



Colorado Department
of Public Health
and Environment

Lowry Site Remedy Progress Continues

EPA Region 8

March 2004

Lowry Landfill Superfund Site Information Update No. 16

Site Background

The Lowry site consists of about 480 acres, located in Arapahoe County, northeast of the intersection of East Quincy Avenue and Gun Club Road, approximately 15 miles southeast of downtown Denver and two miles east of Aurora. (See Figure 1 on page 3.)

From the mid-1960s until 1980, the City and County of Denver (Denver) operated an industrial and municipal waste landfill at Lowry. An estimated 138 million gallons of liquid wastes were disposed of at the Lowry site in about 75 unlined trenches. Refuse, soil, and tires were added to the pits to absorb liquids. This disposal method is referred to as "co-disposal" and was a common practice at that time. Wastes included industrial solvents, metal-plating wastes, petroleum products, pesticides, sewage sludge, paints, tires, animal carcasses, household wastes, and medical wastes.

In 1980, Waste Management of Colorado (WMC) began landfill operations under a contract with Denver, and disposal was restricted to municipal waste.

Over time, contaminated liquids from the waste pits seeped out and mixed with the surrounding solid waste, ground water, and surface water. In the mid-1970s, nearby residents complained to regulatory authorities about odors, disposal practices, and potential fire danger.

In the mid-1970s, the U.S. Environmental Protection Agency (EPA), Colorado Department of Public Health and Environment (CDPHE), Denver, and other parties began investigating the ground water,

surface water and sediment, air quality, and soil gas. In 1984, EPA designated the Lowry Landfill as a Superfund site. WMC stopped disposing of municipal solid waste (MSW) at the Lowry Landfill Superfund Site in August 1990 and placed a 4-foot-thick soil cover over the main landfill.

From 1984 to 1993, studies identified contamination locations, estimated the potential human health and environmental risks, and evaluated cleanup alternatives.

This update will tell you about:

- Site Background
- Who is Doing Work at the Lowry Site?
- Sitewide Remedy
- Progress of the Sitewide Remedy
- Ongoing Site Activities
- Five-Year Review
- Community Involvement
- Schedule of Future Activities



South Waste Pit Pilot Study

Who is Doing the Work at the Lowry Site?

Superfund mandates that EPA require past and present owners of the site as well as generators or transporters of hazardous substances found at the site (known as Potentially Responsible Parties or PRPs), to pay for studies and undertake cleanup actions at Superfund sites.



Landfill Cap Regrading

EPA identified more than 200 PRPs for the Lowry site. The majority of the PRPs disposed of waste at the site. In November 1994, EPA ordered 34 of the major PRPs (the largest-volume waste generators or transporters and the owners and operators of the site) to develop designs for the sitewide remedy to address the contamination and to perform the work. The sitewide remedy was selected by EPA in consultation with CDPHE. Three of these PRPs, Denver, WMC, and Chemical Waste Management of Colorado, Inc.

(collectively referred to as “the Respondents” to the order) reached agreements with the other PRPs to perform the site work on their behalf. The Respondents are responsible for designing, constructing, and operating the sitewide remedy under EPA and CDPHE oversight.

Sitewide Remedy

Key components of the sitewide remedy are shown on Figure 1 on page 3. A ground-water barrier wall called the North Boundary Barrier Wall or NBBW and an on-site water treatment facility have been operating since 1985 to stop the northward migration of contaminated ground water. Ground water is pumped from the NBBW to the on-site Water Treatment Plant. The treated water is then sent to an off-site plant for further treatment. The Surface Water Removal Action (SWRA) has been operating since 1992 to prevent contaminated water and surface water from migrating or flowing off the Lowry site via the Unnamed Creek.



Well Construction

From 1989 through 1992, WMC, under contract with Denver, shredded approximately 8 million old tires piled on the Lowry site. Some of the shredded tires were sold; the remainder are stored on-site in a 25-foot-deep trench called a monofill. Shredding the tires eliminated health and fire risks and allowed access to the area for site studies.

On March 10, 1994, EPA and CDPHE signed the site Record of Decision (ROD) that selected the sitewide remedy designed to protect human health and the environment. The overall goal of the remedy is to contain site contaminants and prevent potential human exposure to landfill gas, waste pit liquids, contaminated surface water, and ground water.

Additional information on the remedy status is included on Figure 2 on page 4.

