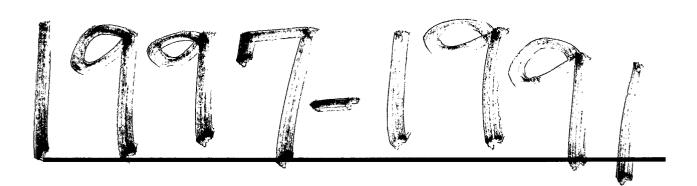


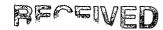
# **REPORTS**

YEAR(S):



# BOREHOLE LITHOLOGIC DATA SUBSURFACE HYDROCARBON INVESTIGATION NAVAJO REFINERY, ARTESIA, NEW MEXICO 1991 - 1997





SEP 3 0 1997

Environmental Bureau
Oil Conservation Division

prepared for:

Navajo Refining Company 501 East Main Street P. O. Drawer 159 Artesia, New Mexico 88210

September 1997



COVENANT TECHNICAL ASSOCIATES, INC.

12258 Mountain Haze NE, Albuquerque, NM 87122 (505) 856-1755

# BOREHOLE LITHOLOGIC DATA SUBSURFACE HYDROCARBON INVESTIGATION NAVAJO REFINERY, ARTESIA, NEW MEXICO 1991 - 1997



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Introduction

#### Introduction

Beginning in 1991, Navajo Refining Company commenced a drilling program to evaluate shallow subsurface conditions in the area immediately to the east of the Artesia refinery. The program was undertaken for several reasons. Initially, the program was designed to provide information as to the possible release of hydrocarbons from the process and product storage areas of the refinery and, if found, to provide information on the extent and magnitude of such releases. Information from investigative work conducted in 1992 was compiled and presented in a report to Navajo entitled "Investigation of the Subsurface Hydrocarbon Plume at the Navajo Refinery, Artesia, New Mexico." Recommendations presented in the 1992 report led to the installation of an extensive hydrocarbon recovery trench system east of the refinery along Bolton Road. Follow-up drilling was conducted in 1995 in an attempt to locate highly permeable zones which could be utilized for re-injection of treated water produced from the Bolton Road trenches and other product recovery units at the refinery. Additional data was collected during confirmatory drilling to assist in interpretation and evaluation of data generated from the electromagnetic (EM) surface geophysical surveys performed in 1996 and 1997.

Borehole and monitor well information collected during the subsurface investigations has been assembled and included in this volume. To date, over 200 boreholes (not including monitor wells) have been drilled in the area northeast, east and southeast of the refinery complex. Except for some borehole and monitor well data included with the 1992 investigation report and data presented in the RCRA reports of the contamination studies conducted along Three-Mile Ditch, borehole information has not been compiled or presented in a convenient and accessible form for potential use in future investigations or remedial actions. Consequently, the field borehole data was collected and entered into a PC Windows-based computer program which quickly generated a lithologic boring diagram to graphically provide information on subsurface features and drilling details. Interpretation is assisted by reference to the "Key to Symbols and Soil Classification" shown on the next page. Ultimately, the quality of the data provided in the boring logs is dependent on the type of drilling equipment used, the types of information collected and tests performed on each sample, and the skill and diligence of the person recording and interpreting the information.

The collective data reveals the existence of a near surface saturated zone (NSSZ) present at depths from 15 to 30 feet. The NSSZ consists of highly permeable gravel seams interbedded with fine grained silts and clays. The gravel zones, which result from fluvial deposition of high energy sediments transported by the ancestral Eagle Creek, are extremely variable in location and extent and overlain by 10 to 15 feet of silty clay and clay soils. Because no surface manifestation of the variable subsurface sedimentary features exists, the shallow boring and monitor well logs provide discrete-point information on below-ground characteristics. This information can be used to guide further efforts to locate permeable and/or hydrocarbon containing zones either for additional investigation or for installation of hydrocarbon remediation equipment.

# KEY TO SYMBOLS AND SOIL CLASSIFICATION

		. ; 3	AMPLE	TYPES	====== S <sub>.</sub> .	COM	IPRESSIVE	STRENGTH	TESTS
Thin-we		Split-	Rock w/Tes	table [	Disturbed	No Recovery	Hand Penetrometer	. Torvane Un	confined Triovial
Major Divisions				oup abols	Typical Names			Consistency Terms	
Size.	Coarse Than No.	avels r no	GW	Well-Graded C		led Gravels, es, Little or			
200 Sieve	FLS lif of Cod GER Than Size.	Clean Gravels (Little or no Fines)	GP			aded Gravels es, Little or	s, Gravel—Sand no Fines.		
SOILS Than No. 2	GRAVELS Than Half of on is LARGER 4 Sieve Size	fith Fines ciable of Fines)	GM		Silty Gro	ivels, Gravel- Mixtures.	-Sand-Silt	Penetration	Descriptive
11	More The Fraction	Gravels With Fines (Appreciable Amount of Fines)	GC		Clayey G	ravels, Grave Mixtures.	el-Sand-Clay	Resistance, Blows/Foot* 0-4 4-10	Term  Very Loose Loose
	Coarse Than No.	Sands or no is)	SW			led Sands, G ittle or no l	Gravelly Sands, Fines.	10-30 30-50 Over 50	Medium Dense Dense Very Dense
CC.	Z S S	Clean (Little Fin	SP			-Graded San Is, Little or			
CC, SE-G	SANDS Than Half on is SMALLE 4 Sieve S	Sands With Fines (Appreciable Amount of Fines)	SM		Silty Sa	nds, Sand-S	Silt Mixtures.	* Based on driving a split—barr	
More	More Fraction	Sands W (Appr Amount	SC		Clayey So	ands, Sand-	Clay Mixtures.		
Than No.		Less	ML		Rock Flour		y Fine Sands, yey Fine Sands ight Plasticity.		
SOILS SMALLER 1 ze.	, YS	Liquid Limit Less Than 50	CL		Plastici	Clays of Lo ty, Gravelly ( Silty Clays,	ow to Medium Clays, Sandy Lean Clays.	Compressive	
	and CLAYS	Liqu	OL			Silts & Organ of Low Plast	nic Silty Clays ticity.	Compressive Strength, ton/sq ft  0 to 0.25	Descriptive Term Very Soft
FINE-GRAINED Half of Material is 200 Sleve SI	SILTS ar	Greater 50	МН		Diatoma	inic Silts, Mi ceous Fine : Soils, Elastic	Sand or Silty	0.25 to 0.50 Soft 0.50 to 1.00 Firm 1.00 to 2.00 Stiff 2.00 to 4.00 Very Stiff Over 4.00 Hard	
FINE Than Half	S	Liquid Limit Gr Than 50	СН		Inorgania	Clays of H Fat Clay	igh Plasticity, s.		
More		Liqui	ОН			Clays of Me sticity, Organ	dium to High nic Silts.		
Ref. Unified Soil Classification System (ASTM D 2487)									



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

40 -

Date Started: Time Started

Date Completed

: 10/03/91 : N/A

: 10/03/91

Drilling Method:

Sampling Method:

: Solid Stem Auger : Cuttings

Drilled By:

: Frank's Rathole Srv.

		Arte	esia, New Mexico	Hole Diameter:	: 10"	Logged By:	: Z.R. Sherman
Depth in Feet	GRAPHIC	USCS	DESCRI	PTION			
0 -							
5 -		ML	Brown loam				
			Caliche soil				
10 -			Gray clay, H/C odor, staining(?	') at 11 ft.			
15		CL	16-19 ft. gravelly(?) clay, silt, F	H/C odor			
20	1/						
	9/07	GC	Gravel, water				
25	1/		Silty				
10-11-010 10-11-01		CL					
30	1	<b>4</b>	Notes:		<del></del>		
avoile1110-	1		Notes of Zeke Sherman. Descincomplete and unreadable; m				
C:MIECH46/mayori9110-03-510off91-01 bor			Location SE of fire training cer of drilling, hole caved to 22.6 f Product TSTM on 10/04. Refir back hole with cuttings.	t., DTW 7.5 ft.	ed		
7861-87-8	4		DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase liq	troleum hydrocarbo uid, TSTM=Too sm	on nall to measure		



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Date Started:

: 10/03/91

Drilling Method:

: Solid Stem Auger

Artesia, New Mexico

Time Started Date Completed : N/A : 10/03/91

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 10"

Logged By:

: Z.R. Sherman

	Depth in Feet	GRAPHIC	nscs	DESCRIPTION
	0 - - - 5 - -			Brown loam
	- 10 - - - - - 15 -		ML	13-15 ft. Gray clayey silt, H/C odor
	20 -	-		Gray-brown silt, H/C odor  Gray silty clay, H/C (product or odor?)
1-02.bor	25	5/09 9/09	CL	Top of gravel, free H/C to water
C:\MTECH46\mavoff91\10-03-91\off91-02.bor	30	9/07	GC	Notes:
09-29-1997 C:\MTECH46	35	-		Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).  Location W. of fire training center, approx. 75 ft. north of E-W dirt road. At completion of drilling, hole caved to 23 ft., DTW 7.6 ft. H/C TSTM on 10/04. Refinery workers plugged back hole with cuttings. DTW=Depth to water, H/C=Petroleum hydrocarbon, NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

Hole Diameter:

: 10/03/91

: 10/03/91

: N/A

: 10"

Drilling Method:

Sampling Method:

: Solid Stem Auger

: Cuttings Drilled By:

: Frank's Rathole Srv.

: Z.R. Sherman Logged By:

Depth nscs **DESCRIPTION** in Feet 0 Brown loam 10 Black staining, H/C odor Gray clayey silt 15 ML 20 25 30 Notes:

C:\MTECH46\mavoff91\10-03-91\off91-03.bor

35

40

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location south of MW-28. Approx. 0.25 in. product on 10/04. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

Date Completed

: 10/03/91 : N/A

: 10/03/91

Drilling Method:

: Solid Stem Auger : Cuttings

Sampling Method: Drilled By:

: Frank's Rathole Srv.

<u> </u>			esia, inew iviexico	Hole Diameter:	: 10"	Logged By:	: Z.R. Sherman
Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION			
5 -		ML	0-14 ft. Clayey silt; gray, tan an	d white; gypsiferous			
20			H/C odor at 18 ft., gasoline sm	ell, water at 18 ft.(?)			
25			Total depth 24 ft.(?)				
30 35			Notes:  Notes of Zeke Sherman. Descincomplete and unreadable; m.		nahle(?)		
35			Location approx. 250 ft. north of TSTM on 10/04. Refinery work hole with cuttings.  DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase liq	of 91-02. Product ers plugged back troleum hydrocarbon		re	



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

Hole Diameter:

: 10/03/91 : N/A

: 10/03/91

: 10"

Drilling Method:

: Solid Stem Auger

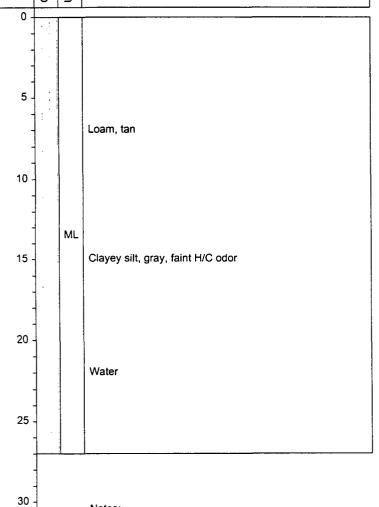
Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

Depth in Feet	RAPHIC	SCS

#### **DESCRIPTION**



#### Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location approx. 550 ft. north of 91-02. Product TSTM on 10/04. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

97 C:MTECH46\mavoff91\10-03-91\off91-05.bor

35

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20 100 00



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/03/91

Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

Time Started
Date Completed
Hole Diameter:

: N/A : 10/03/91

: 10"

Drilled By: Logged By:

: Frank's Rathole Srv. : Z.R. Sherman

Depth in	<b>APHIC</b>	SS	DESCRIPTION
Feet	GR.	OSO	
0 -			
"	: i	[	

Loam, brown

Clayey silt, tan, gypsiferous

ML

Notes:

Water

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location approx. 1000 ft. north of 91-02. Product TSTM on 10/04. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

997 C:\MTECH46\mavoff91\10-03-91\off91-06.bor

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25

30

35

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

: 10/03/91 : N/A

Date Completed : 10/03/91 Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

-			Art	esia, New Mexico	Hole Diameter: : 10"			
	Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION			
	0 -							
	- - - 5 - -							
	- - 10 -							
	15 -			No H/C odor or fluid				
	20							
100.70-16	25							
5-9 : WIR	30	-						
0-01/16		-		Notes:	orintiana camatimas			
тамон		1		Notes of Zeke Sherman. Descincomplete and unreadable; m	arked where questic	onable(?).		
C:\M ECH46\mayoff91\10-03-91\0ff91-0	35	-		Location in field approx. 600 ft and 900 ft. east of old city was plant. No lithologic information DTW measured 12 ft., no prod plugged back hole with cutting	stewater treatment in log book. On 10/ luct. Refinery worke	04		

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/03/91

Drilling Method:

: Solid Stem Auger

Time Started **Date Completed**  : N/A : 10/03/91 Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 10"

Logged By:

: Z.R. Sherman

				Hole Diameter 10
	Depth in Feet	GRAPHIC	nscs	DESCRIPTION
	0 -			
	5 - - - - - - 10 -			Clayey loam, brown
	-	1	ML	
	- - - 15 - -			Clayey silt, gypsiferous
	20 -			Water, no H/C odor or fluid
	25			
91-08.bor		- - - -		
C:\MTECH46\mavoff91\10-03-91\off91-08.bor	30	-		Notes:
5\mayoff91		-		Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).
:MTECH46	35	1		Location approx. 1250 ft. north of 91-01. No product measured on 10/04. Refinery workers plugged back hole with cuttings.
397 C		 		DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/03/91

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : N/A : 10/03/91 Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Hole Diameter:

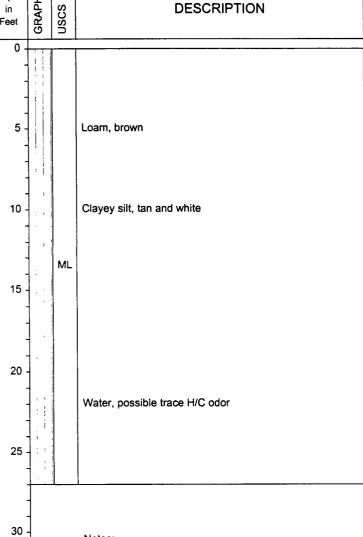
: 10"

Logged By:

: Z.R. Sherman

GRAPHIC Depth Feet

#### **DESCRIPTION**



Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location approx. 1000 ft. north of 91-01. Product TSTM on 10/04. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

C:\MTECH46\mavoff91\10-03-91\off91-09.bor

35

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/03/91 : N/A

: 10/03/91

Drilling Method: Sampling Method: : Solid Stem Auger

Company

Time Started

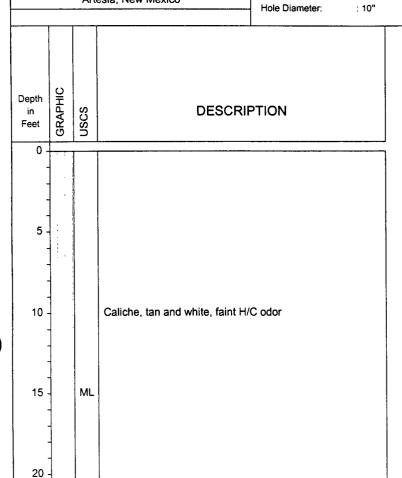
Date Completed

Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman



H/C odor and product on water

C:\MTECH46\mavoff91\10-03-91\off91-10.bor

25

30

35

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Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location approx. 600 ft. north of 91-01. Product TSTM on 10/04. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/04/91

Drilling Method:

: Solid Stem Auger

Time Started

Date Completed

Hole Diameter:

: N/A : 10/04/91

: 10"

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

	Depth in Feet	GRAPHIC	nscs	DESCRIPTION
	0 - - - - 5 -		ML	Loam, brown
	- - 10 - -		CL	11 ft. Silty clay, black, no H/C odor
	15 -		ML	13 ft. Clayey silt, gray, H/C odor  21 ft.(?) H/C odor and NAPL
	25			
	30	-		Notes:
C: WILEOUTE WITCH	35			Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).  Location approx. 50 ft. south of KWB-10. On 10/07 top of fluid 6.3 ft.(?), top of water approx. 2.0 ft(?). Refinery workers plugged back hole with cuttings.  DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

C:\MTECH46\mavoff91\10-03-91\off91-11.bor

700 20 000

40 -



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/04/91

Drilling Method:

: Solid Stem Auger

Time Started Date Completed Hole Diameter:

: N/A : 10/04/91

: 10"

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

	Depth in Feet	GRAPHIC	nscs	DESCRIPTION	
	0 -				
	- - - 5 -			Loam, brown	
	- - 10 -			9.5 ft. Clayey silt, black, trace of H/C odor	
	- - 15 -		ML	14 ft. Clayey silt, gray, H/C odor	
	20			18 ft. Sandy silt, dripping with jet fuel, water, indication of migrating H/C in zone above water zone	
2.bor	25				
)-03-91\off91-1	30			Notes:	
ff91/10				Notes of Zeke Sherman. Descriptions sometimes	
C:\MTECH46\mavoff91\10-03-91\off91-12.bor	35			incomplete and unreadable; marked where questionable(?).  Location approx. 500 ft. west of KWB-10 in field north of dirt road. On 10/07 indication of NAPL in caved hole. Refinery workers plugged back hole with cuttings.	
29-1997				DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure	



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/04/91

Drilling Method:

: Solid Stem Auger

Time Started
Date Completed

: N/A : 10/04/91 Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 10"

Logged By:

: Z.R. Sherman

Ţ			-		Hole Diameter:	: 10"	Logged By:	: Z.R. Snerman
	Depth in Feet	GRAPHIC	USCS	DESCRIF	PTION			
	0 -		ML	Topsoil, brown 2 ft. Caliche				
	5 - - -			5 ft. Silty loam, light brown				
	- 10 -							
	15 -		ML	13.5 ft. Clayey silt, gray				
1.00	20			Water (18 ft.?), faint H/C odor,	no NAPL			
bor	25			Notes: Notes of Zeke Sherman. Desc	criptions sometimes			
C:\MTECH46\mavoff91\10-03-91\off91-13.bor	30			incomplete and unreadable; m ZRS measurement on 10/11/9 Location in "boneyard" east of boring OS 95-15. Refinery wor hole with cuttings.	arked where question 1 found approx. 1/4 in TEL area near 1995			
9-1997 C:\MTECH46\ma	35			DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase liq	troleum hydrocarbon uid, TSTM=Too small	to measure		

C:\MTECH46\mavoff91\10-03-91\off91-13.bor



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

Date Completed

Hole Diameter:

: 10/04/91 : N/A

: 10/04/91 : 10"

Drilling Method:

Sampling Method:

: Solid Stem Auger

Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

	Depth	HIC						
	in Feet	GRAPHIC	nscs	DESCRIPTION				
	0 - - -		ML	Top soil, brown				
	5 - -			(no further soil descriptions)				
	- - 10 -							
	15 -							
	20			18 ft.(?) H/C and NAPL, not as much water				
	20			·				
i	25							
				Notes:				
, , , , , , , ,	30			Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).				
		-		ZRS measurement on 10/11/91 found approx. 1/4 in. H/C				
	35	-		Location in field east of old wastewater treatment plant, approx. 150 ft. east of security fence and 750 ft. south of Eagle Draw fence. Location near 1995 boring OS 95-06. Refinery workers plugged back hole with cuttings.				
	40			DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure				

C:\MTECH46\mavoff91\10-03-91\off91-14.bor



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/04/91

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : N/A

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

: 10/04/91

		Arte	esia, New Mexico	Hole Diameter:	: 10"	Logged By:	: Z.R. Sherman
Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION			
0 -		ML	Loon too and brown				
_	_	IVIL	Loam, tan and brown  2 ft. Caliche, white				
-			White				
5 -			(no further soil descriptions)				
-							
-							
10 -							
-							
-		FO					
15 - ,							
-							
-							
20 -			20 ft. Water, no H/C odor, no N	IAPL			
-							
	<b> </b>						
25 -			Notes:				
			Notes of Zeke Sherman. Descincomplete and unreadable; ma	criptions sometimes arked where question	onable(?).		
			ZRS measurement on 10/11/9				
30 -	1		Location in field east of old war plant, approx. 100 ft. east of se				
	-		250 ft. south of Eagle Draw fer 1995 boring OS 95-02. Refiner hole with cuttings.	nce. Location near	back		
35	-		DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase liq	troleum hydrocarbo	n all to measure		
,	1		422222 622	,			
-	1						

40 -



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/08/91

Drilling Method:

: Solid Stem Auger

A de alla Maria

Time Started

Date Completed

: N/A : 10/08/91 Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By:

		Aite	esia, New Mexico	Hole Diameter:	: 10" Logged By: : Z.R. Sherman				
Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION					
0 -			Loam, brown						
			Becomes moister						
-									
5 - -	!								
-									
10 -		ML							
-									
-			13 ft. Caliche soil, white, calich	e nodules					
15 -									
-									
-									
20 -	7		Grades into brown clay						
-									
25 -									
-		CL							
-									
30 -			30 ft. Water, no H/C odor, no N	NAPL					
	1//								
			Notes:						
35 ·	1		Notes of Zeke Sherman. Descincomplete and unreadable; m	criptions sometimes arked where questi	onable(?).				
			ZRS measurement on 10/11/9	1 found no indication	n of H/C				
40	1		Location in Armstrong field sor Refinery workers plugged back	uth of Bearing Supp k hole with cuttings.	ly				
	}		DTW=Depth to water, H/C=Pe	troleum hydrocarbo	n				
-	-		NAPL=Non-aqueous phase liq	uia, 151M=Too sm	all to measure				
45 -									

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/08/91

Drilling Method:

: Solid Stem Auger

Time Started

Date Completed

Hole Diameter:

: N/A : 10/08/91

: 10"

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

Depth in Feet	GRAPHIC	nscs	DESCRIPTION				
0 -							
- - - 5 -			Loam, brown				
- 10 - -	ML	10 ft. Clayey silt, tan					
15 -			14 ft. Gravel in clayey silt, well rounded, faint H/C odor  17-19 ft. (?) sorted, more H/C odor at top of interval				
Ì.			(/, 60.10.5)				
	<u> </u>	1	10.00				
20		GC	19 ft. Gravel becoming moist 20 ft. Gray zone in gravel, trace NAPL				
25		CL	22 ft. H/C odor, drilling out of gravel into gray silty clay				
30			Wet to total depth				
35			Notes:  Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).  ZRS measurement on 10/11/91 found H/C TSTM Location in Armstrong field south of Coll farm house. Refinery workers plugged back hole with cuttings.				

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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09-29-1997



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/08/91

Orilling Method:

: Solid Stem Auger

Time Started Date Completed : N/A : 10/08/91 Sampling Method:

Cuttings : Frank's Rathole Srv.

: 10"

Drilled By:

	<del></del>		Hole Diameter: : 10"	Logged By:	: Z.R. Sherman
Depth in Feet	GRAPHIC	nscs	DESCRIPTION		
0 -			Lagra braum eleviev		!
5 -			Loam, brown clayey		
} .	. ;		8 ft. White caliche soil		
10		ML	12 ft. Grades to tan damp soil		
15					
20		CL	18 ft. Gray clayey soil  21 ft. faint H/C odor  22 ft. graveliñ seams, large, well rounded, (?) sorfed		
25	909 909 909	GC	24 ft. Water, H/C odor, NAPL		
30	9/09		Notes:		
30			Notes:  Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?)  ZRS measurement on 10/11/91 found H/C TSTM  Location in Armstrong field south of highway, midway between Coll farm house and tenant farmer. Refinery workers plugged back hole with cuttings.	i.	
40	1		DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to mea	asure	



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/08/91

Drilling Method:

Time Started : N/A Sampling Method:

: Solid Stem Auger : Cuttings

**Date Completed** Hole Diameter:

: 10/08/91

: 10"

Drilled By:

: Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

ĺ					note planteter 10	Logged B	y Z.K. Sheman
	Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION		
	0 -			Tan silty clay loam			
	5 -		ML	7 ft. White/tan caliche soil			
)	10 - - - -		ML	12 ft. Brown clayey silt			
	15 - - -			16 ft. Trace H/C odor			
	20 <i>-</i> -	9/0 y 9/0 y 9/0 y		19 ft. Top of gravel, water. H/C	Todor and NAPL		
91-19.bor	25 - - -	909	GC	19-30 ft. Gravel, unconsolidate	ed, in silt/clay		
1/10-08-91\off	30 -	9,09.		Notes:			
3-29-1997 C:\MTECH46\mavoff91\10-08-91\off91-19.bor	35 -			Notes of Zeke Sherman. Descincomplete and unreadable; m On 10/11/91 ZRS measured 2 Location in Armstrong field so house. Refinery workers plugg DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase liq	arked where questionable(?) ft. of H/C  uth of tenant farmer led back hole with cuttings.  troleum hydrocarbon		

40 -



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/08/91

Drilling Method:

: Solid Stem Auger

any

Time Started

Date Completed

: N/A : 10/08/91 Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 10"

Logged By:

: Z.R. Sherman

				—	7: : Z.R. Snerman	
Depth in Feet	GRAPHIC	nscs	DESCRIP	TION		
0 ~			Tan silty clayey loam			
5 -						
- - 10 -				,		
- - 15 -		ML	13 ft. Mottled white/brown silty 15 ft. Gray clayey silt, H/C odor			
20			19 ft. Water			
25			25 ft.(?) Gray clayey silt, H/C oc			
30	-		Notes:			
35			Notes of Zeke Sherman. Descrincomplete and unreadable; ma Measurement by ZRS on 10/11. Location in Armstrong field sout farmer house. Refinery workers cuttings.	rked where questionable(?) 91 found H/C TSTM heast of tenant plugged back hole with		
			DTW=Depth to water, H/C=Petr NAPL=Non-aqueous phase liqu	oleum nydrocarbon id, TSTM=Too small to mea	sure	

997 C:\MTECH46\mavoff91\10-08-91\off91-20.

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Brown loam

Date Started: Time Started : 10/08/91 : N/A

**Drilling Method:** 

Sampling Method:

: Solid Stem Auger : Cuttings

**Date Completed** Hole Diameter:

: 10/08/91 : 10"

Drilled By: Logged By:

: Frank's Rathole Srv. : Z.R. Sherman

epth in Feet	GRAPHIC	nscs

Feet

#### **DESCRIPTION**

]			BIOWITIOATT
-			
5 -			
4	.		
10			
-	1		13 ft. Brown clayey loam, mottled
15 -	:		10 II. Brown dayey loan, moded
, ,		ML	17 ft. Wet caliche soil
-			
20 - -	,		
-			
25 -			
-	:		
30 -			
50 -			
-		GP	Water no H/C odor, no NAPL Gravel and sand
35 -	•••	1	Notes:
- - -			Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).
40 -			Measurement by ZRS on 10/11/91 found no indication of H/C
-			Location in Armstrong field southeast of Diamond Shamrock station. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/09/91

Drilling Method:

: Solid Stem Auger

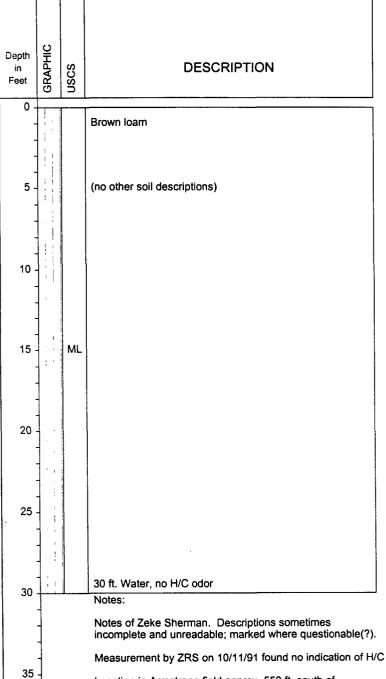
Time Started Date Completed : N/A : 10/09/91 Sampling Method:

: Cuttings

Hole Diameter:

: 10"

Drilled By: Logged By: : Frank's Rathole Srv. : Z.R. Sherman



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35

40

Location in Armstrong field approx. 550 ft. south of OS 91-16. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Date Started:

Hole Diameter:

: 10/09/91

Drilling Method:

: Solid Stem Auger

Artesia, New Mexico

Time Started Date Completed : N/A : 10/09/91

: 10"

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

Ì				Hole Diameter: : 10"
	Depth in Feet	GRAPHIC	nscs	DESCRIPTION
	0 -			
	5		ML	10 ft. Wet caliche soil
	20 -			20 ft. Brown clay
91-23.bor	25		Cr	25 ft.(?) Gray mottled brown clay
10-09-91\off	30		1_	Notes:
9-1997 C:\MTECH46\mavoff91\10-09-91\off91-23.bor	35			Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).  Measurement by ZRS on 10/11/91 found no indication of H/C  Location in Armstrong field approx. 500 ft. south of OS 91-17. Refinery workers plugged back hole with cuttings.  DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

40 -



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

Hole Diameter:

: 10/09/91 : N/A : 10/09/91

: 10"

Drilling Method:

: Solid Stem Auger

Sampling Method:

: Cuttings

Drilled By:

: Frank's Rathole Srv.

Logged By: : Z.R. Sherman

	Depth in Feet	GRAPHIC	nscs	DESCRIPTION
	10 -		ML	(No soil descriptions above 21 ft.)
			GР	21 ft (?) Water, gravel, no H/C odor, no NAPL
<b>×</b>	25	- - -		
mavoff91/10-09-91\off91-24.bor	30			Notes:  Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).
C:\MTECH46\mavoff9	35	     		Measurement by ZRS on 10/11/91 found no indication of H/C Location in Armstrong field approx. 550 ft. south of OS 91-18. Refinery workers plugged back hole with cuttings.
9-1997 C		1		DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

40 -

Date Started:

: 10/09/91

Drilling Method: Sampling Method: : Solid Stem Auger

Time Started Date Completed : N/A : 10/09/91

Drilled By:

: Cuttings : Frank's Rathole Srv.

	Arte	esia, New Mexico	Hole Diameter:	: 10/09/91 : 10"	Drilled By: Logged By:	: Frank's Rathole Srv. : Z.R. Sherman
Depth in Feet C	USCS	DESCR	IPTION			
0		Brown/tan clayey loam				
5 -		5 ft. White caliche soil				
10	CL	Grades into tan/brown caliche	e soil			
15						
20		20 ft. Water				
25 -						
30 -		Notes:				
35		Notes of Zeke Sherman. De incomplete and unreadable; Measurement by ZRS on 10/Location in Armstrong field a OS 91-18. Refinery workers  DTW=Depth to water, H/C=F	marked where questi 11/91 found no indic pprox. 550 ft. south o plugged back hole w	onable(?). ation of H/C of th cuttings.		
1		NAPL=Non-aqueous phase I	iquid, TSTM=Too sm	nall to measure		



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

Hole Diameter:

: 10/09/91 : N/A

: 10/09/91

: 10"

Drilling Method:

:

Sampling Method:

: Solid Stem Auger

Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

	Depth in Feet	GRAPHIC	nscs	DESCRIPTION	
	0 - - - 5 -		ML	Silty loam, tan and brown	
)	- - 10 - - - -			12 ft. Caliche soils(gyp), tan and white	
	15 -			15 ft. Caliche soils, white  18 ft. H/C odor  Clayey silt, gray, H/C odor	
C:\MTECH46\mavoff91\10-09-91\off91-26.bor	25		ML	24 ft.(?) NAPL	
	30	-		Notes:  Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?)	
	35	1		Location approx. 800 ft. south of KWB-10 midway between KWB-10 and highway 82. On 10/11/91 measured approx. 1/4 in. H/C product. Refinery workers plugged back hole with cuttings.	
09-29-1997	40	-		DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to mea	sure

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Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

Hole Diameter:

: 10/09/91

: 10/09/91

: N/A

: 10"

Drilling Method: Sampling Method: : Solid Stem Auger

Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

L				
	Depth in Feet	GRAPHIC	nscs	DESCRIPTION
	0 -			Loam, brown and tan

10 ft. Clayey silt, gray, rank(?) H/C odor

19 ft.(?) NAPL

25

30

35

40

10

15

20

ML

Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location approx. 400 ft. north of KWB-10 along dirt road. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/11/91

Drilling Method: Sampling Method: : Solid Stem Auger

Time Started
Date Completed
Hole Diameter:

: N/A : 10/11/91

: 10"

Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

	Depth in Feet	GRAPHIC	nscs	DESCRIPTION
	0 - - - -			Loam, brown
	5 - - - - 10 -		ML	
	15 -			15 ft. Caliche soil, white, no H/C odor
	20			(no further soil description) 19 ft.(?) Water, no NAPL
	25			
9-91\off91-28.bor	30			

30

35

40

Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location approx. 100 ft. south of KWB-1 wells along dirt road. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

-1997 C:MTECH46vmavoff91\10-09-91\off91-28.bor



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/11/91

Drilling Method:

: Solid Stem Auger

Time Started

Date Completed

Hole Diameter:

: N/A : 10/11/91

: 10"

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By:

Z.R. Sherman

	Depth in Feet	GRAPHIC	USCS	DESCRIPTION
	0 - - - - 5 - - -		ML	Loam, brown Clayey loam, brown
	10 - - - - 15 -			(no further soil description)
	20		FO	18 ft.(?) Water, no H/C odor or NAPL
-09-91\off91-29.bor	25		I	
voff91\10-09-91\on	30	- - - -		Notes:  Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).
9-1997 C:\MTECH46\mavoff91\10	35			Location approx. 700 ft. east of KWB-1 wells along dirt road midway between wells and Bolton Rd. Refinery workers plugged back hole with cuttings.  DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

97 C:\MTECH46\mavoff91\10-09-91\off91-29.b



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/11/91

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : N/A : 10/11/91 Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 10"

Logged By:

: Z.R. Sherman

Depth in Feet	GRAPHIC	nscs	DESCRIPTION
0 -	ļ	· · · · ·	
-		ML	Loam, brown
-			3 ft. Caliche soil, white
5 -			
	[		
	[		
10 -			
	<u> </u>		12 ft. Caliche soil, gray, silty, H/C odor
	]- <u>-</u> -		12 it. Gallond Soll, gray, Sitty, 110 GGG
	<u></u>		(no further soil description)
15			
	<u></u>		17 ft.(?) Water and NAPL (lots of it !)
	[-]		
20	}- <u>-</u> -		
	[-]		
	- <u>-</u> -		
	<u> </u>		Wet zone to 28 ft.
25	<u> </u>		
	<u> </u>		
	<u> </u>		28 ft. Caliche, white, dry
20	<del></del>	1	
30	1		Notes:
	-		Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).
35	-		Location on west side Bolton Rd. at quarter section location approx. 1350 ft. north of highway 82. Refinery workers plugged back hole with cuttings.
			DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

40 -

Date Started: Time Started

: 10/15/91

Drilling Method:

: Solid Stem Auger

: N/A Date Completed

: 10/15/91

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

-			АП	esia, New Mexico	Hole Diameter:	: 10"	Logged By:	: Z.R. Sherman
	Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION			
ļ	0 -							
	-			Loam, brown				
	5 -		ML					
	-		-	8 ft. Caliche soil, tan and white				
	10 -			(no further soil description)				
	15 -			15 ft. Water, no odor, no NAPL				
	20							
	25							
.bor								
\off91-31		-						
10-15-91	30			Notes:				
navoff91∖				Notes of Zeke Sherman. Desincomplete and unreadable; m	criptions sometimes arked where questi	s onable(?).		
C:\MTECH46\mavoff91\10-15-91\off91-31.bor	35	1		Location on west side Bolton forth of OS 91-30 and 1950 ft Refinery workers plugged bac	. north of highway 8	32.		
1				DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase lic	etroleum hydrocarbo juid, TSTM=Too sn	on nall to measure	•	
29-1997		1						



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Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

Hole Diameter:

: 10/15/91

Drilling Method:

: Solid Stem Auger

Time Started :
Date Completed :

: N/A : 10/15/91

: 10"

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By: : Z.R. Sherman

Depth in Feet	GRAPHIC	nscs	DESCRIPTION
C		ML	Loam, tan and brown
5			Caliche soil, white
10			(no further soil description)
	1 1		
15	5 -		15 ft. Water, no odor, no H/C
20	)		
25	5 -		
30	) - - -		Notes:
30	5 -		Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).  Located in pecan grove approx. 200 ft. east of OS 91-33. Refinery workers plugged back hole with cuttings.  DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

37 C:\MTECH46\mavoff91\10-15-91\off91-32.bor

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

: 10/15/91

: 10/15/91

: N/A

Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

: Z.R. Sherman

-	,			esia, New IMEXICO	Hole Diameter:	: 10"	Logged By:
			ML Loam, tan and brown  Caliche soil, white and  14 ft. Clayey silt, gray  ML  24 ft. Water, H/C odoi  Notes: Notes of Zeke Sherm				
	Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION		
	0 - - -		ML	Loam, tan and brown			
	5 -	÷ ; -		Caliche soil, white and tan			
	10 -						
	15 -			14 ft. Clayey silt, gray, H/C odd	л		
	20		ML				
-33.bor	25			24 ft. Water, H/C odor, NAPL			
f91\10-15-91\off91	30			Notes: Notes of Zeke Sherman. Desc	criptions sometimes		
997 C:\MTECH46\mavoff91\10-15-91\off91-	35			incomplete and unreadable; m  Located on east side of Bolton south of OS 91-30. Refinery w hole with cuttings.  DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase liq	arked where questi Rd. approx. 175 ft orkers plugged bac	onable(?). .k on	e



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/15/91

Drilling Method: Sampling Method: : Solid Stem Auger

Time Started **Date Completed**  : N/A : 10/15/91

Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

			Art	esia, New Mexico	Hole Diameter:	: 10"	 Logged
	Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION		
	0 -	<del> </del>					
	- -			(no soil descriptions given)			
	-		8				
	5 -						
	-						
	10 -						
)							
	15 -			No odor, no NAPL			
	20						
		1					
	25	-					
bor		1					

Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Located 1,075 ft. east of OS 91-33 and Bolton Rd. in pecan grove. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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30

35



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Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/15/91

Drilling Method:

: Solid Stem Auger

Time Started
Date Completed
Hole Diameter:

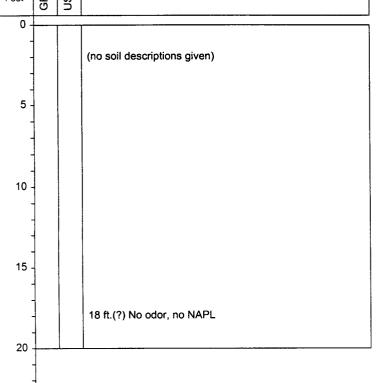
: N/A : 10/15/91

: 10"

Sampling Method: Drilled By: Logged By: : Cuttings : Frank's Rathole Srv.

: Z.R. Sherman

Depth in Feet	RAPHIC	scs	DESCRIPTION



#### Notes:

25

30

35

40

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Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Located in pecan grove approx 1,400 ft. east of Bolton Rd. adjacent to highway 82. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

Date Completed

Hole Diameter:

: 10/15/91 : N/A : 10/15/91

: 10"

Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

	Depth in Feet	GRAPHIC	nscs	DESCRIPTION
	0 - - -	. :	ML	Loam, brown and tan
	- 5 - - -			Caliche soil, light tan Clayey silt, brown and tan
	- 10 -			
	15 -		ML	
	20		i I	19 ft. Water, no H/C odor, no NAPL
36.bor	25			
woff91\10-15-91\off91-36.bor	30			Notes:  Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).
C:\MTECH46\mavoff91\10-15-91	35	- - -		Located approx. 200 ft. east of Bolton Rd. and highway 82 intersection in SW corner of pecan grove. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

C:\MTECH46\mavoff91\10-15-91\off91-36.bor

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/16/91

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : N/A : 10/16/91 Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

	T	Arte	esia, New Mexico	Hole Diameter:	: 10"	Logged By:	: Z.R. Sherman
Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION			
0 -		ML	Loam, brown and tan		·		
5 -			Caliche soil, tan and white				
10 -							
15 -		ML	14 ft. Clayey silt, gray, H/C odd	or			
20 -	:		18 ft. Water, trace NAPL, shee	n			
25 -							
30 -			Notes:  Notes of Zeke Sherman. Desi	crintions sometimes			·
35 -			incomplete and unreadable; m  Located on east side of Bolton north OS 91-30. Refinery work hole with cuttings.  DTW=Depth to water, H/C=PeNAPL=Non-aqueous phase light	arked where question Rd. approx. 100 ft. sters plugged back	onable(?). n		
-							

C:\MTECH46\mavoff91\10-16-91\off91-37.bor

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/16/91

Drilling Method:

: Solid Stem Auger

Time Started **Date Completed**  : N/A : 10/16/91 Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

: Z.R. Sherman

10 15 20 25 30 30 30 30 30 30 30 30 30 30 30 30 30			Art	esia, New Mexico	Hole Diameter:	: 10"	Logged By:	: Z.R. Sher
	Feet	GRAPHIC	nscs	DESCRIF	PTION			
	0 -							
	-			(no soil descriptions given)				
	-							
	-							
	- 10 -							
)	-							
,				14 ft. H/C odor				
	15 -							
				18 ft. Trace NAPL, sheen, H/C	odor			
				To it. Trace NAPL, Sheeri, A/C	odoi			
	20	-	1	· · · · · · · · · · · · · · · · · · ·		1		
		<del>-</del>						
	25	1						
.bor		1						
\off91-38		-						
10-16-91	30	1		Notes:				
avoff91\1				Notes of Zeke Sherman. Descincomplete and unreadable; management	criptions sometimes arked where question	onable(?).		
MTECH46vm	35			Located on east side of Bolton north of OS 91-30. Refinery wo hole with cuttings.	Rd. approx. 375 ft. orkers plugged back	ζ.		
29-1997 C:				DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase liq	troleum hydrocarbo uid, TSTM=Too sm	n all to measure		



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

Hole Diameter:

: 10/16/91

: 10/16/91

: N/A

: 10"

Drilling Method:

: Solid Stem Auger

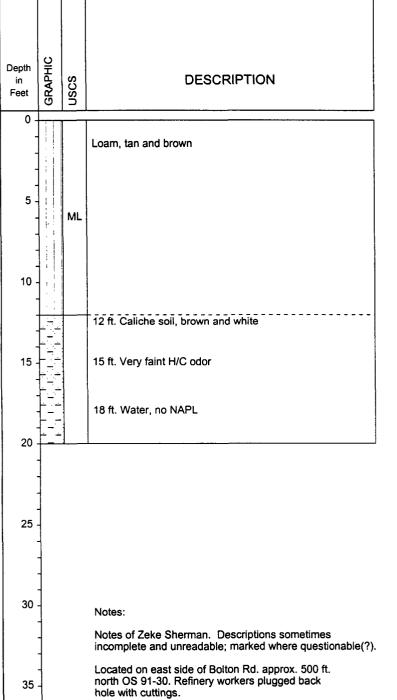
Sampling Method: : Cut

: Cuttings

Drilled By:

: Frank's Rathole Srv.

Logged By: : Z.R. Sherman



DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

97 C:\MTECH46\mavoff91\10-16-91\off91-39.bor

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/16/91

Drilling Method:

: Solid Stem Auger

Time Started

Date Completed

: N/A : 10/16/91 Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 10"

Logged By:

: Z.R. Sherman

	epth in eet	GRAPHIC	nscs	DESCRIPTION
	0 -		L	
	-		ML	Loam, tan and brown
1	-			3 ft. Caliche soil, tan and white
	-	-		one canonic con, tan and white
	5 -	Γ- <sup>-</sup> -		
İ				
1			]	
	-	<u> </u>	1	
	-		1	
	-	<b>├</b> ॅ	]	
	10 -	1-		40 ft Olever sell beauty and and
		//	1	10 ft. Clayey soil, brown and red
		//	CL	
	-	//	CL	
1	-		1	
	-	<del>/ .                                   </del>		14 ft. Clayey silt, gray, trace odor (musty, very old)
	15 -	1:		14 it. Clayey Siit, gray, trace odor (musty, very old)
		٠,	1	
	•	]	ML	40 6 144 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	•		1	18 ft. Water, trace H/C sheen, odor
	•	1	]	
	20 -	-		
		<u> </u>	1	
		1		
		1		
		ł		
	25 -	-		
		4		
3				
ř		]		
2		1		
2		1		
5	30	4		Nistan
8		1		Notes:
2				Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).
	•	7		monipose and unreadable, marked where questionable(:).
		1		Located in pecan grove approx. 100 ft. east of
ξĺ		-		Bolton Rd. and 100 ft. north OS 91-30. Refinery
₫	35	4		workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

C:\MTECH46\mavoff91\10-16-91\off91-40.bo

09-29-1997



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/16/91

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : N/A : 10/16/91 Sampling Method:

: Cuttings

Hole Diameter:

: 10"

Drilled By: Logged By:

: Frank's Rathole Srv.

