No Further Response Action Planned (NFRAP) Decision Document
Fuel Purge Area (WP 36)

I. SUMMARY OF SITE CONDITIONS

SITE BACKGROUND

Tinker AFB is located in central Oklahoma, in the southeast portion of Oklahoma City (Figure 1). The Base is bounded by Sooner Road to the west, Douglas Boulevard to the east, Interstate 40 to the north, and Southeast 74th Street to the south. Fuel Purge Area (Figure 2) is located in the southeastern portion of the Base. The site is located approximately .5 miles west of the intersection of Douglas Boulevard and 59th Street, 400 feet from Building 2121. This site was initially called the Waste Fuel Dump Site (WFDS) and later was called Fuel Purge Area (FPA). The original Waste Fuel Dump Site (or Fuel Purge Area), seen in Figure 3, was in operation from 1975 to 1990. Waste fuels (JP-4 and JP-5) were drained from aircraft in the maintenance facility and transported by truck to the FPA for disposal. During this period, numerous spills allegedly occurred. The original WFDS consisted of a six feet by eight feet by two feet deep metal bunker elevated 1.5 feet above the surface on metal posts, located on bare soil at the west edge of a 60 by 80 feet asphalt pad (Figure 4). The metal bunker was equipped with a steel ramp to accommodate trucks, which were connected to the bunker via hoses for dumping. The metal bunker was connected to two aboveground holding tanks by a steel pipeline, also resting on bare soil and approximately 310 feet south of the metal bunker. Fuel placed in the metal bunker would gravity drain to the holding tanks. About one-third of the connecting pipeline was buried. Operations were suspended temporarily in 1990 while the facility underwent modifications. The existing equipment was dismantled and the asphalt pad was removed. A concrete pad was then installed and a new bunker with spill-containment protection was installed on the east side of this pad. A new aboveground pipeline connecting the new bunker with the existing holding tanks was constructed approximately 50 feet east of the original pipeline (Figure 4). Beginning in1994, site investigations were carried out in association with Site 33. Site 33 consisted of the purge area, a 310 foot above and below ground pipeline that drained purged fuel from the fuel purge into holding tanks located to the south, and three underground storage tanks (USTs) located near Building 2111. Currently, the site is an active site used to load and off-load fuels for engine warm up and testing. The fuel supplies are JP-8 and JP-5 that are stored in underground storage tanks (USTs) 2114 and 2115, respectively, and dispensed at two hydrants in the northwest portion of the site. After testing or warm-up, the purged fuels are returned to the site, where they are off-loaded to underground storage tanks located in the central portion of the site. The fuels are recycled for other uses at Tinker AFB. Soil contamination at this site is thought to be due to various spills that occurred during fuel transfers from 1975 to 1990.

SITE HYDROGEOLOGY

The central Oklahoma region is underlain by Pennsylvanian and Permian sedimentary rocks, which are overlain in places by Quaternary alluvium, sand channels, and terrace deposits. The bedrock formations dip to the west at approximately 30 to 40 feet per mile.

NO FURTHER RESPONSE ACTION PLANNED
(NFRAP)
DECISION DOCUMENT

FUEL PURGE AREA
AIR FORCE ID: WP 36
RCRA ID: NONE

TINKER AIR FORCE BASE, OKLAHOMA
August 2001

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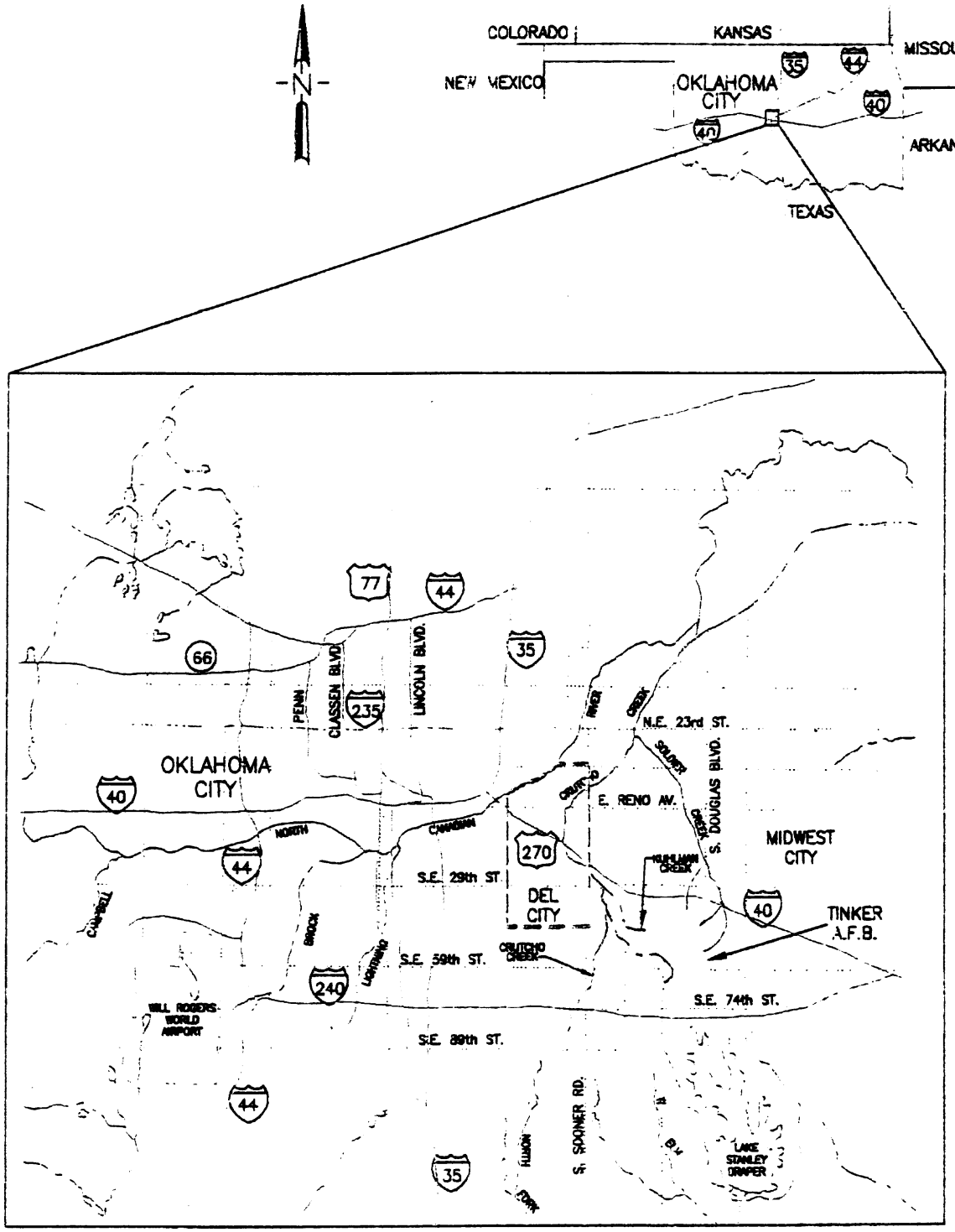
7701 Arnold St., Ste. 213A
Tinker Air Force Base, OK 73145

