
**Title 40 CFR Part 191
Compliance Certification
Application
for the
Waste Isolation Pilot Plant**

Appendix BH



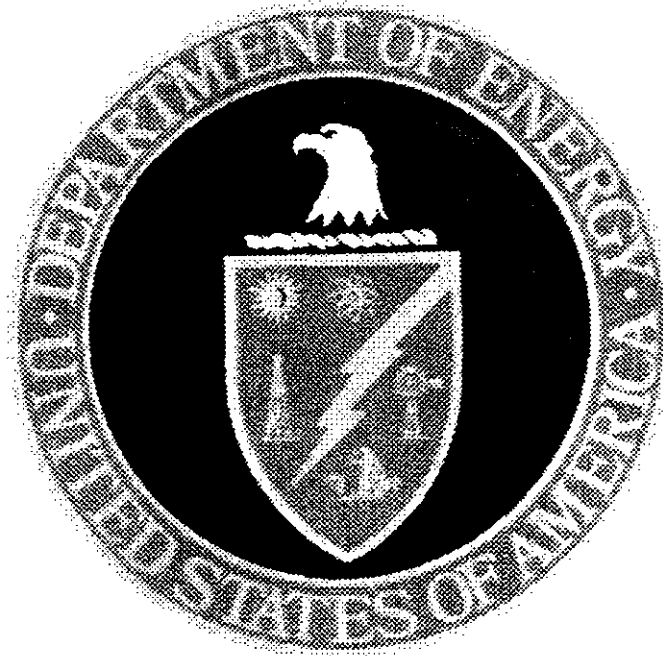
**United States Department of Energy
Waste Isolation Pilot Plant**

**Carlsbad Area Office
Carlsbad, New Mexico**

Borehole Data Report



Waste Isolation Pilot Plant Borehole Data Report



July 1996

Prepared for:

United States Department of Energy
Carlsbad Area Office

Westinghouse Electric Corporation
Waste Isolation Division

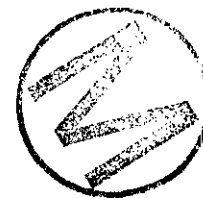


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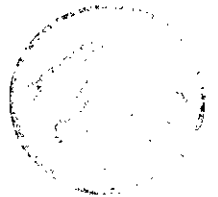


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Introduction



INTRODUCTION

Data pertaining to the surface boreholes that have been used at the WIPP site for site characterization, hydrological testing and resource evaluation exists in numerous source documents. The WIPP Borehole Data Base was prepared to serve as a central document providing data on boreholes used in characterizing the site. This report contains a comprehensive data base on wells drilled in support of the WIPP and boreholes that are within the sixteen section Land Withdrawal Area. Basic data for other boreholes, which includes commercial petroleum and potash, has been copied from other existing reports and is provided in the following attachments:

- Attachment A, *Data for Drillholes in Holt and Powers (1988) including Additional Drillholes Interpreted by Powers*
- Attachment B, *Rustler Formation Stratigraphic Data from Richey (1989)*
- Attachment C, *Calculated Mineral Content of Selected Samples from Potassium-Bearing Intervals with Summation of Percent K_2O as Ore Mineral*

The data compiled from each borehole includes: the operator, permit number, location, elevation, total depth, type of well, driller, drilling record, hole size, well development and stratigraphic summary. There are seven groups of boreholes contained in this data base; they are as follows: Commercially Drilled Boreholes, Energy Department Wells, Geologic Exploration Boreholes, Hydrologic Test Boreholes, Potash Boreholes, Subsurface Exploration Boreholes, and Water Quality Sampling Program Boreholes.

There were numerous sources which contained borehole data. During the compilation of this data base, it was noted that in some cases the data found in one document was inconsistent with data in another document. In order to ensure consistency and accuracy in the data base, the same references were used for as many of the boreholes as possible. For example, all elevations and locations were taken from *Compilation and Comparison of Test-Hole Location Surveys in the Vicinity of the WIPP Site*. SAND 88-1065, Table 3-5. There are some sections where a data field is left blank. In this case, the information was either not applicable, or was unavailable.



Commercially Drilled Borehole Data Base



COMMERCIALLY DRILLED BOREHOLE DATA BASE

BOREHOLE: BADGER-1
OPERATOR: Clayton W. Williams, Jr.
PERMIT NO.: 14-08-0001-12400

LOCATION: 1980' FSL, 1980' FWL
Sec. 15, T 22 S, R 31 E

ELEVATION: 3475'
TOTAL DEPTH: 15225'
TYPE OF WELL: Gas Well
DRILLER:

DRILLING RECORD: Date Started: 06/28/73 Date Completed: 09/17/73

WELL DEVELOPMENT:

PLUGGING SCHEDULE

From: 14,275'	3,780': Set cast iron bridge plug in 9 5/8" casing
To: 14,075'	3,613': Cut off 9 5/8" casing and pulled
Int: 200'	
Material: 65 sx Howco "H" cement	
	From: 3,668'
	To: 3,568'
	Int: 100'
	Material: 100 sx Howco "C" cement
From: 12,940'	
To: 12,840'	From: 850'
Int: 100'	To: 750'
Material: 35 sx Howco "H" cement	Int: 100'
	Material: 100 sx Howco "C" cement
From: 12,100'	
To: 11,900'	
Int: 200'	
Material: 65 sx Howco "H" cement	
From: 4,300'	
To: 4,200'	
Int: 100'	
Material: 35 sx Howco "H" cement	

CASING RECORD

Diameter: 20
Grade:
Wt/Ft: 94
From: 804
To:
Cement: 1120 sx

Diameter: 13 3/8
Grade:
Wt/Ft: 68, 61
From: 4240
To:
Cement: 2920 sx

Diameter: 9 5/8
Grade:
Wt/Ft: 47, 43.5
From: 11,990
To:
Cement: 2000 sx

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
BADGER-1	Salado	1024
	Lamar Ls.	4217
	Deleware Sand	4273
	Cherry Canyon	5173
	Brushy Canyon	6220
	Bone Spring	8152
	Wolfcamp	11405
	Lower Strawn	12896
	Atoka	13152
	Morrow	13739
	Morrow	
	Clastics	13942
	Barnett	14984
	Lower	
	Mississippian	
Ls.	15195	

COMMERCIALLY DRILLED BOREHOLE DATA BASE

BOREHOLE: COTTON-1
OPERATOR: Michael P. Grace
PERMIT NO.: Unknown
LOCATION: 1980' FSL, 1980' FWL
Sec. 34, T 22 S, R 31 E
ELEVATION: 3455'
TOTAL DEPTH: 6700'
TYPE OF WELL: Oil Well
DRILLER:

DRILLING RECORD: **Date Started:** 08/31/73 **Date Completed:** 12/15/75

WELL DEVELOPMENT:

PLUGGING SCHEDULE

From: 4,167'	From: 4,424'
To: 3,967'	To: 4,400'
Int: 200'	Int: 24'
Material: Cement	Material:
From: 1,070'	From: 720'
To: 870'	To: 620'
Int: 200'	Int: 100'
Material: Cement	Material:
3,980': 100' cement plug (top of 2 7/8" stub)	From: 20'
	To: 0'
	Int: 20'
	Material:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 61
From: 680.76
To:
Cement: 70 sx Halliburton Lt. & 100 sx of Class "C" cement

Diameter: 2 7/8
Grade:
Wt/Ft: 6.5
From: 4634
To:
Cement: 325 sx with 3/4 of 1% CFR2
Cut off 2 7/8" casing at 3980'



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
COTTON-1	Rustler	655 (+2800)
	Salt	970 (+2485)
	Base Salt	4077 (-622)
	Lamar	4320 (-865)
	Deleware Sand	4380 (-925)
	Cherry Canyon	5916 (-2461)
	Brushy Canyon	6406 (-2951)
	Total Depth	6700

COMMERCIALY DRILLED BOREHOLE DATA BASE

BOREHOLE: D-123
OPERATOR: Duval Sulphur & Potash Company
PERMIT NO.: Potassium Prospecting Permit LC-066112

LOCATION: 2614' North and 277' West of Southeast
Corner of Section 34, NE1/4 Section 34,
Township 22 South, Range 31 East. NMPM

ELEVATION: 3432'
TOTAL DEPTH: 1880'
TYPE OF WELL: Potash Core Test
DRILLER: Weaver Drilling Company

DRILLING RECORD: **Date Started:** 07/19/53 **Date Completed:** 08/07/53
Rotary Drill
6-1/4" Rockbit: 0-934'
Corebit: 934-1880'

WELL DEVELOPMENT:

CASING RECORD

4" Casing: 934'
Recovered: 692'

PLUGGING SCHEDULE

Shot casing at 910' and 850'. Pulled 692' leaving 242' in hole. The following cement plugs were run:

- 1) 73 sacks of cement mixed with 3% CaCl² and brine at bottom of hole.
- 2) 45 sacks of cement mixed with fresh water bottomed at 880'.

The remainder of the hole was filled with cuttings, a four-foot marker post set, and the hole abandoned.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
D-123	Rustler Formation	670
	Top of Salt	988
	Top of USGS 124 Bed	1779



COMMERCIALLY DRILLED BOREHOLE DATA BASE

BOREHOLE: I-374
OPERATOR: International Minerals & Chemical Corp.
PERMIT NO.: Potassium Prospecting Permit NM-0359163

LOCATION: 424' North 45 degrees West from S1/4 Corner
of Section 30, SW1/4 Section 30, Township
22 South, Range 31 East. NMPM

ELEVATION: 3340'
TOTAL DEPTH: 1538'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company

DRILLING RECORD: **Date Started:** 04/15/65 **Date Completed:** 04/27/65
Rotary Drill
6-1/4" Rockbit: 0-714'
3-7/8" Rockbit: 714-1149'
3-7/8" Corebit: 1149-1538'

WELL DEVELOPMENT:

CASING RECORD

4" Casing: 0-714'
Recovered: 0-437'

PLUGGING SCHEDULE

From: 1538'
To: 714'
Int: 824'
Material: Cement

From: 714'
To: 470'
Int: 244'
Material: Cement

From: 470'
To: 20'
Int: 450'
Material: Mud

From: 20'
To: 0'
Int: 20'
Material: Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
I-374	Rustler Formation	360
	Top of Salt	690
	Top of USGS 124 Bed	1399

COMMERCIALLY DRILLED BOREHOLE DATA BASE

BOREHOLE: I-375
OPERATOR: International Minerals & Chemical Corp.
PERMIT NO.: Potassium Prospecting Permut NM-0359161

LOCATION: 144' South 24 degrees East from Northwest
Corner of Section 33, NW1/4 Section 33,
Township 22 South, Range 31 East. NMPM

ELEVATION: 3390'
TOTAL DEPTH: 1746'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company

DRILLING RECORD: **Date Started:** 04/28/65 **Date Completed:** 05/13/65
Rotary Drill
6-1/4" Rockbit: 0-520'
3-7/8" Rockbit: 520-1300'
3-7/8" Corebit: 1300-1746'

WELL DEVELOPMENT:

CASING RECORD

4" Casing: 0-817'
Recovered: 0-129'

PLUGGING SCHEDULE

From: 1746'
To: 817'
Int: 929'
Material: Cement

From: 817'
To: 510'
Int: 307'
Material: Cement

From: 510'
To: 20'
Int: 490'
Material: Mud

From: 20'
To: 0'
Int: 20'
Material: Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
I-375	Rustler Formation	470
	Top of Salt	790
	Top of USGS 124 Bed	1602

COMMERCIALLY DRILLED BOREHOLE DATA BASE

BOREHOLE: I-376
OPERATOR: International Minerals & Chemical Corp.
PERMIT NO.: Potassium Prospecting Permit NM-0384583

LOCATION: 400' South 75 degrees East from Northwest
Corner of Section 20, NW1/4 Section 20.
Township 22 South, Range 31 East. NMPM

ELEVATION: 3410'
TOTAL DEPTH: 1702'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company

DRILLING RECORD: **Date Started:** 06/15/65 **Date Completed:** 06/23/65
Rotary Drill
6-1/4" Rockbit: 0-840'
3-7/8" Rockbit: 840-1328'
3-7/8" Corebit: 1328-1702'

WELL DEVELOPMENT:

CASING RECORD

4" Casing: 0-840'
Recovered: 0-840'

PLUGGING SCHEDULE

From: 1702'
To: 800'
Int: 902'
Material: Cement

From: 800'
To: 720'
Int: 80'
Material: Mud

From: 720'
To: 660'
Int: 60'
Material: Cement

From: 660'
To: 540'
Int: 120'
Material: Mud

From: 540'
To: 480'
Int: 60'
Material: Cement

From: 480'
To: 30'
Int: 450'
Material: Mud

From: 30'
To: 0'
Int: 30'
Material: Cement

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
I-376	Rustler Formation	500
	Top of Salt	840
	Top of USGS 124 Bed	1581



COMMERCIALLY DRILLED BOREHOLE DATA BASE

BOREHOLE: I-377
OPERATOR: International Minerals & Chemical Corp.
PERMIT NO.: Potassium Prospecting Permit NM-0384584

LOCATION: 105' South 48 degrees East from Northwest
Corner of Section 22, NW1/4 Section 22,
Township 22 South, Range 31 East. NMPM

ELEVATION: 3490'
TOTAL DEPTH: 1876'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Co.

DRILLING RECORD: **Date Started:** 06/26/65 **Date Completed:** 07/16/65
Rotary Drill
6-1/4" Rockbit: 0-996'
3-7/8" Rockbit: 996-1530'

WELL DEVELOPMENT:

CASING RECORD

4" Casing: 0-996'
Recovered: 0-996'

PLUGGING SCHEDULE

From: 1876'
To: 996'
Int: 880'
Material: Cement

From: 996'
To: 925'
Int: 71'
Material: Mud

From: 925'
To: 885'
Int: 40'
Material: Cement

From: 885'
To: 730'
Int: 155'
Material: Mud

From: 730'
To: 700'
Int: 30'
Material: Cement

From: 700'
To: 10'
Int: 690'
Material: Mud

From: 10'
To: 0'
Int: 10'
Material: Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
I-377	Rustler Formation	700
	Top of Salt	1014
	Top of USGS 124 Bed	1770



COMMERCIALLY DRILLED BOREHOLE DATA BASE

BOREHOLE: I-456
OPERATOR: International Minerals & Chemical Corp.
PERMIT NO.: Potassium Prospecting Permit NM-0384584

LOCATION: 300' from South Line and 2650' from East
Line of Section 22, SW1/4 Section 22,
Township 22 South, Range 31 East. NMPM

ELEVATION: 3520'
TOTAL DEPTH: 1975'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company

DRILLING RECORD: **Date Started:** 06/22/76 **Date Completed:** 07/07/76
Rotary Drill
6-1/4" Rockbit: 0-940'
3-7/8" Rockbit: 940-1580'
3-7/8" Corebit: 1580-1975'

WELL DEVELOPMENT:

CASING RECORD

4" Casing: Unknown
Recovered: All

PLUGGING SCHEDULE

From: 1975'
To: 0'
Int: 1975'
Material: Cement



COMMERCIALY DRILLED BOREHOLE DATA BASE

BOREHOLE: KSMITH
OPERATOR: Mark Smith and Sons
PERMIT NO.:

LOCATION: 22.31.15.130a

ELEVATION: 3460'

TOTAL DEPTH: 167.3'

TYPE OF WELL:

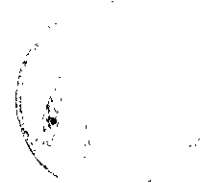
DRILLER:

DRILLING RECORD: **Date Started:**
12"

Date Completed:

WELL DEVELOPMENT:

Capped - Water Well



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
I-456	Rustler Formation	790
	Top of Salt	1080
	Top of USGS 124 Bed	1853



**Energy Department
Wells Data Base**



ENERGY DEPARTMENT WELLS DATA BASE

BOREHOLE: AEC-7
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1323

LOCATION: 2036.97' FNL, 2033.23' FEL
Sec. 31, T 21 S, R 32 E

ELEVATION: 3657.25' (Top of Casing)
TOTAL DEPTH: 4734'
TYPE OF WELL: Geological Exploration
DRILLER: Verna Drilling Company

DRILLING RECORD: **Date Started:** 03/20/74 **Date Completed:** 04/19/80

HOLE SIZE: 17 1/2": 0 to 40'
12 1/2": 40 to 1016'
7 7/8": 1016 to 4734'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade: H-40
Wt/Ft: 48
From: 0
To: 40
Cement:

Diameter: 8 5/8
Grade: H-40
Wt/Ft: 28
From: 0
To: 1016
Cement:



*****RECOMPLETION*****

1979, SNL deepened AEC-7 to 4720' to investigate the regional-formation-pressure distribution in the Bell Canyon Formation and to test borehole-plugging concepts. AEC-7 was completed open hole to 4455' and plugged with grout from 4455' to 4483'.

1980, the well was capped and remained unused until June 1988.

June 1988, AEC-7 was reentered by SNL and INTERA Technologies to reconfigure the well as a Culebra-dolomite observation well.

June 29, 1988, a Baker Service Tools inflatable, retrievable bridge plug was installed in AEC-7 at approximately 950'. After setting the bridge plug, 260 gallons of borehole fluid were air-lifted from the borehole. The Culebra dolomite interval in AEC-7 was shot-perforated at 4 shots/foot from 859' to 890'. Following perforation, a Baker Service Tools PIP was installed from 849' to 851' to prepare the well for bailing and/or swabbing to promote well development and hydrologic testing.

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
AEC-7	Quaternary	
	Holocene-Eolian Sand	16.2-20.2
	Mescalero Caliche	20.2-24.2
	Triassic	
	Santa Rosa Sandstone	24.2-133.0
	Permian	
	Dewey Lake Red Beds	133.0-675.0
	Rustler Formation	675.0-1000.6
	Magenta Dolomite Member	733.5-767.0
	Culebra Dolomite Member	872.2-900.5
	Salado Formation	1000.6-3014.7
	Upper Member	1000.6-1505.1
	MB 101	1125.8
	MB 102	1158.5
	MB 103	1171.4-1186.5
	MB 104	1197.0
	MB 105	1211.5
	MB 106	1230.5
	MB 107	1269.0
	MB 108	1278.0
	MB 109	1303.8-1324.5
	MB 111	1378.0
	MB 112	1397.5
	MB 114	1450.5
	MB 116	1498.4
	McNutt Potash Zone	1505.1-1881.0
	Vaca Triste Sandstone	1505.1-1514.1
	MB 117	1578.9
	MB 118	1595.6
	MB 119	1619.8
	MB 121	1661.5
	MB 122	1668.5
	Union Anhydrite	1696.2-1705.0
MB 123	1774.8-1781.2	
MB 124	1785.5-1795.5	
MB 126	1881.0	
Lower Member	1881.0-3104.7	
MB 128	1918.0	
MB 129	1943.9	
MB 131	2013.5	
MB 132	2039.0	
MB 133	2057.5	
MB 134	2097.0-2109.0	
MB 136	2161.0-2168.0	
MB 139	2267.5	
MB 140	2302.8-2314.2	
MB 141	2364.5	
MB 142	2400.2-2406.5	
MB 143	2453.0-2455.6	
Cowden Anhydrite	2520.0-2539.0	

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
AEC-7	Castile Formation	3014.7-4535.3
	Anhydrite III	3014.7-3113.0
	Halite II	3113.0-3310.0
	Anhydrite II	3310.0-3506.9
	Halite II	3506.9-3588.2
	Anhydrite II	3588.2-4055.0
	Halite I	4055.0-4182.3
	Anhydrite I	4182.3-4535.5
	Bell Canyon Formation	4535.5-4731.9 (T.D.)
	Reef Talus	4535.5-4584.7
	Lamar Limestone	4584.7-4633.3
	Ramsey Sandstone	4633.3-4678.5
	Ford Shale	4678.5-4714.9
	Olds Sandstone	4714.9-4731.9



ENERGY DEPARTMENT WELLS DATA BASE

BOREHOLE: AEC-8
OPERATOR: Sandia National Labs
PERMIT NO.: Unkown

LOCATION: 935' FNL, 1979' FWL
Sec. 11, T 22 S, R 31 E

ELEVATION: 3532' (Top of Casing)
TOTAL DEPTH: 4922'
TYPE OF WELL: Geological Exploration
DRILLER: Sonora Drilling Company

DRILLING RECORD: **Date Started:** 06/28/76 **Date Completed:** 08/05/76

HOLE SIZE: 17 1/2": 0 to 42'
 12 1/4": 42 to 886'
 7 7/8": 886 to 4922'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 54.5
From: 0
To: 42
Cement:

Diameter: 8 5/8
Grade:
Wt/Ft: 28
From: 0
To: 885
Cement: 660 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 4919
Cement: 2481 Cu. Ft.

Completed logging. Ran 7 7/8" bit in the hole and conditioned mud to run casing. Corrected total depth to 4922'. Laid down drill pipe. Ran 123 joints (4933.72') of 5 1/2" O.D., 15.50#, J-55, range 3, ST&C casing in the hole and landed at 4918.77' (4907.22' GL). A Halliburton guide shoe was on bottom with a float shoe at 4859.52' GL. Centralizers were placed at 4905' GL, 4827' GL, 800' GL and 50' GL. 38 joints (1533.25') of casing were sand blasted for better bond from 2374' to 4907' KB.

Completed running casing. Cemented annulus using Halliburton with 1500 sacks (2085 cu ft) of 50-50 Pozmix "C" with 9.7 #/sk of salt and 2% bentonite followed by 300 sacks (396 cu ft) of Class "C" cement. Displaced cement with 117 barrels of water. Casing was reciprocated during displacement. After displacing 90 barrels approximately 2 barrels of cement circulated to the surface, circulation was lost at this point. Bumped plug with 2000 psi and held. Cement in place at 0220 hours. Ran Dresser Atlas temperature log, top of cement at 880'. Ran Sperry-Sun gyroscopic multishot survey in the hole on 25' stations and 100' stations out of the hole.

All depths are measured from Kelly Bushing 11.5' above ground level.

Currently used as a Bell Canyon Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
AEC-8	Quaternary: Holocene-Eolian Sand	9.0-29.0
	Mescalero Caliche	29.0-35.0
	Triassic	
	Santa Rosa Sandstone	35.0-177.4
	Permian	
	Dewey Lake Red Beds	177.4-668.0
	Rustler Formation	668.0-990.0
	Magenta Dolomite Mem	727.3-749.5
	Culebra Dolomite Mem	848.3-873.3
	Salado Formation	990.0-2979.6
	Upper Member	990.0-1469.3
	MB 101	1101.0-1116.5
	MB 102	1146.7
	MB 103	1157.7-1173.7
	MB 104	1184.4
	MB 105	1197.6
	MB 106	1215.3
	MB 107	1240.5
	MB 108	1261.3
	MB 109	1286.1-1304.7
	MB 111	1351.9
	MB 112	1370.4
	MB 113	1398.7
	MB 114	1418.2
	MB 115	1451.3
	MB 116	1462.5
	McNutt Potash Zone	1469.3-1826.5
	Vaca Triste Sands	1469.3-1484.1
	MB 117	1535.4
	MB 118	1557.0
	MB 119	1580.5
	MB 120	1603.2
	MB 121	1622.0
	MB 122	1628.6
	Union Anhydrite	1648.0-1657.9
	MB 123	1733.5
	MB 124	1746.8
MB 126	1826.5	
Lower Member	1826.5-2979.6	
MB 127	1849.5	
MB 128	1861.5	
MB 129	1885.3	
MB 130	1894.7	
MB 131	1959.6	
MB 132	1989.0	
MB 133	2005.5	
MB 134	2047.9-2060.5	
MB 135	2076.0	
MB 136	2114.0-2128.3	
MB 137	2138.5	



STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
AEC-8	MB 138	2187.4
	MB 139	2247.8
	MB 140	2309.1-2316.5
	MB 141	2369.1
	MB 142	2411.8-2419.6
	MB 143	2465.2-2472.7
	MB 144	2498.8-2510.9
	Cowden Anhydrite	2539.5-2561.6
	Castile Formation	2979.6-4315.0
	Anhydrite III	2979.6-3290.0
	Halite II	3290.0-3555.0
	Anhydrite II	3555.0-3695.5
	Halite I	3695.5-4038.0
	Anhydrite I	4038.0-4315.0
	Bell Canyon Formation	4315.0-4918.0 (T.D.)
	Lamar Limestone	4344.5-4374.0
	Ramsey Sand	4374.0-4436.0
Ford Shale	4436.0-?	



ENERGY DEPARTMENT WELLS DATA BASE

BOREHOLE: DOE-1
OPERATOR: Westinghouse
PERMIT NO.: Unknown

LOCATION: 182.4' FSL, 607.8' FEL
Sec. 28, T 22 S, R 31 E

ELEVATION: 3465.22' (Top of Casing)
TOTAL DEPTH: 4057.3'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Salazar Bros. Drilling Co.

DRILLING RECORD: **Date Started:** 07/14/82 **Date Completed:** 07/28/82

HOLE SIZE: >20": 0 to 49'
14 3/4": 49 to 1122.5'
7 7/8": 1122.5 to 4053.3'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 10 3/4 O.D.
Grade:
Wt/Ft:
From: 0
To: 41
Cement: Set and cemented

Diameter: 10 3/4 O.D.
Grade: J-55
Wt/Ft: 40.5
From: 41
To: 1123
Cement: Set and cemented

Diameter: 7 7/8
Grade:
Wt/Ft:
From: 1126.2
To: 4057
Cement: Uncased

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
DOE-1	Quaternary	
	Eolian Sand	Not Described
	Gatuna Formation	Not Described
	Triassic	
	Santa Rosa Sandstone	46.0-133.0
	Permian	
	Dewey Lake Red Beds	133.0-667.5
	Rustler Formation	667.5-976.5
	Magenta Dolomite Member	722.0-745.0
	Culebra Dolomite Member	828.6-850.5
	Salado Formation	976.5-2936.5
	Upper Member	976.5-1486.0
	MB 101	1102.0
	MB 102	1138.5
	MB 103	1159.0-1169.0
	MB 105	1199.0
	MB 106	1216.0
	MB 107	1254.0
	MB 108	1263.0
	MB 109	1286.0-1309.5
	MB 111	1361.3
	MB 112	1379.8
	MB 113	1406.9
	MB 114	1429.3
	MB 115	1465.8
	MB 116	1477.6
	McNutt Potash Zone	1486.0-1880.3
	Vaca Triste Sandstone	1486.0-1489.8
	MB 117	1557.2
	MB 118	1582.6
	MB 119	1608.0
	MB 120	1632.0
	MB 121	1646.5
	MB 122	1656.0
	Union Anhydrite	1681.4-1694.0
	MB 123	1762.0-1769.9
	MB 124	1773.0-1783.8
MB 126	1880.3	
Lower Member	1880.3-2936.5	
MB 127	1907.4	
MB 128	1919.7	
MB 129	1944.3	
MB 130	1956.7	
MB 131	2025.8	
MB 132	2056.6	
MB 133	2076.0	
MB 134	2117.0-2130.0	
MB 135	2149.4	
MB 136	2192.1-2197.1	
MB 137	2209.2	

STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
DOE-1	MB 138	2264.0
	MB 139	2323.7
	MB 140	2374.5-2389.0
	MB 141	2457.0
	MB 142	2497.0-2512.0
	MB 143	2563.5-2570.5
	MB 144	2606.0-2621.5
	Cowden Anhydrite	2647.8-2677.0
	Castile Formation	2936.5 (T.D.)
	Anhydrite III	2936.5-3374.8
	Halite II	3374.8-3600.0
	Anhydrite II	3600.0-3708.3
	Halite I	3708.3-4032.3
Anhydrite I	4032.3-(T.D.)	



ENERGY DEPARTMENT WELLS DATA BASE

BOREHOLE: DOE-2
OPERATOR: U.S. Department of Energy
PERMIT NO.: 0.08.1467 (State Engineers Office)

LOCATION: 704.07' FSL, 128.19' FEL
Sec. 8, T 22 S, R 31 E

ELEVATION: 3419.09' (Top of Casing)
TOTAL DEPTH: 4325'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Unkown

DRILLING RECORD: **Date Started:** 09/08/84 **Date Completed:** 09/18/84

HOLE SIZE: 12 1/4": 0 to 1009'
7 7/8": 1009 to 4325'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9.625
Grade: J-55
Wt/Ft: 36
From: 0
To: 1009
Cement:

Diameter: 13 3/8 O.D.
Grade: H-40
Wt/Ft: 48#
From: 0
To: 39
Cement: Cemented with 81 Cu. Ft.

*****RECOMPLETION*****

April 2, 1986, the Culebra-dolomite interval was perforated.

April 1, 1986, the PIP was released and removed from the well. During removal the 6 5/8" packer element was stripped off the packer mandrel (probably in the Salado Formation interval from 1400' to 1700').

April 2, 1986, the well was re-entered and a Baker 7 1/8" Inflatable Bridge Plug was set at 875'. Natural-gamma and casing-collar-locator geophysical logs were used to determine the location of the Culebra-dolomite. The 9 5/8" casing was shot-perforated from 822' to 848' with 1/2" bullets at 4 shots/foot.

