

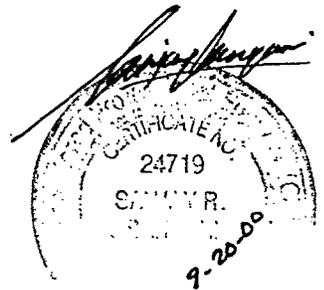
FINAL
FIRST FIVE-YEAR REVIEW REPORT
FOR
19TH AVENUE LANDFILL
PHOENIX, ARIZONA

COPY

SEPTEMBER 18, 2000

PREPARED FOR:

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
3033 NORTH CENTRAL AVENUE
PHOENIX ARIZONA 85012



PREPARED BY

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ESE PROJECT # 66-00-001



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

MEMORANDUM

SUBJECT: Five-Year Review for the Nineteenth (19th) Avenue Landfill Superfund Site,
Phoenix, AZ

FROM: Nadia Hollan, Remedial Project Manager *NH*
Sean Hogan, Chief *A*
Private Sites/DOE Section

THROUGH: Dan Meer, Chief *DM*
Federal Facilities Cleanup Branch

TO: Keith Takata, Director
Superfund Division

I. INTRODUCTION

Attached, please find a copy of the first Five-Year Review for the Nineteenth (19th) Avenue Landfill Superfund Site prepared by Environmental Science & Engineering on behalf of the Arizona Department of Environmental Quality (ADEQ). Due to the fact that hazardous substances, pollutants, and contaminants remain at the site at levels that preclude unlimited land use, this Five-Year review for the 19th Avenue Landfill Superfund Site is required by CERCLA (Section 121 (c)) and by Section 300.430 (f) (4) (ii) of the NCP. The triggering action for this review was the commencement of remedial action construction activities on August 14, 1995. EPA has reviewed ADEQ's Five-Year Review and adopts their recommendations.

II. FIVE-YEAR REVIEW SUMMARY

The 19th Avenue Landfill occupies approximately 213 acres in an industrial area of Phoenix, AZ. The landfill contents consists of primarily municipal and industrial wastes with some medical wastes. The major part of the landfill is Cell A, occupying approximately 200 acres north of the Salt River, and contains approximately nine million cubic yards of refuse. The remainder of the landfill, Cell A-1, occupies approximately 13 acres south of the river channel. The Salt River bed adjacent to the landfill is normally dry. Parts of both Cell A and Cell A-1 are within the 100 year floodplain of the river. EPA placed the landfill on the National Priorities List in September 1983. The Record of Decision (ROD) was signed on September 21, 1989.

The ROD required containment of the landfill wastes on-site, prevention of the infiltration of liquids, prevention of erosion and over-topping due to the Salt River, and the collection and flaring of landfill generated gases at separate gas collection and flare systems for each cell of the landfill. Performance of air and groundwater monitoring was required, while

implementation of a stand-by (contingency) groundwater treatment plan was required should groundwater quality standards be exceeded at the landfill boundary.

The City of Phoenix, under ADEQ oversight, has implemented the required remedial actions, as well as conducted groundwater, methane, and ambient air monitoring. The Five-Year Review Summary Form on page vi and vii identifies the deficiencies noted in the remedy during the review, and the recommended follow-up actions. Table 15 in the Five-Year Review identifies how short and long term protectiveness is affected by the identified deficiencies, and Table 16 presents the schedule for completion of the follow-up actions.

III. CONCLUSION

A protectiveness statement cannot be made at this time. Additional ambient air data, groundwater data, and methane data must be collected and reviewed to ensure protectiveness in the short term. An addendum to this Five-Year review, which would make a determination on the current protectiveness, will need to be completed within 6 months. After all recommended actions in this report are completed, a supplemental follow-up report will be needed to ensure that the actions were implemented and the remedy is protective. The next Five-Year Review will be due by 9/30/2005.

By signature below, I concur with the conclusions and recommendations of this Five-Year Review.

Approved by: Keith Takata
Keith Takata, Director
Superfund Division

Date: 9-29-00

Attachment: Final First Five-Year Review Report for 19th Avenue Landfill

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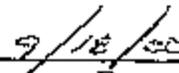
REPORT PREPARATION, CERTIFICATIONS, & APPROVALS

Report Title: First Five-Year Review Report for 19th Avenue Landfill, Phoenix, Arizona
Report Date: September 18, 2000

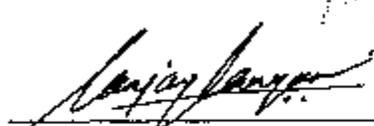
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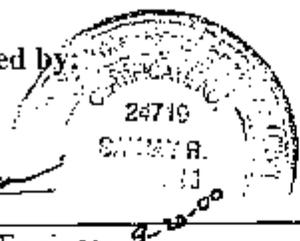
John Kim, ASRAC Project Manager
Environmental Science & Engineering, Inc.

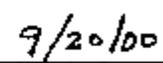


Date

Reviewed and Certified by:


Sanjay Sangani, Chief Engineer
Arizona Registered Professional Engineer





Date

The Arizona Department of Environmental Quality, the lead agency for the 19th Avenue Landfill Superfund Site, and the Environmental Protection Agency Region IX attest, by signature below, their concurrence with the findings, conclusions and recommendations of this five-year review.

Concurrence
David M. Esposito, Director
Waste Programs Division
Arizona Department of Environmental Quality

Date

Concurrence
Daniel A. Meer, Chief
Federal Facilities Cleanup Branch
U.S. Environmental Protection Agency, Region IX

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
AWQSs	Aquifer Water Quality Standards
ARARs	Applicable or Relevant and Appropriate Requirements
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CFR	Code of Federal Regulations
COP	City of Phoenix
CWA	Clean Water Act
EPA	Environmental Protection Agency
ESE	Environmental Science & Engineering, 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 Service Department
MCLs	Maximum Contaminant Levels
MSL	Mean Sea Level
MSWLF	Municipal Solid Waste Landfill
NCP	National Oil and Hazardous Substances 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 Prevention Plan
TASOW	Task Assignment Scope 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:		19th 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 checked="" type="checkbox"/> Operating <input 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			
Reviewing Agency: <input type="checkbox"/> EPA <input checked="" type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other _____			
Author Name: John S. Kim c/o Environmental Science & Engineering, Inc.			
Author Title: Chief Engineer		Author Affiliation: ADEQ Consultant	
Review Period: From: 01/13/00 To: 06/01/00			
Date(s) of Site Inspection: March 01 & 09, 2000			
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 checked="" type="checkbox"/> First <input type="checkbox"/> Second <input type="checkbox"/> Third <input type="checkbox"/> Other _____			
Triggering Action:			
<input checked="" type="checkbox"/> Actual RA Onsite Construction at OU		<input type="checkbox"/> Actual RA Start at OU	
<input type="checkbox"/> Construction Completion		<input type="checkbox"/> Previous Five-Year Review Report	
<input type="checkbox"/> Other (Specify) _____			
Triggering Action Date:		August 14, 1995	
Due Date (five years after triggering action date):		August 14, 2000	

FIVE-YEAR REVIEW SUMMARY FORM

Deficiencies:

1. Health and safety plan, emergency response plan, and inspection and maintenance logs not on-site.
2. Inspection and maintenance logs not being filled out when conducting these activities.
3. Shallow holes evident on the surface of the landfill cap at both Cells
4. Surficial erosion noted around perimeter of both Caps.
5. Eroded access perimeter road located at the let down channel in Cell A.
6. Perimeter drainage system at both cells indicated erosion at top of drainage channels.
7. Sedimentation build up around the drain grates in the bottom of the western drainage channel Cell A.
8. Standing water noted in Cell A south drainage channel near the SE corner; excess vegetation has also occurred.
9. Storm water has the potential to discharge off-site into the SW corner of Tallow Plant.
10. Outlet grate in SW sedimentation pond, Cell A is partially blocked with vegetation and debris.
11. Concentration of Pentachlorophenol in Well DM-3P has the potential to trigger the contingency plan when compared to current MCLs. The 1999 annual groundwater sampling did not include SVOCs and pesticides for Well DM-3P.
12. The groundwater detection limit for Pentachlorophenol is above the MCL.
13. Review of the methane control system and monitoring data indicates that the system could be failing to control the methane migration at the landfill boundaries as called for in the RAP due to the following reasons: The flare stations at both cells are not operating on an continuous basis; and probes A-20D, B-12D, B-14D, B-15D, D-11S, D-11D, SR-2, SR-3, and SR-5 have consistently exceeded the methane boundary limit of 5%. The elevated methane in Probes SR-2, SR-3, and SR-5 provides an exposure potential of methane and VOCs to the public.
14. The existing ambient air monitoring program has been determined to be inadequate by ADEQ and EPA.

Deficiencies Follow-up Actions:

1. Provide health and safety plan, emergency response, and inspection and maintenance logs at the site.
2. Fill out all inspection/maintenance logs when conducting such activities.
3. Fill in all holes with depth > 0.5 feet.
4. Repair all erosion areas around the cap perimeter at both cells.
5. Repair the eroded road at the let down channel in Cell A.
6. Repair eroded sections of the top of the drainage channels at both Cells.
7. Remove sedimentation around the drainage grates in eastern drainage channel, Cell A.
8. Clear drainage channel located at SE corner of Cell A of sediments and vegetation to prevent ponding; clear vegetation at other locations of the perimeter drainage channel in Cell A.
9. Tie in earthen berm with drainage channel so that the off-site discharge of storm water is eliminated.
10. Clear vegetation and debris from drainage grate inside the SW sedimentation pond Cell A.
11. The data obtained from the next quarter of groundwater sampling, must be evaluated for Pentachlorophenol in Well DM-3P to determine if the contingency plan will be triggered based on the current MCLs. In addition, the next quarterly monitoring program must include SVOC and pesticides analyses for Well DM-3P.
12. Groundwater Analytical Laboratory must be consulted to see if detection limit for Pentachlorophenol can be lowered to MCL.
13. The methane recovery system will need to be enhanced to bring all probes into compliance with the landfill boundary limit. During the interim, ambient air readings for methane should be collected within the area of Probes SR-2, SR-3, and SR-5, during monthly monitoring. The COP will need to provide a reevaluation design report for the proposed enhancement of the recovery system. This design report must be submitted and subsequently approved by ADEQ.
14. COP must implement the newly approved ambient air monitoring program in accordance with the Phase II Ambient Air Monitoring Sampling Plan.

Recommended Actions

1. After completion of the Rio Salado Project the current surface water quality standards (AAC 18, Chapter 11, Article 1) should be established as an ARAR.
2. ARAR groundwater standards for Toluene, Naphthalene, Pentachlorophenol, Barium, Antimony, & Thallium should be replaced with current values (MCLs), since established standards were determined to be no longer protective.
3. EPA and ADEQ should evaluate the need for an NPDES storm water permit for the storm water run-off from the landfill to the Salt River
4. The nonmethane organic compound (NMOC) concentration should be determined for this landfill in accordance with the procedures specified in 40 CFR 60.754.

FIVE-YEAR REVIEW SUMMARY FORM

5. If appropriate, the Arizona Ambient Air Quality Guidelines for VOCs should be incorporated as an ARAR.
6. If appropriate, revise baseline risk assessment to address potential exposure pathway of NMOCs emitted from the landfill.
7. After completion of the Rio Salado Project, a formal ecological risk screening and risk assessment revision may be required.
8. The COP should amend the current Quality Assurance Project Plan (QAPP) for the monitoring activities conducted at the site if changes to the QA/QC program are proposed or completed. Consequently, COP should submit an amendment to the QAPP to justify the reduction of the QA/QC sampling frequency.

Protectiveness Statement(s):

A protectiveness statement cannot be made at this time. Additional ambient air data, groundwater data, and methane data needs to be collected in order to ensure protectiveness in the short term. An addendum to this 5-year review will need to be completed within 6 months, which would need to make a determination on the current protectiveness. After all recommended actions in this report are completed, a supplement follow up report will be needed to ensure that the actions were implemented and that the remedy is protective.

Other Comments:

When conducting the next and subsequent five-year reviews, the reviewer(s) should pay close attention to the progress made in the Rio Salado Project, and the potential impacts could have on remedy exposure conditions. Changes in exposure conditions may require that a revised human health risk assessment be completed for the site. In addition, ecological screen may also have to be performed.

1.0 INTRODUCTION

In accordance with Arizona Department of Environmental Quality (ADEQ), Arizona Superfund Response Action Contract (ASRAC) # 99-0017; Work Assignment # 00-0133, Environmental Science & Engineering, Inc. (ESE) conducted the first five-year review of the remedial actions implemented at the 19th Avenue Landfill site in Phoenix, Arizona. This review was conducted from January 2000 through June 2000. This report documents the results of the review. The purpose of five-year reviews is to determine whether the remedy implemented at the site is protective of human health and the environment. The methods, findings, and conclusions of this review including deficiencies and recommendations are documented in this report.

This review is required by statute. ADEQ must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This is the first five-year review for the 19th Avenue Landfill Site. The triggering action for this review was the commencement of remedial action construction activities on August 14, 1995. Due to the fact that hazardous substances, pollutants, and contaminants remain at the site above levels that will **not** allow for unlimited use or unrestricted exposure, this five-year review is required.

2.0 SITE CHRONOLOGY

The chronology of the site relative to the entire Superfund process is provided in Table 1. The site chronology is present from the initial discovery of the problem, through the Remedial Investigation/Feasibility Study (RI/FS), Remedial Action Plan (RAP), and Record of Decision (ROD) phases, up to the implementation of this review.

3.0 BACKGROUND INFORMATION

3.1 SITE LOCATION INFORMATION

The 19th Avenue Landfill occupies approximately 213 acres in an industrial area of Phoenix, Arizona (Figure 1). The major part of the landfill, Cell A, occupies approximately 200 acres north of the Salt River channel (Figure 2). 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, 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 2). 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 Cell A-1 are within the 100 year floodplain of the river.

3.2 SITE HISTORY INFORMATION

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 the space needed for the landfill. The mining and landfill operations began around 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 grade 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 on the type of material that could be deposited were imposed and no formal recording system for the type of material deposited was kept. However, a map was developed through interviews with landfill operators that shows where some industries disposed of their waste. Besides the municipal and industrial wastes, some medical wastes and materials containing low levels of radioactivity were also deposited, according to RI/FS interviewees. It has been estimated that the Cell A landfill 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 an area once it was full of 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. No evidence or mention of liquid or solid special or hazardous types of materials disposed on Cell A-1 was found or made during the RI/FS. The soil cover over Cell A-1 was fairly uniform across the site, approximately four plus feet in thickness. It has been estimated that the Cell A-1 landfill contains approximately one half million cubic yards of refuse.

Parts of the landfill were covered with water by a 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 List (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 Superfund Amendments and Reauthorization Act of 1986 (SARA).

The Remedial Investigation and Feasibility Study Report (RI/FS) 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 in the subsequent Remedial Action Plan (RAP).

In 1988, the EPA assigned the lead oversight responsibility for the site to the ADEQ. Since the ADEQ became the lead agency, the City was then required to prepare a RAP under the state Water Quality Assurance Revolving Fund (WQARF) rules. The RAP included options, ranging from excavation of the entire landfill to a no action at all option. These options were categorized into the four objectives for the 19th Avenue Landfill; *Refuse-Washout*, *Surface-Water Quality*, *Ground-Water Quality*, and *Landfill-Gas Accumulation*. Four options were developed for the Refuse-Washout objective, two for Surface-Water Quality, two for Ground-Water Quality, and one for Landfill-Gas Accumulation. The options surviving the screening in the feasibility study were assembled into alternatives that addressed all objectives together for the 19th Avenue Landfill. Four alternatives were selected for evaluation. Alternative "A" was recommended as the remedial action for the 19th Avenue Landfill.

Alternative "A" included the following options for the established objectives: *Refuse-Washout*-(1) shallow seated compacted soil levees with soil cement bank protection along the river banks of Cell A and Cell A-1, (2) subsurface soil cement control structure across the river channel down stream of the landfill, (3) concrete pipe extension of the 15th Avenue storm drain outfall channel, and (4) widening the river channel bottom by excavation and grading; *Surface-Water Quality*- (1) single layer compacted soil cap over Cell A and Cell A-1, (2) surface drainage from Cell A and Cell A-1, (3) fence around Cell A and Cell A-1 to prevent access to the site, and (4) relocate the two businesses operating on the landfill property, A&B Silica and All Chevy Parts; *Ground-Water Quality*- (1) continue to monitor groundwater quality using existing network to detect possible changes in water quality conditions; and *Landfill-Gas Accumulation* (1) collection of landfill gas at the perimeter of the site with an active collection system, (2) treatment of and collect landfill gas by flaring and discharge to the atmosphere, and (3) monitoring of landfill gas at the perimeter of the site and monitoring of air quality.

Alternative "B" was the same as "A" except for the following differences: *Refuse-Washout*- (1) shallow seated compacted soil levees with soil cement bank protection along the river back of Cell

A only, (2) relocation of Cell A-1 to Cell A by excavating, transporting and landfilling. Alternative "C" was the same as "A" except for the following differences: *Ground-Water Quality* (1) collection of groundwater flowing past the landfill using production wells, (2) treatment of the collected groundwater, and (3) verification of the effectiveness by sampling the existing groundwater monitoring wells. Alternative "D" was the same as 'a' except for the following differences: *Refuse-Washout*- (1) shallow seated compacted soil levees with soil cement bank protection along the river bank of Cell A only, (2) relocation of Cell A-1 to Cell A by excavating, transporting and landfilling; and *Ground-Water Quality* (1) collection of groundwater flowing past the landfill using production wells, (2) treatment of the collected groundwater, and (3) verification of the effectiveness by sampling the existing groundwater monitoring wells.

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 that pertained to the investigation and 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 an approval of the preferred alternative, which included a Groundwater Contingency Plan (Reference 3).

The Record of Decision (ROD) declaration by the 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.

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

No future end use plans for the Site are being considered. 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 environment, and that public access to the Site will be prohibited by a site perimeter security fence. Any future end use plans for the Site would require review and approval by the ADEQ to ensure that the protection of public health and the environment is maintained. Section XLI of the Consent Decree entitled "Conveyance of Title" provide institutional control over the site. This section states, "No conveyance of interest in those portions of the Site on which any containment system, treatment system, monitoring system or other response actions are installed or implemented pursuant to this Consent Decree shall be consummated by the City without provision for continued maintenance of any such system or other response action. At least sixty (60) days prior to any conveyance, the City shall notify the State by registered mail of the provisions made for the continued operation and maintenance of any response actions or system installed or implemented pursuant to this Consent Decree".

4.0 REMEDIAL ACTIONS

4.1 REMEDY SELECTION

ADEQ's LOD describes the selected remedy as the 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 will stabilize the landfill and monitor for contaminants. Groundwater will be remediated when standards are exceeded at the landfill boundary.
- # 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 the groundwater.
- # Reduction of toxicity, mobility, or volume by stabilizing the landfill and remediating groundwater contamination at the landfill boundary.
- # Implementability- Alternative "A" is technically and administratively feasible.
- # Cost- The estimated cost for Alternative "A" is estimated to be \$42,990,000 over the next 30 years.
- # Community comments- ADEQ has evaluated every public comment submitted concerning 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 would be placed along both the north and south banks of the Salt River at the landfill site to provide for refuse-washout control and bank protection;
- # the river channel would be widened;
- # a single layer soil cap would be placed over the landfill so that rain water does not seep into the landfill material. The design concepts for the soil cap addressed in the Consent Decree are as follows:
 - the cap 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 10^{-4} centimeters per second; and
- the cap will have a surface slope of two percent to surface water towards the perimeter of the site and away from the landfill.
- # a secure fence would be erected around the landfill boundary;
- # ambient air quality, methane gas, and groundwater would be monitored;
- # a contingency plan would be implemented should groundwater quality standards be exceeded at the landfill boundary; and,
- # Methane gas would be collected and treated in a manner that eliminates any risk of explosion.

An anticipated operating life of the gas extraction and control system and the duration of groundwater and methane monitoring was not specified in the LOD.

4.2 REMEDY IMPLEMENTATION

From October 1990 to May 1995, the engineering investigations, design and preparation of construction plans and specifications for the Remedial Action were performed. This work was performed by Simons, Li and Associates, Inc. (SLA), under contract to COP. 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 U.S. Army Corp 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 one Explanation of Significant Difference (ESD) for the remedial action. ESD # 1 (Modification to the Perimeter Drainage

Channels) was signed by the ADEQ in December 1995, which modified the ROD remedy dealing with the perimeter drainage collection channel and sedimentation pond lining system. 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 (Engineer Firm) 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 & drainage tasks were started and the capping system tasks were under way by October 1995. In March 1996, the channelization tasks were completed and the work on the gas collection system was started. The site landscaping was started in May 1996 along with the installation of the Armorflex™ (per ESD #1) channel and sedimentation pond lining system. Both the capping system and erosion & drainage system were completed by the end of August 1996. The gas collection system was operational by the first of October with flare station's emission testing being performed on October 16-18, 1996. The site landscaping was completed in November 1996 and correction of punch list items on the flare stations was started. Final acceptance of the flare stations occurred in February 1998. A detailed summary of the start and completion of tasks by each major component of construction is provided in their respective sections.

The contract completion date was extended to December 6, 1996. The time extension was due to rain days (provided in the contract) and a time extension was granted to cover the duration of the import infiltration barrier soil haul that was not anticipated at bid time.

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 February 28, 1997, by ADEQ.

ADEQ issued approval of “Completion of Remedial Action” on June 30, 1997. This approval triggered the following four items in accordance with the CD: (1) preparation of this 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 the CERLCA (as amended) and according to the CD, thus the first review to occur on or about August 20, 2000; (3) the groundwater contingency plan (GWCP) in accordance with Section XII of the CD went into effect June 30, 1997; and (4) preparation of the methane and ambient air monitoring programs, a written program included in the Operation & Maintenance Manual for the landfill.

4.3 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 address all requirements to inspect, operate, maintain the gas extraction/control system as well as address monitoring requirements for the probes, and management of the condensate;
 - Maintaining appropriate maintenance logs at each flare station location;
 - Submittal of annual inspection/maintenance reports;
 - Conducting monitoring of condensate water prior to discharge to COP sanitary sewer.
 - Conducting quarterly groundwater monitoring of designated wells at the site;
 - Conducting monthly methane monitoring of gas probes;
 - Conducting monthly monitoring the flare stations emissions;
 - Conduct biannual sampling of gas extraction wells; and
 - Performing ambient air monitoring during two separate events (once in the summer season and once in the winter season).

During the operational period of the landfill covered by this review, monitoring of groundwater, methane probes, flare stations emissions, and condensate discharge, as well as routine maintenance activities have taken place. Maintenance activities included repair of eroded areas, repair of irrigation system, fence repair, rodent control, and minor repairs of wells, probes, and the gas control system. However, interviews with the COP Project Manager has revealed some problems with flare system and methane monitoring probes. These problems are presented in detail in Sections 6.1 and 6.2 of this report.

O&M costs, in general ran, about 50% less than the original estimate of \$ 1,010,000 (June 1989). These reduced O&M costs may have been the result of less Cap repairs due to little rainfall occurring during the monitoring periods of this review. In addition, O&M cost may have also been reduced because the actual time that the flare system has been in operation versus the initial assumed time is considerably lower. Table 2 provides the annual O&M cost for covering the period from July 1997 to June 1999. O&M costs could not be provided (or broken out) for 1996, because only the last four months of the year was subject to O&M, which could not be broken out of the total cost. A detailed breakdown of the O&M costs for the two periods is presented in

Appendix A.

4.4 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the first five-year review since the construction of the remedies at the Site.

5.0 FIVE-YEAR REVIEW PROCESS

Section 121 (c) of CERCLA requires that the lead regulatory agency conduct a review of any remedial action selected that results in any hazardous substances, pollutants, or contaminants remaining at the Site no less often than every five years. The 1989 ROD for the 19th Avenue Landfill Superfund Site allows the hazardous substances to remain on site; therefore, five year reviews will be required. Guidance for this review is provided in OSWER Directive 9355.7-03B-P Draft Comprehensive Five-Year Review Guidance, Dated October 1999, EPA 540R-98-050.

Based on the revised five year policy review procedures, the 19th Avenue Landfill is expected to be subject to an initial five year review not later than August 14, 2000, five years after the date the notice to proceed with construction activity was issued by the COP. The ADEQ, in consultation with the EPA, will then determine whether human health and the environment are being protected adequately by the remedial action being implemented.

The 19th Avenue Landfill five-year review was lead by Stephanie Ciekot, Project Manager of ADEQ, who provided oversight of the review process that was conducted by Environmental Science and Engineering, Inc. (ESE), ADEQ's consultant. The following team members assisted in the review:

- John Kim, ESE Project Manager;
- Sanjay Sangani, ESE Professional Engineer;
- Larry Froebe, ESE Toxicologist;
- John Mieher, ESE Chief Hydrologist;
- Ron Serio, COP Project Manager;
- Robert Upton, COP Civil Engineer; and
- Nadia Hollan, EPA Project Manager.

The five-year review consisted of the following activities: a review of relevant documents (Appendix B); interviews with appropriate operations staff, state and federal agencies, local government officials, and concerned community members; and a site inspection. In addition, a public notice regarding the initiation of the forthcoming review was placed in the local newspaper (See Appendix C). The completed report is available at the ADEQ file room. A copy of the final

report will also be available 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.

6.0 FIVE-YEAR REVIEW FINDINGS

6.1 INTERVIEWS

The following individuals were interviewed during this five-year review process by personal contact or by telephone:

- Ron Serio, 19th Avenue Landfill Project Manager COP (Interviewed 02/10/00);
- Steve Brittle, Community Member representing Don't Waste Arizona (Interviewed 02/11/00);
- Carol Johnson; Project Manager COP Planning Department (Interviewed 02/11/00);
- Nancy Nesky; Former 19th Avenue Landfill Project Manager ADEQ (Interviewed 02/14/00);
- Cody Williams; Council Member District 8, City of Phoenix Council (Interviewed 02/24/00); and
- Nadia Hollan; Project Manager EPA Region 9 (Interviewed 03/07/00).

In addition to the interviews, on 03/24/00 ESE conducted a file review at the Maricopa County Environmental Services Department (MCESD) Air Pollution Unit. The detailed account of the interviews are presented in Appendix D, which are briefly summarized in the following paragraphs.

Mr. Serio is the site Project Manager, who is responsible for overseeing all O&M, Monitoring, and Reporting activities performed at the landfill since 1991. Mr. Serio stated that he understood all aspects of the project and was familiar with all O&M and monitoring operations at the site. Mr. Serio stated that he is very pleased about the completed project. He also stated that the overall project was implemented successfully and meets all remedial objectives. In terms of O&M issues, Mr. Serio stated that the monitoring probe D11 in Cell A-1 has methane concentrations in the range of 5 to 6 %, because insufficient vacuum from the vacuum pumps cannot reduce the level of methane in this area. An evaluation of the system in Cell A-1 is currently being planned to increase the vacuum pressure. Mr. Serio believes that the probes in the Salt River (SR-1 thru SR-8) are not representative of the methane concentrations generated from the cells and should be abandoned. In addition, during flows in the river, Salt River probes cannot be sampled. In Cell A Probe A20 has had continuous readings of Methane above 5%. Mr. Serio believes that this

reading is the result of the Probe being installed in the landfill trash, which is supported by the fact that a newly installed probe (A21) within the vicinity of Probe A20, but outside of the trash did not detect the presence of methane. Consequently, Mr. Serio recommended that Probe 20 be abandoned. Other probes with elevated methane reading (i.e., > 5%) include Probes B12 thru B15, which are all located 150 feet inside the property boundary within landfilled trash. Installation of additional probes closer to the property boundary and outside of the trash does not appear to be possible for this area. However, they are currently evaluating increasing the flare capacity so that vacuums and flowrates can be increased in these areas to reduce methane levels. Mr. Serio noted that although these probes did show elevated methane levels, it was his belief that these elevated levels did not affect the protectiveness or effectiveness of the remedy. Mr. Serio also stated that during certain periods of the year the flare system would continuously shut-down because the methane levels were not high enough in the recovered system. Once the system shuts down, it is manually restarted. Mr. Serio stated that they may look into retrofitting the system with an automatic restarting system when methane concentrations reach appropriate levels. Lots of rodents and rabbits were also noted within the landfill property. In terms of groundwater monitoring, Mr. Serio stated that during 1999 the arsenic and nickel concentrations in Well I-4 exceeded the MCL. However, because the three quarter average arsenic concentration was below the MCL, the Contingency Plan was not implemented. The nickel concentration did exceed the Groundwater Contingency plan threshold of three times the MCL in July 1999. Therefore, a follow-up sample was collected and the exceedance was not confirmed; the concentration of nickel was less than the MCL. In terms of the VOC concentrations, a few downgradient wells indicated detection of 1,1-DCE above the MCL and threshold level stated in the Groundwater Contingency Plan. However, the City demonstrated that 1,1-DCE concentrations in the downgradient wells were coming from an upgradient source. Consequently, the Groundwater Contingency Plan was not triggered. In terms of the Ambient Air monitoring, Mr. Serio believes the proximity of the Summa Canisters, placed on the landfill boundary along 19th Avenue, does not provide adequate representation of possible emissions of VOCs directly from the landfill. In term of opportunities to optimize O&M activities, Mr. Serio recommended that for the groundwater monitoring program, QA/QC sampling frequency of 20% be reduced. It was also recommended that analytical constituents, the number of wells to monitoring, and the monitoring frequency be reduced. Mr. Serio stated well DM-4 is cross gradient and does not provide useful groundwater data from the landfill. Wells DM-3D and 3P are located approximately ½ mile northwest of the landfill and may not provide the best data regarding the

landfill's impact on groundwater should sampling reveal contamination in these wells. Wells DM-7S and 7D are located at the northwest corner of the landfill and may provide more useful data. In terms of comments and recommendations, Mr. Serio, believed that closed landfills such as the 19th Ave Landfill should be considered for future reuse.

Steven 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. Recently, Mr. Brittle contacted ADEQ and EPA regarding recent groundwater 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 at the site in the recent years, he was aware of some past issues regarding reburial of found drums containing hazardous waste, back into the landfill. He also stated his concern on potential waste washout once a flow is established in the Salt River.

Carol Johnson is the City's Project Manager for the land use planning aspects of the Phoenix Reach of the Rio Salado Project, and has had no involvement with the Site until recently. She stated communities were raising questions about future use of landfill located adjacent to the Salt River, and the effects that the Rio Salado Project would have on these landfills. She stated that community members have attended monthly meeting regarding Rio Salado Project, where landfill location and redevelopment issues have been raised. Ms. Johnson also stated that as part of the Rio Salado Project the City of Phoenix is considering doing design overlay of corridors from I-17 to Broadway ½ mile on either side of the Salt River. No rezoning of the area surrounding the site is planned. Additionally, a low flow channel within the Salt River is planned from 7th St to 19th Ave. No plans for open channel flow within the Salt River portion adjacent to the landfill. Ponds will be located within the Salt River between 7th Ave and 7th St. The low-flow channel and ponds will get the water supply from new wells that will be installed along the Salt River bank at 16th Street, 7th Street, Central Avenue, and 7th Avenue. Walkways are also planned on either side of the Salt River through the entire length of the project.

Nancy Nesky former 19th Avenue Project Manager for ADEQ stated that she was the previous ADEQ Project Manager during the implementation of the remedies at the Site. Mrs. Nesky stated that she was very pleased with completed project and that a good cap and methane recovery system was installed. She was also pleased with the channelization of the Salt River.

Mrs. Nesky discussed the reburied drum issue brought up by Steve Brittle. She stated that the first drum issue was presented by Heidi Stierman former employee of ADEQ, who also had a second job doing health and safety oversight at the landfill. Ms. Stierman initially reported to ADEQ that the COP had encountered drums during the relocation of the some of the landfill waste during the rechannelization, which were reburied at a specific location of the current landfill. Based on her allegation, ADEQ performed pot holing and geophysical survey at the suspected area where the drums were supposed to be buried. The results indicated that there was no evidence of any drums being buried in the suspected area. Approximately a year later, after Ms. Stierman was discharged from ADEQ, she accused the COP of finding more drums and disposing of the contents which was determined to be hazardous waste into the landfill cell. When ADEQ investigated this second accusation, it was determined that the COP did uncover some drums containing liquids which was mixed with soil and placed into the cell without proper characterization. Further interviews with the COP revealed that the noncharacterization and disposal of the drummed liquids was conducted at the direction of Ms. Stierman, who was working for the COP and ADEQ. Based on the amount of material that was disposed, ADEQ Hazardous Waste Division and EPA decided not to pursue any enforcement action, which was presented in a memorandum.

Cody Williams is the COP Council Member for District 8 (19th Avenue Landfill resides in District 8), and is involved with the planning aspects and community relations for the Phoenix Rio Salado project. Mr. Williams stated that he has never received (via telephone or community meetings) a comment regarding outstanding health concerns at the site. Mr. Williams receives routine concerns from the community regarding other environmental issues within his district (i.e., recent issue regarding the hazardous waste permit at the IWU facility). However, the community does not express concerns regarding the 19th Avenue Landfill. Mr. Williams did state that recently the community has concerns regarding the future use of the landfill in regards to the Rio Salado project, which is to revitalize the dry Salt River bed, including revegetation, a low flow channel, and multi-use trails. The community has expressed opinions that the 19th Avenue Landfill is an unproductive, valuable piece of property that may be used in some respect for the Rio Salado project. Mr. Williams stated that he and the community would like to know what resources are available, and what process must take place for possible redevelopment or re-use of the landfill.

Nadia Nollan is the current Project Manager for EPA Region 9 overseeing the O&M activities at the 19th Avenue Landfill. Ms. Hollan stated that currently all remedies have been implemented and the site is conducting O & M of the implemented remedies, and monitoring of groundwater and methane. Ms. Hollan believed that the overall project went pretty well. However, she had some concern about methane probes located in the landfill trash providing non-representative elevated readings. Ms. Hollan also pointed out that the monitoring procedure in the Ambient Air Monitoring Plan may have to be revised so that background versus actual landfill emissions can be distinguished. In terms of actions taken by EPA, Ms. Hollan stated Ms. Heidi Stierman former employee of ADEQ, submitted a request to EPA to perform a criminal investigation on illegal disposal of hazardous waste at the site. EPA and ADEQ investigated this allegation (See Nancy Nesky of ADEQ's response above), and concluded that the allegation of criminal activities was unfounded. Other environmental groups had concerns on the potential use and reuse of the site. Also, Mr. Steve Brittle of Don't Waste Arizona also submitted a letter pertaining to the presence of 1,1-DCE in groundwater relative to the IWU facility. In terms of community concerns, Ms. Hollan stated the Arizona community was mainly concerned about future use/reuse of the landfill. In addition, California communities are also concerned about Dioxin Emissions, which may prompt EPA to request an emissions study for Dioxin of the gas control systems at the landfill.

A file review at the Maricopa County Environmental Services Department (MCESD) Air Pollution Unit was conducted on 03/24/00. During this review, ESE reviewed all files associated with the permitting of the methane control flare system including initial burn test results, annual emissions inventories, and inspection reports. Results of the file review revealed no technical deficiencies and no record of non-compliance for both flare systems.

6.2 SITE INSPECTION

Representatives of ADEQ, COP, and ESE took part in a site inspection on March 1 and March 9, 2000. Two teams were organized to inspect Cells A and A-1. Cell A was inspected by John Kim, Project Manager with ESE and Julie Linn, Project Hydrologist with ADEQ. Cell A-1 was inspected by Stephanie Ciekot, Remedial Project Manager with ADEQ, Ron Serio, P.E, Project Manager with the City of Phoenix, and Sanjay R. Sangani, P.E., Project Engineer with ESE. The site inspection was performed using a checklist developed by ESE and approved by ADEQ on February 29, 2000.

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. Visual observations were made of overall site conditions and specific components of the remedial actions were inspected. The inspection evaluated the landfill cap, the landfill gas collection system, the two flare stations, and representative groundwater monitoring wells (i.e., I-1, I-2R, I-6, & DM-7) and methane gas extraction wells (i.e., A-1A, A10-B, A70-B, A310-B, A320-B, B40-B, B160-B, B179-B, B180-B, B350-B, & B360-B). A summary of the inspection findings is presented below. Appendix E provides a copy of the completed site inspection checklist that was used during the inspection, which details inspection findings as well as a photographic documentation of the site inspection.

Conditions during the inspection were favorable with warm temperatures and no precipitation. Heavy rainfall had occurred during the week prior to the inspection. No problems were encountered with access to relevant site features inspected.

The site inspection conducted on 03/01/00, revealed that the health and safety plan and emergency response plan were not present at the 19th Avenue Landfill. Other documents not found on-site included blank and completed inspection and maintenance logs for the landfill cap system, including groundwater monitoring wells. Mr. Serio stated that inspection and maintenance logs presented in the ADEQ approved O&M Manual were not being used. In addition, no storm water permit had been issued for this site (See ARARs Section in this report).

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. The loose top soil layer over the 3-foot landfill cap had consolidated in numerous places, due to the heavy rainfall that occurred the day before the inspection, as evident by holes which extended to no more than one foot vertically. However, the impermeable clay layer of the landfill cap or underlying waste materials were not exposed nor appeared likely to be exposed.

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. There was no evidence of trespassing.

Due to the heavy rainfall that occurred during the week prior to the inspection, surficial erosion

was evident at several locations along the perimeter of both landfill cells that ranged in depths of 1 to 3.5 feet, with no exposure of trash. It was noted by the COP representative that these eroded area would be backfilled within the following week by COP maintenance crews. Access roads were in good condition with the exception of areas where they intercepted surficial erosional features in both cells and the let down channels in Cell A. No obstruction to traffic along the access roads was noted.

Inspection of the perimeter drainage channel at both cells verified that both system directed surface water toward the two sedimentation ponds in Cell A located at the southwest and southeast corners of the Cell, and one sedimentation pond located at the northwest corner of Cell A-1. The sedimentation ponds remove the sediments in the storm water prior to discharge into the Salt River (flap gates). Examination of the perimeter drainage system indicated that the top of the drainage channels showed evidence of minor erosion that had not effected the Armor Flex. Silt accumulation was evident in both drainage channels and sedimentation ponds; however, sufficient capacity remained for unobstructed drainage flows. Sedimentation had built up around the drain grates located in the bottom of the drainage channel that runs the length of 15th Avenue in Cell A. Ponding/Standing water was noted in the drainage channel covering the south boundary of Cell A near the southeast corner of the Cell. In addition, excessive vegetation build-up had occurred in some sections of the drainage channel in Cell A.

Further inspection of the drainage channel in Cell A indicated that storm water run-off from the cap had a potential to discharge to the southwest corner of the Tallow Plant. The reason why this potential discharge exists is that the earthen berm that runs east and west at this locations does not completely tie into the drainage ditch the runs north and south. Consequently, a 6 to 8 feet gap exist at this location where a sufficient volume/flow of storm water run-off could discharge into the adjacent property.

Inspection of the sedimentation ponds and the inlet and outlet structures indicated they are all in good condition. However, the outlet grate in the southwest sedimentation pond in Cell A was partially blocked with vegetation and debris.

The north and south bank protection (soil-cement) was in good condition and there was no evidence of erosion along the banks. No obstructions were noted on the storm drainage inlets and

outlets. Small trees had grown along the bottom of the Salt River Channel; however, no major obstructions were noted. **Note:** No significant flows have occurred in the Salt River at the location of the landfill to properly test the soil-cement stabilization.

The flare stations at Cell A-1 and A were not operating at the time of the inspection, and had to be manually turned on by the COP representative to observe operations. Because the operation of each flare station is dependant on the concentration of methane, when methane concentrations are low, the system automatically shuts down. Electronic controls, sensors, and data monitoring instrumentation appeared to be in good working condition. Pressure gages and valves appeared to be in good condition and there was no evidence of leakage. The operation of the system was demonstrated by the COP representative. 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 it is discharged into the flare for combustion. The location of written manuals of operations and procedures was noted. Written logs of system operations were also observed within the control box for easy access by operators and inspectors. However, because the flare system is not in continuous operation, there is a concern of potential methane migration beyond the boundary of the facility, should methane generation increase within the landfill during times when the system is down, which could extend greater than 12-hours.

Representative on-site groundwater monitoring wells I-1, I-2R, I-6, and DM-7 (Figure 3) were visually inspected. The COP representative opened the outside locks on the cover boxes for inspection of internal components. No water, debris or foreign material were present. Well casings and caps appeared to be in good condition

Inspection of representative groundwater monitoring wells, gas extraction wells, gas monitoring probes, and condensate sump collection boxes indicated that the cover was secure and appeared to be in good condition. Internal pipes, gages, valves and fittings were in good condition and no water, debris or foreign material was present.

6.3 RISK INFORMATION REVIEW

6.3.1 Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121 of CERCLA requires, in part, that if any hazardous substances will remain on-site at the conclusion of a remedial action under 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 depends 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 becomes established (frozen), and cannot be changed or modified unless the new or modified requirement/standard calls 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 means 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 means 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: Interim Final" (EPA/540/G-89/006, EPA, 1988a) 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 on-site 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 maybe 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; and
- 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 remedial actions.

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 developed for the Study Area.

CERCLA § 121(d) provides for waivers from ARARs under certain circumstances that are detailed in Publication 9234.2-03/FS “Overview of ARARs Focus on ARARs Waivers” in the “CERCLA Compliance with Other Laws Manual.” CERCLA § 121(d) specifies that remedial actions shall attain a standard of cleanup that attains Maximum Contaminant Level Goals promulgated under the Safe Drinking Water Act and/or water quality criteria established under the Clean Water Act. The statute allows an exception to this general rule by permitting establishment of Alternative Concentration Limits (ACLs) for hazardous constituents under certain circumstances, including where:

- there are known and projected points of entry of contaminated groundwater into surface water; and
- there will not be a statistically significant increase of constituents from groundwater or surface water at the point of entry (or downstream); and
- the remedial action includes enforceable measures that will preclude human exposure to the contaminated groundwater at any point between the facility boundary and all known or projected points of entry of groundwater into surface water.

Therefore, in limited situations in which enforceable, institutional measures will effectively preclude the use of drinking water in an area, ACLs may be established. The assumed point of human exposure for risk assessment purposes when using ACLs will be the point at which groundwater enters surface water. ACLs were not used as action levels for the 19th Avenue Landfill.

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 remedial alternative cannot reasonably be implemented or the reliability regarding the potential for the alternative to continue to be protective into the future is low. Use of the waiver may consider cost; however, cost should

not be the major factor for invoking the waiver.

