Silverbell Landfill

Water Quality Assurance Revolving Fund (WQARF) Site
(formerly known as Silverbell Jail Annex Landfill)

Boundaries:

The Silverbell Landfill Site (Site) is located in west Tucson, Arizona and is bounded approximately by Sweetwater Drive on the north, Interstate 10 on the east, Grant Road/Ironwood Hill Drive on the south, and Silverbell Road on the west.

The plume geographic boundaries depicted on the Site map represent the Arizona Department of Environmental Quality's (ADEQ) interpretation of data available at the time the map was constructed. The map is intended to provide the public with basic information as to the estimated extent of known contamination as of the date of map production. The actual extent of contamination may be different. Therefore, the plume may change in the future as new information becomes available.

Site Status Update:

The Silverbell Landfill - A Closed Municipal Solid Waste Landfill

In 2010, the City of Tucson (COT) completed its revised Remedial Action Plan Implementation Evaluation of Remedial Alternatives report. In this report, COT proposed the installation of a groundwater pump and treat system to address the central part of the landfill with the highest volatile organic compound (VOC) concentrations. ADEQ provided COT with conditional approval of the plan as an Early Response Action. To help optimize the planned locations for the extraction/injection wells, COT also updated the groundwater modeling study to include data from new wells installed in 2010. Further work on the new system by COT is pending resolution of how methyl tertbutyl ether (MTBE) from a 2003 gasoline pipeline break will affect VOC treatment.

As of March 2011, Kinder Morgan Energy Partners has extracted approximately 203,300 pounds (approximately 33,000 gallons) of hydrocarbons from the soil beneath the Site. Approximately 64,000 gallons of hydrocarbons have also been removed through free product recovery. These hydrocarbons (gasoline) were released when the pipeline broke in 2003.

Community Involvement Activities:

The COT involved the community throughout the remedial investigation/feasibility study (RI/FS) process. However, if the Proposed Remedial Action Plan (PRAP) is significantly modified, additional public comment will be solicited. The most recent Fact Sheet can be found on the ADEQ Web site.

Site History:

1960-1978: The University of Arizona operated a solid waste landfill in the area east of the Santa Cruz River and south of Fort Lowell Road. The COT-managed Silverbell Landfill is made up of two landfill cells, approximately 40 acres in total size, which received wastes between 1966 and 1977. Neither cell accepted hazardous waste, although landfill access was not strictly controlled. The South Cell has been covered with soil, and the North Cell underlies a portion of the Silverbell Golf Course.

1983-1985: In Fall 1983, groundwater contamination was discovered at the Tratel Mobile Home Park Production Well located east of the Site. Also in 1983, COT began conducting subsurface investigations, and ADEQ began conducting groundwater investigations in 1985. VOCs were identified in the groundwater at concentrations exceeding Aquifer Water Quality Standards (AWQS).

1995: In June, COT completed an interim final RAP. The approved RAP proposed a pump and treat system utilizing air stripping treatment and a carbon filter to capture exhaust from the air stripper. Treated water would be reinjected into the aquifer and/or reused at Silverbell Golf Course. Although this groundwater remedy was not implemented, COT evaluated several groundwater remedial pilot projects and installed an air injection/soil vapor extraction (SVE) system.

Also in June, ADEQ closed the University of Arizona's West Campus Agricultural Center Site. Data and information collected and available as of June 1995 did not show that this site was a source of tetrachloroethene (PCE) and trichloroethene (TCE) contamination in the groundwater.

1996-1998: ADEQ approved COT's request to conduct a pilot study to evaluate the effectiveness of a recirculation well to replace or enhance the approved pump and treat remedy.

1999: The Site was placed on the WQARF Registry in April with an eligibility and evaluation score of 51 out of a possible 120.

1999-2005: From October 1999 to September 2005, COT operated an SVE system to mitigate the source. This system removed a total of 2,061 pounds of VOCs. The system has remained off since achieving cleanup goals, but has operated occasionally to control methane migration.

In July 2003, a pipeline operated by Kinder Morgan Energy Partners (Kinder Morgan) broke resulting in the release of gasoline to an area near the Site. Cleanup of the gasoline contamination is being conducted under ADEQ's Voluntary Remediation Program. The gasoline contamination and the existing PCE and TCE plume emanating from the Silverbell Landfill are being monitored.

The COT's Bioremediation and Soil Vapor Extraction System

The COT has evaluated monitored natural attenuation with enhanced bioremediation for the source areas. A pilot test using sodium benzoate to stimulate indigenous microbes began in June 2003.