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
DOE-2	Quaternary	
	Holocene-Dune Sand	0-8
	Pleistocene-Mescalero Caliche	8-13
	Triassic	
	Santa Rosa Sandstone	13-133.3
	Permian	
	Dewey Lake Red Beds	133.3-639.1
	Rustler Formation	639.1-698.6
	Forty-Niner Member	698.6-722.4
	Magenta Dolomite Member	722.4-823.7
	Tamarisk Member	823.7-846.0
	Culebra Dolomite Member	846.0-960.9
	Unnamed Lower Member	
	Salado Formation	960.9-3082.8
	Upper Member	960.9-1448.7
	MB 101	1080.3-1084.2
	MB 102	1116.6-1117.7
	MB 103	1130.4-1143.5
	MB 104	1154.7-1155.1
	MB 105	1170.8-1171.8
	MB 106	Not Present
	MB 107	1228.0-1228.4
	MB 108	1237.5-1238.1
	MB 109	1260.0-1283.5
	MB 110	Not Present
	MB 111	1330.8-1331.0
MB 112	1347.0-1349.2	
MB 113	1372.4-1372.9	
MB 114	1394.3-1394.8	
MB 115	1427.7-1430.6	
MB 116	1439.3-1441.4	
McNutt Potash Zone	1448.7-1827.4	
Vaca Triste Sandstone	1448.7-1456.1	
MB 117	1510.0-1511.9	
MB 118	1533.6-1534.7	
MB 119	1556.8-1557.9	
10th Ore Zone	1574.0-1580.0	
MB 120	1581.4-1581.8	
9th Ore Zone	1580-1584(EST.)	
MB 121	1598.5-1599.8	
MB 122	1606.6-1607.5	
8th Ore Zone	1611.1-1619.3	
Union Anhydrite	1630.1-1637.9	
MB 123	1716.5-1721.9	
MB 124	1728.8-1738.4	
4th Ore Zone	1746.0-1748.5	
3rd Ore Zone	1766-1774(EST.)	
2nd Ore Zone	1780-1782.5(EST.)	
MB 125	Not Present	
MB 126	1825.9-1827.4	

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET	
DOE-2	Lower Member	1827.4-3082.8	
	MB 127	1852.7-1853.8	
	MB 128	1864.5-1865.5	
	MB 129	1889.9-1891.9	
	MB 130	1901.8-1902.0	
	MB 131	1971.2-1971.7	
	MB 132	1999.7-2001.2	
	MB 133	2018.8-2021.7	
	MB 134	2069.3-2081.0	
	MB 135	2099.8-2100.5	
	MB 136	2144.9-2157.3	
	MB 137	Not Present	
	MB 138	2203.1	
	MB 139	2303.3-2306.3	
	MB 140	2372.1-2388.0	
	MB 141	2450.1-2454.5	
	MB 142	2503.6-2517.9	
	MB 143	2566.4-2571.6	
	MB 144	2603.6-2615.7	
		Cowden Anhydrite	2644.5-2669.5
		Castile Formation	3082.8-4071.4
		Anhydrite III	3082.8-3801.1
		Halite II	Not Present
		Anhydrite II	?
		Halite I	3801.1-3809.2
		Anhydrite I	3809.2-4071.4
		Delaware Mountain Group	
		Bell Canyon Formation	4071.4-4325+
		Lamar Limestone Member	4071.4-4103.4
		Ramsey Sand	4103.4-4174.0
		Ford Shale	4174.0-4182.8
		Olds Sand	4182.8-4218.2(?)
	Hays Sand	4218.2(?) -4248+	

ENERGY DEPARTMENT WELLS DATA BASE

BOREHOLE: ERDA-6
OPERATOR: Sandia National Labs
PERMIT NO.: Unkown

LOCATION: 2152' FSL, 910' FEL
Sec. 35, T 21 S, R 31 E

ELEVATION: 3540.2' (Top of Casing)
TOTAL DEPTH: 2775'
TYPE OF WELL: Geologic Exploration
DRILLER: Boyles Bros. Drilling Company: 06/11/75 to 08/15/75 - Pan AM Dri

DRILLING RECORD: **Date Started:** 06/13/75 **Date Completed:** 09/23/75

HOLE SIZE: 17 1/4": 0 to 30'
12 1/4": 30 to 883'
7 7/8": 883 to 2775'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 54.5
From: 0
To: 30
Cement: Ready Mix

Diameter: 8 5/8
Grade: K-55
Wt/Ft: 24
From: 0
To: 880
Cement: 575 SX

Plugged back 2773' to 2560' with 225 sacks of cement. Hole filled with brine.

Plugged and abandoned.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
ERDA-6	Quaternary	
	Holocene-Eolian Sand	0-9
	Mescalero Caliche	9-17
	Triassic	
	Santa Rosa Sandstone	17-72
	Permian	
	Dewey Lake Red Beds	72-538
	Rustler Formation	538-811
	Dissolution Residue	570-581
	Magenta Dolomite Member	598-623
	Dissolution Residue	696-707
	Culebra Dolomite Member	713-739
	Dissolution Residue	742-762
	Salado Formation	811-2396.5
	Upper Unit	811-1276.6
	MB 100	NR
	MB 101	923.5-929.9
	MB 102	956.8-958.2
	MB 103	970.3-984.3
	MB 104	992.1-992.4
	MB 105	NR
	MB 106	NR
	MB 107	1060.0-1060.9
	MB 108	1069.1-1069.9
	MB 109	1090.9-1113.5
	MB 110	NP
	MB 111	1161.5-1161.8
	MB 112	1178.9-1180.2
	MB 113	NP
	MB 114	1224.9-1226.9
	MB 115	1256.1-1257.2
	MB 116	1268.7-1271.4
	McNutt Potash Zone	1276.6-1612.9
Vaca Triste Sandstone	1276.6-1287.3	
11th Ore Zone	1324.7-1329.8	
MB 117	1340.7-1342.7	
	1346-1349.0	
MB 118	1359.0-1366.2	
MB 119	1378.4-1379.4	
10th Ore Zone	1386.1-1395.5	
MB 120	1401.0-1402.3	
9th Ore Zone	1403.2-1410.3	
MB 121	1413.3-1415.5	
MB 122	1422.3-1424.3	
8th Ore Zone	1424.9-1437.0	
Union Anhydrite	1444.6-1453.8	
7th Ore Zone	1464.0-1468.5	
6th Ore Zone	1479.7-1482.2	
5th Ore Zone	1487.8-1494.9	
MB 123	1517.7-1524.9	

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
ERDA-6	MB 124	1529.4-1537.5
	4th Ore Zone	1541.9-1549.1
		1549.7-1553.0
	3rd Ore Zone	1555.5-1567.2
	2nd Ore Zone	1571.0-1574.3
	MB 125	NP
	1st Ore Zone	1587.0-1603.3
	MB 126	NP
	Lower Member	1612.9-2396.5
	MB 127	1635.0-1635.7
	MB 128	1647.7-1648.5
	MB 129	1670.0-1671.5
	MB 130	NP
	MB 131	1743.0-1743.7
	MB 132	1770.6-1771.4
	MB 133	1785.6-1789.2
	MB 134	1833.2-1843.4
	MB 135	1860.4-1861.5
	MB 136	1900.5-1910.5
	MB 137	NP
	MB 138	1967.5-1967.7
	MB 139	2019.5-2022.4
	MB 140	2060.4-2075.6
	MB 141	2124.5-2126.6
	MB 142	2163.8-2169.5
	MB 143	2212.7-2215.6
	MB 144	2237.0-2237.7
	Cowden Anhydrite	2269.5-2291.0
Castile Formation	2400.5-2775.0	
Halite II	2400.5-2555.1	
Anhydrite II	55.1-2732.5 (Fault or Rupture Zone)	
Halite I	2732.5-2775.0	
Cowden Anhydrite	2540.0-2653.0	
Castile Formation	2836.0-2889.0	



ENERGY DEPARTMENT WELLS DATA BASE

BOREHOLE: ERDA-9
OPERATOR: Sandia National Labs
PERMIT NO.: Unknown

LOCATION: 267.17' FSL, 176.74' FEL
Sec. 20, T 22 S, R 31 E

ELEVATION: 3410.10' (Top of Casing)
TOTAL DEPTH: 2886'
TYPE OF WELL: Geologic Exploration
DRILLER: Sonora Drilling Company

DRILLING RECORD: **Date Started:** 04/28/76 **Date Completed:** 06/26/76

HOLE SIZE: Excavated: 0 to 5'
20": 5 to 40'
15": 51 to 1049'
9 7/8": 1049 to 2886'

WELL DEVELOPMENT:

Diameter: 16
Grade:
Wt/Ft:
From: 0
To: 40
Cement: 95 Cu. Ft.

Diameter: 10 3/4
Grade: J-55
Wt/Ft: 40.5
From: 0
To: 1045
Cement: 1159 Cu. Ft.

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 2883
Cement: Mud Pack

Ran Dresser Atlas caliper log. Ran 79 joints (2889.66') of 7" O.D., 23# casing with a Dowell swirl type shoe on bottom and a Dowell orifice fill collar on top of the bottom joint. Set casing at 2882.66' with centralizers at 2868', 2520', and 1030'. Rigged up Dowell and pumped in 140 barrels of Baroid casing pack mud. Cemented annulus with 10 barrels of water, 12 barrels of chemical wash, 12 barrels of oil base slurry ahead of 122 cu. ft. (115 sacks) of Class "H" cement + 3% calcium chloride. Seated plug with 1000 psi, plug holding. Cement in place at 1445 hours.

All depths are measured from Kelly Bushing 11.5' above ground level.

*****RECOMPLETION*****

October 1, 1986, cut the 7" casing in ERDA-9 at 980' with an explosive charge and removing the cut casing from the borehole. A 7" retrievable bridge plug was then installed inside 10 3/4" casing from 760.15' to 761.90' below top of wellhead.

October 4, 1986, ERDA-9 was flushed with 300 barrels of freshwater, washed twice with 150 barrels of freshwater mixed with 25 gallons of MilChem-MD (a degreaser), and rinsed with 300 barrels of freshwater to remove remnant oil-emulsion drilling fluid that

ENERGY DEPARTMENT WELLS DATA BASE

was left in the well after the original well completion.

October 20-21, 1996, the borehole fluid was bailed and pumped to a depth of 511'. The remaining fluid was left in the borehole to provide a fluid cushion for the perforation tool and to provide a post-perforation underpressure on the formation to help stimulate flow from the formation to the borehole.

October 22, 1986, the 10 3/4" casing in ERDA-9 was perforated across the Culebra-dolomite interval between 705.5' and 728.5' with 15/32" jet shots at 4 shots/foot.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
ERDA-9	Kelly Bushing (KB) to Land Surface (LS)	0-12.0
	Holocene Deposits	12.0-22.0
	Pleistocene Rocks	
	Mescalero Caliche	22.0-27.0
	Gatuna Formation	27.0-54.0
	Triassic	
	Santa Rosa Sandstone	54.0-63.0
	Permian	
	Dewey Lake Red Beds	63.0-550.0
	Ruslter Formation	550.0-860.0
	Dissolution Residue	580.0-592.0
	Magenta Dolomite Member	608.0-632.0
	Dissolution Residue	691.0-710.0
	Culebra Dolomite Member	716.0-739.0
	Dissolution Residue	742.0-748.0
	Salado Formation	860.0-2836.0
	Upper Member	860.0-1362.0
	MB 100	939.0
	MB 101	984.0
	MB 102	1026.0
	MB 103	1040.0-1050.0
	MB 104	1061.0
	MB 105	1075.0
	MB 106	1093.0-1094.0
	MB 107	1132.0
	MB 108	1142.0
	MB 109	1165.0-1188.0
	MB 110	NP
	MB 111	1238.0
	MB 112	1256.0-1258.0
	MB 113	1282.0-1284.0
	MB 114	1306.0
MB 115	1340.0-1344.0	
MB 116	1354.0-1356.0	
McNutt Potash Zone	1362.0-1742.0	
Vaca Triste Sands	1365.0-1367.0	
11th Ore Zone	1420.0-1422.0	
MB 117	1431.0-1433.0	
MB 118	1455.0-1463.0	
MB 119	1482.0	
10th Ore Zone	1487.0-1493.0	
MB 120	1501.0-1502.0	
9th Ore Zone	1507.0-1512.0	
MB 121	1515.0-1517.0	
MB 122	1524.0	
8th Ore Zone	1531.0-1542.0	
Union Anhydrite	1549.0-1557.0	
7th Ore Zone	1572.0-1576.0	
6th Ore Zone	1590.0-1593.0	
5th Ore Zone	1597.0-1603.0	



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
ERDA-9	MB 123	1630.0-1637.0
	MB 124	1645.0-1653.0
	4th Ore Zone	1659.0-1669.0
	3rd Ore Zone	1676.0-1688.0
	2nd Ore Zone	1696.0-1698.0
	MB 125	NP
	1st Ore Zone	1712.0-1723.0
	MB 126	1742.0
	Lower Member	1742.0-2836.0
	MB 127	1768.0-1770.0
	MB 128	1778.0-1781.0
	MB 129	1803.0-1805.0
	MB 130	1815.0
	MB 131	1884.0
	MB 132	1914.0-1915.0
	MB 133	1933.0-1935.0
	MB 134	1976.0-1989.0
	MB 135	2006.0
	MB 136	2043.0-2058.0
	MB 137	2075.0
	MB 138	2120.0-2121.0
	MB 139	2177.0-2180.0
	MB 140	2241.0-2251.0
	MB 141	2320.0-2330.0
	MB 142	2377.0-2391.0
	MB 143	2450.0-2456.0
	MB 144	2493.0-2506.0
		Cowden Anhydrite
	Castile Formation	2836.0-2889.0



ENERGY DEPARTMENT WELLS DATA BASE

BOREHOLE: ERDA-10
OPERATOR: Sandia National Labs
PERMIT NO.: Unknown

LOCATION: 200' FNL, 2327' FEL
Sec. 34, T 23 S, R 30 E

ELEVATION: 3371.2' (Top of Casing)
TOTAL DEPTH: 4418.5'
TYPE OF WELL: Geologic Exploration
DRILLER: Corel Drilling Company

DRILLING RECORD: **Date Started:** 08/18/77 **Date Completed:** 10/14/77

HOLE SIZE: 18": 0 to 53'
 12 1/4": 53 to 805'
 7 7/8": 805 to 4431.5'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade: H-40
Wt/Ft: 48
From: 0
To: 50
Cement: 81 Cu. Ft.

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 805
Cement: 554 Cu. Ft.

Hole plugged to surface.
All depths are measured from Kelly Bushing 13' above ground level.

PLUGGING SCHEDULE

10/01/77 - Made trip with 7 7/8" bit and conditioned hole. Ran 2 3/8" O.D. tubing in the hole and plugged back hole using Dowell with 10 barrels of water ahead of 48 barrels of mud wash followed by 414 cu. ft. of class "C" cement with 2% calcium chloride. Displace cement with 12.5 barrels of water. Cement in place at 1300 hours. Pulled tubing and waited on cement.

10/03/77 - Made trip with 7 7/8" bit and tagged cement at 3556', conditioned hole. Made up 7 13/16" core bit and cut core #32 from 3556' to 3595', recovered 10' of cement. Cut core #33 from 3595' to 3623', recovered 20' of cement. Cut core #34 from 3623' to 3630'.

10/04/77 - Completed core #34 from 3630' to 3673', recovered 27' of cement. Ran 2 7/8" O.D. tubing in the hole to 3673'. Cemented plug #2 using Dowell with 10 barrels of water ahead of 84 barrels of mud flush followed by 10 barrels of water ahead of 1040 cu. ft. of 70% class "C" cement and 30% Litepoz. Cement in place at 1140 hours. Pulled tubing to 2300' and circulated hole. Waited on cement. Laid down drill pipe.

10/05/77 - Waited on cement to 0900 hours. Tagged top of plug #2 at 2335' with tubing. Cemented plug #3 with 10 barrels of water, 60 barrels of mud flush and 10 barrels of water, ahead of 1039 cu. ft. of cement slurry. Cement in place at 1420 hours. Pulled tubing to 803' and circulated out mud flush and cement. Waited on cement.

ENERGY DEPARTMENT WELLS DATA BASE

10/06/77 - Tagged top of plug #3 at 827'. Cemented plug #4 to surface with 10 barrels of water, 1000 gallons of mud flush and 10 barrels of water ahead of 417 cu. ft. of cement slurry. Cement in place at 0050 hours. Rigged down government furnished equipment and released rig at 1600 hours.

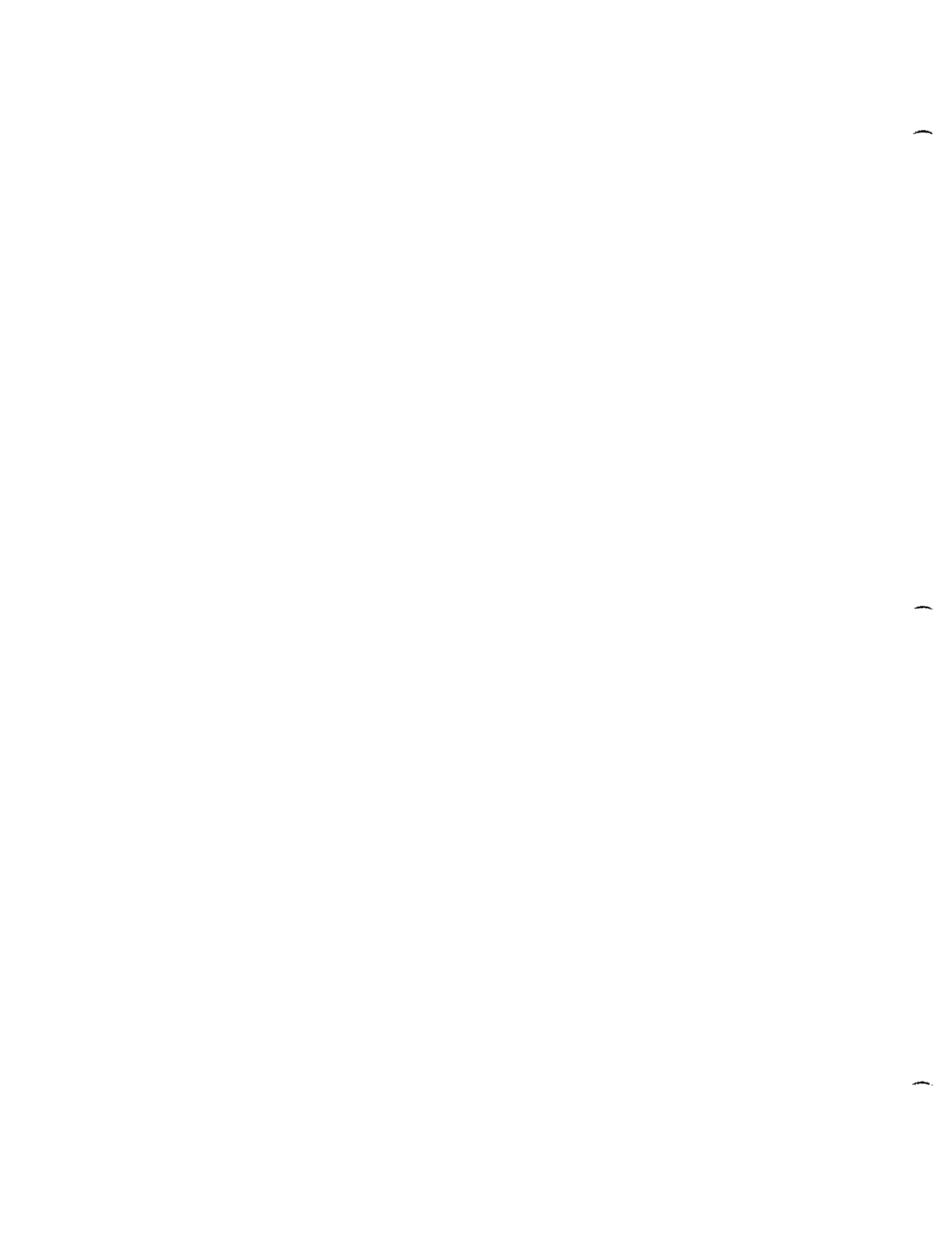
10/14/77 - Cement had dropped to 11.5' inside the 9 5/8" O.D. casing. Cemented to surface with 6 sacks of cement. Hole plugged 10/14/77.



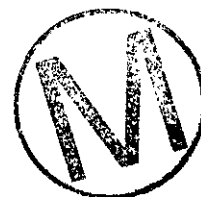
STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
ERDA-10	Quaternary	
	Holocene-Eolian Sand	
	Mescalero Caliche	13.0-17.0
	Triassic	
	Gatuna Formation	17.0-164.0
	Permian	
	Dewey Lake Red Beds	164.0-378.0
	Rustler Formation	378.0-640.0
	Magenta Dolomite Member	378.0-379.0
	Culebra Dolomite Member	489.0-517.0
	Salado Formation	640.0-2350.0
	Upper Member	640.0-1078.0
	MB 101	696.0
	MB 102	743.0
	MB 103	775.0-783.5
	MB 104	794.5
	MB 105	807.0
	MB 106	817.0
	MB 107	829.0
	MB 108	852.5
	MB 109	879.5-904.5
	MB 111	960.0
	MB 112	978.0
	MB 113	1018.0
	MB 114	1035.0
	MB 115	1068.0
	MB 116	1076.0
	McNutt Postash Zone	1087.0-1521.5
	Vaca Triste Sands	1087.0-1092.5
	MB 117	1162.0
	MB 118	1189.0
	MB 119	1225.0
	MB 121	1264.0
	MB 122	1279.5
	Union Anhydrite	1310.0-1330.0
	MB 123	1380.5-1387.0
	MB 124	1399.5-1407.5
	MB 125	1482.5
MB 126	1521.5	
Lower Member	1521.5-2350.0	
MB 128	1556.0	
MB 129	1590.0	
MB 130	1604.0	
MB 131	1674.5	
MB 132	1704.5	
MB 133	1722.0	
MB 134	1771.5-1781.0	
MB 135	1807.0	
MB 136	1855.0-1864.5	
MB 138	1930.0	





Geologic Exploration Borehole Data Base



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-11
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.994 (State Engineer's Office)

LOCATION: 711.80' FNL, 294.08' FWL
Sec. 9, T 22 S, R 31 E

ELEVATION: 3426.07'
TOTAL DEPTH: 3580'
TYPE OF WELL: Geologic Exploration
DRILLER: Verna Drilling Company

DRILLING RECORD: **Date Started:** 02/06/78 **Date Completed:** 03/14/78

HOLE SIZE: Excavated: 0 to 5'
18": 5 to 40.4'
12 1/4": 40.4 to 985'
8 3/4": 985 to 3580'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade: H-40
Wt/Ft: 48
From: 0
To: 40
Cement: 81 Cu. Ft.

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 985
Cement: 656 Cu. Ft.

Hole plugged and abandoned by DOE/Sandia.



STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WIPP-11	MB 136-T	1978.5
	MB 136-B	1978.5-1986.0
	MB 138-T	1986-2025.0
	MB 138-B	2025-2027
	Anhydrite A	Not Encountered
	Anhydrite B	Not Encountered
	MB 139-T	2061.0
	MB 139-B	2061-2064
	MB 140-T	2064-2092
	MB 140-B	2092-2105



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-12
OPERATOR: Westinghouse
PERMIT NO.: Unknown

LOCATION: 149.4' FSL, 80.4' FEL
Sec. 17, T 22 S, R 31 E

ELEVATION: 3472.06 (Top of Casing)
TOTAL DEPTH: 3927.5'
TYPE OF WELL: Geologic Exploration
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 11/17/78 **Date Completed:** 12/07/78

HOLE SIZE: 18": 0 to 38.6'
12 1/4": 38.6 to 1001.5'
7 7/8": 1001.5 to 3005'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: H-40
Wt/Ft: 32.3
From: 39
To: 1001.8
Cement: 475 Cu. Ft.

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 39
Cement: 475 Cu. Ft.

Diameter: 9 5/8
Grade: H-40
Wt/Ft: 32
From: 39
To: 1013
Cement: 475 Cu. Ft.



Hole loaded with brine based mud pending further tests. All depths are measured from Kelly Bushing 12.2 ft. above ground level.

*****RECOMPLETION*****

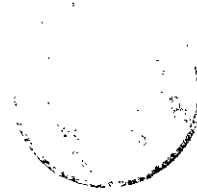
1981-1982, WIPP-12 was deepened through the Castile Formation to a total depth of 3927.5' using brine with a brine-gel clay additive as a drilling fluid (Black 1982). During the deepening, a pressurized brine reservoir was encountered in the Castile Formation at a depth of 3016'.

1983, the brine reservoir was sealed from the upper part of the borehole by installing a borehole plug from 2784' to 3000'. The borehole plug consisted of a bridge plug covered by 27' of sand and 189' of cement (D'Appolonia, 1983).

Well capped until August 1985, when drill-stem testing of the Castile and Salado Formations was performed by Sandia National Laboratories from August to September, 1985 (Beauheim, 1987a).

GEOLOGIC EXPLORATION BOREHOLE DATA BASE

Following testing, a retrievable bridge plug was set in the casing below the Culebra-dolomite interval. The Culebra was then shot-perforated on October 14, 1985 from 815' to 840' and left open for Culebra groundwater level surveillance.



STRATIGRAPHIC SUMMARY

BORIHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET	
WIPP-12	Quaternary Deposits		
	Sand (Holocene-eolian)	0-16.2	
	Mescalero Caliche	16.2-19.2	
		Gatuna Formation	19.2-28.8
		Triassic Rocks	
		Santa Rosa Sandstone	28.8-167.0
		Permian Rocks	
		Dewey Lake Red Beds	167.0-640.0
		Rustler Formation	640.0-966.0
		Magenta Dolomite Member	703.9-727.0
		Culebra Dolomite Member	822.0-846.8
		Salado Formation	966.0-2737.5
		Upper Member	966.0-1444.0
		MB 101	1084.5
		MB 102	1116.0
		MB 103	1130.0-1141.0
		MB 104	1150.0
		MB 105	1167.6
		MB 106	1183.5
		MB 107	1223.5
		MB 108	1232.5
		MB 109	1254.0-1278.0
		MB 111	1324.0
		MB 112	1338.0-1342.0
		MB 113	1367.0
		MB 114	1389.0
		MB 115	1424.5
		MB 116	1436.0
		McNutt Member	1444.0-1798.0
		Vaca Triste Sandstone Member	1444.0-1447.0
		MB 117	1507.5
		MB 118	1531.0
	MB 119	1552.0-1556.5	
	MB 120	1575.0	
	MB 121	1588.0	
	MB 122	1596.0	
	Union Anhydrite	1617.0-1625.0	
	MB 123	1695.0-1700.8	
	MB 124	1708.0-1715.4	
	MB 126	1798.0	
	Lower Member	1798.0-2737.5	
	MB 127	1825.0	
	MB 128	1834.0	
	MB 129	1856.0	
	MB 130	1867.0	
	MB 131	1928.0	
	MB 132	1957.5	



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET	
WIPP-12	MB 133	1976.0	
	MB 134	2015.0-2025.0	
	MB 135	2040.0	
	MB 136	2071.6-2083.1	
	MB 138	2135.1	
	MB 139	2184.9	
	MB 140	2226.1-2238.1	
	MB 141	2290.0-2296.0	
	MB 142	2332.0-2344.0	
	MB 143	2381.5-2387.6	
	MB 144	2413.5-2423.9	
		Cowden Anhydrite	2445.5-2471.0
		Castile Formation	2337.5-T.D.
		DEEPENED PORTION OF WIPP-12	
	Castile Formation	2776.0-T.D.	
	Anhydrite III Member	2776.0-3053.9	
	Halite II Member	3053.9-3281.8	
	Anhydrite II Member	3281.8-3391.0	
	Halite I Member	3391.0-3901.6	
	Anhydrite I Member	3901.6-T.D.	

GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-13
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.09.1182 (State Engineer's Office)

LOCATION: 2565.68' FSL, 1730.59' FWL
Sec. 17, T 22 S, R 31 E

ELEVATION: 2565.68' (Top of Casing)
TOTAL DEPTH: 3856'
TYPE OF WELL: Geologic Exploration
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 07/26/78 **Date Completed:** 10/05/79

HOLE SIZE: 15": 0 to 66'
12 1/4": 66 to 846'
7 7/8": 846 to 3856'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 48
From: 0
To: 35.5
Cement: 108 Cu. Ft.

Diameter: 9 5/8
Grade:
Wt/Ft: 36
From: 0
To: 1023
Cement: 665 Cu. Ft.

Hole loaded with brine based mud pending further test and/or plugging. All depths are measured from Kelly Bushing 12.2 ft. above ground except cores between 570 and 878 ft. and Schlumberger logs which were measured from ground level.

*****RECOMPLETION*****

WIPP -13 was left filled with a brine-gel drilling fluid, capped, and left open hole through the Salado and Castile Formations until 1985.

July 1985, a valve and nipple apparatus was attached to the bull plug fitting of the WIPP-13 wellhead.

July 2 to October 4, 1995, measured pressure.

July 12, 1985, pressure was completely released by opening a valve on the wellhead.

July 30, 1985, closed valve.

October 4, 1985, the wellhead pressure was 404 psi immediately before opening the wellhead for workover activities associated with the casing perforation. A retrievable bridge plug was then set in the casing below the Culebra-dolomite interval.