Prepared by:

Sara Sayler
OC-ALC/EMR
7701 Arnold Street
Tinker AFB, OK 73145

(405) 734-4580
DSN: 884-4580



LEGEND
HIGHWAY OR INTERSTATE
MAJOR ROAD
RIVER OR CREEK
MUNICIPAL BOUNDARIES
TINKER AFB

FIGURE 1

TINKER AIR FORCE BASE
LOCATION MAP

TINKER A.F.B., OKLAHOMA

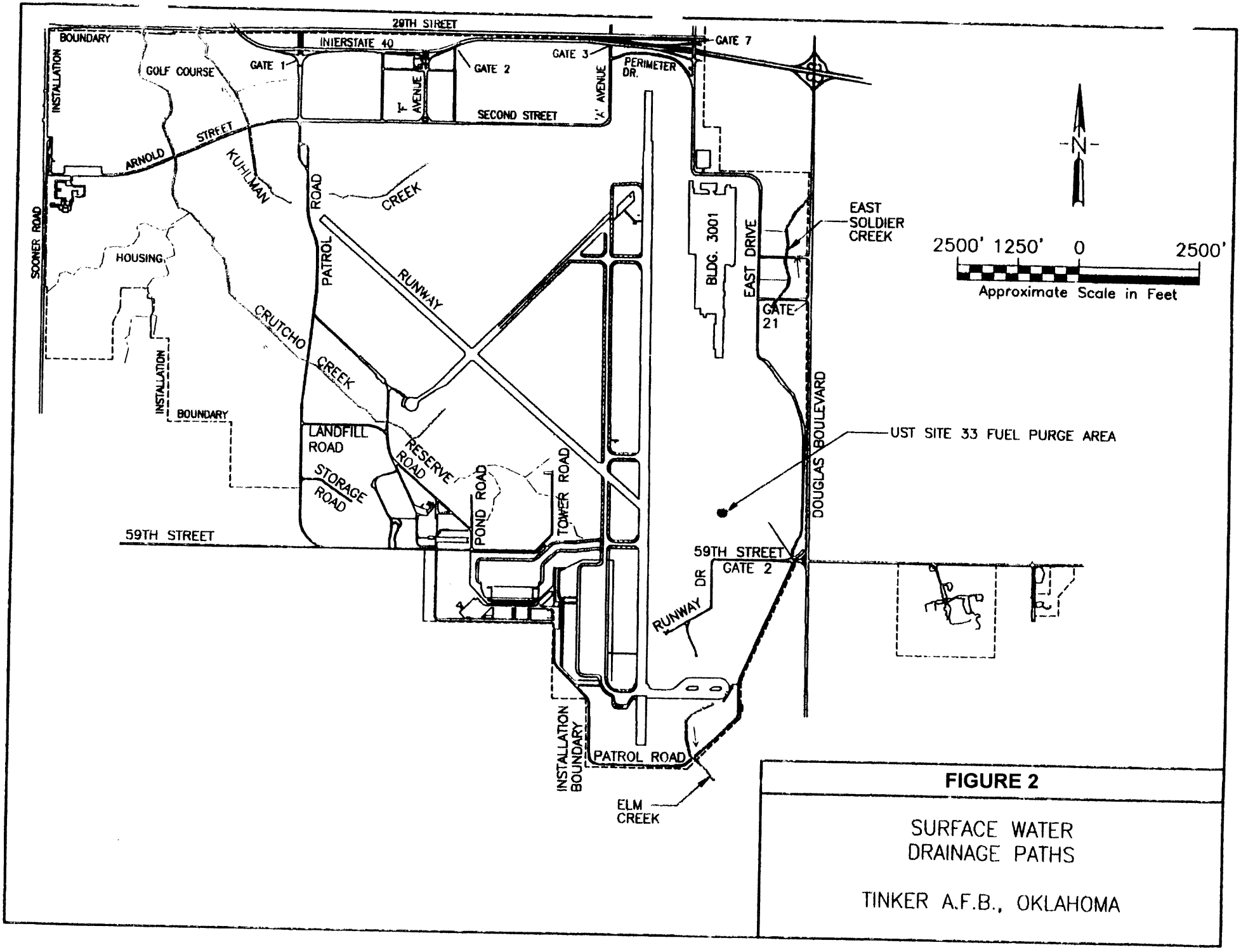


FIGURE 2

SURFACE WATER DRAINAGE PATHS

TINKER A.F.B., OKLAHOMA

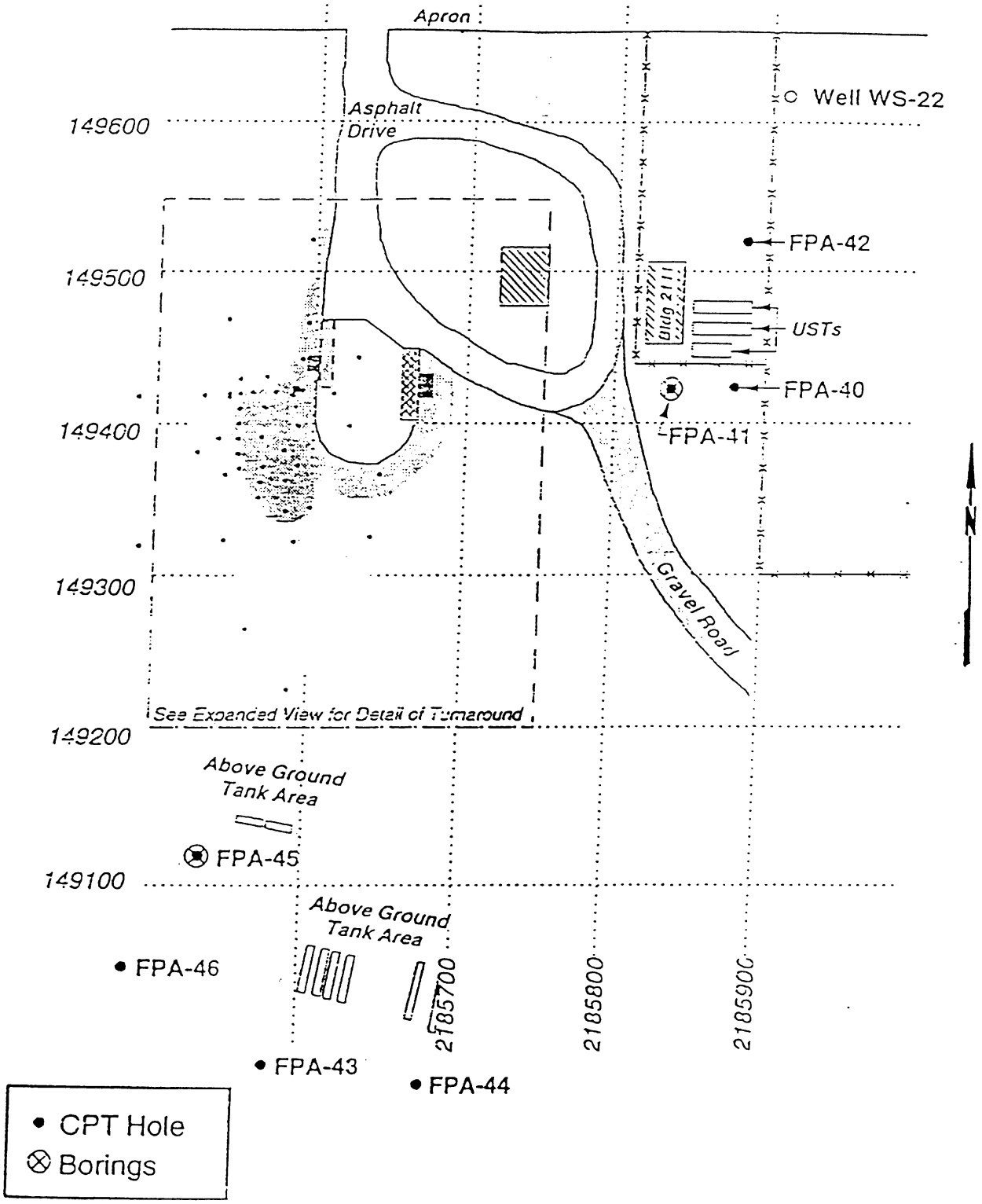


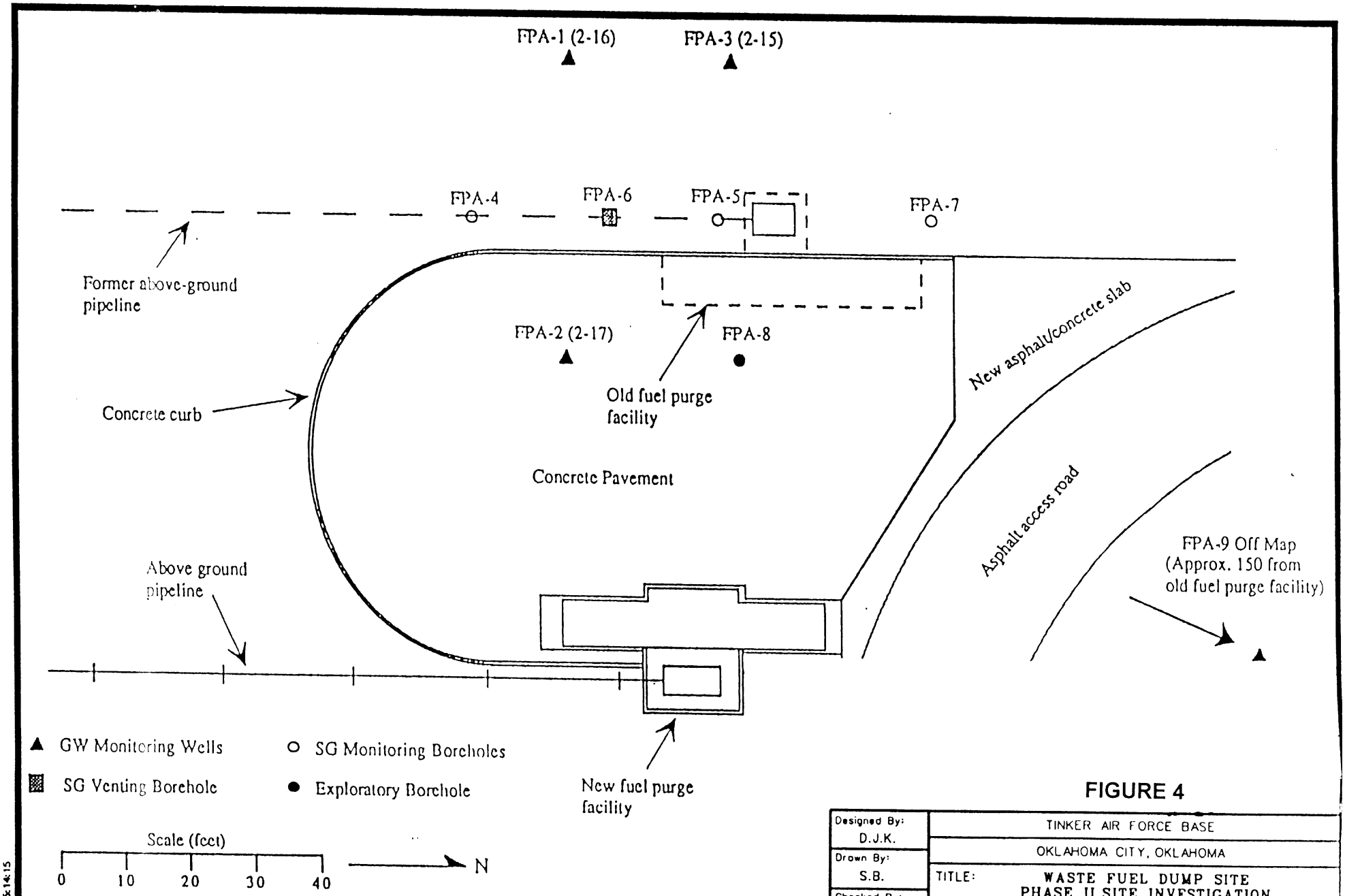
FIGURE 3

SOURCE: APPLIED RESEARCH ASSOCIATES, INC. FEB. 1993

Designed By: D.J.K.	TINKER AIR FORCE BASE
Drawn By: S.B.	OKLAHOMA CITY, OKLAHOMA
Checked By: C.J.	TITLE: WASTE FUEL DUMP SITE PHASE II SITE INVESTIGATION AFSCAPS CPT & BORING LOCATIONS
Submitted By:	PROJECT NUMBER F94509 / DATE 3/27/96

ACAD 12_c19 07/22/93 14:37:44

M.A.L. SC: 1=1



SOURCE: BATELLE ENVIRONMENTAL MANAGEMENT OPERATIONS, MARCH 1993

FIGURE 4

Designed By: D.J.K.	TINKER AIR FORCE BASE
Drawn By: S.B.	OKLAHOMA CITY, OKLAHOMA
Checked By: C.J.	TITLE: WASTE FUEL DUMP SITE PHASE II SITE INVESTIGATION BATTELLE SAMPLE LOCATIONS
Submitted By:	PROJECT NUMBER F94509 / DATE 3/27/96

ACAD 12_c1a 07/22/93 15:14:15

M.A.L. SC: 1=1

The formations generally strike slightly west of north. Older formations outcrop progressively farther east.

