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FINAL WORK PLAN INTERIM REMEDIAL ACTIONS AT SOLID WASTE MANAGEMENT UNITS 12, 31 AND 61 NAS FORT WORTH TX

10/1/2001

ELLIS ENVIRONMENTAL GROUP

707 0 File: 17G D.E.

NAVAL AIR STATION FORT WORTH JRB CARSWELL FIELD TEXAS

ADMINISTRATIVE RECORD COVER SHEET

AR File Number 707

FINAL

Work Plan

Interim Remedial Actions

at

Solid Waste Management Units 12, 31, & 61
NAS Fort Worth JRB, Texas

Prepared for
U.S. Air Force Center for Environmental Excellence
Brooks AFB, Texas

Contract Number F41624-00-D-8032

October 2001

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October 15, 2001

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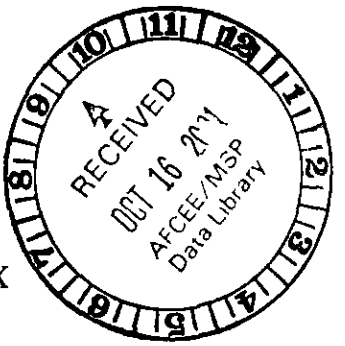

RE: Contract No. F41624-00-D-8032
Delivery Order No. 0009, NAS Forth Worth JRB, TX
Final Work Plan WAAs IRA

Dear Mr. Ficklen:

Please find enclosed the Ellis Environmental Group, L.C. (EEG) Response to Comments on the Draft Work Plan and the resulting Final Work Plan (WP) for Interim Remedial Actions at Solid Waste Units 12, 31, and 61 (Waste Accumulation Areas). We have mobilized and will continue to closely coordinate all activities with Mike Dodyk and you. We look forward to receipt of your comments on the Draft WP for Interim Remedial Actions at Solid Waste Units 17, 28, 29, 30, and 62 (Landfills).

If you have any questions please contact Rick Levin, PG. (phone # 352-333-2679) or me at (352) 333-2655. Thank you.

Sincerely,
ELLIS ENVIRONMENTAL GROUP, L.C.

Richard Wheeler, PE
Asst. Program Manager

Enclosures (two copies)

CC: Mike Dodyk, P.E., AFCEE/ERD, w/two copies of the enclosures
Mario Martinez, HSW/PKVBC, letter only
AFCEE/MSCD, letter only
Mark Webster, P.G., EEG, Fort Worth, w/one copy of enclosures
Miquette Rochford, P.G., HydroGeoLogic, w/one copy of enclosures

Specific Comments and Responses to Comments dated 10 October 2001 from Mike Dodyk, P.E.:

Item	Page	Section	Comment	Response
1	1-5	1.2.2	Second paragraph, second sentence: It is recommended that the number of additional borings be listed separately for each site. Also, please indicate which analyses will be conducted on the subsurface and soil samples.	This sentence pertains to past work rather than proposed work and was replaced with the following text: "A total of 22 additional borings were advanced. Of these, three borings were advanced at SWMU 5; two borings at SWMU 6; five borings at SMWU 12; four borings at SWMU 31; and eight borings SWMU 61."
2	1-5	1.2.2	No SPLP was performed on any locations at SWMU 61. It is recommended that SWMU 61 be deleted from the end of the text.	This change was made.
3	1-6	Table 2-1	Title: Please change "SWMUs 12 and 13" to "SWMUs 12 and 31". Also, it is recommended that PHC be spelled out in the notes.	This change was made to Table 1-2.
4	1-6	Table 2-1	Notes Section: Please include the sentence "No SPLP analysis was performed at SWMU 61".	This change was made to Table 1-2.
5	2-3	2.1.3	Fourth sentence: Please explain why two rounds of groundwater sampling were conducted at WHGLTA028 and one round was conducted at WCHMHTA012.	As stated previously in the text, well WCHMHTA012 was sampled during the second round of sampling after the sampling results from the first round of sampling of well WHGLTA028 were evaluated. Therefore, well WHGLTA028 has been sampled twice and well WCHMHTA012 has only been sampled once thus far. Both wells will be sampled during the next round of sampling. No changes were made to the text.

Item	Page	Section	Comment	Response
6	2-7	2.3.3	Last sentence: Please elaborate on the possible up gradient sources of PCE and TCE found in the groundwater.	The only apparent upgradiant source is the oil/water separator at Building 1320, which has received closure under RRS 1 by TNRCC. No changes to the text were made.
7	3-1	3.0	Bullet List: Please change "confirmation sampling" to "delineation sampling" in the first bullet.	Based on previous discussions with AFCEE and a follow-up conversation with Don Ficklen on Friday, October 12, no changes were made to the approach of using pre-confirmation sampling.
8	3-1	3.0	Bullet List: Please include a bullet indicating that confirmation samples will be collected after excavations.	Refer to response to Comment #7. Confirmation samples will be collected prior to excavation.
9	3-1	3.0	Bullet List: Please change " appropriate material" to "clean fill" in the fourth bullet.	This change was made.
10	4-1	4.1.1	Please explain how the volume of soil proposed for removal was determined for each proposed excavation area.	The size of the proposed excavation was determined based on concentrations in surrounding borings. Each excavation may be larger than presented in the work plan if initial pre-confirmation samples determine that the excavations need to be larger. A new paragraph was added to the end of Section 3 for clarification.
11	4-3	4.3	Third Sentence: This sentence is confusing. It is unclear which COCs are being referred to since TPH and PCE are the only detections above RRS2. Please clarify.	The first three sentences of paragraph 4.1.1were revised to clarify this issue. The point is that PCE is the only VOC that was detected at intervals other than the surface at boring BHGLSWMU61001.

Item	Page	Section	Comment	Response
12	5-1	5.0	Third Paragraph: Please clarify whether the 2 to 4 week work schedule includes all tasks in the IRA WP or just the site work.	The proposed schedule includes all tasks involved with the IRA WPs, with the exception of reporting and additional rounds of groundwater sampling that may be necessary at SWMU 12. The text was revised to reflect this information.
FIGURES				
13	NA	NA	Figures 2.1, 2.2, and 2.3 are not in sequential order. Please revise.	The figures are placed in the correct sequential order in the Final Work Plan.
14	NA	NA	Figure 2.1: Please show TPH results for boring BHGLSWMU12003 or explain why this analysis was not conducted.	No soil samples collected from boring BHGLSWMU12003 contained detections of TPH above RRS 1. Therefore these data were not presented on Figure 2.1. Please refer to the note concerning Phase I Results below the Legend in Figure 2.1.
15	NA	NA	Figure 2.2: Please show TPH results for boring BHGLSWMU31001 or explain why this analysis was not conducted.	No soil samples collected from boring BHGLSWMU31001 contained detections of TPH above RRS 1. Therefore these data were not presented on Figure 2.2. Please refer to the note concerning Phase I Results below the Legend in Figure 2.2.
16	NA	NA	Figure 2.3: Please show PHC (gasoline range) results for boring BHGLSWMU61001 or explain why this analysis was not conducted.	No soil samples collected from boring BHGLSWMU61001 contained detections of PHC (gasoline range) above RRS 1. Therefore these data were not presented on Figure 2.3. Please refer to the note concerning Phase I Results below the Legend in Figure 2.3.
FIELD SAMPLING PLAN				
17	NA	Table 4-1	Please provide correct phone numbers for Don Ficklen and Mike Dodyk. Also, please list PE after Mike Dodyk	These changes were made.

Item	Page	Section	Comment	Response
18	2-1	2.2	Bullet List, First bullet: Please change "confirmation" to "delineation".	Please see response to comments 7 and 8.
19	2-1	2.2	Bullet List, Third bullet: Please delete "and" after "excavated".	This change was made.
20	2-1	2.2	Bullet List: Please include a bullet indicating that post-removal confirmation sampling will be conducted.	Please see the responses to comments 7 and 8.
HEALTH AND SAFETY PLAN				
21	NA	Table 13-1	Please provide correct phone numbers for Don Ficklen and Michael Dodyk.	These changes were made

REPORT DOCUMENTATION PAGE

Form Approved
QMB No 0704-0188

1 AGENCY USE ONLY *(Leave blank)*	2 REPORT DATE	3 REPORT TYPE AND DATES COVERED
	October 2001	Final

4 TITLE AND SUBTITLE

Final Work Plan Interim Remedial Actions
At Solid Waste Management
Units 12, 31, And 61
NAS Fort Worth JRB, Texas

5 FUNDING NUMBERS

F41624-00-D-8032
Delivery Order No 0009

6 AUTHOR(S)

Ellis Environmental Group

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AFCEE/ERD
Brooks AFB,
Texas 78235-5363

10 SPONSORING/MONITORING AGENCY REPORT NUMBER

CDRL No.: A013

11 SUPPLEMENTARY NOTES

12a DISTRIBUTION/AVAILABILITY STATEMENT

Unlimited

12b DISTRIBUTION CODE

13 ABSTRACT (Maximum 200 words)

This Final Work Plan for Interim Remedial Actions provides a summary of the analytical results produced during the RFI activities at SWMUs 12, 31, and 61, and presents the rationale for the selection of additional sampling locations and/or interim remedial actions required to achieve closure of the subject sites under the TNRCC Risk Reduction program.

14 SUBJECT TERMS

15 NUMBER OF PAGES

16 PRICE CODE

17 SECURITY CLASSIFICATION OF REPORT	18 SECURITY CLASSIFICATION OF THIS PAGE	19 SECURITY CLASSIFICATION OF ABSTRACT	20 LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	

Preface

This document contains the Final Work Plan (WP) for the Interim Remedial Action (IRA) at Solid Waste Management Units (SWMUs) 12, 31, and 61 at the Naval Air Station (NAS) Fort Worth Joint Reserve Base (JRB), Texas.

Ellis Environmental Group, LC (EEG) prepared this report under contract to the U.S. Air Force Center for Environmental Excellence (AFCEE), Contract No. F41624-00-D-8032, Delivery Order No. 0009, in support of the Air Force Installation Restoration Program.

Responsible key EEG personnel are as follows:

Rich Wheeler, PE – Assistant Program Manager
Rick Levin, PG – Project Manager

This contract will be administered by the Defense Contract Management Command, 10500 Battleview Pkwy., Suite 200, Manassas, Virginia, 22110. The contracting officer will be Mr. Cliff Trimble. The contracting officer's representative will be Mr. Don Ficklen (210-536-5290), located at the AFCEE/Environmental Restoration Division, 3207 North Road, Brooks Air Force Base, Texas 78235-5363.

Contents

Tables

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Abbreviations & Acronyms

ft-bgs	feet below ground surface
kg	kilogram
mg	milligram
AFB	Air Force Base
AFCEE	U.S. Air Force Center for Environmental Excellence
AOC	area of concern
BTEX	benzene, toluene, ethylbenzene, xylene
CFR	Code of Federal Regulations
COC	contaminant of concern
DPT	direct-push technology
DRMO	Defense Reutilization and Marketing Office
EEG	Ellis Environmental Group, LC
HSA	hollow stem auger
IDW	investigation-derived waste
IRA	interim remedial action
JRB	Joint Reserve Base
MEK	methyl ethyl ketone
MQL	method quantitation limit
MSC	medium-specific concentration
NAS	Naval Air Station
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
PAH	polynuclear aromatic hydrocarbon
PCE	tetrachloroethene
PE	professional engineer
PG	professional geologist
PHC	petroleum hydrocarbon
PID	photo ionization detector
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA facility assessment
RFI	RCRA facility investigation
RRS	risk reduction standards
SPLP	synthetic precipitation leaching procedure
SVOC	semi-volatile organic compound
SWMU	solid waste management unit
TCE	trichloroethene
TNRCC	Texas Natural Resource Conservation Commission
TPH	total petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency

VOC	volatile organic compound
WAA	waste accumulation area
WP	work plan
WPA	work plan addendum

1.0 Introduction

In accordance with the hazardous waste permit HW-50289 issued to the former Carswell Air Force Base (AFB) dated February 7, 1991, a multi-phased Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) was conducted on 14 SWMUs and 2 areas of concern (AOCs) at NAS Fort Worth JRB, Texas (HydroGeoLogic, 1999). The SWMUs and AOCs included in the RFI served mainly as waste accumulation areas (WAAs), which stored hazardous waste before it was either disposed of in landfills, reused on base, or processed through the Defense Reutilization and Marketing Office (DRMO) for off-base recycling or disposal.

Phase I of the RFI was conducted at the subject WAAs during May and June of 1999 in an effort to obtain closure under the Texas Natural Resource Conservation Commission (TNRCC) Risk Reduction Standards (RRS) program (HydroGeoLogic, 1999). As a result of the initial field investigation, 7 of the 16 WAAs were recommended for no further action and closure under RRS 1 (HydroGeoLogic, 2000a) Closure of these seven sites was received in a TNRCC letter dated November 20, 2000. The remaining nine SWMUs were the subject of the Phase II RFI (HydroGeoLogic, 2000b). Phase II of the RFI was conducted during April through June of 2000. As a result of the Phase II RFI, four of the remaining nine SWMUs were recommended for closure. Closure of these four sites was received in a letter from TNRCC dated June 18, 2001. A Phase III RFI was conducted in June 2001 on the five remaining SWMUs. Of the remaining five SWMUs, two will be recommended for closure under TNRCC RRS 2 (HydroGeoLogic, 2001). The three remaining SWMUs are the subject of this WP, as IRAs are required before closure can be recommended (HydroGeoLogic, 2001).

The locations of these three SWMUs in relation to NAS Fort Worth JRB are presented in Figure 1-1. The three SWMUs listed below are identified as they appear on the TNRCC letter dated March 2, 1995, with any exceptions footnoted. These SWMU identifications are based on the 1989 RCRA Facility Assessment (RFA) (A.T. Kearney, 1989) where each WAA was identified with the associated building number from which wastes were stored. The three SWMUs are identified as follows:

- SWMU 12 (Building 1602 WAA[1])
- SWMU 31 (Building 1050 WAA)
- SWMU 61 (Building 1320 Power Production Maintenance Facility WAA)

In 1990, a new metal storage shed, designated as a WAA, was built at SWMU 61 in order to be in compliance with Permit HW-50289. This storage shed was assigned a new, individual building number and is currently used for the storage of hazardous waste. This new WAA building is listed on Table 1-1 along with a summary description of each SWMU listed above. Following the 1989 RFA, wastes were removed from SWMUs 12 and 31. SWMUs 12 and 31 no longer serve as active WAAs at NAS Fort Worth JRB and are being investigated for historical contamination only.

[1]SWMU 12 is identified in the TNRCC letter dated March 2, 1995, as the Building 1619 WAA. However, interviews with site personnel and review of waste storage inventories and historic photographs indicate that SWMU 12 served as the WAA for Building 1602.

This WP summarizes the field activities conducted at the three remaining SWMUs in support of the RFI and presents rationale for additional investigations and/or IRAs to be conducted at the subject sites. When investigation activities are complete at each SWMU, all data will be compiled and presented in an RFI report with a discussion of the RRS standard that is appropriate for closure at each site.

1.1 Project Background

As stated in Section 1.0, the former Carswell AFB, now known as NAS Fort Worth JRB, was issued RCRA permit HW-50289 by the TNRCC on February 7, 1991. This permit requires an RFI of all SWMUs listed in Permit Provision VIII (as well as those SWMUs subsequently added to the list) in order to determine whether any of the hazardous constituents listed in 40 Code of Federal Regulations (CFR), Part 264, Appendix IX, have been released into the environment.

1.2 Investigation Summary

The RFI was designed to meet the requirements of Permit Provision VIII of RCRA permit HW-50289. The RFI WPs and this WP have been prepared using guidance documents from the Installation Restoration Program, RCRA, the U.S. Environmental Protection Agency (USEPA), and the TNRCC RRS program.

Table 1-1. SWMU Summary Information, NAS Fort Worth JRB, Texas

SWMU	Waste Source	Operational Period	Materials Received	Status
SWMU 12	Building 1602 - Propulsion Shop	Approx 1982 – 1990	Waste JP-4 (84 gal/yr) - drummed 7808 engine oil (84 gal/yr) - drummed PD-680 (Type II)(petroleum naptha solvent) (60 gal/yr) - drummed	The concrete pad for the storage area no longer exists No waste is currently stored in this area
SWMU 31	Building 1050 - Pneudraulics Shop Building 1055 - Fire Control Shop	1955 – 1990	Waste hydraulic fluid and oil (120 gal/yr) - drummed PD-680 (Type II) (petroleum naptha solvent)(150 gal/yr) - drummed MEK (unspecified amount) - unspecified container TCE (unspecified amount) - unspecified container Perchloroethylene (unspecified amount) - unspecified container SE-377C (solvent) contaminated with cadmium (unspecified amount) - unspecified container Citri-Kleen (solvent) (unspecified amount) - unspecified container Silicone dampirg fluid contaminated with Freon 113 (unspecified amount) - unspecified container	No waste is currently stored in the area A roof has been erected over the concrete pad, which serves as a base for a picnic table.
SWMU 61 (WAA 1319)	Building 1320 - Power Production Maintenance Facility	Approx 1982 – Present	Waste gasoline and diesel fuel (108 gal/yr) - drummed 7808 engine oil (156 gal/yr) - bowser PD-680 (Type II) (108 gal/yr) - drummed Antifreeze (156 gal/yr) - drummed Battery acid (360 gal/yr) - DRMO Hard material similar to roofing tar (unspecified amount) - bucket	Waste is currently stored by the Navy both within and outside the designated WAA at SWMU 61

Sources:

A.T Kearney 1989, RCRA Facility Assessment, PR/VSI Report, Carswell Air Force Base, Fort Worth, Texas

CH2M HILL, 1984, Installation Restoration Program Records Search for Carswell Air Force Base, Texas

The Earth Technology Corporation, 1993, Basewide Environmental Baseline Survey, Carswell Air Force Base, Texas

U S Air Force Occupational and Environmental Health Laboratory, Human Services Division, 1989, Hazardous Waste Technical Assistance Survey, Carswell AFB, Texas

Phases I, II, and III of the RFI were conducted in accordance with the revised final WPs dated May 1999, final Phase II Work Plan Addendum (WPA) dated April 2000; and the final Phase III WPA dated May 2001, all prepared by HydroGeoLogic The revised final WPs contain the Field Sampling Plan, which was followed during all sampling activities. The final basewide Quality Assurance Project Plan (QAPP), prepared by HydroGeoLogic, dated February 1998, was used as guidance for managing specific quality assurance (QA) and quality control (QC) procedures as well as analytical data generated from the previous RFI. Analytical data generation and assessment procedures were designed to achieve data quality goals in accordance with the basewide QAPP. The basewide QAPP was revised and approved in March 2000. All additional sampling activities proposed in this WP will be conducted in accordance with the final 2000 basewide QAPP (HydroGeoLogic, 2000c).

In May and June of 1999, an initial soil assessment was conducted at each site, which focused on characterizing any potential contaminant sources. The analytical results from the Phase I RFI provided a preliminary evaluation of the nature and extent of any contamination detected. The analytical results of the inorganic samples collected during this initial investigation were compared to the base-specific background values as determined by the final basewide background study to determine if closure under RRS 1 was appropriate (Jacobs, 1998). As background values are not available for organic compounds, the investigation results for organic compounds were compared to method quantization limits (MQLs) for closure under RRS 1.

The results of the initial investigation were reviewed to determine if the nature and extent of contamination had been delineated. After the results were reviewed, it was determined that the initial RFI activities did not provide a complete delineation of the nature and extent of contamination present at nine of the subject SWMUs. As a result, additional soil borings were advanced, monitoring wells were installed, and soil and groundwater samples were collected as outlined in the Phase II WPA to continue characterization of contaminants identified during the initial sampling phase of the RFI. Results of the Phase II investigation indicated that the five SWMUs would require additional delineation sample. The Phase III investigation sampling was conducted in June 2001. Based on the results from the latest sampling round, IRAs are necessary at three SWMUs (SWMUs 12, 31, and 61) in order to remove soil with RRS 3 contaminant concentrations. With further delineation of contamination at SWMUs 5 and 6 in accordance with recommendations of the Phase III WPA, a request for closure under TNRCC RRS 2 will be submitted under separate cover (HydroGeoLogic, 2001).

1.2.1 Investigation Strategy

The SWMUs included in this WP served as temporary waste storage sites that stored hazardous waste before it was either disposed of in landfills, reused on base, or processed through the DRMO for off-base recycling or disposal. As stated in Section 1.0, a new hazardous waste storage shed was constructed in 1990 at the active WAA at SWMU 61 in order to comply with permit requirements. SWMU 61 currently serves as an active WAA. No waste is currently stored at SWMUs 12 or 31.

Prior to initiating the intrusive investigation at each of these sites, the structural integrity of the shed's walls and floors was examined for cracks or gaps. During the Phase I RFI, the integrity of

the hazardous waste storage shed at SWMU 61 appeared to be intact with no visible cracks or gaps As a result, intrusive activities did not take place within any storage shed Some soil boring locations were adjusted slightly from the locations proposed in the project WPs due to site-specific obstructions such as overhead and subsurface utilities, fences, and other surface barriers encountered during the field implementation.

1.2.2 Field Activities Summary

Phase I RFI field activities were conducted during May and June 1999. A total of 15 continuous-core soil borings were advanced at the five original subject SWMUs (SWMUs 5, 6, 12, 31, and 61) to collect a total of 15 surface soil and 22 subsurface soil samples that were submitted for chemical analysis. Soil samples were collected from each boring every 5 feet from the ground surface to the top of the water table. All soil samples were analyzed in accordance with the analyses and rationale presented in the project WPs (HydroGeoLogic, 1999).

Phase II field activities were conducted from April through October 2000 at the subject SWMUs. A total of 22 additional borings were advanced. Of these, three borings were advanced at SWMU 5; two borings at SWMU 6; five borings at SWMU 12; four borings at SWMU 31, and eight borings at SWMU 61. Three of the soil borings were converted into monitoring wells, and two rounds of groundwater samples were collected from a total of seven wells (three new and four existing) and analyzed for specific contaminants of concern (COCs) identified in the soil at each site.

Phase III field activities were conducted in June 2001. A total of 12 soil samples were collected for delineation purposes. Five monitoring wells were sampled for specific compounds as necessary for contaminant delineation/confirmation.

During each field effort, a portion of the soil sample volume submitted for each metals analysis was held at the laboratory to be utilized for synthetic precipitation leaching procedure (SPLP) extraction and analysis at a later date, if necessary. This SPLP extraction method was used in order to possibly provide a site-specific medium-specific concentration (MSC) if inorganic compounds were detected above the MSC. Therefore, if inorganic compounds were detected above the MSC and an SPLP extraction and analysis were performed, the results were compared to the industrial groundwater MSC. During Phase II of the RFI duplicate samples were collected for each organic constituent for immediate SPLP analysis in order provide a site-specific MSC before sample holding times expired. Table 1-2 presents the SPLP results and site-specific MSCs for the samples collected at SWMUs 12 and 31.

Table 1-2. SPLP Results and Site-Specific MSCs, SWMUs 12 and 31, NAS Fort Worth JRB, Texas

Soil Boring	Sample Depth (ft)	Analyte	Result (mg/Kg)	SPLP Result (mg/L)	MSC (mg/L)
BHGLSWMU12001	10'	Arsenic	10 5 J*	0 0113	0 0500
BHGLSWMU12002	0'	Cadmium	0 98*	0 0020 u	0 0050
BHGLSWMU12002	0'	Lead	[89 4]	[0 0944]	[0 0150]
BHGLSWMU12003	0'	Cadmium	0 74*	0 0020 u	0 0050
BHGLSWMU12003	0'	Lead	[57.8]	[0.1080]	[0 0150]
BHGLSWMU12004	5'	Benzene	[1 3 J]	[0 020]	[0 0050]
BHGLSWMU12004	5'	TPH	1,100*	5 0 u	NV
BHGLSWMU12004	5'	PHC (gasoline range)	370*	5 0 u	NV
BHGLSWMU12004	5'	PHC (diesel range)	740*	5 0 u	NV
BHGLSWMU31001	0'	Barium	506*	0 4030	2 0000
BHGLSWMU31001	0'	Cadmium	1.5*	0.0050 u	0 0050
BHGLSWMU31001	0'	Chromium	40 6*	0 0200 u	0.1000
BHGLSWMU31001	0'	Mercury	0 57*	0 0020 u	0 0020
BHGLSWMU31001	0'	Lead	[159]	[0 0175]	[0 0150]
BHGLSWMU31002	0'	Cadmium	0 99*	0 0020 u	0 0050
BHGLSWMU31002	0'	Lead	[58 5]	[0 0630]	[0 0150]

Notes:

MSC = Medium-specific concentration for industrial groundwater

Values in brackets indicate SPLP concentrations detected above MSC

NV = No Value

* = Indicates site-specific MSC

u = The analyte was analyzed for, but not detected The associated numerical value is the MQL

J = Estimated concentration

PHC = Petroleum hydrocarbon

No SPLP analysis was performed at SWMU 61

2.0 RCRA Facility Investigation Summary

The following sections summarize the analytical results from the RFI field activities and the rationale for the IRAs at SWMUs 12, 31, and 61.

2.1 Solid Waste Management Unit 12

During the Phase I RFI, three characterization soil borings were advanced within SWMU 12 using direct-push technology (DPT). Soil samples were collected from each boring every 5 feet from the ground surface to the top of the water table and analyzed for total petroleum hydrocarbons (TPH) (Method TX1005), and Appendix IX volatile organic compounds (VOCs) (Method 8260B), semi-volatile organic compounds (SVOCs) (Method 8270C), and metals/mercury (Method 6010/7000). The water table was encountered at 14.5 feet below ground surface (ft-bgs). Analytical results above RRS 1 from the Phase I soil boring locations are presented in Figure 2-1.

Several COCs were identified in the surface and subsurface soils during the initial characterization activities. As a result, five additional soil borings were advanced at SWMU 12 during Phase II in order to delineate the lateral extent of the surface and subsurface contamination. One soil boring, BHGLSWMU12004, was advanced northwest of boring BHGLSWMU12001, and a second soil boring, BHGLSWMU12005, was advanced southeast of boring BHGLSWMU12003. A third soil boring, BHGLSWMU12006, and a fourth soil boring, BHGLSWMU12007, were advanced west of boring BHGLSWMU12001 and southwest of boring BHGLSWMU12003, respectively. A fifth soil boring, WHGLTA028, was advanced east of SWMU 12 and completed as a monitoring well to permit groundwater sampling downgradient of the site. All Phase II analytical results are presented in Figure 2-1.

Analytical results from the Phase II surface and subsurface samples collected at SWMU 12 indicate that additional sampling was required for delineation to background concentrations. Figure 2-1 illustrates the Phase III sampling locations with associated analytical results. One soil boring, BHGLSWMU12008, was advanced southwest of boring BHGLSWMU12006, and a second soil boring, BHGLSWMU12009, was advanced southwest of boring BHGLSWMU12004. A third soil boring, BHGLSWMU12010, was advanced northwest of boring BHGLSWMU12004. A fourth soil boring, BHGLSWMU12011, was advanced northeast of boring BHGLSWMU12004, and north of BHGLSWMU12001, respectively

2.1.1 Surface Soil

Several COCs were identified in surface soils at SWMU 12 following Phase I of the RFI (Figure 2-1). These COCs include cadmium and lead detected in the surface samples collected from borings BHGLSWMU12002 and BHGLSWMU12003. Additional COCs detected in the surface soil sample collected from boring BHGLSWMU12003 include benzo[*a*]anthracene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, and indeno[1,2,3-*c,d*]pyrene. Although other constituents were detected above background concentrations in these two borings, no pattern of occurrence could be established, and as a result, no further sampling was conducted.

In order to delineate the organic and inorganic COCs in the surface soils at SWMU 12, boring BHGLSWMU12005 was advanced at the southeast end of SWMU 12, and boring WHGLTA028 was advanced to the east (Figure 2-1). Soil samples were collected at the surface interval of each boring and analyzed for cadmium and lead to delineate the lateral extent of contamination detected in borings BHGLSWMU12002 and BHGLSWMU12003. The surface sample collected from boring BHGLSWMU12005 was also analyzed for benzo[*a*]anthracene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, and indeno[1,2,3-*c,d*]pyrene in order to delineate the lateral extent of the organic contamination in the surface of boring BHGLSWMU12003. These borings successfully delineated COCs detected at BHGLSWMU12002 and BHGLSWMU12003.

Surface soil sampling locations BHGLSWMU12006 and BHGLSWMU12007 were advanced in the parking lot near the northwest and southwest sides of SWMU 12, respectively. Borings BHGLSWMU12006 and BHGLSWMU12007 successfully delineated cadmium and lead detected in borings BHGLSWMU12002 and BHGLSWMU12003. Note that cadmium was detected below background [(0.556 milligrams per kilogram (mg/kg)] in the BHGLSWMU12006 parent sample (0.24 F mg/kg) and just above background (0.7 F mg/kg) in the duplicate sample Based on these results, the duplicate sample result is considered a natural variation of background

Concentrations of several polynuclear aromatic hydrocarbons (PAHs) were also detected in the surface sample collected from borings BHGLSWMU12002 and BHGLSWMU12003. These PAHs were detected in the surface sample collected adjacent to the asphalt parking lot, and were not detected in the subsurface samples collected from the same borings. As a result, these concentrations of PAHs are most likely related to the asphalt parking lot and are not indicative of a release from SWMU 12.

2.1.2 Subsurface Soil

Several COCs were identified in the subsurface characterization soil samples collected from SWMU 12. These COCs include arsenic, which was detected in the sample collected at the 10-foot interval of boring BHGLSWMU12001, along with concentrations of total petroleum hydrocarbons (TPH)[2], benzene, and vinyl chloride, detected at the 5- and 10-foot intervals of borings BHGLSWMU12001 and BHGLSWMU12002. These COCs were the subject of subsurface Phase II delineation at SWMU 12. Boring BHGLSWMU12004, advanced at the northwest end of SWMU 12 delineated the lateral extent of arsenic and benzene in the 10-foot interval of boring BHGLSWMU12001. However, the highest concentrations of benzene and TPH at SWMU 12 were detected in the 5-foot interval of BHGLSWMU12004 (Figure 2-1). Samples from this interval were analyzed for TPH and benzene using the SPLP method The results for TPH were less than the industrial groundwater MSC, but the result for benzene exceeded the industrial groundwater MSC. As a result, three additional soil borings were advanced during Phase III to delineate benzene, toluene, ethylbenzene, xylene (BTEX) and TPH detected in the 5-foot interval of BHGLSWMU12004—boring BHGLSWMU12009 was advanced southwest of BHGLSWMU12004, boring BHGLSWMU12010 was advanced northwest of

[2]TPH sample results are comprised of the total value of the sample results for gasoline range and diesel range petroleum hydrocarbons (PHCs).

BHGLSWMU12004, and BHGLSWMU12011 was advanced northeast of BHGLSWMU12004 and north of BHGLSWMU12001.

In addition, the Phase II soil boring BHGLSWMU12006 successfully delineated arsenic with a concentration of 6.8 F mg/kg, which is considered to be a natural variation of background, benzene, and vinyl chloride in the 10-foot interval, and TPH in the 5-foot interval west of BHGLSWMU12002. However, as benzene was not delineated in the 5-foot interval of BHGLSWMU12006, Phase III boring BHGLSWMU12008 was advanced to delineate benzene southwest of BHGLSWMU12006. Similarly, Phase II soil boring BHGLSWMU12007 delineated arsenic, with a decreasing concentration considered a natural variation of background, benzene and vinyl chloride in the 10-foot interval; and benzene and TPH in the 5-foot interval south of BHGLSWMU12001. Note that further delineation of arsenic to the southwest is impeded by utilities and Building 1602.

Subsurface soil samples collected from Phase II boring WHGLTA028 at the 5- and 10-foot intervals successfully provided eastern delineation of benzene and TPH (5-foot interval); and arsenic, benzene, and vinyl chloride (10-foot interval). These COCs were originally detected in subsurface soils sampled from borings BHGLSWMU12001 and BHGLSWMU12002. Phase II boring BHGLSWMU12005 also provided delineation of subsurface PAHs to the southeast of boring BHGLSWMU12003.

Note that concentrations of several PAHs were detected in the soil sample collected at the 5-foot interval of boring BHGLSWMU12001. These PAHs were detected in the sample collected adjacent to the asphalt parking lot, and were not detected in the 10-foot sample collected from the same boring As a result, these concentrations of PAHs are most likely related to the asphalt parking lot and are not indicative of a release from SWMU 12.

Concentrations slightly above RRS 1 of cobalt (7.5 mg/kg) and copper (15.8 J mg/kg) were detected in the sample collected from the 5-foot interval, and acetone (0.012 mg/kg) was detected in the sample collected from the 10-foot interval of boring BHGLSWMU12003. Since cobalt, copper, and acetone were detected in only one sample at SWMU 12, no pattern of occurrence can be established. Based on this information, these detections of cobalt, copper, and acetone are not indicative of a release from SWMU 12 and do not warrant further consideration.

2.1.3 Groundwater

WHGLTA028 was completed as a downgradient monitoring well for SWMU 12. Well WHGLTA028 was the only monitoring well originally proposed for groundwater sampling at SWMU 12. However, based on the presence of BTEX-related compounds in the Phase II delineation borings and the presence of benzene in the Round 1 groundwater sample collected from WHGLTA028, an additional well, WCHMHTA012, was sampled in order to gather cross-gradient background data at the site (Figure 2-1) during Round 2. Two rounds of groundwater sampling were conducted at WHGLTA028 and one round was collected at WCHMHTA012. Groundwater samples were analyzed for selected total metals (arsenic and lead), and selected VOCs (benzene and vinyl chloride). Arsenic and lead were not detected in the first round at WHGLTA012 but arsenic was detected at a low concentration slightly above background in the second round of sampling. Arsenic was also detected at a similar concentration in the sample

collected from cross-gradient well WCHMHTA012, suggesting that a source may exist to the west of SWMU 12. Similarly, benzene and vinyl chloride were detected at low concentrations in both rounds at WHGLTA028; however, benzene and vinyl chloride were detected at higher concentrations in WCHMHTA012, also suggesting an upgradient source for these compounds west of SWMU 12. Additional monitoring wells are necessary to fully characterize groundwater contamination as described in Section 4.1.2. These wells will be installed and sampled according to the RFI Field Sampling Plan prepared in 1999 (HydroGeoLogic, 1999). The presence of vinyl chloride in the groundwater at the site is most likely attributed to the basewide trichloroethene (TCE) plume. As a result, no further groundwater sampling for vinyl chloride at SWMU 12 is recommended.

2.2 Solid Waste Management Unit 31

As depicted on Figure 2-2, SWMU 31 is located within the boundaries of SWMU 29 (Landfill 2). Two initial characterization soil borings, BHGLSWMU31001 and BHGLSWMU31002, were advanced at SWMU 31 during Phase I of the RFI using DPT. Various types of landfill debris were encountered in both borings between 4 ft-bgs and 10 ft-bgs. This debris consisted of glass fragments, concrete rubble, and coarse gravel. Soil samples were collected from each boring every 5 feet from the ground surface to the top of the water table and analyzed for TPH (Method TX1005), and Appendix IX VOCs/Freon 113 (Method 8260B), SVOCs (Method 8270C), and metals/mercury (Method 6010/7000) The water table was encountered from 18 ft-bgs to 20 ft-bgs. Analytical results above RRS 1 from the Phase I soil boring locations are presented in Figure 2-2.

Analytical results from surface samples collected at SWMU 31 indicated that additional sampling was required for delineation to background concentrations. Four additional Phase II surface soil samples were collected at SWMU 31 to delineate the lateral extent of the surface contamination. One surface soil sample, BHGLSWMU31003, was collected slightly west of boring BHGLSWMU31002, and a second surface soil sample, BHGLSWMU31004, was collected south of boring BHGLSWMU31002 A third surface soil sample, BHGLSWMU31005, was collected east of boring BHGLSWMU31001, and a fourth surface soil sample, BHGLSWMU31006 was collected northeast of boring BHGLSWMU31001. A discussion of the analytical results from these soil sample locations is provided in the following sections. All Phase II analytical results are presented in Figure 2-2.

2.2.1 Surface Soil

Several inorganic and organic COCs were identified in the surface soil samples collected at SWMU 31 (Figure 2-2). These COCs include cadmium, lead, benzene and methyl ethyl ketone (MEK) detected in the surface soil sample collected from BHGLSWMU31002, and barium, cadmium, chromium (total), lead, and mercury detected in the surface soil sample collected from BHGLSWMU31001. The delineation of these COCs was the focus of the Phase II investigation activities. It should be noted that SPLP was performed on metals detected in the surface soil samples of BHGLSWMU31001 and BHGLSWMU31002. Results from the SPLP analysis show that barium, cadmium, chromium (total), and mercury concentration were below the industrial groundwater MSC. Therefore, new site-specific MSCs were applied. However, the concentration

of lead in the SPLP extract exceeded the industrial groundwater MSC at both locations and remains at RRS 3 concentrations. Two Phase II surface soil samples, BHGLSWMU31003 and BHGLSWMU31004, located slightly west and south of boring BHGLSWMU31002, respectively, successfully delineated cadmium, lead, benzene and MEK. In addition, Phase II surface soil samples BHGLSWMU31005 and BHGLSWMU31006 successfully delineated barium, cadmium, chromium (total), lead, and mercury to the east and northwest of boring BHGLSWMU31001 respectively. As a result of the Phase II delineation results, a third phase of delineation at SWMU 31 was not required.

Concentrations of copper, zinc, and acetone were also detected in the surface soil samples collected at SWMU 31 above RRS 1 (Figure 2-2). Since copper, zinc, and acetone were detected in only one sample and the concentrations detected for these compounds were only slightly above RRS 1, no pattern of occurrence can be established. Based on this information, these detections of copper, zinc, and acetone are not indicative of a release from SWMU 31 and do not warrant further consideration. In addition, concentrations of several PAHs were detected in the surface soil samples collected at SWMU 31 (Figure 2-2). These PAHs were detected in the samples collected adjacent to the asphalt parking lot, and were not detected in the subsurface samples collected from the same borings. As a result, these concentrations of PAHs are most likely related to the asphalt parking lot and are not indicative of a release from SWMU 31.

2.2.2 Subsurface Soil

No COCs were identified in the subsurface soils at SWMU 31 following the initial RFI investigation. Mercury (0.2 mg/kg) was detected in the sample collected at the 15-foot interval of boring BHGLSWMU31002. However, since mercury was not detected either at the surface or at 5- or 10-foot intervals, this detection is most likely a result of natural variation in the background concentration and is not related to SWMU 31 activities. Consequently, the delineation of mercury in the 15-foot interval of BHGLSWMU31002 will be addressed as part of the current RFI of Landfill 2 (SWMU 29) No further subsurface soil sampling at this site is required.

2.2.3 Groundwater

All COCs at SWMU 31 were identified in the surface soil samples only. As a result, a groundwater investigation at SWMU 31 was not conducted.

2.3 Solid Waste Management Unit 61

During Phase I of the RFI, five characterization soil borings were advanced at SWMU 61 using DPT. Characterization soil boring locations are presented in Figure 2-3. Soil samples were collected from each boring every 5 feet from the ground surface to the top of the water table and analyzed for TPH (Method TX1005), soil pH (Method SW9045), ethylene glycol (Method 8015), and Appendix IX VOCs (Method 8260B), SVOCs (Method 8270C), and metals/mercury (Method 6010/7000). The water table was encountered between 9.5 ft-bgs and 10 ft-bgs. Analytical results above RRS 1 from the Phase I soil boring locations are presented in Figure 2-3.

Eight Phase II soil borings were advanced at SWMU 61 in May 2000 to delineate the lateral extent of the surface and subsurface contamination encountered in the Phase I characterization

borings. Three of the borings, BHGLSWMU61006, BHGLSWMU61007, and BHGLSWMU61008, were advanced from southwest to northwest, respectively, to delineate the western extent of SWMU 61. Five additional soil borings—BHGLSWMU61009, BHGLSWMU61010, WHGLTA034, BHGLSWMU61011, and WHGLTA035—were advanced from the north to southeast, respectively, to delineate the northern and eastern extent of SWMU 61. Borings WHGLTA034 and WHGLTA035 were advanced as monitoring wells to confirm subsurface lithology and to characterize groundwater downgradient of the site. Analytical results from these soil-boring and monitoring well locations are provided in the following sections. All Phase II analytical results are presented in Figure 2-3.

2.3.1 Surface Soil

One COC, tetrachloroethene (PCE), was detected at concentrations above the RRS 1 in surface soil samples collected from characterization borings BHGLSWMU61001 through SBSWMU61004 during the Phase 1 sampling event (Figure 2-3). PCE was not detected at characterization boring BHGLSWMU61005 Surface samples were collected from all eight Phase II borings (WHGLTA034, WHGLTA035 and BHGLSWMU61006 through BHGLSWMU61011) to delineate PCE. Analytical results indicate that PCE was delineated to the east at BHGLSWMU61010 and WHGLTA034 and to the southeast at BHGLSWMU61011 and WHGLTA035. However, PCE was detected in surface soils to the north and west at BHGLSWMU61006, BHGLSWMU61007, BHGLSWMU61008, and BHGLSWMU61009, with the highest concentration occurring at BHGLSWMU61008 (0.022 mk/kg). As a result, three Phase III surface soil-sampling locations were sampled to further delineate PCE at SWMU 61—boring BHGLSWMU61012 was advanced to the south, BHGLSWMU61013 was advanced to the northwest, and BHGLSWMU61014 was advanced to the north.

In addition to PCE, concentrations of several other VOCs and TPH were detected in the surface interval of boring BHGLSWMU61001. None of these constituents were detected in any of the other surface or subsurface samples collected at the site. In addition, boring BHGLSWMU61001 was advanced over a small stain at the surface. As these constituents are limited to the surface location of boring BHGLSWMU61001, no further sampling was conducted However, excavation of this surface location and conformation sampling is proposed in Subsection 4.3.1. Nickel (14.7 mg/kg) was detected slightly above background (14.6 mg/kg) in the surface soil sample collected from boring BHGLSWMU61005. As this detection of nickel was not repeated in any of the other samples collected at SWMU 61, no pattern of occurrence could be established. Based on this information, the detection of nickel is not indicative of a release from SWMU 61 and does not warrant further consideration (Figure 2-3).

2.3.2 Subsurface Soil

One COC was detected in subsurface characterization samples at SWMU 61. PCE was detected at concentrations above the RRS 1 in the 5-foot intervals of borings BHGLSWMU61001 through BHGLSWMU61004 (Figure 2-3). Subsurface samples were collected from the 5-foot intervals of all of the eight Phase II delineation borings, BHGLSWMU61006 through BHGLSWMU61011, WHGLTA034, and WHGLTA035. The Phase II soil samples were successful in delineating PCE to the north, east, southeast, and west of the unit. However, as PCE is not delineated to the south

of SWMU 61, an additional Phase III soil sample was collected from soil boring BHGLSWMU61012 to complete the delineation of this COC in the subsurface

2.3.3 Groundwater

Groundwater samples were collected from existing upgradient monitoring well WITCTA034 and the new downgradient monitoring wells WHGLTA034 and WHGLTA035 and analyzed for PCE and TCE. Analytical results from two rounds of sampling indicate that no PCE or TCE was detected in downgradient monitoring wells WHGLTA034 and WHGLTA035; however, PCE was detected at RRS 2 concentrations in both rounds, and TCE was detected at an RRS 2 concentration in the second round at the upgradient monitoring well WITCTA034. These results indicate a possible upgradient source of PCE and TCE.

3.0 Interim Remedial Action Objectives

The overall objective is to conduct IRAs necessary to obtain closure of the three subject SWMUs under the TNRCC RRS program. An overview of the RRS program is presented in Section 4.1 of the RFI WPs (HydroGeoLogic, 1999). In addition, the SWMUs at NAS Fort Worth JRB are subject to the specific requirements of the TNRCC permit (HW-50289). Specific permit requirements are discussed in greater detail in Section 3.2 of the RFI WPs (HydroGeoLogic, 1999).

In summary, this IRA is designed and conducted to achieve the following objectives:

- Conduct pre-removal confirmation sampling.
- Excavate a pre-determined volume of contaminated soil.
- Remove, properly contain, and dispose of the excavated and contaminated soil.
- Backfill with clean material.
- Re-grade and restore site to present configuration.

The size of the initially proposed excavations indicated in Section 4 were determined based on concentrations in the borings around which the excavations are to be centered and the concentrations in the surrounding borings. Each excavation may be larger than presented in the Work Plan if initial pre-confirmation samples determine that the excavations need to be larger.

4.0 Description of Remedial Actions

4.1 Solid Waste Management Unit 12

As noted above, alternative MSCs COCs at several SWMU 12 boring locations could not be established using SPLP and remain at RRS 3 concentrations. An IRA consisting of three excavations is to be conducted in order to remove RRS 3 contaminant concentrations.[3] The proposed excavations, appear to be the best interim remedy for attaining RRS 2 closure for the site soils (Figure 2-1). With the goal being to attain RRS 2 closure, confirmation sampling on excavation floors and sidewalls must indicate that COCs are below RRS 2 concentrations. This is determined by comparing the confirmation sampling result to the TNRCC established RRS 2 value, or the site-specific MSC, if it exists (Table 1-2). Pre-excavation confirmation sampling using DPT methods is recommended to ensure that the actual size of the excavation and volume of contaminated soils removed is known prior to the initiation of excavation activities. If RRS 3 concentrations are identified on the floor or sidewall of the excavation, then the aerial extent and/or depth of the excavation will be incrementally enlarged until confirmation sampling indicates that RRS 2 concentrations of COCs have been established on all faces of the excavation area. Specific details about each excavation are outlined below.

4.1.1 Excavation Description

Excavation SWMU12A is for the removal of benzene and TPH contaminated soils at the 5-foot sampling interval of boring BHGLSWMU12004. Excavation SWMU12A will be centered on the location of boring BHGLSWMU12004. The dimensions of the excavation will extend to 7 feet wide by 7 feet long, with an excavation depth of 7 feet (12.7 cubic yards). A confirmation sample will be collected and analyzed for benzene and TPH directly below BHGLSWMU12004 at a depth of 7 ft-bgs. Four additional samples, analyzed for benzene and TPH only, will be collected at the 5-foot interval with locations centered on each the north, south, east, and west sidewalls of the excavation.

Excavation SWMU12B is for the removal of surface soils contaminated with RRS 3 concentrations of lead and other RRS 2 compounds. Excavation SWMU12B is to be centered on the location of boring BHGLSWMU12002. The initial excavation will extend to 5 feet long by 5 feet wide, with an excavation depth of 2 feet (1.9 cubic yards). A confirmation sample will be collected and analyzed for lead, cadmium, and zinc directly below BHGLSWMU12002 at a depth of 2 ft-bgs. Four additional samples, analyzed for lead, cadmium, and zinc only, will be collected at the 2-foot interval with locations centered on each the north, south, east, and west sidewalls of the excavation.

Excavation SWMU12C is for the remediation and removal of surface soils contaminated with RRS 3 concentrations of lead and other RRS 3 compounds. Excavation SWMU12C is to be centered on the location of boring BHGLSWMU12003. The initial excavation will extend to 5 feet long by 5 feet wide, with an excavation depth of 2 feet (1.9 cubic yards). A confirmation

[3]IRA excavation boundaries may be altered and/or additional IRA sites may be added to the area of all SWMUs in this IRA WP and are subject to confirmation sampling of the excavated area.

sample will be collected and analyzed for lead and PAHs directly below BHGLSWMU12003 at a depth of 2 ft-bgs. Four additional samples, analyzed for lead and PAHs only, will be collected at the 2-foot interval with locations centered on each the north, south, east, and west sidewalls of the excavation.

Excavation SWMU12D is for the remediation and removal of surface soils contaminated with RRS 3 concentrations of PHC (gasoline range). Excavation SWMU12D is to be centered on the location of boring BHGLSWMU12001. The initial excavation will extend to 7 feet long by 7 feet wide, with an excavation depth of 7 feet (12.7 cubic yards). A confirmation sample will be collected and analyzed for PHC directly below BHGLSWMU12001 at a depth of 7 ft-bgs. Four additional samples, analyzed for PHC only, will be collected at the 7-foot interval with locations centered on each the north, south, east, and west sidewalls of the excavation.

4.1.2 Groundwater

As previously described in Subsection 2.1.3, additional groundwater sampling is necessary at SWMU 12. An additional downgradiant monitoring well is proposed at SWMU 12 along with an upgradient monitoring well in order to more fully characterize groundwater contamination at SWMU 12. The proposed locations of these wells are depicted on Figure 2-1. After these additional monitoring wells are installed, all four monitoring wells at SWMU 12 should be sampled for VOCs, SVOCs, and metals. Additional sampling may be necessary based on the sampling results from the initial round.

4.2 Solid Waste Management Unit 31

As noted in Subsection 2.2.1, an alternative MSC for lead detections at several SWMU 31 boring locations could not be established using SPLP and remain at RRS 3 concentrations. As a result, an IRA consisting of two excavations will be conducted at SWMU 31. The proposed excavations appear to be the best interim remedy for attaining RRS 2 closure for site soils (Figure 2-2). With the goal being to attain RRS 2 closure, confirmation sampling on excavation floors and sidewalls must indicate that COCs are at RRS 2 concentrations or lower. This is determined by comparing the confirmation sampling result to the TNRCC established RRS 2 value, or the site-specific MSC, if it exists (Table 1-2) Pre-excavation confirmation sampling using DPT methods is recommended to ensure that the actual size of the excavation and volume of contaminated soils removed is known prior to the initiation of excavation activities. If RRS 3 concentrations are identified on the floor or sidewall of the excavation, then the aerial extent and/or depth of the excavation will be incrementally enlarged until confirmation sampling indicates that RRS 2 concentrations of COCs have been established on all faces of the excavation area. Specific details about each excavation are outlined below.

4.2.1 Excavation Description

Excavation SWMU31A, centered on BHGLSWMU31002, is intended to achieve the removal of surface soils contaminated with RRS 3 concentrations of lead and other RRS 2 compounds. The initial excavation will extend to 5 feet long by 5 feet wide, with an excavation depth of 2 feet (1.9 cubic yards). A confirmation sample will be collected and analyzed for lead, cadmium, benzene, and MEK directly below BHGLSWMU31002 at a depth of 2 ft-bgs. Four additional samples,

analyzed for lead and cadmium only, should be collected at the 5-foot interval with locations centered on each the north, south, east, and west sidewalls of the excavation.

Excavation SWMU31B, centered on BHGLSWMU31001, is also intended for the removal of surface soils contaminated with RRS 3 concentrations of lead and other RRS 2 compounds (Figure 2-2) The initial excavation will extend to 5 feet long by 5 feet wide, with an excavation depth of 2 feet (1.9 cubic yards) A confirmation sample will be collected and analyzed for lead, barium, cadmium, chromium, mercury, and zinc directly below BHGLSWMU31001 at a depth of 2 ft-bgs. Four additional samples, analyzed for lead, barium, cadmium, chromium, mercury, and zinc only, will be collected at the 2-foot interval with locations centered on each the north, south, east, and west sidewalls of the excavation.

4.2.2 Groundwater

All COCs at SWMU 31 were identified in the surface soil samples only. As a result, a groundwater investigation at SWMU 31 will not be conducted.

4.3 Solid Waste Management Unit 61

Although PCE was the only VOC detected at intervals other than the surface, several other petroleum-related VOCs were detected in the surface sample collected from boring BHGLSWMU61001. This sample was collected in a small area of stained soil. An IRA will be conducted to remove these COCs. This excavation appears to be the best interim remedy for attaining RRS 2 closure for site soils (Figure 2-3). With the goal being to attain RRS 2 closure, confirmation sampling on excavation floors and sidewalls must indicate that COCs are at RRS 2 concentrations or lower. This is determined by comparing the confirmation sampling result to the TNRCC established RRS 2 value, or the site-specific MSC, if it exists (Table 1-2). Pre-excavation confirmation sampling using DPT methods is recommended to ensure that the actual size of the excavation and volume of contaminated soils removed is known prior to the initiation of excavation activities. If RRS 3 concentrations are identified on the floor or sidewall of the excavation, then the aerial extent and/or depth of the excavation will be incrementally enlarged until confirmation sampling indicates that RRS 2 concentrations of COCs have been established on all faces of the excavation area Specific details about each excavation are outlined below.

4.3.1 Excavation Description

Excavation SWMU61A, centered on BHGLSWMU61001, intended for the removal of soils contaminated with RRS 3 concentrations of PCE and TPH as well as other RRS 2 VOCs. The initial excavation is to extend to 10 feet long by 10 feet wide, with an excavation depth of 2 feet (7.4 cubic yards). A confirmation sample will be collected and analyzed for VOCs and TPH directly below BHGLSWMU61001 at a depth of 2 ft-bgs. Four additional samples, analyzed for VOCs and TPH, will be collected at the 2-foot interval with locations centered on each the north, south, east, and west sidewalls of the excavation.

4.3.2 Groundwater

Groundwater samples were collected from existing upgradient monitoring well WITCTA034 and the new downgradient monitoring wells WHGLTA034 and WHGLTA035 and analyzed for PCE and TCE. Analytical results from two rounds of sampling indicate that no PCE or TCE was detected in downgradient monitoring wells WHGLTA034 and WHGLTA035, however, PCE was detected at RRS 2 concentrations in both rounds, and TCE was detected at an RRS 2 concentration in the second round at the upgradient monitoring well WITCTA034. These results indicate a possible upgradient source of PCE and TCE. A third round of groundwater sampling for PCE and TCE is to be conducted from monitoring wells WITCTA035, WHGLTA034, and WHGLTA035. In addition, a collection of groundwater samples will be taken from monitoring well SD13-05 to verify an offsite upgradient source of the PCE and TCE (Figure 2-3).

5.0 Description of Work

Figure 1-1 shows the location of each SWMU. The areas to be excavated are shown on Figures 2-1, 2-2, and 2-3.

In the event that hazardous materials are discovered during excavation at any site, the excavation will be temporarily halted and the potential threat to human health and/or the environment will be evaluated along with consultation with the AFCEE and TNRCC field inspector. Potentially hazardous soils, liquids, or similar materials that do not pose an immediate or short-term threat to human health or the environment will be appropriately contained and transported to the investigation-derived waste (IDW) storage area. Potentially hazardous soils, liquids, or similar materials that do pose an immediate or short-term threat to human health or the environment will be handled as an emergency response.

If unexploded ordnance is encountered, work will be halted and control of the site given over to the appropriate Air Force and Navy personnel. The excavation effort will resume only if clearance is given in writing by an authorized Air Force or other Department of Defense representative.

The IRA herein described is anticipated to begin in October 2001 and Tasks 1 through 8 are expected to last from two to four weeks, with the exception of additional groundwater sampling that may be necessary at SWMU 12. This IRA WP is divided into nine tasks:

- Task 1 – Mobilization/demobilization
- Task 2 – Site preparation and clearance
- Task 3 – Excavation
- Task 4 – Temporary storage and disposal of excavated materials
- Task 5 – Transport and disposal of COC soils
- Task 6 – Acquisition and transport of clean fill
- Task 7 – Backfill and site restoration
- Task 8 – Equipment decontamination
- Task 9 – Reporting

5.1 Task 1 – Mobilization / Demobilization

This task includes all necessary planning, site clearances, preparation of any permit applications, and efforts needed to obtain necessary permits. It also includes site preparation and mobilizing personnel and equipment to the site. EEG will act as the initial point of contact with the base for all activities and will obtain utility clearances from NAS Fort Worth JRB. Prior to mobilization, EEG will apply for dig permits through the Navy Public Works office, and will keep these permits, once obtained, in clear view at each work site. EEG will also obtain all other permits, applications, certificates, and other documents required by federal, state, and local authorities to perform and complete each remedial action.

If necessary, traffic will be routed around each work site with minimal interference to normal traffic patterns. EEG's subcontractor will maintain access to the work site at all times and furnish

all signs, barricades, and flagmen required to control traffic. All signs and barricades shall be in accordance with the American National Standards Institute (ANSI) D6.1, Manual of Uniform Traffic Control Devices. If needed, temporary fencing or other barricades will be installed to restrict access to the work sites or to control vehicle or pedestrian traffic. Traffic patterns will minimize the chance of accidents and protect the public and worker safety. The use of traffic patterns may be initiated in areas where base personnel must travel in proximity to the IRA site.

