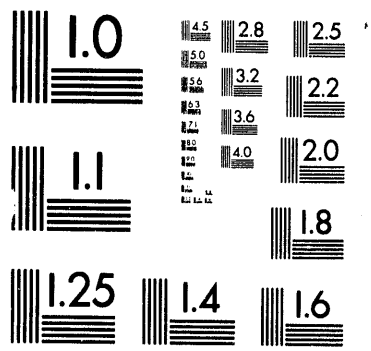
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1 of 1

WSRC-RP-93-890

# U.S. EPA RECORD OF DECISION REVIEW FOR LANDFILLS (U)
# SANITARY LANDFILL (740-G)
# SAVANNAH RIVER SITE



June 1993

Westinghouse Savannah River Company
Savannah River Site
Aiken, South Carolina 29808

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Environmental Restoration Department

# U.S. EPA RECORD OF DECISION REVIEW FOR LANDFILLS (U)
# SANITARY LANDFILL (740-G)
# SAVANNAH RIVER SITE

M. A. Ebra

**M.A. Ebra**
**Authorized Derivative Classifier**

**Westinghouse Savannah River Company**
**Aiken, South Carolina 29802**

## SIGNATURE PAGE

### U.S. EPA Record of Decision Review for Landfills

The attached document was completed under the direction of the Environmental Restoration Program Management Team at the Westinghouse Savannah River Company. We have reviewed the document, and to the best of our knowledge, it is true, accurate, and correct.

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| | |
|---|---|
| ACL | Alternate Concentration Limit |
| CAP | Corrective Action Plan |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| COC | contaminant of concern |
| DOE | U.S. Department of Energy |
| EPA | U.S. Environmental Protection Agency |
| FFA | Federal Facility Agreement |
| MCL | maximum contaminant level |
| NPL | National Priority List |
| OSWER | U.S. EPA Office of Solid Waste and Emergency Response |
| PAHs | polynuclear aromatic hydrocarbons |
| PCB | Polychlorinated Biphenyl |
| PCE | Tetrachloroethylene (perchlorethylene) |
| PMCL | Proposed Maximum Contaminant Level |
| POTWs | Publicly Owned Treatment Works |
| RCRA | Resource Conservation and Recovery Act |
| ROD | Record of Decision |
| RODS | Records of Decision System |
| SCDHEC | South Carolina Department of Health and Environmental Control |
| SCHWMR | South Carolina Hazardous Waste Management Regulations |
| SDWA | Safe Drinking Water Act |
| SRS | Savannah River Site |
| SWMU | Solid Waste Management Unit |
| TCE | Trichloroethylene |
| WSRC | Westinghouse Savannah River Company |

## EXECUTIVE SUMMARY

The Savannah River Site (SRS) is owned and operated by the U.S. Department of Energy (DOE) and has been managed by the Westinghouse Savannah River Company (WSRC) since April 1989, with the mission to produce nuclear materials for national defense. The SRS is an approximately 300 square mile facility located in a rural area along the Savannah River, principally in Aiken and Barnwell Counties, South Carolina. The SRS is approximately 25 miles southeast of Augusta, Georgia, and 20 miles south of Aiken, South Carolina. There is a total resident population of approximately 363,253 persons in the counties immediately surrounding the SRS (Allen, Aiken, and Barnwell Counties in South Carolina, and Burke and Richmond Counties in Georgia) [U.S. Department of Commerce, Census Bureau, 1990].

The SRS Sanitary Landfill is an approximately 70-acre site. It was opened in 1974 as a 32-acre site and received solid waste from a variety of sources, including site construction areas, offices, shops, and the cafeteria. In 1987, as the original area reached its capacity, a 16-acre Northern Expansion and a 22-acre Southern Expansion were added. The Southern Expansion is nearing capacity, and the Northern Expansion will be opened for operation in early 1993.

During the course of its operation, the Sanitary Landfill received rags and wipes used with F-listed solvents. In 1988, the Sanitary Landfill became the subject of a Resource Conservation and Recovery Act (RCRA) Facility Investigation and was designated a RCRA Solid Waste Management Unit (SWMU) due to recurring evidence of RCRA hazardous constituents in the groundwater beneath the site. In December 1989, the SRS was added to the National Priority List (NPL). At the time, the Sanitary Landfill was included in a combined RCRA/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unit list in the Federal Facility Agreement (FFA). As a result of an ongoing RCRA permit investigation, the U.S. Environmental Protection Agency (EPA) removed the Sanitary Landfill from the combined RCRA/CERCLA unit list on August 29, 1991.

The DOE and the South Carolina Department of Health and Environmental Control (SCDHEC) reached a settlement agreement (SW-91-51) in August 1991 outlining the steps that DOE would take to comply with the RCRA regulations. Principally, DOE would close the portions of the landfill containing the solvent rags in compliance with Subpart G (Closure and Post-Closure) of Part 265 (Interim Status Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities) of the South Carolina Hazardous Waste Management Regulations (SCHWMR).

The settlement agreement also states that the DOE shall submit a Post-Closure Part B Permit Application on March 31, 1993, for the portions of the landfill that received the solvent rags. The Post-Closure Part B Permit Application contained an Alternate Concentration Limits (ACLs) demonstration. If, based on the status reports or the final submission of the ACL,

SCDHEC or DOE determine that an ACL is not appropriate, the DOE shall submit a Corrective Action Plan (CAP) on or before March 31, 1994.

This report has been prepared to support the decision making process for remedial technology selection. A review was performed of selected U.S. Environmental Protection Agency (EPA) Record of Decision (ROD) abstracts for landfill sites under the Superfund program. The EPA Record of Decision System (RODS) database of 907 RODs was sorted for RODs containing the word "landfill" in their abstract statement. The EPA sort produced 245 landfill RODs. Abstracts from these RODs were evaluated to identify those landfills with historical use similar to the SRS Sanitary Landfill. A detailed analysis was then performed on the 107 ROD abstracts identified, evaluating them by the following four criteria:

- Site types
- Contaminants of concern
- Remedies selected
- Cleanup goals.

The analysis of the RODs was performed in two ways. First, EPA Region IV RODs were addressed separately to evaluate whether there are any trends specific to EPA Region IV, the EPA region where the SRS Sanitary Landfill is located. Second, all 107 RODs from all 10 EPA Regions were assessed collectively to evaluate nationwide trends in response action selection.

Site Types

Most of the sites were sanitary landfills but very few were limited to sanitary waste only. Some landfills also had solvent recycling and burning operations. Most landfills were unlined, some were in open quarries, river beds, wetlands, and open mine pits. Industrial wastes were accepted at many of the sanitary landfills, and included paint sludge, demolition waste, incinerator ash, sewage sludge, waste oils, drummed wastes, chemical wastes, and fly ash. The three primary landfill site types identified among the 245 ROD abstracts included sanitary waste landfills, sanitary/industrial waste landfills, and industrial waste landfills. This report's analysis was limited to the 107 ROD abstracts for landfills most similar to the SRS Sanitary Landfill in the history of use, primarily sanitary and sanitary/industrial landfills. The EPA Region IV landfills included in the analysis were similar to landfills in the other nine EPA regions.

Contaminants Of Concern

The primary contaminants of concern (COCs) present in the landfills were volatile organic compounds including benzene, toluene, xylenes, trichloroethylene (TCE), and tetrachloroethylene (PCE). Several of the landfills also were contaminated with vinyl

chloride, methylene chloride, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides and dioxins. Many of the sites also had metals' contamination with arsenic, chromium and lead being the most prevalent. No radionuclides were reported as COCs for the 107 landfills in this analysis. There were no differences in the contaminants present in EPA Region IV sites versus nationwide sites.

Remedies Selected

The 16 EPA Region IV RODs were similar to the 107 nationwide RODs in all response action areas. The following general conclusions can be drawn for both EPA Region IV RODs and nationwide landfill RODs:

- No EPA Region IV RODs selected the "No Action" alternative, while two nation-wide RODs selected this remedy.
- Institutional controls were selected as a component to many RODs, however, no EPA Region IV RODs selected institutional controls only as the response action. Nationwide two RODs selected institutional controls only as the response action, both were to provide an alternate supply of drinking water to affected persons.
- Groundwater treatment was selected as a component of the remedial action in 8 (50%) EPA Region IV RODs, and in 60 (56%) nationwide RODs.
- Groundwater containment was selected as a component of the remedial action in 1 (6%) EPA Region IV ROD, and in 10 (9%) nationwide RODs.
- Capping was selected as a component of the remedial action in 12 (75%) EPA Region IV RODs, and in 75 (70%) nationwide RODs.
- Soil treatment was selected as a component of the remedial action in 5 (31%) EPA Region IV RODs, and in 26 (24%) nationwide RODs.
- Leachate treatment was selected as a component of the remedial action in 2 (12%) EPA Region IV RODs, and in 28 (26%) nationwide RODs.
- Gas venting was selected as component of the remedial action in 1 (6%) EPA Region IV ROD, and in 33 (31%) nationwide RODs.

Cleanup Goals

Cleanup goals were not always specified in RODs. Where defined for groundwater, they were primarily equivalent to Maximum Contaminant Levels (MCLs) defined by the Safe Drinking Water Act (SDWA) or more stringent state-specific regulations. Cleanup levels for soils were specified in RODs less frequently than groundwater cleanup levels. Where defined, the soil cleanup levels were based on state cleanup objectives or site-specific health- or risk-based criteria, or comparison to naturally-occurring or background levels for inorganics.

Comparison of ROD Analysis Results to SRS Sanitary Landfill Selected Alternative

The following observations are made comparing the EPA Superfund landfill ROD abstracts analyzed in this report to the SRS Sanitary Landfill selected alternative.

- None of the 245 landfill ROD abstracts were for landfills located in South Carolina, the location of the SRS Sanitary Landfill.

- The analysis was limited to 107 ROD abstracts for sites with historical use similar to the SRS Sanitary Landfill.

- The COCs in the 107 ROD abstracts were similar to SRS Sanitary Landfill COCs for organics and inorganics. However, no radionuclides were reported as COCs for the 107 landfills in this analysis.

- The majority of the 107 ROD abstracts specified capping, groundwater treatment, institutional controls, and no soil/source treatment. These remedial actions are similar to the selected alternative for the SRS Sanitary Landfill.

- Only ex-situ treatment was selected for groundwater in the 107 ROD abstracts reviewed. Less than one percent of the ROD abstracts selected in-situ treatment for soil/source areas.

- MCLs or more stringent state levels were selected for groundwater cleanup goals in the majority of the 107 ROD abstracts reviewed. Soil cleanup goals were typically developed site specifically. Only one ROD abstract specified ACLs for groundwater. Further investigation is required to determine if these ACLs were accepted and used as cleanup goals during the actual remediation.

# 1.0 INTRODUCTION

## 1.1 Purpose and Organization of Report

This report presents the results of a review of the U.S. Environmental Protection Agency (EPA) Record of Decision System (RODS) database search conducted to identify Superfund landfill sites where a Record of Decision (ROD) has been prepared by EPA, the States or the U.S. Army Corps of Engineers describing the selected remedy at the site. ROD abstracts from the database were reviewed to identify site information including site type, contaminants of concern, components of the selected remedy, and cleanup goals. Only RODs from landfill sites were evaluated so that the results of the analysis can be used to support the remedy selection process for the Sanitary Landfill at the Savannah River Site (SRS).

Section 1.0 presents the purpose and organization of the report and brief site background information. Section 2.0 describes the RODS database which is the source of ROD information evaluated in this report. The ROD site selection process is described in Section 3.0. Section 4.0 presents the analysis of the RODs reviewed. A comparison of ROD analysis results to the selected alternative for the SRS Sanitary Landfill is described in Section 5.0. Section 6.0 presents the references used to prepare this report.

## 1.2 Site Background

The Savannah River Site (SRS) is owned and operated by the U.S. Department of Energy (DOE) and has been managed by the Westinghouse Savannah River Company (WSRC) since April 1989, with the mission to produce nuclear materials for national defense. The SRS is an approximately 300 square mile facility located in a rural area along the Savannah River, principally in Aiken and Barnwell Counties, South Carolina. The SRS is approximately 25 miles southeast of Augusta, Georgia, and 20 miles south of Aiken, South Carolina. There is a total resident population of approximately 363,253 persons in the counties immediately surrounding the SRS (Allen, Aiken, and Barnwell Counties in South Carolina, and Burke and Richmond Counties in Georgia) [U.S. Department of Commerce, Census Bureau, 1990].

The SRS Sanitary Landfill is an approximately 70-acre site. It was opened in 1974 as a 32-acre site and received solid waste from a variety of sources, including site construction areas, offices, shops, and the cafeteria. In 1987, as the Main Section reached its capacity, a 16-acre Northern Expansion and a 22-acre Southern Expansion were added. The Southern Expansion is nearing capacity and the Northern Expansion will be opened for operations in early 1993.

During the course of its operation, the Sanitary Landfill received rags and wipes used with F-listed solvents. In 1988, the Sanitary Landfill became the subject of a Resource Conservation and Recovery Act (RCRA) Facility Investigation and was designated a RCRA

Solid Waste Management Unit (SWMU) due to recurring evidence of RCRA hazardous constituents in the groundwater beneath the site. In December 1989, the SRS was added to the National Priority List (NPL). At the time, the Sanitary Landfill was included in a combined RCRA/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unit list in the Federal Facility Agreement (FFA). As a result of an ongoing RCRA permit investigation, EPA removed the Sanitary Landfill from the combined RCRA/CERCLA unit list on August 29, 1991.

The DOE and South Carolina Department of Health and Environmental Control (SCDHEC) reached a settlement agreement (SW-91-51) in August 1991 outlining the steps DOE would take to comply with the RCRA regulations. Principally, DOE would close the portions of the landfill containing the solvent rags in compliance with Subpart G (Closure and Post-Closure) of Part 265 (Interim Status Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities) of the South Carolina Hazardous Waste Management Regulations (SCHWMR).

Pursuant to the settlement agreement, DOE is required to submit a Post-Closure Part B Permit Application on March 31, 1993, for the portions of the landfill that received the solvent rags. The Post-Closure Part B Permit Application contained an Alternate Concentration Limits (ACL) demonstration. If based on the status reports or the final submission of the ACL, SCDHEC or DOE determines that an ACL is not appropriate, then DOE shall submit a Corrective Action Plan (CAP) on or before March 31, 1994.

This report has been prepared to support the preparation of the CAP. A review was performed of the 245 U.S. Environmental Protection Agency (EPA) Record of Decision (ROD) abstracts for landfill sites under the Superfund program. The 245 landfill ROD abstracts were evaluated to identify those landfills with historical use similar to the SRS Sanitary Landfill. This evaluation resulted in the selection of 107 RODs. A detailed analysis was performed on the 107 ROD abstracts evaluating them by the following four criteria:

- Site types
- Contaminants of concern
- Remedies selected
- Cleanup goals.

The COCs at the SRS Sanitary Landfill and the selected alternative for this site are summarized below. These contaminants and response actions were considered in the evaluation of the RODs analyzed in this report. A comparison of the SRS site to the EPA landfill RODs is presented in Section 5.0.

The contaminants detected in the soil and groundwater at the SRS Sanitary Landfill Site are summarized in Table 1-1.

The recommended combined remedial alternative for the SRS Sanitary Landfill groundwater and vadose zone is a phased approach and will include:

- Capping the landfill
- Monitoring the groundwater plume
- Groundwater remediation using in-situ bioremediation and in-situ air stripping/air sparging, combined with soil gas extraction and soil gas treatment with vapor-phase granular activated carbon
- If the groundwater cleanup objectives are not met, the evaluation of the addition of a horizontal well treatment and extraction system in the vadose zone beneath the landfill to control the source
- In-situ bioremediation of the vadose zone beneath the landfill supplemented by soil gas extraction and treatment, if required
- No treatment of the vadose zone above the groundwater plume is recommended at this time. If additional data indicate a source of contamination in this zone, additional treatment will be considered.