: Z.R. Sherman

				Hole Diameter.	: 10"	Logged By:
	Depth in Feet	GRAPHIC	nscs	DESCRIPTION		
	0 -			Loam, tan and brown		
	- 5 -		ML			
	10 -			Caliche, tan and white		
)	15 -			16 ft. Clayey soil, gray and light tan		
	20		CL	19 ft. Clean at total depth		
or or	25					
::IMTECH46\mavoff91\10-16-91\off91-41.bor	30			Notes:  Notes of Zeke Sherman. Descriptions sometimes		
::MTECH46\mave	35			incomplete and unreadable; marked where question Located in pecan gronve approx. 200 ft. east of Bolton Rd. and 150 ft. north OS 91-30. Refinery workers plugged back hole with cuttings.	nable(?).	

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

Hole Diameter:

: 10/16/91 : N/A : 10/16/91

: 10"

Drilling Method:

Sampling Method:

: Cuttings

: Solid Stem Auger

Drilled By:

: Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

1	epth in Feet	GRAPHIC	nscs	DESCRIPTION
	0 - - -	1 '	ML	Loam, tan and brown
	5 -			Caliche soil, white and brown
	- - 10 -			
The second secon	15 -			13 ft. Caliche soil, gray
	20			19 ft.(?) Water  22 ft. Caliche soil, gray, no free water
	25			22 ft. Caliche soil, gray, no free water Trace H/C odor at total depth, no H/C sheen
mavoff91\10-16-91\off91-42.bor	30			Notes:  Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Located in pecan grove approx. 100 ft. east of Bolton Rd. and OS 91-33. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/16/91

Drilling Method:

: Solid Stem Auger

Time Started

Date Completed

: N/A : 10/16/91 Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

			esia, New Mexico	Hole Diameter:	: 10 <b>"</b>
Depth in Feet	GRAPHIC	nscs	DESCRII	PTION	
0 - - -			Loam, tan and brown		
5 - - -		ML			
10	1				
15		CL	14 ft. Clayey soil, gray, H/C od	or	

20 ft. Water, H/C odor, NAPL

30 - Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Located on east side of Bolton Rd. approx. 400 ft. south of OS 91-30. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

25

35



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

Date Completed

Hole Diameter:

: 10/16/91 : N/A

: 10/16/91

: 10"

Drilling Method:

: Solid Stem Auger

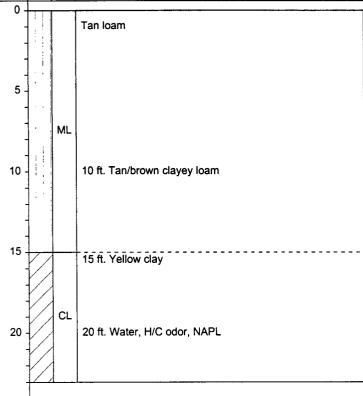
Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

Depth in Feet	GRAPHIC	nscs

#### **DESCRIPTION**



#### Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/16/91

Drilling Method:

: Solid Stem Auger

Time Started

Date Completed

: N/A

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

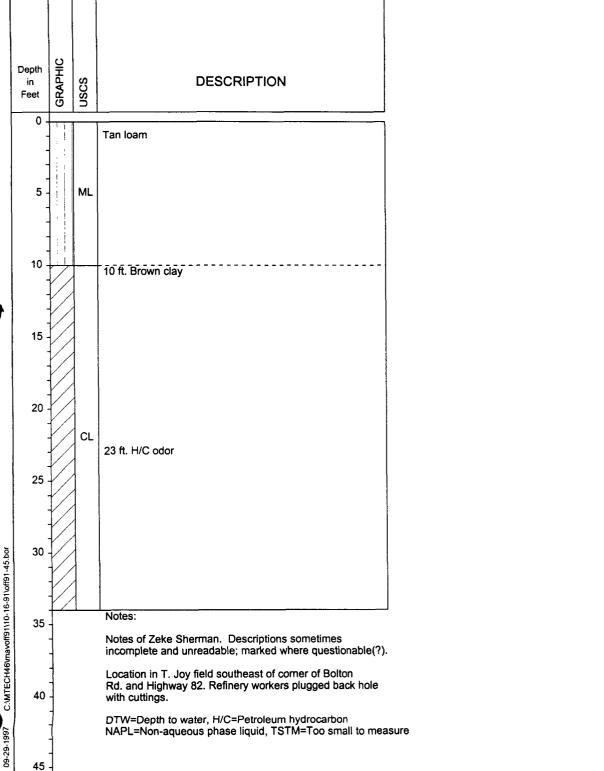
Hole Diameter:

eter: : 10"

: 10/16/91

Logged By:

: Z.R. Sherman





(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started : 10/16/91 : N/A

Drilling Method: Sampling Method: : Solid Stem Auger : Cuttings

**Date Completed** 

: 10/16/91

Drilled By:

: Frank's Rathole Srv.

Z.R. Sherman

			Arte	esia, New Mexico	Hole Diameter:	: 10"	Logged By:
	Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION		
	0 -			Tan loam	······		
'	5 - 5 -		ML				
	10 -						
)	-			10 ft. Clay			
	15						
	20		CL	20 ft. H/C odor, faint			
11-46.bor	25						
C:\MTECH46\mavoff91\10-16-91\off91-46.bor	30		1	30 ft. Water, NAPL & H/C odor	, brown clayey (?)		
avoff91\		-		Notes:			
CH46\m	25			Notes of Zeke Sherman. Descincomplete and unreadable; m	criptions sometimes arked where questio	nable(?).	
997 C:\MTE	1	1 1		Location in T. Joy field souther Rd. and Highway 82. Refinery with cuttings.	ast of corner of Bolto	on	

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia. New Mexico

Date Started:

: 10/16/91

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : N/A

Sampling Method:

: Cuttings

: 10/16/91

Drilled By:

: Frank's Rathole Srv.

-	Artesia, New Mexico		Hole Diameter:	: 10"	Logged By:	: Frank's Ratifole Siv.		
	Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION			
	0 -							
	- - 5 - -							
	- - 10 - -			(No soil descriptions)				
	15 -							
	20							
17.bor	25	- - - - -						
10-16-91\off91~	30	1		30 ft. Water, No H/C odor, no f	NAPL			
997 C:\MTECH46\mavoff91\10-16-91\off91-47.bor	35			Notes:  Notes of Zeke Sherman. Descincomplete and unreadable; m  Location in T. Joy field souther Rd. and Highway 82. Refinery with cuttings.	arked where questinest of Bolton	onable(?).		
09-29-1997	40			DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase liq	troleum hydrocarbo uid, TSTM=Too sm	on nail to measure		



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

Hole Diameter:

: 10/16/91 : N/A : 10/16/91

: 10"

Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

: Cuttings

Logged By:

: Frank's Rathole Srv. : Z.R. Sherman

Depth in Feet	GRAPHIC	nscs	DESCRIPTION
-			Tan Loam
5 -		ML	
-			
10 -			White/tan caliche soil
15 -			
20		CL	
25			·
		1	30 ft. Water, no H/C odor, no(?) NAPL
30			Notes:  Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).  Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/16/91

Drilling Method:

: Solid Stem Auger

Time Started

Date Completed

: N/A : 10/16/91 Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 10"

Logged By:

: Z.R. Sherman

L				<u> </u>
	Depth in Feet	GRAPHIC	nscs	DESCRIPTION
	0 -			
	5 - - -		ML	Tan Loam
	10 -			
	15			Clayey
	20		CL	
191-49.bor	25			25 ft. H/C odor
91/10-16-91/0119	30	//	1	29 ft. Water 30 ft. H/C odor, NAPL
navoff		1		Notes:
	35			Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).  Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.
1997 C:\MTECH46\mavoff91\10-16-91\off	35			incomplete and unreadable; marked where questionable(?)  Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

7 C:\MTECH46\mavoff91\10-16-91\off91-49.bc

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/22/91

Drilling Method:

: Solid Stem Auger

Time Started

Date Completed

: N/A : 10/22/91 Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 10"

Logged By:

: Z.R. Sherman

Depth in Feet	GRAPHIC	nscs		DESCRIPTION
0 -				
-			Brown Loam	

20 ft. Water, H/C odor, no NAPL

Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

Date Completed

: 10/22/91 : N/A

: 10/22/91

Drilling Method:

Sampling Method:

: Solid Stem Auger : Cuttings

Drilled By:

: Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

			Arte	esia, New Mexico	Hole Diameter:	: 10"
	Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION	
	0 -	1 1		Daniel Laure	······································	
	- - -	1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 ·		Brown loam		
	5 -			5 ft. Tan clayey silt		
	- - 10 -					
į	-		ML			
ŕ	- - 15 -					
	,5					
	20 -					
		1.		22 ft.(?) Water, no H/C odor, no	NAPL	
				Tan, very fine to fine grain san	d	
	25		SM			
51.bor				Total depth shown as 28 ft. (?)		
\off91-			CL			
1-22-91	30	//	1	30 ft. Red clay	·	
C:\MTECH46\mavoff91\10-22-91\off91-51				Notes:		
CH46	25	1		Notes of Zeke Sherman. Descincomplete and unreadable; m	criptions sometimes arked where question	nable(?).
)	35			Location in T. Joy field souther Rd. and Highway 82. Refinery with cuttings.	ast of corner of Bolto workers plugged bac	n :k hole
09-29-1997	40			DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase liq	troleum hydrocarbon uid, TSTM=Too sma	Il to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

Hole Diameter:

: 10/22/91

: 10"

Drilling Method:

: Solid Stem Auger

Time Started : N/A Date Completed : 10/22/91

Sampling Method: Drilled By:

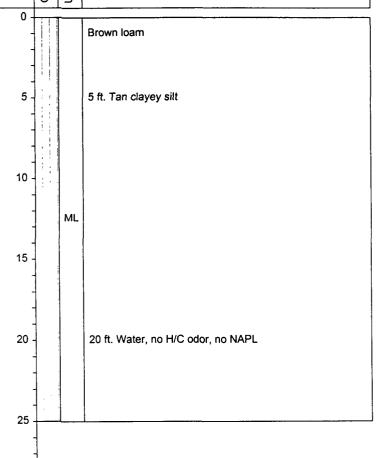
: Cuttings

Logged By:

: Frank's Rathole Srv. : Z.R. Sherman

Depth	2	
in Feet	зкарн	000

#### **DESCRIPTION**



#### Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/22/91

Drilling Method:

: Solid Stem Auger

Time Started

Date Completed

: N/A : 10/22/91 Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

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-			, , , ,	SSIA, NOW MOXICO	Hole Diameter:	: 10"	Logged By:	: Z.R. Sherman
	Depth in Feet	GRAPHIC	USCS	DESCRIF	PTION			
t	0 -							
	- - - 5 -			Tan Loam (no other soil descriptions)		in the second		
	- - - 10 -		ML					
	15 -							
	20	1 1 1 1		20 ft. Water, trace H/C odor, sh	neen			
1-53.bor	25		n.					
110-22-91\off9	30	- - -		Notes:				
1997 C:\MTECH46\mavoff91\10-22-91\off91-	35	-		Notes of Zeke Sherman. Descincomplete and unreadable; multiple and unreadable; multiple and Location in T. Joy field souther Rd. and Highway 82. Refinery with cuttings.  DTW=Depth to water, H/C=Penapple and the complete and unreadable; multiple a	arked where question ast of corner of Bolto workers plugged backtroleum hydrocarbor	n ck hole	e	



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/22/91

Drilling Method:

: Solid Stem Auger

Time Started **Date Completed** Hole Diameter.

: N/A : 10/22/91

: 10"

Sampling Method: Drilled By:

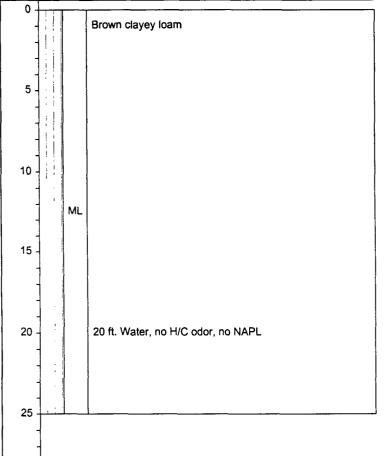
: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

Depth in Feet	GRAPHIC	nscs	

#### **DESCRIPTION**



#### Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/22/91

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : N/A : 10/22/91 Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Artesia, New Mexico				Hole Diameter:	: 10"		Logged By:	: Z.R. Sherman
Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION				,
0 -			Brown loam					
_			3 ft. Tan clayey silt					
-			3 ft. Pari Clayey Sift					
5 -		ML						
-								
10 -			10 ft. Red clay					
-			To it. Neu day					
15 -								
-			18 ft. Tan/white clayey soil					
		CL	To it. Tail/writte dayey 30ii					
20 -								
25			25 ft. Water, no H/C odor, no N	IAPL				
		1				J		
30			Notes:					
	-		Notes of Zeke Sherman. Descincomplete and unreadable; management			·.		
30	1		Location in T. Joy field souther Rd. and Highway 82. Refinery	ast of corner of Bol	ton			
35	1		with cuttings.					
1	1		DTW=Depth to water, H/C=Pe NAPL=Non-aqueous phase liq	troleum hydrocarbouid, TSTM=Too sn	on nall to mea	asure		
40	1							



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

Hole Diameter:

: 10/22/91 : N/A

: 10/22/91

: 10"

Drilling Method: Sampling Method: : Solid Stem Auger

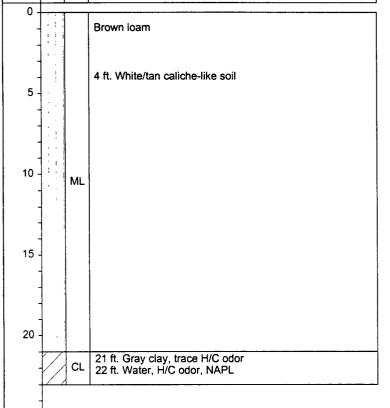
od: : Cuttings

Drilled By: : Fran Logged By: : Z.R.

: Frank's Rathole Srv. : Z.R. Sherman

Depth in Feet CRAPHIC

#### **DESCRIPTION**



25

30

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Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

37 C:\MTECH46\mavoff91\10-22-91\off91-56.bor

20 30 1007



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Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/22/91

Drilling Method:

: Solid Stem Auger

Time Started

Date Completed

: N/A : 10/22/91 Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 10"

Logged By:

: Z.R. Sherman

GRAPHIC Depth nscs **DESCRIPTION** in Feet 0 -Brown loam (no other soil descriptions) 10 15 ML 20 25 26 ft. Water, No H/C odor, No NAPL 30 Notes: Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?). Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole 35 with cuttings. DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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29-1997



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/22/91

Drilling Method:

: Solid Stem Auger

Time Started **Date Completed**  : N/A : 10/22/91 Sampling Method:

: Cuttings

Hole Diameter:

: 10"

Drilled By: Logged By:

: Frank's Rathole Srv. : Z.R. Sherman

L					
	Depth in Feet	GRAPHIC	nscs	DESCRIPTION	
	0 -				
	5 -			Brown loam (no other soil descriptions)	
	10 -	]			
	- - - 15 -		ML		
	- - 20 -				
ff91-58.bor	25 -			27 ft. Water, No H/C odor, No NAPL	
91\off	30	+	<u> </u>		
10-25-		Notes:		Notes:	
\avoff91\		_		Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).	
C:\MTECH46\mavoff91\10-22-91\o	35	 		Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.	
	1	1		DTM=Donth to water H/C=Petroleum hydrocarbon	

40

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

Hole Diameter:

: 10/22/91 : N/A

: 10/22/91

: 10"

Drilling Method:

Sampling Method:

: Solid Stem Auger : Cuttings

Drilled By:

: Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

	Depth in Feet	GRAPHIC	nscs	DESCRIPTION	
	0 -			Brown loam	
	5 - - -			5 ft. Tan silty/clayey loam	
	10 -			10 ft. Occassional gravel	
	15 -		ML		
	20 -				
_	25	-		23 ft. Water, No H/C odor, No NAPL	

Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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35



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 10/22/91

: 10"

Drilling Method:

: Solid Stem Auger

Time Started **Date Completed** Hole Diameter:

: N/A : 10/22/91 Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman

Depth in Feet	GRAPHIC	nscs	DESCRIPTION
0 - - -			Brown loam
5 - -	. 1		5 ft. Tan silty caliche soil
- 10 -			
- - 15 -		ML	
-			
20			
25			23 ft. Water, No H/C odor, No NAPL

Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure

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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

Date Completed

Hole Diameter:

: 10/22/91

Drilling Method:

: Solid Stem Auger

: N/A : 10/22/91

: 10"

Sampling Method:

: Cuttings

Drilled By: Logged By: : Frank's Rathole Srv. : Z.R. Sherman

	Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION
	0 -	-	Ι		
	5 - - -			(No soil descriptions)	
	10 -				
	15				
	20				
.bor	25	-		25 ft. Water, No H/C odor, No	NAPL
22-91\off91-61.bor	30	1			

C:\MTECH46\mavoff91\10-22-91\off91-61

35

40

Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

Location in T. Joy field southeast of corner of Bolton Rd. and Highway 82. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 11/06/91

Drilling Method:

: Solid Stem Auger

Time Started **Date Completed**  : N/A

Sampling Method:

: Cuttings

Hole Diameter:

: 11/06/91 : 10"

Drilled By:

: Frank's Rathole Srv.

Logged By: : Z.R. Sherman

Depth in Feet	GRAPHIC	nscs		DESCRIPTION
0 - - - - 5 -			Brown loam	

19 ft.(?) Gray clay, H/C odor

25 ft.(?) Light-dark gray & tan(?) clay, H/C odor, NAPL

30

15

20

25

35

40

45

Notes:

Notes of Zeke Sherman. Descriptions sometimes incomplete and unreadable; marked where questionable(?).

On 11/08/91 measured fluid depth about 10 ft. with no estimate of NAPL thickness; field notes read "no top on water." Boring located at northwest corner of Bearing Supply yard south of Tank 415(?). Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

Date Completed

Hole Diameter:

: 11/06/91 : N/A

: 11/06/91

: 10"

Drilling Method:

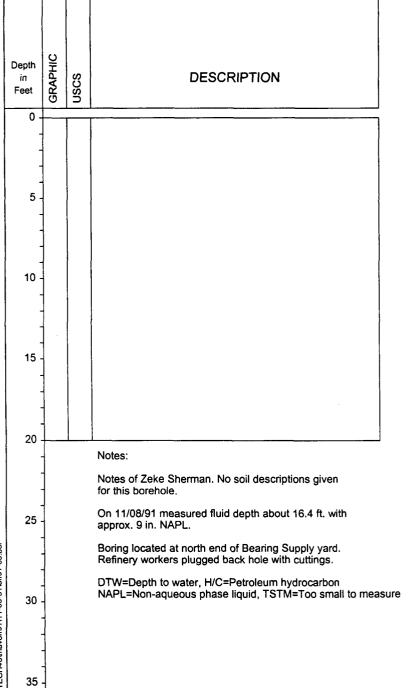
: Solid Stem Auger

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman



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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started

**Date Completed** 

: 11/06/91 : N/A

: 11/06/91

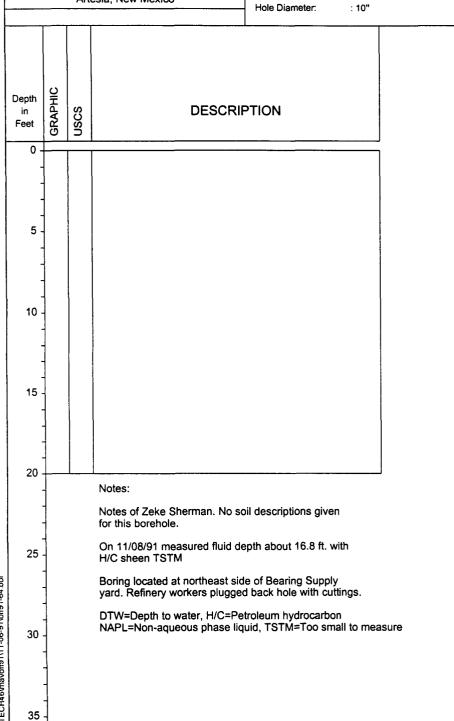
Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman



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(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 11/06/91

Drilling Method:

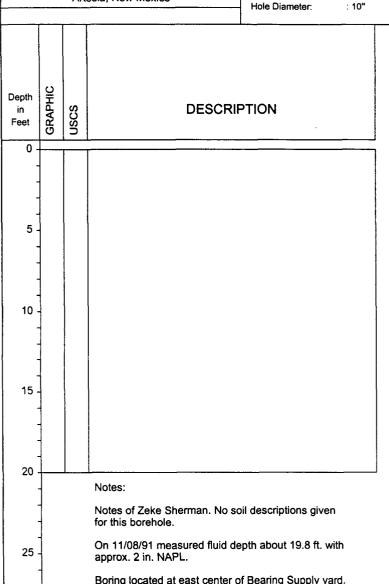
: Solid Stem Auger

Time Started **Date Completed**  : N/A : 11/06/91 Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Logged By:

: Z.R. Sherman



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Boring located at east center of Bearing Supply yard. Refinery workers plugged back hole with cuttings.

DTW=Depth to water, H/C=Petroleum hydrocarbon NAPL=Non-aqueous phase liquid, TSTM=Too small to measure



#### LOG OF BORING OS #66

(Page 1 of 1)

Offsite Borings 1991 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started:

: 11/06/91

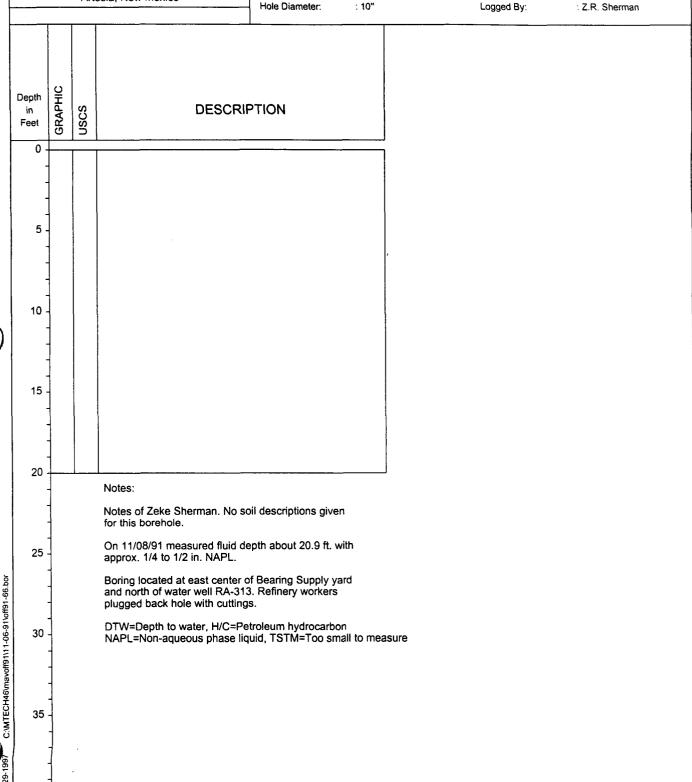
Drilling Method:

: Solid Stem Auger

Time Started **Date Completed**  : N/A : 11/06/91 Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

: Z.R. Sherman



ROJECT: 622092001—237 (B67) LIENT: Navajo\_Refinery

LIENT: Navajo Refinery BORING NUMBER: B67 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 27' DATE COMPLETED: 03/03/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 29'

DATE COMPLETED: 03/03/92				
DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-12' SANDY CLAY, dark brown to brown, moist to dry, increasing pebble content with depth, plastic to stiff.  12-27' SANDY CLAY, gray hydrocarbon staining beginning at 12' becoming a bluish—gray color in a zone from 14-16', strong hydrocarbon odor, moist, color becoming lighter gray after 16'.  27-29' SANDY CLAY, gray, saturated, strong hydrocarbon odor, some gravel.  \[ \begin{array}{c c c c c c c c c c c c c c c c c c c	- 2			
- KWBES				

ROJECT: 622092001-237 (B68)

BORING NUMBER: B68
EXCAVATED POND:

FIRST ENCOUNTERED WATER: 26' DATE COMPLETED: 03/02/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 28'

	DESCI	RIPTION		DEPTH (ft.)	SYMBOL	SAMPLE	WELL
0-11'	SANDY CLAY, dark brown pebble content with dep		y, increasing	- 2 - - 2 - - 4 -			
11–16'	CLAY, tan, with small po occasional small pebbles		d, moist,	6			
16–19'	CLAY, brown, with small moist.	pockets of fine white s	and and pebbles,	- 8 - 			
19–20'	GRAVEL with clay mix, g in clay, slight odor.	ray hydrocarbon staining	g noticeable	- 10 - - 12 -			
20-24	CLAY, progressively dark	er staining, increasing m	noisture content and	- 14 -			
24-28'	CLAY TO SANDY CLAY, of gravel seams, saturated		g, interspersed thin	- 16 - - 18 - - 20 - - 22 -			
	(D-T-P)	(D-T-W)	Product	24			
<u>Date</u> 3/4/92	Depth to Product	Depth to Water  22.79'	Thickness film (<1/16")	- 26 - - 28 - - 30 -   			

ROJECT: 622092001—237 (B69) LIENT: Navajo Refinery

LIENT: Navajo Refinery BORING NUMBER: B69 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 28' DATE COMPLETED: 03/03/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 29'

