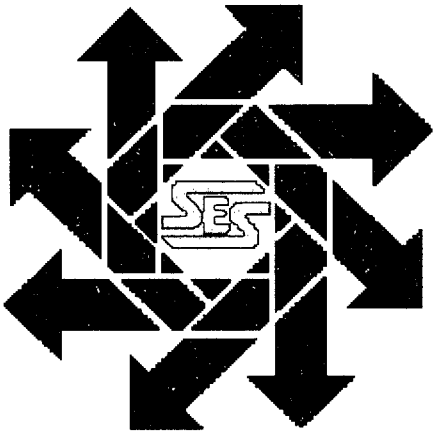
AP - 35

STAGE 1 & 2 REPORTS

DATE: 4/2/2004

Stage 1 Abatement Plan (AP-35)
Navajo Refining Company
Hobbs North GSA Unit 6-Inch Gathering Line
Lea County, New Mexico

April 2, 2004



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I. Introduction

By letter dated February 4, 2004, the New Mexico Oil Conservation Division is requiring Navajo Refining Company (Navajo) to submit a Stage 1 investigation proposal to complete the definition of the lateral and vertical extent of soil and groundwater contamination at the Hobbs 6-inch crude gathering line located in Unit A, Section 5, Township 19 South, Range 38 East, Lea County, in the City of Hobbs in Lea County. The plan is being required pursuant to OCD Rule 19.E.1 and OCD Rule 19.E.3. The Stage 1 abatement plan presented herein complies with the requirements of these rules and incorporates work already performed at the site since detection of the crude oil release.

II. Background

On Friday, January 5, 2001, oil was discovered leaking from a crude oil gathering line operated by Navajo Refining Company. The leak occurred on the Hobbs North GSA Unit 6-inch pipeline in the NE/4, NE/4, Section 5, T19S, R38E in Lea County, New Mexico. The location is within the City of Hobbs and several hundred feet northwest of the intersection of Rash and Humble streets in southwest Hobbs (Figure 1). The leak resulted in the release of an unknown quantity of crude oil to the ground and subsurface. The site is located on an unimproved lot in an area that is covered by stockpiled crushed asphalt. Figure 2 is a detailed location map of the area.

The leak was reported to the New Mexico Oil Conservation Division (OCD) District One office in Hobbs. Initial response at the time of the leak included excavation of the surface and subsurface material most impacted by the leak. Approximately 412 cubic yards of contaminated soil was removed and transported to Controlled Recovery Inc. (CRI), an NMOCD approved disposal facility, on January 9, 2001.

III. Investigation Status

Prior to presentation of the Abatement Plan later in this document, the soil and groundwater work performed to date will be briefly reviewed below.

Preliminary investigation of the extent of soil contamination leak was performed in January and February 2001. A series of soil borings were drilled and two monitor wells completed. The soil information collected during that initial investigation is shown on Table 1. Additional soil borings were drilled and a third monitor well completed in May 2001. Soil data collect during that work is also shown in Table 1.

Based on investigation results and pursuant to NMOCD guidelines (**"Guidelines for Remediation of Leaks, Spills and Releases"** *New Mexico Oil Conservation Division* - August 13, 1993), Safety and Environmental Solutions, Inc. (SESI) submitted a remedial/clean-up work plan to the NM OCD in July 2001. The work plan included excavation of highly contaminated soils above the water table, testing of soils not removed due to proximity to an Equilon pipeline and testing of soils remaining on the sides and bottom of the excavation. Also, groundwater would be monitored for an undetermined period of time following backfill and closure of the excavation.

Vertical and Horizontal Extent of Contamination in the Vadose Zone

Work in support of the work plan began on January 22, 2002. Clean overburden was removed and stockpiled in the area to the west of the leak. Following removal of the overburden, digging to determine the horizontal and vertical extent of crude oil impact on the soil commenced.

Digging was hindered by the presence of layers of very hard-consolidated caliche that frequently broke teeth off the heavy equipment. Eventually, a trackhoe with a jackhammer attachment used to break the caliche. Despite the hard rock encountered, it was not uniform throughout the site and excavation revealed areas of fractures and permeable sands and silts that provided potential avenues for downward migration of fluids. Contaminated soils were transported to Controlled Recovery Inc. for disposal. Progress in excavating the site can be seen in Figures 3 through 5.

Excavation continued until most of the contaminated soil had been removed as determined by onsite observation (visual and odor) and laboratory testing. Contaminated soil was removed to a maximum depth of approximately 29 ft. where another hard layer of consolidated bedrock was encountered. The zone between 29 and 35 ft. (the approximate depth to groundwater) was not excavated.

Excavation was completed by April 23, 2002 and a topographic survey of the site was performed that date by Pettigrew and Associates of Hobbs (Plate 1). The maximum depth of the excavation was approximately 29 ft. Samples were collected from the bottom and sides of the excavation (Table 2, Figure 5). Testing of the sides and bottom of the excavation (to the extent that the rock bottom could be sampled) showed that a small area (45 ft. x 20 ft.) directly under an active Plains (formerly Equilon) pipeline remained with elevated hydrocarbon concentrations. This area was not excavated due to objections from an Equilon supervisor because soil removal would require deactivating the pipeline, removing it, and reinstalling it following excavation. Samples of the remaining material were collected and tested in the laboratory and the results are shown in Table 2. NM OCD inspectors were on site during excavation and following testing. Prior to backfilling the sample results were reviewed with them and no objections were raised regarding initiation of backfilling.

Backfilling with clean stockpiled and imported soil began on April 29 and continued through May ending on June 7, 2002. Backfilling proceeded in stages with each placement of clean material followed by compaction to prevent future consolidation. At the conclusion of the operation 7,600 cubic yards of soil (including clean overburden and contaminated material) had been excavated from the site. Approximately 250 cubic yards remain beneath the unexcavated Equilon line.

Groundwater Characterization

Samples taken from the first two monitor wells completed in February 2001 detected high dissolved phase hydrocarbon (BTEX*) contamination in the north well (MW-1) and a trace of contamination in MW-2, the south well (Table 3). A third well (MW-3) was completed in May of 2001 and BTEX concentrations were minimal at the time.

The third monitor well allowed groundwater flow direction to be determined. Monitor well locations are shown on Figure 6. Figures 7 and 8 show the water level elevations and groundwater flow direction in May 2001 and January 2002, respectively. The general direction of groundwater flow is southeasterly.

A fourth groundwater monitor well upgradient of the site was drilled in February 2002 and three temporary monitor wells were installed in April 2002. Water level elevations and groundwater flow direction for these wells for February, April and September 2002, and March 2004 are shown on Figures 9 through 12 respectively.

Water quality sampling of the wells detected the highest concentrations of BTEX in the northernmost well (MW-1) and temporary well T-7, also located north of the excavation and away from the direction of groundwater flow. In conversations with the landowner, Mr. Lewis Wright, he tells of an earlier spill that occurred 100 to 200 ft. north of MW-1 sometime in the early 1990's that he alleges was not properly investigated or remediated. The continued presence of dissolved phase hydrocarbon in this area supports his assertion.

Following submittal of a water quality sample from newly drilled well MW-4 in February 2002, the analytical laboratory, Cardinal Laboratories of Hobbs, alerted SESI that a chlorinated solvent was detected in an otherwise clean sample. A duplicate sample was obtained and 1, 2 Dichloroethane (EDC) was confirmed in both samples. Subsequent to that discovery, EDC has been detected in all the monitoring wells sampled with the highest detection of 0.362 mg/L occurring in MW-4 in March 2004. The source of the chlorinated solvent is undetermined, but an oilfield service company yard is located several hundred feet upgradient of the monitor well with the company shop at some additional distance, also upgradient.

No water wells are known to have been impacted by the pipeline release. The temporary wells installed downgradient from the current spill do not show BTEX but do have varying concentrations of EDC as described above.

Product Recovery

At about the time site excavation began in late January 2002, hydrocarbon product was detected in MW-2. Product thickness increased to a maximum of 1.41 on April 22, 2002 and declined after that date following installation of a passive skimmer in the well. Product thickness declined to less than 0.05 ft. in 2003 and the passive skimmer was

* BTEX constituents are benzene, toluene, ethylbenzene and total xylenes

removed and replaced by an absorbent sock to capture oil. Currently, only a hydrocarbon sheen remains on the water in that well.

In January 2003, hydrocarbon product was detected in MW-3. Product thickness was first measured at 2.7 ft. and has remained fairly constant at 2.3 ft. since that time. Currently a recovery pump on a timer removes product and water to two 330-gallon storage totes at the site. The power for the pump comes from a solar panel and storage batteries.

As of the current date, a maximum of about 1 barrel (42 gallons) of hydrocarbon product has been recovered from the two monitor wells with current or past measured product thickness.

IV. Discussion

Information available from the soil borings indicates a variable lithology at the site, with the predominate constituents being caliche and fine-grained sand which may be cemented as sandstone as some locations. This allows for the formation of preferential pathways for fluid movement. Visual observations made during excavation confirmed movement of fluids vertically until a less permeable stratum was encountered, followed by movement laterally until higher vertical permeability again allowed for downward migration.

The presence of a capillary fringe may impede the downward movement of crude oil at the site. When the capillary fringe is encountered, it acts as a barrier to further vertical migration until and unless the volume of oil is sufficient to overcome the water capillary forces and move the water downward out of the soil pores. Until that occurs the oil will pond and spread laterally on top of the capillary fringe forming what can be called an "oil table" (Figure 13*).

If a monitor well or borehole is drilled through the oil into the water-saturated zone, ponded oil will drain into the well or borehole until equilibrium is reached with the oil in the formation. Oil accumulation in the well or borehole allows recovery of the free product using a pump or skimmer.

At the North GSA location, the monitor well showing the greatest thickness of free phase product is immediately south of the pipeline leak location at a distance of about 75 ft. However, the groundwater gradient is east-southeast at the site meaning that the oil is very likely migrating in preferential flow channels on or above the capillary fringe. Because the site was excavated to a depth of 28 to 29 feet north of the well and the water table is at a depth of 35 to 36 ft. beneath land surface, the oil product is confined to a zone approximately 6 to 8 ft. thick.

* Fetter, C.W. 1993. Chapter 5, Multiphase Flow, *Contaminant Hydrogeology*, Prentice-Hall, Upper Saddle River, NJ.

V. Abatement Plan

The purpose of the Stage 1 abatement plan is "to design and conduct a site investigation that will adequately define site conditions, and provide the data necessary to select and design an effective abatement option." Pursuant to OCD Rule 19.E.3, a Stage 1 abatement plan may include but not be limited to information as needed to select and implement an abatement option. Accordingly, Navajo will generate and include the following information and data in the report to be submitted following such site investigation as necessary to determine abatement options. Information previously generated and included with this report is expected to satisfy some to the investigation report requirements.

a. *Descriptions of the site, including a site map, and of site history including the nature of the release that caused the water pollution, and a summary of previous investigations.*

   Information satisfying much of this requirement is submitted herein. It will be updated as necessary for submittal with the Stage 1 report.

b. *Additional site investigation to define (i) site geology and hydrogeology, the vertical and horizontal extent and magnitude of vadose-zone and groundwater contamination, subsurface hydraulic conductivity, transmissivity, storativity, and rate and direction of contaminant migration, inventory of water wells inside and within one (1) mile from the perimeter of the three dimensional body where the standards set forth in [the rule] are exceeded, and location and number of such wells actually or potentially affected by the pollution; and (ii) surface-water hydrology, seasonal stream flow characteristics, groundwater/surface-water relationships, ... [etc.].*

   Additional investigation is necessary to fill gaps in data already collected at the site, including the drilling of additional boreholes, installation of additional monitor wells, and measurement of aquifer properties. An inventory of water wells will be conducted within one mile of the perimeter of the site and wells that potentially could be affected by the contamination identified.

   As described in Section III above, off site BTEX and one chlorinated solvent has migrated onto the location from unknown sources off gradient and upgradient from the site. This contamination is not the responsibility of Navajo and Navajo is not proposing to investigate the sources of these water contaminants.

   Starting in the general vicinity of existing MW-3, additional delineation of contamination is proposed to be performed at the site.

   1. A grid with 30 ft. centers will be marked off north, east and west of well MW-3 (Figure 14). At least one grid point will be marked off to the south of this well and nearby MW-2. Drilling will proceed northerly until contamination is not encountered in the lower vadose zone. Samples will be obtained in the zone beneath the excavation and analyzed for TPH and BTEX. If hydrocarbon product or soil highly saturated with hydrocarbon is encountered, a screened recovery borehole will be completed with its base several feet into the groundwater so that product will drain and can

be recovered. The borehole screen will extend across the vertical distance of contaminated soil so that the boreholes can be utilized for possible later remediation, such as soil vapor extraction. It is expected a maximum of 15 to 20 borings will be required to complete this task.

2. The three existing temporary monitor wells will be completed as permanent wells with a bentonite seal to within 2 ft. of the surface and a metal protective locking box cemented at the surface.
3. Following evaluation of data collected from the exploratory borings, additional monitoring wells will be placed around the southern and eastern area of the site. It may be that four to five additional wells may be necessary to monitor migration of dissolved phase hydrocarbons.
4. Current saturated thickness of MW-1 is less than two feet. This monitoring well will be replaced with one whose initial saturated thickness is from 10 to 13 ft. The exiting well will be plugged unless it would be useful for soil vapor extraction during site remediation.

To determine the hydraulic conductivity and transmissivity of the sediments, groundwater slug-tests will be conducted on the monitor wells and the drawdown and recovery data analyzed with procedures commonly utilized for this purpose. Determination of storativity usually requires installation of closely spaced monitor wells so that one can serve as an observation well for the pumping well. At this location with a shallow water table, storativity can be estimated from technical publications and a separate monitor well solely for this purpose is not necessary.