The bedrock geologic formations that are important to an evaluation of the fate of surficial or near-surface contaminant releases at Tinker AFB include, from youngest to oldest, the Hennessey Group, the Garber Sandstone, and the Wellington Formation. The Garber Sandstone and the Wellington Formation are the principal water-bearing units of the Central Oklahoma Aquifer. The Hennessey Group, Garber Sandstone, and Wellington Formation were deposited during the Permian Period. The units form a conformable sequence of sandstones, siltstones, and shales. The Hennessey Group also consists of reddish-brown shale and mudstone, with a few thin, lenticular beds of very fine-grained sandstone.

The Garber Sandstone and the Wellington Formation have similar lithologies. In central Oklahoma, these units consist of lenticular beds of fine-grained, cross-bedded sandstone interbedded with siltstone and mudstone. The sand is predominantly quartz. Both of these formations were deposited in a fluvial-deltaic environment at the margin of a broad Permian basin located to the west of Tinker AFB. Lithology of all of these units is highly variable, with individual lithologic beds pinching out abruptly by grading laterally into a different lithology, making time-stratigraphic correlation difficult.

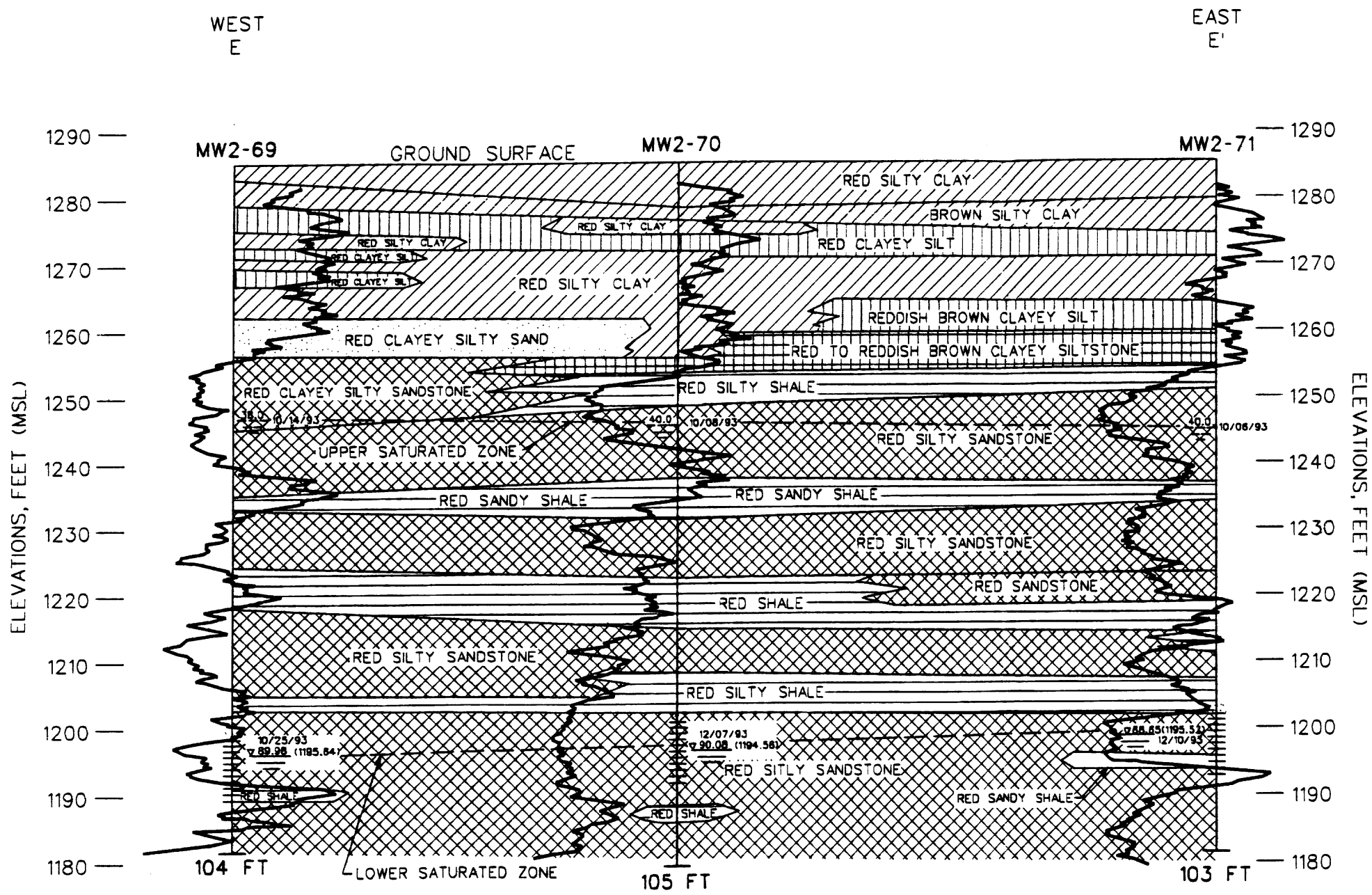
The uppermost aquifer beneath the site is the Upper Saturated Zone (USZ) (Figure 5). The USZ occurs at a depth of approximately 30 feet below ground surface (bgs) across the site. The USZ is separated from deeper zones by intervening confining shales; thus, contamination of deeper zone water supplies (deeper than 200 feet bgs) is not a likely threat. The USZ groundwater flow direction at this site is essentially west-southwest with a gradient of 0.007 ft/ft (Figure 6). Estimated hydrogeologic properties of the aquifer include: groundwater flow velocity is approximately 0.003 ft/day, water content varies from 0.1781 at a depth of 6-23.5 feet to 0.091 from a depth of 27.5 to 44 feet, porosity of 0.22 and hydraulic conductivity is 1.1866 ft/day.

ESTABLISHMENT OF CLEANUP LEVELS

The soils at Fuel Purge Area are regulated under the Oklahoma Corporation Commission (OCC) while the groundwater is regulated by the Oklahoma Department of Environmental Quality (ODEQ). The Oklahoma Risk Based Corrective Action (ORBCA) was used in order to determine site soil clean-up goals. Site 33 was determined to be an OCC Category II based on the soil samples. Regulatory limits for benzene, toluene, ethylbenzene and xylene (BTEX) in native soils are as follows: benzene=0.5 mg/kg, toluene=40.0 mg/kg, ethylbenzene=15.0 mg/kg and xylene=200.0 mg/kg. The maximum undifferentiated total petroleum hydrocarbon (TPH) concentration of approximately 22,000 mg/kg was detected at a depth of 1.5 feet in sample FPA-11 (near the former asphalt pad), and exceeded the Category II criteria of 500 mg/kg. The high TPH value represents the only constituent detected at Site 33 which exceeded the OCC cleanup levels for TPH in soils at a Category II site.