	DESC	RIPTION		DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-8'	SANDY CLAY, dark brown to stiff.	to brown, moist to dry,	plastic	- 2 - - 2 - - 4 -			
8–14'	CLAY, tan, with small poo occasional pebbles.	ckets of fine white sand,	moist,	- 6 - - 8 -			
14-26'	CLAY, brown, moist, plast occasional pebbles.	ic, some small pockets (	of fine white sand,	- 10 - - 12 -			
26-29'	CLAY, brown, at 28', incr saturated, slight gray hyd	- · · · · · · · · · · · · · · · · · · ·		- 14 16 18 20 22 -			
Date 3/4/9	(D-T-P) Depth to Product 2 22.27'	(D-T-W) Depth to Water 22.83'	Product Thickness 0.56'	24 26 			
				- 28 - - 30 - 			
~~~		oved from hole, brownish luct was on last flight.		   			

ROJECT: 622092001-237 (B70) LIENT: Navajo Refinery BORING NUMBER: B70 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 26' DATE COMPLETED: 03/02/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 29'

	WFLETED. 03/02/92		The state of the s	T- T-	и о
	DESC	RIPTION	V	DEPTH (ft.) SYMBOL	SAMPLE
				- 2 -	
0-10'	SANDY CLAY, dark brown to stiff.	to brown, moist to dry,	plastic	- 4	
10-14'	CLAY, reddish brown, with white sand, moist, plastic		ts of fine	6	
14–16'	CLAY, tan, with small peb	bles throughout, moist,	plastic.	8 -	
21-26'	CLAY, brown, with occasion	onal pockets of fine sand	d and pebbles,	- 10	
26-29'	moist, plastic.  GRAVEL mixed with CLAY,	aray hydrocarbon staini	ing saturated	12-	
20-23	rocks to 2 inches in diar		ing, suturated,	- 14 -	
				16	
				18 –	
				20-	
				22-	
	(D-T-P)	(D-T-W)	Product	-24-	
Date	Depth to Product	Depth to Water	Thickness	26	
3/4/9	2 22.04'	22.08'	0.04	28	
				- 30 -	
				<u> </u>	
) <sup>*</sup>					
	29 <b>2 A</b> 22 <b>3 22 A</b>				
	KWBES				

ROJECT: 622092001-237 (B71) LIENT: Navajo Refinery BORING NUMBER: B71 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 24' DATE COMPLETED: 03/03/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC

SURF. ELEV: N/A TOTAL DEPTH: 25'

		<del></del>			<del></del>
	DESCRIPTION	DEPTH (ft.)	SYMBÖL	SAMPLE	CUTTING
0-7' 7-11'	SANDY CLAY, dark brown to brown, moist to dry, plastic to stiff.  CLAY with SAND, tan, moist, plastic, occasional pebbles.	- 2 - - 2 - - 4 - - 6 -			
11–17'	CLAY, brown, with some small pockets of fine white sand, moist, plastic.	- 8 - - 8 - - 10 -			
17-24'	CLAY, gray hydrocarbon staining, moist, color is darker with depth, some pebbles.	12 -			
24-25'	GRAVEL mixed with CLAY, gray staining, saturated.  (D-T-P) (D-T-W) Product	- 14			
Date 3/4/92	Depth to Product Depth to Water Thickness 2 18.12' 20.34' 2.22'	- 26 28 30			

ROJECT: 622092001-237 (B72)

BORING NUMBER: B72 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 24' DATE COMPLETED: 03/03/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 25'

	FLETED. 03/03/92			<del></del>		
	DESC	RIPTION	1	DEPTH (ft.)	SYMBOL	CUTTING
0-8' 8-15' 15-16' 16-24' 24-25'	SANDY CLAY, dark brown CLAY, tan, with some sm occasional small pebbles, CLAY, brown, moist, plast CLAY, gray hydrocarbon s pebbles, color becoming of SILTY SAND, gray hydroca	nall pockets of fine white plastic. ic, occasional small pebb taining, moist, plastic, oc larker with depth.	sand, moist, eles.	- 2 4 6		
Date	(D-T-P)	(D-T-W)   Depth to Water	Product Thickness	- 14 16 18 20 22 24 24 20 24 24 24 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 - 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 - 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 - 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 26 - 2		
3/4/9		18.55 <b>'</b> '	0.02'	- 26 - - 28 - - 30 - - 30 - 		

ROJECT: 622092001-237 (B73) LIENT: Navajo Refinery BORING NUMBER: B73 **EXCAVATED POND:** 

FIRST ENCOUNTERED WATER: 20' DATE COMPLETED: 03/03/92

SHEET: 1 of 1 DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 24'

	WI LETED: 00/00/32				T	T.,
	DESCI	RIPTION	1	DEPTH (ft.)	SAMPLE	CUTTING
0-7' 7-11'	SANDY CLAY, dark brown CLAY, tan, with some smaplastic.			- 2 - - 2 - - 4 - - 6 -		
11–20'	CLAY, brown, with small p pebbles, moist, plastic.	ockets of fine sand and	occasional	- 8 -		
20-24'	CLAYEY SAND, gray hydrod with depth.  (D-T-P)			- 10 12 14 16 18 20 22 24		
Date	Depth to Product	(D-T-W)  Depth to Water	Product Thickness	26 -		
3/4/9	ZVBES	19.34'	Film (<1/16")	- 28		

ROJECT: 622092001-237 (B74)

LIENT: Navajo Refinery BORING NUMBER: B74 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 19.5' DATE COMPLETED: 03/04/92

SHEET: 1 of 1

DRILLED BY: Pool Envir. LOGGED BY: PWC

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 22'

		<del>- 1 1</del>			<del>-</del>
	DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	CUTTING
0-9'	SANDY CLAY, dark brown to brown, moist to dry, plastic.	- 2 - - 2 - - 4 -			
9-11'	CLAY, tan, moist, plastic.	- 6 -			
11-19.5'	CLAY, gray hydrocarbon staining, moist, plastic, color becoming darker with depth, very strong hydrocarbon odor.	- 8 -			
19.5–22'	CLAYEY SAND, dark gray staining, saturated, brown colored free product coming to surface on auger flights.	- 10 12 14			
Date	(D-T-P) (D-T-W) Product Depth to Product   Depth to Water   Thickness	- 24 - 26 -			
3/5/9	2 15.89' 18.80' 2.91'	- 28 - - 30 -   			

PROJECT: 622092001-237 (B75)

CLIENT: Navajo Refinery BORING NUMBER: B75 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 21' DATE COMPLETED: 03/04/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 23'

	DESC	RIPTION		DEPTH (ft.)	SYMBOL	CUTTING
0–5' 5–16'	SANDY CLAY, dark brown CLAY, tan, with occasiona plastic.			- 2 - - 2 - - 4 - - 6 -		
16-21'	CLAY, gray hydrocarbon s darker with depth, pronou	taining, moist, plastic, c nced odor increase with	color becoming depth.	8 -		
21–23'	CLAYEY SAND, gray staining brown colored free product		drocarbon odor,	- 12 14 16 18		
Date 3/5/9	(D-T-P)   Depth to Product   2	(D-T-W)  Depth to Water  16.63'	Product Thickness 0.21'	- 24		

ROJECT: 622092001-237 (B76)

BORING NUMBER: B76
EXCAVATED POND:

FIRST ENCOUNTERED WATER: 22' DATE COMPLETED: 03/04/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 23'

	DESC	RIPTIO	N	DEPTH (ft.)	SYMBOL	SAMPLE	CUTTING
0-7'	SANDY CLAY, dark brown	to brown, moist to dr	y, plastic.	- 2 - - 2 - 4 -			
7–17'	CLAY, tan, with occasional moist, plastic.	al small pockets of fine	e white sand,	-			
17-23'	SANDY CLAY, tan, moist, smell, no visible staining.	saturated at 22', very	faint hydrocarbon	- 8 - - 10 - - 12 - - 14 - - 16 -			
Date	(D-T-P) Depth to Product	(D-T-W) Depth to Water	Product Thickness	- 18 - - 20 - - 22 - 			
3/5/9	2 17.26'	17.27	0.01'				

ROJECT: 622092001-237 (B77) LIENT: Navajo Refinery BORING NUMBER: B77 **EXCAVATED POND:** 

FIRST ENCOUNTERED WATER: 26' DATE COMPLETED: 03/04/92

SHEET: 1 of 1

DRILLED BY: Pool Envir. LOGGED BY: PWC

SURF. ELEV: N/A TOTAL DEPTH: 27'

	DESCRIPTION	DEPTH (ft.) SYMBOL SAMPLE CUTTING
0-6' 6-11' 11-13' 13-16'	SANDY CLAY, dark brown to brown, moist, plastic.  CLAY, tan, with occasional pockets of fine sand and small pebbles, moist, plastic.  CLAY, brown, with occasional pockets of fine sand and small pebbles, moist, plastic.  CLAY, gray hydrocarbon staining, moist, plastic, odor increasing with depth.	- 2
16-27'	GRAVEL mixed with CLAY, gray staining, rock up to 3" diameter, moist until 26', saturated from 26-27'.  (D-T-P) (D-T-W) Product  [ Depth to Product   Depth to Water   Thickness	- 14
3/5/9		- 26

ROJECT: 622092001-237 (B78)

LIENT: Navajo Refinery BORING NUMBER: B78 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 17' DATE COMPLETED: 03/05/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 21'

DESCRIPTION  DESCR	——————————————————————————————————————				
0-8' SANDY CLAY, dark brown to brown, moist, plastic.  8-17' CLAY, gray hydrocarbon staining, moist, plastic, color becoming darker with depth, odor increasing.  17-21' CLAY, dark gray hydrocarbon staining, saturated, brown colored free product coating auger flights.	DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	CUTTING
	8-17' CLAY, gray hydrocarbon staining, moist, plastic, color becoming darker with depth, odor increasing.  17-21' CLAY, dark gray hydrocarbon staining, saturated, brown colored free product coating auger flights.  (D-T-P) (D-T-W) Product Date Depth to Product Depth to Water Thickness 3/6/92 13.03' 17.67' 4.64'	- 2			

ROJECT: 622092001-237 (B79) LIENT: Navajo\_Refinery

LIENT: Navajo Refinery BORING NUMBER: B79 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 17' DATE COMPLETED: 03/05/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 19'

	DESC	RIPTION		DEPTH (ft.) SYMBOL	SAMPLE	CUTTING
0-7' 7-17'	SANDY CLAY, dark brown CLAY, gray hydrocarbon s darker color increasing w	staining, moist, plastic, c		- 2 - - 2 - - 4 - - 6 -		
17–19'	CLAYEY SAND, gray stain  (D-T-P)	ing, saturated. (D-T-W)	Product	- 8		
Date 3/6/9:	Depth to Product	Depth to Water  16.51'	Thickness 2.47'	- 26 28 30		

ROJECT: 622092001-237 (B80) CLIENT: Navajo Refinery BORING NUMBER: B80 **EXCAVATED POND:** 

FIRST ENCOUNTERED WATER: 17' DATE COMPLETED: 03/05/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 19'

				<del></del> ,			
	DESC	RIPTION		DEPTH (ft.)	SYMBOL	SAMPLE	CUTTING
0-4' 4-7' 7-17' 17-18.5' 18.5-19'	SANDY CLAY, dark brown CLAY with SAND, moist, p CLAY, gray hydrocarbon s becoming darker with dep CLAYEY SAND, saturated, CLAY, blue—gray staining,	blastic. staining, moist, plastic, o oth, blue—gray staining t blue—gray staining, stro	color peginning at 10'.	- 2 4 10 12 14 16 18 18 18			
	(D-T-P) Depth to Product 14.69'	(D-T-W) Depth to Water 17.25'	Product Thickness 2.56'	- 20 22 24 26 30			

ROJECT: 622092001—237 (B81) LIENT: Navajo Refinery BORING NUMBER: B81 **EXCAVATED POND:** 

FIRST ENCOUNTERED WATER: 21' DATE COMPLETED: 03/05/92

SHEET: 1 of 1 DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 24'

	DESC	RIPTION	$\bigvee$	DEPTH (ft.)	SYMBOL	SAMPLE	CUTTING
0-6'	SANDY CLAY, dark brown	to brown, moist, plastic	<b>.</b>	- 4			
6-12'	CLAY, tan, with occasiona	tan, with occasional pockets of fine sand, moist, plastic.					
12-21'	CLAY, gray hydrocarbon s coloration increasing with	gray hydrocarbon staining, moist, plastic, odor and darker					
21-24'	CLAYEY SAND, saturated,	brown colored free prod	duct on auger flights.	- 10 -			
				- 12 -			
		•		  - 14			
				- 16 -			
				- 18 - 			
				<del>-</del> 20 -			
				<u> </u>			
	(D-T-P)	(D-T-W)	Product	- 24 -			
Date	Depth to Product	Depth to Water	Thickness	26-			
3/6/9	15.62'	17.97	2.35'	 - 28 -			
	·			- 30 -			
				-			
				-			
	KWBES						

ROJECT: 622092001-237 (B82) LIENT: Navajo Refinery BORING NUMBER: B82 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 21'

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 22'

DATE CO	MPLETED: 03/05/92				
	DESC	RIPTIO	Ν	DEPTH (ft.) SYMBOL	SAMPLE CUTTING
0-5' 5-11' 11-18' 18-22'	SANDY CLAY, brown, dry, CLAY, brown, dry to mois colored bands and small CLAY, gray hydrocarbon s coloration increasing with SANDY CLAY, gray, moist	et, stiff to plastic, occa caliche pebbles. taining, moist, plastic, depth.		- 2 4	
<u>Date</u> 3/6/9	(D-T-P) Depth to Product  2  -	(D-T-W)   Depth to Water   14.04' "	Product   Thickness   Film (<1/16")	- 24	

ROJECT: 622092001-237 (B83)
LIENT: Navajo Refinery
BORING NUMBER: B83
EXCAVATED POND:

FIRST ENCOUNTERED WATER: 20' DATE COMPLETED: 03/05/92

SHEET: 1 of 1 DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 21'

DATE COMP	PLETED: 03/05/92				<del></del>
	DESC	RIPTION		DEPTH (ft.) SYMBOL	SAMPLE
10–15' C	CLAY, tan, moist, plastic.  CLAY, gray hydrocarbon s  SANDY CLAY, gray, sature  (D-T-P)	taining, moist, plastic.	Product	- 2	
	Depth to Product —	Depth to Water	Thickness –	- 26 - - 28 - - 30 -	
	TWBES =				

OJECT: 622092001-237 (B84) LIENT: Navajo Refinery BORING NUMBER: B84 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 23' DATE COMPLETED: 03/06/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 24'

	DESC	RIPTION		DEPTH (ft.)	SYMBOL	SAMPLE	CUTTING
0-9' 9-15'	SANDY CLAY, dark brown CLAY, tan, dryer, stiff to caliche nodules.			- 2 - 2 - 4 - 4 - 6			
15-23'				8 -			
23-24'	CLAYEY SAND, saturated,	gray staining, strong od	or.	- 10 - - 12 - - 14 - - 16 - - 18 - - 20 - - 22 - 			
Date	(D-T-P)   Depth to Product	(D-T-W)   Depth to Water	Product Thickness	- 24 - 			
3/7/92		20.33'	2.93'	- 26 28 30			

COJECT: 622092001-237 (B85) LIENT: Navajo Refinery BORING NUMBER: B85 **EXCAVATED POND:** 

FIRST ENCOUNTERED WATER: 20' DATE COMPLETED: 03/06/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 21'

	MPLETED: 03/06/92				·
	DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	CUTTING
0-8' 8-15' 15-20' 20-21'	SANDY CLAY, dark brown to brown, moist, plastic.  CLAY with SAND, gray hydrocarbon staining, moist, plastic, odor and darker coloration increasing with depth.  CLAY, gray staining, moist, very sticky.  CLAYEY SAND, gray, saturated, strong odor, brown colored free product on augers.	- 2			
Date 3/7/9	(D-T-P) (D-T-W) Product Depth to Product   Depth to Water   Thickness 2 16.05' 19.82' 3.77'	- 22 24 26			

PROJECT: 622092001-237 (B86)

CLIENT: Navajo Refinery BORING NUMBER: B86 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 19'
DATE COMPLETED: 03/06/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 20'

DATE COMP	PLETED: 03/06/92					
	DESC	RIPTION	<b>\</b> :	DEPTH (ft.) SYMBOL	SAMPLE	CUTTING
6–19'	SANDY CLAY, dark brown CLAY, gray hydrocarbon s darker discoloration incred CLAYEY SAND, gray, satur	taining, moist, plastic, od sing with depth.	dor and	- 2		
Date 3/7/92	(D-T-P) Depth to Product 14.99'	(D-T-W)  Depth to Water  17.48'	Product Thickness 2.49'	- 24 - - 26 - - 28 - - 30 - 		

ROJECT: 622092001-237 (B87)

LIENT: Navajo Refinery BORING NUMBER: B87 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 20' DATE COMPLETED: 03/06/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 21'

	DESC	RIPTION		DEPTH (ft.)	SYMBOL	SAMPLE	CUTTING
0-6'	SANDY CLAY, dark brown pebbles and pockets of fi	to brown, moist, plastic, ne white sand.	occasional	 - 2 - - 4 -			
6-7'	SANDY CLAY, gray hydroc plastic.	arbon staining, strong o	dor, moist,	- 6 - 6			
7–15'	CLAY, gray to blue-gray, lighter in color with depth		oming	- 8 -  - 10 -			
15-20'	CLAYEY SAND, gray, mois	t, thin gravel bed around	d 16, plastic.	- 12 <del>-</del>			
20-21'	CLAY with SAND, gray, so	turated, occasional large	gravel.	- 14 16 18 20 22 24			
Date	(D-T-P)   Depth to Product	(D-T-W) Depth to Water	Product Thickness				
3/7/9	TAMBES	19.24	4.56'	- 26 - - 28 - - 30 -   			

`ROJECT: 622092001-237 (B88)

LIENT: Navajo Refinery BORING NUMBER: B88 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 23' DATE COMPLETED: 03/07/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 25'

	DESCI	RIPTION		DEPTH (ft.)	SYMBOL	SAMPLE	CUTTING
8.5–13' ( 13–23' (	SANDY CLAY, dark brown to plastic. CLAY, gray hydrocarbon si SANDY CLAY, gray, moist, GRAVEL mixed with SAND	aining, moist, plastic, s	slight odor. orbon odor.	- 2 - - 2 - - 4 - - 6 - - 8 - - 10 - - 12 -			
Date	(D-T-P) Depth to Product	(D-T-W) Depth to Water	Product Thickness				
3/8/92	17.01'	19.59'	2.58'	- 26 - - 28 - - 30 -    			

ROJECT: 622092001-237 (B90)

LIENT: Navajo Refinery BORING NUMBER: B90 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 20' DATE COMPLETED: 03/07/92

**EXE KWBES** 

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 21'

	DESCRIPTION	DEPTH (ft.)	NAMBOL	SAMPLE	CUTTING
0-6 6-13	plastic to stiff with occasional caliche nodules.	- 2 - - 2 - - 4 - - 6 -			
13-21	CLAYEY SAND, gray, hydrocarbon staining, moist, plastic, strong odor, becoming darker in color with depth, saturated at 20'.	- 8 10 12 14 16 18 20 22 22			
		- 24 26 28 30			

ROJECT: 622092001-237 (B91)

BORING NUMBER: B91 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 20' DATE COMPLETED: 03/07/92

SHEET: 1 of 1

DRILLED BY: Pool Envir. LOGGED BY: PWC

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 22'

					TT		
	DESC	RIPTION	1	DEPTH (ft.) SYMBOL	SAMPLE	CUTTING	
0-4'	SANDY CLAY, dark brown	to brown, moist, plastic.		- 2 - - 2 - - 4 -			
4-6'	CLAY with SAND, reddish- white caliche nodules.	AY, tan, with occasional pockets of fine sand, moist,					
6–12'	CLAY, tan, with occasional plastic.	tan, with occasional pockets of fine sand, moist,					
12-20'	SANDY CLAY, gray staining plastic, increasing gravel		dor, moist,	12			
20-22'	SAND with some CLAY, g	dor.	- 14 - - 16 - - 18 -				
				20			
Date	(D-T-P)   Depth to Product	(D-T-W) Depth to Water	Product Thickness	- 24 - 			
3/8/9		16.19' ·	1.04'	- 26 - - 28 - - 30 - 			

ROJECT: 622092001-237 (B92)

LIENT: Navajo Refinery BORING NUMBER: B92 **EXCAVATED POND:** 

FIRST ENCOUNTERED WATER: 20' DATE COMPLETED: 03/07/92

SHEET: 1 of 1

DRILLED BY: Pool Envir. LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 21'

	DESC	RIPTION		DEPTH (ft.) SYMBOL	SAMPLE	CUTTING
0-5' 5-16'	SANDY CLAY, dark brown CLAY with SAND, tan, dry	·		- 2 - 2 - 4 - 4		
16-20'	odor detectable in soil at CLAY with SAND, brown, i but no discoloration note	12' but no color change moist, plastic, hydrocarbo	<b>?</b> .	- 6 - - 8 -		
20-21'	GRAVEL mixed with CLAY,	saturated, odor, no colo	or change.	- 10 12 14 16		
Date	(D-T-P) Depth to Product	(D-T-W) Depth to Water	Product Thickness	- 24 -  - 26 -		
3/10/9	Z 20.32'	21.10'	0.78'	- 28		

PROJECT: 622092001-237 (B93) CLIENT: Navajo Refinery BORING NUMBER: B93 **EXCAVATED POND:** 

FIRST ENCOUNTERED WATER: 22' DATE COMPLETED: 03/09/92

SHEET: 1 of 1

DRILLED BY: Pool Envir. LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 23'

	DESCI	RIPTION		DEPTH (ft.) SYMBOL	SAMPLE	CUTTING
0-3' 3-8' 8-10' 10-19' 19-21' 21-23'	SANDY CLAY, dark brown, SILTY SAND, tan, moist to CLAYEY SAND, brown, mois nodules. CLAY, brown, very moist, CLAY, gray hydrocarbon s	o dry. ist, plastic. t, plastic, occasional sm plastic.		- 2		
	(D-T-P) Depth to Product 22 21.1'	(D-T-W)  Depth to Water  21.6'	Product Thickness 0.5'	- 20		

ROJECT: 622092001-237 (B94)

BORING NUMBER: B94 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 25' DATE COMPLETED: 03/09/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 26'

	DESCI	RIPTION		DEPTH (ft.)	SYMBOL	SAMPLE	CUTTING
3–8' CL 8–17' CI 17–21' GI 21–25' CI	ANDY CLAY, dark brown, LAY with SAND, tan, mois LAY, brown, moist, plasti RAVEL with CLAY, moist. LAY, reddish—brown, mois RAVEL with CLAY, satura	st, plastic. c. st, plastic.		- 2 4 6 10 12 16 18			
Date 3/10/92	(D-T-P) Depth to Product -	(D-T-W) Depth to Water  22.66'	Product Thickness -	- 22 - - 24 - - 26 - - 28 - - 30 - 			

ROJECT: 622092003-237 (B-95)

JENT: Navajo Refinery BORING NUMBER: B95 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 20.0' DATE COMPLETED: 08/04/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 22.0'

DATE COMPLETED:	08/04/92 						
D	ESCRI	PTIO		DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
6.0–12.0' SAI pla 12.0–20.0' CL/ pla 20.0–22.0' SIL	AY WITH SAND, dark  NDY CLAY, tan, occar istic.  AY, light brown, small istic.  T, reddish-brown, sa  = 22.0'	sional gravel fragm I fragments of gro	nents, moist,	- 2 4 12 16 16 16 16			
Date 08-05-92	(D-T-P) Depth to Product	(D-T-W) Depth to Water  15.4'	Product Thickness None	- 18			

ROJECT: 622092003-237 (B-96)

LIENT: Navajo Refinery BORING NUMBER: B96 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 22.5' DATE COMPLETED: 08/04/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 23.0'

DATE COMPLETED: 08/04/92				
DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-5.0' CLAY WITH SAND, dark brown to brown, moist, plastic.  5.0-7.0' CLAY, brown, moist, plastic.  7.0-20.0' SANDY CLAY, tan, slightly moist, plastic, occasional fragments of gravel starting © 10.0'  20.0-22.5' SANDY CLAY, light gray hydrocarbon staining, strong hydrocarbon odor, moist, gravel fragments up to 1' in diameter.  22.5-23.0' SILT, gray hydrocarbon staining, strong hydrocarbon odor, saturated.  TD = 23.0'  Date   Depth to Product   Depth to Water   Thickness    08-05-92     14.38' <1.8" (film)	- 2			

PROJECT: 622092003-237 (B-97) LIENT: Navajo Refinery BORING NUMBER: B97 **EXCAVATED POND:** 

FIRST ENCOUNTERED WATER: 22.0' DATE COMPLETED: 08/04/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 24.0'

DATE COMPLETED	U6/U4/92						
	ESCRI	PTIOI	V	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
SANDY hydroca of fine  TD = 2  Date  08-05-92	(D-T-P) Depth to Product	pist to moist, plas starting @ 15.0'. on staining, strong occasional small p	tic,	- 2 4			
	lll		•				

PROJECT: 622092003-237 (B-98)

LIENT: Navajo Refinery BORING NUMBER: B98 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 19.0'

DATE COMPLETED: 08/04/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 20.0'

DATE COMPLETED. 00/04/92				
DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-12.0' CLAY MITH SAND, dark brown to brown, moist, plasticgravel fragments starting to appear @ 10.0'  12.0-14.0' CLAY, light gray hydrocarbon staining, weak hydrocarbon odor, moist, plastic.  14.0-16.0' GRAVEL MITH CLAY, 1-2" diameter gravel mixed with moist clay.  16.0-19.0' CLAY AND GRAVEL, brown, moist, plastic.  19.0-20.0' SILT, gray hydrocarbon staining, strong hydrocarbon odor, saturated.  TD = 20.0'    Date	- 2			

PROJECT: 622092003-237 (B-99)

IENT: Navajo Refinery BORING NUMBER: B99 **EXCAVATED POND:** 

FIRST ENCOUNTERED WATER: 19.0' DATE COMPLETED: 08/04/92

SHEET: 1 of 1

DRILLED BY: Pool Envir.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 20.0'

	DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
8.0–19.0' S.  19.0–20.0' Cl hy	CLAY WITH SAND, dark brown to brown, moist, plastic.  SANDY CLAY, tan, moist, plastic -occasional gravel fragments starting @ 11.0'  CLAYEY SILT, tan to gray hydrocarbon staining, strong sydrocarbon odor, saturated.  TD = 20.0'	- 2 4			
Date 08-05-		- 16			

PROJECT: 622092003 (B-100)

CLIENT: Navajo Refinery BORING NUMBER: B100 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 5.0' DATE COMPLETED: 10/06/92

SHEET: 1 of 1 DRILLED BY: Precision Eng.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 55.0'

5/112 001111 22		 			
·	DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
		- 2 -			
0-5.0'	CLAYEY SAND, dark brown to brown, moist to very moist, plastic.	 _ 6 _			
5.0-20.0	SILTY SAND, reddish brown, saturated, occasional pockets of gravel.	- 10 <i>-</i>			
20.0-55.0'	SAND, tan, saturated, fine to medium grained, occasional thin lenses of high plasticity red clay.	14 18			
	TD = 55.0'	 _ 22 _			
		- 26 - 			
		- 30 - 34 -			
		- 38 -			
		- 42 -			
		- 46 - 			
		- 50 - - 54 -			
		 _ 58 _			
_					
			<b>†</b> <b>†</b>		
	WBES —	 			
T did	AA DT9	 			

PROJECT: 622092003 (B-101) CLIENT: Navajo Refinery BORING NUMBER: B101 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 17.0' DATE COMPLETED: 10/07/92

SHEET: 1 of 1

DRILLED BY: Precision Eng.

LOGGED BY: PWC

SURF. ELEV: N/A TOTAL DEPTH: 50.0'

	DESCRIPTION		DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-8.0'	SANDY CLAY, brown, moist, occasional pockets of fine white sand.	-	- 2 - - 6 - - 6 -			
8.0-20.0'	CLAYEY SAND, brown to tan, very moist to saturated at 17.0'.		- 10 -  - 14 <del>-</del>			
20.0-25.0	CLAY, red, very moist to saturated.	}				
25.0-33.0	SILTY SAND, reddish brown, saturated.		– 18 – –     –			
33.0-50.0'	SAND, tan, saturated, occasional thin seams of gravel.	ļ	– 22 <del>–</del> –       –			
	TD = 50.0'	}	26 			
		-	- 30 - 			
		-	- 34 - 			
			- 38 - 			
			- 42 - 			
			<del>-</del> 46 -			
			<del>-</del> 50 -			
			54			
			 58			
			<del></del>	1		
	WBES					
	TT MEN					

PROJECT: 622092003 (B-102)

CLIENT: Navajo Refinery BORING NUMBER: B102 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 10.0' DATE COMPLETED: 10/07/92

SHEET: 1 of 1

DRILLED BY: Precision Eng.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 50.0'

DE;	SCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL
0-9.5' CLAYEY SA zone at 2. 9.5-17.0' SILTY SANI 10.0'	ND, tan to white, dry to moist, thin gravel 5'.  O, reddish brown, very moist to saturated at saturated, fine to medium grained.	- 2	SYM	SAM	WE
KWB	ES —				

PROJECT: 622092003 (B-103)

CLIENT: Navajo Refinery BORING NUMBER: B103 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 33.0' DATE COMPLETED: 10/07/92

SHEET: 1 of 1

DRILLED BY: Precision Eng.

LOGGED BY: PWC SURF. ELEV: N/A TOTAL DEPTH: 50.0'

	DESCRIPTION	DFPTH	(ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-5.0' 5.0-10.0' 10.0-19.5' 19.5-30.0' 30.0-50.0'	SAND WITH CLAY, tan, dry to slighty moist, clay content increasing with depth, occasional gypsum crystals.  CLAYEY SAND, tan to gray, dry to slightly moist, 1" river rock seams at 6.0' and 8.5'  CLAY, alternating bands of greenish—gray and red color (reduced and oxidized), blocky, stiff, moist—sharp contact between color changes  SILTY SAND, reddish brown, very moist  SAND, tan, very moist to saturated a 33.0', fine to medium grain.  TD = 50.0'		2 - 6 - 10 - 114 - 118 - 22 - 30 - 338 - 42 - 50 - 54 - 58 58 - 58 - 58 - 58 - 58 -			
	WBES —					

PROJECT: 622092003-253 (B-104)

CLIENT: Navajo Refinery BORING NUMBER: B104 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 24' DATE COMPLETED: 01/24/93

SHEET: 1 of 1 DRILLED BY: Pool Env. LOGGED BY: PWC

SURF. ELEV: TOTAL DEPTH: 26'

	DESCF	RIPTIC		DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-6' 6-21' 21-2	-gray discoloro dark a 13' to	wn, moist, friable on to 7' then gray, aining and odor note friable to stiff ation varies in shade light at 18' clay is gray with a s dor, gravel is up to well rounded, moist t	from	- 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 10 - 11 - 12 - 13 - 14 - 15 - 16 - 17 - 18 - 18 - 18 - 18 - 18 - 18 - 18			
1-25-93	(D-T-P) DEPTH TO PRODUCT  19.6'	(D-T-W) DEPTH TO WATER 20.69'	PRODUCT THICKNESS 1.09'	- 19 - 20 - 21 - 22 - 23 - 24 - 25 - 26 - 27	10000000000000000000000000000000000000		
	WBES		·	 			

PROJECT: 622092003-253 (B-105)

CLIENT: Navajo Refinery BORING NUMBER: B105 EXCAVATED POND:

FIRST ENCOUNTERED WATER: 23' DATE COMPLETED: 01/24/93

SHEET: 1 of 1

DRILLED BY: Pool Env.

LOGGED BY: PWC SURF. ELEV: TOTAL DEPTH: 24'

	DESCF	RIPTIO	Ν	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-7' 7-18' 18-2: 23-2 TD=2	moist, plastic  -gray discolore dark at 9' to  3' CLAYEY GRAVEL, of up to 2" in die  4' SILTY SAND, gray, staining, strong	en, moist, plastic arbon discoloration a ation varies in shade light at 13' clay is gray, moist, g ameter and well roun saturated, gray hydr g hydrocarbon odor	from ravel is ded	- 1 -   -   -   -   -   -   -   -   -			
DATE 1-25-93	(D-T-P) DEPTH TO PRODUCT 18.27'	(D-T-W) DEPTH TO WATER  19.76'	PRODUCT THICKNESS 1.49'	- 18 - 19 - 20 - 21 - 22 - 23 - 24 - 25 - 26 - 27 - 27 - 27 - 27 - 27 - 27 - 27	000000000000000000000000000000000000000		
	WBES						

PROJECT: 622092003-253 (B-106)

CLIENT: Navajo Refinery BORING NUMBER: B106 **EXCAVATED POND:** 

FIRST ENCOUNTERED WATER: 19' DATE COMPLETED: 01/24/93

SHEET: 1 of 1

DRILLED BY: Pool Env.

LOGGED BY: PWC SURF. ELEV: TOTAL DEPTH: 19'

DATE COMPL	ETED: 01/24/93						
	DESC	RIPTIO	Ν	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
0-8' 8-18 18-19	clay content ir ' CLAY, gray hydroc odor, moist, p	wn, moist, friable to pacreasing with depth carbon staining with hlastic and and silt are tan, so 2" in diameter, well DEPTH TO WATER	ydrocarbon	- 1 - 2 - 3 4 5 6 7 11 12 13 14 15 16 17 18 20 21 20 21 20 21			
1-25-93	* NOTE: Hole coll	- * apsed back to 18.86'	- dry	- 22 23 24 25 26 27			

PROJECT: 622092003-253 (B-107)

CLIENT: Navajo Refinery BORING NUMBER: B107

EXCAVATED POND:

FIRST ENCOUNTERED WATER: 29' DATE COMPLETED: 01/24/93

SHEET: 1 of 1

DRILLED BY: Pool Env.

LOGGED BY: PWC

SURF. ELEV: TOTAL DEPTH: 29'

	I			1
DESCRIPTION	DEPTH (ft.)	SYMBOL	SAMPLE	WELL DESIGN
9-16' CLAY, gray hydrocarbon staining and hydrocarbon odor, moist, plastic  16-24' CLAYEY GRAVEL, sand and clay, moist, gravel is up to 2" in diameter and well rounded  24-28' SANDY CLAY, gray hydrocarbon staining and hydrocarbon odor, moist, satruated plastic  28-29' SILTY SAND, gray hydrocarbon staining and hydrocarbon odor, satruated  TD=29'	- 1 - 2 - 3 - 4 - 5 - 6 - 7 10 11 12 13 16 17 18 20 - 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 - 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21 - 21	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		
(D-T-P) (D-T-W)  DATE DEPTH TO PRODUCT DEPTH TO WATER PRODUCT THICKNESS	- 22 - - 23 - - 24 -	36		
1-25-93 21.10' 21.12' 0.02'	- 25 - 26 - 27 - 28 - 29                                                                                                                                                                                                                                                                                                                                              			

Offsite Borings

Offsite Borings 1995 - 1997



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started: Time Started Date Completed : 10/13/95 : 0905 : 10/13/95 Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Logged By

		Arte	sia, N	lew Mexico	Hole Diameter:	: 13"	Logged By:	: D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
0 -			ML	0-5 ft. Surface soil, sar	ndy silt with clay, bro	own		
5 - - - -				5-10 ft. Clay, brown				
10 -				10-12 ft. Clay, white, i grains, no H/C odor 12-14 ft. Clay, white, o				
15			CL	14-18 ft. Clay, white, odor; water at 18 ft.	moist, caliche grains	s, no H/C		
20				18-25 ft. Clay, sticks o	on auger, light browr	1		
25	- - - - - -		ML	25-30 ft. Clay with inc seen at 30 ft., auger fa	reasing sand; small airly clean	gravel		
30				Notes:				
30 35				Borings located in field treatment plant along a 290 ft. east of refinery located 200 ft. south of south bank of Eagle Co	a north-south line ap r security fence. Bor of the east-west fen	prox. ing 95-01		
40	-			Upon completion, wate At 1800, hole caved to apparent product. Refi hole with cuttings.  DTW = Depth to wate	o 15.1 ft., DTW 11. nery workers plugge	3 ft., no d back	n.	
40	4			·		•		



(Page 1 of 1)

Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started: Time Started : 10/13/95 : 0940 Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

Date Completed

: 10/13/95

Drilled By:

: Frank's Rathole Srv.

	Navajo Refining Company  Artesia, New Mexico  Date Completed : 10/13/95  Hole Diameter: : 13"			Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Samples GRAPHIC USCS	DES	SCRIPTION			
O ML	0-5 ft. Surface soil, sar	ndy silt with clay, bro	own		
10	5-11 ft. Clay, moist bu	t dry at base, no H/C	Codor		
15 - CL	12 ft. Clay with small of	gravel, caliche clay			
20	19 ft. Water, fast entry 20-21 ft. Clay with sor and sand		rox. 1/2")		
25	21-28 ft. Clay with so	me silt, no gravel			
30 -	Notes:  Borings located in field treatment plant along 290 ft. east of refinery located 300 ft. south bank of Eagle Creek.	a north-south line ap / security fence. Bori	prox. ing 95-02		
35 -	At 1800, hole caved tapparent product. Refihole with cuttings.  DTW = Depth to water	nery workers plugge	d back		
40					



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: : 10/13/95 Time Started : 1000

: 10/13/95

Drilling Method:

: Solid Stem Auger

Sampling Method: : Cuttings

Drilled By: : Frank's Rathole Srv.

Date Completed Artesia, New Mexico Hole Diameter: : 13" Logged By: : D.G. Boyer GRAPHIC Depth nscs **DESCRIPTION** Feet 0 0-9 ft. Surface soil, sandy silt with clay, brown ML 5 10 9-13 ft. Clay with gypsum or caliche, white, moist 15 17 ft. Clay with gypsum or caliche, white, dry, some small gravels 20 21 ft. Clay, dense, moist 22 ft. Water entering hole 23 ft. Clay, light brown, some silt 25 23-30 ft. Clay, slightly moist, little water at bottom 30 Notes: Borings located in field east of old city wastewater treatment plant along a north-south line approx. 290 ft. east of refinery security fence. Boring 95-03 located 400 ft. south of the east-west fence on the south bank of Eagle Creek. 35 At 1800, hole caved to 16.4 ft., DTW 11.4 ft., no apparent product. Refinery workers plugged back hole with cuttings. DTW = Depth to water, H/C = Petroleum hydrocarbon

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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started: Time Started : 10/13/95 : 1025

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Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings : Frank's Rathole Srv.

	Na	avajo	Refir	ning Company New Mexico	Date Completed Hole Diameter:	: 10/13/95 : 13"	Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
5 -			ML	0-10 ft. Surface soil, s	andy silt with clay,	brown		
10 <sup>-</sup> - -				10-12 ft. Clay with sm	nall gravels, slightly	moist		
- 15 - - -				14 ft. Clay, stiff 16 ft. Gravely clay, wa 17 ft. Clay, brown, sti		ft		
20 -			CL	17-26 ft. Clay, brown	stiff			
30				26-30 ft. Clay, brown light reddish-brown.	, stiff, some fine gr	ained sand,		
30	-			Notes:				
35	-			Borings located in field treatment plant along 290 ft. east of refiner located 500 ft. south south bank of Eagle C Upon completion, wat At 1800, hole caved tapparent product. Refhole with cuttings.	a north-south line a y security fence. Bo of the east-west fe reek. er level in hole at 1 o 16.4 ft., DTW 1	opprox. oring 95-04 nce on the 4 ft. 1.4 ft., no		
40 ·	-			DTW = Depth to wat	er, H/C = Petroleui	m hydrocarbon		



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Offsite Borings 1995 Hydrocarbon Study

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Date Started: Time Started : 10/13/95 : 1050 : 10/13/95 Drilling Method:

: Solid Stem Auger

Sampling Method: : Cuttings

Navajo Refining Company **Date Completed** Drilled By: : Frank's Rathole Srv. : 13" Artesia, New Mexico Hole Diameter: Logged By: : D.G. Boyer GRAPHIC Samples Depth **DESCRIPTION** Feet 0 0-7 ft. Surface soil, sandy silt with clay, brown 5 10 10 ft. Clay, dry, crumbly 15 16 ft. Clay, moist, strong H/C odor 17-18 ft. Gravelly clay, H/C product 19 ft. Water and product in well, cease drilling. 20 Notes: Borings located in field east of old city wastewater treatment plant along a north-south line approx. 290 ft. east of refinery security fence. Boring 95-05 located 600 ft. south of the east-west fence on the south bank of Eagle Creek. 25 At completion of drilling, water and product fluid level rose to 14 ft. At 1800, hole caved to 16 ft.,

DTW 11.1 ft., 0.6 ft. of product measured. Refinery workers plugged back hole with cuttings.

DTW = Depth to water, H/C = Petroleum hydrocarbon



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started Date Completed

: 10/13/95 : 1110 : 10/13/95 Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

	14	-		ew Mexico	Hole Diameter:	: 13"	Logged By:	: D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
O - - - 5 -			ML	0-6 ft. Surface soil, san	dy silt with clay,	brown		
10 -				6-9 ft. Clay  11 ft. Clay, dark gray,	H/C odor			
15			CL	14 ft. Clay, dark gray, plastic, H/C odor	crumbly to slightly	/ moist and		
20 - - -				18-19.5 ft. Clay with s product	ome gravels, wat	er and H/C		
- 25 <sup>-</sup> - -			SM	22-27 ft. Silty sand, fir	ne grained			
30 <sup>-</sup>				30 ft. Silty sand, fine g	grained, with clay			
30 -				Notes:  Borings located in field treatment plant along a 290 ft. east of refinery located 700 ft. south c south bank of Eagle Cr.  At completion of drilling treatment of the south bank of the	a north-south line security fence. B of the east-west for eek.	approx. oring 95-06 ence on the		
40 -	- - - - - - - - - - -			product on water. At 1800, hole caved to of product measured. It hole with cuttings.  DTW = Depth to water.	o 14.3 ft., DTW 1 Refinery workers p	1.1 ft., 0.2 ft. olugged back		



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company

Date Started: Time Started Date Completed : 10/13/95 : 1130

Drilling Method: Sampling Method:

: Solid Stem Auger

Drilled By:

: Cuttings : Frank's Rathole Srv.

: 10/13/95

	Artesia, New Mexico		ew Mexico	Hole Diameter:	: 13"	Logged By:	: D.G. Boyer	
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
0 -			ML	0-6 ft. Surface soil, bro	own and dry to ap	prox. 6 ft.		
5 <del>-</del> - -				6-9 ft. Caliche clay, cru	umbly, white			
10 <sup>-</sup> - -				11 ft. Caliche clay, gra no H/C odor 12-13 ft. Gray clay, H/		/n, crumbly,		
15 <sup>-</sup> -			CL	13-16 ft. Caliche clay, moist, H/C odor.	dry, crumbly but			
- 20 -				16-19 ft. Caliche clay color with depth  21 ft. Water, slight pro		i lighter		
25 -			SM	22 ft. Clayey silt at 22 22-27 ft. Sandy silt to				
•			GC CL	28 ft. Gravel to 2 in. d 28-29 ft. Clay, stiff.	iameter at 28 ft.			
30	- - - - -			Notes:  Borings located in field treatment plant along 290 ft. east of refinery located 800 ft. south south bank of Eagle C	a north-south line / security fence. I of the east-west t	approx. Boring 95-07		
35	-			At completion of drilling product on water. At DTW 10.5 ft., 0.1 ft. workers plugged back	1800, hole caved of product measu	to 18.9 ft., red. Refinery		
	1			DTW = Depth to water	er, H/C = Petrole	um hydrocarbon	1	



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started

: 10/13/95 : 1200 : 10/13/95 Drilling Method: Sampling Method: : Solid Stem Auger

Drilled By:

: Cuttings : Frank's Rathole Srv.

Date Completed

		-		ew Mexico	Hole Diameter:	: 13"	Logged By:	: D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
5 -			ML	0-6 ft. Surface soil, bro	wn and dry to ap	prox. 6 ft.		
10 -				6-13 ft. Caliche clay, c	rumbly, white			
15 -			CL	13-15 ft. Clay, light gr odor 15-17 ft. Clay, browni				
20 -				18-19 ft. Clay, gray, sti 20 ft. Gravely clay, stif 21-24 ft. Gravelly sand	f	1		
25 -			SW	to 2 in. diameter at 24  24-30 ft. Clay, stiff	ft.			
30 -				Notes:				