No intermittent, ephemeral or permanent sources of surface-water are present in the area of the leak, so no hydrological or biological studies of the impact of the release on surface water are necessary.

c. *Monitoring program, including sampling stations and frequencies, for the duration of the abatement plan that may be modified, after approval by the Director, as additional sampling stations are created.*

Following installation of the monitoring wells, they will be developed to remove any mud, silt and sand inadvertently introduced during the drilling process. The well locations and elevations will be located and surveyed by a registered professional surveyor. Water levels will be measured quarterly and wells will be sampled quarterly for BTEX constituents plus EDC following purging to ensure a fresh sample. In addition, the initial sampling will also include major cations and anions to establish a baseline condition for these constituents although produced water was not released to the environment as a result of the pipeline leaks.

d. *Quality assurance plan, consistent with the sampling and analytical techniques listed in [the Water Quality Control Commission regulations] for all work to be conducted pursuant to the abatement plan.*

Samples will be collected and handled in accordance with appropriate protocols for collection, preservation and transport of samples including maintaining a chain-of-custody and record keeping. The analytical laboratory selected to perform the analyses will be monitored for compliance with the applicable

QA/QC standards.

e. *A schedule for all Stage 1 abatement plan activities, including the submission of summary quarterly progress reports, and the submission, for approval by the Director, of a detailed final site investigation report.*

It is expected that all investigation work proposed within the State 1 abatement plan will be completed within three months of the date of approval. Quarterly progress reports will be submitted within 30 days following the end of the previous quarter. The report will include work performed and analytical results of from testing of water quality in new and existing monitor wells. A final report will be prepared and submitted within 60 days of the completion of the work.

f. *Any additional information that may be required to design and perform an adequate site investigation.*

The information necessary to design and perform an adequate site investigation is included in the above paragraphs.

VI. Additional Information

During the time of review of this proposed Stage 1 Abatement Plan and subsequent to its anticipated approval by OCD, Navajo will continue with the existing oil recovery program. During this time, and prior to submittal and approval of a Stage 2 Abatement Plan, Navajo may desire to initiate additional actions to recover hydrocarbon and/or to prevent or minimize free or dissolved phase hydrocarbon movement from the existing impacted area. If such work is necessary, Navajo will notify the OCD of the proposed activity and seek to meet and discuss the anticipated work with the OCD prior to beginning work.

VII. Report Tables and Figures

Table 1. Results of Investigation Soils Testing, Navajo Hobbs North GSA 6" Gathering Line Leak

Sample Location and Depth	Sample Date	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl-benzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)	GRO (mg/Kg)	DRO (mg/Kg)	TPH (mg/Kg)
W. Wall, South	01/08/01	1.42	3.42	9.71	54.9	69	3,390	13,800	17,190
W. Wall, North	01/08/01	NS	NS	NS	NS	NS	3,660	15,600	19,260
East Wall	01/08/01	4.09	6.75	16.4	103	130	5,730	33,500	39,230
Spill, New Surface	01/08/01	3.63	<2.00	2.27	42.5	48.4	2,480	7,780	10,260
Bottom, North	01/08/01	6.30	8.00	15.5	90.7	121	4,400	8,200	12,600
Bottom, South	01/08/01	NS	NS	NS	NS	NS	3,230	7,000	10,230
SB-1, 5 ft.	02/19/01	<0.005	0.006	0.009	0.10	0.115	<50	353	353
SB-1, 10 ft.	02/19/01	<0.005	0.006	<0.005	0.02	0.026	<50	<50	<100
SB-1, 15 ft.	02/19/01	<0.005	<0.005	<0.005	<0.015	<0.030	<50	237	237
SB-1, 18 ft.	02/19/01	0.021	0.824	2.45	15.7	19.0	672	2,530	3,202
SB-1, 20 ft.	02/19/01	<0.005	0.127	1.60	10.7	12.4	439	3,190	3,629
SB-1, 24 ft.	02/19/01	0.009	0.395	1.42	8.19	10.0	833	3,710	4,543
SB-2, 10 ft.	02/27/01	<0.005	0.005	<0.005	<0.015	0.005	<50	<50	<100
SB-2, 20 ft.	02/27/01	<0.005	<0.005	<0.005	<0.015	<0.030	<50	<50	<100
SB-2, 30 ft.	02/27/01	<0.005	<0.005	<0.005	<0.015	<0.030	<50	<50	<100
SB-2, 40 ft.	02/27/01	<0.005	<0.005	<0.005	<0.015	<0.030	<50	<50	<100
SB-3, 10 ft.	02/27/01	<0.005	<0.005	<0.005	<0.015	<0.030	<50	<50	<100
SB-3, 20 ft.	02/27/01	<0.005	<0.005	<0.005	<0.015	<0.030	<50	128	128
SB-3, 30 ft.	02/27/01	<0.005	<0.005	<0.005	<0.015	<0.030	<50	<50	<100
SB-4, 10 ft.	02/27/01	<0.005	<0.005	<0.005	<0.015	<0.030	<50	<50	<100
SB-4, 20 ft.	02/27/01	0.038	<0.005	0.029	<0.015	0.067	<50	<50	<100
SB-4, 30 ft.	02/27/01	<0.005	<0.005	<0.005	<0.015	<0.030	<50	<50	<100
SB-4, 40 ft.	02/27/01	<0.005	<0.005	<0.005	<0.015	<0.030	<50	<50	<100
SB-5, 10 ft.	05/08/01	NS	NS	NS	NS	NS	NS	NS	1,680
SB-5, 15 ft.	05/08/01	NS	NS	NS	NS	NS	NS	NS	1,900
SB-5A, 10 ft.	05/24/01	<0.025	0.35	0.535	<0.025	0.885	64.7	668	733
SB-5A, 15 ft.	05/24/01	0.17	0.395	0.942	3.57	5.08	38.2	236	274
SB-5A, 20 ft.	05/24/01	0.783	0.701	2.56	12.4	16.4	148	2,100	2,248
SB-5A, 30 ft.	05/24/01	8.81	9.72	19.7	66.3	105	904	3,520	4,424
SB-5A, 35 ft.	05/24/01	0.23	0.424	1.32	3.75	5.72	54.6	80	135

Table 1. Results of Investigation Soils Testing, Navajo Hobbs North GSA 6" Gathering Line Leak

Sample Location and Depth	Sample Date	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl-benzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)	GRO (mg/Kg)	DRO (mg/Kg)	TPH (mg/Kg)
SB-6, 10 ft.	05/24/01	<0.013	<0.013	0.185	0.498	0.683	4.4	<50	4.4
SB-6, 15 ft.	05/24/01	0.0947	<0.013	0.305	1.02	1.420	16	105	121
SB-6, 20 ft.	05/24/01	<0.025	0.494	1.65	8.76	10.90	73	2,320	2,393
SB-6, 25 ft.	05/24/01	3.74	7.62	12.9	48.1	72.4	578	11,400	11,978
SB-6, 30 ft.	05/24/01	<0.025	0.415	1.09	4.82	6.33	52.5	2,330	2,383
SB-6, 35 ft.	05/24/01	0.11	0.236	0.633	3.3	4.28	24.6	402	427
SB-7, 5 ft.	05/24/01	<0.025	<0.025	<0.025	<0.025	<0.100	<2.5	<50	<52.5
SB-7, 10 ft.	05/24/01	<0.013	<0.013	0.191	0.52	0.711	6.3	<50	6.3
SB-8, 5 ft.	05/25/01	<0.013	<0.013	<0.013	<0.013	<0.052	<1.3	<50	<51.3
SB-9, 5 ft.	05/25/01	<0.013	<0.013	<0.013	<0.013	<0.052	<1.3	<50	<51.3
SB-9, 10 ft.	05/25/01	<0.013	<0.013	<0.013	<0.013	<0.052	<1.3	<50	<51.3
SB-10, 10 ft.	05/25/01	<0.013	<0.013	<0.013	0.489	0.489	<1.3	<50	<51.3
SB-10, 15 ft.	05/25/01	<0.013	<0.013	<0.013	<0.013	<0.052	<1.3	<50	<51.3
SB-10, 20 ft.	05/25/01	<0.013	<0.013	<0.013	0.485	0.485	<1.3	<50	<51.3
SB-10, 25 ft.	05/25/01	<0.013	<0.013	<0.013	<0.013	<0.052	<1.3	<50	<51.3
SB-10, 30 ft.	05/25/01	<0.013	0.182	0.182	0.488	0.852	<1.3	<50	<51.3
SB-10, 35 ft.	05/25/01	<0.013	<0.013	<0.013	0.488	0.488	<1.3	<50	<51.3
SB-10, 40 ft.	05/25/01	<0.013	0.182	<0.013	0.487	0.669	<1.3	<50	<51.3
SB-11, 10 ft.	05/24/01	<0.013	<0.013	<0.013	0.492	0.492	4.0	<50	4.0
SB-11, 15 ft.	05/24/01	<0.013	<0.013	0.194	0.508	0.702	1.68	<50	1.68
SB-12, 5 ft.	05/25/01	<0.013	<0.013	<0.013	<0.013	<0.052	<1.3	<50	<51.3
Notes:									
SB-2 completed as MW-1, SB-4 completed as MW-2, SB-10 completed as MW-3									
NS - Not sampled									
Samples in January, February 2001 collected by Environmental Technology Group, Inc., Hobbs.									
Samples in May 2001 collected by Safety and Environmental Solutions, Inc., Hobbs.									
Auger refusal in SB-5 at 15 ft. with Giddings drill rig, moved over to SB-5A to start drilling with Atkins rig.									
BTEX analyses by SW-846 method 8021-B; Jan-Feb 2001 by Cardinal Laboratories, Hobbs, NM; all other analyses by TraceAnalysis, Lubbock, TX.									
TPH analyses by EPA method 8015 (modified); Jan-Feb 2001 by Cardinal Laboratories, Hobbs, NM; SB-5 samples in field by SESI									
(using EPA method 418.1); all other analyses by TraceAnalysis, Lubbock, TX.									
TPH GRO range: C_6-C_{10} Cardinal Laboratories, C_6-C_{12} TraceAnalysis									
TPH Diesel range: >C_{10}-C_{28} Cardinal Laboratories, >C_{12}-C_{28} TraceAnalysis									

Table 2. Results of Excavation Soils Testing, Navajo Hobbs North GSA 6" Gathering Line Leak

Sample Location and Depth	Sample Date	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl-benzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)	GRO (mg/Kg)	DRO (mg/Kg)	TPH (mg/Kg)	Comments
W. side., bottom, 30'	*01/25/02*	*0.041*	*1.28*	*1.89*	*14.8*	*18.0*	*1,000*	*2,210*	*3,210*	*418.1 TPH: 2,410 mg/Kg*
Southeast corner, 10'	03/25/02	<0.010	0.023	9.38	<0.030	9.40	672	1,190	1,862	
Northwest corner, 10'	03/25/02	<0.010	0.051	0.202	5.43	5.68	62.8	148	211	
E. side, SE bottom, 25'	03/26/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10.0	30.3	30.3	
E. side, center btm., 25'	03/26/02	<0.005	0.007	0.011	0.036	0.153	<10.0	137	137	
S. excavation, 22'	04/10/02	0.287	2.94	5.6	33.1	41.9	3,890	5,010	8,900	See Note 1.
W. side, gray sand, 26'	04/17/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	Survey S-9, see Note 2.
W. side, east wall, 29'	04/17/02	0.303	9.38	20.6	89.7	120	6,420	8,090	14,510	Base of Equilon line
T-1, 10 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-1, 15 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-1, 20 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-1, 25 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-2, 5 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-2, 10 ft.	03/19/02	<0.005	0.008	<0.005	0.028	0.036	<10	<10	<20	
T-2, 15 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-2, 20 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-2, 25 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-3, 10 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-3, 15 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-3, 20 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-3, 25 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-4, 10 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-4, 15 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-4, 20 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-4, 25 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-5, 20 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-5, 25 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
T-6, 25 ft.	03/19/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	

Table 2. Results of Excavation Soils Testing, Navajo Hobbs North GSA 6" Gathering Line Leak

Sample Location and Depth	Sample Date	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl-benzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)	GRO (mg/Kg)	DRO (mg/Kg)	TPH (mg/Kg)	Comments
S-1, E. side, 26-27 ft.	04/02/02	<0.005	0.005	0.038	0.150	0.193	37.6	92.4	130	
S-2, E. side, 27-28 ft.	04/02/02	<0.005	0.023	0.169	0.633	0.825	59.0	335	394	
S-3, E. side, 22.7 ft.	04/05/02	0.033	2.02	8.15	42.5	52.7	3,270	7,260	10,530	
S-4, E. side, 24 ft.	04/05/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	73.0	73.0	
S-5, E. side, 21 ft.	04/05/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	18.1	18.1	
S-6, E. side, 21 ft.	04/05/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
S-7, E. side, 21 ft.	04/05/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
S-8, E. side, 22 ft.	04/05/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
S-9, W. side, 26'	04/17/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	(gray sand, see Note 2)
S-10, W. side, 24'	04/23/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
S-11, W. side, 28'	04/23/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
S-12, W. side, 27'	04/23/02	<0.005	<0.005	0.006	0.04	0.046	<10	52.0	52.0	
S-13, W. side, 26'	04/23/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
S-14, W. side, 28'	04/23/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	<10	<20	
S-15, W. side, 27'	04/23/02	0.062	1.83	9.30	45.0	56.2	3,860	9,470	13,330	
S-16, W. side, 28'	04/23/02	0.014	0.645	2.64	15.8	19.1	1,900	11,200	13,100	
S-17, W. side, 28'	04/23/02	<0.005	<0.005	<0.005	<0.015	<0.030	<10	57.5	57.5	
Notes:										
1. Sample from base of excavation at north end of south excavation. The south excavation was merged into the west excavation.										
following removal of the Navajo pipeline. The sampling location was excavated an additional seven feet.										
2. Sample is gray sandy zone near bottom of excavation. No odor, possible weathering of hydrocarbons, labeled S-9 for survey location.										
"T" locations are additional exploratory boreholes for horizontal and vertical extent, and possible temporary monitor wells.										
"S" locations are verification sample sites and samples documenting remaining contamination under Equilon line.										
Samples collected by Safety and Environmental Solutions, Inc., Hobbs.										
BTEX analyses by SW-846 method 8260; Cardinal Laboratories, Hobbs, NM.										
TPH analyses by EPA method 8015 (modified) unless otherwise noted; Cardinal Laboratories, Hobbs, NM										
TPH GRO range: C6-C10; TPH Diesel range: >C10-C28										

