



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

September 30, 2005

Don Richey, Manager
Remedial Programs Section
Waste Programs Division
Arizona Department of Environmental Quality
1110 W. Washington St
Phoenix, AZ 85007-2935

Re: Five-Year Review Report Concurrence, 19th Avenue Landfill, Phoenix, AZ

Dear Don

Thank you for the opportunity to concur on the Final Second Five-Year Review (FYR) Report, 19th Avenue Landfill, dated September 16, 2005. Our comments have been adequately addressed and we concur on the protectiveness statement and the recommendations. Enclosed please find the signature pages for the FYR concurrence.

We have a few additional comments which should be noted for the record. First, there is an error on page 24 where the document incorrectly refers to "to be considered" criteria (TBCs) as not enforceable. We would like to point out that when selected as performance standards, TBCs are equally as enforceable as ARARs.

The second issue is in regards to the description the last deficiency that is identified in Section 7 page 37: "There is currently no deed restriction (DEUR) in place at the Site". This deficiency is described on page 33 as "no institutional controls have been implemented at the site", therefore we would like to clarify that the deficiency is actually that there are not adequate institutional controls (ICs) in place at the site, and not specifically that there is no DEUR in place. The follow-up action for this deficiency, included in Section 8.0 page 38, is that a deed restriction in the form of a DEUR will be implemented, however it wasn't clear in either the description of the deficiencies or the follow-up actions that this is being done in order to fulfill the need for an IC. In addition, ICs are not currently identified in the existing decision documents, therefore the State has prepared a Draft Explanation of Significant Differences to identify the ICs required. This issue would normally be a deficiency and related follow-up action identified in the Five-Year Review despite the fact that we know it is already in progress and will occur.

Finally, an ecological risk assessment was completed in 1988 and described in the 1989 Remedial Action Plan. The conclusion was that either there is no exposure route or that

completed routes were within ecological screening values. The FYR raises some concerns that the original ecological risk assessment may be outdated and recommends that the need for an ecological risk screening/assessment be considered, particularly in conjunction with changes in the river habitat anticipated with the Rio Salado Project. The FYR did not indicate whether the screening levels used in the 1988 ecological risk assessment were relevant or applicable today.

We encourage the State to require a screening level ecological risk assessment (SLERA) in the near future based on the existing information. A SLERA first determines if actual or potential exposure routes to ecological receptors exist; a predictive assessment of site toxicity is only necessary if exposure routes exist. The result of this screening level evaluation would determine whether a formal ecological risk assessment is appropriate. The information can also be used to assist the City of Phoenix during their planning of the Rio Salado Project development, as opposed to after the plans are completed.

Thanks to you and your staff for working to get this done and for the continued progress on the DEUR and ESD toward our common goal of delisting this Site. The State has put so much effort into this Site over the years, and your cooperation has been much appreciated.

Sincerely,

A handwritten signature in black ink, appearing to read "Kathleen Johnson". The signature is fluid and cursive, written over a light blue horizontal line.

Kathleen Johnson, Branch Chief
Federal Facilities and Site Cleanup Branch
Superfund Division

Enclosure

cc William DePaul, ADEQ
Moses Olade, ADEQ

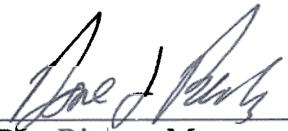
Five-Year Review Report

Second Five-Year Review Report For 19th Avenue Landfill, NPL Site, Phoenix, AZ

September 16, 2005

PREPARED BY:
EEC

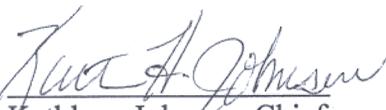
Engineering and Environmental Consultants, Inc.
3003 N. Central Avenue, Suite 600
Phoenix, Arizona 85012

Approved by: 
Don Richey, Manager

Remedial Programs Section
Waste Programs Division

Arizona Department of Environmental Quality

Date: 9/29/05

Concurred by: 
Kathleen Johnson, Chief

Federal Facilities & Site Cleanup Branch
Superfund Division

U.S. Environmental Protection Agency, Region 9

Date: 9/30/05

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: 19 th Avenue Landfill NPL Site		
EPA ID: AZD980496780		
Region: IX	State: AZ	City/County: Phoenix, Maricopa
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input checked="" type="checkbox"/> Deleted <input type="checkbox"/> Other (specify) Construction complete, Preparing for Deletion		
Remediation status: (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple Operable Units (OUs)*? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Construction completion date: February 25, 1997	
Has site been put into reuse? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input checked="" type="checkbox"/> Tribe <input checked="" type="checkbox"/> Other Federal Agency _____		
Author name: Dave F. Laney c/o Engineering & Environmental Consultants, Inc. (EEC)		
Author title: Senior Project Manager	Author Affiliation: ADEQ Consultant (EEC)	
Review period: 02/07/2005 to 09/30/2005		
Date(s) of site inspection: 02/07/2005 to 06/30/2005		
Type of review: <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input checked="" type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input checked="" type="checkbox"/> (first) <input type="checkbox"/> (second) <input checked="" type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <input checked="" type="checkbox"/> Actual RA Onsite Construction <input type="checkbox"/> Actual RA Start at OU# <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date: September 18, 2000		
Due date: September 18, 2005		

Deficiencies:

1. Routine maintenance and repair records for the landfill cap, perimeter drainage, sediment ponds, and groundwater monitoring wells, and Site access records, a site specific incident log, and records of storm water discharge events not on-site.
2. Surficial erosion holes and cracks evident at both cells.
3. Excessive weed growth was observed storm drain inlet and outlets.
4. The capsulhelic gauge on the knockout tank at Cell A was inoperable. In addition, some of the capsulhelic gauges at the flare station at Cell A-i appeared to be inoperable.
5. There was no chart paper at one of the two flare stations.
6. There was some minor erosion beneath the pad of well 1-3. Three 2" diameter observation wells DM-3P, DM-31, and DM-3D were not locked.
7. The casing of the probes SR-i through SR-8 appear to have been silted up after winter storm water flow in the Salt River.
8. The Site's perimeter fence has no signage.
9. There is currently no deed restriction (DEUR) in place at the Site.

Five-Year Review Summary Form, cont'd.

Recommendations and Follow-up Actions:

1. Records showing routine maintenance and repairs performed on the landfill cap, perimeter drainage, sediment ponds, and groundwater monitoring wells must be maintained at the Site. Site access records, a site-specific incident log, and records of storm water discharge events must also be present at the Site.
2. All cracks and holes extending 0.5 feet or greater must be filled in as soon as possible and prior to the next heavy rainfall event.
3. All areas of erosion along the top of the bank of the perimeter drainage channels should be repaired as soon as possible and prior to the next heavy rainfall event.
4. Sedimentation in all drainage channels and sedimentation basins must be cleared. Excessive vegetation growth must be cleared wherever appropriate from drainage channels, including both inlets and outlets. Any other natural or manmade debris must also be removed.
5. The capsulhelic gauge on the knockout tank at Cell A should be repaired/replaced or removed . Any inoperable capsulhelic gauges at the flare station at Cell A-i should be repaired/replaced or removed.
6. An adequate quantity of chart paper for system controls should be stocked at both flare stations.
7. Repair erosion beneath the pad of well 1-3. Either lock the three 2" diameter observation wells DM-3P, DM-31 , and DM-3D or (better) abandon these wells, since they are no longer used.
8. Clean the silt out of methane monitoring probes SR-i through SR-8. If appropriate, provide a hood, shield or box that will keep silt out of these probes in the future.
9. Provide signage for the Site's perimeter fence.
10. Place a deed restriction (DEUR) on the Site in accordance with the provisions of the upcoming ESD. The DEUR will ensure the performance of O& M activities in the future and limit incompatible land use.

In addition to the follow-up actions to correct the above deficiencies, it is recommended that after completion of future redevelopment plans for the Salt River (i.e., Rio Salado Project), the need to conduct a formal ecological risk screening/ assessment and revise the exposure scenarios in the baseline 1988 Risk Assessment should be evaluated.

Protectiveness Statement(s):

The remedy at the Site currently protects human health and the environment. A cap, groundwater monitoring and methane control system remain in place and appear to be in good condition. However, several deficiencies were noted during this five-year review. These are listed in Section 7.0. In order for the remedy to be protective in the long-term these items should be addressed by COP within six months of this report as per the recommendations in Section 8.0. In addition, it will be necessary once deficiencies have been addressed to produce a follow- up report. This report will document the adequate implementation of all recommendations.



**FINAL
SECOND FIVE-YEAR REVIEW REPORT
19th AVENUE LANDFILL
PHOENIX, ARIZONA**

Prepared for:

**Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona 85007**

Prepared by:



**Engineering and Environmental Consultants, Inc.
3003 N. Central Avenue, Suite 600
Phoenix, AZ 85012**

September 16, 2005



**FINAL
SECOND FIVE-YEAR REVIEW REPORT
19th AVENUE LANDFILL
PHOENIX, ARIZONA**

Prepared for:

**Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona 85007**

Prepared by:

**Engineering and Environmental Consultants, Inc.
3003 N. Central Avenue, Suite 600
Phoenix, AZ 85012**

September 16, 2005

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
2.0 BACKGROUND INFORMATION	2
2.1 SITE LOCATION	2
2.2 SITE HISTORY	2
3.0 REMEDIAL ACTIONS	5
3.1 REMEDY SELECTION	5
3.2 REMEDY IMPLEMENTATION	6
3.3 SYSTEM OPERATIONS	7
3.4 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW	8
4.0 FIVE-YEAR REVIEW PROCESS	10
5.0 FIVE-YEAR REVIEW FINDINGS	13
5.1 INTERVIEWS	13
5.2 SITE INSPECTION	20
5.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS	22
5.3.1 Chemical-Specific Standards	25
5.3.2 Action-Specific Standards	28
5.3.3 Location-Specific Standards	31
6.0 ASSESSMENT	33
7.0 DEFICIENCIES	37
8.0 FOLLOW-UP ACTIONS AND RECOMMENDATIONS	38
9.0 PROTECTIVENESS STATEMENT	39
10.0 NEXT REVIEW	40
11.0 REFERENCES	41

TABLES

- Table 1 Chronology of Site Events
- Table 2 Annual O&M Costs
- Table 3 Summary of Current Chemical-Specific Standards
- Table 4 Summary of Current Action-Specific Standards
- Table 5 Summary of Current Location-Specific Standards

FIGURES

- Figure 119th Avenue Landfill

APPENDICES

- Appendix A O&M Cost Breakdown
- Appendix B List of Documents Reviewed
- Appendix C Interview Questionnaire Summaries
- Appendix D Completed Site Inspection Checklist and Photographic Documentation
- Appendix E Maricopa County Air Permit
- Appendix F Technical Memorandum on Arsenic Concentrations in Groundwater Monitor Wells

REPORT PREPARATION, CERTIFICATIONS & APPROVALS

Report Title: Final Five-Year Review Report for the 19th Avenue Landfill NPL Site, Phoenix,
Arizona, Maricopa County

Report Date: September 16, 2005

Prepared by:

David F. Laney, Project Manager
Engineering and Environmental Consultants, Inc.

Date

Approved by:

Bill DePaul, Project Manager
Superfund Programs Section
Arizona Department of Environmental Quality

Date

LIST OF ACRONYMS

AAAQGs	Arizona Ambient Air Quality Guidelines
AAC	Arizona Administrative Code
ACLs	Alternative Concentration Limits
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ADWR	Arizona Department of Water Resources
ASRAC	Arizona Superfund Response Action Contract
AWQs	Aquifer Water Quality Standards
ARARs	Applicable or Relevant and Appropriate Requirements
CAA	Clean Air Act
CERCLA	Comprehensive Emergency Response Cleanup and Liability Act
CFR	Code of Federal Regulations
COP	City of Phoenix
CWA	Clean Water Act
EEC	Engineering and Environmental Consultants, Inc.
GPLs	Groundwater Protection Levels
GPM	Gallons Per Minute
HASP	Health and Safety Plan
LOD	Letter of Determination
MCAP	Maricopa County Air Pollution
MCESD	Maricopa County Environmental Services Department
MCLs	Maximum Contaminant Levels
MSL	Mean Sea Level
MSWLF	Municipal Solid Waste Landfill
NCP	National Contingency Plan
NMOC	Nonmethane Organic Compounds
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OUs	Operable Units
PCC	Phoenix City Code
PRGs	Preliminary Remediation Goals
PM10	Particulates < 10 Microns
RA	Risk Assessment
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SRLs	Soil Remediation Levels
SWPPP	Storm Water Pollution Prevent Plan
TASOW	Task Assignment Statement of Work
TBC	To Be Considered
TSP	Total Suspended Particulates
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOCs	Volatile Organic Compounds

FIVE YEAR REVIEW SUMMARY FORM		
SITE IDENTIFICATION		
Site Name: 19 th Avenue Landfill		
EPA ID: AZD980496780		
Region: 9	State: Arizona	City/County: Phoenix/Maricopa
SITE STATUS		
NPL Status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation Status: (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Construction Completion Date: February 25, 1997	
Has site been put into reuse? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
REVIEW STATUS		
Lead Agency: <input type="checkbox"/> EPA <input checked="" type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other _____		
Author Name: David F. Laney c/o Engineering and Environmental Consultants, Inc.		
Author Title: Senior Project Manager	Author Affiliation: ADEQ Consultant	
Review Period: 2/7/05 to 6/30/05		
Date(s) of Site Inspection:		
Type of Review: <input checked="" type="checkbox"/> Statutory <input type="checkbox"/> Policy <input type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL Removal Only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe Lead <input type="checkbox"/> Regional Discretion		
Review Number: <input type="checkbox"/> First <input checked="" type="checkbox"/> Second <input type="checkbox"/> Third <input type="checkbox"/> Other _____		
Triggering Action: <input type="checkbox"/> Actual RA Onsite Construction at OU <input type="checkbox"/> Actual RA Start at OU <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (Specify) _____		
Triggering Action Date:		September 18, 2000
Due Date (five years after triggering action date):		September 18, 2005
Deficiencies:		
<ol style="list-style-type: none"> 1. Routine maintenance and repair records for the landfill cap, perimeter drainage, sediment ponds, and groundwater monitoring wells, and Site access records, a site-specific incident log, and records of storm water discharge events not on-site. 2. Surficial erosion, holes and cracks evident at both cells. 3. Excessive weed growth was observed storm drain inlet and outlets. 4. The capsulhelic gauge on the knockout tank at Cell A was inoperable. In addition, some of the capsulhelic gauges at the flare station at Cell A-1 appeared to be inoperable. 5. There was no chart paper at one of the two flare stations. 6. There was some minor erosion beneath the pad of well I-3. Three 2" diameter observation wells DM-3P, DM-3I, and DM-3D were not locked. 7. The casing of the probes SR-1 through SR-8 appear to have been silted up after winter storm water flow in the Salt River. 8. The Site's perimeter fence has no signage. 9. There is currently no deed restriction (DEUR) in place at the Site. 		

Recommendations and Follow-up Actions:

1. Records showing routine maintenance and repairs performed on the landfill cap, perimeter drainage, sediment ponds, and groundwater monitoring wells must be maintained at the Site. Site access records, a site-specific incident log, and records of storm water discharge events must also be present at the Site.
2. All cracks and holes extending 0.5 feet or greater must be filled in as soon as possible and prior to the next heavy rainfall event.
3. All areas of erosion along the top of the bank of the perimeter drainage channels should be repaired as soon as possible and prior to the next heavy rainfall event.
4. Sedimentation in all drainage channels and sedimentation basins must be cleared. Excessive vegetation growth must be cleared wherever appropriate from drainage channels, including both inlets and outlets. Any other natural or manmade debris must also be removed.
5. The capsulhelic gauge on the knockout tank at Cell A should be repaired/replaced or removed. Any inoperable capsulhelic gauges at the flare station at Cell A-1 should be repaired/replaced or removed.
6. An adequate quantity of chart paper for system controls should be stocked at both flare stations.
7. Repair erosion beneath the pad of well I-3. Either lock the three 2" diameter observation wells DM-3P, DM-3I, and DM-3D or (better) abandon these wells, since they are no longer used.
8. Clean the silt out of methane monitoring probes SR-1 through SR-8. If appropriate, provide a hood, shield or box that will keep silt out of these probes in the future.
9. Provide signage for the Site's perimeter fence.
10. Place a deed restriction (DEUR) on the Site in accordance with the provisions of the upcoming ESD. The DEUR will ensure the performance of O&M activities in the future and limit incompatible land use.

In addition to the follow-up actions to correct the above deficiencies, it is recommended that after completion of future redevelopment plans for the Salt River (i.e., Rio Salado Project), the need to conduct a formal ecological risk screening/assessment and revise the exposure scenarios in the baseline 1988 Risk Assessment should be evaluated.

Protectiveness Statement(s):

The remedy at the Site currently protects human health and the environment. A cap, groundwater monitoring and methane control system remain in place and appear to be in good condition. However, several deficiencies were noted during this five-year review. These are listed in Section 7.0. In order for the remedy to be protective in the long-term these items should be addressed by COP within six months of this report as per the recommendations in Section 8.0. In addition, it will be necessary once deficiencies have been addressed to produce a follow-up report. This report will document the adequate implementation of all recommendations.

Other Comments: None.

1.0 INTRODUCTION

This report documents the results of a five-year review of the remedy implemented at the 19th Avenue Landfill Site located in Phoenix, Arizona. This work has been performed by Engineering and Environmental Consultants, Inc. (EEC) in accordance with Arizona Department of Environmental Quality (ADEQ) Arizona Response Action Contract (ASRAC) #EV03-0073; Work Assignment EV05-0074. The ADEQ is the lead agency for the Site and EPA is the support agency.

The current five-year review started February 7, 2005. The purpose of the review is to determine whether the remedy is protective of human health and the environment. The review is required by statute. Section 121(C) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires a five-year review whenever hazardous substances remain on-site as part of a remedy.

According to EPA Guidance Documents, the five-year review must address the following:

- Achievement of remedial objectives,
- Appropriateness of cleanup levels and remedial objectives, given any changes in ARARs or site characteristics,
- Whether the remedy is effective and functioning as designed,
- The adequacy of Operation and Maintenance (O&M), and
- Early indicators of potential failure of one or more components of the remedy.

This is the Site's second five-year review. This review covers the entire Site. There has been only one operable unit established for the entire remedy. The first five-year review of the 19th Avenue Landfill remedy occurred in 2000.

The action that triggered the time required for completion of this review was the completion of the Final First Five-Year Review on September 18, 2000. As a result of this action, the Site's second five-year review must be completed by September 18, 2005.

2.0 BACKGROUND INFORMATION

2.1 SITE LOCATION

The 19th Avenue Landfill occupies approximately 213 acres in an industrial area of Phoenix, Arizona. The major portion of the landfill, Cell A, occupies approximately 200 acres north of the Salt River channel (Figure 1). Cell A 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, occupies about 13 acres south of the river channel (Figure 1). 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 Salt River bed adjacent to the landfill is normally dry. Parts of both Cell A and A-1 are within the 100 year floodplain of the river.

2.2 SITE HISTORY

A chronology of site specific activities is presented in Table 1. 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 (COP) 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 space needed for the landfill. The mining and landfill operations began about 1957 on Cell A. Sand and gravel pits were excavated to a depth of approximately 30 to 35 feet, however, some pits were excavated as deep as 50 feet below ground surface. The pits were then backfilled predominately with municipal refuse from the Phoenix area, and some solid and liquid industrial wastes.

Liquid industrial wastes were poured into unlined pits dug into areas of Cell A previously filled with refuse. Most of the liquid disposal pits were in the north-central part of Cell A and along the eastern boundary. Few restrictions were imposed on the type of material that could be deposited. Furthermore, there was no formal recording system for the type of material that was deposited. However, a map that was developed through interviews with landfill operators shows where some industries disposed of their wastes.

According to interviewees contacted during the Remedial Investigation/Feasibility (RI/FS) that was completed for the Site, some medical wastes and materials containing low levels of radioactivity were deposited, in addition to municipal and industrial wastes (Dames & Moore, 1989).

It has been estimated that Cell A contains approximately nine million cubic yards of refuse. The refuse was generally covered on a daily basis and a temporary soil cap was placed over each area once it had been filled with waste.

Cell A-1 was mined for sand and gravel sometime before 1971 and completely filled with refuse by late 1972. The pit was excavated to a depth of 30 to 34 feet in much of the southern two-thirds of the cell and to 10 to 20 feet in the northern one-third of the site. The filling of Cell A-1 probably took place because flows in the Salt River prevented access to much of the available space in Cell A. The same general type of municipal refuse was disposed of in both Cells A and A-1. During the RI/FS, no evidence or mention of the disposal of liquid or solid, special or hazardous materials in Cell A-1 was discovered (Dames &

Moore, 1989). It is estimated that Cell A-1 contains approximately one half million cubic yards of refuse. The refuse was generally covered on a daily basis and a temporary soil cap was placed over each area once it had been filled with waste. The soil cover over Cell A-1 is estimated to be approximately four feet in thickness (ESE, 2000).

Parts of the landfill were covered with water by at least one flood event during 1965 and intermittently during the 1970' s. Surface water runoff events in May 1978 washed refuse from the southwest part of Cell A and the northern third of Cell A-1. These were refilled, Cell A with refuse during the summer of 1978 and Cell A-1 with construction debris in 1979. River flows in the winter and spring of 1979 again washed out refuse in the southwestern part of Cell A. The next few years following the river flows, the area was covered with rubble, asphalt and dirt to function as rip rap.

The landfill was closed by a cease and desist order issued by the Arizona Department of Health Services (ADHS) in February 1979. 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 COP covered the site with fill material, stockpiled soil for final capping, installed groundwater monitor 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 placed on the EPA's National Priorities Lists (NPL) in September 1983. A Remedial Investigation/Feasibility Study (RI/FS) was voluntarily conducted by the City. 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).

The RI/FS Report was submitted to the ADEQ on June 9, 1988. The RI/FS report was reviewed by the ADEQ, EPA, and the Arizona Department of Water Resources (ADWR). Comments by these agencies were incorporated into a Remedial Action Plan (RAP).

In 1988, the EPA assigned the lead oversight responsibility for the Site to the ADEQ. The ADEQ required the City to prepare a RAP under the state Water Quality Assurance Revolving Fund (WQARF) rules. The RAP included options, ranging from no action to excavation of the entire landfill. These options were supposed to address four different objectives: (1) Refuse-Washout, (2) Surface-Water Quality, (3) Ground-Water Quality, and (4) Landfill-Gas Accumulation. Four alternatives were ultimately selected for evaluation. Alternative "A" was recommended as the remedial action for the 19th Avenue Landfill.

The final draft RAP was completed in June 1989, and was determined to be ready for public review and comment. A public comment period was held by the ADEQ and EPA from June 29, 1989 through August 11, 1989. In addition, a public meeting was held on July 20, 1989 to present the RAP and to obtain additional public opinion. Both the ADEQ and EPA responded to public comments and questions about both the investigation and the proposed RAP for the landfill.

By Letter of Determination (LOD), dated September 21, 1989, the ADEQ approved the final draft RAP for the 19th Avenue Landfill along with the RI/FS. The LOD included approval of the preferred alternative.

The Record of Decision (ROD) declaration by EPA was dated September 29, 1989. The ROD served as the EPA's concurrence of the remedy selected by the ADEQ for the 19th Avenue Landfill Site. The selected remedy was Alternative "A" in the RAP, as described in the LOD and the ROD.

The Consent Decree between the State of Arizona and the City was signed by the United States District Court on June 18, 1992. The purpose of the Consent Decree was to serve the public interest by providing legal assurance that the work would be implemented as described in the ROD and LOD.

In December 1995, ADEQ issued an Explanation of Significant Differences (ESD). ESD #1 (Modification to the Perimeter Drainage Channels) modified the perimeter drainage collection channel and sedimentation pond lining system in the remedy. In September 2003, ADEQ issued ESD #2. This updated MCLs for specific constituents in groundwater and added the Arizona Ambient Air Quality Guidelines (AAAQG) for VOCs as performance standards for ambient air quality. It is anticipated that ADEQ will issue a third ESD in the future. The purpose of this ESD will be to place a Declaration of Environmental Use Restriction (DEUR) on the property to ensure long-term operation and maintenance of the remedy and the compatibility of future land uses.

No future end use plans are being considered for the Site. A basic premise of the Feasibility Study was that the 19th Avenue Landfill will not be used for any purpose inconsistent with the protection of public health and the environment, and that public access to the Site will be prohibited by the existing site perimeter security fence. Any future end use plans for the Site will require ADEQ review and approval to ensure that adequate protection of public health and the environment is maintained.

3.0 REMEDIAL ACTIONS

3.1 REMEDY SELECTION

ADEQ's LOD describes the selected remedy as Preferred Alternative "A". Alternative "A" is a remedy designed to meet the following remedial action goals:

- Overall protection of human health and the environment. The remedy was designed to stabilize the landfill and monitor for contaminants. The remedy contains provisions for an evaluation of the need for remediation of groundwater if standards are exceeded at the landfill boundary. In addition, methane concentrations at the landfill boundary should be less than 5% by volume in air. Finally, ambient air at the landfill should show (1) attainment of Arizona Ambient Air Quality Guidelines (AAAQGs), (2) that surface emissions from the landfill have had a negligible contribution to VOC concentrations in ambient air, and (3) that surface emissions from the landfill do not present a significant risk to human health and the environment.
- Compliance with applicable or relevant and appropriate requirements (ARARs) and substantive requirements of any future permits if required.
- Long-term effectiveness and performance. The remedy will maintain reliable protection of human health and the environment over time and will mitigate any potential release of contaminants to groundwater.
- Reduction of toxicity, mobility, or volume. The remedy is designed to stabilize the landfill and contains provisions for an evaluation of the need for remediation of groundwater if standards are exceeded at the landfill boundary.
- Implementability. Alternative "A" is technically and administratively feasible.
- Cost. The estimated cost for Alternative "A" is approximately \$42,990,000 over a 30 year period.
- Community comments. ADEQ has evaluated every public comment submitted concerning the 19th Avenue Landfill. Portions of the community did not feel that Alternative "A" went far enough in remediating the landfill. Others commented that Alternative "A" is in excess of what is needed for remediation.

The selected remedy for the 19th Avenue Landfill consists of the following components:

- Levees along both the north and south banks of the Salt River at the landfill site for refuse-washout control and bank protection;
- A widened river channel;
- A single layer soil cap over the landfill that prevents rain from seeping into the landfill material;
- A secure fence around the landfill perimeter;
- Monitoring of ambient air quality, methane gas, and groundwater;
- A contingency plan to be implemented if groundwater quality standards are exceeded at the landfill perimeter; and,
- A system for the collection and treatment of methane gas in a manner that eliminates risk of explosion.

The Consent Decree specifies that the soil cap will consist of at least one foot of existing soil and three feet of compacted soil, that the compacted soil of the cap will have a hydraulic conductivity of less than 10^{-4} centimeters per second, and that the cap will have a slope of two percent to carry surface water towards the landfill perimeter.

The LOD does not specify the operating life of the gas extraction and control system or the duration of groundwater and methane monitoring.

Since the Consent Decree/LOD, ADEQ has issued two modifications to remedy design. These are called Explanation of Significant Differences (ESD). ESD #1 (Modification to the Perimeter Drainage Channels) was issued during Remedial Design/Remedial Action (RD/RA) and is described in greater detail in Section 3.2. ESD #2 (MCL Revisions and Arizona Ambient Air Quality Guidelines) was issued after the first five-year review and is described in Section 3.4.

3.2 REMEDY IMPLEMENTATION

From October 1990 to May 1995, the engineering investigations, design and preparation of construction plans and specifications for the remedy were performed. This work was performed by Simons, Li and Associates, Inc. (SLA), under contract to the City of Phoenix. The work included river mechanics and sediment transport analysis for design of the bank protection and the grade control structure; floodplain analysis and processing of the Conditional Letter of Map Revision (CLOMR) with the Federal Emergency Management Agency (FEMA); preparation and coordination for application of appropriate permits; a sampling plan for the de-watering discharge to the Salt River; and preparation of construction plans and design documents for the bank protection system and grade-control structure.

The design work also included evaluation, modification and expansion of the landfill gas control system; geotechnical investigations; surveying and mapping; storm drainage control and sedimentation basins; landfill capping and grading and site security. Application for the § 404 permit of the Clean Water Act was made to the U.S. Army Corps of Engineers (COE) in August 1991, and the permit was subsequently issued after reviews and revisions were made to the Mitigation Plan in June 1992. The draft QA/QC Plan was submitted to ADEQ on May 1992 and approved on February 1993. These efforts resulted in a complete set of project plans, specifications and an Explanation of Significant Difference (ESD) for the remedy. ESD #1 (Modification to the Perimeter Drainage Channels) was signed by the ADEQ in December 1995. This modified the perimeter drainage collection channel and sedimentation pond lining system in the remedy. The 100% Final Design Plans were submitted in September 1994 and approved by the ADEQ in May 1995. The primary reviewers were SLA and subcontractors, the City, the ADEQ, and Malcolm Pirnie Inc. (ADEQ's consultant).

The City Council awarded the contract to Bentson Contracting Company (BCC) on June 28, 1995, and subsequently issued the Notice to Proceed with a start of August 10, 1995. The Consent Decree allowed 100 weeks for construction. However, the contract duration was established by the specifications at 365 calendar days.

Award of a contract to provide construction administration services to the COP for the project was made to SLA in July 1995. The purpose of this contract was to provide construction quality assurance for the 19th Avenue Landfill Environmental Cleanup. SLA was responsible for overall project administration services, including bidding assistance; pre-construction services; the supervision and administration of the project site security and health and safety plan; engineering services during construction; resident engineering services during construction, including monitoring of the contractor's hazardous waste handling activities; and other special services.

BCC started construction of the channelization tasks on August 14, 1995. By the end of September 1995, the erosion and drainage tasks were started. Capping was underway by October 1995. In March 1996, the channelization tasks were completed and work on the gas collection system was started. The site landscaping started in May 1996 along with installation of the Armorflex™ channel and sedimentation pond lining system. Both the capping system and the erosion and drainage system were completed by the end of August 1996. The gas collection system was operational by the first of October 1996. Flare station emissions tests were performed October 16-18, 1996. The site landscaping was completed in November 1996 and correction of punch list items on the flare stations were started. Final acceptance of the flare stations occurred in February 1998.

The contract completion date was extended to December 6, 1996. The time extension was due to rain days (provided in the contract). In addition, a time extension was granted to cover the time required to haul imported soil for the infiltration barrier. This was not anticipated at the time of the original bid.

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 were performed on December 4 and 5, 1996, by ADEQ. Inspections for the other features of the project were conducted on December 6 and 12, 1996. Based on the results of the inspections, the project was determined to be substantially complete on December 6, 1996. Based on the results of two additional punch list inspections conducted on January 7 and February 13, 1997, final project acceptance was made by ADEQ on February 28, 1997.

ADEQ issued approval of "Completion of Remedial Action" on June 30, 1997. This approval triggered the following four items in accordance with the Consent Decree: (1) preparation of a remedial action report to document construction complete, to be submitted and approved by September 30, 1997; (2) initiation of five year reviews to evaluate the effectiveness of the remedial action under § 300.340 (f)(4)(ii) of the National Oil & Hazardous Substances Contingency Plan, § 121 (e) of CERCLA (as amended); (3) a groundwater contingency plan; and (4) preparation of the methane and ambient air monitoring programs.

3.3 SYSTEM OPERATIONS

The COP has been performing all O&M activities at the landfill in accordance with the approved O&M Manual dated September 15, 1998, and the Operations, Maintenance & Monitoring Program Manual for the Landfill Gas Extraction System dated March 1999. O&M requirements for the landfill include:

- Quarterly inspections of the landfill during the first year of operations;
- Annual and after storm inspections of the landfill during subsequent years of operations;

- Recording and maintaining inspection results in appropriate logs at each flare station area;
- Performing appropriate maintenance of the cap, perimeter drainage system, access roads, security fencing and landscaping;
- Performing appropriate maintenance of the Salt River levee system;
- Performing appropriate maintenance of groundwater monitoring wells;
- Performing O&M of the landfill gas extraction, control, and monitoring system in accordance with the March 1999 manual, which addresses all requirements to inspect, operate, maintain the gas extraction/control system as well as address monitoring requirements for the probes, and management of condensate;
- Maintaining appropriate maintenance logs at each flare station location;
- Submittal of annual inspection/maintenance reports;
- Conducting quarterly groundwater monitoring of designated wells at the site;
- Conducting monthly methane monitoring of gas probes; and
- Conducting biannual sampling of gas extraction wells.

The O&M Manual also requires COP to perform ambient air monitoring during two separate events (once in the summer season and once in the winter season). To date, this monitoring has been performed once. However, ambient air monitoring is not currently being performed at the landfill.

During the operational period of the landfill covered by this review, monitoring of groundwater and methane, as well as routine maintenance activities have taken place. Maintenance activities included repair of eroded areas, repair of irrigation systems, fence repair, rodent control, and minor repair of wells, probes, and the gas control system.

O&M costs for 2000-2003 were available for this five-year review. EEC also reviewed a Final Report from the COP City Auditor dated September 1, 2004. O&M costs for FY 2004 had not been compiled at the time of this report. This review showed that O&M costs for FY 2001, FY 2002 and FY 2003 were between 15% and 22% of the original estimate of \$1,010,000 (June 1989) for annual O&M costs. Lower than expected O&M costs for these years may be due to less cap repairs due to the small amount of rainfall that occurred. It is also known that the wellfield for methane extraction was balanced during this period to prevent periodic shutdown of the flares at Cell A and A-1. Both events may have necessitated significantly less involvement at the Site by COP personnel.

Table 2 provides the annual O&M cost covering the period from 1996 to 2003. A detailed breakdown of the O&M for 2000 to 2003 is included in Appendix A.

3.4 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

Section 10 (Protectiveness Statements) of the Final First Five-Year Review Report dated September 18, 2000 says:

“Additional action and data is required to address the methane boundary issue within the landfill. In addition, other actions are necessary to address the Pentachlorophenol and Thallium groundwater issues, and the incorporation or evaluation of changes in ARARs that were determined to be protective. Based

on these findings, a protectiveness statement cannot be made at this time. Upon completion of appropriate activities (See Section 9.0) to address deficiencies and recommended actions, ADEQ will reevaluate the site to determine if the remedies are protective of human health and the environment. A supplemental report will be issued that will address the results of the evaluation.”

On January 3, 2001 COP submitted “Ambient Air Monitoring Program Report for 19th Avenue Landfill Phase II, Volumes I and II”. This report contained the results of ambient air sampling that COP conducted at the 19th Avenue Landfill. The results of the sampling were compared to background concentrations and the Arizona Ambient Air Quality Guidelines (AAAQGs), which were developed by the Arizona Department of Health Services (ADHS). This comparison determined that low levels of VOCs in the vicinity of the landfill: (1) cannot be conclusively associated with the landfill (i.e., they are indistinguishable from background ambient air concentrations), and (2) represent acceptable health risk even if they exceed the AAAQGs. On June 26, 2001 EPA provided COP with comments on the ambient air report.

On March 22, 2001, a follow-up site inspection was conducted by ADEQ and EPA to evaluate whether deficiencies identified in the Final First Five-Year Review Report had been corrected. Furthermore in early to mid 2001, COP submitted and ADEQ approved final engineering design of a system that included the installation of additional methane monitoring probes and extraction wells along the Salt River on the south side of Cell A.

Subsequent to these actions, ADEQ issued the Supplemental First Five Year Review Report dated July 16, 2001. Section 3.0 (Protectiveness Statement) of this report says “Based on the actions completed to date, ADEQ has determined that the remedies implemented at the 19th Avenue Landfill, along with implemented actions to correct the deficiencies and recommendations, are adequate to protect human health and the environment.”

Construction of enhancements to the original methane collection system were completed in August 2002. During the fall of 2002 a performance test of the system was conducted and Maricopa County gave COP an air quality permit to operate the system (See Appendix E).

On April 30, 2002 COP submitted “Ambient Air Monitoring Program Report – Phase II, Volume I, Revision 1”. This revised report addressed EPA’s comments on the first ambient air monitoring report. On July 8, 2003, EPA provided COP with additional comments. In this document EPA concluded that responses to its earlier comments were acceptable and that additional ambient air sampling was unnecessary. In September 2003, ADEQ issued ESD #2. This updated MCLs for specific constituents in groundwater and added the Arizona Ambient Air Quality Guidelines for VOCs as performance standards for ambient air quality. COP/URS submitted responses to EPA’s last set of comments on February 19, 2004.

In FY 2004, COP installed ArmorflexTM drainage mats at several locations on Cell A. According to COP personnel, these significantly reduced the amount of erosion and sedimentation that the cap previously experienced.

4.0 FIVE-YEAR REVIEW PROCESS

Section 121(c) of CERCLA requires that the lead regulatory agency conduct a review of any remedy that includes the presence of residual hazardous substance, pollutants, or contaminants at a site. When a remedy of this type has been implemented, CERCLA requires the review occur no less often than every five years. The 1989 ROD for the 19th Avenue Landfill National Priorities List (NPL) Site allows the hazardous substances to remain on site; therefore, five year reviews are required. Guidance for this review is provided in OSWER Directive 9355.7-03B-P Comprehensive Five-Year Review Guidance (EPA, 2001).

According to EPA guidance, the five-year review must address the following:

- Achievement of remedial objectives,
- Appropriateness of cleanup levels and remedial objectives, given any changes in ARARs or site characteristics,
- Whether the remedy is effective and functioning as designed,
- The adequacy of Operation and Maintenance (O&M), and
- Early indicators of potential failure of one or more components of the remedy.

The primary objective of the five-year review is to evaluate whether the remedy remains protective of human health and the environment.

The first five-year review for the Site was to have been completed no later than August 14, 2000, five years after the date the notice to proceed with construction activity was issued by the City of Phoenix. The Final First Five-Year Review Report was completed by Environmental Science & Engineering, Inc. on September 18, 2000. This second five-year review needs to be completed five years after the date of the last review, i.e. September 2005.

The second five-year review was lead by Mr. William DePaul, Project Manager of ADEQ, who provided oversight of the review process that was conducted by Engineering and Environmental Consultants, Inc. (EEC), ADEQ's consultant. The following team members assisted in the review:

- Hugh Rieck, ADEQ Hydrologist;
- David Laney, EEC Project Manager;
- Kirk Creswick, EEC Project Geologist;
- Kevin Pierce, EEC Project Geologist;
- Mark Gavan, EEC Senior Civil (Drainage) Engineer;
- Nadia Hollan, EPA Project Manager; and
- Waleska Nieves-Munoz, EPA HQ Reviewer.