SITE INVESTIGATION ACTIVITIES AND RESULTS

In 1990, the original fuel purge area and the 310 feet of above and below ground piping were removed and replaced. Additional purge fuel holding tanks were also constructed at



HORIZONTAL & VERTICAL SCALE: 1 INCH = 20 FEET

LEGEND:

MW2-71 — BORING LOCATION AND DEPTH TO BOTTOM OF BORING
103 FT

INFERRED FACIES CHANGE WHERE CONTROL IS ABSENT

OBSERVED GROUNDWATER SATURATION AT TIME OF DRILLING

MONITORING WELL SCREEN AND SAND PACK

DEPTH TO GROUNDWATER FEET, BGS AND GROUNDWATER ELEVATION, FEET MEAN SEA LEVEL (MSL)

SAND

CLAY

SILT

SHALE

SANDSTONE

SILTSTONE

GAMMA RAY

NOTES:

1. LITHOLOGY BELOW 30 FEET BASED ON GAMMA RAY BOREHOLE LOG INTERPRETATION.
2. SEE DRAWING 3-2 FOR CROSS-SECTION LOCATIONS.

FIGURE 5

Designed By: D.J.K.	TINKER AIR FORCE BASE
Drawn By: T.R.F.	OKLAHOMA CITY, OKLAHOMA
Checked By: C.J.	TITLE: WASTE FUEL DUMP SITE PHASE II SITE INVESTIGATION GEOLOGICAL CROSS-SECTION E-E', DEEP STRATIGRAPHY
Submitted By:	PROJECT NUMBER F94509 — DATE MAY, 1996

MCS FILE: F94509C

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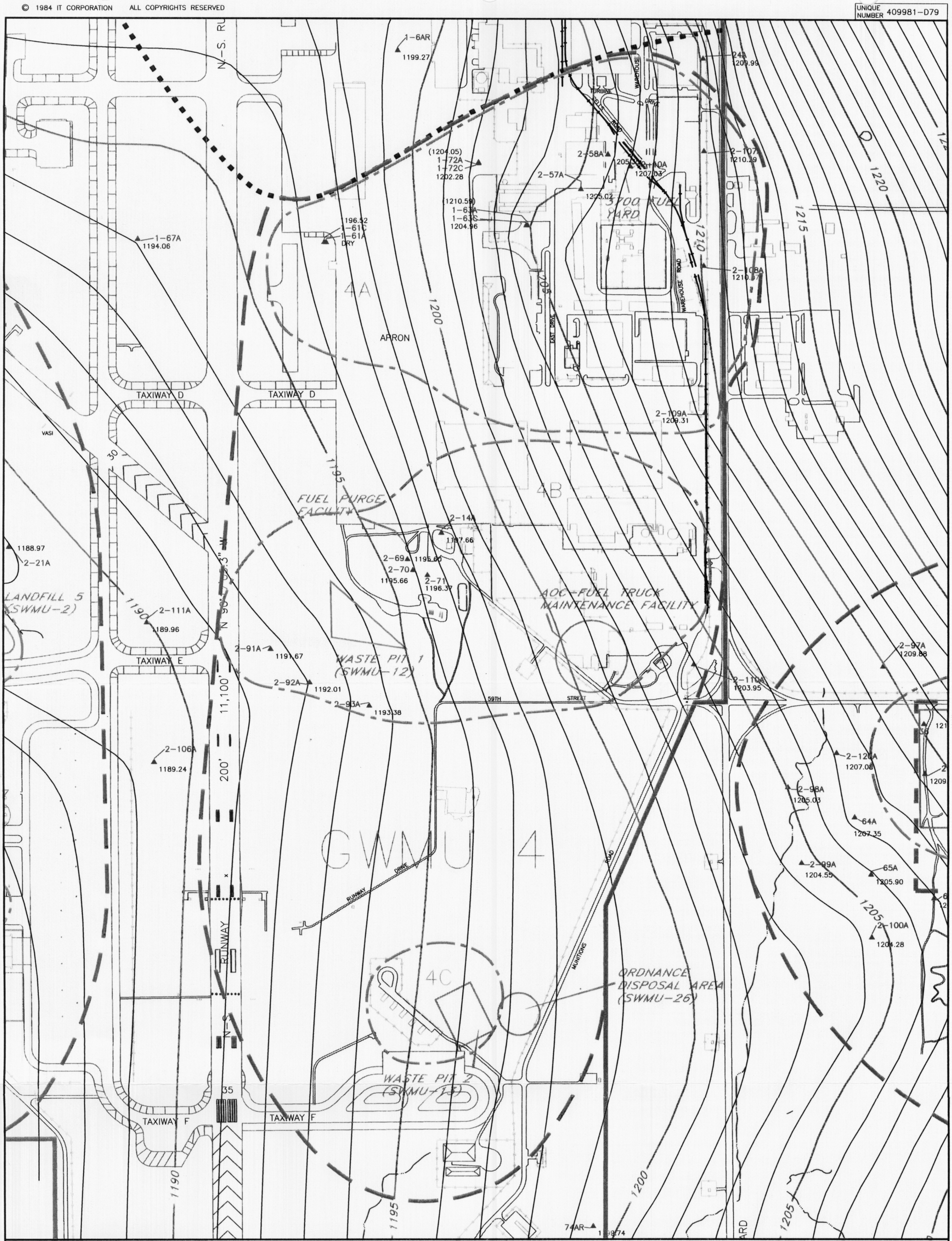
UNIQUE NUMBER 409981-D79



EXPLANATION

75A ▲	LOWER SATURATED ZONE MONITORING WELL LOCATION
TOR-1 ○	PUMPING WELL LOCATION
1189.96	GROUNDWATER ELEVATION
(1224.04)	GROUNDWATER ELEVATION NOT USED IN CONTOURING
———	1 FOOT CONTOUR (NGVD)
———	5 FOOT CONTOUR (NGVD)
LANDFILL 6 (SWMU-1)	SWMU/AOC DESIGNATION
▭	SWMU/AOC BOUNDARY
▪▪▪▪	NORTHEASTERN LIMIT OF RCRA GROUNDWATER INVESTIGATION
———	TINKER AIR FORCE BASE PROPERTY LINE
- - -	TINKER AIR FORCE BASE LEASED PROPERTY LINE
GWMU 4	APPROXIMATE BOUNDARY OF GROUNDWATER MANAGEMENT UNIT LOCATION AND UNIT IDENTIFICATION NUMBER
4A	LOCATION BOUNDARY AND IDENTIFICATION NUMBER

N

0 300 600
FEET

DRAWN BY:	RPS
START DATE:	1/29/96
REVISED BY:	RPS
LAST REV:	4/11/96
INITIATOR:	M. WILSON 1/29/96
DRAFT. CHK.:	RPS 4/11/96

GROUNDWATER MANAGEMENT UNIT 4
LOWER SATURATED ZONE
POTENTIOMETRIC SURFACE MAP – JULY 1995
BASEWIDE NON-NPL GROUNDWATER PHASE II RFI

PREPARED FOR

TINKER AIR FORCE BASE

PROJ. NO. 409981

FIGURE 6

this time. During this removal action, suspected hydrocarbon contamination was investigated. Sixteen soil borings were drilled around the area. Contaminant levels reached a maximum of 11,100 mg/kg of Total Petroleum Hydrocarbons (TPH), 39 mg/kg of benzene, 80 mg/kg of toluene, and 43 mg/kg ethylbenzene. No elevated xylene concentrations were detected at this time. In 1991, approximately 352 cubic yards (an area of approximately 22 X 36 X 12 feet in depth) of contaminated soil was removed from the old bunker area. The extent of the soil removal was based on results from previous soil sampling. Soil samples were collected from the bottom of the excavation. No sample results exceeded OCC Category I guidelines for BTEX and TPH.