Table 3. Water Level Elevation Data, Navajo Hobbs North GSA 6" Gathering Line Leak

Well Name and Depth Below TOC (ft.)	Elevation Top of Casing (feet)	Measure-ment Date	Depth to Product Below TOC (feet)	Depth to Water Below TOC (feet)	Product Thickness (feet)	Corrected Depth to Water (feet)	Corrected Water Level Elev. (feet)	Water Saturated Thickness (feet)
MW-1	3,621.20	05/29/01	- -	35.63	0	35.63	3,585.57	4.1
39.74		01/28/02	- -	36.53	0	36.53	3,584.67	3.2
		02/19/02	- -	36.42	0	36.42	3,584.78	3.3
	3,622.36	04/23/02	- -	36.49	0	36.49	3,585.87	3.3
		09/03/02	- -	36.91	0	36.91	3,585.45	2.8
40.47		01/20/03	- -	36.91	0	36.91	3,585.45	3.6
40.07		05/22/03	- -	37.17	0	37.17	3,585.19	2.9
39.77		03/18/04	- -	37.99	0	37.99	3,584.37	1.8
MW-2	3,620.30	05/29/01	- -	34.88	0.00	34.88	3,585.42	8.7
43.55		01/28/02	35.52	36.32	0.80	35.64	3,584.66	7.9
		02/19/02	35.60	36.11	0.51	35.68	3,584.62	7.9
	3,621.47	04/23/02	35.68	35.93	0.25	35.72	3,585.75	7.8
		05/19/02	35.58	36.14	0.56	35.66	3,585.81	7.9
		09/03/02	36.03	36.21	0.18	36.06	3,585.41	7.5
		01/20/03	36.16	36.17	0.01	36.16	3,585.31	7.4
		05/15/03	36.50	36.51	0.01	36.50	3,584.97	7.0
		03/16/04	- -	37.34	0	37.34	3,584.13	6.2
Note 1: Corrected depth to water = Static DTW - (Prod. Thickness x SG), SG = 0.8498								
MW-3	3,619.67	05/29/01	- -	34.21	0	34.21	3,585.46	9.6
43.85		01/28/02	- -	35.13	0	35.13	3,584.54	8.7
		02/19/02	- -	35.01	0	35.01	3,584.66	8.8
		02/22/02	- -	35.01	0	35.01	3,584.66	8.8
	3,620.81	04/23/02	- -	35.05	0	35.05	3,585.76	8.8
		09/03/02	- -	35.39	0	35.39	3,585.42	8.5
		01/20/03	35.11	37.77	2.66	35.51	3,585.30	8.3
		05/15/03	35.44	37.76	2.32	35.79	3,585.02	8.1
		03/16/04	36.42	38.72	2.30	36.77	3,584.04	7.1
Note 1: Corrected depth to water = Static DTW - (Prod. Thickness x SG), SG = 0.8498								
MW-4	3,620.04	02/19/02	- -	35.17	0	35.17	3,584.87	13.9
49.07	3,621.19	04/23/02	- -	35.25	0	35.25	3,585.94	13.8
		09/03/02	- -	35.56	0	35.56	3,585.63	13.5

Table 3. Water Level Elevation Data, Navajo Hobbs North GSA 6" Gathering Line Leak

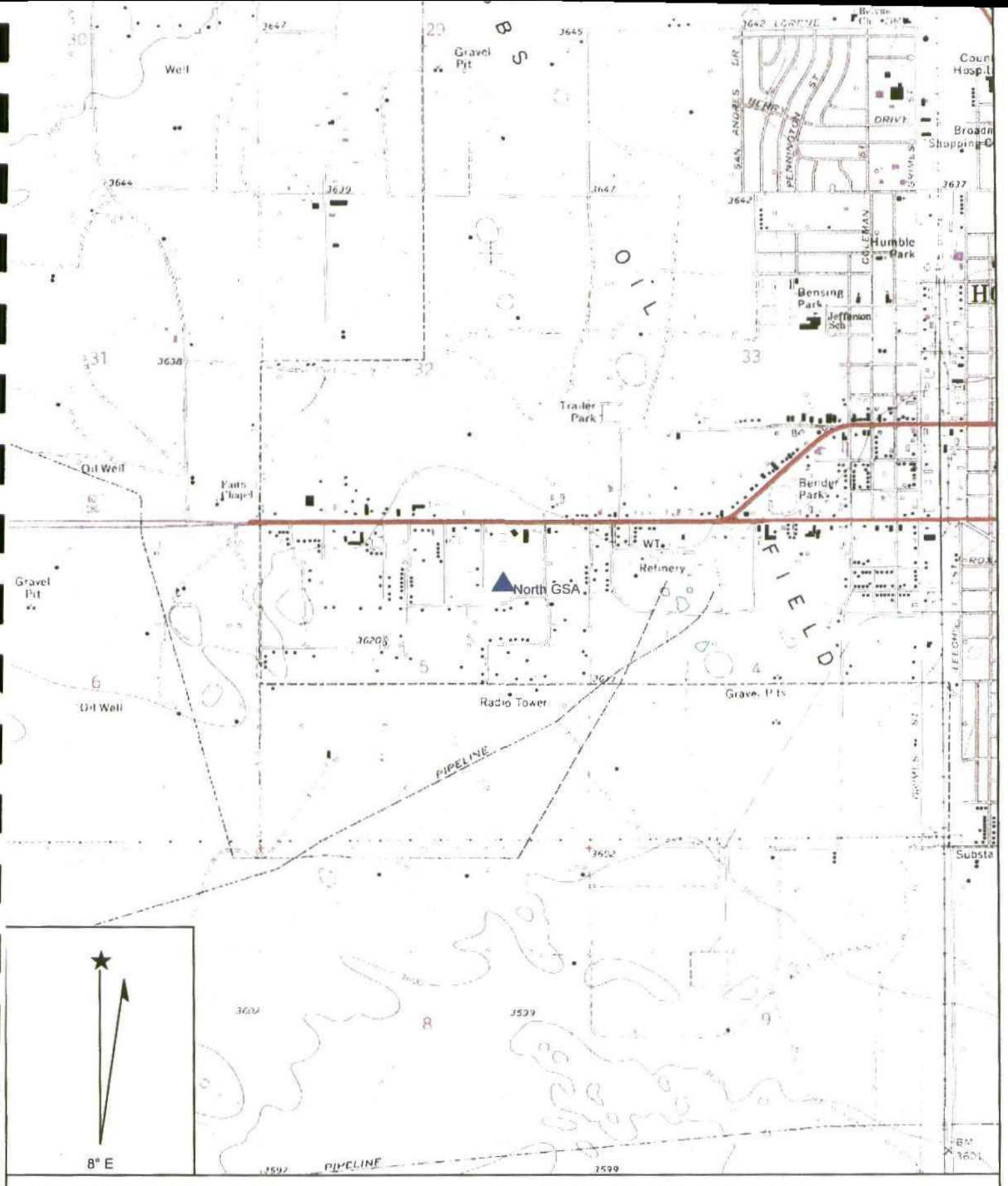
Well Name and Depth Below TOC (ft.)	Elevation Top of Casing (feet)	Measure-ment Date	Depth to Product Below TOC (feet)	Depth to Water Below TOC (feet)	Product Thickness (feet)	Corrected Depth to Water (feet)	Corrected Water Level Elev. (feet)	Water Saturated Thickness (feet)
49.81		01/20/03	- -	35.67	0	35.67	3,585.52	14.1
49.81		05/22/03	- -	35.94	0	35.94	3,585.25	13.9
49.77		03/18/04	- -	36.76	0	36.76	3,584.43	13.0
T-6	3,622.31	04/23/02	- -	36.73	0	36.73	3,585.58	13.3
50.04		05/19/02	- -	36.85	0	36.85	3,585.46	13.2
		09/03/02	- -	37.11	0	37.11	3,585.20	12.9
50.09		01/20/03	- -	37.18	0	37.18	3,585.13	12.9
50.06		05/22/03	- -	37.50	0	37.50	3,584.81	12.6
50.18		03/18/04	- -	38.27	0	38.27	3,584.04	11.9
T-7	3,622.07	04/23/02	- -	36.31	0	36.31	3,585.76	13.9
50.20		05/18/02	- -	36.40	0	36.40	3,585.67	13.8
		09/03/02	- -	36.67	0	36.67	3,585.40	13.5
50.30		01/20/03	- -	36.74	0	36.74	3,585.33	13.6
50.22		05/22/03	- -	37.02	0	37.02	3,585.05	13.2
50.04		03/18/04	- -	37.83	0	37.83	3,584.24	12.2
T-8	3,621.70	04/23/02	- -	36.03	0	36.03	3,585.67	14.3
50.30		05/18/02	- -	36.10	0	36.10	3,585.60	14.2
		09/03/02	- -	36.40	0	36.40	3,585.30	13.9
50.28		01/20/03	- -	36.46	0	36.46	3,585.24	13.8
50.27		05/22/03	- -	36.79	0	36.79	3,584.91	13.5
50.22		03/18/04	- -	37.58	0	37.58	3,584.12	12.6

Table 4. Water Quality Data, Navajo Hobbs North GSA 6" Gathering Line

Monitoring Well	Sample Date	Benzene (mg/L)	Toluene (mg/L)	*Ethyl* benzene (mg/L)	Xylenes (total, mg/L)	Total BTEX (mg/L)	Naphthalene (mg/L)	1,2-Dichloro-ethane (EDC) (mg/L)	Chloride (mg/L)	Total Dissolved Solids (mg/L)	Notes:
MW-1	02/27/01	0.852	0.009	0.581	0.044	1.49	--	--	271	988	1
	06/01/01	0.260	0.033	0.902	1.20	2.40	--	--	--	--	
	01/28/02	0.094	0.012	0.783	0.435	1.32	--	--	--	--	
	01/20/03	0.036	0.006	0.389	0.148	0.579	--	0.020	--	--	
	05/22/03	0.061	0.003	0.335	0.170	0.569	--	0.056	68	568	8
	03/19/04	0.015	<0.002	0.069	0.047	0.131	0.055	0.096			
MW-2	02/27/01	<0.002	<0.002	<0.002	<0.004	<0.006	--	--	334	1,072	2
	06/01/01	0.005	<0.001	0.006	0.003	0.014	--	--	--	--	
	01/28/02	--	--	--	--	--	--	--	--	--	4
	05/22/03	--	--	--	--	--	--	--	--	--	4
	03/19/04	--	--	--	--	--	--	--	--	--	4
MW-3	06/01/01	0.008	<0.005	<0.005	0.008	0.015	--	--	--	--	
	01/28/02	<0.002	<0.002	0.002	0.006	0.008	--	--	--	--	
	05/22/03	--	--	--	--	--	--	--	--	--	4
	03/19/04	--	--	--	--	--	--	--	--	--	4
MW-4	02/19/02	<0.002	0.004	<0.002	<0.004	0.004	--	--	--	--	
(dup. analysis)	02/19/02	<0.002	<0.002	<0.002	<0.004	<0.002	--	0.197	--	--	5
	01/20/03	<0.005	<0.005	<0.005	<0.010	<0.005	--	0.193	--	--	
	05/22/03	<0.002	<0.002	<0.002	<0.004	<0.002	--	0.263	172	770	8
	03/19/04	0.002	<0.002	<0.002	<0.004	0.002	<0.002	0.362			
T-6	05/19/02	0.005	0.004	<0.002	<0.004	0.009	--	0.039	272	1,467	
	01/20/03	<0.005	<0.005	<0.005	<0.010	<0.005	--	0.054	--	--	
	05/22/03	<0.005	<0.005	<0.005	<0.010	<0.005	--	0.046	248	1,498	8
	03/19/04	<0.002	<0.002	0.002	<0.004	0.002	0.004	0.117			
T-7	05/19/02	0.008	0.003	0.019	0.031	0.061	--	0.032	96	722	6
	01/20/03	0.012	<0.005	0.026	0.034	0.072	--	0.054	--	--	
	05/22/03	0.010	<0.002	0.004	0.011	0.025	--	0.059	96	864	8
	03/19/04	0.006	<0.002	0.006	0.016	0.028	0.016	0.067			
T-8	05/19/02	0.004	0.003	<0.002	<0.004	0.007	--	0.029	268	1,245	7
	01/20/03	<0.005	<0.005	<0.005	<0.010	<0.005	--	0.037	--	--	
	05/22/03	<0.002	<0.002	<0.002	<0.004	<0.002	--	0.041	272	1,374	8
	03/19/04	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	0.039			

