Modern Technology-Modern Environment

09 December 2015

Mr. Chance Goodin, Manager
Municipal Solid Waste Permits Section
Waste Permits Division
TCEQ
MC 124
12100 Park 35 Circle, Building F
Austin, TX 78753

RE: Modification of Groundwater Sampling and Analysis Plan (GWSAP)
Hidalgo County Precinct 4 Closed Landfill, MSW Permit No. 1593-A
CN 600753990/RN102120763 Hidalgo County, Texas

Dear Mr. Goodin,

Please find enclosed the permit modification form TCEQ-20650 and the required attachments. The modification (with public notice) is submitted to update the facility GWSAP to meet the requirements of 30 TAC 330.401(b). Because the existing GWSAP is very dated, it has been completely stricken and replaced with an entirely new document. The format and principle content of the new document have been through review for the 2006 rule revision and is used on several facilities.

Please contact me at the address/phone below or by email at: mitch@mtmetex.com if we can provide any additional information that will aid in your review.

Respectfully submitted,
Modern Technology – Modern Environment

DRAFT

Mitch Hudgins, P.E.

Enclosures: Modification form and Attachments 1 through 4

cc: Mr. Martin Ramirez, Hidalgo County
Mr. Jaime Garza, TCEQ Region 15

Facility Name: Hidalgo County Precinct 4 Landfill
Permittee/Registrant Name: Hidalgo County
MSW Authorization #: 1593A
Initial Submittal Date: 12/09/2015
Revision Date:

Texas Commission on Environmental Quality

Permit/Registration Modification and Temporary Authorization Application Form for an MSW Facility

1. Reason for Submittal

☑ Initial Submittal ☐ Notice of Deficiency (NOD) Response

2. Authorization Type

☑ Permit ☐ Registration

3. Application Type

☑ Modification with Public Notice ☐ Modification without Public Notice
☐ Temporary Authorization (TA) ☐ Modification for Name Change/Transfer

4. Application Fees

☐ Pay by Check ☑ Online Payment

If paid online, e-Pay Confirmation Number:

5. Application URL

Is the application submitted for a permit/registration modification with public notice?

☑ Yes ☐ No

If the answer is "Yes", enter the URL address of a publicly accessible internet web site where the application and all revisions to that application will be posted in the space provided: http:// http://co.hidalgo.tx.us/index.aspx?nid=1037

6. Confidential Documents

Does the application contain confidential documents?

☐ Yes ☑ No

If "Yes", cross-reference the confidential documents throughout the application and submit as a separate attachment in a binder clearly marked "CONFIDENTIAL."

7. General Facility Information

Facility Name: Hidalgo County Precinct 4 Landfill

MSW Authorization No.: 1593A

Regulated Entity Reference No.: RN102120763

Physical or Street Address (if available): N. side of Davis Road at N. Alamo Road

City: Edinburg County: Hidalgo State: TX Zip Code: 78542

(Area code) Telephone Number: N/A

Latitude: N 26 21 09 Longitude: W 98 05 46

8. Facility Type(s)

- [x] Type I
- [ ] Type IV
- [ ] Type V
- [ ] Type I AE
- [ ] Type IV AE
- [ ] Type VI

9. Description of the Revisions to the Facility

Provide a brief description of all revisions to the permit/registration conditions and supporting documents referred by the permit/registration, and a reference to the specific provisions under which the modification/temporary authorization application is being made. Also, provide an explanation of why the modification/temporary authorization is requested:

Revision of the Groundwater Sampling and Analysis Plan in accordance with 30 TAC Chapter 330. 401(b) to meet the 2006 rule revision. The old plan is replaced by a completely new plan.

10. Facility Contact Information

Site Operator (Permittee/Registrant) Name: Hidalgo County

Customer Reference No. (if issued)*: CN 600753990

Mailing Address: 1102 N. Doolittle Rd.

City: Edinburg County: Hidalgo State: Texas Zip Code: 78542

(Area Code) Telephone Number: 956-383-3112

E-mail Address: joseph.palacios@co.hidalgo.tx.us

TX Secretary of State (SOS) Filing Number: N/A

*If the Site Operator (Permittee/Registrant) does not have this number, complete a TCEQ Core Data Form (TCEQ-10400) and submit it with this application. List the Site Operator (Permittee/Registrant) as the Customer.

Operator Name[1]: Same as Permittee

Customer Reference No. (if issued)*: CN 600753990

Mailing Address: 1102 N. Doolittle Rd.

City: Edinburg County: Hidalgo State: Texas Zip Code: 78542

(Area Code) Telephone Number: 956-383-3112

E-mail Address:

Charter Number: N/A

[1]If the Operator is the same as Site Operator/Permittee type "Same as "Site Operator (Permittee/Registrant)".
*If the Operator does not have this number, complete a TCEQ Core Data Form (TCEQ-10400) and submit it with this application. List the Operator as the customer.

Consultant Name (if applicable): Modern Technology - Modern Environment

Texas Board of Professional Engineers Firm Registration Number: F-10265

Mailing Address: 548 Naples St.

City: Corpus Christi County: Nueces State: Texas Zip Code: 78404

(Area Code) Telephone Number: 361-533-7102

E-Mail Address: mitch@mtmetex.com

Agent in Service Name (required only for out-of-state):

Mailing Address:

City: County: State: Zip Code:

(Area Code) Telephone Number:

E-Mail Address:

11. Ownership Status of the Facility

Is this a modification that changes the legal description, the property owner, or the Site Operator (Permittee/Registrant)?

☐ Yes ☒ No

If the answer is "No", skip this section.

Does the Site Operator (Permittee/Registrant) own all the facility units and all the facility property?

☐ Yes ☐ No

If "No", provide the information requested below for any additional ownership.

Owner Name:

Street or P.O. Box:

City: County: State: Zip Code:

(Area Code) Telephone Number:

Email Address (optional):

Charter Number:

Signature Page

I, _____, _____,
(Site Operator (Permittee/Registrant)'s Authorized Signatory) (Title)

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____ Date: _____

- -

TO BE COMPLETED BY THE OPERATOR IF THE APPLICATION IS SIGNED BY AN AUTHORIZED REPRESENTATIVE FOR THE OPERATOR

I, _____ , hereby designate _____
(Print or Type Operator Name) (Print or Type Representative Name)

as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

_____
Printed or Typed Name of Operator or Principal Executive Officer

_____
Signature

-- -

SUBSCRIBED AND SWORN to before me by the said _____

On this _____ day of _____, _____

My commission expires on the _____ day of _____ , _____

_____
Notary Public in and for

_____ County, Texas
(Note: Application Must Bear Signature & Seal of Notary Public)

Permit/Registration Modification with Public Notice

(See Instructions for P.E. seal requirements.)

Required Attachments	Attachment No.
Land Ownership Map	1
Land Ownership List	2
Marked (Redline/Strikeout) Pages	3
Unmarked Revised Pages	4

Additional Attachments as Applicable- Select all those apply and add as necessary

- ☐ Signatory Authority
- ☒ Fee Payment Receipt
- ☐ Confidential Documents

Permit/Registration Modification without Public Notice or TA

(See Instructions for P.E. seal requirements.)

Required Attachments (for Modifications only) **Attachment No.**

Marked (Redline/Strikeout) Pages

Unmarked Revised Pages

Additional Attachments as Applicable- Select all those apply and add as necessary

☐ Signatory Authority

☐ Fee Payment Receipt

☐ Confidential Documents

Permit / Registration Name Change / Transfer Modification

(See Instructions for P.E. seal requirements.)

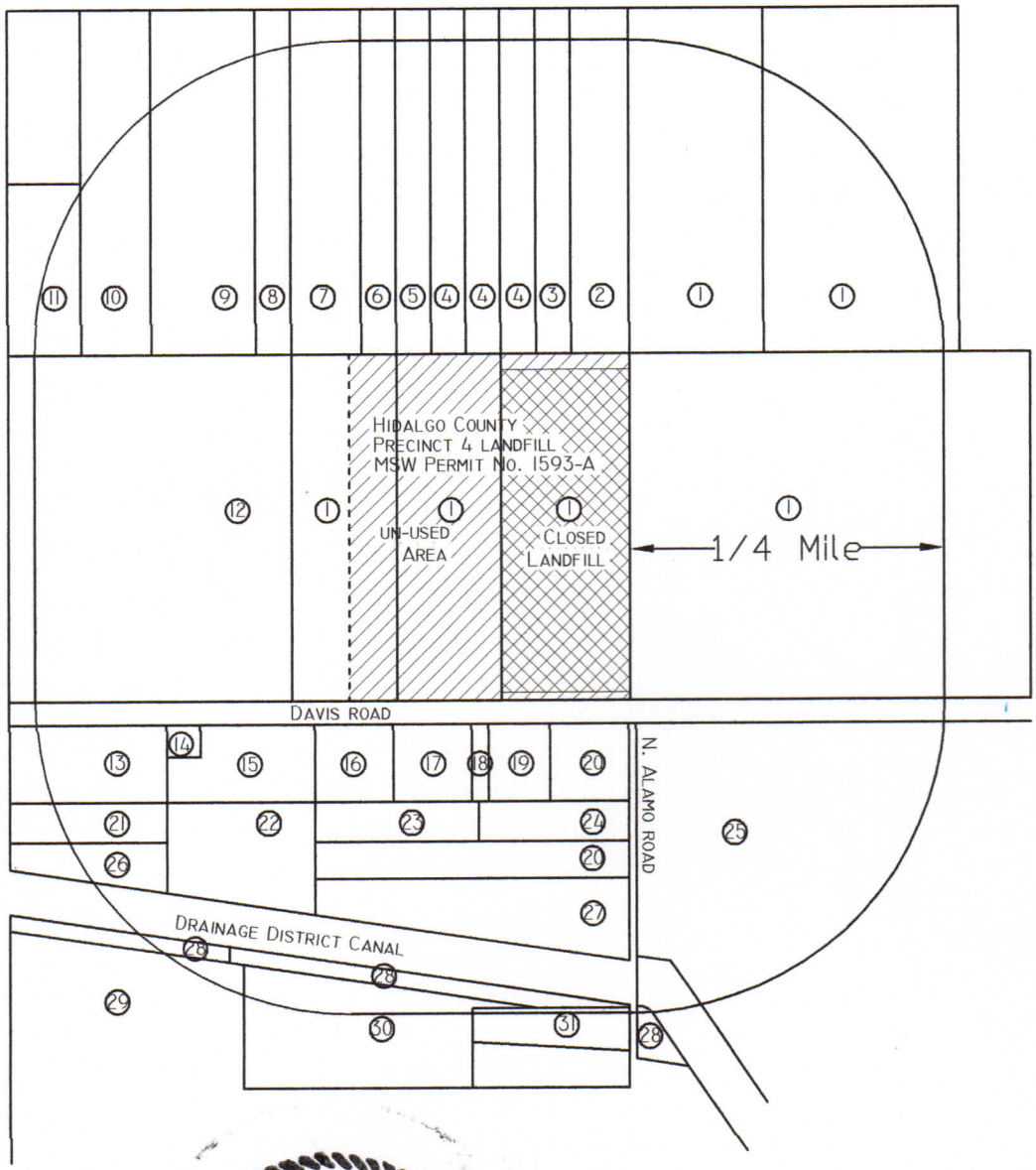
Required Attachments	**Attachment No.**
TCEQ Core Data Form(s)	
Property Legal Description	
Property Metes and Bounds Description	
Metes and Bounds Drawings	
On-Site Easements Drawing	
Land Ownership List	
Land Ownership Map	
Property Owner Affidavit	
Verification of Legal Status	
Evidence of Competency	

Additional Attachments as Applicable- Select all those apply and add as necessary

- ☐ Signatory Authority
- ☐ Fee Payment Receipt
- ☐ Confidential Documents
- ☐ Final Plat Record of Property, if platted
- ☐ Assumed Name Certificate

ATTACHMENT 1

Land Ownership Map



STATE OF TEXAS
G. M. HUDGINS
73845
LICENSED
PROFESSIONAL ENGINEER
11/10/15

LEGEND:

(12) -- PROPERTY OWNER I.D.
SEE ACCOMPANYING LIST

NOTES:

FIGURE DRAWN FROM HIDALGO COUNTY APPRAISAL DISTRICT'S ON-LINE MAPS. NOT SURVEYED PLATS. NOT TO BE RELIED UPON OTHER THAN TO IDENTIFY PROPERTIES WITHIN 1/4 MILE RADIUS FOR NOTICE.

1/4 0 1/4

APPROXIMATE SCALE IN MILES

Texas Registered Engineering Firm F-10265
MODERN TECHNOLOGY - MODERN ENVIRONMENT
548 Naples St. Corpus Christi, Texas 78404
(361) 533-7102

DRAWN BY:	GMH
APP'D BY:	GMH
DATE:	11/5/15
SCALE:	AS SHOWN
MTME Drawing No.:	Property GWSAP.dwg

LAND OWNERSHIP MAP

Hidalgo County Precinct 4, MSW Permit No. 1593-A

GWSAP Modification

Figure 1

ATTACHMENT 2

Land Ownership List

1/4TH MILE LANDOWNERSHIP LIST - HIDALGO CO. PRECINT 4 GWSAP MODIFICATION

1.
HIDLGO COUNTY
PO BOX 1356
EDINBURG TX 78540

2.
ERIC S GUTIERREZ & MARIA AIDEE GARCIA
6314 PROMENADE AVE
EDINBURG TX 78542

3.
RENE ECHAVARRIA
5112 E RAMSEYER RD
EDINBURG TX 78542

4.
OSVALDO & ANA MARIA ZAMORA
5104 E RAMSEYER RD
EDINBURG TX 78542

5.
ARMANDO AND MARIA G GONZALEZ
820 S 12TH PL
ALAMO TX 78516

6.
MARIA YOLANDO TREVINO
632 LUCY CT
EDINBURG TX 78541

7.
EUGINIO LONGORIA & PONCIANO LONGORIA III
1001 VISTA HERMOSA ST
EDINBURG TX 78539

8.
ANDY PEREZ
4702 E RAMSEYER RD
EDINBURG TX 78542

9.
ISAIAS & TRINIDAD GONZALEZ
2508 BENITO A RAMIREZ RD
EDINBURG TX 78542

10.
JOSE M JR & YVETTE PEREZ
7100 N 23RD LN
MCALLEN TX 78504

11.
MANI SKARIA
713 SHASTA AVE
MCALLEN TX 78504

12.
EVELYN EAST & ALICE GK TRUSTEE
PO BOX 56
LINN TX 78563

13.
WAYNE GLOVER BARNES
CO REYNALDO RODRIGUEZ
4408 E DAVIS RD
EDINBURG TX 78542

14.
SYLVIA A ZUNIGA
4510 E DAVIS RD
EDINBURG TX 78542

15.
VITALIO ZUNIGA
4512 E DAVIS RD
EDINBURG TX 78542

16.
DAVID A ZUNIGA
5004 E DAVIS RD
EDINBURG TX 78542

17.
GRACIE ZUNIGA
5004 E DAVIS RD
EDINBURG TX 78542

18.
SAN LUANA SALAZAR
5004 E DAVIS RD
EDINBURG TX 78542

19.
GUADALUPE LOPEZ
408 S IRONWOOD ST
PHARR TX 78577

20.
EDELMIRO SANCHEZ CUSTODIAN
ISAAK SANCHEZ
PO BOX 898
PHARR TX 78577

21.
YODAFORU TRUST
CO ABRAM & CECILIA ESPINOZA
4506 E DAVIS RD
EDINBURG TX 78542

22.
ESEQUIEL & IRMA LOPEZ
4511 N NOWELL DR
EDINBURG TX 78542

23.
MANUEL LUNA
ESTATE OF GLORIA CORNELIESEN
5004 E DAVIS RD
EDINBURG TX 78542

24.
JOSIE ANN SANCHEZ CUSTODIAN
ISAAK SANCHEZ
PO BOX 898
PHARR TX 78577

25.
US FISH & WILDLIFE SERVICE
PO BOX 1306
ALBUQUERQUE NM 87103

26.
VINCENT & NILDA F CANTU
PO BOX 3721
EDINBURG TX 78540

27.
TR & LILIA PERDUE
PO BOX 3791
MCALLEN TX 78502

28.
HIDALGO CO DRAIN DIST NO 1
902 N DOOLITTLE RD
EDINBURG TX 78542

29.
RAYMOND F DOERFLER
901 ALL DAY ST
ROCKDALE TX 76567

30.
WILLIAM AND KATHERINE BROZOWSKI
202 SMITH STREET
COLUMBUS TX 78934

31.
RUDOLFO & DOMINGA GALVAN
RR 12 BOX 2465
EDINBURG TX 78542

ATTACHMENT 3

Marked (Redline/Strikeout) Pages

GROUND WATER SAMPLING AND ANALYSIS PLAN

HIDALGO COUNTY PRECINCT No. 4 LANDFILL
HIDALGO COUNTY, TEXAS

MSW PERMIT No. 1593-A

SEPTEMBER 2000

Prepared for:

J.E. SAENZ & ASSOCIATES, INC.
and
THE COUNTY OF HIDALGO

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STATE OF TEXAS
STEVEN W. FUNDERBURG
65467
REGISTERED PROFESSIONAL ENGINEER

8.31.00

Submitted to:

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
MUNICIPAL SOLID WASTE DIVISION

Prepared By:

RABA-KISTNER CONSULTANTS, INC.

