# 19th Avenue Landfill Superfund Site 2010 Five Year Review

## Appendix D - Final Close-Out Report (FCOR), July 2006

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# 19TH AVENUE LANDFILL

# FINAL CLOSE OUT REPORT

## July 2006

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# FINAL CLOSE OUT REPORT

**Final Operable Unit Remedial Action**
**19th Avenue Landfill Federal Superfund Site**
**Phoenix, Arizona**
**July 2006**

## I. INTRODUCTION

This Final Close Out Report (FCOR) documents that the Nineteenth (19th) Avenue Landfill Superfund Site ("Site"), located in Phoenix, Arizona is eligible for site completion in accordance with the United States Environmental Protection Agency ("EPA") Office of Solid Waste and Emergency Response (OSWER) Directive 9320.2-09A-P "Close Out Procedures for National Priorities List Sites". Site completion signifies the end of all response actions at National Priorities List (NPL) sites. Site completion means that the response actions at the site were successful and no further Superfund response is required to protect human health and the environment. The Site completion criteria are as follows:

- Clean-up goals specified in the Record of Decision (ROD) are met;
- Institutional Controls are in place;
- The Remedial Action (RA) Report has been completed;
- All Explanation of Significant Differences (ESD) have been completed;
- The Site is protective of human health and the environment; and
- The only remaining activities at the site are operation and maintenance activities that are performed by the State or responsible party.

The above criteria at the Site have been met, and the operation and maintenance activities to ensure the site remains protective will be performed by The City of Phoenix. The work will be performed pursuant to a June 1992 Consent Decree with the Arizona Department of Environmental Quality (ADEQ) as the lead agency.

This FCOR documents compliance with statutory requirements and provides a consolidated record of all remedial activities for the entire site. This FCOR is intended to be complete and stand alone.

## II. SUMMARY OF SITE CONDITIONS

### *A. Background*

The 19th Avenue Landfill is located in a predominantly industrial area of Phoenix, Maricopa County, Arizona, located southeast of the intersection of Lower Buckeye Road and 19th Avenue. The site is transected by the usually dry Salt River channel (Figure 1). The major part of the landfill covers approximately 200 acres, referred to as Cell A, and is located on the north side of the Salt River channel. The remainder of the landfill is referred to as Cell A-1. Cell A-1 is located on the south side of the Salt River channel. Figure 2 shows a plan view of the landfill and key project features.

In 1955, the 19th Avenue Landfill site was relatively undisturbed except for a shallow 20-acre excavation in the northwestern portion of Cell A. Sand and gravel pits were excavated to a depth of approximately 30 to 35 feet, although some pits were excavated as deep as 50 feet below land surface, to create the space needed for waste disposal. The pits were then backfilled with municipal refuse from the Phoenix area. Solid and liquid industrial wastes were also disposed. Liquid wastes, including industrial wastes, were poured into unlined pits dug into areas of Cell A previously filled with refuse. In addition to the municipal and industrial wastes, some medical wastes and materials containing low levels of radioactivity were also deposited. It has been estimated that the landfill contains approximately nine million cubic yards of refuse. The refuse was generally covered with soil on a daily basis, and a final soil cap was placed over an area once it was full of waste.

Parts of the landfill were covered with water by at least one flood during 1965 and intermittently during the 1970s. Surface water runoff events in May 1978 washed refuse from the southwest part of Cell A and the northern third of Cell A-1. River flows in 1979 again washed out refuse in the southwestern part of Cell A.

***B. Early Actions Performed***

The landfill was closed by a cease and desist order issued by the Arizona Department of Health Services (ADHS), predecessor to ADEQ, in February 1979. The City and ADHS entered into a Consent Order in June 1979. The Consent Order was amended in December 1979. To comply with the first amended Consent Order, the City covered the site with fill material, stockpiled soil for final capping, installed 18 groundwater monitoring wells, built berms around the boundary of the landfill, installed a methane gas collection system, and provided a 24-hour security guard until November 30, 1996. The guard was no longer required once the site was secured by a permanent fence with secured access points.