The second five-year review consisted of the following activities: document review; interviews; review of Applicable, Relevant or Appropriate Requirements (ARARs); site inspection/technology review; and preparation of a five-year review report.

The document review included a review of ADEQ's project files for the 19th Avenue Landfill. This work was completed in accordance with Appendix B (Document Review) of the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (EPA, June 2001). Specific information gathered during the document review included:

- Remedial objectives
- Status of remedy implementation
- Operation and maintenance (O&M) requirements
- Status of O&M, including unanticipated expenditures

The document review process provides the information needed to determine the degree to which the remedy has achieved cleanup levels/performance objectives as set forth in the ROD, the degree to which the remedy has been able to achieve containment of source(s) and/or groundwater contamination, and the degree to which the remedy has achieved compliance with the requirements of any active permits.

Interviews targeted individuals who are knowledgeable as to the operation of the site remedy. This work was completed in accordance with Appendix C (Five-year Interviews) of the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (EPA, June 2001).

Interviewees included City employees who have responsibility for the operation and maintenance of the 19th Avenue landfill, business owners who have businesses located adjacent to the landfill, citizens who live in the vicinity of the landfill, community groups, elected officials, and employees of local, state and federal regulatory agencies.

The purpose of the interviews was to identify information about any problems associated with the remedy. Thus, interviewees were questioned as to procedures for operation of the methane gas collection and flare system, the clay soil cap, the perimeter drainage system, and any site specific factors that appear to have impacted the effectiveness of the remedy, and its ability to provide protection of human health and the environment.

Review of Federal, State, and local ARARs was conducted in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (EPA, June 2001) including Appendix G (Methods and Examples for Evaluating Changes in Standards and Toxicity). The purpose of this work was determine if changes in ARARs occurring after the ROD have an impact on the protectiveness of the remedy for the 19th Avenue Landfill. Of particular importance were changes to toxicological, chemical characteristic and radiological information for the chemicals of concern. If these have changed, then concentrations that may once have been acceptable for protection of human health and the environment may no longer be acceptable.

The site inspection was designed to determine whether each element of the ROD has been implemented and whether each component of the remedy is operating in accordance with its intended function.

The site inspection was completed in accordance with Appendix D (Five-Year Review Site Inspection Checklist) of the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (EPA, June 2001). The following is a list of the items that were reviewed:

- Physical site characteristics
- Remedial facilities
- Monitoring wells
- Access controls (fences, signs, etc.)
- Onsite documents and records
- Systems operations and O&M costs
- On-site and adjacent land use

The purpose of the site inspection was to determine the current status of remedy implementation, the status of ongoing O&M, the detection of monitoring and maintenance problems, and changes in site characteristics, land use or access controls.

The results of the second five-year review are included in this report. Following completion of the report it will be available to the public at the ADEQ file room and at the local site repository, City of Phoenix public library. Notice of its completion will be placed in the local newspaper and local contacts will be notified by letter. If applicable, a brief summary of this report will be distributed to community members by ADEQ.

5.0 FIVE-YEAR REVIEW FINDINGS

5.1 INTERVIEWS

The following individuals were interviewed during the five-year review:

- Steve Brittle, Community Member representing Don't Waste Arizona (Interviewed 4/29/05);
- Bill DePaul, 19th Avenue Landfill Project Manager ADEQ (Interviewed 4/29/05);
- Nadia Hollan, 19th Avenue Landfill Project Manager EPA Region 9 (Interviewed 5/4/05);
- Hugh Rieck, 19th Avenue Landfill Project Hydrologist ADEQ (Interviewed 5/4/05);
- Bruce Henning, 19th Avenue Landfill Acting Project Manager and Deputy Public Works Director, City of Phoenix (Interviewed 5/9/05);
- Michael Johnson, Vice Mayor and Council Member for District 8, City of Phoenix (Interviewed 5/25/05);
- Ron Serio, Former 19th Avenue Landfill Project Manager, City of Phoenix (Interviewed 7/5/05);
- Linda Pollock, Office of Arizona Attorney General (Interviewed 7/18/05); and
- Susan Sargent, City of Phoenix Planning Department (Interviewed 7/29/05).

Detailed records for each interview are included in Appendix C. The following presents a summary of each.

Steve Brittle of Don't Waste Arizona has participated in the Site by reviewing files at ADEQ and may have attended some community meetings in the past. Mr. Brittle contacted ADEQ and EPA regarding groundwater monitoring data at the Site to inquire how the Industrial Waste Utilization (IWU) facility is potentially related. Mr. Brittle is also involved in community meetings for planning of the Rio Salado project. Although Mr. Brittle stated that he has had limited involvement with the Site in recent years, he is aware of some past issues regarding reburial of drums containing hazardous waste, back into the landfill. He also stated his concern regarding potential waste washout once a flow is established in the Salt River.

Bill DePaul, 19th Avenue Landfill Project Manager for ADEQ stated that although it was initially thought that hazardous substances would be discovered in soil and groundwater at the Site, this hasn't ever happened. His impression is that the remedy has been adequately implemented and that future work at the Site will consist primarily of long-term monitoring of the waste that has been left in place. Mr. DePaul is unaware of any complaints that ADEQ has received about the Site from the community. He says that routine review of the data revealed that there has been an exceedance of the standards for arsenic in groundwater beneath the landfill but it has been determined that this has not been generated by contamination in the landfill. Mr. DePaul said the only issues relevant to future use of the Site are the addition of appropriate Institutional Controls. He indicated that the City of Phoenix has been following the O&M Plan that is part of the Consent Decree.

Nadia Hollan, 19th Avenue Landfill Project Manager for EPA stated that she has been involved with the Site since she started with EPA in September 1997. She said that at this point the Site has gone through

the entire Superfund process and that current plans are to try and get the Site delisted. Ms. Hollan said that as far as Site cleanup is concerned, everything has been implemented. She said that there has been a lot of groundwater monitoring data collected and that there are no offsite impacts. She said there have been no complaints about the Site from the community in the last five years.

According to Ms. Hollan, at the time of the first five-year review, EPA had not finished looking at the ambient air monitoring data collected by the City of Phoenix. The City collected a second round of data and after a lot of back and forth, EPA finally approved the report and determined that there was no major problem.

Ms. Hollan said that EPA has tried to talk to the City about future land use for the Site. However, the City hasn't really come up with all that much about what it wants to do. She mentioned Rio Salado as one project that is immediately adjacent to the Site where the City is involved. She said that she isn't sure how far along this project is but once Rio Salado is implemented, it will be necessary to conduct an analysis to ensure that the Site doesn't adversely impact this project.

Ms. Hollan said she believes that the City pretty much does what they are supposed to do with respect to operations and maintenance at the Site. However, one concern that she has is that the City's staff has changed and she knows nothing about any new staff or new procedures. Since the City never really replaced their original project manager for the Site, Ms. Hollan said that the Site appears to be not much of a priority.

Ms. Hollan said that EPA never gets any calls about the Site from the community but that she worries about future development of the Site and the surrounding area. She said that she thinks the community is more concerned about neighboring industries than they are about the Site. Specifically, she mentioned Innovative Waste and a nearby tallow plant.

Ms. Hollan suggested that the City should take a look at the groundwater monitoring data and see if they need to collect it as frequently as they are currently doing. She also said she would like to see if the City has any new suggestions for the ambient air and monitoring program to be sure that the Site has the best program for making sure that everything is intact and working. Ms. Hollan also said that although groundwater levels have been dropping, it is important to monitor groundwater if levels ever rise. She said the City should be sure it has enough personnel dedicated to the Site and make sure that EPA and ADEQ have a list of who is responsible for it and maintain documentation of activities so that it is possible to check that everything is being done as often as it is supposed to be.

Ms. Hollan said that one thing that EPA is working on is an ESD to identify Institutional Controls. This will require that the City and any future owners agree that certain land uses are not appropriate, that waste remains in place, and that the existing system is operated and maintained appropriately. She said that EPA has tried to encourage the City to think about what they want to do with the Site because it's a lot easier to plan ahead of time and deal with these ideas now as opposed to later. Ms. Hollan said that the further along in the process you get the harder it is to go back and change anything. She said that the main thing is to be sure that any use that is proposed is protective. Anything that is done with the Site that requires any modifications to the design has to go through the approval process.

Hugh Rieck, 19th Avenue Landfill Hydrologist for ADEQ said that work at the Site has been well done and every aspect of the remedy has been successful. He said that the only changes to regulations or ordinance that may impact operations or remedies at the Site are the lowering of the arsenic MCL and the implementation of a Declaration of Environmental Use Restriction (DEUR) to ensure that no inappropriate land uses occur. He said that in all cases, he believes that appropriate O&M and monitoring have been conducted and that this has been done in accordance with previously development manuals and plans. He said that he is not aware of any community concerns regarding the Site.

Mr. Rieck said that the only concern he has is the possible impact that long-term future land use may have on the remedy. He also said long-term monitoring is necessary.

Bruce Henning, 19th Avenue Landfill Acting Project Manager for City of Phoenix said that he has been involved with the Site since the RI/FS. He said that his understanding of the project is that it includes placement of a remedy which has as its components a cap, drainage controls, groundwater monitoring and collection and treatment of methane. Mr. Henning said that construction of the remedy is complete and that O&M has been ongoing for a number of years and indicated that this work has been going well. He said although recent heavy rains have caused some erosion problems that required special attention, seeding of the cap has been doing its job. He also said that methane monitoring along the Salt River is going pretty well.

Mr. Henning said that every year more people seem to be interested in new and different future land uses for the site so the remedy must be working. He noted that this year there was some flow in the Salt River and both this and the Rio Salado Project have increased interest in the Site.

Mr. Henning said that in the future the City plans to name a permanent project manger for the Site. However, at the present time, many of the City's engineers are busy working on the design and construction of the City's new landfill so naming a new project manager for the Site will have to wait until this work is complete.

Mr. Henning said that a City maintenance crew performs monthly monitoring at the Site and that a City technician performs all groundwater monitoring. The City's Engineering Group prepares quarterly groundwater monitoring reports and keeps official data. The City also performs all minor maintenance. Contractors are hired to perform any major maintenance. Recently Bryan Stirrat & Associates (BSA) was hired to perform monthly maintenance on the methane system.

Mr. Henning said that City staff and contractors are currently working on a DEUR for the Site. He said there may be changes that need to be made to the O&M/monitoring as a result of the DEUR.

Mr. Henning said that in response to the findings of the last five-year review, the City added methane monitoring probes along the Salt River and that this improved the protectiveness and effectiveness of the remedy. He said that the City has attempted to optimize O&M by installing an above ground methane monitoring and collection system and balancing the well field. He also said that, in general, O&M costs have been decreasing with time.

Mr. Henning said there have been no ambient air issues and that the potential groundwater issues that have been identified recently - - arsenic and DCE - - have been well documented in reports that the City has made available to ADEQ. He said the best systems for operation and maintenance of the Site are already in place although the City may propose to change the frequency of groundwater monitoring from quarterly to semiannually. There is sufficient quarterly data for this change to occur without impacting the ability of EPA and ADEQ to evaluate groundwater quality and this would make the groundwater monitoring program similar to the program that is already in place at other City landfills.

Michael Johnson, Vice Mayor and City Councilman for District 8, City of Phoenix said that he understands that the Site was a landfill that was filled and closed and placed on the Superfund. He said that his office has been over in the area several times responding to environmental issues (mainly air quality) that have been unrelated to the Site.

Vice Mayor Johnson said that he is unaware of any changes to City regulations or ordinances that may impact operations or remedies at the Site. However, he noted that as the Rio Salado project goes forward the City will be looking for ways to encourage development of compatible land use in the area.

Vice Mayor Johnson said that he believes that appropriate O&M and monitoring have been conducted at the Site. He said that the City has been monitoring operations at the Site and there have been no issues or violations. He also said he is unaware of any community concerns about the Site.

Vice Mayor Johnson indicated that he would like to see the Site delisted so that it can be developed as a Brownfields project that will be compatible with the open ended development of Rio Salado.

Ron Serio, Former 19th Avenue Landfill Project Manager, City of Phoenix said that although he currently has no responsibility for the Site he was the project manager for the Site for several years and sometimes still gets calls from the City staff who are doing work there. Mr. Serio said he understands that since remedial construction has been completed the objective is to keep the remedy maintained so that there is no threat to human health and safety, and to continue monitoring groundwater, landfill gas, etc. He said he thinks the remedy has been very successful, that everything was done appropriately, that it met the objective of being protective of human health and the environment. He said that he thinks it's going so well that it needs to go the next step where it needs to be evaluated to see if the Site could be used for some sort of a public use instead of just restricted and never to be used again. Mr. Serio said there should probably be a risk assessment or something done to determine if there could be some other use there. He said he thinks that would really be a positive thing.

Mr. Serio said that the City uses its' our own technicians for the landfill gas monitoring and for the groundwater sample collection. He said the City uses contract labs for analysis of the groundwater. Mr. Serio said that the City does the reporting itself in house. He said that a consultant also used to do some surface sweeps in the Salt River but that he doesn't know if that's still going on. Mr. Serio said that was part of the ambient air concerns. He said that the City may bring in specialists or contractors to do work for maintenance of the flare. Mr. Serio said that surface emission monitoring was done temporarily until the wells were installed along the Salt River. He said he thought it should have quit, but that he doesn't know if it actually did.

Mr. Serio said that O&M manuals and monitoring plans should have been changed to reflect changes that occurred during expansion of the landfill gas collection system. He said he thinks all the procedures would be the same as before the expansion and that since it's just the number of wells that has changed the only change that might have been necessary would be a revision to the map of wells. He said he doesn't know if there were any probes added but he doesn't think so. Mr. Serio said that since these changes in the system were so minor and no procedures changed, it would be very easy to update the manuals and plans, if this has not already been done.

Mr. Serio said he didn't think there were any O&M problems or difficulties that may have affected the protectiveness or effectiveness of the remedy or O&M costs. However, he said there may have been an impression there was a problem or the data could have been misleading because there were some probes installed in trash around the rendering plant in the northeast corner -- so you'd get readings in those wells. However, there was vacuum on those wells usually indicating that there was no gas migrating offsite. Therefore, the data reflected the gas in the trash but not gas that was outside the landfill. Mr. Serio said that was always something that had to be explained and that there was not an easy solution to the situation. He said that was the only thing that may have looked bad but really wasn't.

Mr. Serio said that that the added wells helped provide more fuel for the flares and optimize O&M. He said there was nothing significant beyond that in the way of optimization. Mr. Serio said that the only monitoring results that may have affected the groundwater, methane extraction systems, or ambient air, or have caused the implementation of the Site's Contingency Plans may have been the detection of some elevated concentrations of groundwater contaminants right before he left the project. He thought it was nickel on the west side. It was just starting when he left so he doesn't know if it triggered the Contingency Plan but that's about the only thing that he is aware of.

Mr. Serio said he think that now that there's a huge history of groundwater quality data and methane probe reading data it probably wouldn't hurt to see if there are constituents that were never ever detected for ten years. He said he believes that it would make sense to review the data and get rid of some of that stuff -- not make it required to be monitored. He said he also thinks it would be good to look at some of the lab procedures because the Consent Decree requires very specific test methods for analysis of groundwater samples. He said some of those may be a little bit outdated, because of changes in analytical testing technology at the labs. He said that's something that should be looked at because sometimes to do it the old way may cost more money and may not even be as accurate. He also said that based on history it would also be appropriate to see if it's okay to have less monitoring events. He said he thinks the longer the Site goes, eventually the concentration of contamination is going to have to decline and that the five-year reviews are an appropriate time to look at that type of thing.

Linda Pollock, Office of Arizona Attorney General said that her understanding of the purpose of the remedy is that it is supposed to protect the public and the environment from releases or threat of releases of hazardous substances. She said she has a very high opinion of the completed remedy. She especially likes the rechannelization of the Salt and the rip-rap. Ms. Pollock said that it's designed to prevent washout in the event of a flood and although it cost millions of dollars it was well worth it.

Ms. Pollock said there have been no routine communications conducted by her office related to the Site. She said there are regular communications with the City right now because she is currently negotiating a recorded deed restriction with the City. Ms. Pollock said there been no complaints or other incidents related to the Site that require any response by her office.

Ms. Pollock said she is unaware of any current or planned changes to regulations/ordinances, or current/future land development that may impact the operations or remedies at the Site. However, she suggested that this question be posed to the City because they may have some long range plans for that landfill.

Ms. Pollock said that on-site operations and monitoring at the Site been conducted in accordance with developed manuals and plans and that the City is very conscientious about this. She said she has not heard of any community concerns regarding the Site or its operations and administration.

Ms. Pollock said she has no comments, suggestions or recommendations regarding the Site's management or operations other than the fact that a recorded declaration of use restriction needs to be filed for the Site. She said this is a glaring omission. "We have no way to protect the integrity of the remedy in the event the City sells all or part of the property. That's what I'm focusing on right now."

Susan Sargent, City of Phoenix Planning Department said she does the planning for the Beyond the Banks Area adjacent to the Rio Salado Project but doesn't have technical information about the project itself. The Rio Salado Habitat Restoration Project's western boundary is 19th Avenue. The Rio Owesta (spelling?) will continue to the west from 19th to 83rd Avenue and it's in the feasibility study/planning stage. "We've got a feasibility report from the Army Corps of Engineers but it has not been funded. We eventually hope to restore, reclaim, and develop the river bed all the way through to the western boundary of the City, 115th Avenue."

She also said the City has a cohesive, interdepartmental team including the Rio Salado people and the Office of Environmental Programs. She said she has some background from them [about the landfill] because they share a lot of information.

Ms. Sargent said that she knows that there has been some remediation of the Site and that "We expect to have it delisted later this year." She said she knows that it has to be delisted in order for the City's Rio Salado facilities to run along the southern boundary of the landfill, at least on the north side of the river. She said she knows that a portion [of the landfill] extends to the south side of the river and that most of the methane venting has occurred around the perimeter of the Site. Ms. Sargent said she knows that the Site's got about a 2 percent slope and that it's been capped. She said she knows the City has had some development proposals for possible use or reuse of the Site were it to be delisted but that the City is not actively marketing it at this point. Ms. Sargent said the City shows the landfill on its general plan for future, probably passive recreation. "We don't see it at this time as something that is likely to be developed for other uses."

Ms. Sargent said she can't address how effective the work on the landfill has been because she doesn't know exactly all the details of what's been done and to what standards its been done. She said she thinks

in the future there might be some higher and better uses for that Site were it not environmentally compromised and that there's a great demand for housing and other land uses adjacent to the Rio Salado Project which will be opening to the public later this year. She said that there are certainly better uses than passive recreation on the Site but not under its present environmental status.

With respect to the Rio Salado Project and the Salt River, Ms. Sargent said there is a low flow channel that was constructed by the Army Corps of Engineers and its subcontractors in conjunction with federal funding and funding from the City of Phoenix and the Maricopa County Flood Control District. She said that she knows that during the peak releases during the winter there was as great as 40,000 cubic foot per second flow that was contained within the low flow channel. She said there was very little erosion to the low flow channel construction and that it proved effective at handling flows at that amount. Ms. Sargent said that water that is presently in the low flow channel and that will probably typically be present in the low flow channel is the result of water from the outflow channels that flow through the City to the river bed. She said that as a result there will be a perennial flow in the Salt River - - maybe less than 1,000 cubic feet per second. She said that this flow is from storm water outflow.

Ms. Sargent said the flow in the Salt River is supposed to support aquatic species and riparian species in the area. She said that in addition to storm water there will be an additional input of well water that the City will treat and use through a series of wetland ponds. She said she believes that there have already been sited over 100 species, in the river corridor. Ms. Sargent said that more specifics are available from the Rio Salado people - Karen Williams. She's in the City Manager's Office. She's the Rio Salado Project Manager. Engineering information can be obtained from Walt Kinsler in Engineering and Architectural Services. He knows how the Project is related to the water distribution system in the canals and the wells. Ms. Sargent said that Don Stoltzfus in the City's Office of Environment of Programs also is working on those. She said the City has a lot of people who are involved in Rio Salado and adjacent areas. She said one of the landowners comes in and talks with the City frequently. This landowner has part of the northeast corner, Sloan McFarland, on Pasqual Eddy properties. They just recently pulled a permit to have some electrical on the eastern portion of their property to have some outdoor storage of containers on the Site. Ms. Sargent said the property shows up on maps as Pasqual Eddy Family Trust. She said that Mr. McFarland told her that maybe there was a five acre section of the landfill that was never mined. She said she thought that was interesting.

Ms. Sargent said she is not aware of any current or planned changes to the City's regulations/ordinances, or current/future land development that may impact the operations or remedies at the Site. She said "We changed the requirements for filling of sand and gravel pits - - that was a recent thing that is somewhat related and near the river but not to change anything that I am aware of - at least from a planning perspective on that landfill. The landfill is still zoned industrial. On our General Plan we show idealized land uses and that would be for recreational use - public recreational or open space. We won't need to change the zoning of the landfill to make it compatible with Rio Salado."

Ms. Sargent said she has not had any complaint about the landfill or its operation. "The only complaints I've had have been about the lack of availability of such a large piece of land to the development community."

She said she has no comments, suggestions, or recommendations regarding the Site's management or operations and that she is pleased to see that the City is moving forward to get the Site delisted. She said it meets the objectives of planning for Beyond the Banks Area. For official planning purposes, Beyond the Banks Area extends from I-17 on the North to Broadway on the South, 19th Avenue on the West and 32nd Street on the East so this is in what the City calls the Beyond the Banks Planning Area. The area plan for Beyond the Banks was officially adopted by the City Council in December of 2003 and it's a policy document for guiding improvement and revitalization of that area over the next 20 to 30 years.

Ms. Sargent said that if the Site doesn't get delisted or doesn't get delisted in the near future, she believes it will have impacts for the Rio Salado Project. However, she said that she can't address those. She said that the City does not see the Site as land that is available for promotion in the Beyond the Banks Area so it essentially has no impact for planning.

5.2 SITE INSPECTION

Representatives of COP and EEC took part in a site inspection on May 11, 2005. Two teams were organized to inspect Cells A and A-1. Cell A was inspected by Kirk Creswick, R.G. Project Geologist and Mark Gavan, P. E., Project Engineer with EEC. Cell A-1 was inspected by Kevin Pierce, Project Geologist and Mark Gavan, P. E., Project Engineer with EEC. The site inspection was performed using a checklist developed by EEC and reviewed by ADEQ.

Cell A occupies approximately 200 acres north of the Salt River Channel, while Cell A-1 occupies about 13 acres south of the river channel. The inspection included visual observation of overall site conditions and inspection of various components of the remedy. The inspection evaluated the landfill cap, the landfill gas collection system, the two flare stations, as well as groundwater monitoring wells DM-3P, DM-3I, DM-3D, methane probes SR1 through SR8, and several representative gas extraction wells. A summary of the inspection findings is presented below. Appendix D includes a copy of the inspection checklist that was completed during the site inspection. This includes more detailed information about the findings of the inspection as well as photographic documentation of the site inspection.

Conditions during the inspection were favorable with warm temperatures and no precipitation. Heavy rainfall had occurred several weeks prior to the inspection. No problems were encountered with access to the features of the Site that were to be inspected.

The site inspection revealed that a copy of groundwater and landfill gas monitoring requirements from the Consent Decree were not present at the 19th Avenue Landfill. Although records were present that showed inspection of the landfill cap, perimeter drainage, sediment ponds, and groundwater monitoring wells, there were no records that showed that maintenance of any of these items has been performed. In addition, there were no site access records, no site-specific incident log, and no record of storm water discharge after storm events.

Although there were a few areas of concern, in general, the landfill cap at both Cells A and A-1 was found to be in good condition. The vegetative cover was well established and uniform at both landfill cells A and A-1. At cell A, the site inspection revealed the presence of a crack that was approximately 160 feet in

length and appeared to be as much as 3 feet deep (Cell A photos 17, 18 and 19). The width of the crack at the bottom was approximately one inch. The crack widened to a width of one foot at the surface. There were also two areas of erosion observed in the central portion of the northern half of Cell A (Cell A photos 11, 12 and 13). The size of these areas was approximately 300 square feet.

There were also 6 to 8 areas with minor rills at Cell A-1. Most were 10 to 20 feet in length, up to 4 inches wide and 2 to 3 feet deep (Cell A-1 photos 3, 5 and 12). One collapsed area was observed on the east side of the cell. This area was approximately 3 to 4 feet across and 1 to 2 feet deep (Cell A-1 photo 6).

The impermeable clay layer of the landfill cap and the underlying waste materials at Cell A and A-1 did not appear to be exposed. Photographs of cracks and eroded areas are included in Appendix D.

The perimeter fence was in good condition with locked gates for restricted access. Minor amounts of miscellaneous trash, including empty beer bottles were observed along the fenced perimeter. No signage was observed on the fencing and there was no evidence of trespassing.

Access roads were in good condition. No obstruction to traffic along access roads was noted.

Inspection of perimeter drainage channels at both cells verified that surface water is directed toward three sedimentation basins located at the east, the southwest and southeast corners of Cell A, and to one sedimentation basin that is located at the northwest corner of Cell A-1. The sedimentation basins remove sediments in storm water prior to discharge to the Salt River (flap gates). Examination of the drainage channels at Cell A revealed two rills approximately 12 inches in depth along the top of the bank of the perimeter channel. There were also several minor rills (less than 6 inches in depth) around the top of the bank of the perimeter channel at Cell A-1. However, erosion had not affected the Armorflex™ that was used to line the channels at both cells.

Silt accumulation was evident in all drainage channels and sedimentation basins; however, it appeared that sufficient capacity remains for unobstructed drainage flows. At Cell A an accumulation of tumbleweeds was observed in the north channel and excessive weed growth in the east channel, particularly around the storm drain inlet. In addition, excessive weed growth was observed in the outlets for the eastern and southeastern sedimentation basins. The 36-inch storm water discharge outfall to the Salt River at Cell A-1 contained several buckets of epoxy resin (labeled “corrosive”) and numerous 45-RPM records (Cell A-1 photo 11). It appeared that this material had been placed in the outfall.

The north and south bank protection (soil-cement) along the Salt River appeared to be in good condition and there was no evidence of erosion along the banks.

Electronic controls, sensors, and instrumentation at the flare stations at Cell A and A-1 appeared to be in good working condition. Operation of shutoff and alarms was not observed during the inspection because this was not allowed by existing conditions. Centrifugal blowers at each station induce a vacuum which extracts the landfill gas. The gas then passes through a knockout vessel where free liquids and solid particulates are removed before the landfill gas is discharged into the flare for combustion.

Most pressure gauges and all valves at Cell A appeared to be in good condition and there was no evidence of leakage. However, the capsulhelic gauge on the knockout tank at Cell A was inoperable. In addition, some of the capsulhelic gauges at the flare station at Cell A-1 appeared to be inoperable. The City representative reported that portable gauges are used instead. A manual of operating procedures and written logs of systems operations were observed inside the control box for easy access by operators and inspectors (Cell A-1 photo 9).

Representative groundwater monitoring wells were visually inspected. A City representative opened the outside locks on the cover boxes for inspection of internal components. No water, debris or foreign material was present. With the exception of some minor erosion beneath the pad of well I-3, it appeared that well casings and caps are in good condition (groundwater monitoring well photos 17 and 190. It was noted that three 2" diameter observation wells DM-3P, DM-3I, and DM-3D were not locked.

With the exception of SR methane monitoring probes SR-1 through SR-8, inspection of representative methane monitoring probes and gas extraction wells, as well as condensate sump collection boxes, showed that all of these items were secure and in relatively good condition. The casing of the probes in question appeared to have been silted up after winter storm water flow in the Salt River (methane well photo 21). Internal pipes, gauges, valves, and fittings were in good condition and no water, debris or foreign material was present.

5.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Section 121 of CERCLA requires, in part, that if any hazardous substances remain onsite at the conclusion of a remedial action that is conducted in accordance with CERCLA, the level or standard of control that must be met for hazardous substances remaining on site is at least that of any applicable or relevant and appropriate requirement (ARAR), criteria, or limitation under any Federal environmental law, or any more stringent standard, promulgated pursuant to a state environmental statute. These standards of control are termed ARARs. Determination of ARARs are site-specific and depend on the location of the site, remedial actions under consideration, and chemical contaminants of concern. An important factor to note is that once the ROD/LOD has been signed, all ARARs identified for the remedy become established (frozen), and cannot be changed or modified unless new or modified requirements or standards call into question the protectiveness of the selected remedy.

The National Contingency Plan (40 CFR 300.5; EPA, 1990) defines "applicable" and "relevant and appropriate" as follows:

Applicable

Applicable requirements mean those clean-up standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.

Relevant and Appropriate

Relevant and appropriate requirements mean those clean-up standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

EPA’s guidance document entitled “CERCLA Compliance with Other Laws Manual, Part II. Clean Air Act and Other Environmental Statutes and State Requirements” EPA/530/G-89/009, August 1989, sets forth the general procedure for selection of ARARs, and details ARAR selection under several Federal environmental statutes. The guidance provides that a *requirement is applicable if the specific terms (or ‘jurisdictional prerequisites’) of the law or regulation directly address the circumstances at a site. If not applicable, a requirement may nevertheless be relevant and appropriate if circumstances at the site are, based on best professional judgment, sufficiently similar to the problems or situations regulated by the requirement.* Thus, in order to determine whether a requirement is an ARAR for a particular site, the “applicability” of the requirement must first be analyzed. If the requirement is not “applicable,” it must then be determined whether the requirement is “relevant and appropriate” to the circumstances of the site. Unless a waiver can be justified, an onsite remedial action must comply with all ARARs.

The “CERCLA Compliance with Other Laws Manual” divides ARARs into three types: (1) chemical-specific ARARs, (2) action-specific ARARs, or (3) location-specific ARARs. Each is defined as follows:

Chemical-specific ARARs are usually technology- or risk-based numerical limitations or methodologies that, when applied to site-specific conditions, result in the establishment of acceptable concentrations of a chemical that may be found in or discharged to the ambient environment.

Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous substances. These requirements typically define acceptable treatment, storage, and disposal procedures for hazardous substances during the implementation of the response action.

Location-specific ARARs are the restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in special locations. These requirements relate to the geographical or physical position of the sites rather than to the nature of the contaminants or the proposed remedy.

Chemical-specific ARARs are used to “help determine the remediation goals”, while action- and location-specific ARARs are considered during the detailed evaluation of the potential remedial alternatives.

The “CERCLA Compliance with Other Laws Manual” identifies several other opportunities for waivers from ARARs under site-specific circumstances. These waivers are authorized by CERCLA § 121(d). The Technical Impracticability waiver may be invoked when compliance with an ARAR is technically impracticable from an engineering standpoint. The waiver may be used if either engineering methods necessary to construct and maintain a remedy cannot reasonably be implemented, or the reliability regarding the potential for the remedy to continue to be protective into the future is low. Use of the waiver may consider cost; however, should not be the major factor for invoking the waiver.

EPA has identified another category of criteria, advisories, guidance and proposed regulations. These are “to be considered” (TBC) for the purpose of interpreting ARARs, or to determine preliminary remediation goals when ARARs do not specifically address particular contaminants. TBCs are neither promulgated nor enforceable, therefore compliance with TBCs is not mandatory in the same way it is for ARARs.

The ARARs that were established (frozen) for the site during the signing of the ROD/LOD for the remedy at the 19th Avenue Landfill are identified in the Consent Decree and Remedial Action Plan (RAP) dated June 12, 1989. These include:

- Surface Water Protection ARARs – Designation of protected use for the Salt River (AAC R9-21-206);
- Groundwater Protection ARARs – Safe Drinking Water Act Maximum Contaminant Levels (MCLs), Safe Drinking Water Act Proposed MCLs, ADEQ Human Health-Based Guidance Levels for Contaminants in Drinking Water and Soil (1990), and ADEQ Laboratory Confidence Limits;
- Air Emissions Limitation ARARs – Maricopa County Air Control Permit (1996), and RCRA Proposed Rule on Methane Emissions for Landfills (1988);
- Air Preservation/Protection ARARs – EPA’s Ambient Air Quality Standards (1980);
- Soil Exposure Protection ARARs – Because the implemented remedial action to address soil contamination within the landfill was a containment remedy (i.e., capping), soil exposure protection ARARs were not established.

All of the above established ARARs are considered “chemical-specific” ARARs because they provide technology- or risk-based numerical concentrations of a chemical that may be found in or discharged to the ambient environment. The Maricopa County Air Control Permit conditions also provide “action-specific” requirements for the design and operation of the flare control systems. In addition, the designation of protected use for the Salt River ARAR, which provides different protective uses based on specific sections of the Salt River, would be considered a “location-specific” ARAR.

As part of this five-year review, EEC evaluated the remedy at the Site to determine if it still complies with established ARARs. EEC also compared current standards with established ARARs to determine if:

- The established ARARs were still protective of human health and the environment when compared to the current standards, and
- The remedy complies with current standards.

Potentially applicable guidance for this work includes “CERCLA Compliance with Other Laws Manual”, “Permits and Permit Equivalency Processes for CERCLA On-site Response Actions” (EPA OSWER Directive 9355.7-03, February 1992), and the EPA Technical Impracticability Waiver. The following sections summarize the results of this evaluation.

5.3.1 Chemical-Specific Standards

The current chemical-specific standards discussed in the following sections are summarized in Table 3.

Surface Water

The RAP identified the “Designation of protected use for the Salt River (Arizona Administrative Code [A.A.C.] R9-21-206)” as the ARAR that may have set limits to surface water (i.e. storm water) discharge from the landfill to the Salt River. This ARAR designates three protected uses for the Salt River along the reach that runs from below Granite Reef Dam to 99th Avenue, which includes the portion of the river adjacent to the Site. This ARAR is mainly applicable to sections of the Salt River that have continuous perennial surface water flows. To ensure that these protected uses are not compromised, applicable discharge limits could have been established for the storm water discharge from the landfill to the Salt River. However, there was no actual use of surface water in the Salt River during that timeframe because no continuous perennial surface water flowed through the river bottom adjacent to the landfill. Consequently the river bed was predominantly dry and surface flows only occurred during heavy storm events, which made this ARAR not applicable to Site conditions. Currently, the conditions within the Salt River have not changed, and the ARAR is still not applicable.

Current water quality standards for surface waters are addressed in A.A.C. Title 18, Chapter 11, Article 1. In Section R18-11-104 of Article 1, ADEQ identifies designated uses of surface water. In terms of the Salt River, from the I-10 bridge to the 23rd Avenue wastewater treatment plant outfall, the designated uses are aquatic and wildlife warm water fishery (A&Ww), partial body contact (PBC), and fish consumption (FC). The Salt River adjacent to the Site falls under this designated use category. Numeric water quality criteria to protect the designated uses of surface waters are prescribed in Appendix A of this Article and Sections R18-11-109, R18-11-110, and R18-11-112. These numeric water quality criteria could have applied to the storm water discharges from the landfill to the Salt River. However, because the Salt River in the landfill area is still predominantly dry, the current numeric water quality criteria are not applicable and do not need to be evaluated for protectiveness.

Should future development of the Salt River (i.e., Rio Salado Project) establish continuous flow, the numeric water quality standards in A.A.C. R9-21-206 and A.A.C. Title 18, Chapter 11, Article 1 should be compared to the ARARs originally established for the remedy to determine if it is still protective.

Non-Storm Water and Process/Treatment Wastewater

No process/treatment wastewater is generated at the site. The only non-storm water generated at the site is condensate generated from the landfill gas recovery system, which is pumped from the condensate sumps to on-site tanks. The tanks are connected to pipes that discharge into the City of Phoenix sanitary sewer

system. Consequently, the City of Phoenix pretreatment effluent limitations addressed in the Phoenix City Code, Chapter 28, Articles II and VI are applicable to the discharge of the condensate. A letter of authorization has been issued by the COP sanitary sewer system approving discharge of the condensate water to their Publicly Owned Treatment Works (POTW) with the condition that pH is adjusted to be greater than 5.0 Standard Unit (SU) or less than 10.5 SU. Review of discharge records indicates that the condensate water being discharged to the POTW complies with the pretreatment limit.

Groundwater

The established chemical-specific groundwater protection ARARs for the Site are addressed in ADEQ's Consent Decree. These established ARARs identified specific compounds with corresponding water quality standards that were based on the following sets of standards: Safe Drinking Water Act Maximum Contaminant Levels (MCLs), Safe Drinking Water Act Proposed MCLs, ADEQ Human Health-Based Guidance Levels for Contaminants in Drinking Water and Soil (1990), and ADEQ Laboratory Confidence Limits. Currently, the Site is in compliance with these established ARARs.

The current groundwater protection standard is ADEQ's Aquifer Water Quality Standards (AWQSs) addressed in A.A.C. Title 18, Chapter 11, Article 4. In this current standard, state-wide numeric values for drinking water protected use have been established, which would have been applicable for contaminants detected in groundwater associated with the Site if they had been in place at the time the remedy was constructed. Other current numeric standards that would have been relevant or appropriate include: the current MCLs and the national revised primary drinking water regulations MCLs in 40 CFR Part 141, Subparts B and G; and/or EPA's Region IX preliminary remediation goals (PRGs) for tap water.

The First Five-Year Review identified five MCLs that had been lowered and two MCLs that had been established since the remedy was first implemented. At the time of that review, data showed no recent exceedances of any of the new MCLs although there was data missing for well DM-3P for Semi-Volatile Organic Compounds (SVOCs). Thus, it was concluded that groundwater concentrations for all compounds were in compliance with standards that were current at that time. Comparing recent groundwater data to current MCLs shows that the only recent MCL exceedances are for arsenic, nitrate, 1,1-dichloroethene (DCE) and vinyl chloride. In the case of arsenic, the exceedances are transient, occur only directly beneath the landfill, and are thought to be the result of a reducing environment that tends to precipitate naturally occurring arsenic from soil to groundwater (See Appendix F). In the case of the DCE, exceedances are believed to be the result of upgradient, offsite releases and exceedances of the vinyl chloride MCL are believed to be due to biodegradation of the DCE. Thus, this review concludes that groundwater for all compounds are in compliance with current standards.

Air Emissions from Methane Extraction System

The control of landfill gases at the site are performed by the use of active gas extraction systems that draw the gases to extraction wells that are connected to flare stations that flash the gases prior to discharge into the atmosphere. Separate gas extraction systems have been provided for each landfill cell. The flare system has been, and currently operates under an air permit issued by the Maricopa County Environmental Services Department (MCESD) Air Pollution Control which recently changed to the Maricopa County Air

Quality Department (MCAQD). This permit (See Appendix E) provides general conditions on the operation of the flare systems as well as specific emissions allowances for total suspended particulates (TSP), particulates smaller than 10 microns (PM10), VOCs, non-precursors on organic compounds, sulfur oxides (SO_x), carbon monoxide, and nitrogen oxides (NO_x), which are applicable to the operation of the flare systems. The emission allowances provide daily and annual emission limits, based on flare systems performance information and data supplied during the submittal of the application. Review of emission data shows that both flare systems are in compliance with permit emission limits.