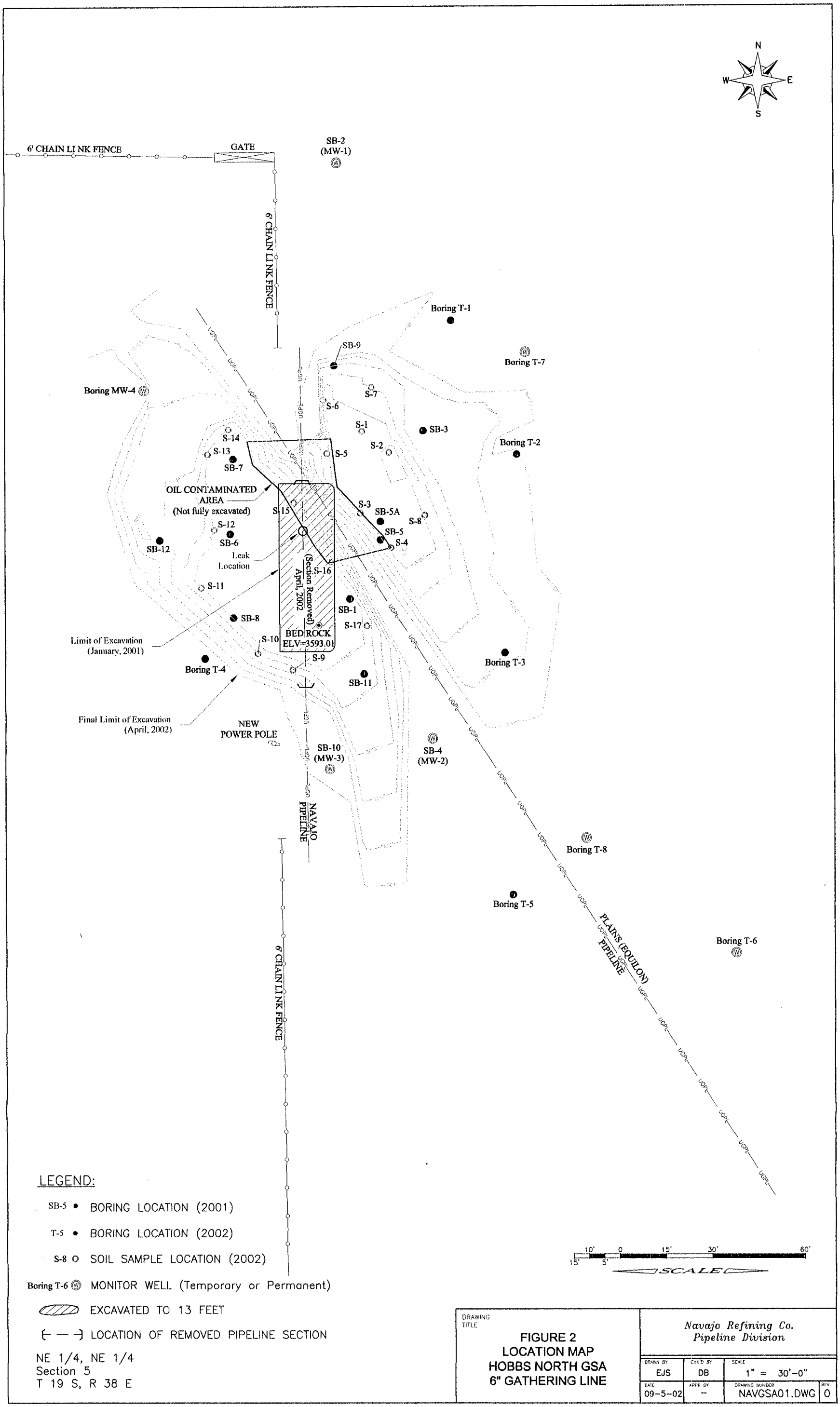
Table 4. Water Quality Data, Navajo Hobbs North GSA 6" Gathering Line

Monitoring Well	Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethyl benzene (mg/L)	Xylenes (total, mg/L)	Total BTEX (mg/L)	Naphthalene (mg/L)	1,2-Dichloro-ethane (EDC) (mg/L)	Chloride (mg/L)	Total Dissolved Solids (mg/L)	Notes:
Notes: 1.	MW-1 identified in ETGI report of March 2001 as SB-2.										
2.	MW-2 identified in ETGI report of March 2001 as SB-4.										
3.	SB-10 completed by SESI as MW-3.										
4.	Not sampled due to hydrocarbon product.										
5.	Additional method 8260 compounds detected (mg/L): Naphthalene, 0.003 mg/L.										
6.	Additional method 8260 compounds detected (mg/L): Carbon disulfide, 0.003; 2-butanone, 0.071; isopropylbenzene, 0.009;										
	n-propylbenzene, 0.013; 1,3,5-trimethylbenzene; sec-butylbenzene, 0.007; 4-isopropyltoluene, 0.006; n-butylbenzene, 0.021;										
	naphthalene, 0.020 mg/L.										
7.	Additional method 8260 compounds detected (mg/L): n-propylbenzene, 0.003 mg/L.										
8.	Complete cation/anion analysis on file.										
Analyses performed at Cardinal Laboratories, Hobbs, NM, except for 06/01/01 analysis by TraceAnalysis, Lubbock, TX.											
Analyses using EPA SW-846 methods 8260 (volatile organics) and 160.1 (TDS), and Standard Method 4500-Cl B (Cl).											



Name: HOBBS WEST
Date: 4/6/2004
Scale: 1 inch equals 2000 feet

Location: 032° 41' 37.4" N 103° 09' 58.3" W
Caption: Figure 1. Vicinity Map
Hobbs North GSA



LEGEND:

- SB-5 • BORING LOCATION (2001)
- T-5 • BORING LOCATION (2002)
- S-8 ○ SOIL SAMPLE LOCATION (2002)
- Boring T-6 Ⓦ MONITOR WELL (Temporary or Permanent)
- EXCAVATED TO 13 FEET
- LOCATION OF REMOVED PIPELINE SECTION

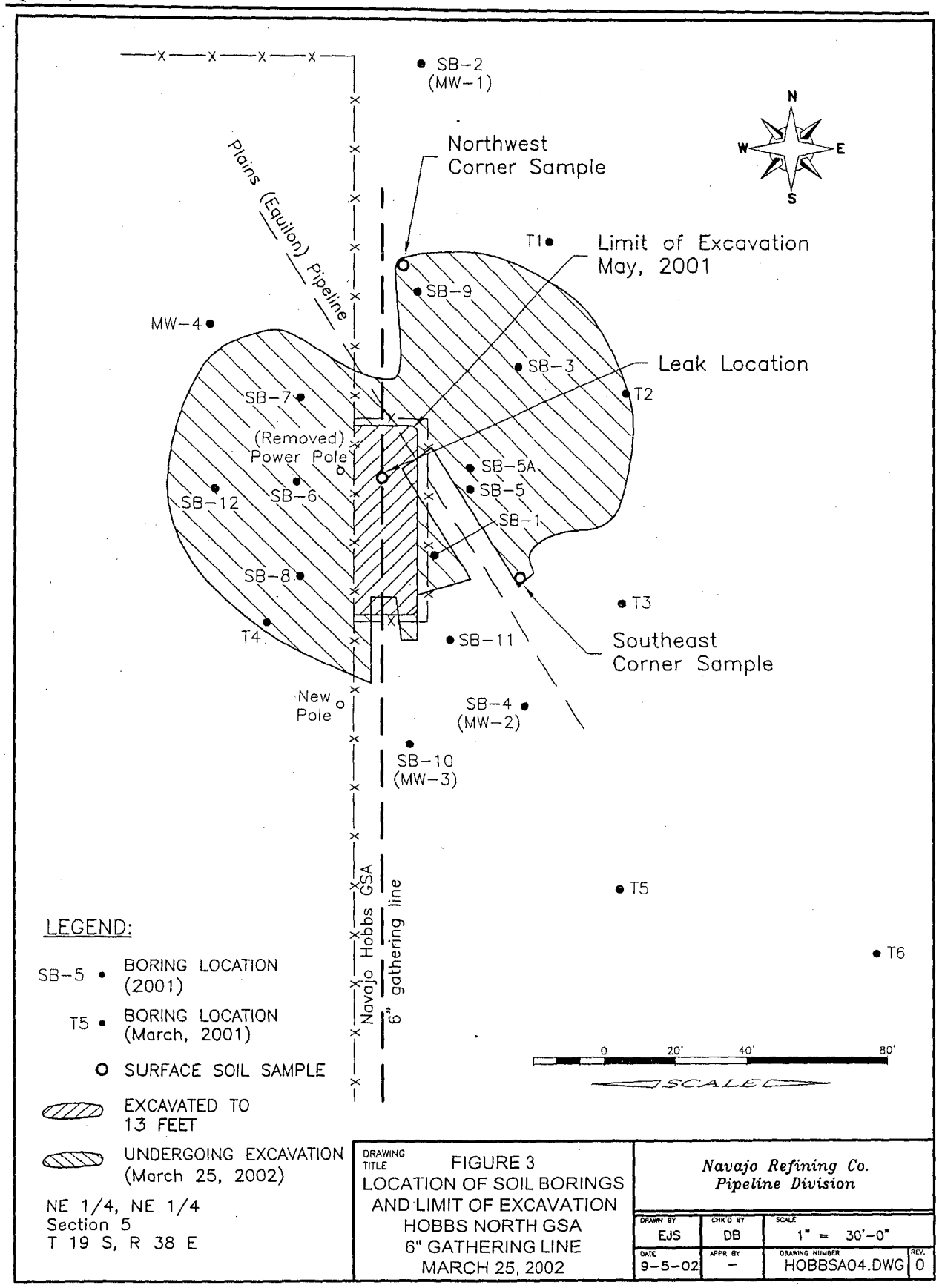
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