During September of 1992, a Laser Induced Fluorescence-Cone Penetrometer Test (LIF-CPT) was used to investigate the site. During this investigation, 55 CPT profiles were completed and six soil borings were drilled. Fifteen soil samples were collected from both the soil borings and the CPT probe locations. Results of the CPT samples indicated elevated TPH levels (ranging from 12 to 22,000 mg/kg). The highest TPH concentration was found in FPA-11 at a depth of 1.5 to 2.1 feet below ground surface. Elevated benzene (the regulatory driver for the BTEX constituents) concentrations were detected in six of the samples. These concentrations ranged from 6.6 to 20.7 mg/kg at depths ranging from 0.75 to 4 feet below ground surface. Low levels of naphthalene, phenol and trichloroethene were also found in the soils but at levels below regulatory limits.

In December 1992, soil and groundwater samples were collected from nine soil borings and one groundwater monitor well. Results of these samples include below regulatory levels of BTEX and were all detected at depths of less than 20 feet. Three soil borings showed TPH levels above regulatory limits with a maximum concentration of 1581 mg/kg.

A Phase I RFI was performed in 1993. At this time, soil and groundwater samples were collected from 36 soil borings and four monitor wells. No benzene was detected in any of the borings and TPH levels were below regulatory limits. Other VOCs detected include 1,2-DCE, 2-butanone, acetone, carbon disulfide, chloroform and PCE. The Phase I recommended additional soil and groundwater sampling.

From 1994 through 1996, several additional soil borings and monitor wells were installed in order to complete both the OCC required Initial Site Characterization (ISC) and the Investigation for Soil and Groundwater Cleanup (ISGC). None of the soils sampled exhibited BTEX or TPH concentrations at elevated levels. In 1997 an Oklahoma Risk Based Corrective Action (ORBCA) Tier 1/1-A Summary Report was prepared. Based upon the results of this risk assessment, closure of the vadose zone soils was recommended in accordance with the requirements of Tier 1/1-A. In 1998, an in situ respiration test was conducted to determine whether the rate at which soil bacteria were degrading petroleum hydrocarbons in contaminated soils changed over time. The results indicated that the data were inconclusive with regard to significant benzene or VOC reductions during the one-year treatment period, although it appeared that the VOC levels in most intervals were decreasing. More data were needed to make definitive conclusions. It was recommended that the treatment system operation be continued in accordance with the remedial action plan (RAP) and that air injection be continued for an additional year. In 1999, the site was closed in accordance with OCC requirements (Figure 7).

BOB ANTHONY
Commissioner

ED APPLE
Commissioner

DENISE A. BODE
Commissioner

OKLAHOMA CORPORATION COMMISSION
PETROLEUM STORAGE TANK DIVISION
(405) 521-4683 FAX: (405) 521-4945

JIM THORPE BLDG, ROOM 238 • P.O. BOX 52000-2000 • OKLAHOMA CITY, OKLAHOMA 73152-2000

FIGURE 7

October 13, 1999

Case ID #064-1105
Facility ID #55-08120

CERTIFIED MAIL, RETURN RECEIPT REQUESTED
CERTIFICATE NUMBER Z 228 414 392

OC-ALC/EMR
Attn: Ms. Cathy Scheirman, Chief
7701 2nd Street, Suite 204
Tinker AFB, OK 73145-9100

RE: Final Closure for site located at:

Fuel Purge Area
Bldg. 2111 Area
Tinker AFB, OK

Dear Ms. Scheirman:

Based upon the review of the Oklahoma Risk-Based Corrective Action Report, this case is closed. If in the future, levels of Chemicals of Concern are discovered to exceed those determined appropriate for this site, the case will be reopened. A copy of this letter is being sent to your consultant.

If you have any questions, please discuss them with your consultant or call Joseph Lopez at (405) 522-1446 between 8:00 a.m. and 4:30 p.m. Monday through Friday. Please reference the appropriate OCC Facility Number and Case Number on all correspondence.

Sincerely,

Neil R. Garrett

Neil R. Garrett
Project Environmental Analyst Supervisor

cc: Parsons Engineering Science
Attn: Mr. John Osweiler
5600 Liberty Parkway, Suite 700-C
Midwest City, OK 73110

NG/JEL:la

NOTE: The applicable Corporation Commission rule is found in the Oklahoma Administrative Code at 165:25-3-79. If you need a copy, please call us and we will send you one.

Figure 6 shows the various soil sample locations for this site while Table 1 illustrates the BTEX and naphthalene results for the various soil samples collected for analysis during the various investigations of the site. Table 2 lists a brief chronology of the various rounds of site investigation activities.

II. DEMONSTRATION OF QUALITY ASSURANCE/QUALITY CONTROL

Field data were collected in accordance with the technical approach outlined in the work plan. This approach included standard operating procedures, methods, and protocols for collecting project data. Overall quality indicators from every aspect of the data collection have been reviewed, and an assessment of the data with regard to the project specific objectives is presented. The reliability of the sampling and analytical procedures used during the investigation was assured by implementing the project-specific quality assurance procedures specified in the work plans for the Phase I RCRA Facility Investigation of Waste Fuel Dump Site. Successful execution of these procedures ensures that data will be accepted as being representative of the area under investigation.

A sample collection log, a chain-of-custody record/laboratory request for analysis form and a sample label were completed in the field. The chain-of -custody record/laboratory request for analysis form accompanied the samples to the laboratory. Tools and equipment were also decontaminated using steam cleaning and/or laboratory grade detergent.

Quality control (QC) samples were collected in order to verify the sampling procedures and quality of groundwater samples. Quality control samples included field blanks, trip blanks, equipment blanks, sample duplicates and matrix spike analyses.