Landfill Cap Emissions

The established ARAR in the RAP addressing landfill CAP emissions were addressed in the RCRA Proposed Rule on Methane Emissions for Landfills (1988). In this proposed rule, upper methane limits were established for facility structures and landfill boundaries at 1.25 and 5 percent by volume, respectively. The current standard limiting methane emissions is included in 40 CFR 258.23 (a), which deals with explosive gas control of municipal solid waste municipal landfills (MSWLF). Because this requirement applies to MSWLFs that receive waste after October 9, 1991, it is not applicable to the Site. However, this regulation is considered relevant and appropriate. The current standard specifies that the concentrations of methane by the landfill must not exceed 25% of the lower explosive limit (LEL) in facility structures (1.25 percent by volume) and the LEL (5 percent by volume) at the landfill boundary which are the same ARAR limits established in the RAP.

The RAP identified EPA's ambient air quality standard, which was determined to be directly applicable to the Site. However, standards were not developed for the constituents under consideration at the landfill (i.e. VOCs). Consequently, no ARARs were identified which applied specifically to the VOCs which were detected in gas emissions from the landfill. In current standards both the MCAQD and ADEQ have final rules regarding ambient air quality standards and area classifications (Rule 10 for MCAQD and Title 18, Chapter 2, Article 2 for ADEQ). However, because both sets of rules do not include VOCs, they are not directly applicable to landfill emissions at the Site. The Arizona Ambient Air Quality Guidelines (AAAQG), which were updated in 1992, do list threshold concentrations for compounds including certain VOCs. These threshold concentrations are presented as 1-hour, 24-hour, or annual averages for a given compound. ESD #2 adopted the AAAQG as TBCs.

Review of the results of methane monitoring in probes at the landfill boundary indicates that since the 4th quarter of 2002, methane has consistently been below the limit originally established in the RAP and the methane boundary limit specified in 40 CFR 258.23 (a) (5 percent by volume).

Results of surface air emission monitoring conducted in March and April 2001 to measure landfill emissions indicated that the total measured methane did not exceed the background concentrations of 0.2 to 0.51 ppm (Harding ESE, 2001). Thus, the concentration of methane showed that the Site was in compliance with Rule 321 and 40 CFR 60.755 (c). However, given the age of the data, it is unclear how long conclusions regarding potential effectiveness of the remedy with respect to potential ambient air impacts will remain valid.

Ambient air monitoring and reporting was conducted at the Site in December 1998 and June 1998 for VOCs. ADEQ and EPA determined that, due to limitations in the frequency and duration of sampling and the statistical methods used to estimate annual average differential concentrations, the monitoring data was insufficient for determining whether or not AAAQGs are being met. Consequently, COP implemented a Phase II Ambient Air Monitoring Sampling Plan and samples were collected during September 2000. A review of the data from this work resulted in the conclusion that:

“... with one exception, there were no significant indicators of landfill VOC emissions. For that one analyte, PCE statistical analysis shows that the difference in means between the landfill and vicinity sources is less than the relevant annual AAAQG concentration.” (URS, 2002)

It should be noted that the data upon which this statement is based was collected several years ago and it is unclear how long these conclusions regarding potential effectiveness of the remedy with respect to potential ambient air impacts will remain valid.

5.3.2 Action-Specific Standards

The current action-specific standards discussed in the following sections are summarized in Table 4.

Landfill Cap

Although no action-specific ARARs were identified for the landfill cap design during the signing of the ROD, the RAP and Consent Decree did provide some specifications on the cap design as follows:

- The single-layer cap section will consist of at least one foot of existing soil and three feet of compacted soil.
- The compacted soil of the cap will have a permeability of less than 1×10^{-4} centimeters per second.
- The cap will have a surface slope of two percent to direct surface water toward the perimeter of the site and away from the landfill.

Review of the landfill cap Remedial Action (RA) Completion Report indicates that the 19th Ave. Landfill soil cap complies with all of the above established ARARs.

In current standards, 40 CFR 258.60 (a) provides specification on final covers of a MSWLF, which are relevant and appropriate to the 19th Ave. Landfill cap. Specifically in 40 CFR 258.60 (a), the final cover must be designed and constructed to:

- Have a permeability of less than or equal to 1×10^{-5} cm/sec;
- Minimize infiltration through the closed MSWLF by the use of an infiltration layer that contains a minimum of 18-inches of earthen material; and
- Minimize erosion of the final cover by the use of an erosion layer that contains a minimum 6-inches of earthen material that is capable of sustaining native plant growth.

Review of the landfill cap RA Completion Report indicates that the 19th Ave. Landfill soil cap complies with the specifications in the RAP and Consent Decree and with 40 CFR 258.60.

Other current action-specific standards for landfill post-closure operations are included in 40 CFR 258.61(a). These regulations include post-closure requirements for a closed MSWLF and are relevant and appropriate to the 19th Ave. Landfill. Specifically in 40 CFR 258.61 (a), it states that post-closure care must be conducted for 30 years except as provided by the Director of ADEQ, who is authorized to increase or decrease the post-closure care period. Post-closure care must consist of the following activities:

- Maintaining the integrity and effectiveness of the final cover;
- Maintaining and operating the leachate collection system in accordance with requirements of 40 CFR 258.40, if applicable;
- Groundwater monitoring in accordance with requirements of 40 CFR 258 Subpart E and maintaining groundwater monitoring systems; and
- Maintaining and operating the gas monitoring system in accordance with the requirements of 40 CFR 258.23.

Review of the landfill cap O&M Manual and the Consent Decree, indicates that the landfill O&M program complies with all of the above post-closure current ARARs. However, no time-frame for the O&M period is specified in the Consent Decree. ADEQ may want to consider the establishment of a post-closure time-frame within an amended Consent Decree or as part of a Declaration of Environmental Use Restriction (DEUR).

Active Gas Monitoring/Recovery System

The action-specific ARAR that addressed the design, operation, and monitoring of the active gas recovery system is included in the Consent Decree. This ARAR required that an air permit be obtained from the MCESD Air Pollution Control. Conditions on the operation of the active gas recovery flare systems are summarized in “Specific Condition #21” of the permit #010048 (See Appendix E). Although this is the second permit issued to the system by Maricopa County, the standards in the current air permit remain unchanged, and both flare systems are in compliance with the permit conditions. No other action-specific ARARs were addressed in the RAP for the design, operation, and monitoring of the active gas collection system.

Current action-specific standards that would have applied to a newly designed active gas monitoring/recovery system are included in 40 CFR 258.61 (a) and 40 CFR 258.23. As previously mentioned, 40 CFR 258.61(a) requires that a closed landfill maintain and operate a gas monitoring system in accordance with the requirements of 40 CFR 258.23 to ensure that the concentrations of methane gas generated by the landfill do not exceed appropriate limits in facility structures and the facility boundary (40 CFR 258.23(a)). In addition, 40 CFR 258.23(b) requires the implementation of the following routine methane monitoring program:

- The type and frequency of monitoring must be determined based on soil conditions, hydrogeology conditions, hydraulic conditions, and the location of facility structures and boundaries; and
- The minimum frequency of monitoring shall be quarterly.

EEC's review of the existing methane monitoring program currently implemented at the landfill has concluded that the gas monitoring activities which are conducted at the site on a monthly basis, comply with current standards.

Pretreatment of Condensate

As previously stated, during operation of the gas collection system, condensate is generated that is collected into storage tanks located at each flare station, which is eventually discharged into the City of Phoenix sanitary sewer system. Although no established ARARs were identified in the RAP or ROD concerning pretreatment of condensate prior to discharge, agreements have been established with the COP POTW that address pretreatment requirements for the condensate. The City of Phoenix pretreatment effluent limitations addressed in the Phoenix City Code, Chapter 28, Articles II and VI applies to the discharge of the condensate. If pretreatment effluent limitations are not met, treatment of the condensate water to meet limitations prior to discharge, is required.

Review of the condensate discharge agreement and analytical data indicate that the Site is required to adjust pH prior to discharge of the condensate, if pH is outside of the range of 5.0 to 10.5 standard units. Site inspection activities confirmed that pH adjustments are being performed in the storage tanks and discharge limits are being met.

Storm Water Management and Discharge

The Supplemental First Five-Year Review Report (ESE, 2001) noted that on September 5, 1997, COP submitted a Notice of Termination for the NPDES General Permit for storm water discharges from the 19th Avenue Landfill. At the time of the report, the COP had received no response from EPA and ADEQ concluded that the Notice of Termination had been accepted and that NPDES permitting for storm water discharges from the landfill was unnecessary.

Groundwater Monitoring Program

The Consent Decree provides requirements for conducting a groundwater monitoring program at the Site. The established monitoring program is a network of upgradient and downgradient wells used to monitor the shallow and deeper aquifers within the boundary of the landfill cells. Groundwater monitoring is conducted on a quarterly basis, and the results are provided in a quarterly report submitted to ADEQ. A contingency plan was developed to address necessary actions to undertake should threshold levels be exceeded. The following conditions trigger the contingency plan in any downgradient well:

- The average of three (3) consecutive quarterly samples of a constituent in a well exceeds the threshold level; and
- A follow-up groundwater sample confirms that the exceedance condition has occurred.

In current standards, the requirements in 40 CFR 258 Subpart E, provides groundwater monitoring and corrective action requirements for MSWLF. Thus, these are relevant and appropriate ARARs for the 19th Ave. Landfill. In general, Subpart E contains specific guidelines and requirements that address:

- The groundwater monitoring system;
- The groundwater sampling and analysis requirements;
- The detection monitoring program;
- The assessment monitoring program;
- The assessment of corrective measures;
- The selection of the remedy; and
- The implementation of corrective action.

EEC's review of the existing monitoring program implemented at the Site has verified that the existing program complies with both the established ARARs and current standards. In addition, because the established monitoring program at the Site is more stringent than the current standard, this standard does not need to be incorporated as an ARAR for the Site.

5.3.3 Location-Specific Standards

The current location-specific standards discussed in the following sections are summarized in 5.

As previously discussed, "Designation of Protected Use for the Salt River (A.A.C. R9-21-206)" was identified as an ARAR for potential surface water discharge from the landfill to the Salt River. This ARAR can also be classified as a location-specific ARAR because the designated protected uses depend on the location of the landfill in relation to the Salt River. The regulations provide protection for both actual and future uses. However, there was no actual use of surface water during that timeframe because the river was dry. The current standard for designation of protected use of surface water is addressed in A. A. C. Title 18, Chapter 11, Article 1, which applies to the Salt River, from the I-10 bridge to the 23rd Avenue wastewater treatment plant outfall. The designated use for this area of the river is A&Ww, PBC, and FC (R18-11-104). Because the Salt River in the area is generally dry, the landfill site is currently in compliance with the current standard. However, should future development of the Salt River establish continuous flow (i.e. Rio Salado Project), the current standard should be compared to the established ARAR to determine if it is still protective.

The Consent Decree also included requirements for protection against a 100-year flood event, by requiring a levee and bank protection system to provide containment of the refuse and protection of the landfill from inundation during a flood event. This also required that the protection system maintain a conveyance capacity of the Salt River for the 100-year flood event as delineated by the Federal Emergency Management Act (FEMA). All plans and specifications for the design and installation of the protection/conveyance system were required to be reviewed and approved by the Maricopa County Flood

Control District, with appropriate notices issued in accordance with A.R.S. 48-3610. Current standards regarding landfill protection against 100-year flood events have not changed from the requirements identified in the Consent Decree.

Other current standards addressing landfill protection against flood events were found in 40 CFR 258.11 and are relevant and appropriate to the Site. Generally, this regulation requires that landfills located in 100-year floodplains must be appropriately designed to prevent washout of waste, which addresses the same requirements as those in the Consent Decree. Consequently, no modification of the established requirements for the protection against a 100-year flood event is necessary. EEC's review of the RA Completion Report, as verified by the site inspection, determined that appropriate bank and levee protection systems have been installed, and the conveyance system capacity within the Salt River is adequate to manage a 100-year flood event. Consequently, the landfill is in compliance with current standards.

The RAP summarizes the results of an exposure assessment completed for various species of plants and animals at the Site and concludes that there is no risk to these species, based on Site conditions at that time. Current standards or guidelines for evaluating and conducting formal ecological risk assessments and screenings are addressed in a variety of guidance documents, as follows:

- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (USEPA, 1997);
- Guidelines for Ecological Risk Assessment (USEPA, 1998);
- Guide for Screening Level Ecological Assessments (Suter, 1995);
- Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference (USEPA, 1989); and
- Risk Assessment Guidance for Superfund, Volume II: Environmental Evaluation Manual (USEPA, 1989).

The need to conduct a formal screening-level ecological risk assessment for the Site depends on how much current Site conditions differ from Site conditions at the time the remedy was constructed. Although there is significantly more vegetation at the Site, it may not be necessary to conduct an ecological risk assessment until and unless implementation of the Rio Salado Project revitalizes the dry Salt River bed adjacent to and upstream of the Site with vegetation, a low flow perennial stream, and multi-use trails. Conducting a formal ecological risk screening/assessment may be required at that time. It should be noted that with the implementation of the Rio Salado Project other location-specific standards may also become applicable (i.e., wetlands mitigation (40 CFR 268.12 and 33 CFR 320 –328)).

Currently, the Site is in compliance with all established location-specific ARARs and current standards.

6.0 ASSESSMENT

The following conclusions support the determination that the remedy at the 19th Avenue Landfill is protective of human health and the environment.

1. Is the remedy functioning as intended by the decision documents?

Plans and Documentation

It appears that the remedy is functioning as intended in the decision documents and that most of the appropriate plans and documentation are present at the Site or at a nearby COP facility at 27th Avenue. To ensure that all requirements of the decision documents are being met, a copy of groundwater and landfill gas monitoring requirements from the Consent Decree should be present at the Site.

Institutional Controls

Appropriate site security has been provided at the Site. However, no institutional controls have been implemented for the Site. Because no future land use was designated for the Site in any of the decision documents, ADEQ and COP should agree to place a Declaration of Environmental Use Restriction (DEUR) on the property to prevent inappropriate land use and ensure that appropriate O&M will be conducted regardless of property ownership.

Remedial Action Performance

The landfill cover system has been effective in containing the waste and contaminants, and preventing leaching of contaminants through the vadose zone via percolation. However, the site inspection identified one large crack in the soil cover and evidence of erosion at Cell A. In addition, several small rills and one collapsed area was identified at Cell A-1. While these do not impact the integrity of the cover, they should be repaired as soon as possible.

Examination of the perimeter drainage system indicated that it is functioning properly. However, the top of the drainage channels showed evidence of minor erosion. While this has not affected the Armorflex™ or the integrity of drainage channels, it should be repaired.

At Cell A an accumulation of tumbleweed was observed in the north channel and excessive weed growth was observed in the east channel, particularly around the storm drain inlet. In addition, excessive weed growth was observed in the outlets for the eastern and southeastern sedimentation basins. The storm water discharge outfall to the Salt River at Cell A-1 was observed to contain several buckets of an unknown material and other manmade objects. These items do not affect the integrity of the drainage system. However, they should be removed because if they are not addressed, they may eventually restrict storm water flow.

Comparing groundwater monitoring data to MCLs, it appears that those components of the remedy that have been implemented to protect groundwater at the Site are functioning appropriately and are protective

of human health and the environment. However, as applicable standards for constituents change, the COP and ADEQ will need to continue to review the data to ensure that the Contingency Plan will not be triggered.

Assessment of the methane recovery system and monitoring data verified that it is generally protective of human health and the environment. However, since recent flows in the Salt River has silted in the methane monitoring probes in this area, it will be necessary to clean and inspect these to ensure they are functioning properly.

Assessment of the flare system at both cells shows that they are generally in good condition and are protective of human health and the environment. However, the capsulhelic gauge on the knockout tank at Cell A was inoperable and some of the capsulhelic gauges at the flare station at Cell A-1 appear to be inoperable. The City representative reported that portable gauges are used instead. To ensure that the correct readings are made, the existing gauges should either be repaired/replaced, or they should be removed.

System O&M

In general, the COP has been performing O&M activities according to the Consent Decree, and the Site's O&M Plan. In addition, the COP has been routinely submitting quarterly monitoring reports to ADEQ. However, maintenance records are not currently present at the Site that show routine maintenance and repairs performed on the landfill cap, perimeter drainage, sediment ponds, and groundwater monitoring wells. These records should be maintained on site. Chart paper should be present at all times at flare stations. COP should also have a copy of site access records, a site-specific incident log, and records of storm water discharge events.

Cost of O&M Activities

As previously stated, annual O&M costs for the period 2001-2003 were between 15% and 22% of the original estimate of \$1,010,000 (June 1989). These reduced costs may have been the result of less cap repairs due to little rainfall occurring during the monitoring periods of this review. It is also known that the wellfield for methane extraction was balanced during this period to prevent periodic shutdown of the flares at Cell A and A-1. Both events may have necessitated significantly less involvement at the Site by COP personnel.

Early Indicator of Potential Remedy Failure

The erosion that is visible at Cell A and the siltation of methane monitoring probes in the Salt River may be an early indicator of potential remedy failure because if left unattended, the ability of the remedy to protect human health and the environment could be compromised.

It is also important that all gauges at the flare stations are operable, that excessive vegetation and natural and manmade debris be removed from drainage channels and sedimentation basins, and that pumps for condensate collection tanks be "exercised" on a routine basis, as per the manufacturer's specifications, so that these can be kept operational.

2. Are the assumptions used at the time of remedy selection still valid?

Changes to Established ARARs

The five-year review identified chemical-specific Federal and State groundwater, surface water and air standards that are in some cases more stringent than the ARARs identified in the Consent Decree and Remedial Action Plan (RAP) dated June 12, 1989. For these more stringent standards, EEC evaluated the originally established ARARs to determine if they are still protective of human health and the environment when compared to current standards. If the established ARAR was determined to be no longer protective, EEC provided recommendations to incorporate the current standard as an ARAR. In addition, EEC also recommended incorporating new standards that were not established for the site during the signing of the ROD, if these new standards addressed other protectiveness issues applicable to the remedy. The details of these evaluations are described in Section 5.3.1.

As far as action-specific ARARs (Section 5.3.2) EEC identified non-compliance issues associated with storm water run-off from the landfill cells that discharge into the Salt River. Based on the definition of storm water discharges associated with industrial activities, this discharge may be subject to NPDES storm water permitting, which the Site currently does not have.

In terms of Location-Specific ARARs (Section 5.3.3), no standards were identified that need to be incorporated as an ARAR. However, should site conditions change (i.e., Rio Salado Project), EEC did identify the need to conduct future ecological risk screening/assessment.

Changes In Exposure Pathway

No changes in the Site conditions that affect the exposure pathways were identified as part of the five-year review. However, there may be future planned changes to the Salt River as a result of the Rio Salado Project. The project may provide a low-flow perennial stream within the bottom of the Salt River channel adjacent to the Site, and reestablish native vegetation and wildlife that once flourished in the Salt River. If this occurs, the Rio Salado Project may alter initial exposure pathway assumptions in the 1988 Risk Assessment, as well as ecological assumptions based on the potential future use of the Salt River.

Changes in Risk Assessment Methodologies

A material difference between the methodology of the baseline risk assessment and current practice is the evaluation of ecological receptors. The 1988 Risk Assessment specifies several native species of plants and animals, including various species of birds associated with the Site. Jackrabbits and burrowing owls were cited as living on the landfill. Although the Site inspection revealed no problems with burrowing animals, there could be a need for future risk management measures to protect some species if changes in surrounding land use attracts them to the Site. Should this occur, performance of an ecological survey may be appropriate in the future.

3. Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has come to light that would call into question the protectiveness of the remedy.

7.0 DEFICIENCIES

The following is a list of deficiencies that were discovered during the five-year review.

1. Records showing routine maintenance and repairs performed on the landfill cap, perimeter drainage, sediment ponds, and groundwater monitoring wells were not present at the Site. Site access records, a site-specific incident log, and records of storm water discharge events were not present at the Site.
2. A crack approximately 160 feet in length and as much as 3 feet deep was observed at Cell A. The width of the crack at the bottom was approximately one inch. The crack widened to a width of one foot at the surface. There were also two areas of erosion observed in the central portion of the northern half of cell A. The size of these areas was approximately 300 square feet.
3. There were 6 to 8 areas with minor rills at cell A-1. Most were 10 to 20 feet in length, up to 4 inches wide and 2 to 3 feet deep. One collapsed area was observed on the east side of the cell. This area was approximately 3 to 4 feet across and 1 to 2 feet deep.
4. Examination of the drainage channels at Cell A revealed two rills approximately 12 inches in depth along the top of the bank of the perimeter channel. There were also several minor rills (less than 6 inches in depth) around the top of the bank of the perimeter channel at Cell A-1. This had not affected the Armorflex™.
5. An accumulation of tumbleweed was observed in the north channel of Cell A. Excessive weed growth was observed in the east channel of Cell A, particularly around the storm drain inlet. In addition, excessive weed growth was observed in the outlets for the eastern and southeastern sedimentation basins. The 36-inch storm water discharge outfall to the Salt River at Cell A-1 contained several buckets of epoxy resin (labeled “corrosive”) and numerous 45-RPM records.
6. The capsulhelic gauge on the knockout tank at Cell A was inoperable. In addition, some of the capsulhelic gauges at the flare station at Cell A-1 appeared to be inoperable.
7. There was no chart paper at one of the two flare stations.
8. There was some minor erosion beneath the pad of well I-3. Three 2” diameter observation wells DM-3P, DM-3I, and DM-3D were not locked.
9. The casing of the probes SR-1 through SR-8 appear to have been silted up after winter storm water flow in the Salt River.
10. The Site’s perimeter fence has no signage.
11. There is currently no deed restriction (DEUR) in place at the Site.

8.0 FOLLOW-UP ACTIONS AND RECOMMENDATIONS

Based on the deficiencies found during the five-year review (Section 7.0) the following actions must be taken by COP and/or appropriate parties:

1. Records showing routine maintenance and repairs performed on the landfill cap, perimeter drainage, sediment ponds, and groundwater monitoring wells must be maintained at the Site. Site access records, a site-specific incident log, and records of storm water discharge events must also be present at the Site.
2. All cracks and holes extending 0.5 feet or greater must be filled in as soon as possible and prior to the next heavy rainfall event.
3. All areas of erosion along the top of the bank of the perimeter drainage channels should be repaired as soon as possible and prior to the next heavy rainfall event.
4. Sedimentation in all drainage channels and sedimentation basins must be cleared. Excessive vegetation growth must be cleared wherever appropriate from drainage channels, including both inlets and outlets. Any other natural or manmade debris must also be removed.
5. The capsulhelic gauge on the knockout tank at Cell A should be repaired/replaced or removed. Any inoperable capsulhelic gauges at the flare station at Cell A-1 should be repaired/replaced or removed.
6. An adequate quantity of chart paper for system controls should be stocked at both flare stations.
7. Repair erosion beneath the pad of well I-3. Either lock the three 2" diameter observation wells DM-3P, DM-3I, and DM-3D or (better) abandon these wells, since they are no longer used.
8. Clean the silt out of methane monitoring probes SR-1 through SR-8. If appropriate, provide a hood, shield or box that will keep silt out of these probes in the future.
9. Provide signage for the Site's perimeter fence.
10. Place a deed restriction (DEUR) on the Site in accordance with the provisions of the upcoming ESD. The DEUR will ensure the performance of O&M activities in the future and limit incompatible land use.

In addition to the follow-up actions to correct the above deficiencies, it is recommended that after completion of future redevelopment plans for the Salt River (i.e., Rio Salado Project), the need to conduct a formal ecological risk screening/assessment and revise the exposure scenarios in the baseline 1988 Risk Assessment should be evaluated.

These follow-up actions should be taken by COP within six months of the date of this report.

9.0 PROTECTIVENESS STATEMENT

The remedy at the Site currently protects human health and the environment. A cap, groundwater monitoring and methane control system remain in place and appear to be in good condition. However, several deficiencies were noted during this five-year review. These are listed in Section 7.0. In order for the remedy to be protective in the long-term these items should be addressed by COP within six months of this report as per the recommendations in Section 8.0. In addition, it will be necessary once deficiencies have been addressed to produce a follow-up report. This report will document the adequate implementation of all recommendations.

10.0 NEXT REVIEW

This is a Site that requires ongoing statutory five-year reviews. The next review will be completed within five years after the date that ADEQ and EPA approve this report. The approval date of this report is provided in the “ Report Approvals” section, page ii.

11.0 REFERENCES

ADEQ (Arizona Department of Environmental Quality), 1990. Human Health-Based Guidance Levels for Contaminants in Drinking Water and Soil.

ADEQ/USEPA, 1998. Superfund Preliminary Close-Out Report. February 17.

Bryan A. Stirrat & Associates, 1999. Operations, Maintenance & Monitoring Program Manual for Landfill Gas Extraction System. March 1.

Dames & Moore, 1989. Remedial Action Plan, Final Draft. June 12.

Dames & Moore, 1989. Remedial Investigation/Feasibility Study (RI/FS) Report (6 Volumes), Revised Draft, January 13.

EPA (United States Environmental Protection Agency), 2001. Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P. June.

EPA, 1998. Guidelines for Ecological Risk Assessment.

EPA, 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments.

EPA, 1992. Permits and Permit Equivalency Processes for CERCLA On-site Response Actions. EPA OSWER Directive 9355.7-03, February.

EPA, 1989. Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference.

EPA, 1989. Risk Assessment Guidance for Superfund, Volume II: Environmental Evaluation Manual.

EPA, 1989. CERCLA Compliance with Other Laws Manual, Part II. Clean Air Act and Other Environmental Statutes and State Requirements. EPA/530/G-89/009, August.

ESE, 2000. Final First Five-Year Review Report For 19th Avenue Landfill, Phoenix, Arizona. September 18.

Harding ESE (Harding Environmental Science and Engineering), 2001. Supplemental First Five Year Review Report. July 16.

Simons, Li & Associates, Inc., 1998. Final Operation & Maintenance Manual. September 15.

Simons, Li & Associates, Inc., 1998. Final RA Report: Construction Complete. September 15.

Suter, 1995. Guide for Screening Level Ecological Assessments.

TABLE 1
CHRONOLOGY OF EVENTS

DATE	EVENT
1957	City of Phoenix extends existing lease with landowner to operate a municipal landfill
1972	Cell A-1 is completely filled with refuse
February 1978	Cease and desist order issued by Arizona Department of Health Services (ADHS)
May 1978-1979	Flooding events cause washout of refuse from landfill into Salt River
September 8, 1983	Site placed on Environmental Protection Agency's (EPA) national priorities list (NPL)
1988	EPA assigns lead authority of the site to Arizona Department of Environmental Quality (ADEQ)
1988	City of Phoenix (COP) voluntarily completes a remedial investigation/feasibility study (RI/FS)
January 13, 1989	Revised RI/FS Report submitted to ADEQ
June 12, 1989	Final draft of remedial action plan (RAP) submitted to ADEQ
September 21, 1989	Letter of Determination (LOD) approving the RAP issued by ADEQ
September 29, 1989	Record of Decision (ROD) issued by EPA
September 23, 1991	Administrative consent order/agreement for recovery of past costs issued by EPA
June 18, 1992	ADEQ and COP enter Consent Decree & agreement
August 14, 1995	Construction of remedy begins
December 1995	ADEQ issued ESD #1 (Modification to the Perimeter Drainage Channels)
February 25, 1997	ADEQ and EPA conduct final inspection of constructed remedy
June 30, 1997	ADEQ issues written approval of remedial action
February 17, 1998	ADEQ & EPA prepare Superfund Preliminary Close-Out Report
September 1998	COP submits the final Remedial Action Completion report to ADEQ
September 1998	COP submits final O&M manual to ADEQ
November 25, 1998	City submits upgradient assessment of 1,1-DCE in groundwater
February 5, 1999	COP submits first ambient air monitoring results report to ADEQ
March 1, 1999	COP submits O&M and monitoring program manual for gas extraction system to ADEQ
August 5, 1999	COP submits second ambient air monitoring results to ADEQ
2000	First five-year review
2001	ADEQ approves final engineering design for expanded gas extraction system
2002	Construction of gas extraction system expansion complete: air permit issued
2003	EPA concludes that COP response to comments on ambient air reports are acceptable & no further sampling is needed. ADEQ issues ESD #2 (Modification of MCLs & Adoption of AAAQG).
2005	Second five-year review

TABLE 2
ANNUAL OPERATION & MAINTENANCE (O&M) COST
19TH AVENUE LANDFILL

DATES		TOTAL COST ROUNDED TO NEAREST \$100
FROM	TO	
July 1997	June 1998	\$555,600.00
July 1998	June 1999	\$316,900.00
July 1999	June 2000	NA
July 2000	June 2001	\$232,400.00
July 2001	June 2002	\$224,400.00
July 2002	June 2003	\$149,900.00

NA – not available

Notes:

All cost data was provided by City of Phoenix. Costs for July 1997 to June 1998 and July 1998 to June 1999 are provided in the “Summary of Accumulated Costs, 19th Avenue Landfill – Cist Accumulation”. This is included in Appendix A.

Costs for July 2000 to June 2001, July 2001 to June 2002, and July 2002 to June 2003 are provided in spreadsheet entitled “19th Avenue Remediation Fund Allowable Expenditures” and “Litigation Support – 19th Avenue Landfill Public Works Department”. Both of these documents are included in Appendix A.

TABLE 3
SUMMARY OF CURRENT CHEMICAL-SPECIFIC STANDARDS
19TH AVENUE LANDFILL

Authority	Medium	Requirements	Synopsis
Federal Regulatory Requirements	Groundwater	Federal Safe Drinking Water Act Maximum Contaminant Levels (MCLs) for organic and inorganic chemicals (40 CFR 141 Subparts B and G)	MCLs have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the concentration of contaminants in public drinking water supplies, and are considered relevant and appropriate for groundwater aquifers potentially used for drinking water.
		EPA Region IX, 1999 Preliminary Remediation Goals	EPA Region K guidelines establishing concentrations of compounds in soil, tap water, and air considered to be protective of human health.
	Air	Federal Clean Air Act Standard of Performance for Municipal Solid Waste Landfills (40 CFR 60, Subpart WWW)	Establishes design and operating standards and reporting requirements for municipal landfills emitting non-methane organic compounds (NMOCs) equal to or greater than 50 megagrams per year.
		Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfills (40 CFR 258.23)	Restricts the level of methane within facility structures to less than 25% of the lower explosive limit (LEL) and methane at landfill boundaries to less than or equal to the LEL.
Local Regulatory Requirements	Groundwater	Arizona Aquifer Water Quality Standards (AAC Title 18, Chapter 11, Article 4)	Statewide aquifer protection standards for organic and inorganic compounds established for drinking water protective usage. Many of the compound concentrations are comparable to the Federal MCLs.
		ADEQ Human Health-Based Guidance Levels for the Ingestion of Contaminants in Drinking Water and Soil, June 1992	This guidance document lists a variety of compounds and provides different concentrations/limits based on: calculated risk-based ingestion concentrations; MCLs; proposed MCLs; and state laboratory level of quantitation values.
	Surface water Storm water	Arizona Water Quality Standards for Surface Waters (AAC Title 18, Chapter 11, Article 1)	Depending on the designated use of a surface water body (R18-11-104), appropriate numeric water quality criteria may be applicable to storm water discharges at the Site.
	Wastewater	City of Phoenix Pretreatment Effluent Limitations (PCC, Chapter 28, Articles II and VI)	The discharge of condensate into the City of Phoenix sewer system must meet all appropriate effluent limits.

TABLE 3
SUMMARY OF CURRENT CHEMICAL-SPECIFIC STANDARDS
19TH AVENUE LANDFILL

Authority	Medium	Requirements	Synopsis
	Air	Maricopa County Air Quality Department (MCAQD) Rule 200, Section 303 & ARS 49-480	An air quality permit has been issued by MCAQD for the gas control system operating at the Site. This permit provides general conditions on the operation of the gas control system as well as specific emissions allowances for appropriate emission criteria.
		MCAQD Ambient Air Quality Standard and Area Classification (Rule 510)	Rule 510 establishes ambient air quality standards for Maricopa County's appropriate air emissions parameters, which includes ozone. The air quality standards are allowable limits of emissions based on the area classification.
		Arizona Ambient Air Quality Guidelines (AAAQGs)	The AAAQG which was updated in 1992 provides threshold concentrations for VOCs in ambient air. VOCs are the compounds of concern for ambient air emissions at the Site.
		MCAP; Air Contaminants from Municipal Solid Waste Landfills (Rule 321)	Adopts the Federal Clean Air Act Standard of Performance for Municipal Solid Waste Landfills (40C FR 60, Subpart WWW) and applies the standards (with amendments) to all municipal landfills for which construction commenced prior to May 30, 1991 and has accepted waste at any time since November 8, 1997. Refer to the Federal Air Section for requirements of 40 CFR, Subpart WWW.

TABLE 4
SUMMARY OF CURRENT ACTION-SPECIFIC STANDARDS
19TH AVENUE LANDFILL

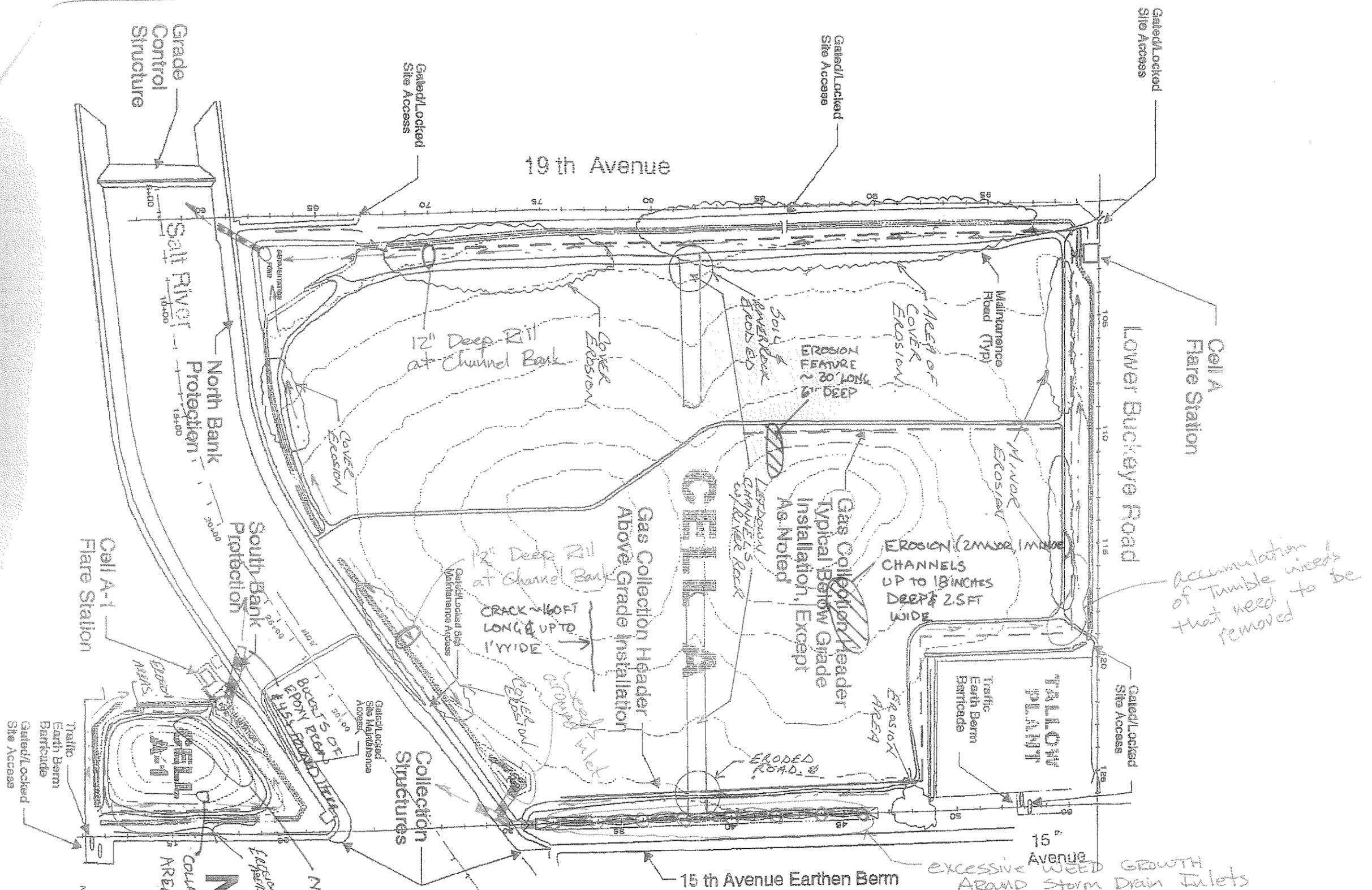
Authority	Requirements	Synopsis
Federal Regulatory Requirements	Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfills (40 CFR 258.60(a))	Provides design and performance specifications for final covers/caps at municipal landfills.
	Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfills (40 CFR 258.61(a))	Identifies post-closure O&M and monitoring requirements for closed municipal landfills.
	Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfills; Gas Collection System Monitoring During Post-Closure (40 CFR 258.61(a) and 258.23)	Provides monitoring requirements for landfill gas from municipal landfills during the post-closure period.
	Federal Clean Air Act Standard of Performance for Municipal Solid Waste Landfills; Design, Operating, and Monitoring Guidelines for Landfill Gas Collection and Control Systems (40 CFR 60.752(b)(2), 60.759, 60.753, 60.756)	Provides design standards (40 CFR 60.752(b)(2) and 60.759), operating (40 CFR 60.753), and monitoring (40 CFR 60.756) requirements for landfill gas collection and control systems.
	Federal Clean Air Act Standard of Performance for Municipal Solid Waste Landfills; Design and Operating Guidelines for Landfill Gas Control Flare Systems (40 CFR 60.18)	Provides design standards and operating requirements for a landfill gas control flare system.
	Federal Clean Water Act; NPDES Storm Water Discharge Permitting (40 CFR 122.26)	NPDES permitting of all storm water discharges associated with industrial activities. Requires all storm water discharges from landfills to be permitted.
	Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfill; Groundwater Monitoring and Corrective Action Requirements (40 CFR 258 Subpart E)	Requires owner/operators to implement a groundwater monitoring program at municipal landfill facilities and provides corrective action procedures if contaminants are detected.

