TECHNICAL DATA MANAGEMENT SYSTEM

TECHNICAL DATA HANDBOOK

ONWI
Office of Nuclear Waste Isolation

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PREFACE

This is the initial version of the Salt Repository Project Technical Data Handbook, planned to eventually serve as an authoritative source of technical data and information that supports the development of a HLW repository in a salt geologic formation. This version begins to describe the quantitative features of sites and engineering designs, and will eventually abstract the test cases used to assess the performance of repository designs.

This handbook has been prepared to serve the technical community and others interested in the Salt Repository Project (SRP). Its purpose is to make technical data and knowledgeable individuals known to anyone seeking specific information on technical aspects of the project. **This initial version has been distributed for the explicit purpose of soliciting input on its structure and content. It is only for review purposes at this time and is not mature enough to serve as a comprehensive resource for current technical data.** The next issuance of the handbook is planned for September of 1984.

Data entries are closely reviewed for their accuracy and applicability to the SRP by both knowledgeable technical and systems personnel. However, if entries are found that seem questionable, please contact us with your suggestions for changes, additions and substitutions, as well as any other comments regarding any aspect of the handbook.

Send your comments to the attention of:

LESLIE CASEY

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HOW TO USE THIS HANDBOOK

Important Note

This handbook has been prepared to serve as a ready reference to data being used by Salt Repository Project (SRP) technical personnel. The criteria are considered technically accurate, but may not be as comprehensive as some users desire. **THIS HANDBOOK IS NOT A SUBSTITUTE FOR THE ORIGINAL DATA/ INFORMATION FOUND IN THE REFERENCED REPORTS.** It is only a convenient summary of technical data that are being used and planned to be used as part of the SRP. There data must be supplemented by referenced documents in order to completely cover each area of technical interest.

ORGANIZATION

The handbook is organized into the four major sections of SITE, DESIGN, PERFORMANCE and UTILITIES. The SITE section is subdivided into (1) generic descriptions of natural materials and (2) summaries of technical data that are state-specific. The DESIGN section is subdivided into waste package, exploratory shaft and repository design data with a separate subsection devoted to characterization of manufactured materials. The PERFORMANCE section is devoted to brief descriptions of selected types of performance assessments being conducted on behalf of the project. The UTILITIES section contains helpful information related to terms, metric conversions and other ancillary items.

Each section beings with an INDEX of its content. The indexes constitute the inventory of types of data currently in the SRP Technical Data Base (SRP/TDB) as well as items planned to be added as the database is further developed. Hence the indexes are the key items to be scanned in order to decide what data may be available that are of interest to the user.

SPECIAL NOTES

(1) Metric units are used in most cases in compliance with existing government recommendations. A set of conversion factors have been included in the UTILITIES section as well as a look-up table to convert meters to feet.

(2) In some reports, particularly materials summaries, the entire content of complex combinatiions of rock types may have been truncated in order to accommodate computer-generated reports. In all cases, such materials follow the format of displaying the most dominant rock type first, followed by a string of leaser constituents linked by (+) signs.

For example: Limestone + mudstone + siltstone has the truncated version
Limestone + muds

For complete details in such cases, either the computerized version of the SRP/TDB or the original reference document should be consulted (contact the office cited in the preface).

(3) In order to display all data categories included in the database, an entry is put into each data classification whether or not explicit data are known. The convention used is:

NA - (Not Applicable) ... It is known that no data exist for this item.

NR - (Not Recorded) . . . It is <u>not known</u> whether or not data exist for this item.

(4) Key technical individuals are cited (SRP contact) in order to expedite inquiries into special questions about the current status of related technical data.

(5) The formats and type fonts displayed throughout the handbook represent several varieties that are under consideration for future revisions. They include the following:

(1) Parts of database records converted to special purpose reports for display by laser-printer technology.

Examples include:

Mechanical Behavior of Materials	S-G-2
State summaries of boreholes	SL-BS-1
Borehole summaries	SL-BS-2

(2) Parts of database records converted to special purposes reports for display by interactive terminals or conventional printer systems (dot matrix on daisy wheel).

Examples include:

Thermal Properties of Salt	S-G-5

(3) Parts of database records displayed as seen at an interactive terminal and using conventional printer systems.

Examples include:

Hydromechanical Properties	S-G-7
Waste Package Design	D-WP-1
Repository Design	D-R-1

(6) The data input forms shown in the UTILITIES section represent both forms that have been used to create database entries,

For example:

• Borehole Summary	U-IF-1
• Borehole Results	U-IF-6
• Constitive Properties	U-IF-10

as well as forms that are under design and beginning to be used for data entry.

For example:

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GENERIC NATURAL MATERIALS CHARACTERIZATION

- Mechanical Properties
- Thermal Properties
- Hydromechanical Properties
- Mechanical Failure Modes

MECHANICAL BEHAVIOR OF MATERIALS

MATERIAL IDENTIFICATION	YOUNGS MODULUS (Static)(GPa)	POISSONS RATIO (Static)	COMPRESSIVE STRENGTH (Unconfined)(MPa)	TENSILE STRENGTH (Indirect)(MPa)	LOCATION WELL	DEPTH(m)
anhydrite					Detten #1	664.2
anhydrite					Friemel G #1	670.5
anhydrite					Friemel G #1	738.2
anhydrite	65.0	0.40	146.6	-10.7	Gibson Dome #1	830.6
anhydrite					Gibson Dome #1	945.0
anhydrite	25.0	0.44	49.4	-5.8	Gibson Dome #1	1049.0
anhydrite					Gibson Dome #1	1050.0
anhydrite	59.1	0.36	148.1	-11.7	Grabbe #1	655.3
anhydrite	70.1	0.39	95.2	-6.9	MRIG-9	180.0
anhydrite	78.5	0.35	87.3	-6.1	MRIG-9	199.0
anhydrite	73.1	0.38	82.4	-5.9	MRIG-9	219.0
anhydrite	83.9	0.32	70.1	-7.6	US DOE-Smith #	187.5
anhydrite	74.7	0.32	66.5	-5.4	US DOE-Smith #	211.5
anhydrite	79.6	0.32	63.5	-6.7	US DOE-Smith #	236.2
caprock					MRIG-9	192.0
caprock					MRIG-9	213.0
carnallite	29.8	0.36			Gibson Dome #1	972.9
claystone +	24.2	0.41	114.8	-8.7	Gibson Dome #1	876.0
dolomite					Detten #1	849.7
dolomite					Friemel G #1	720.1
dolomite					Friemel G #1	800.7
dolomite					Friemel G #1	810.3
dolomite					Gibson Dome #1	943.0
dolomite	32.2	0.32	24.0	-15.0	Grabbe #1	832.0
halite					Gibson Dome #1	914.0
halite					Gibson Dome #1	970.0
halite					Gibson Dome #1	1018.0
halite					Gibson Dome #1	1048.0
halite					MRIG-9	243.0
halite					MRIG-9	261.0
halite					MRIG-9	294.0
halite					MRIG-9	305.0
halite					MRIG-9	325.0
halite					MRIG-9	378.0
halite					MRIG-9	381.0
halite					MRIG-9	384.0
limestone					E J Kubat #1	
limestone					Gibson Dome #1	396.0
limestone	20.2	0.42	98.7	-6.5	Gibson Dome #1	466.0

MECHANICAL BEHAVIOR OF MATERIALS

MATERIAL IDENTIFICATION	YOUNGS MODULUS (Static)(GPa)	POISSONS RATIO (Static)	COMPRESSIVE STRENGTH (Unconfined)(MPa)	TENSILE STRENGTH (Indirect)(MPa)	LOCATION WELL	DEPTH(m)
limestone	51.1	0.27	207.2	-10.0	Gibson Dome #1	533.0
limestone					Gibson Dome #1	667.0
limestone +	60.9	0.34	185.0	-9.0	Gibson Dome #1	670.0
limestone +	60.3	0.26	205.9	-16.9	Gibson Dome #1	701.0
limestone +					Gibson Dome #1	
limestone +					Gibson Dome #1	
limestone +					Gibson Dome #1	887.6
limestone +	32.8	0.25	100.4	-5.5	Gibson Dome #1	381.0
limestone +	43.1	0.27	135.8	-10.0	Gibson Dome #1	640.1
limestone +	36.9	0.43	72.3	-5.7	Gibson Dome #1	934.0
limestone +	46.6	0.29	174.0	-15.1	Gibson Dome #1	777.0
mudstone	9.4	0.25	34.5	-5.0	Grabbe #1	335.3
mudstone	6.4	0.34	38.7	-5.8	Grabbe #1	975.0
salt					Detten #1	428.3
salt					Detten #1	431.9
salt					Detten #1	812.0
salt					Friemel G #1	532.0
salt					Friemel G #1	538.0
salt					Friemel G #1	770.6
salt	26.9	0.31			Gibson Dome #1	1000.1
salt	31.0	0.36			Gibson Dome #1	1040.0
salt					Grabbe #1	385.0
salt					Grabbe #1	596.0
salt					Grabbe #1	770.0
salt	26.6	0.33			Grabbe #1	799.8
salt					Mansfield #1	323.9
salt	29.1	0.33			Mansfield #1	449.9
salt					Mansfield #1	596.7
salt	31.5	0.36			MRIG-9	374.9
salt					Rex White #1	226.0
salt					Rex White #1	427.0
salt					Rex White #1	563.0
salt					Rex White #1	653.0
salt	31.1	0.39			US DOE-Smith #	599.9
salt + muds	2.2	0.32	24.0	-2.4	Grabbe #1	390.0
salt + muds	3.1	0.30	23.7	-2.6	Grabbe #1	1042.0
salt + sand					Mansfield #1	573.6
salt + sand					Mansfield #1	573.6
sandstone	31.4		79.1	-4.0		350.0

MECHANICAL BEHAVIOR OF MATERIALS

MATERIAL IDENTIFICATION	YOUNGS MODULUS (Static)(GPa)	POISSONS RATIO (Static)	COMPRESSIVE STRENGTH (Unconfined)(MPa)	TENSILE STRENGTH (Indirect)(MPa)	LOCATION WELL	DEPTH(m)
sandstone	18.6	0.48	92.3	-7.8	Gibson Dome #1	145.0
sandstone	17.6		78.6	-5.7	Gibson Dome #1	183.0
sandstone					Mansfield #1	709.2
sandstone +					Detten #1	385.4
sandstone +					Detten #1	385.4
sandstone +	7.0	0.40	40.5	-2.9	Gibson Dome #1	244.0
shale	10.0	0.11	61.8	-7.1	Gibson Dome #1	424.0
shale					Gibson Dome #1	1027.0
shale + dol					Mansfield #1	457.3
siltstone					Detten #1	406.8
siltstone					Friemel G #1	368.4
siltstone					Friemel G #1	377.2
siltstone					Friemel G #1	528.5
siltstone	13.8	0.23	69.3	-6.4	Gibson Dome #1	320.0
siltstone					Gibson Dome #1	805.0
siltstone					Gibson Dome #1	948.0
siltstone	2.5	0.26	15.3		Grabbe #1	502.9
siltstone					Mansfield #1	190.6
siltstone					Mansfield #1	224.0
siltstone +					Mansfield #1	349.3
siltstone +					Mansfield #1	168.6
siltstone +					Detten #1	345.5
siltstone +					Mansfield #1	285.3
various					Elk Ridge #1	
various	27.5	0.43	89.1	-6.8	Gibson Dome #1	565.0

THERMAL PROPERTIES OF SALT

FROM Gulf Interior Richton Dome

WELL UNIT	MATERIAL HORIZON(m)	DENSITY (kg/cu-m)	THERMAL CONDUCT. (W/m-K)	THERMAL EXP COEFF (10E-6/K)	SPECIFIC HEAT (J/KG-K)
MRIG-9	halite 305.0	2230	4.2	46.2	975
	halite 243.0	2170	3.0	40.8	913
	halite 261.0	2200	3.0	39.5	913
	halite 294.0	2210	2.9	41.2	913
	halite 325.0	2220	3.2	39.5	913
	halite 378.0	2260	2.7	45.0	929
	halite 381.0	2170		39.1	913
	halite 384.0	2220	2.9	37.5	925

FROM Paradox Gibson Dome

WELL UNIT	MATERIAL HORIZON(m)	DENSITY (kg/cu-m)	THERMAL CONDUCT. (W/m-K)	THERMAL EXP COEFF (10E-6/K)	SPECIFIC HEAT (J/KG-K)
Gibson Dome #1 Cycle 5	halite 914.0	2180	3.6	46.5	925
Cycle 6	halite 970.0	2170	3.2	45.0	929
Cycle 6	halite 1018.0	2210	3.7	47.5	934
Cycle 7	halite 1048.0	2250	3.4	46.7	925

FROM Permian Palo Duro

WELL UNIT	MATERIAL HORIZON(m)	DENSITY (kg/cu-m)	THERMAL CONDUCT. (W/m-K)	THERMAL EXP COEFF (10E-6/K)	SPECIFIC HEAT (J/KG-K)
Detten #1	salt 812.0	2180			
Friemel G #1	salt 538.0	2210			
	salt 770.6	2190			
	salt 532.0	2220			
Grabbe #1	salt 385.0	2180	2.9	47.0	900
	salt 596.0	2210	3.5	48.0	896
	salt 770.0	2150	3.4	38.0	904
Mansfield #1	salt 596.7	2190			
	salt 323.9	2180			
Rex White #1	salt 653.0	2160	3.7	46.0	896
	salt 427.0	2160	3.2	48.0	904
	salt 226.0	2140	2.7	40.0	909
	salt 563.0	2170	3.6	47.0	904

HYDROMECHANICAL PROPERTIES

WELL ID :, E J Kubat #1
BASIN,SUBBASIN :, Paradox, Elk Ridge Study Area
COUNTY,STATE :, San Juan, UT
TEST LAB :, Woodward Clyde Consultants
CORE SUPPLIER :, NA
CORE ID :, NA
SAMPLE ID :, NA
MATERIALS ID :, limestone
FORMATION :, LEADVILLE LIMESTONE
TEST INTERVAL :, 1023.5, 1089.7, (3358-3575 BKB) meters(feet)

HYDRAULIC CONDUCTIVITY [cm/sec,category,type,characteristics]:
, 3.5 x 10E-5, field (short term), injection with shut-in, NA
, 2.6 x 10E-5, field (long term), injection, NA
, 2.5 x 10E-5, field (long term), fall-off, NA
, 2.0 x 10E-5, field (long term), slug, NA

INTRINSIC PERMEABILITY [millidarcies,category,type] :
, 37., field (short term), injection with shut-in

INTRINSIC PERMEABILITY: METHODS/UNCERTAINTIES :
, calculated (Theis non-equilibrium equation)

TRANSMISSIVITY [sq m/day,catagory,type] :
, 1.5, field (short term), injection with shut-in
, 1.0, field (long term), injection
, 1.0, field (long term), fall-off
, 8., field (long term), slug

TRANSMISSIVITY: METHODS/UNCERTAINTIES :
, Injection with shut-in: Calculated (Theis non-equilibrium well formulae)
slug test: results based on Cooper and Papadopulos

TRANSMISSIBILITY [md-ft/cp,category,type] :
, 4300, field (short term), injection with shut-in
, 4000, field (long term), injection
, 3800, field (long term), fall-off
, 3000, field (long term), slug

TRANSMISSIBILITY: METHODS/UNCERTAINTIES :
, injection with shut-in: calculated using several equations

POTENTIOMETRIC LEVEL [meters(feet),category,type] :
, 1119.2, (3672), field (long term), NA

POTENTIOMETRIC LEVEL: METHODS/UNCERTAINTIES :
, calculated: Formation pressures measured via H-P quartz crystal pressure transducer. Injectate was traced NaCl brine

SOURCES:
, (1) Thackston, W. et al, April 1983. Results of Hydraulic Tests at Gibson Dome No. 1, Elk Ridge No. 1, and E.J. Kubat Boreholes, Woodward Clyde Consultants Inc

WELL ID :, Elk Ridge #1
BASIN, SUBBASIN :, Paradox, Elk Ridge Study Area
COUNTY, STATE :, San Juan, UT
TEST LAB :, Woodward Clyde Consultants
CORE SUPPLIER :, NA
CORE ID :, NA
SAMPLE ID :, NA
MATERIALS ID :, various
FORMATION :, CEDAR MESA;, ELEPHANT CANYON;, HONAKER TRAIL;
TEST INTERVAL :, 131.0, 498.6, (430-1635.7) meters(feet)
HYDRAULIC CONDUCTIVITY [cm/sec, category, type, characteristics]:
, 1.0 x 10E-6, field (short term), pump, NA
, 2.3 x 10E-6, field (short term), recovery, NA
HYDRAULIC CONDUCTIVITY: METHODS/UNCERTAINTIES :
, Constant rate (0.3 l/sec) pump out for 416.5 min. using Reda Model No. 75A7E-42754 pump with 249.0 min. recovery calculated from transmissivity divided by test interval during first 380 min. of drawdown period. Note: Packer leakage suspected to cause some anomalous indication.
INTRINSIC PERMEABILITY [millidarcies, category, type] :
, 1.1, field (short term), pump
, 2.1, field (short term), recovery
TRANSMISSIVITY [sq m/day, catagory, type] :
, 0.29, field (short term), pump
, 0.63, field (short term), recovery
TRANSMISSIBILITY [md-ft/cp, category, type] :
, 1153, field (short term), pump
, 2487, field (short term), recovery
POTENTIOMETRIC LEVEL [meters(feet), category, type] :
, 1859.0, (6099), field (long term), NR
POTENTIOMETRIC LEVEL: METHODS/UNCERTAINTIES :
, Calculated from nitrogen manifold/bubbler tube. Observations following overnight stabilization.

