

Explanation of Significant Difference #1
19th Avenue Landfill
Phoenix, Arizona

December 1995

I. INTRODUCTION

On September 21, 1989, the State of Arizona's Department of Environmental Quality (ADEQ) signed a Letter of Determination (LOD) for the final remedy at the 19th Avenue Landfill site in Phoenix, Arizona. The United States Environmental Protection Agency (EPA) concurred with the remedy selected in the 1989 LOD through the issuance of a Record of Decision (ROD) on September 29, 1989. ADEQ is modifying the LOD/ROD to explain a difference between the final remedy selected in 1989 and the remedy currently being implemented at the site. These changes are not fundamental alterations of the remedy described in the 1989 LOD/ROD.

Under Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1989 (CERCLA), as amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA), and pursuant to 40 C.F.R. Section 300.435(c)(2)(i) (55 Fed. Reg. 8666, 8852 (March 8, 1990)), ADEQ is required to publish an Explanation of Significant Difference (ESD) when significant (but not fundamental) changes are being considered to a final remedial action plan as described in a ROD. If the changes fundamentally alter the nature of the selected remedy, an amendment to the ROD would be required [40 C.F.R. Section 300.435(c)(2)(ii)]. In this instance, an important change has

been made that modifies the LOD/ROD requirements, but does not alter the hazardous waste management approach that ADEQ and EPA selected in the LOD and ROD, respectively. The purpose for this change is described in detail in Section III of this document. This document provides a brief background of the site, a summary of the remedy selected in the 1989 LOD/ROD, a description of how this ESD affects the remedy originally selected by ADEQ and EPA in the 1989 LOD/ROD, and an explanation of why ADEQ and EPA are making these changes to the LOD/ROD.

This ESD modifies the remedy selected by changing the lining material used in the perimeter drainage channels at the site. This ESD and supporting documentation will become part of the 19th Avenue Landfill Administrative Record. Copies of the Administration Record for the 19th Avenue Landfill site, including this ESD, have been placed at the following locations:

City of Phoenix Public Library
1221 N. Central Avenue
Phoenix, Arizona 85012

AND

Arizona Department of
Environmental Quality
3033 N. Central Avenue
Phoenix, Arizona 85012

ADEQ provided a fifteen (15) working-day comment period to the EPA in accordance with 40 C.F.R. Section 300.515(h)(3). EPA comments on this ESD are summarized in Section IV of this document and are also included in the 19th Avenue Landfill Administration Record file. Pursuant to 40 C.F.R. Section

300.435(c)(2)(i), a formal public comment period is not required for this ESD.

II. BACKGROUND

The following provides a brief background of the 19th Avenue Landfill site and a short summary of the original 1989 LOD/ROD. Additional background information can be found in the 1989 LOD/ROD and in the 19th Avenue Landfill Administrative Record.

A. Site Background and Description

The 19th Avenue Landfill is located in an industrial area of Maricopa County within the municipal boundaries of Phoenix, Arizona. The landfill is 213 acres in size. The major part of the landfill, which covers approximately 200 acres and is referred to as Cell A, is located on the north side of the Salt River channel. This cell is bounded on the north by Lower Buckeye Road, on the east by the 15th Avenue storm drain outfall channel, on the west by 19th Avenue, and on the south by the river channel. The remainder of the landfill, Cell A-1, covers approximately 13 acres and is located on the south side of the Salt River channel. Cell A-1 is bounded on the north by the Salt River channel, on the east by an active sand and gravel pit, on the south by industrial property, and on the west by an inactive sand and gravel pit. The 19th Avenue landfill is located within the West Basin of the Salt River Valley. The site is located on

alluvial fill that commonly occupies the basins of the Basin and Range physiographic province. Groundwater flow direction is generally to the northwest.

In 1955, the 19th Avenue Landfill site was relatively undisturbed except for a shallow 20-acre excavation in the northwestern portion of Cell A. In 1957, the City of Phoenix (City) extended an existing lease with the landowner to operate a municipal landfill. The landowner brought in another party to start sand and gravel mining at the site to create the space needed for the landfill.

