



COMMUNITY OUTREACH PROGRAM MATERIALS FOR LOWRY LANDFILL

LOWRY LANDFILL REMEDY OVERVIEW

Introduction

On March 10, 1994, the U.S. Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) signed the Record of Decision (ROD) that formally laid out a plan for addressing contamination at the Lowry Landfill Superfund Site. The plan is based on the concept of “containment,” which means protective measures are put in place to keep contamination above certain carefully established standards onsite and out of potential contact with the surrounding environment and community.

Containment is an accepted practice at CERCLA (Comprehensive Environmental Response, Compensation and Liability Act) municipal landfill sites around the United States because the volume of contaminated materials at such sites is typically too large to safely remove and transfer elsewhere; left in place, the materials represent a relatively low long-term threat; and treatment is impracticable due to the size and heterogeneity of the contents.

The ROD was revised in 1995, 1997, 2005 and 2007 to reflect new information and minor remedy changes. Primarily technical in nature, none of the changes fundamentally altered the sitewide containment remedy, which is continually monitored and upgraded as necessary to make certain that it will effectively protect human health and the environment for the foreseeable future. Following are more detailed explanations of the individual components that make up the remedy for the Lowry Landfill site.

Underground Barrier Walls

An underground barrier wall is a vertical wall constructed of metal, compacted clay or a soil/bentonite mixture that helps prevent lateral movement of buried wastes or contaminated groundwater from leaving the site. At Lowry, compacted clay and soil/bentonite walls are in use, anchored into underlying bedrock and extending to approximately five feet beneath the ground surface. In 1984, as a preliminary step while the ROD was being researched and developed, a compacted clay barrier and collection drain immediately upstream of the barrier were installed at the north end of the site to capture shallow contaminated groundwater approaching the northern boundary of the site. The North Boundary Barrier Wall system remains in place and operating today.

In February of 1997, in accordance with the ROD, EPA and CDPHE approved a design for an additional wall to be built around the east, west and south sides of the site. Completed in the spring of 1998, this wall is constructed of a soil/bentonite mixture. Groundwater levels are monitored inside and outside of the wall, and pumping wells were constructed where necessary to maintain inward gradients across the wall. The wall and pumping wells not only prevent contaminated groundwater from escaping the site, but also minimize the occurrence of groundwater from outside the wall flowing inward and contacting contaminated materials.

Onsite Water Treatment Plant

At the same time the North Boundary Barrier Wall was installed in 1984, a plant to treat contaminated groundwater captured by the barrier wall system was constructed. The plant was similar to those constructed as part of cleanup remedies at many other landfill sites around the country. In 1992, the water treatment plant was upgraded to treat a broader range of contaminants. The 1994 ROD required that the plant be upgraded even further or replaced with a new plant to accept groundwater from newly constructed remedy elements. Construction began on a new plant in 1999 and was completed in March 2000. The plant was further upgraded in 2004. Today, the plant treats approximately 900,000 gallons of water each month. The water comes from various locations around the Lowry Landfill site. After the water is treated, it is piped offsite into the municipal sewer system and then further treated at the Metro Wastewater Reclamation District and Aurora's wastewater treatment facilities.

North Toe Extraction System

Constructed in 1998, the North Toe Extraction System extracts and pumps contaminated water that originates underneath the landfill mass. The term "north toe" refers to the fact that the extraction system is located at the northern edge of the former landfill area, which is near the center of the Lowry Landfill site. The system works by collecting groundwater that migrates from beneath the landfill mass into a lined trench. The water is then pumped from the trench through underground pipes to the water treatment plant.

Landfill Gas-to-Energy Plant

Most landfills naturally produce gases as the materials within the landfills degrade. In July of 2007, the City & County of Denver and Waste Management broke ground on a new, regulator-approved plant that will collect landfill gas and burn it in four combustion engines to generate electricity for a local utility. Utilizing gas from both the Lowry Landfill and the adjoining Denver-Arapahoe Disposal Site (DADS), the plant will produce 3.2 megawatts of electricity, enough to power 3,000 homes while at the same time reducing emissions of greenhouse gases. Expected to be completed in 2008, the new plant will replace the existing landfill gas treatment system at Lowry, which is an enclosed burner where methane and any organic compounds in the landfill gas are destroyed. The plant will achieve the same landfill gas treatment standards as the enclosed burner.