III. SOIL BORING SAMPLE RESULTS

Based on analytical data collected from 90 soil borings drilled between 1992 and 1996, the maximum levels of the chemicals of concern (COCs) were benzene (0.017 mg/kg), toluene (0.18 mg/kg), ethylbenzene (2.3 mg/kg), xylenes (4.4 mg/kg) and naphthalene (3.8 mg/kg). Table 1 details the analytical results for the benzene, toluene, ethylbenzene, xylene and naphthalene compounds detected in the soil samples collected for analysis during the various investigations of the site. Maximum levels for various total petroleum hydrocarbon ranges were as follows: TPH/gasoline range organics (1,400 mg/kg) at 1.0 to 1.5 feet below ground surface near UST 2117; TPH/diesel range organics (4,110 mg/kg) near the former asphalt pad at a depth of 1 to 2 feet below ground surface; TPH C9-C16 (1,070 mg/kg) at a depth of 11 to 11.5 feet below ground surface near UST 2117; and TPH C10-C18 (2,490 mg/kg) near the hydrant stand at a depth of 2 to 3 feet below ground surface. The highest undifferentiated TPH value was 22,000 mg/kg at a depth of 1.5 feet near the former asphalt pad. The deepest occurrence of COCs was toluene at 0.005 mg/kg and was detected at a depth of 45 feet below ground surface in the saturated zone near UST 2117. Figure 8 illustrates the locations of the soil borings at the Fuel Purge Area.

TABLE 1

Analytical Data Summary for Soil

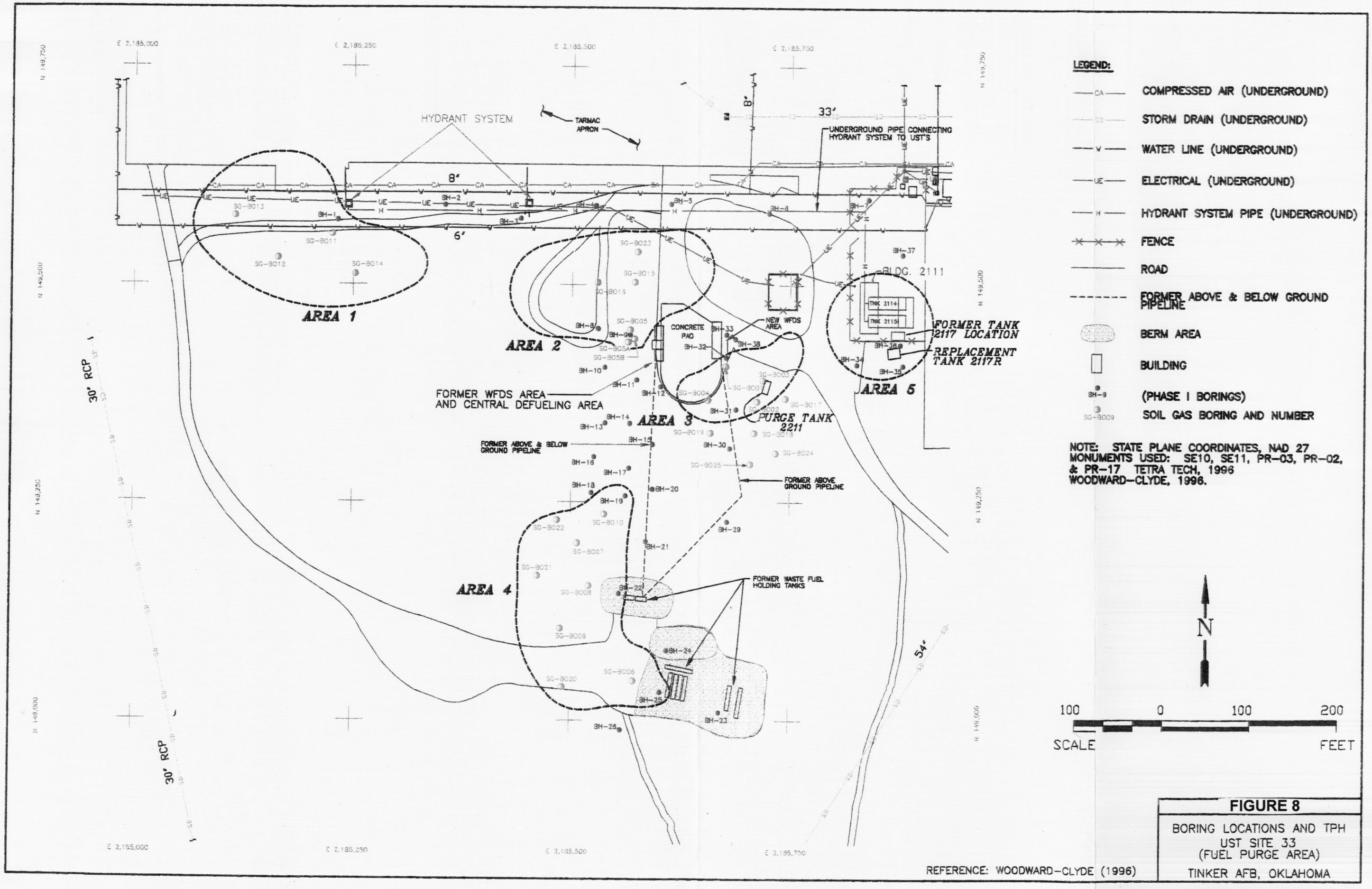
MW No./Sample Location	Sampling Date	Sample Depth [ft.]	Benzene [mg/kg]	Toluene [mg/kg]	Ethylbenzene [mg/kg]	Xylene [mg/kg]	Naphthalene [mg/kg]
BO19-SS-001	1/1/1996	3.0-4.0	<0.006	0.0013	<0.006	<0.006	< 0.41
BO20-SS-001	1/1/1996	4.0-5.0	<0.006	0.0016	<0.006	<0.006	<0.39
BO21-SS-001	1/1/1996	2.0-3.0	<0.01	0.0014	<0.01	<0.01	<0.4
BO21-SS-003	1/1/1996	12.0-13.0	<0.006	0.0018	<0.006	<0.006	<0.37
BO23-SS-001	1/1/1996	3.0-4.0	<0.006	0.0014	<0.006	<0.006	NA
BO23-SS-002	1/1/1996	6.0-8.0	<0.006	0.0054	<0.006	<0.006	NA
BO24-SS-002	1/1/1996	7.0-8.0	<0.02	0.0037	<0.02	<0.02	<0.41
BO26-SS-005	1/1/1996	24.0-25.0	<0.005	0.005	<0.005	<0.006	NA
BO27-SS-004	1/1/1996	17.0-18.0	<0.006	<0.006	<0.006	0.0012	<0.38
BO27-SS-005	1/1/1996	24.0-25.0	<0.006	0.0012	<0.006	<0.006	<0.38
BO28-SS-001	1/1/1996	4.0-5.0	<0.006	0.0028	<0.006	<0.006	<0.41
BO29-SS-001	1/1/1996	3.0-4.0	<0.006	0.0022	<0.006	<0.006	NA
BO29-SS-002	1/1/1996	7.0-8.0	<0.006	0.0016	<0.006	<0.006	<0.39
BO29-SS-004	1/1/1996	15.0-16.0	<0.006	0.0013	<0.006	<0.006	NA
BO30-SS-001	1/1/1996	3.0-4.0	<0.006	0.004	<0.006	<0.006	NA
BW33-B5-12.5	9/1/1995	12.5-13.3	<0.001	0.0006	<0.001	<0.001	NA
BW33-B5-45.8	9/1/1995	45.8-46.5	<0.001	0.005	<0.001	<0.001	NA
BW33-B7-11.5	9/1/1995	11.5-12.0	<0.001	0.006	<0.001	<0.001	NA
BW33-B7-47	9/1/1995	47.0-47.5	<0.001	0.005	<0.001	<0.001	NA
BW33-B12A-2.5	9/1/1995	2.5-3.0	<0.125	<0.125	<0.125	0.263	NA
BW33-B12A-11	9/1/1995	11.0-11.5	<0.125	<0.125	<0.125	0.0898	NA
BW33-B13-1	9/1/1995	1.0-1.5	<0.125	<0.125	<0.125	1.87	NA
BO04-SS-002	12/1/1994	5.0-10.0	<0.006	0.0023	<0.006	<0.006	<0.4
BO07-SS-001	12/1/1994	0.0-5.0	<0.057	<0.057	0.027	0.081	1.6
BO07-SS-002	12/1/1994	5.0-10.0	<0.017	0.088	0.18	1	3.8
BO07-SS-003	12/1/1994	10.0-15.0	<0.006	0.18	1	3.8	<0.37
BO12-SS-002	12/1/1994	15.0-16.0	<5.6	<5.6	<5.6	4.4	<3.7
BO13-SS-002	12/1/1994	5.0-10.0	<0.006	0.0012	<0.006	<0.006	<0.39
BO18-SS-001	12/1/1994	0.0-5.0	<0.007	0.0015	<0.007	<0.007	<0.40

