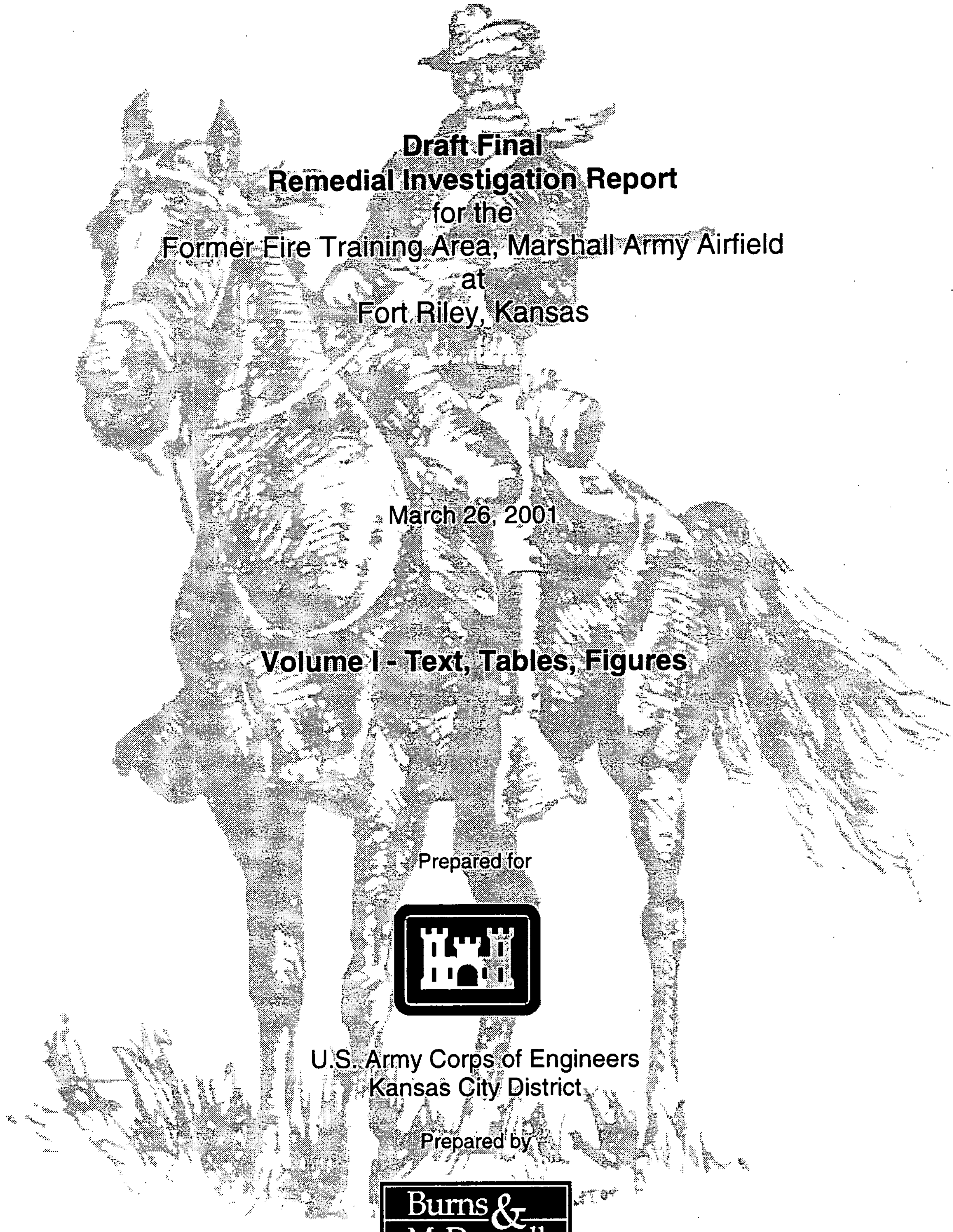

Draft Final
Remedial Investigation Report
for the
Former Fire Training Area, Marshall Army Airfield
at
Fort Riley, Kansas

March 26, 2001

Volume I - Text, Tables, Figures

Prepared for

U.S. Army Corps of Engineers
Kansas City District

Prepared by

Burns & McDonnell
SINCE 1898

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LIST OF ACRONYMS AND ABBREVIATIONS

AFCEE	Air Force Center for Environmental Excellence
AOC	Area of Concern
APZ	Accident Potential Zone
APZ-I	Aircraft Approach Zone
APZ-II	Accident Zone
ARI	Analytical Resources, Inc.
ASTM	American Society of Testing Materials
atm-m^3/mol	Atmospheres-Cubic Meters per Mole
bgs	Below Ground Surface
BMcD	Burns & McDonnell
BOD	Biological Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
^{N}C	Degrees Celcius
C	Conductance
CAS	Chemical Abstracts Services
CEC	Cation Exchange Capacity
CENWK	U.S. Army Corps of Engineers, Kansas City District
cfs	Cubic Feet per Second
cm^2	Square Centimeters
cm/cm	Centimeters per Centimeter
cm^3/g	Cubic Centimeters per Gram
cm/hr	Centimeters per Hour
cm/sec	Centimeters per Second
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
COD	Chemical Oxygen Demand
Continental	Continental Analytical Services
COPCs	Chemicals of Potential Concern
COPECs	Chemicals of Potential Ecological Concern
DA	Department of the Army
DCA	Dichloroethane
1,2-DCE	1,2-Dichloroethene
DCP	Data Collection Platform
DES	Directorate of Environment and Safety
DMD/ARI	DMD, Inc. / Analytical Resources, Inc.
DNL	Day-Night Sound Level
DO	Dissolved Oxygen
DoD	Department of Defense
DOIM	Directorate of Information Management
DSR	Data Summary Report
D_x	Longitudinal Dispersion Coefficient
D^*	Effective Molecular Diffusion Coefficient
ERA	Ecological Risk Assessment

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

EHQ	Ecological Hazard Quotient
ESI	Expanded Site Investigation
NF	Degrees Fahrenheit
Fe	Iron
FFA	Federal Facility Agreement
FFTA	Former Fire Training Area
f_{oc}	Fraction of Organic Carbon
FOC	Fiber Optic Cable
FR	Federal Register
FS	Feasibility Study
FSP	Field Sampling Plan
ft^2	Square Feet
ft/day	Feet per Day
ft/ft	Feet per Foot
g/cm^3	Grams per Cubic Centimeter
GC	Gas Chromatograph
GHB	General Head Boundary
gpm	Gallons per Minute
GMS	Groundwater Modeling System
HEAST	USEPA Health Effects Assessment Summary Tables
HHBRA	Human Health Baseline Risk Assessment
HRI	Hampshire Research Institute
HRS	Hazard Ranking System
i	Averaged Hydraulic Gradient
IAG	Interagency Agreement
ICUZ	Installation Compatibility Use Zone Study
in/yr	Inches per Year
IPPBR	Institute for Public Policy and Business Research
IPS	Innovative Probing Solutions
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
ISRM	In-Situ Redox Manipulation
IWSA	Installation Wide Site Assessment
k	First Order Biodegradation Rate
K	Hydraulic Conductivity
K_d	Distribution Coefficient
K_p	Chemical Specific Permeability Constant
KDHE	Kansas Department of Health and Environment
KDR	Kansas Department of Revenue
Kg	Kilogram
K_{oc}	Organic Carbon-Water Partitioning Coefficient
K_{ow}	Octanol-Water Partitioning Coefficient
KSWQS	Kansas Surface Water Quality Standards

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

KWO	Kansas Water Office
K_x	Longitudinal Dispersivity Coefficient
LBA	Louis Berger & Associates
lbs	Pounds
lbs/day	Pounds per Day
L/day	Liters per Day
L/hr	Liters per Hour
LOAELs	Lowest Observed Adverse Effect Levels
MAAF	Marshall Army Airfield
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
m^2	Square Meters
m^3/hr	Cubic Meters per Hour
meq/100g	Milliequivalents per 100 Grams
mg	Milligrams
mg/cm^2	Milligrams per Square Centimeter
mg/day	Milligrams per Day
mg/kg	Milligrams per Kilogram
mg/kg/day	Milligrams of Chemical per Kilogram Body Weight per Day
mg/L	Milligrams per Liter
mg/m^3	Milligrams per Cubic Meter
mm	Millimeters
MMOC	Modified Method of Characteristics
MOC	Method of Characteristics
Mn	Manganese
MS	Mass Spectrometer
msl	Mean Sea Level
MWIP	Monitoring Well Installation Plan
NAWQC	National Ambient Water Quality Criterion
NCDC	National Climatic Data Center
NCI	National Cancer Institute
NOAELs	No Observed Adverse Effect Levels
NPL	National Priorities List
NRWQC	National Recommended Water Quality Criterion
NTUs	Nephelometric Turbidity Units
ORP	Oxidation Reduction Potential
ORNL	Oak Ridge National Laboratory
OSHA	Occupation Health and Safety Administration
OSWER	USEPA Office of Solid Waste and Emergency Response
PA	Preliminary Assessment
PAOC	Potential Areas of Concern
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PCOPC	Preliminary Chemical of Potential Concern

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

PHHBRA	Preliminary Human Health Baseline Risk Assessment
PID	Photoionization Detector
PP	Priority Pollutant
PQL	Practical Quantitation Limit
PRGs	Preliminary Remediation Goals
QAPP	Quality Assurance Project Plan
QC	Quality Control
R	Retardation
RAGS	Risk Assessment Guidance for Superfund
RBCs	Risk-Based Concentrations
RCRA	Resource Conservation and Recovery Act
RfC	Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
RSK	Risked Based Standards for Kansas
RT3D	Reactive Multi-Species Transport in 3-Dimensional Groundwater Aquifers
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SCAPS	Site Characterization Analysis Penetrometer System
SEAM	Superfund Exposure Assessment Manual
SI	Site Investigation
Site	Former Fire Training Area – Marshall Army Airfield, Ft. Riley, Kansas
SSHP	Site Safety and Health Plan
SSSA	Soil Science Society of America
STSC	Superfund Technical Support Center
SVE	Soil Vapor Extraction
SVOCs	Semivolatile Organic Compounds
TCA	Trichloroethane
TCE	Trichloroethene
TCL	Target Compound List
TNRCC	Texas Natural Resource Conservation Commission
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbon
TPH-DRO	Total Petroleum Hydrocarbon - Diesel Range Organic
TPH-GRO	Total Petroleum Hydrocarbon - Gasoline Range Organic
TVPH	Total Volatile Petroleum Hydrocarbons
UCL	Upper Confidence Limit
UFs	Uncertainty Factors
U.S.	United States
USAEHA	United States Army Environmental Hygiene Agency
USACE	United States Army Corps of Engineers

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

USATHMA	United States Army Toxic and Hazardous Materials Agency
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USDoC	United States Department of Commerce
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USCS	Unified Soil Classification System
UTL	Upper Tolerance Limit
VC	Vinyl Chloride
V_{gw}	Pore Velocity (Advective Velocity)
VPCA	Vapor Phase Carbon Adsorption
VOCs	Volatile Organic Compounds
WP	Work Plan
α_x	Longitudinal Dispersivity
α_y	Transverse Dispersivity
α_z	Vertical Dispersivity
0	Porosity
0_e	Effective Porosity
ρ_o	Bulk Density
µg	Micrograms
µg/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter

* * * * *

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

The purpose of this *Remedial Investigation (RI) Report* is to document the evaluation of current conditions as they pertain to potential threats to human health and the environment associated with the Former Fire Training Area (FFTA) at Marshall Army Airfield (MAAF), Fort Riley, Kansas. This *RI Report* was developed in support of the Fort Riley, Kansas, Directorate of Environment and Safety (DES), Installation Restoration Program (IRP). The *RI Report* was also written to satisfy the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. The *RI Report* was prepared by Burns & McDonnell (BMcD) under contract DACA41-96-D-8010 with the United States Army Corps of Engineers, Kansas City District (CENWK) and represents Fort Riley's ongoing fulfillment of obligations to investigate and take appropriate actions at sites posing a potential threat to human health and the environment. Included within this *RI Report* are characterizations of the nature and extent of contamination, an evaluation of the fate and transport of contaminants, and human health and ecological risk assessments.

Since 1993, Fort Riley has conducted several investigations to identify and delineate contamination associated with the FFTA-MAAF and associated impacted areas (hereinafter collectively referred to as the Site). Use of the term FFTA in this document refers only to the area associated with the former burn pit and the former drum storage area. Results from these investigations have indicated that releases of organic compounds have occurred at the Site that may pose a threat to human health and/or the environment.

1.2 SITE BACKGROUND

1.2.1 Site Description

The more developed areas of Fort Riley are in the southern portion of the reservation along the Republican and Kansas Rivers. Figure 1-1 depicts the location of Fort Riley in Geary and Riley County, Kansas.

At the fort, developed areas are divided into six cantonment areas: Main Post, Camp Forsyth, Camp Funston, Camp Whitside, MAAF, and Custer Hill (see Figure 1-2). MAAF is located south of the Kansas River as shown in Figure 1-2.

The FFTA is located along the MAAF northern boundary, approximately 1000 feet from the northeast end of the airfield north-south runway (Figure 1-1). The FFTA-MAAF burn pit is approximately 300 feet south of the Fort Riley reservation boundary.

1.2.2 Site History

The FFTA-MAAF was operated from the mid-1960s through 1984 to conduct fire-training exercises (U.S. Army Environmental Hygiene Agency [USAEHA], 1979; U.S. Army Toxic and Hazardous Materials Agency [USATHMA], 1984). During this period, the FFTA-MAAF burn pit consisted of a crushed stone pad (approximately 200 feet by 200 feet) with no subsurface liner. Flammable liquids were temporarily stored in drums near the burn pit for use during training exercises.

During fire training exercises, flammable liquids were dumped into the burn pit, ignited, then extinguished. The predominant fuels used for the fire training exercises were petroleum hydrocarbons, including JP-4, diesel, and MOGAS (a generic term for motor gasoline often used to refer to gasolines with lead alkyls, and gasoline). In August 1982, reportedly 55 gallons of tetrachloroethene (PCE) were inadvertently poured into the fire training pit. The next day it was pumped out of the pit and contained in

55-gallon drums. Hay was spread over any remaining liquid in the pit, and subsequently removed and placed in drums. The drums were then properly disposed of.

An overview of historic Site features is provided in Figure 1-3. Notable historic features previously at the Site include the drum storage area to the east and southeast of the burn pit, and the areas near the perimeter of the burn pit used for storage of miscellaneous debris. Prominent drainage features at the Site include the drainage ditch that formerly directed surface runoff from the area northwest of the FFTA to a culvert located to the west of the Site that passed through the levee. Another culvert through the levee was located east of the burn pit. Remnants of this culvert are still visible along the levee, and the vegetation and topography north of the levee provide discernible traces of this former drainage from the airfield.

1.2.2.1 Past and Current Land Uses

The area of the FFTA-MAAF is within the boundaries of the airfield and is separated from the properties to the north by a levee and an 8-foot, continuous chain-link fence that surrounds the airfield. The nearest airfield building is over 2000 feet to the southwest. The FFTA-MAAF was operated from the mid-1960s through 1984 (USAEHA, 1979; USATHMA, 1984). No fire fighting training has been conducted at the FFTA-MAAF since 1984.

Wild hay now grows near the FFTA-MAAF and is harvested annually. In December 1994, a temporary fence was installed around the FFTA to conduct a pilot test study (see Section 3.4 for details of the SVE/bioventing pilot study). The area inside the fence is no longer used to harvest wild hay.

Property use north of the FFTA-MAAF includes residential, agricultural, and commercial (auto racing). In this area, private wells are located within approximately one-half mile to the north of the installation boundary. Four properties with a total of ten private wells have been identified. These private wells are depicted on Figure 1-1:

- Wells M-1 and N-1 reportedly supply water to residences for domestic use.
- Wells F-1 and F-2 are located at an abandoned trailer house. One of these wells is reported to supply water for livestock.
- Wells R-1, R-2, R-3, and R-4 are located at the racetrack. Wells R-1 and R-2 are used for utility reasons. Wells R-3 and R-4 are not used.
- Well I-1 is an irrigation well that was placed into service in the spring of 1994.
- Well B-1 is a domestic well located at a residence approximately 6000 feet northeast of the FFTA near the edge of the river valley.

The property immediately north of the FFTA-MAAF has been used as an automobile racetrack for standard and mini-sized automobiles since the early 1980s. A 1992 cursory inspection of the speedway identified approximately fifty 55-gallon drums stored just north of the track (*Site Investigation for Former Fire Training Area, Marshall Army Airfield, Fort Riley, Kansas, and Nearby Off-Post Properties,* Louis Berger and Associates [LBA], 1995e) [*FFTA-MAAF SI*]. These drums were subsequently scattered throughout the area as a result of the July 1993 flooding of the area. A former driver at the speedway indicated that blue drums located on the property were used for spectator and crew trash (nonhazardous, solid waste) (LBA, 1995e) [*FFTA-MAAF SI*]. The majority of drums observed scattered at the speedway were blue, with some other black and yellow drums. The former driver also indicated that some of the drums, not colored blue, were used for the storage of fuel to be used by the racers. The exact contents of the yellow and black drums is unknown. The drums containing fuel were reportedly stored in the center of the speedway or in the vehicle maintenance pit area.

Historic aerial photographs indicate that the dimensions, configuration, and features of the FFTA-MAAF changed over time. Aerial photographs were reviewed during the Site Investigation. Several of these photos are discussed here. A complete discussion of historical aerial photographs is provided in Appendix B of the *FFTA-MAAF SI* (LBA, 1995e).

The 1971 aerial photograph of the area (Figure 1-4) depicts activity in the area of the FFTA. Appendix B of the *FFTA-MAAF SI* (LBA, 1995e) states that the perimeter of the FFTA is delineated by grass worn thin by vehicles driving repeatedly around it. There are three circular tracks in the area, indicating three separate training areas. The FFTA is the northernmost of these three areas.

By 1979, the FFTA is readily apparent and in active use (Figure 1-5). Appendix B of the *FFTA-MAAF SI* (LBA, 1995e) states that the body of a partially dismantled airplane is located about 40 feet to the west of the road that encircles the training pit. The grass within about 50 feet from the plane is distressed. On the east side of the pit is a drum storage area. The grass underneath and in the near vicinity of the barrels is either distressed or nonexistent. Inside the training pit, three quarters of the area is blackened. A pool of what is assumed a liquid is visible in the northeast corner of the pit.

The 1984 aerial photo (Figure 1-6) shows that since 1979 a racetrack was constructed north of the FFTA and the levee. Appendix B of the *FFTA-MAAF SI* (LBA, 1995e) states that subsurface utility construction occurred in the area. The FFTA is still in active use. To the east of the pit are two drum storage locations. In one area, approximately 100 barrels lying on their sides form a square. Directly north of this area, approximately 50 barrels are standing. The grass north of these barrels is distressed. The sand road encircling the FFTA itself is in very poor condition; in many sections grass forms the surface layer. In the center of the FFTA are two vehicles. On the west side is a truck; just south of this vehicle is what appears to be a cylindrical truck. The racetrack north of the levee appears to be in active use at the time of the 1984 aerial photo. Appendix B of the *FFTA-MAAF SI* (LBA, 1995e) states that three propane tanks are located on the racetrack property, and north of the racetrack is a barrel storage area with approximately 30 barrels, most of which are lying on their sides.

By 1993, the FFTA is no longer discernible (see Figure 1-7). Also, the Kansas River has overflowed its banks and flooding is pervasive in the vicinity of the oxbow and all regions along the river not protected by the levee. Most of the racetrack is located within the boundaries of the old oxbow and is flooded. It appears that the oxbow, while flooded from the north, is draining to the east, following the natural course of the old oxbow.

The most recent aerial photo was taken in 1998 (Figure 1-8). As in the 1993 photo, the FFTA is no longer discernible; however, a shed can be seen near the former FFTA.

1.2.2.2 Regulatory History

Fort Riley was established in 1853 and has been owned and operated by the Department of the Army (DA) since that time. Environmental investigations and sampling events were performed at Fort Riley during the 1970s and 1980s. These investigations identified activities and facilities where hazardous substances had been released or had the potential to be released to the environment. Potential sources of contamination included landfills; printing, dry cleaning, and furniture shops; and pesticide storage facilities. On July 14, 1989, the United States Environmental Protection Agency (USEPA) proposed inclusion of Fort Riley on the National Priorities List (NPL) pursuant to CERCLA. USEPA included the Site on the NPL, promulgated in August 1990. Fort Riley is identified by USEPA as Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Site KS6214020756.

Effective June 1991, the DA entered into a Federal Facility Agreement (FFA), Docket No. VII-90-F-0015, with the State of Kansas Department of Health and Environment (KDHE) and USEPA Region VII to address environmental pollution subject to the Resource Conservation and Recovery Act (RCRA) and/or CERCLA (USEPA, 1991). This agreement is also referred to as the Interagency Agreement (IAG). Pursuant to the IAG, Fort Riley conducted an Installation Wide Site Assessment (*IWSA*) in 1992 (LBA, 1992) to identify sites having the potential to release hazardous substances to the environment. The IWSA identified the FFTA-MAAF as one of the sites where releases of hazardous substances to the environment either have occurred or were likely to have occurred. Subsequent to the IWSA, site investigations were planned for three groupings of sites. A Site Investigation (*SI*) for the first group, the Sensitive-Receptor Lead Sites, was initiated in June 1993. The Sensitive-Receptor Lead Sites were later incorporated into a second group, the High Priority Sites. The SI for the High Priority Sites (LBA, 1994a) was initiated in September 1993, and included the FFTA-MAAF as one of the High Priority Sites. The remaining sites, known as "Other Sites", identified in the *IWSA* as requiring further investigation, were included in an SI (LBA, 1995a) initiated in March 1994.

SI results for the FFTA-MAAF Site indicated that concentrations of organic compounds had been released to groundwater at concentrations exceeding federal and state drinking water standards. Also, similar contaminants were found in off-site, private wells at levels above drinking water standards. These results indicated that additional investigation and study at the Site was necessary. Therefore, Fort Riley separated the FFTA-MAAF Site from the remainder of the High Priority Sites into an expanded investigation for additional data collection.

In 1996, Fort Riley began the process of implementing an interim action at FFTA-MAAF to control exposures of humans to the groundwater containing Site-related compounds. The resulting *Exposure Control Action Engineering Evaluation/Cost Analysis for the Former Fire Training Area, Marshall Army Airfield, Fort Riley, Kansas and Nearby Off-Post Properties* (LBA, 1997b) recommended the installation of two new supply wells within the aquifer in areas that have not been influenced by the groundwater plume. These supply wells were intended to replace existing residential Wells M-1, R-1 and R-2. This remedy has not been completed at the Site due to legal issues.

Another Engineering Evaluation/Cost Analysis was undertaken beginning in 1997 to provide a reasonable reduction of off-post hot-spot contamination. The resulting *Draft Groundwater Engineering Evaluation/Cost Analysis for the Former Fire Training Area at Marshall Army Airfield, Fort Riley, Kansas* (BMcD, 1998d) was never completed because the plume characterization activities defined a larger plume than anticipated and addressing hot-spot contamination was no longer applicable. It was agreed by Fort Riley, CENWK, and regulators to cease the report and proceed with this RI Report and the Feasibility Study (FS).

1.3 REPORT ORGANIZATION

Section 1.0 of this *RI Report* includes an introduction of background of the FFTA-MAAF Site and this RI. The other sections included in this Report are as follows:

- Section 2.0, Setting – A discussion of surface features, meteorology, hydrology, hydrogeology, geology, land zoning and water use, and ecology at the Site.
- Section 3.0, Previous Investigations – A presentation of results of previous investigations conducted at the Site.

- Section 4.0, Remedial Investigation Field Activities – A presentation of groundwater monitoring, plume characterization, soil pit sampling, tracer study, and microcosm study activities.
- Section 5.0, Nature and Extent of Contamination – An assessment of current contamination conditions in all media.
- Section 6.0, Fate and Transport Evaluation – An evaluation of the fate and transport of contaminants in the environment at the Site, including an assessment of results from the modeling performed using Site data.
- Section 7.0, Human Health Risk Assessment – A presentation of the human health risk assessment performed using Site data.
- Section 8.0, Environmental Evaluation - A presentation of the ecological evaluation performed using Site data.
- Section 9.0, Conclusions

* * * * *

Figure 1-1
General Site Location

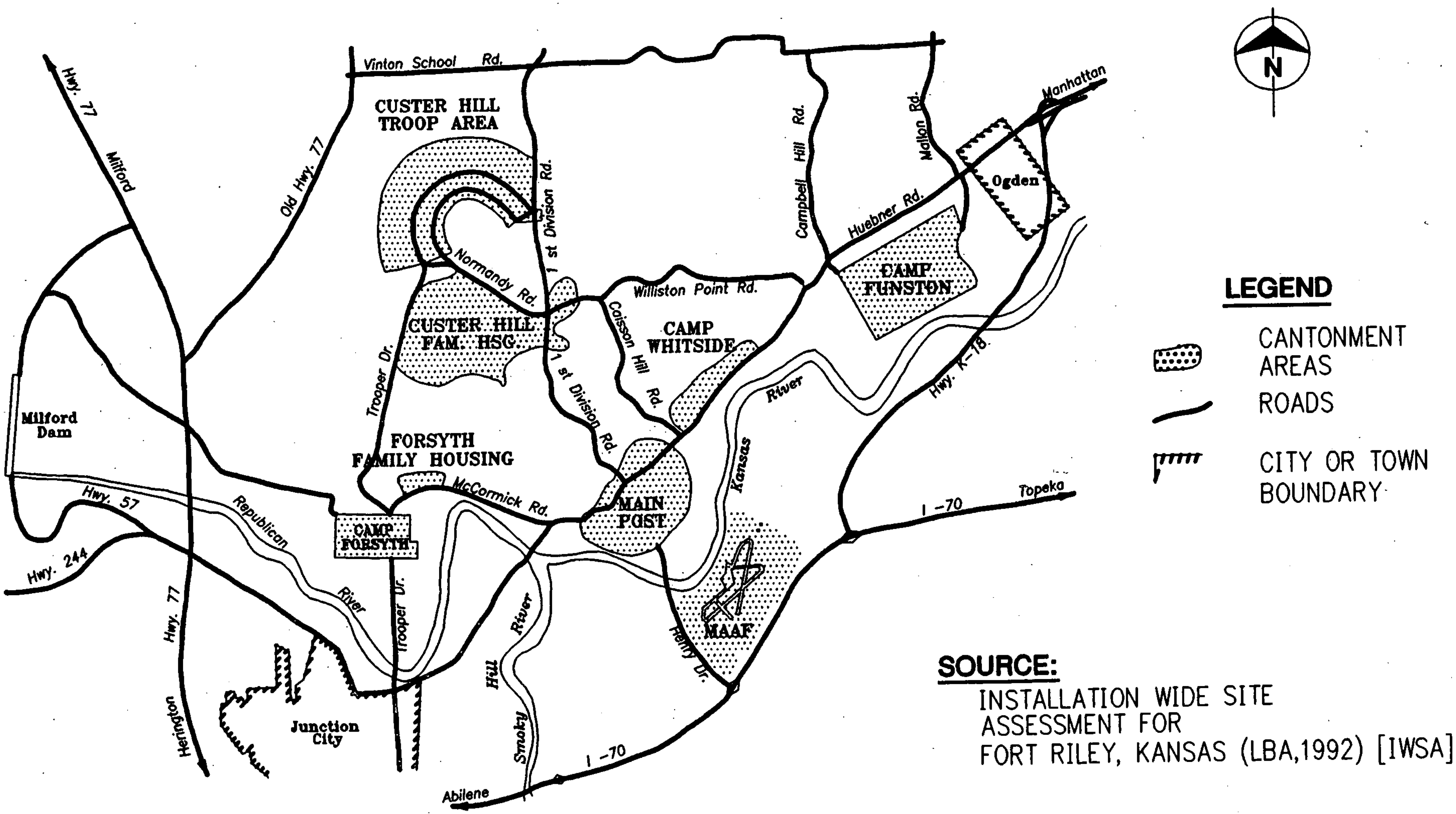

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Figure 1-2

FORT RILEY CANTONMENT AREAS

FFTA-MAAF RI

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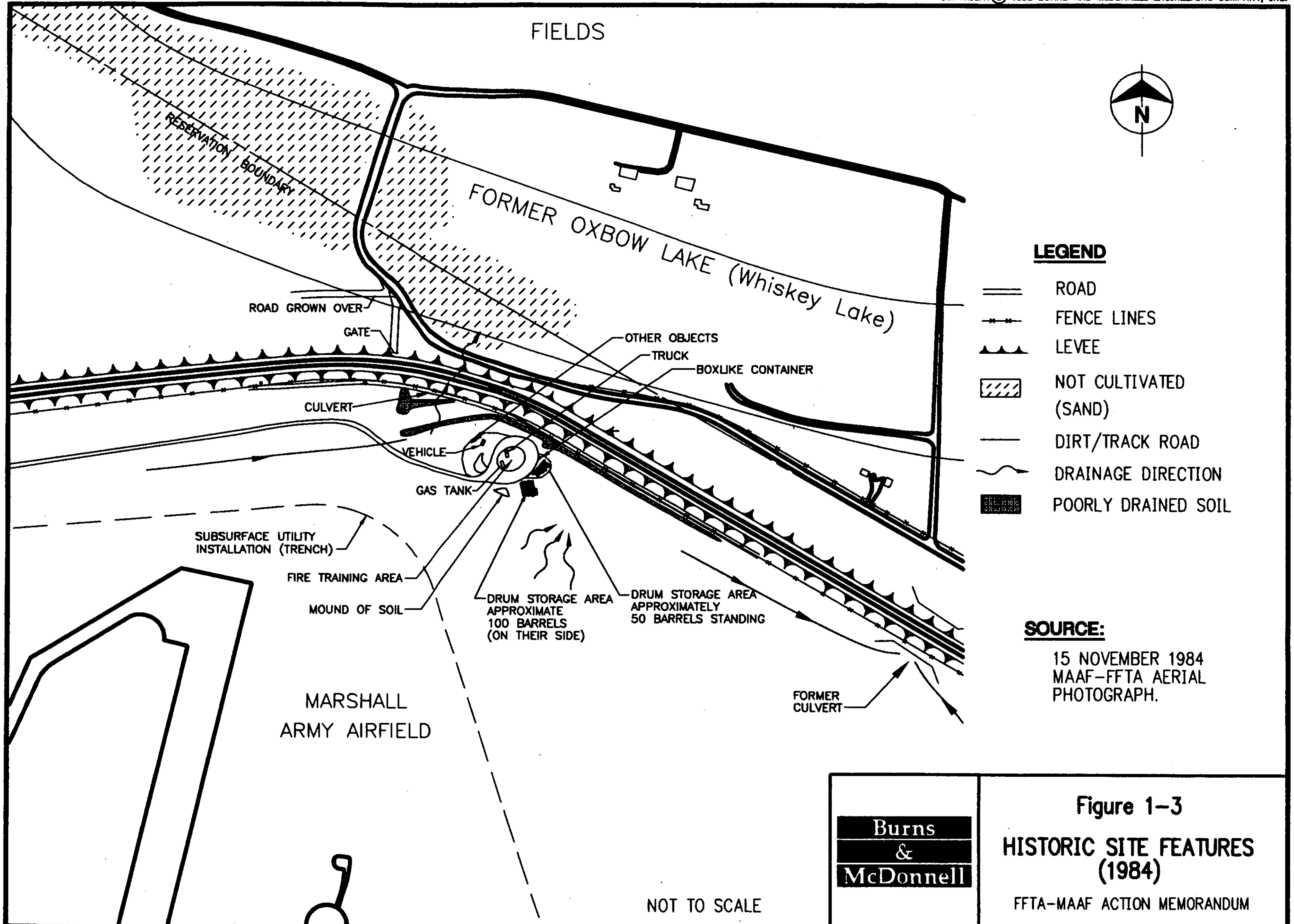

Burns & McDonnell

Figure 1-3

HISTORIC SITE FEATURES (1984)

FFTA-MAAF ACTION MEMORANDUM

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Figure 1-4

1971 Aerial Photo

FFTA-MAAF RI

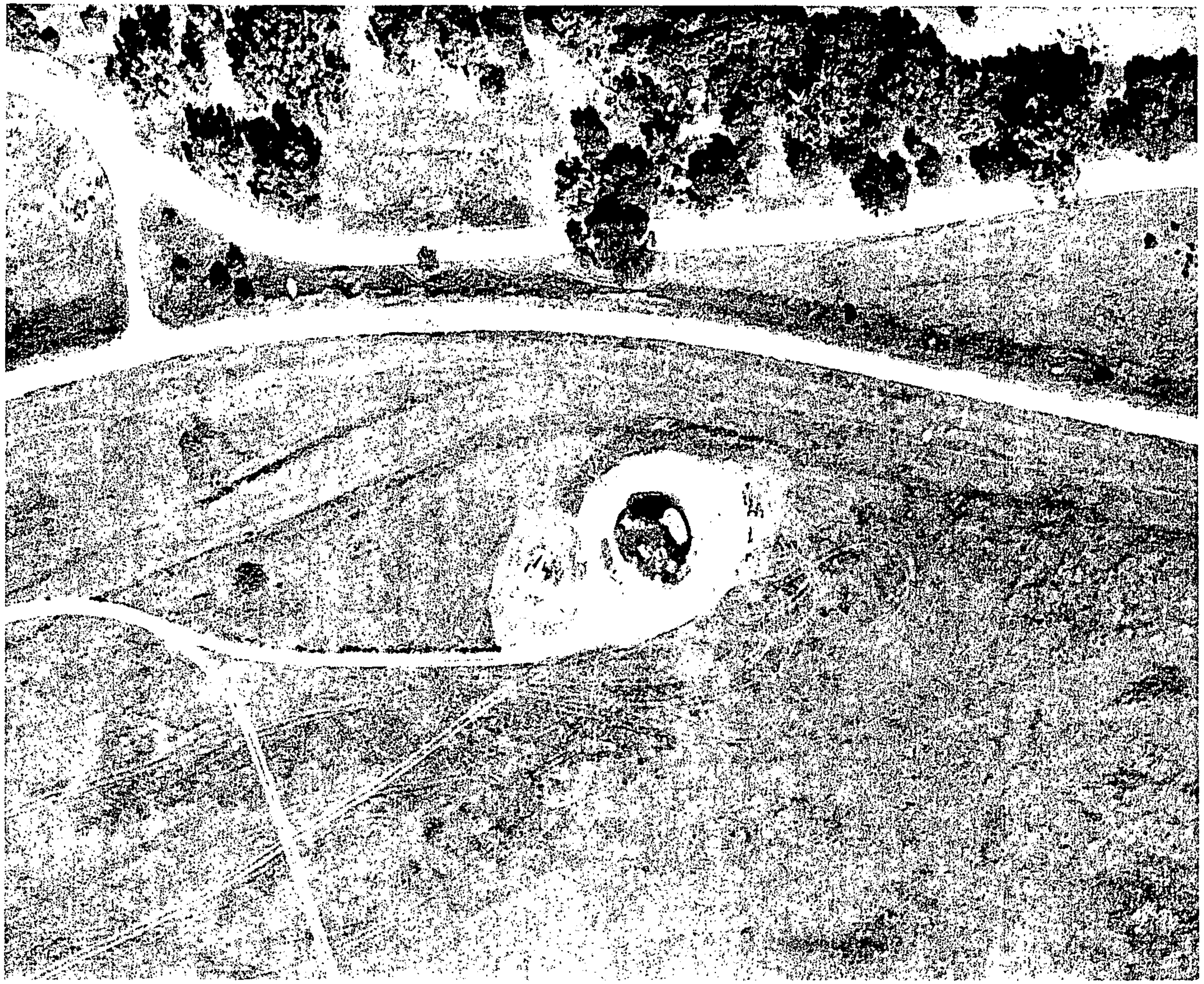

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Figure 1-5

1979 Aerial Photo

FFTA-MAAF RI

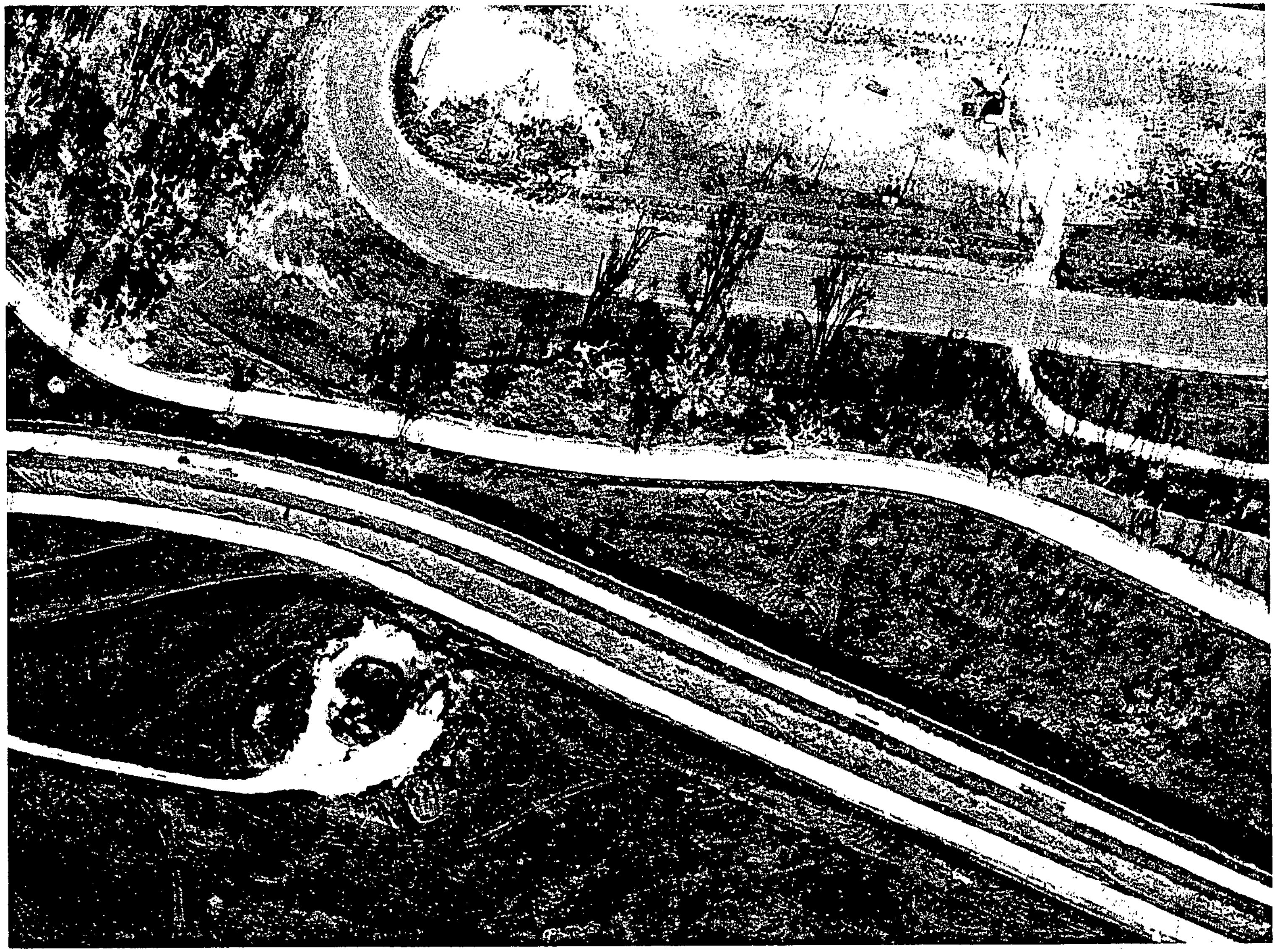

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Figure 1-6

1984 Aerial Photo

FFTA-MAAF RI

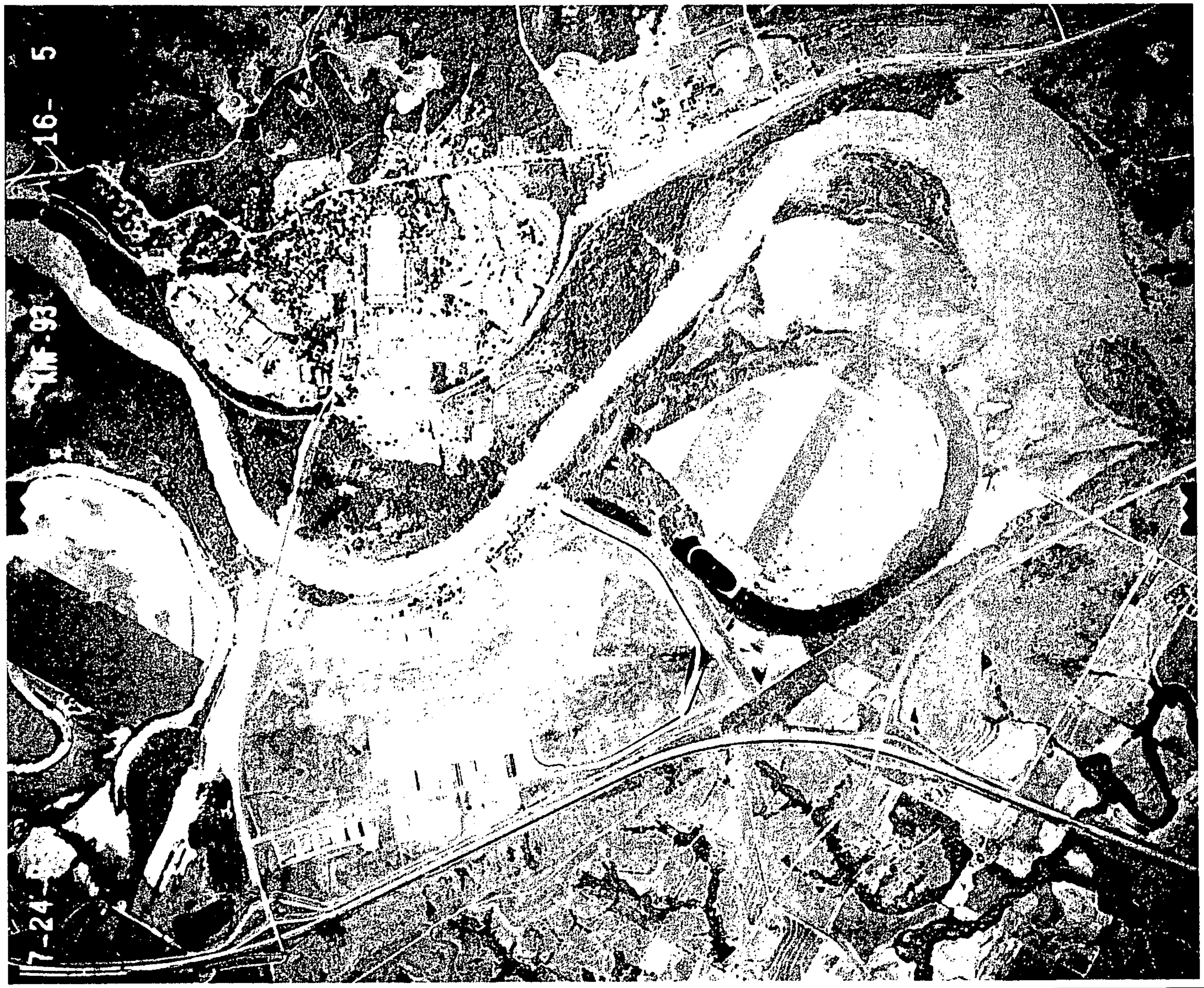

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Figure 1-7

1993 Aerial Photo

FFTA-MAAF RI

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SINCE 1898

Figure 1-8

1998 Aerial Photo

FFTA-MAAF RI

2.0 SETTING

2.1 SURFACE FEATURES

Fort Riley and the surrounding area are a part of the Osage Plains section of the Central Lowlands physiographic province, which consists of a plain with low relief, which has been eroded by rivers and streams. Sedimentary bedrock strata dip gently to the west-northwest and east-facing escarpments eroded into more resistant rock units are separated by gentle, westward sloping plains. The resulting topography can be divided into upland areas that are dissected by numerous intermittent and perennial streams, and lowland areas that consist of alluvial plains and associated terraces. The lowland areas occur along the banks of the major rivers in the area: the Republican, Smoky Hill, and Kansas Rivers. The topographic relief between the alluvial floodplains and the higher elevations of the upland areas is approximately 250 feet.

FFTA-MAAF and the Site are located in the alluvial floodplain of the Kansas River, where the land surface is relatively flat. The general Site location is shown in Figure 1-1. Whiskey Lake, a former oxbow lake of the Kansas River, has been essentially dry since the 1950s. However, during periods of overbank flooding, Whiskey Lake will retain water for extended periods of time. During and after the significant flood event of summer 1993, Whiskey Lake contained water for approximately five months.

The FFTA-MAAF is covered with soil and has a well-established grass cover; its previous location is no longer discernible in the field. After use of the FFTA-MAAF was discontinued in 1984, a new road and associated drainage ditch were constructed along the northern edge of the airfield. Surface soil was excavated from portions of the FFTA-MAAF during road construction to complete the project and improve surface drainage. As needed, soil was spread in nearby areas consistent with the natural topography. A new road runs south of the boundary of the former FFTA-MAAF burn pit and the new drainage ditch transects the former burn pit. With the exception of the drainage ditch and a low area east of the former burn pit, the surrounding area is relatively flat with a gentle grade to the south.

2.2 METEOROLOGY

Annual precipitation (measured at Station 724550, located at MAAF) from January 1981 through December 1990 ranged from a minimum of 15.67 inches to a maximum of 50.99 inches, with an average of approximately 34 inches per year (in/yr). The maximum 24-hour rain event during the same period was reported at 5.57 inches. The average temperature for the area is 55 degrees Fahrenheit (^{N}F). Temperature extremes range from a record low of –26 ^{N}F to a record high of 112 ^{N}F. Pan evaporation, measured by the U.S. Army Corps of Engineers (USACE) at Tuttle Creek Reservoir north of Manhattan, Kansas, averaged 47.13 in/yr between 1980 and 1997, with extremes of 37.39 in/yr minimum and 58.66 in/yr maximum.

Prevailing wind directions are variable. Winds are predominantly from the south and southwest during March through December, with winds predominantly from the north during the months of January and February. Wind speeds generally range from seven to ten miles per hour. Wind speeds of up to 110 miles per hour have been recorded at MAAF (personal communication, First Weather Group, Detachment 8, Fort Riley MAAF, 1998).

2.3 GEOLOGY

2.3.1 Regional Geology

The geology of the area consists of outcrops of Permian Age sedimentary rock overlain by Pleistocene and Recent eolian and fluvial deposits (Jewett, 1941). The Nemaha Anticline is the prominent structural feature in the area, and Fort Riley is situated on the western limb of this fold within the Salina Basin

(Merriam, 1963). Bedrock in the vicinity of Fort Riley dips gently (less than ten degrees) to the west-northwest, and consists of alternating beds of limestone and shale of the Permian Chase and Council Grove Groups. The Barnestone Formation of the Chase Group (composed of the Fort Riley Limestone, Oketo Shale, and Florence Limestone Members) is the youngest stratigraphic unit exposed in the upland areas. This sequence of interbedded limestone and shale continues to depths of several hundred feet. The bedrock surface has been eroded by the major rivers and streams, which generally flow to the east and south. No significant karst features have been identified on Fort Riley.

2.3.2 Site-Specific Geology

FFTA-MAAF is located on the alluvial floodplain of the Kansas River. Figure 2-1 shows the location of cross section A – A' (Figure 2-2), which is a diagrammatic depiction of the topography and geology across the entire Kansas River valley. The Site is underlain by approximately 70 feet of unconsolidated alluvial deposits, consisting predominantly of sand, with occasional clay and silt layers and some gravel. Alluvial deposits are probably thickest in the center of the Kansas River valley and thin toward the bluffs to the west and east. The locations of three profiles (cross sections B – B', C – C', and D – D') showing the geology beneath the Site and the area hydraulically down-gradient from the Site are shown in Figure 2-3. The geologic cross sections of this area are presented in Figures 2-4 (B – B') and 2-5 (C – C' and D - D'). The profiles were prepared using subsurface information obtained from drilling activities conducted during the SI and the RI. The geologic profiles show that the upper layers at or near the ground surface consist of either clay or silt. Below the clay and silt units, at a depth generally between 5 and 10 feet below ground surface (bgs), a sand unit is encountered that extends to the bedrock surface at a depth of 60 to 70 feet bgs beneath the Site. Within the sand unit, minor discontinuous lenses of clay or silt are present. Generally, the unconsolidated alluvial material displays a coarsening downward sequence typical of this type of geologic setting.

In summary, the Site is located within the river valley of the Kansas River. The material beneath the Site consists primarily of unconsolidated alluvial sand and gravel deposits (with minor discontinuous lenses of silt and clay) that tend to coarsen downward to the bedrock surface. The top of bedrock is at a depth of approximately 60 to 70 feet bgs, and is composed of limestone and shale units.

2.4 SURFACE WATER HYDROLOGY

The major river in the area is the Kansas River, which runs along the southern portion of the Fort Riley military reservation. Other large bodies of surface water include Milford Lake to the west, the Republican River (which drains Milford Lake), and the Smoky Hill River to the south. The Republican and Smoky Hill Rivers merge to form the Kansas River approximately two miles west of the Site. There are numerous other intermittent and perennial creeks and streams dissecting Fort Riley, all eventually feeding into one of the larger elements of the drainage network discussed above.

The Kansas River, at its closest point, is approximately 2300 feet west of the FFTA and flows to the north. The FFTA is separated from the Kansas River by levees designed for a 100-year flood; the FFTA was not flooded during the large-scale regional flooding that occurred in the Summer of 1993. All of MAAF is located within the 500-year floodplain (LBA, 1995e). Stream flow within the Kansas River is heavily regulated by Milford Reservoir and is typically less than 2,500 cubic feet per second (cfs). During the large-scale regional flood event during the Summer of 1993, peak discharge at Fort Riley was approximately 85,000 cfs. Releases from Milford Reservoir, as well as heavy local rainfall events on the lower drainage basins of the Republican and Smokey Hill Rivers, can result in "flashy" river discharge events, with a rapid rise in stage followed by a less rapid fall in stage.

Aerial photographs from 1954 through 1998 (Kansas Department of Revenue [KDR], 1954 through 1998) were used to determine past drainage patterns across MAAF. Prior to the operation of the FFTA-MAAF, surface water drained north toward the levee, then south and east along a swale adjacent to the levee. This water then discharged through a culvert (approximately 1600 feet southeast of the FFTA-MAAF) into the former oxbow lake located north of MAAF.

During the operational years of the FFTA (mid 1960s through 1984), photographic records suggest that surface drainage from MAAF was primarily toward the culvert to the east, via a drainage swale. However, a second culvert, northwest of the FFTA, may have carried some drainage from the FFTA through the levee toward the former oxbow lake. Surface drainage directly from the FFTA appeared to flow toward a topographic low northeast of the FFTA.

After training exercises ceased at the FFTA in 1984, a drainage ditch transecting the FFTA was constructed to divert surface runoff to the west and, via piping and a gate valve in the levee, to the Kansas River west of MAAF. This gate valve normally is kept open to allow drainage to the river, but is closed to prevent water from entering MAAF during times of flooding.

2.5 HYDROGEOLOGY

2.5.1 Regional Hydrogeology

The Fort Riley area lies within the Nonglaciated Central Region Groundwater Province (Heath, 1984). This region is hydrogeologically complex and is generally characterized by consolidated-rock aquifers having low yields. In the vicinity of Geary and Riley Counties, two types of aquifers are present. Consolidated Permian limestone and shale aquifers produce small quantities of groundwater (10 to 100 gallons per minute (gpm)) in the uplands areas. These aquifers are developed within fractures and cavities in the Permian Chase and Council Grove Groups (Buchanan and Buddemeier, 1993). In the river valleys, aquifers are developed within the unconsolidated alluvial sediments deposited by the rivers and major streams. These alluvial aquifers are usually unconfined and water wells completed on the floodplain have high yields in the hundreds of gallons per minute. This alluvial environment is the setting for the FFTA-MAAF Site.

2.5.2 Site-Specific Hydrogeology

The Site is underlain by the alluvial aquifer of the Kansas River valley. The aquifer is unconfined and controlled through its hydraulic connection with the Kansas River. This section discusses hydrogeologic data obtained during this investigation and hydrogeologic conclusions developed through the review of this data.

Basic hydrogeologic information collected during this investigation included river stage, water level measurements, and aquifer parameters such as porosity and hydraulic conductivity. Water level information, coupled with river stage data, was used to determine groundwater flow direction, flow gradients (both horizontal and vertical), and aquifer/river interaction. Groundwater levels have been measured at the Site since the initial seven monitoring wells were installed during the SI activities in October 1993. Additional monitoring wells and piezometers have been installed periodically since October 1993. As of September 1999, a total of 63 monitoring wells and piezometers were available for water level measurements, not including private wells. Table 2-1 lists the monitoring wells and piezometers installed at the Site, and provides specific construction data. Lithologic logs of the borings and construction diagrams for the monitoring wells and piezometers listed in Table 2-1 are provided in Appendix 2A. A generalized diagram showing the typical configuration of a typical monitoring well cluster is shown in Figure 2-6. The screened interval of the shallow zone averages from 11 to 26 feet bgs, the screened interval of the intermediate zone averages from 49 to 59 feet bgs, and the screened interval of the deep zone averages from 56 to 66 feet bgs.

Periodic measurements of water levels in monitoring wells and piezometers have been made throughout this investigation. This water level elevation data is presented in Table 2-2. These measurements are used in conjunction with the surveyed well elevations to generate maps depicting the piezometric surface beneath the Site. Groundwater elevation maps, which show typical conditions as of June 1998 and May 1999, are presented as Figures 2-7 through 2-12 for the shallow, intermediate, and deep zones of the aquifer. Groundwater elevations generally have ranged between 1036 and 1043 feet above mean sea level (msl), or approximately 20 to 25 feet bgs. Groundwater flow within the alluvium is generally toward the north-northeast, in the downgradient direction of the Kansas River parallel to the alluvial valley. The flow direction has remained consistent along the axis of the plume, extending north-northeast from the former location of the FFTA-MAAF. However, there is variability in the direction of groundwater flow to the west of the Site, along the Kansas River. Here the groundwater flow can be either towards or away from the river, depending on whether the Kansas River is acting as a gaining or a losing stream. When behaving as a gaining stream, the water level in the river is lower than the water level in the aquifer and groundwater provides flow to the river. As a losing stream, the water level is higher in the river than the surrounding alluvial aquifer and the river provides recharge to the aquifer. The river stage, when compared to the water level in the alluvial aquifer, may explain occasional observed minor variances in the direction of groundwater flow near the Site.

Several sets of hydrological and hydrogeological data were available to assist in determining the nature of the groundwater/surface water interaction. As mentioned above, periodic manual measurements of water levels have been made since October 1993. In addition, continuous water level measurements have been made at selected monitoring wells and piezometers with sensors installed and maintained by the United States Geological Survey (USGS). The first monitoring well so equipped was FP-93-07, which has been providing water level data continuously since May 1995. Subsequently, additional continuous measurement devices have been installed on the following monitoring wells and piezometers: FP-96-13PZ, FP-96-15PZ, FP-96-20, FP-96-21, FP-96-23, FP-96-23c, FP-96-26, FP-98-27, FP-98-29, FP-98-31, FP-98-31c, FP-99-32, FP-99-32c, FP-98-39PZ, and FP-98-40PZ. Continuous measurements of the Kansas River stage and discharge have been made at the Henry Drive Bridge, on Fort Riley, throughout the course of this investigation. Daily precipitation data (for Manhattan, Kansas) is available from the National Climatic Data Center (NCDC). Precipitation has been remotely measured by the USGS at Monitoring Well FP-93-07 since May 1999.

The hydrologic interaction between the Kansas River and the alluvial aquifer is complex at the Site. Interpolated river stage elevations along the reach just west of the Site indicate that conditions can be losing, gaining, or both losing and gaining stream conditions can exist simultaneously along different reaches of the River. Additional factors controlling the hydrogeology of the alluvial aquifer include the contribution of water from adjacent bedrock aquifers in the uplands areas and infiltration of precipitation.

The Kansas River stage rises and falls rapidly in response to precipitation events and discharge from Milford Reservoir. This is clearly shown in Figure 2-13, which shows the river stage for 1998. The water table rises and falls seasonally in response to changes in the river stage, and to recharge from precipitation and bedrock. In general, the alluvial aquifer is slow to respond to changes in the river stage and the degree of response diminishes with distance from the river. Much of the rapid fluctuation in the water table in the immediate vicinity of the Kansas River probably represents short-term bank storage of water, which occurs during periods of rapid rise in river stage. An evaluation of over 30 years of hydrograph data from the Henry Drive Bridge station indicates that approximately 14 percent of the time, the Kansas River stage is rising in the vicinity of MAAF, while about 86 percent of the time, the stage is stable or falling. During those periods when the river stage is rising, the duration of the rise is two days or less (Pers. Comm., 1998a). The Kansas River loses water to bank storage during those periods when the river stage is rising. If the river stage falls shortly after rising, much of the water in bank storage will quickly return to the river. Comparison of Monitoring Well FP-93-07 and Piezometer FP-96-13PZ clearly demonstrate the differing aquifer responses in the immediate vicinity and away from the river. Changes in the water table at Monitoring Well FP-93-07 (located approximately ½ mile from the river) are subtle in comparison to the relatively rapid rise and fall of the river stage (see Figure 2-13). Water table fluctuations at Monitoring Well FP-93-07 are typical of most shallow, intermediate, and deep monitoring wells at the Site. In comparison, Piezometer FP-96-13PZ, located approximately 1000 feet from the river, is quicker to respond to changes in river stage (Figure 2-13). Here the Kansas River is losing water to bank storage during periods when the river stage is rising. Once the river stage falls, the elevation of the river becomes lower than the elevation of the water table at Piezometer FP-96-12PZ, indicating that water is flowing from the vicinity of the piezometer to the river and water in bank storage is returning to the Kansas River, thereby indicating gaining stream conditions. This suggests that much of the hydrogeologic interaction between the aquifer and the river along this reach is concentrated within several hundred feet of the riverbank.

Water level elevation maps prepared from manual measurements provide information for determining the general nature of groundwater flow within the Kansas River valley. There appears to be no strong correlation between seasonal precipitation and whether the river is in a gaining or losing condition. This is probably because the discharge control from Milford Reservoir operates independent of seasonal precipitation. Figure 2-14 depicts typical configurations of the piezometric surface under gaining stream and losing stream conditions. During January 1999, groundwater west of the FFTA was flowing toward the Kansas River (gaining conditions), while in May 1999, groundwater was flowing from the Kansas River into the alluvial aquifer (losing conditions). As discussed previously, gaining or losing river conditions west of FFTA do not appear to impact the direction of groundwater flow downgradient of the FFTA.

Both horizontal and vertical groundwater gradients were calculated using groundwater level data collected during the investigation. For any one sampling event, the horizontal component of the hydraulic gradient has typically been in the range of 0.0006 to 0.0009 feet per foot (ft/ft). A comparison of hydraulic gradients for the various water level measurement events throughout the course of the investigation indicates that the hydraulic gradient has not varied significantly outside of this range. The typical vertical component of the hydraulic gradient as determined by comparison of hydraulic heads within paired shallow and deep monitoring wells at different locations in the project area, and at different times, ranges from a negative 0.0031 ft/ft to positive 0.0034 ft/ft.

Aquifer parameters have been calculated from data collected during aquifer pumping tests performed at various areas at Fort Riley and along the Kansas River valley. These tests were performed by contractors to both private entities and USACE for the purpose of constructing water supply wells. An aquifer-pumping test was also performed at MAAF for the purpose of potentially constructing a small groundwater production facility for use during airfield operations. In addition to the aquifer pumping tests, slug tests were performed on eight monitoring wells installed at the Site in June 1996 during expanded SI activities. Information collected includes the following:

- Mean value of horizontal hydraulic conductivity for 18 aquifer pumping tests of the Kansas River Valley alluvium, from Manhattan, Kansas to Kansas City, Kansas was 675 feet per day (ft/day) (Myers et. al., 1996; Fader, 1974). The three aquifer tests nearest Junction City, Kansas reported horizontal hydraulic conductivities ranging from 750 feet/day to 910 feet/day (Myers et. al., 1996; Fader, 1974).

- A seven-day pumping test was conducted in the Republican River alluvium by the USACE in 1975. Horizontal hydraulic conductivity ranged from 460 feet/day to 1,030 feet/day and averaged 820 feet/day (Myers et. al., 1996; USACE, 1975).

- A ten-hour aquifer test was performed approximately 7,000 feet southwest of the FFTA at MAAF by the USACE in 1983. Horizontal hydraulic conductivity ranged from 605 feet/day to 723 feet/day and averaged 664 feet/day, based on a saturated thickness of 45 feet (USACE, 1983). Wells used for this aquifer test were screened from the water table to bedrock (the saturated thickness of the aquifer).
- Values for horizontal hydraulic conductivity calculated from aquifer slug tests at the Site ranged from 16 to 30 feet/day. Differences in the calculated horizontal hydraulic conductivity values between the pumping tests and the slug tests might be explained by the difference in areas measured during the tests. Aquifer pumping tests provide an estimate of the saturated subsurface area between the pumped well and the observation wells, whereas slug tests provide an estimate of the horizontal hydraulic conductivity for the saturated material immediately surrounding the well. In addition, slug tests often do not provide representative values for hydraulic parameters in coarse-grained media.

- Values for horizontal hydraulic conductivity calculated from grain size data ranged from 47 to 694 ft/day (Table 2-3). These results also demonstrate increasing values of horizontal hydraulic conductivity with depth. Using the average of two methods (Hazen, 1991 and Shepherd, 1989), horizontal hydraulic conductivity was estimated to be 100 ft/day, and 181 ft/day, and 278 ft/day for the shallow, intermediate, and deep zones, respectively.

A complete summary comparing results between aquifer pumping test and slug test data conducted in the Fort Riley area was presented in the *Data Summary Report for Pre-Remedial Investigation (Slug Tests and Soils Data) for the Expanded Site Investigation Former Fire Training Area Marshall Army Airfield Fort Riley, Kansas and Nearby Off-Post Properties*, LBA, 1996b) [*Soils Data*].

Measurements were made of the porosity of the alluvial sediments. Effective porosity has been measured using the Soil Science Society of America (SSSA) Method 36-2231 (Part 1) for three shallow well borings completed at the Site: FP-96-18, FP-96-19, and FP-96-21 (Table 2-4) (LBA, 1996b). Effective porosity is defined as the porosity through which flow can occur (Fetter, 1993). Therefore, non-interconnected and dead-end pores are not included in the effective porosity. Of the nine samples collected from these borings, three samples represent a clay soil. Since aquifer materials at the Site are predominately fine to coarse sand, the samples representing a clay soil were excluded from the calculations of average effective porosity. This allowed for an average effective porosity that more closely represented aquifer conditions at the Site. The measured effective porosity (excluding clay samples) ranges from 0.31 to 0.40, with a mean of 0.35.

The parameters of bulk density and total organic carbon (TOC) were also measured from samples taken from selected borings in the field. Bulk density at MAAF was measured using United States Bureau of Reclamation (USBR) Method 5372-89 for three well borings collected at the Site: FP-96-18, FP-96-19, and FP-96-21 (LBA, 1996b). Of the nine samples collected from these borings, three samples represented a clay soil. Since aquifer materials at the Site are predominantly fine to coarse sand, the samples representing a clay soil were excluded from bulk density estimates. This allowed for an average bulk density that more closely represented aquifer conditions at the Site. The mean bulk density for samples collected at the Site was 1.6 grams per cubic centimeter (g/cm^3) (see Table 2-4). TOC was measured in samples from these same three borings, plus FP-96-20c, FP-96-23c, and FP-96-26c. As discussed above, clay samples were excluded from the analysis. Average TOC values were 3,300 milligrams per kilogram (mg/kg), 7,300 mg/kg, and 13,600 mg/kg for the shallow, intermediate, and deep zones, respectively (see Table 2-5).

2.6 SOILS

The United States Department of Agriculture (USDA) Soil Conservation Service, in cooperation with the Kansas Agricultural Experiment Station, has previously designated the soil type typically found at MAAF in the area of the FFTA-MAAF as the Haynie Series of the Eudora-Haynie-Sarpy association. This soil is described as very fine sandy loam soil that consists of deep, nearly level, calcareous soils on floodplains along the rivers. These soils form in calcareous alluvium (USDA, 1975).

In a representative profile, the surface layer is light brownish-gray, very fine sandy loam, approximately ten inches thick. Light brown-gray coarse silt loam is encountered at a depth of ten to 20 inches bgs. Gray very fine sandy loam is at a depth of 20 to 30 inches bgs, and light gray very fine sandy loam is at a depth of 30 to 41 inches bgs. All of these layers are soft when dry and are very friable when moist. Grayish-brown silty clay loam is at a depth of 41 to 47 inches bgs. This layer is hard when dry and firm when moist. Light brownish-gray light silty clay loam extends from a depth of 47 to 60 inches bgs. This soil is easily tilled. It takes in water well and releases it readily for plant use. It has high available water capacity and is subject to flooding (USDA, 1975).

Shallow soils encountered while drilling during the SI were consistent with the descriptions for the Haynie Series; the soils observed had a light brown sandy surface underlain by organic silts, silty clays and clays. However, in the area of the former burn pit, the upper soil layer was distinctively darker than surrounding soils, with a higher silt and organic content.

2.7 DEMOGRAPHY

Fort Riley's manpower strength was 10,256 military personnel and 3,312 civilians as of September 30, 1998. In addition, 12,387 military family members (dependents) were housed on Fort Riley (Pers. Comm., 1999a). The majority of personnel at Fort Riley are housed on the Custer Hill cantonment area. Daily occupancy at MAAF ranges from 150 to 200 people. There are 11 family housing units for active-duty personnel located on MAAF approximately ½ mile southwest of the FFTA-MAAF.

The properties surrounding MAAF consist of a seasonal use racetrack, undeveloped land, and farmland. In addition to the other cantonment areas of Fort Riley (all of which are within four miles), the following towns are within four miles of the Site: Junction City (adjacent to the south of the post, including Grandview Plaza) and Ogden (approximately 3.8 miles to the northeast).

The approximate populations of the surrounding towns according to the 1990 census are: Junction City (20,642), Grandview Plaza (1,233), and Ogden (1,494) (U.S. Department of Commerce [USDoC], 1990). Population projections for the year 2000 according to the Kansas Water Office (KWO) are: Junction City (21,711), Grandview Plaza (1,281), and Ogden (1,301) (KWO, 1999).

Junction City is in Geary County; Ogden is in Riley County. According to the 1990 census data, there is an average of 2.58 persons per residence in Riley County, which has a population of 67,139 persons, and 2.71 persons per residence in Geary County, which has a population of 30,453 persons. According to the Institute for Public Policy and Business Research (IPPBR) at the University of Kansas, the 1998 projected population for Riley County is 63,615 persons and the 1998 projected population for Geary County is 25,370 persons (IPPBR, 1999).

A few private residences are scattered in the primarily agricultural land area north of the Site. The property adjacent to the installation boundary north of the FFTA is a seasonal racetrack (dirt track) for racing motor vehicles.

2.8 LAND ZONING AND WATER USE

2.8.1 Land Zoning

Figure 2-15 shows land uses zoned by Geary County in the area north of the FFTA. Geary County zoning regulations are presented in Appendix 2B. The FFTA is part of the Fort Riley reservation and as such is not zoned by the county. The FFTA is at the northern edge of MAAF, just beyond the airport perimeter road.

Land use on MAAF is related to the operation of an active military airfield. The level of activity at MAAF has decreased significantly over the past few years due to reassignment of aviation units to other bases. However, land use for MAAF in the short and long term is expected to continue to be active military. Land use on the Fort Riley reservation is provided in Appendix 2B.

The Department of Defense (DoD) requires the establishment of aircraft safety zones near military airfields. According to the *Installation Compatibility Use Zone Study* (ICUZ), prepared for Fort Riley by Robert and Company (Robert & Company, 1993) [Updated in 2000], the FFTA-MAAF lies west of aircraft accident potential zones (APZ), APZ-I and APZ-II. APZ-I is designated as an approach safety zone and APZ-II an accident potential zone. These zones are shown in Figure 2-16.

DoD guidelines, as stated in ICUZ, prevent uses in aircraft zones which have a high residential density, large numbers of workers, concentrate (*sic*) of people not able to respond well to emergencies, among other restrictions. ICUZ also states DoD policy that structures should be located toward the edges of this zone wherever possible. Although there is currently little aircraft activity at MAAF, ICUZ points out that development should still be limited. Given the small amount of fixed wing activity at MAAF, the APZ-I and APZ-II are of little concern. However, attention should be given to limiting development in the APZ-I zone in order to preserve the opportunity to safely accommodate expanded fixed-wing activities in the future. (Robert & Company, 1993)

Also associated with MAAF are aircraft noise level zones. Noise level zoning is established based on noise as a nuisance or as a health concern. The FFTA-MAAF falls within noise level Zone II. Zone II, as it pertains to transportation-related noise, is an average day-night sound level (DNL) range of 65 to 75 decibels. Zone II is defined as normally unacceptable and means that 15 to 39 percent of a population would be highly annoyed with this level of noise. Noise zoning near the FFTA-MAAF is also shown in Figure 2-16.

The MAAF levee is immediately north of the FFTA. The levee was designed by the USACE and constructed by Fort Riley to prevent flooding of MAAF by the Kansas River during 100-year flood events. The USACE does not manage the levee and, therefore, cannot place restrictions on activities near it. In general, USACE policy regarding development near levees is to prohibit construction within 500 feet of the landward side of the toe of a levee or the edge of a seepage berm, or within 300 feet of the riverward side (Pers. Comm., 1996a).

A small triangular tract of property north of the levee and the racetrack road is owned by the Fort Riley reservation, but is leased as a safety zone to Plaza Speedway (referred to as Junction City Raceway on the property lease). The lease agreement restricts construction of any permanent structure on the subject property.

The actual racetrack north of the FFTA is zoned commercial by Geary County. Commercial zoning does allow the use of a mobile home for sales, but not for residence. Because it is in the 100-year floodplain, future development of this property for other commercial uses is unlikely. Geary County zoning regulations impose building restrictions within the floodplain that require the bottom finished floor of the structure to be a minimum of one foot above flood level, i.e., 326 meters (1067 feet) above msl (Pers. Comm., 1996). Ground surface elevation near the Site ranges from 1050 to 1060 feet above msl.

Property west of the racetrack is zoned by Geary County for agricultural use. Residential and other public institutions could be permitted by the county in agricultural districts, as defined in the *Geary County Zoning Regulations* prepared by Bucher Willis & Ratliff for the county (1986). However, because the location of this land is within the Kansas River 100-year floodplain, development of this kind is not likely to occur in the future.

2.8.2 Water Use

Groundwater is the primary source of drinking water for Fort Riley and many of the surrounding communities. Alluvial sand and gravel deposits in the Kansas and Republican River valley areas are excellent aquifers. In the upland areas, bedrock is also tapped as a source of water. Potential users of the alluvial aquifer and the limestone bedrock aquifers are identified in this section.

As part of the SI, groundwater users were evaluated within four miles of the Site. Results of this evaluation are presented in the SI (LBA, 1995e) [*FFTA-MAAF SI*]. This information was reviewed and updated as appropriate for this report.

2.8.2.1 Alluvial Aquifer

Fort Riley, Morris County Rural Water District, and the communities of Junction City and Ogden rely on groundwater withdrawn from alluvial materials for their drinking water supplies. Fort Riley has eight active wells, Junction City has nine active wells, Ogden has three active wells (USAEHA, 1992; LBA, 1995e [*FFTA-MAAF SI*]), and Morris County Rural Water District has three active wells. Although the Morris County Rural Water wells are located in Geary County near the site, the water is piped to Morris County located approximately 15 miles south of the site on the southern edge of Geary County. Ogden also provides water to a rural water district in Riley County. The wells for Ogden and Junction City are more than four miles from the Site and the Morris County Rural Water District Wells withdraw water from the Clark Creek alluvial materials which are hydraulically separated from the Kansas River alluvial materials.

The Fort Riley water supply wells are located approximately four miles upgradient (west) of the Site near Camp Forsyth. The nearest water supply well (used as a backup well) is in Building 801 at MAAF, within one mile of the Site. This well is east of the airfield and south (upgradient) of the Site. The purpose for the well at Building 801 is to service the airfield in the event of an emergency affecting the Fort Riley water distribution system.

According to the KWO, the projected water demand in millions of gallons by public water supplier is as follows:

Water Supplier	Year 2000	Year 2010
Grandview Plaza	47	48
Junction City	1,117	1,158
Fort Riley	715	715
Ogden	82	82

These projected demands indicate that large increases in water use are not expected. Therefore, it is unlikely that in the next ten years new well fields would be required to meet demands.
There are ten private wells north of the FFTA. Nine of these wells (identified as Wells F-1, F-2, I-1, M-1, N-1, R-1, R-2, R-3, and R-4) are located within the Kansas River valley and one well (identified as Well B-1) appears to be near the margin of the valley and the upland terrace. Of the nine wells located in the river valley, two are reported to presently supply water to residences for domestic use (Wells M-1 and N-1). Wells F-1 and F-2 are located at an abandoned trailer house; one of these wells is reported to supply water for livestock. Wells R-1, R-2, R-3, and R-4 are located at the racetrack; two are used for utility reasons (nonconsumptive) and two wells are not used. The operators of the speedway were denied a permit to use Well R-1 for public water supply in 1993, based on analytical results from a sample collected from the well. Well I-1 is an irrigation well approximately 2400 feet north (downgradient) of the FFTA. During calendar years 1997 and 1998, water use from this well was reported to be 25.1 million gallons and 15.6 million gallons, respectively. The tenth well (identified as Well B-1) is located at a residence approximately 6,000 feet northeast of the Site near the edge of the river valley. This well supplies water to a residence for domestic use.

Based on analytical results collected from the ten private wells, only three wells (Wells R-1, R-2, and M-1) appear to have been impacted by previous activities at the FFTA. Six wells (Wells F-1, F-2, N-1, R-3, R-4, and B-1) are located outside the area which is expected to be impacted by the contaminant plume. Well I-1 has experienced detections of 1,2-dichloroethene (1,2-DCE) during sampling events. In August 1997 and May 1998 these detections were 1.9 micrograms per liter (µg/L) and 0.6 µg/L (while pumping), respectively. However, there have been no detections of chlorinated solvents since these sampling events.

2.8.2.2 Bedrock Aquifers

Groundwater flow beneath Fort Riley is much greater in the unconsolidated material within the alluvial aquifer than the bedrock aquifers beneath the upland areas. Therefore, minimal movement of groundwater from the alluvial aquifer to the adjacent bedrock aquifer is expected, since groundwater flow in the alluvial aquifer is dominantly to the Kansas River rather than to the bedrock aquifer. Private residences in the upland areas, outside of town limits, use private wells. Many of the rural residences surrounding Fort Riley are located in the upland areas, and their wells tap bedrock aquifers. To provide sufficient quantities of groundwater, these wells often penetrate several different limestone strata. In general, bedrock formations yield sufficient groundwater for use only if the secondary porosity of the formations is adequate.

2.9 ECOLOGY

The FFTA-MAAF and surrounding area are located within the floodplain of the Kansas River. This area has been extensively modified from its original setting. Historically, the region would have consisted of bottomland forests and tall grass prairies. Settlement by Euro-American settlers resulted in dramatic changes for the area, primarily as a result of conversion to agriculture, and later for use as a military facility. Currently, stands of woodland, representative of those previously present, occur in small isolated areas, on steep slopes, and along the Kansas River. No plots of tall grass prairie were observed during site reconnaissance on or in the vicinity of the FFTA-MAAF. The area currently consists of a mosaic of upland and riparian woodland, cropland, pasture/hayfield, and lawn (see Figure 2-17).

Upland forests in the Site area are limited to the eastern portions of the Site. These forests are found along the slope face leading out of the Kansas River floodplain and are above the 100-year floodplain. Upland forests in this area, observed during October 1999, are second growth woodlands which consist of red oak (*Quercus rubra*), bur oak (*Quercus macrocarpa*), chinquapin oak (*Quercus muhlenbergii*), cottonwood (*Populus deltoides*), American elm (*Ulmus americana*), and bitternut hickory (*Carya cordiformes*) in the canopy. The shrub layer contained redbud (*Cercis canadensis*), small eastern red cedar (*Juniperus virginiana*), sumac (*Rhus* sp.), buckbrush (*Symphoricarpus orbiculatus*), and green ash (*Fraxinus pennsylvanica*). Herbaceous species within the woodland and along the transecting roadway included poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), grape (*Vitis* sp.), foxtail (*Alopecurus* sp.), green briar (*Smilax* sp.), sunflower (*Helianthus* sp.), elderberry (*Sambucus canadensis*), morning glory (*Ipomoea* sp.), wood sorrel (*Oxalis montana*), snow-on-the-mountain (*Euphorbia marginata*), and plantain (*Plantago major*).

The remainder of the Site lies within the 100-year floodplain of the Kansas River. The majority of the Site was observed to be agricultural land. Outside the post, agricultural land consists of both cropland and hayfield. Hayfield areas were predominantly smooth brome (*Bromus inermis*) and fescue (*Festuca* sp.) with a variety of weedy annuals sparsely scattered throughout the field.

Riparian forests occur mainly as a band alongside the Kansas River. Tree species present in this community include American elm, red elm (*Ulmus rubra*), cottonwood, black willow (*Salix niger*), hackberry (*Celtis occidentalis*), green ash, red cedar, honey locust (*Gleditsia triancanthos*), and mulberry (*Morus rubra*). Little shrub and herbaceous growth was present in this community. The area appeared to have been heavily disturbed during flood events over the last five years. Abundant, irregularly deposited, unvegetated sand, was present. Shrubs present included saplings of the dominant trees mentioned. Herbaceous species were sparsely scattered and included mullein (*Verbascum thapsus*), dayflower (*Commelina virginica*), poison ivy, Virginia creeper, sedge (*Carex* sp.), rice cutgrass (*Leersia oryzoides*), and bur oak seedlings.

The remaining areas off-post include revegetated grasslands and lawn. Revegetated grasslands include areas subject to past disturbance which have been revegetated. Portions of these areas are subject to periodic mowing, others receive no regular maintenance. These grasslands are dominated by brome and fescue, species probably used to establish vegetative cover following disturbance to these areas. However, numerous annual and perennial species, including trees, also occur within these communities. Additional species observed include black willow, hackberry, mulberry, honey locust, eastern red cedar, bitternut hickory, green ash, goldenrod (*Solidago* sp.), morning glory, bindweed (*Convolvulus* sp.), sunflower, crabgrass (*Digitaria sanguinalis*), smartweed (*Polygonum* sp.), sumac, milkweed (*Asclepias* sp.), bristle grass (*Setaria* sp.), ragweed (*Ambrosia* sp.), and rough-leaved dogwood (*Cornus drummondii*). Lawn areas are found around the race track. They occupy open space and serve as parking areas. These areas are mowed on a regular basis and are dominated by fescue, brome, and bluegrass (*Poa* sp.).

Wetlands near the Site include two small isolated ponds, an emergent area within a portion of the former oxbow lake, and scattered shrub/scrub and forested wetlands along the Kansas River. Wetlands along the Kansas River include vegetated sandbars immediately adjacent to the river and riparian woodlands. Sandbar areas are unstable and unable to support diverse and dense vegetation. They contain primarily willow species (*Salix* sp.). Riparian woodlands, also classified as wetlands, contain the same species as noted previously. Ponds are unvegetated and located within riparian woodlands. Vegetation surrounding them would be consistent with other riparian woodlands along the Kansas River. An emergent wetland is present within a portion of an old oxbow of the Kansas River. This former lake was the former channel of the Kansas River that has been cut off and filled with silt and sand during flood events. About half of the former lake is wetland; the remainder, including a small portion at the north end and most of the southern half, are currently cropped. The wetland portion of the lake contained cattail (*Typha* sp.), black willow, smartweed, sedge, river bulrush (*Scirpus fluviatilis*) and canary grass (*Phalaris arundinacea*).

The Fort Riley area lies within a transition zone between eastern deciduous forests and the grass prairies of the Great Plains. Thus, the wildlife present represent a combination of species specific to each environment as well as those adapted for more transitional habitats. The lack of prairie habitat in the Site area and the overall reduction of this habitat in the region make it unsuitable for most prairie species. However, those able to adapt to agriculture, particularly hayfield habitats, likely still occur in the area. Riparian and upland woodlands provide some habitat for forest species. However, overall wildlife habitat is created by the mosaic of different habitats which creates an edge effect between two or more different habitats. An edge is a transition zone between habitats that has characteristics of the habitats on either side of it. It generally contains a more diverse and productive assemblage of plants and wildlife than the habitats producing it. Thus, the wildlife at the Site include a mix of grassland and woodland species, many adapted to edge environments.

The Fort Riley area supports a wide variety of wildlife, adapted to a variety of habitat types. Numerous species were observed in the project area during the October 1999 field reconnaissance. Those species observed, and others not observed but expected to occur, are listed in Table 2-6.

Additional wildlife habitat is provided by the Kansas River. The river provides habitat for a variety of shorebirds, waterfowl, and furbearers, as well as maintaining a fishery. Wildlife species expected to use riverine areas include those mentioned previously in Table 2-6. Numerous fish species typical of a large, sand bottom, warm water rivers occur in the Kansas River. Representative species expected to be present are listed in Table 2-7.

In addition to the common flora and fauna of the area, several species listed as federally threatened or endangered may also exist near the Site. Numerous threatened and endangered species potentially occur in Riley and Geary Counties. However, the only species likely to use the Site include the bald eagle (*Haliaeetus leucocephalus*) and sturgeon chub (*Hybopsis geldia*). Bald eagles are known to use the areas adjacent to the Kansas River in winter for perching, roosting, and feeding. Peregrine falcons have been observed in the area, and like the bald eagle, use the area during fall and winter migration. Bald eagles and peregrine falcons rely heavily on waterfowl during the winter; the open water of the Kansas River provides habitat for this food source. Open water also provides areas for eagles to fish. Sturgeon chub historically occurred throughout the Kansas River system and may still occur within the mainstream Kansas River, although in low numbers. Critical habitat designated by the Kansas Department of Wildlife and Parks for the bald eagle and sturgeon chub includes that portion of the Kansas River adjacent to the Site.

Information on potential plant and animal receptors and the potential for ecological risk to these receptors at the FFTA-MAAF is presented in Section 9.0, Environmental Evaluation.

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Table 2-1
Well and Piezometer Construction Data
FFTA-MAAF Remedial Investigation Report

Well Number	Surface Elevation (feet)	TOC Elevation (feet)	Total Depth (feet bgs)	Screened Interval (feet)	Length of Screen (feet)	Top of Screen Elevation (feet)	Well Coordinates	
							Northing	Easting
FP-93-01	1056.05	1058.94	25	5-25	20	1051.05	268048.35	1665024.49
FP-93-02	1057.94	1060.15	31	6-31	25	1051.94	267934.69	1665356.34
FP-96-02b	1057.24	1060.03	51.6	41.6-51.6	10	1015.64	267936.71	1665363.85
FP-96-02c	1057.59	1060.64	67.7	57.1-67.1	10	1000.49	267940.35	1665351.97
FP-93-03	1054.59	1057.38	24	4-24	20	1050.59	267859.06	1665660.92
FP-93-04	1056.03	1058.82	31.3	6-31	25	1050.03	267774.71	1665107.23
FP-96-04b	1056.05	1058.88	47.3	36.7-46.7	10	1019.35	267779.45	1665114.15
FP-96-04c	1056.01	1058.76	66.2	54.6-64.6	10	1001.41	267782.38	1665105.06
FP-93-05	1056.05	1059.11	31	6-31	25	1050.05	267679.81	1665324.80
FP-93-06	1056.00	1058.50	30	5-30	25	1051	267625.27	1665545.88
FP-93-07	1056.62	1059.66	24	4-24	20	1052.62	267347.38	1665151.89
FP-96-07c	1056.63	1058.91	66.7	55.5-65.5	10	1001.13	267338.57	1665158.46
FP-94-08	1054.47	1057.42	22	12-22	10	1042.47	268771.46	1664724.73
FP-94-09	1060.22	1061.12	27.5	17.5-27.5	10	1042.72	268854.81	1665507.08
FP-96-09B	1060.40	1063.25	51	40.5-50.5	10	1019.9	268814.09	1665489.62
FP-96-09C	1060.50	1063.37	69.7	59.2-69.2	10	1001.3	268814.22	1665477.94
FP-94-10	1060.27	1062.52	27.2	17.2-27.2	10	1043.07	268668.23	1666197.17
FP-94-11	1048.42	1048.09	15.3	5.3-15.3	10	1043.12	268373.41	1665341.25
FP-94-12PZ	1053.27	1054.70	19.8	9.8-19.8	10	1043.47	267949.83	1662895.36
FP-96-13PZ	1055.47	1056.51	29.5	17.5-29.5	12	1037.97	269001.76	1663850.77
FP-96-14PZ	1053.88	1055.77	28	16-28	12	1037.88	268415.38	1664596.75
FP-96-15PZ	1055.74	1057.26	27.90	15.9-27.9	12	1039.84	268070.35	1663847.53
FP-96-16PZ	1058.27	1059.77	29.40	17.4-29.4	12	1040.87	267916.55	1664557.55
FP-96-17PZ	1057.26	1058.52	29.60	17.6-29.6	12	1039.66	267454.51	1664574.06
FP-96-18	1051.75	1054.55	22.3	6.3-22.3	15.5	1045.45	268404.46	1665134.78
FP-96-19	1046.81	1046.58	15.8	5-15.8	10.3	1041.81	268313.74	1665622.16
FP-96-20	1059.97	1063.16	31.3	15.2-30.8	15.6	1044.77	268905.31	1665253.03
FP-96-20b	1060.30	1063.71	51.5	41-51	10	1019.3	268911.84	1665251.20
FP-96-20c	1060.30	1063.72	69.7	59.2-69.2	10	1001.1	268913.47	1665252.66
FP-96-21	1060.13	1059.79	31.6	15.2-31.1	15.9	1044.93	268722.81	1665881.14
FP-96-21b	1060.32	1060.04	51.1	40.41-50.4	9.99	1019.91	268729.40	1665886.45
FP-96-21c	1060.24	1059.89	70.8	60.22-70.2	9.98	1000.02	268730.80	1665876.36
FP-96-22	1058.89	1061.86	30.1	13.72-29.6	15.88	1045.17	269705.01	1665313.32

Table 2-1 (Continued)
Well and Piezometer Construction Data
FFTA-MAAF Remedial Investigation Report

Well Number	Surface Elevation (feet)	TOC Elevation (feet)	Total Depth (feet bgs)	Screened Interval (feet)	Length of Screen (feet)	Top of Screen Elevation (feet)	Well Coordinates	
							Northing	Easting
FP-96-23	1056.79	1060.01	31.6	15.1-31.1	16	1041.69	269576.51	1665690.97
FP-96-23b	1057.00	1060.05	49.9	39.4-49.4	10	1017.6	269589.39	1665692.50
FP-96-23c	1056.90	1059.99	66.2	55.8-65.8	10	1001.1	269600.88	1665692.21
FP-96-24	1056.88	1059.96	31	14.91-30.5	15.59	1041.97	269416.88	1665988.69
FP 96-25	1046.60	1046.19	16	6-16	10	1040.6	268310.43	1665496.41
FP 96-25b	1046.40	1046.05	36.5	26-36	10	1020.4	268316.89	1665505.71
FP 96-25c	1046.40	1045.75	56.3	45.8-55.8	10	1000.6	268323.544	1665497.17
FP 96-26	1059.60	1059.15	26	11-26	15	1048.6	268654.79	1665656.42
FP 96-26b	1059.50	1059.23	47.1	36.6-46.6	10	1022.9	268656.491	1665650.91
FP 96-26c	1059.50	1059.27	70.1	59.6-69.6	10	999.9	268661.41	1665650.96
FP 98-27	1056.43	1059.02	25	11.34-27.8	16	1045.9	270367.92	1665965.11
FP 98-27b	1056.44	1059.01	49	40.96-50.97	10.1	1013.1	270381.05	1665964.01
FP 98-27c	1056.43	1058.98	65.1	54.8-64.8	10	1001	270391.809	1665963.12
FP 98-28	1053.19	1055.69	23.3	9.8-25.8	16	1045.9	271305.226	1665837.52
FP 98-28b	1053.3	1055.74	50.1	42.6-52.6	10	1013.1	271317.845	1665837.8
FP 98-28c	1053.42	1055.75	64.8	54.8-64.8	10	1001	271328.61	1665838.10
FP 98-29	1055.66	1058.40	25	11.37-27.3	16	1047	271301.81	1666443.62
FP 98-29b	1055.76	1058.24	48	40.49-50.49	10	1017.8	271313.91	1666443.75
FP 98-29c	1055.87	1058.31	64.9	57.3-67.3	10	1001	271327.312	1666444.37
FP 98-30	1054.9	1057.48	24	10.3-26.3	16.3	1041.2	270931.178	1666783.76
FP 98-30b	1054.83	1057.3	47.3	39.8-49.8	10	1097	270944.978	1666783.07
FP 98-30c	1054.67	1057.24	66.6	59-69	10	998.2	270959.16	1666782.56
FP 98-31	1058.52	1061.13	28	14.2-30	15.8	1058.8	271936.70	1666786.31
FP 98-31b	1058.56	1061.15	49.3	41.7-51.7	10	1058.7	271937.51	1666775.11
FP 98-31c	1058.64	1061.17	69.7	62.2-72.2	10	999	271937.543	1666764.81
FP 99-32		1055.26	29.24	9.54-26.2	16.7		273528.61	1667837.37
FP 99-32b		1055.32	50.4	37.6-47.6	10		273536.858	1667843.5
FP 99-32c		1055.24	68.9	58.1-68.1	10		273544.797	1667849.8
FP-99-39PZ	1055.88	1058.49	27	10.6-26.5	15.9	1045.3	271732.80	1664432.76
FP-99-40PZ	1055.50	1058.31	28.9	12.6-28.4	15.8	1042.9	271894.02	1669120.65

Notes:

Elevations are presented in feet above mean sea level

TOC = Top of casing

bgs = Below ground surface

The above coordinates are provided in Kansas State Plane north zone. Units are in feet.

The projection is polyconic, based on the 1983 North American Datum (NAD83).

Table 2-2
RI Groundwater Elevations
FFTA-MAAF Remedial Investigation Report

Well I.D.	Well Depth (Feet)	SCREEN LENGTH (FEET)	PAD ELEVATION (FEET)	Screened Interval (Elevation)	Top of PVC/Riser Elevation (Feet)	Site Investigation Activities Groundwater Elevations (Feet)																		
						27-Oct-93	6-Jan-94	11-Mar-94	30-Jun-94	28-Jul-94	24-Aug-94	18-Sep-94	11-Oct-94	30-Nov-94	22-Dec-94	16-Mar-95	24-Apr-95	24-Aug-95	11-Dec-95	28-May-96	11-Jun-96	15-Jul-96	13-Aug-96	25,26-Sep-96
FP-93-01	25	20	1056.05	1051.1-1031.1	1058.94	1047.17	1044.16	1042.24	1040.29	1039.88	1039.43	1038.88	1038.59	1037.74	1037.46	1037.14	1037.25	1043.12	1039.12	1037.81	1038.60	1039.37	1039.05	1039.26
FP-93-02	31	25	1057.94	1051.9-1026.9	1060.15	1047.28	1044.23	1042.27	1040.31	1039.90	1039.43	1038.89	1038.50	1037.73	1037.45	1037.14	1037.12	1043.11	1039.13	1037.85	1038.63	1039.42	1039.12	1039.30
FP-96-02b	51.6			1017.7-1007.7	1060.03															1037.81	1038.57	1039.33	1039.03	1039.21
FP-96-02c	67.7			1000.7-990.7	1060.64															1037.79	1038.59	1039.34	1039.03	1039.22
FP-93-03	24	20	1054.59	1050.6-1030.6	1057.38	1047.31	1044.23	1042.27	1040.31	1039.91	1039.43	1038.89	1038.47	1037.73	1037.43	1037.16	1037.10	1043.12	1039.14	1037.84	1038.57	1039.38	1039.08	1039.25
FP-93-04	31.3	25	1056.03	1050.0-1025.0	1058.82	1047.20	1044.29	1042.39	1040.46	1040.07	1039.62	1038.99	1038.20	1037.80	1037.46	1037.31	1037.28	1043.28	1039.28	1038.19	1038.84	1039.63	1039.29	1039.51
FP-96-04b	47.3			1019.4-1009.4	1058.88															1037.93	1038.78	1039.51	1039.18	1039.36
FP-96-04c	66.2			1001.4-991.4	1058.76															1037.93	1038.79	1039.52	1039.19	1039.38
FP-93-05	31	25	1056.05	1050.1-1025.1	1059.11	1047.31	1044.38	1042.27	1040.47	1040.07	1039.64	1039.05	1038.63	1037.88	1037.57	1037.29	1037.26	1043.29	1039.29	1038.07	1038.76	1039.59	1039.27	1039.45
FP-93-06	30	25	1056.00	1051.0-1026.0	1058.50	1047.39	1044.35	1042.29	1040.47	1040.08	1039.60	1039.05	1038.63	1037.87	1037.57	1037.30	1037.24	1043.31	1039.28	1038.06	1038.76	1039.58	1039.27	1039.43
FP-93-07	24	20	1056.62	1052.6-1032.6	1059.66	1047.54	1044.58	1042.41	1040.72	1040.31	1039.90	1039.31	1038.89	1038.09	1037.80	1037.46	1037.46	1043.60	1039.53	1038.19	1039.04	1039.94	1039.58	1039.73
FP-96-07c	66.7			1001.1-991.1	1058.91															1038.09	1038.98	1039.81	1039.45	1039.58
FP-94-08	22	10	1054.47	1042.5-1032.5	1057.42							1038.39	1038.05	1037.42	1037.16	1036.88	1036.90	1042.43	1038.65	1037.46	1038.49	1038.94	1038.63	1039.36
FP-94-09	27.5	10	1060.22	1042.7-1032.7	1061.12							1038.25	1037.85	1037.18	1036.89	1036.57	1036.50	1042.42	1038.49	1037.08	1037.84	1038.56	1038.36	1038.57
FP-96-09b	51			1019.9-1009.9	1063.25																			
FP-96-09c	69.7			1001.3-991.3	1063.37																			
FP-94-10	27.2	10	1060.27	1043.1-1033.1	1060.10							1035.79	1035.34	1034.66	1034.36	1034.05	1034.58	NM (1)	NM (1)	1037.18	1037.88	1038.62	1038.39	1038.60
FP-94-11	15.3	10	1048.42	1043.1-1033.1	1048.09							1038.54	1038.15	1037.42	1037.14	1036.89	1037.18	1042.73	1038.8	1037.58	1038.28	1038.99	1038.72	1038.91
FP-94-12PZ	19.8	10	1053.27	1043.5-1033.5	1054.70							1037.67	1037.93	1037.16	1037.28	1037.72	1037.62	1041.52	1037.57	1040.63	1041.74	1039.66	1038.88	NM
FP-96-13PZ	29.5			1037.97-1025.97	1056.51																1039.81	1039.01	1038.40	1038.94
FP-96-14PZ	28			1037.88-1025.88	1055.77																1038.71	1039.19	1038.82	1039.09
FP-96-15PZ	27.9			1039.84-1027.84	1057.26																1040.40	1039.63	1038.93	1039.49
FP-96-16PZ	29.4			1040.87-1028.07	1059.77																1039.01	1039.56	1039.16	1039.44
FP-96-17PZ	29.6			1045.09-1028.63	1058.52																1039.19	1039.85	1039.44	1039.63
FP-96-18	22.3			1045.09-1028.63	1054.55															1037.57	1038.30	1038.98	1038.69	1039.03
FP-96-19	15.8			1041.8-1031.5	1046.58															1037.59	1038.32	1039.09	1038.82	1039.13
FP-96-20	31.3			1044.8-1029.2	1063.16															1037.20	1038.00	1038.62	1038.43	1038.66
FP-96-20b	51.5			1019.3-1009.3	1063.71																			
FP-96-20c	69.7			1001.1-991.1	1063.72																			
FP-96-21	31.6			1044.9-1029.0	1059.79															1037.23	1037.96	1038.70	1038.47	1038.68
FP-96-21b	51.1			1019.9-1009.9	1060.04															1037.25	1038.17	1038.70	1035.46	1038.67
FP-96-21c	70.8			999.9-989.9	1059.89															1037.29	1037.84	1038.73	1038.51	1038.69
FP-96-22	30.1			1045.2-1029.3	1061.86															1036.61	1037.44	1037.84	1037.82	1038.18
FP-96-23	31.6			1041.7-1025.7	1060.01															1036.73	1037.48	1037.98	1037.91	1038.13
FP-96-23b	49.9			1017.6-1007.6	1060.05																			
FP-96-23c	66.2			1001.1-991.1	1059.99																			
FP-96-24	31			1042.0-1026.4	1059.96															1036.84	1037.54	1038.14	1037.99	1038.21
FP-96-25	16			1040.6-1030.6	1046.19																			
FP-96-25b	36.5			1020.4-1010.4	1046.05																			
FP-96-25c	56.3			1000.6-990.6	1045.75																			
FP-96-26	26			1048.6-1033.6	1059.15																			
FP-96-26b	47.1			1022.9-1012.9	1059.23																			
FP-96-26c	70.1			999.9-989.9	1059.27																			
FP-98-27	25			1045.1-1028.6	1059.02																			
FP-98-27b	49			1015.5-1005.5	1059.01																			
FP-98-27c	65.1			1001.6-991.6	1058.98																			
FP-98-28	23.3			1043.4-1027.4	1055.69																			
FP-98-28b	50.1			1010.7-1000.7	1055.74																			
FP-98-28c	64.8			998.6-988.6	1055.75																			
FP-98-29	25			1044.3-1028.4	1058.40																			
FP-98-29b	48			1015.3-1005.3	1058.24																			
FP-98-29c	64.9			998.6-988.6	1058.31																			
FP-98-30	24			1044.6-1028.6	1057.48																			
FP-98-30b	47.3			1015.0-1005.0	1057.30																			
FP-98-30c	66.6			995.7-985.7	1057.24																			
FP-98-31	28			1044.3-1028.5	1061.13																			
FP-98-31b	49.3			1016.9-1006.9	1061.15																			
FP-98-31c	69.7			996.4-986.4	1061.17																			
FP-99-32																								
FP-99-32b																								
FP-99-32c																								
FP-98-39PZ	27			1045.3-1029.4	1058.49																			
FP-98-40PZ	28.9			1042.9-1027.1	1058.31																			
I-1	63			NAv	1060.30											1035.73	1035.74	1041.30	1037.44	1037.74	1037.09	1037.37	1037.43	NM
R-1	40.3			NAv	1061.39																			
R-2	35.6			NAv	1047.96																			
R-3	29.4			NAv	1046.80																			

Table 2-2 (continued)
RI Groundwater Elevations
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Well I.D.	Remedial Investigation Activities Groundwater Elevations (feet)																							
	25,26-Oct -96	28-Jan-97	16-Feb-97	25-Mar-97	14,15-Apr-97	15-May-97	17-Jun-97	14-Jul-97	18-Aug-97	24-Sep-97	22-Oct-97	25-Nov-97	22-Dec-97	21-Apr-98	26-May-98	30-Jun-98	28-Jul-98	24-Aug-98	23-Sep-98	21-Oct-98	17-Nov-98	16-Dec-98	25-Jan-99	3-May-99
FP-93-01	1039.23	1039.16	1038.86	1038.77	1038.81	1039.03	1039.12	1038.70	1038.17	1038.00	1037.82	1037.58	1037.67	1039.52	1040.22	1039.71	1039.74	1040.79	1040.17	1040.33	1041.61	1041.77	1041.06	1041.08
FP-93-02	1039.28	1039.20	1038.88	1038.77	1038.80	1039.09	1039.18	1038.76	1038.20	1038.04	1037.84	1037.60	1037.68	1039.56	1040.28	1039.76	1039.83	1040.9	1040.26	1040.33	1041.72	1041.89	1041.14	1041.14
FP-96-02b	1039.19	1039.09	1038.79	1038.66	1038.73	1039.00	1039.08	1038.66	1038.10	1037.95	1037.75	1037.50	1037.61	1039.50	1040.18	1039.66	1039.73	1040.8	1040.14	1040.33	1041.67	1041.78	1041.02	1041.08
FP-96-02c	1039.20	1039.09	1038.79	1038.68	1038.73	1039.01	1039.08	1038.67	1038.11	1037.96	1037.75	1037.51	1037.60	1039.51	1040.20	1039.65	1039.73	1040.82	1040.15	1040.34	1041.68	1041.8	1041.03	1041.07
FP-93-03	1039.23	1039.13	1038.85	1038.73	1038.78	1039.05	1039.14	1038.72	1038.16	1038.00	1037.80	1037.56	1037.62	1039.48	1040.25	1039.72	1039.79	1040.85	1040.24	1040.42	1041.68	1041.88	1041.11	1041.14
FP-93-04	1039.42	1039.32	1039.03	1038.92	1039.01	1039.25	1039.33	1038.96	1038.56	1038.21	1038.03	1037.76	1037.86	1039.74	1040.46	1039.85	1039.95	1041.08	1040.56	1040.67	1041.93	1042.05	1041.31	1041.34
FP-96-04b	1039.33	1039.20	1038.88	1038.80	1038.88	1039.13	1039.21	1038.82	1038.25	1038.09	1037.87	1037.62	1037.77	1039.71	1040.34	1039.78	1039.88	1040.93	1040.26	1040.47	1041.89	1041.9	1041.12	1041.25
FP-96-04c	1039.34	1039.22	1038.91	1038.81	1038.86	1039.15	1039.23	1038.83	1038.27	1038.09	1037.89	1037.64	1037.78	1039.73	1040.35	1039.79	1040.27	1040.97	1040.3	1040.55	1041.92	1041.94	1041.15	1041.28
FP-93-05	1039.39	1039.29	1038.99	1038.88	1038.96	1039.21	1039.31	1038.93	1038.48	1038.19	1037.98	1037.73	1037.81	1039.67	1040.42	1039.93	1040.16	1041.05	1040.5	1040.61	1041.91	1042.04	1041.27	1041.32
FP-93-06	1039.39	1039.29	1039.00	1038.90	1038.97	1039.24	1039.36	1038.91	1038.42	1038.20	1037.96	1037.71	1037.78	1039.67	1040.42	1039.92	1040.09	1041.05	1040.46	1040.64	1041.93	1042.08	1041.31	1041.37
FP-93-07	1039.68	1040.16	1039.28	1039.18	1039.21	1039.54	1039.51	1039.14	1038.66	1038.47	1038.26	1037.56	1037.16	1039.94	1040.74	1040.19	1040.24	1041.36	1040.64	1040.86	1042.24	1042.34	1041.55	1041.70
FP-96-07c	1039.57	1038.87	1039.10	1039.02	1039.06	1039.40	1039.49	1039.09	1038.51	1038.32	1038.10	1037.83	1037.98	1039.96	1040.60	1040.03	1040.12	1041.25	1040.57	1040.78	1042.26	1042.26	1041.41	1041.58
FP-94-08	1038.92	1038.81	1038.48	1038.37	1038.34	1038.65	1038.67	1038.22	NM (2)	NM (2)	NM (2)	NM (2)	NM (2)	1039.46	1039.88	1039.20	1039.10	1040.33	1039.57	1039.77	1041.27	1041.22	1040.52	1040.73
FP-94-09	1038.58	1038.49	1038.20	1038.12	1038.06	1038.34	1038.44	1037.97	1037.39	1037.33	1037.15	1036.93	1036.98	1038.79	1039.48	1039.02	1038.85	1040.07	1039.43	1039.55	1040.76	1041.07	1040.4	1040.17
FP-96-09b		1038.59	1038.30	1038.19	1038.17	1038.44	1038.52	1038.06	1037.48	1037.42	1037.25	1037.03	1037.12	1038.97	1039.64	1039.10	1039.03	1040.16	1039.52	1039.67	1040.92	1041.15	1040.45	1040.31
FP-96-09c		1038.62	1038.35	1038.19	1038.17	1038.47	1038.56	1038.08	1037.51	1037.44	1037.28	1037.05	1037.15	1039.00	1039.66	1039.12	1039.12	1040.2	1039.54	1039.71	1040.95	1041.17	1040.48	1040.33
FP-94-10	1038.64	1038.70	1038.30	1038.15	1038.13	1038.32	1038.49	1038.02	1037.86	1037.41	1037.22	1037.30	1037.03	1038.77	1039.62	1039.10	1039.00	1040.15	1039.56	1039.65	1040.69	1041.14	1040.48	1040.10
FP-94-11	1038.87	1038.81	1038.61	NM	1038.44	1038.68	1038.82	1038.43	1037.78	1037.69	1037.48	1037.27	1037.35	1039.26	1039.90	1039.35	1039.41	1040.47	1039.81	1039.59	1041.26	1041.42	1040.71	1040.71
FP-94-12PZ	1041.19	1038.40	1038.34	1038.13	1039.10	1038.71	1036.35	1038.58	1038.39	1037.99	1037.37	1037.36	1039.57	1042.24	1039.68	1038.53	1039.26	1039.54	1038.62	1039.03	1042.63	1040.79	1039.04	1041.86
FP-96-13PZ	1039.14	1038.45	1038.12	1038.03	1038.19	1038.48	1038.38	1038.11	1037.39	1037.46	1037.26	1037.08	1038.09	1040.59	1039.66	1038.56	1038.86	1040	1038.71	1039.2	1041.95	1040.44	1039.54	1041.29
FP-96-14PZ	1039.08	1038.98	1038.65	1038.50	1038.50	1038.85	1038.91	1038.51	1037.90	1037.84	1037.66	1037.44	1037.66	1039.65	1040.06	1039.38	1039.30	1040.53	1039.76	1039.98	1041.53	1041.4	1040.68	1041.01
FP-96-15PZ	1039.67	1038.86	1038.52	1038.54	1038.71	1038.98	1038.89	1038.72	1038.00	1037.92	1037.69	1037.50	1038.62	1041.20	1040.19	1039.12	1039.67	1040.62	1039.28	1039.83	1042.62	1041.04	1040.04	1041.93
FP-96-16PZ	1039.37	1039.20	1038.88	1038.80	1038.82	1039.14	1039.21	1038.86	1038.32	1038.11	1037.92	1037.66	1037.89	1039.91	1040.34	1039.79	1040.03	1040.95	1040.2	1040.44	1042.02	1041.78	1040.98	1041.34
FP-96-17PZ	1039.62	1039.41	1039.07	1038.95	1039.02	1039.40	1039.47	1039.13	1038.50	1038.35	1038.13	1037.86	1038.14	1040.20	1040.61	1039.95	1040.01	1041.28	1040.42	1040.69	1042.35	1042.1	1041.26	1041.64
FP-96-18	1038.90	1038.81	1038.55	1039.01	1038.55	1038.67	1038.76	1038.33	1037.75	1037.66	1037.48	1037.25	1037.35	1039.20	1039.88	1039.33	1039.38	1040.42	1039.77	1039.97	1041.2	1041.4	1040.72	1040.71
FP-96-19	1038.99	1038.94	1038.57	1038.58	1038.58	1038.75	1038.84	1038.41	1037.84	1037.73	1037.54	1037.29	1037.37	1039.24	1039.97	1039.44	1039.53	1040.55	1039.91	1040.1	1041.31	1041.53	1040.8	1040.80
FP-96-20	1038.67	1038.59	1038.30	1038.17	1038.16	1038.42	1038.52	1038.06	NM (3)	1037.80	1037.26	1037.05	1037.12	1039.03	1039.67	1039.10	1038.95	1040.13	1039.51	1039.65	1040.87	1041.13	1040.46	1040.24
FP-96-20b		1038.57	1038.25	1038.11	1038.10	1038.40	1038.49	1038.02	1037.43	1037.39	1037.22	1036.99	1037.11	1038.98	1039.60	1039.05	1038.92	1040.11	1039.45	1039.6	1040.89	1041.08	1040.39	1040.24
FP-96-20c		1038.49	1038.19	1038.07	1038.04	1038.35	1038.41	1037.94	1037.35	1037.32	1037.15	1036.92	1037.05	1038.92	1039.52	1038.97	1038.85	1040.03	1039.37	1039.51	1040.82	1041.01	1040.32	1040.18
FP-96-21	1038.68	1038.59	1038.29	1038.15	1038.18	1038.42	1038.53	1038.07	1037.52	1037.42	1037.24	1037.02	1037.07	1038.90	1039.67	1039.16	1039.07	1040.24	1039.62	1039.73	1040.91	1041.24	1040.53	1040.28
FP-96-21b	1038.68	1038.59	1038.29	1038.16	1038.18	1038.43	1038.53	1038.07	1037.51	1037.41	1037.23	1037.01	1037.08	1038.90	1039.64	1039.12	1039.04	1040.23	1039.58	1039.7	1040.9	1041.2	1040.49	1040.29
FP-96-21c	1038.71	1038.62	1038.33	1038.19	1038.21	1038.48	1038.57	1038.11	1037.55	1037.45	1037.26	1036.05	1037.12	1038.93	1039.69	1039.17	1039.09	1040.26	1039.63	1039.74	1040.95	1041.24	1040.53	1040.34
FP-96-22	1038.10	1038.13	1037.71	1037.56	1037.48	1037.79	1037.88	1037.35	1036.77	1036.80	1036.63	1036.44	1036.57	1038.42	1038.78	1038.44	1038.14	1039.4	1038.77	1038.87	1040.15	1040.4	1039.71	1039.37
FP-96-23	1038.16	1038.08	1037.81	1037.84	1037.56	1037.88	1037.99	1037.45	1036.87	1036.87	1036.71	1036.50	1036.56	1038.40	1039.12	1038.62	1038.36	1039.56	1038.95	1039.01	1040.19	1040.57	1039.89	1039.46
FP-96-23b		1038.07	1037.75	1037.61	1037.55	1037.86	1037.95	1037.45	1036.87	1036.86	1036.69	1036.49	1036.58	1038.43	1038.96	1038.54	1038.30	1039.54	1038.89	1039	1040.21	1040.52	1039.83	1039.46
FP-96-23c		1038.08	1037.79	1037.62	1037.56	1037.88	1037.96	1037.46	1036.89	1036.87	1036.70	1036.50	1036.58	1038.44	1038.95	1038.54	1038.30	1039.55	1038.9	1039.01	1040.2	1040.52	1039.82	1039.47
FP-96-24	1038.21	1038.13	1037.84	1037.70	1037.62	1037.93	1038.03	1037.54	1036.96	1036.93	1036.76	1036.55	1036.61	1038.41	1039.17	1038.65	1038.49	1039.67	1039.03	1039.11	1040.25	1040.65	1039.95	1039.51
FP-96-25		1038.89	1038.62	1038.49	1038.50	1038.78	1038.87	1038.45	1037.88	1037.78	1037.58	1037.35	1037.43	1039.28	1040.00	1039.47	1039.48	1040.57	1039.95	1040.1	1041.36	1041.55	1040.83	1040.79
FP-96-25b		1038.85	1038.57	1038.45	1038.49	1038.96	1038.85	1038.43	1037.86	1037.76	1037.57	1037.33	1037.42	1039.28	1039.99	1039.44	1039.44	1040.58	1039.93	1040.1	1041.38	1041.53	1040.81	1040.80
FP-96-25c		1038.89	1038.64	1038.50	1038.52	1038.80	1038.88	1038.47	1037.88	1037.77	1037.58	1037.36	1037.43	1039.32	1040.00	1039.45	1039.46	1040.58	1039.96	1040.12	1041.4	1041.57	1040.84	1040.82
FP-96-26		1038.70	1038.37	1038.15	1038.15	1038.54	1038.61	1038.75	1037.50	1038.04	1037.34	1037.14	1037.17	1038.95	1039.74	1039.23	1039.10	1040.3	1039.68	1039.8	1040.97	1041.3	1040.6	1040.39
FP-96-26b		1038.68	1038.40	1038.82	1038.27	1038.54	1038.63	1038.18	1037.62	1037.52	1037.34	1037.11	1037.19	1038.99	1039.75	1039.21	1039.19	1040.32	1039.67	1039.81	1041.04	1041.29	1040.58	1040.44
FP-96-26c		1038.69	1038.40	1038.27	1038.27	1038.55	1038.64	1038.20	1037.63	1037.52	1037.34	1037.12	1037.19	1039.02	1039.72	1039.22	1039.17	1040.32	1039.69	1039.82	1041.06	1041.3	1040.58	1040.47
FP-98-27																1038.19	1037.86	1039.18	1038.48	1038.53	1039.67	1040.08	1039.38	1038.90
FP-98-27b																1038.12	1037.91	1039.17	1038.41	1038.47	1039.79	1040.01	1039.28	1038.96
FP-98-27c																1038.09	1037.92	1039.18	1038.43	1038.48	1039.78	1040.03	1039.29	1038.98
FP-98-28																1037.56	1037.48	1038.72	1037.75	1037.83	1039.27	1039.32	1038.55	1038.35
FP-98-28b																1037.53	1037.42	1038.71	1037.74	1037.82	1039.29	1039.31	1038.56	1038.39
FP-98-28c																1037.54	1037.42	1038.71	1037.73	1037.81	1039.33	1039.32	1038.56	1038.39
FP-98-29																1037.32	1037.20	1038.58	1037.53	1037.68	1039.27	1039.15	1038.32	1038.32
FP-98-29b																1037.32	1037.24	1038.59	1037.54	1037.69	1039.3	1039.15	1038.35	1038.33
FP-98-29c																1037.31	1037.21	1038.56	1037.53	1037.65	1039.27	1039.14	1038.3	1038.30
FP-98-30																1037.51	1037.37	1038.74	1037.74	1037.89	1039.42	1039.35	1038.56	1038.48
FP-98-30b																1037.50	1037.41	1038.73	1037.73	1037.9	1039.44	1039.35	1038.55	1038.51
FP-98-30c																1037.50	1037.43	1038.73	1037.75	1037.92	1039.43	1039.34	1038.55	1038.52
FP-98-31																1036.62	1036.73	1038.04	1036.79	1037.03	1039.03	1038.43	1037.53	1037.91
FP-98-31b																1036.58	1036.70	1037.97	1036.71	1037	1039.05	1038.4	1037.46	1038.00
FP-98-31c																1036.60	1036.72	1037.99	1036.74	1037.05	1039.08	1038.42	1037.48	1038.01
FP-99-32																								
FP-99-32b																								
FP-99-32c																								
FP-98-39PZ																								1039.37
FP-98-40PZ																								1037.94
I-1	1037.70	1037.63	1037.30	1037.11	1037.03	1037.39	1037.47	1036.95	1036.34	1036.40	1036.24	1036.04	1036.18	1038.08	1060.30	1038.03	1037.69	1038.94	1038.32	1038.4	1039.7	1039.95	1039.23	1038.90
R-1		1038.75	1038.47	1038.33	1038.37	1038.60	1038.71	1038.25	1037.69	1037.60	1037.41	1037.18	1037.24	1039.08	1039.71	1039.29	1039.22	1040.37	1039.75	1039.87	1041.09	1041.37	1040.35	1040.47
R-2		1038.90	1038.61	1038.46	1038.51	1038.76	1038.91	1038.49	1037.88	1037.77	1037.58	1037.34	1037.43	1039.29	1039.99	1039.46	1039.48	1040.59	1039.93	1040.1	1041.38	1041.55	1040.82	1040.81
R-3		1038.87	1038.58	1038.45	1038.52	1038.76	1038.85	1038.42	1037.90	1037.75	1037.53	1037.29	1037.34	1039.17	1039.99	1039.47	1039.6	1040.58	1039.99	1040	1041.34	1041.6	1040.92	1040.80

Notes:

(1) Groundwater elevation data is not available in August 1995 and December 1995 from Well FP-94-10 due to the condition of the casing.
(2) Groundwater elevation data is not available between August 1997 and January 1998 (inclusive) from Monitoring Well FP-94-08 because monitoring well was fouled with roots. Problem corrected and water level measurement resumed in February 1998.
(3) Water level not measured in Monitoring Well FP96-20 because water was below the top of the pump.
NAv = Not Available
NM: = Data Not Measured

- Piezometer FP-94-12PZ was installed and developed in August 1994.
- Irrigation well I-1 was included in the periodic monitoring activities for the first time in October 1994.
- Monitoring Wells FP-94-08, FP-94-09, FP-94-10, and FP-94-11 were included in the periodic groundwater monitoring activities for the first time in January 1995.
- Monitoring Wells FP-96-18 through FP-96-23 were included in the periodic groundwater monitoring activities for the first time in May 1996.
- Piezometers FP-96-13PZ through FP-96-17PZ were included in the periodic groundwater monitoring activities for the first time in June 1996.
- Monitoring Wells FP-96-09b and 09c; FP-96-20b and 20c; FP-96-23b and 23c; FP-96-25, 25b, and 25c; and FP-96-26, 26b, and 26c; and private wells R-1, R-2, and R-3 were measured for the first time in December 1996.
- Well R-3 is assumed to be of similar construction as Well R-2.
- Monitoring Well FP-96-21 had a pressure transducer with satellite link installed in February 1998.
  Additional riser material was added and the top of riser elevation changed to 1061.68 feet MSL.
  Water levels measured from February 1998 to the present are subtracted from the new riser elevation.