Sitewide Remedy continued on page 5

**Figure 1
Sitewide Remedy Map**

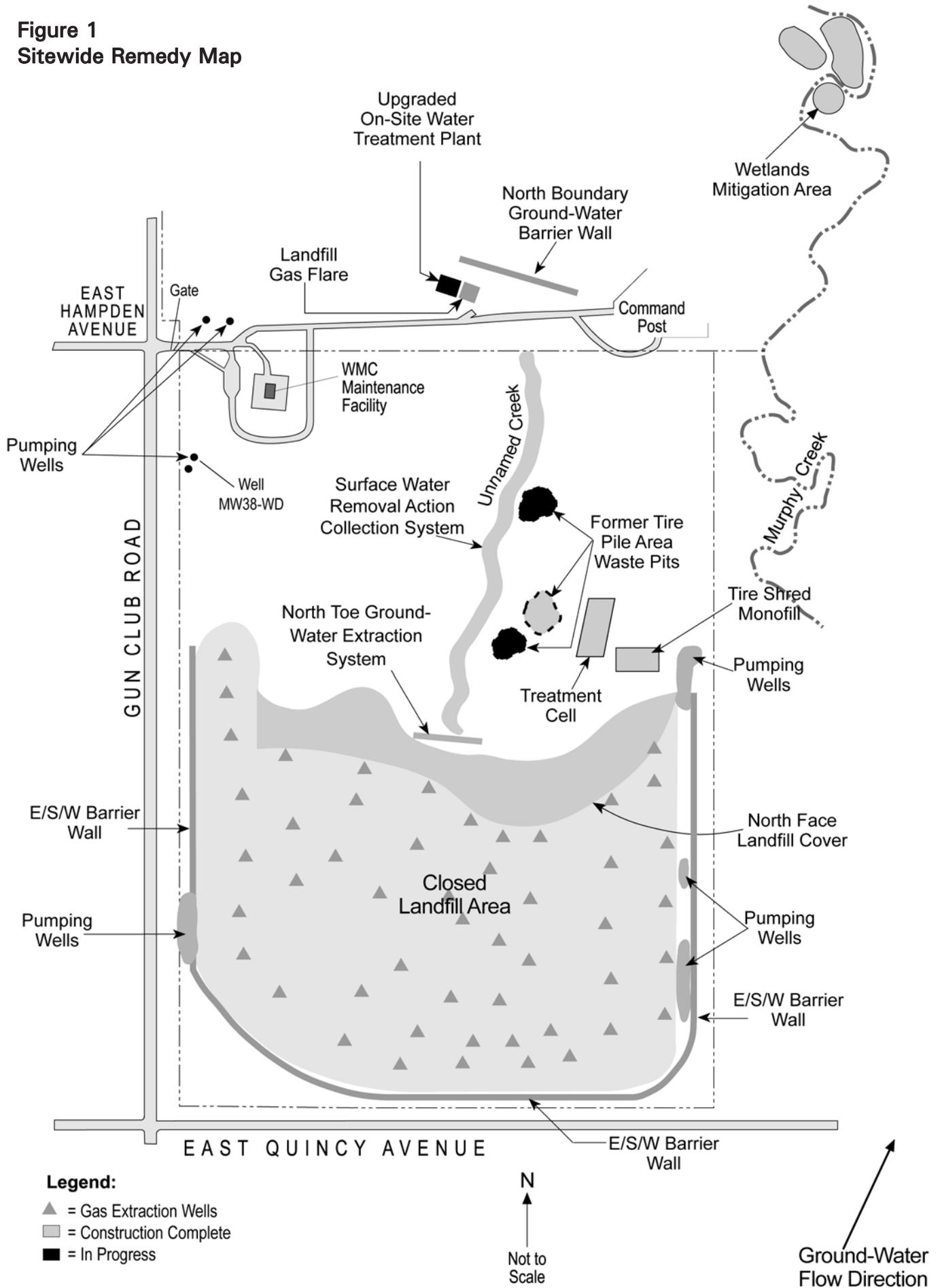


Figure 2 PROGRESS AS OF MARCH 2004 ON THE SITEWIDE REMEDY

REMEDY ITEM	DETAILS	STATUS
Well Plugging Program	<ul style="list-style-type: none"> A program to abandon and plug about 67 of the more than 300 on-site monitoring wells was completed in 1997. 	Complete
Landfill Gas Collection and Treatment System	<ul style="list-style-type: none"> This system was constructed in 1997 and is operating continuously to treat landfill gas. 	Ongoing Operations and Maintenance
Wetlands Mitigation	<ul style="list-style-type: none"> The Respondents replaced nearly an acre of wetlands that were destroyed during remedy activities. The wetlands were completed in 1997 and reconstructed in 1999 after flooding. 	
East/South/West (E/S/W) Ground-Water Barrier Wall	<ul style="list-style-type: none"> The E/S/W Ground-Water Barrier Wall was constructed in 1998 to restrict contaminated ground water from flowing off-site. 	
North Toe Extraction System (NTES)	<ul style="list-style-type: none"> The NTES was constructed in spring 1998 to capture and remove contaminated ground water. The water will be treated at the on-site Water Treatment Plant once it is fully operational. 	
North Boundary Barrier Wall (NBBW) System	<ul style="list-style-type: none"> This system was constructed in 1984 to prevent contaminated ground water from flowing north off the Lowry site. The contaminated ground water is removed, treated on-site, then sent to an off-site Water Treatment Plant, and potable water is re-injected into the ground to maintain constant ground water elevations. Additional wells have been installed and sampled to evaluate the effectiveness of the NBBW. 	
North Face Landfill Cover	<ul style="list-style-type: none"> The soil cover was completed in 1999 and included placing an additional two feet of cover on about 29 acres on the north face of the landfill. Ongoing inspections and maintenance of the landfill cover continue. 	