## Table 1-1. Contaminants of Concern (Page 1 of 2)

RCRA Organic Constituents

| Constituent | Soil Cmax (μg/kg) | Water Cmax (μg/L) | MCL (μg/L) | TCLP (μg/L) |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | ND | 249 | 200 | - |
| trans 1,2-Dichloroethene | ND | 754 | 100 | - |
| Vinyl Chloride | ND | 400 | 2 | 200 |
| Dichlorodifluoromethane | NA | 94 | - | - |
| Tetrachloroethylene | 87 | 2028 | 5 | 700 |
| Trichloroethylene | 20 | 97 | 5 | 500 |
| Trichlorofluoromethane | NA | 625 | - | - |
| Dichloromethane (Methylene Chloride) | ND | 757 | - | - |
| 1,4-Dichlorobenzene | NA | 99 | 75 | 7,500 |
| Chlorobenzene | ND | 84 | 100 | 100,000 |
| Benzene | ND | 21 | 5 | 500 |
| Ethylbenzene | 70 | 230 | 700 | - |
| Xylenes | 240 | 248 | 10,000 | - |

## Table 1-1. Contaminants of Concern (Page 2 of 2)

RCRA Inorganic Constituents

| Constituent | Soil Cmax (mg/kg) | Water Cmax (mg/L) | MCL (mg/L) | TCLP (mg/L) |
|---|---|---|---|---|
| Arsenic | ND | 0.050 | 0.05 | 5 |
| Lead | 6930 | 0.091 | 0.05 | 5 |

Non-RCRA Constituents

| Constituent | Soil Cmax (mg/kg) | Water Cmax (mg/L) | MCL (mg/L) |
|---|---|---|---|
| Tritium | UA | 101 pCi/mL | 20 pCi/mL |

NA Not Analyzed
ND Not Detected
UA Unavailable (laboratory has not delivered results)
MCL Maximum Contaminant Level
TCLP Toxicity Characteristic Leaching Procedure
Cmax maximum concentration

## 2.0 RODS DATABASE SYSTEM

The U.S. EPA RODS database was used to provide information on Superfund landfill sites. Sites with RODs signed from 1984 to September 1991 are currently available in the database. The RODS database is created by the U.S. EPA Office of Solid Waste and Emergency Response (OSWER), and contains 907 RODs for Superfund sites nationwide. The abstracts in the RODS database were accessed to provide information on site type, contaminants of concern (COCs), components of the selected remedy, and performance standards or goals.

## 3.0 ROD SELECTION

The RODS database abstracts were searched by EPA for the key word "landfill". Of the 907 RODS in the database, a total of 245 sites were identified as being associated with landfills (see Appendix A). Many of the sites initially identified were not landfills but were identified because the word "landfill" was present within the RODS abstract text (e.g., disposal in offsite landfill). These sites were therefore excluded from further evaluation.

In addition, sites where landfills were present onsite at manufacturing facilities for the disposal of manufacturing process wastes were clearly different from the SRS Sanitary Landfill and were screened from further analysis. Appendix A lists the 245 RODs that were identified from the RODS database as well as the reason for excluding sites from further evaluation based upon the requirement that the site be similar to the SRS Sanitary Landfill. Note that in a few cases, the same site had more than one ROD, typically for different operable units with different ROD dates (e.g., Auburn Road Landfill, NH - OU-1 ROD dated 09/17/86 and OU-2/OU-3 ROD dated 09/29/89). None of the 245 RODs identified were in the State of South Carolina.

Of the 245 RODs initially identified, 107 were identified as landfills with historical use similar to the SRS Sanitary Landfill. These sites were either sanitary landfills, landfills that primarily accepted municipal waste and to a lesser extent industrial or hazardous waste, or industrial waste landfills. Appendix B presents a detailed summary of the 16 landfill RODs identified in EPA Region IV. The 91 RODs from the other nine EPA regions are summarized in Appendix C.

## 4.0 RODS ANALYSIS

The information from the ROD was evaluated according to site type, contaminants of concern, components of selected remedy, and cleanup goals as described below.

### 4.1 Site Types

Most of the sites were sanitary landfills but very few were limited to sanitary waste only. Some landfills also had solvent recycling and burning operations. Most landfills were unlined, some landfills were in open quarries, river beds, wetlands, and open mine pits. Industrial wastes accepted at many of the landfills included paint sludge, demolition waste, incinerator ash, sewage sludge, waste oils, drummed wastes, chemical wastes, and fly ash.

Three specific types of landfill sites were identified. These include sanitary waste landfills, industrial waste landfills, and sanitary/industrial waste landfills. Industrial waste landfills are landfills that accepted only industrial waste, sanitary waste landfills are reported to accept only sanitary waste, and sanitary/industrial waste landfills accepted both wastes. It should be noted that while some of the sites are listed as sanitary waste landfills, it is likely that undocumented industrial or hazardous wastes were disposed which led to soil and/or groundwater contamination and subsequently listing of the landfill as a Superfund site. A total of 8 sites were identified as industrial landfills, 7 were identified as sanitary landfills, and 92 were identified as sanitary/industrial landfills.

### 4.2 Contaminants Of Concern

The primary COCs present in the landfills were volatile organic compounds including benzene, toluene, xylenes, trichloroethylene (TCE), and tetrachloroethylene (PCE). Several of the landfills also were contaminated with vinyl chloride, methylene chloride, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides and dioxins. Many of the sites also had metals contamination with arsenic, chromium and lead being the most prevalent. No radionuclides were reported as COCs for the 107 landfills in this analysis. There were no differences in the contaminants present in EPA Region IV sites versus nationwide sites.

### 4.3 Components of Selected Remedy

Remedies selected in the 107 RODs ranged from no action to complete remediation consisting of capping of the landfill with treatment of soil/source materials and collection and treatment of leachate and groundwater. However, this latter comprehensive response was seldom selected. The selected response actions were analyzed in two ways. First, the 16 EPA Region IV RODs described in Appendix B were assessed separately to evaluate whether there were any trends specific to EPA Region IV, the EPA region where the SRS Sanitary Landfill is located. Second, the 107 RODs from all 10 EPA regions described in Appendices

B and C were assessed collectively to evaluate nationwide trends in response action selection. Table 4-1 presents the results of this analysis of response actions, both for relevant EPA Region IV and nationwide RODs. The number of RODs where a particular response action was selected and the percentage of the total number of EPA Region IV RODs or nationwide RODs are presented in Table 4-1.

As shown in Table 4-1, for EPA Region IV, no RODs specified no action or institutional controls only as the remedy. Twelve RODs specified capping as a component of the response action, with the following components selected in fewer cases: gas venting, capping, soil/source treatment, leachate treatment, groundwater treatment, and groundwater containment.

Two of the 107 nationwide RODs specified no action as the remedy. Two others specified institutional controls only as the remedy. Seventy-five of the RODs specified capping as a component of the response action, 60 selected groundwater treatment, and the following components were selected in fewer cases: gas venting, capping, soil/source treatment, leachate treatment, and groundwater containment.

A detailed breakdown of the types of containment, collection, treatment and discharge actions selected in both the 16 Region IV RODs and the 107 nationwide RODs as well as their frequency of occurrence is presented in Table 4-2. Note that for treatment technologies, some sites utilized treatment trains and, therefore, the total number of treatment technologies for each medium listed is greater than the total number of RODs that specified treatment as presented in Table 4-1 (e.g., 30 different types of soil/source treatment technologies are identified in the RODs while only 26 RODs specify soil/source treatment as a component of the remedy). Also note that not all of the RODs which identified gas venting also included treatment of the vented gas.

As indicated in Table 4-2, the treatment and containment technologies most often used in EPA Region IV were: RCRA caps and unspecified caps; dewatering and solidification/ stabilization for soil/source treatment; unspecified methods for leachate and groundwater collection; unspecified methods for the 25 percent of RODs selecting leachate treatment; air stripping for the 50 percent of RODs selecting groundwater treatment; and discharge to surface water for groundwater/leachate discharge.

Table 4-2 also indicates that the technologies most used for the 107 nationwide RODs included: flaring for gas treatment; RCRA caps and unspecified caps for containment; incineration for the 24 percent of RODs selecting soil/source treatment; unspecified methods for leachate collection and groundwater collection; pump and treat systems consisting of air stripping, carbon adsorption, and metals precipitation/sedimentation for the 56 percent of RODs selecting groundwater treatment; unspecified methods for the 26 percent of RODs selecting leachate treatment; and discharge to surface water for groundwater/leachate discharge. Note that many of the RODs provided a choice of discharge methods such as

surface water, infiltration basin or reinjection to the aquifer. In these instances, the technique that was stated first was chosen for this analysis.

In addition to the treatment and containment actions described previously, many RODs specified monitoring and institutional controls as components to the response action. Table 4-3 summarizes these selected actions for EPA Region IV RODs and landfill RODs in all regions.

## 4.4 Cleanup Goals

The cleanup goals specified in the Summarization of Records of Decision Related to Landfills (Appendices B and C) can be arranged into two media-specific groups - groundwater and soils.

Cleanup goals for groundwater identified in RODs are predominantly based on the federally-mandated Maximum Contaminant Levels (MCLs) or Proposed Maximum Contaminant Levels (PMCLs) as stated in the Safe Drinking Water Act (SDWA). For states in which the cleanup goals are more stringent (i.e., lower) than the MCLs, the state regulatory requirements were adopted as the site-specific cleanup goals. For example, in EPA Region IV, the State of Florida's regulatory limit for benzene in groundwater is 1 $\mu$g/L which is more restrictive than the SDWA MCL of 5 $\mu$g/L. If state or federal regulatory limits are not established, cleanup goals in RODs are typically calculated from health-based criteria such as a total carcinogenic risk level of $1 \times 10^{-6}$.

Only one ROD abstract specified ACLs for groundwater, because the groundwater in the vicinity of that landfill was not a current or projected future drinking water source. Further investigation is required to determine if these ACLs were accepted by the state.

Cleanup goals for soils and/or sediments are less clearly defined in the 107 landfill ROD abstracts reviewed in this analysis. State cleanup objectives, such as the ones developed by the New Jersey Department of Environmental Quality, are used when available. Other cleanup requirements specified for soil in ROD abstracts include health or risk-based criteria or comparison to naturally-occurring or background levels for inorganics in the vicinity of that landfill.

## Table 4-1. Summary of Selected Response Actions

| | EPA Region IV (16 sites) | | All EPA Regions (107 sites) | |
|---|---|---|---|---|
| | Number of Sites | Percentage of Sites | Number of Sites | Percentage of Sites |
| No Action | 0 | 0% | 2 | 2% |
| Institutional Controls Only | 0 | 0% | 2 | 2% |
| Gas Venting | 1 | 6% | 33 | 31% |
| Capping | 12 | 75% | 75 | 70% |
| Soil/Source Treatment | 5 | 31% | 26 | 24% |
| Leachate Treatment | 2 | 12% | 28 | 26% |
| Groundwater Containment | 1 | 6% | 10 | 9% |
| Groundwater Treatment | 8 | 50% | 60 | 56% |

NOTE: No action and institutional controls are isolated responses; they do not contain any other types of response options. The other response options are not isolated, and therefore generally occur in RODs together with other response options.

**Table 4-2. Summary of Selected Treatment and Containment Actions (Page 1 of 3)**

| | EPA Region IV (16 sites) | | All EPA Regions (107 sites) | |
|---|---|---|---|---|
| | Number of sites | Percentage of sites | Number of sites | Percentage of sites |
| Gas venting | 3 | 19% | 33 | 31% |
| Gas treatment: | | | | |
| Carbon adsorption | 0 | 0% | 1 | <1% |
| Flaring | 0 | 0% | 5 | 5% |
| Incineration | 0 | 0% | 3 | 3% |
| Containment: | | | | |
| Clay cap | 1 | 6% | 7 | 7% |
| RCRA cap (Subtitle C) | 4 | 25% | 31 | 29% |
| Sanitary cap (Subtitle D) | 1 | 6% | 5 | 5% |
| Synthetic cap | 1 | 6% | 3 | 3% |
| Unspecified cap | 4 | 25% | 28 | 26% |
| Slope stabilization | 0 | 0% | 5 | 5% |
| Slurry Walls | 0 | 0% | 7 | 7% |
| Soil/source excavation and offsite disposal | 1 | 6% | 10 | 9% |
| Soil/source excavation and consolidation in landfill | 5 | 31% | 14 | 13% |
| Soil/source treatment: | | | | |
| Aeration | 1 | 6% | 1 | <1% |
| Bioremediation | 0 | 0% | 1 | <1% |
| Dechlorination | 0 | 0% | 1 | <1% |
| Dewatering | 3 | 19% | 5 | 5% |
| Incineration | 1 | 6% | 9 | 8% |
| In-situ bioremediation | 0 | 0% | 1 | <1% |
| In-situ stabilization | 0 | 0% | 3 | 3% |
| In-situ vapor stripping (air sparging) | 0 | 0% | 1 | <1% |
| In-situ vitrification | 0 | 0% | 1 | <1% |
| Low temperature thermal desorption | 0 | 0% | 1 | <1% |
| Solidification/stabilization | 3 | 19% | 6 | 6% |

**Table 4-2. Summary of Selected Treatment and Containment Actions (Page 2 of 3)**

| | EPA Region IV (16 sites) | | All EPA Regions (107 sites) | |
|---|---|---|---|---|
| | Number of sites | Percentage of sites | Number of sites | Percentage of sites |
| Leachate collection: | | | | |
| Extraction wells | 0 | 0% | 2 | 2% |
| Trench | 0 | 0% | 2 | 2% |
| Unspecified | 4 | 25% | 24 | 22% |
| Leachate treatment: | | | | |
| Biological | 0 | 0% | 1 | <1% |
| Incineration | 0 | 0% | 2 | 2% |
| POTW | 0 | 0% | 5 | 5% |
| Unspecified | 4 | 25% | 20 | 19% |
| Groundwater collection: | | | | |
| Extraction wells | 1 | 6% | 11 | 10% |
| Trench | 0 | 0% | 7 | 7% |
| Unspecified | 6 | 38% | 42 | 39% |
| Groundwater treatment: | | | | |
| Aeration | 0 | 0% | 3 | 3% |
| Air stripping | 4 | 25% | 21 | 20% |
| Biological treatment | 2 | 12% | 7 | 7% |
| Carbon adsorption | 1 | 6% | 18 | 17% |
| Constructed wetlands | 0 | 0% | 1 | <1% |
| Ion exchange | 0 | 0% | 1 | <1% |
| Membrane microfiltration | 0 | 0% | 1 | <1% |
| Metals precipitation/ sedimentation | 1 | 6% | 21 | 20% |
| Oxidation | 0 | 0% | 4 | 4% |
| POTW | 2 | 12% | 2 | 2% |
| Wellhead/point-of-use carbon adsorption | 1 | 6% | 2 | 2% |
| Unspecified | 0 | 0% | 13 | 12% |

**Table 4-2. Summary of Selected Treatment and Containment Actions (Page 3 of 3)**

| | EPA Region IV (16 sites) | | All EPA Regions (107 sites) | |
|---|---|---|---|---|
| | Number of Sites | Percentage of Sites | Number of Sites | Percentage of Sites |
| Groundwater/leachate discharge: | | | | |
| Infiltration basin | 1 | 6% | 4 | 4% |
| Injection wells | 0 | 0% | 6 | 6% |
| Surface water | 3 | 19% | 25 | 23% |
| POTW | 1 | 6% | 5 | 5% |
| Trench | 1 | 6% | 3 | 3% |
| Unspecified | 1 | 6% | 17 | 16% |

## Table 4-3. Summary of Selected Monitoring and Institutional Control Actions

| | Region IV | | All Regions | |
|---|---|---|---|---|
| | **Number** | **Percentage** | **Number** | **Percentage** |
| Monitoring | 10 | 62% | 74 | 69% |
| Institutional Controls | | | | |
| Deed Restrictions | 6 | 38% | 38 | 36% |
| Site Access Restrictions | 5 | 31% | 48 | 45% |
| Groundwater Use Restrictions | 6 | 38% | 26 | 24% |
| Land Use Restrictions | 2 | 12% | 9 | 8% |
| Alternate Water Supply | 2 | 12% | 13 | 12% |

# 5.0 COMPARISON OF ROD ANALYSIS RESULTS TO SRS SANITARY LANDFILL SELECTED ALTERNATIVE

The following observations are made comparing the ROD analysis to the SRS Sanitary Landfill Selected Alternative (described in Section 1.0):

1. The 107 ROD abstracts included in the detailed analysis identified historical landfill use similar to the Sanitary Landfill at SRS. ROD abstracts for predominantly industrial hazardous waste landfills or non-landfill sites were excluded from the analysis.

2. None of the 245 landfill ROD abstracts were located in South Carolina, the location of the SRS Sanitary Landfill.

3. The COCs at landfill sites were similar to those compounds found in the SRS Sanitary Landfill groundwater including volatile organic compounds. Lead, present at the SRS Sanitary Landfill, was also prevalent at many of the 107 landfills in this analysis. Levels of tritium or other radionuclides were not reported in any of the 107 ROD abstracts.

4. The majority of the landfills in the ROD abstract analysis specified capping, groundwater treatment and institutional controls, but no source treatment. This is similar to the capping and groundwater treatment response actions selected for the SRS Sanitary Landfill, with phased vadose zone (source) treatment to be implemented only if groundwater treatment is ineffective in remediating the plume.

5. Only ex-situ technologies were selected for groundwater treatment at the 107 ROD abstract landfills. In EPA Region IV the most prevalent technology was air stripping. Nationwide, air stripping, carbon adsorption, and metals precipitation/sedimentation were most prevalent. However, for the SRS Sanitary Landfill, more cost effective and innovative, solutions were sought out resulting in the selection of in-situ bioremediation supplemented by air stripping and air sparging. This response action was not specified in the ROD abstracts reviewed.

6. In the few cases where soil/source treatment was selected in the ROD abstracts reviewed, dewatering and solidification/stabilization were most prevalent in EPA Region IV. Incineration was most prevalent nationwide. In accordance with the approach used to select the groundwater response (See Item #5), cost-effective and innovative solutions were sought for the SRS Sanitary Landfill's vadose zone. The in-situ bioremediation of the vadose zone supplemented by air stripping and air sparging selected for the SRS Sanitary Landfill was in contrast to the conventional response actions specified in the ROD abstracts reviewed.