EPA has identified another category of criteria, advisories, guidance and proposed regulations that 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 implemented remedies are addressed in the Consent Decree and Remedial Action Plan (RAP) dated June 12, 1989, which are identified as follows:

- **Surface Water Protection ARARs** - Designation of Protected used for the Salt River (AAC R9-21-206);
- **Groundwater Protection ARARs** - Safe Drinking Water Action Maximum Contaminant Levels (MCLs), Safe Drinking Water Act Proposed MCL, ADEQ Human Health-Based Guidance Levels for Contaminants in Drinking Water and Soil (1990), and ADEQ Laboratory Confidence Limit;
- **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 used for the Salt River ARAR, which provides different protective uses based on specific sections of the Salt River, would also be considered a “Location-Specific” ARAR.

As part of this Five-Year review, ESE evaluated the remedies at the landfill to determine if they still complied with the established ARARs. ESE 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 complied with current standards.

The following sections summarizes the results of this evaluation.

6.3.1.1 Chemical-Specific Standards

The current chemical-specific standards discussed in the following sections are summarized in Table 3. Comparison of the ARARs established for the site during the signing of the ROD to current standards are presented in Table 4.

Surface Water

The RAP identified the “Designation of Protected used for the Salt River (AAC R9-21-206)” as the ARAR that may have set certain 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 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. In order 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 at the landfill area. 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 Arizona Administrative Code (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 (See Table 4) are not applicable and does not need to be evaluated for protectiveness. However, should future redevelopment of the Salt River establish continuous flow (i.e., Rio Salado Project), the current numeric water quality standards should be compared to the established ARAR 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 Operated 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 Action Maximum Contaminant Levels (MCLs), Safe Drinking Water Act Proposed MCL, ADEQ Human Health-Based Guidance Levels for Contaminants in Drinking Water and Soil (1990), and ADEQ Laboratory Confidence Limit. Currently, the site is in compliance with these established ARARs (See Section 6.4.1). However, because some of the established ARARs were determined to no longer be protective, a reevaluation of the protectiveness of the remedy may be required for compounds (i.e., Pentachlorophenol) that

exceed current standards once these compounds are incorporated into the Consent Decree.

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. 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; ADEQ's HBGLs (June 1992); and/or EPA's Region IX preliminary remediation goals (PRGs) for tap water.

When comparing the groundwater chemical-specific ARARs established for the site to current standards, the following compounds were identified having lower concentrations (Table 4):

• Toluene:	Established - 2000 ug/l	Current - 1000 ug/l (AWQS & MCL);
• Naphthalene:	Established - Not Established	Current - 28 ug/l (ADEQ HBGL);
• Pentachlorophenol:	Established - Not Established	Current - 1 ug/l (MCL);
• Barium:	Established - 5000 ug/l	Current - 2000 ug/l (AWQS & MCL);
• Beryllium:	Established - 5 ug/l	Current - 4 ug/l (AWQS & MCL);
• Antimony:	Established - 50 ug/l	Current - 6 ug/l (AWQS & MCL); and
• Thallium:	Established - 5 ug/l	Current - 2 ug/l (MCL);

In order to determine if the above established groundwater chemical-specific ARARs were still protective of human health and the environment, ESE compared the concentrations of each compound to EPA values acceptable for risk in the range of 10^{-6} to 10^{-4} for carcinogens, or a hazard quotient of 1 for noncarcinogens. In making this comparison, all concentrations that were above the upper limit carcinogenic risk range or above the noncarcinogenic hazard quotient of 1 was deemed no longer protective. Based on this criteria, the concentrations established for the following compounds were deemed no longer protective: Toluene; Barium; Antimony; and Thallium. Consequently, the Consent Decree concentrations established for these compounds, should be revised to incorporate the current standards. In addition, for the compounds that did not have established standards during the issuance of the Consent Decree (i.e., Naphthalene & Pentachlorophenol), the current standards should also be incorporated.

Comparing the last two years of groundwater data to the current standards indicates that Pentachlorophenol was detected in Wells DM-8D (upgradient) and DM-3P on January 1998 that exceeded the current MCL (1.0 ug/l). Review of the January 1999 data indicated that Pentachlorophenol was not detected in Well DM-8D, however, SVOC data was not available for Well DM-3P. Consequently, the presence or absence of Pentachlorophenol could not be confirmed for this well. No other SVOCs were detected in any of the wells that exceeded respective standards. Because, the concentration of Pentachlorophenol was not determined in Well DM-3P for the 1999 data, the site would not have been in compliance with the current standard for this compound until follow-up data can be evaluated. Other compounds detected in groundwater wells that exceeded the current standard were detected only once, or were detected in upgradient wells, as further detailed in the Groundwater Data review section of this report (Section 6.4.1). Consequently, groundwater concentrations of these other compounds are in compliance with the current standards.

Air Emissions

- **Methane Extraction System Emissions** - The control of landfill gases at the site are performed by use of active gas extraction systems that draws the gases to extraction wells that are connected to flare stations that flashes 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. This permit (See Appendix F) provides general conditions on the operation of the flare systems as well as specific emissions allowances for Particulates (TSP), Particulates smaller than 10 Microns (PM10), VOCs, Non-precursor Organic Compounds, Sulfur Oxides (SO_x), Carbon Monoxide, and Nitrogen Oxides (No_x), which is applicable to the operation of the flare systems. The emission allowances provide daily and annual emission limits, based on flare system performance information and data supplied during the submittal of the application. Review of annual emissions inventories for 1997 and 1998 shows that the both flare system are in compliance with permit emission limits. The 1999 inventory was not available for review, because Maricopa County had not yet requested the submittal of this report. It is recommended that once the 1999 inventory becomes available it should be reviewed for compliance.

- **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 are addressed in 40 CFR 258.23(a), which deals with explosive gas control of municipal solid waste municipal landfills (MSWLF). Because this requirements applies to MSWLFs that receive waste after October 9, 1991, it would not have been applicable to the site. However, this regulation would have been considered relevant and appropriate. The current standard specifies that the concentrations of methane gas generated 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. Review of the methane data with the current standard, indicates that certain probes have consistently exceeded the established and current methane boundary limit. These exceedences are further detailed in the Methane Data review section of this report (Section 6.4.2).

Other current standards that address emissions from landfills are found in both the MCESD and ADEQ final rules regarding control of air contaminants from MSWLFs (Rule 321 for MCESD and R18-2-731 for ADEQ). Essentially both sets of rules contains the same requirements. Therefore, this document references MCESD Rule 321, since this agency regulates air permitting authority in Maricopa County with ADEQ's authorization. The purpose of this rule is to limit landfill CAP emissions of nonmethane organic compounds (NMOC) from municipal landfills for which construction commenced prior to May 30, 1991, and which has accepted waste at any time since November 8, 1997. The rule adopted EPA's standard of performance for MSWLFs addressed in 40 CFR 60, Subpart WWW, excluding 40 CFR 60.750, with amendments to: the collection and control system design plan (40 CFR 60.752(b)(2)(i)); design capacity report (40 CFR 60.757(a)); and NMOC Emission Rate Report (40 CFR 60.757(b)). Based on the date that the landfill was in operation (i.e., wastes were not placed in the landfill after 1980), and because the landfill was not classified as a MSWLF, Rule 321 would not have been applicable for the site. However, because NMOC emissions could be a potential protectiveness issue at the landfill, Rule 321 would have been relevant or appropriate for

the site. In general, 40 CFR 60 Subpart WWW states that the requirements are not applicable for closed landfills if all of the following three criteria are met: after closure no additional waste is placed in the landfill; the collection and control system must have been in operation for a minimum of 15 years; and the calculated NMOC gas produced by the landfill is less than 50 megagrams per year. Of particular interest is that, if the NMOC is greater than 50 megagrams per year, the operation of the gas collection and control system (40 CFR 60.753(d)) must be performed such that methane concentration is less than 500 ppm above background at the surface of the landfill. Because this current standard provides protectiveness issues not previously addressed in the ROD/LOD, the determination of the landfill's NMOC emission rates should be incorporated as an ARAR in the Consent Decree. Testing for NMOC should be conducted at the Site following the test methods and procedures specified in 40 CFR 60.754, which should be reported to ADEQ. After the NMOC results have been received, ADEQ can determine if other sections of this standard needs to be incorporated as an ARAR.

- **Ambient Air Quality Standards** - 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 MCESD and ADEQ have final rules regarding ambient air quality standards and area classifications (Rule 510 for MCESD and Title 18, Chapter 2, Article 2 for ADEQ). However, because both sets of rules do not include VOCs, they would not be directly applicable to the landfill emissions at the Site. The Arizona Ambient Air Quality Guidelines (AAAQG), which was updated in 1992, does 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 (Table 4).

Because the AAAQGs for VOCs, were not available during the signing of the ROD, no ambient air protective ARARs were established for the landfill VOC emissions at the site. ADEQ, EPA, and ESE will determine if the AAAQGSs meet the appropriate risk-based exposure criteria. If so, the ADEQ will incorporate the current AAAQGs for VOCs within the Consent Decree as an ARAR for the Site.

Ambient air monitoring and reporting was conducted at the site in December 1998 and June 1999 for VOCs. However, 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 is insufficient for determining whether or not AAAQGs are being met. Consequently, a more comprehensive ambient air monitoring program should be implemented. A draft Phase II Ambient Air Monitoring Sampling Plan for the site has been submitted to ADEQ. A determination has been made that the information that will be produced following the plan's procedures would yield data of sufficient quantity and quality to determine whether or not the AAAQGSs are being met, and can be used to evaluate the health risks attributable to the landfill. ADEQ has provided conditional approval of the sampling plan. Consequently, the protectiveness and compliance of landfill emissions with the AAAQGSs cannot be determined by ADEQ and EPA until this data becomes available for review.

6.3.1.2 Action Specific Standards

The current action-specific standards discussed in the following sections are summarized in Table 5. Comparison of the ARARs established for the site during the signing of the ROD to current standards are presented in Table 6.

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 would have been 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 all of the above current standards (Table 5).

Other current action-specific standards for landfill post-closure operations are addressed in 40 CFR 258.61(a), which provides post-closure requirements for a closed MSWLF that would have also been 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 system; 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 (Table 5). However, no timeframe has been specified for O&M period in the Consent Decree. The establishment of a post-closure timeframe within an amended Consent Decree, should be at the discretion of ADEQ

Active Gas Monitoring/Recovery System

The established action-specific ARAR that addressed the design, operation, and monitoring of the active gas recovery system is addressed in the Consent Decree, that required 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 #95-0352 (See Appendix F). The current standards for air permitting remains 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 systems are addressed 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, hydrogeologic conditions, hydraulic conditions, and location of facility structures and boundaries; and
- the minimum frequency of monitoring shall be quarterly.

ESE'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, complies with the current standards.

Other current action-specific standards that may have applied to a newly designed active gas monitoring/recovery systems are addressed in the MCESD Rule 321 regarding control of air contaminants from MSWLFs. As previously stated in Section 6.3.1.1, the purpose of this rule is to limit emissions of nonmethane organic compounds (NMOC) from municipal landfills by adopting EPA's standard of performance for MSWLFs addressed in 40 CFR 60, Subpart WWW, excluding 40 CFR 60.750. This set of regulations provides design, operating, and monitoring guidelines for a landfill gas collection and control systems if NMOC exceeds 50 megagrams per

year. The design specifications for the active gas collection and control system are provided in 40 CFR 60.752(b)(2) and 60.759. The flare control system design and operation specifications are provided in 40 CFR 60.18. The operating standards for the active gas collection and control system are provided in 40 CFR 60.753. The monitoring guidelines for the gas collection and control system are provided in 40 CFR 60.756.

Because the NMOC concentration of the 19th Ave Landfill is currently unknown, no evaluation was conducted to determine if the existing gas collection/control system complied with current standards. Once NMOC concentrations are determined, if the value is greater than 50 megagrams per year, the existing landfill gas collection and control system at cells A and A-1 should be evaluated to determine if current standards have been met or need to be met.

Pretreatment of Condensate

As previously stated in Section 6.3.1.1, 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 had been established with the COP POTW that addressed 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 indicated that the site was required to adjust pH prior to discharge of the condensate, if pH was outside of the range of 5.0 to 10.5 standard units. Site inspection activities confirmed that pH adjustments were being performed in the storage tanks and discharge limits were being met.

Storm Water Management and Discharge

The storm water discharge from a landfill is defined as a storm water discharge associated with industrial activities that will require a NPDES permit in accordance with 40 CFR 122.26. Review of this regulation does not provided an “industrial activities” exemption of storm water discharges from a capped landfill. Consequently, a specific permit may be required for the storm water

discharge from the site because, like the air emissions permit, storm water discharges to the Salt River has the potential to leave the facility boundary, which does not fall into the permitting exemption category under CERCLA Superfund Sites. The storm water discharge from the landfill is currently, not permitted. Consequently, ADEQ and EPA should make a determination on the applicability of storm water discharges from capped landfills requiring an NPDES discharge permit.

Because the COP already has a group NPDES storm water discharge permit for **other** landfills, should a permit be required for this site, a permit modification request should be submitted to ADEQ and EPA to include the 19th Ave. Landfill as a permitted discharge. This permit modification submittal must be accompanied with a site specific Storm Water Pollution Prevention Plan (SWPPP) for the facility. The SWPPP insures appropriate practices are being conducted to minimize pollutant from coming into contact with storm water discharges, and to eliminate discharge of non-storm water.

Groundwater Monitoring Program

The Consent Decree provides requirements in conducting the groundwater monitoring program at the Site. The established monitoring program is a network of upgradient and downgradient wells used to monitoring the shallow and deeper aquifers within the boundary of the landfill cells. Groundwater monitoring is conducted on a quarterly basis, the results of which 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 triggers 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, which would have been relevant and appropriate to 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 remedy; and
- the implementation of corrective action.

ESE'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 (Table 5). In addition, because the establish 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.

6.3.1.3 Location-Specific Standards

The current location-specific standards discussed in the following sections are summarized in Table 7. Comparison of the ARARs established for the site during the signing of the ROD to current standards are presented in Table 8.

As previously discussed in Section 6.3.1.1, the "Designation of Protected used for the Salt River (A.A.C. R9-21-206)" was identified as the 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 depends of 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 redevelopment 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 identified the 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 specification 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, which would have been 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. ESE'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 Rive is adequate to manage a 100-year flood event. Consequently, the landfill is compliance with the current standards.

The RAP summarize the results of an exposure assessment completed for various species of plants and animals at the Site, which concluded that there was no risk to these species, based on the site condition 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).

A formal screening-level ecological risk assessment utilize currently available information and data regarding ecological constituents of potential concern (ecoCOPCs), ecotox, and ecology to estimate the potential for undesirable ecological effects and to provide a means of determining if a more detailed ecological risk assessment is required. In addition, the ecological screening would also identify if any other location-specific standards are applicable to the landfill site.

The decision to conduct a formal ecological screening or risk assessment for the Site would depend on how much current site conditions differ from previous site conditions. Because, current site conditions have not changed, conducting a formal ecological risk screening/assessment is not necessary. However, with the implementation of the Rio Salado project (See Interview Section), which could revitalize the dry Salt River bed adjacent to and upstream of the Site with vegetation, a low flow perennial stream, and multi-use trails, significant changes to site conditions could occur. Consequently, conducting a formal ecological risk screening/assessment may be applicable at that time. In addition, 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.

6.3.2 Evaluation of Toxicity Values

The toxicity values of the baseline risk assessment conducted during the RI/FS (1988) were confirmed by detailed analysis, presented in Table 9. The chemicals of concern (COCs), listed as indicator chemicals for soil and groundwater from Tables L.2, L.3, and L.4 in the baseline risk assessment, were surveyed for current toxicity values that are different than those used in the risk assessment. The confirmation of the toxicity values by comparison of previous and current values is the subject of Table 9. Analysis of toxicity value changes for impact on the risk assessment and associated decision making is also listed for each chemical in the table.

The result of the analysis, including COCs with previously limited toxicological data, is a finding of no-significant-impact on the risk assessment results for human health. The additional contributions to risk/hazard for the changes in the toxicity values and for the new toxicity values were found to be *de minimis* and are described in detail in Table 9. These results are based on the

acceptability of pathways chosen for the conceptual model of human exposure associated with the site.

6.3.3 Confirmation of Risk Assessment Methodology

The 1988 risk assessment methodology used was based on Superfund Public Health Evaluation Manual (EPA, 1986). Current methodology for risk assessment is based on the risk assessment paradigm of the National Research Council (NRC, 1983) as incorporated in Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A) (EPA, 1989) and confirmed in the NRC report, Science and Judgment in Risk Assessment (NRC, 1994). Since the 1986 guidance is also based on the NRC paradigm, the risk assessment for the site is applicable today, and the results are compatible with those using the newer guidance.

A material difference between the methodology of the 1988 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 site inspection has revealed no problems with burrowing animal at the site, there could be a need for future risk management measures to protect these Species of Concern if changes in surrounding land use attracts these species to the Site. The response to this potential occurrence would be to perform an ecological survey in the future for all biota on the site (See Section 6.3.1.3).

6.3.4 Inconsistencies in the Risk Assessment

The following bullet items specify inconsistencies in the 1988 risk assessment report with current requirements, but have *de minimis* impact on risk-based decision making.

- **In Section 7.1.2, page 7-2 (1988 Risk Assessment)**, no complete exposure pathway was found for “...*use of well water for irrigation purposes...*”. Perhaps it was intended to read no ingestion of well water used for irrigation purposes. In the next paragraph of that section, a complete pathway was specified for “...*consumption of foodstuffs grown using ground water for irrigation purposes.*” Also, where irrigation piping is laid for crop irrigation, there are usually workers who might be exposed by inhalation of spray irrigation or dermal contact with groundwater brought to the surface. Given the low magnitude of the risk/hazard presented in the risk assessment and the usual relative

magnitude of exposure by spray irrigation or dermal contact, it is not likely that these other potential pathways would significantly affect risk-based decision making. Of course, additional description of the likelihood that workers may or may not be on the site could preclude the speculation about worker exposure.

- **In Section 7.1.2, page 7-2 (1988 Risk Assessment)**, a complete exposure pathway is cited for methane gas. Other than asphyxiation by exposure to high concentrations that displace oxygen, methane is not noted for toxic effects consistent with a risk assessment. Rather, methane is cause for safety concern as was described, correctly, elsewhere in the report. In addition, the presence of NMOC may provide an exposure pathway not previously identified in the 1988 Risk Assessment. Once the NMOC is determined and applicable ambient air quality data becomes available, should these results indicate potential toxic effects, the risk assessment should be revised to address this potential exposure pathway.
- In addition to the description of **Section 7.1.2, page 7-2 (1988 Risk Assessment)**, a conceptual site model (CSM) should have been prepared and included in the risk assessment. The first EPA guidance for preparing a CSM appeared in (EPA, 1988) which was cited in the risk assessment. More recent EPA guidance (EPA, 1996a, b) more fully describes the central role of the CSM and the requirement to begin the risk assessment with the preparation of the CSM. The CSM provides an important visual tool for the inclusion/exclusion of exposure pathways in the risk assessment.
- **On page 7-15, paragraph 2 (1988 Risk Assessment)**, it is cited that the methane collection system could go down and that this presents an explosion potential. Nothing is mentioned in the risk assessment about addressing this more immediate safety problem in a contingency plan or risk management plan, which the Site's O&M Plan does address. Site inspection has verified that notification alarms have been installed at each system. However, automatic backup systems have not been installed and the flare system at each cell is prone to being shut-down for long periods of time (See Section 6.2).

6.4 **DATA REVIEW**

As part of this five-year review, groundwater and methane monitoring data from 4th quarter 1997 to 4th quarter 1999 were reviewed. The results of this review is presented in the following sections.

6.4.1 Groundwater Data

The quarterly groundwater monitoring program that is conducted by the COP includes a network of wells used to monitoring shallow and deeper aquifers upgradient, downgradient, and cross-gradient to the site. The identification of all groundwater wells used in the monitoring program is provided in Table 10. The location of these wells are provided in Figure 3. Samples collected from the network of wells are analyzed for VOCs, Metals, General Chemistry Parameters (e.g., pH, Nitrate), and radionuclides (i.e., Gross Alpha, Gross Beta) on a quarterly basis as required in the Consent Decree. In addition, collected groundwater samples are also analyzed for semi-volatiles organic compounds (SVOCs) and organochlorine pesticides on an annual basis. In terms of the groundwater sample results, comparison of the maximum concentrations of the major contaminants found during pre and post implementation of the RA, and in 1999, are summarized in Table 11. As shown in Table 11, some of the compounds initially detected prior to issuance of the RAP (i.e., Arsenic, Mercury, Carbon Tetrachloride, Vinyl Chloride, Gross Alpha, and Gross Beta), have either not been detected or detected in concentrations lower than the MCLs in post remedial (1997) and current (1999) data. In addition Appendix G presents graphic depictions of the major contamination concentrations over the last two years for appropriate wells. The following presents the results of quarterly groundwater data reviewed from 4th Quarter 1997 to 4th Quarter 1999.

Review of the groundwater data for metals indicates that, all appropriate metal compound concentrations have been generally below the established threshold standards and current AWQSSs, except for Thallium, and Nickel. On July 1999 Thallium was detected in Well I-4 (See Appendix G1) at a concentration greater than two times the threshold standard (0.005 mg/l). However, because the average Thallium concentration during this timeframe in Well I-4 did not exceed the threshold value, no addition action was taken and the Contingency Plan was not triggered. No other wells exceed the threshold standard for Thallium during the last two years. However, when comparing the groundwater data to the current MCL for Thalliurn (0.002 mg/l), the average concentration of three rounds of sampling in Well I-4 during the sample timeframe specified above would have exceeded the MCL and could have potentially triggered the Contingency Plan. In addition, Well I-6 would have exceeded the current standard for Thallium on July 1998. However, because the average Thallium concentration for this and two consecutive rounds of sampling would have been below the current MCL, no follow-up action would have been required. The 4th quarter 1999 sampling results showed that Thallium concentrations are

below the MCL in all of the wells, including Wells I-4 and I-6. In addition, the results of the 1st and 2nd quarter 2000 sampling (not part of the original data review timeframe) have shown Thallium concentration below the current MCL in all of the wells, including Wells I-4 and I-6. In July 1999 Nickel was detected at a concentration greater than six times the threshold standard (0.1 mg/l) in Well I-4 (See Appendix G2). There is no current MCL for Nickel, because it was remanded by EPA on June 29, 1995. However, the PRG for Nickel that is considered protective of human health and the environment (i.e., 0.73 mg/l) is higher than the threshold standard. During the same timeframe, Nickel was also detected in Well I-3 at a concentration that just exceeded the threshold standard. Because the average Nickel concentration of the July 1999 and two additional consecutive rounds of sampling exceeded the threshold standard in Well I-4, a confirmation sample was collected by COP. The results of the confirmation sample did not confirm the exceedance of Nickel in Well I-4, and the Contingency Plan was not implemented. No additional confirmation sampling for Nickel was performed in Well I-3, because subsequent sampling rounds showed Nickel below the threshold standard. Currently, Nickel concentrations in Wells I-3 and I-4, and all of the other wells have been below the threshold standard.

Review of the of VOC groundwater results indicates that over the last two years the concentration of 1,1-Dichloroethene (1,1-DCE) has consistently exceed the threshold standard (7 ug/l) and current AWQSs (which is the same) in Wells DM-5S/D, DM-8S/D, DM-3I, DM-6, and DM-7D (Appendix G3). Normally the Contingency Plan would have been triggered, however, because 1,1-DCE was consistently detected in upgradient wells (i.e., Well DM-5S/D and DM-8S/D), COP made a demonstration that the concentration of 1,1-DCE was coming from an off-site source upgradient to the site. This demonstration was accepted by both ADEQ and EPA. The last round of samples collected in October 1999, showed 1,1-DCE concentrations above the AWQS in Wells DM-8S (upgradient) and DM-3I, which still demonstrates that an off-site upgradient source is continuing to contribute to the elevated 1,1-DCE concentrations at the Site. No other VOCs were detected in any of the wells that exceeded the appropriate threshold standards and/or current AWQSs.

Review of the general chemistry parameters groundwater results indicates that over the last two years the concentration of Nitrate has exceeded the threshold standard (10 mg/l) and current AWQS (which is the same) in Wells DM-5D. Because Well DM-5D is an upgradient well, the Nitrate concentration, may be naturally occurring or influenced by an off-site upgradient source.

Consequently, no additional action is necessary to address the Nitrate in Well DM-5D. The last round of samples collected in October 1999, showed Nitrate concentrations below the AWQS in all wells, including DM-5D.

Review of the radionuclides groundwater results indicates that Gross Alpha was detected in Wells DM-5S (upgradient) and DM-6, on January 1998 and July 1998, respectively, which exceeded the threshold standard (15 pCi/l) and current AWQS (which is the same) by a small order of magnitude. Because subsequent sample results for Gross Alpha in Wells DM-5S and DM-6 were well below the AWQS, no further action was necessary. Gross Alpha was not detected in any other wells that exceeded the AWQS. In addition, no other radionuclides have been detected in any of the wells that exceeded their respective AWQSs or MCLs.

Review of the annual groundwater data for SVOCs and Organochlorine Pesticides indicated that no pesticides were detected in the collected groundwater samples, and only Pentachlorophenol was detected in Wells DM-8D (upgradient) and DM-3P on January 1998 that exceeded the current MCL (1.0 ug/l). Review of the January 1999 data indicated that Pentachlorophenol was not detected in Well DM-8D, however, SVOC data was not available for Well DM-3P. Consequently, the presence or absence of Pentachlorophenol could not be confirmed for this well. No other SVOCs were detected in any of the wells that exceeded respective standards. As a follow-up action to the above findings, during the next round of **quarterly** sampling, SVOCs analysis must be performed for Well DM-3P. Once this data becomes available, the results of Pentachlorophenol in Well DM-3P must be compared with previous data to determine if further action is warranted. In addition, during the review of the data, ESE noted that the detection limit for Pentachlorophenol (i.e., 5 ug/l) was higher than the threshold standard. Consequently, it is required that prior to subsequent rounds of sampling for SVOCs, the analytical laboratory must be consulted to see if the detected limit can be lowered for this compound.

Comparison of groundwater elevation measurement taken at December 1987, October 1997, and October 1999 (See Table 12), indicates a general decrease in the groundwater in the range of 15 to 25 feet. However, the groundwater flow direction has remained relatively steady to the northwest.

A cursory review of the COP's QAPP has shown that the plan will need an amendment if the COP

wishes to reduce the QA/QC field sampling frequency from 20% to 10%.

Based on the groundwater monitoring data, when comparing the results with established threshold concentrations, the implemented remedies protecting groundwater beneath the site appears to be functioning appropriately and is protective of human health and environment. However, when comparing the data with current standards, a definitive conclusion on the protectiveness of the remedies cannot be made. After ADEQ incorporates applicable current standards that are more protective in the Consent Decree, groundwater data for Pentachlorophenol in Well DM-3P must be evaluated to ensure that the Contingency Plan will not be triggered. In addition, prior to any subsequent sampling event, the analytical laboratory must be contacted to establish appropriate action to reduce the detection limit of Pentachlorophenol below the MCL.

6.4.2 Methane Data

The monthly methane monitoring program that is conducted by the COP includes a network of shallow and deep probes that is grouped by the section of the facility boundary that they monitor, as follows:

- probes in Group A monitors western boundary of Cell A;
- probes in Group B monitors the northern and eastern boundary of Cell A;
- probes in Group D monitors the entire boundary of Cell A-1, except for the northern boundary; and
- probes in Group SR, which are install in or within the side bank of the Salt River monitors the southern boundary (SR-1 to SR-6) of Cell A, the northern boundary of Cell A-1 (SR-7 and SR-8), and the southern facility boundary (SR-9 to SR-13).

The identification and depths of all probes used during the methane monitoring program is provided in Table 13. The locations of these probes are provided in Figure 4. The methane concentrations found during pre and post RA construction activities, and during the last round of sampling in 1999 are summarized in Table 14. The last round of methane data collected in 1999 was not available for some of the Salt River Probes because storm water flows in Salt River made sampling the probes impossible. Appendix H presents graphic depictions of the methane concentrations in appropriate probes that have consistently exceeded the established boundary limit and, had the highest concentrations within each group (excluding SR) over the last two

years. As previously stated, the current standard limiting the methane concentration at the facility boundary has not changed from the established limit of 5%. Review of two years of methane data up to December 1999, indicates that Probes A-20D in Group A; B-12D, B-14D, and B-15D in Group B; D-11S and D-11D in Group D; and SR-2, SR-3, and SR-5 in Group SR have consistently exceeded the established limit. In comparing concentration of methane in applicable probes over a two year period, no specific pattern could be determined (See Appendix H). Another concern deals with NMOCs identified during the ARAR review, that may also be present with the migrating methane. Each of the probes or sets of probes identified above that have methane problems are addressed in the following paragraphs.

Review of installation data of Probe A-20D in Cell A, revealed that this probe is installed in trash, which explains the elevated reading of methane. A newly installed probe (A-21S & D) within the vicinity of Probe A-20D, but outside of the trash and across 19th Avenue, did not detect the presence of methane above the boundary limit. Although the installation of Probe A-21 provides indication that methane is not migrating beyond the facility boundary, the vicinity of the new probe to A-20, does not completely verify that methane (and potentially NMOCs) is not migrating beyond the landfill boundary.

Review of the installation data of Probes B-12, B-14 and B-15 in Cell A, indicates that all of these probes are located 150 feet inside the property boundary, and within landfilled trash. Review of the landfill waste boundary information indicates that placement of alternate probes closer to the property boundary and outside of the trash does not appear to be possible for this area. In addition, pressure readings taken within these probes shows negative pressure, which would indicate the possibility of no potential migration of methane. However, ESE could not make a definitive conclusion on the migration potential of methane (and potentially NMOCs) beyond the facility boundary at this location.

Probe D-11 in Cell A-1, is not installed in trash. Consequently, there is a concern that the current operation of the methane recovery system is not effectively controlling methane at this location. Based on the location of this probe and surrounding land use, the migration of methane beyond the facility boundary at this location would not create any potential explosive conditions at this time (Probe D-11 resides next to an open gravel pit).

In terms of Probes SR-2, SR-3, and SR-5 in the Salt River, significant high levels of methane have been consistently detected in these probes. Because there is no access control within facility boundary of the Salt River channel bottom, there could be some potential methane (and NMOC) exposure to the public. The risk potential to the exposure of methane is small because there are no enclosed spaces within the Salt River bottom to create any explosive conditions. The risk potential of exposure to NMOC is unknown at this time until applicable new data can be evaluated.

Based on these finding, COP must implement temporary short-term measures to insure methane (and potentially NMOCs) migration (> 5%) does not occur at these probe locations (i.e., A-20, B-12, B-14, B-15, D-11, SR-2, SR-3, and SR-5). This short term measure, will require the COP to conduct ambient air measurements during monthly methane monitoring to determine if methane and NMOC ambient air reading within the boundaries are within applicable limits. Ambient air readings must first be taken and recorded as close as possible to each probe location and near the surface of the cap or channel bottom. Ambient air reading should then be collected within the nearest landfill boundary of each probe. The methane results of the ambient air readings should be compared to the methane boundary limit (i.e., 5 %), and the NMOC readings (i.e., VOCs) should be compared to the AAAQGs, and included in the methane reports submitted to ADEQ. Prior to conducting the ambient air monitoring, COP must submit a proposed sampling plan to ADEQ for the collection of the ambient air samples, which will describe what methodology will be used to take these readings. In the long term, COP must enhance the methane recovery systems to ensure the methane is not allowed to migrate beyond landfill boundaries at both Cells. During the time of this review, the COP was already aware of this situation and is planning to conduct an evaluation in the near future of increasing vacuum and flowrates of the methane recovery system in hopes of reducing methane levels in this area. During this evaluation of the recovery system, the COP must also consider the use of supplemental fuel (or alternative) to insure that the recovery system will not be down for significant lengths of time (See Section 6.2). As part of this evaluation, the COP must submit a draft reevaluation design report of the methane recovery system to ADEQ for approval, that identifies the proposed modifications that will be completed for each recovery system.

Based on these findings, a determination on the current short term protectiveness of the methane recovery system cannot be made until the applicable data (i.e., methane and NMOC ambient air

data) have been collected by COP, and evaluated by ADEQ. In addition, long term protectiveness will not be determined until all the recommended actions have been completed.

7.0 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?

- **HASP/Contingency Plan:** Both plans are sufficient to control risks, however, in order to properly implement both plans, they must be physically located at the Site.
- **Implementation of Institutional Control:** Section XLI of the Consent Decree entitled “Conveyance of Title” provide institutional control over the site. This section states, “No conveyance of interest in those portions of the Site on which any containment system, treatment system, monitoring system or other response actions are installed or implemented pursuant to this Consent Decree shall be consummated by the City without provision for continued maintenance of any such system or other response action. At least sixty (60) days prior to any conveyance, the City shall notify the State by registered mail of the provisions made for the continued operation and maintenance of any response actions or system installed or implemented pursuant to this Consent Decree”.
- **Remedial Action Performance:** The landfill cover system has been effective in containing the waste and contaminants, and preventing leaching of contaminants in the vadose via percolation. However, significant erosion has occurred around the perimeter of the cells (more in Cell A), which does not effect the integrity of the cover but should be repaired as soon as possible. Examination of the perimeter drainage system indicates that the system is functioning properly. However, the top of the drainage channels showed evidence of minor erosion that has not effected the Armor Flex or the integrity of the channel, but should be repaired. Excessive vegetation buildup has occurred at some locations within the perimeter drainage around Cell A, which does not affect the integrity of the drainage system but can eventually restrict surface water flow. Ponding/Standing water was noted in the drainage channel covering the south boundary of Cell A near the southeast

corner of the Cell, standing water can eventually infiltrate through the bottom of the channel that is also situated on landfill wastes. Sedimentation had built up around the drain grates located in the bottom of the drainage channel that runs the length of 15th Avenue in Cell A, which does not affect the integrity of the channel but should be cleared to prevent sediments from entering the Salt River. Debris buildup on top of the grate in the southwest sedimentation pond in Cell A could eventually impede drainage to the Salt River. The drainage conveyance system near the southwest corner of the Tallow Plant in Cell A has a gap that would allow storm water run-off from the cap to discharge to the adjacent property. Access roads were in good condition with the exception of areas where they intercepted surficial erosional features in both cells and the let down channels in Cell A. Conversations with the COP has indicated that many of the deficiencies identified above have already been corrected. However, due to the limited time in the preparation of this report, the corrected deficiencies could not be confirmed.

Based on review of the groundwater monitoring data, when comparing the results with established threshold concentrations, the implemented remedies protecting groundwater beneath the site appears to be functioning appropriately and is protective of human health and environment. However, when comparing the data with current standards, a definitive conclusion on the protectiveness of the remedies cannot be made. After ADEQ incorporates applicable current standards that are more protective in the Consent Decree, groundwater data for Pentachlorophenol in Well DM-3P must be evaluated to ensure that the Contingency Plan will not be triggered.

Assessment of the methane recovery system and monitoring data verified that Probes A-20D, B-12D, B-14D, and B-15D at Cell A; D-11S and D-11D at Cell A-1; and SR-2, SR-3, and SR-5 in the Salt River have consistently exceeded the established limit. Although there is evidence that elevated levels of methane in probes A-20, B-12, B-14, and B-15 more than likely due to the probes being installed in trash, no definitive conclusion could be made on the methane migration beyond the facility boundary. Probe D-11 in Cell A-1, is not installed in trash. Consequently, there is a concern that the current operation of the methane

recovery system is not effectively controlling methane at this location. Another issue may also be present that deals with NMOCs identified during the ARAR review, that may also be migrating with the methane. The risk potential of exposure to NMOC is unknown at this time until applicable new data can be evaluated. Assessment of the flare control systems at both cells has shown that, during the colder months, both systems frequently shut-down due to lower levels of methane generated from the landfill. When the system shuts down, it must be manually restarted by COP personnel, who are only at the site during daytime hours. Therefore, if system shut down occurs in the evening, it would not be detected until the next morning. Based on these finding, COP must implement temporary short-term measures to insure methane (and potentially NMOCs) migration (> 5%) does not occur at these probe locations (i.e., A-20, B-12, B-14, B-15, D-11, SR-2, SR-3, and SR-5). This short term measure, will require the COP to conduct ambient air measurements during monthly methane monitoring to determine if methane and NMOC ambient air reading within the boundaries are within applicable limits (See Section 6.4.2). The methane results of the ambient air readings should be compared to the methane boundary limit (i.e., 5 %), and the NMOC readings (i.e., VOCs) should be compared to the AAAQGs, and included in the methane reports submitted to ADEQ. Prior to conducting the ambient air monitoring, COP must submit a proposed sampling plan to ADEQ for the collection of the ambient air samples, which will describe what methodology will be used to take these readings. In the long term, COP must evaluate options to enhance the methane recovery systems to ensure the methane is not allowed to migrate beyond landfill boundaries at both Cells. During this evaluation, the COP must also consider the use of supplemental fuel (or alternative) to insure that the recovery system will not be down for significant lengths of time (See Section 6.2). As part of this evaluation, the COP must submit a draft reevaluation design report of the methane recovery system to ADEQ for approval, that identifies the proposed modifications that will be completed for each recovery system. Based on these findings, a determination on the current short term protectiveness of the methane recovery system cannot be made until the applicable data (i.e., methane and NMOC ambient air data) have been collected by COP, and evaluated by ADEQ. In addition, long term protectiveness will not be determined until all the

recommended actions have been completed.

- **System O&M:** In general the COP has been performing appropriate O&M activities according to the Consent Decree, O & M Plan, annual O&M cost incurred, and quarterly monitoring reports. However, blank and completed inspection and maintenance logs for the landfill cap system needs to be present at the Site. In addition, COP needs to begin using appropriate inspection and maintenance logs presented in the ADEQ approved O&M Manual. At the time of this report, the COP had already provided the inspection and maintenance logs at the Site. When reviewing the methane data it was noted that, periodically, data was not available for certain probes in the Salt River. COP stated that these probes were occasionally not sampled due to periodic storm water flows in the Salt River, which made it impossible to sample these probes.
- **Cost of O&M Activities:** As previously stated, annual O&M costs were in general about 50% less than the original estimate of \$ 1,010,000 (June 1989). These reduced O&M costs may have been the result of less cap repairs due to little rainfall occurring during the monitoring periods of this review. In addition, lower O&M costs could also be the result of implemented remedies not functioning as intended, however, the COP has indicated that the lower costs may also be the result of the fact that when the remedy is new, less O & M costs are expended.
- **Opportunities for Optimization:** Based on review of the groundwater analytical data (See Section 6.4.1), contaminants have been detected in many of the wells at concentrations that have exceeded AWQSs, but have not triggered the contingency plan. In addition, evaluation of the location and depths of all wells has concluded that the number of wells currently being used is appropriate in monitoring groundwater quality up-gradient, down-gradient, and cross-gradient to the Site. Although in some wells contaminants have not exceeded AWQSs (i.e., Wells I-1, I-2R, I-5R, I-8R, and DM-4), the continued monitoring of these wells are necessary if future changes in groundwater flow direction should occur. In addition, groundwater monitoring has been performed for less than 3 years from the time that the cap was installed at the landfill cells. Consequently, based on

these findings, no recommendations can be made at this time to eliminate any wells, any parameters, or reduce the monitoring frequency. However, ESE can recommend reducing the QA\QC field sampling frequency from 20% to 10%. This will require an amendment to the QAPP.

- **Managing Remedy Effectiveness:** Significant erosion around the perimeter of the cap, if left unattended, can eventually lead to exposure of landfill waste and further deterioration of the cap. In order maintain the effectiveness of the cap, all eroded areas must be repaired prior to another storm event in which storm water run-off can further deteriorate the eroded areas. Exceedence of methane concentrations within the boundary of the landfill may be early indicators that methane is migrating beyond the facility boundary. The hazard associated with methane is the potential of creating explosive conditions should enclosed structures be present in areas of methane gas migration. However, assessment of surrounding land use indicates that there are no present site conditions the would potentially create explosive conditions. In addition to the methane, the presence of NMOCs (e.g., VOC) that is usually contained with the methane may present an exposure risk if levels exceed applicable risk-based criteria. The risk potential of exposure to NMOC is unknown at this time until applicable new data can be evaluated. Based on these finding, the effectiveness of the methane recovery system must be reevaluated to ensure that methane and NMOCs are properly controlled within the boundary of the landfill cells. This reevaluation must examine all areas of the methane recovery system including: extraction well locations; system vacuum (i.e., pull) capacity; system flow rates; and flare systems capacities and performance. This evaluation, must also examine applicable modifications to the flare stations to minimize shut-downs. Once completed a draft reevaluation design report for the methane recovery systems must be submitted to ADEQ for approval, that identifies the findings of the reevaluation and identified proposed modifications that will be completed for each recovery system. Upon approval of the report, all modifications must be immediately implemented. Verification of the success of the systems enhancements will come from subsequent monitoring of landfill perimeter probes. Because the reevaluation of the methane recovery system is a long term action to improve effectiveness, a temporary short-term measure needs to be

implemented to insure methane (and potentially NMOCs) are not migrating beyond these probe locations (i.e., A-20, B-12, B-14, B-15, D-11, SR-2, SR-3, and SR-5). This short term measure, will require the COP to conduct ambient air measurements during monthly methane monitoring to determine if methane and NMOC ambient air reading within the boundaries are within applicable limits (See Section 6.4.2). The methane results of the ambient air readings should be compared to the methane boundary limit (i.e., 5 %) and the NMOC readings (i.e., VOCs) should be compared to the AAAQGs, and included in the methane reports submitted to ADEQ. Prior to conducting the ambient air monitoring, COP must submit a proposed sampling plan to ADEQ for the collection of the ambient air samples, which will describe what methodology will be used to take these readings. In addition, during the quarterly groundwater monitoring program COP should closely examine the concentrations of Nickel, Barium, Thallium, and Pentachlorophenol which have exceeded current AWQs in down-gradient wells during previous rounds of sampling.

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

- **Changes to Established ARARs:** This five-year review identified Chemical-Specific Federal and State groundwater, surface water, and air standards that are in some cases more stringent than established ARARs. For these more stringent standards, ESE evaluated the established ARAR to determine if it was still protective of human health and the environment when compared to the current standard. If the established ARAR was determined to be no longer protective, ESE provided recommendations to incorporate the current standard as an ARAR. In addition, ESE 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 6.3.1.1. In the action-specific standards (Section 6.3.1.2), ESE identified the need in determining the NMOC concentration at the landfill, in order to evaluate the need in providing more stringent requirements in the operation of the methane gas recovery system. In addition, ESE identified non-compliance issue with storm water discharges at the landfill.

Storm water run-off from the landfill cells are discharge into the Salt River. Based on definition of storm water discharges associated with industrial activities, this discharge is subject to NPDES storm water permitting, which the site currently does not have. In terms of the location-specific standards (Section 6.3.1.3), no current standards were identified that needed to be incorporated as an ARAR. However, should site conditions change (i.e., Rio Salado Project), ESE did identify the need in conducting future ecological risk screening/assessment.