TABLE 4
SUMMARY OF CURRENT ACTION-SPECIFIC STANDARDS
19TH AVENUE LANDFILL

Authority	Requirements	Synopsis
State/Local Regulatory Requirements	Maricopa County Air Quality Department (MCAQD) Rule 200, Section 303 & ARS 49-480	Addresses specific operating conditions of the active gas collection and control system at the Site.
	MCAQD; Air Contaminants from Municipal Solid Waste Landfills (Rule 321)	Adopts the Federal Clean Air Act Standard of Performance for Municipal Solid Waste Landfills (40CFR 60, Subpart WWW) and applies the standards (with amendments) to all municipal landfills for which construction commenced prior to May 30, 1991 and has accepted waste at any time since November 8, 1997. Refer to the Federal Air Section for requirements of 40 CFR, Subpart WWW.
	City of Phoenix Pretreatment Effluent Limitations (PCC, Chapter 28, Articles II and VI)	The discharge of condensate into the City of Phoenix sewer system must meet all appropriate effluent limits.

TABLE 5
SUMMARY OF CURRENT LOCATION-SPECIFIC STANDARDS
19TH AVENUE LANDFILL

Authority	Medium	Requirements	Synopsis
Federal Regulatory Requirements	Floodplains	Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfills; Floodplains (40 CFR 258.11)	Landfill must be designed to avoid washout.
	Wetlands	Federal Clean Water Act regulations governing dredge and fill activities in wetlands (33 CFR 320-328)	No discharge of dredged or fill materials to wetlands or other waters of the US is allowed if there is a practicable alternative to the discharge which would have a less adverse impact on the aquatic ecosystem, so long as the alternatives does not have other significant adverse impacts. Appropriate and practicable steps must be taken to minimize adverse impacts.
		Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfills; Wetlands (40 CFR 258.12)	Requirements to protect the integrity of wetlands.
	Ecological Assessment	Variety of different CERCLA Guidance documents including: Risk Assessment Guidance for Superfund (EPA, 1989) and Conducting Ecological Risk Assessments (EPA, 1997)	As part of CERCLA's risk evaluation process, an ecological risk assessment/ screening should be performed to estimate the potential for undesirable ecological effects associated with the Site.
State Regulatory Requirements	Surface Water	Arizona Water Quality Standards for Surface Waters (AAC Title 18, Chapter 11, Article 1)	Identifies the designated use of the Salt River within the vicinity of the Site between the 1-10 bridge and the 23rd Avenue wastewater treatment plan outfall.



NOTE: ORIGINAL SITE PLAN DEVELOPED BY SIMONS, LI & ASSOCIATES, 9/15/96

 Environmental Science & Engineering, Inc. A MACTEC COMPANY	Drawn Daniel L. Kudlicki	Project Number 6600001	Approved JSK	Date 3/30/00
	SITE PLAN GENERAL SITE LAYOUT 19TH AVENUE LANDFILL			Figure A

— ESE inspection results circa 2000
 — EEC inspection circa 2005



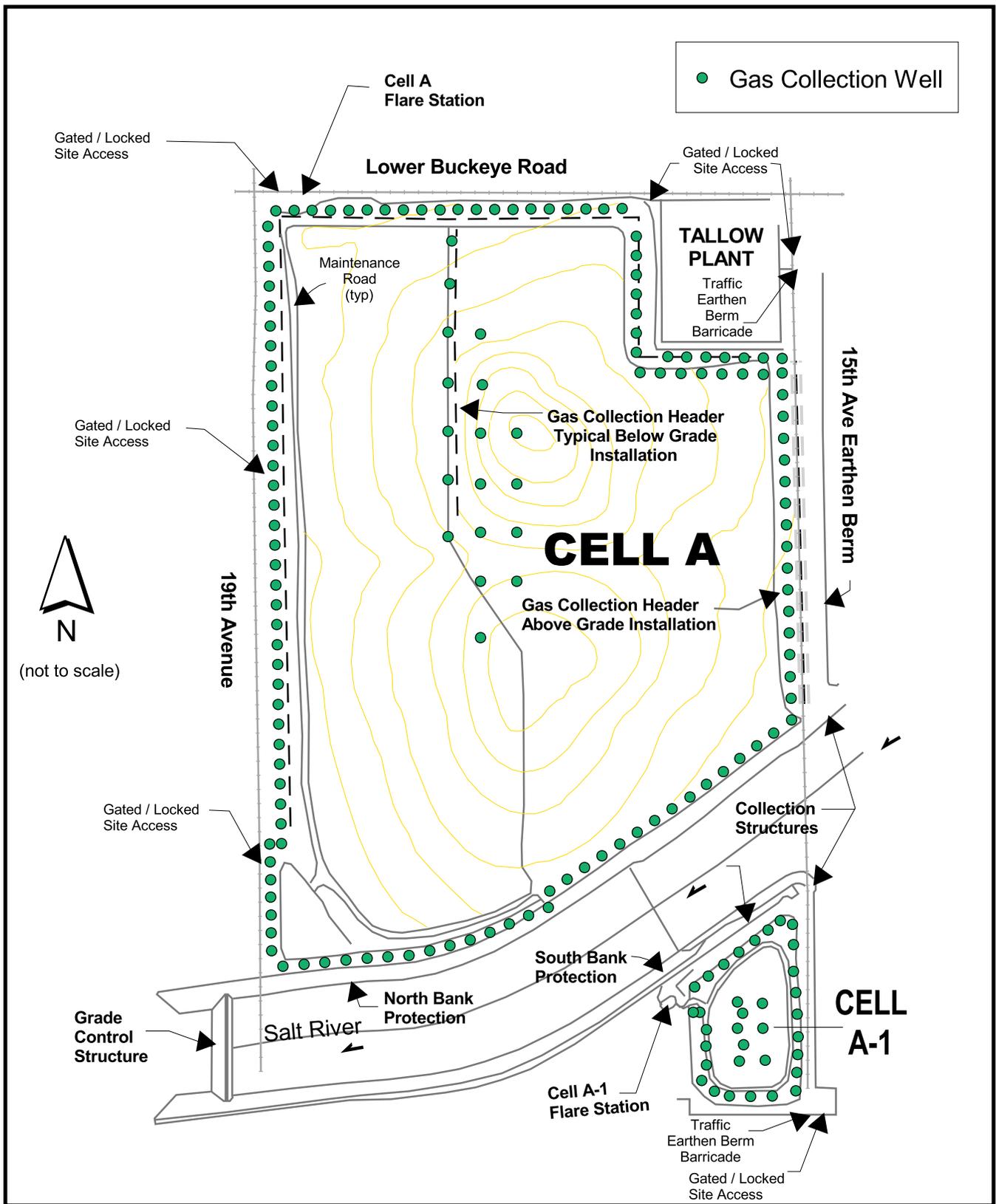


Figure 1 -
19th Avenue Landfill Site Location



Engineering and Environmental Consultants, Inc.
3003 North Central Ave, Suite 600
Phoenix, Arizona 85012-2905
602-248-7702

APPENDICES

19TH AVENUE LANDFILL

APPENDIX 1

O&M COST BREAKDOWN

19TH AVENUE LANDFILL

19TH AVENUE REMEDIATION FUND

FY 2002-03

ALLOWABLE EXPENDITURES

Exhibit Reference	Vendor	Amount	Cost Center or WBS	GL Acct.	Fund
C	City Attorney's Office	\$5,005.00	(a) 7060503020	903010	0037
C	Outside Legal Services	\$7,236.30	(b) 7060503020	510035	0037
D	City Auditor				0037
D	Public Works Employee Time Charges	\$19,165.76	(e)		0037
E	Electricity	\$6,687.39	(c) 7060503020	510345	0037
E	Electrical Supplies	\$848.62	7060503020	520325	0037
E	Environmental Programs	\$568.00	7060503020	904401	0037
E	Equipment Management	\$3,143.00	7060503020	907020	0037
E	Machinery & Equipment Repairs				0037
E	Facilities Management	\$5,386.08	7060503020	907021	0037
E	Fuel (Unleaded and CNG)	\$1,836.66	7060503020	907025/27	0037
E	Landscaping	\$19,120.00	7060503020	510570	0037
E	Liquid Petroleum Gas	\$15.48	7060503020	520425	0037
E	Materials to Maintain Infrastructure	\$1,719.73	7060503020	520330	0037
E	Miscellaneous Contracts	\$132.30	7060503020	511190	0037
E	Miscellaneous Maintenance & Repairs	\$1,288.70	7060503020	510690	0037
E	Office Supplies	\$225.92	7060503020	520215	0037
E	Other Commodities	\$891.17	7060503020	520990	0037
E	Pest Control	\$33.00	7060503020	510510	0037
E	Plumbing Supplies	\$37.15	7060503020	520315	0037
E	Small Tools and Equipment	\$1,361.06	7060503020	520870	0037
E	Taxes	\$650.00	7060503020	511065	0037
E	Testing (Ground Water Monitoring)	\$46,373.29	7060503020	510175	0037
E	Water	\$4,819.36	7060503020	510330	0037
F	Indirect Operating Expenses	\$23,385.00	(d) various	various	0037
	SUBTOTAL	\$149,928.97			
B	Arizona Water Quality Assurance	\$29,488.72	PW16520007	510165	0150
B	U.S. EPA	\$39,499.07	PW16520007	510165	0150
B	Bryan A. Stirrat & Assoc.	\$155,162.00	PW16520006	510025	0150
B	EAS Services	\$500.00	PW16520002	904128	0150
B	Finance Dept.	\$264.00	PW16520005/6	903501	0150
B	Sunrise Engineering	\$19,558.00	PW16520002	510030	0150
B	Clean Harbors Environmental	\$21,639.99	PW16520006	510180	0150
B	CES Landtech	\$8,814.97	PW16520006	530900	0150
B	Street Transportation Dept.	\$201.00	PW16520006	906307	0150
	SUBTOTAL	\$275,127.75	(1)		
	TOTAL ALLOWABLE EXPENDITURES	\$425,056.72			

**19TH AVENUE REMEDIATION FUND
FY 2000-01
ALLOWABLE EXPENDITURES**

Exhibit Reference	Vendor	Amount	Cost Center or WBS	GL Acct.	Fund
E	Agricultural/Hort. Supply	\$3,846.51	7060503020	520305	0037
C	City Attorney's Office	\$2,318.00	7060101000	970008	0037
D	City Auditor	\$7,398.00	7060503020	901900	0037
E	Electricity	\$4,363.20	7060503020	510345	0037
E	Environmental Programs	\$3,436.00	7060503020	904401	0037
E	Equipment Management	\$2,588.98	7060503020	907020	0037
E	Facilities Management	\$4,980.74	7060503020	907021	0037
E	Liquid Petroleum Gas	\$19.80	7060503020	520425	0037
E	Materials	\$6,496.60	7060503020	520330	0037
E	Other Commodities	\$1,154.59	7060503020	520990	0037
D	PW Solid Waste Disp. Employee Time	\$44,352.00	7060101000	500110	0037
E	Small Tools and Equipment	\$144.33	7060503020	520870	0037
E	Taxes	\$753.70	7060503020	511065	0037
E	Telephone	\$742.10	7060503020	510305	0037
E	Testing (Ground Water Monitoring)	\$95,397.20	7060503020	510175	0037
E	Water	\$6,895.82	7060503020	510330	0037
E	19th Ave. Indirect Operating Expenses	\$47,522.00	various cost centers	various	0037
	SUBTOTAL	\$232,409.57			
B	Dames & Moore	\$3,924.37	PW16520005	510030	0150
B	EAS - Project Mgt. Fee	\$25,000.00	PW16520003	904111	0150
C	Squire Sanders and Dempsey	\$6,323.00	PW16520007	510165	0150
B	Arizona Water Quality Assurance	\$22,423.86	PW16520007	510165	0150
	SUBTOTAL	\$57,671.23			
	TOTAL ALLOWABLE EXPENDITURES	\$290,080.80			

19TH AVENUE REMEDIATION FUND

FY 2001-02

ALLOWABLE EXPENDITURES

Exhibit Reference	Vendor	Amount	Cost Center or WBS	GL Acct.	Fund
C	City Attorney's Office	\$1,751.00	d 7010101000	903010	0001
C	Outside Legal Services				0037
D	City Auditor	\$5,880.00	c 7060503020	901910	0037
D	Public Works Employee Time Charges	\$62,771.82	f		0037
E	Electricity	\$3,714.78	b 7060503020	510345	0037
E	Electrical Supplies				0037
E	Environmental Programs	\$142.00	7060503020	904401	0037
E	Equipment Management	\$3,556.00	7060503020	907019	0037
E	Machinery & Equipment Repairs	\$150.31	7060503020	510555	0037
E	Facilities Management	\$2,553.02	7060503020	907021	0037
E	Fuel (Unleaded and CNG)				0037
E	Landscaping				0037
E	Liquid Petroleum Gas	\$158.89	7060503020	520425	0037
E	Materials	\$25,155.45	7060503020	520330	0037
E	Miscellaneous Contracts				0037
E	Miscellaneous Maintenance & Repairs				0037
E	Office Supplies				0037
E	Other Commodities				0037
E	Pest Control				0037
E	Plumbing Supplies	\$34.00	7060503020	520315	0037
E	Small Tools and Equipment	\$514.22	7060503020	520870	0037
E	Taxes	\$592.50	7060503020	511065	0037
E	Testing (Ground Water Monitoring)	\$87,619.19	7060503020	510175	0037
E	Water	\$9,018.67	7060503020	510330	0037
F	Indirect: Operating Expenses	\$28,499.00	e various	various	0037
	SUBTOTAL	\$232,110.85			
	Less: Correction to FY 2000-01 Audit	(\$7,685.00)			
		\$224,425.85			
B	Arizona Water Quality Assurance	\$59,165.04	1 PW16520007	510165	0150
B	U.S. EPA	\$36,765.65	✓ PW16520007	510165	0150
B	Bryan A. Stirrat & Assoc.	\$176,738.00	2 PW16520006	510061	0150
B	EAS Services	\$78,720.68	✓ PW16520006	various	0150
B	Finance Dept.	\$140.00	PW16520006	903201	0150
B	LFG & E International	\$847,156.55	PW16520006	510130	0150
B	Message Link Communications Corp.	\$164.24	PW16520006	510025	0150
B	Techniprint	\$765.99	PW16520006	510080	0150
B	Street Transportation Dept.	\$148.00	PW16520006	906307	0150
B	Arizona Republic	\$11.44	✓ PW16520006	510085	0150
	SUBTOTAL	\$1,199,775.59			
	TOTAL ALLOWABLE EXPENDITURES	\$1,424,201.44			

**CITY AUDITOR DEPARTMENT
FINAL REPORT**

LITIGATION SUPPORT - 19TH AVENUE LANDFILL

PUBLIC WORKS DEPARTMENT

CITY AUDITOR DEPARTMENT

September 1, 2004

Mark Leonard
Public Works Director

SUBJECT: LITIGATION SUPPORT - 19TH AVENUE LANDFILL

This is our final report. A summary of the work is presented in the Executive Summary, which immediately follows.

Copies Of this report have been sent to the City Manager and the Deputy City Manager for appropriate distribution.

Sincerely,

Bob Wingenroth
City Auditor

BW/BC/AA/rv/1050167f

Audit Team: Barbara Coppage, CQA
Aaron Avila, CFE

Enclosure

cc: Frank Fairbanks, City Silanager
Juan Martin, Deputy City Manager
Julio Zapata, Public Works Deputy Director (Audit Liaison)

LITIGATION SUPPORT - 19TH AVENUE LANDFILL

EXECUTIVE SUMMARY

PURPOSE	To accumulate and verify costs associated with the 19 th Avenue Landfill for Fiscal Year 2001-02 (FY02) and FY2002-03 (FY03).
BACKGROUND	<p>In 1979, the Arizona Department of Health Services ordered the closure of the City operated 19th Avenue Landfill (Landfill). In 1980, the Comprehensive Environmental Response Compensation and Liability Act ("CERCLA" or "Superfund"), a federal program for the cleanup of hazardous sites, was passed. The Landfill was placed on the Superfund National Priorities List for clean up in 1983.</p> <p>A Solid Waste Remediation Fund was created as a result of settlements with area polluters to clean up the site. The balance of this fund as of June 30, 2003, is \$10,628,510, which includes interest earned of \$516,811 for FY02 and \$431,779 for FY03.</p>
RESULTS IN BRIEF	<p>We accumulated \$1,424,202 in total costs related to activities at the Landfill for FY02 and \$425,058 for FY03 (Exhibit A). Costs were included based on adequate supporting documentation and consistency with prior reviews. Large fluctuations in amounts reported were investigated and determined reasonable.</p>

TABLE OF CONTENTS

	PAGE
EXECUTIVE SUMMARY	1
SCOPE AND METHODS	3
EXHIBITS	
A - SUMMARY OF ACCUMULATED COSTS	4
B - CAPITAL EXPENDITURES	5
C - LEGAL FEES	7
D - EMPLOYEE TIME CHARGE	8
E - OTHER DIRECT EXPENSES	9
F - INDIRECT OPERATING EXPENSES	10

LITIGATION SUPPORT - 19TH AVENUE LANDFILL

SCOPE AND METHODS

For the period July 1, 2001, through June 30, 2003, we accumulated all costs from the SAP records paid by the City relating to activities at the 19th Avenue Landfill. For expenditures, we examined supporting invoice or payment documentation. We allocated indirect costs based on direct operating costs paid in relation to other City landfills.

Total costs by the 19th Avenue Landfill from June 1, 1979, through June 30, 2003, total \$46,098,200. Of that amount, \$28,986,550 has been paid from the Solid Waste Remediation Fund (Fund). The balance of the Fund is \$10,628,510 as of June 30, 2003, which includes interest earned of \$616,811 for FY02 and \$433,779 for FY03.

This audit was performed in accordance with generally accepted government auditing standards.

EXHIBIT A

SUMMARY OF ACCUMULATED COSTS 19th AVENUE LANDFILL – COST ACCUMULATION

<u>EXPENSE</u>	<u>FY 02</u> <u>TOTAL</u>	<u>FY 03</u> <u>TOTAL</u>
CAPITAL (EXHIBIT B)	\$1,199,776	\$275,128
LEGAL FEES (EXHIBIT C)	1,751	12,241
CITY EMPLOYEE TIME (EXHIBIT D)	68,652	19,166
OTHER DIRECT EXPENSES (EXHIBIT E)	133,208	95,136
INDIRECT OPERATING (EXHIBIT F)	20,814	23,385
TOTAL	\$1,424,202	\$425,056

EXHIBIT B

CAPITAL EXPENDITURES 19TH AVENUE LANDFILL – COST ACCUMULATION

FY 2002

<u>VENDOR</u>	<u>GENERAL LEDGER ACCOUNT</u>	<u>TOTAL</u>
Arizona Water Quality Assurance	Development Management	\$59,165
US EPA	Development Management	36,766
Bryan A Stirrat & Assoc	Engineering Construction Admin	176,738
Engineering & Architectural Services	EAS-Project Management Services	65,000
Engineering & Architectural Services	EAS-Professional Services Fee	4,000
Engineering & Architectural Services	EAS-Maps, Drawings	16
Engineering & Architectural Services	EAS-Reprographic Services	79
Engineering & Architectural Services	EAS-Construction Contract Fee	5,389
Engineering & Architectural Services	EAS-Central Records	4,236
Finance Department	Finance Accounting	140
LFG & E International	Contractual Construction	847,157
Message Link Communications Corp	Cons/Other Professional Services	164
Techniprint Co	Printing Services	766
Street Transportation Department	ST – Material Lab	148
Arizona Republic	Advertising Services	11
TOTAL CAPITAL EXPENDITURES	FY 2002	<u>\$1,199,776</u>

EXHIBIT B

CAPITAL EXPENDITURES 19TH AVENUE LANDFILL – COST ACCUMULATION

FY 2003

<u>VENDOR</u>	<u>GENERAL LEDGER ACCOUNT</u>	<u>TOTAL</u>
Arizona Water Quality Assurance	Development Management	\$29,489
US EPA	Development Management	39,499
Bryan A Stirrat & Assoc	Engineering Construction Admin	365,362
Engineering & Architectural Services	EAS Citywide ASC/JOC	500
Street Transportation Department	ST – Material Lab	201
Finance Department	Finance Accounting	264
Sunrise Engineering Inc.	Engineering Services	19,558
Clean Harbors Environmental	Safety/Environmental Costs	21,640
CES Landtech	All Other Equipment	8,815
TOTAL CAPITAL EXPENDITURES	FY 2003	<u>\$275,128</u>

EXHIBIT C

LEGAL FEES 19th AVENUE LANDFILL – COST ACCUMULATION

Legal fees represent the time spent by the City Attorney's Office and outside legal firms on the 19th Avenue Landfill Project during FY 2002 through FY 2003.

<u>VENDOR</u>	<u>FY 02</u> <u>TOTAL</u>	<u>FY 03</u> <u>TOTAL</u>
City Attorney's Office	\$1,751	\$5,005
Squire, Sanders &, Dempsey	0	7,236
TOTAL LEGAL FEES	<u>\$1,751</u>	<u>\$12,241</u>

EXHIBIT D

**EMPLOYEE TIME CHARGE
19th AVENUE LANDFILL – COST ACCUMULATION**

<u>DEPARTMENT</u>	<u>FY 02</u> <u>TOTAL</u>	<u>FY 03</u> <u>TOTAL</u>
City Auditor	\$5,880	\$0
Public Works	<u>62,772</u>	<u>19,166</u>
TOTAL EMPLOYEE CHARGES	<u>\$68,652</u>	<u>\$19,166</u>

EXHIBIT E

OTHER DIRECT EXPENSES 19th AVENUE LANDFILL – COST ACCUMULATION

<u>OTHER DIRECT EXPENSES</u>	<u>FY 02</u> <u>TOTAL</u>	<u>FY 03</u> <u>TOTAL</u>
Electricity	\$3,715	\$6,687
Electrical Supplies	0	849
Environmental Programs	142	568
Equipment Management	3,556	3,143
Equipment Repairs	150	0
Facilities Management	2,553	6,386
Fuel (Unleaded & CNG)	0	1,837
Landscaping	0	19,120
Liquid Petroleum Gas	159	15
Materials	25,155	1,720
Miscellaneous Contracts	0	132
Miscellaneous Maintenance & Repair	0	1289
Office Supplies	0	226
Other Commodities	0	891
Pest Control	0	33
Plumbing	34	37
Small Tools and Equipment	514	1,361
Taxes	593	650
Testing (Ground Water Monitoring)	87,619	46,373
Water	<u>9,019</u>	<u>4,819</u>
TOTAL OTHER DIRECT EXPENSES	<u>\$133,209</u>	<u>\$95,136</u>

EXHIBIT F

INDIRECT OPERATING EXPENSES 19th AVENUE LANDFILL – COST ACCUMULATION

<u>INDIRECT EXPENSES</u>	<u>FY 02</u> <u>TOTAL</u>	<u>FY 03</u> <u>TOTAL</u>
Solid Waste Division Administration	\$1,627,873	\$1,542,782
Landfill Subdivision Administration	166,043	185,282
Citywide (Central Service)	921,173	740,660
In-Lieu Taxes	134,850	129,567
TOTAL INDIRECT OPERATING EXPENSES	\$2,849,939	\$2,598,284
19 th Avenue Average Allocation @	<u>1.0%</u>	<u>0.9%</u>
19th AVENUE INDIRECT OPERATING EXPENSES	<u>\$28,499</u>	<u>\$23,385</u>
<i>Correction made to the amount reported in FY 2000-01</i>	-7,685	
ADJUSTED INDIRECT OPERATING EXPENSES	<u>\$20,814</u>	

Note: We allocated indirect costs based on direct operating costs paid to other City landfills.

APPENDIX B
LIST OF DOCUMENTS REVIEWED

19TH AVENUE LANDFILL

**DOCUMENTS UTILIZED DURING SECOND FIVE-YEAR REVIEW
19TH AVENUE LANDFILL**

DATE	TITLE OF DOCUMENT	AUTHOR
07/29/2005	19th Ave Landfill, Quarterly Progress Report, Second Quarter 2005	COP, Public Works Department
04/29/2005	19th Ave Landfill, Quarterly Progress Report, First Quarter 2005	COP, Public Works Department
01/28/2005	19th Ave Landfill, Quarterly Progress Report, Fourth Quarter 2004	COP, Public Works Department
10/30/2004	19th Ave Landfill, Quarterly Progress Report, Third Quarter 2004	COP, Public Works Department
07/30/2004	19th Ave Landfill, Quarterly Progress Report, Second Quarter 2004	COP, Public Works Department
04/30/2004	19th Ave Landfill, Quarterly Progress Report, First Quarter 2004	COP, Public Works Department
04/14/2004	Technical memorandum on arsenic concentrations in groundwater monitor wells at the 19 th Avenue Landfill Superfund Site	ADEQ, Hugh Rieck
01/30/2004	19th Ave Landfill, Quarterly Progress Report, Fourth Quarter F003	COP, Public Works Department
10/30/2003	19th Ave Landfill, Quarterly Progress Report, Third Quarter 2003	COP, Public Works Department
07/08/2003	Comments on the Ambient Air Monitoring Report, Phase II Report, April 30, 2032, URS	EPA, Nadia Hollan
04/30/2003	19th Ave Landfill, Quarterly Progress Report. First Quarter 2003	COP, Public Works Department
01/30/2003	19th Ave Landfill, Quarterly Progress Report, Fourth Quarter 2002	COP, Public Works Department
Sept 2003	Explanation of Significant Differences #2	ADEQ
12/12/2002	Surface Emission Monitoring in the Salt River - Cover letter to ADEQ	City of Phoenix, Ron Serio, PM
12/11/2002	Salt River Surface Emissions Monitoring for Total Organic Compounds (TOCs) - 10/25/02	BAS
12/11/2002	Salt River Surface Emissions Monitoring for Total Organic Compounds (TOCs) - 11/27/02	BAS
12/11/2002	Salt River Bed Landfill Gas Monitoring, Results for Sept and Oct. 2002	BAS
10/30/2002	19th Ave Landfill, Quarterly Progress Report, Third Quarter 2002	COP, Public Works Department

**DOCUMENTS UTILIZED DURING SECOND FIVE-YEAR REVIEW
19TH AVENUE LANDFILL**

DATE	TITLE OF DOCUMENT	AUTHOR
10/03/2002	Salt River Surface Emissions Monitoring for Total Organic Compounds (TOCs) - 9/25/02	Bryan A. Stirrat & Associates, Inc. (BAS)
07/30/2002	19th Ave Landfill, Quarterly Progress Report. Second Quarter 2002	COP, Public Works Department
04/30/2002	Ambient Air Monitoring Program Report, Phase II Report, Volume 1, Revision I	URS
04/23/2002	19th Ave Landfill, Quarterly Progress Report, First Quarter 2002	COP, Public Works Department
01/30/2002	19th Ave Landfill, Quarterly Progress Report, Fourth Quarter 2001	COP, Public Works Department
10/30/2001	19th Ave Landfill, Quarterly Progress Report, Third Quarter 2001	COP, Public Works Department
07/30/2001	19th Ave Landfill, Quarterly Progress Report, Second Quarter 2001, Incl. Letter regarding exceedance condition	COP, Public Works Department
07/16/2001	Supplemental First Five Year Review Report	Harding ESE
07/02/2001	Salt River Surface Emissions Monitoring Proposal Quality Assurance Plan Comments to letter from ADEQ dated 5/15/01	City of Phoenix, Ron Serio, PM
06/26/2003	EPA Comments, Ambient Air Monitoring Program Report for 19th Ave Landfill - Phase II	EPA, Nadia Hollan
05/04/2001	Salt River Surface Emissions Monitoring For Total Organic Compounds (TOCs) - 4/24/01	BAS
05/03/2001	ADHS Comments on Ambient Air Monitoring Program Report for 19th Ave Landfill - Phase II	AZ Department of Health Services, Office of Environmental Health
04/23/2001	19th Ave Landfill, Quarterly Progress Report, First Quarter 2001	COP, Public Works Department
04/16/2001	Recommendations RE: City of Phoenix Salt River Surface Air Emissions Monitoring Proposal Quality Assurance Project Plan (QAPP) for 19th Ave Landfill, Interoffice Memo	ADEQ, Kenyon C. Carlson, Manager
04/09/2001	EPA Review Letter of 1) Draft COP Salt River Surface Emissions Monitoring Proposal Quality Assurance Project Plan for 19th Ave Landfill 2) Existing System Expansion Basis of Design Report	EPA, Nadia Hollan

**DOCUMENTS UTILIZED DURING SECOND FIVE-YEAR REVIEW
19TH AVENUE LANDFILL**

DATE	TITLE OF DOCUMENT	AUTHOR
04/09/2001	EPA Letter to ADEQ with INEEL Comments on Ambient Air Monitoring Program Report for 19th Ave Landfill – Phase II	EPA, Nadia Hollan
03/30/2001	Salt River Surface Emissions Monitoring far Total Organic Compounds (TOCs) - 3/15/01	BAS
03/23/2001	ADEQ Interoffice Memo RE: Review of COP Salt River Surface Emissions Monitoring Proposal Quality Assurance Plan	Julie Rutkowski, Bill Ruddiman
03/23/2001	Cover letter to ADEQ Salt River Channel Surface Emission Monitoring Plan	City of Phoenix, Ron Serio, PM
03/23/2001	The City of Phoenix Salt River Surface Emissions Monitoring Proposal Quality Assurance Plan	BAS
02/23/2001	Memo to Nadia Hollan from Ken Brown RE: Review Comments Ambient Air Monitoring Report	EPA, Ken Brown
02/02/2001	ADEQ Interoffice Memo RE: Review of COP Salt River Surface Emissions Monitoring Proposal Quality Assurance Plan	Julie Rutkowski, Bill Ruddiman
01/29/2001	19th Ave Landfill, Quarterly Progress Report, Fourth Quarter 2000	COP, Public Works Department
03/18/2001	The City of Phoenix Salt River Surface Emissions Monitoring Protocol	BAS
01/05/2001	Letter of Transmittal for 2 copies of the Phase II Ambient Air Monitoring Report	City of Phoenix, Ron Serio, PM
09/18/2000	Final First Five-Year Review Report For 19 th Avenue Landfill, Phoenix, Arizona	ESE
06/06/2000	Draft Health Consultation, 19th Avenue Landfill, CERCLIS No. AZD980496780	AZ Department of Health Services, Office of Environmental Health
05/15/2000	Health Consultation, 19th Avenue Landfill, CERCLIS No. AZD980496780	AZ Department of Health Services, Office of Environmental Health
05/04/2000	Comments on April 26, 2000 ADHS Health Consultation, 19th Avenue Landfill	ADEQ, Stephanie Ciekot, PM
01/24/2000	Health Consultation, 19th Avenue Landfill, CERCLIS No. AZD980496780. Draft copy for review at ATSDR	AZ Department of Health Services, Office of Environmental Health

APPENDIX C
INTERVIEW QUESTIONNAIRES

19TH AVENUE LANDFILL

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW

INTERVIEWER (S): David Laney, EEC

DATE: 4/29/05 INTERVIEW METHOD: telephone

TOPIC: **NEIGHBORS & REPRESENTATIVES OF COMMUNITY GROUPS**

INTERVIEWEE: Steve Brittle

REPRESENTING: Don't Waste Arizona PHONE: (602)268-6110

ADDRESS: 6205 S. 12th Street Phoenix, AZ 85040

1. What is/was your understanding of the overall project at the Site?

This is a closed landfill where ADEQ moved a lot of dirt to cap it. I have a real concern. I was approached by a woman who used to work for them who said that they had dug up some barrels of toxic waste and had simply reburied them and the little that I could find out about it seemed to indicate she was telling the truth in that they decided it was more of a risk to try and dig them back up again and that they are still there. How many of them, I'm not sure but she was pretty adamant and when she kind of blew the whistle on them they got rid of her. So that would be my concern. This was someone who worked for the ADEQ. She pointed out that they found all these barrels, which could be expected, but then they just buried them again; she said they should pay to dispose of them at a hazardous waste facility and they said no. I had several conversations with her and I also went and reviewed the files. And it was the kind of thing where you of had to read between the lines. They certainly talk about finding them and they are still there - - they were not sent to a hazardous waste facility. They were put back in place and the cap was put over them.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
NEIGHBORS & REPRESENTATIVES OF COMMUNITY GROUPS

2. What is your impression of the completed project at the Site?

Other than that [the buried drums] it looks like it's been done pretty well. I drive by it a lot. Now, we have this thing going on called the Rio Salado Restoration Project along the Salt River bed and one of the concerns that was raised by Nadia Holland, part of the EPA superfund team, she said when the river's full of water it affects the flow of contaminants and if you're going to have water there year round no one really knows what effect that will have on the water levels at the landfill. The concern was that if you raised it up you might find some of the stuff that they reburied. So I'm concern about that and I've got conflicting information from EPA about the direction of the groundwater flow in that area. It isn't just a the Rio Salado thing - - its going to go all the way from about 16th Street to 99th Avenue or further and there's a concern there as far as water flowing in it. It will groundwater. I served on a Superfund TAG grant committee some time ago and learned some of this stuff and some of the considerations. Its just a concern there that at some point the water may rise up enough to cause a problem.

3. Please describe your involvement or participation at the Site.

I have only had my nose in it when someone calls me when there is something wrong. What happened was that we had this several years long controversy about this hazardous waste facility just right next to it. There was groundwater contamination and there was finger pointing about whose it was. So that brought my attention back to all of this. I had kind of looked at all of this as a done deal and then of course I was contacted by this person while this work was being done and she was very upset about the reburying of these barrels that she alleged. It was funny, the agency certainly acted really funny about it. The facility was Innovative Waste Utilization on 15th Avenue. Historically it has had problems and there was a question about the groundwater and they said "Oh, its just the Superfund site's contamination coming our way" and I said "Well I think the groundwater goes a different direction."

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
NEIGHBORS & REPRESENTATIVES OF COMMUNITY GROUPS

4. Do you feel that you were kept well informed about all phases of the project?

Oh, no. Absolutely not.

5. What effects have site operations had on you (or the surrounding community)?

I don't really think much if any. The actual location of the landfill is not adjacent to any residential property - - it's a main thoroughfare - - I mean you drive by and see a lot of work going on. It certainly improved the aesthetics of that particular spot.

6. During implementation of the project were you aware of any events, incidents, problems, or activities, that may have effected the site, you, or surrounding community?

The incident about the alleged reburying of the drums. And then also this new Rio Salado project - I'm concerned that the extra groundwater - - I mean they're going to pump millions of gallons of groundwater a day and I'm afraid that that will raise the level of the groundwater in the landfill and contaminants may be affected.

7. After completion of the project were you aware of any events, incidents, problems, or activities, that may have effected the site, you, or the surrounding community?

No.

**INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
NEIGHBORS & REPRESENTATIVES OF COMMUNITY GROUPS**

8. Are you aware of any community concerns regarding the site or its operation and administration that have not been resolved?

Other than the things I brought up - - I don't think most people are too aware of it. All they see is that the thing is capped. I don't think that there's any real community concern.

9. Do you have comments, suggestions, or recommendation regarding the site's management or operations?

I think they ought to take the groundwater monitoring results and post them on the Internet on the ADEQ's website. Going through the public records process is very discouraging for the public so having it available on the web would probably solve a problem for people.

10. Can you recommend any additional community members that we should talk to?

No, I really can't. I wish I did.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW

INTERVIEWER(S): David Laney
DATE: 4/29/05 INTERVIEW METHOD: telephone
TOPIC: STATE & LOCAL CONSIDERATION, STATE AGENCIES &
LOCAL AUTHORITIES
INTERVIEWEE: Bill DePaul, Project Manager, Superfund Program Section
REPRESENTING: AZ Department of Environmental Quality PHONE: (602)771-4654
ADDRESS: 1110 W. Washington Street Phoenix, AZ 85007

1. What is/was your understanding of the overall project at the Site?
Initially it was thought that hazardous substances would be discovered in soil and groundwater, but, that hasn't ever happened. So now the emplaced remedy is to mitigate infiltration and collect methane from the degeneration of garbage in the landfill and to monitor groundwater and assure that no contamination is ever noted.

2. What is your impression of the completed project at the Site?
That the remedy is adequately emplaced and long-term monitoring of a waste left in place is all that's anticipated.

3. Have there been routine communications or activities conducted by your office related to the Site?
Yes. Certainly. Our ongoing efforts are to review and comment on any data or information that the City provides to us as prescribed in their Consent Decree. That's all that ADEQ has had to do since construction of the remedy has been completed.

4. Have there been any complaints or other incidents related to the Site requiring any response by your office?
None from the community. The only issues we have had at all have been generated by the data. Like arsenic. This was not a complaint from anybody it was just that standard review of the data revealed that we had an arsenic exceedance and we had to determine if it was generated by contamination in the landfill or otherwise and we determined otherwise.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
STATE AGENCIES & LOCAL AUTHORITIES

5. Are you aware of any current or planned changes to your regulations/ordinances, or current/future land development that may impact the operations or remedies at the Site?

None that may impact the remedy. The only issues relevant to the future are the addition of appropriate Institutional Controls and the only physical activity that's going to have anything to do with even the fringe part of the scenario is the Rio Salado and it's not anticipated or indicated that it will impact the remedy.

6. In your opinion, have on-site operations included appropriate O & M and monitoring in accordance with developed manuals and plans?

Yes. We have an O&M plan as part of this Consent Decree and they're following it. In fact, as part of the process that the City is going through to develop a DEUR for ADEQ review, we've talked about them referencing the O&M plan and not redesign the wheel. I guess that means we're happy with it.

7. Are you aware of any community concerns regarding the Site or its operations and administration?

I am not personally aware but it has been told to me by Nadia Holland that there is a South Phoenix group that is aware of the situation. I have never received a call from anyone on it unless it was a consultant maybe, looking at a nearby site and trying to figure out if there was some interaction between the sites.

8. Do you have any comments, suggestions, or recommendations regarding the Site's management or operations?

Just to continue what they're doing now - - monitoring and O&M plan oversight, methane collection, groundwater monitoring and the physical inspections. The other thing is they do have knowledge that drums of solvents and things went in that landfill, and why that never showed up anywhere - - who knows - - and hopefully they never will. But I guess the fact they went in there, there's always the possibility something could show up some day in groundwater. We've seen some contaminant slugs come on to the site from offsite and kind of move across the site offsite but we've never seen anything, contaminant-wise, that was generated by the landfill.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW

INTERVIEWER(S): David Laney, EEC
DATE: 5/9/05 INTERVIEW METHOD: telephone

TOPIC: SITE OPERATIONS, MAINTENANCE & MONITORING; SITE
MANAGER, O&M, SITE STAFF, & CONSULTANTS

INTERVIEWEE: Bruce Henning
REPRESENTING: City of Phoenix PHONE: (602)256-5621
ADDRESS: 101 S. Central Avenue Phoenix, Arizona 85004

1. What is/was your understanding of the overall project at the Site?

Have been involved since RI/FS. The Site was designated a Superfund Site and went through the ROD process. A remedy was put in place that included a cap, drainage controls, groundwater monitoring and collection and treatment of methane.