7. MCLs or more stringent state levels were consistently specified for groundwater in the ROD abstracts reviewed. Only one ROD abstract specified ACLs.

## 6.0 REFERENCES

RODS Database Search, April 28, 1993

Westinghouse Savannah River Company, 1993a, *Draft 1992 RCRA Part B Permit Application (U)*, SRS, Volume XXIII, Book 1 of 6, "Sanitary Landfill Postclosure", Westinghouse Savannah River Company, Aiken, SC

Westinghouse Savannah River Company, 1993b, *Vadose Zone Remediation Technology Selection Report (U)*, SRS, Westinghouse Savannah River Company, Aiken, SC

Westinghouse Savannah River Company, 1993c, *Draft Groundwater and Vadose Zone Combined Alternative Selection Report (U)*, SRS, Westinghouse Savannah River Company, Aiken, SC

U.S. Department of Commerce, Census Bureau, 1990

# Appendix A. List of Records of Decision Reviewed

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 1 | Auburn Road Landfill | Londonderry, NH | 09/17/86 | * |
| 1 | Auburn Road Landfill | Londonderry, NH | 09/29/89 | * |
| 1 | Beacon Heights Landfill | Beacon Falls, CT | 09/28/90 | * |
| 1 | Charles George Landfill | Tyngsborough, MA | 07/11/85 | * |
| 1 | Charles George Land Reclamation Landfill #3 | Tyngborough, MA | 09/29/88 | * |
| 1 | Coakley Landfill | Greenland, NH | 06/28/90 | * |
| 1 | Davis Liquid Waste | Smithfield, RI | 09/29/87 | Lagoons and pits for disposing solvents |
| 1 | Dover Municiple Landfill | Dover, NH | 09/10/91 | * |
| 1 | Groveland Wells 1 & 2 | Groveland, MA | 09/30/88 | Disposal of solvents into an underground leach field |
| 1 | Hocomonco Pond | Westborough, MA | 09/30/85 | Wood treating facility with onsite lagoons |
| 1 | Iron Horse Park | Billerica, MA | 09/15/88 | Industrial and sanitary wastewater lagoons |
| 1 | Iron Horse Park | Billerica, MA | 06/27/91 | * |
| 1 | Kearsarge Metallurgical Corporation | Conway, NH | 09/28/90 | Process waste disposed of in septic system and waste piles |
| 1 | Landfill and Resource Recovery | North Smithfield, RI | 09/29/88 | * |
| 1 | Laurel Park Inc. | Naugatuck, CT | 06/30/88 | * |
| 1 | Old Springfield Landfill | Springfield, VT | 09/22/88 | * |
| 1 | Old Springfield Landfill | Springfield, VT | 09/28/90 | * |
| 1 | Saco Tannery Waste Pits | Saco, ME | 09/27/89 | Disposal of process waste into lagoons and small pits |
| 1 | Stamina Mills, Inc. | North Smithfield, RI | 09/28/90 | Process waste were placed in onsite landfill |
| 1 | Union Chemical Company, Inc. | South Hope, ME | 12/27/90 | Paint stripping solvent manufacturing and recycling |
| 1 | W. R. Grace & Co., Inc | Acton, MA | 09/29/89 | Disposal of process effluent to lagoons and industrial landfill |
| 1 | Yaworski Waste Lagoon | Cantebury, CT | 09/29/88 | Chemical waste disposal lagoon |

* Site included in ROD summarization

# Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 2 | Burnt Fly Bog | Marlboro Township, NJ | 09/29/88 | Oil waste lagoons and sanitary landfill |
| 2 | Ciba-Geigy Corp | Toms River, NJ | 04/24/89 | Landfilling of wastewater treatment plant sludges |
| 2 | Clothier Disposal | Granby, NY | 12/28/88 | Disposal of drums of chemical waste |
| 2 | Colesville Municiple Landfill | Colesville, NY | 03/29/91 | * |
| 2 | Combe Fill South | Chester Township, NJ | 09/29/86 | * |
| 2 | Endicott Village Well Field | Endicott, NY | 09/25/87 | City well contained VOCs possibly from nearby landfill |
| 2 | Fibers Public Supply Wells | Jobos, PR | 09/30/91 | Process wastewater discharged to settling ponds |
| 2 | General Motors/Central Foundry Div. | Massena, NY | 12/17/90 | Process wastewaste containing PCBs discharged to lagoons |
| 2 | Global Landfill | Old Bridge, NJ | 09/11/91 | * |
| 2 | Helen Kramer | Mantua Township, NJ | 09/27/85 | * |
| 2 | Hertel Landfill | Plattekill, NY | 09/27/91 | * |
| 2 | Hooker - 102ND Street | Niagara Falls, NY | 09/26/90 | Landfilling of industrial and chemical process waste |
| 2 | Hooker Chemical/Ruco Polymer | Hicksville, NY | 09/28/90 | Process wastewater discharged to groundwater recharge basins |
| 2 | Hyde Park | Niagara Falls, NY | 11/26/85 | * |
| 2 | Imperial Oil Company Inc/Champion Chemicals | Morganville, NJ | 09/27/90 | Oil reclamation facility |
| 2 | Kin-Buc Landfill | Edison, NJ | 09/30/88 | * |
| 2 | Lang Property | Pemberton Township, NY | 09/29/86 | Clearing with unauthorized dumping of hazardous wastes |
| 2 | Lipari Landfill | Pitman, NJ | 09/30/85 | * |
| 2 | Lipari Landfill | Pitman, NJ | 07/11/88 | * |
| 2 | Lone Pine Landfill | Freehold, NJ | 09/28/84 | * |
| 2 | Lone Pine Landfill | Freehold, NJ | 09/28/90 | * |

* Site included in ROD summarization

# Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 2 | Love Canal | Niagara Falls, NY | 05/06/85 | * |
| 2 | Ludlow Sand and Gravel | Clayville, NY | 09/30/88 | * |
| 2 | M & T Delisa Landfill | Ocean Township, NJ | 09/20/90 | * |
| 2 | Mannheim Ave. Dump | Galloway Township, NJ | 09/27/90 | Waste buried under mounds |
| 2 | Metaltec/Aerosystems | Franklin Boro, NJ | 06/30/86 | Lagoons for metal manufacture |
| 2 | Myers Property | Franklin Township, NJ | 09/28/90 | Surface soil contamination from pesticide manufacturing |
| 2 | North Sea Municiple Landfill | North Sea, NY | 09/29/89 | * |
| 2 | Old Bethpage Landfill | Oyster Bay, NY | 03/17/88 | * |
| 2 | Port Washington Landfill | Port Washington, NY | 09/30/89 | * |
| 2 | Radium Chemical Company | Woodside, NY | 06/21/90 | Radium 226 production |
| 2 | Renora Inc. | Edison, NJ | 09/29/87 | Waste oil blending and tranfer site |
| 2 | Ringwood Mines | Ringwood, NJ | 09/29/88 | Waste automobile manufacturing products and limited sanitary landfill operations |
| 2 | Roebling Steel Co. | Roebling, NJ | 09/26/91 | Various containers of hazardous materials and sludge lagoons |
| 2 | Sarney Farm | Amenia, NY | 09/27/90 | * |
| 2 | Sharkey Landfill | Parsippany/Troy Hills, NJ | 09/29/86 | * |
| 2 | Sinclair Refinery | Wellsville, NY | 09/30/85 | * |
| 2 | Sinclair Refinery | Wellsville, NY | 09/30/91 | Refinery waste landfilled in drums |
| 2 | Vineland State School | Vineland, NJ | 09/30/89 | * |
| 2 | Volney Landfill | Volney, NY | 07/31/87 | * |
| 2 | Warwick Landfill | Warwick, NY | 06/27/91 | * |
| 3 | Alladin Plating | Clarks Summit, PA | 09/27/88 | Discharge of electroplating waste to shallow lagoon |
| 3 | Avtex Fibers Site | Front Royal, VA | 09/28/90 | Process waste to unlined landfills or impoundments |

* Site included in ROD summarization

# Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 3 | Bloscnski Landfill | Wagontown, PA | 09/29/86 | * |
| 3 | C & R Battery Co, Inc. | Richmond, VA | 03/30/90 | Former battery sawing and shredding facility |
| 3 | Craig Farm Drum | Parker, PA | 09/29/89 | Strip mine pits used to dispose of drums of Resorcinol/polymers |
| 3 | Delta Quarries/Stotler Landfill | Antis and Logan Twps, PA | 03/29/91 | * |
| 3 | Dorney Road Site | Mertztown, PA | 09/30/91 | * |
| 3 | Dover Air Force Base | Dover, DE | 09/28/90 | Industrial waste disposed of in landfills, pits, and ditches |
| 3 | Drake Chemical Site | Lock Haven, PA | 09/29/88 | Chemical Manufacturing facility operating disposal lagoons |
| 3 | Greenwood Chemical Company | Greenwood, VA | 12/31/90 | Buried drum area and seven former treatment lagoons |
| 3 | Heleva Landfill | Coplay (Ironton Village), PA | 09/30/91 | * |
| 3 | Henderson Road Site | Upper Merion, PA | 09/29/89 | * |
| 3 | Keystone Sanitation Landfill | Hanover, PA | 09/30/90 | * |
| 3 | Limestone Road | Cumberland, MD | 09/30/86 | * |
| 3 | Lord Shope Landfill | Girard, PA | 06/29/90 | * |
| 3 | Middletown Air Field | Middletown, PA | 12/17/91 | Various waste disposal sites from industrial processes |
| 3 | Millcreek Dump | Erie, PA | 05/07/86 | * |
| 3 | MW Manufacturing | Valley Township, PA | 06/29/90 | Copper recovery process from large piles of fluff |
| 3 | Old City of York Landfill | Seven Valleys, PA | 09/30/91 | * |
| 3 | Ordnance Works Disposal Areas | Morgantown, WV | 03/31/88 | * |
| 3 | Ordnance Works Disposal Areas | Morgantown, WV | 09/29/89 | * |
| 3 | Osborne Landfill | Grove City, PA | 09/28/90 | * |
| 3 | Sand, Gravel, and Stone Site | Elkton, MD | 09/28/90 | Hazardous waste disposal in old quarry |

* Site included in ROD summarization

# Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 3 | Taylor Borough | Taylor, PA | 06/28/85 | Coal mining pits used for industrial waste |
| 3 | USA Letterkenny - Southeast Area | Chambersburg, PA | 08/02/91 | Various pits, trenches, and landfills for hazardous waste |
| 3 | Welsh Landfill | Honeybrook, PA | 06/29/90 | * |
| 3 | William Dick Lagoons | W Caln Twp., PA | 06/28/91 | Discharging water from cleaning tanker trucks into lagoons |
| 4 | 62ND Street Dump | Tampa, FL | 06/27/90 | * |
| 4 | Airco Carbide Inc./Div Airco Inc. | Calvert City, KY | 06/24/88 | * |
| 4 | American Creosote Works | Pensacola, FL | 09/30/85 | Wood treating facility with onsite lagoons |
| 4 | American Creosote Works, Inc. | Pensacola, FL | 09/28/89 | Wood preserving facility with surface impoundments |
| 4 | Anniston Army Depot | Bynum, AL | 09/26/91 | Industrial waste in landfills, pits, trenches, and lagoons |
| 4 | Biscayne Aquifer | Dade County, FL | 09/16/85 | Aquifer contaminated from several sources |
| 4 | Cape Fear Wood Preserving | Fayetteville, NC | 06/30/89 | Discharge of wood preserving waste to an unlined lagoon |
| 4 | Carolina Transformer | Fayetteville, NC | 08/29/91 | PCB contamination due to transformer maintainance |
| 4 | Celanese Fibers Operations Site | Shelby, NC | 03/23/88 | Disposal of waste used to manufacture polyester fiber |
| 4 | Chemtronics Inc | Swannanda, NC | 04/05/88 | Disposal of waste in burning pits or trenches |
| 4 | Chemtronics, Inc | Swannanda, NC | 04/26/89 | Disposal of chemical waste in trenches and burn pits |
| 4 | City Industries | Orlando, FL | 03/29/90 | Hazardous waste recycling and transfer facility |
| 4 | Coleman Evans | Jacksonville, FL | 09/25/86 | Wood treating facility with onsite lagoons |
| 4 | Coleman-Evans Wood Preserving Site | Jacksonville, FL | 09/26/90 | Wood treatment facility with process waste to unlined pits |
| 4 | Davie Landfill | Dania, FL | 09/30/85 | * |

* Site included in ROD summarization

# Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 4 | Distler Farm | Louisville, KY | 08/19/86 | Fields with unregulated disposal of drummed wastes |
| 4 | Goodrich B. F. Chemical Group | Calvert City, KY | 06/24/88 | * |
| 4 | Hercules Inc 009 LDFL | Brunswick, GA | 06/27/91 | Landfilling of pesticide waste and settling pond storage |
| 4 | Hipps Road | Jacksonville, FL | 09/03/86 | * |
| 4 | Hipps Road Landfill | Jacksonville, FL | 09/21/90 | * |
| 4 | Home Valley Landfill | Home Valley, KY | 09/28/90 | * |
| 4 | Interstate Lead Company | Leeds, AL | 09/30/91 | Disposal of furnace slag from smelting to refine lead |
| 4 | Jadco-Hughes | Belmont, NC | 09/27/90 | Solvent reclamation and storage facility |
| 4 | Kassouf-Kimerling Battery Disposal | Tampa, FL | 03/31/89 | Battery Casing Landfill |
| 4 | Kassouf-Kimerling Battery Disposal | Tampa, FL | 03/30/90 | Battery casing disposal in excavated areas |
| 4 | Lewisburg Dump | Lewisburg, TN | 09/19/90 | * |
| 4 | Martin Marietta-Sodyeco Division | Charlotte, NC | 09/24/87 | * |
| 4 | Munisport Landfill | North Miami, FL | 07/26/90 | * |
| 4 | Newport Dump | Wilders, KY | 03/27/87 | * |
| 4 | North Hollywood Dump | Memphis, TN | 09/13/90 | * |
| 4 | Pickettville Road Landfill | Jacksonville, FL | 09/28/90 | * |
| 4 | Powersville Landfill | Powersville, GA | 09/30/87 | * |
| 4 | Sapp Battery | Alford, FL | 09/26/86 | Battery recycling plant |
| 4 | Sherwood Medical Industries | Deland, FL | 03/27/91 | Disposal of waste into percolation ponds |
| 4 | Smith's Farm Brooks | Shepeardsville, KY | 09/29/89 | * |
| 4 | Smith's Farm Brooks | Shepeardsville, KY | 09/30/91 | ROD addresses unpermitted disposal of drums |
| 4 | Stauffer Chemical Co Cold Creek Site | Bucks, AL | 09/27/89 | Disposal of plant waste in two landfills and a lagoon |

* Site included in ROD summarization

# Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 4 | Stauffer Chemical Co Axis Plant | Le Moyne, AL | 09/27/89 | Chemical plant process waste disposed of in unlined landfill |
| 4 | Tri-City Industrial Disposal | Brooks, KY | 08/28/91 | * |
| 4 | US DOE Oak Ridge Reservation | Oak Ridge, TN | 06/28/91 | Debris from the Decommissioned Wood River Junction facility |
| 4 | Zellwood Groundwater Contamination Site | Zellwood, FL | 03/01/90 | Drum cleaning process with wastewater discharged to ponds |
| 5 | Acme Solvents | Winnebego, IL | 09/27/85 | Lagoons and Pits for disposing of solvents |
| 5 | Acme Solvent Reclaiming Inc. | Winnebago, IL | 12/31/90 | Waste dumped into depressions onsite created by quarrying |
| 5 | Arcanum Iron | Arcanum, OH | 09/26/86 | Lead battery reprocessing plant |
| 5 | Belvidere, IL | Belvidere, IL | 06/29/88 | * |
| 5 | Berlin & Farro | Swartz Creek, MI | 02/29/84 | Lagoon storage of solvents and buried drums of solid waste |
| 5 | Big D Campground | Kingsville, OH | 09/29/89 | Disposal of drums of hazardous waste in an old sand quarry |
| 5 | Bofors Nobel Inc. | Muskegon, MI | 09/17/90 | Chemical production waste discharges to lagoons |
| 5 | Buckeye Reclamation | St Clairsville, OH | 08/19/91 | * |
| 5 | Byron Johnson Salvage | Byron, IL | 03/13/85 | * |
| 5 | Carter Industrials, Inc. | Detroit, MI | 09/18/91 | Spillage of dielectric fluid containing PCBs onto soil |
| 5 | Enviro-Chem Corp | Zionsville, IN | 09/25/87 | * |
| 5 | Enviro-Chem Corp | Zionsville, IN | 06/07/91 | Facility is a former waste recovery/reclamation/brokerage |
| 5 | Folkertsma Refuse | Grand Rapids, MI | 06/28/91 | * |
| 5 | Forest Waste Disposal | Otisville, MI | 03/31/88 | * |
| 5 | Forest Waste Products | Otisville, MI | 06/30/86 | * |
| 5 | Fort Wayne Reduction | Fort Wayne, IN | 08/26/88 | * |
| 5 | Fultz Landfill | Byesville, OH | 09/30/91 | * |
| 5 | Hunts Disposal | Caledonia, WI | 09/29/90 | * |