Table 2-3
Horizontal Hydraulic Conductivity (K) from Grain Size Analysis
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MAAF Area

Boring No.	Depth Interval (bgs)	d_{50} (mm)	Grain Size	K (ft/day) (C = 450)	Shepherd (1989) Geometric Mean Layer 1	Layer 2	Layer 3	d_{10} (mm)	K (ft/day) (C = 80)	K (ft/day) (C = 100)	Hazen (1991) Geometric Mean Layer 1 (C = 100)	Layer 2 (C = 100)	Layer 3 (C=100)
FP-98-27c	20	0.42	fine sand	107.54	75.89			0.19	81.87	102.34	102.34		
FP-98-27c	26	0.36	fine sand	83.39									
FP-98-27c	30	0.26	fine sand	48.74									
FP-98-27c	36	0.5	medium sand	143.39		199.15							
FP-98-27c	42	0.7	medium sand	249.82									
FP-98-27c	46	0.6	medium sand	193.71									
FP-98-27c	50	0.66	medium sand	226.70									
FP-98-27c	56	0.5	medium sand	143.39			207.59						
FP-98-27c	62	0.71	medium sand	255.73									
FP-98-27c	64	0.69	medium sand	243.96									
FP-98-28c	20	0.3	fine sand	61.73	76.20								
FP-98-28c	26	0.6	medium sand	193.71									
FP-98-28c	30	0.22	fine sand	37.00									
FP-98-28c	36	0.41	fine sand	103.35		194.01							
FP-98-28c	42	0.47	medium sand	129.47									
FP-98-28c	46	0.75	medium sand	279.94									
FP-98-28c	50	0.9	medium sand	378.19									
P-98-28c	56	1.3	medium sand	693.78			693.78						
P-96-18	8.3 - 10.6 *	0.45	medium sand	120.51				0.23	119.98	149.97	141.15		
FP-96-18	12 - 13.8 *	0.45	medium sand	120.51				0.21	100.02	125.02			
FP-96-18	14.1 - 15.8 *	0.42	fine sand	107.54				0.23	119.98	149.97			
FP-96-19	3.8 - 5.9 *	0.05	medium sand	2.80									
FP-96-19	8 - 9.2 *	0	fines	0.00									
FP-96-19	10 - 12.4 *	0	fines	0.01									
FP-96-21	16.1 - 18.1 *	0.2	fine sand	31.62	112.10						125.31		
FP-96-21	20.2 - 22	0.35	fine sand	79.60				0.17	65.55	81.93			
FP-96-21	22.7 - 24.7	0.53	medium sand	157.86				0.26	153.32	191.65			
FP-96-20	20	0.37	fine sand	87.25	49.58			0.11	27.44	34.30	46.78		
FP-96-20	25	0.35	fine sand	79.60				0.15	51.03	63.79			
FP-96-20	30	0.14	fine sand	17.55									
FP-96-20	35	0.66	medium sand	226.70		371.25		0.16	58.06	72.58		68.04	
FP-96-20	45	1.2	medium sand	607.94				0.15	51.03	63.79			
FP-96-20	65	0.46	medium sand	124.96			124.96	0.23	119.98	149.97			149.97
FP-96-23	20	0.28	fine sand	55.08	134.98			0.14	44.45	55.57	75.41		
FP-96-23	25	0.4	fine sand	99.22									
FP-96-23	30	1	medium sand	450.00				0.19	81.87	102.34			
FP-96-23	35	0.56	medium sand	172.87		452.97		0.1	22.68	28.35		31.19	
FP-96-23	45	1.8	medium sand	1186.89				0.11	27.44	34.30			
FP-96-23	65	1	medium sand	450.00			294.34	0.13	38.33	47.91			127.29
FP-96-26	20	0.49	medium sand	138.69	125.43			0.27	165.34	206.67	138.52		
FP-96-26	25	0.5	medium sand	143.39				0.2	90.72	113.40			
FP-96-26	30	0.4	fine sand	99.22				0.2	90.72	113.40			
FP-96-26	35	0.74	medium sand	273.81		198.14		0.19	81.87	102.34		134.66	
FP-96-26	45	0.5	medium sand	143.39				0.25	141.75	177.19			
FP-96-26	65	1.25	medium sand	650.30			650.30	0.27	165.34	206.67			206.67
				Average of Wells	**95.70**	**283.10**	**394.19**			**Average of Wells**	**104.92**	**77.96**	**161.31**

Table 2-3 (continued)
Horizontal Hydraulic Conductivity (K) from Grain Size Analysis
FFTA-MAAF Remedial Investigation Report

Pump Test Wells (Southwest of Airfield)

		d_{50}			Shepherd (1989) Geometric Mean						Hazen (1991) Geometric Mean		
Boring No.	Depth Interval (bgs)	(mm)	Grain Size	K (ft/day) (C = 450)	Layer 1	Layer 2	Layer 3	d_{10} (mm)	K (ft/day) (C = 80)	K (ft/day) (C = 100)	Layer 1 (C = 100)	Layer 2 (C = 100)	Layer 3 (C=100)
D-83-116	22-24	0.37	fine sand	87.25	186.24			0.22	109.771	137.214	204.29		
D-83-117	24-26	0.64	medium sand	215.48				0.3	204.12	255.15			
D-83-118	26-28	0.64	medium sand	215.48				0.3	204.12	255.15			
D-83-119	28-30	0.66	medium sand	226.70				0.32	232.243	290.304			
D-83-120	32-34	0.69	medium sand	243.96				0.22	109.771	137.214			
D-83-121	36-38	0.9	medium sand	378.19		400.46		0.13	38.33	47.91		74.29	
D-83-122	38-42	0.81	medium sand	317.84				0.13	38.33	47.91			
D-83-123	42-44	0.78	medium sand	298.65				0.11	27.44	34.30			
D-83-124	46-48	0.95	medium sand	413.48				0.23	119.98	149.97			
D-83-125	50-54	1.3	medium sand	693.78				0.26	153.32	191.65			
D-83-126	56-60	0.71	medium sand	255.73			255.73	0.13	38.3292	47.9115			66.34
D-83-127	60-62	0.71	medium sand	255.73				0.18	73.4832	91.854			
D-83-502	20-22	0.35	fine sand	79.60	129.29			0.11	27.44	34.30	63.25		
D-83-503	22-24	0.41	fine sand	103.35				0.2	90.72	113.40			
D-83-504	24-26	0.52	medium sand	152.97				0.24	130.64	163.30			
D-83-505	26-28	0.4	fine sand	99.22				0.11	27.44	34.30			
D-83-506	28-30	0.5	medium sand	143.39				0.14	44.45	55.57			
-83-507	30-32	0.45	medium sand	120.51				0.12	32.66	40.82			
-83-508	32-34	0.75	medium sand	279.94				0.17	65.55	81.93			
D-83-509	34-38	1	medium sand	450.00		445.69		0.39	344.963	431.2035		224.68	
D-83-510	38-40	1.2	medium sand	607.94				0.31	217.955	272.4435			
D-83-511	40-42	1.3	medium sand	693.78				0.29	190.739	238.4235			
D-83-512	42-44	1.5	medium sand	878.54				0.3	204.12	255.15			
D-83-513	44-46	1.3	medium sand	693.78				0.35	277.83	347.2875			
D-83-514	46-48	1.2	medium sand	607.94				0.28	177.811	222.264			
D-83-515	48-50	0.6	medium sand	193.71				0.19	81.8748	102.3435			
D-83-516	50-52	0.76	medium sand	286.12				0.27	165.337	206.6715			
D-83-517	52-54	0.57	medium sand	177.99				0.21	100.019	125.0235			
D-83-518	54-56	0.58	medium sand	183.18			696.57	0.3	204.12	255.15			281.57
D-83-519	56-58	2	coarse sand	1412.25				0.22	109.77	137.21			
D-83-520	58-60	2.5	coarse sand	2040.86				0.32	232.24	290.30			
D-83-521	60-62	2.4	coarse sand	1907.92				0.46	479.91	599.89			
D-83-522	62-64	0.54	medium sand	162.80				0.32	232.24	290.30			
				Average of Wells	**157.77**	**423.07**	**476.15**			**Average of Wells**	**133.77**	**149.48**	**173.96**

From Shepherd (1989) and Fetter (1994)

d_{50} = Mean Grain Size (mm)

C = Dimensionless Constant

j = Exponent related to slope

$K = Cd_{50}^{j}$ (ft/day) C = 450, j = 1.65

Values of C and j taken from Fetter (1994)

MAFF Area		
Ground Surface	1055	ft. above MSL
Bottom of Layer 1	32	bgs
Bottom of Layer 2	52	bgs
Bottom of Layer 3	62	bgs

Pump Test Area		
Ground Surface	1055	ft. above MSL
Bottom of Layer 1	34	bgs
Bottom of Layer 2	54	bgs
Bottom of Layer 3	68	bgs

NOTE: Layer information is approximate

From Hazen (1991) and Fetter (1994)

d_{10} = Mean Grain Size (cm)

C = Dimensionless Constant

$K = C(d_{10})^2$ (cm/sec) C = 80 or 100

Values of C taken from Fetter (1994)

Table 2-4
Effective Porosity and Bulk Density
FFTA-MAAF Remedial Investigation Report

Well ID	Date Sampled	Sample Depth (feet)	USCS Classification	Effective Porosity (%)	Sample Depth (feet)	Dry Bulk Density g/cm^3
FP-96-18	4/20/96	8.3 - 10.6	SP	34.5	8.3 - 10.6	1.66
		12.0 - 13.8	SP	39.09	12.0 - 13.8	1.52
		14.1 - 15.8	SP	30.99	14.1 - 15.8	1.76
FP-96-19	4/19/96	3.8 - 5.9	ML	16.59	3.8 - 5.9	1.59
		8.0 - 9.2	CH	19.42	8.0 - 9.2	1.16
		10 - 12.4	CL	10.02	10 - 12.4	1.04
FP-96-21	4/16/96	16.1 - 18.1	SP	33.61	16.1 - 18.1	1.49
		20.2 - 22	SP	39.71	20.2 - 22	1.49
		22.7 - 24.7	SP	32.38	22.7 - 24.7	1.70
			Average	**28.48**	**Average**	**1.49**
			Average w/o FP-96-19	**35.05**	**Average w/o FP-96-19**	**1.60**

References: (LBA, 1996a)

Notes:
- Since aquifer materials at MAAF are predominately fine to coarse sand, the soil samples representing a clay soil were excluded from effective porosity and bulk density estimates.
- All samples collected from the shallow zone (Model Layer 1) at MAAF.

Unified Soil Classification System

SW - Well Graded Sand (wide range of grain sizes)
SP - Poorly Graded Sand (narrow range of grain sizes)
SM - Silty Sand
ML - Silt (non-expanding silt)
CL - Lean Clay (non-expanding clay)
CH - Fat Clay (expanding clay)
GP - Poorly Graded Gravel

Table 2-5
Total Organic Carbon
FFTA-MAAF Remedial Investigation Report

Well ID	Date Sampled	Sample Depth (feet)	TOC (mg/kg)	USCS Classification	Source
FP-96-18	4/20/96	10.6 - 11.2	ND (100)	SP	LBA, 1996a
		13.1 - 14	249	SP	
		14.1 - 15.5	6,470	SP	
FP-96-19	4/19/96	5.9 - 6.5	8,950	ML	LBA, 1996a
		8.8 - 9.8	8,460	CH	
		11.1 - 12.5	6,660	CL	
FP-96-21	4/16/96	18.2 - 19.2	3,000	SP	LBA, 1996a
		21.9 - 22.1	2,750	SP	
		23 - 24	5,560	SP	
FP-96-20c	11/12/96	20	2,710	SP	LBA, 1996b
		25	4,380	SP	
		30	2,110	SP	
		35	7,300	SP	
		45	6,070	SP	
		65	7,800	SP	
FP-96-23c	11/2/96	20	1,220	SP	LBA, 1996b
		25	2,700	SP	
		30	10,700	SP	
		35	4,460	SP	
		45	12,800	SP	
		65	15,800	SP	
FP-96-26c	10/23/96	20	5,950	SP	LBA, 1996b
		25	5,640	SP	
		30	1,200	SW-SM	
		35	5,610	SW	
		45	23,600	SW	
		65	43,100	SP	
FP-98-27c	5/20/98	20 - 22	3,330	NR	BcMD, 1998
		26 - 28	1,380	NR	
		30 - 32	6,490	Clay (FC)	
		36 - 38	1,490	NR	
		42 - 44	5,580	NR	
		46 - 48	6,540	NR	
		52 - 54	7,570	NR	
		56 - 58	9,080	NR	
		62 - 64	2,550	NR	
FP-98-28c	5/18/98	20 - 22	ND (100)	NR	BcMD, 1998
		26 - 28	7,500	NR	
		29 - 30	NA	Clay (FC)	
		30 - 32	1,150	Clay (FC)	
		36 - 38	2,180	NR	
		42 - 44	5,390	NR	
		46 - 48	6,220	NR	
		52 - 54	6,750	NR	
		56 - 58	16,400	NR	

Notes:
- Sample FP-96-18 (10.6 - 11.2') and FP-98-28c (20 - 22') were taken as half the dectection limit
- Since aquifer materials at MAAF are predominately silt to coarse sand, the soil samples representing a clay soil were excluded from TOC/foc estimates.
- Clay samples in wells FP-98-27c and FP-98-28c, and all samples from Well FP-96-19 were excluded from calculations
- Particle size analysis was not performed for borings FP-98-27c and FP-98-28c. Clay samples were determined from boring logs and are not representative of the USCS system
- Model layers 1, 2, and 3 correspond to shallow, intermediate, and deep respectively
- NR: Not Recorded

Unified Soil Classification System

SW - Well Graded Sand (wide range of grain sizes)
SP - Poorly Graded Sand (narrow range of grain sizes)
SM - Silty Sand
ML - Silt (non-expanding silt)
CL - Lean Clay (non-expanding clay)
CH - Fat Clay (expanding clay)
GP - Poorly Graded Gravel

Table 2-6
Representative Wildlife Species Expected to Occur at the Site
FFTA-MAAF Remedial Investigation Report

Common Name	Scientific Name
Mammals	
beaver	Castor canadensis
big brown bat	Eptesicus fuscus
coyote	Canis latrans
deer mouse	Peromyscus maniculatus
Eastem cottontail	Sylvilagus floridanus
Eastern fox squirrel	Sciurus niger
Eastern mole	Scalopus aquaticus
Eastem pipistrelle	Pipistrellus subflavus
gray fox	Urocyon cineroargentus
Hipid cotton rat	Sigmondon hispidus
hoary bat	Lasiurus cinereus
house mouse	Mus musculus
least shrew	Cryptotis parva
mink	Mustela vison
muskrat	Onadatra zibethica
opossum	Didelphis marsupialis
prairie vole	Microtus ochrogaster
raccoon	Procyon lotor
red bat	Lasiurus borealis
red fox	Vulpes vulpes
short-tailed shrew	Brevicauda carolinensis
striped skunk	Mephitis mephitis
Western harvest mouse	Reithrodontomys megalotis
white-footed mouse	Peromyscus leucopus
white-tailed deer	Odocoileus virginianus

Notes:

* Summary of common species likely to occur based on Site Investigation (August 1996) and information contained in:

LBA, 1994c, *Integrated Natural Resource Plan for Fort Riley, Kansas*.

LBA, 1995, Louis Berger & Associates. *Remedial Investigation Report Dry Cleaning Facilities Area (DCFA-RI), Volume I*.

** None of these species are threatened, endangered, or otherwise.

Table 2-6 (continued)
Representative Wildlife Species Expected to Occur at the Site
FFTA-MAAF Remedial Investigation Report

Common Name	Scientific Name
Amphibians	
American toad	Bufo americanus
Blanchard,s cricket frog	Acris crepitans
bullfrog	Rana catesbeiana
gray treefrog	Hyla chrysoscelis
Great Plains toad	Bufo cognatus
plains leopard frog	Rana blairi
plains spadefoot toad	Scaphiopus bombifrons
tiger salamander	Ambystoma tigrinum
Woodhouses' toad	Bufo woodhousei
Reptiles	
black rat snake	Elaphe obsoleta
blotched water snake	Nerodia reythrogaster
brown snake	Storieria dekayi
Copperhead	Agkistrodon contortrix
Five-lined skink	Eumeces fasciatus
gopher snake	Pituophis catenifer
ground skink	Scincella lateralis
lined snake	Tropidoclonion lineatum
midland smooth softshell	Trionyx muticus
Northern water snake	Nerodia sipedon
ornate box turtle	Terrapene ornata
painted turtle	Chrysemys picta
prairie kingsnake	Lampropeltis calligaster
red-eared slider	Trachemys scripta
red-sided garter snake	Thamnophis radix
Ringneck snake	Diadophis punctatus
snapping turtle	Chelydra serpentina
spiny softshell	Trionyx spinifer
timber rattlesnake	Crotalus horridus
Western ribbon snake	Thamnophis proximus
Western worm snake	Carphophis amoenus
Yellow-bellied racer	Coluber constrictor

Notes:

* Summary of common species likely to occur based on Site Investigation (August 1996) and information contained in:

LBA, 1994c, *Integrated Natural Resource Plan for Fort Riley, Kansas*.

LBA, 1995, Louis Berger & Associates. *Remedial Investigation Report Dry Cleaning Facilities Area (DCFA-RI), Volume I*.

** None of these species are threatened, endangered, or otherwise.

Table 2-6 (continued)
Representative Wildlife Species Expected to Occur at the Site
FFTA-MAAF Remedial Investigation Report

Common Name	Scientific Name
Birds	
American goldfinch	Carduelis tristis
American kestrel	Falco sparverius
American robin	Turdus migratorius
barn swallow	Hirundo rustica
black-capped chickadee	Parus atricapillus
blue jay	Cyanocitta cristata
brown thrasher	Toxostoma rufum
Brown-headed cowbird	Molothrus ater
Canada goose	Branta canadensis
dickcissel	Spiza americana
Eastern kingbird	Tyrannus tyrannus
Eastern meadowlark	Sturnella magna
Eastern wood-pewee	Contopus virens
grackle	Quiscalus quiscalus
great horned owl	Bubo virginianus
indigo bunting	Passerina cyanea
killdeer	Charadrius vociferus
mallard duck	Anas platyrhynchos
morning dove	Zenaida macroura
Northern bobwhite quail	Colinus virginianus
Northern cardinal	Cardinalis cardinalis
red-headed woodpecker	Melanerpes erythrocephalus
red-tailed hawk	Buteo jamaicensis
red-winged blackbird	Agelaius phoeniceus
scissor-tailed flycatcher	Tyrannus forficatus
starling	Sturnus vulgaris
turkey vulture	Cathartes aura
white-breasted nuthatch	Sitta carolinensis
wild turkey	Meleagris gallopavo

Notes:

* Summary of common species likely to occur based on Site Investigation (August 1996) and information contained in:

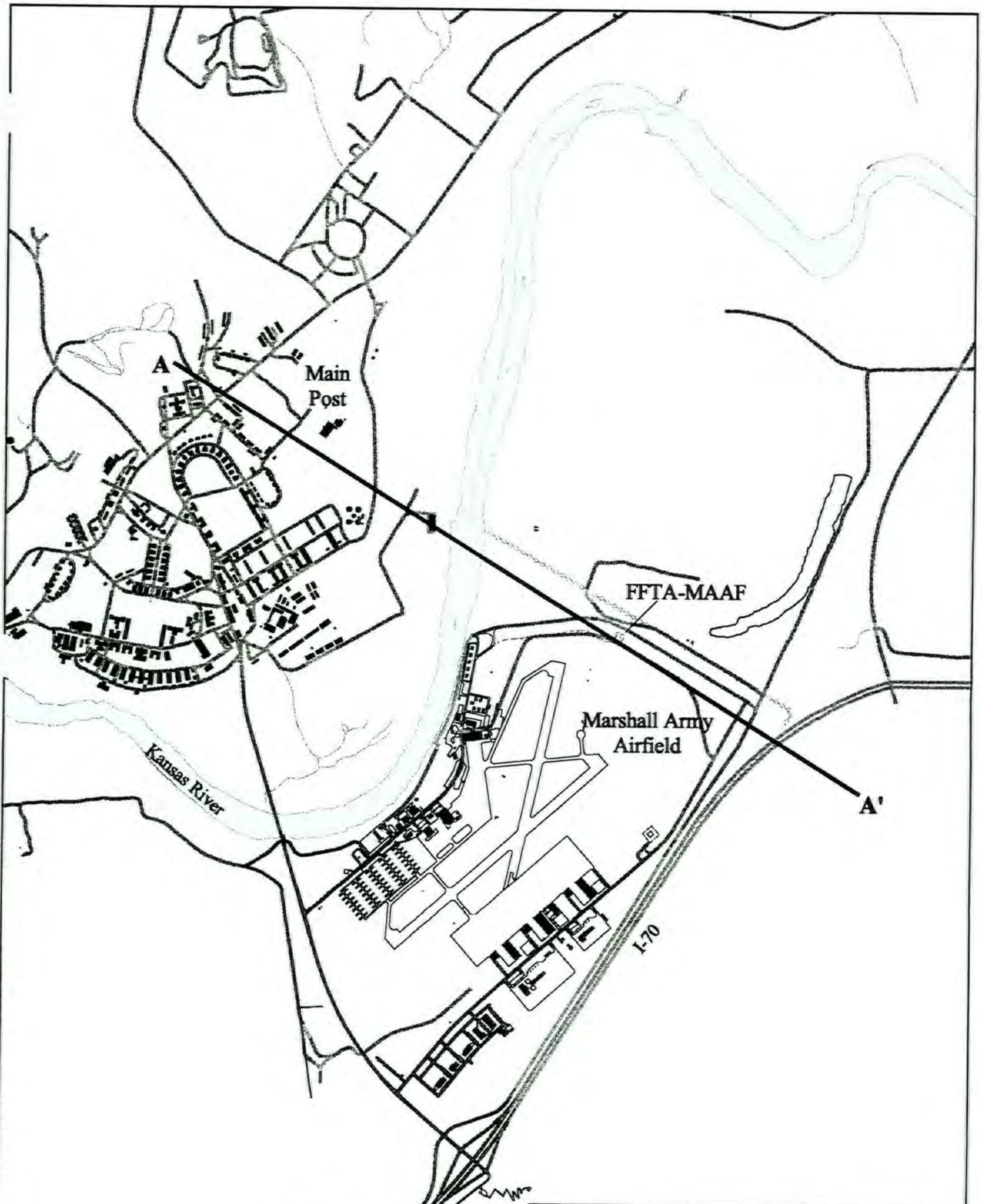
LBA, 1994c, *Integrated Natural Resource Plan for Fort Riley, Kansas*.

LBA, 1995, Louis Berger & Associates. *Remedial Investigation Report Dry Cleaning Facilities Area (DCFA-RI), Volume I*.

** None of these species are threatened, endangered, or otherwise.

Table 2-7
Representative Fish Species in the Kansas River Portion Near the Site
FFTA-MAAF Remedial Investigation Report

Common Name	Scientific Name
largemouth bass	Micropterus salmoides
central stoneroller	Campostoma anomalum
river carpsucker	Carpiodes carpio
red shiner	Cyprinella lutrensis
golden redhorse	Moxostoma erythrurum
emerald shiner	Notropis atherinoides
sand shiner	Notropis ludibundus
channel catfish	Ictalurus punctatus
flathead catfish	Pylodictis olivaris
longnose gar	Lepisosteus osseus
white bass	Morone chrysops
mosquitofish	Gambusia affinis
green sunfish	Lepomis cyanellus
bluegill	Lepomis macrochirus
white crappie	Pomoxis annularis
gizzard shad	Dorosoma cepedianum



2000 0 2000 Feet

N

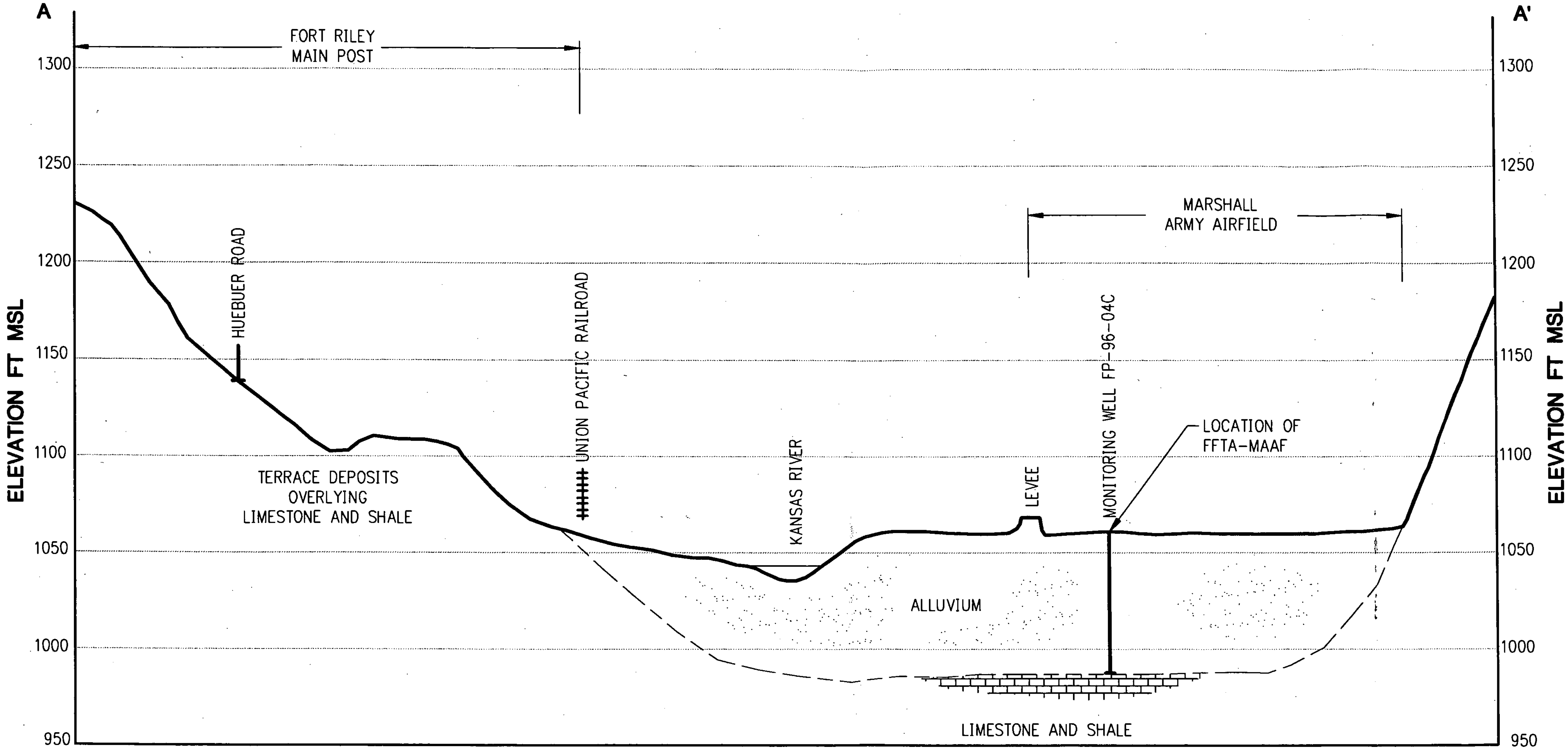
Burns & McDonnell SINCE 1898

Figure 2-1

Cross-Section A-A' Location

FFTA-MAAF RI

r:\avievwn_sect2.apr\fig2-1 cross-sect view & layout LGB 12/15/99 1:24000



NOTE:

CROSS SECTION IS DIAGRAMMATIC AND
BASED ON LIMITED SUBSURFACE CONTROL.

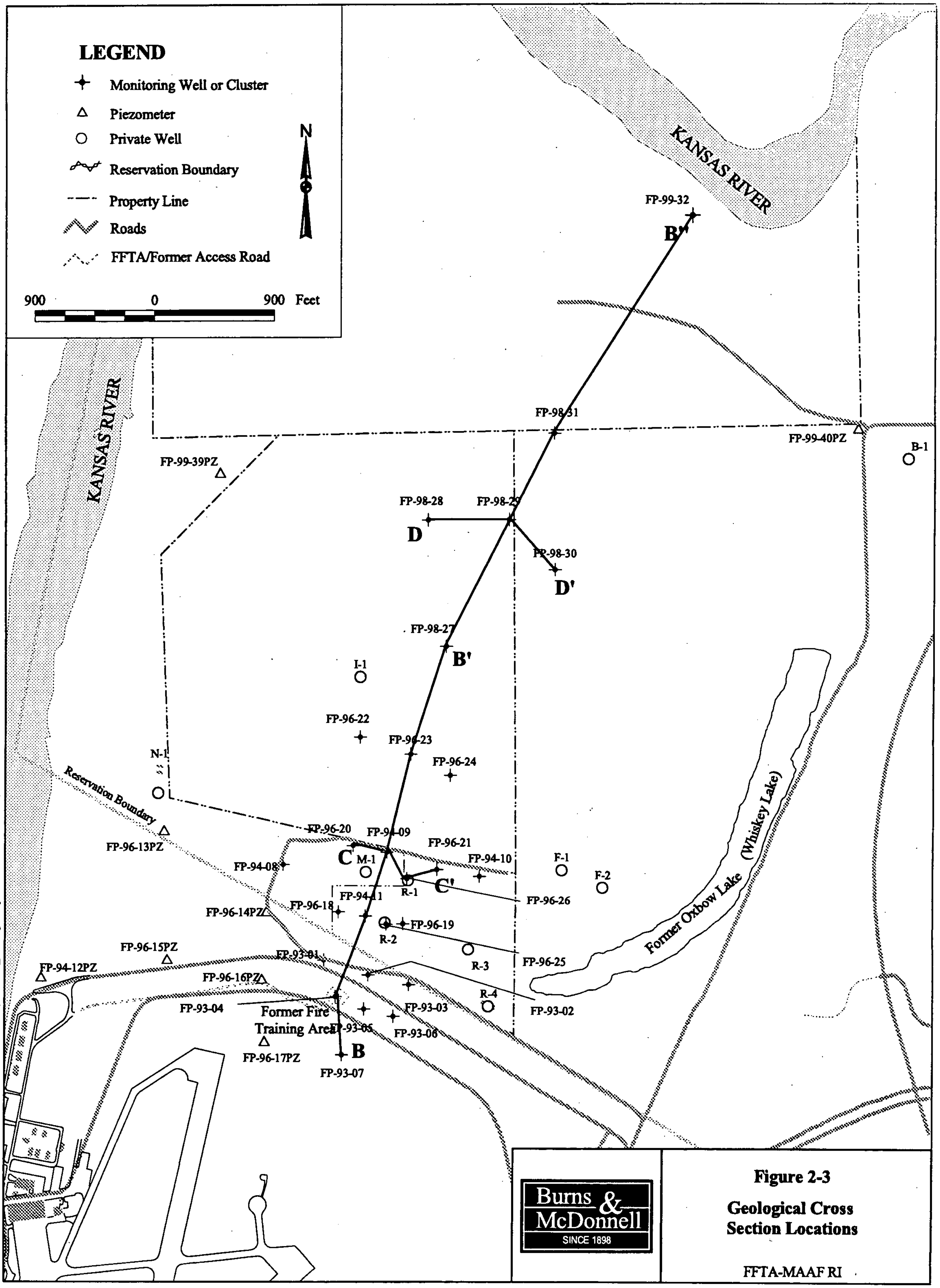
60 0 60 120
S C A L E I N F E E T
VERTICAL SCALE:

100 0 100 200
S C A L E I N F E E T
HORIZONTAL SCALE:

Burns & McDonnell
SINCE 1898

Figure 2-2
Cross-Section A – A'
Kansas River Valley

FFTA-MAAF RI



Burns & McDonnell SINCE 1898

Figure 2-3

Geological Cross Section Locations

FFTA-MAAF RI

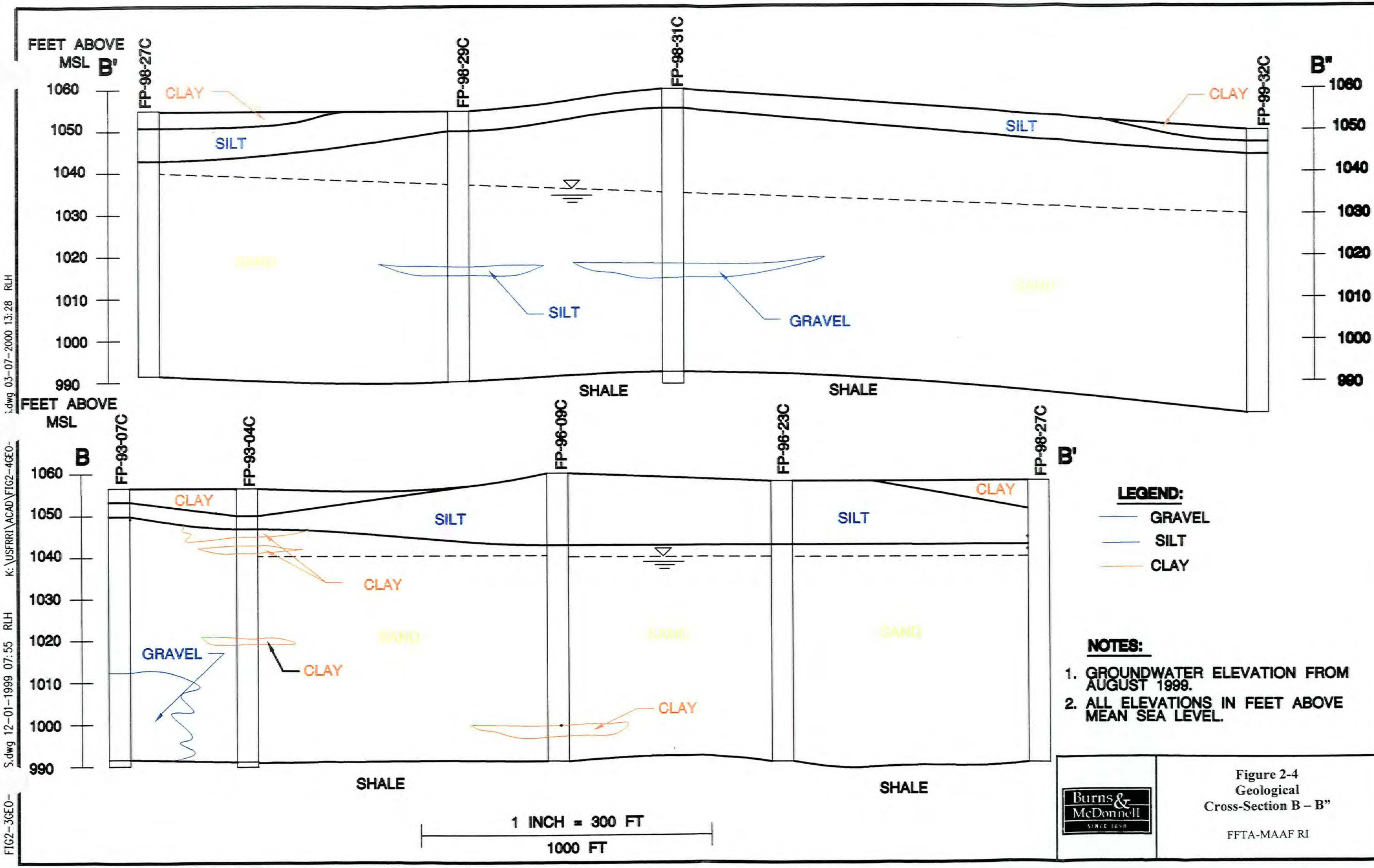
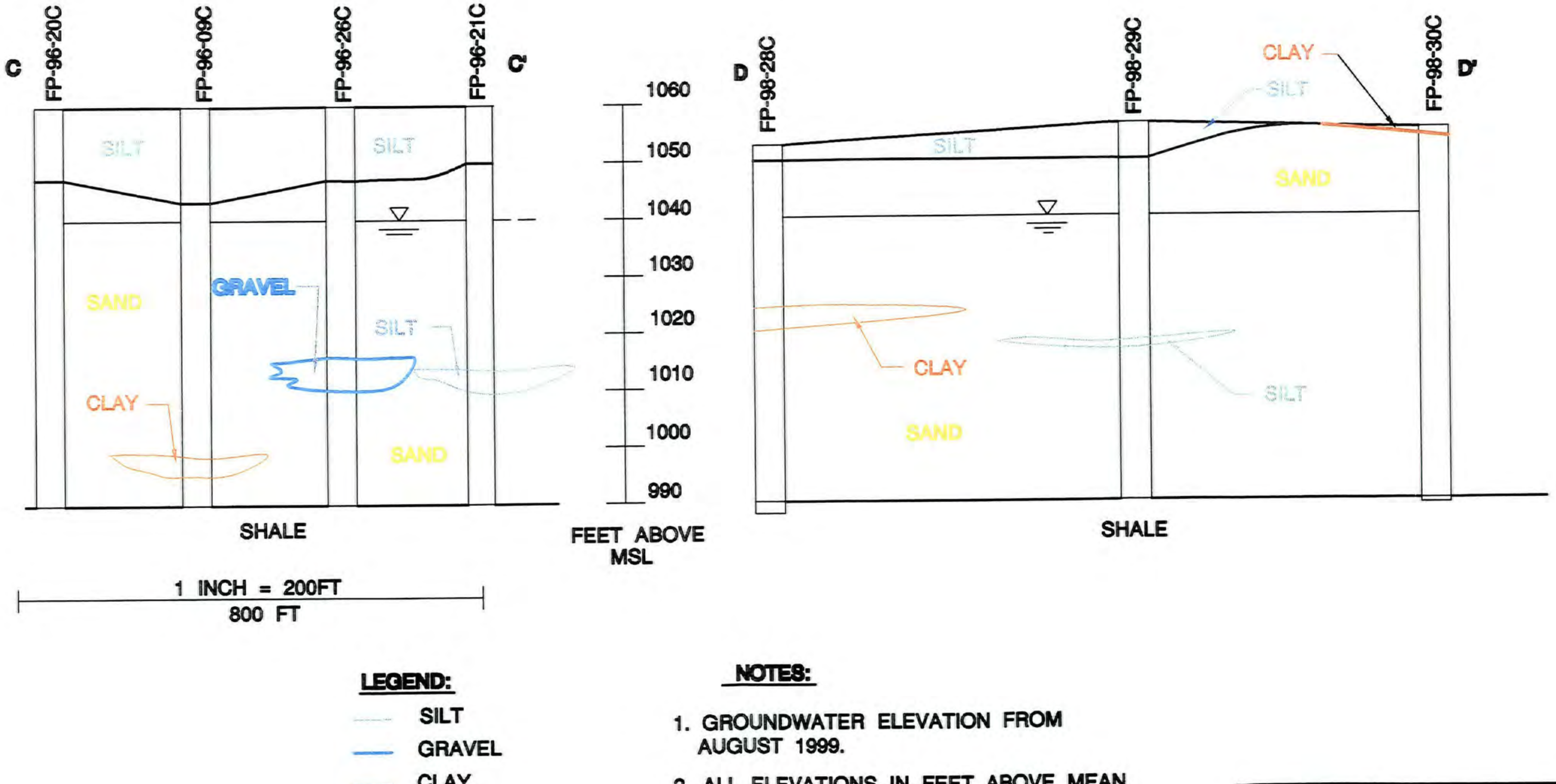


Figure 2-4
Geological
Cross-Section B – B”



NOTES:

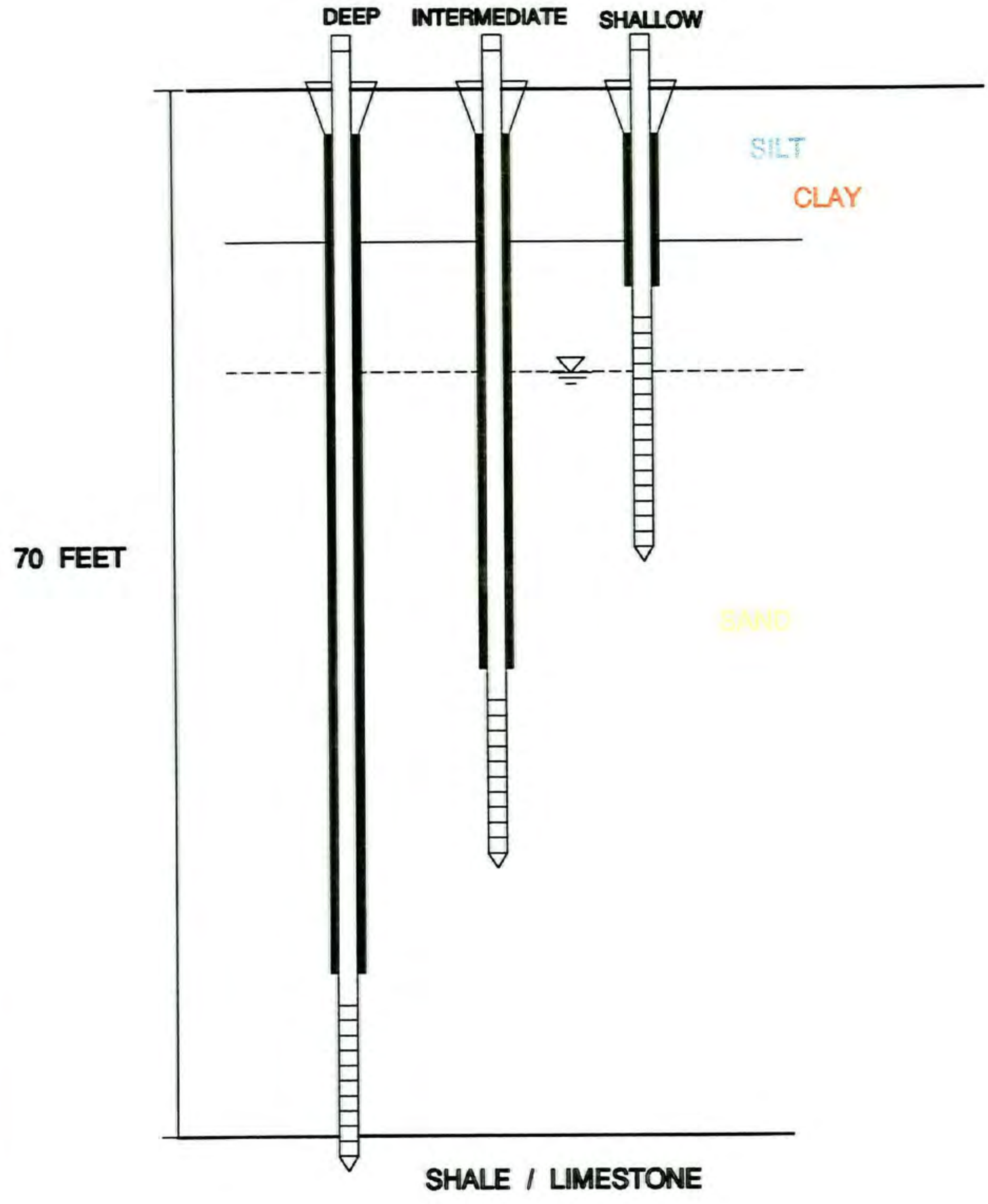
1. GROUNDWATER ELEVATION FROM AUGUST 1999.
2. ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.

Burns & McDonnell SINCE 1898

Figure 2-5
Geological
Cross-Sections C-C' / D-D'

FFTA-MAAF RI

FIG2-4GEO SS.dwg 12-06-1999 09:01 RLH K:\USFRRI\ACAD\FIG2-5GEO S.dwg 03-07-2000 13:26 RLH



NOTES:

1. SHALLOW WELL - 15 FT SCREEN
2. INTERMEDIATE WELL- 10 FT SCREEN (POSITIONED MIDWAY BETWEEN SHALLOW AND DEEP SCREEN)
3. DEEP WELL - 10 FT SCREEN

Burns & McDonnell SINCE 1898

Figure 2-6
Typical Monitoring Well Cluster

FFTA-MAAF RI

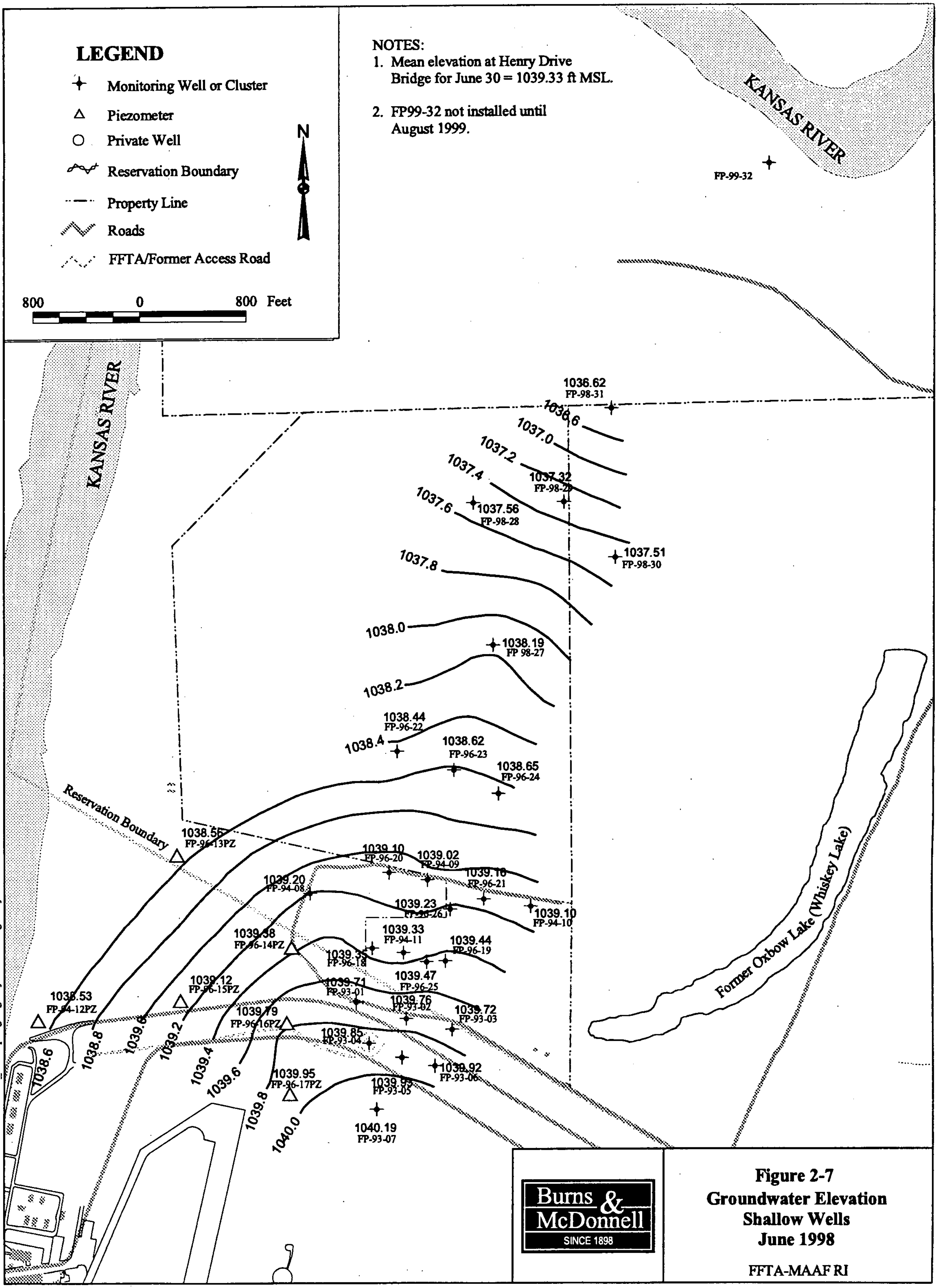


Figure 2-7
Groundwater Elevation
Shallow Wells
June 1998

FFTA-MAAF RI

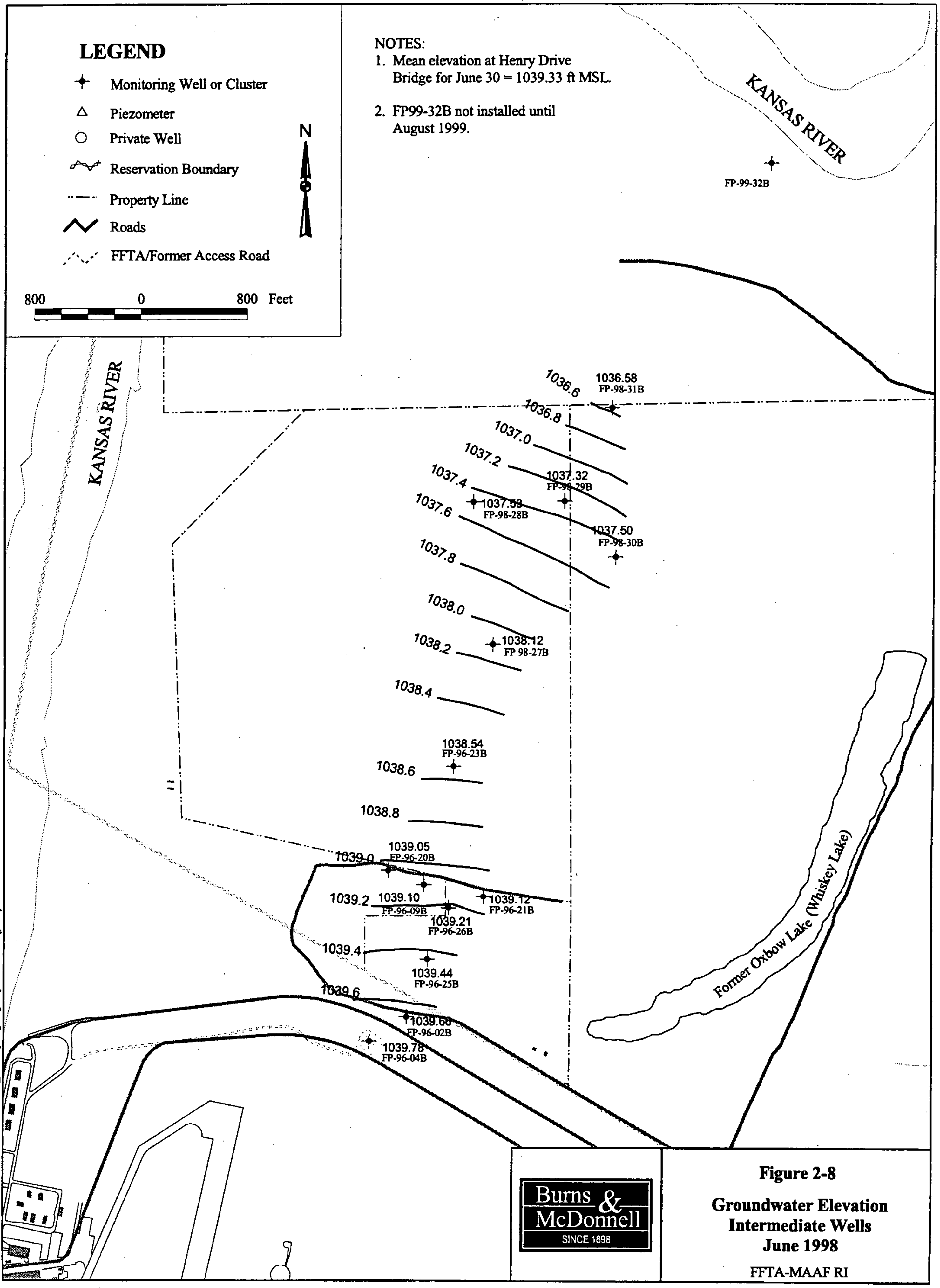


Figure 2-8

Groundwater Elevation Intermediate Wells June 1998

FFTA-MAAF RI

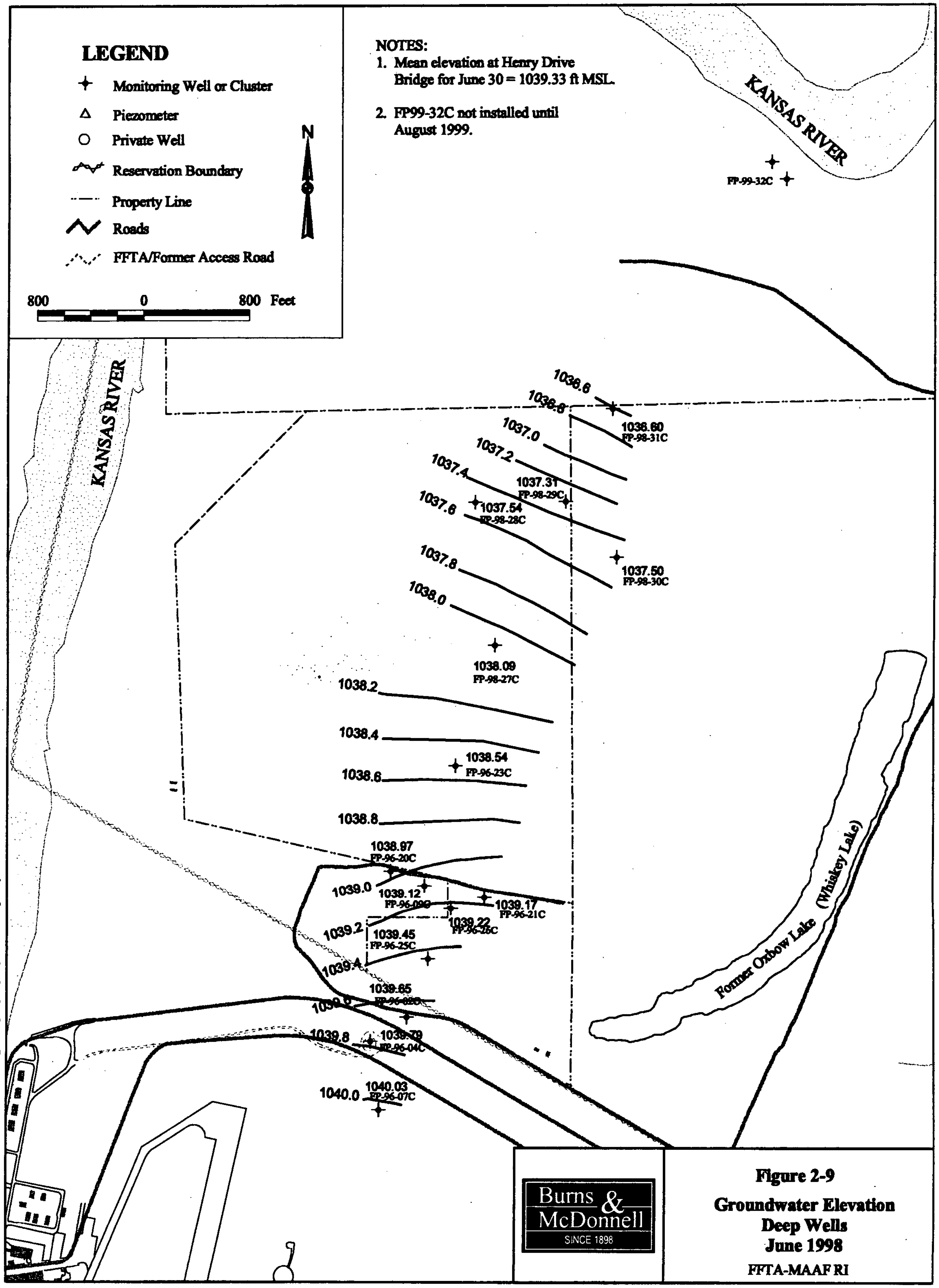


Figure 2-9
Groundwater Elevation
Deep Wells
June 1998
FFTA-MAAF RI

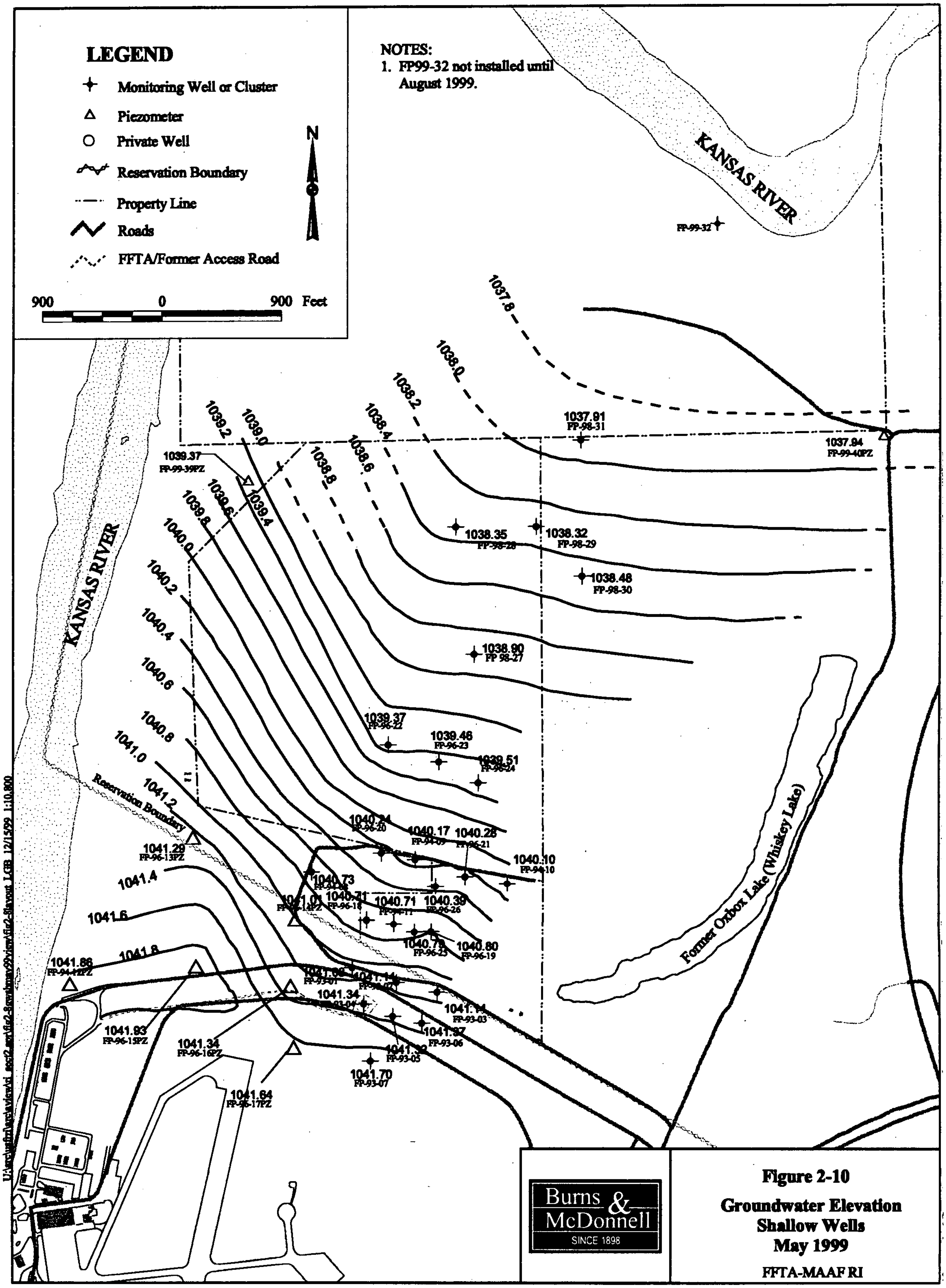


Figure 2-10

Groundwater Elevation Shallow Wells May 1999

FFTA-MAAF RI

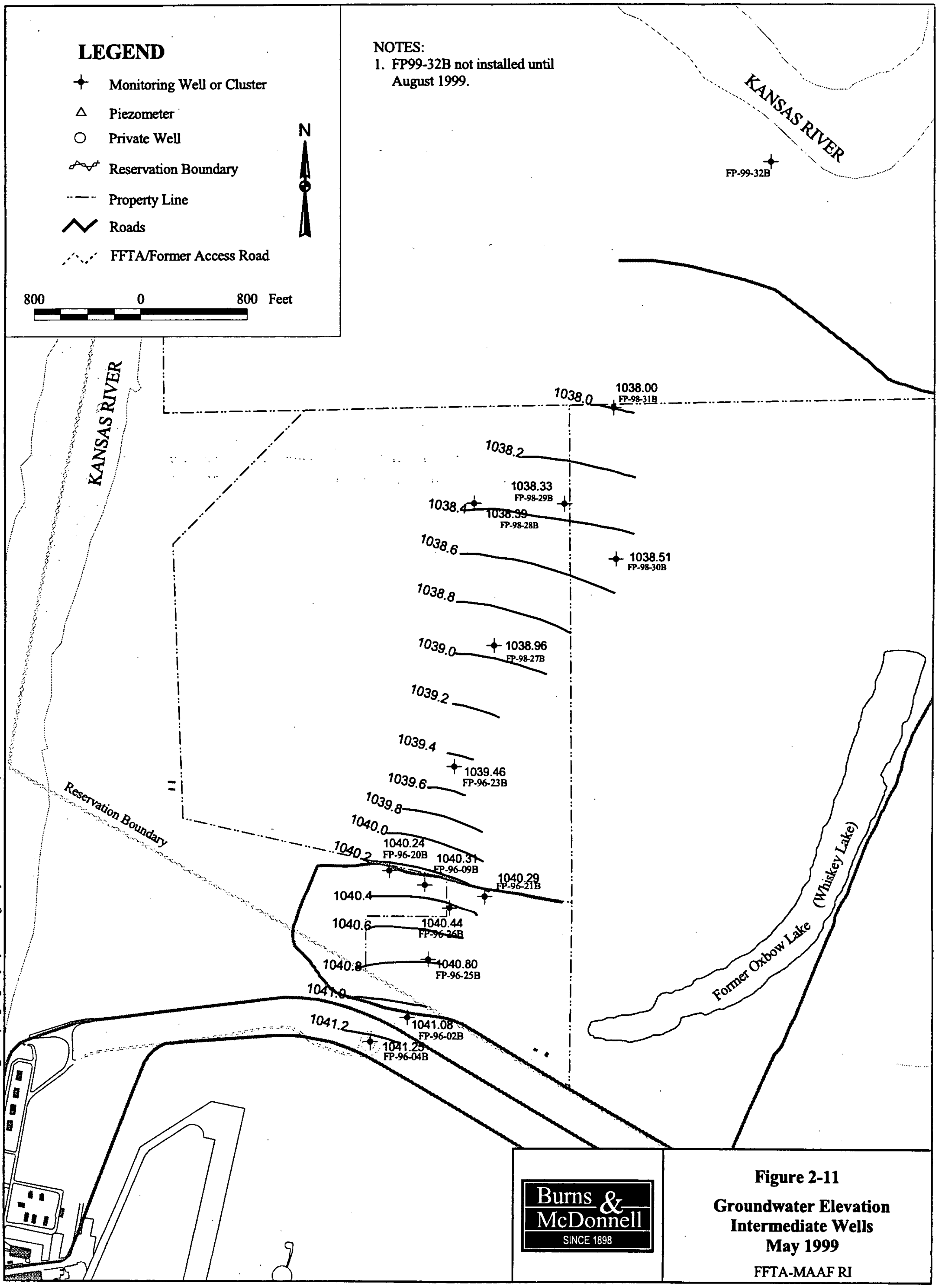


Figure 2-11
Groundwater Elevation Intermediate Wells May 1999
FFTA-MAAF RI

U:\arc\usfrri\arc\aview\ri_sect2.apr\fig2-9gwintjmay99view\fig2-9layout LGB 12/15/99 1:10,800

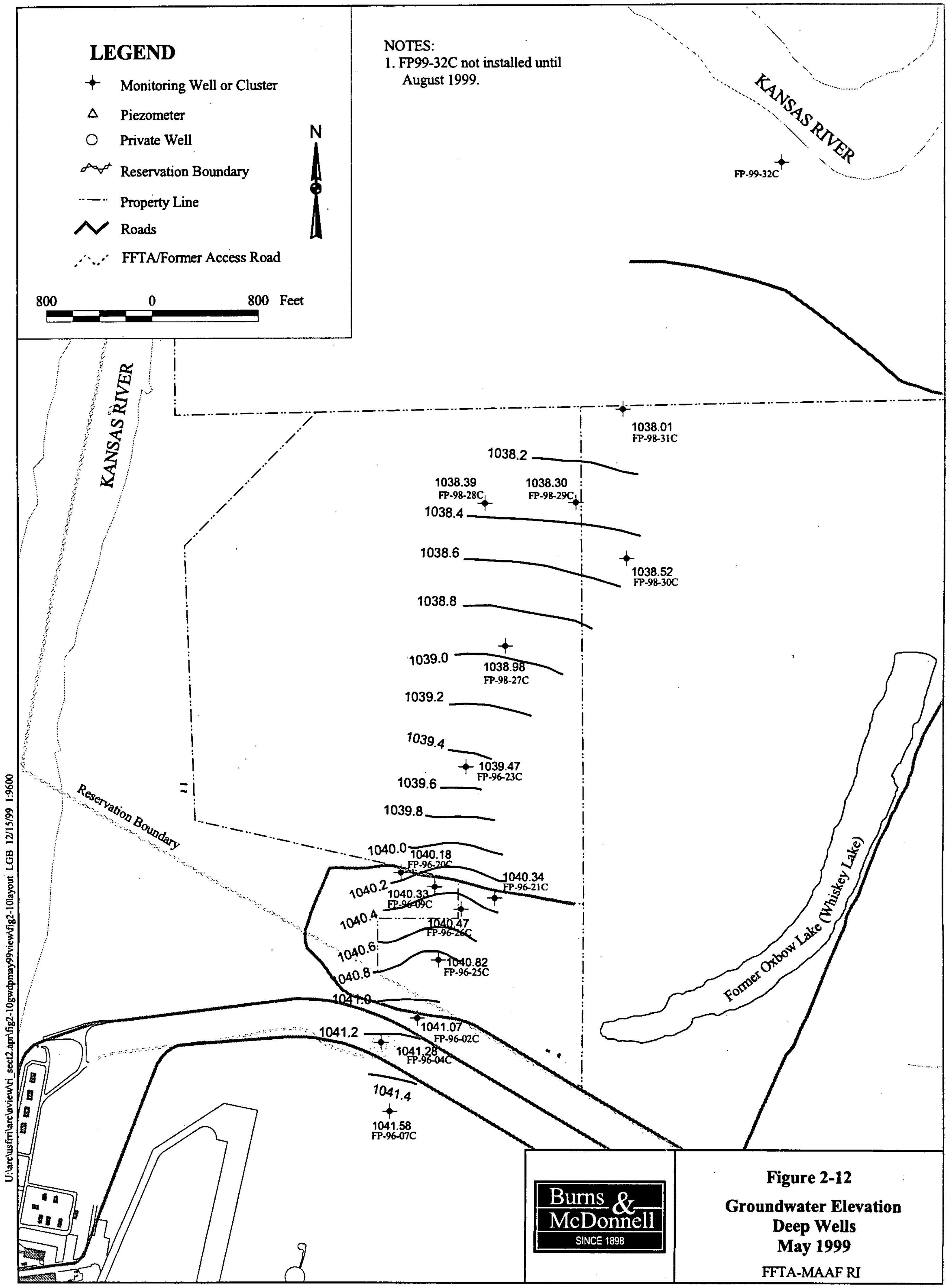
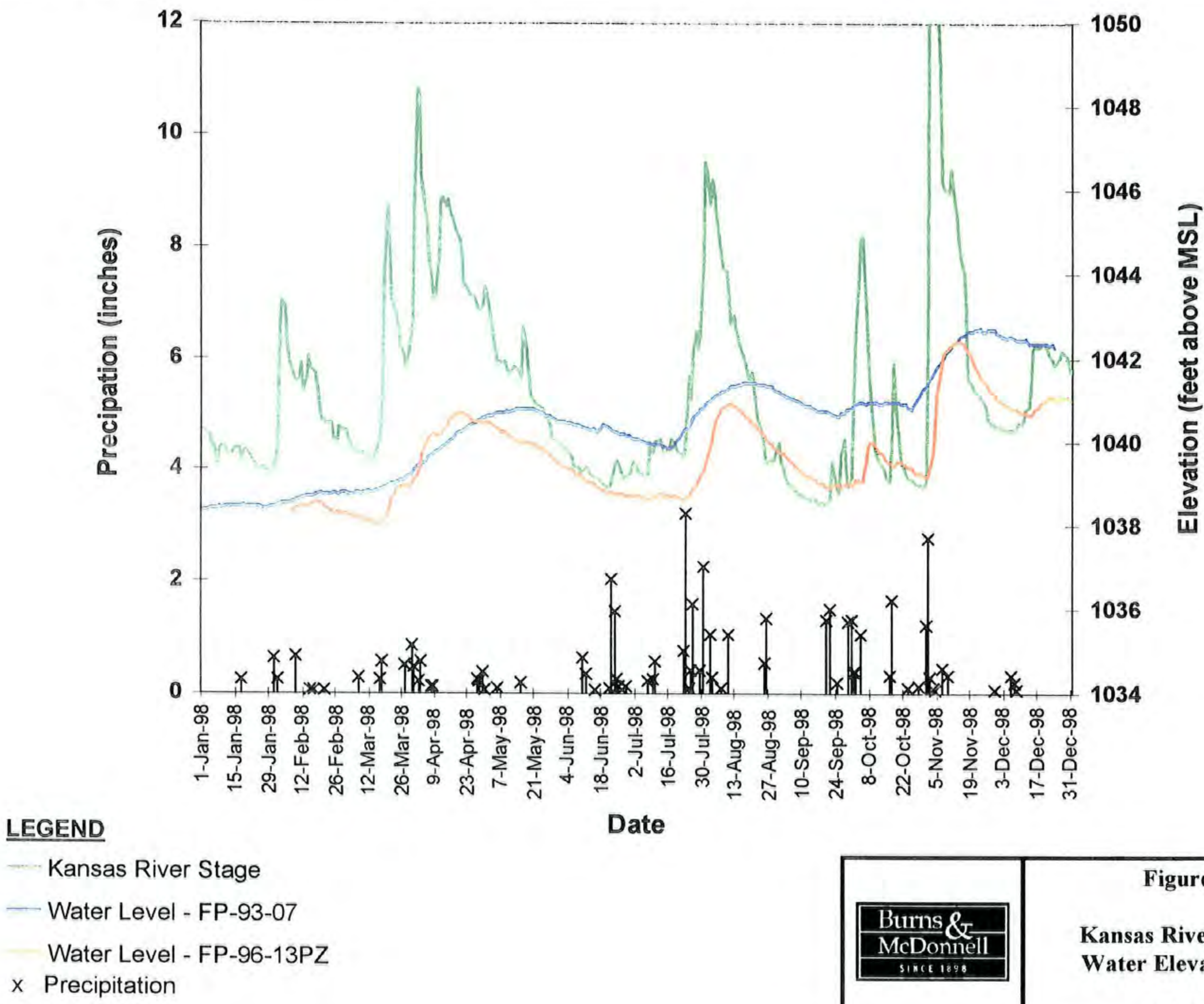


Figure 2-12
Groundwater Elevation Deep Wells May 1999
FFTA-MAAF RI

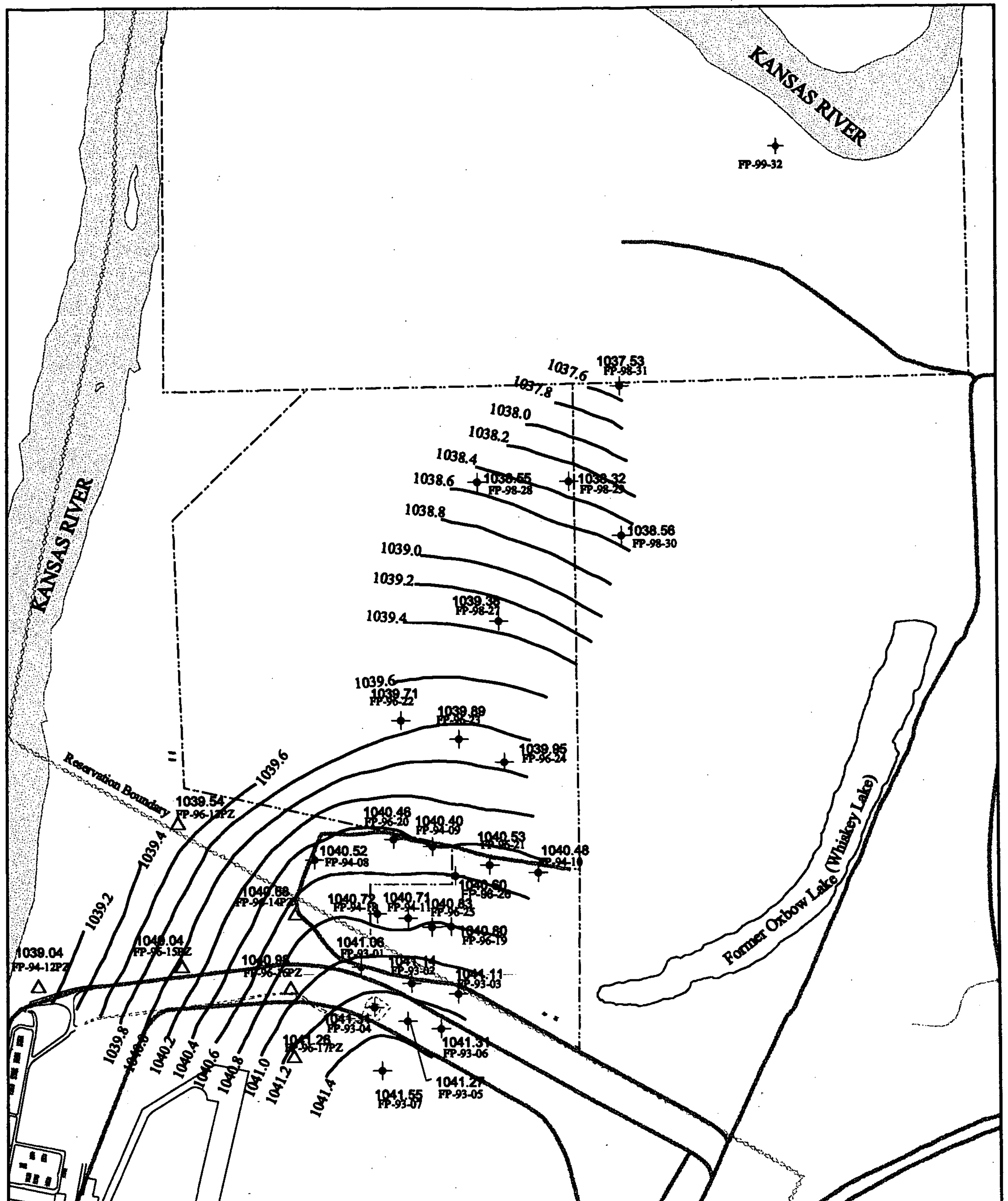


Burns & McDonnell SINCE 1898

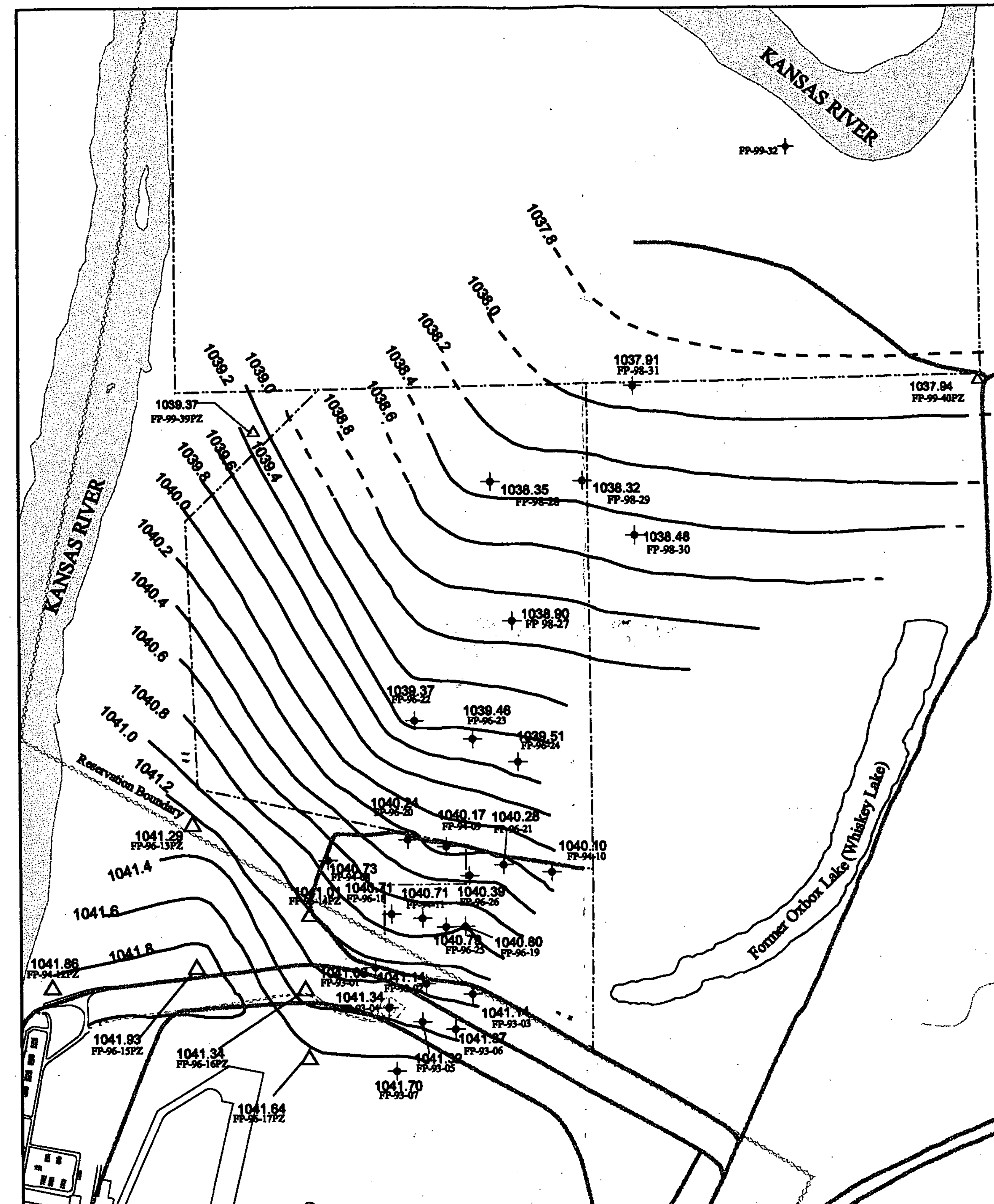
Figure 2-13

Kansas River Stage and Water Elevations -1998

FFTA-MAAF RI



Groundwater Elevation, January 1999 (GAINING STREAM)



Groundwater Elevation, May 1999 (LOSING STREAM)

LEGEND

- + Monitoring Well or Cluster
- △ Piezometer
- ○ Private Well
- Reservation Boundary
- Property Line
- Roads
- FFTA/Former Access Road

900 0 900 Feet

N

NOTE:
1. FP99-32 NOT INSTALLED UNTIL AUGUST 1999.

Burns & McDonnell
SINCE 1898

Figure 2-14
Groundwater Elevation
Shallow Wells
January 1999 and May 1999

FFTA-MAAF RI

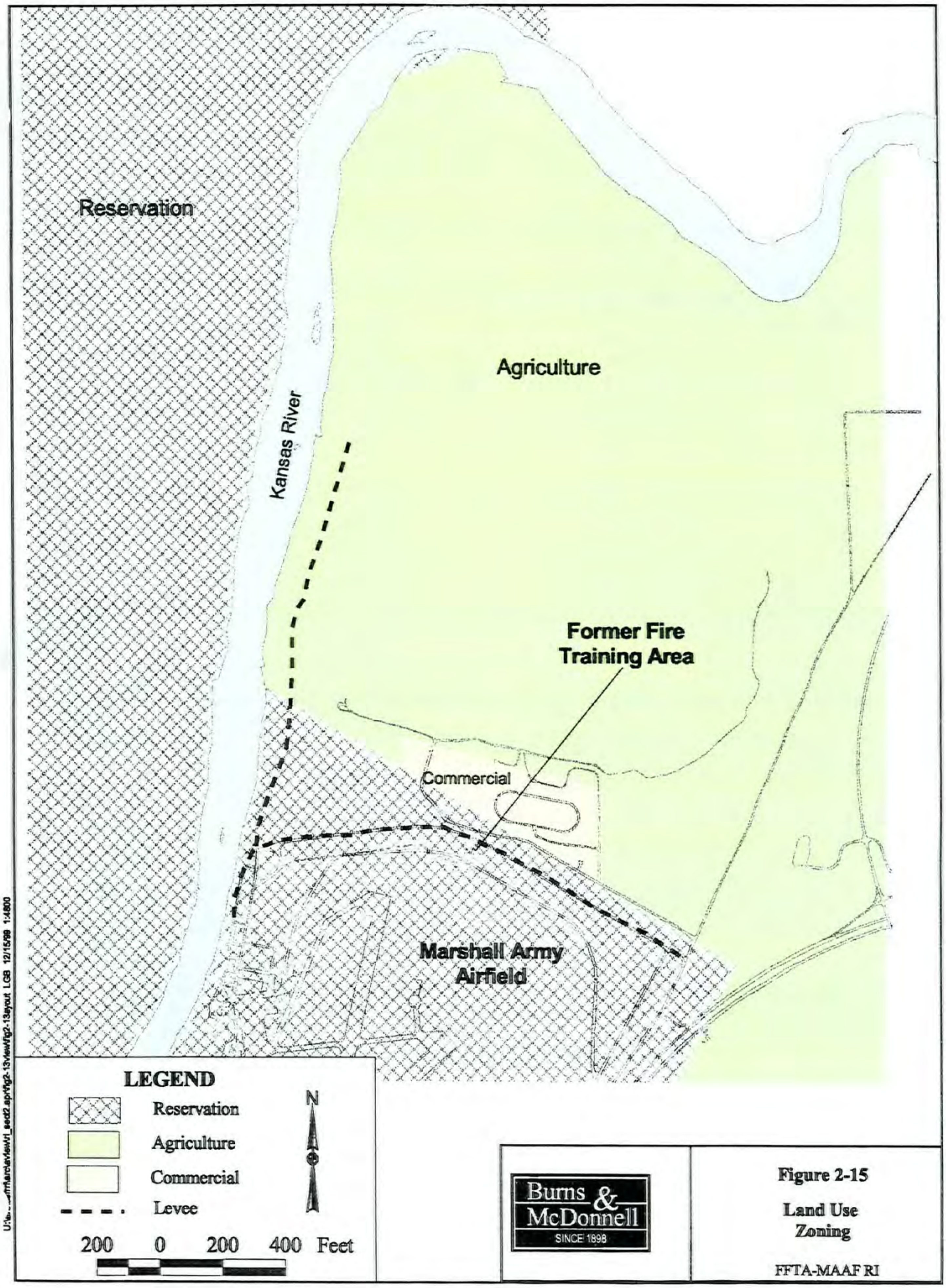
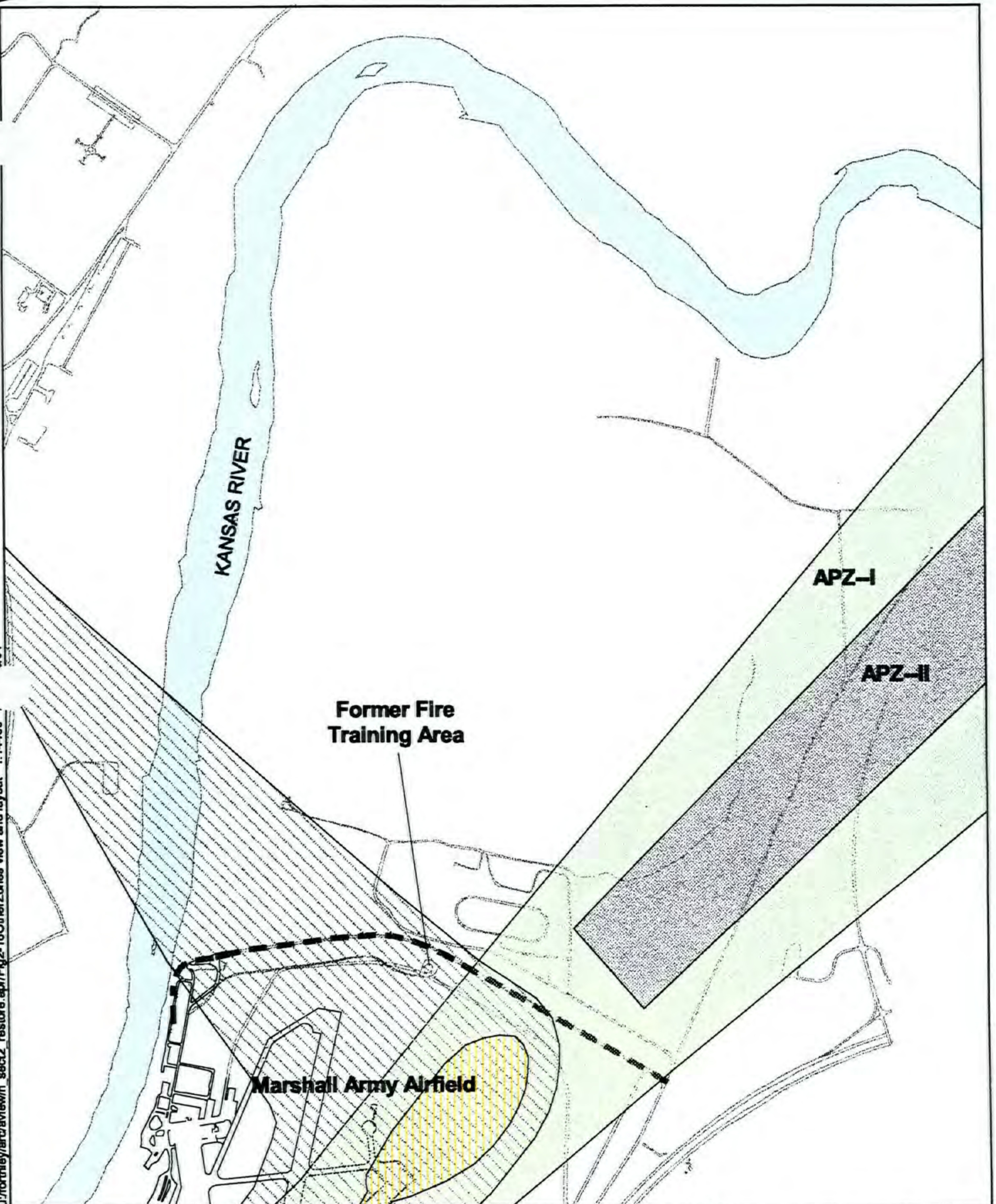


Figure 2-15

Land Use Zoning

FFTA-MAAF RI



LEGEND

- Aircraft Approach Safety Zone APZ-I
- Aircraft Accident Potential Zone APZ-II
- 50-55 ADNL Noise Contour
- 55-65 ADNL Noise Contour
- Levee

N

800 0 800 Feet

Burns & McDonnell
SINCE 1898

Figure 2-16

Other Zones

FFTA-MAAF RI

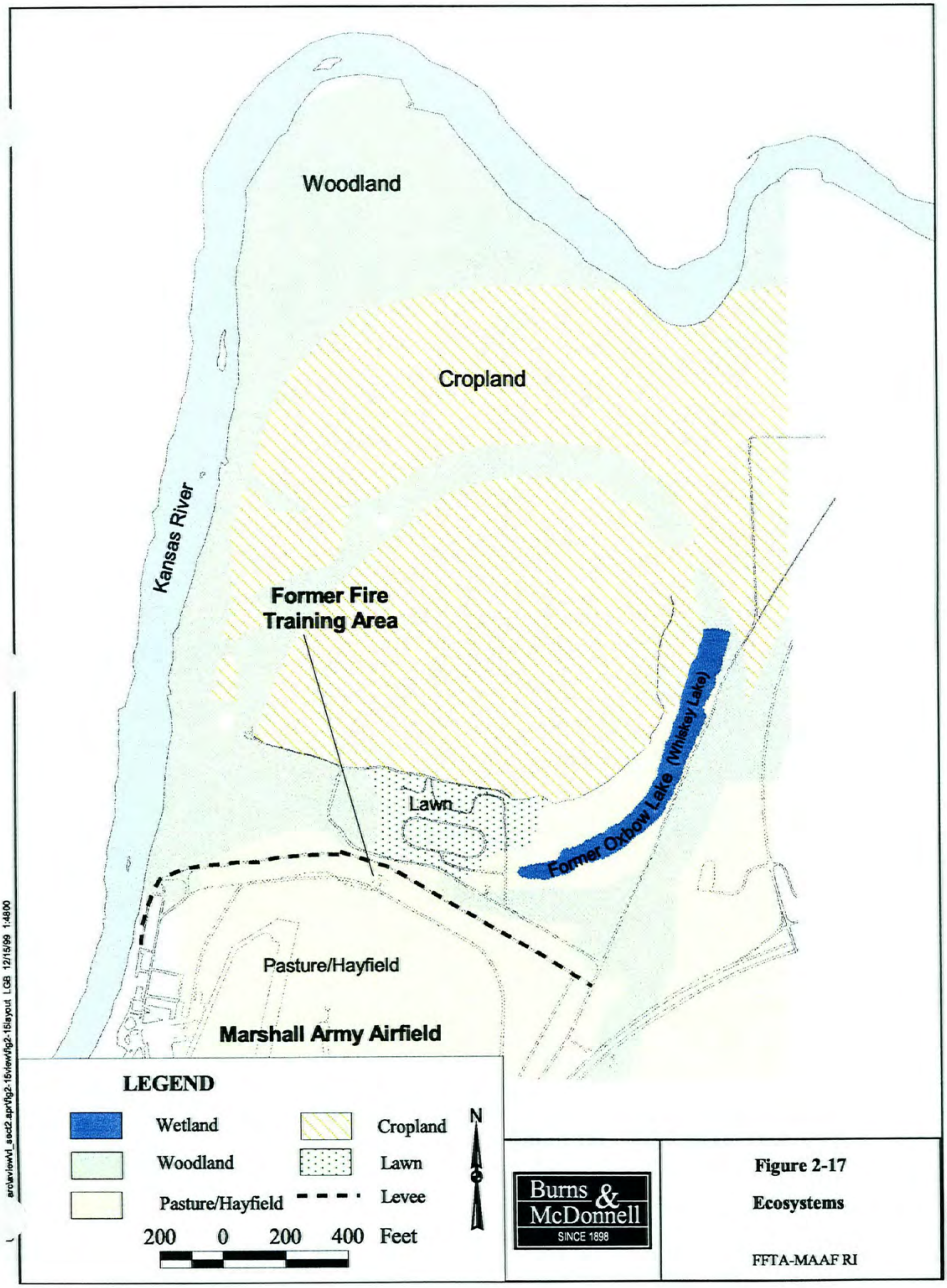


Figure 2-17

Ecosystems

FFTA-MAAF RI

3.0 PREVIOUS INVESTIGATIONS

This section provides an overview of the work performed prior to commencing the remedial investigation and presents a brief summary of the significant results through December 1996. Previous evaluations of the Site include the IWSA, the SI, and additional Site investigations. The IWSA (which included the FFTA-MAAF) was conducted in 1992. The original phases of the SI were performed from September 1993 through June 1994. These are covered in Section 3.2. Additional SI investigations, which are addressed in Section 3.3, commenced in June 1994 and were completed in August 1995. In addition to field investigation activities, a soil vapor extraction (SVE) and bioventing study was conducted from October 1994 through January 1995 and March 1995 through September 1995. The SVE and bioventing study is discussed in Section 3.4. Periodic groundwater sampling was performed by LBA from October 1993 through December 1996. Section 3.5 integrates and discusses the results of all SI field activities, including those for soil-gas, groundwater screening, soil, and groundwater. Detailed summaries of SI activities and Technical Memoranda Nos. 1 through 6 which documented modifications, are presented in the *FFTA-MAAF SI* (LBA, 1995e). The results of the pilot test study are available in *Pilot Test Study Results Report, Soil Vapor Extraction and Bioventing Systems for Former Fire Training Area* (LBA, 1999) [*Pilot Study Report*]. Additional figures showing sampling locations, which were taken directly from LBA reports, are included in Appendix 3A.

3.1 INSTALLATION WIDE SITE ASSESSMENT

The IAG required Fort Riley to investigate previously identified potential areas of concern (PAOCs) and conduct a systematic Site assessment to identify all PAOCs at Fort Riley. The systematic Site assessment was performed in 1992, with the results presented in the *IWSA* (LBA, 1992). The IWSA identified 24 groupings of PAOCs, consisting of over 45 individual PAOCs. Information was collected on the PAOCs to evaluate their eligibility under CERCLA and RCRA authorities, the contaminants present, potential migration pathways, and potentially exposed populations. The IWSA activities were conducted consistent with USEPA requirements for Preliminary Assessments (PAs) under CERCLA. Based on USEPA's PA methodology, potential risk posed by the PAOCs was estimated using the Hazard Ranking System (HRS).

Results of the PA were used to identify sites requiring further investigations because of their potential risk or high likelihood for causing releases to the environment. The FFTA-MAAF was identified as one of these sites due to the previous practice of pouring flammable liquids into the unlined burn pit as part of fire training exercises.

3.2 SITE INVESTIGATION

The original scope of the SI for the FFTA-MAAF Site was conducted in three phases from September 1993 through June 1994. The purpose of SI activities was to confirm whether contamination existed at the Site and to support decision-making regarding the need for more detailed investigations, cleanup of the Site, or no further action. Environmental sampling during the SI was performed to characterize physical conditions and contamination at the Site.

The SI focused primarily on the immediate area of the FFTA-MAAF and the area between the former burn pit and the Fort Riley reservation boundary to the north (Figure 3-1). Based on initial SI findings that groundwater contamination was present at the Site, the SI scope was modified to include the collection of groundwater samples from downgradient private wells located to the north (Figure 3-2).

Sampling at the Site was performed from September through November 1993 in accordance with the *Sampling and Analysis Plan for Site Investigations of High Priority Sites* (LBA, 1993a) [*SAP for High Priority Sites*]. Proposed modifications, including the rationale for proposed modifications, were presented in written Technical Memoranda. Copies of these Technical Memoranda are provided in Appendix A of the *FFTA-MAAF SI* (LBA, 1995e).

Modifications to the SI generally provided for changes in methods used for screening the FFTA-MAAF to locate potential buried drums, specific groundwater and soil sampling, and laboratory analysis for polychlorinated biphenyls (PCBs). These changes are explained in detail in Technical Memoranda Nos. 2 and 3, contained in Appendix A of the *FFTA-MAAF SI* (LBA, 1995e).

3.2.1 Phase I

Phase I field activities were conducted during September 1993 (Figure 3-1). Phase I investigations included locating the FFTA-MAAF, performing a soil-gas survey and on-site groundwater screening at 40 locations (Tables 3-1 and 3-2; Figure A3-1), and collection of duplicate groundwater screening samples for off-site laboratory analysis (Table 3-3). In addition, eight soil samples were collected for chemical analyses (Table 3-4) and five surface soil (sediment) samples were collected from the drainage ditch adjacent to the FFTA-MAAF for chemical analysis (Figure A3-1). Six soil samples were collected and analyzed for PCB analysis at two locations within the former fire training pit, including four samples analyzed for Target Compound List (TCL) pesticides.

3.2.2 Phase II

Phase II was performed after completion of Phase I activities. Phase II was an expansion of the Phase I soil gas and groundwater screening grid (Figures 3-1 and A3-1). The Phase II soil-gas sampling expanded the original SI scope to include 18 additional sample locations. This expansion was performed to further delineate the extent of contamination from the FFTA-MAAF. Two soil-gas samples were collected at each location and analyzed in the field. One sample was collected from a depth of four feet bgs and the second sample from a depth of approximately eight feet bgs. Phase II soil gas samples and groundwater headspace screening samples were analyzed for chlorinated volatile organic compounds (VOCs) and petroleum constituents using modified USEPA Methods 601 and 602 (see Tables 3-5 and 3-6).

3.2.3 Phase III

Phase III of the SI was initiated during October 1993, and consisted of the installation and sampling of seven shallow (24 to 31 feet bgs) groundwater monitoring wells within the uppermost saturated zone (FP-93-01 through FP-93-07; see Figure 3-1). Based on the initial findings from Phases I and II of the SI, the Phase III was expanded to include sampling of nine existing private water wells north of the Fort Riley installation boundary. These included private wells B-1, F-1, F-2, I-1, M-1, N-1, R-1, R-2, and R-3 (Figure 3-2 and Table 3-7). (Note: Table 3-7 contains results for all SI and RI groundwater sampling of monitoring and private wells through August 1999, and data is presented by well location).

3.2.4 Summary of the Site Investigation

In summary, the SI for the Site included the following activities conducted during three phases:

- Collection and chemical analyses of soil-gas and groundwater screening samples at 58 locations in and around the FFTA-MAAF burn pit and downgradient of the pit along the Fort Riley reservation boundary to the north.

- Collection and chemical analyses of eight soil samples at four locations within the former fire training burn pit and from adjacent soils.

- Collection and chemical analyses of five surface soils (sediments) along the drainage ditch transecting the FFTA-MAAF.

- Sampling of seven private wells north of the FFTA-MAAF.
- Installation and sampling of seven groundwater monitoring wells within the Fort Riley installation boundaries.

3.3 ADDITIONAL SITE INVESTIGATIONS

Based on the results of the SI, additional investigation activities were performed during the period of June 1994 through April 1995. The expanded investigations were conducted in the immediate area of the FFTA-MAAF and in the areas north of the reservation boundary where groundwater contamination was detected (Figure 3-3). The objectives of the additional investigations were to characterize the nature of the environmental release, evaluate the horizontal and vertical distribution of contaminants, characterize groundwater contamination, and collect data to support selection and potential implementation of response actions and/or interim remedial measures.

Similar to the approach for the SI, the expanded SI was conducted in phases. The SI phasing allowed investigation activities to be focused based on findings as the data was generated, resulting in a more cost-effective approach. The phased approach was consistent with the approach used in the SI, which was effective in delineating areas of soil and groundwater contamination in the area of the FFTA-MAAF.

The *Expanded Site Investigation Sampling and Analysis Plan for the Former Fire Training Area, Marshall Army Airfield, Fort Riley, Kansas, and Nearby Off-Post Properties* (LBA, 1994) [*ESI SAP*] served as the planning document for implementation of the expanded SI at the Site. When field conditions required revisions to field sampling activities not discussed in the expanded SI SAP, changes were implemented only after consultation with CENWK, Fort Riley, and the regulatory authorities (USEPA and KDHE). Proposed modifications, including the rationale for proposed modifications, were presented in written Technical Memoranda. Copies of these Technical Memoranda are provided in Appendix A of the *FFTA-MAAF SI* (LBA, 1995e).

In general, modifications to the expanded SI pertained to changes in the groundwater screening, the deep alluvial well, and specific soil and groundwater sampling points. These changes are explained in detail in Technical Memoranda Nos. 1, 2, 4, 5, and 6, contained in Appendix A of the *FFTA-MAAF SI* (LBA, 1995e).

3.3.1 Phase I

The additional SI was implemented in accordance with the *ESI SAP* (LBA, 1994). There were two phases of sampling proposed at the Site. The Phase I investigation was organized into on-post and off-post activities. The Phase I was initiated in June 1994 and included quarterly sampling of groundwater wells (Table 3-7), the collection and chemical analyses of soil gas samples from 238 off-post locations and 90 groundwater screening samples from off-post locations (Tables 3-8 and 3-9; Figure A3-2), and monthly measurements of groundwater elevations (Table 2-2). Groundwater headspace and soil gas samples were analyzed for petroleum hydrocarbons and chlorinated VOCs. Geophysical surveys, including seismic reflection on-post and resistivity on-post and off-post, were also conducted to characterize the depth to bedrock, the topography of the underlying bedrock surface, and geologic layering in the alluvial materials (Figure A3-3). Results for the geophysical surveys can be found in the *FFTA-MAAF RI* (LBA, 1995e).

3.3.2 Phase II

Phase II was initiated in August 1994 and included activities to evaluate the hydrogeologic characteristics as well as the vertical and horizontal extent of contaminant migration in the off-post areas. Phase II included an expanded area of investigation for the groundwater screening survey, with an additional 154 off-post locations sampled and screened for groundwater contamination (Figure A3-2), the installation and sampling of one piezometer (FP-94-12PZ) and four shallow groundwater monitor wells (FP-94-08, FP-94-09, FP-94-10, and FP-94-11)[Figure 3-3], and soil sampling from 29 locations (Figure A3-4). In addition, the USACE Site Characterization Analysis Penetrometer System (SCAPS) was used to collect deep alluvial groundwater screening samples at nine locations and to collect cone penetrometer and electrical resistivity data at four of those locations (Figure A3-5). This data, which was also used to confirm the bedrock depth deduced from the seismic study, generally corroborated the seismic data. SCAPS results are located in the *FFTA-MAAF RI* (LBA, 1995e).

3.3.3 Summary of Additional Site Investigations

In summary, the expanded SI for the Site included the following activities conducted during two phases:

- Collection and chemical analyses of soil gas and groundwater screening samples.
- Collection and chemical analyses of soil samples.
- Installation of one piezometer near the Kansas River and four groundwater monitoring wells at the racetrack property.
- Completion of four quarterly groundwater sampling events.
- Performance of a seismic reflection survey and electrical resistivity soundings to collect additional subsurface geological information.
- Use of the SCAPS to collect deep alluvial groundwater screening samples at nine locations and to collect cone penetrometer and electrical resistivity data at four locations.
- Monthly measurements of groundwater elevations at all monitoring wells.

3.4 SOIL VAPOR EXTRACTION AND BIOVENTING PILOT STUDY

3.4.1 Approach

The purpose of the Pilot Test Study was to evaluate the feasibility of two technologies for soil remediation at the FFTA-MAAF. The Pilot Test Study included installation and testing of SVE or SVE/bioventing systems to address vadose zone soil contamination in the former burn pit and drum storage area at FFTA-MAAF. In the former burn pit area, a SVE/bioventing system was evaluated for its effectiveness treating petroleum hydrocarbon and low level VOC contamination. In the former drum storage area, an SVE system was evaluated for its effectiveness in treating PCE contamination. The primary goal of the bioventing system was to enhance biodegradation of petroleum hydrocarbons in soil; the SVE system was focused primarily on the removal of VOCs.

Prior to the Pilot Test Study, soil borings were advanced and sampled in and around the former fire training pit to characterize baseline conditions and to further delineate the horizontal and vertical extent of impacted soils (Tables 3-10 and 3-11; Figure A3-6). Following completion of the pilot study, soils were resampled for chemical analysis (Tables 3-12 and 3-13), geotechnical parameters, and microbial colony counts. Soil samples from eight borings were collected for geotechnical parameter testing. Chemical analytical results were used to delineate the extent of contaminated soils. Results from chemical, geotechnical, and biological tests were used for pilot test system design. The efficiency of the pilot test system was evaluated by analysis of soil respiration, soil permeability to air flow, and soil vapor chemical concentrations at influent and effluent port locations.

Sampling at the Site was performed according to the *Work Plan, Pilot Test Study, Soil Vapor Extraction and Bioventing Systems* (LBA, 1994b)[*Pilot Study WP*]. Modifications to the Pilot Test Study included a change to the time interval to measure groundwater levels from certain wells and soil boring resampling. These changes are detailed in Technical Memorandum No. 2 provided in Appendix A of the *FFTA-MAAF SI* (LBA, 1995e).

3.4.2 Pilot Test Operation

In the former burn pit area, the pilot test included:

- An initial three-day SVE/bioventing test
- A series of soil gas permeability tests
- Three in-situ respiration tests
- A 45-day bioventing study
- An extended six-month bioventing study

The SVE portion of the pilot study performed in the former burn pit lasted 48 hours (November 15 to November 17, 1994). The SVE portion of the study was terminated after 48 hours due to the unexpectedly high loading of the vapor phase carbon adsorption (VPCA) units by petroleum hydrocarbons and chlorinated VOCs. This resulted in rapid consumption of the activated carbon.

In the former drum storage area, the pilot test involved:

- Five-day SVE tests on each of the three extraction wells (15 days)
- A 15-day combined SVE test
- An extended two-month SVE test

The SVE pilot study in the former drum storage area was conducted in two phases; an initial 30-day period (December 15, 1994 to January 16, 1995) and a two-month extended test (March 3 to May 23, 1995).

3.4.3 Pilot Test Results

In the former burn pit area, unexpectedly high total petroleum hydrocarbon (TPH) concentrations were observed in the extracted vapor samples collected during the initial three-day bioventing/SVE test. VOC removal rates from the four extraction wells ranged from 452 to 1,110 pounds per day (lbs/day). Within the three-day period, about 776 lbs of VOCs (primarily TPH constituents) were removed.

Results from the in-situ respiration test conducted during the initial phase indicated that indigenous microorganisms in the soil could degrade an average of 5.3 lbs/day of TPH contaminants (expressed as hexane mass). It was estimated that approximately 320 lbs of TPH contaminants were biodegraded during the initial phase bioventing test. During the extended phase bioventing study at the former burn pit, the average biodegradation rate was approximately 4.5 lbs/day, resulting in an estimated removal of 800 lbs of TPH. The total estimated TPH removed from the former burn pit via bioventing during the study was 1,120 lbs.

In the former drum storage area, the three SVE extraction wells produced maximum VOC removal rates of approximately 15 to 19 lbs/day. Over the initial 30-day test period, approximately 252 lbs of VOCs were removed from this area. During the extended phase pilot test, measured VOC removal rates ranged from 0.05 to 3.10 lbs/day. Based on this data, approximately 220 lbs of VOCs (primarily PCE) were removed during the extended pilot test for a total of approximately 472 lbs removed from the former drum storage area.

Complete results of the Pilot Test Study are presented and discussed in the *Pilot Test Study Results Report, Soil Vapor Extraction and Bioventing Systems for the Former Fire Training Area, Marshall Army Airfield, Fort Riley, Kansas* (LBA, 1999) [Pilot Study Report]. Results indicated that the SVE and/or bioventing were effective at reducing contaminant levels of VOCs, such as chlorinated organics and light petroleum compounds (e.g., xylenes and toluene), but had only a minimal impact on reducing heavier petroleum compounds (e.g., diesel and gasoline range organics) (see Figure 3-4).

3.5 RESULTS OF SI FIELD ACTIVITIES

3.5.1 Soil-Gas and Groundwater Screening Results

The results of the soil gas surveys in the SI and Phase I of the additional SI correlated well with the results of the groundwater screening. Specifically, the soil gas and groundwater screening samples detected the same types of contaminants in the same areas and the magnitude of the detections was similar. The Phase II included only groundwater screening samples which provided data from direct measurements of the media of concern. Except in the immediate vicinity of the FFTA, soil gas detections may have been a result of off-gassing of PCE from groundwater or residual PCE from fluctuations in the water table due to flooding and /or seasonal movement and would be attributed entirely to off-gassing at locations where PCE was not present in soils. Therefore, no soil gas surveys were used in Phase II.

Significant results follow:

- The soil gas results of the SI showed that chlorinated solvents were present in the subsurface at and in the vicinity of the FFTA-MAAF (Tables 3-1, 3-5, and 3-8; Figure 3-5). The maximum concentrations detected were PCE at 50 ug/L, TCE at 6.2 ug/L, and cis-1,2-DCE at 21 ug/L.

- In general, during the expanded SI, there were few detections of non-chlorinated VOCs in groundwater, which would be indicative of migration of petroleum hydrocarbons. The primary contaminants detected during the additional SI were PCE, TCE, and 1,2-DCE. Isoconcentration contours were developed for each of these contaminants (Tables 3-2, 3-6, and 3-9; Figures 3-6 through 3-8). In compiling the isoconcentration contours, data from groundwater screening activities conducted over a period of approximately 16 months (October 1993 to January 1995) was used (LBA, 1995e).