- **Changes in Exposure Pathway:** No changes in the site conditions that effect the exposure pathways were identified as part of the five-year review. However, the potential presence of NMOC may provide an exposure pathway not previously identified in the 1988 Risk Assessment. Once the NMOC is determined and applicable ambient air quality data becomes available, should these results indicate potential toxic effects, the risk assessment should be revised to address this potential exposure pathway. In addition, there are future planned changes to the Salt River that may impact the next five-review, which is called the Rio Salado project. This project will 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. The project will also provide public access recreational trails on the upper bank of the Salt River. The future implementation of 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 to Toxicity and Other Contaminant Characteristics:** The result of the toxicity analysis, did identify some changes in the toxicological data. However, these changes result in no-significant-impact on the risk assessment results for human health. The additional contributions to risk/hazard for the changes in the toxicity values and for the new toxicity values were found to be *de minimis* (Table 9).
- **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 site inspection has revealed no problems with burrowing animal at the site, there could be a need for future risk management measures to protect this owl if changes in surrounding land use attracts this species to the Site. Should this occur, performance of an ecological survey may be appropriate in the future (See Section 6.3.1.3). In addition, some inconsistencies in the baseline risk assessment report were found, which have *de minimis* impact on risk-based decision making (See Section 6.3.4).

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.

8.0 DEFICIENCIES

Deficiencies were discovered during the five-year review and are noted in Table 15.

1. Health and safety plan and emergency response plan were not present at the 19th Avenue Landfill. Other documents not found on-site included blank and completed inspection and maintenance logs for the landfill cap system, including groundwater monitoring wells.
2. Inspection and maintenance logs presented in the ADEQ approved O&M Manual are not being used.
3. The loose top soil layer over the 3-foot landfill cap had consolidated in numerous places as evident by holes extending to no more than one foot vertically.
4. Surficial erosion was evident at several locations along the perimeter of both landfill cells that ranged in depths of 1 to 3.5 feet, with no exposure of trash.
5. Eroded access perimeter roads were found at the let down channels in Cell A.
6. The top of the perimeter drainage system showed evidence of minor erosion that had not effected the Armor Flex.
7. Sedimentation has built up around the drain grates located in the bottom of the drainage channel that runs the length of 15th Avenue in Cell A.
8. Ponding/Standing water was noted in the drainage channel covering the south boundary of Cell A near the southeast corner of the Cell. In addition, excessive vegetation build-up had occurred in some sections of the drainage channel in Cell A.
9. A non-controlled storm water off-site discharge location has been identified near southwest corner of the adjacent Tallow Plant, that could discharge storm water run-off into the adjoining property.
10. The outlet grate in the southwest sedimentation pond in Cell A is partially block with vegetation and debris.
11. When comparing the groundwater data to current MCLs, the concentrations of Pentachlorophenol in Well DM-3P could potentially trigger the Contingency Plan. In addition the 1999 annual groundwater sampling event that includes analysis of SVOCs and Organochlorine Pesticides did not these parameters in Well DM-3P.
12. The groundwater SVOC analytical detection limit for Pentachlorophenol is set above the MCL.
13. Review of the methane control system and monitoring data indicates that the systems

could be failing to control the methane migration at the landfill boundaries as called for in the RAP due to the following reasons: the flare systems at both cells are not in continuous operation; and Probes A-20D, B-12D, B-14D, B-15D, D-11S, D-11D, SR-2, SR-3, and SR-5, have consistently had elevated methane readings above the boundary limit (5%). The elevated methane readings in Probes SR-2, SR-3, and SR-5 provides an potentially explosive concern of methane, and potentially exposure concern of NMOCs to the public.

14. The existing ambient air monitoring program data has been determined to be inadequate by ADEQ and EPA.

9.0 FOLLOW-UP ACTIONS AND RECOMMENDATION

Based on the deficiencies found during the five year review (Section 8.0) the following actions must be taken by COP and/or appropriate parties:

1. The health and safety plan, emergency response plan, and blank and completed inspection and maintenance logs for the landfill cap system, including groundwater monitoring wells, must be maintained on-site.
2. Inspection and maintenance logs presented in the ADEQ approved O&M Manual must be used and maintained in appropriate files.
3. All holes extending 0.5 feet or greater must be filled in.
4. All surficial erosion along the perimeter of both landfill cells must be repaired as soon as possible, prior to the next heavy rainfall event.
5. The eroded access perimeter road located at the let down channels in Cell A must be repaired.
6. The erosion at the top of the perimeter drainage channels must be repaired.
7. Sedimentation around the drain grates in the bottom of the drainage channel that runs the length of 15th Avenue in Cell A must be cleared.
8. The drainage channel where the water is ponding must be cleared to ensure proper drainage of storm water. In addition, excessive vegetation build-up must be cleared at appropriate sections of the drainage channel in Cell A.
9. The earthen berm must be extended to the drainage channel so that the non-controlled storm water off-site discharge location near the southwest corner of the adjacent Tallow Plant can be eliminated.
10. The blocked outlet grate in the southwest sedimentation pond in Cell A must be cleared of vegetation and debris.
11. After ADEQ incorporates applicable current standards that are more protective in the Consent Decree, groundwater data for Pentachlorophenol in Well DM-3P must be evaluated to ensure that the Contingency Plan will not be triggered. In addition, the next quarterly sampling event must include analyses of SVOCs and Organochlorine Pesticides in Well DM-3P.
12. Prior to the next sampling event, the groundwater analytical laboratory must be consulted to see if the detection limit for Pentachlorophenol can be lowered to, or a close as possible

to the MCL.

13. In the short-term, the COP must take ambient air measurements during monthly methane monitoring to determine if methane and NMOC readings within the boundaries are within applicable limits at the following probe locations: A-20, B-12, B-14, B-15, D-11, SR-2, SR-3, and SR-5. Prior to conducting the ambient air monitoring, a proposed sampling plan for the collection of the ambient air samples must be submitted to ADEQ for approval, which will describe what methodology will be used to take these readings/samples. In the long term, COP must enhance the methane recovery systems to ensure the methane is not allowed to migrate beyond landfill boundaries at both Cells. During this evaluation of the recovery system, the COP must also consider the use of supplemental fuel (or alternative) to insure that the recovery system will not be down for significant lengths of time (See Section 6.2). As part of this evaluation, the COP must submit a draft reevaluation design report of the methane recovery system to ADEQ for approval, that identifies the proposed modifications that will be completed for each recovery system.
14. A draft Phase II Ambient Air Monitoring Sampling Plan for the site has been submitted to ADEQ. A determination has been made that the information that will be produced following the plan's procedures would yield data of sufficient quantity and quality to determine whether or not the AAAQGs are being met, and can be used to evaluate the health risks attributable to the landfill. ADEQ has provided conditional approval of the sampling plan. Consequently, once the new data is received it must be determined if this data complies with the AAAQGs.

In addition to the follow-up actions to correct the above deficiencies, the following actions are recommended:

1. After completion of future redevelopment plans in the Salt River to establish a perennial stream (i.e., Rio Salado Project), the current surface water quality standards addressed in A.A.C. Title 18, Chapter 11, Article 1, should be incorporated as an ARAR (See Section 6.3.1.1) within the Consent Decree.
2. The established groundwater protection standards, which were determined to be no longer protective (i.e., AWQSS, MCLs, & HBGLs), in the Consent Decree for the following compounds, should be replaced with current standards :

- | | | | |
|---|--------------------|-------------------------|-----------------------|
| • | Toluene: | Established - 2000 ug/l | Current - 1000 ug/l; |
| • | Naphthalene: | Not Established | Current - 28 ug/l; |
| • | Pentachlorophenol: | Not Established | Current - 1 ug/l; |
| • | Barium: | Established - 5000 ug/l | Current - 2000 ug/l; |
| • | Antimony: | Established - 50 ug/l | Current - 6 ug/l; and |
| • | Thallium: | Established - 5 ug/l | Current - 2 ug/l; |
-
3. ADEQ and EPA should evaluate the need for an NPDES storm water permit for storm water discharges from the landfill to the Salt River.
 4. Determine the NMOC emission rate from the landfill to determine if SWMLF performance standards (40 CFR 60 WWW) should apply to the gas collection and flare systems at the site (See Section 6.3.1.1).
 5. If the AAAQGs are determined by EPA and ADEQ to be protective standards of human health and the environment, they should be incorporated as an ARAR (See Section 6.3.1.1).
 6. Upon determination of NMOC and after determining the ambient air VOC concentrations emitted from the landfill, should these results indicate potential toxic effects, the 1988 baseline risk assessment should be revised to address this potential exposure pathway.
 7. After completion of future redevelopment plans in the Salt River to establish a perennial stream (i.e., Rio Salado Project), conducting a formal ecological risk screening/assessment may be appropriate (See Section 6.3.1.3). In addition, changes to exposure scenarios may require that the baseline 1998 Risk Assessment be revised.
 8. If the COP would like to reduce the QA/QC field sampling frequency, an amendment to the existing QAPP will be required.

Table 16, provides a summary of the above follow-up and recommended actions.

10. PROTECTIVENESS STATEMENTS

A protectiveness statement cannot be made at this time. Additional data regarding methane and NMOCs in ambient air and groundwater will need to be collected and evaluated to determine if the landfill is currently protective. An addendum to this five year review determining protectiveness will be completed within 6 months. Upon completion of all appropriate activities (See Section 9.0) to address deficiencies and recommended actions, ADEQ will reevaluate the site to determine if the remedies are meeting remedial objectives, and are protective of human health and the environment. A supplemental report will be issued that will address the results of the evaluation.

11.0 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 ADEQ and EPA approves this report. The approval date of this report is provided in the “Report Approvals” section, Page iii.

12.0 OTHER COMMENTS

When conducting the next and subsequent five-year review, the reviewer(s) should pay close attention to the progress made on the Rio Salado Project, and the potential impact it could have on this remedy. In addition, if the methane recovery systems have not been modified to control methane levels at applicable areas of the facility property, future surrounding land use must be closely examined to identify any modifications that could create explosive conditions from methane migrating beyond the facility boundary.

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TABLE 1 - CHRONOLOGY OF SITE EVENTS

DATE	EVENT
May 1978	Flooding event causes washout of refuse in Cell A and A-1 into the Salt River.
1979	Flooding events causes more washout of refuse into the Salt River.
February 1978	Cease and desist order issued by Arizona Department of Health (ADHS)
September 8, 1983	Placed on Environmental Protection Agency's (EPA) national priorities list (NPL)
1988	EPA assigns lead oversight authority of the site to ADEQ
1988	City of Phoenix 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	Consent decree & agreement between ADEQ and City of Phoenix entered
August 14, 1995	Began construction of remedies
February 25, 1997	ADEQ and EPA conduct final inspection of constructed remedies
June 30, 1997	ADEQ issues written approval of remedial action
September 1997	City of Phoenix completes the draft Remedial Action Completion report.
February 17, 1998	ADEQ completes the Superfund Preliminary Close-Out Report
September 1998	Submittal of final Remedial Action Completion report to ADEQ
September 1998	Submittal of final O&M manual for landfill to ADEQ
October 30, 1998	City submits Ambient Air Monitoring Plan to ADEQ for approval.
November 25, 1998	City submits upgradient assessment of 1,1-DCE in groundwater
February 05, 1999	City submits first ambient air monitoring results report to ADEQ
March 01, 1999	City submits O&M and monitoring program manual to ADEQ for gas extraction system
August 05, 1999	City submits second ambient air monitoring results report to ADEQ
January 13, 2000	ADEQ and ESE begins five-year review

TABLE 2 - ANNUAL O&M COSTS

Dates		Total Cost Rounded to Nearest \$100
From	To	
July 1996	June 1997	The last 4-months were subject to O&M; costs could not be broken out.
July 1997	June 1998	\$ 555,600.00
July 1998	June 1999	\$ 316,900.00

Note: Cost data was provided by City of Phoenix in the "Summary of Accumulated Costs, 19th Avenue Landfill - Cost Accumulation" (See Appendix A).

TABLE 3
SUMMARY OF CURRENT CHEMICAL-SPECIFIC STANDARDS
19th Avenue Landfill - Five Year Review
Phoenix, Arizona

Authority	Medium	Requirements	Requirement Synopsis	Remedy Compliance w/Current Standards
Federal Regulatory Requirements	Groundwater	Federal Safe Drinking Water Maximum Contaminants 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 concentrations of contaminants in public drinking water supplies, and are considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	No – Pentachlorophenol and Thallium was detected in Wells DM-3P and I-4, respectively that may trigger Contingency Plan.
		EPA Region IX, 1999 Preliminary Remediation Goals.	EPA Region IX guidelines establishing concentrations of compounds in soil, tap water, and air considered to be protective of human health.	Yes
	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. Also 40 CFR 60.753(d) limits the methane concentration at the surface of the landfill to 500 ppm above background.	Unknown – Compliance with this standard cannot be determined until NMOC concentration can be determined.
		Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfills (40 CFR 258.23(a))	Limits the level of methane within facility structure is 25 % of the lower explosive limit (LEL) and the landfill boundary to less than or equal the LEL (i.e., 5%).	No – Probes A-20D, B-12D, B-14D, B-15D, D-11, SR-2, SR-3, & SR-5 have exceeded boundary limits.
State, and 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.	Not Applicable unit continuous flows are established in Salt River.
		ADEQ’s Human Health-Based Guidance Levels for the Ingestion of Contaminants in Drinking Water and Soil, June 1992	This guidance document list a variety of compounds that provides different concentrations/limits based on: calculated risk-based ingestion concentrations; MCLs; proposed MCLs; and state laboratory level of quantitation values.	Yes

TABLE 3
SUMMARY OF CURRENT CHEMICAL-SPECIFIC STANDARDS
19th Avenue Landfill - Five Year Review
Phoenix, Arizona

Authority	Medium	Requirements	Requirement Synopsis	Remedy Compliance w/Current Standards
State and Local Regulatory Requirements	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.	Yes
	Wastewater	City of Phoenix Pretreatment Effluent Limitations (PCC, Chapter 28, Articles II and VI)	The discharge of the condensate into the City of Phoenix sewer system must meet all appropriate effluent limits.	Yes
	Air	Maricopa County Air Pollution Control Permitting (MCAP) Rule 200, Section 303 & ARS 49-480)	An air quality permit has been issued by Maricopa County for the gas control system operating at the site. This permit provides general condition on the operation of the gas control systems as well as specific emission allowances for appropriate emission criteria.	Yes
		MCAP Ambient Air Quality Standard and Area Classification (Rule 510)	Rule 510 establishes ambient air quality standards for Maricopa county's appropriate air emissions parameter, which includes ozone. The air quality standards are allowable limits of emission parameter based on the area classification. The site is currently performing air monitoring for VOCs, which has no established standards.	Yes
		Arizona Ambient Air Quality Guidelines (AAAQGs)	The AAAQGs, 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 Landfill.	Unknown – ADEQ and EPA are currently evaluating the sampling methodology and data collected to determine if the sampling results meet the current standards.
		MCAP; Air Contaminants from Municipal Solid Waste Landfills (Rule 321)	Adopts the Federal Clean Air Act Standard of Performance for Municipal Solid Waste Landfills (40 CFR 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	Unknown - Compliance with this standard cannot be determined until NMOC concentration can be

TABLE 3
SUMMARY OF CURRENT CHEMICAL-SPECIFIC STANDARDS
19th Avenue Landfill - Five Year Review
Phoenix, Arizona

Authority	Medium	Requirements	Requirement Synopsis	Remedy Compliance w/Current Standards
			November 8, 1997. Refer to the Federal Air Section for requirements of 40 CFR 60, Subpart WWW.	determined.

**TABLE 4
COMPARISON OF CHEMICAL-SPECIFIC ESTABLISHED ARARS TO CURRENT STANDARDS**

Contaminant	Media	Standards	Source	Year	
Volatile Organic Compounds					
Acetone	Groundwater	Established	700 ug/l	ADEQ HBGLs	1990
		Current	NC	ADEQ HBGLs	1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	20,000 ug/m ³	AAAQGs	1992
		Current (24-hr)	14,000 ug/m ³	AAAQGs	1992
Benzene	Groundwater	Established	5 ug/l	MCLs	NS
		Current	NC	ADEQ AWQS	1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	630 ug/m ³	AAAQGs	1992
		Current (24-hr)	51 ug/m ³	AAAQGs	1992
Bromodichloromethane	Groundwater	Established	100 ug/l	MCLs	NS
		Current	NC	MCLs	1998
	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	36 ug/m ³	AAAQGs	1992
		Current (24-hr)	9.5 ug/m ³	AAAQGs	1992
Bromoform (Trihalomethane)	Groundwater	Established	100 ug/l	MCLs	NS
		Current	NC	MCLs	1998
Bromomethane	Groundwater	Established	0.5 ug/l	ADEQ LCL	NS
		Current	9.8 ug/l	ADEQ HBGLs	1992
2-Butanone	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	7400 ug/m ³	AAAQGs	1992
		Current (24-hr)	4700 ug/m ³	AAAQGs	1992
Carbon Tetrachloride	Groundwater	Established	5 ug/l	MCLs	NS
		Current	NC	ADEQ AWQS	1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	49 ug/m ³	AAAQGs	1992
		Current (24-hr)	13 ug/m ³	AAAQGs	1992
Chlorobenzene	Groundwater	Established	100 ug/l	Proposed MCLs	NS
		Current	NC	MCLs	1998
	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	NE	AAAQGs	1992
		Current (24-hr)	2560 ug/m ³	AAAQGs	1992
Chloroform	Groundwater	Established	100 ug/l	MCLs	NS
		Current	NC	MCLs	1998
	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	60 ug/m ³	AAAQGs	1992
		Current (24-hr)	16 ug/m ³	AAAQGs	1992
Chloromethane	Groundwater	Established	0.5 ug/l	ADEQ LCL	NS
		Current	2.8 ug/l	ADEQ HBGLs	1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	36 ug/m ³	AAAQGs	1992
		Current (24-hr)	9.5 ug/m ³	AAAQGs	1992

TABLE 4
COMPARISON OF CHEMICAL-SPECIFIC ESTABLISHED ARARS TO CURRENT STANDARDS

Contaminant	Media	Standards	Source	Year	
Volatile Organic Compounds					
Dibromochloromethane	Groundwater	Established Current	100 ug/l NC	MCLs MCLs	NS 1998
1,2-Dichlorobenzene	Groundwater	Established Current	500 ug/l NC	Proposed MCLs ADEQ AWQS	NS 1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr) Current (24-hr)	9100 ug/m ³ 2400 ug/m ³	AAAQGs AAAQGs	1992 1992
1,3-Dichlorobenzene	Groundwater	Established Current	620 ug/l NC	ADEQ HBGLs ADEQ HBGLs	1990 1992
	Groundwater	Established Current	75 ug/l NC	MCLs ADEQ AWQS	NS 1992
Air		Established	NE	AAAQGs	1992
		Current (1-hr) Current (24-hr)	250 ug/m ³ 66 ug/m ³	AAAQGs AAAQGs	1992 1992
Dichlorodifluoromethane	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	52,000 ug/m ³	AAAQGs	1992
		Current (24-hr)	39,000 ug/m ³	AAAQGs	1992
1,1-Dichloroethane	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	53 ug/m ³	AAAQGs	1992
		Current (24-hr)	14 ug/m ³	AAAQGs	1992
1,2-Dichloroethane	Groundwater	Established Current	5 ug/l NC	MCLs ADEQ AWQS	NS 1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr) Current (24-hr)	8400 ug/m ³ 3200 ug/m ³	AAAQGs AAAQGs	1992 1992
1,1-Dichloroethene	Groundwater	Previous Current	7 ug/l NC	MCLs ADEQ AWQS	NS 1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr) Current (24-hr)	420 ug/m ³ 110 ug/m ³	AAAQGs AAAQGs	1992 1992
Trans-1,2-Dichloroethene	Groundwater	Established Current	100 ug/l NC	Proposed MCLs ADEQ AWQS	NS 1992
Cis-1,2-Dichloroethene	Groundwater	Established Current	70 ug/l NC	Proposed MCLs ADEQ AWQS	NS 1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr) Current (24-hr)	23,800 ug/m ³ 6300 ug/m ³	AAAQGs AAAQGs	1992 1992
1,2-Dichloropropane	Groundwater	Established Current	5 ug/l NC	Proposed MCLs ADEQ AWQS	NS 1992
Trans-1,3-Dichloropropene	Groundwater	Established Current	0.5 ug/l NC	ADEQ LCL ADEQ LCL	NS 1992
Cis-1,3-Dichloropropene	Groundwater	Established Current	0.5 ug/l NC	ADEQ LCL ADEQ LCL	NS 1992

**TABLE 4
 COMPARISON OF CHEMICAL-SPECIFIC ESTABLISHED ARARS TO CURRENT STANDARDS**

Contaminant	Media	Standards	Source	Year	
Volatile Organic Compounds					
Ethylbenzene	Groundwater	Established Current	700 ug/l NC	Proposed MCLs ADEQ AWQS	NS 1992
	Air	Established Current (1-hr) Current (24-hr)	NE 4500 ug/m ³ 3500 ug/m ³	AAAQGs AAAQGs	1992 1992
Halocarbon 113	Air	Established Current (1-hr) Current (24-hr)	NE 79,000 ug/m ³ 60,000 ug/m ³	AAAQGs AAAQGs	1992 1992
		Established Current (1-hr) Current (24-hr)	NE 7.2 ug/m ³ 1.9 ug/m ³	AAAQGs AAAQGs	1992 1992
Methylene Chloride	Groundwater	Established Current	5 ug/l NC	Proposed MCLs Proposed MCLs	NS 1992
	Air	Established Current (1-hr) Current (24-hr)	NE 7600 ug/m ³ 2000 ug/m ³	AAAQGs AAAQGs	1992 1992
Styrene	Air	Established Current (1-hr) Current (24-hr)	NE 3500 ug/m ³ 1700 ug/m ³	AAAQGs AAAQGs	1992 1992
		Established Current	0.5 ug/l NC	ADEQ LCL ADEQ LCL	NS 1992
Tetrachloroethene	Groundwater	Established Current	5 ug/l NC	Proposed MCLs ADEQ AWQS	NS 1992
	Air	Established Current (1-hr) Current (24-hr)	NE 11,000 ug/m ³ 770 ug/m ³	AAAQGs AAAQGs	1992 1992
Toluene	Groundwater	Established Current	2000 ug/l 1000 ug/l	Proposed MCLs ADEQ AWQS	NS 1992
	Air	Established Current (1-hr) Current (24-hr)	NE 4700 ug/m ³ 3000 ug/m ³	AAAQGs AAAQGs	1992 1992
Total Trihalomethanes	Groundwater	Established Current	100 ug/l NC	MCLs MCLs	NS 1998
		Established Current	200 ug/l NC	MCLs ADEQ AWQS	NS 1992
1,1,1-Trichloroethane	Air	Established Current (1-hr) Current (24-hr)	NE 20,000 ug/m ³ 1100 ug/m ³	AAAQGs AAAQGs	1992 1992
	Groundwater	Established Current	5 ug/l NC	Proposed MCLs MCLs	NS 1994

**TABLE 4
 COMPARISON OF CHEMICAL-SPECIFIC ESTABLISHED ARARS TO CURRENT STANDARDS**

Contaminant	Media	Standards	Source	Year	
Volatile Organic Compounds					
Trichloroethene	Groundwater	Established	5 ug/l	MCLs	NS
		Current	NC	ADEQ AWQS	1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	1100 ug/m ³	AAAQGs	1992
		Current (24-hr)	280 ug/m ³	AAAQGs	1992
Trichlorofluoromethane	Groundwater	Established	2100 ug/l	ADEQ HBGLs	1990
		Current	NC	ADEQ HBGLs	1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	220,000 ug/m ³	AAAQGs	1992
		Current (24-hr)	59,000 ug/m ³	AAAQGs	1992
Trichlorotrifluoromethane	Groundwater	Established	210,000 ug/l	ADEQ HBGLs	1990
		Current	NC	ADEQ HBGLs	1992
1,3,5-Trimethylbenzene	Air	Established	NE		
		Current (1-hr)	NE		
		Current (24-hr)	1090 ug/m ³	AAAQGs	1992
1,2,4-Trimethylbenzene	Air	Established	NE		
		Current (1-hr)	NE		
		Current (24-hr)	1422 ug/m ³	AAAQGs	1992
Vinyl Chloride	Groundwater	Established	2 ug/l	MCLs	NS
		Current	NC	ADEQ AWQS	1992
Total Xylenes	Groundwater	Established	10000 ug/l	Proposed MCLs	NS
		Current	NC	ADEQ AWQS	1992
	Air	Established	NE	AAAQGs	1992
		Current (1-hr)	5500 ug/m ³	AAAQGs	1992
		Current (24-hr)	3500 ug/m ³	AAAQGs	1992
Base/Neutral Extractable Compounds					
Bis(2-ethylhexyl)phthalate	Groundwater	Established	4 ug/l	MCLs	1990
		Current	6 ug/l	MCLs	1994
Butylbenzylphthalate	Groundwater	Established	100 ug/l	ADEQ HBGLs	1990
		Current	110 ug/l	ADEQ HBGLs	1992
Naphthalene	Groundwater	Established	NE		
		Current	28 ug/l	ADEQ HBGLs	1992
Pentachlorophenol	Groundwater	Established	NE		
		Current	1 ug/l	MCLs	1994
Metals					
Zinc	Groundwater	Established	5000 ug/l	ADEQ HBGLs	1990
		Current	NC	ADEQ HBGLs	1992
	Surface Water	Established	NE		
		Current (AC)	0.8473*10(CaCO ₃)+0.85	ADEQ SWQS	1996
		Current (CH)	0.8473*10(CaCO ₃)+0.761		

**TABLE 4
 COMPARISON OF CHEMICAL-SPECIFIC ESTABLISHED ARARS TO CURRENT STANDARDS**

Contaminant	Media	Standards	Source	Year	
Metals					
Copper	Groundwater	Established Current	1300 ug/l NC	ADEQ HBGLs ADEQ HBGLs	1990 1992
	Surface Water	Established Current (AC) Current (CH)	NE $0.9422 \ln(\text{CaCO}_3) - 1.465$ $0.8545 \ln(\text{CaCO}_3) - 1.465$	ADEQ SWQS	1996
Silver	Groundwater	Established Current	50 ug/l NC	MCLs MCLs	NS NS
	Surface Water	Established Current	NE $1.72 \ln(\text{CaCO}_3) - 6.52$	ADEQ SWQS	1996
Arsenic	Groundwater	Established Current	50 ug/l NC	MCLs ADEQ AWQS	NS 1992
Barium	Groundwater	Established Current	5000 ug/l 2000 ug/l	Proposed MCLs ADEQ AWQS	NS 2000
	Surface Water	Established Current	NE NE	ADEQ SWQS	1996
Beryllium	Groundwater	Established Current	5 ug/l 4 ug/l	ADEQ LCL MCLs	NS 1994
Cadmium	Groundwater	Established Current	5 ug/l NC	Proposed MCLs ADEQ AWQS	NS 1992
	Surface Water	Established Current (AC) Current (CH)	NE $1.128 \ln(\text{CaCO}_3) - 2.0149$ $0.7852 \ln(\text{CaCO}_3) - 3.49$	ADEQ SWQS	1996
Chromium	Groundwater	Established Current	50 ug/l 100 ug/l	MCLs ADEQ AWQS	NS 1992
Iron	Groundwater	Established Current	NE NC		
Manganese	Groundwater	Established Current	NE NC		
Mercury	Groundwater	Established Current	2 ug/l NC	MCLs ADEQ AWQS	NS 1992
Lead	Groundwater	Established Current	50 ug/l NC	MCLs ADEQ AWQS	NS 1992
	Surface Water	Established Current (AC) Current (CH)	NE $1.273 \ln(\text{CaCO}_3) - 1.46$ $1.273 \ln(\text{CaCO}_3) - 4.705$	ADEQ SWQS	1996
Selenium	Groundwater	Established Current	10 ug/l 50 ug/l	MCLs ADEQ AWQS	NS 1992
Antimony	Groundwater	Established Current	50 ug/l 6 ug/l	ADEQ LCL MCLs	NS 1994
Nickel	Groundwater	Established Current	100 ug/l 730 ug/l	Proposed MCLs PRGs	NS 1999
	Surface Water	Established Current (AC) Current (CH)	NE $0.846 \ln(\text{CaCO}_3) + 3.3611$ $0.846 \ln(\text{CaCO}_3) + 1.1644$	ADEQ SWQS	1996

**TABLE 4
 COMPARISON OF CHEMICAL-SPECIFIC ESTABLISHED ARARS TO CURRENT STANDARDS**

Contaminant	Media	Standards	Source	Year	
Metals					
Thallium	Groundwater	Established Current	5 ug/l 2 ug/l	ADEQ LCL MCLs	NS 1994
General Parameters					
Cyanide	Groundwater	Established Current	200 ug/l NC	Proposed MCLs MCLs	NS 1994
Fluoride	Groundwater	Established Current	4000 ug/l NC	MCLs ADEQ AWQS	NS 1992
Nitrate	Groundwater	Established Current	10,000 ug/l NC	MCLs ADEQ AWQS	NS 1992
Sulfate	Groundwater	Established Current	400,000 ug/l NC	Proposed MCLs	NS
Chloride	Groundwater	Established Current	NE NC		
pH	Groundwater	Established Current	NE NC		
	Surface Water	Established Current	NE 6.5 to 9.0 SU	ADEQ SWQS	1996
	Wastewater	Established Current	5.0 to 10.5 SU NC	COP PEL COP PEL	1997 1997
Fecal Coliform	Surface Water	Established Current	NE 1000 cfu/100 * 4000 cfu/100 **	ADEQ SWQS	1996
Temperature	Surface Water	Established Current	NE 3.4 deg. C	ADEQ SWQS	1996
Turbidity	Surface Water	Established Current	NE 50 NTU	ADEQ SWQS	1996
Dissolved Oxygen	Surface Water	Established Current	NE 55 mg/l	ADEQ SWQS	1996
Total Phosphorus	Surface Water	Established Current	NE 0.12 mg/l *** 0.3 mg/l **** 1 mg/l *****	ADEQ SWQS	1996
Total Nitrogen	Surface Water	Established Current	NE 0.6 mg/l *** 1.2 mg/l **** 2 mg/l *****	ADEQ SWQS	1996
Hardness (CaCO ₃)	Surface Water	Established Current	NE 400 mg/l	ADEQ SWQS	1996
Radio nuclides					
Gross Alpha	Groundwater	Established Current	15 pCi/l NC	MCLs ADEQ AWQS	NS 1992
	Surface Water	Established Current	NE 15 pCi/l	ADEQ SWQS	1996

**TABLE 4
 COMPARISON OF CHEMICAL-SPECIFIC ESTABLISHED ARARS TO CURRENT STANDARDS**

Contaminant	Media	Standards	Source	Year	
Radionuclides					
Gross Beta	Groundwater	Established Current	50 pCi/l NC	Screening Level MCLs	NS 1994
	Surface Water	Established Current	NE 4 millirems/yr	ADEQ SWQS	1996
Radium-226 + 228	Surface Water	Established Current	NE 5 pCi/l	ADEQ SWQS	1996
Strontium-90	Surface Water	Established Current	NE 8 pCi/l	ADEQ SWQS	1996
Tritium	Surface Water	Established Current	NE 20000 pCi/l	ADEQ SWQS	1996
Specific Air Emission Parameters					
Methane	Air	Established	1.25% structures 5% boundaries	RCRA HWLFE	1988
		Current	NC	40 CFR 258.23(a)	1991
Non-Methane Organic Compounds (NMOC)	Air	Established Current	NE 50 mg/yr	40 CFR 60 WWW	1998
Particulates (TSP)	Air	Established	105 lbs/day 17.5 tons/year	Air Quality Permit	1996
		Current	NC	Air Quality Permit	1996
	Air	Established Current	75 ug/m ³ AM 260 ug/m ³ 24-hrs NC	Maricopa AAQSSs Maricopa AAQSSs	1988 1988
Particulates < 10 Microns (PM10)	Air	Established	75 lbs/day 12.5 tons/year	Air Quality Permit	1996
		Current	NC	Air Quality Permit	1996
	Air	Established Current	50 ug/m ³ AM 150 ug/m ³ 24-hrs NC	Maricopa AAQSSs Maricopa AAQSSs	1988 1988
Ozone	Air	Established	75 lbs/day 12.5 tons/year	Air Quality Permit	1996
		Current	NC	Air Quality Permit	1996
	Air	Established Current	235 ug/m ³ 1-hr NC	Maricopa AAQSSs Maricopa AAQSSs	1988 1988
Non-Precursor Organic Compounds	Air	Previous	75 lbs/day 12.5 tons/year	Air Quality Permit	1996
		Current	NC	Air Quality Permit	1996
Sulfur Oxides (SOx)	Air	Established	30 lbs/day 5 tons/year	Air Quality Permit	1996
		Current	NC	Air Quality Permit	1996
	Air	Established Current	80 ug/m ³ AM 365 ug/m ³ 24-hrs 1300 ug/m ³ 3-hrs NC	Maricopa AAQSSs Maricopa AAQSSs	1988 1988

**TABLE 4
 COMPARISON OF CHEMICAL-SPECIFIC ESTABLISHED ARARS TO CURRENT STANDARDS**

Contaminant	Media	Standards	Source	Year	
Specific Air Emission Parameters					
Carbon Monoxide	Air	Established	75 lbs/day 12.5 tons/year	Air Quality Permit	1996
		Current	NC	Air Quality Permit	1996
	Air	Established	40 mg/m ³ 1-hr 10 mg/m ³ 8-hrs	Maricopa AAQSSs	1988
		Current	NC	Maricopa AAQSSs	1988
Nitrogen Oxides (Nox)	Air	Established	50 lbs/day 8.5 tons/year	Air Quality Permit	1996
		Current	NC	Air Quality Permit	1996
	Air	Established	100 ug/m ³ AM	Maricopa AAQSSs	1988
		Current	NC	Maricopa AAQSSs	1988

Notes:

* 30-day geometric mean (5 samples minimum)

** Single sample maximum

*** Single sample

**** Annual 90th sample

***** Mean percentile maximum

ug/l - micrograms per liter

mg/kg - milligrams per kilograms

mg/l - milligrams per liter

pCi/l - picocuries per liter

ug/m³ - microgram per cubic meter

mg/m³ - milligrams per cubic meter

NC - No Change

NE - Not Established

NS - Not Specified

ADEQ - Arizona Department of Environmental Quality

HBGLs - Health Based Guidance Levels

MCLs - Maximum Contaminant Levels

AWQS - Aquifer Water Quality Standards

PRGs - Preliminary Remediation Goals

LCL - Laboratory Confidence Limit

SALs - Soil Action Levels

SRLs - Soil Remediation Levels

MDL - Method Detection Limit

SWQS - Surface Water Quality Standards

SU - Standard Units

AC - Acute

CH - Chronic

COP - City of Phoenix

PEL - Pretreatment Effluent Limit

AM - Annual Mean

RCRA - Resource Conservation and Recovery Act

HWLFE - Hazardous Waste Landfill Emissions

AAQSSs - Ambient Air Quality Standards

Bold - Denotes that current standard is more stringent than established standard

TABLE 5
SUMMARY OF ACTION-SPECIFIC STANDARDS
19th Avenue Landfill - Five Year Review
Phoenix, Arizona

Revision: 2
Date: 07/28/00

Authority	Requirements	Requirement Synopsis	Remedy Compliance w/ ARARs
Federal Regulatory Requirement	Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfill; Final Covers (40 CFR 258.60(a)).	Provides design and performance specification on final covers/cap of municipal landfills.	Yes
	Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfill; Post-Closure Requirements (40 CFR 258.61(a)).	Identifies post-closure O & M and monitoring requirements of closed municipal landfills.	Yes
	Federal solid Waste Disposal Act Criteria for Municipal Solid Waste Landfill; Gas Collection System Monitoring during Post-Closure (40 CFR 258.61(a) and 258.23).	Provides monitoring requirements of landfilled gases during the post-closure period of the municipal landfill	Yes
	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 a landfill gas collection and control systems.	Unknown - The nonmethane organic compound (NMOC) concentration must first be known before compliance with this standard can be determined.
	Federal Clean Air Act Standard of Performance for Municipal Solid Waste Landfills; Design and Operating Guidelines for Landfill Gas Collection and Control Flare Systems (40 CFR 60.18).	Provides design standards and operating requirements for a landfill gas control flare system.	Unknown - The NMOC concentration must first be known before compliance with this standard can be determined.

TABLE 5
SUMMARY OF ACTION-SPECIFIC STANDARDS
19th Avenue Landfill - Five Year Review
Phoenix, Arizona

Revision: 2
Date: 07/28/00

Authority	Requirements	Requirement Synopsis	Remedy Compliance w/ARARs
Federal Regulatory Requirements Cont'd.	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 for landfill be permitted.	No - Because no exemption could be found on storm water discharges from closed landfills, the City must obtain an appropriate permit for this Site.
	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 a Municipal landfill facility, and provides corrective action procedures if contaminants are detected.	Yes
State/Local Regulatory Requirements	Maricopa County Air Pollution Control Permitting (MCAP) Rule 200, Section 303 & ARS 49-480)	Addresses specific operating conditions of the active gas collection and control system at the site.	Yes
	MCAP; Air Contaminants from Municipal Solid Waste Landfills (Rule 321)	Adopts the Federal Clean Air Act Standard of Performance for Municipal Solid Waste Landfills (40 CFR 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 60, Subpart WWW.	Unknown - Compliance with this standard cannot be determined until the concentration of NMOC is determined.
	City of Phoenix Pretreatment Effluent Limitations (PCC, Chapter 28, Articles II and VI)	Requires on-site treatment of condensate water if pretreatment effluent discharge limits cannot be met.	Yes

**TABLE 6
COMPARISON OF ACTION-SPECIFIC ESTABLISHED ARARS TO STANDARDS**

Unit/Activity	Status	Requirements	Source	Year
Landfill Cap	Established	- Permeability greater than 1×10^{-4} cm/sec. - infiltration (clay) layer minimum 36-inches thick	Consent Decree	1992
	Current	- Permeability greater than 1×10^{-5} cm/sec. - infiltration (clay) layer minimum 18-inches thick	40 CFR 258.60(a)	1992
Post-Closure	Established	- Post-Closure care period not specified - Conduct groundwater and methane monitoring - Maintain gas collection system - Landfill CAP inspection and maintenance	Letter of Determination Record of Decision Consent Decree	1989 1989 1992
	Current	- Post-Closure care period of a minimum 30-years - Conduct groundwater and methane monitoring - Maintain gas collection system - Landfill CAP inspection and maintenance	40 CFR 258.61(a) 40 CFR 258.23	1992 1992
Gas Collection System	Established	- 90% destruction efficiency of Methane and VOC - Filter/condensate knockout drum w/control efficiency of 99.7% for PM5 or above. - Carbon canister for condensate tank. - Minimum temp of 1400 EF at 1500 scfm (Cell A) - Minimum temp of 1400 EF at 100 scfm (Cell A-1)	Air Quality Permit	1996
	Current	No changes - 98% destruction efficiency of NMOC - Operate collection system so that methane is less than 500 ppm at landfill surface. - All collected gases must be vented to a control device (i.e., flare) - Continuous operation of the system when collected gas is being routed to the system.	Air Quality Permit 40 CFR 60.752, 753, 756, and 759. MCAP Rule 321	1996 1998 1997
Flare System	Established	- Minimum temp of 1400 EF at 15000 scfm (Cell A) - Minimum temp of 1400 EF at 100 scfm (Cell A-1)	Air Quality Permit	1996
	Current	- No visible emissions - Flares shall be operated with a flame present at all times - Flares used must have a diameter of 3 inches or greater, nonassisted, hydrogen content of 8 % or greater, and exit velocity less than 37.2 m/sec; OR Flares can only be used with net heating value of the combusted gas of 11.2 MJ/scm or greater for steam/air assisted, or 7,45 MJ/scm for nonassisted	40 CFR 60.18	1998
Surface Water Discharge	Established	Not addressed		
	Current	- NPDES permitting of storm water discharges from landfill cells to Salt River.	20 CFR 122.26	1995

**TABLE 6
 COMPARISON OF ACTION-SPECIFIC ESTABLISHED ARARS TO STANDARDS**

Unit/Activity	Status	Requirements	Source	Year
Groundwater Monitoring	Established	<ul style="list-style-type: none"> - Wells include upgradient and downgradient wells. - Quarterly groundwater monitoring required - Trigger contingency plan if average of three consecutive quarters exceeds threshold value. - Allows for verification sample prior to triggering of contingency plan. - Allows owner/operator to demonstration off-site contamination impacted downgradient wells. - Allows for assessment of corrective action remedies and implementation of selected remedy. 	Consent Decree	1989
	Current	<ul style="list-style-type: none"> - Requires appropriate number of wells to monitor groundwater upgradient and downgradient of the unit. - Allows for semi-annual detection monitoring if no constituents exceed groundwater standards of determined background concentrations. - Requires more extensive assessment monitoring if one or more constituents statistically exceeds background concentrations; requires semi-annual monitoring of detection monitoring constituents and annual monitoring of expanded lists of contaminants (Appendix II 40 CFR 258) - Requires owner/operator to compare off-site (background) contamination to downgradient wells. - Requires assessment of corrective action, selection of remedy, and implementation of remedy if constituents statistically exceeds groundwater protection levels. 	40 CFR 258, Subpart E	1992
Wastewater Pretreatment	Established	<ul style="list-style-type: none"> - Requires adjustment of pH that is < 5 or > 10.5 SU prior to discharge into sanitary sewer. 	COP Discharge Authorization Letter	1997
	Current	No changes.	COP Discharge Authorization Letter	1997

Notes:

- cm/sec - centimeter per second
- ppm - parts per million
- SU - standard units
- CFR - Code of Federal Regulations
- VOC - Volatile Organic Compounds
- PM5 - particulate matter > 5 microns
- NMOC - Nonmethane Organic Compounds
- MCAP - Maricopa County Air Pollution
- NPDES - National Pollutant Discharge Elimination System
- COP - City of Phoenix
- Bold** - Denotes more stringent current standard.