35 -				Borings located in field treatment plant along 290 ft. east of refinery located 900 ft. south 6 south bank of Eagle Co.  At completion of drilling no apparent product. A DTW 10.5 ft., 0.25 ft workers plugged back	a north-south line security fence. But the east-west for eek.  g, water level at 1 to 1800, hole cave of product measi	approx. oring 95-08 ence on the 0.5 ft. with ed to 20 ft., ured. Refinery		
40 -				DTW = Depth to wate	er, H/C = Petroleu	m hydrocarbon		

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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started : 10/13/95 : 1350

Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

	Na	-		ling Company lew Mexico	Date Completed Hole Diameter:	: 10/13/95 : 13"	Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
0 - - - - 5 -			ML	0-6 ft. Top soil to appr	ox. 6 ft.			
10 -			CL	6-10 ft. Caliche clay 10-12 ft. Clay, slightly 12-15 ft. Clay, slightly				:
15 ·	1			15-17 ft. Same as abo				
20			SC SM	18-21 ft. Clayey sand, 21-22 ft. Sand	very fine grained,	saturated		
25	- - - - -		CL	22-24 ft. Gravelly clay 24 -29 ft. Clay with so dense, dry		5 ft.,		
30 35	-	12.2	J	Notes:  Borings located in field treatment plant along a 290 ft. east of refinery located 1000 ft. south south bank of Eagle Cr	a north-south line a v security fence. Bo of the east-west t	approx. oring 95-09		
35				At completion of drillin possible product sheer At 1800, hole caved to product sheen. Refiner hole with cuttings.  DTW = Depth to water	ig, water level at 1 h. o 22.9 ft., DTW 9 y workers plugged	5 ft., light back		
40	4			-F		•		



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started

Date Completed

: 10/13/95 : 1420 : 10/13/95 Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

			•		lew Mexico	Hole Diameter:	: 13"	Logged By	
Dep ir Fe	١	Samples	GRAPHIC	nscs	DES	SCRIPTION			
	0		11111						
	5			ML	0-6 ft. Top soil to appr	ox. 6 ft.			
	10				6-13 ft. Caliche clay				
	15				13 ft. Caliche clay, wh				
	20 -			CL	17 ft. Caliche clay, wh 18 ft. Caliche clay, gra 18-19 ft. Gravelly clay 20-22 ft. Clay with so	ding to light brown , slightly moist			
	- - 25 - -				24 ft. Clay, dry, stiff 26 ft. Same as above, about 20 ft.	water entering ho	e from		
3-95/off95-10.ge3	- - 30 - -				26-29 ft. Clay,stiff 29-30 ft. Sandy clay 30-32 ft. Clay, hard				
10-1	-				Notes:			_	
/mtech3\navajo\10-13-95\off95-10.g	35 - -				Borings located in field treatment plant along 290 ft. east of refiners located 1100 ft. south south bank of Eagle C	a north-south line y security fence. B n of the east-west	approx. oring 95-10		
1-25-1996	- - - 40				At 1800, hole caved t product sheen. Refine hole with cuttings.  DTW = Depth to water	ry workers plugged	l back	1	



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 10/13/95 : 1500

Drilling Method:

: Solid Stem Auger

Sampling Method:

: Cuttings

	Na	avajo	Refir	roon Study ning Company Iew Mexico	Date Completed Hole Diameter:	: 1500 : 10/13/95 : 13"	Sampling Metho Drilled By: Logged By:	cd: : Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs		SCRIPTION			· · · · · · · · · · · · · · · · · · ·
0 <del>-</del> - - 5 -			ML	0-6 ft. Top soil to appr	ox. 6 ft.			
10 -			CL	6-17 ft. Caliche clay, v	ery white			
15 - - -	5 -							
20 -			GC	17-19 ft. Gravelly clay at 17 ft., caving  20 ft. Gravelly clay to bottom  21-24 ft. Clay, stiff				
- 25 - - -	5 - CI		CL	24-30 ft. Clay, stiff				
30 -				Notes:				
35 ·	-			Borings located in field treatment plant along a 290 ft. east of refinery located 1200 ft. south south bank of Eagle Cr.  At completion no appa At 1800, hole caved to product sheen. Refiner hole with cuttings.	a north-south line a v security fence. Bo of the east-west f reek. arent product or H/0 o 16.1 ft., DTW 9.	pprox. oring 95-11 ence on the C odor. 7 ft., light		
40	DTW = Depth to water, H/C = Petroleum					n hydrocarbor	1	



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia New Mexico

Date Started: Time Started Date Completed : 10/13/95 : 1600 (approx.)

: 10/13/95

Drilling Method: Sampling Method: : Solid Stem Auger

Drilled By:

: Cuttings : Frank's Rathole Srv.

			Artes	ia, N	lew Mexico	Hole Diameter:	; 13"	Logged By:	: D.G. Boyer	
Dep in Fee		Samples	GRAPHIC	nscs	DES	CRIPTION				
	5 -			ML	0-6 ft. Top soil to appro	ox. 6 ft.				
1	10 -				CL	6-12 ft. Caliche clay 12 ft. Clay, blue-gray, I	H/C odor			
1	5 -			GC	14 ft. Clay, light gray a slightly moist 14-17 ft. Clayey gravel		H/C odor,			
2	20 -			CL GC	19 ft. Clay, stiff 20-22.5 Clayey gravel					
	25 -			CL	23-26 ft. Clay, stiff 26-28 ft. Clay, some g	ravel (may have fal	len from			
5\off95-12.ge3	30				30 ft. Clay, stiff Notes:					
\mtech3\navajo\10-13-95\off95-12.	35 -	Road and along a 290 ft. east of the south from Eagle 100 ft. south of			Borings located in "bor Road and along a north 290 ft. east of the refi south from Eagle Creek 100 ft. south of the ea separating the "boneya	n-south line approxi nery security fence c. Boring 95-12 is l ist-west quarter-se	mately running ocated ction fence	th.		
-25-1996	- - - - - -				At completion water at 1800, hole caved to product sheen. Refiner hole with cuttings.  DTW = Depth to water	o 17.1 ft., DTW 7. y workers plugged	8 ft., light back	n		
4	40	L								



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 10/13/95 : 1625

Drilling Method:

: Solid Stem Auger

Sampling Method:

: Cuttings

				ing Company ew Mexico	Date Completed Hole Diameter:	: 10/13/95 : 13"	Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
0 - - - 5			ML	0-6 ft. Top soil to appr	ox. 6 ft.			
10 -			CL	6-10 ft. Caliche clay 11 ft. Clay, possible H	'C odor			
15 -				14 ft. Clay, white to bl H/C odor in some samp 15 ft. Clay, darker gray	oles v, stronger H/C odo	r.		
20			GC	18 ft. Gravelly clay, was 18-21 ft. Gravel with o				
25	-		CL	21-25 ft. Clay, dry, bro	own, no product			
3-95\officers 13.ge3				Borings located in "bor Road and along a north 290 ft. east of the refi south from Eagle Cree 200 ft. south of the ea separating the "boneya north.	n-south line approxi nery security fence k. Boring 95-13 is l ast-west quarter-se	mately running ocated ction fence		
\text{Imtech3\text{inavago\10-13-95\text{off95-13.ge3}}} \text{C} \text{C} \text{C}				At completion DTW 12 At 1800, hole caved to product measured. Refindle with cuttings.  DTW = Depth to water	o 18.7 ft., DTW 12 inery workers plug			
4.25-1936								



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Offsite Borings 1995
Hydrocarbon Study
Navajo Refining Company
Artesia, New Mexico

Date Started: Time Started : 10/13/95 : 1640 Drilling Method:

: Solid Stem Auger

Sampling Method:

: Cuttings : Frank's Rathole Srv.

		vajo I	Refin	bon Study ling Company lew Mexico	Date Completed Hole Diameter:	: 1640 : 10/13/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
5 -			ML	0-6 ft. Top soil to appro	ox. 6 ft.			
10 -	10			6-10 ft. Caliche clay				
- - - 15 -	5			12 ft. Clay, black, H/C  14 ft. Clay, dark gray,  16 ft. Clay, dark gray, (gasoline as per D.Griff	dry, crumbly, H/C			
20 -			GP GC	18 ft. Clay, dark gray, 18-19 ft. Gravel, up to H/C product	dry, powdery, H/C 3 in. diameter, w			
25			CL	23-25 ft. Clay, brown,	dry, stiff			
30	-			Borings located in "bor Road and along a north 290 ft. east of the refi south from Eagle Creel 300 ft. south of the ea separating the "boneya north.	n-south line approx nery security fenc k. Boring 95-14 is ast-west quarter-se	kimately e running located ection fence		
30	At completion water and product in hole. At 1800, hole caved to 22.4 ft., DTW 18.3 ft., 0.1 product measured. Refinery workers plugged back hole with cuttings.  DTW = Depth to water, H/C = Petroleum hydroca				o 22.4 ft., DTW 1 inery workers plug	8.3 ft., 0.3 ft gged back		
40								



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: : 10/13/95 Time Started : 1740 Date Completed

Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings Drilled By:

	N	avajo	Refir	ning Company lew Mexico	Date Completed Hole Diameter:	: 1740 : 10/13/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
0 - - - 5 -			ML	0-6 ft. Top soil to appr	ox. 6 ft.			
10 -				6-9 ft. Caliche clay 9 ft. Clay, dark gray, H 9-13 ft. Clay, light blue		, very		
15 - -			CL	strong H/C odor  13 ft. Clay, moist at 13  13-18 ft. Clay, slightly approximately 17 ft.		ng hole at		
20 -				18-20 ft. Gravelly clay, 20-21 ft. Clay, gray, d	ry with gravel and I			
25	-			Notes:				
30				Borings located in "bor Road and along a north 290 ft. east of the refi south from Eagle Creel 400 ft. south of the ea separating the "boneya north.	n-south line approxi nery security fence k. Boring 95-15 is l ast-west quarter-sec	mately running ocated ction fence		
30				At completion water et At 1800, hole depth 2 sheen on surface. Refil hole with cuttings.	5(?) ft., DTW 16.3 nery workers plugg	ft., light ed back		
OSC .	1			DTW = Depth to wate	er, H/C = Petroleun	n hydrocarbon		



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 10/18/95 : 0730

Drilling Method: Sampling Method: Drilled By:

: Solid Stem Auger

: Cuttings · Frank's Rathole Srv.

	N	avajo	Refin	bon Study ning Company Iew Mexico	Time Started  Date Completed  Hole Diameter:	: 0730 : 10/18/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
0 - - - - 5 -			ML	0-6 ft. Top soil to appr	ox. 6 ft.			
- - 10 - -				6-10 ft. Clay 10-12 ft. Silty clay, ligl H/C odor and stain	ht gray-blue, dry, c	rumbly,		
- 15 - -	CL			13 ft. Silty clay, light g 13.5-15 ft. Silty clay, l H/C odor, increasing st 15-19 ft. Silty clay bed	ight gray-blue, dry aining	, crumbly,		
20 -			GC	19-22 ft. Clayey grave	brown, slightly mo			
25 <sup>-</sup> -			CL	24-29 ft. Clay, brown, gravel in clay		cassional		
30				Notes:				
30	-			Borings located in "bor Road and along a north 290 ft. east of the refi south from Eagle Cree 500 ft. south of the ea separating the "boneya	h-south line approx inery security fence k. Boring 95-16 is ast-west quarter-se	cimately e running located ection fence		
40				At completion water a at depth of 15 ft. At a caved to 21.3 ft., DTV Refinery workers plugg DTW = Depth to water	pproximatey 1800 V 10.2 ft., 1.7 ft.p ged back hole with	hrs., hole product. cuttings.		



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico

Date Started: Time Started

: 10/18/95 : 0845 (approx.) Drilling Method: Sampling Method: : Solid Stem Auger

Date Completed Hole Diameter:

: 10/18/95 : 13"

Drilled By:

: Frank's Rathole Srv.

: Cuttings

Logged By: : D.G. Boyer

Depth in Feet	Samples	GRAPHIC	nscs	DESCRIPTION
5 -			ML	0-9 ft. Top soil to approx. 9 ft.
10			CL	
15 -			GC	11 ft. Clay with small gravels (pea gravel size), water, H/C product (gasoline?) 11-15 ft. Clayey gravel, water, H/C product (gasoline?)
			CL	15-17 ft. Clay with occassional gravel, gray-blue, H/C odor 17-19 ft. Clay grading to silt at 19 ft., large gravel at 19 ft.
20 -			GC	19-23 ft. Clayey gravel with occassional sand zone, some clay (not saturated), gravels through out
25 -			CL	23 ft. Clay, brown, dry, dense, stiff, occassional small gravel or pebble, no H/C
-			1_	28 ft. Clay, brown, dry, stiff, no H/C
30 - - -				Notes:  Borings located in "boneyard" east of Truck By-Pass Road and along a north-south line approximately 290 ft. east of the refinery security fence running
35 -				south from Eagle Creek. Boring 95-17 is located 600 ft. south of the east-west quarter-section fence separating the "boneyard" from the pasture to the north

At approximatey 1800 hrs., hole caved to 20.2 ft., DTW 11.7 ft., 0.8 ft.product. Refinery workers plugged back hole with cuttings.

DTW = Depth to water, H/C = Petroleum hydrocarbon



(Page 1 of 1)

Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started

: 10/18/95 : 0930 : 10/18/95 Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

	Na	avajo	Refir	bon Study ning Company lew Mexico	Date Completed Hole Diameter:	: 0930 : 10/18/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
0 -			ML	0-5 ft. Top soil to appr	rox. 5 ft.			
5 - - -				5-10 ft. Clay, light bro	wn, dry, crumbly			
10 - - - -			CL	11 ft. Clay, small pebb 11-13 ft. Gravelly clay H/C odor, hard drilling		oist,		
- 15 - -				13-18 ft. No recovery,	saturated			
20 -			GC	18-20 ft. Clayey grave				
25 <sup>-</sup>			CL	22-24 ft. Gravelly, silt no H/C odor 24-27 ft. Silty clay		saturated,		
30 ·				Notes:				
35	Road and along a non- 290 ft. east of the south from Eagle C 700 ft. south of the			Borings located in "bo Road and along a nort 290 ft. east of the ref south from Eagle Cree 700 ft. south of the e separating the "boney	h-south line approx inery security fence k. Boring 95-18 is ast-west quarter-se ard" from the past	imately running located ction fence ure to the north.		
35	Upon completion, water and product in hole at 12 th At approximatey 1800 hrs., hole caved to 21.3 ft., DTW 11.6 ft., 0.3 ft. product. Refinery workers plugged back hole with cuttings.  DTW = Depth to water, H/C = Petroleum hydroca			o 21.3 ft., vorkers				



(Page 1 of 1)

Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico

Date Started:

Hole Diameter:

: 10/18/95

: 13"

Drilling Method: Sampling Method:

: Solid Stem Auger

Time Started : 1015 (approx.) Date Completed

: 10/18/95

Drilled By:

: Frank's Rathole Srv.

Logged By:

: D.G. Boyer

: Cuttings

-			Artes	sia, i	iew Mexico	Hole Diameter: : 13	Logged By: : D.G. Boyer	
	Depth in Feet	Samples	GRAPHIC	uscs	DES	CRIPTION		
	0 -		ППП					
	- - - 5 -			ML	0-5 ft. Top soil to appro	ox. 5 ft.		
	- - -				5-9 ft. Clay, white, slig no odor	htly moist, brown staining,		
	10 <sup>-</sup> -				9-11 ft. Clay, light brov small gravel	wn, crumbly, occasional		
	- - 15 -				11-16 ft. Clay with inci H/C odor	reasing gravel, moist, plastic,	ic,	
	- - 20 -			CL	16-19 ft. Clay, reddish gravel, very stiff	brown, some moisture and		
	- - -				19-24 ft. Clay, reddish gravel, very stiff, trace	brown, some moisture and of water at 24 ft.	1	
	25 <sup>-</sup> -				24-27 ft. Clay, light bro			
ff95-19.ge3	30 -				27-30 ft. Clay, light bro	own to brown		
/mtech3/navajo/10-18-95/off95-1	35	-			Road and along a north 290 ft. east of the refin south from Eagle Creek 921 ft. south of the ea	neyard" east of Truck By-Pass n-south line approximately nery security fence running c. Boring 95-19 is located list-west quarter-section fence ard" from the pasture to the r	nce	
4-25-1996 \mte	40				seen. At approximatey to 23.4 ft., with water However, water/product hole OS 95-20 due to	er in hole at 21 ft. No product 1800 hrs., hole reported cave at 11.1 ft., 0.2 ft. product. at measurements may be for possible recording mixup. led back hole with cuttings.	aved t. or	



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Offsite Borings 1995
Hydrocarbon Study
Navajo Refining Company
Artesia, New Mexico

Date Started: Time Started : 10/18/95 : 1110 Drilling Method: Sampling Method: : Solid Stem Auger : Cuttings

Date Completed

: 10/18/95

Drilled By:

: Frank's Rathole Srv.

		•		lew Mexico	Hole Diameter:	: 13"	Logg	ed By:	: D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION				
0 - - - - 5 -			ML	0-8 ft. Top soil to appr content with depth	ox. 8 ft. with incre	asing clay			
- 10 - -				8-10 ft. Clay, brown, r 10-13 ft. Gravelly clay stain and odor. Water a	, gray, gravels to 3	in., H/C			
15 -			CL	13-15 ft. Gravelly clay stain and odor. 15-18 ft. Clay, dark-gr		in., H/C			
20 -				18-21 ft. Clay, dark-gr gravels in clay at 18 ft 21-23 ft. Clay, light br		some			
25				23-27 ft. Clay, light br odor	own, hard, very tig	ht, no H/C			
30				Notes:					
30				Boring 95-20 drilled in and fire training area. I corner approximately 5 concrete irrigation dito "boneyard" fence.  At approximatey 1800 to 23.4 ft., with DTW However, water/produhole OS 95-19 due to Refinery workers plugg	Hole located in nort of ft. south of east h and 25 ft. east o hrs., hole reported 11.1 ft., 0.2 ft. pr ct measurements n possible recording	hwest -west f I caved oduct. nay be for mixup.			
40				DTW = Depth to water	er, H/C = Petroleur	n hydrocarbon	1		



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company

Artesia, New Mexico

Date Started: Time Started **Date Completed**  : 10/18/95 : 1200 : 10/18/95 Drilling Method: Sampling Method: : Solid Stem Auger : Cuttings

Drilled By:

: Frank's Rathole Srv.

Logged By:

: D.G. Boyer

		Artesia	a, Ne	w Mexico	Hole Diameter:	: 13"			
Depth in Feet	Sample Type	GRAPHIC	nscs	DE	SCRIPTION				
5 -	Cuttings		ML						
10 -	Cuttings			8-10 ft. Clay, light brow 10-12 ft. Gravelly clay, strong H/C odor 12-14 ft. Same as abov	light gray, stiff, sligl				
15 -		Cuttings	CL	14-18 ft. Clay, light bro stiff, strong H/C odor	wn, occasional grav	vel,			
20				18-19 ft. Gravelly clay, gray, saturated, very strong gasoline odor 19-20 ft. Clay, light gray to light brown, some gravel, tight, 20-22 ft. Clay, very tight, slight odor					
25				Notes:  Boring 95-21 drilled in and fire training area. It pasture area, approxing concrete irrigation ditcles.	Hole located in north	n center f east-west			

post at N-S road by KWB-1 wells.

At approximatey 1800 hrs., hole reported caved to less than 10 ft. No H/C product measured. Refinery workers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon

30

35



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico

Date Started:

: 10/18/95

Drilling Method: Sampling Method: : Solid Stem Auger : Cuttings

Time Started Date Completed : 1330 (approx.) : 10/18/95

Drilled By:

: Frank's Rathole Srv.

Hole Diameter:

: 13"

Logged By:

: D.G. Boyer

		Arte	sıa, N	lew Mexico	Hole Diameter:	: 13"	Logged E	sy:	: D.G. Boyer	
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION					
5			ML	0-8 ft. Top soil to appr clay, moist	ox. 8 ft. grading to	light brown				
10	1			8-13 ft. Clay, light brov	wn, moist, stiff, no	odor				
15			CL	13-16 ft. Clay, light broclay, stiff, no odor, mo 16-18 ft. Clay, light browater entering hole at	isture at bottom of own, stiff, caliche o	hole.				
20				18-23 ft. Clay, tight, s	ome gravel at top,	less at 23 ft.				
25				23-26 ft. Clay, light to 26-28 ft. Same as abo moist, no H/C odor						
.95\off95-22.ge	-			Notes:						
5-1996 (mtech3/navajo/10-18-95/off95-22.ge3				Hole located 50 ft. socinside pasture.  At approximatey 1800 to approximately 10 ft Refinery workers plugg H/C = Petroleum hydr	hrs., hole reported . No H/C product n ged back hole with	l caved neasured.				



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Offsite Borings 1995

Date Started:

: 10/18/95

Drilling Method:

: Solid Stem Auger

		Hydrocarbon Study Navajo Refining Company Artesia, New Mexico				Time Started Date Completed Hole Diameter:	: 1425 : 10/18/95 : 13"		Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Dept in Fee	İ	Samples	GRAPHIC	nscs	DES	CRIPTION				
	5			ML	0-10 ft. Top soil to app clay, stiff	rox. 8 ft. grading f				
1	0 -				10-13 ft. Clay, grading gravels in clay matrix. 13-14 ft. Clay and calid gravels in clay matrix.					
1	5 -		Gravels in clay matrix.  CL 14-18 ft. Clay with less gravel and caliche							
2	0 -				18-20 ft. Clay with inc small gravels, no H/C o 20-22 ft. Gravelly clay, saturated, no odor 22-24 ft. No recovery, 2.5 in. gravel, ref. Fran	dor chalk gray, gravel hard at 24 ft. (sus	pea sized,			
	5 -			CL	24-27 ft. Clay with gradepth, no H/C odor.	vel at top decreasi	ng with			
\mtech3\navajo\10-18-95\off95-23.ge3	10 -				Notes: Hole located 150 ft. so inside pasture.					
	35 -				At approximatey 1800 to less than 10 ft. No l Refinery workers plugg H/C = Petroleum hydro	H/C product measured back hole with	ıred.			
4-25-1996	-0								,,,,	



(Page 1 of 1)

Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 10/18/95 : 1450 (approx.) Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

	Navajo Refining Company Artesia, New Mexico				Date Completed Hole Diameter:	: 10/18/95 : 13"	ed By: ged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples GRAPHIC USCS DESCRIPTION							
0 -				0.0 % Townsiles	0 fadi			
5 -			ML	0-9 ft. Top soil to appr	ox. 8 ft. grading to			
10 -				9 ft. Clay, light brown, 10-12 ft. Caliche clay,				
- 15 - - -		12-17 ft. Clay, occasional caliche, very stiff  17-19 ft. Clay, occasional caliche, very stiff, water entering at bottom						
20 -				19-20 ft. Clay with gramatrix predominates)  22-24 ft. Clay as abov (pea gravel size)		•		
25 <sup>-</sup> - -				24-27 ft. Clay, brown,	little or no gravel,	very stiff		
30 - -				Notes: Hole located 250 ft. so	outh of monitor w	ell KWB-1B		
35 ·				At approximatey 1800 H/C product measured back hole with cutting H/C = Petroleum hydr	. Refinery workers s.			
40 <sup>-</sup>	-							



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Offsite Borings 1995 Hydrocarbon Study Navaio Refining Company Date Started: Time Started

: 10/18/95 : 1510

Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings : Frank's Rathole Srv.

	Navajo Refining Company Artesia, New Mexico				Date Completed Hole Diameter:	: 10/18/95 : 13"		Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION				
0 - - - 5 -		ML 0-8 ft. Top soil grading to brown clay							
- 10 - -				8-10 ft. Clay and calich 10-13 ft. Clay and calic with occasional small g	che clay, light brov	wn and white			
15				13-14 ft. Clay and cal	iche clay, no H/C d				
20 -			CL	saturated 18-20 ft. Gravelly clay					
25				20-23 ft. Gravelly clay		g with depth			
30				Notes: Hole located 350 ft. so	outh of monitor w	ell KWB-1B			
35	inside pasture.  At approximatey 1800 hrs., hole reported caved. No H/C product measured. Refinery workers plugged back hole with cuttings.  H/C = Petroleum hydrocarbon								
40									



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Offsite Borings 1995 Hydrocarbon Study Navaio Refining Company Date Started: Time Started

: 10/18/95 : 1543

Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

: Cuttings · Frank's Bathole Srv.

	N	avajo	Refir	bon Study ning Company Iew Mexico	Time Started Date Completed Hole Diameter:	: 1543 : 10/18/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
5 -			ML	0-6 ft. Top soil				
10 -				6-8 ft. Clay. Water entr from field drainage or in noted 8-13 ft. Clay, light brow	rigation pipe, no H	ximately 7 ft. /C odor		
15 -			CL	13-15 ft. Caliche clay, 15-19 ft. Caliche clay,		stiff		
20 -				19-23 ft. Caliche clay,	some gravels			
25 - - -				23-28 ft. Caliche clay,	some gravels			
30 -				Notes: Hole located 50 ft. nor 13 ft. east of electric f	th of KWB-1 moni	tor wells,		
1	1			Refinery workers plugg H/C = Petroleum hydr	ed back hole with			
40								



(Page 1 of 1)

Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started: Time Started : 10/18/95 : 1615 Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

Date Completed

: 10/18/95

Drilled By:

: Frank's Rathole Srv.

		-		lew Mexico	Hole Diameter:	: 10/18/95	Drilled By: Logged By:	: Frank's Hathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
5 -			ML	0-6 ft. Top soil, moist a	t 6 ft.			
10 -				6-12 ft. Clay, light brov	vn, moist			
15 -			CL	12-15 ft. Clay, light bro		at 16 ft.		
20 -				17-20 ft. Clay, light bro				
25 -								
18-95\off95-27.ge3				Notes: Hole located 150 ft. no	orth of KWB-1 mor	nitor wells,		
5 \mtech3\navajo\10-18-95\off95-27.ge C C C				13 ft. east of electric f  At completion DTW wa odor noted. Refinery w cuttings.  DTW = Depth to wate	ater approximately orkers plugged ba	7 ft. No H/C ck hole with		
4.26-1996	1			·				



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 10/18/95 : 1630

Drilling Method: Sampling Method: : Solid Stem Auger

		Hyd avajo	rocar Refir	rings 1995 rbon Study ning Company Iew Mexico	Time Started Date Completed Hole Diameter:	: 1630 : 10/18/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DE	SCRIPTION			
O -			ML	0-6 ft. Top soil, moist	at 6 ft.			
10 -				6-12 ft. Clay, light bro	own, moist, no H/C	odor noted		
15 - - -			CL	12-15 ft. Clay, light be 15-17 ft. Clay, light be 17-20 ft. Clay, light be	rown, moist, softer	at 16 ft.		
20 -				20-25 ft. Clay, light b				
25 - -		<b>Y</b> //	<u>}</u>					
30 - - - -				Notes: Hole located 300 ft. r 13 ft. east of electric Refinery workers plug	fence along dirt roa	ad.		
35 ·				H/C = Petroleum hyd		cuttings.		
- 40 -								



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 10/18/95 : 1650

Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

	١	Navajo Refining Company Artesia, New Mexico			Date Completed Hole Diameter:	: 10/18/95 : 13"	Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	[2	GRAPHIC	nscs	DES	SCRIPTION			
0	-		ML	0-6 ft. Top soil				
5	T-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1			6-10 ft. Clay, brown				
10				10-12 ft. Clay with inc no H/C odor noted 12-14 ft. Clay with cal		urated,		
15			CL	14-17 ft. Clay, very sti				
20	1			17-21 ft. Clay, very st 21-24 ft. Clay, brown	iff, no gravel			
.ge3	5 -	- X - Z		Notes:  Hole located 450 ft. notice 13 ft. east of electric f	ence along dirt roa	d.		
\mtech3\navajo\10-18-95\off95-29.ge3				H/C = Petroleum hydr		outtings.		
\mtech3\nava	5 -							
4-26-1996	) - -							



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started : 10/18/95 : 1715

Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

		Navajo Refining Company Artesia, New Mexico			ning Company	Date Completed Hole Diameter:	: 1715 : 10/18/95 : 13"	D	ampling Method: rilled By: ogged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
İ	epth in eet	Samples	GRAPHIC	nscs	DES	CRIPTION				
	5			ML	0-6 ft. Top soil					
	10			CL	6-10 ft. Clay, brown, n 10-11 ft. Clay with rive odor noted 11-15 ft. River gravel,	er gravels, saturate				
)	15			GC	15-18 ft. Gravel with s	ome clay				
	20 -		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	GP	18-20 ft. Gravel, can n binding by gravel	ot drill deeper due	to auger			
	25 -				Notes: Hole located 600 ft. no. 13 ft. east of electric for	orth of KWB-1 mor	nitor wells, d.			
\mtech3\navajo\10-18-95\off95-30.ge3	30 -				At completion water do Refinery workers plugg H/C = Petroleum hydro	epth at 12 ft. with ed back hole with	caving.			
	35 -									
4-26-1996	40 -						,			



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Offsite Borings 1995
Hydrocarbon Study
Navajo Refining Company
Artesia. New Mexico

Date Started: Time Started

: 10/18/95 : 1735 Drilling Method: Sampling Method: : Solid Stem Auger

Time Started
Date Completed

: 10/18/95

Drilled By:

	•••			lew Mexico	Hole Diameter:	: 13"	gged By:	: D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
O - - 5 -			ML	0-6 ft. Top soil				
10 -			CL	6-10 ft. Clay, light brown 10 ft. Auger refusal, ching 10-13 ft. Clay with cal no H/C odor noted	neck for metal, nor			
- 15 - -			GC	13-14 ft. Gravel and cl	· · · · · ·			
20 - -			ō	18-22 ft. Gravelly clay down gravel)	(but auger may be	dragging		
- 25 - -			CL	22-26 ft. Gravelly clay down gravel)	(but auger may be	dragging		
30 -				Notes: Hole located 750 ft. no. 13 ft. east of electric f				
35 <sup>-</sup>				Refinery workers plugg H/C = Petroleum hydro		cuttings.		
40 -								



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started: Time Started : 10/19/95 : 0845 Drilling Method: Sampling Method: : Solid Stem Auger : Cuttings

Date Completed Hole Diameter: : 10/19/95 : 13" Drilled By:

: Frank's Rathole Srv.

Logged By:

	Artesia, New Mexico		Hole Diameter: : 13"		Logged By:	: D.G. Boyer		
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
0	-	ПП						
5			ML	0-6 ft. Top soil to appr	roximately 6 ft.			
10	1 1				vater at approximately 8 f			
15			CL	H/C odor	rown, plastic, very stiff			
20				gravel 19-21 ft. Clay, light br gravel	rown rown, increasing small cali rown, very stiff, small calio rown, less gravel (occasion	che		
25	1		1_	oanono gravor,				
9-95/off95-32.ge3				Notes:	orth of KWB-1 monitor w	ells,		
/mtech3(navajo/10-19-95)off95-32.				13 ft. east of electric	fence along dirt road. ged back hole with cutting			
4-26-1996	-							



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started: Time Started : 10/19/95 : 0925 Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

	N			ing Company lew Mexico	Date Completed Hole Diameter:	: 10/19/95 : 13"	Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
5 -			ML	0-6 ft. Top soil				
10 -			CL	6-10 ft. Clay, brown, s gravel 10-13 ft. Clay, brown, increasing in size and fr	stiff, moist, calich			
15 -		13-15 ft. Gravelly clay, water at 13 ft. No H/C odor noted. 15-16 ft. Clayey gravel, river gravels to 3 in. diameter 16-18 ft. Clayey gravel, gravel smooth, well rounded						
20 -			CL	18-20 ft. Clayey gravel 20-21 ft. Clay, stiff, no 21-24 ft. Clay, light bro	gravel	: 20 ft.		
25		<u> </u>	<b>.</b>	Notes: Hole located 675 ft. no	ath of KWP 1 moon	itor walla		
Intechâlnavajol 10-19-95/off95-33-ges				13 ft. east of electric f Refinery workers plugg H/C = Petroleum hydro	ence along dirt roa ed back hole with	d.		
4-20-1996 (mtech3/navago)	-							
40								•



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 10/19/95 : 0945

Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

	Na	avajo	Refir	ning Company Iew Mexico	Date Completed Hole Diameter:	: 10/19/95 : 13"	Drilled By: Logged By:	: Frank's Rathole Srv.
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
0 - - - - 5 -			ML	0-6 ft. Top soil to appr	oximately 6 ft.			
10 -			CL	6-10 ft. Clay, brown 10-11 ft. Clay and calicolor gray-brown, stroi	ng H/C odor on dirt			
- 15 - - -			GC	14-21 ft. Claγeγ grave				
20 <sup>-</sup> - -			CL	22 ft. Clay, light brow out, total depth 22 ft.	n, stiff, auger jamm	ning, pulled		
25 ·				Notes:		L KIND 1		
30 35	1 1 1 1			Hole located 525 ft. nowells, 13 ft. east of elements, 13 ft. east of elements workers plugged back  H/C = Petroleum hydrones	ectric fence along one and 0.5 ft. of gasoling thole with cuttings.	lirt road. e. Refinery		
35								
40	- - - -							



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Offsite Borings 1995
Hydrocarbon Study
Navajo Refining Company
Artesia. New Mexico

Date Started:

: 10/19/95

Drilling Method:

: Solid Stem Auger

Time Started
Date Completed

: 1300 : 10/19/95 Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

	Artesia, New Mexico			lew Mexico	Hole Diameter:	: 13"	Logged By:	: D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
5			ML	0-6 ft. Top soil to appro	oximately 6 ft.			
10				6-9 ft. Caliche clay, slig 9-11 ft. Caliche clay 11-15 ft. Caliche clay, caliche than above		stiff, less		
15			CL	15-18 ft. Clay, light bro	own, stiff, water o	draining into		
20				18-21 ft. Clay, light bro		-		
25							-	
\off95-35.g	27-29 ft. Caliche clay, white, very hard  Notes:						I	
4-26-1996 \text{Imtech3\navajo\10-19-95\text{lof195-35.}}  9	Borings placed in field north of Eagl located along a continuation of the defined by borings OS 95-01 to 95 Creek. Boring 95-35 located 55 ft. fence on the north bank of Eagle Creek. At approximately 1700 hrs., hole of DTW 10.8 ft., no H/C product or of Refinery workers plugged back hole.  DTW = Depth to water, H/C = Peters of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the product of the pro					n-south line south of Eagle of east-west to 14.3 ft., etected.	1	
40	) <del>-</del>							



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Offsite Borings 1995
Hydrocarbon Study
Navajo Refining Company
Artesia, New Mexico

Date Started: Time Started : 10/19/95 : 1340 Drilling Method: Sampling Method:

: Solid Stem Auger

	Na	avajo	Refir	ling Company lew Mexico	Date Completed Hole Diameter:	: 10/19/95 : 13"	Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
0 <del>-</del>			ML	0-6 ft. Top soil to appr	oximately 6 ft.			
10 -				6-9 ft. Clay, calcite(?) of 9-14 ft. Clay, light browery stiff, segments of	wn, slightly moist,	plastic,		
15 - - -			CL	14-17 ft. Clay, light b very stiff, some caliche 17-20 ft. Clay, light br very stiff, some caliche	e clay, no gravel own, slightly mois	t, plastic,		
20 -				20-22 ft. Caliche clay staining 22-26 ft. Caliche clay,		:		
25 <sup>-</sup> - - -				26-30 ft. Clay, brown	to chalk color, dry	, hard		
30 -				Notes:			1	
35 - - -				Borings placed in field located along a continu defined by borings OS Creek. Boring 95-36 loeast-west fence on the At approximately 1700 DTW 10.9 ft., no H/C Refinery workers plugg	uation of the north 95-01 to 95-19 s ocated 155 ft. north e north bank of Ear O hrs., hole caved product or odor di ged back hole with	esouth line outh of Eagle th of gle Creek. to 22.3 ft., etected. cuttings.		
- 40 -				DTW = Depth to wate	er, H/C = Petroleu	m hydrocarbor	1	



(Page 1 of 1)

Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 10/19/95 : 1405

Drilling Method:

: Solid Stem Auger

	Nav	ajo 1	Refir	bon Study ning Company lew Mexico	Time Started Date Completed Hole Diameter:	: 1405 : 10/19/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
5 -			ML	0-8 ft. Top soil				
10 -				8-12 ft. Caliche clay, w	hite			
15 - -			CL	12-14 ft. Clay, light bro				
20 -			CL	18-20 ft. Gravelly clay, small river gravels 20-23 ft. Clay grading or no gravel				
25 -				23-27 ft. Clay, brown a	and chalk white, lit	tle or no		
30 -				Notes:				
30 35 35 35 35 35 35 35 35 35 35 35 35 35				Borings placed in field a located along a continu defined by borings OS Creek. Boring 95-37 lo east-west fence on the At approximately 1700 DTW 11.8 ft., no H/C Refinery workers plugg	eation of the north- 95-01 to 95-19 so cated 250 ft. north north bank of Eag hrs., hole caved to product or odor de	south line uth of Eagle of le Creek. 21.3 ft., tected.		
40	DTW = Depth to water, H/C = Petroleum hydrocarbo							



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started Date Completed 10/19/95 : 1440

Drilling Method: Sampling Method:

: Solid Stem Auger : Cuttings

: 10/19/95

Drilled By:

: Frank's Rathole Srv.

	Artesia, New Mexico				Hole Diameter:	: 13"	Logged By:	: D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	SCRIPTION			
0 -			ML	0-7 ft. Top soil				
10 -				7-11 ft. Clay, light bro				
15 -			CL	14-16 ft. Clay, light br 16 ft. Gravelly clay, sa (3/4 in.) and caliche gr 17-18 ft. Clay, DTW 1	aturated, small river ravel	gravel		
20 -				18-22 ft. Clay, by the last odor, very stiff		, no H/C		
25 - -				22-26 ft. Clay and cal white, very stiff, occar 26-29 ft. Clay and cal	sional small gravels			
- - 30 -			1_	white, very stiff, occa	sional small gravels	s		
-				Notes:	mands of Facility Co.	ale Davissa		
35 <sup>-</sup> -				Borings placed in field located along a contin defined by borings OS Creek. Boring 95-38 keast-west fence on th At approximately 170 DTW 10.8 ft., no H/C Refinery workers plug	uation of the north 35-01 to 95-19 s ocated 350 ft. north e north bank of Earl O hrs., hole caved product or odor de	i-south line outh of Eagle th of gle Creek. to 16.1 ft., etected.		
- - 40				DTW = Depth to wat	er, H/C = Petroleu	m hydrocarbon		



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 10/19/95 : 1505

Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

	Na	avajo	Refir	ning Company lew Mexico	Date Completed Hole Diameter:	: 10/19/95 : 13"	Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
5 -			ML	0-8 ft. Top soil				
10 -				8-13 ft. Clay, light brow	wn, stiff			
15 -			CL	13-16 ft. Clay, very sti 16 ft. Clay, some silt, p 16-17 ft. Gravelly clay, 17-18 ft. Clay with sor	olastic . small gravels, sati	urated		
20 -				18-24 ft. Clay, light bro	own, very stiff			
25				24-28 ft. Clay, light br	own, very stiff			
5/off95-39.ge 0.	 			Notes:				
96 \mtech3\navajo\10-19-95\off95-39.ge3	Borings placed in field north of Eagle Creek. Borings located along a continuation of the north-south line defined by borings OS 95-01 to 95-19 south of Eagle Creek. Boring 95-39 located 450 ft. north of east-west fence on the north bank of Eagle Creek.  At approximately 1700 hrs., hole caved to 19.5 ft., DTW 10.7 ft., no H/C product or odor detected. Refinery workers plugged back hole with cuttings.							
4.26-1996	DTW = Depth to water, H/C = Petroleum hydrocarbon							



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started : 10/19/95 : 1530

Drilling Method: Sampling Method: Drilled By: : Solid Stem Auger

	Navajo Refining Company Date Completed : 10/ Artesia, New Mexico Hole Diameter: : 13"						Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
5			ML	0-7 ft. Top soil				
10			CL	7-15 ft. Clay, light brov and iron staining	wn, very stiff, som			
15			СН	15-17 ft. Clay, light browith auger sticking 17-18 ft. Clay, light brows				
20			CL	18-19 ft. Clay with gra 19-20 ft. Clay, stiff, pl 20-23 ft. Clay, stiff, pl	astic			
25	-			gravels at 20 ft. 23-26 ft. Clay, stiff, pl mottled brown and cha	astic, caliche grave	els, clay		
\mtech3\mavago\10-19-95\offge 40.ge3				Notes: Borings placed in field located along a continudefined by borings OS	uation of the north 95-01 to 95-19 s	-south line outh of Eagle		
4-26-1996 (mtech3)navajo	Creek. Boring 95-40 located 550 ft. north of east-west fence on the north bank of Eagle Creek.  At approximately 1700 hrs., hole caved to 25 ft., DTW 12 ft., no H/C product or odor detected. Refinery workers plugged back hole with cuttings.  DTW = Depth to water, H/C = Petroleum hydrocarbo					ר		
40	, -							



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 10/19/95 : 1600

Drilling Method: Sampling Method: : Solid Stem Auger : Cuttings

	Hydrocarbon Study Navajo Refining Company Artesia, New Mexico			ning Company	Time Started Date Completed Hole Diameter:	: 1600 : 10/19/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	GRAPHIC OSCS DESCRIPTION							
0 5			ML	0-8 ft. Top soil				
10 -			CL	8-10 ft. Clay, mottled v				·
15 -				13-17 ft. Clay, mottled small caliche gravel, wa	white and brown, ater seeping in at 1	occasional 7 ft.	,	
- 20 - -			GC	17-18 ft. Clayey gravel saturated 18-20 ft. Clay, some g 20-23 ft. Clay, very sti	ravel at top, very s			
25 - 			CL	23-29 ft. Clay, brown	and white mottled,	very stiff		