The landfill was proposed for the EPA National Priorities List (NPL) on December 30, 1982, and formally placed on the NPL on September 8, 1983. A remedial investigation and feasibility study (RI/FS) conducted voluntarily by the City was completed in 1988. The RI/FS was prepared according to the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

***C. RI/FS results***

The remedial investigation (RI) included four major areas of investigation: landfill contents, groundwater, surface water and sediments, and air quality. The findings of the RI were then used in a baseline risk assessment to evaluate the risk that the 19th Avenue Landfill might pose to public health and the environment. The RI and baseline risk assessment were then used to select and design appropriate corrective actions for the site. The findings of the RI/FS were culminated and summarized in the RAP.

***(i.) Landfill Contents***

The investigation of the landfill contents provided information on the types of refuse, chemical constituents in the refuse, and on the volume and distribution of refuse in the landfill. An assessment of the size of the landfill and characterization of the contents were required to

determine proper design and evaluation of the potential corrective actions

An estimated volume of 9 million cubic yards of refuse is contained in Cell A and 436,000 cubic yards in Cell A-1. The principal conclusion drawn from the investigation of the landfill contents is that the contents were generally similar to those of other municipal landfills of its era, and include some hazardous materials and substances.

***(ii.) Groundwater***

The focus of the groundwater investigation included an evaluation of groundwater levees, direction of groundwater flow, horizontal and vertical gradients, chemical composition of groundwater, and physical characteristics of the aquifer. Monitor well installation, ground water quality sampling, groundwater level monitoring, and aquifer testing were conducted during the RI.

The RI determined that the groundwater flow direction is to the northwest with a velocity of 1 to 8 feet per day. Water levels varied between 20 and 80 feet below the land surface. Water levels are influenced by irrigation and industrial well pumping and by recharge during flows in the Salt River.

The majority of water quality results did not exceed Maximum Contaminant Levels (MCL). The following constituents exceeded the MCL intermittently, and in only a few wells during the RI: arsenic (maximum level detected 170 ppb), barium (max. 2.58 ppm), carbon tetrachloride (max. 35.1 ppb), gross alpha (max. 17.9 pCi/L), gross beta (max. 122 pCi/L), mercury (max. 11 ppb), and vinyl chloride (max. 2.6 ppb). Generally, the total concentrations of volatile organic compounds (VOC) in down-gradient wells were similar or less than in upgradient wells, and impacts of inorganic contaminants at the landfill were not discernible in down-gradient wells.

The RI and risk assessment determined that groundwater quality did not pose a threat to public health or the environment. Groundwater in the vicinity of the landfill is not currently used for drinking water. Drinking water will continue to be supplied by the City of Phoenix water distribution system; however, in Arizona all groundwater aquifers may have the potential to be used for drinking water. Long-term protection will be assessed by monitoring groundwater at the landfill.

***(iii.) Surface Water and Sediments***

The surface water and sediment studies of the RI concentrated on the extent of potential flooding of the landfill by the Salt River, the potential for changes in the location and depth of the channel near the landfill caused by flooding, and the quality of surface water and sediments.

The RI concluded that without additional flood protection, approximately 30 percent of the surface area of Cell A and 50 percent of Cell A-1 will be subject to inundation during a 100 year flow in the Salt River.

***(iv.) Air Quality***

The air quality investigation focused on the effectiveness of the existing gas collection system and the potential impacts of the landfill on ambient air quality. Shallow soil-gas sampling,

collection of data from existing gas probes, and ambient air monitoring were conducted during the RI.

Prior to the RI, the existing landfill gas collection system controlled off-site migration of methane along the northern and western boundaries of cell A. The RI determined that the gas extraction system required renovation: flare stations at each cell and a network of perimeter wells along all boundaries. The RI determined the 19th Avenue Landfill did not appear to have an identifiable impact on the quality of ambient air in the vicinity of the landfill.

### *D. ROD Findings*

In 1988, the EPA assigned the lead oversight responsibility for the site to ADEQ. As ADEQ was the lead agency, the City completed a Remedial Action Plan (RAP) under the state's Water Quality Assurance Revolving Fund (WQARF or State Superfund) in June 1989. By a Letter of Determination (LOD) dated September 21, 1989, ADEQ approved the final draft RAP for the site. The LOD included an approval of the preferred remedial alternative, which included a groundwater contingency plan. The Record of Decision (ROD) declaring concurrence with the remedy by the EPA was dated September 29, 1989.