TABLE 7
SUMMARY OF ACTION-SPECIFIC STANDARDS
19th Avenue Landfill - Five Year Review
Phoenix, Arizona

Revision: 2
Date: 07/28/00

Authority	Media	Requirements	Requirement Synopsis	Remedy Compliance w/ ARARs
Federal Regulatory Requirements	Floodplains	Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfill; Floodplains (40 CFR 258.11).	Landfill must be designed to avoid washout.	Yes
	Wetlands	Federal Clean Water 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 to the aquatic ecosystem, so long as the alternative does not have other significant adverse impacts. Appropriate and practicable steps must be taken to minimize adverse impacts.	Yes
		Federal Solid Waste Disposal Act Criteria for Municipal Solid Waste Landfill; Wetlands (40 CFR 258.12).	Requirements to protect the integrity of wetlands.	Yes
	Ecological Assessment	Variety of different CERCLA Guidance documents including: Risk Assessment Guidance for Superfund, 1989, and Conducting Ecological Risk Assessments, 1997.	As part of Superfunds risk evaluation process, and ecological risk assessment/screening should be performed to estimate the potential for undesirable ecological effects associate with site impact.	Yes
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 to the 23 rd Avenue Wastewater Treatment Plant outfall.	Yes

**TABLE 8
 COMPARISON LOCATION-SPECIFIC ESTABLISHED ARARS TO CURRENT STANDARDS**

Location	Status	Requirements	Source	Year
Floodplains	Established	- Installation of levees for Salt River bank flood protection, and containment of refuse.	Consent Decree	1992
	Current	- Landfill must be designed to avoid refuse washout into rivers or channels	40 CFR 258.11	1992
Wetlands (future consideration)	Established	Not specified	Not specified	NS
	Current	- Prohibits discharge of fill materials to wetlands by taking appropriate and practicable steps to minimize adverse impact.	33 CFR 320-328	
		- Taking appropriate actions to protect the integrity of wetlands.	40 CFR 258.12	1992
Surface Water (future requirement)	Established	- Designates uses for the Salt River in the area for incidental human body contact, agricultural irrigation and livestock watering, and aquatic wildlife use.	AAC R9-21-206	NS
	Current	- Designates uses for the Salt River in the area for warmwater aquatic and wildlife, partial body contact, and fish consumption use.	AAC Title 18, Chapter 11, Article 1.	1992
Ecological Assessment (future consideration)	Established	- Informal Ecological screening to identify wildlife present at landfill.	Remedial Action Plan	1989
	Current	- Performance of an ecological screening or risk assessment to estimate the potential of undesirable ecological effects.	Risk Assessment Guidance for Superfund Conducting Ecological Risk Assessments Other guidance documents	1989 1997

Notes:

AAC - Arizona Administrative Code
 CFR - Code of Federal Regulations
 NS - Not specified

Table 9. Confirmation of Chemical-Specific Toxicity Values

Chemical of Concern*	Toxicity Value Name	Toxicity Value**	Source (oral/inhal.)	Impact on Risk Assessment	
COCs with Carcinogenic Endpoint (from Table L.3)					
Vinyl Chloride	Potency Factor [PF] (mg/kg-day) ⁻¹	Previous (oral/inhalation)	2.3 / 0.025	EPA, 1986	The oral slope factors are within 10% of one another, so the difference will not materially affect the risk calculation. The inhalation slope factors differ by an order of magnitude, so there could be an impact on the calculated risk and, therefore, the decisions made. However, inhalation pathways were not used in the risk assessment. Result due to changes in the slope factors: no impact on the risk assessment.
	Cancer Slope Factor [SF] (mg/kg-day) ⁻¹	Current (oral/inhalation)	1.9 / 03	EPA, 1997	
1,1-Dichloroethene	Potency Factor [PF] (mg/kg-day) ⁻¹	Previous (oral/inhalation)	0.58 / 1.16	EPA, 1986	The oral slope factors are essentially the same. The inhalation slope factor is relaxed by an order of magnitude for the current value, but inhalation pathways were not used in the risk assessment. Result due to changes in the slope factors: no impact on the risk assessment.
	Cancer Slope Factor [SF] (mg/kg-day) ⁻¹	Current (oral/inhalation)	0.6 / 0.18	EPA, 1999a	
Chloroform	Potency Factor [PF] (mg/kg-day) ⁻¹	Previous (oral/inhalation)	0.081 / NL	EPA, 1986	The current slope factor is an order of magnitude less stringent than the previous value, The protectiveness of the remedy is not compromised by this change. A new inhalation slope factor is not of consequence because inhalation pathways were not used in the risk assessment. Result due to changes in the slope factors: no impact on the risk assessment.
	Cancer Slope Factor [SF] (mg/kg-day) ⁻¹	Current (oral/inhalation)	0.0061 / 0.081	EPA, 1999a	
4,4'-DDE	Potency Factor [PF] (mg/kg-day) ⁻¹	Previous (oral/inhalation)	NL / NL	EPA, 1986	A new slope factor for oral ingestion could add to the cumulative risk and thereby the decisions based on risk. Inhalation pathways were not used in the risk assessment, so the new inhalation slope factor has no impact. As shown in Table L.6, DDE was not carried in the final selection of indicator chemicals for groundwater, implying that its CT (concentration times toxicity) score was not a significant contributor to risk. The impact on decision making by incorporating the new oral slope factor will be <i>de minimis</i> .
	Cancer Slope Factor [SF] (mg/kg-day) ⁻¹	Current (oral/inhalation)	0.34 / 0.34	EPA, 1999a / EPA, 1999c	
Bis(2-ethylhexyl)-phthalate	Potency Factor [PF] (mg/kg-day) ⁻¹	Previous (oral/inhalation)	0.000684 / NL	EPA, 1986	The current values for oral and inhalation slope factors are significantly higher than the previous values. However, as shown in Table L.6, the COC was not carried in the final selection of indicator chemicals for groundwater, implying that its CT (concentration times toxicity) score was not a significant contributor to risk, The impact on decision making by incorporating the new slope factors will be <i>de minimis</i> .
	Cancer Slope Factor [SF] (mg/kg-day) ⁻¹	Current (oral/inhalation)	0.014 / 0.014	EPA, 1999a / EPA, 1999c	
Arsenic	Potency Factor [PF] (mg/kg-day) ⁻¹	Previous (oral/inhalation)	15 / 5	EPA, 1986	The oral slope factor is reduced by an order of magnitude in the current value. The protectiveness of the remedy is not compromised by this change. The inhalation slope factor is greater by a factor of 3. Inhalation pathways were not used in the risk assessment, so this change has no impact on the decision making.

Table 9. Confirmation of Chemical-Specific Toxicity Values

Chemical of Concern*	Toxicity Value Name	Toxicity Value**		Source (oral/inhal.)	Impact on Risk Assessment
		Current (oral/inhalation)	1.5 / 15	EPA, 1999a	
COCs with Noncarcinogen Effects (from Table L.4)					
Vinyl Chloride	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	NL / NL	EPA, 1986	Toxicity values for noncarcinogenic effects of vinyl chloride still are not available. A data gap of this type is usually covered in the uncertainty section of the risk assessment. In the case of carcinogens like vinyl chloride, the carcinogenic toxicity is usually a greater impact than noncarcinogenic effects. Because vinyl chloride was carried as an indicator chemical in the risk assessment, it is likely that the currently-effective remedy based on carcinogenic effects is also protective for noncarcinogenic effects.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	NL / NL	EPA, 1999c	
1,1-Dichloroethane	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	0.12 / 0.138	EPA, 1986	The previous and current toxicity values are essentially the same. There is no impact on the decision making for the currently-effective remedy.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.1 / 0.14	EPA, 1997	
1,1,1-Trichloroethane	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	0.54 / 6.3	EPA, 1986	New reference doses for both oral and inhalation are more stringent by an order of magnitude. This could have impact on the calculated hazard index and the decision making. However, as shown in Tables L.5 and L.6, the contribution to total toxicity was 11th of the indicator chemicals, and 1,1,1-trichloroethane was not carried as a final indicator chemical. It is likely that even with the changes in the reference doses that the impact on the hazard index and the decision making would be <i>de minimis</i> .
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.035 / 0.29	EPA, 1999b	
Chlorobenzene	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	0.027 / 0.0057	EPA, 1986	The previous and current toxicity values round to the same values. Therefore, there is no significant impact on the decision making for the currently-effective remedy.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.02 / 0.017	EPA, 1999a / EPA, 1999b	
1,2-Dichlorobenzene	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	NL / NL	EPA, 1986	The new toxicity values could help to reduce the uncertainty of the risk assessment by allowing the calculation of hazard quotients for the risk assessment. However, 1,2-dichlorobenzene was ranked 9th among indicator chemical candidates and was not carried to the final selection of indicator chemicals. It is likely that even with the changes in the reference doses that the impact on the hazard index and the decision making would be <i>de minimis</i> .
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.09 / 0.057	EPA, 1999a / EPA, 1997	

Table 9. Confirmation of Chemical-Specific Toxicity Values

Chemical of Concern*	Toxicity Value Name	Toxicity Value**		Source (oral/inhal.)	Impact on Risk Assessment
1,4-Dichlorobenzene	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	NL / NL	EPA, 1986	The new toxicity values could help to reduce the uncertainty of the risk assessment by allowing the calculation of hazard quotients for the risk assessment. However, 1,4-dichlorobenzene was ranked 10th among indicator chemical candidates and was not carried to the final selection of indicator chemicals. It is likely that even with the changes in the reference doses that the impact on the hazard index and the decision making would be <i>de minimis</i> .
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.03 / 0.03	EPA, 1999b / EPA, 1999a	
Barium	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	0.051 / 0.00014	EPA, 1986	The current oral reference dose is less stringent than the oral reference dose used for the risk assessment. The inhalation reference dose remains the same as previous. The remedy selected remains protective for new oral reference dose.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.07 / 0.00014	EPA, 1999a / EPA, 1997	
Mercury	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	0.0003 / 0.000051	Risk Assessment / EPA, 1986	The oral reference dose has not changed. Inhalation toxicity values are not used because no inhalation pathways are included in the risk assessment. The remedy remains protective.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.0003 / NL	EPA, 1999a	
Nickel	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	0.02 / NL	EPA, 1986	The toxicity values have not changed. The remedy remains protective.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.02 / NL	EPA, 1999a	
Arsenic	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	NL / NL	EPA, 1986	An oral reference dose has appeared for noncancer effects from arsenic. Page 7-14 of the risk assessment lists the daily intake of arsenic from ingestion of leafy green vegetables as 4.2×10^{-7} mg/kg-day, which is three orders of magnitude less than the new oral reference dose, 3×10^{-4} mg/kg-day. The hazard quotient is the ratio of the daily intake to the reference dose, so the hazard quotient is much less than 1. The new reference dose supports new evaluation for noncarcinogenic effects of arsenic. The result is consistent with the protectiveness of the current remedy.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.0003 / NL	EPA, 1999a	
1,1-Dichloroethene	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	0.009 / NL	EPA, 1986	The oral reference dose remains the same as previous. The new inhalation slope factor is <i>de minimis</i> because inhalation pathways are not incorporated in the risk assessment. The remedy remains protective.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.009 / 0.009	EPA, 1999a / EPA, 1999c	

Table 9. Confirmation of Chemical-Specific Toxicity Values

Chemical of Concern*	Toxicity Value Name	Toxicity Value**		Source (oral/inhal.)	Impact on Risk Assessment
Trichlorofluoromethane	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	0.3 / NL	EPA, 1986	The oral reference dose remains the same as previous. The new inhalation slope factor is de minimis because inhalation pathways are not incorporated in the risk assessment. The remedy remains protective.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.3 / 0.2	EPA, 1999a / EPA, 1997	
COCs with Limited Toxicological Data (from Table L.2)					
<p>The COCs with noncarcinogenic effects listed below (chloroethane, trichlorofluoromethane, trans-1,2-dichloroethene, and trichlorotrifluoroethane) can be evaluated for potential contribution to the hazard index by comparison to chemicals that are already part of the noncarcinogen component of the risk assessment. For instance, Table 7.1 (DRAFT 1/13/89) lists the maximum concentrations of the groundwater concentrations of COCs, including those incorporated in the risk assessment and those with the new reference doses listed below. The parameter to be used for comparison for noncarcinogens is the concentration divided by the reference dose (C/T). C and T are both chemical-specific parameters. The other default factors normally used for calculation of the chemical-specific hazard quotients are the same for all the COCs, so they need not be part of the analysis. Table L.4 (DRAFT 1/13/89) lists the noncarcinogens ranked for inclusion in the risk assessment. Barium was ranked number 1. The C/T for barium is $2.6 / 0.07 = 37.1$. Mercury was ranked number 4, The C/T for mercury is $2.0 \times 10^{-3} / 0.0003 = 6.66$. A footnote to Table L.6 (DRAFT 1/13/89) specified that indicator constituent selection included those COCs with ranks of 4 or higher (and other related criteria). Therefore, a comparison of the C/T values for the chemicals below with the 4th-ranked chemical should be a good indicator of the contribution to the total hazard index. That analysis is listed with each of the chemicals where appropriate.</p>					
Chloroethane	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	NL / NL	EPA, 1986	The C/T is $7.6 \times 10^{-3} / 0.4 = 0.019$. This value is 0.2% (0.019 / $6.66 \times 100\%$) of that for mercury, the 4th-ranked COC. For a hazard index of 1, 0.2% is 0.02. This contribution is not likely to be significant in altering the decision of the risk assessment.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.4 / 2.9	EPA, 1999b / EPA, 1999c	
Chloroethane	Potency Factor[PF] (mg/kg-day) ⁻¹	Previous (oral/inhalation)	NL / NL	EPA, 1986	In Table 7.1 (DRAFT 1/13/89) of the risk assessment, the maximum groundwater concentration of chloroethane is about 3 times that of vinyl chloride ($0.0076 / 0.0026 = 2.9$). But the slope factor of chloroethane is almost 3 orders of magnitude ($10^{-3} = 1,000$) less than that of vinyl chloride ($2.3 / 0.0029 = 793$). Incorporation of chloroethane in the risk assessment can be conducted, but the contribution of chloroethane to the total incremental lifetime cancer risk is likely to be <i>de minimis</i> .
	Cancer Slope Factor (SP) (mg/kg-day) ⁻¹	Current (oral/inhalation)	0.0029 / 0.0029	EPA, 1999b / EPA, 1999c	
Trichlorofluoromethane	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	NL / NL	EPA, 1986	The C/T is $1.1 \times 10^{-3} / 0.3 = 0.003$. This value is 0.04% ($0.003 / 6.66 \times 100\%$) of that for mercury, the 4th-ranked COC. For a hazard index of 1, 0.04% is 0.0004. This contribution will not be significant for altering the decision of the risk assessment.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	0.3 / 0.2	EPA, 1999a / EPA, 1997	
trans-1,2-Dichloroethene	Potency Factor[PF] (mg/kg-day) ⁻¹	Previous (oral/inhalation)	NL / NL	EPA, 1986	The C/T is $1.1 \times 10^{-2} / 0.02 = 0.55$. This value is 8.2% ($0.55 / 6.66 \times 100\%$) of that for mercury, the 4th-ranked COC. For a hazard index of 1, 8.2% is 0.08. This contribution is not likely to be significant in altering the decision of the risk assessment.
	Cancer Slope Factor (SP) (mg/kg-day) ⁻¹	Current (oral/inhalation)	0.02 / 0.02	EPA, 1999a / EPA, 1999c	

Table 9. Confirmation of Chemical-Specific Toxicity Values

Chemical of Concern*	Toxicity Value Name	Toxicity Value**		Source (oral/inhal.)	Impact on Risk Assessment
Trichlorofluoroethane	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	NL / NL	EPA, 1986	The C/T is $1.2 \times 10^{-3} / 30 = 4 \times 10^{-5}$. This value is 0.0006% ($4 \times 10^{-5} / 6.66 \times 100\%$) of that for mercury, the 4th-ranked COC. For a hazard index of 1, 0.0006% is 0.0000006 and is insignificant. This contribution will not be significant in altering the decision of the risk assessment.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	30 / 8.6	EPA, 1999a / EPA, 1997	
D-BHC	Acceptable Intake Chronic (AIC) (mg/kg-day)	Previous (oral/inhalation)	NL / NL	EPA, 1986	Toxicity values are still not available for D-BHC, so it remains as part of the uncertainty of the risk assessment. There is no new impact on the current remedy selection.
	Reference Doses (mg/kg-day)	Current (oral/inhalation)	NL / NL	EPA, 1999c	
<p>EPA, 1986, Superfund Public Health Evaluation Manual, EPA/540/1-86/060, OSWER Directive 9285.4-1, United States Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC 20460, October.</p> <p>EPA, 1997, Health Effects Assessment Summary Tables, FY-1997 Update, EPA 540/R-97-036, 9200.6-303(97-1), PB97-921199, National Center for Environmental Assessment, Cincinnati, OH, July 31.</p> <p>EPA, 1999a, Integrated Risk Information System, IRIS, URL: http://www.epa.gov/ngispgm3/iris/index.html.</p> <p>EPA, 1999b, value estimated by route-to-route extrapolation, National Center for Environmental Assessment, as listed in EPA, 1999c.</p> <p>EPA, 1999c, Region 9 Preliminary Remediation Goals (PRGs) 1999, URL: http://www.epa.gov/region09/waste/sfund/prg/, October 1.</p>					
<p>*Chemicals of Concern (COCs) in each category are listed in the order presented in the risk assessment, reflecting their relative contribution to risk/hazard as determined by indicator chemical screening in EPA, 1986.</p> <p>**Toxicity values for selected COCs as final indicator chemicals are not listed in the risk assessment. The use of EPA, 1986 as the protocol for the risk assessment implies that toxicity values from that guidance (Exhibit A-4 & Exhibit A-6) were used. Appropriate toxicity values from the risk assessment, Table L.8, and from Exhibit A-4 and Exhibit A-6 have been cited for this evaluation.</p> <p>NL = not listed.</p>					

TABLE 10

LIST OF 19TH AVENUE LANDFILL GROUNDWATER WELLS

Well Name	Date Complete	Well Depth (in feet)	Casing Type	Screen Interval (in feet)
DM-3D	6/15/87	370	6" PVC	280-320
DM-31	6/26/87	232	6" PVC	185-225
DM-3P	6/20/87	170	10" PVC	110-150
DM4	6/19/87	170	6" PVC	110-150
DM-5D	8/8/87	300	6" PVC	185-225
DM-5S	8/5/87	164	6" PVC	110-150
DM-6	6/11/87	170	6" PVC	110-150
DM-7D	5/13/92	169	6" PVC	153.4-168.4
DM-7S	5/13/92	101	6" PVC	59-99
DM-8D	5/13/92	179	6" PVC	163.4-178.4
DM-8S	5/13/92	99	6" PVC	58.9-98.9
I-1	10/27/79	101	4" PVC	32-101
I-2R	9/18/96	101	4" PVC	60-100
I-3	12/6/79	100	4" PVC	46-100
I-4	11/3/79	102	4" PVC	33-102
I-5R	7/10/96	115	4" PVC	65-115
I-6	11/14/79	102	4" PVC	32-102
I-8R	7/11/96	115	4" PVC	65-115

**TABLE 11
 COMPARISON OF INITIAL AND RECENT GROUNDWATER CONTAMINANT
 CONCENTRATIONS**

Contaminant	Well	1986/1987 Highest Concentration (1989 RAP) (µg/l)	1997 Highest Concentration (µg/l)	1999 Highest Concentration (µg/l)	Established/ Current Cleanup Level (µg/l)
Arsenic	I-8	170	32	23	50/50
Barium	I-4	2,580	2,120	1,170	5000/1000
Mercury	I-4	2	Not Detected	Not Detected	2.0/2.0
Nickel	I-3	113	Not Detected	130	100/100
	I-4	99	Not Detected	670	100/100
Thallium	I-4	Not Tested	Not Detected	12	5.0/2.0
	I-6	Not Tested	2	Not Detected	5.0/2.0
Nitrate	DM-5D*	14,900	10,800	10,600	10,000/10,000
Carbon Tetrachloride	I-1	35	Not Detected	Not Detected	5.0/5.0
Vinyl Chloride	I-1	2.6	Not Detected	Not Detected	2.0/2.0
1,1-Dichloroethene	DM-3I	Not Detected	13.6	9.5	7.0/7.0
	DM-5S*	0.3	23.4	20.3	7.0/7.0
	DM-5D*	Not Detected	10.0	7.3	7.0/7.0
	DM-6	Not Detected	8.9	8.6	7.0/7.0
	DM-7D	Not Tested	11.7	8.4	7.0/7.0
	DM-8S*	Not Tested	14.1	9.4	7.0/7.0
	DM-8D*	Not Tested	24.0	13.1	7.0/7.0
Gross Alpha (pCi/l)	I-5	17.9	3.2	7.4	15/15
Gross Beta (pCi/l)	I-6	92.8	8.0	11.3	50/50

µg/l - micrograms per liter

bold - indicates concentration exceeds current respective cleanup level

* - up-gradient wells

RAP - Remedial Action Plan

TABLE 12
COMPARISON OF INITIAL AND RECENT GROUNDWATER ELEVATIONS

Landfill Cell	Well	Well Location	December 1987 Groundwater Elevation (Feet above MSL)	October 1997 Groundwater Elevation (Feet above MSL)	October 1999 Groundwater Elevation (Feet above MSL)
A-1	DM-5S	Up-gradient	1,017.22	1,007.79	1,003.41
	I-6	Cross-gradient	1,015.03	1,004.12	999.45
	I-5R	Down-gradient	1,015.38	1,001.68	996.88
A	DM-8S	Up-gradient	NI	1,007.82	1,002.88
	DM-5S	Up-gradient	1,017.22	1,007.79	1,003.41
	I-3	Cross-gradient	1,009.96	995.99	990.53
	I-1	Down-gradient	1,008.40	991.58	984.02
	I-4	Down-gradient	1,008.01	991.96	985.52
	I-8R	Down-gradient	1,007.05	987.49	979.85
	DM-6	Down-gradient	1,004.42	985.61	975.80
	DM-3P	Down-gradient	1,001.93	980.45	967.25

MSL - mean sea level

NI - well not installed

TABLE 13
LIST OF 19TH AVENUE LANDFILL METHANE PROBES

Probe Number	Date of		Total Probe of Depths		Screen Interval Lengths	
	Installation	Surface	Specified	Installed	Specified	Installed
A-01	4/19/96	4/19/96	30' and 15'	30' and 15'	10	10
A-02	4/19/96	4/26/96	30' and 15'	30' and 15'	10	10
A-03	4/19/96	4/26/96	30' and 15'	30' and 15'	10	10
A-04	4/17/96	4/26/96	30' and 15'	30' and 15'	10	10
A-05	4/2/96	4/26/96	30' and 15'	30' and 15'	10	10
A-06	4/2/96	4/26/96	30' and 15'	30' and 15'	10	10
A-07	4/1/96	4/26/96	30' and 15'	30' and 15'	10	10
A-08	4/1/96	4/26/96	30' and 15'	30' and 15'	10	10
A-09	3/28/96	4/26/96	30' and 15'	30' and 15'	10	10
A-10	3/28/96	4/26/96	30' and 15'	30' and 15'	10	10
A-11	3/27/96	4/26/96	30' and 15'	30' and 15'	10	10
A-12	3/27/96	4/26/96	30' and 15'	30' and 15'	10	10
A-13	3/27/96	4/26/96	30' and 15'	30' and 15'	10	10
A-14	3/26/96	4/26/96	30' and 15'	30' and 15'	10	10
A-15	3/26/96	4/26/96	30' and 15'	30' and 15'	10	10
A-16	4/18/96	4/26/96	30' and 15'	30' and 15'	10	10
A-17	3/12/96	4/26/96	30' and 15'	30' and 15'	10	10
A-18	3/12/96	4/26/96	30' and 15'	30' and 15'	10	10
A-19	3/12/96	4/26/96	30' and 15'	30' and 15'	10	10
A-20	3/11/96	4/26/96	30' and 15'	28'-6" and 15'	10	10
A-21	11/26/96	4/26/96	30' and 15'	28'-6" and 15'	10	10
B-01	7/19/96	4/26/96	30' and 15'	30' and 15'	10	10
B-02	4/12/96	4/26/96	30' and 15'	30' and 15'	10	10
B-03	4/12/96	4/26/96	30' and 15'	30' and 15'	10	10
B-04	4/15/96	4/26/96	30' and 15'	30' and 15'	10	10
B-05	4/15/96	4/26/96	30' and 15'	30' and 15'	10	10
B-06	4/16/96	4/26/96	30' and 15'	30' and 15'	10	10
B-07	4/16/96	4/26/96	30' and 15'	30' and 15'	10	10
B-08	4/17/96	4/26/96	30' and 15'	30' and 15'	10	10
B-09	4/22/96	4/26/96	30' and 15'	30' and 15'	10	10
B-10	4/24/96	4/26/96	30' and 15'	30' and 15'	10	10
B-11	4/24/96	4/26/96	30' and 15'	30' and 15'	10	10
B-12	4/25/96	4/26/96	30' and 15'	30' and 15'	10	10
B-13	4/22/96	4/26/96	30' and 15'	30' and 15'	10	10
B-14	4/23/96	4/26/96	30' and 15'	30' and 15'	10	10
B-15	4/23/96	4/26/96	30' and 15'	30' and 15'	10	10
B-16	7/18/96	7/26/96	30' and 15'	30' and 15'	10	10
B-17	7/18/96	7/26/96	30' and 15'	30' and 15'	10	10
B-18	7/17/96	7/26/96	30' and 15'	30' and 15'	10	10

TABLE 13
LIST OF 19TH AVENUE LANDFILL METHANE PROBES

Probe Number	Date of		Total Probe of Depths		Screen Interval Lengths	
	Installation	Surface	Specified	Installed	Specified	Installed
B-19	7/17/96	7/26/96	30' and 15'	30' and 15'	10	10
B-20	7/16/96	7/26/96	30' and 15'	30' and 15'	10	10
B-21	7/16/96	7/26/96	30' and 15'	30' and 15'	10	10
B-22	7/15/96	7/26/96	30' and 15'	30' and 15'	10	10
B-23	7/24/96	7/26/96	30' and 15'	30' and 15'	10	10
B-24	7/24/96	7/26/96	30' and 15'	30' and 15'	10	10
D-01	5/15/96	5/31/96	30' and 15'	30' and 15'	10	10
D-02	5/15/96	5/31/96	30' and 15'	30' and 15'	10	10
D-03	5/16/96	5/31/96	30' and 15'	30' and 15'	10	10
D-04	5/14/96	5/31/96	30' and 15'	30' and 15'	10	10
D-05	5/14/96	5/31/96	30' and 15'	30' and 15'	10	10
D-06	5/14/96	5/31/96	30' and 15'	30' and 15'	10	10
D-07	5/23/96	5/31/96	30' and 15'	30' and 15'	10	10
D-08	5/23/96	5/31/96	30' and 15'	30' and 15'	10	10
D-09	5/29/96	5/31/96	30' and 15'	30' and 15'	10	10
D-10	5/29/96	5/31/96	30' and 15'	30' and 15'	10	10
D-11	10/17/96	10/18/96	30' and 15'	30' and 15'	10	10
SR-01	5/20/96	5/31/96	15'	15'	10	10
SR-02	5/20/96	5/31/96	15'	15'	10	10
SR-03	5/20/96	5/31/96	15'	15'	10	10
SR-04	5/20/96	5/31/96	15'	15'	10	10
SR-05	5/17/96	5/31/96	15'	15'	10	10
SR-06	5/17/96	5/31/96	15'	15'	10	10
SR-07	5/16/96	5/31/96	15'	15'	10	10
SR-08	5/17/96	5/31/96	15'	15'	10	10
SR-09	11/12/96	11/13/96	45', 30' & 15'	45', 30' & 15'	10	10
SR-10	11/15/96	11/16/96	45', 30' & 15'	45', 30' & 15'	10	10
SR-11	11/18/96	11/19/96	45', 30' & 15'	45', 30' & 15'	10	10
SR-12	11/20/96	11/21/96	45', 30' & 15'	45', 30' & 15'	10	10
SR-13	11/22/96	11/25/96	45', 30' & 15'	45', 30' & 15'	10	10

**TABLE 14
 COMPARISON OF INITIAL AND CURRENT METHANE GAS CONCENTRATIONS**

Location	Probe	1996 Pre-Construction Concentration (% by Volume)	1997 Post Construction Concentration (% by Volume)	1999 Current to Date Concentration (% by Volume)	Methane Concentration Limit, Boundary (Established/Current)
Cell A	A-20S	41.4	12.7	0.1	5/5 %
	A-20D	0	42.1	26	5/5 %
	A-21S	NS	0	0	5/5 %
	A-21D	NS	0	0	5/5 %
	B-12D	0	0	15.4	5/5 %
	B-14D	0	0	40.8	5/5 %
	B-15D	0	0	45.2	5/5 %
	B-19S	11.6	0	0	5/5 %
	B-20S	7.4	0	0	5/5 %
	B-20D	11.4	0	0	5/5 %
	B-24D	13.4	0	0	5/5 %
Cell A-1	D-11S	0	4.6	14.7	5/5 %
	D-11D	0	0	15.5	5/5 %
Salt River	SR-2	43.9	22.1	NS*	5/5 %
	SR-3	42.8	1.8	NS*	5/5 %
	SR-4	49.5	0	NS*	5/5 %
	SR-5	70	45.1	NS*	5/5 %
	SR-6	20.7	32.9	NS*	5/5 %

Notes:

NS - Not Sampled

* - Probes were not sampled due storm water present within the Salt River Channel.

Bold - Indicates exceedence of methane boundary limit.

**TABLE 15
IDENTIFIED DEFICIENCIES**

Location	Deficiencies	Protectiveness Affected?	
		Current	Future
Documents	Health and safety plan and emergency response plan and inspection and maintenance logs not available on-site.	no	no
Documents	Inspection and maintenance logs are not being filled out	no	no
Landfill Cap	Shallow holes evident at both landfill Cells.	no	yes
Landfill Cap	Surficial erosion noted around perimeter of both Caps.	no	yes
Road Cell A	Eroded access perimeter road located at the let down channel in Cell A	no	no
Drainage	Perimeter drainage system at both cells indicated erosion at top of drainage channels (no impact to Armorflex)	no	yes
Drainage	Sedimentation has built up around the drain grates located in the bottom of the drainage next to 15th Avenue.	no	yes
Drainage	Ponding/Standing water noted in the drainage channel covering the south boundary of Cell A neat the SE corner of the Cell. In addition, excessive vegetation build-up has occurred in some sections of the drainage channel.	no	yes
Drainage	A non-control storm water discharge location has been identified near the SW corner of the adjacent Tallow Plant.	no	yes
SW Pond	The outlet grate in the SW sedimentation pond in Cell A is partially blocked	no	yes
Groundwater	Comparing groundwater data to current MCLs indicates that concentration of Pentachlorophenol in Well DM-3P could have the potential of triggering the contingency plan (depending on subsequent results). In addition, the 1999 annual groundwater sampling event excluded well DM-3P from the program.	unknown	unknown
Groundwater	The groundwater SVOC analytical detection limit for Pentachlorophenol is set above the MCL.	no	yes
Methane Recovery System	Review of the methane recovery system and monitoring data indicates that the system could be failing to control the methane migration at the landfill boundaries as called for in the RAP due to the following reasons: the flare stations at both cells are not operating on an continuous basis; and probes A-20D, B-12D, B-14D, B-15D, D-11S, D-11D, SR-2, SR-3, and SR-5 have consistently exceeded the methane boundary limit of 5%. The elevated methane levels in probes SR-2, SR-3, and SR-5 provides an potential explosive condition of methane and potential exposure condition of NMOCs (i.e., VOCs) to the public.	unknown	yes
Ambient Air Monitoring	The existing ambient air monitoring program has been determined to be inadequate by ADEQ and EPA.	unknown	unknown

**TABLE 16
 FOLLOW-UP ACTIONS AND RECOMMENDATIONS**

Reference Number*	Follow-up Action/Recommendations	Responsible Party	Oversight Agency	Completion Date
Follow-up Action to Correct Deficiencies				
1	Place appropriate plans and logs at each Flare Station	COP	ADEQ	Completed
2	Fill out inspection and maintenance log each time these activities are performed	COP	ADEQ	On Going
3	Fill in all holes that are > 0.5 feet deep	COP	ADEQ	10/31/2000
4	Repair all erosion areas around the perimeter of each Cell.	COP	ADEQ	10/31/2000
5	Repair all eroded roads at the let down channel in Cell A	COP	ADEQ	10/31/2000
6	Repair eroded sections of the top of the drainage channels at both Cells	COP	ADEQ	10/31/2000
7	Remove sedimentation around the drain grates in eastern drainage channel Cell A	COP	ADEQ	10/31/2000
8	Clear drainage channel of sediments and vegetation near the SE corner of Cell A to prevent future pond of water. Clear excess vegetation in appropriate sections of Cell A's drainage channel	COP	ADEQ	10/31/2000
9	Tie in earthen berm with drainage channel so that the off-site discharge of storm water to Tallow Plant can be eliminated	COP	ADEQ	10/31/2000
10	Clear vegetation and debris from drainage grate inside the SW sedimentation pond Cell A	COP	ADEQ	10/31/2000
11	Groundwater data of next quarter sampling must be evaluated for Pentachlorophenol in Well DM-3P and Thallium in Well I-4, to insure that the contingency plan will not be triggered for current MCLs. Next quarter sampling must also include pesticides analysis for Well DM-3P	COP	ADEQ	Prior to 4th Quarter 2000 Sampling (10/00)
12	GW Analytical Lab must be consulted to see if detection limit for Pentachlorophenol can be lowered to the MCL.	COP	ADEQ	Prior to 4th Quarter 2000 Sampling (10/00)
13	Submit methane NMOC ambient air sampling plan to ADEQ.	COP	ADEQ	12/31/00
	Begin ambient air sampling during monthly methane monitoring.	COP	ADEQ	01/2001 (monthly)
	Review ambient air data and issue addendum report on current landfill protectiveness.	ADEQ/EPA	ADEQ/EPA	3/29/2001
	Submit reevaluation design report to enhance methane recovery system.	COP	ADEQ	3/29/2001
	Implement enhancement of methane recovery system.	COP	ADEQ	9/30/2001
	Review methane recovery enhancements and issue addendum report on landfill protectiveness.	ADEQ/EPA	ADEQ/EPA	10/30/2001
14	COP must implement newly approved ambient air monitoring program in accordance with the Phase II Ambient Air Monitoring Sampling Plan.	COP	ADEQ/EPA	3/29/2001

**TABLE 16
 FOLLOW-UP ACTIONS AND RECOMMENDATIONS (Con't)**

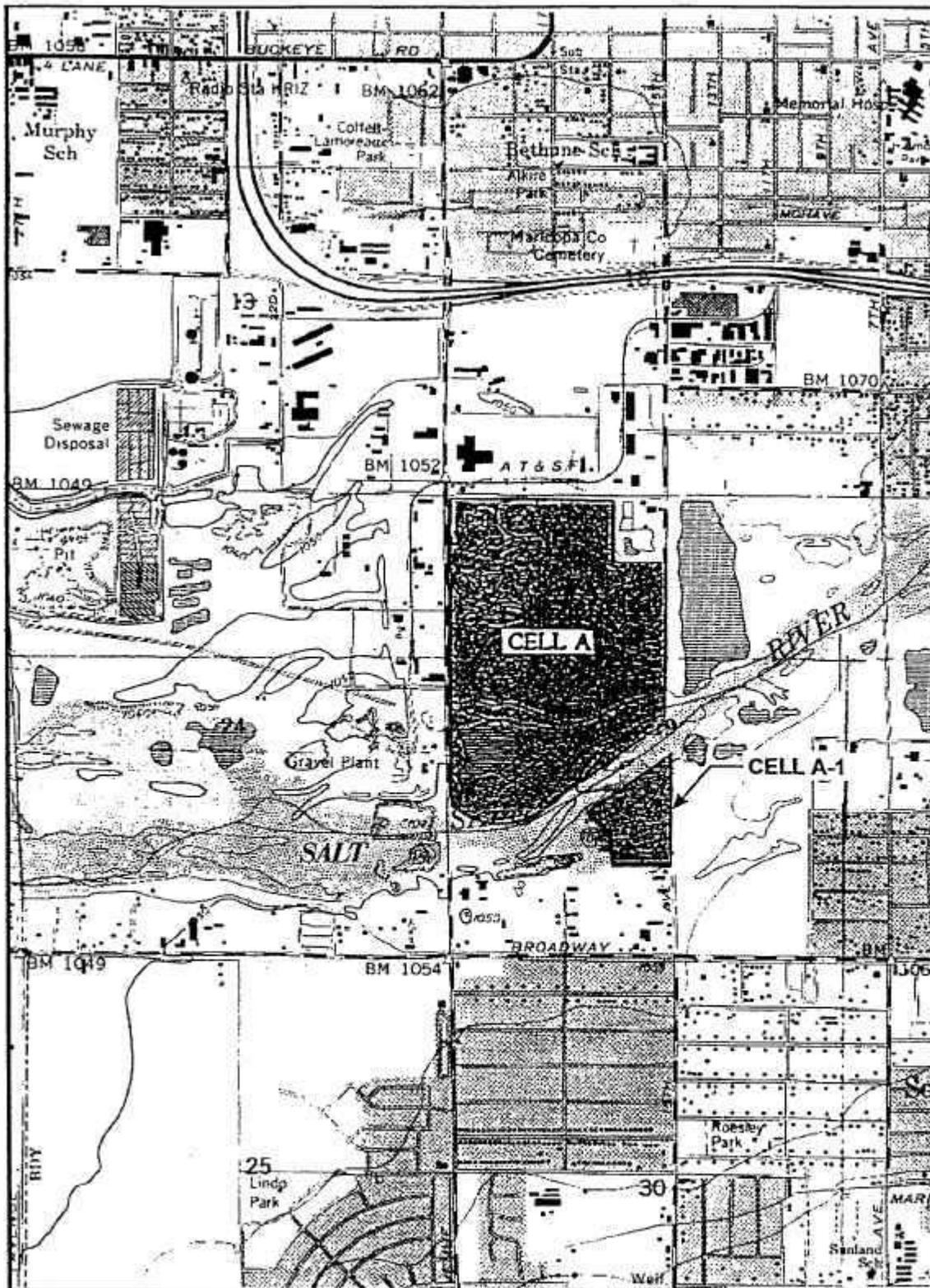
Reference Number*	Follow-up Action/Recommendations	Responsible Party	Oversight Agency	Completion Date
Recommended Actions				
1	Incorporate current surface water quality standard (AAC Title 18, Chapter 11, Article 1) as an ARAR after completion of Rio Salado Project.	ADEQ	ADEQ	Unknown
2	The current groundwater protection standards for Toluene, Naphthalene, Barium, Antimony, Thallium, & Pentachlorophenol should replace the established values in the Consent Decree.	ADEQ	ADEQ	03/01/2001
3	Evaluate the need for an NPDES Storm Water Permit at the Site	ADEQ/EPA	ADEQ	10/31/2000
4	Determine the NMOC emissions from the landfill.	COP	ADEQ	03/01/2001
5	Incorporate current AAAQGs for VOCs as an ARAR for the ambient air monitoring program.	ADEQ	ADEQ	03/01/2001
6	If appropriate revise baseline risk assessment.	COP	ADEQ	Unknown
7	Conduct an ecological risk screening should the Rio Salado Project alter the habitat that are present at the Site.	COP	ADEQ	Unknown
8	Submit amended QAPP to reduce QA/QC sampling frequency.	COP	ADEQ	Prior to next sampling event.