30 -		1//	1	Notes:				
35 <sup>-</sup>		·		Borings placed in field located along a continu defined by borings OS Creek. Boring 95-41 lo east-west fence on the At completion of hole, At approximately 1700 DTW 13.3 ft., no H/C Refinery workers plugg	ation of the north- 95-01 to 95-19 so cated 650 ft. north north bank of Eag DTW 17 ft. hrs., hole caved to product or odor de	south line outh of Eagle of le Creek. o 22.4 ft., tected.		
40 -	DTW = Depth to water, H/C = Petroleum hydrocarbo							



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Offsite Borings 1995 Hydrocarbon Study

Date Started:

: 10/19/95

Drilling Method: : Solid Stem Auger
Sampling Method: : Cuttings

	Na	avajo	Refir	bon Study ning Company Iew Mexico	Time Started Date Completed Hole Diameter:	: 1630 : 10/19/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples	GRAPHIC	nscs	DES	CRIPTION			
5 -			ML	0-6 ft. Top soil				
10 -				6-13 ft. Clay and calich white, iron staining, slig				
15 -				13-17 ft. Clay and calid white, iron staining				
20 -			CL	17-19 ft. Clay and calid white, iron staining 19-20 ft. Clay with sor 20-24 ft. Clay with sor	ne caliche gravels,			
25 -				24-25 ft. Clay, some social matrix  25-30 ft. Clay, some social matrix				
5/off95-42.ge3 0	clay matrix							
26-1996 \mtech3\navajo\10 19-95\off95-42.ge3	At approximately 1700 hrs., DTW 13.8 ft., no H/C product or odor detected. Refinery workers plugged back hole with cuttings.						n	
4.26-1996	back hole with cuttings.  DTW = Depth to water, H/C = Petroleum hydrocarbo						1	



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started:

: 10/19/95 : 1655

Drilling Method:

: Solid Stem Auger

Time Started Date Completed

: 10/19/95

Sampling Method: : Cuttings Drilled By:

: Frank's Rathole Srv.

		in de A S		lew Mexico	Hole Diameter: : 13"		Logged By:	: D.G. Boyer	
	Depth in Feet			DES	CRIPTION				
	0 - - - - 5 -			ML	0-6 ft. Top soil to appro	oximately 6 ft.			
	-			CL	6-8 ft. Clay				
	10 -				8-14 ft. Clay, brown ar stiff, slightly moist, aug	nd white mottled, plastic, ger sticking	very		
	- 15 - - -			СН	14-18 ft. Clay, brown a stiff, moisture seeping	and white mottled, plastic at 14 ft.	, very		
	20 -				18-26 ft. Clay, brown a	and white mottled, plastic	, very		
ge3	25 <sup>-</sup> - -				26-28 ft. Clay, brown stiff, some moisture se	and white mottled, plastic en seeping at 20 to 21 ft	, very		
95\off95-43.ge	30 ·				Notes:				
4-26-1996 \mtech3\navajo\10-19-95\off95-43.	35				located along a continu defined by borings OS Creek. Boring 95-43 lo east-west fence on the	north bank of Eagle Cree r detected. Refinery work n cuttings.	ine Eagle k.		
4-26	40								



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started: Time Started

Date Completed

: 10/19/95 : 1730 : 10/19/95 Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By: : Cuttings

: Frank's Rathole Srv.

		Artesia, New Mexico			Hole Diameter:	: 13"	Logged By		
	Depth in Feet	Samples	GRAPHIC	sosn	DES	CRIPTION			
	0 - - - 5 -			ML	0-6 ft. Top soil to appr	oximately 6 ft.			
	10 -				6-8 ft. Clay 8-13 ft. Clay, white, cr	umbly, plastic			
	15 -			CL	13-17 ft. Clay, white, o	crumbly, plastic			
	20 <sup>-</sup>				17-19 ft. Clay, white, of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	crumbly, plastic, so	ome caliche		
	- - 25 -				into hole  23-26 ft. Clay, white, of gravel at 24 ft.				
5\off95-44.ge3	30 -				Notes:				
4-26-1996 \mtech3\navajo\10-19-95\off95-44.ge3	35 <sup>-</sup> - - -				Borings placed in field of located along a continu defined by borings OS Creek. Boring 95-44 lo east-west fence on the No H/C product or odo plugged back hole with H/C = Petroleum hydronical places.	eation of the north 95-01 to 95-19 so cated 950 ft. nort north bank of Eag r detected. Refined cuttings.	-south line outh of Eagle h of gle Creek.		
4	40 -								



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started: Time Started : 10/20/95

Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

Time Started : 0900 (approx.)

Date Completed : 10/20/95

Drilled By:

: Frank's Rathole Srv.

Artes	ia, New Mexico	Hole Diameter:	: 13"	Logged By:	: D.G. Boyer
epth GRAPHIC USCS	DESCR	IPTION			
0	0-6 ft. Top soil (approximat	e extent)			
10	6-10 ft. Clay, damp 10 ft. Clay, brown, moist, p 10-12 ft. Caliche gravels, s		gravels		
15	12-15 ft. Clay, brown, plas 15-17 ft. Clay, brown, plas 17-20 ft. Clay, brown, plas	tic			
20	20-24 ft. Clay grading to s caliche gravel		, some		
25 -					
1	Notes:				
35	Borings placed in field 250 south of Eagle Draw, and a separating crops from woo located 600 ft. north of ea No H/C product or odor de plugged back hole with cut H/C = Petroleum hydrocar	along north-south fer ded area. Boring 95 st-west dirt road to tected. Refinery wor ttings.	nceline -45 fields.		
40					



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Offsite Borings 1995
Hydrocarbon Study
Navajo Refining Company
Artesia, New Mexico

40

Date Started: Time Started

: 10/20/95 : 0935 Drilling Method:

: Solid Stem Auger

Sampling Method: : 0

Nava	jo Refining Company tesia, New Mexico	Date Completed : 10/20/95 Hole Diameter: : 13"	Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in CRAPHIC OSCS	DESC	RIPTION		
0	O-6 ft. Top soil (approxim	ate extent)		
	6-8 ft. Clay, light brown,	plastic, soft		
10	8-13 ft. Clay, light brown caliche gravels, water at a	, plastic, soft, some small approximately 11 ft.		
15 CI	-	n with some silt, plastic, soft		
20	small caliche gravels at 1	rn with some silt, plastic, soft, 7 ft. rated, no gravels, no H/C odor		
25				
30	Notes:			
	south of Eagle Draw, and separating crops from wo	60 ft. west of Bolton Road, I along north-south fenceline boded area. Boring 95-46 east-west dirt road to fields.		
35 -	No H/C product or odor of plugged back hole with of H/C = Petroleum hydroc			
+				



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Offsite Borings 1995

Date Started:

: 10/20/95

Drilling Method:

: Solid Stem Auger

Navajo	drocarbon Study o Refining Company esia, New Mexico	Time Started : 0955 Date Completed : 10/20/95 Hole Diameter: : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet SOSO	DESCRIF	PTION		
0 - - - - - - - 5 -	0-6 ft. Top soil (approximate	extent)		
	6-9 ft. Clay, brown and white at 9 ft.	e mottled, caliche gravels		
10	9-13 ft. Clay, light brown an caliche pebbles and gravel, w	d white, frequent small eater at approx. 11 ft.		
15 CL	13-17 ft. Clay, light brown a with depth	nd white, less gravel		
20	17-20 ft. Clay and silty clay,	occasional caliche gravel		
	20-24 ft. Silty clay, soft			
25	24-28 ft. Silty clay, soft (dril stem), occasional caliche gra	ling with weight of drill vel		
30 -	Notes:			
-	Borings placed in field 250 fr south of Eagle Draw, and alc separating crops from wood located 500 ft. north of east	ong north-south fenceline ed area. Boring 95-47		
30 -	No H/C product or odor dete plugged back hole with cutti H/C = Petroleum hydrocarbo	ngs.		
40				



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Offsite Borings 1995 Hydrocarbon Study

Date Started:

: 10/20/95 : 1015

Drilling Method:

: Solid Stem Auger

Hydrocarbon Study Navajo Refining Company Artesia, New Mexico			drocarbon Study Refining Company	Time Started  Date Completed	: 10/20/95 : 1015 : 10/20/95	Sampling Method: Drilled By:	: Solid Stem Auger : Cuttings : Frank's Rathole Srv.
Depth in Feet	GRAPHIC	nscs	DESCRI	Hole Diameter:	: 13"	Logged By:	: D.G. Boyer
0 - - - -			0-6 ft. Top soil (approximat	e extent)			
,	6-8 ft. Clay, brown and white mottled  8-11 ft. Clay, brown and white mottled, soft, small						
10					mali ter		
,			11-15 ft. Clay, brown and	white mottled, soft			
15 ·		CL	15-18 ft. Clay, brown and	white mottled, soft			
20			18-21 ft. Silty clay				
25			21-26 ft. Clay and silty clar at 24 ft.	y, small caliche grave	el		
30			Notes:				
	4		Borings placed in field 250 south of Eagle Draw, and a separating crops from woo located 400 ft. north of ea	along north-south fer ded area. Boring 95-	nceline -48		
35	-		No H/C product or odor de plugged back hole with cut	tected. Refinery wor ttings.	kers		
	1		H/C = Petroleum hydrocar	bon			
40	-						



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

Drilling Method:

Sampling Method:

	Navajo Refining Company	Date Completed	:	Drilled By: :		
	Artesia, New Mexico	Hole Diameter:	:	Logged By:	: D.G. Boyer	
Dorah						
Depth in	DESCRIPTION					
Feet	2 2 3 3				'	
0 -						
-						
_	Notes:					
-		ot drillad. It is			j	
-	Boring designated as OS 95-49 was n listed to maintain numbering sequence	e.				
5 -			i .			
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Offsite Borings 1995
Hydrocarbon Study
Navajo Refining Company
Artesia, New Mexico

40

Date Started: Time Started : 10/20/95 : 1040 Drilling Method: Sampling Method:

: Solid Stem Auger

Completed : 10/20/95

Drilled By:

	1 1				Date Completed Hole Diameter:	: 10/20/95 : 13"	Drilled By: Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	Samples GRAPHIC USCS Saga		CRIPTION					
5 -			ML	0-6 ft. Top soil (approx	imate extent)			
10 -	11-15 ft. Clay, light brown					ttled, stiffer		
15 -			CL	15-24 ft. Clay grading caliche gravels at 23 ft	to clayey silt with	depth, small		
25	-	<u> </u>						
/mtech3/navajo/10-20-95/off95-50.ge3	-			Notes:  Borings placed in field south of Eagle Draw, a separating crops from	ind along north-so	uth fenceline		
.3-1996 \mtech3\navajc				located 300 ft. north of No H/C product or odd plugged back hole with H/C = Petroleum hydr	of east-west dirt room of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the contro	ad to fields.		



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started

: 10/20/95

Drilling Method:

: Solid Stem Auger

Date Completed

: 1100 : 10/20/95 Sampling Method: Drilled By:

	esia, New Mexico	Hole Diameter: : 13"	Logged By:	: D.G. Boyer
ebth GRAPHIC	DESCF	RIPTION		
0 - - - - - - - - - - - - -	0-6 ft. Top soil (approxima	ite extent)		
10	6-10 ft. Clay			
15 CL	10-14 ft. Clay, brown and 14-15 ft. Clay, small calicl zone at 14 ft.			
20	15-19 ft. Clay, increasing			
25 -	19-24 ft. Clay, mottled, si gravels	in, some small calche		
30 -	Notes:	Off west of Rolton Road		
35	separating crops from wo	along north-south fenceline oded area. Boring 95-51 ast-west dirt road to fields. etected. Refinery workers uttings.		
40				



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started:

: 10/20/95 : 1120

Drilling Method: Sampling Method: : Solid Stem Auger

Time Started Date Completed

: 10/20/95

Drilled By:

	esia, New Mexico	Hole Diameter: : 13"	Logged By:	: D.G. Boyer
GRAPHIC GRAPHIC	DESC	RIPTION		
0	0-6 ft. Top soil (approxim	ate extent)		
	6-10 ft. Clay			
10	10-12 ft. Clay and silty c	lay		
CL 15	12-16 ft. Clay, silty, grav	elly, medium river gravel		
20	16-22 ft. Clay			
25	Notes: Borings placed in field 25	O ft. west of Bolton Road,		
30	located 50 ft. north of ea	l along north-south fenceline coded area. Boring 95-52 ist-west dirt road to fields. detected. Refinery workers uttings.		
35 -	H/C = Petroleum hydroc	arbon		
1				



(Page 1 of 1)

Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico

Date Started: Time Started Date Completed

: 10/20/95 : 1140

: 10/20/95

Drilling Method:

: Solid Stem Auger

Sampling Method: : Cuttings

Drilled By: : Frank's Rathole Srv.

	Artesia, New Mexico			Hole Diameter:	: 10/20/95	Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	in A S DESCR			TION			
5 -		ML	0-6 ft. Top soil (approximate	extent)			
10 -		CL	6-9 ft. Clay 9-14 ft. Clay, light brown, st	iff some small ca	liche		
-		SP	pebbles  14-15 ft. Sand, fine-grained,				
15 -		CL	15-16 ft. Clay  16-19 ft. Clay, sandy, gravel staining, small river gravels,	ly, light brown, iro	on		
20			19-22 ft. Clay, silty, stiff				
25 ·			Notes: Borings placed in field 250 frouth of Eagle Draw, and ald	:. west of Bolton I	Road, nceline		
35	-		separating crops from wood located at corner of trees an fields.  No H/C product or odor deteplugged back hole with cutti  H/C = Petroleum hydrocarbo	ed area. Boring 95 d east-west dirt ro cted. Refinery wo ngs.	-53 ead to	<u>.</u>	
mtecnsmavajorio	-		,				
40	-					·	



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started:

: 10/20/95

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : 1200 (approx.) : 10/20/95

Sampling Method: Drilled By:

; Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 13"

Logged By:

Art	esia, New Mexico	Hole Diameter: : 13"	Logged By:	: D.G. Boyer
GRAPHIC USCS	DESCR	PTION		
0 -	0-8 ft. Top soil			
10	8-11 ft. Clay, brown, mottl of iron staining, no H/C odo	ed, soft, moist, large areas		
CL 15	11-15 ft. Clay, brown, stiff			
GP	17-19 ft. Gravels, river grav limited auger recovery, satu 19-21 ft. Gravels as above, bottom, auger refusal, ceas	vel to 2 in., flat, rounded, irated		
25 -	Notes:  Borings placed in field 125 south of Eagle Draw, and a separating crops from woo	long north-south fenceline		
30 -	located 213 ft. south of Ea  No H/C product or odor det plugged back hole with cut  H/C = Petroleum hydrocarl	gle Creek east-west fence. tected. Refinery workers tings.		
35 -				
10	·			



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Offsite Borings 1995
Hydrocarbon Study
Navajo Refining Company
Artesia, New Mexico

40 -

Date Started: Time Started : 10/20/95 : 1220 Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

Date Completed

: 10/20/95

Drilled By:

: Frank's Rathole Srv.

	tesia, New Mexico	Hole Diameter: : 13"	Logged By:	: D.G. Boyer
GRAPHIC GRAPHIC	DESCI	RIPTION		
0	- 0-8 ft. Top soil (approxima	ate extent)		
10	8-10 ft. Clay 10-11 ft. Clay, light brow	n, very stiff, iron staining		
15 CL	11-15 ft. Clay, stiff, small saturated at 14 ft.	caliche gravels, soft and		
20	15-20 ft. Clay, gravels at	base		
	20-24 ft. Gravelly clay, m	edium gravels, saturated		
25 -	separating crops from wo	along north-south fenceline		
30 -	No H/C product or odor d plugged back hole with co H/C = Petroleum hydroca	uttings.		
35 -				
-				



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started Date Completed

: 10/20/95 : 1235 : 10/20/95 Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

	sia, New Mexico	Hole Diameter: : 13"	Logged By:	: D.G. Boyer
Depth in Feet CSO CSO CSO CSO CSO CSO CSO CSO CSO CSO	DESCI	RIPTION		
0 	0-6 ft. Top soil (approxima	ate extent)		
	6-9 ft. Clay			
10 CL	9-12 ft. Gravelly clay, ligh gravel, saturated	t brown to white, caliche		
15	12-15 ft. Gravelly clay, gr gravels	avels grading to small river		
	15-17 ft. Gravelly clay, lin			
sc 20	17-20 ft. Gravelly sand ar sized river gravels 22-22 ft. Gravelly sand ar	nd clay, gravels are medium		
CL	22-24 ft. Clay, stiff			
25 -	separating crops from wo	along north-south fenceline oded area. Boring 95-56		
30	No H/C product or odor d plugged back hole with co	uttings.		
- - - -	H/C = Petroleum hydroca	ırbon		
30 -				
40				



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started

: 11/01/95 : 0820

Drilling Method: Sampling Method: : Solid Stem Auger

	Navajo Refining Company Artesia, New Mexico		Refining Company	Date Completed Hole Diameter:	: 0820 : 11/01/95 : 13"	Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	GRAPHIC	nscs	DESCRI				. 3.5. 3070
5 -		ML	0-7 ft. Top soil				
10 11		CL	7-11 ft. Caliche clay and gragray, gravels are caliche graves and the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the	vels d brown, plastic, m			
15		GС	14-18 ft. Clayey gravel, rive smooth, rounded	r gravel to 3 in., eli	otical,		
20		CL GC	18-19 ft. Clay, light brown, 19-21 ft. Gravels, medium s water rising to ground surface 21-25 ft. Gravels as above,	ized (river?), some oce (caving?)	clay,		
25			21-25 II. Graveis as above,	auger rerusar at 25	it.		
30 -			Notes: Borings placed in field 125 f south of Eagle Draw, and alseparating crops from wood located 175 ft. south of Eag	ong north-south fer ed area. Boring 95-	nceline 57		
35			No H/C product or odor deterplugged back hole with cutt H/C = Petroleum hydrocarb	ings.	kers		
40							



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Offsite Borings 1995 Hydrocarbon Study

Date Started: Time Started

: 11/01/95 : 0900

Drilling Method: Sampling Method: : Solid Stem Auger

: Cuttings

	Navajo Refining Company Artesia, New Mexico			Date Completed Hole Diameter:	: 11/01/95 : 13"	Drilled By: Logged By:	: Frank's Rathole Srv.
Depth in Feet	GRAPHIC	nscs	DESCRI	PTION			
5 -		ML	0-6 ft. Top soil				
10 -		CL	6-8 ft. Clay 8-10 ft. Clay, light gray, dan 10-11 ft. Caliche clay with s 11-13 ft. Caliche clay with s saturated	mall caliche gravels			
15 -	13-17 ft. Clay becoming gravelly clay are river gravels with caliche coating				Gravels		
20 -		GC	19-22 ft. Clayey gravel, incr	easing clay with de	ppth		
25 -			22-26 ft. Clayey gravel, incr	easing clay			
-		CL	26-28 ft. Clay, chalk color, s	soft			
30 -			Notes:				
30 -			Borings placed in field 125 f south of Eagle Draw, and al- separating crops from wood located 250 ft. south of Eag	ong north-south fe ed area. Boring 95	nceline -58		
35 -	1		No H/C product or odor dete plugged back hole with cutt		kers		
]	}		H/C = Petroleum hydrocarb	on			
40 -							



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started:

: 11/01/95

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : 0930 : 11/01/95

Sampling Method: Drilled By:

	Artesia, New Mexico	Hole Diameter: : 13"	Logged By:	: D.G. Boyer
Depth in Feet CRAPHIC	SSSO	RIPTION		
5 -	ML 0-6 ft. Top soil			
10	6-9 ft. Clay, light gray, dr 9-10 ft. Clay, chalk color,			
	10-15 ft. Clay, gray and v at approx. 11 ft.	vhite, soft, plastic, water		
15	15-18 ft. Soft, no recover	у		
20	18-21 ft. Gravels and grav	velly clay		
	21-24 ft. Gravels and grad	velly clay		
25	24-30 ft. Gravels, auger r that has sloughed into ho gravel thickness	nay be pulling up material le, possible 7-8 ft. total		
30	CL 30-31 ft. Clay, brown and	d white, no gravels		
35	south of Eagle Draw, and separating crops from wo located 325 ft. south of I	Eagle Creek east-west fence. etected. Refinery workers		
40	H/C = Petroleum hydroca	arbon		



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started

: 11/01/95 : 1000

Drilling Method:

: Solid Stem Auger

Sampling Method:

: Cuttings

	Hydrocarbon Study Navajo Refining Company Artesia, New Mexico		Date Completed Hole Diameter:	: 1000 : 11/01/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer	
Depth in Feet	GRAPHIC	nscs	DESCRIF	PTION			
5 -		ML	0-6 ft. Top soil				
10 -			6-11 ft. Clay, light gray to lig	ght brown, mottled			
15 -		CL	11-15 ft. Clay with caliche g light brown, soft		and		
20 -			15-17 ft. Clay, gravels at 17 17-19 ft. Gravelly clay with caliche coating 19-21 ft. Gravelly clay, smal at 21 ft.	river gravels, rough	ĺ		
-		GC	21-24 ft. Gravels and clayey to 4 in.	gravel, gravel size			
25 - -		CL	24-26 ft. Gravels and clayey gravelly clay and clay at 26 26-27 ft. Clay, brown, very	ft.			
- - 30 -		•	Notes: Borings placed in field 125 f	t. west of Bolton R			
- - 35 -			south of Eagle Draw, and ald separating crops from wood located 400 ft. south of Eag No H/C product or odor dete plugged back hole with cutt	ed area. Boring 95- ple Creek east-west ected. Refinery wor	60 fence.		
- - -	1		H/C = Petroleum hydrocarb				



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started

: 11/01/95 : 1025

Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

	Hydrocarbon Study Navajo Refining Company Artesia, New Mexico		Refining Company	Date Completed Hole Diameter:	: 1025 : 11/01/95 : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet	GRAPHIC	nscs	DESCRI	PTION			
0 -		ML	0-6 ft. Top soil				
			6-8 ft. Clay, light brown and	I gray, mottled, dan	np		
10 -			8-10 ft. Clay and caliche cla saturated, no H/C odor	y with caliche grave	els,		
-			10-14 ft. Clay and gravelly of to 2 in., caliche nodules on of	clay, very soft, grav gravels	el size		
15		CL	14-18 ft. Gravelly clay, soft	, gravels pea sized			
20			18-20 ft. Gravelly clay				
			20-22 ft. Clay, brown, plast caliche inclusions	ic, stiff, occasional			
25			22-27 ft. Clay with caliche,	mottled, very stiff			
	-						
30	T - T - T - T		Notes:  Borings placed in field 125 south of Eagle Draw, and al separating crops from wood located 475 ft. south of Eagle	ong north-south fer led area. Boring 95-	nceline 61		
35	]		No H/C product or odor det plugged back hole with cutt	ings.	kers		
	1		H/C = Petroleum hydrocarb	oon			
40							



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started:

: 10/31/95

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : a.m. : 10/31/95 Sampling Method:

: Cuttings : Frank's Rathole Srv.

Drilled By:

		Artesia, New Mexico		sia, New Mexico	Hole Diameter: : 13"	Log	ged By:	: D.G. Boyer
	Depth in Feet	DESCRIP		DESCRIF	PTION			
	0 - - - - 5 -		ML	0-8 ft. Top soil				
	10			8-13 ft. Clay, gray brown, da	amp			
)	15		CL	13-18 ft. Clay grading to cla	yey silt, saturated			
	20			18-22 ft. Silty clay grading t no gravels or H/C odor	o clay, light brown, stiff,			
	25			22-25 ft. Clay, brown, stiff, caliche gravels at 23 ft. 25-28 ft. Clay, brown, stiff,				
olton\offbr-01.ge3	30	 		Notes: Borings placed in field east of	f Bolton Road and south			
/mtech3/navoff95/bolton/offbr-01.g	35			of Eagle Draw. Borings locat line approximately 200 ft. ea intermediate between piezon Boring 95-BR-01 located 13 boundary fence.	est of Bolton Rd. and neters NP-1 and NP-2. ft. north of south			
	l	1		No H/C product or odor determined back hole with cutting				
4-1996		1		H/C = Petroleum hydrocarbo	on			

40 -



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Offsite Borings 1995
Hydrocarbon Study
Navajo Refining Company
Artesia, New Mexico

Date Started:

: 10/31/95

Drilling Method:

: Solid Stem Auger

Time Started : a.m.

Date Completed : 10/31/95

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 13"

		Arte	sia, New Mexico	Hole Diameter: : 13"	Logged By:	: D.G. Boyer
Depth in Feet	GRAPHIC	uscs	DESCRIF	PTION		
0 - - - - 5 -		ML	0-6 ft. Top soil (approximate	extent)		
- - -			6-8 ft. Clay			
10 <sup>-</sup> -		CL	8-12 ft. Clay, damp, saturate	ed		
- - 15			12-15 ft. Clay, brown,			
- - -		ML	15-18 ft. Sandy silt, light bro fine-grained	own, sand very		
20 -		sc	18-23 ft. Sand, light brown, clay, saturated	fine-grained with some		
25 <sup>-</sup>		SP	23-27 ft. Sand, light brown, gravels at 27 ft.	fine-grained, small		
		CL	27-29 ft. Clay, brown			
30	1		Notes:			
35			Borings placed in field east of Eagle Draw. Borings locat line approximately 200 ft. ea intermediate between piezon Boring 95-BR-02 located 88 boundary fence.	ed along north-south ast of Bolton Rd. and neters NP-1 and NP-2. ft. north of south		
	1		No H/C product or odor deter plugged back hole with cutti H/C = Petroleum hydrocarbo	ings.		
40 ·	1.		,			



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico

Date Started:

: 10/31/95

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : a.m. : 10/31/95 Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

N	Navajo Refining Company Artesia, New Mexico		Hole Diameter:	: 10/31/95	Logged By:	: Frank's Rathole Srv. : D.G. Boyer
Depth in Feet B	nscs	DESCRI	PTION			
5 -	ML	O-6 ft. Top soil, clayey				
		6-9 ft. Clay and gravelly clay	, water at 9 ft.			
10	CL	9-13 ft. Clay, brown to light	gray, no H/C odor			
15		13-17 ft. Silty clay with som	ne sand, soft			
20	ML	17-20 ft. Clayey silt, light br	own, dry			
		20-23 ft. Clay with some ca	liche clay, dry at 23	3 ft.		
25	CL	23-26 ft. Clay, light brown t	o light gray, hard,	dry		
		26-29 ft. Clay, light brown t	to light gray			
30 -		Notes:				
35		Borings placed in field east of Eagle Draw. Borings local line approximately 200 ft. eintermediate between piezor Boring 95-BR-03 located 16 boundary fence.	ted along north-sou ast of Bolton Rd. ar meters NP-1 and NF	th nd 2-2.		
		No H/C product or odor determined by the plugged back hole with cutt		kers		
40 -		H/C = Petroleum hydrocarb	on			



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Offsite Borings 1995
Hydrocarbon Study
Navajo Refining Company
Artesia, New Mexico

Date Started:

: 10/31/95

Drilling Method:

: Solid Stem Auger

Time Started : a.m.
Date Completed : 10/31/95

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 13"

Logged By:

,	Artesia, New Mexico	Hole Diameter: : 13"	Logged By:	: D.G. Boyer
Depth in Feet B	DI DI	SCRIPTION		
5 -	ИL 0-7 ft. Top soil, claye	DY		
10	8-9 ft. Clay with sma 9-11 ft. Clay, light gr no H/C odor	all pebbles, saturated ray, moist, very plastic,		
15	11-19 ft. Clay, light except soft at 19 ft.	gray to brown, very stiff		
20	19-21 ft. Clay, gray 21-23 ft. Clay, gray			
25	23-29 ft. Clay, gray,	chalk-colored caliche at bottom		
30	Notes:			
35 -	of Eagle Draw. Borin line approximately 2 intermediate betwee Boring 95-BR-04 loc boundary fence.	d east of Bolton Road and south gs located along north-south 30 ft. east of Bolton Rd. and n piezometers NP-1 and NP-2. ated 238 ft. north of south		
-	No H/C product or o plugged back hole w H/C = Petroleum hy			
40				



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico Date Started: Time Started : 10/31/95

Drilling Method:

: Solid Stem Auger

Time Started : a.m.

Date Completed : 10/31/95

Sampling Method: Drilled By: : Cuttings : Frank's Rathole Srv.

Hole Diameter:

: 13"

Logged By:

L				Sia, New Michiel																	
	Depth in Feet	DESCRIF		DESCRIP	TION																
	0 - - - - 5 -		ML	0-6 ft. Top soil, clayey																	
	-			6-9 ft. Clay, gray and brown,	soft at 7 ft.																
	10 -			9-13 ft. Clay, gray and brow	n, no water																
	15 <sup>-</sup> 		CL	13-17 ft. Clay, gray and brov	vn, plastic, swelling,																
	20 ·			17-19 ft. Gravelly clay, grave damp, slightly sandy and sat 19-21 ft. Gravelly clay with i	urated at 19 ft.																
																		21-23 ft. Clay, light brown 23-26 ft. Gravelly clay, grave	els present in silty-clay		
	25 ·		1	matrix, stiff 26-27 ft. Caliche clay, chalk	color, hard, dry to damp																
n\offbr-05.ge3	30	- - - - - -		Notes:																	
\mtech3\navoff95\bolton\offbr-05.ge3	35	- - - -		Borings placed in field east of Eagle Draw. Borings locat line approximately 200 ft. ea intermediate between piezon Boring 95-BR-05 located 31 boundary fence.	ed along north-south st of Bolton Rd. and neters NP-1 and NP-2.																
6-24-1996 \mt				No H/C product or odor dete plugged back hole with cutti H/C = Petroleum hydrocarbo	ngs.																
6-24	40	1	_																		



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started

: 10/31/95 : 1110

Drilling Method: Sampling Method: : Solid Stem Auger

N	lavajo	drocarbon Study o Refining Company esia, New Mexico		0/31/95 3"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet B	nscs	DESCI	RIPTION			
5 -	ML	0-7 ft. Top soil, clayey				
		7-9 ft. Clay, light gray and	I brown, damp at 7 ft.			_
10		9-14 ft. Clay, light gray ar	nd brown, wet at 13 ft.			
15		14-17 ft. Clay, light gray	and brown, no free water			
20	CL	17-22 ft. Clay, light gray imbedded in matrix at 21	and brown, some gravel ft.			
		22-25 ft. Clay, soft from	22-24 ft., saturated		•	
25		25-28 ft. Clay, chalk colo	r, small caliche gravel at 2	5 ft.		
30		Notes:				
35		Borings placed in field eas of Eagle Draw. Borings lo line approximately 200 ft intermediate between pie Boring 95-BR-06 located boundary fence.	east of Bolton Rd, and zometers NP-1 and NP-2.	h		
		No H/C product or odor d plugged back hole with co	uttings.			
40 -		H/C = Petroleum hydroca	II DUN			



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Artesia, New Mexico

Date Started:

: 10/31/95 : 1125

Drilling Method:

: Solid Stem Auger

Time Started Date Completed

: 10/31/95

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

		N		esia, New Mexico	Hole Diameter:	: 13"	Logged By:	: Prank s Hatho : D.G. Boyer
	Depth in Feet	GRAPHIC	nscs	DESCR	IPTION			
	0 - - - - 5 -		ML	0-6 ft. Top soil (approximat	te extent)			
	10			6-8 ft. Clay with caliche gra 8-10 ft. Clay, light gray, ve		odor		
	-		CL	10-14 ft. Clay and caliche of gravels and crystals, no wa	clay with small calic ter	he		
7	15 <sup>-</sup>			14-17 ft. Caliche clay, grad brown, very stiff, dry 17-19 ft. Clay and caliche of 19-20 ft. Caliche clay, very	clay, moisture in bol			
	20			20-23 ft. Caliche clay, satu				
	25	1		Notes:				
\mtech3\navoff95\bolton\offbr-07.ge3	30			Borings placed in field east of Eagle Draw. Borings localine approximately 200 ft. cintermediate between piezo Boring 95-BR-07 located 4 boundary fence.  No H/C product or odor deplugged back hole with cut	ated along north-sou east of Bolton Rd. a ometers NP-1 and N' 63 ft. north of sout tected. Refinery wo ttings.	ith nd P-2. h		
\mtech3\navoff95\	35			H/C = Petroleum hydrocar	bon			
-1996		1						



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Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started:

: 10/31/95

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : 1145 (approx.) : 10/31/95

Sampling Method: Drilled By:

		-	sìa, New Mexico	Hole Diameter:	: 13"	Logged By:	: D.G. Boyer
Depth in Feet	GRAPHIC	nscs	DESCRIF	TION			
5	-	ML	0-6 ft. Top soil (approximate	extent)			
			6-8 ft. Clay, saturated at 8 ft				
10		CL	8-12 ft. Clay with caliche gra	vels in matirx			
15			12-16 ft. Clay, soft at 16 ft.				
			16-18 ft. Clay				
20			18-20 ft. Caliche, white, har	d			
		GC	20-22 ft. Caliche gravels, sa	urated			
25		CL	22-26 ft. Clay, gray and bro	wn, stiff			
br-08.ge3	-		Notes:				
\mtech3\navoff95\bolton\offbr-08.ge \text{C} \text{C} \text{C} \text{C}	-		Borings placed in field east of Eagle Draw. Borings locat line approximately 200 ft. eaintermediate between piezon Boring 95-BR-08 located 53 boundary fence.  No H/C product or odor determined by the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	ed along north-so ist of Bolton Rd. in neters NP-1 and N 8 ft. north of sou acted. Refinery wo	outh and NP-2. th		
6-24-1996			plugged back hole with cutti H/C = Petroleum hydrocarbo				



(Page 1 of 1)

Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started: Time Started

: 10/31/95 : 1400 : 10/31/95 Drilling Method:

: Solid Stem Auger

Sampling Method: Drilled By:

Navaj	ydrocarbon Study jo Refining Company tesia, New Mexico	Date Completed : 10/31/95 Hole Diameter: : 13"	Sampling Method: Drilled By: Logged By:	: Cuttings : Frank's Rathole Srv. : D.G. Boyer
Depth in Feet CBAPHIC	DESCI	RIPTION		
0	. 0-6 ft. Top soil			,
10-	6-10 ft. Clay with small ca at 10 ft.	aliche gravels, saturated		
	10-14 ft. Gravelly clay, ca some up to 3 in.	liche gravels in clay matrix,		
15 CL		ff, very few gravels h caliche gravels, saturated		
20	20-24 ft. Caliche clay, ha	rd, dry		
25	24-27 ft. Caliche clay, ve	ry hard		
30	Notes:			
30 -	Borings placed in field eas of Eagle Draw. Borings lo line approximately 200 ft intermediate between pie: Boring 95-BR-09 located boundary fence.	east of Bolton Rd. and zometers NP-1 and NP-2.		
100 vinted	No H/C product or odor d plugged back hole with co H/C = Petroleum hydroca	uttings.		
40	· · · · · · · · · · · · · · · · · · ·			



(Page 1 of 1)

Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started:

: 10/31/95

Drilling Method:

: Solid Stem Auger

Time Started Date Completed : 1430 : 10/31/95 Sampling Method: Drilled By:

0	GRAPHIC	DESCF	RIPTION		
-	ML				 
5 1		- 0-6 ft. Top soil (approxima	ite extent)		
10		6-12 ft. Clay			
15	CL	12-14 ft. Caliche clay with 14-17 ft. Silty clay	n caliche gravel, soft		
20		17-20 ft. Clay and caliche			
25		24-27 ft. Clay and caliche gravel		е	
30		Notes:			
30 35 35 35 35 35 35 35 35 35 35 35 35 35		Borings placed in field eas of Eagle Draw. Borings loo line approximately 200 ft. intermediate between piez Boring 95-BR-10 located 6 boundary fence.  No H/C product or odor deplugged back hole with county for the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	eated along north-south east of Bolton Rd. and cometers NP-1 and NP-2688 ft. north of south etected. Refinery workenttings.	1    2.	
40		·			



(Page 1 of 1)

Offsite Borings 1995 Hydrocarbon Study Navajo Refining Company Date Started:

: 10/31/95

Drilling Method:

: Solid Stem Auger

Time Started Date Completed

: 1500 (approx.) : 10/31/95

Sampling Method: Drilled By:

: Cuttings : Frank's Rathole Srv.

Hole Diameter:

		Arte	sia, New Mexico	Hole Diameter:	: 13"	Logg	ed By:	: D.G. Boyer
Depth in Feet	GRAPHIC	nscs	DESCRIP	TION				
5		ML	0-6 ft. Top soil (approximate	extent)				
			6-9 ft. Clay, caliche gravels a	t 8 ft., saturated				
10			9-14 ft. Clay, light brown, ha	ırd				
15			14-17 ft. Caliche clay, hard,	dry				
20		CL	17-20 ft. Clay and caliche cla	зу				
			20-24 ft. Clay and caliche cla	ay, occasional grav	/el			
25			24-28 ft. Clay and caliche cla	эү				
30	1		Notes:					
/mtech3/navoff95/bolton/offbr-11.ge3			Borings placed in field east of Eagle Draw. Borings locat line approximately 200 ft. eaintermediate between piezon Boring 95-BR-11 located 76: boundary fence.  No H/C product or odor deter plugged back hole with cutti	ed along north-sou ist of Bolton Rd. a neters NP-1 and N 3 ft. north of sout cted. Refinery wo	ith nd P-2. h			
6-24-1996 40	-	·	H/C = Petroleum hydrocarbo	on .				



		Hydrod	Borings 19 carbon Sturey Verification	dy		Date Drilled : 10/29/96 Drilling Method : Hollow S Time Start, Finish : 1320, 1700 Drill Equipment : Ingersoll- Transect & Location : #3, 135 ft. South Drilled By : Atkins Er						)
ļ	N	avajo Re	fining Con	npany								
-		Artesia	, New Mex	cico		Hole D	iamet	er	: 6 inch	: D.G. Boyer		
Depth in	Samples			Sample	Blow		SRAPHIC	Ş	Sample Condition:  Remoulded  Undisturbed  Lost  Rock Core	Sample From: SS Split Spoon ST Shelby Tube CT Auger Cuttings CB 5 ft. Core Barr	i	
Feet	Sam	Sample From:	Sample Taken?	Interval (ft)	Count per foot	Recvy.	38	nscs	DESC	RIPTION		
0 -	0,											
5-		СТ							0-5 ft. Surface soil, silty cla moist, very plastic, sample 5-7 ft. Silty clay, very light	from cuttings, no H/	'Č odor	
		ss	No	,	8/12	2			crystals (gypsum?) in clay,	softer at 7 ft, no H/0	Codor	
		SS	Bagged	7-9	8/15	2			7-9 ft. Silty clay, dark brow at 9', frequent small crysta 9-11 ft. Clay, mottled light	ls, no H/C odor		
10		SS	No		11/18	2		CL	crumbly, small crystals in c	clay, no H/C odor		
		ss	No		10/21	2			11.5-13 ft. Clay and crysta 13-15 ft. Clay, light brown,	ls, no H/C odor		
15		ss	No		5/11	1		1	no H/C odor	rown elightly moiet	plaetic	
15		ss	No		5/7	1.6		1	15-17 ft. Silty clay (1.2'), bit Clay (0.4'), white & gray mino H/C odor, water at appr 17-18 ft. Clay, soft, moist,	ottled, moist, plastic ox. 16 ft.	,	
		ss	No	!	5/6	2			3/4" at 18' 18-19 ft. Clay, dry, brown, 19-20.8 ft. Clay, brown, sti			
20		ss	No		7/31	1.8		GP	no H/C odor /20.8-21 ft, Gravel, gray (lir		1"	
		ss	Bagged	21-22	14/27	2	9/0	SM	21-22 ft. Silty sand, brown 22-23 ft. Clayey gravel, siz		odor	
25		ss	No		11/33	1.4	0.00	1	23-25 ft. Gravel, varying si matrix, no H/C odor	izes as above, silty s	sand	
		ss	No		19/50	1.1	0.000	2]	25-27 ft. Gravel with silt ar some clay, no H/C odor	nd very fine grained :	sand,	
		ss	No		45/9	1.3	/°/	GC				
30 17-05110005-57-01105110AE		SS	No		7/9	1.8		CL	caliche gravel at 30.5', no	ne silt, slightly moist,		
									Notes: Boring 96-01 located in fie 155 ft. south of the Eagle electric fence. At complet with cuttings.	Creek fence and 424 tion, drillers plugged	4 ft. east of	
35	<u> </u>		<del></del>				····		H/C = Petroleum hydroca	roon		



			Hydrod EM Surv avajo Re	Borings 19 arbon Stu ey Verifica fining Con New Mex	dy ation npany		Date D Time S Transe Hole D	itart, F oct & L	.ocatio	: 6" Logged By : D.G. Boyer
	epth in eet	Samples	Sample From:	Sample Taken?	Sample Interval (ft)	Blow Count per foot	Recvy.	SRAPHIC	nscs	Sample Condition:  Remoulded SS Split Spoon Undisturbed ST Shelby Tube CT Auger Cuttings Rock Core  CB 5 ft. Core Barrel  DESCRIPTION
_	0 -	S	From.	iakeii!	22-23	perioot	(11)	9	12	
	5 -		СТ		24 23					0-14 ft. Silty clay, moist at 14 ft., log from cuttings, no H/C odor
	10 -								CL	
	- 15 -		SS	No		5/7	1.6			14-16 ft. Silty clay, light brown, moist, soft, plastic, single caliche gravels (cemented) at 15.5 and 16', water at approx. 16', no H/C odor 16-18 ft. Siltly clay to clay, brown, slightly moist to
	_		ss	No		3/4	2		1	moist, caliche gravel and clay zone from 16.6-16.8', wet where gravels, no H/C odor
	- 20 -		ss	No		4/9	2			18-20 ft. Clay, light brown, slightly moist, plastic, some silt and very fine-grained sand, single gravel in matix at 19.5', no H/C odor 20-22 ft. Clay, brown, stiff, plastic, occasional single
	-		SS	No		7/11	1.5			gravel, gravelly clay at 21.8, no H/C odor
	-		SS	No		10/4	0.6	9.0/	GC	22-23 ft. Clayey gravel (0.4'), gravel chips may be due to hammering, no H/C odor Clay (0.2'), brown, stiff, very plastic, no H/C odor
	25 -		ss	No		6/9	1.4			24-26 ft. Silty clay(0.7'), light brown, moist. Clay(0.7') brown, stiff, very plastic, no H/C odor
			ss	No		5/9	2		CL	26-28 ft. Clay, brown, stiff, plastic, single caliche gravel at 28', no H/C odor
			ss	No		7/8				28-30 ft. Same as above, occasional caliche gravels, no H/C odor
avoirabili	30 -							• /		Notes: Boring 96-02 located in field northeast of well KWB-1, 270 ft. south of the Eagle Creek fence and 700 ft. east of electric fence. At completion, drillers plugged back hole with cuttings.
	35 -									H/C = Petroleum hydrocarbon



		Hydrod EM Surv	Borings 19 carbon Stu rey Verifica efining Cor	dy ation		Date Drilled Time Start, Finish Transect & Location Hole Diameter			: 10/30/96 : 1020, 1500 n : #6, 180 ft. South : 6"	Drilling Method Drill Equipment Drilled By Logged By	: Hollow Stem Auger : Ingersoil-Rand A-300 : Atkins Eng. Assoc.
		Artesia	, New Mex	tico		- TOIG D	name (			: D.G. Boyer	