The selected remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable. However, the size, volume, and limited threat posed by the landfill precluded a remedy in which contaminants could be feasibly excavated and/or treated. The significant components of the remedy are collection and flaring of the landfill gas, protection of the landfill from flood events, and development of a groundwater contingency plan. The final remedy consists of the following activities:

- Levees placed along both the north and south banks of the Salt River at the landfill site to provide for flood protection;
- Channelization of the Salt River to widen the river bottom to a constant width of 600 ft. in the area near the landfill. The improvements should withstand a 100-year flood event to prevent flood water from impeding upon the landfill surface.
- A soil cap (minimum of 3 feet) with a hydraulic conductivity of less than $10^{-4}$ centimeters per second placed over the landfill so that rain water does not seep into the landfill material. The cap should have one foot of sub-grade and two feet of soil placed on top of the cap as a vegetative/erosion layer;
- Ambient air quality monitoring;
- Methane gas collection system where methane gas will be collected and treated in a manner that eliminates any risk of explosion.
- Groundwater monitoring program including a contingency plan, identified in the Consent Decree to be implemented should groundwater quality standards be exceeded at the landfill boundary. In the event that groundwater remediation would be required, the remedies proposed would be evaluated using the nine criteria specified in 40 CFR Part 300.430(e)(9) (iii).

Since the ROD, there have been three Explanation of Significant Differences (ESD) issued by ADEQ and EPA. In December 1995, ESD #1 changed the perimeter drainage channel lining material from gunite to Armorflex. The Armorflex material was better suited to handle potential

landfill settlement and for landfill maintenance activities. In October 2005, ESD #2 updated the applicable standards for groundwater and air quality. The current and proposed EPA Safe Drinking Water Act Maximum Contaminant Level (MCL) and the Arizona Ambient Air Quality Guidelines for volatile organic carbons were identified. Groundwater and ambient air monitoring data are used to determine compliance with the updated standards. In April 2006, ESD#3 was completed to identify institutional controls (IC) that are necessary to protect the integrity of the remedy in the long-term. The specific IC mechanisms identified were the Declaration of Environmental Use Restriction (DEUR) and the existing Arizona Department of Water Resources (ADWR) requirements. The DEUR controls the use and access to the landfill property and ADWR restricts groundwater well site location, construction, and use that could impact the remedy.

A Consent Decree between the State of Arizona and the City was entered by the United States District Court on June 18, 1992. The purpose of the Consent Decree was to ensure implementation of the work to be performed and the remedial actions as described in the ROD and LOD. To help defray the City's cost of the necessary remedial actions, identified responsible parties settled with the City and paid into a designated fund specifically for remedial activities at the site. This agreement allows ADEQ to recover all oversight costs.

***E. Design Criteria and Cleanup Activities Performed***

Construction drawings and specifications were prepared by the City for all components of the project and submitted for review and approval by appropriate federal, state, county, and city agencies. Applicable permits for construction and operation were obtained from the appropriate agencies.

The City's construction contractor started work on the bank protection system on August 14, 1995. By the end of August, work had started on the grade control structure and site grading for the soil cap. In December 1995, areas of site grading were completed and work on the capping system was started. By March 1996, the bank protection system and grade control structure were completed, and work on the gas collection system began. In May 1996, the installation of the Armorflex® channel and sedimentation pond lining system started. The site landscaping began in July 1996. The capping system and site landscaping were both completed by the end of November 1996. The gas collection system and the two flare stations were completed in October 1996. The emissions testing for the flare stations at Cell A and Cell A-1 were performed on October 16-18, 1996 and was satisfactory. An air permit was subsequently issued to the City. The landfill gas collection system has been operational since February 1997. ADEQ issued a written approval of completion of the remedial action in accordance with the Consent Decree on June 30, 1997 which activated the ground water monitoring protocol outlined in the Groundwater Contingency Plan. A Preliminary Close-Out Report (PCOR) documenting construction completion was signed by ADEQ and EPA in February 1998. Remedial Action Report was completed by the City of Phoenix in September 1998, documenting that the remedy was operational and functional.