Notes

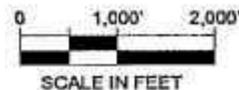
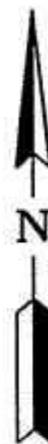
- * Refer to Section 9.0 for reference number.
- AAC - Arizona Administrative Code
- AAAQGs - Arizona Ambient Air Quality Guidelines
- ADEQ - Arizona Department of Environmental Quality
- ARARs - Applicable, Relevant, or Appropriate Requirements
- COP - City of Phoenix
- EPA - Environmental Protection Agency
- GW- Groundwater
- MCL - Maximum Contaminant Level
- NMOC - Nonmethane Organic Compounds
- QA/QC - Quality Assurance/Quality Control
- SVOC - Semi-Volatile Organic Compounds
- SW - Surface Water
- VOC - Volatile Organic Compounds

LIST OF FIGURES

- Figure 1. Site Location Map
- Figure 2. Site Plan - General Site Layout
- Figure 3. Site Plan - Groundwater Monitor Well Locations
- Figure 4. Site Pan - Gas Extraction System Well & Monitoring Probe Locations



NOTE: MAP TAKEN FROM PHOENIX QUADRANGLE,
ARIZONA - MARICOPA COUNTY, 7.5 MINUTE SERIES



 **Environmental Science &
Engineering, Inc.**
A MACTEC COMPANY

**19TH AVENUE LANDFILL
SITE LOCATION MAP
PHOENIX, ARIZONA**

Figure

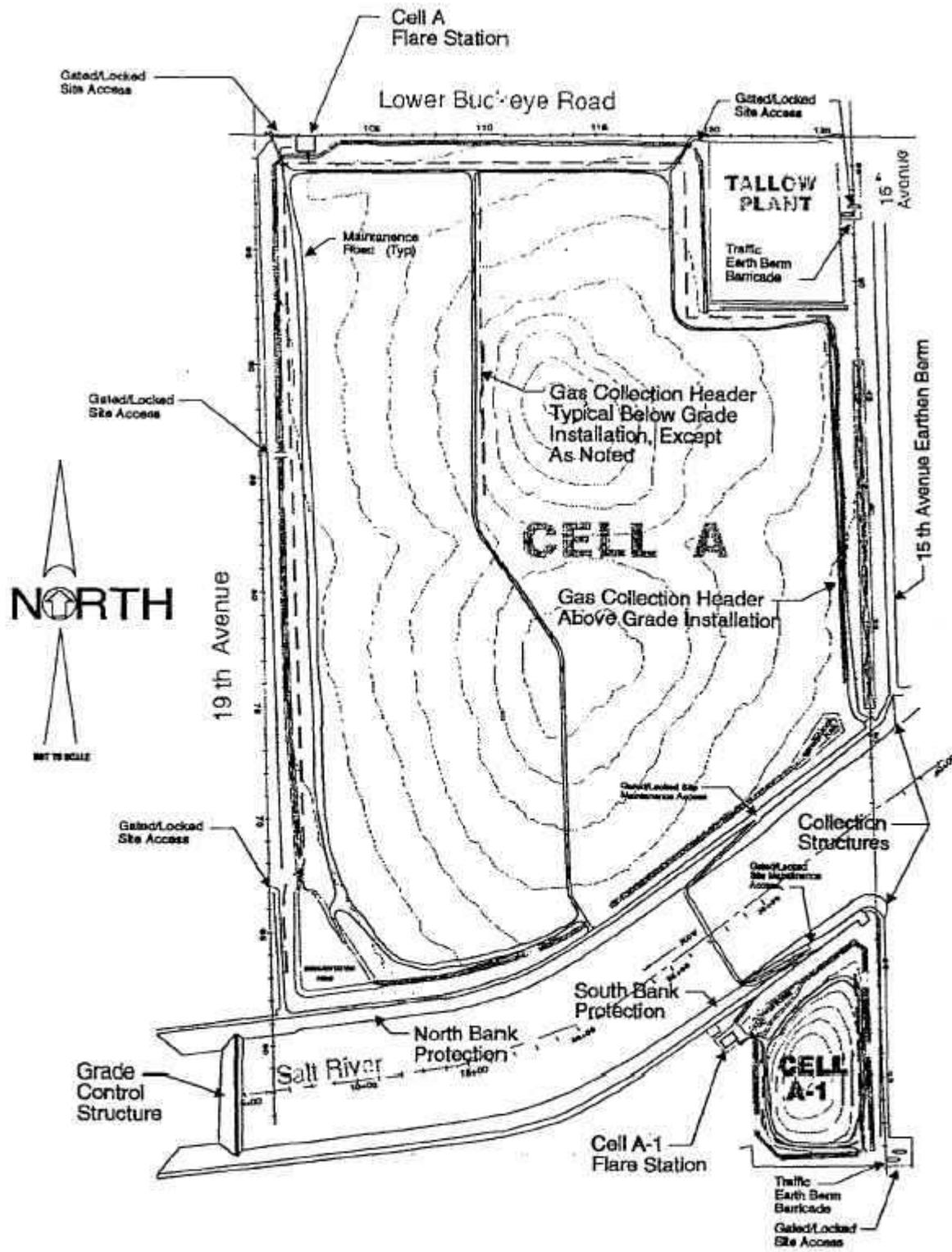
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Drawn
Daniel L. Kudlicki

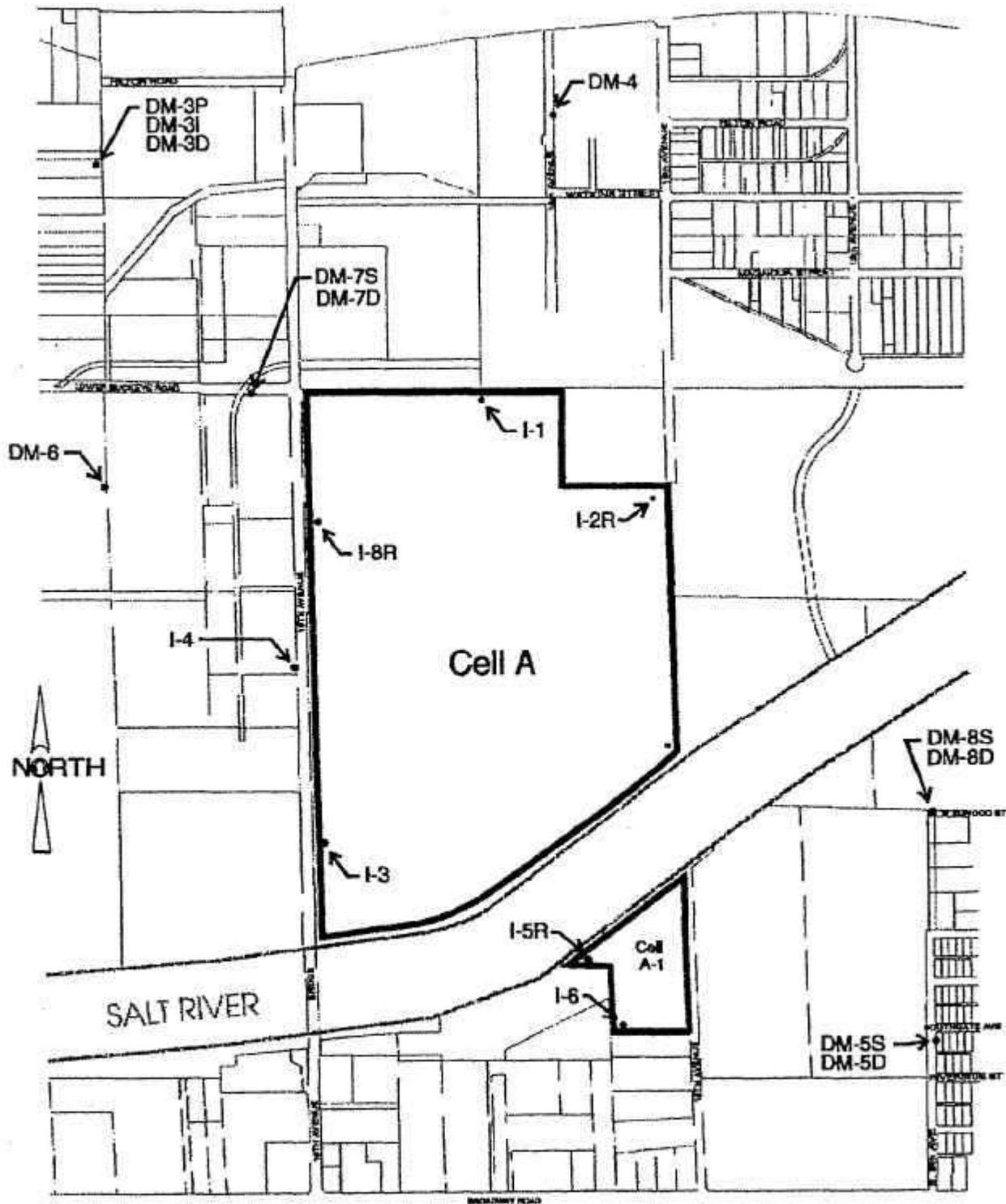
Project Number
680001

Approved
JSK

Date
3/30/00



NOTE: ORIGINAL SITE PLAN DEVELOPED BY SIMONS, LI & ASSOCIATES 9/15/98



NOTE: ORIGINAL SITE PLAN DEVELOPED BY SIMONS, LI & ASSOCIATES 9/15/98



Environmental Science & Engineering, Inc.

A MACTEC COMPANY

SITE PLAN
GROUNDWATER MONITORING WELL LOCATIONS
19TH AVENUE LANDFILL

Figure

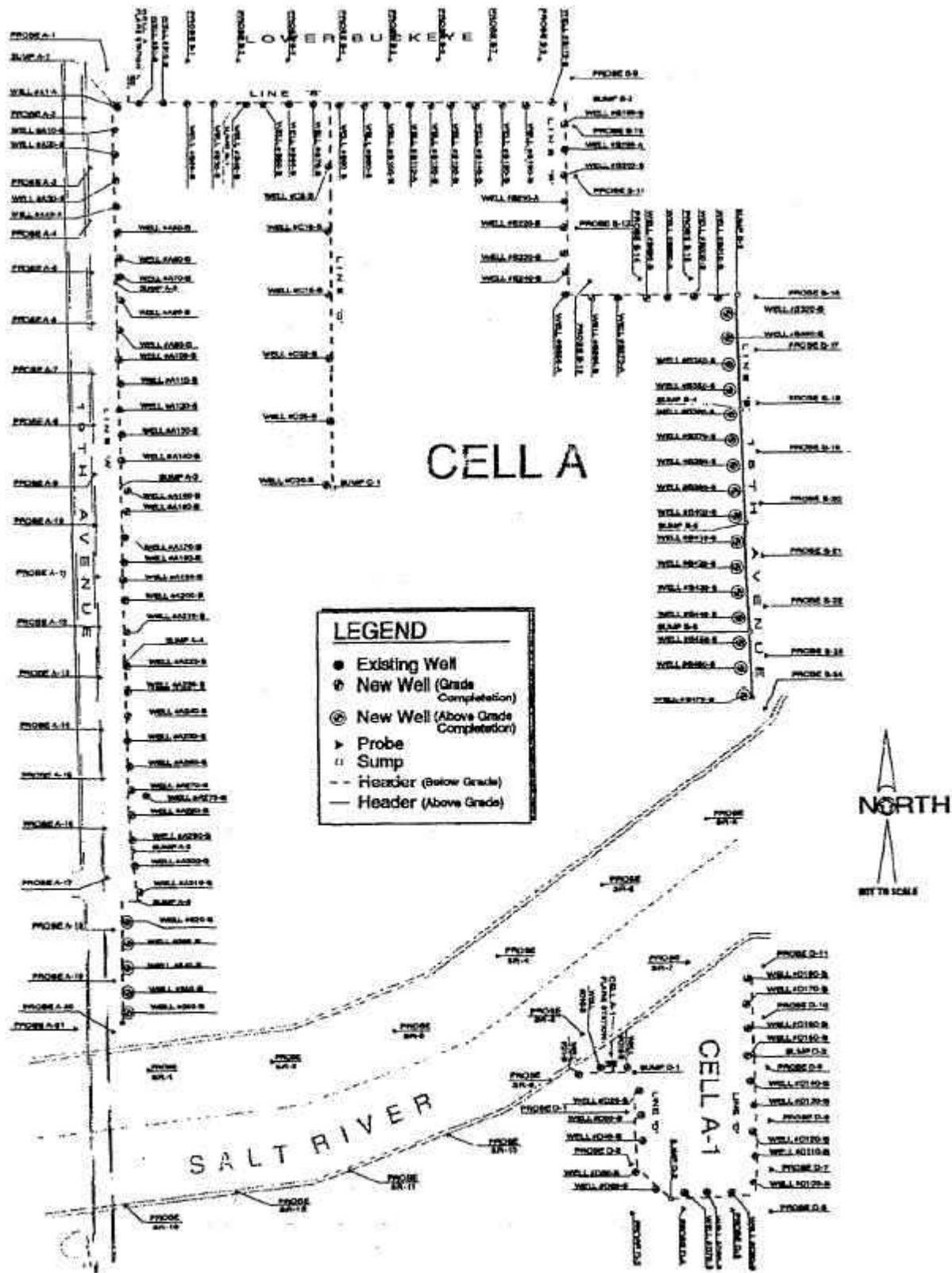
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Drawn
Daniel L. Kudlicki

Project Number
6600001

Approved
JSK

Date
3/30/00



NOTE: ORIGINAL SITE PLAN DEVELOPED BY SIMONS, LI & ASSOCIATES 9/15/98

LIST OF APPENDICES

- Appendix A. O&M Cost Breakdowns
- Appendix B. List of Documents Reviewed
- Appendix C. ADEQ Performance of Five-Year Review Newspaper Notice
- Appendix D. Interview Questionnaire Summaries
- Appendix E. Completed Site Inspection Checklist and Photographic Documentation
- Appendix F. Maricopa County Air Permit
- Appendix G. Graphical Representation of Groundwater Analytical Data Over Time
- Appendix H. Graphical Representation of Methane Analytical Data Over Time

EXHIBIT A

SUMMARY OF ACCUMULATED COSTS 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1996 - JUNE 30, 1997

<u>EXPENSE</u>	<u>TOTAL</u>
CAPITAL (Exhibit B)	\$ 7,507,756
LEGAL FEES (Exhibit C)	12,815
CITY EMPLOYEE TIME (Exhibit D)	67,034
OTHER DIRECT EXPENSES (Exhibit E)	55,634
INDIRECT OPERATING (Exhibit F)	6,421
TOTAL	\$7,649,660

EXHIBIT B

CAPITAL EXPENDITURES BY VENDOR 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1996 - JUNE 30, 1997

<u>VENDOR</u>	<u>WORK PERFORMED</u>	<u>TOTAL</u>
Bentson Contracting	Remedial Construction	\$6,427,621
Simons Li & Associates	Construction Administration	954,548
AZ Water Quality Assurance	Oversight Services	61,292
Bolin Laboratories	Groundwater Analysis	43,688
Donald E. Ross, ASA	Appraisal Services	5,872
Agra Earth & Environment	Materials Testing	5,618
Dennis Lopez & Associates	Appraisal Services	3,200
Kleinfelder Inc.	Quality Control Testing	2,639
Stirrat, Bryan & Associates	Construction Administration	2,608
Grand Canyon Pump	Groundwater Pumps (2)	402
Alameda Chemical	Supplies	60
Salt River Project	Landscape Controller Hookup	58
Miscellaneous	Telephone & Electricity	150
TOTAL CAPITAL EXPENDITURES		\$7,507,756

EXHIBIT C

LEGAL FEES 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1996 - JUNE 30, 1997

FISCAL YEAR SERVICES PROVIDED	AMOUNT
1996 - 97	\$12,815
TOTAL LEGAL FEES	\$12,815

NOTE: Legal fees represent City payments to the law firm or Squire Sanders and Dempsey for services in connection with the 19th Avenue Landfill. These fees are direct expenses and were not included in capital expenditures.

EXHIBIT D

EMPLOYEE TIME CHARGES 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1996 - JUNE 30, 1997

<u>DEPARTMENT</u> EMPLOYEE TIME CHARGES	<u>AMOUNT</u>
Public Works	\$36,407
City Attorney	17,895
Street Transportation	4,610
Engineering	935
City Auditor	7,187
	<hr/>
TOTAL EMPLOYEE CHARGES	\$67,034

Note: Employee time charges represent the actual hours spent on 19th Avenue activities by each employee in the above-listed departments. Their hours were multiplied by their actual pay rates, plus fringes, or by their work order rates, when available. These costs are direct expenses.

EXHIBIT E

OTHER DIRECT EXPENSES 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1996 - JUNE 30,1997

<u>EXPENSE</u>	<u>AMOUNT</u>
OTHER DIRECT EXPENSES:	
Electricity	\$6,379
Telephone	3,763
Water	1,363
Security Services	41,056
Fence Repair Material	1,597
Flame Detector	827
Locks	517
Miscellaneous	132
	<hr/>
TOTAL OTHER DIRECT EXPENSES	\$55,634

Note: Other Direct Expenses were summarized from the City's financial Management System (FMS) Report 162. This total includes expenses from contractual services cost categories. Legal fees and employee time charges are also considered direct expenses but appear under their own headings on The Cost Summary.

EXHIBIT F

INDIRECT OPERATING EXPENSES 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1996 - JUNE 30,1997

<u>EXPENSE</u>	<u>AMOUNT</u>
INDIRECT EXPENSES:	
SANITATION DIVISION ADMIN.	\$ 209,069
LANDFILL SUBDIVISION ADMIN.	826,361
CITYWIDE (CENTRAL SERVICE)	1,188,847
IN-LIEU TAXES	<u>124,476</u>
TOTAL INDIRECT OPERATING EXPENSES	\$ 2,348,753
19TH AVENUE AVERAGE ALLOC. @	1.56%
19TH AVE. INDIRECT OPERATING EXPENSES	\$36,641
LESS PRIOR YEAR CORRECTION	<u>(30,220)</u>
CORRECTED 19TH AVENUE INDIRECT OPERATING EXPENSES	\$6,421

NOTE: We allocated indirect costs based on direct operating costs paid in relation to other City landfills.

EXHIBIT A

SUMMARY OF ACCUMULATED COSTS 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1977 - JUNE 30, 1998

<u>EXPENSE</u>	<u>TOTAL</u>
CAPITAL (EXHIBIT B)	\$430,456
LEGAL FEES (EXHIBIT C)	13,635
CITY EMPLOYEE TIME (EXHIBIT D)	92,957
OTHER DIRECT EXPENSES (EXHIBIT E)	13,611
INDIRECT OPERATING (EXHIBIT F)	<u>4,985</u>
TOTAL	\$555,644

EXHIBIT B

CAPITAL EXPENDITURES BY VENDOR 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1997 - JUNE 30,1998

<u>VENDOR</u>	<u>WORK PERFORMED</u>	<u>TOTAL</u>
Gordon Dudley, et al	Land Acquisition – Peters Property	\$89,794
U.S. Environmental. Protection Agy	Oversight Costs - 3/1/90 -12/31/97	86,936
Simons Li & Associates	Construction Administration	77,982
Arizona Water Quality Assurance	Oversight Services	58,334
Bolin Laboratories	Groundwater Analysis	54,635
Dames & Moore	Groundwater Study	28,585
Laidlaw Environmental Services	Hazardous Waste Cleanup	18,389
Donald E. Ross, ASA	Appraisal Services	10,032
National Flood Insurance Prgm.	FEMA Review Fee	2,300
Grand Canyon Pump	Cooling Shroud	1,441
Maricopa County	Jury Fees	490
Graphic Law	Photo Enlargements	447
Barry, Hetzer, Stickley	Deposition Fees	331
Landiscor Inc.	Photos	274
A to Z Equipment Rental	Equipment Repair	194
Cole-Palmer Instrument Co.	Testing Equipment	125
Fleming Attorney Services	Process Server Fees	123
Reprographics	Copy Services	44
TOTAL CAPITAL EXPENDITURES		\$430,456

EXHIBIT C

LEGAL FEES 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1997 - JUNE 30, 1998

<u>FISCAL YEAR SERVICES PROVIDED</u>	<u>AMOUNT</u>
1997 – 98	\$13,635
TOTAL LEGAL FEES	\$13,635

NOTE: Legal fees, this year, represent time spent by the City Attorney's Office on 19th Avenue Landfill. On prior year reports, City Attorney time appeared under **EMPLOYEE TIME CHARGES, EXHIBIT D.**

This year, any payments to outside legal firms pertain only to fees paid for the acquisition of additional land for the Landfill, and are shown by firm name under **EXHIBIT B, CAPITAL EXPENDITURES BY VENDOR.**

EXHIBIT D

EMPLOYEE TIME CHARGES 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1997 - JUNE 30,1998

<u>Department</u>	<u>Amount</u>
Public Works	\$92,957
TOTAL EMPLOYEE CHARGES	\$92,957

Note: Employee time charges represent the actual hours spent on 19th Avenue Landfill activities by employees in the departments listed above. Their hours were multiplied by the actual pay rate plus fringes.

EXHIBIT E

OTHER DIRECT EXPENSES 19TH AVENUE LANDFILL – COST ACCUMULATION JULY 1, 1997 - JUNE 30,1998

<u>OTHER DIRECT EXPENSES</u>	<u>AMOUNT</u>
Electricity	\$5,361
Telephone	3,837
Water	2,434
Plants	1,181
Taxes and Fees	449
Coding Shroud Maintenance	225
Liquid Petroleum	82
Small Tools	42
TOTAL OTHER DIRECT EXPENSES	\$13,611

Note: Other Direct Expenses were summarized from the City's Financial Management System (FMS) Report 162. This total includes expenses from contractual services cost categories.

EXHIBIT F

INDIRECT OPERATING EXPENSES 19TH AVENUE LANDFILL - COST ACCUMULATION JULY 1, 1997 – JUNE 30,1998

<u>EXPENSE</u>	<u>AMOUNT</u>
INDIRECT EXPENSES:	
SANITATION DIVISION ADMIN.	\$ 241,339
LANDFILL SUBDIVISION ADMIN.	1,092,031
CITYWIDE (CENTRAL SERVICE)	1,051,739
IN-LIEU TAXES	<u>107,329</u>
TOTAL INDIRECT OPERATING EXPENSES	\$2,492,438
19 TH AVENUE AVERAGE ALLOCATION @	<u>.2%</u>
19TH AVENUE INDIRECT OPERATING EXPENSES	\$ 4,985

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

EXHIBIT A

SUMMARY OF ACCUMULATED COSTS 19TH AVENUE LANDFILL – COST ACCUMULATION JULY 1, 1998 – JUNE 30, 1999

<u>EXPENSE</u>	<u>TOTAL</u>
CAPITAL (EXHIBIT B)	\$ 90,762
LEGAL FEES (EXHIBIT C)	306
CITY EMPLOYEE TIME (EXHIBIT D)	57,814
OTHER DIRECT EXPENSES (EXHIBIT E)	89,886
INDIRECT OPERATING (EXHIBIT F)	<u>78,087</u>
TOTAL	<u><u>\$ 316,855</u></u>

EXHIBIT B

CAPITAL EXPENDITURES 19TH AVENUE LANDFILL – COST ACCUMULATION JULY 1, 1998 – JUNE 30, 1999

<u>VENDOR</u>	<u>OVERSIGHT</u>	<u>TOTAL</u>
Arizona Water Quality Assurance	Development Management	\$ 22,228
Dames & Moore	Groundwater Air	50,631
Simon LI & Associates	Construction Administration	17,530
Techniprint Co.	Printing Services	373
TOTAL CAPITAL EXPENDITURES		<u><u>\$90,762</u></u>

EXHIBIT C

LEGAL FEES 19TH AVENUE LANDFILL – COST ACCUMULATION JULY 1, 1998 – JUNE 30, 1999

Legal fees represent the time spent by the City Attorney's Office on the 19th Avenue Landfill Project during July 1, 1998 through June 30, 1999. The total fees were \$306.

This year, there were no additional legal fees paid to outside legal firms for this project.

EXHIBIT D

**EMPLOYEE TIME CHARGES
19TH AVENUE LANDFILL – COST ACCUMULATION
JULY 1, 1998 – JUNE 30, 1999**

<u>DEPARTMENT</u>	<u>TOTAL</u>
City Auditor	\$ 6,252
Public Works	51,562
TOTAL EMPLOYEE CHARGES	<u><u>\$57,814</u></u>

EXHIBIT E

OTHER DIRECT EXPENSES 19TH AVENUE LANDFILL – COST ACCUMULATION JULY 1, 1998 – JUNE 30, 1999

<u>OTHER DIRECT EXPENSES</u>	<u>AMOUNT</u>
Agriculture and Horticulture	\$ 1,624
Clothing	285
Electricity	5,517
Environmental Programs	126
Equipment Management	3,313
Equipment Rental	4,783
Facilities Management	2,606
Liquid Petroleum Gas	68
Materials	5,437
Small Tools and Equipment	2,049
Taxes	991
Telephone	1,994
Testing (Ground Water Monitoring)	57,056
Water	4,037
TOTAL OTHER DIRECT EXPENSES	<u><u>\$ 89,886</u></u>

EXHIBIT F

INDIRECT OPERATING EXPENSES 19TH AVENUE LANDFILL – COST ACCUMULATION JULY 1, 1998 – JUNE 30, 1999

INDIRECT EXPENSES

Solid Waste Division Administration	\$ 212,632
Landfill Subdivision Administration	1,594,024
Citywide (Central Service)	885,174
In-Lieu Taxes	96,986
TOTAL INDIRECT OPERATING EXPENSES	\$2,788,816
19 TH Avenue Average Allocation @	<u>2.8%</u>
19 Avenue Indirect Operating Expenses	<u><u>\$ 78,087</u></u>

NOTE: We allocated indirect costs based on direct operating costs paid in relation to other City landfills.

APPENDIX B
LIST OF DOCUMENTS REVIEWED

Community Relations Plan, with List of Contacts & Interested Parties, March 28, 1988, AZ Dept. of Health Services

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

Remedial Action (RA) Plan, Final Draft, June 12, 1989 Dames & Moore

Record of Decision (ROD) Declaration, September 29, 1989 EPA, Daniel McGovern

Letter of Determination (LOD) w/No Action Alternative, September 21, 1989 ADEQ, Norm Weiss

Consent Decree & Agreement between State of AZ & City of Phoenix, AZ, June 18, 1992, U S District Court- Arizona

Explanation of Significant Differences #1, December 14, 1995, AZ Dept. of Environmental Quality Environmental Protection Agency- Region 9

Superfund Preliminary Close-Out Report, February 17, 1998 ADEQ Keith Takata & USEPA

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

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

Ambient Air Monitoring Plan, October 30, 1998, Dames & Moore

Assessment of Upgradient 1, 1-DCE, November 25, 1998, Dames & Moore

Ambient Air Monitoring Program-Winter Sampling, February 5, 1999, Dames & Moore

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

Ambient Air Monitoring Program Report, August 5, 1999, Dames & Moore

Letter: Review of Ambient Air Monitoring Program Report dated 8/5/99, September 20, 1999 EPA, Nadia Hollan

Memo: Concern RE: Groundwater Contamination at Hazardous Waste Facility Adjacent to Site, November 4, 1999, Steve Brittle

Letter: Follow up Groundwater Sample for Nickel, w/ Lab Reports, November 12, 1999 COP, Ronald Serio

Letter: Reply to 11/4/99 memo RE: Groundwater Contamination Adjacent to Site, November 19, 1999 EPA, Nadia Hollan

**PUBLIC NOTICE
ARIZONA DEPARTMENT
OF ENVIRONMENTAL
QUALITY
NOTICE OF FIVE YEAR
REVIEW**

PLEASE TAKE NOTICE the United States, U.S. Environmental Protection Agency (EPA), and the State of Arizona, Arizona Department of Environmental Quality (ADEQ) announce the beginning of the Five Year Review for the 19th Avenue Landfill Federal Superfund Site in Phoenix, Arizona.

Section 121 (C) of the Comprehensive Environmental Response, Compensation, and Liability (CERCLA) and the National Contingency Plan state, "a remedial action that resulted in hazardous substances, pollutants, or contaminants remaining at the site shall be reviewed no less frequently than every five years." Thus, at the 19th Avenue Landfill Federal National Priorities List (NPL) Superfund site, CERCLA requires a statutory Five Year Review of the selected remedy.

ADEQ initiated the Five Year Review process in January, 2000 and anticipates completion by August, 2000. The findings of the Five Year Review will be available at the local repositories for public review in August, 2000. A local repository has been established to provide detailed information concerning the site at the following addresses:

ADEQ Records Center
1033 N. Central Avenue
Phoenix, AZ 85012
(602) 207-4389
City of Phoenix Public Library
721 N. Central Avenue
Phoenix, AZ 85004
(602) 262-4636

Any questions regarding the Five Year review for the 19th Avenue Landfill may be directed to Stephanie Ciekot, ADEQ, at (602) 207-4137. In Arizona, outside the Phoenix area, call 1-800-734-5677 ext. 4137. Hearing impaired, call TDD line at (602) 207-4879. Dated this 13th day of January, 2000.

Jacqueline E. Schafer
Arizona Department of Environmental Quality
60617-January 13, 2000

THE ARIZONA REPUBLIC

STATE OF ARIZONA }
COUNTY OF MARICOPA } SS.

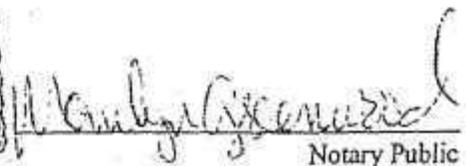
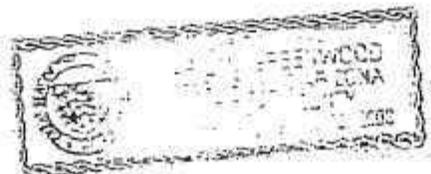
Gloria Saldivar, being first duly sworn, upon oath deposes and says: That she is a legal advertising representative of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic

January 13, 2000



Sworn to before me this
19 day of
January A.D.2000


Notary Public

INTERVIEWER(S): S. Ciekot (ADEQ); John Kim (ESE)
DATE: February 10, 2000 ; **INTERVIEW METHOD:** In person interview

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

INTERVIEWEE: Ron Serio
REPRESENTING: City of Phoenix
ADDRESS: 3060 S. 27th Ave ; **PHONE:** 602- 534-1420
Phoenix, AZ 85009-6810

1. What is/was your understanding of the overall project at the Site?
Mr. Serio stated that he understood all aspects of the project and was familiar with all O&M and monitoring operations at the site.

2. What is your impression of the completed project at the Site?
Mr. Serio stated that he is very pleased about the completed project. He also stated that the overall project was implemented successfully and meets all remedial objectives.

3. What is your responsibility at the site (O&M, Monitoring)?
Mr. Serio is the site Project Manager who is responsible for overseeing all O&M, Monitoring, and Reporting activities performed at the landfill since 1991.

4. Please describe the O&M/Monitoring responsibilities of other city staff and consultants?
Dale Henderson, works for the City of Phoenix and is the Supervisor of the of all O&M activities performed. This includes the methane recovery and control system (flare), well and monitoring points, as well as the landfill CAP. Mr. Henderson has two maintenance personnel under his direct control. Groundwater and methane monitoring activities are directly supervised by Ron Serio, who has three technicians/inspectors that perform the necessary tasks associated with collecting groundwater and methane data. Sheri Williams is the primary person responsible for management of the groundwater and methane data. Bob Farmer of Dames and Moore is the Project Manager that implements the Ambient Air monitoring and reporting at the site for the City of Phoenix. The O&M staff performs daily visual inspections at the site, including inspection of each flare station.

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?

No significant changes have been implemented. However, Mr. Serio stated he has submitted a request for additional funding for the site. Mr. Serio would like to hire a contractor to evaluate the existing methane extraction system at both cells (See issues with methane system discussed in the response to Question #6). Any potential recommendations to improve the existing system will be subject to approval by ADEQ and EPA.

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

The monitoring probe D11 in Cell A-1 has methane concentration in the ranging 5 to 6 % Mr. Serio believes that reason why D11 has elevated levels of methane is that there is not sufficient pull (i.e., vacuum) from the vacuum pumps to reduce the level of methane in this area. An evaluation of the system in Cell A-1 is currently being planned to increase the vacuum pressure. Mr. Serio believes that the probes in the Salt River (SR-1 thru SR-8) are not representative of the methane concentrations generated from the cells and should be abandoned. In addition, during flows in the river, Salt River probes cannot be sampled. In Cell A Probe 20 has had continuous anomalous readings of Methane above 5%. Mr. Serio believes that this anomalous reading is the result of the Probe being installed in the landfill trash, which is supported by the fact that a newly installed Probe (21) within the vicinity of Probe 20, but outside of the trash did not detect the presence of methane. Consequently, Mr. Serio recommended that Probe 20 be abandoned. Other probes with elevated methane reading (i.e., > 5%) include Probes B12 thru B15, which are all located 150 feet inside the property boundary within landfilled trash. Installation of additional probes closer to the property boundary and outside of the trash does not appear to be possible for this area. However, they are currently evaluating increasing the flare capacity so that vacuums and flowrates can be increased in these areas to reduce methane levels. Mr. Serio noted that although some of the probes did show elevated methane levels, it was his belief that these elevated did not affect the protectiveness or effectiveness of the remedy. Mr. Serio also stated that during certain periods of the year the flare system would continuously shut-down because the methane levels were not high enough in the recovered system. Once the system shuts down, it is manually restarted. Mr. Serio stated that they may look into retrofitting the system with an automatic restarting system when methane concentrations reach appropriate levels. Lot of rodents and rabbits were also noted within the landfill property.

7. Describe any activities implemented since completion of the remedies to optimize O&M? A new position was recently filled by the City of Phoenix, who will be strictly in charge of O&M activities, solely at the 19 Ave Landfill.

8. Describe any monitoring problems or results that may have affected the groundwater, methane extraction systems, or ambient air, or have caused the implementation of the site's contingency plans?
- Problems with the methane extraction system was discussed in #6. In terms of ground water monitoring, during 1999 the arsenic and nickel concentrations in Well I-4 exceeded the MCL. However, because the three quarter average arsenic concentration was below the MCL, the Contingency Plan was not implemented. The three quarter nickel concentration did exceed the Groundwater Contingency plan threshold of three time the MCL in July 1999. Therefore, a follow-up sample was collected and the exceedance was not confirmed; the concentration of nickel was less than the MCL. In terms of the VOC concentrations, a few downgradient wells indicated detection of 1,1-DCE above the MCL and threshold level stated in the Groundwater Contingency Plan. However, the City demonstrated that 1,1-DCE concentrations in the downgradient wells were coming from an upgradient source. Consequently, the Groundwater Contingency Plan was not triggered. In terms of the Ambient Air monitoring, Mr. Serio believes the proximity of the Suma Canisters, placed on the landfill boundary along 19th Avenue, does not provide adequate representation of possible emissions of VOCs directly from the landfill.
9. Describe any activities implemented since completion of the remedies to optimize on-site monitoring?
- Mr. Serio recommended that for the groundwater monitoring program, QA/QC sampling frequency of 20% be reduced. It was also recommended that analytical constituents, the number of wells to monitoring, and the monitoring frequency be reduced. Mr. Serio stated well DM-4 is cross gradient and does not provide useful groundwater data from the landfill. Wells DM-3D and 3P are located approximately ½ mile northwest of the landfill and may not provide the best data regarding the landfill's impact on groundwater should sampling reveal contamination in these wells. Wells DM&S and 7D are located at the northwest corner of the landfill and may provide more useful data.
10. Do you have any comments, suggestions, or recommendations to improve the site's operations, maintenance, or monitoring activities?
- The only comments Mr. Serio had was on future reuse and development of the landfill. Mr. Serio, believed that closed landfills such as the 19th Ave Landfill should be considered for future reuse, especially since the implementation of the Rio Salado Project
-
-
-

5. What effects have site operations had on you (or the surrounding community)?
Not much effect at present. However, during construction of landfill cap significant
amounts of dust was created. Concern is still present associated with dust generating
from the landfill during major wind storms.
-
-
6. During implementation of the project were you aware (or informed) of any events, incidents, problems or activities that effected you (or the surrounding community)?
Mr. Brittle stated the issue regarding whether or not drums containing hazardous waste
were found, made the community skeptical of the City.
-
-
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.
-
-
8. Are you aware of any community concerns regarding the site or its operation and administration that have not been resolved?
Mr. Brittle believes leaving contaminated groundwater in place is inappropriate and
future generations may have to deal with these problems.
-
-
9. Do you have any comments, suggestions, or recommendations regarding the site's management or operations?
Mr. Brittle again commented on Rio Salado Development issue with landfill washout
and the reburied drums issue. Mr. Brittle state that the City of Phoenix had lost some
credibility with the public regarding the reburied drum issue.
-
-
10. Can you recommend any additional community members that we should talk to?
No.
-
-

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

INTERVIEWER(S): S. Ciekot (ADEQ); J. Kim (ESE)
DATE: February 11, 2000 ; **INTERVIEW METHOD:** Telephone

TOPIC: **STATE & LOCAL CONSIDERATIONS, STATE AGENCIES & LOCAL AUTHORITIES**

INTERVIEWEE: Carol Johnson
REPRESENTING: City of Phoenix, Planning Department
ADDRESS: 200 W. Washington, 6th Floor ; **PHONE:** 602-262-4071
Phoenix, Arizona 85003

1. What is/was your understanding of the overall project at the Site?
Site is closed and being monitored with no future land use planned until monitoring is completed.

2. What is your impression of the completed project at the Site?
Had no impression about the completed project except for future land use of the property.

3. Have there been routine communications or activities conducted by you office related to the site?
Ms. Johnson is the City's Project Manager for the planning aspects of the Phoenix Reach of the Rio Salado Project, and has had no involvement with the Site until recently. She stated communities were raising questions about future use of landfill located adjacent to the Salt River, and the effects that the Rio Salado Project would have on these landfills. She stated that community members have attended monthly meeting regarding Rio Salado Project, where landfill location and redevelopment issues have been raised.

4. Have there been any complaints or other incidents related to the site requiring any response by your office?
None.

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?
As part of the Rio Salado Project the City of Phoenix is considering doing design overlay of corridors from I-17 to Broadway ½ mile on either side of the Salt River. No rezoning of the landfill area is planned. Additional low flow channels within the Salt River is planned from 7th St to 19th Ave. No plans for open channel flow within the Salt River portion adjacent to the Landfill. Ponds will be located between 7th Ave and 7th St which will discharge into the Salt River; wells are currently being installed at 7th Ave for irrigation and the ponds. Walkways are also planned on either side of the Salt River through the 19th Ave. Landfill Portion of the Salt River, which may require redefining the land use restriction.

6. In your opinion, have on-site operations conducted appropriate O&M and monitoring at the site in accordance with developed manuals and plans?
Not applicable to this interviewee

7. Are you aware of any community concerns regarding the site or its operation and administration?
None that she was aware of.

8. Do you have any comments, suggestions, or recommendations regarding the site's management or operations?
Site redevelopment issues including landscaping and vegetation to blend in with the Rio Salado Project.

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

INTERVIEWER(S): J. Kim (ESE)
DATE: February 14, 2000 ; **INTERVIEW METHOD:** Telephone

TOPIC: **STATE & LOCAL CONSIDERATIONS, STATE AGENCIES & LOCAL AUTHORITIES**

INTERVIEWEE: Nancy Nesky
REPRESENTING: ADEQ
ADDRESS: 3033 N. Central Ave. ; **PHONE:** 602-207-4180
Phoenix, AZ 85012

1. What is/was your understanding of the overall project at the Site?
Mrs. Nesky stated that she was the previous ADEQ Project Manager during the implementation of the Remedies at the Site so she had full understanding of the implementation phase of the project.

2. What is your impression of the completed project at the Site?
Mrs. Nesky stated that she was very pleased with completed project and that a good cap and methane recovery system was installed. She was also pleased with the channelization of the Salt River. The only problem she could remember during the construction phase was dust emissions, which were resolved by putting in semi-permanent access roads in the landfill property.

3. Have there been routine communications or activities conducted by you office related to the site?
Mrs. Nesky stated that since she is no longer involved on this project, she was unaware of any activities performed by her office.

4. Have there been any complaints or other incidents related to the site requiring any response by your office?
Mrs. Nesky discussed the reburied drum issue brought up by Steve Brittle. She stated that the first drum issue was presented by Heidi Stillman former employee of ADEQ, who also had a second job doing health and safety oversight at the landfill. Ms. Stillman initially reported to ADEQ that the City of Phoenix had encountered drums during the relocation of the some of the landfill waste during the rechannelization, which were

reburied at a specific location of the current landfill. Based on her allocation, ADEQ performed pot holing and geophysical survey at the suspected area where the drums were supposed to be buried. The results indicated that there was no evidence of any drums being buried in the suspected area. Approximately a year later, after Ms. Stillman was discharged from ADEQ, she accused the City of Phoenix of finding more drums and disposing of the contents which was determined to be hazardous waste into the landfill cell. When ADEQ investigated this second accusation, it was determined that the City of Phoenix did uncover some drums containing liquids which was mixed with soil and placed into the cell without proper characterization. Further interview with the City of Phoenix revealed that the noncharacterization and disposal of the drummed liquids was conducted at the direction of Ms. Stillman, who was working for the City of Phoenix and ADEQ. Based on the amount of material that was disposed, ADEQ Hazardous Waste Division and EPA decided not to pursue any enforcement action, which was presented in a memorandum.

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.

6. In your opinion, have on-site operations conducted appropriate O&M and monitoring at the site in accordance with developed manuals and plans?
No opinion, not current Project Manager.

7. Are you aware of any community concerns regarding the site or its operation and administration?
No, not current Project Manager.

8. Do you have any comments, suggestions, or recommendations regarding the site's management or operations?
No.

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

INTERVIEWER(S): S. Ciekot (ADEQ)
DATE: February 24, 2000 ; **INTERVIEW METHOD:** In person interview

TOPIC: **STATE & CONSIDERATIONS, STATE AGENCIES & LOCAL
AUTHORITIES**

INTERVIEWEE: Cody Williams, Council Member District 8
REPRESENTING: City of Phoenix City Council
ADDRESS: 200 W. Washington, 11th Floor ; **PHONE:** 602-262-7493
Phoenix, Arizona 85003

1. Please describe any community concerns regarding the 19th Avenue Landfill.
Mr. Williams stated the community has concerns regarding the future use of the landfill. Mr. Williams is involved with the planning aspects and community relations for the Phoenix Rio Salado project. The goal of this project is to revitalize the dry Salt River bed, including revegetation, a low flow channel, and multi-use trails. The community has expressed concerns that the 19th Avenue Landfill is seen as an unproductive, valuable piece of property that may be used in some respect for the Rio Salado project. Mr. Williams and the community would like to know what resources are available and what process must take place for possible redevelopment or use of the landfill.

2. Has the community expressed concerns to you regarding health threats related to the completed site?
Mr. Williams stated, over the last 6 years of service in District 8, he has never received (via telephone or community meetings) a comment regarding outstanding health concerns at the site. Mr. Williams receives routine concerns from the community regarding other environmental issues within his district (i.e., recent issue regarding the hazardous waste permit at the Innovative Waste Utilization facility). However, the community does not express concerns regarding the 19th Avenue Landfill.

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

INTERVIEWER(S): J. Kim (ESE)
DATE: March 07, 2000 ; **INTERVIEW METHOD:** Telephone

TOPIC: **STATE & LOCAL CONSIDERATIONS, STATE AGENCIES & LOCAL AUTHORITIES**

INTERVIEWEE: Nadia Hollan
REPRESENTING: U.S. EPA, Region IX
ADDRESS: 75 Hawthorne Street ; **PHONE:** 415-744-2363
San Francisco, CA 94105

1. What is/was your understanding of the overall project at the Site?
Ms. Hollan stated the site was originally placed on the Superfund list due to washout of trash during a 100-year storm event. The site eventually was transferred to ADEQ for oversight under the WQARF program. Currently all remedies have been implemented and the site is conducting O & M of the implemented remedies, and monitoring of groundwater and methane.

2. What is your impression of the completed project at the Site?
Ms. Hollan believed that the overall project went pretty well. However, she had some concern about methane probes located in the landfill trash Providing non-representative elevated readings. Ms. Hollan also pointed out that the monitoring procedure in the Ambient Air Monitoring Plan may have to be revised so that background versus actual landfill emissions can be distinguished.

3. Have there been routine communications or activities conducted by you office related to the site?
Ms. Hollan stated that most of the communication regarding this site was between her and ADEQ, which included addressing community concerns and review of documents and reports.

4. Have there been any complaints or other incidents related to the site requiring any response by your office?
Ms. Hollan stated Ms. Heidi Stillman former employee of ADEQ, submitted a request to EPA to perform a criminal investigation on illegal disposal of hazardous waste at the site. EPA and ADEQ investigated this allocation (See Nancy Nesky of ADEQ's response to Question #4), and concluded that the allocation of criminal activities was unfounded. Other environmental groups had concerns on the potential use and reuse of the site. Also Mr. Steve Brittle of Don't Waste Arizona also submitted a letter pertaining to the presence of 1,1-DCE in groundwater relative to the Innovative Waste Utilization facility.

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?

Ms. Hollan stated that the Dioxin Emission requirements for RCRA hazardous waste incinerators may be relevant and appropriate (or to be considered) for the methane extraction control system at the site.

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

Ms. Hollan stipulated that without her detailed examination of O&M manuals and monitoring plans, she was under the impression that generally on-site operation have conducted appropriate O&M and monitoring at the site.

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

Ms. Hollan stated the Arizona community was mainly concerned about future use/reuse of the landfill. In addition, in California communities are also concerned about Dioxin Emissions, which may prompt EPA to request an emissions study for Dioxin of the gas control systems at the landfill.

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

Ms. Hollan stated that she had no comments or recommendations since ADEQ is conduct the oversight of the landfill O&M and monitoring operations.

Final Site Inspection Checklist

Five-Year Review

19th Avenue Landfill WQARF Site

Phoenix, Arizona

February 29, 2000

Prepared for:

Arizona Department of Environmental Quality

3033 North Central Ave

Phoenix, Arizona 85012

Prepared by:

Environmental Science & Engineering, Inc.