37740

Project No. ASF00-065-00
September 1, 2000

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FIGURES

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TABLES

APPENDICES

1.0 Introduction

In accordance with the Agreed Order (Docket No. 1999-0695-MSW-E) and applicable Texas Natural Resource Conservation Commission (TNRCC) regulations, the Ground Water Sampling and Analysis Plan (GWSAP) presented herein was prepared to describe procedures and methodologies associated with the collection, handling and laboratory testing of ground water samples at the Hidalgo County Precinct No. 4 Landfill (Permit No. MSW-1593A) located in Edinburg, Hidalgo County, Texas. The purpose of the GWSAP is to define site-specific standards and practices for ground water sampling and analysis within the context of a stand-alone document that provides a concise set of instructions to sampling and analytical personnel conducting a ground water sampling program. The GWSAP was developed in accordance with *30 TAC §330.233* and TNRCC guidance document RG 74 entitled *Guidelines for Preparing a ground-Water Sampling and Analysis Plan* to ensure that representative ground water data are obtained at the subject landfill. Figures, tables, and supplemental information referenced herein are provided in respective "Figures", "Tables", and "Appendices" sections immediately following the narrative portion of the GWSAP.

The ground water sampling program will be conducted in accordance with the procedures established herein. Although the GWSAP addresses the collection, handling, storage, and treatment of the samples, both in the field and at the testing laboratory, the contract laboratory that performs analyses of ground water samples will submit a Laboratory Standard Operating Procedures (LSOP) document to the TNRCC prior to the implementation of the sampling program. The LSOP will describe specific laboratory protocols used to provide data of stated quality with a stated probability of being correct including all procedures to handle and analyze samples from receipt until results are officially reported.

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Ground water samples will be collected from the ground water monitoring wells installed as part of landfill closure activities (see ***Figure II.1: Proposed Ground Water Monitor Well Locations***). As presented on Figure II.1, a network comprised of ten (10) ground water monitoring wells will be installed along the periphery of buried municipal solid waste (MSW) at the subject landfill.

2.0 Monitoring Well Inspection

The location of each monitoring well will be initially verified using a current site map to ensure that appropriate monitoring wells are identified for sampling. The unique monitoring well identification numbers will be verified with the identification markers shown on well installations and recorded on a well inspection and sampling (WIS) form (see ***Appendix II.1***). The WIS form will accompany field personnel performing ground water monitoring to the subject landfill during all monitoring events.

Prior to the commencement of monitoring well gauging or purging activities, the condition of all site wells will be visually inspected. The well casing and concrete pads will be checked for the presence of cracks or fissures that could compromise the integrity of the surface completion. Each well will be additionally inspected for damage due to vandalism, animals or insects, and/or heavy equipment operations. Descriptions of apparent well damage or conditions conducive to the transmission of surface runoff along monitoring well installations will be noted in the 'Comments' section of the WIS form.

3.0 Gas Monitoring / Water-Level Measurements

The presence of explosive gases within the well casing at respective monitoring well/piezometer locations will be evaluated utilizing a properly calibrated landfill gas monitor. Measurements will consist of gas temperature, pressure and concentration. Well casings will be screened during each monitoring event to verify that the concentration of methane gas does not exceed 25 percent of the lower explosive limit (LEL) for methane. In the event that methane is detected at concentrations that exceed 25 percent of the LEL, steps will be immediately taken to ensure the protection of human health and safety pursuant to contingencies described in the accompanying Landfill Gas Management Plan (LFGMP) and *30 TAC §330.56*(n). A record of field methane measurements will be recorded on the WIS form.

Prior to purging site monitoring wells, depth to water and total well depth measurements will be gauged at each well location from a permanent, clearly marked reference point located at the TOC. All measurements will be recorded to the nearest hundredth of a foot utilizing an electronic water-level indicator (e-line). To ensure that potential contaminants are not introduced to site monitoring wells as the result of gauging activities, the e-line probe and measurement tape will be decontaminated before and after each use. Decontamination procedures are further described in Section 4.0 of this plan. All decontamination fluids will be containerized pending the results of ground water sampling and analyses.

4.0 Well Purging

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In order to secure representative ground water samples, monitoring wells will be purged in order to remove water from the well casing that may not be chemically representative of the formation ground water. Well purging will be accomplished utilizing either a properly decontaminated electric pump or a dedicated Teflon® or polyethylene bailer. In the event that an electric pump is used to purge monitoring wells, purging equipment including pump, tubing, and connectors will be decontaminated according to the following procedure: 1) an initial wash in a mild solution containing a biodegradable, phosphate-free detergent such as Alconox®; 2) a second wash utilizing clean drinking-grade water; and 3) final rinse with reagent-grade water obtained from the contract analytical laboratory. In order to prevent cross-contamination of purging equipment by field personnel, clean, disposable, powder-free, nitrile gloves will be used when handling the decontaminated purging equipment. Prior to purging and sampling, clean, disposable plastic sheeting will be placed around respective wells in order to prevent clean equipment from coming into contact with the ground.

During purging, a minimum of three (3) casing volumes of ground water will be removed from respective monitoring wells. As indicated on the attached WIS form (see ***Attachment II.2***), the volume of water to be removed at each well location will be calculated based on the respective height of the water column in the monitoring well and the well casing diameter. If sufficient ground water is available, purging will continue until field parameters including pH, temperature, turbidity, and conductivity have stabilized and the ground water is clear. A description of measurement protocols for field parameters is provided in Section 6.2 of this plan.

In the event that monitoring wells recharge very slowly, wells will be purged to dryness in order to remove stagnant water from well casings. Wells will be allowed sufficient time (maximum of 72 hours) to recover such that ground water samples can be collected. Whenever possible, the

ground water level shall be allowed to recover to within 90 percent of the original water level measurement prior to purging. Based upon a review of historical ground water monitoring data available for the subject landfill, it is anticipated that ground water levels will recover to the 90 percent pre-purging elevations within 12 to 24 hours of purging. In the event that sufficient well volume for sampling is not available within 72 hours of purging, respective wells will be reported as "purged dry with insufficient sampling volume after 72 hours" on the WIS form and in the corresponding Ground Water Sampling and Analyses Report submitted to the TNRCC.

All data collected prior to sampling will be recorded on the WIS form and will include the following at a minimum:

- initial depth to water,
- measured depth to the bottom of the well,
- height of the water column inside the well,
- well volume,
- purging discharge rate,
- well purging time,
- volume purged from the well,
- a record of pH, conductivity, temperature, turbidity readings, and
- information from the well inspection and other pertinent information.

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All ground water removed from site monitoring wells during the purging activities will be stored in labeled 55-gallon drums or similar containers. The ground water containers will be temporarily stored at a secured site location until analytical results are received from the contract laboratory. If the report of laboratory analyses indicate that the concentrations of contaminants do not exceed levels of concern as determined by the TNRCC, the water will be applied to the unsaturated soil on-site. In the event that analytical results indicate concentrations of contaminants that are above levels of concern or classified as hazardous by the TNRCC, the water will be properly disposed of at a waste-water treatment facility, other authorized facility, or hazardous waste facility in accordance with applicable TNRCC and Federal regulations.

5.0 Timing and Order of Sampling

In association with each monitoring event, ground water sampling will be accomplished as soon as practicable subsequent to the completion of purging activities to avoid temporal variations in water levels and water chemistry. When possible, sampling activities will be conducted within twenty-four (24) hours of well purging. As described in Section 4.0 of this plan, a maximum of 72 hours will be allowed subsequent to purging in the event that monitoring wells recharge slowly and sufficient water volume is not available for sampling at a lesser duration. In general, the time interval between purging and sampling activities will be kept to a minimum, particularly when the analysis of volatile organic compounds (VOCs) is required.

In an effort to avoid cross-contamination of samples between monitoring wells during respective monitoring events, sampling will commence at the monitoring well which is known to be the least contaminated and conclude with the most contaminated well. In the absence of contamination data for newly installed monitoring wells during initial background monitoring events, the order of sampling will be from the well with the highest water-level elevation to the

well with the lowest elevation (upgradient to downgradient) for each group of wells completed within a discrete water bearing interval.

6.0 Sample Collection, Preservation, and Shipment

In an effort to maximize the validity of ground water samples and protect sample integrity, the following procedures for sample collection, preservation and shipment will be implemented. The methods and procedures described herein will be consistently applied at all site monitoring wells and throughout subsequent ground water monitoring events.

6.1 Sample Collection

Ground water samples will be collected at each well location utilizing a new, clean, disposable bailer suspended from new, clean nylon string. In order to minimize turbulence and aeration and associated potential volatilization of organic compounds during sampling, bailers will be equipped with a bottom-emptying device allowing water to be discharged slowly from the bottom directly into sample containers. Field personnel will wear new, clean, disposable nitrile gloves throughout the duration of sampling at each well location. Soiled sample bottles, bailers, nylon string, and filtration media will not be reused at subsequent well sampling locations.

In the event that ground water samples are collected immediately subsequent to purging activities (6 to 12 hours), it is not anticipated that ground water present at the top of the water column will be oxidized to an extent that could potentially affect the collection representative ground water samples. In the event that sufficient sample volume recharges into monitoring wells and sampling is conducted within 24 hours of purging the first portion of collected water (approximately 2 liters) will be discarded to eliminate potentially oxidized water prior to filling sample containers. In the event that site wells recharge slowly and must be sampled 24 to 72 hours subsequent to purging, a lesser volume may be initially discarded in order to preserve sufficient sampling volume for analytical chemistry assignments.

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6.2 Field Measurements

An unfiltered portion of the ground water will be poured into a clean container for field measurement of temperature, specific conductance, and pH. The temperature readings will be measured immediately upon collection. Subsequently, measurements of specific conductance will be accomplished to avoid any effect on the sample from salts on the pH probe. The specific conductance readings will be followed by the pH measurements. In addition to recording ground water parameter measurements, observations regarding the ground water color, odor, foaming, presence of more than one phase of liquid, and turbidity will be recorded on the WIS form.

Equipment utilized for the field measurements will be calibrated each day that the equipment is used in the field. Copies of the daily calibration logs will be kept on file and presented in the Ground Water Sampling and Analyses Report. Provisions will be made for backup equipment in the event of a primary equipment failure during the course of a monitoring event.

6.3 Sample Containers

The volume of samples and the types of sample containers depends on the parameters to be analyzed during respective monitoring events and will be consistent with recommendations

provided by the TNRCC in *RG-74, Attachment A*, which are based upon EPA guidance. Sampling, preservation, and storage procedures for potential ground water monitoring parameters are presented in ***Table II-1***.

As recommended in *RG-74*, sample containers will be filled in the following order according to volatilization sensitivity:

1. **VOCs** (volatile organic compounds)
2. **SVOCs** (semi-volatile organic compounds)
3. **NPOC** (non-purgeable organic carbon, also called TOC or total organic carbon)
4. **Metals**
5. **Other Inorganic Parameters**

Although volatilization is of primary concern during VOC sampling, designated VOC vials will additionally be sampled from the same bailer in order to prevent inhomogeneity in the samples resulting from the presence of suspended sediments. As referenced in Section 6.3 and 7.0 of *RG-74*, inhomogeneity of samples owing to the presence of suspended sediments is additionally of concern when collecting samples with a bailer to the extent that VOCs adsorbed to sediment particles can influence measured concentrations in ground water. However, as wells will be properly designed, constructed, and installed, it is not anticipated that appreciable suspended sediments will be encountered during sampling activities.

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The contract analytical laboratory will supply appropriate pre-preserved sampling containers, labeled by analyte, prior to the mobilization of sampling personnel to the subject landfill. Sample containers will be subsequently labeled in the field for identification purposes and will include the following information at a minimum: site identification, monitoring well number, date and time of sample collection, type of preservatives used, analyses to be performed (in accordance with laboratory designation), and the name of the sampler. Information will be written on laboratory-supplied sample labels using indelible ink and covered with transparent tape to protect written data.

6.4 Types of Sample Containers

As referenced in ***Table II.1*** of this plan, the following sample containers and protocols will be utilized during ground water monitoring at the subject landfill.

- VOCs: Two (2) 40-ml glass vials with special caps containing Teflon septa will be used per analysis. Containers will be pre-preserved with HCL by the contract laboratory. Prior to filling, the septum of each vial will be placed with the Teflon side toward the sample. During filling, water will be allowed to stream down the inner wall of the vial to minimize formation of air bubbles. The vials will be slightly overfilled in order to create a positive meniscus. Upon completion of filling, caps will be carefully screwed on to avoid leaving any airspace within the vials. In the event that an air bubble forms in a vial subsequent to capping, an additional separate 40-ml sample will be collected.

- SVOCS: One (1) glass one-liter bottle with Teflon-lined cap will be used per analysis. Containers will be completely filled and capped.

- Metals: One (1) polyethylene one-liter bottle, pre-preserved with HNO_3 by the contract laboratory, will be used per analyses for total metals. Containers will be completely filled and capped. In the event that dissolved metals are to be tested, samples will be field filtered prior to adding the preservative in accordance with the procedure described in Section 7.0 of this plan.

- Other Inorganic Parameters: Depending on the specific parameters to be analyzed, one or more glass/plastic one-liter containers will be used per analyses of the suite of inorganic parameters including those listed on ***Table II.1***. With the exception of ammonia (in the event that it is assigned for analysis), preservatives will not be used on samples collected for other inorganic parameter analyses.

- NPOC (TOC): In the event that NPOC analyses are assigned, quadruplicate 100-ml amber glass bottles with Teflon-lined caps will be used per analyses. Sample containers will be filled to capacity (no airspace) to minimize the possibility of volatilization of organics, if present. In the event that samples cannot be analyzed within 48 hours of collection, containers pre-preserved with HCL by the contract laboratory will be used.

6.5 Sample Preservation and Holding Times

As described in *RG-74*, sample preservation is intended to 1) retard biological action, 2) retard hydrolysis, and 3) reduce sorption effects. Preservation methods are generally limited to pH control, chemical addition, refrigeration, and protection from light. Specific preservation methods for analytes that may be assigned in association with ground water monitoring at the subject landfill are presented in ***Table II.1*** of this plan.

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Specific sample volumes required for each analysis and associated sample holding times will be reviewed with the contract analytical laboratory prior to sampling. In general, these requirements will be consistent with those presented in ***Table II.1***.

6.6 Sample Storage and Transport

In accordance with preservation requirements presented in ***Table II.1***, sample containers will be placed into a clean, insulated cooler and kept on ice following sample collection. Adequate ice will be kept on the samples to maintain a maximum temperature of 4°C (39.2°F) during transport to the contract analytical laboratory. The samples will be kept in the sampler's possession at all times and will be submitted to the laboratory via proper chain-of-custody protocol within forty-eight (48) hours of sampling.

6.7 Chain-of-Custody Documentation

Appropriate Chain-of-Custody (COC) procedures will be implemented to ensure sample integrity and to provide technically and legally defensible ground water quality data. At any time that a ground water monitoring event is conducted, a COC form will be completed, placed in a sealable plastic bag, and placed in the cooler with the samples collected. The completed COC form will accompany the samples at every step from the field to the laboratory and will be signed by each party handling the samples, from sampler, through transporter to the laboratory to document the possession of the samples at all times. An example COC form is provided as ***Appendix II.2*** of this plan.

In the event that samples are sent by mail to the contract analytical laboratory, packages containing samples will be certified with return receipt requested to document shipment. If the samples are shipped via overnight courier, the bill of lading will be retained to document shipment. Copies of the return receipt/bill of lading will be subsequently attached to the COC at the completion of each stage of shipment.

6.8 Documentation of Sampling

As described in Sections 2.0 through 4.0 of this plan, information related to a sampling event will be recorded on the WIS form (see ***Appendix II.1***). All entries will be legible and made in indelible black ink. Entry errors will be crossed out with a single line, dated, and initialed by the person making the corrections. Sufficient information including sample location, date, time, weather, name and affiliation of field personnel, field measurements including the numerical values and units, the integrity of the well, methane gas measurements, etc. will be recorded on WIS forms such that the monitoring event can be reconstructed without relying on the sampler's memory. Completed forms will be maintained in project files as a permanent record of ground water monitoring activities.

7.0 Sample Filtration

As described in *RG-74*, samples are typically filtered to remove sediments that can cause interferences during analysis. Filtering is essential in determining the concentration of dissolved constituents in ground water because suspended sediments in the sample can react and change the concentration of some of the dissolved constituents. In the event that samples are filtered, acid preservatives are added to the sample subsequent to filtering to avoid breaking down clay molecules or placing absorbed ions into solution, which may result in artificially high concentrations of metals.

Pursuant to *30 TAC §330.233* and discussed in *RG-74*, samples that are to be analyzed for organic constituents listed in *30 TAC §330.241, Table 1* will not be field-filtered. In accordance with recommendations provided by the TNRCC ground water samples will be analyzed for dissolved metals as these are often better indicators of potential contamination than analyses for total metals. Field filtering will be conducted on samples to be submitted for analyses of dissolved metals according to the following protocol:

1. Upon collection, ground water samples will be extracted from bailers utilizing a field-portable peristaltic pump fitted with dedicated silicon tubing. The outflow reach of silicon tubing will be fitted with a new, disposable in-line filter capsule. Commercially available filter capsules utilized for sampling will generally consist of polypropylene housing containing a 20 cm^2 effective filtration area comprised of a 0.45µm nylon-supported membrane. Filter capsules will not be reused following sample collection.

2. Sample volumes discharging through the filter capsule will be directed into non-preserved polyethylene sampling containers. Samples will be subsequently acidified in the field to pH<2 by adding 5 ml of laboratory-supplied HNO_3 to one-liter sampling containers.

3 Filled and capped containers containing field-filtered sample will be subsequently submitted for analyses of dissolved metals.

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8.0 Analytical Parameters

Pursuant to *30 TAC §330.241, Table 1* and *RG-74, Attachment B*, organic and metals constituents that will be monitored as part of the facility background and detection sampling programs are listed on ***Table II.2***.

As discussed in *RG-74*, inorganic parameters other than heavy metals are useful indicators of contamination because of their relative abundance in waste, mobility, and lack of reactivity in ground water. In order to successfully characterize the ground water chemistry at each well, the following inorganic parameters listed in ***Table II.3*** will additionally be analyzed during facility background and detection monitoring events.