WELL ID :, Gibson Dome #1
BASIN, SUBBASIN :, Paradox, Gibson Dome
COUNTY, STATE :, San Juan, UT
TEST LAB :, Woodward Clyde Consultants
CORE SUPPLIER :, NA
CORE ID :, NA
SAMPLE ID :, NA
MATERIALS ID :, limestone + dolomite
FORMATION :, PARADOX
TEST INTERVAL :, 829.7, 890.0, (2722-2920 BKB) meters(feet)
HYDRAULIC CONDUCTIVITY [cm/sec, category, type, characteristics]:
, 5.2 x 10E-11, field (long term), shut-in, NR
, 6.0 x 10E-10, field (long term), pressurized slug, NR
, 6.1 x 10E-11, field (long term), injection/fall-off, NR
POTENTIOMETRIC LEVEL [meters(feet), category, type] :
, 1717.6, (5635), field (long term), shut-in
, 1541.7, (5058), field (long term), injection/fall-off

SOURCES:
, (1) Thackston, W. et al, April 1983. Results of Hydraulic Tests at Gibson Dome No. 1, Elk Ridge No. 1, and E.J. Kubat Boreholes, Woodward Clyde Consultants Inc

WELL ID :, Gibson Dome #1
BASIN,SUBBASIN :, Paradox, Gibson Dome
COUNTY,STATE :, San Juan, UT
TEST LAB :, Woodward Clyde Consultants Inc
CORE SUPPLIER :, Woodward Clyde Consultants Inc
CORE ID :, NA
SAMPLE ID :, GW-31
MATERIALS ID :, limestone + dolomite
FORMATION :, PARADOX
HORIZON :, 887.6, (2912) meters(feet)
TEST FLUID :, Dow 200
HYDRAULIC CONDUCTIVITY [cm/sec,category,type,characteristics]:
, <1.0 x 10E-10, lab test, NR, V
, 2.1 x 10E-8, lab test, NR, H
EFFECTIVE POROSITY [percent,category,type] :
, 7.9, lab test, NA

SOURCES:
, (1) Thackston, W. et al, April 1983. Results of Hydraulic Tests at Gibson Dome No. 1, Elk Ridge No. 1, and E.J. Kubat Boreholes, Woodward Clyde Consultants Inc

WELL ID :, Gibson Dome #1
BASIN,SUBBASIN :, Paradox, Gibson Dome
COUNTY,STATE :, San Juan, UT
TEST LAB :, Woodward Clyde Consultants Inc
CORE SUPPLIER :, NA
CORE ID :, NA
SAMPLE ID :, NA
MATERIALS ID :, limestone + dolomite
FORMATION :, PARADOX
TEST INTERVAL :, 845.8, 906.5, (2775-2974) meters(feet)
HYDRAULIC CONDUCTIVITY [cm/sec,category,type,characteristics]:
, 1.5 x 10E-7, field (short term), drill stem, ET
, 1.1 x 10E-8, field (short term), drill stem, LT
HYDRAULIC CONDUCTIVITY: METHODS/UNCERTAINTIES :
, modified DST techniques (Eurlougher 1977)
POTENTIOMETRIC LEVEL [meters(feet),category,type] :
, 876.3, (2875), field (short term), drill stem
TOTAL POROSITY [min(%),max(%),category,type] :
, 8.3, 14.6, field (short term), NR

SOURCES:
, (1) Thackston, W. et al, April 1983. Results of Hydraulic Tests at Gibson Dome No. 1, Elk Ridge No. 1, and E.J. Kubat Boreholes, Woodward Clyde Consultants Inc

MECHANICAL FAILURE CRITERIA

MATERIAL IDENTIFICATION	k (MPa)	ALPHA (MPa)	BETA (1/MPa)	LOCATION WELL	DEPTH(m)
anhydrite				MRIG-9	219.0
anhydrite				US DOE-Smith #	187.5
anhydrite				US DOE-Smith #	211.5
anhydrite				US DOE-Smith #	236.2
caprock				MRIG-9	192.0
caprock				MRIG-9	213.0
carnallite	1.5	47.1	0.0149	Gibson Dome #1	972.9
claystone +				Gibson Dome #1	876.0
dolomite				Detten #1	849.7
dolomite				Friemel G #1	720.1
dolomite				Friemel G #1	800.7
dolomite				Friemel G #1	810.3
dolomite				Gibson Dome #1	943.0
dolomite				Grabbe #1	832.0
halite				Gibson Dome #1	914.0
salt				Detten #1	812.0
salt				Friemel G #1	532.0
salt				Friemel G #1	538.0
salt				Friemel G #1	770.6
salt	2.2	48.2	0.0129	Gibson Dome #1	1000.1
salt	1.6	51.4	0.0134	Gibson Dome #1	1040.0
salt				Grabbe #1	385.0
salt				Grabbe #1	596.0
salt				Grabbe #1	770.0
salt	1.0	38.8	0.0174	Grabbe #1	799.8
salt				Mansfield #1	323.9
salt	1.1	43.5	0.0151	Mansfield #1	449.9
salt				Mansfield #1	596.7
salt	0.2	40.0	0.0180	MRIG-9	374.9
salt				Rex White #1	226.0
salt				Rex White #1	427.0
salt				Rex White #1	563.0
salt				Rex White #1	653.0
salt	0.7	46.4	0.0133	US DOE-Smith #	599.9
salt + muds				Grabbe #1	390.0
salt + muds				Grabbe #1	1042.0
salt + sand				Mansfield #1	573.6
salt + sand				Mansfield #1	573.6
sandstone					350.0

MECHANICAL FAILURE CRITERIA

REFERENCES

WELL NAME: Gibson Dome #1
REFERENCES:

(1) Pfeifle, T. W. et al, July, 1983. Preliminary Constitutive Properties for Salt and Nonsalt Rocks From Four Potential Repository Sites, RE/SPEC Inc, ONWI-450
(2) Woodward Clyde Consultants, 1982. Well Completion Report for Gibson Dome #1 Borehole, ONWI-388

WELL NAME: Grabbe #1
REFERENCES:

(1) Pfeifle, T.W. et al, 1983. Preliminary Constitutive Properties for salt and Nonsalt Rocks from Four Potential Repository Sites, ONWI-450, RE/SPEC Inc.

WELL NAME: Mansfield #1
REFERENCES:

(1) Martin, R. J. III, July 26, 1983. Laboratory Testing of Rock and Salt Samples for Static Moduli, Dynamic Moduli and Triaxial Compressive Strength, Volume 3, Applied Research Associates, for Stone & Webster Engineering

WELL NAME: MRIG-9
REFERENCES:

(1) Capps, W. and Lagedrost, J. F., (1981). Thermal Property and Density Measurements of Samples Taken From Drilling Cores From Potential Geologic Media, Interim Reports (6) on Materials From the Richton Salt Dome, MRIG-9, Mississippi.
(2) Lagedrost, J. F. (1980). Thermal Property and Density Measurements of Samples Taken From Drilling Cores From Potential Geologic Media, Interim Reports (4) on Materials From the Richton Salt Dome, MRIG-9, Mississippi. Report No.
(3) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MRIG-9, ONWI-178

WELL NAME: US DOE-Smith #1
REFERENCES:

(1) Pfeifle, T.W. et al, 1983. Preliminary Constitutive Properties for Salt and Nonsalt Rocks from Four Potential Repository Sites, ONWI-450, RE/SPEC Inc.

(2) Nance, D. et al, 1979. Lithology of the Vacherie Salt Dome Core, Institute for Environmental Studies, Louisiana State University, E511-05 2500-5

FAILURE DUE TO CREEP IN SALT

WELL ID :, Gibson Dome #1
FORMATION :, PARADOX
UNIT,SUBUNIT :, Cycle 6
BASIN,SUBBASIN :, Paradox, Gibson Dome
COUNTY,STATE :, San Juan, UT
TEST LAB :, RE/SPEC Inc
CORE SUPPLIER :, Woodward Clyde Consultants
HORIZON :, 1000.1, (3281) meters(feet)
CREEP LAW PARAMETER: A :, 6.33 x 10E-4 MPaE-n per sec
CREEP LAW PARAMETER: n :, 1.86
CREEP LAW PARAMETER: Ea :, 11.9 x 10E-2
CREEP LAW PARAMETER: B :, 192
CREEP LAW PARAMETER: Ess* :. 5 x 10E-8 per sec
CREEP LAW PARAMETER: Q/R :, 6835 deg K
CREEP LAW PARAMETER: TEST CONDITIONS :, (5 MPA, 100C), (10 MPa, 100C) and (5 MPa, 200C)
CREEP LAW PARAMETER: METHODS/UNCERTAINTIES:
, three triaxial creep tests
SOURCES:
, (1) Pfeifle, T.W. et al, 1983. Preliminary Constitutive Properties for Salt and Nonsalt Rocks from Four Potential Repository Sites, ONWI-450, RE/SPEC Inc.
, (2) Woodward Clyde Consultants, 1982. Well Completion Report for Gibson Dome #1 Borehole, ONWI-388

WELL ID :, Gibson Dome #1
FORMATION :, PARADOX
UNIT,SUBUNIT :, Cycle 7
BASIN,SUBBASIN :, Paradox, Gibson Dome
COUNTY,STATE :, San Juan, UT
TEST LAB :RE/SPEC Inc
CORE SUPPLIER :, Woodward Clyde Consultants
HORIZON :, 1040.0, (3412) meters(feet)
CREEP LAW PARAMETER: A :, 1.52 x 10E-7 MPaE-n per sec
CREEP LAW PARAMETER: n :, 1.39
CREEP LAW PARAMETER: Ea :, 14.1 x 10E-2
CREEP LAW PARAMETER: B :, 158
CREEP LAW PARAMETER: Ess* :, 5 x 10E-8 per sec
CREEP LAW PARAMETER: Q/R :, 3468 deg K
CREEP LAW PARAMETER: TEST CONDITIONS :, (5 MPa, 100C), (10 MPa, 100C) and (5 MPa, 200C)
CREEP LAW PARAMETER: METHODS/UNCERTAINTIES:
, three triaxial creep tests
SOURCES:
, (1) Pfeifle, T.W. et al, 1983. Preliminary Constitutive Properties for Salt and Nonsalt Rock from Four Potential Repository Sites, ONWI-450, RE/SPEC Inc.
, (2) Woodward Clyde Consultants, 1982. Well Completion Report for Gibson Dome #1 Borehole, ONWI-388

WELL ID :, MRIG-9
FORMATION :, DOMAL SALT
BASIN,SUBBASIN :, Gulf Interior, Richton Dome
COUNTY,STATE :, Perry, MS
TEST LAB :, RE/SPEC Inc
CORE SUPPLIER :, Law Engineering and Testing Company
HORIZON :, 374.9, (1230) meters(feet)
CREEP LAW PARAMETER: A :, 2.60 x 10E-2 MPaE-n per sec
CREEP LAW PARAMETER: n :, 5.01
CREEP LAW PARAMETER: Ea :, 4.22 x 10E-2
CREEP LAW PARAMETER: B :, 126
CREEP LAW PARAMETER: Ess* :, 5 x 10E-8 per sec
CREEP LAW PARAMETER: Q/R :, 9895 deg K
CREEP LAW PARAMETER: TEST CONDITIONS :, (5 MPa, 100C), (10 MPa, 100C) and (5 MPa, 200C)
CREEP LAW PARAMETER: METHODS/UNCERTAINTIES:
, three triaxial creep tests
SOURCES:
, (1) Pfeifle, T.W. et al, 1983. Preliminary Constitutive Properties for Salt and Nonsalt Rocks from Four Potential Repository Sites, ONWI-450, RE/SPEC Inc.
, (2) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MRIG-9, ONWI-178

WELL ID :, US DOE-Smith #1
FORMATION :, DOMAL SALT
BASIN,SUBBASIN :, Gulf Interior, Vacherie Dome
COUNTY,STATE :, Webster Parish, LA
TEST LAB :, RE/SPEC Inc
CORE SUPPLIER :, Louisiana State University
HORIZON :, 599.9, (1968) meters(feet)
CREEP LAW PARAMETER: A :, 8.71 x 10E-3 MPaE-n per sec
CREEP LAW PARAMETER: n :, 2.22
CREEP LAW PARAMETER: Ea :, 5.93 x 10E-2
CREEP LAW PARAMETER: B :, 188
CREEP LAW PARAMETER: Ess* :, 5 x 10E-8 per sec
CREEP LAW PARAMETER: Q/R :, 7569 deg K
CREEP LAW PARAMETER: TEST CONDITIONS :, (5 MPa, 100C), (10 MPa, 100C) and (5 MPa, 200C)
CREEP LAW PARAMETER: METHODS/UNCERTAINTIES:
, three triaxial creep tests
SOURCES:
, (1) Pfeifle, T.W. et al, 1983. Preliminary Constitutive Properties for Salt and Nonsalt Rocks from Four Potential Repository Sites, ONWI-450, RE/SPEC Inc.
, (2) Nance, D. et al, 1979. Lithology of the Vacherie Salt Dome Core, Institute for Environmental Studies, Louisiana State University, E511-02500-5

WELL ID :, Grabbe #1
UNIT, SUBUNIT :, Cycle 4
BASIN, SUBBASIN :, Permian, Palo Duro
COUNTY, STATE :, Swisher, TX
TEST LAB :, RE/SPEC Inc
CORE SUPPLIER :, Texas Bureau of Economic Geology/Stone and Webster
HORIZON :, 799.8, (2624) meters(feet)
CREEP LAW PARAMETER: A :, 4.66 x 10E-3 MPaE-n per sec
CREEP LAW PARAMETER: n :, 4.60
CREEP LAW PARAMETER: Ea :, 3.97 x 10E-2
CREEP LAW PARAMETER: B :, 82
CREEP LAW PARAMETER: Ess* :, 5 x 10E-8 per sec
CREEP LAW PARAMETER: Q/R :, 8660 deg K
CREEP LAW PARAMETER: TEST CONDITIONS :, (5 MPa, 100C), (10 MPa, 100C) and (5 MPa, 200C)
CREEP LAW PARAMETER: METHODS/UNCERTAINTIES:
, three triaxial creep tests
SOURCES:
, (1) Pfeifle, T.W. et al, 1983. Preliminary Constitutive Properties for Salt and Nonsalt Rocks from Four Potential Repository Sites, ONWI-450, RE/SPEC Inc.