October 26, 1985, the Culebra was shot perforated from 702' to 727' and left open for Culebra groundwater level surveillance.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET	
WIPP-13	Quaternary Deposits	0-13	
	Triassic Rocks		
	Santa Rosa Sandstone	13-66	
	Permian Rocks		
	Dewey Lake Red Beds	66-517	
	Rustler Formation	517-846	
	Dissolution Residue	543-550	
	Magenta Dolomite Member	565-583	
	Dissolution Residue	679-686	
	Culebra Dolomite Member	703-726	
	Dissolution Residue	730-735	
	Top of Highest Salt in Section	745	
	Salado Formation	846-1025	
	Upper Member	846-1025	
	MB 101	967	
	MB 102	1003	
	MB 103	1018	
	DEEPENED PORTION OF WIPP-13 (Distance below K.B.)		
	Permian Rocks		
	Salado Formation	858.0-2971.6	
	Upper Member	858.0-1356.7	
	MB 103	1030.0-1042.3	
	MB 104	1069.8	
	MB 105	1091.0	
	MB 106	1111.0	
	MB 107	1128.0	
	MB 108	1136.1	
MB 109	1161.0-1185.0		
MB 111	1232.8		
MB 112	1250.0		
MB 113	1277.9		
MB 114	1300.9		
MB 115	1338.3		
MB 116	1350.0		
McNutt Member	1356.7-1730.4		
Vaca Triste Sandstone Member	1356.7-1359.0		
MB 117	1426.5		
MB 118	1451.5		
MB 119	1478.2		
MB 120	1497.0		
MB 121	1513.8		
MB 122	1522.0		
Union Anhydrite	1542.0-1550.0		
MB 123	1628.0		
MB 124	1644.7		
MB 126	1730.4		
Lower Member	1730.4-2971.6		



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET	
WIPP-13	MB 127	1757.8	
	MB 128	1770.0	
	MB 129	1794.0	
	MB 130	1804.5	
	MB 131	1873.6	
	MB 132	1902.0	
	MB 133	1924.0	
	MB 134	1968.9-1980.6	
	MB 135	1996.8	
	MB 136	2033.0-2048.0	
	MB 137	2063.0	
	MB 138	2110.2	
	MB 139	2168.3	
	MB 140	2221.0-2232.9	
	MB 141	2294.6	
	MB 142	2341.5-2355.0	
	MB 143	2409.0-2417.0	
	MB 144	2460.4	
		Cowden Anhydrite	2493.9-2521.6
		Castile Formation	2971.6-3861.6+ (T.D.)
		Anhydrite III	2971.6-3518.7
		Halite II	3518.7-3638.0
		Anhydrite II	3638.0-3727.5
	Halite I	3727.5-3821.0	
	Anhydrite I	3821.0-3861.6+ (T.D.)	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: **WIPP-14**
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1458 (State Engineer's Office)

LOCATION: 98.57' FSL, 2112.08' FEL
Sec. 9, T 22 S, R 31 E

ELEVATION: 3429' (G.L.)
TOTAL DEPTH: 1000'
TYPE OF WELL: Geologic Exploration
DRILLER: Boyles Brothers Drilling

DRILLING RECORD: **Date Started:** 05/02/81 **Date Completed:** 06/08/81

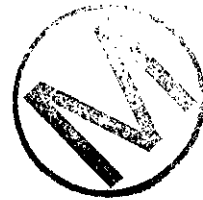
HOLE SIZE:
8 3/4": 0 to 110.4'
7 5/8": 110.4 to 111.4'
6 1/8": 111.4 to 1000'

WELL DEVELOPMENT:

CASING RECORD

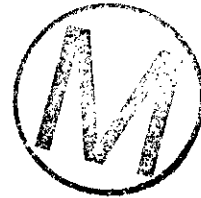
Diameter: 7 5/8
Grade: J-55
Wt/Ft: 23
From: 0
To: 111
Cement: 2 sacks

Plugged and abandoned by DOE.



STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WIPP-14	Quaternary Rocks	
	Sand (Holocene-eolian)	0-15.4
	Triassic Rocks	
	Santa Rosa Sandstone	15.4-141.0
	Permian Rocks	
	Dewey Lake Red Beds	141.0-638.7
	Rustler Formation	638.7-951
	Magenta Dolomite Member	706.5-730.0
	Culebra Dolomite Member	817.2-836.2
Salado Formation (Upper Member)	951.6	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-15
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.13.00 (State Engineer's Office)

LOCATION: 2426' FNL, 1973' FWL
Sec. 18, T 23 S, R 35 E

ELEVATION: 3269.34' (G.L.1)
TOTAL DEPTH: 810'
TYPE OF WELL: Geologic Exploration
DRILLER: Boyles Brothers Drilling

DRILLING RECORD: **Date Started:** 03/08/78 **Date Completed:** 04/04/78

HOLE SIZE: 4": 0 to 29'
3.975": 29' to 61.2'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 7
Grade: J-55
Wt/Ft: 20
From: 0
To: 13
Cement: None

Diameter: 6 1/8
Grade: HW
Wt/Ft: 11.3
From: 13
To: 592
Cement: None

Diameter: 4
Grade: Core
Wt/Ft:
From: 592
To: 810
Cement: None

Diameter: 4 1/2
Grade: HW
Wt/Ft: 11.3
From: 0
To: 555
Cement: None



Hole loaded with mud and temporarily capped pending further testing and/or plugging. Hole was relinquished to land owner for use as water well to relieve liability for plugging.

STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WIPP-15	Quaternary Deposits	
	Clay	0-34
	Marl	34-99
	Sand	99-153.3
	Clay	153.3-226
	Sand	226-547.2
	Triassic Rocks	
Chinle	547.2-790.5	
Santa Rosa Sandstone	790.5-812	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-16
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1290 (State Engineer's Office) 0.08.1182 (reentry)

LOCATION: 2356.6' FSL, 138.8' FWL
Sec. 5, T 21 S, R 30 E

ELEVATION: 3383.40' (Top of Casing)
TOTAL DEPTH: 1300'
TYPE OF WELL: Geologic Exploration
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 01/11/80 **Date Completed:** 02/08/80

HOLE SIZE: 18": 0 to 38'
6 3/4": 38 to 459'
3 3/4": 459 to 1300'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade: H-40
Wt/Ft: 48
From: 0
To: 38
Cement:

Diameter: 4 1/2
Grade: J-55
Wt/Ft: 10.5
From: 0
To: 459
Cement: None

Plugged and abandoned by DOE.



STRATIGRAPHIC SUMMARY

<u>BORZHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WIPP-16	Rubble?	0-1148
	Permian Rocks	
	Rustler Formation	1148-1300+
	Magenta Dolomite Member	1189-1199
	Culebra Dolomite Member	1153-1176
Total Depth	1300	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-18
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1123 (State Engineer's Office)

LOCATION: 983.58' FNL, 11.85' FEL
Sec. 20, T 22 S, R 31 E

ELEVATION: 3458.7' (Top of Casing)
TOTAL DEPTH: 1060'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 03/14/78 **Date Completed:** 04/03/78

HOLE SIZE: 8 3/4": 0 to 16'
6 1/8": 16 to 1060'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 7
Grade: Used
Wt/Ft: 20
From: 0
To: 16
Cement: None



Hole loaded with mud pending further testing and/or plugging.

*****RECOMPLETION*****

September-October, 1985, this well was recompleted as a hydrologic monitoring well for the Culebra-dolomite.

The recompletion activity of this well consisted of cleaning and reaming to a diameter of 7 7/8" using ten-pound per gallon salt-brine as a drilling fluid; fully cementing 5 1/2" casing to the top of the Salado Formation leaving a cement plug in the bottom of the casing; filling the casing with ten-pound per gallon salt-brine; and shot-perforating the Culebra-dolomite interval. The well is currently being used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BORHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WTFP-18	Quaternary Deposits	
	Holocene Deposits	0-5
	Mescalero Caliche	5-9
	Triassic Rocks	
	Santa Rosa Sandstone	9-138
	Permian Rocks	
	Dewey Lake Red Beds	138-613
	Rustler Formation	613-928
	Dissolution Residue	643-655
	Magenta Dolomite Member	672-696
	Dissolution Residue	757-769
	Culebra Dolomite Member	787-808
	Dissolution Residue	812-822
	Salt-bearing Interval	822-928
	Salado Formation	928-1060
	Upper Member	928-1060
MB 101	1049	
Maximum Depth Recorded	1060	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-19
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1124 (State Engineer's Office)

LOCATION: 2286.5' FNL, 12.7' FEL
Sec. 20, T 22 S, R 31 E

ELEVATION: 3435.14' (Top of Casing)
TOTAL DEPTH: 1038'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Boyles Brothers Drilling

DRILLING RECORD: **Date Started:** 04/06/78 **Date Completed:** 05/08/78

HOLE SIZE: 8 3/4": 0 to 8'
6 1/8": 8 to 1038'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 7
Grade: Used
Wt/Ft: 20
From: 0
To: 8
Cement: None



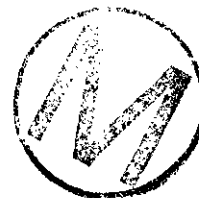
*****RECOMPLETION*****

September-October, 1985, this well was recompleted as a hydrologic monitoring well for the Culebra-dolomite.

The recompletion activity of this well consisted of cleaning and reaming to a diameter of 7 7/8" using ten-pound per gallon salt-brine as a drilling fluid; fully cementing 5 1/2" casing to the top of the Salado Formation leaving a cement plug in the bottom of the casing; filling the casing with ten-pound per gallon salt-brine; and shot-perforating the Culebra-dolomite interval. The well is currently being used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WIPP-19	Quaternary Deposits	
	Holocene Deposits	0-7
	Mescalero Caliche	7-14
	Triassic Rocks	
	Santa Rosa Sandstone	14-96
	Permian Rocks	
	Dewey Lake Red Beds	96-590
	Rustler Formation	590-895
	Dissolution Residue	619-629
	Magenta Dolomite Member	647-672
	Dissolution Residue	730-756
	Calebra Dolomite Member	756-779
	Dissolution Residue	781-795
	Salt-bearing Interval	795-895
	Salado Formation	895-1038.2
	Upper Member	895-1038.2
	MB 101	1010-1012
Maximum Depth Recorded	1034	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-21
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1126 (State Engineer's Office)

LOCATION: 1450.6' FSL, 11.7' FEL
Sec. 20, T 22 S, R 31 E

ELEVATION: 3418.96' (Top of Casing)
TOTAL DEPTH: 1045'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Boyles Brothers Drilling

DRILLING RECORD: **Date Started:** 05/24/78 **Date Completed:** 05/26/78

HOLE SIZE: 8 3/4": 0 to 20'
6 1/8": 20 to 1045'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 20
Cement: Dirt



Hole loaded with brine mud pending further testing and/or plugging.

*****RECOMPLETION*****

September-October, 1985, this well was recompleted as a hydrologic monitoring well for the Culebra-dolomite.

The recompletion activity of this well consisted of cleaning and reaming to a diameter of 7 7/8" using ten-pound per gallon salt-brine as a drilling fluid; fully cementing 5 1/2" casing to the top of the Salado Formation leaving a cement plug in the bottom of the casing; filling the casing with fresh water; and shot-perforating the Culebra-dolomite interval. The well is currently being used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

<u>BORHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WIPP-21	Quaternary Deposits	
	Holocene Deposits	0-6
	Mescalero Caliche	6-12
	Gatuna Formation	12-39
	Triassic Rocks	
	Santa Rosa Sandstone	39-73
	Permian Rocks	
	Dewey Lake Red Beds	73-560
	Rustler Formation	560-868
	Dissolution Residue	588-601
	Magenta Dolomite Member	618-642
	Dissolution Residue	706-715
	Culebra Dolomite Member	729-753
	Dissolution Residue	755-759
	Salt-bearing Interval	770-868
	Salado Formation	868-1046
	Upper Member	868-1046
	MB 101	986-989
	MB 102	1025-1026
	MB 103	1039
Maximum Depth Recorded	1046	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-22
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1127 (State Engineer's Office)

LOCATION: 2544.9' FSL, 10.82' FEL
Sec. 20, T 22 S, R 31 E

ELEVATION: 3428.12' (Top of Casing)
TOTAL DEPTH: 1450'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Boyles Brother Drilling

DRILLING RECORD: **Date Started:** 05/08/78 **Date Completed:** 05/24/78

HOLE SIZE: 8 3/4": 0 to 20'
6 1/8": 20 to 1450'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 7
Grade: Used
Wt/Ft: 20
From: 0
To: 20
Cement: None

Hole loaded with mud pending further testing and/or plugging.

*****RECOMPLETION*****

September-October, 1985, this well was recompleted as a Culebra Groundwater Level Surveillance Well.

The recompletion activity of this well consisted of cleaning and reaming to a diameter of 7 7/8" using ten-pound per gallon salt-brine as a drilling fluid; fully cementing 5 1/2" casing to the top of the Salado Formation leaving a cement plug in the bottom of the casing, filling the casing with ten-pound per gallon salt-brine, and shot-perforating the Culebra-dolomite interval. The water level has been monitored since it was perforated.

STRATIGRAPHIC SUMMARY

<u>BORRHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WIPP-22	Quaternary Deposits	
	Holocene Deposits	0-6
	Mescalero Caliche	6-13
	Triassic Rocks	
	Serra Rosa Sandstone	13-81
	Permian	
	Dewey Lake Red Beds	81-574
	Rostler Formation	574-885
	Dissolution Residue	603-614
	Magenta Dolomite Member	630-654
	Dissolution Residue	717-728
	Culebra Dolomite Member	742-764
	Dissolution Residue	767-773
	Salt Interval	777-885
	Salado Formation	885-1450
	Upper Member	883-1363
	MB 101	1000-1003
	MB 102	1036-1037
	MB 103	1049-1063
	MB 104	1071-1072
	MB 105	1086-1087
	MB 106	1102-1103
	MB 107	1142-1143
MB 108	1150-1151	
MB 109	1172-1196	
MB 111	1242-1243	
MB 112	1259-1261	
MB 113	1285-1286	
MB 114	1307-1308	
MB 115	1342-1344	
MB 116	1353-1355	
McNur Potash Unit	1363-1450	
Vaca Triste Sandstone Member	1363-1367	
MB 117	1426-1427	
Maximum Depth Recorded	1448	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-25
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1172 (State Engineer's Office)

LOCATION: 1852.77' FSL, 2838.10' FEL Sec.
15, T 22 S, R 30 E

ELEVATION: 3214.39' (Top of Casing)
TOTAL DEPTH: 650'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Boyles Brothers Drilling

DRILLING RECORD: **Date Started:** 08/28/78 **Date Completed:** 09/12/78

HOLE SIZE: 8 3/4": 0 to 21'
7 7/8": 21 to 650'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 7
Grade: J-55
WuFt: 23
From: 0
To: 21
Cement:

Diameter: 5 1/2
Grade: K-55
WuFt: 15.5
From: 0
To: 649
Cement: 269 Cu. Ft.

7" casing pulled. Culebra perforated from 445-475' with 120 holes spaced at 4 holes per foot. Magenta perforated from 300-330' with 120 holes spaced at 4 holes per foot. Rustler perforated from 579-608' with 116 holes spaced at 4 holes per foot. Top of PIP Packers set at 572.7' and 365.1'.

Currently used as a Culebra and Magenta Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

<u>BORHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WIPP-25	Pleistocene Deposits	0-17
	Permian Rocks	
	Dewey Lake Red Beds	17-232
	Rustler Formation	232-565
	Dissolution Residue	270-287
	Magenta Dolomite Member	302-328
	Dissolution Residue	415-424
	Culebra Dolomite Member	447-472
	Dissolution Residue	475-512
	Salado Formation	565-655 (T.D.)
	Upper Member	565-600
	Dissolution Residue	565-600
	MB 101	589
	MB 102	599
	Salt Interval	600-655
	MB 103	615
	MB 104	628
MB 105	640	
Maximum Depth Recorded on Geophysical Logs	651	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-26
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1173 (State Engineer's Office)

LOCATION: 2232.27' FNL, 12.20' FEL
Sec. 29, T 22 S, R 30 E

ELEVATION: 3153.20' (Top of Casing)
TOTAL DEPTH: 503'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/28/78 **Date Completed:** 09/11/78

HOLE SIZE: 8 3/4": 0 to 268'
7 7/8": 268 to 503'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 268
Cement:

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 502
Cement: 510 Cu. Ft.

7" casing pulled. Culebra perforated from 185-210' with 100 holes spaced at 4 holes per foot. Magenta perforated from 70-100' with 120 holes spaced at 4 holes per foot, and from 50-70' with 80 holes spaced at 4 holes per foot. Rustler perforated from 288-329' with 164 holes spaced at 4 holes per foot. Top of Pip Packers set at 269' and 139.1'.

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

<u>BORHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WIPP-26	Holocene Deposits	0-10
	Permian Rocks	
	Rustler Formation	10-309
	Dissolution Residue	34-50
	Magenta Dolomite Member	70-99
	Dissolution Residue	152-174
	Culebra Dolomite Member	186-209
	Dissolution Residue	213-234
	Salado Formation	309-503
	Upper Member	309-503
	Dissolution Residue	309-320
	Salt Interval	320-503
	MB 101	387
	MB 102	423
	MB 103	460
	MB 104	469
MB 105	481	
MB 106	495	
Maximum Depth Recorded	503	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-27
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1174 (State Engineer's Office)

LOCATION: 89.79' FNL, 1485.03' FWL
Sec. 21, T 21 S, R 30 E

ELEVATION: 3178.98' (Top of Casing)
TOTAL DEPTH: 592'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Boyles Brothers Drilling

DRILLING RECORD: **Date Started:** 09/12/78 **Date Completed:** 10/09/78

HOLE SIZE: 8 3/4": 0 to 200'
7 7/8": 200 to 592'



WELL DEVELOPMENT:

CASING RECORD

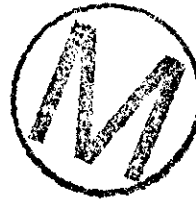
Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 588
Cement: 440 Cu. Ft.

Culebra perforated from 290-320' with 120 holes spaced at 4 holes per foot. Magenta perforated from 175-195' with 80 holes spaced at 4 holes per foot. Rustler perforated from 425-460' with 135 holes and from 483-513' with 120 holes spaced at 4 holes per foot. Top of PIP Packers set at 399.4' and 267.4'.

Currently used as a Culebra and Magenta Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WIPP-27	Quaternary Deposits	
	Holocene Deposits	0-74
	Mescalero Caliche	74-79
	Permian Rocks	
	Dewey Lake Red Beds	79-152
	Rustler Formation	152-421
	Dissolution Residue	152-193
	Magenta Dolomite Member	175-193
	Dissolution Residue	270-281
	Culebra Dolomite Member	292-318
	Dissolution Residue	321-421
	Salado Formation	421-592
	Upper Member	421-592
	Dissolution Residue	421-509
	MB 101	442-447
	MB 102	449-451
	MB 103	456-468
	MB 107-108	481-484
	MB 109	487-494
	Salt Interval	509-592
MB 113	548-550	
Maximum Depth Recorded	592	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-28
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1175 (State Engineer's Office)

LOCATION: 98.72' FNL, 2400.99' FEL
Sec. 18, T 21 S, R 31 E

ELEVATION: 3349.21' (Top of Casing)
TOTAL DEPTH: 801'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/07/78 **Date Completed:** 08/28/78

HOLE SIZE: 12 1/4": 0 to 21.5'
8 3/4": 21.5 to 216'
7 7/8": 216 to 801'

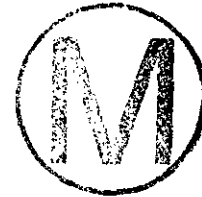
WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 21
Cement: Ready Mix

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 223
Cement:

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 800
Cement: 314 Cu. Ft.



7" casing pulled. Culebra perforated from 420-446' with 104 holes spaced at 4 holes per foot. Magenta perforated from 285-310' with 100 holes spaced at 4 holes per foot. Rustler perforated from 549-589' with 160 holes spaced at 4 holes per foot. Top of PIP Packers set at 526.7' and 365.1'.

Currently used as a Rustler/Salado Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WIPP-28	Holocene Deposits	0-12
	Permian Rocks	
	Dewey Lake Red Beds	12-215
	Rustler Formation	215-531
	Magenta Dolomite Member	285-310
	Culebra Dolomite Member	420-446
	Salado Formation	531-801 (T.D)
	Upper Member	531-801
	Dissolution Residue	531-589
	MB 101	567
	MB 103	585
	Salt Interval	589-801
	MB 105	598
	MB 106	612
	MB 107	656
	MB 108	664
	MB 109	694
	MB 111	731
	MB 112	743
	MB 113	769
MB 114	791	
	Maximum Depth Recorded	802



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-29
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1176 (State Engineer's Office)

LOCATION: 406.62' FSL, 1827.54' FEL
Sec. 34, T 22 S, R 29 E

ELEVATION: 2978.26' (Top of Casing)
TOTAL DEPTH: 377'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 10/03/78 **Date Completed:** 10/10/78

HOLE SIZE: 8 3/4": 0 to 135'
7 7/8": 135 to 377'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 376
Cement: 135 Cu. Ft.



Top joint of 5 1/2" casing is 14 lb. Culebra perforated from 10-45' with 140 holes spaced at 4 holes per foot. Rustler perforated from 216-250' with 136 holes spaced at 4 holes per foot. Top of PIP Packers set at 203.7.

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BORZHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WIPT-29	Holocene Deposits	0-12
	Permian Rocks	
	Rustler Formation	12-143
	Culebra Dolomite Member	12-42
	Salado Formation	143-377 (T.D.)
	Upper Member	143-248
	Dissolution Residue	143-248
	MB 101	175
	MB 102	181
	MB 103	199
	MB 109	228
	McNitt Potash Zone	248-377 (T.D.)
	Dissolution Residue	248-251
	Vaca Triste Sandstone Member	248-251
	Salt Interval	251-377
	MB 117	319
	MB 118	346
Maximum Depth Recorded	358	



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-30
OPERATOR: Sandia National Laboratories
PERMIT NO.: 0.08.1177 (State Engineer's Office)

LOCATION: 667.5' FNL, 177.41' FWL
Sec. 33, T 21 S, R 30 E

ELEVATION: 3429.05' (Top of Casing)
TOTAL DEPTH: 913'
TYPE OF WELL: Geologic Exploration/Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 09/08/78 **Date Completed:** 10/02/78

HOLE SIZE: 4.95": 0 to 913'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 246
Cement:

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 912
Cement: 463 Cu. Ft.

7" casing pulled. Culebra perforated from 631-654' with 92 holes spaced at 4 holes per foot. Magenta perforated from 510-540' with 120 holes spaced at 4 holes per foot. Rustler perforated from 731-753' with 88 holes spaced at 4 holes per foot. Top of PIP Packers set at 701.1' and 585.4'.

*****RECOMPLETION*****

March, July, September 1980, WIPP-30 was perforated across three intervals: the Rustler-Salado contact, from 731' to 753'; the interval from 631' to 654', which includes the Culebra-dolomite from 631' to 653'; and the interval from 510' to 540', which includes the Magenta-dolomite from 513' to 537'.

July and August, 1980, after perforation and testing, two retrievable bridge plugs were installed to prevent mixing of fluids between the Rustler-Salado contact, the Culebra-dolomite, and the Magenta-dolomite.

August 1983, the upper bridge plug in WIPP-30 was replaced with a 4 1/4" PIP installed on 2 3/8" tubing. The PIP was set at 570'.

October 1987, the PIP was removed from WIPP-30.

October 29, 1987, the casing was perforated with 15/32" bullets at 4 shots/foot over a 26' interval from 629' to 655' including the Culebra-dolomite interval from 631' to 653'.

Currently used as a Culebra and Magenta Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WIPP-30	Permian Rocks	
	Dewey Lake Red Beds	0-449
	Rustler Formation	449-748
	Magenta Dolomite Member	513-537
	Culebra Dolomite Member	631-653
	Salado Formation	748-912 (T.D.)
	Upper Member	748-912
	Salt Interval	748-912
	MB 101	862
	MB 102	894
	MB 103	In Bed at Total Depth
	Maximum Depth Recorded	908



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-31
OPERATOR: Sandia National Laboratories
PERMIT NO.: Unknown

LOCATION: 422.54' FSL, 1762.24' FWL
Sec. 35, T 20 S, R 30 E

ELEVATION: 3401.43' (Top of Casing)
TOTAL DEPTH: 1981.7'
TYPE OF WELL: Geologic Exploration
DRILLER: Chortes Drilling Company

DRILLING RECORD: **Date Started:** 07/18/80 **Date Completed:** 09/29/80

HOLE SIZE: 18": 0 to 40'
7 7/8": 40 to 810'

WELL DEVELOPMENT:

CASING RECORD

Diameter:
Grade: 6' x 6' CEL
Wt/Ft:
From: 0
To: 5
Cement: Dirt



Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 3
To: 37
Cement: 81 Cu. Ft.

Diameter: 7 5/8
Grade: J-55
Wt/Ft: 26.4
From: 2.5
To: 808
Cement: 414 Cu. Ft.

Hole plugged and abandoned.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WIPP-31	Gatuna Formation	Not Present
	Santa Rosa Formation	0 (Breccia)
	Dewey Lake Redbeds	38 (Breccia)
	Rustler Formation	750 (Breccia)
	Magenta Dolomite Member	1981 (Breccia)
	Top of Salado Formation	Not Present
	Total Depth	1981



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: **WIPP-32**
OPERATOR: Sandia National Laboratories
PERMIT NO.: SEO: 04/25/79; USGS: 10/15/79

LOCATION: 1673.22' FSL, 29.14' FEL
Sec. 33, T 22 S, R 29 E

ELEVATION: 3023.26' (Top of Casing)
TOTAL DEPTH: 390'
TYPE OF WELL: Geologic Exploration
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/07/79 **Date Completed:** 08/23/79

HOLE SIZE: Excavated: 0 to 4'
6 3/4": 4 to 390'

WELL DEVELOPMENT:

CASING RECORD

No casing used.

Hole plugged to surface with 500 Cu. Ft. cement.



STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WIPP-32	Rustler Formation	0-166
	Magenta Dolomite Member	19-36
	Culebra Dolomite Member	61-90
	Top of Salado Formation	166-390
	Total Depth	390



GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: WIPP-33
OPERATOR: Sandia National Laboratories
PERMIT NO.: SEO: 04/25/79

LOCATION: 1762.48' FSL, 2426.65' FWL
Sec. 13, T 22 S, R 30 E

ELEVATION: 3323.23' (Top of Casing)
TOTAL DEPTH: 840'
TYPE OF WELL: Geologic Exploration
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 07/13/79 **Date Completed:** 07/26/79

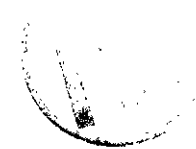
HOLE SIZE: Excavated: 0 to 5'
 18": 5 to 38'
 6 3/4": 38 to 840'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 38
Cement: 192 Cu. Ft.

Hole plugged and abandoned on 09/04/79.



STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WIPP-33	Surficial Deposits	0-40
	Dewey Lake Red Beds	40-398
	Rustler Formation	398-675
	Magenta Dolomite Member	449-468
	Culebra Dolomite Member	550-578
	Top of Salado Formation	657-840
	Total Depth	840

GEOLOGIC EXPLORATION BOREHOLE DATA BASE

BOREHOLE: **WIPP-34**
OPERATOR: Sandia National Laboratories
PERMIT NO.: 08.08.1291 (State Engineer's Office) 08.08.1195 (reentry)

LOCATION: 201.78' FSL, 1999.73' FWL
Sec. 8, T 22 S, R 31 E

ELEVATION: 3433' (Top of Casing)
TOTAL DEPTH: 1820'
TYPE OF WELL: Geologic Exploration
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/16/79 **Date Completed:** 09/04/79

HOLE SIZE: Excavated: 0 to 5'
18": 5 to 38'
6 3/4": 38 to 1820'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 48
From: 0
To: 38
Cement:

Plugged and abandoned 09/04/79.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WIPP-34	Quaternary Deposits	0-11
	Triassic Rocks	
	Santa Rosa Sandstone	11-154
	Permian Rocks	
	Dewey Lake Red Beds	154-657
	Rustler Formation	657-973
	Magenta Dolomite Member	716-741
	Culebra Dolomite Member	834-861
	Salado Formation	973-1820+
	Upper Unit	973-1437
	MB 101	1092
	MB 102	1122
	MB 103	1148
	MB 104	1158
	MB 105	1173
	MB 106	1191
	MB 107	1228
	MB 108	1237
	MB 109	1280
	MB 110	1317
	MB 111	1326
	MB 112	1344
	MB 113	1366
	MB 114	1396
	MB 115	1420
	MB 116	1430
	McNutt Potash Unit	1437-1751
	Vaca Triste Sandstone Member	1437-1442
	MB 117	1498
	MB 118	1520
MB 119	1540	
MB 120	1560	
MB 121	1573	
MB 122	1580	
Union Anhydrite	1599-1607	
MB 123	1676	
MB 124	1690	
MB 125	---	
MB 126	1751	
Lower Unit	1751-1820+	
MB 127	1768	
MB 128	1775	
MB 129	1785	

Hydrologic Test Borehole Data Base



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-1
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.979 (State Engineer's Office)

LOCATION: 623.2' FNL, 1083.1' FWL Sec.
29, T 22 S, R 31 E

ELEVATION: 3399.53' (Top of Casing)
TOTAL DEPTH: 856'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 05/20/76 **Date Completed:** 06/10/76

HOLE SIZE: 9 5/8": 0 to 856'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 10 1/8
Grade:
Wt/Ft: 40.5
From: 0
To: 48
Cement: 51 Cu. Ft.

Diameter: 7
Grade: K-55
Wt/Ft: 26
From: 0
To: 848
Cement: 192 Cu. Ft.

Perforated from 803 to 827' with 72 holes. 703 to 683' with 3 holes per foot. 683 to 675' with 3 holes per foot, 562 to 590' with 3 holes per foot. All depths are measured from Kelly Bushing 8' above ground level except DST's which are measured from ground level.

*****RECOMPLETION*****

January 1977, the casing in H-1 was perforated across the Rustler-Salado contact zone from 803' to 827' using 1/2" shots at 3 shots/foot.

March 1977, the casing across the Culebra-dolomite interval was perforated from 675' to 703' using 1/2" shots at 3 shots/foot.

April 1977, the casing across the Magenta-dolomite interval was perforated from 562' to 590' with 1/2" shots at 3 shots/foot.

Following hydrologic testing, an inflatable bridge plug was set in the casing at about 790' to isolate the Rustler-Salado contact, and PIP was set on 2 3/8" tubing at about 651'.

Currently used as a Culebra and Magenta Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-1	Holocene	
	Surficial Deposits	0-15
	Pleistocene	
	Gatuna Formation	15-35
	Ochoan	
	Dewey Lake Red Beds	35-502
	Rustler Formation	502-824
	Magenta Dolomite Member	563-589
	Culebra Dolomite Member	676-699
	Top of Salado	824
Total Depth	856	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-2a
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.990 (State Engineer's Office)

LOCATION: 726.96' FNL, 1697.64', FWL
Sec. 29, T 22 S, R 31 E

ELEVATION: 3378.09' (Top of Casing)
TOTAL DEPTH: 672'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 02/14/77 **Date Completed:** 02/21/77

HOLE SIZE:
18": 0 to 33'
8 3/4": 33 to 513'
4 3/4": 513 to 672'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 10 3/4
Grade:
Wt/Ft:
From: 0
To: 33
Cement: 54 Cu. Ft.