Although the landfill may have been used as an open-burning dump as early as 1920, mining and landfill operations did not begin until around 1957. 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. The pits were then backfilled with municipal refuse from the Phoenix area. Solid and liquid industrial wastes were also deposited. Liquid wastes, including industrial waste, were poured into unlined pits which were dug into areas of Cell A previously filled with refuse. In addition to the municipal and industrial wastes, 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 (approximately 4.8 millions tons). The refuse was generally covered on a daily basis. 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 event during 1965 and intermittently during the 1970s. Liquid waste disposal pits had been breached at least once. Surface water runoff events in May 1978 washed refuse from the southwest part of Cell A and the northern third portion of Cell A-1. As a result, the landfill was closed by a cease and desist order issued by the Arizona Department of Health Services (ADHS) in February 1979. Subsequent to the issuance of the order, the City closed the landfill. The City and ADHS entered into a consent agreement 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, stockpiled soil for final capping, installed groundwater monitor wells, built berms around the boundary of the landfill, and installed a methane gas collection system.

The landfill was placed on the EPA's National Priority List in September, 1983 (see Federal Register, 48 FR 40658 (September 8, 1983)). A Remedial Investigation/Feasibility Study (RI/FS), completed in 1988, was conducted by the City. The RI/FS was conducted in accordance with the requirements of CERCLA and SARA. Water samples collected during the RI revealed that the following compounds were evident in groundwater samples above the respective maximum contaminant levels (MCLs): 1,1,1-trichloroethane, Trans-1,2-dichloroethylene, 1,1-dichloroethane, carbon tetrachloride, 1,1-dichloroethylene, and vinyl chloride. In addition to the RI/FS, other tasks and studies were completed

for the site. These reports are available in the 19th Avenue Landfill Administrative Record files.

In 1988, the EPA agreed to assign the lead oversight responsibility for the site to ADEQ. When ADEQ became the lead agency, the City was then required to prepare a remedial action plan (RAP) under the state Water Quality Assurance Revolving Fund (WQARF) rules. The draft RAP was completed in June 1989, and was determined to be ready for public review and comment. The final RAP was completed in September 1989.

The Consent Decree between the City and the State of Arizona was signed by ADEQ on February 14, 1991, and entered in the United States District Court on June 18, 1992. ADEQ, with the assistance of the EPA, authorizes and oversees all clean-up activities at this Superfund site.

B. Remedy Selected in the 1989 LOD and ROD

The LOD for the final remedy at the 19th Avenue Landfill site was signed by the ADEQ Assistant Director on September 21, 1989. The ROD for the final remedy at the 19th Avenue Landfill site was signed by the EPA Regional Administrator on September 29, 1989. The Consent Decree requires the City to perform the following work selected by the LOD/ROD:

Refuse Washout Control

- Levee and bank protection
- Install a grade control structure in the Salt River channel
- Construct a storm drain pipe along 15th Avenue to outfall to Salt River

Surface Water & Sediment Quality Protection

Construct a single-layer compacted soil cap over Cells A and A-1
Construct surface drainage and outfall structures

Groundwater Quality Protection

Operate and maintain a groundwater monitoring program
Submit for review & approval a quality assurance/quality control plan for monitoring
Maintain and replace groundwater monitoring well network as necessary
Implement the Contingency Plan if necessary

Methane Gas Control and Ambient Air Quality Protection

Design and construct a gas collection and disposal system
Monthly monitoring of landfill gas migration

Site Requirements

Install a chain link fence around site perimeter
Submit for review & approval a landscaping plan

The remedial alternative selected for the 19th Avenue Site provides for containment of the wastes on site. The most significant impact that is most likely to occur would be contamination of groundwater due to leachate from the landfill.

A risk of contaminating the Salt River could arise if floods, similar to those in the late 1970's which eroded the landfill and washed garbage into the Salt River, occur without landfill protection. This could contaminate the river and its sediments downstream of the landfill. Currently, berms exist to help protect the landfill from erosion. These berms were successful in preventing washout during the Winter 1992-1993 floods. The risk of washout from a 100-year flood event in the Salt River is being minimized or eliminated by a channelization project. This project includes widening the Salt River to a

minimum of 600 ft. across and adding a grade control structure. The grade control structure would be placed downstream of the 19th Avenue bridge to prevent general degradation of the river bed.

A summary of the groundwater and soil cleanup levels can be found in Tables 3.2 and 3.2, respectively, of the RAP.

III. MODIFICATIONS TO THE ROD REMEDY

This ESD modifies the portion of the remedy dealing with Section 5.2.2.3 of the RAP, "Drainage and Outfall Structures". The section calls for the perimeter drainage collection channel side slopes and channel bottom to be lined with a 1 inch gunite surface as depicted in Figure 5.10 of the RAP.