WELL ID :, Mansfield #1
UNIT, SUBUNIT :, Cycle 5
BASIN, SUBBASIN :, Permian, Palo Duro
COUNTY, STATE :, Oldham, TX
TEST LAB :, RE/SPEC Inc
CORE SUPPLIER :, Texas Bureau of Economic Geology/Stone and Webster
HORIZON :, 449.9, (1476) meters(feet)
CREEP LAW PARAMETER: A :, 1.93 x 10E-4 MPaE-n per sec
CREEP LAW PARAMETER: n :, 4.15
CREEP LAW PARAMETER: Ea :, 5.50 x 10E-2
CREEP LAW PARAMETER: B :, 180
CREEP LAW PARAMETER: Ess* :, 5 x 10E-8 per sec
CREEP LAW PARAMETER: Q/R :, 7154 deg K
CREEP LAW PARAMETER: TEST CONDITIONS :, (5 MPa, 100C), (10 MPa. 100C) and (5 MPa, 200C)
CREEP LAW PARAMETER: METHODS/UNCERTAINTIES:
, three triaxial creep tests
SOURCES:
, (1) Pfeifle, T.W. et al, 1983. Preliminary Constitutive Properties for Salt and Nonsalt Rocks from Four Potential Repository Sites, ONWI-450, RE/SPEC Inc.
, (2) Stone & Webster Engineering Corporation, June, 1982. Well Completion Report Mansfield No. 1 Palo Duro Basin, Draft

LOUISIANA

- Borehole Summaries

B. BOREHOLE SUMMARIES

LOUISIANA
BORINGS

COUNTY	WELL NAME	DEPTH METERS	(FEET)	STATUS OF WELL
Bienville Parish	CFI-1	1528.0	(5013)	observation
	LH-7A	798.1	(2618.7)	observation
	LH-17A	731.5	(2400)	observation
	LRH-13A	452.5	(1484.77)	blocked
	LVH-6A	914.4	(3000)	observation
Webster Parish	LH-2A	563.9	(1850)	plugged
	Smith #1	1533.8	(5032)	observation

WELL NAME	COUNTY	DEPTH METERS	(FEET)	STATUS OF WELL
CFI-1	Bienville Parish	1528.0	(5013)	observation
LH-2A	Webster Parish	563.9	(1850)	plugged
LH-7A	Bienville Parish	798.1	(2618.7)	observation
LH-17A	Bienville Parish	731.5	(2400)	observation
LRH-13A	Bienville Parish	452.5	(1484.77)	blocked
LVH-6A	Bienville Parish	914.4	(3000)	observation
Smith #1	Webster Parish	1533.8	(5032)	observation

WELL NAME: CFI-1
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Bienville Parish
STATE: LA
LATITUDE: NR deg-min
LONGITUDE: NR deg-min
SECTION/BLOCK: Sec 31, T15 R5W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	68.9	(226)
GROUND LEVEL ELEV.:	65.5	(215)
TOTAL DEPTH OF HOLE:	1528.0	(5013)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)	INTERVAL, m(ft)

-----CASING SUMMARY-----

CASING DIAM., cm(in)	TOTAL DEPTH, m(ft)	
(NR)	129.2	(424)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	33.2- 808.3	775.1

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: MAY 6, 1978
STATUS OF WELL: observation

MONITORING:
water levels initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m
CAPROCK	0.0- 42.4
SALT	42.4- 1528.0

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions

CORE LOGS
YES, conventional core

MUD LOGS
YES

GEOPHYSICAL LOGS
YES, caliper, compensated density, temperature

-----LITHOLOGY-----

CAPROCK, inequidimensional halite with many near-vertical anhydrite bonds. Bonds are diffuse and rarely more than 2 in. in thickness
SALT , equidimensional and megacrystalline halite with broadly spaced near-vertical bands of anhydrite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR,;

LAB TESTS: strength;, creep;, index;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: petrographic analysis;

HYDROCHEMICAL TESTS: NR;

-----REFERENCES-----

WELL NAME: CFI-1
REFERENCES:

(1) Nance, D. et al, 1979. Lithology of the Rayburns Dome Salt Core,, Institute for Environmental Studies, Louisiana State University, E511- 02500-3
(2) Martinez, J. D. et al, 1979. An Investigation of the Utility of Gulf Coast Salt Domes for the Storage or Disposal of Radioactive Wastes, Institute for Environmental Studies, Louisiana State
(3) Hawkins, M. F. Jr., 1978. An Engineering Report of the Coreholes at Vacherie and Rayburns Salt Domes - North Louisiana Salt Dome Basin, Institute for Environmental Studies, Louisiana State University
(4) Pfeifle, T. W. et al, July 1983. Preliminary Constitutive Properties for Salt and Nonsalt Rocks from Four Potential Repository Sites, RE/SPEC Inc, ONWI-450

WELL NAME: LH-2A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Webster Parish
STATE: LA
LATITUDE: 32-35 deg-min
LONGITUDE: 93-23 deg-min
SECTION/BLOCK: Sec 3, T18N R10W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	64.4	(211.57)
GROUND LEVEL ELEV.:	60.8	(199.57)
TOTAL DEPTH OF HOLE:	563.9	(1850)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
71.1	(28)	0.0-	22.9	(0-75)
44.4	(17-1/2)	21.7-	123.4	(71.6-405)
25.1	(9-7/8)	121.9-	563.9	(400-1850
27.9	(11)	506.6-	557.8	(1662-1830)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
50.8	(20)	21.7	(71.6)
32.4	(12-3/4)	121.9	(400)
16.8	(6-5/8)	506.6	(1662)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	506.6- 547.0
sidewall	165.5- 556.3

-----WELL HISTORY-----

DRILL COMPLETION DATE: JANUARY 31, 1980
STATUS OF WELL: plugged

MONITORING:
initial capacity tests

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
RIVER TERRACE-ALLUVIUM	0.0-	20.7
SPARTA	20.7-	39.6
CANE RIVER	39.6-	106.7
WILCOX	106.7-	265.2
MIDWAY	265.2-	478.5
ARKADELPHIA	478.5-	504.5
NACATOCH	504.5-	563.9

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions, paleontology

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, lateral log, micro laterolog, SP, conductivity, acoustic gravel pack, cement bond, BHC, gamma, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

"VER TERRACE-ALLUVIUM, mostly light to dark llow-brown sand fine to medium grained. Some yellow-brown sandy siltstone
SPARTA, fine colorless sand, interbeds of lignite, clay and siltstone
CANE RIVER, silty light gray claystone and gray siltstone interbedded with sand
MIDWAY, fine light yellow sandstone, gray silty claystone, light gray marlstone
ARKADELPHIA, white chalk containing clay, silt and sand, interbeds of marlstone
NACATOCH, light gray very fine sand interbedded with dark gray silty marlstone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		506.6- 547.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: porosity;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: permeability;, cation exchange;, grain size analysis;

HYDROCHEMICAL TESTS: water chemistry;, water quality;, gas analysis;

-----REFERENCES-----

WELL NAME: LH-2A
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site LH-2, ONWI-181
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Area Characterization Report North Louisiana Study Area, Volume V Appendix, ONWI-119
(3) Ertec Inc, September 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana

WELL NAME: LH-7A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Bienville Parish
STATE: LA
LATITUDE: 32-29 deg-min
LONGITUDE: 92-84 deg-min
SECTION/BLOCK: Sec 5, T17N R5W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	99.2	(325.57)
TOTAL DEPTH OF HOLE:	798.1	(2618.7)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
71.1	(28)	0.0-	17.4	(0-57)
44.4	(17-1/2)	17.4-	123.4	(57-405)
25.1	(9-7/8)	121.9-	798.1	(400-2618.7)
30.5	(12)	449.9-	478.5	(1476-1570)

-----CASING SUMMARY-----

CASING DIAM., cm(in)		TOTAL DEPTH, m(ft)	
50.8	(20)	17.4	(57)
32.4	(12-3/4)	121.9	(400)
16.8	(6-5/8)	449.9	(1476)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	451.1- 469.7
sidewall	149.4- 789.4

-----WELL HISTORY-----

DRILL COMPLETION DATE: MARCH 11, 1980
STATUS OF WELL: observation

MONITORING:
water level monitoring. Water levels between 78.9m (2659.1 feet) and 73.5m (241 feet) from 5/16/80 to 12/4/80. Water levels initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
RIVER TERRACE-ALLUVIUM	0.0-	9.1
COOK MOUNTAIN	9.1-	27.4
SPARTA	27.4-	213.4
CANE RIVER	213.4-	286.5
CARRIZO	286.5-	318.5
WILCOX	318.5-	477.6
MIDWAY	477.6-	688.9
ARKADELPHIA	688.9-	720.9
NACATOCH	720.9-	763.5
SARATOGA	763.5-	780.9
MARLBROOK	780.9-	798.1

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions, paleontology

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, lateral log, micro laterolog, SP, BHC sonic, gravel pack acoustic, cement bond, gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

RIVER TERRACE-ALLUVIUM, colorless to light-brown fine sand mixed with red, brownish yellow or light gray clay
COOK MOUNTAIN, mostly brownish-gray silty claystone
SPARTA, colorless to light-gray fine to medium grained sands
CANE RIVER, brownish-gray claystone
CARRIZO, very fine to medium sands
WILCOX, very fine to medium grained sands some dark gray to black silty clay and light-gray siltstone
MIDWAY, dark gray claystone
ARKADELPHIA, light to medium gray marlstone
NACATOCH, light to medium gray siltstone interbeds with chalk, claystone and sand
SARATOGA, white to light gray chalk
MARLBROOK, very light gray chalky locally silty marlstone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		451.1- 469.7

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: porosity;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: grain size analysis;, permeability;, grain density;, cation exchange;

HYDROCHEMICAL TESTS: water chemistry;, water quality;, gas analysis;

-----REFERENCES-----

WELL NAME: LH-7A
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site LH-7, ONWI-183
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Area Characterization Report North Louisiana Study Area, Volume V Appendix, ONWI-119
(3) Ertec Inc, September 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana

WELL NAME: LH-17A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Bienville Parish
STATE: LA
LATITUDE: 32-17 deg-min
LONGITUDE: 93-20 deg-min
SECTION/BLOCK: Sec 12, T15N R10W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	82.9	(272)
GROUND LEVEL ELEV.:	82.3	(270)
TOTAL DEPTH OF HOLE:	731.5	(2400)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)	INTERVAL, m(ft)

-----CASING SUMMARY-----

CASING DIAM., cm(in)		TOTAL DEPTH, m(ft)	
50.8	(20)	14.6	(48)
27.3	(10-3/4)	121.9	(400)
16.8	(6-5/8)	607.2	(1992)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
sidewall	125.0- 731.2
fluid samples	607.5- 616.3

-----WELL HISTORY-----

DRILL COMPLETION DATE: JULY 21, 1980
STATUS OF WELL: observation

MONITORING:
water levels between 84(276) and 86(281) meters(feet) on 11/18/80 and 3/30/81 respectively. Initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m
QUATERNARY	0.0- 30.5
WILCOX	30.5- 185.9
MIDWAY	185.9- 358.1
ARKADELPHIA	358.1- 390.1
NACATOCH	390.1- 449.0
SARATOGA	449.0- 463.3
MARLBROOK	463.3- 524.3
ANNONA	524.3- 554.7
OZAN	554.7- 609.6
AUSTIN	609.6- 731.5

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions, paleontology

CORE LOGS
NA

MUD LOGS
YES

GEOPHYSICAL LOGS
YES, temperature, compensated density, compensated neutron, caliper, gamma ray, SP, BHC sonic, dual induction, laterolog, formation tester, microelectric

-----LITHOLOGY-----

QUATERNARY, sand with traces of claystone
WILCOX, three variations of sand, sandstone, and silty sandy, claystone
MIDWAY, gray claystone
ARKADELPHIA, marlstone replaced by limestone interbeds near bottom
NACATOCH, light sands partly consolidated in a chalky matrix
SARATOGA, marlstone
MARLBROOK, marlstone
ANNONA, chalk
OZAN, marlstone with siltstone and chalk interbeds
AUSTIN, fine sand with interbeds of claystone, marlstone, and chalk

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drill stem		607.5- 616.3

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: porosity;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: hydrocarbon analysis;, permeability;, cation exchange;, grain size analysis;

HYDROCHEMICAL TESTS: field tests, dissolute solids of 45,634 mg/l indicates brine(>35K mg/l);, water chemistry;, water quality;, gas analysis;

-----REFERENCES-----

WELL NAME: LH-17A
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report:Site LH-17, ONWI-185
(2) Geologic Area Characterization Appendix, Louisiana Study Area, Gulf Coast Salt Dome Project
(3) Ertec Inc, 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana, September

WELL NAME: LRH-13A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Bienville Parish
STATE: LA
LATITUDE: 32-13 deg-min
LONGITUDE: 92-65 deg-min
SECTION/BLOCK: Sec 7, T14N R6W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	77.2	(253.65)
GROUND LEVEL ELEV.:	73.6	(241.65)
TOTAL DEPTH OF HOLE:	452.5	(1484.77)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
71.1	(28)	0.0-	21.6	(0-71
25.1	(9.87)	16.2-	452.5	(53-1484.7
27.9	(11)	320.0-	374.3	(1050-1228

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
50.8	(20)	21.3	(70)
16.8	(6-5/8)	320.0	(1050)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	318.8- 370.3
sidewall	27.4- 452.5

-----WELL HISTORY-----

DRILL COMPLETION DATE: APRIL 12, 1980
STATUS OF WELL: blocked

MONITORING:
water level monitoring. Water levels between 50.9m (167.4 feet) and 50.9m (167.3 feet) from 8/4/80 to 2/25/81. Water levels initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
SPARTA	0.0-	58.5
CANE RIVER	58.5-	125.0
WILCOX	125.0-	420.6
MIDWAY	420.6-	452.5

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions, paleontology

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, lateral log, microlog, SP, acoustic gravel pack, cement bond, BHC sonic, gamma, gamma-gamma, neutron porosity, caliper, dip, temperature

-----LITHOLOGY-----

SPARTA, gray-olive green fine to medium grained sand, interbeds of light-brown-gray claystone
CANE RIVER, brownish-gray claystone interbeds with yellowish gray siltstone, marlstone with interbeds of dolomite and siltstone
WILCOX, grayish-olive-green very fine to medium sand, interbedded with grayish claystone, brownish sandy siltstone, marlstone, lignite beds, limestone and dolomite
MIDWAY, dark and brownish gray claystone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drill stem	1	318.8- 337.4
drill stem	1	340.5- 370.3

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: porosity;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: permeability;, cation exchange;, grain size analysis;

HYDROCHEMICAL TESTS: water chemistry;, water quality;, gas analysis;

-----REFERENCES-----

WELL NAME: LRH-13A
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site LRH-13, ONWI-184
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Area Characterization Report North Louisiana Study Area, Volume V Appendix, ONWI-119
(3) Slaughter George M. et al, February 1983. Permeability of Selected Sediments in the Vicinity of Five Salt Domes in the Gulf Interior Region, Law Engineering Company, ONWI-356
(4) Ertec Inc, September 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana

WELL NAME: LVH-6A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Bienville Parish
STATE: LA
LATITUDE: 32-20 deg-min
LONGITUDE: 93-10 deg-min
SECTION/BLOCK: Sec 35, T17N R8W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	68.0	(223.16)
TOTAL DEPTH OF HOLE:	914.4	(3000)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
66.0	(26)	0.0-	29.6	(0-97)
38.1	(15)	26.5-	123.4	(87-405
25.1	(9-7/8)	121.9-	914.4	(400-3000
30.5	(12)	772.7-	826.0	(2535-2710)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
50.8	(20)	26.5	(87.25)
27.3	(10-3/4)	121.9	(400)
16.8	(6-5/8)	772.7	(2535)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	773.3- 785.5
sidewall	249.9- 914.4

-----WELL HISTORY-----

DRILL COMPLETION DATE: MAY 29, 1980
STATUS OF WELL: observation

MONITORING:
Water levels between 38.5m (126.6 feet) and 38.9m (127.8 feet) from 8/26/80 to 8/24/81. Water levels initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m
SPARTA	0.0- 34.1
CANE RIVER	34.1- 103.0
WILCOX	103.0- 295.7
MIDWAY	295.7- 527.3
ARKADELPHIA	527.3- 556.3
NACATOCH	556.3- 608.1
SARATOGA	608.1- 627.9
MARLBROOK	627.9- 682.8
ANNONA	682.8- 710.2
OZAN	710.2- 773.6
AUSTIN	773.6- 914.4

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions, paleontology

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, lateral log, microlog, SP, acoustic, cement bond, sonic, gamma, gamma-gamma, neutron porosity, caliper, dip, temperature

-----LITHOLOGY-----

SPARTA, mostly very light gray to pale orange fine to medium grained sands
CANE RIVER, brownish gray claystone and some marlstone
WILCOX, grayish silty claystone with interbeds of lignite and gray-brown-red fine grained sand
MIDWAY, medium gray claystone and light gray marlstone
ARKADELPHIA, chalky light gray marlstone to pale yellow limestone and chalk
NACATOCH, light gray, very fine coarse silt, light-yellow-gray medium to very coarse siltstone
SARATOGA, very light gray to white chalk grading into light gray marlstone
MARLBROOK, moderate to light gray chalky marlstone
ANNONA, white to light gray chalk grading into marlstone
OZAN, moderately light gray marlstone, partly chalky and silty
AUSTIN, light gray fine to medium sand interbedded with light gray fine sandstone and moderately gray marlstone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drill stem		773.3- 785.5
drill stem		787.0- 822.1

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: porosity;

-----REFERENCES-----

WELL NAME: LVH-6A
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site LVH-6, ONWI-182
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Area Characterization Report North Louisiana Study Area, Volume V Appendix, ONWI-119
(3) Slaughter, George M. et al, February 1983. Permeability of Selected Sediments in the Vicinity of Five Salt Domes in the Gulf Interior Region, Law Engineering Testing Company, ONWI-356
(4) Ertec Inc, September 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: permeability;, grain size analysis;, grain density;, cation exchange;

HYDROCHEMICAL TESTS: water quality;

WELL NAME: Smith #1
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Webster Parish
STATE: LA
LATITUDE: NR deg-min
LONGITUDE: NR deg-min
SECTION/BLOCK: Sec 16, T17N R8W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	73.5	(241.3)
GROUND LEVEL ELEV.:	70.1	(230)
TOTAL DEPTH OF HOLE:	1533.8	(5032)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)	INTERVAL, m(ft)

-----CASING SUMMARY-----

CASING DIAM., cm(in)	TOTAL DEPTH, m(ft)
(NR)	296.3 (972)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	165.5- 248.7	83.2
10.2	248.7- 1015.3	766.6

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: APRIL 11, 1978
STATUS OF WELL: observation