Diameter: 6 5/8
Grade: J-55
Wt/Ft: 24
From: 0
To: 511
Cement: 260 Cu. Ft.

*****RECOMPLETION*****

April 1984, H-2a had degraded so much that it was necessary to reenter the hole, set casing to the top of the Culebra (4 1/2" OD, 9.5 lb/ft to 623') and place a screen assembly across the Culebra.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-2a	Holocene	
	Surficial Deposit	0-14
	Pleistocene	
	Gatuna Formation	14-38
	Ochoan	
	Dewey Lake Red Beds	38-457
	Rustler Formation	457-672 (T.D.)
	Forty-Niner Member	457-515
	Magenta Dolomite Member	515-543
	Tamarisk Member	543-623
	Culebra Dolomite Member	623-645
	Unnamed Part	645-672 (T.D.)
	Total Depth	672



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-2b1
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.990 (State Engineer's Office)

LOCATION: 695.57' FNL, 1660.57' FWL,
Sec. 29, T 22 S, R 31 E

ELEVATION: 3378.46 (Top of Casing)
TOTAL DEPTH: 661'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 02/07/77 **Date Completed:** 02/14/77

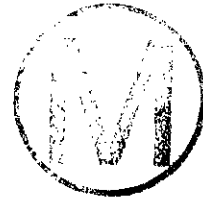
HOLE SIZE:
18": 0 to 33'
8 3/4": 33 to 609'
4 3/4": 609' to 661'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 10 3/4
Grade:
Wt/Ft:
From: 0
To: 33
Cement: 54 Cu. Ft.

Diameter: 6 5/8
Grade: J-55
Wt/Ft: 24
From: 0
To: 609
Cement: 282 Cu. Ft.



Perforated from 510 to 538' with 3 holes per foot.

*****RECOMPLETION*****

After coring and testing the Culebra interval, a retrievable bridge plug was set above the Culebra interval and the Magenta interval was shot perforated and tested by bailing. After the initial construction-and-testing period, a PIP was installed and the well was used to monitor Magenta and Culebra water levels. The PIP separating the Culebra and Magenta had to be removed and replaced several times in 1987 and 1988 because of leaks and other technical problems.

April 1989, the PIP was replaced with a retrievable bridge plug set below the Magenta interval and H-2b1 was converted to a Magenta monitoring well for hydrologic testing and water-quality sampling.

April 20, 1989, a Baker Service Tools 4 1/4" PIP was set on 2 3/8" tubing above the Magenta interval to minimize wellbore volume and reduce test-zone volume. Testing was performed in the 2 3/8" tubing with BASKI 1 1/2" inflatable mupacker.

July 13, 1989, the PIP was removed and the well was returned to service as a Magenta Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-2b1	Holocene	
	Surficial Deposit	0-14
	Pleistocene	
	Gatuna Formation	14-38
	Ochoan	
	Dewey Lake Red Beds	38-457
	Rustler Formation	457-661
	Forty-Niner Member	457-515
	Magenta Dolomite Member	515-543
	Tamarisk Member	543-623
	Culebra Dolomite Member	623-645
	Unnamed Part	645-661
Total Depth	661	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-2b2
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.990 (State Engineer's Office)

LOCATION: 700.6' FNL, 1690.8' FWL, Sec.
29, T 22 S, R 31 E

ELEVATION: 3378.31' (Top of Casing)
TOTAL DEPTH: 660'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 07/16/83 **Date Completed:** 05/03/84

HOLE SIZE: 18": 0 to 20'
7 7/8": 20 to 660'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9.625 O.D.
Grade: J-55
Wt/Ft: 36
From: 0
To: 20
Cement:

Diameter: 5.5 O.D.
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 620
Cement:

Note: Open 613-650'.

*****RECOMPLETION*****

April 1984, problems with hole instability necessitated the placement of a screen across the Culebra to maintain the hole in open condition. This was done on the first two days of May 1984.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-2b2	Holocene	
	Surficial Deposits	0-14
	Quaternary	
	Gatuna Formation	14-38
	Permian	
	Dewey Lake Red Beds	38-457
	Rustler Formation	457-660 (T.D.)
	Forty-Niner Member	457-515
	Magenta Dolomite Member	515-543
	Tamarisk Member	543-623
	Culebra Dolomite Member	623-645
Unnamed Part	645-660 (T.D.)	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-2c
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.990 (State Engineer's Office)

LOCATION: 637.15' FNL, 1708.62' FWL,
Sec. 29, T 22 S, R 31 E

ELEVATION: 3378.41' (Top of Casing)
TOTAL DEPTH: 795'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 01/28/77 **Date Completed:** 02/05/77

HOLE SIZE: 18": 0 to 33'
8 3/4": 33 to 742'
4 3/4": 742 to 795'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 10 3/4
Grade:
Wt/Ft:
From: 0
To: 33
Cement: 54 Cu. Ft.

Diameter: 6 5/8
Grade: J-55
Wt/Ft: 24
From: 0
To: 742
Cement: 339 Cu. Ft.

Perforated from 618 to 655' with 3 holes per foot.

Currently used as a Magenta Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-2c	<i>Holocene</i>	
	Surficial Deposits	0-34
	<i>Quaternary</i>	
	Gatuna Formation	0-34
	<i>Permian</i>	
	Dewey Lake Red Beds	34-457
	Rustler Formation	
	Magenta Dolomite Member	515-540
	Culebra Dolomite Member	624-642
	Top of Rustler Salt	642
Salado Formation	764-795 (T.D.)	
Maximum Depth	795	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-3b1
OPERATOR: Sandia National Lab
PERMIT NO.: 0.08.991 (State Engineer's Office)

LOCATION: 2085.31' FSL, 138.10' FEL,
Sec. 29, T 22 S, R 31 E

ELEVATION: 3390.64' (Top of Casing)
TOTAL DEPTH: 902'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 07/25/76 **Date Completed:** 08/12/76

HOLE SIZE: 13 3/4": 0 to 38'
8 3/4": 38 to 902'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 10 3/4
Grade:
Wt/Ft: 40.5
From: 0
To: 38
Cement: 54 Cu. Ft.

Diameter: 6 5/8
Grade: J-55
Wt/Ft: 24
From: 0
To: 891
Cement: 625 Sacks

Perforated from 813 to 837' with 72 holes, 683 to 703' with 3 holes per ft, 675 to 683' with 3 holes per ft, 562 to 590' with 3 holes per ft.

*****RECOMPLETION*****

1977, the Rusiter/Salado contact and the Culebra-dolomite intervals, in that order, were each shot perforated, isolated, and bailed. The Culebra interval was also geophysically logged. After perforating and testing the Culebra interval, a retrievable PIP was set above the Culebra interval, and the Magenta interval was shot perforated, and tested by bailing. After testing the Magenta, tubing was reattached to the PIP and H-3b1 was used to monitor Magenta and Culebra water levels from 1977 to 1987.

1987, the PIP was replaced with a retrievable bridge plug set below the Magenta interval and H-3b1 was converted to a Magenta monitoring well for water-level monitoring and water-quality sampling.

July 14, 1989, a Baker Service Tools 4 1/4" PIP was set on 2 3/8" tubing above the Magenta interval to minimize wellbore volume and reduce test-zone volume. Testing was performed in the 2 3/8" tubing with a BASKI 1 1/2" inflatable minipacker.

After testing, the PIP was removed and the well was returned to service as a Magenta Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-3b1	Holocene	
	Surficial Deposits	0-4
	Quaternary	
	Gatuna Formation	4-22
	Permian	
	Dewey Lake Red Beds	22-502
	Rustler Formation	502-821
	Magenta Dolomite Member	559-584
	Culebra Dolomite Member	672-694
	Top of Rustler Salt	Not Given
	Salado Formation	821- T.D.
Maximum Depth	902	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-3b2
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.991 (State Engineer's Office)

LOCATION: 2122.15' FSL, 231.29' FEL,
Sec. 29, T 22 S, R 31 E

ELEVATION: 3390.03' (Top of Casing)
TOTAL DEPTH: 725'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 10/25/83 **Date Completed:** 11/08/83

HOLE SIZE: 7 7/8": 0 to 673'
4 3/4": 673' to 725'

WELL DEVELOPMENT:

CASING RECORD

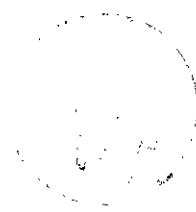
Diameter: 5 1/2 O.D.
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 672.7
Cement:

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-3b2	Surficial Deposits	0-11
	Gatuna Formation	
	Dockum Group	11-65
	Dewey Lake Red Beds	65-565.7
	Rustler Formation	565.7-788.7
	Magenta Dolomite Member	564-590
	Culebra Dolomite Member	676-700
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
Total Depth	725	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-3b3
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.991 (State Engineer's Office)

LOCATION: 2022.35' FSL, 217.30' FEL,
Sec. 29, T 22 S, R 31 E

ELEVATION: 3388.67' (Top of Casing)
TOTAL DEPTH: 730'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 11/15/83 **Date Completed:** 12/16/83

HOLE SIZE: 7 7/8": 0 to 673'
4 3/4": 673' to 730'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 5.5
Grade: J-55
Wt/Ft: 15.5
From: .50
To: 670.5
Cement: Casing cemented in place

Currently used as a Magenta Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-3b3	Surficial Deposits	
	Gatuna Formation	
	Dockum Group	
	Dewey Lake Red Beds	
	Rustler Formation	
	Magenta Dolomite Member	563-586
	Culebra Dolomite Member	673-696
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
Castile Formation		



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-3d (H-3b4)
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.991 (State Engineer's Office)

LOCATION: 2067.3' FSL, 164.3' FEL, Sec.
29, T 22 S, R 31 E

ELEVATION: 3390.01' (Top of Casing)
TOTAL DEPTH: 554'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 03/31/87 **Date Completed:** 04/22/87

HOLE SIZE:

WELL DEVELOPMENT:

CASING RECORD

Diameter: 8 5/8

Grade:

Wt/Ft:

From: 0

To: 39

Cement:

7 7/8" uncased borehole 33-559'.

Currently used as a Forty-niner and Dewey Lake Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-3d	Surficial Deposits	
	Gatuna Formation	
	Dockum Group	
	Dewey Lake Red Beds	420
	Rustler Formation	
	Forty-Niner Member	508-537
	Forty-Niner Claystone Member	537-547
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
Castile Formation		



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-4a
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1153 (State Engineer's Office)

LOCATION: 545.89' FNL, 720.00' FWL,
Sec. 5, T 23 S, R 31 E

ELEVATION: 3333.29' (Top of Casing)
TOTAL DEPTH: 415'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 04/30/78 **Date Completed:** 05/23/78

HOLE SIZE: 18": 0 to 32'
7 7/8": 32 to 365'
4 3/4": 365 to 532'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 32
Cement: 63 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 364
Cement: 173 Cu. Ft.

Hole in standby condition for hydro tracer tests. 4 1/2" inflatable packer set at 485' on 1 1/2" galvanized pipe. 1 3/8" pump cylinder set at 499' in the Culebra Dolomite. The hole is dual completion across the Magenta and Culebra Dolomites.

*****RECOMPLETION*****

Well deepened to 532' and recompleted. (SAND85-7206)

Current status - Not in use.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-4a	Holocene	
	Surficial Deposits	0-13
	Pleistocene	
	Gatuna Formation	13-29
	Ochoan	
	Dewey Lake Red Beds	29-315
	Rustler Formation	315
	Magenta Dolomite Member	375-400
	Total Depth	415



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-4b
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1154 (State Engineer's Office)

LOCATION: 498.47' FNL, 632.54' FWL,
Sec. 5, T 23 S, R 31 E

ELEVATION: 3333.35 (Top of Casing)
TOTAL DEPTH: 529'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 04/30/78 **Date Completed:** 05/15/78

HOLE SIZE:
18": 0 to 33'
7 7/8": 33 to 477'
4 3/4": 477 to 529'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 33
Cement: 63 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 476
Cement: 269 Cu. Ft.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-4b	Surficial Deposits	0-13
	Gatuna Formation	13-29
	Dockum Group	NP
	Dewey Lake Red Beds	29-315
	Rustler Formation	315-T.D.
	Magenta Dolomite Member	377-402
	Culebra Dolomite Member	498-522
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
Total Depth	529	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-4c
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1152 (State Engineer's Office)

LOCATION: 446.36 FNL, 717.89 FWL, Sec.
5, T 23 S, R 31 E

ELEVATION: 3334.04' (Top of Casing)
TOTAL DEPTH: 661'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 04/30/78 **Date Completed:** 05/09/78

HOLE SIZE: 18": 0 to 33'
7 7/8": 33 to 610'
4 3/4": 610 to 661'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 33
Cement: 63 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 610
Cement: 270 Cu. Ft.



Bridge plug at 530'. Perforated from 494' to 520' with 104 holes spaced at 4 holes per foot. Hole in standby condition for hydro tracer tests.

*****RECOMPLETION*****

February 5, 1981, a 4 1/4" retrievable bridge plug was set in the casing at a depth of 530'. The casing was then shot perforated with 4 shots/foot from 494' to 520' to provide access to the Culebra dolomite. Mercer and others (1981) list the Culebra depths at H-4c as between 490' and 516' deep, and the gamma log used to select the perforation interval shows the Culebra from 489' to 515' deep. Therefore, the upper 4' to 5' of the Culebra dolomite are apparently not perforated at H-4c.

Currently used as a Magenta Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-4c	Surficial Deposits	0-13
	Gatuna Formation	13-29
	Dockum Group	NP
	Dewey Lake Red Beds	29-315
	Rustler Formation	315-626
	Magenta Dolomite Member	377-403
	Culebra Dolomite Member	490-516
	Salado Formation	626-661



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-5a
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1159 (State Engineer's Office)

LOCATION: 1091.98 FNL, 185.03 FEL, Sec.
15, T 22 S, R 31 E

ELEVATION: 3506.19 (Top of Casing)
TOTAL DEPTH: 824'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 05/22/78 **Date Completed:** 06/20/78

HOLE SIZE: 18": 0 to 38'
7 7/8": 38 to 775'
4 3/4": 775 to 930'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 774
Cement: 192 Cu. Ft.

Hole in standby condition for hydro tracer tests. 4 1/2" inflatable packer set at 895' on 1 1/2" galvanized pipe. 1 3/8" pump cylinder set at 905' in the Culebra Dolomite. The hole is dual-completion across the Magenta and Culebra Dolomites.

*****RECOMPLETION*****

Well deepened to 930' and recompleted. (SAND85-7206)

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-5a	Surficial Deposits	0-8
	Gatuna Formation	Not Present
	Santa Rosa Formation	8-225
	Dewey Lake Redbeds	225-732
	Rustler Formation	732-
	Magenta Dolomite Member	783-810
	Culebra Dolomite Member	897-920
	Total Depth	824

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-5b
OPERATOR: Sandia National Lab
PERMIT NO.: 0.08.1160 (State Engineer's Office)

LOCATION: 1008.30' FNL, 236.22' FEL,
Sec. 15, T 22 S, R 31 E

ELEVATION: 3506.04' (Top of Casing)
TOTAL DEPTH: 925'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 05/22/78 **Date Completed:** 06/13/78

HOLE SIZE:
18": 0 to 38'
7 7/8": 38 to 882'
4 3/4": 882 to 925'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 881
Cement: 336 Cu. Ft.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-5b	Surficial Deposits	0-8
	Gatuna Formation	NP
	Dockum Group	8-225
	Dewey Lake Red Beds	225-732
	Rustler Formation	732-T.D.
	Magenta Dolomite Member	785-805
	Culebra Dolomite Member	897-920
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
Castile Formation		



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-5c
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1161 (State Engineer's Office)

LOCATION: 1005.55 FNL, 134.95 FEL, Sec.
15, T 22 S, R 31 E

ELEVATION: 3506.04' (Top of Casing)
TOTAL DEPTH: 1076'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 05/22/78 **Date Completed:** 06/03/78

HOLE SIZE: 18": 0 to 38'
7 7/8": 38 to 1025'
4 3/4": 1025 to 1076'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 1024
Cement: 416 Cu. Ft.

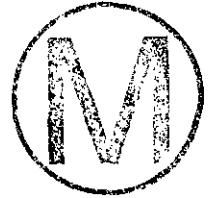
Bridge plug set at 935'. Perforated from 895' to 925' with 120 holes spaced at 4 holes per foot.

Currently used as a Magenta Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-5c	Surficial Deposits	0-8
	Gatuna Formation	NP
	Dockum Group	8-225
	Dewey Lake Red Beds	225-732
	Rustler Formation	732-1041
	Magenta Dolomite Member	788-812
	Culebra Dolomite Member	899-924
	Salado Formation	1041-T.D.
	Upper Member	
	McNutt Member	
	Lower Member	
	Total Depth	1076



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-6a
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1162 (State Engineer's Office)

LOCATION: 283.30' FNL, 274.34' FWL,
Sec. 18, T 22 S, R 31 E

ELEVATION: 3347.83' (Top of Casing)
TOTAL DEPTH: 525'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 03/05/78 **Date Completed:** 07/11/78

HOLE SIZE:
18": 0 to 38'
3 7/8": 38 to 475'
4 3/4": 475 to 637'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 475
Cement: 155 Cu. Ft.

Hole in standby condition for hydro tracer tests. 4 1/2" packer set at 594' on 1 1/2" galvanized pipe. 1 3/8" pump cylinder at 608' in the Culebra Dolomite. The hole is dual-completion across the Magenta and Culebra Dolomites.

*****RECOMPLETION*****

Well deepened to 637' and recompleted. (SAND 85-7206)

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-6a	Surficial Deposits	0-12
	Gatuna Formation	12-38
	Santa Rosa Formation	Not Present
	Dewey L. Redbeds	225-732
	Rustler Formation	427
	Magenta Dolomite Member	429-511
	Total Depth	525



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-6b
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1163 (State Engineer's Office)

LOCATION: 196.34' FNL, 332.96' FWL, Sec
18, T 22 S, R 31 E

ELEVATION: 3348.25' (Top of Casing)
TOTAL DEPTH: 640'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 06/19/78 **Date Completed:** 07/05/78

HOLE SIZE:
18": 0 to 38'
7 7/8": 38 to 592'
4 3/4": 592 to 640'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 590
Cement: 210 Cu. Ft.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-6b	Surficial Deposits	0-12
	Gatuna Formation	12-38
	Dockum Group	NP
	Dewey Lake Red Beds	38-427
	Rustler Formation	427-T.D.
	Magenta Dolomite Member	492-511
	Culebra Dolomite Member	604-627
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
Total Depth	640	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-6c
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1164 (State Engineer's Office)

LOCATION: 281.06' FNL, 374.47' FWL,
Sec. 18, T 22 S, R 31 E

ELEVATION: 3348.52' (Top of Casing)
TOTAL DEPTH: 741'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 06/19/78 **Date Completed:** 06/26/78

HOLE SIZE: 18": 0 to 38'
7 7/8": 38 to 700'
4 3/4": 700 to 741'

WELL DEVELOPMENT:

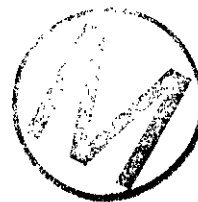
CASING RECORD

Diameter: 9 5/8
Grade: J-55
Wt/Ft: 36
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: +1.29
To: 699
Cement: 335 Cu. Ft.

Bridge plug set at 641'. Perforated from 604' to 631' with 108 holes spaced at 4 holes per foot.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-6c	Surficial Deposits	0-12
	Gatuna Formation	12-38
	Dockum Group	NP
	Dewey Lake Red Beds	38-427
	Rustler Formation	427-721
	Magenta Dolomite Member	490-514
	Culebra Dolomite Member	604-627
	Salado Formation	721-T.D.
	Upper Member	
	McNutt Member	
	Lower Member	
	Total Depth	741



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-7a
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08-1271 (State Engineer's Office)

LOCATION: 2495.04' FNL, 2492.35' FWL,
Sec. 14, T 23 S, R 30 E

ELEVATION: 3164' (Top of Casing)
TOTAL DEPTH: 154'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 09/18/79 **Date Completed:** 10/18/79

HOLE SIZE: 18"
9 7/8"
6 1/8"

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 48
From: 0
To: 38
Cement: 81 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 23
From: 0
To: 109
Cement: 265 Cu. Ft.

Current status - Not in use.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-7a	Surficial Deposits	0-5
	Santa Rosa Formation	Not Present
	Dewey Lake Redbeds	57-87
	Rustler Formation	87-283
	Magenta Dolomite Member	117-140
	Total Depth	154



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-7b1
OPERATOR: Sandia National Lab
PERMIT NO.: 0.08-1272 (State Engineer's Office)

LOCATION: 2565.80' FNL, 2563.45' FWL,
Sec. 14, T 23 S, R 30 E

ELEVATION: 3164.17' (Top of Casing)
TOTAL DEPTH: 286'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 09/13/79 **Date Completed:** 09/18/79

HOLE SIZE: 18": 0 to 38'
9 1/2": 38 to 230'
6 1/8": 230' to 286'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 48
From: 0
To: 38
Cement: 54 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 23
From: 0
To: 230
Cement: 270 Cu. Ft.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-7b1	Holocene	
	Surficial Deposits	0-5
	Pleistocene	
	Gatuna Formation	12-38
	Dockum Group	NP
	Dewey Lake Red Beds	57-87
	Rustler Formation	87-T.D.
	Magenta Dolomite Member	117-140
	Culebra Dolomite Member	237-283
	Salado Formation	
	Upper Member	
	Lower Member	
	Castile Formation	
Total Depth	286	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-7b2
OPERATOR: Sandia National Labs
PERMIT NO.: ---- (State Engineer's Office)

LOCATION: 2662.16' FNL, 2537.98' FWL,
Sec. 14, T 23 S, R 30 E

ELEVATION: 3164.40' (Top of Casing)
TOTAL DEPTH: 295'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/27/83 **Date Completed:** 09/02/83

HOLE SIZE: 8 3/4": 20 to 233'
6 1/8": 233 to 295'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 7/8
Grade:
Wt/Ft:
From: 0
To: 20
Cement: Casing set in cement

Diameter: 7
Grade: J-55
Wt/Ft: 20
From: 0
To: 230.19
Cement: Cemented in place

Hole was back filled with peu gravel from 295' to 268' and left open as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-7b2	Surficial Deposits	
	Gatuna Formation	57
	Dockum Group	NP
	Dewey Lake Red Beds	57-87
	Rustler Formation	87-T.D.
	Magenta Dolomite Member	117-140
	Culebra Dolomite Member	232-280
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
	Total Depth	295



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-7c
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1273 (State Engineer's Office)

LOCATION: 2591.93' FNL, 2467.51' FWL,
Sec. 14. T 23 S, R 30 E

ELEVATION: 3164.13 (Top of Casing)
TOTAL DEPTH: 420'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 09/06/79 **Date Completed:** 11/02/79

HOLE SIZE: 9 7/8"

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 48
From: 0
To: 38
Cement: 68 Cu. Ft.

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 356
Cement: 706 Cu. Ft.

Slotted liner installed from 347' to 420'.

Current status - Not in use.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-7c	Holocene	
	Unconsolidated Alluvium and Dune Sand	0-5
	Pleistocene	
	Gatuna Formation	5-57
	Permian	
	Dewey Lake Red Beds	57-87
	Rustler Formation	87-283
	Magenta Dolomite Member	117-140
	Culebra Dolomite Member	237-273.5
	Salado Formation	283-420
	Dissolution Residue	283-405
Top of Salt Interval	405	
Total Depth	420	

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-8a
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1274 (State Engineer's Office)

LOCATION: 1962.61' FNL, 1486.59' FEL,
Sec. 23, T 24 S, R 30 E

ELEVATION: 3432.99' (Top of Casing)
TOTAL DEPTH: 505'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 09/07/79 **Date Completed:** 09/18/79

HOLE SIZE: 9 7/8"

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 48
From: 0
To: 38
Cement: 108 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 23
From: 0
To: 452
Cement: 393



Currently used as a Magenta Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-8a	Surficial Deposits	0-4 4-10 Mescalero
	Gatuna Formation	10-153
	Santa Rosa Formation	Not Present
	Dewey Lake Redbeds	153-399
	Rustler Formation	399-
	Magenta Dolomite Member	466-488
	Total Depth	505

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-8b
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1275 (State Engineer's Office)

LOCATION: 1994.76' FNL, 1405.41' FEL,
Sec. 23, T 24 S, R 30 E

ELEVATION: 3433.64' (Top of Casing)
TOTAL DEPTH: 624'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/06/79 **Date Completed:** 08/12/79

HOLE SIZE: 18": 0 to 38'
9 7/8": 38 to 575'
6 1/8": 575 to 624'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 48
From: 0
To: 38
Cement: 108 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 20
From: 0
To: 574
Cement: 378 Cu. Ft.

Current status - Not in use.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-8b	Surficial Deposits	0-10
	Gatuna Formation	10-153
	Dockum Group	NP
	Dewey Lake Red Beds	153-399
	Rustler Formation	399-T.D.
	Magenta Dolomite Member	466-490
	Culebra Dolomite Member	586-613
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
Total Depth	624	

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-8c
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1276 (State Engineer's Office)

LOCATION: 2059.36' FNL, 1470.14' FEL,
Sec. 23, T 24 S, R 30 E

ELEVATION: 3432.90' (Top of Casing)
TOTAL DEPTH: 808'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 07/27/79 **Date Completed:** 08/06/79

HOLE SIZE: 9 7/8"

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 48
From: 0
To: 38
Cement: 108 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 20
From: 0
To: 734
Cement: 314 Cu. Ft.

Currently used as a Rustler/Salado Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-8c	Holocene	
	Unconsolidated Alluvium and Eolian Sand	0-4
	Pleistocene Rocks	
	Mescalero Caliche	4-10
	Gatuna Formation	10-153
	Permian	
	Dewey Lake Red Beds	153-399
	Rustler Formation	399-733
	Magenta Dolomite Member	466-488
	Culebra Dolomite Member	588-614
	Salado Formation	733-
	Dissolution Residue	733-774
	MB 103	774-786
	Top of Salt Interval	798
Total Depth	808	

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-9a
OPERATOR: Sandia National Lab
PERMIT NO.: 0.08.1277 (State Engineer's Office)

LOCATION: 2392.14' FNL, 138.92' FWL,
Sec. 4, T 24 S, R 31 E

ELEVATION: 3406.68' (Top of Casing)
TOTAL DEPTH: 692'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 07/09/79 **Date Completed:** 08/23/83

HOLE SIZE:
18": 0 to 40'
9 3/4": 40 to 512'
6 1/8": 512 to 645'
4 3/4": 645 to 692'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 48
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 7
Grade: J-55
Wt/Ft: 20
From: 0
To: 570
Cement: 266 Cu. Ft.

Diameter: 4.5" O.D.
Grade: J-55
Wt/Ft: 9.5
From: 0
To: 643
Cement:



Hole in standby condition for testing.

*****RECOMPLETION*****

April 19, 1984, the plug was drilled out.

April 23, 1984, a screen and packer assembly was placed across the Culebra after washing the hole to 683'.

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-9a	Holocene	
	Surficial Deposits	0-5
	Pleistocene	
	Gatuna Formation	5-25
	Ochoan	
	Dewey Lake Red Beds	25-455
	Rustler Formation	455-T.D.
	Forty-Niner Member	455-523
	Magenta Dolomite Member	523-554
	Tamarisk Member	554-647
	Culebra Dolomite Member	647-677
	Unnamed Part	677-T.D.
Total Depth	692	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-9b
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1278 (State Engineer's Office)

LOCATION: 2391.04' FNL, 238.63' FWL,
Sec. 4, T 24 S, R 31 E

ELEVATION: 3406.86' (Top of Casing)
TOTAL DEPTH: 708'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/14/79 **Date Completed:** 08/28/79

HOLE SIZE: 18": 0 to 40'
9 3/4": 40 to 638'
6 1/8": 638 to 708'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade: K-55
Wt/Ft: 48
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 638
Cement: 295 Cu. Ft.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-9b	Surficial Deposits	0-5
	Gatuna Formation	5-25
	Dockum Group	NP
	Dewey Lake Red Beds	24-455
	Rustler Formation	455-T.D.
	Magenta Dolomite Member	523-554
	Culebra Dolomite Member	647-677
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
	Total Depth	708



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-9c
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1279 (State Engineer's Office)

LOCATION: 2479.06' FNL, 188.02' FWL,
Sec. 4, T 24 S, R 31 E

ELEVATION: 3407.30' (Top of Casing)
TOTAL DEPTH: 816'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/01/79 **Date Completed:** 09/24/79

HOLE SIZE:
18": 0 to 40'
9 3/4": 40 to 785'
6 1/8": 785 to 816'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade: K-55
Wt/Ft: 48
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 7
Grade: J-55
Wt/Ft: 20
From: 0
To: 783
Cement: 320 Cu. Ft.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-9c	Holocene	
	Eolian Sand and Caliche	0-5
	Pleistocene Rocks	
	Gatuna Formation	5-25
	Permian Rocks	
	Dewey Lake Redbeds	25-455
	Rustler Formation	455-791
	Dissolution Residue	484-501
	Magenta Dolomite Member	523-554
	Dissolution Residue	615-625
	Culebra Dolomite Member	647-677
	Dissolution Residue	692-712
	Salado Formation	791
	Top of Salt Interval	791
Total Depth	816	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-10a
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1280 (State Engineer's Office)

LOCATION: 433.0' FSL, 2068.9' FEL, Sec.
20, T 23 S, R 32 E

ELEVATION: 3688.67' (Top of Casing)
TOTAL DEPTH: 1318'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/21/79 **Date Completed:** 08/26/79

HOLE SIZE: 9 7/8"

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade: K-55
Wt/Ft: 48
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 1243
Cement: 519 Cu. Ft.