During the first Five-Year Review in 2000, it was determined that the methane gas collection system was not operating optimally and methane had been migrating past the landfill boundary. In order to enhance the operational up time of the system as well as to better control methane along the southern and northeastern portions of the landfill, where probes were out of compliance, an expansion to the system was completed. The enhancements included installation of additional methane monitoring probes at the perimeter of the landfill, and methane collection

along the middle and southern portions of the landfill. A final engineering design of a system to enhance gas collection was approved by ADEQ in 2001, and construction was completed during May 2002. The system operates more effectively and the methane monitoring probes have been in compliance since the system expansion was completed.

*F. Institutional Controls*

In order to implement institutional controls concerning future land use, a Declaration of Environmental Use Restriction (DEUR) was recorded on the property title in July 2006. The DEUR restricts uses of the property, and specifically prohibits residential use.

***G. Community Involvement Activities Performed***

The Community Relations Plan (CRP) was developed in accordance with Section 113K(2)(i-v) of CERCLA. Community involvement activities for the Nineteenth Avenue Landfill began in 1986 and continued throughout the cleanup. Several fact sheets were developed and distributed to residents and businesses in the vicinity of the landfill. A mailing list was developed consisting of individuals who returned mail-in reply cards, agency and local representatives, elected officials, and media contacts. A Community Participation Group was established to review and provide comments on available information about the project and serve as a point of information exchange for the community. A public meeting was held on July 20, 1989 to solicit public comment on the proposed Remedial Action Plan. Subsequent meetings, fact sheets, and public notices were distributed to keep the community informed of the progress of the cleanup.

A repository for technical documents related to the site is available for review at the Phoenix Public Library, 1221 N. Central Avenue, Phoenix, AZ 85004, and the Arizona Department of Environmental Quality, 1110 West Washington, Phoenix, AZ 85007.

## III. DEMONSTRATION OF CLEANUP ACTIVITY

***A. Sampling and Analysis Protocol***

During the RI/FS stage, the City prepared several Sampling and Analysis Plans for review and approval by ADEQ and EPA for use during all aspects of investigation at the site. At the time of the RI, all samples were analyzed according to the sampling and analysis plans by an Arizona state certified laboratory.

Additionally, ADEQ's contractor prepared a Field Sampling and Analysis Plan (PRC Environmental Management, January 1992) for technical oversight and quality assurance of remedial activities performed by the City. As part of this evaluation, ADEQ's contractor conducted personnel interviews on-site during construction, observed field sampling personnel, and collected split samples for verification of laboratory results. Since implementing the groundwater monitoring program, ADEQ has continued to collect split samples on a routine basis.

***B. QA/QC Protocol***

The project work plans and specifications described in detail the contractor's general performance standards for this project. The contractor was required to meet the specified standards during construction for (1) density and moisture content of soil embankments; (2) density, moisture, thickness, and engineering properties of infiltration barrier embankment; (3) gradation, density, moisture, strength, and placement of soil cement embankments; (4) high density polyethylene (HDPE) liner confirmation sampling, and shear and tear strengths of the

HDPE liner seams; (5) Maricopa County air quality standards for emissions from the flare stations; and (6) density, moisture, compaction, and thickness of the soil cap. The contractor's project work plan and various task work plans that provided additional performance standards for those specific operations were reviewed and approved by the City's resident engineer. Design changes were reviewed by ADEQ and its oversight contractor. All significant design changes were approved by ADEQ.

The construction quality assurance was achieved through continuous field inspections, field testing, and collection of quality assurance samples for laboratory analysis. The field inspection of all components of construction was documented with written daily reports and photographs which can be reviewed at the City's Central Records area at City Hall. Weekly meetings were held to assist in the monitoring of the construction contractor's performance. In November 1995, two additional meetings were initiated to address contract compliance issues and regulatory compliance issues. All forums were successful in resolving the problems affecting construction compliance, progress, and quality. In addition, ADEQ conducted weekly inspections and protocol audits. The activities completed at the site were consistent with the ROD and LOD. The QA/QC program used throughout the remedial action was rigorous and in conformance with EPA and state standards. Therefore, ADEQ and EPA determined that all analytical results were accurate to the degree necessary. The data assured satisfactory execution of the remedial action, and are consistent with the ROD, LOD, and remedial design plans and specifications. This process of documentation continued through both the primary and expansion phases of construction of the enhanced methane collection system.