MONITORING:
water levels initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m
CAPROCK	165.5- 248.6
SALT	248.6- 1533.8

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions

CORE LOGS
YES, conventional core

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, caliper, compensated density, temperature

-----LITHOLOGY-----

CAPROCK, carbonate (21 ft) porous with open fissues and vugs, gypsum (3 ft) fine grained and crystalline, anhydrite (249 ft) fine grained and crystalline with contact surfaces and inclusions of anhydrite blocks
SALT, halite (90%) and minor anhydrite in stuply dipping, folded bands of varying fabric

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: strength;, creep;, thermal;, density;, index;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NR;

HYDROCHEMICAL TESTS: NR;

-----REFERENCES-----

WELL NAME: Smith #1
REFERENCES:

(1) Nance, D. et al, 1979. Lithology of the Vacherie Salt Dome Core. Institute for Environmental Studies, Louisiana State University, E511-02500-5
(2) Martinez, J.D. et al, 1979. An Investigation of the Utility of Gulf Coast Salt Domes for the Storage or Disposal of Radioactive Wastes, Institute for Environmental Studies, Louisiana State
(3) Hawkins, M.F. Jr., 1978. An Engineering Report of the Boreholes at Vacherie and Rayburn's Salt Dome-North Louisiana Salt Dome Basin, Institute for Environmental Studies, Louisiana State University
(4) Pfeifle, T. W. et al, July 1983. Preliminary constitutive Properties for Salt and Nonsalt Rocks From Four Potential Repository Sites, RE/SPEC Inc, ONWI-450

MISSISSIPPI

- Borehole Summaries
  - Deep Borings
  - Shallow Borings

B. BOREHOLE SUMMARIES

MISSISSIPPI
DEEP (>100 m) BORINGS

COUNTY	WELL NAME	DEPTH METERS	(FEET)	STATUS OF WELL
Forrest	MH-5A	1094.0	(3589.3)	observation
	MH-7A	868.7	(2849.9)	observation
Marion	MH-6A	1066.8	(3500)	observation
	MH-8A	1127.8	(3700)	observation
Perry	MCCG-1	575.7	(1888.91)	observation
	MCCG-2	913.5	(2997.2)	observation
	MCCH-3B	1249.8	(4100.3)	observation
	MH-4A	823.1	(2700.65)	observation
	MRIG-9	388.6	(1275)	plugged
	MRIG-10	822.7	(2699.38)	observation
	MRIG-301	152.4	(500)	plugged
	MRIG-302	152.4	(500)	plugged
	MRIG-303	149.7	(491)	plugged
	MRIG-304	152.4	(500)	plugged
	MRIG-305	167.8	(550.9)	plugged
	MRIG-306	149.4	(490)	plugged
	MRIG-307	162.6	(533.5)	plugged
	MRIG-308	152.4	(500)	plugged
	MRIG-309	109.7	(360)	plugged
	MRIG-310	121.9	(400)	plugged
	MRIH-11A	1841.3	(6041.15)	observation

WELL NAME	COUNTY	DEPTH METERS	(FEET)	STATUS OF WELL
MCCG-1	Perry	575.7	(1888.91)	observation
MCCG-2	Perry	913.5	(2997.2)	observation
MCCH-3B	Perry	1249.8	(4100.3)	observation
MH-4A	Perry	823.1	(2700.65)	observation
MH-5A	Forrest	1094.0	(3589.3)	observation
MH-6A	Marion	1066.8	(3500)	observation
MH-7A	Forrest	868.7	(2849.9)	observation
MH-8A	Marion	1127.8	(3700)	observation
MRIG-9	Perry	388.6	(1275)	plugged
MRIG-10	Perry	822.7	(2699.38)	observation
MRIG-301	Perry	152.4	(500)	plugged
MRIG-302	Perry	152.4	(500)	plugged
MRIG-303	Perry	149.7	(491)	plugged
MRIG-304	Perry	152.4	(500)	plugged
MRIG-305	Perry	167.8	(550.9)	plugged
MRIG-306	Perry	149.4	(490)	plugged
MRIG-307	Perry	162.6	(533.5)	plugged
MRIG-308	Perry	152.4	(500)	plugged
MRIG-309	Perry	109.7	(360)	plugged
MRIG-310	Perry	121.9	(400)	plugged
MRIH-11A	Perry	1841.3	(6041.15)	observation

MISSISSIPPI
SHALLOW (<100 m) BORINGS

COUNTY	WELL NAME	DEPTH METERS	(FEET)	STATUS OF WELL
Perry	MCCG-101	51.9	(170.5)	observation
	MCCG-102	61.1	(200.5)	observation
	MCCG-103	82.3	(270)	plugged
	MCCG-104	29.1	(95.5)	observation
	MCCG-105	27.5	(90.5)	observation
	MCCG-106	33.6	(110.5)	plugged
	MCCG-107	29.1	(95.5)	observation
	MCCG-108	6.1	(20.5)	plugged
	MCCG-109	6.2	(20.5)	plugged
	MCCG-110	26.2	(86)	observation
	MCCG-111	36.7	(120.5)	observation
	MCCG-112	55.0	(180.5)	plugged
	MCCG-113	26.0	(85.5)	observation
	MCCG-114	23.0	(75.5)	plugged
	MCCG-115	47.3	(155.5)	observation
	MCCG-116	7.7	(25.5)	plugged
	MCCG-117	33.6	(110.5)	destroyed
	MCCG-118	30.6	(100.5)	destroyed
	MCCG-119	24.5	(80.5)	plugged
	MCCG-120	4.0	(13)	plugged
	MCCG-201	45.8	(150.5)	plugged
	MCCG-202	30.6	(100.5)	plugged
	MCCG-203	30.2	(99)	plugged
	MCCG-204	33.6	(110.5)	plugged
	MCCG-206	48.9	(160.5)	plugged
	MCCG-207	55.0	(180.5)	plugged
	MCCG-208	58.0	(190.5)	plugged
	MCCG-209	30.6	(100.5)	plugged
	MCCG-210	54.6	(179)	plugged
	MCCG-211	45.6	(150.5)	plugged
	MCCG-212	26.0	(85.5)	plugged
	MCCG-213	36.7	(120.5)	plugged
	MCCG-214	58.0	(190.5)	plugged
	MCCG-215	51.9	(170.5)	plugged
	MCCG-216	64.1	(210.5)	plugged
	MCCG-217	45.8	(150.5)	plugged
	MCCG-218	30.6	(100.5)	plugged
	MCCG-219	42.8	(140.5)	plugged
	MCCG-220	36.7	(120.5)	plugged
	MCCG-221	24.5	(80.5)	plugged

MCCG-222	27.5	(90.5)	plugged
MCCG-223	21.7	(71.5)	plugged
MCCG-225	39.7	(130.5)	plugged
MCCG-226	48.9	(160.5)	plugged
MCCG-227	29.4	(96.5)	plugged
MCCG-229	24.5	(80.5)	plugged
MCCG-230	57.6	(189)	plugged
MCCG-231	27.5	(90.5)	plugged
MCCG-232	39.7	(130.5)	plugged
MCCG-233	45.5	(149)	plugged
MRIG-201	24.7	(81)	observation
MRIG-202	61.0	(200)	observation
MRIG-203	36.9	(121)	observation
MRIG-204	55.2	(181)	observation
MRIG-205	43.0	(141)	observation
MRIG-208	23.2	(76)	NR
MRIG-209	24.4	(80)	observation
MRIG-210	54.9	(180)	observation
MRIG-211	43.3	(142)	capped
MRIG-212	54.9	(180)	observation
MRIG-213	30.5	(100)	observation
MRIG-215	36.6	(120)	observation
MRIG-216	36.6	(120)	observation
MRIG-217	54.9	(180)	plugged
MRIG-219	43.0	(141)	observation
MRIG-220	36.6	(120)	observation
MRIG-222	37.8	(124)	observation
MRIG-223	48.8	(160)	observation
MRIG-224	39.6	(130)	plugged
MRIG-226	48.8	(160)	observation
MRIG-227	42.7	(140)	observation
MRIG-228	36.6	(120)	observation
MRIG-229	30.2	(99)	NR
MRIG-230	48.5	(159)	observation
MRIG-232	36.6	(120)	observation

WELL NAME: MCCG-1
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Perry
STATE: MS
LATITUDE: 31-09 deg-min
LONGITUDE: 89-00 deg-min
SECTION/BLOCK: Sec 9, T2N R10W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	70.4	(231)
GROUND LEVEL ELEV.:	67.4	(221)
TOTAL DEPTH OF HOLE:	575.7	(1888.91)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
76.2	(30)	0.0-	18.3	(0-60)
43.2	(17)	18.3-	150.6	(60-494)
27.9	(11)	150.6-	364.2	(494-1195)
19.9	(7-7/8)	364.2-	575.7	(1195-1889)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
50.8	(20)	18.0	(59)
32.3	(12-1/2)	150.6	(494)
21.9	(8-5/8)	364.2	(1195)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
8.9	331.3- 349.0	17.7
8.9	364.2- 575.7	211.5

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
sidewall	195.1- 363.9
fluid samples	364.2- 417.6

-----WELL HISTORY-----

DRILL COMPLETION DATE: MAY 9, 1979
STATUS OF WELL: observation

MONITORING:
water levels between 32.6m (106.9 ft) and 31.8m (104.6 ft) on 10/29/79 and 12/4/80 respectively. Initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m
CITRONELLE	0.0- 6.7
HATTIESBURG	6.7- 360.3
CAPROCK	360.3- 422.5
SALT	422.5- 575.7

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, paleontology, photographs, lithologic descriptions

CORE LOGS
YES, conventional core

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, SP, acoustic, acoustic televiewer, gamma, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

NR

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
recovery		417.6- 420.9

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: porosity;, thermal;, density;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: grain size analysis;, permeability;, cation exchange;

HYDROCHEMICAL TESTS: gas analysis;, water quality;

-----REFERENCES-----

WELL NAME: MCCG-1

REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MCCG-1, ONWI-170

(2) Ertec Inc, 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana, September

(3) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Geologic Area Characterization Report Mississippi Study Area, Volume VII, July, ONWI-120

(4) Law Engineering Testing Company, 1983. Petrographic and Geochemical Characteristics of the Cypress Creek Salt Core, July, ONWI-365

WELL NAME: MCCG-2
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Perry
STATE: MS
LATITUDE: 31-11 deg-min
LONGITUDE: 89-00 deg-min
SECTION/BLOCK: Sec 33, T3N R10W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	62.9	(205.73)
GROUND LEVEL ELEV.:	59.9	(196.89)
TOTAL DEPTH OF HOLE:	913.5	(2997.2)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
76.2	(30)	0.0-	18.4	(0-60.4)
43.2	(17)	18.4-	126.6	(60.4-415.5)
25.1	(9-7/8)	126.6-	913.5	(415.5-2997)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
50.8	(20)	18.4	(60.4)
32.3	(12-3/4)	125.9	(413)
16.8	(6-5/8)	813.7	(2669.5)

-----CORES TAKEN-----

CORES SIZE, cm INTERVAL, m LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m	
sidewall	143.3-	899.2
fluid samples	812.5-	815.7

-----WELL HISTORY-----

DRILL COMPLETION DATE: SEPTEMBER 10, 1979
STATUS OF WELL: observation

MONITORING:
long-term water level monitoring. Water levels between 31.0m (101.9 feet) and 30.6m (100.4 feet) from 9/29/79 to 12/4/80. Initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
QUATERNARY	0.0-	16.8
HATTIESBURG-CATAHOULA	16.8-	396.2
CATAHOULA (HETEROSTEGINA)	396.2-	423.7
CATAHOULA (LOWER)	423.7-	442.0
CHICKASAWHAY	442.0-	507.5
BUCATUNNA	507.5-	535.2
VICKSBURG	535.2-	584.3
RED BLUFF	584.3-	614.2
YAZOO	614.2-	631.6
COCOA SAND	631.6-	651.7
NORTH TWISTWOOD CREEK CLAY	651.7-	655.3
MOODYS BRANCH	655.3-	662.9
COCKFIELD	662.9-	717.8
COOK MOUNTAIN	717.8-	771.8
SPARTA	771.8-	819.9
ZILPHA	819.9-	845.8
WINONA	845.8-	855.9
TALLAHATTA	855.9-	913.5

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, paleontology, lithologic descriptions

CORE LOGS
NA

MUD LOGS
NA

GEOPHYSICAL LOGS
YES, electric, induction electric, electric survey, SP, acoustic, gamma, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

QUATERNARY, upper 5 ft sand followed by white, red, orange sandy to silty clay
HATTIESBURG-CATAHOULA, sand medium to coarse, clay light gray to olive gray, black lignite, and vari colored limestone
CATAHOULA (HETEROSTEGINA), fine to medium grained sand and white to gray limestone
CHICKASAWHAY, very fine to medium grained sand, white chalky limestone
BUCATUNNA, very fine to coarse sand, yellow to olive gray clay
VICKSBURG LIMESTONE, white chalky limestone with minor sand, clay, mudstone and dolomite
RED BLUFF, yellow-gray clay, fine to medium grained sand, white to gray limestone
YAZOO CLAY, yellowish gray clay
COCOA SAND, quartz, fine to medium sand
NORTH TWISTWOOD CREEK CLAY, light olive gray clay
MOODYS BRANCH, very fine sand, white chalky limestone, brown silty mudstone
COCKFIELD, yellowish gray and light clay, very fine to medium sand
COOK MOUNTAIN, white to gray limestone
SPARTA, light olive gray and yellow-gray silty clay, white and gray fine sand
ZILPHA, yellowish gray clay, brown silty mudstone
WINONA, white limestone, clear to pale green very fine sand
TALLAHATTA, yellowish gray and tan clay, silty hard shale, brown silty mudstone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		812.5- 815.7

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: porosity;

-----REFERENCES-----

WELL NAME: MCCG-2
REFERENCES:
(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MCCG-2, ONWI-171
(2) Ertec Inc, 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana, September
(3) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Geologic Area Characterization Report, Mississippi Study Area, Volume VII, July, ONWI-120

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: grain size analysis;, permeability;, cation exchange;

HYDROCHEMICAL TESTS: water quality;

WELL NAME: MCCH-3B
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Perry
STATE: MS
LATITUDE: 31-05 deg-min
LONGITUDE: 89-00 deg-min
SECTION/BLOCK: Sec 33, T2N R10W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	81.7	(267.9)
GROUND LEVEL ELEV.:	78.6	(258.1)
TOTAL DEPTH OF HOLE:	1249.8	(4100.3)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
66.0	(26)	0.0-	18.3	(0-60)
38.1	(15)	18.3-	125.6	(60-412)
25.1	(9.87)	125.6-	1249.7	(412-4100)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
40.6	(16)	18.3	(60)
27.3	(10-3/4)	123.4	(405)
16.8	(6-5/8)	1051.6	(3450)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
sidewall	523.0- 1246.6
fluid samples	1050.7- 1063.8

-----WELL HISTORY-----

DRILL COMPLETION DATE: MAY 29, 1979
STATUS OF WELL: observation

MONITORING:
water level monitoring. Initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
CITRONELLE	0.0-	35.1
HATTIESBURG-CATAHOULA (UPPER)	35.1-	528.8
CATAHOULA (HETEROSTEGINA)	528.8-	612.7
CATAHOULA (LOWER)	612.7-	641.9
CHICKASAWHAY	641.9-	676.7
BUCATUNNA	676.7-	695.6
VICKSBURG	695.6-	762.0
RED BLUFF	762.0-	791.9
YAZOO	791.9-	810.8
PACHUTA MARL	810.8-	847.4
COCOA SAND	810.8-	847.4
NORTH TWISTWOOD CREEK CLAY	847.4-	850.4
MOODYS BRANCH	850.4-	861.7
COCKFIELD	861.7-	947.0
COOK MOUNTAIN	947.9-	1021.1
SPARTA	1021.1-	1065.3
ZILPHA	1065.3-	1079.6
WINONA	1079.6-	1094.2
TALLAHATTA	1094.2-	1246.6
WILCOX	1246.6-	1249.8

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, paleontology, lithologic descriptions

CORE LOGS
NA

MUD LOGS
YES

GEOPHYSICAL LOGS
YES, induction electric, acoustic, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