As referenced in *RG-74*, it is not considered likely that metals including antimony, beryllium, thallium, and vanadium will be present in ground water present beneath a municipal solid waste landfill (MSWLF). After the completion of the background monitoring program, it is anticipated that the omission of some heavy metals will be proposed to the TNRCC. Changes and/or modifications to the list of analytes provided in ***Tables II.2 and II.3***, if necessary, will be submitted to the TNRCC in the form of a permit modification request.

9.0 Analytical Methods

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As stipulated in *RG-74*, the ground water monitoring program described herein will include the application of appropriate analytical methods in order to accurately measure concentrations of hazardous constituents or other monitoring parameters that may be present in the ground water samples. EPA-approved methods will be utilized for analyses of ground water samples obtained at the subject landfill in accordance with procedures described in the following published references:

- EPA 600/4-79-020, *Methods for Chemical Analysis of Water and Wastes*, March 1983
- EPA SW-846, *Test Methods for Evaluating Solid Waste*, Third Edition, September 1986, and Updates I, II, IIA, IIB, and III.
- *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992.

As stipulated previously in Section 1.0 of this plan, the contract laboratory that performs analyses of ground water samples will submit a LSOP document to the TNRCC prior to the implementation of the sampling program described herein. The LSOP will describe specific laboratory protocols used to provide data of stated quality with a stated probability of being correct including all procedures to handle and analyze samples from receipt until results are officially reported.

Pursuant to Drinking Water Standards adopted by the TNRCC on March 25, 1944 (provided in *RG-74, Attachment E)*, the contract laboratory will demonstrate as part of the LSOP that analytical methods, instruments, and procedures used are capable of attaining PQLs at or below established maximum contaminant levels (MCLs) for respective analytes. In the event that PQL's greater than those presented in *Attachment C* are reported, any quantifiable amount below the PQL will be flagged to indicate that the compound is present but below the PQL. In

these instances, documentation regarding the two lowest calibration points and MDL for the flagged compounds will accompany the analytical results.

Laboratory methods, method detection limits (MDLs), and practical quantitation limits (PQLs) for organic, metals, and inorganic constituents that will be monitored as part of the facility background and detection sampling programs are presented in ***Tables II.4 and II.5***. As it is anticipated that chemical analyses of water samples will be performed by Severn Trent Laboratories, Inc. (STL) of Corpus Christi, Texas, the values presented in the referenced tables are laboratory-specific based on recent quality assurance data provided by STL. As presented in ***Tables II.4 and II.5***, PQLs reported by STL are consistent with PQLs for organic constituents set forth in *RG-74, Attachment C*, as established by the Texas Department of Health (TDH) Laboratory. PQLs reported by STL are typically a factor of three times the MDL with regard to organic constituents. Chemical analyses of water samples will be performed by STL or other qualified laboratory capable of achieving MDLs and PQLs presented in the referenced tables.

In the event that PQLs in excess of those presented in *RG-74, Attachment C* are reported for organic compounds that have extremely low MCLs, such as DBCP and EDB, procedures described above for flagging will be followed.

10.0 Background Samples

As defined in *RG-74*, "background" refers to the chemical characteristics of ground water comprising a data set to which the chemical characteristics of the current samples are compared to determine if the current samples show statistically significant changes (SSCs) in those characteristics. Background water quality will be established for the 15 metals and 47 VOCs listed in ***Table II.2*** of this plan pursuant to *30 TAC §330.241, Table 1*. As per recommendations provided in *RG-74*, a minimum of eight (8) background monitoring events will be conducted such that a statistical approach may be subsequently applied involving intrawell and/or interwell comparisons.

The spacing of background monitoring events will be adequate to facilitate the hydraulic and chemical stabilization of ground water such that consecutive samples are statistically independent. Based upon limited historical site data, it is initially proposed that background monitoring events be conducted quarterly over the duration of two years to incorporate seasonal variations in water chemistry into the background data set. In the event results of initial background monitoring indicate that a quarterly frequency will not likely produce statistically independent samples based upon the calculated ground water gradient, an alternate background monitoring frequency will be proposed to the TNRCC as a permit modification. The specific methodology for determining ground water sampling frequency is further discussed in Section 14.2 of this plan.

Background samples will be taken from all existing site monitoring wells that are included as part of the ground water monitoring system (see ***Figure II.1***). After background analyses have been completed, data will be treated statistically and background concentrations established for each parameter. Although these analyses will be used to obtain background data for subsequent statistical analysis during detection monitoring, calculated background concentrations will be subject to review by the TNRCC for indications of historical ground water contamination based upon available site information.

Do Not Duplicate

A general discussion and flow chart describing the application of statistical methods to background and detection monitoring are presented in Section 14.0 and ***Figure II.2***, respectively. Subsequent to the completion of background monitoring, a plan outlining the statistical approach to be applied to background and detection monitoring data will be submitted to the TNRCC. The statistical plan will compliment the GWSAP, utilize site specific analytical data, and present a more detailed approach than described herein.

11.0 Detection Monitoring

Subsequent to the completion of background monitoring, detection monitoring will be conducted on a semi-annual basis. The first detection monitoring sampling event will occur approximately six (6) months after completion of background sampling pending the reduction of background sampling data. It is anticipated that this frequency will continue throughout the duration of the closure and post/closure care period unless site ground water flow velocities are sufficiently low such that an annual monitoring frequency will suffice. In the event that a SSC occurs in ground water chemistry data, or if deemed necessary by the TNRCC, an alternate monitoring frequency may be adopted. Pursuant to *RG-74*, it is understood that the adoption of an alternate monitoring frequency will require TNRCC concurrence. If warranted, an alternate detection monitoring frequency will be proposed as a permit modification request.

Site wells comprising the ground water monitoring network will be sampled during each detection monitoring event in accordance with the methodologies and procedures described herein. As previously stipulated, it is anticipated that the omission of some heavy metals will be proposed to the TNRCC following the completion of the background monitoring program. If warranted, proposed changes and/or modifications to the list of analytes provided in ***Tables II.2 and II.3*** will be submitted to the TNRCC as a permit modification request.

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12.0 Assessment Monitoring

The occurrence of a confirmed SSC from background for a specific detection monitoring constituent (see ***Table II.2)*** during a sampling event will result in the implementation of assessment monitoring. In the event that a SSC is determined as the result of a detection monitoring event, site monitoring wells exhibiting statistically anomalous analytical results will be immediately re-sampled in order to confirm the SSC. Unless it can be demonstrated to the satisfaction of TNRCC that the SSC is the result of an error, seasonal variation, or cause other than the subject landfill, an assessment monitoring program will be initiated no more than ninety (90) days from the report of the SSC to the TNRCC.

Assessment monitoring will be performed on a site-specific basis in accordance with *30 TAC §330.235*. Although the initiation of assessment monitoring does not require TNRCC concurrence, these activities will be coordinated with the TNRCC to ensure adequate characterization of potential ground water contamination.

13.0 Quality Assurance and Quality Control (QA/QC)

The assessment of data reliability is essential to determine if the analytical parameters detected by the contract laboratory are truly present in the ground water at the reported concentrations and to confirm that all compounds of interest in the sample have been detected. A good QA/QC

program ensures that the data generated are accurate, precise and legally defensible and enhances consistency in data analysis.

Quality-assurance/ quality control (QA/QC) procedures address both the field and laboratory activities. In order to provide good QA/QC for field data generated during background and detection monitoring at the subject landfill, project documentation for each monitoring event will include descriptions of the following areas and activities at a minimum. Specific discussions pertaining to items listed below are provided in preceding sections of this work plan.

- The location where decontamination of sampling equipment is to be performed, the method, solvents, and purity of water used for decontamination purposes, and the method and storage location for purged ground water generated as a result of sampling activities.
- Sample management procedures including the container types, volume of samples, preservatives, labeling, holding times, chain-of-custody documentation, and shipping methods
- Field equipment and instrumentation used in the field including calibration and maintenance procedures.
- Sample collection information including the names of field personnel, sample numbers, dates and times, climatic conditions, and documentation QC samples including trip and equipment blanks, and duplicate samples.

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Laboratory QA/QC procedures will be established and followed for the analyses of samples from the subject landfill in order to reduce the frequency of random and systematic errors and maintain such errors within tolerable limits. As referenced in Section 1.0 of this plan, the contract analytical laboratory will provide an LSOP for TNRCC review prior to the implementation of the background monitoring program in partial fulfillment of QA/QC requirements. The LSOP will describe a detailed program of how the laboratory will proceed to provide data of stated quality with stated probability of being correct including all procedures to handle and analyze samples from receipt until results are reported. At a minimum, the laboratory QA/QC program described in the LSOP will address the following items:

- Procedures will be in place for demonstrating proficiency with each analytical method used in the laboratory including documentation of precision, bias, methods and frequency of the determinations of method detection limits (MDLs), checks on reagent purity and glassware purity, and checks on spike and surrogate recoveries.
- The laboratory will have methods in place for establishing control limits for analysis, documenting the effect of the matrix on analytical results, and reviewing, approving, and revising laboratory records.
- The laboratory will maintain equipment records documenting the frequency of equipment maintenance, standards used, calibration history, and verification of all working standards against appropriate primary grade standards.

- The laboratory will maintain records including descriptions of samples received, steps of sample handling, assigned personnel responsibilities, chain-of-custody, and reagents used and date of purchase.
- The laboratory will maintain in permanent records the raw data and calculated results for all QC, field samples, and standards.

13.1 Trip Blanks

Trip blanks are used to determine whether sample bottles or collected samples may have been contaminated before or during sampling, or whether sample shipment, handling and storage may have had an impact on sample integrity. Trip blanks, supplied by the contract laboratory containing laboratory-grade distilled water, will be prepared and sent from and to the laboratory in the same manner as actual ground water samples. One properly preserved trip blank will accompany sampling personnel into the field during each sampling event and subsequently analyzed for parameters specified in ***Table II.2***.

13.2 Field Blanks

Field blanks are used to check sampling procedures and evaluate potential airborne contaminants. Field blanks will be prepared by sampling personnel in the field by placing laboratory-grade distilled water, supplied by the contract laboratory, into clean sample containers. Pending the initial determination of ground water gradient at the site, field blanks will be collected when sampling downgradient wells. At a minimum, one field blank per day or per every 10 wells, whichever is greater, will be collected and analyzed for parameters listed in ***Table II.2*** for each monitoring event.

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13.3 Equipment Blanks

Equipment blanks are used to check the effectiveness of decontamination procedures for sampling equipment. Equipment blanks will be prepared by sampling personnel by processing laboratory-grade distilled water trough the sampling equipment (i.e. bailer or pump) in the same manner as the actual ground water samples obtained from site monitoring wells. One equipment blank per day will be collected and analyzed for parameters listed in ***Table II.2*** during each monitoring event.

13.4 Field Duplicates

Field duplicates will be collected in order to check the precision of laboratory techniques. Duplicates will be prepared by collecting two ground water samples from the same well, preferably from the same bailer, but labeled differently, so that the analytical laboratory is unaware that the samples are duplicate. One field duplicate will be collected per 10 wells sampled, or per sampling event for fewer than 10 wells and analyzed for parameters listed in ***Tables II.2 and II.3*** of this plan.

14.0 Statistical Methods

Pursuant to *30 TAC §330.233*, statistical treatment of analytical data is required as part of the ground water sampling and analyses plan. The purpose of the statistical evaluation of ground water data is to determine whether "there is evidence of a SSC from background values for

each detection/monitoring constituent required as part of the ground water monitoring program". As discussed in *RG-74*, the rules provide for the use of a wide variety of statistical methods but require that the method chosen for a constituent be appropriate for the constituent, for the data available, and for the site. It is crucial to select appropriate statistical methods for a variety of reasons: the necessity of being able to detect a release from the subject landfill in a timely way, the ability to evaluate data clearly and quickly, and the intent to detect SSCs that may indicate contamination.

Appropriate statistical methods cannot be chosen in advance of sampling as specific methods depend upon the distribution of data although it is possible to establish guidelines for the application of statistical methods to analytical data prior to sampling. Therefore, a general discussion pertaining to the application of statistical methods to background and detection monitoring is presented in Section 4.1 of this plan. Information provided in Section 4.1 is based to a large extent upon recommendations set forth in the following publications:

- American Society for Testing and Materials (ASTM), 1998; *Standard Guide for Developing Appropriate Statistical Approaches for Ground Water Detection Monitoring Programs, (Designation: D 6312-98).*
- EPA, Office of Solid Waste, Waste Management Division, 1989; *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance, April 1989.*
- EPA, Office of Solid Waste, Waste Management Division, 1992; *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Draft Addendum to Interim Final Guidance, July 1992.*

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Subsequent to the completion of background monitoring, a plan outlining the statistical approach to be applied to background and detection monitoring data will be submitted to the TNRCC. The statistical plan will compliment the GWSAP, utilize site specific analytical data, and present a more detailed approach than described herein.

14.1 Statistical Comparisons

As discussed in *RG-74*, three types of statistical comparisons are possible at a site with more than one monitoring well for background and detection monitoring: (1) the current data for a well may be compared to the historical data for that same well (intrawell comparison); (2) one downgradient well may be compared to one or a group of upgradient wells (interwell comparison); and (3) a variation of the second type, a group of downgradient wells may be compared to a group of upgradient wells. In the event that a SSC is detected and assessment monitoring conducted, a fourth type of statistical comparison may be employed involving the comparison of well data to a constant limit such as a maximum concentration limit (MCL).

As discussed in *RG-74*, a serious difficulty associated with the comparison of downgradient water quality with upgradient water quality is the underlying assumption that the two sets of data are from water that has everywhere had an identical history. This assumption would imply that the upgradient and downgradient water would have the same infiltration time, period of contact with water-bearing sediments, chemical reactions with passing constituents, and no other

significant differences from one part of the water-bearing zone to another. Although such assumptions are often necessary to make comparisons, they are generally not realistic with regard to natural ground water systems.

Therefore, based upon recommendations set forth in *RG-74* and the above-referenced ASTM publication *D 6312-98*, intrawell comparisons, involving the comparison of current data from a well with historical data from the same well, may be better suited to the treatment of data generated at the subject landfill. Intrawell comparisons are generally preferable to their interwell counterparts because they completely eliminate the spatial component of variability in samples. Due to the absence of spatial variability, the uncertainty associated with measured concentrations is decreased, making intrawell comparisons more sensitive to real releases (that is, false statistical negatives), and false positives. For sites where the hydraulic gradient is indefinite, the intrawell comparison is probably the most useful treatment of ground water sampling data. As per the above discussion, it is anticipated that intrawell comparisons will be applied to sampling data generated at the subject landfill following the completion of eight background monitoring events.

Flow charts can be valuable tools, aiding in the selection of appropriate statistical methods. As set forth in *RG-74*, it is recommended that a flow chart depicting methods likely to be used along with decision points or basis for making selections be included in the GWSAP. It is anticipated that this format will allow for future flexibility contingent upon analytical data and minimize potential future changes to this plan. A generalized flow chart depicting the conceptual development of the statistical detection monitoring plan for the subject landfill is provided as ***Figure II.2*** of this plan. Information provided in the referenced figure was adapted from the example provided in ASTM publication *D 6312-98*.

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Detailed descriptions of the selected statistical comparison method(s), decision points, and specific statistical treatments presented in the attached flow chart will be provided to the TNRCC in a statistical plan subsequent to the completion of background monitoring. Descriptions of specific methods presented in the statistical plan will include appropriate information pertaining to normality of data, statistical intervals, and the handling on non-detects. A description of graphical methods to be applied to monitoring data will additionally be discussed in the statistical plan.

14.2 Independent Samples

Statistical methods generally used in ground water monitoring require that data be statistically independent for the results to be strictly valid. The sampling frequency must be established such that sufficient elapsed time occurs between monitoring events ensuring that consecutive samples are not taken from the "same" water. In general, the more permeable the water-bearing zone and the steeper the hydraulic gradient, the less time is necessary between monitoring events to facilitate the collection of statistically independent samples.

As discussed briefly in Section 8.0 of this plan, it is anticipated that background monitoring events will be conducted quarterly for a duration of two years in order to construct a background database consisting of eight statistically independent samples per well. In order to confirm the adequacy of a quarterly monitoring program, site-specific lithologic and depth-to-water

information including measurements/estimations of effective porosity, ground water gradient, and hydraulic conductivity will be used to calculate the horizontal ground water flow velocity according to the procedure described in *RG-74*. Given the diameter of site monitoring wells, it will be possible to determine whether flow velocities are such that water within the well casing will completely change within the three-month duration between monitoring events.

In the event that the site-specific determination of ground water flow velocity indicates that an alternate monitoring frequency is warranted (i.e. semi-annual as opposed to quarterly), a revised frequency will be proposed to the TNRCC for remaining background and detection monitoring events as a permit modification request.

14.3 Seasonal Variation

Seasonal variation of ground water chemistry is well known in the state of Texas. Determination of seasonal influences requires adequate data, that is, data collected over a full range of seasons, in order to make proper adjustments. Therefore, as described in section 8.0 of this plan, a total of eight background sampling event will be conducted quarterly over a duration of two years in order to obtain data that reflects seasonal variations in ground water chemistry. By incorporating such data into the background monitoring database, it is anticipated that seasonal influences on the statistical treatment of data collected during detection monitoring events can be minimized.

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15.0 Reporting and Submittals

As stipulated in *RG-74*, analytical results for background and detection monitoring events will be submitted to the TNRCC within 45 days of respective events. Monitoring event submittals will consist of a narrative description of site conditions and analytical results, appropriate graphical illustrations and tables, and the completed 4-page *Ground-Water Sampling Report (TNRCC-0312)* form (see ***Appendix II.3)*** or other format designated by the TNRCC. It is anticipated that the text discussion of monitoring results will include the results of statistical analysis of well data pursuant to the approved statistical plan.