### *C. Results of On-site Inspections*

Pre-final inspections were conducted to determine the substantial completion of the project. A pre-final inspection of the gas collection system and flare stations was performed on December 4 and 5, 1996. Inspection of the other features of the project, including the completed levees and channelization of the Salt River, was conducted on December 6 and 12, 1996. The project was determined to be substantially complete on December 12, 1996 based on the results of the inspections. The City of Phoenix, EPA, and ADEQ conducted an inspection January 7 and February 13, 1997, and a final inspection on February 25, 1997, and determined that the contractors have constructed the remedy in accordance with remedial design (RD) plans and specifications. Final project acceptance was given to the construction contractor by the City on February 28, 1997. During the construction of the system expansion, both EPA and ADEQ conducted site visits. A final inspection by ADEQ and EPA and was completed on September 4, 2002. The City completed revision of the as-built drawings by December 2002.

## IV. MONITORING RESULTS

### *A. Groundwater*

Since 1992, the City has compiled quarterly data collected for submittal of quarterly progress reports. In accordance with the requirements in the Consent Decree, these quarterly progress reports included tabulated water quality data, water level data, monthly methane data, laboratory reports, and QA/QC reports. The sampling results contained in the progress reports continue to show that the remedy is operational and effective according to design specifications.

The direction of groundwater flow is predominately from the southeast to the northwest. The average depth to groundwater at the site is approximately 50 to 55 feet below ground surface. However, during periods of flow in the adjacent Salt River, the groundwater table rises and is in

contact with the landfill refuse. The Groundwater Contingency Plan (GCP) serves as the mechanism to ensure protection of groundwater. Should groundwater quality degradation be observed at a *demonstratably down-gradient* monitoring well, the City is required to implement the GCP which provides threshold limits for groundwater quality levels as a means of evaluating the extent of any groundwater quality degradation, and to evaluate whether or not it is caused by the landfill. If the landfill is found to be contributing to the degradation of the groundwater quality, the City of Phoenix must evaluate alternatives for a groundwater remedy.

Groundwater contaminants have generally not been detected or are detected inconsistently, with the exception of 1,1-DCE, vinyl chloride, and arsenic, which are not due to contaminants at the landfill. 1,1-DCE and vinyl chloride has been determined to be from an upgradient source. It has been determined that arsenic is being mobilized into the groundwater out of the soil due to the reducing conditions at the landfill, and is not seen in the groundwater beyond the landfill boundaries, where oxidizing conditions resume. Since no trends can be established with any of the other the constituents that are occasionally detected, it has been determined that the landfill has not impacted groundwater. Groundwater monitoring will continue according to GCP requirements, however, the provisions associated with the groundwater remedy are not expected to be triggered.

***B. Ambient Air and Surface Emissions***

The Ambient Air Monitoring Program, prepared by Dames & Moore dated October 1998, requires the City to monitor any potential impacts to the air quality from the landfill. The City conducted ambient air studies in the winter and summer months of 1999 to determine if there were any VOC emissions from the landfill that could have discernible effects on the surrounding air quality and public health. The multi-point, upwind and downwind sampling involved integrated 4-hour air samples. A comparison of the collected data with the corresponding Arizona Ambient Air Quality Guidelines (AAAQG) showed that most of the TO-15 compounds were non-detect, and those that were detected were well below the guidelines except for 1.2-Dibromoethane. A second phase of more extensive ambient air sampling was conducted over a period of seven days in 2001 using closed cells over the landfill and the surrounding community. Results indicated that there was no discernible impact of emissions from the landfill that exceeded the AAAQGs. For three of the target elements that were detectable, the concentrations from the surrounding area were higher than concentrations above the landfill. Consequently, it was decided that no further ambient air monitoring will be required unless determined in the future to be necessary.