Prior to commencement of work, all excavation equipment shall be cleaned and decontaminated according to the guidelines described in Subsection 5.8. The equipment shall not leak any fluids that may enter the excavation or contaminate equipment that is placed in the pits. If hazardous material is encountered, any necessary permits for excavation, transport, and/or disposal of hazardous debris will be obtained in a timely manner.

5.2 Task 2 – Site Preparation and Clearance

No excavation shall be performed until a NAS Fort Worth JRB digging permit is acquired, underground utility clearances have been obtained, and site utilities have been field located The subcontractor shall take the necessary precautions to ensure that no damage occurs to existing structures and utilities. Although EEG will acquire the necessary utility clearances before work begins, the subcontractor is required to verify the safe vertical limit of excavating equipment for working in the vicinity of active electrical components.

Before any excavation equipment is moved into the project areas, decontamination areas pertaining to either individual excavation sites or those in close proximity to each other shall be identified and provided for excavators and other equipment. The decontamination areas shall be large enough to allow storage of cleaned equipment and materials prior to use, as well as to stage drums of decontamination waste. The decontamination area shall be lined with a heavy-gauge plastic sheeting and designed with a collection system to capture decontamination waters. Solid wastes shall be accumulated in 55-gallon drums and subsequently transported to the waste storage area designated by authorized base personnel Smaller decontamination areas for personnel and portable equipment shall be provided as necessary. These locations shall include basins or tubs to capture decontamination fluids, which shall be transferred to a large accumulation tank as necessary. The IDW storage area is located in the Civil Engineering Storage Yard south of Building 1337. Containers of IDW from all three excavation areas will be brought to this storage lot. IDW shall be properly containerized and temporarily stored at each site prior to transportation into the storage lot. General waste-handling procedures are discussed in Section 5.5.

For the completion of IRAs at SWMU 12 and 61, it may be necessary to remove chain-link fencing that presently runs along at least one side of the SWMUs. If it becomes necessary to remove or, by the act of excavation the structural integrity of the fencing is compromised, the excavation subcontractor shall provide for the reinstallation of said fencing. In the event that existing fencing must be removed or temporarily relocated, the subcontractor shall take steps to ensure the security of the site and the safety of workers or base personnel that may be in the area, especially after normal working hours. This will be accomplished by use of various types of barriers or temporary fencing as the site manager shall deem appropriate.

5.3 Task 3 – Excavation

Figures 2-1, 2-2, and 2-3 show the areas to be excavated for each site. The site-specific dimensions are listed above in Subsections 4.1.1, 4.2.1, and 4.3.1. The location of each excavation site will be clearly marked in the field by EEG before the excavation activities commence. At each site, the excavation subcontractor will maintain an excavation of sufficient size to allow workers to complete all necessary tasks related to this IRA in a safe and timely manner. All contractors and subcontractors shall follow Occupational Safety and Health Administration (OSHA) rules for excavation and confined space entry. Sheeting, bracing, or shoring shall be installed in the absence of adequate side slopes if there is a need for workers to enter the excavated area. The subcontractor will submit specifications to EEG for sheeting, bracing, or shoring that shall be installed in the absence of adequate side slopes if there is a need for workers to enter any excavation areas that are greater than 4 feet deep.

Excavation and sampling activities will be monitored with an organic vapor monitor such as a photo-ionization detector or an organic vapor analyzer. Additional monitoring devices may be deemed advisable such as Draeger tubes and a LEL/02 for benzene monitoring at depth.

Surface water shall be diverted to prevent entry into the excavation. The subcontractor will protect the site from puddling or running water, or accumulation of standing water in excavations. Excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. All excavated soils will be temporarily stored in such a way as to prevent movement of COC soils from the containment area. This would include protection from precipitation events or displacement of material by wind. This could involve utilization of a water-impermeable tarp between the ground and the bottom of the pile that is protected from surface water by a berm structure around its perimeter and under the tarp. The berm structure can be achieved by clean fill, or dimensional lumber laid end to end, or uncontaminated soil. The whole pile would also be covered by a secured water-impermeable tarp to protect the deposited COC soil from precipitation and wind.

It is not expected that excavation activity will come into contact with the water table at any of the WAAs addressed by this IRA. Nevertheless, the subcontractor shall be prepared to deal with any dewatering of the excavation pit necessary for the adequate completion of the proposed work. If large volumes of water are to be pumped, the subcontractor will station a portable water storage tank for collection of removed water Any dewatering that might be needed shall be limited to that necessary to ensure adequate access and safe excavation and to ensure that compaction requirements can be met.

No blasting will be permitted. No open burning of trash, brush, or refuse will be permitted. In addition, the subcontractor will take steps to ensure that no accumulation of litter or debris shall accumulate or be deposited at the IRA site herein described. Appropriate waste containers, where necessary, shall be provided by the subcontractor.

The subcontractor will treat areas subject to dust-producing activities with liquid palliatives that will not harm re-growth of vegetation or with another such method of dust control that complies with base regulations. Likewise, excavated materials stored for subsequent use as backfill will be treated or protected to control the production of dust in accordance with base regulations.

EEG will conduct all soil and water sampling in accordance with TNRCC regulations during excavation activities. All bottleware, sampling supplies, and sample analyses will be provided by EEG Sampling intervals for each SWMU excavation is as stated above in Section 4.0. Stockpiled soils will also be tested after removal so as to determine suitability for backfill or appropriate containment and disposal. Each sample shall be homogenized and quartered before being containerized. Samples collected for VOC analysis shall be containerized prior to sample homogenization. Stainless steel scoops or trowels, glass jars with Teflon™ lids, or equivalent equipment compatible with the chemical analyses proposed shall be used to collect and store samples. Any above-ground vegetative matter or debris will be excluded from the sample.

Specific suites of laboratory analyses are prescribed for each individual SWMU addressed by this IRA WP. Analytical methods and COCs to be tested are listed in Figures 2-1, 2-2, and 2-3.

Appropriate methods for the collection of samples will be dependent upon the method of analysis chosen. Samples will be collected from the exposed soil surface using a stainless steel hand trowel for metals, TPH, or SVOCs. VOC samples will be collected using the EnCore™ soil sampler. The Quality Assurance Project Plan (HydroGeoLogic, 2000c) will be used to ensure that the data collected is accurate and representative.

The sampling crew will record any unusual surface conditions that may affect the chemical analyses, such as (1) asphalt pieces that may have been shattered by mowers, thus spreading small fragments of asphalt over the sampling area; (2) distance to roadways, aircraft runways, or taxiways; (3) obvious deposition of contaminated or clean soil at the site; (4) evidence of dumping or spillage of chemicals; (5) soil discoloration; and/or (6) unusual condition of growing plants, etc.

5.4 Task 4 – Temporary Storage and Disposal of Excavated Materials

The State of Texas requires the generator to determine if the waste is hazardous within 90 days from the date it was produced. In AFCEE's agreement with the Navy, hazardous or non-hazardous waste will not be stored on base for more than 90 days. In the event that hazardous materials are discovered during this investigation, the subcontractor will stop work and notify the EEG field supervisor for further direction. Potentially hazardous soils, liquids, or similar materials that do not pose an immediate or short-term threat to human health or the environment will be secured in the manner described in Section 5.2 and Appendix A.

Hazardous material shall be stored in 55-gallon drums or other sealed containers suitable for prevention of contaminant release. Storage shall comply with RCRA regulations and relevant TNRCC requirements for temporary storage of hazardous materials. Field personnel will use proper drum-labeling techniques in order to identify the origin of the waste. All drums will be placed on wood palettes. Field personnel will complete the IDW Inventory Sheet to log all waste produced. At the completion of all excavation work at the three sites, composite samples of the waste will be collected by the field sampling team and submitted to an approved laboratory for analysis. Analytical testing will be performed to characterize any potentially hazardous debris found during the excavation. Following receipt of analytical results, EEG will request approval for disposal of the waste from the receiving disposal facility.

Upon approval, solids will be disposed of at a permitted landfill. Depending on the analytical results for containerized water, the water may be discharged into the base sanitary sewer at the Civil Engineering Storage Yard via Manway #4, or shipped off-site for disposal. Depending on the volume of IDW produced, the drums containing solids are either emptied into a roll-off container by field sampling personnel or removed by a licensed transporter to the landfill. Water that is transferred into the sanitary sewer system will be documented on the IDW Inventory Sheet by field personnel for submittal to the Navy. Waste that is transported off-base will be accompanied by a waste manifest that is completed by EEG and signed by an AFCEE representative.

Potentially hazardous soils, liquids, or similar materials that do pose an immediate or short-term threat to human health or the environment will be handled by the subcontractor as an emergency response.

For any spill of hazardous material that could threaten or harm human health or the environment, or that exceeds the reportable quantity limits under 40 CFR 302.4, EEG will immediately notify the following entities:

- Base fire department
- AFCEE
- TNRCC
- National Response Center at 1-800-424-8802

The spill will be immediately cleaned up and the material will be re-collected and stored for proper disposal. Written reports in accordance with relevant TNRCC guidance will be submitted within 15 calendar days.

5.5 Task 5 – Transport and Disposal of COC Soils

All soil and debris that is to be removed should be treated as potentially hazardous, though it is not anticipated to be. Field screening and definitive analytical laboratory analysis is to be utilized to verify that material is non-hazardous. EEG will maintain a log of the materials and any visible signs of contamination encountered during excavation.

The subcontractor shall segregate and contain any and all excavated material in the manner described in Sections 5.3 and 5.4 and Appendix A. All materials will be handled, transported, stored, and disposed of in accordance with applicable federal, state, and local laws, ordinances, or other rulings having the effect of law, including but not limited to the items listed below:

- Resource Conservation and Recovery Act (42 USC 6901)
- Clean Water Act (33 USC 1251)
- Clean Air Act (42 USC 7401-7642)
- Toxic Substances Control Act (15 USC 260)
- National Environmental Policy Act (42 USC 4321-4347)
- Hazard Communication (OSHA Std 29 CFR 1910.1200)

Disposal of COC soils shall be performed by the subcontractor in accordance with all local, state, and federal solid and hazardous waste laws and regulations, and conditions specified herein. This work shall include all necessary personnel, labor, transportation, packaging, documentation (if

required for disposal, manifesting, or completing waste profile sheets), equipment, and reports. EEG will perform all sampling and analyses needed to support the determination of the disposal method. Personal protective equipment and other associated miscellaneous wastes are expected to be non-hazardous and will be packed in appropriate IDW containers.

Transportation shall be provided in accordance with Department of Transportation hazardous material regulations and state and local requirements, including obtaining all necessary permits, licenses, and approvals. Evidence that a state licensed hazardous waste transporter is being used shall be submitted to EEG. Transport vehicles shall not be overloaded and will have the ability to totally enclose the waste soils so as to prevent loss or wetting during transport. Transportation, treatment, disposal methods and dates, the quantities of waste, the names and addresses of each transporter, and the disposal or reclamation facility shall also be made available for inspection, as well as copies of manifests and certifications of final treatment/disposal signed by the responsible disposal facility official.

The wastes shall be taken to a treatment, storage, or disposal facility that has EPA or appropriate state permits and hazardous waste identification numbers and complies with the provisions of all applicable federal, state and local regulations. The original return copy of the hazardous waste manifest, signed by the owner or operator of a facility legally permitted to treat or dispose of those materials shall be furnished to EEG not later than 10 working days following the delivery of those materials to the facility. A statement of agreement and sampling requirements from the proposed treatment, storage, or disposal facility and certified transporters to accept hazardous wastes shall be furnished to EEG not less than 14 days before transporting any wastes. If the subcontractor selects a different facility than is identified in the proposal, documentation shall be provided for approval to certify that the facility is authorized and meets the standards specified in 40 CFR 264.

5.6 Task 6 – Acquisition and Transport of Clean Fill

Depending upon the results of stockpile characterization and confirmation sampling, the excavated material may be used as backfill when the excavation has been completed. No borrow material from other unrelated sites on NAS Fort Worth JRB will be used for fill material. If needed, satisfactory off-site fill will be brought in and will consist of clean, sound, durable particles and be free of hazardous materials, roots, grass, or other biodegradable materials. All backfill materials delivered into the base shall be transported in accordance with 49 CFR 172, 173, 178, and 179, and all other applicable local, state, and federal transportation regulations.

5.7 Task 7 – Backfill and Site Restoration

Satisfactory excavated materials may be used as backfill. Non-hazardous excavated material shall be backfilled immediately after the required information has been recorded. The first soils that were excavated shall be the last replaced when filling each pit, so that native soils will be restored at the ground surface No excavation pit shall be left open overnight unless adequate safety precautions are employed. No borrow material from other unrelated sites on NAS Fort Worth JRB will be used for fill material Soils will be backfilled until compaction requirements are met and the original grade is restored.

At each excavation location, the subcontractor must compact soils when backfilling, using 6-inch lifts, to obtain a 95 percent density for materials returned to excavation pits. At least three compaction density tests shall be performed, in accordance with ANSI/ASTM D1556, ANSO/ASTM D1557, or ANSI/ASTM D698. The degree of compaction required is expressed as a percentage of the maximum density obtained by the compaction test procedure using a Nuclear Density Test Gauge. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

The fill material shall be mixed and blended to the proper moisture content before beginning compaction. The mixed material shall be placed on the prepared subgrade in layers of uniform thickness. The surface shall be finished to a smooth and compact surface in accordance with the lines, grades, and cross-sections of existing surfaces at each site. The lines and grades including cross and crown slope indicated for the select fill shall be maintained by means of line and grade stakes.

Segregated soil stockpiles that appear or are suspected to be contaminated with hazardous substances are to be contained and disposed of in accordance with provisions outlined in Sections 5.4 and 5.5. Stockpiled soils subjected to chemical confirmation testing may be used as backfill if they are found to conform to the requirements of clean fill per TNRCC regulation, 30 Texas Administrative Code 334.503 (c)(3)(E) or as otherwise approved by the TNRCC field inspector. Clean replacement fill that is brought from off-site must also conform to the above regulatory requirement, and must be similar in composition to native soils at the site. Boring logs from nearby monitoring wells indicate that site soils are made up of mostly silty clay from the ground surface to an approximate depth of 7 or 8 feet, grading to sand and gravel below that depth.

Each excavation location shall be returned as closely as possible to its original condition when work is complete. Following the completion of backfilling at each of the three sites, all drums, trash, and other waste shall be removed. Each site will then be graded, contoured, and leveled to its original elevation. Parcels that were excavated in vegetated areas will be reseeded with native grasses, and those that were excavated in paved areas, such as the picnic area at SWMU 31, shall be repaired to a condition equal to or exceeding that found before the excavation work.

5.8 Task 8 – Equipment Decontamination

All equipment that may directly or indirectly contact samples or contaminated materials shall be decontaminated in a designated decontamination area. This includes excavators, loaders, dozers, sampling devices, and miscellaneous small tools and other implements. In addition, the contractor shall take care to prevent post-excavation samples from coming into contact with potentially contaminating substances, such as oil, engine exhaust, corroded surfaces, and dirt.

The following procedure shall be used to decontaminate large pieces of equipment, such as excavators and loaders: The external surfaces of equipment shall be washed with high-pressure hot water and Alconox™ or equivalent laboratory-grade detergent, and, if necessary, scrubbed until all visible dirt, grime, grease, oil, loose paint, rust flakes, etc., have been removed. The equipment shall then be rinsed with potable water. The inside surfaces of equipment buckets and blades shall also be washed as described.

The following procedure shall be used to decontaminate sampling devices that are used in conjunction with heavy equipment for collection of samples along pit sidewalls.

- Scrub the equipment with a solution of potable water and Alconox, or equivalent laboratory-grade detergent.
- Rinse the equipment with copious quantities of potable water followed by ASTM Type II Reagent Water (high-performance liquid chromatography-grade water and distilled water purchased in stores are not acceptable substitutes for ASTM Type II Reagent-Grade Water).
- Air dry the equipment on a clean surface or rack, such as Teflon®, stainless steel, or oil-free aluminum elevated at least 2 feet above ground.
- If the sampling device shall not be used immediately after being decontaminated, it shall be wrapped in oil-free aluminum foil or placed in a closed stainless steel, glass, or Teflon® container.

ASTM Reagent-Grade Type II Water, methanol, and hexane shall be purchased, stored, and dispensed only in glass, stainless steel, or Teflon® containers. These containers shall have Teflon® caps or cap liners. EEG will ensure that these materials remain free of contaminants. If any question of purity exists, new materials shall be used.

5.9 Task 9 – Reporting

Following the completion of all tasks, EEG, in coordination with the subcontractor, will prepare a set of drawn "as built" field diagrams that illustrate the exact location and dimensions of each excavation. The limits of the excavation work will then be recorded by a professional surveyor at each SWMU. All surveying locations of field activities shall be measured by a State of Texas certified land surveyor. The surveys shall be third order (cf. Urquhar, L.C., 1962 Civil Engineering handbook, 4th Edition, p. 96 and 97) and references will be tied to the Texas State Plane Coordinate System, North Central Zone. The horizontal datum will be the North American Datum of 1983 and the units will be in U.S. survey feet. The vertical datum will be the National Geodetic Vertical Datum of 1988 and the units will be in U.S. survey feet. The surveyed control information for all data collection points shall be recorded and displayed in a table. The table shall give the X (easting) and Y (northing) coordinates, the ground elevation, and the measuring point elevation of any specific features at each site. The reference location is the origin. The accuracy of the X-Y coordinates for each sample location will be within 0.1 foot.

All excavation information will be documented in the RFI report for these units. The RFI report will be prepared after all IRA work has been completed.

6.0 References

A. T. Kearney, 1989, RCRA Facility Assessment, Preliminary Review/Visual Site Inspection

CH2M HILL, 1984, Installation Restoration Program Records Search for Carswell Air Force Base, Texas.

HydroGeoLogic, Inc., 1998, Final Basewide Quality Assurance Project Plan, NAS Fort Worth JRB, Texas

HydroGeoLogic, Inc., 1999, Revised Final Work Plans, RCRA Facility Investigation of Waste Accumulation Areas, NAS Fort Worth JRB, Texas.

HydroGeoLogic, Inc., 2000a, Final RCRA Facility Investigation Report, SWMUs 16, 33, 34, 39, 42, and AOCs 6 and 15, NAS Fort Worth JRB, Texas.

HydroGeoLogic, Inc., 2000b, Final Phase II RCRA Facility Investigation of Waste Accumulation Areas Work Plans Addendum, NAS Fort Worth JRB, Texas.

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HydroGeoLogic, Inc., 2001, Final Phase III Work Plans Addendum, SWMUs 5, 6, 12, 31, and 61, NAS Fort Worth JRB, Texas

Jacobs Engineering Group, 1998, Final Basewide Background Study, Volume 1, NAS Fort Worth JRB, Texas.

Texas Natural Resource Conservation Commission, 1996a, Guidance for Conducting Ecological Assessments Under the Texas Risk Reduction Program.

Texas Natural Resource Conservation Commission, 1996b, Texas Administrative Code, Environmental Quality, Chapter 335 Industrial Solid Waste and Municipal Hazardous Waste, Risk Reduction Standards.

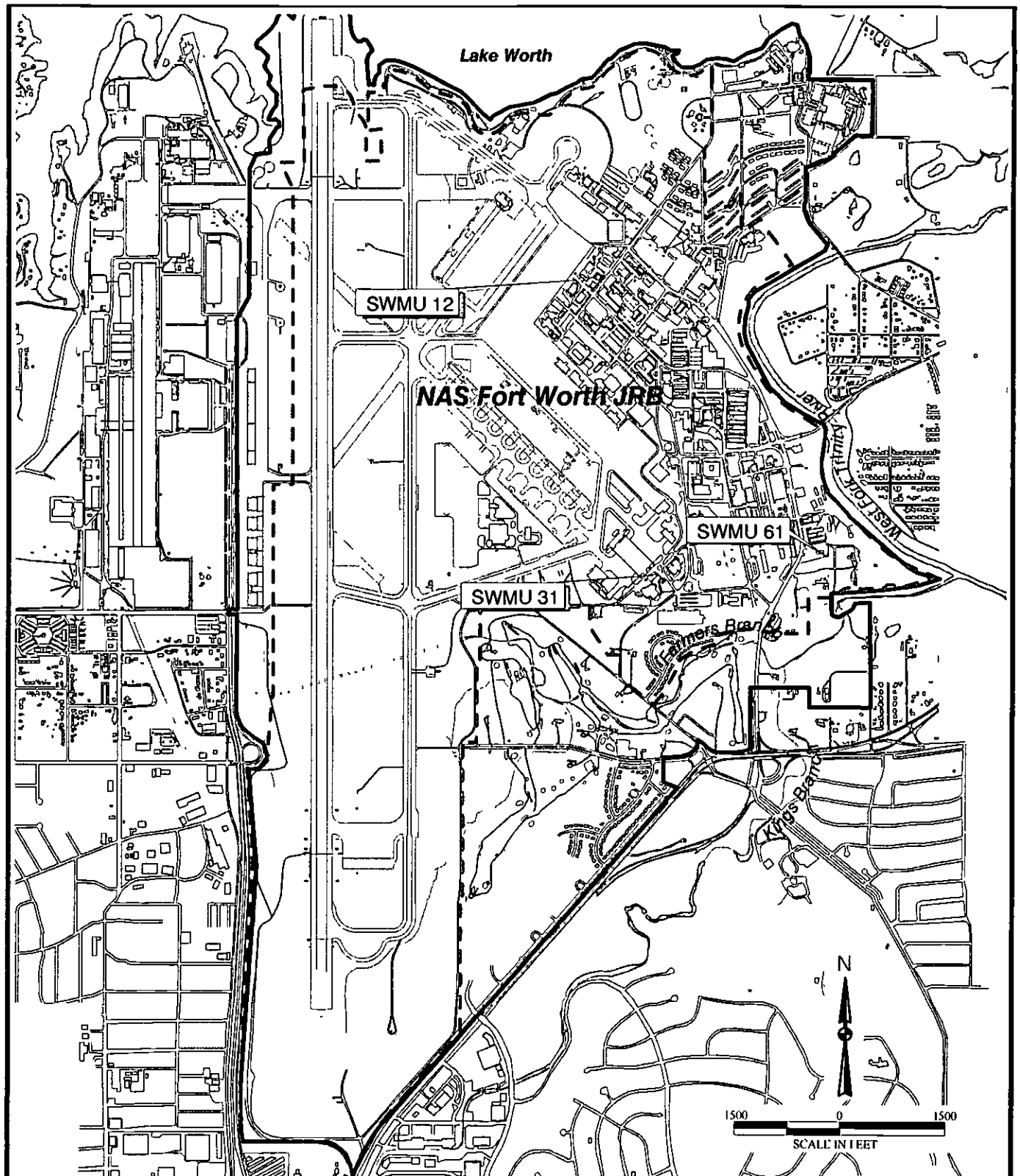
The Earth Technology Corporation, 1993, Basewide Environmental Baseline Survey, Carswell Air Force Base, Texas.

U.S. Air Force Occupational and Environmental Health Laboratory, Human Services Division, 1989, Hazardous Waste Technical Assistance Survey, Carswell AFB, Texas.

TAB

FIGURES

Figures



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Project EEG001-01B010
Created 03/11/99 jbelcher
Revised 8/31/01 th
Source HydroGeoLogic, Inc GIS Database

ERTS ENVIRONMENTAL GROUP LC

HYDRO GeoLogic

Legend

NAS Fort Worth JRB Boundary

Former Carswell AFB Boundary

Figure 1.1

SWMU Locations
NAS Fort Worth JRB, Texas

Figure 2.1
RFI Results and Proposed Actions
SWMU 12

U.S. Air Force Center for Environmental Excellence

BEEGSWMU12011

Method	Analyte	5'	10'	RRS-1	MSC
SW6010	Arsenic	NA	2 7 F	6 58	6 58
SW8260	Benzene	ND	0 001 F	0 002	0 5
SW8310	Acenaphthene	(0 11 J)	(0 093 F)	0 083	610
SW8310	Benzo(a)anthracene	ND	(0.0093 J)	0 0042	0 039
SW8310	Benzo(b)fluoranthene	(0 032)	(0 0039)	0 0017	0 039
SW8310	Chrysene	ND	0 0033 F	0 0042	3 9
SW8310	Dibenzo(a,h)anthracene	ND	0 011 F	0 017	0 02
SW8310	Phenanthrene	ND	(0 0061)	0 0033	310
TX1005	TPH	ND	ND		

WCHMITA012 (Groundwater)

Method	Analyte	Result Oct'00	RRS-1	MSC
SW7060	Arsenic	(0 035 F)	0 0049	0 05
SW7421	Lead	ND	0 0016	0 015
SW8260	Benzene	(0 004 F)	0 0002	0 005
SW8260	Vinyl Chloride	(0 003)	0 0004	0 002

BEEGSWMU12010

Method	Analyte	5'	RRS-1	MSC
SW8260	BTEX	ND		
SW8310	Acenaphthene	(0 2 J)	0 083	610
SW8310	Anthracene	(0 037 J)	0 0017	3100
SW8310	Benzo(a)anthracene	(0 0077 J)	0 0042	0 039
SW8310	Benzo(b)fluoranthene	(0 019)	0 0017	0 039
SW8310	Fluoranthene	(0 086)	0 0042	410
SW8310	Fluorene	(0 072)	0 0083	410
SW8310	Phenanthrene	(0 017)	0 0033	310
SW8310	Pyrene	(0 013)	0 0083	310
TX1005	TPH	ND		

BHGLSWMU12004

Method	Analyte	Surface	5'	10'
SW6010	Arsenic			3 2 F
SW8260	Benzene		1 3 J	ND
TX1005	TPH		1,100	
TX1005	PHC (Gasoline Range)		370	
TX1005	PHC (Diesel Range)		740	

BHGLSWMU12001

Method	Analyte	Result Surface	Result 5'	Result 10'	RRS-1 Surface	RRS-1 Subsurface	MSC	Revised MSC
SW6010	Arsenic			10 5J		6 58	6 58	10 5
SW6010	Cobalt		7 7			6 19	610	
SW8260	Benzene		0 1J	0 003		0 002	0 5	
SW8260	Ethylbenzene		0 006J			0 003	70	
SW8270	Fluorene		0 61			0 33	410	
SW8270	2-Methylnaphthalene		0 47			0 33	410	
SW8270	Naphthalene		0 85			0 33	200	
SW8270	Phenanthrene		0 57			0 33	310	
TX1005	TPH		771 13			59	500*	1,100
TX1005	PHC (Gasoline Range)		391 46			59	100*	370
TX1005	PHC (Diesel Range)		379 67			59	500*	740

BHGLSWMU12002

Method	Analyte	Result Surface	Result 5'	Result 10'	RRS-1 Surface	RRS-1 Subsurface	MSC	Revised MSC
SW6010	Cadmium	0 98			0 556		0 556	0 98
SW6010	Lead	89 4			30.97		30.97	
SW6010	Zinc	84 8			38 8		3,100	
SW8260	Benzene		0 003	0 006		0 002	0 5	
SW8260	Vinyl chloride			0 007		0 005	0 007	
SW8270	Fluoranthene	0 37F			0 33		410	
SW8270	Pyrene	0 42			0 33		310	

WHGLTA028
Soil

Method	Analyte	Surface	5'	10'
SW6010	Arsenic			2 5 F
SW6010	Cadmium	ND		
SW6010	Lead	10 5		
SW8260	Benzene		ND	ND
SW8260	Vinyl Chloride			ND
TX1005	TPH		ND	
TX1005	PHC (Gasoline Range)		ND	
TX1005	PHC (Diesel Range)		ND	

Groundwater

Method	Analyte	Result May'00	Result Oct'00	RRS-1	MSC
SW6010/SW7060	Arsenic	ND	(0 0165 F)	0 0049	0 05
SW6010/SW7421	Lead	ND	ND	0 0016	0 015
SW8260	Benzene	(0 001)	(0 002)	0 0002	0 005
SW8260	Vinyl Chloride	(0 009)	(0 012)	0 0004	0 002

BEEGSWMU12009

Method	Analyte	5'
SW8260	BTEX	ND
SW8310	PAHs	ND
TX1005	TPH	ND

BHGLSWMU12006

Method	Analyte	Surface	5'	10'
SW6010	Arsenic			(6 8 F)
SW6010	Cadmium	0 24 F		
SW6010	Cadmium	(0 70 F**)		
SW6010	Lead	11 3 F		
SW6010	Lead	9 6 F**		
SW8260	Benzene		(0 015)	ND
SW8260	Vinyl Chloride			ND
TX1005	TPH		ND	
TX1005	PHC (Gasoline Range)		ND	
TX1005	PHC (Diesel Range)		ND	

**Duplicate sample result

BEEGSWMU12008

Method	Analyte	5'
SW8260	Benzene	ND

BHGLSWMU12005

Method	Analyte	Surface	5'
SW6010	Cadmium	ND	
SW6010	Lead	5 4 F	
SW8270	Benzo(a)anthracene	ND	ND
SW8270	Benzo(a)pyrene	ND	ND
SW8270	Benzo(b)fluoranthene	ND	ND
SW8270	Benzo(k)fluoranthene	ND	ND
SW8270	Indeno(1,2,3-c,d)pyrene	ND	ND

BHGLSWMU12003

Method	Analyte	Result Surface	Result 5'	Result 10'	RRS-1 Surface	RRS-1 Subsurface	MSC	Revised MSC
SW6010	Cadmium	0 74			0 556		0 556	0 98
SW6010	Cobalt		7 5			6 19	610	
SW6010	Copper		15 8J			13.72	130	
SW6010	Lead	57 8			30 97		30 97	
SW6010	Zinc	97 9			38 8		3,100	
SW8260	Acetone			0 012		0 005	1,000	
SW8270	*bis* (2-Ethylhexyl)phthalate	0 42			0 33		0 6	
SW8270	Benzo(a)anthracene	1.7			0.33		0 33	
SW8270	Benzo(a)pyrene	1 4			0 33		0 33	
SW8270	Benzo(b)fluoranthene	2			0 33		0 33	
SW8270	Benzo(g,h,i)perylene	0 75			0 33		310	
SW8270	Benzo(k)fluoranthene	0 76			0 33		0 39	
SW8270	Chrysene	1.8			0 33		3 9	
SW8270	Fluoranthene	3 3			0 33		410	
SW8270	Indeno(1,2,3-c,d)pyrene	0 96			0 33		0 33	
SW8270	Phenanthrene	1 6			0 33		310	
SW8270	Pyrene	3 3			0 33		310	

BHGLSWMU12007

Method	Analyte	Surface	5'	10'
SW6010	Arsenic			(8 4 F)
SW6010	Cadmium	0 08 F		
SW6010	Lead	4 5 F		
SW8260	Benzene		ND	ND
SW8260	Vinyl Chloride			ND
TX1005	TPH		ND	
TX1005	PHC (Gasoline Range)		ND	
TX1005	PHC (Diesel Range)		ND	

SWMU 12A
7' X 7' X 7'

SWMU 12D
7' X 7' X 7'

SWMU 12B
5' X 5' X 2'

SWMU 12C
5' X 5' X 2'

SWMU 12

Bldg. 1604

Bldg. 1602

Bldg. 1617

Bldg. 1619

WAA 1618
SWMU 11

WEEGTA001

WEEGTA002

WHGLTA027

Concrete

Wash Rack

Groundwater Flow

ACCESS ROAD

Power Line

Water Line

Power Line

Grass

Legend

- Solid Waste Management Unit (SWMU)
- Waste Accumulation Area (WAA)
- Monitoring Well
- Proposed Monitoring Well
- Phase I Soil Boring Location
- Phase II Soil Boring Location
- Phase III Soil Boring Location
- Proposed Excavation Location
- Surface Runoff

- Phase I Results (header)
- Phase II Results (header)
- Phase III Results (header)
- Analyte detected above MSC SPLP not performed
- Analyte detected above MSC in soil and in SPLP extract
- Analyte detected above MSC in soil, but detected below MSC in SPLP extract

Notes:
Soil concentrations reported in mg/kg
Groundwater concentrations reported in mg/L.
MSC—Medium-Specific Concentration.
Revised MSC—Value based on SPLP result
NV—No Value
ND—Not Detected
F—The analyte was positively identified but the associated numerical value is below the adjusted method quantitation limit
J—The analyte was positively identified, the quantitation is an estimation.
Phase I Results - Only detections above RRS-1 are reported on the figure.
Phase II Results - All results are reported. Analytes depicted in (parentheses) exceed RRS-1 but are below MSC
PHC—Petroleum Hydrocarbons
* TNRCC Action Level for course-grained soils (TNRCC RG-17)

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Project EEG001-01B010
Created 10/26/99 jbelcher
Revised. 09/10/01 asp
Map Source: HGL ArcView Database

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Figure 2.2
RFI Results and Proposed Actions SWMU 31

U.S. Air Force Center for Environmental Excellence

Bldg. 1050

Bldg. 1060

WITCTA021

PERIMETER ROAD

Water Line

SWMU 31 Concrete Pad

SWMU 31A 5' X 5' X 2'

Concrete Parking Area

Sidewalk

SWMU 29 Boundary (Landfill No 2)

Groundwater Flow

Grass

Grass

Gas Line

Sidewalk

SWMU 31B 5' X 5' X 2'

BLDG1040-1

Bldg. 1040

WHGLTA202

BHGLSWMU31006

Method	Analyte	Surface
SW6010	Barium	69 3
SW6010	Cadmium	(0 6)
SW6010	Chromium (total)	13 3
SW6010	Lead	22 8
SW7471	Mercury	ND

BHGLSWMU31001

Method	Analyte	Result Surface	Result 5'	Result 10'	Result 15'	RRS-1 Surface	RRS-1 Subsurface	MSC	Revised MSC
SW6010	Barium	506				128 1		233	506
SW6010	Cadmium	1 5				0 556		0 556	1 5
SW6010	Chromium (total)	40 6				25 86		25 86	40 6
SW6010	Copper	23 3				17 37		130	
SW6010	Lead	159				30 97		30 97	
SW6010	Zinc	123				38 8		3 100	
SW7471	Mercury	0 57				0 14		0 2	0 57
SW8270	Benzo(b)fluoranthene	0 51				0 33		0 33	
SW8270	Benzo(g,h,i)perylene	D 44				0 33		310	
SW8270	Chrysene	0 38				0 33		3 9	
SW8270	Fluoranthene	0 79				0 33		410	
SW8270	Indeno(1,2,3-c,d)pyrene	0 42				0 33		0 33	
SW8270	Phenanthrene	0 5				0 33		310	
SW8270	Pyrene	0 64				0 33		310	

BHGLSWMU31002

Method	Analyte	Result Surface	Result 5'	Result 10'	Result 15'	RRS-1 Surface	RRS-1 Subsurface	MSC	Revised MSC
SW6010	Cadmium	0 99				0 556		0 556	1 5
SW6010	Lead	58.5				30 97		30 97	
SW7471	Mercury				0 2		0 035	0 2	
SW8260	Acetone	0.15				0 005		1,000	
SW8260	Benzene	0 009				0 002		0 5	
SW8260	Methyl Ethyl Ketone	0 019				0 005		6,100	
SW8270	Fluoranthene	0 341				0 33		410	

BHGLSWMU31003

Method	Analyte	Surface
SW6010	Cadmium	0 31 F
SW6010	Lead	15 8
SW8260	Benzene	ND
SW8260	Methyl Ethyl Ketone	ND

BHGLSWMU31004

Method	Analyte	Surface
SW6010	Cadmium	0 35 F
SW6010	Lead	19 5
SW8260	Benzene	ND
SW8260	Methyl Ethyl Ketone	ND

BHGLSWMU31005

Method	Analyte	Surface
SW6010	Barium	71 2
SW6010	Cadmium	0 45 F
SW6010	Chromium (total)	11 9
SW6010	Lead	10 2
SW7471	Mercury	ND

Legend

- Solid Waste Management Unit (SWMU)
- Monitoring Well
- Round I Soil Boring Location
- Round II Soil Boring Location
- Proposed Excavation Location
- Surface Runoff

Phase I Results
Phase II Results
Analyte detected above MSC SPLP not performed
Analyte detected above MSC in soil and in SPLP extract
Analyte detected above MSC in soil but detected below MSC in SPLP extract

Notes:
Soil concentrations reported in mg/kg.
MSC—Medium-Specific Concentration.
Revised MSC—Value based on SPLP result
NV—No Value
ND—Not Detected
F—The analyte was positively identified but the associated numerical value is below the adjusted method quantitation limit.
J—The analyte was positively identified, the quantitation is an estimation
Phase I Results - Only detections above RRS-1 are reported on the figure.
Phase II Results - All results are reported Analytes depicted in (parentheses) exceed RRS-1 but are below MSC.

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Map Source: HGL ArcView Database

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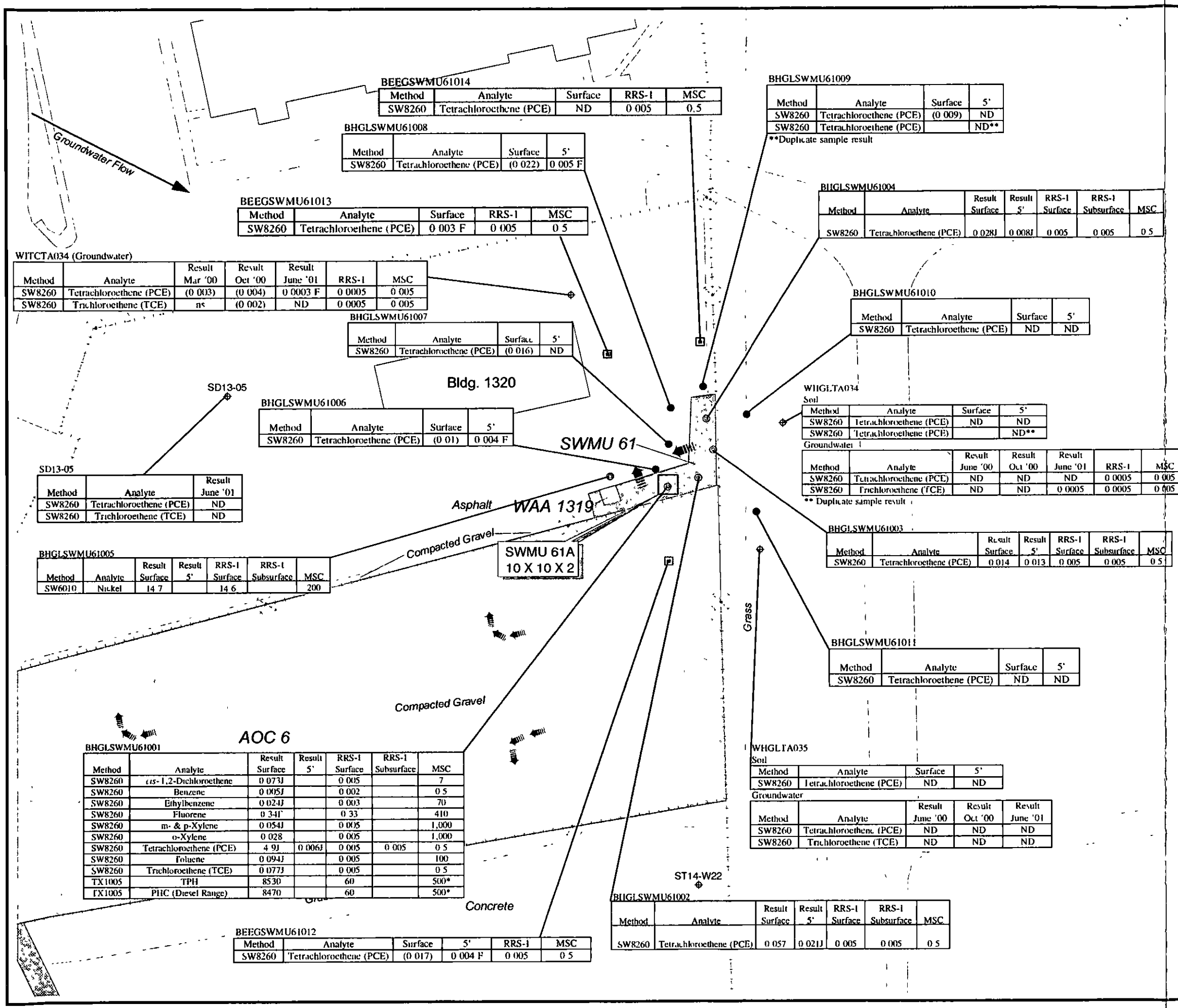

Work Plan—Interim Remedial Actions—Waste Accumulation Areas
NAS Fort Worth JRB, Texas

Figure 2.3
RFI Results and Proposed Actions
SWMU 61

U.S. Air Force Center for Environmental Excellence

Legend

- Solid Waste Management Unit (SWMU)
- Area of Concern (AOC)
- Waste Accumulation Area (WAA)
- Monitoring Well
- Round I Soil Boring Location
- Round II Soil Boring Location
- Proposed Soil Boring Location
- Proposed Excavation Location
- Surface Runoff

- Phase I Results (header)
- Phase II Results (header)
- Phase III Results (header)
- Analyte detected above MSC SPLP not performed
- Analyte detected above MSC in soil and in SPLP extract
- Analyte detected above MSC in soil, but detected below MSC in SPLP extract

Notes:
Soil concentrations reported in mg/kg
Groundwater concentrations reported in mg/L.
MSC—Medium-Specific Concentration
Revised MSC—Value based on SPLP result
NV—No Value
ND—Not Detected
F—The analyte was positively identified but the associated numerical value is below the adjusted method quantitation limit
J—The analyte was positively identified, the quantitation is an estimation
Phase I Results - Only detections above RRS-1 are reported on the figure
Phase II Results - All results are reported. Analytes depicted in (parentheses) exceed RRS-1 but are below MSC
PHC—Petroleum Hydrocarbons
* TNRCC action level for course-grained soils (TNRCC RG-17)

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Project: EEG001-01B010
Created. 10/26/99 jbelcher
Revised: 08/31/01 th
Map Source. HGL ArcView Database

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HYDRO Geologic Inc.

TAB

APPENDIX A

APPENDIX A

Field Sampling Plan

FINAL

Field Sampling Plan

for

Interim Remedial Actions

at

Solid Waste Management Units 12, 31, and 61
NAS Fort Worth JRB, Texas

Contract No. F41624-00-D-8032

Prepared for
U.S. Air Force Center For Environmental Excellence
Brooks AFB, Texas

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October 2001

Contents

Tables

Figures

Attachment

Abbreviations & Acronyms

3-D	three dimension
Fe	iron
gal	gallon
L	liter
mg	milligram
min	minute
mL	milliliter
°C	degrees Celsius
AFCEE	U.S. Air Force Center for Environmental Excellence
AOC	area of concern
ASTM	American Society for Testing and Materials
CAFB	Carswell Air Force Base
CFR	Code of Federal Regulations
COC	chain-of-custody
DNAPL	dense non-aqueous phase liquids
DO	dissolved oxygen
DRMO	Defense Reutilization Management Office
EC	electrical conductivity
EEG	Ellis Environmental Group, LC
FSP	Field Sampling Plan
HASP	Health and Safety Plan
HSA	hollow stem auger
HSC	health and safety coordinator
HW	hazardous waste
IDW	investigation-derived waste
IRP	Installation Restoration Program
IRPIMS	Installation Restoration Program Information Management System
IT	International Technology Corporation
JP-4	jet propulsion (grade 4) fuel
JRB	Joint Reserve Base
LNAPL	light non-aqueous phase liquid
MEK	methyl ethyl ketone
MS	matrix spike
MSD	matrix spike duplicate
NAS	naval air station
NDI	non-destructive inspection
NGVD	National Geodetic Vertical Datum
NTU	nephelometric turbidity unit
OD	outside diameter
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer

OWS	oil/water separator
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenol
PID	photo-ionization detector
PM	project manager
POC	point of contact
PPE	personal protective equipment
PVC	polyvinyl chloride
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA facility assessment
RFI	RCRA facility investigation
RRS	risk reduction standards
RV	recreational vehicle
SAP	Sampling and Analysis Plan
SVOC	semi-volatile organic compound
SWMU	solid waste management unit
TCE	trichloroethylene
TNRCC	Texas Natural Resource Conservation Commission
TOC	total organic carbon
TPH	total petroleum hydrocarbon
UN	United Nations
USAF	United States Air Force
USCS	United Soil Classification System
USEPA	U.S Environmental Protection Agency
USGS	U. S. Geological Survey
VOC	volatile organic compound
VSI	visual site inspection
WAA	waste accumulation area
WP	Work Plan

1.0 Introduction

The Field Sampling Plan (FSP) presents the requirements and procedures for conducting field operations. This project specific FSP has been prepared to ensure that (1) the data quality objectives specified for this project are met, (2) the field sampling protocols are documented and reviewed in a consistent manner, and (3) the data collected are scientifically valid and defensible. This site specific FSP and the basewide Quality Assurance Project Plan (QAPP) (HydroGeoLogic, 1998), shall constitute, by definition, the Sampling and Analysis Plan (SAP).

Guidelines followed in the preparation of this plan are set out in the Naval Air Station (NAS) Fort Worth Resource Conservation and Recovery Act (RCRA) Permit HW-50289 issued by the Texas Natural Resource Conservation Commission (TNRCC) on February 7, 1991. Additional reference documents followed in the preparation of this FSP include "U. S. Air Force Center for Environmental Excellence (AFCEE's) Model Field Sampling Plan" (AFCEE, 1997) and the U.S. Air Force Center for Environmental Excellence (AFCEE) "Handbook for the Installation Restoration Program (IRP) for Remedial Investigations and Feasibility Studies" (AFCEE, 1993).

This FSP is required reading for all staff participating in the work effort. The FSP shall be in the possession of the field teams during sample collection. Ellis Environmental Group, LC (EEG) and its subcontractors shall be required to comply with the procedures documented in this FSP in order to maintain comparability and representativeness of the collected and generated data.

Controlled distribution of the FSP shall be implemented by EEG to ensure that the current approved version is being used. A sequential numbering system shall be used to identify controlled copies of the FSP. Controlled copies shall be provided to applicable AFCEE managers, regulatory agencies, remedial project managers (PMs), PMs, and quality assurance (QA) coordinators. Whenever AFCEE revisions are made or addenda added to the FSP, a document control system shall be put into place to ensure that (1) all parties holding a controlled copy of the FSP shall receive the revisions/addenda, and (2) outdated material is removed from circulation The document control system does not preclude making and using copies of the FSP, however, the holders of controlled copies are responsible for distributing additional material to update any copies within their organizations. The distribution list for controlled copies shall be maintained by EEG.

2.0 Project Background

The following sections briefly describe the objective of the interim removal action (IRA) and the rationale for implementing this RCRA IRA work plan (WP).

2.1 Site History

Carswell Air Force Base (CAFB) was officially closed on September 30, 1993. A parcel of the former CAFB, NAS Fort Worth Joint Reserve Base (JRB), is in the process of being transferred from Air Force to Navy management. Before the property transfer can be completed, required environmental investigations of potential contamination related to USAF activities at the NAS Fort Worth property are to be completed and contaminated sites are to be remediated.

2.2 Project Objectives

The overall objective is to conduct IRAs necessary to obtain closure of the three subject solid waste management units (SWMUs) under the TNRCC Risk Reduction Standards (RRS) program. An overview of the RRS program is presented in Section 4 1 of the RCRA facility investigation (RFI) WPs (HydroGeoLogic, 1999) In addition, the SWMUs at NAS Fort Worth JRB are subject to the specific requirements of the TNRCC permit (HW-50289). Specific permit requirements are discussed in greater detail in Section 3.2 of the RFI WPs (HydroGeoLogic, 1999).

In summary, this IRA is designed and conducted to achieve the following objectives:

- Conduct pre-removal confirmation sampling
- Excavate a pre-determined volume of contaminated soil
- Remove, properly contain and dispose of the excavated contaminated soil
- Backfill with appropriate material
- Re-grade and restore site to present configuration

2.3 Project Site Description

NAS Fort Worth JRB is located on 2,555 acres of land in Tarrant County, Texas, 8 miles west of downtown Fort Worth. The sites covered by this FSP are three SWMUs located throughout NAS Fort Worth JRB.

These SWMUs are identified as follows:

- SWMU 12 (WAA 1602/Building 1602)
- SWMU 31 (WAA 1050/Building 1050)
- SWMU 61 (WAA 1319/Building 1320)

The locations of the SWMUs in relation to the Base are presented on Figure 1-1 of the WP.

2.3.1 Description of Solid Waste Management Unit 12

SWMU 12 is located east of Building 1602[1] at the edge of the parking lot, along D Street, and operated from approximately 1982 until approximately 1990. Building 1602 housed the propulsion shop, which was responsible for the build-up and repair of jet engines. The tear down section of the shop generated waste jet propulsion (grade 4) fuel (JP-4) (84 gallons/year) and 7808 oil (84 gallons/year). Both of these wastes were collected in pans and drummed separately. The afterburner section of the shop used PD-680 (Type II) for parts cleaning The waste PD-680 (60 gallons/year) was drummed and stored at the accumulation site (USAF, 1989).

At the time of the 1989 Resource Conservation and Recovery Act facility assessment (RFA), SWMU 12 consisted of seven 55-gallon drums of waste on top of wooden pallets, and two 5-gallon cans on a concrete pad. Drums of product were stored adjacent to drums of waste. This unit was not fenced or covered (A.T. Kearney, 1989). The concrete pad at SWMU 12 no longer exists and no wastes are currently stored at this area.

2.3.2 Description of Solid Waste Management Unit 31

SWMU 31 is located southeast of Building 1050 on Perimeter Road. Building 1050 housed the pneudraulics shop, which was responsible for aircraft hydraulic systems, component maintenance, and operational checks. The pneudraulics shop was equipped with two PD-680 (Type II) tanks for parts cleaning: one 15-gallon tank and one 50-gallon tank. Approximately 150 gallons/year of waste PD-680 (Type II) was placed into 55-gallon drums and stored at SWMU 31. These drums were eventually taken to SWMU 16. SWMU 31 also received waste from the fire control shop located inside Building 1055. Additional waste managed at SWMU 31 included hydraulic fluid and oil (120 gallons/year), as well as unspecified quantities of MEK, trichloroethylene (TCE), perchloroethylene, SE-377C™ (solvent) contaminated with cadmium, Citri-Kleen™ (solvent), and silicone damping fluid contaminated with freon 113 (USAF, 1989).

SWMU 31 operated from 1955 to 1990 and was described as an outdoor, uncovered 6-inch thick concrete pad measuring 15 by 8 feet. This pad, which had no surrounding fence or secondary barricade, supported approximately ten 55-gallon drums along with several smaller containers (A.T. Kearney, 1989). A roof was erected over the concrete pad after 1990 to serve as cover for a picnic table. No waste is currently stored at this SWMU.

2.3.3 Description of Solid Waste Management Unit 61

SWMU 61 is located in the southeast corner of the parking lot behind Building 1320. This SWMU, which operated from approximately 1982 until approximately 1990, served as an outdoor container storage area for waste generated inside Building 1320, the power production maintenance facility. Power production personnel were responsible for preventive maintenance of gasoline and diesel generators. This facility generated waste antifreeze (156 gallons/year), waste gasoline and diesel fuel (108 gallons/year), 7808 engine oil (156 gallons/year), PD-680 (Type II)

[1] References to Building 1619 are incorrect and should actually be referring to Building 1602.

(108 gallons/year), and battery acid (360 gallons/year). The waste fuels, solvents, and antifreeze were drummed and kept at SWMU 61. The waste oil was stored in a bowser that was periodically pumped out by a contractor, and the battery acid was sent to Defense Reutilization Management Office (DRMO) for disposal (USAF, 1989).

SWMU 61 consisted of a gravel-based outdoor container storage area that held 55-gallon drums placed on wooden pallets set on railroad ties. A hard material similar to roofing tar was kept in a bucket at the site. SWMU 61 was uncovered and lacked a berm or other form of secondary containment. During a 1989 visual site inspection (VSI), one of the drums stored at this unit was noted to have been more than 18 months old. Overall conditions at this unit were described as poor (A.T. Kearney, 1989). WAA 1319 was built near the west corner of SWMU 61 in 1990. Waste is currently stored outside in this storage area.

2.4 Project Site Contamination History

Section 1.2 of the WP provides the history of environmental investigations conducted at each site and documents contamination discovered at each site. Please refer to this section for the contamination history of the sites.

3.0 Project Scope and Data Quality Objectives

The following sections describe the objectives of the IRA and the specific field activities that will be conducted during the remedial action.

3.1 Data Quality Objectives

The data generated by this project must be of sufficient quality and quantity to support the overall project objective: the closure of three SWMUs located at NAS Fort Worth JRB under the TNRCC Risk Reduction Program. The objectives and focus of this work will be to conduct pre-removal confirmation sampling prior to soil removal.

Data from the following categories are required for this study:

- **Site Characterization.** Data will be used to evaluate physical and chemical properties of soil. The data will also be used to characterize the nature and extent of any contaminants detected.

- **Health and Safety.** Data will be used to establish the level of protection needed for the work party and other site-related personnel. This data will be gathered during intrusive activities by the use of an organic vapor analyzer.

Site characterization data will be a combination of screening data and definitive data. Health and safety data will be collected as screening data. The definitions of screening data and definitive data, as established by the "Data Quality Objectives Process for Superfund Interim Final Guidance" [U S. Environmental Protection Agency (EPA)/540/G-93/071, 1993], are described below.

- **Screening Data with Definitive Confirmation.** Screening data are generated by rapid, less precise methods of analysis with less rigorous sample preparation. Sample preparation steps may be restricted to simple procedures such as dilution with a solvent, instead of elaborate extraction/digestion and cleanup. Screening data provides analyte identification and quantification. Although the quantification may be determined using analytical methods with quality assurance/quality control (QA/QC) procedures and criteria associated with definitive data, screening data without associated confirmation data are not considered to be data of known quality.

- **Definitive Data.** Definitive data will be generated using rigorous analytical methods, such as approved EPA reference methods. Data will be analyte-specific, with **confirmation** of analyte identity and concentration. These methods produce tangible raw data (e.g , chromatograms, spectra, digital values) in the form of paper printouts or computer-generated electronic files. Data may be generated at the site or at an off-site location, as long as the QA/QC requirements are satisfied. For the data to be definitive, either analytical or total measurement error must be determined.

The data generated by the laboratory analysis of samples must be sufficiently sensitive to allow comparison of the results to the TNRCC RRS. The basewide QAPP (HydroGeoLogic, 1998)

describes each method that will be performed as part of the investigation and outlines the quality assurance measures the contract laboratory must follow. The methods of analysis selected for samples collected from NAS Fort Worth JRB will produce screening as well as definitive data. Table 3-1 is a summary of the data quality levels and intended use for data collected during the IRA.

3.2 Sample Analysis Summary

Provision VIII of Permit HW-50289 requires that soil and groundwater samples submitted for chemical analysis be analyzed in accordance with EPA SW-846 for all Appendix IX constituents, unless a shorter list can be justified. The Air Force has provided justification of a reduced list of analyses for the IRA in a letter to the TNRCC dated April 20, 1999. Table 3-2 provides a summary of the materials handled or potentially handled at each of the subject sites along with the proposed analyses for each site.

3.3 Field Activities

The following sections describe the proposed field activities for each site. More detailed descriptions of the remedial actions, rationale, and justification for each of the proposed activities are presented in Section 4.0 of the WP.

The proposed field tasks described in this FSP will be conducted to achieve the project objectives as presented in Section 2.2. Field activities will be conducted at three SWMUs. Table 3-3 provides a summary of the field activities at each site, and Tables 3-4 and 3-5 present the number of soil and groundwater samples to be collected and the analytical methods to be performed during the field investigations.