The Lowry gas collection system consists of 64 extraction wells that are drilled into and screened across buried landfill solids. The wells are connected by a series of buried pipes that convey extracted gas to the enclosed burner (current) or to the gas-to-energy plant (online in 2008). In addition, Lowry landfill is surrounded by 21 gas-monitoring probes positioned along the perimeter of the site to confirm that gases are not leaving the site. Similarly, gas monitoring probes are positioned around the DADS landfill and monitored to ensure that landfill gases from DADS are not leaving the facility. These monitoring probes will remain in place throughout operations of the gas-to-energy plant.

For more information, please see the “Landfill Gas to Energy Project” section of this website.

North Face Landfill Cover

The 1994 ROD required that an additional two feet of compacted clay cover be placed over the two-foot soil cover that had been placed on the north face of the landfill mass in 1990. Completed in 1999, the new cover involved placing approximately 100,000 cubic yards of soil and clay over 29 acres. The placement increased the total thickness of the north face cover to four feet, equal in thickness to the covers on other surface areas of the landfill mass. The cover is designed to reduce the potential for infiltration of rain and surface water into the landfill mass, prevent erosion, further reduce the potential for landfill gas release and better contain the landfill waste.

New Landfill Cover

Closed depressions in the landfill cover were filled and regraded in 2002, but the top surface of the landfill remained relatively flat (in many areas, less than 1% positive slope off of the cover). This prompted an evaluation of long-term maintenance alternatives that would continuously promote positive drainage of precipitation off the cover. In 2005, CDPHE approved an Engineering Design and Operations Plan (EDOP) that would entail construction of a cover with a 5% slope, that over time, might reduce to a 2-4% slope as the landfill mass settled. The EDOP allowed for placing construction and demolition debris and other inert waste over the top of the current landfill, followed by construction of another top cover.

Former Tire Pile Area Remedy

During the 1970s and 1980s, some six to 10 million tires accumulated at the Lowry Landfill. The tires were placed on top of other waste that had been placed in three separate pits, each approximately 20-30 feet deep. In 1989 the tires were removed, shredded and placed in an onsite monofill for future use as a fuel source. The three waste pits that lay under the tires collectively became known as the Former Tire Pile Area (FTPA) and were given special attention under the ROD because they contained accessible contaminated soil and waste liquids.

The original ROD called for materials in the FTPA to be excavated and transported offsite for treatment and disposal, but modifications made to the ROD by the EPA in 1997 allowed for containment and treatment of these materials onsite. Waste materials were removed from the middle pit and successfully treated onsite. In 2005, EPA presented several alternatives for addressing contamination in the north and south pits. Following a period of public and official review, EPA selected a proposed remedy that combines excavation, offsite disposal and onsite containment and monitoring. This decision was formalized through an additional amendment to the ROD.

For more information, please see the “Former Tire Pile Area” section of this website.

Groundwater Monitoring Wells and Compliance Program

There is an ongoing groundwater monitoring program at the Lowry Landfill to verify that the site remedy remains effective and protective. Over the many years that the site has been investigated and the remedy has been implemented, hundreds of wells have been drilled and used to monitor the movement of and contaminant levels in the groundwater underlying the site. In addition, hundreds of borings have been drilled into the site so that the removed soil could be tested for contaminants. In 2005, EPA approved an updated comprehensive groundwater monitoring program for the Lowry Landfill Superfund Site. The program is helping to ensure that the groundwater containment remedy remains effective and protective, and in compliance with water quality standards.

For more information, please see the “North End Monitoring and Response Action” section of this website.

Land Surrounding the Site

Although not part of the formal EPA remedy, Denver and Waste Management as an added precaution purchased properties around the former landfill. Ownership of these properties prohibits future groundwater use and control future development around the site so that the only allowable land uses are compatible with the remedy. The properties are one-half mile wide on the east, west and south sides of the site. (No such zone was purchased to the north because the active Denver Arapahoe Disposal Site facility adjoins the Lowry Landfill site at the north end.)

Five-Year Reviews

The federal law that created the Superfund process requires that EPA thoroughly review a contaminated site every five years to determine if the prescribed remedy is protective of human health and the environment.

With cooperation from CDPHE, local officials and the general public, EPA completed the second Five-Year Review of the Lowry Landfill site in February 2007. In its final report, the EPA concluded that the Lowry remedy “is functioning as intended” and “is

protective of human health and the environment.” A copy of the full report can be found on the EPA’s website at www.epa.gov/region8/superfund/co/lowry/index.html. Hard copies can also be found on file at the EPA Superfund Records Center at 1595 Wynkoop Street in Denver, Colorado (303-312-6473), and at the Aurora Central Public Library at 14949 East Alameda in Aurora, Colorado (303-340-2290).

The next Five Year Review is scheduled to be completed in 2011.