- The isoconcentrations for PCE, TCE, and 1,2-DCE show detections of chlorinated VOCs occur in an area downgradient of the FFTA, extending from the FFTA across the racetrack property in a north-northeast direction (Figures 3-6 thorough 3-8). Detections were also recorded in agricultural fields located to the north of the racetrack property. The direction of detections away from the FFTA is consistent with the regional groundwater flow direction to the north. In general, the pattern of detections is similar for each contaminant; however, detections in the area of the racetrack and in the agricultural fields further to the north are not contiguous.

3.5.2 Soil Results

3.5.2.1 Pre-Pilot Study Soil Results

For the SI, eight shallow (2.0 to 5.0 feet bgs) soil samples were collected at four locations, all within or immediately adjacent to the FFTA (Figure 3A-1). These samples were analyzed for VOCs, semivolatile organic compounds (SVOCs), TPH, and priority pollutant (PP) metals. Soil samples were collected at 29 boring locations off-post, in the vicinity of the dirt track, during Phase II of the additional SI (Figure A3-4). At 26 boring locations, samples were collected from depths of 2.0 to 3.0, and 7.0 to 8.0 feet bgs. At the remaining three locations, shallow soil samples were only collected from the 2.0 to 3.0 foot interval. All soil samples were analyzed for VOCs. For the pilot test study, baseline soil borings were collected and analyzed from nine borings at up to five depths, along with four co-located borings at two depths.

- The soil results of the SI showed that chlorinated solvents were present in the subsurface at and in the vicinity of the FFTA (Table 3-4; Figure 3-9). The maximum concentration detected was PCE at 480 ug/kg.

- The results for those soil borings advanced off-site, in the vicinity of the dirt track, indicate that PCE was detected at levels of 17 to 44 ug/kg, TCE at 6.6 ug/kg, and 1,2-DCE at levels of 30 to 49 ug/kg. These chlorinated VOCs were detected in only four of the 29 boring locations (SB-2, SB-3, SB-4, and SB-8; see Figure A3-3), and these were all located downgradient from the source area at the former fire training pit. These soil detections were only in the deeper sample zone, indicating that a separate shallow source area was not likely. Therefore, detections of PCE, TCE and 1,2-DCE were most likely due to adsorption of these contaminants to the soil due to the elevated groundwater levels in September 1993, when contaminated groundwater occupied the pore spaces of soils at depths of 7.0 to 8.0 feet bgs.

- In those soil borings advanced for the pilot test study baseline, the maximum concentrations of TPH detected were TPH-DRO at 23,000,000 ug/kg and TPH-GRO at 2,600,000 ug/kg. All these samples were taken in and around the FFTA (Tables 3-10 and 3-11; Figure 3-4). The maximum concentration detected of m- and/or p-xylenes was 170,000 ug/kg.

3.5.2.2 Post-Pilot Study Soil Results

Samples collected at four to five depth intervals from a total of 53 post-pilot study boring locations were analyzed at an off-site laboratory for VOCs, SVOCs, TPH, and metals (Figure A3-6). Twelve of the 53 post-pilot study soil boring locations were sampled for comparison to the baseline samples. Of these twelve post-pilot locations, nine were located within five feet of the baseline sample locations. However, due to a survey error, three of the locations were improperly co-located with the baseline sampling locations. Locations MAAFPSB-01, MAAFPSB-06, and MAAFPSB-07 were located 33 ft, 35 ft, and 27 ft from their respective baseline sample. Therefore, a valid comparison for these sample locations was not possible.

A comparison between pre-pilot study analytical results and post-pilot analytical results revealed an overall reduction in the number and levels of chemicals detected in soils near the treatment area (Figure 3-4). Reductions ranged from a high of 98 percent (e.g., total xylenes) to as little as 3.8 percent (TPH- GRO). Post-pilot study results are described below and are described in detail in *Data Summary Report for Post-Pilot Study Expanded Soil Sampling for the Expanded Site Investigation, Former Fire Training Area, Marshall Army Airfield, Fort Riley, Kansas, and Nearby Off-Post Properties* (LBA, 1996a) [*Post-Pilot Soils*].

3.5.2.2.1 Volatile Organic Compounds

Several VOCs were detected in post-pilot study soil borings at the Site. These included PCE, TCE, ethylbenzene, toluene, and xylenes.

Detections of PCE occurred at seven soil boring locations. At six of these locations (PSB-4, PSB-7, PSB-8, PSB-9, PSB-24, and PSB-25) detections ranged in concentration from 9 to 100 ug/kg (Table 3-12; Figure A3-6). The highest detection of PCE (290 ug/kg) occurred at Soil Boring PSB-17, on the edge of the former drum storage area. TCE was detected at post-pilot Soil Borings PSB-13 and PSB-14. The single detection of TCE at Soil Boring PSB-13 (7.5 ug/kg) occurred at 4.7 to 7.0 feet bgs. TCE was detected three times at Soil Boring PSB-14 at concentrations ranging from 21 to 51 ug/kg at depths ranging from 0.5 to 7.0 feet bgs. Neither 1,2-DCE or vinyl chloride were detected in any of the soil samples analyzed at the Site.

Ethylbenzene was detected in two soil borings (PSB-4 and PSB-44; see Table 3-12). These detections were 15,000 ug/kg and 40 ug/kg, respectively. Toluene was detected in post-pilot Soil Borings PSB-4 and PSB-5. Toluene was detected in PSB-5 at a level of 370 ug/kg (10.0 to12.0 feet bgs). The two detections of toluene in PSB-4 occurred above six feet bgs at concentrations of 760 ug/kg and 63,000 ug/kg. Xylenes were detected in eight soil borings at levels from 17 ug/kg to 37,000 ug/kg. Xylenes were detected throughout Soil Boring PSB-4, ranging from 180 ug/kg of o-xylene to 37,000 ug/kg of m,p-xylene. Soil Boring PSB-4 is located in the center of the former fire training pit where fuels were used in the fire training exercises.

3.5.2.2.2 Semi-Volatile Organic Compounds

SVOCs were detected primarily at soil sampling locations within the former burn pit boundaries. Acenaphthene, bis(2-ethylhexyl)phthalate, and fluorene were detected once at Soil Boring PSB-4 at concentrations of 3,400, 2,000, and 3,400 ug/kg, respectively. Phenanthrene, pyrene, naphthalene, and 2-methylnaphthalene were also detected at several post-pilot study soil borings.

3.5.2.2.3 Total Petroleum Hydrocarbons

TPH-DRO and TPH-GRO were detected in many of the soil borings in the area of FFTA-MAAF (Table 3-13; Figure A3-6). The highest detections occurred at Soil Boring PSB-4. TPH-DRO was detected at concentrations ranging from 2,600 to 21,000 mg/kg at Soil Boring PSB-4. High detections of TPH-DRO also occurred at Soil Boring PSB-5, where detections ranged from 7.7 to 11,000 mg/kg. Both of these soil borings are located in the center of the former burn pit. Detections of TPH-GRO ranged from 0.116 to 2,800 mg/kg.

3.5.3 Groundwater Results

The potential for groundwater contamination as a result of releases from the Site was evaluated by installing and sampling groundwater monitoring wells located in the vicinity of FFTA-MAAF. Monitoring Wells FP-93-01 through FP-93-07 were installed as part of the SI activities. Boring logs, well completion diagrams, well specification forms, and well development records are provided in Appendix E of the *FFTA-MAAF* SI (LBA, 1995e). In August 1994, the off-post driven well points FP-94-08 through FP-94-11 were installed. Piezometer FP-94-12PZ was installed in July 1994 and in 1996, Monitoring Wells/Piezometers FP-96-13 through FP-96-24 were installed (Figure 3-10). In addition, ten off-post private wells (B-1, F-1, F-2, I-1, M-1, N-1, R-1, R-2, R-3, R-4) have been sampled as a part of the periodic sampling events. Through May 1996, all samples were analyzed for VOCs, SVOCs, PP metals, and TPH. Results for sampling events are included in Table 3-7.

3.5.3.1 Volatile Organic Compounds

VOCs detected at the Site include PCE, TCE, 1,2-DCE, benzene, ethylbenzene, toluene, and xylenes. PCE, a chlorinated solvent, entered the environment at FFTA-MAAF from a documented release. TCE and 1,2-DCE are known degradation products of PCE. As noted in Section 3.5.3, all of the PCE detections in soil occurred near the former fire training pit; however, PCE was detected in groundwater at both off-post and on-post wells. The highest detection of PCE through May 1996 was 330 ug/L, which was detected at Private Well R-1 in October 1994.

In May 1996, TCE was detected in a total of three monitoring wells and two private wells, with the highest detection of 77 ug/L in Private Well R-2. Under anaerobic conditions, TCE can biodegrade to 1,2-DCE.

1,2-DCE was detected in the groundwater at the Site, but was not detected in the soil. The highest detections of 1,2-DCE through May 1996 occurred at Monitoring Well FP-93-04 in October 1993, with a detection of 4,100 ug/L.

Benzene was detected in Monitoring Well FP-93-02 (0.8 ug/L) and Private Well R-1 (0.5 ug/L) in April 1995. Benzene was also detected at Monitoring Well FP-93-04 in October 1993, October 1994, and in December 1995 at concentrations of 64.0, 6.0, and 0.9 ug/L, respectively. Benzene was detected at Monitoring Wells FP-94-11 at a concentration of 1.0 ug/L in December 1995. In May 1996, benzene was not detected in any monitoring or private wells. Benzene was not detected in any of the soil collected from post-pilot soil borings advanced at the FFTA.

The only detections of ethylbenzene through May 1996 occurred at Monitoring Well FP-93-04, with the highest detection (190 ug/L) occurring in October 1993. Toluene was detected in post-pilot study soil borings in the center of the former fire training pit and has consistently been detected at Monitoring Well FP-93-04 for all sampling rounds through May 1996. Toluene was also detected in Monitoring Well FP-94-11 at 0.6 ug/L in December 1995, and in May 1996 was detected in Monitoring Well FP-93-04 (1.5 ug/L). Xylenes were detected in three monitoring wells through May 1996 (FP-93-01, FP-93-04, and FP-94-11), with the highest detections at Monitoring Well FP-93-04 (560 ug/L of m,p-xylene and 330 ug/L of o-xylene). Xylenes were also detected in soil at the former fire training pit.

3.5.3.2 Semi-Volatile Organic Compounds

SVOCs were detected in groundwater during sampling events through May 1996. All confirmed detections occurred at Monitoring Well FP-93-04 and Private Well R-3. The SVOCs detected were 4-methylphenol, bis(2-ethylhexyl)phthalate, naphthalene, and 2-methylnaphthalene. Naphthalene was detected only at Monitoring Well FP-93-04 at levels not exceeding 73 ug/L (October 1993). 2-Methyl naphthalene was detected at Monitoring Well FP-93-04 and Private Well R-3, at levels not exceeding 14 ug/L. 2-Methylnaphthalene has not been detected since August 1994. Detections of SVOCs at Private Well R-3 are the result of releases that occurred at the dirt track.

3.5.3.3 Total Petroleum Hydrocarbons

TPHs were introduced into the environment from the use of fuels during fire training exercises. TPH-DRO and TPH-GRO were detected in many of the groundwater monitoring wells in the area of the FFTA-MAAF former burn pit. TPH-DRO was consistently detected in Monitoring Well FP-93-04 through December 1996. The highest detection occurred in May 1996 at a concentration of 2,600 ug/L. TPH-DRO was also detected once in Monitoring Well FP-93-02 at a concentration of 210 ug/L. TPH-GRO was also detected regularly at Monitoring Well FP-93-04 through May 1996. The highest detection through May 1996 of TPH-GRO occurred at Monitoring Well FP-93-04 in July 1994 (4,400 ug/L). TPH-GRO has also been detected at Monitoring Wells FP-93-02 and FP-94-11, and Private Wells R-1 and R-2. TPH-GRO was detected in one monitoring well in May 1996 (Monitoring Well FP-93-04 at 1,500 ug/L).

3.5.3.4 Summary

As of December 1996, chlorinated VOCs had migrated from the FFTA towards the north-northeast, in the direction of groundwater flow. PCE, TCE, and 1,2-DCE had all been detected at the most northerly monitoring well cluster (FP-96-23). The areas of contamination based on isoconcentration maps are largely overlapping for the different contaminants (see Figures 3-10 through 3-12). Soil contamination was restricted to the general vicinity of the former fire training pit.

3.5.4 Overview of Contamination

Soil samples were analyzed for TPH, VOCs, SVOCs, PCBs, pesticides, and metal parameters. SI results indicated petroleum hydrocarbons and chlorinated solvents were present in the subsurface at the Site, with the highest soil and groundwater petroleum hydrocarbon concentrations detected in the center of the former fire training pit. Soil TPH detections of 400,000 micrograms per kilogram (ug/kg) TPH-gasoline range organics (TPH-GRO) and 8,100,000 ug/kg TPH-diesel range organics (TPH-DRO) were reported. Petroleum hydrocarbons were detected in a groundwater sample from Monitoring Well FP-93-04, located near the center of the former fire training pit. Groundwater TPH-GRO (13,000 ug/L) and TPH-DRO (1,200 ug/L) were also elevated at the former fire training pit. Specific hydrocarbons detected in the groundwater include benzene, toluene, ethylbenzene, and xylenes (BTEX). Petroleum hydrocarbons were detected in soils or groundwater in the vicinity of the racetrack; however, these detections are probably the result of releases which occurred at the track. TPH was not detected in sediment samples taken from the drainage ditch.

Chlorinated VOCs were detected during the SI activities. PCE, and related degradation compounds TCE and 1,2-DCE were the most frequently detected chlorinated solvents. PCE, the only chlorinated solvent detected in soil, was detected in soil samples from the FFTA at a maximum concentration of 480 ug/kg. The highest detections of PCE, TCE, and 1,2-DCE in groundwater samples collected from the FFTA through May 1996 were 320 ug/L, 93 ug/L, and 4,100 ug/L, respectively.

Four soil samples from two locations were collected during the SI to screen the Site for PCB and/or pesticide contamination. Analytical results for these parameters from these samples were reported as non-detect.

A Pilot Test Study was conducted in 1995 to determine the feasibility of possible remediation options at the Site. Soil samples were collected before and after the Pilot Test Study to evaluate the effect of the pilot study on the FFTA soils. Results indicated that there were significant reductions in the chlorinated solvents (PCE, TCE, and 1,2-DCE) at the former fire pit, while detected levels of BTEX and TPH were not reduced significantly.

Five surface soil/sediment samples were collected during the SI activities to determine if contaminants were being transported along the drainage ditch that transects the former fire training pit. These samples were analyzed for VOCs and SVOCs to determine if contamination was migrating through surface runoff in the drainage ditch. Neither VOCs or SVOCs were detected in the samples. Because of a lack of standing water, no surface water samples were taken from the drainage ditch.

* * * * *

Table 3-1
SI Phase I Soil Gas Screening Results
(Positive Detections Only)
September 1993
FFTA-MAAF Remedial Investigation Report

Sample Identification	Depth (feet)	Units	PCE	TCE	cis-1,2-DCE	Benzene	Toluene	Ethyl-benzene	Xylenes	Total FID (a)
MAAF-D6	4	ug/L	<1.0	<1.0	<1.0	**1.0**	<1.0	<1.0	<1.0	<10
MAAF-H7	4	ug/L	<1.0	<1.0	**21**	<1.0	**422**	**44**	**278**	**660**
MAAF-H8	4	ug/L	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-H9	4	ug/L	**4.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-J7	4	ug/L	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-J8	4	ug/L	**29**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-JZ	4	ug/L	**9.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-K7	4	ug/L	**9.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-K9	4	ug/L	**50**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-M6	4	ug/L	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-M8	4	ug/L	**9.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-M14 (b)	4	ug/L	**4.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-N2	4	ug/L	**3.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-N7	4	ug/L	**16**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-NY	4	ug/L	**1.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-P9	4	ug/L	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-PX	4	ug/L	**3.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-PZ	4	ug/L	**1.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-WZ	4	ug/L	<1.0	<1.0	<1.0	<1.0	**3.1**	<1.0	<1.0	<10

Notes:

Bold values represent detected compounds.

(a) Represents the sum of all petroleum hydrocarbon compounds observed on the chromatogram for the FID.

(b) Represents the 4-foot sample from location M1.

< - Below Practical Quantitation Limit.

PCE - Tetrachloroethene
TCE - Trichloroethene
cis-1,2-DCE - cis-1,2-Dichloroethene
FID - Flame Ionization Detector
ug/L - micrograms per liter

Source:
FFTA-MAAF SI (LBA, 1995e)

Table 3-2
SI Phase I Groundwater Screening Results
(Positive Detections Only)
September 1993
FFTA-MAAF Remedial Investigation Report

Sample Identification	Depth (feet)	Units	PCE	TCE	cis-1,2-DCE	Benzene	Toluene	Ethyl-benzene	Xylenes	Total FID (a)
MAAF-H6W	8	ug/L	<1.0	<1.0	**4.8**	<1.0	<1.0	<1.0	<1.0	<10
MAAF-H7W	7	ug/L	<1.0	<1.0	**725**	**13**	**3841**	**356**	**1586**	**6421**
MAAF-H8W	8	ug/L	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-H9W	8	ug/L	**4.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-J7W	8	ug/L	**4.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-J8W	6	ug/L	**51**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-JZW	8	ug/L	**6.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-K7W	9	ug/L	**56**	<1.0	**1.6**	<1.0	<1.0	<1.0	<1.0	**17**
MAAF-K9W	9	ug/L	**46**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-M6W	8	ug/L	**8.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-M8W	8	ug/L	**160**	**2.5**	**32**	<1.0	<1.0	<1.0	<1.0	**49**
MAAF-M1W	8	ug/L	**17**	**1.3**	**129**	<1.0	<1.0	<1.0	<1.0	**15**
MAAF-N2W	8	ug/L	**24**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-N7W	8	ug/L	**10**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-NYW	7	ug/L	**13**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-P9W	7	ug/L	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-PXW	7	ug/L	**4.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MAAF-PZW	7	ug/L	**3.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10

Notes:

Bold values represent detected compounds.

(a) Represents the sum of all petroleum hydrocarbon compounds observed on the chromatogram for the FID.

< - Below Practical Quantitation Limit.

PCE - Tetrachloroethene

TCE Trichloroethene

cis-1,2-DCE - cis-1,2-Dichloroethene

FID Flame Ionization Detector

ug/L - micrograms per liter

Source:

FFTA-MAAF SI (LBA, 1995e)

Table 3-3
SI Phase I Groundwater Screening Results - Laboratory Analyses
(Positive Detections Only)
September 1993
FFTA-MAAF Remedial Investigation Report

Sample Identification	Units	PCE	1,2-DCE	Benzene	Toluene	Ethyl-benzene	m/p-Xylenes	o-Xylenes
FP-N2	ug/L	**32**	<0.5	**0.5**	**1.2**	**1.1**	<0.6	<0.6
FP-PZ	ug/L	**3.7**	<0.5	<0.4	**0.6**	**0.7**	<0.6	<0.6
FP-V8 (a)	ug/L	<2.2	<1.0	<0.8	**1.0**	<1.4	<1.2	<1.2
FP-N7	ug/L	**1.7**	<0.5	<0.4	**0.6**	<0.7	<0.6	<0.6
FP-M8 (a)	ug/L	**250**	**95**	<10	<10	<18	<15	<15
FP-H7 (a)	ug/L	<110	**2,100**	<40	**2,600**	**170**	**380**	**400**
FP-J6 (a,b)	ug/L	<3.3	<1.5	<1.2	**6.0**	<2.1	<1.8	<1.8
FP-J6W (a,c)	ug/L	<5.5	<2.5	<2.0	<2.0	<3.5	<3.0	<3.0
FP-E5	ug/L	<1.1	<0.5	<0.4	**1.1**	<0.7	<0.6	<0.6
FP-W4	ug/L	<1.1	<0.5	<0.4	**0.6**	**0.7**	<0.6	<0.6
FP-W4D (d)	ug/L	<1.1	<0.5	<0.4	**1.0**	**1.0**	<0.6	<0.6
FP-M1 (a)	ug/L	**40**	**280**	<10	<10	<18	<15	<15

Notes:
Bold values represent detected compounds.
ug/L - micrograms per liter
PCE - Tetrachloroethene
1,2-DCE - 1,2-Dichloroethene

(a) Samples with practical quantitation limit (PQL) raised due to limited sample volume.
(b) Original sample container broken in lab custody; analyses conducted on remainder of sample.
(c) Resample of FP-J6.
(d) Duplicate of FP-W4.
< - Below Practical Quantitation Limit

Source:
FFTA-MAAF SI (LBA, 1995e)

Table 3-4
SI Phase I Soil Sampling Results
September 1993
FFTA-MAAF Remedial Investigation Report

Sample Location	H7	H7	K7	K7	K7	M8	M8	NY	NY	KDHE Cleanup Standards*	Risk-based Guidelines**
Sample Depth (feet)	2	4	2	4	4	2.5	4.5	2	5		
Sample Identification	MAAF H7S1	MAAF H7S2	MAAF K7S1	MAAF K7S2	MAAF K7S3 (a)	MAAF M8S1	MAAF M8S2	MAAF NYS1	MAAF NYS2		
Volatile Organic Compounds (ug/kg)											
Dichloromethane	**7.4B**	<26	**11B**	**12B**	**10B**	<22	<6.1	<6.1	<7.3	NAv	25,000 - 760,000
PCE	<5.9	<26	**31**	**34**	**15**	**480**	**110**	<6.1	<7.3	NAv	25,000 - 110,000
m- &/or p-Xylenes	<5.9	**100**	**18**	<6.3	<5.9	<22	<6.1	<6.1	<7.3	63,000 (b)	980,000 - 1,000,000,000 (b)
o-Xylene	<12	**170**	**20**	<13	<12	<54	<12	<12	<7.3	NAv	980,000 - 1,000,000,000
Semi-Volatile (ug/kg)											
di-n-Butylphthalate	<1500	<800	<800	<800	<800	<800	**900**	<800	<800	NAv	68,000,000 - 200,000,000
2-Methyl Naphthalene	<1500	**2700**	<800	<800	<800	<800	<800	<800	<800	NAv	NAv
Naphthalene	<1500	**1000**	<800	<800	<800	<800	<800	<800	<800	NAv	800,000 - 82,000,000
Phenanthrene	<1500	**1400**	<800	<800	<800	<800	<800	<800	<800	NAv	NAv
Total Petroleum Hydrocarbons (ug/kg)											
TPH-GRO	<120	**400000**	<120	<120	<120	**380**	<120	<120	<120	100,000	NAv
TPH-DRO	**880000**	**8100000**	<6100	**15000**	<6100	<6200	<6200	<6200	<6300	100,000	NAv
Metals (mg/kg)											
Arsenic	**3 (c)**	**2 (c)**	**4 (c)**	**2 (c)**	**2 (c)**	**4 (c)**	**3 (c)**	**3 (c)**	**3 (c)**	NAv	2 - 610
Beryllium	<0.6	<0.6	<0.6	<0.6	<0.6	**0.9**	<0.6	**0.7**	**0.6**	NAv	1.1 - 1.3
Cadmium	<0.6	<0.6	<0.6	<0.6	<0.6	**1.1**	<0.6	<0.6	**0.9**	NAv	850 - 1,000
Chromium	**9**	**10**	**10**	**9**	**6**	**15**	**11**	**12**	**14**	NAv	230 - 1,000,000
Copper	**9**	**8**	**10**	**6**	**5**	**16**	**9**	**12**	**10**	NAv	63,000 - 76,000
Lead	**30**	**30**	**11**	**7**	**7**	**15**	**8**	**10**	**10**	500	400 (d)
Nickel	**11**	**10**	**12**	**9**	**7**	**20**	**11**	**14**	**14**	NAv	NAv
Zinc	**35**	**31**	**40**	**26**	**22**	**67**	**34**	**53**	**44**	NAv	100,000 - 610,000

Notes:

Bold values represent detected compounds.
Results are reported in dry weight.
TPH-GRO - Total Petroleum Hydrocarbons - Gasoline Range Organics
TPH-DRO - Total Petroleum Hydrocarbons - Diesel Range Organics

B - Analyte detected in the associated method blank; result has not been blank corrected.
* - "Interim Soil Cleanup Standards, December 1993", Kansas Department of Health and Environment, Bureau of Environmental Remediation.
** - Risk-based guideline concentrations are based on a range of the industrial guidelines to represent EPA Regions III & IX, from the following citations: Region III Risk-based Concentration Table, March 1995, Roy L Smith, Senior Toxicologist - Technical Support Section; Region IX Preliminary Remediation Goals (PRGs) February 1995, Stanford J. Smucker, PhD, Regional Toxicologist.
(a) Duplicate of MAAF K7S2.

Source: FFTA-MAAF SI (LBA, 1995e)

ug/kg - micrograms per kilogram
mg/kg - milligrams per kilogram

(b) Although no standards or guidelines are available for m- &/or p-xylenes, concentrations reported as m- &/or p-xylenes will be compared to the standards and guidelines for xylenes (mixed).
(c) Sample concentration exceeded EPA Region III risk-based standard for arsenic as a carcinogen.
(d) OSWER Directive 9355.4-12, Revised Interim Lead Guidance for CERCLA sites and RCRA Corrective Action Facilities, dated 14 July 1994, lead screening level is 400 mg/kg for residential setting.
NAv Not Available
< Below Practical Quantitation Limit
PCE Tetrachloroethene

Table 3-5
SI Phase II Soil Gas Screening Results
(Positive Detections Only)
September 1993
FFTA-MAAF Remedial Investigation Report

Sample Identification	Depth (feet)	Units	PCE	TCE	cis-1,2-DCE	Benzene	Toluene	Ethyl-benzene	Xylenes	Total FID (a)
MF-1	4	ug/L	**3.9**	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<10
MF-2	4	ug/L	**4.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MF-3	4	ug/L	**44**	**6.2**	<1.0	<1.0	<1.0	<1.0	<1.0	**11**
MF-4	4	ug/L	<1.0	<1.0	<1.0	<1.0	**1.3**	<1.0	<1.0	<10
MF-5	4	ug/L	**9.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MF-6	4	ug/L	<1.0	<1.0	<1.0	<1.0	**3.1**	<1.0	<1.0	<10
MF-8	4	ug/L	<1.0	<1.0	<1.0	<1.0	**1.3**	<1.0	<1.0	<10
MF-9	4	ug/L	<1.0	<1.0	<1.0	<1.0	**1.8**	<1.0	<1.0	<10
MF-12	4	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**12**

Notes:

Bold values represent detected compounds.

(a) Represents the sum of all petroleum hydrocarbon compounds observed on the chromatogram for the FID.

< - Below Practical Quantitation Limit.

PCE - Tetrachloroethene

TCE - Trichloroethene

cis-1,2-DCE - cis-1,2-Dichloroethene

FID Flame Ionization Detector

Source:

FFTA-MAAF SI (LBA, 1995e)

Table 3-6
SI Phase II Groundwater Screening Results
(Positive Detections Only)
September 1993
FFTA-MAAF Remedial Investigation Report

Sample Identification	Depth (feet)	Units	PCE	TCE	cis-1,2-DCE	Benzene	Toluene	Ethyl-benzene	Xylenes	Total FID (a)
MF-1W	8	ug/L	**41**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MF-2W	8	ug/L	**4.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MF-3W	8	ug/L	**6.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MF-5W	8	ug/L	**7.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MF-7W	9	ug/L	**1.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
FP-E5	10	ug/L	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0	<1.0	**11**
FP-H7	7	ug/L	<1.0	<1.0	**375**	**6.7**	**1,522**	**177**	**888**	**14,510**
FP-M1	9	ug/L	**6.5**	<1.0	**39**	<1.0	<1.0	<1.0	<1.0	**16**
FP-M8	9	ug/L	**78**	**1.6**	**13**	<1.0	**1.1**	<1.0	**1.5**	**23**
FP-N2	9	ug/L	**7.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
FP-PZ	8	ug/L	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10

Notes:

Bold values represent detected compounds.

(a) Represents the sum of all petroleum hydrocarbon compounds observed on the chromatogram for the FID.

< - Below Practical Quantitation Limit.

PCE - Tetrachloroethene

TCE - Trichloroethene

cis-1,2-DCE - cis-1,2-Dichloroethene

FID Flame Ionization Detector

Source:

FFTA-MAAF SI (LBA, 1995e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-01						MCL and KSWQS
Sample Identification	FP-93-01-02	FP-93-01	FP-93-01	GW01-01	GW01-02	GW01-01	
Sample Event	Oct-94	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Volatiles (ug/L)							
ortho-Xylene	**0.7**	ND (<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	10,000

Sample Location	FP-93-01					MCL and KSWQS
Sample Identification	FP-93-01	FP-93-01	FP-93-01	GW01-02	GW01-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
ortho-Xylene	ND (<0.6)	ND (<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	10,000

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Sample Location	FP-93-02						MCL and KSWQS
Sample Identification	MAAF-MW-2	FP-93-02	FP-93-02-02	FP-93-02	FP-93-02-4	FP-93-02-05	
Sample Event	Oct-93	Jul/Aug-94	Oct-94	Jan-95	Apr-95	Aug-95	
Volatiles (ug/L)							
Benzene	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	**0.8**	ND (<0.8)	5
1,2-Dichloroethene	**76**	**29**	**21**	**5.5**	**140**	**30**	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70
Tetrachloroethene	**210**	**140**	**100**	**16**	**320**	**110**	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1,000
Trichloroethene	**21**	**56**	**43**	**4.4**	**93**	**47**	5
Trichloromethane	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	**0.5**	ND (<0.5)	100 (g)
Priority Pollutant Metals (mg/L)							
Selenium, Total	**0.009**	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND (<0.005)	0.05
Silver, Total	ND (<0.01)	**0.03**	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.005)	0.1 (d)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND (<100)	ND (<100)	NA	ND (<100)	**170**	**100**	NAv
TPH-DRO	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	NAv

Sample Location	FP-93-02						MCL and KSWQS
Sample Identification	FP-93-02-06	FP-93-02-07	FP-93-02	FP-93-02	GW02-01	GW02-02	
Sample Event	Dec-95	May/June -96	Aug-96	Dec-96	May-97	Aug-97	
Volatiles (ug/L)							
Benzene	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	5
1,2-Dichloroethene	**14**	**5.8**	**6.4**	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	**9.1**	**4.8**	**5.8**	70
Tetrachloroethene	**52**	**32**	**27**	**26**	**15**	**14**	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	**1.7**	1,000
Trichloroethene	**56**	**40**	**28**	**25**	**13**	**11**	5
Trichloromethane	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100 (g)
Priority Pollutant Metals (mg/L)							
Selenium, Total	**0.005**	ND (<0.005)	ND (<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.05
Silver, Total	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.1 (d)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND (<100)	ND (<100)	ND (<100)	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-DRO	**210**	ND (<100)	ND (<100)	ND(<100)	ND(<100)	ND(<100)	NAv

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Sample Location	FP-93-02						MCL and KSWQS
Sample Identification	GW02-01	FP-93-02	FP-93-02	FP-93-02	GW02-02	GW02-03	
Sample Event	Feb-98	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)							
Benzene	ND(<0.4)	ND(<0.4)	ND (<0.4)	ND (<0.4)	ND(<0.4)	ND(<0.4)	5
1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**4.6**	**4.7**	**5.8**	**3.2**	**3.3**	**2.4**	70
Tetrachloroethene	**9.4**	**7.0**	**18.8**	**14.7**	**4.0**	**5.9**	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1,000
Trichloroethene	**8.9**	**8.4**	**6.7**	**3.8**	**2.6**	**1.7**	5
Trichloromethane	ND(<0.5)	ND(<0.5)	ND (<0.5)	ND (<0.5)	ND(<0.5)	ND(<0.5)	100 (g)
Priority Pollutant Metals (mg/L)							
Selenium, Total	NA	NA	ND (<0.005)	ND (<0.005)	NA	NA	0.05
Silver, Total	NA	NA	ND (<0.005)	ND (<0.005)	NA	NA	0.1 (d)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND(<100)	ND(<100)	ND (<100)	ND (<100)	ND(<100)	ND(<100)	NAv
TPH-DRO	ND(<100)	ND(<100)	ND (<100)	ND (<100)	ND(<100)	ND(<100)	NAv

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Sample Location	FP-96-02b						MCL and KSWQS
Sample Identification	FP-96-02b-07	FP-96-02b	FP-96-02b	GW02b-01	GW02b-02	GW02b-01	
Sample Event	May/June -96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	ND (<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	**2.8**	ND(<0.5)	70
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	**5.0**	ND(<1.1)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1,000
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Trichloroethene	**4.3**	**3.3**	**1.5**	**1.6**	**13.0**	**1.0**	5
meta- &/or para-Xylenes	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	10,000
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.014**	**0.018**	**0.015**	**0.018**	**0.014**	NA	0.05
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	NA	0.015 (c)
Zinc, Total	ND(<0.010)	ND(<0.010)	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	5 (e)

Sample Location	FP-96-02b					MCL and KSWQS
Sample Identification	FP-96-02b	FP-96-02b	FP-96-02b	GW02b-02	GW-02b-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	**7.4**	**0.6**	**8.5**	70
Methane	ND(<2.0)	**3.0**	**15.0**	**2.0**	NA	Nav
Tetrachloroethene	ND(<1.1)	ND(<1.1)	**4.4**	ND(<1.1)	ND(<1.1)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1,000
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	**1.2**	ND(<0.5)	**0.9**	100
Trichloroethene	**1.0**	**0.8**	**39.6**	**1.3**	**25.8**	5
meta- &/or para-Xylenes	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	10,000
Priority Pollutant Metals (mg/L)						
Arsenic, Total	NA	NA	NA	NA	NA	0.05
Lead, Total	NA	NA	NA	NA	NA	0.015 (c)
Zinc, Total	NA	NA	NA	NA	NA	5 (e)

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Sample Location	FP-96-02c						MCL
Sample Identification	FP-96-02c-07	FP-96-02c	FP-96-02c	GW02c-01	GW02c-02	GW02c-01	and
Sample Event	May/June-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	KSWQS
Volatiles (ug/L)							
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	**0.8**	ND(<0.4)	1,000
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
meta- &/or para-Xylenes	ND (<0.6)	ND (<0.6)	ND(<0.6)	ND(<0.6)	**1.0**	ND(<0.6)	10,000
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.014**	**0.011**	**0.01**	**0.011**	**0.01**	NA	0.05
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	**0.005**	NA	0.015 (c)
Zinc, Total	ND(<0.010)	ND(<0.010)	ND(<0.010)	**0.012**	ND (<0.010)	NA	5 (e)

Sample Location	FP-96-02c					MCL
Sample Identification	FP-96-02c	FP-96-02c	FP-96-02c	GW02c-02	GW02c-03	and
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	KSWQS
Volatiles (ug/L)						
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1,000
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
meta- &/or para-Xylenes	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	10,000
Priority Pollutant Metals (mg/L)						
Arsenic, Total	NA	NA	NA	NA	NA	0.05
Lead, Total	NA	NA	NA	NA	NA	0.015 (c)
Zinc, Total	NA	NA	NA	NA	NA	5 (e)

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Sample Location	FP-93-03						MCL and KSWQS
Sample Identification	FP-93-03-05	FP-93-03-07	FP-93-03	FP-93-03	GW03-01	GW03-02	
Sample Event	Aug-95	May/June-96	Aug-96	Dec-96	May-97	Aug-97	
Volatiles (ug/L)							
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1,000
Priority Pollutant Metals (mg/L)							
Antimony, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	**0.004**	ND(<0.003)	ND(<0.003)	0.006
Lead, Total	**0.004**	**0.004**	ND (<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	0.015 (c)

Sample Location	FP-93-03						MCL and KSWQS
Sample Identification	GW03-01	FP-93-03	FP-93-03	FP-93-03	GW03-02	GW03-03	
Sample Event	Feb-98	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)							
Toluene	ND(<0.4)	ND(<0.4)	**0.8**	ND(<0.4)	ND(<0.4)	ND(<0.4)	1,000
Priority Pollutant Metals (mg/L)							
Antimony, Total	NA	NA	NA	NA	NA	NA	0.006
Lead, Total	NA	NA	NA	NA	NA	NA	0.015 (c)

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Sample Location	FP-93-04						MCL and KSWQS
Sample Identification	MAAF-MW-4	FP-93-04	FP-93-04-2	FP-93-04	FP-93-04-4	FP-93-04-05	
Sample Event	Oct-93	Jul/Aug-94	Oct-94	Jan-95	Apr-95	Aug-95	
Volatiles (ug/L)							
Benzene	**64**	ND (<20)	**6.0**	ND (0.4)	ND (<0.4)	ND (<0.4)	5
1,2-Dichloroethene	**4100**	**820**	**710**	**3.3**	**1.8**	**3.3**	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70
Dichloromethane	ND (<45)	ND (<45)	ND (<9.0)	**1.4 B**	ND (<0.9)	ND (<0.9)	5
Ethylbenzene	**190**	**150**	**100**	**50**	**48**	**47**	700
Tetrachloroethene	ND (<55)	ND (<55)	ND (<11)	ND (<1.1)	**1.1**	ND (<1.1)	5
Toluene	**3200**	**150**	**83**	**2.3**	**1.2**	**5.5**	1000
Trichloroethene	ND (<30)	ND (<30)	ND (<6.0)	**1.9**	**1.3**	ND (<0.6)	5
meta- &/or para-Xylenes	**320**	**560**	**370**	**220**	**100**	**84**	10000
ortho-Xylene	**330**	**310**	**200**	**150**	**58**	**51**	10000
Semivolatiles (ug/L)							
2-Methyl Naphthalene	**31**	**14**	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NAv
4-Methylphenol	**15**	ND (<10)	ND (<10)	ND (<10)	ND (<10)	**21**	NAv
Naphthalene	**73**	**45**	**29**	**13**	ND (<10)	**20**	NAv
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.01**	ND (<0.01)	ND (<0.01)	ND (0.01)	ND (<0.01)	**0.013**	0.05
Lead, Total	**0.004**	ND (<0.003)	ND (<0.003)	**0.013**	**0.006**	**0.040**	0.015 (c)
Zinc, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	5
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	**13000**	**3600**	**2200**	**1900**	**1700**	**730**	NAv
TPH-DRO as Motor Oil	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	NAv
TPH-DRO as Diesel	**1200**	ND (<100)	ND (<100)	**1090 (h)**	**678 (i)**	**150 (j)**	NAv

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Sample Location	FP-93-04						MCL and KSWQS
Sample Identification	FP-93-04-06	FP-93-04-07	FP-93-04	FP-93-04	GW04-01	GW04-02	
Sample Event	Dec-95	May/June -96	Aug-96	Dec-96	May-97	Aug-97	
Volatiles (ug/L)							
Benzene	ND (<2.0)	ND (<0.4)	ND (<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	5
1,2-Dichloroethene	ND (<2.5)	ND (<0.5)	**5.1**	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	**2.9**	**4.8**	**2.0**	70
Dichloromethane	ND (<4.5)	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	5
Ethylbenzene	**33**	**140**	**83**	**78**	**77**	**54**	700
Tetrachloroethene	ND (<5.5)	ND (<1.1)	ND (<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Toluene	ND (<2.0)	**1.5**	**5.6**	**1.5**	**0.9**	**0.8**	1000
Trichloroethene	ND (<3.0)	ND (<0.6)	ND (<0.6)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
meta- &/or para-Xylenes	**84**	**320**	**170**	**210**	**160**	**120**	10000
ortho-Xylene	**45**	**160**	**95**	**110**	**81**	**62**	10000
Semivolatiles (ug/L)							
2-Methyl Naphthalene	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NAv
4-Methylphenol	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NAv
Naphthalene	**21**	**21**	**32**	**26**	**25**	**17**	NAv
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.014**	**0.012**	**0.016**	**0.015**	**0.008**	**0.007**	0.05
Lead, Total	**0.010**	**0.049**	**0.027**	**0.011**	ND(<0.003)	**0.005**	0.015 (c)
Zinc, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	**0.016**	5
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	**1000**	**1500 J**	**1300**	**980**	**1040**	**932**	NAv
TPH-DRO as Motor Oil	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	NAv
TPH-DRO as Diesel	**960 (h)**	**2600 (k,l)**	**1700 (j)**	**1400**	**1400**	**623**	NAv

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Sample Location	FP-93-04						MCL and KSWQS
Sample Identification	GW04-01	FP-93-04	FP-93-04	FP-93-04	GW04-02	GW04-03	
Sample Event	Feb-98	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)							
Benzene	ND(<0.4)	ND(<0.4)	**0.9**	**0.6**	**1.1**	ND(<0.8)	5
1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**6.3**	**7.6**	**52.5**	**20.4**	**95.9**	**25**	70
Dichloromethane	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	5
Ethylbenzene	**53**	**64.4**	**91.5**	**74.6**	**83.3**	**64.0**	700
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND (<1.1)	ND (<1.1)	ND(<1.1)	ND(<2.2)	5
Toluene	ND	**0.6**	**4.5**	**3.2**	**6.6**	**4.0**	1000
Trichloroethene	ND(<0.6)	ND(<0.6)	ND (<0.6)	ND (<0.6)	**0.8**	ND(<1.2)	5
meta- &/or para-Xylenes	**49**	**151**	**291**	**294**	**328**	**248**	10000
ortho-Xylene	**40**	**88.3**	**124**	**89.1**	**87.1**	**54.0**	10000
Semivolatiles (ug/L)							
2-Methyl Naphthalene	NA	NA	NA	NA	NA	NA	NAv
4-Methylphenol	NA	NA	NA	NA	NA	NA	NAv
Naphthalene	**7.7**	**17.6**	**60.3**	**36.9**	**45.5**	**46**	NAv
Priority Pollutant Metals (mg/L)							
Arsenic, Total	NA	NA	NA	NA	NA	NA	0.05
Lead, Total	NA	NA	NA	NA	NA	NA	0.015 (c)
Zinc, Total	NA	NA	NA	NA	NA	NA	5
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	**670**	**990 R**	**2410 J***	**2100**	**2500**	**1600**	NAv
TPH-DRO as Diesel	**1100**	**1200**	**3700**	**1700**	**3900**	**790**	NAv
TPH-DRO as Motor Oil	**240**	ND (<100)	**750**	**680**	**890**	**430**	NAv

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Sample Location	FP-96-04b						MCL and KSWQS
Sample Identification	FP-96-04b-07	FP-96-04b	FP-96-04b	GW04b-01	GW04b-02	GW04b-01	
Sample Event	May/June-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
Toluene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	1000
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.031**	**0.022**	**0.023**	**0.022**	**0.022**	NA	0.05
Zinc, Total	ND(<0.010)	ND(<0.010)	**0.013**	ND(<0.010)	ND(<0.010)	NA	5 (e)

Sample Location	FP-96-04b					MCL and KSWQS
Sample Identification	FP-96-04b	FP-96-04b	FP-96-04b	GW04b-02	GW04b-03	
Sample Event	May/June-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
cis-1,2-Dichloroethene	ND(<0.5)	**1.2**	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
Toluene	ND(<0.5)	**0.5**	ND(<0.5)	ND(<0.4)	ND(<0.4)	1000
Priority Pollutant Metals (mg/L)						
Arsenic, Total	NA	NA	NA	NA	NA	0.05
Zinc, Total	NA	NA	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-04c						MCL and KSWQS
Sample Identification	FP-96-04c-07	FP-96-04c	FP-96-04c	GW04c-01	GW04c-02	GW04c-01	
Sample Event	May/June-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Volatiles (ug/L)							
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.022**	**0.015**	**0.015**	**0.014**	**0.012**	NA	0.05
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	**0.004**	NA	0.015 (c)

Sample Location	FP-96-04c					MCL and KSWQS
Sample Identification	FP-96-04c	FP-96-04c	FP-96-04c	GW04c-02	GW04c-03	
Sample Event	May/June-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
Toluene	ND(<0.4)	**0.6**	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Priority Pollutant Metals (mg/L)						
Arsenic, Total	NA	NA	NA	NA	NA	0.05
Lead, Total	NA	NA	NA	NA	NA	0.015 (c)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-05						MCL and KSWQS
Sample Identification	FP-93-05	FP-93-05-02	FP-93-05	FP-93-05-4	FP-93-05-05	FP-93-05-06	
Sample Event	Jul/Aug-94	Oct-94	Jan-95	Apr-95	Aug-95	Dec-95	
Volatiles (ug/L)							
1,2-Dichloroethene	ND (<0.5)	**0.80**	**0.8**	ND (<0.5)	ND (<0.5)	ND (<0.5)	70 (a)
Dichloromethane	ND (<0.9)	ND (<0.9)	**1.4B**	ND (<0.9)	ND (<0.9)	ND (<0.9)	5
Tetrachloroethene	**3.5**	**1.7**	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	5
Toluene	ND (<0.4)	**0.80**	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	1000
Trichloroethene	**2.4**	**1.7**	ND (<0.6)	**0.7**	ND (<0.6)	ND (<0.6)	100 (g)
Priority Pollutant Metals (mg/L)							
Arsenic, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.005)	**0.012**	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.002)	**0.004**	0.1 (b)
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	0.015 (c)
Selenium, Total	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND (<0.005)	0.05
Silver, Total	ND (<0.010)	ND (<0.010)	ND (<0.010)	ND (<0.010)	ND (<0.010)	ND (<0.005)	0.05
Zinc, Total	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.010)	**0.051**	5 (e)

Sample Location	FP-93-05						MCL and KSWQS
Sample Identification	FP-93-05	FP-93-05	FP-93-05	GW05-01	GW05-02	GW05-01	
Sample Event	May-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Volatiles (ug/L)							
1,2-Dichloroethene	NA	ND (<0.5)	NA	NA	NA	NA	70 (a)
Dichloromethane	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	5
Tetrachloroethene	ND(<1.1)	ND (<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<0.5)	5
Toluene	ND(<0.4)	ND (<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Trichloroethene	ND(<0.6)	ND (<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	100 (g)
Priority Pollutant Metals (mg/L)							
Arsenic, Total	ND(<0.003)	ND (<0.01)	ND(<0.003)	ND(<0.003)	ND(<0.003)	NA	0.05
Chromium, Total	ND(<0.002)	ND (<0.01)	ND(<0.002)	ND(<0.002)	ND(<0.002)	NA	0.1 (b)
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	**0.013**	NA	0.015 (c)
Selenium, Total	ND(<0.005)	ND (<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	NA	0.05
Silver, Total	ND (<0.005)	**0.008**	ND (<0.005)	ND (<0.005)	ND (<0.005)	NA	0.05
Zinc, Total	ND(<0.010)	ND (<0.02)	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-05				MCL and KSWQS
Sample Identification	FP-93-05	FP-93-05	FP-93-05	GW05-02	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	
Volatiles (ug/L)					
1,2-Dichloroethene	NA	NA	NA	NA	70 (a)
Dichloromethane	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	5
Tetrachloroethene	ND(<1.1)	ND (<1.1)	ND(<1.1)	ND(<1.1)	5
Toluene	ND(<0.4)	**0.6**	ND(<0.4)	ND(<0.4)	1000
Trichloroethene	ND(<0.6)	ND (<0.6)	ND(<0.6)	ND(<0.6)	100 (g)
Priority Pollutant Metals (mg/L)					
Arsenic, Total	NA	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	NA	0.1 (b)
Lead, Total	NA	NA	NA	NA	0.015 (c)
Selenium, Total	NA	NA	NA	NA	0.05
Silver, Total	NA	NA	NA	NA	0.05
Zinc, Total	NA	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-06						MCL and KSWQS
Sample Identification	FP-93-06-06	FP-93-06-07	FP-93-06	FP-93-06	GW06-01	GW06-02	
Sample Event	Dec-95	May/June-96	Aug-96	Dec-96	May-97	Aug-97	
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.007**	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND(<0.005)	0.05
Chromium, Total	**0.003**	ND (<0.002)	ND (<0.01)	ND(<0.002)	ND(<0.002)	ND(<0.002)	0.1 (b)
Lead, Total	ND(<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND(<0.003)	**0.004**	0.015 (c)
Zinc, Total	**0.012**	**0.012**	**0.013**	ND(<0.010)	ND(<0.010)	**0.011**	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-07						MCL and KSWQS
Sample Identification	MAAF-MW-7	FP-93-07	FP-93-07	FP-93-07	FP-93-07	FP-93-07-05	
Sample Event	Oct-93	Jul/Aug-94	Oct-94	Jan-95	Apr-95	Aug-95	
Volatiles (ug/L)							
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.010**	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	0.05
Chromium, Total	**0.030**	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	0.1 (b)
Copper, Total	**0.030**	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	1.3 (c)
Lead, Total	**0.010**	**0.003**	ND (<0.003)	ND (<0.003)	ND (<0.003)	**0.008**	0.015 (c)
Nickel, Total	**0.050**	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	0.1
Silver, Total	ND (<0.01)	**0.01**	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	0.1 (d)
Zinc, Total	**0.150**	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	5 (e)

Sample Location	FP-93-07						MCL and KSWQS
Sample Identification	FP-93-07-06	FP-93-07	FP-93-07	FP-93-07	GW07-01	GW07-02	
Sample Event	Dec-95	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	
Volatiles (ug/L)							
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	**0.9 B U***	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.010**	ND (<0.01)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND(<0.002)	ND(<0.002)	ND(<0.002)	0.1 (b)
Copper, Total	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND(<0.010)	**0.025**	**0.020**	1.3 (c)
Lead, Total	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	0.015 (c)
Nickel, Total	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND(<0.010)	ND(<0.010)	ND(<0.010)	0.1
Silver, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.1 (d)
Zinc, Total	**0.013**	ND (<0.02)	ND (<0.02)	ND(<0.010)	**0.080**	**0.066**	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-07						MCL and KSWQS
Sample Identification	GW07-01	GW07-01	GW07-01	GW07-01	GW07-02	GW07-03	
Sample Event	Feb-98	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)							
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	NA	NA	NA	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	NA	NA	NA	0.1 (b)
Copper, Total	NA	NA	NA	NA	NA	NA	1.3 (c)
Lead, Total	NA	NA	NA	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	NA	NA	NA	0.1
Silver, Total	NA	NA	NA	NA	NA	NA	0.1 (d)
Zinc, Total	NA	NA	NA	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-07c						MCL and KSWQS
Sample Identification	FP-96-07c	FP-96-07c	GW07c-01	GW07c-02	GW07c-01	FP-96-07c	
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	
Volatiles (ug/L)							
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	ND (<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	NA	NA	0.05
Chromium, Total	ND (<0.01)	ND(<0.002)	ND(<0.002)	ND(<0.002)	NA	NA	0.1 (b)
Copper, Total	ND (<0.02)	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	NA	1.3 (c)
Lead, Total	ND (<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	NA	NA	0.015 (c)
Nickel, Total	ND (<0.04)	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	NA	0.1
Silver, Total	ND (<0.01)	ND(<0.005)	ND(<0.005)	ND(<0.005)	NA	NA	0.1 (d)
Zinc, Total	**0.010**	ND(<0.010)	ND(<0.010)	**0.022**	NA	NA	5 (e)

Sample Location	FP-96-07c				MCL and KSWQS
Sample Identification	FP-96-07c	FP-96-07c	GW07c/02	GW07c-03	
Sample Event	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)					
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Priority Pollutant Metals (mg/L)					
Arsenic, Total	NA	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	NA	0.1 (b)
Copper, Total	NA	NA	NA	NA	1.3 (c)
Lead, Total	NA	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	NA	0.1
Silver, Total	NA	NA	NA	NA	0.1 (d)
Zinc, Total	NA	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-94-08						MCL and KSWQS
Sample Identification	FP-94-01PZ-3*	FP-94-08-05	FP-94-08	FP-94-08	GW08-01	GW08-02	
Sample Event	Jan-95	Aug-95	Aug-96	Dec-96	May-97	Aug-97	
Volatiles (ug/L)							
Dichloromethane	**0.9B**	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	**1.1 B U***	5
Tetrachloroethene	ND(<1.1)	ND (<1.1)	ND (<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Priority Pollutant Metals (mg/L)							
Lead, Total	ND (<0.003)	**0.006**	ND (<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	0.015 (c)
Zinc, Total	ND (<0.02)	ND (<0.010)	ND (<0.002)	**0.013**	ND (<0.010)	ND (<0.010)	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-94-09						MCL and KSWQS
Sample Identification	FP-94-02PZ-3*	FP-94-02PZ-4*	FP-94-09-05	FP-94-09-06	FP-94-09-07	FP-94-09	
Sample Event	Jan-95	Apr-95	Aug-95	Dec-95	May/Jun-96	Aug-96	
Volatiles (ug/L)							
Benzene	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	5
1,1-Dichloroethene	ND(<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	7
1,2-Dichloroethene	**94**	ND (<0.5)	**45**	**93**	**72**	**150**	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	100
Tetrachloroethene	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	5
Trichloroethene	**1.9**	**0.7**	ND (<0.6)	**6.3**	**4.6**	**10**	5
Vinyl Chloride	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	ND(<0.8)	2
Priority Pollutant Metals (mg/L)							
Arsenic, Total	ND (<0.01)	ND (<0.01)	ND (<0.005)	ND (<0.005)	**0.007**	**0.006**	0.05
Zinc, Total	ND (<0.02)	ND (<0.02)	ND (<0.010)	ND (<0.010)	ND (<0.010)	**0.015**	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	NAv

Sample Location	FP-94-09						MCL and KSWQS
Sample Identification	FP-94-09	GW09-01	GW09-02	GW09-01	FP-94-09	FP-94-09	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
Benzene	**1.5**	ND (<0.4)	**1.8**	**0.7**	**0.9**	**0.5**	5
1,1-Dichloroethene	ND(<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	7
1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**260**	**180**	**300**	**140**	**234**	**133**	70
trans-1,2-Dichloroethene	**2.1**	ND(<0.5)	**1.9**	**1.5**	**1**	**0.9**	100
Tetrachloroethene	**2.5**	ND (<1.1)	**7.4**	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	**19**	**22**	**32**	**19**	**17**	**13.4**	5
Vinyl Chloride	ND(<0.8)	ND(<0.8)	**1.7**	ND(<0.8)	ND(<0.8)	ND(<0.8)	2
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.006**	**0.005**	**0.006**	NA	NA	NA	0.05
Zinc, Total	ND (<0.010)	ND (<0.010)	ND (<0.010)	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	**140 (h)**	**156**	**195**	**115**	**190 J***	ND(<100 ug/L)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-94-09			MCL and KSWQS
Sample Identification	FP-94-09	GW09-02	GW09-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
Benzene	**1.9**	**2.1**	ND(<2.0)	5
1,1-Dichloroethene	**0.8**	**1.2**	ND(<3.0)	7
1,2-Dichloroethene	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**386**	**685**	**496**	70
trans-1,2-Dichloroethene	**2.4**	**3.8**	**4**	100
Tetrachloroethene	ND (<1.1)	ND(<1.1)	ND(<5.5)	5
Trichloroethene	**8.2**	**9.7**	**17**	5
Vinyl Chloride	**1.1**	**1.6**	ND<(4.0)	2
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Zinc, Total	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)				
TPH-GRO	**320**	**420**	**360**	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-09b						MCL and KSWQS
Sample Identification	FP-96-09b	GW09b-01	GW09b-02	GW09b-01	FP-96-09b	FP-96-09b	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
Benzene	**8.6**	**11**	**12**	**4.9**	**2**	**2.2**	5
cis-1,2-Dichloroethene	**710**	**710**	**1100**	**360**	**116**	**303**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	**1**	ND(<0.5)	ND(<0.5)	100
Trichloroethene	**24**	**13**	**14**	**1.7**	ND(<0.6)	ND(<0.6)	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.034**	**0.033**	**0.039**	NA	NA	NA	0.05
Lead, Total	ND(<0.003)	ND(<0.003)	**0.008**	NA	NA	NA	0.015 (c)
Nickel, Total	ND(<0.010)	**0.011**	**0.011**	NA	NA	NA	0.1
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	**400 (h)**	**512**	**680**	**344**	**150 J***	**244**	NAv
TPH-DRO Motor Oil	NA	**220**	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv

Sample Location	FP-96-09b			MCL and KSWQS
Sample Identification	FP-96-09b	GW09b-02	GW09b-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
Benzene	**3.6**	**2**	ND(<1.6)	5
cis-1,2-Dichloroethene	**398**	**342**	**279**	70
trans-1,2-Dichloroethene	**2**	**1.1**	ND(<2.0)	100
Trichloroethene	**1.4**	**0.8**	ND(<2.4)	5
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Lead, Total	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	0.1
Total Petroleum Hydrocarbons (ug/L)				
TPH-GRO	**450**	**260**	**330**	NAv
TPH-DRO Motor Oil	ND(<100)	ND(<100)	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-09c						MCL and KSWQS
Sample Identification	FP-96-09c	GW09c-01	GW09c-02	GW09c-01	GW09c-01	GW09c-01	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
Benzene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	5
cis-1,2-Dichloroethene	**1.8**	**0.5**	**1.9**	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.022**	**0.023**	**0.025**	NA	NA	NA	0.05
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.010)	NA	NA	NA	0.015 (c)
Nickel, Total	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	NA	NA	0.1
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-DRO Motor Oil	NA	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv

Sample Location	FP-96-09c			MCL and KSWQS
Sample Identification	GW09c-01	GW09c-01	GW09c-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
Benzene	ND(<0.4)	ND(<0.4)	ND(<0.4)	5
cis-1,2-Dichloroethene	**1**	ND(<0.5)	**0.7**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Lead, Total	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	0.1
Total Petroleum Hydrocarbons (ug/L)				
TPH-GRO	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-DRO Motor Oil	ND(<100)	ND(<100)	ND(<100)	NAv

Table 3-7
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Sample Location	FP-94-10						MCL and KSWQS
Sample Identification	FP-94-03PZ-3*	FP-94-10-05	FP-94-10-06	FP-94-10-07	FP-94-10	FP-94-10	
Sample Event	Jan-95	Aug-95	Dec-95	May/Jun-96	Aug-96	Dec-96	
Priority Pollutant Metals (mg/L)							
Chromium, Total	ND (<0.01)	**0.004**	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND(<0.002)	0.1 (b)
Lead, Total	ND (<0.003)	**0.005**	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND(<0.003)	0.015 (c)
Nickel, Total	ND (<0.04)	**0.014**	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND(<0.010)	0.1
Selenium, Total	**0.006**	ND (<0.005)	**0.006**	**0.009**	**0.006**	ND(<0.005)	0.05
Zinc, Total	ND (<0.02)	**0.011**	ND (<0.02)	**0.015**	**0.018**	**0.011**	5 (e)

Sample Location	FP-94-10		MCL and KSWQS
Sample Identification	GW10-01	GW10-02	
Sample Event	May-97	Aug-97	
Priority Pollutant Metals (mg/L)			
Chromium, Total	ND(<0.002)	ND(<0.002)	0.1 (b)
Lead, Total	ND(<0.003)	ND(<0.003)	0.015 (c)
Nickel, Total	ND(<0.010)	ND(<0.010)	0.1
Selenium, Total	**0.006**	**0.008**	0.05
Zinc, Total	ND (<0.02)	ND (<0.02)	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	FP-94-11						MCL and KSWQS
Sample Identification	FP-94-04PZ-3*	FP-94-04PZ-4*	FP-94-11-05	FP-94-11-06	FP-94-11-07	FP-94-11	
Sample Event	Jan-95	Apr-95	Aug-95	Dec-95	May/Jun-96	Aug-96	
Volatiles (ug/L)							
Benzene	**0.9**	ND (<0.4)	ND (<0.4)	**1**	ND (<0.4)	ND (<0.4)	5
1,2-Dichloroethene	**51**	**190**	**57**	**420**	**17**	**22**	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	100
Dichloromethane	ND (<0.9)	ND (<0.9)	ND (<0.9)	**1.1**	ND (<0.9)	ND (<0.9)	5
Tetrachloroethene	ND (<1.1)	**2.5**	ND (<1.1)	**2.2**	ND (<1.1)	ND (<1.1)	5
Toluene	**2.4**	ND (<0.4)	ND (<0.4)	**0.6**	ND (<0.4)	ND (<0.4)	1000
Trichloroethene	**1**	**3.1**	ND (<0.6)	**3.9**	**4.6**	ND (<0.6)	5
meta- &/or para-Xylenes	**1.1**	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	10000
Vinyl Chloride	ND (<0.8)	ND (<0.8)	ND (<0.8)	ND (<0.8)	ND (<0.8)	ND (<0.8)	2
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.01**	**0.02**	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND (<0.005)	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	**0.018**	ND (<0.002)	ND (<0.002)	ND (<0.002)	0.1 (b)
Lead, Total	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	**0.003**	0.015 (c)
Nickel, Total	ND (<0.04)	ND (<0.04)	**0.025**	**0.017**	**0.012**	**0.013**	0.1
Selenium, Total	ND (<0.005)	ND (<0.005)	ND (<0.005)	**0.007**	**0.02**	**0.021**	0.05
Zinc, Total	ND (<0.02)	ND (<0.02)	**0.012**	ND (<0.010)	ND (<0.010)	ND (<0.010)	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND (<100)	**150**	ND (<100)	**550**	ND (<100)	ND (<100)	NAv
TPH-DRO as Diesel	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-DRO as Motor Oil	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	FP-94-11						MCL and KSWQS
Sample Identification	FP-94-11	GW11-01	GW11-02	GW11-01	FP-94-11	FP-94-11	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
Benzene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	5
1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**43**	**49**	**120**	**71**	**71.2 J***	**120**	70
trans-1,2-Dichloroethene	ND(<0.5)	**0.6**	**1.3**	**0.6**	ND(<0.5)	**0.6**	100
Dichloromethane	ND (<0.9)	ND (<0.9)	**1.1 B U***	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Trichloroethene	ND(<0.6)	ND(<0.6)	**0.7**	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
meta- &/or para-Xylenes	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	10000
Vinyl Chloride	ND (<0.8)	ND (<0.8)	ND (<0.8)	ND (<0.8)	ND (<0.8)	ND (<0.8)	2
Priority Pollutant Metals (mg/L)							
Arsenic, Total	ND(<0.005)	ND(<0.005)	ND(<0.005)	NA	NA	NA	0.05
Chromium, Total	ND(<0.002)	ND(<0.002)	ND(<0.002)	NA	NA	NA	0.1 (b)
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	NA	NA	NA	0.015 (c)
Nickel, Total	**0.014**	**0.012**	**0.011**	NA	NA	NA	0.1
Selenium, Total	**0.016**	**0.007**	ND(<0.005)	NA	NA	NA	0.05
Zinc, Total	**0.014**	**0.023**	**0.041**	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-DRO as Diesel	ND(<100)	ND(<100)	ND(<100)	ND(<100)	**100**	ND(<100)	NAv
TPH-DRO as Motor Oil	ND(<100)	ND(<100)	ND(<100)	ND(<100)	**100**	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	FP-94-11			MCL and KSWQS
Sample Identification	FP-94-11	GW11-02	GW11-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
Benzene	**1.3**	**0.4**	**2.5**	5
1,1-Dichloroethene	ND(<0.6)	ND(<0.6)	**0.9**	7
1,2-Dichloroethene	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**297**	**109**	**561**	70
trans-1,2-Dichloroethene	**1.4**	ND(<0.5)	**3**	100
Dichloromethane	ND (<0.9)	ND(<0.9)	ND(<0.9)	5
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
meta- &/or para-Xylenes	ND(<0.6)	ND(<0.6)	ND(<0.6)	10000
Vinyl Chloride	**2.1**	ND(<0.8)	**2.8**	2
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	0.1 (b)
Lead, Total	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	0.1
Selenium, Total	NA	NA	NA	0.05
Zinc, Total	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)				
TPH-GRO	**360**	**110**	**520**	NAv
TPH-DRO as Diesel	**130**	**100**	**190**	NAv
TPH-DRO as Motor Oil	ND (<100)	ND (<100)	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-94-12PZ						MCL and KSWQS
Sample Identification	FP-93-12PZ-05	FP-93-12PZ-06	FP-93-12PZ-07	FP-94-12PZ	FP-94-12PZ	GW12PZ-01	
Sample Event	Aug-95	Dec-95	May/June-96	Aug-96	Dec-96	May-97	
Volatiles (ug/L)							
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	ND (<0.01)	**0.007**	**0.009**	ND (<0.005)	ND(<0.005)	ND(<0.005)	0.05
Chromium, Total	ND (<0.01)	**0.002**	**0.049**	**0.025**	**0.067**	**0.207**	0.1 (b)
Lead, Total	ND (<0.003)	ND (<0.003)	**0.007**	ND (<0.003)	ND(<0.003)	ND(<0.003)	0.015 (c)
Nickel, Total	ND (<0.04)	ND (<0.010)	**0.027**	ND (<0.04)	**0.04**	**0.091**	0.1
Selenium, Total	ND (<0.005)	ND (<0.005)	**0.005**	ND (<0.005)	ND(<0.005)	ND(<0.005)	0.05
Zinc, Total	**0.016**	**0.018**	**0.033**	**0.016**	ND(<0.010)	**0.011**	5 (e)

Sample Location	FP-94-12PZ	MCL and KSWQS
Sample Identification	GW12PZ-02	
Sample Event	Aug-97	
Volatiles (ug/L)		
Dichloromethane	**1.1 B U***	5
Priority Pollutant Metals (mg/L)		
Arsenic, Total	ND(<0.005)	0.05
Chromium, Total	**0.022**	0.1 (b)
Lead, Total	ND(<0.003)	0.015 (c)
Nickel, Total	**0.012**	0.1
Selenium, Total	ND(<0.005)	0.05
Zinc, Total	ND(<0.010)	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-18						MCL and KSWQS
Sample Identification	FP-96-18-07	FP-96-18	FP-96-18	GW18-01	GW18-02	GW18-01	
Sample Event	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Volatiles (ug/L)							
Dichloromethane	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	**0.9 B U***	ND (<0.9)	5
Priority Pollutant Metals (mg/L)							
Selenium, Total	ND (<0.005)	**0.016**	ND(<0.005)	**0.008**	ND(<0.005)	NA	0.05
Zinc, Total	**0.032**	**0.025**	**0.027**	ND(<0.010)	ND(<0.010)	NA	5 (e)

Sample Location	FP-96-18				MCL and KSWQS
Sample Identification	FP-96-18	FP-96-18	FP-96-18	GW18-02	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	
Volatiles (ug/L)					
Dichloromethane	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND(<0.9)	5
Priority Pollutant Metals (mg/L)					
Selenium, Total	NA	NA	NA	NA	0.05
Zinc, Total	NA	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-19						MCL and KSWQS
Sample Identification	FP-96-19-07	FP-96-19	FP-94-19	GW19-01	GW19-02	GW19-01	
Sample Event	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Priority Pollutant Metals (mg/L)							
Antimony, Total	ND(<0.003)	ND(<0.003)	**0.004**	ND(<0.003)	ND(<0.003)	NA	0.006
Arsenic, Total	**0.033**	**0.043**	**0.036**	**0.038**	**0.04**	NA	0.05
Chromium, Total	**0.003**	**0.003**	ND(<0.002)	ND(<0.002)	**0.003**	NA	0.1 (b)
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	**0.005**	NA	0.015 (c)
Zinc, Total	ND (<0.010)	ND (<0.010)	**1.13**	**0.016**	ND(<0.010)	NA	5 (e)

Sample Location	FP-96-19				MCL and KSWQS
Sample Identification	FP-94-19	FP-94-19	FP-94-19	GW19-02	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	
Priority Pollutant Metals (mg/L)					
Antimony, Total	NA	NA	NA	NA	0.006
Arsenic, Total	NA	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	NA	0.1 (b)
Lead, Total	NA	NA	NA	NA	0.015 (c)
Zinc, Total	NA	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-20						MCL and KSWQS
Sample Identification	FP-96-20-07	FP-96-20	FP-94-20	GW20-01	GW20-02	GW20-01	
Sample Event	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.013**	**0.02**	**0.017**	**0.017**	**0.024**	NA	0.05
Chromium, Total	ND (<0.002)	**0.007**	ND (<0.002)	ND (<0.002)	ND (<0.002)	NA	0.1 (b)
Nickel, Total	**0.019**	ND (<0.010)	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	0.1
Zinc, Total	ND (<0.010)	**0.012**	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	5 (e)

Sample Location	FP-96-20				MCL and KSWQS
Sample Identification	FP-96-20	FP-96-20	FP-96-20	GW20-02	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	
Priority Pollutant Metals (mg/L)					
Arsenic, Total	NA	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	NA	0.1 (b)
Nickel, Total	NA	NA	NA	NA	0.1
Zinc, Total	NA	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	FP-96-20b						MCL and KSWQS
Sample Identification	FP-96-20b	GW20b-01	GW20b-02	GW20b-01	GW20b-01	GW20b-01	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	Feb-98	Feb-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	**1.8**	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.023**	**0.020**	**0.019**	NA	NA	NA	0.05

Sample Location	FP-96-20b					MCL and KSWQS
Sample Identification	FP-96-20b	FP-96-20b	FP-96-20b	FP-96-20b	GW20b-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
cis-1,2-Dichloroethene	ND(<0.5)	**0.6**	ND(<0.5)	ND (<0.5)	ND(<0.5)	70
Priority Pollutant Metals (mg/L)						
Arsenic, Total	NA	NA	NA	NA	NA	0.05

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-20c						MCL and KSWQS
Sample Identification	FP-96-20c	GW20c-01	GW20c-02	GW20c-01	GW20c-01	GW20c-01	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	Feb-98	Feb-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND (<0.5)	70
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.032**	**0.031**	**0.03**	NA	NA	NA	0.05

Sample Location	FP-96-20c					MCL and KSWQS
Sample Identification	FP-96-20c	FP-96-20c	FP-96-20c	GW20c-02	GW20c-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND (<0.5)	ND(<0.5)	70
Priority Pollutant Metals (mg/L)						
Arsenic, Total	NA	NA	NA	NA	NA	0.05

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-21						MCL and KSWQS
Sample Identification	FP-96-21-07	FP-96-21	FP-96-21	GW21-01	GW21-02	GW21-01	
Sample Event	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Volatiles (ug/L)							
Dichloromethane	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	**1.1 B U***	ND (<0.9)	5
Priority Pollutant Metals (mg/L)							
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	**0.006**	NA	0.015 (c)
Nickel, Total	**0.043**	**0.006**	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	0.1
Selenium, Total	ND(<0.005)	ND(<0.005)	ND(<0.005)	**0.006**	**0.008**	NA	0.05
Silver, Total	ND(<0.005)	ND(<0.005)	**0.008**	ND(<0.005)	ND(<0.005)	NA	0.1 (d)
Zinc, Total	**0.029**	**0.015**	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	5 (e)

Sample Location	FP-96-21					MCL and KSWQS
Sample Identification	FP-96-21	FP-96-21	FP-96-21	GW21-02	GW21-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
Dichloromethane	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND(<0.9)	5
Priority Pollutant Metals (mg/L)						
Lead, Total	NA	NA	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	NA	NA	0.1
Selenium, Total	NA	NA	NA	NA	NA	0.05
Silver, Total	NA	NA	NA	NA	NA	0.1 (d)
Zinc, Total	NA	NA	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-21b						MCL and KSWQS
Sample Identification	FP-96-21b-07	FP-96-21b	FP-96-21b	GW21b-01	GW21b-02	GW21b-02	
Sample Event	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Volatiles (ug/L)							
Dichloromethane	NA	NA	NA	**1.4**	ND(<0.9)	ND(<0.9)	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.025**	**0.022**	**0.026**	**0.024**	**0.025**	NA	0.05
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	**0.005**	NA	0.015 (c)
Nickel, Total	ND(<0.010)	**0.01**	**0.011**	ND(<0.010)	ND(<0.010)	NA	0.1

Sample Location	FP-96-21b					MCL and KSWQS
Sample Identification	FP-96-21b	FP-96-21b	FP-96-21b	GW21b-02	GW21b-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Priority Pollutant Metals (mg/L)						
Arsenic, Total	NA	NA	NA	NA	NA	0.05
Lead, Total	NA	NA	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	NA	NA	0.1

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-21c						MCL and KSWQS
Sample Identification	FP-96-21c-07	FP-96-21c	FP-96-21c	GW21c-01	GW21c-02	GW21c-02	
Sample Event	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.017**	**0.017**	**0.017**	**0.015**	**0.015**	NA	0.05

Sample Location	FP-96-21c					MCL and KSWQS
Sample Identification	FP-96-21c	FP-96-21c	FP-96-21c	GW21c-02	GW21c-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Priority Pollutant Metals (mg/L)						
Arsenic, Total	NA	NA	NA	NA	NA	0.05

Table 3-7
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Sample Location	FP-96-22						MCL and KSWQS
Sample Identification	FP-96-22-07	FP-96-22	FP-96-22	GW22-01	GW22-02	GW22-01	
Sample Event	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Priority Pollutant Metals (mg/L)							
Antimony, Total	ND (<0.0003)	ND (<0.0003)	**0.003**	ND (<0.0003)	ND (<0.0003)	NA	0.006
Arsenic, Total	**0.009**	**0.006**	**0.006**	**0.008**	**0.006**	NA	0.05

Sample Location	FP-96-22					MCL and KSWQS
Sample Identification	FP-96-22	FP-96-22	FP-96-22	GW22-02	GW22-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Priority Pollutant Metals (mg/L)						
Antimony, Total	NA	NA	NA	NA	NA	0.006
Arsenic, Total	NA	NA	NA	NA	NA	0.05

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Sample Location	FP-96-23						MCL and KSWQS
Sample Identification	FP-96-23-07	FP-96-23	FP-96-23	GW23-01	GW23-02	GW23-01	
Sample Event	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Volatiles (ug/L)							
1,2-Dichloroethene	**4.9**	**7.4**	NA	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	NA	NA	**7.8**	**8.2**	**9.5**	**13**	70
trans-1,2-Dichloroethene	NA	NA	ND(<0.5)	**0.6**	**0.6**	**0.7**	100
1,1-Dichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	**1**	ND(<0.6)	ND(<0.6)	7
Dichloromethane	NA	NA	NA	**1.0 U***	**1.1 B U***	ND(<0.9)	5
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	NAv
TPH-DRO as Diesel	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	**150**	NAv

Sample Location	FP-96-23					MCL and KSWQS
Sample Identification	FP-96-23	FP-96-23	FP-96-23	GW23-02	GW23-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
1,2-Dichloroethene	NA	NA	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**19.6**	**14.3**	**12.2**	**17.6**	**13.7**	70
trans-1,2-Dichloroethene	**1.2**	**0.8**	**1.1**	**1.1**	**1**	100
1,1-Dichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	7
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.6)	5
Methane	**5.0**	ND(<2.0)	**3.0**	**3.0**	**4.0**	NAv
Total Petroleum Hydrocarbons (ug/L)						
TPH-GRO	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND(<100)	NAv
TPH-DRO as Diesel	ND (<100)	ND (<100)	ND (<100)	ND(<100)	ND(<100)	NAv

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Sample Location	FP-96-23b						MCL and KSWQS
Sample Identification	FP-96-23b	GW23b-01	GW23b-02	GW23b-01	FP-96-23b	FP-96-23b	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
Benzene	**7.6**	**6.2**	**7**	**6.2**	**3.5**	**3.3**	5
cis-1,2-Dichloroethene	**270**	**150**	**280**	**180**	**141**	**108**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	**1.1**	**0.8**	ND(<0.5)	ND(<0.5)	100
Ethylbenzene	**3.8**	ND(<3.5)	**2.4**	**1.5**	**0.8**	**0.8**	700
Tetrachloroethene	**17**	**7.4**	**5.1**	**1.2**	ND(<0.5)	ND(<0.5)	5
Trichloroethene	**13**	**7.3**	**7.8**	**3.4**	**1.6**	**1.7**	5
Meta &/or Para-Xylene	**6.2**	ND(<3.0)	ND(<3.0)	ND(<3.0)	ND(<3.0)	ND(<3.0)	10000
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.021**	**0.020**	**0.026**	NA	NA	NA	0.05
Chromium, Total	ND(<0.002)	ND(<0.002)	ND(<0.002)	NA	NA	NA	0.1
Zinc, Total	ND(<0.01)	ND(0.01)	**0.014**	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	**180 (h)**	**109**	**250**	**200**	**150 J***	**125**	NAv

Sample Location	FP-96-23b			MCL and KSWQS
Sample Identification	FP-96-23b	GW23b-02	GW23b-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
Benzene	**3.5**	**2.5**	**2.1**	5
cis-1,2-Dichloroethene	**148**	**129**	**199**	70
trans-1,2-Dichloroethene	**1.1**	**0.8**	**1.2**	100
Ethylbenzene	ND(<3.5)	ND(<0.7)	ND(<1.4)	700
Tetrachloroethene	ND(<0.5)	ND(<1.1)	ND(<2.2)	5
Trichloroethene	**1.9**	**1.4**	**2.6**	5
Meta &/or Para-Xylene	ND(<3.0)	ND(<0.6)	ND(<1.2)	10000
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	0.1
Zinc, Total	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)				
TPH-GRO	**170**	**210**	**170**	NAv

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Sample Location	FP-96-23c						MCL and KSWQS
Sample Identification	FP-96-23c	GW23c-01	GW23c-02	GW23c-01	FP-96-23c	FP-96-23c	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
Benzene	**0.5**	**0.8**	**1.4**	**0.9**	ND(<0.4)	**0.5**	5
cis-1,2-Dichloroethene	**18**	**22**	**100**	**23**	**10.8**	**11.6**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Ethylbenzene	ND(<0.7)	ND(<0.7)	ND(<0.7)	ND(<0.7)	ND(<0.7)	ND(<0.7)	700
Tetrachloroethene	**1.7**	ND(<1.1)	**1.8**	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	**1.1**	**0.9**	**4.3**	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
Meta &/or Para-Xylene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	10000
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.033**	**0.017**	**0.036**	NA	NA	NA	0.05
Chromium, Total	ND(<0.002)	ND(<0.002)	**0.003**	NA	NA	NA	0.1
Zinc, Total	ND(<0.010)	**0.017**	ND(<0.010)	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv

Sample Location	FP-96-23c			MCL and KSWQS
Sample Identification	FP-96-23c	GW23c-02	GW23c-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
Benzene	**2.7**	**1.6**	**0.6**	5
cis-1,2-Dichloroethene	**172**	**198**	**48.3**	70
trans-1,2-Dichloroethene	**0.7**	**0.5**	ND(<0.5)	100
Ethylbenzene	ND(<0.7)	ND(<0.7)	ND(<0.7)	700
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	**2.1**	**1.0**	**0.9**	5
Meta &/or Para-Xylene	ND(<0.6)	ND(<3.0)	ND(<0.6)	10000
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	0.1
Zinc, Total	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)				
TPH-GRO	**220**	**250**	ND(<100)	NAv

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Sample Location	FP-96-24						MCL and KSWQS
Sample Identification	FP-96-24-07	FP-96-24	FP-96-24	GW24-01	GW24-02	GW24-01	
Sample Event	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	Feb-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	NA	NA	**0.6**	**1.2**	**1.8**	**5**	70
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	**0.9 B U***	ND(<0.9)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	**0.9**	**0.7**	ND(<0.6)	**1.6**	5
Priority Pollutant Metals (mg/L)							
Chromium, Total	**0.003**	ND (<0.002)	ND(<0.002)	ND(<0.002)	ND(<0.002)	NA	0.1 (b)
Lead, Total	**0.003**	ND (<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	NA	0.015 (c)
Nickel, Total	**0.023**	ND (<0.010)	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	0.1
Selenium, Total	**0.028**	**0.022**	**0.010**	**0.019**	**0.024**	NA	0.05

Sample Location	FP-96-24					MCL and KSWQS
Sample Identification	FP-96-24	FP-96-24	FP-96-24	GW24-02	GW24-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
cis-1,2-Dichloroethene	**4**	**2**	**2.6**	**3.4**	**0.9**	70
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Trichloroethene	**1.2**	ND(<0.6)	**1.1**	**1.6**	**0.7**	5
Priority Pollutant Metals (mg/L)						
Chromium, Total	NA	NA	NA	NA	NA	0.1 (b)
Lead, Total	NA	NA	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	NA	NA	0.1
Selenium, Total	NA	NA	NA	NA	NA	0.05

Table 3-7
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Sample Location	FP-96-25						MCL and KSWQS
Sample Identification	FP-96-25	GW25-01	GW25-02	GW25-01	FP-96-25	FP-96-25	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	**35**	**48**	**58**	**77**	**70**	**59.3 J***	70
trans-1,2-Dichloroethene	**1.6**	**3.5**	**2.3**	**3.9**	**2.6**	ND(<1.6)	100
Tetrachloroethene	**85**	**56**	**22**	**11**	**4.5**	**4.3 KJ***	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	**0.4**	1000
Trichloroethene	**140**	**190**	**96**	**98**	**39.7**	**45.2 J***	5
Priority Pollutant Metals (mg/L)							
Antimony, Total	**0.004**	ND(<0.003)	ND(<0.003)	NA	NA	NA	0.006
Arsenic, Total	**0.006**	**0.006**	**0.007**	NA	NA	NA	0.05
Lead, Total	ND(<0.003)	ND(<0.003)	**0.004**	NA	NA	NA	0.015 (c)
Nickel, Total	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	NA	NA	0.1
Zinc, Total	ND(<0.010)	**0.011**	**0.032**	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	**180 (h)**	**109**	ND(<100)	**106**	ND(<100)	ND(<100)	NAv
TPH-DRO	ND (<100)	**300**	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv

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Sample Location	FP-96-25			MCL and KSWQS
Sample Identification	FP-96-25	GW25-02	GW25-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
cis-1,2-Dichloroethene	**43.9**	**36.2**	**15.7**	70
trans-1,2-Dichloroethene	**1.5**	**0.9**	**0.7**	100
Tetrachloroethene	**2.4**	**1.2**	ND(<1.1)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Trichloroethene	**33.2**	**24.9**	**8.9**	5
Priority Pollutant Metals (mg/L)				
Antimony, Total	NA	NA	NA	0.006
Arsenic, Total	NA	NA	NA	0.05
Lead, Total	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	0.1
Zinc, Total	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)				
TPH-GRO	ND (<100)	ND(<100)	ND(<100)	NAv
TPH-DRO	ND (<100)	ND(<100)	ND(<100)	NAv

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Sample Location	FP-96-25b						MCL and KSWQS
Sample Identification	FP-96-25b	GW25b-01	GW25b-02	GW25b-01	FP-96-25b	FP-96-25b	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	**0.6**	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	**3.4**	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	**2.4**	**0.8**	ND(<0.6)	**0.7**	**0.8**	**0.8**	5
Priority Pollutant Metals (mg/L)							
Antimony, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	NA	NA	NA	0.006
Arsenic, Total	**0.021**	**0.021**	**0.02**	NA	NA	NA	0.05
Lead, Total	ND(<0.003)	ND(<0.003)	**0.005**	NA	NA	NA	0.015 (c)
Nickel, Total	ND(<0.010)	**0.012**	ND(<0.010)	NA	NA	NA	0.1
Zinc, Total	ND(<0.010)	ND(<0.010)	**0.01**	NA	NA	NA	5 (e)

Sample Location	FP-96-25b			MCL and KSWQS
Sample Identification	FP-96-25b	GW25b-02	GW25b-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
Priority Pollutant Metals (mg/L)				
Antimony, Total	NA	NA	NA	0.006
Arsenic, Total	NA	NA	NA	0.05
Lead, Total	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	0.1
Zinc, Total	NA	NA	NA	5 (e)

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Sample Location	FP-96-25c						MCL and KSWQS
Sample Identification	FP-96-25c	GW25c-01	GW25c-02	GW25c-01	FP-96-25c	FP-96-25c	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	**1.0**	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
Priority Pollutant Metals (mg/L)							
Antimony, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	NA	NA	NA	0.006
Arsenic, Total	**0.014**	**0.011**	**0.011**	NA	NA	NA	0.05
Lead, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	NA	NA	NA	0.015 (c)
Nickel, Total	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	NA	NA	0.1
Zinc, Total	ND(<0.010)	**0.015**	**0.02**	NA	NA	NA	5 (e)

Sample Location	FP-96-25c			MCL and KSWQS
Sample Identification	FP-96-25c	GW25c-02	GW25c-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
Priority Pollutant Metals (mg/L)				
Antimony, Total	NA	NA	NA	0.006
Arsenic, Total	NA	NA	NA	0.05
Lead, Total	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	0.1
Zinc, Total	NA	NA	NA	5 (e)

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Sample Location	FP-96-26						MCL and KSWQS
Sample Identification	FP-96-26	GW26-01	GW26-02	GW26-01	FP-96-26	FP-96-26	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	**70**	**8.3**	**4.5**	**34**	**210 J***	**102 J***	70
trans-1,2-Dichloroethene	**2.0**	ND(<0.5)	ND(<0.5)	ND(<0.5)	**1.3**	**0.6 J***	100
Tetrachloroethene	**71**	**24**	**22**	**13**	**10.7**	**15.7 KJ***	5
Trichloroethene	**100**	**23**	**17**	**19**	**10**	**18.5 J***	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.006**	ND(<0.005)	ND(<0.005)	NA	NA	NA	0.05
Chromium, Total	**0.003**	ND(<0.002)	ND(<0.002)	NA	NA	NA	0.1 (b)
Mercury, Total	ND(<0.0002)	ND(<0.0002)	ND(<0.0002)	NA	NA	NA	0.002
Nickel, Total	**0.014**	ND(<0.010)	**0.014**	NA	NA	NA	0.1
Selenium, Total	ND(<0.005)	**0.008**	**0.009**	NA	NA	NA	0.05
Zinc, Total	**0.014**	ND(<0.010)	ND(<0.010)	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	**110 (h)**	ND (<100)	ND (<100)	ND (<100)	**162 J***	ND (<100)	NAv

Sample Location	FP-96-26			MCL and KSWQS
Sample Identification	FP-96-26	GW26-02	GW26-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
cis-1,2-Dichloroethene	**21.1**	**16.6**	**7.5**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	**7.5**	**4.6**	**3.7**	5
Trichloroethene	**13.4**	**5.7**	**3.9**	5
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	0.1 (b)
Mercury, Total	NA	NA	NA	0.002
Nickel, Total	NA	NA	NA	0.1
Selenium, Total	NA	NA	NA	0.05
Zinc, Total	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)				
TPH-GRO	ND (<100)	ND(<100)	ND(<100)	NAv

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Sample Location	FP-96-26b						MCL and KSWQS
Sample Identification	FP-96-26b	GW26b-01	GW26b-02	GW26b-01	FP-96-26b	FP-96-26b	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	**0.6**	**1.1**	ND(<0.5)	**6.2**	**1.4**	**0.7**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	**1.8**	**2.4**	ND(<1.1)	**1.8**	ND(<1.1)	ND(<1.1)	5
Trichloroethene	**1.3**	**2.7**	**0.8**	**2.6**	ND(<0.6)	**0.8**	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.026**	**0.023**	**0.026**	NA	NA	NA	0.05
Chromium, Total	**0.002**	ND(<0.002)	ND(<0.002)	NA	NA	NA	0.1 (b)
Mercury, Total	ND(<0.0002)	ND(<0.0002)	ND(<0.0002)	NA	NA	NA	0.002
Nickel, Total	**0.016**	**0.011**	**0.011**	NA	NA	NA	0.1
Selenium, Total	ND(<0.005)	ND(<0.005)	ND(<0.005)	NA	NA	NA	0.05
Zinc, Total	**0.014**	ND(<0.010)	ND(<0.010)	NA	NA	NA	5 (e)

Sample Location	FP-96-26b			MCL and KSWQS
Sample Identification	FP-96-26b	GW26b-02	GW26b-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
cis-1,2-Dichloroethene	**42.2**	ND(<0.5)	**18.3**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	**1.1**	ND(<1.1)	ND(<1.1)	5
Trichloroethene	**2.9**	ND(<0.6)	**0.7**	5
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	0.1 (b)
Mercury, Total	NA	NA	NA	0.002
Nickel, Total	NA	NA	NA	0.1
Selenium, Total	NA	NA	NA	0.05
Zinc, Total	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-26c						MCL and KSWQS
Sample Identification	FP-96-26c	GW26c-01	GW26c-02	GW26c-01	FP-96-26c	FP-96-26c	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	**0.5**	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	**1 BJ***	ND(<0.9)	5
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.020**	**0.016**	**0.018**	NA	NA	NA	0.05
Chromium, Total	ND(<0.002)	ND(<0.002)	ND(<0.002)	NA	NA	NA	0.1 (b)
Mercury, Total	ND(<0.0002)	ND(<0.0002)	**0.0003**	NA	NA	NA	0.002
Nickel, Total	ND(<0.010)	ND(<0.010)	ND(<0.010)	NA	NA	NA	0.1
Selenium, Total	ND(<0.005)	ND(<0.005)	ND(<0.005)	NA	NA	NA	0.05
Zinc, Total	**0.012**	ND(<0.010)	**0.011**	NA	NA	NA	5 (e)

Sample Location	FP-96-26c			MCL and KSWQS
Sample Identification	FP-96-26c	GW26c-02	GW26c-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	5
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	0.1 (b)
Mercury, Total	NA	NA	NA	0.002
Nickel, Total	NA	NA	NA	0.1
Selenium, Total	NA	NA	NA	0.05
Zinc, Total	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-27					MCL and KSWQS
Sample Identification	FP-98-27	FP-98-27	FP-98-27	GW27-02	GW27-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
cis-1,2-Dichloroethene	**0.9**	**1.2 J***	**2.1**	**3.1**	**2**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-27b					MCL and KSWQS
Sample Identification	FP-98-27b	FP-98-27b	FP-98-27b	GW27b-02	GW27b-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
Benzene	**1.2**	**3.7**	**3.2**	**3.0**	**2.4**	5
cis-1,2-Dichloroethene	**111**	**227**	**198**	**240**	**257**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	**1**	**0.8**	**1**	100
Tetrachloroethene	**21**	**34.8**	**12**	**7.4**	**8.1**	5
Trichloroethene	**15**	**24**	**18**	**15.9**	**17.1**	5
Total Petroleum Hydrocarbons (ug/L)						
TPH-GRO	ND(<100)	ND(<100)	ND(<100)	**300**	**200**	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-27c					MCL and KSWQS
Sample Identification	FP-98-27c	FP-98-27c	FP-98-27c	GW27c-02	GW27c-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
Benzene	**0.7**	**1.3**	**1.8**	**2.7**	**1**	5
cis-1,2-Dichloroethene	**28.7**	**55**	**100**	**167**	**87.1**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1.0)	ND(<0.5)	100
Tetrachloroethene	**2.3**	**4.2**	**2.6**	ND(<2.2)	**1.4**	5
Trichloroethene	**1.5**	**3.5**	**4.9**	**4.3**	**2.9**	5
Total Petroleum Hydrocarbons (ug/L)						
TPH-GRO	ND(<100)	ND(<100)	ND(<100)	**200**	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-28				MCL and KSWQS
Sample Identification	FP-98-28	FP-98-28	FP-98-28	GW28-02	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	
Volatiles (ug/L)					
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-28b					MCL and KSWQS
Sample Identification	FP-98-28b	FP-98-28b	FP-98-28b	GW28b-02	GW28b-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	**1.2**	**9.4**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-28c					MCL and KSWQS
Sample Identification	FP-98-28c	FP-98-28c	FP-98-28c	GW28c-02	GW28c-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	**4.8**	**7.8**	**9.6**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-29				MCL and KSWQS
Sample Identification	FP-98-29	FP-98-29	FP-98-29	GW29-02	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	
Volatiles (ug/L)					
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-29b					MCL and KSWQS
Sample Identification	FP-98-29b	FP-98-29b	FP-98-29b	GW29b-02	GW29b-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
Benzene	**0.6**	**0.5**	**0.5**	ND(<0.4)	ND(<0.4)	5
cis-1,2-Dichloroethene	**51.3**	**42.8**	**28.6**	**29.4**	**14.1**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	**18.1**	**22.2**	**20.6**	**12.3**	**10.4**	5
Trichloroethene	**5.6**	**6.9**	**8.6**	**6.8**	**5.7**	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-29c					MCL and KSWQS
Sample Identification	FP-98-29c	FP-98-29c	FP-98-29c	GW29c-02	GW29c-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
Benzene	**0.5**	**0.6**	**0.5**	ND(<0.4)	ND(<0.4)	5
cis-1,2-Dichloroethene	**37.1**	**36.4**	**36.4**	**27.7**	**30**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	**7**	**11.7**	**17.7**	**11.6**	**12.1**	5
Trichloroethene	**4.8**	**6.7**	**10.3**	**7.4**	**7**	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-30				MCL and KSWQS
Sample Identification	FP-98-30	FP-98-30	FP-98-30	GW30-02	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	
Volatiles (ug/L)					
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-30b					MCL and KSWQS
Sample Identification	FP-98-30b	FP-98-30b	FP-98-30b	GW30b-02	GW30b-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-30c					MCL and KSWQS
Sample Identification	FP-98-30c	FP-98-30c	FP-98-30c	GW30c-02	GW30c-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-31				MCL and KSWQS
Sample Identification	FP-98-31	FP-98-31	FP-98-31	GW31-02	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	
Volatiles (ug/L)					
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Toluene	ND(<0.4)	**0.5**	ND(<0.4)	ND(<0.4)	1000
Trichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-31b					MCL and KSWQS
Sample Identification	FP-98-31b	FP-98-31b	FP-98-31b	GW31b-02	GW31b-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
Benzene	**0.4**	**0.5**	ND(<0.4)	ND(<0.4)	ND(<0.4)	5
cis-1,2-Dichloroethene	**32.9**	**35.4**	**16.4**	**10.6**	**7.5**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	**15.5**	**20**	**11.1**	**3.6**	**4**	5
Trichloroethene	**6**	**6.9**	**6.6**	**3.2**	**4.3**	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-31c					MCL and KSWQS
Sample Identification	FP-98-31c	FP-98-31c	FP-98-31c	GW31c-02	GW31c-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)						
Benzene	**0.6**	**0.7**	**0.6**	**0.4**	**0.4**	5
cis-1,2-Dichloroethene	**43.1**	**53.6**	**39.6**	**36.8**	**38.3**	70
trans-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	**6.6**	**13.2**	**13.5**	**10.2**	**14.6**	5
Trichloroethene	**3.5**	**4.9**	**6.8**	**6.5**	**8.1**	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-99-32	MCL and KSWQS
Sample Identification	GW32-03	
Sample Event	Aug-99	
Volatiles (ug/L)		
cis-1,2-Dichloroethene	ND(<0.5)	70
trans-1,2-Dichloroethene	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	5
Trichloroethene	ND(<0.6)	5

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Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	**FP-99-32b**	MCL
Sample Identification	GW32b-03	and
Sample Event	Aug-99	KSWQS
Volatiles (ug/L)		
Benzene	**0.4**	5
cis-1,2-Dichloroethene	**24.5**	70
Methane	**11**	
trans-1,2-Dichloroethene	ND(<0.5)	100
Tetrachloroethene	**8**	5
Trichloroethene	**7.7**	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-99-32c	MCL and KSWQS
Sample Identification	GW32c-03	
Sample Event	Aug-99	
Volatiles (ug/L)		
Benzene	**0.5**	5
cis-1,2-Dichloroethene	**39.1**	70
Methane	**19**	
trans-1,2-Dichloroethene	ND(<0.5)	100
Tetrachloroethene	**13.6**	5
Trichloroethene	**4.7**	5

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	Building 801						MCL and KSWQS
Sample Identification	Bldg801-06	BLDG801-07	BLDG801	BLDG801	GW801-01	GW801-02	
Sample Event	Dec-95	May/June-96	Aug-96	Dec-96	May-97	Aug-97	
Priority Pollutant Metals (mg/L)							
Chromium, Total	ND (<0.002)	ND (<0.002)	ND (<0.01)	ND(<0.002)	**0.005**	ND(<0.002)	0.1 (b)
Copper, Total	**0.012**	**0.065**	ND (<0.010)	ND (<0.010)	ND (<0.010)	ND (<0.010)	1.3 (c)
Lead, Total	ND (<0.003)	**0.023**	ND (<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	0.015 (c)
Zinc, Total	**0.013**	**0.060**	**0.017**	**0.022**	**0.022**	**0.023**	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	I-1						MCL and KSWQS
Sample Identificatio	I-1-03	I-1-04	I-1-05	I-1-06	I-1	I-1	
Sample Event	Jan-95	Apr-95	Aug-95	Dec-95	Aug-96	Dec-96	
Volatiles (ug/L)							
Acetone	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	ND(<0.5)	70
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Toluene	**2.2**	ND (<4.0)	ND (<4.0)	ND (<4.0)	**2**	ND(<0.4)	1000
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.02**	**0.02**	**0.020**	**0.035**	**0.028**	**0.025**	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	**0.002**	0.1 (b)
Zinc, Total	**0.04**	ND (<0.010)	ND (<0.010)	ND (<0.010)	**0.013**	**0.013**	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-DRO as Diesel	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-DRO as Motor Oil	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-GRO	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND(<100)	NAv

Sample Location	I-1						MCL and KSWQS
Sample Identification	GWI1-01	GWI1-02	GWI1-01	I-1 Pumping	I-1 Nonpumping	I-1	
Sample Event	May-97	Aug-97	Feb-98	May/Jun-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
Acetone	ND(<100)	**160**	**220**	ND(<100)	ND(<100)	ND(<100)	NAv
cis-1,2-Dichloroethene	ND(<0.5)	**1.9**	ND(<0.5)	**0.6**	ND(<0.5)	ND(<0.5)	70
Dichloromethane	ND(<0.9)	**1.4 B U***	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.026**	**0.031**	NA	NA	NA	NA	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	NA	NA	NA	NA	0.1 (b)
Zinc, Total	**0.015**	ND (<0.010)	NA	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-DRO as Diesel	ND(<100)	ND(<100)	ND(<100)	ND(<100)	**110**	ND(<100)	NAv
TPH-DRO as Motor Oil	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-GRO	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	I-1			MCL and KSWQS
Sample Identification	I-1	GWI1-02	GWI1-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
Acetone	ND(<100)	ND(<100)	ND(<100)	NAv
cis-1,2-Dichloroethene	ND(<0.5)	ND(<0.5)	ND(<0.5)	70
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	0.1 (b)
Zinc, Total	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)				
TPH-DRO as Diesel	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-DRO as Motor Oil	**120**	ND(<100)	ND(<100)	NAv
TPH-GRO	ND(<100)	ND(<100)	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	M-1						MCL and KSWQS
Sample Identification	M-1	M-1	M-1-02	M-1	M-1-4	M-1-05	
Sample Event	Oct-93	Jul/Aug-94	Oct-94	Jan-95	Apr-95	Aug-95	
Volatiles (ug/L)							
1,2-Dichloroethene	**2.2**	ND (<0.5)	**0.9**	**0.5**	**1.2**	**0.5**	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Toluene	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	1000
Trichloromethane	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	100 (g)
Priority Pollutant Metals (mg/L)							
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	**0.010**	0.1 (b)
Copper. Total	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	**0.011**	1.3(c)
Nickel, Total	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	**0.014**	0.1
Selenium, Total	ND (<0.005)	**0.006**	ND (<0.005)	ND (<0.005)	ND (<0.005)	**0.009**	0.05
Silver, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	**0.011**	0.1 (d)
Zinc, Total	**0.34**	**0.09**	**0.06**	**0.05**	**0.06**	**0.095**	5 (e)

Sample Location	M-1						MCL and KSWQS
Sample Identification	M-1-06	M-1-07	M-1	M-1	GWM1-01	GWM1-02	
Sample Event	Dec-95	May/Jun-96	Aug-96	Dec-96	May-97	Aug-97	
Volatiles (ug/L)							
1,2-Dichloroethene	ND (<0.5)	**19**	**13**	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	**8.6**	**6.1**	**4.2**	70
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	**1.2 B U***	5
Toluene	ND (<0.4)	ND (<0.4)	**11**	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Trichloromethane	ND (<0.5)	ND (<0.5)	**9.7**	ND(<0.5)	ND(<0.5)	ND(<0.5)	100 (g)
Priority Pollutant Metals (mg/L)							
Chromium, Total	ND (<0.002)	ND (<0.01)	ND (<0.01)	ND(<0.002)	ND(<0.002)	ND(<0.002)	0.1 (b)
Copper. Total	**0.012**	ND (<0.02)	ND (<0.02)	ND(<0.010)	**0.024**	ND(<0.010)	1.3(c)
Nickel, Total	ND (<0.010)	ND (<0.04)	ND (<0.04)	ND(<0.010)	ND(<0.010)	ND(<0.010)	0.1
Selenium, Total	**0.008**	ND (<0.005)	ND (<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.05
Silver, Total	ND (<0.005)	ND (<0.01)	ND (<0.01)	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.1 (d)
Zinc, Total	**0.080**	**0.040**	**0.201**	**0.145**	**0.072**	**0.061**	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	M-1						MCL and KSWQS
Sample Identification	GWM1-01	M-1	M-1	M-1	GWM1-02	GWM1-03	
Sample Event	Feb-98	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)							
1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**9.8**	**3.6**	**4.6 J***	**2.2**	**5.7**	**1.6**	70
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Trichloromethane	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100 (g)
Priority Pollutant Metals (mg/L)							
Chromium, Total	NA	NA	NA	NA	NA	NA	0.1 (b)
Copper. Total	NA	NA	NA	NA	NA	NA	1.3(c)
Nickel, Total	NA	NA	NA	NA	NA	NA	0.1
Selenium, Total	NA	NA	NA	NA	NA	NA	0.05
Silver, Total	NA	NA	NA	NA	NA	NA	0.1 (d)
Zinc, Total	NA	NA	NA	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	N-1						MCL and KSWQS
Sample Identification	N-1	N-1	N-1-02	N-1	N-1-4	N-1-05	
Sample Event	Oct-93	Jul/Aug-94	Oct-94	Jan-95	Apr-95	Aug-95	
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.01**	**0.02**	**0.01**	**0.01**	ND (<0.01)	**0.009**	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	0.1 (b)
Copper. Total	**0.24**	**0.02**	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	1.3(c)
Lead, Total	**0.006**	**0.006**	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	0.015 (c)
Zinc, Total	**0.24**	**0.06**	**0.07**	**0.04**	**0.05**	ND (<0.010)	5 (e)

Sample Location	N-1						MCL and KSWQS
Sample Identification	N-1-06	N-1-07	N-1	GWN1-01	GWN1-02	GWN1-01	
Sample Event	Dec-95	May/Jun-96	Aug-96	May-97	Aug-97	Feb-98	
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.016**	**0.010**	**0.009**	**0.011**	**0.012**	NA	0.05
Chromium, Total	ND (<0.002)	**0.002**	ND (<0.002)	ND (<0.002)	ND (<0.002)	NA	0.1 (b)
Copper. Total	**0.052**	**0.017**	ND (<0.010)	ND (<0.010)	ND (<0.010)	NA	1.3(c)
Lead, Total	**0.012**	ND (<0.003)	**0.004**	ND (<0.003)	ND (<0.003)	NA	0.015 (c)
Zinc, Total	**0.629**	**0.033**	**0.068**	**0.031**	**0.05**	NA	5 (e)

Sample Location	N-1					MCL and KSWQS
Sample Identification	N-1	N-1	N-1	GWN1-02	GWN1-03	
Sample Event	May/Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Priority Pollutant Metals (mg/L)						
Arsenic, Total	NA	NA	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	NA	NA	0.1 (b)
Copper. Total	NA	NA	NA	NA	NA	1.3(c)
Lead, Total	NA	NA	NA	NA	NA	0.015 (c)
Zinc, Total	NA	NA	NA	NA	NA	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	R-1						MCL and KSWQS
Sample Identification	R-1	R-1	R-1-02	R-1-4	R-1	R-1-07	
Sample Event	Oct-93	Jul/Aug-94	Oct-94	Apr-95	Aug-95	May/Jun-96	
Volatiles (ug/L)							
Benzene	ND (<0.4)	ND (<0.4)	**2.0**	**0.5**	ND (<0.4)	ND (<0.4)	5
1,1-Dichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	7
1,2-Dichloroethene	**98**	**96**	**290**	**84**	**44 J**	**42**	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	100
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Tetrachloroethene	**160**	**170**	**330**	**190**	**110 J**	**140**	5
Toluene	ND (<0.4)	ND (<0.4)	ND (<2)	ND (<0.4)	ND (<0.4)	ND (<0.4)	1000
Trichloroethene	**33**	**29**	**76**	**40**	**32 J**	**66**	5
Trichloromethane	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100 (g)
Priority Pollutant Metals (mg/L)							
Antimony, Total	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	0.006
Arsenic, Total	**0.03**	**0.02**	**0.01**	**0.02**	**0.010**	**0.022**	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.002)	0.1 (b)
Copper. Total	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	**0.021**	1.3(c)
Lead, Total	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	**0.025**	0.015 (c)
Nickel, Total	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.010)	0.1
Zinc, Total	**0.04**	ND (<0.02)	**0.08**	ND (<0.02)	**0.080**	**0.020**	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND (<100)	**140**	**260**	**150**	ND (<100)	**110**	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	R-1						MCL and KSWQS
Sample Identification	R-1	R-1	GWR1-01	GWR1-02	GWR1-01	R-1	
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	
Volatiles (ug/L)							
Benzene	ND (<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	5
1,1-Dichloroethene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	7
1,2-Dichloroethene	**49**	NA	NA	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	NA	**10**	**70**	**100**	**38**	**129**	70
trans-1,2-Dichloroethene	NA	ND(<0.5)	**0.7**	**0.8**	ND(<0.5)	**0.6**	100
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	**1 B**	5
Tetrachloroethene	**77**	**29**	**39**	**27**	**25**	**13.7**	5
Toluene	ND (<0.4)	**4**	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND(<0.4)	1000
Trichloroethene	**44**	**11**	**17**	**14**	**13**	**9.9**	5
Trichloromethane	ND(<0.5)	**0.6**	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100 (g)
Priority Pollutant Metals (mg/L)							
Antimony, Total	ND (<0.003)	**0.003**	ND (<0.003)	ND (<0.003)	NA	NA	0.006
Arsenic, Total	**0.018**	**0.025**	**0.024**	**0.023**	NA	NA	0.05
Chromium, Total	ND (<0.01)	**0.002**	ND (<0.01)	ND (<0.01)	NA	NA	0.1 (b)
Copper. Total	ND (<0.02)	ND (<0.010)	ND (<0.02)	ND (<0.02)	NA	NA	1.3(c)
Lead, Total	ND (<0.003)	ND(<0.003)	ND (<0.003)	ND (<0.003)	NA	NA	0.015 (c)
Nickel, Total	ND (<0.04)	**0.012**	**0.010**	ND (<0.010)	NA	NA	0.1
Zinc, Total	ND (<0.02)	**0.011**	ND (<0.02)	ND (<0.02)	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND (<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	**120 J***	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	R-1				MCL
Sample Identification	GWR1-03	R-1	GWR1-02	GWR1-03	and
Sample Event	Aug-98	Jan-99	May-99	Aug-99	KSWQS
Volatiles (ug/L)					
Benzene	ND(<0.4)	**0.5**	ND(<0.4)	ND(<0.4)	5
1,1-Dichloroethene	ND(<0.6)	**0.9**	ND(<0.6)	ND(<0.6)	7
1,2-Dichloroethene	NA	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**49.5 J***	**264**	**11.5**	**110**	70
trans-1,2-Dichloroethene	ND(<0.5)	**2**	ND(<0.5)	0.8	100
Dichloromethane	ND(<0.9)	ND(<0.9)	ND(<0.9)	ND(<0.9)	5
Tetrachloroethene	**6.3 J***	**6.2**	**1.6**	**3.8**	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Trichloroethene	**7.3 J***	**7.8**	**3.7**	**3**	5
Trichloromethane	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	100 (g)
Priority Pollutant Metals (mg/L)					
Antimony, Total	NA	NA	NA	NA	0.006
Arsenic, Total	NA	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	NA	0.1 (b)
Copper. Total	NA	NA	NA	NA	1.3(c)
Lead, Total	NA	NA	NA	NA	0.015 (c)
Nickel, Total	NA	NA	NA	NA	0.1
Zinc, Total	NA	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)					
TPH-GRO	ND(<100)	**190**	ND(<100)	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	R-2						MCL and KSWQS
Sample Identification	R-2	R-2-02	R-2-4	R-2-05	R-2-07	R-2	
Sample Event	Jul/Aug-94	Oct-94	Apr-95	Aug-95	May/Jun-96	Aug-96	
Volatiles (ug/L)							
1,2-Dichloroethene	**88**	**110**	**150**	**140**	**76**	**64**	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	100
Tetrachloroethene	**140**	**130**	**230**	**120**	**110**	**50**	5
Toluene	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.8)	ND (<0.4)	ND (<0.4)	1000
Trichloroethene	**56**	**49**	**96**	**55**	**77**	**46**	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.02**	**0.02**	**0.01**	**0.014**	**0.016**	**0.017**	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.002)	ND (<0.002)	**0.002**	0.1 (b)
Nickel, Total	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	0.1
Zinc, Total	ND (<0.02)	ND (<0.02)	ND (<0.02)	**0.019**	**0.011**	ND (<0.02)	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND (<100)	**130**	**190**	**160**	ND (<100)	ND (<100)	NAv

Sample Location	R-2						MCL and KSWQS
Sample Identification	R-2	GWR2-01	GWR2-02	GWR2-01	R-2	GWR2-03	
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	Aug-98	
Volatiles (ug/L)							
1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**21**	**16**	**14**	**13**	**120**	**8 J***	70
trans-1,2-Dichloroethene	**0.6**	**0.6**	**0.6**	ND(<0.5)	**2.3**	ND(<0.5)	100
Tetrachloroethene	**24**	**8.1**	**5.3**	**15**	**7.3**	**3.1 J***	5
Toluene	**19**	**0.6**	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND(<0.4)	1000
Trichloroethene	**18**	**16**	**15**	**16**	**57.2**	**10.4 J***	5
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.023**	**0.031**	**0.022**	NA	NA	NA	0.05
Chromium, Total	ND (<0.002)	ND (<0.002)	ND (<0.002)	ND (<0.002)	NA	NA	0.1 (b)
Nickel, Total	ND(<0.010)	**0.011**	ND(<0.010)	NA	NA	NA	0.1
Zinc, Total	**0.016**	ND (<0.02)	ND (<0.02)	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-GRO	ND(<100)	ND(<100)	ND(<100)	ND(<100)	**120 J***	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	R-2			MCL and KSWQS
Sample Identification	R-2	GWR2-02	GWR2-03	
Sample Event	Jan-99	May-99	Aug-99	
Volatiles (ug/L)				
1,2-Dichloroethene	NA	NA	NA	70 (a)
cis-1,2-Dichloroethene	**57.9**	**1.5**	**2.9**	70
trans-1,2-Dichloroethene	**1.7**	ND(<0.5)	ND(<0.5)	100
Tetrachloroethene	ND(<1.1)	ND(<1.1)	ND(<1.1)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Trichloroethene	**21.1**	ND(<0.6)	**1.1**	5
Priority Pollutant Metals (mg/L)				
Arsenic, Total	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	0.1 (b)
Nickel, Total	NA	NA	NA	0.1
Zinc, Total	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)				
TPH-GRO	ND(<100)	ND(<100)	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
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Sample Location	R-3						MCL and KSWQS
Sample Identification	R-3	R-3-02	R-3-3	R-3-05	R-3-06	R-3-07	
Sample Event	Jul/Aug-94	Oct-94	Jan-95	Aug-95	Dec-95	May/Jun-96	
Volatiles (ug/L)							
Benzene	ND (<0.4)	ND (<0.4)	<5.0	ND (<0.4)	ND (<0.4)	ND (<0.4)	5
Toluene	**0.5**	**24**	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	1000
Semivolatiles (ug/L)							
2-Methyl Naphthalene	**14**	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NAv
4-Methylphenol	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NAv
Bis (2-ethylhexyl) phthalate	ND (<10)	ND (<10)	ND (<10)	ND (<10)	**25**	ND (<10)	6
Naphthalene	**52**	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NAv
Phenol	ND(<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NAv
Priority Pollutant Metals (mg/L)							
Arsenic, Total	ND (<0.01)	ND (<0.01)	**0.02**	ND (<0.01)	ND (<0.005)	ND (<0.01)	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	**0.002**	ND (<0.01)	0.1 (b)
Lead, Total	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	**0.006**	0.015 (c)
Zinc, Total	ND (<0.02	ND (<0.02)	ND (<0.02)	**0.052**	**0.079**	**0.010**	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-DRO as Motor Oil	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	NAv
TPH-DRO as Diesel	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	NAv
TPH-GRO	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	ND (<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	R-3						MCL and KSWQS
Sample Identification	R-3	R-3	GWR3-01	GWR3-02	GWR3-01	R-3	
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May/Jun-98	
Volatiles (ug/L)							
Benzene	ND (<0.4)	ND(<0.4)	**0.5**	ND(<0.4)	ND(<0.4)	ND(<0.4)	5
Toluene	ND (<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Semivolatiles (ug/L)							
2-Methyl Naphthalene	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NA	NA	NAv
4-Methylphenol	ND (<10)	ND (<10)	ND (<10)	**140**	NA	NA	NAv
Bis (2-ethylhexyl) phthalate	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NA	NA	6
Naphthalene	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND(<0.5)	ND(<0.5)	NAv
Phenol	ND (<10)	ND (<10)	ND (<10)	**17**	NA	NA	NAv
Priority Pollutant Metals (mg/L)							
Arsenic, Total	**0.007**	**0.005**	**0.008**	**0.008**	NA	NA	0.05
Chromium, Total	ND (<0.01)	**0.004**	ND (<0.01)	ND (<0.01)	NA	NA	0.1 (b)
Lead, Total	ND (<0.003)	ND(<0.003)	ND (<0.003)	ND (<0.003)	NA	NA	0.015 (c)
Zinc, Total	ND (<0.02)	ND(<0.010)	ND (<0.02)	ND (<0.02)	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)							
TPH-DRO as Motor Oil	ND (<100)	ND(<100)	ND(<100)	**130**	ND(<100)	ND(<100)	NAv
TPH-DRO as Diesel	ND (<100)	ND(<100)	ND(<100)	**140**	ND(<100)	ND(<100)	NAv
TPH-GRO	ND (<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	R-3				MCL and KSWQS
Sample Identification	GWR3-03	R-3	GWR3-02	GWR3-03	
Sample Event	Aug-98	Jan-99	May-99	Aug-99	
Volatiles (ug/L)					
Benzene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	5
Toluene	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	1000
Semivolatiles (ug/L)					
2-Methyl Naphthalene	NA	NA	NA	NA	NAv
4-Methylphenol	NA	NA	NA	NA	NAv
Bis (2-ethylhexyl) phthalate	NA	NA	NA	NA	6
Naphthalene	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<5.0)	NAv
Phenol	NA	NA	NA	NA	NAv
Priority Pollutant Metals (mg/L)					
Arsenic, Total	NA	NA	NA	NA	0.05
Chromium, Total	NA	NA	NA	NA	0.1 (b)
Lead, Total	NA	NA	NA	NA	0.015 (c)
Zinc, Total	NA	NA	NA	NA	5 (e)
Total Petroleum Hydrocarbons (ug/L)					
TPH-DRO as Motor Oil	ND (<100)	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-DRO as Diesel	ND (<100)	ND(<100)	ND(<100)	ND(<100)	NAv
TPH-GRO	**107 J***	ND(<100)	ND(<100)	ND(<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	R-4	MCL and KSWQS
Sample Identification	GWR4-01	
Sample Event	May-97	
Priority Pollutant Metals (mg/L)		
Lead, Total	**0.004**	0.015 (c)
Zinc, Total	ND(<0.010)	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	F-1						MCL and KSWQS
Sample Identification	F-1	F-1	F-1-02	F-1-4	F-1-05	F-1-07	
Sample Event	Oct-93	Jul/Aug-94	Oct-94	Apr-95	Aug-95	May/Jun-96	
Volatiles (ug/L)							
Benzene	ND (<0.4)	ND (<0.4)	<5.0	ND (<0.4)	ND (<0.4)	ND (<0.4)	5
1,2-Dichloroethene	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	70 (a)
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	100
Dichloromethane	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	ND (<0.9)	5
Ethylbenzene	ND(<0.7)	ND(<0.7)	ND(<0.7)	ND(<0.7)	ND(<0.7)	ND(<0.7)	700
Tetrachloroethene	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	5
Toluene	ND (<0.4)	**1.2**	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	1000
Trichloroethene	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	5
Trichloromethane	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	100 (g)
Meta &/or Para-Xylene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	10000
Ortho-Xylene	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	ND(<0.6)	10000
Semivolatiles (ug/L)							
2-Methyl Naphthalene	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NAv
Bis (2-ethylhexyl) phthalate	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	6
Naphthalene	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	ND (<10)	NAv
Priority Pollutant Metals (mg/L)							
Antimony, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	0.006
Arsenic, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.005)	ND (<0.005)	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.005)	ND (<0.005)	0.1 (b)
Copper. Total	**0.02**	ND (<0.02)	ND (<0.02)	**0.02**	**0.030**	**0.033**	1.3(c)
Lead, Total	**0.015**	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	0.015 (c)
Nickel, Total	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	**0.048**	0.1
Selenium, Total	**0.009**	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND (<0.005)	ND (<0.005)	0.05
Silver, Total	ND (<0.005)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.005)	0.1 (d)
Zinc, Total	**0.04**	**0.02**	**0.04**	**0.11**	**0.051**	**0.560**	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	F-1 (Cont.)	MCL and KSWQS
Sample Identification	F-1	
Sample Event	Aug-96	
Volatiles (ug/L)		
Benzene	ND (<0.4)	5
1,2-Dichloroethene	ND (<0.5)	70 (a)
cis-1,2-Dichloroethene	NA	70
trans-1,2-Dichloroethene	NA	100
Dichloromethane	ND (<0.9)	5
Ethylbenzene	ND(<0.7)	700
Tetrachloroethene	ND (<1.1)	5
Toluene	ND (<0.4)	1000
Trichloroethene	ND (<0.6)	5
Trichloromethane	ND (<0.5)	100 (g)
Meta &/or Para-Xylene	ND(<0.6)	10000
Ortho-Xylene	ND(<0.6)	10000
Semivolatiles (ug/L)		
2-Methyl Naphthalene	ND (<10)	NAv
Bis (2-ethylhexyl) phthalate	ND (<10)	6
Naphthalene	ND (<10)	NAv
Priority Pollutant Metals (mg/L)		
Antimony, Total	ND(<0.003)	0.006
Arsenic, Total	ND (<0.01)	0.05
Chromium, Total	ND (<0.01)	0.1 (b)
Copper. Total	ND (<0.02)	1.3(c)
Lead, Total	ND (<0.003)	0.015 (c)
Nickel, Total	ND (<0.04)	0.1
Selenium, Total	ND (<0.005)	0.05
Silver, Total	ND (<0.01)	0.1 (d)
Zinc, Total	**0.042**	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	F-2			MCL and KSWQS
Sample Identification	F-2	F-2	F-2-02	
Sample Event	Oct-93	Jul/Aug-94	Oct-94	
Volatiles (ug/L)				
Benzene	ND (<0.4)	ND (<0.4)	ND (<0.4)	5
cis-1,2-Dichloroethene	NA	NA	NA	70
trans-1,2-Dichloroethene	NA	NA	NA	100
Dichloromethane	ND (<0.9)	ND (<0.9)	ND (<0.9)	5
Ethylbenzene	ND(<0.7)	ND(<0.7)	ND(<0.7)	700
Tetrachloroethene	ND (<1.1)	ND (<1.1)	ND (<1.1)	5
Toluene	ND (<0.4)	ND (<0.4)	ND (<0.4)	1000
Trichloroethene	ND (<0.6)	ND (<0.6)	ND (<0.6)	5
Trichloromethane	ND (<0.5)	ND (<0.5)	ND (<0.5)	100 (g)
Meta &/or Para-Xylene	ND (<0.6)	ND (<0.6)	ND (<0.6)	10000
Ortho-Xylene	ND (<0.6)	ND (<0.6)	ND (<0.6)	10000
Priority Pollutant Metals (mg/L)				
Antimony, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	0.006
Arsenic, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	0.1 (b)
Copper. Total	ND (<0.02)	ND (<0.02)	ND (<0.02)	1.3(c)
Lead, Total	**0.006**	**0.005**	**0.007**	0.015 (c)
Nickel, Total	ND (<0.04)	ND (<0.04)	ND (<0.04)	0.1
Selenium, Total	ND (<0.005)	**0.006**	ND (<0.005)	0.05
Silver, Total	ND (<0.01)	ND (<0.005)	ND (<0.01)	0.1 (d)
Zinc, Total	**0.30**	**1.20**	**0.43**	5 (e)
Total Petroleum Hydrocarbons (ug/L)				
TPH-GRO	ND (<100)	ND (<100)	ND (<100)	NAv
TPH-DRO	**300**	ND (<100)	ND (<100)	NAv

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	B-1						MCL and KSWQS
Sample Identification	B-1	B-1	B-1-02	B-1	B-1-4	B-1-05	
Sample Event	Oct-93	Jul/Aug-94	Oct-94	Jan-94	Apr-95	Aug-95	
Volatiles (ug/L)							
Benzene	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	ND (<0.4)	5
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	70
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	100
Dichloromethane	ND (<0.9)	ND (<0.9)	**0.9B**	ND (<0.9)	ND (<0.9)	ND (<0.9)	5
Ethylbenzene	ND(<0.7)	ND(<0.7)	ND(<0.7)	ND(<0.7)	ND(<0.7)	ND(<0.7)	700
Tetrachloroethene	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	5
Toluene	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	1000
Trichloroethene	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	5
Trichloromethane	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	100 (g)
Meta &/or Para-Xylene	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	10000
Ortho-Xylene	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	ND (<0.6)	10000
Priority Pollutant Metals (mg/L)							
Antimony, Total	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	0.006
Arsenic, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	0.05
Chromium, Total	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	0.1 (b)
Copper. Total	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	1.3(c)
Lead, Total	ND (<0.003)	**0.004**	ND (<0.003)	ND (<0.003)	ND (<0.003)	ND (<0.003)	0.015 (c)
Nickel, Total	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	0.1
Selenium, Total	**0.008**	**0.016**	**0.013**	**0.1**	**0.009**	**0.012**	0.05
Silver, Total	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.1 (d)
Zinc, Total	**0.04**	**0.060**	ND (<0.02)	**0.04**	**0.08**	**0.034**	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

Sample Location	B1 (Cont)	MCL
Sample Identification	B-1-06	and
Sample Event	Dec-95	KSWQS
Volatiles (ug/L)		
Benzene	ND (<0.4)	5
cis-1,2-Dichloroethene	NA	70
trans-1,2-Dichloroethene	NA	100
Dichloromethane	ND (<0.9)	5
Ethylbenzene	ND(<0.7)	700
Tetrachloroethene	ND (<1.1)	5
Toluene	ND (<4.0)	1000
Trichloroethene	ND (<0.6)	5
Trichloromethane	ND (<0.5)	100 (g)
Meta &/or Para-Xylene	ND (<0.6)	10000
Ortho-Xylene	ND (<0.6)	10000
Priority Pollutant Metals (mg/L)		
Antimony, Total	ND(<0.003)	0.006
Arsenic, Total	**0.007**	0.05
Chromium, Total	**0.002**	0.1 (b)
Copper. Total	**0.024**	1.3(c)
Lead, Total	**0.004**	0.015 (c)
Nickel, Total	ND (<0.010)	0.1
Selenium, Total	**0.015**	0.05
Silver, Total	ND(<0.005)	0.1 (d)
Zinc, Total	**0.181**	5 (e)

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

NOTES:

Results are shown only for the rounds sampled at each well.