* Site included in ROD summarization

# Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 5 | Industrial Excess Landfill | Uniontown, OH | 09/30/87 | * |
| 5 | Industrial Excess Landfill | Uniontown, OH | 07/17/89 | * |
| 5 | Ionia City Landfill | Ionia, MI | 09/29/89 | * |
| 5 | Janesville Old Landfill | Janesville, WI | 12/29/89 | * |
| 5 | Janesville Ash Beds | Janesville, WI | 12/29/89 | Industrial liquids deposited on ash beds to evaporate |
| 5 | K & L Landfill | Kalamazoo, MI | 09/28/90 | * |
| 5 | Kentwood Landfill | Kentwood, MI | 03/29/91 | * |
| 5 | Koppers Co/Galesburg | Galesburg, IL | 06/28/89 | Wood Preservation Facility |
| 5 | Kummer Sanitary Landfill | Northern Township, MN | 09/29/90 | * |
| 5 | Laskin/Poplar Oil | Jefferson, OH | 06/29/89 | Disposal of waste oil in boilers to heat greenhouses |
| 5 | Lemberger Landfill Inc. | Whitelaw, WI | 09/23/91 | * |
| 5 | Lemberger Transport & Recycling Inc. | Franklin Township, WI | 09/23/91 | Disposal of waste into unlined trenches |
| 5 | Liquid Disposal | Utica, MI | 09/30/87 | Commercial incinerator of hazardous waste |
| 5 | Mason County Landfill | Pere Marquette Township, MI | 09/28/88 | * |
| 5 | Master DSPL Service LDFL | Brookfield, WI | 09/26/90 | Landfilling of foundry sands with industrial waste |
| 5 | Metamora Landfill | Metamora, MI | 09/30/86 | * |
| 5 | Metamora Landfill | Metamora, MI | 09/28/90 | * |
| 5 | Miami County Incinerator | Troy, OH | 06/30/89 | Dumping of liquid waste and landfilling incinerator ash |
| 5 | Michigan Disposal Service | Kalamazoo, MI | 09/30/91 | * |
| 5 | Midco I Site | Gary, IN | 06/30/89 | Stockpiling drums of liqiud hazardous waste |
| 5 | Midco II | Gary, IN | 06/30/89 | Disposal of liquid waste into onsite pits |
| 5 | Midstate Disposal Landfill | Cleveland Township, WI | 09/30/88 | * |

* Site included in ROD summarization

## Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 5 | National Presto Industries | Eau Claire, WI | 08/01/90 | Process waste to dry wells, seepage pits, and lagoons |
| 5 | National Presto Industries | Eau Claire, WI | 09/30/91 | Dry wells, seepage pits, lagoons, and direct discharge |
| 5 | Naval Industrial Reserve Ordinace Plant | Fridley, MN | 09/28/90 | Waste disposal in onsite pits and trenches |
| 5 | Northern Engraving Corp | Sparta, WI | 09/28/87 | Metal finishing by-products treated in sludge ponds |
| 5 | Oak Grove Landfill | Oak Grove Twp, MN | 09/30/88 | * |
| 5 | Oak Grove Sanitary Landfill | Oak Grove Twp, MN | 12/21/91 | * |
| 5 | Onalaska Municiple Landfill | Onalaska, WI | 08/14/90 | * |
| 5 | Pagel's Pit | Rockford, IL | 06/28/91 | * |
| 5 | Pristine, Inc | Reading, OH | 12/31/87 | Liquid waste storage and incineration site |
| 5 | Schilling E H Landfill | Ironton, OH | 09/29/89 | * |
| 5 | South Macomb DSPL #9, 9A | St Clair Shores, MI | 08/13/91 | * |
| 5 | South Andover Sites | Andover, MN | 03/30/88 | Chemical waste disposal and storage |
| 5 | Spiegelberg Landfill | Brighton, MI | 09/30/86 | * |
| 5 | Spiegelberg Landfill | Brighton, MI | 06/29/90 | * |
| 5 | St Louis River | Duluth, MN | 09/28/90 | Surface disposal of tars |
| 5 | Summit National | Deerfield, OH | 11/02/90 | Solvent recycling facility. Waste buried/dumped on ground |
| 5 | Summit National Liquid Disposal Service | Deerfield, OH | 06/30/88 | Disposal of liquid waste on ground surface or buried drums |
| 5 | Thermo Chem, Inc. | Muskegon, MI | 09/30/91 | Solvent and chemical recycling facility. Wastewater to lagoons |
| 5 | Tri-State Plating | Columbus, IN | 03/30/90 | Contamination due to onsite waste spill |
| 5 | University of Minnesota | Rosemount, MN | 06/29/90 | Burn pit for waste chemicals, waste from electrical equip. |

* Site included in ROD summarization

# Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 5 | US DOI Sangam Crab ORCH NWR | Carterville, IL | 03/30/90 | Solid waste industrial landfill liquid waste to impoundments |
| 5 | US DOI Sangam Crab ORCH NWR | Carterville, IL | 08/01/90 | Industrial process waste to landfills or impoundments |
| 5 | Verona Well Field | Battle Creek, MI | 08/12/85 | Air stripping to protect well field from various VOC sources |
| 5 | Waste Disposal Engineering | Andover, MN | 12/31/87 | * |
| 5 | Wausau Groundwater Contamination | Wausau, WI | 09/29/89 | Municiple well contamination from multiple sources |
| 5 | Wayne Waste Oil | Columbia City, IN | 03/30/90 | Waste oil reclamation and municiple landfill |
| 6 | Bayou Bonfuca | Slidell, LA | 08/15/85 | Creosote Works Facility |
| 6 | Bayou Bonfouca | Slidell, LA | 03/31/87 | Creosote Works Facility |
| 6 | Cleve Reber | Sorrento, LA | 03/31/87 | * |
| 6 | Geneva Industries | Houston, TX | 09/18/86 | Abandoned refinery with onsite lagoons |
| 6 | Hardage/Criner | Criner, OK | 11/14/86 | * |
| 6 | Industrial Waste Control | Fort Smith, AZ | 06/28/88 | * |
| 6 | Jacksonville Municipal Landfill | Jacksonville, AR | 09/27/90 | * |
| 6 | Mid-South | Mena, AR | 11/14/86 | Wood Treatment Facility with onsite lagoons |
| 6 | Rogers Road Municiple Landfill | Jacksonville, AZ | 09/27/90 | * |
| 6 | Sheridan Disposal Services | Hempstead, TX | 12/29/88 | Steam distallation, burning, incineration, and pit disposal |
| 6 | Sheridan Disposal Services | Hempstead, TX | 09/27/89 | Steam distallation, burning, incineration, and lagoons |
| 6 | Tenth Street Dump/Junkyard | Oklahoma City, OK | 09/27/90 | * |
| 7 | Chemplex Co | Clinton, IA | 09/27/89 | Landfilling of process waste and construction debris |
| 7 | Doepke Disposal Holliday | Holliday, KS | 09/21/89 | Industrial waste landfill |

* Site included in ROD summarization

# Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 7 | EI Dupont De Nemours & Co Inc. | West Point, IA | 05/28/91 | Disposal of drums in trenches and waste burning in trenches |
| 7 | Ellisville | St. Louis County, MO | 09/29/86 | Waste oil disposal in pits and applied to surface soils |
| 7 | Hastings Groundwater Contamination | Hastings, NE | 09/28/90 | Groundwater contamination from several source areas |
| 7 | Kem-Pest Laboratories | Cape Girardeau, MO | 09/29/89 | Disposal of pesticide manufacturing waste in lagoon |
| 7 | Lawrence Todtz Farm Site | Camanche, IL | 11/04/88 | * |
| 7 | Lindsay Manufacturing Co. | Lindsay, NE | 09/28/90 | Spent acid disposed of in unlined pit |
| 7 | Midwest Manufacturing/North Farm | Kellogg, IA | 09/27/90 | Solid waste unlined disposal cell for metal residuals |
| 7 | Shaw Avenue Dump | Charles City, IA | 09/27/91 | * |
| 7 | Wheeling Disposal Service Company, Inc. | Amazonia, MO | 09/27/90 | * |
| 7 | White Farm Equipment Co Dump | Charles City, IA | 09/28/90 | * |
| 8 | Marshall Landfill | Boulder, CO | 09/26/86 | * |
| 8 | Martin Marietta, Denver Aerospace | Waterton, CO | 09/24/90 | Chemical waste to ponds and storage tanks |
| 8 | Mystery Bridge at Hwy 20 | Evansville, WY | 09/24/90 | Groundwater contamination from spills and flare pits |
| 8 | Portland Cement (Kiln Dust #2 & #3) | Salt Lake City, UT | 07/19/90 | Deposition of Waste Kiln Dust on three properties |
| 8 | Sand Creek Industrial | Commerce City, CO | 09/29/89 | Chemical release due to fires and improper storage practices |
| 8 | Sand Creek Industrial | Commerce City, CO | 09/28/90 | Pesticide manufacturing waste landfilled or put in acid pits |
| 8 | Woodbury Chemical Co | Commerce City, CO | 09/29/89 | Pesticide manufacturing plant and contaminated debris |
| 9 | Louisiana Pacific Corp | Oroville, CA | 09/28/90 | Wood processing plant with PCP contamination from spraying |
| 9 | MGM Brakes | Cloverdale, CA | 09/29/88 | PCB surface soil contamination |

* Site included in ROD summarization

# Appendix A. List of Records of Decision Reviewed (Cont'd)

| EPA Region | Site Name | Location | ROD Date | Reason for Exclusion from Summary List |
|---|---|---|---|---|
| 9 | Nineteenth Avenue Landfill | Phoenix, AZ | 09/29/89 | * |
| 9 | South Bay Asbestos Area | San Jose, CA | 09/29/89 | Onsite landfilling of asbestos contaminated debris |
| 9 | South Bay Asbestos Area | San Jose, CA | 06/26/91 | Addresses asbestos contaminated soil used as fill material |
| 9 | Teledyne Semiconductor | Mountain View, CA | 03/22/91 | Release of VOCs from underground sumps |
| 9 | Tucson Airport Area | Tucson, AZ | 08/22/88 | Disposal of waste onto ground surface or unlined pits |
| 10 | Colbert Landfill | Colbert, WA | 09/29/87 | Industrial Waste Landfill |
| 10 | Commencement Bay | Tacoma, Wa | 05/03/85 | Waste oil reclamation and paint and solvent manufacturing site |
| 10 | Commencement Bay - South Tacoma Channel | Tacoma, WA | 03/31/88 | * |
| 10 | Gould Inc | Portland, OR | 03/31/88 | Lead-Acid battery recycling facility |
| 10 | Northside Landfill | Spokane, WA | 09/30/89 | * |
| 10 | Northwest Transformer - Mission Pole | Everson, WA | 09/30/91 | Disposal of PCB contaminated oils into seepage pits |
| 10 | Teledyne Wah Chang Albany (TWC) | Albany, OR | 12/28/89 | Metal processing sludge and wastewater ponds |
| 10 | Toftdahl Drums | Brush Prairie, WA | 09/30/86 | Drum cleaning and burial site |
| 10 | Union Pacific Railroad Yard | Pocatello, ID | 09/10/91 | Sludge pits from train fueling and cleaning waste |
| 10 | Yakima Plating Co. | Yakima, WA | 09/30/91 | Wastewater discharge to drain field and sedimentation tank |

* Site included in ROD summarization

# Appendix B. Summarization of Records of Decision Related to Landfills in EPA Region IV

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 4 | Airco Carbide Inc., Div. Airco Inc., Calvert City, KY 06/24/88<br><br>Industrial waste landfill accepting coal ash and chemical wastes; adjacent to the B.F. Goodrich Chemical site (treated as one site for RI/FS) | VOCs, benzene, toluene, 1,2-dichloroethane, PAHs, PCBs | Excavation and consolidation of contaminated soil and sediments within the dikes and around the landfill for onsite disposal in the burn pit area followed by construction of an organic vapor recovery system and a RCRA cap over the burn pit, reconstruction of the dikes surrounding the landfill for flood prevention, upgrading of the landfill caps and installation of a leachate extraction system with onsite treatment of the leachate and offsite discharge to surface water, P&T with air stripping and biological treatment or activated carbon adsorption with discharge to surface water, imposition of deed restrictions to prevent residential developments of the B.F. Goodrich-owned property | Unspecified |
| 4 | B.F. Goodrich Chemical Group, Calvert City, KY 06/24/88<br><br>Former creek channel used as landfill for construction and plant waste, also contains waste burn pits for burning liquid chlorinated organics, adjacent to the Airco site (treated as one site for the RI/FS) | VOCs, benzene, toluene, 1,2-dichloroethane, organics, PAHs | Excavation and consolidation of contaminated soil and sediments within the dikes and around the landfill for onsite disposal in the burn pit area followed by construction of an organic vapor recovery system and a RCRA cap over the burn pit, reconstruction of the dikes surrounding the landfill for flood prevention, upgrading of the landfill caps and installation of a leachate extraction system with onsite treatment of the leachate and offsite discharge to surface water, P&T with air stripping and biological treatment or activated carbon adsorption with discharge to surface water, imposition of deed restrictions to prevent residential development of the B.F. Goodrich-owned property | Unspecified |

GW = Groundwater
P&T = Pump and Treat

## Appendix B. Summarization of Records of Decision Related to Landfills in EPA Region IV (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 4 | Davie Landfill, Dania, FL<br>09/30/85<br><br>Garbage and trash landfill and sludge lagoon | Cyanide, sulfide | Dewatering and stabilization of the sludge lagoon contents and placement in a single-lined sanitary landfill cell, installation of a cap on the cell that meets 40CFR264.310(A) | Cancer Risk Level = $10^{-6}$ |
| 4 | Hipps Road, Jacksonville, FL<br>09/03/86<br><br>Municipal landfill | VOCs, TCE, metals, xylene, toluene, benzene | P&T with treatment at the POTW, Subtitle D landfill closure, fencing, grouting of existing wells, instituting a well drilling ban which can be lifted at the conclusion of the 20-year monitoring period, acquiring affected properties under the policies and practices of FEMA | Safe Drinking Water Act standards, $1 \times 10^{-6}$ risk |
| 4 | Hipps Road Landfill, Jacksonville, FL<br>Amendment to 09/03/86 ROD<br>09/21/90<br><br>Municipal landfill | VOCs, benzene, vinyl chloride, metals, chromium, lead | GW recovery wells, recovery system monitoring, offsite GW monitoring, air stripping, discharge to retention basin | GW:<br>Benzene - 1 µg/L (state)<br>Chromium - 50 µg/L (MCL)<br>Lead - 15 µg/L (Federal recommended cleanup goal) |
| 4 | Howe Valley Landfill, Howe Valley, KY<br>09/28/90<br><br>Landfill for disposal of refuse and industrial by-products | VOCs, PCE, Chromium | Excavating soil from outlying areas of the site containing elevated inorganic levels followed by disposal offsite, excavating soil with elevated concentrations of organic followed by aeration, perform treatability study to ensure that onsite aeration will reduce organic concentrations in soil to acceptable levels, onsite disposal of treated soil, onsite air monitoring, installing water diversion ditches to prevent water from running onto the aerating soil, covering area with soil and installing a vegetative cover over the entire site, monitoring GW at Boutwell Spring and at additional springs or wells, implementing institutional controls such as deed restriction to limit the property and GW usage | Soil:<br>PCE - 7.5 mg/kg<br>Cr(VI) - 400 mg/kg<br>TCE - 117.3 mg/kg<br>1,2-Dichloroethene - 7.72 mg/kg |

GW = Groundwater
P&T = Pump and Treat

## Appendix B. Summarization of Records of Decision Related to Landfills in EPA Region IV (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 4 | Lewisburg Dump, Lewisburg, TN<br>09/19/90<br><br>Landfill accepted municipal and industrial wastes, located at former limestone quarry | Bis(2-ethylhexyl) phthalate, aluminum, barium, copper, zinc, manganese | Security fence, deed restrictions, removal of surface and submerged debris with on or offsite disposal, regrading of landfill cover with revegetation, long-term GW monitoring | Unspecified |
| 4 | Martin Marietta - Sodyeco Division, Charlotte, NC<br>09/24/87<br><br>Five CERCLA facilities, one of which operated as an industrial landfill | TCE, PAHs, volatile organics | Extraction and onsite treatment at the waste water treatment facility of contaminated GW with offsite discharge to a stream | GW:<br>TCE - 2.7 µg/L<br>PCE - 0.8 µg/L<br>Chlorobenzene - 60 µg/L<br>Ethylbenzene - 680 µg/L<br>1,2-Dichlorobenzene - 400 µg/L<br>Toluene - 2,000 µg/L<br>Xylene - 440 µg/L<br>PAHs:<br>Anthracene - 2.8 µg/L<br>Fluorene - 2.8 µg/L<br>Phenanthrene - 2.8 µg/L |
| 4 | Munisport Landfill, North Miami, FL<br>07/26/90<br><br>Municipal landfill | VOCs, benzene, toluene, metals, arsenic, lead, chromium | Hydraulic barrier using negative pressure or positive infiltration, air stripping, discharge to trenches or surface water, hydrologic improvements to wetlands | Unspecified |
| 4 | Newport Dump, Wilders, KY<br>03/27/87<br><br>Municipal landfill that accepted commercial wastes | Metals, PAHs, solvents, PCBs | Implementation of a multi-media monitoring program, restoration and extension of leachate collection system, restoration, regrading, and revegetation of existing clay cap | Unspecified |

