

December- 2008 Update

Lowry Landfill Superfund Site
Arapahoe County, CO
(Five-Year Review Date: 2/7/2007)

Highlights Since the 2007 Five-Year Report

- Stormwater Monitoring Plan updated November 2007; Agency review and approval nearing completion
- Plume intercept wells with extraction and treatment underway

Brief Site History: In 1964, the land was deeded to the City and County of Denver and used as a municipal and industrial landfill, operating from 1965 until 1980. During that time, millions of gallons of industrial wastes were dumped into unlined pits. Some of these hazardous wastes leached down into nearby ground and surface waters. From 1971 to 1979, citizens complained to regulatory authorities regarding fires, disposal practices and odors. Beginning in the mid-70's EPA, the United States Geological Survey, the Colorado Department of Public Health and Environment (CDPHE) and the City of Denver investigated groundwater, surface water and sediment, air quality and soil gas. In 1980, Waste Management began operating the landfill under a contract with Denver. The landfill stopped accepting industrial waste and began accepting only municipal refuse. In the 1980s, EPA, the CDPHE and the City and County of Denver investigated the nature and extent of contamination at the site. Groundwater contamination posed a public health threat. EPA placed the site on its National Priorities List in 1984. The site has been divided into six Operable Units (OUs) including shallow and deep groundwater, landfill solids and gas, soils, surface water and sediments. The selected site-wide remedy utilizes containment, collection, treatment and monitoring to address the contamination at the site.

Cleanup Activities Completed: To address immediate concerns of ground and surface water contamination, EPA, CDPHE and the Potentially Responsible Parties undertook two initial cleanup measures: construction of an underground barrier wall (the North Boundary Barrier Wall) and groundwater treatment plant; and a Surface Water Removal Action designed to prevent contaminated surface water from flowing off site.

On March 10, 1994, EPA and CDPHE signed the Lowry Landfill Superfund Site Record of Decision that formally selected the site-wide remedy. Contaminated groundwater is being contained, collected and treated at the site. Landfill gas is being addressed through containment, collection and treatment using enclosed flare technology (a large open-flame burner within a four-sided metal shed). Contaminated seepage and surface water are no longer exposed at the surface because of a drainage and underground collection system. The former tire-pile area will be cleaned up by excavation, proper disposal of contaminants and in-situ treatment.

In October 1997, EPA approved two changes to the 1994 ROD. First, instead of complete on-site treatment, the site's groundwater is now being pretreated on site and then piped via a sewer line to off-site treatment plants. Second, excavated drums, drum contents and contaminated soils in the former tire-pile area are being treated and disposed of on site, instead of off site

Current Status: There is an ongoing monitoring program at the Lowry site to check compliance with the performance standards in the ROD. In addition, an early warning monitoring well system is in place to identify contaminants which could impact water treatment plant operations. A pilot study of soil-vapor extraction (SVE) began in 2001 on the north and south pits in the Former Tire Pile Area (FTPA) and was completed in 2003. In August 2005, EPA changed the remedy for the FTPA waste pits from excavation to extraction of heavily contaminated liquids and capping. A final groundwater monitoring plan (GWMP) was implemented in February 2005.

The selected site-wide remedy also required the implementation of on-site and off-site institutional controls. The site achieved construction completion with the signing of the Preliminary Close Out Report on September 28, 2006. The second five-year review was completed February 7, 2007.

Summary of Protectiveness: The remedy for all six OUs is protective of human health and the environment.

Issues Impacting Protectiveness: Issues were noted during the 2007 Five-Year Review of the site. The following table summarizes the status of the follow-up actions addressing these issues.

**Lowry Landfill Superfund Site
Five-Year Review Update Table
(Review Date: 2/07/2007)**

Issues	Recommendations Follow-up Actions	Follow-up Actions (Status/Due Date)	Status of Follow-up Actions 12/08	Responsible Party
<p>1) Surface water monitoring has been performed since 1996 in accordance with the “Final Interim Compliance Monitoring Plan” (February 1996). The interim compliance monitoring program for surface water was intended to provide a technical basis for development of a long-term surface water monitoring program to be implemented during and following remedial action at the site. However, the current program has been in place since 1996 and has not been re-considered or developed into a long-term compliance monitoring program for surface water.</p>	<p>Develop long-term compliance monitoring plan for surface water.</p>	<p>9/30/2007</p>	<p>DONE Updated Stormwater Monitoring Plan submitted November 2007; review approval by Agency near completion.</p>	<p>Work Settling Defendants (WSDs)</p>
<p>2) Recent groundwater sampling results indicate that monitoring well MW05-WD, designated as representative of background groundwater quality for inorganic contaminants, may have been impacted by the site. The groundwater performance standards for inorganics were established based on background concentrations. It may be inappropriate to include groundwater quality data from well MW05-WD in the population of data used to calculate statistics on background levels of inorganics in groundwater in the vicinity of the site. Groundwater quality data collected from an alternate monitoring well in the vicinity of MW05-WD may be more appropriate. This does not affect protectiveness since there is no current or reasonably anticipated future exposure via the drinking water pathway.</p>	<p>Evaluate the need to replace MW05-WD as a background well and if necessary, recalculate background concentrations for inorganics in shallow groundwater using data from samples collected from the replacement well as part of the background population.</p>	<p>9/30/2007</p>	<p>Technical discussion ongoing – continuing</p>	<p>WSDs</p>

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<p>3) The chemicals 1,4 dioxane and nitrate have been detected at levels above performance standards in wells north of the site outside the effective groundwater hydraulic control area of the NBBW. The GWMP, enforceable under the Consent Decree, contains provisions for investigating the extent of the groundwater impacts and for implementing response actions to limit contaminant migration and lower the concentrations of contaminants in groundwater. In accordance with the GWMP, a groundwater investigation has been implemented north of the site and is ongoing. The investigation found 1,4-dioxane above performance standards in shallow groundwater and above State standards in surface water in Murphy Creek 2 ½ miles downstream of the site. .</p>	<p>There is no current or reasonably anticipated future exposure to the impacted surface water or groundwater via the drinking water or vapor intrusion to indoor air pathways and the potential incidental exposures to surface water by nearby residents or recreational users such as golfers are not considered to be a public health threat. Response actions to limit migration and lower the concentrations of contaminants in groundwater are required by the GWMP and are ongoing as part of the implementation of the selected remedy</p>	<p>GWMP On-going</p>	<p>Plume intercept wells, with extraction and treatment underway. – continuing as Operation & Maintenance.</p>	<p>WSDs</p>