Bold values indicate positive detections above the detection limits.

* Monitoring Wells FP-94-08, FP-94-09, FP-94-10, and FP-94-11 were formally designated as 01 PZ, 02 PZ, 03 PZ, and 04 PZ, respectively, before the August 1995 sampling event.

Shaded values represent concentrations that are equal to or exceed the MCL or Treatment Threshold.

ND(<): Not Detected above Practical Quantitation Limit

NA: Not Analyzed

NAv: Standard Not Available

NS: Not Sampled

ug/L: micrograms per liter

mg/L: milligrams per liter

mV: millivolts

BOD: Biochemical Oxygen Demand

TPH: Total Petroleum Hydrocarbons

GRO: Gasoline Range Organics

DRO: Diesel Range Organics

DO: Dissolved Oxygen

TOC: Total Organic Carbon

TOX: Total Halogenated Compounds

COD: Chemical Oxygen Demand

J: Estimated Concentration

B: Analyte detected in the associated method blank; result has not been blank corrected.

U*: Qualified as undetected in the QC evaluation

UJ Compound not detected above Practical Quantitation Limit (PQL), which may be imprecise or inaccurate.

MCL: Federal Maximum Contaminant Level. From: Drinking Water Regulations and Health Advisories, Office of Water, United States Environmental Protection Agency, May 1995.

KSWQS: Kansas Surface Water Quality Standards. From: Kansas Department of Health and Environment, July 1994.

For all compounds listed, the KSWQS is the same value as the MCL, unless otherwise noted.

(a) The value presented represents the MCL for cis-1,2-dichloroethene; the MCL for trans-1,2-dichloroethene is 100 ug/L.

(b) The MCL represents both hexavalent and trivalent chromium.

(c) MCLs have not been established for lead or copper. Instead, the Safe Drinking Water Act has established Treatment Thresholds (TT), above which treatment is required.

(d) Secondary Drinking Water Standard, KSWQS is 0.050 mg/l.

(e) Secondary Drinking Water Standard, no KSWQS available.

(f) Secondary Drinking Water Standard, KSWQS is the same value.

(g) The value presented represents the MCL for total trihalomethanes.

(h) TPH value consists mostly of non-characteristic hydrocarbon peaks.

The (h) through (m) listed below are for sheets FP-93-04, -04b, -04c, 801

(h) Calculated from a kerosene standard.

(i) Calculated from a kerosene and motor oil standard.

Table 3-7
Previous Groundwater Data (Positive Detections Only)
FFTA-MAAF Remedial Investigation Report

(j) Calculated from a motor oil standard.
(k) Calculated from a diesel standard.
(l) Result of Repreparation/Analysis outside of holding time was 3800 ug/l.
(m) Questionable value: aeration of sample was probable.

Wells F-1, F-2, B-1, M-1, N-1, R-1, R-2, and R-3 are private wells.
Wells R-2 and R-3 were not sampled in October 1993 due to regional flooding.
The identification in the QCSR for all VOC resamples (July/August 1994) is the well identification followed by "-1R".
Well F-2 not sampled since October 1994.
In January 1995 Wells F-1, F-2, R-1, and R-2 had been shut down for the Winter.
Piezometer FP-94-12PZ was installed and developed in August 1994, and sampled for the first time in January 1995.
In December 1995, Building 801, the backup water supply well for Marshall Army Airfield, was sampled for the first time.
Monitoring Wells FP-96-07c; FP-96-02b and -02c; FP-96-04b and -04c; FP-96-18 through FP-96-24; and FP-96-21b and -21c were installed in May 1996 and sampled for the first time in May/June 1996.
Monitoring Wells FP-96-09b and -09c; FP-96-20b and -20c; FP-96-25, -25b and -25c; and FP-96-26, -26b and -26c were installed in October/November 1996 and sampled for the first time in December 1996.
Monitoring Wells FP-98-27, -27b, and -27c; FP-98-28; FP-98-29, -29b, and -29c; FP-98-30; and FP-98-31, -31b, and -31c were installed in May 1990.

Table 3-8
Additional SI Phase I Soil Gas Results
(Positive Detections Only)
June 1994
FFTA-MAAF Remedial Investigation Report

Sample Identification	Chlorinated Solvents			Petroleum
	PCE	TCE	cis-1,2-DCE	Total VOCs
ESISG4-18	<1.0	<1.0	<1.0	**80**
ESISG4-35	**6.4**	<1.0	<1.0	<10
ESISG12-35	**91**	**1.2**	<1.0	<10
ESISG4-36	**1.4**	<1.0	<1.0	<10
ESISG12-36	**4.9**	<1.0	**25**	<10
ESISG4-38	**14**	<1.0	<1.0	<10
ESISG4-38D	**14**	<1.0	<1.0	<10
ESISG12-38	**1.5**	<1.0	<1.0	<10
ESISG4-39	**2.5**	<1.0	<1.0	<10
ESISG8-39	**2.0**	<1.0	<1.0	<10
ESISG4-70	**2.9**	<1.0	<1.0	<10
ESISG4-76	<1.0	<1.0	**1.6**	<10
ESISG12-77	**16**	**2.7**	**12**	<10
ESISG12-99	**13**	**1.1**	**23**	<10
ESISG12-99D	**13**	**1.1**	**23**	<10
ESISG12-131	<1.0	<1.0	**1.3**	<10
ESISG4-142	**1.9**	<1.0	<1.0	<10
ESISG4-152	<1.0	<1.0	<1.0	**33**
ESISG16-152	<1.0	<1.0	<1.0	**21**
ESISG4-152D	<1.0	<1.0	<1.0	**27**
ESISG4-157	**5.8**	**2.8**	**2.3**	<10
ESISG12-171	<1.0	<1.0	**2.4**	<10
ESISG12-173	**4.9**	<1.0	<1.0	<10

Notes:
Bold values represent detected compounds.
All results are reported in micrograms per liter - ug/L.

The sample identification contains the following information:
ESI Expanded Site Investigation
SG Soil Gas
the first number identifies the depth of the sample in feet (I.e. 4, 10, 12)
the second number identifies the sample location
All identifications with a "D" is a duplicate sample (from the corresponding identification).
< Below Practical Quantitation Limit
PCE - Tetrachloroethene
TCE - Trichloroethene
cis-1,2-DCE - cis-1,2-Dichloroethene
VOC - Volatile Organic Compound

Source:
FFTA-MAAF SI (LBA, 1995e)

Table 3-9
SI Phase I Additional Groundwater Screening Results
June/September 1994
FFTA-MAAF Remedial Investigation Report

Sample Identification	Volatile Organic Compounds - Chlorinated Compounds							Volatile Organic Compounds - Petroleum				
	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	1,2-DCA	PCE	1,1,1-TCA	TCE	Benzene	Toluene	Xylenes	BTEX	Total VOCs
ESIGW-8	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-18	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-22	<1.0	**2.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-25	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-25R	**2.0**	<1.0	<1.0	**215**	**280**	<1.0	**249**	<1.0	**10**	<1.0	**10**	**238**
ESIGW-26	<1.0	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW8-33D	<1.0	**3.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-35	<1.0	**8.2**	**3.0**	<1.0	**6.3**	<1.0	**17**	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-36	<1.0	**214**	**2.6**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.8**	<1.0	<1.0	**63**
ESIGW-36D	<1.0	**213**	**2.1**	<1.0	<1.0	<1.0	<1.0	<1.0	**1.5**	<1.0	<1.0	**49**
ESIGW-39	<1.0	**4.5**	**1.0**	<1.0	**1.1**	<1.0	**3.5**	<1.0	<1.0	<1.0	<1.0	**18**
ESIGW-57	<1.0	**2**	<1.0	<1.0	<1.0	**20**	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-61	<1.0	**1.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-70	<1.0	**322**	**1.3**	<1.0	**70**	<1.0	**120**	<1.0	**2.2**	<1.0	**2.2**	**147**
ESIGW-70D	<1.0	**291**	**1.6**	<1.0	**36**	<1.0	**76**	<1.0	<1.0	<1.0	<1.0	**110**
ESIGW-70R2 (b)	**2.8**	<1.0	<1.0	**212**	**156**	<1.0	**114**	**1**	**12**	<1.0	**13**	**285**
ESIGW-79	<1.0	<1.0	**1.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-91	<1.0	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-91E	<1.0	<1.0	<1.0	<1.0	<1.0	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-92	<1.0	**1.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-92E	<1.0	<1.0	<1.0	<1.0	<1.0	**5.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-98	**1.0**	**2.1**	<1.0	<1.0	**62**	<1.0	**12**	<1.0	<1.0	<1.0	<1.0	**16**
ESIGW-99	**1.8**	**254**	**2.9**	<1.0	**86**	<1.0	**85**	<1.0	**1.2**	<1.0	**1.2**	**148**
ESIGW-101A	<1.0	**1.4**	<1.0	<1.0	<1.0	<1.0	**1.4**	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-113	<1.0	**2.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.6**	**2.6**	<10
ESIGW-115	<1.0	<1.0	**1.2**	<1.0	<1.0	**15**	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-129	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-132	<1.0	**9.5**	<1.0	<1.0	**1.1**	<1.0	**1.5**	<1.0	<1.0	<1.0	<1.0	<10
ESIGW8-133	<1.0	**2.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-159	<1.0	**118**	<1.0	<1.0	**1.7**	<1.0	**4.3**	**2.4**	<1.0	<1.0	**2.4**	**80**
ESIGW-159R	<1.0	<1.0	<1.0	**6.7**	<1.0	<1.0	**0.7**	<1.0	<1.0	<1.0	<1.0	**7**
ESIGW-167	<1.0	**1.6**	**1.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-170	<1.0	**6.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-172	<1.0	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-174	<1.0	<1.0	<1.0	<1.0	**5.1**	<1.0	**1.7**	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-187	<1.0	<1.0	**1.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-189	<1.0	<1.0	**2.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-192	<1.0	<1.0	**2.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-210	<1.0	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-214	<1.0	**3.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-216	<1.0	**30**	<1.0	<1.0	**65**	<1.0	**11**	<1.0	<1.0	<1.0	<1.0	29.0
ESIGW-217	<1.0	**1.2**	<1.0	**13**	**26**	<1.0	**4.3**	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-217D	<1.0	<1.0	<1.0	<1.0	**11**	<1.0	**3.5**	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-217R	<1.0	<1.0	<1.0	<1.0	**66**	<1.0	**14**	<1.0	<1.0	<1.0	<1.0	**35**
ESIGW-223	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-229	<1.0	**16**	<1.0	<1.0	**75**	<1.0	**6.9**	<1.0	<1.0	<1.0	<1.0	**25**
ESIGW-231	<1.0	**9.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESI-M1	<1.0	<1.0	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW-B1R	<1.0	<1.0	**10**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
ESIGW1-98A (a)	<1.0	<1.0	<1.0	**18**	**53**	<1.0	**38**	<1.0	**19**	<1.0	**19**	**60**
ESIGW1-159A (a)	<1.0	<1.0	<1.0	**91**	**2.0**	<1.0	**7**	<1.0	<1.0	<1.0	<1.0	<10
ESIGW1-229A (a)	<1.0	<1.0	<1.0	**10**	**32**	<1.0	**13**	<1.0	<1.0	<1.0	<1.0	**35**

Notes:

Bold values represent detected compounds.
All results are reported in micrograms per liter - ug/L.
All identifications with a "D" is a duplicate sample (from the corresponding identification).
OB - Compound concentration observed below reporting limits.
< - Below Practical Quantitation Limit.
(a) Location sampled again in accordance with Technical Memorandum #6
(b) Location 70 was inadvertently re-collected and field analyzed on 16 November 1994.

BTEX - Benzene, Toluene, Ethylbenzene, Xylene
DCA - Dichloroethane
DCE - Dichloroethene
PCE - Tetrachloroethene
TCA - Trichloroethane
TCE - Trichloroethene
VOC - Volatile Organic Compound

Sourace: FFTA-MAAF SI (LBA, 1995e)

Table 3-10
Positive VOC Detections in Pre-Pilot Study Soil Borings
July 1994
FFTA-MAAF Remedial Investigation Report

Site ID	Sample ID	Depth From (ft)	Depth To (ft)	Concentration	Units
Benzene					
SB-4	MAAFSB4-2	4.0	7.0	550	µg/kg
SB-4	MAAFSB4A-2	4.0	7.0	1400	µg/kg
Ethylbenzene					
SB-4	MAAFSB4-2	4.0	7.0	15000 r,J	µg/kg
SB-4	MAAFSB4A-2	4.0	7.0	19000 r,J	µg/kg
SB-4	MAAFSB4-3	10.0	12.0	9600 r,J	µg/kg
SB-4	MAAFSB4-4	12.5	13.0	1300	µg/kg
Meta &/or Para-Xylene					
SB-4	MAAFSB4-1	1.0	3.0	850	µg/kg
SB-4	MAAFSB4-2	4.0	7.0	160000 r,J	µg/kg
SB-4	MAAFSB4A-2	4.0	7.0	160000 r,J	µg/kg
SB-4	MAAFSB4-3	10.0	12.0	94000 r,J	µg/kg
SB-4	MAAFSB4-4	12.5	13.0	22000 r,J	µg/kg
SB-5	MAAFSB5-3	10.0	12.0	170000 r,J	µg/kg
SB-5	MAAFSB5-4	12.0	13.0	18000	µg/kg
Ortho-Xylene					
SB-4	MAAFSB4-2	4.0	7.0	33000 r,J	µg/kg
SB-4	MAAFSB4A-2	4.0	7.0	29000 r,J	µg/kg
SB-4	MAAFSB4-3	10.0	12.0	18000 r,J	µg/kg
SB-4	MAAFSB4-4	12.5	13.0	2900	µg/kg
SB-5	MAAFSB5-3	10.0	12.0	24000 r,J	µg/kg
SB-5	MAAFSB5-4	12.0	13.0	4000	µg/kg
Toluene					
SB-4	MAAFSB4-1	1.0	3.0	710	µg/kg
SB-4	MAAFSB4-2	4.0	7.0	130000 r,J	µg/kg
SB-4	MAAFSB4A-2	4.0	7.0	180000 r,J	µg/kg
SB-4	MAAFSB4-3	10.0	12.0	70000 r,J	µg/kg
SB-4	MAAFSB4-4	12.5	13.0	8600 r,J	µg/kg
SB-5	MAAFSB5-3	10.0	12.0	26000 r,J	µg/kg
SB-5	MAAFSB5-4	12.0	13.0	4100	µg/kg

Table 3-10 (continued)
Positive VOC Detections in Pre-Pilot Study Soil Borings
July 1994
FFTA-MAAF Remedial Investigation Report

Site ID	Sample ID	Depth From (ft)	Depth To (ft)	Concentration	Units
Tetrachloroethene					
SB-4	MAAFSB4A-1	1.0	3.0	170	μg/kg
SB-7	MAAFSB7-2	1.0	3.0	250	μg/kg
SB-7	MAAFSB7-3	5.0	7.0	130	μg/kg
SB-8	MAAFSB8-2	1.0	3.0	35	μg/kg
SB-8	MAAFSB8B-1	1.0	3.0	21	μg/kg
SB-8	MAAFSB8B-2	4.0	6.0	260	μg/kg
SB-8	MAAFSB8-3	4.0	6.0	560	μg/kg
SB-9	MAAFSB9-1	1.0	3.0	220	μg/kg
SB-9	MAAFSB9B-1	1.0	3.0	103	μg/kg
SB-9	MAAFSB9-2	4.0	6.0	650	μg/kg
SB-9	MAAFSB9B-2	4.0	6.0	240	μg/kg
SB-9	MAAFSB9-3	10.0	12.0	15	μg/kg
SB-9	MAAFSB9B-3	4.0	6.0	93	μg/kg
SB-10	MAAFSB10-1	1.0	3.0	170	μg/kg
SB-10	MAAFSB10-2	5.0	7.5	19	μg/kg
SB-10	MAAFSB10-4	10.1	12.0	26	μg/kg
SB-11	MAAFSB11-1	1.0	3.0	26	μg/kg
SB-11	MAAFSB11-2	4.0	6.0	18	μg/kg
SB-12	MAAFSB12-1	1.0	3.0	38	μg/kg
Trichloroethene					
SB-4	MAAFSB4A-1	1.0	3.0	8.6	μg/kg
1,2-Dichloroethene					
SB-4	MAAFSB4A-1	1.0	3.0	160	μg/kg
SB-4	MAAFSB4-2	4.0	7.0	13000 r,J	μg/kg
SB-4	MAAFSB4A-2	4.0	7.0	23000 r,J	μg/kg
SB-4	MAAFSB4-3	10.0	12.0	310	μg/kg

Notes:

r - Laboratory Reanalysis

J - Sample quantitative value estimated

μg/kg - micrograms per kilogram

Source:

Post-Pilot Soils (LBA, 1996a)

Table 3-11
Positive TPH Detections in Pre-Pilot Study Soil Borings
July 1994
FFTA-MAAF Remedial Investigation Report

Site ID	Sample ID	Depth From (ft)	Depth To (ft)	Concentration	Units
TPH-DRO					
SB-1	MAAFSB1-1	1.0	3.0	150000	µg/kg
SB-1	MAAFSB1-4	12.3	12.8	1400000	µg/kg
SB-3	MAAFSB3B-1	1.0	3.0	40000	µg/kg
SB-4	MAAFSB4-1	1.0	3.0	15000000	µg/kg
SB-4	MAAFSB4A-1	1.0	3.0	7000000	µg/kg
SB-4	MAAFSB4-2	4.0	7.0	23000000	µg/kg
SB-4	MAAFSB4A-2	4.0	7.0	980000	µg/kg
SB-4	MAAFSB4-3	10.0	12.0	6000000	µg/kg
SB-4	MAAFSB4-4	12.5	13.0	3300000	µg/kg
SB-5	MAAFSB5-3	10.0	12.0	4000000	µg/kg
SB-5	MAAFSB5-4	12.0	13.0	6000000	µg/kg
TPH-GRO					
SB-1	MAAFSB1-1	1.0	3.0	190	µg/kg
SB-1	MAAFSB1-2	4.0	7.0	270	µg/kg
SB-1	MAAFSB1-3	10.0	12.0	200	µg/kg
SB-1	MAAFSB1-4	12.3	12.8	21000	µg/kg
SB-4	MAAFSB4-1	1.0	3.0	350000	µg/kg
SB-4	MAAFSB4A-1	1.0	3.0	1800000	µg/kg
SB-4	MAAFSB4-2	4.0	7.0	2600000	µg/kg
SB-4	MAAFSB4A-2	4.0	7.0	2200000	µg/kg
SB-4	MAAFSB4-3	10.0	12.0	2200000	µg/kg
SB-4	MAAFSB4-4	12.5	13.0	600000	µg/kg
SB-5	MAAFSB5A-2	4.0	6.0	130	µg/kg
SB-5	MAAFSB5-3	10.0	12.0	1800000	µg/kg
SB-5	MAAFSB5-4	12.0	13.0	1500000	µg/kg
SB-7	MAAFSB7-2	1.0	3.0	430	µg/kg
SB-7	MAAFSB7-3	5.0	7.0	320	µg/kg
SB-7	MAAFSB7-4	5.0	7.0	210	µg/kg
SB-7	MAAFSB7-5	10.0	12.0	450	µg/kg
SB-7	MAAFSB7-6	14.0	15.5	170	µg/kg

Notes:

µg/kg - micrograms per kilogram

TPH-DRO - Total Petroleum Hydrocarbons - Diesel Range Organics

TPH-GRO - Total Petroleum Hydrocarbons - Gasoline Range Organics

Source:

Post-Pilot Soils (LBA, 1996a)

Table 3-12
Positive VOC Detections in Post-Pilot Study Soil Borings
March/April 1996
FFTA-MAAF Remedial Investigation Report

Site ID	Sample ID	Depth From (ft)	Depth To (ft)	Concentration	Units
Ethylbenzene					
PSB-4	MAAFPSB-4-1	1.0	3.0	450	µg/kg
PSB-4	MAAFPSB-4-2	4.2	6.0	15000	µg/kg
PSB-44	MAAFPSB-44-5	15.7	16.7	40	µg/kg
Meta &/or Para-Xylene					
PSB-16	MAAFPSB-16-5	16.5	17.5	210	µg/kg
PSB-29	MAAFPSB-29-5	15.8	17.0	520	µg/kg
PSB-30	MAAFPSB-30-5	15.5	16.5	470	µg/kg
PSB-30	MAAFPSB-30-4	13.0	14.5	130	µg/kg
PSB-31	MAAFPSB-31-5	14.8	15.7	3100	µg/kg
PSB-32	MAAFPSB-32-5	16.0	16.8	340	µg/kg
PSB-4	MAAFPSB-4-5	14.8	15.8	610	µg/kg
PSB-4	MAAFPSB-4-1	1.0	3.0	2200	µg/kg
PSB-4	MAAFPSB-4-3	10.0	11.8	240	µg/kg
PSB-4	MAAFPSB-4-4	12.6	13.1	210	µg/kg
PSB-4	MAAFPSB-4-2	4.2	6.0	37000	µg/kg
PSB-44	MAAFPSB-44-5	15.7	16.7	260	µg/kg
PSB-5	MAAFPSB-5-3	10.0	12.0	1700	µg/kg
PSB-5	MAAFPSB-5-4	12.5	13.0	170	µg/kg
PSB-5	MAAFPSB-5-5	15.3	16.3	830	µg/kg
Ortho-Xylene					
PSB-29	MAAFPSB-29-5	15.8	17.0	850	µg/kg
PSB-30	MAAFPSB-30-4	13.0	14.5	260	µg/kg
PSB-30	MAAFPSB-30-5	15.5	16.5	330	µg/kg
PSB-31	MAAFPSB-31-5	14.8	15.7	420	µg/kg
PSB-32	MAAFPSB-32-5	16.0	16.8	150	µg/kg
PSB-4	MAAFPSB-4-5	14.8	15.8	550	µg/kg
PSB-4	MAAFPSB-4-4	12.6	13.1	180	µg/kg
PSB-4	MAAFPSB-4-1	1.0	3.0	950	µg/kg
PSB-4	MAAFPSB-4-3	10.0	11.8	490	µg/kg
PSB-4	MAAFPSB-4-2	4.2	6.0	27000	µg/kg
PSB-44	MAAFPSB-44-5	15.7	16.7	140	µg/kg
PSB-44	MAAFPSB-44-4	12.8	14.8	17	µg/kg
PSB-5	MAAFPSB-5-4	12.5	13.0	550	µg/kg
PSB-5	MAAFPSB-5-3	10.0	12.0	1500	µg/kg
PSB-5	MAAFPSB-5-5	15.3	16.3	450	µg/kg

Table 3-12 (continued)
Positive VOC Detections in Post-Pilot Study Soil Borings
March/April 1996
FFTA-MAAF Remedial Investigation Report

Site ID	Sample ID	Depth From (ft)	Depth To (ft)	Concentration	Units
Tetrachloroethene					
PSB-17	MAAFPSB-17-5	15.1	16.0	35	µg/kg
PSB-17	MAAFPSB-17-1	0.5	1.0	290	µg/kg
PSB-24	MAAFPSB-24-6	4.2	7.0	11	µg/kg
PSB-24	MAAFPSB-24-2	4.2	7.0	21	µg/kg
PSB-25	MAAFPSB-25-2	4.8	7.0	28	µg/kg
PSB-4	MAAFPSB-4-1	1.0	3.0	100	µg/kg
PSB-7	MAAFPSB-7-1	1.0	3.0	8.8	µg/kg
PSB-8	MAAFPSB-8-6	3.9	6.1	63	µg/kg
PSB-8	MAAFPSB-8-2	3.9	6.1	41	µg/kg
PSB-9	MAAFPSB-9-1	1.0	3.0	47	µg/kg
PSB-9	MAAFPSB-9-2	4.0	6.0	74	µg/kg
PSB-9	MAAFPSB-9-6	4.0	6.0	29	µg/kg
Toluene					
PSB-4	MAAFPSB-4-1	1.0	3.0	760	µg/kg
PSB-4	MAAFPSB-4-2	4.2	6.0	63000	µg/kg
PSB-5	MAAFPSB-5-3	10.0	12.0	370	µg/kg
Trichloroethene					
PSB-13	MAAFPSB-13-2	4.7	7.0	7.5	µg/kg
PSB-14	MAAFPSB-14-2	4.0	7.0	37	µg/kg
PSB-14	MAAFPSB-14-1	0.5	1.3	51	µg/kg
PSB-14	MAAFPSB-14-6	4.0	7.0	21	µg/kg

Notes:

µg/kg - micrograms per kilogram

Source:

Post-Pilot Soils (LBA, 1996a)

Table 3-13
Positive TPH Detections in Post-Pilot Study Soil Borings
March/April 1996
FFTA-MAAF Remedial Investigation Report

Site ID	Sample ID	Depth From (ft)	Depth To (ft)	Concentration	Units
TPH-DRO					
PSB-13	MAAFPSB-13-5	15.0	15.5	500000	µg/kg
PSB-13	MAAFPSB-13-4	13.0	14.5	160000	µg/kg
PSB-14	MAAFPSB-14-1	0.5	1.3	16000	µg/kg
PSB-15	MAAFPSB-15-4	12.7	13.3	750000	µg/kg
PSB-15	MAAFPSB-15-3	10.0	11.2	180000	µg/kg
PSB-16	MAAFPSB-16-5	16.5	17.5	1400000	µg/kg
PSB-16	MAAFPSB-16-4	13.0	14.6	84000	µg/kg
PSB-16	MAAFPSB-16-3	10.0	12.0	11000	µg/kg
PSB-17	MAAFPSB-17-1	0.5	1.0	13000	µg/kg
PSB-2	MAAFPSB-2-5	14.8	15.6	33000	µg/kg
PSB-22	MAAFPSB-22-1	0.5	1.0	13000	µg/kg
PSB-23	MAAFPSB-23-1	0.6	1.0	11000	µg/kg
PSB-24	MAAFPSB-24-1	0.5	1.0	16000	µg/kg
PSB-25	MAAFPSB-25-1	0.5	1.0	27000	µg/kg
PSB-27	MAAFPSB-27-1	0.5	1.0	10000	µg/kg
PSB-29	MAAFPSB-29-5	15.8	17.0	1500000	µg/kg
PSB-3	MAAFPSB-3-5	15.4	16.4	5900	µg/kg
PSB-30	MAAFPSB-30-5	15.5	16.5	700000	µg/kg
PSB-30	MAAFPSB-30-1	0.5	1.0	8700	µg/kg
PSB-30	MAAFPSB-30-4	13.0	14.5	1200000	µg/kg
PSB-30	MAAFPSB-30-3	10.5	12.0	77000	µg/kg
PSB-31	MAAFPSB-31-4	13.0	14.8	15000	µg/kg
PSB-31	MAAFPSB-31-1	0.5	1.0	14000	µg/kg
SB-31+A	MAAFPSB-31-5	14.8	15.7	2900000	µg/kg
PSB-32	MAAFPSB-32-4	13.0	14.6	190000	µg/kg
PSB-32	MAAFPSB-32-5	16.0	16.8	1000000	µg/kg
PSB-34	MAAFPSB-34-1	0.9	1.4	8700	µg/kg
PSB-36	MAAFPSB-36-2	4.0	7.0	9200	µg/kg
PSB-38	MAAFPSB-38-2	4.0	7.0	6100	µg/kg
PSB-39	MAAFPSB-39-4	14.2	15.0	40000	µg/kg
PSB-4	MAAFPSB-4-5	14.8	15.8	2600000	µg/kg
PSB-4	MAAFPSB-4-4	12.6	13.1	2700000	µg/kg
PSB-4	MAAFPSB-4-1	1.0	3.0	6200000	µg/kg
PSB-4	MAAFPSB-4-2	4.2	6.0	21000000	µg/kg
PSB-4	MAAFPSB-4-3	10.0	11.8	5300000	µg/kg
PSB-40	MAAFPSB-40-1	0.5	1.0	6200	µg/kg
PSB-41	MAAFPSB-41-1	0.5	1.0	10000	µg/kg
PSB-42	MAAFPSB-42-1	0.5	1.0	13000	µg/kg
PSB-43	MAAFPSB-43-1	0.5	1.0	7300	µg/kg

Table 3-13 (continued)
Positive VOC Detections in Post-Pilot Study Soil Borings
March/April 1996
FFTA-MAAF Remedial Investigation Report

Site ID	Sample ID	Depth From (ft)	Depth To (ft)	Concentration	Units
TPH-DRO					
PSB-44	MAAFPSB-44-4	12.8	14.8	1100000	µg/kg
PSB-44	MAAFPSB-44-1	0.5	1.0	130000	µg/kg
PSB-44	MAAFPSB-44-5	15.7	16.7	1800000	µg/kg
PSB-47	MAAFPSB-47-1	0.5	1.0	1100000	µg/kg
PSB-5	MAAFPSB-5-5	15.3	16.3	1200000	µg/kg
PSB-5	MAAFPSB-5-4	12.5	13.0	2300000	µg/kg
PSB-5	MAAFPSB-5-3	10.0	12.0	11000000	µg/kg
PSB-5	MAAFPSB-5-2	4.1	6.0	7700	µg/kg
PSB-5	MAAFPSB-5-1	1.0	3.0	15000	µg/kg
PSB-7	MAAFPSB-7-4	12.5	14.0	5300	µg/kg
PSB-7	MAAFPSB-7-5	15.3	16.3	850000	µg/kg
PSB-8	MAAFPSB-8-6	3.9	6.1	10000	µg/kg
TPH-GRO					
PSB-13	MAAFPSB-13-5	15.0	15.5	37000	µg/kg
PSB-14	MAAFPSB-14-5	15.7	16.4	140	µg/kg
PSB-15	MAAFPSB-15-3	10.0	11.2	4900	µg/kg
PSB-15	MAAFPSB-15-4	12.7	13.3	89000	µg/kg
PSB-16	MAAFPSB-16-5	16.5	17.5	96000	µg/kg
PSB-16	MAAFPSB-16-4	13.0	14.6	410	µg/kg
PSB-28	MAAFPSB-28-2	4.4	7.0	116	µg/kg
PSB-29	MAAFPSB-29-5	15.8	17.0	92000	µg/kg
PSB-30	MAAFPSB-30-5	15.5	16.5	73000	µg/kg
PSB-30	MAAFPSB-30-4	13.0	14.5	87000	µg/kg
PSB-31	MAAFPSB-31-5	14.8	15.7	70000	µg/kg
PSB-32	MAAFPSB-32-5	16.0	16.8	19000	µg/kg
PSB-4	MAAFPSB-4-3	10.0	11.8	340000	µg/kg
PSB-4	MAAFPSB-4-2	4.2	6.0	2500000	µg/kg
PSB-4	MAAFPSB-4-4	12.6	13.1	100000	µg/kg
PSB-4	MAAFPSB-4-1	1.0	3.0	240000	µg/kg
PSB-4	MAAFPSB-4-5	14.8	15.8	97000	µg/kg
PSB-44	MAAFPSB-44-5	15.7	16.7	55000	µg/kg
PSB-44	MAAFPSB-44-4	12.8	14.8	34000	µg/kg
PSB-5	MAAFPSB-5-5	15.3	16.3	740000	µg/kg
PSB-5	MAAFPSB-5-4	12.5	13.0	210000	µg/kg
PSB-5	MAAFPSB-5-3	10.0	12.0	2800000	µg/kg
PSB-7	MAAFPSB-7-5	15.3	16.3	230000	µg/kg

Notes:

µg/kg - micrograms per kilogram

TPH-DRO - Total Petroleum Hydrocarbons - Diesel Range Organics

TPH-GRO - Total Petroleum Hydrocarbons - Gasoline Range Organics

Source:

Post-Pilot Soils (LBA, 1996a)

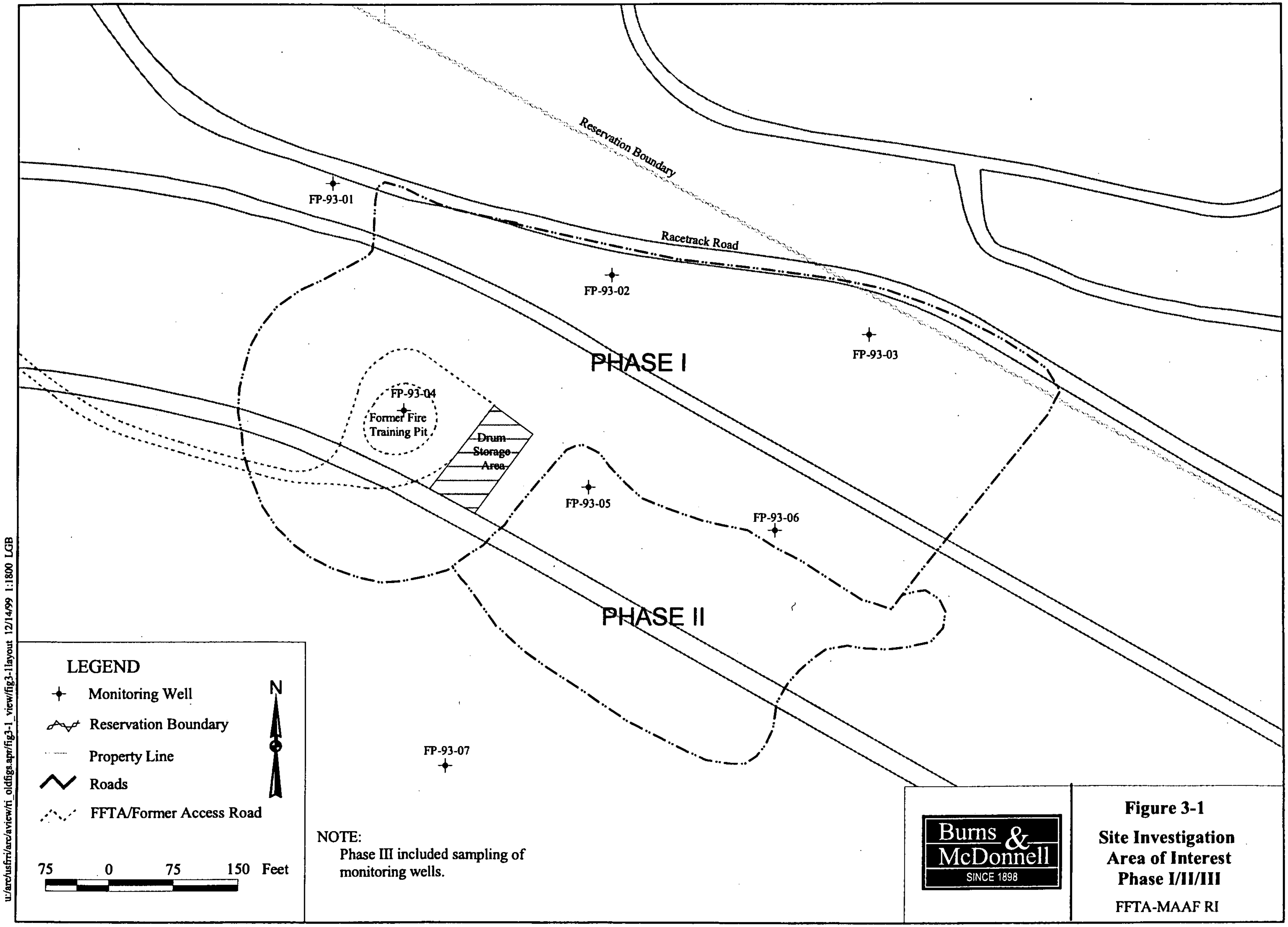

Figure 3-1
Site Investigation Area of Interest Phase I/II/III
FFTA-MAAF RI

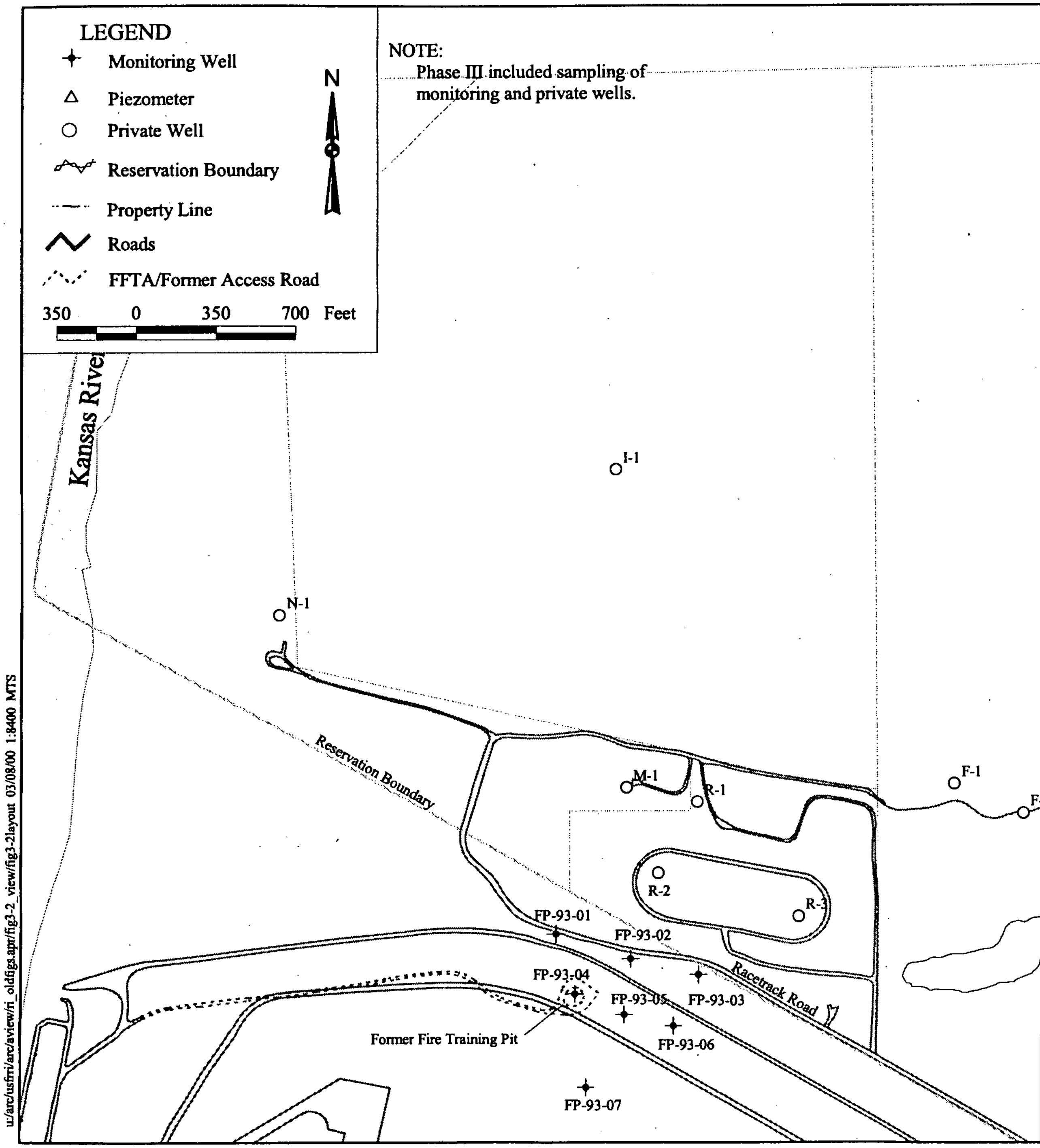

Figure 3-2

SI Groundwater Sampling Locations Phase I/II/III

FFTA-MAAF RI

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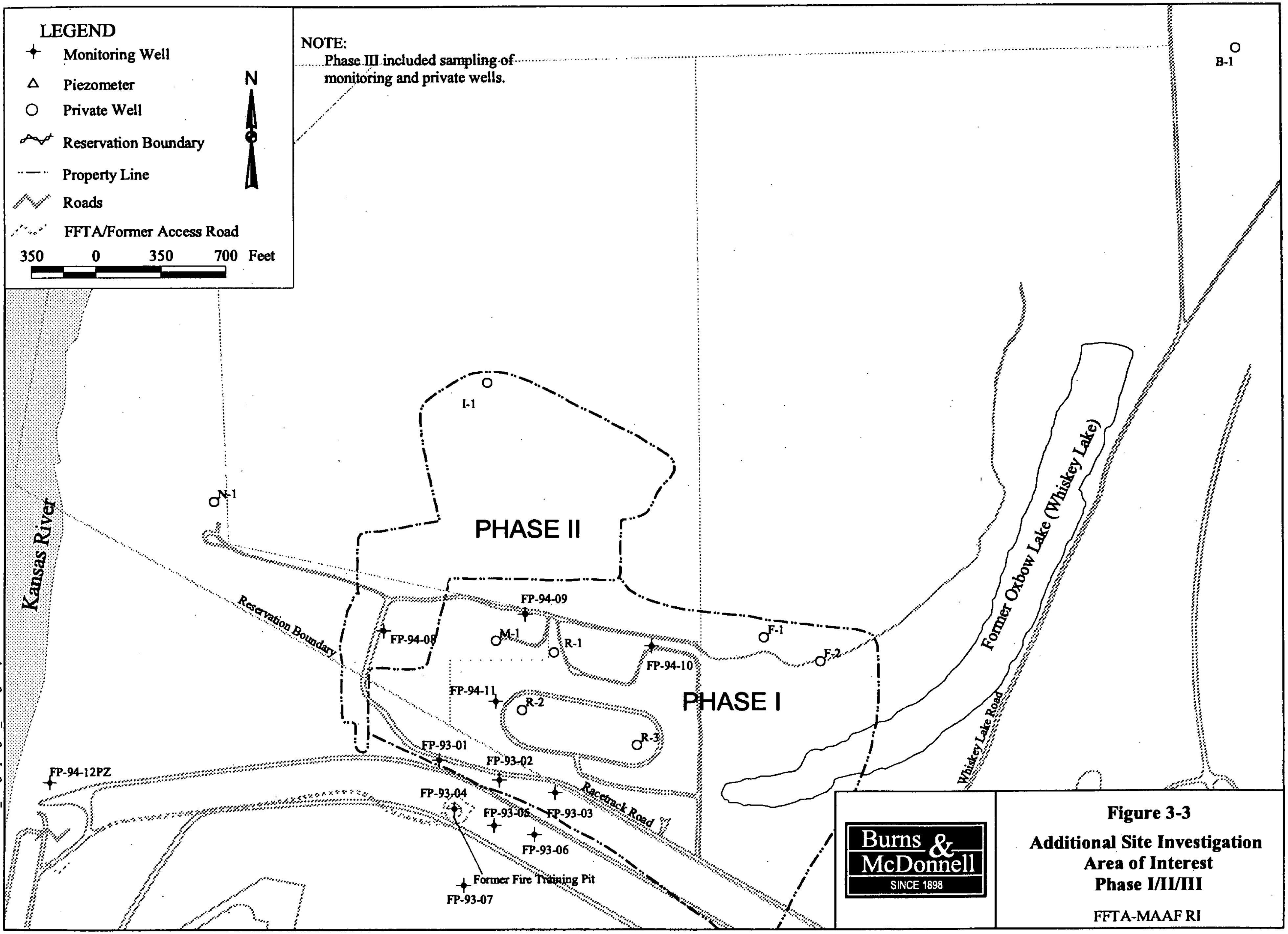

Figure 3-3
Additional Site Investigation Area of Interest Phase I/II/III

FFTA-MAAF RI

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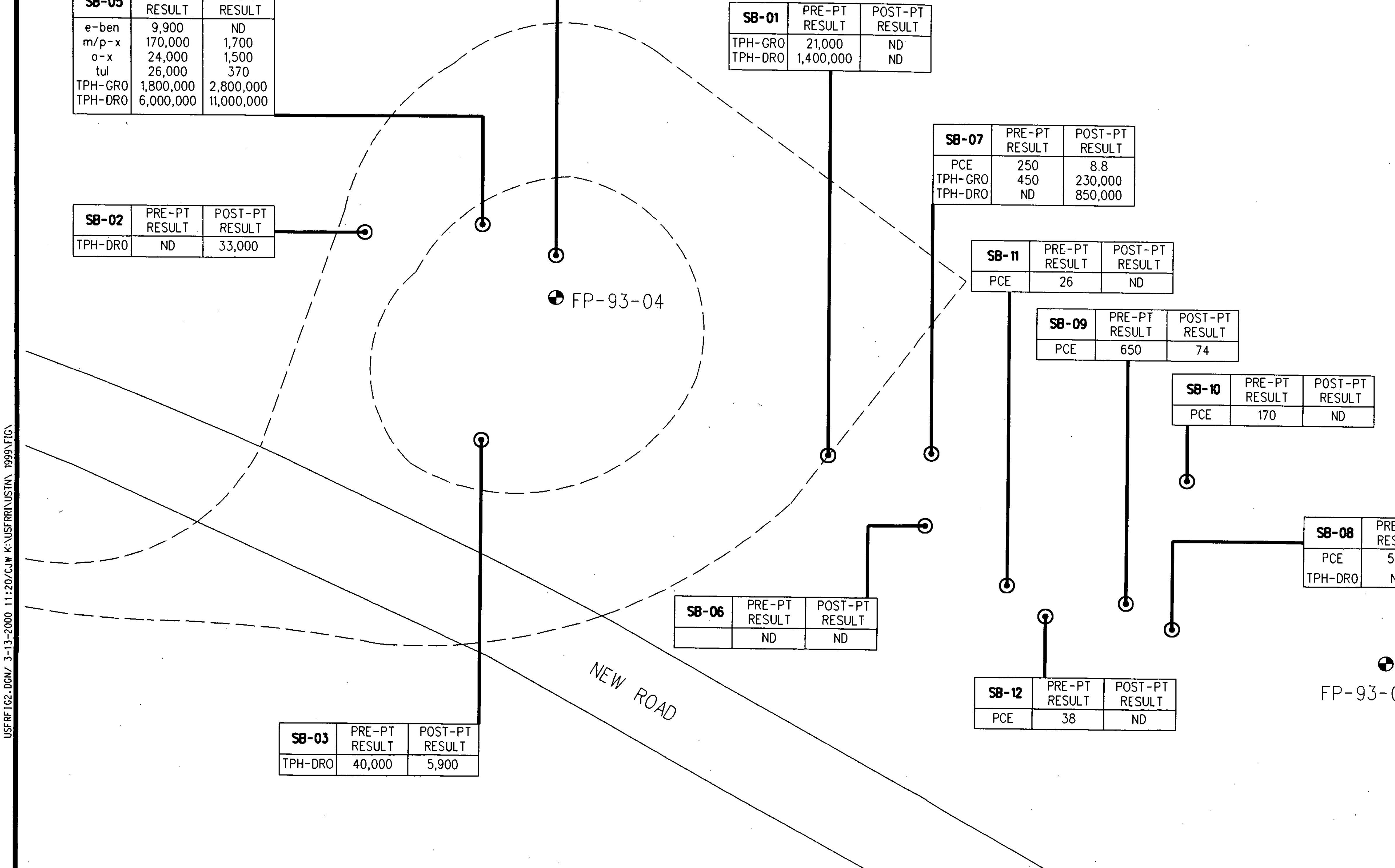


SB-04	PRE-PT RESULT	POST-PT RESULT
PCE	170	100
TCE	8.6	ND
1,2-DCEb	23,000	ND
ben	1,400	ND
e-ben	19,000	15,000
m/p-x	160,000	37,000
o-x	33,000	27,000
tul	180,000	63,000
TPH-GRO	2,600,000	2,500,000
TPH-DRO	23,000,000	21,000,000

SB-05	PRE-PT RESULT	POST-PT RESULT
e-ben	9,900	ND
m/p-x	170,000	1,700
o-x	24,000	1,500
tul	26,000	370
TPH-GRO	1,800,000	2,800,000
TPH-DRO	6,000,000	11,000,000

SB-01	PRE-PT RESULT	POST-PT RESULT
TPH-GRO	21,000	ND
TPH-DRO	1,400,000	ND

SB-07	PRE-PT RESULT	POST-PT RESULT
PCE	250	8.8
TPH-GRO	450	230,000
TPH-DRO	ND	850,000

SB-02	PRE-PT RESULT	POST-PT RESULT
TPH-DRO	ND	33,000

SB-11	PRE-PT RESULT	POST-PT RESULT
PCE	26	ND

SB-09	PRE-PT RESULT	POST-PT RESULT
PCE	650	74

SB-10	PRE-PT RESULT	POST-PT RESULT
PCE	170	ND

SB-08	PRE-PT RESULT	POST-PT RESULT
PCE	560	63
TPH-DRO	ND	10,000

SB-06	PRE-PT RESULT	POST-PT RESULT
	ND	ND

SB-12	PRE-PT RESULT	POST-PT RESULT
PCE	38	ND

SB-03	PRE-PT RESULT	POST-PT RESULT
TPH-DRO	40,000	5,900

LEGEND

- EXISTING GROUNDWATER MONITORING WELL
- PILOT STUDY SOIL BORING
- ROAD
- FORMER FEATURE

PCE	Tetrachloroethene
PT	PILOT TEST
TCE	Trichloroethene
1,2-DCE	1,2-Dichloroethene
ben	Benzene
e-ben	Ethylbenzene
m/p-x	m/p-Xylenes
o-x	o-Xylenes
tol	Toluene
TPH-GRO	Total Petroleum Hydrocarbons Gasoline Range Organics
TPH-DRO	Total Petroleum Hydrocarbons Diesel Range Organics
ND	NO DETECTION

NOTES:

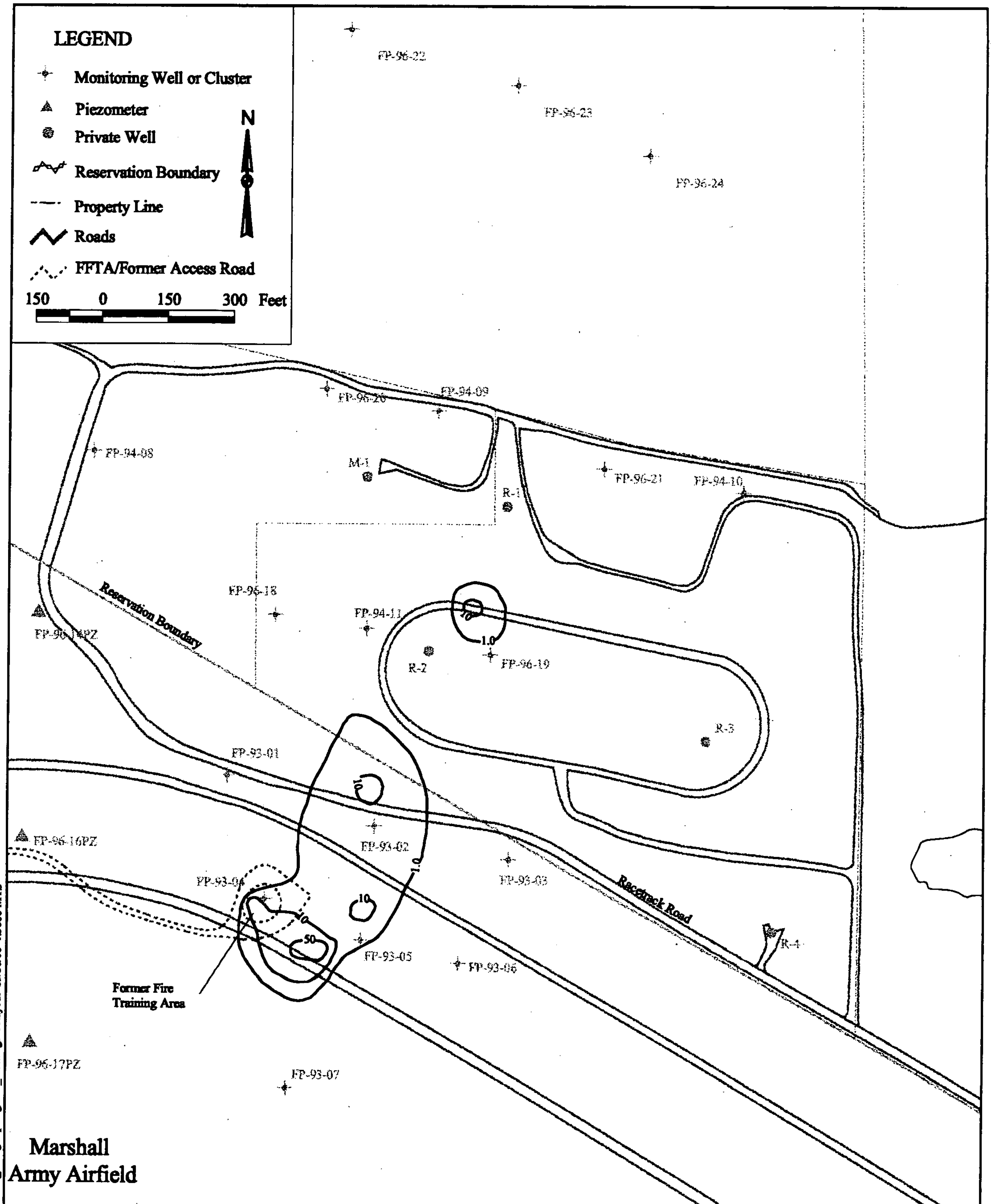
1. SOIL BORING LOCATIONS DEPICTED ON THIS FIGURE WERE USED FOR PILOT STUDY ACTIVITIES AND SHOULD NOT BE CONFUSED WITH ESI PHASE II SOIL BORING LOCATIONS.
2. REPORTED CONCENTRATIONS REPRESENT THE MAXIMUM DETECTION OF ALL SAMPLED INTERVALS.
3. CONCENTRATION ug/Kg.

Burns & McDonnell SINCE 1898

Figure 3-4
Pre/Post Pilot Test Soil Results

FFTA-MAAF RI

USFRFIG2.DGN/ 3-13-2000 11:20/CJW K:\USFRRI\USTN\ 1999\FIG\

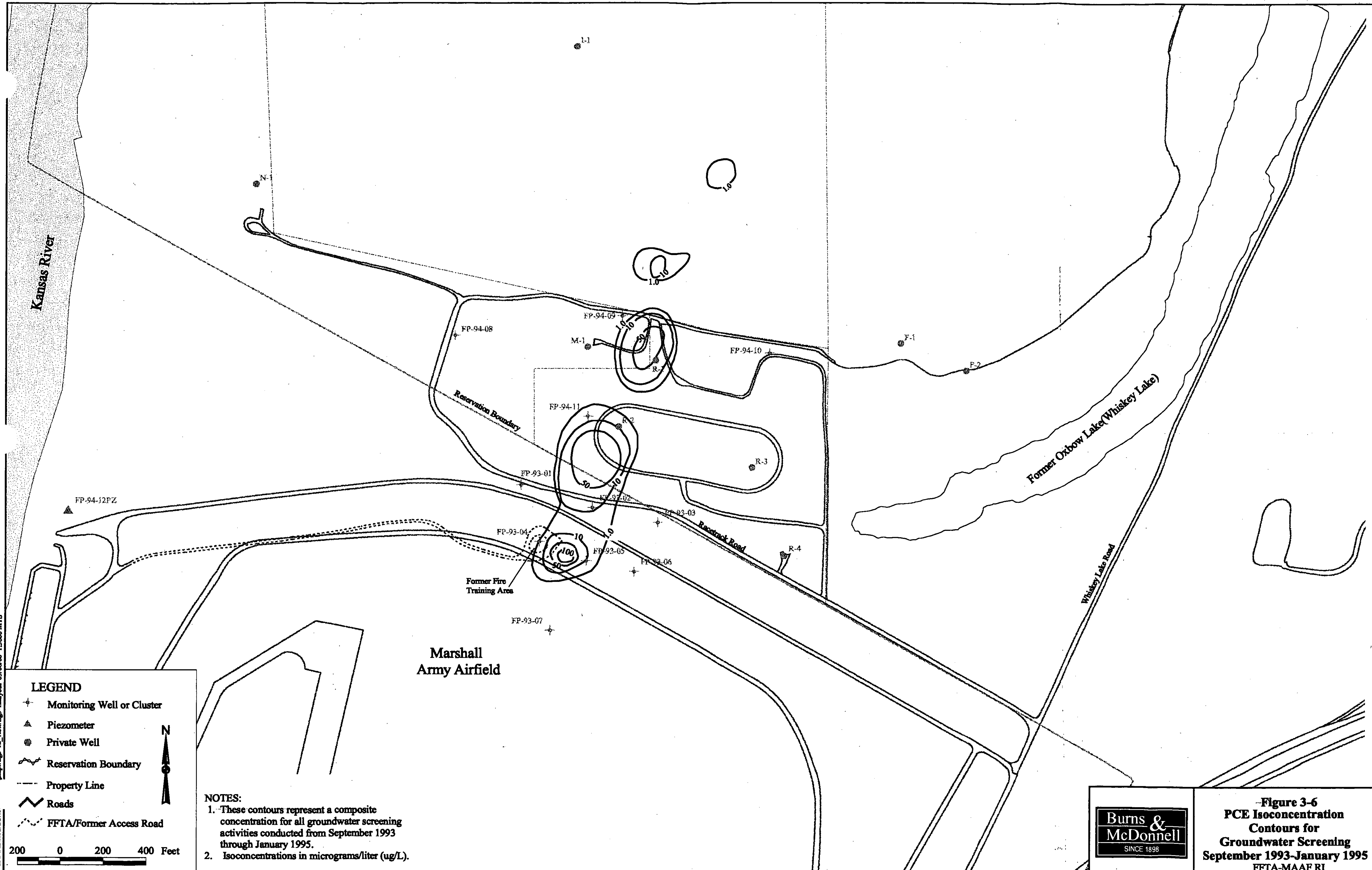


NOTE:
Isoconcentration in micrograms/liter (ug/L).

Burns & McDonnell
SINCE 1898

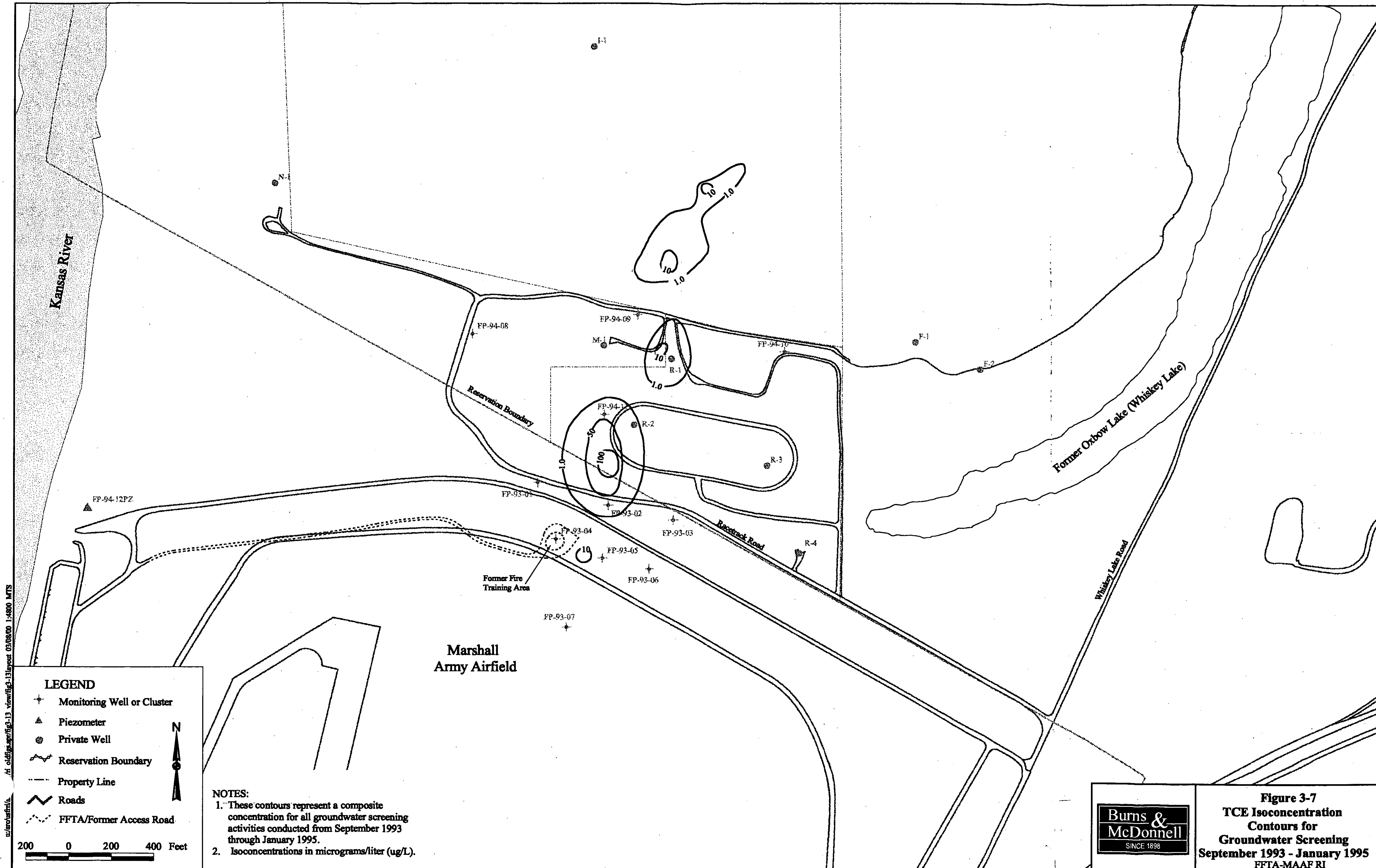
Figure 3-5
Total Chlorinated VOC Concentrations in 4-Foot Soil-Gas Samples September 1993-June1994
FFTA-MAAF RI

u/arc/usfrd/arc/avlew/ri_oldfigs.apr/fig3-11_view/fig3-11layout 03/08/00 1:3600 MTS



NOTES:
1. These contours represent a composite concentration for all groundwater screening activities conducted from September 1993 through January 1995.
2. Isoconcentrations in micrograms/liter (ug/L).

Figure 3-6
PCE Isoconcentration Contours for Groundwater Screening September 1993-January 1995
FFTA-MAAF RI



NOTES:
1. These contours represent a composite concentration for all groundwater screening activities conducted from September 1993 through January 1995.
2. Isoconcentrations in micrograms/liter (ug/L).

Figure 3-7
TCE Isoconcentration Contours for Groundwater Screening September 1993 - January 1995
FFTA-MAAF RI

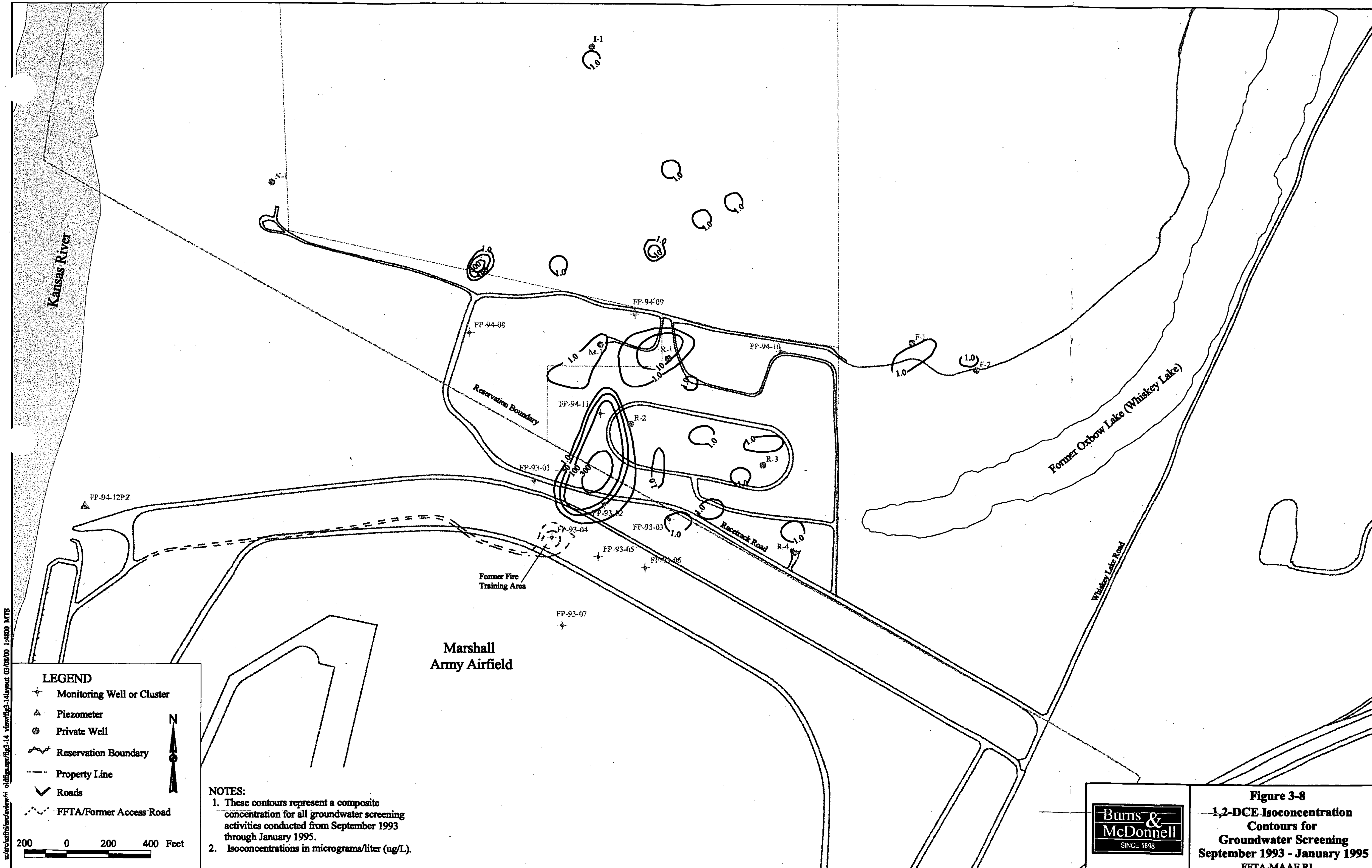
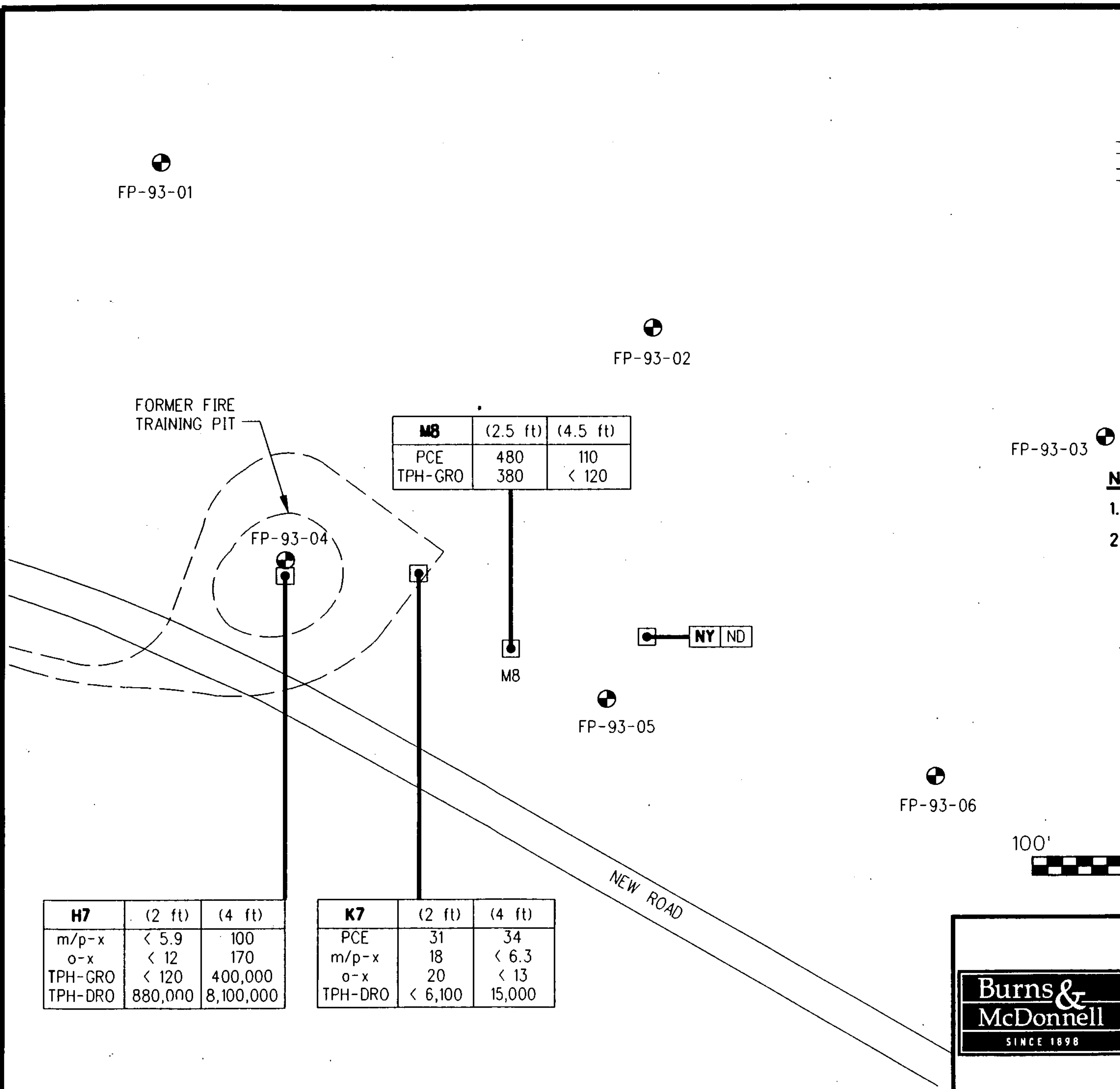


Figure 3-8
1,2-DCE Isoconcentration Contours for Groundwater Screening September 1993 - January 1995
FFTA-MAAF RI

K:*USFRRI*USTN' ?EF*USFMAAP.DGN() OFF=28,32,40-41,60,62
K:*USFRRI*USTN .EF*BDR8X11.DGN() OFF=61

USFRFIG1.DGN/ 3-13-2000 11:00/CJW K:\USFRRI\USTN\ 1999\FIG\



M8	(2.5 ft)	(4.5 ft)
PCE	480	110
TPH-GRO	380	< 120

H7	(2 ft)	(4 ft)
m/p-x	< 5.9	100
o-x	< 12	170
TPH-GRO	< 120	400,000
TPH-DRO	880,000	8,100,000

K7	(2 ft)	(4 ft)
PCE	31	34
m/p-x	18	< 6.3
o-x	20	< 13
TPH-DRO	< 6,100	15,000

LEGEND

(well symbol)	GROUNDWATER MONITORING WELL
(box symbol)	SOIL SAMPLING LOCATION
(solid lines)	ROAD
(dashed lines)	FORMER FEATURE
PCE	Tetrachloroethene
m/p-x	m,p-Xylene
o-x	o-Xylene
TPH-GRO	Total Petroleum Hydrocarbons-Gasoline Range Organics
TPH-DRO	Total Petroleum Hydrocarbons-Diesel Range Organics
ND	No Detections

NOTES:

1. CONCENTRATIONS IN ug/kg.
2. AT LOCATION NY THERE WERE NO DETECTIONS ABOVE METHOD DETECTION LIMIT.

Burns & McDonnell SINCE 1898

Figure 3-9
Soil Sample Locations And Results
SI Phase I/II
FFTA-MAAF RI

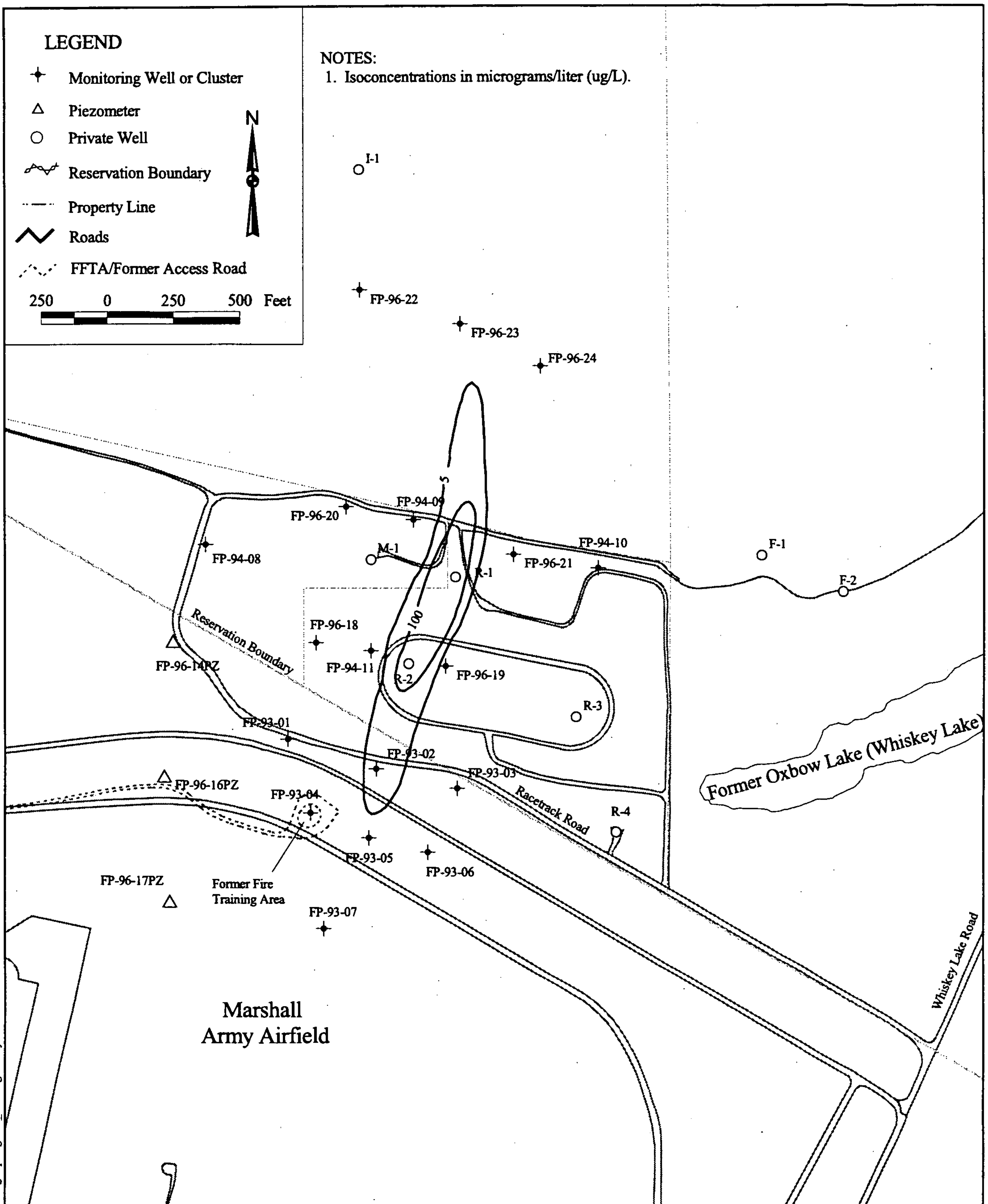


Figure 3-10

PCE Isoconcentration Contours for Groundwater May 1996

FFTA-MAAF RI

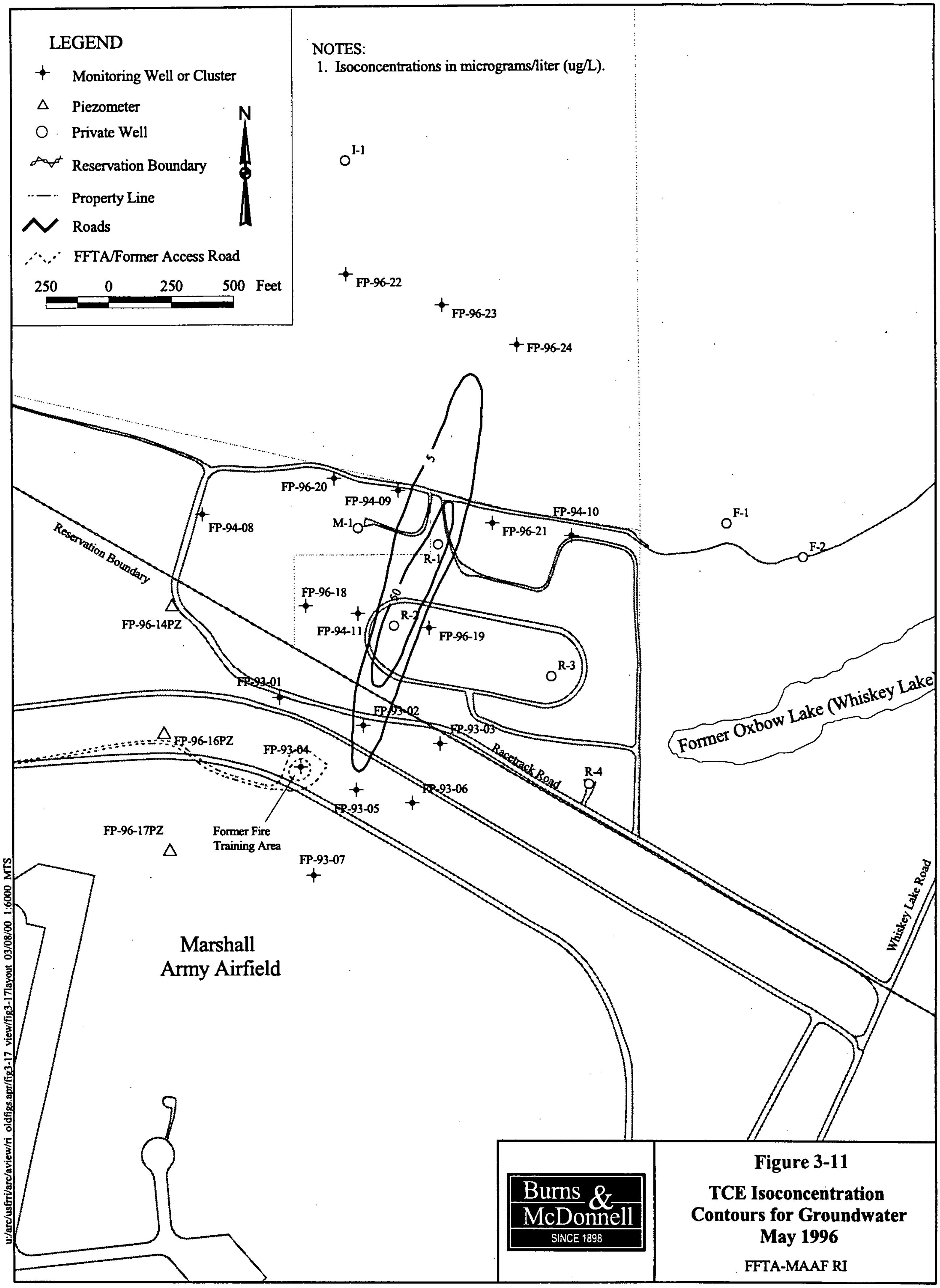


Figure 3-11

TCE Isoconcentration Contours for Groundwater May 1996

FFTA-MAAF RI

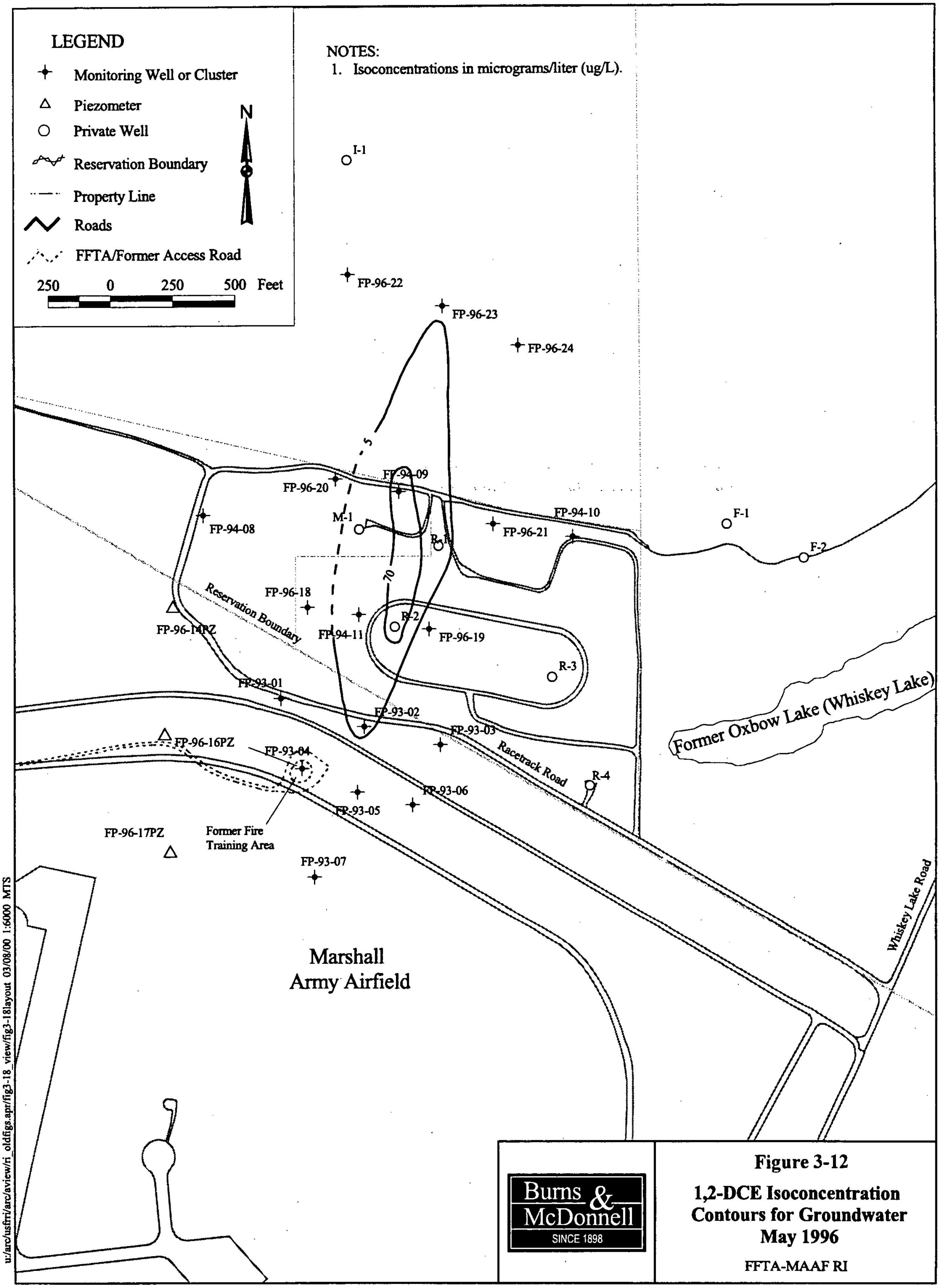


Figure 3-12

1,2-DCE Isoconcentration Contours for Groundwater May 1996

FFTA-MAAF RI

4.0 REMEDIAL INVESTIGATION FIELD ACTIVITIES

This section summarizes the field activities conducted after preparation of the *Remedial Investigation/Feasibility Study Workplan for the Former Fire Training Area of Marshall Army Airfield Fort Riley, Kansas (BMcD, 1998k) [RI/FS WP].* The RI field activities were conducted per the specific procedures and guidelines outlined in the following documents along with any activity-specific documents prepared:

- *Draft Final (Revised) Sampling and Analysis Plan for Environmental Investigations at Fort Riley, Kansas* (BMcD, 1998e) [*Site-Wide SAP*]
  - *Volume I - Field Sampling Plan* [*Site-Wide FSP*]
  - *Volume II - Quality Assurance Project Plan* [*Site-Wide QAPP*]
- *Draft Final (Revised) Monitoring Well Installation Plan for Environmental Investigations at Fort Riley, Kansas* (BMcD, 1998f) [*Site-Wide MWIP*]
- *Draft Final (Revised) Site Safety and Health Plan for the Environmental Investigations at Fort Riley, Kansas* (BMcD, 1998g) [*Site-Wide SSHP*]
- *Site-Wide Quality Control Plan for Environmental Studies and Investigations at Fort Riley, Kansas* (BMcD, 1998c) [*Site-Wide QC Plan*]

4.1 GROUNDWATER INVESTIGATIONS

This section summarizes the field activities conducted after preparation of the *RI/FS WP* to further define the nature and extent of contamination in the groundwater at the Site. These activities included installation of additional monitoring wells at the Site, a plume characterization study, groundwater monitoring activities, collection of groundwater elevations, a tracer study, and a microcosm study. These activities began in August of 1996.

4.1.1 Monitoring Well Installation

4.1.1.1 Purpose

During the investigations and monitoring activities conducted at the Site, it has been necessary on more than one occasion to install additional monitoring wells to further aid in the horizontal and vertical groundwater plume definition.

4.1.1.2 Approach

To determine the extent of the groundwater contamination at the Site, the following monitoring wells were installed at the Site as part of the RI field efforts:

- FP-96-09b, FP-96-09c (installed by LBA)
- FP-96-20b, FP-96-20c (installed by LBA)
- FP-96-23b, FP-96-23c (installed by LBA)
- FP-96-25, FP-96-25b, FP-96-25c (installed by BMcD)
- FP-96-26, FP-96-26b, FP-96-26c (installed by BMcD)
- FP-98-27, FP-98-27b, FP-98-27c (installed by BMcD)
- FP-98-28, FP-98-28b, FP-98-28c (installed by BMcD)
- FP-98-29, FP-98-29b, FP-98-29c (installed by BMcD)
- FP-98-30, FP-98-30b, FP-98-30c (installed by BMcD)

- FP-98-31, FP-98-31b, FP-98-31c (installed by BMcD)
- FP-99-32, FP-99-32b, FP-99-32c (installed by BMcD)
- FP-99-39PZ (installed by BMcD)
- FP-99-40PZ (installed by BMcD)

A summary of well construction information for these wells is provided on Table 2-1. All boring logs and well construction diagrams are provided in Appendix 2A. In addition, Figure 1-1 depicts the locations of all wells installed at the Site.

Monitoring wells were installed in the intermediate and deep portions of the plume at locations FP-96-09, FP-96-20, and FP-96-23 for monitoring the vertical extent of the groundwater plume in these areas. Monitoring Well Clusters FP-96-25 and FP-96-26 replaced the racetrack private Wells R-2 and R-1, respectively, for groundwater monitoring purposes. These monitoring wells also aided in definition of vertical extent of the groundwater plume in this area. Monitoring Well Clusters FP-98-27 through FP-98-32 were installed based upon results of groundwater screening activities performed in the downgradient portion of the plume (described further in Section 4.1.2). Piezometers FP-99-39PZ and FP-99-40PZ were installed to monitor groundwater levels in the vicinity of the groundwater plume and the Kansas River.

Soil was sampled during installation of selected monitoring wells for geotechnical analysis, and for analysis of VOCs, TOC, and cation exchange capacity (CEC).

4.1.1.3 Results

As of December 1999, there were 55 monitoring wells (at 26 locations), eight piezometers, and ten private wells at the Site. Of the 55 monitoring wells, 15 were deep wells screened near the bedrock surface (approximately 60 feet bgs), 14 were screened in the intermediate portion of the aquifer (approximately 35 to 45 feet bgs), and 26 were shallow wells with screened intervals intersecting, or near, the groundwater surface (approximately 20 to 25 feet bgs). All piezometers at the Site were screened in the shallow portion of the aquifer.

4.1.1.3.1 1996 Monitoring Well Installation Activities

The objectives of the 1996 monitoring well installation activities were: 1) establish monitoring wells at multiple depths of the aquifer as close as possible to the center of the area of contamination, 2) bound the area of contamination on the eastern and western sides, 3) assess the downgradient vertical extent of alluvial contamination, and 4) obtain geotechnical data related to aquifer characteristics. The results of these activities are summarized in detail in the *Summary Report for Additional Monitoring Wells and Geotechnical Sampling* (LBA, 1997).

Intermediate and deep wells were added to the shallow well for Monitoring Wells FP-94-09, FP-FP-96-20, and FP-96-23 to provide additional vertical characterization of the groundwater contaminant plume.

Wells R-1 and R-2 were shut down by the property owner, therefore samples could not be collected during the winter months, resulting in impaired comparability of their data with other Site monitoring well data. Replacement of these wells with monitoring wells that conformed to standards for groundwater monitoring wells improved the data quality from these important locations within the contaminant plume, resulting in improved ability to predict contaminant fate and transport. Also, installation of three-well cluster monitoring wells at these locations aided in the delineation of the vertical extent of the plume in the area.

During drilling and installation of new deep wells FP-96-20c, FP-96-23c, and FP-96-26c, soil samples for geotechnical and/or contaminant analysis were collected at depths corresponding to the approximate screened intervals of well clusters. In Monitoring Wells FP-96-20c, FP-96-23c, and FP-96-26c, samples were collected at 20, 25, 30, 35, 45, and 65 feet bgs for the geotechnical parameters listed below:

- Grain size analysis (American Society of Testing Materials [ASTM] 422)
- Specific gravity (ASTM 854)
- Moisture content (ASTM 2216)
- TOC (SW-846 Method 9060)
- CEC (SW-846 Method 9081)

Results for this geotechnical sampling are provided on Table 4-1. Sieve analysis resulted in Unified Soil Classification System (USCS) classifications for the soil samples of either poorly-graded or well-graded sand. The TOC results were high, ranging from 1,220 to 43,100 mg/kg. An important trend in the TOC that was evident from this sampling was that TOC increased with depth in all of the samples. Finally, CEC ranged from 0.6 to 3.7 milliequivalents per 100 grams (meq/100g).

During installation of Monitoring Wells FP-96-25c and FP-96-26c, soil samples were collected for VOC analysis at 5 and 10 feet bgs and 5, 10, and 15 feet bgs, respectively. There were no detections of VOCs in these soil samples collected from the vadose zone.

4.1.1.3.2 1998 Monitoring Well Installation Activities

Five new monitoring well clusters (FP-98-27 through FP-98-31) were installed and developed between May 5 and June 18, 1998 based on findings from the March/April 1998 Groundwater Screening Survey which defined the groundwater plume between Monitoring Well FP-96-23 and the Kansas River (described in detail in Section 4.1.2). All boring logs and monitoring well installation diagrams are included in Appendix 2A of this report. Two monitoring well clusters (FP-98-28 and FP-98-30) were installed outside the eastern and western edges of the plume as defined by groundwater screening results. The remaining three clusters (FP-98-27, FP-98-29, and FP-98-31) were installed along the linear axis of the plume based upon positive results from the groundwater screening. Well locations are provided on Figure 4-2.

Soil samples were collected from Monitoring Wells FP-98-27c and FP-98-28c during drilling and analyzed for TOC, CEC, grain size, specific gravity, and moisture content. A total of twenty-seven geotechnical soil samples were collected during drilling activities and analyzed for moisture content, grain size distribution, and specific gravity. Results of the soil sampling activities are discussed in further detail in Section 4.1.2.

4.1.1.3.3 1999 Monitoring Well Installation Activities

In February 1999 two piezometers, FP-99-39PZ and FP-99-40PZ were installed on private property to the north of MAAF. The piezometers were installed to monitor groundwater levels in the vicinity of the groundwater plume and the Kansas River. Construction diagrams for these two piezometers are included in Appendix 2A. Well locations are provided on Figure 4-2.

Based on the results of groundwater screening activities conducted in the summer of 1998 and confirmed in the summer of 1999 (see Section 4.1.2), one new Monitoring Well Cluster (FP-99-32) was installed between Location B-10d and the Kansas River during the week of August 23, 1999 and developed on August 31, 1999 (Figure 4-2). Drilling logs and well development forms for the new well cluster are provided in Appendix 2A.

4.1.2 Plume Characterization

4.1.2.1 Purpose

In March through June 1998, BMcD conducted a plume characterization study to determine the vertical and horizontal extent of groundwater contamination at the downgradient edge of the chlorinated solvent plume at the Site. A complete description of field activities and analytical results for the plume characterization is provided in the *Data Summary Report for May/June 1998 Groundwater Sampling Event for the FFTA-MAAF* (BMcD, 1998j) [*May/June 1998 DSR*].

4.1.2.2 Approach

Previous investigations at the Site resulted in defining an area of groundwater contamination that extended north of the reservation boundary and the farthest downgradient well cluster, FP-96-23. Prior to conducting the field work, an estimate of the extent of the plume was determined to establish an area where direct-push activity would begin (refer to the *Draft Final Technical Memorandum Work Plan for the Plume Characterization at the FFTA-MAAF* [BMcD, 1998] for further details). The contaminant fate and transport model previously developed in the *RI/FS Work Plan* was used to initially estimate the extent of the plume. The results from the model predicted that maximum concentrations at each receptor location (Wells M-1, I-1, R-1, and R-2) have already been reached (as of May, 1996) and will decrease over time. This is consistent with the analytical results reported for these wells since 1996. The model also predicted that PCE will reach the Kansas River in 2031 at a concentration of 96 µg/L (assuming no degradation). This prediction is extremely unlikely since the current maximum PCE concentration anywhere in the plume is approximately 15 µg/L. The width of the PCE plume reaching the river was predicted to be 2,000 feet wide. This is also extremely unlikely since the current plume is approximately 400 feet wide and does not appear to be expanding.

The success of this model was inhibited by several factors. One of the limitations was that the model available at the time (AT123D) was not capable of accounting for sequential decay of chlorinated solvents. In other words, decreases in PCE did not result in increases in TCE or cis-1,2-DCE. Another limitation was that the modeling effort was only able to simulate two-dimensional transport, since limited data were available for the vertical extent of the plume. In addition, since the northern extent of the plume was only defined downgradient to Well FP-94-09, the results of this modeling effort were severely overestimated.

To determine the extent of the groundwater contamination at the Site, the following field activities were performed:

- Groundwater screening using direct-push equipment and on-site field GC/MS (gas chromatograph/mass spectrometer) analyses.
- Installation of five monitoring well clusters in 1998 and one monitoring well cluster in 1999 to monitor horizontal and vertical extent and to identify the leading edge of the plume.
- Collection of soil samples for geotechnical, TOC, and CEC analyses during drilling activities at Monitoring Wells FP-98-27c and FP-98-28c.
- Topographic and aerial surveying of all direct-push and monitoring well locations.
- Groundwater sampling for VOCs at the new monitoring well clusters.

4.1.2.3 Results

4.1.2.3.1 Groundwater Screening

The groundwater screening samples were collected from March 3 to March 7, 1998 and April 13 to April 16, 1998. Direct-push equipment was used to collect the groundwater samples at 36 locations, as shown on Figure 4-1, and three different aquifer depths at each location. The aquifer depths coincided with the approximate depths of the existing monitoring well clusters at the Site. Groundwater samples were analyzed in the field for targeted VOCs using a GC/MS. The targeted VOCs included PCE, TCE, cis-1,2-DCE, and Vinyl Chloride (VC). Samples were also collected from existing Monitoring Wells FP-96-22, FP-96-23b, and FP-96-24 and Well I-1 and analyzed on-Site to supplement the direct-push survey.

The results of the groundwater screening activities are provided in Table 4-2. Detections were most prevalent in the deep and intermediate zones of the groundwater aquifer. VC was not detected in any of the groundwater screening samples.

<u>Shallow Zone</u>

PCE was not detected in the shallow groundwater screening samples. TCE was detected in only one shallow zone sample collected from Monitoring Well FP-96-24 and contained a reported concentration of 2.1 µg/L. Cis-1,2-DCE was detected in three shallow zone samples ranging in concentration from 0.2 µg/L in Probehole B10 to 3.3 µg/L in Monitoring Well FP-96-24. None of these detections exceeded their respective MCLs.

<u>Intermediate Zone</u>

PCE was detected in 13 intermediate zone screening samples ranging in concentration from 0.3 µg/L to 7.0 µg/L. The samples collected from Probeholes B24 and B31 exceeded the MCL for PCE of 5 µg/L. TCE was detected in 16 intermediate zone samples ranging in concentration from 0.2 µg/L to 7.0 µg/L. The samples collected from Probeholes B22 and B9a and Monitoring Well FP-96-23b exceeded the MCL for TCE of 5 µg/L. Cis-1,2-DCE was detected in 20 intermediate zone samples ranging in concentration from 0.5 µg/L to 277 µg/L. The sample collected from Monitoring Well FP-96-23b exceeded the MCL for cis-1,2-DCE of 70 µg/L.

<u>Deep Zone</u>

PCE was detected in 11 deep zone screening samples with concentrations ranging from 0.3 µg/L to 7.5 µg/L. The sample collected from Probehole B18 exceeded the MCL for PCE of 5 µg/L. TCE was detected in 13 deep zone samples ranging in concentration from 0.3 µg/L to 6.8 µg/L. The sample collected from Probehole B2 exceeded the MCL for TCE of 5 µg/L. Cis-1,2-DCE was detected in 16 deep zone samples ranging in concentration from 0.3 µg/L to 54.8 µg/L. None of the samples exceeded the MCL for cis-1,2-DCE of 70 µg/L.

4.1.2.3.2 Monitoring Well Installation

The placement of the monitoring well clusters was based on field analytical results from the direct-push groundwater screening activity. The 1998 well installation activities consisted of two clusters located laterally (east and west) outside of the plume (Monitoring Well Clusters FP-98-28 and FP-98-30) and three well clusters along the longitudinal axis (parallel to groundwater flow direction) inside the plume (Monitoring Well Clusters FP-98-27, FP-98-29, and FP-98-31). The new wells installed include the following, as shown on Figure 4-2:

- FP-98-27, FP-98-27b, FP-98-27c (located inside the plume)
- FP-98-28, FP-98-28b, FP-98-28c (located outside of the plume)

- FP-98-29, FP-98-29b, FP-98-29c (located inside the plume)
- FP-98-30, FP-98-30b, FP-98-30c (located outside of the plume)
- FP-98-31, FP-98-31b, FP-98-31c (located inside the plume)

The boring logs, well construction diagrams, and well development forms are provided in Appendix 2A.

Groundwater sampling results from Monitoring Well Clusters FP-98-28 and FP-98-30 confirmed the non-detects reported at all sampling depths in Probeholes B19 and B21. Groundwater sampling results from Monitoring Well Clusters FP-98-27, FP-98-29, and FP-98-31 were similar to results from groundwater screening results from Probeholes B22, B18, and B31, respectively. Table 4-3 contains a comparison of the field screening and groundwater data for these wells.

On August 18, 1999, Kaw Valley Engineering, Inc. relocated Probeholes B10, B10a, and B10b which were originally sampled during the March/April 1998 Groundwater Screening Survey. The surveyors located two additional points (B10c and B10d) midway between the original sample locations (see Figure 4-2). Direct-push sampling equipment was used to collect groundwater samples from three depths at Locations B10a, B10c, B10d, and B10 to determine the placement of Monitoring Well Cluster FP-99-32. Location B10b was not sampled because contaminants were not detected in B-10c. The sample depths were approximately 25, 45, and 65 feet bgs and were intended to approximate the screened interval of the existing monitoring wells. Each groundwater sample was analyzed in the field for PCE, TCE, and cis-1,2-DCE. Innovative Probing Solutions, Inc. (IPS) performed all direct-push groundwater sampling and analysis activities on August 18 and 19, 1999.

Results of the groundwater screening indicated the presence of PCE, TCE, and cis-1,2-DCE in the deep sample at Location B10d, and PCE and TCE in the intermediate sample at Location B10d. PCE, TCE, and cis-1,2-DCE were not detected in the other samples collected during the investigation. The IPS groundwater analysis report is provided in Attachment 1 of the *August 1999 DSR* (BMcD, 1999g). Based on the results of this screening, one new Monitoring Well Cluster (FP-99-32) was installed between Location B-10d and the Kansas River during the week of August 24, 1999 and developed on August 31, 1999. Drilling logs and well development forms for the new well cluster are provided in Appendix 2A.

4.1.2.3.3 Soil Sampling

Soil samples were collected for geotechnical, TOC, and CEC analyses during drilling activities at Monitoring Wells FP-98-27c and FP-98-28c as specified in the *Draft Final Technical Memorandum Work Plan for the Plume Characterization at the FFTA-MAAF* (BMcD, 1998). Twenty-seven geotechnical soil samples were collected during drilling activities and analyzed for moisture content, grain size distribution, and specific gravity. Soil samples collected from 0 to 20 feet bgs were analyzed for moisture content and results ranged from 4.3 to 31.1 percent. Soil samples from 20 to 64 feet bgs were analyzed for grain size distribution and specific gravity. The grain size distribution graphs indicated that the soil encountered was primarily poorly-graded sand with 1.1 to 30 percent fines and 0 to 4.0 percent gravel. Specific gravity of the soil samples ranged from 2.561 to 2.743. Geotechnical data is presented in Table 4-4 and Appendix C of the *May/June 1998 DSR* (BMcD, 1998j).

Nine soil samples were collected from 20 to 64 feet bgs during drilling activities at Monitoring Well FP-98-27c and analyzed for TOC, which ranged from 1,380 to 9,080 mg/kg. Nine soil samples were collected from 20-58 feet bgs during drilling activities at Monitoring Well FP-98-28c and analyzed for TOC, which ranged from non-detect to 16,400 mg/kg. Only clay soils were analyzed for CEC and since very little clay was encountered during drilling activities, only three samples were analyzed for CEC between the two monitoring wells. The sample from Monitoring Well FP-98-27c (30 to 32 feet bgs) had a CEC of 5.8 meq/100g and the CEC of the two samples from Monitoring Well FP-98-28c was 9.2

meq/100g (from 29 to 30 feet bgs) and 13.0 meq/100g (from 30 to 32 feet bgs). Table 4-5 presents the TOC and CEC data.