426 North 44th Street, Suite 110

Phoenix, Arizona 856008

ESE Project # 66-00-001

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

II. INTERVIEWS (Continued)			
3. O & M On-Site Staff <u>NOT INTERVIEWED</u>			
	Name	Title	Date
Interviewed: <input type="checkbox"/> at Site	<input type="checkbox"/> at Office	<input type="checkbox"/> by Phone	Phone No. _____
Interview Summary:	<input type="checkbox"/> Interview Summary Report/Questionnaire Attached		
5. Regulatory Agencies and Local Authorities (i.e., ADEQ, EPA, City of Phoenix, Maricopa County Department of Environmental Services, etc.). Fill in all that apply.			
Agency: <u>CITY OF PHOENIX PLANNING DEPT.</u>			
Contact:	<u>CAROL JOHNSON</u>	<u>PROJECT MANAGER</u>	<u>2/11/00</u> <u>602-262-4071</u>
	Name	Title	Date Phone No.
Interview Summary:	<input checked="" type="checkbox"/> Interview Summary Report/Questionnaire Attached (<u>APPENDIX C</u>)		
Agency: <u>ADEQ</u>			
Contact:	<u>NANCY NESKY</u>	<u>PROJECT MANAGER</u>	<u>2/14/00</u> <u>602-207-4180</u>
	Name	Title	Date Phone No.
Interview Summary:	<input checked="" type="checkbox"/> Interview Summary Report/Questionnaire Attached (<u>APPENDIX C</u>)		
Agency: <u>CITY OF PHOENIX CITY COUNCIL</u>			
Contact:	<u>CODY WILLIAMS</u>	<u>COUNCIL MEMBER DISTRICT 8</u>	<u>2/24/00</u> <u>602-262-7493</u>
	Name	Title	Date Phone No.
Interview Summary:	<input checked="" type="checkbox"/> Interview Summary Report/Questionnaire Attached (<u>APPENDIX C</u>)		

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

H. INTERVIEWS (Continued)

5. Regulatory Agencies and Local Authorities (Continued)

Agency: EPA REGION 9
 Contact: NADIA HOLLAN PROJECT MANAGER 3/7/00 415-744-2363
Name Title Date Phone No.

Interview Summary: Interview Summary Report/Questionnaire Attached (APPENDIX C)

Agency: _____
 Contact: _____
Name Title Date Phone No.

Interview Summary: Interview Summary Report/Questionnaire Attached

6. The Community (i.e., Community Advisory Board; Surrounding Residence; Environmental Conservation Groups)

Fill in all that apply.

Representing: DON'T WASTE ARIZONA
 Contact: STEVE BRITTLE NA 2/11/00 602-268-6110
Name Title Date Phone No.

Interview Summary: Interview Summary Report/Questionnaire Attached (APPENDIX C).

Representing: _____
 Contact: _____
Name Title Date Phone No.

Interview Summary: Interview Summary Report/Questionnaire Attached

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

III. ONSITE DOCUMENT AND RECORDS VERIFICATION

1. On-Site Documents

<input checked="" type="checkbox"/> Landfill O & M Manual	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Gas Extraction System O & M Manual	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Groundwater Monitoring Plan (QAPP ONLY)	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Landfill Gas Monitoring Plan	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Ambient Air Monitoring Plan	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Groundwater Contingency Plan	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Health & Safety Plan (NOT @ 19TH AVE)	<input type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input type="checkbox"/> Storm Water Pollution Prevention Plan	<input type="checkbox"/> Readily Available	<input type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Contingency/Emergency Response Plan	<input type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> As-Built Drawings	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A

Remarks NO GW MONITORING SAMPLING & ANALYSIS PLAN DEVELOPED (QAPP ONLY); SAP NOT REQUIRED IN CONSENT DECREE. (SEE SUPPLEMENT)

2. Permits and Service Agreements

<input checked="" type="checkbox"/> Air Permit	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input type="checkbox"/> Effluent NPDES Permit	<input type="checkbox"/> Readily Available	<input type="checkbox"/> Up to Date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Storm Water NPDES Permit (PERMIT REQ)	<input type="checkbox"/> Readily Available	<input type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> POTW Discharge Authorization	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Others <u>EARTH MOVING BLOCK PERMIT</u>	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A

Remarks STORM WATER NPDES PERMIT NOT OBTAINED FOR SITE DISCHARGE TO SALT RIVER. PERMIT NEEDS TO BE OBTAINED PER AARMS

3. Maintenance Logs

<input type="checkbox"/> Landfill CAP Maintenance Log	<input type="checkbox"/> Readily Available	<input type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input type="checkbox"/> Perimeter Drainage Maintenance Log	<input type="checkbox"/> Readily Available	<input type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input type="checkbox"/> Sediment Ponds Maintenance Log	<input type="checkbox"/> Readily Available	<input type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Gas Collection System Maintenance Log	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Flare System Maintenance Log	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Gas Probe Monitoring Maintenance Log	<input checked="" type="checkbox"/> Readily Available	<input checked="" type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input type="checkbox"/> GW Monitoring Well Maintenance Log	<input type="checkbox"/> Readily Available	<input type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input type="checkbox"/> Condensate Tank Carbon Changeout Log	<input type="checkbox"/> Readily Available	<input type="checkbox"/> Up to Date	<input type="checkbox"/> N/A
<input type="checkbox"/> Site Barrier Maintenance Log	<input type="checkbox"/> Readily Available	<input type="checkbox"/> Up to Date	<input type="checkbox"/> N/A

Remarks REMAINING LOGS (NOT CHECKED) WERE NOT AVAILABLE. RON SERIO STATED THAT THESE LOGS WERE -> (SEE SUPPLEMENT).

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

III. ONSITE DOCUMENT AND RECORDS VERIFICATION (Continued)

4.

Records

- | | | | |
|---|---|--|---|
| <input type="checkbox"/> Daily Site Access Records (<i>See Remarks</i>) | <input type="checkbox"/> Readily Available | <input type="checkbox"/> Up to Date | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Employee O&M Training Records | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Employee OSHA Certification Records | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Site Incident Records (<i>NO INCIDENTS</i>) | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Gas Generation Records | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Air Emissions Records/Inventories | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Condensate Generation/Discharge Records | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input type="checkbox"/> Leachate Generation/Discharge Records | <input type="checkbox"/> Readily Available | <input type="checkbox"/> Up to Date | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Storm Water Discharge Records | <input type="checkbox"/> Readily Available | <input type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input type="checkbox"/> CAP Settlement Records | <input type="checkbox"/> Readily Available | <input type="checkbox"/> Up to Date | <input checked="" type="checkbox"/> N/A |

Remarks SITE ACCESS IS CONTROLLED BY LOCKED GATE;
NO ACCESS RECORDS IS REQUIRED. AIR EMISSIONS INVENTORY
AVAILABLE UPTO 1998; 1999 INVENTORY HAS NOT BEEN
REQUESTED BY MARICOPA COUNTY. NO STORM WATER
DISCHARGE RECORDS ARE AVAILABLE. SINCE SITE IS
SUBJECT TO STORM WATER PERMITTING, THESE RECORDS
NEED TO BE ESTABLISHED.

5.

Monitoring Data and Report

- | | | | |
|---|---|--|---|
| <input checked="" type="checkbox"/> Groundwater Monitoring Data | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Groundwater Monitoring Reports | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Methane Monitoring Data (<i>INCLUDED IN GW RPT</i>) | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Methane Monitoring Reports | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Ambient Air Monitoring Data | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Ambient Air Monitoring Reports | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Condensate Analytical Data | <input checked="" type="checkbox"/> Readily Available | <input checked="" type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |
| <input type="checkbox"/> Leachate Analytical Data | <input type="checkbox"/> Readily Available | <input type="checkbox"/> Up to Date | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Storm Water Monitoring Data | <input type="checkbox"/> Readily Available | <input type="checkbox"/> Up to Date | <input type="checkbox"/> N/A |

Remarks SAME ISSUE AS # 4 REGARDING STORM
WATER MONITORING DATA.

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

IV. O & M COST EVALUATION																					
1.	<p>O & M Implementation Organization</p> <p> <input type="checkbox"/> Agency <input type="checkbox"/> Agency Contractor <input checked="" type="checkbox"/> PRP <input type="checkbox"/> PRP Contractor <input type="checkbox"/> Other _____ </p>																				
2.	<p>O & M Cost Records</p> <p> <input checked="" type="checkbox"/> Readily Available <input checked="" type="checkbox"/> Up to Date <input type="checkbox"/> Funding Mechanism/Agreement in Place Original O & M Cost <u>\$1,010,000</u> <input type="checkbox"/> Breakdown Attached </p> <p>Actual Annual O & M Costs for Review Period</p> <table style="width:100%; border: none;"> <tr> <td style="width: 15%;">1995</td> <td style="width: 40%;"><u>UNDER CONSTRUCTION</u></td> <td style="width: 20%;"><input type="checkbox"/> Breakdown Attached</td> <td style="width: 25%;"><input checked="" type="checkbox"/> Not Available</td> </tr> <tr> <td>1996</td> <td><u>UNDER CONSTRUCTION</u></td> <td><input type="checkbox"/> Breakdown Attached</td> <td><input checked="" type="checkbox"/> Not Available</td> </tr> <tr> <td>1997-1998</td> <td><u>\$ 535,000</u></td> <td><input checked="" type="checkbox"/> Breakdown Attached (APPB)</td> <td><input type="checkbox"/> Not Available</td> </tr> <tr> <td>1998-1999</td> <td><u>\$ 316,900</u></td> <td><input checked="" type="checkbox"/> Breakdown Attached (APPB)</td> <td><input type="checkbox"/> Not Available</td> </tr> <tr> <td>1999-2000</td> <td><u>NA</u></td> <td><input type="checkbox"/> Breakdown Attached</td> <td><input type="checkbox"/> Not Available</td> </tr> </table>	1995	<u>UNDER CONSTRUCTION</u>	<input type="checkbox"/> Breakdown Attached	<input checked="" type="checkbox"/> Not Available	1996	<u>UNDER CONSTRUCTION</u>	<input type="checkbox"/> Breakdown Attached	<input checked="" type="checkbox"/> Not Available	1997-1998	<u>\$ 535,000</u>	<input checked="" type="checkbox"/> Breakdown Attached (APPB)	<input type="checkbox"/> Not Available	1998-1999	<u>\$ 316,900</u>	<input checked="" type="checkbox"/> Breakdown Attached (APPB)	<input type="checkbox"/> Not Available	1999-2000	<u>NA</u>	<input type="checkbox"/> Breakdown Attached	<input type="checkbox"/> Not Available
1995	<u>UNDER CONSTRUCTION</u>	<input type="checkbox"/> Breakdown Attached	<input checked="" type="checkbox"/> Not Available																		
1996	<u>UNDER CONSTRUCTION</u>	<input type="checkbox"/> Breakdown Attached	<input checked="" type="checkbox"/> Not Available																		
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1998-1999	<u>\$ 316,900</u>	<input checked="" type="checkbox"/> Breakdown Attached (APPB)	<input type="checkbox"/> Not Available																		
1999-2000	<u>NA</u>	<input type="checkbox"/> Breakdown Attached	<input type="checkbox"/> Not Available																		
3.	<p>Identification of Unanticipated or Unusually High O & M Cost During Review Period</p> <p>Describe Applicable Cost(s) and Reason(s) for Each Year</p> <p>Year 1995 <u>NOT APPLICABLE</u></p> <hr/> <p>Year 1996 <u>NOT APPLICABLE</u></p> <hr/> <p>Year 1997 <u>NONE - FROM JULY 1997 TO JUNE 1998</u></p> <hr/> <p>Year 1998 <u>NONE - FROM JULY 1998 TO JUNE 1999</u></p> <hr/> <p>Year 1999 <u>NOT APPLICABLE.</u></p> <hr/>																				

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

CELL A

V. GENERAL SITE CONDITIONS INSPECTION

1. **Access Restriction** Applicable Not Applicable
Perimeter Fencing Good Condition Bad Condition Bad in Sections Shown in Map
 Remarks _____

Access Gates Good Condition Bad Condition, Shown in Map Locks in Place
 Remarks _____

Perimeter Signs Good Condition Bad Condition Spaced Accordingly
 Remarks _____

Evidence of Vandalism/Trespassing No Yes (See Map)
 Remarks _____

2. **Institutional Controls** Applicable Not Applicable
Deed Restrictions in Place No Yes Not Applicable
 Remarks _____

Evidence of Land Use Changes On-Site No Yes Not Applicable
 Remarks _____

Evidence of Land Use Changes Off-Site No Yes Not Applicable
 Remarks _____

3. **On-Site Roads** Applicable Not Applicable
Roads Appropriately Sealed to Prevent Dust No Yes Not Applicable
 Remarks _____

Evidence of Road Damage/Deterioration No Yes Not Applicable
 Remarks ROAD ERODED AWAY EAST PERIMETER @ LETDOWN/
CHANNEL DISCHARGE : SEE FIGURE A

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

CELL A

VI. LANDFILL COVER/CAP VISUAL INSPECTION		
1.	Settlement <input type="checkbox"/> Location Shown on Map <input checked="" type="checkbox"/> Not Evident Areal Extent of Settlement _____ Settlement Depth _____ Remarks <u>ONLY MINOR SETTLEMENT (I.E. 4.2 INCHES) NOTED.</u> <u>SMALL POCKETS AFFECT TOP COVER ONLY</u>	
2.	Cracks <input type="checkbox"/> Location Shown on Map <input checked="" type="checkbox"/> Not Evident Length and Width _____ Estimate Depth _____ Remarks _____ _____ _____	
3.	Erosion <input checked="" type="checkbox"/> Location Shown on Map <input type="checkbox"/> Not Evident Areal Extent of Erosion <u>PERIMETER CELL A</u> Erosion Depth <u>1 FT TO 3.5 FT.</u> Remarks <u>DUE HEAVY RAIN PRIOR TO INSPECTION, PERIMETER</u> <u>OF CELL A COVER HAD SIGNIFICANT AMOUNT OF ERODED</u> <u>AREA (FIGURE A). HOWEVER NONE OF THE ERODED AREAS</u> <u>HAD ANY TRASH EXPOSED</u>	
4.	Holes <input checked="" type="checkbox"/> Location Shown on Map <input checked="" type="checkbox"/> Not Evident (FIG A) Areal Extent of Hole(s) <u>THROUGH OUT</u> _____ Estimate Depth <u>4.1 FT</u> Remarks <u>LOOSE TOP HAD CONSOLIDATED LEAVING SMALL</u> <u>HOLES EXTENDING NO DEEPER THAN 1-FOOT.</u>	
5.	Vegetative Cover <input checked="" type="checkbox"/> Grass <input type="checkbox"/> Trees <input checked="" type="checkbox"/> Properly Established <input checked="" type="checkbox"/> No Signs of Stress <input checked="" type="checkbox"/> Tree and Shrub Locations (See Map) <input type="checkbox"/> Cover Stress Locations (See Map) Remarks <u>TOO MUCH VEGETATION WITHIN PERIMETER</u> <u>DRAINAGE CHANNEL. SEE FIG B FOR LOCATION.</u> <u>VEGETATION IN THESE AREAS NEED TO BE REDUCED.</u>	
6.	Bulges <input type="checkbox"/> Location Shown on Map <input checked="" type="checkbox"/> Not Evident Areal Extent of Bulge _____ Bulge Height _____ Remarks _____ _____ _____	

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

CELL A

VI. LANDFILL COVER/CAP VISUAL INSPECTION (Continued)

7. **Wet Areas/Water Damage** Not Evident
- Wet Areas Location Shown on Map Areal Extent 5' x 10'
- Ponding Location Shown on Map Areal Extent _____
- Seeps Location Shown on Map Areal Extent _____
- Soft Subgrade Location Shown on Map Areal Extent _____

Remarks PONDING (STANDING WATER) NOTED IN PERIMETER DRAINAGE CHANNEL NEAR SOUTHEAST CORNER OF CELL. SEE FIG B.

8. **Cover Slope Instability** Location Shown on Map Not Evident
- Remarks _____

9. **Benches** Applicable N/A

10. **Cover Letdown Channels** Applicable N/A
- Settlement** Location Shown on Map Not Evident
- Areal Extent of Settlement _____ Settlement Depth _____

Remarks _____

- Material Degradation** Location Shown on Map Not Evident
- Material Type _____ Areal Extent _____

Remarks _____

- Erosion** Location Shown on Map Not Evident
- Areal Extent of Erosion _____ Erosion Depth _____

Remarks SEE FIG. A: NOTE WESTERN PERIMETER WHERE LET-DOWN CHANNEL DISCHARGES TO DRAINAGE CHANNEL.

- Undercutting** Location Shown on Map Not Evident
- Areal Extent of Undercut _____ Estimate Depth _____

Remarks _____

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

CELL A

VI. LANDFILL COVER/CAP VISUAL INSPECTION (Continued)

10. **Cover Letdown Channels (Continued)**

Drainage Obstructions Location Shown on Map Not Evident

Obstruction Type _____ Areal Extent _____

Remarks _____

Excessive Vegetation Growth Location Shown on Map Not Evident

Vegetation Type _____ Areal Extent _____

Remarks _____

11. **Cover Penetrations** Applicable N/A

Gas Vents/*WELLS* Evidence of Leakage at Penetration Not Evident

Gas Probes Evidence of Leakage at Penetration Not Evident

Monitoring Wells Evidence of Leakage at Penetration Not Evident

Condensate Sumps Evidence of Leakage at Penetration Not Evident

Settlement Monuments (*N/A*) Evidence of Leakage at Penetration Not Evident

Show on Site Map Locations of all Cover Penetration Locations that Shows Evidence of Leakage and/or Seepage into the Landfill.

Remarks _____

12. **Cover Drainage Layer** Applicable N/A

VII. LANDFILL PERIMETER DRAINAGE AND EROSION CONTROL

1. **Material Degradation** Location Shown on Map Not Evident

Material Type *CLAY / ARMOR FLEX* Areal Extent _____

Remarks _____

2. **Channel/Ditch Erosion** Location Shown on Map Not Evident

Areal Extent of Erosion *VARIABLES* Erosion Depth *1/2' TO 1'*

Remarks *THE TOP OF THE DRAINAGE CHANNEL THAT RUNS ADJACENT TO "LOWER BUCKETS", 19TH AVE "and THE SALT RIVER DID SHOW EVIDENCE OF EROSION. (FIG B) ARMOR FLEX NOT IMPACTED*

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

CELL A

VII. LANDFILL PERIMETER DRAINAGE AND EROSION CONTROL (Continued)			
3.	Undercutting Areal Extent of Undercut _____ Estimate Depth _____ Remarks _____	<input type="checkbox"/> Location Shown on Map	<input checked="" type="checkbox"/> Not Evident
4.	Siltation Areal Extent of Siltation _____ Estimate Depth _____ Remarks <u>THERE WAS SOME SILTATION WITHIN DRAINAGE CHANNEL; HOWEVER INSUFFICIENT AMOUNT HAS BEEN GENERATED TO WARRANT REMOVAL.</u>	<input type="checkbox"/> Location Shown on Map	<input checked="" type="checkbox"/> Not Evident
5.	Vegetation Growth Vegetation Type <u>PLANTS AND CALTUS</u> Areal Extent _____ Remarks <u>SEE COMMENT VI.5.</u>	<input checked="" type="checkbox"/> Location Shown on Map	<input type="checkbox"/> Does Not Impede Flow
6.	Sedimentation Impoundments <input type="checkbox"/> Excessive Sedimentation Areal Extent _____ Depth <u>1-2' CRACK</u> <input type="checkbox"/> Evidence of Erosion Areal Extent _____ Depth _____ <input checked="" type="checkbox"/> Inlet <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Blocked (<u>PARTIALLY</u>) <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Outlet <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> Blocked <input type="checkbox"/> N/A Remarks <u>TWO SEDIMENTATION PONDS ARE PRESENT WITHIN CELL A. BOTH APPEARED TO BE IN GOOD CONDITION, HOWEVER VEGETATION & DEBRIS HAD BUILT-UP OVER THE INLET GRATE OF THE ONE (SEE SUPPLEMENT)</u>	<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Map Attached (<u>FIG 3</u>)
7.	Storm Water Discharge Outfalls <input type="checkbox"/> Excessive Sedimentation Areal Extent _____ Depth _____ <input type="checkbox"/> Evidence of Erosion Areal Extent _____ Depth _____ <input checked="" type="checkbox"/> Outlet <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> Blocked <input type="checkbox"/> N/A Remarks <u>BOTH STORM WATER OUTLETS TO THE SALT RIVER (FIG 3) ARE OPERATING CORRECTLY. HOW A THIRD NON-DESIGNED (OR PLANNED) STORM WATER DISCHARGE LOCATION HAS BEEN IDENTIFIED NEAR THE (SEE SUPP.)</u>	<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Map Attached (<u>FIG 3 B</u>)

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

CELL A

VIII. LANDFILL GAS COLLECTION & CONTROL SYSTEM

1. **Gas Collection Wells** Active Passive Map Attached (FIG. 4)

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 VISUAL INSPECTION ONLY. (BASED ON)

2. **Gas Collection Piping & Manifolds** Active Passive Map Attached (FIG. 4)

Properly Buried Yes No If No, Explain POOR GROUND PAVING REQUIRED

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 ALONG 15TH AVENUE PERIMETER (DESIGNED ACCORDINGLY)
BASED ON VISUAL INSPECTION ONLY.

3. **Gas Treatment System Gas Collection Tanks** Applicable N/A

Good Condition Yes No If No, Explain _____

Evidence of Leakage Yes No If Yes, Explain _____

O & M Required Yes No If Yes, Explain _____

Remarks BASED ON VISUAL INSPECTION ONLY.

4. **Gas Treatment System Piping and Valves** Applicable N/A

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 BASED ON VISUAL INSPECTION ONLY.

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

CELL A

VIII. LANDFILL GAS COLLECTION & CONTROL SYSTEM (Continued)

5. Gas Treatment System Flare Station Applicable N/A
- Functioning Yes No If No, Explain _____
- Proper Operation 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 FLARE SYSTEM WAS OPERATING @ TIME OF INSPECTION;
HOWEVER, INTERVIEW WITH RON SERIO REVEALED THAT
FLARE SYSTEM DOES SHUT DOWN FREQUENTLY DURING
THE WINTER MONTH BECAUSE THE METHANE ^{LEVELS} ARE NOT
HIGH ENOUGH. EACH TIME THE SYSTEM SHUTS-DOWN, IT
MUST BE MANUALLY RESTARTED. THERE IS A CONCERN FOR ^(END SLOTT)

3. Gas Treatment System Knockout Drums Applicable N/A
- 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 _____

4. 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 NOT TESTED (See Remark)
- Good Condition Overall Yes No If No, Explain _____
- O & M Required Yes No If Yes, Explain _____

Remarks RON SERIO STATED THAT THE ALARM IS WORKING
PROPERLY.

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

CELLA

IX. CONDENSATE COLLECTION AND TREATMENT SYSTEM

1. **Condensate Collection Sumps** Map Attached (FIG. D)

Properly Secured Yes No If No, Explain _____

Sump in Good Condition Yes No If No, Explain _____

Pumps Functioning 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 _____

Remarks BASED ON VISUAL INSPECTION ONLY.

2. **Condensate Transfer Piping** Map Attached (FIG. A)

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 BASED ON VISUAL INSPECTION ONLY

3. **Condensate Storage Tanks** Applicable N/A

Tank Capacity 8,000 (Gallons) Construction Material _____

Good Condition Yes No If No, Explain _____

Carbon Canister in place Yes No If No, Explain _____

Sheen in Water Yes No If Yes, Explain _____

Evidence of Leakage Yes No If Yes, Explain _____

O & M Required Yes No If Yes, Explain _____

Remarks _____

4. **Condensate Discharge Pretreatment** Applicable N/A

Summarize Treatment Process and Adequacy IF PH EXCEEDS PRETREATMENT
LIMIT: IT IS ADJUSTED W/ LIME PRIOR TO DISCHARGE
TO COP POTW.

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

CELL A

X. MONITORING SYSTEMS

1. **Groundwater Monitoring Wells** Well List & Map Attached (FIG. C)
- 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 NOT NEEDED.
- Routinely Monitored Yes No If No, Explain _____
- O & M Required Yes No If Yes, Explain _____

Remarks ONLY A FEW WELLS WERE VISUALLY INSPECTED.

2. **Gas Monitoring Probes** Probe List & Map Attached (FIG. D)
- 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 NOT NEEDED.
- Routinely Monitored Yes No If No, Explain _____
- Condensate Present Yes No If Yes, Explain _____
- O & M Required Yes No If Yes, Explain _____

Remarks ONLY A FEW PROBES WERE VISUALLY INSPECTED.

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

Cell A

XII. REMEDIAL TREATMENT SYSTEMS

1. Groundwater Treatment System Applicable N/A
2. Vadose Zone Treatment System Applicable N/A

XIII. OVERALL OBSERVATIONS

i. Adequacy of Remedy

Landfill Capping: IN GENERAL THE CAP IS GOOD CONDITION AND APPEARS TO BE PERFORMING PROPERLY. HOWEVER, SIGNIFICANT AMOUNT OF EROSION WAS NOT AROUND THE PERIMETER OF CAP IN DEPTHS RANGING FROM 1 TO 3.5' ALTHOUGH NO WASTE WAS EXPOSED THESE ERODED AREAS SHOULD BE REPAIRED AS SOON AS POSSIBLE.

Perimeter Drainage: ADEQUATE, SOME LOCATIONS DID HAVE EXCESSIVE VEGETATION THAT SHOULD BE CLEARED TO ENSURE STORM WATER FLOW ARE NOT INHIBITED. ALSO STANDING WATER WAS NOT IN A SMALL SECTION OF DRAINAGE NEAR THE SOUTHEAST CORNER OF THE CELL.

Gas Collection/Control: THERE IS A CONCERN THAT THE FREQUENT SHUT-DOWN OF THE FLARE SYSTEM MAY NOT ADEQUATELY PREVENT MIGRATION OF METHANE OFF-SITE.

Access Control EXCELLENT (FENCE & GATES IN GOOD CONDITION, NO EVIDENCE OF VANDALISM.)

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

CELL A

XIII. OVERALL OBSERVATIONS (Continued)

1. Adequacy of Remedy (Continued)

Institutional Control ADEQUATE LEAD RESTRICTIONS
IN PLACE.

Monitoring ADEQUATE; ^{WELL} LOCATIONS & MONITORING
FREQUENCY IS MORE THAN ADEQUATE.

Condensate Discharge ADEQUATE, ^{MEETS COP POTW} ~~LEAD RESTRICTIONS~~
PRETREATMENT AUTHORIZATION.

Channelization ADEQUATE.

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

CELL A

XIII. OVERALL OBSERVATIONS (Continued)

2.

Adequacy of O & M

Landfill Cover System THE MAINTENANCE LOG FOR THE COVER SYSTEM MUST BE USED. O & M FREQUENCY IS ADEQUATE.

Landfill Drainage USE OF APPROPRIATE LOGS REQUIRED.

Gas Collection System OK

Gas Treatment System GAS SYSTEM MAY NEED TO BE EVALUATED DUE TO FREQUENT SHUT-DOWNS.

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

CELL A

XIII. OVERALL OBSERVATIONS (Continued)

2. Adequacy of O & M (Continued)

Site Access System ADEQUATE

Monitoring Systems ADEQUATE

Condensate Management System ADEQUATE

Salt River Channelization ADEQUATE (VISUAL ONLY)

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

CELL A

XIII. OVERALL OBSERVATIONS (Continued)

3. Early Indicators of Potential Remedy Failure

Landfill Capping: SIGNIFICANT PERIMETER EROSION
NEEDS TO BE REPAIRED. (THIS IS NOT AN INDICATION
OF EARLY FAILURE, BECAUSE PRIOR TO THE INSPECTION
AN UNUSUALLY LARGE AMOUNT OF RAINFALL HAD OCCURRED.

Perimeter Drainage: MINOR EROSION & VEGETATION BUILD-UP.
(NOT EARLY FAILURE)

Gas Collection/Control: IF METHANE CONTROL SYSTEM
CONTINUES TO SHUT-DOWN, THIS COULD BE
AN EARLY INDICATION THAT THE SYSTEM MAY
NOT ADEQUATELY CONTROL THE MIGRATION
OF METHANE.

Access Control ADEQUATE

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

CELL A

XIII. OVERALL OBSERVATIONS (Continued)

3. Early Indicator of Potential Remedy Failure (Continued)

Institutional Control

ADEQUATE

Monitoring

Review

ADEQUATE (DOES NOT INCLUDE DATA

Condensate Discharge

ADEQUATE

Channelization

ADEQUATE (HOW EVER SUFFICIENT
FLOW HAVE NOT GONE THROUGH THE SALT RIVER
TO REALLY TEST THE STABILIZATION OF THE BANKS.

FIVE-YEAR REVIEW 19TH AVE LANDELL
SITE INSPECTION CHECKLIST

CELL A

XIII. OVERALL OBSERVATIONS (Continued)

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

Landfill Cover System Perimeter erosion could be reduced by use of "benches".

Landfill Drainage None

Gas Collection System To minimize the down-time of the collection system, an automatic start-up system, may be considered that starts the flare system when methane levels reach appropriate levels.

Gas Treatment System See above.

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

CELL A

XIII. OVERALL OBSERVATIONS (Continued)

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

Site Access System None.

Monitoring Systems AFTER GROUND WATER & METHANE DATA HAS BEEN ASSESSED, MONITORING LOCATIONS, PARAMETERS, & FREQUENCY MAY BE REDUCED.

Condensate Management System None

Salt River Channelization None

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

CELL A.

SUPPLEMENTAL REMARKS SHEET (Attach to Appropriate Section of Checklist)

SECTION III. 1 (CONTINUED)

HEALTH & SAFETY PLAN AND EMERGENCY RESPONSE PLAN WERE NOT PHYSICALLY PRESENT @ 19TH AVE SITE. THESE DOCUMENTS NEED TO BE ON-SITE. NO STORM WATER POLLUTION PREVENTION PLAN WAS DEVELOPED FOR SITE. SINCE STORM WATER DISCHARGES FROM THE SITE IS SUBJECT TO NPDES PERMITTING (CURRENT ARAR); THIS PLAN NEEDS TO BE DEVELOPED.

SECTION III. 3 (CONTINUED)

→ NOT USED. HOWEVER IN ACCORDANCE W THE 9/15/98 O&M MANUAL, ALL APPROPRIATE LOGS MUST BE USED WHEN CONDUCTING INSPECTION & MAINTENANCE ACTIVITIES.

SECTION VII. 6

→ SOUTHWEST POND THAT COULD PARTIALLY BLOCK STORM WATER DRAINAGE (SEE FIG. B). ALSO A DRAINAGE GRATE AT THE SOUTHEAST CORNER HAS SEDIMENT BUILD-UP (SEE FIG. B)

SECTION VII. 7

→ THE SOUTHWEST CORNER OF THE "TALLOW PLANT". AT THIS LOCATION, THE EARTHEN BERM RUNNING EAST AND WEST DOES NOT COMPLETELY TIE INTO THE DRAINAGE DITCH RUNNING NORTH AND SOUTH. APPROXIMATELY 6-8' GAP IS PRESENT AT THIS LOCATION WHERE A SUFFICIENT VOLUME OF STORM WATER RUN-OFF COULD RUN INTO THE ADJOINING PROPERTY. ~~ALSO A SEDIMENT~~

SECTION VIII. 5

→ METHANE MIGRATION & CONTROL IF THE SYSTEM IS DOWN FOR AN EXTENDED PERIOD (I.E. > 8 HRS).

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

CELL A-1

V. GENERAL SITE CONDITIONS INSPECTION

1. **Access Restriction** Applicable Not Applicable
Perimeter Fencing Good Condition Bad Condition Bad in Sections Shown in Map
 Remarks _____

Access Gates Good Condition Bad Condition, Shown in Map Locks in Place
 Remarks _____

Perimeter Signs Good Condition Bad Condition Spaced Accordingly
 Remarks _____

Evidence of Vandalism/Trespassing No Yes (See Map)
 Remarks beer bottles (empty) misc. trash along fence line - minor

2. **Institutional Controls** Applicable Not Applicable
Deed Restrictions in Place No Yes Not Applicable
 Remarks _____

Evidence of Land Use Changes On-Site No Yes Not Applicable
 Remarks _____

Evidence of Land Use Changes Off-Site No Yes Not Applicable
 Remarks _____

3. **On-Site Roads** Applicable Not Applicable
Roads Appropriately Sealed to Prevent Dust No Yes Not Applicable
 Remarks _____

Evidence of Road Damage/Deterioration No Yes Not Applicable
 Remarks erosion and cracks from recent rain storms particularly along drainage paths

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

CELL A-1

VI. LANDFILL COVER/CAP VISUAL INSPECTION	
1.	<p>Settlement <input type="checkbox"/> Location Shown on Map <input checked="" type="checkbox"/> Not Evident</p> <p>Areal Extent of Settlement <u>on landfill proper</u> Settlement Depth <u>< 1ft</u></p> <p>Remarks <u>pockets of settlement (holes) of upper 1ft of cap (top soil) within uncompacted portion. - throughout landfill</u></p>
2.	<p>Cracks <input type="checkbox"/> Location Shown on Map <input checked="" type="checkbox"/> Not Evident</p> <p>Length and Width _____ Estimate Depth _____</p> <p>Remarks _____</p>
3.	<p>Erosion <input type="checkbox"/> Location Shown on Map <input type="checkbox"/> Not Evident</p> <p>Areal Extent of Erosion <u>along perimeter of cell A, A-1</u> Erosion Depth <u>varies < 1ft - 3ft in depth</u></p> <p>Remarks _____</p>
4.	<p>Holes <input type="checkbox"/> Location Shown on Map <input type="checkbox"/> Not Evident</p> <p>Areal Extent of Hole(s) <u>on landfill proper</u> Estimate Depth <u>< 1ft</u></p> <p>Remarks <u>holes within unconsolidated upper portion (< 1ft) of cap.</u></p>
5.	<p>Vegetative Cover <input checked="" type="checkbox"/> Grass <input type="checkbox"/> Trees <input checked="" type="checkbox"/> Properly Established <input checked="" type="checkbox"/> No Signs of Stress</p> <p><input type="checkbox"/> Tree and Shrub Locations (See Map) <input type="checkbox"/> Cover Stress Locations (See Map)</p> <p>Remarks _____</p>
6.	<p>Bulges <input type="checkbox"/> Location Shown on Map <input checked="" type="checkbox"/> Not Evident</p> <p>Areal Extent of Bulge _____ Bulge Height _____</p> <p>Remarks _____</p>

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

Cell A-1

VI. LANDFILL COVER/CAP VISUAL INSPECTION (Continued)		
7.	Wet Areas/Water Damage <input type="checkbox"/> Wet Areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft Subgrade Remarks _____ _____ _____	<input checked="" type="checkbox"/> Not Evident <i>on cap</i> <input type="checkbox"/> Location Shown on Map Areal Extent _____ <input type="checkbox"/> Location Shown on Map Areal Extent _____ <input type="checkbox"/> Location Shown on Map Areal Extent _____ <input type="checkbox"/> Location Shown on Map Areal Extent _____
8.	Cover Slope Instability Remarks _____ _____ _____	<input type="checkbox"/> Location Shown on Map <input checked="" type="checkbox"/> Not Evident
9.	Benches Remarks _____ _____ _____	<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
10.	Cover Letdown Channels Settlement Areal Extent of Settlement <i>holes in top soil</i> Remarks <i>< 1 ft</i> _____ _____ _____ Material Degradation Material Type _____ Areal Extent _____ Remarks _____ _____ _____ Erosion Areal Extent of Erosion _____ Erosion Depth _____ Remarks _____ _____ _____ Undercutting Areal Extent of Undercut _____ Estimate Depth _____ Remarks _____ _____ _____	<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Location Shown on Map <input type="checkbox"/> Not Evident Settlement Depth <i>< 1 ft in top soil</i> <i>3' cap ok.</i> <input type="checkbox"/> Location Shown on Map <input type="checkbox"/> Not Evident <input type="checkbox"/> Location Shown on Map <input type="checkbox"/> Not Evident

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

CELL A-1

VI. LANDFILL COVER/CAP VISUAL INSPECTION (Continued)

10. **Cover Letdown Channels (Continued)**
Drainage Obstructions Location Shown on Map Not Evident
 Obstruction Type _____ Areal Extent _____
 Remarks _____

Excessive Vegetation Growth Location Shown on Map Not Evident
 Vegetation Type _____ Areal Extent _____
 Remarks _____

11. **Cover Penetrations** Applicable N/A
 Gas Vents Evidence of Leakage at Penetration Not Evident
 Gas Probes Evidence of Leakage at Penetration Not Evident
 Monitoring Wells Evidence of Leakage at Penetration Not Evident
 Condensate Sumps Evidence of Leakage at Penetration Not Evident *N/A*
 Settlement Monuments Evidence of Leakage at Penetration Not Evident *N/A*
 Show on Site Map Locations of all Cover Penetration Locations that Shows Evidence of Leakage and/or Seepage into the Landfill.
 Remarks _____

12. **Cover Drainage Layer** Applicable N/A

VII. LANDFILL PERIMETER DRAINAGE AND EROSION CONTROL

1. **Material Degradation** Location Shown on Map Not Evident
 Material Type _____ Areal Extent *surface erosion*
 Remarks _____ *(noted by COP for repairs this week)*

2. **Channel/Ditch Erosion** Location Shown on Map Not Evident
 Areal Extent of Erosion _____ Erosion Depth _____
 Remarks _____

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

CELL A-1

VII. LANDFILL PERIMETER DRAINAGE AND EROSION CONTROL (Continued)			
3.	Undercutting Areal Extent of Undercut _____ Estimate Depth _____ Remarks _____	<input type="checkbox"/> Location Shown on Map <input checked="" type="checkbox"/> Not Evident	
4.	Siltation Areal Extent of Siltation _____ Estimate Depth <u><i>< 2 ft</i></u> Remarks <u><i>sufficient drainage capacity; no significant obstructions</i></u>	<input type="checkbox"/> Location Shown on Map <input type="checkbox"/> Not Evident	
5.	Vegetation Growth Vegetation Type _____ Areal Extent _____ Remarks _____	<input type="checkbox"/> Location Shown on Map <input checked="" type="checkbox"/> Does Not Impede Flow	
6.	Sedimentation Impoundments <input type="checkbox"/> Excessive Sedimentation <u><i>no</i></u> <input type="checkbox"/> Evidence of Erosion <u><i>no</i></u> <input checked="" type="checkbox"/> Inlet <input checked="" type="checkbox"/> Outlet Remarks _____	<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A <input type="checkbox"/> Map Attached Areal Extent _____ Depth _____ <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> Blocked <input type="checkbox"/> N/A	<input type="checkbox"/> N/A <input type="checkbox"/> Map Attached Areal Extent _____ Depth _____ <input type="checkbox"/> Blocked <input type="checkbox"/> N/A
7.	Storm Water Discharge Outfalls <input type="checkbox"/> Excessive Sedimentation <u><i>no</i></u> <input type="checkbox"/> Evidence of Erosion <u><i>no</i></u> <input checked="" type="checkbox"/> Outlet Remarks _____	<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A <input type="checkbox"/> Map Attached Areal Extent _____ Depth _____ <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> Blocked <input type="checkbox"/> N/A	<input type="checkbox"/> N/A <input type="checkbox"/> Map Attached Areal Extent _____ Depth _____ <input type="checkbox"/> Blocked <input type="checkbox"/> N/A

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

CELL A-1

VIII. LANDFILL GAS COLLECTION & CONTROL SYSTEM				
1.	Gas Collection Wells	<input checked="" type="checkbox"/> Active	<input type="checkbox"/> Passive	<input type="checkbox"/> Map Attached
	Properly Secured	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If No, Explain _____	
	Functioning	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If No, Explain _____	
	Good Condition	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If No, Explain _____	
	Condensate Buildup	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Yes, Explain _____	
	O & M Required	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Yes, Explain _____	
	Remarks <u>See cell within ref</u>			
2.	Gas Collection Piping & Manifolds	<input checked="" type="checkbox"/> Active	<input type="checkbox"/> Passive	<input type="checkbox"/> Map Attached
	Properly Buried	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If No, Explain _____	
	Functioning	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If No, Explain _____	
	Good Condition	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If No, Explain _____	
	Evidence of Leakage	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Yes, Explain _____	
	Condensate Buildup	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Yes, Explain _____	
	O & M Required	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Yes, Explain _____	
	Remarks _____			
3.	Gas Treatment System Gas Collection Tanks	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A	
	Good Condition	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If No, Explain _____	
	Evidence of Leakage	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Yes, Explain _____	
	O & M Required	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Yes, Explain _____	
	Remarks _____			
4.	Gas Treatment System Piping and Valves	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A	
	Functioning	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If No, Explain _____	
	Good Condition	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If No, Explain _____	
	Evidence of Leakage	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Yes, Explain _____	
	O & M Required	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Yes, Explain _____	
	Remarks _____			

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

Cell A-1

IX. CONDENSATE COLLECTION AND TREATMENT SYSTEM

1. **Condensate Collection Sumps** Map Attached *Per Ron Series*

Properly Secured Yes No If No, Explain _____

Sump in Good Condition Yes No If No, Explain _____

Pumps Functioning 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 _____

Remarks _____

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** Applicable N/A

Tank Capacity _____ (Gallons) Construction Material _____

Good Condition Yes No If No, Explain _____

Carbon Canister in place Yes No If No, Explain *(not observed - ok per*

Sheen in Water Yes No If Yes, Explain *Ron Series)*

Evidence of Leakage Yes No If Yes, Explain _____

O & M Required Yes No If Yes, Explain _____

Remarks _____

4. **Condensate Discharge Pretreatment** Applicable N/A

Summarize Treatment Process and Adequacy *off-site disposal by*

COP, PRETREATMENT

NO LINE TO ADJUST PH, IF REQUIRED

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

Cell A-1

X. MONITORING SYSTEMS

1. **Groundwater Monitoring Wells** Well List & Map Attached *(Those observed on-site)*
- 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 *NA* If No, Explain _____
- Routinely Monitored Yes No If No, Explain _____
- O & M Required Yes No If Yes, Explain _____

Remarks _____

2. **Gas Monitoring Probes** Probe List & 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 *NA* If No, Explain _____
- Routinely Monitored Yes No If No, Explain _____
- Condensate Present Yes No If Yes, Explain _____
- O & M Required Yes No If Yes, Explain _____

Remarks *cap off on one - repair promptly capped by COP - Ron Serio*

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

CELLA-1

XII. REMEDIAL TREATMENT SYSTEMS

- | | | | |
|----|------------------------------|-------------------------------------|---|
| 1. | Groundwater Treatment System | <input type="checkbox"/> Applicable | <input checked="" type="checkbox"/> N/A |
| 2. | Vadose Zone Treatment System | <input type="checkbox"/> Applicable | <input checked="" type="checkbox"/> N/A |

XIII. OVERALL OBSERVATIONS

1. Adequacy of Remedy

Landfill Capping: Excellent condition - no exposed cap or waste materials

Perimeter Drainage: Siltation evident but adequate capacity left.