4.0 Project Organization and Responsibility

Figure 4-1 shows the project organization, reporting relationships, and line authority. Table 4-1 lists key project personnel and their respective telephone numbers. Other personnel will be assigned as necessary. The specific responsibilities are described in the following subsections

4.1 Management Responsibilities

4.1.1 Program Manager

The program manager's responsibilities will include the following:

- Reviewing and approving the WP, QAPP, FSP, and Health and Safety Plan (HASP)
- Providing sufficient resources to the project team so that it can respond fully to the requirements of the investigation
- Providing direction and guidance to the project manager (PM)
- Reviewing the final project report
- Providing other responsibilities as requested by the PM

4.1.2 Project Manager

The PM will be the prime point of contact with AFCEE and will have primary responsibility for technical, budget, and scheduling matters. His duties will include:

- Reviewing and approving project plans and reports
- Assigning duties to the project staff and orienting the staff to the needs and requirements of the project
- Obtaining the approval of the QA manager for proposed variances to the WP and FSP
- Supervising the performance of project team members
- Providing budget and schedule control
- Reviewing subcontractor work and approving subcontract invoices
- Ensuring that major project deliverables are reviewed for technical accuracy and completeness before their release, including data validity
- Ensuring that all resources of the laboratory are available on an as-required basis
- Overseeing final analytical reports

4.2 Quality Assurance and Health and Safety Responsibilities

4.2.1 Quality Assurance Manager

Responsibilities of the QA manager will include:

- Serving as official contact for QA matters for the project
- Identifying and responding to QA/QC needs and problem resolution needs
- Answering requests for guidance or assistance
- Reviewing, evaluating, and approving the FSP and QAPP and all changes to these documents
- Verifying that appropriate corrective actions are taken for all nonconformances
- Verifying that appropriate methods are specified in the FSP and QAPP for obtaining data of known quality and integrity

- Fulfilling other responsibilities as requested by the PM
- Evaluating subcontractor quality program
- Training staff on QA subjects
- Supervising staff in QA program related tasks
- Recommending changes in the QA program

4.2.2 Health and Safety Coordinator

Responsibilities of the Health and Safety Coordinator (HSC) will include:

- Developing the HASP
- Ensuring that the requirements of the QAPP are satisfied
- Providing other responsibilities as identified in the HASP

4.3 Laboratory Responsibilities

4.3.1 Laboratory Project Manager

The laboratory's PM will report directly to EEG's PM and will be responsible for the following:

- Ensuring that all resources of the laboratory are available on an as-required basis
- Overseeing final analytical reports

4.3.2 Laboratory Operations Manager

The laboratory's operation manager will report to the laboratory's PM and will be responsible for the following:

- Coordinating laboratory analyses
- Supervising in-house chain-of-custody
- Scheduling sample analyses
- Overseeing data review
- Overseeing preparation of analytical reports
- Approving final analytical reports prior to submission to HydroGeoLogic

4.3.3 Laboratory Quality Assurance Officer

The laboratory's QA officer has the overall responsibility for data after it leaves the laboratory. The QA officer will be independent of the laboratory but will communicate data issues through the laboratory's PM. In addition, the QA officer will be responsible for the following:

- Conduct audits of laboratory analyses
- Provide oversight of laboratory QA
- Provide oversight of QA/QC documentation
- Conduct detailed reviews of data
- Determine whether to implement laboratory corrective actions, if required
- Define appropriate laboratory QA procedures
- Prepare laboratory standard operation procedures

4.3.4 Laboratory Sample Custodian

The laboratory's sample custodian will report to the operations manager. Responsibilities of the sample custodian will include:

- Receiving and inspecting the incoming sample containers
- Recording the condition of the incoming sample containers
- Signing appropriate documents
- Verifying chain of custody and its correctness
- Notifying laboratory manager and laboratory supervisor of sample receipt and inspection
- Assigning a unique identification number and customer number, and entering each into the sample receiving log
- Initiating transfer of the samples to appropriate lab sections with the help of the laboratory operations manager
- Controlling and monitoring access/storage of samples and extracts

4.4 Field Responsibilities

4.4.1 Project Geologist

The project geologist will be responsible for geologic interpretations as well as acting as lead coordinator for field activities. The project geologist's duties and responsibilities will include:

- Providing orientation and any necessary training to field personnel (including subcontractors) on the requirements of the FSP, HASP, and QAPP before the start of work
- Providing direction and supervision to the sampling crews
- Monitoring sampling operations to ensure that the sampling team members adhere to the QAPP and FSP
- Ensuring the use of calibrated measurement and test equipment
- Maintaining a field records management system
- Coordinating activities with the PM
- Supervising geological data interpretation activities
- Overseeing field data documentation and conducting quality checks on interpretive geologic work products
- Reviewing reports for compliance with State of Texas and EPA requirements
- Assuming the duties of the HSC if directed by the HSC

4.5 Subcontractors

Subcontractors will be used for line locating, soil excavations, surveying, and the drilling of soil borings and monitoring wells during the field investigation. In addition, laboratory analyses of all samples collected during the investigation will also be subcontracted to an analytical laboratory.

Qualified subcontractors will be selected in accordance with AFCEE requirements and EEG procurement and QA procedures. Subcontractors will meet predetermined qualifications developed by the PM and defined in the procurement bid packages Each bid submitted will be reviewed for technical, QA, and purchasing requirements. All subcontractors will be required to

follow the procedures of the WP, FSP, QAPP, and HASP. Periodic QC inspections of each subcontractor may be performed as specified in the FSP (Section 7.5), QAPP (Section 9.1), and HASP (Section 1.3.2). These inspections will be performed by the QA manager, or his designee, as unannounced audits to confirm adherence to the procedures and guidance outlined in the aforementioned documents. Such inspections may relate to health and safety, QAPP requirements, or field standard operating procedures.

5.0 Field Operations

The overall project field logistics and activities necessary to complete the project remediation objectives described in the work plan are presented in this section. All field work will be conducted in accordance with the site HASP. EEG is the prime contractor for the field remedial action. The point of contact (POC) at the base will be Mr. Michael Dodyk, PG. EEG's project geologist/field coordinator will be Mr. Rick Levin, PG.

5.1 Geologic Standards

The lithologic descriptions for consolidated materials (igneous, metamorphic, and sedimentary rocks) shall follow the standard professional nomenclature (cf. Tennissen, A.C., 1983, *Nature of Earth Materials*, 2nd Edition, pp. 204-348), with special attention given to describing fractures, vugs, solution cavities and their fillings or coatings, and any other characteristics affecting permeability. Colors shall be designated by the Munsell Color System.

The lithologic descriptions for unconsolidated materials [soils (engineering usage) or deposits] shall use the name of the predominant particle size (e.g., silt, fine sand, etc.). The dimensions of the predominant and secondary sizes shall be recorded using the metric system. The grain size and name of the deposit shall be accompanied by the predominant mineral content, accessory minerals, color, particle angularity, and any other characteristics. The classic deposit descriptions shall include, as a supplement, symbols of the Unified Soil Classification System (USCS). The color descriptions shall be designated by the Munsell Color System.

The sedimentary, igneous, and metamorphic rocks and deposits shall be represented graphically by the patterns shown in Figure 5-1. Columnar sections, well and boring logs, well construction diagrams, cross sections, and three-dimensional (3-D) diagrams shall use these patterns. Supplementary patterns shall follow Swanson, R. G., 1981, Sample Examination Manual, American Association of Petroleum Geologists, pp IV-41 and 43. Geologic structure symbols shall follow American Geological Institute Data Sheets, 3d Edition, 1989, sheets 3.1 through 3.8.

The scales for maps, cross sections, or 3-D diagrams shall be selected in accordance with the geologic and hydrologic complexity of the area and the purposes of the illustrations. Geophysical logs shall be run at a constant vertical scale of 1 inch equals 20 feet. When geophysical logs are superimposed on geologic logs, cross sections, or 3-D diagrams, the scales shall be the same. If defining geological conditions requires other scales, additional logs at those scales shall be provided.

For orientation, the cross sections shall show the northern end on the viewer's right. If the line of cross section is predominantly east-west, the eastern end is on the right. Maps shall be oriented with north toward the top, unless the shape of the area dictates otherwise. Indicate orientation with a north arrow.

5.2 Site Reconnaissance, Preparation, and Restoration Procedures

Areas designated for intrusive sampling shall be surveyed for the presence of underground utilities. Utility locations are determined using existing utility maps; in the field, they are verified

by using a hand-held magnetometer or utility probe. Prior to commencement of drilling activities, digging permits will be obtained from NAS Fort Worth JRB. The base civil engineer will be contacted to verify that selected locations are free of underground utilities. Those locations not clear of underground utilities will be relocated to achieve clearance, and then verified for clearance a second time. Vehicle access routes to sampling locations shall be determined prior to any field activity.

A centralized decontamination area shall be provided for drilling rigs and equipment. The decontamination area shall be large enough to allow storage of cleaned equipment and materials prior to use, as well as to stage drums of decontamination waste. The decontamination area shall be lined with a heavy gauge plastic sheeting, and designed with a collection system to capture decontamination waters. Solid wastes shall be accumulated in 55-gallon drums and subsequently transported to a waste storage area designated by the AFCEE. Smaller decontamination areas for personnel and portable equipment shall be provided as necessary. These locations shall include basins or tubs to capture decontamination fluids, which shall be transferred to a large accumulation tank as necessary. These designated areas of decontamination shall be determined during the pre-construction meeting.

Each work site or location shall be returned to its original condition when possible. Efforts shall be made to minimize impacts to work sites and sampling locations, particularly those in or near sensitive environments such as wetlands. Following the completion of work at a site, all drums, trash, and other waste shall be removed. Decontamination and/or rinse water and soil cuttings shall be transported to the designated locations as described in Section 5.9. At the completion of field activities, all capital equipment and consumable materials will be removed or turned over to base personnel in accordance with AFCEE procedures. A final site walk will be conducted with the base representative, at his/her discretion, to ensure that all sampling locations have been restored satisfactorily before final demobilization from the site.

5.3 Excavations

Figures 2-1, 2-2, and 2-3 of the WP show the areas to be excavated for each site. The site-specific dimensions are listed in Subsections 4.1.1, 4 2.1, and 4.3.1 of the WP. The location of each excavation site will be clearly marked in the field by EEG before the excavation activities commence. At each site, the excavation subcontractor will maintain an excavation of sufficient size to allow workers to complete all necessary tasks related to this IRA in a safe and timely manner. All contractors and subcontractors shall follow Occupational Safety and Health Administration (OSHA) rules for excavation and confined space entry. Sheeting, bracing, or shoring shall be installed in the absence of adequate side slopes if there is a need for workers to enter the excavated area. The subcontractor will submit specifications to EEG for sheeting, bracing, or shoring that shall be installed in the absence of adequate side slopes if there is a need for workers to enter any excavation areas that are greater than four feet deep.

Excavation and sampling activities will be monitored with an organic vapor monitor such as a photo-ionization detector (PID) or an organic vapor analyzer (OVA). Additional monitoring devices may be deemed advisable such as Draeger tubes and a LEL/02 for benzene monitoring at depth.

Surface water shall be diverted to prevent entry into the excavation. The Subcontractor will protect the site from puddling or running water, or accumulation of standing water in excavations. Excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. All excavated soils will be temporarily stored in such a way as to prevent movement of chain of custody (COC) soils from the containment area. This would include protection from precipitation events or displacement of material by wind. This could involve utilization of a water impermeable tarp between the ground and the bottom of the pile that is protected from surface water by a berm structure around its perimeter and under the tarp. The berm structure can be achieved by clean fill, or dimensional lumber laid end-to-end, or uncontaminated soil. The whole pile would also be covered by a secured water impermeable tarp to protect the deposited COC soil from precipitation and wind.

It is not expected that excavation activity will come into contact with the water table at any of the WAAs addressed by this IRA. Nevertheless, the subcontractor shall be prepared to deal with any dewatering of the excavation pit necessary for the adequate completion of the proposed work. If large volumes of water are to be pumped, the subcontractor will station a portable water storage tank for collection of removed water. Any dewatering that might be needed shall be limited to that necessary to assure adequate access, safe excavation, and to ensure that compaction requirements can be met.

No blasting will be permitted. No open burning of trash, brush, or refuse will be permitted. In addition the subcontractor will take steps to ensure that no accumulation of litter or debris shall accumulate or be deposited at the IRA site herein described. Appropriate waste containers, where necessary, shall be provide by the subcontractor.

The subcontractor will treat areas subject to dust-producing activities with liquid palliatives that will not harm re-growth of vegetation, or another such method of dust control that complies with base regulations. Likewise, excavated materials stored for subsequent use as backfill will be treated or protected to control the production of dust in accordance with base regulations.

EEG will conduct all soil and water sampling in accordance with TNRCC regulations during excavation activities. All bottleware, sampling supplies, and sample analyses will be provided by EEG. Sampling intervals for each SWMU excavation is as stated above in Section 4.0. Stockpiled soils will also be tested after removal so as to determine suitability for backfill or appropriate containment and disposal. Each sample shall be homogenized and quartered before being containerized. Samples collected for volatile organic compounds (VOC) analysis shall be containerized prior to sample homogenization. Stainless steel scoops or trowels, glass jars with TeflonTM lids, or equivalent equipment compatible with the chemical analyses proposed shall be used to collect and store samples. Any above ground vegetative matter or debris will be excluded from the sample.

Specific suites of laboratory analyses are prescribed for each individual SWMU addressed by this IRA WP. Analytical methods and COCs to be tested are listed in Figures 2-1, 2-2, and 2-3.

Appropriate methods for the collection of samples will be dependent upon the method of analysis chosen. Samples will be collected from the exposed soil surface using a stainless steel hand

trowel for metals, total petroleum hydrocarbon (TPH), or semi-volatile compounds VOC samples will be collected using the EnCoreTM soil sampler. The Quality Assurance Project Plan (HydroGeoLogic, 2000c) will be used to assure that the data collected is accurate and representative.

The sampling crew will record any unusual surface conditions that may affect the chemical analyses such as (1) asphalt pieces that may have been shattered by mowers, thus spreading small fragments of asphalt over the sampling area, (2) distance to roadways, aircraft runways, or taxiways, (3) obvious deposition of contaminated or clean soil at the site, (4) evidence of dumping or spillage of chemicals, (5) soil discoloration, and/or (6) unusual condition of growing plants, etc.

5.4 Borehole Drilling, Lithologic Sampling, Logging, and Abandonment

5.4.1 General Drilling Procedures

All drilling activities shall conform to state and local regulations and will be supervised by a professional geologist or engineer. EEG will obtain and pay for all permits, applications, and other documents required by state and local authorities.

The location of all borings will be coordinated, in writing, with the base civil engineer, or equivalent, before drilling commences. When drilling boreholes through more than one water bearing zone or aquifer, EEG and its subcontractors will take measures to prevent cross-connection or cross-contamination of the zones or aquifers.

The drill rig will be cleaned and decontaminated in accordance with the procedure in Section 5.8. The drill rig shall not leak any fluids that may enter the borehole or contaminate equipment placed in the hole. The use of rags or absorbent materials to absorb leaking fluids is unacceptable, and will not be permitted.

Drilling fluids shall not be used for this project unless prior authorization is obtained by the TNRCC or the EPA. A log of drilling activities will be kept in a bound field notebook. Information in the log book will include location, time on site, personnel and equipment present, down time, materials used, samples collected, measurements taken, and any observations or information that would be necessary to reconstruct field activities at a later date. At the end of each day of drilling, the drilling supervisor will complete a Log of Daily Time and Materials Form. An example of this form is provided in Attachment A.

EEG will dispose of all trash, waste grout, cuttings, and drilling fluids as coordinated with the base civil engineer or NAS Fort Worth JRB representative.

5.4.2 Sampling and Logging

The lithology in all boreholes will be logged. The boring log form (Attachment A) will be used for recording the lithologic logging information. Information on the boring log sheet includes the borehole location, drilling information, sampling information (such as sample intervals), recovery, blow counts, and sample description information.

Unconsolidated samples for lithologic description will be obtained continuously at 2-foot intervals using split spoon samplers and standard penetration tests. Lithologic descriptions of unconsolidated materials encountered in the boreholes will generally be described in accordance with American Society for Testing and Materials (ASTM) D-2488-90 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) (ASTM, 1990). Descriptive information to be recorded in the field will include the following: (1) identification of the predominant particles. size and range of particle sizes, (2) percent of gravel, sand, fines, or all three, (3) description of grading and sorting of coarse particles, (4) particle angularity and shape, and (5) maximum particle size or dimension.

Plasticity of fines description include the following: (1) color using Munsell Color System, (2) moisture (dry, wet, or moist), (3) consistency of fine grained soils, (4) structure of consolidated materials, and (5) cementation (weak, moderate, or strong).

Identification of the USCS group symbol will be used. Additional information to be recorded includes the depth to the water table, caving or sloughing of the borehole, changes in drilling rate, depths of laboratory samples, presence of organic materials, presence of fractures or voids in consolidated materials, and other noteworthy observations or conditions, such as the locations of geologic boundaries.

Lithologic descriptions of consolidated materials encountered in the boreholes will generally be described in accordance with Section 5.1. Consolidated samples for lithologic description will be obtained continuously at 2-foot intervals using split spoon samplers and standard penetration tests. All samples will be monitored with an organic vapor monitor [e.g., PID, organic vapor analyzer (OVA)]. The samples shall be handled in such a way as to minimize the loss of volatiles; these procedures are described in Section 6.2. Cuttings will be examined for their hazardous characteristics. Materials suspected to be hazardous because of abnormal color, odor, or organic vapor monitor readings will be containerized in conformance with RCRA, state, and local requirements.

5.4.3 Abandonment

Boreholes will be abandoned in accordance with 30 TAC Chapter 238, Water Well Driller Rules (TNRCC, 1997). Since the borings will not exceed 100 feet, the boring will be plugged to a depth not exceeding 2 feet below ground surface with a solid column of either cement, or 3/8 inch or larger granular sodium bentonite. The granular bentonite shall be hydrated at frequent intervals while strictly adhering to the manufacturer's specifications. The top two feet of each boring will be filled with cement as an atmospheric barrier (TNRCC, 1997).

All abandoned boreholes will be checked 24 to 48 hours after mud/solid bentonite emplacement to determine whether curing is occurring properly. More specific curing specifications may be recommended by the manufacturer and will be followed. If settling has occurred, a sufficient amount of cement will be added to fill the hole to the ground surface. Curing checks and any addition of cement will be recorded in the field log.

5.5 Monitoring Well Construction

The on-site project geologist will supervise the drilling, soil boring, geophysical surveys, lithologic sampling, and monitoring well construction and will be a professional geologist or engineer. A professional geologist will affix his/her signature and registration/ certification seal to all drilling logs, as-built well construction diagrams, lithologic logs, sampling records, and similar documents. Although floating petroleum products [i e , light non-aqueous phase liquids (LNAPLs)] are not anticipated, shallow monitoring wells shall be screened across the water table if they are encountered. The length of the screen will be such that tidal and seasonal water table fluctuations shall not cause water levels to rise above or fall below the screened interval. If dense petroleum products [i.e., dense non-aqueous phase liquids (DNAPLs)] are encountered, monitoring wells will be screened at the bottom of the aquifer to capture the DNAPLs.

5.5.1 Drilling Requirements

All drilling and well installations will conform to state and local regulations, and EEG will obtain and pay for all permits, applications, and other documents required by state and local authorities. The location of all borings will be coordinated in writing with the base civil engineer, or equivalent, before drilling commences.

The rig will be cleaned and decontaminated according to the guidelines described in Section 5.8. The rig will not leak any fluids that may enter the borehole or contaminate equipment that is placed in the hole. Rags or absorbent materials will not be used to absorb leaking fluids.

EEG and its drilling subcontractors will dispose of all trash, waste grout, cuttings, and drilling fluids as coordinated with the base civil engineer or representative. Monitoring wells will be completed in the alluvial terrace groundwater only, thereby preventing cross-connection or cross-contamination of other water bearing zones or aquifers.

5.5.2 Monitoring Well Borehole Requirements

As hollow stem auger (HAS) drilling is to be used for this project, the inside diameter of the auger will be at least 4 inches larger than the outside diameter of the casing and well screen.

The completed monitoring wells will be sufficiently straight to allow passage of pumps or sampling devices and will be pumped within 1 degree of vertical where the water level is greater than 30 feet below land surface unless otherwise approved by AFCEE. AFCEE may waive a plumbness requirement. Any request for a waiver from straightness or plumbness specifications will be made in writing to AFCEE, in advance of mobilization for drilling. EEG or its drilling subcontractor will use a single-shot declination tool to demonstrate plumbness. Monitoring wells not meeting straightness or plumbness specifications will be redrilled and/or reconstructed.

Formation samples for lithologic description will be obtained continuously at 2-foot sampling intervals. All samples will be monitored with an organic vapor monitor (e.g , PID, OVA). The samples will be handled in such a way as to minimize the loss of volatiles; these procedures will be described in Section 6.2. Cuttings will be examined for their hazardous characteristics. Materials that are suspected to be hazardous because of abnormal color, odor, or organic vapor

monitor readings shall be containerized in conformance with RCRA, state, and local requirements. The documentation record and forms (Attachment A) will document the following information for each boring: (1) boring or well identification (this identification shall be unique, and EEG will ensure it has not been used previously at the installation.), (2) purpose of the boring (e.g , soil sampling, monitoring well), (3) location in relation to an easily identifiable landmark, (4) names of drilling contractor and logger, (5) start and finish dates and times, (6) drilling method, (7) types of drilling fluids and depths at which they were used (not applicable to the drilling method used for this project), (8) diameters of surface casing, casing type, and methods of installation, (9) depth at which saturated conditions were first encountered, (10) lithologic descriptions and depths of lithologic boundaries, (11) sampling-interval depths, (12) zones of caving or heaving, (13) drilling rate, and (14) drilling rig reactions, such as chatter, rod drops, and bouncing.

In addition to the above, the following information shall be recorded when rock core samples are collected: (1) the depth interval and top and bottom of each core shall be marked on the core box, (2) percentage of core recovered, (3) number of fractures per foot, (4) angle of fractures relative to the core axis, and (5) breaks due to coring and core handling shall be distinguished from naturally occurring fractures.

A standard penetration test shall be performed each time a split spoon sample is taken. The test shall be performed in accordance with ASTM D-1586.

5.5.3 Casing Requirements

The casing requirements that will be followed are the following: (1) all casing will be new, unused, and decontaminated according to the specifications of Section 5.8, (2) glue will not be used to join casing, and casings will be joined only with compatible welds or couplings that shall not interfere with the planned use of the well, (3) all polyvinyl chloride (PVC) will conform to the ASTM Standard F-480-88A or the National Sanitation Foundation Standard 14 (Plastic Pipe System), (4) all metal casing will be seamless stainless steel casing, and the casing "mill" papers will be included in the appendix of the technical report, (5) the casing will be straight and plumb within the tolerance stated for the borehole, and (6) the driller shall cut a notch in the top of the casing to be used as a measuring point for water levels.

All monitoring wells for this project will be constructed using flush threaded two-inch diameter Schedule 40 PVC casing. The notches cut in the top of the monitoring well casings for water level measuring points will be oriented on the north side of each casing for uniformity.

5.5.4 Well Screen Requirements

AFCEE well screen requirements are the following: (1) all requirements that apply to casing will also apply to well screen, except for strength requirements, (2) monitoring wells will not be screened across more than one water-bearing unit, (3) screens will be factory slotted or wrapped, (4) screen slots will be sized to prevent 90 percent of the filter pack from entering the well, and for wells where no filter pack is used, the screen slot size will be selected to retain 60 to

70 percent of the formation materials opposite the screen, and (5) the bottom of the screen is to be capped, and the cap will be joined to the screen by threads.

The monitoring wells will be constructed using flush-threaded two-inch diameter Schedule 40 PVC casing and screen. The upper 20 feet of the uppermost flow zone of the uppermost aquifer will be screened with 0.010 inch continuous slotted PVC. No well screen will be over 20 feet in length; however, every effort will be made to install monitoring wells with a maximum screen length of 10 feet. It is anticipated that well screens will be placed from the lowest portion of the alluvial terrace groundwater zone through the surface of the water table. The bottom of the screen will be capped using a flush threaded PVC cap.

5.5.5 Annular Space Requirements

The annular apace requirements are the following: (1) the annular space will be filled with a filter pack, a bentonite seal, and casing grout between the well string and the borehole wall, and (2) as the annular space is being filled, the well string will be centered and suspended such that it does not rest on the bottom of the hole, and for wells greater than 50 feet deep, at least two stainless steel centralizers will be used, one at the bottom and one at the top of the screen Additional centralizers will be used as needed.

5.5.6 Filter Pack Requirements

The filter pack will consist of silica sand or gravel and will extend from the bottom of the hole to at least 2 feet above the top of the well screen. After the filter pack is emplaced, the well will be surged with a surge block for ten minutes. The top of the sand pack will be sounded to verify its depth during placement. Additional filter pack will be emplaced as required to return the level of the pack to 2 feet above the screen. The well will then be surged again for five minutes and additional filter pack will be emplaced as required to bring its level to 2 feet above the screen.

The filter pack material will be clean, inert, and well rounded and will contain less than 2 percent flat particles. The sand will be certified free of contaminants by vendor or contractor. If decontamination is necessary, the methods shall be approved in writing by AFCEE.

The filter pack will have a grain size distribution and uniformity coefficient compatible with the formation materials and the screen. This will be calculated as described in Chapter 12, Ground Water and Wells, 2nd Edition (Driscoll, 1986). The grain size of the filter pack material will be determined based on existing grain size analysis prior to mobilization to the field. The filter pack will not extend across more than one water-bearing unit. In all wells (deep or shallow), the filter pack will be emplaced with a bottom discharge tremie pipe of at least 1-1/2 inches in diameter to prevent bridging. The tremie pipe will be lifted from the bottom of the hole at the same rate the filter pack is set. EEG will record the volume of the filter pack emplaced in the well. If potable water is necessary to place the filter pack, EEG will obtain prior approval from the regulatory agency providing oversight, and will ensure that no contaminants are introduced into the well.

5.5.7 Bentonite Seal Requirements

The bentonite seal requirements that will be followed are the following: (1) the bentonite seal will consist of at least 2 feet of bentonite between the filter pack and the casing grout, (2) the bentonite will be hydrated before placement and shall be installed by pump tremie methods, and (3) only 100 percent sodium bentonite shall be used.

5.5.8 Casing Grout Requirements

The casing grout requirements are the following: (1) the casing grout will extend from the top of the bentonite seal to ground surface, (2) the grout will be mixed in the following proportions: 94 pounds of neat Type I Portland or American Petroleum Institute Class A cement, not more than 4 pounds of 100 percent sodium bentonite powder, and not more than 8 gallons of potable water, (3) all grout will be pump tremied using a side-discharge tremie pipe, and pumping will continue until 20 percent of the grout has been returned to the surface, and (4) in wells where the bentonite seal is visible and within 30 feet of the land surface, the 20 percent return is not necessary so long as the tremie pipe is pulled back as the grout is emplaced.

5.5.9 Surface Completion Requirements

For flush-mounted completions, the casing will be cut about three inches below the land surface and provide a water-tight casing cap to prevent surface water from entering the well. To allow for escape of gas, a small diameter (e.g., 1/4 inch) vent hole will be placed in the upper portion of the casing, or a ventilated well cap will be used. A freely draining valve box with a locking cover will be placed over the casing. The top of the casing will be at least one foot above the bottom of the box. The valve box lid will be centered in a three-foot diameter, four-inch thick concrete pad that slopes away from the box at 1/4 inch per foot. The identity of the well will be permanently marked on the valve box lid and the casing cap. Where heavy traffic may pass over the well or for other reasons, the concrete pad and valve box/lid assembly will be constructed to meet the strength requirements of surrounding surfaces.

When aboveground surface completion is used, the well casing will be extended 2 or 3 feet above land surface. A casing cap will be provided for each well, and the extended casing will be shielded with a steel sleeve that is placed over the casing and cap and seated in a 3-foot-by-3-foot-by-4-inch concrete surface pad. To allow for escape of gas, a small diameter (e.g., 1/4 inch) vent hole will be placed in the well casing, or a ventilated well cap will be used. The concrete surface pad will be reinforced with steel reinforcing bars at least 1/4 inch in diameter. The ground surface will be freed of grass and scoured to a depth of 2 inches before setting the concrete pad. The diameter of the sleeve will be at least 6 inches greater than the diameter of the casing. The pad will be sloped away from the well sleeve. A lockable cap or lid will be installed on the guard pipe. The identity of the well will be permanently marked on the casing cap and the protective sleeve. Three 3-inch diameter concrete-filled steel guard posts, each 5 feet in total length, will be installed radially from each wellhead. The guard posts will be recessed approximately 2 feet into the ground and set in concrete. The guard posts will not be installed in the concrete pad placed at the well base. The protective sleeve and guard posts will be painted with a color specified by the installation civil engineer.

All wells will be secured as soon as possible after drilling with corrosion-resistant locks for both flush and aboveground surface completions. The locks will either have identical keys or be keyed for opening with one master key. The lock keys will be delivered to the appropriate Air Force personnel following completion of the field effort. A Monitoring Well Construction Form will be completed for each well (Attachment A).

5.6 Monitoring Well Development

The monitoring well development requirements are the following: (1) all newly installed monitoring wells will be developed no sooner than 24 hours after installation to allow for grout curing, (2) all drilling fluids used during well construction will be removed during development, (3) wells will be developed using surge blocks and bailers or pumps (prior approval for any alternate method will be obtained, in writing, from AFCEE before well construction begins), and wells will be developed until the turbidity of the well is less than or equal to 10 nephelometric turbidity units (NTU) and remains within a 5 NTU range for at least 30 minutes and the stabilization criteria in Section 6.1 are met, (4) discharge water color and volume will be documented, (5) no sediment will remain in the bottom of the well, (6) no detergents, soaps, acids, bleaches, or other additives will be used to develop a well, and (7) all development equipment will be decontaminated according to the specifications of Section 5.8.

5.7 Abandoning Monitoring Wells

All abandonment of monitoring wells, when necessary, shall be performed in accordance with state and local laws and regulations. If slurry is used, a mud balance and/or marsh funnel will be used to ensure that the density (lbs/gal) of the abandonment mud mixture conforms to the manufacturer's specification. All abandoned monitoring wells will be checked 24 to 48 hours after mud/solid bentonite emplacement to determine whether curing is occurring properly. More specific curing specifications or quality assurance checks may be recommended by the manufacturer and will be followed Additionally, if significant settling has occurred, a sufficient amount of mud/solid bentonite will be added to attain its initial level. These slurry/solid bentonite curing checks and any addition of mud/solid bentonite will be recorded in the field logs.

5.8 Surveying

All surveying locations of field activities will be measured by a state of Texas certified land surveyor as the distance in feet from a reference location that is tied to the state plane system. The surveys will be third order (cf. Urquhart, L.C., 1962 Civil Engineering Handbook, 4th Edition, pp. 96 and 97). An XY-coordinate system will be used to identify locations. The X-coordinate will be the east-west axis; the Y-coordinate will be the north-south axis. The reference location is the origin. All surveyed locations will be reported using the state plane coordinate system. The surveyed control information for all data collection points will be recorded and displayed in a table. The table will give the X and Y coordinates in state plane coordinate values, the ground elevation, and the measuring point elevation if the location is a ground-water monitoring well. The elevation of all newly installed wells and piezometers will be surveyed at the water level measuring point (notch) on the riser pipe. The elevation of the ground surface at each water level measuring point will be included in the survey.

The X-Y coordinates for each sample location will be determined to within 0.1 feet and referenced to the State Plane Coordinate System. Vertical control will be to the National Geodetic Vertical Datum (NGVD) and will be within 0.01 feet for all sampling locations.

5.9 Equipment Decontamination

All equipment that may directly or indirectly contact samples will be decontaminated in a designated decontamination area. This includes casing, drill bits, auger flights, portions of drill rigs that stand above boreholes, sampling devices, and instruments, such as slugs and sounders. In addition, EEG and its subcontractors will take care to prevent the sample from coming into contact with potentially contaminating substances such as tape, oil, engine exhaust, corroded surfaces, and dirt.

The following procedure will be used to decontaminate large pieces of equipment such as casings, auger flights, pipe and rods, and those portions of the drill rig that may stand directly over a boring or well location or that come into contact with casing, auger flights, pipe, or rods. The external surfaces of equipment will be washed with high-pressure hot water and Alconox, or equivalent laboratory-grade detergent, and if necessary, scrubbed until all visible dirt, grime, grease, oil, loose paint, rust flakes, etc., have been removed. The equipment will then be rinsed with potable water. The inside surfaces of casing, drill rod, and auger flights will also be washed as described.

The following procedure will be used to decontaminate sampling and drilling devices such as split spoons and augers that can be hand-manipulated. For sampling and smaller drilling devices, the equipment will be scrubbed with a solution of potable water and Alconox, or equivalent laboratory-grade detergent The equipment will then be rinsed with copious quantities of potable water followed by a rinse with ASTM Type II reagent-grade water. High pressure liquid chromatograph-grade water and distilled water purchased in stores are not acceptable substitutes for ASTM Type II Reagent-Grade Water. The equipment will then be rinsed with pesticide-grade methanol followed by a rinse with pesticide-grade hexane. The equipment will then be allowed to air dry on a clean surface or rack, such as Teflon®, stainless steel, or oil-free aluminum, elevated at least 2 feet above ground. If the sampling device will not be used immediately after being decontaminated, it will be wrapped in oil-free aluminum foil, or placed in a closed container made of stainless steel, glass, or Teflon®.

Reagent-Grade II water, methanol, and hexane will be purchased, stored, and dispensed only in glass, stainless steel, or Teflon® containers. These containers will have Teflon® caps or cap liners. EEG and its subcontractors will assure that these materials remain free of contaminants. If any question of purity exists, new materials will be used.

All fluids generated during decontamination activities will be placed in United Nations (UN)-approved steel 55-gallon drums. All drums will be properly labeled as to content and shall be staged in a central location designated by the base representative for temporary storage pending removal and disposal.

5.10 Waste Handling

Waste handling will be dealt with on a site-by-site basis. Waste will be classified as either non-investigative waste or investigative waste per the requirements of 30 TAC Section 335, Subchapter R and 40 Code of Federal Regulations (CFR) Part 261, Subpart C. Non-investigative waste, such as litter and household garbage, will be collected on an as-needed basis to maintain each site in a clean and orderly manner. This waste will be containerized and transported to the designated sanitary landfill or collection bin. Acceptable containers will be sealed boxes or plastic garbage bags.

Waste containers will be labeled with the following information: type of matrix being contained, depth from which matrix was obtained, date matrix was contained, company name and phone number, and whether matrix is considered hazardous or not.

Characterization of investigation-derived waste (IDW) will be based on sample analysis obtained during the field investigation following EPA approved methods. Hazardous waste classification will first be determined as per 40 CFR Sections 261.2, 261.3, or 261.4. Waste that is nonhazardous, is then classified as Class 1, Class 2, or Class 3 according to 30 TAC Sections 335.505 to 335.507. Once the IDW has been characterized, an eight-digit waste code number will be provided as required in Section 335.501. The disposal of IDW will be conducted in a timely and cost effective manner, and in accordance with all state and federal regulations.

IDW will be properly containerized and temporarily stored at each site, prior to transportation. Depending on the constituents of concern, fencing or other special markings may be required. The number of containers will be estimated on an as-needed basis. Acceptable containers will be sealed in either 55-gallon drums or small dumping bins with lids. The containers will be transported in such a manner to prevent spillage or particulate loss to the atmosphere.

The IDW will be segregated at the site according to matrix (solid or liquid) and as to how it was derived (drill cuttings, drilling fluid, decontamination fluids, and purged groundwater). Each container will be properly labeled with site identification, sampling point, date, depth, matrix, constituents of concern, and other pertinent information for handling.

Waste generated during the field activities will be handled and disposed of in accordance with applicable federal, state, and local regulations Disposable materials such as latex gloves, aluminum foil, paper towels, etc., shall be placed and sealed in plastic garbage bags for disposal with sanitary waste from the site. Soil cuttings will be placed in 55-gallon steel open top drums with lids. Development and purge waters evacuated from groundwater monitoring wells, and all fluids generated during decontamination activities, will be placed in 55-gallon steel drums. Drums will be properly labeled with the appropriate boring or well number, and content, and will be staged in a central location designated by the base representative for temporary storage pending removal and disposal.

5.11 Corrective Action

Table 5-1 contains a summary of field quality control procedures and corrective actions.

6.0 Environmental Sampling

6.1 Sampling Procedures

All purging and sampling equipment will be decontaminated according to the specifications in Sections 5.8 and 7.3 prior to any sampling activities and will be protected from contamination until ready for use. The construction material of the sampling devices (e.g , plastic, PVC, metal, etc.) discussed below will be appropriate for the contaminant of concern and shall not interfere with the chemical analyses being performed.

6.1.1 Groundwater Sampling

When numerous monitoring wells are to be sampled in succession, wells expected to have low levels of contamination or no contamination will be sampled prior to wells expected to have higher levels of contamination. This practice will help reduce the potential for cross contamination between wells. All sampling activities will be recorded in the field logbook. Additionally, all sampling data will be recorded on a Field Sampling Report form (Attachment A).

Before groundwater sampling begins, wells will be inspected for signs of tampering or other damage. If tampering is suspected, (i.e., casing is damaged, lock or cap is missing) this shall be recorded in the field logbook and on the well sampling form, and reported to the project geologist/field coordinator. Wells that are suspected to have been tampered with will not be sampled until the project geologist/field coordinator has discussed the matter with the PM.

Before the start of sampling activities, plastic sheeting will be placed on the ground adjacent to the well. The plastic sheeting will be used to provide a clean working area for clean equipment to be placed during sampling. Water will be removed from the protective casing or from vaults around the well casing prior to venting and purging. Every time a casing cap is removed to measure water level or collect a sample, the air in the breathing zone will be checked with an organic vapor meter Procedures in the HASP will be followed when high concentrations of organic vapors are detected. Air monitoring data will be recorded on the well sampling form.

Purge pump intakes will be equipped with a positive check valve to prevent purged water from flowing back into the well. Purging and sampling will be performed in a manner that minimizes aeration in the well bore and the agitation of sediments in the well and formation. Equipment will not be allowed to free-fall into a well.

In addition to the information required in Section 8.0, the following information will be recorded each time a well is purged and sampled: (1) depth to water before and after purging; (2) well bore volume calculation; (3) sounded total depth of the monitoring well; (4) the condition of each well, including visual (mirror) survey; (5) the thickness of any non-aqueous layer and; (6) field parameters, such as pH, temperature, electrical conductivity (EC), oxidation-reduction potential (ORP), dissolved oxygen (DO), and turbidity. This information will be encoded in Installation Restoration Program Information Management System (IRPIMS) files when required.

6.1.1.1 Water Level Measurement

An interface probe will be used since a nonconductive floating product layer is suspected at some of the proposed well locations. The interface probe will be used to determine the presence of floating product, if any, prior to measurement of the ground-water level. The ground-water level will then be measured to the nearest 0.01 foot using an electric water level indicator. Water levels will be measured from the notch located at the top of the well casing and recorded on the well sampling form. If well casings are not notched, measurements will be taken from the north edge of the top of the well casing, and a notch will be made using a decontaminated metal file.

Following water level measurement, the total depth of the well from the top of the casing will be determined using a weighted tape or electric sounder and recorded on the well sampling form. The water level depth will then be subtracted from the total depth of the well to determine the height of the water column present in the well casing. All water level and total depth measuring devices will be routinely checked with a tape measure to ensure measurements are accurate.

6.1.1.2 Purging Prior to Sampling

Purging of monitoring wells is performed to evacuate water that has been stagnant in the well and may not be representative of the aquifer. Purging will be accomplished using the micropurge technique. Micropurge is a low flow-rate monitoring well purging and sampling method that induces laminar (non turbulent) flow in the immediate vicinity of the sampling pump intake, thus drawing groundwater directly from the sampled aquifer, horizontally through the well screen, and into the sampling device.

Pumps capable of achieving low-flow rates in the range of 0.1 to 0.5 liter per minute (L/min) will be used for purging and sampling. These low flow rates minimize disturbance in the screened aquifer, resulting in the following: (1) minimal production of artificial turbidity and oxidation; (2) minimal mixing of chemically distinct zones; (3) minimal loss of volatile organic compounds; and (4) collection of representative samples while minimizing purge volume.

Pumps will be lowered to the middle of the screened interval or slightly above the interval (i.e., a measured depth of 43 percent of the saturated screened interval below the top of the water table). This is to minimize the resuspension of solids that have collected at the bottom of the well and to minimize the potential mixing of stagnant water trapped in the casing above the screen. The key is to minimize the disturbance of water and solids in the well casing.

As a guide to flow rate adjustment during purging, water levels will be checked and recorded to monitor drawdown in the well Groundwater will be pumped in a manner that minimizes the stress to the system to the extent practical taking into account established site sampling objectives. The goal is to purge the well at a rate that does not draw down the static water level more than 0.33 foot.

Temperature, pH, EC, DO, ORP, and turbidity will also be measured during purging and recorded on the well sampling form. Measurements will be taken every 3 to 5 minutes when flow rates are in the 0.1 to 0.5 L/min range. Stabilization is achieved after all parameters have stabilized for three consecutive readings. Successive readings should be approximately within ±1.0°C for

temperature, ±0.1 units for pH, ±5 percent for EC, ±0.1 milligrams per liter (mg/L) or 10 percent (whichever is greater) for DO, ±10 percent for ORP, and ±10 NTUs for turbidity. In general, the order of stabilization is pH, temperature, and EC, followed by ORP, DO, and turbidity. Water samples will be collected immediately after parameter stabilization using the same pump as was used in purging. Field equipment will be calibrated in accordance with the basewide QAPP (HydroGeoLogic, 1998) Section 6.0, and in Section 7.2 of this FSP.

In lieu of measuring all six parameters (temperature, pH, EC, turbidity, DO, and ORP), a minimum subset would include pH, EC, and either turbidity or DO as critical stabilization parameters. If parameter stabilization criteria are too stringent, then minor oscillations in indicator parameters may cause purging operations to become unnecessarily protracted. Turbidity is a very conservative parameter in terms of stabilization and is almost always the last parameter to stabilize. Excessive purge times are invariably related to the establishment of too stringent turbidity stabilization criteria. It should be noted that natural turbidity levels in groundwater may exceed 10 NTUs (USEPA, 1996).

For wells known to have a less than 0.1 L/min flow rate, a low-flow (<0.1 L/min) pump will be lowered into the well to mid-screen as described above and set in place a minimum of 48 hours prior to the initiation of purging procedures. This procedure will reduce the purge volume requirements. Water samples will be collected as soon as parameters have stabilized (USEPA, 1996).

Alternately, if a well is known to have less than a 0.1 L/min flow rate, a passive sampling device could be lowered to mid-screen as described above and set in place a minimum of 48 hours prior to retrieval. Regulatory approval for sample volumes, which are lower than required by individual EPA analytical methods, would have to be obtained prior to using this procedure (USEPA, 1996).

If during low-flow purging the drawdown is greater than 0.33 foot, then the micropurge technique is assumed to be invalid and will be discontinued. The reason is that groundwater flow to the pump is no longer considered to be laminar across the screen from the aquifer. The flow in the vicinity of the pump would then contain a vertical component from the stagnant water column in the filter pack and casing

In this situation (i.e., drawdown >0 33 foot at low-flow rates), the pumping rate will be increased and a minimum of three borehole volumes will be removed to ensure that all of the stagnant water has been removed from the borehole. The drawdown will continue to be monitored and the pumping rate will be adjusted to avoid pumping the well dry. Measurements for water quality parameters will be taken every 3 to 5 minutes. After three well volumes have been removed and water quality parameters have stabilized for three consecutive readings, water samples will be collected when the water level has recovered to 80 percent of its static water level or 16 hours after completion of purging. Water samples will be collected using either a low-flow pump or a Teflon® bailer.

If the parameters do not stabilize, then five well volumes will be removed and water samples will be collected when the water level has recovered to 80 percent of its static water level or 16 hours

after completion of purging. Water samples will be collected using either a low-flow pump or a Teflon® bailer.

If a well is purged dry, then the well will be sampled as soon as a sufficient volume of groundwater has entered the well to enable the collection of necessary groundwater samples (USEPA, 1992). Water samples will be collected using either a low-flow pump or a Teflon® bailer.

Water removed from the well during purging will be containerized. Detailed information concerning IDW is presented in Section 5.9. A maximum of five well volumes may be removed from any well before it is sampled. The well bore volume is defined as the volume of submerged casing, screen, and filter pack. One well volume can be calculated using the following equation (Ohio EPA, 1993):

$$V = H \times F$$

where V = one well volume

H = the difference between the depth of well and depth to water (feet)

F = factor for volume of one foot section of casing (gallons) from Table 6-1

F can also be calculated from the formula:

$$F = \pi (D/2)^2 \times 7.48 \text{ gal/ft}$$

where D = the inside diameter of the well casing (feet) and $\pi = 3.141593$.

6.1.1.3 Sample Collection

At newly developed wells, water samples may be collected only after a 24-hour period has elapsed from the conclusion of monitoring well development activities.

Following the micropurge techniques outlined above, a small positive-displacement pump (e.g , bladder pump) may be used collect water samples. Samples to be analyzed for volatile or gaseous constituents will not be withdrawn with pumps or at flows that degas the samples. Water-quality indicators will be monitored during micropurge (turbidity, dissolved oxygen, specific conductance, temperature, etc.)

Groundwater samples will be collected after the critical water quality indicators have stabilized for three consecutive readings. Stabilization shall be defined as follows: temperature ±1.0°C, pH ±0.1 units, EC ±5 percent, DO ±0.1 mg/L or 10 percent (whichever is greater), ORP ±10 percent, and turbidity ±10 NTUs between three consecutive readings. Where possible, groundwater samples will be collected using the same pump used in the purging procedure. If the parameters do not stabilize, a subset (pH, EC, and turbidity or DO) will be used as the stabilization parameters. If subset parameters do not stabilize, then the sample shall be collected as described above in Section 6.1.1.2, and the anomalous parameters shall be brought to the field

coordinator's attention. Field equipment will be calibrated in accordance with the base-wide QAPP.

The preservative hydrochloric acid shall be added to the VOC sample bottle before introducing the sample water. The sample shall be collected from the pump discharge line using a slow, controlled pour down the side of a tilted sample vial to minimize volatilization. The sample vial shall be filled until a meniscus is visible and immediately sealed. When the bottle is capped, it shall be inverted and gently tapped to ensure no air bubbles are present in the vial. If bubbles are present after the initial filling, the vials shall be discarded and the VOC sampling effort shall be repeated. Refilling of vials will result in loss of preservatives. After the containers are sealed, sample degassing may cause bubbles to form. These bubbles shall be left in the container. These samples shall never be composited, homogenized, or filtered.

Following the collection of VOC samples, the remaining water samples shall be collected in the following order: semi-volatile organic compounds (SVOCs) including polynuclear aromatic hydrocarbons (PAHs), pesticides/polychlorinated biphenols (PCBs), herbicides organophosphorus pesticides, dioxins/furans, metals, mercury, cynide, sulfide, total organic carbon (TOC), methane, Fe (II), alkalinity, and common anions. Field filtering of metals will not occur.

The pH of preserved samples will be checked in the field by pouring a small amount of the water sample onto pH paper. The paper will not touch the sample inside the container. The pH of acidified VOC samples will not be checked. The preservation checks will be documented in the chain-of-custody forms.

Required sample containers, preservation methods, volumes and holding times are given in Section 6.2 and Table 6-2. Sampling equipment shall be decontaminated in accordance with Section 5.8 upon completion of sampling activities.

6.1.2 Surface Soil Sampling

Surface soil samples will not be collected as part of this field effort. Unusual surface conditions that may affect the chemical analyses will be recorded, such as (1) asphalt chunks that may have been shattered by mowers, thus spreading small fragments of asphalt over the sampling area, (2) distance to roadways, aircraft runways, or taxiways, (3) obvious, deposition of contaminated or clean soil at the site, (4) evidence of dumping or spillage of chemicals, (5) soil discoloration, and/or (6) unusual condition of growing plants, etc.

6.1.3 Subsurface Soil Sampling

Soil samples will be collected as specified in the work plan.

6.1.3.1 Split-Spoon Samples

During monitoring well installation using hollow-stem auger methods, soil samples will be collected using stainless steel, continuous drive, California modified split-spoon samplers, or equivalent. These samplers are 24 inches in length and have an outside diameter (OD) of 3 inches

to accommodate four stainless steel/Teflon® sleeves, each of which is 6 inches in length. Soil samples during monitoring well installation will be field screened for VOCs

For split-spoon samples collected using hollow stem augers, a standard penetration test will be performed in accordance with ASTM D-1586, "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils." The sample is obtained by driving the sampler a distance of 1 foot into undisturbed soil with a 140-pound hammer free falling a distance of 30 inches. The sampler is first driven 6 inches to seat it in undisturbed soil; then the test is performed. The number of hammer blows for seating the spoon and making the test are then recorded for each 6 inches of penetration on the drill log (i.e., 5/7/8). The standard penetration test result (N) is obtained by adding the last two figures (i e., 7+8=15 blows per foot). The sampler is then driven an additional 6 inches to fill the remainder of the split-spoon prior to retrieval.

As soon as the split-spoon is opened, the open ends of the stainless/Teflon® steel sleeves will be monitored for organic vapors using the PID. Air monitoring results will be recorded on the boring log and in the field log book.

6.1.3.2 Direct-Push Sampling

Direct-push sampling involves advancing a sampling probe by direct hydraulic pressure or by using a slide or rotary hammer. Samples may be collected continuously or at specific depths. The samples are collected in brass/stainless steel sleeves. Samples for VOC analysis will be collected from the sleeves in the same manner as described in Section 6.1.3.1. Samples for other analytical parameters will be collected using the sleeves. The sleeve shall be capped with Teflon® tape and end caps. The ends of the capped sleeve shall then also be wrapped with Teflon® tape. Care shall be taken not to touch the ends of the sleeves prior to capping. Custody seals shall be placed across the capped ends of the sleeve. Once the container has been filled, the appropriate information shall be recorded in the field logbook.

6.1.3.3 Rinse Water Sampling

When numerous WAAs are to be rinsed and sampled in succession, those facilities expected to have low levels of contamination or no contamination will be sampled prior to those expected to have higher levels of contamination. This practice will help reduce the potential for cross contamination between the WAAs. All sampling activities will be recorded in the field logbook. Additionally, all sampling data will be recorded on a Field Sampling Report form. An example Field Sampling Report form is shown in Attachment A.

In addition to the information required in Section 8.0, the following information will be recorded each time a waste accumulation area (WAA) is rinsed and sampled: (1) the condition of each WAA, (2) the presence of any waste products, and (3) field parameters (i.e., OVA readings). This information will be encoded in the IRPIMS files when required.

6.1.3.3.1 Sample Collection

The water will be collected by the use of an aluminum funnel that will direct the rinse water into the appropriate sample container. The sample container will be filled until full or a meniscus is

visible, as applied to 40 mL vials, and immediately sealed. When a 40 mL vial is sealed, it will be inverted and gently tapped to ensure no air bubbles are present in the vial. If bubbles are present after the initial filling, the vials shall be reopened and topped off with rinse water. Extreme care will be taken during the refilling of vials to prevent a loss of preservatives. After the vial is sealed, sample degassing may cause bubbles to form. These bubbles shall be left in the container. These samples shall never be composited, homogenized, or filtered Following the collection of VOC samples, the remaining SVOC and metal samples will be collected.

All water not collected during this sampling procedure will be removed from the floor drains, if present via a pump. If floor drains are not present, then plastic sheeting will be laid out to collect excess rinse water. All excess rinse water will be containerized in 55-gallon drums and disposed of in accordance with Section 5.9 of this FSP. All drums will be stored at the staging area until the analytical data has been reviewed

6.1.3.3.2 Sample Preservation

The laboratory will provide sample containers that are appropriately preserved. Required sample containers, preservation methods, volumes and holding times are given in Section 6 2 and Table 6-2.

The walls of the WAAs will be wiped with an absorbent sterile cotton gauze pad following the collection of the rinse samples. Each wipe sample will be analyzed for Appendix IX VOCs, SVOCs, and metals.

6.2 Sample Handling

6.2.1 Sample Containers

Sample containers will be provided to field personnel, precleaned and treated according to EPA specifications for the methods. No sampling containers will be reused for the sampling events of this RFI. Containers will be stored in clean areas to prevent exposure to fuels, solvents, and other contaminants. Amber glass bottles are used routinely where glass containers are specified in the sampling protocol.

6.2.2 Sample Volumes, Container Types, and Preservation Requirements

Sample volumes, container types, and preservation requirements for the analytical methods performed on AFCEE samples are listed in Table 6-2. Sample holding time tracking begins with the collection of samples and continues until the analysis is complete. Holding times for methods used in this FSP are specified in Table 6-2.

6.2.3 Sample Identification

The following information will be written in the logbook and on the sample label when samples are collected for laboratory analysis:

- Project identification (name and number)
- Sample identification number

- Sample location
- Preservatives added
- Date and time of collection
- Requested analytical methods
- Sampler's name

Each sample will be assigned a unique identification number that describes where and what type of sample was collected. The number that will be used in the field will consist of a maximum 15 digit alphanumeric code. Once data is ready to be entered into the IRPIMS database, the alphanumeric code will be truncated to 10 digits. This system is explained in detail as follows:

abbbcccccdd-ee

where:

a	represents the medium (e g., W = monitoring well, P = wipe sample, R = rinse sample, B = soil boring, U = surface water sample, or E = sediment sample)
bbb	represents Ellis Environmental Group, LC designation (e.g., EEG)
cccccc	represents the SWMU/area of concern (AOC) number (e.g., SWMU05, SWMU51, AOC015, etc.)
dd	represents the location identification (LOCID) (e.g , 01, 02)
ee	represents the order that the sample was obtained within the soil boring, i.e., a surface soil sample would be 01, a 5- to 7-foot sample would be 02, etc. These two digits will be dropped once the data is entered into the IRPIMS database.

For example, the first soil sample collected from soil boring 01 located at SWMU05 would be identified as "BEEGSWMU0501-01." The second sample collected from soil boring 01 located at SWMU05 would be identified as "BEEGSWMU0501-02." Duplicate samples will be submitted to the laboratory blind. A note in the field log book and the Field Sampling Report form will identify the location and sample number that has been duplicated.

QC samples will be identified by the use of a similar system of identifiers with a maximum of 10 characters. The QC sampling number system is summarized below.

aabbccdd

where:

aa	represents medium (e.g., ER = equipment rinsate, TB = trip blank, AB = ambient blank, EB = equipment blank)
bb	represents the day (e.g., 15)
cc	represents the month (e.g., 06)
dd	represents the year (e.g., 98)

For example, an equipment blank collected on the 15th day of June in the year 1998 will be "EB150698."

The field coordinator will maintain a list that describes how each QC sample corresponds with specific environmental samples. For instance, each trip blank will be correlated with a particular set of samples shipped to the laboratory, and each rinsate will be correlated to those samples collected by a particular set of decontaminated sampling tools.

6.3 Sample Custody

Procedures to ensure the custody and integrity of the samples begin at the time of sampling and continue through transport, sample receipt, preparation, analysis and storage, data generation and reporting, and sample disposal. Records concerning the custody and condition of the samples are maintained in field and laboratory records.

Chain-of-custody (COC) records will be maintained for all field and field QC samples. A sample is defined as being under a person's custody if any of the following conditions exist: (1) it is in their possession, (2) it is in their view, after being in their possession, (3) it was in their possession, and they locked it up, or (4) it is in a designated secure area. All sample containers will be sealed in a manner that will prevent or detect tampering if it occurs In no instance will tape be used to seal sample containers. Samples will not be packaged with activated carbon.

The following minimum information concerning the sample will be documented on the COC form:

- Unique sample identification
- Date and time of sample collection
- Source of sample (including name, location, and sample type)
- Designation of matrix spike/matrix spike duplicate (MS/MSD)
- Preservative used
- Analyses required
- Name of collector(s)
- Pertinent field data (pH, temperature, etc.)
- Serial numbers of custody seals and transportation cases (if used)
- Custody transfer signatures and dates and times of sample transfer from the field to transporters and to the laboratory or laboratories
- Bill of lading or transporter tracking number (if applicable)

All samples will be uniquely identified, labeled, and documented in the field at the time of collection in accordance with Section 6.2.3 of the FSP. Samples collected in the field will be transported to the laboratory or field testing site as expeditiously as possible. When a 4°C requirement for preserving the sample is indicated, the samples will be packed in ice or chemical refrigerant to keep them cool during collection and transportation. During transit, it is not always possible to rigorously control the temperature of the samples. As a general rule, storage at low temperature is the best way to preserve most samples A temperature blank (a VOC sampling vial filled with water) will be included in every cooler and used to determine the internal temperature of the cooler upon receipt of the cooler at the laboratory.