Excavation of the Former Tire Pile Area (FTPA) Middle Waste Pit	<ul style="list-style-type: none"> Excavation of the FTPA Middle Waste Pit was completed in spring 1999. Drums, soil, debris, and liquids were excavated from this area. The material was placed in a lined and covered treatment cell that operated until 2003. Evaluation of remedial alternatives is ongoing in the North and South Waste Pits. 	
On-Site Water Treatment Plant (WTP)	<ul style="list-style-type: none"> The on-site WTP was previously upgraded in 1992 as part of the Surface Water Removal Action. It was upgraded again in 1999 to treat additional contaminants, and the upgraded WTP was brought online in July 2000. This upgraded WTP is currently operating and treating water from the barrier walls and other site sources. It is currently being modified so that it can treat water from the NTES. These upgrades should be completed by fall 2004. Water treated at the on-site WTP is discharged to the City of Aurora and Metro Wastewater Reclamation District wastewater pipelines for further treatment. 	

Sitewide Remedy (continued from page 2)



Well Construction East of Gun Club Road

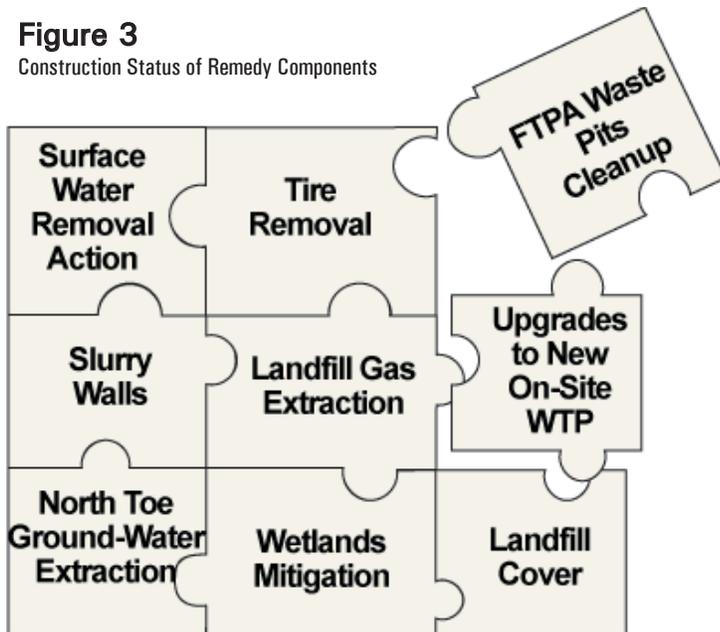
- The NBBW and the SWRA are key components of the selected remedy. Under the selected sitewide remedy in the ROD, contaminated ground water is contained using barrier walls and water collection systems and treated in the on-site Water Treatment Plant. Landfill gas is contained, collected, and treated with an enclosed flare (a large open-flame burner housed in a metal container). Contaminated seepage and surface water are addressed by a drainage and underground collection system in the Unnamed Creek area as part of the SWRA. The response action selected for the Former Tire Pile Area includes the excavation of drums, drum contents, and contaminated soils and off-site disposal of the excavated materials. Soil in the former landfill is also contained at the site.
- Monitoring programs, including sampling of ground water, surface water, landfill gas, sediments, and Water Treatment Plant effluent provide information about how well the remedy components are working.