The submittal package will additionally contain the signed laboratory report of analysis, appropriate laboratory QA/QC data, and copies of associated chain-of-custody documentation. As described in Section 9.0, if PQL's greater than those presented in *Attachment C* are reported by the contract laboratory for any of the specified constituents, any quantifiable amount below the PQL will be flagged to indicate that the compound is present but below the PQL. In these instances, documentation regarding the two lowest calibration points and MDL for the flagged compounds will accompany the analytical results. Each submittal package (including the cover letter) will be produced in triplicate, including one original and two copies.

If it is determined that a SSC has occurred from background of any tested constituent, the TNRCC will be notified in writing within 60 days of the sampling event. A description of the statistical data used to make the determination will be provided with the notification in order to facilitate a TNRCC review of data and statistical procedures. In the event that a SSC has occurred and it is believed that the change resulted from a source other than the MSWLF unit, evidence to support this view will be provided. Pending a review of laboratory analytical

methods and results, statistical methods and results, and re-sampling of monitoring wells if necessary, information demonstrating the basis for the SSC will be submitted to the TNRCC within 90 days of the notification that a SSC has occurred.

In the event that it is not possible to substantiate the basis of statistical change in monitoring data, an appropriate assessment monitoring program will be initiated within 90 days of the notification of the SSC. As stipulated in *RG-74*, TNRCC approval of the assessment monitoring program will be obtained prior to implementation.

16.0 Health and Safety

Pursuant to *30 TAC §330.156*, a site-specific health and safety plan will be maintained independent of GWSAP due to the potential changes and updates of information such as emergency contacts and telephone numbers. This plan will include a summary of work tasks, site conditions, parties involved, and assigned responsibilities. The plan will describe emergency communications and response procedures with emphasis on the types of potential and existing hazards, exposure routes, MSDS information, escape routes, personal protective equipment, first aid, and routes to the nearest hospital. A general site location map and detailed facility map will be included as part of the health and safety plan.
In summary, the permittee and/or subcontractors performing functions specific to activities associated with, and identified in the GWSAP, will establish and implement, and maintain appropriate health and safety plans.

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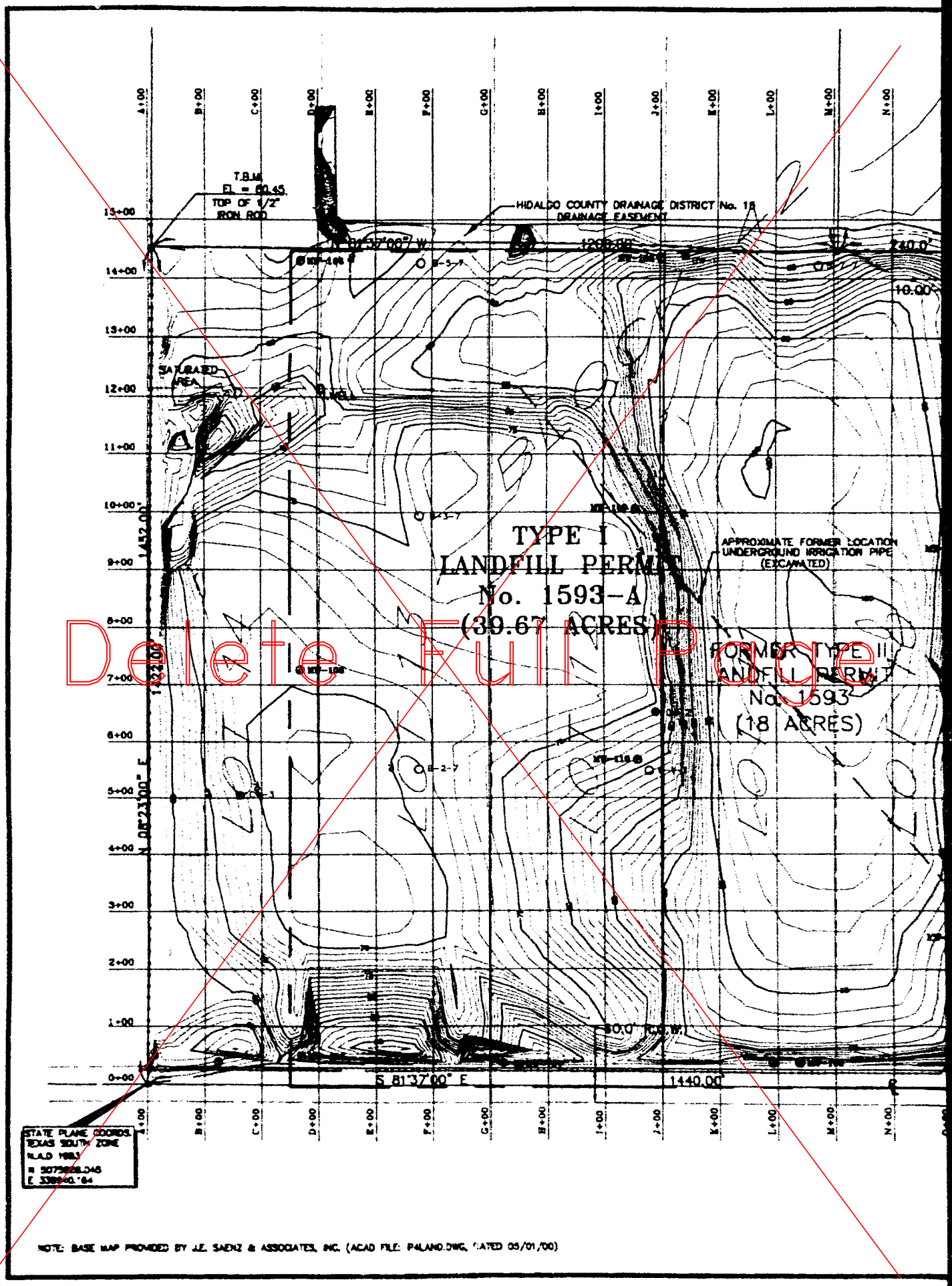
FIGURES



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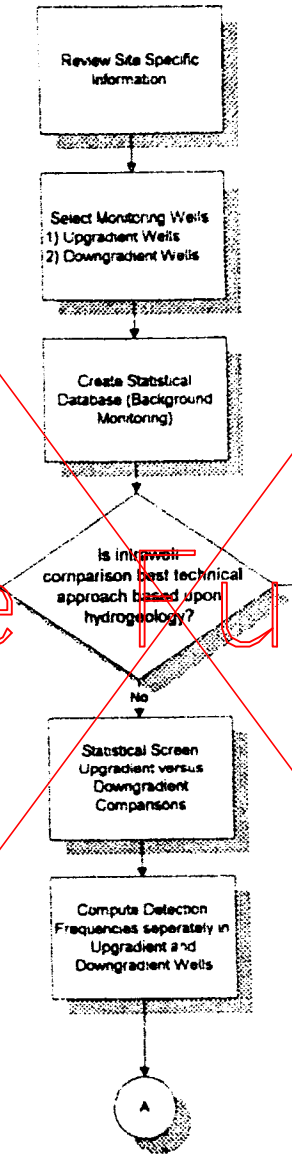
NOTE: BASE MAP PROVIDED BY J.E. SAENZ & ASSOCIATES, INC. (ACAD FILE: P4LAND.DWG, DATED 05/01/00)

Attachment II-4
Development of a Statistical Detection Monitoring Plan
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A



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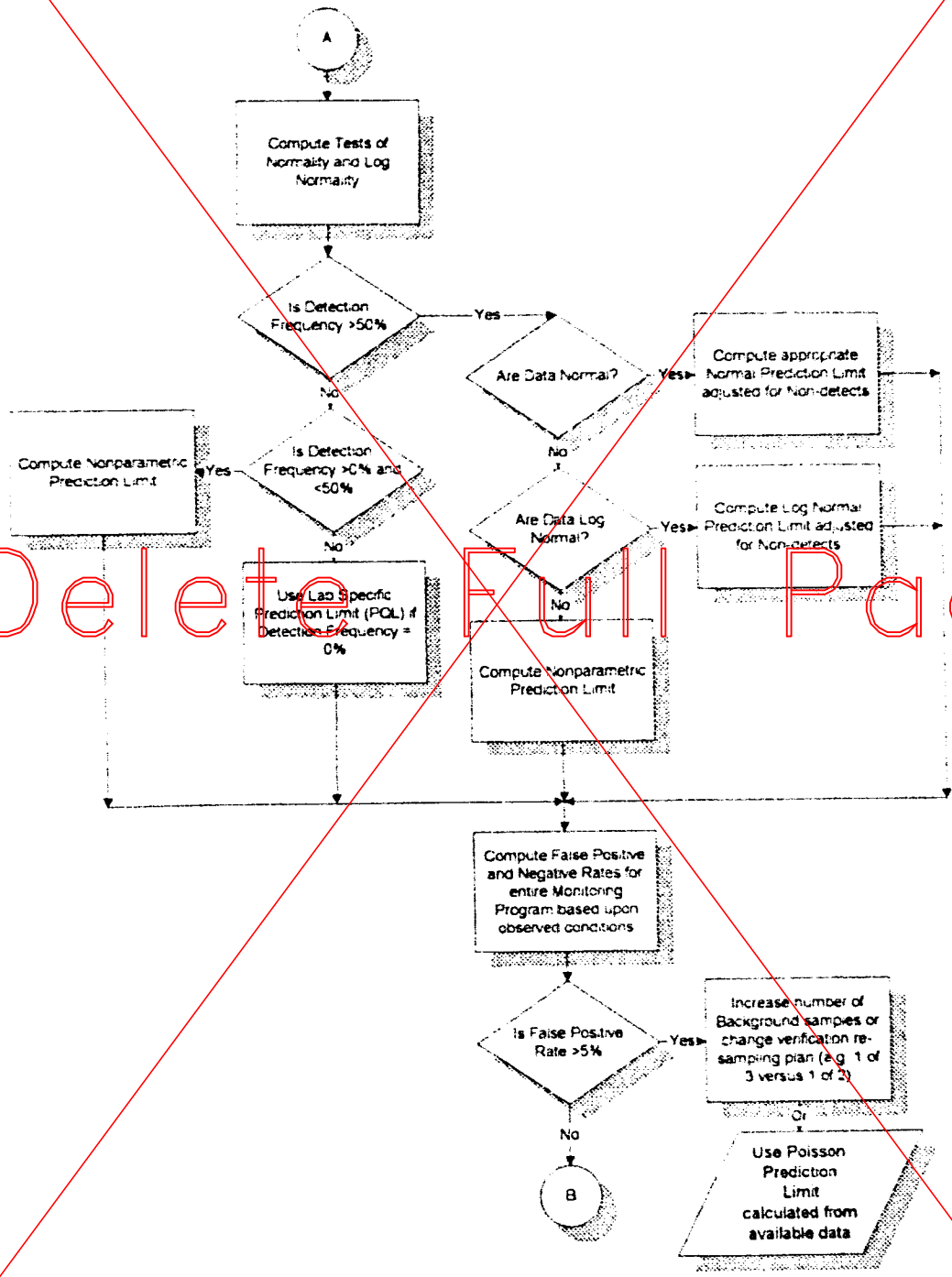
* Figure II.2 was adapted from: ***American Society for Testing and Materials (ASTM), 1998; Standard Guide for Developing Appropriate Statistical Approaches For Ground-Water Detection Monitoring Programs, (Designation: D 6312-98).***

Attachment II-4 (Continued)
Development of a Statistical Detection Monitoring Plan
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A



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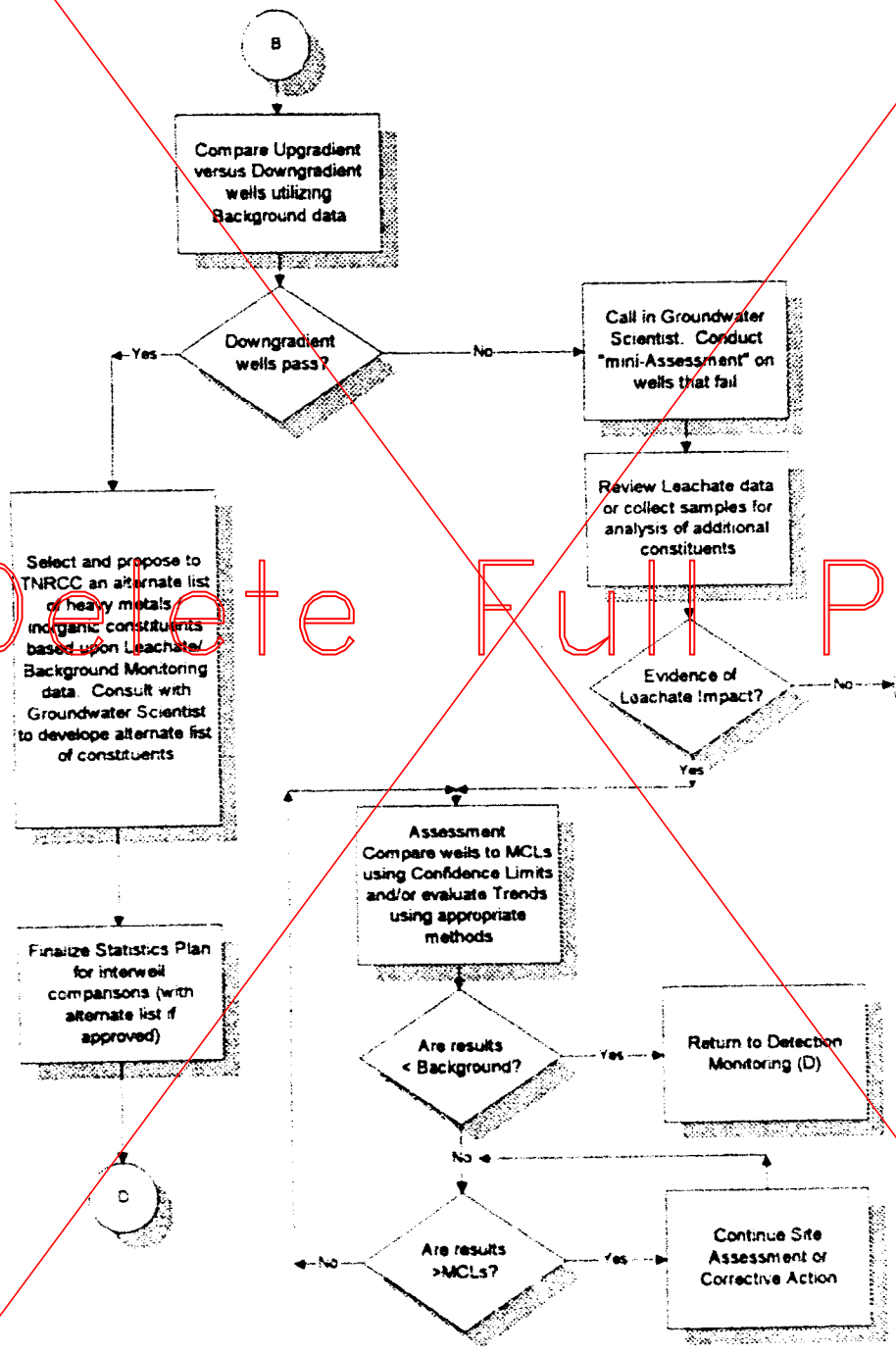
Attachment II-4 (Continued)
Development of a Statistical Detection Monitoring Plan
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A



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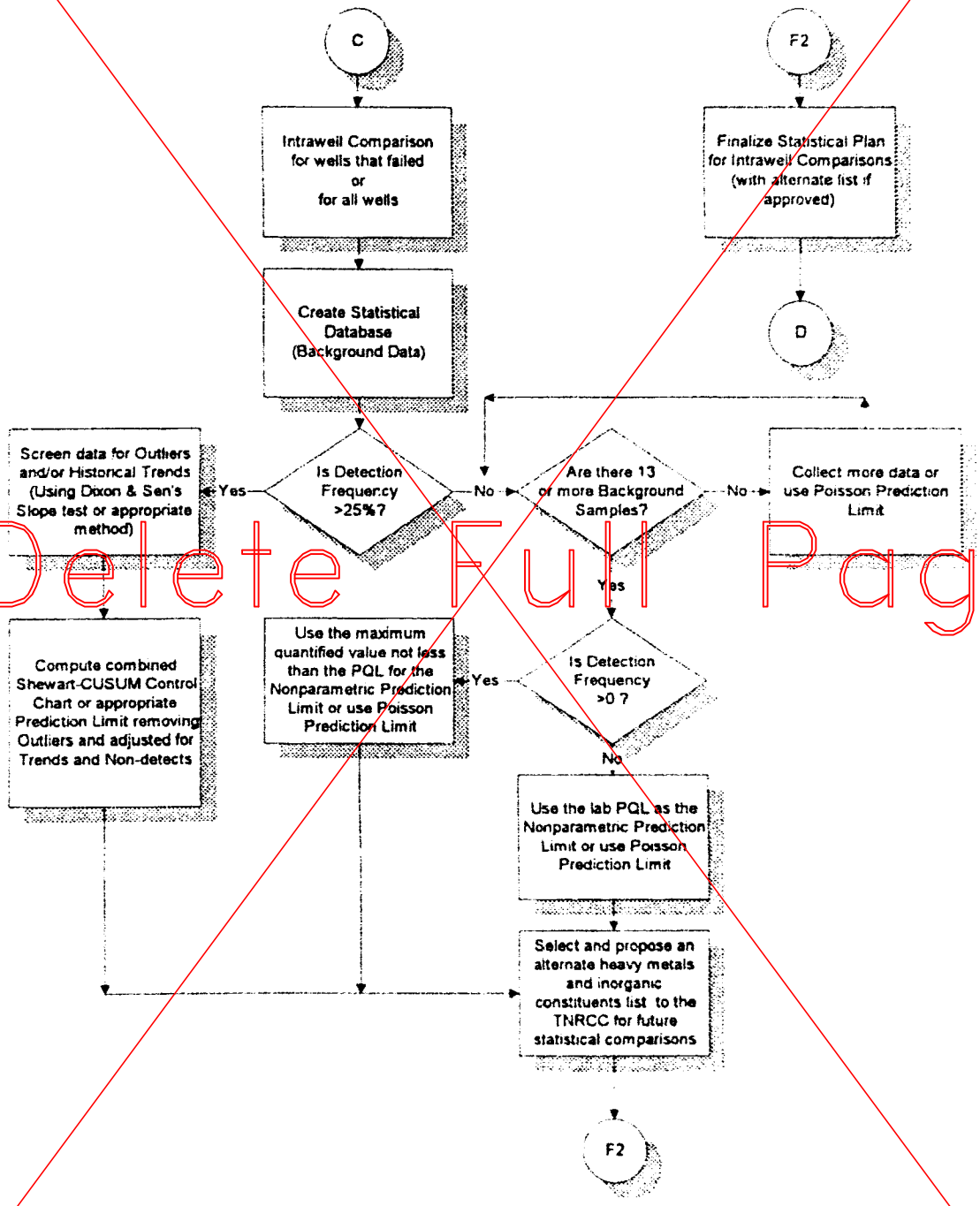
Project No. ASF00-065-00
Figure II.2 (Cont'd)