6.4 Field Quality Control Samples

Field quality control samples such as blanks and duplicates will be collected as described in the following sections.

6.4.1 Ambient Blank

The ambient blank consists of ASTM Type II reagent-grade water poured into a VOC sample vial at the sampling site. It is handled like an environmental sample and transported to the laboratory for analysis. Ambient blanks are prepared only when VOC samples are taken and are analyzed only for VOC analytes.

Ambient blanks are used to assess the potential introduction of contaminants from ambient sources (e.g., active runways, engine test cells, gasoline motors in operation, etc.) to the samples during sample collection. Ambient blanks will be collected downwind of possible VOC sources. One ambient blank will be collected at the beginning of the field investigation. Additional ambient blanks will be collected if site conditions warrant

6.4.2 Equipment Blank

An equipment blank is a sample of ASTM Type II reagent-grade water poured into or over or pumped through the sampling device, collected in a sample container, and transported to the laboratory for analysis Equipment blanks are used to assess the effectiveness of equipment decontamination procedures. Equipment blanks will be collected immediately after the equipment has been decontaminated. The blank will be analyzed for all laboratory analyses requested for the environmental samples collected at the site. One equipment blank will be collected per day when environmental samples are collected.

6.4.3 Trip Blank

The trip blank consists of a VOC sample vial filled in the laboratory with ASTM Type II reagent-grade water, transported to the sampling site, handled like an environmental sample, and returned to the laboratory for analysis. Trip blanks are not opened in the field. Trip blanks are prepared only when VOC samples are taken and are analyzed only for VOC analytes. Trip blanks are used to assess the potential introduction of contaminants from sample containers or during the transportation and storage procedures. One trip blank will accompany each cooler of samples sent to the laboratory for analysis of VOCs

6.4.4 Field Duplicates

A field duplicate sample is a second sample collected at the same location as the original sample Duplicate samples are collected simultaneously, or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. The sample containers are assigned an identification number in the field so that they cannot be identified (blind duplicate) as duplicate samples by laboratory personnel performing the analysis. Specific locations are designated for collection of field duplicate samples prior to the beginning of sample collection.

Duplicate sample results are used to assess precision of the sample collection process Precision of soil samples to be analyzed for VOCs is assessed from collocated samples because the compositing process required to obtain uniform samples could result in loss of the compounds of interest. One duplicate sample will be collected for every 10 groundwater samples collected.

6.4.5 Field Replicates

A field replicate sample, also called a split, is a single sample divided into two equal parts for analysis. The sample containers are assigned an identification number in the field such that they cannot be identified as replicate samples by laboratory personnel performing the analysis. Specific locations are designated for collection of field replicate samples prior to the beginning of sample collection. Replicate sample results are used to assess precision. One replicate sample will be collected for every 10 soil samples.

7.0 Field Measurements

7.1 Parameters

7.1.1 Field Screening of Soils

RFI field activities will utilize field screening of soil samples for VOCs to provide data on the chemical characteristics of the soil at the sites. During hand auguring and HSA drilling activities, sample cores will be monitored for organic vapors using an OVA or PID, and headspace readings will be recorded from collected soils. Headspace analysis will be performed on each lithologic and analytical soil sample collected. A portion of the recovered soil sample will be placed into a quart-size, resealable plastic bag, and the bag will be labeled, sealed, and shaken to mix the sample. The sample will be allowed to volatilize in a shaded area for approximately 15 minutes after which a headspace reading will be taken by punching through the bag with an OVA or PID sampling tip. The OVA or PID shall be calibrated using a standard of known concentration (e.g., isobutylene at 104 parts per million) in accordance with the requirements of the final basewide QAPP (HydroGeoLogic, 1998). The sampling tip will not be placed in the soil, but in the headspace of the bag. A background headspace value will be obtained from empty resealable plastic bags handled in a manner identical to the plastic bag containing the headspace sample. The headspace reading and the background reading will be recorded on the Soil Boring Log (Attachment A).

7.1.2 Field Parameters for Water Samples

The pH will be measured during the WAA rinse activities and groundwater purging. The pH of each water aliquot will be measured by a portable pH meter. The pH meter will be calibrated with two buffer solutions of the appropriate range for the expected values of pH. The meter will be recalibrated daily.

7.2 Equipment Calibration and Quality Control

Field equipment will be maintained and calibrated to the standards in their respective operations manuals. Equipment failures will be repaired in the field if possible; if not, the instrument will be tagged, removed from use, and returned for repair or replacement. Field equipment will be calibrated daily before the start of sampling activities. Calibration records will be maintained on the Calibration Log (Attachment A). The calibration record will include a unique instrument number (e.g., serial number), standards used, concentrations, and meter readings.

7.3 Equipment Maintenance and Decontamination

7.3.1 Equipment Maintenance

Field equipment will be kept in a controlled storage room and will be decontaminated prior to return to storage; any malfunctions will be reported to the field coordinator. The field coordinator will initiate actions necessary for the repair or replacement of defective equipment. Equipment maintenance logs are kept updated and on file. Power supplies of battery-powered instruments will be checked daily. Rechargeable instruments will be recharged daily.

7.3.2 Decontamination of Field Instruments

Decontamination of field instruments will be instrument-specific. The probes of the pH meters will be rinsed with reagent-grade water before and after each use, and at the end of each day. No decontamination is required for the OVA.

7.4 Field Performance and System Audits

The project geologist or a designated representative will conduct weekly informal audits of the field activities. The weekly audit for completeness will include the following items:

- Sample labels
- Chain of custody records
- Field notebooks
- Sampling operations
- Document control

The first three items above will be checked for completeness. Sampling operations will be reviewed to determine if they are performed as stated in the WP or as directed by the Project geologist. The informal document control audit will consist of checking each document for completeness, including items such as signatures, dates, and project numbers.

An unscheduled systems audit of field operations will be conducted using the project-specific work plan and will be used to review the total data generation. The audit will include on-site review of the field operational system, physical facilities for sampling, and equipment calibrations. A performance audit may be conducted by the PM and Project Geologist if deemed necessary by the PM, project geologist, lab coordinator, or client. The audit may focus on verifying that proper procedures are being followed so that subsequent sample data will be valid. Prior to the audit, a checklist will be prepared by the PM and project geologist that will serve as a guide for the performance audit.

The audit will verify whether or not the following items are being accomplished: (1) collection of samples follows the available written procedures, (2) chain of custody procedures are followed for traceability of samples origin, (3) appropriate QC checks are being made in the field and documented in the field log book, (4) specified equipment is available, calibrated, and working properly, (5) sampling crews are adequately trained, (6) record-keeping procedures are being followed and appropriate documentation is maintained, and corrective action procedures are followed. An audit report summarizing the results and corrections will be prepared and filed in the project files.

8.0 Record Keeping

EEG will maintain field records sufficient to recreate all sampling and measurement activities and to meet all IRPIMS data loading requirements. The information shall be recorded with indelible ink in a permanently bound notebook with sequentially numbered pages. These records shall be archived in an easily accessible form and made available to the USAF upon request.

The following information will be recorded for all field activities: (1) location, (2) date and time, (3) identity of people performing activity, and (4) weather conditions. The following information will be recorded for all field measurements: (1) the numerical value and units of each measurement, and (2) the identity of and calibration results for each field instrument will also be recorded.

The following additional information will be recorded for all sampling activities: (1) sample type and sampling method, (2) the identity of each sample and depth(s), where applicable, from which it was collected, (3) the amount of each sample, (4) sample description (e.g., color, odor, clarity), (5) identification of sampling devices, and (6) identification of conditions that might affect the representativeness of a sample (e g., refueling operations, damaged casing).

The following section describes the field documentation procedures, which will be followed as a means of recording observations and findings during the RFI field investigation. Documentation will include the form of field logbooks, various sample and calibration forms, site photographs, and drawings/sketches. All documentation will be completed in indelible ink and corrections will be stricken out with a single line and initialed. Examples of field forms are included in Attachment A.

8.1 Field Logbook

Logbooks with sequentially numbered pages will be kept at the site during all field activities and will be assigned to each sample team. These logs will be updated, continually, and will constitute master field investigation documents. Information to be recorded in the logs includes, but is not limited to, the following:

- Project identification
- Field activity subject
- General work activity, work dates, and general time of occurrence
- Unusual events
- Subcontractor progress or problems
- Communication with the client or others
- Weather conditions
- EEG personnel, subcontractors, and visitors on site
- Sample number and time of day for each sample collected for analysis
- Listing by sample number of samples collected during the day, sorted by chain-of-custody record number (compiled at the end of the day)
- Record of telephone call to laboratory informing it of sample shipment
- Accomplishment of decontamination of drilling rig, construction materials, and sampling equipment

- Accomplishment of required calibration checks
- Disposition of purge water, decontamination fluids, and soil cuttings
- Variances from project plans and procedures (details will be recorded in the log book and presented in the IRA)
- Accomplishment of tailgate safety meetings
- Review of project procedures with site personnel
- Head space screening and breathing zone readings
- Accomplishment of decontamination of water sampling equipment
- Photographs taken and identification numbers
- Name and signature of person making log book entries
- Inspections and results of inspections

8.2 Field Equipment Logbook

A field equipment logbook will be kept on site to document the proper use, maintenance, and calibration of field testing equipment Accompanying the field equipment logbook will be a three-ring binder containing operator manuals, specifications, and calibration requirements and procedures for all field-testing equipment. Information to be recorded in the field equipment logbook includes the following:

- Equipment calibration status
- Equipment decontamination status
- Equipment nonconformance
- Equipment inspection and repair records
- Name and signature of person making entry
- Date of entry
- Name of equipment and its identifying number
- Nature of work conducted
- List or reference of procedures used for calibration or maintenance
- Manufacturer, lot number, and expiration date of calibration standards
- Measurement results

8.2.1 Sample Collection Log

A sample collection log form (i.e., Field Sampling Report) will be completed for each sample collected during the investigation. An example of the Field Sampling Report form is included in Attachment A. Information to be included on the form includes the following:

- Date and time of sample collection
- Sample location
- Sample type (i.e., surface soil, sediment, groundwater, etc.)
- Name of person collecting samples
- Sample volumes and container types

9.0 References

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Urquhart, L.C., 1962, Civil Engineering Handbook 4th Edition, Water Measurement Manual, Bureau of Reclamation.

Tables

Table 3-1. Data Quality Levels and Intended Use for Field and Laboratory Data

Sampling Matrix/Location	Parameters	Analytical Method	Field/Lab Analysis	Data Quality Level	Intended Use
Subsurface Soil	metals	6010A	Lab	Definitive	Nature/extent of contaminants
	Mercury	7470A/7471A	Lab	Definitive	
	VOCs	8260A	Lab	Definitive	
	SVOCs	8270B	Lab	Definitive	
	PAHs	8310	Lab	Definitive	
	TPH/PHC/MEK	TX1005	Lab	Definitive	
Grroundwater	metals	6010A	Lab	Definitive	Nature/extent of contaminants,
	Mercury	7470A/7471A	Lab	Definitive	
	VOCs	8260A	Lab	Definitive	
	SVOCs	8270B	Lab	Definitive	

Key:

VOCs = Volatile Organic Compounds

SVOCs = Semivolatile Organic Compounds

PAHs = Polynuclear Aromatic Hydrocarbons

TPH = Total Petroleum Hydrocarbons

PHC = Petroleum Hydrocarbons

MEK = Methyl Ethyl Ketone

Table 3-2. Current SWMU Summary Table

SWMU/AOC	Waste Source:	Operational Period	Materials Received	Analyses
SWMU 12	Building 1602 - Propulsion Shop	Approx. 1982 – 1990	Waste JP-4 (84 gal/yr) - drummed 7808 engine oil (84 gal/yr) - drummed PD-680 (Type II)(petroleum naptha solvent) (60 gal/yr) - drummed	TPH (TX1005) Appendix IX VOCs (SW8260B) SVOCs (SW8270C) Metals/Mercury(SW6010/7000)
SWMU 31	Building 1050 - Pneudraulics Shop Building 1055 - Fire Control Shop	1955–1990	Waste hydraulic fluid and oil (120 gal/yr) - drummed PD-680 (Type II) (petroleum naptha solvent)(150 gal/yr) - drummed MEK (unspecified amount) - unspecified container TCE (unspecified amount) - unspecified container Perchloroethylene (unspecified amount) - unspecified container SE-377C (solvent) contaminated with cadmium (unspecified amount) - unspecified container Citri-Kleen (solvent) (unspecified amount) - unspecified container Silicone damping fluid contaminated with Freon 113 (unspecified amount) - unspecified container	TPH (TX1005) Appendix IX. VOCs/Freon 113 (SW8260B) SVOCs (SW8270C) Metals/Mercury(SW6010/7000)
SWMU 61 WAA 1319	Building 1320 - Power Production Maintenance Facility	Approx 1982 - 1990	Waste gasoline and diesel fuel (108 gal/yr) - drummed 7808 engine oil (156 gal/yr) - bowser PD-680 (Type II) (108 gal/yr) - drummed Antifreeze (156 gal/yr) - drummed Battery acid (360 gal/yr) - DRMO Hard material similar to roofing tar (unspecified amount) - bucket	TPH (TX1005) Soil pH (SW9045) Ethylene Glycol (SW8015) Appendix IX VOCs (SW8260B) SVOCs (SW8270C) Metals/Mercury(SW6010/7000)

Sources:

A T Kearney 1989, RCRA Facility Assessment, PR/VSI Report, Carswell Air Force Base, Fort Worth, Texas

CH2M HILL, 1984, Installation Restoration Program Records Search for Carswell Air Force Base, Texas

The Earth Technology Corporation, 1993, Basewide Environmental Baseline Survey, Carswell Air Force Base, Texas

U S. Air Force Occupational and Environmental Health Laboratory, Human Services Division, 1989, Hazardous Waste Technical Assistance Survey, Carswell AFB, Texas

Table 3-3. Field Activities Summary

Site	DPT Borings (to level specified in work plan)	Wells/HSA (to bedrock)
SWMU 12	20	2
SWMU 31	10	0
SWMU 61	5	0
Total	35	2

Notes:

DPT = direct push technology

HSA = hollow stem auger

Table 3-4. Soil Sample Analysis Summary

Site	Method	Matrix	No. of Samples [1]	No. of Equipment Blanks [2]	No. of Ambient Blanks [3]	No. of Trip Blanks [2]	No. of Field Replicates	No. of MS/MSD	Total No. of Samples
SWMU 12	TX1005	Soil	10	1	0	0	2	1/1	15
SWMU 12	SW8260B	Soil	5	1	1	1	2	1/1	12
SWMU 12	SW8310	Soil	5	1	0	0	2	1/1	10
SWMU 12	SW6010	Soil	10	1	0	0	2	1/1	15
SWMU 31	TX1005	Soil	1	1	0	0	1	1/1	5
SWMU 31	SW8260B	Soil	1	1	0	1	1	1/1	6
SWMU 31	SW7471	Soil	5	1	0	0	1	1/1	9
SWMU 31	SW6010	Soil	10	1	0	0	1	1/1	14
SWMU 61	TX1005	Soil	5	1	0	0	1	0	7
SWMU 61	SW8260B	Soil	5	1	0	1	1	0	8

Notes:

Equipment Blanks = One equipment blank will be taken per day, per analysis (for example, 3 equipment blanks represents 1 sample/day for 3 days).

Field Replicates = Collected on a 10% basis of investigation samples

Trip Blanks = One trip blank will be included per cooler when at least one sample is analyzed for VOCs from that cooler

Ambient Blanks = One ambient blank will be collected at the beginning of the field investigation for soil

Table 3-5. Groundwater Sample Analysis Summary

Site	Method	Matrix	No. of Samples	No. of Equipment Blanks	No. of Ambient Blanks	No. of Trip Blanks	No. of Field Duplicates	No. of MS/MSD	Total No. of Samples
SWMU 12	SW8260B	Groundwater	4	1	1	1	1	1/1	10
SWMU 12	SW8270C	Groundwater	4	1	0	0	1	1/1	8
SWMU 12	SW6010	Groundwater	4	1	0	0	1	1/1	8
SWMU 61	SW8260B	Groundwater	4	0	0	0	0	0	4

Notes:

Equipment Blanks = One equipment blank will be taken per day, per analysis (for example, 3 equipment blanks represents 1 sample/day for 3 days).

Field Duplicates = Collected on a 10% basis of investigation samples.

Trip Blanks = One trip blank will accompany each cooler that contains samples to be analyzed for VOCs. Trip blanks will only be analyzed for VOCs

Ambient Blanks = One ambient blank will be collected at the beginning of the field investigation for groundwater

Table 4-1. Key Project Personnel

Name	Title	Organization	Telephone
Don Ficklen	Team Chief	AFCEE/ERD	(210) 536-5290
Michael Dodyk, PE	NAS Fort Worth JRB POC	AFCEE/ERD	(817) 782-7167
Richard Wheeler, PE	Assistant Program Manager	EEG	(352) 332-3888
Rick Levin, PG	Project Manager	EEG	(352) 332-3888
Mark Bagel, PG	QA Manager	EEG	(352) 332-3888
Jason Shannon	Health & Safety Officer	EEG	(352) 332-3888
Jeffrey Finn	Project Geologist	EEG	(352) 332-3888
Karen Hatfield	Data Mgmt. Supervisor/ Chemist	EEG	(352) 332-3888
Miquette Rochford, PG	Project Manager	HydroGeoLogic	(703) 478-5186

Table 5-1. Field Corrective Action Procedures

Field Corrective Action Procedures				
Situation	**Calibration**	**Frequency**	**Field Objective Affected**	**Corrective Action Procedure**
Equipment malfunction			Equipment is calibrated and operating properly	-Notification of site supervisory personnel
PID/OVA	-Calibrated to ±20% of known calibration gas	- Daily		-Correct problem, recalibrate
pH	-Calibrated with two buffer solutions that bracket expected sample pH	- Daily		-Repair or replace malfunctioning parts -Recalibrate and/or replace standards
SC	-Calibrated with two standards in expected range of sample SC	- Daily		
Temperature	-Calibrate within expected temperature range of samples	- Monthly		-Submission of document to Project Geologist, Project Manager, and Quality Assurance Manager
Turbidity	-Calibrate within expected range of sample turbidity	-Daily		
Incorrect sample collection procedures	NA	NA	Samples are taken according to standard operating procedures	-Notification of site supervisory personnel -Review of situation and correct procedures -Submission of document to Project Geologist, Project Manager, and Quality Assurance Manager

Field Corrective Action Procedures				
Situation	**Calibration**	**Frequency**	**Field Objective Affected**	**Corrective Action Procedure**
Insufficient sample volume collection	NA	NA	Sufficient sample volume is provided to maintain sample integrity so that all required analyses can be conducted	-Notification of site supervisory personnel by laboratory manager -Review site affected and impact of samples on site characterization - correct procedures -Submission of document to Project Geologist, Project Manager, and Quality Assurance Manager
Incorrect measurement data collection	NA	NA	Measurements are conducted according to standard operating procedures	-Notification of site supervisory personnel -Review of situation and correct procedures -Submission of document to Project Geologist, Project Manager, and Quality Assurance Managemt

NA = Not Applicable

Table 6-1. Volume of Water in One-Foot Section of Well Casing

Diameter of Borehole (inches)	F Factor (gallons)
1.5	0 09
2	0 16
3	0 37
4	0.65
6	1 47
8	2 60
10	4.04
12	5 81

Table 6-2. Requirements for Containers, Preservation Techniques, Sample Volumes, and Holding Times

Requirements for Containers, Preservation Techniques, Sample Volumes, and Holding Times					
Name	Analytical Methods	Container[a]	Preservation[b,c]	Minimum Sample Volume or Weight	Maximum Holding Time
Metals (except mercury)	SW6010A SW6020 and SW-846 AA methods	P, G, T	HNO_3 to pH < 2, 4°C	500 mL or 8 ounces	180 days (water and soil)
Mercury	SW7470 SW7471	P, G, T	HNO_3 to pH < 2, 4°C	500 mL or 8 ounces	28 days (water and soil)
Chlonnated herbicides	SW8150B SW8151	G, Teflon-lined cap, T	4°C, pH 5–9	1 liter or 8 ounces	7 days until extraction and 40 days after extraction (water), 14 days until extraction and 40 days after extraction (soil)
Cyanide, total and amenable to chlonnation	SW9010A SW9012	P, G, T	4°C, NaOH to pH >12, 0 6g ascorbic acid	500 mL or 4 ounces	14 days (water and soil)
Dioxins and furans	SW8290	G, Teflon-lined cap, T	4°C, 0 008% $Na_2S_2O_3$ (Kept Dark)	1 liter or 8 ounces	30 days to extraction and 45 days after extraction (water and soil)
Organochlorine pesticides and polychlonnated biphenyls (PCBs)	SW8080A, SW8081,	G, Teflon-lined cap, T	4°C, pH 5–9	1 liter or 8 ounces	7 days until extraction and 40 days after extraction (water), 14 days until extraction and 40 days after extraction (soil)
Organo-phosphorus Pesticides	SW8140	G, Teflon-lined cap, T	4°C, pH 5–9	1 liter or 8 ounces	7 days until extraction and 40 days after extraction (water), 14 days until extraction and 40 days after extraction (soil)
Sulfide	SW9030	P, G, T	4°C, NaOH to pH >9, 2ml zinc acetate	500ml or 4 ounces	7 days
Petroleum Hydrocarbons	TX1005	Amber Glass	4°C, H_2SO_4 to pH < 2	1 liter or 8 ounces	7 days until extraction and 40 days after extraction (water), 14 days until extraction and 40 days after extraction (soil)
Methane	SW3810 Mod	3 40 mL clear glass vials with rubber septa & Teflon lined caps	4°C	120mL	14 days
Ferrous Iron	HACH method #8146	100-ml glass vials	NA	NA	Field method- analyze immediately
Alkalinity	E310 1	One 500-mL polyethylen e	4°C	250mL	14 days
Common Anions	SW9056	one 1-L polyethylen e	4°C	100mL	28 days for Br, F, Cl and SO_4^{2} 48 hours for NO_3, NO_2, and PO_4^{3}
Semivolatile organics	SW8270B SW8310	G, Teflon-lined cap, T	4°C, 0 008% $Na_2S_2O_3$	1 liter or 8 ounces	7 days until extraction and 40 days after extraction (water), 14 days until extraction and 40 days after extraction (soil)

Requirements for Containers, Preservation Techniques, Sample Volumes, and Holding Times					
Name	**Analytical Methods**	**Container[a]**	**Preservation[b,c]**	**Minimum Sample Volume or Weight**	**Maximum Holding Time**
Volatile organics (water)	SW8260B	G, Teflon-lined septum	4°C, 0 008% $Na_2S_2O_3$ (HCl to pH < 2 for volatile aromatics by SW8260)[b]	2 x 40 mL or 4 ounces	14 days, 7 days if unpreserved by acid
Volatile organics (soil)	SW8260B/ SW5035	EnCore™ Sampler	4°C, frozen at -12 °C within 2 days of collection	3 x 5 gram cores	14 days

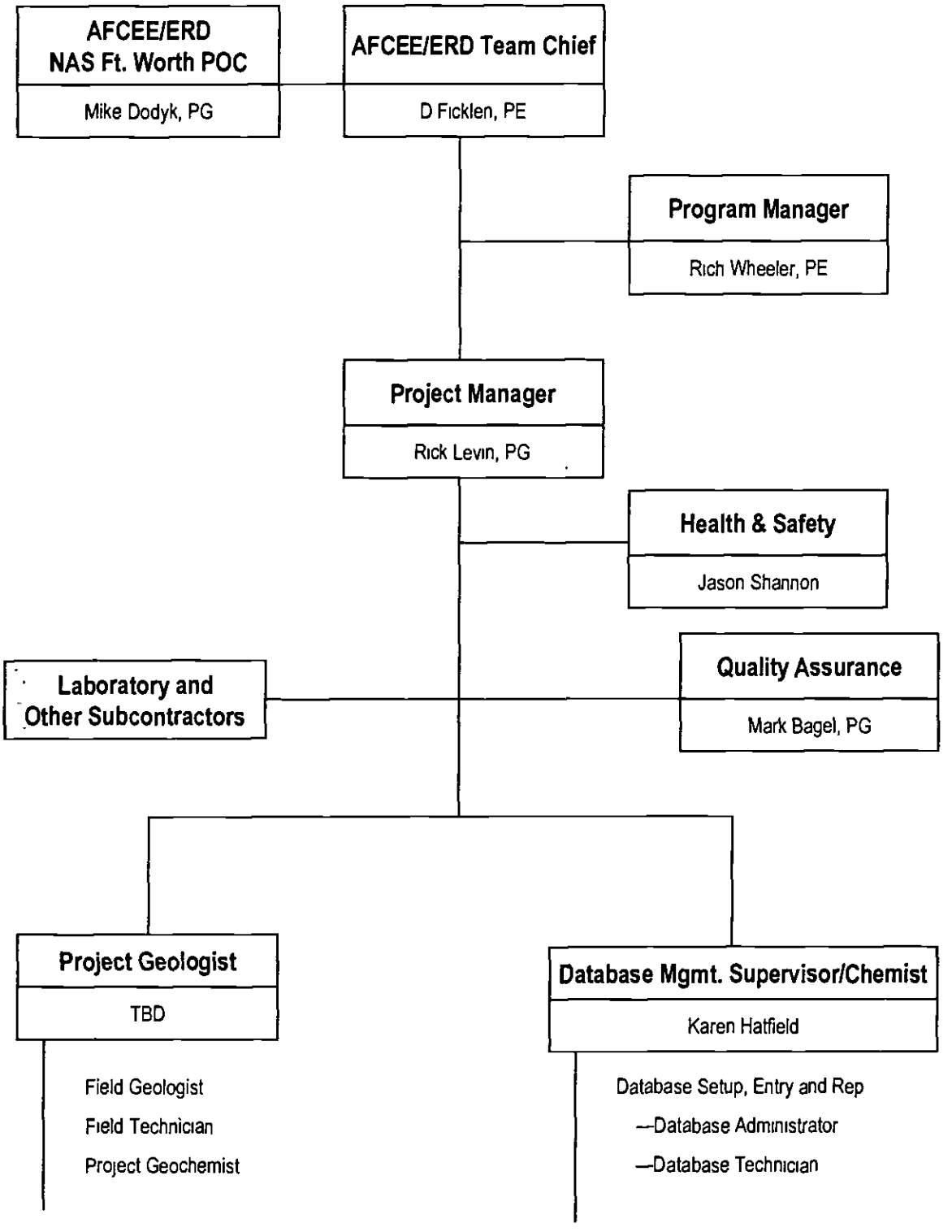
a = Polyethylene (P), glass (G); brass sleeves in the sample barrel, sometimes called California brass (T)

b = No pH adjustment for soil

c = Preservation with 0 008 percent $Na_2S_2O_3$ or by ascorbic acid is only required when residual chlorine is present

Figures

Figure 4-1. Project Organization Chart



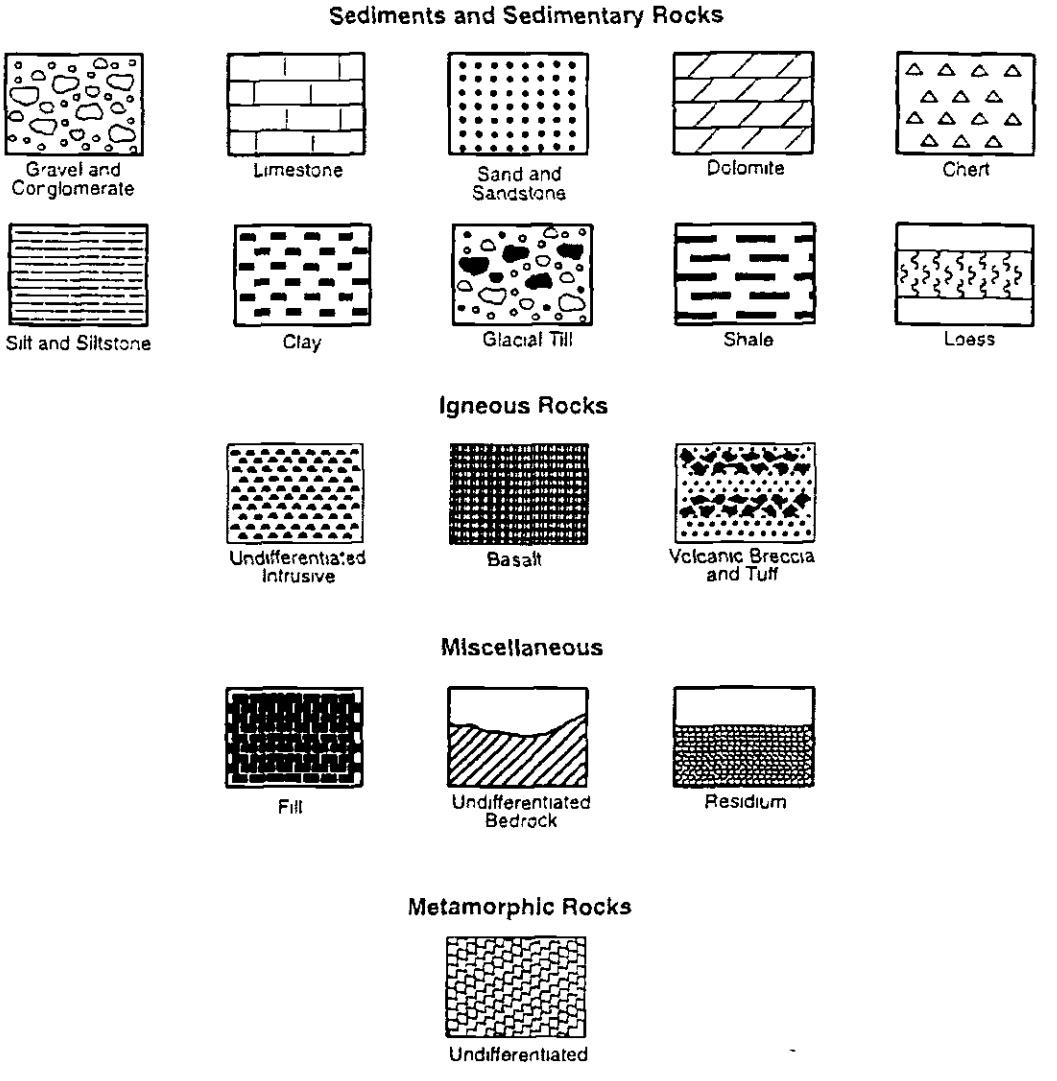


Figure 5.1 Lithologic Patterns for Illustration

ATTACHMENT A

Field Forms

ELLIS ENVIRONMENTAL GROUP, LC

BORING LOG

Borehole ID: _____
Sheet ____ of ____

AFIID			LOCID		
Project Name	Project Number		LTCCODE	Site ID	LPRCODE (IRPIMS)
Drilling Company DRL Code	Driller		Ground Elevation	Total Drilled Depth	EXCODE
Drilling Equipment	Drill/Excav Method	Borehole Diameter	Date/Time Drilling Started	Date/Time Total Depth Reached	
Type of Sampling Device			Water Level (bgs) First/Final	Site Name	
Sample Hammer Type _____ Driving Wt. _____ Drop _____			Hydrogeologist	Checked by/Date	SITEXREF

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Lithology	Water Content	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)

ELLIS ENVIRONMENTAL GROUP, LC

707 110

FIELD SAMPLING REPORT

LOCATION: _____ PROJECT : _____

SITE: _____

SAMPLE INFORMATION

MATRIX _____ SAMPLE ID: _____

SAMPLING METHOD _____ DUP./REP. OF : _____

BEGINNING DEPTH _____ MATRIX SPIKE/MATRIX SPIKE DUPLICATE
YES ( ) NO ( )

END DEPTH _____

GRAB ( ) COMPOSITE ( ) DATE: _____ TIME: _____

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL METHOD	ANALYSIS

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st	COLOR:	
2nd	ODOR:	
	OTHER:	

pH _____ Temperature _____ Dissolved oxygen _____ Specific Conductivity_____

GENERAL INFORMATION

WEATHER: SUN/CLEAR _____ OVERCAST/RAIN _____ WIND DRIECTION _____ AMBIENT TEMP _____

SHIPMENT VIA: FED-X _____ HAND DELIVER _____ COURIER _____ OTHER _____

SHIPPED TO: _____

COMMENTS: _____

SAMPLER: _____ OBSERVER: _____

MATRIX TYPE CODES

DC=DRILL CUTTINGS
WG=GROUND WATER
LH=HAZARDOUS LIQUID WASTE
SH=HAZARDOUS SOLID WASTE
SE=SEDIMENT
SL=SLUDGE
SO=SOIL
GS=SOIL GAS
WS=SURFACE WATER
SW=SWAP\WIPE

SAMPLING METHOD CODES

B=BAILER
BR=BRASS RING
CS=COMPOSITE SAMPLE
C=CONTINUOUS FLIGHT AUGER
DT=DRIVEN TUBE
W=SWAB\WIPE
G=GRAB
HA=HAND AUGER
H=HOLLOW STEM AUGER
HP=HYDRO PUNCH
SS=SPLIT SPOON
SP=SUBMERSIBLE PUMP

ELLIS ENVIRONMENTAL GROUP, LC

MONITOR WELL PURGING FORM

PROJECT : _____ DATE: _____

LOCATION: _____ EXPLOSIMETER BOREHOLE READING _____

WELL ID: _____ PURGE VOLUME (3 WELLBORE VOLUMES): _____ (L)

WELL DEPTH: _____

Time	Depth to Water (ft)	Flow Meter Reading	Volume Purged (L)	Temp. (°C)	pH	Electrical Conductivity (mmho)	Turbidity N.T.U	Comments

Note: Condition of the well: _____

pH - Calibrate at start and before last reading.

Sampler _____ Observer _____

ELLIS ENVIRONMENTAL GROUP, LC

MONITOR WELL STATIC WATER LEVEL FORM

PROJECT NAME:_____ DATE: _____

PROJECT NO.: _____

WATER LEVEL INDICATOR ID NO.: _____ FIELD BOOK NO.: _____

LOCATION: _____ PAGE NO.: _____

Monitor Well Name	LOCID	Time	Depth to Static Water Level (from T.O.C.)	Total Well Depth (ft)	Explosimeter Reading (above background)	PID Reading (above background)

Note: Total well depth to be measured at time of gauging.

Comments: _____

_____

_____

Sampler _____ Observer _____

ELLIS ENVIRONMENTAL GROUP, LC

WELL DEVELOPMENT RECORD

WELL/PIEZOMETER ID _____
SHEET _____ of _____

AFIID: _____ LOCID: _____ SITEID: _____

PROJECT NAME: _____ PROJECT NO. : _____ DATE: _____

LOCATION: _____ DATE INSTALLED: _____

TOTAL DEPTH (FTOC) _____ CASING DIAMETER _____ LOGCODE: HGL-H

METHODS OF DEVELOPMENT

☐ Swabbing ☐ Bailing ☐ Pumping ☐ Describe _____

Equipment decontaminated prior to development ☐ Yes ☐ NO

Describe _____

EQUIPMENT NUMBERS:

pH Meter _____ EC Meter _____ Turbidity Meter _____ Thermometer _____

CASING VOLUME INFORMATION:

Casing ID (inch)	1 0	1 5	2 0	2 2	3 0	4 0	4 3	5 0	6 0	7 0	8.0
Unit Casing Volume (A) (gal/ft)	0 04	0.09	0 16	0.2	0 37	0 65	0 75	1.0	1.5	2.0	2.6

PURGING INFORMATION:

Measured Well Depth (B) _____ ft.

Static Water Level Depth (C) _____ ft.

Length of Static Water Colume (D) _____ (B) - _____ (C) = _____ ft.

Casing Water Volume (E) + _____ (A) x _____ (D) = _____ gal

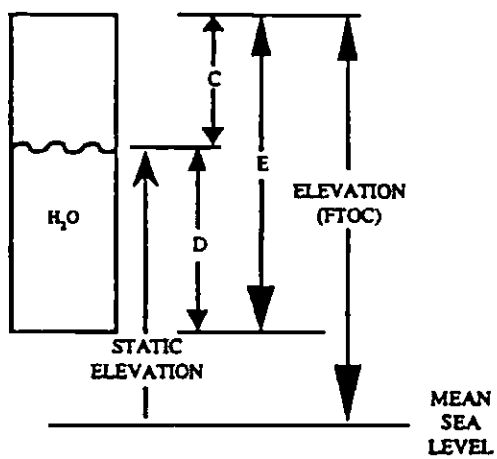
Total Purge Volume = _____ (gal)

Pumping/Purge Rate (PRODRATE) = _____ (gal/min)

Pumping Depth (PUMPDEP) = _____ (ft)

Water Level Recovery Depth (DEPWAT) = _____ (ft)

Recovery Time (LECTIME) = _____ (min)



Date	Time	Water Level (FTOC)	Volume Removed (gal)	pH	EC	Temperature F or C	Turbidity (NTU)	Comments

ELLIS ENVIRONMENTAL GROUP, LC

WELL CONSTRUCTION DETAILS AND ABANDONMENT FORM

FIELD REPRESENTATIVE: _____

DRILLING CONTRACTOR: _____

DRILLING TECHNIQUE: _____
AUGER SIZE AND TYPE: _____

BOREHOLE IDENTIFICATION: _____
BOREHOLE DIAMETER: _____
WELL IDENTIFICATION: _____

WELL CONSTRUCTION START DATE: _____
WELL CONSTRUCTION COMPLETE DATE: _____

SCREEN MATERIAL: _____
SCREEN DIAMETER: _____
STRATUM-SCREENED INTERVAL (FT): _____

CASING MATERIAL: _____
CASING DIAMETER: _____

TYPE OF FILTER PACK: _____
GRADIATION: _____
AMOUNT OF FILTER PACK USED: _____

TYPE OF BENTONITE: _____
AMOUNT BENTONITE USED: _____

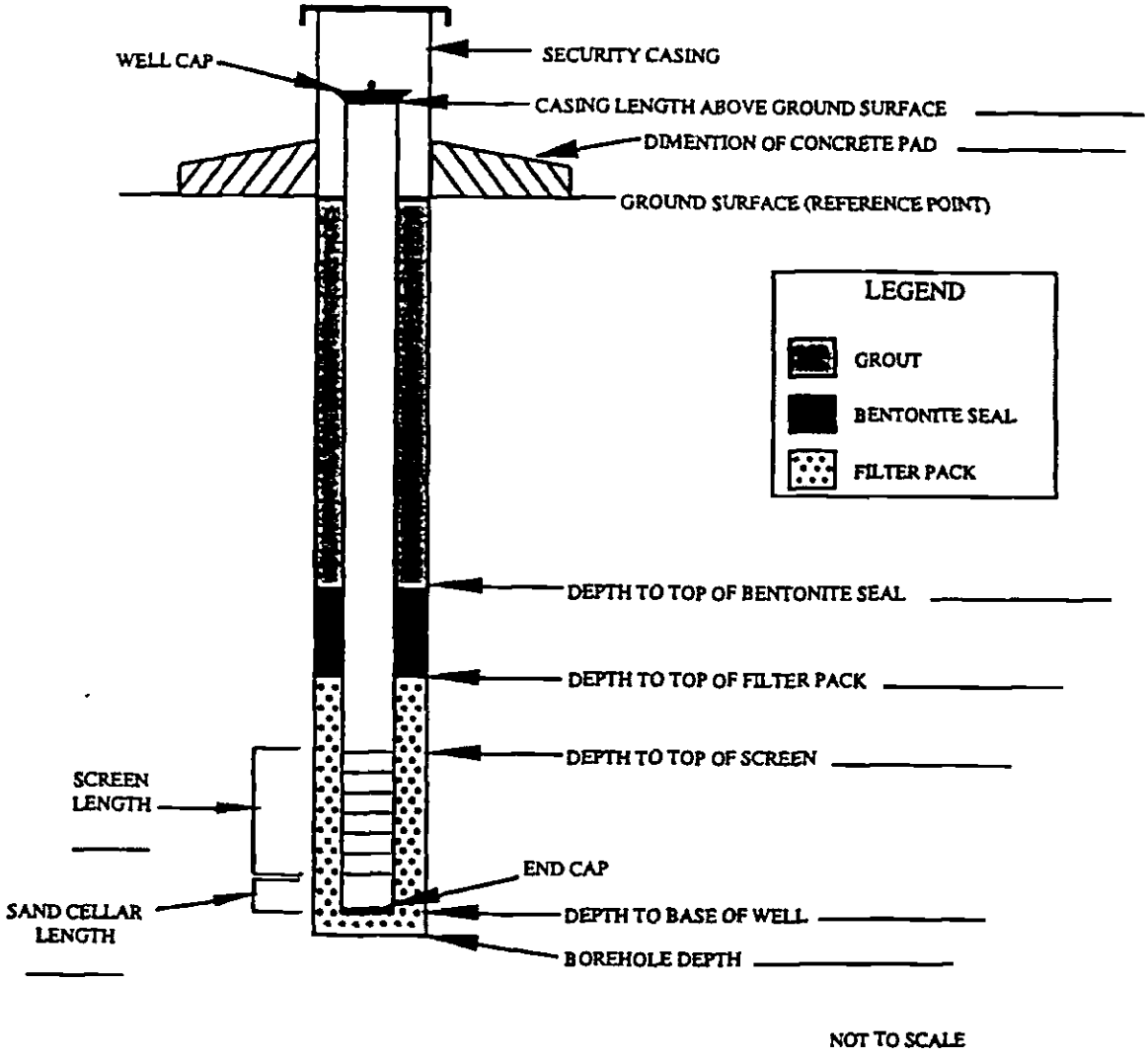
TYPE OF CEMENT: _____
AMOUNT CEMENT USED: _____
GROUT MATERIALS USED: _____

DIMENSIONS OF SECURITY CASING: _____

TYPE OF WELL CAP: _____
TYPE OF END CAP: _____

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



NOT TO SCALE

INSTALLED BY: _____ INSTALLATION OBSERVED BY: _____

DISCREPANCIES: _____

TAB

APPENDIX B

APPENDIX B

Health and Safety Plan

FINAL

Health and Safety Plan
for
Interim Remedial Actions
at
Solid Waste Management Units 12, 31, and 61
NAS Fort Worth JRB, Texas

Contract No. F41624-00-D-8032

Prepared for
U.S. Air Force Center For Environmental Excellence
Brooks AFB, Texas

Prepared by
Ellis Environmental Group, LC
414 SW 140th Terrace
Newberry, FL 32669
(352) 332-3888
&
HydroGeoLogic, Inc.
1155 Herndon Parkway, Suite 900
Herndon, VA 20170

October 2001

Final

Health and Safety Plan
for
Interim Remedial Actions
at
Solid Waste Management Units 12, 31, and 61
NAS Fort Worth JRB, Texas

Project:	U.S Air Force Center for Environmental Excellence
Project Number:	Contract No F41624-00-D-8032
Project Site Location:	NAS Fort Worth JRB, Texas
Project Manager:	Rick Levin, PG
Health and Safety Director:	Jason Shannon
Site Safety and Health Officer:	TBA
Plan Preparer:	Jason Shannon
Preparation Date:	September 2001

Approved By:

Jason P. Shannon Date
Ellis Environmental Group, LC
Health and Safety Director

Rick Levin, PG Date
Ellis Environmental Group, LC
Project Manager

Contents

Tables

Forms

Abbreviations & Acronyms

AFB	Air Force Base
AFCEE	U.S Air Force Center for Environmental Excellence
ANSI	American National Standards Institute
AOC	area of concern
CAFB	Carswell Air Force Base
CFR	Code of Federal Regulations
COR	contracting officer's representative
CPC	chemical protective clothing
CPR	cardiopulmonary resuscitation
dB(A)	decibel A-weighted scale
DRMO	Defense Reutilization and Marketing Office
FAR	Federal Acquisition Regulation
FSP	Field Sampling Plan
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Site Operations
HCS	hazard communication standard
HEPA	high efficiency particulate air
HSD	Health and Safety Director
JRB	Joint Reserve Base
LEL	lower explosive limit
MEK	methyl ethyl ketone
mg/m^3	milligrams per cubic meter
MSDS	Material Safety Data Sheet
NAS	Naval Air Station
NIOSH	National Institute for Occupational Safety and Health
O_2	oxygen
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
PEL	permissible exposure limit
PID	photo-ionization detector
PM	project manager
POC	point of contact
PPE	personal protective equipment
ppm	parts per million
PVC	polyvinyl chloride
RCO	Responsible Corporate Officer
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RV	recreational vehicle
SSHO	Site Safety and Health Officer
SWMU	solid waste management unit
T	air temperature

T_{aj}	adjusted air temperature
TLV	threshold limit value
UEL	upper explosive limit
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
WAA	waste accumulation area
WP	Work Plan
°C	degrees Celsius
°F	degrees Fahrenheit

1.0 Introduction

This Health and Safety Plan (HASP) has been adapted from a HASP prepared by HydroGeoLogic, Inc. for the RCRA facility investigation of the waste accumulation areas at NAS Fort Worth JRB, Texas.

1.1 Purpose

This HASP is designed to assign responsibilities, establish personnel protection standards, specify mandatory operating procedures, and provide for emergency contingencies with respect to health and safety issues that may arise while Ellis Environmental Group, LC (EEG) personnel and subcontractor personnel are engaged in Interim Remedial Actions (IRA) activities at any of the following sites:

- Solid Waste Management Unit (SWMU) 12 (Waste Accumulation Area (WAA) 1602/Building 1602)
- SWMU 31 (WAA 1050/Building 1050)
- SWMU 61 (WAA 1319/Building 1320)

All of the sites are located within the former Carswell Air Force Base (CAFB), now referred to as Naval Air Station (NAS) Fort Worth Joint Reserve Base (JRB), located in Fort Worth, Texas.

This HASP conforms to the requirements of Occupational Safety and Health Administration (OSHA) Standard 29 Code of Federal Regulations (CFR) 1910 and 1926. Detailed OSHA requirements for hazardous waste operations are contained in OSHA Standard 29 CFR 1910.120 and OSHA Standard 29 CFR 1926.65, "Hazardous Waste Operations and Emergency Response." Additional guidance for hazardous waste operations may be found in the U. S. Environmental Protection Agency (USEPA) publication "Standard Operating Safety Guides" (June 1992), the National Institute of Occupational Safety and Health (NIOSH)/OSHA/U.S. Coast Guard (USCG)/USEPA publication "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" (October 1985), and Federal Acquisition Regulation (FAR) clause 52 236-13, Accident Prevention.

This HASP is based on available background information regarding possible chemical, physical, and biological hazards that may exist at the site. If more information concerning the nature and/or concentrations of contaminants becomes available, this HASP will be amended accordingly.

1.2 Applicability

The provisions of the HASP are mandatory for all official visitors, EEG employees, and subcontractors while interim remedial actions are being conducted at NAS Fort Worth JRB. Inadequate health and safety precautions on the part of visitors or subcontractors, or the belief that personnel on the site are or may be exposed to an immediate health hazard, can be cause for EEG to suspend on-site activities and require all personnel to evacuate the area.

1.3 Project Organization, Personnel, and Responsibilities

This section outlines EEG's personnel organization for this project and establishes the roles and responsibilities of various project personnel regarding site health and safety. The authority and responsibilities of each EEG official utilized for this project are presented in the following sections.

1.3.1 Health and Safety Director

The EEG Health and Safety Director (HSD) is Jason Shannon. The HSD has the authority to.

- Suspend work or otherwise limit exposure to personnel if health and safety plans appear to be unsuitable or inadequate
- Direct personnel to change work practices if existing practices are deemed to be hazardous to their health and safety
- Remove personnel from projects if their actions or conditions endanger their health and safety or the health and safety of coworkers
- Approve the qualifications of employees to work at hazardous waste sites
- Approve health and safety plans

The HSD responsibilities for this project will include the following:

- Interfacing with the Project Manager (PM) in matters of health and safety
- Keeping the PM informed on the status of the site health and safety plan
- Developing or reviewing and approving project health and safety plans prior to submittal
- Appointing or approving the Site Safety and Health Officer (SSHO)
- Monitoring compliance with health and safety plans and conducting site audits as necessary
- Assisting in obtaining required health and safety equipment if needed
- Approving personnel to work on hazardous waste management projects with regard to medical examinations and health and safety training
- Maintaining records pertaining to medical surveillance, training, fit testing, chemical exposure, and accidents/incidents
- Providing industrial hygiene/chemical safety guidance

1.3.2 Project Manager

The PM for this project will be Rick Levin, PG. The PM has the authority to:

- Coordinate with the HSD on health and safety matters
- Assign an HSD-approved SSHO to the project and, if necessary, assign a suitably qualified replacement
- Temporarily suspend field activities if health and safety of personnel are endangered, pending an evaluation by the HSD
- Temporarily suspend an individual from field activities for infractions of the health and safety plan, pending an evaluation by the HSD

The PM responsibilities for this project will include the following:

- Ensuring that the project is performed in a manner consistent with the health and safety program
- Ensuring that the project health and safety plan is prepared, approved, and properly implemented
- Providing the HSD with the information needed to develop health and safety plans
- Ensuring that adequate funds are allocated to fully implement project health and safety plans

1.3.3 Site Safety and Health Officer

The SSHO will direct all on-site health and safety training and daily safety inspections. A qualified EEG employee who has performed these functions previously will be the designated SSHO. The SSHO has the authority to temporarily suspend field activities if the health and safety of personnel are endangered, pending further consideration by the HSD, and to temporarily suspend an individual from field activities for infractions of the health and safety plan, pending an evaluation by the HSD.

The SSHO will report any problems or concerns to the EEG HSD and PM. The HSD will also review accident reports and air monitoring data sheets; however, because these reviews are necessarily conducted after the fact, the SSHO remains the person responsible for on-site safety. At the facilities, the SSHO has primary responsibility for:

- Directing health and safety activities on the site
- Ensuring that appropriate personal protective equipment (PPE) is available and properly utilized by EEG personnel, visitors, and subcontractor personnel

- Ensuring that personnel are aware of the provisions of this plan, are instructed in the work practices necessary to ensure safety, and are aware of planned procedures for dealing with emergencies

- Ensuring that personnel are aware of the potential hazards associated with investigation activities

- Monitoring the safety performance of all personnel to ensure that required work practices are followed

- Monitoring the physical condition of site workers for heat and cold stress

- Correcting any work practices or conditions that may result in injury or exposure to hazardous substances

- Ensuring the completion of the site-specific HASP forms presented in Section 14.1 (e.g., Compliance Agreement, Accident/Incident Reports, Site Safety Briefing Form, etc.)

- Ensuring that a copy of the HASP is maintained on the site during all investigation activities

- Ensuring that all air monitoring and equipment calibrations required by the HASP are preformed and recorded, and that logs/forms that include these activities are maintained (Section 14.1)

- Ensuring that the subcontractor's medical monitoring program is adequate per OSHA Standard 29 CFR 1910.120 and this document

- Verifying OSHA 40-hour health and safety training before admitting official site visitors (Air Force and regulatory representatives) in the exclusion zone and verifying medical certification and fit-testing for respirator use for visitors requesting admittance into a Level C PPE exclusion zone (per OSHA Standard 29 CFR 1910.120)

1.3.4 Project Field Personnel

Personnel working on this project will be approved by the PM and the HSD and will meet the qualifications outlined in OSHA Standard 29 CFR 1910.120, and this HASP. The project personnel involved in on-site investigations and operations are responsible for:

- Taking all reasonable precautions to prevent injury to themselves and to their fellow employees

- Implementing the HASP and reporting any deviations from the anticipated conditions described in the plans to the SSHO

- Performing only those tasks that they believe they can do safely, and immediately reporting any accidents and/or unsafe conditions to the SSHO

1.3.5 Subcontractor Responsibilities

It is the responsibility of each EEG subcontractor to ensure compliance with all applicable Federal and state regulations, including OSHA Standard 29 CFR, Parts 1900 through 1910, and Part 1926, and the contents of this HASP. Specifically contained within these OSHA regulations is OSHA Standard 29 CFR 1910.120, which includes requirements for training and medical surveillance for employees engaged in certain hazardous waste operations. Subcontractors are required to have a corporate health and safety plan at least as strict as the EEG Corporate Health and Safety Plan and provide a copy of it to the EEG HSD on request.

2.0 Site Description Information

A detailed description of the NAS Fort Worth JRB sites under investigation is presented in Section 1.0 of the Work Plan (WP). Please refer to that section for detailed site description information.

2.1 Description of Solid Waste Management Unit 12

At the time of the 1989 RCRA Facility Assessment (RFA), SWMU 12 consisted of seven 55-gallon drums of waste on wooden pallets, and two 5-gallon cans on a concrete pad. Drums of jet engine oil and PD-680 were stored adjacent to the drums of waste. This unit was not fenced or covered (A.T. Kearney, 1989). The concrete pad under the storage area at this SWMU no longer exists, and no wastes are currently stored at this area.

2.2 Description of Solid Waste Management Unit 31

SWMU 31, which operated from 1955 to 1990, consisted of an outdoor uncovered 6-inch thick concrete pad measuring 15 by 8 feet. This pad, which had no surrounding fence or secondary barricade, supported approximately ten 55-gallon drums along with several smaller containers (A.T. Kearney, 1989). No waste is currently stored at this area. A roof has subsequently been erected over the concrete pad, which now serves as a base for a picnic table.

2.3 Description of Solid Waste Management Unit 61

SWMU 61 consisted of a gravel-based outdoor container storage area that held 55-gallon drums placed on wooden pallets set on railroad ties. This unit was uncovered and lacked a berm or other form of secondary containment. During the 1989 Visual Site Inspection, one of the drums stored at this unit was noted to have been more than 18 months old. Overall conditions at this unit were described as poor (A T. Kearney, 1989). Waste is currently stored outside in the former storage area.

3.0 Interim Remedial Actions Activities

The IRA activities to be conducted at the NAS Fort Worth JRB will include the following:

- Areas of contaminated soil will be excavated from the affected SWMUs.
- Soil borings will be advanced and sampled, as necessary, to ensure that all contaminated soil is removed.
- Monitoring wells will be installed at selected sites and the groundwater will be sampled to further characterize the extent of contamination.

4.0 Hazard Assessment

This section identifies and evaluates potential site hazards that may be encountered during IRA activities. Control measures to protect site personnel from these potential hazards are incorporated throughout this HASP, but are mainly contained in the following sections:

- Section 6.0, Air Monitoring
- Section 7.0, Personal Protective Equipment
- Section 11.0, Standard Work Practices

4.1 Chemical Hazards

Based upon the information obtained from previous site investigations (groundwater and soil), the primary chemicals of concern at NAS Fort Worth JRB have been listed in Table 4-1.

The primary concerns from a chemical exposure standpoint are inhalation, ingestion, and absorption by direct skin contact with contaminants in locations expected to be source areas. The specific contaminants, their exposure limits, and their recognition qualities are presented in Table 4-1. The acute and chronic symptoms of overexposure to these chemical contaminants and first aid procedures are presented in Table 4-2. If additional contaminants are identified at the NAS Fort Worth JRB, this HASP will be amended accordingly.

4.2 Decontamination Solutions and Preservatives

Chemicals used to decontaminate sampling equipment and to preserve environmental sampling also present hazards to the project personnel who use them. The chemicals likely to be brought to the site for use in this manner include the following:

- Nitric Acid
- Hydrochloric Acid
- Methanol
- Hexane
- Alkanes™
- Liquid Tide™
- Alconox™

Although overexposure to these chemicals is unlikely, the acute and chronic symptoms and first aid procedures are also presented in Table 4-2.

In order to communicate the hazards of these chemicals to site personnel, Material Safety Data Sheets (MSDSs) for each of these chemicals will be maintained on-site and presented as part of the site-specific training (Section 10.2).