Gas Collection/Control: Proper functioning

Access Control: fenced and locked gates

FIVE-YEAR REVIEW 19TH AVE LANDFILL

SITE INSPECTION CHECKLIST
SITE INSPECTION CHECKLIST

Cell A-1

XIII. OVERALL OBSERVATIONS (Continued)

1. Adequacy of Remedy (Continued)

Institutional Control _____

Monitoring _____ *ok* _____

Condensate Discharge _____ *ok* _____

Channelization _____ *ok* _____

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

CELL A-1

XIII. OVERALL OBSERVATIONS (Continued)

2.

Adequacy of O & M

Landfill Cover System

OK

Landfill Drainage

OK

Gas Collection System

OK

Gas Treatment System

OK

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

CELL A-1

XIII. OVERALL OBSERVATIONS (Continued)

2. Adequacy of O & M (Continued)

Site Access System OK

Monitoring Systems OK

Condensate Management System OK

Salt River Channelization OK

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

Cell A-1

XIII. OVERALL OBSERVATIONS (Continued)

3. Early Indicators of Potential Remedy Failure

Landfill Capping: None

Perimeter Drainage: None (minor siltation and erosion to be repaired by COP)

Gas Collection/Control: None

Access Control None

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

CELL A-1

XIII. OVERALL OBSERVATIONS (Continued)

3. Early Indicator of Potential Remedy Failure (Continued)

Institutional Control

Monitoring

None

Condensate Discharge

None

Channelization

None

FIVE-YEAR REVIEW 19TH AVE LANDFILL
SITE INSPECTION CHECKLIST

Cell A-1

XIII. OVERALL OBSERVATIONS (Continued)

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

Landfill Cover System None

Landfill Drainage Perimeter Erosion to be backfilled to grade

Gas Collection System OK - None

Gas Treatment System OK - None

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

CELL A-1

XIII. OVERALL OBSERVATIONS (Continued)

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

Site Access System None

Monitoring Systems Move perimeter monitoring probes within waste areas to serve adequately to detect off-site migration of methane.

Condensate Management System None

Salt River Channelization None

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

SUPPLEMENTAL REMARKS SHEET (Attach to Appropriate Section of Checklist)

INSPECTION TEAM CONSISTED OF THE FOLLOWING
PERSONNEL: CELL A & A-1

- STEPHANIE CIERKOT - ADEQ
- JULIE LINN - ADEQ
- RON BERIO - CITY OF PHOENIX
- JOHN KIM - ESE (CELL A)
- SANJAY SANGANI PE - ESE (CELL A-1)

SPECIFIC CONDITIONS:

21. **Allowable Emissions:** The Permittee shall not allow emissions into the atmosphere to exceed any of the following limits:

	Daily Emission Limits	Twelve Month Rolling Average
Particulates (TSP)	105 pounds	17.5 Tons
Particulates smaller than 10 Microns (PM10)	75 pounds	12.5 Tons
Non-Methane Organic Compounds (NMOCs)	75 pounds	12.5 Tons
Sulfur Oxides (So _x)	30 pounds	5 Tons
Carbon Monoxide	75 pounds	12.5 Tons
Nitrogen Oxides (No _x)	50 pounds	8.5 Tons

The twelve month rolling average shall be calculated at the end of each calendar month by summing the total emissions over the most recent twelve calendar months.

22. **Control Device Parameters for Cell A Flare Exhaust System:**

1. Filter/condensate knockout drums
All landfill gas from field gas collection systems shall pass through the filter/condensate knockout drums having a control efficiency of 99.7% by weight for particulates of 5 microns or above as certified by the filter manufacturer.
2. All landfill gas passing through the gas collection system Cell -A, shall pass through a properly functional flare system. The flare system shall be operated at a minimum temperature of 1400 EF and shall have a maximum landfill gas inlet stream of 1500 standard cubic feet per minute (scfm). The flare system 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 a 90% destruction efficiency for NMOCs, with a carbon monoxide concentration of less than 100 parts per million by volume at the outlet.

ACTUAL EMISSION RATE(S):

EMISSIONS FROM CELL A FLARE STATION

RUN NUMBER	EXHAUST TEMPERATURE (EF)	FUEL FLOW RATE (DSCFM)	RESIDENCE TIME (SEC)	NO _x EMISSIONS (LB/DAY)	CO EMISSIONS (LB/DAY)	NMOC EMISSIONS		
						INLET) (LB/DAY)	OUTLET) (LB/DAY)	EFFICIENCY (%)
1	1632	1230	1.7	6.6	7.2	46.6	<0.3	>99.4
2	1549	1300	1.3	16.7	5.5	61.3	<0.4	>99.3
3	1536	1320	1.1	19.8	4.3	50.5	<0.4	>99.1
4	1354	1340	1.1	16.9	53.5	52.3	0.9	98.3
5	TEST ABORTED AFTER 30 MINUTES - DATA EXCEEDED INSTRUMENT RANGE							
6	1390	770	2.6	5.6	3.5	25.9	0.3	98.7
7	1340	680	2.3	7.2	21.5	30.2	0.5	98.3
8	1335	820	1.8	11.2	30.1	27.0	0.9	96.7
AVG 1-3	1572	1283	1.4	14.4	5.7	52.8	<0.4	>99.3
AVG 6-8	1355	757	2.2	8.0	18.4	27.7	0.6	97.9
LIMIT	\$1400	#1500	\$0.6	#50	#75		#75	\$90

Runs 1, 2, and 3 performed with operating temperature set at 1700EF and VFD set at 1291 rpm (~1385 acfm)

Runs 4 and 5 performed with operating temperature set at 1500EF and VFD set at 1291 rpm (~1385 acfm)

Runs 6, 7, and 8 performed with operating temperature set at 1500EF and VFD set at 880 rpm (~900 acfm)

COMPLIANCE DETERMINATION: Performance of the Perennial Energy, Inc., flare located at the Cell A flare station complies with Maricopa County Air Pollution Control Regulations for operation at either 1700EF and 1291 rpm or 1500EF and 880 rpm with the primary air shutter lever positioned in the same setting as during testing.

II. TEST METHOD(S):

EPA Test Methods 2 through 4 (General)

EPA Test Method 7E (Outlet NO_x concentration)

EPA Test Method 10 (Outlet CO concentration)

EPA Test Method 19 (Inlet flow rate)

Modified South Coast Air Quality Management District (SCAQMD) Method 25.1 (Inlet and outlet NMOC concentrations)

CALCULATIONS REVIEW: All calibration data, production information, field data, data logs, and summaries.

APPLICABLE REGULATION(S): Maricopa County Air Pollution Control Rule 320 - Odors and Gaseous Air Contaminants.

III. COMMENTS: When lab results are below the detectability limit, a concentration of one-half the detection limit cannot arbitrarily be assumed. Results must be reported as "less than" the detection limit with efficiencies being "greater than" those calculated using the detection limit. Runs 1 through 3 NMOC outlet emissions and flare efficiencies are affected by this change.

ACTUAL EMISSION RATE(S):

EMISSIONS FROM CELL A1 FLARE STATION

RUN NUMBER	EXHAUST TEMPERATURE (EF)	FUEL FLOW RATE (DSCFM)	RESIDENCE TIME (SEC)	NO _x EMISSIONS (LB/DAY)	CO EMISSIONS (LB/DAY)	NMOC EMISSIONS		
						INLET) (LB/DAY)	OUTLET (LB/DAY)	EFFICIENCY (%)
1	1408	75	1.9	1.06	3.03	1.22	<0.02	>98.4
2	1433	71	1.7	1.28	0.55	1.50	<0.03	>98.0
3	1430	77	1.4	1.70	1.06	1.77	0.05	97.2
AVG 1-3	1424	74	1.7	1.35	0.54	1.50	<0.03	>97.9
LIMIT	\$1400	#1500	\$0.6	#50	#75		#75	\$90

Runs 1, 2, and 3 performed with operating temperature 1550EF and flow rate set at ~75 acfm

COMPLIANCE DETERMINATION: Performance of the Perennial Energy, Inc., flare located at the Cell A1 flare station complies with Maricopa County Air Pollution Control Regulations for operation at 1550EF and 75 acfm.

II. TEST METHOD(S):

- EPA Test Methods 2 through 4 (General)
- EPA Test Method 7E (Outlet NO_x concentration)
- EPA Test Method 10 (Outlet CO concentration)
- EPA Test Method 19 (Inlet flow rate)
- Modified South Coast Air Quality Management District (SCAQMD) Method 25.1 (Inlet and outlet NMOC concentrations)

CALCULATIONS REVIEW: All calibration data, production information, field data, data logs, and summaries.

APPLICABLE REGULATION(S): Maricopa County Air Pollution Control Rule 320 - Odors and Gaseous Air Contaminants.

III. COMMENTS: When lab results are below the detectability limit, a concentration of one-half the detection limit cannot arbitrarily be assumed. Results must be reported as "less than" the detection limit with efficiencies being "greater than" those calculated using the detection limit. Runs 1 and 2 NMOC outlet emissions and flare efficiencies are affected by this change.

The hydrocarbon emissions data in the report summary table are expressed in terms of lb/hr. However, the numerical values presented actually correspond to emission results in lb/day.

Reviewer Kathy E. Buddie

Date 01/09/97

copies: Permit File Source

**Table 8-1
Summary of Well
Identification & Location Information**

Well Name	ADWR Registration	ADWR File	Northing	Easting	Elev
<i>Existing and Replacement Wells</i>					
DM-3I	55-516923	A(1-2)13DBD	882691.43	442971.18	1055.34
DM-3D	55-516922	A(1-2)13DBD	882687.76	442967.76	1055.64
DM-3P	55-516924	A(1-2)13DBD	882696.20	442995.32	1055.73
DM-4	55-516921	A(1-3)18CAB	883031.22	446189.00	1060.22
DM-5S	55-516919	A(1-3)19BDD	876583.48	448819.94	1063.73
DM-5D	55-516918	A(1-3)19BDD	876576.93	448819.78	1063.34
DM-6	55-516920	A(1-2)24ABC	880452.47	443028.16	1050.51
DM-7S	55-534371	A(1-2)24AAA	881105.10	444061.57	1051.16
DM-7D	55-534372	A(1-2)24AAA	881102.87	444048.82	1051.29
DM-8S	55-534796	A(1-3)19DAB	878162.06	448827.47	1064.45
DM-8D	55-534797	A(1-3)19DAB	878160.40	448814.84	1064.53
I-1	55-806908	A(1-3)19BAB	881134.40	445656.00	1059.38
I-2R	55-556389	A(1-3)19BAD	880382.89	446984.93	1060.85
I-3	55-502039	A(1-3)19CAC	877935.10	444454.30	1059.17
I-4	55-502038	A(1-2)24ADA	879195.90	444343.00	1054.28
I-5R	55-559326	A(1-3)19CAC	877211.97	446333.01	1059.30
I-6	55-806910	A(1-3)19CAC	876644.64	446569.17	1057.87
I-8R	55-559327	A(1-3)19BBC	880253.63	444427.60	1054.12
River North-R	55-556809	A(1-3)19ACC	878571.62	447105.35	1062.98
<i>Abandoned Wells</i>					
I-2	55-806907	A(1-3)19BAD	880418	446990	1061.08
I-5	55-806909	A(1-3)19CAC	877263	446403	1045.80
I-8	55-502037	A(1-3)19BBC	880229	444506	1057.77
River North	55-807384	A(1-3)19BDD	878572	446952	1048.77

**Table 8-2
Summary of Well
Construction**

Well Name	Date Completed	Drilling Method	Well Depth (in feet)	Casing Type	Screen Interval (in feet)
<i>Existing and Replacement Wells</i>					
DM-3D	6/15/87	Mud Rotary	370	6" PVC	280-320
DM-3I	6/26/87	Mud Rotary	232	6" PVC	185-225
DM-3P	6/20/87	Mud Rotary	170	10" PVC	110-150
DM-4	6/19/87	Mud Rotary	170	6" PVC	110-150
DM-5D	8/8/87	Mud Rotary	300	6" PVC	185-225
DM-5S	8/5/87	Mud Rotary	164	6" PVC	110-150
DM-6	6/11/87	Mud Rotary	170	6" PVC	110-150
DM-7D	5/13/92	Casing Hammer	169	6" PVC	153.4-168.4
DM-7S	5/13/92	Casing Hammer	101	6" PVC	59-99
DM-8D	5/13/92	Casing Hammer	179	6" PVC	163.4-178.4
DM-8S	5/13/92	Casing Hammer	99	6" PVC	58.9-98.9
I-1	10/27/79	Casing Hammer	101	4" PVC	32-101
I-2R	9/18/96	Percussion	101	4" PVC	60-100
I-3	12/6/79	Casing Hammer	100	4" PVC	46-100
I-4	11/3/79	Casing Hammer	102	4" PVC	33-102
I-5R	7/10/96	Percussion Hammer	115	4" PVC	65-115
I-6	11/14/79	Casing Hammer	102	4" PVC	32-102
I-8R	7/11/96	Percussion Hammer	115	4" PVC	65-115
River North-R	10/30/96	Percussion	95	4" PVC	60-95
<i>Abandoned Wells</i>					
I-2	11/7/79	Casing Hammer	101	4" PVC	32-101
I-5	11/16/79	Casing Hammer	100	4" PVC	41-100
I-8	2/2/82	Drilled	100	4" PVC	40-100
River North	unknown	Casing Hammer	82	3" PVC	47-82

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**

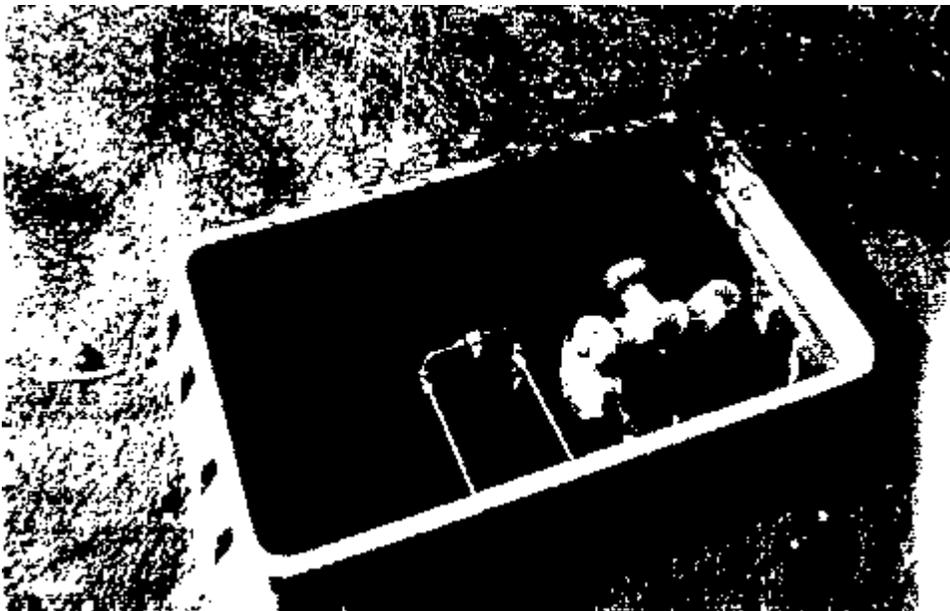


Pic. 1. Excessive vegetation potentially restricting storm water flow through the drainage ditch culvert; northwest corner of Cell A.



Pic. 2. Eroded area at edge of the CAP leading to perimeter drainage channel west side of Cell A.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 3. Typical picture of gas collection system condensate sump valve set.

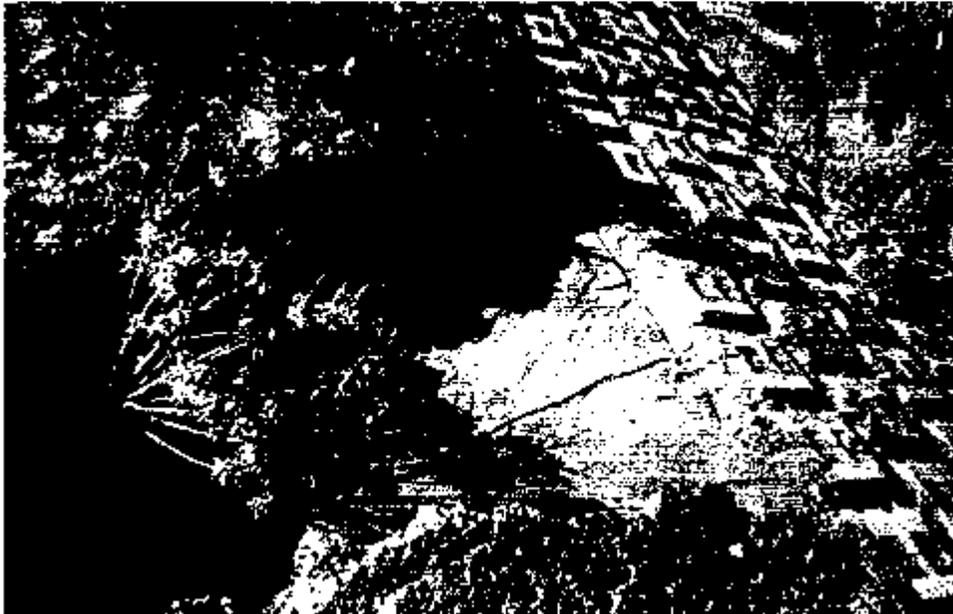


Pic. 4. Picture of gas extraction well A1-A (right) and condensate sump A-1.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 5. More eroded area around the perimeter of the CAP on the western side of Cell A, just prior to the drainage channel.



Pic. 6. Close up of eroded area at same location described in Pic. 5, approximately 5 feet wide and 2 feet deep.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 7. View of western drainage channel with amorfex exposed. Note: excessive vegetation in front of picture and eroded cover on right side of channel.

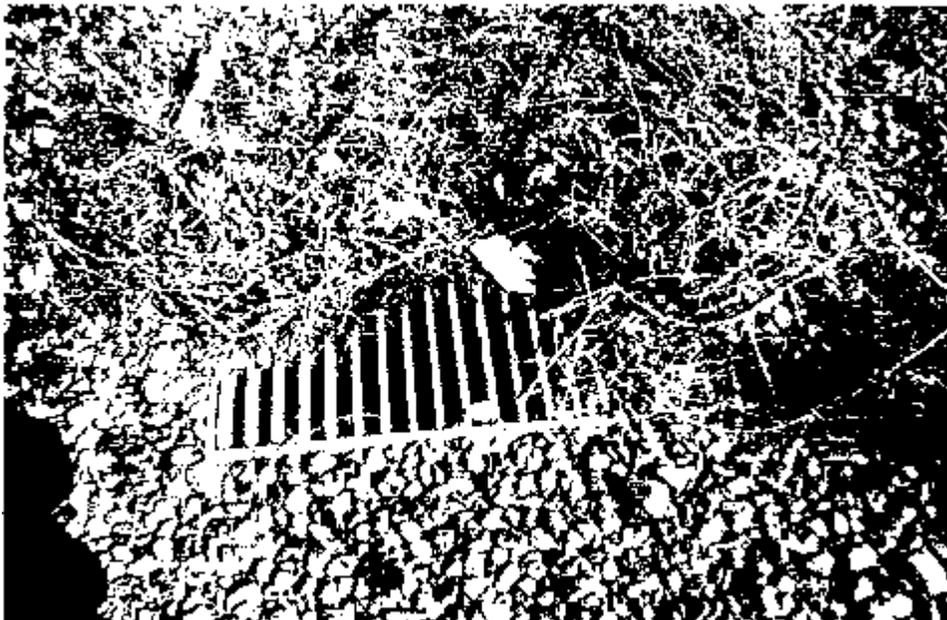


Pic. 8. Soil around valve box of gas extraction well A290-B and Sump A-5, eroded away.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**

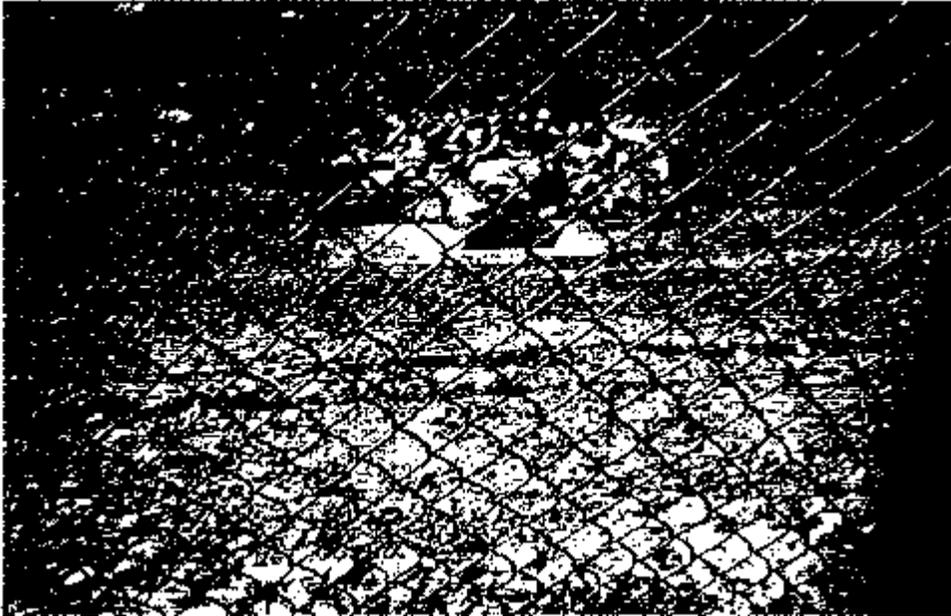


Pic. 9. Picture of sedimentation pond located at southwest corner of perimeter drainage system.



Pic. 10. Picture of storm water outlet grate in southwest sedimentation pond. Note: Debris needs to be cleared.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**

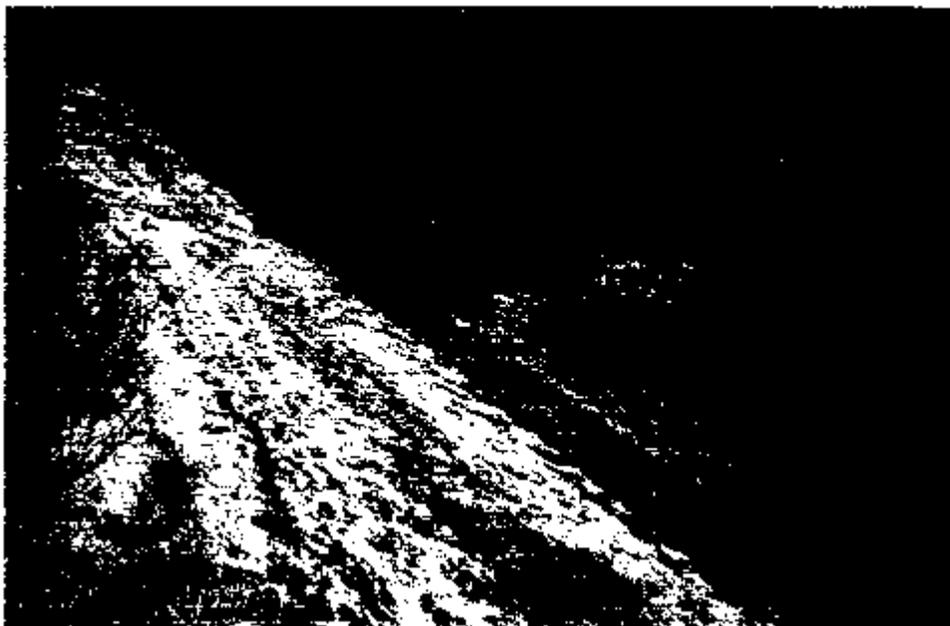


Pic. 11. Picture of flap gate that discharges storm water from the southwest sedimentation pond to the Salt River. Soil cement washout protection levee along north river bank wall also shown.



Pic. 12. Perimeter drainage channel along south boundary of Cell A.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 13. Picture of standing water in southern drainage channel near west side of the Cell.



Pic. 14. Cell A Cover eroded area along the southern drainage channel near western section.

PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000

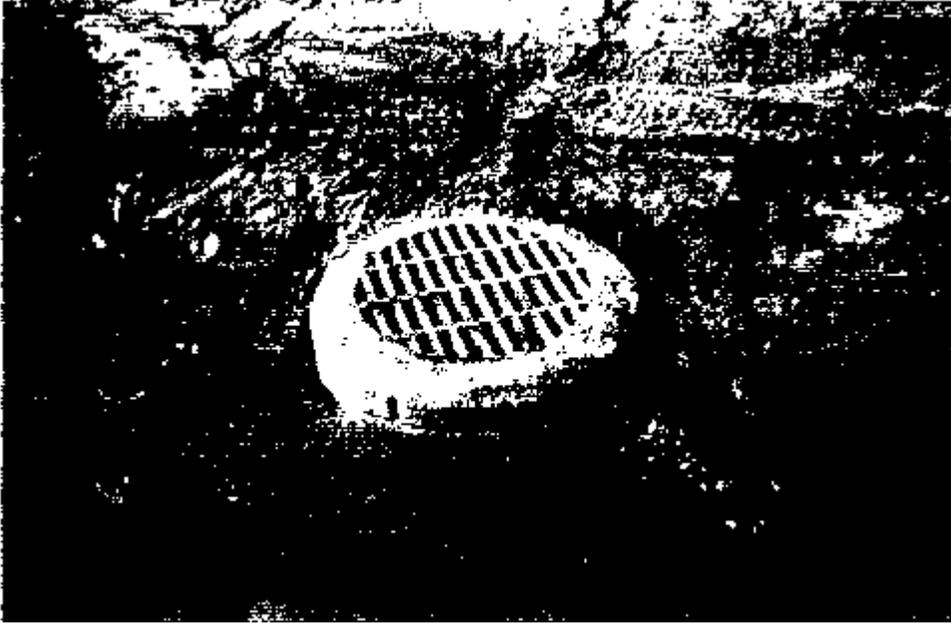


Pic. 15. Picture of southeast sedimentation pond.



Pic. 16. Picture of flap gate that discharge storm water from the southwest sedimentation pond to the Salt River. Note: Standing water.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 17. Picture of storm water drainage gate located in the bottom of eastern perimeter drainage channel adjacent to the 15th Avenue berm. Note: Sedimentation buildup around the grate, which drains storm water to flap gate shown in Pic. 16.

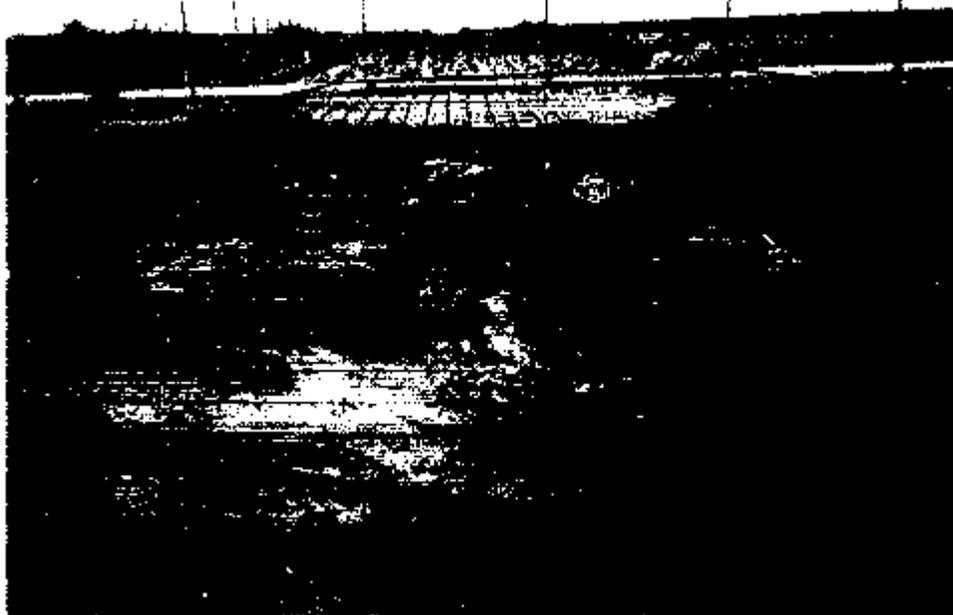


Pic. 18. Picture of eastern drainage channel showing more drainage gates. Note: Above ground gas collection line shown on the right.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**

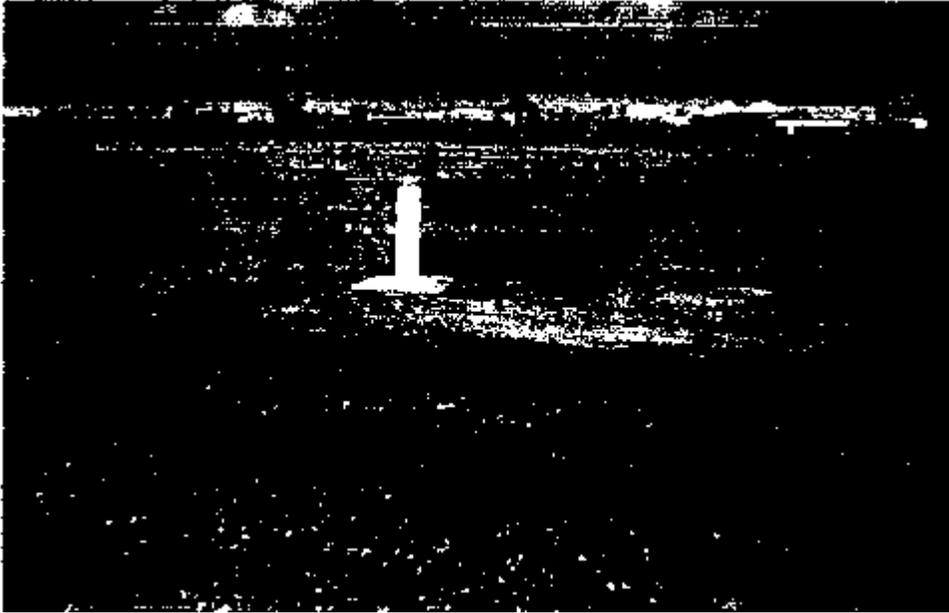


Pic. 19. Above ground gas extraction line along the eastern side of Cell A.

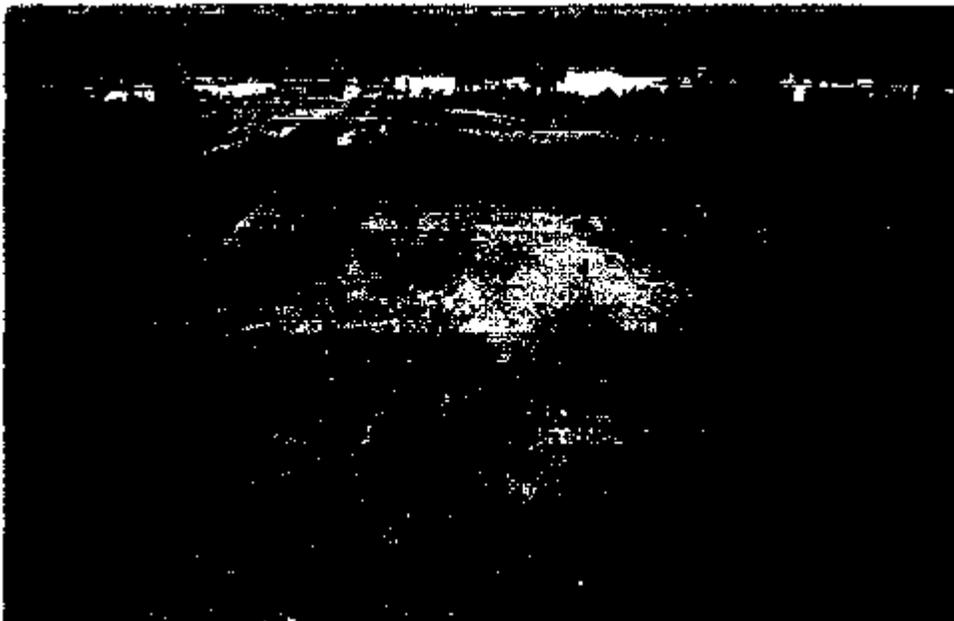


Pic. 20. Picture of Cell A let down channel on the east side of the landfill. Note: Access road has been eroded away.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 21. Picture of methane probe B-15.

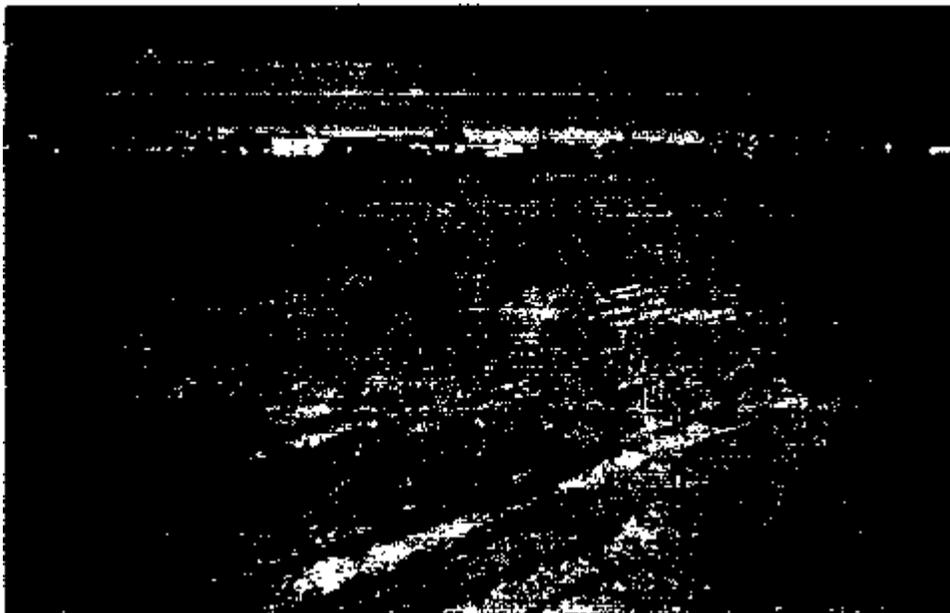


Pic. 22. Area adjacent to the southwest corner of the Tallow Plant, where the berm, pictured on the right, does not tie into the drainage channel, pictured on the left, which could allow storm water run-off from the cap to flow off-site into the Tallow Plant property.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**

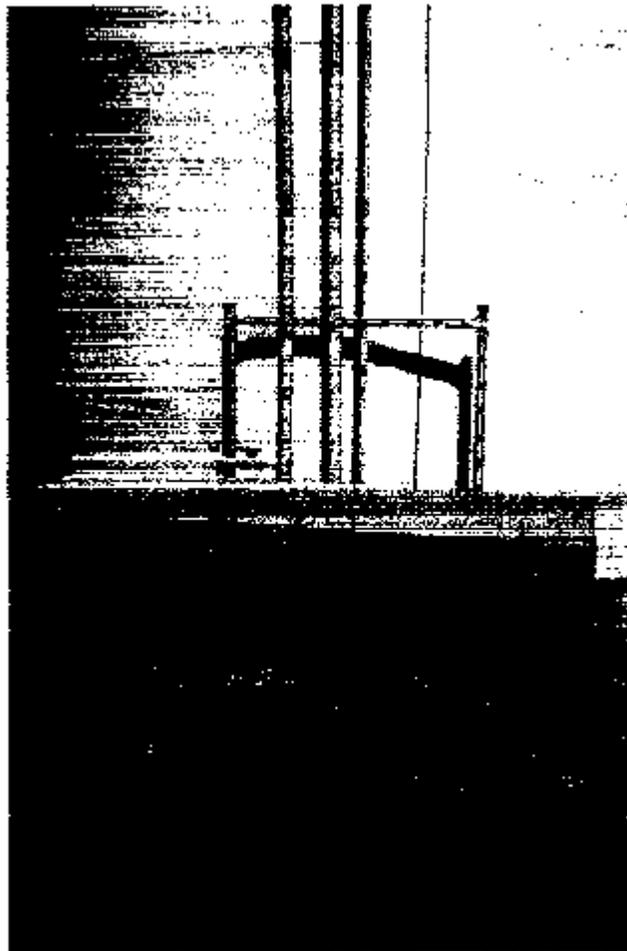


Pic. 23. Another picture of the let down channel running east-west along the center of Cell A.



Pic. 24. Typical picture of Cell A top cover w/ established vegetation.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 25. Picture of Condensate tank at Cell A flare station.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 26. Picture of Cell A flare system emergency shut-off system. Note: Picture of flare system inspection and maintenance logs.

PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A-1, MARCH 9, 2000



Pic. 1. Picture of access gate to Cell A-1 perimeter security fencing.



Pic. 2. Picture of exposed armor flex in Cell A-1 perimeter drainage channel.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 3. Picture of Cell A-1 top cover with established vegetation.



Pic. 4. Picture of minor Cell A-1 cover eroded area along the perimeter drainage channel along the west property boundary.

**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 5. Picture of typic condensate collection valve box in Cell A-1.



Pic. 6. Picture of northwest sedimentation pond with storm water outlet culvert. Note: Picture of Cell A-1 flare station in background.

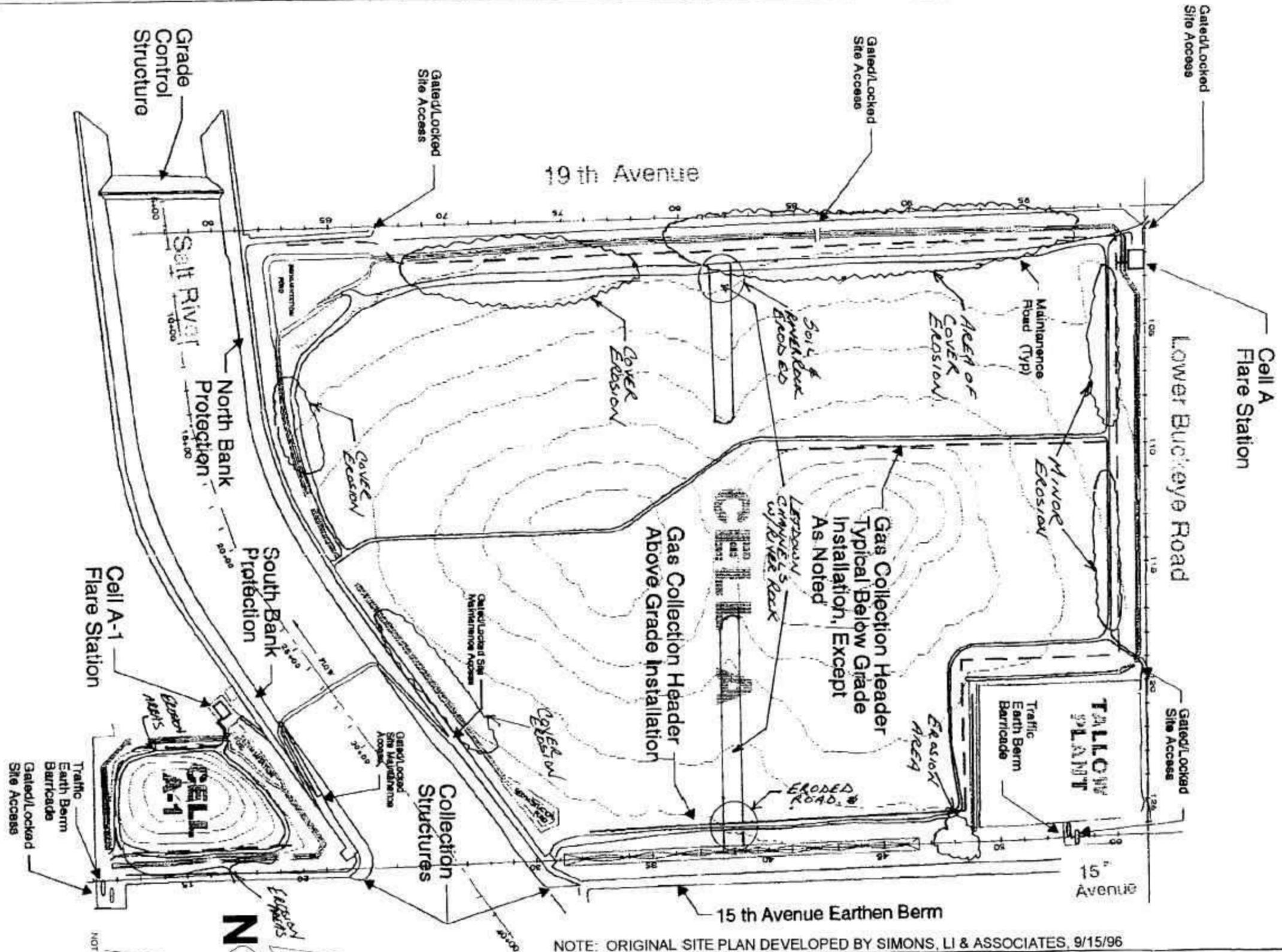
**PHOTOGRAPHIC DOCUMENTATION
SITE INSPECTION OF 19TH AVENUE LANDFILL CELL A, MARCH 9, 2000**



Pic. 7. Picture of soil cement levee along south bank of Salt River.



Pic. 8. Picture of groundwater monitoring Well I-6.