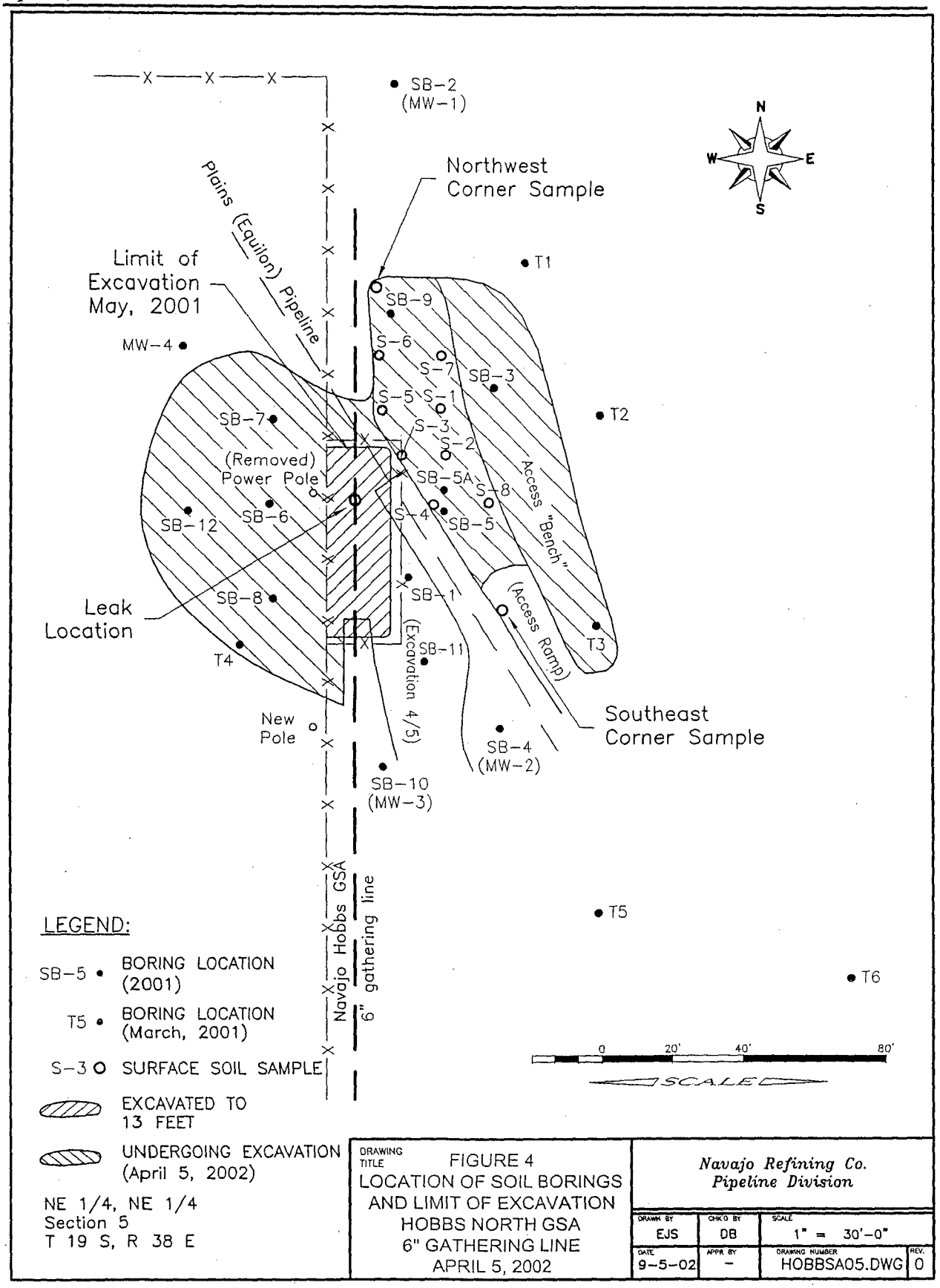
DRAWING TITLE

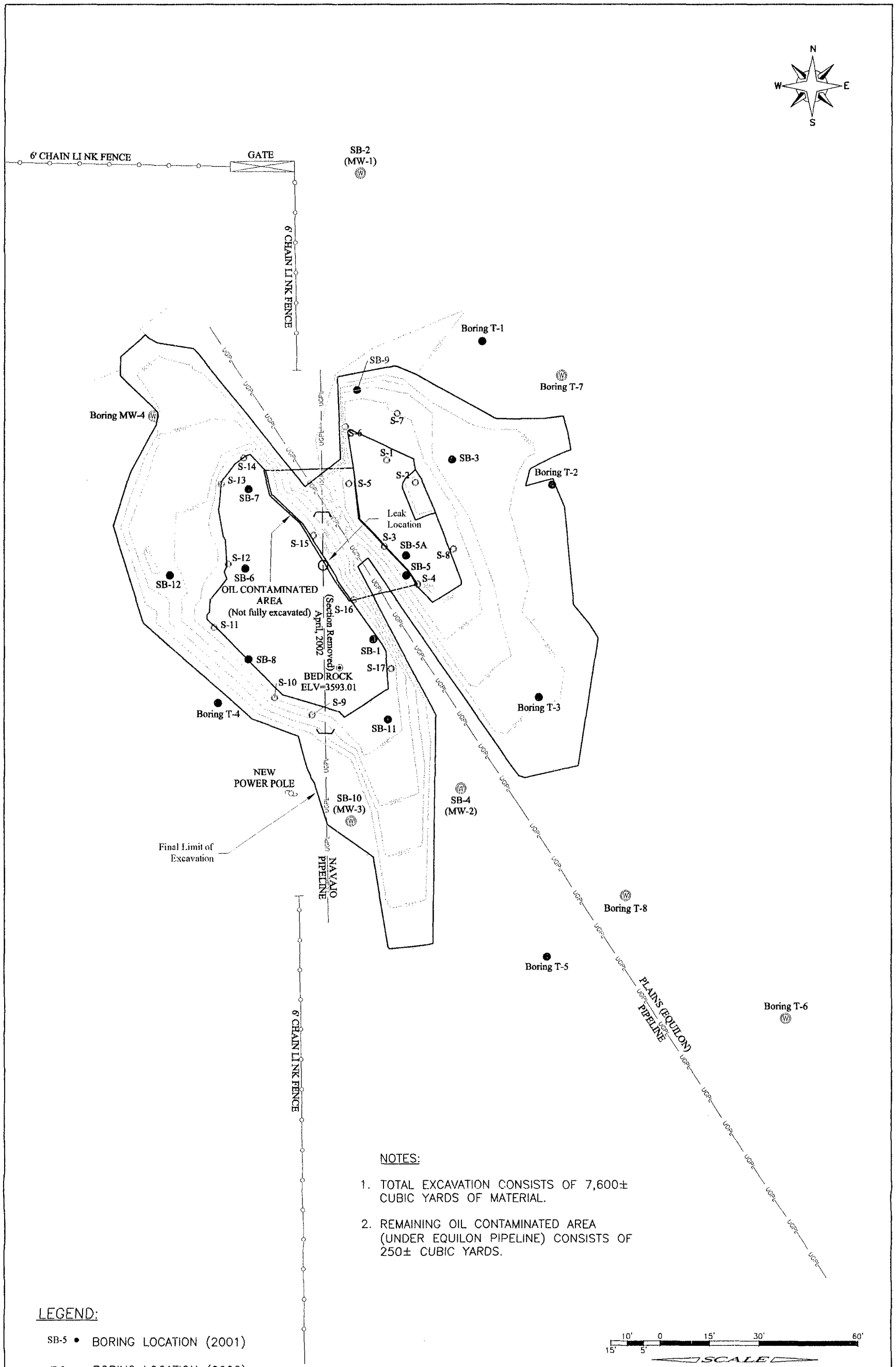
FIGURE 2
LOCATION MAP
HOBBS NORTH GSA
6" GATHERING LINE

Navajo Refining Co.
Pipeline Division

DRAWN BY	CHK'D BY	SCALE	
EJS	DB	1" = 30'-0"	
DATE	APPR BY	DRAWING NUMBER	REV.
09-5-02	--	NAVGSA01.DWG	0


SB-2
(MW-1)
N
W
E
S
Northwest
Corner Sample
Plains (Equilon) Pipeline
T1
Limit of Excavation
May, 2001
SB-9
MW-4
SB-3
Leak Location
SB-7
T2
(Removed)
Power Pole
SB-5A
SB-5
SB-12
SB-6
SB-1
SB-8
T3
T4
SB-11
Southeast
Corner Sample
New
Pole
SB-4
(MW-2)
SB-10
(MW-3)
T5
T6
Navajo Hobbs GSA
6" gathering line
LEGEND:
SB-5 • BORING LOCATION (2001)
T5 • BORING LOCATION (March, 2001)
O SURFACE SOIL SAMPLE
EXCAVATED TO 13 FEET
UNDERGOING EXCAVATION (March 25, 2002)
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
0
20'
40'
80'
SCALE
DRAWING TITLE
FIGURE 3
LOCATION OF SOIL BORINGS
AND LIMIT OF EXCAVATION
HOBBS NORTH GSA
6" GATHERING LINE
MARCH 25, 2002
Navajo Refining Co.
Pipeline Division
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 30'-0"
DATE 9-5-02
APPR BY -
DRAWING NUMBER HOBBSA04.DWG
REV. 0


SB-2
(MW-1)
N
W
E
S
Northwest
Corner Sample
Plains (Equilon) Pipeline
Limit of
Excavation
May, 2001
T1
SB-9
MW-4
S-6
S-7
SB-3
S-5
S-1
T2
SB-7
S-3
S-2
(Removed)
Power Pole
SB-5A
S-8
Access "Bench"
SB-12
SB-6
S-4
SB-5
SB-1
Leak
Location
SB-8
(Access Ramp)
T3
T4
SB-11
(Excavation 4/5)
New
Pole
Southeast
Corner Sample
SB-4
(MW-2)
SB-10
(MW-3)
Navajo Hobbs GSA
6" gathering line
T5
T6
0
20'
40'
80'
SCALE
LEGEND:
SB-5 • BORING LOCATION (2001)
T5 • BORING LOCATION (March, 2001)
S-3 O SURFACE SOIL SAMPLE
EXCAVATED TO 13 FEET
UNDERGOING EXCAVATION (April 5, 2002)
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
DRAWING TITLE
FIGURE 4
LOCATION OF SOIL BORINGS
AND LIMIT OF EXCAVATION
HOBBS NORTH GSA
6" GATHERING LINE
APRIL 5, 2002
Navajo Refining Co.
Pipeline Division
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 30'-0"
DATE 9-5-02
APPR BY -
DRAWING NUMBER HOBBSA05.DWG
REV. 0



NOTES:

1. TOTAL EXCAVATION CONSISTS OF 7,600± CUBIC YARDS OF MATERIAL.
2. REMAINING OIL CONTAMINATED AREA (UNDER EQUILON PIPELINE) CONSISTS OF 250± CUBIC YARDS.

LEGEND:

SB-5 • BORING LOCATION (2001)

T-5 • BORING LOCATION (2002)

S-8 ○ SOIL SAMPLE LOCATION (2002)

{— —} LOCATION OF REMOVED PIPELINE SECTION

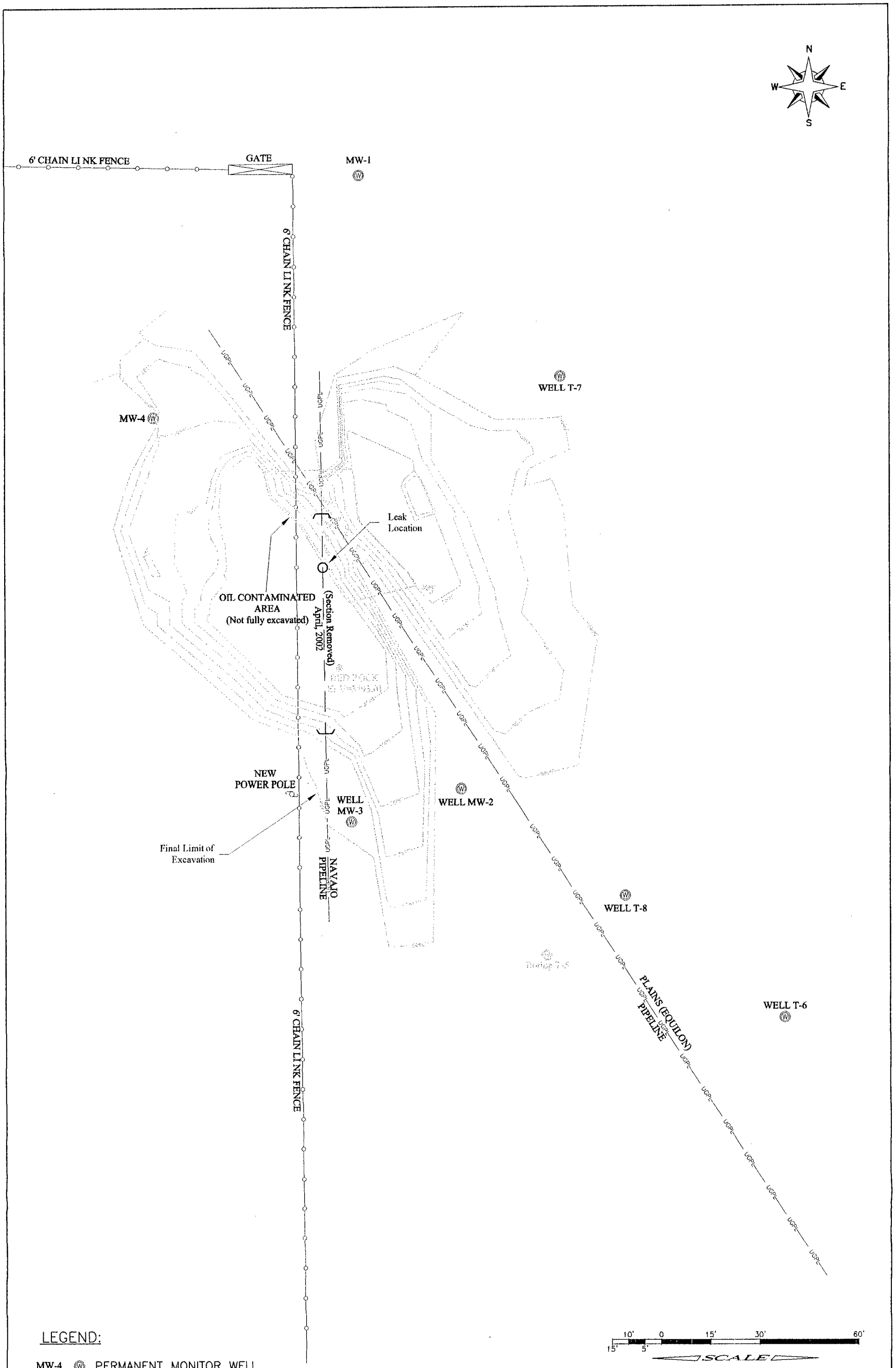
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

10' 0 15' 30' 60'
15' 5'
SCALE

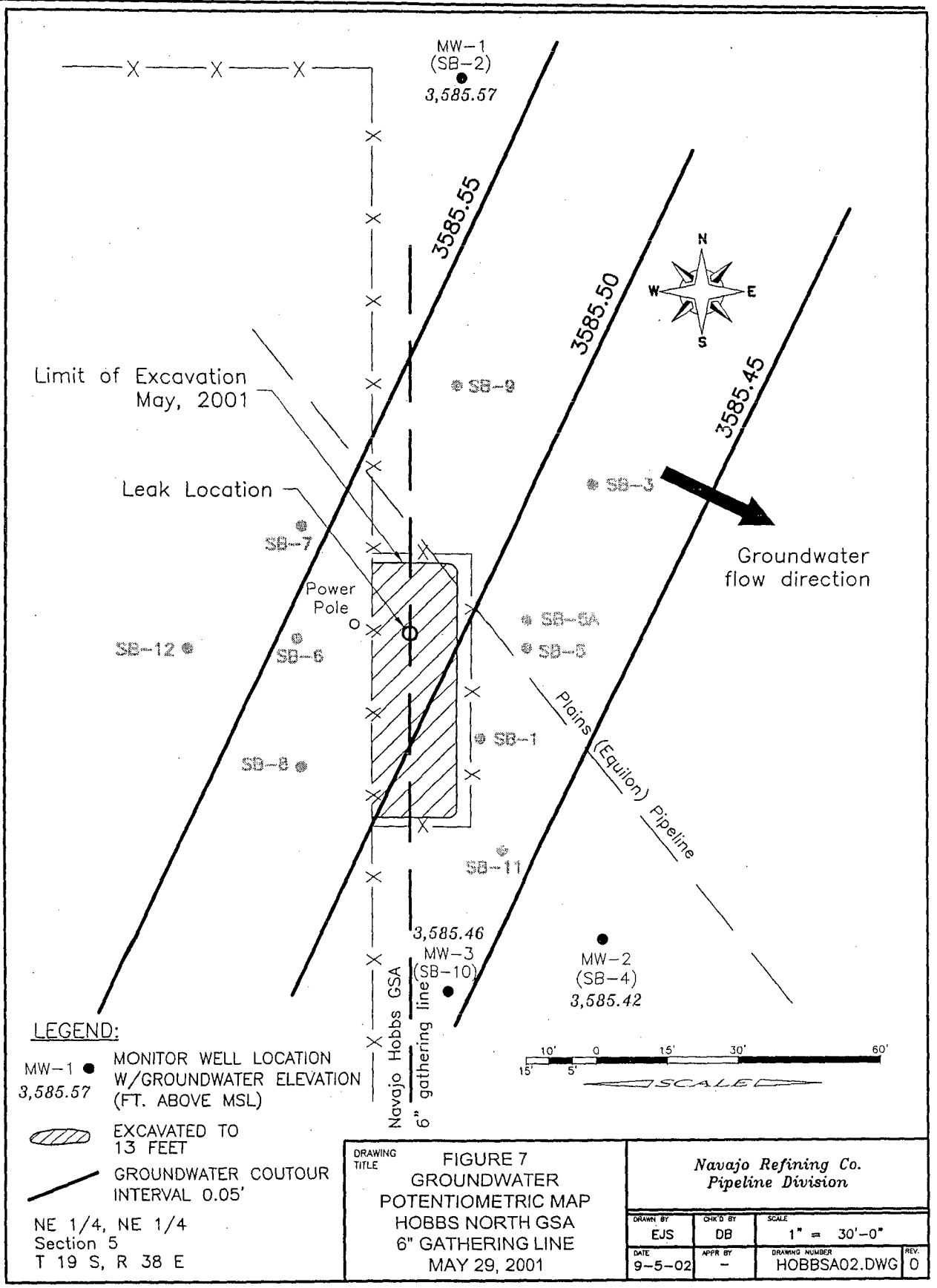
DRAWING TITLE
FIGURE 5
LOCATION OF SOIL BORINGS, SURFACE SOIL SAMPLES, AND FINAL LIMIT OF EXCAVATION
HOBBS NORTH GSA
6" GATHERING LINE
APRIL 30, 2002