4.3 Physical Hazards

The following section titles identify physical hazards that may be encountered. They include, but are not limited to:

- Hot or Cold Work Environments (Stress)
- Noise Hazards

- Materials Handling
- Utility Hazards
- Fall, Trip, and Slip Hazards (Section 11.0)
- Flammable/Explosive Atmospheres (Section 6.0)
- Heavy Equipment/Vehicular Activity (Section 11.0)

Control measures to help protect site personnel from these potential hazards are incorporated in the following subsections and throughout this HASP, specifically Section 11.0, Standard Work Practices, for safety hazards associated with drilling rigs and support vehicles.

4.3.1 Heat Stress

Heat stress can be a problem especially if personnel must perform site activities while wearing PPE in warm, humid weather conditions. The four types of heat illness in increasing order of severity include heat rash, heat cramps, heat exhaustion, and heat stroke.

- Heat rash may result from continuous exposure to heat or humid air.

- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include muscle spasms and pain in the hands, feet, and abdomen.

- Heat exhaustion occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include pale, cool, and moist skin; heavy sweating; dizziness, fainting and nausea

- Heat stroke is the most serious form of heat stress. Temperature regulation fails, and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. When heat stroke is suspected, professional medical help must be obtained immediately. Signs and symptoms include red, hot, and unusually dry skin, lack of or reduced perspiration; dizziness and confusion; strong, rapid pulse; and coma.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important, because once someone suffers from heat stroke or heat exhaustion, that person may be predisposed to additional injuries. To avoid heat stress, the following steps should be taken:

- Work schedules should be adjusted. The following guidelines of rest and cooling of the body will be followed to minimize the effects of heat stress:
  —If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period.
  —If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following work cycle by one-third.
  —Do not permit a worker to wear a semi-permeable or impermeable garment when his/her oral temperature exceeds 100.6°F (38.1°C).

Initially, the frequency of physiological monitoring depends on the air temperature adjusted for solar radiation and the level of physical work (See Table 4-3). The length of the work cycle will be governed by the frequency of the required physiological monitoring.

- Shelter (air conditioners and other cooling devices, if possible) or shaded areas should be provided to protect personnel during rest periods.

- Workers' body fluids should be maintained at normal levels to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water perspired, which will vary from day to day. The normal thirst mechanism is not sensitive enough to ensure that water intake is sufficient to replace water lost through perspiration. When heavy sweating occurs, workers should be encouraged to drink more. Have workers drink fluid (preferably water or diluted drinks) before beginning work. Urge workers to drink a cup or two at each scheduled break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but will depend on actual fluid replacement needs, which will vary depending on the sweat rate.

- The drinking water temperature should be maintained at 50°F to 60°F (10°C to 15.6°C).

- Disposable cups that hold about 16 ounces should be provided.

- Workers should be encouraged to maintain an optimal level of physical fitness Where indicated, acclimatize workers to site work conditions.

- Workers should be trained to recognize, identify, and treat heat stress.

When heat stress is suspected, the following steps should be taken:

- Move the victim out of the heat.

- Loosen tight clothing.

- Remove perspiration-soaked clothing.

- Apply cool, wet cloths to the skin.

- Fan the victim.

- If the victim is conscious, give cool water to drink Do not give electrolyte solutions (i.e., those containing salt) to victims of heat stress because it can cause nausea and vomiting. Only small sips of cool water should be administered to heat stress victims.

- Call for an ambulance if the victim refuses water, vomits, or starts to lose consciousness.

4.3.2 Cold Stress

If site work is to be conducted during the winter, cold stress is a concern to the health and safety of personnel. Special concern must be taken with regard to the wearing of Tyvek™ suits in cold

weather. Such disposable clothing does not "breathe," perspiration does not evaporate, and the suits can become wet. Wet clothes combined with cold temperatures can lead to hypothermia If the air temperature is less than 40°F and an employee perspires, the employee must change to dry clothes.

The following are the five degrees of cold stress in increasing order of severity:

- Incipient frostbite is a mild form of cold stress characterized by sudden blanching or whitening of the skin.

- Chilblain is an inflammation of the hands and feet caused by exposure to cold moisture. It is characterized by a recurrent localized itching, swelling, and painful inflammation of the fingers, toes, or ears. Such a sequence produces severe spasms, accompanied by pain.

- Second-degree frostbite is manifested by skin with a white, waxy appearance that is firm to the touch. Individuals with this condition are generally not aware of its seriousness because the underlying nerves are frozen and unable to transmit signals to warm the body. Immediate first aid and medical treatment are required.

- Third-degree frostbite will appear as blue, blotchy skin. The tissue is cold, pale, and solid. Immediate medical attention is required.

- Hypothermia develops when body temperature falls below a critical level. In extreme cases, cardiac failure and death may occur. Immediate medical attention is warranted when the following symptoms are observed: involuntary shivering, irrational behavior, slurred speech, and sluggishness.

To care for any frostbite, handle the area gently. Never rub an affected area because rubbing causes further damage to soft tissues. Warm the affected area gently by soaking the affected part in water no warmer than 105°F. Keep the frostbitten part in the water until it looks red and feels warm. Loosely bandage the affected area with a dry, sterile dressing. If fingers or toes are frostbitten, place cotton or gauze between them. Do not break any blisters caused by frostbite. Obtain professional medical attention as soon as possible.

To treat hypothermia, start by caring for any life-threatening problems and call for emergency medical assistance. Remove any wet clothing and dry the victim. Warm the body gradually by wrapping the victim in blankets or putting on dry clothing and moving him or her to a warm place. If available, apply heat pads or other heat sources to the body, but be sure to keep a barrier such as a blanket, towel, or clothing between the heat source and the victim to avoid burning the victim. If the victim is alert, give warm liquids to drink. Do not warm the victim too quickly, such as by immersing the victim in warm water, because rapid rewarming can cause dangerous heart problems. In cases of severe hypothermia, when the victim may be unconscious, give rescue breathing when necessary and be prepared to administer cardiopulmonary resuscitation (CPR).

4.3.3 Noise Hazards

The SSHO or designee will monitor high noise levels when equipment or machinery (e.g., backhoe, drill rig, etc.) is being used on-site. Field personnel working in areas where noise levels can be expected to reach or exceed 85 decibels A-weighted [dB(A)] will be issued hearing protection to reduce the level below the 85 dBA threshold.

4.3.4 Materials Handling

The most common type of materials handling accident involves fingers or toes of field personnel being caught between two objects. Special precautions must be implemented during the moving, shifting, or rolling of materials and should never be attempted by a single individual. Workers are required to use proper lifting techniques for handling materials, and oversize or heavy loads require "team lift" procedures.

4.3.5 Utility Hazards

The locations of all underground utilities must be identified and marked prior to initiating any subsurface investigations. In addition, drilling within 20 feet in any direction of overhead power lines will not be permitted

4.4 Biological Hazards

The biological hazards that could be encountered by site personnel include, but are not limited to, the following:

- Poisonous Snakes and Spiders
- Stinging Insects
- Ticks and Chiggers
- Poisonous Plants (e.g., poison sumac, poison ivy, poison oak)

Control measures to protect site personnel from these biological hazards are included in the following sections.

4.4.1 Poisonous Snakes and Spiders

Reactions from a snakebite are aggravated by acute fear and anxiety. Other factors that affect the severity of local and general reaction from a poisonous snakebite include the amount of venom injected and the speed of absorption of venom into the victim's circulation; the size of the victim; protection from clothing, including shoes and gloves; quick anti-venom therapy; and location of the bite.

Spiders in the United States are generally harmless, with two notable exceptions: the black widow spider (Latrodectus Mactans) and the brown recluse or violin spider (Lox Osceles Reclusa). The symptoms of a black widow spider bite are slight local reaction, severe pain produced by nerve toxin, profuse sweating, nausea, painful cramps in abdominal muscles, and difficulty in breathing and speaking. The symptoms of a brown recluse spider bite can be mild to severe. In the mildest form, the bite can cause pain and swelling like a bee sting or ant bite. If the reaction is severe, the

bite area may become swollen, painful, and weep fluid. Swelling and reddening may spread to an entire limb, and if left untreated, the bite may cause necrosis of surrounding tissue and infection. Diarrhea, stomach cramps, and hot/cold flashes may also occur. Victims of poisonous spider bites recover in almost all cases, but an occasional death is reported.

Field personnel should exercise caution when lifting logs, rocks, covers to manholes, sumps, etc.

4.4.1.1 First Aid Procedures (Snakebite)

The objective of first aid is to reduce the circulation of blood through the bite area, to delay absorption of venom, to prevent aggravation of the local wound, and to sustain respiration. Several steps are listed to properly care for a snakebite victim. The most important step is to get the snakebite victim to the hospital quickly. Meanwhile, take the following first aid measures:

- Keep the victim from moving around.
- Keep the victim as calm as possible and preferably in a lying position.
- Immobilize the bitten extremity and keep it at or below heart level. If the victim can reach a hospital within 4 to 5 hours, and if no symptoms develop, no further first aid measures need to be applied.
- If mild-to-moderate symptoms develop, apply a constricting band 2 to 4 inches above the bite, but not around a joint (the elbow, knee, wrist, or ankle) and not around the head, neck, or trunk The band should be 3/4 to 1-1/2 inches wide, not thin like a rubber band. The band should be snug but loose enough for a finger to be slipped underneath. Watch for swelling and loosen the band if it becomes too tight, but do not remove it. Periodically check the pulse in the extremity beyond the bite to insure that the blood flow has not stopped.

Several other factors must be considered in cases of snakebite:

- **Shock.** Keep the victim lying down and comfortable, and maintain his or her body temperature.
- **Breathing and heartheat.** If breathing stops, give mouth-to-mouth resuscitation. If breathing stops and there is no pulse, perform CPR if you have been trained to do so.
- **Identifying the snake.** If you can kill the snake without risk or delay, bring it to the hospital for identification, but exercise extreme caution in handling the snake.
- **Cleaning the hitten area.** You may wash the bitten area with soap and water and blot it dry with sterile gauze. You may apply dressings and bandages, but only for a short period of time.
- **Medicine to relieve pain.** Do not give the victim alcohol, sedatives, aspirin, or any medicine containing aspirin. Consult a doctor or other medical personnel for specific medications that may be used.

- **Snakebite kits.** Keep a kit accessible for all outings in primitive areas or areas known or suspected to be snake infested.

It is not recommended that cold compresses, ice, dry ice, chemical ice packs, spray refrigerants, or other methods of cold therapy be used in the first aid treatment of a snakebite.

4.4.1.2 General First Aid for Poisonous Insect Bites

For minor bites and stings use cold applications and soothing lotions, such as calamine. For more severe reactions, take the following first aid measures:

- Apply a constricting band above the injection site on the victim's arm or leg (between the site and the heart). Do not apply tightly. You should be able to slip your index finger under the band when it is in place. Give artificial respiration if necessary
- Keep the affected part below the level of the victim's heart
- If medical care is ready available, leave the band in place; otherwise, remove it after 30 minutes.
- Apply ice contained in a towel or plastic bag, or cold cloths, to the site of the sting or bite.
- Give home medicine, such as aspirin, for pain.
- If the victim has a history of allergic reactions to insect bites or is subject to attacks of hay fever or asthma, or if he or she is not promptly relieved of symptoms, call a physician or take the victim immediately to the nearest location where medical treatment is available. In a highly sensitive person, do not wait for symptoms to appear, since delay can be fatal.
- In case of a bee sting, remove and discard the stinging apparatus and venom sac.

Workers who have had severe allergic reactions to bee/wasp stings in the past will inform the SSHO when they arrive at the site for the first time.

4.4.2 Ticks and Chiggers

Field personnel should be aware of the presence of ticks (i.e., deer tick) and chiggers at the site. Common carriers of ticks and chiggers are the white-footed mouse and white-tailed deer, both of which are prevalent in the area. The deer tick is about the size of a sesame seed, as distinguished from the dog tick, which is significantly larger. The deer tick is principally found along the Atlantic coast, living in grassy and wooded areas, and feeds on mammals such as mice, shrews, birds, raccoons, opossums, deer, and humans. Common diseases caused by ticks are presented in the following subsections.

Removal of ticks is best accomplished using small tweezers. Do not squeeze the tick's body. Grasp it where the mouth parts enter the skin and tug gently, not firmly, until it releases its hold

on the skin. Save the tick in a jar labeled with the date, body location of the bite, and the place where it may have been acquired. Wipe the bite thoroughly with an antiseptic Seek medical attention in the event tick-related disease symptoms develop.

When in an area suspected of harboring ticks (grassy, bushy, or woodland area) the following precautions can minimize the chances of being bitten by a tick:

- Wear long pants and long-sleeved shirts that fit tightly at the ankles and wrists.
- Wear light colored clothing so ticks can be easily spotted.
- Wear tick repellents.
- Inspect clothing frequently while in tick habitat.
- Inspect your head and body thoroughly when you return from the field.
- Remove any attached ticks by tugging with tweezers where the tick's mouth parts enter the skin. Do not squeeze or crush it.

4.4.2.1 Lyme Disease

Lyme disease is an illness caused by a bacterium that may be transmitted by the bite of a tick (Ixodes Dammini), commonly referred to as the deer tick. Not all ticks are infected with the bacterium, however. When an infected tick bites, the bacterium is passed into the bloodstream of the host, where it multiplies. The various stages and symptoms of the disease are well recognized and, if detected early, can be treated with antibiotics.

The illness typically occurs in the summer and is characterized by a slowly expanding red rash, which develops a few days to a few weeks after the bite of an infected tick This may be accompanied by flu-like symptoms along with headache, stiff neck, fever, muscle aches, and/or general malaise. At this stage treatment by a physician is usually effective, but, if left too long, these early symptoms may disappear and more serious problems may follow. The most common late symptom of the untreated disease is arthritis Other problems that may occur include meningitis and neurological and cardiac abnormalities. It is important to note that some people do not get the characteristic rash but progress directly to the later manifestations. Treatment of later symptoms is more difficult than early symptoms and is not always successful.

4.4.2.2 Rocky Mountain Spotted Fever

In the eastern and southern United States this tickborne disease is transmitted by the infected dog tick (Dermacentor Variabilis). It is important to note that the dog tick is significantly larger than the deer tick. Nearly all cases of infection occur in the spring and summer, generally several days after exposure to infected ticks. The onset of illness is abrupt and often accompanied by high fever, headache, chills, and severe weakness. After the fourth day of fever, victims develop a spotted pink rash that usually starts on the hands and feet and gradually extends to most of the body. As with Lyme disease, early detection and treatment significantly reduces the severity of illness. The disease responds to antibiotic therapy with tetracycline or chloramphenicol.

4.4.2.3 Other Diseases

Ticks transmit several other diseases, most of which are rare and occur only in specific areas. Babesiosis occurs mainly in the Cape Cod area and eastern Long Island. Colorado tick fever is similarly regional and occurs only among those who live or work at altitudes above 4,000 feet.

4.4.3 Poisonous Plants

The majority of skin reactions following contact with offending plants are allergic in nature and are characterized by general symptoms of headache and fever, itching, redness, and rash.

Some of the most common and most severe allergic reactions result from contact with plants of the poison ivy group including poison ivy, poison oak, and poison sumac. The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each. Both plants also have greenish-white flowers and berries that grow in clusters. Such plants produce a severe rash characterized by redness, blistering, swelling, and intense burning and itching. The victim can also develop a high fever and become very ill. Ordinarily, the rash begins within a few hours after exposure, but it may be delayed for 24 to 48 hours

4.4.3.1 First Aid Procedure

- Remove contaminated clothing.
- Wash all exposed areas thoroughly with soap and water, followed by rubbing alcohol.
- Apply calamine or other soothing skin lotion if the rash is mild.
- Seek medical advice if a severe reaction occurs, or if there is a known history of previous sensitivity.

5.0 Hazard Communication

The EEG Hazard Communication Program is located within the EEG Corporate Health and Safety Plan and complies with the OSHA hazard communication standard (HCS) found in OSHA Standard 29 CFR 1910.120 and 1926.59, which applies to any chemical present in the workplace in such a manner that employees may be exposed to under normal conditions of use in a foreseeable emergency. Although waste materials are excluded from the OSHA requirements, decontamination chemicals for sampling equipment or protective clothing and calibration standards require MSDSs.

The principle of communicating the hazards of materials used in the workplace applies to company-wide activities, from informational programs on the conduct of hazardous waste activities to the company's insistence upon adequate health and safety training. It is also important for personnel to have an awareness of client concern for hazard communication due to Federal, state, and local regulations directly affecting certain client activities.

In order to comply with the HCS, EEG has made the following determinations:

- All containers of hazardous chemicals must be appropriately labeled or tagged to identify the hazard and provide information on effects and appropriate protective measures.
- Labels, tags, or signs must be properly affixed and visible at all times while a hazard is present and removed promptly when the hazard no longer exists.
- Written information (i.e., MSDSs) on hazardous chemicals in the workplace must be available to employees working with the substances.
- Appropriate MSDSs will be available to any contractor or subcontractor employee working on projects under EEG's control.

When investigation results indicate potential imminent health risks to contracted or Federal personnel, or the public at large, the contracting officer's representative (COR) and the base point of contact (POC) will be notified as soon as practicable. Written notification and supporting documentation will be provided within 3 days of finding potential imminent health risks during investigation activities.

6.0 Air Monitoring

This section presents requirements for the use of real-time air monitoring instruments during site activities involving potential for exposure to site contaminants. It establishes the types of instruments to be used, the frequency of their use, the techniques for their use, the action levels for upgrading/downgrading levels of protection, and the methods for instrument maintenance and calibration.

6.1 Instruments and Use

A photo-ionization detector (PID) equipped with an appropriate lamp will be utilized for detecting the presence of emissions from chemicals of concern. A Draeger pump and colorimetric tubes will be used to confirm any detections observed with the PID in accordance with Table 6-1. Additionally, lower explosive limit/oxygen (LEL/O_2) detectors will be used during all drilling and excavation activities to detect the presence of flammable/explosive atmospheres. Visual observation will be used to detect the presence of airborne particulates.

The PID/Drager pump will be used throughout the execution of these activities:

- Excavations
- Soil boring installation
- Well installation

6.2 Air Monitoring Requirements

6.2.1 Photo-Ionization Detector

Air monitoring with the PID will be initiated at potential sources of vapor emissions (source monitoring) at specified frequencies. The frequencies will be increased where concentrations of constituents are measured.

If source monitoring indicates the presence of airborne emissions, air monitoring will then be initiated in the breathing zones of those workers who could be affected by the emissions. Air monitoring will also occur upon the request of site workers who notice unusual site odors or an increase in their intensity. If work is to be performed downwind of a site, air monitoring will be conducted to determine what type of PPE, if any, is required to protect workers and to determine the potential for an imminent threat to public health.

The presence of elevated readings in the worker's breathing zone as identified in Table 6-1 requires amendments to the HASP before workers are allowed to enter the exclusion zone. Depending on the air monitoring readings, air-purifying respirators may not be acceptable because some contaminants of concern have poor warning properties and/or cannot be filtered from inspired air with chemical cartridges (Table 6-1). Elevated readings will be based on confirmation sampling using a Draeger pump and colorimetric tubes in accordance with Table 6-1.

6.2.2 Draeger Pump and Tubes

A hand-operated Draeger pump with colorimetric tubes will be used to confirm the results of PID testing. If the results of the PID tests show concentrations greater than 0.5 parts per million (ppm) above background concentrations in the breathing zone, then the colorimetric tubes will be used to identify the contaminants in the breathing zone. Colorimetric tubes to be utilized in the event of elevated PID readings will include vinyl chloride, benzene, tetrachloroethylene, and/or trichloroethylene in accordance with Table 6-1. The colorimetric tube utilized will depend on the chemical anticipated to be present at the site.

6.2.3 LEL / O_2 Detectors

Air monitoring with the LEL/O_2 detectors will be conducted during all drilling and excavation activities within boreholes, and immediately over drill cuttings at every 5-foot depth interval. If elevated (above background) LEL readings are observed, personnel must be advised of the potential explosive nature and must initiate the use of spark proof tools in accordance with Table 6-1. LEL readings in excess of 10 percent requires cessation of drilling and abandonment of the drilling location until readings subside.

6.2.4 Visual Observations

If airborne particulate are observed and air monitoring results (as indicated in Table 6-1) warrant, personnel must don air-purifying respirators equipped with organic vapor cartridges and high efficiency particulate air (HEPA) filters. If airborne particulate are observed due to intrusive activities at these sites, dust control measures will be implemented.

6.3 Modification of Air Monitoring Requirements

The action levels and protection measures presented in Table 6-1 are based upon the assumption that the contaminants listed in Table 4-1 are the only contaminants that pose a reasonable health risk to site workers. In the event that this assumption is found to be invalid through analysis of samples collected, or by some other means, the action levels will be modified as necessary.

6.4 Instrument Maintenance and Calibration

Air and noise monitoring instruments will be calibrated before being brought on site. Field maintenance will consist of daily cleaning of the instruments using a damp towel or rag to wipe off the instrument's outer casing, overnight battery recharging, and cleaning or replacing of the lamp whenever calibration cannot be attained Procedures for accomplishing instrument maintenance are contained in the user's manual provided with each instrument. The user's manual provided with each instrument will be followed to field calibrate the instrument prior to each day of use under the environmental conditions (temperature and humidity) that sampling will occur. Field equipment will also be calibrated at the end of each day to account for instrument drift and ensure reliability.

6.5 Record Keeping

Instrument calibrations and readings will be recorded on the Air Monitoring Log Sheet provided in Section 14.1 of this HASP. Copies of these log sheets will be maintained on-site until field activities covered by this HASP have been completed. The log sheets will be transmitted to the EEG HSD and to the project file at the completion of the field work.

LEL/O_2 readings will not be recorded unless flammable/explosive or oxygen deficient/enriched atmospheres are detected, in which case entries will be made in the field log book.

LEL/O_2, detector, and the PID will undergo daily operational checks. These checks will be recorded in the field log book and Equipment Calibration Log (Section 14.1).

7.0 Personal Protective Equipment

This section presents requirements for the use of PPE for each of the activities being conducted. This section includes anticipated levels of protection for each of the activities, the criteria used for selecting various levels of protection, and criteria for modifying levels of protection based on monitoring instrument readings, and personal observations.

7.1 Anticipated Levels of Protection

All work is anticipated to be performed in Level D protection, as defined in Appendix B of OSHA Standard 29 CFR 1910.120. Many activities may require the use of chemical resistant coveralls, gloves, and boot covers as presented in Table 7-1.

The items of PPE anticipated to be used for each activity are presented in Table 7-1. Where overlap in activities occurs, the more protective requirement will apply.

7.2 Personal Protective Equipment Selection Criteria

Respiratory protection is not anticipated for use during the initial stages of work until detectability of site contaminants with air monitoring instruments warrants the donning of respirator protection in accordance with Table 6-1. See Section 7.3 for modification criteria of respiratory protection. Basic requirements for field personnel using respiratory protection include the following.

- All field personnel will be medically certified to wear a full-face respirator and have the proper fit test documentation within the past 12 months prior to assignment.
- Only NIOSH-approved respirators are to be used on-site. The respirators are to be properly cleaned, inspected, and maintained prior to and at the conclusion of the work day.
- Cartridges to air-purifying respirators will be disposed of at the end of each work day and when increased breathing resistance or breakthrough occurs.
- Field personnel will be clean shaven in areas that might prevent the seal of the respirator to the face.

Hard hats, safety glasses, and steel-toe work boots will be used as minimum protection to reduce the potential for injury resulting from exposure to the physical hazards associated with on-site investigations.

Boot covers, disposable nitrile gloves, and Tyvek™ coveralls will be used to minimize contamination of work clothes and to prevent direct skin contact with low level contamination. Nitrile gloves of 11 mil thickness or greater will be worn for activities that may involve direct contact with appreciable concentrations of contaminants thought to be present as site contaminants.

Polyvinyl chloride (PVC) or Serinus™ coveralls, hoods, and/or splash shields will be worn to prevent saturation or work clothes during activities involving large volumes of liquids and/or saturated soils/equipment

7.3 Personal Protective Equipment Modification Criteria

This section presents criteria for upgrading and downgrading chemical protective clothing (CPC) and/or respiratory protection. When uncertainties arise, the more protective requirement will apply.

7.3.1 Chemical Protective Clothing Modification Criteria

Tyvek™ coveralls and boot covers must be worn anytime there is a reasonable potential for contamination of street clothes

Disposable nitrile gloves must be worn anytime there is a reasonable potential for contact with unsaturated soils or equipment that may contain trace contamination.

Nitrile gloves (11 mil or greater) must be worn anytime there is a reasonable potential for contact with groundwater, saturated soils, and/or soils producing elevated PID readings.

PVC or Serinus™ coveralls must be worn anytime there is a reasonable potential for saturation of work clothes.

8.0 Decontamination

This section describes the steps site personnel will follow to prevent the spread of site contaminants into areas that may affect unprotected, unsuspecting site personnel or the public. It includes requirements for decontamination of personnel, sampling equipment, and augering/drilling equipment.

8.1 Personnel Decontamination

The decontamination of personnel and their protective clothing will be performed within the decontamination zone. Table 8-1 presents the six stages for decontamination for Modified Level D protection.

Wash tubs containing an appropriate decontamination solution and soft-bristle brushes will be used to wash reusable PPE and boots. Clean water will be used for the final rinse. The choice of decontamination solution is dependent upon the type of materials that must be removed from reusable protective equipment. Based on the current understanding of potential site contaminants, a detergent and water solution is recommended for general purpose decontamination. Acceptable detergents include laboratory-grade cleaners (e.g., Alconox™ or equivalent), or a high strength consumer detergent such as Liquid Tide™.

Alternative decontamination solutions may be called for if the contaminants encountered are different or in a more concentrated state than anticipated. Alternative solutions include the following:

- Dilute acids for removal of basic (caustic) compounds, amines, and hydrazines
- Dilute bases (soaps and detergents) for removal of acidic compounds, phenols, thiols and some nitro and sulfonic compounds
- Organic solvents for removal of nonpolar compounds (organic)

Gloves and other PPE should be inspected frequently for integrity, and manufacturers' data for breakthrough times should be considered if concentrated contaminants are encountered.

The decontamination of personnel and their protective clothing will be performed in 18 stages for Level C protection, if necessary. The 18 stages are presented in Table 8-2 below.

All decontamination fluids generated will be contained and disposed of as specified in the WP. The decontamination area will be physically identified with rope or flagging and will be sufficiently equipped to be conducive for completion of the stages listed above.

8.1.1 Closure of the Personnel Decontamination Station

All disposable clothing and plastic sheeting used during the operation will be double-bagged and contained on-site prior to removal to an approved off-site disposal facility as identified in the WP. Decontamination and rinse solution will be contained on-site prior to disposal. Reusable rubber clothing will be dried and prepared for future use. If contamination of non-disposable clothing

has occurred, the item will be discarded. All wash tubs, pail containers, etc., will be thoroughly washed, rinsed, and dried prior to removal from the site.

8.1.2 Disposal of Decontamination and Other Wastes

All PPE, polyethylene sheeting, and sampling support materials (e.g., paper towers, ziplock bags) will be collected at the end of each work day, placed in plastic trash bags, and left at the site overnight. The following day, the air within the plastic trash bag will be tested using a PID. If the air within the bag does not show significant concentrations of organic vapors (greater than 10 ppm above background), the plastic trash bag will be double-bagged and placed in the municipal waste dumpster for disposal.

All other wastes generated during decontamination other than decontamination fluids will be placed into 55-gallon drums; each drum will have a removable top cover fitted with a top cover bung (type 17E/H) as identified in the FSP. The drums will be filled partially or completely, depending upon the difficulty of transporting them from the work site. All containers will be numbered and clearly labeled with the boring/well number and date of filling The mixing of solid and liquid wastes will be avoided. The containers will be stored at a predesignated site until the analytical results from each boring/well can be reviewed in order to determine the waste classification for handling, transportation, and disposal.

8.2 Equipment Decontamination

All sampling equipment will be decontaminated prior to use, between sampling locations, and at the end of sampling activities to avoid cross-contamination, and to decrease contact between personnel and contaminated materials, and to reduce the probability of removing contamination from the site. The procedures for decontaminating equipment are presented in Section 5.8 of the FSP.

9.0 Medical Surveillance

9.1 Requirements for EEG Personnel

All employees involved in field activities will be active participants in the EEG medical surveillance program. All medical examinations and procedures will be performed by or under the supervision of a licensed occupational physician. The examination will include the tests, procedures, and frequencies that comply with the requirements of OSHA Standard 29 CFR 1910 120 (f) and American National Standards Institute (ANSI) Z-88.2, and will be medically qualified to perform hazardous waste site work under respiratory protection. Medical surveillance documents confirming the worker's fitness to perform hazardous waste operations on this project are on file at EEG's headquarters in Newberry, Florida, and can be made available upon request.

9.2 Requirements for Subcontractors

Subcontractors are also required to obtain a certificate of their ability to perform hazardous waste operations work and to wear respiratory protection. Subcontractors, that have a company medical surveillance program meeting the requirements of OSHA Standard 29 CFR 1910.120 (f) will be required to submit a letter, on company letterhead, confirming that all on-site workers to be utilized for this project are medically qualified to perform the investigation activities. In addition, medical surveillance documents for personnel assigned to this project must be made available upon request.

10.0 Training Requirements

10.1 Initial Training

10.1.1 Requirements for EEG Personnel

All investigation personnel to be utilized are currently enrolled in EEG's continuous training program in accordance with OSHA Standard 29 CFR 1910.120. Individuals working on a site have successfully completed an approved 40-hour Hazardous Waste Site Operations (HAZWOPER) course including 24-hours of actual field experience under the direction of a trained supervisor, and any subsequent annual 8-hour refresher courses. In addition, the on-site field leader will have completed an 8-hour supervisory course, and a majority of EEG's field investigation personnel are also current in first aid/CPR training requirements. EEG employee records are on file in the company's home office in Newberry, Florida.

10.1.2 Requirements for Subcontractors

All EEG subcontractor personnel must also have completed a 40-hour HAZWOPER training course or the equivalent work experience as defined in OSHA Standard 29 CFR 1910.120(e) prior to performing work at the site. In addition, subcontractor personnel must also have successfully completed any subsequent annual 8-hour refresher training.

EEG subcontractors must certify that each subcontractor employee who will perform work at the site has had training meeting the requirements of OSHA Standard 29 CFR 1910.120(e). This certification can be accomplished by submitting a letter to EEG, on company letterhead, containing such information.

10.1.3 Requirements for Site Visitors

No person will be allowed in the work zones (exclusion and decontamination) unless they have completed the necessary health and safety training as required by OSHA Standard 29 CFR 1910.120(e) and are wearing the necessary protective equipment as required by this HASP.

10.2 Site-Specific Training

EEG will provide site-specific training to all EEG employees and subcontractor personnel who will perform work at the site. Daily health and safety meetings will be held prior to beginning field activities to discuss each day's activities, potential hazards, and any new health and safety issues not previously discussed. Personnel who do not participate in training will not be permitted to perform work at the site. Site-specific training will include the following:

- Contents of the HASP
- Names of personnel and alternates responsible for site health and safety
- Safety, health, and other hazards present on the site
- Use of PPE

- Work practices by which the employees can minimize risks from hazards
- Safe use of engineering controls and equipment on the site
- Medical surveillance requirements, including recognition of symptoms and signs that might indicate overexposure to hazards
- Decontamination procedures
- Emergency response procedures

EEG and subcontractor personnel will be required to sign a statement indicating receipt of site-specific training and understanding of site hazards and control measures. This form is presented in Section 14.1.

11.0 Standard Work Practices

All site investigation activities will follow these appropriate health and safety standard work practices.

11.1 General Requirements / Prohibitions

- A copy of this HASP will be available on-site for all field personnel, including visitors, to reference during investigation activities.
- No running or horseplay will be permitted.
- Eating, drinking, chewing gum or tobacco, taking medication, applying cosmetics, and/or smoking are prohibited in the exclusion and decontamination zones, or any location where a possibility for contact with site contaminants exists.
- The minimum required level of PPE to be worn by all on-site personnel will include steel-toed safety boots, safety glasses, and hard hat, if necessary.
- Upon leaving the exclusion zone, each worker's hands and face must be thoroughly washed. Any protective outer clothing is to be decontaminated and removed as specified in this HASP and left at a designated area prior to entering the clean area.
- Contact with potentially contaminated substances must be avoided. Contact with the ground or with contaminated equipment must also be avoided. Air monitoring equipment must not be placed on potentially contaminated surfaces.
- Facial hair that interferes with a satisfactory fit of the mask-to-face seal is not permitted on personnel required to wear respiratory protective equipment.
- All personnel must satisfy medical monitoring procedures.
- No flames or open fires will be permitted on-site.
- All personnel must be aware of and follow the action levels presented in this HASP for upgrading respiratory protection.
- Any new analytical data must be promptly conveyed via telephone to the project HSD by the laboratory technician or field leader.
- Personnel must develop hand signals with users of heavy equipment (e.g., drillers, geoprobe operators, etc.). Standard hand signals to be used by personnel for nonverbal communication include:
  —**Stop.** With arm extended to the side and palm down, hold position rigidly.
  —**Hoist.** With forearm and forefinger pointing up, move hand in small horizontal circle.
  —**Lower.** With forearm extended and forefinger pointing down, move hand in a small horizontal circle.

—**Travel.** With palm up, fingers closed, and thumb pointing in the direction of motion, jerk hand horizontally.
—**Slow Move.** Use one hand to give any motion signal, and place the other hand motionless in front of the hand giving the motion signal.
—**Emergency.** With arm extended to the side and palm down, move hand rapidly right and left.

Standard hand signals will be discussed during each daily health and safety meeting when the use of heavy equipment is anticipated.

- A copy of the OSHA "Job Safety and Health Protection" poster must be prominently posted at each site.

- Only equipment that has been approved by the manufacturer may be used in conjunction with site equipment.

- Medicine and alcohol can potentiate the effects from exposure to toxic chemicals. Prescribed drugs should not be taken by personnel on operations where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverage intake will not be allowed at anytime, including during breaks.

- No person will enter the exclusion zone alone.

- Safety devices on equipment must be left intact and used as designed.

- Equipment and tools will be kept clean and in good repair and used only for their intended purpose.

- Eye protection must be worn when any hammering or pounding is performed that may product flying particles or slivers.

- Field personnel are not allowed to lift more than 60 pounds. Rules to remember when attempting to lift heavy objects include:
  —Size up the load before trying to lift it, test the weight, and get help if needed.
  —Bend the knees and look up to keep the neck and back straight.
  —Do not twist or turn your body once you have made the lift.
  —Make sure you can carry the load where you need to go before lifting it.
  —Set the load down properly, lower slowly by bending the knees
  —Always push, not pull, the object when possible.

- Heavy lifting (more than 60 pounds per worker) must be accomplished using mechanical lifting equipment. Mechanical lifting equipment that will be available on-site will include forklifts, hoists, dollies, backhoe/trackhoe, and other types of equipment that can be easily rented from an off-site location.

- Leather gloves must be worn when handling objects that may produce slivers (e.g., driving wood stakes, handling drill rods/augers).

- No person shall climb the drill mast without the use of ANSI-approved fall protection (i.e., approved belts, lanyards, and a fall protection slide rail) or a portable ladder that meets the requirements of OSHA standards.

- The SSHO must make an entry into the site field logbook at least daily to include the following:
  —Weather conditions
  —Site personnel
  —New arrivals and their clearance for site work
  —Air monitoring data summary
  —Monitoring instrument calibration
  —Indications of inhalation exposure
  —PPE used per task
  —Deviations from HASP
  —Inspection and cleaning of respiratory equipment
  —General health and safety problems/corrective actions

- If personnel note any warning properties of chemicals (irritation, odors, symptoms, etc.) or even remotely suspect the occurrence of exposure, they must immediately notify the SSHO for further direction.

11.2 Drilling Activities

Prior to the commencement of drilling activities, all locations will be surveyed and marked for underground utilities. In addition, a hand auger or probe will be used to a depth of 3 feet to ensure the absence of underground utilities at the location of interest. If any uncertainties exist, the location will be moved to an adjacent area.

The following general drilling practices must be adhered to during investigation activities

- All drilling equipment (i.e., rigging, derrick, hoists, augers, etc.) must be inspected by the drilling crew and SSHO prior to starting work. Defective equipment will be removed from service and replaced.

- No drilling within 20 feet in any direction of overhead power lines will be permitted. The locations of all underground utilities must be identified and marked prior to initiating any subsurface activities.

- All drill rigs and other machinery with exposed moving parts must be equipped with an operational emergency stop device. Drillers and geologists must be aware of the location of this device. This device must be tested prior to job initiation and periodically thereafter. The driller and helper shall not simultaneously handle moving augers or flights unless there is a standby person to activate the emergency stop.

- Prior to raising the mast, the drill rig operator shall ensure that the proper stabilization measures have been taken. The drill rig shall not be moved while the mast is in the raised position.

- The driller must never leave the controls while the tools are rotating unless all personnel are clear of the rotating equipment.

- Drillers must wear hearing protection unless the employer can provide documentation that noise exposures are less than a dose of 50 percent as required by OSHA Standard 29 CFR 1910.95.

- Drilling activities shall immediately cease when inclement weather (e.g., heavy rains, lightning) and high winds occurs at the site. All site personnel should immediately seek shelter.

- To maintain a clean operation, drill cuttings shall be promptly containerized as they are generated. A long-handled shovel or equivalent must be used to clear drill cuttings away from the hole and from rotating tools. Hands and/or feet are not to be used for this purpose.

- A remote sampling device must be used to sample drill cuttings if the tools are rotating. Samplers must not reach into or near the rotating equipment. If personnel must work near any tools, that could rotate, the driller must shut down the rig prior to initiating such work.

- Drillers, helpers, and samplers must secure all loose clothing when in the vicinity of drilling operations.

- Only equipment that has been approved by the manufacturer may be used in conjunction with site equipment Pins that protrude from augers will not be allowed.

A variety of additional work practices (i.e., hoisting, cat line, pipe and auger handling, etc.) are to be adhered to by the drilling crew, but will not be addressed in this HASP. If the on-site field team leader or site supervisor observes any operations or actions that are perceived as threatening to the health and safety of site personnel, drilling operations will be temporarily suspended until a mutual understand of the action(s) in question are addressed and/or corrected.

Soil borings have the potential for releases to the environment and exposure to personnel Gases and vapors that have a vapor density of less than 1.0 are lighter-than-air and tend to migrate upward in the atmosphere and disperse (e.g., methane). Heavier-than-air gases and vapors tend to stay close to the ground and may migrate to low-lying areas (e.g., hydrogen sulfide). In general, the only containment for a release to the air is termination of the release at the source (e.g., plug the boring). Depending on the contaminant encountered, it may be necessary to evacuate persons downwind of the area of the release. Emergency response personnel should be notified (Section 13.6) if air concentrations at the perimeter of the exclusion zone exceed threshold limit values (TLVs) or permissible exposure limits (PELs).

11.3 Housekeeping

Housekeeping is a very important aspect of an investigation program and will be strongly stressed in all aspects of field work. Good housekeeping plays a key role in occupational health protection

and is a way of preventing dispersion of dangerous contaminants. All work areas will be kept as clean as possible at all times and spills will be cleaned up immediately. Housekeeping will be the responsibility of all employees.

EEG will implement a housekeeping program for the field activities to minimize the spread of contamination beyond the work site. The program will include the following.

- Daily scheduling to police the area of debris including paper products, cans, and other materials brought on-site
- Changing of wash and rinse water for hands, face, and equipment as needed
- Periodic (daily minimum) removal of all garbage bags and containers used to dispose of food products, plastic inner gloves, and contaminated disposable clothing

11.4 Work Limitations

All investigation activities will be performed during normal daylight hours.

11.5 Confined Space Entry

Site personnel are not to undertake any activity that could be considered a confined-space entry.

11.6 Spill Containment

The procedures defined in this section comprise the spill containment activities in place at the site.

- All drums and containers used during the cleanup will meet appropriate United Nations, OSHA, and USEPA regulations for the waste that they will contain.
- Drums and containers will be inspected and their integrity ensured prior to being moved. Drums or containers that cannot be inspected before being moved because of storage conditions will be positioned in an accessible location and inspected prior to further handling.
- Operations on-site will be organized so as to minimize the amount of drum or container movement
- Employees involved in the drum or container operations will be warned of the hazards associated with the containers.
- Where spills, leaks, or ruptures may occur, adequate quantities of spill containment equipment (absorbent, pillows, etc.) will be stationed in the immediate area. The spill containment program must be sufficient to contain and isolate the entire volume of hazardous substances being transferred.

- Drums or containers that cannot be moved without failure will be emptied into a sound container.

- Fire extinguishing equipment meeting 29 CFR Part 1910 Subpart 1 shall be on hand and ready for use to control fires.

12.0 Site Control

Each investigation location will be physically barricaded with rope flagging or caution tape to control entry to and exit from the area. These barricaded areas will be referred to as the exclusion zones. The exclusion zone will be identified by the site supervisor and consist of a 20-foot radius surrounding the drilling location. Each person leaving an exclusion zone will proceed directly to the decontamination zone, which will be located adjacent to the exclusion zone and identified by physical barriers. The decontamination zone will consist of a low-lying area covered with a plastic sheeting. At the completion of decontamination procedures at each location, the debris will be enclosed in the plastic sheeting and deposited into 55-gallon type 17 E/H drums for later disposal as identified in the WP and FSP. Only personnel who are cleared by the EEG field leader and SSHO will be permitted in the exclusion zones and/or decontamination zones. Clearance for accessing these areas will only be given to personnel who meet the training and medical surveillance requirements of OSHA Standard 29 CFR 1910.120 and are wearing the appropriate PPE required for the work activity.

The support zone, where the administrative, communications, and other support services will be based, will be in a controlled area off the site or on the far end upwind of potential site contamination or areas of potential exposure Only persons and equipment that are free of contamination will be permitted in the support zone.

12.1 On-Site / Off-Site Communciations

Communications will consist of a centrally located telephone within the designated support zone (i.e., trailer, office) in addition to a mobile phone stationed within the on-site vehicle utilized for transportation. Field personnel may also utilize telephones located at NAS Fort Worth JRB in emergency situations.

13.0 Emergency Response

This HASP has been developed in an attempt to prevent the occurrence of situations that may jeopardize the health and safety of on-site personnel However, supplemental emergency procedures must be identified in the event that an unforeseen health and safety accident or incident occurs. In general, EEG will evacuate their employees and subcontractors from the workplace if an emergency involving chemical spills, chemical fires, chemical exposure, and/or chemical emissions occurs. For this reason, emergency response planning will be in accordance with OSHA Standard 29 CFR 1910 38(a).

13.1 Preplanning

Upon initial arrival at the site, the EEG field leader and SSHO will visit the base's fire department to determine the status of emergency response services. This meeting will include a determination as to the need for further coordination with local rescue and police services

Another aspect of preplanning for emergencies includes completion of the Medical Data Sheet (Section 14.1). This sheet must be completed by all EEG personnel and subcontractors so that, in the event of personal injury or illness, the examining physician has background information readily available on the injured/ill party.

13.2 Emergency Procedures and Assignments

Upon notification of a site emergency requiring evacuation, all EEG personnel and subcontractors will proceed directly to the support zone (i.e., trailer, office). If personnel cannot reach the support zone without endangering life or health, an alternate meeting point will be specified by the EEG SSHO Emergency egress routes and meeting points will be discussed at each daily health and safety briefing.

In the event of an emergency, the following procedures will be implemented:

- The site supervisor will evaluate the incident, assess the need for assistance, and call the appropriate contacts, if necessary.
- The site supervisor will act as the point of contact for outside emergency personnel and on-site personnel.
- The site supervisor will advise emergency response and emergency room personnel as to the types of contamination potentially contacted by injured workers receiving emergency care.
- The site supervisor will ensure that the SSHO promptly notifies the EEG PM and HSD of the incident.

13.2.1 Chemical Inhalation

It is not anticipated that chemicals of concern will be present at the site in concentrations to cause immediate danger to life and health. However, any field personnel exhibiting or complaining of

symptoms of chemical exposure as described in Section 4.1 will be removed from the work zone and transported to the designated medical facility for examination and treatment.

13.2.2 Eye and Skin Contact

Field personnel who have come into contact with contaminants while in the exclusion zone will proceed immediately to the decontamination zone, where an eye wash station will be located. At the eyewash station the following procedures will be followed:

- Do not decontaminate prior to using the eye wash
- Remove necessary PPE to perform the eye wash procedures
- Flush the eye with the clean water for at least 15 minutes
- Arrange for prompt transport to the designated medical facility

Unless skin contact with contaminants is severe, personnel should proceed through the decontamination zone. Field personnel should remove any contaminated PPE and wash the affected area for at least 15 minutes. If the personnel show signs of skin irritation, they will be transported to the designated facility.

13.3 Procedures for Personnel Remaining On-Site

No EEG or subcontractor personnel will remain on-site to operate critical site emergency operations.

13.4 Procedures to Account for Site Personnel

The EEG and subcontractor work force will be small enough so that accounting for site personnel will not be a problem. The EEG field leader and SSHO will ensure that the whereabouts of all personnel are known.

13.5 Rescue and Medical Duties

Only those persons who have been trained by the American Red Cross, or equivalent, will be permitted to perform rescue, first aid, and/or CPR treatment. Outside emergency services and medical facilities will be the primary providers of such services. At least one person who is currently certified in first aid and CPR will be on-site at all times during field activities. An ANSI-approved first aid kit, an ANSI-approved eye wash station with 15-minutes of free-flowing freshwater, and a Class ABC fire extinguisher will be readily available on-site.

Any EEG employee who shows signs or symptoms of overexposure must immediately be examined by a licensed physician. Subcontractor personnel who show signs or symptoms of overexposure will be encouraged to visit a licensed physician as well. Figure 13-1 describes the directions to the nearest medical facility.

13.6 Emergency Communication Procedures, Contacts, and Phone Numbers

Persons who observe an emergency situation must immediately notify the EEG field leader and/or SSHO. The field leader or SSHO will then immediately assess the emergency and appoint

someone to telephone appropriate outside emergency services and will coordinate site evacuation. Emergency telephone numbers and directions to the nearest medical facility are included as Table 13-1, a copy of which will be posted at the nearest telephone. In addition, Figure 13-1 illustrates the directions to the nearest medical facility.

13.7 Accident / Incident Follow-Up and Reporting

Upon receiving a report of an incident (or near-incident), the SSHO shall immediately investigate the circumstances and make appropriate recommendations to prevent recurrence. The HSD shall also be immediately notified by telephone on occurrence of a serious accident or incident. The HSD, at their individual discretion, may also participate in the investigation.

Details of the incident shall be documented on the Accident/Incident/Near Miss Investigation form (Section 14.1) within 24 hours of the incident and shall be distributed to the PM, HSD, and COR. A copy of this report shall also be sent to the appropriate administrative contact for inclusion into the OSHA Form 101 and 200 log. Incident report forms will be available at site support facilities.

14.0 Document and Equipment

This section summarizes the documentation and equipment needs for the project as specified in the HASP. Its purpose is to serve as a partial checklist to help ensure all of the necessary resources are available to carry out the requirements of the HASP.

14.1 Documentation and Forms

The following documents are presented at the end of this document for use during site operations:

- Site Safety Briefing Form
- HASP Compliance Agreement Form
- HASP Amendments Form
- Accident/Incident/Near Miss Investigation Form
- Medical Data Sheet
- Daily Equipment Calibration Log
- Air Monitoring Log

In addition, the following documentation will be present on-site during site operations:

- Approved HASP (signed copy)
- OSHA poster
- MSDSs
- Employee training and medical surveillance certificates
- Subcontractor training and medical surveillance certificates

14.2 Emergency Health and Safety Equipment

- First aid kit
- Eye wash
- Inner latex or vinyl gloves
- Outer nitrile gloves (disposable and 11 mil thick)
- Boot covers
- Hard hats and safety glasses
- Tyvek™ suits
- PVC and/or Saranex™ suits (with hoods)
- Ear plugs or muffs
- Decontamination kit
- Fire extinguisher
- Fall protection devices (body harness and lanyard)
- Duct tape
- LEL/O_2 meter
- PID

The site supervisor and/or SSHO shall be responsible for maintaining first aid kits and fire extinguishers at each site where field activities are taking place. The location of first aid kits and fire extinguishers will be discussed during each daily health and safety meeting.

15.0 References

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Federal Acquisition Regulation, FAR Clause 52.236-13, Accident Prevention.

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Tables

Table 4.1
Exposure Limits and Recognition Qualities

Compound	Permissible Exposure Limit (PEL)[a]	IDLH Level[b]	Recognition Qualities			Odor Warning Concentration (ppm)	LEL[c] (%)	UEL[d] (%)	Ionization Potential (eV)
			Color	Odor	State				
Anthracene	See coal tar pitch volatiles								
Arsenic Compounds	0.010 mg/m³	5 mg/m³[e]	Silver gray to tin-white	Odorless	Solid	NA	NA	NA	NA
Benzene	1.0 ppm[f]	500 ppm[e]	Colorless to light yellow	Aromatic	Liquid	1.5 - 5.0	1.2	7.8	9.24
Benzo[*a*]anthracene	See coal tar pitch volatiles								
Benzo[*b*]fluoranthene	See coal tar pitch volatiles								
Benzo[*k*]fluoranthene	See coal tar pitch volatiles								
Benzo[*g,h,i*]perylene	See coal tar pitch volatiles								
Benzo[*a*]pyrene	See coal tar pitch volatiles								
bis-(2-ethylhexyl)phthalate	5 mg/m³	5,000 mg/m³	Colorless	Slight	Liquid	NA	0.3	NA	NA

Compound	Permissible Exposure Limit (PEL)[a]	IDLH Level[b]	Recognition Qualities			Odor Warning Concentration (ppm)	LEL[c] (%)	UEL[d] (%)	Ionization Potential (eV)
			Color	Odor	State				
2-Butanone (MEK)	200 ppm	3000 ppm	Colorless	Sharp, mint-like	Liquid	ND	1.4	11.4	9.54
Cadmium	0.0005 mg/m3	9 mg/m3 (Ca[e])	Bluish-silver	N/A	Metal	NA	NA	N/A	NA
Chloroethane	1,000 ppm	3,800 ppm	Colorless	Ether-like	Liquid or gas	NA	3.8	15.4	10.97
Chrysene	See coal tar pitch volatiles								
Coal tar pitch volatiles	0.2 mg/m3	80 mg/m3 (Ca[e])	Black or brown	None	Solid	NA	NA	NA	NA
1,1-Dichloroethane	100 ppm	3,000 ppm	Colorless	Chloroform-like	Liquid	NA	5.4	11.4	11 06
1,1-Dichloroethene	ND	ND	Colorless	Chloroform-like	Liquid or gas	50	6.5	15.5	10.00
1,2-Dichloroethene	200 ppm	1,000 ppm	Colorless	Slightly acrid, chloroform-like	Liquid	17.0	5.6	12 8	9.65
Ethylbenzene	100 ppm	800 ppm	Colorless	aromatic	Liquid	4.7 - 5.0	0.8	6.7	8.76
Ethylene dibromide	20 ppm	100 ppm (Ca[e])	Colorless	Sweet	Liquid	ND	NA	NA	9.45
Fluoranthene	See coal tar pitch volatiles								

Compound	Permissible Exposure Limit (PEL)[a]	IDLH Level[b]	Recognition Qualities			Odor Warning Concentration (ppm)	LEL[c] (%)	UEL[d] (%)	Ionization Potential (eV)
			Color	Odor	State				
Freon 113	7,600 mg/m3	2,000 ppm	Colorless to water-white	Ether-like	Liquid or gas	ND	NA	NA	11.99
Gasoline	ND	ND	Clear	Gasoline	Liquid	ND	1.4	7.6	ND
Hexane	500 ppm	1,100 ppm	Colorless	Gasoline-like	Liquid	NA	1.1	7.5	10.18
Hydrochloric Acid	C 5 ppm	50 ppm	Colorless to light yellow	Irritating	Gas	NA	NA	NA	12.74
Indeno[1,2,3-*cd*]pyrene	See coal tar pitch volatiles								
Jet Fuel (JP-4)	ND	ND	Tea-brown	Gasoline	Liquid	ND	ND (flammable)	ND (flammable)	ND
Lead	0.050 mg/m3	100 mg/m3	Gray	Odorless	Solid	NA	NA	NA	NA
Mercury	0.100 mg/m3	10 mg/m3	Silver-white	Odorless	Liquid	NA	NA	NA	NA
Methanol	200 ppm	6,000 ppm	Colorless	Pungent	Liquid	100	6.0	36.0	10.84
Naphthalene	10 ppm	250 ppm	Colorless to brown	Mothballs	Solid	ND	0.9	5.9	8.12
Nitric Acid	2 ppm	25 ppm	Colorlessred or yellow	Acrid, suffocating	Liquid	NA	NA	NA	11.95

Compound	Permissible Exposure Limit (PEL)[a]	IDLH Level[b]	Recognition Qualities			Odor Warning Concentration (ppm)	LEL[c] (%)	UEL[d] (%)	Ionization Potential (eV)
			Color	Odor	State				
Phenanthrene	See coal tar pitch volatiles								
Pyrene	See coal tar pitch volatiles								
Sulfuric Acid	1 mg/m³	15 mg/m³	Colorlessy ellow, or brown	Odorless	Solution	NA	NA	NA	ND
1,1,1,2-Tetrachloroethane	ND	ND	Yellowish -red	None	Liquid	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	7 mg/m³ [skin]	100 ppm (Ca[e])	Colorless to pale yellow	Pungent, chloroform-like	Liquid	ND	NA	NA	11.10
Tetrachloroethylene	100 ppm[f]	150 ppm[e]	Colorless	Chloroform-like	Liquid	27.0	NA	NA	9.32
Toluene	200 ppm	500 ppm	Colorless	Aromatic	Liquid	0.17 - 40	1.1	7.1	8.82
1,1,1-Trichloroethane	350 ppm	700 ppm	Colorless	Mild, chloroform-like	Liquid	ND	7.5%	12.5%	11.00
1,1,2-Trichloroethane	10 ppm	100 ppm (Ca[e])	Colorless	Sweet, chloroform-like	Liquid	ND	6	15.5	11.00
Trichloroethylene	100 ppm[f]	1,000 ppm[e]	Colorless	Chloroform-like	Liquid	28.0	8.0	10.5	9.45

Compound	Permissible Exposure Limit (PEL)[a]	IDLH Level[b]	Recognition Qualities			Odor Warning Concentration (ppm)	LEL[c] (%)	UEL[d] (%)	Ionization Potential (eV)
			Color	Odor	State				
Vinyl Chloride	1 ppm	Unknown [e]	Colorless	Pleasant	Liquid or gas	3,000	3.6	33	9.99
Xylenes (total)	100 ppm	900 ppm	Colorless	Aromatic	Liquid	1.0 - 1.5	1.1	7.0	8.56

[a] OSHA permissible exposure limit or the American Conference of Governmental Industrial Hygienists' threshold limit value (both 8-hour time weighted averages).
[b] Immediately dangerous to life or health.
[c] Lower explosive limit.
[d] Upper explosive limit.
[e] To be treated as a carcinogen.
[f] The value presented is the OSHA PEL, which is not necessarily the most conservative of the available exposure limits. The air monitoring screening levels in Table 6.1 are based upon the most conservative values.

C Ceiling value, a 15-minute Time Weighted Average that shall not be exceeded at any time during the work day.
eV Electron volts.
mg/m^3 Milligrams per cubic meter.
NA Not applicable.
ppm Parts per million.