Surface emission monitoring for methane was conducted for several months during 2002 at the Salt River channel. Monitoring was conducted in response to elevated probe readings (SR-1 through SR-8) on the south boundary of Cell A adjacent to the Salt River to determine if landfill gas was migrating from the subsurface into the Salt River channel. The surface air emissions monitoring did not indicate any methane above background and methane probes were brought back into compliance after the system expansion was completed in August 2002. Therefore, the surface emissions monitoring program was discontinued in January 2003.

*C. Methane Extraction System*

Methane monitoring at landfill probes has occurred on a monthly basis at the site since installation. Occasionally, methane levels are detected at perimeter probes above the compliance limit of 5% by volume; however the system is adjusted so that the methane flare stations at each cell continue to operate efficiently to control methane levels.

The system must also be operated to comply with Maricopa County Air Pollution Control Regulations, Rule 200, Section 303, and Arizona Revised Statues Section 49-480. Maricopa County requires annual reporting and testing of the flare stations every five years for permit renewal. Stack testing was most recently completed on September 4 and 5, 2002, and met all County standards.

## V. SUMMARY OF OPERATION AND MAINTENANCE (O&M)

Pursuant to the Consent Decree, the City of Phoenix developed an O & M plan in September 1998 involving landfill cap inspections, operations and maintenance of a landfill gas extraction system, groundwater monitoring wells and landfill drainage and levee system. The O & M manual for the landfill gas extraction system was developed in March 1999, and updated in August 2002.

### *A. Groundwater monitoring*

The City of Phoenix is required to continue quarterly groundwater monitoring of the well network (Figure 3) in accordance with the Groundwater Contingency Plan. Additionally, Section 2.0 of the O&M plan ensures that the groundwater monitoring wells are functional so that quarterly samples may be obtained. ADEQ collects split groundwater samples at the 19th Avenue Landfill on a quarterly basis.

### *B. Methane Extraction System monitoring*

The City shall continue long-term operation and maintenance of the landfill gas collection system. The Landfill Gas Extraction System O&M manual describes procedures for monitoring and adjustment of the gas probes and extraction wells. In accordance with the Consent Decree, methane shall be monitored on a monthly basis to ensure no migration at the landfill boundary (Figure 4). Additional monitoring is performed as needed between the monthly readings to ensure compliance. O&M plans were developed, reviewed and approved for the flare stations at Cells A and A-1. The City must meet Maricopa County permit requirements to continue operation of the flare stations.

### *C. Drainage & Levee System*

Section 3.0 of the O&M plan requires the City of Phoenix to ensure that all drainage facilities are maintained and kept clear from objects that may impede the flow of storm water runoff and ensure compliance with the Federal Emergency Management Agency (FEMA) criteria. All components of the drainage and levee system shall be inspected at least annually, cleaned, and repaired as necessary, including storm drainage inlets and outlets, flow gate valves, natural and man-made drainage channels, and retention basins.

### *D. Routine Landfill O&M*

Section 2.0 of the O&M plan requires the City of Phoenix to complete inspections of all access roads, perimeter security fence, topsoil cover, infiltration barrier layer, vegetative landscape, irrigation system and swales and slopes. Inspections shall occur on a scheduled, routine basis. Unscheduled inspections will be necessary after storm events. Maintenance may include, but are not limited to; regrading of roads, and repair of surficial erosion, areas of settlement or subsidence, vegetation cover damage, irrigation system, and replacement of fencing, signs and locks.

## VI. SUMMARY OF REMEDIATION COSTS

Table 1 at the end of this document outlines the past costs incurred by the City at the site, including a breakdown of the other costs associated with the final remedy. The original cost estimate for the remedial action was $27,460,000, and the final remedial action cost $31,329,995. The original estimated annual maintenance costs were $1,010,000 and the current estimated annual cost is $1,300,000. The total cost to develop, implement, operate and monitor the remedy through 2005 is $48,229,995.

Additional construction was completed from January 2002 through September 2002 to expand the gas collection and treatment system. The costs associated with this expansion are included in the remedial action costs in Table 1.