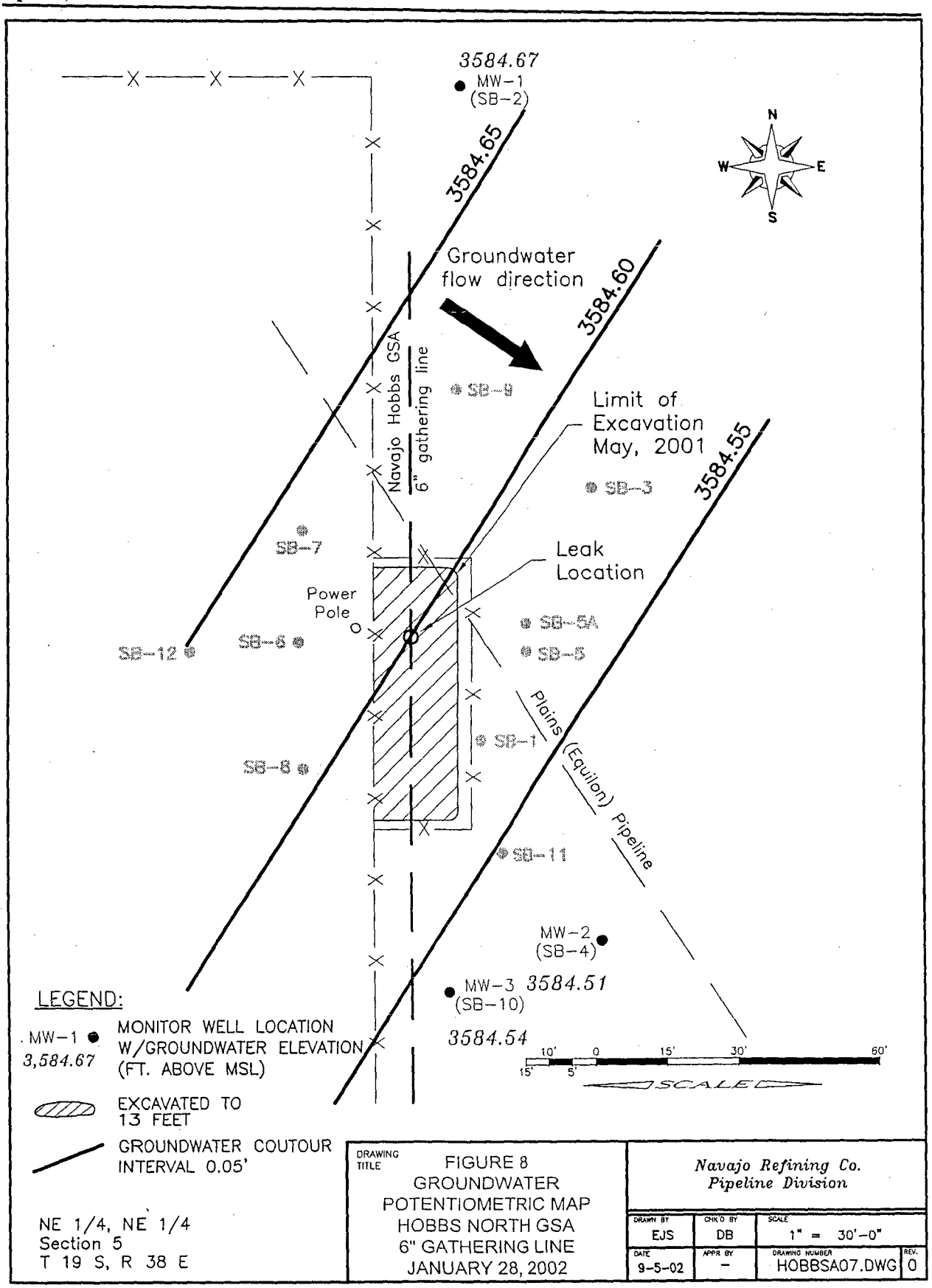
Navajo Refining Co.
Pipeline Division

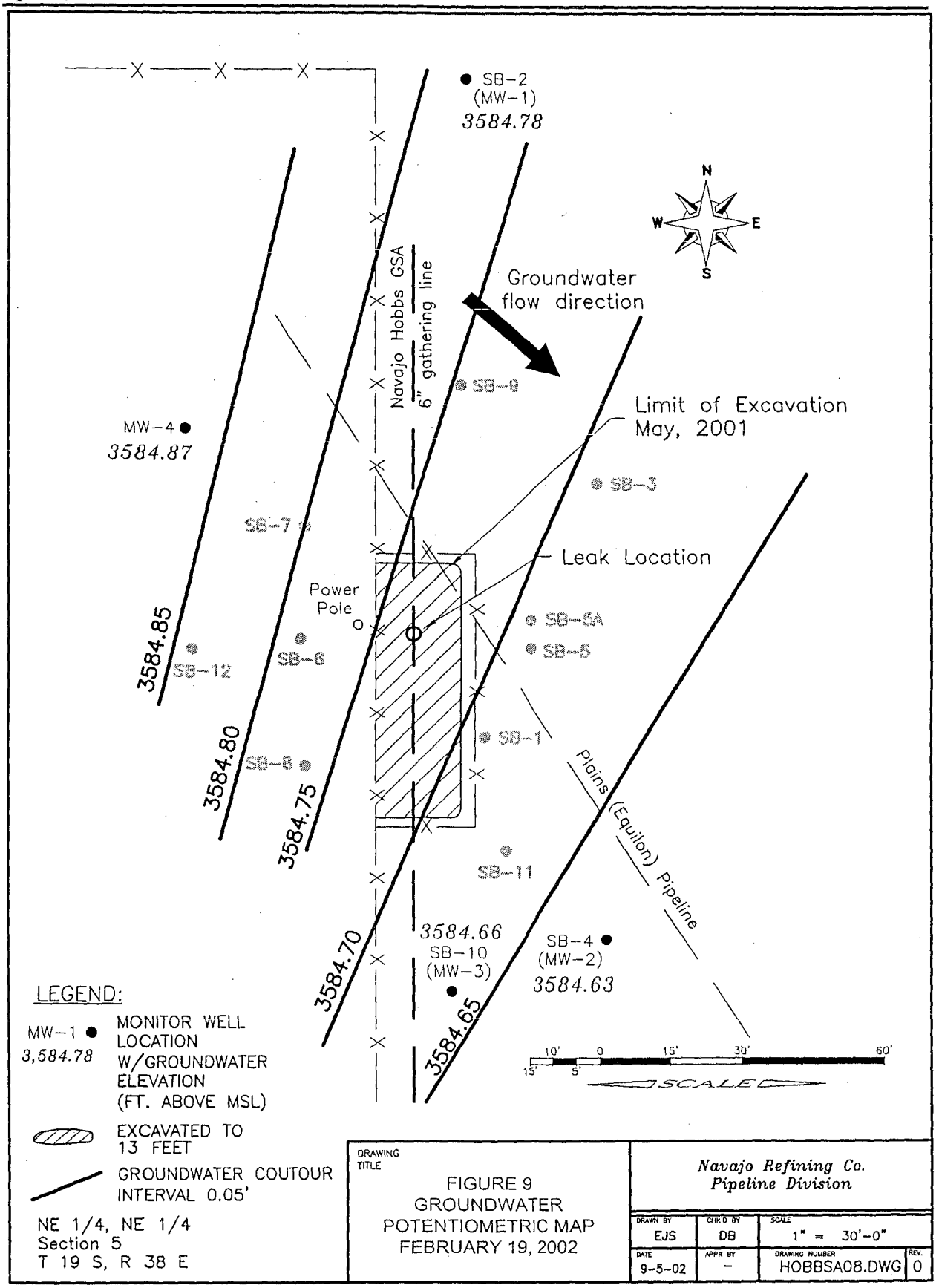
DRAWN BY	CHK'D BY	SCALE	
EJS	DB	1" = 30'-0"	
DATE	APPR BY	DRAWING NUMBER	REV.
9-5-02	–	NAVGSA02.DWG	0

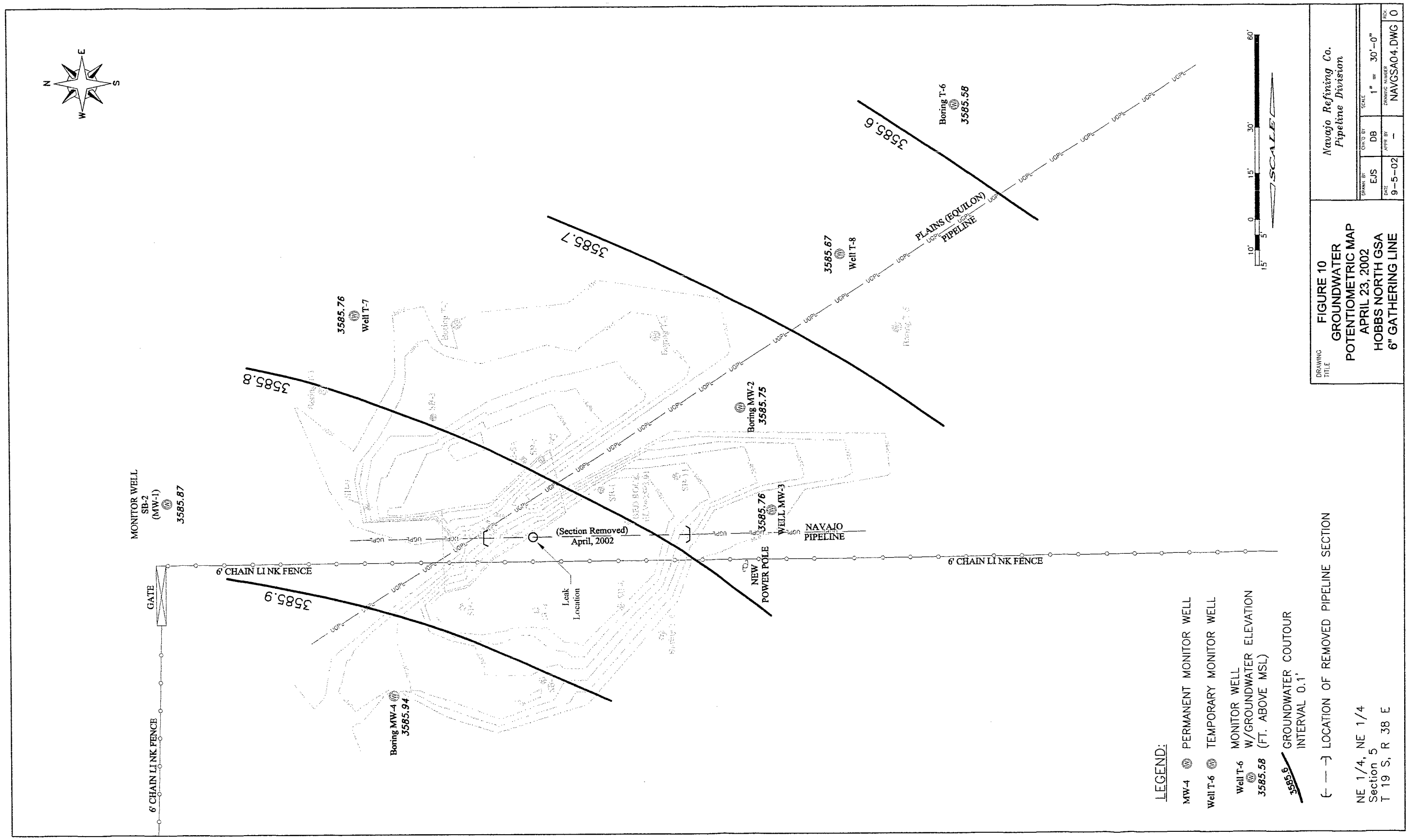


DRAWING TITLE: FIGURE 6 LOCATION OF MONITOR WELLS HOBBS NORTH GSA 6" GATHERING LINE MAY, 2002	*Navajo Refining Co.* *Pipeline Division*		
	DRAWN BY: EJS	CHK'D BY: DB	SCALE: 1" = 30'-0"
	DATE: 9-5-02	APPR BY: –	DRAWING NUMBER: NAVGSA03.DWG / REV.: 0


MW-1
(SB-2)
3,585.57
3585.55
3585.50
3585.45
N
W
E
S
Limit of Excavation
May, 2001
Leak Location
SB-9
SB-3
SB-7
Power
Pole
SB-5A
SB-5
SB-12
SB-6
SB-1
SB-8
SB-11
Groundwater
flow direction
Plains
(Equilon) Pipeline
3,585.46
MW-3
(SB-10)
MW-2
(SB-4)
3,585.42
Navajo Hobbs GSA
6" gathering line
10' 0 15' 30' 60'
15' 5'
SCALE
LEGEND:
MW-1 ● MONITOR WELL LOCATION
3,585.57 W/GROUNDWATER ELEVATION
(FT. ABOVE MSL)
EXCAVATED TO
13 FEET
GROUNDWATER COUTOUR
INTERVAL 0.05'
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
DRAWING TITLE
FIGURE 7
GROUNDWATER
POTENTIOMETRIC MAP
HOBBS NORTH GSA
6" GATHERING LINE
MAY 29, 2001
Navajo Refining Co.
Pipeline Division
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 30'-0"
DATE 9-5-02
APPR BY -
DRAWING NUMBER HOBBSA02.DWG
REV. 0


3584.67
MW-1
(SB-2)
3584.65
3584.60
3584.55
N
W
E
S
Groundwater
flow direction
Navajo Hobbs GSA
6" gathering line
SB-9
Limit of
Excavation
May, 2001
SB-3
SB-7
Leak
Location
Power
Pole
SB-5A
SB-5
SB-12
SB-6
Plains
(Equilon) Pipeline
SB-1
SB-8
SB-11
MW-2
(SB-4)
MW-3 3584.51
(SB-10)
3584.54
10' 0 15' 30' 60'
15' 5'
SCALE
LEGEND:
MW-1
3,584.67
MONITOR WELL LOCATION
W/GROUNDWATER ELEVATION
(FT. ABOVE MSL)
EXCAVATED TO
13 FEET
GROUNDWATER COUTOUR
INTERVAL 0.05'
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
DRAWING TITLE
FIGURE 8
GROUNDWATER
POTENTIOMETRIC MAP
HOBBS NORTH GSA
6" GATHERING LINE
JANUARY 28, 2002
Navajo Refining Co.
Pipeline Division
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 30'-0"
DATE 9-5-02
APPR. BY -
DRAWING NUMBER HOBBSA07.DWG
REV. 0