EPA issued two changes to the ROD based on new information received during design of the remedy. These changes are referred to as Explanations of Significant Differences, or ESDs:

- The first ESD (1995) made minor corrections to the compliance standards for ground water, air quality, and landfill gas.
- The second ESD (1997) approved two changes: 1) The ROD states that contaminated ground water would be treated in the existing on-site Water Treatment Plant or an upgraded facility. The ESD allowed water to be treated on-site to remove organics and then piped off-site to a wastewater treatment facility to treat inorganic and any remaining organic contaminants.

2) The ROD states that contaminated soil and debris in the Former Tire Pile Area will be excavated and transported off-site for treatment and disposal. The ESD required excavated materials to be treated in an on-site unit or treatment cell and disposed of on-site.

Figure 3
Construction Status of Remedy Components



Note: Attached pieces = constructed components

Progress of the Sitewide Remedy

Figures 1 and 2 show the sitewide remedy components and the status of the remedy actions. Figure 3 depicts the construction status of the remedy components. Progress has been made in implementing the remedy. Several remedy components have been constructed and operation and maintenance are ongoing.

Ongoing Site Activities

Pumping along the East/South/West (E/S/W) Ground-Water Barrier Wall began in January 2000. See Figure 1 for pumping locations. Contaminants were detected above performance standards in some wells, and water levels were higher in monitoring wells located inside the barrier walls than those located outside the walls. This

suggested that there was a potential for contaminated water to move past the barrier walls. To reduce risk, EPA required the Respondents to implement corrective measures including the installation of additional monitoring wells and pumping water from these wells. This pumping will continue until the ground-water flow potential is reversed or contamination concentrations no longer exceed performance standards.

The Sitewide Monitoring Program. EPA is requiring the Respondents to install additional monitoring wells and to develop a comprehensive sitewide monitoring program in response to the first Five-Year Review (see page 7). The review

noted that the existing monitoring wells are too far apart and that deeper wells are needed to detect when contaminant performance standards for ground water are exceeded.

Evaluation of the Former Tire Pile Area. In January 2003, the Respondents completed a pilot study in the South Waste Pit in the Former Tire Pile Area. In compliance with Superfund policies, the Respondents are now in the process of preparing a feasibility study to evaluate various alternatives to address contamination in the north and south waste pits. The feasibility study is expected to be completed in summer 2004. At that time, EPA and CDPHE will determine if any changes are needed to the selected remedy for the north and south FTPA waste pits.

Water Treatment Plant. The on-site Water Treatment Plant was upgraded in 1999 and is currently operating to treat water from the barrier wall collection systems and other site sources; however, the

plant cannot treat all the contaminants in the water from the extraction system north of the former landfill, called the North Toe Ground-Water Extraction System. The Respondents are designing additional modifications to the Water Treatment Plant to address this issue. The modified plant will use biological reactors to treat organic contaminants and is scheduled to be online by mid-2004.

The North Boundary Barrier Wall. The Respondents have installed two additional wells to monitor water quality along this wall and are reviewing the data from these wells. The evaluation is expected to be complete by the end of 2004.

Monitoring Well MW-38WD is located in the northwest portion of the Lowry Landfill site (see Figure 1 on page 3). The first Five-Year Review identified volatile organic compounds in MW-38WD at higher-than-acceptable levels. These compounds are typically present in paints, solvents, and many household cleaners. The Respondents are currently performing a ground-water pumping pilot study in the MW-38WD area to evaluate options for long-term remedial actions.



Well Installation



On-site Water Treatment Plant currently being upgraded

Five-Year Review

EPA completed the first Five-Year Review of the Lowry site on September 30, 2001, and prepared an Addendum to the first Five-Year Review Report on September 30, 2002.

The Five-Year Review is required by Superfund law to evaluate whether the remedy is functioning as intended by the ROD. The Five-Year Review evaluated remedy activities for performance and protectiveness.

The review showed that the majority of the remedy elements and components were protective of human health and the environment. It also identified areas where additional information is needed to determine protectiveness. EPA required the Respondents to perform additional investigations to demonstrate effectiveness of the barrier walls and to install additional wells.

The review also identified specific areas where contaminant performance standards were exceeded and determined that additional investigations are needed in these areas. These investigations are currently in progress. The next Five-Year Review will be performed by September 2006, and every five years thereafter.