2. What is/was your impression of the completed project at the Site?

The remedy has been complete and O&M and monitoring has been ongoing for a number of years. This work has been going well. Seeding of the cap has been doing its job although recent heavy rains have caused some problems due to erosion and these have required some special attention. Methane monitoring along the Salt River is going pretty well. Every year more people seem to be interested in new and different future land uses for the site so the remedy must be working. This year there was some flow in the Salt River and both this and the Rio Salado project have increased interest in the landfill.

3. What is your responsibility at the Site (O&M, monitoring, etc.)?

Project manager for the City of Phoenix. Ron Serio used to have this position and he reported to Bruce but when Ron moved on to other responsibilities within the City, Bruce took over this job. In the future the City plans to name a more permanent project manager. However, at the present time, many of Bruce's engineers are tied up working on the design and construction of the City's new landfill so naming a new project manager for the Site will have to wait until this work is complete.

**INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
SITE MANAGER, O&M, SITE STAFF, & CONSULTANTS**

4. Please describe the O&M/monitoring responsibilities of other city staff and consultants?

A COP maintenance crew performs monthly methane monitoring. A COP technician performs all groundwater monitoring. The COP Engineering Group prepares quarterly groundwater monitoring reports and keeps official data. COP also performs all minor maintenance. Contractors are hired to perform any major maintenance. Recently Bryan Stirrat & Associates (BSA) was hired to perform monthly maintenance on methane system.

5. Describe any significant changes (or planned changes) to O&M/monitoring activities that are not addressed in the appropriate O&M manuals or monitoring plans?

City staff and contractors are working on a Declaration of Environmental Use Restriction (DEUR) for the Site. A draft of this will be done this week. There may be changes that need to be made to the O&M/monitoring as a result of the DEUR – Like using BSA to perform maintenance on the methane system.

6. Describe any O&M problems or difficulties that may have affected the the protectiveness or effectiveness of the remedy, or O&M costs?

Recent big rains required COP to upgrade erosion controls. In response to the findings of the last Five-Year Review the City added methane monitoring probes along the Salt River. These have improved the protectiveness and effectiveness of the remedy. In general, O&M costs have been decreasing with time.

7. Describe any activities implemented since completion of the remedy to optimize O&M?

The City has installed an above ground methane monitoring and collection system and balanced the well field.

**INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
SITE MANAGER, O&M, SITE STAFF, & CONSULTANTS**

8. Describe any monitoring results that may have affected the groundwater, methane extraction systems, or ambient air, or have caused the implementation of the Site's contingency plans?

There have been no ambient air issues. The potential groundwater issues that have been identified recently – arsenic and DCE – have been well documented in reports that COP has made available to ADEQ.

9. Describe any activities implemented since completion of the remedy to optimize on-site monitoring?

See answer to question # 7.

10. Do you have any comments, suggestions, or recommendations to improve the Site's operations, maintenance, or monitoring activities?

The best systems that are available for the Site are already in place. The frequency of groundwater monitoring could be changed from quarterly to semi-annual.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW

INTERVIEWER(S): David Laney
DATE: 5/4/05 INTERVIEW METHOD: telephone
TOPIC: STATE & LOCAL CONSIDERATION, STATE AGENCIES &
LOCAL AUTHORITIES
INTERVIEWEE: Nadia Hollan
REPRESENTING: U.S. EPA, Region IX PHONE: (415)972-3187
ADDRESS: 75 Hawthorne Street San Francisco, CA 94105

1. What is was your understanding of the overall project at the Site?

Basically its a Superfund site. I'm involved directly with Bill in managing the project so we would know about all of the aspects associated with it. I started at EPA in September 1997 and that was when I was first assigned the Site so my historical understanding dates from then. At this point we've gone through almost the entire process and are trying to complete the Superfund process and are trying to get the Site delisted. When I came on, they were doing the O&M manuals and I was looking at whether if they had completed all of the requirements in the ROD and I think what had initially happened was that we were trying to do a final closure report and what I noted was that they hadn't completed some of the requirements to do methane & ambient air monitoring. So the first issues that I brought up from the very beginning that they needed a program -- the ROD said you needed a methane and air monitoring program and that kind of mutated into a one time ambient air plan which ended up having to be done again, and then the methane monitoring was kind of done separately as part of this monthly monitoring. But anyway, I was just trying to make sure that all of the O&M requirements were being completed. I think that we went through that and then the first five-year review came up and identified some issues which then prevented us again from completing a final close out report and now we're kind of working through those same issues and we've identified the Institutional Controls issue. So we're still trying to do a final close out report but you can't do that until everything is implemented, not just identified, but implemented. But as far as the site cleanup is concerned, we've implemented everything.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
STATE AGENCIES & LOCAL AUTHORITIES

2. What is your impression of the completed project at the Site?

We still have some remaining work to do but we're focused on completing the remaining requirements. The issues that I was concerned about when I first started, it appears that they've addressed a lot of that stuff like expanding the system. One thing is I don't keep as involved in the regular reporting so as long as there haven't been any more problems like methane going beyond the boundaries or things like that. The other thing is we've had a lot of groundwater monitoring data and I think we're pretty satisfied that there's no offsite impacts and as long as those things are still the case, it's does the State good just like every one I attend, to take a close look. My role is more guiding them and overseeing them ... what are our expectations and our targets, deadlines and things like that. Now I think that the difficult task is getting Institutional Controls in place and between the State and City, making sure there's long-term protection and as long as we're satisfied that in the long-term things are going to be managed and reviewed. I don't have any outstanding concerns that haven't already been raised.

3. Have there been routine communications or activities conducted by your office related to the Site?

Sure, Bill and I keep in touch whenever something goes on and I get copied on all the documents that comes through. EPA maintains information about the Site on its website but I'm probably a little behind on the 19th Avenue Site updated and ADEQ has its own website that is updated. I need to go back and make sure - - probably not much has changed. I should probably put something in there about conducting the next one. That's probably a good thing to do, to keep it updated.

4. Have there been any complaints or other incidents related to the Site requiring any response by your office?

Not in the last five years. You know when I very first started there were some communities that had some concerns. You know it would probably go back to the first five-year review. I remember that there was one lady that was concerned about activities that were conducted during the actual construction. I don't think any of that has come up in the last five years. There was this woman who worked for the State or someone was there overseeing the Site and Steve did an investigation and EPA was called in. There's a lot of documentation on it. I think what happened is that they (ADEQ) went back

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
STATE AGENCIES & LOCAL AUTHORITIES

and did some surveys (GPS or GPR) looking for that and no one could ever really find what she was talking about and in any case would you need to modify the remedy or what would you do? Not knowing what they were. We know there's stuff in there, we know its going to be in place forever. The question is, is it going to impact groundwater or air? I'm mainly concerned about is the cap working, are there impacts to groundwater, are we seeing any impacts to air? The monitoring that's been done is supposed to speak to that. So the only really remote thing is the air monitoring. They never really developed a program. They were willing to do what we asked them to do -- one or two rounds of monitoring -- and then the results of that concluded there were some low level emissions and whether they were protective or not. We kind of felt that it wasn't at a high enough level to be of concern. But a toxicologist could take that data today and maybe do something else with it. It's kind of looking at what we have and do we still have a concern with it. We kind of felt that we would address it every five years in the five year review - - is what we think is happening here still ok? And actually at the time of the ambient air monitoring we still hadn't completed some of the system expansion. The purpose of it was to make sure that the cap was still working. We never really came to a conclusion of what's was the best way to make sure that there's not VOCs or things coming from the cap and impacting ambient air. If anything, it would be one issue where it would be nice if we could come up with something, or just say that we are going to rely on the data that was collected, or more data would need to be collected every so often. It never was clear to me how we were going to resolve that. I think we were satisfied with what was collected. It just bothers that it wasn't really programmed. I just don't know that there's any resolution to it. Whoever the engineer is that looks at it thinks is the best way to ensure that the integrity of the cap is sounds. But you know we had even contacted ORD trying to determine ... there are different things you can put on the cap to find localized sources -- potential cracks or something but the City, they never really proposed anything. We talked the flux chambers and there was a big debate and I think the City didn't want to do it or we could never agree on whether it was even useful and I remember that was part of the debate. And I think their original ambient air monitoring work plan probably addressed some of that stuff. But this is old and kind of dated - - the first five years we kind of covered a lot of that stuff. At the time of the first five year review we still hadn't finished looking at the data. So they went with a second round and we finally after a lot of back and forth between EPA and the City we finally said "your report's okay and we don't think there's a major problem here." But it's kind of like I said - - the long term issue was never really resolved.

**INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
STATE AGENCIES & LOCAL AUTHORITIES**

5. Are you aware of any current or planned changes to your regulations/ordinances, or current/future land development that may impact the operations or remedies at the Site?

No. That'd be a question for my Site attorney. He'd probably know more about any upcoming EPA regulations. We've actually tried to talk to the City and they don't really seem to come up with all that much about what they want to do but they'll probably know better about the development that they might want. There is the Rio Salado Project where they're kind of ecologic aquatic environments there so that's one thing that would have to be looked at at the time they did it. I don't know how far along they are at this point. We'd want to make sure that the landfill wouldn't adversely impact it. During the last five-year they brought it up but we didn't really feel it was appropriate until we knew more about it but you probably need an eco person or somebody to go out there and make sure that the data at the landfill that we know about wouldn't adversely impact. For example you'd take the air data or something and find out are these at levels that would be a problem. Obviously runoff isn't really an issue because they drainage and control. You'd need to make sure that anything coming off of that ... irregular storm water ... but you never know. And at the time we thought there wasn't anything there yet so nothing to really assess.

6. In your opinion, have on-site operations been conducted appropriately and have O & M and monitoring been conducted in accordance with developed manuals and plans?

I don't really know enough to speak to that because I've only gone at there a couple of times and I don't really closely review the reports but based on what I did see and after the first five-year review it looked like they pretty much do what they're supposed to be doing. But I would rather rely on your on-site visits or Bill's because they're probably more in tune to the day-to-day operations. Another thing is the staff has changed so one concern I would have is how comfortable we were with the staff they had but knowing nothing about any new staff or new procedures I'd be reluctant saying whether I was confident or not. I think I felt pretty confident with one of the people that were out there. I can't remember her name. Bill knows who it was. Whenever we would have a meeting she would know exactly what needed to be done and what was going on out there. One thing that would concern me is that it appears to be not as much of a priority. Given that they never really replaced the project manager I would be concerned that they are out there but usually

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
STATE AGENCIES & LOCAL AUTHORITIES

that stuff becomes pretty routine. I remember a couple of years ago the ADEQ hydro discovered that they weren't doing the right monitoring with the groundwater but I think they looked at that at the time. It's just hard because I don't get to spend a heck of a lot of time on what's going on on a day-to-day basis. I think it's its more important that during the five-year review we put a lot more attention on it. It's really the only opportunity we have.

7. Are you aware of any community concerns regarding the Site or its operations and administration?

No, not about operation. As far as I know, no one ever calls us and says we saw something or noticed something about it. Steve Brittle would probably know if anyone. And the group that I e-mailed you might. Yeah, we really haven't gotten a whole heck of a lot of feedback. I'm trying to worry what Cody Williams would say ... always worried about development stuff. It's pretty much enclosed now and people don't have access to it. They one thing they are more concerned about are the neighboring industries. Steve probably mentioned to you Innovative Waste. They're more concerned about what's going on there I think and there's this tallow plant at the corner and I think everyone would be a little bit more concerned about what's going on there too. You know they're not under active CERCLA investigation. Once you're under Superfund you have a microscope on you. These other facilities are not necessarily under a formal program although I think Innovative Waste is RCRA. It's one of those things where we kind of took care of the problem and now we're just trying to maintain so we don't have any other problems.

8. Do you have any comments, suggestions, or recommendations regarding the Site's management or operations?

One thing that Bill and I have talked about--they monitor on a quarterly basis for groundwater. We've got lots of data. At some point they really should take a look at all that data and make a decision whether they need to do it that often. Conversely like I mentioned with the ambient air, do they really have any new suggestions for the monitoring program for the methane or ambient air. They seemed to kind of in the original decision document feel it was something that was necessary and now they don't. You know, just making sure that they think they have the best program for making sure everything's intact and working. With the groundwater monitoring, it's based on what they see in the groundwater - they'll increase it if they see something. And just to make sure that arsenic, they have looked at that to, with the onsite wells, any other issues like that we want to identify if there's any problem

**INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
STATE AGENCIES & LOCAL AUTHORITIES**

coming offsite in the groundwater. I think you're aware of this too - - that there is the 1,1-DCE plume and it kind of comes upgradient and passes through the landfill and goes downgradient. One other thing is that the groundwater levels have been dropping too so if we ever someday decades from now get a major recharge then I would be concerned, about okay now you want to be really sure that groundwater is being monitored to see if there's any leachate because the table has dropped. You could be having something and no one would ever find it because its not at the groundwater table. That's another thing - it looks good for now but you never know what might happen out there. But then again, none of my sites - after one or two years they switch to semi-annual or annual monitoring. I'm actually impressed that they do quarterly monitoring which will really help us make decisions. That's one thing that I think I'll mention to ADD-Q about maybe having them deal with under their agreement with the City. At 19th Avenue they've been doing O&M - - we're at close-out now. It's kind of up to them. Just make sure that there are enough personnel dedicated to the site and make sure we have a list from the City of who's responsible for it and documentation of logs and then out there. I want to make sure that they're doing it as often as they're supposed to be. In terms of management or as far as long term, with a deed restriction it's just to make sure that the responsibilities to maintain and operate the landfill are in place regardless of who owns the property. If for some reason the City decides they want to sell the property it remains an attachment to the title so that even though the City is still obligated under their agreement with the state it also obligates the new people. And then that's just more of a protection for future use. It kind of one of those things that we've already identified as is needed you know one thing that we're working concurrently on is an ESD to identify Institutional Controls so whether that would be this simple land use scenario and making sure that the City does agree that certain uses that aren't appropriate that waste remains in place and that they do maintain and operate the system according to the requirements although you know that's kind of in the agreement with the state and that's an Institutional Control in itself. The DEUR would help detect any changes in future land use and also be more specific about what's now allowable as far as land use. The other thing is that we've tried to encourage the City to think about what they do want - - it's a lot easier to plan ahead of time so if they do have any ideas about what they want to do with the landfill - - deal with them now as opposed to later because the further away you get in the process the harder it is to go back and change anything. It seems to me that they want to leave it like that and then there are other parts of the City who want to redevelop that whole area. I remember before the last five-year review we had somebody who wanted to use it as a soccer field - - just odd things like that. The few things are making sure that it doesn't affect the cap and the remedy

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
STATE AGENCIES & LOCAL AUTHORITIES

and the other thing is that the exposures at the landfill are still protective of whatever use. So if you've got kids running around playing. I might be a little less comfortable about VOCs in the ambient air because I'd want to talk to a toxicologist about it. That's just the thing is to make sure that any use that any use that you propose if you're at the landfill or near it, it's still going to be protective. It's easier to do it now when we know. If they needed to do something with it that would require any kind of modifications to the design that has to go through the approval process. At this point, the options are a lot more limited than they would have been if they had thought of something before the design. That's where a lot of other people contact EPA. You say "look at what they did" well yeah, but they knew that when they were designing it. And know, it's harder to retrofit.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW

INTERVIEWER(S): David Laney, EEC
DATE: 5/25/05 INTERVIEW METHOD: telephone
TOPIC: STATE & LOCAL CONSIDERATION, STATE AGENCIES &
LOCAL AUTHORITIES
INTERVIEWEE: Vice Mayor Michael Johnson, Council Member for District 8
REPRESENTING: City of Phoenix PHONE: (602)534-9327
ADDRESS: 200 W. Washington, 11th Floor Phoenix, AZ 85003

1. What is/was your understanding of the overall project at the Site?

This was a landfill that was filled and closed and placed on the Superfund.

2. What is your impression of the completed project at the Site?

See above.

3. Have there been routine communications or activities conducted by your office related to the Site?

The Vice Mayor's office has been over in the area of the landfill several times responding to environmental issues (mainly air quality) that have been unrelated to the Site.

4. Have there been any complaints or other incidents related to the Site requiring any response by your office?

No.

5. Are you aware of any current or planned changes to your regulations/ordinances, or current/future land development that may impact the operations or remedies at the Site?

No. However, as the Rio Salado project goes forward, the Vice Mayor's office and the City of Phoenix will be looking for ways to encourage development of compatible land use in the area.

**INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
STATE AGENCIES & LOCAL AUTHORITIES**

6. In your opinion, have on-site operations included appropriate O & M and monitoring in accordance with developed manuals and plans?

Yes. The City has been monitoring operations at the Site and there have been no issues or violations.

7. Are you aware of any community concerns regarding the Site or its operations and administration?

No.

8. Do you have any comments, suggestions, or recommendations regarding the Site's management or operations?

The only thing is to see if the property can be delisted so it can be developed as a Brownsfield project that will be compatible with the open ended development of Rio Salado.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW

INTERVIEWER(S): David Laney, EEC
DATE: 5/4/05 INTERVIEW METHOD: telephone
TOPIC: STATE & LOCAL CONSIDERATION, STATE AGENCIES &
LOCAL AUTHORITIES
INTERVIEWEE: Hugh Rieck, Hydrologist
REPRESENTING: ADEQ PHONE: (602)771-4196
ADDRESS: 1110 West Washington Street Phoenix, AZ 85007

1. What is/was your understanding of the overall project at the Site?
To safely contain waste in place for a very long time - - indefinitely - - into the future.

2. What is your impression of the completed project at the Site?
It has been well done and every aspect has been successful.

3. Have there been routine communications or activities conducted by your office related to the Site?
Yes.

4. Have there been any complaints or other incidents related to the Site requiring any response by your office?
No. I don't think so.

5. Are you aware of any current or planned changes to your regulations/ordinances, or current/future land development that may impact the operations or remedies at the Site?
Not specifically other than those that you surely have already noted, for example, the lowering of the arsenic MCL. I think you are already aware of those. The future land uses - - I think we are putting a mechanism in place to ensure that no inappropriate land uses occur through the DEUR. I'm not aware of any specific plans that would be incompatible or interfere with the remedy.

INTERVIEW QUESTIONNAIRE
19th AVENUE LANDFILL, 5-YEAR REVIEW
STATE AGENCIES & LOCAL AUTHORITIES

6. In your opinion, have on-site operations including appropriate O & M and monitoring in accordance with developed manuals and plans?

Yes. In all cases.

7. Are you aware of any community concerns regarding the Site or its operations and administration?

No.

8. Do you have any comments, suggestions, or recommendations regarding the Site's management or operations?

I think the City of Phoenix is doing a pretty good job on it. I don't see how they could improve it really. The only caution would be long term future land use that would impact the remedy. That's the only thing we need to keep an eye on. That and the long-term monitoring. I think things are lined out pretty well for delisting. I can't imagine what else needs to be done to delist it.

**INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW**

INTERVIEWER(S): David Laney
DATE: 7/5/05 INTERVIEW METHOD: telephone
TOPIC: SITE OPERATIONS, MAINTENANCE & MONITORING; SITE
MANAGER, O&M, SITE STAFF, & CONSULTANTS
INTERVIEWEE: Ron Serio
REPRESENTING: City of Phoenix PHONE: (602)262-7030
ADDRESS: 3060 S. 27th Avenue Phoenix, AZ. 85009-6810

1. What is/was your understanding of the overall project at the Site?
Since remedial construction has been completed the objective is to keep it maintained so that there is no threat to human health and safety, and monitoring - groundwater, landfill gas, etc.

2. What is/was your impression of the completed project at the Site?
I think it's been very successful, that everything was done appropriately, that it met the objective of being protective of human health and the environment and I think it's going so well that it needs to go the next step where it needs to be evaluated to see if it could be used for some sort of a public use instead of just restricted and never to be used again. There should probably be a risk assessment or something done to determine if there could be some other use there. I think that would really be a positive thing.

3. What is your responsibility at the Site (O&M, monitoring, etc.)?
None. I was the Project Manager for the Site for many years and sometimes still get calls from the staff that are currently doing work there.

4. Please describe the O&M/monitoring responsibilities of other city staff and consultants?
The City's responsible and we used our own technicians for the landfill gas monitoring for the groundwater sample collection and then used contract labs for analysis of the groundwater. We do the reporting ourself in house. There was a consultant also used to do some surface sweeps in the Salt River - I don't know if that's still going on. But that was part of the ambient air concerns. And then for maintenance of the flare and all that, if we need to bring specialists in or contractors to do work on that. Surface emission monitoring was done temporarily until the wells were installed along the Salt River. It should have quit, I don't know if it actually did.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
SITE MANAGER, O&M, SITE STAFF, & CONSULTANTS

5. Describe any significant changes (or planned changes) to O&M/monitoring activities that are not addressed in the appropriate O&M manuals or monitoring plans?

These documents should have been changed to reflect changes that occurred during expansion of the landfill gas collection system. I think all the procedures would be the same it's just the number of wells would change - the map of wells would change. Maybe the probes. I don't know if there were any probes added. I don't think so. So if they're not updated, it would be very easy to do it, but my recollection is that they were updated.

6. Describe any O&M problems or difficulties that may have affected the the protectiveness or effectiveness of the remedy, or O&M costs?

I don't think so but there was an impression or it could have been misleading that there was that problem - and what I'm talking about is that there were some probes installed in trash around the rendering plant in the northeast corner -- so you'd get readings in those wells and there was vacuum on those wells usually indicating that you're not migrating any gas offsite but you're just reading what's in the trash and there is gas in the trash. So, I don't know, that was always something that you always had to explain it away I guess, but not an easy solution to it though. But that was the only thing that may have looked bad but really wasn't.

7. Describe any activities implemented since completion of the remedy to optimize O&M?

Add the wells helped provide more fuel for the flares. Not much else that I'm aware of. - nothing significant beyond that.

8. Describe any monitoring results that may have affected the groundwater, methane extraction systems, or ambient air, or have caused the implementation of the Site's contingency plans?

The only thing that I'm aware of - I think there were some elevated groundwater readings right before I left. I think it was nickel on the west side. It was just starting when I left so I don't know if that triggered the contingency plan but that's about the only thing that I'm aware of.

9. Describe any activities implemented since completion of the remedy to optimize on-site monitoring?

**INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW
SITE MANAGER, O&M, SITE STAFF, & CONSULTANTS**

10. Do you have any comments, suggestions, or recommendations to improve the Site's operations, maintenance, or monitoring activities?

I think now there's a huge history of groundwater quality data and methane probe reading data. It probably wouldn't hurt to see if there are constituents that we never ever detected for ten years. It would make sense to review that and get rid of some of that stuff – not make it required to be monitored. I think it would be good to look at some of the lab procedures because the consent decree requires very specific test methods for analysis of groundwater samples. If some of those are a little bit outdated, you know, the technology changes at the labs. I think that's something that should be looked at because sometimes to do it this old way it may cost more money and may not even be as accurate. I think that would be something to consider. And then, even monitoring frequency, again based on the history, if its ok to have less monitoring events and the history supports doing something like that, that would be something good to look at I think. Because I think the longer the Site goes eventually that stuff's going to have to decline and I think the five year reviews are an appropriate time to look at that type of stuff.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW

INTERVIEWER(S): David Laney, EEC
DATE: July 28, 2005 INTERVIEW METHOD: telephone

TOPIC: STATE & LOCAL CONSIDERATION, STATE AGENCIES & LOCAL AUTHORITIES

INTERVIEWEE: Linda Pollock
REPRESENTING: Office of the Arizona Attorney General PHONE: (602)542-8534
ADDRESS: 1275 W. Washington Phoenix, AZ, 85007

1. What is/was your understanding of the remedy at the Site?
To protect the public and the environment from releases or threat of releases of hazardous substances.

2. What is your impression of the completed remedy at the Site?
I have a very high opinion of the completed remedy. I especially like the rechannelization of the Salt and the rip-rap. It's designed to prevent washout in the event of a flood. That cost millions of dollars but it was well worth it.

3. Have there been routine communications or activities conducted by your office related to the Site?
No. I am negotiating a recorded deed restriction with the City right now. That's about it. So there are some regular communications with the City with respect to the deed restriction.

4. Have there been any complaints or other incidents related to the Site requiring any response by your office?
No. None whatsoever.

5. Are you aware of any current or planned changes to your regulations/ordinances, or current/future land development that may impact the operations or remedies at the Site?
No. But do pose that question to the City. You know they may have some long range plans for that landfill.

6. In your opinion, have on-site operations and monitoring at the Site been conducted in accordance with developed manuals and plans? Yes. The City's very conscientious.

**INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW**

7. Are you aware of any community concerns regarding the Site or its operations and administration?

No, I haven't heard a thing.

8. Do you have any comments, suggestions, or recommendations regarding the Site's management or operations?

No, other than the fact that we need to file a recorded declaration of use restriction on the Site which is a glaring omission. We have no way to protect the integrity of the remedy in the event the City sells all or part of the property. That's what I'm focusing on right now.

**INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW**

INTERVIEWER(S): David Lanev, EEC
DATE: 7/29/05 INTERVIEW METHOD: telephone
TOPIC: STATE & LOCAL CONSIDERATION, STATE AGENCIES &
LOCAL AUTHORITIES
INTERVIEWEE: Susan Sargent
REPRESENTING: City of Phoenix Planning Department PHONE: (602)262-4065
ADDRESS: 200 W. Washington Phoenix, AZ 85003

1. How far to the west will the Rio Salado Project extend and will there be perennial flow in the vicinity of 19th Avenue?

I do the planning for the Beyond the Banks Area adjacent to the project but don't have technical information about the project itself. The Rio Salado Habitat Restoration Project's western boundary is 19th Avenue. The Rio Owesta (spelling?) will continue to the west from 19th to 83rd Avenue and its in the feasibility study/planning stage. We've got a feasibility report from the Army Corps of Engineers but it has not been funded. We eventually hope to restore, reclaim, and develop the river bed all the way through to the western boundary of the City, 115th Avenue.

We have a cohesive, interdepartmental team that works in the City including the Rio Salado people and the Office of Environmental Programs so I have some background from them [about the landfill] because we share a lot of information.

2. What is/was your understanding of the overall project at the Site?

I know that there has been some remediation of the Site; we expect to have it delisted later this year. I know that it has to be delisted in order for our Rio Salado facilities to run along the southern boundary of the landfill, at least on the north side of the river. A portion [of the landfill] extends to the south side of the river. Most of the methane venting has occurred around the perimeter of the Site. I know it's got about a 2 percent slope; it's been capped. I know we've had some development proposals for possible use or reuse of the Site were it to be delisted. I know that the City is not actively marketing it at this point. So those are some of the land use type pieces of information I have on the landfill. We show it on our General Plan for future, probably passive recreation. We don't see it at this time as something that is likely to be developed for other uses.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW

3. What is your impression of the completed project at the Site?
I can't address how effective the work on the landfill has been because I don't know exactly all the details of what's been done and to what standards its been done. I think in the future there might be some higher and better uses for that Site were it not environmentally compromised and there's a great demand for housing and other land uses adjacent to the Rio Salado Project which will be opening to the public later this year and that there are certainly better uses than passive recreation on the Site but not under its present environmental status.
4. What are the designated uses of the water that's adjacent to the landfill that's currently running in the Salt River?
Well there is a low flow channel that was constructed by the Army Corps of Engineers and its subcontractors in conjunction with federal funding and funding from the City of Phoenix and the Maricopa County Flood Control District. I know that during the peak releases during the winter there was as great as 40,000 cubic foot per second flow that was contained within the low flow channel. There was very little erosion to that low flow channel construction and that it has proved effective at handling flows at that amount. Water that is presently in the low flow channel and that will probably typically be present in the low flow channel is the result of water from the outflow channels that do flow through the City to the river bed. So there will be a perennial flow - - maybe less than 1,000 cubic feet per second. That is storm water outflow.
5. Is the flow supposed to support aquatic species or riparian species in the area?
Yes. It will and with the additional input of well water that the City will treat and use through a series of wetland ponds. There have already been sited over 100 species. I believe, in the river corridor. You can get more specifics from the Rio Salado people - Karen Williams. She's in the City Manager's Office. She's the Rio Salado Project Manager. Engineering information can be obtained from Walt Kinsler in Engineering and Architectural Services. He can tell you about how the Project is related to the water distribution system in the canals and the wells. Of course our Office of Environment of Programs also is working on those - - Don Stoltzfus. We have a lot of people who are involved in Rio Salado and adjacent areas and one of the landowners comes in and talks with us frequently who has part of that northeast corner. Sloan McFarland, on Pasqual Eddy properties. They just recently pulled a permit to have some electrical on the eastern portion of their property to have some outdoor storage of containers on the Site. That's another thing that comes to mind. The property shows up on maps as Pasqual Eddy Family Trust. He also told me that maybe there was a five acre section of the landfill that was never mined. I thought that was interesting.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW

6. Have there been routine communications or activities conducted by your office related to the Site?
Yes there have been and I have not been a part of those. But there have been some considerations of possible land uses of the Site.

7. Have there been any complaints or other incidents related to the Site requiring any response by your office?
That is not typically a function of the Planning Department.

8. Are you aware of any current or planned changes to your regulations/ordinances, or current/future land development that may impact the operations or remedies at the Site?
No. We changed the requirements for filling of sand and gravel pits - - that was a recent thing that is somewhat related and near the river but not to change anything that I am aware of - at least from a planning perspective on that landfill. The landfill is still zoned industrial. On our General Plan we show idealized land uses and that would be for recreational use - public recreational or open space. We won't need to change the zoning of the landfill to make it compatible with Rio Salado.

9. In your opinion, have on-site operations including appropriate O & M and monitoring in accordance with developed manuals and plans?
For any of the work that I have been involved with in doing the Rio Salado Beyond the Banks Area Plan and responding to land use questions and proposals in the area, I have not had any complaint about the landfill or its operation. The only complaints I've had have been about the lack of availability of such a large piece of land to the development community.

10. Are you aware of any community concerns regarding the Site or its operations and administration?
See answer to question # 9 above.

INTERVIEW QUESTIONNAIRE
19TH AVENUE LANDFILL, 5-YEAR REVIEW

11. Do you have any comments, suggestions, or recommendations regarding the Site's management or operations?

No. I'm pleased to see that the City is moving forward to get the Site delisted. She said it meets the objectives of planning for Beyond the Banks Area. For official planning purposes, Beyond the Banks Area extends from I-17 on the North to Broadway on the South, 19th Avenue on the West and 32nd Street on the East so this is in what the City calls the Beyond the Banks Planning Area. The area plan for Beyond the Banks was officially adopted by the City Council in December of 2003 and it's a policy document for guiding improvement and revitalization of that area over the next 20 to 30 years.

12. If the Site doesn't get delisted or doesn't get delisted in the near future, what impact will that have on the Rio Salado and Beyond the Banks Projects?

I believe it has impacts for the Rio Salado Project and I can't address those. We do not see it as land that is available for promotion in the Beyond the Banks Area so it essentially has not impact for planning. I believe it does for the project. Karen would definitely know that - - I have heard her address it.

APPENDIX D
SITE INSPECTION CHECKLIST

19TH AVENUE LANDFILL

**FIVE-YEAR REVIEW 19TH AVE LANDFILL.
SITE INSPECTION CHECKLIST**

I. GENERAL SITE INFORMATION	
Site Name:	1974 AVENUE LANDFILL NPL SITE
Date(s) of Inspection:	MAY 11, 2005
Weather Conditions:	CLEAR, BREEZY ~ 85°F
Agency/Consultant Conducting Inspection:	ENGINEERING & ENVIRONMENTAL CONSULTANTS, INC. (EEC)
Remedy includes (check all that apply):	
<input checked="" type="checkbox"/>	Landfill cap
<input type="checkbox"/>	Landfill leachate collection system
<input checked="" type="checkbox"/>	Perimeter erosion & drainage CONTROLS
<input checked="" type="checkbox"/>	Landfill gas collection & control system
<input checked="" type="checkbox"/>	Site access controls
<input type="checkbox"/>	Institutional controls
<input type="checkbox"/>	Groundwater treatment system
<input type="checkbox"/>	Surface water collection and treatment
<input checked="" type="checkbox"/>	Groundwater monitoring
<input checked="" type="checkbox"/>	Salt River channelization
<input checked="" type="checkbox"/>	Condensate collection, treatment and discharge
<input type="checkbox"/>	Other _____
<hr/>	
LANDFILL IS NOT LINED. THEREFORE, LEACHATE CANNOT BE COLLECTED.	
<hr/>	
NO INSTITUTIONAL CONTROLS ARE CURRENTLY IN PLACE.	
<hr/>	
OFFSITE GROUNDWATER DOES NOT CURRENTLY REQUIRE TREATMENT.	
<hr/>	
DRAINAGE CONTROLS COLLECT RUNOFF. NO TREATMENT OF RUNOFF OCCURS. OUTFALLS FROM DRAINAGE TO SALT RIVER EXIST.	
<hr/>	
<hr/>	
Attachments:	<input checked="" type="checkbox"/> Inspection Team <input checked="" type="checkbox"/> Site Map

II. ONSITE DOCUMENT AND RECORDS VERIFICATION

I. On-Site Documents

Landfill O&M Manual	✓ Readily Available	✓ Up to Date	N/A
Gas Extraction System O&M Manual	✓ Readily Available	✓ Up to Date	N/A
Groundwater Monitoring Plan	✓ Readily Available	✓ Up to Date	N/A
Landfill Gas Monitoring Plan	✓ Readily Available	✓ Up to Date	N/A
Ambient Air Monitoring Plan	✓ Readily Available	✓ Up to Date	N/A
Groundwater Contingency Plan	✓ Readily Available	✓ Up to Date	N/A
Health & Safety Plan	✓ Readily Available	✓ Up to Date	N/A
Storm Water Pollution Prevention Plan	Readily Available	Up to Date	N/A
Contingency/Emergency Response Plan	✓ Readily Available	✓ Up to Date	N/A
As-Built Drawings	✓ Readily Available	✓ Up to Date	N/A

Remarks: **GROUNDWATER & LANDFILL GAS MONITORING REQUIREMENTS SPELLED OUT IN CONSENT DECREE (COPY ON SITE @ 27TH AVE FACILITY).**

- "AMBIENT AIR MONITORING PLAN SECOND PHASE," 9/12/00
- HASP ADDENDUM 8/17/98

• DRAFT 19TH AVE LANDFILL SWPPP - 3/93, SIMONS, LI & ASSOC.

NPDES PERMIT A R 00A353 - NO LONGER IN AFFECT. NO AZPDES PERMIT REQUIRED UNDER CERCLA UMBRELLA, BUT EQUIVALENT CONDITIONS UNDER CERCLA.

2. Permits and Service Agreements

Air Permit	✓ Readily Available	✓ Up to Date	N/A
Influent NPDES Permit	Readily Available	Up to Date	* N/A
Storm Water NPDES Permit	Readily Available	Up to Date	* N/A
POFV Discharge Authorization	✓ Readily Available	✓ Up to Date	N/A
Earth Moving Block Permit	✓ Readily Available	✓ Up to Date	N/A
Others	Readily Available	Up to Date	N/A

Remarks: **MARICOPA CO. AIR PERMIT # 010048 - NON-TITLE V. NO TITLE V PERMIT REQUIRED.**

AS STATED ABOVE, NO AZPDES PERMIT REQUIRED WHILE UNDER CERCLA.

3. Maintenance Logs

Landfill CAP Maintenance Log	* Readily Available	Up to Date	N/A
Perimeter Drainage Maintenance Log	* Readily Available	Up to Date	N/A
Sediment Ponds Maintenance Log	* Readily Available	Up to Date	N/A
Gas Collection System Maintenance Log	✓ Readily Available	✓ Up to Date	N/A
Flare System Maintenance Log	✓ Readily Available	✓ Up to Date	N/A
Gas Probe Monitoring Maintenance Log	✓ Readily Available	✓ Up to Date	N/A
GW Monitoring Well Maintenance Log	* Readily Available	Up to Date	N/A
Condensate Tank Carbon Changeout Log	✓ Readily Available	✓ Up to Date	N/A
Site Barrier Maintenance Log	Readily Available	Up to Date	N/A

Remarks: *** INSPECTION RECORDS EXIST FOR THESE ITEMS, BUT NO RECORDS WERE READILY AVAILABLE TO SHOW WHAT MAINTENANCE WAS ACTUALLY PERFORMED.**

"MONTHLY REPORT OF CELL MONITORING" HAS FLARE STATION MONITORING RECORDS; CONDENSATE MANAGEMENT, CARBON FILTER, CALIBRATION RECORDS; FLOW, CH₄, CO₂, O₂; CONDENSATE SUMP FUNCTION; AIR EMISSIONS; LEGES SHUTDOWN & DEVIATION LOG; & MAINTENANCE CHECKLIST.

II. ONSITE DOCUMENT AND RECORDS VERIFICATION (continued)

4. Records

Daily Site Access Records	Readily Available	Up to Date	✓	N/A
Employee O&M Training Records	✓ Readily Available	✓ Up to Date		N/A
Employee OSHA Certification Records	✓ Readily Available	✓ Up to Date		N/A
Site Incident Reports	Readily Available	Up to Date		N/A
Gas Generation Records	✓ Readily Available	✓ Up to Date		N/A
Air Emissions Records/Inventories	✓ Readily Available	✓ Up to Date		N/A
Condensate Generation/Discharge Records	✓ Readily Available	✓ Up to Date		N/A
Leachate Generation/Discharge Records	Readily Available	Up to Date	✓	N/A
Storm Water Discharge Records	Readily Available	Up to Date		N/A
CAP Settlement Records	✓ Readily Available	✓ Up to Date		N/A

Remarks • OSHA 8-HR REFRESHER - 2/10/05. • NO SITE ACCESS RECORDS.

FACILITY IS SECURED WITH FENCING & LOCKED GATES.

- EMPLOYEE TRAINING RECORDS AVERAGED 4-6 PAGES FOR EACH EMPLOYEE. SOME RETRAINING DATES HAVE APPARENTLY LAPSED, HOWEVER, FOR O&M (2 EMPLOYEES) & OSHA, ALL RECORDS INDICATE CAP-TO-DATE TRAINING. • NO SPECIFIC SITE INCIDENT LOG IDENTIFIED. • AIR EMISSIONS (PM10, TSP, SO₂, VOCs, NO_x, CO, H₂O_x) IN MONTHLY O&M REPORT. • INSPECTION LOG OF EROSION AFTER SDRM EVENTS, BUT NO DISCHARGE RECORDS.