CITRONELLE, white to brown fine to coarse sand
HATTIESBURG-CATAHOULA, interbedded sand and clay with prominead gravel beds
HETERSTEGINA ZONE, gray to white chalky limestone, light olive gray clay
LOWER CATAHOULA, interbedded gray chalky limestone, medium to coarse sand, and light gray clay
CHICKASAWHAY, fine to medium white sand and light olive gray clay
BUCATUNNA, gray clay, traces of lignite, and pyrite, limestone and sand
VICKSBURG, light gray limestone
RED BLUFF, gray limestone with interbedded light olive-gray clay and fine to medium grained sand
YAZOO CLAY, light olive-gray clay
PACHUTA MARL and COCOA SAND, gray claystone, light gray fine and medium-grained sand, light olive gray clay
NORTH TWISTWOOD CREEK CLAY, light olive gray clay
MOODYS BRANCH, gray to white limestone and gray, fine sand
COCKFIELD, interbedded gray, fine to coarse sand, sandy limestone, mottled gray and red-brown clay
COOK MOUNTAIN, light gray sandy limestone
SPARTA, interbedded olive gray clay, gray limestone, fine to coarse sand beds. Pyrite common
ZILPHA, mottled light olive gray and dark gray clay, greenish gray shale
WINONA, light gray and green fine to coarse sand, pale brown limestone with interbedded olive gray clay
TALLAHATTA, pale brown and greenish gray shale, light gray limestone, olive gray clay
WILCOX, light olive gray clay, coarse sand, abundant glauconite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		1050.7- 1063.8

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: porosity;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: permeability;, grain size analysis;, cation exchange;

HYDROCHEMICAL TESTS: water quality;, water chemistry;, gas analysis;;

-----REFERENCES-----

WELL NAME: MCCH-3B
REFERENCES:

(1) Law Engineering Testing Company, 1982, Gulf Coast Salt Domes Well Completion Report: Site MCCH-3, ONWI-172
(2) Ertec Inc, 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana, September
(3) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Geologic Area Characterization Report, Mississippi Study Area, Volume VII, July, ONWI-120
(4) Slaughter, G. M. et al, February 1983. Permeability of Selected Sediments in the Vicinity of Five Salt Domes in the Gulf Interior Region, Law Engineering Testing Company, ONWI-356

WELL NAME: MH-4A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Perry
STATE: MS
LATITUDE: 31-15 deg-min
LONGITUDE: 88-59 deg-min
SECTION/BLOCK: Sec 3, T3N R10W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	59.8	(196.3)
GROUND LEVEL ELEV.:	55.9	(183.3)
TOTAL DEPTH OF HOLE:	823.1	(2700.65)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
66.0	(26)	0.0-	18.3	(0-60)
38.1	(15)	18.3-	122.8	(60-403)
14.9	(9-7/8)	122.8-	823.0	(400-2701)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
40.6	(16)	18.3	(60)
27.3	(10-3/4)	121.9	(400)
16.8	(6-5/8)	763.5	(2505)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
sidewall	229.0- 785.0

-----WELL HISTORY-----

DRILL COMPLETION DATE: JULY 18, 1979
STATUS OF WELL: observation

MONITORING:
water level initially monitored monthly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
CITRONELLE	0.0-	54.3
HATTIESBURG-CATAHOULA	54.3-	245.1
CATAHOULA (HETEROSTEGINA)	245.1-	283.5
CATAHOULA (LOWER)	283.5-	348.1
CHICKASAWHAY	348.1-	362.1
BUCATUNNA	362.1-	381.0
VICKSBURG	381.0-	401.7
RED BLUFF	401.7-	426.7
YAZOO	426.7-	443.5
PACHUTA MARL	443.5-	457.8
NORTH TWISTWOOD CREEK CLAY	457.8-	461.2
MOODYS BRANCH	461.2-	467.6
COCKFIELD	467.6-	510.2
COOK MOUNTAIN	510.2-	543.8
SPARTA	543.8-	600.5
ZILPHA	600.5-	629.1
WINONA	629.1-	638.3
TALLAHATTA	638.3-	711.7
WILCOX	711.7-	823.1

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, paleontology, lithologic descriptions

CORE LOGS
NA

MUD LOGS
YES

GEOPHYSICAL LOGS
YES, induction electric, SP, acoustic, sonic, gamma, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

CITRONELLE, yellow-brown medium sand
HATTIESBURG-CATAHOULA, interbedded white to light gray fine sand and greenish-gray and pale red clay
CATAHOULA(HETEROSTEGINA), white chalky sandy limestone and white fine sandstone
CATAHOULA (LOWER), white, fine to medium-grained sandstone, pale brown to gray clay with interbedded white chalky limestone
CHICKASAWHAY, tan to brown clay
BUCATUNNA, white to gray sandy chalky limestone grading down into gray clay
VICKSBURG LIMESTONE, white sandy limestone
RED BLUFF, greenish gray clay and white to gray chalky limestone
YAZOO CLAY, light brown to gray clay
PACHUTA MARL, white to gray chalky limestone
NORTH TWISTWOOD CREEK CLAY, pale brown and olive gray clay
MOODYS BRANCH, white to olive green chalky silty limestone
COCKFIELD, light brown and green clay, white to light green sandy limestone
COOK MOUNTAIN, white and light gray chalky sandy limestone
SPARTA, gray and brown clay, brown and green silty/sandy shale
ZILPHA, green and brown clay and shale
WINONA, light gray, brown, green marly limestone, fine sand
TALLAHATTA, brown and green silty shale, white and light green-gray chalky sandy limestone
WILCOX, predominantly gray, brown, green clay and clear and green fine to medium sand interbedded with marl

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		762.9- 769.4

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: NR;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: grain size analysis;

HYDROCHEMICAL TESTS: gas analysis;, water quality;, water chemistry;

-----REFERENCES-----

WELL NAME: MH-4A
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MH-4, ONWI-173
(2) Ertec Inc, 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana, September
(3) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Geologic Area Characterization Report, Mississippi Study Area, Volume VII, July, ONWI-120

WELL NAME: MH-5A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Forrest
STATE: MS
LATITUDE: 31-04 deg-min
LONGITUDE: 89-18 deg-min
SECTION/BLOCK: Sec 4, T1N R13W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	99.4	(326.1)
GROUND LEVEL ELEV.:	96.3	(315.8)
TOTAL DEPTH OF HOLE:	1094.0	(3589.3)

-----DRILLING PROGRAM-----

BIT DIAM., cm	(in)	INTERVAL, m		(ft)
66.0	(26)	0.0-	18.6	(0-61)
38.1	(15)	0.0-	125.0	(0-410)
25.1	(9-7/8)	0.0-	976.0	(0-3202)
14.9	(5-7/8)	976.0-	1094.0	(3202-3589)

-----CASING SUMMARY-----

CASING DIAM., cm	(in)	TOTAL DEPTH, m	(ft)
40.6	(16)	18.3	(60)
27.3	(10-3/4)	121.0	(397)
16.8	(6-5/8)	899.8	(2952)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
sidewall	289.6- 1082.7
fluid samples	1073.2- 1079.6

-----WELL HISTORY-----

DRILL COMPLETION DATE: JUNE 30, 1979
STATUS OF WELL: observation

MONITORING:
long term water level monitoring

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
CITRONELLE	0.0-	24.4
HATTIESBURG-CATAHOULA	24.4-	451.1
CATAHOULA (HETEROSTEGINA)	451.1-	466.3
CATAHOULA (LOWER)	466.3-	946.8
CHICKASAWHAY	946.8-	520.0
BUCATUNNA	520.0-	526.4
VICKSBURG	526.4-	577.3
RED BLUFF	577.3-	599.2
YAZOO	599.2-	609.6
PACHUTA MARL	609.6-	637.6
NORTH TWISTWOOD CREEK CLAY	637.6-	640.7
MOODYS BRANCH	640.7-	643.7
COCKFIELD	643.7-	666.3
COOK MOUNTAIN	666.3-	710.2
SPARTA	710.2-	768.1
ZILPHA	768.1-	787.0
WINONA	787.0-	794.3
TALLAHATTA	794.3-	852.2
WILCOX	852.2-	1094.0

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, paleontology, lithologic descriptions

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, SP, acoustic, gamma, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

CITRONELLE, white, clear, pink and orange very fine to coarse grained sand
HATTIESBURG-CATAHOULA, interbedded very fine to coarse sand and light grays and brown clay
CATAHOULA (HETEROSTEGINA), white, part sandy, bioclastic limestone, clear fine sand and yellow gray slightly silty sand
CATAHOULA (LOWER), interbedded clear fine sand, grayish clay and sandy chalky limestone
CHICKASAWHAY, interbedded grayish clay and clear, some black fine partly silty sand
BUCATUNNA, gray clay
VICKSBURG, white sandy limestone
RED BLUFF, grayish clay, white sandy limestone, clear and gray very fine grained sand
YAZOO, gray and yellowish gray silty clay
PACHUTA MARL, gray and brownish gray clay, white and light gray limestone
NORTH TWISTWOOD CREEK CLAY, gray clay
MOODYS BRANCH, olive gray clay and white sandy limestone
COCKFIELD, white and gray sandy limestone, greenish fine sandstone, gray clay
COOK MOUNTAIN, white and light gray sandy limestone
SPARTA, white sandy part silty limestone, grayish silty sandy clay, white, locally black fine grained sand
ZILPHA, brown and olive gray clay
WINONA, brownish silty clay and light gray, olive gray, green sandy siltstone
TALLAHATTA, interbedded brownish clay, white and light gray fine sandstone, grayish sandy siltstone
WILCOX, grayish clay, light gray, greenish gray sand and sandstone, white, gray and pink limestone, light to dark gray siltstone and brownish black lignite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		1073.2- 1079.6

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: NR;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: grain size analysis;, field content;

HYDROCHEMICAL TESTS: water quality;, water chemistry;

-----REFERENCES-----

WELL NAME: MH-5A
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MH-5, ONWI-174
(2) Ertec Inc, 1983. Annual Report-1983 Pontentiometric-Level Monitoring Program Mississippi and Louisiana, September
(3) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Geologic Area Characterization Report, Mississippi Study Area, Volume VII, July, ONWI-120

WELL NAME: MH-6A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Marion
STATE: MS
LATITUDE: 31-26 deg-min
LONGITUDE: 89-43 deg-min
SECTION/BLOCK: Sec 4, T5N R17W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	139.0	(456.32)
GROUND LEVEL ELEV.:	135.4	(444.61)
TOTAL DEPTH OF HOLE:	1066.8	(3500)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
66.0	(26)	0.0- 18.9	(0-62.3)
38.1	(15)	- 123.4	(0-405)
25.1	(9-7/8)	0.0- 1066.8	(0-3500)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
40.6	(16)	18.9	(62.3)
27.3	(10-3/4)	123.3	(404.5)
16.8	(6-5/8)	995.5	(3266)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	994.9- 1001.3
sidewall	382.2- 1048.6

-----WELL HISTORY-----

DRILL COMPLETION DATE: SEPTEMBER 3, 1979
STATUS OF WELL: observation

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
CITRONELLE	0.0-	64.6
HATTIESBURG-CATAHOULA	64.6-	310.9
CATAHOULA (HETEROSTEGINA)	310.9-	332.2
CATAHOULA (LOWER)	332.2-	434.3
CHICKASAWHAY	434.3-	477.9
BUCATUNNA	477.9-	488.6
VICKSBURG	488.6-	513.0
RED BLUFF	513.0-	525.2
YAZOO	525.2-	605.6
PACHUTA MARL	605.6-	617.2
NORTH TWISTWOOD CREEK CLAY	617.2-	618.4
MOODYS BRANCH	618.4-	621.8
COCKFIELD	621.8-	709.6
COOK MOUNTAIN	709.6-	743.7
SPARTA	743.7-	856.5
ZILPHA	856.5-	923.6
WINONA	923.6-	935.7
TALLAHATTA	935.7-	995.8
WILCOX	995.8-	1066.8

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, paleontology, lithologic descriptions

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, SP, acoustic, gamma, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

CITRONELLE, clear moderate to reddish orange, pink yellow very fine to very coarse grained sand and varicolored gravel
HATTIESBURG-CATAHOULA, orange and yellowish gray clay, gravel, and clear white, yellow, orange and pink very fine to very coarse sand
CATAHOULA (HETEROSTEGINA), interbedded white to light gray part sandy limestone, grayish clay and very fine to very coarse sand
CATAHOULA (LOWER), olive clay, light gray sandy limestone, clear to white fine and medium grained sand
CHICKASAWHAY, interbedded olive gray and yellowish brown clay, clear fine to very coarse grained sand
BUCATUNNA, dark yellowish brown and greenish gray clay
VICKSBURG, white bioclastic, part sandy, part silty limestone
RED BLUFF, yellowish gray clay and white sandy limestone
YAZOO, light olive-gray, yellowish-gray and brown clay with minor limestone, mudstone, and sand
PACHUTA MARL, white limestone
NORTH TWISTWOOD CREEK CLAY, yellowish gray clay
MOODYS BRANCH, white hard limestone
COCKFIELD, interbedded olive gray and yellow brown clay, very fine to medium grained sand, white limestone, and green-brown sandy siltstone
COOK MOUNTAIN, white locally sandy limestone
SPARTA, interbedded olive gray and yellow-brown clay, fine sand, pale green, gray and brown silty mudstone and limestone
ZILPHA, yellow-brown and olive-gray clay, minor interbedded limestone, dolomite, mudstone and sand
WINONA, white and light gray limestone, pale greenish gray silty shale
TALLAHATTA, yellowish-brown-gray clay, pale grayish green and white silty limestone, pale green, brown, gray shale, light gray fine sandstone
WILCOX, light olive gray, dark yellow-brown silty clay, dark green very fine to medium grained sand, pale green and gray silty shale, and pale gray to white very sandy limestone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		994.9- 1001.3

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: NR;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: grain size analysis;

HYDROCHEMICAL TESTS: water quality;, gas analysis;

-----REFERENCES-----

WELL NAME: MH-6A
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MH-6, ONWI-175
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Area Characterization Report Mississippi Study Area, Volume VII Appendix, ONWI-120
(3) Ertec Inc, September 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana

WELL NAME: MH-7A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Forrest
STATE: MS
LATITUDE: 31-25 deg-min
LONGITUDE: 89-18 deg-min
SECTION/BLOCK: Sec 9, T5N R13W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	67.3	(220.75)
GROUND LEVEL ELEV.:	64.1	(210.4)
TOTAL DEPTH OF HOLE:	868.7	(2849.9)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
66.0	(26)	0.0-	18.6	(0-61)
38.1	(15)	18.6-	123.8	(61-406)
25.1	(9-7/8)	123.8-	868.7	(406-2849.9)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
40.6	(16)	18.6	(61)
27.3	(10-3/4)	123.1	(404)
16.8	(6-5/8)	807.7	(2650)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	808.0- 814.7
sidewall	200.3- 854.1

-----WELL HISTORY-----

DRILL COMPLETION DATE: AUGUST 16, 1979
STATUS OF WELL: observation

MONITORING:
water level monitoring. Water levels between 80.5-81.2m (264.2 feet and 266.5 feet) between 3/28/80 and 12/1/80. Water levels initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
CITRONELLE	0.0-	33.5
HATTIESBURG-CATAHOULA	33.5-	195.1
CATAHOULA (HETEROSTEGINA)	195.1-	219.5
CATAHOULA (LOWER)	219.5-	258.8
CHICKASAWHAY	258.8-	303.9
BUCATUNNA	303.9-	320.0
VICKSBURG	320.0-	350.2
RED BLUFF	350.2-	361.2
YAZOO	361.2-	417.6
PACHUTA MARL	417.6-	425.2
NORTH TWISTWOOD CREEK CLAY	425.2-	429.8
MOODYS BRANCH	429.8-	434.7
COCKFIELD	434.7-	491.0
COOK MOUNTAIN	491.0-	559.3
SPARTA	559.3-	596.2
ZILPHA	596.2-	650.5
WINONA	650.5-	661.1
TALLAHATTA	661.1-	725.4
WILCOX	725.4-	868.7

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions, paleontology.