Attachment II-4 (Continued)
Development of a Statistical Detection Monitoring Plan
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A



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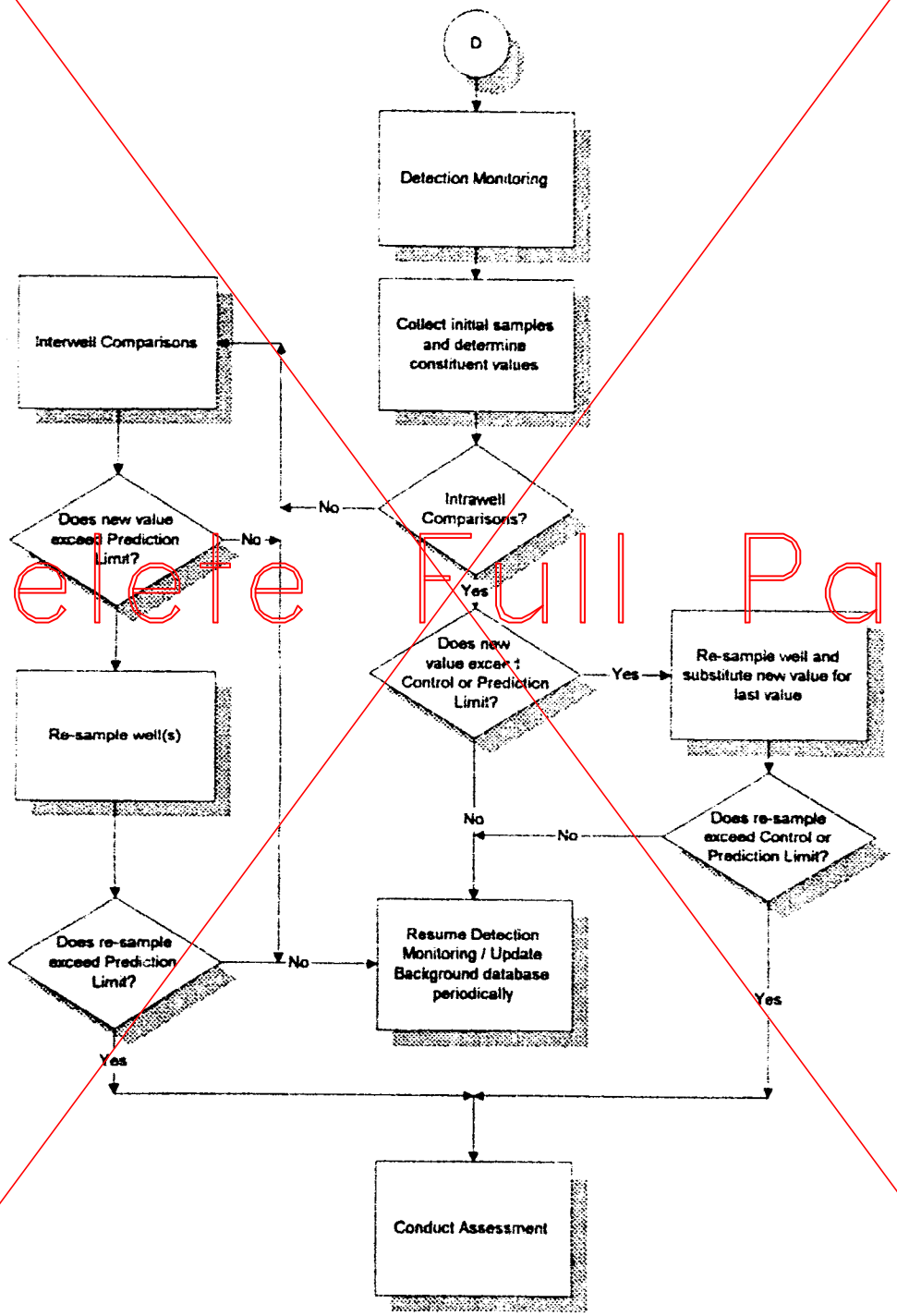
Attachment II-4 (Continued)
Development of a Statistical Detection Monitoring Plan
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A



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TABLES

Table II-1
Sampling, Preservation, and Storage Procedures for Ground Water Monitoring
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A

Parameter	Recommended Containers	Preservation	Maximum Holding Time	Minimum Volume
PH	P, G	None	Analyze immediately	25 ml
Spec. Conductivity	P, G	None	Analyze immediately	100 ml
Temperature	P, G	None	Analyze immediately	1 Liter
Heavy Metals (includes iron and manganese)	P	*Acidify w/ HNO_3 to pH<2, 4° C	6 months, except 28 days for Hg	1 Liter
Calcium, Magnesium, Sodium, Potassium, Fluoride, Sulfate, Chloride, and Hardness	P, G	4° C	28 days	1 Liter
TDS (may be included with above parameters)	P, G	4° C	7 days	1 Liter
Nitrate	P, G	4° C	48 hours	100 ml
Ammonia	P, G	4° C; Acidify w/ H_2SO_4 to pH<2, 4° C	7 days; 28 days if acidified	500 ml
Alkalinity	P, G	4° C	48 hours	200 ml
NPOC	G amber, T-lined caps	4° C; Acidify w/ HCL to pH<2, 4° C	48 hours; 28 days if acidified	100 ml / replicate
COD	P, G	4° C; Acidify w/ H_2SO_4 to pH<2, 4° C	48 hours; 28 days if acidified	100 ml
SVOC	G, T-lined caps	4° C	7 days until extraction, then analyze in 40 days	1 Liter
BOD	P, G	4° C	24 hours	1 Liter
VOC	G, T-lined septa	Acidify w/ HCL to pH<2, 4° C	14 days	2 x 40 ml

P=Polyethylene, G=Glass, T=Teflon.
* If analyzing for dissolved metals, filter in the field prior to acidifying.

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Table II.2
Organic/Metals Constituents to be Monitored During Background/Detection Sampling
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A

Organic Constituents			Metals Constituents	
		CAS No.		
(1)	acetone	67-64-1	(1)	antimony (dissolved)
(2)	acrylonitrile	107-13-1	(2)	arsenic (dissolved)
(3)	benzene	71-43-2	(3)	barium (dissolved)
(4)	bromochloromethane	74-97-5	(4)	beryllium (dissolved)
(5)	bromodichloromethane	75-27-4	(5)	cadmium (dissolved)
(6)	bromoform (tribromomethane)	75-25-2	(6)	chromium (dissolved)
(7)	carbon disulfide	75-15-0	(7)	cobalt (dissolved)
(8)	carbon tetrachloride	56-23-5	(8)	copper (dissolved)
(9)	chlorobenzene	108-90-7	(9)	lead (dissolved)
(10)	chloroethane (ethyl chloride)	75-00-3	(10)	nickel (dissolved)
(11)	chloroform (trichloromethane)	67-66-3	(11)	selenium (dissolved)
(12)	dibromochloromethane (chlorodibromomethane)	124-48-1	(12)	silver(dissolved)
(13)	1,2-dibromo-3-chloropropane (DBCP)	96-12-8	(13)	thallium (dissolved)
(14)	1,2-dibromoethane (ethylene dibromide, EDB)	106-93-4	(14)	vanadium (dissolved)
(15)	o-dichlorobenzene (1,2-dichlorobenzene)	95-50-1	(15)	zinc (dissolved)
(16)	p-dichlorobenzene (1,4-dichlorobenzene)	106-46-7		
(17)	trans-1,4-dichloro-2-butene	110-57-6		
(18)	1,1-dichloroethane (ethylidene chloride)	75-34-3		
(19)	1,2-dichloroethane (ethylene dichloride)	107-06-2		
(20)	1,1-dichloroethylene (1,1-dichloroethene)	75-35-4		
(21)	cis-1,2-dichloroethylene (cis-1,2-dichloroethene)	156-59-2		
(22)	trans-1,2-dichloroethylene (trans-1,2-dichloroethene)	156-60-5		
(23)	1,2-dichloropropane (propylene dichloride)	78-87-5		
(24)	cis-1,3-dichloropropene	10061-01-5		
(25)	trans-1,3-dichloropropene	10061-02-6		
(26)	ethylbenzene	100-41-4		
(27)	2-hexanone (methyl butyl ketone)	591-78-6		
(28)	methyl bromide (bromomethane)	74-83-9		
(29)	methyl chloride (chloromethane)	74-87-3		
(30)	methylene bromide (dibromomethane)	74-95-3		
(31)	methylene chloride (dichloromethane)	75-09-2		
(32)	methyl ethyl ketone (MEK, 2-butanone)	78-93-3		
(33)	methyl iodide (iodomethane)	74-88-4		
(34)	4-methyl-2-pentanone (methyl isobutyl ketone)	108-10-1		
(35)	styrene	100-42-5		
(36)	1,1,1,2-tetrachloroethane	630-20-6		
(37)	1,1,2,2-tetrachloroethane	79-34-5		
(38)	tetrachloroethylene (tetrachloroethene)	127-18-4		
(39)	toluene	108-88-3		
(40)	1,1,1-trichloroethane (methylchloroform)	71-55-6		
(41)	1,1,2-trichloroethane	79-00-5		
(42)	trichloroethylene (trichloroethene)	79-01-6		
(43)	trichlorofluoromethane (CFC-11)	75-69-4		
(44)	1,2,3-trichloropropane	96-18-4		
(45)	vinyl acetate	108-05-4		
(46)	vinyl chloride	75-01-4		
(47)	xylenes (total)	1330-20-7		

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Table II.3
Inorganic Constituents to be Monitored During Background/Detection Sampling
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A

Inorganic Constituents			
(1)	calcium (dissolved)	(8)	iron (dissolved)
(2)	magnesium (dissolved)	(9)	manganese (dissolved)
(3)	sodium (dissolved)	(*10)	alkalinity
(4)	potassium (dissolved)	(**)	total dissolved solids (TDS)
(5)	chloride	(12)	specific conductance (field & lab)
(6)	sulfate	(13)	pH (field & lab)
(7)	ammonia		

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Table II.4
Analytical Parameters for Organic Constituents
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A

	Organic Constituents	*LABORATORY SPECIFIC PARAMETERS			RECOMMENDED PQLs *(RG-74, Attachment C)*
		Analytical Method	MDL (µg/L)	PQL (µg/L)	PQL (µg/L)
(1)	acetone	8260B/624	2.54	7.62	<10
(2)	acrylonitrile	8260B/624	4.14	12.42	<10
(3)	benzene	8260B/624	0.40	1.20	<2
(4)	bromochloromethane	8260B/624	0.41	1.23	<2
(5)	bromodichloromethane	8260B/624	0.29	0.87	<2
(6)	bromoform (tribromomethane)	8260B/624	0.36	1.08	<2
(7)	carbon disulfide	8260B/624	1.00	3.00	<2
(8)	carbon tetrachloride	8260B/624	0.30	0.90	<2
(9)	chlorobenzene	8260B/624	0.34	1.02	<2
(10)	chloroethane (ethyl chloride)	8260B/624	0.37	1.11	<5
(11)	chloroform (trichloromethane)	8260B/624	0.39	1.17	<2
(12)	dibromochloromethane (chlorodibromomethane)	8260B/624	0.30	0.90	<2
(13)	1,2-dibromo-3-chloropropane (DBCP)	8260B/624	0.27	0.80	<2
(14)	1,2-dibromoethane (ethylene dibromide, EDB)	8260B/624	0.35	1.05	<2
(15)	o-dichlorobenzene (1,2-dichlorobenzene)	8260B/624	0.30	0.90	<2
(16)	p-dichlorobenzene (1,4-dichlorobenzene)	8260B/624	0.27	0.80	<2
(17)	trans-1,4-dichloro-2-butene	8260B/624	0.52	1.56	<20
(18)	1,1-dichloroethane (ethylidene chloride)	8260B/624	0.39	1.17	<2
(19)	1,2-dichloroethane (ethylene dichloride)	8260B/624	0.65	1.95	<2
(20)	1,1-dichloroethylene (1,1-dichloroethene)	8260B/624	0.47	1.41	<2
(21)	cis-1,2-dichloroethylene (cis-1,2-dichloroethene)	8260B/624	0.45	1.35	<2
(22)	trans-1,2-dichloroethylene (trans-1,2-dichloroethene)	8260B/624	0.42	1.26	<2
(23)	1,2-dichloropropane (propylene dichloride)	8260B/624	0.31	0.93	<2
(24)	cis-1,3-dichloropropene	8260B/624	0.63	1.89	<2
(25)	trans-1,3-dichloropropene	8260B/624	0.41	1.23	<2
(26)	ethylbenzene	8260B/624	0.23	0.69	<2
(27)	2-hexanone (methyl butyl ketone)	8260B/624	0.30	0.90	<2
(28)	methyl bromide (bromomethane)	8260B/624	0.40	1.20	<5
(29)	methyl chloride (chloromethane)	8260B/624	0.29	0.87	<5
(30)	methylene bromide (dibromomethane)	8260B/624	0.55	1.65	<2
(31)	methylene chloride (dichloromethane)	8260B/624	0.67	2.01	<2
(32)	methyl ethyl ketone (MEK, 2-butanone)	8260B/624	1.95	5.85	<10
(33)	methyl iodide (iodomethane)	8260B/624	0.33	0.99	<2
(34)	4-methyl-2-pentanone (methyl isobutyl ketone)	8260B/624	0.69	2.07	<2
(35)	styrene	8230B/624	0.45	1.35	<2
(36)	1,1,1,2-tetrachloroethane	8260B/624	0.33	0.99	<2
(37)	1,1,2,2-tetrachloroethane	8260B/624	0.82	2.46	<2
(38)	tetrachloroethylene (tetrachloroethene)	8260B/624	1.54	4.62	<2
(39)	toluene	8260B/624	0.32	0.96	<2
(40)	1,1,1-trichloroethane (methylchloroform)	8260B/624	0.37	1.11	<2
(41)	1,1,2-trichloroethane	8260B/624	0.36	1.08	<2
(42)	trichloroethylene (trichloroethene)	8260B/624	0.55	1.65	<2
(43)	trichlorofluoromethane (CFC-11)	8260B/624	0.56	1.68	<2
(44)	1,2,3-trichloropropane	8260B/624	1.43	4.29	<2
(45)	vinyl acetate	8260B/624	0.75	2.25	<10
(46)	vinyl chloride	8260B/624	0.68	2.04	<2
(47)	xylenes (total)	8260B/624	0.75	2.25	<6

* Laboratory-Specific Parameters are presented in accordance with most recent quality assurance data provided by Severn-Trent Laboratories, Inc (STL)

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Table II.5
Analytical Parameters for Metals and Inorganic Constituents
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A

		*LABORATORY SPECIFIC PARAMETERS			DRINKING WATER STANDARDS (MCLs) *(as per RG-74)*
	Metals Constituents	**Analytical Method**	**MDL (µg/L)**	**PQL (µg/L)**	**MCL (µg/L)**
(1)	antimony (dissolved)	6010B/200.7	0.944	2.832	6
(2)	arsenic (dissolved)	6010B/200.7	2.101	6.303	50
(3)	barium (dissolved)	6010B/200.7	0.511	2.555	2,000
(4)	beryllium (dissolved)	6010B/200.7	0.124	3.321	4
(5)	cadmium (dissolved)	6010B/200.7	0.393	1.179	5
(6)	chromium (dissolved)	6010B/200.7	0.409	1.227	100
(7)	cobalt (dissolved)	6010B/200.7	0.506	1.518	*Not Listed*
(8)	copper (dissolved)	6010B/200.7	1.220	3.660	1,000
(9)	lead (dissolved)	6010B/200.7	1.465	7.325	*Not Listed*
(10)	nickel (dissolved)	6010B/200.7	0.517	1.551	100
(11)	selenium (dissolved)	6010B/200.7	3.172	9.516	50
(12)	silver(dissolved)	6010B/200.7	0.591	1.773	100
(13)	thallium (dissolved)	6010B/200.7	1.957	5.871	2
(14)	vanadium (dissolved)	6010B/200.7	0.502	1.506	*Not Listed*
(15)	zinc (dissolved)	6010B/200.7	0.729	2.187	5,000
	Inorganic Constituents	**Analytical Method**	**MDL (µg/L)**	**PQL (µg/L)**	**PQL (µg/L)**
(1)	calcium (dissolved)	6010B/200.7	21.66	64.98	*Not Listed*
(2)	magnesium (dissolved)	6010B/200.7	4.052	12.16	*Not Listed*
(3)	sodium (dissolved)	6010B/200.7	7.661	22.98	*Not Listed*
(4)	potassium (dissolved)	6010B/200.7	7.556	22.67	*Not Listed*
(5)	chloride	325.2	**	5,000	300,000
(6)	sulfate	375.4	669	2,006	300,000
(7)	ammonia	350.3	37	112	*Not Listed*
(8)	iron (dissolved)	6010B/200.7	5.724	17.17	300
(9)	manganese (dissolved)	6010B/200.7	4.302	12.91	50
(10)	alkalinity (total)	310.1	736	2,208	*Not Listed*
(11)	total dissolved solids (TDS)	160.1	**	10,000	*1,000,000*
(12)	specific conductance (field & lab)	160.1	***	1 µmho/cm	*Not Listed*
(13)	pH (field & lab)	150.1	***	0.1 pH units	7.0

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* Laboratory-Specific Parameters are presented in accordance with most recent quality assurance data provided by Severn-Trent Laboratories, Inc. (STL).