Well Construction

Schedule of Future Activities

Figure 4 shows an approximate timeline for future activities over the next two years. However, after all remedy components are operational, the need for monitoring, treatment, and operation and maintenance will continue until EPA determines that no hazardous substances or pollutants remain at the Lowry site above levels that allow for unrestricted use and exposure. At Lowry, this is anticipated to continue for more than 30 years and, in some cases, indefinitely.

Community Involvement

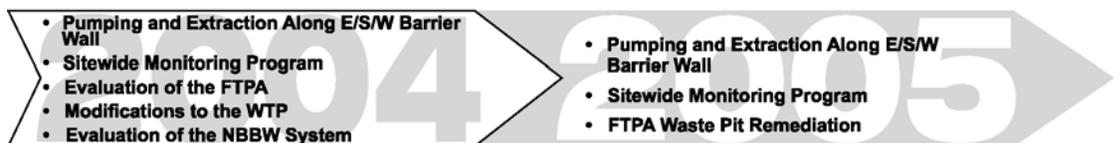
Community involvement is an integral part of the study and decision-making process at the Lowry site, and EPA and CDPHE welcome your participation. The ongoing community outreach program includes meetings, fact sheets, a web site, and opportunities for comment on key documents. The goal is to keep the public informed about the Lowry site and to provide opportunities to participate in the Superfund process.

EPA awards Technical Assistance Grants (TAG) to local community groups to hire technical advisors to monitor site activities including studies, designs, and construction. Citizens for Lowry Landfill Environmental Action Now (CLLEAN) received a TAG grant in 1995. This group and its consultant attend technical meetings and review site activities on behalf of area homeowners' associations. (For more information about CLLEAN, please contact Bonnie Rader at 303/364-2905.)

EPA also holds periodic meetings of the Lowry Landfill Technical Advisory Group that are open to community members. This group is composed of local community groups; regulatory agencies (EPA, the State, and the Tri-County Health Department); local governments such as the Aurora Planning Department and Arapahoe County; the PRPs; and other interested parties.

EPA would be happy to help arrange a site tour or meeting for interested school, community, or local homeowners' association groups to provide more information about the Lowry site. Please contact Nancy Mueller at 303/312-6602 for information.

Figure 4
Schedule of Future Activities





U.S. Environmental Protection Agency
 Office of Communications and Public Involvement-80C (NM)
 999 18th Street, Suite 300
 Denver, Colorado 80202-2466

Where to Get More Information About the Lowry Landfill Site

Community members are encouraged to stop by the EPA Information Centers or to visit the web site listed below to review documents and get more information about the site.

EPA Superfund Records Center 999 18 th Street Denver, CO 80202 303/312-6473	Colorado Department of Public Health and Environment Records Center 4300 Cherry Creek Drive South, B2 Denver, CO 80246 303/692-3311	Aurora Public Library 14949 East Alameda Drive Aurora, CO 80012 303/739-6600
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Many site documents can also be seen at the Deer Trail Public Library, Bennett Public Library, and Byers Public Library.

Additional information about the Lowry site and answers to frequently asked questions about the site can be obtained on the Internet at:

<http://www.epa.gov/region8/superfund/sites/co/lowry.html>

We Would Like to Hear From You!

Key Contacts

If you have questions about the Lowry site or would like to be added to (or removed from) the mailing list, please contact any of the following individuals:

EPA Bonnie Lavelle Remedial Project Manager 1-800-277-8917 ext. 6579 or 303/312-6579 lavelle.bonita@epa.gov	CDPHE Lee Pivonka State Project Officer 1-888-569-1831 ext. 3453 or 303/692-3453 lee.pivonka@state.co.us
Nancy Mueller Community Involvement Coordinator 1-800-277-8917 ext. 6602 or 303/312-6602 mueller.nancy@epa.gov	Marion Galant State Community Relations Manager 1-888-569-1831 ext. 3304 or 303/692-3304 marion.galant@state.co.us

Changes to EPA's Project Team: Bonnie Lavelle is EPA's new Remedial Project Manager for the Lowry Landfill Superfund Site. Bonnie replaced Janice Pearson, who has moved to another position within EPA. Barry Levene retired from EPA in 2003. Barry is a former Lowry Project Manager and, more recently, an EPA Section Chief with supervisory responsibility for Colorado sites. Russ LeClerc has replaced Barry as Section Chief.