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, SP, acoustic, sonic, gamma, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

CITRONELLE, white, orange, yellow, pink gravelly sand fine to very coarse grained
HATTIESBURG-CATAHOULA, interbedded clear to white very fine to very coarse sand, buff gray and brown-green clay, minor lignite, gravel and mudstone
CATAHOULA (HETEROSTEGINA), predominantly white to light gray limestone with interbedded white very fine to coarse sand and light green, gray clay
CATAHOULA (LOWER), interbedded clear/white very fine to very coarse grained sand, light green gray, brown clay, white chalky limestone
CHICKASAWHAY, predominantly brown, green, gray, orange clay with fine sand and white sandy limestone
BUCATUNNA, gray and tan clay
VICKSBURG, white limestone
RED BLUFF, white limestone and buff clay
YAZOO, tan, light green and gray clay
PACHUTA MARL, white limestone and clear very fine to medium grained sand
NORTH TWISTWOOD CREEK CLAY, buff gray, and tan/brown clay
MOODYS BRANCH, white limestone
COCKFIELD, interbedded brown and tan clay, clear and light green medium to coarse sand, and white sandy limestone
COOK MOUNTAIN, white limestone with a clay interval
SPARTA, clear very fine to very coarse grained sand, brownish clay, brown sandy siltstone, minor dolomite limestone and mudstone
ZILPHA, brownish silty clay
WINONA, brown clay, white limestone, brown fine to coarse grained sand, minor dolomite and mudstone
TALLAHATTA, tan and green-gray clay and white to light gray sandy, silty limestone
WILCOX, predominantly dark brown, green/brown silty clay and clear, tan, green very fine to medium grained silty sand, minor limestone mudstone and lignite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		808.0- 814.7

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: NR;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: grain size analysis;

HYDROCHEMICAL TESTS: gas analysis;, water quality;, water chemistry;

-----REFERENCES-----

WELL NAME: MH-7A
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MH-7, ONWI-176
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Characterization Report Mississippi Study Area, Volume VII, Appendix, ONWI-120
(3) Ertec Inc, September 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana

WELL NAME: MH-8A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Marion
STATE: MS
LATITUDE: 31-09 deg-min
LONGITUDE: 89-41 deg-min
SECTION/BLOCK: Sec 10, T2N R17W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	77.4	(254.3)
GROUND LEVEL ELEV.:	74.4	(244.3)
TOTAL DEPTH OF HOLE:	1127.8	(3700)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
66.0	(26)	0.0-	18.1	(0-59.6)
38.1	(15)	18.4-	123.4	(60.4-405)
25.1	(9-7/8)	123.4-	1127.8	(405-3700)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
40.6	(16)	18.3	(60)
27.3	(10-3/4)	121.9	(400)
16.8	(6-5/8)	969.3	(3180)

-----CORES TAKEN-----

CORES SIZE, cm INTERVAL, m LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	969.0- 972.3
sidewall	472.4- 1117.1

-----WELL HISTORY-----

DRILL COMPLETION DATE: NOVEMBER 3, 1979
STATUS OF WELL: observation

MONITORING:
water levels (between 201.8 feet and 197.5 feet) 61.5-60.2m between 11/12/79 to 12/2/80. Water levels initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
HATTIESBURG-CATAHOULA	0.0-	411.5
CATAHOULA (HETEROSTEGINA)	411.5-	499.9
CATAHOULA (LOWER)	499.9-	527.3
CHICKASAWHAY	527.3-	562.1
BUCATUNNA	562.1-	570.0
VICKSBURG	570.0-	613.9
RED BLUFF	613.9-	634.0
YAZOO CLAY	634.0-	656.2
PACHUTA MARL	656.2-	670.6
NORTH TWISTWOOD CREEK CLAY	670.6-	676.7
MOODYS BRANCH	676.7-	687.0
COCKFIELD	687.0-	724.8
COOK MOUNTAIN	724.8-	779.7
SPARTA	779.7-	835.8
ZILPHA	835.8-	899.2
WINONA	899.2-	905.9
TALLAHATTA	905.9-	953.4
WILCOX	953.4-	1127.8

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, paleontology, lithologic descriptions

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, lateral log, SP, acoustic, sonic, gamma, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

HATTIESBURG-CATAHOULA, interbedded tan olive gray silty sandy clay, clear white and pink fine to coarse grained sand, gravel, tan yellowish gray sandy siltstone, silty mudstone and white chalky limestone
CATAHOULA (HETEROSTEGINA), white to gray limestone and clear very fine to very coarse grained sand
CATAHOULA (LOWER), predominantly light olive gray clay with interbedded smoky and pink fine to coarse sand, light olive gray shale and white chalky sandy limestone
CHICKASAWHAY, interbedded grayish clay, white and gray very fine to very coarse sand, fine to coarse white sandstone
BUCATUNNA, light olive gray clay with minor sand, sandstone and limestone
VICKSBURG, white to gray chalky limestone
RED BLUFF, light olive gray clay, white to gray chalky limestone, and clear to gray very fine to coarse grained sand
YAZOO CLAY, grayish clay
PACHUTA MARL, yellowish gray clay and limestone
NORTH TWISTWOOD CREEK CLAY, light olive gray clay and greenish brown silty mudstone
MOODYS BRANCH, white chalky limestone and clear fine to coarse grained sand
COCKFIELD, grayish clay, pale green to grayish brown silty shale and greenish brown, olive gray chalky limestone
COOK MOUNTAIN, white to pale green chalky limestone, minor interbedded olive gray clay
SPARTA, interbedded olive gray and yellowish brown clay, buff to white limestone, brownish shale
ZILPHA, brownish clay and brown, tan and pale green silty shale
WINONA, mottled gray chalky limestone
TALLAHATTA, interbedded light olive gray to dark yellowish brown clay, greenish and yellowish gray silty shale, pale greenish gray chalky limestone
WILCOX, interbedded light olive gray silty clay, pale greenish gray sandy limestone, gray brown and green sandy siltstone, clear green, brown, white and pink very fine to very coarse sand, and brown to black lignite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		969.0- 972.3

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: grain size analysis;, petrographic analysis;, x-ray analysis;

HYDROCHEMICAL TESTS: water quality;, gas analysis;

-----REFERENCES-----

WELL NAME: MH-8A
REFERENCES:

(1) Law Engineering Testing Company. 1982. Gulf Coast Salt Domes Well Completion Report: Site MH-8, ONWI-177
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Characterization Report Mississippi Study Area, Volume VII Appendix, ONWI-120
(3) Ertec Inc, September 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana

WELL NAME: MRIG-9
SRP CONTACT: CZ Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Perry
STATE: MS
LATITUDE: 31-32 deg-min
LONGITUDE: 88-58 deg-min
SECTION/BLOCK: Sec 26, T5N R10W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	81.5	(267.48)
GROUND LEVEL ELEV.:	78.2	(256.7)
TOTAL DEPTH OF HOLE:	388.6	(1275)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
66.0	(26)	0.0- 18.0	(0-59)
38.1	(15)	18.0- 138.1	(59-453)
27.9	(11)	137.2- 203.9	(450-669)
19.8	(7-13/16)	170.4- 388.3	(559-1274)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
40.6	(16)	18.0	(59)
32.4	(12-3/4)	137.2	(450)
21.9	(8-5/8)	170.4	(559)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	138.4- 388.6	250.2

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
sidewall	138.4- 388.6
fluid samples	170.4- 234.7

-----WELL HISTORY-----

DRILL COMPLETION DATE: NOVEMBER 30, 1979
STATUS OF WELL: plugged

MONITORING:
water levels on monthly basis initially then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
HATTIESBURG-CATAHOULA	0.0-	178.0
CAPROCK	178.0-	233.8
SALT	233.8-	388.6

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions, photographs

CORE LOGS
YES, conventional core

MUD LOGS
YES, gas detector, mud condition

GEOPHYSICAL LOGS
YES, acoustilog, gamma ray, caliper, temperature, compensated density, compensated neutron, SP, dual induction focused logs, laterolog, differential temperature, resistivity

-----LITHOLOGY-----

NR

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
slug		228.6- 234.7
production		170.4- 234.7
drawdown and recovery		170.4- 234.7

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: strength;, index;, creep;, density;, thermal;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: grain size analysis;, petrographic analysis;, permeability;, elemental composition;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;, gas analysis;

-----REFERENCES-----

WELL NAME: MRIG-9

REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MRIG-9, ONWI-178

(2) Drumheller, J.C. et al, 1982. Petrographic and Geochemical Characteristics of the Richton Salt Core, ONWI-277, Law Engineering Testing Company

(3) Pfeifle, T. W. et al, 1983. Constitutive Properties of Salt from Four Sites, ONWI-314, RE/SPEC Inc.

(4) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Area Characterization Report Mississippi Study Area, Volume VII, ONWI-120

WELL NAME: MRIG-10
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Perry
STATE: MS
LATITUDE: 31-25 deg-min
LONGITUDE: 88-57 deg-min
SECTION/BLOCK: Sec 12, T5N R10W

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	88.5	(290.6)
GROUND LEVEL ELEV.:	86.7	(284.6)
TOTAL DEPTH OF HOLE:	822.7	(2699.38)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
66.0	(26)	0.0-	18.7	(0-61.4
38.1	(15)	18.7-	123.4	(61.4-404.9
25.1	(9-7/8)	123.4-	822.7	(404.9-2699.4

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
40.6	(16)	18.7	(61.4)
27.3	(10-3/4)	121.9	(400)
16.8	(6-5/8)	822.7	(2699)

-----CORES TAKEN-----

CORES SIZE, cm INTERVAL, m LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	796.9- 803.3
sidewall	177.1- 816.9

-----WELL HISTORY-----

DRILL COMPLETION DATE: OCTOBER 16, 1979
STATUS OF WELL: observation

MONITORING:
water levels between (253.8 feet and 251.8 feet) 7.3-76.7m from 11/10/79 to 5/27/80. Water levels initially monitored monthly then quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
CITRONELLE	0.0-	45.7
HATTIESBURG-CATAHOULA	45.7-	253.0
CATAHOULA (HETEROSTEGINA)	253.0-	289.6
CATAHOULA (LOWER)	289.6-	343.2
CHICKASAWHAY	343.2-	374.9
BUCATUNNA	374.9-	398.1
VICKSBURG	398.1-	427.9
RED BLUFF	427.9-	443.5
YAZOO	443.5-	475.5
PACHUTA MARL	475.5-	484.6
NORTH TWISTWOOD CREEK CLAY	484.6-	492.6
MOODYS BRANCH	492.6-	498.0
COCKFIELD	498.0-	566.3
COOK MOUNTAIN	566.3-	600.5
SPARTA	600.5-	666.9
ZILPHA	666.9-	708.7
WINONA	708.7-	727.6
TALLAHATTA	727.6-	795.5
WILCOX	795.5-	822.7

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, paleontology, lithologic descriptions

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, SP, acoustic, sonic, gamma, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

CITRONELLE, unconsolidated sand and gravel, with traces of white chalky limestone
HATTIESBURG-CATAHOULA, interbedded unconsolidated white, light gray fine sand and yellow to olive gray clay
CATAHOULA (HETEROSTEGINA), white chalky sandy limestone with interbedded very fine to coarse grained sand and olive gray clay
CATAHOULA (LOWER), perdominantly olive gray clay with interbedded gray chalky limestone and medium to fine grained sand
CHICASAWHAY, interbedded olive gray clay, white to gray sandy limestone and fine grained sand
BUCATUNNA, olive gray clay with interbedded fine to medium grained sand and light green to brown mudstone
VICKSBURG, white chalky limestone
RED BLUFF, olive gray clay with interbedded white chalky limestone
YAZOO, light olive gray clay with beds of white sandy chalky limestone
PACHUTA MARL, white and brown chalky limestone
NORTH TWISTWOOD CREEK CLAY, light olive gray clay with interbedded light green shale
MOODYS BRANCH, white to gray sandy limestone
COCKFIELD, predominantly olive gray clay, light green to brown silty shale and light brown, green, white sandy limestone
COOK MOUNTAIN, part sandy chalky limestone
SPARTA, interbedded olive gray clay, white gray and brown sandy limestone, light brown and gray green silty shale
ZILPHA, predominantly light olive gray clay with minor interbedded white to light brown sandy shale
WINONA, white, yelloy gray limestone, interbedded gray green silty shale
TALLAHATTA, interbedded light olive gray clay, white gray and brown sandy chalky limestone, gray green and brown silty shale
WILCOX, olive gray fine to very coarse grained sand, light greenish gray to brown silty shale with minor limestone and lignite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		796.9- 803.3

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: porosity;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: permeability;, cation exchange:

HYDROCHEMICAL TESTS: water quality;, gas analysis;

-----REFERENCES-----

WELL NAME: MRIG-10
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MRIG-10, ONWI-179
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Area Characterization Report Mississippi Study Area, Volume VII Appendix, ONWI-120
(3) Slaughter, George M. et al, February 1983. Permeability of Selected Sediments in the Vicinity of Five Salt Domes in the Gulf Interior Region, Law Engineering Testing Company, ONWI-356
(4) Ertec Inc, September 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana

WELL NAME: MRIH-11A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Perry
STATE: MS
LATITUDE: 31-19 deg-min
LONGITUDE: 88-60 deg-min
SECTION/BLOCK: Sec 9, T4N R10

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	58.0	(190.5)
GROUND LEVEL ELEV.:	55.0	(180.4)
TOTAL DEPTH OF HOLE:	1841.3	(6041.15)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
66.0	(26)	0.0-	18.1	(0-59.4
38.1	(15)	0.0-		(0-805
25.1	(9-7/8)	245.4-	1841.3	(805-6041.1

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
40.6	(16)	18.1	(59.46)
27.3	(10-3/4)	243.8	(800)
16.8	(6-5/8)	1280.5	(4201)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	1281.7- 1288.1
sidewall	254.5- 1788.6

-----WELL HISTORY-----

DRILL COMPLETION DATE: OCTOBER 2, 1979
STATUS OF WELL: observation

MONITORING:
long-term Water levels between (95.1 feet and 89.5 feet) 29.0-27.3m between 10/29/79 and 11/7/80. Water levels initially monitored monthly than quarterly

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
HATTIESBURG-CATAHOULA	0.0-	213.4
CATAHOULA (HETEROSTEGINA)	213.4-	237.7
CATAHOULA (LOWER)	237.7-	298.7
CHICKASAWHAY	298.7-	334.4
BUCATUNNA	334.4-	347.5
VICKSBURG	347.5-	366.1
RED BLUFF	366.1-	378.9
YAZOO	378.9-	395.3
PACHUTA	395.3-	413.9
NORTH TWISTWOOD CREEK CLAY	413.9-	420.0
MOODYS BRANCH	420.0-	424.6
COCKFIELD	424.6-	474.9
COOK MOUNTAIN	474.9-	509.0
SPARTA	509.0-	559.0
ZILPHA	559.0-	597.4
WINONA	597.4-	609.6
TALLAHATTA	609.6-	678.2
WILCOX	678.2-	1438.7
MIDWAY	1438.7-	1675.8
CLAYTON	1675.8-	1682.8
SELMA CHALK	1682.8-	1841.3

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, paleontology, lithologic descriptions

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, acoustic, gamma, gamma-gamma, neutron porosity, caliper, temperature

-----LITHOLOGY-----

HATTIESBURG-CATAHOULA, interbedded medium to very coarse grained sand and yellow gray to olive gray clay
CATAHOULA (HETEROSTEGINA), white, bioclastic sandy limestone. Interbedded yellowish gray clay and fine to very coarse grained sand
LOWER CATAHOULA, white to light gray sandy chalky limestone, interbedded very fine to medium grained sand and light olive gray clay
CHICKASAWHAY, white to tan locally sandy limestone, interbedded light olive gray clay and fine to medium grain sand
VICKSBURG, white to gray chalky sandy limestone
RED BLUFF, light olive gray clay and white chalky limestone
YAZOO, mottled light olive gray and yellow gray clay
PACHUTA, white to gray chalky locally sandy marl
NORTH TWISTWOOD CREEK, light olive gray clay
MOODYS BRANCH, white chalky sandy and bioclastic limestone
COCKFIELD, interbedded yellow-gray-brown clay and greenish gray chalky limestone
COOK MOUNTAIN, white chalky sandy to silty limestone
SPARTA, interbedded olive-gray and yellow-brown clay, green gray silty shale and brown-green siltstone
ZILPHA, predominantly olive gray clay, interbedded gray shale, brown siltstone and very fine to coarse sand
WINONA, brownish gray to green siltstone, white sandy limestone
TALLAHATTA, interbedded olive gray clay, light gray silty sandy limestone and light gray and brown siltstone
WILCOX, interbedded white to gray fine grained sand, light gray siltstone gray-olive gray silty clay, gray brown silty shale, white gray sandy limestone
MIDWAY, predominantly olive gray clay with interbedded fine grained silty sand and gray silty shale. Lignite, pyrite and glauconite common
CLAYTON, white to light gray chalky silty limestone
SELMA CHALK, interbedded olive gray clay, dark-gray to pale green silty shale and white, gray, pale green chalky silty limestone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		1281.7- 1288.1

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: porosity;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: permeability;, grain size analysis;, cation exchange;

HYDROCHEMICAL TESTS: water quality;, gas analysis;;

-----REFERENCES-----

WELL NAME: MRIH-11A
REFERENCES:
(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site MRIH-II, ONWI-180
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Area Characterization Report Mississippi Study Area, Volume VII Appendix, ONWI-120
(3) Slaughter, George M. et al, February 1983. Permeability of Selected Sediments in the Vicinity of Five Salt Domes in the Gulf Interior Region, Law Engineering Testing Company, ONWI-356
(4) Ertec Inc, September 1983. Annual Report-1983 Potentiometric-Level Monitoring Program Mississippi and Louisiana

TEXAS

- Borehole Summaries

TEXAS
BORINGS

COUNTY	WELL NAME	DEPTH METERS	(FEET)	STATUS OF WELL
Deaf Smith	Detten #1	865.4	(2839.3)	plugged
	Detten #2	403.9	(1325)	open
	Friemel G #1	826.0	(2710.2)	plugged
	Friemel J #1	2524.6	(8283)	open
Donley	Sawyer #1	1464.9	(4806)	plugged
	Sawyer #2	239.0	(784)	open
Freestone	TOG-1	413.1	(1355.7)	plugged
	TOH-5D	205.1	(673)	plugged
Leon	TOH-2A	1036.3	(3400)	plugged
Oldham	Mansfield #1	2258.3	(7409)	plugged
	Mansfield #2	237.1	(778)	open
Randall	Holtzclaw #1	879.2	(2884.4)	capped
	Rex White #1	1220.0	(4001.5)	plugged
Swisher	Grabbe #1	1283.8	(4212)	plugged
	Harman #1	930.3	(3052)	open
	Zeeck #1	2328.7	(7640)	open