Depth in Feet	Samples	Sample From:	Sample Taken?	Sample Interval (ft)	Blow Count per foot	Recvy. (ft)	GRAPHIC	nscs	Sample Condition:  Remoulded  Undisturbed  Lost  Rock Core	Sample From: SS Split Spoon ST Shelby Tube CT Auger Cuttings CB 5 ft. Core Barre	
0 -	1/1					[	V /				
5 -		ст						CL	0-16 ft. Silty clay to clay, by driller at approx. 13 ft no H/C odor		rted
15			No		2/4	1.0			16-18 ft. Clay (1.2'), soft, caliche clay (0.4'), chalk	color, soft, gravelly, no	H/C odor
		SS	No No		3/4	1.6		1	18-20 ft. Clay, brown, so dry at bottom, some white		
	1	ss	No		4/10	1.5		1			
20		ss	No		9/26	1.6			20-21 ft. Clay (0.8'), brow		- IIII
		SS	Yes	22-24	9/16	1.6		SM	22-24 ft. Sand, brown, vi clean, no H/C odor	erface, saturated, no od ery fine-grained, little cl	lor
25		SS	No		21/60	2	:::		24-25.3 ft. Sand, same a 25.3-25.5 ft. Sandy clay,	no H/C odor	
		ss	No		11/41	2	<u>Z\$Z</u>	SP	25.5-26 ft. Clavey grave 26-28 ft. Sand, brown, vi backflow), gravel in tip, r	no H/C odor	
		ss	No		36/34	2	- 7	-	28-29 ft. Sand, same as 29-30 ft. Gravel, as above	, , , , , , , , , , , , , , , , , , , ,	Į.
30		ss	No		35/50	1.5	90	GC	30-32 ft. Gravel, as above a pieces, no H/C odor 32-34 ft. Gravel, same a	s above with broken co	obble
	]	ss	No		33/69	1.5			clay, variable sized, smann H/C odor, blow count	aller gravels well rounde 33-34 ft. for 10" interva	ed, al
35	10	ss	No		5/48	0.6		GP	34-36 ft. Hole filled in 1', spoon to 1.4', gravels (0		nside
		ss	No		31/47	1.5		СН	spoon tip, no H/C odor 36-38 ft. Gravels (0.1'), stiff ("fat" clay), no H/C	clay (1.4'), chalk color,	very
40									Notes:  Boring 96-03 located in 200 ft. south of the Eagl electric fence. At complicuttings.	e Creek fence and 849	ft. east of
45	4								H/C = Petroleum Hydro	carbon	



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

**Date Drilled** 

: 10/30/96

Drilling Method **Drill Equipment**  : Hollow Stem Auger : Ingersoll-Rand A-300

**EM Survey Verification** Navajo Refining Company Time Start, Finish Transect & Location

: 1551, 1615 : Not Applicable

Drilled By

: Atkins Eng. Assoc.

: D.G. Boyer Ву

	IN	Artesia				Hole Diame	ter	: 6"		Logged I
Depth in Feet	Samples	Sample From:	PHIC	nscs	Sample Condition Remoulded Undisturbed Lost Rock Core	l	CB 5 ft. (	Spoon		
0 <del>-</del>		ст		CL	0-5 ft. Silty clay,	brown, no H/	C odor			
- - 10 - -		СТ	70.70	GC	5-11 ft. Clay and rounded gravels	at 7 ft.		small,		
- 15 - - -		СТ		GW	12-15 ft. Clay, so 15-19 ft. River gr water at 15 ft., no	avels, limes	 tone, to 3'	' diameter,		
- 20 - - - -		СТ	0.00	CL	19-27 ft. Silty Cla	ay, saturated	I, no H/C	odor		
25 -					Notes:	rated in field	northeast	of well KWR.	-1 670 ft	

30

Boring 96-04 located in field northeast of well KWB-1, 670 ft. south of the Eagle Creek fence and 150 ft. east of electric fence. At completion, drillers plugged back hole with cuttings. H/C = Petroleum Hydrocarbon



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

**Date Drilled** 

: 10/30/96

**Drilling Method** Drill Equipment : Hollow Stem Auger : Ingersoil-Rand A-300

: Atkins Eng. Assoc.

Time Start, Finish Transect & Location Navajo Refining Company

Hole Diameter

: 1630, 1650 : Not Applicable

Drilled By Logged By

: D.G. Boyer

Artesia, New Mexico

Sample

Depth

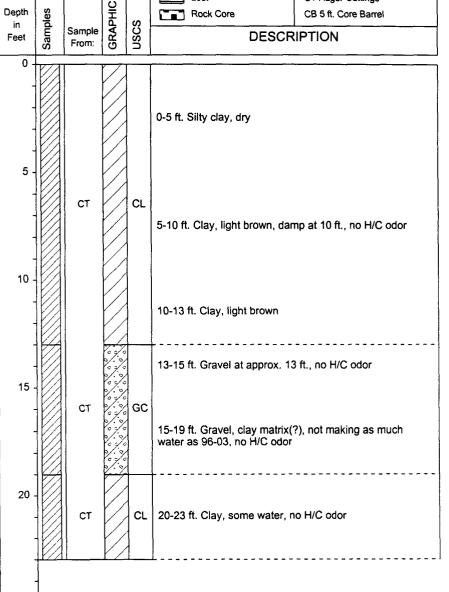
Sample Condition: Remoulded Undisturbed Lost

Rock Core

Sample From: SS Split Spoon ST Shelby Tube **CT Auger Cuttings** CB 5 ft. Core Barrel

: 6"

**DESCRIPTION** 



Notes:

Boring 96-05 located in field northeast of well KWB-1, 620 ft. south of the Eagle Creek fence and 300 ft. east of electric fence. At completion, drillers plugged back hole with cuttings.

H/C = Petroleum Hydrocarbon

25



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study EM Survey Verification

Date Drilled
Time Start, Finish
Transect & Location

Hole Diameter

: 10/31/96 : 0730, 0810 : Not Applicable

: 6"

Drilling Method Drill Equipment Drilled By

Logged By

: Hollow Stem Auger : Ingersoll-Rand A-300 : Atkins Eng. Assoc.

: D.G. Boyer

Navajo Refining Company

GRAPHIC

Sample

uscs

Depth

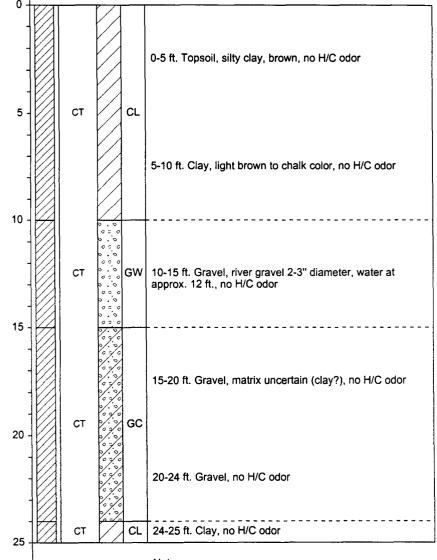
Feet

Artesia, New Mexico

Sample Condition:

Remoulded
SS Split Spoon
ST Shelby Tube
CT Auger Cuttings
Rock Core
CB 5 ft. Core Barrel

DESCRIPTION



Notes:

Boring 96-06 located in field northeast of well KWB-1, 620 ft. south of the Eagle Creek fence and 150 ft. east of electric fence. At completion, drillers plugged back hole with cuttings.

H/C = Petroleum Hydrocarbon

C:\MTECH46



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study EM Survey Verification

Date Drilled Time Start, Finish : 10/31/96

Drilling Method

: Hollow Stem Auger

Navajo Refining Company

Hole Diameter

: 0820, 0840 : Not Applicable Drill Equipment Drilled By : Ingersoll-Rand A-300 : Atkins Eng. Assoc.

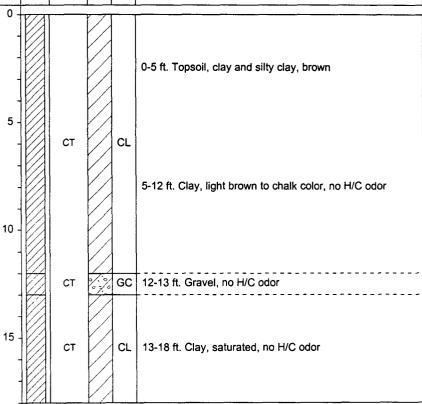
Transect & Location Hole Diameter

: 6**"** 

Logged By

: D.G. Boyer

Artesia, New Mexico Sample Condition: Sample From: Remoulded SS Split Spoon Undisturbed ST Shelby Tube Lost **CT Auger Cuttings** GRAPHIC Depth Rock Core CB 5 ft. Core Barrel uscs Sample **DESCRIPTION** Feet From:



Notes:

Boring 96-07 located in field northeast of well KWB-1, 720 ft. south of the Eagle Creek fence and 150 ft. east of electric fence. At completion, drillers plugged back hole with cuttings.

H/C = Petroleum Hydrocarbon

C:\MTECH46

20

25

30

09-22-1997 C:\MI



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

Date Drilled Time Start, Finish : 10/31/96 : 0850, 0910 **Drilling Method Drill Equipment**  : Hollow Stem Auger : Ingersoll-Rand A-300

Transect & Location Navajo Refining Company

: Not Applicable Hole Diameter : 6"

Drilled By Logged By : Atkins Eng. Assoc. : D.G. Boyer

Sample

Depth

in

15

20

25

30

Artesia, New Mexico

Sample Condition:

Sample From: SS Split Spoon

Undisturbed

ST Shelby Tube

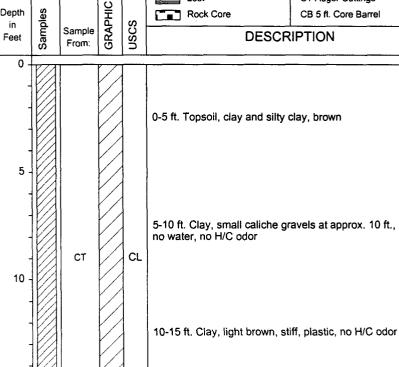
Lost Rock Core

Remoulded

**CT Auger Cuttings** 

CB 5 ft. Core Barrel

**DESCRIPTION** 



15-18 ft. Clay, same as above, no H/C odor

Notes:

Boring 96-08 located in field northeast of well KWB-1, 770 ft. south of the Eagle Creek fence and 150 ft. east of electric fence. At completion, drillers plugged back hole with cuttings.

H/C = Petroleum Hydrocarbon



		O#-11-	De-			<del></del>		<del></del>			(1 age 1 0/ 1)
•		Offsite Hydroc				Date Drilled	1	: 10/31/96		Drilling Method	: Hollow Stem Auger
	1	EM Surv				Time Start,	Finish	: 0920, 0950		Drill Equipment	: Ingersoll-Rand A-300
		avajo Re				Transect &	Location	: Not Applicable		Drilled By	: Atkins Eng. Assoc.
	1.46	Artesia				Hole Diame	eter	: 6"		Logged By	: D.G. Boyer
		, u teold	,ev	. IVICX	Sample Condition	 រn:	Sample	From:	<del></del>		
1		\	( )		•		1				
					Remoulded		SS Split		Ì		
			} }	}	Undisturbed	u	ST Shell	•			
Dooth	ی		일	! !	Lost			er Cuttings			
Depth in	ple		F	à	Rock Core		<u> </u>	Core Barrel	_		
Feet	Samples	Sample From:	GRAPHIC	nscs		DESCR	RIPTION	1	-		
0	-			<u>ا</u> ا							
0 -											
٦				[ ]							
]		<u> </u>	1		0-5 ft. Topsoil, cla	ay, brown, s	mall calic	he gravels			
]			1/								
5 -		}	1/		!						
		СТ	1	CL	1				}		
	1///		1/	1					}		
]		{	1/		5-11 ft. Clay, brow	wn, darker a	it approx	7 ft.,			
1			//		no H/C odor	.,		· r	}		
10 -		1	//								
		}	/		L						
		}	0 . 0								
		1	0.0								
		СТ	0.0	GW	11-17 ft. River gr	avels, mode	rate H/C	odor, stronger			
15 -			000		from 15-17 ft.			-			
		}	0.0		(						
-	WA.		مروع		<u> </u>						
_			1/	1							
-			1/	]							
20 -			Y/								
-			1/	1	17-25 ft. Clay, sa	iturated, gra	vels at 23	ft.,			
_			1/	1	no evidence of fr clays, but H/C oc	ee product of for	on auger,	water, or			
-			<b>/</b> /		5.2,0, 5at 1 % OC	- <del>-</del> '					
_	1//		//		}						
25 -		СТ		CL	[						
-	1//		//	1							
-	18/		1	1	25-30 ft. Clay, gr	avel at anno	ox. 27 ft	occasional	1		
-	11//		1/	1	sheen on clay sli	urry from au	gers, H/C	odor	1		
-			1/	1					1		
30 -	11//		1/	1	}				-		
30 -	11//		1/	1	30-33 ft. Clay, od	casional ara	avel felt b	y driller, clav			
-	18/1	1	1/	]	slurry lighter cold						
	122	1	1//	·1	Notes:		<del></del>		<b>ل</b> ــــــ		
35 -	{				Boring OS 00 Icc	ated in field	northeast	of well KMP 1			
	1				Boring 96-09 loc 720 ft. south of the	the Eagle Cr	eek fence	and 85 ft.			
	1				east of electric fe	ence. At con	npletion, c	trillers plugged			
	1				back hole with co						
	1				H/C = Petroleum	1 Hydrocarbo	on				
40 -	1										



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

Date Drilled

: 10/31/96 : 1010, 1040 **Drilling Method** 

: Hollow Stem Auger

**EM Survey Verification** 

Time Start, Finish Transect & Location Drill Equipment Drilled By

: Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Logged By

: D.G. Boyer

	N	avajo Re	efinin	g Cor	mpany	Transect & Location : Not Applicable Hole Diameter : 6"		
		Artesia	, Nev	v Mex	cico	noie Diamei	er	: 6"
					Sample Condition	on:	Sampl	e From:
		l			Remoulded	,	SS Spli	it Spoon
				<b>i</b> '	Undisturbe	d	ST She	elby Tube
	}				Lost		CT Aug	ger Cuttings
Depth in	les		₹	S	Rock Core		CB 5 ft	. Core Barrel
Feet	Samples	Sample From:	GRAPHIC	nscs		DESCR	IPTIO	V
0 -	7/1		V /		· · · · · · · · · · · · · · · · · · ·			
- - -					0-5 ft. Topsoil an	d clay, browr	n, no H/0	C odor
5 - - -		СТ		CL	5-10 ft. Clay, ligh caliche gravel at			

11-15 ft. Gravel, water at approx. 11 ft., no H/C odor

15-20 ft. Gravels, no odor

10-11 ft. Clay as above

20-23 ft. Gravel, H/C odor on clays returned to surface on auger, no water/slurry returned to surface

Notes:

Boring 96-10 located in field northeast of well KWB-1, 670 ft. south of the Eagle Creek fence and 85 ft. east of electric fence. At completion, spotted H/C sheen on water in hole. Drillers plugged back hole with cuttings.

H/C = Petroleum Hydrocarbon

15

20

25

30

CT



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

**Date Drilled** Time Start, Finish : 10/31/96 : 1050, 1115

: 6"

: Not Applicable

Drilling Method

: Hollow Stem Auger : Ingersoll-Rand A-300

Transect & Location Hole Diameter

**Drill Equipment** Drilled By Logged By

: Atkins Eng. Assoc. : D.G. Boyer

Navajo Refining Company

GRAPHIC

Sample

uscs

Depth

Feet

Samples

Artesia, New Mexico

Sample Condition: Sample From: Remoulded SS Split Spoon Undisturbed ST Shelby Tube Lost **CT Auger Cuttings** Rock Core CB 5 ft. Core Barrel

**DESCRIPTION** 

5 -	СТ	CL	0-9 ft. Topsoil and clay, brown, no H/C odor
10 -			9-11 ft. Caliche clay, light brown, no H/C odor
15 -	СТ	G G	11-18 ft. Gravel and clay, no H/C odor
20 -	СТ	6 GW	18-22 ft. Gravel, no H/C odor
-	СТ	CL	22-23 ft. Clay, no H/C odor on soil or clay slurry
			•

Notes:

Boring 96-11 located in field northeast of well KWB-1, 620 ft. south of the Eagle Creek fence and 85 ft. east of electric fence. At completion drillers plugged back hole with cuttings.

H/C = Petroleum Hydrocarbon

25



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

Navajo Refining Company

Date Drilled Time Start, Finish Transect & Location : 10/31/96 : 1125, 1155

: Not Applicable

Drilling Method Drill Equipment Drilled By

: Hollow Stem Auger : Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Hole Diameter : 6"

Logged By

: D.G. Boyer

	in Sample &		v Me	cico	Hole Diameter ; 6		
					Sample Condition	n:	Sample From:
					Remoulded		SS Split Spoon
			Undisturbed	i	ST Shelby Tube		
				Lost		CT Auger Cuttings	
Depth	Seles		¥	S	Rock Core		CB 5 ft. Core Barrel
Feet	am'	Sample	RA	SCS		DESCRIPTION	

5 -	ст	CL	0-6.5 ft. Topsoil, brown
-			6.5-8 ft. Clay, light brown, very soft, very plastic
	СТ	GC GC	8-9 ft. Gravel
10 -	ст	CL	9-11 ft. Clay, no H/C odor
15 -	ст	0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0 0 : 0	11-17 ft. Gravel, no H/C odor
20 -	ст	CL	17-23 ft. Clay, no H/C odor in hole
_			

Notes:

Boring 96-12 located in field northeast of well KWB-1, 685 ft. south of the Eagle Creek fence and 107 ft. east of electric fence. At completion drillers plugged back hole with cuttings.

H/C = Petroleum Hydrocarbon

25



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

0

5

10

15

20

25

30

35

40

СВ

СВ

CB

СВ

CB

CB

СВ

1.7

2.7

1

4.2

2.7

1.4

No

No

No

No

No

No

No

Date, Time Started

: 11/19/96, 0830

Drilling Method

: Hollow Stem Auger

**EM Survey Verification** 

Date, Time Finish Transect & Location

11/20/96 1145 : #20, 550 ft, South Drill Equipment Drilled By

: Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Navajo Refining Company Artesia, New Mexico

Hole Diameter

: 6 inch

Logged By

: D.G. Boyer

Sample Condition: Sample From: Remoulded SS Split Spoon ST Shelby Tube Undisturbed **CT Auger Cuttings** Lost Depth Samples Rock Core CB 5 ft. Core Barrel Sample uscs Sample Recvy. Sample Interval DESCRIPTION Feet Taken? (ft) From:

> 0-5 ft. Clay, brown, stiff, plastic, some silt at top, no H/C odor

5-10 ft. Clay, light brown to 6.4, then light gray, soft, moist at top, hard, dr, crumbly at bottom with gray caliche and crystals at tip.

10-15 ft. Clay, brown, dry hard with light gray caliche at tip. Water at 14 ft. on outside of core barrel; driller to slow auger for better recovery.

15-20 ft. Silty clay, light brown to brown, slightly moist, plastic, light gray streaks at 17 ft., small gravels in clay at tip. Water in barrel at top. Sample from 23.8 ft.

20-24 ft. Clay, light brown; poor recovery due to core barrel being 6-8 in. ahead of auger; removed core-barrel swivel.

24-24.4 ft. Slough & clayey backflow.

24.4-24.8 ft. Clayey gravel, saturated, gravel size variable to 2 in.

24.8-25.0 ft. Gravelly clay.

25.0-26.9 ft. Silty clay, light brown, occasional gravel, no H/C odor.

29-34 ft. Clay, light brown, dry, still, hard. Auger refusal at 32 ft. Tip of core barrel has thick lip due to heat rotation and no water. Small gravels imbedded in core.

#### Notes:

CL

Boring 96-13 located in field northwest of well KWB-1, 556 ft. south of the Eagle Creek fence and 1450 ft. west of electric fence. At completion, drillers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

Date, Time Started

: 11/19/96, 1230

**Drilling Method** 

: Hollow Stem Auger

**EM Survey Verification** 

Date, Time Finish Transect & Location

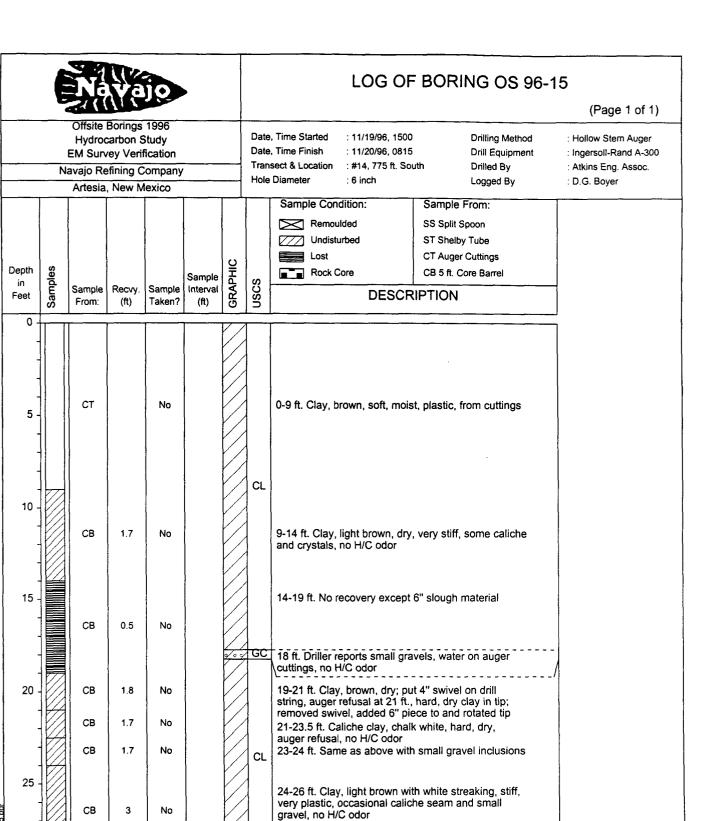
: 11/20/96, 1400 : #16, 200 ft. South Drill Equipment Drilled By

: Ingersoil-Rand A-300 : Atkins Eng. Assoc.

yer

	-	N	avajo Re	efining C	ompany	'				f16, 200 ft. Sout Finch	•	: Atkins En
			Artesia	, New M	lexico			noie			Logged By	: D.G. Boye
	Depth in Feet	Samples	Sample From:	Recvy. (ft)	Sample Taken?	Sample Interval (ft)	GRAPHIC	nscs	Sample Condition  Remoulded  Undisturbe  Lost  Rock Core	1	Sample From:  SS Split Spoon  ST Shelby Tube  CT Auger Cuttings  CB 5 ft. Core Barrel	
	0 - - - 5 - - - 10 -		СВ	0	No				0-14 ft. No samp	le, plug in barı	rel	
	15 -		СВ	3	No		7.7.	GC	14-16.2 ft. Satura (variable size, so (from auger goin 16.2-17 ft. Clay,	ome fine grain g back down i		
	20 -		СВ	1.2	No			CL			f, plastic, white streaks	
	25		СВ	4	No			GC CL	/Clayey gravel, th	nin saturated z		
14 505	30	-		1								
41ECH46 906111-10-0610#06-14 bor	35								south of the Eag	le Creek fenc	orthwest of well KWB-1, 220 f e and 850 ft. west of electric plugged back hole with cutting	

H/C = Petroleum hydrocarbon



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550 ft. west of electric fence. At completion, drillers plugged back hole with cuttings. H/C = Petroleum hydrocarbon

occasional gravel, no H/C odor

Notes:

26-29 ft. Clay and caliche clay, light gray, hard, dry,

Boring 96-15 located in field northwest of well KWB-1, 795 ft. south of the Eagle Creek fence and



Sample From: SS Split Spoon ST Shelby Tube **CT Auger Cuttings** CB 5 ft. Core Barrel (Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

Date Drilled

: 11/20/96

**Drilling Method** 

: Hollow Stem Auger

**EM Survey Verification** 

Time Start, Finish Transect & Location

: 0830, 1430 : #14, 1,120 ft. South **Drill Equipment** Drilled By

: Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Navajo Refining Company Artesia, New Mexico

Hole Diameter

: 6 inch

Logged By

: D.G. Boyer

							Sample Condition:
							Remoulded
			1				Undisturbed
		ļ	ļ				Lost
h Ses				Sample	Ħ	,,	Rock Core
Samp	Sample From:	Recvy. (ft)	Sample Taken?	Interval (ft)	GRA	USC	DES
	Samples	h Sample Sample From:	h sample Recvy.	h 80 Sample Recvy. Sample t G From: (ft) Taken?	h sample Recvy. Sample Interval Taken? (ft)	h sample t Sample From: (ft) Taken?	

SCRIPTION

0 +	1						
5 -		СТ		No			0-9 ft. No cuttings returned to surface  9-14 ft. From driller: gravels at 11-13 ft., slight H/C odor on mud returns; pulled out of hole, 2" rounded gravel in auger, H/C product in mud and on auger. Shut down until additional short center rods received. At 1230 started new hole at 5 ft. north of original.
10		СВ	4.2	Yes	13-14 ft.	s G	9-11 ft. Clay, dark brown to 9.8 then light brown  11-12.3 ft. Clay, grading to light gray and sandy with gravels at 12.3 ft.  12.3-12.8 ft. Sandy gravel, dry, strong H/C odor
15 -		СВ	3.7	No		, , , c	14-15 ft. Gravels with sand, clay and H/C product, saturated  15-16.7 ft. Clay, dark gray at top becoming light gray at base, mottled, dry, stiff, some silt and very fine grained sand, some H/C odor  16.7-18 ft. Caliche clay, light gray to chalk color,
20 -		СВ	3.8	Yes	18 ft.		mottled, slight H/C odor, hard, pulled core at 18 ft. 18-20 ft. Clay, light gray and brown mottled, stiff, plastic, wet zone at 20 ft., no H/C odor  CA 20-22 ft. Caliche, white, dry, hard, pulled core at 22 ft.
25 -		СВ	3.8	No			22-27 ft. Clay, mottled light brown and chalk colored, dry, hard but softer at 27 ft.
30 -		СВ	27	No			27-32 ft. Clay, same as above, soft from 28.3-28.5 ft., occasional small gravel in clay matrix
-	V/A		<u> </u>		L	r / l	Notes: Boring 96-16 located in field northwest of well

KWB-1, 1,140 ft. south of the Eagle Creek fence and 550 ft. west of electric fence. At completion, drillers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon

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(Page 1 of 1)

Hydrocarbon Study **EM Survey Verification** 

Date Drilled Time Start, Finish : 11/20/96 : 1610, 1700 Drilling Method Drill Equipment : Hollow Stem Auger : Ingersoll-Rand A-300

ins Eng. Assoc. . Boyer

			avajo Re Artesia	efinin	g Con	npany	Transect &		: #12, 880 ft. South : 6"	Drilled By Logged By	: Atkins
	Depth in Feet	Samples	Sample From:	PHIC	USCS	Sample Condition Remoulded Undisturbed Lost Rock Core		SS Split ST Shel CT Aug CB 5 ft.	lby Tube er Cuttings Core Barrel		
	5 -		ст		CL	0-5 ft. Clay, dark		lastic			
Ī	CT GC 13 ft. Gravels, str product observed					11 ft. Gravel lens 13 ft. Gravels, sti product observed 15 ft. Gravels, he	rong H/C od I on auger re	or, water eturns	sheen and		
	- - 20 - -		СТ		GW	21 ft. Gravels, he	eavy drill rig	auger cha	atter		
	25 - -					22-29 ft. Clay, H	'C odor on r	eturns			
C:\MTECH46	30 -		СТ		CL	29-39 ft. Clay an	d caliche cla	ay, chalk	color		
C:\MTECH4	40		1	<u> </u>	1	Notes: Boring 96-17 loc KWB-1, 900 ft. s 250 ft. west of el plugged back ho	outh of the lectric fence	Eagle Cre	eek fence and	1	

H/C = Petroleum Hydrocarbon

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(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

**Date Drilled** 

: 11/21/96

**Drilling Method** 

: Hollow Stem Auger

**EM Survey Verification** 

Time Start, Finish Transect & Location

: 1000, 1200 Drill Equipment : #12, 810 ft. South Drilled By

: Ingersoil-Rand A-300 : Atkins Eng. Assoc.

Navajo Refining Company

D.G. Boyer

	Navajo I	Refining (	Company	,			Diameter	: #12, 010 ft. 50L	•
	Artes	ia, New N	Mexico			Hole	Diameter	: 6 inch	Logged By
	Sample Sample From		Sample Taken?	Sample Interval (ft)	GRAPHIC	nscs	Sample Conc Remou Undistu Lost Rock C	ided urbed	Sample From: SS Split Spoon ST Shelby Tube CT Auger Cuttings CB 5 ft. Core Barrel
5 -	ст		No			CL	0-9 ft. Clay, b	rown, soft, plast	ic, from cuttings
10 -	СВ	5	No		20.3	GC	& plastic, occ √12.9-13.3 ft. 0	lay, light brown, asional light colo Clayey gravel, so	some silt, slightly soft ored calich inclusions mall (<1/2"), H/C odor
15 -	СВ	3.3	No		709	GL GW GW	sand, some s 14,4-15.2 ft. s H/C odor 15,2-15.8 ft. s 15.8-16.2 ft. s	mall gravel Sandy gravel (to Sand, fine graine Sandy gravel, so	brown, very fine-grained 2'), saturated, dark gray, ed, brown ome clay, H/C odor all gravels, gray,
20	СВ	4.5	No		200	GW	19-19.2 ft. Sa 19.2-20.2 ft. o and caliche in 20.2-24 ft. Cl	Clay, brown with nclusions, some	ng caliche zones to
25 -	СВ	0.9	No			CL	24-29 ft. Clay no H/C odor	, brown and cha	alk colored, dry,
30 -	//11		<u></u>		1/_	<u>.l.</u>	Notes:		

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Boring 96-18 located in field northwest of well KWB-1, 830 ft. south of the Eagle Creek fence and 250 ft. west of electric fence. At completion, drillers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

Date Drilled

: 11/21/96 : 1230, 1430 Drilling Method

: Hollow Stem Auger

**EM Survey Verification** 

Time Start, Finish Transect & Location

**Drill Equipment** : #34, 250 ft. South **Drilled By** 

: Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Navajo Refining Company Artesia, New Mexico

Hole Diameter

: 6 inch

Logged By

: D.G. Boyer

								Sample Condition:	Sample From:
								Remoulded	SS Split Spoon
								Undisturbed	ST Shelby Tube
								Lost	CT Auger Cuttings
Depth in	mples				Sample	Ĭ	s	Rock Core	CB 5 ft. Core Barrel
Feet	am	Sample	Recvy.	Sample	Interval	\₹	SCS	DESC	RIPTION

epth	es				Sample	JH.		Lost Rock Core	CT Auger Cuttings CB 5 ft. Core Barrel
in Feet	Samples	Sample From:	Recvy. (ft)	Sample Taken?		GRAPHIC	nscs	DESCR	IPTION
5 -		ст		No			CL	0-9 ft. Clay, brown, soft, plast 9.5-10 ft. Gravels, auger refus H/C odor, dark gray clay on a with rock in barrel. Moved ove 9-10 ft. Clay, brown, becomin	sal @10 feet; changed bit, uger. Auger refusal @11 feet er to redrill.
							OL.		
10 - -		СВ	3.3	Yes	10-12	9/09/	GC GC	10-10.8 ft. Gravels, clay matr H/C odor, dry. 10.8-11.1 ft. Clay, brown	
-		СВ	1.4	No		20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70 20.70	GC	11.1-12.4 ft. Gravels, same a 12.4-12.6 ft. Clayey gravel, so 12.6-13.8 ft. Gravelly clay, we moist, dark gray, H/C odor.	aturated, strong H/C odor
15 - -		СВ	3	No		7.5	CL	14-15.3 ft. Gravel with sand a well sorted	and clay, saturated, gray, H/C,
20 -		СТ		No		-1 2000 2000 2000		15.3-17.5 ft. Clay, gray, hard, SAA, becoming caliche clay a No coring, installed pilot bit. Drilled gravels @ approx. 20-21 ft.	
- - -								Caliche. Free product on surf	face mud.
25 -		СТ		No	·		CA	Hard drilling 24-27 ft.	
								Softer drilling 27-29 ft.	

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Notes:

Boring 96-19 located in field southwest of well KWB-1, 250 ft. south of the concrete lined channel, and 990 ft. west of the corner fence post south of KWB-1. At completion, drillers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon

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(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

Date Drilled

: 11/21/96

**Drilling Method** Drill Equipment : Hollow Stem Auger : Ingersoll-Rand A-300

Navajo Refining Company

Artesia, New Mexico

Time Start, Finish Transect & Location Hole Diameter

: 1500, 1545 : #32, 555 ft. South : 6"

Drilled By

: Atkins Eng. Assoc.

Logged By

: D.G. Boyer

		Artesia	i, Nev	v Mex	(ico			
					Sample Condition	n:	Sample From:	
					Remoulded		SS Split Spoon	
			•		Undisturbed	j	ST Shelby Tube	
			ပ		Lost		CT Auger Cuttings	
Depth in	les		Ē	ြက္က	Rock Core		CB 5 ft. Core Barrel	
Feet	Samples	Sample From:	GRAPHIC	uscs		DESCR	RIPTION	
0 -	127	1						
-				ML	0-4 ft. Topsoil			
5 -		СТ		CL	4-9 ft. Clay, brow	n		
10 -					10 ft. Clay,tan			
-		СТ		CA	11-13 ft. Caliche,	no H/C ode	or	
1 -			7		13 ft. Clay, light b	rown, crum	nbly, slight H/C odor	
15 -					15 ft. Clay, as ab	ove, slightly	plastic	
		СТ		CL	17 ft. Clay, brown	n, softer, mo	ist, strong H/C odor	
20 -					20 ft. Clay, as ab	ove, no wat	er	
25		СТ			22-29 ft. Caliche zone at approx. 2 Product on auge	27 feet.	ght gray, driller reports soft	
40011200		<u> </u>	<u> </u>	1	Notes:	<u></u>		
30	1				555 ft. south of the	ne concrete ce post sout	southwest of well KWB-1, lined channel, and 690 ft. west th of KWB-1. At completion, th cuttings.	

H/C = Petroleum hydrocarbon



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

Date Drilled

: 11/21/96

Drilling Method

: Hollow Stem Auger

Time Start, Finish Transect & Location

: 1230, 1430 : #28, 1,000 ft. South Drill Equipment Drilled By

: ingersoll-Rand A-300 : Atkins Eng. Assoc.

Navajo Refining Company Artesia, New Mexico

Hole Diameter

: 6 inch

Logged By

: D.G. Boyer

				-			- 1				
l									Sample Condition:	Sample From:	
l									Remoulded	SS Split Spoon	
١					Ì	l			Undisturbed	ST Shelby Tube	
I							၂		Lost	CT Auger Cuttings	
١	Depth in	Seles				Sample	末		Rock Core	CB 5 ft. Core Barrel	
l	Feet	ampl	Sample	Recvy.	Sample Taken?	Interval	\¥	SCS	DESC	CRIPTION	

Depth	səle		<u>'</u>		Sample	Ĭ	· ·	Rock Core	CB 5 ft. Core Barrel
Feet	Samples	Sample From:	Recvy. (ft)	Sample Taken?	Interval (ft)	GRAPHI	nscs	DESCR	RIPTION
0 -		1							
5 -				:				No log or samples	
10 -							CL	9-10.4 ft. Clay, brown with ca	aliche inclusions, stiff
-		СВ	5	No				10.4-12.4 ft. Caliche clay, grawhere caliche present, dry, s	ay & black with black zones trong H/C odor
- 15 -						[[- []- []-	CA	12.4-14 ft. Caliche clay, dry, staining, strong H/C odor	hard, crumbly, some gray H/C
-		СВ	5	Yes	16			14-16.7 ft. Clay with caliche 16.7-17.5 More caliche, less	clay
-		\ \			Ì	1/	CL	17.5-18.5 ft. Clay	
20 -		СВ	1.2	No		$\mathbb{Z}$	CL	odor throughout core.	st at core tip, very strong H/C
-			ļ	No				19-19.2 ft. Slough in core, wa 19.2-20.2 ft. Clay, brown with	ater & product n caliche, dry, H/C odor
-				140				Auger refusal @ 21 feet; retr No core 21-24 ft., 0.5 ft. slou	acted core 4 in., no effect. gh only
25 - - - -		СТ		No				24-29 ft. Cuttings only, hard 28-29 ft., no gravels	caliche drilling, softer at
30 - - -		ст		No			-	29-34 ft. Augered with pilot the hard caliche drilling, no grave	oit, cuttings only, mud return, els
35 -		СТ		No				34-39 ft. Same as above, no	gravels
40	1//	Ц	<u></u>	<u> </u>	1	11	1	Notes:	

Boring 96-21 located in field southwest of well KWB-1, 1,000 ft. south of the concrete lined channel, and 90 ft. west of the corner fence post south of KWB-1. At completion, drillers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

Date Drilled

: 11/22/96 : 0930, 1140

: #35, 380 ft. South

Drilling Method

: Hollow Stem Auger

**EM Survey Verification** 

Time Start, Finish Transect & Location Drill Equipment Drilled By

: Ingersoil-Rand A-300 : Atkins Eng. Assoc.

Navajo Refining Company

			Artesia	, New M	lexico	<del>,</del>		Hole Diameter	: 6 inch	Logged By	; D.G. Boyer
	Depth in Feet	Samples	Sample	Recvy.	GRAPHIC	USCS	R 	Condition: emoulded ndisturbed oost oock Core	Sample From: SS Split Spoon ST Shelby Tube CT Auger Cuttings CB 5 ft. Core Barrel		
		S	From:	(ft)	Ø	)					
	0 - - - 5 -		СТ				-6 ft. Cla	ay, black, strong H/C	odor		
ī	10 -		СВ	5		CL	9.7-14 ft.	. Clay and caliche cla	ray/black H/C staining ay, gray, H/C staining ex very strong H/C odor	xcept	
	- 15 - - -		СВ	4.5	7	SP	15.6-16.3 16.3-18.3 grained, /18.5 ft. S	3 ft. Silty clay, black, 3 ft. Sand, light gray black stain at 18.1 ft Sandy silt, sand v. fir	to light brown, fine to v.		
	20 -		СВ	4	000	SC GW SP GP SP	19.3-20 some sa with som rock, cor 21-21.6 21.6-22. 22.1-23. 23.0-23.	nd and clay as matri ne product. Pulled contents as above. Cut ft. Sand, light brown 1 ft. Gravellly sand, 0 ft. Sandy gravel, light. Sand as above		d/C odor ammed ravels./ uct/	
aw#96\11-19-96\n#96-22 hor	25 - - - -		CB	5		CL	24.5-26. sand. 26.5-29 gravel a	5 ft. Silty clay, light b	orown with some v. fine	grained	
23-1997 C.um Edito	30 -	-					380 ft. s the corn drillers p	outh of the concrete er fence post south plugged back hole wi	•	t. west of	
23-1:		4					H/C = P	etroleum hydrocarbo	n		



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

Date Drilled

: 05/09/97

Drilling Method

: Hollow Stem Auger

**EM Survey Verification** 

Time Start, Finish Transect & Location

: 1300, 1450 : #35, 340 ft. South

Drill Equipment Drilled By

: ingersoll-Rand A-300 : Atkins Eng. Assoc.

ed By

: D.G. Boyer

		avajo Re		ompa	any		Transect & Location Hole Diameter	: #35, 340 ft. South : 6 inch	Drille
		Artesia	, New IV	exico	,	Samole	Condition:	Sample From:	
Depth in Feet	Samples	Sample	Recvy.	GRAPHIC	nscs	ZZZ U	emoulded Indisturbed SS Split Spoon ST Shelby Tube CT Auger Cuttings CB 5 ft. Core Barrel		
	Š	From:	(ft)	Ō	Š				
5 -		ст				Contami	nated clay at 6 feet, o	clay, dark gray, very plastic	;
10 -					CL	13-15.3	ft. Clay, black, H/C sa	aturated	
15		СВ	5			15.3-15.	9 ft. Sandy clay, light	gray, H/C saturated	
20					sw	17.1-18 18-19.8	1 ft. Clayey sand, ligh ft. Sand, fine grained ft. Sand, fine to medi id H/C saturated	nt brown , brown, H/C saturated um grained, light brown,	
20		СВ	2.3	. 0 .	GW		ft. Gravel with sand, d, strong H/C odor th	river gravel, light gray, roughout	
25		СВ	4.4			23.4-25. 25.3-26.	ft. Sandy clay, light b 3 ft. Silty clay, light b 7 ft. Clay, light gray, 4 ft. Clay and caliche	rown	
30		СВ	2.5		CL		Silty clay with calich gray, slight odor, very	e clay, chalk color with trac stiff, crumbly	се
35		СВ	4.8					th white caliche streaks, caliche inclusions, very stil	ff
avoff96\11-19-96\nof96-22a.bor 4 0 6		СВ	5					light gray, green caliche cottom, slight H/C odor	
136/11	11//	Ц	-1	<u> </u>	<u> </u>	Notes:			
45	1					Boring 9	96-22a located along	west side of dirt farm road	.44

340 ft. south of the concrete lined channel (which is south of well KWB-10). At completion, drillers plugged back hole with cuttings. H/C = Petroleum hydrocarbon



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

Date Drilled

: 11/22/96

**Drilling Method** 

: Hollow Stem Auger

Time Start, Finish Transect & Location

: 1230, 1400 : #39, 950 ft. South Drill Equipment Drilled By

: Ingersoll-Rand A-300 : Atkins Eng. Assoc.

	N	avajo Re					Transect & Location Hole Diameter	: #39, 950 ft. South : 6 inch	Drilled By Logged By	: Atkins Eng. Assoc. : D.G. Boyer
		Artesia	, New M	lexico	· —	Campala				
Depth in Feet	Samples	Sample From:	Recvy.	GRAPHIC	nscs		Condition: emoulded indisturbed ost lock Core	Sample From: SS Split Spoon ST Shelby Tube CT Auger Cuttings CB 5 ft. Core Barrel		
5		ст			CL	0-9 ft. C	uttings, clay			
10		СВ	5			streaks, 10.6-12. color at	root at 10.4 ft. 4 ft. Silty clay, black, 12.4, slightly moist	ith occassional caliche  H/C odor, becoming lig		
15	1	СВ	5		CL	14-15.4 15.4-17. 17.7-18.	ft. Silty clay, gray, st ft. Silty clay, gray, st ft. Silty clay, black g ft. Silty clay, gray, ft. Silty clay, gray to	r. Drillers note water at rong H/C odor, dry H/C odor, dry black at tip, dry	~13.5 ft.	
20	1	СВ	5	a.o.o.	GW	water ar	nd hydrocarbon, grav	ed, sandy, saturated wit els to 2 in., black black, hard, strong H/C		
25	1	СВ	3.2		CL		. Silty clay, black to I			
30	1		1			950 ft. s of the c	outh of the concrete	southwest of well KWB lined channel, and 650 th of KWB-10. At comp ith cuttings.	ft. west	
	4					U/O = 0	letenia um budenasebe	<b>.</b>		

H/C = Petroleum hydrocarbon

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(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

Date Drilled Time Start, Finish : 11/22/96 : 1415, 1500 **Drilling Method** Drill Equipment : Hollow Stem Auger : Ingersoll-Rand A-300 : Atkins Eng. Assoc.

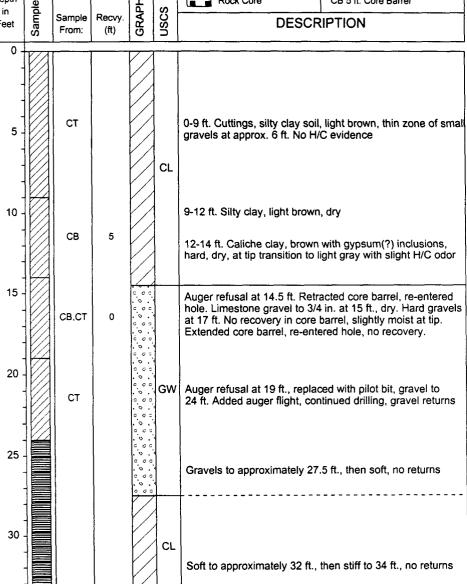
Transect & Location Navajo Refining Company

: #45, 115 ft. South Hole Diameter : 6 inch

**Drilled By** Logged By

: D.G. Boyer

Artesia, New Mexico Sample Condition: Sample From: Remoulded SS Split Spoon Undisturbed ST Shelby Tube **CT Auger Cuttings** Lost GRAPHIC Depth Rock Core CB 5 ft. Core Barrel USCS Sample Recvy. **DESCRIPTION** Feet From: (ft)



Notes:

Boring 96-24 located in field southwest of well KWB-10, 115 ft. south of the refinery security fence, and 1,550 ft. west of the corner fence post south of KWB-10. At completion, drillers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

Date Drilled

: 05/08/97 : 1400, 1700 **Drilling Method** 

: Hollow Stem Auger

**EM Survey Verification** Navajo Refining Company

Time Start, Finish Transect & Location

**Drill Equipment** : #30, 880 ft. South Drilled By

: Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Hole Diameter

Artesia, New Mexico

: 6 inch

Logged By : D.G. Boyer

Depth in Feet	Samples	Sample From:	Recvy.	GRAPHIC	nscs	Sample Condition:  Remoulded  Undisturbed  Lost  Rock Core	Sample From: SS Split Spoon ST Shelby Tube CT Auger Cuttings CB 5 ft. Core Barrel
<del></del>	0,		(**)			L	

5 - 10 - 15 - 15 - 15 - 1		СТ		CL	0-16 ft. Silty clay, brown 16-18 ft. Clay, gray-black, moist, H/C odor
20 -		СВ	4.6	SP GC	18-18.8 ft. Silty clay, gray black, H/C odor 18.8-20.8 ft. Silty clay, brown, slight odor, sandy at base 20.8-21.7 ft. Sand, fine-grained, some clay 21.7-22.5 ft. Gravel with sand and clay, angular fragments (from drilling?)
25 - -		СВ	2.9	SP	23-23.5 ft. Sand, fine-grained, light brown, slight H/C odor 25.5-28 ft. Clay, chalk-color, caliche gravels, no odor
30 -		СВ	2.5		Rock in tip, no recovery 28-33 ft.; no recovery 33-38 ft. Moved north 10 ft. and drilled to 28-38 feet.  From new hole: 28-33 ft. Clay, light brown, stiff, occassional rock, dry, sand at top (slough)
35 - -		СВ	3.6	CL	33-36 ft. Clay, light brown with white streaks, very stiff, crumbly 36-38 ft. Clay, white, damp, plastic
40 - - -		СВ	4.8		From original hole: 38-43 ft. Clay, brown with white streaks and occassional gravel, no odor, large single gravel at top of core
_	]				Notes:

Notes:

Boring 96-25 located in field southwest of well KWB-1, 880 ft. south of the concrete lined channel, and 390 ft. west of the corner fence post south of KWB-1. Left hole open; hole caved to 11 ft. on 05/09. Drillers plugged back hole with cuttings. H/C = Petroleum hydrocarbon

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(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

Date Drilled

: 05/09/97

Drilling Method

: Hollow Stem Auger

Time Start, Finish Transect & Location : 0600, 0800 : #29, 1,180 ft. South Drill Equipment Drilled By

: Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Logged By

: D.G. Boyer

Navajo Refining Company Hole Diameter : 6 inch Artesia, New Mexico Sample Condition: Sample From: Remoulded SS Split Spoon Undisturbed ST Shelby Tube **CT Auger Cuttings** Lost GRAPHIC Depth Rock Core CB 5 ft. Core Barrel Samples USCS Recvy. Sample DESCRIPTION Feet From: (ft) 0 CT 0-13 ft. from cuttings. 10 12 ft. Clay, dark black, strong H/C odor 13-18 ft. No recovery, blue H/C clay in tip. Probable thin permeable zone with  $\mbox{H/C}$ 15 СВ 0 18-19.6 ft. Clay with some silt, blue gray, strong H/C odor CL 19.6-23 ft. Same as above, but becoming lighter, some 20 CB 5 caliche streaks. 23 ft. Clay, chalk color but light blue in spots, occassional gravel, very stiff, H/C odor. 25 CB 3.8 25 ft. Clay, crumbly, chalk color but becoming brown at tip, water in top of core barrel 30 ft. Caliche clay, chalk colored, hard to drill, saturated in 30 CB 1.8 core barrel, slight odor (from water?) 33-37.3 ft. Caliche clay, saturated, chalk color with some sand and gravel, very plastic 35 CB 5 37.3-38 ft. Clay, light brown, some silt, very plastic, stiff, no odor 38-43 ft. Clayey sand with silt, light brown, very fine 40 СВ 1.5 grained, no odor 45 43-48 ft. Drilling chatter, gravels, no recovery in core -GC CB 0 completely empty, outside sandy

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Boring 96-26 located in field southwest of well KWB-1, 1,880 ft. south of the concrete lined channel, and 240 ft. west of the corner fence post south of KWB-1. Left hole open; water at 14.7 ft. at 1150, product too small to measure. Drillers plugged back hole with cuttings. H/C = Petroleum hydrocarbon



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

Date Drilled

: 05/08/97 : 1025, --

**Drilling Method** 

: Hollow Stem Auger

**EM Survey Verification** 

Recvy.

(ft)

Sample

From:

Depth

Feet

Time Start, Finish Transect & Location Drill Equipment Drilled By

: Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Navajo Refining Company Hole Diameter

uscs

: 6 inch

: #33, 130 ft. South

CB 5 ft. Core Barrel

Logged By

: D.G. Boyer

Artesia, New Mexico Sample Condition: Sample From: Remoulded SS Split Spoon Undisturbed ST Shelby Tube Lost **CT Auger Cuttings** GRAPHIC

Rock Core

**DESCRIPTION** 

- - -					ML	Clayey silt, brown, no odor
_ ]					CL	Silty clay, light brown, slightly moist
5 -		СТ		909 909 909	GC	5-8 ft. Clayey gravel, dry, gravels to 1.5 in., most 1/2-3/4 in., no H/C odor.
4				909		11-13 ft. Gravels to cobble size
15 -		СВ	5		CL	13-13.3 ft. Silty clay, gray, strong H/C odor 13.3-14.8 ft. Clay, stiff, brown, slight H/C odor 14.8-15.6 ft. Gravelly clay, dark gray, small pebbles, H/C odor and product
20 -		СВ	3.7			15.6-17.1 ft. Silty clay, becoming light gray at base. 17.1-18 ft. Silty clay, dark gray, stiff, H/C odor 19.5-21 ft. Clay, blue-gray color, stiff, very plastic
				[-[-]- - [-]-	CA	21-23 ft. Clay and caliche, white, slight odor, saturated
25 -		СВ	1.5			23-28 ft. Hard drilling in clay, core recessed even with bit Clay, white slight odor, some pea-sized caliche pebbles
30 -		СВ	3.6			28-28.5 ft. Clay and caliche clay 28.5-33 ft. Clay, brown, stiff to very stiff, no odor, occassional small gravel and white streaks.
35 -			0		CL	33-38 ft. Ran with core even with bit. Gravel in clay in tip, no other recovery, soft at 36 ft, heard some gravel chatter while drilling