5. Monitoring Data and Report

Groundwater Monitoring Data	✓ Readily Available	✓ Up to Date		N/A
Groundwater Monitoring Reports	✓ Readily Available	✓ Up to Date		N/A
Methane Monitoring Data	✓ Readily Available	✓ Up to Date		N/A
Methane Monitoring Reports	✓ Readily Available	✓ Up to Date		N/A
Ambient Air Monitoring Data	✓ Readily Available	Up to Date		N/A
Ambient Air Monitoring Reports	✓ Readily Available	Up to Date		N/A
Condensate Analytical Data	✓ Readily Available	✓ Up to Date		N/A
Leachate Analytical Data	Readily Available	Up to Date	✓	N/A
Storm Water Monitoring Data	Readily Available	Up to Date		N/A

Remarks QUARTERLY PROGRESS REPORTS CONTAIN WATER LEVEL, pH, CONDUCTIVITY & TEMPERATURE DATA FOR GROUNDWATER, WATER TABLE MAP, GROUNDWATER ANALYTICAL DATA, METHANE PROBE DATA (% CH₄ IN PROBES & FLARES) QUARTERLY REPORT READILY AVAILABLE BACK TO 1ST Q 1995.

4/30/02 "AMBIENT AIR MONITORING REPORT" REFERENCES 1998 AMBIENT AIR MONITORING PLAN. "PHASE II MONITORING" REQUIRED BY EPA & ADEQ TO ADDRESS DEFICIENCIES IN PHASE I.

III. O&M COST EVALUATION

1. O & M Implementation Organization

Agency PRP Agency Contractor
 PRP PRP Contractor

2. O&M Cost Records

Readily Available Up to Date TO 2003 . 2004 - 2005 NOT YET COMPLETED
 Funding Mechanism/Agreement In Place

Original O&M Cost Estimate Breakdown Attached

Annual O&M Costs for Review Period (2000 - 2005)

2000	2001	<input checked="" type="checkbox"/>	Breakdown Attached	<input checked="" type="checkbox"/>	Not Available
2001	2002	<input checked="" type="checkbox"/>	Breakdown Attached	<input checked="" type="checkbox"/>	Not Available
2002	2003	<input checked="" type="checkbox"/>	Breakdown Attached	<input checked="" type="checkbox"/>	Not Available
2003	2004		Breakdown Attached		Not Available
2004	2005		Breakdown Attached		Not Available

3. Unanticipated or Unusually High O&M Cost During Review Period

List Amount of Higher Than Anticipated O&M Costs For Each Year and Identify Reason(s) for Variance From Expectations

Year 2000 _____

Year 2001 _____

Year 2002 ADDITIONAL WELLS INSTALLED ON SOUTH SIDE OF CELLS (EXTRACTION WELLS)

Year 2003 _____

Year 2004 DRAINAGE MATS INSTALLED.

Year 2005 _____

IV. GENERAL SITE CONDITIONS INSPECTION

1. Access Restrictions Applicable Not Applicable

Perimeter Fencing Condition Good Poor (show on map)
Remarks _____

Access Gates Condition Good Poor (show on map)
Locks in Place Yes No (show on map)
Remarks _____

Perimeter Signs Condition Good Poor
Spacing Adequate Poor
Remarks NO SIGNS EXIST ON FENCING OR GATES

Evidence of Vandalism/Trespassing Yes No (show on map)
Remarks _____

2. Institutional Controls Applicable Not Applicable

Deed Restrictions in Place Yes No

Remarks NO CURRENT LAND USE RESTRICTIONS RECORDED ON DEEDS.

Evidence of On-Site Land Use Changes Yes No

Remarks _____

Evidence of Off-Site Land Use Changes Yes No

Remarks _____

3. On-Site Roads Applicable Not Applicable

Roads Appropriately Sealed to Prevent Dust Yes No

Remarks NOT SEALED, BUT NO SIGNIFICANT DUST NOTED. GRAVEL COVER IS LOW DUST.

Evidence of Road Damage/Deterioration Yes No

Remarks _____

V. LANDFILL COVER/CAP VISUAL INSPECTION

1. Settlement Yes (show on map) No

Areal Extent of Settlement _____ Settlement Depth _____

Remarks _____

2. Cracks Yes (show on map) _____ No

Length and Width ~ 160 FT X 1/4" Approximate Depth 1-3 FT

Remarks CRACK WIDTH UP TO 1/4" VISIBLE AT DEPTHS UP TO 3 FT
(VISIBLE RANGE). CRACK WIDENED TO 1 FOOT AT SURFACE.

3. Erosion Yes (show on map) _____ No

Areal Extent ~ 300 FT² Approximate Depth UP TO 2 FT

Remarks TWO AREAS OF EROSION SHOWN ON MAP (CENTRAL PORTION OF
NORTHERN HALF OF CELL A).

OBVIOUS MAINTENANCE OF SEVERAL AREAS. REVEGETATION SUCCESSFUL.

4. Holes Yes (show on map) _____ No

Areal Extent _____ Approximate Depth _____

Remarks SMALL ANIMAL BURROWS ONLY.

5. Vegetative Cover (show on map) Grass Bushes _____ Trees

Well established? Yes _____ No

Stressed? _____ Yes (show on map) No

Remarks OCCASIONAL LARGE BUSHES MAY BE INAPPROPRIATE (DISURBANCE
BY ROOT ZONE). SUGGEST CHECKING BUSH TYPES FOR COMPATIBILITY.

6. Bulges Yes (show on map) _____ No

Areal Extent _____ Bulge Height _____

Remarks _____

V. LANDFILL COVER/CAP VISUAL INSPECTION (continued)

7. Wet Areas/Water Damage

Wet Areas	Yes (show on map)	<input checked="" type="checkbox"/>	No	Areal Extent	_____
Ponding	Yes (show on map)	<input checked="" type="checkbox"/>	No	Areal Extent	_____
Seeps	Yes (show on map)	<input checked="" type="checkbox"/>	No	Areal Extent	_____
Soft Subgrade	Yes (show on map)	<input checked="" type="checkbox"/>	No	Areal Extent	_____

Remarks _____

8. Cover Slope Instability Yes (show on map) No

Remarks _____

9. Cover Letdown Channels Applicable Not applicable

Settlement Yes (show on map) No
Areal Extent _____ Approximate Depth _____

Remarks _____

Material Degradation Yes (show on map) No

Material Type _____ Areal Extent _____

Remarks _____

Erosion Yes (show on map) No

Areal Extent _____ Approximate Depth _____

Remarks _____

Undercutting Yes (show on map) No

Areal Extent _____ Approximate Depth _____

Remarks _____

V. LANDFILL COVER/CAP VISUAL INSPECTION (continued)

9. Cover Letdown Channels (Continued)

Drainage Obstructions

Yes (show on map) No

Obstruction Type _____ Areal Extent _____

Remarks _____

Excessive Vegetation Growth

Yes (show on map) No

Vegetation Type _____ Areal Extent _____

Remarks _____

10. Cover Penetrations – Is there evidence of leakage or seepage at penetration?

- | | | | |
|----------------------|-------------------|-------------------------------------|----|
| Gas Vents/Wells | Yes (show on map) | <input checked="" type="checkbox"/> | No |
| Gas Probes | Yes (show on map) | <input checked="" type="checkbox"/> | No |
| Monitoring Wells | Yes (show on map) | <input checked="" type="checkbox"/> | No |
| Condensate Sumps | Yes (show on map) | <input checked="" type="checkbox"/> | No |
| Settlement Monuments | Yes (show on map) | <input checked="" type="checkbox"/> | No |

Remarks RECENT REPAIRS NOTED AROUND SOME SUMPS

VI. LANDFILL PERIMETER DRAINAGE AND EROSION CONTROL

1. Material Degradation

Yes (show on map) No

Material Type _____ Areal Extent _____

Remarks _____

2. Channel/Ditch Erosion

Yes (show on map) _____ No

Areal Extent 2 RILLS Approximate Depth 12"

Remarks TWO RELATIVELY DEEP RILLS (APPROX. 12" DEEP) OBSERVED
ALONG TOP OF BANK ON PERIMETER CHANNEL OTHERWISE,
NO SIGNIFICANT CHANNEL EROSION. NORTH, WEST & SOUTH CHANNELS
LINED WITH ARMORFLEX IN GOOD CONDITION. EAST CHANNEL
UNLINED EARTH, BUT NO EROSION.

VI. LANDFILL PERIMETER DRAINAGE AND EROSION CONTROL (continued)

3. Undercutting Yes (show on map) No

Areal Extent _____ Approximate Depth _____

Remarks _____

4. Siltation Yes (show on map) No

Areal Extent _____ Approximate Depth _____

Remarks THERE IS EVIDENCE OF MINOR SEDIMENTATION (APPROX. 1-3") ALONG MUCH OF THE PERIMETER CHANNEL, BUT IT IS NOT SIGNIFICANT AND WILL NOT IMPEDE STORM WATER FLOW.

5. Vegetation Growth Yes (show on map) No

Vegetation Type _____ Areal Extent _____

Remarks THERE IS AN ACCUMULATION OF TUMBLEWEED IN THE NORTH CHANNEL AND EXCESSIVE WEED GROWTH IN THE EAST CHANNEL, PARTICULARLY AROUND THE STORM DRAIN INLET.

6. Sedimentation Impoundments

Excessive Sedimentation _____ Areal Extent _____ Depth _____
 Evidence of Erosion _____ Areal Extent _____ Depth _____

Inlet Functioning Blocked
 Outlet Functioning Blocked

Remarks ALL THREE SEDIMENTATION BASINS (SW BASIN, SE BASIN & EAST BASIN) APPEAR TO BE IN GOOD WORKING CONDITION.

7. Storm Water Discharge Outfalls

Excessive Sedimentation _____ Areal Extent _____ Depth _____
 Evidence of Erosion _____ Areal Extent _____ Depth _____

Outlet Functioning Blocked

Remarks ALL OF THE SEDIMENT BASIN OUTLETS APPEAR TO BE IN GOOD WORKING CONDITION, BUT THERE IS EXCESSIVE WEED GROWTH AROUND THE OUTLETS IN THE EAST BASIN AND THE OUTLET IN THE SE BASIN. OUTFALLS TO SALT RIVER PROTECTED BY HEAVY CAST IRON DOORS.

VII. LANDFILL GAS COLLECTION AND CONTROL SYSTEM

1. Gas Collection Wells Active Passive Map Attached

Properly secured? Yes No If no, explain _____

Functioning? Yes No If no, explain _____

Good condition? Yes No If no, explain _____

Condensate buildup? Yes No If yes, explain _____

O&M required? Yes No If yes, explain _____

Remarks * NO PROBLEM VISIBLE OR REPORTED BY CITY.

2. Gas Collection Piping and Manifolds Active Passive Map Attached

Properly buried? Yes No If no, explain ABOVEGROUND HEADERS IN SE CORNER

Functioning? Yes No If no, explain _____

Good condition? Yes No If no, explain _____

Evidence of leakage? Yes No If yes, explain _____

Condensate buildup? Yes No If yes, explain _____

O&M required? Yes No If yes, explain _____

Remarks * NO PROBLEMS VISIBLE OR REPORTED BY CITY.

3. Gas Treatment System Piping and Valves

Functioning? Yes No If no, explain _____

Good condition? Yes No If no, explain _____

Evidence of leakage? Yes No If yes, explain _____

O&M required? Yes No If yes, explain _____

Remarks NO PROBLEMS VISIBLE OR REPORTED BY CITY.

VII. LANDFILL GAS COLLECTION AND CONTROL SYSTEM (continued)

4. Gas Treatment System Flare Station

Functioning? Yes No If no, explain _____
 Proper operating temp? Yes No If no, explain _____
 Proper inlet gas flow? Yes No If no, explain _____
 Proper destruction? Yes No If no, explain _____
 Good condition? Yes No If no, explain _____
 Visual emissions? Yes No If yes, explain _____
 O&M required? Yes No If yes, explain _____

Remarks ROUTINE O&M ONLY. NO SPECIAL MAINTENANCE REQUIREMENTS NOTED.

5. Gas Treatment System Knockout Drums

Good condition? Yes No If no, explain _____
 Filter in place? Yes No If no, explain _____
 Evidence of leakage? Yes No If yes, explain _____
 O&M required? Yes No If yes, explain _____

Remarks CARBON FILTER ON POLY TANK
CAPSULINIC WAGE ON KNOCKOUT TANK (FOR WATER LEVEL) INOPERABLE.

6. Gas Treatment System Control Panel

Instruments working? Yes No If no, explain _____
 Shut-off working? Yes No If no, explain _____
 Alarms working? Yes No If no, explain _____
 Good condition? Yes No If no, explain _____

O&M required? Yes No If yes, explain ROUTINE O&M ONLY

Remarks * DID NOT OBSERVE ACTUAL OPERATION OF SHUTOFF OR ALARMS. HOWEVER, NO PROBLEMS REPORTED BY THE CITY.

VIII. CONDENSATE COLLECTION AND TREATMENT SYSTEM

1. Condensate Collection Sumps Map Attached

Properly secured? Yes No If no, explain _____
 Pumps functioning? Yes No If no, explain _____
 Sump in good condition? Yes No If no, explain _____
 Sediment buildup? Yes No If yes, explain _____
 Condensate buildup? Yes No If yes, explain _____
 O&M required? Yes No If yes, explain PUMPS REQUIRE ROUTINE "EXCESS"

Remarks FUNCTION OF PUMPS NOT OBSERVED, NO PROBLEMS WITH CONDENSATE BUILDUP REPORTED BY CITY. CITY REPORTED THAT PUMP MANUFACTURER RECOMMENDED PERIODIC MANUAL "EXERCISE" OF THE PUMPS TO KEEP IN OPTIMAL PERFORMANCE.

2. Condensate Transfer Piping Map Attached

Properly buried? Yes No If no, explain _____
 Functioning? Yes No If no, explain _____
 Good condition? Yes No If no, explain _____
 Evidence of leakage? Yes No If yes, explain _____
 O&M required? Yes No If yes, explain _____

Remarks _____

3. Condensate Storage Tanks

Tank capacity 8,000 (gallons) Construction material POLY
 Good condition? Yes No If no, explain _____
 Carbon canister in place? Yes No If no, explain _____
 Sheen in water? Yes No If yes, explain NOT OBSERVED
 Evidence of leakage? Yes No If yes, explain _____
 O&M required? Yes No If yes, explain _____

Remarks CONDENSATE DISCHARGED ANNUALLY TO POTW

4. Condensate Discharge Pretreatment

Summarize treatment process and adequacy
ADJUST PH PRIOR TO DISCHARGE TO POTW
LIME USED WHEN NECESSARY.

IX. MONITORING SYSTEMS

1. Groundwater Monitoring Wells Map Attached

Vaults in place? Yes No If no, explain _____

Properly secured? Yes No If no, explain SEE BELOW

Vault in good condition? Yes No If no, explain _____

Well in good condition? Yes No If no, explain _____

Bollards present? Yes No If no, explain WHERE APPLICABLE

Routinely monitored? Yes No If no, explain _____

O&M required? Yes No If yes, explain SEE BELOW

Remarks 3 - 2" OBSERVATION WELLS NEAR DM-3P, 3I & 3D NOT LOCKED.

SUGGEST ABANDONMENT OF WELLS DISCUSSED ABOVE (55-516925 THROUGH 7) SINCE IT APPEARS THEY ARE NO LONGER USED BY THE CITY.

MINOR EROSION OF WEST SIDE UNDER PAD AT WELL I-3.

2. Gas Monitoring Probes Map Attached

Vaults in place? Yes No If no, explain _____

Properly secured? Yes No If no, explain _____

Vault in good condition? Yes No If no, explain _____

Probe in good condition? Yes No If no, explain SEE BELOW

Bollards present? Yes No If no, explain _____

Routinely monitored? Yes No If no, explain _____

O&M required? Yes No If yes, explain SEE BELOW

Remarks * SR WELLS 1 THROUGH 8 ARE LOCATED IN THE SALT RIVER. WELL CASINGS OILTED UP AFTER WINTER SPIRAL FLOW IN RIVER

X. SALT RIVER CHANNELIZATION/LEVEE SYSTEM

1. Landfill Bank Protection (Levee System) Map Attached

Bank material of construction SOIL CEMENT

Evidence of flooding? Yes No If yes, explain _____

Bank length adequate? Yes No If no, explain _____

Bank height adequate? Yes No If ~~no~~ explain _____

Deformation note Yes (show on map) No

If yes: Horizontal displacement _____

Vertical displacement _____

Rotational displacement _____

Material degradation Yes (show on map) No

If yes: Form of degradation _____

Areal extent _____

Bank erosion Yes (show on map) No
 If yes: Areal extent _____
 Approximate depth _____
 Waste washout Yes (show on map) No
 If yes: Amount of waste _____
 Washout extent _____

Remarks SOIL CEMENT BANK PROTECTION ON THE SALT RIVER
APPEARED TO BE IN VERY GOOD CONDITION.

X. SALT RIVER CHANNELIZATION/LEVEE SYSTEM (continued)

2. Downstream Grade Control Structure Map Attached

Material of construction CONCRETE
 Deformation note Yes (show on map) No
 If yes: Horizontal displacement _____
 Vertical displacement _____
 Rotational displacement _____
 Material degradation Yes (show on map) No
 If yes: Form of degradation _____
 Areal extent _____

Remarks GRADE CONTROL STRUCTURE ON THE SALT RIVER
APPEARED TO BE IN GOOD CONDITION.

XI. OVERALL OBSERVATIONS

I. Adequacy of Remedy

Landfill Capping: GENERALLY GOOD CONDITION. APPROXIMATELY 4 LIMITED AREAS
OF SURFACE EROSION NOTED (MARKED ON MAP) THAT SHOULD BE REPAIRED,
AS WELL AS ONE AREA OF CRACKING, ALSO REQUIRING REPAIR.

Perimeter Drainage: OVERALL GOOD CONDITION, EXCEPT AS NOTED.

Gas Collection/Control: GOOD.

Access Control: NO SIGNS PRESENT.

Institutional Controls: DEED RESTRICTION RECOMMENDED.

Monitoring: PROPER MONITORING BEING PERFORMED.

Condensate Discharge:

Channelization: GOOD BANK PROTECTION

XI. OVERALL OBSERVATIONS (continued)

2. Adequacy of O&M

Landfill Cover System: O&M ONGOING. AREAS NOTED IN THIS INSPECTION REQUIRE ATTENTION

Landfill Drainage: FUNCTIONING, SOME AREAS OF EXCESSIVE VEGETATION

Gas Collection System: GOOD CONDITION

Gas Treatment System: GOOD CONDITION

Site Access: GOOD CONDITION, BUT LACKING SIGNAGE

Monitoring Systems: IN PLACE & IN GOOD CONDITION

Condensate Management System: GOOD CONDITION

Salt River Channelization: GOOD CONDITION

3. Early Indicators of Potential Remedy Failure

Landfill Capping: SEE ABOVE

Perimeter Drainage: SEE ABOVE

Gas Collection Control: NONE

Access Controls: NONE

Institutional Controls: _____

XI. OVERALL OBSERVATIONS (continued)

3. Early Indicators of Potential Remedy Failure (continued)

Monitoring: NONE

Condensate Discharge: NONE

Channelization: NONE

4. Opportunities for Optimization of O&M/Monitoring Activities

Landfill Cover System: REPAIR AREAS NOTED IN THIS INSPECTION

Landfill Drainage: VEGETATION CONTROL

Gas Collection System: NONE

Gas Treatment System: NONE

Site Access: ADD SIGNAGE INDICATING SITE NAME, CONTACT NAME & NUMBER, OWNERSHIP AND RESTRICTED ACCESS NOTATION.

Monitoring Systems: ABANDON UNUSED OBSERVATION WELLS
EXAMINE SALT RIVER BOTTOM PROBES TO LIMIT FUTURE FLOOD DAMAGE.

Condensate Management System: NONE

Salt River Channelization: NONE

IV. GENERAL SITE CONDITIONS INSPECTION

1. Access Restrictions

Applicable Not Applicable

Perimeter Fencing

Condition Good Poor (show on map)

Remarks _____

Access Gates

Condition Good Poor (show on map)
Locks in Place Yes No (show on map)

Remarks _____

Perimeter Signs

Condition Good Poor
Spacing Adequate Poor

Remarks NO SIGNS ON FENCE OR GATES

Evidence of Vandalism/Trespassing

Yes No (show on map)

Remarks _____

2. Institutional Controls

Applicable Not Applicable

Deed Restrictions in Place

Yes No

Remarks NO CURRENT DEED RESTRICTIONS

Evidence of On-Site Land Use Changes

Yes No

Remarks _____

Evidence of Off-Site Land Use Changes

Yes No

Remarks _____

3. On-Site Roads

Applicable Not Applicable

Roads Appropriately Sealed to Prevent Dust

Yes No

Remarks ROADS NOT SEALED, BUT NO SIGNIFICANT DUST IS
GENERATED BY GRAVEL COVER

Evidence of Road Damage/Deterioration

Yes No

Remarks _____

V. LANDFILL COVER/CAP VISUAL INSPECTION

1. Settlement Yes (show on map) No

Areal Extent of Settlement _____ Settlement Depth _____

Remarks _____

2. Cracks Yes (show on map) No

Length and Width _____ Approximate Depth _____

Remarks _____

3. Erosion Yes (show on map) No

Areal Extent _____ Approximate Depth ~ 2-3"

Remarks APPROXIMATELY 6-8 AREAS OF MINOR BILLING WERE OBSERVED. MOST WERE 0-20 FT LONG, UP TO 4" WIDE & 2-3" DEEP.

4. Holes Yes (show on map) No

Areal Extent ~10 ft² Approximate Depth 1-2'

Remarks 1 COLLAPSED AREA OBSERVED. APPROXIMATELY 1-2' DEEP & 3-4' ACROSS. LOCATED ON EAST SIDE OF CAP.

5. Vegetative Cover (show on map) Grass Bushes _____ Trees _____

Well established? Yes No
Stressed? Yes (show on map) No

Remarks _____

6. Bulges Yes (show on map) No

Areal Extent _____ Bulge Height _____

Remarks _____

V. LANDFILL COVER/CAP VISUAL INSPECTION (continued)

7. Wet Areas/Water Damage

Wet Areas	Yes (show on map)	<input checked="" type="checkbox"/> No	Areal Extent	_____
Ponding	Yes (show on map)	<input checked="" type="checkbox"/> No	Areal Extent	_____
Seeps	Yes (show on map)	<input checked="" type="checkbox"/> No	Areal Extent	_____
Soft Subgrade	Yes (show on map)	<input checked="" type="checkbox"/> No	Areal Extent	_____

Remarks _____

8. Cover Slope Instability Yes (show on map) No

Remarks _____

9. Cover Letdown Channels Applicable Not applicable

<u>Settlement</u>	Yes (show on map)	No
	Areal Extent	Approximate Depth

Remarks _____

Material Degradation Yes (show on map) _____ No

	Material Type	Areal Extent
--	---------------	--------------

Remarks _____

Erosion Yes (show on map) _____ No

Areal Extent _____ Approximate Depth _____

Remarks _____

Undercutting Yes (show on map) _____ No

Areal Extent _____ Approximate Depth _____

Remarks _____

V. LANDFILL COVER/CAP VISUAL INSPECTION (continued)

9. Cover Letdown Channels (Continued)

Drainage Obstructions _____ Yes (show on map) _____ No

Obstruction Type _____ Areal Extent _____

Remarks _____

Excessive Vegetation Growth _____ Yes (show on map) _____ No

Vegetation Type _____ Areal Extent _____

Remarks _____

10. Cover Penetrations -- Is there evidence of leakage or seepage at penetration?

- | | | | |
|----------------------|-------------------|-------------------------------------|----|
| Gas Vents/Wells | Yes (show on map) | <input checked="" type="checkbox"/> | No |
| Gas Probes | Yes (show on map) | <input checked="" type="checkbox"/> | No |
| Monitoring Wells | Yes (show on map) | <input checked="" type="checkbox"/> | No |
| Condensate Sumps | Yes (show on map) | <input checked="" type="checkbox"/> | No |
| Settlement Monuments | Yes (show on map) | <input checked="" type="checkbox"/> | No |

Remarks _____

VI. LANDFILL PERIMETER DRAINAGE AND EROSION CONTROL

1. Material Degradation _____ Yes (show on map) No

Material Type _____ Areal Extent _____

Remarks _____

2. Channel/Ditch Erosion _____ Yes (show on map) No

Areal Extent _____ Approximate Depth _____

Remarks ENTIRE PERIMETER CHANNEL IS LINED BY ARMOR FLEX (A CONCRETE BLOCK SYSTEM). IT SHOWS NO SIGNS OF BEING ERODED. HOWEVER, THERE ARE SOME MINOR RILLS (LESS THAN 6" DEEP) AT A NUMBER OF LOCATIONS AROUND THE TOP OF THE BANK OF THE PERIMETER CHANNEL.

VI. LANDFILL PERIMETER DRAINAGE AND EROSION CONTROL (continued)

3. Undercutting Yes (show on map) No

Areal Extent _____ Approximate Depth _____

Remarks _____

4. Siltation Yes (show on map) No

Areal Extent _____ Approximate Depth _____

Remarks THERE IS EVIDENCE OF MINOR SEDIMENTATION
(APPROX. 1-3" DEEP) ALONG MUCH OF THE PERIMETER CHANNEL,
BUT IT IS INSIGNIFICANT AND WON'T IMPED E STORMWATER
FLOW.

5. Vegetation Growth Yes (show on map) No

Vegetation Type _____ Areal Extent _____

Remarks SHORT GRASSES ON CHANNEL BOTTOM AND SLOPES THAT
WON'T IMPED FLOWS.

6. Sedimentation Impoundments

Excessive Sedimentation
 Evidence of Erosion

Areal Extent _____
 Areal Extent _____

Depth _____
 Depth _____

Inlet
 Outlet

Functioning
 Functioning

Blocked
 Blocked

Remarks THE SEDIMENTATION BASIN APPEARS TO BE IN GOOD
WORKING CONDITION.

7. Storm Water Discharge Outfalls

Excessive Sedimentation
 Evidence of Erosion

Areal Extent _____
 Areal Extent _____

Depth _____
 Depth _____

Outlet

Functioning

Blocked

Remarks SEVERAL BUCKETS OF DIOXY RESIN (LABELED CORROSIVE)
& NUMEROUS 45-RPM RECORDS STORED IN 36" OUTFALL
TO SALT RIVER.

VII. LANDFILL GAS COLLECTION AND CONTROL SYSTEM

1. Gas Collection Wells Active Passive Map Attached

Properly secured? Yes No If no, explain _____

Functioning? Yes No If no, explain _____

Good condition? Yes No If no, explain _____

Condensate buildup? Yes No If yes, explain _____

O&M required? Yes No If yes, explain _____

Remarks * NONE OBSERVED OR REPORTED BY CITY

2. Gas Collection Piping and Manifolds Active Passive Map Attached

Properly buried? Yes No If no, explain _____

Functioning? Yes No If no, explain _____

Good condition? Yes No If no, explain _____

Evidence of leakage? Yes No If yes, explain _____

Condensate buildup? Yes No If yes, explain _____

O&M required? Yes No If yes, explain _____

Remarks NONE OBSERVED OR REPORTED BY CITY

3. Gas Treatment System Piping and Valves

Functioning? Yes No If no, explain _____

Good condition? Yes No If no, explain _____

Evidence of leakage? Yes No If yes, explain _____

O&M required? Yes No If yes, explain _____

Remarks _____

VII. LANDFILL GAS COLLECTION AND CONTROL SYSTEM (continued)

4. Gas Treatment System Flare Station

Functioning? Yes No If no, explain _____
 Proper operating temp? Yes No If no, explain _____
 Proper inlet gas flow? Yes No If no, explain _____
 Proper destruction? Yes No If no, explain _____
 Good condition? Yes No If no, explain _____
 Visual emissions? Yes No If yes, explain _____
 O&M required? Yes No If yes, explain ROUTINE O&M ONLY

Remarks SOME OF THE CAPSULETIC GAGES MAY NOT BE OPERABLE
HOWEVER, CITY REPORTS USE OF PORTABLE GAGES INSTEAD.

5. Gas Treatment System Knockout Drums

Good condition? Yes No If no, explain _____
 Filter in place? Yes No If no, explain _____
 Evidence of leakage? Yes No If yes, explain _____
 O&M required? Yes No If yes, explain _____

Remarks _____

6. Gas Treatment System Control Panel

Instruments working? Yes No If no, explain _____
 Shut-off working? Yes No If no, explain _____
 Alarms working? Yes No If no, explain _____
 Good condition? Yes No If no, explain _____
 O&M required? Yes No If yes, explain ROUTINE ONLY (CHART ERROR)

Remarks * SHUTTER & ALARMS FUNCTION NOT OBSERVED, BUT CITY DID
NOT REPORT PROBLEMS.

VIII. CONDENSATE COLLECTION AND TREATMENT SYSTEM

1. Condensate Collection Sumps Map Attached

Properly secured? Yes No If no, explain _____
 Pumps functioning? Yes No If no, explain _____
 Sump in good condition? Yes No If no, explain _____
 Sediment buildup? Yes No If yes, explain _____
 Condensate buildup? Yes No If yes, explain _____
 O&M required? Yes No If yes, explain ROUTINE EXERCISE

Remarks * NOT OBSERVED OR REPORTED BY CITY

PUMP MANUFACTURER RECOMMENDS ROUTINE MANUAL "EXERCISE" OF PUMPS ON A PERIODIC BASIS.

2. Condensate Transfer Piping Map Attached

Properly buried? Yes No If no, explain _____
Functioning? Yes No If no, explain _____
Good condition? Yes No If no, explain _____
Evidence of leakage? Yes No If yes, explain _____
O&M required? Yes No If yes, explain _____

Remarks _____

3. Condensate Storage Tanks

Tank capacity EST. 3000 (gallons) Construction material DOUBLEWALLED POLY
Good condition? Yes No If no, explain _____
Carbon canister in place? Yes No If no, explain _____
Sheen in water? Yes No If yes, explain NOT OBSERVED
Evidence of leakage? Yes No If yes, explain _____
O&M required? Yes No If yes, explain _____

Remarks _____

4. Condensate Discharge Pretreatment

Summarize treatment process and adequacy

ADJUST PH W/ HMB IF NECESSARY PRIOR TO ANNUAL DISCHARGE TO POTW.

IX. MONITORING SYSTEMS

1. Groundwater Monitoring Wells Map Attached

Vaults in place? Yes No If no, explain _____

Properly secured? Yes No If no, explain _____

Vault in good condition? Yes No If no, explain _____

Well in good condition? Yes No If no, explain _____

Bollards present? Yes No If no, explain STEEL BOLDS

Routinely monitored? Yes No If no, explain _____

O&M required? Yes No If yes, explain _____

Remarks _____

2. Gas Monitoring Probes Map Attached

Vaults in place? Yes No If no, explain _____

Properly secured? Yes No If no, explain _____

Vault in good condition? Yes No If no, explain _____

Probe in good condition? Yes No If no, explain _____

Bollards present? Yes No If no, explain _____

Routinely monitored? Yes No If no, explain _____

O&M required? Yes No If yes, explain _____

Remarks _____

X. SALT RIVER CHANNELIZATION/LEVEE SYSTEM

1. Landfill Bank Protection (Levee System) Map Attached

Bank material of construction SOIL CEMENT

Evidence of flooding? Yes No If yes, explain _____

Bank length adequate? Yes No If no, explain _____

Bank height adequate? Yes No If ~~no~~ explain _____

Deformation note Yes (show on map) No

If yes: Horizontal displacement _____

Vertical displacement _____

Rotational displacement _____

Material degradation Yes (show on map) No

If yes: Form of degradation _____

Areal extent _____

Bank erosion Yes (show on map) No
 If yes: Areal extent _____
 Approximate depth _____
 Waste washout Yes (show on map) No
 If yes: Amount of waste _____
 Washout extent _____

Remarks SOIL CEMENT BANK PROTECTION ON SALT RIVER
APPEARED TO BE IN GOOD CONDITION

X. SALT RIVER CHANNELIZATION/LEVEE SYSTEM (continued)

2. Downstream Grade Control Structure Map Attached

Material of construction CONCRETE
 Deformation note Yes (show on map) No
 If yes: Horizontal displacement _____
 Vertical displacement _____
 Rotational displacement _____
 Material degradation Yes (show on map) No
 If yes: Form of degradation _____
 Areal extent _____

Remarks GRADE CONTROL STRUCTURE APPEARED TO BE IN
GOOD CONDITION.

XI. OVERALL OBSERVATIONS

f. Adequacy of Remedy
 Landfill Capping: GENERALLY GOOD CONDITION. AREAS OF EROSION
DISCOVERED IN THIS INSPECTION REQUIRE REPAIR

Perimeter Drainage: GOOD CONDITION.

Gas Collection/Control: GOOD CONDITION.

Access Control: FENCING & GATES ARE IN GOOD CONDITION
NEED APPROPRIATE SIGNAGE

Institutional Controls: NOT IN PLACE AT THIS TIME.

Monitoring: GOOD.

Condensate Discharge: APPROPRIATELY DISCHARGED TO POTW ANNUALLY.

Channelization: GOOD CONDITION

XI. OVERALL OBSERVATIONS (continued)

2. Adequacy of O&M

Landfill Cover System: VISIBLE REPAIRS IN GOOD CONDITION, MOST WITH VEGETATION RE-ESTABLISHED. MOST RECENT REPAIRS HAVE NOT YET SHOWN VEGETATION.

AREAS NOTED IN INSPECTION REQUIRE REPAIR.

Landfill Drainage: GOOD CONDITION

Gas Collection System: GOOD CONDITION - ADEQUATE O&M

Gas Treatment System: GOOD CONDITION - ADEQUATE O&M

Site Access: ADEQUATE

Monitoring Systems: GOOD CONDITION.

Condensate Management System: GOOD CONDITION - ADEQUATE O&M

Salt River Channelization: GOOD CONDITION.

3. Early Indicators of Potential Remedy Failure

Landfill Capping: REPAIRS ARE NEEDED IN AREAS NOTED.

Perimeter Drainage: NONE

Gas Collection Control: NONE

Access Controls: NONE

Institutional Controls: NOT IN PLACE

XI. OVERALL OBSERVATIONS (continued)

3. Early Indicators of Potential Remedy Failure (continued)

Monitoring: NONE

Condensate Discharge: NONE

Channelization: NONE

4. Opportunities for Optimization of O&M/Monitoring Activities

Landfill Cover System: REPAIR & INSPECT CAP.

Landfill Drainage:

Gas Collection System:

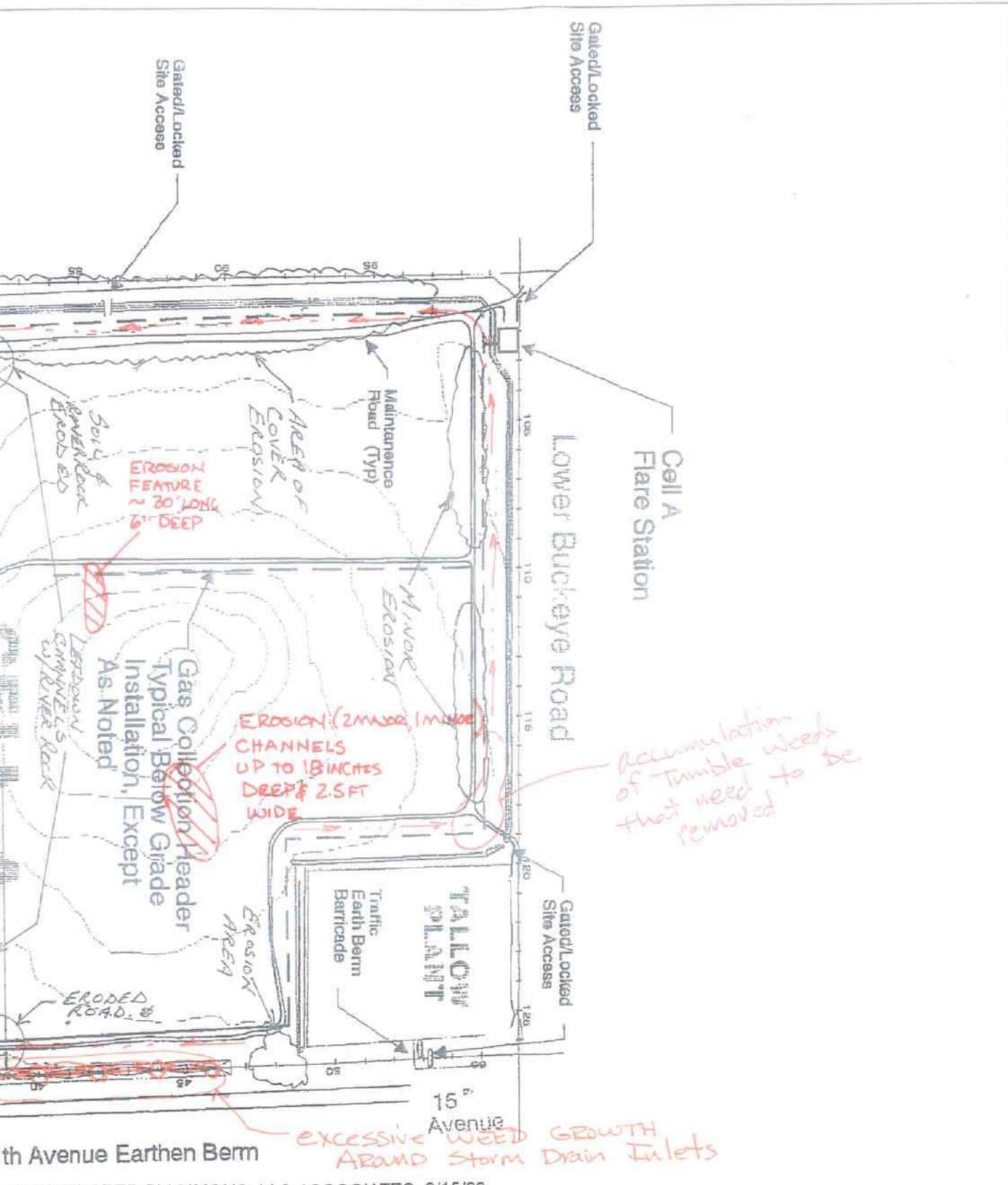
Gas Treatment System: REMOVE OR REPLACE NON FUNCTIONING GAGE.

Site Access: ADD APPROPRIATE SIGNAGE

Monitoring Systems: EVALUATE CHANGES TO DESIGN OF RIVER BOTTOM PROBES TO REDUCE FLOOD IMPACT.

Condensate Management System:

Salt River Channelization:



PLAN DEVELOPED BY SIMONS, LI & ASSOCIATES, 9/15/96

Environmental Science & Engineering, Inc.

