

EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) Region 8 conducted a second five-year review of the remedial actions implemented at the Lowry Landfill Superfund Site (the Site) in Arapahoe County, Colorado. The purpose of the five-year review is to determine if the remedy at the Site is or will be protective of human health and the environment. This is the second five-year review for the Site. The triggering action for this review is the date of completion of the first five-year review, as shown in EPA's WasteLAN database: September 28, 2001. EPA selected a remedy for the Site that, upon completion, will leave hazardous substances, pollutants, or contaminants on-Site above levels that allow for unlimited use and unrestricted exposure. Therefore, five-year reviews of the remedy are required by statute.

The remedy for the Site included remedial actions for each of six operable units to address groundwater, surface water, landfill gas, landfill solids, soils and sediments. The selected Site-wide remedy utilizes containment, collection, treatment, and monitoring to address the contamination at the Site.

The remedy required a combination of engineered components to be constructed and operated to prevent off-Site migration of contamination above performance standards. If performance standards are not met during implementation or operation, the remedy requires appropriate contingency measures to be implemented. 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.

Three issues were identified during this second five-year review:

- (1) The chemicals nitrate and 1,4-dioxane have been detected at levels above performance standards in groundwater wells north of the Site outside the groundwater containment components and area of hydraulic control. In accordance with the Sitewide Groundwater Monitoring Plan (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 current State standards in surface water in Murphy Creek 2 ½ miles downstream of the Site. There is no current or reasonably anticipated future exposure to the impacted surface water or groundwater via the drinking water pathway or the vapor intrusion to indoor air pathway 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 groundwater 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.
- (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. The Work Settling Defendants should evaluate the need to replace this well and if necessary, recalculate background concentrations for inorganics in shallow groundwater using data from the replacement well.

- (3) The current interim compliance monitoring program for surface water has been in place since 1996 and has not been re-considered or developed into a long-term compliance monitoring program for surface water. The Work Settling Defendants should develop a long-term compliance monitoring plan for surface water.

The assessment of this second five-year review is that the remedy for all six operable units is functioning as intended by the decision documents. The exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection remain valid. No other information has come to light that could call into question the protectiveness of the remedy. The remedy for all six operable units is protective of human health and the environment. Because the remedy for all six operable units is protective, the Site is protective of human health and the environment.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name (from WasteLAN): Lowry Landfill Superfund Site		
EPA ID (from WasteLAN): COD 980499248		
Region: 8	State: CO	City/County: Aurora/Arapahoe
SITE STATUS		
NPL status: Final		
Remediation status (choose all that apply): Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Construction Complete <input checked="" type="checkbox"/>		
Multiple OUs?* YES	Construction completion date: September 29, 2006	
Has site been put into reuse? NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Bonnie Lavelle		
Author title: Remedial Project Manager	Author affiliation: EPA Region 8	
Review period:** April 2006 to January 2007		
Date(s) of site inspection: May 31 – June 1, 2006		
Type of review: Statutory		
Review number: : 2 (second)		
Triggering action: Previous Five-Year Review Report		
Triggering action date (from WasteLAN): September 2001		
Due date (five years after triggering action date): September 2006		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

FIVE-YEAR REVIEW SUMMARY FORM (continued)

Issues:

Issues	Affects Protectiveness (Y/N)	
	Current	Future
Surface water monitoring has been performed since 1996 in accordance with the “ <i>Final Interim Compliance Monitoring Plan</i> ” (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.	N	N
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.	N	N
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. There is no current or reasonably anticipated future exposure to the impacted surface water or groundwater via the drinking water or vapor intrusion 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.	N	N

Recommendations and Follow-up Actions:

Recommendations/ Follow-up Actions	Parties Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current	Future
Develop long-term compliance monitoring plan for surface water.	WSDs	EPA	9/30/2007	N	N
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.	WSDs	EPA	9/30/2007	N	N

Protectiveness Statements:

OU's 1 & 6: Shallow Groundwater and Surface Liquids and Deep Groundwater

The remedy for OUs 1 and 6 is protective of human health and the environment. The remedy is functioning as intended by the decision documents. The GWMP component of the remedy for OUs 1 and 6 is functioning to identify areas where concentrations of Site-related chemicals are out of compliance with performance standards at the point of compliance and to evaluate the effectiveness of the groundwater containment features of the remedy. In addition, the GWMP requires the implementation of response actions in the event that it is determined that containment may not be effective or that groundwater is out of compliance with performance standards, assuring remedial action objectives will be met and maintained. The remedy for OUs 1 and 6 also contains contingency measures which may be implemented if performance standards are not met at the point of compliance. The exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection remain valid.

The North End Investigation and response action have been implemented as required by the GWMP. The extent of 1,4 dioxane in shallow groundwater north of the Site boundary has been determined. There are no uncontrolled exposure pathways that could result in unacceptable risks to human health and the environment. The data collected during the North End Investigation indicates there are no unacceptable risks associated with potential exposures to the levels found in groundwater and surface water, even using very conservative assumptions. Therefore, the data indicates the remedy for OUs 1 and 6 is protective.

No other information has come to light that could call into question the protectiveness of the remedy.

OU 2 & 3: Landfill Solids and Landfill Gas

The remedy for OUs 2 and 3 is protective of human health and the environment. The remedy is functioning as intended by the decision documents. The exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection remain valid. No other information has come to light that could call into question the protectiveness of the remedy at OUs 2 and 3.

OU 4 & 5: Soils and Surface Water and Sediment

The remedy for OUs 4 and 5 is protective of human health and the environment. The remedy is functioning as intended by the decision documents. The exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection remain valid. No other information has come to light that could call into question the protectiveness of the remedy for OUs 4 and 5.

Comprehensive Protectiveness Statement

Because the remedy for all six OUs is protective, the Site is protective of human health and the environment.