In 2004, Kinder Morgan identified the presence of VOCs in the soil vapors within the Silver Creek residential subdivision. ADEQ believed these soil vapors were unrelated to the gasoline pipeline rupture. ADEQ conducted additional soil vapor testing in early October 2004 to confirm and expand upon the Kinder Morgan data. With that data, the Arizona Department of Health Services conducted a Health Consultation to evaluate whether soil vapors from VOCs in the subsurface at the Silver Creek subdivision posed any health risks to residents. The report, released in June 2005, concluded that the observed concentrations of compounds in soil vapors pose no apparent public health hazard.

2005: In July, COT expanded the pilot test by constructing an automatic mixing and delivery system for the north cell area, and changed the added nutrient to sodium lactate.

2006: In May, COT included the south cell in the pilot test. Based upon the pilot test results, sodium lactate was shown to be a suitable nutrient to stimulate anaerobic bioremediation and has reduced PCE concentrations within both the north and south cells. However, COT has determined that use of this remedial technology for the final remedy would be cost-prohibitive.

2007: In August, Kinder Morgan began operating an SVE remediation system to clean up contaminated soil beneath the Site.

2008: The COT Environmental Services, with Tucson Water assistance, developed a groundwater fate and transport model for the Site. The COT has been evaluating a pump and treat system for plume containment using this model to prevent further off-site migration.

2009: As of December, Kinder Morgan Energy Partners has extracted approximately 172,300 pounds (approximately 28,000 gallons) of hydrocarbons from the soil beneath the Site.

2010: In January, COT submitted to ADEQ its revised Remedial Action Plan Implementation Evaluation of Remedial Alternatives report for review. In this report, COT proposed the installation of a groundwater pump and treat system to address the central part of the landfill with the highest volatile organic compound (VOC) concentrations. The plan includes four extraction wells, an air stripping treatment plant with granular activated system to capture VOCs in the vapor phase, and four injection wells. One potential complication not addressed by the plan is the commingling of the Kinder Morgan MTBE plume with the Silverbell Landfill PCE plume.

In the Fall, ADEQ provided COT with conditional approval of the plan as an Early Response Action (ERA), but asked COT to further define the extent of the plume to the northeast. COT installed two shallow- and intermediate-zone well pairs between the Silverbell Landfill and the Miracle Mile WQARF sites. These wells were sampled during the Fall groundwater monitoring event which was coordinated with Tucson Water, ADEQ, and Kinder Morgan so that the well water gauging for the Sweetwater Recharge Facilities, the Miracle Mile site, and the Kinder Morgan site were conducted during the same period.

Contaminants:

The current contaminants of concern in groundwater include tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride. Contaminants of concern at the Site may change as new data becomes available.

Public Health Impact:

No one is known to be drinking contaminated water from this Site. However, if you are drinking water from a private well within the boundaries of the Site, please contact the ADEQ Project Manager. The City of Tucson (COT) is the main municipal water provider at this Site. COT's policy is to shut down any COT water supply well containing a VOC concentration that reaches one-half of the drinking water standard.

Site Hydrogeology:

The Site is located within the Tucson Basin. The basin is a broad, northwest sloping alluvial valley surrounded by mountain ranges and can be divided into four geologic units: the Pantano Formation, Tinaja Beds, Fort Lowell Formation, and recent alluvial deposits. The Santa Cruz River is an ephemeral stream that flows as a result of seasonal storm events and runs adjacent to the landfill cells.

The regional aquifer is encountered approximately 145 feet below ground surface. Flow direction in the aquifer is generally to the northwest.

Contacts:

Silverbell Landfill WQARF Contacts		
Name	**Phone/Fax**	**E-Mail**
Gretchen Wagenseller, ADEQ Project Manager	(520) 628-6708*/ (520) 628-6745 fax	wagenseller.gretchen@azdeq.gov
ADEQ Kinder-Morgan Contact		
Name	**Phone/Fax**	**E-Mail**
Tom Di Domizio, Voluntary Remediation Program Manager	(602) 771-4229/ (602) 771-4272 fax	didomizio.thomas@azdeq.gov

*In Arizona, but outside the Tucson area, call toll-free (888) 271-9302.

Information Repository:

The complete official Site file is located in Phoenix at the ADEQ Central Office at 1110 W. Washington Street; however, select documents are also available in Tucson at the Southern Regional Office at 400 W. Congress, Suite 433. Please call (520) 628-6715 or toll-free (888) 271-9302 to arrange a file review appointment at the Southern Regional Office.

To arrange for a time to review the site file at the main ADEQ Phoenix office, please call the ADEQ Records Management Center with 24-hour notice at (602) 771-4380 or (800) 234-5677. Once all documents requested have been collected, you will be contacted for a review Monday through Friday from 8:30 a.m. to 4:30 p.m. at the ADEQ Records Management Center, 1110 W. Washington Street in Phoenix, AZ.