SB-2
(MW-1)
3584.78
N
W
E
S
Groundwater
flow direction
Navajo Hobbs GSA
6" gathering line
SB-9
Limit of Excavation
May, 2001
MW-4
3584.87
SB-3
SB-7
Leak Location
Power
Pole
SB-5A
SB-5
3584.85
SB-12
SB-6
3584.80
SB-8
SB-1
3584.75
Plains
(Equilon) Pipeline
SB-11
3584.66
SB-10
(MW-3)
SB-4
(MW-2)
3584.63
3584.70
3584.65
10' 0 15' 30' 60'
15' 5'
SCALE
LEGEND:
MW-1
3,584.78
MONITOR WELL LOCATION W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
EXCAVATED TO 13 FEET
GROUNDWATER COUTOUR INTERVAL 0.05'
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
DRAWING TITLE
FIGURE 9
GROUNDWATER
POTENTIOMETRIC MAP
FEBRUARY 19, 2002
Navajo Refining Co.
Pipeline Division
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 30'-0"
DATE 9-5-02
APPR BY -
DRAWING NUMBER HOBBSA08.DWG
REV. 0



DRAWING TITLE
FIGURE 10
GROUNDWATER
POTENTIOMETRIC MAP
APRIL 23, 2002
HOBBS NORTH GSA
6" GATHERING LINE

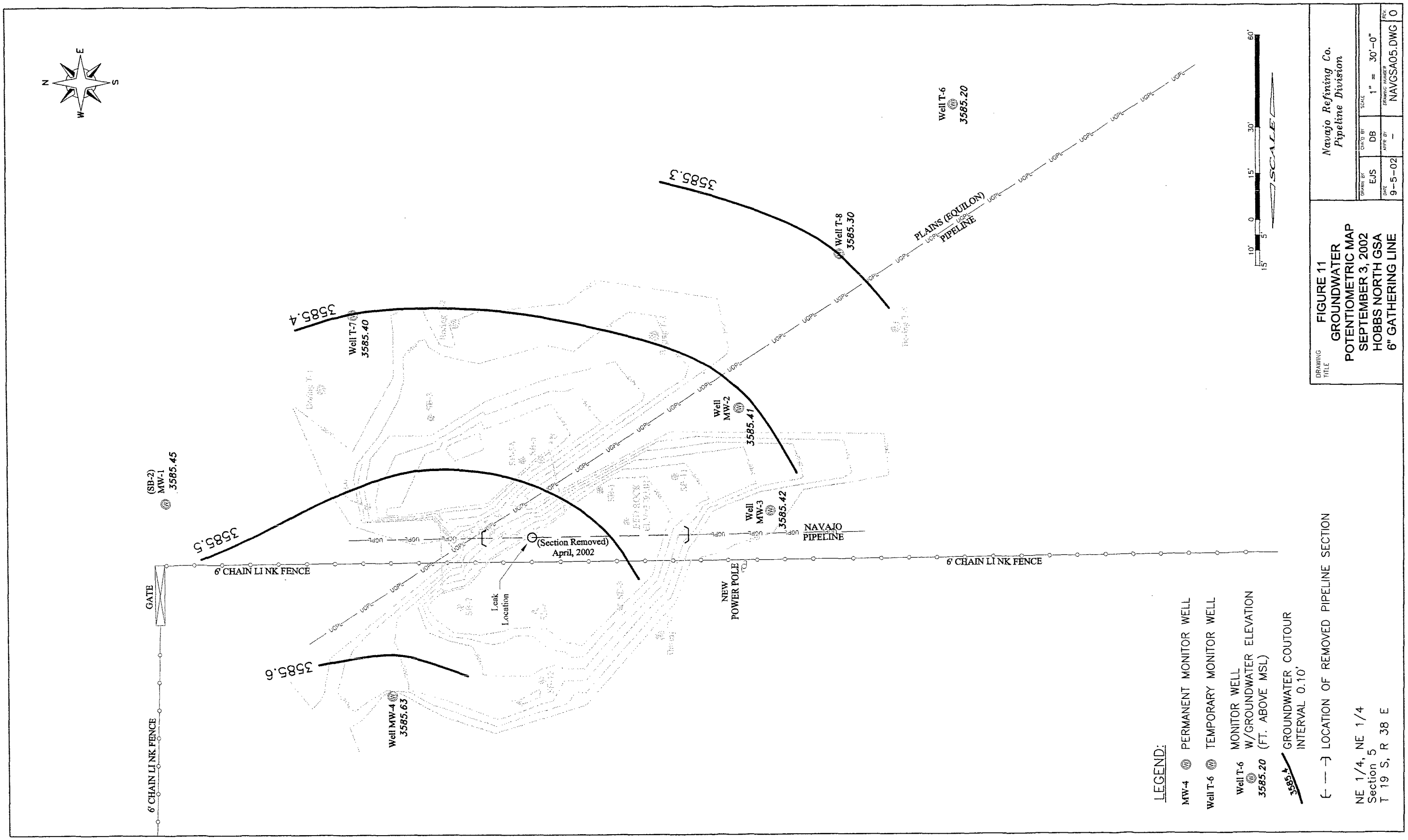
Navajo Refining Co.
Pipeline Division

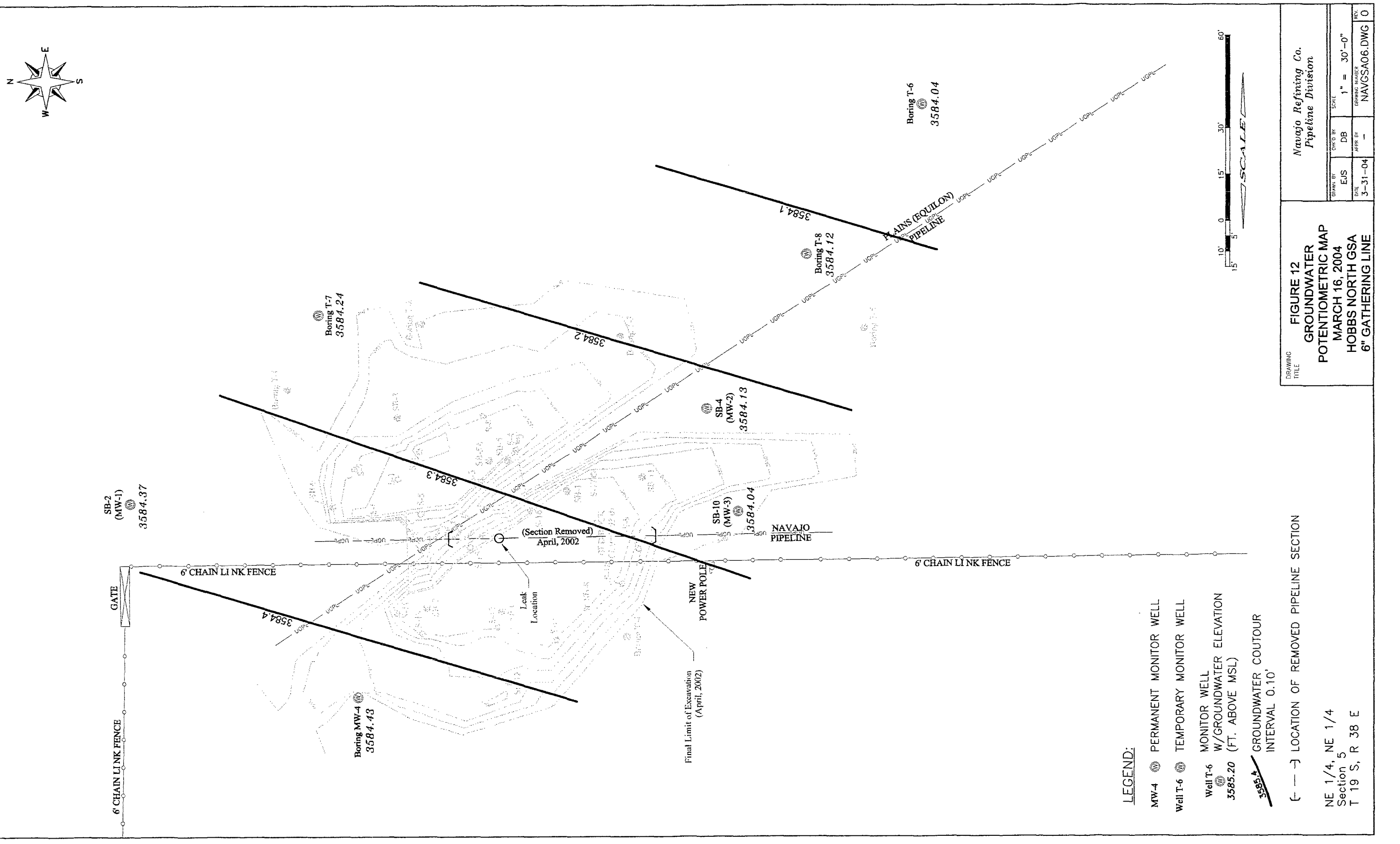
DRAWN BY	CHK'D BY	SCALE	REV.
EJS	DB	1" = 30'-0"	0
DATE	APPR BY	DRAWING NUMBER	
9-5-02	–	NAVGSA04.DWG	

LEGEND:

- MW-4 (W) PERMANENT MONITOR WELL
- Well T-6 (W) TEMPORARY MONITOR WELL
- Well T-6 (W) 3585.58 MONITOR WELL W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
- 3585.6 GROUNDWATER COUTOUR INTERVAL 0.1'
- ← — → LOCATION OF REMOVED PIPELINE SECTION

NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E


N
E
S
W
3585.3
3585.4
3585.5
3585.6
Well T-6
3585.20
Well T-8
3585.30
Well T-7
3585.40
Well MW-2
3585.41
Well MW-3
3585.42
(SB-2) MW-1
3585.45
Well MW-4
3585.63
PLAINS (EQUILON) PIPELINE
NAVAJO PIPELINE
(Section Removed) April, 2002
Leak Location
NEW POWER POLE
GATE
6' CHAIN LI NK FENCE
6' CHAIN LI NK FENCE
6' CHAIN LI NK FENCE
UGPL
SCALE
0
5'
15'
30'
60'
10'
15'
LEGEND:
MW-4 PERMANENT MONITOR WELL
Well T-6 TEMPORARY MONITOR WELL
Well T-6 MONITOR WELL
3585.20 W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
3585.4 GROUNDWATER COUTOUR INTERVAL 0.10'
LOCATION OF REMOVED PIPELINE SECTION
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
DRAWING TITLE
FIGURE 11
GROUNDWATER
POTENTIOMETRIC MAP
SEPTEMBER 3, 2002
HOBBS NORTH GSA
6" GATHERING LINE
Navajo Refining Co.
Pipeline Division
DRAWN BY EJS
DATE 9-5-02
CHK'D BY DB
APP'D BY –
SCALE 1" = 30'-0"
DRAWING NUMBER NAVGSA05.DWG
REV. 0


N
E
S
W
Boring T-6
3584.04
3584.1
PLAINS (EQUILON)
PIPELINE
Boring T-8
3584.12
Boring T-7
3584.24
3584.2
SB-4
(MW-2)
3584.13
3584.3
SB-2
(MW-1)
3584.37
SB-10
(MW-3)
3584.04
NAVAJO
PIPELINE
(Section Removed)
April, 2002
6' CHAIN LI NK FENCE
6' CHAIN LI NK FENCE
GATE
3584.4
Leak
Location
NEW
POWER POLE
6' CHAIN LI NK FENCE
Boring MW-4
3584.43
Final Limit of Excavation
(April, 2002)
10'
15'
0
15'
30'
60'
SCALE
Navajo Refining Co.
Pipeline Division
DRAWN BY EJS
CHK'D BY DB
APPR BY –
DATE 3-31-04
SCALE 1" = 30'-0"
DRAWING NUMBER NAVGSA06.DWG
REV 0
DRAWING TITLE
FIGURE 12
GROUNDWATER
POTENTIOMETRIC MAP
MARCH 16, 2004
HOBBS NORTH GSA
6" GATHERING LINE
LEGEND:
MW-4 PERMANENT MONITOR WELL
Well T-6 TEMPORARY MONITOR WELL
Well T-6 MONITOR WELL
3585.20 W/GROUNDWATER ELEVATION
(FT. ABOVE MSL)
3585.4 GROUNDWATER COUTOUR
INTERVAL 0.10'
LOCATION OF REMOVED PIPELINE SECTION
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