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



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Drawn
Daniel L. Kudlicki

Project Number
6600001

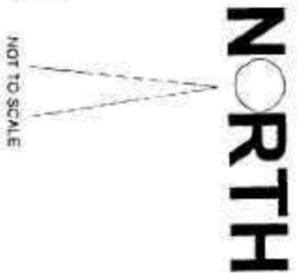
Approved
JSK

Date
3/30/00

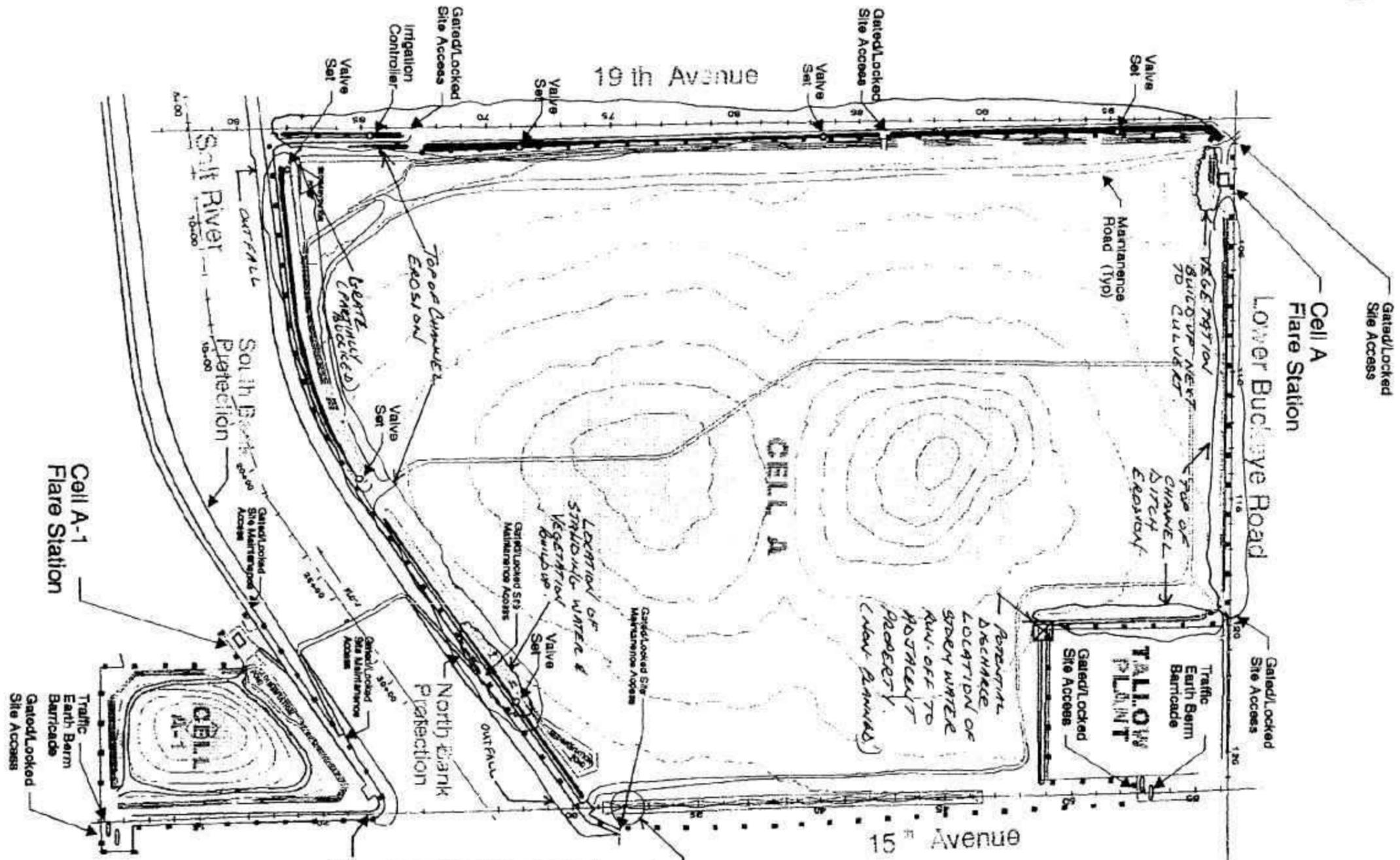
SITE PLAN
GENERAL SITE LAYOUT
19TH AVENUE LANDFILL

Figure

A



NOT TO SCALE



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

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LOCATION MAP
 LANDSCAPING & SITE SECURITY
 19TH AVENUE LANDFILL

Figure
B

Drawn
 Daniel L. Kudlicki

Project Number
 6600001

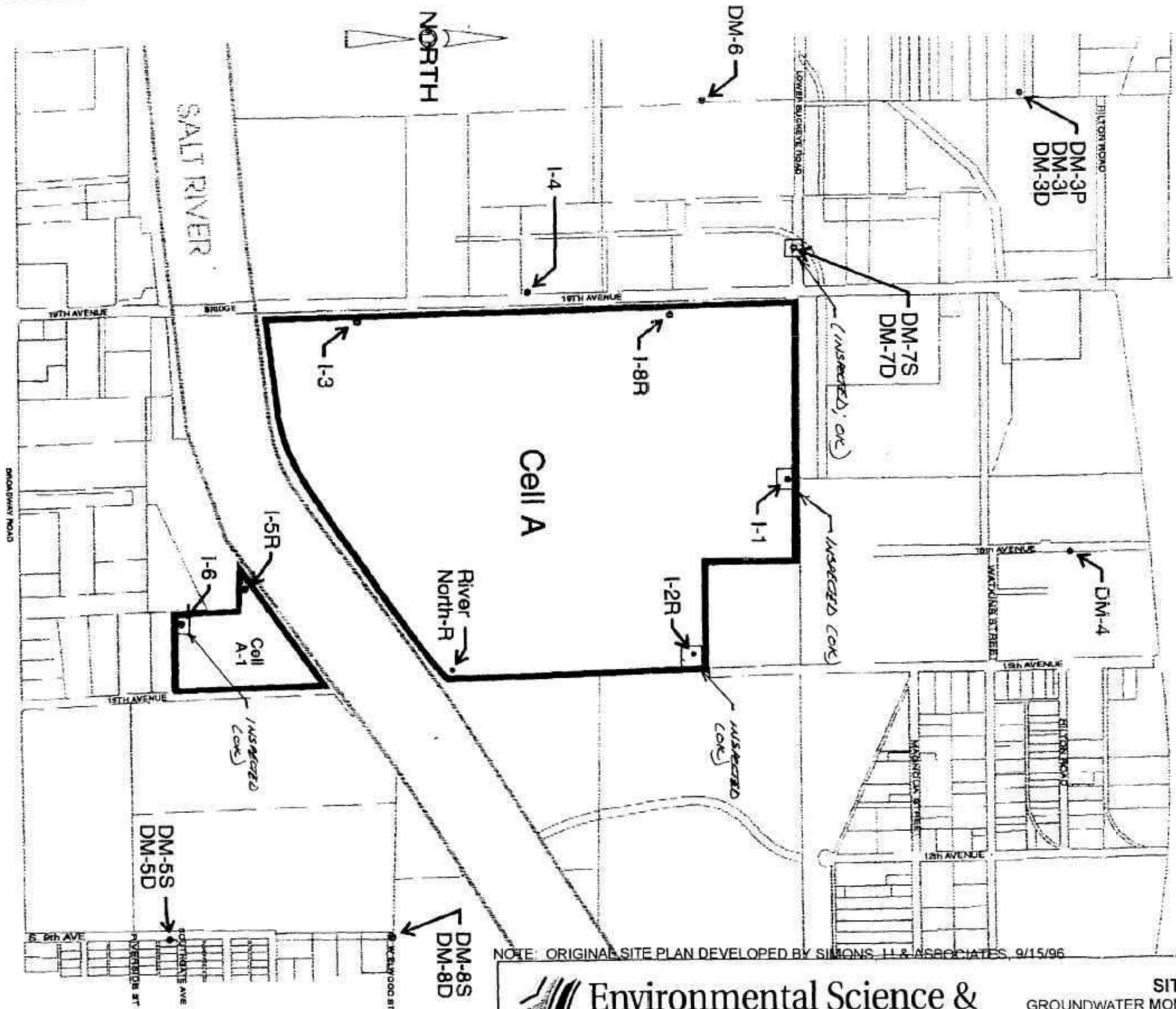
Approved
 JSK

Date
 3/30/00

NORTH

NOT TO SCALE





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



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Drawn
Daniel L. Kudlicki

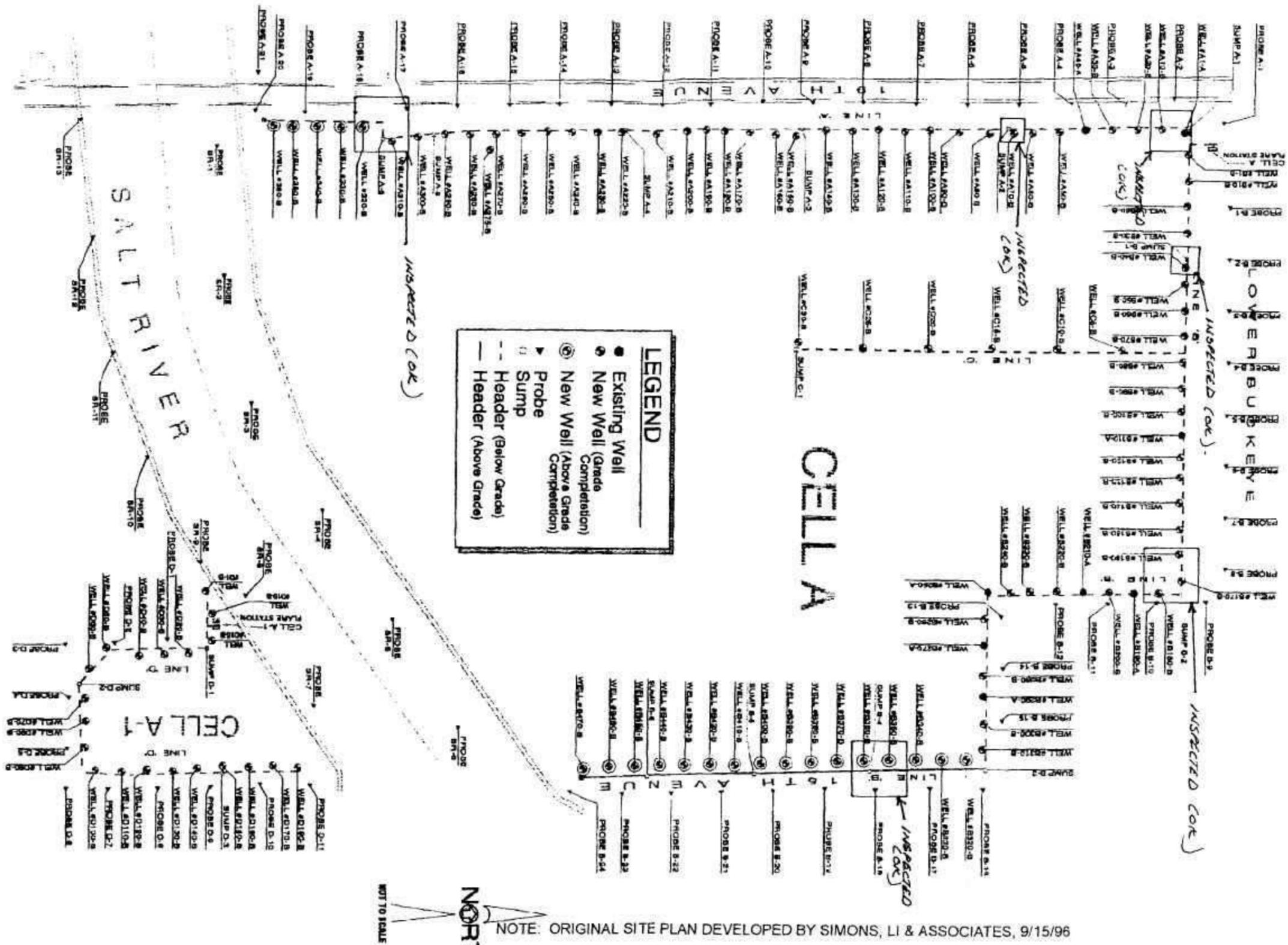
Project Number
6600001

Approved
JSK

Date
3/30/00

SITE PLAN
GROUNDWATER MONITORING WELL LOCATION
19TH AVENUE LANDFILL

Figure
C



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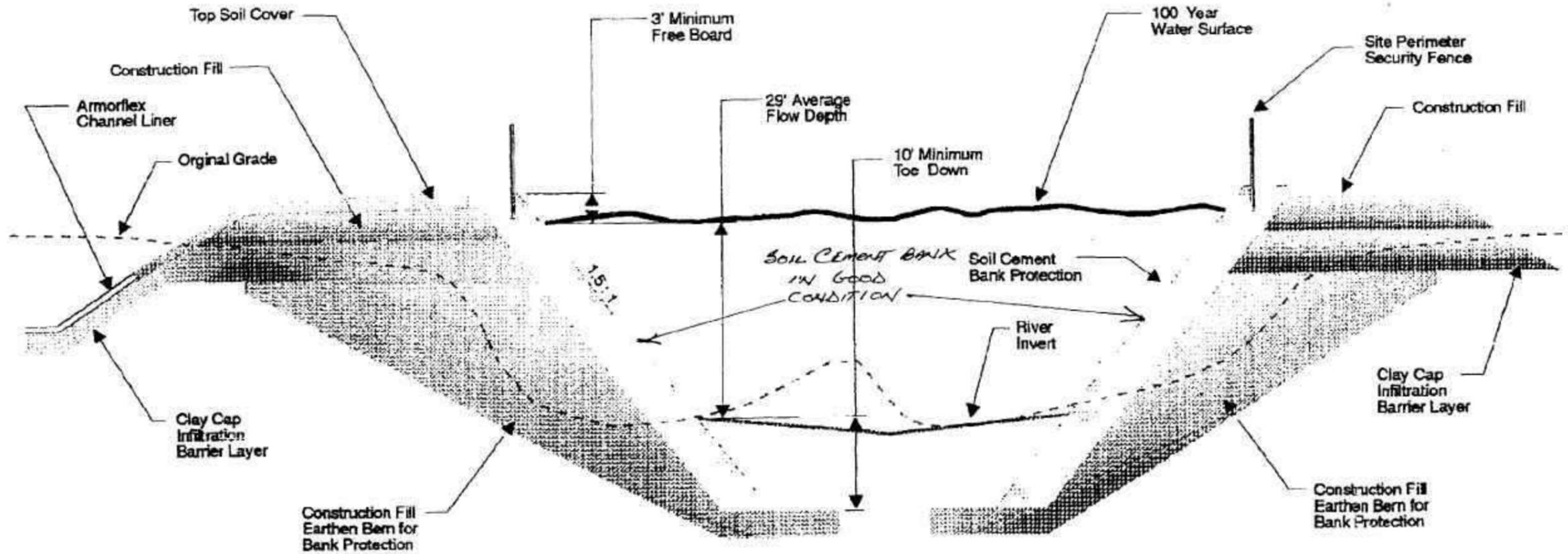
SITE PLAN
 GAS EXTRACTION SYSTEM
 WELL & MONITORING PROBE LOCATIONS
 19TH AVENUE LANDFILL

Figure
D

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

Cell A

Cell A-1



TYPICAL CHANNEL SECTION

(NOT TO SCALE)

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



Environmental Science & Engineering, Inc.

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CHANNEL SECTION
19TH AVENUE LANDFILL
PHOENIX, ARIZONA

Figure

E

Drawn
Daniel L. Kudlicki

Project Number
6600001

Approved
JSK

Date
3/30/00



ENVIRONMENTAL SERVICES DEPARTMENT

AIR POLLUTION CONTROL

2406 South 24th Street, Suite E-204

Phoenix, Arizona 85034

(602) 506-6027, 6094

(602) 406-6925 (FAX)

AIR QUALITY PERMIT

Permit Number: 95-0352

Issue Date: June 28, 1996

Expiration Date: June 28, 2001

Permittee Name: City Of Phoenix Public Works
Mailing Address: 3060 S 27TH AVE, Phoenix, AZ 85009
Business Name: City Of Phoenix 19th Ave Landfill
Business Address: LOWER BUCKEYE RD, Phoenix, AZ

Equipment Covered: See attached list

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

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

This Permit is not transferable except by application to the MCAP Control Officer as provided for by Arizona Revised Statutes § 49-483.

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.

to obtain or modify this Permit.


Albert F. Brown, MPA, RS
Maricopa County Air Pollution Control Officer



PERMIT CONDITIONS

City of Phoenix, 19th Ave. Landfill

Permit Number 95-0352

May 2, 1996

The numerical section references in this Permit are based on Maricopa County Air Pollution Control Rules and Regulations (Rules) in effect on the date of issuance of these Permit Conditions. In the event that these rules are revised to change the numerical references during the term of this Permit, the revised numbering system will apply to this permit.

GENERAL CONDITIONS:

1. **Annual Compliance Certification:** The Permittee shall file an annual compliance certification with the Maricopa County Department of Environmental Services (Department), Attn: Air Quality Compliance Supervisor. The compliance certification shall be filed on a form and in the manner specified by the Maricopa County Air Pollution Control Officer (Control Officer).
2. **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.
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 temporarily waived:
 - a. for good cause if advanced written approval is obtained from the Control Officer, or
 - b. for preventative maintenance of the control device if the shutdown is allowed in the control's Operation and Maintenance Plan which has been approved in writing by the Control Officer.

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

4. **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.

City of Phoenix, 19th Ave. Landfill
Permit Number 95-0352
May 2, 1996

5. **Fugitive Dust:** The Permittee shall take all reasonable precautions to minimize the emissions of fugitive dust in accordance with §300 of Rule 310.
6. **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.
7. **Maintenance:** The Permittee shall keep all equipment under this Permit in good working order through an active maintenance program established in accordance with the approved Operation and Maintenance Plans or, in its absence, with manufacturers' recommendations, and generally accepted industry standards.
8. **Malfunctions (Emergency Upsets):** A malfunction that causes emissions in excess of those allowable by either the Rules or these Permit Conditions shall constitute a violation. Any affirmative defense of a violation caused by a malfunction shall be documented in accordance with §501 of Rule 100.
9. **Modifications:** The Permittee shall notify the Control Officer, in accordance with the Rules, of changes, replacements or additions to the source which are not covered by this Permit.
10. **Operations:** The Permittee shall operate all equipment and processes in accordance with these Permit Conditions, applicable approved operations and maintenance plans, and all applicable requirements of Federal laws, Arizona laws, and Maricopa County Air Pollution Control Rules and Regulations.

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 Regulations.

11. **Portable Sources:** If this Permit is for a portable source, the Permittee shall notify this Department, Attn: Air Quality Compliance Supervisor, in writing at least ten days in advance of moving to any location in Maricopa County. The

City of Phoenix, 19th Ave. Landfill
Permit Number 95-0352
May 2, 1996

notification shall include, at a minimum, the information required by §410 of Rule 200.

If the proposed location will have additional sources of air pollution under the control of the Permittee, the notification shall also contain a summary of the projected and allowable emissions for these additional sources.

The ten day notification requirement may be waived if both of the following conditions are met:

- a. the Permittee can demonstrate to the satisfaction of the Control Officer that an emergency situation existed, and
- b. the Permittee notifies the Department of the required information by telephone as soon as is practical and follows up with a written copy within seven days.

The Permittee shall submit any fees required by Rule 280 at the time that the notification is filed.

If the Permittee obtains an air quality permit from the Arizona Department of Environmental Quality (ADEQ) for any source covered by this Permit, the Permittee shall provide a copy of the ADEQ permit to the Department within 30 days of its issue.

12. **Record Keeping:** The Permittee shall maintain accurate records as required by these Permit Conditions and by Section 500 of all applicable Rules. These records will 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 a minimum of three years except that all records required to demonstrate that an air pollution control device is being operated properly shall be retained for five years.

All records required by this Permit shall 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.

13. **Renewal:** 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.

City of Phoenix, 19th Ave. Landfill
Permit Number 95-0352
May 2, 1996

14. **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, or
 - b. either the Control Officer or Administrator determines that this Permit must be revised or revoked to assure compliance with the applicable requirements.

15. **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 §507 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.

16. **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 emissions-related activity is conducted, or in which any records are required to be kept under the terms and conditions of this Permit, and
 - b. to have access to and copy, at reasonable times, any records required to be kept under the terms and conditions of this Permit, and
 - c. to inspect any source, at reasonable times, equipment (including monitoring and air pollution control equipment), practices or operations regulated or required in this Permit, and

City of Phoenix, 19th Ave. Landfill
Permit Number 95-0352
May 2, 1996

- d. to sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with this 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.

- 17. **Rights and Privileges:** This Permit does not convey any property rights nor exclusive privileges of any sort.
- 18. **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.
- 19. **Start-up Notification:** The Permittee shall give written notification to the Department, Attention Compliance Supervisor, at least 7 days but no more than 30 days before the initial start-up of any new equipment or process. Start-up shall be defined as the use of any equipment or process covered by this Permit in a manner that emits or controls a regulated air pollutant. However, startup shall not be considered as having occurred if the equipment or process is operated solely for the purpose of calibration or test runs.

This startup notification does not apply to processes or equipment recognized by the Control Officer as being trivial or insignificant activities.
- 20. **Temporary Equipment:** The Permittee shall notify the Control Officer and obtain appropriate approval, in accordance with the Rules, prior to the installation or operation of any temporary or contractor operated equipment not covered by this Permit.

City of Phoenix, 19th Ave. Landfill
Permit Number 95-0352
May 2, 1996

SPECIFIC CONDITIONS:

21. **Allowable Emissions:** The Permittee shall not allow emissions into the atmosphere to exceed any of the following limits:

	Daily Emission Limits	Twelve Month Rolling Average
Particulates (TSP)	105 pounds	17.5 Tons
Particulates smaller than 10 Microns (PM10)	75 pounds	12.5 Tons
Volatile Organic Compounds (VOCs)	75 pounds	12.5 Tons
Non-precursor Organic Compounds	75 pounds	12.5 Tons
Sulfur Oxides (SO _x)	30 pounds	5 Tons
Carbon Monoxide	75 pounds	12.5 Tons
Nitrogen Oxides (NO _x)	50 pounds	8.5 Tons

The twelve month rolling average shall be calculated at the end of each calendar month by summing the total emissions over the most recent twelve calendar months.

22. **Control Device Parameters for Cell A Flare Exhaust System:**

1. Filter/condensate knockout drums
All landfill gas from field gas collection systems shall pass through the filter/condensate knockout drums having a control efficiency of 99.7% by weight for particulates of 5 microns or above as certified by the filter manufacturer.
2. All landfill gas passing through the gas collection system Cell -A, shall pass through a properly functional flare system. The flare system shall be operated at a minimum temperature of 1400 EF and shall have a maximum landfill gas inlet stream of 1500 standard cubic feet per minute (scfm). The flare system shall have at least 90% destruction efficiency by weight for methane and VOCs. If a lower temperature is to be used, it must first be demonstrated through testing that the lower

temperature produces at least a 90% destruction efficiency for methane and VOCs, with a carbon monoxide concentration of less than 100 parts per million by volume at the outlet.

3. Carbon Canister for the condensate storage tank
The Permittee shall replace the carbon canister before the calculated breakthrough time is reached as well as anytime breakthrough is discovered. The Permittee shall also maintain a log for the carbon canister changeout schedule.

Control Device Parameters for Cell A1 Flare Exhaust System:

1. Filter/condensate knockout drums
All landfill gas from field gas collection systems shall pass through the filter/condensate knockout drums having a control efficiency of 99.7% for particulates of 5 microns or above as certified by the filter manufacturer.
 2. All landfill gas passing through the gas collection system Cell A-1 shall pass through a properly functional flare system. The flare shall be operated at a minimum temperature of 1400 EF and shall have a maximum landfill gas inlet stream of 100 standard cubic feet per minute (scfm). The flare system used shall have a methane and VOC destruction efficiency of at least 90%. If a lower temperature is to be used, it must first be demonstrated through testing that the lower temperature produces at least a 90% destruction efficiency for methane and VOCs, with a carbon monoxide concentration of less than 100 parts per million by volume at the outlet.
 3. Carbon Canister for the condensate storage tank
The Permittee shall replace the carbon canister before the calculated breakthrough time is reached as well as anytime breakthrough is discovered. The Permittee shall also maintain a log for the carbon canister changeout schedule.
23. **Operations and Maintenance Plans:** The Permittee shall submit an approvable Operations and Maintenance (O&M) plan to Attn: Air Quality Compliance Supervisor for each of the following pieces of equipment:
1. Filter/condensate knockout drums (Cell A and Cell A-1)
 2. Flares (Cell A and Cell A-1).

City of Phoenix, 19th Ave. Landfill
Permit Number 95-0352
May 2, 1996

Each O&M plan shall contain all the information in the attached guidance document. Each O&M plan shall be submitted before the equipment start up. As part of the O&M plan, the combustion zone temperature of each flare shall be recorded by a continuous temperature recorder.

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.
25. **Recordkeeping:** The Permittee shall maintain accurate reports of the following:
 1. The temperature at which the flares are operated
 2. The measured landfill gas inlet stream into the flares.
 3. Dates of any filters replaced for the filter/condensate knockout drums.
26. **Testing:** The Permittee shall conduct an emissions test for methane and VOC destruction efficiency as well as for the NO_x and CO emission rates on the flares within 60 days after the equipment has achieved the capability to operate at its maximum production rate on a sustained basis. This time frame may be extended by the Control Officer for good cause, but in no case shall the testing period extend for more than 180 days after the initial startup of the equipment. Testing shall be performed for the Cell A flare exhaust system in accordance with the USEPA approved test procedures. A grab sample and analysis would be required for the Cell A-1 flare exhaust system within the dates specified above.

The Permittee shall submit a test protocol to the Department for review and approval at least 30 days prior to the emissions test for Cell A. A fee for the emissions testing from Cell A, as required by Rule 280, shall be submitted with the test protocol.

The Permittee shall notify the Division in writing at least two weeks in advance of the actual time and date of the emissions test so that the Department may have a representative attend.

The Permittee shall complete and submit a report to the Department within 30 days after completion of the emissions 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 95-0352

May 2, 1996

Cell A Flare Station Equipment

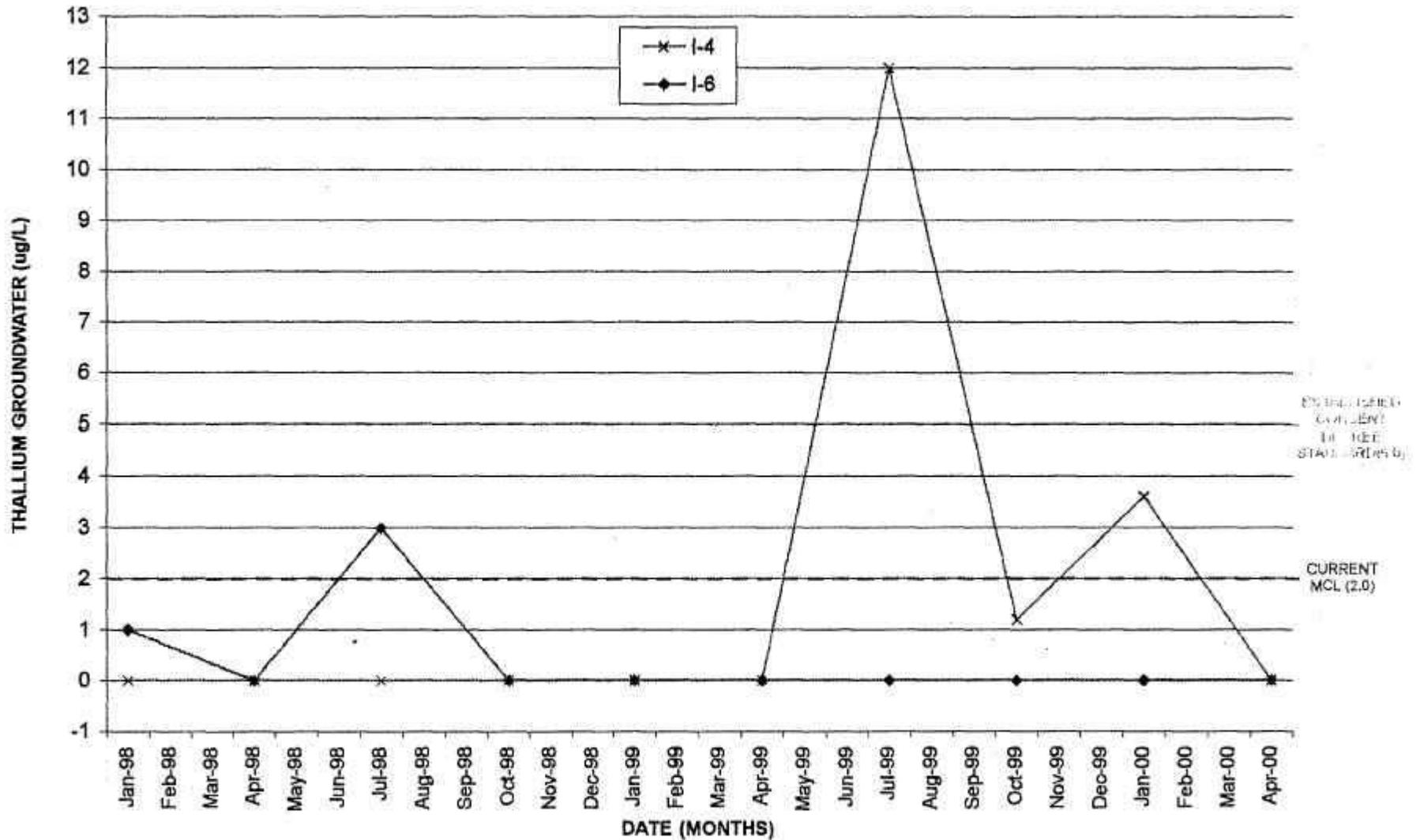
1. Two 30 HP each, blower with a landfill gas flowrate of 1500 SCFM.
2. One 6.5' X 30', landfill gas flare, with an input rating of 18 million BTU per hour.
3. Ninety two landfill gas wells.
4. One 14" X 58", fuel filter/condensate knockout.
5. Two 5 gallon each, granular activated carbon vessels.
6. One 9200 gallon condensate storage tank.

Cell A-1 Flare Station Equipment

1. Two 7.5 HP each, 100 SCFM LFG blower.
2. One 3.5' X 16' Landfill gas flare, 1.5 million BTU per hour.
3. Twenty landfill gas wells.
4. One fuel filter/condensate knockout.
5. One 5 gallon, granular activated carbon vessel.
6. One 1400 gallon condensate storage tank.

Hem/95-0352

THALLIUM CONCENTRATION IN GROUNDWATER OVER PREVIOUS 2 YEARS



**Environmental Science &
Engineering, Inc.**

A MACTEC COMPANY

**THALLIUM CONCENTRATION IN GROUNDWATER
OVER PREVIOUS 2 YEARS
10TH AVENUE LANDFILL**

APPENDIX

G1

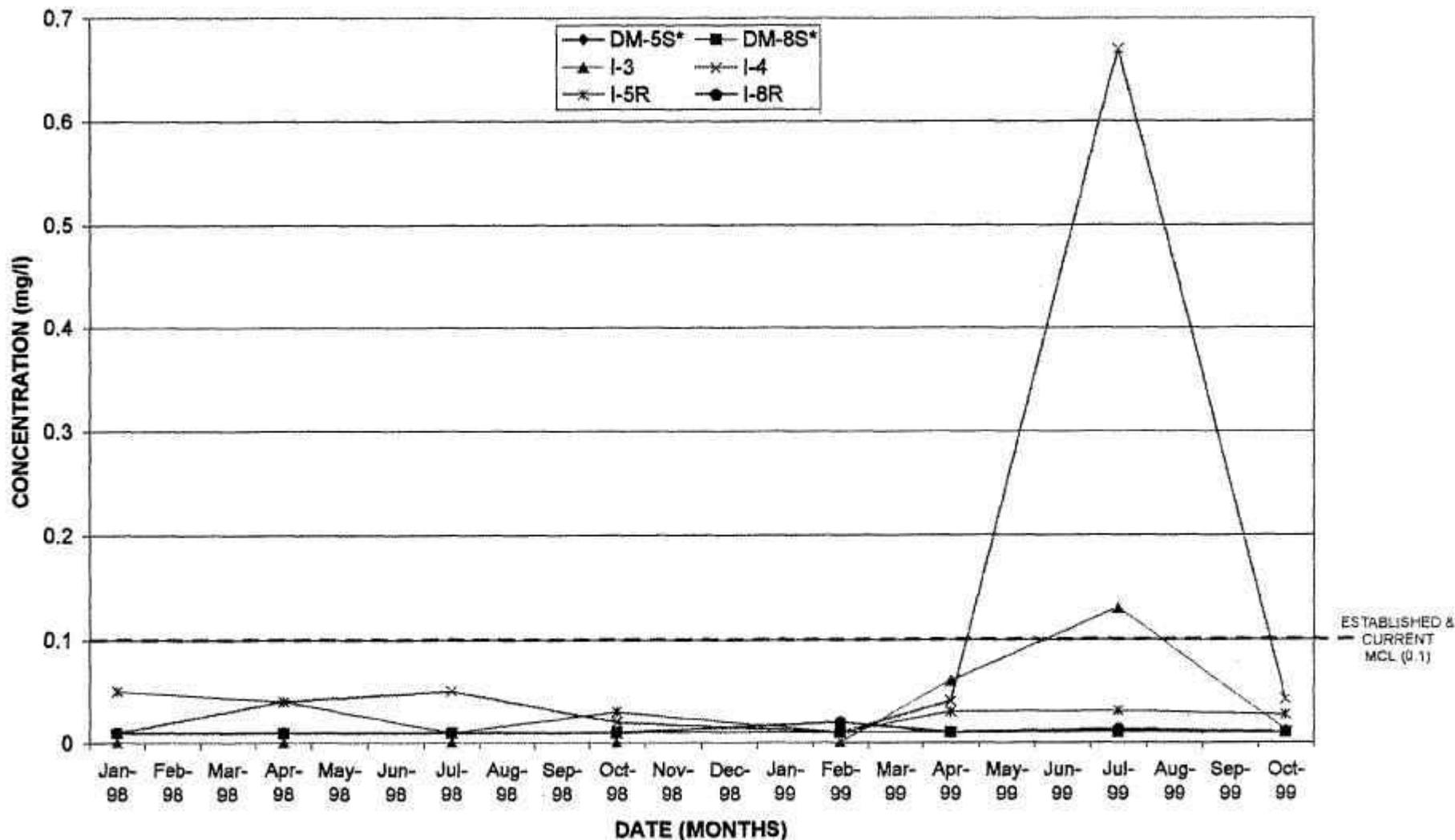
Drawn
Daniel L. Kudlicki

Project Number
6600001

Approved
JSK

Date
9/26/2000

NICKEL CONCENTRATION IN GROUNDWATER OVER PREVIOUS 2 YEARS



NOTE: * INDICATES UP-GRADIENT WELL



**Environmental Science &
Engineering, Inc.**

A MACTEC COMPANY

**NICKEL CONCENTRATION IN GROUNDWATER
OVER PREVIOUS 2 YEARS
19TH AVENUE LANDFILL**

APPENDIX

G2

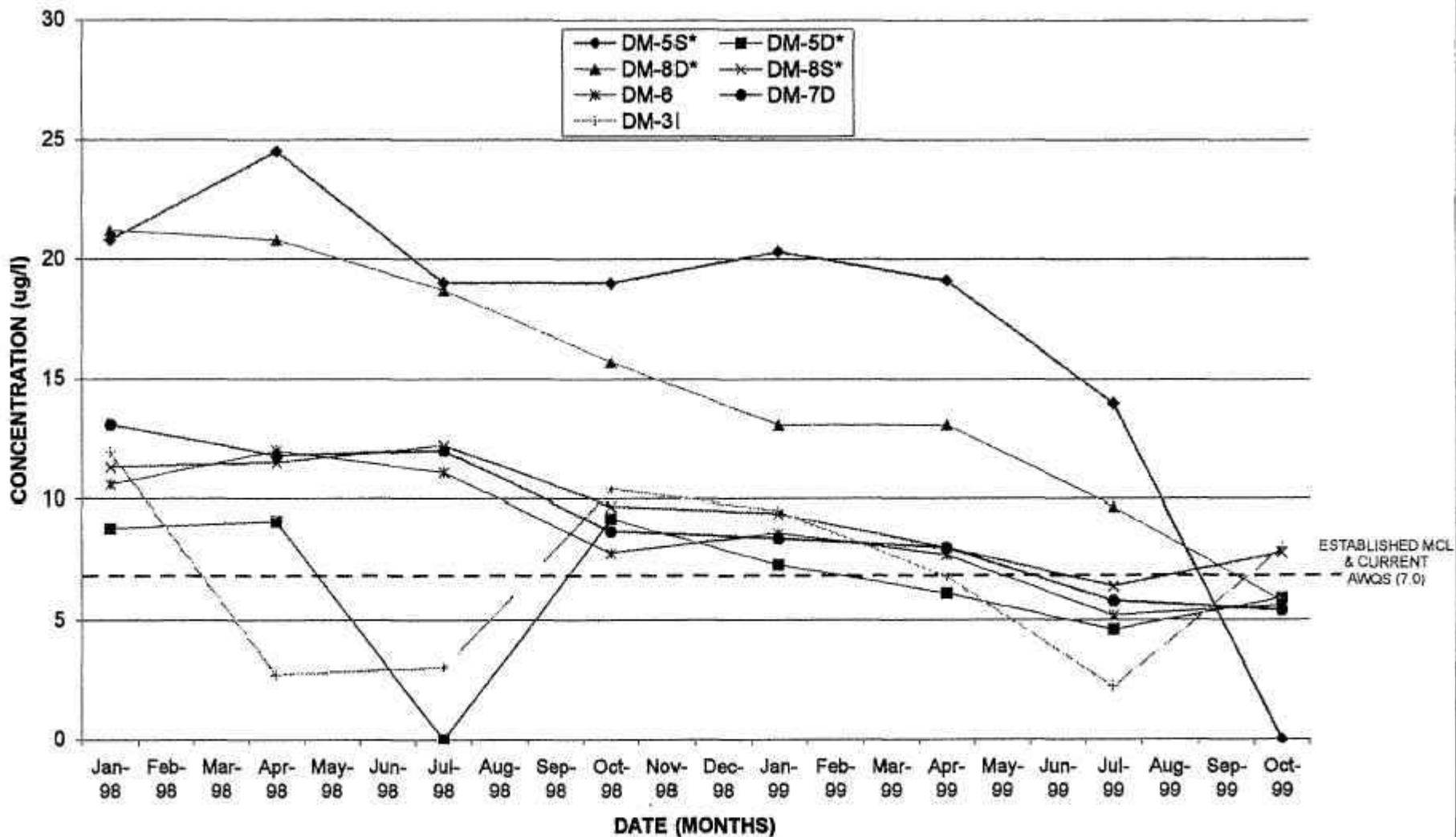
Drawn
Daniel L. Kudlicki

Project Number
6600001

Approved
JSK

Date
7/24/00

1,1 - DICHLOROETHENE CONCENTRATION IN GROUNDWATER OVER PREVIOUS 2 YEARS



NOTE: * INDICATES UP-GRADIENT WELL



Environmental Science & Engineering, Inc.

A MACTEC COMPANY

**1,1 - DICHLOROETHENE CONCENTRATION IN
GROUNDWATER OVER PREVIOUS 2 YEARS
19TH AVENUE LANDFILL**

APPENDIX

G3

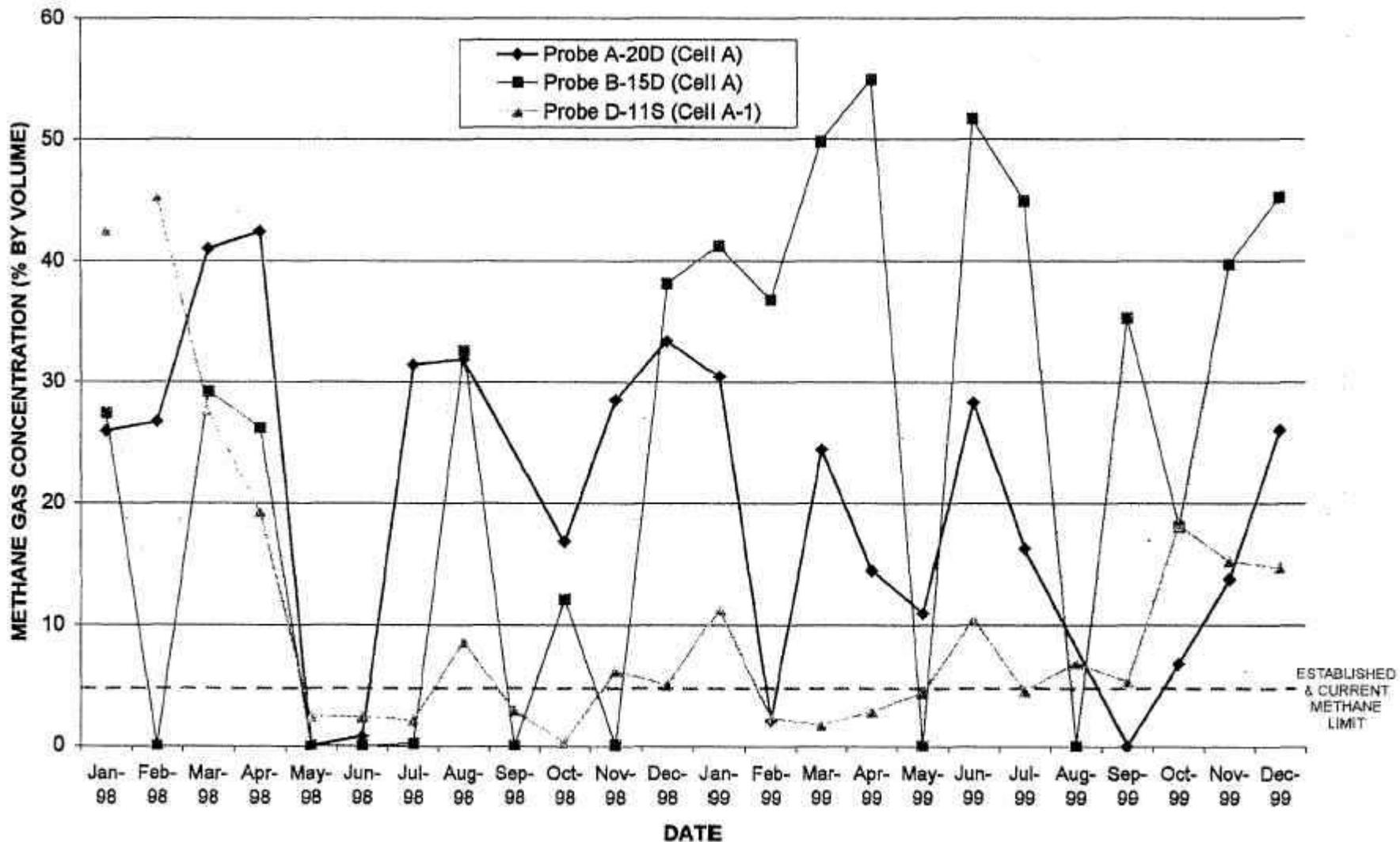
Drawn
Daniel L. Kudliok

Project Number
8600001

Approved
JSK

Date
7/24/00

METHANE GAS CONCENTRATION OVER PREVIOUS 2 YEARS



**Environmental Science &
Engineering, Inc.**

A MACTEC COMPANY

**GRAPHICAL REPRESENTATION OF METHANE
GAS CONCENTRATION OVER PREVIOUS 2 YEARS
19TH AVENUE LANDFILL**

APPENDIX

H

Drawn
Daniel L. Kudlicki

Project Number
6600001

Approved
JSK

Date
3/31/00