4.1.3 Groundwater Monitoring

4.1.3.1 Purpose

The potential for groundwater contamination as a result of releases from the Site has been evaluated by installing and sampling groundwater monitoring wells located in the vicinity of the FFTA-MAAF. Groundwater monitoring has been ongoing at the Site since October of 1993. SI groundwater monitoring activities have occurred since August of 1996.

4.1.3.2 Approach

The SI groundwater monitoring was conducted on the following dates:

- August 1996 (conducted by LBA)
- December 1996 (conducted by LBA)
- May 1997 (conducted by BMcD)
- August 1997 (conducted by BMcD)
- February 1998 (conducted by BMcD)
- May/June 1998 (conducted by BMcD)
- August 1998 (conducted by BMcD)
- January 1999 (conducted by BMcD)
- May 1999 (conducted by BMcD)
- August 1999 (conducted by BMcD)

In general, the groundwater has been sampled for VOCs and TPHs since October 1993. The sampling plan for monitoring wells at the Site has been modified over time as various wells consistently indicate nondetections of contaminants. Sampling plans have also been modified to include new wells as they are installed. These changes are evident on Table 3-7 in Section 3.0. SVOCs were analyzed through August of 1997, when the *RI/FS WP* showed that these parameters were not of concern at this Site, with the exception of naphthalene. Since that time the only SVOC analyzed for in the groundwater has been naphthalene. Priority pollutant metals were last analyzed for in August of 1997 after evaluation in the *RI/FS WP* showed that these parameters were no longer of concern at this Site.

In August 1996, natural attenuation parameters were added to the analyte list for several wells at the Site. The purpose of these analyses was to determine if the environment is suitable for natural biodegradation of the contaminants. This monitoring has continued through August 1999 to evaluate trends in the data. Results of the natural attenuation monitoring are provided on Table 4-6.

Figures 4-3 through 4-17 are Site maps showing nitrate, sulfate, Dissolved Oxygen (DO), and Ferrous Iron [Fe(II)] levels in the shallow, intermediate, and deep zones with time. The wells having favorable geochemical conditions for the occurrence of biological reductive dechlorination are highlighted in green on these Figures. Favorable geochemical conditions were determined using the USEPA/AFCEE (Air Force Center for Environmental Excellence) screening protocol which is discussed further in Section 6.3.4.2.1 of this Report. Dissolved oxygen levels below 0.5 mg/L, nitrate below 1 mg/L, Fe(II) above 1.0 mg/L, and Oxidation/Reduction Potential (ORP) less than 50 mV indicate aquifer conditions are anaerobic and iron reducing. The occurrence of reductive dehalogenation is possible within this range.

4.1.3.3 Results

The results for each sampling round were presented and evaluated in Data Summary Reports (DSRs) submitted after each sampling event. Table 3-7 presents the positive detections for groundwater monitoring activities from October 1993 through August 1999 for various contaminants. Table 4-6 presents the results for the natural attenuation monitoring activities conducted at the Site as part of the RI activities. The results and trends from the RI data are analyzed in Sections 5.0 and 6.0.

4.1.4 Groundwater Elevations and Automated Data Collection Platforms

4.1.4.1 Purpose

Groundwater level information, coupled with river stage data, is used to determine groundwater flow direction, flow gradients (both horizontal and vertical), and aquifer/river interaction. Groundwater levels have been measured at the Site since the initial seven monitoring wells were installed during the SI activities in October 1993. Additional monitoring well and piezometer installation was conducted periodically subsequent to October 1993. As of December 1999 a total of 63 monitoring wells and piezometers were available for water level measurements.

4.1.4.2 Approach

Periodic manual measurements of water levels have been made since October 1993. In addition, continuous water levels are measured at monitoring wells and piezometers throughout the groundwater plume and along the Kansas River with data collection platforms (DCPs) installed and maintained by the USGS. The first monitoring well so equipped was FP-93-07, which has been providing water level data continuously since May 1995. Subsequently, additional continuous measurement devices have been installed on the following monitoring wells and piezometers: FP-96-13PZ, FP-96-15PZ, FP-96-20, FP-96-21, FP-96-23, FP-96-23c, FP-96-26, FP-98-27, FP-98-29, FP-98-31, FP-98-31c, FP-99-32, FP-99-32c, FP-99-39PZ, and FP-99-40PZ. These groundwater elevations are updated every morning on the following web site:

http://www-ks.cr.usgs.gov/kansas/riley

Continuous measurements of the Kansas River stage and discharge have been made at the Henry Drive Bridge, on Fort Riley, throughout the course of this investigation. Daily precipitation data (for Manhattan, Kansas) is available from the NCDC. Precipitation has been remotely measured by the USGS at Monitoring Well FP-93-07 since May 1999.

4.1.4.3 Results

Periodic measurements of water levels in monitoring wells and piezometers have been made throughout this investigation. This water level elevation data is presented in Table 2-2. These measurements are used in conjunction with the surveyed well elevations to generate maps depicting the piezometric surface beneath the Site. Groundwater elevation maps, which show typical conditions as of June 1998 and May 1999, are presented as Figures 2-6 through 2-11 for the shallow, intermediate, and deep zones of the aquifer. Groundwater elevations generally have ranged between 1036 and 1043 feet above msl, or approximately 20 to 25 feet bgs. Groundwater flow within the alluvium is generally toward the north-northeast, in the downgradient direction of the Kansas River along the alluvial valley. The flow direction has remained consistent along the axis of the plume, extending north-northeast from the former location of FFTA. However, there is variability in the direction of groundwater flow to the west of the Site, along the Kansas River. Here the groundwater flow can be either towards or away from the river, depending on whether the Kansas River is acting as a gaining or a losing stream. When behaving as a gaining stream, the water level in the river is lower than the water level in the aquifer and groundwater flow provides recharge to the river. As a losing stream, the water level is higher in the river than the surrounding alluvial aquifer and groundwater flow provides recharge to the aquifer. The river stage, when compared to the water level in the alluvial aquifer, may explain occasional observed minor variances in the direction of groundwater flow near the Site.

4.1.5 Tracer Study

4.1.5.1 Purpose

The tracer study was conducted in the Spring of 1999 to gain essential hydrogeologic data related to contaminant fate and transport to facilitate evaluation of remedial technologies available for this Site. A tracer test enables the determination of critical site-specific contaminant transport parameters such as:

- Porosity (η) - Volume of voids in a unit volume of the aquifer
- Pore Velocity (V_{gw}) - Seepage or advective velocity
- Longitudinal Dispersivity (α_x) - The spreading of a contaminant over a given length of flow

This site-specific hydrogeological data can be used to simulate the behavior of the plume through a computer model and to predict the future extent and concentration of dissolved contaminant plumes. Modeling the effects of advection, dispersion, sorption, and biodegradation will aid in assessing the exposure of the potential downgradient receptors to contaminant concentrations and will provide technical support for selection of the best remedial alternative for the Site (see Section 6.0).

4.1.5.2 Approach

The tracer test study was conducted within the contaminant plume at a location that had the following qualities:

- Historically detected contaminants of concern (PCE, TCE, and cis-1,2-DCE)
- Representative Site geology and groundwater geochemistry
- Minimal seasonal changes in the groundwater flow direction
- Minimal disturbance to landowner/tenant activities

Based on these criteria, the tracer test study area was located between Monitoring Well Clusters FP-94-11 and FP-94-09 (see Figure 4-18). The location was selected based on data up to and including the January 1999 Groundwater Sampling Event, historical groundwater elevations, chemical and geochemical data, and monitoring well boring logs. One tracer injection well (FP-99-36I installed February 1999) and two monitoring wells (FP-99-37T and FP-99-38T installed April 1999) were installed to conduct the tracer test (well construction diagrams are included in Appendix 4A). The tracer injection well was constructed with a 50 foot screened interval which covered the entire saturated thickness of the aquifer including the shallow, intermediate, and deep intervals. The two tracer monitoring wells were constructed with multiple screens, which covered the shallow, intermediate, and deep intervals of the aquifer. Packers and bladder pumps were installed to allow discreet groundwater samples to be collected from each interval. Sampling intervals were identified using the following qualifiers after the well name: s – shallow interval, i-intermediate, and d – deep.

The approach of the study, first detailed in the *Work Plan for the Aquifer Tracer Study at the FFTA-MAAF* (BMcD, 1999a) [*Tracer Work Plan*] is outlined below. Table 4-7 provides a chronological summary of the study activities described below.

4.1.5.2.1 Dye Tracer Study

At the FFTA-MAAF Site, the groundwater flow rate and the groundwater flow direction are known from historical data. However, prior to injection and monitoring of the potassium bromide tracer, a dye tracer (rhodamine WT) was injected to determine the exact groundwater flow direction in the area of the study.

After injection of the dye tracer, direct-push samples were collected along several transects to determine the centerline of the dye tracer plume.

Rhodamine WT is a highly fluorescent material with the unique ability to absorb green light and emit red light. The amount of red light emitted is directly proportional to the concentration of the dye, up to 100 parts per billion or 100 µg/L. Very few compounds have this property, so interference from other substances is very rare. Thus, rhodamine WT is a highly specific tracer. Rhodamine WT is nontoxic, stable, and cost effective. In *An Evaluation of Some Fluorescent Dyes for Water Tracing* Smart and Laidlaw (Smart et. al., 1977) found rhodamine WT to be the most acceptable dye tracer. Field instrumentation, such as a fluorometer, is available for ease in analysis.

On March 12, 1999 the rhodamine WT dye was injected into the aquifer. To emplace the tracer, a 1 inch threaded pipe, plugged at the bottom end with a rubber stopper, was suspended in the injection well (FP-99-36I). The internal volume of the pipe, from the water table to the lower end, was approximately 28 liters, so a similar volume of distilled water was used to dissolve the 10 µg/L of rhodamine WT. The solution was then poured into the top of the pipe, displacing the air in the pipe and the stopper was displaced. The pipe was then withdrawn from the well, leaving the tracer solution in the well. The stopper attached to the base of the pipe mixed the tracers within the well as the pipe was withdrawn.

On March 26, 1999, fourteen days after injection of the dye, BMcD sampled the groundwater with a geoprobe unit and analyzed the extracted groundwater for the fluorescent dye. Results of this one day sampling event resulted in a Rhodamine WT plume approximately 25 feet wide by 20 feet long (see Figure 4-19). However, the exact location of the Rhodamine WT zero line was not found either downgradient or sidegradient of the injection well. Monitoring Well FP-94-09, located 75 feet downgradient was analyzed for Rhodamine WT as a background well since the dye was not expected to travel 75 feet in 14 days and was found to be nondetect for the fluorescent dye. Therefore, the location of the Rhodamine WT zero line was located between FP-94-09 and the detections in the groundwater samples collected with the direct-push equipment. These results depict a larger amount of dispersion occurring than expected. The high solubility of the fluorescent dye likely aided in this dispersion; however, the aquifer properties were also likely influential in these results.

The study was conducted in an area of the aquifer that is not affected by the Kansas River. Therefore, groundwater flow direction and gradient is consistent throughout the rounds of data available. The Site also has an apparently high hydraulic conductivity. Therefore, a large amount of transverse dispersion of the dye tracer was not expected. The high solubility of the Rhodamine WT may have increased the dispersion, but the same or similar dispersion may be observed using potassium bromide as a conservative tracer. Based on the above reasons, BMcD re-evaluated the injection concentration of the conservative tracer potassium bromide. Since historical groundwater elevations are available and are consistent with time, the direction of groundwater flow is assumed from this information for the potassium bromide study.

Bioscreen was used to determine the injection concentration of bromide in the *Tracer Work Plan* (BMcD, 1999a) by using the input parameters utilized in the *RI/FS WP* modeling efforts. The results of the Rhodamine WT tracer study revealed that a greater amount of dispersion may be occurring than originally thought. Therefore, while all other parameters remained the same, dispersion coefficients were altered and the model was calibrated to the results of the Rhodamine WT study. This effort resulted in a longitudinal dispersion coefficient of 60 ft, and transverse dispersion coefficient of 10 ft, and a vertical dispersion coefficient of 6 ft. Then the input of various bromide concentrations was modeled using the calibrated input parameters.

Based on the results of this modeling exercise, BMcD set the injection concentration to 3,000 mg/L of bromide or 4,452.5 mg/L of potassium bromide. Also, the observation wells were installed in a straight line that is parallel to the groundwater flow direction, based on the average flow direction derived over time and the general flow direction of the plume. In this test, the distances between the tracer injection well and the first and second observation wells were 25 and 50 feet, respectively. The screened intervals for the monitoring wells were set consistent with other monitoring wells at the Site. The screened interval for the injection well was from the top of groundwater to the top of bedrock. Boring logs and well installation diagrams are provided in Appendix 4A.

4.1.5.2.2 Potassium Bromide Tracer Study

The conservative and nonreactive inorganic tracer potassium bromide was employed to determine the groundwater flow pore velocity and dispersivity. Bromide is biologically stable, is not lost by precipitation or sorption, and has a retardation factor of one (Davis et. al., 1985). Bromide is also one of the most commonly used ion tracers. Finally, potassium and bromide are not regulated compounds nor do they have risk-based concentrations (RBCs).

On May 24, 1999 BMcD injected the conservative tracer potassium bromide into Injection Well FP-99-36I, and subsequently conducted biweekly sampling and analysis of the groundwater for bromide. The first month of sampling resulted in a peak detection in the shallow interval of Observation Well FP-99-37 of 0.4 mg/L of bromide 20 days after injection. In the deep interval at the same observation well, the peak bromide detection of 0.3 mg/L occurred 3 days after injection. The detection limit for bromide is 0.1 mg/L. Therefore, there was concern that these low peak detections may not provide an accurate depiction of the subsurface conditions at FFTA-MAAF.

4.1.5.2.3 Potassium Iodide Tracer Study

After discussion with CENWK and Fort Riley, BMcD recommended utilizing another conservative tracer, injected at a higher concentration, to verify the observed tracer concentrations. BMcD's research indicated that potassium iodide (CAS 7681-11-0) was very similar in its physical and chemical properties to potassium bromide and therefore, was expected to transport in a very similar matter. It is soluble, nonreactive, and slightly denser than potassium bromide. Iodide was not expected to impact the subsurface geochemistry or biological conditions and was not a regulated compound.

Therefore, based on the preliminary results of the bromide tracer study, 47,000 mg/L of iodide or 61,483 mg/L of potassium iodide was injected into the aquifer (via Injection Well FP-99-36I). This concentration was obtained by using a ratio analysis to determine the amount required to be injected to see a maximum detection of 4 mg/L at 25 feet downgradient of the injection point based on the preliminary bromide results. The potassium iodide was injected on July 7, 1999. Subsequent biweekly sampling and analysis of the groundwater for bromide was conducted.

4.1.5.3 Results

The dynamic profile of the tracer of bromide within the monitoring wells and observed field data such as groundwater elevation were used to estimate targeted hydraulic parameters such as porosity, groundwater Darcy's velocity or pore velocity/seepage velocity and longitudinal, transverse, and vertical dispersivity coefficients. The methodologies employed during the data analysis and interpretation were elaborated in the *Tracer Work Plan* (BMcD, 1999a). Based upon the methodologies described in the work plan, the field data obtained from the tracer test were used to derive following three parameters directly:

- Effective porosity (η_e)
- Groundwater pore velocity or Darcy's velocity/seepage velocity (V_{gw})

- Longitudinal dispersivity coefficient (K_x)

Breakthrough curves of the bromide and iodide arrival at the observation wells is provided in Figures 4-20 and 4-21, respectively.

4.1.5.3.1 Estimate of V_{gw} and η_e

Effective porosity η_e is the total porosity of the aquifer minus the specific retention (unconfined) or storativity (confined) of the aquifer:

$$\eta_e = \eta - S$$

Where:

η_e = Effective porosity (dimensionless)
η = Total porosity (dimensionless)
S = Specific retention or storativity (dimensionless)

The pore velocity (i.e., Darcy's velocity or seepage velocity) is defined in the following equation:

$$V_{gw} = - K\, i / \eta_e$$

Where:

V_{gw} = Groundwater pore velocity = bromide traveling velocity in centimeters per second (cm/sec)

K = Hydraulic conductivity (cm/sec) = 0.212 (600 feet per day [ft/day]), 0.282 (800 ft/day), and 0.318 (900 ft/day) for shallow, intermediate, and deep aquifers, respectively from the RI model.

i = Averaged hydraulic gradient in centimeters per centimeter (cm/cm) = - 0.0006 cm/cm for the test area during the tracer test (based upon data collected from the selected dates of 6/1/99, 6/15/99, 7/6/99, 7/23/99, and 7/30/99). The estimate of the averaged groundwater gradient is based upon the following equation:

$$i = ((\text{Elevation of Well Casing - Depth to GW})_{\text{point 1}} - (\text{Elevation of Well Casing - Depth to GW})_{\text{point 2}}) / \text{Distance between point 1 and point 2})$$

Using the equations and procedure outline above, the effective porosity for each of aquifer layers can be estimated as follows:

Shallow Aquifer:

Potassium bromide was first detected at FP-99-37s (25 feet downgradient) on 6/6/99 (13 days)
Potassium bromide was first detected at FP-99-38s (50 feet downgradient) on 6/23/99 (30 days)

$$V_{gw} = (50 \text{ ft})\,(30.48 \text{ cm/ft}) / ((30 \text{ day})\,(86{,}400 \text{ sec/day})) = 5.9\text{E-04 (cm/sec)}$$

$$\eta_e = -\,(0.212 \text{ cm/sec})\,(-0.0006 \text{ cm/cm}) / 5.9\text{E-04 (cm/sec)} = 0.22$$

Intermediate Aquifer:

Potassium bromide was first detected at FP-99-37i (25 feet downgradient) on 6/6/99 (13 days)

Potassium bromide was first detected at FP-99-38i (50 feet downgradient) on 7/7/99 (44 days)

V_{gw} = (50 ft) (30.48 cm/ft) / ((44 day) (86,400 sec/day))
= 4.0E-04 (cm/sec)

η_e = - (0.282 cm/sec) (-0.0006 cm/cm) / 4.0E-04 (cm/sec)
= 0.42

<u>Deep Aquifer:</u>
Potassium bromide was first detected at FP-99-37d (25 feet downgradient) on 5/27/99 (3 days)
Potassium bromide was first detected at FP-99-38d (50 feet downgradient) on 7/12/99 (49 days)

V_{gw} = (50 ft) (30.48 cm/ft) / ((49 day) (86,400 sec/day))
= 3.6E-04 (cm/sec)

η_e = - (0.318 cm/sec) (-0.0006 cm/cm) / 3.6E-04 (cm/sec)
= 0.53

The above calculations used data collected at the 50 foot interval (FP-99-38). It is noted that the tracer travels at different velocities at different layers based upon the observation from the tracer test. Based on the groundwater pore velocity calculated between FP-99-36I and FP-99-38T, the deeper the aquifer, the slower the tracer travels. The exception to this statement was the tracer's travel time to 25 foot interval (FP-99-37d). This type of tracer behavior can be explained by three different possibilities: different hydraulic heads, different aquifer hydraulic conductivity, and different effective porosity. Since hydraulic head does not vary among different layers and conductivity for each layer is well defined, the varying effective porosity for different layers appears to be the reason for the tracer traveling at different velocity at different layers.

In general, the smaller the soil particle, the higher total porosity. This is best demonstrated by comparing the total porosity of coarse sand with medium and fine sand/silty sand. At the Site, the aquifer material consists of fine/silty sand at the top to medium/coarse sand at the bottom. The deeper in the aquifer, the greater the soil particle size and the smaller the total porosity. This seems to be contradictory to the various velocities of the tracer at the different depth aquifer (i.e., the deeper aquifer, the smaller total porosity, the slower the tracer travels instead of the faster the tracer travels). However, there is important distinction between the total and effective porosity. The total porosity does not require pore connection to allow groundwater to travel through and effective porosity is defined as percentage of interconnected pore space. In addition, there is no linear relationship between the total porosity and effective porosity. The greater total porosity at the shallow aquifer at the Site does not necessarily mean the greater effective porosity. In fact, effective porosity implies some connectivity through the soil media, and is more closely related to aquifer intrinsic permeability/conductivity than total porosity. According to the results of the tracer test, the deeper in the aquifer, the greater the effective porosity. This vertical profile of the effective porosity is consistent with the vertical profile of hydraulic conductivity at the Site. It is also important to note that if the tracer arrival time peak was missed during the monitoring activities, the true tracer velocity could be over or underestimated.

4.1.5.3.2 Estimate of the Longitudinal Dispersion Coefficient (D_x)

The longitudinal dispersion coefficient is defined as:

$$D_x = [\, x^2 - V_{gw}^2\, t_m\, (t_m - t_o)\,] \,/\, [2\, (t_m - t_o)\,]$$

Where:

x = Abscissa of the measurement point (cm)
t_m = Occurrence time of the maximum concentration of the tracer (sec)
V_{gw} = Groundwater pore velocity (cm/sec)
t_o = Occurrence time of the maximum concentration of the tracer at t = 0 (sec)

Using Potassium bromide breakthrough curves (Figure 4-20) observed at FP-99-38S, FP-99-38I, and FP-99-38D, located 50 feet downgradient of the injection well, the averaged time of the peak bromide concentration for the three wells was 41 days. Therefore,

$$D_x = \{(50 \text{ ft} * 30.48 \text{ cm/ft})^2 - (4.2E\text{-}04 \text{ cm/sec})^2 [(41-1) \text{ day} * 86400 \text{ sec/day}][(41-1) \text{ day} * 86400 \text{ sec/day}]\} / \{2 [(41-1) \text{ day} * 86400 \text{ sec/day}]\}$$
$$= 0.03 \text{ (cm}^2\text{/sec)}$$

After D_x is determined, longitudinal dispersivity, α_x , can be determined by the following equation:

$$\alpha_x = D_x / V_{gw}$$
$$\alpha_x = (0.03 \text{ cm}^2\text{/sec}) / (4.2E\text{-}04 \text{ cm/sec})$$
$$= 71 \text{ cm}$$

When α_x is available, the transverse and vertical dispersivities (α_y and α_z) over the 50-foot test area can be estimated based upon the empirical relationship between α_x and α_y or α_z (Gelhar et al., 1992) in the following equations:

$$\alpha_y = (0.10 \ \alpha_x) = 7.1 \text{ cm}$$
$$\alpha_z = \text{ranges from } (0.025 \ \alpha_x) \text{ to } (0.1 \ \alpha_x) = 7.1 \text{ cm to } 1.78 \text{ cm}$$

4.1.5.3.3 Confirmatory Sampling with Potassium Iodide Tracer

The highest detected concentrations of the tracer bromide in the first monitoring cluster FP-99-37s, FP-99-37i, and FP-99-37d were lower than expected concentration based upon the initial estimate derived from the analytical model BIOSCREEN. Therefore there was a concern that these detected peak concentrations (ranging from 0.3 to 0.4 mg/L) would not provide an accurate depiction of the surface conditions encountered at the Site.

To confirm the observed peak concentration of bromide at FP-99-37, another similar conservative inorganic tracer, potassium iodide, was injected into the same injection well at a higher concentration (i.e., 47,000 mg/L for iodide vs. 10,900 mg/L for bromide). The concentration of iodide was approximately five times higher that the concentration of bromide. After the potassium iodide was injected, the tracer concentration was closely monitored in accordance with the same monitoring protocol used for potassium bromide. Based upon the tracer field data, it was found that iodide behaved in the same pattern as the bromide in terms of the peak concentrations observed at FP-99-37 except that the averaged peak concentration of iodide was several times higher than the tracer bromide. For example, the peak concentrations of iodide and bromide in FP-99-37s were 1.4 and 0.4 mg/L, respectively. At FP-99-37i, the peak concentrations of iodide and bromide were 1.6 and 0.4 mg/L, respectively. For deep well FP-99-37d, the maximum concentrations of iodide and bromide were 3.8 and 0.3 mg/L, respectively. Based upon these observations, a linear relationship between the injected concentration and the peak concentration at the monitoring wells was found to exist. The similar behavior of these two tracers in terms of the peak concentrations observed has proven that the low peak concentrations of the potassium bromide tracer reflect the nature of the subsurface at the Site with the exception of the anomalous travel time between the injection well (FP-99-36I) and the 25 foot interval monitoring well (FP-99-37d). Therefore, the potassium bromide data is appropriate for use in deriving the hydrogeological parameters of the aquifer targeted by the tracer test.

4.1.6 Natural Attenuation Study

4.1.6.1 Purpose

A microcosm study was conducted starting in the spring of 1999 to evaluate the viability of natural attenuation at FFTA-MAAF and determine the degree to which natural attenuation is occurring. Work was conducted according to the *Work Plan for the Natural Attenuation Evaluation Study at the FFTA-MAAF* (BMcD, 1998h) [*NA Study Work Plan*]. Initially, samples were collected in February 1999 for the microcosm study; however, due to laboratory contamination new samples were collected in April of 1999 and the microcosm study was reinitiated. The text in this section only discusses the activities associated with the April 1999 study.

The study was performed by conducting a microcosm study and tracer test, and performing analyses and interpretation of field and laboratory data. The tracer study is described in detail in the previous Section 4.1.5. The microcosm study results were used to determine the degree of degradation of PCE to TCE to 1,2-DCE to VC occurring at the Site. This data will also be used to determine if there is evidence of complete degradation of VC to nontoxic end products such as ethene, ethane, and methane.

Although the degradation pathway described above is the most common pathway for degradation of TCE, alternate reduction pathways are possible. Figure 4-22 presents a flow chart of possible transformations of chlorinated aliphatic hydrocarbons. The analytical methods used for the study also evaluated the alternate reduction pathways indicated in Figure 4-22.

The results from the microcosm study, including the tracer test and field data analyses, will be used to provide additional data to select or eliminate natural attenuation as an acceptable remedial alternative for the Site during the feasibility study.

4.1.6.2 Approach

4.1.6.2.1 Sampling Locations

Samples of groundwater and soil were collected from the locations described below. The rationale for choosing these locations is described below. It should be noted that locations were selected based on data up to and including the August 1998 groundwater sampling event and information currently available on the extent of contamination. Well locations are provided on Figure 4-2.

- Soil Sample FP-MS-01 was collected on April 9, 1999 in the immediate vicinity of Monitoring Well FP-94-09 at a depth of 23 to 30 feet bgs. Groundwater was also collected from Monitoring Well FP-94-09 (shallow well, screened at 17.5 to 27.5 bgs) on April 8, 1999. The location was selected based on data from the August 1997 groundwater sampling event (BMcD, 1998b) that showed the presence of PCE, TCE, cis-1,2-DCE, VC, and one possible PCE reductive dehalogenation end product (i.e., methane). Since that time, PCE has not been detected in this well. VC was detected again at the well in January 1999 and May 1999, subsequent to this sampling event. At the time of sample collection, the breakdown products of PCE have been present at Monitoring Well FP-94-09 and the well was still in the center of the plume. There were relatively high concentrations of TCE at this well and the highest concentration of cis-1,2-DCE in the plume was present at this location at the time of sampling. Finally, the subsurface lithology and groundwater geochemistry represented the center of the plume.

- Soil Sample FP-MS-02 was collected on April 9, 1999, adjacent to Monitoring Well FP-96-27b at a depth of 44 to 48 feet bgs. Groundwater was collected from Monitoring Well FP-96-27b (intermediate well, screened from 40.96 to 50.97 feet bgs) on April 8, 1999. This location was selected based on data from the August 1998 groundwater sampling event that indicated this location had the highest concentrations of PCE and TCE in the intermediate zone of the groundwater aquifer. January 1999 and May 1999 groundwater results showed similar levels of the chlorinated solvents in this well. In addition, the location is in the middle of the plume, contains the degradation product cis-1,2-DCE, and the subsurface geology and groundwater geochemistry represents that portion of the plume.

- Soil Sample FP-MS-03 was collected on April 12, 1999 near Monitoring Well FP-98-31b from a depth of 44 to 49 feet bgs. Groundwater was collected on April 12, 1999 from Monitoring Well FP-98-31b (intermediate well, screened from 39.3 to 49.3 feet bgs). The location was selected based on data from the May/June 1998 (BMcD, 1998j) groundwater sampling event that indicated the location is near the downgradient edge of the plume, contains PCE, TCE, and the degradation product cis-1,2-DCE, and represents the subsurface lithology and groundwater geochemistry in the downgradient edge of the plume.

4.1.6.2.2 Sampling Methodology

Groundwater sampling was performed using the standard protocols for FFTA-MAAF (*Site-Wide SAP*). Temperature, pH, conductivity, turbidity, DO and ORP were measured during monitoring well purging. Ferrous iron was measured once at the completion of sampling. Appendix 4B contains all field forms from the sample collection effort. To preserve the anaerobic conditions in the groundwater, the groundwater samples were collected in a manner to ensure minimal contact with atmospheric oxygen. A total of 12 liters of water was collected from each monitoring well in 2 liter bottles. Each bottle was sealed to ensure zero headspace.

Soil samples were collected within 72 hours of completion of the groundwater sampling at each location. The soil samples were collected from new borings driven within 10 to 15 feet cross-gradient of the sampled monitoring wells at each cluster. The samples were collected with a split-spoon sampler containing a 2.5 inch diameter stainless steel sampling tube. These were then sealed with teflon tape and plastic caps, placed on ice, and shipped to Envirogen Laboratory in New Jersey by overnight express.

4.1.6.2.3 Microcosm Set-Up

Thirty-three microcosms were constructed for each location with equal volumes of soil and groundwater placed in 125-milliliter serum vials with no headspace, and sealed with teflon-lined septa and crimp seals. Six of the microcosms (three live and three killed) will be reused throughout the microcosm study for sample collection and subsequent analyses of target chemicals. Eighteen microcosms (nine live and nine killed) were prepared for sample collection for analyses of degradation end products at the initial, intermediate, and final stages of the microcosm study. In addition, three live and three killed microcosms were prepared as backup samples. After preparation, the microcosms are stored in the dark at approximately 15 degrees Celsius (°C), the approximate temperature of the Site aquifer. The live and killed microcosms will be sampled and analyzed up to eight times during the course of study for PCE, TCE, cis and trans isomers of 1,2-DCE, VC, ethene, ethane, methane, and DOC.

The sampling events occurred at intervals of 0, 3, 6, 9, 18, and 26 weeks. Quality Assurance (QA) samples were prepared and submitted to the QA Lab during the 0, 9, and 26 week sampling events. Three live and three killed microcosms were analyzed at each sampling event for each sample point. Three samples are needed to provide data to conduct statistical analyses of biodegradation rates obtained from the microcosm study. The purpose of the killed microcosm analyses is to distinguish the biodegradation rate from the degradation rate resulting from abiotic degradation mechanisms. The most common abiotic mechanisms include hydrolysis, substitution, dehalogenation, coupling, and reduction reactions. By destroying the bacteria in the killed microcosms, the reduction of the targeted chemicals caused by biodegradation may be quantified by subtracting the abiotic degradation rates in the killed microcosms from the overall degradation rates in the live microcosms.

4.1.6.3 Natural Attenuation Study Tasks

The tasks that were anticipated for completion of a natural attenuation evaluation for FFTA-MAAF were developed in the *NA Study Work Plan* (BMcD, 1998h) and are summarized below. The evaluation was to occur in three phases. However, the laboratory microcosm study was not completed in time for inclusion in this Report, therefore, the tasks summarized below include only those tasks completed for this Report. A report on the results of the microcosm study will be provided under separate cover.

4.1.6.3.1 Phase 1 Tasks

Phase 1 is divided into two steps, the first step is evaluation of existing data. The following tasks were conducted as part of this RI effort to evaluate the existing data as part of step 1. The Sections of this Report that include the referenced evaluation is provided in parentheses.

- Potentiometric surface maps prepared to assess lateral groundwater flow (Section 2.0);
- Hydrogeological cross sections prepared parallel and perpendicular to the groundwater flow path to assess vertical components of groundwater flow (including flow patterns to the river) (Section 2.0);
- Isoconcentration contour maps and vertical cross sections of groundwater geochemistry parameters [oxygen, nitrate, ferrous iron, sulfate, methane, alkalinity, TOC, BTEX (if present), pH, chloride, and conductivity] and mother-daughter products [PCE, TCE, cis-1,2-DCE, VC, and ethene (if available)] prepared (Sections 5.0 and 6.0);
- PCE, TCE, cis-1,2-DCE, and VC concentrations versus distance along the groundwater flow direction superimposed on one plot (Sections 5.0 and 6.0) ; and
- Geochemical parameter versus distance along the plume plotted (Section 6.0).

The second step for the Phase 1 evaluation is the determination of PCE, TCE, cis-1,2-DCE, and VC laboratory based rate constants by conducting a microcosm study using samples from three locations at the Site. However, the microcosm study has not been completed at the time of this report preparation. Therefore, results of the microcosm study will be provided under separate cover at a later date. A contaminant transport model for the Site was also prepared during this phase. Based on information collected during the Phase 1 tasks and aquifer characterization data available at the Site, the following were obtained or estimated:

- Hydraulic conductivity, hydraulic gradient, and effective porosity (Section 4.0);
- Groundwater flow direction (Section 2.0);
- Horizontal and vertical plume delineations and concentrations (Sections 5.0 and 6.0);
- Portions of the Site where complete degradation of chlorinated solvents to ethene will be expected to occur based on field evidence of Site conditions (Section 6.0);

- Portions of the Site where incomplete degradation of chlorinated solvents to ethene will be expected to occur based on field evidence of Site conditions (Section 6.0);
- Reductive environment as a function of location in the plume where chlorinated solvents will be expected to degrade (Section 6.0);
- Total mass of chlorinated solvents in the plume (Section 6.0);
- Total carbon substrate available in the plume (Section 6.0);
- Capacity of the aquifer to degrade the chlorinated solvents present (Section 6.0); and
- Conservative prediction of the future contaminant migration using Darcy flow with the groundwater velocity (assuming no dispersion or degradation) (Section 7.0).

4.1.6.3.2 Phase 2 Tasks

Phase 2 involves evaluating field data to determine field based rate constants for PCE, TCE, cis-1,2-DCE, and VC and evaluation of the field based rate constants. The field attenuation rate constants for PCE, TCE, cis-1,2-DCE, and VC were determined from the concentration versus distance data (Section 6.0);

4.1.6.3.3 Phase 3 Tasks

Phase 3 uses the data collected and evaluated in Phase 1 and 2 in a sequential reaction flow and transport model (RT3D and MODFLOW with Groundwater Modeling System) to predict future concentrations for the plume (an RI activity) and evaluate natural attenuation as a final remedial solution for the Site (to be conducted in the FS for this Site). The expected contamination based on the model results are evaluated with respect to potential receptors and the associated risk. These tasks are described in detail in Section 7.0.

4.2 SOIL INVESTIGATIONS

This section summarizes the field activities conducted after preparation of the *RI/FS Work Plan* to further define the nature and extent of contamination in the soil at the Site. These activities included additional soil sampling to aid in the characterization of the soils in the unsaturated zone at the FFTA-MAAF. As discussed previously in Section 1.0, the former fire training pit and former drum storage area were the site of a pilot study to remove contamination from the soils. Results of the previous soil investigations and the soil vapor extraction/bioventing pilot study at the Site are presented in Section 3.0 of this Report and detailed in the following reports:

- *Post-Pilot Soils* (LBA, 1996a)
- *Pilot Study Report* (LBA, 1999)

4.2.1 Purpose

The purpose of this sampling effort was to evaluate soils in the former fire training pit (AOC-1) and former drum storage area (AOC-2) for the presence of chlorinated organics (PCE, TCE, DCE). During the post-pilot study investigation at the Site, the presence of high TPH levels (as high as 23,500,000 µg/kg) in soil samples resulted in a high detection level for individual VOCs (as high as 2,800 µg/kg). The elevated detection levels in the previous data did not allow for complete evaluation of chlorinated VOCs in soils at the Site.

The RI soil investigation was concentrated in the vicinity of the FFTA (AOC-1) and the former drum storage area (AOC-2). The objectives of the additional soil sampling investigation, as outlined in the *Site-Specific Sampling & Analyses Plan for the RI Soil Sampling for the FFTA-MAAF* (BMcD, 1999c) were as follows:

- Evaluate current concentrations to determine the extent to which contaminants may be leaching to the groundwater.
- Determine the current nature of the PCE, TCE, cis-1,2-DCE, and TPH in soil at the Site.
- Determine whether areas with the highest concentrations of PCE, TCE, and cis-1,2-DCE were encountered during the Post Pilot Study soil sampling.
- Determine if further degradation of the contaminants has occurred since the Post Pilot Study.

4.2.2 Approach

The area to be sampled was established to include positive detection locations of PCE, TCE, and cis-1,2-DCE observed during the Post Pilot Study. ELIPGRID PC software was then used to design a grid within that area to provide a 95 percent confidence level of finding areas of "highest concentration/hot spot" measuring greater than 35 feet by 35 feet. A 40-foot spacing with a triangular pattern was the most effective grid for the Site. Figure 4-23 illustrates the Site layout and location of soil sample collection.

Several soil sampling locations were added along the northern edge of the grid to confirm the absence of chlorinated organics in areas that previously exhibited elevated TPH levels (Probeholes FP99-SB01, SB02, and SB03).

On June 7 through June 12, 1999, direct-push sampling equipment was used to collect soil samples from the 36 locations at four depths above the water table at each location. A total of 144 soil samples were collected and submitted for analyses. Each borehole was logged by a BMcD geologist and the drilling logs are included in Appendix 4C of this Report.

The sampling elevations for the Site were predetermined to be approximately 1056 to 1052, 1052 to 1048, 1048 to 1044, and 1044 to 1040 feet above mean sea level and are indicated by sample qualifiers a, b, c, and d, respectively. The portion of each sampling interval collected for analyses was selected by field screening the entire sample with a photoionization detector (PID), then immediately collecting the portion (approximately 12 inch portion) of the sample with the highest PID reading for laboratory analyses. If elevated headspace readings were not encountered and no visible staining of the soil was present, then the sample was collected from the last foot of the sampling interval. Sampling elevations for each location are presented on Table 4-8.

Soil samples from the initial RI field effort were submitted to Continental Analytical Services (Continental) and analyzed for TPHs (using AO-1 and AO-2 methodology) and VOCs (using EPA SW-846 Method 8260B). Preliminary results indicated 11 soil samples exhibited a VOC detection limit greater than 60 μg/kg due to elevated TPH levels. The soil samples with elevated VOC detection limits are listed below.

FP99-SB01d	FP99-SB05d	FP99-SB06d	FP99-SB07d
FP99-SB21d	FP99-SB13a	FP99-SB13b	FP99-SB13c
FP99-SB13d	FP99-SB14d	FP99-SB15d	

On July 8, 1999, direct-push sampling equipment was again used to collect soil samples at these 11 locations. Soil samples were collected at each of the above locations from the discreet interval sampled previously. Samples were submitted to DMD, Inc./Analytical Resources, Inc. (DMD/ARI) for analysis using a modified EPA SW-846 Method 8260 developed by DMD. The modified method for samples with elevated TPH levels results in detection levels of less than 50 µg/kg as opposed to the 280 plus µg/kg obtained by Continental using EPA SW-846 Method 8260B.

4.2.3 Results

Compounds detected from the initial investigation soil samples analyzed by Continental are as follows:

- VOC detections included ethylbenzene, xylenes, and toluene
- Chlorinated VOC detections included PCE and cis-1,2-DCE
- TPH detections included GRO, diesel, and motor oil.

Continental indicated that the TPH as motor oil does not match the typical chromatographic pattern for motor oil. Although TPH detected is within the motor oil boiling range the chromatographic pattern indicates that the source of the detections may be from a "lighter" weathered product, possibly diesel fuel. The method does not allow for product identification without the use of a known standard. Table 4-9 presents the positive detection of the compounds listed above. In the case of duplicate samples, the highest concentration of the two samples for each compound is presented on the table. The evaluation of these analytical results is included in the *Quality Control Summary Report for the Remedial Investigation Soil Sampling for the FFTA-MAAF (BMcD, 1999d) [RI Soil QCSR].*
DMD/ARI detected PCE, TCE, and cis-1,2-DCE during reanalysis of those locations with elevated VOC detection limits during Continental's analysis. Vinyl chloride was not detected in the 11 soil samples submitted to DMD/ARI for further analysis. Table 4-10 presents the results of the DMD/ARI chemical analyses. The evaluation of the analytical results is included in the *Quality Control Summary Report (DMD, Inc. Data) Remedial Investigation Soil Sampling for FFTA-MAAF* (BMcD, 1999e).

Combined results of the investigation are presented in cross sections of the Site. Figures 4-24 through 4-30 present the positive detections of PCE, TCE, cis-1,2-DCE, TPH reported as diesel fuel, TPH reported as C19 – C40, and Total Volatile Petroleum Hydrocarbons (TVPH) in 2-dimensional cross sections. The results of this sampling effort are further evaluated in Section 5.0 of this report.

4.3 SURFACE WATER AND SEDIMENTS

Surface water at the FFTA-MAAF is diverted by a drainage ditch that encircles the MAAF. The surface water discharges from a gate valve at the northwest corner of the levee into a drainage ditch that leads to the Kansas River. Sediment samples were taken from the drainage ditch during the SI and the expanded SI activities.

Five sediment samples were collected during the SI activities to determine if contaminants were being transported along the drainage ditch that transects the former fire training pit (Appendix 3A, Figure A3-1). These samples were analyzed for VOCs and SVOCs to determine if contamination was migrating through surface runoff in the drainage ditch. Neither VOCs nor SVOCs were detected in the samples (LBA, 1995e).

Surface water samples were collected from the Kansas River by USGS from July 26 through July 28, 1999 (Figure 4-31). Samples were collected upstream of the dry cleaning facility, but downstream of the confluence of the Republican and Smoky Hill Rivers to provide background VOC concentrations (cross section E). A second cross section of the Kansas River was sampled downstream of the dry cleaning facility (cross section C). The third cross section of the Kansas River was downstream of Building 354 (cross section C). A fourth cross section of the Kansas River was sampled downstream of the MAAF, but upstream of where the VOC groundwater plume from the MAAF enters the Kansas River (cross section B). The fifth and final cross section of the Kansas River was downstream of the MAAF area, but upstream of the Southwest Funston Landfill (cross section A).

Ten grab samples were taken from each cross section of the river. The cross section was divided into ten discrete increments from bank to bank. The depth of maximum flow was determined at the middle of each increment and the water sample was collected at this depth using a sampler deployed from the bow of a boat. The sampler was designed to fill up four VOC vials simultaneously. Samples were analyzed for target compound list VOCs.

Fifty-five surface water samples were collected from five cross-section locations in the Kansas River. VOCs were not detected in any of the samples.

* * * * *

Table 4-1
1996 Monitoring Well Installation Soil Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Boring Number	Depth (feet)	Water Content (%)	Specific Gravity	USCS Classification		Solids Total (% by Weight)	Total Organic Carbon (mg/kg)	Cation Exchange Capacity (meq/100g)
				Visual	Sieve Analysis			
FP-96-26c	20	15.72	2.66	SW	SP	87.0	5,950	0.9
	25	14.48	2.64	SP	SP	90.0	5,640	0.6
	30	18.27	2.71	SP	SP	86.2	12,000	1.5
	35	13.52	2.67	SP	SP	85.6	5,610	0.8
	45	21.87	2.70	GP	SP	93.5	23,600	0.6
	65	18.54	2.70	SP	SP	90.9	43,100	1.2
FP-96-23c	20	18.15	2.59	SW	SP	84.2	1,220	1.2
	25	17.53	2.65	SW	SP	82.4	2,700	1.2
	30	12.49	2.62	SP	SW	87.6	10,700	2.2
	35	13.18	2.66	SP	SW	87.1	4,460	1.9
	45	15.37	2.59	SP	SW	87.7	12,800	2.1
	65	9.46	2.67	SP	SW	88.9	15,800	0.9
FP-96-20c	20	4.27	2.55	SW	SP	95.3	2,710	3.0
	25	17.67	2.64	SW	SP	83.1	4,380	1.1
	30	12.49	2.51	SP	SW-SM	88.0	2,110	3.7
	35	12.81	2.61	SP	SW	90.1	7,300	2.5
	45	10.51	2.61	SP	SW	86.9	6,070	1.5
	65	22.42	2.62	SP	SP	80.3	7,800	2.0

Source:
Summary Report for Additional Monitoring Wells and Geotechnical Sampling for the FFTA-MAAF (LBA, 1997)

Notes:
meq/100g = milliequivalents per 100 grams
USCS = Unified Soil Classification System
SW = Well-graded sand
SP = Poorly-graded sand
GP = Poorly-graded gravel
SM = Silty Sand

Table 4-2
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-23b	I-1
Sample Identification	FP-96-23b	I-1
Date Sampled	2-Mar-98	2-Mar-98
Sample Depth (feet)	NAv (Intermediate)	NAv (Shallow)
Laboratory Number	FFTA-MAAF FP-96-23b	FFTA-MAAF I-1
Sample Parameters (ug/L)		
PCE	0.1 U	0.1 U
TCE	**5.7**	0.1 U
cis-1,2-DCE	**277**	0.1 U
Vinyl Chloride	0.1 U	0.1 U

Sample Location	B1			
Sample Identification	GW-1	GW-2	GW-2 D	GW-3
Date Sampled	3-Mar-98	3-Mar-98	3-Mar-98	3-Mar-98
Sample Depth (feet)	25	45	45	65
Laboratory Number	FFTA-MAAF GW-1	FFTA-MAAF GW-2	FFTA-MAAF GW-2D	FFTA-MAAF GW-3
Sample Parameters (ug/L)				
PCE	0.1 U	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	**0.9**	**0.8**	**4.8**
Vinyl Chloride	0.1 U	0.1 U	0.1 U	0.1 U

Sample Location	B1a		
Sample Identification	GW-4	GW-5	GW-6
Date Sampled	3-Mar-98	3-Mar-98	3-Mar-98
Sample Depth (feet)	25	45	66
Laboratory Number	FFTA-MAAF GW-4	FFTA-MAAF GW-5	FFTA-MAAF GW-6
Sample Parameters (ug/L)			
PCE	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	0.1 U	0.1 U
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B1b		
Sample Identification	GW-7	GW-8	GW-9
Date Sampled	3-Mar-98	3-Mar-98	3-Mar-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-7	FFTA-MAAF GW-8	FFTA-MAAF GW-9
Sample Parameters (ug/L)			
PCE	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	0.1 U	0.1 U
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Sample Location	B9			
Sample Identification	GW-10	GW-11	GW-12	GW-12 D
Date Sampled	4-Mar-98	4-Mar-98	2-Mar-98	2-Mar-98
Sample Depth (feet)	25	45	65	65
Laboratory Number	FFTA-MAAF GW-10	FFTA-MAAF GW-11	FFTA-MAAF GW-12	FFTA-MAAF GW-12D
Sample Parameters (ug/L)				
PCE	0.1 U	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	0.1 U	0.1 U	0.1 U
Vinyl Chloride	0.1 U	0.1 U	0.1 U	0.1 U

Sample Location	B9b		
Sample Identification	GW-13	GW-14	GW-15
Date Sampled	3-Mar-98	3-Mar-98	3-Mar-98
Sample Depth (feet)	25	45	64
Laboratory Number	FFTA-MAAF GW-13	FFTA-MAAF GW-14	FFTA-MAAF GW-15
Sample Parameters (ug/L)			
PCE	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	0.1 U	0.1 U
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B11		
Sample Identification	GW-16	GW-17	GW-18
Date Sampled	3-Mar-98	3-Mar-98	4-Mar-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-16	FFTA-MAAF GW-17	FFTA-MAAF GW-18
Sample Parameters (ug/L)			
PCE	0.1 U	0.1 U	**2.3**
TCE	0.1 U	**2.9**	**1.2**
cis-1,2-DCE	0.1 U	**2.0**	**3.7**
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Sample Location	B12			
Sample Identification	GW-19	GW-20	GW-21	GW-21 D
Date Sampled	5-Mar-98	5-Mar-98	5-Mar-98	5-Mar-98
Sample Depth (feet)	25	45	65	65
Laboratory Number	FFTA-MAAF GW-19	FFTA-MAAF GW-20	FFTA-MAAF GW-21	FFTA-MAAF GW-21D
Sample Parameters (ug/L)				
PCE	0.1 U	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	0.1 U	0.1 U	0.1 U
Vinyl Chloride	0.1 U	0.1 U	0.1 U	0.1 U

Sample Location	B12b		
Sample Identification	GW-22	GW-23	GW-24
Date Sampled	5-Mar-98	5-Mar-98	5-Mar-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-22	FFTA-MAAF GW-23	FFTA-MAAF GW-24
Sample Parameters (ug/L)			
PCE	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	0.1 U	0.1 U
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B9a		
Sample Identification	GW-25	GW-26	GW-27
Date Sampled	5-Mar-98	5-Mar-98	5-Mar-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-25	FFTA-MAAF GW-26	FFTA-MAAF GW-27
Sample Parameters (ug/L)			
PCE	0.1 U	**2.0**	**2.3**
TCE	0.1 U	**5.7**	**3.5**
cis-1,2-DCE	0.1 U	**14.2**	**33.4**
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Sample Location	B10			
Sample Identification	GW-28	GW-29	GW-30	GW-30 D
Date Sampled	6-Mar-98	6-Mar-98	6-Mar-98	2-Mar-98
Sample Depth (feet)	25	45	64	64
Laboratory Number	FFTA-MAAF GW-28	FFTA-MAAF GW-29	FFTA-MAAF GW-30	FFTA-MAAF GW-30D
Sample Parameters (ug/L)				
PCE	0.1 U	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	**0.2**	0.1 U	0.1 U	0.1 U
Vinyl Chloride	0.1 U	0.1 U	0.1 U	0.1 U

Sample Location	B11a		
Sample Identification	GW-31	GW-32	GW-33
Date Sampled	2-Mar-98	3-Mar-98	3-Mar-98
Sample Depth (feet)	25	45	63
Laboratory Number	FFTA-MAAF GW-31	FFTA-MAAF GW-32	FFTA-MAAF GW-33
Sample Parameters (ug/L)			
PCE	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	0.1 U	0.1 U
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B11b		
Sample Identification	GW-34	GW-35	GW-36
Date Sampled	3-Mar-98	3-Mar-98	3-Mar-98
Sample Depth (feet)	25	45	63
Laboratory Number	FFTA-MAAF GW-34	FFTA-MAAF GW-35	FFTA-MAAF GW-36
Sample Parameters (ug/L)			
PCE	0.1 U	0.1 U	**0.4**
TCE	0.1 U	**0.2**	**1.1**
cis-1,2-DCE	0.1 U	0.1 U	**0.9**
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Sample Location	B10a		
Sample Identification	GW-37	GW-38	GW-39
Date Sampled	6-Mar-98	6-Mar-98	6-Mar-98
Sample Depth (feet)	25	45	63
Laboratory Number	FFTA-MAAF GW-37	FFTA-MAAF GW-38	FFTA-MAAF GW-39
Sample Parameters (ug/L)			
PCE	0.1 U	**4.1**	**4.0**
TCE	0.1 U	**4.6**	**3.5**
cis-1,2-DCE	0.1 U	**13.8**	**5.3**
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Sample Location	B10b			
Sample Identification	GW-40	GW-41	GW-42	GW-42 D
Date Sampled	7-Mar-98	7-Mar-98	7-Mar-98	7-Mar-98
Sample Depth (feet)	25	45	60	60
Laboratory Number	FFTA-MAAF GW-40	FFTA-MAAF GW-41	FFTA-MAAF GW-42	FFTA-MAAF GW-42D
Sample Parameters (ug/L)				
PCE	0.1 U	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	0.1 U	0.1 U	0.1 U
Vinyl Chloride	0.1 U	0.1 U	0.1 U	0.1 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B13		
Sample Identification	GW-43	GW-44	GW-45
Date Sampled	7-Mar-98	7-Mar-98	7-Mar-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-43	FFTA-MAAF GW-44	FFTA-MAAF GW-45
Sample Parameters (ug/L)			
PCE	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	0.1 U	0.1 U
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Sample Location	B13b		
Sample Identification	GW-46	GW-47	GW-48
Date Sampled	7-Mar-98	7-Mar-98	7-Mar-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-46	FFTA-MAAF GW-47	FFTA-MAAF GW-48
Sample Parameters (ug/L)			
PCE	0.1 U	0.1 U	0.1 U
TCE	0.1 U	0.1 U	0.1 U
cis-1,2-DCE	0.1 U	**0.7**	**0.9**
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Sample Location	B2		
Sample Identification	GW-49	GW-50	GW-51
Date Sampled	7-Mar-98	7-Mar-98	7-Mar-98
Sample Depth (feet)	25	45	62
Laboratory Number	FFTA-MAAF GW-49	FFTA-MAAF GW-50	FFTA-MAAF GW-51
Sample Parameters (ug/L)			
PCE	0.1 U	**2.2**	**3.5**
TCE	0.1 U	**3.1**	**6.8**
cis-1,2-DCE	0.1 U	**36**	**54.8**
Vinyl Chloride	0.1 U	0.1 U	0.1 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B14	
Sample Identification	GW-52	GW-53
Date Sampled	13-Apr-98	13-Apr-98
Sample Depth (feet)	45	65
Laboratory Number	FFTA-MAAF GW-52	FFTA-MAAF GW-53
Sample Parameters (ug/L)		
PCE	0.2 U	0.2 U
TCE	0.2 U	0.2 U
cis-1,2-DCE	0.2 U	0.2 U
Vinyl Chloride	0.2 U	0.2 U

Sample Location	B15	
Sample Identification	GW-54	GW-55
Date Sampled	13-Apr-98	13-Apr-98
Sample Depth (feet)	45	65
Laboratory Number	FFTA-MAAF GW-54	FFTA-MAAF GW-55
Sample Parameters (ug/L)		
PCE	**0.3**	0.2 U
TCE	**1.4**	0.2 U
cis-1,2-DCE	**0.5**	0.2 U
Vinyl Chloride	0.2 U	0.2 U

Sample Location	B16			
Sample Identification	GW-56	GW-57	GW-58	GW-58 D
Date Sampled	13-Apr-98	13-Apr-98	13-Apr-98	13-Apr-98
Sample Depth (feet)	25	45	65	65
Laboratory Number	FFTA-MAAF GW-56	FFTA-MAAF GW-57	FFTA-MAAF GW-58	FFTA-MAAF GW-58D
Sample Parameters (ug/L)				
PCE	0.2 U	**1.5**	0.2 U	0.2 U
TCE	0.2 U	**2.0**	**0.6**	**0.3**
cis-1,2-DCE	0.2 U	**2.0**	**0.3**	0.2 U
Vinyl Chloride	0.2 U	0.2 U	0.2 U	0.2 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B17		
Sample Identification	GW-59	GW-60	GW-61
Date Sampled	13-Apr-98	13-Apr-98	13-Apr-98
Sample Depth (feet)	25	45	63
Laboratory Number	FFTA-MAAF GW-59	FFTA-MAAF GW-60	FFTA-MAAF GW-61
Sample Parameters (ug/L)			
PCE	0.2 U	**1.4**	**1.4**
TCE	0.2 U	**2.3**	**3.3**
cis-1,2-DCE	0.2 U	**29.7**	**33.6**
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Sample Location	B18			
Sample Identification	GW-62	GW-63	GW-64	GW-64 D
Date Sampled	13-Apr-98	13-Apr-98	14-Apr-98	14-Apr-98
Sample Depth (feet)	25	45	64	64
Laboratory Number	FFTA-MAAF GW-62	FFTA-MAAF GW-63	FFTA-MAAF GW-64	FFTA-MAAF GW-64D
Sample Parameters (ug/L)				
PCE	0.2 U	**4.0**	**7.5**	**5.3**
TCE	0.2 U	**2.1**	**4.0**	**3.0**
cis-1,2-DCE	0.2 U	**11.7**	**22.6**	**16.0**
Vinyl Chloride	0.2 U	0.2 U	0.2 U	0.2 U

Sample Location	B19		
Sample Identification	GW-65	GW-66	GW-67
Date Sampled	14-Apr-98	14-Apr-98	14-Apr-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-65	FFTA-MAAF GW-66	FFTA-MAAF GW-67
Sample Parameters (ug/L)			
PCE	0.2 U	0.2 U	0.2 U
TCE	0.2 U	0.2 U	0.2 U
cis-1,2-DCE	0.2 U	0.2 U	0.2 U
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B20			
Sample Identification	GW-68	GW-69	GW-69 D	GW-70
Date Sampled	14-Apr-98	14-Apr-98	14-Apr-98	14-Apr-98
Sample Depth (feet)	25	45	45	62
Laboratory Number	FFTA-MAAF GW-68	FFTA-MAAF GW-69	FFTA-MAAF GW-69D	FFTA-MAAF GW-70
Sample Parameters (ug/L)				
PCE	0.2 U	0.2 U	0.2 U	0.2 U
TCE	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-DCE	0.2 U	**0.8**	**0.7**	**1.9**
Vinyl Chloride	0.2 U	0.2 U	0.2 U	0.2 U

Sample Location	B21		
Sample Identification	GW-71	GW-72	GW-73
Date Sampled	14-Apr-98	14-Apr-98	14-Apr-98
Sample Depth (feet)	25	45	61
Laboratory Number	FFTA-MAAF GW-71	FFTA-MAAF GW-72	FFTA-MAAF GW-73
Sample Parameters (ug/L)			
PCE	0.2 U	**0.3**	0.2 U
TCE	0.2 U	**1.4**	0.2 U
cis-1,2-DCE	0.2 U	**0.5**	0.2 U
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Sample Location	B22		
Sample Identification	GW-74	GW-75	GW-76
Date Sampled	14-Apr-98	14-Apr-98	14-Apr-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-74	FFTA-MAAF GW-75	FFTA-MAAF GW-76
Sample Parameters (ug/L)			
PCE	0.2 U	**4.5**	**0.9**
TCE	0.2 U	**7.0**	**1.3**
cis-1,2-DCE	0.2 U	**57.1**	**25.6**
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B23		
Sample Identification	GW-77	GW-78	GW-79
Date Sampled	15-Apr-98	15-Apr-98	15-Apr-98
Sample Depth (feet)	25	45	60
Laboratory Number	FFTA-MAAF GW-77	FFTA-MAAF GW-78	FFTA-MAAF GW-79
Sample Parameters (ug/L)			
PCE	0.2 U	**0.3**	0.2 U
TCE	0.2 U	**0.7**	**0.3**
cis-1,2-DCE	0.2 U	**0.5**	0.2 U
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Sample Location	FP-96-22	FP-96-24
Sample Identification	GW-80	GW-81
Date Sampled	15-Apr-98	15-Apr-98
Sample Depth (feet)	NAv (Shallow)	NAv (Shallow)
Laboratory Number	FP-96-22 GW-80	FP-96-24 GW-81
Sample Parameters (ug/L)		
PCE	0.2 U	0.2 U
TCE	0.2 U	**2.1**
cis-1,2-DCE	0.2 U	**3.3**
Vinyl Chloride	0.2 U	0.2 U

Sample Location	B24			
Sample Identification	GW-82	GW-83	GW-84	GW-84 D
Date Sampled	15-Apr-98	15-Apr-98	15-Apr-98	15-Apr-98
Sample Depth (feet)	25	45	65	65
Laboratory Number	FFTA-MAAF GW-82	FFTA-MAAF GW-83	FFTA-MAAF GW-84	FFTA-MAAF GW-84D
Sample Parameters (ug/L)				
PCE	0.2 U	**6.6**	**2.5**	**3.2**
TCE	0.2 U	**4.3**	**2.4**	**3.3**
cis-1,2-DCE	0.2 U	**26.2**	**10.2**	**10.8**
Vinyl Chloride	0.2 U	0.2 U	0.2 U	0.2 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B25		
Sample Identification	GW-85	GW-86	GW-87
Date Sampled	15-Apr-98	15-Apr-98	15-Apr-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-85	FFTA-MAAF GW-86	FFTA-MAAF GW-87
Sample Parameters (ug/L)			
PCE	0.2 U	0.2 U	0.2 U
TCE	0.2 U	0.2 U	0.2 U
cis-1,2-DCE	0.2 U	0.2 U	0.2 U
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Sample Location	B26		
Sample Identification	GW-88	GW-89	GW-90
Date Sampled	15-Apr-98	15-Apr-98	15-Apr-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-88	FFTA-MAAF GW-89	FFTA-MAAF GW-90
Sample Parameters (ug/L)			
PCE	0.2 U	**0.9**	**0.3**
TCE	0.2 U	**1.7**	**0.7**
cis-1,2-DCE	0.2 U	**54.2**	**33.6**
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Sample Location	B27		
Sample Identification	GW-91	GW-92	GW-93
Date Sampled	15-Apr-98	15-Apr-98	15-Apr-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-91	FFTA-MAAF GW-92	FFTA-MAAF GW-93
Sample Parameters (ug/L)			
PCE	0.2 U	0.2 U	0.2 U
TCE	0.2 U	0.2 U	0.2 U
cis-1,2-DCE	0.2 U	**11.3**	**0.4**
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B28		
Sample Identification	GW-94	GW-95	GW-96
Date Sampled	16-Apr-98	16-Apr-98	16-Apr-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-94	FFTA-MAAF GW-95	FFTA-MAAF GW-96
Sample Parameters (ug/L)			
PCE	0.2 U	0.2 U	0.2 U
TCE	0.2 U	0.2 U	0.2 U
cis-1,2-DCE	0.2 U	0.2 U	0.2 U
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Sample Location	B29	
Sample Identification	GW-97	GW-98
Date Sampled	16-Apr-98	16-Apr-98
Sample Depth (feet)	25	45
Laboratory Number	FFTA-MAAF GW-97	FFTA-MAAF GW-98
Sample Parameters (ug/L)		
PCE	0.2 U	0.2 U
TCE	0.2 U	0.2 U
cis-1,2-DCE	0.2 U	0.2 U
Vinyl Chloride	0.2 U	0.2 U

Sample Location	B30		
Sample Identification	GW-99	GW-100	GW-101
Date Sampled	16-Apr-98	16-Apr-98	16-Apr-98
Sample Depth (feet)	25	45	64
Laboratory Number	FFTA-MAAF GW-99	FFTA-MAAF GW-100	FFTA-MAAF GW-101
Sample Parameters (ug/L)			
PCE	0.2 U	0.2 U	0.2 U
TCE	0.2 U	0.2 U	0.2 U
cis-1,2-DCE	0.2 U	0.2 U	0.2 U
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Table 4-2 (continued)
Plume Characterization Groundwater Screening Results
FFTA-MAAF Remedial Investigation Report

Sample Location	B31			
Sample Identification	GW-102	GW-103	GW-104	GW-104 D
Date Sampled	16-Apr-98	16-Apr-98	16-Apr-98	16-Apr-98
Sample Depth (feet)	25	45	65	65
Laboratory Number	FFTA-MAAF GW-102	FFTA-MAAF GW-103	FFTA-MAAF GW-104	FFTA-MAAF GW-104D
Sample Parameters (ug/L)				
PCE	0.2 U	**7.0**	**4.3**	**3.6**
TCE	0.2 U	**3.0**	**2.1**	**2.0**
cis-1,2-DCE	**0.3**	**26.3**	**41.7**	**42.1**
Vinyl Chloride	0.2 U	0.2 U	0.2 U	0.2 U

Sample Location	B32		
Sample Identification	GW-105	GW-106	GW-107
Date Sampled	16-Apr-98	16-Apr-98	16-Apr-98
Sample Depth (feet)	25	45	65
Laboratory Number	FFTA-MAAF GW-105	FFTA-MAAF GW-106	FFTA-MAAF GW-107
Sample Parameters (ug/L)			
PCE	0.2 U	0.2 U	0.2 U
TCE	0.2 U	0.2 U	0.2 U
cis-1,2-DCE	0.2 U	**0.8**	0.2 U
Vinyl Chloride	0.2 U	0.2 U	0.2 U

Source:
May/June 1998 DSR (BMcD, 1998j)
Notes:
D = Duplicate sample
U = Qualified as undetected by the laboratory
NAv = Not Available
ND = Not Detected
µg/L = micrograms per liter
DCE = Dichloroethene
PCE = Tetrachloroethene
TCE = Trichloroethene
BOLD text indicates positive detections
Shaded values indicate detections exceding MCL

Table 4-3
Plume Characterization Monitoring Well and Probehole Groundwater Results Comparison
FFTA-MAAF Remedial Investigation Report

Sample Locations	FP-98-27 vs. B22	
Sample Identification	FP-98-27	B-22 (GW-74)
Date Sampled	25-Jun-98	14-Apr-98
Sample Depth (feet)	25	25
Sample Parameters (ug/L)		
PCE	0.5 U	0.2 U
TCE	0.5 U	0.2 U
cis-1,2-DCE	**0.7**	0.2 U

Sample Locations	FP-98-27b vs. B22	
Sample Identification	FP-98-27b	B-22 (GW-75)
Date Sampled	25-Jun-98	14-Apr-98
Sample Depth (feet)	45	45
Sample Parameters (ug/L)		
PCE	**21**	**4.5**
TCE	**15**	**7.0**
cis-1,2-DCE	**111.0**	**57.1**

Sample Locations	FP-98-27c vs. B22	
Sample Identification	FP-98-27c	B-22 (GW-76)
Date Sampled	25-Jun-98	14-Apr-98
Sample Depth (feet)	65	65
Sample Parameters (ug/L)		
PCE	**2.3**	**0.9**
TCE	**1.5**	**1.3**
cis-1,2-DCE	**28.7**	**25.6**

Table 4-3 (continued)
Plume Characterization Monitoring Well and Probehole Groundwater Results Comparison
FFTA-MAAF Remedial Investigation Report

Sample Locations	FP-98-28 vs. B21	
Sample Identification	FP-98-28	B-21 (GW-71)
Date Sampled	26-Jun-98	14-Apr-98
Sample Depth (feet)	25	25
Sample Parameters (ug/L)		
PCE	0.5 U	0.2 U
TCE	0.5 U	0.2 U
cis-1,2-DCE	0.5 U	0.2 U

Sample Locations	FP-98-28b vs. B21	
Sample Identification	FP-98-28b	B-21 (GW-72)
Date Sampled	26-Jun-98	14-Apr-98
Sample Depth (feet)	45	45
Sample Parameters (ug/L)		
PCE	0.5 U	0.2 U
TCE	0.5 U	0.2 U
cis-1,2-DCE	0.5 U	0.2 U

Sample Locations	FP-98-28c vs. B21	
Sample Identification	FP-98-28c	B-21 (GW-73)
Date Sampled	26-Jun-98	14-Apr-98
Sample Depth (feet)	61	61
Sample Parameters (ug/L)		
PCE	0.5 U	0.2 U
TCE	0.5 U	0.2 U
cis-1,2-DCE	0.5 U	0.2 U

Table 4-3 (continued)
Plume Characterization Monitoring Well and Probehole Groundwater Results Comparison
FFTA-MAAF Remedial Investigation Report

Sample Locations	FP-98-29 vs. B18*	
Sample Identification	FP-98-29	B-18 (GW-62)
Date Sampled	26-Jun-98	13-Apr-98
Sample Depth (feet)	25	25
Sample Parameters (ug/L)		
PCE	0.5 U	0.2 U
TCE	0.5 U	0.2 U
cis-1,2-DCE	0.5 U	0.2 U

Sample Locations	FP-98-29b vs. B18*	
Sample Identification	FP-98-29b	B-18 (GW-63)
Date Sampled	25-Jun-98	13-Apr-98
Sample Depth (feet)	45	45
Sample Parameters (ug/L)		
PCE	**18.1**	**4.0**
TCE	**5.6**	**2.1**
cis-1,2-DCE	**51.3**	**11.7**

Sample Locations	FP-98-29c vs. B18*	
Sample Identification	FP-98-29c	B-18 (GW-64)
Date Sampled	26-Jun-98	14-Apr-98
Sample Depth (feet)	64	64
Sample Parameters (ug/L)		
PCE	**7.0**	**7.5**
TCE	**4.8**	**4.0**
cis-1,2-DCE	**37.1**	**22.6**

*Probehole B-18 is approximately 300 feet south of the FP-98-29 well cluster.

Table 4-3 (continued)
Plume Characterization Monitoring Well and Probehole Groundwater Results Comparison
FFTA-MAAF Remedial Investigation Report

Sample Locations	FP-98-30 vs. B19	
Sample Identification	FP-98-30	B-19 (GW-65)
Date Sampled	25-Jun-98	14-Apr-98
Sample Depth (feet)	25	25
Sample Parameters (ug/L)		
PCE	0.5 U	0.2 U
TCE	0.5 U	0.2 U
cis-1,2-DCE	0.5 U	0.2 U

Sample Locations	FP-98-30b vs. B19	
Sample Identification	FP-98-30b	B-19 (GW-66)
Date Sampled	25-Jun-98	14-Apr-98
Sample Depth (feet)	45	45
Sample Parameters (ug/L)		
PCE	0.5 U	0.2 U
TCE	0.5 U	0.2 U
cis-1,2-DCE	0.5 U	0.2 U

Sample Locations	FP-98-30c vs. B-19	
Sample Identification	FP-98-30c	B-19 (GW-67)
Date Sampled	25-Jun-98	14-Apr-98
Sample Depth (feet)	65	65
Sample Parameters (ug/L)		
PCE	0.5 U	0.2 U
TCE	0.5 U	0.2 U
cis-1,2-DCE	0.5 U	0.2 U

Table 4-3 (continued)
Plume Characterization Monitoring Well and Probehole Groundwater Results Comparison
FFTA-MAAF Remedial Investigation Report

Sample Locations	FP-98-31 vs. B31*	
Sample Identification	FP-98-31	B-31 (GW-102)
Date Sampled	26-Jun-98	16-Apr-98
Sample Depth (feet)	25	25
Sample Parameters (ug/L)		
PCE	0.5 U	0.2 U
TCE	0.5 U	0.2 U
cis-1,2-DCE	0.5 U	**0.3**

Sample Locations	FP-98-31b vs. B31*	
Sample Identification	FP-98-31b	B-31 (GW-103)
Date Sampled	26-Jun-98	16-Apr-98
Sample Depth (feet)	45	45
Sample Parameters (ug/L)		
PCE	**15.5**	**7.0**
TCE	**6.0**	**3.0**
cis-1,2-DCE	**32.9**	**26.3**

Sample Locations	FP-98-31c vs. B31*	
Sample Identification	FP-98-31c	B-31 (GW-104)
Date Sampled	26-Jun-98	16-Apr-98
Sample Depth (feet)	65	65
Sample Parameters (ug/L)		
PCE	**6.6**	**4.3**
TCE	**3.5**	**2.1**
cis-1,2-DCE	**43.1**	**41.7**

*Probehole B31 is approximately 250 feet southwest of the FP-98-31 well cluster.

Source:

May/June 1998 DSR (BMcD, 1998j)

Notes:

PCE = Tetrachloroethene
TCE = Trichloroethene
DCE = Dichloroethene
BOLD text indicates positive detections

μg/L = micrograms per liter
U = Qualified as undetected by laboratory
Shaded values indicate detections exceding MCL

Table 4-5
Plume Characterization Soil Boring TOC and CEC Results
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-27C								
Sample Identification	S0-1	S0-2	S0-3	S0-4	S0-5	S0-6	S0-7	S0-8	S0-9
Date Sampled	20-May-98	20-May-98	20-May-98	20-May-98	20-May-98	20-May-98	21-May-98	21-May-98	21-May-98
Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth (feet)	20-22	26-28	30-32	36-38	42-44	46-48	52-54	56-58	62-64
Laboratory Number	98052109	98052110	98052111	98052112	98052113	98052114	98052115	98052116	98052117
Sample Parameters									
TOC (mg/kg)	3330	1380	6490	1490	5580	6540	7570	9080	2550
CEC (meq/100 g)	NA	NA	5.8	NA	NA	NA	NA	NA	NA

Sample Location	FP-98-28C								
Sample Identification	S0-1	S0-2	S0-3	S0-4	S0-5	S0-6	S0-7	S0-8	S0-9
Date Sampled	18-May-98	18-May-98	18-May-98	18-May-98	18-May-98	18-May-98	18-May-98	18-May-98	18-May-98
Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth (feet)	20-22	26-28	29-30	30-32	36-38	42-44	46-48	52-54	56-58
Laboratory Number	98051496	98051497	98051498	98051499	98051501	98051502	98051503	98051504	98051505
Sample Parameters									
TOC (mg/kg)	ND(<100)	7500	NA	11500	2180	5390	6220	6750	16400
CEC (meq/100 g)	NA	NA	9.2	13	NA	NA	NA	NA	NA

Source:

May/June 1998 DSR (BMcD, 1998j)

Notes:

Clay samples only were analyzed for CEC

ND = Not Detected

NA = Not Analyzed

TOC = Total Organic Carbon

CEC = Cation Exchange Capacity

mg/kg = milligrams per kilogram

meq/100g = milliequivalents per one hundred grams

Table 4-4
Plume Characterization Soil Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Boring Number	Sample Number	Depth (feet)	Water Content (%)	Specific Gravity
FP-98-27c	SB-01	0.0	20.5	NA
	SB-02	6.0	24.6	NA
	SB-03	12.0	9.8	NA
	SB-04	18.0	14.2	NA
	SB-05	20.0	4.3	2.636
	SB-06	26.0	5.3	2.618
	SB-07	30.0	15.7	2.586
	SB-08	36.0	10.2	2.586
	SB-09	42.0	9.1	2.620
	SB-10	46.0	14.7	2.621
	SB-11	50.0	13.3	2.602
	SB-12	56.0	16.2	2.630
	SB-13	62.0	13.7	2.616
	SB-14	64.0	9.2	2.576
FP-98-28c	SB-01	0.0	12.3	NA
	SB-02	4.0	15.8	NA
	SB-03	10.0	8.3	NA
	SB-04	14.0	9.1	NA
	SB-05	18.0	16.1	NA
	SB-06	20.0	22.3	2.743
	SB-07	26.0	15.8	2.618
	SB-08	30.0	31.1	2.582
	SB-09	36.0	19.9	2.561
	SB-10	42.0	17.6	2.605
	SB-11	46.0	10.2	2.587
	SB-12	52.0	15.9	2.628
	SB-13	56.0	13.9	2.577

Source:
May/June 1998 DSR (BMcD, 1998j)
Notes:
NA = Not Analyzed

Table 4-5
Plume Characterization Soil Boring TOC and CEC Results
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-27C								
Sample Identification	S0-1	S0-2	S0-3	S0-4	S0-5	S0-6	S0-7	S0-8	S0-9
Date Sampled	20-May-98	20-May-98	20-May-98	20-May-98	20-May-98	20-May-98	21-May-98	21-May-98	21-May-98
Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth (feet)	20-22	26-28	30-32	36-38	42-44	46-48	52-54	56-58	62-64
Laboratory Number	98052109	98052110	98052111	98052112	98052113	98052114	98052115	98052116	98052117
Sample Parameters									
TOC (mg/kg)	3330	1380	6490	1490	5580	6540	7570	9080	2550
CEC (meq/100 g)	NA	NA	5.8	NA	NA	NA	NA	NA	NA

Sample Location	FP-98-28C								
Sample Identification	S0-1	S0-2	S0-3	S0-4	S0-5	S0-6	S0-7	S0-8	S0-9
Date Sampled	18-May-98	18-May-98	18-May-98	18-May-98	18-May-98	18-May-98	18-May-98	18-May-98	18-May-98
Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth (feet)	20-22	26-28	29-30	30-32	36-38	42-44	46-48	52-54	56-58
Laboratory Number	98051496	98051497	98051498	98051499	98051501	98051502	98051503	98051504	98051505
Sample Parameters									
TOC (mg/kg)	ND(<100)	7500	NA	11500	2180	5390	6220	6750	16400
CEC (meq/100 g)	NA	NA	9.2	13	NA	NA	NA	NA	NA

Source:

May/June 1998 DSR (BMcD, 1998j)

Notes:

Clay samples only were analyzed for CEC

ND = Not Detected

NA = Not Analyzed

TOC = Total Organic Carbon

CEC = Cation Exchange Capacity

mg/kg = milligrams per kilogram

meq/100g = milliequivalents per one hundred grams

Table 4-6
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-01										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	14.9	14.5	15.0	16.1	13.3	15.0	15.2	14.0	14.4	15.0	> 20°C
pH (standard units) (b)	6.83	6.92	7.06	7.1	7.2	6.96	7.1	7.1	7.2	7.2	5 < x < 9
Conductivity (µohm/cm) (b)	701	676.1	500	600	930	690	600	680	610	520	NAp
Turbidity (NTU) (b)	16.2	5.42	4	1.35	3.86	6.10	4.97	2.07	21.00	10.5	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	4.0 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	354	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	43.8 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	13.2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	<0.1	0.29R	NA	NA	NA	1.3	0.06	0.04	0.14	0.11	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-117	NA	NA	NA	NA	NA	NA	NA	NA	-62	< 50
Iron (II), Ferrous (units in mg/L) (b)	6.3	NA	NA	NA	NA	NA	NA	NA	NA	3.36	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-02										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	14.7	14.7	13.9	14.2	13.9	14.3	14.7	14.2	13.7	14.4	> 20°C
pH (standard units) (b)	6.80	6.59	6.90	6.95	6.9	7.42	7.2	6.9	7.1	7.4	5 < x < 9
Conductivity (µohm/cm) (b)	827	742	800	680	960	720	900	980	850	660	NAp
Turbidity (NTU) (b)	11	6.69	7	2.53	1.18	2.85	2.75	9.58	4.38	8.5	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	2.1	2.8	ND(<2.0)	2 U	3.3	2	ND(<2.0)	3	3	NA	> 500
Ethane (units in ug/L)	4.0 UJ	ND(<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	425	373	388	378	430	486	440	430	342	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	1.2	0.7	0.7	0.7	1.2	0.4	0.9	0.3	0.1	0.1	< 1
Sulfate (units in mg/L)	53.8 J	54	60	40	52	51	49	33	34	19	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	> 1
Chloride (units in mg/L)	9.42 J	16	13	10	9	16	23	21	31	NA	> 56 (d) (e)
TOC (units in mg/L)	5.1	9.6	7.6	12	16	2.1	4.3	6.4	0.8	1.9	> 20
DO (units in mg/L) (b)	0.9	<0.01R	0.73	0.37	1.7	0.45	2.09	1.37	0.50	0.49	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	84	-151R	-38	229	-18	60	78	283	-49	0	< 50
Iron (II), Ferrous (units in mg/L) (b)	1.7	1.66	2.08	1.93	2.97	1.97	2.48	0.89	1.82	0.93	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-02b										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	15.2	14.1	12.8	14.9	13.6	15.5	15.4	13.6	14.2	15.0	> 20°C
pH (standard units) (b)	6.86	6.11	6.99	7.03	7.1	7.5	6.9	7.1	7.2	7.4	5 < x < 9
Conductivity (µohm/cm) (b)	857	783.6	900	760	980	730	800	1040	900	960	NAp
Turbidity (NTU) (b)	19	2.5	3	0.4	1.03	0.59	1.47	0.44	0.75	3.17	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	10	6.0	ND(<2.0)	20.3	4.6	ND(<2.0)	3	15	2	NA	> 500
Ethane (units in ug/L)	4.0 UJ	ND(<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND (<4.0)	ND (<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	463	465	440	432	490	456	450	450	411	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	46.8 J	51	49	44	50	45	46	54	48	50	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	> 1
Chloride (units in mg/L)	10.4 J	9.3	9	11	9	11	11	22	15	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	11	7.7	12	5	8.3	5.9	5.8	ND(<0.5)	3.7	> 20
DO (units in mg/L) (b)	<0.1	4.63R	0.27	0.30	0.50	0.21	0.35	0.82	0.81	0.52	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-133	-137R	-133	-42	-94	-23	-56	154	-126	-83	< 50
Iron (II), Ferrous (units in mg/L) (b)	8.9	7.18	6.08	1.82	7.3	5.96	5.34	3.70	5.88	5.70	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-02c										Favorable Geochemical Conditions (a)
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters											
Temperature (degrees C) (b)	15.2	14.1	15.7	15.0	14.1	15.2	15.5	14.0	14.5	15.4	> 20°C
pH (standard units) (b)	6.91	6.57	7.10	7.05	6.9	7.21	6.9	7.0	7.2	7.4	5 < x < 9
Conductivity (µohm/cm) (b)	865	781.1	800	780	980	750	800	960	930	900	NAp
Turbidity (NTU) (b)	6.0	2.18	1	0.2	0.63	0.70	0.40	0.56	0.46	3.66	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	<2.0	NA	NA	NA	2.2	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NA	> 500
Ethane (units in ug/L)	4.0 UJ	NA	NA	NA	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	ND (<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	ND (<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	441	NA	NA	NA	460	450	430	420	421	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	ND(<1)	ND(<1)	ND(<0.1)	0.2	0.3	0.2	< 1
Sulfate (units in mg/L)	59.4 J	NA	NA	NA	53	50	51	51	49	46	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	ND (< 0.1)	> 1
Chloride (units in mg/L)	21.9 J	NA	NA	NA	30	30	29	36	36	NA	> 56 (d) (e)
TOC (units in mg/L)	3.1	NA	NA	NA	6.6	7.7	3.5	4.8	0.8	5.0	> 20
DO (units in mg/L) (b)	<0.1	0.53R	NA	0.35	0.9	0.15	5.38	0.43	0.14	0.11	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-61	-110R	NA	52	-28	70	2	179	-60	17	< 50
Iron (II), Ferrous (units in mg/L) (b)	1.1	NA	NA	0.52	0.8	0.87	0.68	0.61	0.57	0.48	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-03										Favorable Geochemical Conditions (a)
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters											
Temperature (degrees C) (b)	14.4	14.2	13.1	15.6	12.3	13.0	14.3	13.7	12.8	14.6	> 20°C
pH (standard units) (b)	6.78	6.39	6.99	7.1	7.3	6.89	7.2	7.0	7.0	7.2	5 < x < 9
Conductivity (µohm/cm) (b)	855	703.0	600	700	790	620	500	850	880	690	NAp
Turbidity (NTU) (b)	10.5	3.79	5	10.4	2.96	6.33	3.49	2.58	1.76	9.97	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	4.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	4.0 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	468	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	47.6 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	5.07 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	3.1	3.3R	NA	NA	NA	4.0	0.61	1.52	3.24	2.09	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	128	NA	NA	NA	NA	NA	NA	NA	NA	82	< 50
Iron (II), Ferrous (units in mg/L) (b)	2.9	NA	NA	NA	NA	NA	NA	NA	NA	0.0	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-04										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	15.7	16.6	14.0	14.3	13.1	15.1	18.4	16.5	14.0	16.9	> 20°C
pH (standard units) (b)	6.73	6.67	6.73	6.93	7.1	6.77	6.9	6.8	7.1	6.9	5 < x < 9
Conductivity (μohm/cm) (b)	1034	948.4	600	800	1080	900	440	860	1070	770	NAp
Turbidity (NTU) (b)	11.5	1.23	4	11.3	1.48	1.82	9.42	1.76	4.67	2.84	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	4800	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	560	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	51.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	13.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	<0.1	0.05R	NA	NA	NA	0.6	0.15	0.04	0.12	0.12	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-183	NA	NA	NA	NA	NA	NA	NA	NA	-122	< 50
Iron (II), Ferrous (units in mg/L) (b)	5.1	NA	NA	NA	NA	NA	NA	NA	NA	12.6	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-04b										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	15.0	14.4	15.1	14.8	13	14.7	15.3	14.5	14.5	15.7	> 20°C
pH (standard units) (b)	6.86	6.76	7.20	7.2	7.5	6.95	7.2	7.1	7.2	7.0	5 < x < 9
Conductivity (µohm/cm) (b)	861	862.8	860	940	880	970	570	1010	900	920	NAp
Turbidity (NTU) (b)	8.6	1.36	1	1.85	1.54	0.21	3.44	0.54	0.77	3.14	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	ND(<2.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	4.0 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	444	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	40.8 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	15.8 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	0.1	0.24R	NA	NA	NA	0.6	0.16	0.05	0.82	0.13	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-90	NA	NA	NA	NA	NA	NA	NA	NA	-81	< 50
Iron (II), Ferrous (units in mg/L) (b)	6.8	NA	NA	NA	NA	NA	NA	NA	NA	5.02	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-04c										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	15.1	14.3	16.1	14.9	12.7	16.0	15.8	14.5	14.5	15.9	> 20°C
pH (standard units) (b)	6.93	6.73	7.23	7.21	7.5	7.01	8.0	7.1	7.2	7.2	5 < x < 9
Conductivity (μohm/cm) (b)	883	882.6	880	950	1000	840	880	1020	940	920	NAp
Turbidity (NTU) (b)	0.10	0.97	2	1.4	0.24	0.58	2.50	0.23	0.38	2.93	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	ND(<2.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	4.0 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	438	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	55 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	25.3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	<0.1	0.21R	NA	NA	NA	1.7	0.07	0.06	0.16	0.14	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-71	NA	NA	NA	NA	NA	NA	NA	NA	-26	< 50
Iron (II), Ferrous (units in mg/L) (b)	1.4	NA	NA	NA	NA	NA	NA	NA	NA	0.92	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-05										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	14.2	15.3	14.6	13.2	13.8	14.7	15.6	16.9	12.7	NS	> 20°C
pH (standard units) (b)	7.00	6.85	6.99	7.03	6.0	6.96	7.3	7.3	7.0	NS	5 < x < 9
Conductivity (µohm/cm) (b)	646	682.1	450	893	1030	910	260	830	920	NS	NAp
Turbidity (NTU) (b)	17.5	13.04	11	11.7	20.9	5.42	14.7	15.6	20.7	NS	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	4.1	NA	NA	NA	NA	NA	NA	NA	NA	NS	> 500
Ethane (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NS	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NS	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	338	NA	NA	NA	NA	NA	NA	NA	NA	NS	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NS	< 1
Sulfate (units in mg/L)	29.9	NA	NA	NA	NA	NA	NA	NA	NA	NS	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	> 1
Chloride (units in mg/L)	8.56	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	> 20
DO (units in mg/L) (b)	1.1	0.21R	NA	NA	NA	5.0	0.67	0.88	3.22	NS	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-20	NA	NA	NA	NA	NA	NA	NA	NA	NS	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.8	NA	NA	NA	NA	NA	NA	NA	NA	NS	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-93-07										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	14.8	14.0	13.1	14.8	13.3	13.9	15.1	13.6	13.2	14.8	> 20°C
pH (standard units) (b)	6.97	6.12	6.35	7.12	7.4	7.08	7.0	7.0	7.3	7.4	5 < x < 9
Conductivity (µohm/cm) (b)	680	589.2	600	610	730	520	700	890	620	590	NAp
Turbidity (NTU) (b)	9.86	1.41	3	3.93	2.18	3.68	1.91	0.95	2.46	3.57	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	2	3.6	ND(<2.0)	4.8	5.4	7	3	3	4	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	336	394	342	352	350	369	380	394	336	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.2	0.1	0.2	< 1
Sulfate (units in mg/L)	26.1	33	23	23	18	16	21	18	14	18	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	ND(<1)	1.7	1	1	1	2	2	1	1	NA	> 56 (d) (e)
TOC (units in mg/L)	3.2	2.4	4.1	3.9	2.5	9.6	1.6	1.1	ND(<0.5)	2.8	> 20
DO (units in mg/L) (b)	6.5	4.09R	3.01	2.1	2.1	1.61	3.95	1.76	4.29	2.62	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-451	-128R	-19	1	-16	41	15	193	155	72	< 50
Iron (II), Ferrous (units in mg/L) (b)	1.9	4.32	1.89	1.96	2.67	2.80	1.96	0.02	0.05	0.18	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-07c										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	15.0	14.0	14.4	15	13.9	15.0	15.1	13.6	14.5	15.0	> 20°C
pH (standard units) (b)	6.91	6.87	6.30	7.05	7.2	6.97	7.2	7.1	7.1	7.4	5 < x < 9
Conductivity (µohm/cm) (b)	951	869.5	800	810	1120	760	800	1050	930	870	NAp
Turbidity (NTU) (b)	7.45	1.37	2	3	0.37	0.22	0.47	0.30	0.56	2.05	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	2	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	384	472	417	418	420	444	425	446	422	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	1.68	1.5	1.2	1.2	1.4	1.2	1.3	1.4	1.3	1.3	< 1
Sulfate (units in mg/L)	59.9	53	46	47	55	53	65	56	54	60	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	28.1	32	29	34	36	33	48	40	46	NA	> 56 (d) (e)
TOC (units in mg/L)	3.3	2.6	3.0	2.8	6.6	10	10	2.2	2.2	2.3	> 20
DO (units in mg/L) (b)	0.4	0.51R	0.27	1.1	3.6	0.22	1.25	0.17	0.78	0.06	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	210	-88R	151	200	-8	103	90	311	197	59	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.01	0.06	ND	0.04	ND	ND	0.03	0.15	0.02	0.00	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-94-09										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	14.8	14.2	14.2	14.4	14	14.6	14.4	14.6	14.8	15.2	> 20°C
pH (standard units) (b)	6.82	6.50	6.85	6.79	7.1	7.37	7.4	6.9	7.1	7.3	5 < x < 9
Conductivity (μohm/cm) (b)	1148	761.2	1100	1160	1460	1020	1200	1160	1220	1080	NAp
Turbidity (NTU) (b)	2.6	8.52	4	4.14	0.87	0.42	1.53	3.24	0.47	8.19	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	64	63	30	20.3	36	69	37	120	147	108	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Alkalinity, as $CaCO_3$ (units in mg/L)	580	602	575	613	670	663	580	510	501	510	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	0.3	0.2	0.2	0.2	ND(<0.1)	ND(<0.1)	1.2	0.7	0.9	< 1
Sulfate (units in mg/L)	117 J	119	127	112	105	98	110	86	130	97	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	52 J	31	35	27	21	28	30	15	18	NA	> 56 (d) (e)
TOC (units in mg/L)	20	20	18	19	16	8.3	5.6	7.2	2.6	4.8	> 20
DO (units in mg/L) (b)	2.2	0.36R	0.62	5.2	0.7	0.17	0.45	0.95	0.43	0.78	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-37	-182R	-42	-75	-60	-62	-45	131	-78	-32	< 50
Iron (II), Ferrous (units in mg/L) (b)	8.8	10.04	7.82	7.6	6.06	6.6	4.14	5.90	5.10	3.24	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
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Sample Location	FP-96-09b									Favorable Geochemical
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters										
Temperature (degrees C) (b)	15.3	14.7	15.3	13.9	15.1	15.4	14.3	14.7	15.5	> 20°C
pH (standard units) (b)	6.84	6.96	6.93	7.1	7.32	7.1	7.0	7.3	7.4	5 < x < 9
Conductivity (µohm/cm) (b)	870	900	1020	1240	810	950	1120	1020	1000	NAp
Turbidity (NTU) (b)	26	3	3.1	0.26	0.80	1.37	0.47	0.90	14.40	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	200	150	28	130	80	160	461	273	251	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	514	494	595	440	506	494	470	428	500	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	56	62	88	117	82	87	89	80	71	< 20
Sulfide (units in mg/L)	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	15	18	17	18	18	17	18	18	NA	> 56 (d) (e)
TOC (units in mg/L)	14	10	14	5	4.5	5	8.9	1.5	3.5	> 20
DO (units in mg/L) (b)	0.12R	0.41	0.23	0.4	0.41	0.24	0.15	0.13	0.07	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-245R	-122	-126	-112	-69	-72	132	-158	-93	< 50
Iron (II), Ferrous (units in mg/L) (b)	11.44	6.98	4.54	7.64	8.64	7.70	2.66	8.94	4.11	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
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Sample Location	FP-96-09c									Favorable Geochemical Conditions (a)
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters										
Temperature (degrees C) (b)	14.2	14.2	15.2	14	15.4	15.4	14.2	14.6	15.3	> 20°C
pH (standard units) (b)	**6.87**	**7.02**	**6.99**	**7.2**	**7.5**	**7.4**	**7.0**	**7.2**	**7.4**	5 < x < 9
Conductivity (µohm/cm) (b)	869	700	830	1100	740	800	990	940	950	NAp
Turbidity (NTU) (b)	11.89	2	2.28	1.12	0.25	1.22	0.15	0.47	4.83	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	3.2	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	5	ND(<2.0)	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	405	430	462	640	458	430	420	421	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	< 1
Sulfate (units in mg/L)	55	52	53	59	55	55	54	52	48	< 20
Sulfide (units in mg/L)	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	27	28	29	33	30	34	32	33	NA	> 56 (d) (e)
TOC (units in mg/L)	8.5	11	**26**	5.1	1.5	2.6	3.4	ND(<0.5)	1.8	> 20
DO (units in mg/L) (b)	0.03R	**0.32**	**0.18**	**0.3**	**0.11**	**0.39**	**0.18**	**0.11**	**0.10**	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-452R	**-71**	**-100**	**-91**	**-52**	**-63**	**44**	**-117**	**-61**	< 50
Iron (II), Ferrous (units in mg/L) (b)	**4.85**	**4.16**	**4.54**	**4.08**	**4.48**	**3.66**	**3.81**	**4.04**	**3.93**	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
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Sample Location	FP-94-11										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	16.5	15.2	12.9	16.9	12.2	13.3	17.0	14.8	13.1	16.1	> 20°C
pH (standard units) (b)	6.74	6.80	6.99	7.1	7.1	6.77	6.9	7.1	7.0	6.7	5 < x < 9
Conductivity (µohm/cm) (b)	779	742.4	800	1010	1130	1000	400	1750	1100	1140	NAp
Turbidity (NTU) (b)	1.5	10.87	29	7.32	0.94	0.72	17.7	19.1	24.4	21.00	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	372	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	2.57	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	86.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	3.94 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	0.3	NA	NA	NA	NA	0.2	2.15	0.07	0.12	0.06	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	263	NA	NA	NA	NA	NA	NA	NA	NA	-48	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.1	NA	NA	NA	NA	NA	NA	NA	NA	1.62	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-18										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	16.2	15.7	12.8	15.8	13.7	13.7	16.9	14.6	13.7	NS	> 20°C
pH (standard units) (b)	6.86	6.6	6.94	6.95	7.0	6.98	6.9	7.4	7.0	NS	5 < x < 9
Conductivity (µohm/cm) (b)	863	751.5	940	810	910	690	800	960	790	NS	NAp
Turbidity (NTU) (b)	2.7	10.03	1.6	3.95	0.73	0.95	0.87	3.84	4.26	NS	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	5.3	5.8	ND(<2.0)	3.6	5	2	4	5	3	NS	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NS	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NS	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	372	408	410	452	410	412	400	426	371	NS	> 680 (c) (e)
Nitrate, as N (units in mg/L)	1.24	0.5	0.6	1	ND(<0.1)	0.6	1.9	0.8	0.8	NS	< 1
Sulfate (units in mg/L)	160	134	107	96	83	81	71	57	52	NS	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND (<0.1)	NS	> 1
Chloride (units in mg/L)	11.1 J	9	8	9	11	11	10	10	9	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	2.3	3	4	12	5.6	5.2	2.2	1.1	NS	> 20
DO (units in mg/L) (b)	0.5	<0.01 R	0.017	0.65	0.2	0.22	0.32	0.79	0.48	NS	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-71	-59 R	-77	-72	-8	6	-26	92	-38	NS	< 50
Iron (II), Ferrous (units in mg/L) (b)	4.8	5.6	4.14	5.72	4.75	4.42	2.85	2.44	1.38	NS	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-19										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	18.6	15.0	11.8	18	9.7	12.9	19.4	12.5	12.4	20.1	> 20°C
pH (standard units) (b)	6.71	6.38	6.79	6.76	7.0	6.83	7.1	6.8	6.8	6.7	5 < x < 9
Conductivity (µohm/cm) (b)	277	689	2010	>2000	2700	2600	820	2800	1950	2400	NAp
Turbidity (NTU) (b)	7	12.59	7	15	2.7	1.65	4.17	3.38	2.42	2.89	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	240	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	1410	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	856	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	10.2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	<0.1	NA	NA	NA	NA	0.3	0.27	0.06	0.08	0.13	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-188	NA	NA	NA	NA	NA	NA	NA	NA	-117	< 50
Iron (II), Ferrous (units in mg/L) (b)	19	NA	NA	NA	NA	NA	NA	NA	NA	14.74	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-20										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	14.6	14.5	14.0	14.6	13.3	14.5	17.0	14.4	14.2	16.2	> 20°C
pH (standard units) (b)	6.83	6.95	7.01	6.8	7.4	6.82	7.2	6.8	6.9	7.1	5 < x < 9
Conductivity (μohm/cm) (b)	977	921.7	800	900	1030	870	930	1020	990	1040	NAp
Turbidity (NTU) (b)	9.8	7.92	15	3.39	1.26	2.10	8.26	1.48	1.47	12.60	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	4.1	NA	NA	NA	NA	NA	NA	NA	NA	ND(<2.0)	> 500
Ethane (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	550	NA	NA	NA	NA	NA	NA	NA	NA	460	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	0.9	< 1
Sulfate (units in mg/L)	116 J	NA	NA	NA	NA	NA	NA	NA	NA	83	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND(<0.1)	> 1
Chloride (units in mg/L)	8.99 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.2	> 20
DO (units in mg/L) (b)	0.8	NA	NA	NA	NA	0.9	2.13	0.59	0.30	6.11	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-134	NA	NA	NA	NA	NA	NA	NA	NA	39	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.7	NA	NA	NA	NA	NA	NA	NA	NA	0.31	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-20b									Favorable Geochemical
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters										
Temperature (degrees C) (b)	14.0	14.6	15.4	13.2	15.3	15.8	13.9	14.7	15.9	> 20°C
pH (standard units) (b)	6.95	7.17	7.0	7.4	7.00	7.2	7.2	7.1	7.2	5 < x < 9
Conductivity (µohm/cm) (b)	934.5	600	800	930	810	950	980	900	1010	NAp
Turbidity (NTU) (b)	9.53	0.5	3.45	1.06	1.48	11.9	0.62	1.89	2.04	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	4	> 500
Ethane (units in ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<4.0)	> 10
Ethene (units in ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	480	> 680 (c) (e)
Nitrate, as N (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<0.1)	< 1
Sulfate (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	68	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<0.1)	> 1
Chloride (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	1.8	> 20
DO (units in mg/L) (b)	NA	NA	NA	NA	1.4	1.43	0.68	0.15	0.13	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	NA	NA	NA	NA	NA	NA	NA	NA	-132	< 50
Iron (II), Ferrous (units in mg/L) (b)	NA	NA	NA	NA	NA	NA	NA	NA	10.84	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-20c									Favorable Geochemical
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters										
Temperature (degrees C) (b)	14.0	14.5	15.2	13.2	15.5	15.7	14.1	14.8	15.6	> 20°C
pH (standard units) (b)	6.74	7.2	7.0	7.4	6.94	7.2	7.1	7.1	7.2	5 < x < 9
Conductivity (μohm/cm) (b)	780.2	700	900	930	810	980	1010	920	1010	NAp
Turbidity (NTU) (b)	21.5	1.5	4.48	1.17	5.73	14.4	22.5	13.6	2.85	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<2.0)	> 500
Ethane (units in ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<4.0)	> 10
Ethene (units in ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	460	> 680 (c) (e)
Nitrate, as N (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<0.1)	< 1
Sulfate (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	55	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND(<0.1)	> 1
Chloride (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	1.6	> 20
DO (units in mg/L) (b)	NA	NA	NA	NA	1.3	1.60	0.08	0.27	0.14	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	NA	NA	NA	NA	NA	NA	NA	NA	-109	< 50
Iron (II), Ferrous (units in mg/L) (b)	NA	NA	NA	NA	NA	NA	NA	NA	8.56	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
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Sample Location	FP-96-21										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	15.2	14.5	14.1	14.5	14.6	14.7	15.4	14.5	14.3	16.5	> 20°C
pH (standard units) (b)	6.83	6.58	6.94	7.08	6.9	7.5	6.7	7.3	6.9	7.0	5 < x < 9
Conductivity (µohm/cm) (b)	940	767.3	1000	1080	1230	970	1000	1270	1200	810	NAp
Turbidity (NTU) (b)	16	9.41	8	2.8	4.6	7.29	1.66	11.8	0.58	2.42	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	2	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	485	560	540	572	560	575	530	592	523	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	1.8	1.9	1.7	1.4	1.5	1.4	1.1	1.8	0.8	NA	< 1
Sulfate (units in mg/L)	16.6	79	82	90	104	89	100	90	110	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NA	> 1
Chloride (units in mg/L)	7.4 J	8.0	9	10	12	12	13	10	13	NA	> 56 (d) (e)
TOC (units in mg/L)	9.6	15	11	14	17	15	11	7.7	6.7	NA	> 20
DO (units in mg/L) (b)	3.3	0.46R	1.64	0.82	0.4	0.53	4.66	1.01	0.42	2.10	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-13	-45R	48	208	84	77	23	189	1	68	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.6	1.38	0.62	0.09	0.79	0.21	0.88	0.05	0.40	0.05	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-21b										Favorable Geochemical Conditions (a)
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters											
Temperature (degrees C) (b)	15.2	14.1	14.4	15.1	14.4	16.3	15.7	14.1	14.5	16.0	> 20°C
pH (standard units) (b)	6.93	6.93	7.07	7.2	7.1	7.5	6.9	6.5	7.2	7.1	5 < x < 9
Conductivity (µohm/cm) (b)	832	839.1	800	800	940	790	800	960	920	730	NAp
Turbidity (NTU) (b)	2	7.94	2	1.61	1.16	0.22	1.32	1.02	0.41	7.69	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	2	3.7	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	414	456	426	423	430	430	430	460	443	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NA	< 1
Sulfate (units in mg/L)	51.6 J	54	55	48	54	49	49	52	46	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NA	> 1
Chloride (units in mg/L)	18.2 J	19	19	16	17	17	18	16	18	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	8.9	7.1	20	5.1	2.1	3.8	1.6	ND(<0.5)	NA	> 20
DO (units in mg/L) (b)	<0.1	0.26R	0.13	0.23	0.2	0.13	0.31	0.20	0.08	0.12	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-123	-310R	-112	-112	-77	-41	-35	12	-112	-86	< 50
Iron (II), Ferrous (units in mg/L) (b)	6	6.42	5.1	NM	4.98	5.6	5.05	4.95	4.69	5.60	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
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Sample Location	FP-96-21c										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	15.3	14.2	16.1	15.6	13.1	15.6	16.1	14.2	14.6	16.5	> 20°C
pH (standard units) (b)	6.84	6.90	7.3	7.4	7.3	6.95	6.9	6.6	7.2	7.1	5 < x < 9
Conductivity (µohm/cm) (b)	867	870.4	910	800	1190	840	420	1020	1120	330	NAp
Turbidity (NTU) (b)	2.3	8.6	2	1.02	0.94	1.34	4.32	0.43	0.46	4.27	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	430	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	14.7 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	28.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	<0.1	NA	NA	NA	NA	0.1	0.85	0.19	0.24	0.19	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-62	NA	NA	NA	NA	NA	NA	NA	NA	32	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.8	NA	NA	NA	NA	NA	NA	NA	NA	3.68	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
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Sample Location	FP-96-22										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	14.5	14.0	15.2	14.6	12.5	14.5	14.6	14.1	14	14.2	> 20°C
pH (standard units) (b)	6.93	6.9	7.1	7.5	7.4	7.00	7.2	7.0	7.0	7.0	5 < x < 9
Conductivity (µohm/cm) (b)	951	993.3	980	1000	1130	790	900	1100	1060	1040	NAp
Turbidity (NTU) (b)	7.1	1.92	6	3.9	1.5	3.43	0.87	9.65	14.0	7.94	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	8.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	540	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	95.5 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	5.33 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	<0.1	0.14R	NA	NA	NA	0.5	1.65	0.06	0.63	0.04	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-95	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 50
Iron (II), Ferrous (units in mg/L) (b)	8.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-23										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	14.5	13.8	13.9	14.2	13.9	15.3	14.7	14.1	14.1	14.4	> 20°C
pH (standard units) (b)	6.98	6.42	7.12	7.07	7.1	7.12	7.3	7.2	7.3	7.3	5 < x < 9
Conductivity (µohm/cm) (b)	936	781.2	900	880	1100	780	900	1130	1140	870	NAp
Turbidity (NTU) (b)	14.6	5.62	10	4.87	1.66	0.27	8.05	5.82	4.22	5.50	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	7.9	6.4	ND(<0.2)	5.6	4.6	5	ND(<2.0)	3	3	4	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	430	377	375	398	430	464	464	420	412	420	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	ND(<0.1)	0.7	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.9	0.1	0.9	< 1
Sulfate (units in mg/L)	240 J	205	219	212	241	170	210	180	180	160	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	5.88 J	5.7	6	4	5	9	10	7	8	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	5.7	9.5	9.5	6.3	6.1	6.8	5.8	1.6	4.6	> 20
DO (units in mg/L) (b)	0.1	0.47R	0.33	0.16	0.5	0.14	0.28	0.52	0.13	0.13	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-107	-238R	-89	-131	-105	-36	-51	154	-161	-50	< 50
Iron (II), Ferrous (units in mg/L) (b)	6.9	5	6.0	5.8	5.54	7.20	3.64	4.51	5.60	4.68	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-23b									Favorable Geochemical Conditions (a)
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters										
Temperature (degrees C) (b)	14.0	14.4	14.9	13.8	15.4	16.5	14.4	14.2	15.0	> 20°C
pH (standard units) (b)	7.04	6.99	7.05	7.1	7.10	7.1	7.0	7.2	7.2	5 < x < 9
Conductivity (µohm/cm) (b)	944.7	700	870	1080	760	900	1090	1100	890	NAp
Turbidity (NTU) (b)	27.7	8	3.37	1.98	0.67	1.39	0.54	1.16	3.79	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	120	44	37	76	60	87	113	110	76	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	489	453	483	400	465	494	496	462	480	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	62	102	76	92	80	82	120	110	110	< 20
Sulfide (units in mg/L)	NA	NA	NA	ND (<0.1)	ND (<0.1)	ND (<0.1)	ND (<0.1)	ND (<0.1)	ND (<0.1)	> 1
Chloride (units in mg/L)	16	17	15	17	23	20	21	22	NA	> 56 (d) (e)
TOC (units in mg/L)	16	9.3	8.2	23	6.4	2.7	2.1	1.7	7.2	> 20
DO (units in mg/L) (b)	1.51	0.26	0.34	0.3	0.08	0.60	0.44	0.13	0.16	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-241R	-142	-136	-117	-95	-87	1	-173	-97	< 50
Iron (II), Ferrous (units in mg/L) (b)	10.04	8.96	9.42	8.22	9.04	7.72	6.04	11.36	8.82	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-23c									Favorable Geochemical
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters										
Temperature (degrees C) (b)	13.1	14.6	14.9	14.1	15.3	16.4	14.5	14.3	15.2	> 20°C
pH (standard units) (b)	7.03	6.98	7.04	7.1	7.10	7.1	7.0	7.2	7.2	5 < x < 9
Conductivity (µohm/cm) (b)	806.8	700	830	1010	740	800	1020	1140	780	NAp
Turbidity (NTU) (b)	24.6	14	10.1	1.89	1.07	0.70	4.48	15.9	9.32	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	NA	7.4	42	15	12	10	114	150	35	> 500
Ethane (units in ug/L)	NA	6.98	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Ethene (units in ug/L)	NA	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	NA	436	520	420	448	456	482	482	420	> 680 (c) (e)
Nitrate, as N (units in mg/L)	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	NA	47	46	54	53	58	73	70	55	< 20
Sulfide (units in mg/L)	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	NA	23	23	27	28	30	25	24	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	5	21	5.3	3.8	3.6	2	0.9	5.5	> 20
DO (units in mg/L) (b)	NA	0.44	0.25	0.2	0.08	0.51	0.24	0.14	0.11	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	NA	-111	-134	-84	-81	-100	-78	-134	-93	< 50
Iron (II), Ferrous (units in mg/L) (b)	NA	4.92	8.02	5.76	8.14	5.66	6.86	11.86	7.70	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-24										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	14.4	14.0	14.8	14.3	12	14.3	14.8	14.2	13.7	14.4	> 20°C
pH (standard units) (b)	7.03	7.13	7.3	7.5	7.5	7.01	7.1	7.1	7.3	7.2	5 < x < 9
Conductivity (µohm/cm) (b)	927	964	1130	1110	1430	1040	1100	1700	1320	950	NAp
Turbidity (NTU) (b)	12.6	1	4	2.5	0.42	1.94	1.36	0.68	1.88	7.92	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	<2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	440	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	10.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	104 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	5.55 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	3	NA	NA	NA	NA	1.5	2.21	1.00	0.19	1.33	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	184	NA	NA	NA	NA	NA	NA	NA	NA	76	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.13	NA	NA	NA	NA	NA	NA	NA	NA	0.0	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-25									Favorable Geochemical
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters										
Temperature (degrees C) (b)	15.2	12.6	15.7	13.6	14.4	17.8	14.3	13.4	16.6	> 20°C
pH (standard units) (b)	6.48	6.89	6.85	7.0	7.2	7.1	6.1	7.0	6.9	5 < x < 9
Conductivity (μohm/cm) (b)	753.1	1100	860	1060	1000	700	1240	1150	960	NAp
Turbidity (NTU) (b)	13.2	7	12	2.77	4.10	4.79	2.02	8.95	16.40	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	82	43	39	57	40	54	163	72	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	507	507	355	470	460	512	574	525	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	**ND(<0.1)**	< 1
Sulfate (units in mg/L)	110	156	146	142	83	100	120	120	67	< 20
Sulfide (units in mg/L)	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.3	> 1
Chloride (units in mg/L)	16	17	12	15	16	18	17	19	NA	> 56 (d) (e)
TOC (units in mg/L)	17	3.7	4.7	4.7	4.2	4.2	6.2	2.7	4	> 20
DO (units in mg/L) (b)	1.29R	0.39	0.23	0.4	1.4	0.86	0.17	0.05	0.06	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-13R	-224	24	-76	-144	-130	Rejected (f)	-176	-73	< 50
Iron (II), Ferrous (units in mg/L) (b)	8.6	3.68	4.73	6.96	8.45	7.32	8.94	10.28	8.54	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-25b									Favorable Geochemical Conditions (a)
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters										
Temperature (degrees C) (b)	14.3	14.0	14.7	14.7	15.7	14.9	14.5	14.7	15.9	> 20°C
pH (standard units) (b)	6.88	7.04	7.06	7.1	7.3	7.0	6.4	7.2	7.2	5 < x < 9
Conductivity (μohm/cm) (b)	869.7	800	830	940	900	800	1000	930	900	NAp
Turbidity (NTU) (b)	7.33	5	6	2.41	18.1	1.70	2.91	3.97	6.67	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	3.2	ND(<2.0)	ND(<2.0)	2.5	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	474	444	444	440	430	440	472	441	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	52	55	48	54	48	49	48	52	46	< 20
Sulfide (units in mg/L)	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	16	16	14	19	16	14	18	17	NA	> 56 (d) (e)
TOC (units in mg/L)	22	5.2	3.4	4.6	3.3	7.6	2	ND(<0.5)	1.4	> 20
DO (units in mg/L) (b)	0.39R	0.63	0.35	0.3	0.58	0.34	0.15	0.12	0.09	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-223R	-156	-30	-74	-0.031	-50	93	-125	-63	< 50
Iron (II), Ferrous (units in mg/L) (b)	6.46	2.09	4.83	5.54	1.58	4.46	1.24	5.56	5.44	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-25c									Favorable Geochemical
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters										
Temperature (degrees C) (b)	14.3	14.9	16	14.5	15.7	15.3	14.1	14.5	16.4	> 20°C
pH (standard units) (b)	6.89	7.01	7.08	7.1	7.3	7.0	6.5	7.2	7.2	5 < x < 9
Conductivity (μohm/cm) (b)	871.4	890	870	900	830	800	1010	910	920	NAp
Turbidity (NTU) (b)	11.36	10	10	9.73	1.04	6.91	2.92	21.6	18.6	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	NA	NA	NA	ND(<2.0)	ND(<2.0)	ND(<2.0)	2	ND(<2.0)	NA	> 500
Ethane (units in ug/L)	NA	NA	NA	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	NA	NA	NA	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	NA	NA	NA	440	420	410	468	471	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	NA	NA	NA	53	50	49	50	47	45	< 20
Sulfide (units in mg/L)	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	NA	NA	NA	28	30	32	36	33	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	13	5.3	2.5	1.9	ND(<0.5)	2	> 20
DO (units in mg/L) (b)	NA	NA	1.07	0.3	0.27	1.53	0.14	0.10	0.12	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	NA	NA	176	-40	-77	-17	Rejected (f)	-235	-82	< 50
Iron (II), Ferrous (units in mg/L) (b)	NA	NA	4.83	1.48	4.73	1.21	1.75	0.58	2.00	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-26									Favorable Geochemical
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters										
Temperature (degrees C) (b)	14.1	13.4	14.8	13.9	16.6	17.2	14.7	14.3	15.7	> 20°C
pH (standard units) (b)	6.47	6.73	6.91	7.0	7.1	7.2	7.2	7.0	7.4	5 < x < 9
Conductivity (μohm/cm) (b)	771.2	1400	1180	1250	1200	650	1440	1170	1480	NAp
Turbidity (NTU) (b)	74.4	12	23.1	8.28	4.96	7.56	4.52	10.5	11.0	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	6.61	7.2	4.4	12	16	6	19	4	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	601	568	590	550	520	567	608	479	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	0.8	2.2	2.5	1	0.8	0.5	0.8	2.5	2.2	< 1
Sulfate (units in mg/L)	134	155	143	120	120	130	130	110	120	< 20
Sulfide (units in mg/L)	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	20	26	27	20	19	17	35	21	NA	> 56 (d) (e)
TOC (units in mg/L)	14	12	14	3.9	7.6	4	5.8	6.6	5.2	> 20
DO (units in mg/L) (b)	0.36R	11.8	0.76	3.0	0.85	2.11	1.18	0.85	2.07	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-310R	81	138	100	119	71	110	18	NA	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.04	0.06	0.16	0.11	0.08	0.12	0.03	0.05	0.15	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-26b									Favorable Geochemical
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters										
Temperature (degrees C) (b)	14.1	14.9	15.7	14.5	15.8	16.6	14.4	14.4	15.0	> 20°C
pH (standard units) (b)	6.92	6.99	7.2	7.0	7.4	7.1	7.2	7.1	7.4	5 < x < 9
Conductivity (μohm/cm) (b)	872.4	700	820	1010	800	800	1050	930	1000	NAp
Turbidity (NTU) (b)	27.9	29	7.1	3.23	1.16	10.6	15.2	18.7	26.7	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	3.7	ND(<2.0)	2.1	3.2	4	2	18	2	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	453	436	454	440	420	462	474	416	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	50	55	41	50	48	53	58	52	49	< 20
Sulfide (units in mg/L)	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	16	17	14	17	17	16	17	17	NA	> 56 (d) (e)
TOC (units in mg/L)	13	5.1	7.1	13	1.9	2.7	2.1	4.3	6.4	> 20
DO (units in mg/L) (b)	1.01R	0.89	0	0.4	0.09	0.69	0.33	0.19	0.08	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-211R	-112	-130	-103	-74	-87	-61	-122	-90	< 50
Iron (II), Ferrous (units in mg/L) (b)	8.24	6.7	5.1	6.04	7.40	5.78	4.99	4.80	3.21	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-96-26c									Favorable Geochemical Conditions (a)
Sample Event	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters										
Temperature (degrees C) (b)	14.3	14.5	15.9	14.7	16.1	18.3	14.9	14.5	15.0	> 20°C
pH (standard units) (b)	6.86	6.95	7.13	7.1	7.4	7.0	7.2	7.1	7.3	5 < x < 9
Conductivity (μohm/cm) (b)	886.6	900	710	980	820	900	980	940	980	NAp
Turbidity (NTU) (b)	2.67	14	1.4	0.82	1.3	1.99	2.30	4.95	17.91	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	422	432	408	440	440	448	460	414	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	53	53	51	52	50	52	49	48	45	< 20
Sulfide (units in mg/L)	NA	NA	NA	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	31	26	27	28	28	32	33	36	NA	> 56 (d) (e)
TOC (units in mg/L)	14	3.4	96	5.1	1.8	1.1	1.2	2.8	5.7	> 20
DO (units in mg/L) (b)	0.32R	0.39	0.68	0.4	0.09	0.53	0.30	0.20	0.09	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-174R	-104	-99	-68	-22	-79	71	-97	-44	< 50
Iron (II), Ferrous (units in mg/L) (b)	3.44	0.07	3	2.74	2.35	2.51	2.73	2.62	2.46	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-27					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	14.1	14.5	13.9	13.6	14.0	> 20°C
pH (standard units) (b)	6.93	6.8	7.1	7.4	7.1	5 < x < 9
Conductivity (µohm/cm) (b)	880	800	1810	1000	1020	NAp
Turbidity (NTU) (b)	0.97	2.28	2.10	2.27	1.09	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	ND(<2.0)	ND(<2.0)	2	2	ND(<2.0)	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	400	470	450	422	430	> 680 (c) (e)
Nitrate, as N (units in mg/L)	4.7	2.7	4.2	5.4	4.1	< 1
Sulfate (units in mg/L)	76	110	91	91	94	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	5	5	5	5	NA	> 56 (d) (e)
TOC (units in mg/L)	4.9	3.3	1.9	1.4	4.8	> 20
DO (units in mg/L) (b)	1.14	2.61	1.08	1.85	1.32	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	63	83	-27	122	49	< 50
Iron (II), Ferrous (units in mg/L) (b)	ND	0.14	0.15	0.08	0.23	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-27b					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	14.8	14.9	13.6	14.1	14.8	> 20°C
pH (standard units) (b)	7.00	6.7	7.1	7.2	7.1	5 < x < 9
Conductivity (µohm/cm) (b)	1010	900	1870	1050	1020	NAp
Turbidity (NTU) (b)	5.28	3.11	1.07	1.92	2.41	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	41	78	140	89	90	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	484	494	506	493	440	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	97	73	72	84	67	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	14	20	19	19	NA	> 56 (d) (e)
TOC (units in mg/L)	5.2	4	2	2.2	5.4	> 20
DO (units in mg/L) (b)	0.14	1.48	0.19	0.64	0.21	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-90	-78	-113	-113	-107	< 50
Iron (II), Ferrous (units in mg/L) (b)	7.94	6.56	4.30	12.20	12.16	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-27c					Favorable Geochemical Conditions (a)
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters						
Temperature (degrees C) (b)	15.3	16.3	13.7	14.1	15.6	> 20°C
pH (standard units) (b)	7.02	6.7	7.1	7.2	7.1	5 < x < 9
Conductivity (μohm/cm) (b)	910	900	1830	1020	980	NAp
Turbidity (NTU) (b)	20.2	2.59	1.53	1.17	2.98	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	20	8	69	70	62	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	490	462	476	465	490	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	49	54	52	59	66	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	28	29	30	28	NA	> 56 (d) (e)
TOC (units in mg/L)	5.1	14	1.9	0.7	6.1	> 20
DO (units in mg/L) (b)	0.17	0.25	0.22	0.81	0.22	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-95	-97	-71	-111	-112	< 50
Iron (II), Ferrous (units in mg/L) (b)	5.50	5.76	7.42	9.16	9.40	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-28					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	14.9	14.6	14.8	14.4	NS	> 20°C
pH (standard units) (b)	**6.98**	**7.3**	**7.1**	**7.2**	NS	5 < x < 9
Conductivity (μohm/cm) (b)	720	800	780	620	NS	NAp
Turbidity (NTU) (b)	0.97	1.74	1.72	0.85	NS	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NS	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NS	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NS	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	400	400	350	306	NS	> 680 (c) (e)
Nitrate, as N (units in mg/L)	7.7	7.1	6.7	2	NS	< 1
Sulfate (units in mg/L)	44	21	**18**	**14**	NS	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NS	> 1
Chloride (units in mg/L)	4	4	5	4	NA	> 56 (d) (e)
TOC (units in mg/L)	2.9	2	4.1	0.9	NS	> 20
DO (units in mg/L) (b)	3.24	3.98	0.99	2.24	NS	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	161	**37**	181	146	NS	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.13	0.03	0.07	0.03	NS	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-28b					Favorable Geochemical
Sample Event	Aug-98	Jul-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	15.2	15.5	13.9	14.8	15.1	> 20°C
pH (standard units) (b)	7.12	7.4	7.2	7.2	7.3	5 < x < 9
Conductivity (µohm/cm) (b)	910	900	1830	990	1090	NAp
Turbidity (NTU) (b)	15.2	2.85	3.48	9.08	6.96	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	ND(<2.0)	3	3	3	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	440	450	478	452	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	69	73	76	71	73	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	18	16	16	17	NA	> 56 (d) (e)
TOC (units in mg/L)	3	3.8	1.3	1.6	8.7	> 20
DO (units in mg/L) (b)	0.36	1.28	0.27	0.38	0.07	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-58	-39	92	-115	-52	< 50
Iron (II), Ferrous (units in mg/L) (b)	5.22	5.06	5.00	7.96	12.64	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-28c					Favorable Geochemical
Sample Event	Aug-98	Jul-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	15.5	15.5	13.7	15.1	15.0	> 20°C
pH (standard units) (b)	7.07	7.4	7.1	7.3	7.3	5 < x < 9
Conductivity (µohm/cm) (b)	880	900	1860	960	1090	NAp
Turbidity (NTU) (b)	5.45	1.33	1.92	1.26	6.73	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	ND(<2.0)	3	3	6	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	440	450	496	439	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	58	63	56	54	54	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	22	23	25	26	NA	> 56 (d) (e)
TOC (units in mg/L)	3.2	5.4	0.8	0.6	8	> 20
DO (units in mg/L) (b)	0.27	9.82	0.21	0.26	0.10	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-105	-83	-40	-124	-71	< 50
Iron (II), Ferrous (units in mg/L) (b)	5.12	5.06	6.42	7.90	13.20	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-29					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	14.7	14.8	14.6	13.3	NS	> 20°C
pH (standard units) (b)	6.97	7.5	7.4	7.2	NS	5 < x < 9
Conductivity (µohm/cm) (b)	770	800	1380	910	NS	NAp
Turbidity (NTU) (b)	7.87	1.75	3.20	5.14	NS	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NS	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NS	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NS	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	394	370	366	354	NS	> 680 (c) (e)
Nitrate, as N (units in mg/L)	15.1	17.9	29	24.1	NS	< 1
Sulfate (units in mg/L)	33	28	27	34	NS	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NS	> 1
Chloride (units in mg/L)	5	4	4	4	NA	> 56 (d) (e)
TOC (units in mg/L)	5	5.4	1.1	ND(<0.5)	NS	> 20
DO (units in mg/L) (b)	1.32	3.11	7.19	1.36	NS	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	55	93	136	95	NS	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.09	0.16	0.01	0.00	NS	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-29b					Favorable Geochemical Conditions (a)
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters						
Temperature (degrees C) (b)	14.7	15.2	14.2	14.0	14.4	> 20°C
pH (standard units) (b)	7.03	7.4	7.2	7.3	7.3	5 < x < 9
Conductivity (µohm/cm) (b)	930	900	1400	1030	1060	NAp
Turbidity (NTU) (b)	3.37	0.92	1.73	7.11	4.24	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	27	31	18	14	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	498	470	502	461	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	70	66	72	70	68	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	80	21	21	20	NA	> 56 (d) (e)
TOC (units in mg/L)	4.6	4.1	1.1	2.9	7.3	> 20
DO (units in mg/L) (b)	0.17	2.05	0.06	0.10	0.10	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-28	-69	-94	-143	-78	< 50
Iron (II), Ferrous (units in mg/L) (b)	5.24	5.80	5.62	5.24	16.64	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-29c					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	15.4	15.0	13.9	14.1	14.9	> 20^oC
pH (standard units) (b)	7.06	7.3	7.2	7.2	7.3	5 < x < 9
Conductivity (μohm/cm) (b)	880	900	1420	990	1050	NAp
Turbidity (NTU) (b)	17.3	2.71	1.26	0.98	14.00	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	20	15	17	9	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	478	450	482	467	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	57	52	55	54	54	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	27	28	27	27	NA	> 56 (d) (e)
TOC (units in mg/L)	3.8	12	3.1	3.2	5.9	> 20
DO (units in mg/L) (b)	0.18	0.58	0.05	0.17	0.13	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-48	-63	-76	-128	-79	< 50
Iron (II), Ferrous (units in mg/L) (b)	4.50	4.63	4.77	5.26	10.52	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-30					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	14.8	14.8	14.2	13.3	NS	> 20°C
pH (standard units) (b)	7.10	7.3	7.5	7.3	NS	5 < x < 9
Conductivity (μohm/cm) (b)	720	240	1210	730	NS	NAp
Turbidity (NTU) (b)	1.53	7.18	1.10	0.99	NS	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NS	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NS	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NS	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	348	400	366	296	NS	> 680 (c) (e)
Nitrate, as N (units in mg/L)	0.6	0.4	0.8	1.4	NS	< 1
Sulfate (units in mg/L)	34	37	17	14	NS	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NS	> 1
Chloride (units in mg/L)	4	4	2	2	NA	> 56 (d) (e)
TOC (units in mg/L)	3.5	3.3	2.5	ND(<0.5)	NS	> 20
DO (units in mg/L) (b)	2.63	2.24	2.38	3.21	NS	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	121	102	138	121	NS	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.06	0.22	0.27	0.10	NS	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-30b					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	15.3	14.7	14.0	14.5	14.8	> 20°C
pH (standard units) (b)	7.07	7.5	7.1	7.2	7.2	5 < x < 9
Conductivity (μohm/cm) (b)	860	770	1320	890	830	NAp
Turbidity (NTU) (b)	15.7	2.15	1.03	1.11	2.88	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	460	410	446	430	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NA	< 1
Sulfate (units in mg/L)	54	52	50	54	NA	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NA	> 1
Chloride (units in mg/L)	21	21	18	20	NA	> 56 (d) (e)
TOC (units in mg/L)	2.5	3.2	0.7	ND(<0.5)	NA	> 20
DO (units in mg/L) (b)	0.12	0.29	1.05	0.67	0.09	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	39	-66	-54	-53	-61	< 50
Iron (II), Ferrous (units in mg/L) (b)	3.84	1.26	3.45	3.91	3.86	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-30c					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	15.4	14.9	13.9	14.3	14.6	> 20°C
pH (standard units) (b)	7.02	8.5	7.3	7.2	7.1	5 < x < 9
Conductivity (μohm/cm) (b)	870	740	1440	970	880	NAp
Turbidity (NTU) (b)	28.5	15.1	1.39	1.46	3.43	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	463	430	460	447	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NA	< 1
Sulfate (units in mg/L)	50	52	44	50	NA	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NA	> 1
Chloride (units in mg/L)	30	27	32	32	NA	> 56 (d) (e)
TOC (units in mg/L)	2.1	2.9	2.9	1	NA	> 20
DO (units in mg/L) (b)	0.14	0.39	0.33	0.70	0.21	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	99	-23	7	-32	-16	< 50
Iron (II), Ferrous (units in mg/L) (b)	1.31	1.36	1.02	1.05	1.07	> 1.