WELL NAME	COUNTY	DEPTH METERS	(FEET)	STATUS OF WELL
Detten #1	Deaf Smith	865.4	(2839.3)	plugged
Detten #2	Deaf Smith	403.9	(1325)	open
Friemel G #1	Deaf Smith	826.0	(2710.2)	plugged
Friemel J #1	Deaf Smith	2524.6	(8283)	open
Grabbe #1	Swisher	1283.8	(4212)	plugged
Harman #1	Swisher	930.3	(3052)	open
Holtzclaw #1	Randall	879.2	(2884.4)	capped
Mansfield #1	Oldham	2258.3	(7409)	plugged
Mansfield #2	Oldham	237.1	(778)	open
Rex White #1	Randall	1220.0	(4001.5)	plugged
Sawyer #1	Donley	1464.9	(4806)	plugged
Sawyer #2	Donley	239.0	(784)	open
TOG-1	Freestone	413.1	(1355.7)	plugged
TOH-2A	Leon	1036.3	(3400)	plugged
TOH-5D	Freestone	205.1	(673)	plugged
Zeeck #1	Swisher	2328.7	(7640)	open

WELL NAME: Detten #1
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Deaf Smith
STATE: TX
LATITUDE: 34-56 deg-min
LONGITUDE: 102-22 deg-min
SECTION/BLOCK: Sec 52, K-3

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1177.1	(3861.9)
GROUND LEVEL ELEV.:	1175.0	(3855.0)
TOTAL DEPTH OF HOLE:	865.4	(2839.3)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
44.5	(17-1/2)	0.0- 16.8	(0-55)
31.1	(12-1/4)	16.8- 342.6	(55-1124)
21.6	(8.5)	342.6- 865.4	(1124-2839.3)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
34.0	(13-3/8)	16.2	(53)
24.4	(9-5/8)	342.0	(1122)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	344.1- 433.7	89.6
10.2	574.3- 865.4	291.1

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
well cuttings	0.0- 865.4

-----WELL HISTORY-----

DRILL COMPLETION DATE: MAY 5, 1982
STATUS OF WELL: plugged

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
OGALLALA	0.0-	117.0
DOCKUM	117.0-	326.1
DEWEY LAKE	326.1-	342.3
ALIBATES	342.3-	357.2
SALADO	357.2-	378.0
YATES	378.0-	404.2
UPPER SEVEN RIVERS	404.2-	443.8
LOWER SEVEN RIVERS	443.8-	501.7
QUEEN/GRAYBURG	501.7-	568.8
UPPER SAN ANDRES	568.8-	723.6
LOWER SAN ANDRES UNIT 5	723.6-	784.9
LOWER SAN ANDRES UNIT 4	784.9-	862.6
LOWER SAN ANDRES UNIT 3	862.6-	865.4

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log, final core log, photographs

CORE LOGS
YES, storage log, sample status log

MUD LOGS
YES, gas detector

GEOPHYSICAL LOGS
YES, proximity log-micrology, sonic waveform, dual induction, compensated sonic, temperature, compensated neutron, density, continuous dipmeter, fracture ID, continuous directional, natural gamma ray spectrometry, gamma ray, spontaneous potential, dual laterolog, caliper, Cyberlook, Coriband, Cluster, Geogram, computed directional

-----LITHOLOGY-----

OGALLALA, sandstone, lt. brown, v. fine to coarse grained, loosely to well cemented w/occ. caliche and gravel beds, low to high porosity
DOCKUM, alternating silty shale and sandstone ending in siltstone
DEWEY LAKE, siltstone, dk. reddish brown
ALIBATES, anhydrite, lt. gray w/interbed of med. red brown siltstone and gypsum
SALADO, siltstone, med. red brown, slightly dolomitic and argillaceous with occ. bed of anhydrite
YATES, siltstone overlying sandstone, red brown, very fine grain, occ. silty, moderate porosity
UPPER SEVEN RIVERS, salt interbedded with red brown silty shale, red brown siltstone and anhydrite. Evidence of dissolution in upper portion
LOWER SEVEN RIVERS, siltstone, medium red brown and brown with occ. thin bed of anhydrite and thick anhydrite at base
QUEEN/GRAYBURG, siltstone, medium red brown, hard, occ. arenaceous
UPPER SAN ANDRES, salt with thin interbeds of shale, siltstone and anhydrite with lower seciton of very hard anhydrite interbedded with disseminated salt, thin dolomite, soft shale, and siltstone
LOWER SAN ANDRES UNIT 5, salt with occ thin interbed of shale and anhydrite and lower sections of anhydrite with interbeds of dolomite, limestone, and soft shale
LOWER SAN ANDRES UNIT 4, salt with occ thin shale and anhydrite interbed. bottom is dolomite of very slight to low porosity, dolomitic shale at base
LOWER SAN ANDRES UNIT 3, clean salt

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL,
repeat formation	3	842.2- 853.
drill stem	1	837.9- 865.

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: creep;, strength;, density;, porosity;, hardness;, water content;, shake durability;, indirect tensile;, direct shear;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: clay mineralogy;, petrographic analysis;

HYDROCHEMICAL TESTS: NA;

-----REFERENCES-----

WELL NAME: Detten #1
REFERENCES:
(1) Stone and Webster Engineering Corp., 1982. Well Completion Report, Detten No. 1, Palo Duro Basin.
(2) Martin, R. J., July 26, 1982. Laboratory Testing of Rock and Salt Samples for Static Moduli, Dynamic Moduli and Triaxial Compressive Strength, Applied Research Associates Inc, for Stone & Webster
(3) Fukui, L. M., May 2, 1983. Summary of Petrographic and Chemical Data From Palo Duro Basin Samples, Bendix Field Engineering Corporation

WELL NAME: Detten #2
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Deaf Smith
STATE: TX
LATITUDE: NR deg-min
LONGITUDE: NR deg-min
SECTION/BLOCK: Sec 52, Block K-3

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	1175.0	(3855)
TOTAL DEPTH OF HOLE:	403.9	(1325)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
31.1	(12-1/4)	0.0- 397.8	(0-1305)
20.0	(7-7/8)	397.8- 403.9	(1305-1325)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
24.5	(9.67)	397.8	(1305)
40.6	(16)	9.1	(30)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: MARCH 11, 1983
STATUS OF WELL: open

MONITORING:
water level monitoring - preliminary indications show no water in test zone

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m
YATES	378.0- 404.2

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, open hole logs

CORE LOGS
NA

MUD LOGS
NA

GEOPHYSICAL LOGS
NR

-----LITHOLOGY-----

-----FORMATION TESTS-----

NR	NAME	NUMBER	INTERVAL, m

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: NA;

-----REFERENCES-----

WELL NAME: Detten #2
REFERENCES:

(1) Stone & Webster Engineering Corporation, June 1983. Well Completion Report Dissolution Zone Water Wells Palo Duro Basin, ONWI/SUB/83/E512-05000-T10

WELL NAME: Friemel G #1
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Deaf Smith
STATE: TX
LATITUDE: 34-55 deg-min
LONGITUDE: 102-22 deg-min
SECTION/BLOCK: Sec 6, Block 3

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1165.3	(3823.2)
GROUND LEVEL ELEV.:	1163.2	(3816.7)
TOTAL DEPTH OF HOLE:	826.0	(2710.2)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
31.1	(12-1/4)	0.0- 322.8	(0-1059)
44.4	(17-1/2)	0.0- 15.2	(0-50)
21.6	(8-1/2)	322.8- 826.0	(1059-2710)

-----CASING SUMMARY-----

CASING DIAM., cm(in)		TOTAL DEPTH, m(ft)	
33.9	(13-3/8)	15.2	(50)
24.4	(9-5/8)	322.5	(1058)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	362.7- 399.9	37.2
10.2	520.9- 826.0	305.1

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: MARCH 31, 1982
STATUS OF WELL: plugged

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
OGALLALA	0.0-	79.9
DOCKUM	79.9-	300.2
DEWEY LAKE	300.2-	319.4
ALIBATES	319.4-	331.6
SALADO	331.6-	354.8
YATES	354.8-	380.4
UPPER SEVEN RIVERS	380.4-	410.3
LOWER SEVEN RIVERS	410.3-	464.8
QUEEN/GRAYBURG	464.8-	531.0
UPPER SAN ANDRES	531.0-	680.0
LOWER SAN ANDRES UNIT 5	680.0-	742.2
LOWER SAN ANDRES UNIT 4	742.2-	819.3
LOWER SAN ANDRES UNIT 3	819.3-	826.0

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log, field core log, photographs

CORE LOGS
YES, sample status log, storage log

MUD LOGS
YES, gas detector, pump stroke counter, gas chromatograph, H2S gas detector, depth meter

GEOPHYSICAL LOGS
YES, dip, dual induction, temperature, sonic, variable density, compensated neutron

-----LITHOLOGY-----

OGALLALA, light brown sandstone with caliche and gravel layers
DOCKUM, red-brown sandstone, siltstone, and shales
DEWEY LAKE, dark red-brown siltstone
ALIBATES, light gray anhydrite with thin red-brown siltstone
SALADO, red-brown siltstone with anhydrite interbeds at base
YATES, red-brown siltstone with occasional silty shale
UPPER SEVEN RIVERS, salt with interbeds of red-brown siltstone and anhydrite
LOWER SEVEN RIVERS, red-brown to brown siltstone with occasional anhydrite, thick basal anhydrite
QUEEN/GRAYBURG, red-brown siltstone
UPPER SAN ANDRES, salt with interbeds of red-brown shale, siltstone, and basal anhydrite
LOWER SAN ANDRES UNIT 5, salt with interbeds of red-brown shale and anhydrite. Massive dolomite and basal anhydrite
LOWER SAN ANDRES UNIT 4, salt with shale and anhydrite interbeds, olive dolomite, and limestone
LOWER SAN ANDRES UNIT 3, salt

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drill stem	1	792.5- 826.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: creep;, strength;, density;, porosity;, water content;, hardness;, indirect tensile;, direct shear;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: mineralogic analysis;, petrographic analysis;

HYDROCHEMICAL TESTS: NA;

-----REFERENCES-----

WELL NAME: Friemel G #1
REFERENCES:

(1) Stone & Webster Engineering Corporation, July 1982. Well Completion Report Friemel No. 1 Palo Duro Basin, Draft, Volume 1
(2) Martin, R.J., July 26, 1983. Laboratory Testing of Rock and Salt Samples For Static Moduli, Dynamic Moduli and Triaxial Compressive Strength, Applied Research Associates Inc, for Stone & Webster
(3) Fukui, L.M., May 2, 1983. Summary of Petrographic and Chemical Data for Palo Duro Basin Samples, Bendix Field Engineering Corporation, for ONWI
(4) Fukui, L.M., 1983. petrographic Report on Clay-Rich samples from Permian Unit 4 Salt, C. Friemel #1 Well, Palo Duro Basin, Deaf Smith County, Texas: Uranalyzed Data, September, Bendix Field Engineering Corp.

WELL NAME: Friemel J #1
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Deaf Smith
STATE: TX
LATITUDE: 35-NR deg-min
LONGITUDE: 102-NR deg-min
SECTION/BLOCK: Sec 3, K-7

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1226.8	(4024.9)
GROUND LEVEL ELEV.:	1223.8	(4015.9)
TOTAL DEPTH OF HOLE:	2524.6	(8283)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
76.2	(30)	0.0- 17.4	(0-57)
50.8	(20)	17.4- 368.8	(57-1210)
37.5	(14-3/4)	368.8- 1432.0	(1210-4698)
22.2	(8-3/4)	1432.0- 2524.6	(4698-8283)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
55.9	(22)	17.4	(57)
40.6	(16)	368.8	(1210)
27.3	(10-3/4)	1432.0	(4698)
14.0	(5-1/2)	2524.6	(8283)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
	107.3- 370.6	263.3
	377.7- 446.2	68.5
	562.7- 862.6	299.9
	1682.2- 1838.6	156.4
	1957.1- 1992.5	35.4
	2346.4- 2371.4	25.0
	2452.7- 2524.6	71.9

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: MARCH 18, 1983
STATUS OF WELL: open

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
OGALLALA	0.0-	120.1
DOCKUM	120.1-	335.3
DEWEY LAKE	335.3-	362.1
ALIBATES	362.1-	369.7
SALADO	369.7-	390.1
YATES	390.1-	410.9
UPPER SEVEN RIVERS	410.9-	455.4
LOWER SEVEN RIVERS	455.4-	513.9
QUEEN/GRAYBURG	513.9-	574.6
UPPER SAN ANDRES	574.6-	691.3
LOWER SAN ANDRES UNIT 5	691.3-	782.1
LOWER SAN ANDRES UNIT 4	782.1-	860.2
LOWER SAN ANDRES UNIT 3	860.2-	897.6
LOWER SAN ANDRES UNIT 2	897.6-	919.9
GLORIETA	919.9-	1110.4
UPPER CLEAR FORK	1110.4-	1264.3
TUBB	1264.3-	1335.6
LOWER CLEAR FORK	1335.6-	1433.2
RED CAVE	1433.2-	1601.1
WICHITA	1601.1-	1701.4
WOLFCAMP	1701.4-	2070.2
PENNSYLVANIAN UNDIFF	2070.2-	2524.6

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log, final core log, photographs

CORE LOGS
YES, storage log, sample status log

MUD LOGS
YES, gas detector, gas chromatograph, infrared analyzer, pump stroke counter, drilling rate, mud check twice daily

GEOPHYSICAL LOGS
YES, gamma, spontaneous potential, caliper, dual induction/dual laterolog, microresistivity, compensated sonic, long spared sonic, lithodensity, natural gamma ray spectrometry, compensated neutron, dipmeter, temperature, well seismic monitor log, fracture ID, Cyberlook, Coriband, cluster, geogram, computed directional, vertical seismic profile, cement bond/variable density

-----LITHOLOGY-----

OGALLALA, reddish-tan claystone and sandstone unconsolidated to soft, fine-subrounded to round grains (poor recovery)
DOCKUM, red-brown sandy siltstone with layers of claystone and sandstone
hick layer of tan sandstone, mostly fine-grained from 237.7-266.7m (780-875 ft), grading to conglomerate to 271.3m (890 ft)
DEWEY LAKE, red-brown siltstone and claystone
ALIBATES, light green to white dolomite with some siltstone
SALADO, red-brown siltstone with some gypsum and anhydrite
YATES, red-brown siltstone
UPPER SEVEN RIVERS, interbedded gray anhydrite and red-brown claystone/siltstone, salt with some siltstone/claystone and anhydrite from 416.4-445.0m (1366-1460 ft)
LOWER SEVEN RIVERS, red-brown siltstone with occasional anhydrite
QUEEN/GRAYBURG, red-brown siltstone with occasional sandstone zones
UPPER SAN ANDRES, salt with varying amounts of red-brown claystone impurities, occasional anhydrite and dolomite layers, mostly anhydrite with interbeds of dolomite and siltstone at the base
LOWER SAN ANDRES UNIT 5, upper portion- alternating beds of salt with some red-brown claystone inpurities and bluish gray anhydrite, lower portion- alternating beds of bluish gray anhydrite and grayish brown dolomite
LOWER SAN ANDRES UNIT 4, salt with varying amounts of red-brown claystone, mainly calcareous dolomite with anhydrite beds at the base
LOWER SAN ANDRES UNIT 3, clear to white salt with a 9.1m (30 feet) thick layer of gray-brown dolomite at the base
LOWER SAN ANDRES UNIT 2, upper portion- clear to white salt with red-brown siltstone impurities, lower portion- light to medium gray dolomite with occasional interbeds of salt
LOWER SAN ANDRES UNIT 1, absent
GLORIETA, thick salt sequence with varying quantities of red-brown siltstone impurities, occasional sandstone
UPPER CLEAR FORK, mainly salt with some beds of red-brown siltstone, light tan dolomite and white anhydrite, sequence of white anhydrite, red-brown siltstone and light tan dolomite at the base
TUBB, red-brown siltstone with some anhydrite and salt
LOWER CLEAR FORK, alternating beds of red-brown siltstone, clear to white salt and white anhydrite
RED CAVE, red shale with some siltstone and anhydrite
WICHITA, upper section-interbedded anhydrite, red shale with some medium olive-gray dolomite, lower section-olive-gray argillaceous dolomite with anhydrite
WOLFCAMP, top-thick sequence of olive-gray dolomite 61m (200 ft), middle-limestone varying in color from olive gray-tan to dark gray (300 ft), bottom-thick sequence of dark gray to black argillite 213.4m (700 ft)
PENNSYLVANIAN, thick medium gray shale sequence grading into a sequence of alternating shale and tan limestone and then into a mainly limestone zone, mainly black limestone shale and arkosic sandstone (granite wash) from 2347.0-2524.6m