TABLE 1 (Continued)
Analytical Data Summary for Soil

MW No./Sample Location	Sampling Date	Sample Depth [ft.]	Benzene [mg/kg]	Toluene [mg/kg]	Ethylbenzene [mg/kg]	Xylene [mg/kg]	Naphthalene [mg/kg]
BH01-SS-001	1/1/1993	0.0-5.0	<0.006	<0.006	0.001	0.0052	NA
BH01-SS-002	1/1/1993	2.0-3.0	<0.006	<0.006	<0.006	0.019	NA
BH04-SS-002	1/1/1993	0.0-1.0	<0.006	0.0011	<0.006	<0.006	NA
BH09-SS-004	1/1/1993	13.0-14.0	0.017	<0.006	0.069	0.03	NA
BH09-SS-005	1/1/1993	10.0-15.0	<0.006	<0.006	0.014	0.063	NA
BH12-SS-001	1/1/1993	0.0-5.0	<0.064	<0.064	0.23	<0.064	NA
BH12-SS-002	1/1/1993	1.0-2.0	<0.064	<0.064	0.18	0.15	NA
BH37-SS-003	1/1/1993	5.0-10.0	<0.006	0.002	<0.006	<0.006	NA
FPA-B01-SS-1	9/23/1992	0.75-1.25	<0.005	0.098	0.11	0.25	<0.05
FPA-03-SS-2	9/11/1992	10-10.6	0.01	<0.005	0.12	<0.005	1.2
FPA-11-SS-3	9/15/1992	9-9.6	<0.005	<0.005	0.032	<0.005	<0.05
FPA-12-SS-2	9/15/1992	10-10.6	<0.005	<0.005	0.013	<0.005	<0.05
FPA-B31-SS-1	9/23/1992	2.5-3.5	<0.005	<0.005	1	2	<3.3
FPA-B31-SS-3	9/23/1992	8.0-9.0	<0.005	<0.005	0.3	1.2	2.6
FPA-B33-SS-3	9/23/1992	7.0-8.0	<0.005	<0.005	NA	NA	0.6
FPA-B41-SS-1	9/22/1992	4.0-5.0	<0.025	<0.025	<0.025	<0.025	2

TABLE 2
SITE ACTIVITY SUMMARY

Dates	Activity	Performed By
1975	Original WFDS in operation.	Tinker AFB
1990	Soil samples collected from sixteen soil borings to confirm suspected contamination.	Tinker EED
1991	Approximately 352 cubic yards of contaminated soil removed from the site.	Tinker AFB (1994)
September 1992	LIF-CPT investigation; 55 CPT profiles completed, and soil samples collected from ten borings.	ARA (1993)
December 1992	Soil and groundwater samples collected after advancement of nine borings and one groundwater/soil gas monitoring well.	Battelle (1992)
1993	Phase I RFI performed. Soil and groundwater samples collected after installation of 36 borings and four monitoring wells.	WCFS (1994)
January-February 1994	ISC activities at Site 33. Soil and groundwater samples collected from four borings.	Tetra Tech (1996b)
December 1994	Additional ISC activities performed. Soil gas surveys conducted in 26 locations, and soil samples collected from 18 borings.	WCFS (1996)
1995	ISGC performed in vicinity of tanks 2114, 2115 and 2117 (Site 33). Soil and groundwater samples collected from 14 borings.	Tetra Tech (1996b)
1996	Phase II RFI performed. Soil and groundwater samples collected from 12 borings.	WCFS (1996)
August 1996	OC-ALC/EMR petitioned OCC to consolidate all areas at the FPA into single regulatory unit.	Tinker AFB
May 1997	ORBCA submitted. FPF was one of four areas included in the ORBCA.	Parsons ES (1997b)
July-September 1997	RAP written. Plan detailed methodology, schedule and monitoring requirements for applying bioremediation activities. Initial test procedures and air permeability testing events completed	Parsons ES (1997d; 1998a)
1998	Bioremediation activities performed.	Parsons ES (1998a)
1999	Site closed in accordance with OCC requirements.	OCC



REFERENCE: WOODWARD-CLYDE (1996)

FIGURE 8

BORING LOCATIONS AND TPH
UST SITE 33
(FUEL PURGE AREA)

TINKER AFB, OKLAHOMA

IV. SUMMARY OF OPERATIONS AND MAINTENANCE

Monitoring and any necessary remediation of the groundwater under this site will be addressed as a part of the Southeast Groundwater Management Unit (CG039) at Tinker AFB.

V. PROTECTIVENESS

Because no contaminants remain in the soils at concentrations exceeding the OCC regulatory limits and because of regulatory approval for site closure based on soils, a No Further Remedial Action Planned decision is protective of human health and the environment.

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SIGNATURE PAGE

Vicki L Preacher

Vicki L. Preacher, Director
Environmental Management Directorate

9/5/01

Date