## VII. PROTECTIVENESS

This site meets all the site completion requirements as specified in OSWER Directive 9320.2-09A-P, Close-out Procedures for National Priorities List Sites. Based on the information gathered during the RI/FS, the quality of the construction of the remedy and modifications, subsequent site monitoring and inspection, results of the first two Five-Year Reviews and follow-up actions, and implementation of the institutional controls required at the site, it is determined that the remedies implemented at the 19th Avenue Landfill are protective of human health and the environment for all pathways of potential exposure. The only remaining activity to be performed is O&M that will be conducted by the City of Phoenix under ADEQ oversight. No further Superfund response action is required at this site. A bibliography of all reports relevant to the completion of this site under the Superfund Program is provided in Section IX.

A basic premise of the RAP was that the 19th Avenue Landfill will not be used for any purpose inconsistent with the protection of public health and the environment. The Consent Decree and the Declaration of Environmental Use Restriction (DEUR) provide an institutional control for future property uses of the landfill. Under the Consent Decree section XIII, any future use plans for the site would require review and approval by ADEQ to ensure that the protection of human health and the environment is maintained.

## VIII. FIVE-YEAR REVIEW

Section 121 (C) of CERCLA requires a review of any remedial action selected that result in any hazardous substances, pollutants, or contaminants remaining at the site no less often than every five years. The 1989 ROD and LOD for the 19th Avenue Landfill NPL Site allows the hazardous substances to remain on-site; therefore, statutory reviews no less frequent than every five years are required.

The first 5-Year Review of this site was conducted in September 2000 in accordance with CERCLA requirements. Recommendations of this report identified the need to update the applicable standards for groundwater and air quality, and to enhance the methane recovery systems so that methane is not allowed to migrate beyond landfill boundaries. Other issues raised in the review were related to the quarterly groundwater monitoring, monthly methane monitoring, and inspections of the landfill cap and flood control structures and landscaping. These landfill administrative and maintenance deficiencies were corrected in 2001, and work plans for additional groundwater and ambient air monitoring were developed and implemented.

A final engineering design of a system to enhance gas collection was approved by ADEQ in 2001, and construction was completed during May 2002. The initial performance test was undertaken, and Maricopa County gave the City an Air Quality permit to operate the system during the fall of 2002. In 2003, an Explanation of Significant Difference was entered into the administrative record to formally memorialize the changes in the applicable standards for groundwater ambient air monitoring.

The second 5-Year Review was conducted in June 2005 in accordance with CERCLA requirements. Recommendations of this report identified nine deficiencies which included routine maintenance, repair, and record keeping issues. These issues were addressed by the City of Phoenix and detailed in a report to ADEQ dated May 5, 2006 entitled "19th Avenue Landfill Follow-up Actions – 5 Year Review." The next 5-Year Review is scheduled for September 2010.

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**X. SIGNATURES**

Date 7/21/06

Amanda E. Stone, Director
Waste Programs Division
Arizona Department of Environmental Quality

Keith Takata

Date 8-3-06

Keith Takata, Director
Superfund Division
U.S. EPA - Region IX

# TABLE 1

## 19th Avenue Landfill Cost Summary

**Past RI/FS Costs:**

$4,100,000

**Past O&M (1989-2005):**

GW Monitoring--Annual Estimate $800,000
GW Monitoring--Total Estimate $12,800,000

**Remedial Action Costs (Capping, Erosion & Drainage Control, Channelization of Salt River, Upgrade Landfill Gas Collection System)**

Design .....$1,391,565
Construction.....$25,831,312
Construction Administration .....$2,603,131
City of Phoenix Oversight.....$1,503,987
*TOTAL REMEDIAL ACTION COSTS*.....*$31,329,995*

**TOTAL COSTS AS OF DECEMBER 2005 $ 48,229,995**

(Estimate)

**Projected Future Costs (Annual)**

O&M $1,300,000
*(landfill cap, gas collection system, erosion & drainage systems, and groundwater monitoring)*

**Comments/source:** Information provided by the City of Phoenix

- O&M costs include continued groundwater monitoring.
- Does not include legal costs.

***Sources:*** ***Mr. Bruce Henning, City of Phoenix Project Manager (June 9, 2006)***
***Remedial Action Report: Construction Complete (September 1997 Draft)***
***ADEQ Cost Recovery Packages***