Table 4.2
Acute and Chronic Effects
Symptoms of Overexposure and First Aid Treatment

Compound	Symptoms of Overexposure	First Aid Treatment
Anthracene	See coal tar pitch volatiles	
Arsenic	Ulceration of nasal septum; dermatitis; gastrointestinal disturbances; peripheral neuropathy; respiratory irritation; hyperpigmentation of skin; carcinogen	Eye: Irrigate immediately (15 min) Skin: Soap wash immediately Inhalation: Not an inhalation hazard Ingestion: Medial attention immediately
Benzene	Irritation to eyes, nose, respiratory systems; giddiness; headache, nausea, staggered gait; fatigue, anorexia, lassitude; dermatitis; bone marrow depressant/depression; carcinogenic	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Artificial respiration Ingestion: Medical attention immediately. DO NOT INDUCE VOMITING
Benzo[*a*]anthracene	See coal tar pitch volatiles	
Benzo[*b*]fluoranthene	See coal tar pitch volatiles	
Benzo[*k*]fluoranthene	See coal tar pitch volatiles	
Benzo[*g,h,i*]perylene	See coal tar pitch volatiles	
Benzo[*a*]pyrene	See coal tar pitch volatiles	
bis-(2-ethylhexyl)phthalate	Irritation of eyes, mucous membranes, carcinogen	Eye: Irrigate immediately Skin: Not a dermal hazard Inhalation: Respiratory support Ingestion: Medical attention immediately

Compound	Symptoms of Overexposure	First Aid Treatment
2-Butanone (MEK)	Irritating to eyes and nose; headache; dizziness; vomiting	Eye: Irrigate immediately Skin: Water wash immediately Inhalation: Move to fresh air; respiratory support Ingestion: Medical attention immediately
Cadmium	Pulmonary edema, dyspnea, coughing, chest tightness, substernal pain; headache; chills, muscle pain; nausea, vomiting , diarrhea, anosmia, emphysema, proteinuria, mild anemia; carcinogenic	Eye: Irrigate immediately Skin: Soap wash immediately Inhalation: Move to fresh air; respiratory support Ingestion: Medical attention immediately
Chloroethane	In coordination, inebriate; abdominal cramps; cardiac arrhythmias, cardiac arrest; liver and kidney damage	Eye: Irrigate immediately Skin: Water flush promptly Inhalation: Respiratory support Ingestion: Medical attention immediately
Chrysene	See coal tar pitch volatiles	
Coal tar pitch volatiles	Dermatitis, bronchitis, carcinogenic	Eye: Irrigate immediately Skin: Soap wash immediately Inhalation: Move to fresh air; respiratory support Ingestion: Medical attention immediately
1,1-Dichloroethane	Central nervous system depressant; skin irritant; liver and kidney damage	Eye: Irrigate immediately Skin: Soap flush promptly Inhalation: Respiratory support Ingestion: Medical attention immediately

Compound	Symptoms of Overexposure	First Aid Treatment
1,1-Dichloroethene	Irritation to eyes, skin, and throat; dizziness, headache, and nausea, breathing difficulty, liver and kidney dysfunction; pneumonitis; carcinogen	Eye: Irrigate immediately Skin: Water flush immediately Inhalation: Move to fresh air; respiratory support Ingestion: Medical attention immediately
1,2-Dichloroethene	Irritation of eyes and respiratory system; central nervous system depressant/depression	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Respiratory support Ingestion. Medical attention immediately
Ethylbenzene	Irritation to eyes, mucous membranes; headache; dermatitis; narcosis; coma	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Artificial respiration Ingestion: Medical attention immediately
Ethylene dibromide	Irritation to eyes, skin, respiratory system; dermatitis with vesiculation; liver, heart, spleen, kidney damage; reproductive effects; carcinogen	Eye: Irrigate immediately Skin: Soap wash immediately Inhalation: Move to fresh air; respiratory support Ingestion: Medical attention immediately
Fluoranthene	See coal tar pitch volatiles	
Freon 113	Irritation of skin, throat; drowsiness, dermatitis; central nervous system depression	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Respiratory support Ingestion: Medical attention immediately
Gasoline	Irritation to eyes, skin, mucous membranes; dermatitis; headaches, fatigue, blurred vision, dizziness, slurred speech, confusion, convulsions, chemical pneumonia (aspiration); possible liver, kidney damage; carcinogen	Eye Irrigate immediately Skin: Soap flush immediately Inhalation: Respiratory support Ingestion: Medical attention immediately

Compound	Symptoms of Overexposure	First Aid Treatment
Hexane	Light-headedness, nausea, headaches, numbness in extremities, weak muscles, eye irritation, nose irritation, dermatitis, chemical pneumonia, giddiness	Eye: Irrigate immediately Skin: Soap, wash immediately Inhalation: Respiratory support Ingestion: Medical attention immediately
Hydrochloric Acid	Inflammation of the nose, throat, laryngeal; cough, burns throat, choking; burns eyes, skin; dermatitis	Eye: Irrigate immediately Skin: Water flush immediately Inhalation: Respiratory support Ingestion: Medical attention immediately
Indeno(1,2,3-cd)pyrene	See coal tar pitch volatiles	
Jet fuel (JP-4)	Irritation to eyes, skin, and mucous membranes; dermatitis; headaches, narcosis, coma	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Move to fresh air; respiratory support Ingestion: Medical attention immediately
Lead	Weak, lassitude, insomnia; facial pallor; pal eye, anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremors; paralysis of wrist and ankles; encephalaopathy; nephropathy; irritation to eyes; hypotension	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Respiratory support Ingestion: Medical attention immediately
Mercury	Cough, chest pain, dyspnea, bronchitis pneumonitis; tremors, insomnia, irritability, indecision; headache, fatigue, weak; stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria; irritation of the eyes, skin	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Respiratory support Ingestion: Medical attention immediately
Methanol	Eye irritant, headache, drowsiness; lightheadedness, nausea, vomiting, visual disturbances, blindness	Eye: Irrigate immediately Skin: Water flush immediately Inhalation Respiratory support Ingestion: Medical attention immediately

Compound	Symptoms of Overexposure	First Aid Treatment
Napthalene	Eye irritation; headache, confusion, excitement, malaise; nausea, vomiting, abdominal pain; irritated bladder; profuse sweating, jaundice; blood in urine; hemoglobinuria; renal shutdown; dermatitis; optical neuritis; cornea damage	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Move to fresh air; respiratory support Ingestion: Medical attention immediately
Nitric Acid	Irritation of eyes, mucous membranes, and skin; delayed pulmonary edema, pneuitis, bronchitis; dental erosion	Eye. Irrigate immediately Skin: Water flush immediately Inhalation: Respiratory support Ingestion: Medical attention immediately
Phenanthrene	See coal tar pitch volatiles	
Pyrene	See coal tar pitch volatiles	
Sulfuric Acid	Irritation to eyes, nose, and throat; pulmonary edema; bronchitis; emphysema, conjunctivitis; stomitis; dental erosion, thracheobronchitis; eye and skin burns; dermatitis	Eye· Irrigate immediately Skin: Water flush immediately Inhalation: Move to fresh air; respiratory support Ingestion: Medical attention immediately
1,1,1,2-Tetrachloroethane	Irritated eyes, skin; weakness, restlessness, irregular respiration, muscle incoordination	Eye: Irrigate immediately Skin: Soap wash immediately Inhalation: Respiratory support Ingestion· Medical attention immediately
1,1,2,2-Tetrachloroethane	Nausea, vomiting, abdominal pain; tremor fingers; jaundice, hepatitis, liver tenderness; dermatitis; monocytosis; kidney damage; carcinogen	Eye: Irrigate immediately Skin. Soap wash promptly Inhalation: Respiratory support Ingestion: Medical attention immediately

Compound	Symptoms of Overexposure	First Aid Treatment
Tetrachloroethylene	Irritation of the eyes, nose, throat; nausea; flush face, neck; vertigo, dizziness, in coordination; headache, somnolence; skin erythema; liver damage; carcinogen	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Respiratory support Ingestion: Medical attention immediately
Toluene	Fatigue, weakness; confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; nervousness, muscle fatigue, insomnia; paresis; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Move to fresh air Ingestion: Medical attention immediately; DO NOT INDUCE VOMITING
1,1,1-Trichloroethane	Irritation to eyes, skin; head, weakness, exhaustion, central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmia, liver damage	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Respiratory support Ingestion: Medical attention immediately
1,1,2-Trichloroethane	Irritation to eyes and nose; central nervous system depression; liver and kidney damage; dermatitis, carcinogenic	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Move to fresh air; respiratory support Ingestion: Medical attention immediately
Trichloroethylene	Headache, vertigo; visual disturbance, tremors, somnolence, nausea, vomiting; irritation of the eyes; dermatitis; cardia arrhythmias, paresthesia; carcinogen	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Respiratory support Ingestion: Medical attention immediately
Vinyl Chloride	Weakness; abdominal pain, gastrointestinal bleeding; hepatomegaly; pallor or cyan of extremities; carcinogen	Inhalation: Respiratory support

Compound	Symptoms of Overexposure	First Aid Treatment
Xylenes (total)	Dizziness, excitement, drowsiness, in coordination, staggering gait; irritation of eyes, nose, throat; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Move to fresh air Ingestion: Medical attention immediately; DO NOT INDUCE VOMITING

Table 4.3
Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers

Adjusted Temperature[1]	Normal Work Ensemble[2]	Impermeable Ensemble
90 °F or above	After each 45 minutes of work	After each 15 minutes of work
87.5 °F - 90 °F	After each 60 minutes of work	After each 30 minutes of work
82.5 °F - 87.5 °F	After each 90 minutes of work	After each 60 minutes of work
77.5 °F - 82.5 °F	After each 120 minutes of work	After each 90 minutes of work
72.5 °F - 77.5 °F	After each 150 minutes of work	After each 120 minutes of work

1 Calculate the adjusted air temperature (T_{aj}) by using the equation T_{aj} (°F) = T (°F) + (13 x % sunshine) Measure air temperature (T) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow (100 percent sunshine = no cloud cover and a sharp, distinct shadow, 0 percent sunshine = no shadows)

2 A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

Source NIOSH/OSHA/USCG/EPA, 1985.

Table 6.1
Hazard Monitoring Methods, Action Levels, and Protection Measures

Hazard	Monitoring Method	Action Level	Protective Measures	Monitoring Schedule
Toxic Vapors (as identified in Table 4.1)	PID	0.0 to <0.5 ppm above background based on judgment of SSHO	Level D (see Table 7.1)	-continue with regular monitoring of breathing zone
		0 5 ppm above background based on judgment of SSHO	Level D (see Table 7.1)	-confirm/deny reading with vinyl chloride and benzene colorimetric tubes -if confirmed as vinyl chloride and/or benzene, then see vinyl chloride/benzene hazard identified below -if denied as vinyl chloride and benzene, then continue with regular monitoring of breathing zone
		≥0 5 ppm to <25 ppm above background based on judgment of SSHO (if denied as vinyl chloride and benzene)	Level D (see Table 7.1)	-confirm/deny reading with vinyl chloride and benzene colorimetric tubes -if confirmed as vinyl chloride and/or benzene, then see vinyl chloride/benzene hazard identified below -if denied as vinyl chloride and benzene, then continue with regular monitoring of breathing zone -confirm/deny reading with tetrachloroethylene and TCE colorimetric tubes -if confirmed , then see hazard identified below -if denied as tetrachloroethylene or TCE, then continue with regular monitoring of breathing zone

Hazard	Monitoring Method	Action Level	Protective Measures	Monitoring Schedule
		≥25 to <250 ppm above background based on judgment of SSHO (if denied as vinyl chloride, benzene, and tetrachloroethylene)	Level C (see Table 7.1)	-continue with regular monitoring of breathing zone - contact HSD and Project Manager - continue use of tubes, attempt to identify unknown air contaminants
Vinyl Chloride	Colorimetric Tubes	confirmed 1.0 ppm to 10 ppm above background based on judgment of SSHO	Level C (See Table 7.1)	-continue regular monitoring of breathing zone
Benzene	Colorimetric Tubes	confirmed 0.5 ppm to 5 ppm above background based on judgment of SSHO	Level C (See Table 7.1)	-continue regular monitoring of breathing zone
Tetrachloroethylene	Colorimetric Tubes	confirmed 25 ppm to 250 ppm above background based on judgment of SSHO	Level C (See Table 7 1)	-continue regular monitoring of breathing zone
Flammable/Explosive Gases and/or Vapors	LEL/O_2 Detector	0.0 to 5.0 percent LEL	-notify sampling team of readings	-prior to and during sampling activities, monitor all areas suspected of containing flammable/explosive gases and/or vapors -continue with regular monitoring of breathing zone
		5 0 to <10.0 percent LEL	-use spark proof equipment/tools	-continue with regular monitoring of breathing zone - notify HSD and Project Manager
		>10 0 percent LEL	STOP WORK, EVACUATE AREA, NOTIFY PROJECT MANAGER	-requires HASP amendments unless readings subside

Hazard	Monitoring Method	Action Level	Protective Measures	Monitoring Schedule
Toxic Vapors (as identified in Table 4.1)	PID	≥250 above background based on judgment of SSHO (if denied as all chemicals listed above)	STOP WORK, EVACUATE AREA, NOTIFY PROJECT MANAGER	-requires identification of new chemical hazard and HASP amendments
Vinyl Chloride	Colorimetric Tubes	confirmed 10 ppm or greater above background based on judgment of SSHO	STOP WORK, EVACUATE AREA, NOTIFY PROJECT MANAGER	- requires HASP amendments
Benzene	Colorimetric Tubes	confirmed 5 ppm or greater above background based on judgment of SSHO	STOP WORK, EVACUATE AREA, NOTIFY PROJECT MANAGER	-requires HASP amendments

Table 7.1
Protective Equipment for On-site Activities

Activity	Level	Protective Equipment
Excavations Subsurface Soil Sampling Well Installation Groundwater Sampling	D	• Street clothes or overalls (long sleeves) • Impermeable safety boots/shoes (steel-toed) • Safety glasses/goggles (if hazard to eyes exists) • Hard hat (if hazard to head exists) • Gloves (nitrile, neoprene) • Ear plugs (if hazard exists)
If increased protective measures are required	D (modified)	• Rubber boots; chemically-resistant with steel toe • Gloves (nitrile, neoprene) • Tape for sealing ankle and wrist openings • Hard hat (if hazard to head exists) • Safety glasses/goggles (if hazard to eyes exists) • Unbolted Tyvek™ or equivalent • Ear plugs (if hazard exists)
If increased protective measures are required	C	• Coated Tyvek™ or equivalent • Rubber boots; chemically resistant with steel toe • Rubber boot covers • Latex inner gloves • Tape for sealing ankle and wrist openings • Chemical resistant outer gloves (nitrile, neoprene) • Full-face respirator (organic vapor cartridges) • Additional items may be required (site-specific) • Ear plugs (if hazard exists)

Table 8.1
Six Stages for Decontamination in Modified Level D Protection

Stage	Procedure
Stage 1: Segregated Equipment Drop	Deposit equipment used on-site on plastic drop cloths or in assigned containers with plastic liners.
Stage 2: Boot Cover and Glove Wash	Scrub outer boot covers and gloves with decontamination solution, and rinse with water.
Stage 3: Tape Removal	Remove tape around boots and gloves and deposit in container with plastic liner.
Stage 4: Remove boots, gloves, and disposable clothing	Deposit in appropriate plastic-lined container. Discard disposable clothing.
Stage 5: Field wash	Wash hands and face with soap and water.
Stage 6: Redress	Put on clean clothes.

Table 8.2
Eighteen Stages for Decontamination in Level C Protection

Stage	Procedure
Stage 1: Segregated Equipment Drop	Deposit equipment used on-site on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, a cool-down station may be set up within this area.
Stage 2: Boot Cover and Glove Wash	Scrub outer boot covers and gloves with decon solution of detergent and water.
Stage 3: Boot Cover and Glove Rinse	Rinse off decon solution from Stage 2 using copious amounts of water.
Stage 4: Tape Removal	Remove tape around boots and gloves and deposit in container with plastic liner.
Stage 5: Boot Cover Removal	Remove boot covers and deposit in container with plastic liner.
Stage 6: Outer Glove Removal	Remove outer gloves and deposit in container with plastic liner.
Stage 7: Suit, Glove, and Boot Wash	Wash splash suit, gloves, and safety boots. Scrub with long-handle scrub brush and decon solution.
Stage 8: Suit, Glove and Boot Rinse	Rinse off decon solution using water. Repeat as many times as necessary.
Stage 9: Canister or Mask Change	Perform last step in the decontamination procedure (if worker is leaving exclusion zone to change canister or mask). Worker's canister is exchanged, new outer gloves and boot covers donned, and joints taped; worker returns to duty.
Stage 10: Safety Boot Removal	Remove safety boots and deposit in container with plastic liner.
Stage 11: Splash Suit Removal	Remove splash suit with assistance of helper. Deposit in container with plastic liner.
Stage 12: Inner Glove Wash	Wash inner gloves with decon solution.
Stage 13: Inner Glove Rinse	Rinse inner gloves with water.

Stage	Procedure
Stage 14: Face Piece Removal	Remove face piece. Deposit in container with plastic liner. Avoid touching face with fingers. Note: Certain parts of contaminated respirators, such as the harness assembly and leather or cloth components are difficult to decontaminate. If grossly contaminated, they may need to be discarded. Rubber components can be soaked in soap and water and scrubbed with a brush. Use a final rinse of water and allow to air dry before using again. Inspect the respirator for damage and signs of wear before and after each use.
Stage 15: Inner Glove Removal	Remove inner gloves and deposit in lined container.
Stage 16: Inner Clothing Removal	Remove clothing soaked with perspiration and place in lined container. Do not wear inner clothing off the site since there is a possibility that small amounts of contaminants might have been transferred when removing the disposal coveralls.
Stage 17: Field Wash	Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.
Stage 18: Redress	Put on clean clothes.

Table 13.1
Emergency Telephone Numbers, Contacts, and Directions to Nearest Medical Facility

Key Personnel	Number
Rick Levin - Project Manager Jason Shannon - Health and Safety Director Michael Dodyk, PE - Base Point of Contact (AFCEE/ERD) Don Ficklen - AFCEE/ERD Contracting Officer's Representative	(352) 332-3888 (352) 332-3888 (817) 782-7167 (210) 536-5290
Emergency Phones Numbers	
Ambulance Fire Department Poison Control Hospital - Harris Methodist - Fort Worth 1301 Pennsylvania Avenue	911 or (817) 922-3150 911 or (817) 246-1741 911 or (800) 441-0040 911 or (817) 882-2000
Directions to Nearest Medical Facility (Figure 13.1)	
Exit NAS Fort Worth JRB on Pumphrey Rd. heading south. Turn left on Roaring Springs Rd. heading southeast for 2.0 miles. Roaring Springs Rd. turns into Horne St. prior to I-30. Turn left on I-30 heading east for 4.0 miles. Turn right on Summit Ave. heading south for 0.3 miles. Turn left on Pennsylvania Ave. heading east for 0.2 miles. Turn right on South Lake St. heading south to 1301 Pennsylvania Ave. Emergency entrance is located on the right.	

Forms

SITE SAFETY BRIEFING FORM

Project _____
Date _____ Time _____ Job No. _____
Location _____
Type of Work _____
_____
_____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment _____
_____
Chemical Hazards _____
_____
Physical Hazards _____
_____
Emergency Procedures _____
_____
Hospital/Clinic _____ Phone _____
Hospital Address _____
Special Equipment _____
_____
Other _____
_____
_____
_____

ATTENDEES

Name (Printed) Signature

Meeting Conducted by: _____

Site Safety and Health Officer: _____

HEALTH AND SAFETY PLAN

COMPLIANCE AGREEMENT FORM

PROJECT: Interim Remedial Actions

CLIENT: U.S. Air Force Center for Environmental Excellence

LOCATION: NAS Fort Worth JRB, Texas

I, _____, have received a copy of the Health and Safety Plan for the above-referenced project. I have read the plan, understand it, and agree to comply with all its provisions. I understand that I can be prohibited from working on the project for violating any of the safety requirements specified in the plan.

_____

Signature Date

_____

Company

HEALTH AND SAFETY PLAN AMENDMENTS FORM

Change in field activities or hazards: _____

Proposed Amendments: _____

Proposed by: _____ Date: _____

Approved by: _____

Accented: _____ Declined: _____ Date: _____

Amendment Number:

Amendment Effective Date:

Accident/Incident/Near Miss Investigation Form

Employee's Name:_____
Address:_____
SS#_____
Job Title:_____ Supervisor's Name:_____
Office Location:_____
Location at Time of Incident:_____
Date/Time of Incident:_____

Describe clearly how the accident occurred:_____

Was incident: Physical_____ Chemical_____
Parts of body affected _____ Exposure: _____

Witnesses: 1)_____ 2)_____

Conditions/acts contributing to this incident_____

Managers must complete this section:
Explain specifically the corrective action you have taken to prevent a recurrence:_____

Did injured go to doctor:_____ Where:_____
When:
Did injured go to hospital:_____ Where:_____
When:

Signatures:

Employee	Reporting Manager	Health & Safety Officer
Date	Date	Date

Accidents must be reported immediately; this form must be completed and returned to the Health and Safety Director within **24 hours.**

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all onsite personnel and will be kept in the command post during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project _____

Name _____ Home Telephone _____

Address _____

Age _____ Height _____ Weight _____

Name of Next of Kin _____

Drug or other Allergies _____

Particular Sensitivities _____

Do You Wear Contacts? _____

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals.

_____

_____

What medications are you presently using?_____

_____

_____

Do you have any medical restrictions? _____

_____

_____

Name, Address, and Phone Number of personal physician: _____

_____

_____

_____

_____

_____

I am the individual described above. I have read and understand this HASP:

_____

_____

Signature Date

DAILY EQUIPMENT CALIBRATION LOG

Project Name:

Project No:

DATE/TIME	INITIALS	INSTRUMENT	CALIBRATION SOLUTION OR GAS CONCENTRATION	ADJUSTMENTS REQUIRED/ COMMENTS

HEALTH AND SAFETY/AIR MONITORING LOG

Date: _____ Logged by: _____

Weather: _____
Field Tasks: _____
_____

EEG Personnel (or subs) working on the site (name and affiliation):

EEG Personnel (or subs) working in restricted zone:

EEG Site Visitors:

Air Quality Monitoring Measurements:

Time	Instrument	Parameter	Concentration	Locations

Background:

Exclusion zone:

Level of PPE:

Comments on other safety-related matters (including infractions, accidents, injuries, unusual occurrences, physical complaints):

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TITLE 30 ENVIRONMENTAL QUALITY

PART 1 TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

CHAPTER 334 UNDERGROUND AND ABOVEGROUND STORAGE TANKS

SUBCHAPTER K STORAGE, TREATMENT, AND REUSE PROCEDURES FOR PETROLEUM-SUBSTANCE CONTAMINATED SOIL

RULE §334.503 **Reuse of Petroleum-Substance Waste**

(a) Wastes that are intended for reuse are subject to all the applicable provisions of this subchapter, including, but not limited to, the following requirements. Sections 334.482, 334.496 - 334.500, and 334.502 of this title (relating to General Prohibitions; Shipping Procedures Applicable to Generators of Petroleum-Substance Waste; Recordkeeping and Reporting Procedures Applicable to Generators; Shipping Requirements Applicable to Transporters of Petroleum-Substance Waste; Shipping Requirements Applicable to Owners or Operators of Storage, Treatment, or Disposal Facilities; Record-keeping Requirements Applicable to Owners or Operators of Storage, Treatment, or Disposal Facilities; and Design and Operating Requirements of Stockpiles and Land Surface Treatment Units).

(b) Petroleum-substance waste may be reused in accordance with §350.36 of this title (relating to the Relocation of Soils Containing COCs for Reuse Purposes). Recordkeeping and reporting requirements for any person who intends to reuse petroleum-substance wastes shall be in accordance with §350.36 of this title except under the conditions of subsection (c)(3)(A) - (C) of this section as the requirements of §350.36(b)(4) and (c)(4) of this title will not apply. Under the conditions of subsection (c)(3)(A) - (C) of this section, the person must maintain records and provide to the agency when requested such information deemed necessary by the agency to ensure compliance with the requirements of this subsection.

(1) For releases reported to the agency on or after September 1, 2003, the information that must be maintained under subsection (c)(3)(A) - (C) of this section includes, but is not limited to:

(A) identification, address, and name of the authorized representative of the generating facility;

(B) identification, address, and name of the authorized representative for the receiving facility or location;

(C) identification of the landowner of the receiving location or facility;

(D) the quantity, type, and contaminant levels of the reused wastes;

(E) documentation of the reuse methods and dates of reuse;

(F) documentation that asphalt mix or road base mix meets the specifications required by the final user; and

(G) documentation that the landowner of the receiving location has approved the use of the reused wastes on his property.

(2) For releases reported to the agency on or before August 31, 2003, the recordkeeping and reporting requirement for any person who intends to reuse petroleum-substance wastes must require that person to maintain records and provide to the agency when requested such information deemed necessary by the agency to ensure compliance with the requirements of this subsection. This information shall include, but is not limited to:

(A) identification, address, and name of the designated representative of the generating facility;

(B) identification, address, and name of the designated representative for the receiving facility or location;

(C) identification of the landowner of the receiving location or facility;

(D) the quantity, type, and contaminant levels of the reused wastes;

(E) documentation of the reuse methods and dates of reuse;

(F) documentation that asphalt mix or road base mix meets the specifications required by the final user; and

(G) documentation that the landowner of the receiving location has approved the use of the reused wastes on his property.

(c) Reuse requirements are as follows.

(1) For releases reported to the agency on or before August 31, 2003, any person who intends to utilize petroleum-substance wastes for reuse must obtain written approval from the landowner of the land on which the wastes will be placed and from the agency as specified by this subsection. The landowner's approval shall be submitted to the agency upon request.

(2) Petroleum-substance wastes shall be reused only in manners which are in accordance with §334.482 of this title and at contaminant levels specified by the agency.

(3) Petroleum-substance wastes may be reused under the following conditions.

(A) Petroleum-substance wastes may be utilized in cold-mix-emulsion bituminous paving at a cold-mix asphalt-producing facility registered under the terms of this subchapter. The petroleum-substance waste shall be mixed with aggregate or other suitable materials at a rate which will result in a mixture meeting or exceeding the specifications required by the final user.

(i) For releases reported to the agency on or before August 31, 2003, the petroleum-substance waste will contain less than 0.5 mg/kg for each component of benzene, toluene, ethyl benzene, and total xylenes prior to mixing. Authorization for the facility must also be obtained from all other appropriate federal, state, or local governing agencies. Authorization from the owner of the road or other area where the asphalt is to be utilized must be obtained prior to laying the asphalt.

(ii) For releases reported to the agency on or after September 1, 2003, the concentration of benzene, toluene, ethylbenzene, and total xylenes, or any other relevant chemicals of concern derived from the petroleum substance waste must not exceed levels which are protective of human health and the environment as generally determined in accordance with Chapter 350 of this title (relating to Texas

Risk Reduction Program), and must not be at concentrations which compromise the integrity of the cold-mix asphalt product. Authorization for the facility must also be obtained from all other appropriate federal, state, or local governing agencies. Authorization from the owner of the road or other area where the asphalt is to be utilized must be obtained prior to laying the asphalt.

(B) Petroleum-substance wastes may be utilized in asphalt mix at hot-mix asphalt-producing facilities registered under this subchapter.

(i) For releases reported to the agency on or before August 31, 2003, the petroleum-substance waste will contain less than 0.5 mg/kg for each component of benzene, toluene, ethyl benzene, and total xylenes prior to mixing. The petroleum-substance waste must be mixed with aggregate at a rate which will result in a mixture meeting or exceeding the specifications required by the final user. Authorization for the facility must also be obtained from all other appropriate federal, state, or local governing agencies. Authorization from the owner of the road or other area where the asphalt is to be utilized must be obtained prior to laying the asphalt.

(ii) For releases reported to the agency on or after September 1, 2003, the concentration of benzene, toluene, ethylbenzene, and total xylenes, or any other relevant chemicals of concern derived from the petroleum substance waste must not exceed levels which are protective of human health and the environment as generally determined in accordance with Chapter 350 of this title, and must not be at such concentrations which compromise the integrity of the hot-mix asphalt product. The petroleum-substance waste must be mixed with aggregate at a rate which will result in a mixture meeting or exceeding the specifications required by the final user. Authorization for the facility must also be obtained from all other appropriate federal, state, or local governing agencies. Authorization from the owner of the road or other area where the asphalt is to be utilized shall be obtained prior to laying the asphalt.

(C) Petroleum-substance wastes may be utilized in road base or parking lot stabilized base when the base will be covered with concrete or asphalt.

(i) For releases reported to the agency on or before August 31, 2003, the contaminant levels of the soil prior to mixing into the stabilized base are less than 0.5 mg/kg for each component of benzene, toluene, ethyl benzene, and total xylenes, and less than 500.0 mg/kg total petroleum hydrocarbons or at contaminant levels otherwise specified by the agency. The base must be mixed according to the specifications required by the final user. Soil which is not mixed into stabilized road base must meet the criteria for clean soil as specified by the agency to be spread on a road or parking lot. The generator must obtain prior written consent for the placement of the soil from the owner of the road (if different from the landowner).

(ii) For releases reported to the agency on or after September 1, 2003, the concentration of benzene, toluene, ethylbenzene, and total xylenes, or any other relevant chemicals of concern derived from the petroleum substance waste shall not exceed levels which are protective of human health and the environment as generally determined in accordance with Chapter 350 of this title, and must not be at such concentrations which compromise the integrity of the stabilized base. The base must be mixed according to the specifications required by the final user. Soil which is not mixed into stabilized road base must meet the criteria for clean soil as specified by the agency to be spread on a road or parking lot. The generator must obtain prior written consent for the placement of the soil from the owner of the road (if different from the landowner).

(D) For releases reported to the agency on or before August 31, 2003, petroleum-substance wastes may

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be utilized, if appropriate, in road base or parking lot stabilized base when the base will not be covered with asphalt or concrete. To determine if the soil to be reused is appropriate for the application, analysis for contamination must be conducted as specified by this agency. The agency will give written approval for the particular reuse after ensuring that the implementation will, in the opinion of agency staff, adequately protect human health, safety, and the environment. The base must be mixed according to the specifications required by the final user. The base must be professionally mixed by a facility registered under the terms of this subchapter. Soil which is not mixed into stabilized road base must meet the criteria for clean soil to be spread on a road or parking lot. The generator must obtain prior written consent for the placement of the soil from the owner of the road (if different from the landowner).

(E) For releases reported to the agency on or before August 31, 2003, petroleum-substance wastes may, if appropriate, be used as fill. To determine if the soil to be reused is appropriate for the application, analysis for contamination must be conducted as specified by this agency. The agency will give written approval for the particular reuse after ensuring that the implementation will, in the opinion of agency staff, adequately protect human health, safety, and the environment. The landowner at the receiving site (if different from the original owner of the petroleum substance contaminated soil) must give written consent for this activity. Fill for tank hold bedding and backfill for tank systems must meet the requirements of §334.46(a)(5) of this title (relating to Installation Standards for New Underground Storage Tank Systems).

Source Note: The provisions of this §334.503 adopted to be effective December 27, 1996, 21 TexReg 12177; amended to be effective September 23, 1999, 24 TexReg 7422; amended to be effective November 23, 2000, 25 TexReg 11442; amended to be effective July 12, 2001, 26 TexReg 5031

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TITLE 30 ENVIRONMENTAL QUALITY
PART 1 TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
CHAPTER 350 TEXAS RISK REDUCTION PROGRAM
SUBCHAPTER A GENERAL INFORMATION
RULE §350.2 **Applicability**

(a) General applicability. On May 1, 2000, persons shall comply with the requirements of this chapter to the extent not modified by the provisions of this section. Before May 1, 2000, the person may use this chapter upon the effective date of the chapter. The rules in this chapter specify objectives for response actions for affected properties and further specify the mechanism to evaluate such response actions once an obligation is established to take a response action via other applicable rules, orders, permits or statutes. All actions undertaken and demonstrations required by this chapter must be performed and documented to the reasonable satisfaction of the executive director. Additionally, no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. This chapter does not establish requirements for reporting releases to program areas. The regulations in this chapter address releases of chemicals of concern (COCs) as defined by various programs subject to this chapter as specified in subsections (b)-(m) of this section. However, the regulations in this chapter do not eliminate the need for the person to meet any more stringent or additional requirements found in the particular rules for the covered program areas or applicable federal requirements.

(b) Property where a release of COCs occurs that is regulated under Chapter 327 of this title (relating to Spill Prevention and Control), as amended. The person shall first complete notification for releases under §327.3 of this title (relating to Notification Requirements), as amended, and then conduct response actions under §327.5 of this title (relating to Actions Required), as amended. The person shall utilize this chapter to conduct response actions when either the conditions of paragraphs (1) or (2) of this subsection apply.

(1) The person chooses to respond under this chapter to a release of COCs within the first six months after the release is reported to the executive director.

(2) The person determines that the response action to the release of COCs cannot be completed to the satisfaction of the executive director within the first six months following notification to the executive director.

(c) Property regulated under Chapter 330 of this title (relating to Municipal Solid Waste). Persons shall comply with the requirements of this chapter for those municipal solid waste properties except when subject to the requirements of 40 Code of Federal Regulations Parts 257 and/or 258, as amended. However, for those municipal solid waste properties subject to the requirements of 40 Code of Federal Regulations Parts 257 and/or 258, as amended, the executive director may establish an alternative health-based groundwater protection standard for a COC in accordance with §330.235(i) of this title (relating to Assessment Monitoring Program), as amended. Determination of such an alternative

standard shall be made using the procedures of Subchapter D of this chapter (relating to Development of Protective Concentration Levels).

(d) Property regulated under Chapter 331 of this title (relating to Underground Injection Control). The person shall address unauthorized releases of COCs from associated tankage and equipment utilizing the procedures of this chapter. Excursions of injected mining solutions at in-situ mining properties or injection of waste which is confined below all underground sources of drinking water as defined in §331.2 of this title (relating to Definitions), as amended, are not subject to the requirements of this chapter.

(e) Property regulated under Chapter 332 of this title (relating to Composting). The person shall comply with the requirements of this chapter to conduct assessments, response actions, and post- response action care for releases of COCs in environmental media at a compost facility, mulching facility or land application property authorized under Chapter 332 of this title, as amended.

(f) Property regulated under Chapter 333 of this title (relating to Brownfield Initiatives). The person entering the Voluntary Cleanup Program (VCP) shall comply with all requirements found in the Texas Health and Safety Code, Chapter 361, Subchapter S, as amended, concerning the Voluntary Cleanup Program; Subchapter A of Chapter 333 of this title (relating to Voluntary Cleanup Program Section), as amended; and the requirements of this chapter. Where there is a conflict between the requirements of this chapter and the requirements in the Texas Health and Safety Code Chapter 361, Subchapter S, as amended, and Chapter 333, Subchapter A of this title, as amended, the requirements of the Texas Health and Safety Code Chapter 361, Subchapter S, as amended, and Chapter 333, Subchapter A of this title, as amended, shall apply.

(g) Property regulated under Chapter 334 of this title (relating to Underground and Aboveground Storage Tanks). The person shall comply with the requirements of this chapter for the assessment, response actions, and post-response action care for releases of regulated substances from underground storage tanks as specified in Chapter 334, Subchapter A of this title (relating to General Provisions), as amended, and for releases of petroleum products from aboveground storage tanks as specified in Chapter 334, Subchapter F of this title (relating to Aboveground Storage Tanks), as amended, which are reported to the executive director in accordance with Chapter 334, Subchapter D of this title (relating to Release Reporting and Corrective Action), as amended, on or after September 1, 2003. Additional corrective action requirements for these facilities are found in Chapter 334, Subchapters D, J, and K of this title (relating to Release Reporting and Corrective Action; Registration of Corrective Action Specialists and Project Managers for Product Storage Tank Remediation Projects; and Storage, Treatment and Reuse Procedures for Petroleum-Substance Contaminated Soil, respectively), as amended. For releases discovered and reported to the executive director before September 1, 2003, the person shall continue to comply with Chapter 334 Subchapters D, G, H, J, K, and M of this title (relating to Release Reporting and Corrective Action; Target Concentration Criteria; Interim Reimbursement Program; Registration of Corrective Action Specialists and Project Managers for Product Storage Tank Remediation Projects; Storage, Treatment and Reuse Procedures for Petroleum-Substance Contaminated Soil; and Reimbursable Cost Guidelines for the Petroleum Storage Tank Reimbursement Program, respectively), as amended, which were in effect prior to the effective date of this chapter, not to preclude compliance with a subsequent amendment of 30 TAC 334 of this title (Underground and Aboveground Storage Tanks).

(h) Property regulated under Chapter 335 of this title (relating to Industrial Solid Waste and Municipal Hazardous Waste). The person shall comply with the requirements of this chapter when undertaking the remediation of affected property at facilities used for the storage, processing or disposal of industrial

solid waste or municipal hazardous waste, or for the remediation of environmental media containing COCs resulting from releases from waste management facility components (e.g., tank, container storage area, surface impoundment, etc.), either as part of closure or at any time before or after closure. The person shall close a waste management facility component in a manner that minimizes or eliminates the need for further maintenance and controls. The manner of closure shall also minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of waste, contaminants, leachate, run-off, or decomposition products to the surrounding environmental media. Waste management facility components undergoing closure for which the person can demonstrate that no release of COCs to surrounding environmental media has occurred are subject to this chapter only with regard to this closure performance standard and the removal, decontamination or control requirements for waste as specified in Subchapter B of this chapter (relating to Remedy Standards). In the event a release of COCs to surrounding environmental media has occurred, then the person shall comply with this chapter for response to the release. The person shall comply with §335.118(b) of this title (relating to Closure Plan; Submission and Approval of Plan), as amended, or applicable permit provisions regarding requirements for public participation in the corrective action process for permitted hazardous waste facilities. The person shall also comply with the requirements of paragraphs (1)-(3) of this subsection, as applicable.

(1) Any person who stores, processes, or disposes of industrial solid waste or municipal hazardous waste at a facility permitted under §335.2(a) of this title (relating to Permit Required), as amended, shall, unless specifically modified by other order of the commission, close the facility in accordance with the closing provisions of the permit.

(2) Any person who stores, processes, or disposes of hazardous waste is also subject to the applicable provisions relating to closure and post-closure in Chapter 335, Subchapters E and F of this title (relating to Interim Standards for owners and operators of Hazardous Waste Storage, Processing, or Disposal Facilities; and Permitting Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities, respectively), as amended.

(3) The person may utilize this chapter to determine if COCs, specifically listed hazardous waste or hazardous constituents, exceed concentrations protective of human health and the environment when making "contained-in" determinations for environmental media being managed as wastes (e.g., excavated soils, investigation derived wastes such as monitor well purge water, etc.) for purposes of treatment or disposal in a different location. In such cases, the person must still perform a waste classification in response to Chapter 335, Subchapters A and R of this title (relating to Industrial Solid Waste and Municipal Hazardous Waste Management in General; and Waste Classification, respectively), as amended.

(4) The person may propose a facility operations area (FOA) to address multiple sources of COCs within an active facility that is required to perform corrective action for releases pursuant to a permit or commission corrective action order. The requirements for establishing a FOA are specified in Subchapter G of this chapter (relating to Establishing a Facility Operations Area).

(i) Affected property regulated under Chapter 335, Subchapter K of this title (relating to Hazardous Substance Facilities Assessment and Remediation). The person shall comply with all requirements found in the Texas Health and Safety Code, Chapter 361, Subchapter F, as amended; Chapter 335, Subchapter K of this title (relating to Hazardous Substance Facilities Assessment and Remediation), as amended; and the requirements of this chapter for any release or threatened release of hazardous substances into the environment that may constitute an imminent and substantial endangerment to public health and safety or the environment. Where there is a conflict between the requirements in this

chapter and the requirements of Chapter 361, Subchapter F, as amended, and Chapter 335, Subchapter K of this title, as amended, the requirements of Chapter 361, Subchapter F and Chapter 335, Subchapter K of this title shall apply.

(j) Property regulated under Chapter 336 of this title (relating to Radioactive Substance Rules). The person shall comply with the requirements of Chapter 336 of this title, as amended, regarding contamination limits for radioactive material in environmental media. In instances involving remediation of releases in media containing both radioactive material and other COCs, the person shall use the contamination limits determined in accordance with Chapter 336 of this title, as amended, for radioactive material and PCLs determined by the procedures of this chapter for other COCs.

(k) Property regulated under Chapter 312 of this title (relating to Sludge Use, Disposal and Transportation). The executive director may reference this chapter in permits subject to Chapter 312 of this title, as amended, when specifying closure provisions to address releases of COCs from facility components at municipal wastewater treatment plants.

(l) Other releases. The executive director may require the use of this chapter to address other releases of COCs subject to Texas Water Code, Chapter 26, as amended.

(m) Use of this chapter on or after May 1, 2000. The person who started a response action under Chapter 335, Subchapters A and S of this title (relating to Industrial Solid Wastes and Municipal Hazardous Wastes in General; Risk Reduction Standards, respectively), as amended, may qualify to continue under those previous commission rules subject to the limitations specified in paragraphs (1)-(4) of this subsection. Also, the person shall respond as described in §350.35 of this title (relating to Substantial Change in Circumstances) in the event a substantial change in circumstance occurs which results in an unacceptable threat to human health or the environment.

(1) The person who has submitted an initial notification of intent to conduct a Risk Reduction Standard 1 or 2 response action(i.e., §335.8(c)(1) and (2) of this title (relating to Closures and Remediation), as amended) prior to May 1, 2000, and has submitted a final report within five years after that date may request that the response action be reviewed according to the regulations in effect at the time of initial notification. Persons will automatically qualify for this grandfathering provision if they have previously received a letter from the agency acknowledging receipt of the initial notification, or submit other forms of documentation by May 1, 2001 that proper and timely notification had been made. Any person desiring to remain under Chapter 335 of this title may not use any of the provisions of this chapter.

(2) The person who has submitted a remedial investigation report that fully complies with §335.553(b)(1) of this title (relating to Risk Reduction Standard No. 3), as amended, prior to May 1, 2001 may elect to either continue under those rules or to proceed under this chapter. Any person desiring to remain under Chapter 335 of this title may not use any of the provisions of this chapter. If a person elects to proceed under this chapter, then they shall not be allowed to return to Chapter 335 of this title.

(3) Any closure plans approved as part of a permit issued prior to May 1, 2000, but not implemented at the time of permit renewal are subject to review for compliance with this chapter as part of the permit renewal process.

(4) The person may resubmit plans or reports that the person has revised voluntarily to conform with the requirements of this chapter, unless such resubmittal would result in noncompliance with a previously approved or imposed schedule of compliance.

Source Note: The provisions of this §350.2 adopted to be effective September 23, 1999, 24 TexReg 7436

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TITLE 30 ENVIRONMENTAL QUALITY

PART 1 TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

CHAPTER 350 TEXAS RISK REDUCTION PROGRAM

SUBCHAPTER B REMEDY STANDARDS

RULE §350.36 **Relocation of Soils Containing Chemicals of Concern for Reuse Purposes**

(a) A person must comply with this section when relocating soils for reuse purposes from an affected property (on-site or off-site) which is undergoing or has completed a response action under Remedy Standard A or B and the soils contain COCs in excess of naturally occurring background concentrations. Relocation of soils which contain COCs may be subject to additional requirements or limitations (e.g., land disposal restrictions) within each program area identified in §350.2 of this title (relating to Applicability). The person must treat excavated soils containing non-aqueous phase liquids to applicable levels prior to relocation or else manage the soils as wastes. The excavation of soils containing COCs during construction activities (e.g., installation, repair, removal of telephone lines or other utilities, but not closures, remediations, or PST tank removal actions, for example) and the subsequent replacement of those soils into that same excavation shall not be considered to constitute relocation or reuse and shall not be subject to the provisions of this section.

(b) The person may relocate soils for reuse in response to Remedy Standard A when COCs meet the critical soil PCLs and the following requirements for the new location.

(1) Soils to be reused must meet the residential or commercial/industrial critical surface or subsurface soil PCLs as applicable for the new location, depending upon depth of placement, established in accordance with Subchapter D of this chapter (relating to Development of Protective Concentration Levels).

(2) The soil reuse shall be protective of ecological receptors at the new location.

(3) The soil reuse activity must allow the requirements for Remedy Standard A response actions set forth in §350.32(a) of this title (relating to Remedy Standard A) to be met at the new location.

(4) The person shall comply with the institutional control requirement for commercial/industrial land use as specified in §350.31(g) of this title (relating to General Requirements for Remedy Standards). Proof of compliance with the institutional control requirement shall be submitted within 90 days of completing the relocation action.

(5) The reuse of soils with concentrations of COCs which do not exceed the critical soil PCLs for the new location does not require the prior approval of the executive director, when that new location is within the boundary of on-site or off-site property which contains the affected property (i.e., not just within the affected property limits).

(c) The person must meet the following requirements in response to Remedy Standard B when soils that are to be relocated for reuse purposes contain concentrations of COCs that exceed the critical soil PCLs for the new location.

(1) The person shall determine the critical surface and, if applicable, subsurface soil PCLs in accordance with Subchapter D of this chapter (relating to Development of Protective Concentration Levels) for the new location.

(2) The soil reuse must be protective of ecological receptors at the new location.

(3) The person shall demonstrate that the soil reuse activity will allow the requirements for Remedy Standard B response actions set forth in §350.33(a) of this title (relating to Remedy Standard B) to be met for the new location.

(4) The person shall comply with the institutional control requirements specified in §350.31(g) of this title (relating to General Requirements for Remedy Standards). Proof of compliance with the institutional control shall be submitted within 90 days of completing the relocation action.

(5) The reuse of soil under Remedy Standard B requires prior executive director approval.

(6) The executive director may require the person to conduct post-response action care and submit PRACRs.

(7) The executive director may require the person to provide financial assurance for post-response action care in response to §350.33(e)(2)(C) of this title (relating to Remedy Standard B).

(d) If soils which contain concentrations of COCs above naturally-occurring levels resulting from a release are to be relocated for reuse on property not owned by the person, then the person shall obtain the written consent of the landowner prior to relocation of the soils.

(e) Within 90 days of completing a soil relocation action under this section, the person shall complete the applicable portions of a RACR as described in §350.95 of this title (relating to Response Action Completion Report) and make it available for inspection or submittal upon request of the executive director.

Source Note: The provisions of this §350.36 adopted to be effective September 23, 1999, 24 TexReg 7436

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CODE OF THE CITY OF FORT WORTH, TEXAS
CHAPTER 12.5 ENVIRONMENTAL PROTECTION AND COMPLIANCE
ARTICLE 1, ADMINISTRATION AND ENFORCEMENT
DIVISION 4, ENVIRONMENTAL USE AGREEMENTS

Subdivision I. General Provisions

Section 12.5-136. Definitions.

Unless a provision explicitly states otherwise, the following terms and phrases, as used in this Division, shall have the meanings hereinafter designated.

Property owner means the owner of property upon which or from which there has been a release or suspected release.

Section 12.5-137. Purpose.

(a) The purpose of this Division is to establish guidelines and rules whereby, pursuant to Chapter XXVII, Section 13, of the Charter of the City of Fort Worth, the City Manager may execute use agreements with property owners to allow sub-surface environmental sampling and the placement of monitoring wells in City right-of-way, other City property, and in City easements, without the prior approval of the City Council. These guidelines and rules shall not be interpreted as creating any rights in any property owners to do such sub-surface environmental monitoring or placement of monitoring wells.

(b) It is further the purpose of this Division to protect the lives and safety of the traveling public, to protect the health, safety and welfare of the residents of the City of Fort Worth, and to protect City property.

Section 12.5-138. Authority of City Manager.

(a) The City Manager or the City Manager's designee may enter into use agreements with property owners to allow such owners to perform sub-surface environmental monitoring and place monitoring wells in City right-of-way, other City property, and in City easements, if such sampling or wells are required by the Commission or the EPA, or requested by the property owner, and no reasonable alternative site exists.

(b) The City Manager may establish rules and procedures for the administration of this Division that are not inconsistent with the provisions of this Division, and which are necessary to protect City property interests and the public health, safety or welfare.

(c) For the purpose of making sub-surface environmental sampling or installing monitoring wells on City easements, rights-of-way, or other property, the provisions of this Division supersede any similar provisions in the "Buildings" Chapter of the City Code or other similar provisions in the City Code.

Section 12.5-139. Minimum Requirements for Use Agreements.

Any use agreement approved by the City Manager as allowed by this Division shall at a minimum provide for:

(a) An insurance policy or policies naming the City as an additional insured, with policy types and limits determined by the City's Risk Manager. When factors so warrant, and the Risk Manager believes the City will be properly protected, the Risk Manager may approve self-insurance;

(b) The indemnification of the City by the property owner for all claims and damages arising from use agreement activities;

(c) The relocation of monitoring wells if required for street and utility repair and maintenance;

(d) Minimal disturbance of traffic;

(e) Minimal disturbance of the peace of nearby residential neighborhoods;

(f) The protection of the City's municipal separate storm sewer system and the City's sanitary sewer from use agreement activities;

(g) The proposed drilling depth for soil borings and monitoring wells, locking caps on wells, and restoration of City property following completion or abandonment of contract activities;

(h) Barricading during sampling and drilling of monitoring wells;

(i) Inspection of operations by the Environmental Manager and City Traffic Engineer, and authority of same to halt use agreement activities when necessary to protect the environment or traveling public;

(j) Drilling to be performed by a contractor licensed and bonded to work in the public right-of-way, and licensed under Chapter 32 of the Texas Water Code;

(k) Certification of utility clearance prior to drilling; and

(l) Fees to offset the City's cost of regulating and monitoring use agreement activities as determined by a schedule set by the City Council.

Section 12.5-140. Priority of Placement.

It is the City's position that the placement of sub-surface environmental sampling sites and monitoring wells shall follow the order of priority set forth below, and that sampling sites and monitoring wells be permitted on City roadways or in stormwater drainage channels only as a last resort. In declining order of priority, sampling sites and monitoring wells shall be placed:

(a) On the property owner's property, not within a public easement;

(b) On adjacent private property, not within a public easement;

(c) On the property owner's property, within a public easement;

(d) On adjacent private property, within a public easement;

(e) On City-owned property, excluding rights-of-way;

(f) Within City right-of-way, excluding roadways, sidewalks, and stormwater drainage channels;

(g) Within City right-of-way, including roadways and sidewalks, but excluding stormwater drainage channels;

(h) Within City right-of-way, including stormwater drainage channels.

[Sections 12.5-141 through 12.5-144 reserved]

Subdivision II. Sub-surface Environmental Sampling

Section 12.5-145. Informal Request for Sub-Surface Environmental Sampling.

(a) A property owner seeking permission to conduct sub-surface environmental sampling on City right-of-way, property, or easements shall submit an informal written request to the Environmental Manager.

(b) The informal request shall include:

(1) A complete history of the release prompting the request;

(2) A scale drawing detailing: all adjacent property and improvements within one hundred feet (100') of the proposed sampling site(s); and the location of other soil borings made and monitoring wells placed in response to the release;

(3) The preliminary location, scope, and details of all proposed sampling operations; and

(4) Documentation which shows the Commission's or EPA's directive necessitating the request, if applicable.

(c) After receiving the request, the Environmental Manager shall review it and either:

(1) Approve it for further processing and notify the requestor;

(2) Return it to the requestor for more information; or

(3) Deny the request.

Section 12.5-146. Formal Request for Sub-Surface Environmental Sampling.

(a) If a preliminary request is approved for further processing, the requestor shall submit a formal written request plus seven (7) copies of same to the Environmental Manager.

(b) The formal request shall:

(1) Document contacts with the following persons regarding the release:

A. T.U. Electric Company;

B. Lone Star Gas Company;

C. Southwestern Bell Telephone Company;

D. Sammons Cable;

E. Any other utility company with a City franchise or license;

F. Texas Department of Transportation (if applicable);

G. Tarrant County Water Control and Improvement District (if applicable);

H. Tarrant County Department of Transportation and Public Works (if applicable);

I. Trinity River Authority (if applicable); and

J. The adjacent private property owner (if applicable); and

(2) Contain detailed information regarding the proposed sampling, including:

A. The exact location of all sampling sites, the type and depth of the samples, the hours of operation, and barricading;

B. The equipment to be used in the sampling;

C. The names and qualifications of the businesses involved in the sampling, and the name, title and phone number of the project manager who will oversee the sampling; and

D. The timetable for all sampling operations.

(c) After receiving the formal request, the Environmental Manager shall send copies of the request to the following City officials/ departments:

(1) City Attorney;

(2) Department of Risk Management;

(3) City Fire Chief;

(4) City Traffic Engineer;

(5) Department of Water, Engineering Services Division;

(6) Department of Engineering;

(7) Department of Development; and

(8) Department of Parks and Recreation (if the request will involve use of City parks land).

(d) The officials/departments listed in (c) above may provide the Environmental Manager with requirements to be imposed on the requestor, and other recommendations including alternate sites. The Environmental Manager shall review such requirements and recommendations and shall incorporate them into the use agreement to the degree practicable, but shall have the approval authority of the formal request. However, any sampling which will be done in City right-of-way shall also require the approval of the City Traffic Engineer on matters of traffic safety.

Section 12.5-147. Use Agreement for Sub-Surface Environmental Sampling.

(a) If the Environmental Manager and City Traffic Engineer (if applicable) approve the formal request, the Environmental Manager shall prepare a written use agreement setting forth the City's requirements, and shall deliver it to the requestor.

(b) After the requestor returns the signed use agreement to the Environmental Manager, along with the required fee and appropriate proof of insurance or self-insurance and certification of utility clearance for all city-franchised utility companies, and when applicable, of the other persons listed in Section 12.5-146(b)(1), the Commission, and the EPA, the Environmental Manager shall present it to the City Manager for final review. The City Manager may then approve or reject the use agreement.

(c) The use agreement shall take the place of any permits required by the City elsewhere in this Code, to do the work allowed by the agreement.

[Sections 12.5-148 through 12.5-154 reserved]

Subdivision III. Monitoring Wells

Section 12.5-155. Necessity of Monitoring Wells.

If sub-surface environmental sampling or other tests indicate the possibility of soil or groundwater contamination within City rights-of-way, property, or easements, and either the City, the Commission, or the EPA requires the installation of monitoring wells, the City Manager may enter into a use agreement with a property owner for the placement of monitoring wells and additional sub-surface environmental sampling.

Section 12.5-156. Informal Request for Monitoring Wells.

(a) A property owner seeking to place monitoring wells on City right-of-way, property, or easements shall submit an informal written request to the Environmental Manager.

(b) The informal request shall:

(1) provide documentation of the need for the well(s);

(2) provide documentation of the requestor's efforts to locate the well(s) on property other than City right-of-way, property and easements; and

(3) include a preliminary plan for the location of the well(s).

(c) If the Environmental Manager determines that the request should be approved for further processing, the requestor shall be so notified. If the Environmental Manager determines that the request should be denied, the requestor shall be so notified. The requestor shall have ten days from the date of the notice of denial to appeal the decision to the City Manager.

Section 12.5-157. Formal Request for Monitoring Wells.

(a) If the preliminary request is approved, the requestor shall submit a formal request and seven (7) copies to the Environmental Manager.

(b) The formal request shall include:

(1) Documentation of coordination with:

A. T.U. Electric Company;

B. Lone Star Gas Company;

C. Southwestern Bell Telephone Company;

D. Sammons Cable;

E. Other holders of City utility franchises or licenses;

F. Texas Department of Transportation (if applicable);

G. Tarrant County Water Control and Improvement District (if applicable);

H. Tarrant County Department of Public Works and Transportation (if applicable);

I. Trinity River Authority (if applicable); and

J. The adjacent private property owner (if applicable);

(2) A detailed scale drawing showing all property and improvements located within one hundred feet (100') of the proposed well installation;

(3) The scope and details of all well improvements, including but not limited to location and depth of the well(s), the size of the well(s), the hours of operation, and the construction details of the well(s);

(4) All equipment to be used in the construction, operation and maintenance of the wells;

(5) The names, addresses, phone numbers, and qualifications of all businesses involved in the construction, operation, and maintenance of the well(s) and;

(6) The length of time the well(s) will be in service;

(7) The procedure to remove the well(s) after they are no longer needed, including restoring the property to its original condition; and

(8) The monitoring procedures to be used, including frequency and time of monitoring.

(c) After receiving the formal request, the Environmental Manager shall forward copies to the following City officials/departments for review:

(1) City Attorney;

(2) Department of Risk Management;

(3) City Fire Chief;

(4) City Traffic Engineer;

(5) Department of Water, Engineering Services Division;

(6) Department of Engineering;

(7) Department of Development; and

(8) Department of Parks and Recreation (if the request will involve use of the City parks land).

(d) The officials/departments listed in subsection (c) may provide the Environmental Manager with requirements to be imposed on the requestor, and other recommendations including alternate sites. The Environmental Manager shall review such requirements and recommendations and shall incorporate them into the use agreement to the degree practicable, but will have approval authority over the formal request. However, any wells which will be placed in City rights-of-way shall also require the approval of the City Traffic Engineer on matters of traffic safety.