Currently used as a Magenta Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-10a	Surficial Deposits	0-9
	Gatuna Formation	9-90
	Santa Rosa Formation	90-482 Chinle 482-658
	Dewey Lake Redbeds	658-1204
	Rustler Formation	1204-
	Magenta Dolomite Formation	1256-1280
	Total Depth	1318



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-10b
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1281 (State Engineer's Office)

LOCATION: 484.5' FSL, 1981.8' FEL, Sec.
20, T 23 S, R 32 E

ELEVATION: 3689.47' (Top of Casing)
TOTAL DEPTH: 1398'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 10/07/79 **Date Completed:** 10/13/79

HOLE SIZE: 9 7/8"

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade:
Wt/Ft: 48
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 1346
Cement: 480 Cu. Ft.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-10b	Surficial Deposits	do
	Gatuna Formation	do
	Santa Rosa Formation	do
	Dewey Lake Redbeds	do
	Rustler Formation	1204-
	Magenta Dolomite	1256-1280
	Culebra Dolomite	1360-1391
	Total Depth	1398

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-10c
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1282 (State Engineer's Office)

LOCATION: 384.5' FSL, 1981.8 FEL, Sec.
20, T 23 S, R 32 E

ELEVATION: 3687' (Top of Casing)
TOTAL DEPTH: 1550'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/11/79 **Date Completed:** 08/20/79

HOLE SIZE: 9 7/8"

WELL DEVELOPMENT:

CASING RECORD

Diameter: 13 3/8
Grade: K-55
Wt/Ft: 48
From: 0
To: 38
Cement: 72 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 20
From: 0
To: 1483
Cement: 627 Cu. Ft.

Current status - Not in use.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-10c	Holocene	
	Unconsolidated Alluvium and Eolian Sand	0-5
	Pleistocene	
	Mescalero Caliche	5-9
	Gatuna Formation	9-90
	Triassic	
	Dockum Group	
	Chinle Formation	90-482
	Santa Rosa Sandstone	482-658
	Permian	
	Dewey Lake Red Beds	658-1204
	Rustler Formation	1204-1501
	Magenta Dolomite Member	1256-1280
	Culebra Dolomite Member	1360-1387
	Salado Formation	1501
Top of Salt Interval	1501	
Total Depth	1538	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-11b1
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1462 (State Engineer's Office)

LOCATION: 173.91' FEL, 1510.69' FSL,
Sec. 33, T 22 S, R 31 E

ELEVATION: 3411' (Top of Casing)
TOTAL DEPTH: 785'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 08/03/83 **Date Completed:** 09/02/83

HOLE SIZE: 18": 0 to 35'
7 7/8": 35 to 733'
4 3/4": 733 to 785'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: H-40
Wt/Ft: 40
From: 0
To: 35
Cement: 27 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 732
Cement:

4 3/4" open hole from 732' to the total depth of 785'.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-11b1	Quaternary	deposits
	Holocene Deposits	0-12.5
	Upper Triassic Rocks	
	Dockum Group (undifferentiated)	12.5-63
	Upper Permian Rocks	
	Dewey Lake Redbeds	63-558
	Rustler Formation	
	Forty-niner Member	558-611
	Magenta Dolomite Member	611-638
	Tamarisk Member	638-730
Culebra Dolomite Member	730-756	
Unnamed lower member	756-785+	

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-11b2
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1462 (State Engineer's Office)

LOCATION: 1436.3' FSL, 168.7' FEL, Sec.
33, T 22 S, R 31 E

ELEVATION: 3411.64' (Top of Casing)
TOTAL DEPTH: 776'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 10/01/83 **Date Completed:** 11/28/83

HOLE SIZE: 7 7/8": 35 to 734'
4 3/4": 734 to 776'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: H-40
Wt/Ft: 40
From: 0
To: 37
Cement:

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 733.4
Cement: Cemented

4 3/4" open hole from 733.39' to the total depth of 776'.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-11b2	Quaternary	deposits
	Holocene Deposits	0-11
	Upper Triassic Rocks	
	Dockum Group (undifferentiated)	11-62
	Upper Permian Rocks	
	Dewey Lake Redbeds	62-560
	Rustler Formation	
	Forty-niner Member	560-618
	Magenta Dolomite Member	618-644
	Tamarisk Member	644-733
	Culebra Dolomite Member	733-757
Unnamed lower member	757-776+	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-11b3
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1462 (State Engineer's Office)

LOCATION: 1501.7' FSL, 105.2' FEL, Sec.
33, T 22 S, R 31 E

ELEVATION: 3412.42' (Top of Casing)
TOTAL DEPTH: 788.7'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 12/01/83 **Date Completed:** 01/04/84

HOLE SIZE: 7 7/8": 35 to 734'
4 3/4": 734 to 789'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: H-30
Wt/Ft: 40
From: 0
To: 34
Cement: 27 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 55
From: 0
To: 733
Cement:

4 3/4" open hole from 733' to the total depth of 788.7'.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-11b3	Quaternary	deposits
	Holocene Deposits	0-11
	Upper Triassic Rocks	
	Dockum Group (undifferentiated)	11-65
	Upper Permian Rocks	
	Dewey Lake Redbeds	65-565.7
	Rustler Formation	565.7-788.7+
	Forty-niner Member	565.7-622.9
	Magenta Dolomite Member	622.9-643.8
	Tamarisk Member	648.8-740.2
	Culebra Dolomite Member	740.2-765.5
Unnamed lower member	765.7-788.7+	

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-11b4
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1474 (State Engineer's Office)

LOCATION: 1514.7' FSL, 320.2' FEL, Sec.
33, T 22 S, R 31 E

ELEVATION: 3410.89' (Top of Casing)
TOTAL DEPTH: 765'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 02/23/88 **Date Completed:** 03/17/88

HOLE SIZE: 16": 0 to 27'
7 7/8": 27 to 714'
4 3/4": 714 to 765'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 8 5/8
Grade: H-40
Wt/Ft: 28
From: 0
To: 27
Cement: 18 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 714
Cement:

4 3/4 " open hole from 715' to total depth of 765'.

Current status - Not in use.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-11b4	Quaternary	deposits
	Holocene	0-6
	Pleistocene	
	Mescalero Caliche	6-11
	Upper Triassic Rocks	
	Dockum Group (undifferentiated)	11-60
	Upper Permian Rocks	
	Dewey Lake Redbeds	60-554
	Rustler Formation	554-765.3+
	Forty-niner Member	554-614
	Magenta Dolomite Member	614-642
	Tamarisk Member	642-723.2
	Culebra Dolomite Member	723.2-746.1
	Unnamed Lower Member	746.1-765.3+



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-12
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1463 (State Engineer's-Office)

LOCATION: 23.1' FNL, 91.9' FEL,
Sec. 15, T 23 S, R 31 E

ELEVATION: 3427.19' (Top of Casing)
TOTAL DEPTH: 1001'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 10/03/83 **Date Completed:** 10/18/83

HOLE SIZE: 12": 0 to 41'
7 7/8": 41 to 820'
4 3/4": 820 to 1001'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 9 5/8
Grade: H-40
Wt/Ft: 36
From: 0
To: 37
Cement: 63 Cu. Ft.

Diameter: 5 1/2
Grade: J-55
Wt/Ft: 15.5
From: +1.45
To: 820
Cement:

4 3/4 " open hole from 820' to plugged back depth of 890'.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-12	Quaternary Deposits	0-10+
	Dockum Group	10+-70
	Dewey Lake Red Beds	70-622
	Rustler Formation	622-976
	Forty-Niner Member	622-678
	Magenta Dolomite Member	678-703
	Tamarisk Member	703-823
	Culebra Dolomite Member	823-850
	Unnamed Lower Member	850-976
	Salado Formation	976-T.D.
	Unnamed Upper Member	976-T.D.
Total Depth	1001	

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-14
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1469 (State Engineer's Office)

LOCATION: 372.2' FSL, 562.4' FWL, Sec.
29, T 22 S, R 31 E

ELEVATION: 3347.11' (Top of Casing)
TOTAL DEPTH: 589'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 09/25/86 **Date Completed:** 10/23/86

HOLE SIZE: 12 1/4": 0 to 39'
7 7/8": 39 to 533'
4 3/4": 533 to 589'

WELL DEVELOPMENT:

CASING RECORDS

Diameter: 8.625
Grade: H-40
Wt/Ft: 28
From: +1.6
To: 39
Cement: 27 cu. ft. of ready-mix grout

Diameter: 5.5
Grade: J-55
Wt/Ft: 15.5
From: 0
To: 532
Cement:

4 3/4" open hole from 532' to the total depth of 589'.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-14	Surficial Deposits	0-13
	Gatuna Formation	13-40
	Dockum Group	NP
	Dewey Lake Red Beds	40-360
	Rustler Formation	360-T.D.
	Magenta Dolomite Member	424-448
	Culebra Dolomite Member	545-572
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
	Total Depth	589



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-15
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1470 (State Engineer's Office)

LOCATION: 88.7' FNL, 174.3' FEL, Sec. 28,
T 22 S, R 31 E

ELEVATION: 3481.63' (Top of Casing)
TOTAL DEPTH: 900'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 10/24/86 **Date Completed:** 10/14/86

HOLE SIZE:
12 1/2": 0 to 39'
7 7/8": 39 to 854'
4 3/4": 854 to 900'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 8.625
Grade: H-40
Wt/Ft: 28
From: 0
To: 39
Cement: 27 cu. ft. of ready-mix grout

Diameter: 5.5
Grade: J-55
Wt/Ft: 15.5
From: +1.4
To: 853
Cement:

4 3/4" open hole from 853' to the total depth of 900'.

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-15	Surficial Deposits	0-8
	Gatuna Formation	4-42
	Dockum Group	42-168
	Dewey Lake Red Beds	168-692
	Rustler Formation	692-T.D.
	Magenta Dolomite Member	748-773
	Culebra Dolomite Member	861-883
	Salado Formation	
	Upper Member	
	McNutt Member	
	Lower Member	
Total Depth	900	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-16
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1471 (State Engineer's Office)

LOCATION: 1112.6 FSL, 1241.3 FEL, Sec.
20, T 22 S, R 31 E

ELEVATION: 3406.77' (Top of Casing)
TOTAL DEPTH: 850.9'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 07/13/87 **Date Completed:** 08/18/87

HOLE SIZE: 18": 0 to 36'
9 5/8": 36 to 469'
6 1/8": 469 to 850.9'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 10 3/4
Grade:
Wt/Ft: 40.5
From: 0
To: 36.5
Cement: 35 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 23
From: 0
To: 469
Cement:

6 1/8" inch open hole from 469' to total depth of 850.9'.

Currently used as a Dewey Lake and Unnamed Lower Member Groundwater Level Surveillance Well.

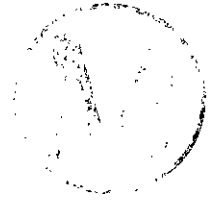


STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-16	Quaternary Deposits	
	Holocene	
	Drill pad material and unconsolidated sand	0-12
	Pleistocene rocks	
	Mescalero caliche	12-18
	Gatuna Formation	18-37
	Upper Triassic Rocks	
	Dockum Group (undifferentiated)	37-52
	Upper Permian Rocks	
	Dewey Lake Redbeds	52-531.9
	Rustler Formation	531.9-841.5
	Forty-niner Member	531.9-590.2
	Magenta Dolomite Member	590.2-615.6
	Tamarisk Member	615.6-702.5
	Culebra Dolomite Member	702.5-724.4
Unnamed Lower Member	724.4-841.5	
Salado Formation	841.5-850.9+	

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-17
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1477 (State Engineer's Office)



LOCATION: 1465.5' FSL, 994.1' FWL, Sec.
3, T 23 S, R 31 E

ELEVATION: 3385.31' (Top of Casing)
TOTAL DEPTH: 880'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 09/21/87 **Date Completed:** 11/04/87

HOLE SIZE:
12 1/4": 0 to 38'
9 5/8": 38 to 692'
6 1/8": 692 to 870.3'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 10 3/4
Grade: H-40
Wt/Ft: 40.5
From: 0
To: 38
Cement: 35 Cu. Ft.

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 692
Cement:

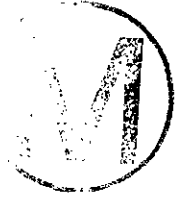
6 1/8" inch open hole from 693' to the plugged back depth of 773'.

The borehole was plugged back with cement grout to a total depth of 773' on 11/06/87.

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-17	Quaternary Deposits	
	Holocene	0-15
	Pleistocene	
	Mescalero Caliche	15-21.5
	Upper Triassic	
	Dockum Group	21.5-55
	Upper Permian	
	Dewey Lake Red Beds	55-509
	Rustler Formation	509-855.7
	Forty-Niner Member	509-564
	Magenta Dolomite Member	564-590.8
	Tamarisk Member	590.8-705.8
	Culebra Dolomite Member	705.8-731.4
	Unnamed Lower Member	731.4-855.7
Salado Formation	855.7-870.3+	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-18
OPERATOR: Sandia National Labs
PERMIT NO.: 0.08.1473 (State Engineer's Office)

LOCATION: 964.8' FNL, 445.6' FWL, Sec.
20, T 22 S, R 31 E

ELEVATION: 3414.21' (Top of Casing)
TOTAL DEPTH: 840'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Pennsylvania Drilling Company

DRILLING RECORD: **Date Started:** 09/29/87 **Date Completed:** 11/16/87

HOLE SIZE: 12 1/4": 0 to 38'
9 5/8": 38 to 673'
6 1/8": 673 to 830.5'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 10 3/4
Grade: H-40
Wt/Ft: 40.5
From: 0
To: 39
Cement: 37 Cu. Ft.

Diameter: 7
Grade: J-55
Wt/Ft: 23
From: 0
To: 673
Cement:

6 1/8" inch open hole from 673' to the plugged back depth of 766'.

The borehole was plugged back with cement grout to a total depth of 766' on 11/19/87.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-18	Quaternary Deposits	
	Holocene	
	Drill Pad Material & Unconsolidated Sand	0-5
	Pleistocene	
	Mescalero Caliche	5-8
	Upper Triassic	
	Dockum Group	8-20
	Upper Permian	
	Dewey Lake Red Beds	20-506.1
	Rustler Formation	506.1-820.9
	Forty-Niner Member	506.1-571.2
	Magenta Dolomite	571.2-594.2
	Tamarisk Member	594.2-688.6
	Culebra Dolomite Member	688.6-712.8
Unnamed Lower Member	712.8-820.9	
Salado Formation	820.9-830.5+	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H19b
OPERATOR: US DOE/CAO
PERMIT NO.: C 2420

LOCATION: SE 1/4, SE 1/4, NE 1/4, SW
1/4, Sec. 28, T 22 S, R 31 E

ELEVATION: 3417.2' (Aluminum Cap)
TOTAL DEPTH: 787.7'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Water Development Corporation

DRILLING RECORD: **Date Started:** 03/28/95 **Date Completed:** 04/22/95

HOLE SIZE: 24": 0 to 38'
14 3/4": 38 to 731.9'
7 3/4": 731.9 to 778.7'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 20
Grade:
Wt/Ft: 53
From: 30
To: 38
Cement: 50 Cu. Ft.

Diameter: 9 5/8
Grade:
Wt/Ft: 5.7
From: 1.2
To: 731.9
Cement: 794 cu. ft.

Current status - Not in use.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-19b	Holocene	0-28
	Dockum Group	28-53
	Dewey Lake Redbeds	53-567
	Rustler Formation	
	Forty-niner Member	567-628
	Magenta Dolomite Member	628-652
	Tamarisk Member	652-740.1
	Culebra Dolomite Member	740.1-764.4
	Unnamed Lower Member	764.4-778.7+

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-19b2
OPERATOR: US DOE/CAO
PERMIT NO.: C 2421

LOCATION: SE 1/4, SE 1/4, NE 1/4, SW
1/4, Sec 28, T 22 S, R 31 E

ELEVATION: 3417.1' (Aluminum Cap)
TOTAL DEPTH: 786'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Water Development Corporation

DRILLING RECORD: **Date Started:** 05/10/95 **Date Completed:** 05/20/95

HOLE SIZE: 18": 0 to 37'
12 1/4": 37 to 732.4'
5.88": 732.4 to 786'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 14
Grade:
Wt/Ft: 42
From: 0.3
To: 37
Cement: 35 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 5.7
From: +2
To: 732.4
Cement: 606 Cu. Ft.

Diameter: 5 1/2
Grade:
Wt/Ft: PVC Liner
From: 766
To: 780
Cement:

Current status - Not in use.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-19b2	Holocene	0-28
	Dockum Group	28-58
	Dewey Lake Redbeds	58-567
	Rustler Formation	
	Forty-niner Member	567-628
	Magenta Dolomite Member	628-653
	Tamarisk Member	653-741.6
	Culebra Dolomite Member	741.6-765
	Unnamed Lower Member	765-786+

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-19b3
OPERATOR: US DOE/CAO
PERMIT NO.: C 2422

LOCATION: SE 1/4, SE 1/4, NE 1/4, SW
1/4, Sec 28, T 22 S, R 31 E

ELEVATION: 3417.2' (Aluminum Cap)
TOTAL DEPTH: 785'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Water Development Corporation

DRILLING RECORD: **Date Started:** 04/23/95 **Date Completed:** 05/09/95

HOLE SIZE: 18": 0 to 38'
12 1/4": 38 to 734'
5.88": 734 to 785'

WELL DEVELOPMENT:

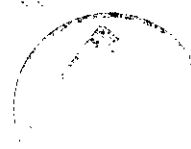
CASING RECORD

Diameter: 14
Grade:
Wt/Ft: 42
From: +30
To: 38
Cement: 35 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 5.7
From: 1.7
To: 732
Cement: 606 Cu. Ft.

Diameter: 5 1/2
Grade:
Wt/Ft: PVC Liner
From: 762
To: 782
Cement:

Current status - Not in use.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-19b3	Holocene	0-26
	Dockum Group	26-60
	Dewey Lake Redbeds	60-568
	Rustler Formation	
	Forty-niner Member	568-629
	Magenta Dolomite Member	629-654
	Tamarisk Member	654-740
	Culebra Dolomite Member	740-765
Unnamed Lower Member	765-785+	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-19b4
OPERATOR: US DOE/CAO
PERMIT NO.: C 2423

LOCATION: SE 1/4, SE 1/4, Ne 1/4, SW
1/4, Sec 28, T 22 S, R 31 E

ELEVATION: 3416 (Aluminum Cap)
TOTAL DEPTH: 782'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Water Development Corporation

DRILLING RECORD: **Date Started:** 05/26/95 **Date Completed:** 06/05/95

HOLE SIZE: 18": 0 to 38'
12 1/4": 38 to 736.7'
5.88": 736.7 to 782'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 14
Grade:
Wt/Ft: 42
From: 0
To: 38
Cement: 35 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 5.7
From: +2.6
To: 730.7
Cement: 606 Cu. Ft.

Diameter: 5 1/2
Grade:
Wt/Ft: PVC Liner
From: 762
To: 782
Cement:

Current status - Not in use.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-19b4	Holocene	0-28
	Dockum Group	28-58
	Dewey Lake Redbeds	58-568
	Rustler Formation	
	Forty-niner Member	568-628
	Magenta Dolomite Member	628-653
	Tamarisk Member	653-738.5
	Culebra Dolomite Member	738.5-761.8
	Unnamed Lower Member	761.8-782+

HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-19b5
OPERATOR: US DOE/CAO
PERMIT NO.: C 2424

LOCATION: SE 1/4, SE 1/4, Ne 1/4, SW
1/4, Sec 28, T 22 S, R 31 E

ELEVATION: 3417.1' (Aluminum Cap)
TOTAL DEPTH: 785.5'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Water Development Corporation

DRILLING RECORD: **Date Started:** 06/11/95 **Date Completed:** 08/27/95

HOLE SIZE: 18": 0 to 38'
12 1/4": 38 to 734'
5.88": 734 to 785.5'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 14
Grade:
Wt/Ft: 42
From: +30
To: 38
Cement: 35 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 5.7
From: +1.6
To: 730.7
Cement: 606 Cu. Ft.

Diameter: 5 1/2
Grade:
Wt/Ft: PVC Liner
From: 763
To: 783
Cement:

Current status - Not in use.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-1965	Holocene	0-29
	Dockum Group	29-58
	Dewey Lake Redbeds	58-565
	Rustler Formation	
	Forty-niner Member	565-623
	Magenta Dolomite Member	623-649
	Tamarisk Member	649-736.7
	Culebra Dolomite Member	736.7-761.2
Unnamed Lower Member	761.2-785.5+	



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-19b6
OPERATOR: US DOE/CAO
PERMIT NO.: C 2425

LOCATION: SE 1/4, SE 1/4, Ne 1/4, SW
1/4, Sec 28, T 22 S, R 31 E

ELEVATION: 3417.2' (Aluminum Cap)
TOTAL DEPTH: 788.1'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Water Development Corporation

DRILLING RECORD: **Date Started:** 07/10/95 **Date Completed:** 08/25/95

HOLE SIZE: 18": 0 to 39'
12 1/4": 39 to 733'
5.88": 733 to 788.1'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 14
Grade:
Wt/Ft: 42
From: +30
To: 39
Cement: 35 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 5.7
From: 1.9
To: 730.1
Cement: 606 Cu. Ft.

Diameter: 5 1/2
Grade:
Wt/Ft: PVC Liner
From: 766
To: 786
Cement:

Current status - Not in use.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-19b6	Holocene	0-28
	Dockum Group	28-63
	Dewey Lake Redbeds	63-566
	Rustler Formation	
	Forty-niner Member	566-623
	Magenta Dolomite Member	623-649
	Tamarisk Member	649-739
	Culebra Dolomite Member	739-765
	Unnamed Lower Member	765-788.1+



HYDROLOGIC TEST BOREHOLE DATA BASE

BOREHOLE: H-19b7
OPERATOR: US DOE/CAO
PERMIT NO.: C2426

LOCATION: SE 1/4, SE 1/4, Ne 1/4, SW
1/4, Sec 28, T 22 S, R 31 E

ELEVATION: 3417.2' (Aluminum Cap)
TOTAL DEPTH: 785'
TYPE OF WELL: Hydrologic Test Hole
DRILLER: Water Development Corporation

DRILLING RECORD: **Date Started:** 07/26/95 **Date Completed:** 08/20/95

HOLE SIZE: 18": 0 to 38'
12 1/4": 38 to 734'
5.88": 734 to 785'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 14
Grade:
Wt/Ft: 42
From: +10
To: 38
Cement: 35 Cu. Ft.

Diameter: 7
Grade:
Wt/Ft: 5.7
From: .8
To: 731
Cement: 606 Cu. Ft.

Diameter: 5 1/2
Grade:
Wt/Ft: PVC Liner
From: 764
To: 784
Cement:

Current status - Not in use.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
H-19b7	Holocene	0-28
	Dockum Group	28-60
	Dewey Lake Redbeds	60-567
	Rustler Formation	
	Forty-niner Member	567-627
	Magenta Dolomite Member	627-652
	Tamarisk Member	652-739.5
	Culebra Dolomite Member	739.5-764
Unnamed Lower Member	764-785+	

**Potash Borehole
Data Base**



POTASH BOREHOLE DATA BASE

BOREHOLE: P-1
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 327' FSL, 551' FWL of Sec. 29, SW 1/4, T 22
S, R 31 E

ELEVATION: 3345'
TOTAL DEPTH: 1591'
TYPE OF WELL: Potash Core Test
DRILLER: Pennsylvania Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 08/23/76 **Date Completed:** 09/02/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE:

8 3/4": 0 to 32'
6 1/4": 32 to 794'
3 3/8": 794 to 1200'
3 1/4": 1200 to 1591'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 7
Grade: Used
Wt/Ft:
From: 0
To: 32
Cement: None

Diameter: 4 1/2
Grade: Used
Wt/Ft:
From: 0
To: 794
Cement: None

7" casing recovered. 203' of 4 1/2" casing left in hole between 591-794' below land surface.

PLUGGING SCHEDULE

From: 1591'
To: 0'
Int: 1591'
Material: 310 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-1	Holocene Deposits	0-10
	Pleistocene Rocks	
	Gatuna Formation	10-40
	Permian Rocks	
	Dewey Lake Red Beds	40-358
	Rustler Formation	358-677
	Magenta Dolomite Member	423-448
	Culebra Dolomite Member	538-565
	Salado Formation	677-1591
	Upper Member	677-1191
	McNutt Potash Zone	1191-1583
	Vaca Triste Sandstone Member	1191-1201
	11th Ore Zone	1246-1250
	MB 117	1259-1262
	MB 118	1282-1285
	MB 119	1307-1309
	10th Ore Zone	1319-1324
	MB 120	1334-1335
	9th Ore Zone	1338-1343
	MB 121	1347-1349
	MB 122	1356-1357
	8th Ore Zone	1361-1370
	Union Anhydrite	1381-1393
	7th Ore Zone	1400-1404
	6th Ore Zone	1414-1416
	5th Ore Zone	1419-1432
	MB 123	1462-1469
	MB 124	1477-1486
	4th Ore Zone	1490-1503
	3d Ore Zone	1511-1526
	2d Ore Zone	1533-1538
1st Ore Zone	1554-1562	
MB 126	1582-1583	
Lower Member	1583-1587	

POTASH BOREHOLE DATA BASE

BOREHOLE: P-2
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 125' FNL, 172' FEL of Sec. 28, NE1/4
Sec. 28, T 22 S, R 31 E

ELEVATION: 3478'
TOTAL DEPTH: 1895'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 08/25/76 **Date Completed:** 09/03/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 20'
5 7/8": 20 to 1038'
3 15/16": 1038 to 1895'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 7
Grade: Used
Wt/Ft:
From: 0
To: 20
Cement: None

Diameter: 4 1/2
Grade: HW
Wt/Ft:
From: 0
To: 1038
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 1895'
To: 0'
Int: 1895'
Material: 274 Cu. Ft. of Cement

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-2	Holocene Deposits	0-18
	Pleistocene Rocks	
	Gatuna Formation	18-38
	Triassic Rocks	
	Santa Rosa Sandstone	38-164
	Permian Rocks	
	Dewey Lake Red Beds	164-690
	Rustler Formation	690-1008
	Magenta Dolomite Member	748-773
	Culebra Dolomite Member	857-883
	Salado Formation	1008-1895
	Upper Member	1008-1506
	McNutt Potash Zone	1506-1883
	Vaca Triste Sandstone Member	1506-1512
	11th Ore Zone	1562-1565
	MB 117	1574-1576
	MB 118	1599-1601
	MB 119	1622-1626
	10th Ore Zone	1632-1639
	MB 120	1646-1647
	9th Ore Zone	1652-1656
	MB 121	1662-1663
	MB 122	1670-1671
	8th Ore Zone	1678-1687
	Union Anhydrite	1695-1705
	7th Ore Zone	1712-1719
	6th Ore Zone	1731-1733
	5th Ore Zone	1738-1745
	MB 123	1774-1781
	MB 124	1787-1795
	4th Ore Zone	1799-1809
	3d Ore Zone	1818-1832
2d Ore Zone	1836-1840	
1st Ore Zone	1859-1870	
MB 126	1882-1883	
Lower Member	1883-1894	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-3
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 103' FSL, 3122' FEL of Sec. 20, SW1/4
Sec. 20, T 22 S, R 31 E

ELEVATION: 3382'
TOTAL DEPTH: 1676'
TYPE OF WELL: Potash Core Test
DRILLER: Pennsylvania Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 08/26/76 **Date Completed:** 09/08/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 30'
6 1/4": 30 to 826'
3 15/16": 826 to 1676'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 7
Grade: Used
Wt/Ft:
From: 0
To: 30
Cement: None



Diameter: 4 1/2
Grade: Used
Wt/Ft:
From: 0
To: 826
Cement: None

7" casing recovered. 336' of 4 1/2" casing left in hole between 490-826' below land surface.

PLUGGING SCHEDULE

From: 1676'
To: 0'
Int: 1676'
Material: 302 Cu. Ft. of Cement

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-3	Holocene Deposits	0-10
	Pleistocene rocks	
	Gatuna Formation	10-41
	Permian Rocks	
	Dewey Lake Red Beds	41-468
	Rustler Formation	468-786
	Magenta Dolomite Member	529-553
	Culebra Dolomite Member	642-665
	Salado Formation	786-1668
	Upper Member	786-1287
	McNutt Potash Zone	1287-1668
	Vaca Triste Sandstone Member	1287-1295
	11th Ore Zone	1346-1349
	MB 117	1357-1358
	MB 118	1375-1378
	MB 119	1405-1407
	10th Ore Zone	1415-1420
	MB 120	1428-1429
	9th Ore Zone	1434-1438
	MB 121	1443-1445
	MB 122	1452-1453
	8th Ore Zone	1458-1467
	Union Anhydrite	1473-1481
	7th Ore Zone	1494-1499
	6th Ore Zone	1509-1511
	5th Ore Zone	1515-1525
	MB 123	1555-1563
MB 124	1571-1579	
4th Ore Zone	1585-1595	
3d Ore Zone	1599-1617	
2d Ore Zone	1623-1627	
1st Ore Zone	1645-1656	
MB 126	1667-1668	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-4
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 146' FSL, 1487' FEL of Sec. 28, SE1/4
Sec. 28, T 22 S, R 31 E

ELEVATION: 3441'
TOTAL DEPTH: 1857'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 08/27/76 **Date Completed:** 09/07/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 23'
5 7/8": 23 to 958'
3 15/16": 958 to 1857'

WELL DEVELOPMENT: *****CASING RECORD*****

Diameter: 6 5/8
Grade: Used
Wt/Ft:
From: 0
To: 23
Cement: None

Diameter: 4 1/2
Grade: HW
Wt/Ft:
From: 0
To: 958
Cement: None

All casing recovered.