SITE PLAN
GENERAL SITE LAYOUT
19TH AVENUE LANDFILL

Figure
A

COMPANY	Drawn Daniel L. Kudlicki	Project Number 6600001	Approved JSK	Date 3/30/00
---------	-----------------------------	---------------------------	-----------------	-----------------

PHOTOS FROM SITE INSPECTION:

CELL A



PHOTO 1: Cell A - PLC for Flare

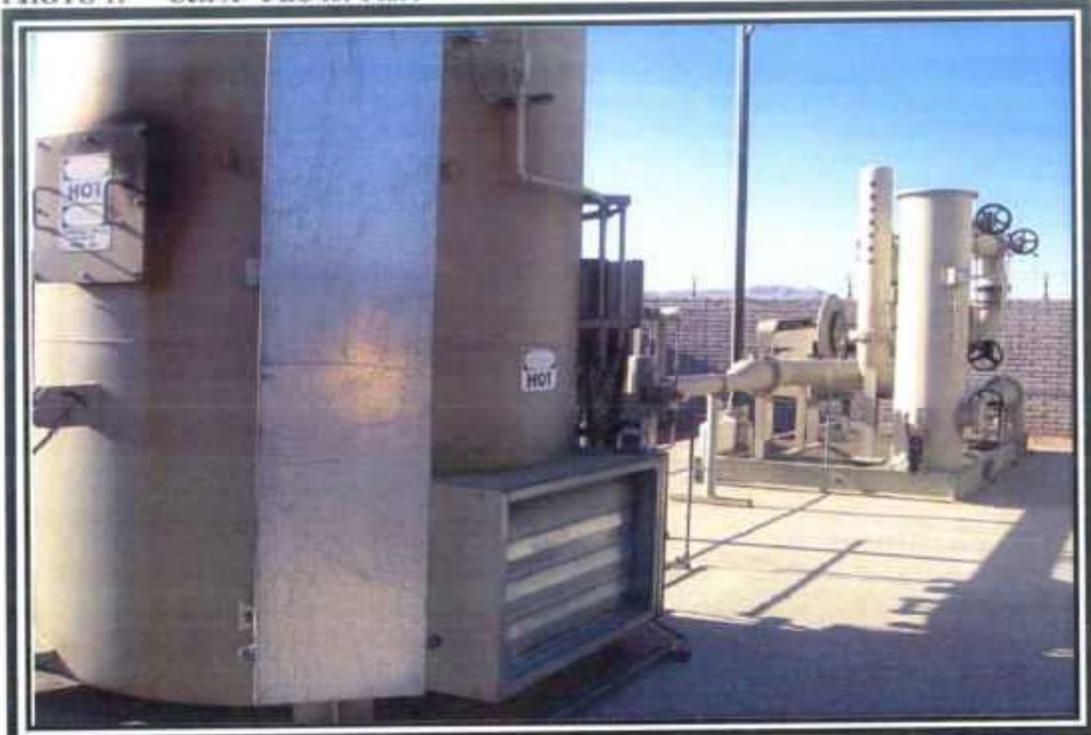


PHOTO 2: Cell A Flare



PHOTO 3: Cell A Flare

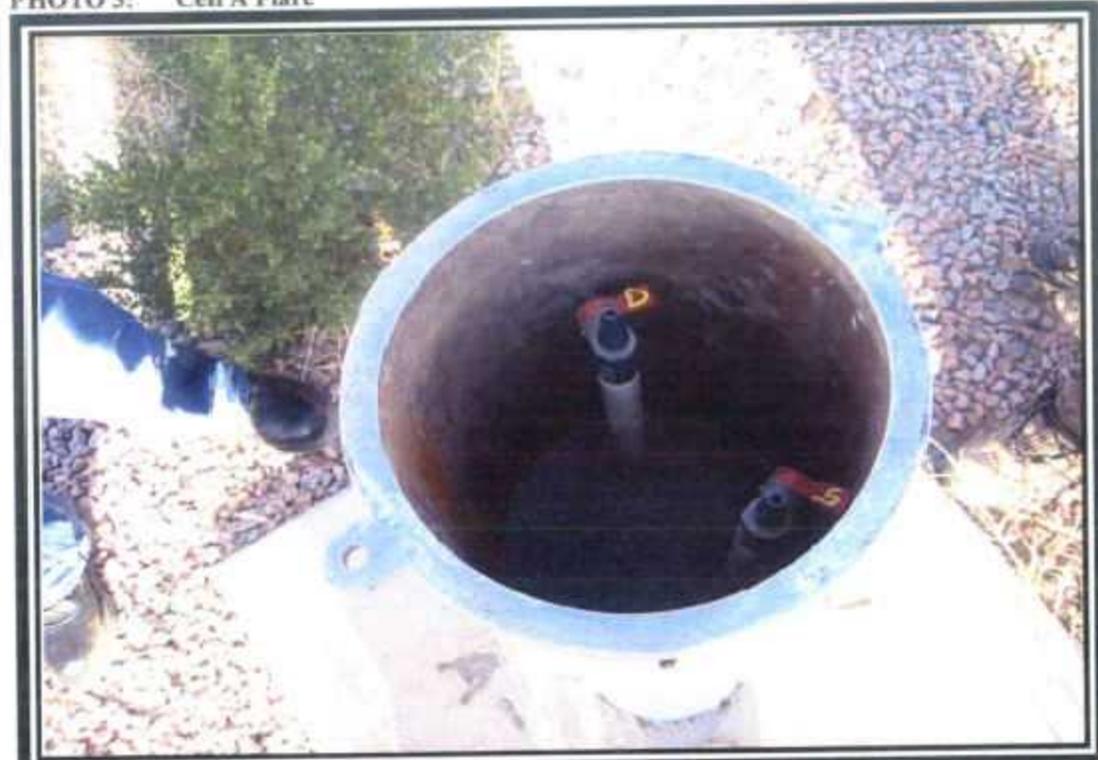


PHOTO 4: Cell A Methane Probe



PHOTO 5: Cell A Methane Collection Well/Condensate Collection Sump



PHOTO 6: Cell A Methane Monitoring Probe and Header

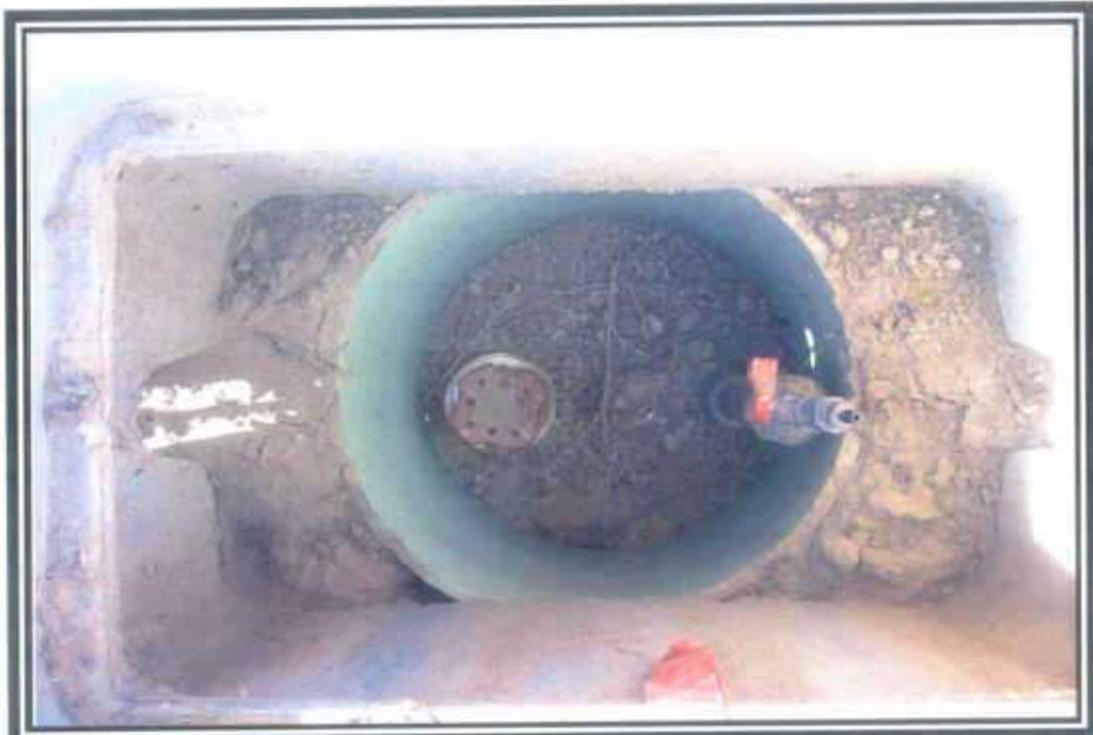


PHOTO 7: Cell A Methane Monitoring Probe



PHOTO 8: Cell A Header



PHOTO 9: Cell A Methane Collection Well/Condensate Collection Sump
North Bank of Salt River



PHOTO 10: Cell A Stormwater Outfalls to Salt River



PHOTO 11: Cell A Erosion



PHOTO 12: Cell A Erosion



PHOTO 13: Cell A Erosion



PHOTO 14: Cell A Aboveground Headers



PHOTO 15: Cell A Aboveground Headers

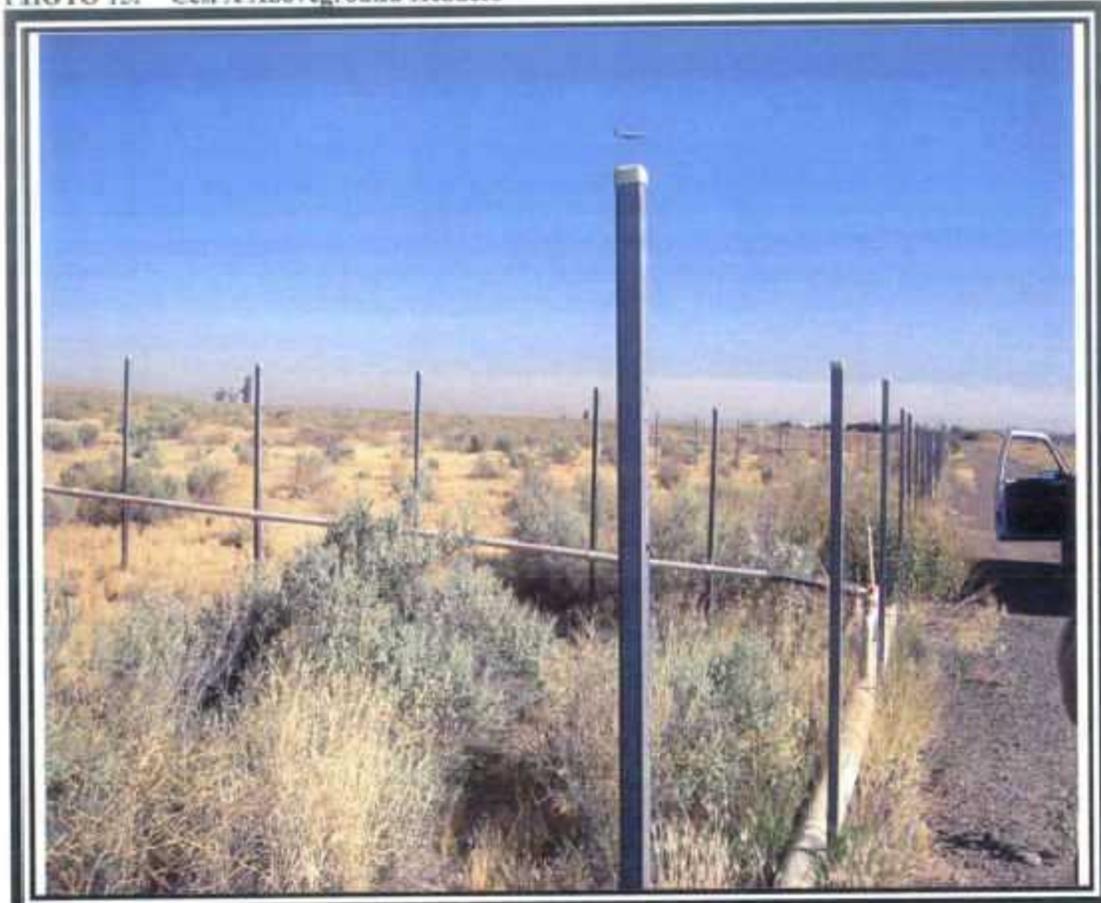


PHOTO 16: Cell A Aboveground Headers



PHOTO 17: Cell A Crack



PHOTO 18: Cell A Crack

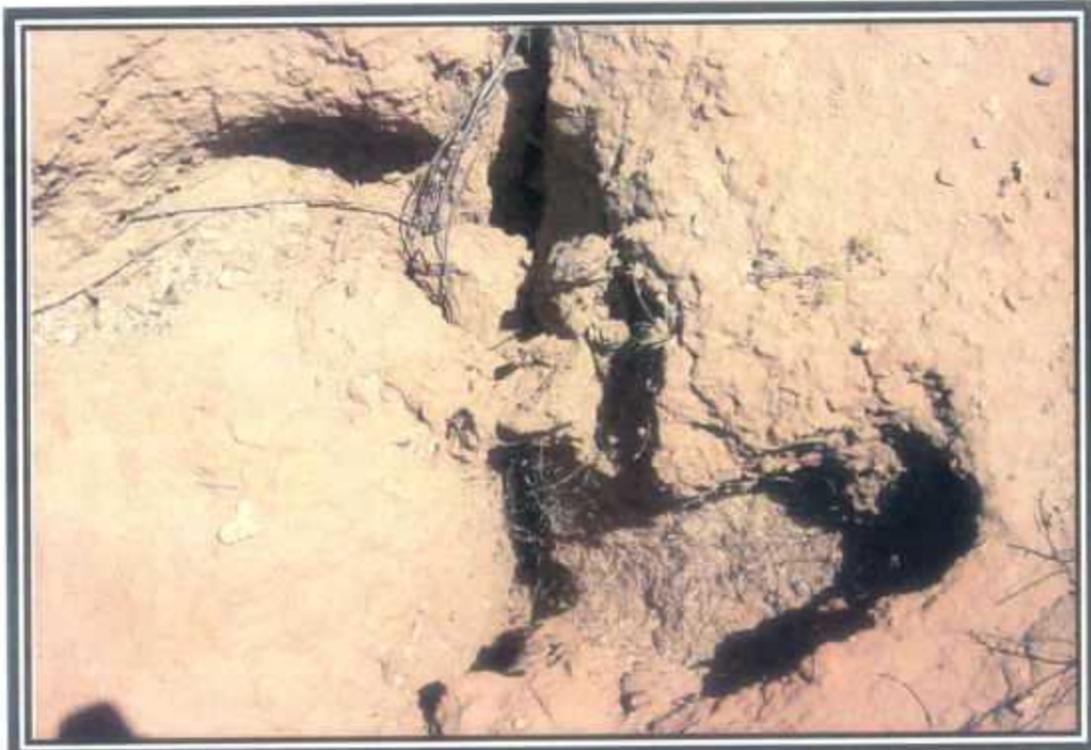


PHOTO 19: Closeup of Crack at Cell A



PHOTO 20: Groundwater Monitoring Well "River North-R"



PHOTO 21: Well Box for Groundwater Monitoring Well "River North-R"



PHOTO 22: Cell A – Permit for Flare

PHOTOS FROM SITE INSPECTION:

CELL A-1

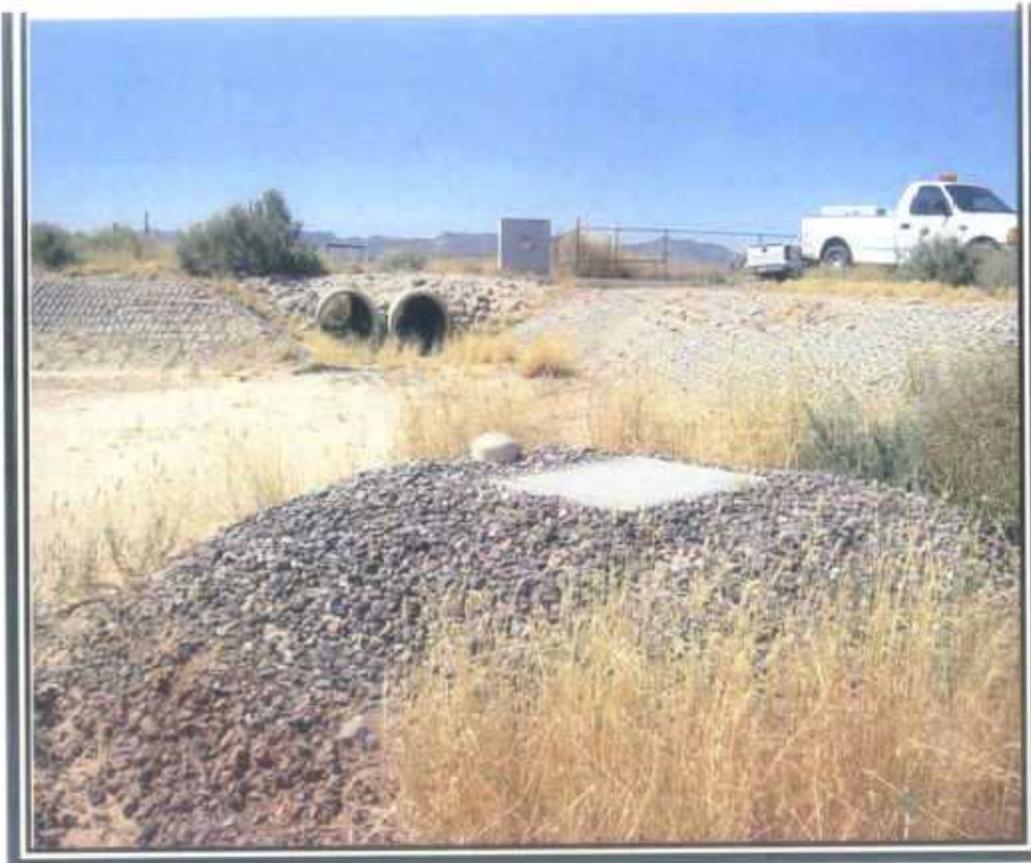


PHOTO 1: Cell A-1 Basin Outlet



PHOTO 2: Cell A-1 Condensate Compressors



PHOTO 3: Cell A-1 Erosion



PHOTO 4: Cell A-1 Erosion Repair

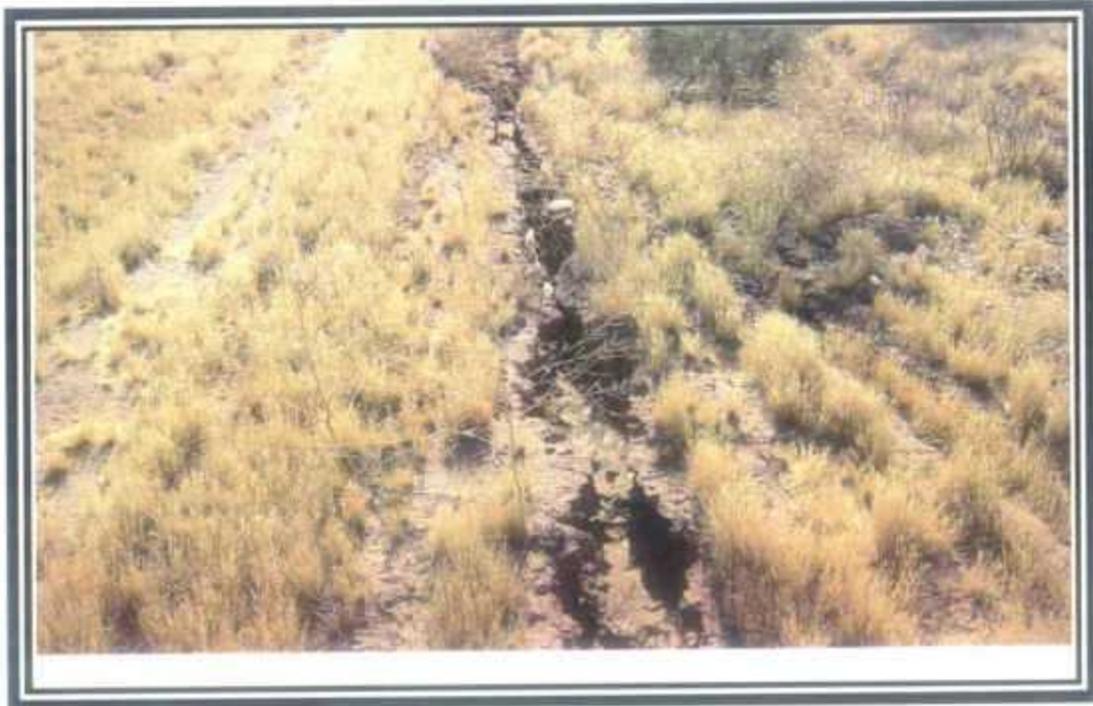


PHOTO 5: Cell A-1 Rills



PHOTO 6: Cell A-1 Hole



PHOTO 7: Cell A-1 Flare



PHOTO 8: Cell A-1 Flare PLC



PHOTO 9: O&M Plan and Reports at Flare for Cell A-1



PHOTO 10: Cell A-1 Retention Basin



PHOTO 11: Cell A-1 Storm Water Outfall to Salt River

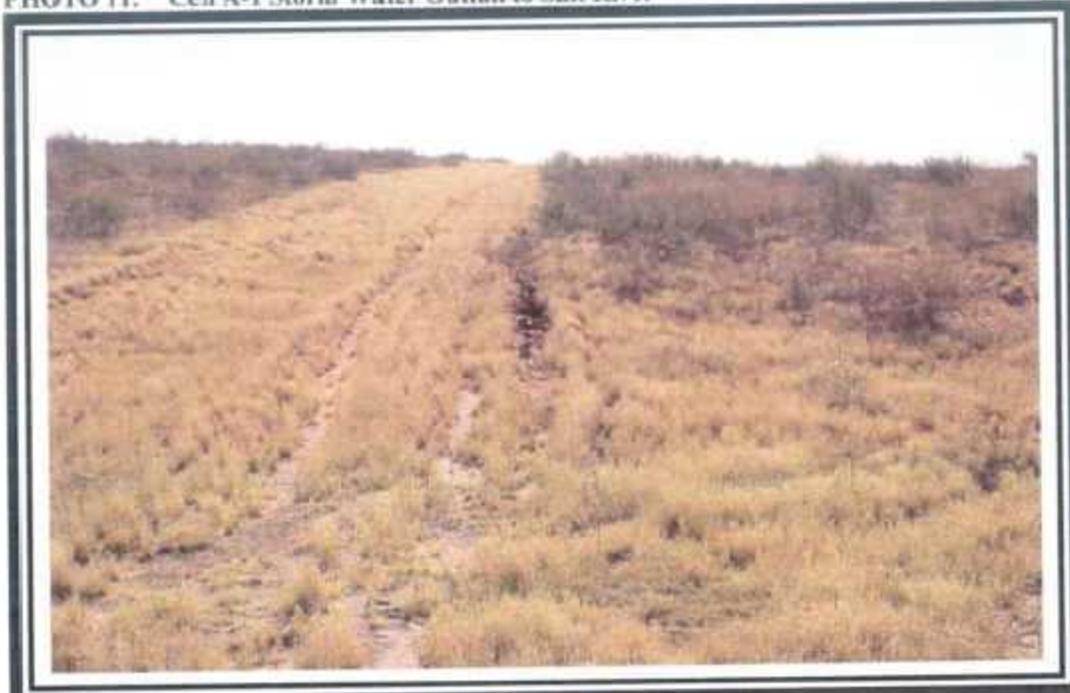


PHOTO 12: Cell A-1 Rills



PHOTO 13: Cell A-1 Methane Monitoring Probe

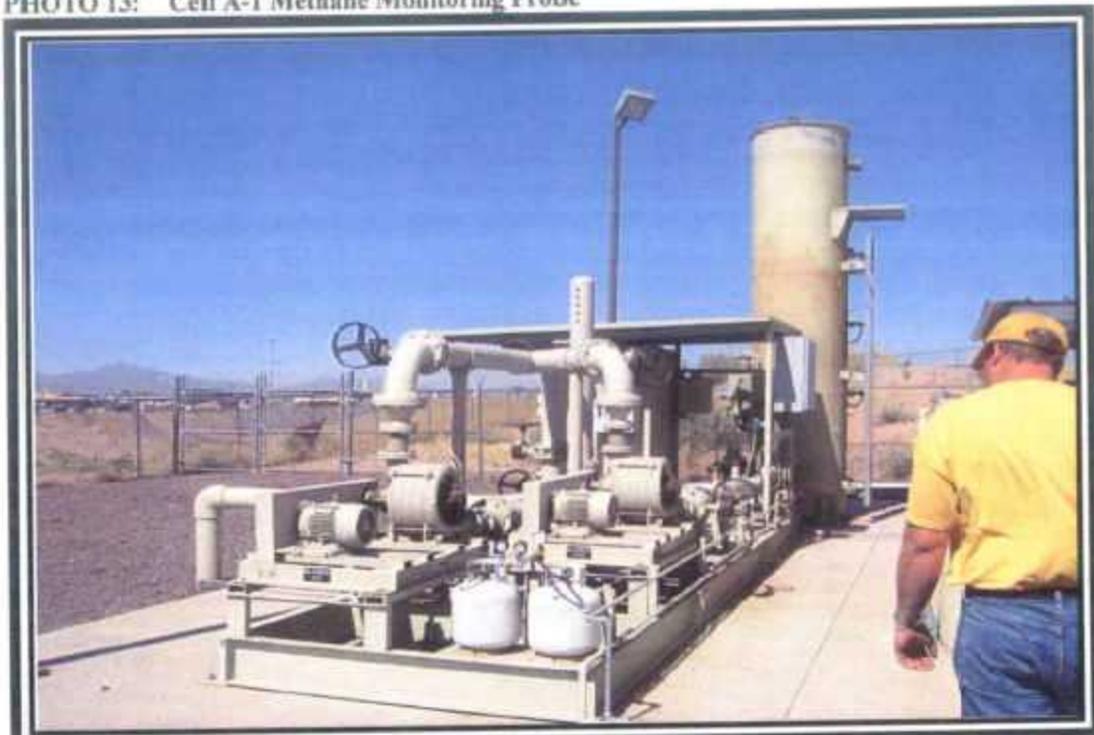


PHOTO 14: Cell A-1 Flare



PHOTO 15: Cell A-1 Flare

PHOTOS FROM SITE INSPECTION:
GROUNDWATER AND METHANE WELLS



PHOTO 1: Photo of Surface Completion of all DM-3 Groundwater Monitoring Wells



PHOTO 2: Wellhead for Groundwater Monitoring Well DM-3D



PHOTO 3: Closeup of Wellhead for GW Monitoring Well DM-3D

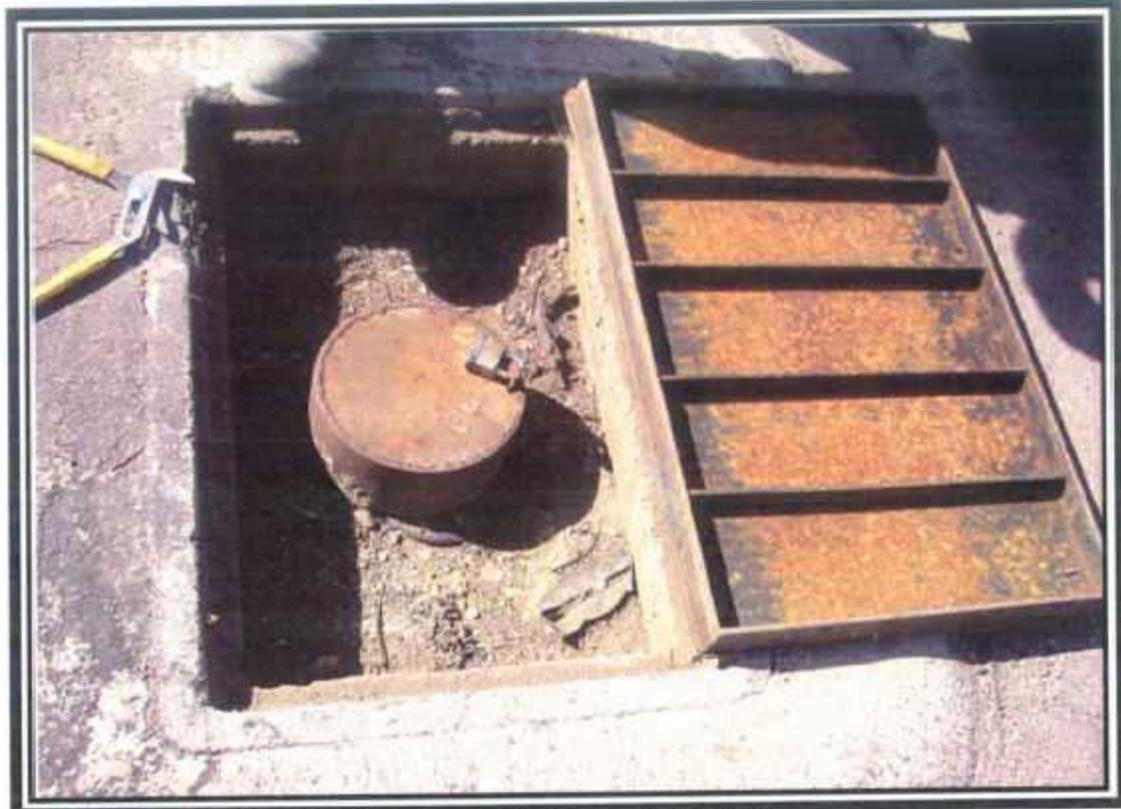


PHOTO 4: Wellhead for Groundwater Monitoring Well DM-3I

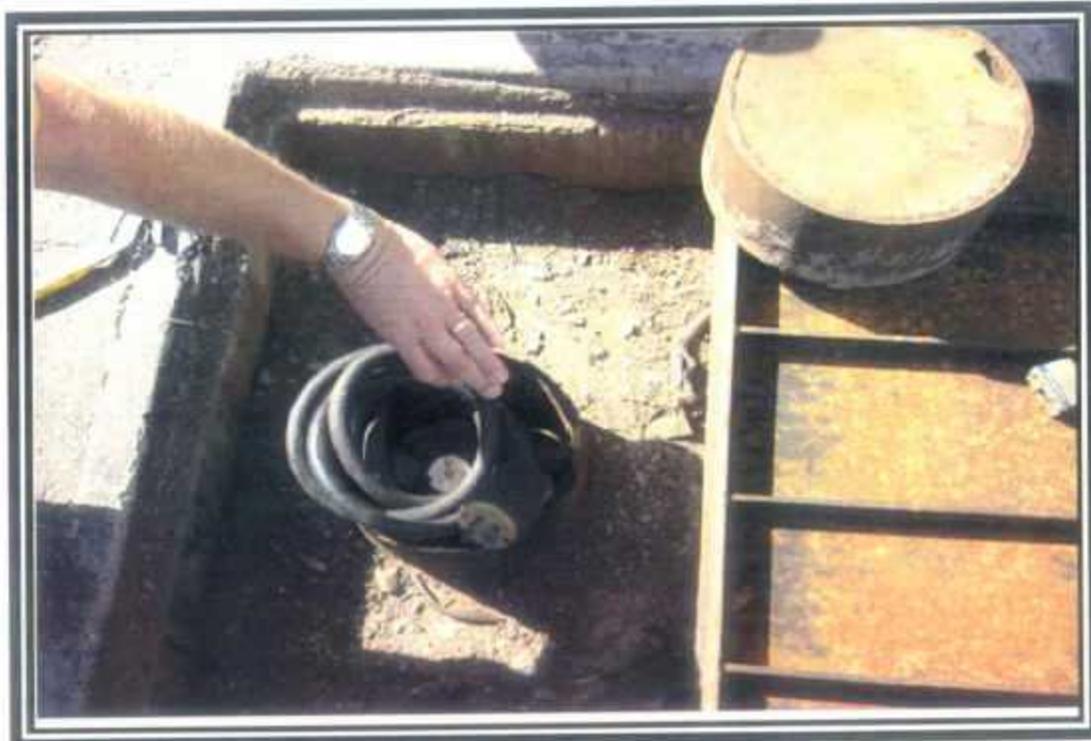


PHOTO 5: Closeup of Wellhead for GW Monitoring Well DM-31



PHOTO 6: Wellhead for Groundwater Monitoring Well DM-3P



PHOTO 7: Closeup of Wellhead for GW Monitoring Well DM-3P

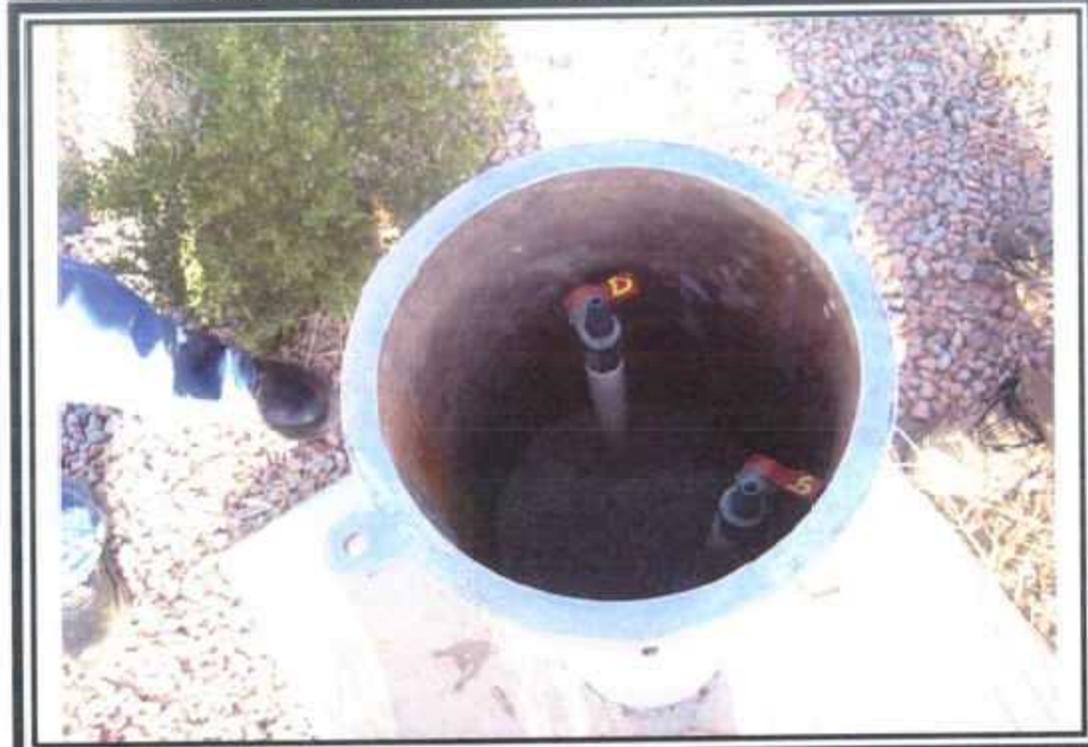


PHOTO 8: Cell A Methane Probe



PHOTO 9: Cell A Methane Collection Well



PHOTO 10: Cell A Methane Monitoring Probe and Header



PHOTO 11: Cell A Methane Monitoring Probe



PHOTO 12: Cell A Header



PHOTO 13: Well Box for GW Monitoring Well "River North-R"

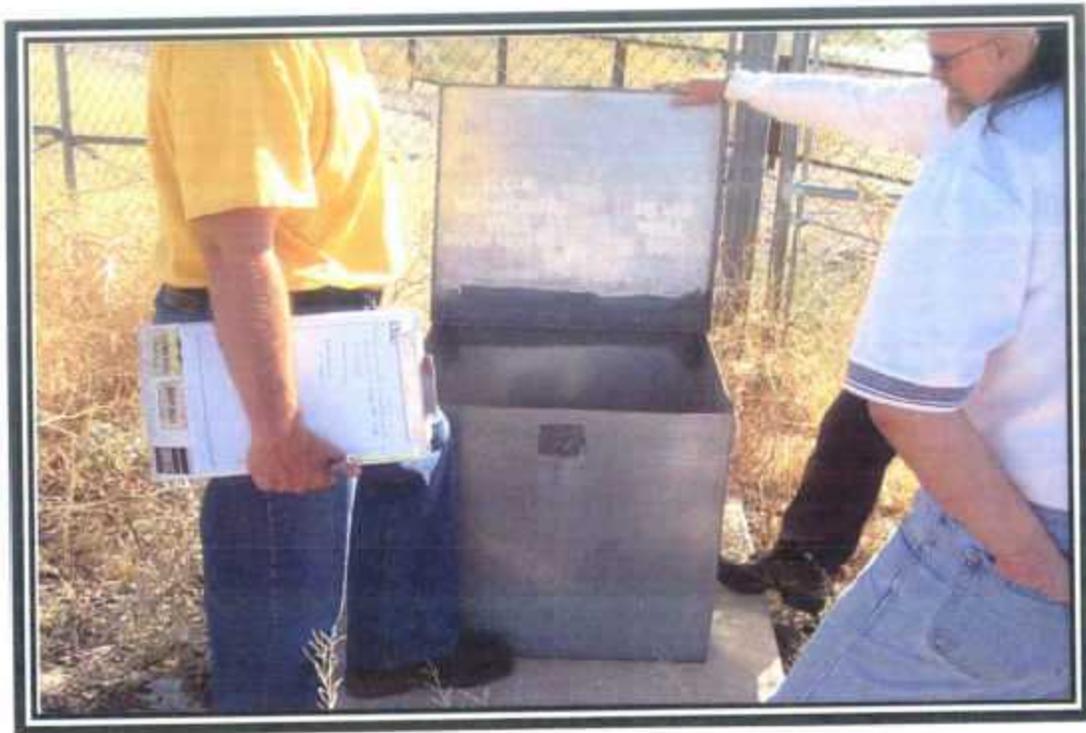


PHOTO 14: Well Box for Groundwater Monitoring Well "River North-R"