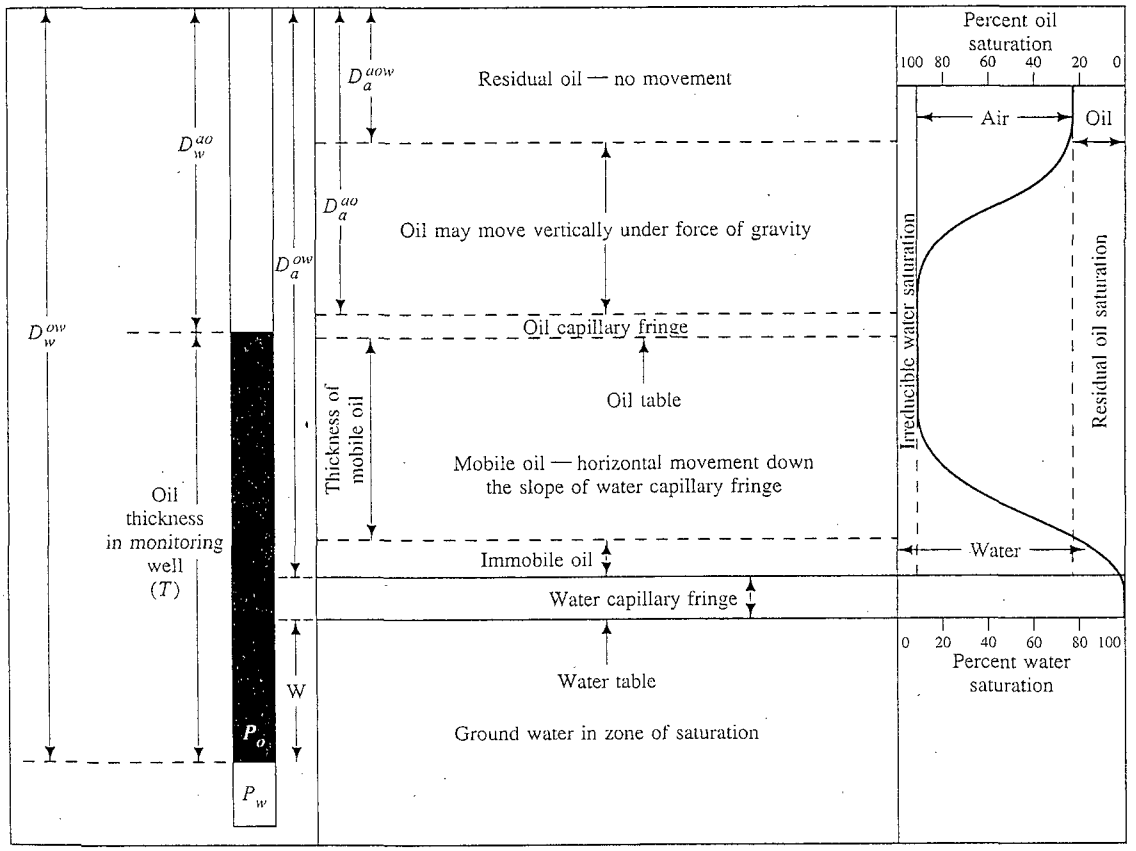
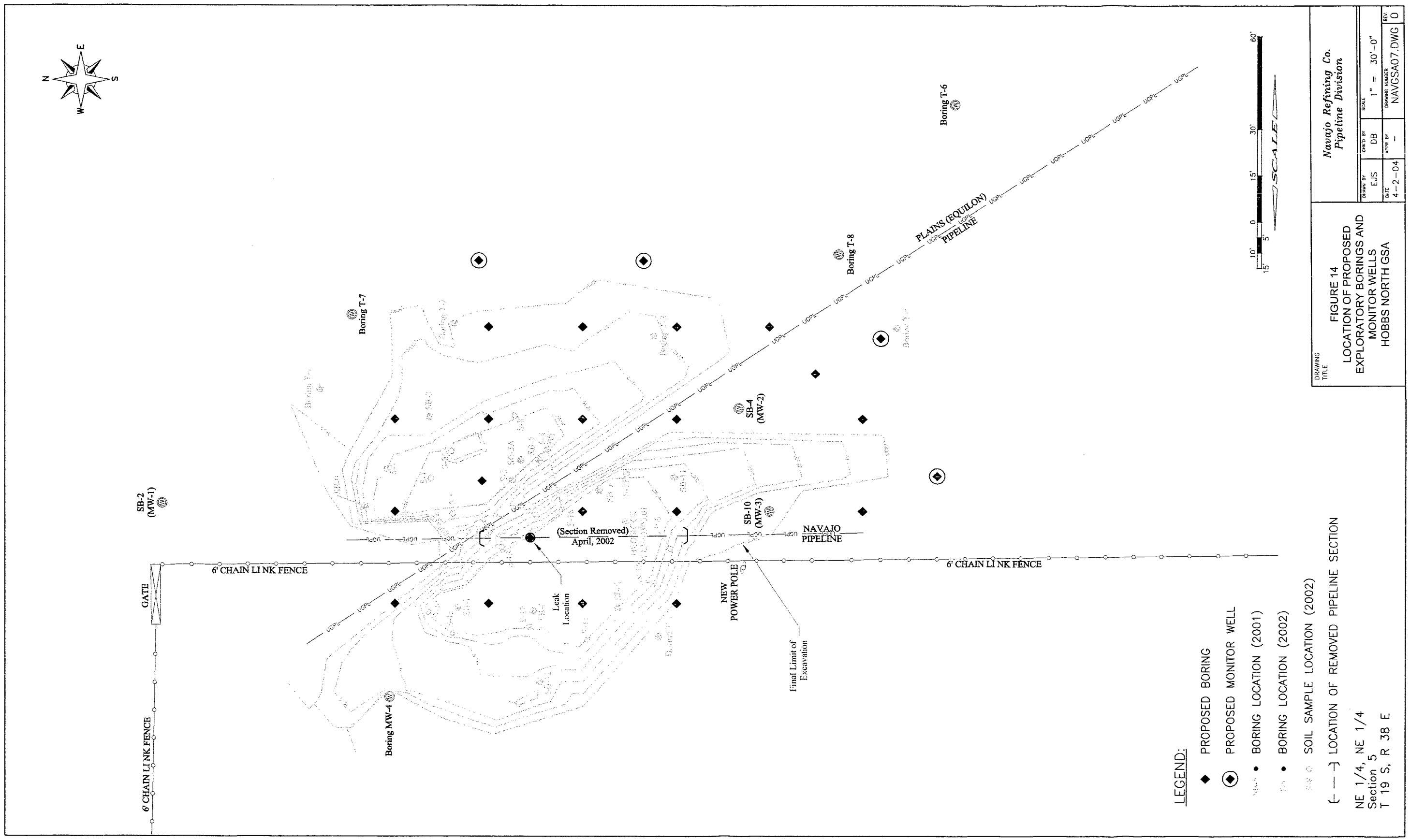


FIGURE 5.19 Comparison of distribution of mobile oil in an aquifer with the thickness of floating oil in a monitoring well for the case where a water capillary fringe exists below the zone of mobile oil.

(Reproduced from *Contaminant Hydrogeology*, by C.W. Fetter, Prentice-Hall, 1993)

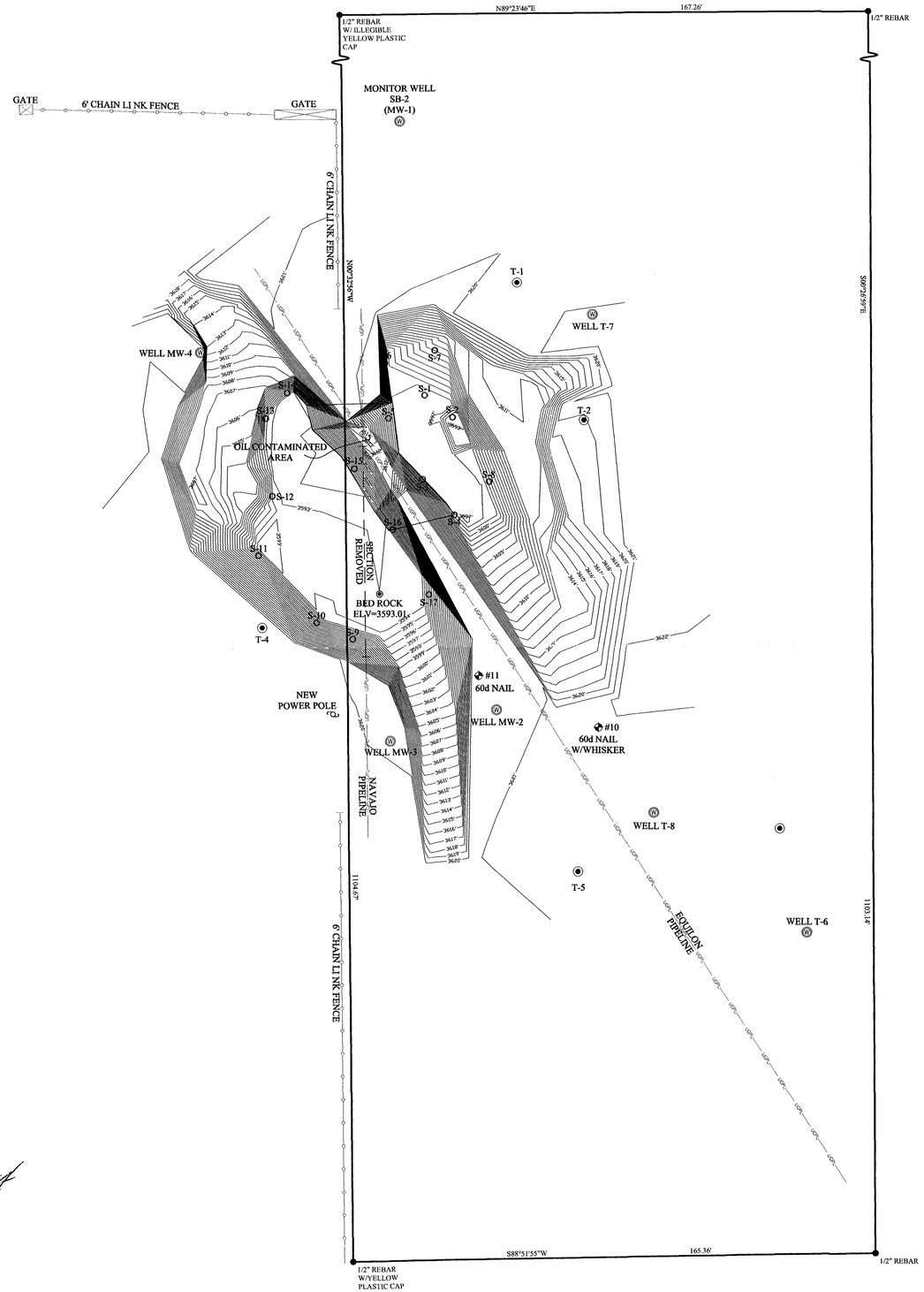
Figure 13. Distribution of Mobile Oil in an Aquifer with a Capillary Fringe and a Monitor Well



DRAWING TITLE
FIGURE 14
LOCATION OF PROPOSED
EXPLORATORY BORINGS AND
MONITOR WELLS
HOBBS NORTH GSA

Navajo Refining Co.
Pipeline Division

DRAWN BY	CHK'D BY	SCALE	REV
EJS	DB	1" = 30'-0"	0
DATE	APP'R BY	DRAWING NUMBER	
4-2-04	–	NAVGSA07.DWG	



BORING & WELL TABLE

WELL	NORTHING	EASTING	ELEVATION	DESCRIPTION
SB2 (MW-1)	618340.09	900535.34	3622.36	TOP OF CASING
T-1	618289.20	900572.72	3620.53	GROUND SURFACE
MW-2	618154.83	900566.43	3621.47	TOP OF CASING
T-2	618246.10	900594.17	3620.16	GROUND SURFACE
MW-3	618145.04	900532.68	3620.81	TOP OF CASING
T-4	618180.64	900492.25	3621.36	LAND SURFACE
MW-4	618266.79	900472.53	3621.19	TOP OF CASING
T-5	618104.41	900592.54	3621.36	GROUND SURFACE
T-6	618085.69	900665.00	3622.31	TOP OF CASING
T-7	618279.11	900596.89	3622.07	TOP OF CASING
T-8	618122.78	900616.50	3621.70	TOP OF CASING

SAMPLE TABLE

SAMPLE	NORTHING	EASTING	ELEVATION
S-1	618253.66	900543.66	3597.41
S-2	618246.86	900552.47	3592.39
S-3	618227.39	900543.03	3597.87
S-4	618216.24	900553.07	3596.69
S-5	618246.52	900532.22	3598.06
S-6	618263.62	900531.10	3598.59
S-7	618267.62	900546.81	3599.24
S-8	618226.67	900564.07	3599.07
S-9	618177.11	900520.95	3594.90
S-10	618182.21	900509.52	3599.73
S-11	618203.41	900491.08	3594.36
S-12	618222.10	900495.37	3594.03
S-13	618246.35	900493.26	3594.07
S-14	618254.29	900500.06	3593.00
S-15	618230.73	900521.34	3593.93
S-16	618211.57	900533.64	3592.86
S-17	618191.08	900545.10	3594.18

CONTROL FOR PIT TABLE

CONTROL POINT	NORTHING	EASTING	ELEVATION
#10	618149.47	900598.90	3621.65
#11	618165.53	900560.77	3620.17

NOTE 1:
TOTAL EXCAVATION CONSISTS OF 7,600± CUBIC YARDS OF MATERIAL.
NOTE 2:
REMAINING OIL CONTAMINATED AREA CONSISTS OF 250± CUBIC YARDS.
NOTE 3:
BOUNDARY INFORMATION SHOWN FOR INFORMATION PURPOSES ONLY. PROPERTY SHOWN IS DEEDED TO LEWIS F. AND MELTA F. WRIGHT IN LEA COUNTY DEEDS BOOK 440, PAGE 520.

CERTIFICATE OF SURVEY-
"I, Daniel R. Muth, New Mexico Professional Surveyor, hereby certify that this Topography Survey Plat was prepared from an actual ground survey performed by me or under my supervision, that this survey is true and correct to the best of my knowledge and belief, that this Topography Survey Plat and the field survey upon which it is based meet the Minimum Standards for Surveying in New Mexico, and that this survey is not a land division or subdivision as defined in the New Mexico Subdivision Act. This is a Topography Survey Plat of an existing tract or tracts.

Daniel R. Muth NMPS# 13239

DANIEL R. MUTH NEW MEXICO 13239 REGISTERED PROFESSIONAL SURVEYOR

6 April 2004
Date

BASIS OF BEARING:
BASIS OF BEARING FOR THIS SURVEY IS THE CITY OF HOBBS GIS CONTROL NETWORK. ALL CONTROL WAS ESTABLISHED BY GLOBAL POSITIONING SYSTEM REAL TIME SURVEYING METHODS FROM CONTROL STATION "PETTIGREW" 32°42'42.05083" NORTH LATITUDE 103°08'39.73125"W LONGITUDE ELEVATION 3638.77 FEET.

LEGEND

✥	CONTROL POINT
●	FOUND MONUMENT
◉	BORING
Ⓦ	WELL
○	SAMPLE SITE

PLATE 1
TOPOGRAPHIC SURVEY OF
EXCAVATION
NAVAJO HOBBS NORTH GSA SITE

PETTIGREW AND ASSOCIATES
1110 N. GRIMES HOBBS, N.M. 88240
(505)393-0927

PLAT OF TOPOGRAPHIC SURVEY FOR
SAFETY & ENVIRONMENTAL SOLUTIONS
HOBBS, NEW MEXICO

REV	DATE	DESCRIPTION	
2	04/06/2004	REVISION	
0	04/30/2002	FINAL PLAT	
00	04/25/2002	PRELIMINARY PLAT	2002.1050 DRN BY: A. GARCIA
	04/23/2002	DATE OF SURVEY	\ACAD Navajo Line\dwg\Navajo R2.dwg
			SHEET 1