** Reporting Limits per the Method

*** Reporting Limits per the Instrument

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APPENDICES

WELL INSPECTION AND SAMPLING (WIS) FORM
Hidalgo County Precinct No. 4 Landfill
MSW Permit No. 1593A

WELL	METHANE CONC. (%LEL)	TOTAL DEPTH (FT)	DEPTH TO WATER/PSH (FT)	WATER COLMN. (FT)	CONVERS. FACTOR (GAL/FT)	WELL VOL. (GAL)	DEVELOP/ PURGE (GAL)	VOLUME REMOVED (GAL)	PURGE RATE (GAL/MIN)	PURGE TIME (MIN)	pH	CONDUCT. (mS)	TURB. (NU)	TEMP. (F / C)	SAMPLE TIME	COMMENTS (Odors, Sheen, PSH, Turbidity, Well Inspection)

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DESCRIBE THE DISPOSITION, AMOUNT, AND LOCATION OF PURGED WATER AND ANY OTHER COMMENTS:

WELL VOLUME DETERMINATION	
CASING DIAMETER (INCHES)	CONVERSION FACTOR FOR WELL VOLUME (GAL/FT)
2	0.16
4	0.66
6	1.47
8	2.61
12	5.88

WV = H X CF; where

WV = Well Volume (gal)
H = Height of the water column (ft)
CF = Conversion factor (gal/ft)

ATTACHMENT 4

Unmarked Revised Pages

HIDALGO COUNTY PRECINCT 4
TYPE I LANDFILL
HIDALGO COUNTY, TEXAS
MSW PERMIT NO. 1593-A

GROUNDWATER SAMPLING AND ANALYSIS PLAN

Applicant:

Hidalgo County, Precinct 4
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Edinburg, Texas 78542
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Previous Edition Date: August 31, 2000

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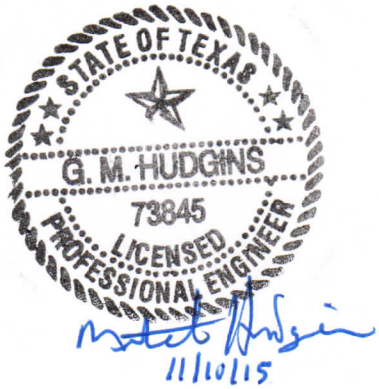

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Laboratory Review Checklist

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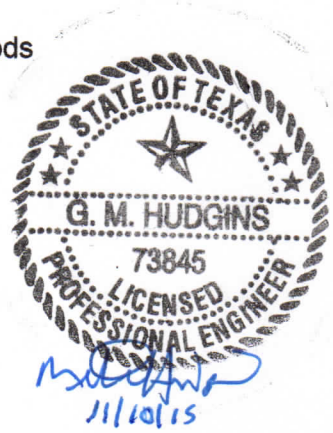

1.0 INTRODUCTION

This plan is prepared to meet the requirements in Title 30 of the Texas Administrative Code (TAC), Chapter 330. Subchapter J, Section 405. This section requires that the owners or operators of Municipal Solid Waste Landfills (MSWLFs) prepare and submit a Ground-Water Sampling and Analysis Plan (GWSAP) to the Texas Commission on Environmental Quality (TCEQ). The purpose of this document is to satisfy the requirements of the above listed regulations as they pertain to the Hidalgo County, Precinct 4 (HCPCT4) closed landfill (MSW Permit No. 1593-A) and provide groundwater sampling procedures, frequencies, analytical parameters, monitoring data evaluation, and reporting requirements.

In accordance with TCEQ regulations, this GWSAP contains the procedures and techniques to be used to establish Background Groundwater Quality and conduct Detection Monitoring and when necessary, Assessment Monitoring and Corrective Action in accordance with 30 TAC § 330.405 through 415.

1.1 Facility Description

The HCPCT4 closed landfill is located north of the City of Edinburg, approximately 3.1 miles east of U.S. Highway 281 on Davis Road in Hidalgo County, Texas. The closed landfill includes an area of approximately 18 acres. The total permitted property is approximately 29.7 acres.

2.0 HEALTH AND SAFETY

Personnel performing water level measurements, well purging, or sampling, at a minimum, will wear latex or nitrile gloves. The gloves will be changed when they become damaged and when activities begin at a different well location. All personnel that are associated with the purging and sample collections from monitor wells will wear other appropriate PPE such as eye protection, chemical resistant clothing and/or aprons, and air purifying respirators, as necessary.

3.0 GROUNDWATER SAMPLING FREQUENCY

3.1 Background Water Quality Sampling

At least eight (8) statistically independent background groundwater samples will be obtained prior to commencing with Detection Monitoring for each groundwater monitor well at the facility. A minimum of 90 days will be provided between background monitoring events to allow the collection of groundwater data over the different seasons of the year. At least two events will be conducted per year.

3.2 Detection Monitoring Sampling

After establishment of the background groundwater quality, detection monitoring will be performed on a semi-annual basis at approximately 6-month intervals during the remaining operational life and post-closure care period. Detection monitoring will begin 6 months after completion of the background groundwater-quality sampling.

4.0 GROUNDWATER ANALYTICAL PARAMETERS

The sampling parameters for both background groundwater quality and detection monitoring sampling and the analytical methods to be used are included in Appendix A. In accordance with 30 TAC § 330.419 the sampling parameters consists of the constituents listed in Appendix I of 40 CFR Part 258. The monitoring wells will also be sampled for the water quality parameters, including pH, temperature, and conductivity. Water quality parameters will not be included in the statistical analyses.

At the conclusion of the background groundwater-sampling period, all the detection monitoring constituents will be thoroughly reviewed. At the conclusion of this review, the HCPCT4 may request that the Executive Director eliminate subsequent monitoring for those constituents that were consistently below the method detection limits (MDL) throughout this period and are not expected to originate from the MSWLF unit (30 TAC §330.419(b)).

5.0 GROUNDWATER PURGING AND SAMPLING

The following subsections summarize specific tasks involved in the purging and sampling of the groundwater monitoring wells at the facility.

5.1 Well Inspection

Prior to performing any purging or sampling, each monitoring well will be inspected to assess its integrity. The visual inspection will include the well lock, static water level measuring mark, protective steel casing, concrete pad, and monitor well casing for signs of damage by vandalism, animals, heavy equipment, or other causes. The objective of the visual inspection is to confirm that no outside constituents or other conditions exist that may affect the quality of the sampling. All necessary repairs or maintenance that can be accomplished without a TCEQ modification request will be conducted immediately by HCPCT4 and documented on the Field Sampling Data Sheet for that well. If it is determined that the integrity of the well has been, or may have been, compromised the necessary information will be documented and the Executive Director of the TCEQ notified. No additional actions will be taken without the approval of the TCEQ.

The inspection will include monitoring for landfill gas within the upper portion of each well casing. The gas readings will be documented on the Field Data Sheet and/or on the monitoring data sheet used in monitoring of the facility gas probes. The criteria for the maximum gas concentration and actions to be taken if the limiting concentration is exceeded are in cluded in the Landfill Gas Management Plan.

5.2 Equipment Decontamination

All equipment used for water-level measurement, purging, and/or the collection of groundwater samples will be decontaminated prior to use at each well location, unless the equipment is dedicated to a specific well. An appropriate decontamination procedure consists of scrubbing all equipment with a solution of Alconox or equivalent laboratory-grade detergent and deionized, tap, or distilled water, then triple rinsing with deionized or distilled water. Separate containers for each rinsate will be individually set up at each monitor well. At the conclusion of the sampling all the rinsate will be properly disposed with the water generated during purging.

5.3 Water-Level Measurements

Immediately prior to purging a well, the static water level below the top of well casing and the total depth of the well will be measured and recorded in the field logbook. Depth measurements will be to the nearest 0.01 foot (ft). The measurements will generally proceed from the most upgradient to the most downgradient wells. Depth measurements will be taken from the north side, top of the well casing at the "permanent measurement mark" each time a measurement is taken. All measurements will be taken within a 48 hour period to minimize potential temporal variations. Prior to use, the functionality of the water level depth probe will be checked by dipping the probe into deionized or distilled water to see if the alarm sounds at the appropriate time. The depth measurement probe will be decontaminated prior to use in each well. A visual check of the probe's condition and the condition of the tape and handle will be made when the measurements are being taken. Notation will be made of any minor damage or irregularities on the water level measurement device. If the tape appears to be elongated, kinked, or twisted, then the tape will be checked against a functional tape to determine if there are any discrepancies in the measurements. If the tape is determined to be non-functional due to elongation and/or damage, it will be replaced.

Using the surveyed elevation of the Top of Casing (referenced to mean sea level (msl)), depth to water measurements can be converted to water-level elevations by subtracting the depth to static water from Top of Casing (TOC) elevation.

Water-Level Elevation (ft msl) = TOC (ft msl) - Depth to Static Water (ft)

5.4 Instrumentation Calibration

Prior to use, portable field measurement instrumentation used or measuring conductivity and pH will be accurately calibrated on-site according to manufacturer's specifications. The probes will first be decontaminated to remove foreign material that may have accumulated on their components since their previous use. As recommended by the manufacturer, the probe's accuracy should first be verified and adjusted accordingly. Typically, conductivity probes are factory calibrated, but the accuracy should be confirmed in the field with a solution of known conductance, preferably in the range anticipated in the samples. The pH meter will first be standardized in the field by placing its

probe in a neutral reference buffer solution (pH=7), adjusting as necessary, and then rinsed with deionized water. The probe will then be placed in a pH reference buffer solution of either 4 or 10, depending on the pH range anticipated in the samples to be collected, and adjusted accordingly.

Prior to each sampling event, the water depth indicator probe shall be inspected for any damage and for proper operation. In addition, it should be periodically verified for accuracy by a comparison to a calibrated tape.

5.5 Field Sampling Data Sheets and Groundwater Sampling Field Report

A summary of all field activities including date, project name, weather conditions, sampling personnel, purpose of sampling, and site observations will be recorded on the Field Data Sheet. Information from this form will facilitate completion of the Groundwater Sampling Report. All forms can be found in Appendix B.

5.6 Purging/Bailing

Personnel performing water level measurements, well purging, or sampling will wear latex or nitrile gloves. The gloves will be changed when they become damaged and when activities begin at a different well location.

The following procedures will be followed for purging or bailing each monitor well prior to sampling:

- Prior to purging the wells, the volume of water in the well casing will be calculated based on the static water level, well casing diameter, and total depth measurements.

- The area around the well will be set-up to provide an area that will minimize potential contamination from the surroundings. If sampling equipment is to be set down, it should be placed on polyethylene sheeting to prevent contamination.

- The monitor well will be purged of a minimum of three well casing volumes of water using a manual hand bailer; electric or air-operated pump; or disposable or dedicated PVC bailer. The purging will continue until the field parameters of temperature, pH, and

specific conductivity of the water have stabilized or the well is pumped dry. The field parameters of temperature, pH, and specific conductivity will be considered stable when three consecutive field measurements, taken at least 3-5 minutes apart, are within 10% of each reading. When using a pump to purge the well, the pump intake should be located below, but near the static groundwater depth to allow for the collection of all potential types of contaminates that may exist in the groundwater. Non-dedicated pumps (if used) will be completely
decontaminated before using it in another well.

• Purged effluent will be stored, transported, and disposed of appropriately. The purged water removed from each well will be containerized until the results of the analysis are known. If analytical results indicate contaminants are below the Maximum Contaminant Level (MCL) for constituents that have an MCL and below detection limits for constituents without MCL's, then the water may be discharged into the site's storm water management system. If levels of contamination are above the MCL's or detection limits, the water will be managed as leachate and handled in accordance with the facility's leachate management plan.

If required, due to a hazardous classification, the water will be transported and disposed of at a permitted hazardous waste facility.

• Extremely slow recharging wells will be purged dry. The total amount of purged water will be measured and recorded.

The following purging information for each well be noted and recorded on the sampling field logbook:

1. Well number;
2. Well casing diameter;
3. Current outside temperature and weather conditions;
4. Well inspection information;

5. Date and time;

6. Static water level and total depth of well;

7. Height of water column and well casing volume;

8. Purging discharge rate, well purging time, volume of water purged; and

9. In situ water quality measurements (temperature, pH, and specific conductivity);

5.7 Groundwater Static Depth Stabilization

Prior to sample collection, the water surface should be allowed to stabilize, after purging, to within a minimum of ninety percent (90%) of the initial static groundwater depth. This provides for a representative and adequate volume of the aquifer's water to enter the well casing for sampling.

5.8 Well Sampling

Sampling personnel will wear nitrile, latex, or other equivalent non-powdered gloves during sampling to avoid contamination of the samples. Generally, wells should be sampled within 48 hours of purging or when the well has recovered to within 90% of the initial static water level. All sampling will be performed in a manner to minimize the possibility of sample aeration or agitation. Samplinq of wells will proceed from the least contaminated well to the most contaminated well if the degree of contamination is known. If the degree of contamination is unknown, then the sampling will proceed from the most upgradient to the downgradient wells. Precautions for avoidance of dust and exhaust generated by vehicles and sampling equipment should be taken. All sampling equipment and containers will be
protected to prevent cross-contamination of the samples.

Sampling may be conducted using dedicated. or disposable PVC, stainless steel, or Teflon bailers. Additionally, electric or air-operated pumps can also be used if the flow rate can be adjusted to less than 100 ml per minute to minimize turbulence and aeration of the sample during the collection of VOCs.

If hand bailers are used to collect the sample then the bailer will be rinsed once with well water prior to sample collection (first bail is discarded into the purged water containers). The bailer will be slowly lowered into the water to minimize turbulence and aeration of the sample. The bailer will then be slowly withdrawn and removed from the well and the sample containers filled from the bottom of the bailer using an appropriate bailer-discharging device. VOC samples will be obtained from a single bailer volume. The bailer will be equipped with a bottom valve apparatus/spigot to minimize turbulence and aeration of the sample.

The following parameter samples are to be collected from each monitor well in the exact order specified:

- VOCs are to be collected in two 40-milliliter (ml) glass vials that utilize Teflon-lined lids (septa), preserved with HCl, and immediately chilled to four degrees Celsius (4°C). The sampling personnel will minimize the introduction of air bubbles by allowing the water to flow down the inside of the container until a positive meniscus forms. If an air bubble exists after closing the lid, do not attempt to remove it, but collect another sample. For the collection of the VOCs, the pump flow rate will be adjusted to less than 100 ml per minute.

- Metals are to be collected in a high density polyethylene (HDPE) or glass container that is preserved with nitric acid (HNO_3) to a pH < 2, and immediately chilled to four degrees Celsius (4°C).

- Other constituents are to be collected in polyethylene or glass containers, and immediately chilled to four degrees Celsius (4°C) as specified in Appendix A, which details preservation, container type, and holding time requirements.

As each sample container is filled, the sampling time will be recorded on the sampling field log and the container will be labeled with the following information:

- Facility name and/or owner (i.e., HCPCT4);
- Monitoring well name and\or number (i.e., MW-1);

- Sample date and time;
- Preservatives utilized;
- Sampler's signature or initials.

5.9 Low-flow Purging and Sampling

As an alternative to the purging and sampling procedures described in Sections 5.6, 5.7, and 5.8, low-flow purging and sampling methods may be employed. The facility has an approved low-flow demonstration. In the event the facility elects to use low-flow purging and sampling techniques, all procedures and recommendations involved in the approved low-flow demonstration will be followed for sample purging and collection.

5.10 Field Sampling QA/QC

After purging the monitoring wells, samples shall be collected to document that sample collection and handling procedures have not affected the quality of the groundwater samples, QA/QC samples shall be prepared and analyzed as detailed below:

- **Equipment Blank:** Following decontamination of all non-dedicated or disposable sampling equipment, and prior to sample collection, reagent-grade water will be run over the sampling equipment and the rinsate collected in a clean container labeled as an Equipment Blank. A minimum of one equipment blank will be collected each day. This sample will be analyzed for all detection monitoring constituents, to measure the effectiveness of the decontamination procedure in removing contaminants from one sample collection point to another.

- **Field Blank:** A field blank will be prepared in the field by pouring reagent-grade water into empty sample containers. This procedure shall be conducted on the

downwind side of the facility or in another appropriate location that is the most representative of site sampling conditions. A minimum of one field blank will be collected per day. The sample will be analyzed for VOCs only and will verify field sampling procedures and check for the presence of airborne contaminants that may be present at the well site.

- **Trip Blank:** A minimum of one Trip Blank per sampling event and/or number of coolers containing VOC samples (whichever is greater) will be prepared by the laboratory with reagent-grade water, and shall accompany the VOC sample container coolers during site activities, but never opened. This blank will be analyzed for VOCs only to determine if any of the samples and/or containers have become contaminated before, during, or subsequent to the sampling event prior to laboratory analysis.