GW = Groundwater
P&T = Pump and Treat

## Appendix B. Summarization of Records of Decision Related to Landfills in EPA Region IV (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 4 | North Hollywood Dump, Memphis, TN<br>09/13/90<br><br>Municipal and industrial landfill | Organics, aldrin, endrin, chlordane, metals, arsenic, lead | Excavating buried wastes and soil in easily eroded areas near the edge of the landfill and consolidating them in the landfill area, excavating and characterizing waste within buried drums, consolidating debris in the landfill or properly disposing of debris as well as drummed wastes offsite, upgrading the existing landfill cover to be 24 inches thick, partially dewatering the surface impoundments, excavating the contaminated sediment from Beaver Pond and placing them within Oxbow Lake, covering the contaminated lake and Beaver Pond sediments with a 36-inch hydraulic geofabric cover, infilling Oxbow Lake with clean fill, harvesting contaminated fish from the abandoned dredge pond, hydraulically containing the contaminated dredge pond sediment with geofabric and three feet of clean fill, refilling the pond with water and restocking with unaffected fish, monitoring the shallow GW with provisions for future P&T if necessary, conducting surface water and well as air and biota monitoring, implementing institutional controls to restrict onsite land use and to prohibit well installation in the vicinity, site access restrictions including fencing | GW:<br>Arsenic - 0.140 µg/L (proposed state water quality standard)<br>Lead - 3.8 µg/L (MCL) |
| 4 | Picketville Road Landfill, Jacksonville, FL<br>09/28/90<br><br>Municipal and hazardous waste landfill | VOCs, benzene, TCE, toluene, acids, PCBs, metals, arsenic, chromium, lead | Excavation of waste in adjacent creek to five feet and disposal in landfill, clay and soil cap, passive landfill gas venting system, alternate water supply, abandon wells, GW monitoring, GW use and deed restrictions, site access restrictions | Unspecified |

GW = Groundwater
P&T = Pump and Treat

## Appendix B. Summarization of Records of Decision Related to Landfills in EPA Region IV (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 4 | Powersville Landfill, Powersville, GA<br>09/30/87<br><br>Sanitary landfill accepting municipal and industrial wastes | VOCs, vinyl chloride, organics, heavy metals, lead, chromium, pesticides | Surface capping of hazardous waste and municipal fill areas using artificial material or clay along with drainage and closure, installation of eight additional monitoring wells in the upper region of the aquifer to determine cap area leaching or migration, extension of the municipal water supply pipeline as an alternate water supply, site deed restrictions to prevent any drilling or construction activities that would compromise the integrity of the remedy, deed restrictions to prohibit drilling of water wells in the area, O&M | Dieldrin - 20 mg/kg<br>Typical background levels used to determine cleanup goals for soils |
| 4 | 62nd Street Dump, Tampa, FL<br>06/27/90<br><br>Industrial waste pit, accepted auto parts, batteries, kiln dust, construction materials, and household garbage | PCBs, metals, arsenic, chromium, lead | Dewatering and excavating contaminated soil and noncement debris, onsite solidification/stabilization, placing material onsite within original dump area, capping site with impermeable membrane and vegetative soil cover, P&T with chromium reduction/flocculation/sedimentation/ filtration/offsite discharge to POTW or onsite discharge to surface water, disposing of sludges onsite, monitoring GW, implementing institutional controls including land use restrictions | GW:<br>Federal MCLs<br><br>Soil: more stringent of health-based criteria or values calculated from a leachate model<br>PCB - 0.33 mg/kg<br>Arsenic - 3.5 mg/kg<br>Chromium - 8.8 mg/kg<br>Lead - 17.4 mg/kg |

GW = Groundwater
P&T = Pump and Treat

## Appendix B. Summarization of Records of Decision Related to Landfills in EPA Region IV (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 4 | Smith's Farm Brooks, Shepardsville, KY<br>OU-1<br>09/29/89<br><br>37.5 acre landfill with unpermitted disposal of 6,000 drums | Organics, PCBs, PAHs, metals, lead | Excavation and onsite incineration of contaminated soil as well as drums and fill material, solidification/fixation of 50% of the treated material followed by placement of all treated or solidified material in drum area, incineration of small volume of hot spot material in landfill area, consolidation of waste and construction of RCRA cap over landfill, construction of a leachate-collection system, access restrictions around contaminated areas, GW monitoring for up to 27 years, maintenance of RCRA cap and the leachate collection system, leachate removal and disposal for up to 30 years | Soil and/or Sediments:<br>Lead - 500 mg/kg<br>PCBs - 2 mg/kg<br>Carcinogenic PAHs - 5 mg/kg |
| 4 | Tri-City Industrial Disposal, Brooks, KY<br>08/28/91<br><br>Industrial waste landfill that accepted scrap lumber, fiberglass insulation, drummed liquid waste, and bulk liquids | VOCs, PCE, TCE, DCE, toluene, vinyl chloride | Installing a carbon adsorption unit at nearby spring, treating contaminated GW using carbon adsorption/ discharge to offsite surface water, conducting a treatability study to determine whether spent carbon is a hazardous waste, regenerating or disposing spent carbon offsite, long-term monitoring, GW use restrictions | GW: MCLs<br>PCE - 5 µg/L<br>TCE - 5 µg/L<br>Toluene - 1,000 µg/L<br>Xylenes - 1,000 µg/L |