*****PLUGGING SCHEDULE*****

From: 1857'
To: 0'
Int: 1857'
Material: 360 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-4	Holocene Deposits	0-8
	Triassic Rocks	
	Santa Rosa Sandstone	8-99
	Permian Rocks	
	Dewey Lake Red Beds	99-609
	Rustler Formation	609-930
	Magenta Dolomite Member	662-686
	Culebra Dolomite Member	775-802
	Salado Formation	930-1857
	Upper Member	930-1446
	McNutt Potash Zone	1446-1853
	Vaca Triste Sandstone Member	1446-1452
	11th Ore Zone	1506-1509
	MB 117	1519-1521
	MB 118	1544-1547
	MB 119	1570-1572
	10th Ore Zone	1581-1589
	MB 120	1596-1597
	9th Ore Zone	1603-1607
	MB 121	1610-1612
	MB 122	1620-1621
	8th Ore Zone	1628-1637
	Union Anhydrite	1646-1659
	7th Ore Zone	1667-1671
	6th Ore Zone	1683-1686
	5th Ore Zone	1690-1700
MB 123	1728-1735	
MB 124	1742-1752	
4th Ore Zone	1756-1768	
3d Ore Zone	1777-1792	
2d Ore Zone	1798-1803	
1st Ore Zone	1824-1835	
MB 126	1852-1853	

POTASH BOREHOLE DATA BASE

BOREHOLE: P-5
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 202' FSL, 165' FEL of Sec. 17, SE1/4
Sec. 17, T 22 S, R 31 E

ELEVATION: 3472'
TOTAL DEPTH: 1830'
TYPE OF WELL: Potash Core Test
DRILLER: Pennsylvania Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 09/10/76 **Date Completed:** 09/22/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 25'
6 1/4": 25 to 1000'
3 7/8": 1000 to 1420'
3 1/2": 1420 to 1830'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 7
Grade: Used
Wt/Ft:
From: 0
To: 25
Cement: None

Diameter: 4 1/2
Grade:
Wt/Ft: 9.5
From: 0
To: 1003
Cement: None

7" casing recovered. 568' of 4 1/2" casing left in hole between 435-1003' below land surface.

PLUGGING SCHEDULE

From: 1830'
To: 0'
Int: 1830'
Material: 336 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-5	Holocene deposits	0-13
	Triassic Rocks	
	Santa Rosa Sandstone	13-146
	Permian Rocks	
	Dewey Lake Red Beds	146-623
	Rustler Formation	623-947
	Magenta Dolomite Member	686-711
	Culebra Dolomite Member	804-827
	Salado Formation	947-1830
	Upper Member	947-1429
	McNutt Potash Zone	1429-1785
	Vaca Triste Sandstone Member	1429-1436
	11th Ore Zone	1482-1486
	MB 117	1492-1494
	MB 118	1514-1517
	MB 119	1541-1543
	10th Ore Zone	1550-1556
	MB 120	1560-1561
	9th Ore Zone	1567-1571
	MB 121	1573-1575
	MB 122	1580-1582
	8th Ore Zone	1589-1595
	Union Anhydrite	1604-1611
	7th Ore Zone	1623-1628
	6th Ore Zone	1635-1638
	5th Ore Zone	1643-1659
	MB 123	1680-1687
	MB 124	1695-1705
	4th Ore Zone	1709-1717
	3d Ore Zone	1725-1737
1st Ore Zone	1742-1746	
MB 126	1784-1785	
Lower Member	1785-1830	
MB 127	1810-1811	
MB 128	1821-1822	

POTASH BOREHOLE DATA BASE

BOREHOLE: P-6
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 2767' FSL, 199' FWL of Sec. 30, NW1/4
Sec. 30, T 22 S, R 31 E

ELEVATION: 3354'
TOTAL DEPTH: 1573'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 09/03/76 **Date Completed:** 09/17/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE:
8 3/4": 0 to 18'
5 7/8": 18 to 703'
3 15/16": 703 to 1573'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 6 5/8
Grade: Used
Wt/Ft:
From: 0
To: 18
Cement: None

Diameter: 4 1/2
Grade: HW
Wt/Ft:
From: 0
To: 775
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 1573'
To: 0'
Int: 1573'
Material: 374 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-6	Holocene Deposits	0-8
	Pleistocene Rocks	
	Gatuna Formation	8-18
	Permian Rocks	
	Dewey Lake Red Beds	18-357
	Rustler Formation	357-659
	Magenta Dolomite Member	417-443
	Culebra Dolomite Member	537-560
	Salado Formation	659-1573
	Upper Member	659-1162
	McNutt Potash Zone	1162-1560
	Vaca Triste Sandstone Member	1162-1170
	11th Ore Zone	1218-1221
	MB 117	1231-1233
	MB 118	1252-1256
	MB 119	1279-1281
	10th Ore Zone	1291-1296
	MB 120	1307-1308
	9th Ore Zone	1313-1317
	MB 121	1324-1326
	MB 122	1332-1333
	8th Ore Zone	1338-1348
	Union Anhydrite	1357-1365
	7th Ore Zone	1378-1382
	6th Ore Zone	1394-1396
	5th Ore Zone	1400-1410
MB 123	1436-1443	
MB 124	1453-1462	
4th Ore Zone	1468-1481	
3d Ore Zone	1489-1502	
2d Ore Zone	1509-1513	
1st Ore Zone	1533-1543	
MB 126	1559-1560	

POTASH BOREHOLE DATA BASE

BOREHOLE: P-7
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 513' FNL, 396' FWL of Sec. 5, NW14
Sec. 5, T 23 S, R 31 E

ELEVATION: 3332'
TOTAL DEPTH: 1574'
TYPE OF WELL: Potash Core Test
DRILLER: Pennsylvania Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 09/04/76 **Date Completed:** 09/22/76

Remarks: Encountered air pocket at 980' below land surface, and lost casing seat.
Encountered several air pockets between 980-1264'. Lost mud at 1234'.

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE:
8 3/4": 0 to 31'
6 1/4": 31 to 740'
3 7/8": 740 to 1574'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 7
Grade: Used
Wt/Ft:
From: 0
To: 31
Cement: None

Diameter: 4 1/2
Grade: Used
Wt/Ft: 9.5
From: 0
To: 740
Cement: None

7" casing recovered. 210' of 4 1/2" casing left in hole between 530-740' below land surface.

PLUGGING SCHEDULE

From: 1574'
To: 0'
Int: 1574'
Material: 346 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-7	Holocene Deposits	0-11
	Pleistocene Rocks	
	Gatuna Formation	11-45
	Permian Rocks	
	Dewey Lake Red Beds	45-312
	Rustler Formation	312-630
	Magenta Dolomite Member	373-398
	Culebra Dolomite Member	496-522
	Salado Formation	630-1574
	Upper Member	630-1155
	McNutt Potash Zone	1155-1566
	Vaca Triste Sandstone Member	1155-1162
	11th Ore Zone	1215-1220
	MB 117	1228-1230
	MB 118	1252-1256
	MB 119	1277-1279
	10th Ore Zone	1291-1296
	MB 120	1307-1308
	9th Ore Zone	1312-1316
	MB 121	1326-1328
	MB 122	1330-1331
	8th Ore Zone	1335-1346
	Union Anhydrite	1358-1372
	7th Ore Zone	1377-1382
	6th Ore Zone	1391-1393
	5th Ore Zone	1398-1407
	MB 123	1433-1441
MB 124	1448-1459	
4th Ore Zone	1467-1484	
3d Ore Zone	1492-1507	
2d Ore Zone	1513-1518	
1st Ore Zone	1537-1547	
MB 126	1565-1566	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-8
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 642' FNL, 96' FWL of Sec. 4, NW1/4
Sec. 4, T 23 S, R 31 E

ELEVATION: 3336'
TOTAL DEPTH: 1660'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 09/08/76 **Date Completed:** 09/15/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 6 3/4": 0 to 23'
5 7/8": 23 to 860'
3 15/16": 860 to 1660'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 6 5/8
Grade: Used
Wt/Ft:
From: 0
To: 23
Cement: None

Diameter: 4 1/2
Grade: HW
Wt/Ft:
From: 0
To: 860
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 1660'
To: 0'
Int: 1660'
Material: 310 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-8	Holocene Deposits	0-9
	Pleistocene Rocks	
	Gatuna Formation	9-39
	Permian Rocks	
	Dewey Lake Red Beds	39-391
	Rustler Formation	391-715
	Magenta Dolomite Member	450-474
	Culebra Dolomite Member	563-585
	Salado Formation	715-1660
	Upper Member	715-1237
	McNutt Potash Zone	1237-1652
	Vaca Triste Sandstone Member	1237-1245
	11th Ore Zone	1297-1301
	MB 117	1308-1310
	MB 118	1333-1337
	MB 119	1360-1362
	10th Ore Zone	1373-1380
	MB 120	1389-1390
	9th Ore Zone	1395-1399
	MB 121	1405-1407
	MB 122	1413-1414
	8th Ore Zone	1421-1430
	Union Anhydrite	1440-1455
	7th Ore Zone	1461-1465
	6th Ore Zone	1472-1475
	5th Ore Zone	1481-1492
MB 123	1517-1524	
MB 124	1537-1545	
4th Ore Zone	1554-1567	
3d Ore Zone	1577-1596	
2d Ore Zone	1601-1604	
1st Ore Zone	1624-1633	
MB 126	1661-1662	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-9
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 1493' FSL, 143' FEL of Sec. 33, SE1/4
Sec. 33, T 22 S, R 31 E

ELEVATION: 3409'
TOTAL DEPTH: 1796'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 09/16/76 **Date Completed:** 09/26/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 23'
5 7/8": 23 to 1023'
3 15/16": 1023 to 1796'

WELL DEVELOPMENT: *****CASING RECORD*****

Diameter: 8 5/8
Grade: Used
Wt/Ft:
From: 0
To: 23
Cement: None

Diameter: 4 1/2
Grade: HW
Wt/Ft:
From: 0
To: 1023
Cement: None

All casing recovered.

*****PLUGGING SCHEDULE*****

From: 1796'
To: 0'
Int: 1796'
Material: 410 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-9	Holocene Deposit	0-11
	Triassic Rocks	
	Santa Rosa Sandstone	11-66
	Permian Rocks	
	Dewey Lake Red Beds	66-562
	Rustler Formation	562-881
	Magenta Dolomite Member	617-644
	Culebra Dolomite Member	734-757
	Salado Formation	881-1796
	Upper Member	881-1401
	McNutt Potash Zone	1401-1796
	Vaca Triste Sandstone Member	1401-1410
	11th Ore Zone	1458-1462
	MB 117	1471-1473
	MB 118	1496-1499
	MB 119	1519-1521
	10th Ore Zone	1530-1538
	MB 120	1546-1547
	9th Ore Zone	1552-1555
	MB 121	1561-1563
	MB 122	1569-1570
	8th Ore Zone	1577-1585
	Union Anhydrite	1597-1608
	7th Ore Zone	1613-1618
	6th Ore Zone	1626-1629
	5th Ore Zone	1634-1643
MB 123	1668-1676	
MB 124	1686-1695	
4th Ore Zone	1699-1714	
3d Ore Zone	1723-1738	
2d Ore Zone	1744-1748	
1st Ore Zone	1769-1778	
MB 126	1795-1796	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-10
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 2315' FNL, 339' FWL of Sec. 26, NW1/4
Sec. 26, T 22 S, R 31 E

ELEVATION: 3508'
TOTAL DEPTH: 2009'
TYPE OF WELL: Potash Core Test
DRILLER: Pennsylvania Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 09/24/76 **Date Completed:** 10/17/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE:
8 3/4": 0 to 31'
6 1/4": 31 to 1209'
3 7/8": 1209 to 2009'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 7
Grade: Used
Wt/Ft:
From: 0
To: 31
Cement: None

Diameter: 4 1/2
Grade: Used
Wt/Ft: 9.5
From: 0
To: 1209
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 2009'
To: 0'
Int: 2009'
Material: 504 Cu. Ft of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-10	Holocene Deposits	0-8
	Triassic Rocks	
	Santa Rosa Sandstone	8-151
	Permian Rocks	
	Dewey Lake Red Beds	151-686
	Rustler Formation	686-1086
	Magenta Dolomite Member	757-781
	Culebra Dolomite Member	931-957
	Salado Formation	1086-2009
	Upper Member	1086-1594
	McNutt Potash Zone	1594-1983
	Vaea Triste Sandstone Member	1594-1603
	11th Ore Zone	1652-1655
	MB 117	1662-1664
	MB 118	1686-1688
	MB 119	1710-1712
	10th Ore Zone	1717-1725
	MB 120	1733-1734
	9th Ore Zone	1740-1744
	MB 121	1751-1753
	MB 122	1759-1760
	8th Ore Zone	1765-1775
	Union Anhydrite	1784-1798
	7th Ore Zone	1807-1811
	6th Ore Zone	1822-1825
	5th Ore Zone	1831-1841
	MB 123	1868-1875
MB 124	1880-1888	
4th Ore Zone	1892-1905	
3d Ore Zone	1913-1929	
2d Ore Zone	1934-1938	
1st Ore Zone	1961-1969	
MB 126	1982-1983	
Lower Member	1983-2009	
MB 127	2005-2008	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-11
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 175' FNL and 177' FWL of Sec. 23, NW1/4
Sec. 23, T 22 S, R 31 E

ELEVATION: 3506'
TOTAL DEPTH: 1940'
TYPE OF WELL: Potash Core Test
DRILLER: Pennsylvania Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 09/24/76 **Date Completed:** 10/18/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 25'
5 7/8": 25 to 1200'
3 7/8": 1200 to 1580'
3 1/2": 1580 to 1940'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 7
Grade: Used
Wt/Ft:
From: 0
To: 25
Cement: None

Diameter: 4 1/2
Grade: Used
Wt/Ft: 9.5
From: 0
To: 1200
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 1940'
To: 0'
Int: 1940'
Material: 490 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-11	Holocene Deposits	0-9
	Triassic Rocks	
	Santa Rosa Sandstone	9-224
	Permian Rocks	
	Dewey Lake Red Beds	224-745
	Rustler Formation	745-1058
	Magenta Dolomite Member	798-823
	Culebra Dolomite Member	912-938
	Salado Formation	1058-1942
	Upper Member	1058-1550
	McNutt Potash Zone	1550-1917
	Vaca Triste Sandstone Member	1550-1557
	11th Ore Zone	1604-1608
	MB 117	1616-1618
	MB 118	1640-1642
	MB 119	1664-1666
	10th Ore Zone	1674-1682
	MB 120	1687-1688
	9th Ore Zone	1693-1698
	MB 121	1702-1704
	MB 122	1711-1712
	8th Ore Zone	1717-1724
	Union Anhydrite	1735-1740
	7th Ore Zone	1754-1759
	6th Ore Zone	1767-1770
	5th Ore Zone	1775-1785
	MB 123	1811-1818
MB 124	1824-1833	
4th Ore Zone	1837-1846	
3d Ore Zone	1853-1866	
2d Ore Zone	1871-1874	
1st Ore Zone	1890-1901	
MB 126	1916-1917	
Lower Member	1917-1942	
MB 127	1940-1941	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-12
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 167' FNL, 195' FEL of Sec. 24, NE1/4
Sec. 24, T 22 S, R 30 E

ELEVATION: 3376'
TOTAL DEPTH: 1598'
TYPE OF WELL: Potash Core Test
DRILLER: Pennsylvania Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 09/17/76 **Date Completed:** 10/23/76

Remarks: Lost circulation at 742' and 813' below land.

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE:

8 3/4": 0 to 30'
6 1/4": 30 to 801'
5 7/8": 801 to 827'
3 7/8": 827 to 1080'
3 1/2": 1080 to 1598'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 7
Grade: Used
Wt/Ft:
From: 0
To: 30
Cement: None

Diameter: 4 1/2
Grade: Used
Wt/Ft: 9.5
From: 0
To: 827
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 1598'
To: 0'
Int: 1598'
Material: 889 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-12	Holocene Deposits	0-8
	Permian Rocks	
	Dewey Lake Red Beds	8-461
	Rustler Formation	461-749
	Magenta Dolomite Member	519-543
	Culebra Dolomite Member	633-656
	Salado Formation	749-1598
	Upper Member	749-1226
	McNutt Potash Zone	1226-1597
	Vaca Triste Sandstone Member	1226-1233
	11th Ore Zone	1280-1284
	MB 117	1290-1292
	MB 118	1314-1317
	MB 119	1338-1340
	10th Ore Zone	1346-1353
	MB 120	1361-1362
	9th Ore Zone	1367-1370
	MB 121	1376-1378
	MB 122	1384-1385
	8th Ore Zone	1390-1398
	Union Anhydrite	1407-1417
	7th Ore Zone	1432-1436
	6th Ore Zone	1442-1445
	5th Ore Zone	1450-1459
	MB 123	1486-1492
	MB 124	1494-1509
4th Ore Zone	1514-1523	
3d Ore Zone	1533-1546	
2d Ore Zone	1550-1555	
1st Ore Zone	1572-1582	
MB 126	1596-1597	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-13
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 125' FNL, 116' FWL of Sec. 18, NW1/4
Sec. 18, T 22 S, R 31 E

ELEVATION: 3345'
TOTAL DEPTH: 1576'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 09/17/76 **Date Completed:** 09/24/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE:
8 3/4": 0 to 18'
5 7/8": 18 to 785'
3 15/16": 785 to 1576'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 6 5/8
Grade: Used
Wt/Ft:
From: 0
To: 18
Cement: None

Diameter: 4
Grade: HW
Wt/Ft:
From: 0
To: 785
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 1576'
To: 0'
Int: 1576'
Material: 338 Cu. Ft. of Cement

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-13	Holocene Deposits	0-12
	Pleistocene Rocks	
	Gatuna Formation	12-38
	Permian Rocks	
	Dewey Lake Red Beds	38-427
	Rustler Formation	427-721
	Magenta Dolomite Member	490-514
	Culebra Dolomite Member	604-627
	Salado Formation	721-1573
	Upper Member	721-1201
	McNutt Potash Zone	1201-1547
	Vaca Triste Sandstone Member	1201-1208
	11th Ore Zone	1252-1255
	MB 117	1264-1265
	MB 118	1287-1289
	MB 119	1309-1311
	10th Ore Zone	1317-1323
	MB 120	1330-1331
	9th Ore Zone	1336-1340
	MB 121	1344-1346
	MB 122	1355-1356
	8th Ore Zone	1359-1368
	Union Anhydrite	1377-1382
	7th Ore Zone	1395-1400
	6th Ore Zone	1407-1410
	5th Ore Zone	1413-1423
	MB 123	1447-1453
	MB 124	1462-1471
	4th Ore Zone	1474-1483
	3d Ore Zone	1491-1501
	2d Ore Zone	1506-1510
1st Ore Zone	1525-1533	
MB 126	1547-1548	
Lower Member	1548-1573	
MB 127	1572-1573	

POTASH BOREHOLE DATA BASE

BOREHOLE: P-14
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 307' FSL, 615.8' FWL of Sec. 24, SW1/4
Sec. 24, T 22 S, R 30 E

ELEVATION: 3358'
TOTAL DEPTH: 1545'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 09/24/76 **Date Completed:** 10/04/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 20'
7 7/8": 20 to 776'
4": 776 to 1188'
3 15/16": 1188 to 1545'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 8 5/8
Grade: Used
Wt/Ft:
From: 0
To: 10
Cement: None

Diameter: 4 1/2
Grade: J-55
Wt/Ft: 9.5
From: 0
To: 775
Cement: 324 Cu. Ft.

McCullough 12 bullet carrier gun left in hole.
8 5/8" casing pulled.

PLUGGING SCHEDULE

From: 1545'
To: 775'
Int: 770'
Material: 122 Cu. Ft. of Cement

From: 775'
To: 0'
Int: 775'
Material:

POTASH BOREHOLE DATA BASE

Hole plugged from 1545-775' with cement and converted to hydrologic observation well in Rus Formation.

*****RECOMPLETION*****

January 21, 1977, P-14 was perforated across the Rustler-Salado contact from 676 to 700'. A PIP was installed between the Rustler-Salado contact and the Culebra-dolomite. The casing was then perforated across the Culebra-dolomite interval from 573 to 601' with 72 holes.

March 7, 1977, casing perforated from 676 to 700' with 72 holes.

February 2, 1989, the P-14 casing was reperforated across the Culebra dolomite interval from 573' to 601' with 15/32" bullets at 4 shots/foot.

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-14	Holocene Deposits	0-10
	Pleistocene Rocks	
	Gatuna Formation	10-42
	Permian Rocks	
	Dewey Lake Red Beds	42-387
	Rustler Formation	387-687
	Magenta Dolomite Member	453-475
	Culebra Dolomite Member	573-595
	Salado Formation	687-1540
	Upper Member	687-1133
	McNutt Potash Zone	1133-1510
	Vaca Triste Sandstone Member	1133-1141
	11th Ore Zone	1186-1190
	MB 117	1199-1200
	MB 118	1225-1228
	MB 119	1251-1253
	10th Ore Zone	1257-1263
	MB 120	1273-1274
	9th Ore Zone	1277-1282
	MB 121	1287-1289
	MB 122	1297-1298
	8th Ore Zone	1302-1310
	Union Anhydrite	1319-1328
	7th Ore Zone	1342-1345
	6th Ore Zone	1352-1355
	5th Ore Zone	1361-1370
	MB 123	1394-1400
	MB 124	1410-1419
4th Ore Zone	1423-1435	
3d Ore Zone	1443-1455	
2d Ore Zone	1461-1465	
1st Ore Zone	1482-1492	
MB 126	1509-1510	
Lower Member	1510-1540	
MB 127	1534-1536	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-15
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 410.8' FSL, 192.32' FWL of Sec. 21, SW1/4
Sec. 31, T 22 S, R 31 E

ELEVATION: 3309.7'
TOTAL DEPTH: 1465'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 10/04/76 **Date Completed:** 10/15/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 20'
7 7/8": 20 to 637'
4": 637 to 1038'
3 15/16": 1038 to 1465'

WELL DEVELOPMENT:

CASING RECORD

Diameter: 8 5/8
Grade: Used
Wt/Ft:
From: 0
To: 20
Cement: None

Diameter: 4 1/2
Grade: J-55
Wt/Ft: 9.5
From: +1
To: 635
Cement: 266 Cu. Ft.

8 5/8" casing recovered. 210' of 4 1/2" casing left in hole between 530-740' below land surface.

PLUGGING SCHEDULE

From: 1465'
To: 620'
Int: 845'
Material: 108 Cu. Ft. of Cement

From: 620'
To: 0'
Int: 620'
Material:



POTASH BOREHOLE DATA BASE

Hole plugged from 1465'-620' with cement, and converted to hydrologic observation well in Rustler Formation.

*****RECOMPLETION*****

January 21, 1977, P-15 was re-entered and the casing was perforated across the Rustler-Salado contact from 532' to 556' with 1/2" shots at 3 shots/foot.

April 6, 1977, the casing in P-15 was perforated across the Culebra-dolomite interval from 410' to 438' with 1/2" shots at 3 shots/foot.

After hydrologic testing of both perforated intervals, a Lynes 3 1/2" PIP was set at a depth of 512'.

June 1985, the PIP was removed from P-15 and a Lynes 3 1/2" retrievable bridge plug was set at 441.36' to provide access to the Culebra-dolomite interval for water-level monitoring.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-15	Holocene Deposits	0-11
	Pleistocene Rocks	
	Gatuna Formation	11-32
	Permian Rocks	
	Dewey Lake Red Beds	32-231
	Rustler Formation	231-542
	Magenta Dolomite Member	294-321
	Culebra Dolomite Member	413-435
	Salado Formation	542-1465
	Upper Member	542-1057
	McNurt Potash Zone	1057-1453
	Vaca Triste Sandstone Member	1057-1065
	11th Ore Zone	1116-1119
	MB 117	1128-1130
	MB 118	1149-1152
	MB 119	1176-1178
	10th Ore Zone	1187-1195
	MB 120	1203-1204
	9th Ore Zone	1208-1212
	MB 121	1216-1218
	MB 122	1225-1226
	8th Ore Zone	1234-1244
	Union Anhydrite	1251-1263
	7th Ore Zone	1271-1275
	6th Ore Zone	1284-1288
	5th Ore Zone	1292-1301
MB 123	1326-1333	
MB 124	1343-1353	
4th Ore Zone	1361-1376	
3d Ore Zone	1384-1397	
2d Ore Zone	1404-1408	
1st Ore Zone	1426-1436	
MB 126	1452-1453	

POTASH BOREHOLE DATA BASE

BOREHOLE: P-16
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 951' FSL, 1629' FEL of Sec. 5, SW1/4
Sec. 5, T 23S, R 31E

ELEVATION: 3323'
TOTAL DEPTH: 1585'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)



DRILLING RECORD: **Date Started:** 09/27/76 **Date Completed:** 10/06/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 23'
5 7/8": 23 to 770'
3 15/16": 770 to 1585

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 6 5/8
Grade: Used
Wt/Ft:
From: 0
To: 23
Cement: None

Diameter: 4
Grade: HW
Wt/Ft:
From: 0
To: 770
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 1585'
To: 0'
Int: 1585'
Material: 353 Cu. Ft. of Cement

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-16	Holocene Deposits	0-14
	Pleistocene Rocks	
	Gatuna Formation	14-32
	Permian Rocks	
	Dewey Lake Red Beds	32-316
	Rustler Formation	316-646
	Magenta Dolomite Member	376-401
	Culebra Dolomite Member	500-523
	Salado Formation	646-1587
	Upper Member	646-1174
	McNutt Potash Zone	1174-1585
	Vaca Triste Sandstone Member	1174-1182
	11th Ore Zone	1235-1237
	MB 117	1245-1247
	MB 118	1269-1273
	MB 119	1293-1295
	10th Ore Zone	1307-1313
	MB 120	1323-1324
	9th Ore Zone	1328-1331
	MB 121	1336-1338
	MB 122	1345-1346
	8th Ore Zone	1352-1365
	Union Anhydrite	1373-1390
	7th Ore Zone	1396-1400
	6th Ore Zone	1411-1412
	5th Ore Zone	1417-1425
	MB 123	1450-1456
	MB 124	1460-1470
	4th Ore Zone	1480-1501
	3d Ore Zone	1510-1526
2d Ore Zone	1533-1536	
1st Ore Zone	1556-1568	
MB 126	1583-1585	

POTASH BOREHOLE DATA BASE

BOREHOLE: P-17
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 1372.2' FSL, 401.9' FWL of Sec. 4, SW1/4
Sec. 4, T 23 S, R 31 E

ELEVATION: 3340'
TOTAL DEPTH: 1660'
TYPE OF WELL: Potash Core Test
DRILLER: Boyies Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 10/18/76 **Date Completed:** 10/28/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE:

8 3/4": 0 to 20'
7 7/8": 20 to 755'
4": 755 to 1220'
3 15/16": 1220 to 1660'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 8 5/8
Grade: Used
Wt/Ft:
From: 0
To: 20
Cement: None

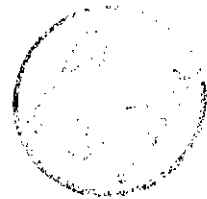
Diameter: 4 1/2
Grade: J-55
Wt/Ft: 9.5
From: +1
To: 751
Cement: 310 Cu. Ft.

8 5/8" casing recovered.

PLUGGING SCHEDULE

From: 1660'
To: 731'
Int: 929'
Material: 130 Cu. Ft. of Cement

From: 731'
To: 0'
Int: 731'
Material:



POTASH BOREHOLE DATA BASE

Hole plugged from 1660'-731 with cement and converted to hydrologic observation well in Rustler Formation.

*****RECOMPLETION*****

January 20, 1977, P-17 was bailed dry and perforated across the Rustler-Salado contact at 3 shots/foot from 702' to 726'

April 5, 1977, a 3 1/2" PIP was installed on tubing and set at 682.5'. The tubing was removed from the well and the casing was perforated across the Culebra-dolomite interval from 558' to 586'. The majority of the borehole fluid was removed by bailing and fluid levels were monitored until May 1977.

May 12, 1977, tubing was reattached to the PIP and the shear plug was overpressured and disengaged from the PIP tubing allowing the fluid levels in both the Rustler-Salado and the Culebra to be monitored. The Culebra was measured in the annulus between PIP's tubing and the perforated casing.

March 1983, the PIP was removed from P-17 due to suspected communication between the Rustler-Salado and Culebra due to leakage around the packer. A retrievable bridge plug was installed at 674' for water-level monitoring and future hydrologic testing of the Culebra.

Currently used as a Culebra Groundwater Level Surveillance Well.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-17	Holocene Deposits	0-14
	Pleistocene Rocks	
	Gatuna Formation	14-46
	Permian Rocks	
	Dewey Lake Red Beds	46-382
	Rustler Formation	382-715
	Magenta Dolomite Member	438-463
	Culebra Dolomite Member	558-583
	Salado Formation	715-1662
	Upper Member	715-1234
	McNutt Potash Zone	1234-1648
	Vaca Triste Sandstone Member	1234-1242
	11th Ore Zone	1294-1299
	MB 117	1306-1308
	MB 118	1330-1334
	MB 119	1358-1359
	10th Ore Zone	1368-1376
	MB 120	1387-1388
	9th Ore Zone	1391-1396
	MB 121	1402-1404
	MB 122	1410-1411
	8th Ore Zone	1418-1428
	Union Anhydrite	1438-1453
	7th Ore Zone	1456-1461
	6th Ore Zone	1471-1474
	5th Ore Zone	1478-1487
MB 123	1513-1521	
MB 124	1527-1535	
4th Ore Zone	1544-1563	
3d Ore Zone	1573-1587	
2d Ore Zone	1594-1599	
1st Ore Zone	1619-1630	
MB 126	1647-1648	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-18
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 138.5' FSL, 732.7' FEL of Sec. 26, SE1/4
Sec. 26, T 22 S, R 31 E

ELEVATION: 3479'
TOTAL DEPTH: 1998'
TYPE OF WELL: Potash Core Test
DRILLER: Pennsylvania Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 10/19/76 **Date Completed:** 11/06/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 18'
7 7/8": 18 to 1139'
3 7/8": 1139 to 1998'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 8 5/8
Grade: Used
Wt/Ft:
From: 0
To: 18
Cement: None

Diameter: 4 1/2
Grade: J-55
Wt/Ft: 9.5
From: +1
To: 1138
Cement: 427 Cu. Ft.