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-31					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	15.7	16.2	14.6	14.2	NS	> 20°C
pH (standard units) (b)	7.22	9.0	7.5	7.4	NS	5 < x < 9
Conductivity (µohm/cm) (b)	710	600	1140	730	NS	NAp
Turbidity (NTU) (b)	2.56	7.93	2.78	1.19	NS	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)	NS	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NS	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NS	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	344	340	323	326	NS	> 680 (c) (e)
Nitrate, as N (units in mg/L)	11.5	7.5	11.8	7.3	NS	< 1
Sulfate (units in mg/L)	42	61	31	35	NS	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	NS	> 1
Chloride (units in mg/L)	3	3	2	2	NA	> 56 (d) (e)
TOC (units in mg/L)	3.7	3.4	1.3	0.8	NS	> 20
DO (units in mg/L) (b)	3.34	2.04	3.05	0.91	NS	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	149	140	178	101	NS	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.02	ND	0.02	0.00	NS	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-31b					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	16.1	14.8	14.1	14.6	14.9	> 20°C
pH (standard units) (b)	7.08	8.9	7.4	7.1	7.4	5 < x < 9
Conductivity (µohm/cm) (b)	910	700	1460	990	1070	NAp
Turbidity (NTU) (b)	10.3	17.1	2.42	3.38	3.53	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	10	28	7	5	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	484	460	500	438	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	75	69	75	77	78	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	16	18	18	19	NA	> 56 (d) (e)
TOC (units in mg/L)	3.9	4.7	1.1	ND(<0.5)	8.1	> 20
DO (units in mg/L) (b)	0.16	0.21	0.39	0.22	0.09	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-15	-99	-88	-109	-67	< 50
Iron (II), Ferrous (units in mg/L) (b)	4.82	5.30	4.59	4.48	12.52	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-98-31c					Favorable Geochemical
Sample Event	Jun-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters						
Temperature (degrees C) (b)	17.1	14.7	13.8	14.2	15.1	> 20°C
pH (standard units) (b)	7.02	8.7	7.4	7.1	7.3	5 < x < 9
Conductivity (μohm/cm) (b)	860	700	1480	960	1050	NAp
Turbidity (NTU) (b)	2.45	20.5	14.0	2.62	2.65	NAp
Natural Attenuation Parameters						
Methane (units in ug/L)	10	30	31	13	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	488	460	496	472	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	< 1
Sulfate (units in mg/L)	52	57	52	56	57	< 20
Sulfide (units in mg/L)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	> 1
Chloride (units in mg/L)	25	25	25	26	NA	> 56 (d) (e)
TOC (units in mg/L)	3.4	3.1	1.1	2.4	8.1	> 20
DO (units in mg/L) (b)	0.30	0.22	0.31	0.11	0.08	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	16	-73	-65	-98	-59	< 50
Iron (II), Ferrous (units in mg/L) (b)	3.88	3.50	3.73	3.88	4.16	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-99-32	Favorable Geochemical
Sample Event	13-Sep-99	Conditions (a)
Field Test Parameters		
Temperature (degrees C) (b)	14.1	> 20°C
pH (standard units) (b)	7.3	5 < x < 9
Conductivity (μohm/cm) (b)	490	NAp
Turbidity (NTU) (b)	21.8	NAp
Natural Attenuation Parameters		
Methane (units in ug/L)	ND(<2.0)	> 500
Ethane (units in ug/L)	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	270	> 680 (c) (e)
Nitrate, as N (units in mg/L)	4.3	< 1
Sulfate (units in mg/L)	58	< 20
Sulfide (units in mg/L)	ND(<0.1)	> 1
Chloride (units in mg/L)	NA	> 56 (d) (e)
TOC (units in mg/L)	1.7	> 20
DO (units in mg/L) (b)	1.4	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-23	< 50
Iron (II), Ferrous (units in mg/L) (b)	0.18	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-99-32b	Favorable Geochemical
Sample Event	13-Sep-99	Conditions (a)
Field Test Parameters		
Temperature (degrees C) (b)	14.0	> 20°C
pH (standard units) (b)	7.0	5 < x < 9
Conductivity (µohm/cm) (b)	730	NAp
Turbidity (NTU) (b)	18.6	NAp
Natural Attenuation Parameters		
Methane (units in ug/L)	11	> 500
Ethane (units in ug/L)	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	460	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	< 1
Sulfate (units in mg/L)	79	< 20
Sulfide (units in mg/L)	ND(<0.1)	> 1
Chloride (units in mg/L)	NA	> 56 (d) (e)
TOC (units in mg/L)	2.1	> 20
DO (units in mg/L) (b)	0.14	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-90	< 50
Iron (II), Ferrous (units in mg/L) (b)	3.00	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	FP-99-32c	Favorable Geochemical
Sample Event	13-Sep-99	Conditions (a)
Field Test Parameters		
Temperature (degrees C) (b)	14.6	> 20°C
pH (standard units) (b)	6.9	5 < x < 9
Conductivity (μohm/cm) (b)	820	NAp
Turbidity (NTU) (b)	13.4	NAp
Natural Attenuation Parameters		
Methane (units in ug/L)	13	> 500
Ethane (units in ug/L)	ND(<4.0)	> 10
Ethene (units in ug/L)	ND(<4.0)	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	420	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<0.1)	< 1
Sulfate (units in mg/L)	62	< 20
Sulfide (units in mg/L)	ND(<0.1)	> 1
Chloride (units in mg/L)	NA	> 56 (d) (e)
TOC (units in mg/L)	1.5	> 20
DO (units in mg/L) (b)	0.13	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-82	< 50
Iron (II), Ferrous (units in mg/L) (b)	1.85	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	I-1										Favorable Geochemical Conditions (a)
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters											
Temperature (degrees C) (b)	15.3	13.6	15.0	15.8	12.4	15.7	14.7	13.1	13.7	16.1	> 20°C
pH (standard units) (b)	7.08	7.11	7.2	7.3	7.5	7.3	7.0	7.0	7.2	7.2	5 < x < 9
Conductivity (μohm/cm) (b)	936	856.4	960	900	1010	880	800	1020	920	950	NAp
Turbidity (NTU) (b)	10	8.53	6	5.64	1.42	3.11	3.02	2.04	3.83	9.81	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	5.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	4.0 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	460	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	52 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	20 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-155	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 50
Iron (II), Ferrous (units in mg/L) (b)	10.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	M-1										Favorable Geochemical Conditions (a)
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters											
Temperature (degrees C) (b)	15.3	NM	17.6	18.6	10.2	17.7	22.3	9.5	13.8	20.0	> 20°C
pH (standard units) (b)	6.75	NM	7.0	6.9	7.2	7.1	6.4	7.0	7.0	7.0	5 < x < 9
Conductivity (μohm/cm) (b)	855.0	NM	840	900	1010	770	510	970	860	1000	NAp
Turbidity (NTU) (b)	16	NM	7	3.22	2.36	1.68	4.90	3.39	9.75	24.30	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	440	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	115 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	11.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	327	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 50
Iron (II), Ferrous (units in mg/L) (b)	6.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	N-1									Favorable Geochemical
Sample Event	Aug-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters										
Temperature (degrees C) (b)	16.8	15.0	16.5	13.3	14.3	NS	NS	13.6	15.8	> 20°C
pH (standard units) (b)	6.87	7.0	7.4	7.3	6.8	NS	NS	6.9	7.1	5 < x < 9
Conductivity (µohm/cm) (b)	953	1020	1000	1190	1160	NS	NS	920	900	NAp
Turbidity (NTU) (b)	4	3	2.46	0.68	2.69	NS	NS	5.24	4.53	NAp
Natural Attenuation Parameters										
Methane (units in ug/L)	NA	NA	NA	NA	NA	NS	NS	NA	NA	> 500
Ethane (units in ug/L)	NA	NA	NA	NA	NA	NS	NS	NA	NA	> 10
Ethene (units in ug/L)	NA	NA	NA	NA	NA	NS	NS	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	NA	NA	NA	NA	NA	NS	NS	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	NA	NA	NA	NA	NA	NS	NS	NA	NA	< 1
Sulfate (units in mg/L)	NA	NA	NA	NA	NA	NS	NS	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NS	NS	NA	NA	> 1
Chloride (units in mg/L)	NA	NA	NA	NA	NA	NS	NS	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NS	NS	NA	NA	> 20
DO (units in mg/L) (b)	0.1	NA	NA	NA	NA	NS	NS	NA	NA	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	NA	NA	NA	NA	NA	NS	NS	NA	NA	< 50
Iron (II), Ferrous (units in mg/L) (b)	NA	NA	NA	NA	NA	NS	NS	NA	NA	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	R-1										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	16.4	14.2	14.8	16.8	13	15.8	14.7	14.1	14.3	18.3	> 20°C
pH (standard units) (b)	6.86	6.89	8.55	7.2	7.3	6.97	7.4	6.9	6.8	7.0	5 < x < 9
Conductivity (μohm/cm) (b)	980	888.5	970	900	970	920	700	1160	930	1000	NAp
Turbidity (NTU) (b)	10.2	0.9	10	11.6	16.6	8.25	25.5	5.92	22.1	29.7	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	57	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	4.0 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	499	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	73.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	12.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	0	NA	NA	NA	NA	0.1	0.22	0.22	0.09	0.34	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-105	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 50
Iron (II), Ferrous (units in mg/L) (b)	5.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1

p

Field Parameters and Geotechnical Data

FFTA-MAAF Remedial Investigation Report

Sample Location	R-2										Favorable Geochemical
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	Conditions (a)
Field Test Parameters											
Temperature (degrees C) (b)	16.0	14.4	14.7	15.5	13.1	14.6	16.4	14.3	14.3	16.7	> 20°C
pH (standard units) (b)	6.96	6.64	7.0	7.3	7.3	6.90	7.3	6.8	7.1	7.5	5 < x < 9
Conductivity (µohm/cm) (b)	915	771.8	910	800	900	940	600	1080	890	900	NAp
Turbidity (NTU) (b)	18.9	12.1	5	3.82	5.38	4.77	8.84	10.5	14.5	25.2	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	26.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	4.0 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	457	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	63.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	17.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	1.8 (f)	NA	NA	NA	NA	0.1	0.41	0.24	0.10	4.02	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-75.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 50
Iron (II), Ferrous (units in mg/L) (b)	5.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1

Table 4-6 (continued)
Field Parameters and Geotechnical Data
FFTA-MAAF Remedial Investigation Report

Sample Location	R-3										Favorable Geochemical Conditions (a)
Sample Event	Aug-96	Dec-96	May-97	Aug-97	Feb-98	May-98	Aug-98	Jan-99	May-99	Aug-99	
Field Test Parameters											
Temperature (degrees C) (b)	15.8	14.5	13.4	19.5	12.7	14.4	15.3	13.7	14.1	17.7	> 20°C
pH (standard units) (b)	6.88	6.95	7.1	7.3	7.1	7.01	7.4	6.7	7.1	7.0	5 < x < 9
Conductivity (µohm/cm) (b)	878	809.8	900	1050	830	660	500	1020	750	1000	NAp
Turbidity (NTU) (b)	1.0	10.82	12	8.32	1.44	5.24	6.91	5.36	3.58	3.63	NAp
Natural Attenuation Parameters											
Methane (units in ug/L)	48	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 500
Ethane (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Ethene (units in ug/L)	ND(<4.0)	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 10
Alkalinity, as $CaCO^3$ (units in mg/L)	438	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 680 (c) (e)
Nitrate, as N (units in mg/L)	ND(<1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1
Sulfate (units in mg/L)	89.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20
Sulfide (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1
Chloride (units in mg/L)	12.3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 56 (d) (e)
TOC (units in mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 20
DO (units in mg/L) (b)	0.0	NA	NA	NA	NA	0.1	0.06	0.10	0.58	0.13	< 0.5
Oxidation/Reduction Potential (units in mV) (b)	-175	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 50
Iron (II), Ferrous (units in mg/L) (b)	4.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	> 1

Sources:

Data Summary Reports for each sampling event

Notes:

ND(<): Not Detected above Practical Quantitation Limit

NS: Not Sampled

NA: Not Analyzed

ug/L: micrograms per liter

mg/L: milligrams per liter

mV: milllivolts

µohm/cm: microohms per centimeter

TOC: Total Organic Carbon

DO: Dissolved Oxygen

NM: Not Measured

NAp: Not applicable

J: Estimated concentration

R: Rejected data due to uncertainty in calibration of meter

U: Qualified as undetected by the laboratory

UJ: Compound not detected above Practical Quantitation Limit

Values in the favorable geochemical conditions range are bolded and highlighted.

(a) From USEPA and AFCEE, 1998; These geochemical conditions represent a range that is favorable for reductive dechlorination.

(b) Field Measurement

(c) Twice the average value for alkalinity of groundwater from Kansas River valley-fill deposits (340 mg/L; range of 170 to 470 mg/L) (Fader, 1974).

(d) Twice the average value for chloride in groundwater from Kansas River valley-fill deposits (28 mg/L; range of 2.0 to 84 mg/L)(Fader, 1974).

(e) These values represent two times the background value as per natural attenuation protocol (USEPA and AFCEE, 1998). Background values were determined using historical water quality data from Fader (1974). Average values for alkalinity and chloride of groundwater from Kansas River alluvial deposits are 340 and 28 mg/L, respectively, with a range of 170 to 470 mg/L for alkalinity and 2.0 to 84 mg/L for chloride (Fader, 1974).

(f) Questionable value: aeration of sample was probable

Table 4-7
Chronology of Tracer Test Field Activities
FFTA-MAAF Remedial Investigation Report

Activity	Date
Tracer test work plan submitted	February 15, 1999
Injection well installation and development	March 15 to 18, 1999
Verification of groundwater flow direction within the test area by injection of dye (Rhodamine WT) and the dye monitoring	March 11 to 26, 1999
Monitoring well installation and development	April 13 to 23, 1999
Tracer (KBr) injection	May 24, 1999
KBr and other parameter monitoring	May 25, 1999 to July 30, 1999
Tracer (KI) Injection	July 7, 1999
KI and other parameter monitoring	July 7 to 30, 1999
Survey of the installed injection and monitoring wells	September 9, 1999
Completion of the field activity	September 9, 1999
Tracer report preparation	October 18, 1999

TABLE 4-8
RI Soil Sampling Intervals/Depths
FFTA-MAAF Remedial Investigation Report

Sampling Point	Sample Number	Sample Depth (ft bgs)	Sample Interval (Elevation)	Sample Interval (Elevation)	Sample Depth (Elevation)	Sample Depth (Elevation)	Closest Post Pilot Sample
FP99-SB01	a	0-4	1056.3	1052.3	1053.3	1052.3	PSB-32
FP99-SB01	b	4-8	1052.3	1048.3	1049.3	1048.3	
FP99-SB01	c	8-12	1048.3	1044.3	1045.3	1044.3	
FP99-SB01	d	12-16	1044.3	1040.3	1041.3	1040.3	
FP99-SB02	a	0-5	1056.9	1051.9	1052.9	1051.9	PSB-29
FP99-SB02	b	5-9	1051.9	1047.9	1048.9	1047.9	
FP99-SB02	c	9-13	1047.9	1043.9	1044.9	1043.9	
FP99-SB02	d	13-17	1043.9	1039.9	1040.9	1039.9	
FP99-SB03	a	0-5	1057	1052	1053	1052	PSB-29
FP99-SB03	b	5-9	1052	1048	1049	1048	
FP99-SB03	c	9-13	1048	1044	1045	1044	
FP99-SB03	d	13-17	1044	1040	1041	1040	
FP99-SB04	a	0-5	1057	1052	1053	1052	PSB-31
FP99-SB04	b	5-9	1052	1048	1049	1048	
FP99-SB04	c	9-13	1048	1044	1044.2	1043.2	
FP99-SB04	d	13-17	1044	1040	1041.3	1040.3	
FP99-SB05	a	0-5	1056.6	1051.6	1052.6	1051.6	PSB-32
FP99-SB05	b	5-9	1051.6	1047.6	1048.6	1047.6	
FP99-SB05	c	9-13	1047.6	1043.6	1044.6	1043.6	
FP99-SB05	d	13-17	1043.6	1039.6	1040.9	1039.9	

TABLE 4-8 (Continued)
RI Soil Sampling Intervals/Depths
FFTA-MAAF Remedial Investigation Report

Sampling Point	Sample Number	Sample Depth (ft bgs)	Sample Interval (Elevation)	Sample Interval (Elevation)	Sample Depth (Elevation)	Sample Depth (Elevation)	Closest Post Pilot Sample
FP99-SB06	a	0-4	1056.2	1052.2	1053.2	1052.2	PSB-30
FP99-SB06	b	4-8	1052.2	1048.2	1049.2	1048.2	
FP99-SB06	c	8-12	1048.2	1044.2	1045.2	1044.2	
FP99-SB06	d	12-16	1044.2	1040.2	1041.2	1040.2	
FP99-SB07	a	0-4	1056.1	1052.1	1053.1	1052.1	PSB-30
FP99-SB07	b	4-8	1052.1	1048.1	1049.1	1048.1	
FP99-SB07	c	8-12	1048.1	1044.1	1045.1	1044.1	
FP99-SB07	d	12-16	1044.1	1040.1	1041.3	1040.3	
FP99-SB08 *	a	0-4	1056.8	1052.8	1053.8	1052.8	PSB-29
FP99-SB08 *	b	4-8	1052.8	1048.8	1049.8	1048.8	
FP99-SB08 *	c	8-12	1048.8	1044.8	1045.8	1044.8	
FP99-SB08 *	d	12-16	1044.8	1040.8	1041.8	1040.8	
FP99-SB09 *	a	0-4	1056.2	1052.2	1053.2	1052.2	PSB-10
FP99-SB09 *	b	4-8	1052.2	1048.2	1049.2	1048.2	
FP99-SB09 *	c	8-12	1048.2	1044.2	1045.2	1044.2	
FP99-SB09 *	d	12-16	1044.2	1040.2	1041.2	1040.2	
FP99-SB10	a	0-4	1056.1	1052.1	1053.1	1052.1	PSB-10
FP99-SB10	b	4-8	1052.1	1048.1	1049.1	1048.1	
FP99-SB10	c	8-12	1048.1	1044.1	1045.1	1044.1	
FP99-SB10	d	12-16	1044.1	1040.1	1041.1	1040.1	

TABLE 4-8 (Continued)
RI Soil Sampling Intervals/Depths
FFTA-MAAF Remedial Investigation Report

Sampling Point	Sample Number	Sample Depth (ft bgs)	Sample Interval (Elevation)	Sample Interval (Elevation)	Sample Depth (Elevation)	Sample Depth (Elevation)	Closest Post Pilot Sample
FP99-SB11	a	0-4	1056.1	1052.1	1053.1	1052.1	PSB-08
FP99-SB11	b	4-8	1052.1	1048.1	1049.1	1048.1	
FP99-SB11	c	8-12	1048.1	1044.1	1045.1	1044.1	
FP99-SB11	d	12-16	1044.1	1040.1	1041.1	1040.1	
FP99-SB12	a	0-4	1056.4	1052.4	1053.4	1052.4	PSB-02
FP99-SB12	b	4-8	1052.4	1048.4	1049.4	1048.4	
FP99-SB12	c	8-12	1048.4	1044.4	1045.4	1044.4	
FP99-SB12	d	12-16	1044.4	1040.4	1041.7	1040.7	
FP99-SB13	a	0-4	1056	1052	1053.5	1052.5	PSB-04
FP99-SB13	b	4-8	1052	1048	1049	1048	
FP99-SB13	c	8-12	1048	1044	1045	1044	
FP99-SB13	d	12-16	1044	1040	1041	1040	
FP99-SB14	a	0-4	1056	1052	1053	1052	PSB-16
FP99-SB14	b	4-8	1052	1048	1049	1048	
FP99-SB14	c	8-12	1048	1044	1045	1044	
FP99-SB14	d	12-16	1044	1040	1041	1040	
FP99-SB15	a	0-4	1056.4	1052.4	1053.4	1052.4	PSB-07
FP99-SB15	b	4-8	1052.4	1048.4	1049.4	1048.4	
FP99-SB15	c	8-12	1048.4	1044.4	1045.4	1044.4	
FP99-SB15	d	12-16	1044.4	1040.4	1041.4	1040.4	

TABLE 4-8 (Continued)
RI Soil Sampling Intervals/Depths
FFTA-MAAF Remedial Investigation Report

Sampling Point	Sample Number	Sample Depth (ft bgs)	Sample Interval (Elevation)	Sample Interval (Elevation)	Sample Depth (Elevation)	Sample Depth (Elevation)	Closest Post Pilot Sample
FP99-SB16	a	0-4	1056.5	1052.5	1053.5	1052.5	PSB-17
FP99-SB16	b	4-8	1052.5	1048.5	1049.5	1048.5	
FP99-SB16	c	8-12	1048.5	1044.5	1045.5	1044.5	
FP99-SB16	d	12-16	1044.5	1040.5	1041.5	1040.5	
FP99-SB17	a	0-4	1056.4	1052.4	1053.4	1052.4	PSB-09
FP99-SB17	b	4-8	1052.4	1048.4	1049.4	1048.4	
FP99-SB17	c	8-12	1048.4	1044.4	1045.4	1044.4	
FP99-SB17	d	12-16	1044.4	1040.4	1041.4	1040.4	
FP99-SB18	a	0-4	1056.2	1052.2	1053.2	1052.2	PSB-22
FP99-SB18	b	4-8	1052.2	1048.2	1049.2	1048.2	
FP99-SB18	c	8-12	1048.2	1044.2	1045.2	1044.2	
FP99-SB18	d	12-16	1044.2	1040.2	1041.2	1040.2	
FP99-SB19	a	0-2	1053.9	1051.9	1053.9	1051.9	PSB-02
FP99-SB19	b	2-6	1051.9	1047.9	1048.9	1047.9	
FP99-SB19	c	6-10	1047.9	1043.9	1044.9	1043.9	
FP99-SB19	d	10-14	1043.9	1039.9	1040.9	1039.9	
FP99-SB20	a	0-0.5	1052.2	1051.7	1052.2	1051.2	PSB-15
FP99-SB20	b	0.5-4	1051.7	1048.2	1049.2	1048.2	
FP99-SB20	c	4-8	1048.2	1044.2	1045.2	1044.2	
FP99-SB20	d	8-12	1044.2	1040.2	1041.2	1040.2	

TABLE 4-8 (Continued)
RI Soil Sampling Intervals/Depths
FFTA-MAAF Remedial Investigation Report

Sampling Point	Sample Number	Sample Depth (ft bgs)	Sample Interval (Elevation)	Sample Interval (Elevation)	Sample Depth (Elevation)	Sample Depth (Elevation)	Closest Post Pilot Sample
FP99-SB21	a	0-0.5	1052.2	1051.7	1052.2	1051.7	PSB-15
FP99-SB21	b	0.5-4	1051.7	1048.2	1049.2	1048.2	
FP99-SB21	c	4-8	1048.2	1044.2	1045.2	1044.2	
FP99-SB21	d	8-12	1044.2	1040.2	1041.7	1040.7	
FP99-SB22	a	0-0.5	1052	1051.5	1052	1051.5	PSB-01
FP99-SB22	b	0.5-4	1051.5	1048	1049	1048	
FP99-SB22	c	4-8	1048	1044	1045	1044	
FP99-SB22	d	8-12	1044	1040	1041	1040	
FP99-SB23	a	0-0.5	1052.3	1051.8	1052.3	1051.8	PSB-08
FP99-SB23	b	0.5-4	1051.8	1048.3	1049.3	1048.3	
FP99-SB23	c	4-8	1048.3	1044.3	1045.3	1044.3	
FP99-SB23	d	8-12	1044.3	1040.3	1041.3	1040.3	
FP99-SB24	a	0-0.5	1052.4	1051.9	1052.4	1051.9	PSB-18
FP99-SB24	b	0.5-4	1051.9	1048.4	1049.4	1048.4	
FP99-SB24	c	4-8	1048.4	1044.4	1045.4	1044.4	
FP99-SB24	d	8-12	1044.4	1040.4	1041.4	1040.4	
FP99-SB25	a	0-0.5	1052.8	1052.3	1052.8	1052.3	PSB-21
FP99-SB25	b	0.5-4	1052.3	1048.8	1049.8	1048.8	
FP99-SB25	c	4-8	1048.8	1044.8	1045.8	1044.8	
FP99-SB25	d	8-12	1044.8	1040.8	1041.8	1040.8	

TABLE 4-8 (Continued)
RI Soil Sampling Intervals/Depths
FFTA-MAAF Remedial Investigation Report

Sampling Point	Sample Number	Sample Depth (ft bgs)	Sample Interval (Elevation)	Sample Interval (Elevation)	Sample Depth (Elevation)	Sample Depth (Elevation)	Closest Post Pilot Sample
FP99-SB26	a	0-1	1053	1052	1050	1049	PSB-27
FP99-SB26	b	1-5	1052	1048	1049	1048	
FP99-SB26	c	5-9	1048	1044	1045	1044	
FP99-SB26	d	9-13	1044	1040	1041	1040	
FP99-SB27	a	0-4	1056.3	1052.3	1053.3	1052.3	PSB-13
FP99-SB27	b	4-8	1052.3	1048.3	1049.3	1048.3	
FP99-SB27	c	8-12	1048.3	1044.3	1045.3	1044.3	
FP99-SB27	d	12-16	1044.3	1040.3	1041.3	1040.3	
FP99-SB28	a	0-4	1056.4	1052.4	1053.4	1052.4	PSB-03
FP99-SB28	b	4-8	1052.4	1048.4	1049.4	1048.4	
FP99-SB28	c	8-12	1048.4	1044.4	1045.4	1044.4	
FP99-SB28	d	12-16	1044.4	1040.4	1041.4	1040.4	
FP99-SB29	a	0-4	1056.5	1052.5	1053.5	1052.5	PSB-23
FP99-SB29	b	4-8	1052.5	1048.5	1049.5	1048.5	
FP99-SB29	c	8-12	1048.5	1044.5	1045.5	1044.5	
FP99-SB29	d	12-16	1044.5	1040.5	1041.5	1040.5	
FP99-SB30	a	0-5	1056.7	1051.7	1052.7	1051.7	PSB-23
FP99-SB30	b	5-9	1051.7	1047.7	1048.7	1047.7	
FP99-SB30	c	9-13	1047.7	1043.7	1044.7	1043.7	
FP99-SB30	d	13-17	1043.7	1039.7	1040.7	1039.7	

TABLE 4-8 (Continued)
RI Soil Sampling Intervals/Depths
FFTA-MAAF Remedial Investigation Report

Sampling Point	Sample Number	Sample Depth (ft bgs)	Sample Interval (Elevation)	Sample Interval (Elevation)	Sample Depth (Elevation)	Sample Depth (Elevation)	Closest Post Pilot Sample
FP99-SB31	a	0-5	1057.2	1052.2	1054.9	1053.9	PSB-25
FP99-SB31	b	5-9	1052.2	1048.2	1049.2	1048.2	
FP99-SB31	c	9-13	1048.2	1044.2	1045.2	1044.2	
FP99-SB31	d	13-17	1044.2	1040.2	1041.2	1040.2	
FP99-SB32	a	0-5	1056.9	1051.9	1054.9	1053.9	PSB-24
FP99-SB32	b	5-9	1051.9	1047.9	1048.9	1047.9	
FP99-SB32	c	9-13	1047.9	1043.9	1044.9	1043.9	
FP99-SB32	d	13-17	1043.9	1039.9	1040.9	1039.9	
FP99-SB33	a	0-5	1056.6	1051.6	1052.6	1051.6	PSB-24
FP99-SB33	b	5-9	1051.6	1047.6	1048.6	1047.6	
FP99-SB33	c	9-13	1047.6	1043.6	1044.6	1043.6	
FP99-SB33	d	13-17	1043.6	1039.6	1040.6	1039.6	
FP99-SB34	a	0-5	1056.6	1051.6	1053.1	1052.1	PSB-26
FP99-SB34	b	5-9	1051.6	1047.6	1049.6	1048.6	
FP99-SB34	c	9-13	1047.6	1043.6	1044.6	1043.6	
FP99-SB34	d	13-17	1043.6	1039.6	1040.6	1039.6	

TABLE 4-8 (Continued)
RI Soil Sampling Intervals/Depths
FFTA-MAAF Remedial Investigation Report

Sampling Point	Sample Number	Sample Depth (ft bgs)	Sample Interval (Elevation)	Sample Interval (Elevation)	Sample Depth (Elevation)	Sample Depth (Elevation)	Closest Post Pilot Sample
FP99-SB35	a	0-5	1057.5	1052.5	1053.5	1052.5	PSB-36
FP99-SB35	b	5-9	1052.5	1048.5	1049.5	1048.5	
FP99-SB35	c	9-13	1048.5	1044.5	1045.5	1044.5	
FP99-SB35	d	13-17	1044.5	1040.5	1041.5	1040.5	
FP99-SB36	a	0-5	1057.3	1052.3	1053.3	1052.3	PSB-37
FP99-SB36	b	5-9	1052.3	1048.3	1049.3	1048.3	
FP99-SB36	c	9-13	1048.3	1044.3	1045.3	1044.3	
FP99-SB36	d	13-17	1044.3	1040.3	1041.3	1040.3	

Notes:

* = Elevation not yet recorded, the sampling interval may be altered based on actual elevation

The QA and field duplicate soil samples will be analyzed for the same parameters as the original field sample.

8260B = SW-846 Method 8260B

OA1 & OA2 = Iowa Methods OA-1 and OA-2

A trip blank accompanied each cooler containing aqueous samples submitted for VOCs.

VOCs = Target compound list volatile organic compounds

TEPH = Total Extractable Petroleum Hydrocarbons

TVPH = Total Volatile Petroleum Hydrocarbons

QA = Quality Assurance

MS/MSD = Matrix spike/matrix spike duplicate sample

QC = Quality Control

Table 4-9
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB01/a		FP99-SB01/b		FP99-SB01/c		FP99-SB01/d		FP99-SB02/a		FP99-SB02/b		FP99-SB02/c	
Date Sampled	11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99	
Laboratory Number	99061347		99061348		99061349		99061350		99061338		99061339		99061340	
Volatiles (ug/kg)														
PCE	12	U	12	U	10	U	280	U	12	U	12	U	12	U
cis-1,2-DCE	12	U	12	U	10	U	280	UJ*	12	U	12	U	12	U
Ethylbenzene	12	U	12	U	10	U	**1,500**		12	U	12	U	12	U
m.p-Xylene	12	U	12	U	10	U	**6,800**		12	U	12	U	12	U
o-Xylene	24	U	24	U	21	U	**1,600**		24	U	25	U	23	U
Toluene	12	U	12	U	10	U	280	U	12	U	12	U	12	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	5.9	U	5.9	U	5.3	U	**840**		5.9	U	6.2	U	5.8	U
Reported as C19 - C40 (mg/kg)	5.9	U	5.9	U	5.3	U	**330**		**11.6**		**11.4**		5.8	U
TVPH (µg/kg)	240	U	240	U	210	U	**300,000**	EJ*	240	U	250	U	230	U

Sample Identification	FP99-SB02/d		FP99-SB03/a		FP99-SB03/b		FP99-SB03/c		FP99-SB03/d		FP99-SB04/a		FP99-SB04/b	
Date Sampled	11-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99		11-Jun-99		11-Jun-99	
Laboratory Number	99061341		99060994		99060995		99060996		99060997		99061330		99061331	
Volatiles (ug/kg)														
PCE	12	U	12	U	12	U	11	U	11	U	12	U	12	U
cis-1,2-DCE	**55**		12	U	12	U	11	U	11	U	12	U	12	U
Ethylbenzene	12	U	12	U	12	U	11	U	11	U	12	U	12	U
m.p-Xylene	12	U	12	U	12	U	11	U	11	U	12	U	12	U
o-Xylene	23	U	23	U	24	U	21	U	22	U	23	U	24	U
Toluene	12	U	12	U	12	U	11	U	11	U	12	U	12	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	**300**		5.8	U	6.1	U	5.4	U	5.6	U	5.8	U	6.0	U
Reported as C19 - C40 (mg/kg)	**200**		**7.6**		6.1	U	5.4	U	5.6	U	**11.2**		6.0	U
TVPH (µg/kg)	**210,000**	EJ*	230	U	240	U	220	U	220	U	230	U	240	U

Table 4-9 (Continued)
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB04/c		FP99-SB04/d		FP99-SB05/a		FP99-SB05/b		FP99-SB05/c		FP99-SB05/c		FP99-SB05/d	
Date Sampled	11-Jun-99		11-Jun-99		12-Jun-99		12-Jun-99		12-Jun-99		12-Jun-99		12-Jun-99	
Laboratory Number	99061332		99061333		99061369		99061370		99061371		99061371R		99061372	
Volatiles (ug/kg)											Reanalysis			
PCE	10	U	12	U	12	U	11	U	10	U	NA		300	UJ*
cis-1,2-DCE	10	U	12	U	12	U	11	U	10	U	NA		300	U
Ethylbenzene	10	U	12	U	12	U	11	U	10	U	NA		300	U
m.p-Xylene	10	U	23	U	24	U	23	U	10	U	NA		**1,500**	
o-Xylene	20	U	12	U	12	U	11	U	21	U	NA		**880**	
Toluene	10	U	12	U	12	U	11	U	10	U	NA		300	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	20	U	**170**		5.9	U	5.7	U	5.3	UR*	5.3	UR*	**220**	
Reported as C19 - C40 (mg/kg)	**170**		**250**		5.9	U	5.7	U	5.3	UR*	5.3	UR*	**160**	
TVPH (µg/kg)	200	U	**65,000**	EJ*	240	U	220	U	210	U	NA		**570,000**	EJ*

Sample Identification	FP99-SB06/a		FP99-SB06/b		FP99-SB06/c		FP99-SB06/d		FP99-SB07/a		FP99-SB07/b		FP99-SB07/c	
Date Sampled	11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99		12-Jun-99		12-Jun-99		12-Jun-99	
Laboratory Number	99061343		99061344		99061345		99061346		99061374		99061375		99061376	
Volatiles (ug/kg)														
PCE	12	U	11	U	12	U	280	U	11	U	12	U	10	U
cis-1,2-DCE	12	U	11	U	12	U	280	UJ*	11	U	12	U	10	U
Ethylbenzene	12	U	11	U	12	U	280	U	11	U	12	U	10	U
m.p-Xylene	12	U	11	U	12	U	**7,800**		11	U	12	U	10	U
o-Xylene	23	U	22	U	23	U	**4,100**		23	U	23	U	21	U
Toluene	12	U	11	U	12	U	280	U	11	U	12	U	10	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	5.9	U	5.6	U	5.8	U	**380**		5.7	U	5.8	U	5.3	U
Reported as C19 - C40 (mg/kg)	**5.9**		5.6	U	**6.6**		**330**		**6.7**		5.8	U	**18.2**	
TVPH (µg/kg)	240	U	220	U	230	U	**340,000**	EJ*	220	U	230	U	210	U

Table 4-9 (Continued)
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB07/d		FP99-SB08/a		FP99-SB08/b		FP99-SB08/c		FP99-SB08/d		FP99-SB09/a		FP99-SB09/b	
Date Sampled	12-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99		10-Jun-99		10-Jun-99	
Laboratory Number	99061377		99060990		99060991		99060992		99060993		99061177		99061178	
Volatiles (ug/kg)														
PCE	290	U	**15**		**23**		12	U	11	U	12	U	11	U
cis-1,2-DCE	290	UJ*	11	U	12	U	12	U	11	U	12	U	11	U
Ethylbenzene	290	U	11	U	12	U	12	U	11	U	12	U	11	U
m.p-Xylene	**6,200**		11	U	12	U	12	U	11	U	12	U	11	U
o-Xylene	**2,800**		22	U	23	U	23	U	22	U	24	U	23	U
Toluene	290	U	11	U	12	U	12	U	11	U	12	U	11	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	**660**		5.6	U	5.8	U	5.8	U	5.6	U	6	U	5.7	U
Reported as C19 - C40 (mg/kg)	**370**		**9**		**7**		5.8	U	5.6	U	**9.3**		5.7	U
TVPH (µg/kg)	**520,000**	EJ*	220	U	230	U	230	U	220	U	240	U	230	U

Sample Identification	FP99-SB09/c		FP99-SB09/d		FP99-SB10/a		FP99-SB10/b		FP99-SB10/c		FP99-SB10/d		FP99-SB11/a	
Date Sampled	10-Jun-99		10-Jun-99		8-Jun-99		8-Jun-99		8-Jun-99		8-Jun-99		8-Jun-99	
Laboratory Number	99061179		99061180		99060849		99060850		99060851		99060853		99060844	
Volatiles (ug/kg)													Reanalysis	
PCE	**15**		12	U	12	U	12	U	10	U	12	U	**20**	
cis-1,2-DCE	12	U	12	U	12	U	12	U	10	U	12	U	12	U
Ethylbenzene	12	U	12	U	12	U	12	U	10	U	12	U	12	U
m.p-Xylene	12	U	12	U	12	U	12	U	10	U	12	U	12	U
o-Xylene	24	U	23	U	24	U	25	U	21	U	24	U	25	U
Toluene	12	U	12	U	12	U	12	U	10	U	12	U	12	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	6	U	5.8	U	6	U	6.2	U	5.2	U	6	U	6.2	U
Reported as C19 - C40 (mg/kg)	6	U	5.8	U	**20.3**		6.2	U	5.2	U	6	U	6.2	U
TVPH (µg/kg)	240	U	230	U	120	U	250	U	100	U	120	U	250	UM

Table 4-9 (Continued)
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB11/a		FP99-SB11/b		FP99-SB11/c		FP99-SB11/d		FP99-SB12/a		FP99-SB12/b		FP99-SB12/c	
Date Sampled	8-Jun-99		8-Jun-99		8-Jun-99		8-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99	
Laboratory Number	99060844I		99060845		99060846		99060847		99061334		99061335		99061336	
Volatiles (ug/kg)	Initial													
PCE	NA		12	U	11	U	12	U	12	U	12	U	11	U
cis-1,2-DCE	NA		12	U	11	U	12	U	12	U	12	U	11	U
Ethylbenzene	NA		12	U	11	U	12	U	12	U	12	U	11	U
m.p-Xylene	NA		12	U	11	U	12	U	12	U	12	U	11	U
o-Xylene	NA		25	U	22	U	23	U	24	U	24	U	22	U
Toluene	NA		12	U	11	U	12	U	12	U	12	U	11	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	NA		6.2	U	5.6	U	5.8	U	5.9	U	6	U	5.6	U
Reported as C19 - C40 (mg/kg)	NA		6.2	U	5.6	U	5.8	U	**15**		6	U	5.6	U
TVPH (µg/kg)	120	UEJ*	120	U	110	U	120	U	240	U	240	U	220	U

Sample Identification	FP99-SB12/d		FP99-SB13/a		FP99-SB13/a		FP99-SB13/b		FP99-SB13/b		FP99-SB13/c		FP99-SB13/d	
Date Sampled	11-Jun-99		12-Jun-99		12-Jun-99		12-Jun-99		12-Jun-99		12-Jun-99		12-Jun-99	
Laboratory Number	99061337		99061384		99061384I		99061385		99061385I		99061386		99061387	
Volatiles (ug/kg)			Reanalysis		Initial		Reanalysis		Initial					
PCE	280	U	1,500	U	300	U	1,600	U	320	U	280	U	280	U
cis-1,2-DCE	280	UJ*	1,500	U	**580**	J*	1,600	U	**800**	J*	**420**	J*	280	U
Ethylbenzene	280	U	**13,000**		**6,100**		**14,000**		**8,100**		**690**		280	U
m.p-Xylene	280	U	**49,000**		OVERCAL		**52,000**		OVERCAL		**4,400**		**2,600**	
o-Xylene	550	U	**26,000**		OVERCAL		**25,000**		OVERCAL		**2,700**		**1,600**	
Toluene	280	U	**30,000**		OVERCAL		**39,000**		OVERCAL		**3,700**		280	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	**120**		**9,400**		NA		3,200	UR*	NA		**11,700**		**380**	
Reported as C19 - C40 (mg/kg)	**72.9**		**15,000**		NA		**12,000**	R*	NA		**14,500**		**590**	
TVPH (µg/kg)	**91,000**	EJ*	**1,800,000**	ER*	NA		**1,000,000**	EJ*	NA		**1,800,000**	EJ*	**360,000**	EJ*

Table 4-9 (Continued)
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB14/a		FP99-SB14/b		FP99-SB14/c		FP99-SB14/d		FP99-SB15/a		FP99-SB15/a		FP99-SB15/b	
Date Sampled	12-Jun-99		12-Jun-99		12-Jun-99		12-Jun-99		10-Jun-99		10-Jun-99		10-Jun-99	
Laboratory Number	99061379		99061380		99061381		99061382		99061159		99061159R		99061160	
Volatiles (ug/kg)											Reanalysis			
PCE	12	U	12	U	11	U	290	U	**20**		NA		11	U
cis-1,2-DCE	12	U	12	U	11	U	290	UJ*	11	U	NA		11	U
Ethylbenzene	12	U	12	U	11	U	290	U	11	U	NA		11	U
m.p-Xylene	12	U	12	U	11	U	**2,400**		11	U	NA		11	U
o-Xylene	24	U	24	U	23	U	**970**		22	U	NA		22	U
Toluene	12	U	12	U	11	U	290	U	11	U	NA		11	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	6	U	6	U	5.7	U	**920**		5.6	UJ*	5.6	UR*	5.6	U
Reported as C19 - C40 (mg/kg)	**19.8**		6	U	5.7	U	**670**		5.6	UJ*	5.6	UR*	**6.8**	
TVPH (µg/kg)	240	U	240	U	230	U	**890,000**	EJ*	220	UE	NA		220	U

Sample Identification	FP99-SB15/c		FP99-SB15/d		FP99-SB16/a		FP99-SB16/b		FP99-SB16/c		FP99-SB16/d		FP99-SB17/a	
Date Sampled	10-Jun-99		10-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99	
Laboratory Number	99061161		99061162		99061005		99061006		99061007		99061008		99060986	
Volatiles (ug/kg)													Reanalysis	
PCE	10	U	280	U	**170**		12	U	10	U	12	U	**61**	
cis-1,2-DCE	10	U	280	UJ*	12	U	12	U	10	U	12	U	12	U
Ethylbenzene	10	U	280	U	12	U	12	U	10	U	12	U	12	U
m.p-Xylene	10	U	**4,400**		12	U	12	U	10	U	12	U	12	U
o-Xylene	21	U	**1,300**		24	U	23	U	20	U	23	U	24	U
Toluene	10	U	280	U	12	U	12	U	10	U	12	U	12	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	5.2	U	**840**		6	U	5.9	U	5.1	U	5.8	U	6.1	U
Reported as C19 - C40 (mg/kg)	5.2	U	**1,500**		**17.6**		5.9	U	5.1	U	5.8	U	**35.1**	
TVPH (µg/kg)	210	U	**1,200,000**	EJ*	240	U	230	U	200	U	230	U	240	UEJ*

Table 4-9 (Continued)
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB17/a		FP99-SB17/b		FP99-SB17/c		FP99-SB17/d		FP99-SB18/a		FP99-SB18/b		FP99-SB18/c	
Date Sampled	9-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99	
Laboratory Number	99060986I		99060987		99060988		99060989		99061000		99061001		99061002	
Volatiles (ug/kg)	Initial													
PCE	NA		12	U	11	U	12	U	**22**		13	U	11	U
cis-1,2-DCE	NA		12	U	11	U	12	U	12	U	13	U	11	U
Ethylbenzene	NA		12	U	11	U	12	U	12	U	13	U	11	U
m.p-Xylene	NA		12	U	11	U	12	U	12	U	13	U	11	U
o-Xylene	NA		25	U	22	U	23	U	25	U	25	U	22	U
Toluene	NA		12	U	11	U	12	U	12	U	13	U	11	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	NA		6.2	U	5.6	U	5.8	U	6.2	U	6.3	U	5.4	U
Reported as C19 - C40 (mg/kg)	NA		**8.4**		5.6	U	5.8	U	**25.8**		**7.8**		5.4	U
TVPH (µg/kg)	240	UEJ*	250	U	220	U	230	U	250	U	250	U	220	U

Sample Identification	FP99-SB18/d		FP99-SB19/a		FP99-SB19/b		FP99-SB19/c		FP99-SB19/d		FP99-SB20/a		FP99-SB20/b	
Date Sampled	9-Jun-99		10-Jun-99		10-Jun-99		10-Jun-99		10-Jun-99		10-Jun-99		10-Jun-99	
Laboratory Number	99061003		99061168		99061169		99061170		99061171		99061173		99061174	
Volatiles (ug/kg)														
PCE	12	U	12	U	12	U	13	U	11	U	11	U	12	U
cis-1,2-DCE	12	U	12	U	12	U	13	U	11	U	11	U	12	U
Ethylbenzene	12	U	12	U	12	U	13	U	11	U	11	U	12	U
m.p-Xylene	12	U	12	U	12	U	13	U	11	U	11	U	12	U
o-Xylene	24	U	23	U	25	U	26	U	23	U	22	U	24	U
Toluene	12	U	12	U	12	U	13	U	11	U	11	U	12	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	5.9	U	5.9	U	6.3	U	6.5	U	5.7	U	5.6	U	6.1	U
Reported as C19 - C40 (mg/kg)	5.9	U	**12.6**		**8.5**		6.5	U	5.7	U	**9.8**		6.1	U
TVPH (µg/kg)	240	U	240	U	250	U	240	U	230	U	230	U	240	U

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Table 4-9 (Continued)
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB20/c		FP99-SB20/d		FP99-SB20/d	
Date Sampled	10-Jun-99		10-Jun-99		10-Jun-99	
Laboratory Number	99061175		99061176		99061176R	
Volatiles (ug/kg)					Reanalysis	
PCE	12	U	30	U	NA	
cis-1,2-DCE	12	U	30	U	NA	
Ethylbenzene	12	U	30	U	NA	
m.p-Xylene	12	U	30	U	NA	
o-Xylene	24	U	60	U	NA	
Toluene	12	U	30	U	NA	
Total Petroleum Hydrocarbons						
Reported as Diesel (mg/kg)	6	U	**1,000**		NA	
Reported as C19 - C40 (mg/kg)	**33.9**		**530**		NA	
TVPH (µg/kg)	240	U	**240,000**	EJ*	**160,000**	EJ*

Table 4-9 (Continued)
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB21/a	FP99-SB21/b	FP99-SB21/c	FP99-SB21/d	FP99-SB22/a	FP99-SB22/b	FP99-SB22/b
Date Sampled	10-Jun-99	10-Jun-99	10-Jun-99	10-Jun-99	10-Jun-99	10-Jun-99	10-Jun-99
Laboratory Number	99061153	99061154	99061155	99061156	99061149	99061150	99061150R
Volatiles (ug/kg)							Reanalysis
PCE	12 U	13 U	12 U	12 U	12 U	13 U	NA
Total Petroleum Hydrocarbons							
Reported as Diesel (mg/kg)	5.8 U	6.3 U	6.2 U	**630**	12 U	6.4 UJ*	6.4 UR*
Reported as C19 - C40 (mg/kg)	**62.6**	6.3 U	6.2 U	**500**	**56**	6.4 UJ*	**24.4** R*
TVPH (µg/kg)	230 U	250 U	250 U	**580,000** EJ*	240 U	260 U	NA

Sample Identification	FP99-SB22/c	FPP99-SB22/d	FP99-SB23/a	FP99-SB23/b	FP99-SB23/c	FP99-SB23/d	FP99-SB24/a
Date Sampled	10-Jun-99	10-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99
Laboratory Number	99061151	99061152	99060998	99060999	99060984	99060985	99061010
Volatiles (ug/kg)							
PCE	12 U	12 U	13 U	13 U	11 U	11 U	13 U
Total Petroleum Hydrocarbons							
Reported as Diesel (mg/kg)	6.3 U	**180**	13 U	6.4 U	5.5 U	5.6 U	26 U
Reported as C19 - C40 (mg/kg)	6.3 U	**250**	**100**	6.4 U	5.5 U	5.6 U	**140**
TVPH (µg/kg)	250 U	**39,000** J*	250 U	250 U	220 U	230 U	260 U

Sample Identification	FP99-SB24/b	FP99-SB24/c	FP99-SB24/d	FP99-SB25/a	FP99-SB25/a	FP99-SB25/b	FP99-SB25/c
Date Sampled	9-Jun-99	9-Jun-99	9-Jun-99	8-Jun-99	8-Jun-99	8-Jun-99	8-Jun-99
Laboratory Number	99061011	99061012	99061013	99060840	99060840I	99060841	99060842
Volatiles (ug/kg)				Reanalysis	Initial		
PCE	12 U	12 U	11 U	13 U	NA	12 U	10 U
Total Petroleum Hydrocarbons							
Reported as Diesel (mg/kg)	6.3 U	6 U	5.7 U	6.3 U	NA	6.2 U	5.2 U
Reported as C19 - C40 (mg/kg)	6.3 U	6 U	5.7 U	6.3 U	NA	6.2 U	5.2 U
TVPH (µg/kg)	250 U	240 U	230 U	250 U	130 UEJ*	120 U	210 U

Table 4-9 (Continued)
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB25/d		FP99-SB26/a		FP99-SB26/a		FP99-SB26/b		FP99-SB26/c		FP99-SB26/d		FP99-SB27/a	
Date Sampled	8-Jun-99		8-Jun-99		8-Jun-99		8-Jun-99		8-Jun-99		8-Jun-99		11-Jun-99	
Laboratory Number	99060843		99060836		99060836R		99060839		99060837		99060838		99061324	
Volatiles (ug/kg)					Reanalysis									
PCE	12	U	12	U	NA		12	U	11	U	12	U	12	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	5.8	U	5.5	U	NA		6.2	U	5.6	U	5.9	U	6	U
Reported as C19 - C40 (mg/kg)	5.8	U	15.7		NA		6.2	U	5.6	U	5.9	U	6.1	
TVPH (µg/kg)	230	U	120	UEJ*	250	UM	250	U	220	U	120	U	240	U

Sample Identification	FP99-SB27/b		FP99-SB27/c		FP99-SB27/d		FP99-SB28/a		FP99-SB28/b		FP99-SB28/c		FP99-SB28/d	
Date Sampled	11-Jun-99		11-Jun-99		11-Jun-99		10-Jun-99		10-Jun-99		10-Jun-99		10-Jun-99	
Laboratory Number	99061325		99061326		99061327		99061164		99061165		99061166		99061167	
Volatiles (ug/kg)														
PCE	13	U	10	U	12	U	12	U	13	U	10	U	12	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	6.5	U	5.2	U	6	U	6.3	U	6.3	U	5.3	U	6	U
Reported as C19 - C40 (mg/kg)	6.5	U	5.2	U	6	U	17		6.3	U	5.3	U	6	U
TVPH (µg/kg)	260	U	210	U	240	U	250	U	250	U	210	U	240	U

Sample Identification	FP99-SB29/a		FP99-SB29/b		FP99-SB29/c		FP99-SB29/d		FP99-SB30/a		FP99-SB30/b		FP99-SB30/c	
Date Sampled	11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99		8-Jun-99		8-Jun-99		8-Jun-99	
Laboratory Number	99061319		99061320		99061321		99061322		99060832		99060833		99060834	
Volatiles (ug/kg)														
PCE	13	U	12	U	10	U	12	U	12	U	12	U	11	U
Total Petroleum Hydrocarbons														
Reported as Diesel (mg/kg)	6.4	U	6.2	U	5.1	U	5.9	U	6.1	U	6.2	U	5.4	U
Reported as C19 - C40 (mg/kg)	18.6		6.2	U	5.1	U	5.9	U	6.1	U	6.2	U	5.4	U
TVPH (µg/kg)	260	U	250	U	210	U	240	U	120	U	120	U	110	U

Table 4-9 (Continued)
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB30/d	FP99-SB31/a	FP99-SB31/a	FP99-SB31/b	FP99-SB31/c	FP99-SB31/d	FP99-SB32/a
Date Sampled	8-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99
Laboratory Number	99060835	99060709	99060709I	99060710	99060711	99060712	99060689
Volatiles (ug/kg)		Reanalysis	Initial				
PCE	12 U	**150**	NA	12 U	10 U	12 U	NA
Total Petroleum Hydrocarbons							
Reported as Diesel (mg/kg)	6 U	6.4 U	NA	6.1 U	5.2 U	6 U	6.5 U
Reported as C19 - C40 (mg/kg)	6 U	**23**	NA	6.1 U	5.2 U	6 U	**9.7**
TVPH (µg/kg)	120 U	130 UEJ*	130 UEJ*	120 U	100 U	120 U	NA

Sample Identification	FP99-SB32/b	FP99-SB32/c	FP99-SB32/d	FP99-SB33/a	FP99-SB33/a	FP99-SB33/b	FP99-SB33/c
Date Sampled	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99
Laboratory Number	99060690	99060691	99060692	99060697	99060697I	99060698	99060699
Volatiles (ug/kg)				Reanalysis	Initial		
PCE	12 U	10 U	12 U	**52**	NA	12 U	10 U
Total Petroleum Hydrocarbons							
Reported as Diesel (mg/kg)	6.2 U	5.2 U	5.8 U	6.5 U	NA	6.2 U	5.2 U
Reported as C19 - C40 (mg/kg)	6.2 U	5.2 U	5.8 U	**12**	NA	6.2 U	5.2 U
TVPH (µg/kg)	120 U	100 U	120 U	130 UEJ*	130 UEJ*	120 U	100 U

Sample Identification	FP99-SB33/d	FP99-SB34/a	FP99-SB34/a	FP99-SB34/b	FP99-SB34/c	FP99-SB34/d	FP99-SB35/a
Date Sampled	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99
Laboratory Number	99060700	99060693	99060693I	99060694	99060695	99060696	99060705
Volatiles (ug/kg)		Reanalysis	Initial				Reanalysis
PCE	12 U	12 U	NA	12 U	10 U	12 U	13 U
Total Petroleum Hydrocarbons							
Reported as Diesel (mg/kg)	5.8 U	6.1 U	NA	6 U	5.3 U	6 U	6.6 U
Reported as C19 - C40 (mg/kg)	5.8 U	**14**	NA	6 U	5.3 U	6 U	6.6 U
TVPH (µg/kg)	120 U	120 UEJ*	120 UEJ*	120 U	100 U	120 U	130 UEJ*

Table 4-9 (Continued)
RI Soil Sampling Positive Detections
FFTA-MAAF Remedial Investigation Report

Sample Identification	FP99-SB35/a	FP99-SB35/b	FP99-SB35/c	FP99-SB35/d	FP99-SB36/a	FP99-SB36/a	FP99-36/b
Date Sampled	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99	7-Jun-99
Laboratory Number	99060705I	99060706	99060707	99060708	99060701	99060701I	99060702
Volatiles (ug/kg)	Initial				Reanalysis	Initial	
PCE	NA	12 U	10 U	12 U	32	NA	12 U
Total Petroleum Hydrocarbons							
Reported as Diesel (mg/kg)	NA	6.2 UJ*	5.2 U	5.9 U	6.4 U	NA	6.2 U
Reported as C19 - C40 (mg/kg)	NA	6.2 U	5.2 U	5.9 U	14	NA	6.2 U
TVPH (µg/kg)	130 UEJ*	120 U	100 U	120 U	120 UEJ*	120 UEJ*	120 U

Sample Identification	FP99-SB36/c	FP99-SB36/d
Date Sampled	7-Jun-99	7-Jun-99
Laboratory Number	99060703	99060704
Volatiles (ug/kg)		
PCE	10 U	12 U
Total Petroleum Hydrocarbons		
Reported as Diesel (mg/kg)	5.2 U	5.9 U
Reported as C19 - C40 (mg/kg)	5.2 U	5.9 U
TVPH (µg/kg)	100 U	120 U

Notes:

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

PCE = Tetrachloroethene
TCE = Trichloroethene
DCE = Dichloroethene
TVPH = Total Volatile Petroleum Hydrocarbons
OVERCAL = Concentration exceeds calibration

U = Qualified as undetected by the laboratory
E = Qualified as estimated due to matrix interference
R = Qualified as rejected based on QC evaluation.
R* = Qualified as rejected based on QC evaluation. However, result is considered useable as an estimate.
J* = Qualified as estimated in the QC evaluation

Table 4-10
RI Soil Re-Sampling Results - DMD Results
FFTA-MAAF Remedial Investigation Report

	Sample Point:	FP99-SB01d	FP99-SB05d	FP99-SB06d	FP99-SB07d	FP99-SB12d	FP99-SB13a	FP99-SB13b
	Date Sampled:	7/08/99	7/08/99	7/08/99	7/08/99	7/08/99	7/08/99	7/08/99
Parameters	Units							
cis-1,2-Dichloroethene	µg/kg	34 U	33 U	34 U	38 U	34 U	**200 J***	**50**
Tetrachloroethene	µg/kg	34 UJ*	33 UJ*	34 UJ*	38 UJ*	**23 JM**	**110 J***	**39 MJ***
Trichloroethene	µg/kg	**19 J**	33 U	34 U	38 U	34 U	35 UJ*	**16 J**
Vinyl Chloride	µg/kg	34 U	33 U	34 U	38 U	34 U	35 UJ*	37 U

	Sample Point:	FP99-SB13b (Duplicate)	FP99-SB13c	FP99-SB13c (Re-analysis)	FP99-SB13d	FP99-SB14d	FP99-SB15d	FP99-SB15d (Re-analysis)
	Date Sampled:	7/08/99	7/08/99	7/08/99	7/08/99	7/08/99	7/08/99	7/08/99
Parameters	Units							
cis-1,2-Dichloroethene	µg/kg	**160**	**150 J***	**110 J***	33 U	39 U	32 UJ*	32 UJ*
Tetrachloroethene	µg/kg	**42 MJ***	**30 JM**	**34 JM**	33 UJ*	**20 JM**	**16 JM**	32 UJ*
Trichloroethene	µg/kg	38 U	36 UJ*	36 UJ*	**14 JM**	39 U	32 UJ*	32 UJ*
Vinyl Chloride	µg/kg	38 U	36 UJ*	36 UJ*	33 U	39 U	32 UJ*	32 UJ*

Notes:

U - Qualified as undetected by laboratory

J - Qualified as estimated by laboratory

M - Qualified as estimated by laboratory due to possible interferences.

J* - Qualified as estimated by during data validation

FP99-SB13c and FP99-SB15d were reanalyzed due to elevated surrogate recovery.

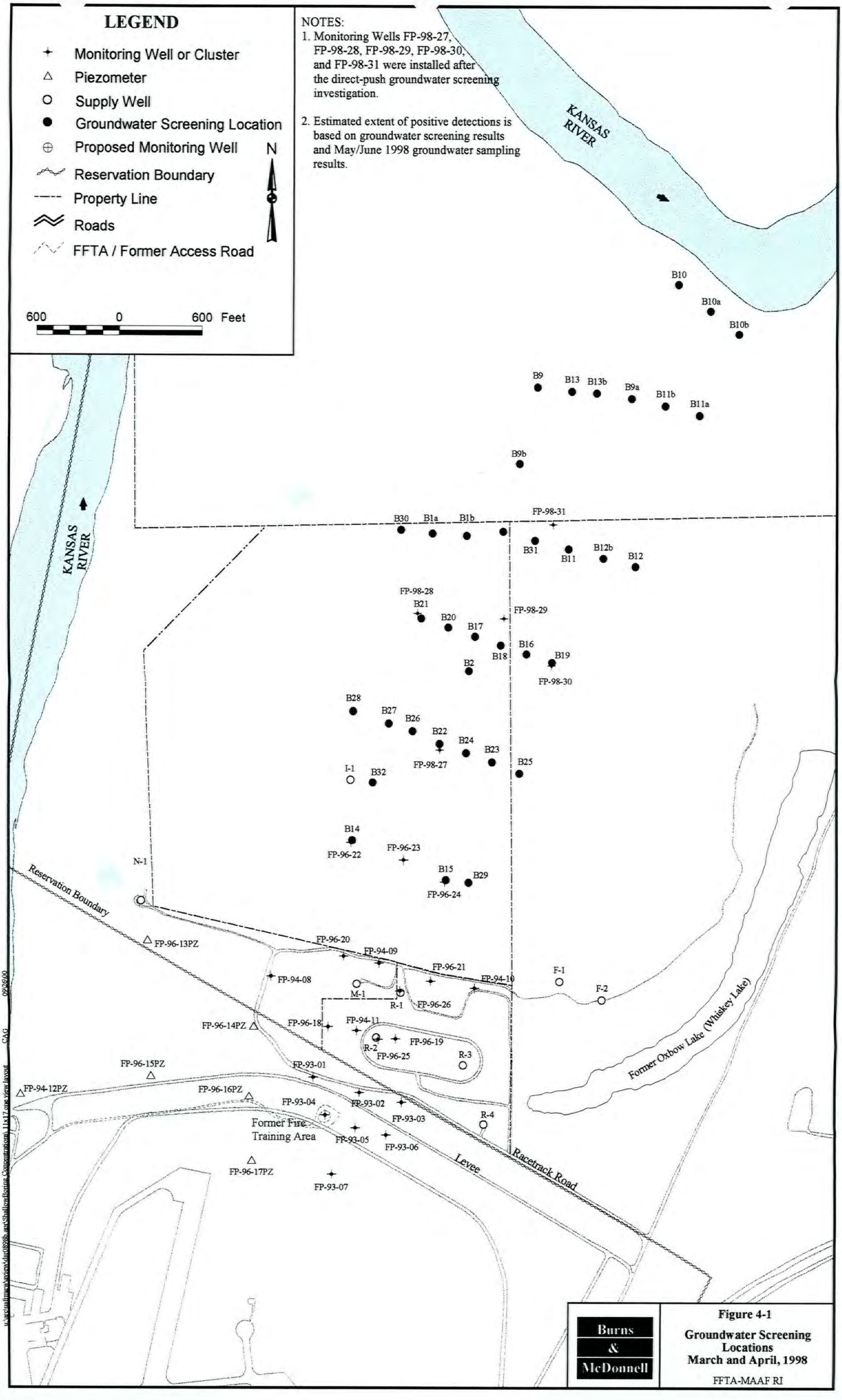


Figure 4-1

Groundwater Screening Locations March and April, 1998

FFTA-MAAF RI

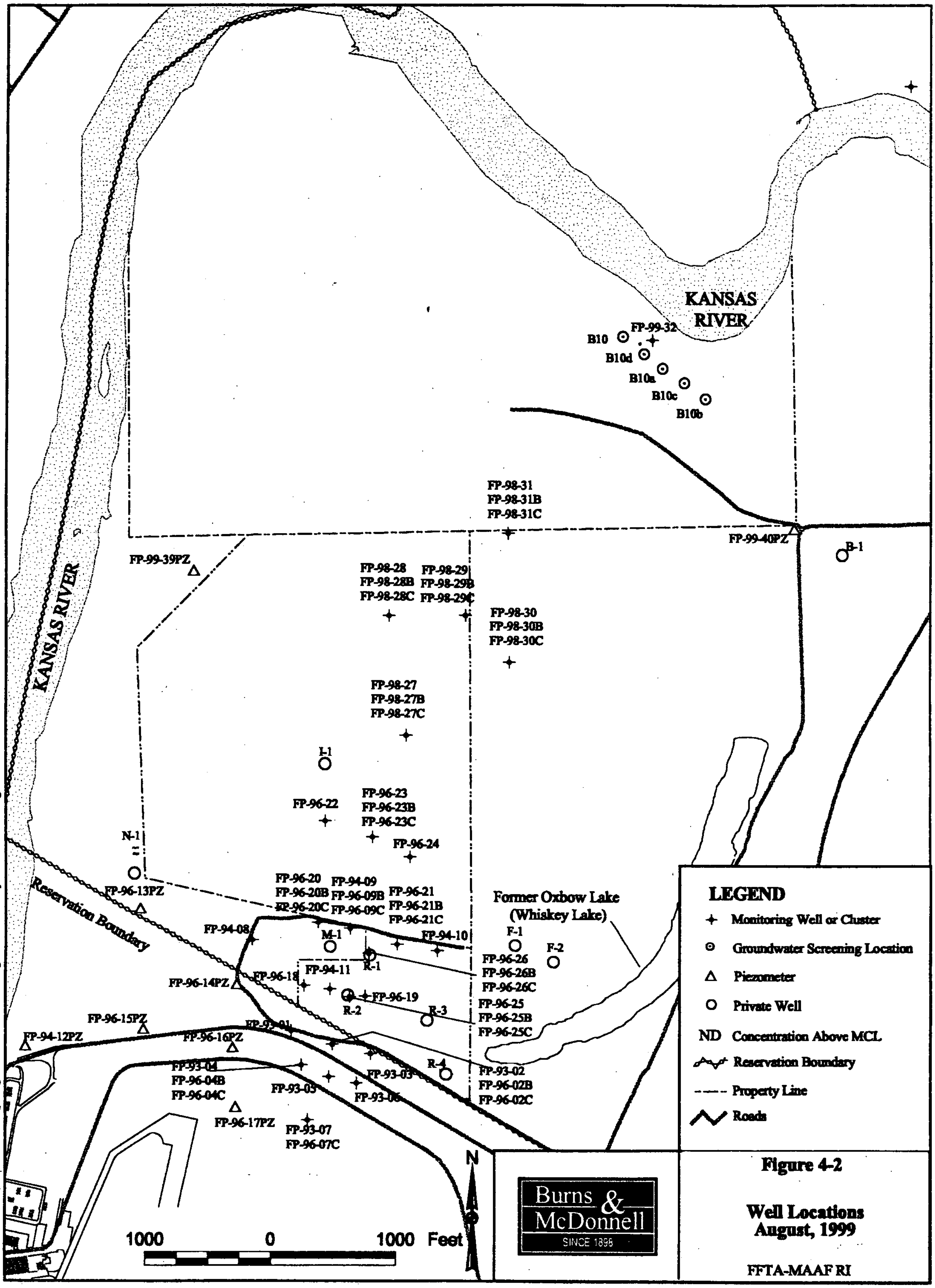
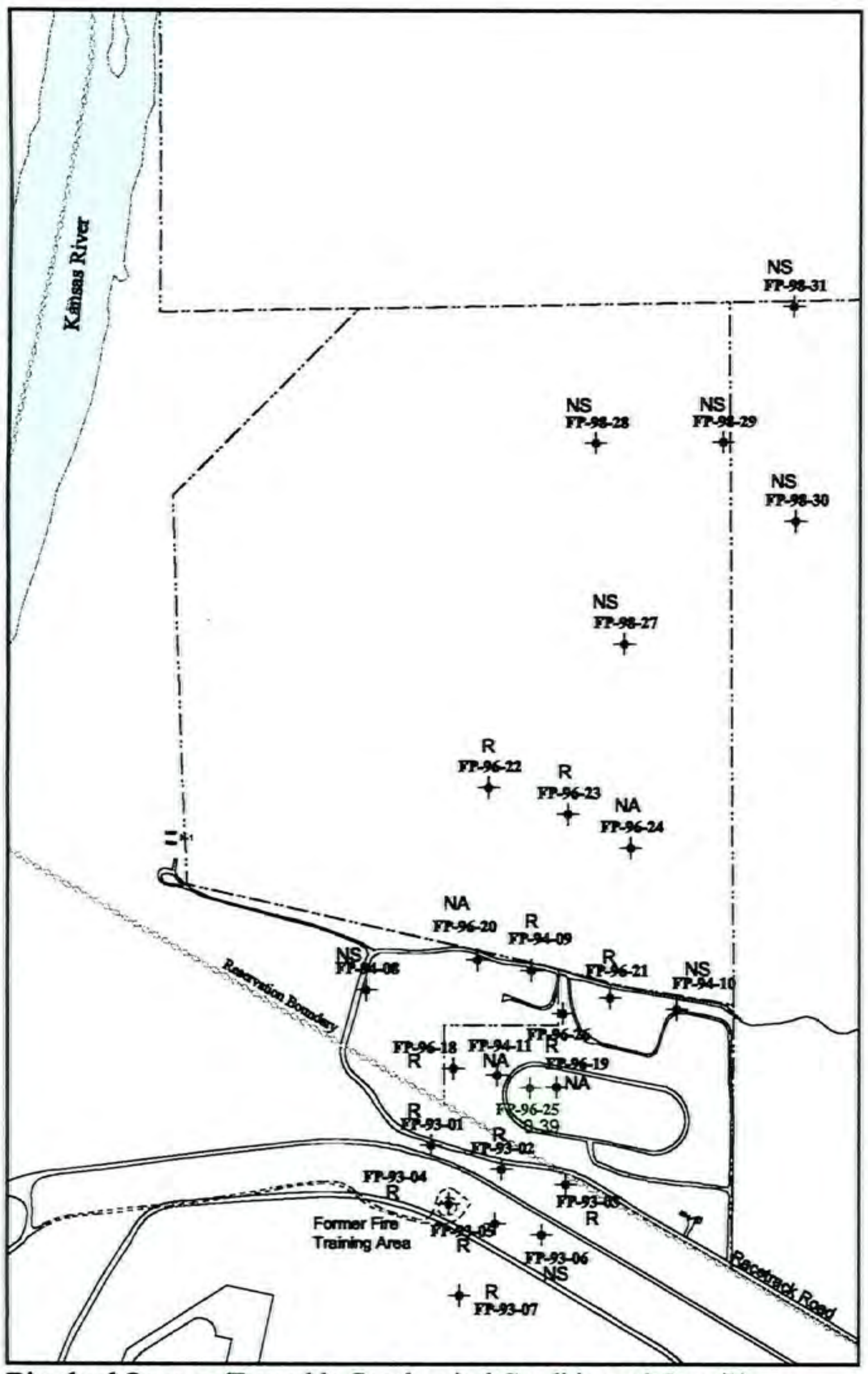


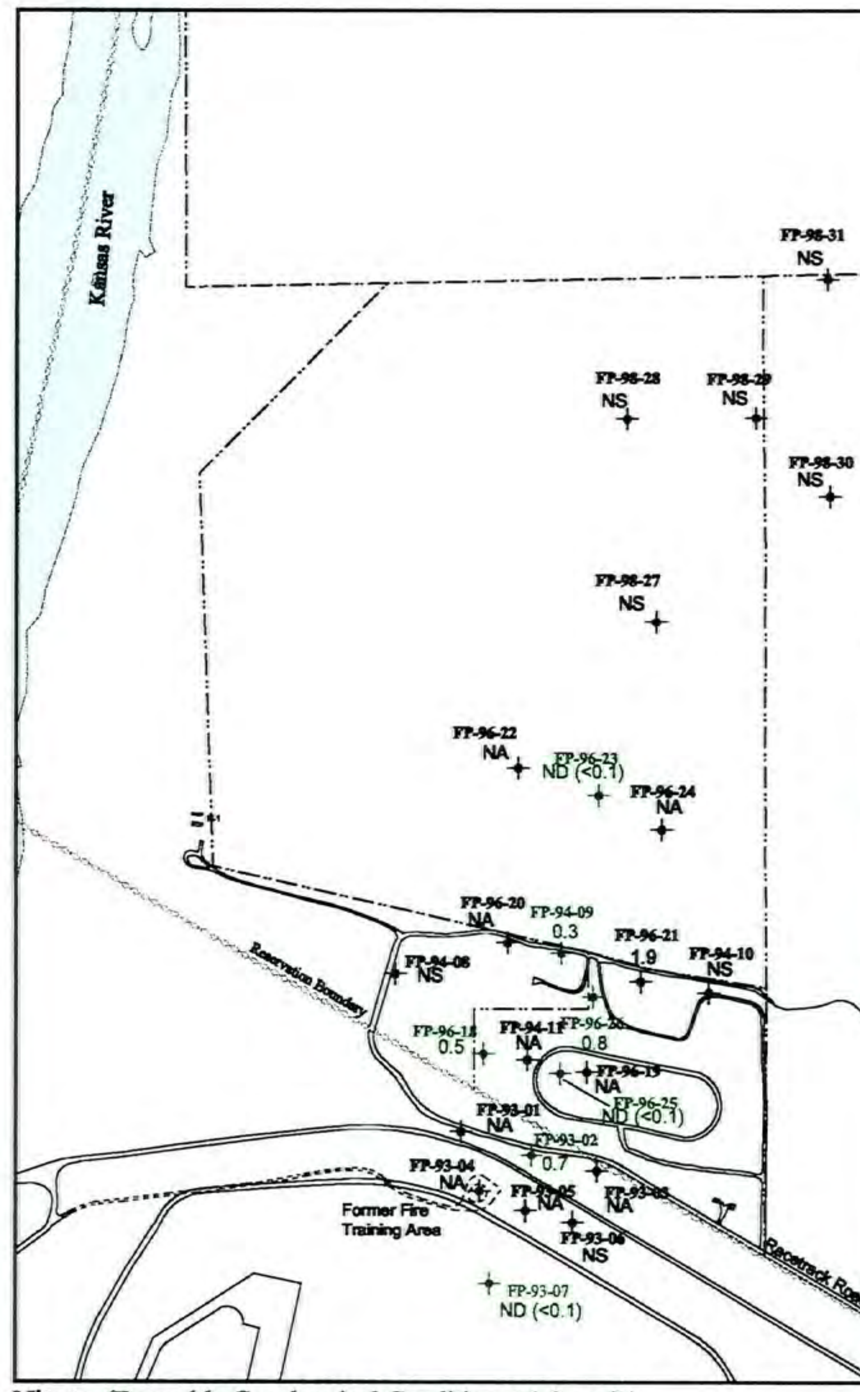
Figure 4-2

Well Locations
August, 1999

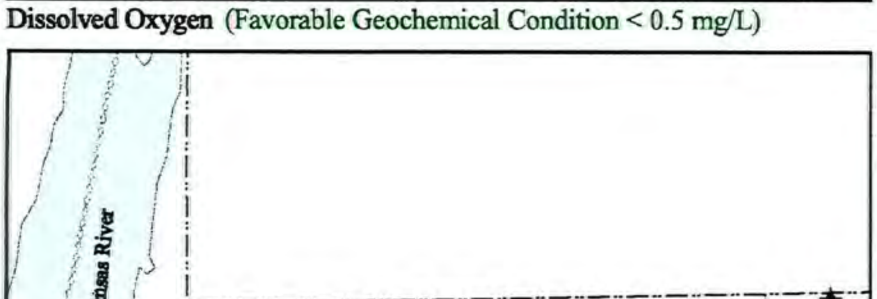
FFTA-MAAF RI



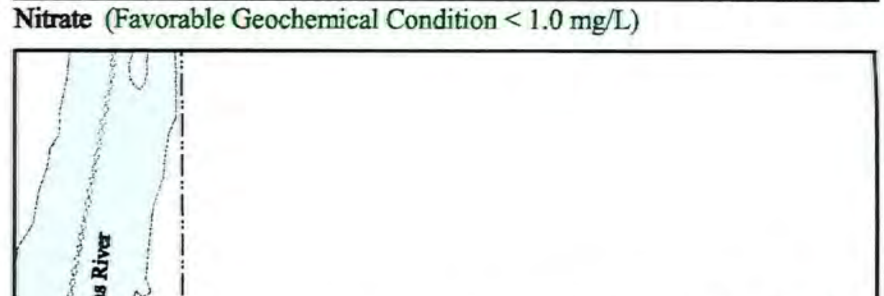
Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)



Nitrate (Favorable Geochemical Condition < 1.0 mg/L)



Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)



Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Sulfate units are in mg/L.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

NA Not Analyzed
NS Not Sampled
ND Not Detected
R Rejected

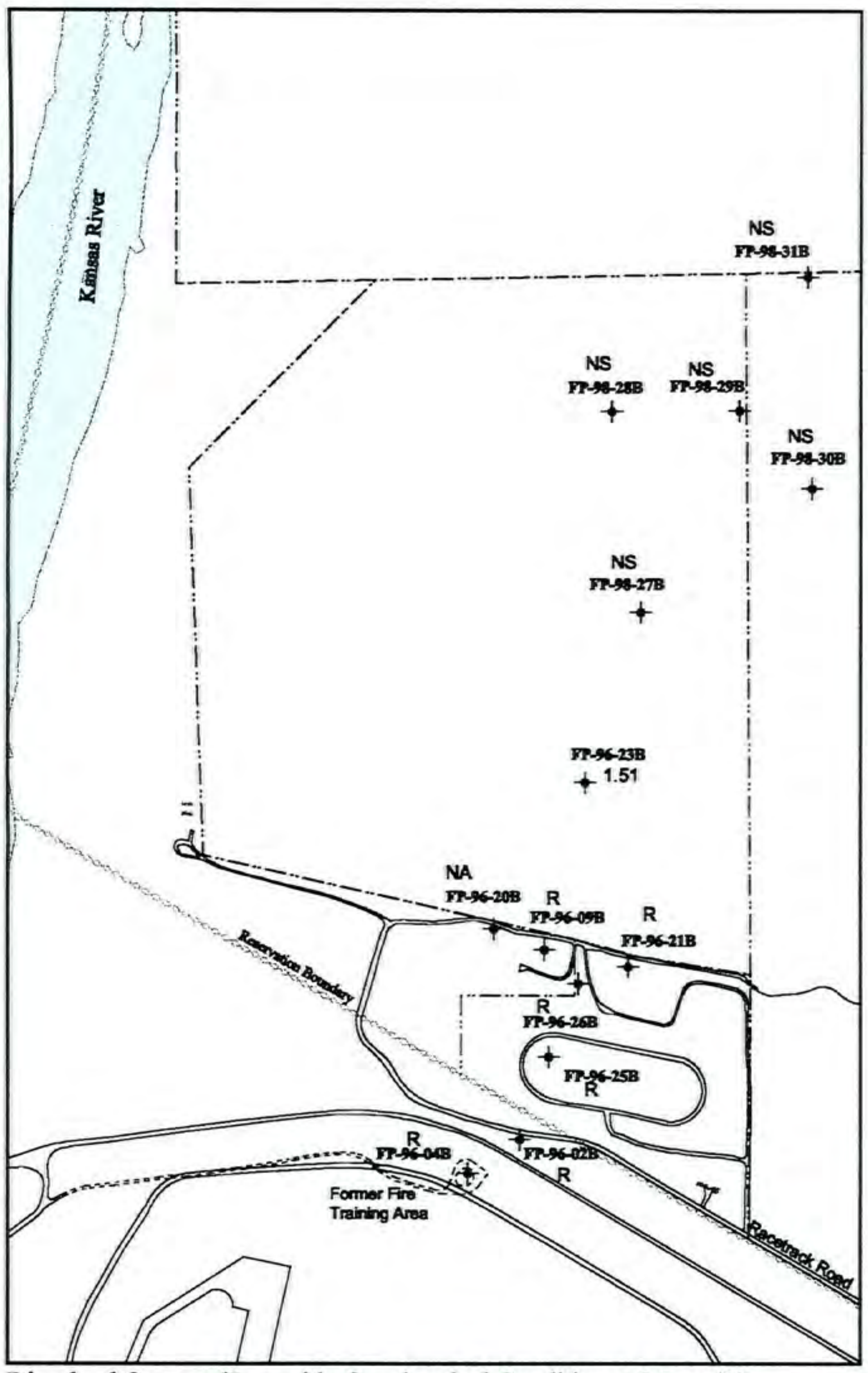
900 0 900 Feet

N

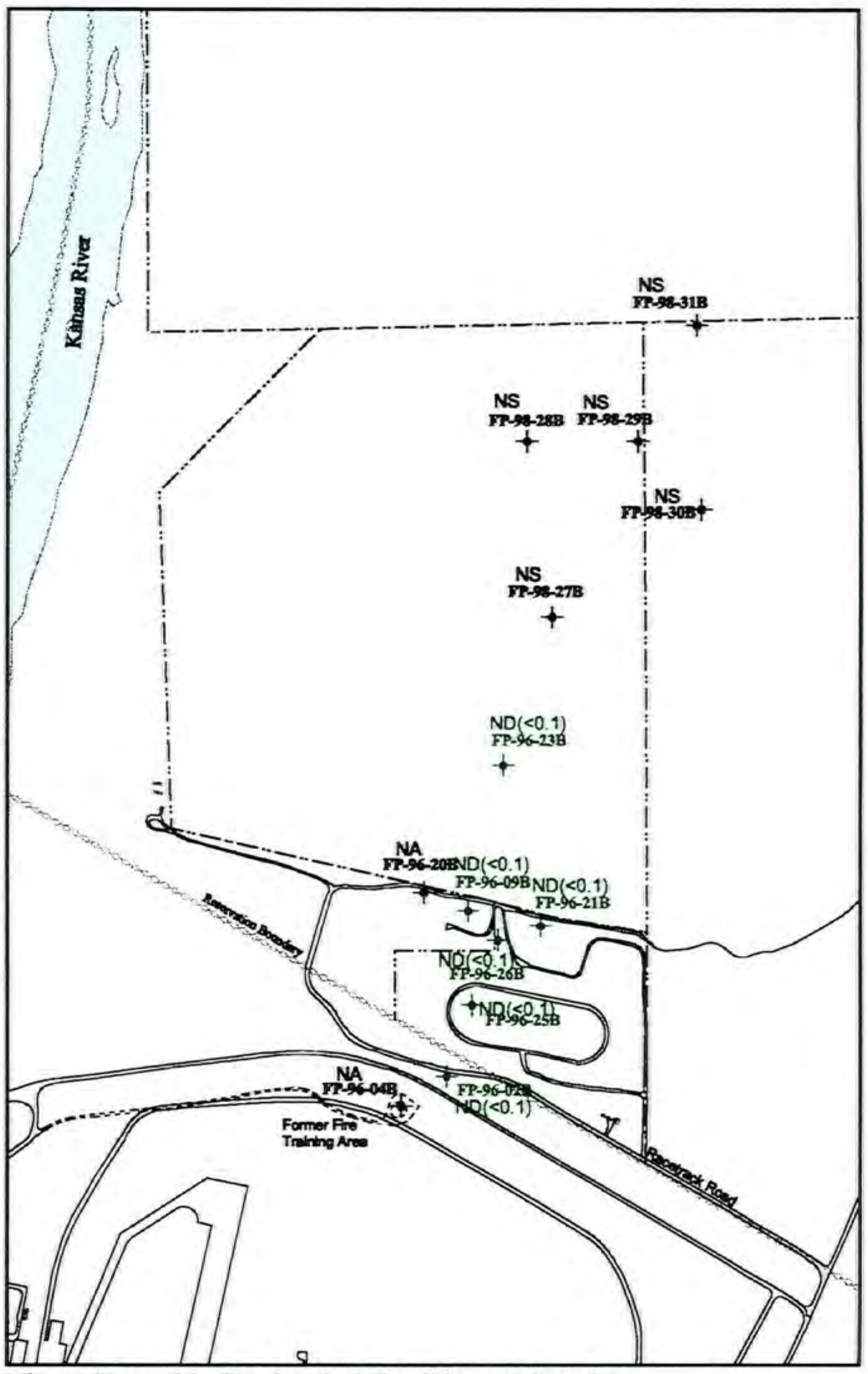
Burns & McDonnell SINCE 1898

Figure 4-3
Natural Attenuation Parameters Shallow Wells December 1996
FFTA-MAAF RI

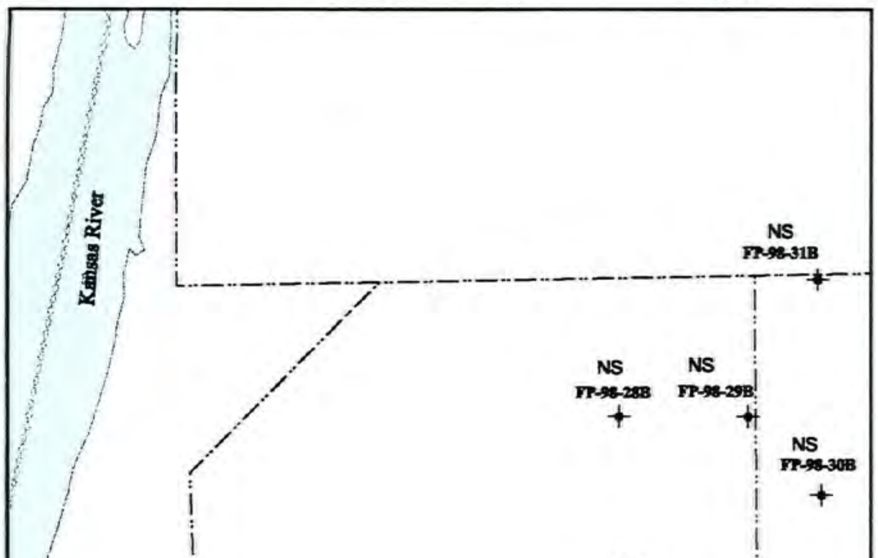
H:\arc\usf\mgvaview\12000_nat.apr\0598 NAT Shallow views\0598 NAT Shallow LAYOUT 12/22/99 12000 MTS



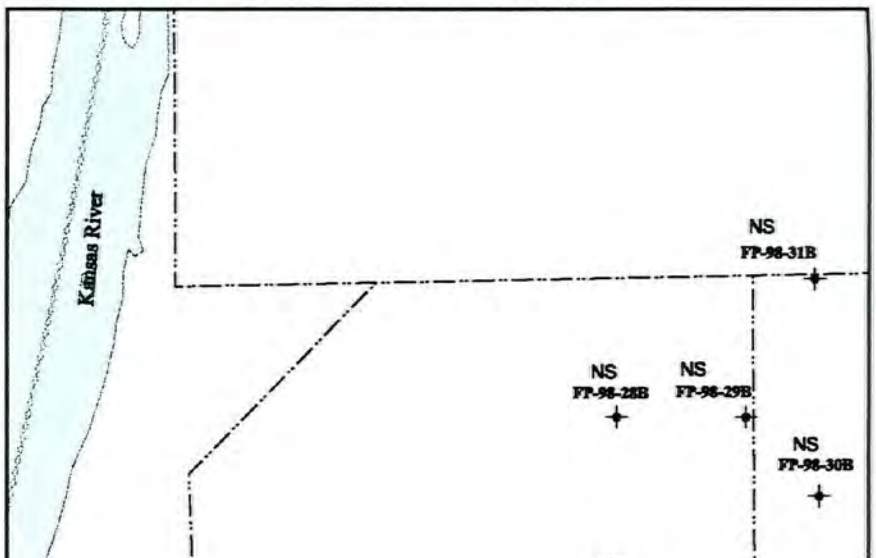
Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)



Nitrate (Favorable Geochemical Condition < 1.0 mg/L)



Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)



Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L.
4.) Sulfate units are in mg/L.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

NA Not Analyzed
ND Not Detected
NS Not Sampled
R Rejected

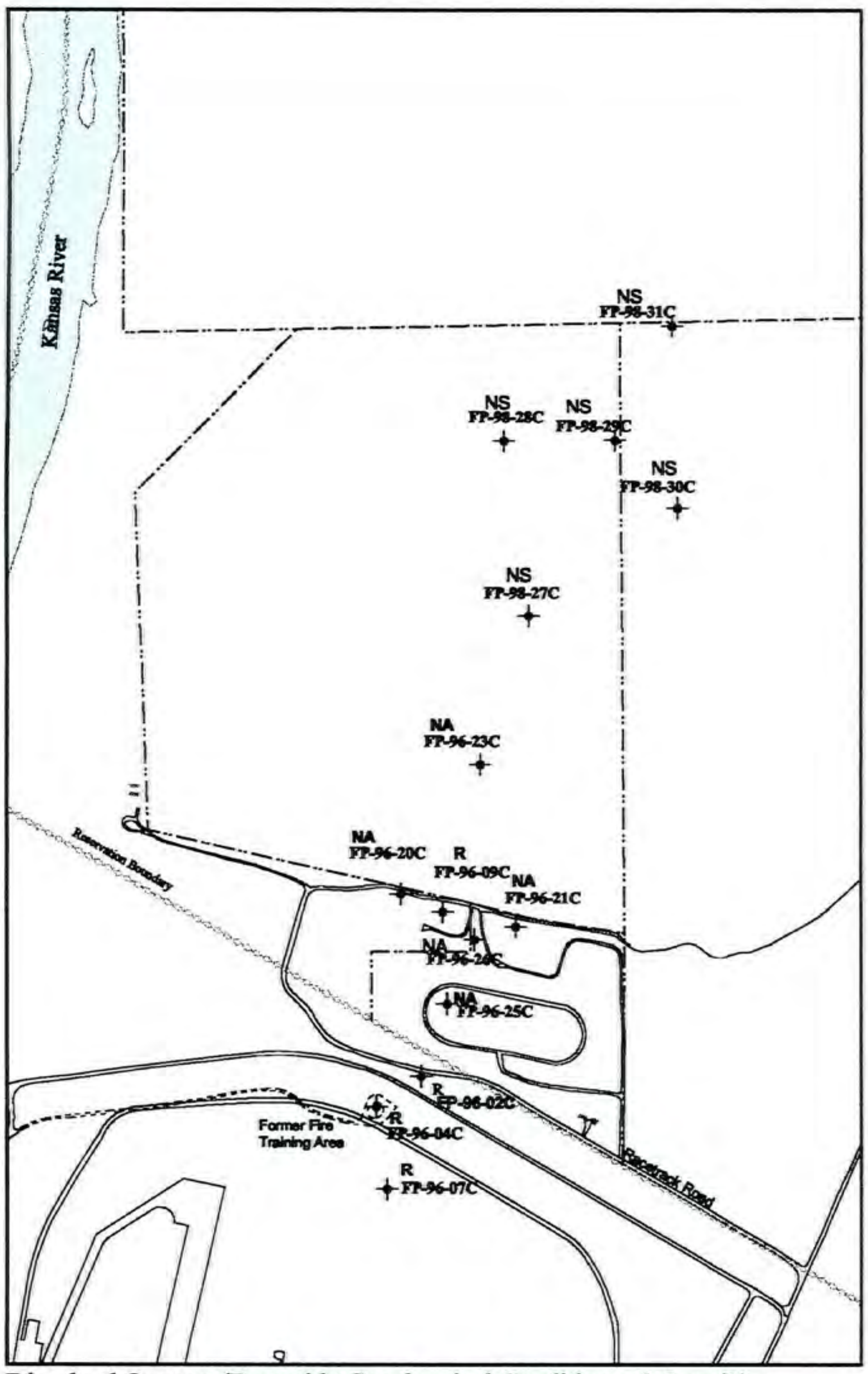
900 0 900 Feet

N

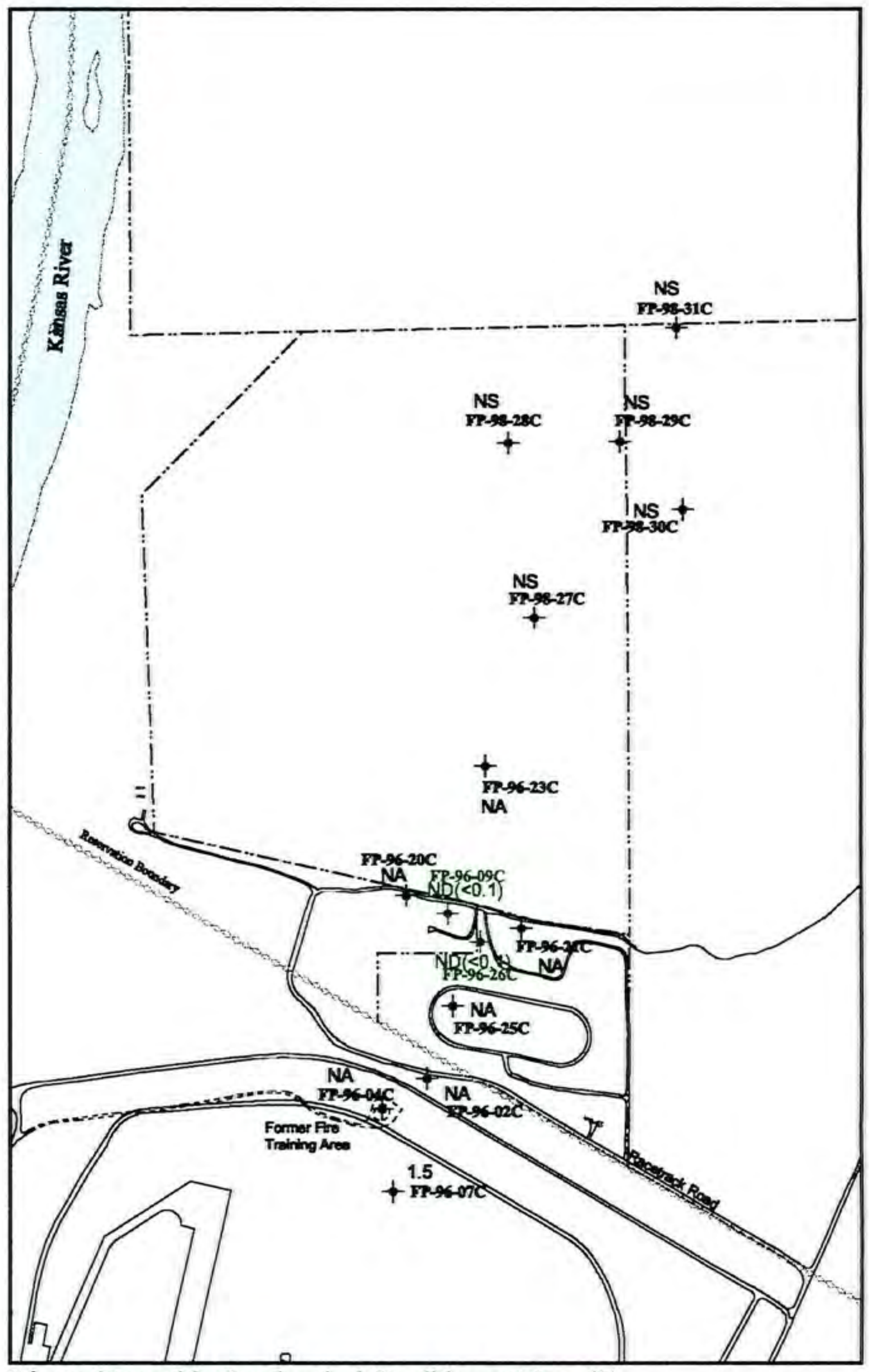
Burns & McDonnell
SINCE 1898

Figure 4-4
Natural Attenuation Parameters Intermediate Wells December 1996
FFTA-MAAF RI

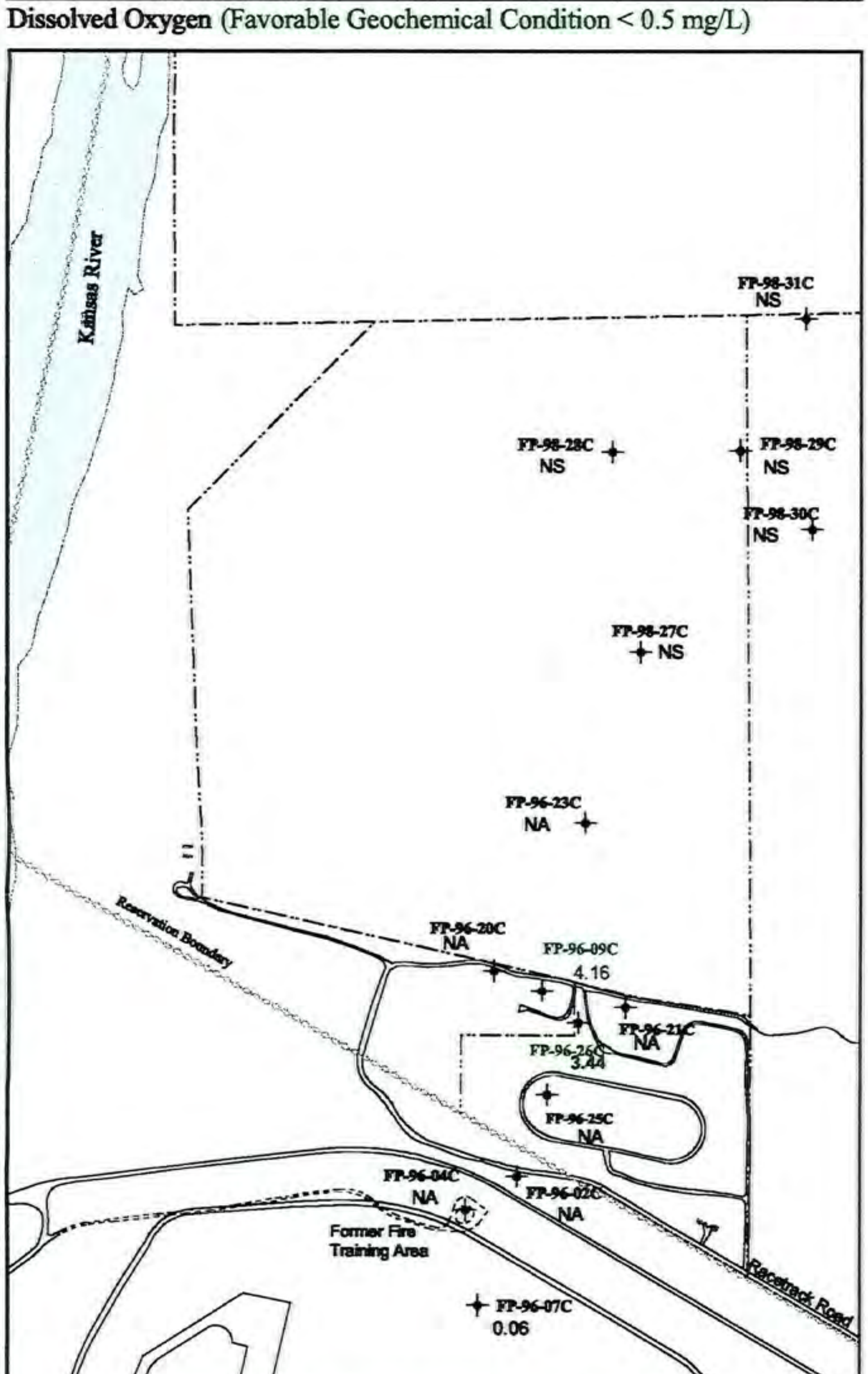
H:\arc\usf\mg\w\view\12000H_nat.apr\1296 NAT Int views\ 1296NAT INT LAYOUT 12/22/98 12000 MTS