Section 12.5-158. Use Agreements for Monitoring Wells.

(a) If the formal request is approved, the Environmental Manager shall prepare a written use agreement setting forth the City's requirements, and shall deliver it to the requestor.

(b) After the requestor returns the signed use agreement to the Environmental Manager, along with the required fee and certification of utility clearance for all city-franchised utility companies, and when applicable, the other persons named in Section 12.5-157(b)(1), the Commission, and the EPA, the Environmental Manager shall present it to the City Manager for final review. The City Manager may then approve or reject the use agreement.

(c) The use agreement shall take the place of any permits required by the City elsewhere in this Code, to do the work allowed by the agreement.

[Sections 12.5-159 through 12.5-164 reserved]

Subdivision IV. Mitigation of Contaminated Soil

Section 12.5-165. Confirmation of Contaminated Soil.

(a) If sub-surface environmental sampling and/or monitoring wells confirm contamination of soil within City right-of-way, property, or easements, the property owner shall notify the Environmental Manager in writing within ten (10) days after learning of the confirmation of contamination.

(b) The property owner shall cooperate with the City in mitigating the contamination as necessary.

[Sections 12.5-166 through 12.5-199 reserved]

SUBCHAPTER A: GENERAL PROVISIONS
§§334.1 - 334.10, 334.12 - 334.18
Effective November 23, 2000

§334.1. Purpose and Applicability.

(a) Purpose. The purposes of this chapter are to:

(1) provide a comprehensive regulatory program for hazardous substance and petroleum substance underground storage tank (UST) systems, and a limited regulatory program for petroleum product aboveground storage tanks (ASTs), as prescribed by the Texas Water Code, Chapter 26, Subchapter I and Subchapter K;

(2) establish minimum standards and procedures to reasonably protect and maintain the quality of the state's groundwater and surface water resources from environmental contamination that could result from any releases of harmful substances stored in such tanks;

(3) provide for the use of risk-based corrective action; and

(4) generally provide for the protection of human health and safety, as well as the protection of the overall environment of the state.

(b) Applicability to USTs.

(1) An UST system is subject to all or part of the applicable regulations in this chapter only when such system:

(A) meets the definition of UST system under §334.2 of this title (relating to Definitions);

(B) contains, has contained, or will contain a regulated substance as defined under §334.2 of this title;

(C) is not completely exempted from regulation under §334.3(a) of this title (relating to Exemptions for Underground Storage Tanks (USTs) and UST Systems); and

(D) is not completely excluded from regulation under §334.4(a) of this title (relating to Exclusions for Underground Storage Tanks (USTs) and UST Systems).

(2) The requirements and provisions in this chapter are applicable to regulated UST systems (as described in paragraph (1) of this subsection), and to the registration, self-certification, design, construction, installation, operation, testing, maintenance, upgrading, recordkeeping, reporting, removal from service, release monitoring, release reporting and corrective action (including risk-based corrective action), fee assessment, financial assurance in accordance with Chapter 37, Subchapter I of this title

(relating to Financial Assurance for Petroleum Underground Storage Tank Systems), and other applicable requirements associated with such systems, as more fully described in this chapter.

(3) The requirements and provisions in this chapter apply equally to all owners and operators of regulated UST systems (as described in paragraph (1) of this subsection), including individuals, trusts, firms, joint-stock companies, corporations, governmental corporations, partnerships, associations (including non-profit and charity organizations), states, municipalities, commissions, political subdivisions of a state, interstate bodies, consortiums, joint ventures, commercial and noncommercial entities, and the United States Government (including all of its departments), except as otherwise provided in this chapter.

(4) The following types of underground tank systems are subject to all or parts of the applicable regulations in this chapter if they meet the general qualifications for an UST system in paragraph (1) of this subsection:

(A) compartmental tanks, when at least one of the compartments is used to store regulated substances; and

(B) dual-use or multiple-use tanks which alternately store two or more substances, when at least one of the stored substances is a regulated substance.

(c) Applicability to ASTs.

(1) An AST is subject to the applicable regulations in this chapter only when such tank;

(A) meets the definition of "aboveground storage tank" in §334.2 of this title;

(B) contains, has contained, or will contain a "petroleum product" as defined in §334.2 of this title;

(C) is not exempted from regulation under §334.123 of this title (relating to Exemptions for Aboveground Storage Tanks (ASTs)); and

(D) is not excluded from regulation under §334.124 of this title (relating to Exclusions for Aboveground Storage Tanks (ASTs)).

(2) The requirements and provisions in this chapter apply to regulated ASTs, and to the registration, installation notification, reporting, recordkeeping, release reporting and corrective action (including risk-based corrective action), fee assessment, and other applicable requirements associated with such tanks, as more fully described in this chapter.

(3) The applicable requirements and provisions in this chapter shall apply equally to all owners and operators of regulated ASTs, including individuals, trusts, firms, joint-stock companies, corporations, governmental corporations, partnerships, associations (including nonprofit and charity organizations), states, municipalities, commissions, political subdivisions of a state, interstate bodies,

consortiums, joint ventures, commercial and noncommercial entities, and the United States government (including all of its departments), except as otherwise provided in this chapter.

(4) The following types of ASTs are subject to the applicable regulations in this chapter if they meet the general qualifications for an AST in paragraph (1) of this subsection:

(A) compartmental tanks, when at least one of the compartments is used to store petroleum products; and

(B) dual-use or multiple-use tanks which alternately store two or more substances when at least one of the stored substances is a petroleum product;

(5) If a storage tank containing a petroleum product technically meets the definitions of both an AST and an UST under this chapter, then the tank will be considered an UST, and must conform with all applicable requirements for USTs in this chapter.

(6) Consistent with the exemption for heating oil tanks in §334.123(a)(2) of this title, an AST storing a petroleum product (such as kerosene or diesel) which is primarily used as a heating oil substitute for heating purposes on the premises where stored, and which is secondarily used as a motor fuel for the operation of internal combustion engines, is exempt from the regulations of this chapter.

(d) Applicability of specific sections to USTs and ASTs.

(1) USTs are subject to all the applicable provisions of this chapter, except Subchapter F of this chapter (relating to Aboveground Storage Tanks). Underground petroleum storage tanks are also subject to all applicable provisions of Chapter 37, Subchapter I of this title.

(2) ASTs are subject to all the applicable provisions of this chapter, except:

(A) §334.3 of this title (relating to Exemptions for Underground Storage Tanks (USTs) and UST Systems), §334.4 of this title (relating to Exclusions for Underground Storage Tanks (USTs) and UST Systems), §334.5 of this title (relating to General Prohibitions for Underground Storage Tanks (USTs) and UST Systems), §334.6 of this title (relating to Construction Notification for Underground Storage Tanks (USTs) and UST Systems), §334.7 of this title (relating to Registration for Underground Storage Tanks (USTs) and UST Systems), §334.8 of this title (relating to Certification for Underground Storage Tanks (USTs) and UST Systems), and §334.9 of this title (relating to Seller's Disclosure), and §334.10 of this title (relating to Reporting and Recordkeeping);

(B) Subchapter B of this chapter (relating to Underground Storage Tank Fees);

(C) Subchapter C of this chapter (relating to UST Technical Standards); and

(D) Subchapter I of this chapter (relating to Underground Storage Tank Contractor Registration and Installer Licensing).

§334.2. Definitions.

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise.

(1) **Abandonment in-place** - A method of permanent removal of an underground storage tank (UST) from service where the tank is left in the ground after appropriate preparation and filling with an acceptable solid inert material in accordance with the requirements of §334.55 of this title (relating to Permanent Removal From Service).

(2) **Abatement** - The process of reducing in sufficient degree or intensity the source of the release or impacted area, and potential fire, explosion, or vapor hazards, such that immediate threats to human health no longer exist. This includes the removal, as necessary, of all regulated substances from any confirmed or suspected release source (including associated aboveground or underground tanks, individual tank compartments, or associated piping) and the removal of phase-separated regulated substances from the impacted area.

(3) **Aboveground release** - Any release to the surface of the land or to surface water, including, but not limited to, releases from the aboveground portion of an UST system and releases associated with overfills and transfer operations during the dispensing, delivering, or removal of regulated substances into or out of an UST system.

(4) **Aboveground storage tank (AST)** - A non-vehicular device, (including any associated piping), that is made of non-earthen materials; located on or above the surface of the ground, or on or above the surface of the floor of a structure below ground, such as mineworking, basement, or vault; and designed to contain an accumulation of petroleum products.

(5) **ACT** - A trademark of the former Association for Composite Tanks, now a licensed trademark of the Steel Tank Institute.

(6) **Allowable cost** - As defined by Subchapter H, §334.308 of this title (relating to Allowable Costs and Restrictions on Allowable Costs).

(7) **Ancillary equipment** - Any devices that are used to distribute, meter, or control the flow of petroleum substances or hazardous substances into or out of an UST, including, but not limited to, piping, fittings, flanges, valves, and pumps.

(8) **ANSI** - American National Standards Institute, a nationally recognized organization which provides certifications and standards for consumer products and services.

(9) **API** - American Petroleum Institute, a nationally recognized organization which provides certifications and standards for petroleum equipment and services.

(10) **Appropriate regional office** - The agency's regional field office which has jurisdiction for conducting authorized agency regulatory activities in the area where a particular UST system or AST system is located.

(11) **ASTM** - American Society of Testing and Materials, a nationally recognized organization which provides certifications and standards for products and services.

(12) **Backfill** - The volume of materials or soils surrounding the UST bounded by the ground surface, walls, and floor of the tank pit.

(13) **Below-ground release** - Any release to the subsurface of the land or to groundwater, including, but not limited to, releases from the below-ground portions of an UST system and releases associated with overfills and transfer operations during the dispensing, delivering, or removal of regulated substances into or out of an UST system.

(14) **Beneath the surface of the ground** - Beneath the ground surface or otherwise covered with materials so that visual inspection is precluded.

(15) **Cathodic protection** - A technique to prevent corrosion of a metal surface by making that surface the cathode of an electrochemical cell, normally by means of either the attachment of galvanic anodes or the application of impressed current.

(16) **CERCLA** - The federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended.

(17) **Change-in-service** - A method of permanent removal from service involving the permanent conversion of a regulated UST to a tank which is not regulated under this chapter, where all regulated substances are properly removed by emptying and cleaning, and the tank is left in the ground for the storage of materials other than regulated substances.

(18) **Closure letter** - A letter issued by the agency which states that, based on the information available, the agency agrees that corrective action has been completed for the referenced release in accordance with agency requirements.

(19) **Commingled** - A combination or mixture of a petroleum product and a substance other than a petroleum product (excluding soil and/or water).

(20) **Common carrier** - With respect to delivery prohibitions, a person (as defined in this section) who physically delivers a regulated substance into an UST directly from a cargo tank which is affixed or mounted to a self-propelled, towable, or pushable vehicle (e.g., wagon, truck, trailer, railcar, aircraft, boat, or barge).

(21) **Composite tank** - A single-wall or double-wall steel tank, to which a fiberglass-reinforced plastic laminate or cladding has been factory-applied to the external surface of the outer tank wall.

(22) **Consumptive use** - (With respect to heating oil) the utilization and consumption of heating oil on the premises where stored.

(23) **Corporate Fiduciary** - An entity chartered by the Banking Department of Texas, the Savings and Loan Department of Texas, the United States comptroller of the currency, or the director of the United States Office of Thrift Supervision that acts as a receiver, conservator, guardian, executor, administrator, trustee, or fiduciary of real or personal property.

(24) **Corrective action** - Any assessment, monitoring, and remedial activities undertaken to investigate the extent of, and to remediate, contamination.

(25) **Corrective action plan (or remedial action plan)** - A detailed plan developed to address site remediation of soil, groundwater, or surface water contamination that provides for required protection of human health, safety, and the environment. The selection of the most effective and efficient remedial method will be dictated by the nature and location of the release, the site soils, hydrogeological conditions, and the required degree of remediation. The remedial method selection should take into consideration such factors as cost, time, and state compliance requirements with each method. The title of any report which contains a corrective action plan must include the designation "remedial action plan."

(26) **Corrosion specialist** - A person who, by reason of a thorough knowledge of the physical sciences and the principals of engineering and mathematics acquired by a professional education and related practical experience, is qualified to engage in the practice of corrosion control on buried or submerged metal piping systems and metal tanks, and who is either:

(A) certified as a corrosion specialist or a cathodic protection specialist by NACE International; or

(B) licensed as a professional engineer by the Texas Board of Professional Engineers in a branch of engineering that includes education and experience in corrosion control of buried or submerged metal piping systems and metal tanks.

(27) **Corrosion technician** - A person who can demonstrate an understanding of the principals of soil resistivity, stray current, structure-to-soil potential, and component electrical isolation measurements as relate to corrosion protection and control on buried or submerged metal tanks and metal piping systems; who is qualified by appropriate training and experience to engage in the practice of inspection and testing for corrosion protection and control on such systems, including the inspection and testing of all common types of cathodic protection systems; and who either:

(A) has been certified by NACE International as a corrosion technician, corrosion technologist, or senior corrosion technologist;

(B) is employed under the direct supervision of a corrosion specialist (as defined in this section), where the corrosion specialist maintains responsible control and oversight over all corrosion testing and inspection activities; or

(C) has been officially qualified as a cathodic protection testor, in strict accordance with the assessment and examination procedures prescribed by NACE International.

(28) **Date installation is complete** - The date any regulated substance is initially placed in an UST or the date any petroleum product is initially placed in an AST.

(29) **Dielectric material** - A material that does not conduct direct electrical current, as related to coatings, bushings, and other equipment and materials used with UST systems.

(30) **Electrical equipment** - Underground equipment which contains dielectric fluid which is necessary for the operation of equipment such as transformers and buried electrical cable.

(31) **Emergency generator** - A standby electrical generating system powered by an internal combustion engine (including a turbine), where such system is designed to supply temporary electrical service only when service from the normal or primary electrical source is disrupted. Such systems include, but are not necessarily limited to, those providing emergency electrical service for hospitals, life support systems, and other medical service facilities; telephone and electrical utilities; heating, lighting, ventilation, security, elevator, fire control, and other essential building operations systems; uninterruptible power systems; essential air conditioning and refrigeration; and motors, machinery, and controls used for other essential or critical purposes.

(32) **Excavation zone** The space containing the UST system and backfill material, which is bounded by the ground surface and the walls and floor of the pit and trenches into which the UST system is placed at the time of installation.

(33) **Existing UST system** - An UST system which is used or designed to contain an accumulation of regulated substances for which installation either had commenced prior to December 22, 1988, or had been completed on or prior to December 22, 1988. Installation will be considered to have commenced if the owner or operator had obtained all federal, state, and local approvals or permits necessary to begin physical construction at the site or installation of the tank system, and if either a continuous on-site physical construction or installation program had begun or the owner or operator had entered into contractual obligations (which could not be canceled or modified without substantial loss) which required that the physical construction at the site or installation of the tank system was to be completed within a reasonable time.

(34) **External release detection** - A method of release detection which includes equipment or procedures designed to effectively monitor or measure for the presence of regulated substances in the excavation zone, soil, or other media outside of a single-wall or double-wall UST system.

(35) **Facility** - The site, tract, or other defined area where one or more UST systems or one or more AST systems are located.

(36) **Farm** - A tract or tracts of land (including all associated structures and improvements) which are principally devoted to the raising of agricultural or other types of crops, domestic or other types of animals, or fish for the production of food, fiber, or other products or for other useful purposes, including fish hatcheries, rangeland, and plant nurseries with growing operations, but not including timber-growing land and operations dedicated primarily to recreational, aesthetic, or other non-agricultural activities (e.g., golf courses and parks).

(37) **Farm tank** - A tank located on a farm where the stored regulated substance is or will be utilized directly in the farm activities.

(38) **Field-constructed tank** - A tank which is not factory-assembled, and which is principally constructed, fabricated, or assembled at the same facility where the tank is subsequently placed into service.

(39) **Flow-through process tank** - A tank through which regulated substances flow in a steady, variable, recurring, or intermittent manner during, and as an integral part of, a production process (such as petroleum refining, chemical production, and industrial manufacturing), but specifically excluding any tank used for the static storage of regulated substances prior to their introduction into the production process and any tank used for the static storage of regulated substances which are products or by-products of the production process.

(40) **Free-product (or non-aqueous phase liquid)** - A regulated substance in its free-flowing non-aqueous liquid phase at standard conditions of temperature and pressure (e.g., liquid not dissolved in water).

(41) **Gathering lines** - Any pipeline, equipment, facility, or building used in the transportation of oil or gas during oil or gas production or gathering operations.

(42) **Hazardous substance** - Any substance defined or listed in the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), §101(14), (42 United States Code §9601, et seq.), and which is not regulated as a hazardous waste under the federal Solid Waste Disposal Act, Subtitle C, (42 United States Code §6921, et seq.).

(43) **Hazardous substance UST system** - An UST system that contains an accumulation of either a hazardous substance, a mixture of two or more hazardous substances, or a mixture of one or more petroleum substances with one or more hazardous substances, and which does not meet the definition of a petroleum UST system in this section.

(44) **Heating oil** - A petroleum substance which is typically used in the operation of heating, boiler, or furnace equipment and which either is one of the following seven technical grades of fuel oil: Number 1, Number 2, Number 4-light, Number 4-heavy, Number 5-light, Number 5-heavy, and Number 6; is a residual fuel oil derivative of the refining process (such as Navy Special and Bunker C residual fuel oils); or is another fuel (such as kerosene or diesel) used for heating purposes as a substitute for one of the above fuel oils or residual fuel oil derivatives.

(45) **Hydraulic fluid** - Any regulated substance that is normally used in a hydraulic lift system.

(46) **Hydraulic lift tank** - A tank holding hydraulic fluid for a closed-loop mechanical system that uses compressed air and hydraulic fluid to operate lifts, elevators, or other similar devices.

(47) **Impressed current system** - A method of cathodic protection where a rectifier is used to convert alternating current to direct current, where the current then flows in a controlled electrically connected circuit to non-sacrificial anodes, then through the surrounding soil or backfill to the protected metallic structure or component, and back to the rectifier.

(48) **In operation** - The description of an in-service UST which is currently being used on a regular basis for its intended purpose.

(49) **In service** - The status of an UST beginning at the time that regulated substances are first placed into the tank and continuing until the tank is permanently removed from service by means of either removal from the ground, abandonment in-place, or change-in-service. An in-service UST may or may not contain regulated substances, and may be either in operation or out of operation at any specific time.

(50) **Installer** - A person who participates in or supervises the installation, repair, or removal of USTs.

(51) **Inventory control** - Techniques used to identify a loss of product that are based on volumetric measurements in the tank and reconciliation of those measurements with product delivery and withdrawal records.

(52) **Jacketed tank** - A factory-constructed tank consisting of a single-wall or double-wall steel internal (or primary) tank that is completely enclosed in an external secondary-containment jacket made of noncorrodible material, and which is designed so that releases of stored substances from the internal tank can be contained and monitored within a liquid-tight interstitial space between the internal tank and the external jacket.

(53) **Lender** - A state or national bank; a state or federal savings bank; a credit union; a state or federal savings and loan association; a state or federal government agency that customarily provides financing; or an entity that is registered with the Office of Consumer Credit Commissioner pursuant to Chapter 7, Title 79, Revised Statutes (Texas Civil Statutes, Article. 5069-7.01, et seq.) if the entity is regularly engaged in the business of extending credit and if extending credit represents the majority of the entity's total business activity.

(54) **Liquid trap** - A collection device (such as a sump, well cellar, and other trap) which is used in association with oil and gas production, gathering, and extraction operations (including gas production plants) for the purpose of collecting oil, water, and other liquids, and which either may

temporarily collect liquids for subsequent disposition or reinjection into a production or pipeline stream, or may collect and separate liquids from a gas stream.

(55) **Leaking petroleum storage tank (LPST) site** - A site at which a confirmed release of a petroleum substance from an UST or AST has occurred. Petroleum substance contamination which results from multiple sources may be deemed as one LPST site by the agency.

(56) **Maintenance** - The normal and routine operational upkeep of UST systems necessary for the prevention of releases of stored regulated substances.

(57) **Monitoring well** - An artificial excavation constructed to measure or monitor the quantity or movement of substances, elements, chemicals, or fluids below the surface of the ground. The term does not include any monitoring well which is used in conjunction with the production of oil, gas, or any other minerals.

(58) **Motor fuel** - A petroleum substance which is typically used for the operation of internal combustion engines (including stationary engines and engines used in motor vehicles, aircraft, and marine vessels), and which is one of the following types of fuels: motor gasoline, aviation gasoline, Number 1 diesel fuel, Number 2 diesel fuel, or gasohol.

(59) **NACE** - NACE International (formerly National Association of Corrosion Engineers), a nationally recognized organization which provides certifications and standards for corrosion protection services.

(60) **New UST system** - An UST system which is used or designed to contain an accumulation of regulated substances for which installation commenced after December 22, 1988; or an underground storage system which is converted from the storage of materials other than regulated substances to the storage of regulated substances after December 22, 1988.

(61) **NFPA** - National Fire Protection Association, a nationally recognized organization which provides certifications and standards for fire protection equipment and services.

(62) **Non-aqueous phase liquid (NAPL)** - See "Free product (or non-aqueous phase liquid)" as defined in this section.

(63) **Non-commercial purposes** - (With respect to motor fuel) all purposes except resale.

(64) **Noncorrodible material** - A material used in the construction, maintenance, or upgrading of any component of an UST system which is designed to retain its physical and chemical properties without significant deterioration or failure for the operational life of the UST system when placed in contact with (and subjected to the resulting electrical and chemical forces associated with) any surrounding soil, backfill, or groundwater, any connected components constructed of dissimilar material, or the stored regulated substance.

(65) **Observation well** - A monitoring well or other vertical tubular structure which is constructed, installed, or placed within any portion of a UST excavation zone (including the tank hole and piping trench), and which is designed or used for the observation or monitoring of groundwater, or for the observation, monitoring, recovery, or withdrawal of either released regulated substances (in liquid or vapor phase) or groundwater contaminated by such released regulated substances.

(66) **Occurrence** - An incident, including continuous or repeated exposure to conditions, which results in a release from an UST or AST or tank system.

(67) **On the premises where stored** - (With respect to heating oil) refers to the consumptive use of heating oil on the same property or site where the heating oil is stored.

(68) **Operational life** - The actual or anticipated service life of an UST system, which begins when regulated substances are first placed into the tank system and which continues until the tank system is permanently removed from service by means of either removal from the ground, abandonment in-place, or change-in-service.

(69) **Operator** - Any person in day-to-day control of, and having responsibility for the daily operation of the UST system or the AST system, as applicable.

(70) **Out of operation** - The description of an in-service UST which is not currently being used on a regular basis for its intended purpose.

(71) **Overfill** - A release that occurs when an UST system is filled beyond its capacity, thereby resulting in a discharge of a regulated substance to the surface or subsurface environment.

(72) **Owner** - Any person who currently holds legal possession or ownership of a total or partial interest in an UST system or an AST. For the purposes of this chapter, where the actual ownership of an UST system or an AST is either uncertain, unknown, or in dispute, the fee simple owner of the surface estate where the UST system or the AST is located shall be considered the UST system or AST owner, unless the owner of the surface estate can demonstrate by appropriate documentation (deed reservation, invoice, bill of sale, etc.) or by other legally-acceptable means that the UST system or AST is owned by others. Except as otherwise provided by the Texas Water Code, §§26.3514 - 26.3516, owner does not include a person who holds an interest in an UST system or AST solely for financial security purposes unless, through foreclosure or other related actions, the holder of such security interest has taken legal possession of the UST system or AST.

(73) **PEI** - Petroleum Equipment Institute, a nationally recognized organization which provides certifications and standards for petroleum equipment and services.

(74) **Permanent removal from service** - The termination of the use and the operational life of an UST by means of either removal from the ground, abandonment in-place, or change-in-service.

(75) **Person** - An individual, trust, firm, joint-stock company, corporation, government corporation, partnership, association, state, municipality, commission, political subdivision of a state, an interstate body, a consortium, joint venture, commercial entity, or the United States government.

(76) **Petroleum marketing facilities** - All facilities at which a petroleum substance is produced or refined and all facilities from which a petroleum substance is sold or transferred to other petroleum substance marketers or to the public.

(77) **Petroleum marketing firms** - All firms owning petroleum marketing facilities. Firms owning other types of facilities with USTs as well as petroleum marketing facilities are considered to be petroleum marketing firms.

(78) **Petroleum product** - A petroleum substance obtained from distilling and processing crude oil that is liquid at standard conditions of temperature and pressure, and that is capable of being used as a fuel for the propulsion of a motor vehicle or aircraft, including but not limited to motor gasoline, gasohol, other alcohol blended fuels, aviation gasoline, kerosene, distillate fuel oil, and Number 1 and Number 2 diesel. The term does not include naphtha-type jet fuel, kerosene-type jet fuel, or a petroleum product destined for use in chemical manufacturing or feedstock of that manufacturing.

(79) **Petroleum substance** - A crude oil or any refined or unrefined fraction or derivative of crude oil which is liquid at standard conditions of temperature and pressure (except for any substance regulated as a hazardous waste under the federal Solid Waste Disposal Act, Subtitle C, (42 United States Code §6921, et seq.)). For the purposes of this chapter, a petroleum substance is limited to one or a combination of the substances or mixtures in the following list:

(A) basic petroleum substances - crude oils, crude oil fractions, petroleum feedstocks, and petroleum fractions;

(B) motor fuels - (see definition for "motor fuel" in this section);

(C) aviation gasolines - Grade 80, Grade 100, and Grade 100-LL;

(D) aviation jet fuels - Jet A, Jet A-1, Jet B, JP-4, JP-5, and JP-8;

(E) distillate fuel oils - Number 1-D, Number 1, Number 2-D, and Number 2;

(F) residual fuel oils - Number 4-D, Number 4-light, Number 4, Number 5-light, Number 5-heavy, and Number 6;

(G) gas-turbine fuel oils - Grade O-GT, Grade 1-GT, Grade 2-GT, Grade 3-GT, and Grade 4-GT;

(H) illuminating oils - kerosene, mineral seal oil, long-time burning oils, 300 oil, and mineral colza oil;

(I) solvents - Stoddard solvent, petroleum spirits, mineral spirits, petroleum ether, varnish makers' and painters' naphthas, petroleum extender oils, and commercial hexane;

(J) lubricants - automotive and industrial lubricants;

(K) building materials - liquid asphalt and dust-laying oils;

(L) insulating and waterproofing materials - transformer oils and cable oils; or

(M) used oils - (see definition for "used oil" in this section).

(80) **Petroleum UST system** - An UST system that contains, has contained, or will contain a petroleum substance (as defined in this section), a mixture of two or more petroleum substances, or a mixture of one or more petroleum substances with very small amounts of one or more hazardous substances. In order for an UST system containing a mixture of petroleum substances with small amounts of hazardous substances to be classified as a petroleum UST system, the hazardous substance must be at such a dilute concentration that the overall release detectability, effectiveness of corrective action, and toxicity of the basic petroleum substance is not altered to any significant degree.

(81) **Pipeline facilities (including gathering lines)** - New and existing pipeline rights-of-way, including any equipment, facilities, or buildings therein which are used in the transportation or associated treatment (during transportation) of gas or hazardous liquids (which include petroleum and other liquids as designated by the Secretary of the United States Department of Transportation), and which are regulated under the federal Natural Gas Pipeline Safety Act of 1968 (49 United States Code App. 1671, et seq.); the federal Hazardous Liquid Pipeline Safety Act of 1979 (49 United States Code App. 2001, et seq.); or (for intrastate pipeline facilities) the Texas Natural Resources Code, Chapters 111 or 117, or Texas Civil Statutes, Articles 6053-1 and 6053-2.

(82) **Piping** - All underground pipes in an UST system, including valves, elbows, joints, flanges, flexible connectors, and other fittings attached to a tank system through which regulated substances flow or in which regulated substances are contained or stored.

(83) **Piping trench** - The portion of the excavation zone at an UST facility which contains the piping system and associated backfill materials.

(84) **Pressurized piping** - Product or delivery piping in an UST system which typically operates at greater than atmospheric pressure.

(85) **Professional engineer** - A person who is currently duly licensed by the Texas Board of Professional Engineers to engage in the practice of engineering in the State of Texas.

(86) **Qualified personnel** - Persons who possess the appropriate competence, skills, and ability (as demonstrated by sufficient education, training, experience, and/or, when applicable, any required certification or licensing) to perform a specific activity in a timely and complete manner consistent with the applicable regulatory requirements and generally accepted industry standards for such activity.

(87) **Radioactive materials** - Radioactive substances or radioactive waste materials (e.g., high-level radioactive wastes and low-level radioactive cooling waters) which are classified as hazardous substances under the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), §101(14), 42 United States Code §9601, et seq., except for radioactive materials regulated as a hazardous waste under the federal Solid Waste Disposal Act, Subtitle C, 42 United States Code §6921, et seq.

(88) **Regulated substance** - An element, compound, mixture, solution, or substance that, when released into the environment, may present substantial danger to the public health, welfare, or the environment. For the purposes of this chapter, a regulated substance is limited to any hazardous substance (as defined in this section), any petroleum substance (as defined in this section), any mixture of two or more hazardous substances and/or petroleum substances, and any other substance designated by the commission to be regulated under the provisions of this chapter.

(89) **Release** - Any spilling including overfills, leaking, emitting, discharging, escaping, leaching, or disposing from an UST or AST into groundwater, surface water, or subsurface soils.

(90) **Release detection** - The process of determining whether a release of a regulated substance is occurring or has occurred from an UST system.

(91) **Repair** - The restoration, renovation, or mending of a damaged or malfunctioning tank or UST system component.

(92) **Residential tank** - A tank located on property used primarily for dwelling purposes.

(93) **Retail service station** - A facility where flammable liquids used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles and where such dispensing is an act of retail sale.

(94) **Risk-based corrective action** - Site assessment or site remediation, the timing, type, and degree of which is determined according to case-by-case consideration of actual or potential risk to public health from environmental exposure to a regulated substance released from a leaking UST or AST.

(95) **Secondary containment** - A containment method by which a secondary wall, jacket, or barrier is installed around the primary storage vessel (e.g., tank or piping) in a manner designed to prevent a release from migrating beyond the secondary wall or barrier before the release can be detected. Secondary containment systems include, but are not limited to: double-wall tank and/or piping systems, and impervious liners, jackets, containment boots, sumps, or vaults surrounding a primary (single-wall) tank and/or piping system.

(96) **Septic tank** - A water-tight covered receptacle designed to receive or process, through liquid separation or biological digestion, the sewage discharged from a building sewer.

(97) **Spill** - A release of a regulated substance which results during the filling, placement, or transfer of regulated substances into an UST or during the transfer or removal of regulated substances from an UST system.

(98) **Standard conditions of temperature and pressure** - A temperature of 60 degrees Fahrenheit and an atmospheric pressure of 14.7 pounds per square inch absolute.

(99) **STI** - Steel Tank Institute, a nationally recognized organization which provides certifications and standards for steel tanks.

(100) **Stormwater collection system** - The piping, pumps, conduits, and any other equipment necessary to collect and transport surface water runoff resulting from precipitation to and from retention areas and into natural or man-made drainage channels.

(101) **Suction piping** - Product or delivery piping in an UST system which typically operates below atmospheric pressure.

(102) **Sump** - Any man-made pit or reservoir that meets the definition of a tank (including any connected troughs or trenches) that serves to collect and temporarily store regulated substances.

(103) **Surface impoundment** - A natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (but possibly lined with man-made materials) that is designed to hold an accumulation of regulated substances.

(104) **Tank** - A stationary device (generally exclusive of any associated ancillary equipment) designed or used to contain an accumulation of regulated substances which is constructed of a non-earthen material (e.g., concrete, steel, or plastic) that provides structural support.

(105) **Tank hole** - The portion of the excavation zone at an UST facility which contains the tanks and associated backfill materials.

(106) **Tank system** - An UST system.

(107) **Temporary removal from service** - The procedure by which an UST system may be temporarily taken out of operation without being permanently removed from service.

(108) **Tightness test (or tightness testing)** - A procedure for testing and analyzing a tank or piping system to determine whether the system(s) is capable of preventing the inadvertent release of a stored substance into the environment.

(109) **UL** - Underwriters Laboratories, Inc., a nationally recognized organization which provides certifications and standards for consumer products and services.

(110) **Underground area** - An underground room, basement, cellar, shaft, or vault, which provides enough space for physical inspection of the exterior of a tank or tank system situated on or above the surface of the floor.

(111) **Underground storage tank** - Any one or combination of underground tanks and any connecting underground pipes used to contain an accumulation of regulated substances, the volume of which, including the volume of the connecting underground pipes, is 10% or more beneath the surface of the ground.

(112) **Underground storage tank system** - An UST, all associated underground piping and underground ancillary equipment, spill and overfill prevention equipment, release detection equipment, corrosion protection system, secondary containment equipment (as applicable), and all other related systems and equipment.

(113) **Unsaturated zone** - The subsurface zone containing water under pressure less than that of the atmosphere (including water held by capillary forces within the soil) and containing air or gases generally under atmospheric pressure. This zone is bounded at the top by the ground surface and at the bottom by the upper surface of the zone of saturation (i.e., the water table).

(114) **Upgrading** - The addition, improvement, retrofitting, or renovation of an existing UST system with equipment or components as required to meet the corrosion protection, spill and overfill prevention, and release detection requirements of this chapter.

(115) **Used oil** - Any oil or similar petroleum substance that has been refined from crude oil, used for its designed or intended purposes, and contaminated as a result of such use by physical or chemical impurities; and including spent motor vehicle and aircraft lubricating oils (e.g., car and truck engine oil, transmission fluid, and brake fluid), spent industrial oils (e.g., compressor, turbine, bearing, hydraulic, metalworking, gear, electrical, and refrigerator oils), and spent industrial process oils.

(116) **UST** - An underground storage tank (as defined in this section).

(117) **UST system** - An underground storage tank system (as defined in this section).

(118) **Vent lines** - All pipes including valves, elbows, joints, flanges, flexible connectors, and other fittings attached to a tank system, which are intended to convey the vapors emitted from a regulated substance stored in an UST to the atmosphere.

(119) **Wastewater collection system** - The piping, pumps, conduits, and any other equipment necessary to collect and transport domestic, commercial, or industrial wastewater to and from any facilities or areas where treatment of such wastewater is designated to occur.

(120) **Wastewater treatment tank** - A tank that is designed to receive and treat an influent wastewater through physical, chemical, or biological methods.

§334.3. Exemptions for Underground Storage Tanks (USTs) and UST Systems.

(a) Complete exemption. The following underground tanks and containment devices (including any connected piping) are completely exempt from regulation under this chapter:

(1) farm or residential tank with a capacity of 1,100 gallons or less used for storing motor fuel for noncommercial purposes;

(2) tanks used for storing heating oil for consumptive use on the premises where stored;

(3) septic tank;

(4) surface impoundments, pits, ponds, or lagoons;

(5) stormwater or wastewater collection systems;

(6) flow-through process tanks;

(7) tanks, liquid traps, gathering lines, or other facilities used in connection with an activity associated with the exploration, development, or production of oil, gas, or geothermal resources, or any other activity regulated by the Railroad Commission of Texas pursuant to the Natural Resources Code, §91.101;

(8) transformers or other electrical equipment that contains a regulated substance and that is used in the transmission of electricity, to the extent that such a transformer or equipment is exempted by the United States Environmental Protection Agency under Title 40 Code of Federal Regulations, Part 280;

(9) storage tanks located in an underground area, including a basement, cellar, mineworking, drift, shaft, or tunnel, if the storage tank is located on or above the surface of the floor;

(10) pipeline facilities, including gathering lines, if such facilities are regulated under:

(A) the Natural Gas Pipeling Safety Act of 1968 (49 United States Code, §1671, et seq.); or

(B) the Hazardous Liquid Pipeline Safety Act of 1979 (49 United States Code, §2001, et seq.);

(11) interstate pipeline facilities if such facilities are regulated under of the following state laws:

(A) the Natural Resources Code, Chapter 111;

(B) the Natural Resources Code, Chapter 117; or

(C) Texas Civil Statutes, Articles 6053-1 and 6053-2.

(b) Partial exemption. As provided under the Texas Water Code (TWC), §26.344(e), in-ground hydraulic lifts that use a compressed air/hydraulic fluid system and which hold less than 100 gallons of hydraulic oil are exempt from regulation under this chapter, except that such lifts remain subject to the release reporting and corrective action requirements under the TWC, §26.351, and Subchapter D of this chapter (relating to Release Reporting and Corrective Action).

(c) Upon request by the agency, the owner and operator of a tank claimed to be exempted under this section must provide appropriate documentation or other information in a timely manner to support that claim.

Adopted November 1, 2000 Effective November 23, 2000

§334.4. Exclusions for Underground Storage Tanks (USTs) and UST Systems.

(a) Complete exclusions. In addition to the tanks exempted from regulation under §334.3 of this title (relating to Exemptions for Underground Storage Tanks (USTs) and UST Systems), the following USTs are completely excluded from regulation under this chapter:

(1) any UST system containing a hazardous listed waste or identified under the federal Solid Waste Disposal Act, Subtitle C, (42 United States Code §6921, et seq.), or containing a mixture of such hazardous waste and other regulated substances, where such system is already subject to regulation under the federal Solid Waste Disposal Act, Subtitle C;

(2) any wastewater treatment tank (including an oil-water separator and any pretreatment facility), which is an integral part of a wastewater treatment facility which is either:

(A) permitted under the federal Clean Water Act, either §402 or §307(b), (33 United States Code §1251, et seq.); or

(B) permitted pursuant to the Texas Water Code, Chapter 26;

(3) sumps which have a capacity of less than 110 gallons;

(4) emergency spill protection or emergency overflow containment tanks, including certain sumps and secondary containment systems, which are used solely for the temporary storage or containment of regulated substances resulting from a leak, spill, overfill, or other unplanned release, and where the regulated substances are routinely removed within 48 hours of the discovery of the release; provided that such tanks must be inspected for a release no less than once every month;

(5) UST systems which during their entire operational life have exclusively contained only regulated substances at such dilute concentrations that any release would not pose any significant threat to human health and safety or the environment.

(b) Partial exclusions. The following USTs are subject to all provisions of this chapter, except for Subchapter C of this chapter (relating to Technical Standards), Chapter 37, Subchapter I of this title (relating to Financial Assurance for Petroleum Underground Storage Tank Systems), and the certification requirements of §334.8 of this title (relating to Certification for Underground Storage Tanks (USTs) and UST Systems):

(1) any wastewater treatment tank (including oil-water separators), where such tank is not an integral part of a wastewater treatment facility which is either:

(A) permitted under the federal Clean Water Act, either §402 or §307(b), (33 United States Code §1151, et seq.); or

(B) permitted pursuant to the Texas Water Code, Chapter 26;

(2) any UST system that contains radioactive substances, where such system is regulated by the federal Nuclear Regulatory Commission (or its successor) under the provisions of the Atomic Energy Act of 1954 (42 United States Code §2011, et seq.);

(3) any UST system that contains fuel used solely to power an emergency electrical generator system at a nuclear power generation system facility regulated by the federal Nuclear Regulation Commission (or its successor) under the provisions of the Title 10 Code of Federal Regulations, Part 50, Appendix A.

(c) Other exclusion. In addition to the partial exemption for hydraulic lifts covered under §334.3(b) of this title, all other in-ground hydraulic lifts that use a compressed air/hydraulic fluid system and which hold 100 gallons or more of hydraulic oil are similarly excluded from regulation under this chapter, except that such lifts remain subject to the release reporting and corrective action requirements under Subchapter D of this chapter (relating to Release Reporting and Corrective Action).

(d) Upon request by the agency, the owner and operator of a tank claimed to be excluded under this section must provide appropriate documentation or other information in a timely manner to support that claim.

Adopted November 1, 2000 Effective November 23, 2000

§334.5. General Prohibitions for Underground Storage Tanks (USTs) and UST Systems.

(a) Design prohibitions. On or after September 1, 1987, no person may install or have installed an underground storage tank (UST) system for the purpose of storing or otherwise containing regulated substances unless such UST system, whether of single-wall or double-wall construction, meets the following standards.

(1) The UST system must prevent releases due to corrosion or structural failure for the operational life of the UST system.

(2) All components of the UST system must be either cathodically protected against corrosion, constructed of noncorrodible material, constructed of a steel material which has been clad with a noncorrodible material, or must be otherwise designed and constructed in a manner that prevents the release of any stored substances.

(3) The UST system must be constructed of or lined with a material that is compatible with the stored substance.

(b) Delivery prohibitions.

(1) Concerning UST systems which the tank owner or operator must self-certify under §334.8(c) of this title (relating to Certification for Underground Storage Tanks (USTs) and UST Systems):

(A) Except as provided under subparagraphs (B) and (C) of this paragraph, no common carrier (as defined in §334.2 of this title (relating to Definitions)) shall deposit any regulated substance into a UST system regulated under this chapter unless he observes that the owner or operator has a valid, current delivery certificate issued by the agency covering that UST system.

(B) For new or replacement UST systems, only during the initial period ending 90 days after the date that a regulated substance is first deposited into the new or replacement system(s), a common carrier may accept, as adequate to meet the requirements of subsection (a) of this section, documentation that the owner or operator has a "temporary delivery authorization," as defined in §334.8(c)(5)(D) of this title, issued by the agency for the facility at which the new or replacement UST system(s) exist.

(C) The requirement to observe a delivery certificate before delivering to an UST system regulated under §334.8(c)(2) of this title will phase-in according to the same schedule found in that section.

(D) If in the exercise of good faith, a common carrier who deposits a regulated substance into an UST system is first presented with an apparently valid, current TNRCC delivery certificate (or temporary delivery authorization, if applicable) represented by the UST system owner or operator to meet the requirements of subsection (a) of this section, this will be considered prima facia evidence of compliance by that common carrier with this subparagraph.

(2) Concerning UST systems which are not required to be self-certified compliant at a given time under §334.8(c) of this title, but which are required to be registered under §334.7 of this title (e.g. tanks which have not yet "phased-in" to the compliance self-certification program under the schedule in §334.8(c)(2) of this title):

(A) Except as provided under subparagraph (B) of this paragraph, no person (as defined in §334.2 of this title) shall deposit any regulated substance into a UST system regulated under this

chapter unless he observes that the owner or operator has a valid, current registration certificate issued by the agency covering that UST system.

(B) The prohibition referenced in subparagraph (A) of this paragraph is not applicable to deliveries into a new or replacement UST system occurring within 30 days of the first deposit of regulated substances.

(3) Concerning both types of delivery prohibition referenced in this subsection, the following documentation can be accepted as adequate:

(A) the original valid, current document issued by the agency; or

(B) a legible copy of the valid, current document issued by the agency.

Adopted November 1, 2000 Effective November 23, 2000

§334.6. Construction Notification for Underground Storage Tanks (USTs) and UST Systems.

(a) General requirements.

(1) Beginning September 1, 1987, any person who intends either to install a new or replacement underground storage tank (UST), to remove an UST from the ground, or to conduct a permanent abandonment in-place of an UST must comply with the notification requirements of this section prior to initiating such activity.

(2) On or after September 29, 1989, any person who intends to perform any construction activity listed in subsection (b)(1) of this section must comply with the notification requirements of this section prior to initiating such activity.

(3) In addition to the construction notification requirements of this section, the owner or operator of an existing or proposed UST system that is located or will be located in the designated recharge zone or transition zone of the Edwards Aquifer must also secure the requisite approval from the agency prior to conducting certain regulated UST activities, as prescribed under Chapter 213 of this title (relating to Edwards Aquifer).

(4) Any UST construction activity performed or completed pursuant to a notification submitted under the provisions of this section must meet the applicable technical standards and procedural requirements under Subchapter C of this chapter (relating to Technical Standards).

(5) In situations where a proposed UST construction activity is necessitated by a suspected or confirmed release of regulated substances, or where the activity contributes to or causes such a release, the owner or operator must comply with the release reporting, investigation, and corrective action requirements of Subchapter D of this chapter (relating to Release Reporting and Corrective Action).

(6) Construction notifications required under this section may be provided to the agency's central office in Austin or to the agency's appropriate regional office in the area of the activity, unless otherwise specified in this section. The official date of notification must be the date on which the notification is first received in an agency office.

(7) Construction notification required under this section must be provided by the owner or operator, or an authorized agent or representative of the owner or operator (e.g., a contractor or consultant who has contracted for such construction activity). Construction notifications filed by unauthorized persons are null and void.

(b) Notification for major construction activities.

(1) Applicable activities.

(A) For the purposes of this section, a major UST construction activity includes any of the following:

(i) installation of new or previously used tank systems at a new facility, and the addition or replacement of tanks at an existing facility;

(ii) removal of existing tank systems from the ground (either temporarily or permanently);

(iii) permanent abandonment in-place or change-in-service of existing tank systems;

(iv) tank repairs, including interior and exterior relining or recoating;

(v) installation of new or replacement piping for existing tanks;

(vi) addition of secondary containment equipment for new or existing tank or piping systems;

(vii) any tank integrity assessment or other activities requiring the entrance of any persons into a tank; and

(viii) addition or replacement of any of the following items at existing facilities, when such addition or replacement is necessary for compliance with the minimum upgrading requirements in §334.47(b) of this title (relating to Technical Standards for Existing UST Systems):

(I) cathodic protection systems;

(II) release detection systems;

(III) spill and overfill prevention equipment; or

(IV) monitoring well.

(B) The requirements of this section are not applicable to routine and minor maintenance activities related to the tank and piping systems, such as tightening loose fittings and joints, adjusting and calibrating equipment, conducting routine inspections and tests, and the substitution or in-kind replacement of any obsolete or malfunctioning UST system component for any purpose other than required upgrading.

(2) Filing requirements. Except as provided under subsection (c) of this section, any owner or operator who intends to perform a major UST construction activity as described in paragraph (1) of this subsection must file a written notification with the agency at least 30 days prior to initiating the activity.

(A) Such notification should be submitted on the agency's authorized form, as described in paragraph (6) of this subsection.

(B) When requested by the agency, any person who intends to perform a major UST construction activity must also submit additional supporting information to assure that the construction activity is in compliance with the requirements of this chapter. Supporting information which may be requested by the agency includes, but is not limited to, the following items:

(i) detailed design plans and specifications (drawn to scale);

(ii) installation standards and operating instructions for major system components;

(iii) quality assurance plans;

(iv) compatibility data related to the stored substances and the materials of construction;

(v) specific geological, hydrological, and environmental site information;

(vi) qualifications and experience records of consultants, equipment installers, and contractors;

(vii) formal plan or procedures for tank removals, changes-in-service, and abandonments in-place;

(viii) disposal procedures for removed tanks;

(ix) general contingency plan for release abatement and the clean-up and disposal of any residual regulated substances, contaminated soils, or contaminated water (including wash water, groundwater, or surface water); and

(x) basis and description for any proposed change-in-service.

(C) Between 24 and 72 hours prior to the scheduled time of initiation of the proposed activity, the owner or operator must contact the agency's appropriate regional office in the area of the activity to confirm the time of the initiation of the proposed activity. Any revisions to the proposed construction start date must be in accordance with paragraph (3) of this subsection.

(3) Rescheduling. If after the submittal of the initial construction notification, the owner or operator determines that a revision to the previously reported scope or start date for the construction is necessary, the owner or operator must immediately report the revised construction information to the commission's appropriate regional office in the area of the activity.

(A) If an earlier start date is proposed, and if this date is less than 30 days from the original notification date, then the owner or operator must comply with the requirements of paragraph (4) of this subsection.

(B) An owner or operator may revise the proposed construction start to a later date as necessary, provided that the agency's appropriate regional office is notified, and provided that original written notifications are properly renewed upon expiration in accordance with paragraph (5) of this subsection.

(4) Waiver requests. Normally a notification period of at least 30 days is required prior to the initiation of any major UST construction activity. However, if after the submittal of the construction notification, the owner or operator has good cause for an accelerated construction schedule, then the owner or operator may request approval of an earlier construction start date. Such request must be made directly to the agency's appropriate regional office in the area of the activity. The regional director (or the director's designated representative) has the authority to approve or deny such requests, and such decision will be based on the following criteria:

(A) good cause shown by the owner or operator for an earlier construction start date; and

(B) the ability of agency personnel to arrange and schedule an adequate inspection of the activity.

(5) Expiration. A written construction notification for a major UST construction activity is valid for only 180 days after the original notification date or 150 days after the originally anticipated construction start date, whichever is earlier. If the proposed construction has not commenced within this period, the original notification will expire. If the owner or operator still plans to perform the construction after the expiration of this period, a new and updated construction notification form must be filed.

(6) Notification form.

(A) Any person who intends to perform a major UST construction activity (as described in paragraph (1) of this subsection) must provide all the applicable construction notification information indicated on the agency's authorized construction notification form.

(B) The construction notification form must be filled out completely and accurately. Upon completion, the form must be dated and signed by the owner, the operator, or the authorized representative of the owner or operator, and must be timely filed in accordance with subsection (a)(5) of this section.

(c) Alternative notification procedures.

(1) Only for UST construction activities involving situations described under paragraph (2) of this subsection, the owner or operator may comply with the following alternative notification and reporting procedures in lieu of the normal notification requirements of subsection (b) of this section.

(A) The owner or operator must provide verbal or written notification to the agency as soon as possible prior to initiating the construction activity. Such notification must be submitted directly to the agency's appropriate regional office in the area of the activity.

(B) After providing the construction notification prescribed under subparagraph (A) of this paragraph, the owner or operator may proceed with the construction activity, as directed by the regional director (or the regional director's designated representative). The owner or operator must maintain detailed records of the construction. No later than 30 days after completion of the construction, the owner or operator must submit to the agency a detailed report describing the activity. If the agency determines that the information in such report is insufficient to assure compliance with the applicable requirements of this chapter, then the owner or operator may be required to submit additional information to demonstrate such compliance.

(2) The alternative notification procedures of paragraph (1) of this subsection may be used only when the following situations occur:

(A) when an owner or operator of an UST can demonstrate that a release or suspected release of a regulated substance has occurred or is likely to occur as a result of the operation of the UST, when such release is considered an immediate threat to human health or safety or the environment, and when the owner or operator can demonstrate that the expeditious initiation and completion of the proposed construction activity is necessary to prevent or abate such release;

(B) when an out-of-operation UST system is discovered during unrelated construction activities (e.g., the construction of building excavations, streets, highways, utilities, etc.), when the property owner can reasonably demonstrate no prior knowledge of the existence of the tank, when the expeditious removal or abandonment in-place of the tank is considered necessary or advisable for the completion of the unrelated construction activity, and where any delays in completion of the tank removal or abandonment in-place would cause unreasonable financial hardship due to contract schedules and completion times;

(C) when any duly authorized public official (e.g., any federal, state, or local fire or safety officer, health or environmental official, law officer, etc.) orders the immediate removal or repair of all or portions of an UST system which poses an immediate threat to human health, safety, or the environment;

(D) when the activity is necessary to maintain the operational readiness of an emergency generator, as defined by §334.2 of this title (relating to Definitions);

(E) in any other case where the agency determines that compliance with the notification provisions of subsection (b) of this section would be unreasonable or impractical, or could increase the threat to human health or safety or the environment.

Adopted November 1, 2000 Effective November 23, 2000

§334.7. Registration for Underground Storage Tanks (USTs) and UST Systems.

(a) General provisions.

(1) All underground storage tanks (USTs) in existence on or after September 1, 1987, must be registered with the agency on authorized agency forms in accordance with subsection (e) of this section, except for those tanks which:

(A) are completely exempted or partially exempted from regulation under §334.3(a) or (b) of this title (relating to Exemptions for Underground Storage Tanks (USTs) and UST Systems);

(B) are completely excluded or partially excluded from regulation under §334.4(a) or (c) of this title (relating to Exclusions for Underground Storage Tanks (USTs) and UST Systems);

(C) were properly registered with the agency prior to the effective date of this subchapter under the provisions of the federal Solid Waste Disposal Act, §9002 (42 United States Code §6921, et seq.), provided that the owner or operator must submit notice of all changes and additional information in accordance with the provisions of subsection (d) of this section;

(D) have been permanently removed from usage by either:

(i) were permanently removed from the ground before May 8, 1986; or

(ii) remain in the ground, but were emptied, cleaned, and filled with solid inert materials on or before January 1, 1974, in accordance with accepted industry practices in effect at the time the UST was taken out of operation;

(E) were out of operation and empty of regulated substances at the time of their discovery, provided that:

(i) the facility owner and operator can reasonably demonstrate no prior knowledge of the existence of the USTs; and

(ii) the USTs are permanently removed from service in accordance with §334.55 of this title (relating to Permanent Removal from Service) no later than September 29, 1990, or within 60 days of their discovery, whichever is later.

(2) The owner and operator of an UST are responsible for compliance with the tank registration requirements of this section. An owner or operator may designate an authorized representative to complete and submit the required registration information. However, the owner and operator remain responsible for compliance with the provisions of this section by such representatives.

(3) All USTs subject to the registration requirements of this section are also subject to the fee provisions of Subchapter B of this chapter (relating to Underground Storage Tank Fees), except where specifically exempted in this chapter. The failure by a tank owner or operator to properly or timely register any tanks does not exempt the owner from such fee assessment and payment provisions.

(4) Proper completion of the tank registration portions of the UST registration and self-certification form will result in the agency's issuance of a UST registration certificate for the tanks at the facility covered by that registration. This certificate is tied to the delivery prohibitions detailed at §334.5(b)(2) of this title (relating to Certification for Underground Storage Tanks (USTs) and UST Systems.

(b) Existing tanks. Any person who owns an UST that was in existence on September 1, 1987, must register such tank with the agency not later than September 1, 1987, on an authorized agency form, except for those tanks exempted and excluded under subsection (a)(1)(A) - (D) of this section. Upon the effective date of this subsection, the obligation becomes joint and several with the tank operator as well.

(c) New or replacement tanks. Any person who owns a new or replacement UST that is placed into service on or after September 1, 1987, must register the tank with the agency on an authorized agency form within 30 days after the date any regulated substance is placed into the tank, except for those tanks exempted or excluded under subsection (a)(1)(A) - (D) of this section. Upon the effective date of this subsection, the obligation becomes joint and several with the tank operator as well.

(d) Changes or additional information.

(1) The owner or operator of an UST system must provide written notice to the agency of any changes or additional information concerning such system. Types of changes or additional information subject to this requirement must include, but are not limited to, the following:

(A) change in owner or operator, or change in owner or operator information (e.g., authorized representative, mailing address, and/or telephone number), provided that:

(B) change in the operational status of any tank system (e.g., in service, temporarily out of service, removed from the ground, permanently abandoned in-place, change-in-service to

provide for the storage of a substance other than a regulated substance, or change to exempt or excluded status);

(C) change in the type of stored regulated substance;

(D) installation of additional tanks and/or ancillary equipment at an existing facility;

(E) change in the type of piping for an existing tank;

(F) the addition of, or a change in the type of, internal or external corrosion protection for the tanks, piping, and/or ancillary equipment;

(G) the addition of, or a change in the type of, spill and overfill prevention equipment for the tanks;

(H) the addition of, or a change in the type of, release detection equipment or methods for the tanks and/or piping;

(I) change in the location of documents and records for the facility; and

(J) change in financial assurance information related to the facility as specified in Chapter 37, Subchapter I of this title (relating to Financial Assurance for Petroleum Underground Storage Tank Systems).

(2) Notice of any change or additional information must be submitted on an authorized agency form which has been completed in accordance with subsection (e) of this section. The agency's UST facility number for the facility must be included in the appropriate space on the form.

(3) Notice of any change or additional information must be filed with the agency within 30 days from the date of the occurrence of the change or addition, or within 30 days from the date on which the owner or operator first became aware of the change or addition, as applicable.

(4) However, for the initial filing of the UST registration and self-certification form (which is described in §334.8(c)(4) of this title (relating to Certification for Underground Storage Tanks (USTs) and UST Systems)) for all regulated UST systems at a facility, all UST owners and operators must complete the "Tank Identification/Description" section of the UST registration portion of the form by the same deadline given in §334.8(c)(4)(A)(vi) of this title. This requirement does not relieve an owner or operator from any other registration requirements under this section.