40 -		СВ	4.5			38-43 ft. Clay, brown with white streaks, with frequent large river gravel pieces, very stiff, very plastic, only slightly moist in places, mostly dry and crumbly
-		<b>.</b>	·	-1//		Notes: Boring 96-27 located in field southwest of well KWB-1,
45	}					boing to L. located in held continuous of mon (type-1)

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130 ft. south of the concrete lined channel, and 840 ft. west of the corner fence post south of KWB-1. Left hole open; water at 9.7 ft. at 1130 (but hole may have caved), product on probe but too small to measure. Drillers plugged back hole with cuttings. H/C = Petroleum hydrocarbon



(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

Date Drilled

: 05/07/97 : 1115, --

**Drilling Method Drill Equipment**  : Hollow Stem Auger : Ingersoll-Rand A-300

Time Start, Finish Navajo Refining Company

Transect & Location Hole Diameter

: S. of KWB-11A : 6 inch

Sample From:

Drilled By Logged By : Atkins Eng. Assoc. : D.G. Boyer

Artesia, New Mexico

Sample Condition: Remoulded Undisturbed

Lost

SS Split Spoon

ST Shelby Tube **CT Auger Cuttings** 

De Fe

epth in	səles			툿	· (c)	Rock Core	CB 5 ft. Core Barrel	
eet	Samples	Sample From:	Recvy. (ft)	GRAPHI	nscs	DESCR	IPTION	
0 - -					ML	Clayey silt, brown, becoming plastic, no odor	silty clay at base, damp,	
5 -	СТ					Silty clay, light brown to white	e at base	
10 -		СТ	0			No core barrel recovery, from cuttings: Silty clay, dry, caliche streaks, no odor		
15 -		СВ	4		Silty clay, brown, dry, crumbly, white streaks light gray at base. Thin caliche zone (< 0.5 in		y, white streaks, becoming the zone (< 0.5 in.) at 15 ft.	
20 -		СВ	3.4		CL	18-19.4 ft. Silty clay, occassion 19.4-20.5 ft. As above, increase 20.5-23 ft. Gravelly clay, lime Saturated at 22-23 ft.	asing gravel	
25 -		СВ	5			23-24.6 ft. Clay with gravel, b 24.6-28 ft. Clay, occassional occassional iron staining on g 2 in. thick @ 25.5 ft., clay col	gravel, mostly dry, gravel, gravely clay zone,	
30 -		СВ	5			28-28.6 ft. Clay, light brown, 28.6-31.4 ft. Clay, as above, 31.4-33 ft. Silty clay, brown, 6 31.6 ft., no H/C odor	caliche gravel @ 31 ft.	
35 -		СВ	5			with depth. Large gravel at 30		
40		СВ	2	9/09	ML CL GC	<del> </del>	t I, no H/C odor. stone gravels, occ. H/C odor	
			0			40-43 ft. Drilled with straight no H/C seen	auger, no cobbles, no recovery	
45		65			SM	43-45 ft. Silty sand and sand	y silt, brown	
		СВ	2		CL	45-50.8 ft. Clay, brown, satur occassional gravel, only sligh	rated at top moist at bottom, ntly moist	
50		СВ	3.6		₽ P.A	50.8-51.2 ft. Caliche, white, I	nard, dry	
	+ 12/1				, ,,,,	Notes:		

Notes:

Boring 97-01 located 100 ft. south of KWB-11A in Chase pecan grove. DTW 17.8 ft., no H/C product at 0800 5/8/97. Drillers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon

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(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

Date Drilled

: 05/07/97

Drilling Method

: Hollow Stem Auger

**EM Survey Verification** 

Time Start, Finish Transect & Location

: 1530, 1800 Drill Equipment : N. of KWB-11A Drilled By

: Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Hole Diameter Artesia, New Mexico

Navajo Refining Company

: 6 inch

Logged By

: D.G. Boyer

		Aitesia	, 1404 14	ICAICC					
						Sample Condition:	Sample From:		
						Remoulded	SS Split Spoon		
			1			Undisturbed	ST Shelby Tube		
				,,		Lost	CT Auger Cuttings		
Depth	es			\f		Rock Core	CB 5 ft. Core Barrel		
in Feet	Samples	Sample From:	Recvy.	GRAPHIC	nscs	DESCR	RIPTION		
0 -	<del>"</del>	<u></u>	L /						
1 -									
				Y/J					
٠ .				Y/		0-8 ft. Silty clay, light brown,	some pebbles on auger		
5 -									
	$\mathbb{R}^{1}$								
		Į							
10 -	11///					8-13 ft. Silty clay, lighter colo	r than above		
		СТ			CL				
	$\  \langle \rangle \ $			//					
15		İ	}	//		13-18 ft. Silty clay, light brown			
						, ,, ,			
				1/	1				
20 -	11///		ł	Y/		18-23 ft. Silty clay, lighter color, saturated at 22 ft.			
20				Y/		10-23 it. Sitty Clay, lighter Col	or, saturated at 22 ft.		
	12	1	ļ	Y/		23-24 ft. Clay, light brown, dr	v		
				1-	ML	24-25 ft. Clayey silt, light bro	′		
25	1///	СВ	4	1		25-28 ft. Clay, light brown wil			
	11//				1	H/C odor			
		}		//	1		1		
30 -	11//	СВ	5	1/	1	28-33 ft. Caliche clay, brown	and white, dry		
		)		V/	CL				
	11//	1		//	"-	33-38 ft. Clay, brown with wh	site etracke eggessional		
35	11//	СВ	3.8	V/	1	gravel; clay hard, dense, dry			
	11//	CB	3.6	Y/	1	gravel lens at 36 ft., no H/C o			
	1//4				]	38-39.5 ft. Clay, as above, so	ome silt		
40	11//			14	GC	39.5-40 ft. Gravelly clay to cl	ayey gravel, saturated		
40	16/	СВ	5		ML	40-42 ft. Clayey silt, slightly	plastic		
	100				CL	42-43 ft. Clay, brown with str	eaks, stiff, slightly moist		
	][[]			, , ,	SP		ne grained, saturated, no odor, k brown, pea-sized gravel @ 4#		
45		СВ	3.6		1	44.1-46.6 ft. Clay, brown, inc	creasing black flecks		
ĺ	18//			1/	CL		C odor. Auger refusal at 46 ft.,		
	11/1			1//	1	adjusted bit and re-entered h 48-49.5 ft. Gravelly clay, sati	noie. urated, gravels angular, broken		
50	18//	СВ	5		ML	49.5-50.7 ft. Clayey silt, light			
	1				CL	50.7-53 ft. Silty clay, light bro	own, becoming harder with dept		
	1	·			•	Notes:			

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Boring 97-02 located 100 ft. north of KWB-11A in Chase pecan grove. At 0730 5/8/97, TD 47.7 ft, DTW 16.9 ft., no H/C product. Drillers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon



#### LOG OF BORING OS 97-03

(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study

Date Drilled

: 05/08/97 : 0600, 0800 Drilling Method

: Hollow Stem Auger

**EM Survey Verification** 

Time Start, Finish Transect & Location : N. of KWB-11A

Drill Equipment Drilled By

: Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Navajo Refining Company

Logged By

: D.G. Boyer

		Artesia	, New M	lexico	)		Hole Diameter	: 6 inch	Logg
	[					Sample	Condition:	Sample From	:
i						⊠ R	emoulded	SS Split Spoon	ľ
	}		ĺ			ZZZ U	ndisturbed	ST Shelby Tube	
ļ	ļ	ļ	ļ	١.,			ost	CT Auger Cuttir	ngs
Depth	S	-	1	呈		R	ock Core	CB 5 ft. Core Ba	arrel
in	Samples	Sample	Recvy.	SRAPHIC	nscs		DEC	CDIDTION	
Feet	Sai	From:	(ft)	GR.	S		DES	CRIPTION	}
0 -	7//	· · · · · · · · · · · · · · · · · · ·		//	1				
] -			ļ						İ
-	16/2		1	//					
5 -		•		//	1				1
-		ļ	ļ	//	1				
-	11//		1	V/	1				
1 ]		}	1	Y/	1				
10 -	11///	ļ	1	V/	1	ļ			
-	1///			Y/	]				
] ]		Ì	1	Y/	]	]			
	16/7	СТ	1	Y/.	CL	Silty clay	, brown, stiff		į.
15 -				Y/.					
] -				ľ/,					
-	11//					1			
20	11//				1				
	11//				1	Clay, wh	ite, moist, very s	oft and plastic	
} .	11//				1				
	11//				1				
25 -	18/	ļ			1				
} '	11//	1	Ì	//	1	)			
	][//	}		60%	—	20 20 2	ft. Crovelly elsy	araval to 1 in	
1 20	11//		İ	25,3	ac		ft. Gravelly clay,		
30		СВ	5	Y/	CL	I \	6 ft. Clayey grave	own w/white streak	- Some sand
	-1//	}	}	<del>////</del>	sc			ight gray, sand fine	
	184			1	SP	∖grained,	no H/C odor, 3 ir	n. gravel at tip	10 voly 11110-
35	][//	00	_		GP	٦١ <sup>-</sup>		n, fine grained, son	ne clay
<b>\</b>	11//	СВ	3	2/03	GC	34-35.5	ft. River gravel w	ith sand, some clay	
	12			9/09	100	no H/C			/
	1			• •	1	35.5-38	tt. Clayey gravel, k brown to black	gravel angular (fra- some H/C and/or s	ctured),
40	11//	СВ	2		GP	large riv	er gravel rock in	core barrel tip	,
	][//		-			38-43 ft.	Gravel, poorly s	orted, gravel stuck i	
	11/			•••	-	slight H/	C odor, strong se	eptic odor, sand (slo	ough) 38-38.5 ft
45	1		]	1/	1	Clay br	own very stiff dr	y, no H/C odor. Cal	iche zone at
43	1///	СВ	5	1/	CL	45 ft. (w	ith small gravel)	and at 47.8 ft. White	
	11//			1/	1	from 44.	5 to45 ft.		
45	+		•	<del></del>		Notes:			
50	1					Boring (	17_03 located 250	ft. north of KWB-1	1A in Chase
	]					pecan g	rove. At 0810 5/	B/97, TD 47.7 ft, DT	W 17 ft., no H/C
	1					product.	Drillers plugged	back hole with cut	tings.
1									

H/C = Petroleum hydrocarbon

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#### LOG OF BORING OS 97-04

(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study EM Survey Verification

Date Drilled

: 05/09/97

Drilling Method

: Hollow Stem Auger

EM Survey Verification

Navajo Refining Company

Time Start, Finish Transect & Location : 0900, - Drill Equipment : S. of KWB-8 Drilled By : Ingersoll-Rand A-300 : Atkins Eng. Assoc.

Hole Diameter

: 6 inch

Logged By : D.G. Boyer

		Artesia	, New M	lexico	)		ameter	; 6 Inch
		T .				Sample Conditio	n:	Sample From:
						Remoulded		SS Split Spoon
						Undisturbed	ı	ST Shelby Tube
				ပ		Lost		CT Auger Cuttings
Depth	es		 	Ĭ	· · ·	Rock Core		CB 5 ft. Core Barrel
in Feet	amb	Sample	Recvy.	RA	SSS		DESCR	IPTION

Feet	Samp	Sample From:	Recvy. (ft)	GRA	nsc	DESCRIPTION
0 -	777			7		
5 -		ст			CL	
- - 15 - -		СВ	4.7			13 ft. Hydrocarbon in clay cuttings 13-14.5 ft. Clay, light brown, occassional gravel, occ. caliche zone, stiff, very plastic, H/C odor 14.5-18 ft. Clay, light brown, becoming gray with depth, more frequent caliche, strong H/C odor
20 - - -		CB	1.7			18-23 ft. Gravelly clay with silt, light gray, some brown gravels to 2.5 in., saturated with product
25 -		СВ	1.3	5 0 a	GW	23-27 ft. Gravels, sized from 0.5 in. to river rock, rock jammed in tip. Heavy drill chatter 26-27 ft., "out of gravel at 27 ft." from Driller
				7.7	SC	27-28.2 ft. Clayey sand, very fine grained, brown
30 -		СВ	3.7		CL	28.2 -29 ft. Silty clay, brown, some gray color 29-31 ft. Clay, light brown, stiff
					sc	31-33.4 ft. Clayey sand, light brown, very fine grained becoming medium grained at 33ft, saturated.
35 -		60			CL	33.4-33.8 ft. Silty clay, some sand 33.8-35.2 ft. Silty clay
•		СВ	3.4		sw <del>Sp</del>	35.2-35.7 ft. Clayey sand, fine and medium grained 35.7-38 ft. Sand, brown, fine grained with some clay, H/C odor (odor residual from core barrel?)
40		СВ	1.8		CA	\(\) 38-38.5 ft. Caliche and gravels, chalk color \(\) 38.5-39.1 ft. Clayey sand, light brown, very fine grained \(\) 39.1-43 ft. Caliche rock with gravels, H/C odor (from core barrel?)
						Notes:
45	-					Boring 97-04 located in Chase pecan grove along a N-S line

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Boring 97-04 located in Chase pecan grove along a N-S line 21 ft. east of KWB-8 and 300 ft. north of Highway 82 fence. At completion, depth to product 18.1 ft., depth to water 18.3 ft. Drillers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon



#### LOG OF BORING OS 97-05

(Page 1 of 1)

Offsite Borings 1996 Hydrocarbon Study **EM Survey Verification** 

Date Drilled : 05/09/97

**Drilling Method** 

: Hollow Stem Auger

Navajo Refining Company

Time Start, Finish Transect & Location

: 1500, --: 50 E of #35, 750 S

Drill Equipment Drilled By

: Ingersoll-Rand A-300 Atkins Eng. Assoc.

Hole Diameter

Artesia, New Mexico

: 6 inch

Logged By

: D.G. Boyer

Sample Condition: Sample From: Remoulded SS Split Spoon Undisturbed ST Shelby Tube CT Auger Cuttings Lost Depth 🙎 CB 5 ft. Core Barrel

Depth	les			품	(n	Rock Core	CB 5 ft. Core Barrel
in Feet	Samples	Sample From:	Recvy. (ft)	GRAPH	nscs	DESCR	IPTION
0 -	V 7 A	1		17 /	1		
- - -							
5 - - -		ст				0-13 ft. Cuttings. Silty clay, brown	
- 10 - -					CL	Clay, blue gray, H/C odor	
15 .		СВ	5			13-14.4 ft. Clay, light gray, ve 14.4-16.8 ft. Clay, brown, cal 16.8-18 ft. Clay, dark gray, ca	cite or gypsum crystals
20		СВ	4.7		CA CL	18-19.9 ft. Sandy, silty clay, sand, light gray, strong H/C of 19.9-21.8 ft. Silty clay, light government (21.8-22 ft. Caliche zone, which is 22-23 ft. Clay, brown, crystal)	odor gray to light brown te, small caliche gravel
25		СВ	4.1		CL CL CL		chalk color, soft, slight odor aliche gravels, light gray to urge caliche gravel, crumbly
	1 <i>VZ</i> 4	<u> </u>		<u>r_/</u>	1	Notes:	

Boring 97-05 located along west side of dirt farm road, 750 ft. south of the concrete lined channel (which is south of well KWB-10). At completion, DTW 15.4 ft., product TSTM. Drillers plugged back hole with cuttings.

H/C = Petroleum hydrocarbon

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Moniter Wells

**Monitor Wells** 

S Design Specification	3351.07 2 3349.10 4	Coordinates: X 5171.71 Y 5193.86  Type of Casing: \times PVC Sched. 40 Flush Thread  Stainless Steel	Casing Diameter: ⊠ 2" ☐ 3" ☐ 4" ☐ 6" ☐	Screen Style: Machine Slot Wire Wrap	Bentonite Seal: ☐1/2" Pellets ☐ Hole Plug ☐ Slurry ☐ ☐ 1/4" Pellets ☐	Grout Type: Portland Weight:	ION ENG	Date: FEBRUARY 11	92 14.7 3336.4 July 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 11:00 pt 1	3/10/92 14.5 3336.2		Comments: Concrete with 5% bentonite used to grout			FE KWBES	KWB1A KWB1A	Project: 622092001—237 (1A)   Location: ARTESIA, NEW MEXICO
Mor j Well Piezometer	3			1	A A A A A A A A A A A A A A A A A A A	* * * * * * * * * * * * * * * * * * *	**************************************	* * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * * *	13.5	180		:::::: !!!!!!!! ::::::::	32.0	C777	Depths in Feet	from Ground Surface (Not to Scale)
Geologic Description	SANDY CLAY, dark brown, with roots.	SANDY CLAY, brown, dry to moist, lighter in color with increasing depth, white caliche pebbles showing up at	9-10 feet, occasional pockets of fine white sand.	CLAY, reddish brown, moist, some caliche pebbles and sand pockets.	SANDY CLAY, brown and white, saturated increasing pebble content.	GRAVEL, 1 to 2" rocks, saturated.	SANDY CLAY, brown and white, moist dry, pebble content decreasing with depth.	TD = 32.5'				5 foot core barrel recovery system used as sampling technique					by Tube   SS=Split Spoon   C=Cuttings
Other(f)	- 2 0-2'	- 4 2-14' - 6	- 8	- 12   14–20' - 14	- 16 20-22'	- 18   22–23° .	- 22   23–32:5' . - 24	- 26	- 28	- 30	- 32	NOTE:					- ST=Shelby Tube
dd) Jd Jd Jd Jd								<b> </b>			1			†			

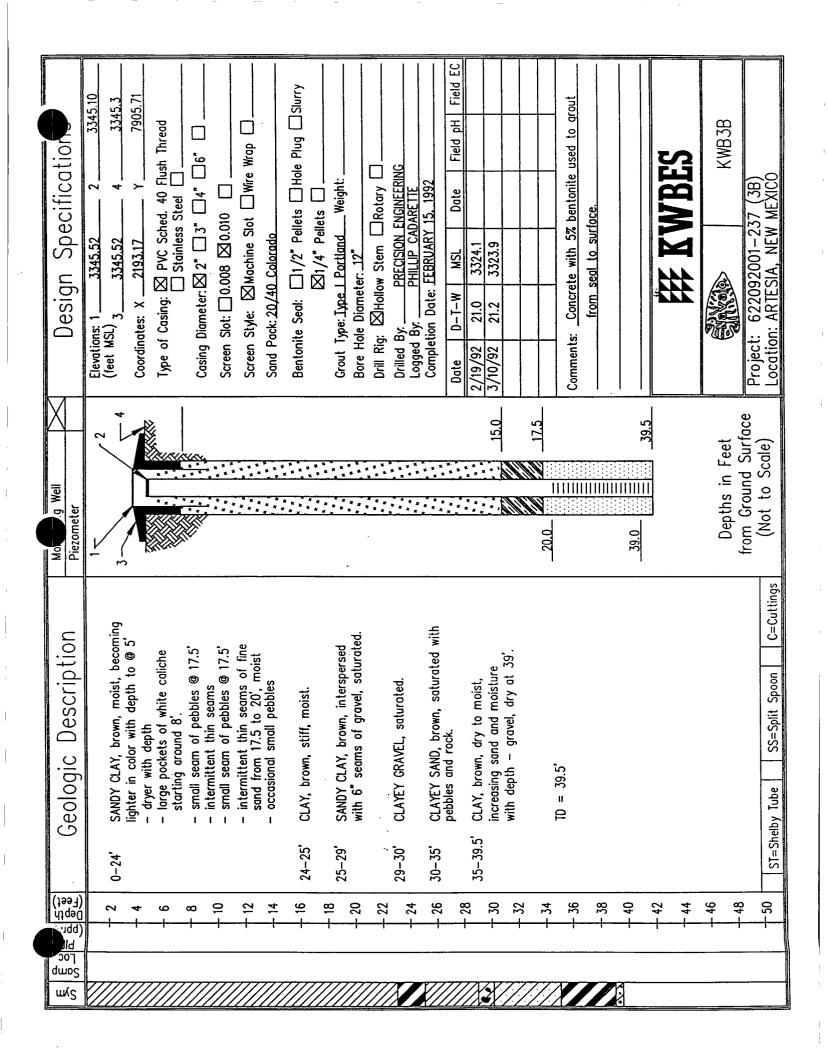
S Design Specification	2	Coordinates: X 5172.42 Y 5181.92  Type of Casing: \( \text{Normal PVC Sched. 40 Flush Thread} \)	Casing Diameter: \( \sum_2^2  \text{37} \text{ \text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tint{\tint{\tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tin}\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\texi}\text{\text{\text{\texi}\text{\text{\texi}\tint{\tin}\tinth{\text{\texi}\text{\text{\text{\text{\text{\text{\ti	Screen Style: Machine Stot Wire Wrap	Bentonite Seal: \$\infty\$1/2" Pellets \$\infty\$Hole Plug \$\infty\$Slurry\$\$\infty\$1/4" Pellets \$\infty\$	Grout Type: Partland Weight:	Drilled By. PRECISION ENGINEERING	Completion Date: FEBRUARY 15, 1992	M-1-0	2/19/92 14.4 3336.4 3/10/92 14.5 3336.3			Comments: Concrete with 5% bentonite used to grout	from seal to surface.		# KWBES		KWB1B KWB1B	e Project: 622092001—237 (1B) Location: ARTESIA, NEW MEXICO
Monney Well	3			*****	**************************************		**************************************	*	* * * * * * * * * * * * * * * * * * *	3.8		18.0		::::: 		32.5	32.5	Depths in Feet	from Ground Surtace (Not to Scale)
Geologic Description	SANDY CLAY, dark brown, with roots.	SANDY CLAY, brown, dry to moist, lighter in color with increasing depth, white coliche peoples showing in at	white sand.	CLAY, reddish brown, moist, some caliche pebbles and sand pockets.	SANDY CLAY, brown and white, saturated, increasing pebble content.	GRAVEL, 1 to 2" rocks, saturated.	SANDY CLAY, brown and white, moist to dry, pebble content decreasing with depth.	10 = 32.5'	1								,		by Tube SS=Split Spoon C=Cuttings
opm epth (feet)	- 2 0-2'	+ 4 2-14' + 6	8 + + 10	+ 12   14-20° + 14	+ 16 20-22'	$\begin{array}{c c} + 18 & 22-23' \\ \hline + 20 & 22-23' \end{array}$	22 23–32.5'	+ 7 <sub>6</sub> + 7 <sub>6</sub>	<del>  28  </del>	_ <u>-</u> 30	+32		-		-				ST=Shelby Tube
Coc Samp								////								3.88 £ £ £ 3			

	Specifications	2	PVC Sched. 40 Flush Thread Stainless Steel	5" \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \( \times \) \(	lot   Wire Wrap   Sand 20/40	llets Landweight:		Indineering	Date Field pH Field EC		ock to 50 feet before		2142	<b>LWBES</b>	KWB-1C	622092003–236 , New Mexico
	Design Spe	Elevations: 1 (feet MSL) 3 Coordinates: X		Cosing Diameter: ☐ 2" ☐ 3"	Screen Style: Machine Stot Wire Wrap [ Sand Pack: Calarado Silica Sand 20/40 Bentonite Sent: 1717, Pellete Hole Plun	Grout Twoe: Portland /5% BentonWeight:	Bore Hole Diameter: 13.5"	Drill Kig: IXHallow Stem L. Motary I Drilled By: Precision Engineering Logged By: PWC Completion Date: 09/22/92	Date D-T-W MSL		Comments: Boring plugged back to	well set	11.	V 222		Project: Navajo 62209 Location: Artesia, New
	Monitoring Well Piezometer	3	7.0							24.5	30.5		49.5	009	Depths in Feet	from Ground Surface (Not to Scale)
	Geologic Description	SANDY CLAY, dark brown to brown, moist, plastic.	CLAYEY SAND, brown to tan, moist to slightly moist, friable.	SANDY CLAY, brown, moist, friable to firm, occasioal fragments fo claiche grovel, angular	CLAY, brown, moist, plastic, thin gravel seam @ 17', saturated, gypsum crystals throughout clay.	SILTY CLAY, brown to white, saturated from 20-23', very maist to maist 23-25'.	SILT, brown to white, saturated.	SILTY CLAY, brown to white, moist with thin intermittent seams fo caliche pebbles, saturoted.	SANDY CLAY, brown, moist, plastic.	GRAVEL, CLAY, SILT MIX, saturated clay lenses with saturated pebble seams throughout.	SANDY CLAY, brown to white, slightly moist, stiff.	CLAY, brown, moist with saturated pebble seams throughout	CLAY, brown, slightly moist, stiff.	10 = 60.0'	CME 5' core barrel recovery system	y Tube SS=Split Spoon C=Cuttings
Ð	(1997) (Feet)	3 0-2' S + 6 P	- 9 2-6° C	6-14'	18 14-20' C	20-25'	25-28'	+ 33   28-32' S + 36   11 + 39   8	42 32-33' S	45 33-44° G	+ 51   44-45' S - 54   s	57   45–59' C	29-60	-	<del></del>	ST=Shelby Tube
	mys Loc Somp Somp															

Specification Design Specification	Elevations: 1 33 (feet MSL) 3 336 (feet MSL) 3 336 (feet MSL) 3 336 Coordinates: X 165 Coordinates: X 165 Coordinates: X 165 Cosing Diameter: X 2 Casing Diameter: X 2 Casing Diameter: X 2 Casing Diameter: X 2 Casing Diameter: 2 Count Type: Partland Bore Hole Diameter: 2 Drill Rig: X Hollow S Drilled By. PRE Completion Date: EB Completion Date: EB Completion Date: EB 2/19/92 29.0 33 3/10/92 29.3 33 33 3/10/92 29.3 33 33 3/10/92 29.3 33 33 33 3/10/92 29.3 33 33 33 34 20 20 20 20 20 30 30 30 30 30 30 30 30 30 30 30 30 30	Comments: Concrete with 5% bentonite used to grout from seal to surface.  ### KWBES    Project: 622092001-237 (2A)   Continue of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project
Mor. Mell Piezometer	3 - Jacobson 1 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - Jacobson 2 - J	48.5  49.0  Depths in Ferfrom Ground Surface (Not to Scale)
Geologic Description	SANDY CLAY, b becoming lighted decreasing mois fine white calic fine white black stip some black stip some black stip pebbles, rocks sand-clay mix.  SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, fine gra SAND, f	NOTE: 5 foot core barrel recovery system used as sampling technique
/dq/ (1997) (1997)	0-16.5' 16.5-23' 23-29.5' 45-47.5' 47.5-49'	+ 34 + 36 + 40 + 44 + 46 + 48 + 48 + 48
31d	d)	

Design Specifications	Elevations: 1 3366.40 2 3366.26 (feet MSL) 3 3364.12 4 3363.9 Coordinates: X 1646.63 Y 3905.71	Type of Casing:   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless Steel   Stainless St		Screen Style: Machine Slot Wire WrapSand Pack: CSS 16-40	1/2" Pellet 1/4" Pellet	Grout Type: <u>Portland</u> weight:	Drill Rig: MHollow Stem Rectary Corriled By: PRECISION ENGINEERING	Date:	M-1-0	2/19/92 28.9 3337.4 3/10/92 29.2 3337.1			ete with	from seal to surface,		W KWRFC		KWB2B KWB2B	Project: 622092001-237 (2B) Location: ARTESIA, NEW MFXICO
Mon g Well Piezometer	3			****************	**************************************	* * * * * * * * * * * * * * * * * * *	**************************************	* * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * * *	24.5		_29.5				49.0	007	Depths in Feet	from Ground Surface (Not to Scale)
Geologic Description	SANDY CLAY, brown, moist to dry, becoming lighter in color with decreasing moisture, pockets of	fine white caliche (appearing at 14').	CLAY, brown, moist, stiff to plastic, some black stippling.	SANDY CLAY, brown, moist, reaching saturation near 29'.		sand-ciay mix.	SANDY CLAY, brown, moist to dry.				TD = 49.0'								ST=Shelby Tube   SS=Split Spoon X C=Cuttings
(pprident)	2 0-16.5°	9 &	+ 10 16.5-23'	+ 12   23-29.5' + 14   23-29.5'	+ 16   29.5-45' + 18	20 , , ,	+ 22   45-4/.5 47.5-49'	+ 24 + 26	+ 28	30	+32	+ 34	<del> </del> 36	- 38	40	+ 42	+ 44	- 46 - 48 - 48	
ald	1																		

Geologic Description  0-24' SANDY CLAY, brown, moist, becoming lighter in color with depth to @ 5' - dryer with depth to @ 5' - dryer with depth to @ 5' - angle seem of pebbles @ 17.5' - intermittent thin seams of fine sand from 17.5 to 20', moist - small seem of pebbles @ 17.5' - intermittent thin seams of fine sand from 17.5 to 20', moist - occasional small pebbles  24-25' CLAY, brown, stiff, moist.  25-29' SANDY CLAY, brown, interspersed with 6' seams of gravel, saturated.  30-35' CLAYEY SAND, brown, saturated with pebbles and rock.  35-39.5' CLAY brown, dry to moist, increasing sand and moisture with depth - gravel, dry at 39'.  ID = 39.5'  NOTE: 5 foot core recovery system used as sampling technique.	Design Specification	Elevations: 1 3345,49 2 3345,31 (feet MSL) 3 3345,49 4 3345,3 4 Coordinates: X 2183,45 Y 7907.17 Type of Casing: ⊠ PVC Sched. 40 Flush Thread Stainless Steel □	Casing Diameter: \(\times 2" \overline{13" \overline{4" \overline{6" \overline{13" \overline{4" \overline{6" \overline{13" \overline{4" \overline{6" \overline{13" \overline{4" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6" \overline{6"	Bentonite Seal: \$\instruct{1}/2\" Pellets \$\square\$ Hole Plug \$\square\$ Slurry \$\instruct{\text{\$\instruct{\text{\$\square\$}}}}\$  Grout Type: Type   Portland   Weight: \$\square\$ Bore Hole Diameter: \$\text{\$\text{\$\instruct{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\$\text{\$\te	Logged By. PHILIP CADARETTE  Completion Date: FEBRUARY 14, 1992  Date D-T-W MSL Date Field pH Field EC  2/19/92 20.7 3324.6  3/10/92 21.0 3324.3	Comments: Concrete with 5% bentonite used to grout from seal to surface.	KWB3A   KWB3A   Project: 622092001–237 (3A)   Location: ARTESIA, NEW MEXICO
Geologic Description ighter in color with depth to © 5' – dryer with depth – large pockets of white caliche starting around 8' – small seam of pebbles @ 17.5' – intermittent thin seams of fine sand from 17.5 to 20', moist – occasiond small pebbles @ 17.5' – intermittent thin seams of fine sand from 17.5 to 20', moist – occasiond small pebbles @ 17.5' – intermittent thin seams of fine sand from 17.5 to 20', moist – occasiond small pebbles @ 17.5' – clay' brown, stiff, moist.  29-30' CLAY' brown, stiff, moist.  30-35' CLAY' brown, dry to moist, increasing sand and moisture with depth – gravel, dry at 39'.  TD = 39.5'  NOTE: 5 foot core recovery system used as sampling technique.				**************************************			Depths in Feet from Ground Surface (Not to Scale)
				CLAY, b SANDY with 6" CLAYEY	<b>*</b> ~	TD = 39.5' NOTE: 5 foot core recovery system used as sampling technique.	ST=Shelby Tube SS=Split Spoon C=Cuttings
Somp   Pigg	ald i	<del>+ + +</del> 6	+ + + + + + + + + + + + + + + + + + + +	+ 16 + 18 + 20 + 22	73 28 58 74 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	38 + + + + + + + + + + + + + + + + + + +	- 46 - 48 - 50



Somp Somp	Pli (ppr: Depth (Feet)		Geologic Description	Mo 19 Well Piezometer	Design Specification
777	-			1	3368.33 2
777	7 4	0-4.5'	SANDY CLAY, brown, moist to dry,	3 - 4 - 4	3365.81 4 3365.4
W. 7.	- (		becoming lighter in color with decreasing moisture.		- - - - - - - - - - - - - - - - - - -
	o (	, A. A. A. A. A. A. A. A. A. A. A. A. A.	O AVEN CAND From moint		Type of Casing: In Pro Sched. 40 Flush Illiedd  Stainless Steel
777	∞ <del> </del>		CLATET SAND, prown, moist.		Casing Diameter: 2" 3" 🖂 4" 6" 🗆
777	1 0	/-9	SAND, fine grained, brown, moist.	1	Screen Slot: ☐0.008 🖾 0.010
///	+ 12	7–25'	SANDY CLAY, brown, moist, gray	** ** ** ** ** ** ** ** ** ** ** ** **	Screen Style: Machine Stot Wire Wrap
777	+14		at 8', dark gray to black staining	2 2 X	Sand Pack: CSSI 16-40
777	+ 16		from 8–11', strong odor,		Bentonite Seal: \$\infty\$" Pellets \$\infty\$ Hole Plug \$\infty\$ Slurry
	<u></u>		15-16', brown color, gray stain	# # # # # #	⊠1/4" Pellets □
77	2		and odor return at 16', thin pebble	* * * * * * * * * * * * * * * * * * *	Grout Type: Portland Weight:
77	+ 20		bed near 18, black, saturated,	1	Bore Hole Diameter: 12"
	+ 22	•	increasing rock content from 18–25.	**************************************	Drill Rig: MHollow Stem Rotary
777	+ 24	, ,	STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE	x * x x	Drilled By. PRECISION ENGINEERING
		/7-c7	SILIT SANU, Brown, odor.	2 x 1 x 2 x 2 x 3 x 3 x 3 x 3 x 3 x 3 x 3 x 3	Completion Date: FEBRUARY 17, 1992
	+ Z <sub>6</sub>	27–30'	SANDY CLAY, gray to brown, moist.	E E E	To the in the last of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the position of the posi
777	+ 28	,		4 X X	
777	- 1	30-35	CLAYEY SAND, dark gray, grossly	<b>-</b> -	7,19/9/ 24.2
77	તુ 		contaminated, no structure, saturated.	15.0	7.10/32 24.0
-/-/	+ 32	35-39.5	SANDY CLAY, brown, moist to dry.		
·	+34			20.0	
7877	+ 36	-	TD = 39.5		Comments: Concrete with 5% bentonite used to grout
777	+ 38				from seal to surface.
77	+ 40				
		NOTE: 5	5 foot core borrel recovery system	39.0	
	+ 45		used as sampling technique	39.5	ET TAIDEC
	+ 44			25	AA DADES
	+ 46			28.2	MAN AMBA
	+ 48			Depths in Feet	
	- 20	CT=Chelby Tube	SS=Split Spoop	from Ground Surface (Not to Scale)	Project: 622092001-237 (KWB4)
			111do00		

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Toc Zamb Zamb	202 PIP (ppn (beth (feet)	Geologic Description	Mon g Well Piezometer	Design Specifications
			72	Elevations: 1 3363.02 2 3362.87
	<del>+</del> 5	0-9' SANDY CLAY, brown, moist	3 defect	t MSL) 3360.92 43360.6
///	+	to dry, becoming lighter in color		Coordinates: X2928.10 Y 4245.94
	9		Type	Type of Casing: X PVC Sched. 40 Flush Thread
///	∞ +	9-10' CLAY, brown, moist.	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Stein Dismater (X) 2"   1"   1"   1"   1"   1"   1"   1"
	10	10-15' SANDY CLAY, brown, dry to moist, aray hydrocarbon staining starting	Scree	1
///	+ 12	at 14.	Scree	Screen Style: Machine Slot Wire Wrap
	+ 14	15-29' CLAYEY SAND, gray staining with	Sand	Sand Pack: CSSI 16-40
X//	+ 16	strong hydrocarbon smell, dry to moist.	Bentc	Bentonite Seal: 1/2" Pellets Hole Plug Slurry
//		20.31' SANDV CLAV prov staining strong	* * * * * * * * * * * * * * * * * * *	⊠1/4" Pellets □
//	2 8	23-31 SANDI OLAT, gray straing, straing odor, moist.	Grout	Grout Type: Partland Weight:
//	07 +		Bore	- [1
//	+ 22	31–38' SATURATED SILT, brown, strong	- III.O	N 된 전 된
77	+ 24		Drille	Drilled By: PRECISION ENGINEERING
//	- <del>-</del>	38-39.5' CLAY, brown, stiff, dry.	Comp	Completion Date: FEBRUARY 11, 1992
//			Date	D-T-P MSL D-T-W Field pH Field EC
7	+ 28		2/19/92	
	1		3/10/92	9 9775 7 7 7 6
	3 2	TD = 39.2'	<u> </u>	0.000
	70		22.0	
	<del> </del>			
	+ 36		Comments:	ı
<b>=</b> 7/	+ 38			from sed to ground surface.
	+ 40			
	+ 42		38.7	בע בוועם בע
	+ 44	NOTE: 5 foot core barrel recovery system		THE DIM BED
	46	used as sampling technique	7.60	KWR5
	+ 48			SILINA TE STORE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE ST
	+ 20	ST-Shelly Tuke   SS-Shlit Snoon   C=Cuttings	(Not to Scale)	Project: 622092001-237 (KWB5)

Geologic Description  O-5' SANDY CLAY, brown, moist to dry, becoming lighter in color with decreasing moisture.  5-13' SANDY CLAY, brown, dry to moist.  13-15' CLAY dark brown, dry to moist.  15-29' CLAYEY SAND, brown, moist, slight groy discolaration starting at 16.5', black and gray hydrocarbon staining from 17-20', thin grovel loyers at 18', discolaration lessening with depth, brown clayey sand alternating with thin bonds of grovel starting at 20'.  35-36' CLAYEY SLI, brown to tan, saturated.  36-36.5' CLAYEY SLI, brown to tan, saturated.  36-39.5' CLAY, brown, stiff, dry.  TD = 39.5' Soot care barrel recovery system used as sampling technique from Ground Surface Property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of	IL						
0–5' SANDY CLAY, brown, moist to dry, becoming lighter in color with decreasing moisture.  5–13' SANDY CLAY, light brown, dry to moist.  13–15' CLAYE' SNU, brown, dry to moist.  15–29' CLAYE' SNU, brown, moist, slight growel loyers and gray hydrocarbon staining from 17–20', thin grovel loyers and 18' discolaration lessening with depth, brown to taye, sond alternating with depth, brown to taye, sond alternating with GRAYE, tan, saturated.  35–38' SAND with GRAYE, tan, saturated.  11.0 3/35–38' SAND with GRAYE, tan, saturated.	шрс І	Γος	(dd)			omet	Design Specification
5–13' SANDY CLAY, light brown, dry to moist.  13–15' CLAY, dark brown, dry to moist.  15–29' CLAYEY SAND, brown, dry to moist.  15–29' CLAYEY SAND, brown, moist, slight groy discolardion starting at 16.5', black and groy hydrocarbon staining from 17–20', thin grovel loyers of 18, discolardion lessening with depth, brown clayey sand alternating with thin bands of grovel starting at 20'.  35–36' SAND with GRAVEL, tan, saturated.  35–36' SAND with GRAVEL, tan, saturated.  36-36' CLAYEY SILT, brown to tan, saturated.  36-36' SAND with GRAVEL, tan, saturated.  36-36' SAND with GRAVEL, tan, saturated.  36-36' CLAYEND of the covery system and sampling technique as sampling technique.  Depths in Feet from Ground Surface processes and the covery system of the Corle of the Corle of the Corle of the Corle of the Corle of the Corle of the Corle of the Corle of the Corle of the Corle of the Corle of the Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of Corle of	1		+ 2	1	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	No.	Elevations: 1 3358.71 2 3358.55 (feet MSL) 2 3358.55
S-13' SANDY CLAY, light brown, dry to moist.  13-15' CLAY, dark brown, dry to moist.  15-29' CLAYEY SAND, brown, moist, slight groy discolardian starting at 16.5', black and groy hydrocarbon staining from 17-20', thin grovel loyers at 18', discolardian lessanting with thin bands of gravel starting at 20'.  29-35' CLAYEY SILT, brown to tan, saturated.  35-38' SAND with GRAVEL, tan, saturated.  11.0 37.  11.0 37.0  11.0 39.5' Sand with GRAVEL, tan, saturated.  11.0 39.5' as a sampling technique of provery system as a sampling technique of trom Grand Surface of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact of the Contact			4	0-2	SANDY CLAY, brown, moist to dry, becoming lighter in color with		X 2652.58 Y
S-13 SMNDY CLAY, light brown, dry to moist.  13-15' CLAY, dark brown, dry to moist.  15-29' CLAYEY SAND, brown, moist, slight groy discolaration starting at 16.5', black and gray hydrocarbon staining from 17-20', thin grovel loyers at 18', discolaration lessening with depth, brown clayey sand alternating with thin bands of grovel starting at 20'.  29-35' CLAYEY SILT, brown to tan, saturated.  35-38' SAND with GRAVEL, tan, saturated.  36-35' CLAYEY SILT, brown to tan, saturated.  36-36' CLAYEY SILT, brown to tan, saturated.  36-36' CLAYEY SILT, brown to tan, saturated.  36-36' CLAYEY SILT, brown to tan, saturated.  36-36' CLAYEY SILT, brown to tan, saturated.  36-37' CAY, brown, stiff, dry.  TD = 39.5' CLAY, brown, stiff, dry.  TD = 39.5' CLAYEY SILT, dry.  TD = 39.5' CLAYEY SILT, dry.  TD = 39.5' CLAYEY SILT, dry.  TD = 39.5' CLAYEY SILT, dry.  TD = 39.5' CLAYEY SILT, dry.  TD = 39.5' CLAYEY SILT, dry.  TD = 39.5' CLAYEY SILT, dry.  TD = 39.5' CLAYEY SILT, dry.  TD = 39.5' CLAYEY SILT, dry.			9	į	decreasing moisture.		Type of Casing: N PVC Sched. 40 Flush Thread
13–15' CLAY, dark brown, dry to moist.  15–29' CLAYEY SAND, brown, moist, slight groy discolarating at 16.5', black and groy hydrocarbon staining from 17–20', thin grovel layers at 18', discolaration lessening with depth, brown clayey sand alternating with depth, brown clayey sand alternating with thin bands of gravel starting at 20'.  29–35' CLAYEY SILT, brown to tan, saturated.  35–38' SAND with GRAVEL, tan, saturated.  36–35' CLAY, brown, stiff, dry.  TD = 39.5' TD = 39.5' 35.			<b>80</b>	5–13	SANDY CLAY, light brown, dry to moist, showing white streaks of		Casing Diameter: \( \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     \begin{align*}     align
13–15' CLAY', dark brown, dry to moist.  15–29' CLAYEY SAND, brown, moist, slight groy discoloration starting at 16.5', black and groy hydrocarbon staining from 17–20', thin gravel loyers at 18', discoloration lessening with depth, brown clayey sand alternating with thin bands of gravel starting at 20'.  29–35' CLAYEY SILT, brown to tan, saturated.  35–38' SAND with GRAVEL, tan, saturated.  11.0 3/35  38–39.5' CLAY, brown, stiff, dry.  TD = 39.5' 36.5  TD = 39.5' 36.5  NOTE: 5 foot core barrel recovery system as a sampling technique barrel recovery system as a sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampling technique as sampl			10		caliche at 10'.	N N R	Screen Slot: 0.008 🖾 0.010
15–29' CLAYEY SAND, brown, moist, slight gray discoloration starting at 16.5', black and gray hydrocarbon staining from 17–20', thin grave layers at 16', discoloration lessening with discoloration lessening with thin bands of gravel starting at 20'.  35–36' CLAYEY SILT, brown to tan, saturated.  35–36' CLAYEY SILT, brown to tan, saturated.  36-36' CLAYEY SILT, brown, stiff, dry.  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50			112	13–15	CLAY, dark brown, dry to moist.	* * * * * * * * * * * * * * * * * * *	Screen Style: Machine Stot Wire Wrap
15–29 CLAYEY SAND, brown, moist, slight gray discoloration starting at 16.5, black and gray hydrocarbon staining from 17–20', thin grovel layers at 18', discoloration lessening with depth, brown clayey some discoloration lessening at 20' with depth, brown to tan, saturated.  35–35' CLAYEY SILT, brown to tan, saturated.  38–39.5' CLAY, brown, stiff, dry.  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 39.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5'  TD = 50.5			14			* * * * * * * * * * * * * * * * * * *	Sand Pack: CSSI 16-40
black and gray hydrocarbon staining from Charles and gray hydrocarbon staining from Charles and gray hydrocarbon staining from Tradicionation lessening with depth, brown clayey sand alternating at 20.  29–35' CLAYEY SILT, brown to tan, saturated.  35–38' SAND with GRAVEL, tan, saturated.  TD = 39.5' CLAY brown, stiff, dry.  TD = 39.5' Section of the staining technique are as sampling technique.  Depths in Feet from Ground Surface processes and the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining surface of the staining s			16	15-29	CLAYEY SAND, brown, moist, slight	1	Bentonite Seal:1/2* PelletsHole PlugSlurry
from 17–20', thin grovel layers at 18', discoloration lessening with depth, brown cloyey sand alternating with thin bands of gravel starting at 20'.  29–35' CLAYEY SILT, brown to tan, saturated.  35–38' SAND with GRAVEL, tan, saturated.  38–39.5' CLAY, brown, stiff, dry.  TD = 39.5'  TD = 39.5'  NOTE: 5 foot core barrel recovery system used as sampling technique bepths in Feet from Ground Surface Province of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique of the sampling technique			18		black and gray hydrocarbon staining	* * * * * * * * * * * * * * * * * * * *	I/4" Pellet
with depth, bouncing sand alternating with thin bands of gravel starting at 20'.  29–35' CLAYEY SILT, brown to tan, saturated.  35–36' SAND with GRAVEL, tan, saturated.  11.0 3/35  38–39.5' CLAY, brown, stiff, dry.  TD = 39.5'  TD = 39.5'  NOTE: 5 foot core barrel recovery system used as sampling technique between the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the sample of the samp		_	+ 20		from 17—20', thin gravel layers	* * * * * * * * * * * * * * * * * * *	Bore Hole Diameter: 8" weight.
alternating with thin bands of gravel starting at 20'.  29–35' CLAYEY SILT, brown to tan, saturated.  35–38' SAND with GRAVEL, tan, saturated.  38–39.5' CLAY, brown, stiff, dry.  TD = 39.5'  NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface Processing the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start o			+ 22	-,		E S F	Drill Rig: MHollow Stem Rotary
29–35' CLAYEY SILT, brown to tan, saturated.  35–38' SAND with GRAVEL, tan, saturated.  11.0 3/3  38–39.5' CLAY, brown, stiff, dry.  TD = 39.5'  NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Province Provin			+24		9	2	Drilled By. PRECISION ENGINEERING
29–35' CLAYEY SILT, brown to tan, saturated.  35–38' SAND with GRAVEL, tan, saturated.  38–39.5' CLAY, brown, stiff, dry.  TD = 39.5'  NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface			7 26		•	* * * * *	Date:
35–38' SAND with GRAVEL, tan, saturated.  38–39.5' CLAY, brown, stiff, dry.  TD = 39.5'  NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface from Ground Surface			—— <del>—</del>	29–35	CLAYEY SILT, brown to tan, saturated	* * * * * * * * * * * * * * * * * * *	Date D-T-P MSL D-T-W Field pH Field EC
35–38' SAND with GRAVEL, tan, saturated.  38–39.5' CLAY, brown, stiff, dry.  TD = 39.5'  NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface from Ground Surface			7			N N N N N N N N N N N N N N N N N N N	92 21.6 3337.0
38–39.5' CLAY, brown, stiff, dry.  TD = 39.5'  NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface (Not to Scole)			+ 30	35~38'	SAND with GRAVEL, tan, saturated.		3/10/92 21.8 3336.8 25.1
38–39.5' CLAY, brown, stiff, dry.  TD = 39.5'  NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface (Not to Scole)			+32				
NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface (Not to Scale)			+ 34	38-39.5			
NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface (Not to Scale)			+ 36				Comments: Concrete with 5% bentonite used to grout
NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface (Not to Scale)		,	<del> </del> 38		į	1111111	from seal to ground surface.