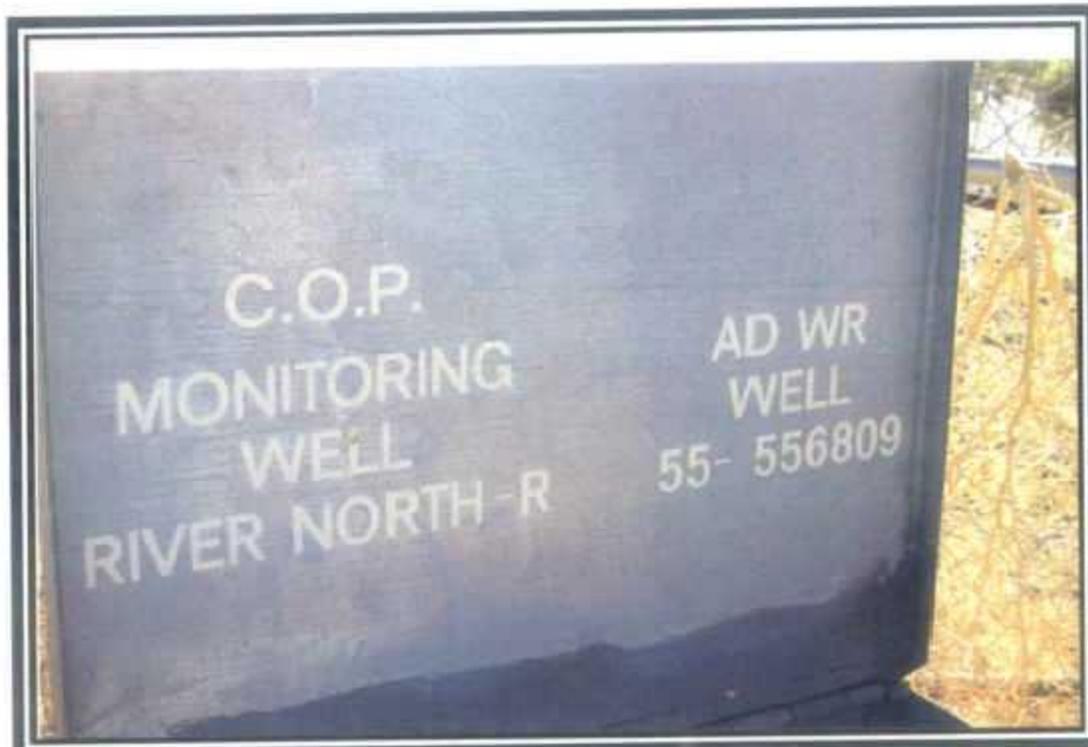


PHOTO 15: Closeup of Well Box Information for GW Monitoring Well "River North-R"



PHOTO 16: Wellhead of Groundwater Monitoring Well "River North-R"



PHOTO 17: Well Box for Groundwater Monitoring Well I-3



PHOTO 18: Wellhead for Groundwater Monitoring Well I-3



PHOTO 19: Groundwater Monitoring Well I-3 Pad Undercut



PHOTO 20: Well Box for Groundwater Monitoring Well I-4



PHOTO 21: Salt River Methane Monitoring Probe



PHOTO 22: Well Box for Groundwater Monitoring Well I-5



PHOTO 23: Scrapyard at Groundwater Monitoring Well I-4



PHOTO 24: Groundwater Monitoring Well I-3 Wellhead and Grundfos Pump



PHOTO 25: Groundwater Observation Well



PHOTO 26: Sump on North Bank of Salt River



PHOTO 27: Groundwater Monitoring Well I-5 Wellhead



PHOTO 28: Groundwater Monitoring Well I-4 Wellhead and Dedicated Grundfos Pump

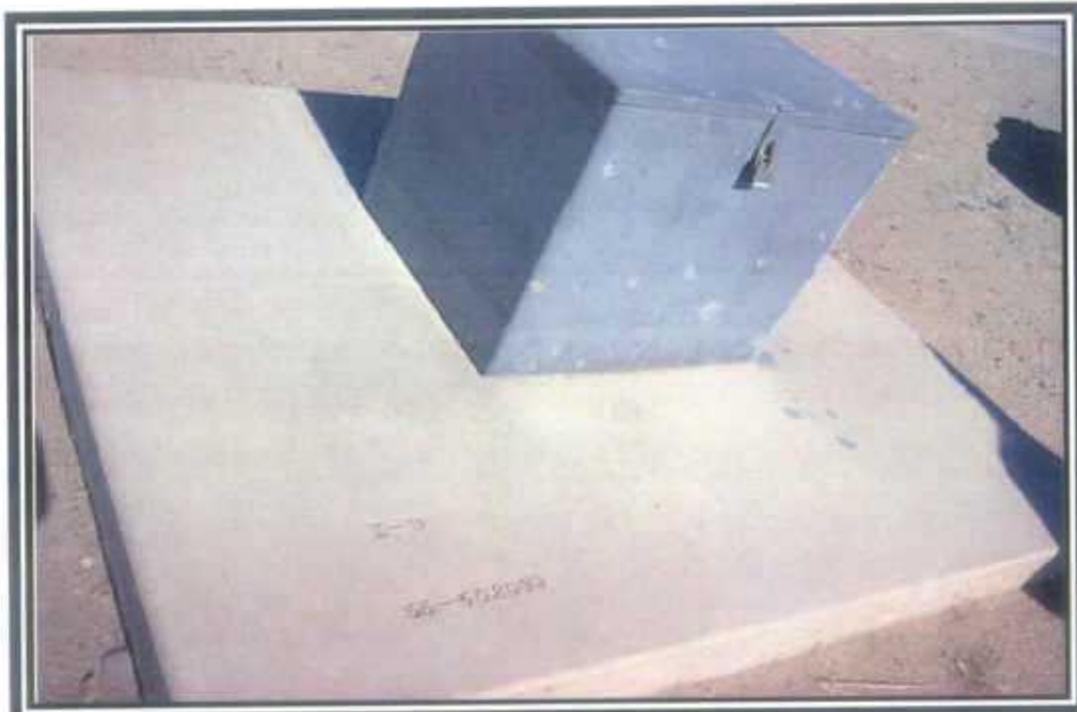


PHOTO 29: Pad for Groundwater Monitoring Well I-3



PHOTO 30: Groundwater Monitoring Well I-3 Information

**APPENDIX E
MARICOPA COUNTY
AIR PERMIT**

19TH AVENUE LANDFILL

MARICOPA COUNTY
ENVIRONMENTAL SERVICES
DEPARTMENT



AIR QUALITY DIVISION
1001 North Central Avenue, Suite 200
Phoenix, Arizona 85004

AIR QUALITY PERMIT

Permit Number: 010048

Issue Date: August 8, 2001

Renewal Date: August 31, 2006

Permittee Name: CITY OF PHOENIX
Mailing Address: 3060 S 27TH AVE PHOENIX, AZ 85009
Business Name: CITY OF PHOENIX 19TH AVE LANDFILL
Facility Address: 1701 W LOWER BUCKEYE RD PHOENIX, AZ 85041

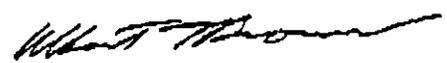
Equipment Covered: See attached list

This Permit is issued in accordance with Maricopa County Air Pollution (MCAP) Control Regulations, Rule 200, §303, and Arizona Revised Statutes, §49-404c and §49-480.

The attached Permit Conditions are incorporated into and form an integral part of this Permit.

If the MCAP Control Officer determines that additional monitoring, sampling, modeling and/or control of emissions from the facility may reasonably be needed to provide for the continued protection of public health, safety and/or welfare, the MCAP Control Officer will amend the provisions of this Permit.

This Permit may be subject to suspension or revocation for cause including nonpayment of fees, noncompliance with Arizona State Statutes, Maricopa County Air Pollution Control Regulations, or the attached Permit Conditions, or if the MCAP Control Officer determines that significant misrepresentation exists in the application and supporting documentation filed to obtain or modify this Permit.



Al Brown, MPA, RS
Maricopa County Air Pollution Control Officer

PERMIT CONDITIONS

CITY OF PHOENIX 19TH AVE LANDFILL

Permit Number 010048

Date Issued: 8/8/01

Revision: 0.1

Revision Date:

The following permit conditions amend any corresponding permit conditions or add additional permit conditions to existing Permit Number 010048. If there is a conflict between these permit conditions and those issued previously, these permit conditions will take precedence. All other permit conditions dated August 8, 2001, not amended by this permit revision, remain in effect as written in this permit.

GENERAL CONDITIONS:

1. **Certification:**

Any document which is required to be submitted by this Permit or the Rules shall contain certification by a responsible official of truth, accuracy and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

[Rule 100, §200.95; Rule 220, §301.5 and §302.14]

2. **Confidentiality Claims:**

Except as provided for in Rule 100, any records, reports, or information obtained from the Permittee pursuant to the County Rules or this Permit shall be available to the public unless the Control Officer has notified the Permittee in writing and unless a person:

- a. Precisely identifies the information in the permit(s), records, or reports which is considered confidential.
- b. Provides sufficient supporting information to allow the Control Officer to evaluate whether such information satisfies the requirements related to trade secrets.

A claim of confidentiality shall not excuse a person from providing any and all information required or requested by the Control Officer and shall not be a defense for failure to provide such information.

[Rule 100, §200.107, §402 and Rule 200, §411]

3. **Controls:**

Except as provided by the applicable Rules or these Permit Conditions, the Permittee shall not operate any equipment or process unless air pollution controls, required by either this Permit or the Rules, are in place, are operating without bypass, and are operating within their design parameters and in accordance with any other conditions specified in this Permit. This requirement to operate any required air pollution control equipment may be conditionally waived due to malfunction in an emergency situation provided that the Permittee fulfills the notification requirements in accordance with Rule , §501, and Rules 130 and 140.

[Rule 100, §501, Rules 130 and Rule 140]

The Permittee shall notify the Control Officer, in accordance with Rule 220, before making any additions, modifications or replacements to any required air pollution control equipment. This notification requirement does not apply to normal maintenance and repair activities.

[Rule 220, §404 and §405]

PERMIT CONDITIONS

CITY OF PHOENIX 19TH AVE LANDFILL
Permit Number O10048

11. Modifications:

The Permittee shall notify the Control Officer, in accordance with Rule 220, of changes, replacements or additions to the source which are not covered by this Permit.
[Rule 200, §312.3 and Rule 220, §400]

12. Odors:

The Permittee shall not emit gaseous or odorous air contaminants from equipment, operations or premises under his control in such quantities or concentrations as to cause air pollution.

13. Permit Term, Permit Transfer, and Permit Renewal:

- a. This Permit shall remain in effect for no more than 5 years.
[Rule 220, §402]
- b. Except as provided in Rule 200, this Permit may be transferred to another person if the person who holds the permit gives notice to the Control Officer in writing at least 30 days before the proposed transfer and complies with the permit transfer requirements of Rule 200 and the administrative permit amendment procedures pursuant to Rule 220.
[Rule 200, §400 and Rule 220, §405.1]
- c. The Permittee shall file an application for a permit renewal at least six months, but not more than 18 months, before the expiration date of this Permit.
[Rule 220, §301.3a]

14. Record Keeping:

The Permittee shall maintain accurate records as required by these Permit Conditions and by Section 500 of all applicable Rules. These records shall be kept in a form, which allows easy verification of compliance with these Permit Conditions and any applicable Rules.

All records shall be kept for the time as specified. All records required to demonstrate that each required air pollution control device is being operated properly shall be retained for five years.

All records required by this Permit should be made available for inspection upon request by a representative of the Control Officer.

Upon request, the Permittee shall furnish to the Control Officer copies of records required to be kept by this Permit.

[Rule 100, §504; Rule 220, §302.7; and §500 of All Applicable Rules]

15. Reopening For Cause:

This Permit shall be reopened or revised prior to expiration under any of the following conditions:

- a. Either the Control Officer or the Administrator of the United States Environmental Protection Agency (Administrator) determines that this Permit contains a material mistake or that inaccurate statements were made in establishing the emission standards or other terms or conditions of this Permit Revision, or

PERMIT CONDITIONS

CITY OF PHOENIX 19TH AVE LANDFILL
Permit Number 010048

4. **Duty to Supplement or Correct Application:**
The Permittee who fails to submit any relevant facts or who has submitted incorrect information in a permit application shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information. In addition, an applicant shall provide additional information as necessary to address any requirements that become applicable to the source after the date it filed a complete application but prior to release of a proposed permit.
[Rule 220, §301.5]
5. **Duty to Comply:**
The Permittee shall comply with all conditions of this Permit including all applicable requirements of Federal laws, Arizona laws, and Maricopa County Air Pollution Control Rules and Regulations.
[Rule 200, §308]

The Permittee shall halt or reduce activities if necessary in order to maintain compliance with these Permit Conditions, all approved operations and maintenance plans, and all applicable requirements of Federal laws, Arizona laws, and Maricopa County Air Pollution Control Rules and Regulation. [Rule 220, §302.10]
6. **Fees:**
The Permittee shall pay, in a timely manner, an annual fee for this Permit as determined by the Control Officer in accordance with Rule 280.
[Rule 280, §302]
7. **Fugitive Dust:**
The Permittee shall take all reasonable precautions to minimize the emissions of fugitive dust in accordance with §300 of Rule 310.
[Rule 310, §300]
8. **Leased/Rented/Borrowed Equipment:**
If the Permittee leases, rents or lends any equipment covered by this Permit to a second party, the Permittee shall provide the second party with a copy of this Permit. It is the responsibility of the person using the equipment to make sure that the equipment is properly permitted and operated. If the Permittee does not provide the second party with a copy of this Permit, both the Permittee and the second party shall be responsible for operating the source in compliance with the Permit and for any violation thereof.
[Rule 200, §300]
9. **Malfunctions (Emergency Upsets) and Excess Emissions:**
Emergencies, malfunctions, and other excess emissions shall be reported as required by Rule 100, Section 500.
[Rule 100, §400 and §500; Rule 130, §400; Rule 140, §400 and §500]
10. **Material Containment:**
Materials including, but not limited to, solvents or other volatile compounds, paints, acids, alkalies, pesticides, fertilizer and manure shall be processed, stored, used and transported in such a manner and by such means that they will not unreasonably evaporate, leak, escape or be otherwise discharged into the ambient air so as to cause or contribute to air pollution.
[Rule 320, §302]

PERMIT CONDITIONS

CITY OF PHOENIX 19TH AVE LANDFILL

Permit Number 010048

- b. Either the Control Officer or Administrator determines that this Permit must be revised or revoked to assure compliance with the applicable requirements.
[Rule 200, §402]

16. **Reporting:**

If notified, the Permittee shall submit an annual emissions inventory report to the Control Officer. The report shall summarize the activities and air pollution emissions from the facility during the previous calendar year in accordance with §505 of Rule 100. The report shall be filed on a form supplied by the Control Officer and shall be due by April 30 or 90 days after the Control Officer makes the forms available, whichever is later.

The Permittee shall furnish to the Control Officer, within a reasonable time, any information that the Control Officer may request in writing to determine whether cause exists for revising or revoking and reissuing this Permit or to determine compliance with this Permit.

Upon request, the Permittee shall furnish to the Control Officer copies of records required to be kept by this Permit.

The Permittee shall file any additional reports required by the Control Officer in a complete and timely manner.

[Rule 100, §501 and §505; Rule 220, §302.8 and §302.13]

17. **Right to Entry:**

The authorized representative of the Control Officer, upon presentation of credentials, shall be permitted:

- a. To enter upon the premises where the source is located or emission-related activity is conducted, or where records are required to be kept under the conditions of this Permit and,
- b. To have access to and copy, at reasonable times, any records that are required to be kept under the conditions of this Permit, and
- c. To inspect, at reasonable times, any source(s), equipment (including monitoring and air pollution control equipment), practices or operations regulated or required under the Permit, and
- d. To sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with the Permit or other applicable requirements, and
- e. To record any inspection by use of written, electronic, magnetic, and photographic media.

No claim of confidentiality for trade secrets or commercial information available to the Permittee under Arizona Revised Statutes (ARS) 49-487 or Rule 200 §400 can limit the scope of or otherwise interfere with an on-site inspection by a representative of the Control Officer. However, a claim of confidentiality may be made on any information gathered during the inspection to the extent identified in ARS 49-487 or Rule 200 §400.

[Rule 100, §200.107 and §402; Rule 200, §411; Rule 220, §302.17-21]

PERMIT CONDITIONS

CITY OF PHOENIX 19TH AVE LANDFILL
Permit Number 010048

18. Rights and Privileges:

This Permit does not convey any property rights nor exclusive privileges of any sort.
[Rule 220, §302.12]

19. Severability:

The provisions of this Permit are severable, and, if any provision of this Permit is held invalid, the remainder of this Permit shall not be affected thereby.
[Rule 220, §302.9]

20. Start-up Notification:

If a performance test is required, the Permittee shall give written notification to the Department, Attention Source Test Compliance Section Manager, at least 7 days but no more than 30 days before the initial start-up of any new pollution abatement equipment or process that requires a test. Start-up of the subject equipment or process, shall be defined as the earliest occurrence of one of the following dates:

- a. The date that achieved maximum (or permitted) capacity occurs; or
- b. The date that a marketable product has been produced; or
- c. The date that achieved sustained product manufacturing occurs; or
- d. The date that the production line(s) or processes, exhausted to the air pollution abatement equipment that require the test, have been qualified to produce product that meets customer requirements.

This startup notification does not apply to processes or equipment recognized by the Control Officer as being trivial or insignificant activities.
[Rule 270, §400]

SPECIFIC CONDITIONS:

21. Allowable Emissions:

The Permittee shall not allow emissions into the atmosphere to exceed any of the following limits:

	Daily Emission Limits	Monthly Emission Limits	Twelve Month Rolling Average Emission Limits
VOLATILE ORGANIC COMPOUNDS (VOC)	48.00 POUNDS	N/A	8.80 TONS

PERMIT CONDITIONS
 CITY OF PHOENIX 19TH AVE LANDFILL
 Permit Number 010048

NON-PRECURSORS (NON)	48.00 POUNDS	N/A	8.80 TONS
SULFUR OXIDE (SOX)	16.50 POUNDS	N/A	3.10 TONS
CARBON MONOXIDE (CO)	48.00 POUNDS	N/A	8.80 TONS
NITROGEN OXIDE (NOX)	29.00 POUNDS	N/A	6.30 TONS
TOTAL SUSPENDED PARTICULATES (TSP)	72.00 POUNDS	N/A	13.20 TONS
PARTICULATE MATTER < 10 MICRON DIAM (PM-10)	38.00 POUNDS	N/A	8.60 TONS

The twelve month rolling total emission shall be calculated within 15 days following the end of each calendar month by summing the emissions over the most recent twelve calendar months.

22. Control Device Parameters:

a. Filter/Condensate Knockout Drums

All landfill gas from field gas collection systems shall pass through the filter/condensate knockout drums having a minimum control efficiency of 99.7% by weight for particulate matter less than 5 microns or above, as certified by the filter manufacturer.

b. Flares:

All landfill gas passing through the gas collection systems shall pass through a properly functioning flare system. The flare system shall be operated at minimum temperature of 1,400 degrees F and shall have a maximum landfill gas inlet stream of:

1. 1,500 scfm for Cell A, and
2. 200 scfm for Cell A-1.

The flare systems shall have at least 90% destruction efficiency by weight for NMOCs. If a lower temperature is to be used, it must first be demonstrated through testing that the lower temperature produces at least 90% destruction efficiency for NMOCs, with a carbon monoxide concentration of less than 100 parts per million by volume (ppmv) at the outlet.

PERMIT CONDITIONS

**CITY OF PHOENIX 19TH AVE LANDFILL
Permit Number 010048**

c. Granular Activated Carbon Vessels:

The Permittee shall replace the carbon canister before the calculated breakthrough time is reached as well as anytime breakthrough is discovered.

23. Operation and Maintenance (O&M) Plan:

The Permittee shall submit an O&M Plan to the Compliance Manager of Maricopa County Environmental Services Department in accordance with Department guidelines for each of the following pieces of equipment:

- a. Flares (Cell A and Cell A-1)
- b. Filter/condensate knockout drums (Cell A and Cell A-1).

The O&M Plan shall be submitted within 60 days of permit issuance.

24. Opacity:

The Permittee shall not discharge into the ambient air from any single source of emissions any air contaminant, other than uncombined water, in excess of 20% opacity.

Opacity observations to determine compliance with the above standards shall be performed with techniques specified in EPA Reference Method 9, 40 CFR Part 60, Appendix A except for intermittent visible emissions which shall require 12 consecutive readings at 15 second intervals.

If any non-compliant visible emissions (not including water vapor) are detected or reported, the Permittee shall determine the cause and/or the source of emissions. The Permittee shall then take immediate corrective action(s) and if necessary, shut down the applicable equipment. The Permittee shall have visible emissions quantified by a certified Visible Emissions Evaluator within three business days to determine compliance. If the evaluator determines that emissions exceed the above specified opacities, the Permittee shall institute repairs or changes necessary to ensure compliance prior to resuming operations.

25. Record Keeping:

The Permittee shall maintain accurate records of the following for a period of at least five years.

- a. The combustion zone temperature of each flare, as recorded by a continuous temperature recorder.
- b. The inlet landfill gas flowrate into the flares.
- c. A schedule for the replacement of the carbon canisters.
- d. Dates and times of any filter replacement.

PERMIT CONDITIONS

CITY OF PHOENIX 19TH AVE LANDFILL
Permit Number 010048

26. EMISSION TESTING:

- a. The Permittee shall conduct performance testing on the following control equipment's exhaust stack within 90 days after the issuance of this permit:

1. Cell A flare
2. Cell A-1 flare

This time frame may be extended by the Control Officer for good cause.

Testing shall be performed for the following pollutant(s):

1. Non-methane organic carbon (NMOC) destruction
2. Nitrogen Oxides (NOx)
3. Carbon Monoxide (CO)

Testing shall be performed in order to demonstrate a minimum 90 % by weight removal efficiency of NMOC.

This testing shall be performed with the following process equipment operating at the maximum production rate desired by the Permittee:

1. Cell A blower
2. Cell A-1 blower

The testing shall be conducted in accordance with all applicable US EPA approved test procedures.

- b. The Permittee shall submit a test protocol to the Department's Source Test Compliance Section for review and approval at least 30 days prior to the performance test. A fee for each stack to be tested, as required by Rule 280, shall be submitted with the test protocol.
- c. The Permittee shall notify the Department's Source Test Compliance Section in writing at least two weeks in advance of the actual time and date of the performance test so that the Department may have a representative attend.

PERMIT CONDITIONS

**CITY OF PHOENIX 19TH AVE LANDFILL
Permit Number 010048**

- d. **The Permittee shall complete and submit a report to the Department's Source Test Compliance Section within 30 days after completion of the performance test. The report shall summarize the results of the testing in sufficient detail to allow a compliance determination to be made.**

Equipment List

CITY OF PHOENIX 19TH AVE LANDFILL

Permit Number 010048

Date Issued: 08/08/01

Revision: 0.1

Equipment Description	Rated Capacity	Quantity Exist/Future
1. BLOWER - LANDFILL GAS FLOW RATE = 1,500 SCFM	30.00 HP	2 / 0
2. BLOWER - LANDFILL GAS FLOW RATE = 200 SCFM	7.50 HP	2 / 0
3. BURNER - LANDFILL GAS FLARE (8.5 FT X 30 FT)	18.00 MM BTU/HR	1 / 0
4. BURNER - LANDFILL GAS FLARE (3.6 FT X 16 FT)	1.50 MM BTU/HR	1 / 0
5. CARBON ADSORPTION UNIT - GRANULAR ACTIVATED CARBON VESSELS	5.00 GALLON(S)	3 / 0
6. EQUIPMENT - FUEL FILTER/CONDENSATE KNOCKOUT		2 / 0
7. TANK - CONDENSATE STORAGE	9,200.00 GALLON(S)	1 / 0
8. TANK - CONDENSATE STORAGE	1,400.00 GALLON(S)	1 / 0

APPENDIX F
TECHNICAL MEMORANDUM -
ARSENIC IN GROUNDWATER

19TH AVENUE LANDFILL



Date: April 14, 2004
To: 19th Avenue Landfill Superfund Site
Facility File
Thru: Bill DePaul, Project Manager
Federal Projects Unit
From: Hugh Rieck, Hydrologist
Remedial Investigations Hydrology Unit
Subject: Technical memorandum on arsenic concentrations in groundwater monitor wells at the 19th Avenue Landfill Superfund Site

Summary

Of the nineteen monitor wells located around the 19th Avenue Landfill, seventeen consistently show arsenic concentrations near or below 10 µg/L, while two (I-3 and I-4) located near the western edge of the landfill have shown elevated and fluctuating levels of arsenic (6 – 92 µg/L). Analysis of the last eight years of historical groundwater elevation and water quality data shows that the elevated levels of arsenic and related elements at I-3 and I-4:

- are clearly above natural background concentrations for the area around the site
- fluctuate seasonally with water level drawdown to meet irrigation demand
- show no long-term trend of increase or decrease independent of water level trends
- remain restricted to the immediate vicinity of the site (boundary wells I-3 and I-4)

The locally elevated arsenic concentrations probably result from mobilization of arsenic and associated redox sensitive metals by the reducing conditions in the vadose zone and capillary fringe beneath the landfill. Possible sources of the arsenic are 1) the landfill trash, and 2) naturally occurring arsenic in sediments of the aquifer. The observed relationship between changes in groundwater elevation and arsenic and related metals (iron, manganese) concentrations strongly suggests that at least some, if not practically all of the arsenic, occurs naturally in the aquifer sediments. Regardless of the source of the arsenic, it is relatively immobile in the oxidizing groundwater conditions of the region and is not transported far beyond the site boundary before it is precipitated into low solubility compounds bound in the aquifer matrix. This is consistent with the lack of elevated arsenic in the monitor wells downgradient of I-3 and I-4. Except for long-term monitoring, no remedial action is recommended for the elevated arsenic.

Introduction

The Arizona Department of Environmental Quality (ADEQ) has completed a review and evaluation of the last eight years of arsenic and related metals concentration data for groundwater monitor wells at the 19th Avenue Landfill National Priorities List (NPL) Site. The main objective of the review is to explain the elevated levels of arsenic in groundwater monitor wells I-3 and I-4, which are immediately adjacent to the western (obliquely down-gradient) boundary of the site. Fluctuating concentrations of arsenic in these wells have averaged near the previous regulatory threshold level of 50 micrograms/liter ($\mu\text{g/L}$) specified in the ROD. However, the lowering of the drinking water standard (on which the ROD was based) to an MCL of 10 $\mu\text{g/L}$ has brought into question the significance of the arsenic concentration in these wells. If applied, the new standard would cause these two monitor wells to be consistently in an exceedance condition or out of compliance.

Background

Quarterly groundwater monitoring data from all monitor wells of the 19th Avenue Landfill network (Figure 1), including upgradient, cross-gradient, and downgradient wells, show that, with the exception of wells I-3 and I-4, arsenic concentrations generally range between 1 and 20 $\mu\text{g/L}$ (Figures 2 and 3). Most wells, including those downgradient from I-3 and I-4 are consistently below 10 $\mu\text{g/L}$.

During the last eight years, arsenic concentrations in samples from wells I-3 and I-4 have been highly variable, ranging from 6 to 99 $\mu\text{g/L}$. However, concentrations in the higher end of this range (*i.e.* > 50 $\mu\text{g/L}$) have been transient, and until recently not triggered action beyond follow-up resampling at the end of the quarter, as specified in the contingency plan of the Consent Decree.

The frequency of fluctuations in arsenic concentrations at I-3 and I-4 suggests that they are related to observed fluctuations in groundwater levels (Figure 2) due to heavy seasonal pumping from large irrigation wells of the Roosevelt Irrigation District northwest of the site. The water table beneath the site is drawn down during spring and summer months to a relative low stand in late summer or fall, then generally recovers to a relative high stand in January or February. The irrigation district wells influence a large area and maintain a consistent northwesterly groundwater flow direction at the site. As determined in the RI, groundwater velocity has varied from 1 to 8 feet per day, and fluctuated between 20 and 80 feet below the ground surface. In recent years, drought in Arizona has produced a widespread decline in the water table upon which the seasonal fluctuations are superposed.

Discussion

Arsenic can occur as a semi metallic element (As^0), arsenate (As^{5+}), arsenite (As^{3+}), or arsine (As^{-3}). Naturally, arsenic occurs almost exclusively as arsenite or arsenate. Anthropogenic arsenic may have any form including the organic arsine species (Vance, 2002). Elemental arsenic or arsine are unlikely to be present under conditions at wells I-3 and I-4, and the difficulties and expense of testing for these species are unwarranted under the present circumstances. Arsenic can readily change oxidation state between arsenite and arsenate species through chemical or biological reactions that are common in the environment.

The solubility and mobility of arsenic compounds in groundwater depend on the oxidation state, chemical composition of the groundwater, and adsorption-desorption reactions (Welch and others, 1988). These in turn are controlled by the oxidation-reduction potential (ORP Eh), pH conditions, and possible biological activity. Arsenite compounds are 4 to 10 times more soluble in water than arsenate compounds (Robins, 1985).

Field measurements of pH reported for the site-related wells are within a typical range between 6.8 and 7.8. No site data have been reported for ORP (convertible to Eh). Nonetheless, from other studies, natural background values for Eh in the regional aquifer system can safely be assumed to be at least a slightly oxidizing (Eh greater than +100 to +200 mV). Eh-pH diagrams of arsenic oxidation state (Figure 4) show that, within the typical range of site pH values, the oxidation state of arsenic is probably above the arsenate-arsenite transition threshold. Thus, a reduction in Eh may tend to make arsenite the stable form.

The geochemical behavior of iron (and manganese) is similar to that of arsenic. At typical site pH values, iron will readily precipitate from solution under oxidizing conditions (Eh $>$ +100 to 200 mV), forming ferric oxy-hydroxide minerals of low solubility (Hem, 1961; Krause and Ettel, 1985) (Figure 5). Arsenate is strongly adsorbed and incorporated into these low solubility complexes (Frank and Dennis, 1986). This co-precipitation of arsenic and iron can be used to effectively remove arsenic in drinking water treatment systems (US EPA, 2002). Under reducing (anaerobic) conditions, both elements are stable in their more soluble forms (arsenite and ferrous iron). Historical dissolved (ferrous) iron concentrations from site wells are generally below laboratory reporting limits (0.10 mg/L). Iron concentrations significantly above the laboratory reporting limit are reported only from wells I-3 and I-4, where they fluctuate with arsenic in response to changes in water table elevation.

Reducing conditions clearly exist in the vadose zone beneath the landfill cap, as evidenced by the large amount of methane gas being collected and burned by the methane extraction system in operation at the site. Seasonal lowering of the water table causes an influx of methane gas and associated reducing conditions downward into the expanding vadose zone and relatively thick capillary fringe (due to the fine-grained nature of the aquifer sediments) to the water table. The water table is only a few tens of feet below the base of the lowest trash layers.

Observations

1. Arsenic (and iron) concentrations increase when the vadose zone expands downward and water table moves farther from base of landfill trash deposits due to a declining water table. This suggests mobilization of naturally occurring arsenic (and iron) in the sediments upon exposure to reducing conditions in the vadose zone, rather than increased contribution from a hypothetical landfill source.
2. The largest increases in arsenic concentration are generally seen after aquifer sediments which have previously always been fully saturated are first exposed to the reducing vadose zone conditions (*i.e.* the water table drops below any previous low stand). Arsenic concentrations (*i.e.* mobility) are seen to equilibrate and then diminish when the water table remains within or rises above a depth that has been previously dewatered (Figure 2). This suggests depletion of a finite amount of potentially mobile arsenic in the aquifer sediments.
3. The slight, long-term increasing trend in arsenic concentration at I-4 mirrors the overall long-term drop in water table elevation (Figure 2) and the continued downward expansion of the vadose zone. This also suggests that the primary source of arsenic is mobilization of naturally occurring arsenic in the aquifer sediment.
4. Sulfate concentrations are observed to be relatively low and consistent in all site wells except I-3 and I-4. Typical sulfate concentrations for site wells range between 80 and 160 mg/L with little variation at a single well. Sulfate concentrations for I-3 and I-4 are generally lower, normally ranging between about 10 and 90 mg/L, and are notably variable with water level. Increases in sulfate concentration indicate more oxidizing conditions. At wells I-3 and I-4 increases in sulfate correspond to increases in water level elevation. Sulfate spiked as high as 158 mg/L (comparable to other wells) in I-3 during the second quarter of 2003, concurrent with an abrupt increase in water level and drop in arsenic concentration to 6 $\mu\text{g/L}$ (Figure 3).

Alternative Hypotheses

URS Corporation, as consultant to the City of Phoenix, prepared a report to explain the arsenic exceedance at the 19th Avenue Landfill wells (URS, 2003). URS proposed seven hypotheses as possible explanations for the arsenic behavior at I-3 and I-4. Two of these (5 and 7, below) in combination are consistent with all available site data. The other five are not supported by the data.

1. *Variation in natural arsenic concentrations associated with aquifer material (independent of the landfill).* This hypothesis suggests that heterogeneity in the distribution of naturally occurring arsenic in the aquifer may be responsible for the locally elevated concentrations, *i.e.* an arsenic rich patch of sediment just upgradient from I-3 and I-4. This is unlikely because 1) the I-3 and I-4 fluctuations in concentration of arsenic and related constituents correlate closely with the patterns of change in water table elevation across a 30-foot thick interval described above and, 2)

other site wells, including wells downgradient from I-3 and I-4, show relatively low, homogeneous and consistent concentrations of arsenic, iron, sulfate, and other related constituents.

2. *Dissolution of arsenic from a source located within the landfill.* Arsenic could be present in the landfill debris; however there is no evidence to suspect any significant arsenic source discarded within the landfill. URS acknowledges that the Remedial Investigation (RI) indicated that no significant [identifiable, localized] sources of contamination were present. Local infiltration through the landfill cap and debris is negligible; there may be net upward migration of water at the site. The correlation of increased arsenic concentration with lowered water table elevation suggests mobilization from the aquifer sediments rather than a landfill source. A landfill source could be expected to cause increased arsenic concentrations with rising water level.
3. *Dissolution of arsenic from an off-site source.* URS acknowledges that the locations of wells I-3 and I-4 along the western edge of the landfill are (and have always been) downgradient from the landfill and upgradient of any potential off-site source, making this a very unlikely hypothesis.
4. *The introduction of dislodged sediment from the well casing into groundwater samples.* URS acknowledges that this is unlikely because comparisons of filtered and unfiltered samples collected on the same day showed no significant differences. RIHU has considered possible differences in well construction or materials; however other wells built to identical specifications do not produce the high arsenic, iron, and related constituent results.
5. *Decreasing groundwater elevations contributing to changes in water quality.* URS notes that historic data suggest transient increases in arsenic [at I-3 and I-4] are concomitant with decreases in groundwater elevation. They also note that although comparable changes in groundwater elevation occur in all site wells, arsenic elevation is observed only in these two wells. In combination with hypothesis number 7 (below), this appears to be an important component of any explanation.
6. *Recharge as a result of flow in the Salt River.* URS points out that recent activities associated with the Rio Salado restoration project have resulted in continuous [very] low flows in the Salt River bed that are expected to result in recharge likely to affect hydrogeology and geochemistry of ground]water in the area. RIHU points out that the relationship between concentrations of arsenic and related elements at I-3 and I-4, and water table elevation, are evident in site data from many years before the Rio Salado restoration activities began. Also, any recharge from the river bed should affect at least several other site wells in addition to I-3 and I-4. The behavior of arsenic and related constituents remains anomalous only at I-3 and I-4. Any recharge that may be occurring beneath the site thus far is immeasurably small; the most recent water table

elevations beneath the site are at all-time historic lows. This hypothesis is unlikely to factor in to any explanation.

7. *Mobilization of naturally occurring arsenic mediated by reducing conditions imposed by the landfill.* URS states that site data indicate reducing conditions beneath the landfill and that reducing conditions favor dissolution of arsenic compounds. They conclude that mobilization of naturally occurring arsenic appears likely at I-3 and I-4.

Conclusion

Drops in the water table exposing aquifer sediment for the first time to reducing vadose zone conditions beneath the landfill appear to be related to increases in arsenic concentration at wells I-3 and I-4, both located at the downgradient edge of the landfill. Some arsenic may be coming from landfill debris, but there is no evidence to support this, and some evidence to suggest that this is not the case. Most, if not all of the arsenic appears to be mobilized from naturally occurring arsenic in the aquifer sediment. Similar mobilization of naturally occurring arsenic has been documented beneath other landfill sites (e.g. White and Sevec, 1999). Regardless of the source of the arsenic, it should not be of significant concern or a hindrance to delisting of the site because 1) it is not mobile or being transported in the oxidizing environment of the regional aquifer system, 2) it is not a threat to human health (*i.e.* drinking water supply) or the environment, 3) the slight increasing trend in concentrations at I-3 and I-4 can be expected to reverse if water levels rise, 4) no technically feasible or cost effective remedy is available, and 5) long-term stability and predictability of the situation is unlikely to change.

Recommendations

Groundwater monitoring should continue indefinitely to insure that any significant change in conditions or future threat is recognized.

Because the arsenic in groundwater at the western edge of the landfill is from a naturally occurring source, predictable, relatively stable, and does not pose a threat to human health or the environment, no remedial action is warranted and it should not hinder delisting of the site.

References

- Frank, Phyllis and Clifford, Dennis. 1986. Arsenic (III) Oxidation and Removal from Drinking Water, U.S. EPA. EPA-600-52-86/021.
- Hem, J. D., 1961. Stability Field Diagrams as Aids in Iron Chemistry Studies. Jour. Am. Water Works Assoc., Vol. 53, No. 2, February, 1961, p. 211-232.

- Krause, E. and Eitel, V. A., 1985. Ferric Arsenate Compounds: Are They Environmentally Safe? Solubilities of Basic Ferric Arsenates. In: Proceedings of CIM Metallurgical Society, 15th Annual Hydrometallurgical Meeting, p. 5-1 - 5-20.
- Pierce, M. L. and Moore, C. B., 1982. Adsorption of Arsenite and Arsenate on Amorphous Iron Hydroxide. Water Res., Vol. 16, p. 1247 - 1253.
- Robins, R.G., 1985. The Aqueous Chemistry of Arsenic in Relation to Hydrometallurgical Processes. Impurity Control and Disposal. In: Proceedings of CIM Metallurgical Society, 15th Annual Hydrometallurgical Meeting, p.1-1 - 1-26.
- LRS Corporation, 2003. Exceedance Report for Arsenic at Monitoring Well I-4, City of Phoenix 19th Avenue Landfill Facility, dated December 15, 2003
- US EPA, 2002. Arsenic Treatment Technologies for Soil, Waste, and Water. EPA 542-R-02-004, 132 p., available at:
http://www.clu-in.org/download/renied/542r02004_arsenic_report.pdf
- Vance, D. B., 2001. Arsenic – Chemical Behavior and Treatment, available at:
<http://2064.net/arsenicatf.htm>
- Welch, A. A., Michael, S. L., and Hughes, J. L., 1988. Arsenic in Groundwater of the Western United States. Groundwater, Vol. 26, No.3, p. 333-347, May-June 1988.
- White, C.A. and Sevee, J. E., 1999. Arsenic Mobilization Mechanisms at a Landfill Site in Southern New Hampshire and an Evaluation of the Effectiveness of Remedial Actions on Dissolved Arsenic Concentrations. American Geophysical Union Spring Meeting, June 1-4, 1999, abstract.