GW = Groundwater
P&T = Pump and Treat

# Appendix C. Summarization of Records of Decision Related to Landfills

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 1 | Auburn Road Landfill, NH<br>OU-1<br>09/17/86<br><br>Four municipal landfill areas; accepted industrial wastes | TCE, extractable organics, heavy metals, inorganics | Provide drinking water for local inhabitants | N/A |
| 1 | Auburn Road Landfill, NH<br>OU-2, OU-3<br>09/29/89<br><br>Four municipal landfill areas; accepted industrial wastes | VOCs, benzene, toluene, TCE, PCE, metals, arsenic, lead | P&T with coagulation and precipitation/air stripping/carbon treatment (if necessary)/discharge to onsite recharge trenches, installation of natural/synthetic cap over dumps | GW:<br>Arsenic - 50 µg/L (MCL)<br>Lead - 50 µg/L (MCL)<br>Vinyl chloride - 2 µg/L (MCL)<br>trans-1,2-Dichloroethene - 70 µg/L (MCL)<br>2-butanene - 172 µg/L (Health Advisory)<br>Trichloroethene - 5 µg/L (MCL)<br>Tetrachloroethene - 5 µg/L (Proposed MCL)<br>Toluene - 2,000 µg/L (PMCL)<br>Benzene - 5 µg/L (MCL) |
| 1 | Beacon Heights Landfill, CT<br>09/28/90<br><br>Dumping and incineration area that accepted industrial liquids and chemicals | VOCs, benzene, toluene, xylene | Offsite leachate treatment at a POTW prior to offsite discharge to surface water, offsite incineration of the sludge generated during leachate treatment, monitoring of landfill gases, providing criteria for excavation of the contaminated soils deemed impracticable to cap | Cleanup goals based on a $10^{-6}$ excess cancer risk level<br><br>Benzene - 0.08 mg/kg<br>TCE - 0.10 mg/kg<br>Toluene - 100 mg/kg<br>Xylene - 500 mg/kg |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 1 | Charles George Landfill, MA<br>07/11/85<br><br>Municipal & hazardous landfill | VOCs, metals, mercury | Full synthetic membrane cap, surface water diversion and collection system, vent network with offgas collection system venting to the atmosphere, full peripheral leachate collection system, O&M requirements, annual mowing and maintenance of the vegetated surface, quarterly inspection of the pump station, leachate, collection/disposal, and cap surface | Unspecified |
| 1 | Charles George Land Reclamation Landfill #3, MA<br>Phase III Cleanup<br>09/29/88<br><br>Municipal landfill that accepted hazardous industrial waste | VOCs, benzene, TCE, organics, PAHs, metals, arsenic | P&T of shallow GW plumes and leachate collected from landfill cap system using biological treatment as well as metals precipitation and carbon adsorption with onsite discharge of treated water into the aquifer or offsite discharge into nearby surface water, collection and incineration of landfill vent gas emissions, excavation and solidification of approximately 500 yards$^3$ of contaminated Dunstable Brook sediments and placement beneath the Phase II landfill cap, GW monitoring | PAH: 1 mg/kg for sediment |
| 1 | Coakley Landfill, NH<br>OU-1<br>06/28/90<br><br>Landfill that accepted waste from Pease AFB and neighboring municipalities as well as incinerator residue | VOCs, benzene, PCE, organics, phenols, metals, arsenic, chromium | Excavating and consolidating approximately 2,000 yards$^3$ of wetland sediment and 30,000 yards$^3$ of solid waste and depositing the material into the landfill prior to capping, collecting and treating landfill gases using a thermal destruction process, P&T with chemical precipitation/air stripping for VOCs/biological treatment (if necessary)/ recharge into the aquifer or discharge to onsite surface water, treating air from the air stripper using incineration or activated carbon filtration prior to release, implementing site access restrictions, long-term environmental monitoring including air and GW | MCLs, HAs, PMCLGs<br><br>GW:<br>Benzene - 5 µg/L<br>Tetrachloroethene - 3.5 µg/L<br>Arsenic - 50 µg/L<br>2-Butanone - 200 µg/L<br>Phenol - 280 µg/L<br>Diethyl phthalate - 2,800 µg/L<br>Chlorobenzene - 100 µg/L<br>trans-1,2-Dichloroethene - 100 µg/L<br>Nickel - 100 µg/L |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 1 | Dover Municipal Landfill, NH<br>09/10/91<br><br>Landfill accepted municipal and industrial solid waste including drummed materials and liquid wastes | VOCs, benzene, PCE, TCE, toluene, vinyl chloride, metals, arsenic | Excavating sediment from drainage channel and depositing in landfill, recontouring and capping landfill with multi-media cap, passive gas venting, pumping for southern GW plume with aeration, carbon adsorption, flocculation, coagulation, precipitation, discharge onsite to surface water or offsite to POTW, offsite disposal of residual sludge, upgradient GW diversion system, natural attenuation for eastern GW plume, surface water run-on/runoff diversion system, long-term GW monitoring, deed and GW use restrictions | Sediment:<br>Arsenic - 50 mg/kg<br><br>GW:<br>Benzene - 5 µg/L (MCL)<br>PCE - 5 µg/L (MCL)<br>TCE - 5 µg/L (MCL)<br>Arsenic - 50 µg/L (RCRA MCL) |
| 1 | Iron Horse Park, MA<br>06/27/91<br>(OU2-Landfill)<br><br>Landfill was used for disposal of residential and commercial solid waste | VOCs, benzene, TCE, toluene, xylenes, PAHs, metals, arsenic, lead | Reconstructing existing landfill cap, maintaining the cap, the existing surface drainage system, and the existing landfill gas collection/flare system, installing leachate collection system, treating and disposing leachate offsite, monitoring GW, SW and gas collection/flare system, deed and GW use restrictions | GW:<br>Arsenic - 50 µg/L (MCL)<br>Benzene - 5 µg/L (MCL)<br>TCE - 5 µg/L (MCL) |
| 1 | Landfill & Resource Recovery, CT<br>09/29/88<br><br>Landfill accepting domestic, commercial, and industrial wastes | Hydrogen sulfide, methane, VOCs, benzene, toluene, PCE, TCE | Access restrictions, stabilization of the side slopes of the landfill and installation of a RCRA cap over the entire landfill with revegetation, collection and thermal destruction of underlying gases with the method of thermal destruction to be determined in design, excavation of eroded landfill sand from the wetlands with replacement onsite and vegetation of excavated wetland areas, GW and air monitoring | Gaseous emissions:<br>Rhode Island Air Toxic Regulations |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 1 | Laurel Park Inc., CT<br>06/30/88<br><br>Municipal landfill accepting industrial wastes; onsite burning | VOCs, organics, metals | Installation of RCRA cap over waste disposal areas, rehabilitation of existing leachate collection supplemented by a shallow GW extraction system consisting of a french drain and/or GW extraction wells with discharge and offsite treatment at Naugatuck water pollution control facility, monitoring of all media | Unspecified |
| 1 | Old Springfield Landfill, VT<br>OU-1<br>09/22/88<br><br>Municipal landfill that accepted industrial liquid and semi-liquid waste, closed in 1968; trailer park on top of landfill | VOCs, benzene, PCE, TCE, toluene, organics, PCBs, PAHs | Construction of an underground collection system to collect leachate, P&T with onsite treatment of the GW/leachate or discharge to the POTW for treatment, institutional controls to restrict the use of GW that exceeds MCLs, multimedia monitoring | MCLs<br><br>GW and Leachate:<br>Benzene - 5 µg/L<br>1,1-Dichloroethene - 7 µg/L<br>TCA - 5 µg/L<br>Vinyl chloride - 2 µg/L<br>PCE - 5 µg/L<br><br>Soil:<br>PCBs - 6,000 µg/kg<br>CPAHs - 3,000 µg/kg |
| 1 | Old Springfield Landfill, VT<br>OU-2<br>09/28/90<br><br>Municipal landfill that accepted industrial liquid and semi-liquid waste, closed in 1968; trailer park on top of landfill | VOCs, benzene, PCE, TCE, toluene, xylenes, organics, PAHs, PCBs | Placing a multi-layer cap over 8 acres where waste has been disposed of or has come to be located or where the soil cleanup levels are exceeded, collection GW and surface water in french drains and extracting GW with source control wells with treatment as necessary in the treatment system developed in OU-1, stabilizing the side slopes of the waste mounds, active gas collecting and passive gas venting of landfill gases followed by treatment using vapor phase carbon adsorption, O&M of components, GW and air monitoring, implementing institutional controls including deed restrictions | Soil:<br>Goals are based on a total carcinogenic risk of $10^{-5}$<br><br>GW:<br>Based on MCLs or proposed MCLs |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 2 | Colesville Municipal Landfill, NY<br>03/29/91<br><br>Landfill accepted primarily municipal solid waste and some drummed industrial waste | VOCs, benzene, PCE, TCA, TCE, metals, arsenic | Cut and regrade sides and surface of landfill, constructing lined leachate collection trenches, multi-media cap, gas venting system built into cap, seeding and mulching cap, GW pumping and treating with air stripping and metals treatment, discharge to surface water, new water supply system, fencing, deed restrictions on new drinking water wells and activities that would affect integrity of cap, monitoring program | GW:<br>Benzene - 5 µg/L (state)<br>PCE - 5 µg/L (state)<br>TCE - 5 µg/L (state)<br>Toluene - 5 µg/L (state)<br>Xylenes - 5 µg/L (state) |
| 2 | Combe Fill South, NJ<br>09/29/86<br><br>Private landfill, accepting municipal and nonhazardous industrial waste, sewage sludge, and waste oils | VOCs, TCE, PCE, toluene, methylene chloride | Alternative water supply for residences, RCRA cap of landfill, active collection and treatment system for landfill gases, P&T of shallow GW and leachate with discharge to Trout Brook, surface water controls to accommodate seasonal precipitation and storm runoff, security fencing to restrict site access, environmental monitoring to ensure effectiveness of the remedial action, supplemental feasibility study to evaluate the need for remediation of the deep aquifer | Unspecified |
| 2 | Global Landfill, NJ<br>09/11/91<br>(OU1-landfill wastes)<br><br>Solid waste disposal facility for nonhazardous waste, drums of hazardous waste were also identified in the landfill | VOCs, benzene, PCE, TCE, toluene, xylenes, metals, arsenic, chromium, lead | Synthetic and clay cap, construction of a soil stabilization berm, gas management system, stormwater and leachate collection systems, pumping leachate and condensate from the gas collection system to a holding tank, transporting the waste offsite for treatment and disposal (interim remedy), offsite disposal of sludge at a RCRA facility, monitoring program, mitigating any affected wetlands, site access restrictions such as fencing | N/A |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 2 | Helen Kramer Landfill, NJ<br>09/27/85<br><br>Municipal landfill with chemical dumping | Trichloroethanes, Benzene, Toluene, Phenols, Arsenic, Iron, Magnesium | Dewatering/excavation/filling of leachate ponds and lagoons, construction of security fence, implementation of surface water controls to ensure reliability of other remedial components, implementation of monitoring program to assess effectiveness, GW leachate collection trench, pretreatment, discharge to POTW, clay cap, O&M as required | Unspecified |
| 2 | Hertel Landfill, NY<br>09/27/91<br><br>Municipal solid waste landfill that accepted industrial waste | VOCs, benzene, toluene, xylenes, phenols, metals, arsenic, chromium, lead | Regrading and compacting landfill mound, multi-layer cap, gas venting system, additional soil sampling to determine need to extend cap or consolidate soil beneath the cap, air monitoring, GW pump and treat by precipitation and membrane microfiltration (to remove metals and solids), ultraviolet light and hydrogen peroxide oxidation, performing a treatability study to demonstrate the effectiveness of the technology, discharge treated water onsite, disposal of treatment residuals in accordance with LDRs, evaluating and mitigating wetlands, GW monitoring, deed restrictions, and perimeter fencing.<br><br>If the treatability study indicates that the technology is not effective, implement a contingency remedy consisting of precipitation, clarification, filtration, and carbon adsorption. | GW:<br>Based on federal and state clean-up goals including xylenes 5 $\mu g/L$ (state) |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 2 | Hyde Park, NY<br>11/26/85<br><br>Industrial landfill from Occidental Chemical Company | VOCs, organics, toluene, phenol, PCBs, dioxin, 2,3,7,8-tetrachloro dibenzo-p-dioxin (TCDD) | Installation of prototype purge well system in the overburden inside the landfill to extract NAPLs from the landfill for destruction by incineration, installation of an overburden tile drain system to contain and collect contaminated GW and NAPL, industrial protection program requiring implementation of engineering controls to eliminate exposure to nearby workers, a residential community monitoring program which requires installation of GW wells in the community to provide early warning and trigger further action in the event that chemicals migrate into nearby residential areas, a bedrock NAPL plume containment system consisting of a purge well and recirculation well system, NAPL plume containment system consisting of installation of two to three purge wells at the Niagara Gorge Face to collect a significant portion of the contaminated GW outside the NAPL plume, water seeps will be diverted and soil either excavated or covered where there is a potential for contamination, contaminated GW collected by the remedial programs will be treated with activated carbon and NAPL will be incinerated | Cancer Risk Level - $10^{-6}$ |
| 2 | Kin-Buc Landfill, NJ<br>OU-1<br>09/30/88<br><br>Industrial and municipal waste disposal area | VOCs, benzene, toluene, PAHs, PCBs, metals, arsenic, lead | Installation of slurry wall surrounding the site, RCRA cap, maintenance and upgrading of existing cap, collection of approximately three million gallons of oily-phase leachate with offsite incineration and residual disposal, collection and onsite biological or carbon treatment of aqueous-phase leachate and contaminated GW with discharge either to surface water or POTW, dewatering residual sludges and offsite disposal, GW water monitoring, O&M | Unspecified |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 2 | Lipari Landfill, NJ<br>Onsite Remedial Action<br>09/30/85<br><br>Municipal, chemical, and industrial waste landfill that accepted solvents, paint thinners, formaldehyde, paints, phenols, animal wastes, and dust collector residues, etc. | Unspecified | Installation of GW/leachate extraction and injection wells within the containment system for dewatering and flushing of the system, P&T from within containment system until it reaches an elevation of approximately 100 feet above mean sea level (Upper Cohansey); the treatment preference being for collected leachate is onsite pretreatment and discharge to the POTW, install and monitor GW wells downgradient of the site within the Kirkwood Aquifer, flush the containment system to cleanse the encapsulated material of water-borne contaminants | For Soils and Sediments:<br><br>1. Cleanup objectives developed by NJDEQ for soils under the Environmental Cleanup and Responsibility Act (ECRA)<br><br>2. Health or risk-based criteria and comparison to background levels |
| 2 | Lipari Landfill, NJ<br>Offsite Remedial Action<br>07/11/88<br><br>Municipal, chemical, and industrial waste landfill | VOCs, benzene, toluene, xylene, metals, arsenic, chromium, lead | Collection of the contaminated GW/leachate followed by onsite treatment and discharge to POTW, excavation of contaminated marsh soil and dredging and dewatering followed by thermal treatment and offsite disposal as nonhazardous material, integration of offsite sampling with the onsite monitoring plan being developed to monitor effectiveness of the onsite flushing action, temporary remedial measures in the surrounding marshland as necessary to mitigate volatile emissions from leachate seepage areas | Unspecified |
| 2 | Lone Pine Landfill, NJ<br>09/28/90<br>(OU2-GW)<br><br>Waste disposal facility that accepted municipal, commercial, and industrial wastes including liquid and hazardous wastes | VOCs, benzene, PCE, TCE, toluene, xylenes, phenols, metals, arsenic, chromium, lead | Interception drain for shallow aquifer supplemented with extraction wells for deeper aquifer, air stripping, precipitation/filtration, carbon adsorption, dewatering and testing of residual solids to determine proper disposal, reinjection to deeper aquifer or discharge to onsite recharge trench, long-term monitoring, deed restrictions, land and GW use restrictions | GW:<br>Benzene - 1 µg/L (state)<br>PCE - 1 µg/L (state)<br>Phenols - 0.0035 µg/L (state)<br>TCE - 1 µg/L (state)<br>Toluene - 50 µg/L (state)<br>Xylenes - 44 µg/L (state)<br>Arsenic - 50 µg/L (state)<br>Chromium - 50 µg/L (state)<br>Lead - 50 µg/L (state) |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 2 | Love Canal, NY<br>05/06/85<br><br>Industrial/chemical landfill | Acids, chlorides, mercaptans, phenols, toluenes, pesticides, chlorophenols, chlorobenzenes, sulfides | Hydraulically clean designated sewers, remove and dispose of contaminated sediments and inspect specific sewer reaches for defects that could act as pathways for contaminate migration waste, limit access and dredge designated portions of Black and Bergholtz Creeks and hydraulically clean Black Creek culverts, perform temporary in-situ stabilization of contaminated sediment at the 102nd Street outfall via the erection of a berm until issues concerning the source of contamination from 102nd Street Landfill are resolved, recommendation to install a permanent administration building | Unspecified |
| 2 | Ludlow Sand & Gravel, NY<br>OU-1<br>09/30/88<br><br>Landfill used for domestic wastes, septic tank effluent, industrial wastes, and animal parts from a meat processing plant | VOCs, benzene, toluene, organics, PCBs, phenols | Consolidation of approximately 10,000 yards$^3$ of contaminated soil and sediment and disposal onsite, installation of impermeable 18-acre cover, collection of leachate from seepage areas formed from the landfill and dewatering of the landfill through use of a passive drain system or an active well system with onsite treatment of the collected leachate/GW and offsite discharge of the effluent, implementation of upgradient GW controls to lower and prevent the GW table from coming in contact with waste material, fencing and access restrictions, imposition of deed restrictions governing future use of the property, implementation of long-term water quality monitoring program including both onsite and offsite GW as well as surface water and potable water supply wells | Soils:<br>PCBs - 10 mg/kg<br>Excavation of soils to a minimum of 12" and backfill with clean fill; revegetate |
| 2 | M & T Delisa Landfill, NJ<br>09/20/90<br><br>Municipal landfill | None | No action<br><br>Site will be transferred to the state solid waste program | N/A |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 2 | North Sea Municipal Landfill, NY<br>OU-1<br>09/29/89<br><br>Active landfill that accepts municipal solid waste, refuse, debris, and septic system waste from residential, industrial and commercial sources | VOCs, PAHs, metals, arsenic, lead, inorganics | Covering cell 1 with a low permeability cap, implementing site security and deed restrictions, sampling sludge/soil in the former sludge lagoons, long-term multi-media sampling (air, surface water, GW) | Unspecified |
| 2 | Old Bethpage Landfill, NY<br>03/17/88<br><br>Municipal landfill that accepted industrial wastes; 3 remedial actions currently underway: landfill cap, methane collection, leachate collection | VOCs, TCE, benzene, toluene, inorganics, chromium, lead | Hydraulic control of the plume through installation of GW recovery wells, P&T with air stripping/carbon adsorption/discharge into an upgradient injection well system, GW monitoring, completion of landfill capping, continuation and expansion or enhancement of leachate control and gas collection systems, gas monitoring | ARARs<br>- MCLs<br>- NY State GW Quality Levels |
| 2 | Port Washington Landfill, NY<br>09/30/89<br><br>Landfill that accepted incinerator residue, residential and commercial refuse, and construction rubble | VOCs, PCE, TCE, benzene, methane | Capping the landfill, rehabilitating the existing gas collection system and installing additional vacuum extraction vents, P&T with metals removal process/air stripping/ discharge to an aquifer recharge basin, environmental monitoring using GW and landfill gas wells, O&M | Unspecified |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 2 | Sarney Farm, NY<br>09/27/90<br><br>Sanitary and industrial waste landfill including drummed waste | VOCs, toluene, pesticides, metals, lead | Excavation of contaminated soil and buried drums, transportation of drums to offsite treatment and disposal facility, onsite low temperature thermal treatment of contaminated soil, grading of excavated area with treated soil, long-term monitoring of GW and SW | Soil:<br>TCE - (risk based)<br>toluene - (risk based) |
| 2 | Sharkey Landfill, NJ<br>09/29/86<br><br>Municipal/industrial landfill | VOCs, TCE, organics, inorganics, heavy metals | RCRA cap, a venting system for landfill gases, P&T of shallow aquifer and leachate, surface water controls, security fencing to restrict site access, environmental monitoring program to ensure the effectiveness of the remedial action | Unspecified |
| 2 | Vineland State School, NJ<br>09/30/89<br><br>Five subsites, two were dumps (one accepting garbage the other accepting mercury and arsenic-contaminated pesticides) and two were pits for transformer oils and chemicals | Low levels of contamination | No further action, continued GW monitoring | Risks posed by the contamination in these areas are within the acceptable range as determined by state and EPA |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 2 | Volney Landfill, NY<br>07/31/87<br><br>Municipal landfill, hazardous waste incineration facility | Vinyl chloride, benzene, arsenic, VOCs, metals | Supplemental capping of the landfill side slopes, installation of a leachate collection system consisting of a perimeter gravel-filled leachate collection drain and soil-bentonite slurry wall around the northern and southwestern sections of the landfill with accompanying collection wells and force mains from the two drain segments, treatment of the contaminated leachate in an onsite treatment plant or transport to an offsite facility for treatment, O&M requirements, a review of the recommended containment remedial action no less often than each five years after the initiation of the proposed remedy | Federal MCLs and CWA Standards; NY State GW Quality Levels |
| 2 | Warwick Landfill, NY<br>06/27/91<br>(OU1-landfill contents and interim GW remedy)<br><br>Landfill accepted municipal and industrial wastes and sludge | VOCs, benzene, TCE, toluene, xylenes, PAHs, phenols, metals, arsenic, chromium, lead | Regrading landfill mound, multi-layer cap, gas venting system, point-of-use treatment by granular activated carbon units at contaminated residential wells until a final GW remedy can be evaluated, monitoring, evaluate wetlands, deed restrictions, site access restrictions such as fencing | N/A |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 3 | Blosenski Landfill, PA<br>09/29/86<br><br>Municipal landfill that also accepted solvents, sludges, and drums | VOCs, benzene, toluene, TCE, lead, cadmium, chromium, mercury | Installation of a public water supply line to twelve residents, excavate and remove buried drums in areas identified during RI and any material in intimate contact with drums and dispose of these materials at a RCRA facility, perform pre-design study which shall include further sampling of residential wells and surface waters as well as the installation of additional monitoring wells and conducting pump testing to more fully delineate the extent and magnitude of the GW contamination, implement a source reduction program involving P&T of GW, install a low permeability RCRA cover on the landfill, construct appropriate surface water diversion systems, construct a gas venting system to protect cover, institute periodic monitoring for GW and surface water contamination in the landfill area in compliance with RCRA closure regulations | Cancer Risk Level - $10^{-6}$ |
| 3 | Delta Quarries/Stotler Landfill, PA<br>03/29/91<br>(ROD only addresses onsite GW)<br><br>Municipal wastes comprise 98% of total landfilled wastes, also accepted industrial wastes including organic solvents, process sludges, metals from electroplating operations, and residues from sludge sedimentation basins | VOCs, PCE, TCE, vinyl chloride, metals, manganese | GW pumping, pretreatment by precipitation if necessary, air stripping, offsite discharge to river, controlling air emissions using activated carbon, monitoring GW and SW, maintaining cap, installing gas venting system, deed and land use restrictions, site access restrictions such as fencing | GW:<br>1,2-DCA - 5 µg/L (MCL)<br>cis-1,2-DCE - 70 µg/L (MCL)<br>trans-1,2-DCE - 100 µg/L (MCL)<br>Chloroform - 100 µg/L (MCL)<br>PCE - 5 µg/L (MCL)<br>TCE - 5 µg/L (MCL)<br>Vinyl chloride - 2 µg/L (MCL) |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 3 | Dorney Road Site, PA<br>09/30/91<br>(OU2-GW)<br><br>Municipal and industrial waste landfill that formally served as an open pit iron mine | VOCs, benzene, TCE, metals, chromium, lead | Wellhead treatment using carbon adsorption for private wells, GW monitoring | GW:<br>Benzene - 5 µg/L<br>TCE - 5 µg/L<br>Chromium - 100 µg/L<br>Lead - 15 µg/L |
| 3 | Heleva Landfill, PA<br>09/30/91<br>(Amendment to GW component of ROD)<br><br>Sanitary landfill accepted municipal and industrial waste that included large volumes of liquid TCE | VOCs, benzene, PCE, TCE, toluene, xylenes | The amended remedial action for this site includes continuing with the selected remedy from the previous ROD and replacing the GW portion with extracting near gradient GW to contain highly contaminated dissolved plume in vicinity of DNAPL contamination, pumping and onsite treatment of the downgradient portion of aquifer, and discharging onsite to surface water | GW (state background):<br>Benzene - 0.2 µg/L<br>PCE - 0.03 µg/L<br>TCE - 0.03 µg/L<br>Toluene - 0.2 µg/L |
| 3 | Henderson Road Site, PA<br>OU-2<br>09/29/89<br><br>Landfill for trash and construction debris, injected industrial waste into a 160-foot well, accepted liquid waste, sludge, and drums | VOCs, bis-(2-chloroethyl) ether | Installation of erosion controls, regrading and capping including possibly moving the onsite watermain, installing a short- and long-term leachate collection system with treatment and discharge to be determined during design, excavation and onsite consolidation of trash as well as soil and cinders currently located at the adjacent PA Turnpike property with appropriate remediation of wastes left in place at the Turnpike property, further sample collection and data evaluation in the western portion of the site leading to a determination regarding treatment and/or capping in that area and a contingent GW recovery system, monitoring of GW and leachate, institutional controls onsite and on adjacent properties to restrict activities that would interfere with remediation at the site | Unspecified |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 3 | Limestone Road, MD<br>09/30/86<br><br>Commercial and demolition landfill, chromium sludge | VOCs, BNAs, TCE, PCE, metals | Site grading, capping of contaminated soil, fencing of site, continued monitoring of GW as well as sediments and surface water, complete historical review of geological information, collection of regional, offsite, and onsite geological information, chemical analysis of the shale to determine its composition, reevaluate and establish background data control points, frequent sampling to increase the data base, increase the number of stream and residential sampling, evaluate the effects of natural and/or domestic (plumbing) conditions on the overall water quality of the area | Unspecified |
| 3 | Lord Shope Landfill, PA<br>06/29/90<br><br>Inactive hazardous waste landfill | VOCs, benzene, PCE, TCE, metals, arsenic, chromium, lead | In-situ vapor stripping using vacuum wells to volatilize and remove VOCs from the landfill material and the surrounding soil, collection and treatment of gas emissions generated by the vapor stripping process using carbon filtration, P&T with pretreatment for metal removal/air stripping/discharge to surface water, restriction of use of contaminated GW, installation of security fencing around property | Soil: To be determined during remedial design<br><br>GW: Will meet MCLs or proposed MCLs and a $10^{-4}$ excess cancer risk.<br>PCE - 5 µg/L<br>TCE - 5 µg/L<br>Benzene - 5 µg/L<br>Arsenic - 2 µg/L<br>Chromium - 50 µg/L<br>Lead - 15 µg/L<br>trans-1,2-Dichloroethene - 100 µg/L<br>Acetone - 3,500 µg/L<br>Barium - 1,000 µg/L<br>Methyl ethyl ketone - 1,750 µg/L<br>Vinyl chloride - 2 µg/L |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 3 | Millcreek Dump, PA<br>05/07/86<br><br>Dump for foundry sand, industrial and municipal waste. | PCBs, PAHs, phthalates, VOCs, phenols, lead, copper | Soil and sediment excavation and consolidation under a RCRA cap, site grading, soil cover over remaining low-level contaminated soils, construction of surface water management basins and ditches, revegetation of soil cover and cap, installation of additional monitoring wells, construction of flood retention basin on property owned by Millcreek Township, P&T of GW, design of remedy which will require additional sampling and well installation, O&M on RCRA cap, flood retention basins, surface | Unspecified |
| 3 | Old City of York Landfill, PA<br>09/30/91<br><br>Municipal waste landfill, also accepted some industrial waste | VOCs, benzene, PCE, TCE | Restoring and revegetating soil cover in northeast portion of site, GW recovery and air stripping, discharge to surface water, gas venting with monitoring probes, monitoring GW, SW and sediment | Unspecified |