NOTE: 5 foot core barrel recovery system used as sampling technique  Depths in Feet from Ground Surface (Not to Scale)			+ 40		C.80 = 01	111111	
NOTE: 5 foot core barrel recovery system  used as sampling technique  Depths in Feet  from Ground Surface			+ 42				אבוואם אא
used as sampling technique  Depths in Feet from Ground Surface (Not to Scale)			44		5 foot core barrel recovery system	J V.	CTQ M Q ZX
from Ground Surface			46		used as sampling technique	Denths in Feet	KWB6
(Not 10 N)			<del> </del>			from Ground Surface	Project: 622092001-237 (KWB6)
SI=Shelby Tube   SS=Split Spoon   C=Cuttings   (1901 to Scarc)			22	ST=Shell	SS=Split Spoon	Ittings (Not to Scale)	: ARTESIA, NEW ME)

Sym Samp	Jod Jog Lingo Lingo (1997)		ipt	Mor g Well Piezometer	Design Specification
				1-1-7-2	Elevations: 1 3344.14 2 3344.00
	+ 5	0-4,	CLAYEY SAND, brown, moist,	3/2	(feet MSL) 3 3341.80 4 3341.6
X		)	becoming lighter colored with depth.		Coordinates: X 3484.17 Y 8055.72
	• 	4-15,	CANDY Of AV brown moist to dry		Type of Casing: 🖂 PVC Sched. 40 Flush Thread
	∞ +-	2	occasional small pebbles of		Casing Diameter: \( \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} \
	+ 10		caliche, white bands of fine grain caliche increasing in frequency	1	Screen Slot: 0.008 🖾 0.010
	+ 12		to 10', gravel content increasing	* * * * * * * * * * * * * * * * * * *	Screen Style: Machine Slot - Wire Wrap
	+ 14		encountered at 14.5.	# # # # #	Sand Pack: CSSI 16-40
4	+ 16			1	Bentonite Seal: 1/2" Pellets Hole Plug Slurry
	+ 18	15–17′	GRAVEL, silty, moist.	* # # # # # # # # # # # # # # # # # # #	Court Trans Dottland Weight:
	+ 20			* * * * * * * * * * * * * * * * * * *	
	+ 22	07~/1	CLAYEY SANU, brown, saturatea.	* * * * * * * * * * * * * * * * * * *	Drill Rig: MHollow Stem Rotary
//	+ 24	20-22′	SILTY SAND, brown, saturated, some	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Drilled By. PRECISION ENGINEERING
V×.	+ 26		gravel.	* * * * * * * * * * * * * * * * * * *	Date:
<b>9</b> /	— <del> </del>	,02 66	CLANES COANE	* * * * * * * * * * * * * * * * * * *	Date D-T-W MSL Date Field pH Field EC
	0 <b>7</b>		CLATET GRAVEL, Saturated, increasing clay content with depth.	* * * * * * * * * * * * * * * * * * *	19.5
	+ 30			12.0	3/10/92 20.8 3323.2
	+ 32	30-32.5	' CLAY, brown, stiff, moist to dry.		
	+ 34			18.0	
	<del></del>				Comments: Concrete with 5% bentonite used to grout
	<del> </del> 38		TD = 32.5'		from seal to ground surface.
	+ 40				
	+ 42			32.5	22 P117DEC
	+ 44			70.5	CHO AN DES
	+ 46	NOTE:	5 foot core barrel recovery system used as sampling technique	Depths in Feet	KWB7 KWB7
	<del>-</del>			from Ground Surface	Project: 622092001-237 (KWB7)
	05	ST=Shelby Tube	by Tube   SS=Split Spoon   C=Cuttings	(Not to Scale)	Location: ARTESIA, NEW MEXICO

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Seologic Description  CLAYEY SAND, brown, moist, becoming lighter colored with depth.  SANDY CLAY, brown, moist to dry, becoming lighter in color with depth to 5', thin banding of coline nodules noted at various depths, banding becoming thicker with depth, slight gray hydrocarbon staining evident at 15', darker gray hydrocarbon staining with depth, ador increasing, 2' gravel seam, saturated  CLAYEY SAND, dark gray, from 23-26', strong hydrocarbon odor, saturated.  SILTY SAND, brown, saturated, slight staining, decreased odor.  CLAYEY SAND, brown, moist.  TD = 34.5'  TD = 34.5'  TD = 34.5'  TD = 34.5'  TD = 34.5'	Monitormy Well Cations Piezometer	Elevations: 1 3348.59 2 3348.39 (feet MSL) 3 3346.22 4 3345.8 Coordinates: X 3211.93 Y 6875.69	Type of Casing: ⊠ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐ ☐ Casing Diameter: ☒ 2" ☐ 4" ☐ 6" ☐	Screen Style: Machine Slot Wire Wrap	1/2" Pellet 1/4" Pellet	Bore Hole Diameter: 8"  Drill Rig: Mollow Stem Rotary Drilled By PRECISION ENGINEERING	etion Date:	2/19/92 20.6 3327.79 10.0 3/10/92 21.0 3327.39	Comments: Concrete with 5% bentonite used to grout from seal to ground surface.			(Not to Scale)   Project: 622092001—237 (KWB8)   (Not to Scale)   Location: ARTESIA, NEW MEXICO
	Description —	£	2-25' SANDY CLAY, brown, moist to dry, becoming lighter in color with	depth to 5, thin banding of caliche nodules noted at various depths, banding becoming thicker with depth. Slight gray hydrocarbon	staining evident at 15', darker gray hydrocarbon staining with depth, odor increasing, 2' gravel seam, saturated at 23'.	25—28' CLAYEY SAND, dark gray, from 23—26', strong hydrocarbon odor, saturated.	28—33' SILTY SAND, brown, saturated, slight staining, decreased odor.	33-35' CLAYEY SAND, brown, moist.	_ 34.5'	34	5 foot core barrel recovery system used as sampling technique	C=Cuttings

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Sym Somp	A dq/	Geologic Description	Mo g Well Piezometer	Design Specification
			1-1	Elevations: 1 3352.67 2 3352.53
	+ 2	0-22.5' SANDY CLAY, brown, dry, caliche	3)	(feet MSL) 33349.9043349.8
	+			Coordinates: X 1838.15 Y 6600.55
	9			Type of Casing: 🖂 PVC Sched. 40 Flush Thread
	80 - <del> </del>	white caliche banding starting at 10, thin aravel seam at 13', sandy clay		Casina Diameter: \$\bigs_2^n \Bigs_3^n \Bigs_4^n \Bigs_6^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^n \Bigs_9^
	+ 10	exhibiting increasing moisture near 15'.	* * * * * * * * * * * * * * * * * * *	Screen Slot: 0.008 🖾 0.010
	+ 12	22.5-23' CLAYEY GRAVEL, saturated.	* * * * * * * * * * * * * * * * * * *	Screen Style: Machine Slot Wire Wrap
///	+14		# # J	Sand Pack: CSSI 16-40
///	91 +	23-25' SILTY SAND, brown, saturated.	* * * * * * * * * * * * * * * * * * *	Bentonite Seal: 1/2" Pellets Hole Plug Slurry
	<del> </del>	25-34.5' SANDY CLAY, brown, saturated to 26'	T T T	⊠1/4" Pellets □
	+ 20	then moist, dry near 34'.	* * * * * * * * * * * * * * * * * * *	Grout Type: Portland Weight:
	72		E E E	Drill Ria: Melollow Stem Rectary
<b>7</b> 7	77		* * * * * * * * * * * * * * * * * * *	PRFCISION
· · ·	+24		* * * * * * * * * * * * * * * * * * *	Logged By: PHILIP CADARETTE
	+ 26		* # # * # #	Completion Date: FEBRUARY 13, 1992
///	<del> </del> 28	T0 = 34.5'	7 K K K	Date D-T-W MSL Date Field pH Field EC
	3		* # * * * * * * * * * * * * * * * * * *	24.9
			15.0	3/10/92 25.2 3327.3
	+ 32			
	+ 34		20.0	
	+ 36		111111	Comments: Concrete with 5% bentonite used to grout
	+ 38			from seal to ground surface.
	+ 40			
	+ 42		34.5	
	+ 44	NOTE: 5 foot core barrel recovery system		THE MARIES
	+ 46		34.5	OGW/I
	+ 48		Depths in Feet	
	+ 50	*:1*3-33	from Ground Surface (Not to Scale)	Project: 622092001-237 (KWB9)
		SI=Shelby Tube   SS=Split Spoon   C=Cuttings		AĽ ¥

Sym Sym PID	d	Det (feet)	Geologic	Descript	ion	Moni Well Piezometer	Design		Specification	ion	
7777			0-10' SANDY CLAY	SANDY CLAY, dark brown to brown, moist	wn, moist	1	Elevations: 1 (feet MSL) <sub>3</sub>		2		
7777		4	to slightly r -hydrocarbo	to slightly moist, plastic to friable. —hydrocarbon odor apparent at 8.0°	sle. 8.0'		Coordinates: X_		 -		
,,,,,		9	-gray hydrocarbo starting at 9.0°	-gray hydrocarbon staining apparent starting at 9.0'	rent .	700	Type of Casing:	PVC Sched. 40	$\sim$	Flush Thread	1
	+	8 — 0	10-12' CLAY, gray	CLAY, gray hydrocarbon staining, strong	, strong	X X X	Casing Diameter: \( \superstack 2" \( \superstack 3" \) \( \times 4" \)	2" 3'			
		10	odor, occas	odor, occasional pockets of fine sand,	sand,	* * * *	Screen Slot: 0.008 🛮 0.010	0.008 🖾 0.0	10 01		
		12	1000			7 X X X X X X X X X X X X X X X X X X X	Screen Style: Machine Slot Wire Wrap	¶Machine Sk	ot   Wire	Wrap	
	-+-	14   12-	12-20' SANDY CLA'	SANDY CLAY, gray hydrocarbon staining,	staining,	X X X	Sand Pack: Colorado Silica Sand 20/40	ado Silica Sa	and 20/40	,	
	-+	16	strong nyd pockets of	strong injurection and, accusional pockets of fine sand, moist.		* * * * * * * * * * * * * * * * * * * *	Bentonite Seal: 🖾1/2" Pellets		ets  Hole Plug		Slurry
	+		-color dark	<ul> <li>-color darkens to black from 17-19.5'</li> <li>-coturated thin pathle seams at 17'</li> </ul>	7-19.5	***		□1/4" Pellets	ets 🗌		
		0 ;	and 18.5'.	runos appod illin		***	Grout Type: Portland/5% BentorMaight:	and/5% Beni	conkreight: _		
	+	 20	-hydrocarb	-hydrocarbon staining becomes lighter	lighter	***	Bore Hole Diameter: 13.5"				
	-+-	22	at 19.5.			* * * *	Drill Rig: \MHoll	⊠Hollow Stem [	☐Rotary ☐		
	-+	24 20-	20-29' CLAYEY SAN	CLAYEY SAND, gray hydrocarbon staining,	staining,	* * * * * * * * * * * * * * * * * * *	Drilled By:	Precision Engineering	gineering		
	+	76	strong odor 25–28².	strong odor, very moist to saturated 25—28'.	rated at	* * * * * * * * * * * * * * * * * * *	Completion Date: 10/02/92	10/02/92			-
						* * * * * * * * * * * * * * * * * * *	Date D-T-W	MSL	Date	Field pH	Field EC
			29-32 CLAY WITH to dry, very	CLAY WIIH SAND, lignt brown, sligntly moi: to dry, very stiff, no hydrocarbon staining	ligntly moist in staining	* * * * * * * * * * * * * * * * * * *					
		 S	or odor.			78.5					
	+	32   20-	39-45' CANDY CIA	Y hydrocarbon starin	in and						
	-1	34		strong odor, moist to saturated at 33 feet	at 33 feet	35.5					
		36	with thin gravel zone —saturated from 42.5	with thin gravel zone -saturated from 42.5-45.0'			Comments: 10"	10" PVC casing grouted in from	grouted in 1	rom 0-30'.	
	+	38	AS AS' OBANCI MIT	CDANEL MITH CAND AND CLAY continuated	+040		After	r curing, well	completed		
		40		hydrocarbon staining and strong odor.	odor.						
	+	42 46-	46-50' SANDY CLA	SANNY CLAY brown slightly moist stiff.	ist, stiff,	49.5					
				no hydrocarbon stain or odor.				N W W	KWBES	<b>S</b>	
		46	TD = 50.0'			50.0	E NEW				
	<del>- }-</del>		CME 5' core	core barrel recovery system	tem	Depths in Feet		_ 11	- 11	K WB-10	
		50	CI-Chalhy Inha	SS=Solit Spoop	C=Cuttings	(Not to Scale)	Project: Navajo	62209 New	32003-236 Mexico	(O	
1		2	ו ישטי לשופווט –ו	1	25,000				MCAICO		

Specification	Elevations: 1  (feet MSL) 3  Coordinates: X  Tope of Casing: Stainles: Casing Diameter: 2" Stainles: Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slo. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot. Screen Slot: 0.008 Slot	Location: Artesia, New Mexico
Monit Well Piezometer	- Sh Sh Sh Sh Sh Sh Sh Sh Sh Sh Sh Sh Sh	(Not to Scale)
Geologic Description	0–10° CLAYEY SAND, dark brown to brown to slightly milist, plastic to stiff.  -thin caliche pebble ozne @ 9.0°, of 10–15° CLAY, brown to white, moist, block gypsum crystals appearing near 15. plasticsaturated @ 20.5° with gravel and tan sand seams interbedded.  25–40° GRAVEL WITH CLAY AND SILT, saturagravel is calich with angular fragme to 2" in size.  TD = 40.0°  CME 5° core barrel recovery system.	ST=Shelby Tube   SS=Split Spoon   C=Cuttings
Somp Somp Loc PIO (pp (pp (pp	7.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1	05 +

∴ Design Specifications		Casing Diameter: ☐ 2" ☐ 3" ☐ 4" ☐ 6" ☐	Screen Slot: \$\int 0.008 \omega 0.010 \$\int \text{Screen Style:}\$ \omega Machine Slot \$\int \text{Wire Wrap }\int \text{	Bentonite Seal: X1/2" Pellets Hole Plug Slurry  11/4" Pellets C  Grout Type: Portland/5% BentonWeight:	Bore Hole Diameter: 13.5."  Drill Rig: MHollow Stem Rotary Concludes By: Precision Engineering	Date:	Date D-T-W MSL Date Field pH Field EC		3		well completed to 70.0'.	F KWBES	KWB-11B	ice Project: Navajo 622092003-236 Location: Artesia, New Mexico
Monit( Well Piezometer	3	50	**************************************	**************************************	** * * * * * * * * * * * * * * * * * *	*****************	* * * * * * * * * * * * * * * * * * *	49.0	50.0			69.5- <del>=</del> 70.0	70.0 Depths in Feet	from Ground Surface (Not to Scale)
Geologic Description	CLAYEY SAND, dark brown to brown, moist to slightly moist, plastiec to stiff. —thin caliche pebble zone @ 9.0', dry.	CLAY, brown to white, moist, blocky, gypsum crystals appearing near 15.0'.	CLAYEY SAND, brown to white, moist, plasticsaturated at 20.5' with gravel and fine tan sand seams interbedded.	GRAVEL WTH CLAY AND SILT, saturated, ravel is caliche with angular fragments up to 2" in size.	RIVER ROCK, blue to gray, well rounded, saturated, 1/4" in diameter.	SANDY CLAY, reddish brown, slightly moist, very stiff.	CLAY WITH SAND, slightly moist to dry, very stiff, occassional rock fragments.		—thin pebble beds, saturated, starting @ 58.0', occuring intermittently to 65.0'	CLAY, reddish brown, moist to slightly, moist, very stiff.	TD = 70.0'	CME 5' core barrel recovery system		ST=Shelby Tube   SS=Split Spoon   C=Cuttings
(799) (7993)	3 0-10'	+ 9 + 12 	+ 15 15-25' + 18 + 21	+ 24 25-45' + 27	+ 30   45-48.5' + 33	+ 36   48.5–50' + 39	42 50–55	+ 45   55-69' + 48   55-69'	- 51	+ 54   69-70' + 57	09	- 63 - 66	69 +	
Samp Loc I gld			· · · · · · · · · · · · · · · · · · ·					<del></del>		· · · · · · · · · · · · · · · · · · ·				

Specification	Elevations: 1 2	Type of Casing: 🔀 PVC Sched. 40 Flush Thread	Casing Diameter: ☐ 2" ☐ 3" 🖾 4" ☐ 6" ☐	Screen Style: Machine Slot Wire Wrap	Sand Pack: Colorado Silica Sand 20/40  Bentonite Seal: 🔼 1/2" Pellets 🗀 Hole Plug 🗀 Slurry	Grout Type: Portland/5% BentorWeight:	Bore Hole Diameter: 13.5"	Drill Rig: MHollow Stem L Rotary L	Date:	Date D-T-W MSL Date Field pH Field EC			Comments:		PHOTO 222	CHA DES	KWR-17A	Navajo 6220002	, New Mexic
Monit Well Piezometer	3		* * * * * *	* * * * * * * * * * * * * * * * * * *	**************************************	* * * * * * * * * * * * * * * * * * *	*****	* * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * * * *	100	15.5			24.5	, u	5.5.2	Ueptns in reet from Ground Surface	(Not to Scale)
gic Description	SANDY CLAY, dark brown to brown, moist, plastic.	CLAYEY SAND, brown to tan, moist, plastic, occasional gypsum crystals.	SANDY CLAY, moist, plastic, thin bands of fine sand interbedded.	CLAYEY SNAD, slightly moist, stiff.	CLAY WITH GRAVEL, sand and silt brown, moist, thin saturated gravel seam @ 18.0'.	GRAVEL WITH CLAY AND SAND, saturated.	CLAY, brown, slightly moist, stiff.	25.0'	CME 5' foot core barrel recovery system										e SS=Split Spoon C=Cuttings
Geologic	0-4' SANDY C plastic.	4-10' CLAYEY S	10–13' SANDY C fine sand	13-15' CLAYEY	15-20' CLAY W moist,	20–22' GRAVEL	22-25' CLAY,	= @	CME 5										ST=Shelby Tube

Specification	Elevations: 1 2 4 Coordinates: X Y	「분」	Casing Diameter: ☐ 2" ☐ 3" 🖾 4" ☐ 6" ☐	Screen Style: Machine Slot Wire Wrap	Sand Pack: <u>Colorado Silica Sand 20/40</u> Bentonite Seal: M1/2" Pellets Hole Plug Slurry	Grout Type: Portland /5% BentonWeight:	Bore Hole Diameter: 13.5"  Orill Rio: MHollow Stem   Rotary	Precision v. PWC	Completion Date: 10/04/92	Date D-T-W MSL Date Field pH Field EC			PVC casing grouted in fron		אפו רטוומופופת נס דנים.		THE LANGES	KWB-12B		Project: Navajo 622092003—236 Location: Artesia, New Mexico
Moni Well Piezometer	3	20	***	****	X X X X X X X X X X X X X X X X X X X	* * * * * * * * * * * * * * * * * * *	** * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * * *	***	****	21.0	23.5				39.5	3	40.0	from Ground Surface	(Not to Sc
Geologic Description	0-4' SANDY CLAY, dark brown to brown, moist, plastic.	4—10° CLAYEY SAND, brown to tan, moist, plastic, occassional gypsum crystals.	10-13' SANDY CLAY, moist, plastic, thin bands of fine sand interbedded.	13-15' CLAYEY SAND, slightly moist, stiff.	15—20° CLAY, with gravel, sand, silt, brown, moist, thin saturated gravel seam @ 18.0°.	20—22' GRAVEL WITH CLAY AND SAND, saturated.	22—35' CLAY, brown, slightly moist, very stiff, occassional caliche rock fraaments. dry.	—thin saturated seams of rock at 30.0', 32.0', 35.0'.	35-40' CLAY. reddish brown, moist with thin	saturated caliche zones at 36.0' and 37.0'. —slightly moist and stiff from 38—40.0'.	$TD = 40.0^{\circ}$	CME 5' core barrel recovery system								ST=Shelby Tube   SS=Split Spoon   C=Cuttings
Samp Loc PID (PP (PP (Peet)	+ + 5	φ α 	- 1 - 1	+ 12		18	1 50	+ 24	+ 26	+ 28	+ 30	+ + + + 32	399	+ 38	+ 40	+ 42	+ 44	46	+ 48	- 20

Design Specifications	Elevations: 1 $\frac{2}{3}$	Coordinates: X Y  Type of Casing: X PVC Sched. 40 Flush Thread  Stoinless Steel	Casing Diameter: \(\overline{\times}\) 2" \(\overline{\times}\) 3" \(\overline{\times}\) 4" \(\overline{\times}\) 6" \(\overline{\times}\) Screen Slot: \(\overline{\times}\) 0.008 \(\overline{\times}\) 0.010 \(\overline{\times}\)	Screen Style: Machine Slot Wire Wrap	Bentonite Seal: \$\int 1/2"\$ Pellets \$\int Hole Plug \$\int \Slurry\$\$ \$\omega 1/4"\$ Pellets \$\int	Grout Type: Portland/5% BentorWeight:Bore Hole Diameter: 8.25"	Drill Rig: MHollow Stem Rotary	Drilled By: Precision Engineering Logged By: PWC Completion Date: 10/07/92	Date D-T-W MSL Date Field pH Field EC					Comments:			21 TIVDEC	CTG AV DES	KWB-1P KWB-1P	Project: Navajo 622092003-236
Monit Well Piezometer	3	151	***	**************************************	**************************************	****	***	* * * * * * * * * * * * * * * * * * *	****	* * * * * * * * * * * * * * * * * * * *	15.0	7.5	20.0		111111		39.0	,007	140.0 Denths in Feet	from Ground Surface (Not to Scale)
Geologic Description	01' CRUSHED LIMESTONE, base materal for pad.	CLAYEY SAND, brown, slightly moist, friable.	CLAYEY SAND, interbedded with caliche seams, gray, dry.	CLAYEY SAND, greenish/gray, moist, friable, occassional caliche fragments, up to 1/2".	SAND, tan, fine to medium grain, clean.  -saturated from 22-40.0'	<ul> <li>Well rounded five fock seath &amp; 20.0.</li> <li>occassional thin seams of red clay, high plasticity encountered, never more than a</li> </ul>	few inches thick.		Split Spoon and CME 5' core barrel recovery system											ST=Shelby Tube X SS=Solit Spoon C=Cuttings
20.1 Glq qq) 19.0 (199.1)	- 2	4 + 6	4-8,	+ 12 8-9' + 14	+ 16 9-40	- 18 - 20	+ 22	+ 24	7.26	07	30	+ 32	+ 34	- 36	- 38	40	+ 42	+ 44	46	+ 48 + 50 CT=Ch
Samp	7///	<b>V</b> ///																		

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NS mo2 JIA	19) 190 190 991)	Geologic Description	<u>e</u>	Design	- 11	Specification	21101	
	+ 2	0-8' CLAYEY SAND, brown, moist plastic. -gypsum crystals appearing © 4'	3	Elevations: 1 (feet MSL) 3		2   4		
	4 9	8–10' CLAY, red with white banding, moist, plastic.		Coordinates: X	PVC Sche	<sup>-</sup> 4	Flush Thread	
	<del>     </del>	10—14' CLAY, red and brown, moist, plastic. —4" band of fine sand @ 12.5'		Stainless Steel (Casing Diameter: \$\infty\$ 2" \$\square\$ 4"	J Stainless Steel ☑ 2" □ 3" □ 4	1 —	]6"	
	<del>+</del> 5	14-16' SAND, tan, fine—grained, moist.	** * * * * * * * * * * * * * * * * * *	Screen Slot: □0.008 ⊠0.010 Screen Style: ⊠Machine Slot [	)08 ⊠0.01 Machine Slot	0     t   Wire Wrap	Vrap	
	+ 14	16—22' SANDY CLAY, red and brown, slightly moist to dry, plastic to stiff, occasional fraaments of caliche aravel throughout.	* * * * * * * * * * * * * * * * * * *	Sand Pack: <u>Colorado Silica Sand 20/40</u> Bentonite Seal: 1/2" Pellets Hol	odo Silica Sand	nd 20/40 ts 🗌 Hole Plug	Plug Slurry	
	<del> </del> 18	22-23.5' SANDY CLAY, white, slightly moist, plastic.	**************************************	Srout Type: <u>Portland /5% Bentor Wes</u> ight:	⊠1/4" Pellets and/5% BentorW	ts 🔲		
	+ 20	23.5—25' CLAY, greenish/gray, moist, blocky.	** * * * * * * * * * * * * * * * * * *	Bore Hole Diameter: 8.25"  Orill Rig: XHollow Stem	rr. 8.25"	]Rotory		
	+ 24 + 24	25—30' SAND WITH SILT, reddish—brown, saturated, fine to medium grain.	** * * * * * * * * * * * * * * * * * *	Drilled By: P	· ¬ 1	jineering		
	+ 26	30-50' SAND, tan, fine to medium grain,	* * * * * * * * * * * * * * * * * * *	pleti	10/0//92		-	
	+ 28		* * * * * * * * * * * * * * * * * * *	Date D-T-W	MSL	Date	Field pH Fie	Field EC
	+ 30	-Weil foulded fivel fock sediff @ +0.0	17.0					
	+ 32	TD = 50.0'						
	+ 34	Note: Plugged boring back to 32.0' before setting well	22.5					
	+ 36	Split Spoon and CME 5' core barrel	THIIII	Comments:				
	+ 38	recovery system	:::::: 					
	+ 40							
	+ 42		31.5		14 2	TOT	2	
	4		,000		ST V V DES	V DE	0	
	+ 46		Depths in Feet			X	KWB-2P	
	<del>/</del> <del>(</del>		from Ground Surface	Project: Navajo,	- 11	622092003-236	9	
:	+ 50 	ST=Shelby Tube   SS=Split Spoon   C=Cuttings	(Not to Scale)	• • 111	III.	lexico		

Design Specifications	Flevations: 1	: Artesia, New Mexico
Monita Well Piezometer	85 Soor Ground Ground	Cuttings (Not to Scale)
Geologic Description	0-4' CLAYEY SAND, brown, dry, stiff.  -abundant gypsum crystals -abundant gypsum crystals -occasional small pockets fo fine tan sand 11–11.5' GRAVEL AND CLAYEY SAND, saturated. 13–14' GRAVEL (CALICHE), CLAY MIX, saturated. 14–25' SILTY SAND, gray to reddish brown, saturated, fine—grained.  25–50' SAND, tan, fine to medium—grained, saturated  TD = 50.0' Note: Plugged boring back to 28.0' before setting well Split Spoon and CME 5' core barrel recovery system	ST=Shelby Tube   X   SS=Split Spoon   C=C
Samp Samp Did Opt Det	7.1.W1111111111111111111111111111111111	

Specifications	2	ight:ary		cement poured from 3.0° to pad — no bentonite added.	<b>VBES</b> KWB-4P  003 (KWB4P)	
Design Spe	コートー あおる ~ もの ~	Grout Type: Partland Weight:  Bore Hole Diameter: 8"  Drill Rig: MHollow Stem Rotary    Drilled By. Percision Engineering    Logged By. PWC  Completion Date: 10/08/92  Date   D-T-W   MSL   Date		Comments: Portland cement po surface pad — no	KWBES  KM  KM  KM  Project: Navajo 622092003 (KWE	∷ા
Monit Well Piezometer	3	**************************************	3.0,	29.5,	Depths in Feet from Ground Surface	(Not to Scale)
ption	reddish-brown, nt from 5-10' caliche from ky, moist. ated reduced), moist	sh-brown after sh fragments				C=Cuttings
Geologic Description		23.0—50.0' SILTY SAND, light green, saturated from 23—30'. —color change to reddish—brown after 30', saturated —occasional caliche gravel fragments encountered.  TD = 50.0'				ST=Shelby Tube   SS=Split Spoon

995									Page 1 of 1				
			ĮŲ.		Client	NAV	AJO REFINERY	Well Number MW- 8					
				3		1/4	1,	4 1/4	1/4 S T R StateNEW MEXICO				
									Contractor LARRY'S DRILLING				
								-20-86	Completion Date 6-20-86				
				//		-			Logged By SELKE				
						Elevati	on		Spud In (Fm.)				
						Remarks Steam cleaned rig and tools prior to drilling -							
	DEBAUM LI IN SECOND		RECOV	drilled with air rotary									
	DEPI	H	1	足	RUN	FROM	Œ	SAMPLE DEPTH	REMARKS				
		0 -		Н					0-8' Brown, silty sandy clay				
		-							moist at approx. 8'				
	الننتنا Sand	_											
		5 -											
,		_											
<b>'</b>	Silt								8-13' white to gray, sandy clay with modera				
		10 -					<u>·</u>		amounts of gravel(pea size)				
		-							·				
, 1	Clay	_							13-20' lt. brown clayey sand (abund. clay)				
1	V. 43	- 15-	A: A						v. minor gravel at top w/ moderate				
Į.		13							to abundant gravel at bottom				
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× Design Specifications	Elevation (feet MS	Bore Hole Diameter: 12"  Type of Casing: \text{NVC Sched. 40 Flush } \text{Casing Diameter: \text{12"} \text{Stainless Steel }	Screen Slot: □0.008 ⊠0.010 □           Screen Style: ⊠Machine Slot □ Wire Wrap □           Sand Pack: C.S.S.L. 20/40           Bentonite Seal: □1/4" Pellets ⊠1/2" Pellets	Nug	Logged By. PWC  Completion Date: 01/21/93	Date D-T-W D-T-P Prod Thick Field pH F	1/26/93 10.18 6.93 7,600 2/10/93 10.41 Comments:	ZZ WIIDEG	MW-20   MW-20   Project: 622092005-110 (MW-20)   Location: Artesia, New Mexico
Monitoring Well Piezometer	Casing YE					55	9.5	23.5	Depths in Feet from Ground Surface (Not to Scale) LOG-1
Geologic Description		1—8.5' CLAYEY SAND, brown, changing to tan near 4', moist, friable, many roots and root channels, clay content increasing with depth.	8.5—13' CLAY, brown, moist, plastic, some gray mottling, gypsum crystals noted.	14-14.5' SAND with silt, tan, saturated, fine to medium grain.	14.5—20' CLAY, with gravel, clay is reddish/brown, very moist, plastic; gravel is < 1" dia. and saturated.	20-20.5 CLAYEY SAND, groy, saturated, some gravel fragments.	20.5—24' CLAY, reddish/brown, moist, plastic, blocky. — thin zone of gravel near 23' is saturated (<4").	TD = 24'	Somple Method Symbols    RB=Recovery Barrel   SS
PID (ppm) Depth (feet)		1 1 1 E 4 C	- F - 7 - 8	+ 9	+ 11 + 12 + 13	4 4	11 + 12	+ 19 + 20 + 21	
Somp. Somp. Log					RB M				

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- Design Specifications		Type of Casing: M PVC Sched. 40 Flush Ihread  Stainless Steel  Casing Diameter: 2" M4" 6"  Screen Slot: 0.008 M0.010	Screen Style: Machine Stot Wire Widp	item Rotary	Completion Date: 1/23/93 Depth First Encountered Water: 10.0' BLS	Date         D-T-W         D-T-P         Prod Thick         Field pH         Field EC           1/27/93         10.65         5,200           2/10/93         10.92         5,200           Comments: Replacement well between MW-8 and MW-9.	## KWBES	MW-21   MW-21   Project: 622092005-110 (MW-21)   Location: Artesia, New Mexico
Monitoring Well X Piezometer	2 Lip————————————————————————————————————					25	22.5	Depths in Feet from Ground Surface (Not to Scale) LOG-1
Geologic Description	0-3.0' CLAYEY SAND, light brown, fine grained, white (carbonate nodules throughout, hard, dry, earthy odor.	3.0-7.5' SANDY CLAY, dark brown, color change to light gray at 6.0', fine grained sand, rust staining (dendritic) throughout, some clear crystals (gypsum?), soft, moist, earthy odor.	7.5-10.5' CALICHE (carbonate) GRAVEL, light gray, some clay throughout, hard, saturated at 10.0', no odor.	10.5—12.0' SANDY CLAY, light gray, fine grained sand, moist, no odor.	12.0-13.0' CALICHE (carbonate) GRAVEL, light gray, some clay throughout, hard, saturated, no odor.	13.0-23.0' CALICHE (carbonate) GRAVEL, reddish/brown, some cloy throughout, hard, saturated at 13.0-13.5', 14.5-15.5', and 19.0-19.5', no odor.  TD = 23.0'		Sample Method Symbols    RB=Recovery Barrel   SS
Somp.  Log PiD  Log PiD  (ppm)  Depth  (feet)	7//////////////////////////////////////	<del>+ + + + + + + + + + + + + + + + + + + </del>	8	RB 10	127	4 91	18 20 20	24

Field EC 6100 1/2" Pellets **MW-29** 1645.21 3331.6 Prod Thick Field pH Design Specifications Weight: Type of Casing: NPVC Sched. 40 Flush Thread Screen Slot: 0.008 X 0.010 Screen Style: Machine Slot Wire Wrap 6.5 <u>ق</u> Depth First Encountered Water: 10 ft. BLS #. | |-| %)RE/SPE Rotary Grout Type: 6% bentonite/Portland Location: Artesia, New Mexico Hole Plug Sand Pack: CSSI 16-40 silica sand Stainless Steel 1/4" Pellets Drilled by: Precision Engineering Comments: D-T-W from casing lip. Hydrated w/ 5 gallons water Bore Hole Diameter: 8 1/4" Completion Date: 1/10/95 MHollow Stem 5 ⊠ D-T-D 7336.58 3334.29 3334.52 318/3.3 1/2" Chips 11.05 11.19 11.07 D-T-W Casing Diameter: Logged by:DGB Coordinates: X\_ Bentonite Seal: Elevations: 1 (feet MSL) 3 Project: Drill Rig: /10/95 1/12/95 2/5/95 Date (Closed) -1 Cover -3 Lip from Ground Surface 19.5 122 ≈2 5.5 6.5 <u>8</u> Depths in Feet (Not to Scale) Protective Casing L0G-1 Monitoring Well Piezometer 19.25 9.75 -4 Surface 20 Silty clay, light brown, moist, 2" piece of broken limestone no odor, roots 4-4.5, brown dry 1-3; crystals (calcite?) 3-4; brown with some black, Geologic Description slightly moist, platy caliche saturated at 10', light gray C-Cutting crystals 5-6', less mottling olive brown mottling with Clay, light gray, granular, fine gravel, crystals, very Clay, light brown, plastic, slightly moist and plastic. brown, moist and plastic 3/4" gravel, cemented, Gravely clay, light gray, Silty clay, light brown, Silty clay, light gray, Silt, roots, topsoil. . | | | Clay, light gray, plastic, no odor. SS-Split Spoon gravel at 15'. 16.5-17'. saturated. 10.5-13'. RB=Recovery Barrel Missing. Sample Method Symbols ST-Shelby Tube -15.5 15.5-17 17.5-20' 17-17.5' 10-13' 0-0.5' 8-10, 7-8 က 16 18 56 7 Depth (Feet) 0 4 22 24 ω 4 ဖ (mqq) OId Воз R. Samp.

## BOWELS FIL

Rig - Hollow stam auger 9" diameter Solit aboon cora barral 13"  Date 8/22/84 Stroud & Ledesma						
oth S	amole description					
$0 - 4\frac{1}{2}$	Red sail dry					
5	Gyp dry					
6 <del>1</del>	6.3 wht gyp - dry. 6½ gry shale - dry					
8	Gry sdy shale w very lge anhy acs - dry					
91	8.8 gry shale & gyp. 9.3 anny gravel 9½ gry shale & anny - dry					
10	drill $\triangle$					
111/2	10.8 gry shale w anhy pcs. 11.3 anhy gravel. 112 gry sh					
13	gry shale w gyp & anhy pcs - damp. Tr rd shale 111/2-12.3					
19/2	14° gravel. 14½ gry shale w gravel streaks - water					
16	14.7-15 gry shale & gravel. 15-16 drk gry shale water TD					
	· · · · · · · · · · · · · · · · · · ·					

### DETAILS OF WELL CONSTRUCTION

Oate 8/22/84 Navajo Refining Company

Protective steel casing Ground level

8" auger hole

2" PVC casing

cement grout

811

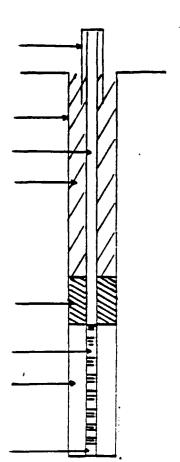
clay seal

101

slotted screen

gravel pack

blank casing TD 16'



# gamani 113

Mell # 46 Gavajo Refining Compa	any - Agnitor wells							
Orilling Contractor - 0. Anderson, El	Paso							
Rig - Hollow stem auger 3" diameter - Solit socon core correl 12"								
Date 8/22/84 Stroud	& Ledesma							
Death Sample description								
· · · ·								
0 - 6½ Dark red soil								
8 Lite red soil & gyp dr	y							
ll Gry clay w gyp	damp							
$12\frac{1}{2}$ gry clay, gyp, anny pcs,	tiopt - dry							
14 Gry clay, gyp, anhy grave	l <u>water</u>							
15½ 15.3 gry sdy shale 15½	Red shale							
17 Fine red shale. TO	,							

## DETAILS OF WELL CONSTRUCTION

Date 8/22/84 Navajo Refining Company

Protective steel casing

Ground level

8° auger hole

2" PVC casing

cement grout

10'

clay seal

12'

slotted screen

gravel pack

TD 17'

#### SAMPLE LOG

Well # 47 Navajo Refining Company - Monitor wells

Orilling Contractor - O. Anderson, El Paso

Rig - Hollow stem auger 8" diameter Split spoon core barrel 18"

Oate 8/22/84 Stroud & Ledesma

- 0 5 Oark red soil damp
  - 10 Lite red soil damp
  - 11 Red shale
  - 13 Orange-red shale damp
  - 14 Orange-red shale damp

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## DETAILS OF WELL CONSTRUCTION

Well # 47 Data 8/22/84 Navajo Refining Company

Protective steel casing Ground level -

- 8\* auger hole
- 2" PVC casing

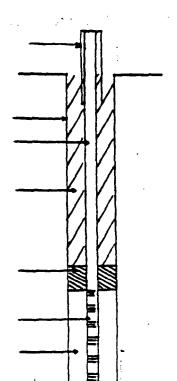
cement grout

clay seal 8'

slotted screen

gravel pack

TO 141



Monitoring Well Design Specifications	ctive Cosing   YES   Elevation (feet MS)    Indee   Coordinal (Glosed)   Coordinal    Indee   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Coordinal    Indee   MS   Co	18.5  19.0  Depths in Feet from Ground Surface (Not to Scale)  LOG-1  LOG-1  19.0  FF KWBES  EC-NP1  EC-NP1  Location: Artesia, New Mexico
Secription     Geologic Description	10-10° CLAYEY SAND, brown, dry to moist near 9°, stiff to friable, roots decreasing with depth, clay content increasing with depth, clay content increasing with depth, rock fragments noted at 9°.  10-11° SANDY CLAY, brown, moist, gravel fragments throughout.  6 11-12.5° CLAYEY SAND, tan with angue mottling, moist to saturated at 14°.  12.5-14° SILTY SAND, tan with arange mottling, moist to saturated at 14°.  18-19° SILTY SAND, tan, saturated to very moist at 19°.  10 18-19° SILTY SAND, tan, saturated to very moist at 19°.  11 18-19° SILTY SAND, tan, saturated to very moist at 19°.  11 18-19° SILTY SAND, tan, saturated to very moist at 19°.  11 18-19° SILTY SAND, tan, saturated to very moist at 19°.	+ 20 + 21 + 23 Sample Method Symbols + 24 ★ RB=Recovery Barrel ★ 5' ★ 1   ST=Shelby Tube

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Monitoring Well Design Specifications	Coording   VES   Elevations: 1   3342.09   2   3342.07	19.0  Depths in Feet from Ground Surface (Not to Scale)  LOG-1  LOG-1  LOG-1  19.0  FFF KWBES  EC-NP2  EC-NP2  Project: 622092005—110 (EC-P2)  Location: Artesia, New Mexico
📲 🖺 Selogic Description 🖟	RB & 5-9' CLAYEY SAND, brown to tan, dry to moist, friable, roots decreasing with depth.  9	+ 21 + 23   Sample Method Symbols + 24   X   RB=Recovery Barrel   X   C=Cutting

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Design Specifications	10 3772	1 Cover (feet MSL) 3 3344.84 4 3342.10		Bore Hole Diameter: 8"  Two of Cosion: M PVC Sched 40 Flush Thread		Cosing Diameter: \( \times 2^n  4^n  6^n  \)	Screen Style: Machine Slot   Wire Wrop		_	Grout Type: Portland/Rentanite Weight:	Rotary	Drilled By. Pool Environmental	Logged By: PWC	Depth First Encountered Water: 25.0' 81.5		20.0 Date D-T-W D-T-P Prod Thick Field pH Field EC 20.0 2/10/03 18 58	20/21/2	777	Comments:		34.0 EE KWRES	EC-NP4	Project: 622093001-115 (EC-P4)
Monitoring Well Piezometer	Protective Casing	y	Source S																111111			 Depths in Feet from Ground Surface	(Not to Scale)
Geologic Description		0-11.5' SILTY GRAVELS, sand and silt are tan,	ary, gravei is well rounded.	11.5–19' SANDY CLAY, reddish/brown, moist,	depth.	19-25' CLAY, brown, moist, plastic.		25-29 SANDY CLAY, brown, saturated.	29-34' SILTY SAND, brown, saturated, fine	grained.	10 = 34.0											SS	ST=Shelby Tube   SS=Split Spoon   C=Cutting
Log (ppm) (ppm) (Peet)		+ 2	+ 4	9	∞ ! 	9	+ 12	777	- 10 - 10	1-18	+20	+22	+24	+ 26	+ 28	+30	+ 32	72	45 45	3	 	 	

Samp.	Log (mqq) (Peet)		Geologic Description	Monitoring Well  Piezometer	Design Specifications	ications
		0-1.5	Clavev silt. light brown, some	Protective Casing YES	Elevations: 1 3353.66	2 3351.50
<u>=</u> \	<del></del>		white staining.		၂၂	
777	// +	1.5-4'	wn,	2 Lip — (Closed)	Coordinates: X 2659.36	γ 3408.23
777	+		slightly moist, dry, some white staining	-4 Surface	Bore Hole Diameter: 8 1/4"	
777	// 4			918	5	
	<i>///</i>	5-8,	Silty clay, light gray,		Type of Casing: XPVC Sched. 40 Flush Thread	-lush Thread
	+		increasing clay with depth.	2 == 14 14 14 14 14 14 14 14 14 14 14 14 14 1	Stair 	  *
777		.0L-8	some black streaks, some silt.	ı	Casing Diameter:	]
	+		moist.		0.008	0.010
777		10,	Clay with gravel moist fine	•••••	Screen Style: Machine Slot Sand Pack: CSSI 16-40 silica sand	Wire wrap
777,	+10				ite Seal: 1/4	
777		10-11'	Clay, chalk color, very moist.		1/2" Chips Hole Plug	
///	12	6.71-11	moist, some fine gravel		Grout Type: 6% bentonite/Portland	d Weight:
RB 			(≈5%).	8 8 8 8 8 8 8 8	Hollow Stem	Pota
	4	12.5-15'	Clay, gray and brown		Drilled by: Precision Engineering	Lic.#:
			inclusions (dissolve in		Date:	
777,	<del> </del>		water), no odor, very plastic.		Depth First Encountered Water: 15 ft. BLS	5 ft. BLS
773	·+	15-17	Silty clay brown some sand	2.0		
			and fine gravel, very moist.		Date D-T-W D-T-P Prod Thick	Thick Field pH Field EC
		17-20'	Clay, gray and light brown,		1/11/95 10.71	4500
	+-		moist at 17.5'.	 3	2/5/95 10.95	
	+20	) 20-25'	Clay, gray, massive, some fine			
	-		gravel at inclusions, moist from 22-22.5'.		Comments: Pumped 60 gallons to clean.  Pumped 3 & nom D.T.W from casing lip	an. from casing lip
	+25					
	+			19.75		
	45 45			25_	念	アガハ
	+				1	
	+26			Depths in Feet		NP-5
	<del></del>	Sample Method Symbols		(Not to Scale)	訓	
	_	X RB=Rec	y Barrel 📉 5'	(NOT 10 Scale) LOG - 1		
		ST-Shelby Tube	Tube SS-Split Spoon C-Cutting		Location: Artesia, New Mexico	

Samp.	Log (ppm) (Pepth (Feet)		Geologic Description	Monitoring Well Piezometer	Design Specifications	ecifications
	+ + +	0-1.6' 1.6-5'	Clayey sand, brown, topsoil Silty clay, light gray, dry, friable, white (caliche?) streaks.	Protective Casing YES	Elevations: 1 3337.12 (feet MSL) 3 3336.96 Coordinates: X 6860.05	2 4 3335.20 Y 1571.60
	111111	5-6.4'	Silty clay, brown, dry stiff, gray streaks.	4 Surface 3 Lp	Bore Hole Diameter: 8 1/4"  Type of Casing: NPVC Sched. 40	leter: 8 1/4"
	+++	7-10'	Sity clay, moist, increasing silt at 10.	28		☐ 4"
	+ + +	10-11.5' 11.5-13' 13-15'	Silty clay, alternating brown and gray, moist. Missing. Clayey gravel (caliche) gray, crumbly, saturated.		ひについっ	and Wire
8 /////	7 + 7	15-17' 17-18' 18-20'	Clayey gravel, gray, cemented. Missing. Clayey silt to silty clay, light brown.		Grout Type: 6% bentonite/Portland Drill Rig: Alellow Stem F Drilled by: Precision Engineering Logged by: DGB Completion Date: 1/10/95	ortland Weight:  Rotary
Village College	+ + + + + + + + + + + + + + + + + + +			8.75.	Date D.T-W D-T-P Programmer of Water	Prod Thick Field pH Field EC
	+ + + + + + + + + + + + + + + + + + + +	700			Comments: Pumped 60 gallons to clean, slightly whitish. Pumped 1.7 gpm, D-T-W from casing lip.	Pumped 60 gallons to clean, slightly whitish. Pumped 1.7 gpm, D-T-W from casing lip.
	+ +			18	&RE/	RE/SPEC
		Sample Method Symbols	Symbols	Depths in Feet from Ground Surface		NP-6
		X RB=Recove	RB=Recovery Barrel S 5' ST-Shelty Tube SS-Split Spoon C-Cutting	(Not to Scale) LOG - 1	Project: 318/3.3 Location: Artesia, New Mexico	exico

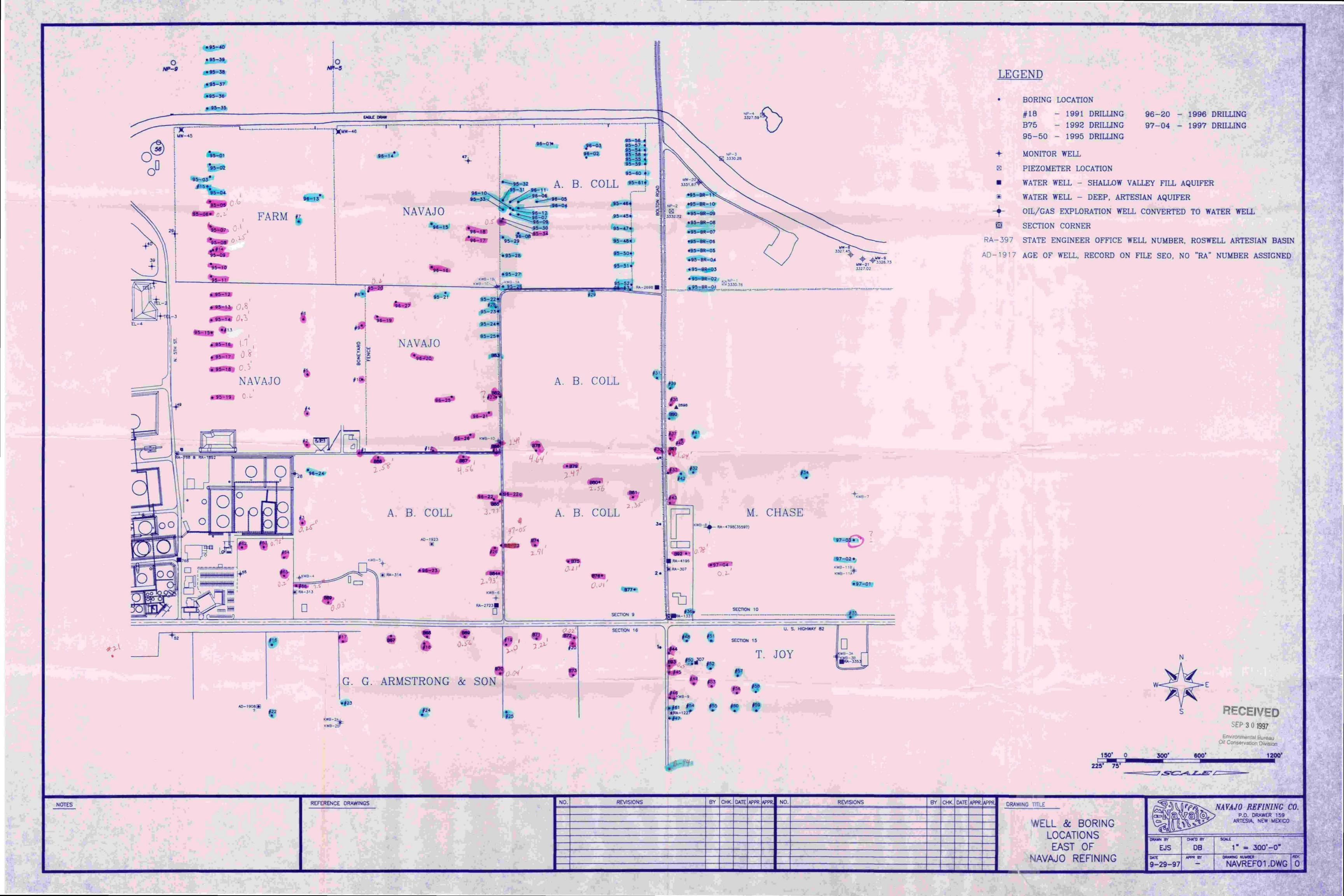
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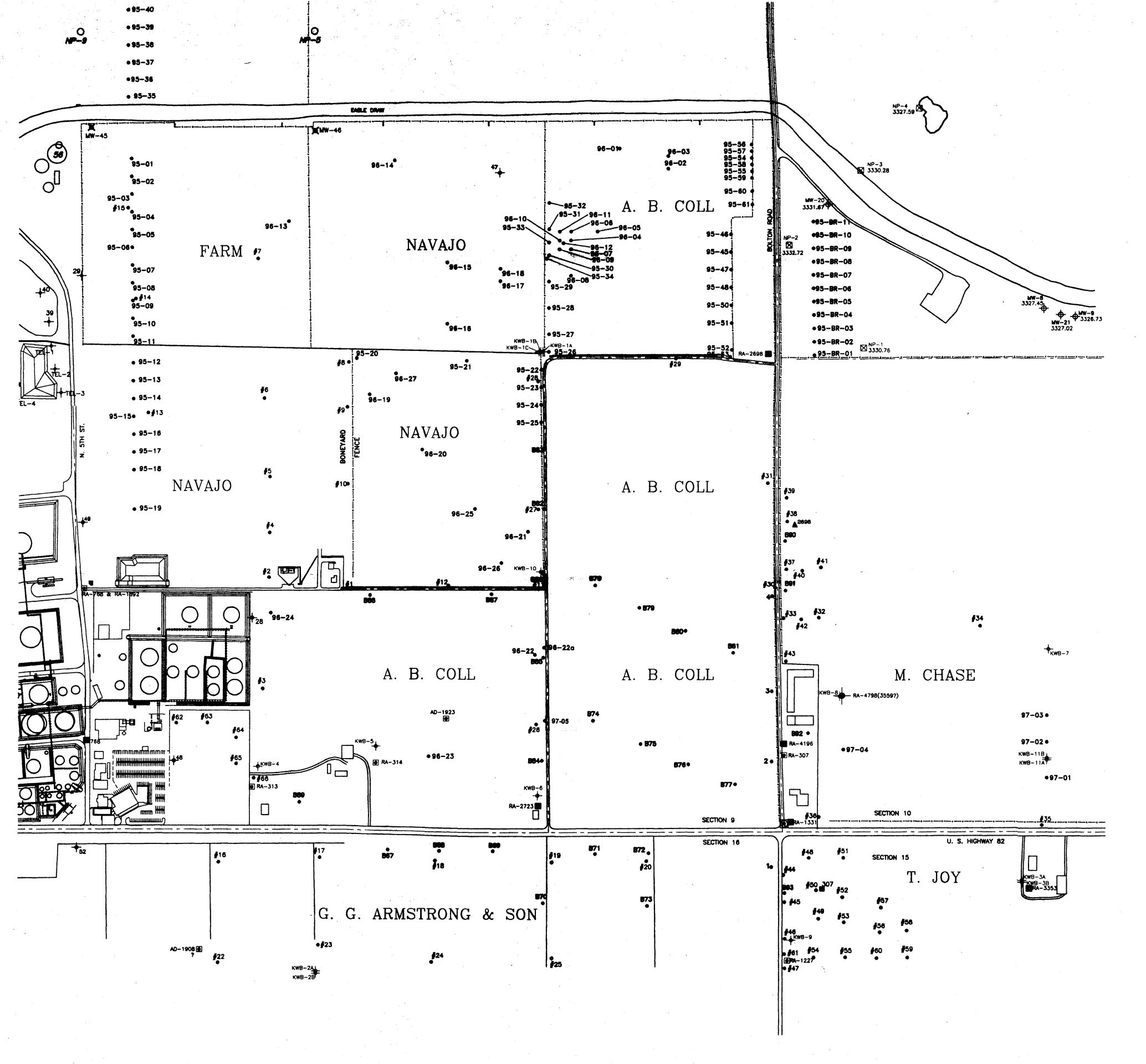
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Design Specifications	Refer Page 1	RESPEC  NP-7  CONTINUED  Project: 318/3  Project: Artesia New Maxica
Monitoring Well X Piezometer	Protective Casing YES  REFERING  TO  NP-7	
Geologic Description	30-31.4' Clay and silty clay, light brown to gray, with caliche gravel and pebbles. 31.4-32.7' Sandy clay with increasing sand to total depth, sand fine to medium, light brown. 32.7-35' No recovery.	Sample Method Symbols    Reserve of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the least specific of the leas
Samp. Marh. Samp. Log PID (ppm) Depth (Feet)	### ### ### ### ### ### ### ### ### ##	

Site Map





REFERENCE DRAWINGS

## **LEGEND**

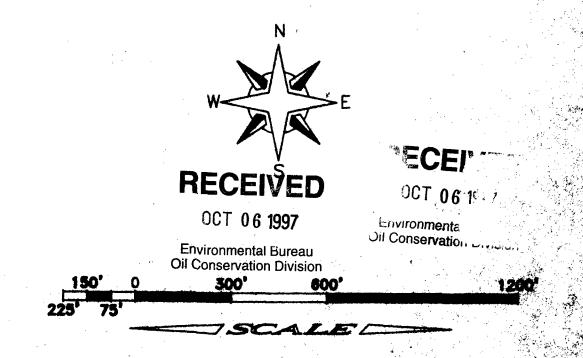
• BORING LOCATION

#18 - 1991 DRILLING 96-20 - 1996 DRILLING B75 - 1992 DRILLING 97-04 - 1997 DRILLING

95-50 - 1995 DRILLING

- + MONITOR WELL
- WATER WELL SHALLOW VALLEY FILL AQUIFER
- WATER WELL DEEP, ARTESIAN AQUIFER
- OIL/GAS EXPLORATION WELL CONVERTED TO WATER WELL
- SECTION CORNER

RA-397 STATE ENGINEER OFFICE WELL NUMBER, ROSWELL ARTESIAN BASIN AD-1917 AGE OF WELL, RECORD ON FILE SEO, NO "RA" NUMBER ASSIGNED



WELL & BORING

LOCATIONS

EAST OF

NAVAJO REFINING

NO. REVISIONS BY CHK DATE APPR APPR NO. REVISIONS BY CHK DATE APPR APPR DRAWING TITLE

WELL

NAVA

NAVAJO REFINING CO.
P.O. DRAWER 159
ARTESIA, NEW MEXICO

BRAIN BY CHICO BY SCALE

EJS DB 1° 1900'-0\*

BATE APPR BY DROWING HAMES

NAVAJO REFINING CO.