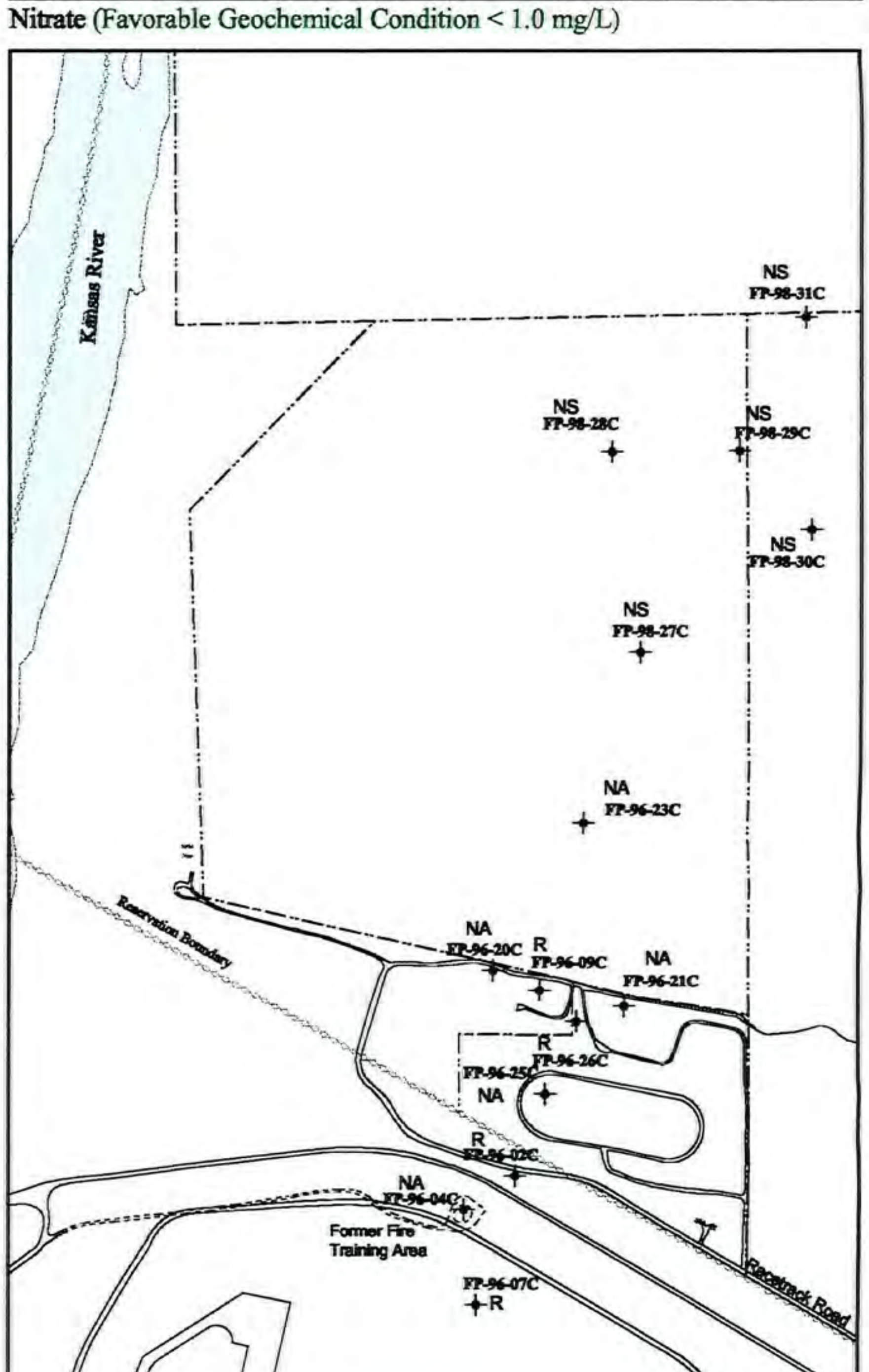
Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)



Nitrate (Favorable Geochemical Condition < 1.0 mg/L)



Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)



Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Sulfate units are in mg/L.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

NA Not Analyzed
ND Not Detected
NS Not Sampled
R Rejected

900 0 900 Feet

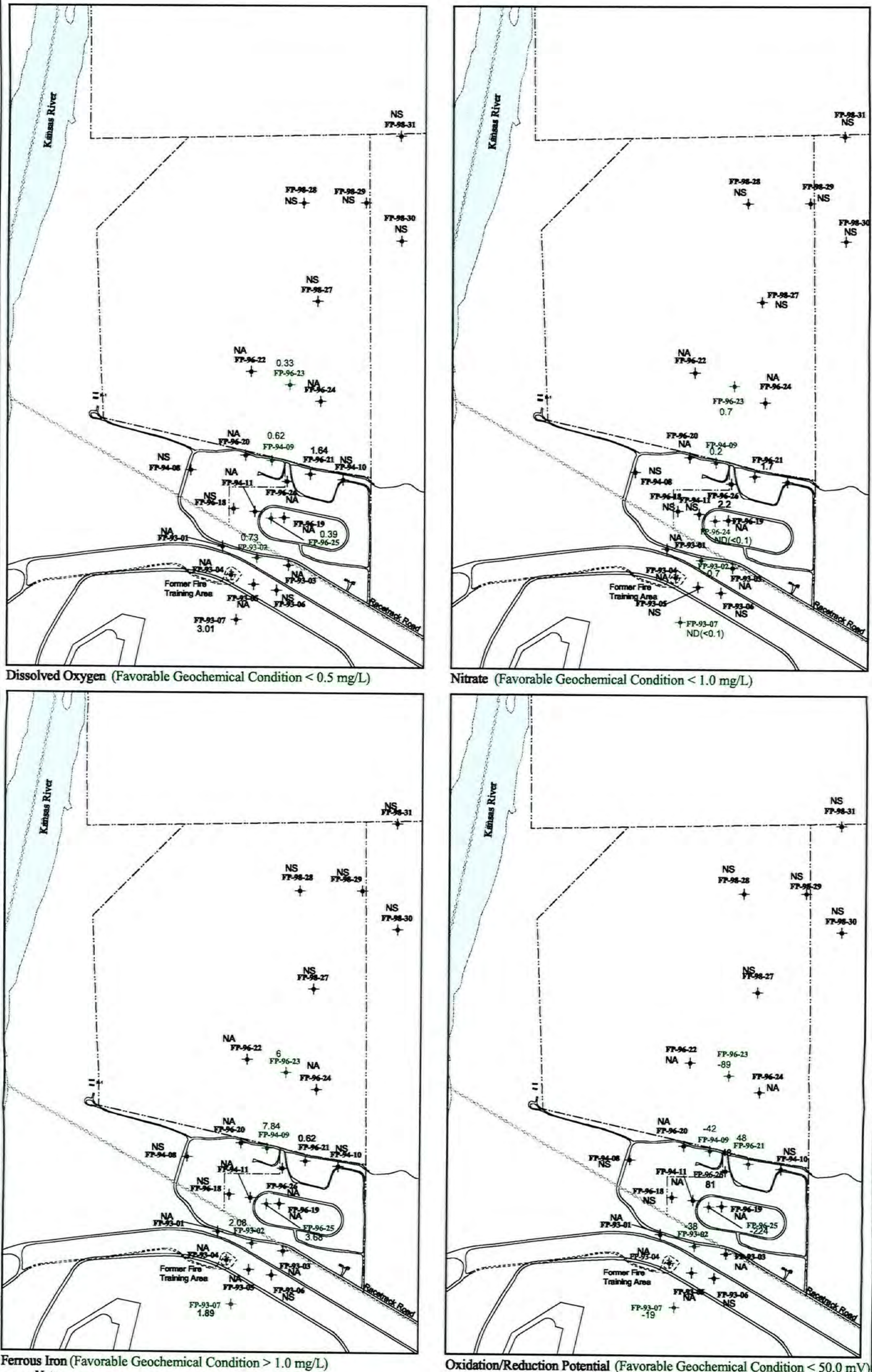
N

Burns & McDonnell
SINCE 1898

Figure 4-5
Natural Attenuation Parameters Deep Wells December 1996
FFTA-MAAF RI

H:\arc\us\fmg\avlew\12000\rl_nat.apr\1296 NAT Deep views\ 1296NAT DEEP LAYOUT 12/06/99 LGB

H:\arc\usf\mgw\s\view\12000H_net.apr\0597NAT Shallow views\0597NAT Shallow LAYOUT 12/06/99 10800 LGB



Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)

Nitrate (Favorable Geochemical Condition < 1.0 mg/L)

Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)

Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:

1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Sulfate units are in mg/L.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

NA Not Analyzed
NS Not Sampled
ND Not Detected

N

900 0 900 Feet

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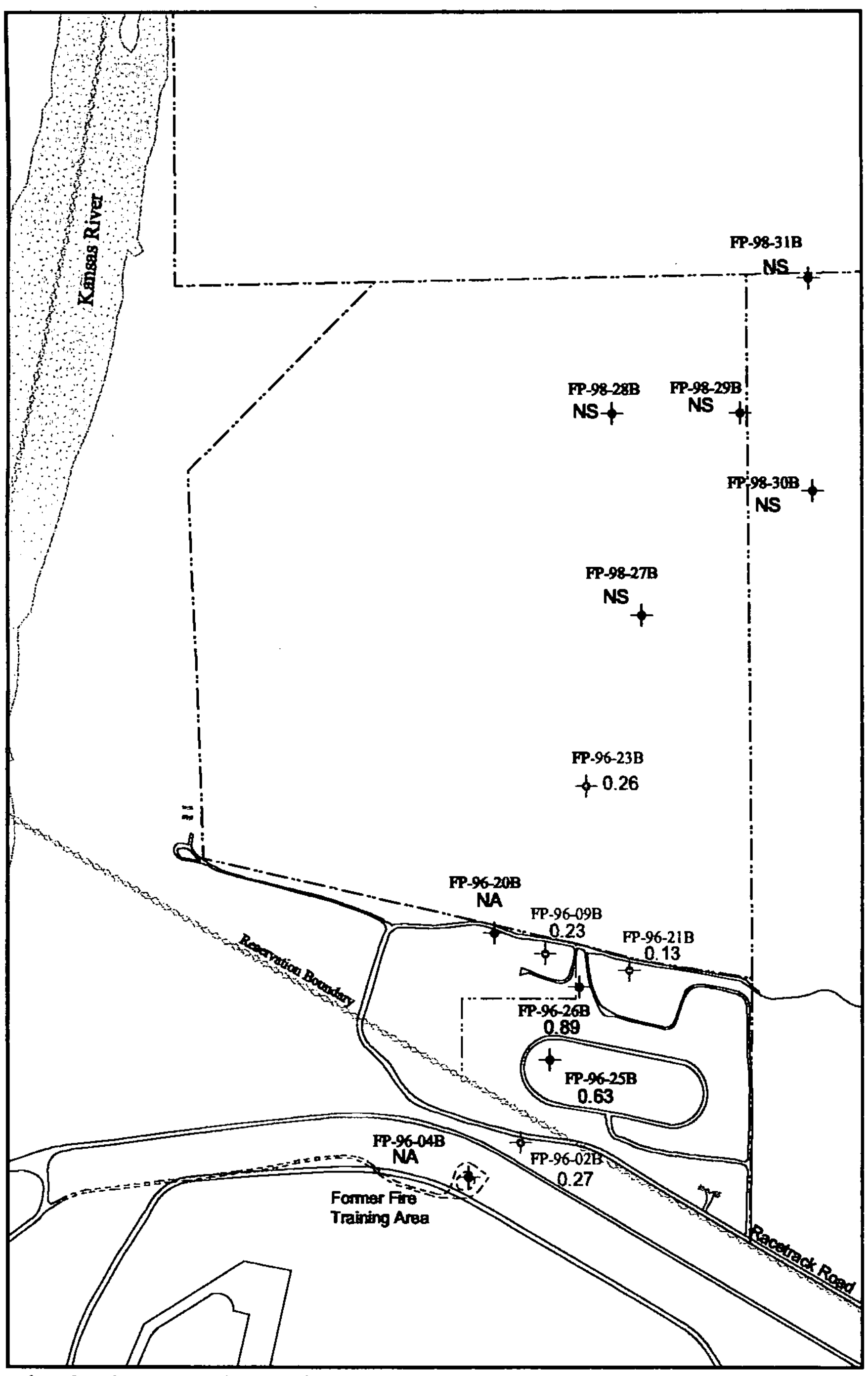
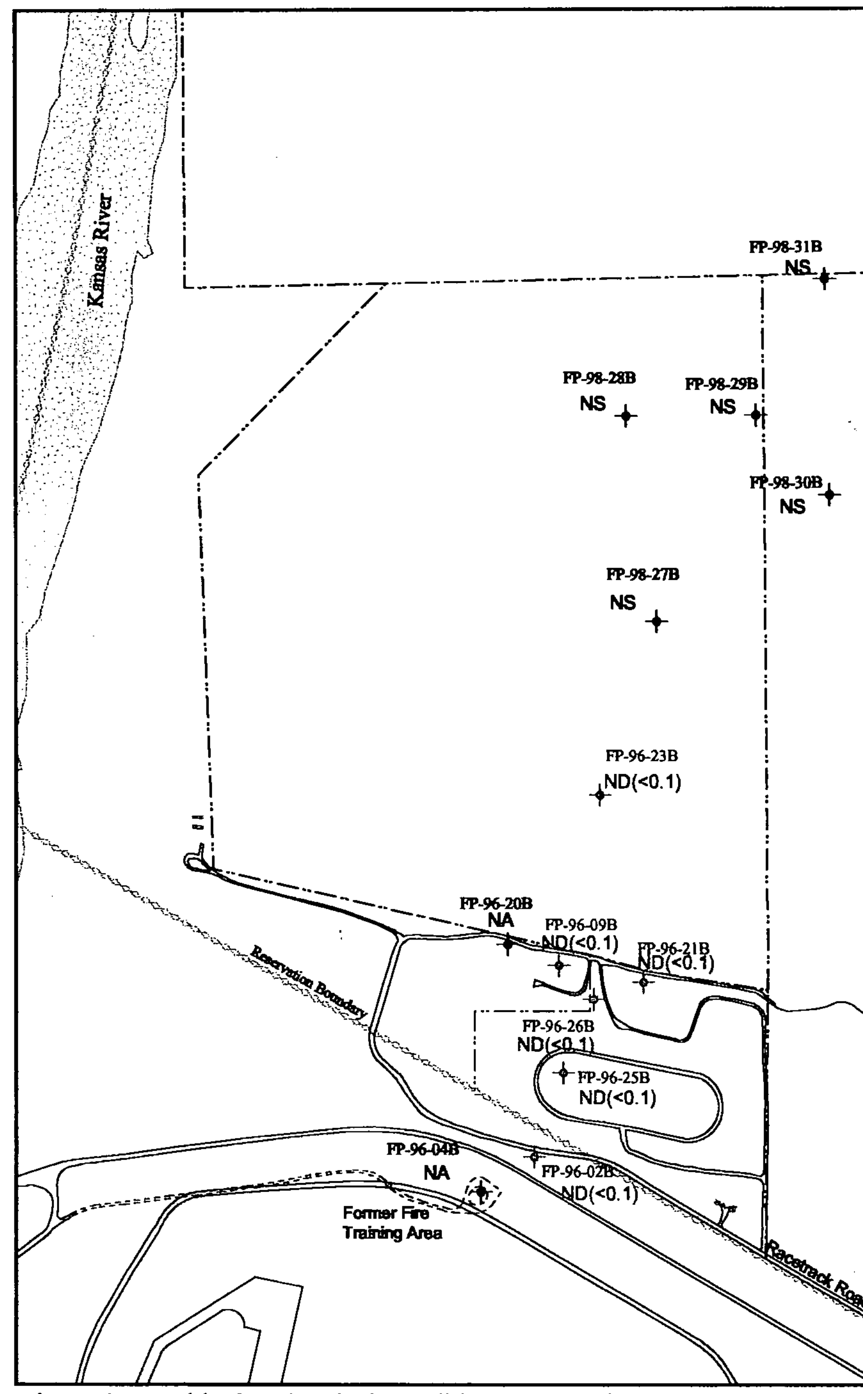
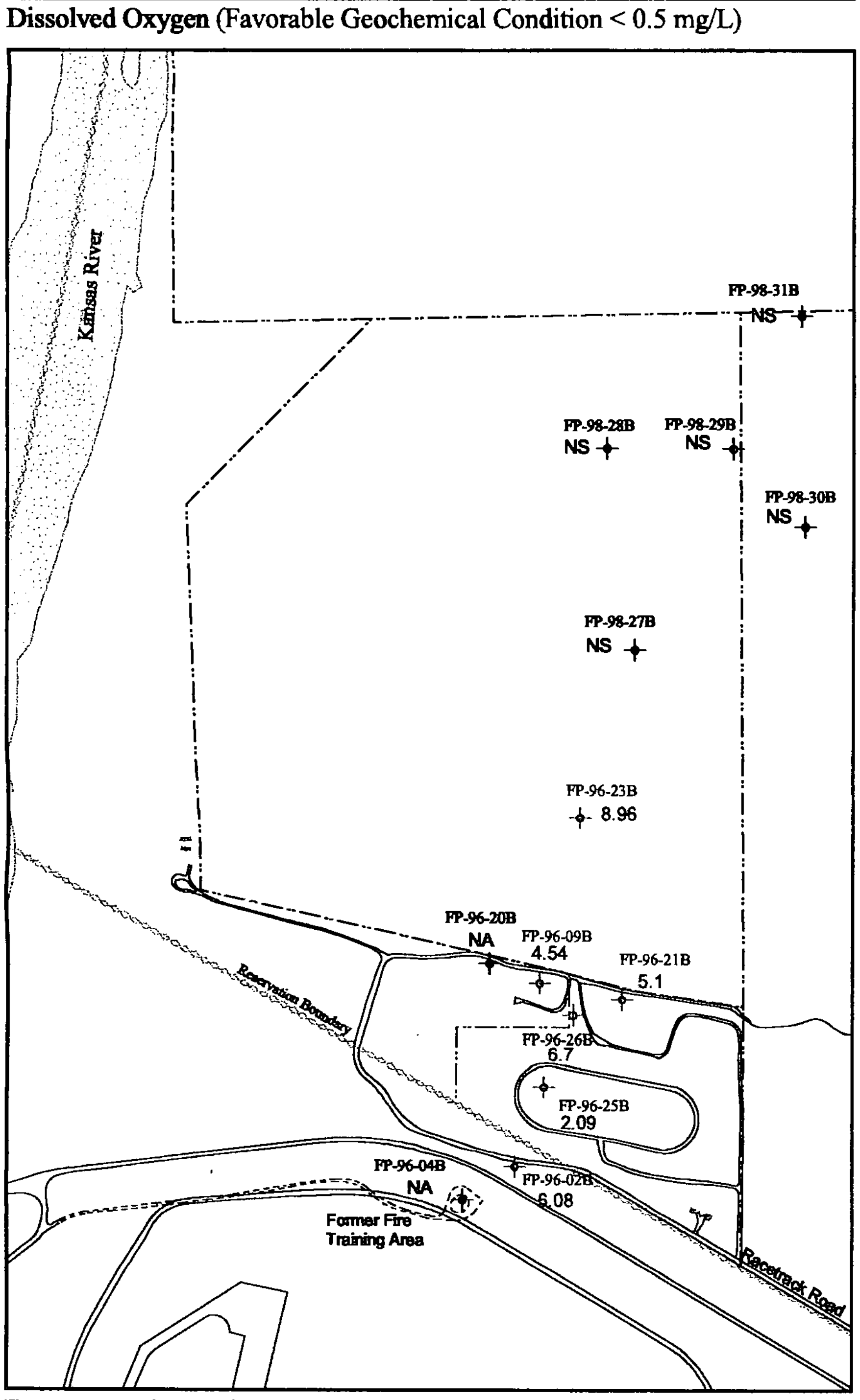
Figure 4-6
Natural Attenuation Parameters Shallow Wells
May 1997
FFTA-MAAF RI



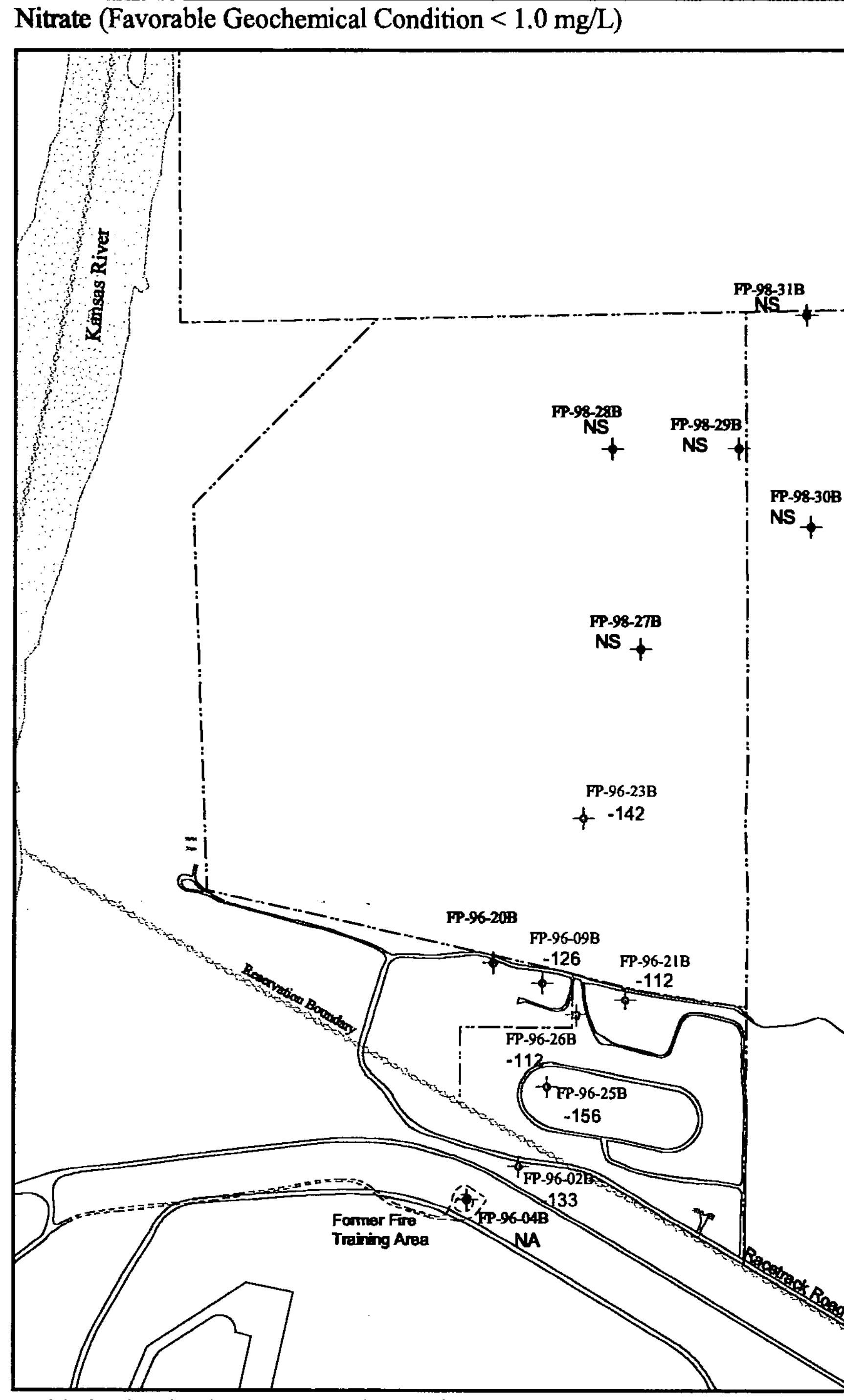
Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)



Nitrate (Favorable Geochemical Condition < 1.0 mg/L)



Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)



Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Sulfate units are in mg/L.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND
- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

NA Not Analyzed
ND Not Detected
NS Not Sampled

900 0 900 Feet

N

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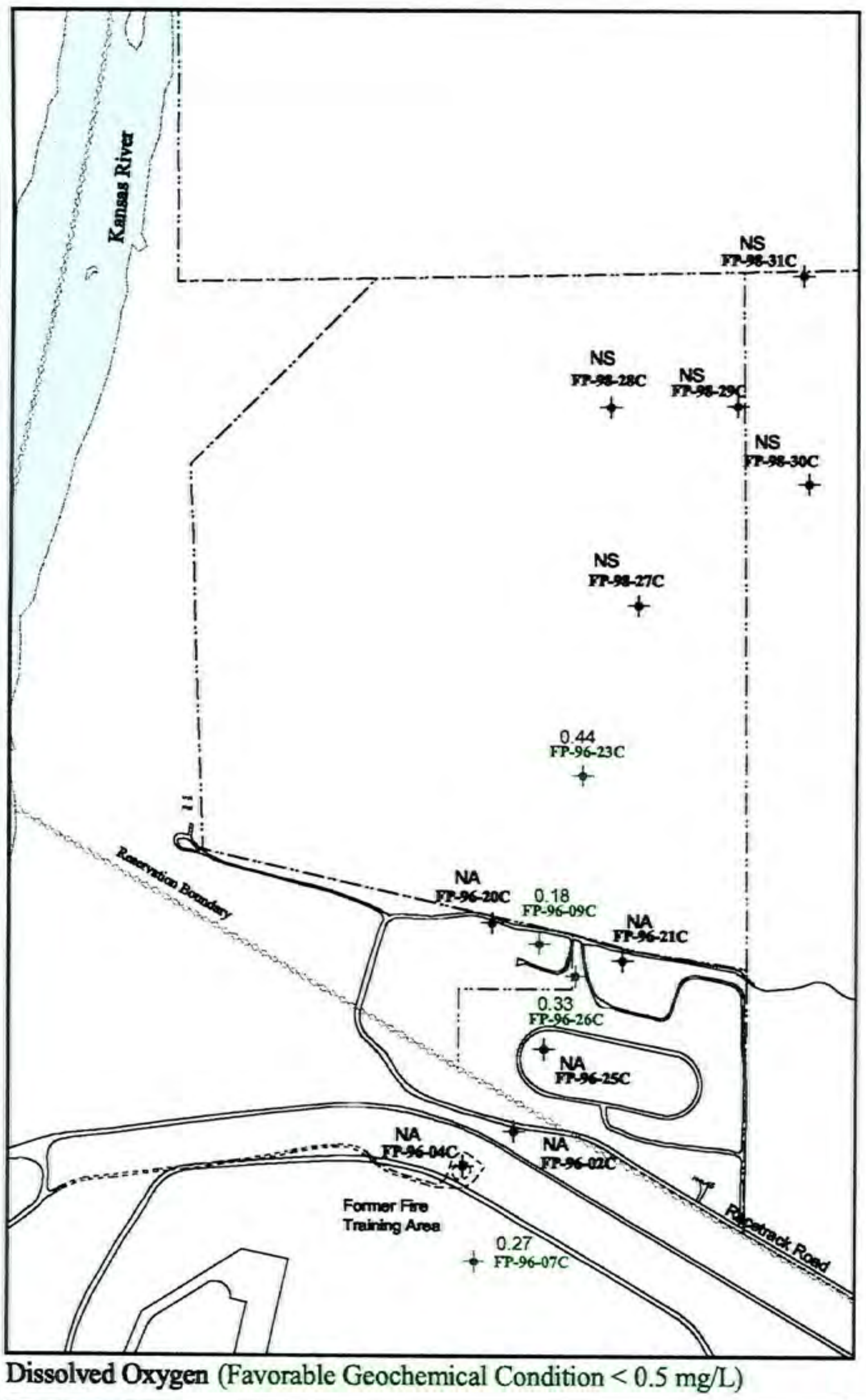
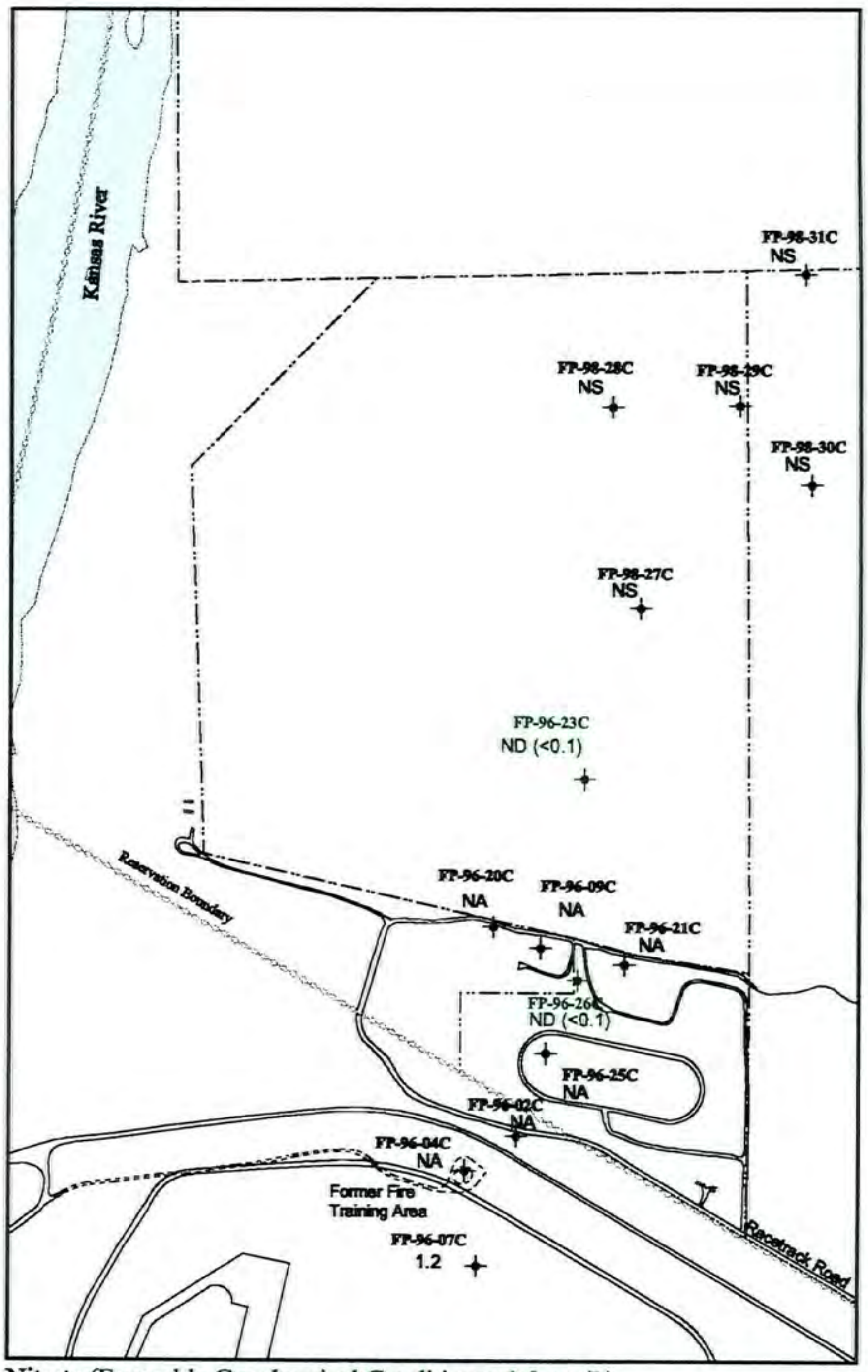
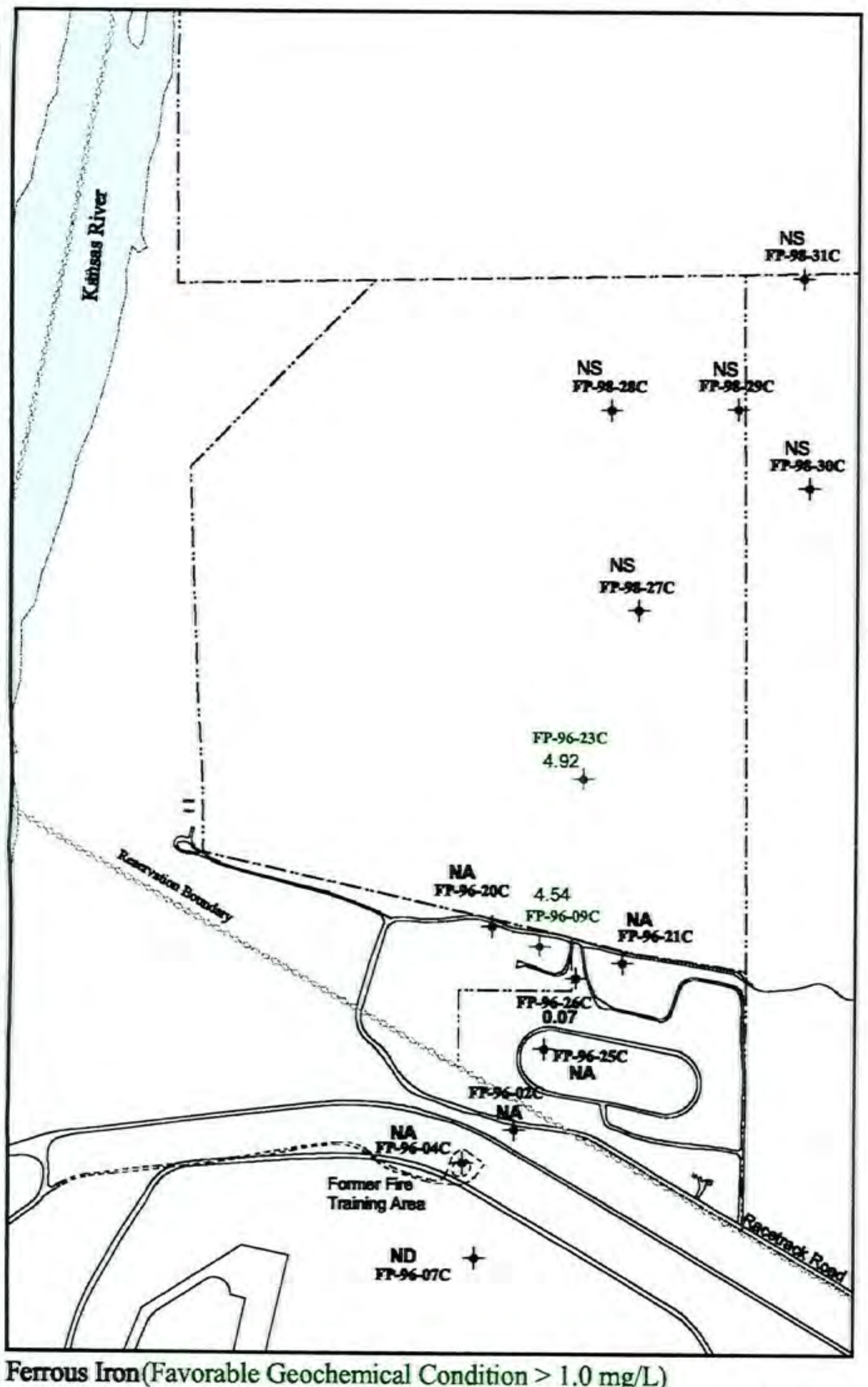
Figure 4-7
Natural Attenuation Parameters Intermediate Wells
May 1997
FFTA-MAAF RI



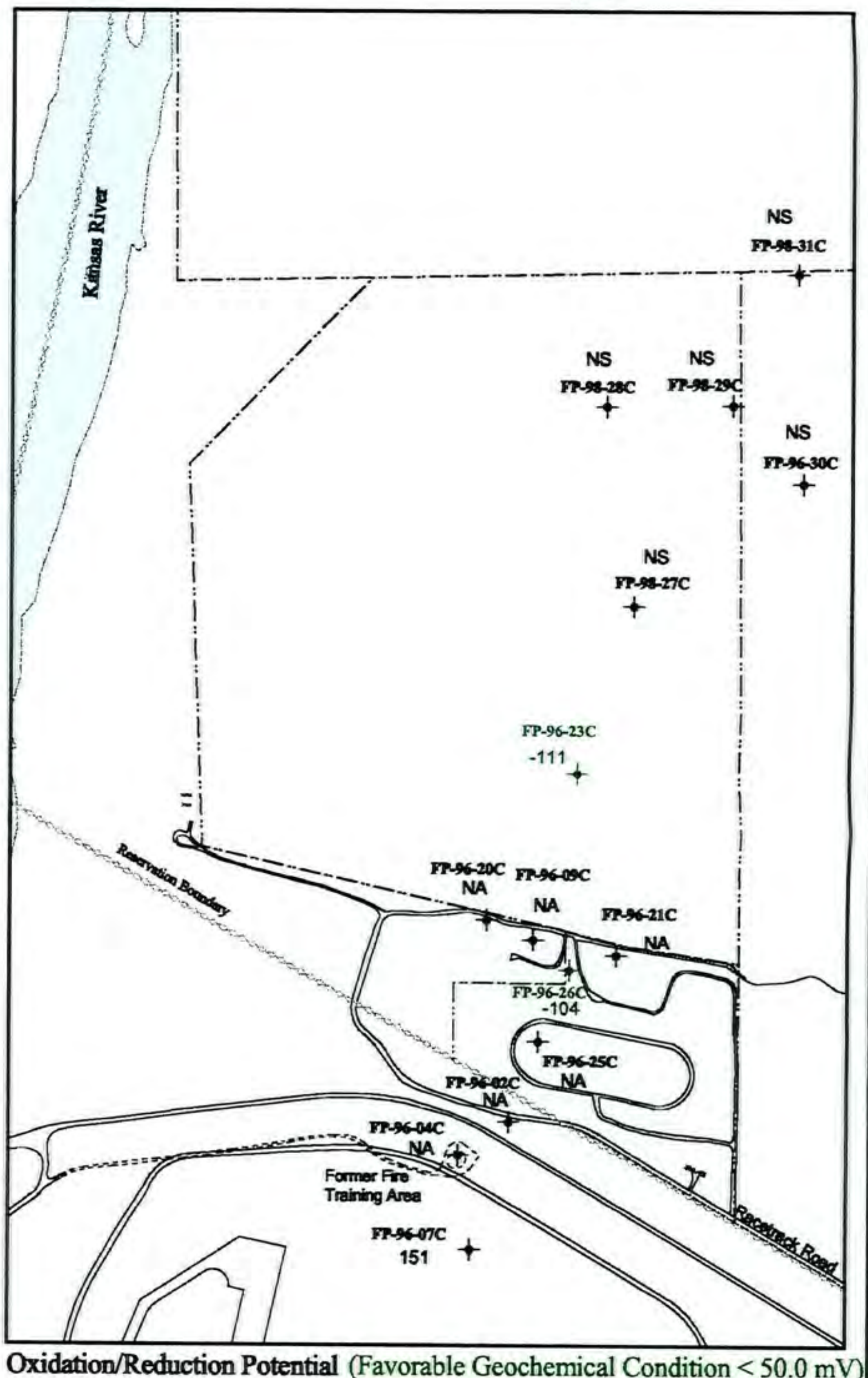
Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)



Nitrate (Favorable Geochemical Condition < 1.0 mg/L)



Ferrous Iron(Favorable Geochemical Condition > 1.0 mg/L)



Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Sulfate units are in mg/L.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

NA Not Analyzed
ND Not Detected
NS Not Sampled

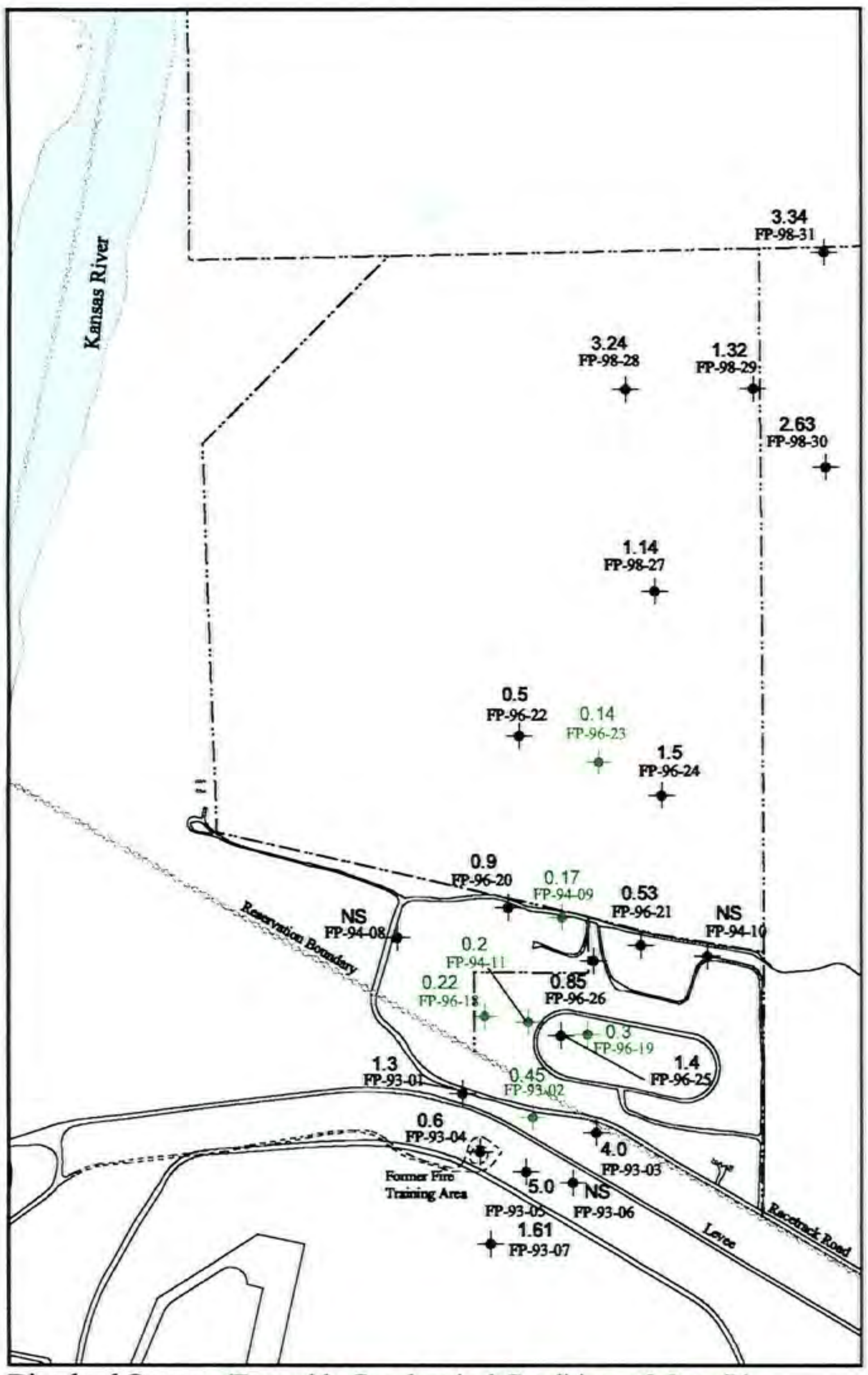
900 0 900 Feet

N

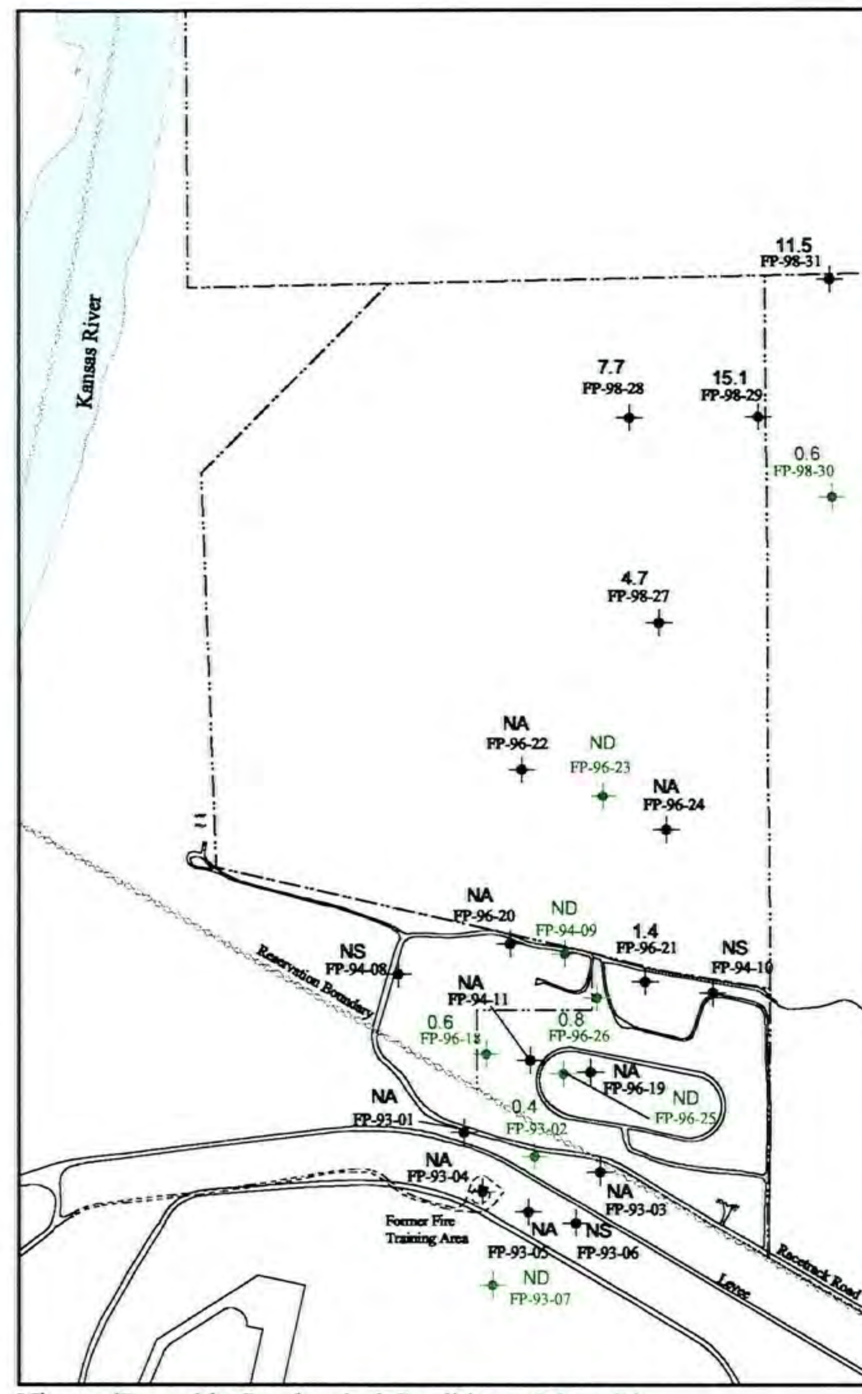
Burns & McDonnell SINCE 1898

Figure 4-8
Natural Attenuation Parameters
Deep Wells
May 1997
FFTA-MAAF RI

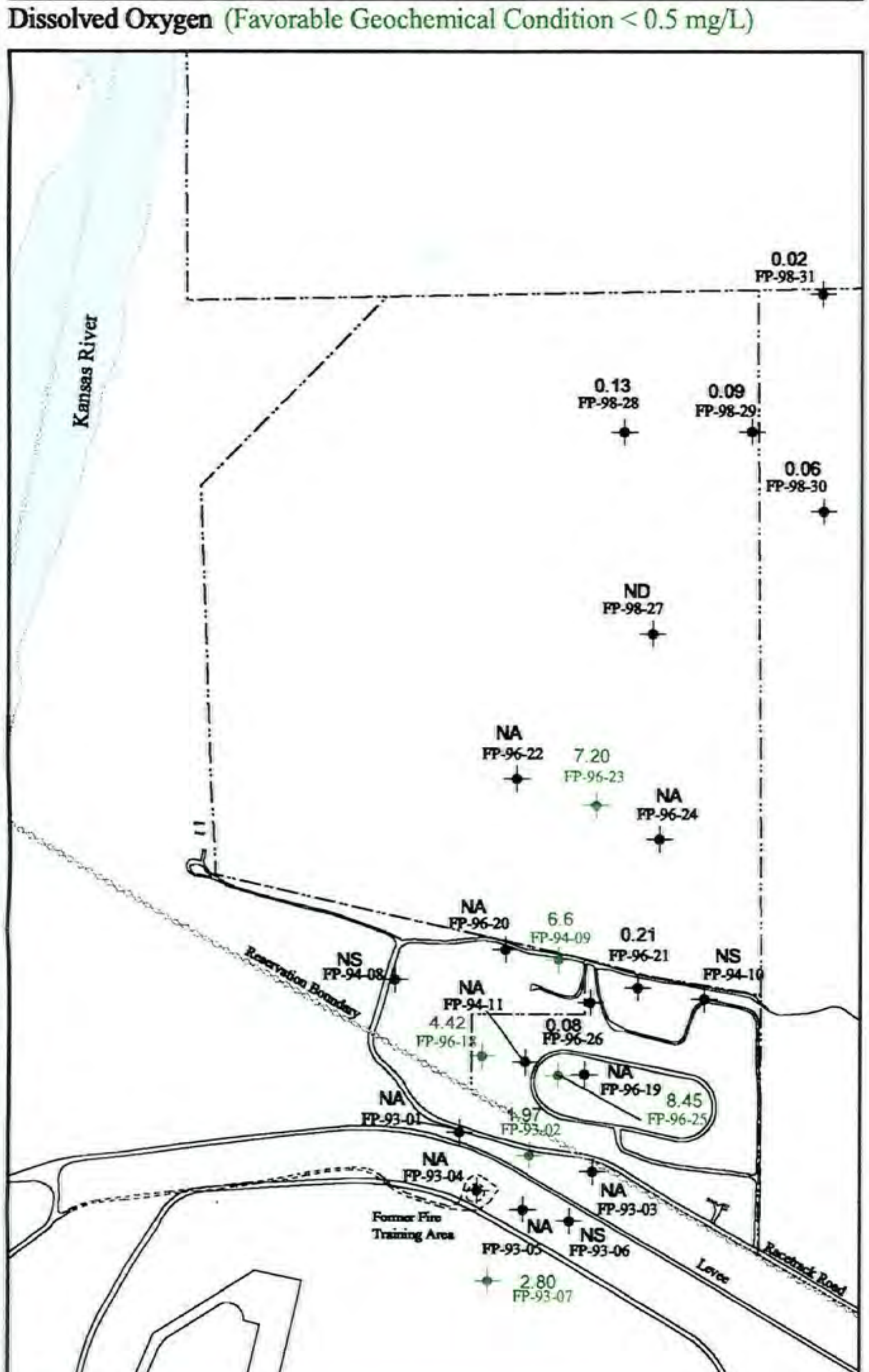
H:\arc\usfr\mgw\avlew\12000rl_nat.spr\0597 NAT Deep views\ 0597 NAT DEEP LAYOUT 12/08/99 LGB



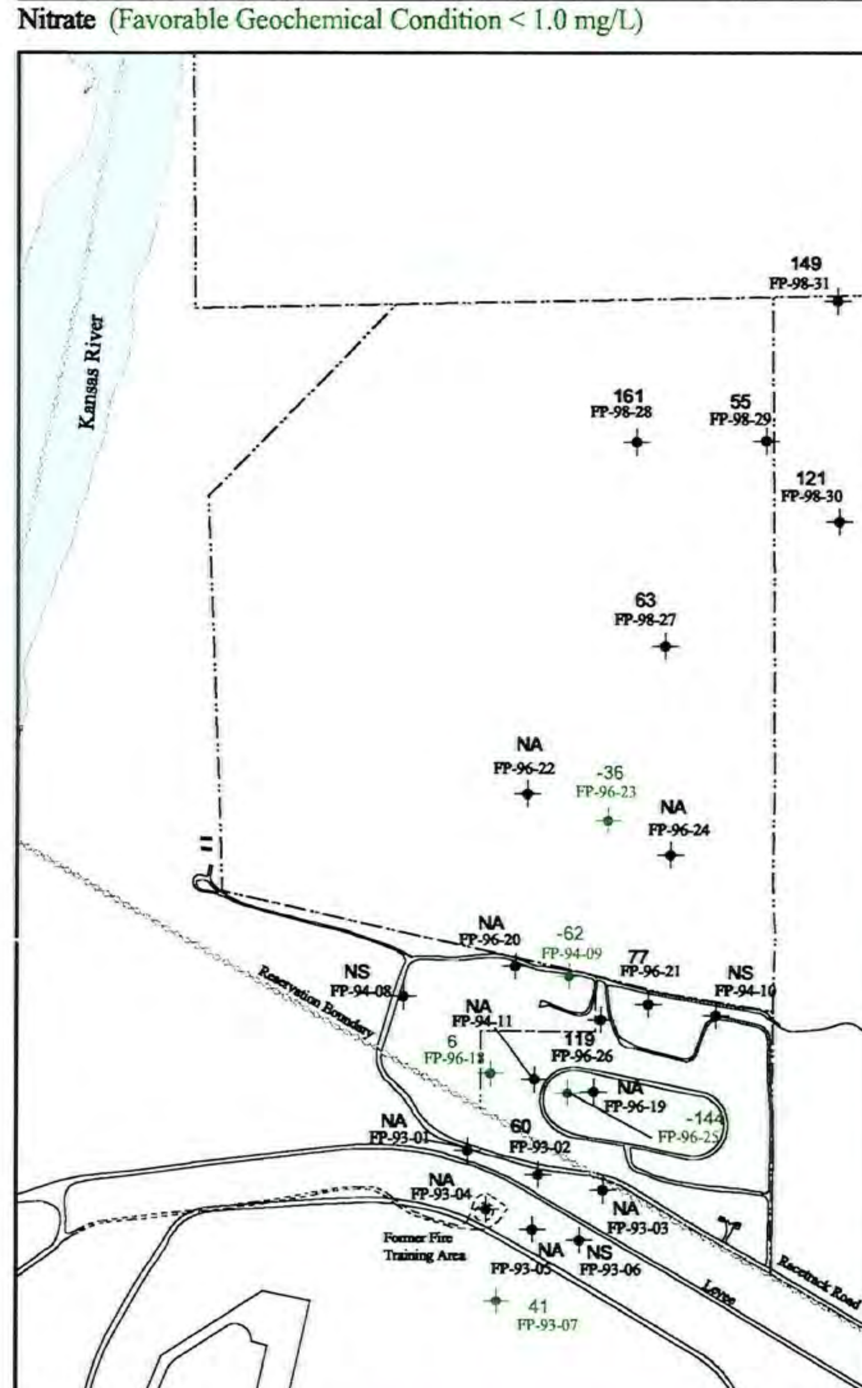
Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)



Nitrate (Favorable Geochemical Condition < 1.0 mg/L)



Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)



Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Sulfate units are in mg/L.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND
- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

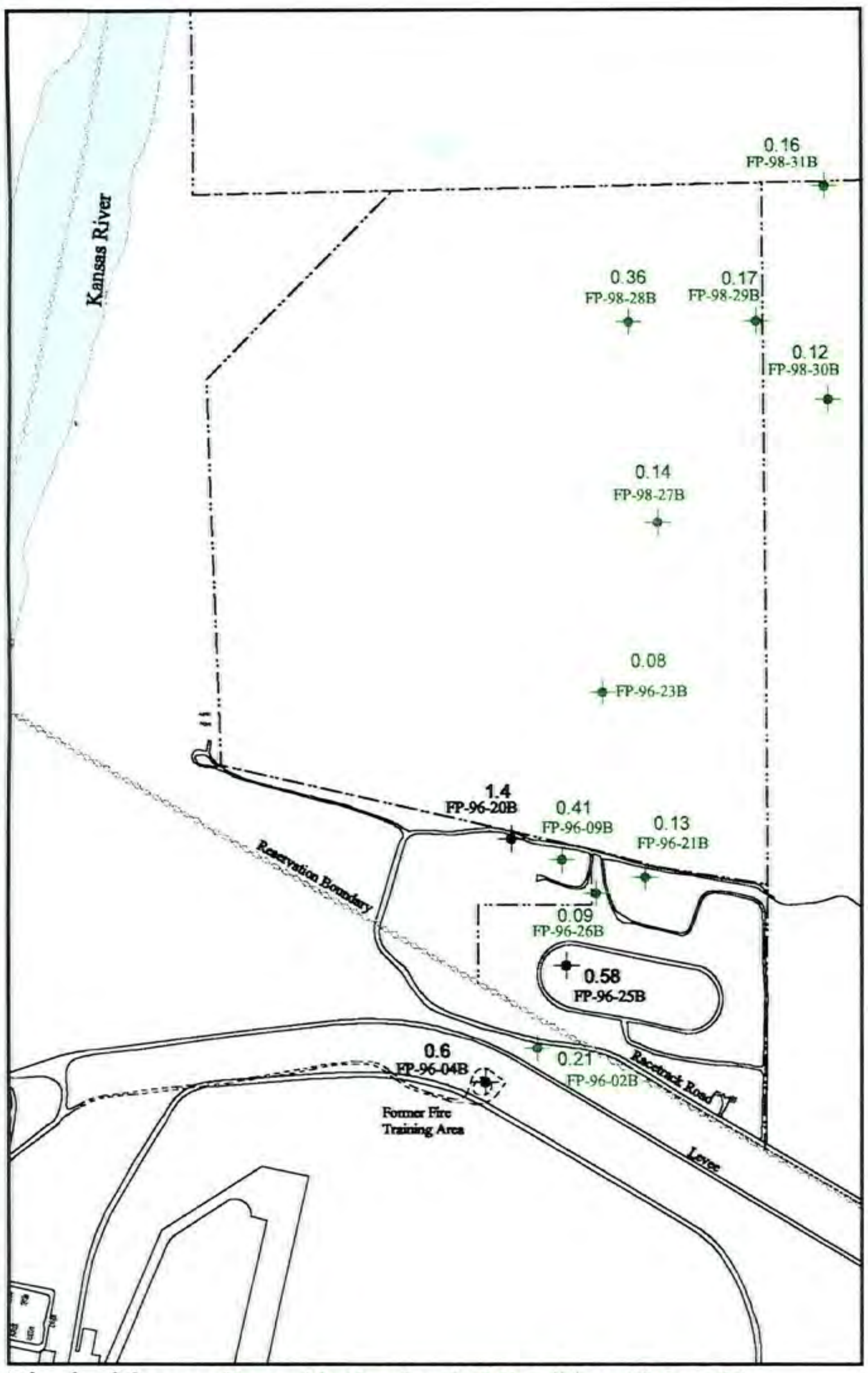
NA Not Analyzed
NS Not Sampled
ND Not Detected

900 0 900 Feet

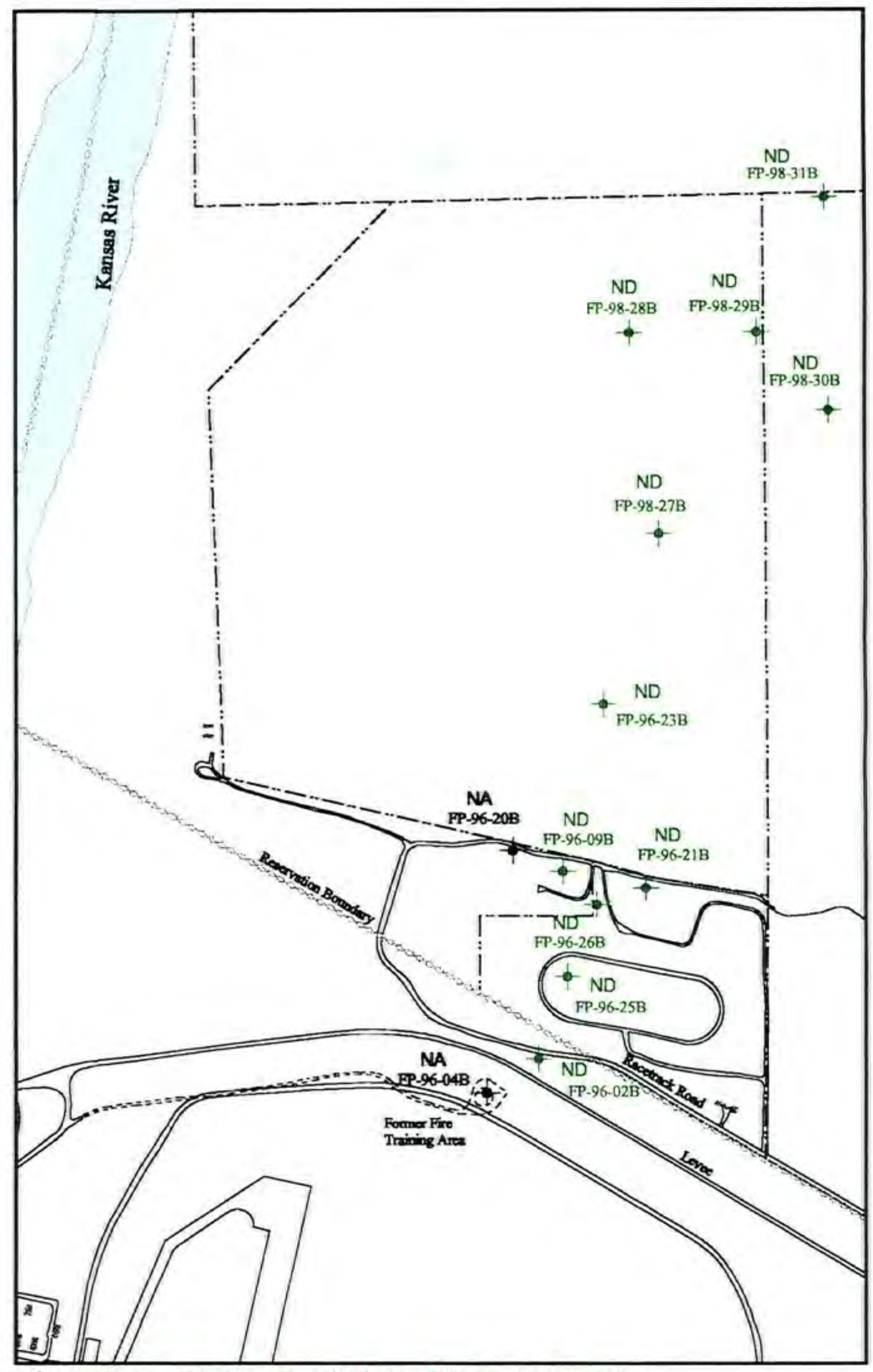
N

Burns & McDonnell SINCE 1898

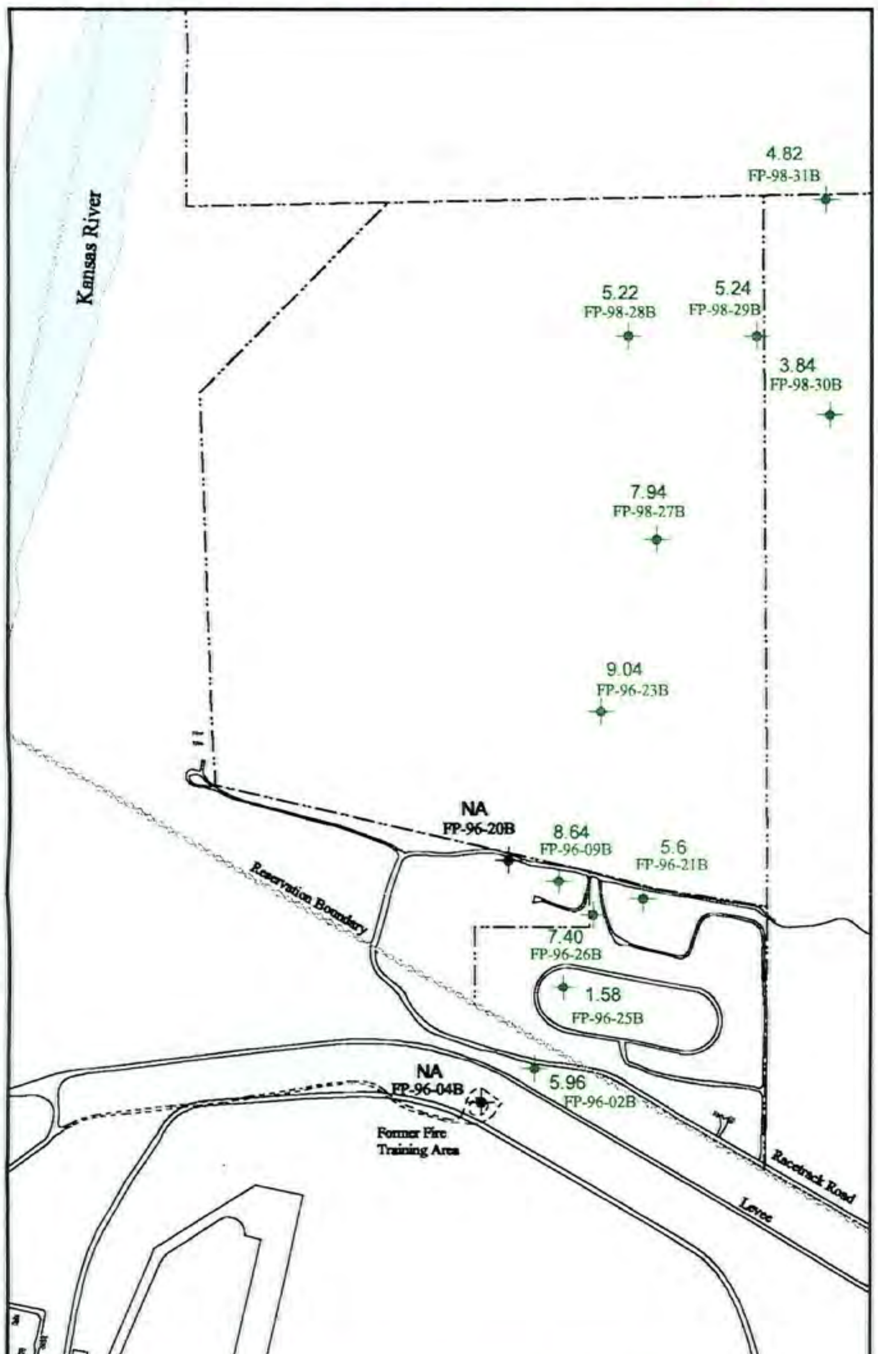
Figure 4-9
Natural Attenuation Parameters
Shallow Wells
May/June 1998
FFTA-MAAF RI



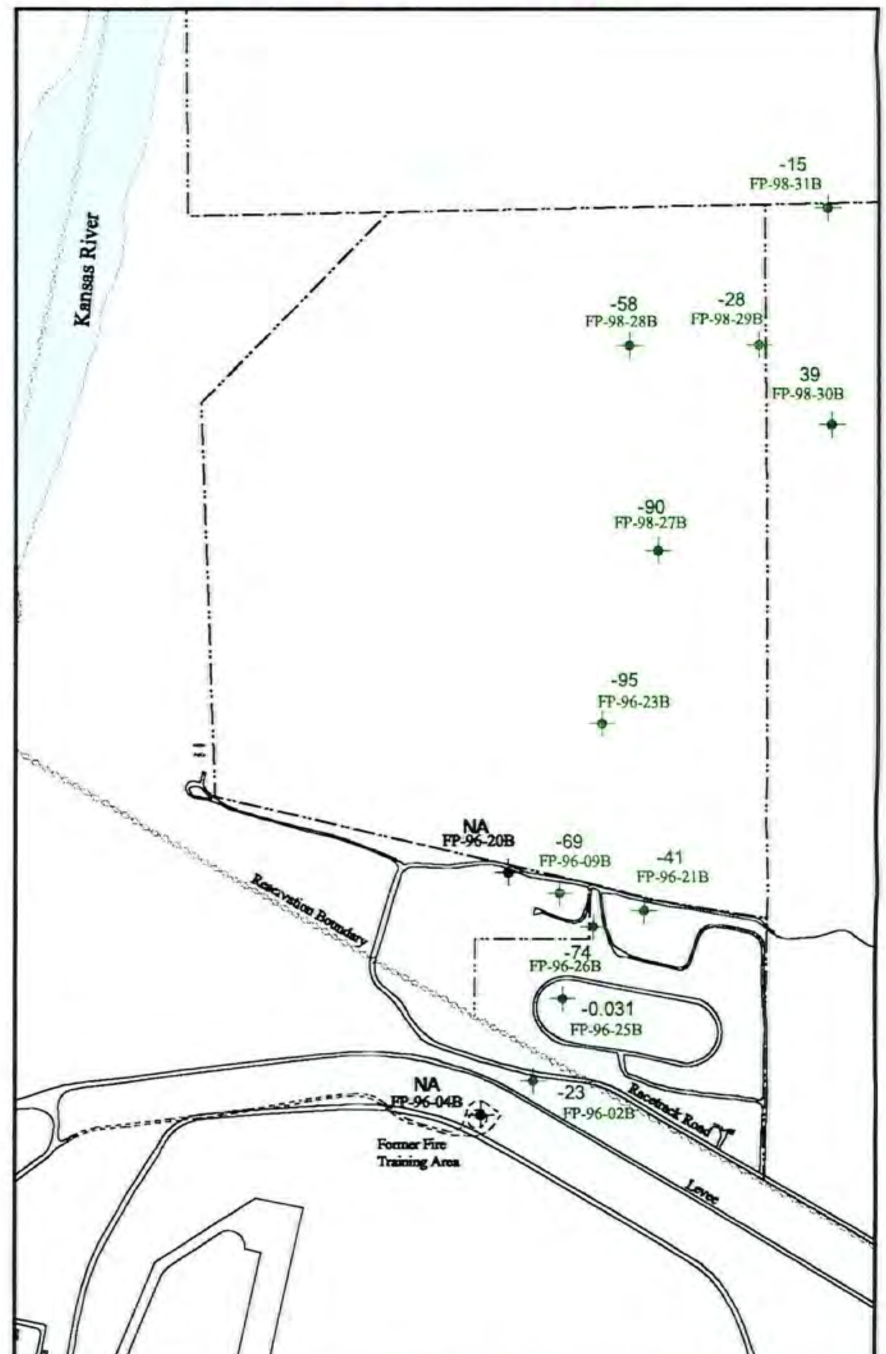
Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)



Nitrate (Favorable Geochemical Condition < 1.0 mg/L)



Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)



Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Sulfate units are in mg/L.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

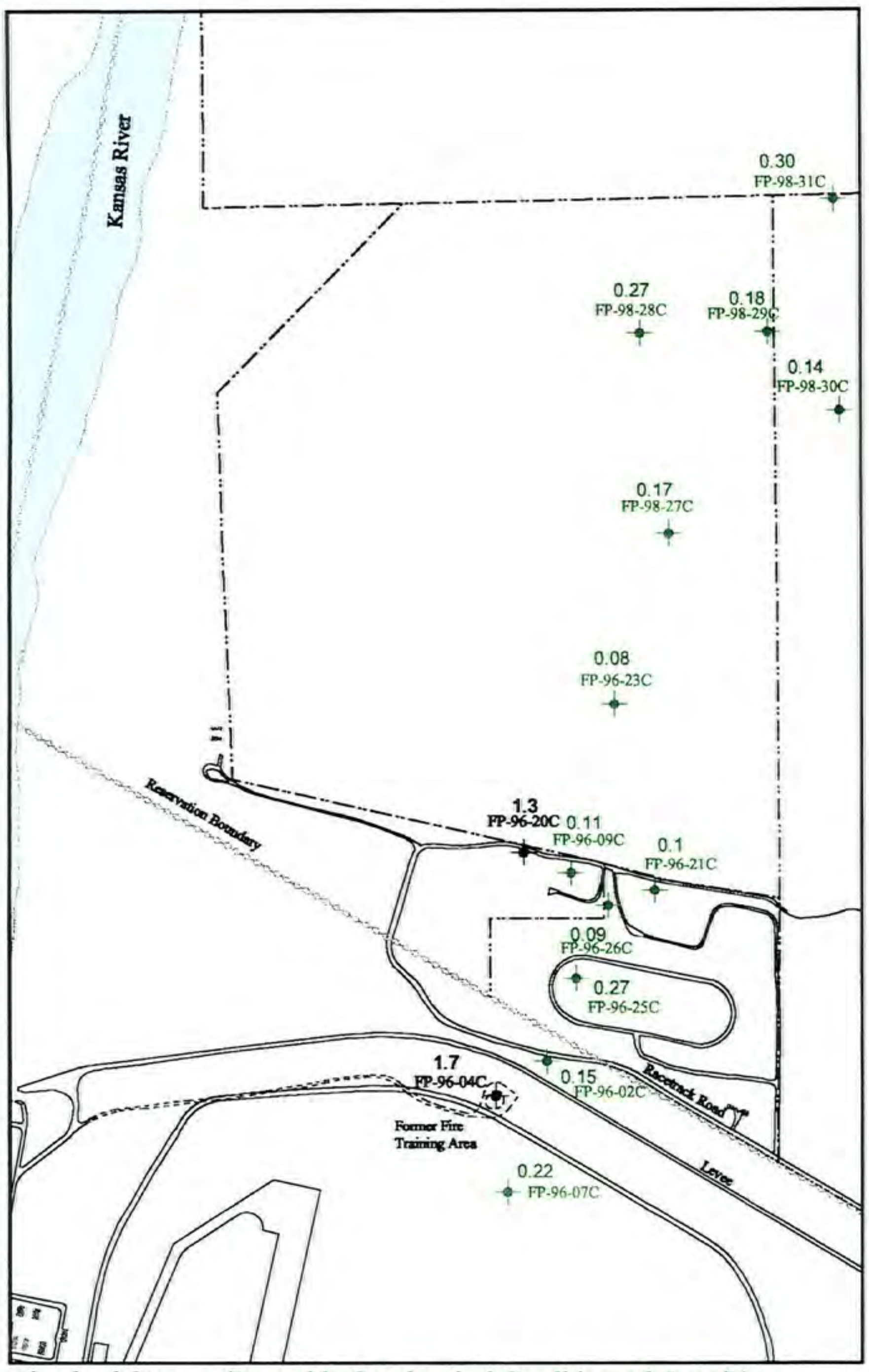
NA Not Analyzed
ND Not Detected

900 0 900 Feet

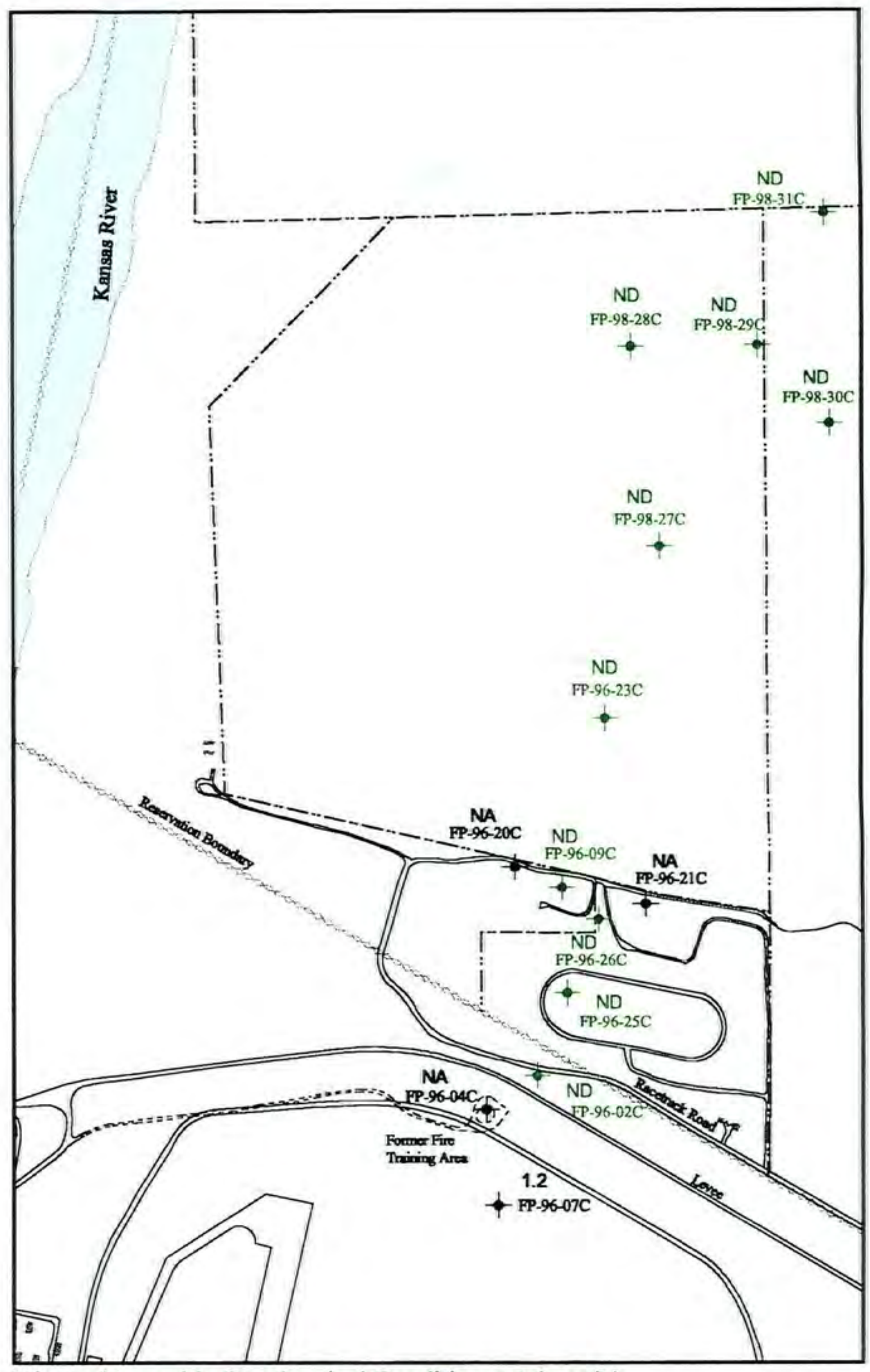
N

Burns & McDonnell SINCE 1898

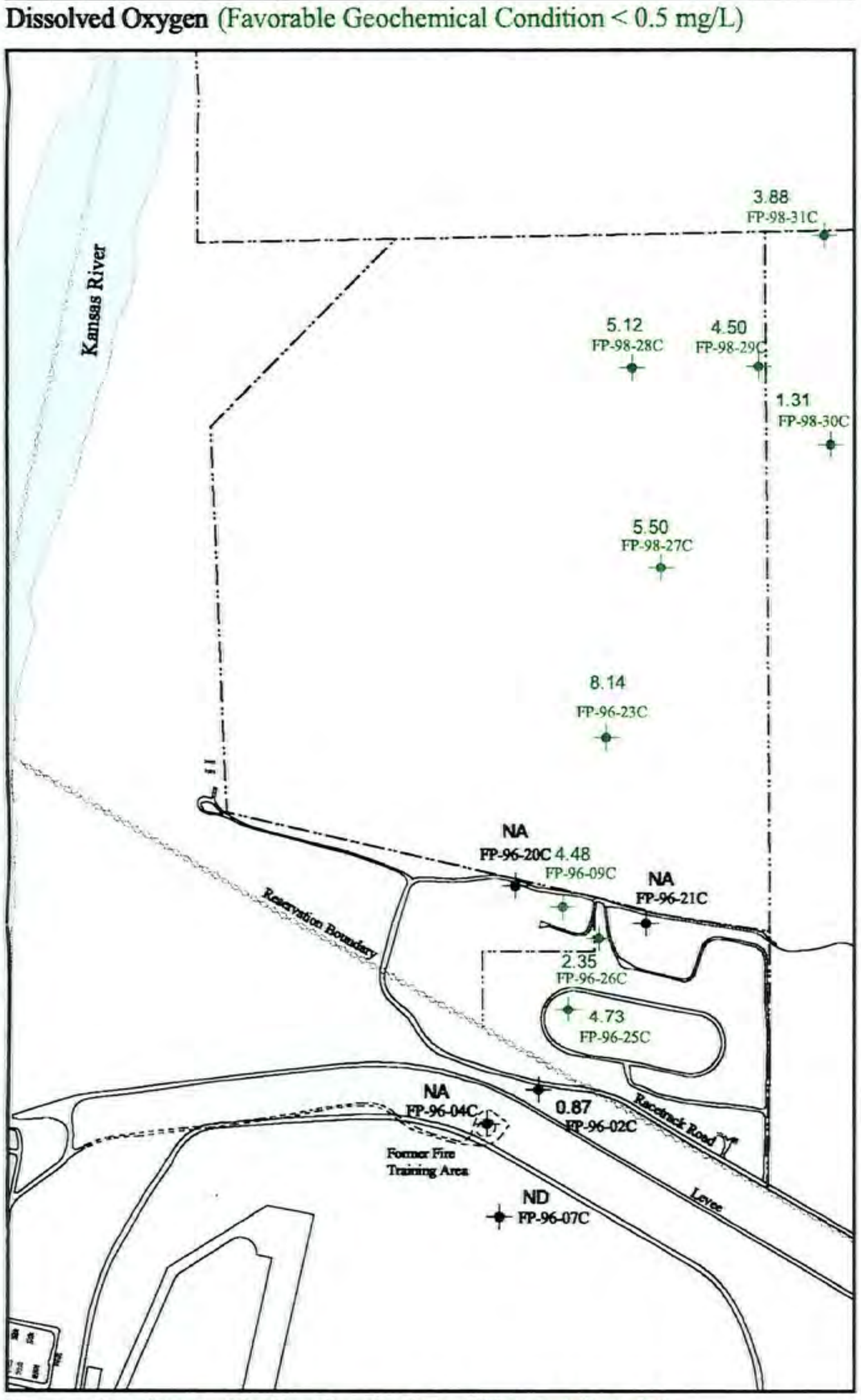
Figure 4-10
Natural Attenuation Parameters
Intermediate Wells
May/June 1998
FFTA-MAAF RI



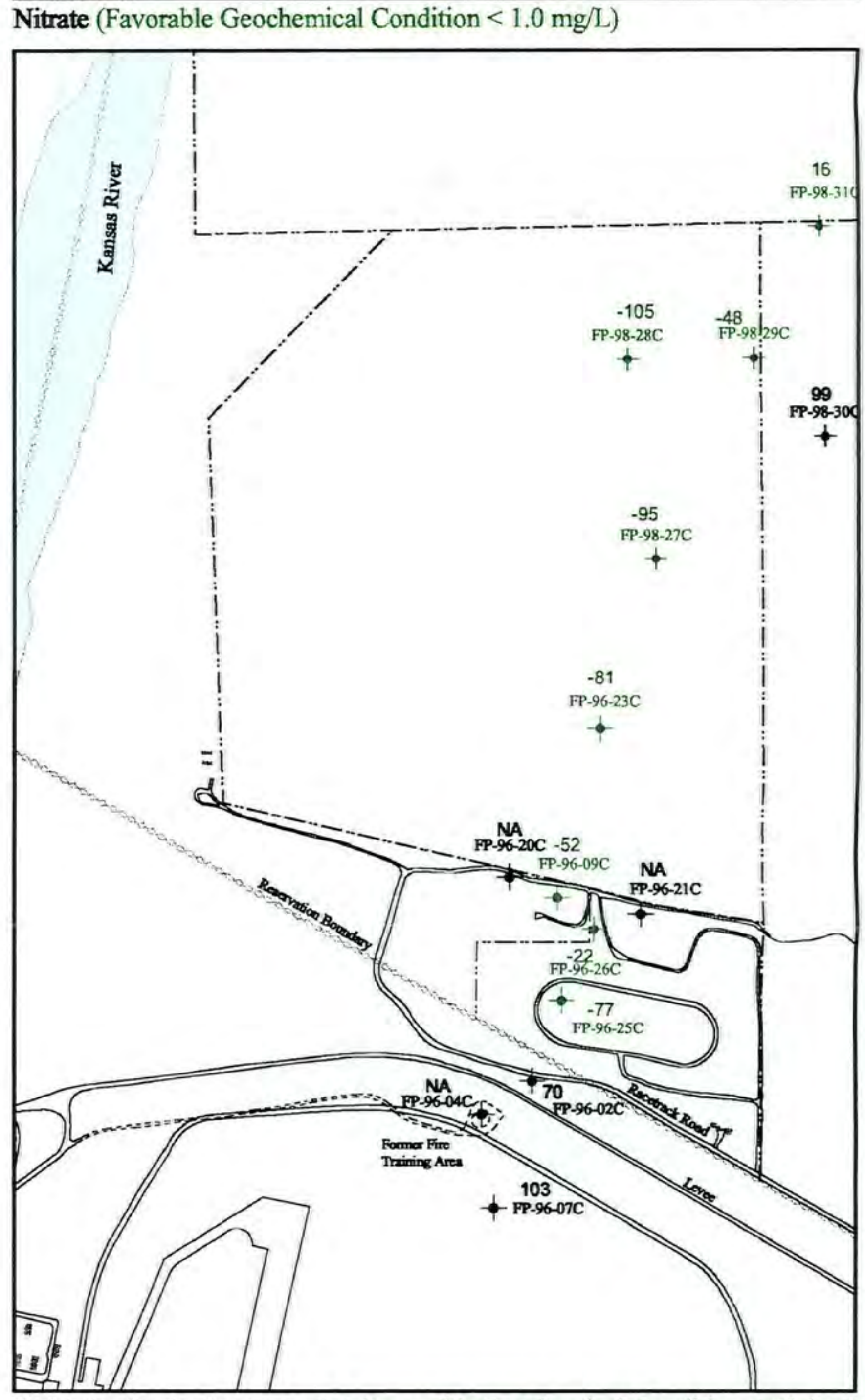
Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)



Nitrate (Favorable Geochemical Condition < 1.0 mg/L)



Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)



Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Sulfate units are in mg/L.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

NA Not Analyzed
ND Not Detected

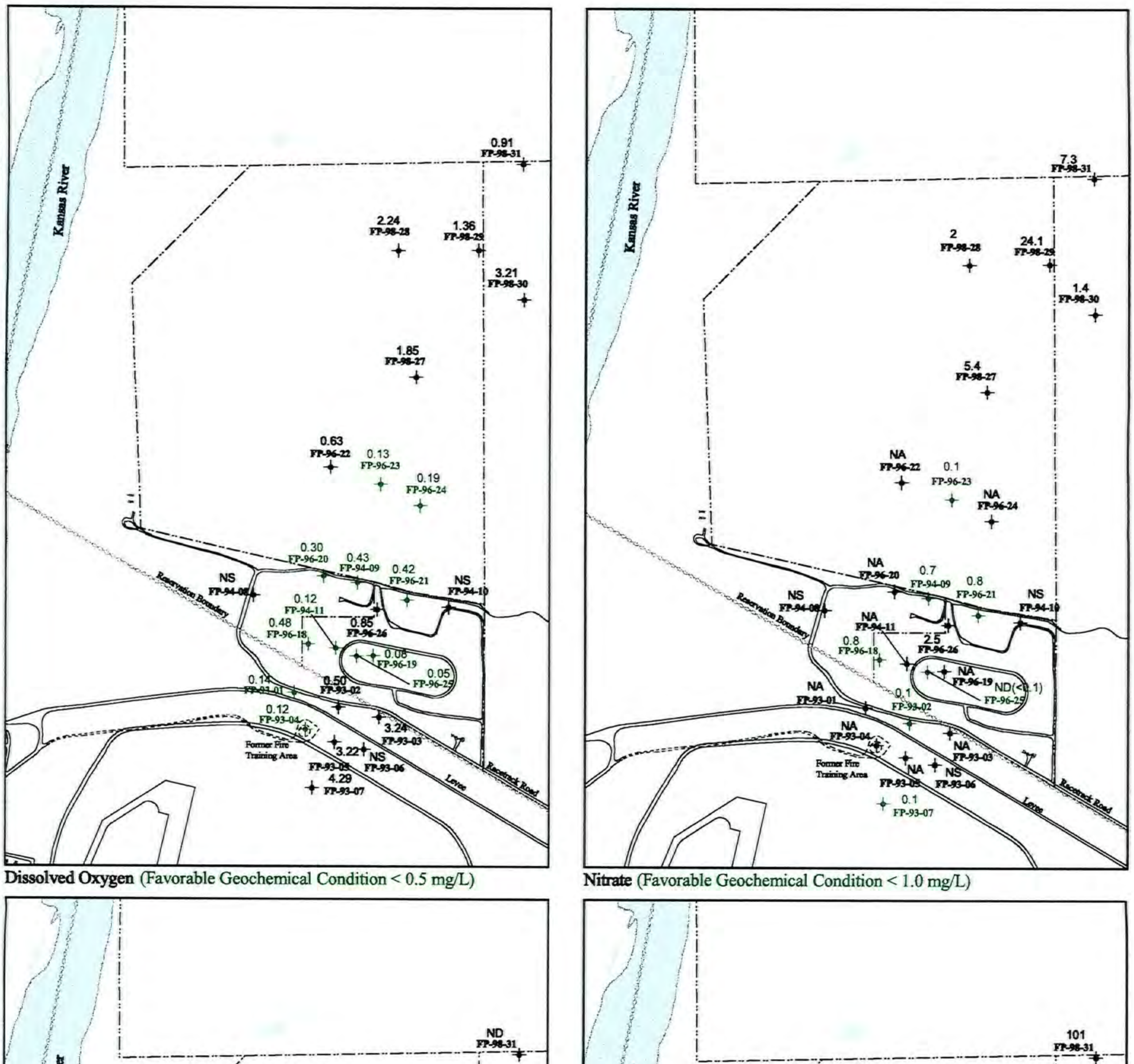
900 0 900 Feet

N

Burns & McDonnell SINCE 1898

Figure 4-11
Natural Attenuation Parameters Deep Wells May/June 1998
FFTA-MAAF RI

H:\arc\usfmgw\avtew\12000_nat.apr\0598 NAT Deep views\0598 NAT DEEP LAYOUT 12/23/99 MTS



Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)

Nitrate (Favorable Geochemical Condition < 1.0 mg/L)

Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)

Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Ox./Red. Potential units are in mV.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

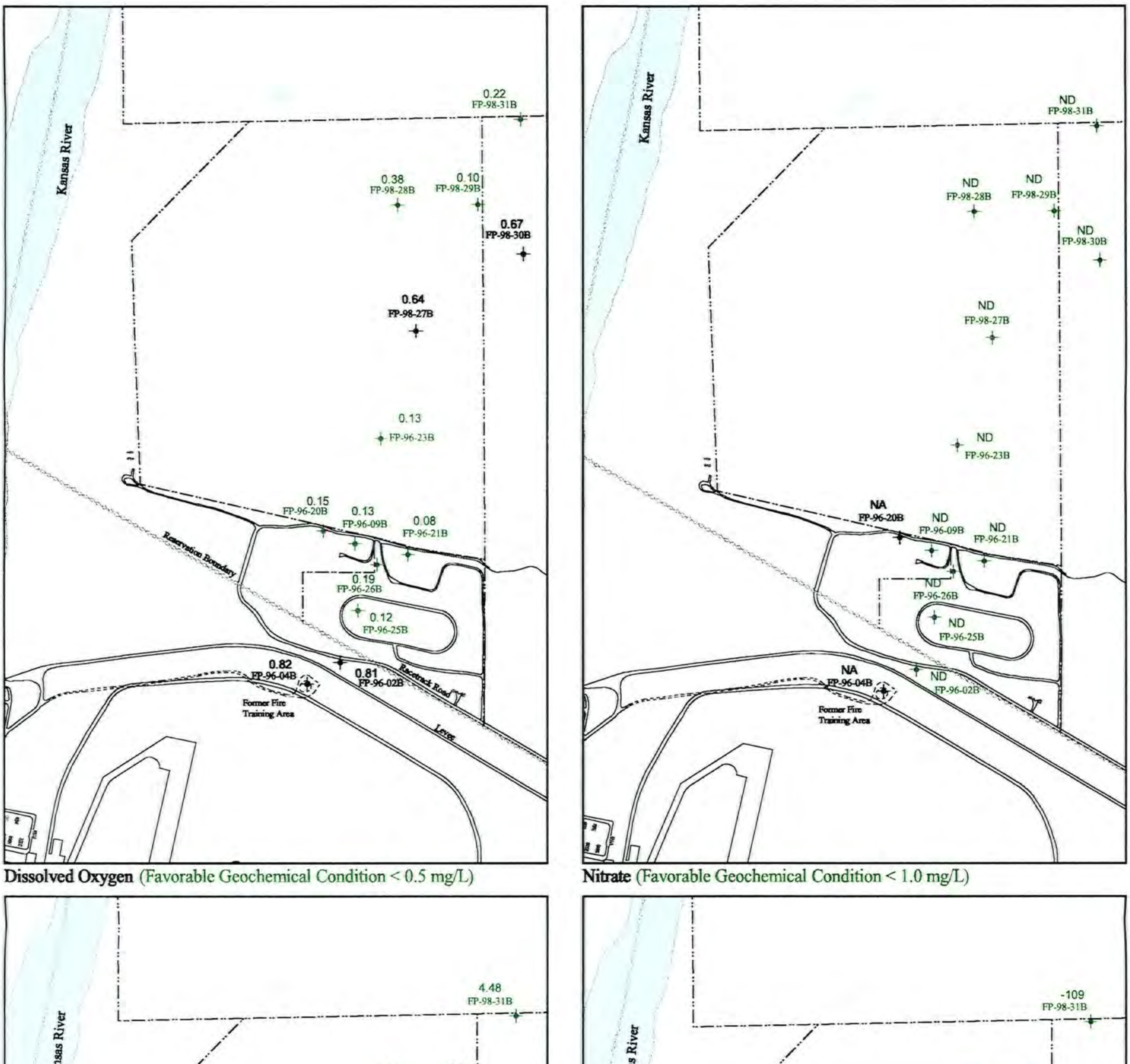
NA Not Analyzed
ND Not Detected
NS Not Sampled

900 0 900 Feet

N

Burns & McDonnell SINCE 1898

Figure 4-12
Natural Attenuation Parameters Shallow Wells May 1999
FFTA-MAAF RI



Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)

Nitrate (Favorable Geochemical Condition < 1.0 mg/L)

Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)

Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Ox./Red. Potential units are in mV.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND
- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line
- NA Not Analyzed
- ND Not Detected

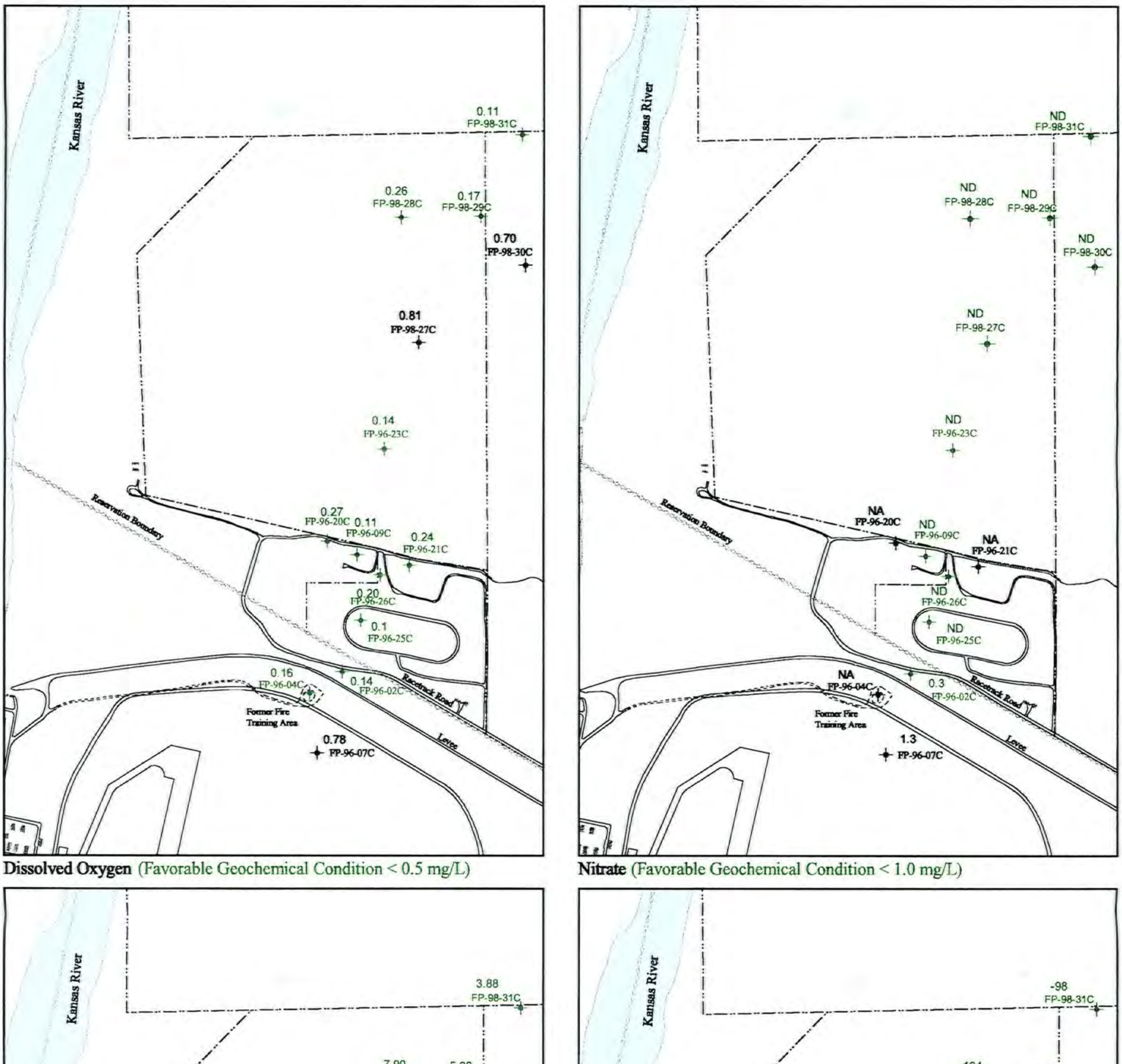
900 0 900 Feet

N

Burns & McDonnell SINCE 1898

Figure 4-13
Natural Attenuation Parameters Intermediate Wells
May 1999
FFTA-MAAF RI

U:\arc\usfmgw\aview\12000rl_nat.apr\0599 NAT Intermediate views\ 0599 NAT Intermediate layout 12/23/99 10800 MTS



Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)

Nitrate (Favorable Geochemical Condition < 1.0 mg/L)

Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)

Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Ox./Red. Potential units are in mV.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

NA Not Analyzed
ND Not Detected
NS Not Sampled

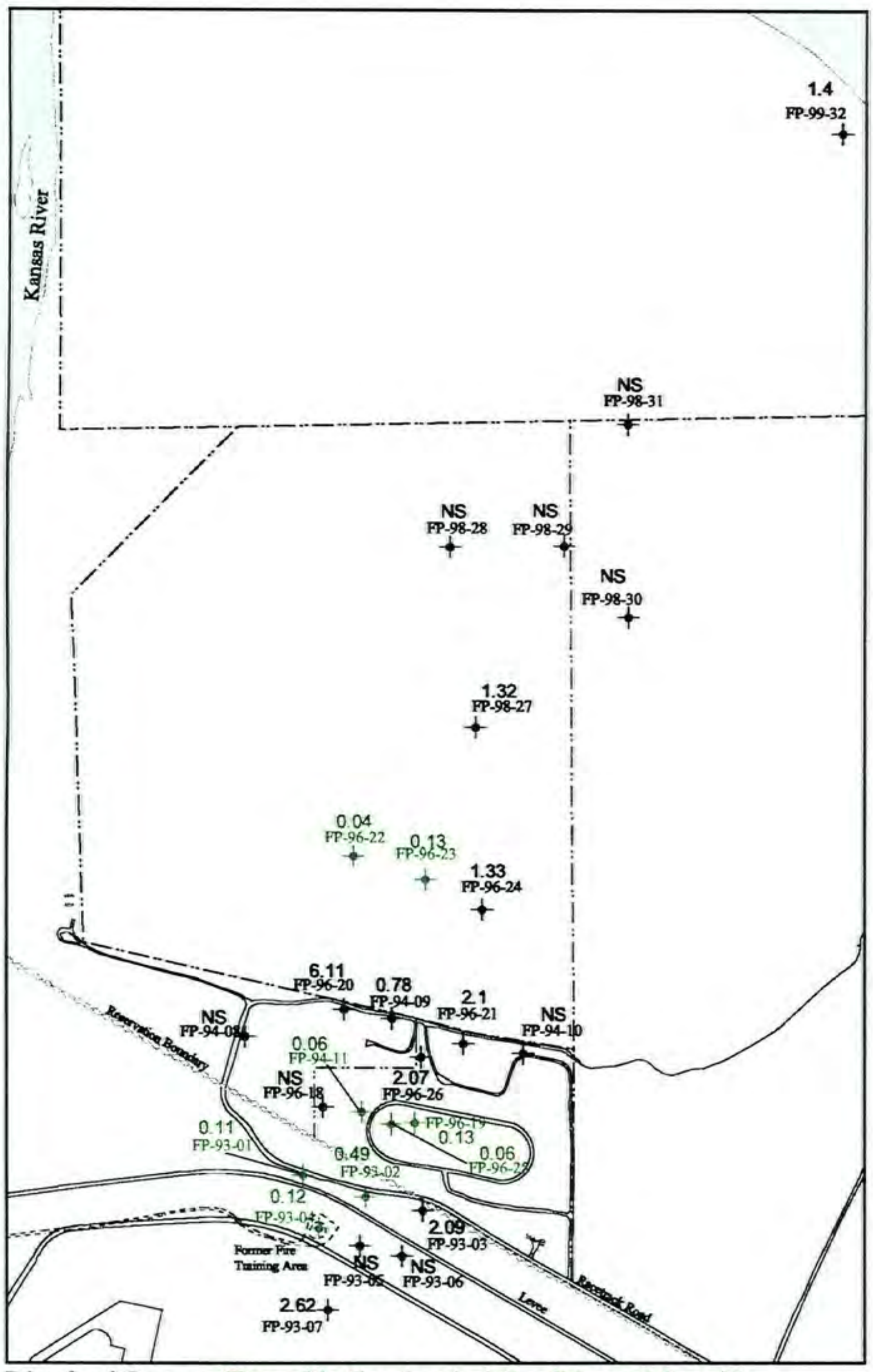
900 0 900 Feet

N

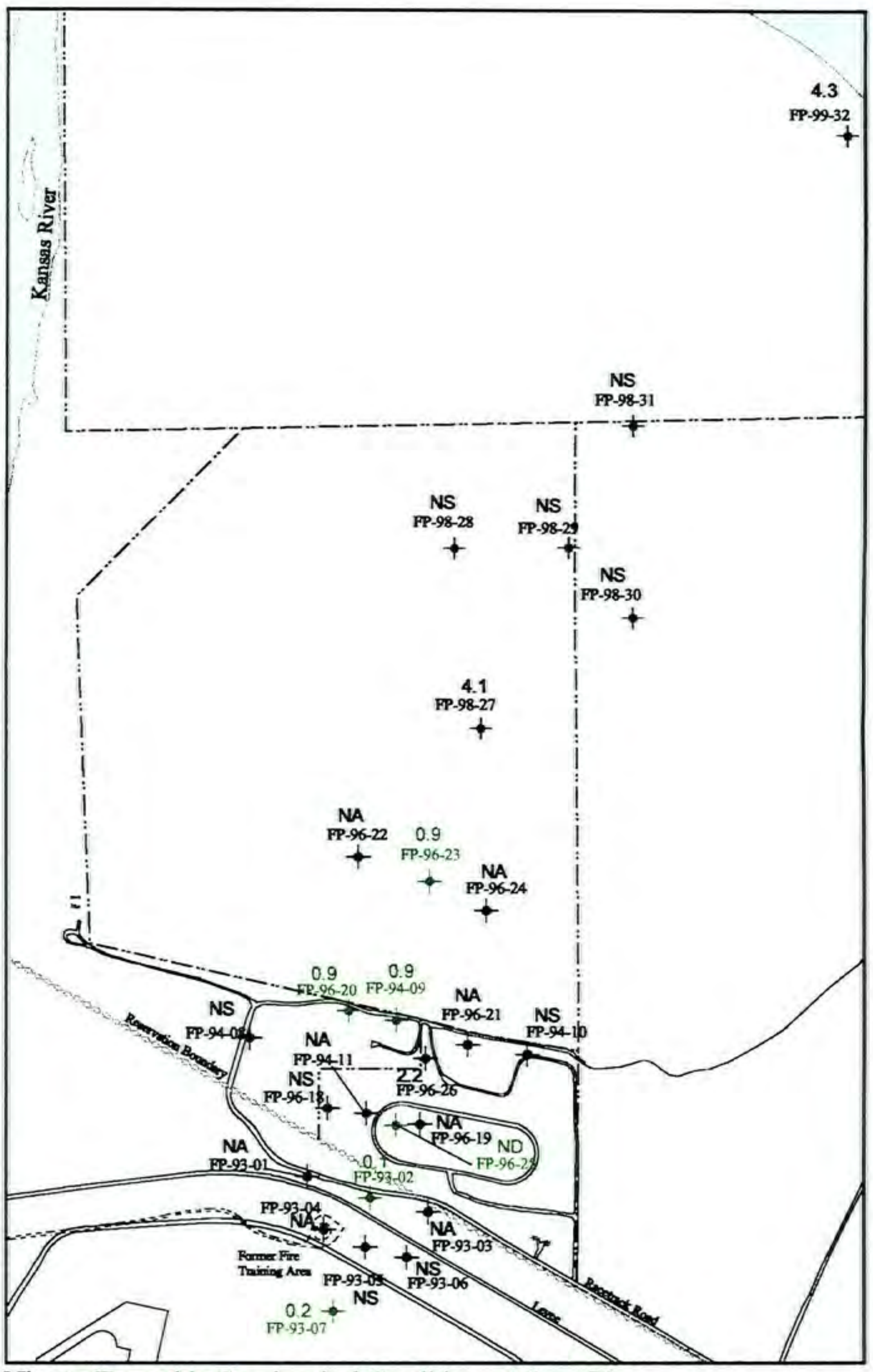
Burns & McDonnell
SINCE 1898

Figure 4-14
Natural Attenuation Parameters Deep Wells May 1999
FFTA-MAAF RI

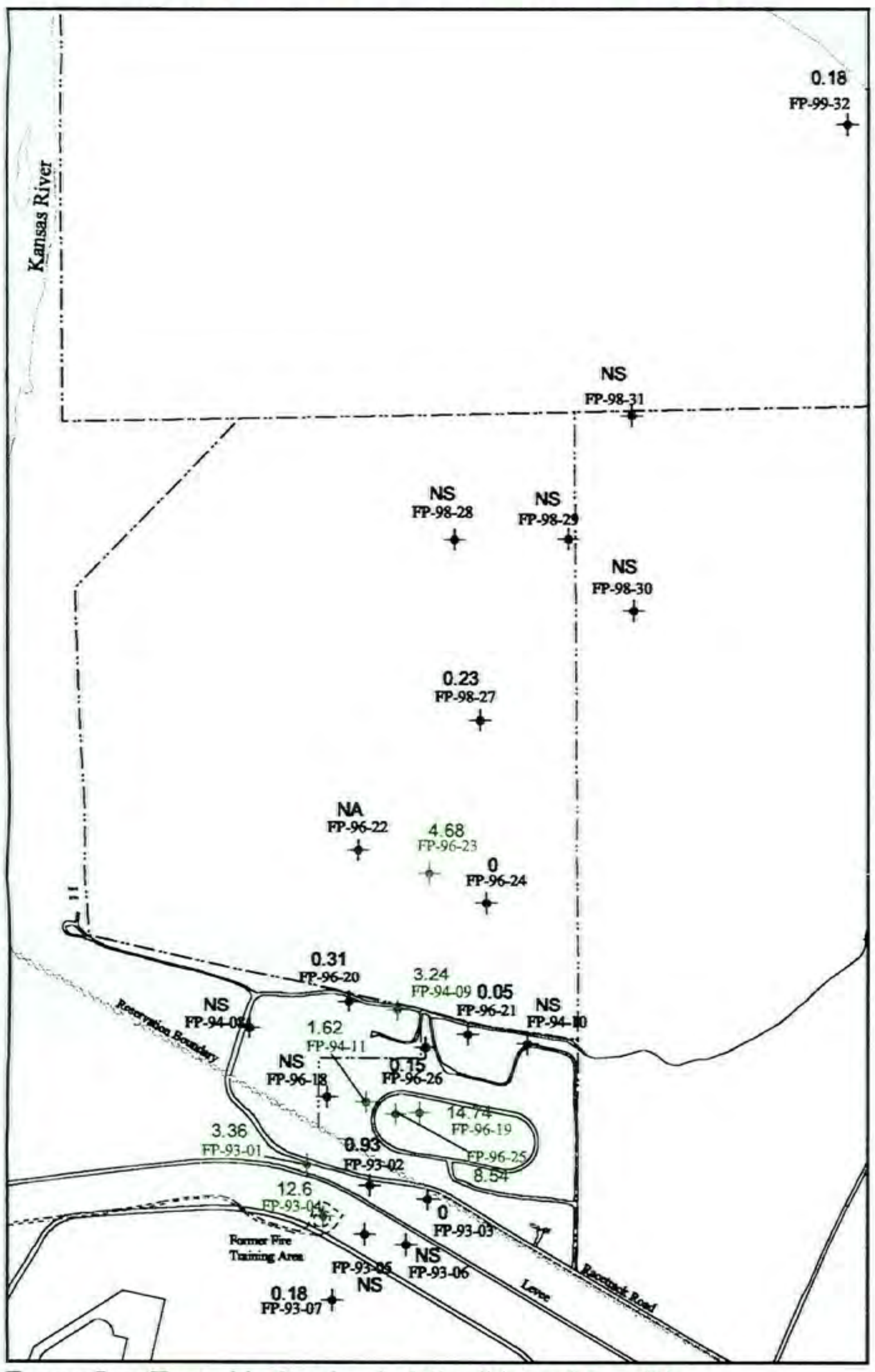
U:\arcus\frmgwaview\12000ri_nat.apr\0599 NAT Deep views\0599 NAT DEEP LAYOUT 12/27/99 10800 MTS



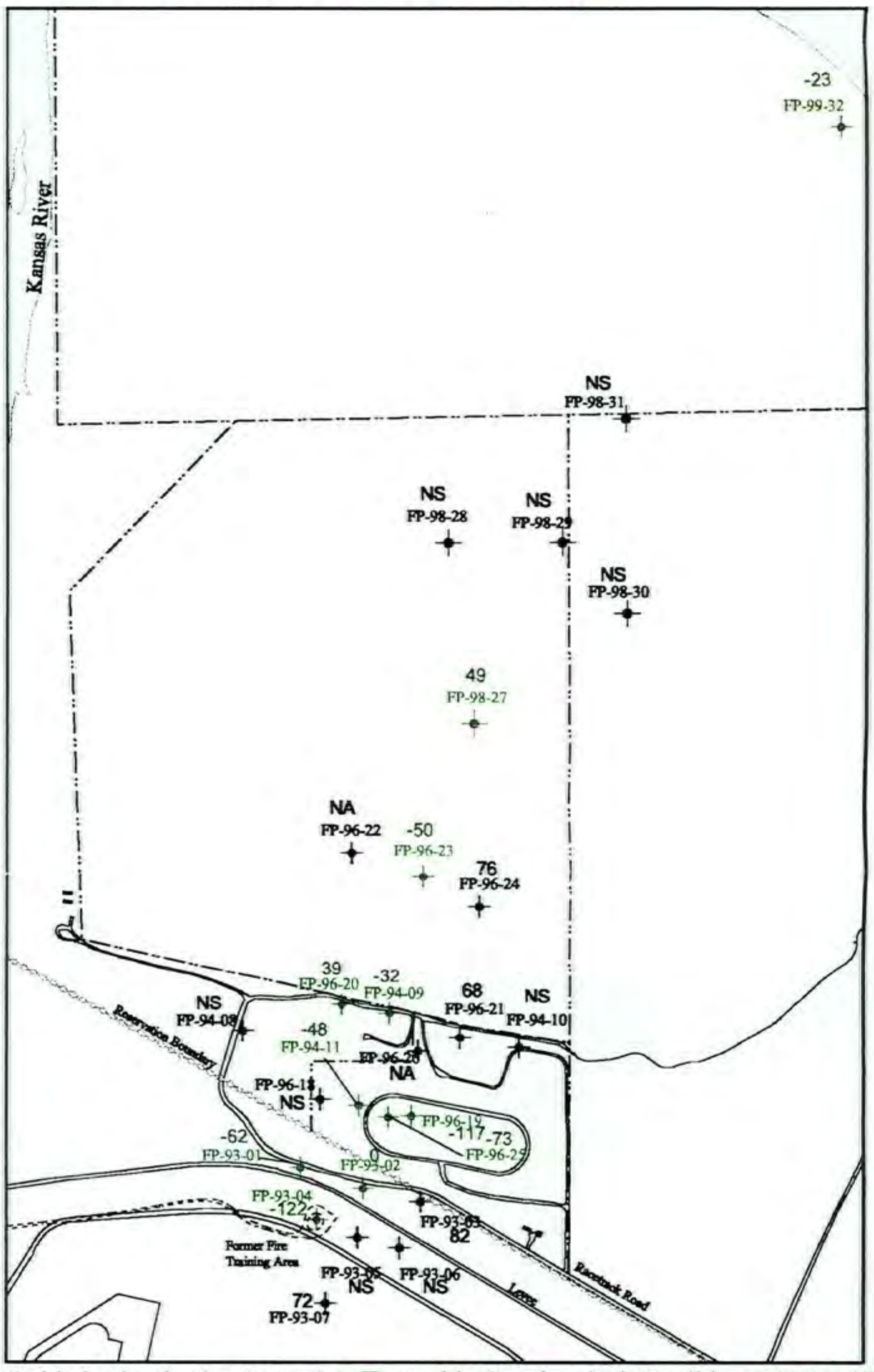
Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)