- **Field Duplicates:** One (1) Field Duplicate will be collected per day. The duplicate samples are prepared by collecting two samples from the same monitor well during the same sample collection period. One of the samples will be labeled only as "duplicate" so that the laboratory is unaware of the relationship between the two samples. The field personnel will note which well was duplicated on their field forms. The duplicate will be analyzed for all detection monitoring constituents. The purpose of these samples is to check the reliability (precision and accuracy) of the laboratory's techniques.

5.11 Sample Preservation and Holding Times

The proper container, preservation technique, and maximum holding times shall be in accordance with the requirements identified in the U.S. EPA Publication No., SW-846 (Test Methods for Evaluating Solid Waste, Physical/Chemical Methods). This information is provided in Appendix A. Preservation of samples may be conducted in the field immediately after the container is filled or the sample container can be pre-preserved by the laboratory in advance of the sampling event based on the specific testing required. The only exception will be for the analyses of volatile organic compounds, in which case the sample containers will always be pre-preserved by the laboratory.

6.0 SAMPLE CHAIN-OF-CUSTODY

The primary objective of the chain-of-custody is to create an accurate written verified record that can be used to trace the possession and handling of the samples from the moment of collection until receipt by the laboratory. Adequate sample custody will be achieved by proper completion of a Chain-of-Custody (COC) Form. Each party handling the samples will sign the COC and provide the date and.time when the samples were relinquished or received. A sample of the type of COC that will be used with each sampling event is included in Appendix B.

The COC form includes:

1. The unique sample number as obtained from the sample label;
2. Source of the sample;
3. Date and time of sample collection;
4. Name of person taking samples;
5. Analysis name and analytical method requested (or reference to list) ;
6. Signature of persons involved in the chain-of-custody; and
7. Inclusive dates of possession.

7.0 SAMPLE SHIPMENT AND HANDLING PROCEDURES

Subsequent to field activities, all samples collected shall be preserved as appropriate, and immediately transported to the laboratory within the required holding times, dictated by the specific analytical methods. To maintain sample integrity, the samples shall be kept in appropriate portable coolers that have a constant interior temperature

of 4°C, protect samples from sunliqht, and minimize the risk of sample container breakage. Under no circumstances shall dry ice be used as the chilling agent for sample preservation; dry ice has the potential to freeze samples, which can result in container breakage (i.e., glass containers may shatter). Custody seals will be placed on the coolers and will not be broken until the samples arrive in the analytical laboratory and are checked in by the laboratory personnel.

If samples are shipped by common carrier, the COC form will be completed with the signature of the relinquisher and the date and time relinquished. The COC is then placed in a sealable plastic storage bag and placed in the sample cooler. At the time and place of receipt of the samples, the receiving party will attach a copy of the bill of lading to the COC document.

8.0 LABORATORY REQUIREMENTS

The analysis of groundwater samples, along with the reports, evaluations, reviews, and checklists required of the laboratory will be completed by an environmental testing laboratory that is accredited by TCEQ. All work will be conducted in accordance with the standards of the National Environmental Laboratory Accreditation Conference (NELAC) or other standards acceptable to TCEQ.

8.1 Laboratory Precision and Accuracy

The precision and accuracy targets shown below have been established by TCEQ through published guidance and may be changed through revised guidance.

The practical quantitation limit (PQL) is defined in §330.405(f)(5) as the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions and is analogous to:

- the limit of quantitation (LOQ) definition in the 2003 NELAC Standard (National Environmental Laboratory Accreditation Conference),
- the detectability check sample (DCS), as defined in the TRRP guidance Review and

Reporting of COC Concentration Data (RG366/TRRP-13).

PQL "check sample" measurements will be acquired with a "performance approach" as defined by the USEPA, at the lower limit of quantitation-whose levels are the lowest expected results for the smallest detectable concentrations, greater than the detection limit, where the required sensitivity (precision and accuracy) is achieved. The method and source used by the MSW owner/operator to assess the lowest expected result must be provided.

Sensitivity measurements of the PQL check sample shall be estimated from eight (8) method and analyte specific data points whose calculated precision and accuracy meet the specified limits of the table below. At a minimum, PQL check sample analyses will continue to be conducted quarterly in order to demonstrate that the PQL estimate continues to meet the precision and accuracy data quality objectives defined in the table below.

Some analytes (poor performers) specified in 40 CFR (Code of Federal Regulations) Part 258 Appendix I and II will not meet the specified limits for precision and accuracy. In those instances, the MSW facility owner/operator shall submit sufficient information to establish alternate precision and accuracy limits to be evaluated on a case by case basis.

QC Specification Limits for PQL Check Samples at Lower Limit of Quantitation

Chemical of Concern	Precision (% RSD)	Accuracy (% Recovery)
Metals	10	70-130
Volatiles	20	50-150
Semi-Volatiles	30	50-150

Note: Non-detected results will be reported as less than the PQL (lower limit of detection) that meets these precision and accuracy requirements.

8.2 Data Examination and Laboratory Case Narrative

All analytical data submitted under the requirements of this permit will be examined by the owner or operator to ensure that the data quality objectives are considered and met prior to submitting the data to the TCEQ for review. The owner or operator will determine if the results representing the sample are accurate and complete. The quality control results, supporting data, and the results of the laboratory's review of the data must be included in the owner/operator's review of the data. Any potential impacts will be reported such as the bias on the quality of the data, footnotes in the report, and anything of concern that was identified in the laboratory case narrative summary.

The owner or operator will ensure that the laboratory documents and reports all problems and observed anomalies associated with the analysis. If analysis of the data indicates that the data fails to meet the quality control goals for the laboratory's analytical data analysis program, the owner or operator will determine if the data is usable. If the owner and/or operator determines the analytical data may be utilized, any and all problems and corrective action that the laboratory identified during the analysis will be included in the report submitted to the TCEQ.
A Laboratory Case Narrative (LCN) report for all problems and anomalies observed must be submitted by the owner or operator. The LCN will report the following information:

1. The exact number of samples, testing parameters, and sample matrix.

2. The name of the laboratory involved in the analysis. If more than one laboratory is used, all laboratories shall be identified in the case narrative.

3. The test objective regarding samples.

4. Explanation of each failed precision and accuracy measurement determined to be outside of the laboratory and/or method control limits

5. Explanation if the effect of the failed precision and accuracy measurements on the results induces a positive or negative bias.

6. Identification and explanation of problems associated with the sample results, along

with the limitations these problems have on data usability.

7. A statement on the estimated uncertainty of reported results when appropriate and/or when requested.

8. A statement of compliance and/or noncompliance with the requirements and specifications. Exceedance of holding times and identification of matrix interferences must be identified. Dilutions shall be identified and if dilutions are necessary, they must be done to the smallest dilution necessary to minimize matrix interferences and bring the sample into control for analysis.

9. Identification of any and all applicable quality assurance and quality control samples that will require special attention by the reviewer.

10. A statement on the quality control of the analytical method and information on the analytical recoveries shall be provided when appropriate and/or when requested.

In addition to the LCN, the following information must be submitted for all analytical data:

1. A table associating the field sample name with the sample identification in the laboratory report if the association is not made in the report.

2. Chain of custody.

3. An analytical report that documents the results and methods for each sample and analyte for each analytical testing event. These test reports must document the reporting limit and method detection limit the laboratory used.

4. A release statement from the laboratory. This statement must state “I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the

potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data."

a. If an in-house laboratory is used, the following statement must also be included: "This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true."

5. If the data are from soil and/or sediment samples, they must be reported on a dry weight basis with the percent solids and the percent moisture reported so that back calculations of the wet analysis may be performed.

6. A laboratory checklist. For every response of "No" or "NR" that is reported on the checklist, the permittee will ensure the laboratory provides a detailed description of the reason for each in an "Exception Report." The permittee will require that the laboratory use the checklist. The laboratory will use the current versions of the Laboratory Package Cover Page and Data Review Checklist, including the Exception Report. The permittee will evaluate the data and write a narrative of the problems identified by the laboratory in the checklist.

9.0 DATA EVALUATION

9.1 Background Data Statistical Evaluation

Background groundwater quality for all monitoring wells in the groundwater monitoring system will be determined in accordance with 30 TAC §330.405 (e) & (f). The goal of the statistical evaluation is to identify evidence of a Statistical Significant Increase (SSI) in constituents listed in Appendix A as required by30 TAC §330. 419. Eight (8) background groundwater samples will be collected from each monitoring well in the groundwater monitoring system. Background data sets may be updated once ever two years with semiannual detection monitoring results that are demonstrated to be representative of background groundwater quality.

Intrawell statistical "upper prediction limits" for inorganic constituents listed in 30 TAC §330. 419 in each monitoring well in the groundwater monitoring system will be established utilizing Sanitas™ statistical software. Non-filtered background analytical results will be utilized to establish the upper prediction limits. Future semiannual detection monitoring results will be compared with the upper prediction limits (inorganics) or reporting limits (organics) to determine if a SSI has occurred.
Non-statistical analysis will be used for evaluation of the VOC's identified in Appendix A for each monitoring well in the Detection Monitoring program. Any VOC detected above the
reporting limit will be considered an SSI.

9.2 Detection Monitoring Data Evaluation

Upon receiving the groundwater sampling data from the laboratory, it shall be organized in a format that it can be clearly understood and analyzed. For each sampling event, HCPCT4 will make a selection of at least one or more of the following data presentation formats:

• Tables: provide an overall summary of the data in a neat, clearly understood format that allows straightforward analysis and comparison to other data points and standards;

• Contour Maps: placement of contaminant concentrations in contours on a map assist in conveying a clearer picture of contamination distribution. Contaminant distribution and associated concentrations will dictate whether this format can be easily utilized;

• Time Series Displays (X and Y Line Graphs): assist in the display of single or multiple contaminant concentration variations over time for a single data point or for multiple point comparison; and/or

• Histograms (X and Y Bar Graphs): allows comparisons of the magnitudes of single or multiple data point contaminant concentrations.

The data will be evaluated not later than 60 days after each monitoring event to determine whether the landfill has released contaminants to the uppermost aquifer. The evaluation will consist of a determination of whether a Statistically Significant Increase (SSI) has

occurred as described in Section 9.3 below. If the facility is found to be contaminating the uppermost aquifer, the TCEQ may order corrective action appropriate to protect human health and the environment up to and including that in §§330.411, 330.413, and 330.415 relating to Assessment of Corrective Measures; Selection of Remedy; and Implementation of the Corrective Action Program.

9.3 Determination of Statistically Significant Increase

A determination will be made as to whether an SSI has occurred in the concentration of any constituents listed in 30 TAC §330. 419 within 60 days of each groundwater sampling event. If an SSI is observed, HCPCT4 will notify the Executive Director, in writing, within 14 days of the SSI determination (30 TAC §330. 407(b)) and the following actions will be initiated:

1. HCPCT4 shall immediately place a notice in the operating record describing the increase and shall establish an assessment monitoring program meeting the requirements of §330. 409 within 90 days of the date of the notice to the TCEQ, except as provided in (2) and (3) below.

2. HCPCT4 shall submit results of re-sampling as appropriate for the statistical method within 60 days of the apparent SSI determination. The re-sample data may be used to statistically confirm of disprove the SSI determination.

3. If there is reasonable cause to think that a source for the SSI is a result of error in sampling, analysis, statistical evaluation, or natural variation in the groundwater quality, HCPCT4 will submit an alternate source demonstration report (ASD), prepared and certified by a qualified groundwater scientist or engineer and submitted to the Executive Director for review and approval (30 TAC §330 407(b)(3). HCPCT4 will:

- Notify the TCEQ within 14 days of the SSI determination that HCPCT4 intends to submit an ASD.

- Submit the ASD to the TCEQ within 90 days of the SSI determination.

- Groundwater samples for constituents addressed by the ASD will not be filtered prior to laboratory analysis.

- Continue detection monitoring .

The landfill will return to detection monitoring if the TCEQ approves the ASD.

9.4 Assessment Monitoring Trigger

Assessment monitoring will be triggered if a SSI has occurred in the concentration of any constituents listed in 30 TAC §330. 419 and re-sampling results confirm the SSI or if the ASD is not satisfactory. See the requirements for assessment monitoring in Section 11.0 below.

10.0 ANNUAL DETECTION MONITORING REPORT

Annual detection monitoring reports will be submitted within 90 days after the last groundwater sampling event in a calendar year. The report will include an introductory letter that briefly describes the event and highlights any anomalies, on-going issues from previous events, a statement regarding whether a SSI has occurred in any well and the status of the SSI, any recommended changes to the monitoring or reporting program, and a narrative of any problems identified by the laboratory. The report will include the following information:

Monitoring Events Summary

- Analytical Results Summary
- Purging and Sampling Summary
- Background Analytical Results Summary
- Comparison of Current to Background Data through Tables, Graphs, Calculations. Drawings, etc., as necessary.

Groundwater Elevation Summary

- Groundwater Elevation Data Summary
- Groundwater Elevation Contour Plot
- Groundwater Flow Direction and Rate with Rate Calculations

TCEQ Groundwater Sampling Reports, Form TCEQ 0312 (or current approved forms)

Quality Control Data

- Duplicate Comparison Summary
- Field Blank, Equipment Blank, and Trip Blank Summary
- Laboratory Data Package Cover Page
- Laboratory Review Checklist
- Exceptions Report
- Laboratory Case Narrative
- Chain-of-Custody forms;

Laboratory Reports

- Laboratory reports, including all analytical data, may be submitted in either hard copy or electronic format acceptable to or requested by TCEQ.

Additional Information

- Explanation of any problems encountered in the laboratory analysis by extension of the Laboratory Review Checklist or Laboratory Case Narrative

- Any information required in the laboratory case narrative that cannot be completed by the laboratory.

- Recommendations for changes to the GWSAP and groundwater monitoring system.

- Any additional information requested by the TCEQ

11.0 ASSESSMENT MONITORING

If during Detection Monitoring an SSI has been detected and no cause can be determined other than a release from the MSWLF unit, then assessment monitoring program in accordance 30 TAC §330. 409, shall be initiated within 90 days after verifying the SSI. Assessment monitoring shall be initiated at the well(s) exhibiting the SSI and at the intermediately adjacent wells on each side of the well(s) exhibiting the SSI, unless an alternative subset of wells is designated by the Executive Director. The frequency of sampling and the testing parameters will be those stated in 30 TAC §330.409.

12.0 CORRECTIVE MEASURES

As required in 30 TAC § 330.409 (g), corrective measures will be implemented as necessary based on the results of assessment monitoring and groundwater protection standards. Assessment of corrective measures will be implemented in accordance with 30 TAC §330.411. The owner or operator will submit a report describing the remedy or remedies purposed for selection in accordance with 30 TAC § 330.413. The report will include a schedule for initiating and completing the remedial activities. The schedule shall require the initiation of remedial activities within a reasonable time approved by the executive director. Implementation of the Corrective Action Program will be conducted in accordance with 30 TAC § 330.415.

APPENDIX A

Lists

Sampling Parameters

Sample Collection, Preservation, Holding Times & Test Methods

Appendix I to Part 258—Constituents for Detection Monitoring

Common name[1]	CAS RN[2]
Inorganic Constituents:	
(1) Antimony	(Total)
(2) Arsenic	(Total)
(3) Barium	(Total)
(4) Beryllium	(Total)
(5) Cadmium	(Total)
(6) Chromium	(Total)
(7) Cobalt	(Total)
(8) Copper	(Total)
(9) Lead	(Total)
(10) Nickel	(Total)
(11) Selenium	(Total)
(12) Silver	(Total)
(13) Thallium	(Total)
(14) Vanadium	(Total)
(15) Zinc	(Total)
Organic Constituents:	
(16) Acetone	67-64-1
(17) Acrylonitrile	107-13-1
(18) Benzene	71-43-2
(19) Bromochloromethane	74-97-5
(20) Bromodichloromethane	75-27-4
(21) Bromoform; Tribromomethane	75-25-2
(22) Carbon disulfide	75-15-0
(23) Carbon tetrachloride	56-23-5
(24) Chlorobenzene	108-90-7
(25) Chloroethane; Ethyl chloride	75-00-3
(26) Chloroform; Trichloromethane	67-66-3
(27) Dibromochloromethane; Chlorodibromomethane	124-48-1
(28) 1,2-Dibromo-3-chloropropane; DBCP	96-12-8
(29) 1,2-Dibromoethane; Ethylene dibromide; EDB	106-93-4
(30) o-Dichlorobenzene; 1,2-Dichlorobenzene	95-50-1
(31) p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7
(32) trans-1, 4-Dichloro-2-butene	110-57-6
(33) 1,1-Dichlorethane; Ethylidene chloride	75-34-3
(34) 1,2-Dichlorethane; Ethylene dichloride	107-06-2
(35) 1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride	75-35-4
(36) cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	156-59-2
(37) trans-1, 2-Dichloroethylene; trans-1,2-Dichloroethene	156-60-5
(38) 1,2-Dichloropropane; Propylene dichloride	78-87-5
(39) cis-1,3-Dichloropropene	10061-01-5
(40) trans-1,3-Dichloropropene	10061-02-6
(41) Ethylbenzene	100-41-4
(42) 2-Hexanone; Methyl butyl ketone	591-78-6
(43) Methyl bromide; Bromomethane	74-83-9
(44) Methyl chloride; Chloromethane	74-87-3
(45) Methylene bromide; Dibromomethane	74-95-3
(46) Methylene chloride; Dichloromethane	75-09-2
(47) Methyl ethyl ketone; MEK; 2-Butanone	78-93-3
(48) Methyl iodide; Idomethane	74-88-4
(49) 4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1
(50) Styrene	100-42-5

(51) 1,1,1,2-Tetrachloroethane	630-20-6
(52) 1,1,2,2-Tetrachloroethane	79-34-5
(53) Tetrachloroethylene; Tetrachloroethene; Perchloroethylene	127-18-4
(54) Toluene	108-88-3
(55) 1,1,1-Trichloroethane; Methylchloroform	71-55-6
(56) 1,1,2-Trichloroethane	79-00-5
(57) Trichloroethylene; Trichloroethene	79-01-6
(58) Trichlorofluoromethane; CFC-11	75-69-4
(59) 1,2,3-Trichloropropane	96-18-4
(60) Vinyl acetate	108-05-4
(61) Vinyl chloride	75-01-4
(62) Xylenes	1330-20-7

[1]Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

[2]Chemical Abstract Service registry number. Where “Total” is entered, all species in the ground water that contain this element are included.