| 3 | Ordnance Works Disposal Areas, Morgantown, WV<br>OU-1<br>03/31/88<br><br>Landfill for various chemical solid chemical wastes | Arsenic, carcinogenic PAHs | Consolidation of existing landfill waste and application of a multi-layer RCRA cap, excavation and onsite incineration of former lagoons and surrounding area soil and impacted stream sediments with onsite disposal of treatment residuals in the landfill prior to the installation of the cap, placement of clean fill in the excavated area, grading and revegetation, implementation of surface management techniques for drainage and sediment control, revegetation, ambient air monitoring, post-treatment monitoring | Risk-based:<br>Arsenic - 20 mg/kg<br>Carcinogenic PAHs - 26 mg/kg<br>Mercury - 175 mg/kg<br>PCB - 5 mg/kg |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 3 | Ordnance Works Disposal Areas, Morgantown, WV OU-1 (replaces previous ROD due to public comments) 09/29/89 | Carcinogenic PAHs, metals, arsenic, lead | Preferred: Installation of a multi-media RCRA Subtitle C cap on the landfill and regrading/revegetation to control surface run-on and runoff, excavation of contaminated inorganic hot spots exceeding risk-based clean-up levels from the lagoon area and scraped area before bioremediation, onsite treatment of soils excavated from inorganic hot spots using solidification and placement of nonhazardous treated material in the landfill before capping, excavation of organic contaminated soils and sediments exceeding risk-based clean-up levels from the scraped area as well as the lagoon area and streams, treatment of excavated soils and sediment organic contaminants using bioremediation in a treatment bed within the associated area of contamination, short-term environmental monitoring to ensure the effectiveness of the remedial action, GW monitoring in the immediate vicinity of the landfill, deed restrictions to prohibit residential and industrial construction in the landfill area and residential construction in the remaining areas<br><br>Contingency: Installation of a multi-media RCRA Subtitle C cap on the landfill and regrading/revegetation to control surface run-on and runoff, excavation of contaminated soils and sediments exceeding risk-based clean-up levels in the scraped area as well as the lagoon area and streams, onsite treatment of excavated soils and sediments using soil washing and backfill with remediated soils, environmental monitoring to ensure the effectiveness of the remedial action, GW monitoring in the immediate vicinity of the landfill area, deed restrictions to prohibit industrial and residential construction in the landfill area and residential construction in remaining areas | Contingency methods would be triggered if: predesign studies show that treatment levels specified in the ROD cannot be achieved using bioremediation techniques within a reasonable time frame; or RPs elect to design, implement, and finance the contingency plan; or information received during the bidding process suggests that the costs of implementing the alternative are significantly higher than originally estimated, then the contingency alternative shall be the remedial action selected by EPA for implementation.<br><br>Soils:<br>Carcinogenic PAHs - 44.7 mg/kg<br>Arsenic - 88.8 mg/kg<br>Cadmium - 642 mg/kg<br>Lead - 500 km/kg<br>Copper - 41,100 mg/kg<br><br>Remediation goals based on CPAH and As only (did not include Cd, Pb, and Cu) |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 3 | Osborne Landfill, PA<br>09/28/90<br><br>Contaminated spent foundary sand, and industrial and municipal waste disposed in former coal strip mine pit | VOCs, benzene, TCE, metals, arsenic, chromium, lead | OU1 (solid waste):<br>Slurry wall barrier around fill, clay cap, GW extraction, equalization, pH adjustment, chemical precipitation, clarification, sand filtration, carbon adsorption, injection into the onsite mine pit, offsite disposal of GW treatment residuals, GW monitoring, deed restrictions.<br><br>Contingency for regrading the site, excavating and placing solid waste in a RCRA onsite landfill, long-term GW monitoring, institutional controls.<br><br>OU3 (leachate):<br>Dewatering site during excavation, isolating the fill area from the onsite mine pools, treating GW using equalization, clarification, and sand filtration, carbon adsorption, onsite discharge, GW monitoring.<br><br>OU4 (aquifer):<br>Pumping GW, air stripping, onsite air emissions monitoring. | GW:<br>TCE - 0.2 µg/L<br>Benzene - 0.2 µg/L<br>PCBs - 1 µg/L<br>Chromium - 50 µg/L<br>Lead - 15 µg/L<br>Arsenic - 22 µg/L |
| 3 | Welsh Landfill, PA<br>OU-1 Source Control<br>06/29/90<br><br>Landfill that accepted mixed municipal and industrial wastes | VOCs, benzene, PCE, TCE, PAHs, metals, arsenic, lead | Removal of bulky items and debris from landfill surface for resource recovery, construction of 5.2-acre landfill cap, provision of alternate water supply to local residences by extending the municipal water system, GW monitoring, implementation of site access restrictions, restrictions on land use, restrictions on GW use | MCLs |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | Belvidere Municipal Landfill, IL<br>06/29/88<br><br>Municipal landfill that accepted industrial and commercial source waste | Organics, PCBs, PAHs, metals, lead | Capping entire landfill (19.5 acres), offsite incineration or onsite consolidation of PCB-contaminated soil, consolidation with landfill material of other soil prior to capping, P&T with possible air stripping with discharge to POTW or surface water, GW monitoring, pond and river fish monitoring, installation of an upgraded fence, deed restrictions to control onsite activities and construction, flood control measures | PCB - 50 mg/kg (action level) |
| 5 | Buckeye Reclamation, OH<br>08/19/91<br><br>Municipal waste landfill that also accepted industrial sludges and liquids, most of which were deposited in a waste pit within the landfill | VOCs, benzene, TCE, toluene, PAHs, metals, arsenic, chromium, beryllium, lead | Solid waste landfill cap, leachate seep and GW collection system, treating collected wastewaters with constructed wetlands, discharge onsite to creek, long-term GW and SW monitoring, deed and land use restrictions, GW use restrictions, site access restrictions including fencing.<br><br>EPA is invoking a waiver of RCRA closure requirements due to the steepness of the landfill slopes which make construction of a RCRA Subtitle C cap technically impracticable. | Contaminants discharged from the wetlands treatment system will not exceed NPDES discharge limits |
| 5 | Byron Johnson Salvage, IL<br>03/13/85<br><br>Junk yard and unregulated landfill accepting domestic refuse and drummed industrial waste | Lead, cyanide, arsenic, halogenated organics, PCBs | Offsite disposal (including RCRA landfill and/or incineration) of all surface and buried drums on the salvage yard site, offsite disposal (including RCRA landfill and/or incineration) of highly contaminated soils which exhibit the EP-toxicity characteristic, in-situ treatment with sodium hypochlorite and ammonia of soil that contains cyanide over 1 ppm | Unspecified |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | E.H. Schilling Landfill, OH 09/29/89<br><br>Landfill that accepted nonhazardous and hazardous waste | VOCs, benzene, PAHs, pesticides, phenol, metals, arsenic | Excavation of 500 yards$^3$ of sediment and 750 yards$^3$ of surface soil for consolidation in the landfill, construction of a 2.7-acre RCRA cap to contain 100,000 yards$^3$ | Unspecified |
| 5 | Enviro-Chem Corp., IN 09/25/87<br><br>Two sites, one a chemical recycling company and the other a municipal landfill. Accepted over 16 million gallons of hazardous substances. | Inorganics, organics, pesticides, acids, BNAs, oils, VOCs, benzene, 1,1-DCE, TCE | Deed and access restrictions to prevent future development of the sites, multi-layer RCRA cap over both sites, rerouting surface waters to reduce potential for contaminant movement to surface water, leachate collection and treatment for NSL, GW collection and treatment for both sites, monitoring to ensure effectiveness of remedy components listed above | Unspecified |
| 5 | Folkertsma Refuse, MI 06/28/91<br><br>Industrial landfill for disposal of foundary sand, chemical products, construction debris, and other industrial wastes | VOCs, SVOCs, PCBs, metals, arsenic, chromium, nickel | Excavating and dewatering contaminated sediment from adjacent creek and consolidating in landfill, clay cap, passive gas venting if necessary, surface drainage measures, monitoring GW and SW, deed and GW use restrictions, site access restrictions such as fencing | N/A |
| 5 | Forest Waste Products, MI 06/30/86<br><br>Landfill accepting general refuse, industrial waste, PCBs, and spent sulfuric acid | Heavy metals, organics | Dispose of 4,000 yards$^3$ of contaminated sludges as well as sediments and soils in an offsite RCRA landfill, dispose of 110,000 gallons of aqueous lagoon wastes at a RCRA treatment facility | Unspecified |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | Forest Waste Disposal, MI<br>03/31/88<br><br>Landfill accepting general refuse, industrial waste, PCBs, and spent sulfuric acid | VOCs, toluene, TCE, pesticides, PAHs, PBBs, metals, arsenic, lead | Removal and either onsite or offsite incineration of 4,000 drums and associated contaminated soil, installation of a RCRA cap, slurry wall, installation of a dewatering system, installation of a leachate collection system with treatment and disposal of collected leachate, deed restrictions to prevent use of the GW as a drinking water source, access restrictions, GW monitoring | GW: MCLs<br>Cumulative Cancer Risk Level based on suspected carcinogenic contaminants |
| 5 | Fort Wayne Reduction, IN<br>08/26/88<br><br>Municipal landfill that accepted industrial and liquid wastes | Metals, organics, PCBs, PAHs, phenols, VOCs | Eastern: Deed and access restrictions, soil capping consistent with state solid waste closure requirements, long-term GW monitoring<br><br>Western: Excavation, reconsolidation, and on- or offsite incineration of contaminated soil within the 100-year floodplain, install and maintain GW collection system as well as treatment if necessary, install soil cover<br><br>Both: Install and maintain a fence around the site to protect the soil covers and restrict public access to the site, limit both present and future use of the site and limit the installation of wells on the site through deed restrictions, provide and maintain flood protection measures for that portion of the site within the 100-year floodplain, compensate for any loss of wetlands due to remedy construction by enhancing an onsite wetland | Unspecified |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | Fultz Landfill, OH<br>09/30/91<br><br>Sanitary landfill accepted household commercial and industrial solid waste | VOCs, benzene, PCE, TCE, toluene, xylenes, PAHs, phenols, metals, arsenic, chromium, lead | Constructing and maintaining berm, multi-layer cap, installing structural supports for voids in the underground mine to prevent cap damage by subsidence, GW and leachate collection system, treatment of GW and leachate by oxidation, precipitation, filtration, carbon adsorption or using another treatment based on a bench-scale treatability study, onsite discharge to surface water, regenerating or disposal of spent carbon offsite, disposal of treatment sludge offsite, run-on controls, wetlands mitigation, connecting affected homes to municipal water supply, monitoring soil, sediment, GW and air, deed and GW use restrictions, site access restrictions such as fencing | Unspecified |
| 5 | Industrial Excess Landfill, OH<br>OU-1<br>09/30/87<br><br>Municipal landfill that accepted chemical wastes | Inorganics, organics, VOCs | Provide alternative water to approximately 100 homes located west of the site | Will be set in future ROD |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | Industrial Excess Landfill, OH<br>OU-2<br>07/17/89<br><br>Municipal landfill that accepted chemical wastes | VOCs, benzene, vinyl chloride, PCE, carcinogenic PAHs, metals, methane | Installing a multilayer RCRA cap over the site to prevent surface water infiltration, expanding the existing methane venting system to accommodate the potential increase of landfill gas due to the cap, extracting and treating approximately 256 million gallons of GW by air stripping/carbon adsorption/flocculation/sedimentation/ filtration/discharge to surface water, continuing the P&T to maintain a lowered water table and protect GW from additional contamination by the landfill, treating surface water from ponds at the site, dredging sediment from the ponds and ditch and incorporating them under the cap, multimedia monitoring, use restriction on future use of the site property, installation of fencing around the perimeter of the site | Unspecified |
| 5 | Ionia City Landfill, MI<br>09/29/89<br><br>Municipal landfill that accepted commercial and municipal wastes including drummed liquids and solids from industrial sources | VOCs, vinyl chloride, methyl chloride, organics, metals, chromium | In-situ vitrification of the defined point source area and an adjacent margin of safety zone including an offgas collection and treatment system, access restrictions, GW monitoring, fencing the site to restrict access, institutional controls to restrict site use and adjacent properties, upgrading the landfill cover and repairing the side slopes followed by revegetation | Unspecified |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | Janesville Disposal facility, WI<br>12/29/89<br><br>Consists of two NPL sites and two non-NPL sites, all landfills | VOCs, benzene, PCE, TCE, arsenic | Ashbeds: Access/land use restrictions, containment of subsurface soils by maintaining the present cap and upgrading the present cap and site drainage as needed, GW monitoring, removal of ash pile<br><br>Old landfill: Access/land use restrictions, recovery and treatment of landfill gas by means of extraction and flaring, upgrading of cap to meet state regs, GW monitoring<br><br>New landfill: Access/land use restrictions, recovery and treatment of landfill gas by means of extraction and flaring, upgrading cap to meet state regs, continued monitoring of air and GW, improving leachate collection system<br><br>Old dump: No action, access/land use restrictions, GW monitoring<br><br>Overall: P&T until below state regs | GW treated at MCLs or state regs<br><br>Surface water will meet surface water quality standards |
| 5 | Kentwood Landfill, MI<br>03/29/91<br><br>Municipal landfill constructed into the uppermost aquifer | VOCs, benzene, PCE, TCE, metals, arsenic, chromium, lead | RCRA Subtitle D cap, gas venting, leachate collection system, leachate treated at POTW, leachate treated onsite if necessary to meet POTW pretreatment standards, GW extraction followed by treatment at POTW, extracted water will be treated onsite to meet POTW pretreatment standards if necessary, monitoring of GW, SW, sediment and air, GW and land use restrictions, site access restrictions such as fencing | GW:<br>Benzene - 1 µg/L (state)<br>PCE 0.7 µg/L (state)<br>TCE - 3 µg/L (state)<br>Arsenic - 0.02 µg/L (state)<br>Chromium - 30 µg/L (state)<br>Lead - 5 µg/L (state) |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | K&L Landfill, MI<br>09/28/90<br><br>Municipal landfill used for disposal of refuse, and liquid and drummed chemical wastes | VOCs, benzene, toluene, xylenes, acids, PAHs, PCBs, phenols, metals, chromium, lead | RCRA multi-layer cap, gas venting, GW extraction, treatment by bioremediation/fixed-film bioreactor and aeration, conducting treatability studies to ensure the effectiveness of the selected technology, discharge by either onsite reinjection, onsite filtration pond, or offsite discharge to a POTW, disposing of any resulting sludges, continued GW, SW, and air monitoring, closure and abandonment of affected residential wells, GW and land use restrictions, site access such as fencing | GW:<br>Acetone - 700 µg/L (state)<br>Benzene - 1.0 µg/L (state)<br>Toluene - 40 µg/L (state)<br>Vinyl chloride - 0.02 µg/L (state)<br>Xylenes - 20 µg/L (state)<br>Phenols - 300 µg/L (state)<br>Lead - 5.0 µg/L (state) |
| 5 | Kummer Sanitary Landfill, MN<br>09/29/90<br>(OU3-Groundwater)<br><br>Mixed municipal waste landfill | VOCs, benzene, PCE, TCE, vinyl chloride | GW extraction, treatment using advanced oxidation processes (e.g., ozone, hydrogen peroxide, or ultraviolet light) and lime soda softening, disposal of precipitated sludge, polishing the effluent stream with granular activated carbon, discharge to onsite infiltration pond, GW monitoring.<br><br>Treatability studies for bioremediation are planned, and the ROD will be amended if treatment is changed to biotreatment. | GW:<br>PCE - 5 µg/L<br>TCE - 5 µg/L<br>Benzene - 5 µg/L |
| 5 | Lemberger Landfill Inc., WI<br>09/23/91<br><br>Open dump later licensed as municipal landfill that accepted municipal waste, power plant fly ash, and bottom ash | VOCs, PCE, TCE, toluene, xylenes, PCBs, pesticides, metals, arsenic, chromium, lead | Clearing and regrading to smooth out existing cap, multi-layer cap, slurry wall around perimeter of waste, installing at least one low volume extraction well in upper aquifer within slurry wall, GW extraction, treatment by electrochemical precipitation, granular activated carbon, offsite disposal of treatment sludge, recycling spent carbon if possible, discharge to onsite river, alternate water supply, mitigating affected wetlands, GW monitoring, deed and GW use restrictions, security fence | GW:<br>TCE - 0.18 µg/L (state)<br>PCE - 0.1 µg/L (state)<br>Toluene - 68.6 µg/L (state)<br>Xylenes - 124 µg/L (state)<br>Arsenic - 5 µg/L (state)<br>Chromium - 5 µg/L (state)<br>Lead - 5 µg/L (state)<br>PCBs - 0.5 µg/L (PMCL) |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | Mason County Landfill, MI<br>OU-1<br>09/28/88<br><br>Sanitary landfill that accepted industrial slurry and sludge wastes | VOCs, benzene, PCE, TCE, xylene | Construction of a RCRA cap over landfill, access restrictions, deed restrictions on and near the site to prohibit use of the shallow aquifer, GW monitoring | Unspecified |
| 5 | Metamora Landfill, MI<br>09/30/86<br><br>Private municipal landfill accepting industrial waste. Discovered as many as 35,000 drums onsite | VOCs, PCE, TCE, heavy metals | Excavate and dispose of all waste at an offsite RCRA incinerator | Unspecified |
| 5 | Metamora Landfill, MI<br>09/28/90<br>(OU2-GW and leachate)<br><br>Industrial and Municipal Landfill | VOCs, benzene, PCE, TCE, xylenes, metals, arsenic, barium | GW extraction, precipitation/flocculation, air stripping, recharge to shallow aquifer, offsite treatment and disposal of flocculation sludge and spent carbon, multi-layer clay cap, gas collection and flaring, GW monitoring, deed and GW use restrictions, access restrictions | GW:<br>Benzene - 1.0 µg/L (state)<br>PCE - 0.7 µg/L (state)<br>TCE - 3.0 µg/L (state)<br>Xylenes - 20 µg/L (state) |
| 5 | Michigan Disposal Service Landfill, MI<br>09/30/91<br><br>Municipal landfill accepted waste from residences, businesses and industries, some of which was incinerated onsite with onsite disposal of the ash | VOCs, benzene, PCBs, metals, arsenic, chromium, lead | Clay cap, leachate collection system, gas venting system, pumping and pretreating GW onsite as required, offsite discharge of GW and leachate to POTW, monitoring all media, institutional controls and site access restrictions including fencing | GW:<br>Benzene - 1 µg/L (state)<br>Arsenic - 0.02 µg/L (state)<br>Lead - 5 µg/L (state) |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | Midstate Disposal Landfill, WI<br>09/30/88<br><br>Municipal/industrial landfill | VOCs, benzene, PCE, TCE, metals | Installation of new soil/clay caps for lagoon and landfills, site monitoring that includes GW as well as surface water and landfill gas monitoring, onsite GW monitoring, alternate water supply for residents, improvement of surface water drainage, offsite treatment of leachate, site fencing and sign posting, onsite road construction, institutional controls to prevent well installation within the site boundary | Unspecified |
| 5 | Oak Grove Landfill, MN<br>OU-1<br>09/30/88<br><br>Sanitary landfill that reached capacity in 1983, received oil sludge, paints, solvents, pesticide wastes | VOCs, ethyl benzene, toluene, xylenes | Installation of a security fence, capping with a final cover system consisting of a gas control layer, a barrier layer of low-permeable material or a flexible membrane and a drainage layer, topsoil cover and vegetation, deed restrictions, consideration of treatment options for air emissions from gas vents after construction of the final cover, consideration during design of the need for extra protection for frost damage without significantly increasing cost or likelihood of failure, air and GW monitoring | Unspecified<br><br>Printout incomplete |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | Oak Grove Sanitary Landfill, MN<br>12/21/90<br>(OU2-shallow GW)<br><br>Municipal and industrial solid waste landfill, accepted acidic oil sludge, paint and solvent waste, foundry sands and sludge, inorganic acids, metal sludge, and chlorinated organic compounds from pesticide manufacturing. In addition, lime sludge was used as a cover material on two thirds of landfill. | VOCs, benzene, toluene, xylenes, metals, arsenic | Monitoring of shallow and deep aquifers, surface water and sediment, natural attenuation for shallow GW, abandoning of non-essential wells, GW use restrictions | N/A<br><br>Printout incomplete |
| 5 | Onalaska Municipal Landfill, WI<br>08/14/90<br><br>Municipal landfill that accepted solvent wastes | VOCs, benzene, toluene, xylenes, TCE, PAHs, metals, arsenic, lead | In-situ bioremediation of solvent-contaminated soil and a portion of the landfill debris, P&T of plume using aeration/ clarification/filtration/discharge to surface water and onsite disposal of sludge, reconstruction of the landfill cap and installation of a passive methane gas venting system to control the gas buildup under the cap, GW monitoring, institutional controls such as deed restrictions limiting GW and surface water use | Soil: 80-95% reduction of organic contaminant mass<br><br>GW:<br>Benzene - 0.067 µg/L<br>Toluene - 68.6 µg/L<br>Xylene - 124 µg/L<br>Ethylbenzene - 272 µg/L<br>Arsenic - 5 µg/L<br>Barium - 200 µg/L<br>Lead - 5 µg/L<br>Trichloroethene - 0.18 µg/L<br>1,1-Dichloroethane - 0.04 µg/L<br>1,1,1-Trichloroethane - 40 µg/L<br>1,1-Dichloroethene - 0.024 µg/L |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | Pagel's Pit, IL<br>06/28/91<br><br>Active sanitary landfill which is a former sand and gravel quarry with a sealed asphalt liner that covers part of the landfill base, accepted municipal waste, sewage sludge, and limited amounts of other wastes | VOCs, 1,2-dichloroethene, vinyl chloride, metals, arsenic, barium, manganese, thallium, zinc | Sanitary landfill cover, GW pumping, ion exchange or coagulation/flocculation if necessary, carbon adsorption or air stripping, carbon polishing, onsite discharge to surface water, offsite regeneration or disposal of spent carbon, extracting and treating leachate offsite at POTW, gas extraction for use as fuel or flaring, monitoring GW, leachate and air, deed restrictions | N/A |
| 5 | South Macomb Disposal #9, MI<br>08/13/91<br>(OU1-GW)<br><br>Two inactive municipal landfills | VOCs, benzene, toluene, phenols, metals, arsenic, chromium | Extraction wells in intermediate aquifer, subsurface drains in shallow aquifer, collecting GW and leachate in a series collection sumps, followed by pumping to the onsite GW treatment system, air stripping, granular activated carbon, oxidation/precipitation, granular media filtration, onsite discharge to surface water, disposal of any treatment residuals offsite, extending existing slurry wall, providing a municipal water supply to any residences not already connected, long-term monitoring, deed and GW use restrictions, site access including fencing | GW:<br>Benzene - 2 µg/L (state)<br>Toluene - 100 µg/L (state)<br>Phenols - 1,100 µg/L (state)<br>Arsenic - 1 µg/L (state)<br>Chromium - 100 µg/L (MCL) |
| 5 | Spiegelberg Landfill, MI<br>OU-1 Paint Sludge<br>09/30/86<br><br>Landfill that accepted septic, domestic, and industrial wastes including paint sludge | Unspecified | Excavation of contaminated soils and wastes from former drum storage areas and sediments from ponds for offsite disposal to a RCRA facility, backfilling and placement of a 24-inch soil cover over former drum storage areas, installation of fence around the perimeter of drum storage areas | Target Carcinogenic Risk Level - $10^{-6}$ |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 5 | Spiegelberg Landfill, MI<br>OU-2 GW Plume<br>06/29/90<br><br>Landfill that accepted septic, domestic, and industrial including paint sludge | VOCs, benzene, toluene, xylenes, lead | P&T with chemical precipitation/pH adjustment/biological treatment/air stripping/GAC/onsite discharge to GW, deed restrictions, GW and well water monitoring | Benzene - 1.2 µg/L ($1x10^{-6}$ risk)<br>Toluene - 40 µg/L (taste and odor thresholds)<br>Lead - 5.0 µg/L (human lifecycle safe concentrations)<br>Vinyl chloride - 0.5 µg/L<br>2-Butanone - 350 µg/L<br>2-Hexanone - 50 µg/L<br>Xylenes - 20 µg/L |
| 5 | Waste Disposal Engineering, MN<br>12/31/87<br><br>Sanitary landfill that received hazardous chemicals; 3,200,000 gallons and 2,500,000 $yards^3$ of waste are estimated to have been disposed of onsite | VOCs, organics | P&T with carbon adsorption/offsite discharge to Coon Creek, installation of RCRA cap to cover entire 73-acre landfill, installation of clay slurry wall, implementation of institutional controls including well use restriction, filling in of a wetland and construction of an alternate wetland area, extensive monitoring | Unspecified |
| 6 | Cleve Reber, LA<br>03/31/87<br><br>Municipal/industrial landfill | Unspecified | Excavation and onsite incineration of buried drums and sludges, drain and backfill onsite ponds, nonincinerable waste will be solidified, RCRA cap, GW monitoring | Unspecified |
| 6 | Hardage/Criner, OK<br>OU-1<br>11/14/86<br><br>Permitted landfill for industrial and hazardous wastes | 1,2-DCE, 1,1,2-TCA, 1,1-DCE, PCE, TCE, lead, chromium, PCBs, toxaphene | Treatment and disposal of solids in an onsite RCRA landfill cell, incineration of organic liquids, unspecified treatment of inorganic liquids | Unspecified |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 6 | Industrial Waste Control, AR<br>06/28/88<br><br>Industrial waste landfill that accepted municipal and industrial trash | VOCs, toluene, organics, metals, arsenic, lead chromium | Installation of a french drain along the south, west, and east sides of the site with a synthetic liner or other barrier such as a slurry wall installed on the site side of the french drain, excavation of liquid-filled drums with offsite disposal, excavation and onsite stabilization of soil with onsite disposal of residual matrix in the excavation pit, categorization of solid and liquid wastes resulting from previous investigations with disposal consistent with soil materials, P&T with either offsite treatment of water, mixture with contaminated soil and stabilized onsite, or onsite treatment with discharge to be determined during design, multilayer RCRA cap, surface water diversion using ditches and berms, access and land use restrictions, GW and site monitoring | Unspecified |
| 6 | Jacksonville Municipal Landfill, AR<br>09/27/90<br><br>Municipal landfill used for drummed or loose waste, burning of waste in unlined trenches | Pesticides, dioxin | Sampling of soil to determine the amount of contaminated soil and debris onsite, excavate and thermally treat soil exceeding 10 mg/kg TCDD with disposal at the adjacent Vertac facility, excavate and treat debris onsite, backfilling, revegetate excavated areas at the site, monitor GW, implement institutional controls included deed restriction, GW use restrictions, and land use restrictions. | Action levels for TCDD set by CDC at 10 mg/kg for offsite treatment. Soil with TCDD concentrations exceeding 1.0 mg/kg but below 10 mg/kg will be covered with one foot of soil. |
| 6 | Rogers Road Municipal Landfill<br>09/27/90<br><br>Landfill accepted municipal and chemical waste, including herbicides and associated dioxin impurities | Dioxins/furans, dieldrin, herbicides | Excavation of highly contaminated soil and debris (50 yards$^3$) with offsite temporary storage pending thermal treatment, capping, institutional controls including GW and land use restriction, GW monitoring | Soils:<br>2,3,7,8-TCDD 1 µg/kg for surface soils - 10 µg/kg when covered by at leat 12 inches of clean fill<br>Dieldrin - 37 µg/kg |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 6 | Tenth Street Dump/Junkyard, OK<br>09/27/90<br><br>Municipal landfill also used as a salvage yard, accepted paint thinners and transformers | PCBs | Removing red clay cover and plastic liner, excavating PCB-contaminated soil with concentrations above 25 mg/kg, treatment of soil with chemical dechlorination and carbon adsorption to control air emissions, backfilling/regrading the excavated area with clean and treated soil | PCB - 25 mg/kg (TSCA) |
| 7 | Lawrence Todtz Farm Site, IA<br>11/04/88<br><br>Landfill that received municipal wastes as well as cellophane process wastes | VOCs, toluene, carbon disulfide, tetrahydrofuran, benzene, metals, arsenic, lead, chromium | Installation of soil cover over DuPont impoundment, implementation of institutional controls including deed and land use restrictions, provision of an alternate water supply for an affected residence, GW monitoring<br><br>If GW monitoring indicates that contaminant levels exceed the chemical-specific action levels provided, GW P&T will be implemented. If the more stringent action levels are exceeded, a treatability study of the impoundment waste will be conducted, and either a permanent treatment remedy of the impoundment material or a cap and slurry wall containment system will be implemented. | Arsenic in GW: 50 µg/L (MCL) |
| 7 | Shaw Avenue Dump, IA<br>09/27/91<br>(ROD only addresses landfill material)<br><br>Municipal landfill used for incineration of wastes and disposal of liming sludge from POTW, asphaltic materials and chemical wastes | VOCs, benzene, toluene, xylenes, PAHs, metals, arsenic, lead | In-situ fixation/stabilization of chemical fill and contaminated soil, low permeable cap, GW monitoring, deed restrictions, and site access restrictions including fencing.<br><br>If treatability studies show that fixation/stabilization is ineffective for the chemical fill and contaminated soil then this material will be excavated and removed to a RCRA approved landfill. | N/A |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 7 | Wheeling Disposal Service Co Inc., MO<br>09/27/90<br><br>Industrial and sanitary landfill, trenches used for disposal of solid and liquid wastes | VOCs, TCE, toluene, pesticides, metals, arsenic, chromium, lead | Upgrading existing cap with clay and soil cover, long-term monitoring of GW and SW, abandoning onsite wells, deed restrictions, access restrictions.<br><br>Contingency for collection and treatment of GW and SW if performance criteria are exceeded. | N/A |
| 7 | White Farm Equipment Co Dump, IA<br><br>Active landfill, former sand and gravel quarry, disposed of wet scrubber sludges, foundry sands, baghouse dusts, and other industrial wastes | VOCs, benzene, toluene, metals, arsenic, lead, chromium | Regrading and covering landfill with impermeable layer of topsoil, vegetation, GW pumping, air stripping, onsite discharge of treated water, controlling air emissions by carbon adsorption, offsite disposal of residuals, monitoring metals contamination and adding a metals treatment train as needed, GW monitoring, site access restrictions, institutional controls, deed restrictions | GW:<br>Benzene - 1 µg/L (state) |
| 8 | Marshall Landfill, CO<br>09/26/86<br><br>Municipal landfill accepted sewage sludge and hazardous wastes | TCE, PCE, DCE, benzene, heavy metals, cadmium, lead | Subsurface collection system using natural GW gradients to collect all contaminated GW leaving the Marshall Landfill site, treatment of contaminated GW by sedimentation, air stripping, and offgas carbon adsorption, landfill improvements including regrading, revegetation, perimeter ditches, and fences to minimize future environmental and public health impacts from the site | Unspecified |

## Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 9 | Nineteenth Avenue Landfill, AZ<br>09/29/89<br><br>Sanitary landfill that accepted municipal refuse, solid and liquid industrial wastes, medical wastes, materials containing low levels of radioactivity | VOCs, toluene, xylenes | Containing landfill wastes onsite by constructing an impermeable cap and surface drainage structures over the landfill as well as soil-cement levees along the river at the landfill boundary, widening the river channel, collecting and flaring landfill generated gases, institutional controls and access restrictions, air and GW monitoring | Soil:<br>TCE - 320 µg/kg<br>1,1-DCE - 700 µg/kg<br>4,4'-DDE - 1,000 µg/kg<br>4,4'- DDT - 1,000 µg/kg |
| 10 | Colbert Landfill, WA<br>09/29/87<br><br>Municipal/commercial landfill | VOCs, TCA, 1,1-dichloroethane, TCE, PCE, methylchloride | Prevent spread of contaminated GW in two aquifers by installing and operating interception wells, remove contaminated materials which have entered the aquifers and are contributing to the contaminant plume by installing extraction wells in plumes, treat all extracted GW from interception and extraction wells, provide alternative water supply system to any residents deprived of their supply due to contamination from the landfill | Water Quality Standards for Waters of the State of Washington WAC 173-201 |

# Appendix C. Summarization of Records of Decision Related to Landfills (Cont'd)

| EPA Region | Site Name/ ROD Date | Contaminants of Concern | Components of Selected Remedy | Cleanup Goals |
|---|---|---|---|---|
| 10 | Northside Landfill, WA<br>09/30/89<br><br>Landfill that accepted residential and light commercial refuse | VOCs, PCE, TCA, TCE, iron, lead | Immediate closing of the inactive units of the landfill with final closing of the active portion by 1992, capping all disposal units, constructing an interim P&T facility with discharge into surface water, GW monitoring, providing an alternate supply of drinking water to residences affected by the contaminated GW, implementing institutional controls to restrict site access, protect the landfill cap, prevent construction of domestic wells in the contaminated plume, control landfill gas emissions | SDWA MCLs<br><br>Chromium - 1,500,000 µg/kg<br>Arsenic - 100,000 µg/kg<br>Barium - 5,000,000 µg/kg<br>Cadmium - 1,000 µg/kg<br>Lead - 700,000 µg/kg<br>Mercury - 5,000 µg/kg<br>Zinc - 2,000,000 µg/kg<br>PCE - 67 µg/kg<br>PCBs - 0.79 µg/kg<br>Trichlorofluoromethane - 19 µg/kg<br>Ethylbenzene - 68,000 µg/kg<br>Xylenes - 44,000 µg/kg<br>o-Dichlorobenzene - 62,000 µg/kg<br>p-Dichlorobenzene - 7,500 µg/kg |

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