8 3/4" casing recovered.

PLUGGING SCHEDULE

From: 1998'
To: 1125'
Int: 873'
Material: 130 Cu. Ft. of Cement

From: 1125'
To: 0'
Int: 1125'
Material:

Hole plugged from 1998-1125' with cement, and converted to hydrologic observation well in



POTASH BOREHOLE DATA BASE

Rustler Formation.

*****RECOMPLETION*****

January and April 1977, the casing was perforated across two intervals: the Rustler-Salado contact from 1076' to 1100'; and the interval from 912' to 940', which includes the Culebra dolomite from 909' to 938'. A PIP was set between the Rustler-Salado contact and the Culebra-dolomite perforated intervals to allow collection of water-level data for these two zones.

March 1983, the was removed and a retrievable bridge plug was set from 997' to 1002' to allow testing of the Culebra.

June 12, 1987, the 4 1/2" casing was reperforated across the Culebra dolomite interval from 909' to 938' with 15/32" bullets at 4 shots/foot to ensure a good hydraulic connection between the well and the Culebra dolomite.

After perforating the casing, a 3" PIP was installed on 2 3/8" tubing and set at a depth of 900'.

July 1 and 2, 1987, a BASKI 1.5" air-inflatable, sliding-end, feed-through minipacker with an attached pressure transducer was installed on 1/8" wireline at a depth of 824' to 826' and inflated.

August 19, 1987, minipacker removed from the well.

September 10, 1987, the minipacker with transducer was reinstalled and the packer inflated.

November 6, 1987, the minipacker was deflated and removed from the well and a Solinst electric water-level sounder was installed on the wellhead to monitor the fluid-level recovery to the slug-withdrawal test.

Currently used as a Culebra Groundwater Level Surveillance Well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-18	Holocene Deposits	0-9
	Triassic Rocks	
	Santa Rosa Sandstone	9-87
	Permian Rocks	
	Dewey Lake Red Beds	87-626
	Rustler Formation	626-1088
	Magenta Dolomite Member	704-730
	Culebra Dolomite Member	909-938
	Salado Formation	1088-2000
	Upper Member	1088-1604
	McNutt Potash Zone	1604-1987
	Vaca Triste Sandstone Member	1604-1614
	11th Ore Zone	1658-1662
	MB 117	1670-1672
	MB 118	1692-1694
	MB 119	1716-1718
	10th Ore Zone	1726-1734
	MB 120	1741-1742
	9th Ore Zone	1749-1752
	MB 121	1756-1758
	MB 122	1765-1766
	8th Ore Zone	1772-1783
	Union Anhydrite	1793-1808
	7th Ore Zone	1812-1817
	6th Ore Zone	1828-1830
	5th Ore Zone	1835-1844
	MB 123	1868-1875
	MB 124	1880-1889
	4th Ore Zone	1897-1910
	3d Ore Zone	1919-1933
2d Ore Zone	1938-1942	
1st Ore Zone	1961-1972	
MB 126	1986-1987	

POTASH BOREHOLE DATA BASE

BOREHOLE: P-19
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 1652' FSL, 2330' FWL of Sec. 23, SW1/4
Sec. 23, T 22 S, R 31 E

ELEVATION: 3546.3'
TOTAL DEPTH: 2000'
TYPE OF WELL: Potash Core Test
DRILLER: Pennsylvania Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 10/19/76 **Date Completed:** 11/04/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE: 8 3/4": 0 to 25'
6 1/4": 25 to 1228'
3 7/8": 1228 to 1635'
3 1/2": 1635 to 2000'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 7
Grade:
Wt/Ft:
From: 0
To: 25
Cement: None

Diameter: 4 1/2
Grade:
Wt/Ft:
From: 0
To: 1228
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 2000'
To: 0'
Int: 2000'
Material: 490 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-19	Holocene Deposits	0-8
	Triassic Rocks	
	Santa Rosa Sandstone	8-232
	Permian Rocks	
	Dewey Lake Red Beds	232-758
	Rustler Formation	758-1117
	Magenta Dolomite Member	814-839
	Culebra Dolomite Member	967-997
	Salado Formation	1117-2002
	Upper Member	1117-1621
	McNutt Potash Zone	1621-2011
	Vaca Triste Sandstone Member	1621-1628
	11th Ore Zone	1677-1681
	MB 117	1688-1690
	MB 118	1711-1713
	MB 119	1735-1737
	10th Ore Zone	1745-1753
	MB 120	1760-1761
	9th Ore Zone	1767-1771
	MB 121	1776-1778
	MB 122	1785-1786
	8th Ore Zone	1792-1801
	Union Anhydrite	1812-1822
	7th Ore Zone	1835-1840
	6th Ore Zone	1850-1854
	5th Ore Zone	1858-1872
MB 123	1892-1901	
MB 124	1909-1917	
4th Ore Zone	1923-1933	
3d Ore Zone	1944-1955	
2d Ore Zone	1962-1967	
1st Ore Zone	1983-1994	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-20
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 794' FSL, 103' FEL of Sec. 14, SE1/4
Sec. 14, T 22 S, R 31 E

ELEVATION: 3552.9'
TOTAL DEPTH: 1995'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 10/06/76 **Date Completed:** 10/15/76

Remarks: Very weak air flow noted during logging operation on October 14, 1976. Air pocket escaped detection throughout coring operation.

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE:
8 3/4": 0 to 23'
5 7/8": 23 to 1195'
3 15/16": 1195 to 1995'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 6 5/8
Grade: Used
Wt/Ft:
From: 0
To: 23
Cement: None

Diameter: 4
Grade: HW
Wt/Ft:
From: 0
To: 1195
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 1995'
To: 0'
Int: 1995'
Material: 442 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-20	Holocene Deposits	0-6
	Triassic Rocks	
	Santa Rosa Sandstone	6-261
	Permian Rocks	
	Dewey Lake Red Beds	261-780
	Rustler Formation	780-1103
	Magenta Dolomite Member	839-866
	Culebra Dolomite Member	953-979
	Salado Formation	1103-1996
	Upper Member	1103-1604
	McNutt Potash Zone	1604-1977
	Vaca Triste Sandstone Member	1604-1612
	11th Ore Zone	1658-1662
	MB 117	1671-1673
	MB 118	1696-1697
	MB 119	1720-1721
	10th Ore Zone	1728-1735
	MB 120	1742-1743
	9th Ore Zone	1747-1750
	MB 121	1756-1758
	MB 122	1764-1765
	8th Ore Zone	1771-1779
	Union Anhydrite	1789-1795
	7th Ore Zone	1807-1811
	6th Ore Zone	1821-1823
	5th Ore Zone	1828-1839
	MB 123	1866-1873
	MB 124	1880-1891
	4th Ore Zone	1893-1904
	3d Ore Zone	1911-1924
	2d Ore Zone	1928-1932
1st Ore Zone	1947-1961	
MB 126	1975-1977	
Lower Member	1977-1996	



POTASH BOREHOLE DATA BASE

BOREHOLE: P-21
OPERATOR: U.S. Department of Energy
PERMIT NO.: Unknown

LOCATION: 852' FNL, 150' FEL of Sec. 15, NE1/4
Sec. 15, T 22 S, R 31 E

ELEVATION: 3510'
TOTAL DEPTH: 1915'
TYPE OF WELL: Potash Core Test
DRILLER: Boyles Bros. Drilling Company (for Sandia Laboratories)

DRILLING RECORD: **Date Started:** 10/15/76 **Date Completed:** 10/27/76

Conventional Rotary Drilling procedures were used to bore to the top of the potash-bearing section, and consecutive cores, 2-1/4" in diameter, were taken through the full thickness of the potash-bearing section.

HOLE SIZE:
8 3/4": 0 to 23'
5 7/8": 23 to 1105'
3 15/16": 1105 to 1915'

WELL DEVELOPMENT: ***CASING RECORD***

Diameter: 6 5/8
Grade: Used
Wt/Ft:
From: 0
To: 23
Cement: None

Diameter: 4
Grade: HW
Wt/Ft:
From: 0
To: 1105
Cement: None

All casing recovered.

PLUGGING SCHEDULE

From: 1915'
To: 0'
Int: 1915'
Material: 425 Cu. Ft. of Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
P-21	Holocene Deposits	0-8
	Triassic Rocks	
	Santa Rosa Sandstone	8-225
	Permian Rocks	
	Dewey Lake Red Beds	225-734
	Rustler Formation	734-1043
	Magenta Dolomite Member	788-812
	Culebra Dolomite Member	899-924
	Salado Formation	1043-1918
	Upper Member	1043-1526
	McNutt Potash Zone	1526-1887
	Vaca Triste Sandstone Member	1526-1533
	11th Ore Zone	1579-1583
	MB 117	1591-1593
	MB 118	1615-1616
	MB 119	1637-1638
	10th Ore Zone	1647-1653
	MB 120	1659-1660
	9th Ore Zone	1665-1669
	MB 121	1676-1678
	MB 122	1685-1686
	8th Ore Zone	1690-1699
	Union Anhydrite	1707-1714
	7th Ore Zone	1727-1732
	6th Ore Zone	1740-1744
	5th Ore Zone	1748-1757
	MB 123	1781-1789
MB 124	1796-1805	
4th Ore Zone	1811-1817	
3d Ore Zone	1824-1837	
2d Ore Zone	1841-1845	
1st Ore Zone	1859-1873	
MB 126	1886-1887	
Lower Member	1887-1918	
MB 127	1912-1913	





Subsurface Exploration Borehole Data Base

SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-1
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499833.57, E666341.70

ELEVATION: 3412.48'
TOTAL DEPTH: 58.2'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 12/29/78
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/27/78 **Date Completed:** 12/29/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-1	Silty Sand, Sand	0-9.5
	Caliche	9.5-14.5
	Gatuna	14.5-38
	(Santa Rosa) Sandstone	38-58.2



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-1A
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499833.20, E666356.32

ELEVATION: 3412.48'
TOTAL DEPTH: 12.9'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 12/29/78
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/29/78 **Date Completed:** 12/29/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D, 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-1A	Sand	0-11.2
	Caliche	11.2-12.9



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-2
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499835.35, E666841.60

ELEVATION: 3411.62'
TOTAL DEPTH: 33.9'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 11/22/78 **Date Completed:** 11/29/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D, 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-2	Sand	0-6.5
	Caliche	6.5-15.5
	Gatuna	15.5-23
	Siltstone	23-30.6
	Intercalated Sandstone and Soil	30.6-33.9



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-3
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499837.13, E667341.49

ELEVATION: 3415.33'
TOTAL DEPTH: 29'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/18/78 **Date Completed:** 12/18/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-3	Sand	0-7.8
	Caliche	7.8-14
	Gatuna	14-24.2
	Siltstone	24.2-25
	Sandstone	25-28
	Siltstone	28-29



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-4
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499838.91, E667841.39

ELEVATION: 3417.08'
TOTAL DEPTH: 38.8'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 12/18/78
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/17/78 **Date Completed:** 12/18/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and wither air or water for drilling fluid.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-4	Silty Sand	0-8.5
	Caliche	8.5-19
	Gatuna	19-37
	Claystone	37-38.8



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-4A
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499837.97, E667829.91

ELEVATION: 3417.08'
TOTAL DEPTH: 13.6'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 12/19/78
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/19/78 **Date Completed:** 12/19/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds of downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-4A	Silty Sand	0-11.5
	Caliche	11.5-13.6



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-5
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499840.69, E668341.29

ELEVATION: 3417.43'
TOTAL DEPTH: 32.3'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/17/78 **Date Completed:** 12/17/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-5	Silty Sand	0-8.2
	Caliche	8.2-17
	Gatuna	17-22.4
	Sandstone	22.4-26.9
	Intercalated Siltstone	26.9-32.3



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-6
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499842.47, E668841.15

ELEVATION: 3422.01'
TOTAL DEPTH: 26.3'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/17/78 **Date Completed:** 12/17/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-6	Silty Sand	0-3.5
	Caliche	3.5-10.1
	Gatuna	10.1-26.3



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-7
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499333.68, E666343.48

ELEVATION: 3404.19'
TOTAL DEPTH: 34.9'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 11/21/78 **Date Completed:** 11/21/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

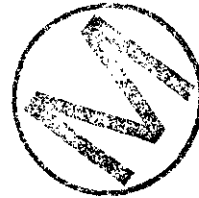
PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-7	Sand	0-5.5
	Caliche	5.5-20
	Gatuna	20-25
	Sandstone	25-27.5
	Santa Rosa	27.5-34.9



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-8
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499335.46, E666843.36

ELEVATION: 3408.55'
TOTAL DEPTH: 100'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/03/79 **Date Completed:** 01/03/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-8	Sand	0-7
	Caliche	7-12
	Gatuna	12-35.7
	Santa Rosa	35.7-40
	Dewey Lake	40-100

SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-9
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499337.27, E667343.26

ELEVATION: 3410.47'
TOTAL DEPTH: 38.3
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/19/78 **Date Completed:** 12/19/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test corings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-9	Sand	0-8.1
	Caliche	8.1-18
	Gatuna	18-32.1
	Siltstone	32.1-36
	Sandstone	36-38.3



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-10
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499339.05, E6678434.11

ELEVATION: 3413'
TOTAL DEPTH: 32'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/19/78 **Date Completed:** 12/19/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

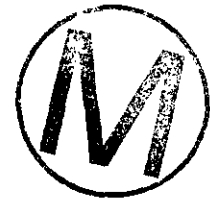
PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-10	Sand	0-10.2
	Caliche	10.2-17
	Gatuna	17-26.5
	Siltstone	26.3-27
	Sandstone	27-32



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-11
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499340.83, E668343.05

ELEVATION: 3414.30'
TOTAL DEPTH: 30'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/15/78 **Date Completed:** 12/15/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-11	Sand	1.2-4.1
	Caliche	4.1-13.5
	Gatuna	13.5-30

SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-12
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499342.61, E668842.93

ELEVATION: 3421.77'
TOTAL DEPTH: 41.5'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/01/78 **Date Completed:** 12/01/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-12	Sand	0-6
	Caliche	6-13
	Gatuna	13-20
	Sandstone	20-26
	Claystone	26-27
	Sandstone	27-31.5
	Claystone	31.5-33.5
	Sandstone	33.5-38.5
	Intercalated Sandstone	38.5-41.5



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-13
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

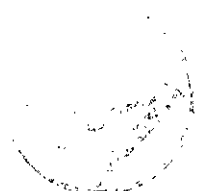
LOCATION: N498833.82, E666345.25

ELEVATION: 3403.91'
TOTAL DEPTH: 28.3'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 12/16/78
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/12/78 **Date Completed:** 12/16/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-13	Sand	0-7
	Caliche	7-12.5
	Gatuna	12.5-26
	Claystone	26-28.3



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-14
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498835.60, E666845.14

ELEVATION: 3406.57'
TOTAL DEPTH: 24.5'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

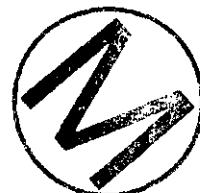
DRILLING RECORD: **Date Started:** 12/13/78 **Date Completed:** 12/13/78

WELL DEVELOPMENT: *****DRILLING EQUIPMENT*****

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

*****PLUGGING SCHEDULE*****

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-14	Sand	0-4.8
	Caliche	4.8-9.9
	Gatuna	9.9-14
	Claystone	14-24.5



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-15
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498837.40, E667345.06

ELEVATION: 3408.64'
TOTAL DEPTH: 56.8'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 11/16/78 **Date Completed:** 11/17/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-15	Sand	0-9
	Caliche	9-13
	Silty Sand	13-26
	Gatuna	26-51.5
	Santa Rosa	51.5-55
	Shale	54.5-56.8



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-16
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498839.19, E667844.94

ELEVATION: 3411.21'
TOTAL DEPTH: 31'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 12/15/78
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/14/78 **Date Completed:** 12/15/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-16	Sand	0-7
	Caliche	7-15
	Gatuna	15-31



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-17
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498840.97, E668343.86

ELEVATION: 3413.26'
TOTAL DEPTH: 25.8'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/13/78 **Date Completed:** 12/13/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

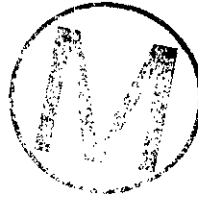
PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-17	Silty Sand Caliche Gatuna	0-5.1 5.1-10.5 10.5-25.8



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-18
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498842.75, E668844.75

ELEVATION: 3419.32'
TOTAL DEPTH: 33.3'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 12/15/78
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/14/78 **Date Completed:** 12/15/78

WELL DEVELOPMENT: *****DRILLING EQUIPMENT*****

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-18	Sand	0-7.1
	Caliche	7.1-15
	Gatuna	15-33.3



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-19
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498333.94, E666347.03

ELEVATION: 3399.84'
TOTAL DEPTH: 38.8'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith



DRILLING RECORD: **Date Started:** 11/30/78 **Date Completed:** 11/30/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-19	Sand	0-8.5
	Caliche	8.5-18.5
	Gatuna	18.5-21.1
	Sandstone	21.1-38.8



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-20
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498335.72, E666846.91

ELEVATION: 3403.53'
TOTAL DEPTH: 14'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 12/16/78
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/12/78 **Date Completed:** 12/16/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-20	Sand	0-10
	Caliche	10-14

SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-20A
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498341.34, E666847.10

ELEVATION: 3403.53'
TOTAL DEPTH: 34.2'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 12/16/78
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/12/78 **Date Completed:** 12/16/78

WELL DEVELOPMENT: *****DRILLING EQUIPMENT*****

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-20A	Sand	0-13.9
	Caliche	13.9-19
	Gatuna	19-34.2



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-21
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498337.50, E667346.75

ELEVATION: 3404.55'
TOTAL DEPTH: 40.4'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 11/17/78 **Date Completed:** 11/17/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-21	Sand	0-9.5
	Caliche	9.5-20
	Gatuna	20-32.5
	Sandstone	32.5-40.4



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-22
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498339.28, E667846.73

ELEVATION: 3406.85'
TOTAL DEPTH: 27.8'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/11/78 **Date Completed:** 12/11/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-22	Sand	0-7.5
	Caliche	7.5-13
	Gatuna	13-27.8



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-23
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown



LOCATION: N498341.06, E668346.63

ELEVATION: 3412.07'
TOTAL DEPTH: 40.5'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/06/78 **Date Completed:** 12/06/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

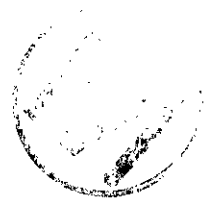
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PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-23	Sand	0-6
	Caliche	6-14.3
	Gatuna	14.3-40.5



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-24
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498342.84, E668846.53

ELEVATION: 3417.87'
TOTAL DEPTH: 29.3'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/07/78 **Date Completed:** 12/07/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-24	Sand	0-5.5
	Caliche	5.5-12
	Gatuna	12-29.3



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-25
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499414.91, E666693.11

ELEVATION: 3408.19'
TOTAL DEPTH: 901.8'
TYPE OF WELL: Deep Exploratory Drilling
DRILLER: Gil's Drilling Co.

DRILLING RECORD: **Date Started:** 12/01/78 **Date Completed:** 01/18/79

WELL DEVELOPMENT: ***HOLE DIAMETER***

9 7/8" 0 to 22.4'
6 1/4" 22.4 to 908'

DRILLING EQUIPMENT

GD-2000 drill.

PLUGGING SCHEDULE

From: 909'
To: 750.4'
Interval: 158.6'
Material: Salt Grout

From: 750.4'
To: 466'
Interval: 284.4'
Material: Freshwater Grout

From: 466'
To: 20'
Interval: 446'
Material: Sand

From: 20'
To: Surface
Interval: 20'
Material: Cement



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-25	Sand	0-10
	Caliche	10-14
	Gatuna	14-34.7
	Santa Rosa	34.7-44.8
	Dewey Lake	44.8-533
	Rustler Formation	533-842.9
	Magenta Member	592.7-617
	Culebra Member	704.1-728
	Salado Formation	842.9-901.8



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-26
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499600.58, E666892.43

ELEVATION: 3410.19'
TOTAL DEPTH: 27.5'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/03/79 **Date Completed:** 01/03/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-26	Sand	0-5
	Caliche	5-11
	Gatuna	11-23
	Siltstone	23-27.5



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-27
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown



LOCATION: N498982.08, E665854.70

ELEVATION: 3400.20'
TOTAL DEPTH: 25.8'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/11/79 **Date Completed:** 01/11/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

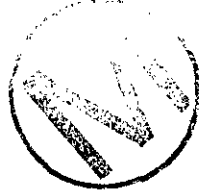
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PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-27	Sand	0-4
	Caliche	4-11
	Gatuna	11-22
	Sandstone	22-22.5
	Claystone	22.5-23
	Sandstone	23-24
	Intercalated Sandstone	24-25.8



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-28
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499295.02, E666718.53

ELEVATION: 3408.17'
TOTAL DEPTH: 27'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergent, Hauskins & Beckwith



DRILLING RECORD: **Date Started:** 01/04/79 **Date Completed:** 01/04/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-28	Sand	0-6
	Caliche	6-12
	Gatuna	12-21
	Sandstone	21-27



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-29
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499397.21, E667253.07

ELEVATION: 3410.87'
TOTAL DEPTH: 28.7'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/30/78 **Date Completed:** 12/30/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-29	Sand Gatuna	0-13 13-28.7



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-30
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499185.81, E666933.86

ELEVATION: 3408.75'
TOTAL DEPTH: 27.8'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/28/78 **Date Completed:** 12/28/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

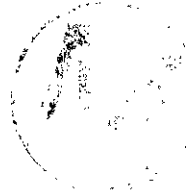
PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-30	Sand	0-7.5
	Caliche	7.5-11.5
	Gatuna	11.5-17.6
	Sandstone	17.6-27.8



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-31
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499206.60, E667143.76

ELEVATION: 3410.27
TOTAL DEPTH: 30.5'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith



DRILLING RECORD: **Date Started:** 12/29/78 **Date Completed:** 12/29/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-31	Sand Caliche Gatuna	0-7.8 7.8-13.4 13.4-30.5



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-32
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown



LOCATION: N499187.96, E667523.76

ELEVATION: 3410.89'
TOTAL DEPTH: 100'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/07/79 **Date Completed:** 01/07/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

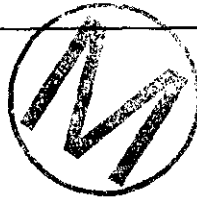
Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-32	Sand	0-12.5
	Caliche	12.5-19.5
	Gatuna	19.5-26.5
	Siltstone & Claystone	26.5-43
	Santa Rosa	43-53
	Dewey Lake	53-100



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-33
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498874.29, E666470.03

ELEVATION: 3404.05'
TOTAL DEPTH: 30.7'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 12/29/78 **Date Completed:** 12/29/78

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide curring faces and either air or water for drilling fluid.

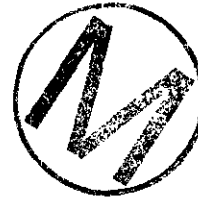
PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-33	Sand	0-6.7
	Caliche	6.7-15.8
	Gatuna	15.8-19
	Sandstone	19-24
	Intercalated Siltstone & Mudstone	24-29.8
	Sandstone	29.8-30.7



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-34
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498205.49, E666762.36

ELEVATION: 3401.97'
TOTAL DEPTH: 100'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/09/79 **Date Completed:** 01/09/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-34	Sand	0-9.1
	Caliche	9.1-14.8
	Gatuna	14.8-40
	Siltstone & Claystone	40-100



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-35
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498326.97, E667196.82

ELEVATION: 3402.55'
TOTAL DEPTH: 32'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/05/79 **Date Completed:** 01/05/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-35	Sand	0-7
	Caliche	7-12
	Gatuna	12-23
	Sandstone	23-32



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-36
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499293.25, E669018.07

ELEVATION: 3422.03'
TOTAL DEPTH: 27.8'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

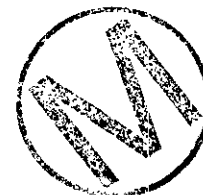
DRILLING RECORD: **Date Started:** 01/07/79 **Date Completed:** 01/07/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-36	Sand	0-5.9
	Caliche	5.9-13.2
	Gatuna	13.2-25
	Siltstone	25-27.8



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-37
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499297.91, E670352.77

ELEVATION: 3438.91'
TOTAL DEPTH: 27.5'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/09/79 **Date Completed:** 01/09/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-37	Sand	0-5.5
	Caliche	5.5-12.5
	Gatuna	12.5-20
	Siltstone	20-20.3
	Sandstone	20.3-27.5



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-37A
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499260.53, E669370.39

ELEVATION: 3426.68'
TOTAL DEPTH: 22.4'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/08/79 **Date Completed:** 01/08/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-37A	Sand	0-5.5
	Caliche	5.5-13.5
	Gatuna	13.5-22.4



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-38
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499155.65, E669683.42

ELEVATION: 3429.88'
TOTAL DEPTH: 50'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 1/23/79
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/11/79 **Date Completed:** 01/23/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-38	Sand	0-5.5
	Caliche	5.5-14
	Gatuna	14-20.5
	Sandstone	20.5-40.2
	Santa Rosa	40.2-43.7
	Dewey Lake	43.7-50

SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-39
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499018.31, E669019.04

ELEVATION: 3422.08'
TOTAL DEPTH: 27.6'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/06/79 **Date Completed:** 01/07/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-39	Sand	0-7
	Caliche	7-13
	Gatuna	13-27.6



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-40
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown



LOCATION: N499023.04, E670353.77

ELEVATION: 3438.48'
TOTAL DEPTH: 27.9'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/10/79 **Date Completed:** 01/10/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

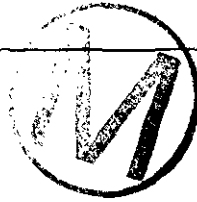
Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-40	Sand Caliche Gatuna Sandstone	0-7.6 7.6-13 13-19 19-27.9



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-41
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499335.51, E666858.36

ELEVATION: 3407.86'
TOTAL DEPTH: 100'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/05/79 **Date Completed:** 01/05/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.


PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-41	Sand	0-6
	Caliche	6-15
	Gatuna	15-42
	Santa Rosa	42-48
	Dewey Lake	48-100



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-42
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499335.57, E666873.35

ELEVATION: 3408.99'
TOTAL DEPTH: 100'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/06/79 **Date Completed:** 01/06/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-42	Sand Caliche Gatuna Santa Rosa Dewey Lake	0-6 6-14 14-42 42-48 48-100



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-43
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown



LOCATION: N499202.96, E667523.70

ELEVATION: 3410.75'
TOTAL DEPTH: 100'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/06/79 **Date Completed:** 01/06/79

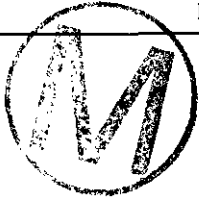
WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT		DEPTH INTERVAL IN FEET
B-43	Sand Caliche Gatuna Santa Rosa Dewey Lake		0-12 12-20 20-43 43-53 53-100

SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-44
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499172.96, E667523.82

ELEVATION: 3411.48'
TOTAL DEPTH: 100'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith



DRILLING RECORD: **Date Started:** 01/08/79 **Date Completed:** 01/08/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-44	Sand	0-16
	Caliche	16-21
	Gatuna	21-38
	Santa Rosa	38-52
	Dewey Lake	52-100



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-45
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498205.44, E666747.36

ELEVATION: 3401.51'
TOTAL DEPTH: 100'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith



DRILLING RECORD: **Date Started:** 01/10/79 **Date Completed:** 01/17/79

WELL DEVELOPMENT: *****DRILLING EQUIPMENT*****

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

*****PLUGGING SCHEDULE*****

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-45	Sand	0-7.5
	Caliche	7.5-15.3
	Gatuna	15.3-31.3
	Dewey Lake	31.3-44.2
	Sandstone	44.2-44.7
	Siltstone	44.7-100



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-46
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498205.54, E666777.36

ELEVATION: 3401.98'
TOTAL DEPTH: 100'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/08/79 **Date Completed:** 01/08/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-46	Sand	0-8
	Caliche	8-13
	Gatuna	13-41
	Santa Rosa	41-48
	Dewey Lake	48-100

SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-47
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499206.77, E667193.82

ELEVATION: 3409.49'
TOTAL DEPTH: 17.5'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/25/79 **Date Completed:** 01/25/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-47	Sand	0-8.9
	Caliche	8.9-15
	Gatuna	15-17.5



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-48
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498839.26, E667854.93

ELEVATION: 3412.12'
TOTAL DEPTH: 15.7'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/24/79 **Date Completed:** 01/24/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-48	Sand Caliche	0-9 9-15.7



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-49
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498937.22, E667294.71

ELEVATION: 3409.07'
TOTAL DEPTH: 19.2'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/24/79 **Date Completed:** 01/24/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-49	Sand	0-8.5
	Caliche	8.5-10.5
	Silty Sand	10.5-15
	Gatuna	15-19.2



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-50
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498487.09, E667236.23

ELEVATION: 3405.65'
TOTAL DEPTH: 23.7'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith



DRILLING RECORD: **Date Started:** 01/26/79 **Date Completed:** 01/26/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-50	Sand	0-9.5
	Caliche	9.5-15
	Gatuna	15-23.7



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-51
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N498337.48, E667341.75

ELEVATION: 3404.74'
TOTAL DEPTH: 15.2'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 01/25/79 **Date Completed:** 01/25/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-51	Sand	0-7.5
	Caliche	7.5-14.5
	Gatuna	14.5-15.2



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-52
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N496981.21, E665461.91

ELEVATION: 3385.48'
TOTAL DEPTH: 30.0'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

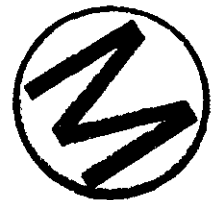
DRILLING RECORD: **Date Started:** 01/26/79 **Date Completed:** 01/26/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

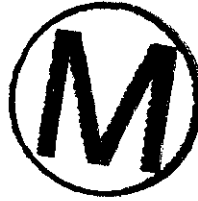
PLUGGING SCHEDULE

Grouted with cement.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-52	Sand	0-3.1
	Caliche	3.1-8.5
	Gatuna	8.5-19
	Dewey Lake	19-30

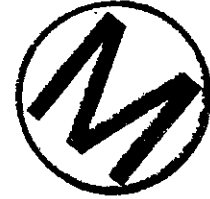


SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-53
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N496651.28, E665463.05

ELEVATION: 3386.65'
TOTAL DEPTH: 30.2'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergent, Hauskins & Beckwith



DRILLING RECORD: **Date Started:** 01/30/79 **Date Completed:** 01/30/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drillin fluid.