During the design process, a Technical Advisory Committee (TAC) was formed and consisted of representatives from ADEQ, the City, and each of their respective consultants. During a TAC meeting, it was concluded that the RAP's conceptual channel lining was not suitable for the 19th Avenue Landfill project with the concerns of landfill settlement and maintenance. The TAC's opinion was that a one-inch thick gunite liner would be subject to excessive fracture given the slightest settlement of the landfill. A fractured and broken gunite lining would subject the City to continuous maintenance and repair of the gunite liner. The TAC developed criteria in order to select an alternative channel and sedimentation pond lining system. The criteria

included erosion protection, flexibility (for landfill settlement concerns), long-term operation, and maintenance. The City stated that maintenance (clearing, cleaning, weeding) would be conducted utilizing mechanical equipment and light utility vehicles. Various traditional lining systems were reviewed, analyzed, and subsequently eliminated from further consideration. These systems included unlined systems (earth), rigid linings (gunite, shotcrete, concrete, soil cement), high maintenance systems (grass), and lining systems not conducive to vehicle loading and mechanized equipment movement (cobbles, gabions).

The TAC discussions ended with the selection of a flexible lining system, Armorflex, with the following capabilities: 1) exhibits flexibility during subgrade landfill settlement while remaining an integral system, 2) provides excellent erosion protection, and 3) withstands mechanized vehicle loading.

Armorflex consists of open-celled concrete blocks that interlock and are cable-stayed with polyester cables. The cables run through the blocks in both the major and minor axis directions. Armorflex has been used successfully on many landfill applications from temporary roads to downdrain (spillway) erosion protection. Maintenance activities on channels lined with Armorflex are minimal. The system designed for the 19th Avenue Landfill consists of open block cells which will be subject to minimal weed growth, although not to the same extent as cobbles or gabion-lined channels. Removal of sediment from landfill channels is accomplished more easily on Armorflex

than on cobble or gabion systems. In fact, Armorflex was selected so as to retain as much sediment as possible in the flowing water column so that sediment would be transported to the sedimentation basins for ultimate deposition.

The cost of Armorflex ranges from \$6.00 to \$7.50 per square foot installed, more expensive than many other channel lining materials. The total cost is estimated at approximately \$2,800,000. However, the TAC concluded, after discussion of the merits of Armorflex, that the merits of Armorflex outweighed its cost, due to the material's overall performance for the anticipated project conditions and criteria. Minor repairs to Armorflex may take the form of patching concrete units where maintenance or other equipment may chip the material. These types of repairs are relatively minor and may be avoided with diligent and attentive maintenance. Major repairs to the Armorflex are not anticipated.

A geotextile liner will be used as a cushion between the Armorflex lining system and the constructed clay earth that forms the channel and ponds. In addition, a high density polyethylene (HDPE) liner will be placed on top of the constructed clay cap that forms the sedimentation basins to provide protection from infiltration of surface water which may cause hazardous substances to leach from the underlying material. The Armorflex will then be placed on top of the HDPE liner.

IV. SUPPORT AGENCY COMMENTS

The U.S. EPA and the Arizona Department of Water Resources [received and] concurred with the proposed ESD, dated December 1995, without comment. Their letters of concurrence without comment are attached in Appendix I.

V. STATUTORY DETERMINATIONS

Considering the new information that has been developed and the changes made to the selected remedy upon implementation of this ESD, ADEQ believes that the remedy for the 19th Avenue Landfill site will remain protective of human health and the environment, will continue to comply with federal and state requirements that are applicable or relevant and appropriate to this remedial action, and will continue to be cost-effective. Although the change contained in this ESD is significant, it does not fundamentally change the remedy.

VI. PUBLIC PARTICIPATION ACTIVITIES

ADEQ has presented these changes to the remedy in the form of an ESD because the changes are of a significant but not fundamental nature. ADEQ provided EPA and the Arizona Department of Water Resources (ADWR) with a fifteen (15) working-day comment period on this ESD. In accordance with Section 117(c) of CERCLA, 42 U.S.C. Section 9617, ADEQ will publish a notice in the Arizona *Republic* newspaper which describes this ESD and its availability

for review. In accordance with 40 C.F.R. Section 300.435(c)(2)(ii), this final ESD and all documents that support the changes and clarifications herein will be contained in the Administrative Record for the 19th Avenue Landfill site prior to the commencement of the remedial actions affected by the final ESD.

Approved By:

for *Mary Lindsay*
Keith Takata
Director
Superfund Programs
USEPA Region IX

12/1/95
Date

Approved By:

Ethel DeMarr
Ethel DeMarr
Director
Waste Programs Division
Arizona Department of Environmental Quality

12/14/95
Date