[70 FR 34555, June 14, 2005; 70 FR 44150, Aug. 1, 2005]

SAMPLE COLLECTION, PRESERVATION, HOLDING TIMES, AND TEST METHODS

Parameter	Sample Volume	Sample Container	Preservation	Holding Time (days)	Laboratory Test Method*
Specific Conductance	100 ml	P,G	none	immediate	9050A & SM2510B
pH	25 ml	P,G	none	immediate	9040C & SM4500H-B
Temperature	25 ml	P,G	none	immediate	----
Heavy Metals	1000 ml	P,G	HNO_3 to pH <2 cool, 4° C	180	200.8/6020 & 7470/SM 3112 B
Volatile Organic Compounds (VOCs)	4-40 ml	glass vial w/septum caps	cool, 4° C, HCL	14	8260B

P = Polyethylene, G = Glass, T = Teflon-lined caps.

APPENDIX B

Forms

Field Data Sheet

Chain-of-Custody (COC) Form

TCEQ Form 0312

Laboratory Data Package Cover Page

Laboratory Review Checklist

Hidalgo County Precinct No. 4 Landfill
Permit No. 1593-A
Low-Flow Field Data Sheet

Date: _____ MW I.D.: MW-_____

Weather:_____ _____°F Sample team: _____

EVENT INFORMATION

Background ____ Detection ____

MONITOR WELL DATA

Total depth (ft) _____ Casing diameter _____ inches

Static water level (ft) _____ Pump vol. _____ ml; Tubing vol. _____ ml

Water column (ft) _____ Total of pump/tubing volume: _____ ml

PURGE AND SAMPLE DATA

Pump controller purge I.D. No.: _____ Set-up purge volume: _____ ml

time	purge rate mL/min	water level ft.	pH	conductivity mS/cm or µs/cm	temp °C	DO mg/l	ORP mV	turbidity NTU

Drawdown _____ ft.
Number of pump and tubing volumes or volume purged: _____ ml

Well inspection comments: _____

Gas = _____%or%LEL, T= _____°F

ANALYSYS LABORATORIES

NELAP ACCREDITED TNI LABORATORY

3512 Montopolis Drive, Austin, TX 78744
Ph:(512) 385-5886 Fax: (512) 385-7411

2209 N. Padre Island Dr., Ste K Corpus Christi, TX 78408
Ph:(361)289-6384 Fax: (361) 289-0875

CHAIN-OF-CUSTODY

Web: www.analysysinc.com
E-Mail: analysys@analysysinc.com

TYPICAL

COMPANY NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

ATTN: _____

PHONE _____ FAX/EMAIL _____

BILL TO COMPANY: _____ PAGE _____ OF _____

BILL TO ADDRESS: _____

PO# _____

PROJECT NAME _____

PROJECT NUMBER _____ SAMPLER _____

Special Reporting

TRRP Report ☐
EDD Spreadsheet ☐
Dry Weight Basis ☐

5035 Requirements

Petroleum Storage Tank Rule ☐
No Hydrocarbons in C6-C12 Range ☐
VOA Vial Could Not Be Used for ☐

Client Sample No. Description/Identification	Date Sampled	Time Sampled	# of Containers	Grab	Composite	Lab I.D. # (Lab Only)	No. of Containers and Preservative: Ice	HNO3	HCL	ZnAc/NaOH	H2SO4 Glass	Unpreserved	Other (Specify)	Matrix: Water-W Soil-S Air-A Waste-WST Other-Specify	PARAMETERS(1)												TAT* 24hr / 48hr / 72hr / Standard

Special Instructions (such as special QC requirements, lists, methods, etc…)

Additional reports to:

(1)Unless specifically requested otherwise on this Chain-of-custody and/or attached documentation, all analyses will be conducted using ASI's method of choice and all data will be reported to ASI's normal reporting limits (MDL/PQL). For GC/MS volatiles and extractables, unless specific analytical parameter lists are specified on this chain-of-custody or attached to this chain-of-custody, ASI will default to Priority Pollutants or ASI's HSL list at ASI's option. Specific compound lists must be supplied for all GC procedures.

Temperature upon receipt (Consistant with NELAC sec. 5.11) (>0-6˚C)

Sample Relinquised By				Sample Received By				˚C-observed	˚C-corrected	T#:
Name	Affiliation	Date	Time	Name	Affiliation	Date	Time			
								Temp Blank ☐		Ambient ☐
								Lab ID #		

[Tendering of above described samples to AnalySys, Inc. for analytical testing constitutes agreement by buyer/sampler to AnalySys, Inc.'s standard terms.]

* By selecting RUSH/Accelerated TAT, client agrees to additional fees. Please call your Project Manager. ASI will make all reasonable efforts to meet rush requests.

Texas Commission on Environmental Quality
Waste Permits Division, Municipal Solid Waste Permits Section
Groundwater Sampling Report

Facility name_____

Permittee_____

County_____

Name of sampler_____

Affiliation of sampler_____

If split-sampled, with whom?_____

Integrity of well_____

Installation date_____

5. Purging/Sampling method_____
(enter Bailer or Pump)

Were low-flow methods used? [ ] yes [ ] no
(check one)

If yes, what volume was purged?_____

6. Well volumes purged_____
(enter 1, 2, 2.5, 3, etc)

7. Was the well dry before purging? [ ] yes [ ] no
(check one)

8. Was the well dry after purging? [ ] yes [ ] no
(check one)

9. How long before sampling?_____
(enter time)

10. Unit of measure?_____
(days, hours, or mins)

1. MSW permit no. _____
(Essential Field)

2. Monitor well no. _____
(Essential Field)

3. Date of sampling _____
(Essential Field)

Most recent previous sampling_____

Date of water level measurements_____

Datum reference point_____

Datum elevation*_____

Depth to water (below datum)*_____

4. Water level elevation*_____

11. Sample Event_____
(enter one of the selections below)

- Background
- Detection Monitoring
- Assessment
- Corrective Action
- Other

12. Sample Schedule_____
(enter one of the selections below)

- Quarterly
- Semi-Annual
- Annual
- Fourth Year
- Other

13. Sample Type_____
(enter one of the selections below)

- Regular
- Duplicate
- Resample
- Split
- Other

Field Measurements: 14. pH _____

15. Spec. cond._____ 16. [ ] umho/cm or [ ] mmho/cm *(check one)*

17. Temp. _____ 18. [ ] °F or [ ] °C *(check one)*

Laboratory: 19. Name _____ Phone _____

Address _____

Representative _____
(name) *(signature)* *(date)*

Site operator or representative_____
(name) *(signature)* *(date)*

***Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (MSL).**

Texas Commission on Environmental Quality
Waste Permits Division, Municipal Solid Waste Permits Section
Groundwater Sampling Report

Heavy Metals

Constituent		Concentration	Reporting Limits[-3]	Method
Antimony	T[1] D[2]	µg/l	µg/l	
Arsenic	T D	µg/l	µg/l	
Barium	T D	µg/l	µg/l	
Beryllium	T D	µg/l	µg/l	
Cadmium	T D	µg/l	µg/l	
Chromium	T D	µg/l	µg/l	
Cobalt	T D	µg/l	µg/l	
Copper	T D	µg/l	µg/l	
Lead	T D	µg/l	µg/l	
Mercury	T D	µg/l	µg/l	
Nickel	T D	µg/l	µg/l	
Selenium	T D	µg/l	µg/l	
Silver	T D	µg/l	µg/l	
Thallium	T D	µg/l	µg/l	
Vanadium	T D	µg/l	µg/l	
Zinc	T D	µg/l	µg/l	
Iron	T D	µg/l	µg/l	
Manganese	T D	µg/l	µg/l	

[1, 2] Indicate whether analyses for Total (T) or Dissolved (D); use two pages if both are run. If analyses for dissolved concentrations, indicate filter pore size [ ] 0.45, [ ] 1, [ ] 10, [ ] ____ micron, and whether filtered [ ] in field or [ ] in laboratory.

[3] Indicate if reporting limits are _____ PQLs or _____ MDLs.

Texas Commission on Environmental Quality
Waste Permits Division, Municipal Solid Waste Permits Section
Groundwater Sampling Report

Volatile Organic Compounds (VOCs) [1]

Constituent	Concentration (µg/L)	Reporting Limit (µg/L) [2]	Method	CAS No.
Acetone				67-64-1
Acrylonitrile				107-13-1
Benzene				71-43-2
Bromochloromethane				74-97-5
Bromodichloromethane				75-27-4
Bromoform				75-25-2
Carbon disulfide				75-15-0
Carbon tetrachloride				56-23-5
Chlorobenzene				108-90-7
Chloroethane				75-00-3
Chloroform				67-66-3
Dibromochloromethane				124-48-1
1,2-Dibromo-3-chloropropane				96-12-8
1,2-Dibromoethane				106-93-4
o-Dichlorobenzene (1,2)				95-50-1
p-Dichlorobenzene (1,4)				106-46-7
trans-1,4-Dichloro-2-butene				110-57-6
1,1-Dichloroethane				75-34-3
1,2-Dichloroethane				107-06-2
1,1-Dichloroethylene				75-35-4
cis-1,2-Dichloroethylene				156-59-2
trans-1,2-Dichloroethylene				156-60-5
1,2-Dichloropropane				78-87-5
cis-1,3-Dichloropropene				10061-01-5
trans-1,3-Dichloropropene				10061-02-6
Ethylbenzene				100-41-4
2-Hexanone				591-78-6
Methyl bromide				74-83-9
Methyl chloride				74-87-3
Methylene bromide				74-95-3
Methylene chloride				75-09-2
Methyl ethyl ketone				78-93-3
Methyl iodide				74-88-4
4-Methyl-2-pentanone				108-10-1
Styrene				100-42-5
1,1,1,2-Tetrachloroethane				630-20-6
1,1,2,2-Tetrachloroethane				79-34-5
Tetrachloroethylene				127-18-4
Toluene				108-88-3
1,1,1-Trichloroethane				71-55-6
1,1,2-Trichloroethane				79-00-5
Trichloroethylene				79-01-6
Trichlorofluoromethane				75-69-4
1,2,3-trichloropropane				96-18-4
Vinyl acetate				108-05-4
Vinyl chloride				75-01-4
Xylenes (total)				1330-20-7

[1] Samples for VOCs must not be filtered.

[2] Indicate if reporting limits are _____ PQLs or _____ MDLs.

Texas Commission on Environmental Quality
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Groundwater Sampling Report

Other Constituents

Constituent [1]	Concentration [2]	Reporting Limit [2, 3]	Method

1 Indicate whether analyses for Total (T) or Dissolved (D) concentrations. If analyses for dissolved concentrations, indicate filter pore size [ ] 0.45, [ ] 1, [ ] 10, [ ] __ micron, and whether filtered [ ] in field or [ ] in laboratory.

2 Indicate if reporting limits are ________ PQLs or ________ MDLs.

3 Show units of concentration and reporting limit.

Laboratory Data Package Cover Page

This data package consists of:

- ☐ This signature page, the laboratory review checklist, and the following reportable data:
- ☐ R1 Field chain-of-custody documentation;
- ☐ R2 Sample identification cross-reference;
- ☐ R3 Test reports (analytical data sheets) for each environmental sample that includes:
  a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  b) dilution factors,
  c) preparation methods,
  d) cleanup methods, and
  e) if required for the project, tentatively identified compounds (TICs).
- ☐ R4 Surrogate recovery data including:
  a) Calculated recovery (%R), and
  b) The laboratory's surrogate QC limits.
- ☐ R5 Test reports/summary forms for blank samples;
- ☐ R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  a) LCS spiking amounts,
  b) Calculated %R for each analyte, and
  c) The laboratory's LCS QC limits.
- ☐ R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  a) Samples associated with the MS/MSD clearly identified,
  b) MS/MSD spiking amounts,
  c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  d) Calculated %Rs and relative percent differences (RPDs), and
  e) The laboratory's MS/MSD QC limits
- ☐ R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  a) the amount of analyte measured in the duplicate,
  b) the calculated RPD, and
  c) the laboratory's QC limits for analytical duplicates.
- ☐ R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;
- ☐ R10 Other problems or anomalies.
- ☐ The Exception Report for every "No" or "Not Reviewed (NR)" item in laboratory review checklist.

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: [ ] This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name (Printed)	Signature	Official Title (printed)	Date

Laboratory Review Checklist: Reportable Data

Laboratory Name:	LRC Date:
Project Name:	Laboratory Job Number:
Reviewer Name:	Prep Batch Number(s):

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
		Chain-of-custody (C-O-C)					
R1	OI	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?					
		Were all departures from standard conditions described in an exception report?					
R2	OI	**Sample and quality control (QC) identification**					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?					
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?					
R3	OI	**Test reports**					
		Were all samples prepared and analyzed within holding times?					
		Other than those results < MQL, were all other raw values bracketed by calibration standards?					
		Were calculations checked by a peer or supervisor?					
		Were all analyte identifications checked by a peer or supervisor?					
		Were sample quantitation limits reported for all analytes not detected?					
		Were all results for soil and sediment samples reported on a dry weight basis?					
		Were % moisture (or solids) reported for all soil and sediment samples?					
		If required for the project, TICs reported?					
R4	O	**Surrogate recovery data**					
		Were surrogates added prior to extraction?					
		Were surrogate percent recoveries in all samples within the laboratory QC limits?					
R5	OI	**Test reports/summary forms for blank samples**					
		Were appropriate type(s) of blanks analyzed?					
		Were blanks analyzed at the appropriate frequency?					
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?					
		Were blank concentrations < MQL?					
R6	OI	**Laboratory control samples (LCS):**					
		Were all COCs included in the LCS?					
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?					
		Were LCSs analyzed at the required frequency?					
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?					
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?					
		Was the LCSD RPD within QC limits?					
R7	OI	**Matrix spike (MS) and matrix spike duplicate (MSD) data**					
		Were the project/method specified analytes included in the MS and MSD?					
		Were MS/MSD analyzed at the appropriate frequency?					
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?					
		Were MS/MSD RPDs within laboratory QC limits?					
R8	OI	**Analytical duplicate data**					
		Were appropriate analytical duplicates analyzed for each matrix?					
		Were analytical duplicates analyzed at the appropriate frequency?					
		Were RPDs or relative standard deviations within the laboratory QC limits?					
R9	OI	**Method quantitation limits (MQLs):**					
		Are the MQLs for each method analyte included in the laboratory data package?					
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?					
		Are unadjusted MQLs included in the laboratory data package?					
R10	OI	**Other problems/anomalies**					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?					
		Were all necessary corrective actions performed for the reported data?					
		Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?					

Laboratory Review Checklist: Supporting Data

Laboratory Name:	LRC Date:
Project Name:	Laboratory Job Number:
Reviewer Name:	Prep Batch Number(s):

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
S1	OI	**Initial calibration (ICAL)**					
		Were response factors and/or relative response factors for each analyte within QC limits?					
		Were percent RSDs or correlation coefficient criteria met?					
		Was the number of standards recommended in the method used for all analytes?					
		Were all points generated between the lowest and highest standard used to calculate the curve?					
		Are ICAL data available for all instruments used?					
		Has the initial calibration curve been verified using an appropriate second source standard?					
S2	OI	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank[6] :**					
		Was the CCV analyzed at the method-required frequency?					
		Were percent differences for each analyte within the method-required QC limits?					
		Was the ICAL curve verified for each analyte?					
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?					
S3	O	**Mass spectral tuning:**					
		Was the appropriate compound for the method used for tuning?					
		Were ion abundance data within the method-required QC limits?					
S4	O	**Internal standards (IS):**					
		Were IS area counts and retention times within the method-required QC limits?					
	OI	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?					
		Were data associated with manual integrations flagged on the raw data?					
S6	O	**Dual column confirmation**					
		Did dual column confirmation results meet the method-required QC?					
S7	O	**Tentatively identified compounds (TICs):**					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?					
S8	I	**Interference Check Sample (ICS) results:**					
		Were percent recoveries within method QC limits?					
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?					
S10	OI	**Method detection limit (MDL) studies**					
		Was a MDL study performed for each reported analyte?					
		Is the MDL either adjusted or supported by the analysis of DCSs?					
S11	OI	**Proficiency test reports:**					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?					
S12	OI	**Standards documentation**					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?					
S13	OI	**Compound/analyte identification procedures**					
		Are the procedures for compound/analyte identification documented?					
S14	OI	**Demonstration of analyst competency (DOC)**					
		Was DOC conducted consistent with NELAC Chapter 5C?					
		Is documentation of the analyst's competency up-to-date and on file?					
S15	OI	**Verification/validation documentation for methods** (NELAC Chap 5n 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?					
S16	OI	**Laboratory standard operating procedures (SOPs):**					
		Are laboratory SOPs current and on file for each method performed?					

Laboratory Review Checklist: Exception Reports	
Laboratory Name:	LRC Date:
Project Name:	Laboratory Job Number:
Reviewer Name:	Prep Batch Number(s):

ER #[5]	DESCRIPTION

1. Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
2. O= organic analyses; I = inorganic analyses (and general chemistry, when applicable);
3. NA = Not applicable;
4. NR = Not reviewed;
5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

6. CCB = Continuing Calibration Blank

ATTACHMENT 5

Fee Payment Receipt