PLUGGING SCHEDULE

Grouted with cement.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-53	Sand	0-8.5
	Caliche	8.5-15.7
	Gatuna	15.7-23.7
	Dewey Lake	23.7-30.2



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-54
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: N499386.52, E666651.92

ELEVATION: 3408.60'
TOTAL DEPTH: 210'
TYPE OF WELL: Shallow Exploratory Drilling Converted to Observation Well 02/14/79
DRILLER: Sergent, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 02/13/79 **Date Completed:** 02/14/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-54	Sand	0-6
	Caliche	6-12
	Gatuna	12-25
	Santa Rosa	25-30
	Dewey Lake	30-210



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-301
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: North Access Road

ELEVATION: Not Recorded
TOTAL DEPTH: 39.7'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

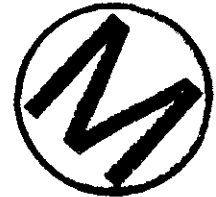
DRILLING RECORD: **Date Started:** 02/08/79 **Date Completed:** 02/08/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

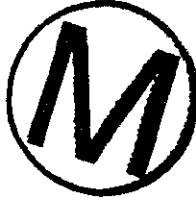
PLUGGING SCHEDULE

Backfilled with native drilled material.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-301	Sand	0-1
	Caliche	1-24
	Dewey Lake	24-39.7



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-302
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: North Access Road

ELEVATION: Not Recorded
TOTAL DEPTH: 39'
TYPE OF WELL: *Shallow Exploratory Drilling*
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 02/07/79 **Date Completed:** 02/07/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

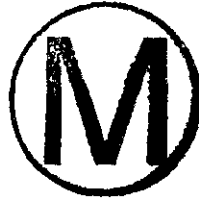
Backfilled with native drilled material.



STRATIGRAPHIC SUMMARY

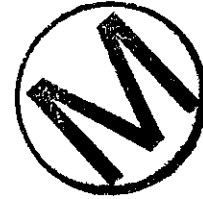
BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
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B-302	Sand	0-10.4
	Caliche	10.4-23
	Dewey Lake	23-39.0



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-303
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown



LOCATION: North Access Road

ELEVATION: Not Recorded
TOTAL DEPTH: 39.1'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 02/07/79 **Date Completed:** 02/07/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

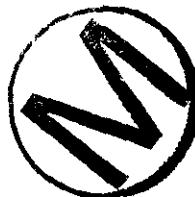
Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Backfilled with native drilled material.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-303	Sand	0-15.5
	Caliche	15.5-18
	Dewey Lake	18-39.1



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-304
OPERATOR: Sergent, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: North Access Road

ELEVATION: Not Recorded
TOTAL DEPTH: 41.5'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergent, Hauskins & Beckwith



DRILLING RECORD: **Date Started:** 02/06/79 **Date Completed:** 02/06/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Backfilled with native drilled material.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-304	Sand	0-20.6
	Caliche	20.6-33
	Sand	33-41.5



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-305
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown



LOCATION: North Access Road

ELEVATION: Not Recorded
TOTAL DEPTH: 41'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 02/06/79 **Date Completed:** 02/06/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Backfilled with native drilled material.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-305	Sand	0-14.5
	Caliche	14.5-19.5
	Sand	19.5-25.5
	Caliche	25.5-33
	Sand	33-41



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-306
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: North Access Road

ELEVATION: Not Recorded
TOTAL DEPTH: 38'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 02/02/79 **Date Completed:** 02/02/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

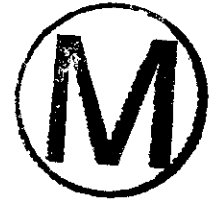
PLUGGING SCHEDULE

Backfilled with native drilled material.

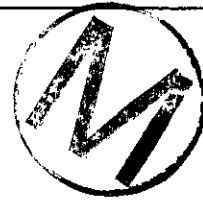


STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-306	Sand	0-7.3
	Caliche	7.3-18
	Santa Rosa	18-38



SUBSURFACE EXPLORATION BOREHOLE DATA BASE



BOREHOLE: B-307
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown

LOCATION: Railroad

ELEVATION: Not Recorded
TOTAL DEPTH: 40'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 02/01/79 **Date Completed:** 02/01/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Backfilled with native drilled material.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-307	Caliche	0-5.6
	Sand	5.6-11.1
	Gatuna	11.1-17.1
	Dewey Lake	17.1-40



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-308
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown



LOCATION: Railroad

ELEVATION: Not Recorded
TOTAL DEPTH: 39.9'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 02/01/79 **Date Completed:** 02/01/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Backfilled with native drilled material.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-308	Caliche	0-10.5
	Gatuna	10.5-19.5
	Dewey Lake	19.5-39.9



SUBSURFACE EXPLORATION BOREHOLE DATA BASE

BOREHOLE: B-309
OPERATOR: Sergeant, Hauskins, & Beckwith
PERMIT NO.: Unknown



LOCATION: South Access Road

ELEVATION: Not Recorded
TOTAL DEPTH: 39.4'
TYPE OF WELL: Shallow Exploratory Drilling
DRILLER: Sergeant, Hauskins & Beckwith

DRILLING RECORD: **Date Started:** 02/02/79 **Date Completed:** 02/02/79

WELL DEVELOPMENT: ***DRILLING EQUIPMENT***

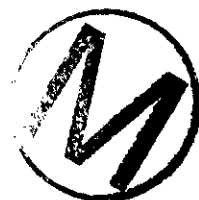
Truck-mounted CME-55 drill rigs powered with 6 cylinder Ford industrial engines were used in advancing test borings. The 6 cylinder engines are capable of delivering about 6,500 foot/pounds torque to the drill spindle. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock was performed with 6 1/2 inch O.D., 3 1/4 inch I.D. hollow stem auger. Carbide insert teeth were used on the auger bits. Core drilling in bedrock was performed using NX size core bits with either diamond or carbide cutting faces and either air or water for drilling fluid.

PLUGGING SCHEDULE

Backfilled with native drilled material.

STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
B-309	Sand	0-5.6
	Caliche	5.6-14
	Gatuna	14-19.8
	Santa Rosa	19.8-22
	Dewey Lake	22-39.4



**Water Quality Sampling
Program Data Base**



WATER QUALITY SAMPLING PROGRAM DATA BASE

BOREHOLE: WQSP-1
OPERATOR: U.S. Dept. of Energy
PERMIT NO.: Unkown

LOCATION: 101' FNL, 1422' FWL,
Sec. 20, T 22 S, R 31 E

EVALUATION: 3419.2' above mean sea level
TOTAL DEPTH: 737'
TYPE OF WELL: Water Quality Sampling Program
DRILLER: West Texas Water Well Service

DRILLING RECORD: **Date Started:** 09/13/94 **Date Completed:** 09/16/94

HOLE SIZE: 4"

WELL DEVELOPMENT: ***CASING RECORD***

0 to 25': 10 3/4" wall surface casing
25 to 550': 5" wall blank fiberglass casing
1 to 550': Cement slurry mix
550 to 640': Bentonite seal
640 to 651': Sand pack
651 to 712': 8/16 Brady gravel
25' of 5" O.D. Fiberglass 0.020 slot screen
Centralizers located at bottom of screen, top of screen, and at 60' intervals to surface
10" of Blank 5" O.D. casing

Currently used as a hydrologic surveillance well.

STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WQSP-1	Surficial Deposits/Santa Rosa	0-40
	Dewey Lake Redbeds	40-522
	Rustler Formation	522-689 partial
	Forty-niner Member	522-591
	Magenta Member	591-612
	Tamarisk Member	612-689?
	Culebra Member	NA
	Partial Lower Unnamed Member	NA
	Maximum Recorded Depth	689

WATER QUALITY SAMPLING PROGRAM DATA BASE

BOREHOLE: WQSP-2
OPERATOR: U.S. Dept. of Energy
PERMIT NO.: Unkown

LOCATION: 1646' FSL, 142' FWL,
Sec. 16, T 22 S, R 31 E

EVALUATION: 3463.9' above mean sea level
TOTAL DEPTH: 846'
TYPE OF WELL: Water Quality Sampling Program
DRILLER: West Texas Water Well Service

DRILLING RECORD: **Date Started:** 09/06/94 **Date Completed:** 09/10/94

HOLE SIZE: 4"

WELL DEVELOPMENT: ***CASING RECORD***

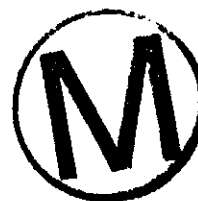
0 to 25': 10 3/4" wall surface casing
25 to 770': 5" wall blank fiberglass casing
1 to 770': Cement slurry mix
770 to 790': Bentonite seal
790 to 793': Sand pack
793 to 846': 8/16 Brady gravel
25' of 5" O.D. Fiberglass 0.020 slot screen
Centralizers located at bottom of screen, top of screen, and at 60' intervals to surface
10" of Blank 5" O.D. casing

Currently used as a hydrologic surveillance well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WQSP-2	Surficial Deposits/Santa Rosa	0-143
	Dewey Lake Redbeds	143-629
	Rustler Formation	629-844 partial
	Forty-niner Member	629-692
	Magenta Member	692-714
	Tamarisk Member	714-811
	Culebra Member	811-833
	Partial Lower Unnamed Member	833-844
	Maximum Recorded Depth	844



WATER QUALITY SAMPLING PROGRAM DATA BASE

BOREHOLE: WQSP-3
OPERATOR: U.S. Dept. of Energy
PERMIT NO.: Unkown

LOCATION: 96' FSL, 2162' FEL,
Sec. 16, T 22 S, R 31 E

EVALUATION: 3480.3' above mean sea level
TOTAL DEPTH: 879'
TYPE OF WELL: Water Quality Sampling Program
DRILLER: West Texas Water Well Service

DRILLING RECORD: **Date Started:** 10/20/94

Date Completed: 10/26/94

HOLE SIZE: 4"

WELL DEVELOPMENT: ***CASING RECORD***

0 to 25': 10 3/4" wall surface casing
25 to 797': 5" wall blank fiberglass casing
1 to 796': Cement slurry mix
797 to 827': Bentonite seal
827 to 830': Sand pack
830 to 880': 8/16 Brady gravel
25' of 5" O.D. Fiberglass 0.020 slot screen
Centralizers located at bottom of screen, top of screen, and at 60' intervals to surface
10" of Blank 5" O.D. casing

Currently used as a hydrologic surveillance well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WQSP-3	Surficial Deposits/Santa Rosa	0-156
	Dewey Lake Redbeds	156-669
	Rustler Formation	669-881 partial
	Forty-niner Member	669-727
	Magenta Member	727-749
	Tamarisk Member	749-848
	Culebra Member	848-871
	Partial Lower Unnamed Member	871-881 partial
	Maximum Recorded Depth	881



WATER QUALITY SAMPLING PROGRAM DATA BASE

BOREHOLE: WQSP-4
OPERATOR: U.S. Dept. of Energy
PERMIT NO.: Unkown

LOCATION: 1632' FSL, 2136' FEL,
Sec. 28, T 22 S, R 31 E

EVALUATION: 3433' above mean sea level
TOTAL DEPTH: 800'
TYPE OF WELL: Water Quality Sampling Program
DRILLER: West Texas Water Well Service

DRILLING RECORD: **Date Started:** 10/05/94 **Date Completed:** 10/07/94

HOLE SIZE: 4"

WELL DEVELOPMENT: ***CASING RECORD***

0 to 25': 10 3/4" wall surface casing
25 to 715': 5" wall blank fiberglass casing
1 to 715': Cement slurry mix
715 to 752': Bentonite seal
752 to 755': Sand pack
755 to 800': 8/16 Brady gravel
25' of 5" O.D. Fiberglass 0.020 slot screen
Centralizers located at bottom of screen, top of screen, and at 60' intervals to surface
10" of Blank 5" O.D. casing

Currently used as a hydrologic surveillance well.



STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WQSP-4	Surficial Deposits/Santa Rosa	0-78
	Dewey Lake Redbeds	78-588
	Rustler Formation	588-802 partial
	Forty-niner Member	588-652
	Magenta Member	652-672
	Tamarisk Member	672-770
	Culebra Member	770-790
	Partial Lower Unnamed Member	790-802 partial
	Maximum Recorded Depth	802



WATER QUALITY SAMPLING PROGRAM DATA BASE

BOREHOLE: WQSP-5
OPERATOR: U.S. Dept. of Energy
PERMIT NO.: Unkown

LOCATION: 330' FSL, 340' FEL,
Sec. 29, T 22 S, R 31 E

EVALUATION: 3384.4' above mean sea level
TOTAL DEPTH: 681'
TYPE OF WELL: Water Quality Sampling Program
DRILLER: West Texas Water Well Service

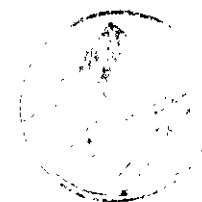
DRILLING RECORD: **Date Started:** 10/12/94 **Date Completed:** 10/13/94

HOLE SIZE: 4"

WELL DEVELOPMENT: ***CASING RECORD***

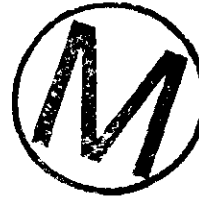
0 to 25': 10 3/4" wall surface casing
25 to 616': 5" wall blank fiberglass casing
1 to 613': Cement slurry mix
613 to 623': Bentonite seal
623 to 626': Sand pack
626 to 681': 8/16 Brady gravel
25' of 5" O.D. Fiberglass 0.020 slot screen
Centralizers located at bottom of screen, top of screen, and at 60' intervals to surface
10" of Blank 5" O.D. casing

Currently used as a hydrologic surveillance well.



STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WQSP-5	Surficial Deposits/Santa Rosa	0-25
	Dewey Lake Redbeds	25-475
	Rustler Formation	475-683 partial
	Forty-niner Member	475-530
	Magenta Member	530-554
	Tamarisk Member	554-648
	Culebra Member	648-669
	Partial Lower Unnamed Member	669-683
	Maximum Recorded Depth	683



WATER QUALITY SAMPLING PROGRAM DATA BASE

BOREHOLE: WQSP-6
OPERATOR: U.S. Dept. of Energy
PERMIT NO.: Unkown

LOCATION: 1626' FSL, 1461' FWL,
Sec. 29, T 22 S, R 31 E

EVALUATION: 3363.8' above mean sea level
TOTAL DEPTH: 617'
TYPE OF WELL: Water Quality Sampling Program
DRILLER: West Texas Water Well Service

DRILLING RECORD: **Date Started:** 09/22/94 **Date Completed:** 09/30/94

HOLE SIZE: 4"

WELL DEVELOPMENT: ***CASING RECORD***

0 to 25': 10 3/4" wall surface casing
25 to 560': 5" wall blank fiberglass casing
1 to 560': Cement slurry mix
560 to 570': Bentonite seal
567 to 570': Sand pack
626 to 681': 8/16 Brady gravel
25' of 5" O.D. Fiberglass 0.020 slot screen
Centralizers located at bottom of screen, top of screen, and at 60' intervals to surface
10" of Blank 5" O.D. casing

Currently used as a hydrologic surveillance well.



STRATIGRAPHIC SUMMARY

BOREHOLE	ROCK UNIT	DEPTH INTERVAL IN FEET
WQSP-6	Surficial Deposits/Santa Rosa	0-68
	Dewey Lake Redbeds	68-409
	Rustler Formation	409-620
	Forty-niner Member	409-474
	Magenta Member	474-497
	Tamarisk Member	497-588
	Culebra Member	588-606
	Partial Lower Unnamed Member	606-620
	Maximum Recorded Depth	620



WATER QUALITY SAMPLING PROGRAM DATA BASE

BOREHOLE: WQSP-6a
OPERATOR: U.S. Dept. of Energy
PERMIT NO.: Unkown

LOCATION: 1653' FSL, 1395' FWL,
Sec. 29, T 22 S, R 31 E

EVALUATION: 3364.7' above mean sea level
TOTAL DEPTH: 225'
TYPE OF WELL: Water Quality Sampling Program
DRILLER: West Texas Water Well Service

DRILLING RECORD: **Date Started:** 10/28/94 **Date Completed:** 10/31/94

HOLE SIZE: 4"

WELL DEVELOPMENT: ***CASING RECORD***

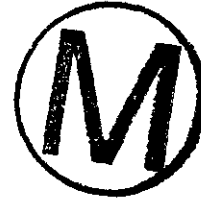
0 to 25': 10 3/4" wall surface casing
25 to 152': 5" wall blank fiberglass casing
1 to 152': Cement slurry mix
152 to 172': Bentonite seal
172 to 175': Sand pack
175 to 225': 8/16 Brady gravel
25' of 5" O.D. Fiberglass 0.020 slot screen
Centralizers located at bottom of screen, top of screen, and at 60' intervals to surface
10" of Blank 5" O.D. casing

Currently used as a hydrologic surveillance well.



STRATIGRAPHIC SUMMARY

<u>BOREHOLE</u>	<u>ROCK UNIT</u>	<u>DEPTH INTERVAL IN FEET</u>
WQSP-6a	Surficial Deposits/Santa Rosa	0-35
	Dewey Lake Redbeds	35-220 partial





Bibliography



BIBLIOGRAPHY

- Beauheim, R.L. Interpretations of Single-Well Hydraulic Tests Conducted At and Near the Waste Isolation Pilot Plant (WIPP) Site, 1983-1987. SAND87-0039, Sandia National Laboratories, Albuquerque, New Mexico. December 1987.
- Beauheim, R.L., et al. Basic Data Report for Borehole Cabin Baby-1 Deepening and Hydrologic Testing, Waste Isolation Pilot Plant (WIPP) Project, Southeastern New Mexico. WTSD-TME-020, U.S. Department of Energy, Albuquerque, New Mexico. December 1983.
- Black, S.R. Basic Data Report Borehole WIPP-12 Deepening, Waste Isolation Pilot Plant (WIPP) Project, Southeastern New Mexico. TME 3148, U.S. Department of Energy, Albuquerque, New Mexico. 1982.
- Cauffman, T.L., et al. Ground Water Flow Modeling of the Culebra Dolomite-Volume II:Data Base. SAND89-7068/2, INTERA Technologies, Inc., Austin, Texas. October 1990.
- Dennehy, K.F. Results of Hydrologic Tests and Water-Chemistry Analysis, Wells H-6A, H-6B, and H-6C, at the Proposed Waste Isolation Pilot Plant Site, Southeastern New Mexico. U.S. Geological Survey Water-Resources Investigation Report 82-8. 1982.
- Freeland, M.H. Basic Data Report for Borehole DOE-1, Waste Isolation Pilot Plant (WIPP) Project, Southeastern New Mexico. TME 3159, U.S. Department of Energy, Albuquerque, New Mexico. 1982.
- Gonzalez, D.D. Hydrogeochemical Parameters of Fluid-Bearing Zones in the Rustler and Bell Canyon Formation. SAND83-0210. March 1983.
- Gonzales, M.M. Compilation and Comparison of Test-Hole Location Surveys in the Vicinity of the Waste Isolation Pilot Plant (WIPP) Site. SAND88-1065, Sandia National Laboratories, Albuquerque, New Mexico. February 1989.
- Griswold, G.B., and V.C. McWhirter. Interpretation of Wireline Geophysical Logs ERDA No. 9 Stratigraphic Test Borehole DOE WIPP Site, Eddy County, New Mexico. SAND80-7119, Telecote Corporation, Albuquerque, New Mexico. February 1981.
- Hydro Geo Chem, Inc. WIPP Hydrology Program, Waste Isolation Pilot Plant, SENM, Hydrologic Data Report #1. SAND85-7206. Hydro Geo Chem, Inc., Tucson, Arizona. September 1985.
- INTERA Technologies, Inc., and Hydro Geo Chem, Inc. WIPP Hydrology Program, Waste Isolation Pilot Plant, Southeastern New Mexico, Hydrologic Data Report #2. SAND85-7263, INTERA Technologies, Inc., Austin, Texas and Hydro Geo Chem, Inc., Tucson, Arizona. December 1985.

BIBLIOGRAPHY (CONTINUED)



- INTERA Technologies, Inc. WIPP Hydrology Program, Waste Isolation Pilot Plant, Southeastern New Mexico, Hydrologic Data Report #3. SAND86-7109, INTERA Technologies, Inc., Austin, Texas. June 1986.
- Memo from Jery W. Mercer, January 22, 1991
- Mercer, J.W., and B.R. Orr. Interim Data Report on the Geohydrology of the Proposed Waste Isolation Pilot Plant Site Southeast New Mexico. USGSOFR-79-98, U.S. Geological Survey, Denver, Colorado. 1979.
- Mercer, J.W., et al. Results of Hydrologic Tests and Water Chemistry Analyses, Wells H-4A, H-4B, H-4C at the Proposed Waste Isolation Pilot Plant Site, Southeastern New Mexico. U.S. Geological Survey Water-Resources Investigations 81-36, U.S. Geological Survey, Albuquerque, New Mexico. 1981.
- Mercer, J.W. Basic Data Report for Drillholes at the H-11 Complex (Waste Isolation Pilot Plant-WIPP). SAND89-0200, Sandia National Laboratories, Albuquerque, New Mexico. May 1990.
- Mercer, J.W., and R.P. Snyder. Basic Data Report for Drillhole H-12 (Waste Isolation Pilot Plant-WIPP). SAND89-0201, Sandia National Laboratories, Albuquerque, New Mexico. January 1990.
- Mercer, J.W., and R.P. Snyder. Basic Data Report for Drillholes H-14 and H-15 (Waste Isolation Pilot Plant-WIPP). SAND89-0202, Sandia National Laboratories, Albuquerque, New Mexico. February 1990.
- Mercer, J.W., and R.P. Snyder. Basic Data Report for Drillhole H-16 (Waste Isolation Pilot Plant-WIPP). SAND89-0203, Sandia National Laboratories, Albuquerque, New Mexico. January 1990.
- Mercer, J.W., and R.P. Snyder. Basic Data Report for Drillholes H-17 and H-18 (Waste Isolation Pilot Plant-WIPP). SAND89-0204, Sandia National Laboratories, Albuquerque, New Mexico. February 1990.
- Potash Mine or Bureau of Land Management (SUNDRY NOTICES AND REPORTS ON WELLS)
- SAND 78-1596, August 1978, Geological Characterization Report, Waste Isolation Pilot Plant (WIPP) Site, Southeastern New Mexico, Volume II
- SAND 79-0267, Basic Data Report for Drillhole ERDA-6
- SAND 79-0268, Basic Data Report for Drillhole AEC-7

BIBLIOGRAPHY (CONTINUED)



- SAND 79-0269, Basic Data Report for Drillhole AEC-8
- SAND 79-0270, Basic Data Report for Drillhole ERDA-9
- SAND 79-0271, Basic Data Report for Drillhole ERDA-10
- SAND 85-7206, September 1985, WIPP Hydrology Program Waste Isolation Pilot Plant, Southeastern New Mexico, Hydrologic Data Report #1
- Sandia National Laboratories, and U.S. Geological Survey. Basic Data Report for Drillhole WIPP-18 (Waste Isolation Pilot Plant-WIPP). SAND79-0275, Sandia National Laboratories, Albuquerque, New Mexico. March 1980.
- Sandia National Laboratories, and U.S. Geological Survey. Basic Data Report for Drillhole WIPP-19 (Waste Isolation Pilot Plant-WIPP). SAND79-0276, Sandia National Laboratories, Albuquerque, New Mexico. March 1980.
- Sandia National Laboratories, and U.S. Geological Survey. Basic Data Report for Drillhole WIPP-21 (Waste Isolation Pilot Plant-WIPP). SAND79-0277, Sandia National Laboratories, Albuquerque, New Mexico. March 1980.
- Sandia National Laboratories, and U.S. Geological Survey. Basic Data Report for Drillhole WIPP-22 (Waste Isolation Pilot Plant-WIPP). SAND79-0278, Sandia National Laboratories, Albuquerque, New Mexico. March 1980.
- Sandia National Laboratories, and U.S. Geological Survey. Basic Data Report for Drillhole WIPP-26 (Waste Isolation Pilot Plant-WIPP). SAND79-0280, Sandia National Laboratories, Albuquerque, New Mexico. August 1979.
- Sandia National Laboratories, and U.S. Geological Survey. Basic Data Report for Drillhole WIPP-27 (Waste Isolation Pilot Plant-WIPP). SAND79-0281, Sandia National Laboratories, Albuquerque, New Mexico. October 1979.
- Sandia National Laboratories, and U.S. Geological Survey. Basic Data Report for Drillhole WIPP-28 (Waste Isolation Pilot Plant-WIPP). SAND79-0282, Sandia National Laboratories, Albuquerque, New Mexico. August 1979.
- Sandia National Laboratories, and U.S. Geological Survey. Basic Data Report for Drillhole WIPP-29 (Waste Isolation Pilot Plant-WIPP). SAND79-0283, Sandia National Laboratories, Albuquerque, New Mexico. September 1980.
- Sandia National Laboratories, and U.S. Geological Survey. Basic Data Report for Drillhole WIPP-30 (Waste Isolation Pilot Plant-WIPP). SAND79-0284, Sandia National Laboratories, Albuquerque, New Mexico. April 1980.



BIBLIOGRAPHY (CONTINUED)

- Sandia National Laboratories, and D'Appolonia Consulting Engineers. Basic Data Report for Deepening of Drillhole WIPP-13 (Waste Isolation Pilot Plant-WIPP). SAND82-1880, Sandia National Laboratories, Albuquerque, New Mexico. October 1982.
- Sandia National Laboratories, and D'Appolonia Consulting Engineers. Basic Data Report for Drillhole WIPP-14 (Waste Isolation Pilot Plant-WIPP). SAND82-1783, Sandia National Laboratories, Albuquerque, New Mexico. August 1982.
- Sandia National Laboratories, and D'Appolonia Consulting Engineers. Basic Data Report for Drillhole WIPP-12 (Waste Isolation Pilot Plant-WIPP). SAND82-2336, Sandia National Laboratories, Albuquerque, New Mexico. October 1982.
- Saulnier, G.J., et al. WIPP Hydrology Program, Waste Isolation Pilot Plant, Southeastern New Mexico, Hydrologic Data Report #4. SAND86-7166, INTERA Technologies Inc., Austin, Texas. February 1987.
- Sergent, Hauskins & Beckwith, Volume I, Subsurface Exploration & Laboratory Testing, Plant Site, Waste Isolation Pilot Plant, Bechtel Job No. 12484
- Seward P.D. Abridged Borehole Histories for the Waste Isolation Pilot Plant (WIPP) Studies. SAND82-0080, Sandia National Laboratories, Albuquerque, New Mexico. January 1982.
- Stensrud, W.A. Reconfiguration of H-4c, H-5c, and H-6c. Communication to Dan Winstanley, Westinghouse Electric. August 1986.
- Stensrud, W.A., et al. WIPP Hydrology Program, Waste Isolation Pilot Plant, Southeastern New Mexico, Hydrologic Data Report #5. SAND87-7125, INTERA Technologies Inc., Austin, Texas. October 1987.
- Stensrud, W.A., et al. WIPP Hydrology Program, Waste Isolation Pilot Plant, Southeastern New Mexico, Hydrologic Data Report #6. SAND87-7166, INTERA Technologies Inc., Austin, Texas. May 1988.
- Stensrud, W.A., et al. WIPP Hydrology Program, Waste Isolation Pilot Plant, Southeastern New Mexico, Hydrologic Data Report #7. SAND88-7014, INTERA Technologies Inc., Austin, Texas. November 1988.
- Stensrud, W.A., et al. WIPP Hydrology Program, Waste Isolation Pilot Plant, Southeastern New Mexico, Hydrologic Data Report #8. SAND89-7056, INTERA Technologies Inc., Austin, Texas. April 1990.
- TME-020, Basic Data Report for Borehole Cabin Baby-1 Deepening and Hydraulic Testing
U.S. DOE/WIPP 89-006, February 1989, Well History for the Water Quality Sampling Program

BIBLIOGRAPHY (CONTINUED)

U.S. DOI Geological Survey, Open-File Report 78-592

USGS OFR 81-469, Geologic Data for Borehole ERDA-9, Eddy County, New Mexico

USGS OFR 81-488, Geologic Data for Borehole ERDA-9, Eddy County, New Mexico

USGS WRI 82-4111, Geologic and Well-Construction Data for the H-9 Borehole Complex Near the Proposed WIPP Site, Southeastern New Mexico

Winstanley, D.J. and R.C. Carrasco. Annual Hydrologic Data Report, 1985-1986. DOE-WIPP 86-004, WIPP Project, Carlsbad, New Mexico. October 1986.

WIPP Central File 4542. WIPP-18, WIPP-19, WIPP-21, and WIPP-22, Field Engineering Summary, Volume II