Nitrate (Favorable Geochemical Condition < 1.0 mg/L)



Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)



Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L.
4.) Ox./Red. Potential units are in mV.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND
- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line
- NA Not Analyzed
- ND Not Detected
- NS Not Sampled

1000 0 1000 Feet

N

Burns & McDonnell SINCE 1898

Figure 4-15
Natural Attenuation Parameters Shallow Wells August 1999
FFTA-MAAF RI

U:\arc\us\frng\view\12000rl_nat.apr\0899 NAT Shallow views\0899 NAT Shallow 12/27/99 12000 MTS

Note:

1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Ox./Red. Potential units are in mV.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

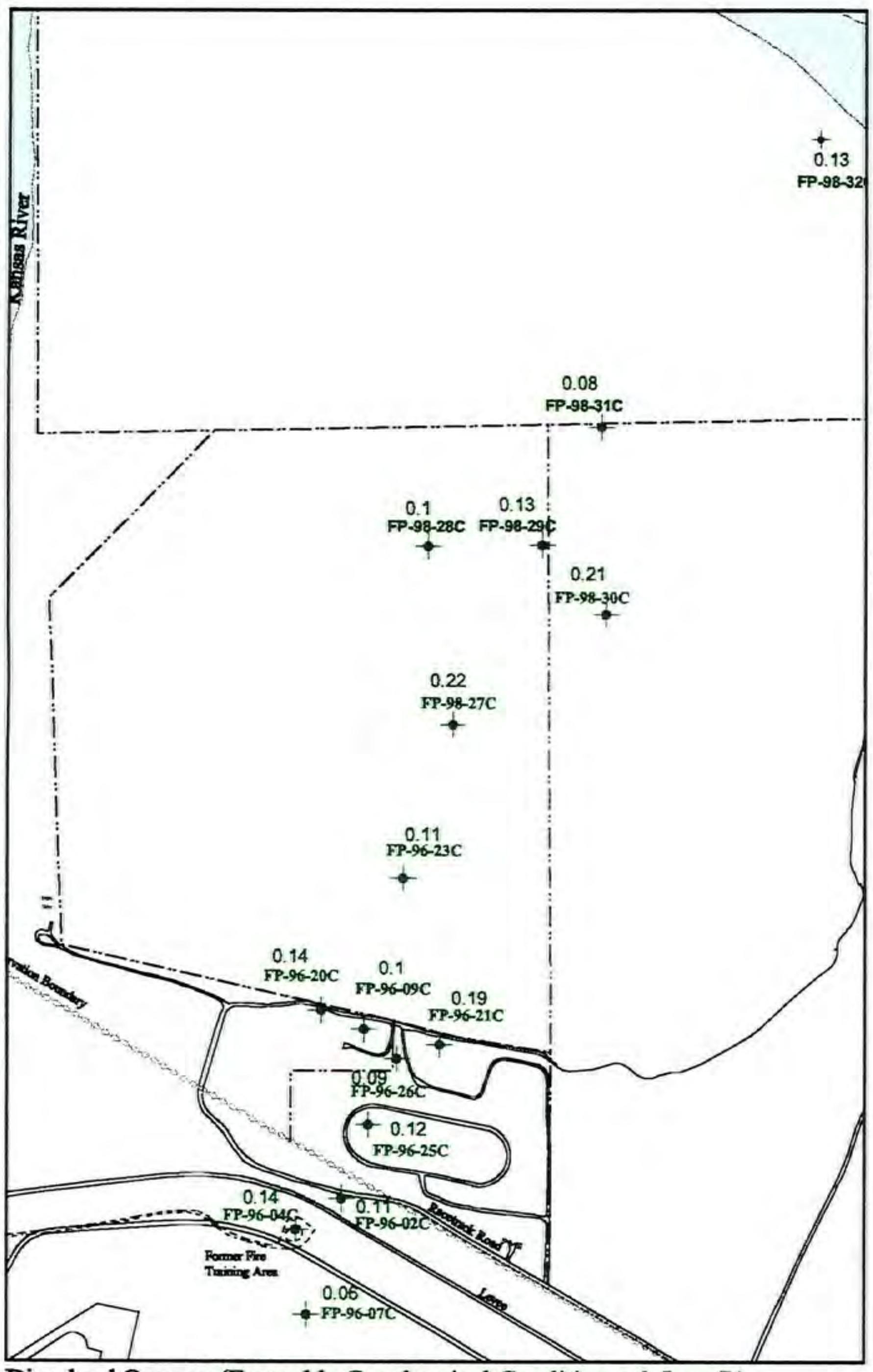
- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line
- NA Not Analyzed
- ND Not Detected

1000 0 1000 Feet

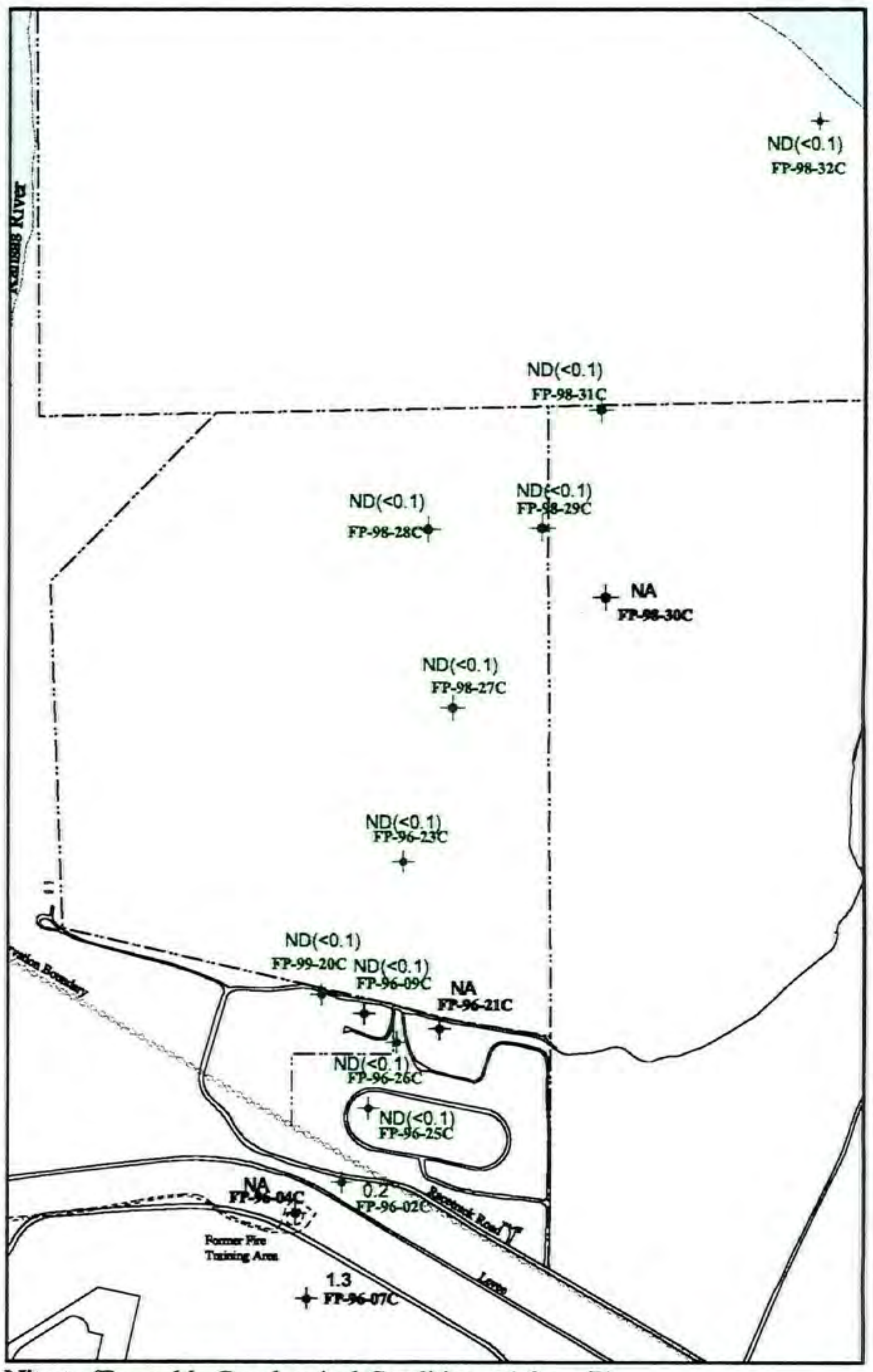
N

Burns & McDonnell SINCE 1898

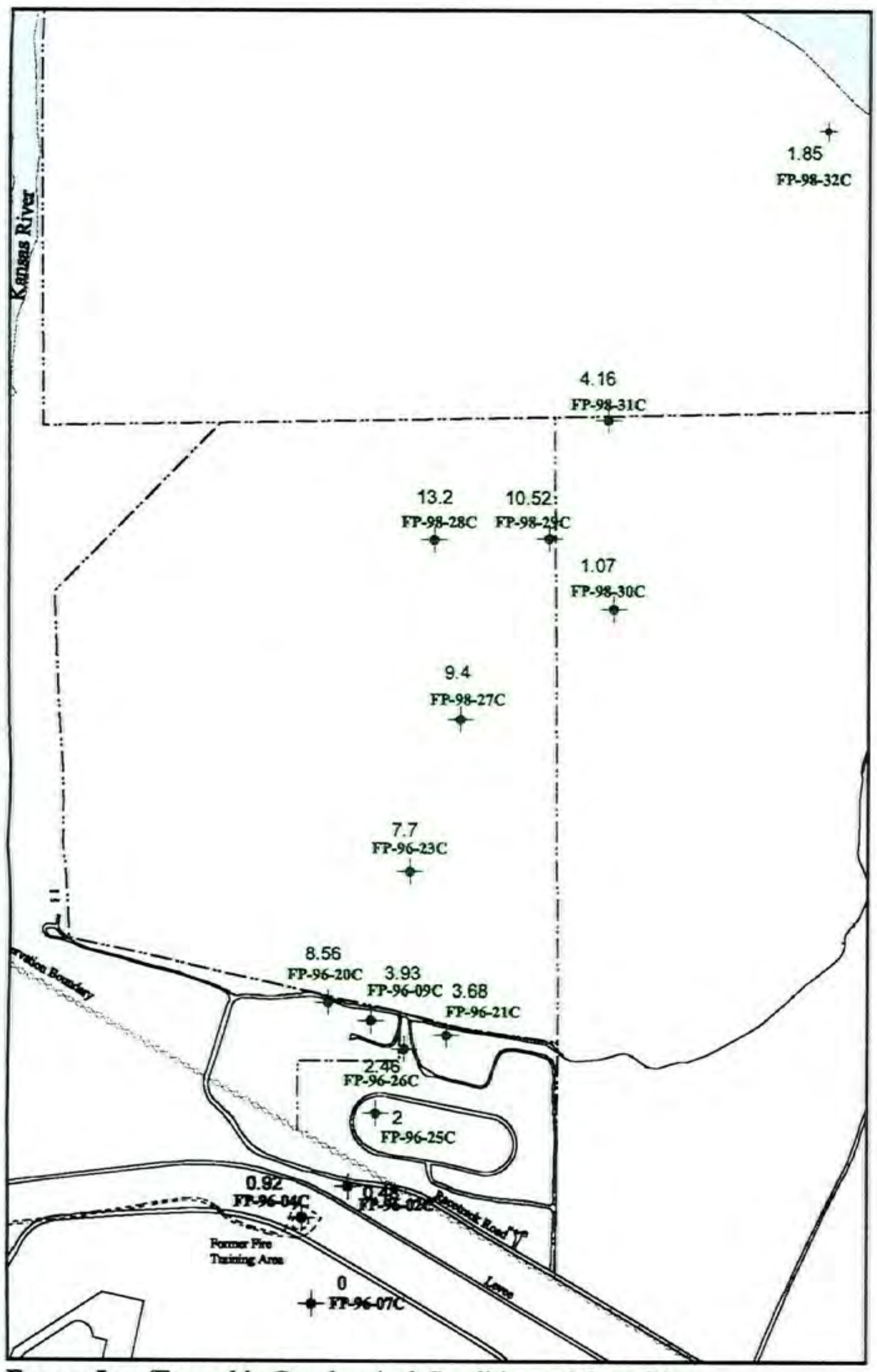
Figure 4-16
Natural Attenuation Parameters Intermediate Wells August 1999
FFTA-MAAF RI



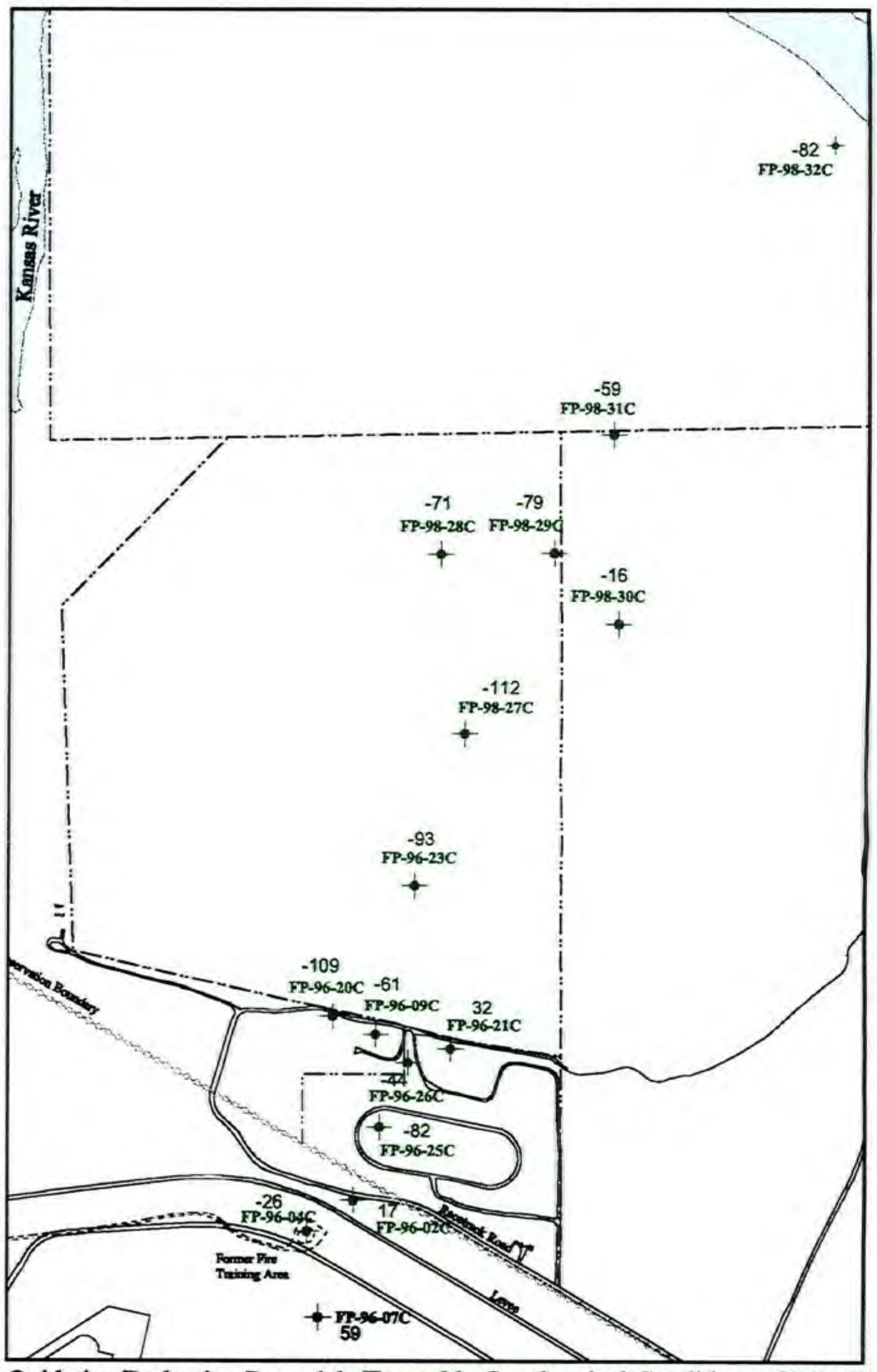
Dissolved Oxygen (Favorable Geochemical Condition < 0.5 mg/L)



Nitrate (Favorable Geochemical Condition < 1.0 mg/L)



Ferrous Iron (Favorable Geochemical Condition > 1.0 mg/L)



Oxidation/Reduction Potential (Favorable Geochemical Condition < 50.0 mV)

Note:
1.) Dissolved Oxygen units are in mg/L.
2.) Ferrous Iron units are in mg/L.
3.) Ferrous Iron Detection Limit = 0.0 mg/L
4.) Ox./Red. Potential units are in mV.
5.) Nitrate units are in mg/L.
6.) Nitrate Detection Limit = 0.1 mg/L.

LEGEND

- Monitoring Well
- FFTA/Former Access Road
- Roads
- Property Line

NA Not Analyzed
ND Not Detected

900 0 900 Feet

N

Burns & McDonnell
SINCE 1898

Figure 4-17
Natural Attenuation Parameters
Deep Wells
August 1999
FFTA-MAAF RI

U:\arc\usfrmgw\aview\12000rl_nat.apr\0899 NAT Deep views\0899 NAT DEEP LAYOUT 12/27/99 12000 MTS

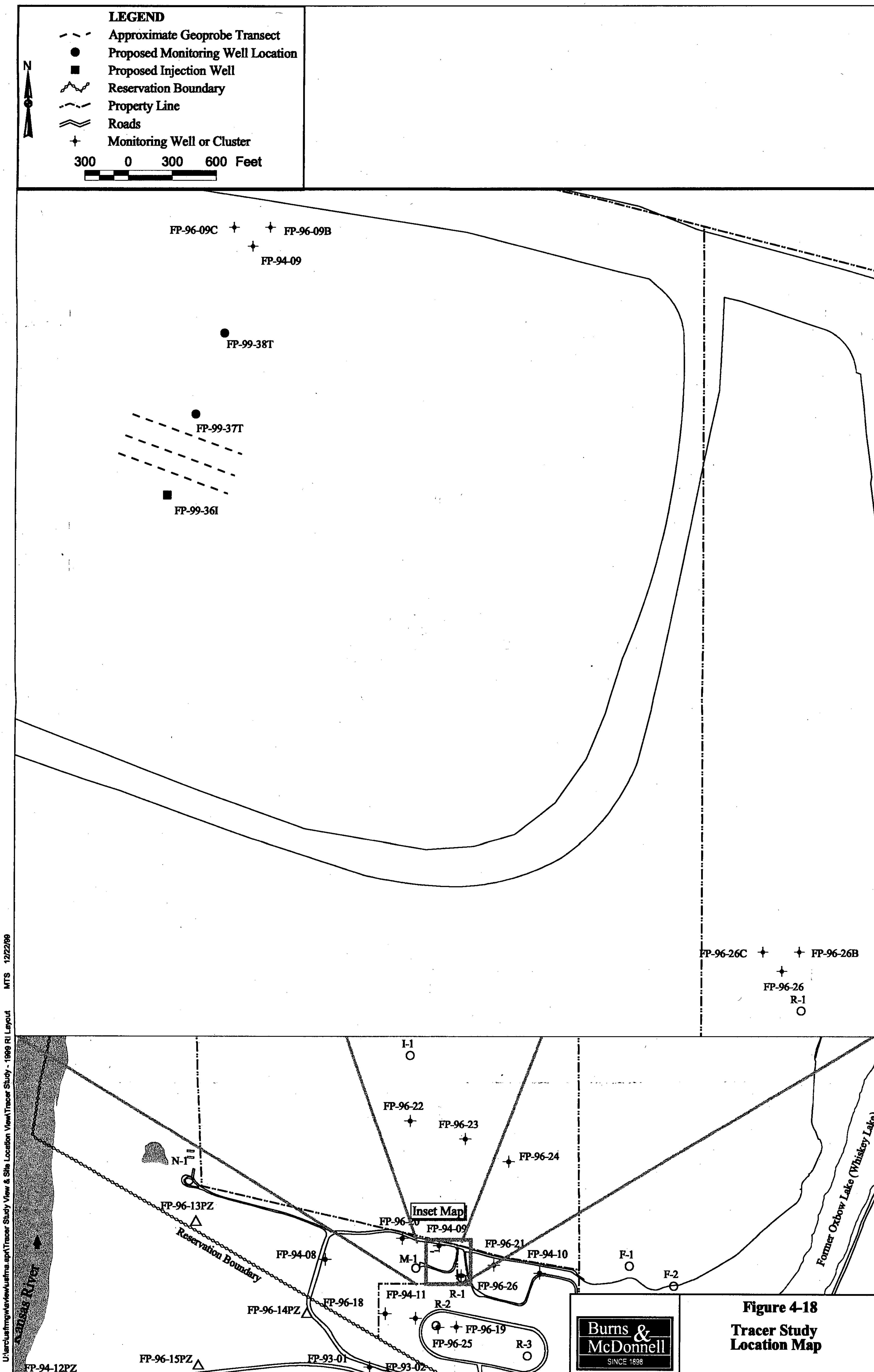
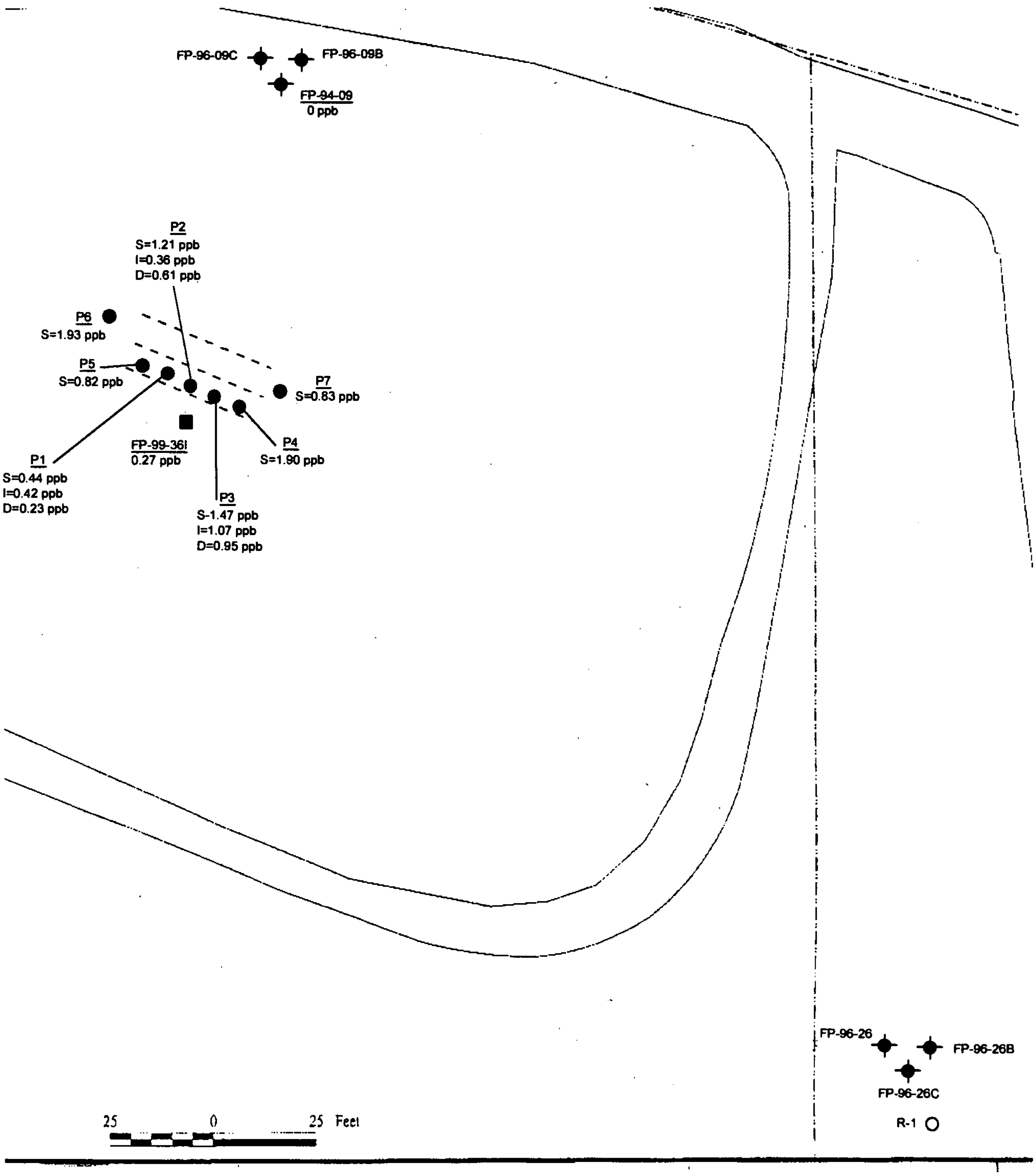


Figure 4-18
Tracer Study Location Map
FFTA-MAAF RI



LEGEND

- ✦ Monitoring Well
- • Geoprobe Location
- ■ Injection Well

S = Shallow
I = Intermediate
D = Deep

N

NOT TO SCALE

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Figure 4-19

Dye Tracer Study Results

FFTA-MAAF RI

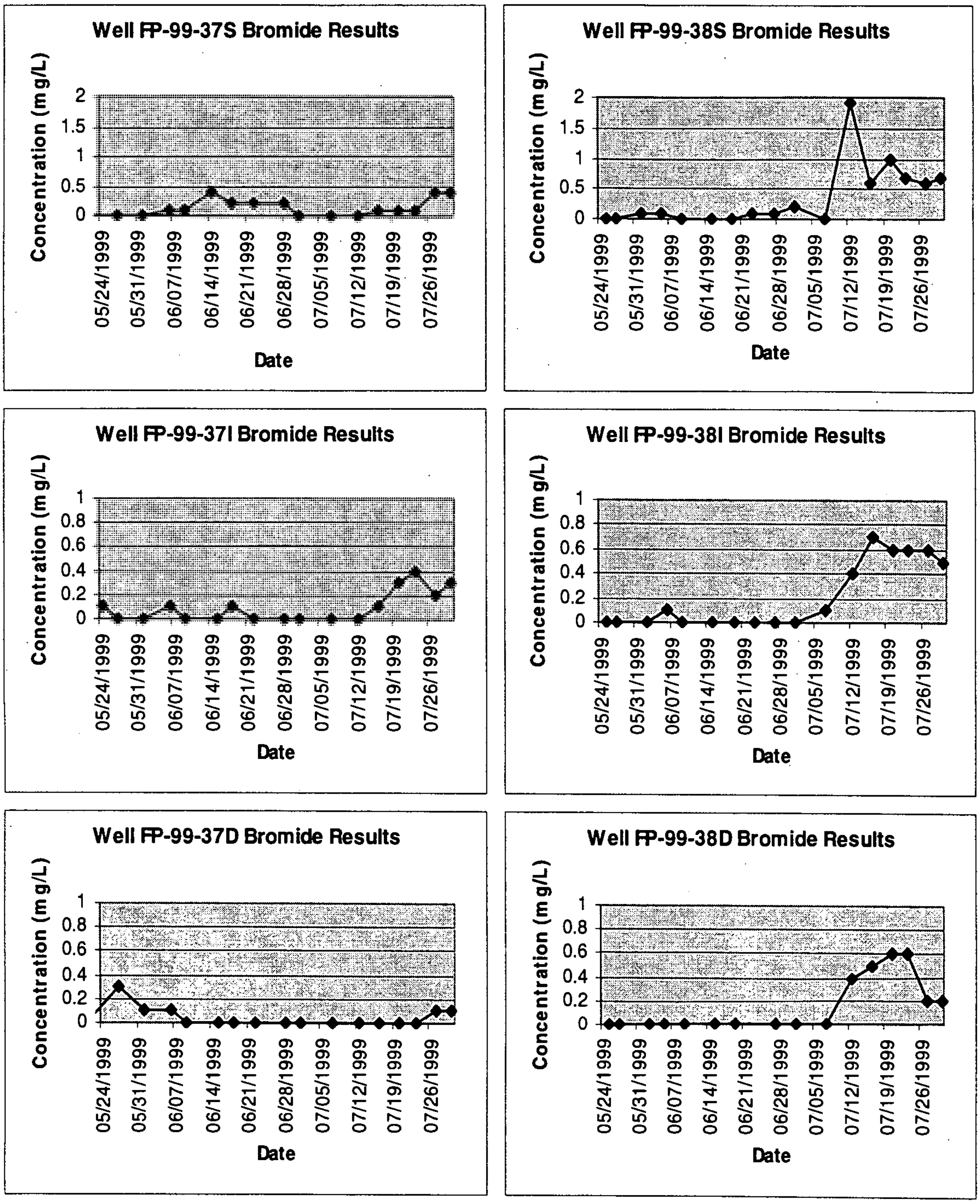

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Figure 4-20

Tracer Study Bromide Trends

FFTA-MAAF RI

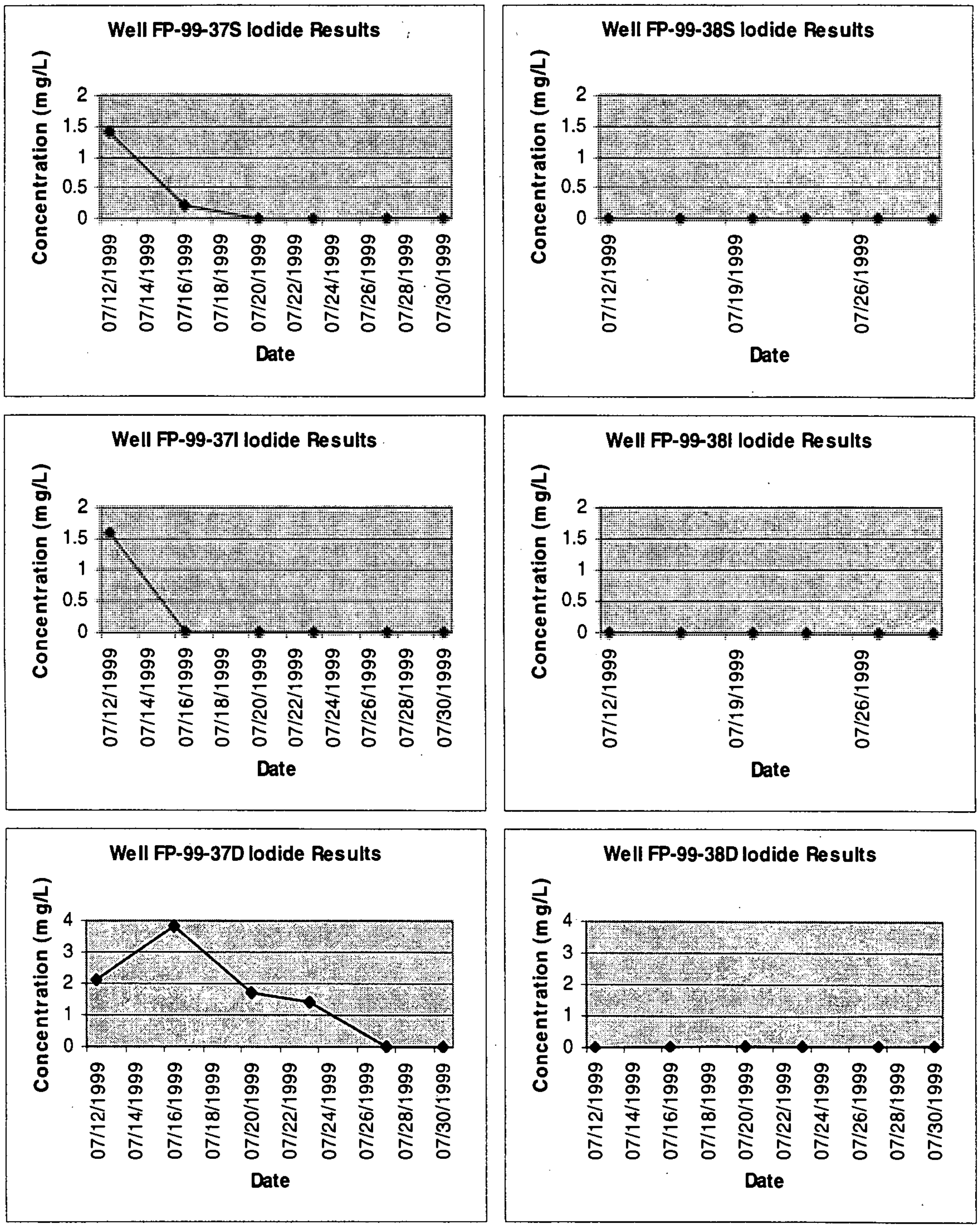

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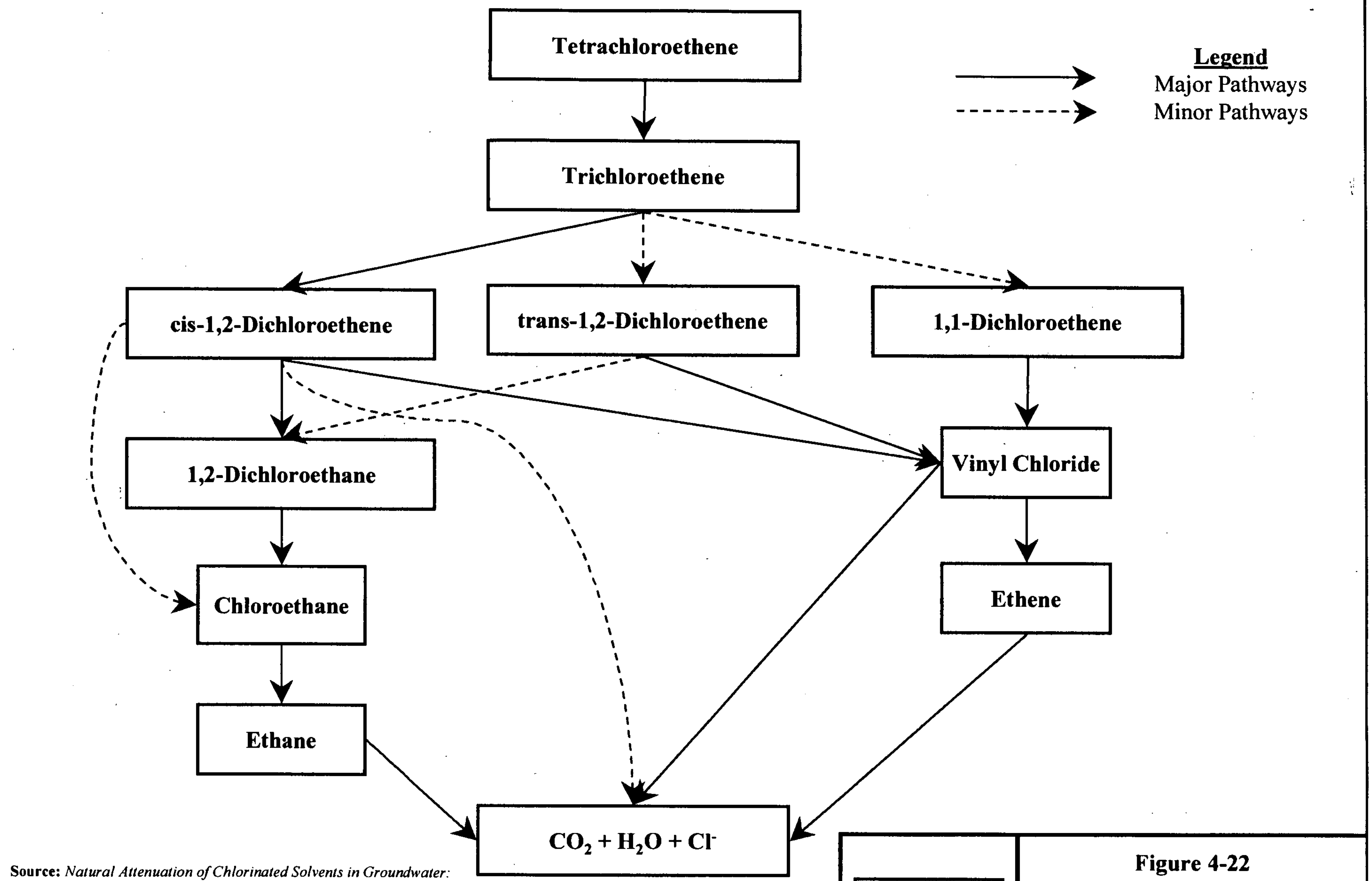
Figure 4-21

Tracer Study Iodide Trends

FFTA-MAAF RI



Source: *Natural Attenuation of Chlorinated Solvents in Groundwater: Principles and Practices* (ITRC, 1999) & *In Situ Bioremediation,* (Rittmann, Seagren, & Wrenn, 1994).

Note: This figure depicts biotic reductive dechlorination and abiotic and biotic direct mineralization pathways. Other pathways may be occurring at the site and are discussed in the text.

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Figure 4-22

Degradation Pathways of Chlorinated Solvents

FFTA-MAAF RI

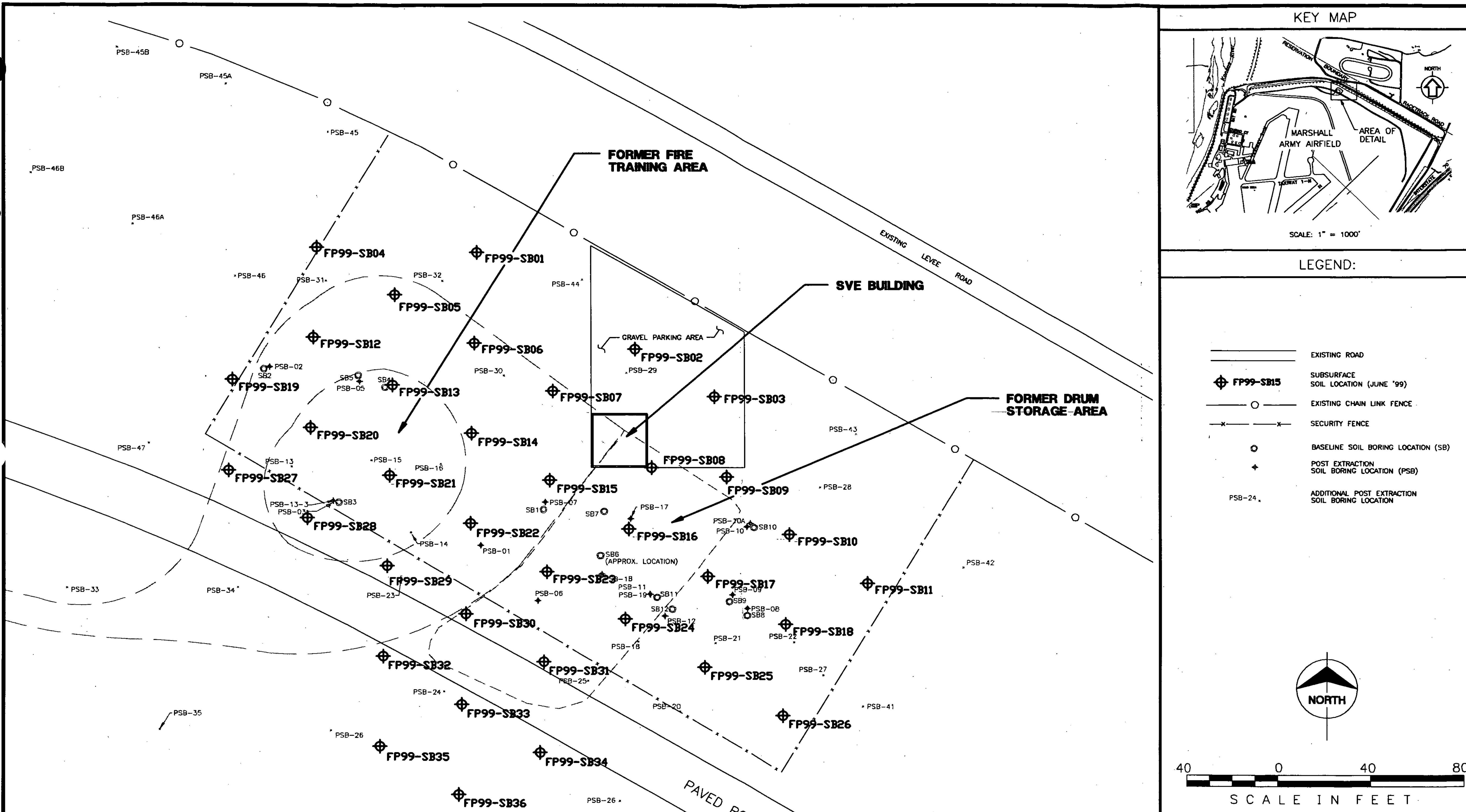


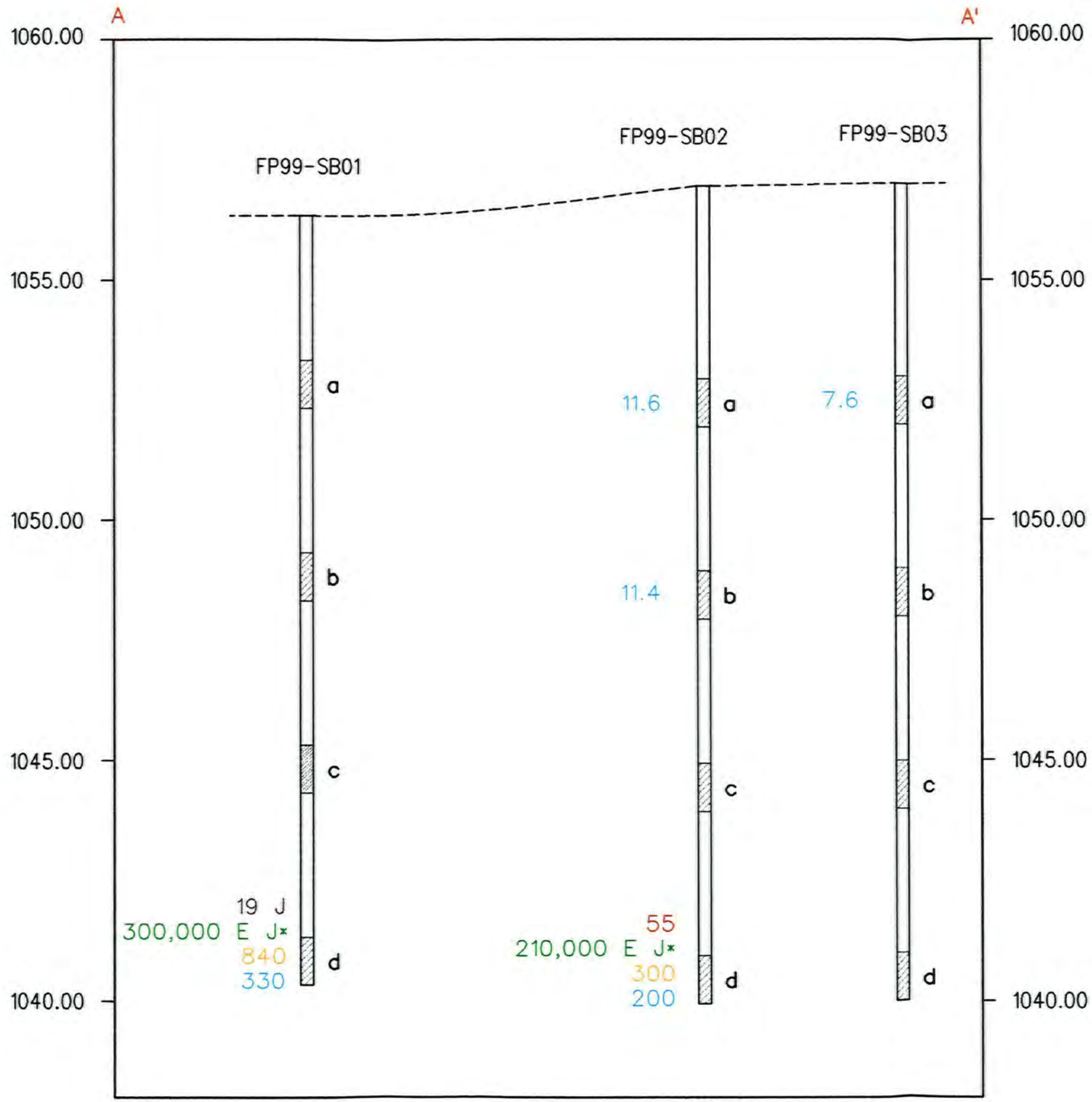
Figure 4-23

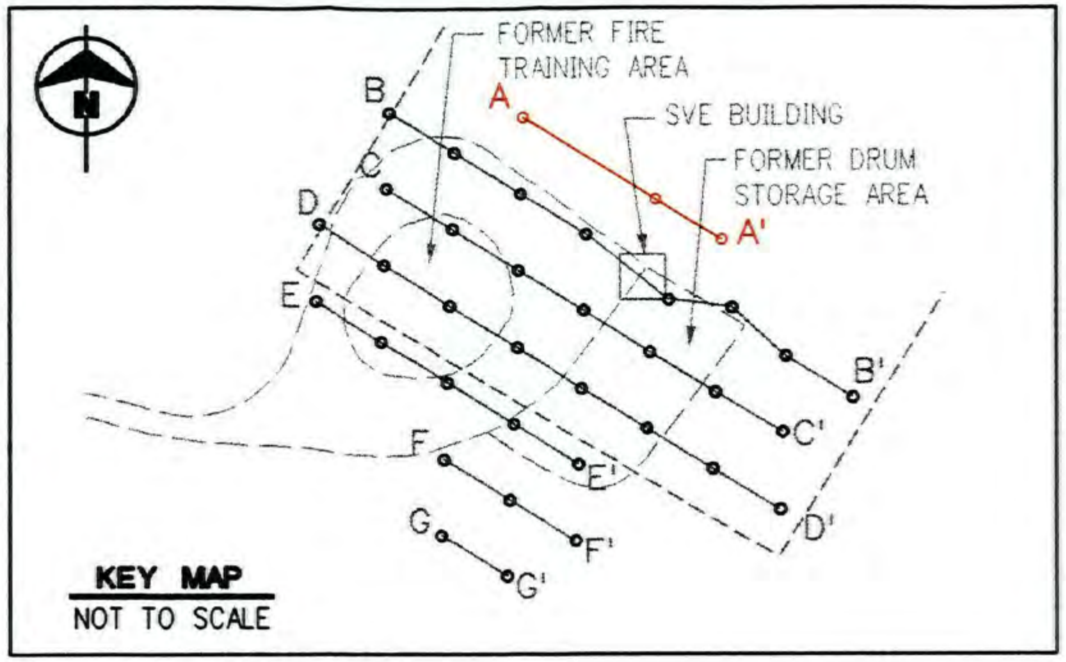
RI SOIL SAMPLING LOCATIONS

FFTA-MAAF RI

Burns & McDonnell SINCE 1898

K:\USFRRI\tem\RI_report\risoil48.dwg 03-13-2000 09:32 BKK





LEGEND:

- TETRACHLOROETHENE (ug/kg)
- TRICHLOROETHENE (ug/kg)
- cis-1,2-DICHLOROETHENE (ug/kg)
- TPH AS DIESEL (mg/kg)
- TPH AS C19-C40 (mg/kg)
- TVPH (ug/kg)

NOTES:

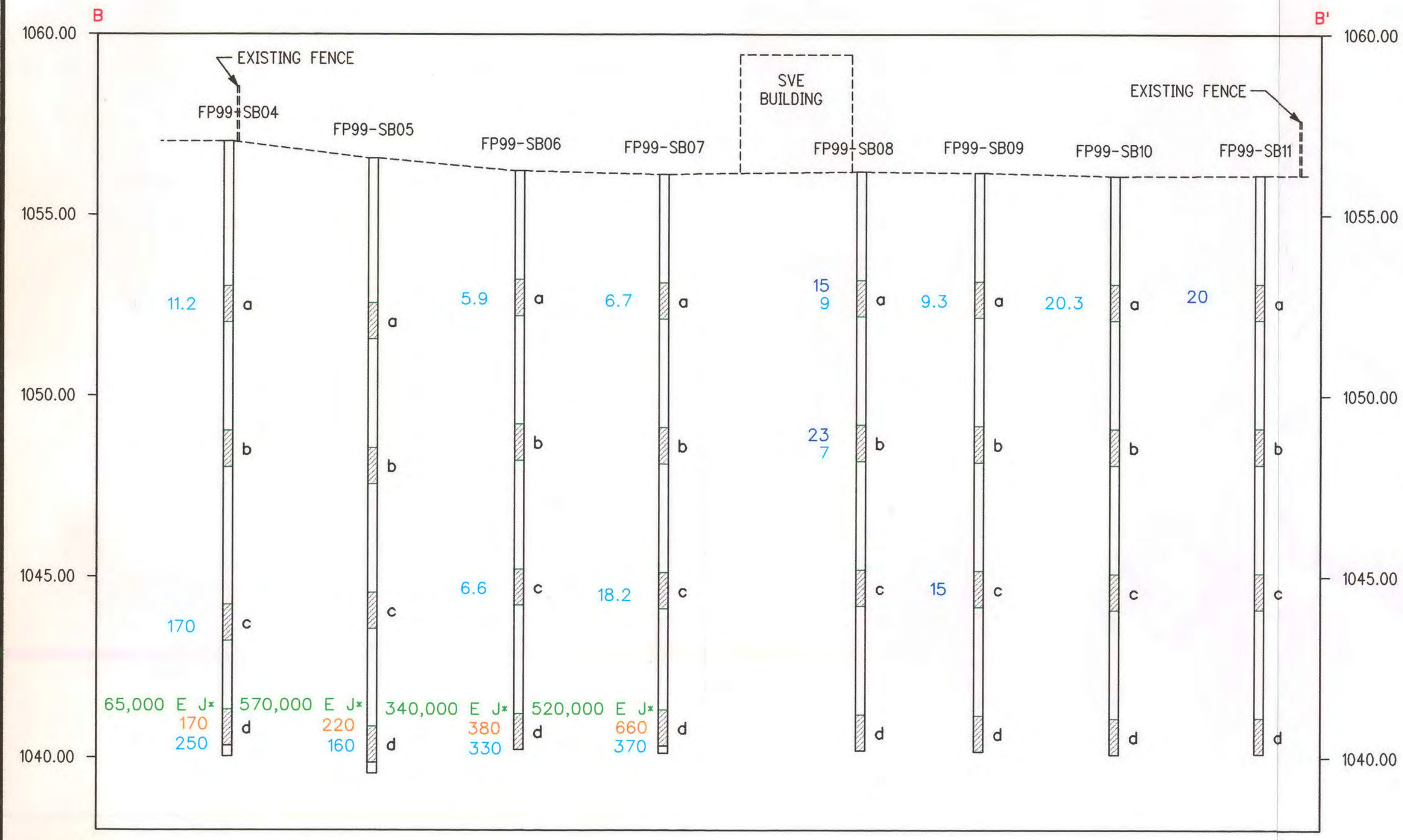
1. ONLY POSITIVE DETECTIONS OF PCE, TCE, cis-1,2-DCE, TPH AS DIESEL, TPH AS C19-C40, AND TVPH ARE PRESENTED ON THIS FIGURE.
2. DISCREET SAMPLE INTERVAL SUBMITTED FOR LABORATORY ANALYSIS FROM EACH FOUR-FOOT SECTION IS SHADED.
3. J - QUALIFIED AS ESTIMATED BY LABORATORY
   E - QUALIFIED AS ESTIMATED DUE TO MATRIX INTERFERENCE
   J*- QUALIFIED AS ESTIMATED DURING QC EVALUATION
4. DETECTIONS PRESENTED ON THIS FIGURE ARE A COMBINATION OF SAMPLING RESULTS FROM TABLE 4-9 AND 4-10.

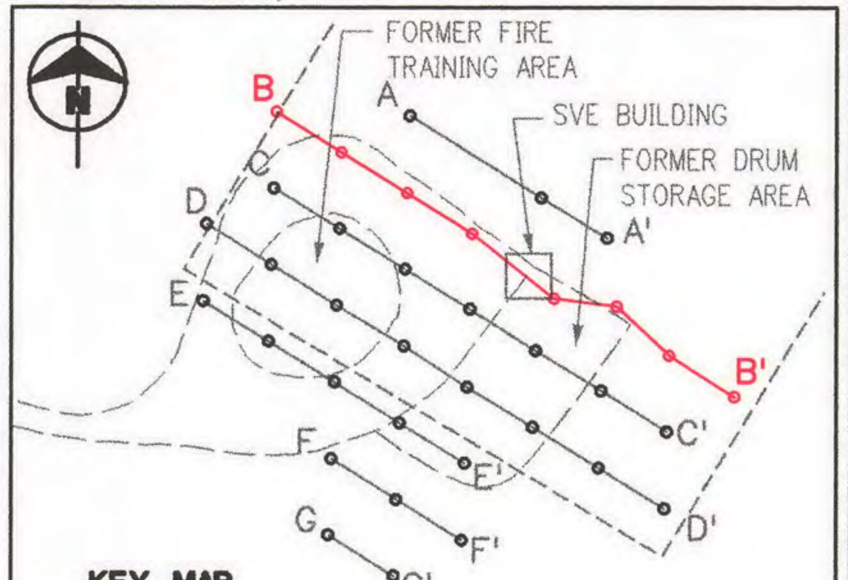
25' 0' 25' 50'
HORIZONTAL SCALE IN FEET

2.5' 0' 2.5' 5'
VERTICAL SCALE IN FEET

Burns & McDonnell SINCE 1898

Figure 4-24
RI SOIL SAMPLING - JUNE 1999 CONTAMINANT CONCENTRATIONS CROSS SECTION A - A'
FFTA-MAAF RI





KEY MAP
NOT TO SCALE

LEGEND:

- TETRACHLOROETHENE (ug/kg)
- TRICHLOROETHENE (ug/kg)
- cis-1,2-DICHLOROETHENE (ug/kg)
- TPH AS DIESEL (mg/kg)
- TPH AS C19-C40 (mg/kg)
- TVPH (ug/kg)

NOTES:

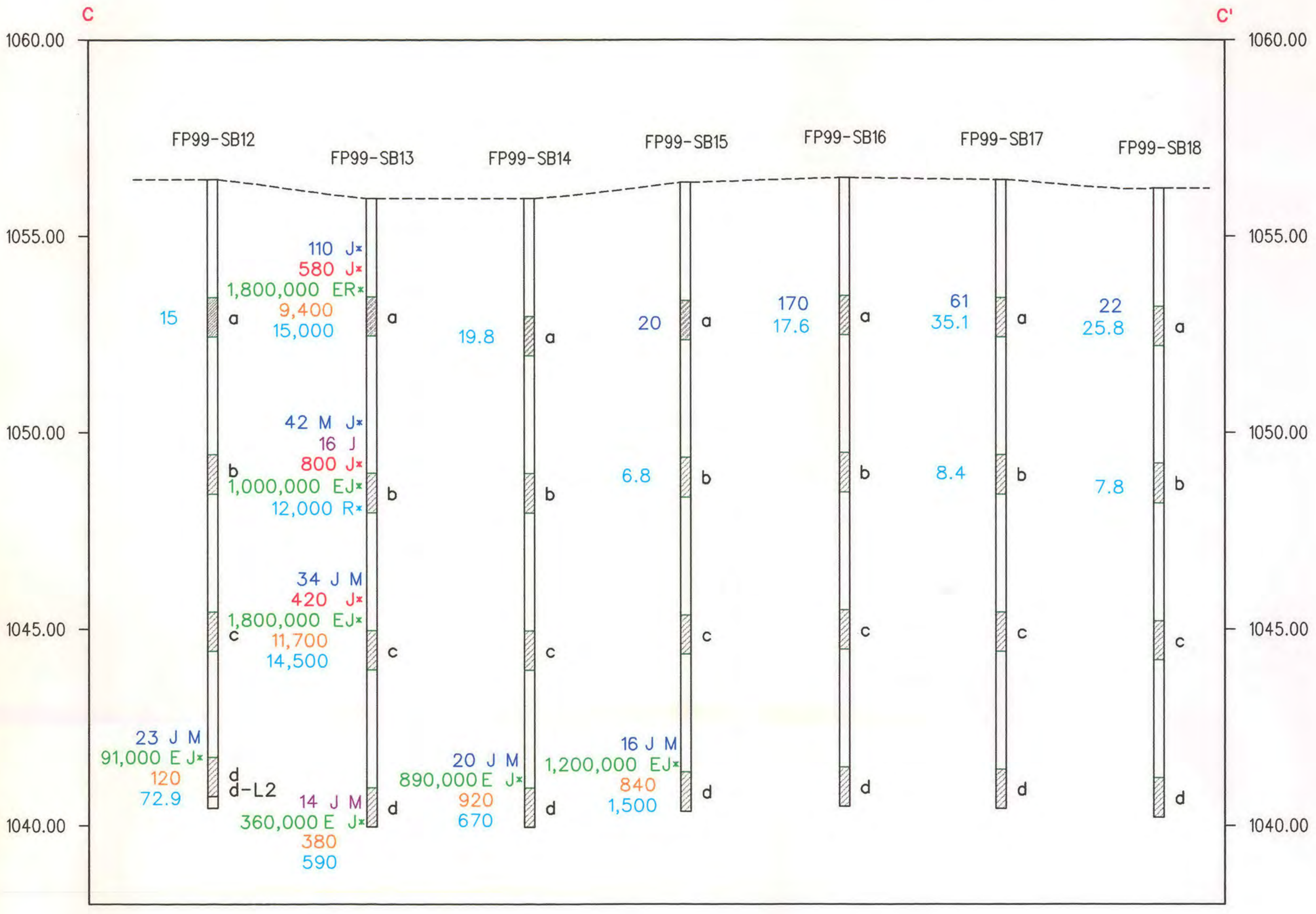
1. ONLY POSITIVE DETECTIONS OF PCE, TCE, cis-1,2-DCE, TPH AS DIESEL, TPH AS C19-C40, AND TVPH ARE PRESENTED ON THIS FIGURE.
2. DISCREET SAMPLE INTERVAL SUBMITTED FOR LABORATORY ANALYSIS FROM EACH FOUR-FOOT SECTION IS SHADED.
3. J - QUALIFIED AS ESTIMATED BY LABORATORY
   M - POSSIBLE INTERFERENCES PRESENT
   E - QUALIFIED AS ESTIMATE DUE TO MATRIX INTERFERENCE
   J* - QUALIFIED AS ESTIMATED DURING QC EVALUATION

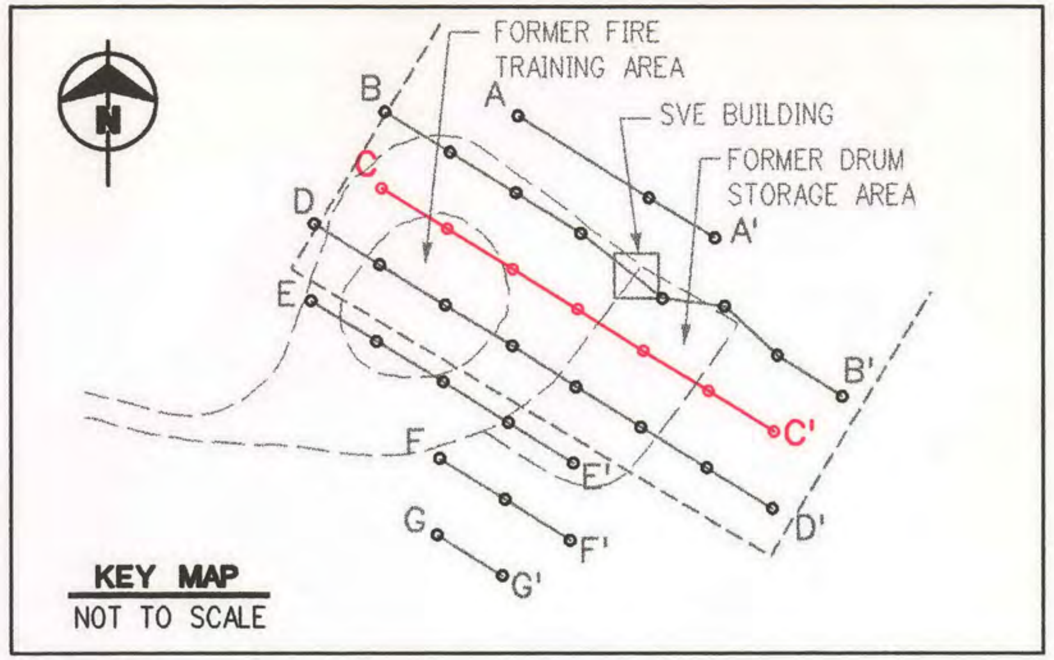
25' 0' 25' 50'
HORIZONTAL SCALE IN FEET

2.5' 0' 2.5' 5'
VERTICAL SCALE IN FEET

Burns & McDonnell
SINCE 1898

Figure 4-25
RI SOIL SAMPLING - JUNE 1999
CONTAMINANT CONCENTRATIONS
CROSS SECTION B - B'
FFTA-MAAF RI





LEGEND:

- TETRACHLOROETHENE (ug/kg)
- TRICHLOROETHENE (ug/kg)
- cis-1,2-DICHLOROETHENE (ug/kg)
- TPH AS DIESEL (mg/kg)
- TPH AS C19-C40 (mg/kg)
- TVPH (ug/kg)

NOTES:

1. ONLY POSITIVE DETECTIONS OF PCE, TCE, cis-1,2-DCE, TPH AS DIESEL, TPH AS C19-C40, AND TVPH ARE PRESENTED ON THIS FIGURE.
2. DISCREET SAMPLE INTERVAL SUBMITTED FOR LABORATORY ANALYSIS FROM EACH FOUR-FOOT SECTION IS SHADED.
3. J - QUALIFIED AS ESTIMATED BY LABORATORY
   M - POSSIBLE INTERFERENCES PRESENT
   E - QUALIFIED AS ESTIMATE DUE TO MATRIX INTERFERENCE
   J* - QUALIFIED AS ESTIMATED DURING QC EVALUATION
   R* - QUALIFIED AS REJECTED BASED ON QC ELAUATION. (HOWEVER, RESULT IS CONSIDERED USEABLE AS AN ESTIMATE.)
4. DETECTIONS PRESENTED ON THIS FIGURE ARE A COMBINATION OF SAMPLING RESULTS FROM TABLE 4-9 AND 4-10.

25' 0' 25' 50'
HORIZONTAL SCALE IN FEET

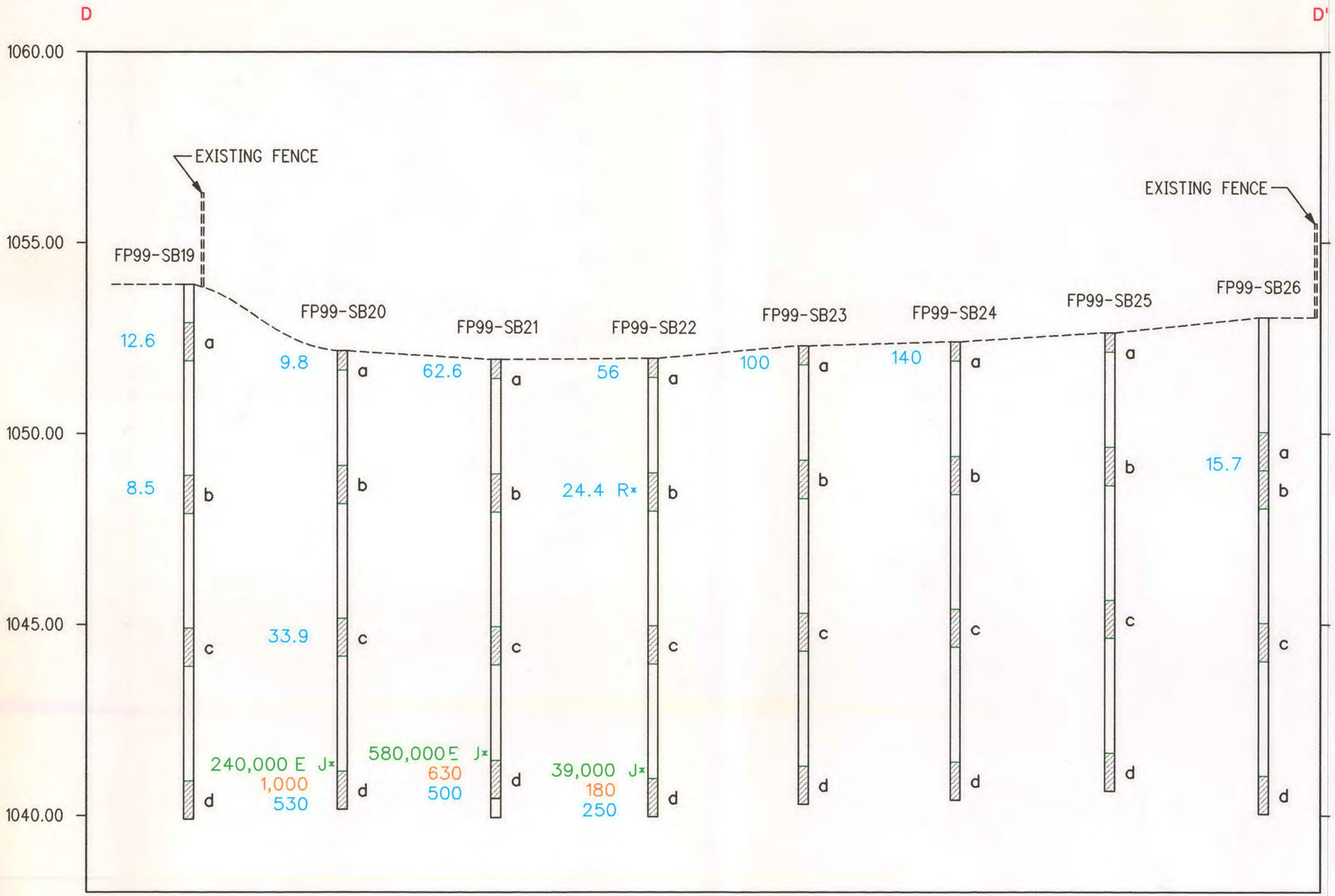
2.5' 0' 2.5' 5'
VERTICAL SCALE IN FEET

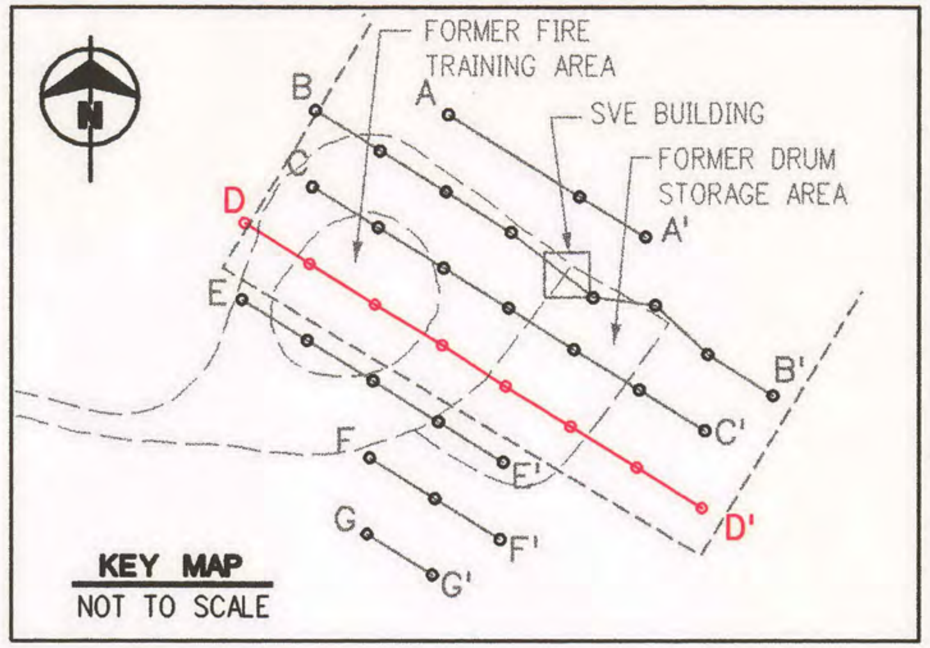
Burns & McDonnell SINCE 1898

Figure 4-26

RI SOIL SAMPLING JUNE - 1999 CONTAMINANT CONCENTRATIONS CROSS SECTION C - C'

FFTA-MAAF RI





LEGEND:

- TETRACHLOROETHENE (ug/kg)
- TRICHLOROETHENE (ug/kg)
- cis-1,2-DICHLOROETHENE (ug/kg)
- TPH AS DIESEL (mg/kg)
- TPH AS C19-C40 (mg/kg)
- TVPH (ug/kg)

NOTES:

1. ONLY POSITIVE DETECTIONS OF PCE, TCE, cis-1,2-DCE, TPH AS DIESEL, TPH AS C19-C40, AND TVPH ARE PRESENTED ON THIS FIGURE.
2. DISCREET SAMPLE INTERVAL SUBMITTED FOR LABORATORY ANALYSIS FROM EACH FOUR-FOOT SECTION IS SHADED.
3. J* - QUALIFIED AS ESTIMATED DURING QC EVALUATION
   E - QUALIFIED AS ESTIMATED DUE TO MATRIX INTERFERENCE
   R*- QUALIFIED AS REJECTED BASED ON QC EVALUATION. (HOWEVER, RESULT IS CONSIDERED USEABLE AS AN ESTIMATE.)

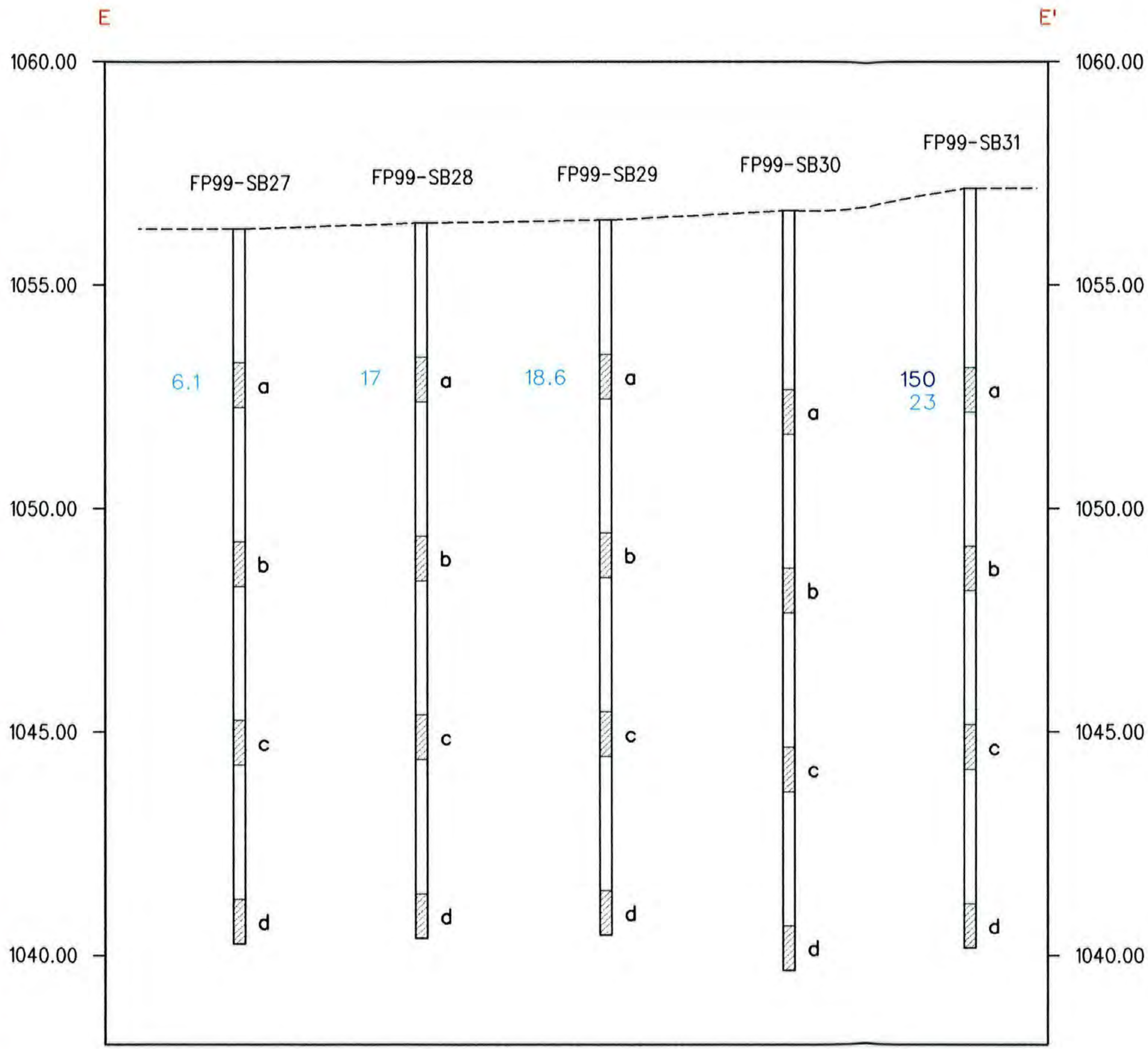
25' 0' 25' 50'
HORIZONTAL SCALE IN FEET

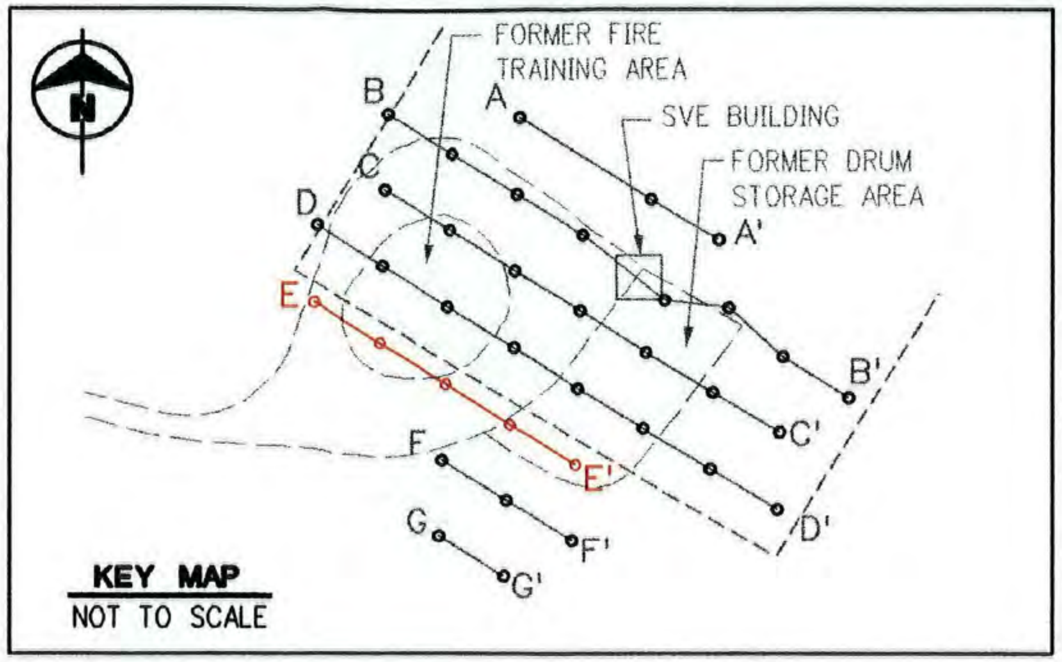
2.5' 0' 2.5' 5'
VERTICAL SCALE IN FEET

Burns & McDonnell SINCE 1898

Figure 4-27
RI SOIL SAMPLING JUNE - 1999
CONTAMINANT CONCENTRATIONS
CROSS SECTION D - D'
FFTA-MAAF RI

RIXSECDD.DGN/ 9-29-2000 10:21/TFG K:\USFRRI\USTN\TEM\





LEGEND:

- TETRACHLOROETHENE (ug/kg)
- TRICHLOROETHENE (ug/kg)
- cis-1,2-DICHLOROETHENE (ug/kg)
- TPH AS DIESEL (mg/kg)
- TPH AS C19-C40 (mg/kg)
- TVPH (ug/kg)

NOTES:

1. ONLY POSITIVE DETECTIONS OF PCE, TCE, cis-1,2-DCE, TPH AS DIESEL, TPH AS C19-C40, AND TVPH ARE PRESENTED ON THIS FIGURE.
2. DISCREET SAMPLE INTERVAL SUBMITTED FOR LABORATORY ANALYSIS FROM EACH FOUR-FOOT SECTION IS SHADED.

25' 0' 25' 50'
HORIZONTAL SCALE IN FEET

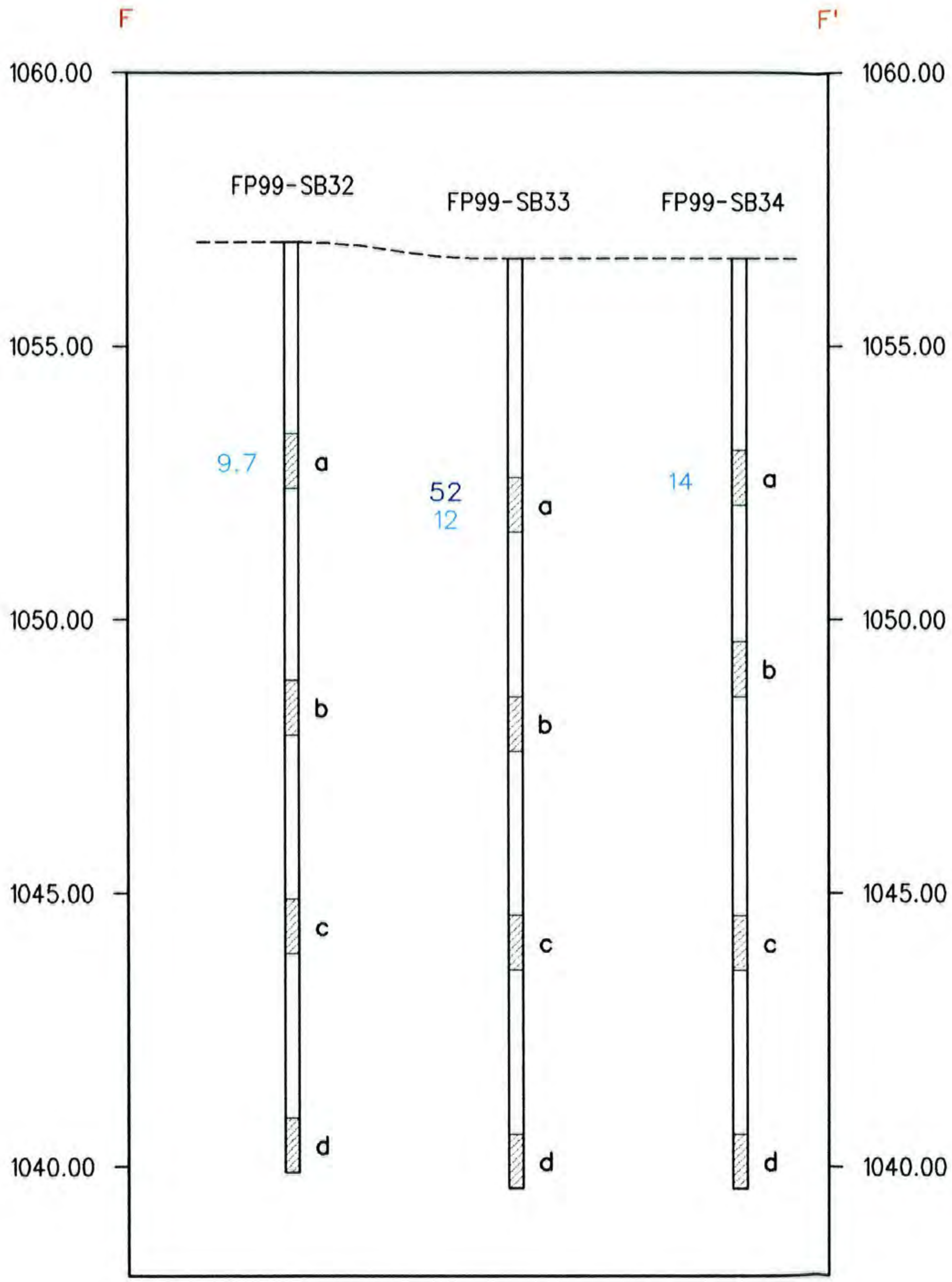
2.5' 0' 2.5' 5'
VERTICAL SCALE IN FEET

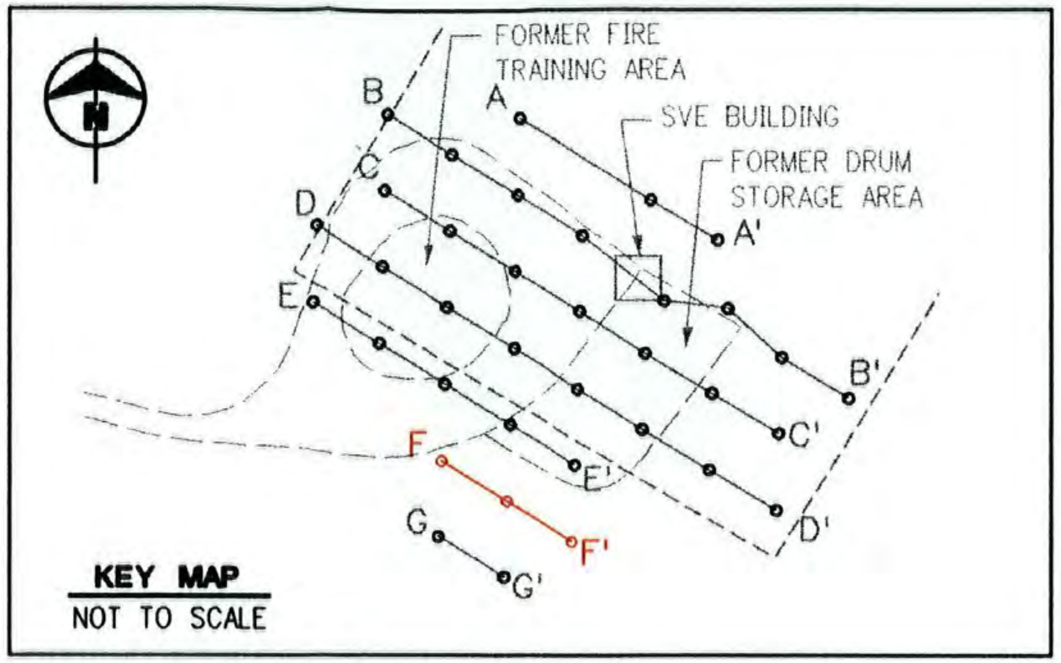
Burns & McDonnell SINCE 1898

Figure 4-28

RI SOIL SAMPLING JUNE 1999 CONTAMINANT CONCENTRATIONS CROSS SECTION E - E'

FFTA-MAAF RI



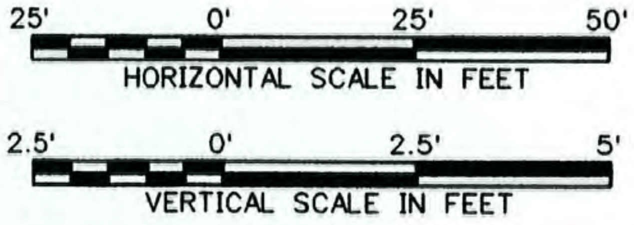


LEGEND:

- TETRACHLOROETHENE (ug/kg)
- TRICHLOROETHENE (ug/kg)
- cis-1,2-DICHLOROETHENE (ug/kg)
- TPH AS DIESEL (mg/kg)
- TPH AS C19-C40 (mg/kg)
- TVPH (ug/kg)

NOTES:

1. ONLY POSITIVE DETECTIONS OF PCE, TCE, cis-1,2-DCE, TPH AS DIESEL, TPH AS C19-C40, AND TVPH ARE PRESENTED ON THIS FIGURE.
2. DISCREET SAMPLE INTERVAL SUBMITTED FOR LABORATORY ANALYSIS FROM EACH FOUR-FOOT SECTION IS SHADED.



Burns & McDonnell
SINCE 1898

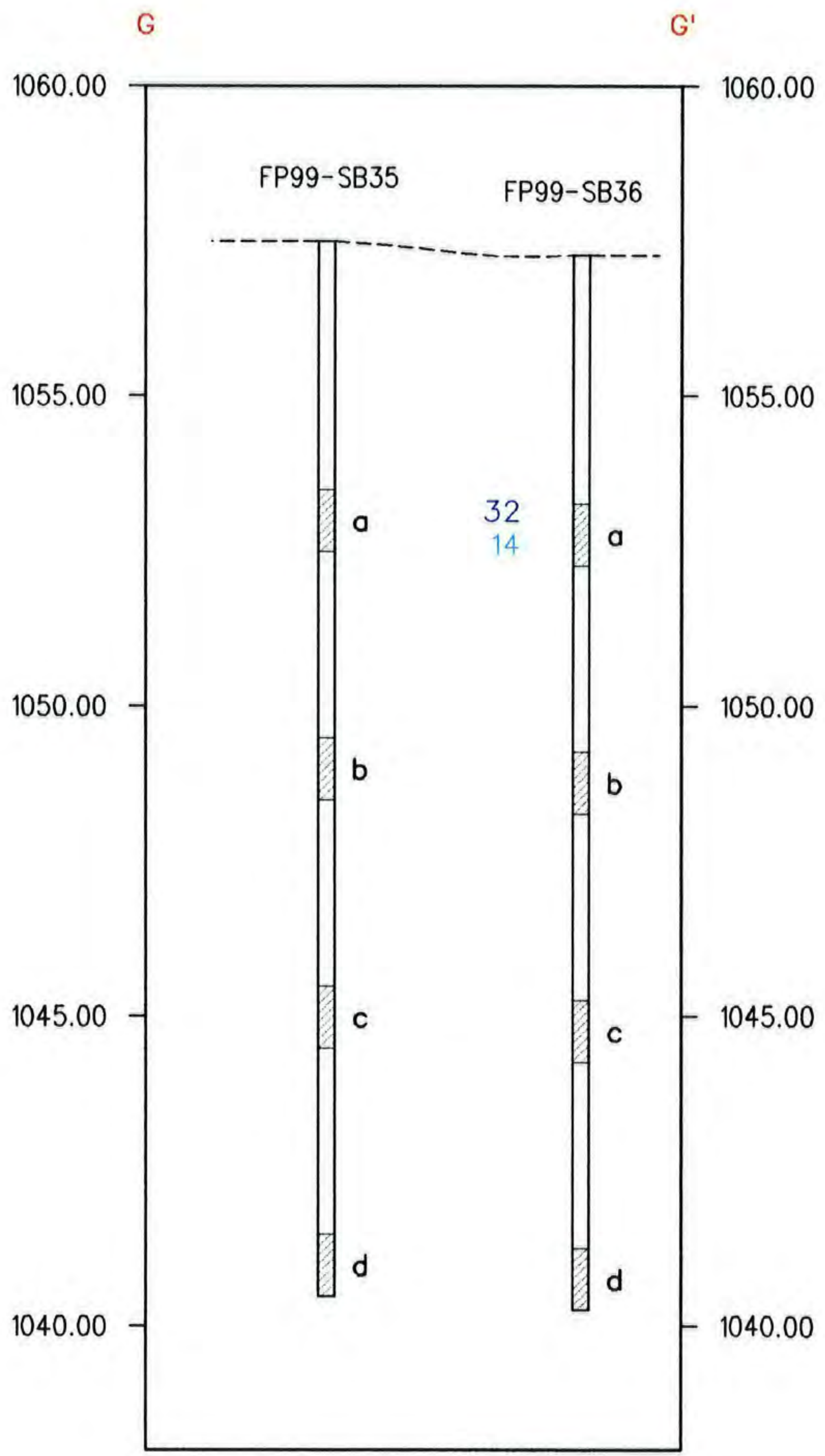
Figure 4-29

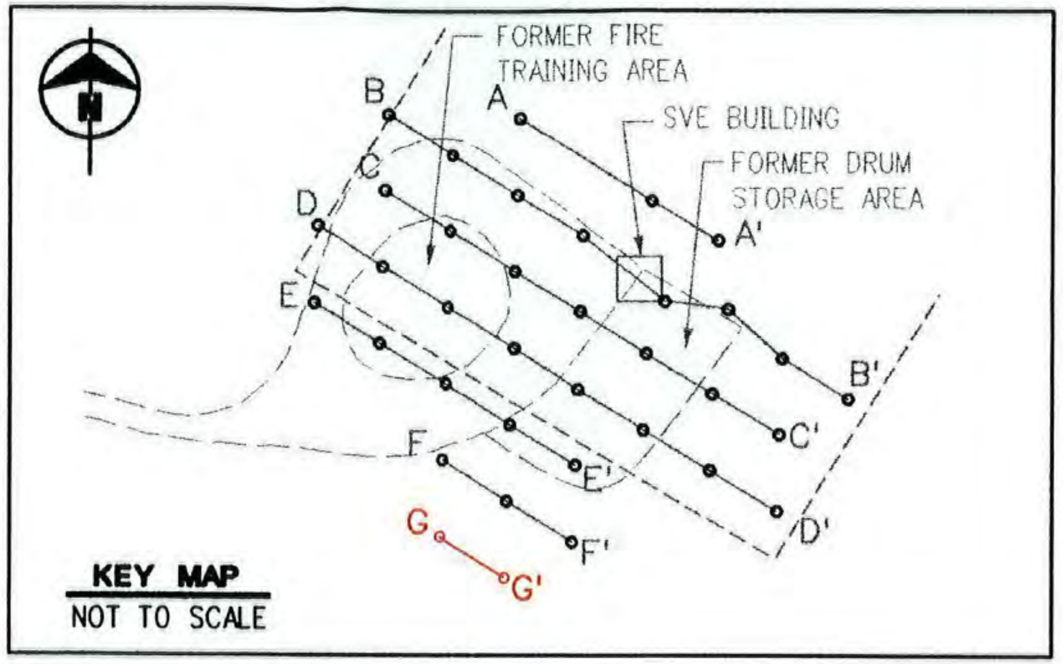
RI SOIL SAMPLING JUNE 1999
CONTAMINANT CONCENTRATIONS
CROSS SECTION F - F'

FFTA-MAAF RI

K:\USFRR\USTN\TEM\RI_repor

RIXSECFF.DGN/ 9-29-2000 13:07/TFG





LEGEND:

- TETRACHLOROETHENE (ug/kg)
- TRICHLOROETHENE (ug/kg)
- cis-1,2-DICHLOROETHENE (ug/kg)
- TPH AS DIESEL (mg/kg)
- TPH AS C19-C40 (mg/kg)
- TVPH (ug/kg)

NOTES:

1. ONLY POSITIVE DETECTIONS OF PCE, TCE, cis-1,2-DCE, TPH AS DIESEL, TPH AS C19-C40, AND TVPH ARE PRESENTED ON THIS FIGURE.
2. DISCREET SAMPLE INTERVAL SUBMITTED FOR LABORATORY ANALYSIS FROM EACH FOUR-FOOT SECTION IS SHADED.

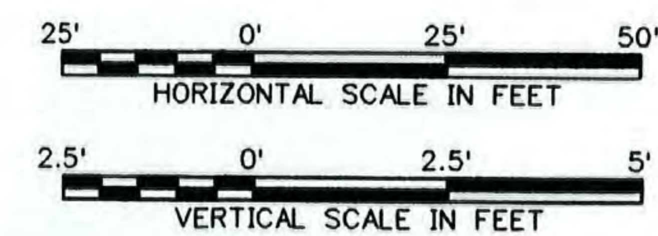


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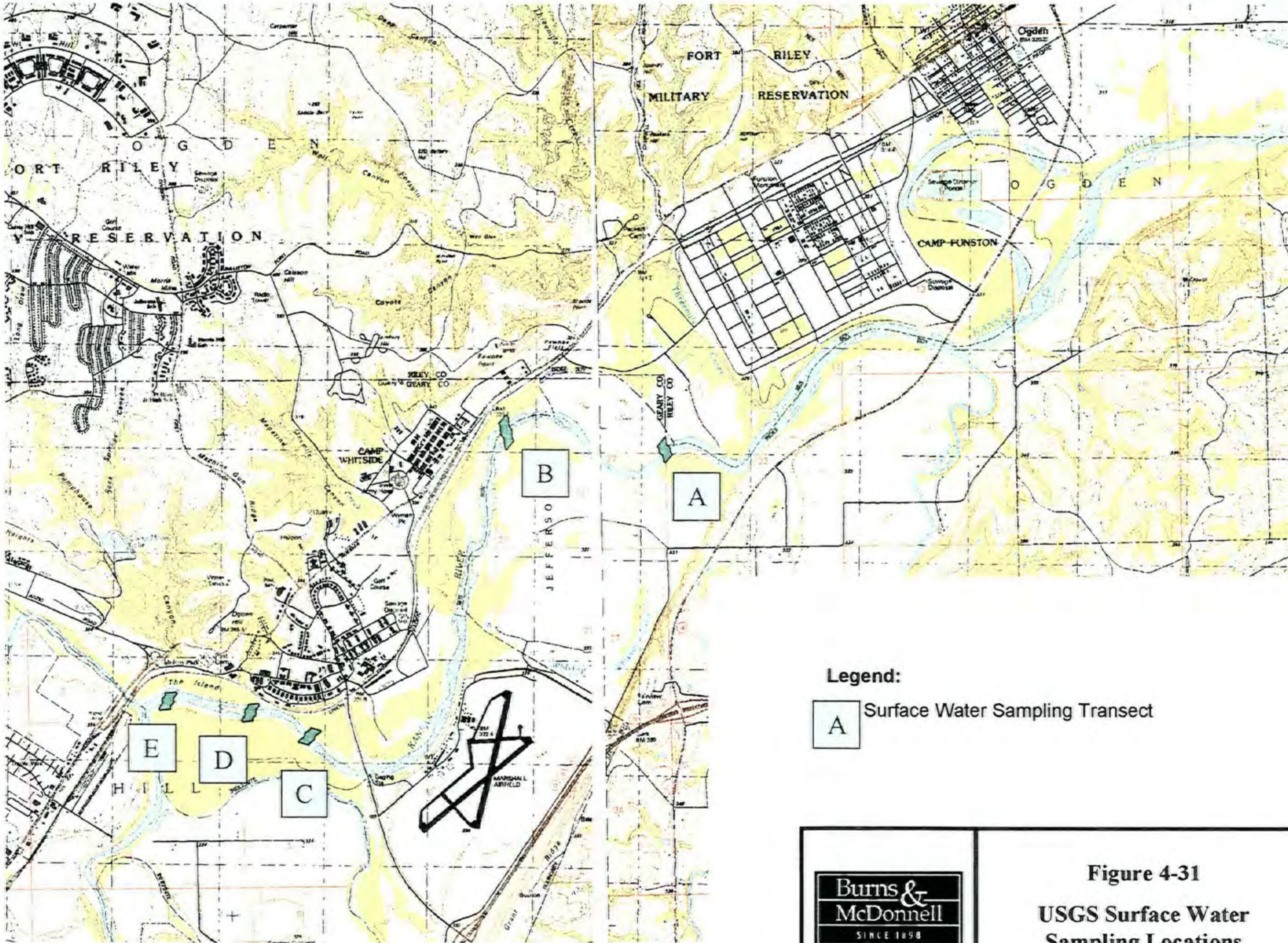
Figure 4-30

RI SOIL SAMPLING JUNE 1999
CONTAMINANT CONCENTRATIONS
CROSS SECTION G - G'

FFTA-MAAF RI



Legend:

A	Surface Water Sampling Transect

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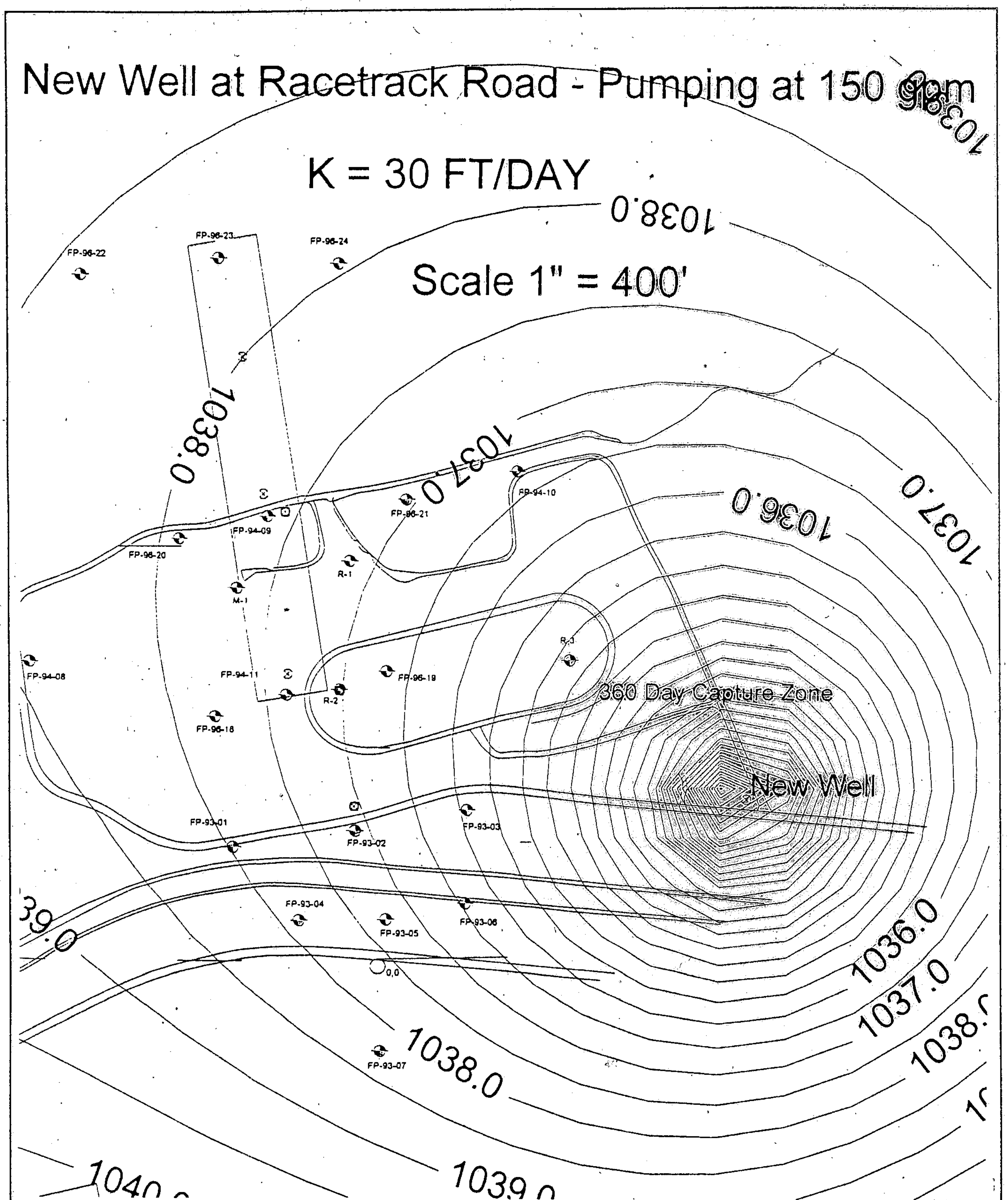
Figure 4-31

USGS Surface Water Sampling Locations

FFTA-MAAF RI



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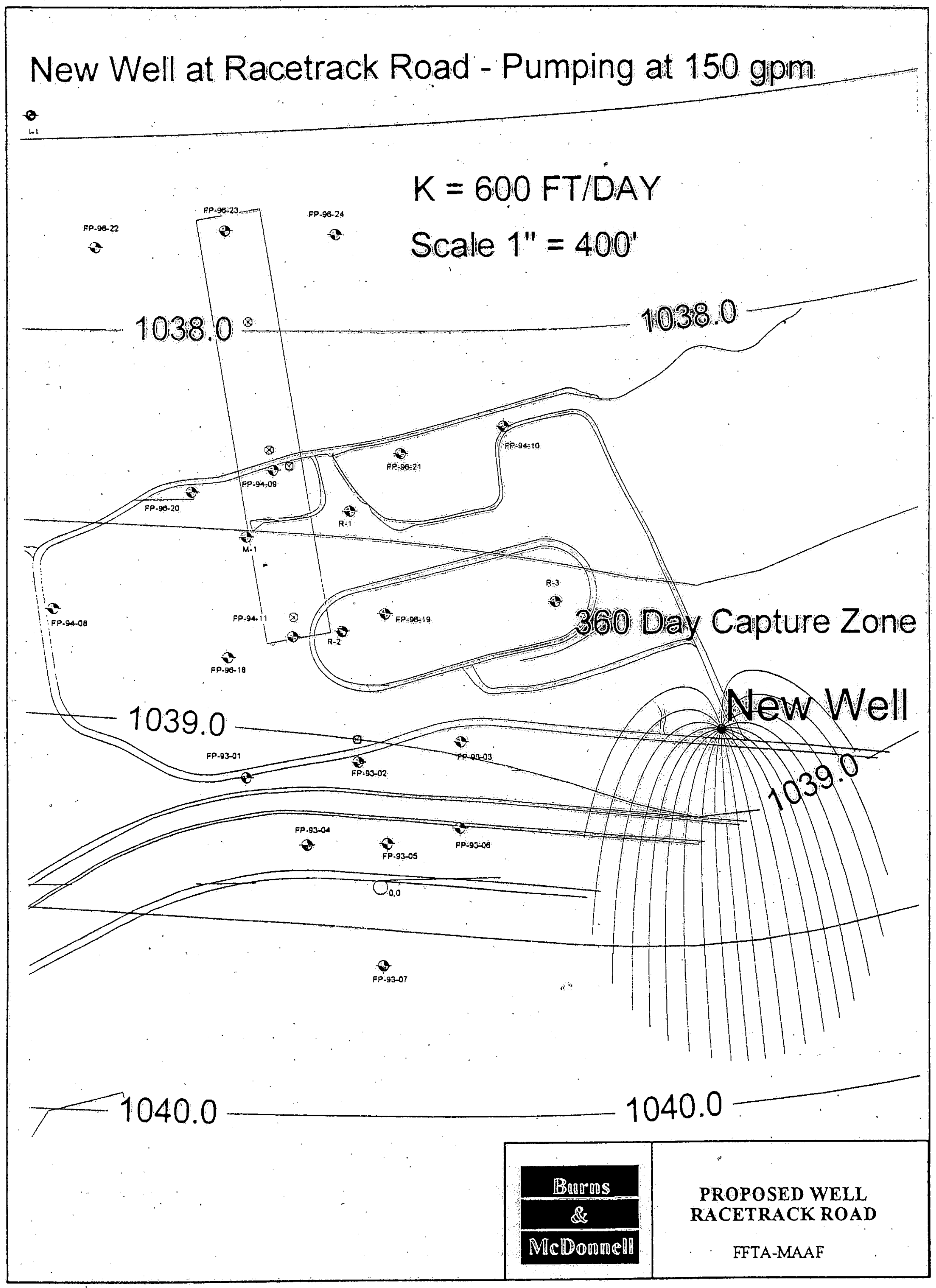
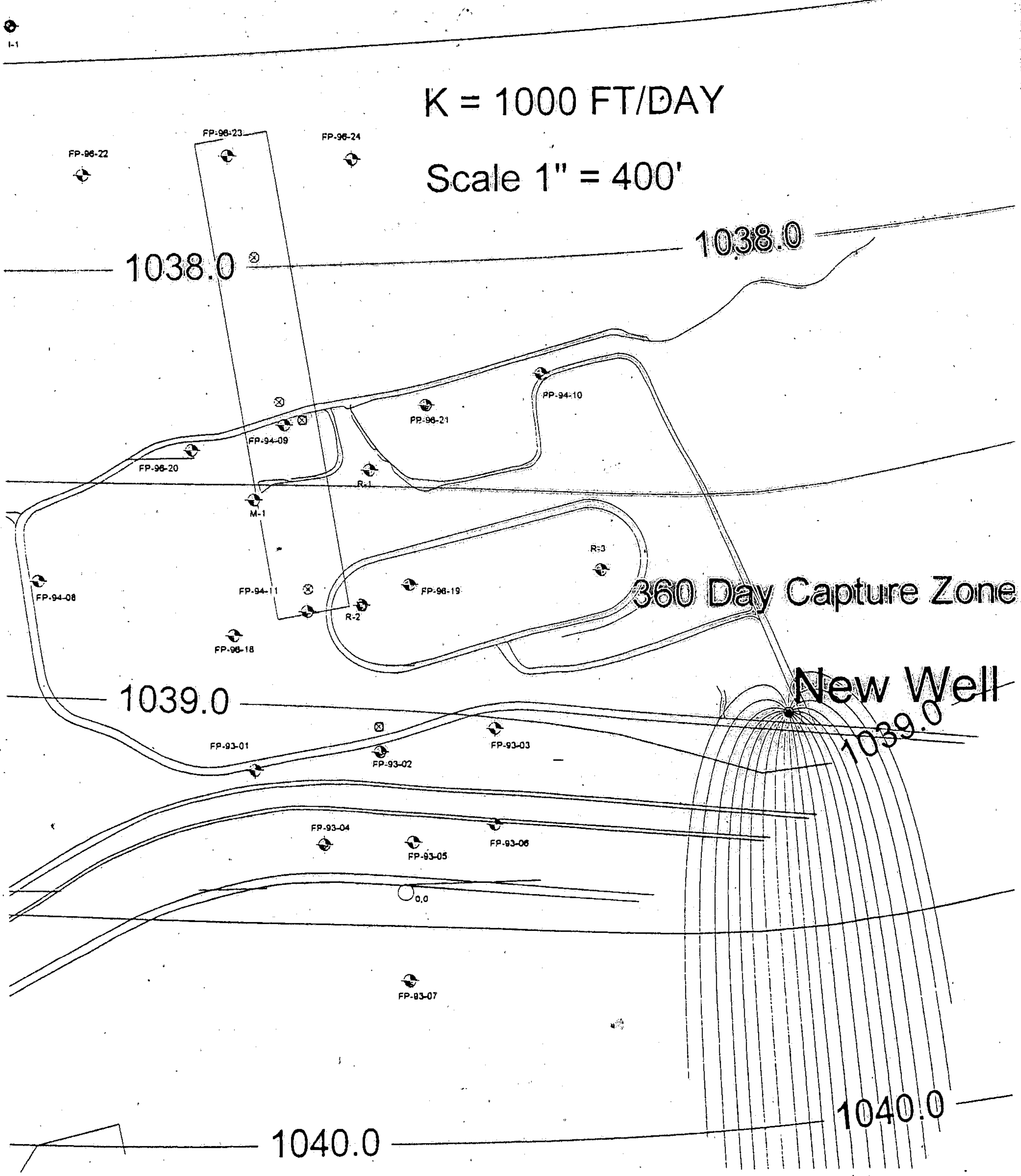
PROPOSED WELL
RACETRACK ROAD

FFTA-MAAF


New Well at Racetrack Road - Pumping at 150 gpm
K = 600 FT/DAY
Scale 1" = 400'
1038.0
1038.0
FP-96-22
FP-96-23
FP-96-24
FP-94-10
FP-96-21
FP-94-09
FP-96-20
R-1
M-1
R-3
FP-94-08
FP-94-11
FP-96-19
R-2
FP-96-18
360 Day Capture Zone
New Well
1039.0
1039.0
FP-93-01
FP-93-02
FP-93-03
FP-93-04
FP-93-05
FP-93-06
0,0
FP-93-07
1040.0
1040.0
Burns & McDonnell
PROPOSED WELL
RACETRACK ROAD
FFTA-MAAF

New Well at Racetrack Road - Pumping at 150 gpm



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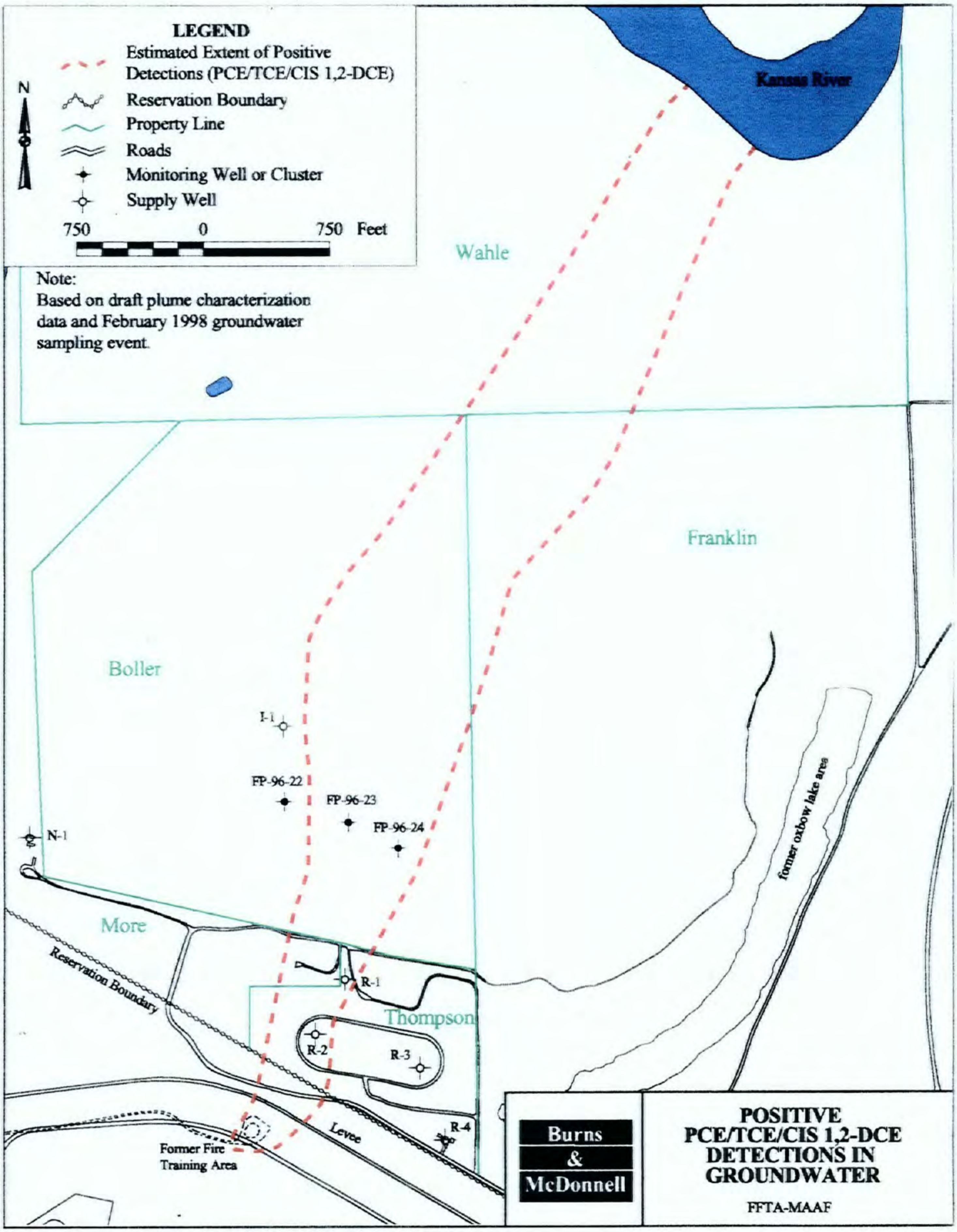
PROPOSED WELL
RACETRACK ROAD

FFTA-MAAF


LEGEND
Estimated Extent of Positive Detections (PCE/TCE/CIS 1,2-DCE)
Reservation Boundary
Property Line
Roads
Monitoring Well or Cluster
Supply Well
750 0 750 Feet
N
Note:
Based on draft plume characterization data and February 1998 groundwater sampling event.
Kansas River
Wahle
Franklin
Boller
I-1
FP-96-22
FP-96-23
FP-96-24
N-1
More
Reservation Boundary
R-1
Thompson
R-2
R-3
R-4
Levee
former oxbow lake area
Former Fire Training Area
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POSITIVE PCE/TCE/CIS 1,2-DCE DETECTIONS IN GROUNDWATER
FFTA-MAAF