(e) Required form for providing UST registration information.

(1) Any UST owner or operator required to submit UST registration information under subsections (a) - (d) of this section must provide all the information indicated on the agency's authorized

form for each regulated UST. The UST registration information must be provided on the appropriate agency form, as specified in paragraph (6) of this subsection.

(2) The UST registration portion of the form must be filled out completely and accurately. Upon completion, the form must be dated and signed by the owner, or the operator, or an authorized representative of the owner or operator, and must be filed with the agency within the specified time frames.

(3) All UST owners or operators required to submit UST registration information under subsections (a) - (d) of this section must provide the registration information for all USTs located at a particular facility on the same form.

(4) UST owners or operators who own or operate USTs located at more than one facility must complete and file a separate form for each facility where regulated USTs are located.

(5) If additional information, drawings, or other documents are submitted with new or revised registration data, specific facility identification information (including the facility identification number, if known) must be conspicuously indicated on each document and all such documents must be attached to and filed with the form.

(6) For any UST registration information filed with the agency on or after the effective date of this paragraph, UST owners and operators must provide the required information on an authorized agency UST registration and self-certification form, as prescribed by §334.8(c)(3) of this title.

(7) Owners and operators of petroleum UST systems should also see the financial assurance requirements in Chapter 37, Subchapter I, §37.870(b) of this title.

(f) Inadequate information. When any of the required UST registration information submitted to the agency is determined to be inaccurate, unclear, illegible, incomplete, or otherwise inadequate, the agency may require the owner and/or operator to submit additional information. An owner or operator must submit any such required additional information within 30 days of receipt of such request.

Adopted November 1, 2000 Effective November 23, 2000

§334.8. Certification for Underground Storage Tanks (USTs) and UST Systems.

(a) Underground storage tank (UST) construction activity certifications. The following UST construction activity certifications are required.

(1) Certification by installer or on-site supervisor. After September 29, 1989, any installer who is employed or otherwise engaged by an UST owner or operator to install or replace an UST system must also certify by signature that the installation methods are in compliance with §334.46 of this title (related to Installation Standards for New UST Systems).

(2) Filing requirements. The installation or construction certification information required under paragraph (1) of this subsection must be included in the appropriate sections of the agency's authorized UST registration form or UST registration and self-certification form, as applicable, in accordance with §334.7(e) of this title (relating to Registration for Underground Storage Tanks (USTs) and UST Systems), and must be filed with the agency in accordance with the applicable tank registration time limits prescribed under §334.7 of this title.

(b) Financial assurance certification for USTs storing a petroleum substance. Owners and operators of UST systems regulated under this section must comply with the requirements of subsection (c) of this section.

(c) UST compliance self-certification requirements.

(1) Applicability. Except as provided in this paragraph, the requirements of this subsection are applicable to the owners and operators of USTs regulated under this chapter.

(A) The requirements of this subsection are not applicable to the following USTs:

(i) USTs which are completely exempt or partially exempt from regulation under §334.3 of this title (relating to Exemptions for Underground Storage Tanks (USTs) and UST Systems); and

(ii) USTs which are completely excluded or partially excluded from regulation under §334.4 of this title (relating to Exclusions for Underground Storage Tanks (USTs) and UST Systems);

(iii) USTs into which deliveries or deposits of regulated substances are exclusively made by persons other than a common carrier, as defined in §334.2 of this title (relating to Definitions).

(B) The agency will not provide an UST delivery certificate for USTs covered by the exceptions in subparagraph (A) of this paragraph.

(2) Phase-in schedule for all regulated substance UST systems except motor fuel (as defined in §334.2 of this title) UST systems.

(A) For these UST systems, the self-certification requirements of this subsection will become effective two years after the effective date of this subsection.

(B) Nothing in this subsection affects the requirements under §334.7(d)(4) of this title.

(3) Conditions and limitations.

(A) Filing of the UST registration and self-certification form does not relieve an owner or operator from the responsibility for timely compliance with other applicable filing requirements under this chapter.

(B) Completion of the UST registration and self-certificaton form in a manner that indicates compliance with applicable UST regulations (as specified in subparagraph (D) of this paragraph) will result in the agency's issuance of an UST delivery certificate for the tanks at the facility for which compliance is self-certified.

(C) The agency's issuance of a delivery certificate for an UST(s) does not constitute agency certification or affirmation of the compliance status of the tank(s) in question with agency UST technical and/or administrative requirements, and this issuance does not preclude the agency from investigating these tanks and pursuing enforcement actions under the Texas Water Code when apparent violations are discovered.

(D) The administrative requirements and technical standards that are the subject of the compliance self-certification shall include:

(i) tank registration, as described in §334.7 of this title;

(ii) facility fees, as described in Subchapter B of this chapter (relating to Underground Storage Tank Fees);

(iii) financial assurance, as described in Chapter 37, Subchapter I of this title; and

(iv) technical standards, as described in §334.49 of this title (relating to Corrosion Protection), §334.50 of this title (relating to Release Detection), §334.51 of this title (relating to Spill and Overfill Prevention and Control), and §334.43 of this title (relating to Variances and Alternative Procedures) when a variance to all or part of one or more of the previous three sections has been granted by the agency in writing under the procedures described in §334.43 of this title (for the purposes of this clause only, certifying to the "technical standards" listed in this subparagraph includes a certification as to recordkeeping and reporting duties required under those regulations for only the 60 days prior to and including the date of certification).

(4) UST registration and self-certification form.

(A) Requirements for completion of the form.

(i) Each UST registration and self-certification form must be completed with all the applicable information requested on the agency's authorized form for all regulated UST systems at the specified facility.

(ii) Owners or operators who own or operate regulated USTs at more than one facility must complete and file a separate UST registration and self-certification form for each facility.

(iii) The agency will not issue a delivery certificate based upon an incomplete submittal.

(iv) Upon completion, the UST registration and self-certification form must be dated and signed by either the UST owner (or the owner's legally authorized representative) or by the UST operator (or the operator's legally authorized representative).

(v) If additional information, drawings, or other documents are submitted with the UST registration and self-certification form, specific facility identification information (including the facility identification number) must be conspicuously indicated on each document and all these documents must be securely attached to and filed with the UST registration and self-certification form.

(vi) To ensure timely initial issuance by the agency of the UST delivery certificate, an owner or operator must submit the required UST registration and self-certification form (including any additional or supplemental information required under clause (v) of this subparagraph) to the agency no later than the following dates:

(I) For UST systems where the first storage of regulated substances was initiated before the effective date of this clause, the deadline for submission is 60 days after the effective date of this section.

(II) For UST systems where the date of the first storage of regulated substances was on or after the effective date of this section, the deadline for submission is no later than 30 days after the date of initial storage of regulated substances.

(vii) To ensure timely renewal of a previously issued UST delivery certificate, the deadline for submission is 30 days before the annual renewal date for the UST delivery certificate for that specific facility, as indicated in paragraph (5)(B)(iii) of this subsection.

(B) The facility owner and operator are both responsible for ensuring that the UST registration and self-certification form is fully and accurately completed, and that it is submitted to the agency in a timely manner. To minimize processing delays, the form should be mailed directly to the specific agency office, department, and mail code shown on the form.

(C) When tank ownership at a facility changes, a new certification under this subsection must be made within 30 days of the ownership change.

(5) UST delivery certificate.

(A) Certificate availability.

(i) The owner and operator of USTs regulated under this section must make available to a common carrier a valid, current Texas Natural Resource Conservation Commission (TNRCC) delivery certificate (or TNRCC temporary delivery authorization under subparagraph (D) of this paragraph, as applicable) before delivery of a regulated substance into the UST(s) can be accepted. The delivery certificate must cover each UST at the facility accepting a delivery. The bill of lading for the first delivery of regulated substance into any new or replacement UST at the facility must be attached to the temporary delivery authorization for that facility.

(ii) The owner and operator of USTs regulated under this section must make immediately available, upon request by agency staff, a valid, current TNRCC delivery certificate (or TNRCC temporary delivery authorization under subparagraph (D) of this paragraph, as applicable) for the USTs at a facility.

(iii) The owner and operator of USTs regulated under this section must ensure that a valid, current TNRCC delivery certificate (or TNRCC temporary delivery authorization under subparagraph (D) of this paragraph, as applicable) is posted at a facility. The posting must be in a location where the document is clearly visible at all times.

(B) Annual delivery certificate renewal.

(i) The initial delivery certificate issued for a tank(s) will be valid until the expiration date indicated on that certificate. The expiration will be based on the last digit of the official TNRCC owner identification number for the registered owner of the tank(s) in question, as described in clause (ii) of this subparagraph. It is the responsibility of the tank owner and operator to ensure that an application for renewal of that certificate is properly and timely filed.

(ii) A delivery certificate is renewed by timely and proper submission of a new UST registration and self-certification form to the agency. For each facility, to allow time for processing of the renewal request, the agency must have received the properly completed form at least 30 days before the expiration date of the delivery certificate in question. The agency will not issue a renewed delivery certificate based on improper submission of renewal documents.

(iii) Annual expiration and renewal dates for delivery certificates are determined by the last digit of the official TNRCC owner identification number for the registered owner of the tank(s) in question, and the first renewal for all owners and operators is due in calendar year 2002, and for each year thereafter on the dates indicated below:

(I) If owner number ends in "1" delivery certificate expires on January 31, and renewal is due February 1;

(II) If owner number ends in "2" delivery certificate expires on the last day of February, and renewal is due March 1;

(III) If owner number ends in "3" delivery certificate expires on March 31, and renewal is due April 1;

(IV) If owner number ends in "4" delivery certificate expires April 30, and renewal is due May 1;

(V) If owner number ends in "5" delivery certificate expires on May 31, and renewal is due June 1;

(VI) If owner number ends in "6" delivery certificate expires on June 30, and renewal is due July 1;

(VII) If owner number ends in "7" delivery certificate expires July 31, and renewal is due August 1;

(VIII) If owner number ends in "8" delivery certificate expires August 31, and renewal is due September 1;

(IX) If owner number ends in "9" delivery certificate expires September 30, and renewal is due October 1; and

(X) If owner number ends in "0" delivery certificate expires October 31, and renewal is due November 1.

(C) Identifying tanks. Within 30 days of the effective date of this section, the owner and operator of USTs regulated under this section are responsible for ensuring that a legible tag, label, or marking is permanently applied upon or affixed to either the top of the fill tube or to a nonremovable point in the immediate area of the fill tube for each regulated UST at the facility. That tag, label, or marking must clearly and legibly show the designated UST identification number of that UST at that facility and that identification number must be identical to the UST identification number listed on the UST registration and self-certification form filed with the agency under this subsection. All UST identification numbers at a given facility must be numeric, must begin with the number one (1) and must proceed sequentially without skipping numbers (i.e.: 1, 2, 3...). In addition, for each compartmented UST where a single UST has a separate fill tube for each internal compartment; the numeric UST identification number must be the same for each fill tube serving that single UST, however, to allow differentiation between compartments on the UST registration and self-certification form and at the facility, that common UST identification number must also be followed by a single additional alphabetic identifier for each compartment, beginning with the letter "A" and proceeding sequentially without skipping letters (i.e.: 1A, 1B, 1C...).

(D) Temporary delivery authorization.

(i) Upon receipt of a TNRCC construction notification form indicating the pending installation of a new or replacement UST system(s), the agency will issue a temporary delivery authorization for those tank systems.

(ii) The temporary delivery authorization is valid for no more than 90 days after the first delivery of regulated substance into the new or replacement UST system.

(iii) The UST owner and operator are responsible for maintaining complete and accurate records of the date of the first deposit of regulated substances into a new or replacement UST(s), as well as the date that the initial 90 day period expires. The bill of lading for the first delivery of regulated substance into any new or replacement UST at the facility must be attached to the temporary delivery authorization for that facility.

(6) Revocation of Delivery Certificate.

(A) Grounds for revocation of delivery certificate. The commission may revoke a delivery certificate for reasons including, but not limited to:

(i) when the executive director determines that any of the information contained or referenced in the compliance self-certification portions of the UST registration and self-certification form was inaccurate at the time the self-certification was made;

(ii) when the tank owner and/or operator submits compliance self-certification information to the executive director which he knows or reasonably should have known to be false or deceptive; and

(iii) for any other reason which the commission finds to constitute good cause for revocation.

(B) Procedures for revocation of delivery certificate.

(i) A proceeding to revoke a delivery certificate must be commenced by:

(I) the executive director through the filing of a petition; or

(II) the commission on its own motion.

(ii) If the executive director determines good cause exists to revoke a delivery certificate, the executive director shall file a petition with the chief clerk and provide notice to the owner and operator of the tank(s) in question. To the extent possible, the procedures required to assess administrative penalties under Chapter 70 of this title (relating to Enforcement) shall be followed to revoke a delivery certificate under this subchapter.

(iii) In response to a petition, or on its own motion to revoke a delivery certificate, the commission may:

(I) revoke a certificate; and

(II) issue any other orders permitted by law.

(iv) Revocation of a delivery certificate is cumulative of any other remedies available to the agency by law.

Adopted November 1, 2000 Effective November 23, 2000

§334.9. Seller's Disclosure.

Effective on and after the effective date of this subchapter, any person who sells or otherwise legally conveys a tank (or tank system) which is designed or intended to be installed as an underground storage tank (UST) must provide the purchaser (or grantee) with written notification of a tank owner's obligations relative to the agency's tank registration, compliance self-certification, and construction notification provisions under §334.7 of this title (relating to Registration for Underground Storage Tanks (USTs) and UST Systems); §334.8 of this title (relating to Certification for Underground Storage Tanks (USTs) and UST Systems); and §334.6 of this title (relating to Construction Notification for Underground Storage Tanks (USTs) and UST Systems).

(1) The written notification must include the names and addresses of the seller (or grantor) and the purchaser (or grantee), the number of tanks involved, a description of each tank (capacity, tank material, and product stored, if applicable), and the agency's designated facility identification number (if the entire facility is being conveyed).

(2) This notification requirement applies to any transfers or conveyances of a new or used tank from one person to another person, and also applies to the sales of real property where USTs are located.

(3) The written notification must be provided by the seller (or grantor) to the purchaser (or grantee) prior to the conveyance of the tanks, or prior to the time of the real property closing, as applicable.

(4) For the purpose of fulfilling the disclosure requirements of this section, the following language (together with the information in paragraph (1) of this section) is deemed sufficient: "The underground storage tank(s) which are included in this conveyance are presumed to be regulated by the Texas Natural Resource Conservation Commission and may be subject to certain registration, compliance self-certification, and construction notification requirements found in Title 30 Texas Administrative Code, Chapter 334."

Adopted November 1, 2000 Effective November 23, 2000

§334.10. Reporting and Recordkeeping.

(a) Reporting. Owners and operators of underground storage tank (UST) systems must assure that all reporting and filing requirements in this chapter are met, including the following (as applicable):

(1) construction notification, in accordance with §334.6 of this title (relating to Construction Notification for Underground Storage Tanks (USTs) and UST Systems);

(2) application for approval of any proposed UST system in the Edwards Aquifer recharge or transition zones, in accordance with §334.6(a)(2) of this title and Chapter 213 of this title (relating to Edwards Aquifer);

(3) registration of UST systems and changes in information, in accordance with §334.7 of this title (relating to Registration for Underground Storage Tanks (USTs) and UST Systems);

(4) certification of construction activities, financial assurance, and compliance self-certification in accordance with §334.8 of this title (relating to Certification for Underground Storage Tanks (USTs) and UST Systems);

(5) request for approval of any variance or alternative procedure, in accordance with §334.43 of this title (relating to Variances and Alternative Procedures);

(6) request for extension of time for an UST system that is temporarily out of service, in accordance with §334.54 of this title (relating to Temporary Removal from Service);

(7) documentation of release determination or site assessment conducted when a UST system is permanently removed from service, in accordance with §334.55(a)(6) of this title (relating to Permanent Removal from Service);

(8) payment of underground storage tank fees, in accordance with Subchapter B of this chapter (relating to Underground Storage Tank Fees);

(9) reports, plans, and certifications related to suspected and confirmed releases of regulated substances, including:

(A) release reports and notifications, in accordance with §334.72 of this title (relating to Reporting of Suspected Releases), §334.75 of this title (relating to Reporting and Cleanup of Surface Spills and Overfills), and §334.76 of this title (relating to Initial Response to Releases);

(B) report and certification of site check methods, in accordance with §334.74(c) of this title (relating to Release Investigation and Confirmation Steps);

(C) initial abatement report, in accordance with §334.77(b) of this title (relating to Initial Abatement Measures and Site Check);

(D) initial site assessment report, in accordance with §334.78(b) of this title (relating to Site Assessment);

(E) non-aqueous phase liquid removal report, in accordance with §334.79(d) of this title (relating to Removal of Non-Aqueous Phase Liquids);

(F) soil and groundwater contamination information, in accordance with §334.80(b) of this title (relating to Investigation for Soil and Groundwater Cleanup);

(G) corrective action plan, in accordance with §334.81 of this title (relating to Corrective Action Plan);

(H) notification of cleanup initiation, in accordance with §334.81(e) of this title;

(I) certification of compliance with corrective action plan, in accordance with §334.81(g) of this title; and

(J) public notices related to corrective action plans, in accordance with §334.82(b) of this title (relating to Public Participation);

(10) notifications and reports relating to financial assurance requirements, in accordance with Chapter 37, Subchapter I of this title (relating to Financial Assurance for Petroleum Underground Storage Tank Systems; and

(11) any other reports, filings, notifications, or other submittals required by this chapter, or otherwise required by the agency to demonstrate compliance with the provisions of this chapter.

(b) Recordkeeping.

(1) General recordkeeping requirements.

(A) Owners and operators of UST systems are responsible for developing and maintaining all records required by the provisions of this chapter.

(B) Except as provided in subparagraphs (C) and (D) of this paragraph, legible copies of all required records pertaining to an UST system must be maintained in a secure location on the premises of the UST facility, must be immediately accessible for reference and use by the UST system operator, and must be immediately available for inspection upon request by agency personnel.

(C) Except as provided in clause (v) of this subparagraph, in the event that copies of the required records cannot reasonably be maintained on the premises of the UST facility, then such records may be maintained at a readily accessible alternate site, provided that the following conditions are met.

(i) If the UST system is in operation, the records must be readily accessible for reference and use by the UST system operator.

(ii) The records must be readily accessible and available for inspection upon request by agency personnel.

(iii) The owner or operator must provide the following information (in writing) to the agency's central office and to the agency's appropriate regional office:

(I) the specific location where the required records are maintained; and

(II) the name, address, and telephone number of the authorized custodian of such records.

(iv) The filing of the written information required in clause (iii) of this subparagraph must be accomplished no later than October 29, 1989, 30 days after an UST installation or replacement has been completed, or 30 days after the UST records are moved to an alternate site, whichever is later or applicable, as provided in §334.7(d) of this title.

(v) The conditional authorization otherwise allowed under this subparagraph for records maintenance at an alternative, off-premises location is not applicable to the UST delivery certificate (or temporary delivery authorization, if applicable) issued by the agency under §334.8(c) of this title. This UST delivery certificate must be maintained on the premises of all facilities with regulated USTs, must be posted by the UST system operator and visible to the person(s) performing deliveries to the UST system.

(D) For UST systems which have been permanently removed from service in accordance with the applicable provisions of §334.55 of this title (relating to Permanent Removal from Service), the facility owner may submit the appropriate records required by this chapter to the agency in lieu of maintaining the records on the premises or at an alternative site, provided that the following conditions are met:

(i) the facility is no longer operated in a manner that requires the underground storage of regulated substances, and all UST systems at the facility have been permanently removed from service;

(ii) the facility owner must provide written justification adequate to explain why such records cannot be maintained on the premises of the UST facility or at a readily accessible alternative site; and

(iii) the records must be submitted at one time in one package for each UST facility, and the records must be appropriately labeled with the UST facility location information and the UST facility identification number.

(2) Required records and documents. Owners and operators of UST systems must assure that all recordkeeping requirements in this chapter are met, including the following records and documentation (as applicable).

(A) Legible copies of the following general records must be maintained for the operational life of the UST system:

(i) original and amended registration documents, in accordance with §334.7 of this title;

(ii) original and amended certifications for UST installations and financial assurance, in accordance with §334.8 of this title;

(iii) notification to UST purchaser, in accordance with §334.9 of this title (relating to Seller's Disclosure).

(B) Legible copies of applicable records and documents related to technical standards for UST systems must be maintained in accordance with the following provisions:

(i) application documents and the agency's approval letter for any variances or alternative procedures, in accordance with §334.43 of this title;

(ii) records demonstrating compliance with technical standards and installation standards for new UST systems, in accordance with §334.45(f) of this title (relating to Technical Standards for New UST Systems) and §334.46(i) of this title (relating to Installation Standards for New UST Systems);

(iii) records demonstrating compliance with the minimum upgrading requirements for existing UST systems, in accordance with §334.47(d) of this title (relating to Technical Standards for Existing UST Systems);

(iv) operation and maintenance records, in accordance with §334.48(g) of this title (relating to General Operating and Management Requirements);

(v) corrosion protection records, in accordance with §334.49(e) of this title (relating to Corrosion Protection);

(vi) release detection records, in accordance with §334.50(e) of this title (relating to Release Detection);

(vii) spill and overfill control records, in accordance with §334.51(c) of this title (relating to Spill and Overfill Prevention and Control);

(viii) records for repairs and relining of a UST system, in accordance with §334.52(d) of this title (relating to UST System Repairs and Relining);

(ix) records for reuse of used tanks, in accordance with §334.53(c) of this title (relating to Reuse of Used Tanks);

(x) records for temporary removal of UST systems from service, in accordance with §334.54(f)(4) of this title;

(xi) records for permanent removal of UST systems from service, in accordance with §334.55(f) of this title.

(C) Legible copies of all required financial assurance records must be maintained in accordance with the applicable provisions of Chapter 37, Subchapter I of this title.

(D) Legible copies of previous and current registration and self-certification forms required to be filed annually with the agency under §334.8(c) of this title, as well as UST delivery certificates, must be maintained for at least five years from the original date of submittal.

Adopted November 1, 2000 Effective November 23, 2000

§334.12. Other General Provisions.

(a) Other regulations.

(1) Except as provided in paragraph (2) of this subsection, compliance with the provisions of this chapter by an owner or operator of an underground storage tank (UST) system or aboveground storage tank (AST) system does not relieve such owner or operator from the responsibility of compliance with any other regulations directly and/or indirectly affecting such tanks and the stored regulated substances, including, but not necessarily limited to, all applicable regulations legally promulgated by the United States Environmental Protection Agency, United States Occupational Safety and Health Administration, United States Department of Transportation, United States Nuclear Regulatory Commission, United States Department of Energy, Texas Department of Health, State Board of Insurance, Texas Commission on Fire Protection, Railroad Commission of Texas, Texas

Department of Agriculture, State Comptroller, Texas Department of Public Safety, Texas Natural Resource Conservation Commission, and any other federal, state, and local governmental agencies or entities having appropriate jurisdiction.

(2) As provided in the Texas Water Code (TWC), §26.359, this chapter establishes a unified statewide program for underground and surface water protection, and any local regulation or ordinance is effective only to the extent the regulation or ordinance does not conflict with the standards adopted for the design, construction, installation, or operation of USTs under this chapter.

(b) Owner and operator responsibility.

(1) Owners and operators are responsible for any violations or noncompliant activities resulting from the actions or inactions by any installer, contractor, operator, or other person who is employed or otherwise engaged by an owner or operator of an UST or AST.

(2) The commission shall consider the person who is in day-to-day control of a petroleum storage tank system at a site that is in violation of applicable statute or agency regulations to be the:

(A) person primarily responsible for taking corrective action, for corrective action costs, for receiving a notice of violation, or for paying a penalty assessed; and

(B) primary subject of an enforcement action or order.

(3) The liability of certain taxing units as owners or operators of USTs and ASTs is conditionally and specifically limited, in accordance with the provisions and conditions of TWC, §26.3516 (relating to Limits on Liability of Taxing Units).

(4) The liability of certain lenders as owners or operators of USTs and ASTs is conditionally and specifically limited, in accordance with the provisions and conditions of TWC, §26.3514 (relating to Limits on Liability of Lender).

(5) The liability of certain corporate fiduciaries as owners or operators of USTs and ASTs is conditionally and specifically limited, in accordance with the provisions and conditions of TWC, §26.3515 (related to Limits on Liability of Corporate Fiduciary).

(c) Inspections, monitoring, and testing.

(1) For the purposes of developing or assisting in the development of any regulation, conducting any study, or enforcing this chapter, an owner and/or operator of an UST or AST, on the request of the agency, must:

(A) furnish information relating to the tank, including tank equipment and contents; and

(B) permit a designated agent or employee of the agency at all reasonable times to have access to and to copy all records relating to the tanks.

(2) For the purposes of developing or assisting in the development of a regulation, conducting a study, or enforcing the provisions of this chapter, the agency's designated agent, or employee may:

(A) enter at reasonable times an establishment or place in which an UST or AST is located;

(B) inspect and obtain samples of a regulated substance contained in the tank from any person; and

(C) conduct monitoring or testing of the tanks, associated equipment, contents, or surrounding soils, air, surface water, or groundwater.

(3) The agency may order an owner or operator of an UST or AST to conduct monitoring and testing if the agency determines that there is reasonable cause to believe that a release has occurred in the area in which the UST or AST is located.

Adopted November 1, 2000 Effective November 23, 2000

§334.14. Memorandum of Understanding Between the Attorney General of Texas and the Texas Natural Resource Conservation Commission.

(a) Applicability. This MOU applies to civil enforcement proceedings and complaints filed on storage tanks subject to this chapter. Pursuant to the Texas Water Code, §5.104, the Texas Natural Resource Conservation Commission adopts a MOU between the Texas Natural Resource Conservation Commission (TNRCC) and the Attorney General of Texas. The MOU contains the TNRCC's and the Attorney General's interpretation concerning intervention in the civil enforcement process under the Texas Water Code. This section applies as follows.

(1) The Texas Water Commission (now the Texas Natural Resource Conservation Commission, TNRCC) was designated as the state agency for the regulation of underground storage tanks by enactment of Senate Bill 779 of the 70th Texas Legislature, 1987.

(2) The Texas Water Code authorizes the Texas Natural Resource Conservation Commission to have instituted civil suits for injunctive relief and the assessment and recovery of a civil penalty, whenever it appears that a person has violated, or is violating or threatening to violate, any provision of the Texas Water Code, or of any rule, permit, or other order of the Texas Natural Resource Conservation Commission.

(3) The Texas Water Code provides that at the request of the executive director of the Texas Natural Resource Conservation Commission, the Attorney General of Texas shall institute and conduct a suit in the name of the State of Texas for injunctive relief or to recover a civil penalty, or for both injunctive relief and penalty.

(4) Federal regulations promulgated by the United States Environmental Protection Agency pursuant to the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976, Subtitle I, require that any state agency administering the Underground Storage Tank Program authorized under that act provide for public participation in the state enforcement process.

(5) All citizen complaints filed, either orally or in writing, that relate to underground storage tanks will be investigated timely and thoroughly by the Texas Natural Resource Conservation Commission. Citizen complaint responses will be first initiated by attempting to establish telephone contact with the complainant within 48 hours of receipt of the complaint, and concurrently beginning whatever records review is necessary. Upon completion of the investigation, the complainant will be informed in writing of the results. In addition, the complainant will be apprised of the ultimate resolution of the problem. The executive director of the Texas Natural Resource Conservation Commission shall keep a complaint file in accordance with §337.4 of this title (relating to Enforcement).

(6) Notice of proposed settlements of civil enforcement actions that relate to underground storage tanks will be published by the attorney general of Texas in the Texas Register (except where immediate action is necessary to adequately protect human health and the environment) and that opportunity will be provided for the public to comment on such proposed settlements.

(7) Nothing in this agreement shall be construed to limit or impair the attorney general's right to control and direct litigation on behalf of the state.

(8) The attorney general will not oppose intervention where permissive intervention may be authorized by statute, rule, or regulation into any civil suit involving the State of Texas relating to violations of the Underground Storage Tank Program by any citizen having an interest which is or may be adversely affected.

(9) The attorney general, on behalf of the State of Texas, will consent to a proposed judgment in an action to enjoin violations of the Underground Storage Tank Program only after the publication of notice which provides at least 30 days for public comment on the proposed judgment prior to its entry by the court, provided that the attorney general may permit an exception to the 30-day comment period if a settlement or judgment is required to avoid delays that would adversely affect public health or the environment.

(b) Execution by all signatories. After execution by all signatories, this agreement shall remain in effect until rescinded by formal action of either agency.

(c) Effective date. The effective date of the memorandum of understanding is the effective date of this rule adoption.

§334.15. Limits on Liability of Lender.

(a) A lender, as defined in §334.2 of this title (relating to Definitions), is not liable as an owner or operator under this chapter solely because the lender holds indicia of ownership to protect a security or lienhold interest in property. A lender is not liable under this subsection if:

(1) such lender has a security interest in a personal property or in a fixture that is not attached to the real estate or a lienhold interest on the real estate or fixture that is attached to the real estate as security for a loan to finance the acquisition or development of property, to finance the removal, repair, replacement, or upgrading of a regulated tank, or to finance the performance of corrective action in response to a release of a regulated substance from a tank, and the security or lienhold interest is in:

(A) an underground storage tank (UST) or aboveground storage tank (AST);

(B) real property on which an UST or AST is located; or

(C) in any other personal property attached to or located on property on which an UST or AST is located; or

(2) the real or personal property described in paragraph (1)(A) - (C) of this subsection constitutes collateral for a commercial loan.

(b) A lender that exercises control over property described under subsection (a) of this section before foreclosure to preserve the collateral or to retain revenues from the property for the payment of debt, or that otherwise exercises the control of a mortgagee in possession, is not liable as an owner or operator under this chapter unless that control leads to action that the executive director finds is causing or exacerbating contamination associated with the release of a regulated substance from a tank located on the property.

(c) A lender that has a bona fide security or lienhold interest in any real or personal property as described under subsection (a) of this section and that forecloses on or receives an assignment or deed in lieu of foreclosure and becomes the owner of that real or personal property is not liable as an owner or operator under this chapter if the lender:

(1) permanently removes from service any USTs or ASTs on the property. A tank is permanently removed from service when the actions defined in §334.55(b) of this title (relating to Permanent Removal from Service) have been properly completed;

(2) undertakes, and with due diligence in a timely and persistent manner completes, corrective action in response to any release from those tanks. A lender acts with due diligence when the lender executes the corrective action in conformance with Subchapter D of this title (relating to Release Reporting and Corrective Action), or as otherwise directed by the executive director; and

(3) performs the removal and corrective action in accordance with all applicable commission rules.

(d) A lender acting under subsection (c) of this section must begin removal of the tank from service or corrective action within 90 days after the date on which the lender becomes the owner of the property.

(e) A lender described by subsection (a) of this section which forecloses on or receives an assignment or deed in lieu of foreclosure on real or personal property described in subsection (a) of this section is not liable as an owner or operator under this chapter because the lender sells, releases, liquidates, or winds up operations and takes measures to preserve, protect, or prepare a secured AST or UST before sale or other disposition of the storage tank or the property if the lender:

(1) did not participate in the management of an AST or UST or real or personal property described by subsection (a) of this section before foreclosure or its equivalent on the storage tank or the property; and

(2) establishes, as provided by subsection (f) of this section, that the ownership indicia maintained after foreclosure continue to be held primarily to protect a security interest.

(f) A lender may establish that the ownership indicia maintained after foreclosure continues to be held primarily to protect a security interest if, within 12 months after foreclosure, the lender:

(1) lists the AST or UST, or the facility or property on which the tank is located, with a broker, dealer, or agent who deals in that type of property; or

(2) advertises the AST or UST for sale or other disposition, at least monthly, in:

(A) a real estate publication;

(B) a trade or other publication appropriate for the AST or UST being advertised; or

(C) a newspaper of general circulation in the area in which the AST or UST is located.

(g) For purposes of subsections (f) and (h) of this section the 12-month period begins:

(1) when the lender acquires good and indefeasible title, if the lender, after the expiration of any redemption period or other waiting period required by law, was acting diligently to acquire such title; or

(2) on the date of foreclosure or its equivalent, if the lender does not act diligently to acquire good and indefeasible title.

(h) A lender that meets the conditions of subsection (f) nonetheless becomes liable as owner and/or operator at the end of the 12-month period, or when the lender no longer holds ownership indicia primarily to protect its security interest, whichever occurs first. If a lender outbids, rejects, or does not act on an offer of fair consideration for the AST or UST or the facility or property on which the storage tank is located, it is presumed that the lender is not holding the ownership indicia primarily to protect the security interest unless the lender is required, in order to avoid liability under federal or state law, to make the higher bid, obtain the higher offer, or seek or obtain an offer in a different manner.

Adopted November 1, 2000 Effective November 23, 2000

§334.16. Limits on Liability of Corporate Fiduciary.

(a) A corporate fiduciary or its agent(s) is not liable in an individual capacity as an owner or operator under this chapter solely because:

(1) the corporate fiduciary or its agent has legal title to real or personal property for purposes of administering a trust or estate of which the property is a part; or

(2) the corporate fiduciary or its agent does not have legal title to the real or personal property but operates or manages the property under the terms of an estate or trust of which the property is a part.

(b) Subsection (a) of this section does not relieve a trust, estate, or beneficiary of any liability the trust, estate, or beneficiary may have as an owner or operator under this chapter.

Adopted October 11, 1995 Effective November 8, 1995

§334.17. Privatization of Storage Tank Program.

The commission may retain agents for the performance of services related to the duties and administrative tasks of this chapter. The agent(s) will act under the direction of the executive director.

Adopted November 1, 2000 Effective November 23, 2000

§334.18. Limits on Liability of Taxing Unit.

(a) Authorization and applicability. The provisions of this section are authorized by Texas Water Code, §26.3516 (relating to Limits on Liability of Taxing Units), and apply only to taxing units as defined in the Property Tax Code, §1.04(12) that:

(1) This section applies to a taxing unit that has foreclosed an ad valorem tax lien on real property on which an underground storage tank (UST) or aboveground storage tank (AST) is located, or on any other personal property attached to or located on property on which a UST or AST is located, as security for payment of ad valorem taxes.

(2) A taxing unit is not liable as an owner or operator under this chapter solely because the taxing unit holds indicia of ownership because of a tax foreclosure sale under the Tax Code.

(b) Removal from service and corrective action requirements. If after foreclosure of an ad valorem tax lien on real property on which an AST or an UST is located, a taxing unit performs or causes to be performed any UST or AST removal from service or corrective action activities, then the taxing unit must perform corrective action in accordance with the standards and procedures outlined in Subchapter D of this chapter (relating to Release Reporting and Corrective Action).

(c) Limits on liability of a taxing unit.

(1) A taxing unit is not liable as an owner or operator under this chapter solely because the taxing unit sells, releases, liquidates, or winds up operations and takes measures to preserve, protect, or prepare the secured AST or the secured UST before the sale or other disposition of either the storage tank, the real property on which the storage tank is located, or any other personal property attached to or located on the real property on which the storage tank is located, provided that the taxing unit:

(A) did not participate in the management of either the AST or UST, the real property on which this storage tank is located, or any other personal property attached to or located on the real property on which the storage tank is located, before the foreclosure of, or an equivalent action on, either the storage tank or the real or personal property; and

(B) establishes, as provided by paragraph (2) of this subsection, that the ownership indicia maintained after foreclosure continue to be held primarily to protect a payment of ad valorem taxes.

(2) A taxing unit may establish that the ownership indicia maintained after foreclosure continue to be held primarily to protect the payment of ad valorem taxes if the taxing unit either:

(A) lists the AST, UST, or the facility or real property on which the storage tank is located, with broker, dealer, or agent who deals in that type of property; or

(B) advertises the AST or UST for sale or other disposition in either:

(i) a real estate publication;

(ii) a trade or other publication appropriate for the AST or UST being advertised; or

(iii) a newspaper of general circulation in the area in which the AST or UST is located.

SUBCHAPTER B: HAZARDOUS WASTE MANAGEMENT GENERAL PROVISIONS
§§335.41, 335.43 - 335.47
Effective April 12, 2001

§335.41. Purpose, Scope and Applicability.

(a) The purpose of this chapter is to implement a state hazardous waste program which controls from point of generation to ultimate disposal those wastes which have been identified by the administrator of the United States Environmental Protection Agency (EPA) in 40 Code of Federal Regulations (CFR) Part 261.

(b) Subchapter E of this chapter (relating to Interim Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities) and Subchapter F of this chapter (relating to Permitting Standards for Owners and Operators of Hazardous Waste, Storage, Processing, or Disposal Facilities) and §335.12 of this title (relating to Shipping Requirements Applicable to Owners or Operators of Storage, Processing, or Disposal Facilities) and §335.15 of this title (relating to Recordkeeping and Reporting Requirements Applicable to Owners or Operators of Storage, Processing, or Disposal Facilities) do not apply to an owner or operator of a totally enclosed treatment facility, as defined in §335.1 of this title (relating to Definitions).

(c) Except as provided in §335.47 of this title (relating to Special Requirements for Persons Eligible for a Federal Permit by Rule), Subchapter E of this chapter (relating to Interim Standards for Owners and Operators of Hazardous Waste Storage, Processing or Disposal Facilities) and Subchapter F of this chapter (relating to Permitting Standards for Owners and Operators of Hazardous Waste, Storage, Processing, or Disposal Facilities) do not apply to the owner or operator of a publicly-owned treatment works (POTW) which processes, stores, or disposes of hazardous waste.

(d) Subchapter E of this chapter (relating to Interim Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities) and Subchapter F of this chapter (relating to Permitting Standards for Owners and Operators of Hazardous Waste, Storage, Processing, or Disposal Facilities) do not apply to:

(1) the owner or operator of an elementary neutralization unit or a wastewater treatment unit as defined in §335.1 of this title (relating to Definitions), provided that if the owner or operator is diluting hazardous ignitable (D001) wastes (other than the D001 High TOC Subcategory defined in 40 CFR §268.40, Table Treatment Standards for Hazardous Wastes), or reactive (D003) waste, to remove the characteristic before land disposal, the owner/operator must comply with the requirements set out in 40 CFR §264.17(b);

(2) persons engaged in processing or containment activities during immediate response to a discharge of a hazardous waste; an imminent and substantial threat of discharge of hazardous waste; a discharge of a material which, when discharged, becomes a hazardous waste; or an immediate threat to human health, public safety, property, or the environment, from the known or suspected presence of military munitions, other explosive material, or an explosive device, as determined by an explosive or munitions emergency response specialist as defined in §335.1 of this title, except that:

(A) an owner or operator of a facility otherwise regulated under Subchapter E of this chapter must comply with all applicable requirements of §335.112(a)(2) and (3) of this title (relating to Standards) and §335.113 of this title (relating to Reporting of Emergency Situations by Emergency Coordinator);

(B) an owner or operator of a facility otherwise regulated under Subchapter F of this chapter must comply with all applicable requirements of §335.152(a)(2) and (3) of this title (relating to Standards) and §335.153 of this title (relating to Reporting of Emergency Situations by Emergency Coordinator);

(C) any person who continues or initiates hazardous waste processing or containment activities after the immediate response is over is subject to all applicable requirements of Subchapter E of this chapter, Subchapter F of this chapter and Chapter 305 of this title (relating to Consolidated Permits); and

(D) in the case of an explosives or munitions emergency response, if a federal, state, tribal, or local official acting within the scope of his or her official responsibilities, or an explosives or emergency response specialist, determines that immediate removal of the material is necessary to protect human health or the environment, that official or specialist may authorize the removal of the material or waste by transporters who do not have EPA identification numbers and without the preparation of a manifest. In the case of emergencies involving military munitions, the responding military emergency response specialist's organizational unit must retain records for three years identifying the dates of the response, the responsible persons responding, the type and description of material addressed, and its disposition;

(3) persons adding absorbent material to waste in a container, as defined in §335.1 of this title and persons adding waste to absorbent material in a container, provided that these actions occur at the time that waste is first placed in the container, and that in the case of permitted facilities, 40 CFR §§264.17(b), 264.171, and 264.172 are complied with, and for all other facilities, 40 CFR §§265.17(b), 265.171, and 265.172 are complied with.

(4) A farmer disposing of waste pesticides from his own use in compliance with §335.77 of this title (relating to Farmers).

(e) Subchapter E of this chapter does not apply to:

(1) a person who stores, processes or disposes of hazardous waste on-site and meets the requirements of §335.78 of this title (relating to Special Requirements for Hazardous Waste Generated by Conditionally Exempt Small Quantity Generators); or

(2) the owner or operator of a solid waste facility who stores, processes or disposes of hazardous waste received from a conditionally exempt small quantity generator.

(f) The following requirements apply to residues of hazardous waste in containers:

(1) Subchapters B-F and O of this chapter (relating to Hazardous Waste Management General Provisions; Standards Applicable to Generators of Hazardous Waste; Standards Applicable to Transporters of Hazardous Waste; Interim Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities; Permitting Standards for Owners and Operators of Hazardous Waste, Storage, Processing, or Disposal Facilities; and Land Disposal Restrictions) do not apply to any hazardous waste remaining in either an empty container or an inner liner removed from an empty container, as defined in paragraph (2) of this subsection. This exemption does not apply to any hazardous waste in either a container that is not empty or an inner liner removed from a container that is not empty.

(2) For purposes of determining whether a container is empty under this subsection, the following provisions apply:

(A) a container or an inner liner removed from a container that has held any hazardous waste, except a waste that is a compressed gas or that is identified as an acute hazardous waste listed in 40 CFR §§261.31, 261.32 or 261.33(e) is empty if:

(i) all wastes have been removed that can be using the practices commonly employed to remove materials from that type of container, e.g. pouring, pumping, and aspirating; and

(ii) no more than 2.5 centimeters (one inch) of residue remains on the bottom of the container or inner liner; or

(iii) no more than 3.0% by weight of the total capacity of the container remains in the container or inner liner if the container is less than or equal to 110 gallons in size, or no more than 0.3% by weight of the total capacity of the container remains in the container or inner liner if the container is greater than 110 gallons in size.

(B) a container that has held a hazardous waste that is a compressed gas is empty when the pressure in the container approaches atmosphere;

(C) a container or an inner liner removed from a container that has held an acute hazardous waste listed in 40 CFR §§261.31, 261.32 or 261.33(e) is empty if:

(i) the container or inner liner has been triple rinsed using a solvent capable of removing the commercial chemical product or manufacturing chemical intermediate;

(ii) the container or inner liner has been cleaned by another method that has been shown in the scientific literature, or by tests conducted by the generator, to achieve equivalent removal; or

(iii) in the case of a container, the inner liner that prevented contact of the commercial chemical product or manufacturing chemical intermediate with the container, has been removed.

(g) Subchapters B-F and O of this chapter (relating to Hazardous Waste Management General Provisions; Standards Applicable to Generators of Hazardous Waste; Standards Applicable to Transporters of Hazardous Waste; Interim Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities; Permitting Standards for Owners and Operators of Hazardous Waste Storage, Processing or Disposal Facilities; and Land Disposal Restrictions) do not apply to hazardous waste which is managed as a recyclable material described in §§335.24(b) and (c) of this title (relating to Requirements for Recyclable Materials and Nonhazardous Recyclable Materials), except to the extent that requirements of these subchapters are referred to in Subchapter H of this chapter (relating to Standards for the Management of Specific Wastes and Specific Types of Facilities) and Chapter 324 of this title (relating to Used Oil).

(h) Subchapter E of this chapter (relating to Interim Standards for Owners and Operators of Hazardous Waste, Storage, Processing, or Disposal Facilities) and Subchapter F of this chapter (relating to Permitting Standards for Owners and Operators of Hazardous Waste, Storage, Processing, or Disposal Facilities) apply to owners or operators of all facilities which treat, store, or dispose of hazardous waste referred to in Subchapter O (relating to Land Disposal Restrictions).

(i) Except as provided in §335.47 of this title (relating to Special Requirements for Persons Eligible for a Federal Permit by Rule), Subchapter F of this Chapter (relating to Permitting Standards for Owners and Operators of Hazardous waste Storage, Processing, or Disposal Facilities) does not apply to persons disposing of hazardous waste by means of underground injection. However, Subchapter F does apply to the aboveground storage or processing of hazardous waste before it is injected underground.

(j) Except as specified in Subchapter H, Division 5 of this chapter (relating to Universal Waste Rule), Subchapters B-F and O of this chapter and Chapter 305 of this title do not apply to universal wastes, universal waste handlers, or universal waste transporters as defined in §335.261 of this title (relating to Universal Waste Rule). Universal wastes are not fully regulated hazardous wastes, but are subject to regulation under Subchapter H, Division 5 of this chapter.

§335.43. Permit Required.

(a) Except as provided in subsection (b) of this section and §335.2 of this title (relating to Permit Required), no person shall store, process, or dispose of hazardous waste without first having obtained a permit from the Texas Water Commission.

(b) Any owner or operator of a solid waste management facility that is in existence on the effective date of a statutory or regulatory change that subjects the owner or operator to a requirement to obtain a hazardous waste permit who has filed a hazardous waste permit application with the commission in accordance with the rules and regulations of the commission, may continue the storage, processing, or disposal of hazardous waste until such time as the Texas Water Commission approves or denies the application, or, if the owner or operator becomes subject to a requirement to obtain a hazardous waste permit after November 8, 1984, except as provided by the United States Environmental Protection Agency or commission rules relative to termination of interim status. If a solid waste facility which has been receiving waste from off-site sources has become a commercial hazardous waste management facility as a result of the federal toxicity characteristic rule effective September 25, 1990, and is required to obtain a hazardous waste permit, such a facility that qualifies for interim status is limited to those activities that qualify it for interim status until the facility obtains the hazardous waste permit. Owners and operators of waste management facilities that are in existence on the effective date of statutory or regulatory amendments under the Solid Waste Disposal Act, Texas Civil Statutes, Article 4477-7, or the Resource Conservation and Recovery Act of 1976, as amended, 42 United States Code, §6901 et seq., that render the facility subject to the requirement to obtain a hazardous waste permit, may continue to operate if Part A of their permit application is submitted no later than:

(1) six months after the date of publication of regulations by the United States Environmental Protection Agency pursuant to the Resource Conservation and Recovery Act of 1976, as amended, which first require them to comply with the standards set forth in Subchapter E of this chapter (relating to Interim Standards for Owners and Operators of Hazardous Waste Storage, Processing or Disposal Facilities), or Subchapter H of this chapter (relating to Standards for the Management of Specific Wastes and Specific Types of Facilities); or

(2) 30 days after the date they first become subject to the standards set forth in Subchapter E of this chapter (relating to Interim Standards for owners and Operators of Hazardous Waste Storage, Processing or Disposal Facilities), or Subchapter H of this chapter (relating to Standards for the Management of Specific Wastes and Specific Types of Facilities); whichever first occurs; or

(3) for generators who generate greater than 100 kilograms but less than 1,000 kilograms of hazardous waste in a calendar month and who process, store, or dispose of these wastes on-site, a Part A permit application shall be submitted to the Environmental Protection Agency by March 24, 1987, as required by 40 Code of Federal Regulations, §270.10(e)(1)(iii).

(c) The following words and terms, when used in subsection (b) of this section, shall have the following meanings unless the text clearly indicates otherwise.

(1) "On-Site Storage, Processing, or Disposal" - On-site storage, processing, or disposal occurs when industrial solid waste is:

(A) Collected, handled, stored, processed, or disposed of within the property boundaries of a tract of land owned or otherwise effectively controlled by the owners or operators of the particular industrial plant, manufacturing plant, mining operation, or agricultural operation from which the waste results or is produced, and which tract of land is within 50 miles from the plant or operation which is the source of the industrial waste; and

(B) The industrial solid waste is not collected, handled, stored, processed, or disposed of with solid waste from any other source or sources. An industrial plant, manufacturing plant, mining operation, or agricultural operation owned by one person shall not be considered an "other source" with respect to other plants and operations owned by the same person.

(2) "Commenced On-Site Storage, Processing, or Disposal of Hazardous Waste" - A person has commenced on-site storage, processing, or disposal of hazardous waste if the owner or operator has obtained all necessary federal, state, and local preconstruction approvals or permits as required by applicable federal, state, and local hazardous waste control statutes, regulations, or ordinances; and either:

(A) a continuous physical, on-site construction program has begun; or

(B) the owner or operator has entered into contractual obligations, which cannot be cancelled or modified without substantial loss, for construction of the facility to be completed within a reasonable time.

(d) Subsection (b) of this section shall not apply to a facility if it has been previously denied a hazardous waste permit or if authority to operate the facility has been previously terminated.

(e) Upon receipt of federal Hazardous and Solid Waste Act (HSWA) authorization for the Texas Water Commission's (commission) Hazardous Waste Program, the commission shall be authorized to enforce the HSWA provisions that the Environmental Protection Agency (EPA) imposed in hazardous waste permits that were issued before the HSWA authorization was granted.

§335.44. Application for Existing On-Site Facilities.

(a) In order to satisfy the application deadline specified in §335.43(b) of this title (relating to Permit Required), an application must be submitted prior to that date which contains information defining the following:

(1) Owner(s) and operator(s) of the facility,

(2) Description of the site,

(3) Description of the facility and all facility components,

(4) Identification of wastes generated, stored, processed, or disposed, together with quantities and sources, and

(5) Methods and types of operations used in the storage, processing, or disposal of wastes.

(b) In addition to the information required in subsection (a) of this section, a complete application, required prior to action on an application by the commission, must include the following:

(1) Engineering plans and specifications and other documentation necessary to demonstrate that all components of the facility design, construction, and operation conform to standards established by the commission, and

(2) Information describing actions necessary to bring existing facilities into compliance with commission standards and a schedule for completion of such actions.

(c) An application form can be obtained from the executive director for each geographical location for which the storage, processing, or disposal of hazardous waste is proposed.

(d) The application shall be signed by the applicant or by a duly authorized agent, employee, officer, or representative of the applicant and shall be verified before a notary public.

§335.45. Effect on Existing Facilities.

(a) Effect on permitted off-site facilities. Subchapters B-E of this chapter (relating to Hazardous Waste Management General Provisions; Standards Applicable to Generators of Hazardous Waste; Standards Applicable to Transporters of Hazardous Waste; and Interim Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities), provide minimum requirements applicable to all persons generating, transporting, storing, processing, and disposing of hazardous waste. All persons holding permits or any other authorizations from the commission, or its predecessor agencies, which relate to hazardous waste, shall meet the requirements of Subchapter E of this chapter (relating to Interim Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities) until final administrative disposition of their permit application pursuant to standards prescribed by Subchapter F of this chapter (relating to Permitting Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities) is made. However, where the

permit or authorization specifies additional or more stringent requirements, the provisions of the permit or authorization shall be complied with.

(b) Effect on off-site facilities without a permit to re-use, recycle or reclaim hazardous waste, or to burn hazardous waste in boilers or industrial furnaces. Any person who has commenced the off-site storage, processing, or disposal of hazardous wastes, or activities that are listed, identified or described by the administrator of the United States Environmental Protection Agency in 40 Code of Federal Regulations Part 261, on or before the effective date of statutory or regulatory amendments under the Resource Conservation and Recovery Act of 1976, as amended, 42 United States Code §§6901 et seq., relating to the re-use, recycling or reclamation of hazardous waste, or relating to the burning of hazardous waste in boilers or industrial furnaces, that render such wastes or activities subject to the requirements to have a hazardous waste permit, shall file an application with the commission on or before the effective date of such amendments, which includes the applicable information required by §335.44 of this title (relating to Application for Existing On-site Facilities). Any person who has commenced off-site storage, processing, or disposal of hazardous waste on or before the effective date of such amendments, who has filed a hazardous waste permit application with the commission on or before the effective date of such amendments in accordance with the rules and regulations of the commission, and who complies with requirements in this chapter applicable to such activities, may continue the off-site storage, processing, or disposal of the newly listed or identified wastes or waste activities until such time as the Texas Water Commission approves or denies the application. In cases where the aforementioned federal statutory or regulatory amendments become effective prior to the effective date of state statutory or regulatory amendments under the Texas Solid Waste Disposal Act, Chapter 361, Texas Health & Safety Code Annotated (Vernon Pamphlet 1992), submittal to the executive director of a copy of the properly filed U.S. E.P.A. permit application within 30 days of the effective date of the applicable state statutory or regulatory requirements shall constitute compliance with this subsection with regard to application filing requirements. Facilities that have received a permit for the reuse, recycling, or reclamation of hazardous waste in accordance with Subchapter F of this chapter (relating to Permitting Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities) are not required to comply with this subsection and may operate pursuant to their existing permit. Such permits, however, are subject to amendment under §305.62 of this title (relating to Amendment) to reflect new regulatory requirements.

§335.46. Sharing of Information.

Any information obtained or used by the commission in the administration of a hazardous waste program authorized under the Resource Conservation and Recovery Act of 1976, §3006 and 40 Code of Federal Regulations Part 271 shall be available to the Environmental Protection Agency upon request without restriction. If the information has been submitted to the commission under a claim of confidentiality, the commission shall submit that claim to the Environmental Protection Agency when providing information under this section. Any information obtained from the commission and subject to a claim of confidentiality will be treated by the Environmental Protection Agency in accordance with 40 Code of Federal Regulations Part 2. If the Environmental Protection Agency obtains information that is

not claimed to be confidential, the Environmental Protection Agency may make that information available to the public without further notice.

§335.47. Special Requirements for Persons Eligible for a Federal Permit by Rule.

(a) The following persons are eligible for a permit by rule under 40 Code of Federal Regulations §270.60:

(1) the owner or operator of a barge or other vessel which accepts hazardous waste for ocean disposal;

(2) the owner or operator of a publicly-owned treatment works (POTW) which accepts hazardous waste for treatment; and

(3) the owner or operator of an injection well used to dispose of hazardous waste.

(b) To be eligible for a permit by rule, such person shall comply with the requirements of 40 Code of Federal Regulations §270.60 and the following rules:

(1) 40 Code of Federal Regulations §264.11 (EPA identification number);

(2) 40 Code of Federal Regulations §264.72 (manifest discrepancies);

(3) 40 Code of Federal Regulations §264.73(a) and (b)(1) (operating record);

(4) 40 Code of Federal Regulations §264.76 (unmanifested waste report);

(5) §335.12 of this title (relating to Shipping Requirements Applicable to Owners or Operators of Storage, Processing, or Disposal Facilities) and §335.15 of this title (relating to Recordkeeping and Reporting Requirements Applicable to Owners of Storage, Processing, or Disposal Facilities) (shipping and reporting procedures); and

(6) §335.15 of this title (relating to Recordkeeping and Reporting Requirements Applicable to Owners or Operators of Storage, Processing, or Disposal Facilities) and §335.154 of this title (relating to Reporting Requirements for Owners and Operators) (annual and monthly reports).

(c) In addition to the requirements stated in subsection (b) of this section, the owner or operator of an injection well used to dispose of hazardous waste shall:

(1) comply with the applicable personnel training requirements of 40 Code of Federal Regulations §264.16;

(2) when abandonment is completed, submit to the executive director certification by the owner or operator and certification by an independent registered professional engineer that the facility has

been closed in accordance with the specifications in §331.46 of this title (relating to Plugging and Abandonment Standards); and

(3) for underground injection control permits issued after November 8, 1984, comply with §335.167 of this title (relating to Corrective Action for Solid Waste Management Units). Where the underground injection well is the only unit at a facility which requires a permit, comply with 40 Code of Federal Regulations §270.14(d) (relating to information requirements for solid waste management units). Persons who dispose of hazardous waste by means of underground injection must obtain a permit under the Texas Water Code, Chapter 27.

(d) In addition to the requirements stated in subsection (b) of this section, the owner or operator of a publicly-owned treatment works (POTW) which accepts hazardous waste for treatment shall:

(1) meet all federal, state and local pretreatment requirements which would be applicable to the waste if it were being discharged into the POTW through a sewer, pipe or, similar conveyance; and

(2) for National Pollutant Discharge Elimination System (NPDES) permits issued after November 8, 1984, comply with §335.167 of this title (relating to Corrective Action for Solid Waste Management Units).

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