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drill stem	2	389.8- 446.2
drill stem	1	725.4- 839.1
drill stem	1	1716.0- 1801.1
pump test		515.1- 2523.7

-----GEOMECHANICAL TESTS-----

FIELD TESTS: point load strength;

LAB TESTS: density;, porosity;, water content;, hardness;, indirect tensile;, direct shear;, strength;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: clay mineralogy;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;, isotopic analysis;, gas analysis;, age dating;

-----REFERENCES-----

WELL NAME: Friemel J #1
REFERENCES:
(1) Stone & Webster Engineering Corporation, October 1983. Well Completion Report J. Friemel No. 1 (PD-9) Palo Duro Basin, Draft, ONWI/SUB/83/E512-05000-T11
(2) Means, J.L. et al, September 1983. The Organic Geochemistry of Deep Ground Waters From the Palo Duro Basin, Texas, Battelle Columbus Laboratories

WELL NAME: Grabbe #1
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Swisher
STATE: TX
LATITUDE: NR deg-min
LONGITUDE: NR deg-min
SECTION/BLOCK: Sec 202, M-9

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	1047.0	(3435)
TOTAL DEPTH OF HOLE:	1283.8	(4212)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)	INTERVAL, m(ft)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
24.4	(9-5/8)	216.4	(710)
33.8	(13-3/8)	23.8	(78)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	770.1- 801.7	31.6

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: NOVEMBER 22, 1978
STATUS OF WELL: plugged

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
OGALLALA	0.0-	184.1
DOCKUM	184.1-	214.0
PERMIAN	214.0-	282.9
ALIBATES/YATES	282.9-	361.5
SALADO SALT	361.5-	509.6
UPPER SAN ANDRES	509.6-	722.4
LOWER SAN ANDRES	722.4-	893.1
GLORIETA	893.1-	908.3
SAN ANGELO	908.3-	993.7
CLEAR FORK	993.7-	1170.4
TUBB	1170.4-	1274.1
TUBB/LOWER CLEAR FORK	1274.1-	1283.2

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, photographs, continuous core

CORE LOGS
YES, storage log

MUD LOGS
YES, drilling rate, gas chromatograph

GEOPHYSICAL LOGS
YES, BHC sonic, fracture ID, compensated neutron, compensated sonic, dual induction, dual laterolog

-----LITHOLOGY-----

NR
NR
PERMIAN, siltstone
ALIBATES/YATES, 1st salt at 317m, (1040 feet) followed by siltstone
SALADO, 62.8m (206 feet) salt between 361.5-424.3m (1186-1392 feet)
UPPER SAN ANDRES, massive salt and anhydrite, some dolomite and claystone
LOWER SAN ANDRES, 46.6m (153 feet) salt interval between 722.4-765.1m (2370-2510 feet), dolomite and anhydrite
GLORIETA, massive salt, mudstone and claystone
SAN ANGELO, 30.5m (100 foot) salt interval between 908.3-938.8m (2980-3080 feet)
CLEAR FORK, 103.6m (340 foot salt) interval with minor 0.6-3.0m (2-10 foot) shale breaks, mudstone, anhydrite and some claystone
TUBB, massive salt, siltstone, mudstone, claystone
TUBB/LOWER CLEAR FORK, massive salt, mudstone, anhydrite and some claystone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
repeat formation	1	67.1- 204.2
repeat formation	1	838.2- 937.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA';

LAB TESTS: creep;, strength;, index;, density;, thermal;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: x-ray analysis;, petrographic analysis;

HYDROCHEMICAL TESTS: organo-geochem analyses;, normalized paraffin;

-----REFERENCES-----

WELL NAME: Grabbe #1
REFERENCES:

(1) Gruy Federal, Inc, 1979. Hole Completion Report DOE-Gruy Federal Inc. - D.M. Grabbe #1 Swisher County, Texas, LaVerne B. Cobb, ONWI/SUBE512-01700-4
(2) Texas Bureau of Economic Geology, 1982. Summary Well Report DOE-Gruy Federal #1 Grabbe Swisher County, Texas, University of Texas-Austin
(3) Pfeifle, T.W. et al, April 1983. Constitutive Properties of Salt from Four Sites, RE/SPEC Inc, ONWI-314
(4) Fukui, L.M., May 2, 1983. Summary of Petrographic and Chemical Data for Palo Duro Basin Samples, Bendix Field Engineering Corporation, for ONWI
(5) Lagedrost J.F. et al, 1983. Thermal Property and Density Measurements of Samples taken from Drilling Cores from Potential Geologic Media, December, Fiber Materials Inc, BMI/ONWI-522

WELL NAME: Harman #1
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Swisher
STATE: TX
LATITUDE: 34-42 deg-min
LONGITUDE: 101-47 deg-min
SECTION/BLOCK: Sec 16, M-9

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1079.0	(3540.3)
GROUND LEVEL ELEV.:	1076.6	(3532)
TOTAL DEPTH OF HOLE:	930.3	(3052)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
44.5	(17-1/2)	0.0-	14.6	(0-48
31.1	(12-1/4)	14.6-	324.3	(48-1064
21.6	(8-1/2)	324.3-	930.3	(1064-3052

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
34.0	(13-3/8)	14.6	(48)
24.4	(9-5/8)	324.3	(1064)
5.6	(2-1/5)	352.7	361.8

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m		LENGTH, m
10.2	326.1-	397.2	71.1
10.2	549.9-	930.3	380.4

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: SEPTEMBER 7, 1982
STATUS OF WELL: open

MONITORING:
planned

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
OGALLALA	0.0-	78.6
DOCKUM	78.6-	306.9
DEWEY LAKE	306.9-	323.7
ALIBATES	323.7-	335.9
SALADO	335.9-	360.6
YATES	360.6-	379.8
UPPER SEVEN RIVERS	379.8-	457.5
LOWER SEVEN RIVERS	457.5-	521.2
QUEEN/GRAYBURG	521.2-	594.1
UPPER SAN ANDRES	594.1-	751.6
LOWER SAN ANDRES UNIT 5	751.6-	808.0
LOWER SAN ANDRES UNIT 4	808.0-	893.4
LOWER SAN ANDRES UNIT 3	893.4-	918.1
LOWER SAN ANDRES UNIT 2	918.1-	930.3

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log, final core log, photographs

CORE LOGS
YES, sample status log, storage log

MUD LOGS
YES, gas detector, mud check twice daily

GEOPHYSICAL LOGS
YES, dual induction, microresistivity, sonic, temperature, compensated neutron, lithology density, continuous dipmeter, fraction identification, continuous directional, natural gamma ray spectrometer, caliper, gamma ray, spontaneous potential, well seismic velocity, cyberlook, coriband, cluster, program, well seismic report, computed directional

-----LITHOLOGY-----

OGALLALA, brown sandstone and reddish-brown siltstone
DOCKUM, brown siltstone with brown sandstone and minor gray limestone
DEWEY LAKE, reddish-brown siltstone
ALIBATES, light gray anhydrite and minor reddish-brown siltstone
SALADO, light gray-purple anhydrite with basal brick red siltstone
YATES, brick red sandy siltstone with minor anhydrite inclusions
UPPER SEVEN RIVERS, light to medium gray salt with thin beds of reddish-brown siltstone and sandstone and gray anhydrite
LOWER SEVEN RIVERS, reddish-brown siltstone with brown sandstone and minor gray salt and gray anhydrite
QUEEN/GRAYBURG, reddish-brown siltstone with minor light gray anhydrite
UPPER SAN ANDRES, pale brown salt with light gray anhydrite and basal minor brown siltstone, gray shale, and gray dolomite
LOWER SAN ANDRES #5, light gray and brown salt with light gray anhydrite and some grayish-green dolomitic limestone
LOWER SAN ANDRES #4, light brownish-gray salt with minor light gray anhydrite and massive basal light greenish-tan limestone
LOWER SAN ANDRES #3, light brown salt, beige dolomite, and light gray anhydrite
LOWER SAN ANDRES #2, light gray and brown salt and light brown dolomite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
repeat formation	7	356.0- 904.4
drill stem	1	865.6- 885.8
drill stem	1	862.6- 929.7
pump		342.6- 370.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA:

LAB TESTS: NA

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA

HYDROCHEMICAL TESTS: NA

-----REFERENCES-----

WELL NAME: Harman #1
REFERENCES:
(1) Stone & Webster Engineering Corporation, 1983. Well Completion Report Harman No. 1 Palo Duro Basin, ONWI-510
(2) Stone & Webster Engineering Corporation, June 1983. Well Completion Report Dissolution Zone Water Wells Palo Duro Basin, ONWI/SUB/83/E512-05000-T10

WELL NAME: Holtzclaw #1
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Randall
STATE: TX
LATITUDE: NR deg-min
LONGITUDE: NR deg-min
SECTION/BLOCK: Sec 57, M8

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1109.0	(3638.5)
GROUND LEVEL ELEV.:	1104.1	(3622.4)
TOTAL DEPTH OF HOLE:	879.2	(2884.4)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)	INTERVAL, m(ft)	
(26)	0.0- 17.5	(0-57.5)
(8-3/4)	17.5- 329.1	(57.5-1079.7)
(8-3/4)	329.1- 427.0	(1079.7-1401)
(8-3/4)	427.0- 702.3	(1401-2304)
(8-3/4)	702.3- 879.2	(2304-2884.4)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
27.3	(10-3/4)	342.9	(1125)
40.6	(16)	12.6	(41.4)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	334.4- 427.0	92.6
10.2	427.0- 702.3	275.3
10.2	702.3- 879.2	176.9

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
tracer analysis	2920.0- 878.4

-----WELL HISTORY-----

DRILL COMPLETION DATE: APRIL 1, 1983
STATUS OF WELL: capped

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m
OGALLALA	0.0- 70.1
DOCKUM	70.1- 317.3
DEWEY LAKE	317.3- 335.3
ALIBATES	335.3- 348.4
SALADO	348.4- 371.3
YATES	371.3- 392.6
UPPER SEVEN RIVERS	392.6- 394.1
SALT	394.1- 441.4
LOWER SEVEN RIVERS	441.4- 499.0
QUEEN/GRAYBURG	499.0- 572.4
UPPER SAN ANDRES	572.4- 722.1
LOWER SAN ANDRES UNIT 5	722.1- 780.9
LOWER SAN ANDRES UNIT 4	780.9- 860.2
LOWER SAN ANDRES UNIT 3	860.2- 877.2

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log, well cuttings

CORE LOGS
YES, sample status log

MUD LOGS
YES, gas detector, gas chromatograph, H2S detector, CO2 record, pump stroke counter, depth meter

GEOPHYSICAL LOGS
YES, compensated sonic, resistivity, microresistivity, sonic, temperature, compensated neutron, photoelectric density, continuous dipmeter, fracture ID, continuous, directional, natural gamma spectrometry, gamma ray, spontaneous potential logs, cyberlook, coriband, cluster, geogram, continuous directional

-----LITHOLOGY-----

OGALLALA, off-white and light brown
poorly-consolidated silty sandstone
ine to medium grained
ubrounded occasional indurated layers
DOCKUM, light gray and red-brown sandy siltstone
with thick interbeds of claystone and anhydrite
with occasional anhydrite nodules
YATES, of fine-grained sandstone and occasional
interbeds of red-brown claystone and mudstone
DEWEY LAKE, brick red siltstone with interbeds of
very fine-grained sandstone and gypsum
ALIBATES, light pink-gray massive anhydrite
SALADO, brick red siltstone with thin to thick
interbeds of claystone and anhydrite with
occasional anhydrite nodules
YATES, red-brown silstone, massive, occasional
claystone interbeds, with scattered anhydrite
UPPER SEVEN RIVERS, clear salt containing pockets
of red-brown claystone and interbeds of claystone
and anhydrite
LOWER SEVEN RIVERS, red-brown siltstone with
interbeds of salt in upper portion of formation
QUEEN/GRAYBURG, red-brown siltstone with
anhydrite interbeds and fine sandstone bottom
UPPER SAN ANDRES, clear to dark salt top and
light gray anhydrite bottom
LOWER SAN ANDRES UNIT 5, white, reddish-brown,
and gray salt with thick interbeds of anhydrite
and dolomite and thin interbeds of shale
LOWER SAN ANDRES UNIT 4, gray-brown and white
salt with thin interbeds of red-brown shale
hick light greenish-gray dolomite at bottom
LOWER SAN ANDRES UNIT 3, thick beds of gray-white
and brown salt, light greenish-gray dolomite, and
light medium gray anhydrite,

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drill stem	1	214.0- 228.0
drill stem	1	347.5- 361.5
drill stem	1	388.9- 403.0
drill stem	1	523.7- 537.7
drill stem	1	836.7- 851.0
repeat formation	11	189.6- 371.6

-----GEOMECHANICAL TESTS-----

FIELD TESTS: point load strength;, hydro fracturing;, borehole televiewer;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: NA;

-----REFERENCES-----

WELL NAME: Holtzclaw #1
REFERENCES:
(1) Stone & Webster Engineering Corporation, 1983. Well Completion Report Holtzclaw No. 1 (PD-8)Palo Duro Basin, ONWI/SUB/83/E512-05000-T12, December

WELL NAME: Mansfield #1
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Oldham
STATE: TX
LATITUDE: 35-23 deg-min
LONGITUDE: 102-24 deg-min
SECTION/BLOCK: Sec 6, H-3

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1128.1	(3701)
GROUND LEVEL ELEV.:	1125.5	(3692.6)
TOTAL DEPTH OF HOLE:	2258.3	(7409)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
44.4	(17-1/2)	0.0- 12.5	(0-41)
31.1	(12-1/4)	12.5- 369.4	(41-1212)
21.6	(8-1/2)	369.4- 1522.8	(1212-4996)
20.0	(7-7/8)	1522.8- 2258.3	(4996-7409)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
33.9	(13-3/8)	9.8	(32)
24.5	(9-5/8)	366.7	(1203)
13.9	(5-1/2)	1576.1	(5171)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	14.0- 1079.0	1065.0
10.2	1225.9- 1256.7	30.8
10.2	1339.0- 1522.5	183.5

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
tracer analysis	1375.9- 1413.7
tracer analysis	1468.5- 1490.5

-----WELL HISTORY-----

DRILL COMPLETION DATE: FEBRUARY 19, 1982
STATUS OF WELL: plugged

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
DOCKUM	0.0-	151.2
DEWEY LAKE	151.2-	160.9
ALIBATES	160.9-	169.5
SALADO	169.5-	186.5
YATES	186.5-	199.6
UPPER SEVEN RIVERS	199.6-	209.4
LOWER SEVEN RIVERS	209.4-	234.7
QUEEN/GRAYBURG	234.7-	300.2
UPPER SAN ANDRES	300.2-	418.5
LOWER SAN ANDRES UNIT 5	418.5-	471.2
LOWER SAN ANDRES UNIT 4	471.2-	553.2
LOWER SAN ANDRES UNIT 3	553.2-	591.3
LOWER SAN ANDRES UNIT 2	591.3-	602.9
LOWER SAN ANDRES UNIT 1	602.9-	609.9
GLORIETA	609.9-	777.2
UPPER CLEAR FORK	777.2-	934.2
TUBB	934.2-	971.4
LOWER CLEAR FORK	976.4-	1030.5
RED CAVE	1030.5-	1243.9
WICHITA	1243.9-	1376.2
WOLFCAMP	1376.2-	1996.5
PENNSYLVANIAN UNDIFF	1996.5-	2249.1
PRECAMBRIAN UNDIFF	2249.1-	2258.3

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log, final core log, photographs

CORE LOGS
YES, sample status log, storage log

MUD LOGS
YES, gas detector, gas chromatograph, H2S detector, pump stroke counter, depth meter, mud check twice daily

GEOPHYSICAL LOGS
YES, density, temperature, dip, gamma, neutron porosity, sonic, laterolog, microlaterolog, caliper, fracture ID, continuous directional, resistivity, cement bond, dual induction

-----LITHOLOGY-----

DOCKUM, interbedded reddish brown siltstone, sandstone and shale
DEWEY LAKE, reddish brown silty shale
ALIBATES, whitish arenaceous dolomite
SALADO, reddish brown siltstone and shale: base is anhydrite
YATES, reddish brown siltstone and shale
UPPER SEVEN RIVERS, reddish brown siltstone and shale with some thin beds of salt
LOWER SEVEN RIVERS, reddish brown siltstone
QUEEN/GRAYBURG, reddish brown sandstone, siltstone and shale with thin beds of salt and anhydrite
UPPER SAN ANDRES, brown and gray salt with thin interbeds of shale, siltstone and anhydrite: basal thick beds of anhydrite
LOWER SAN ANDRES #5, brown and gray salt with thin interbeds of shale, siltstone and anhydrite: basal thick beds of anhydrite
LOWER SAN ANDRES #4, brown and gray salt with thin interbeds of shale: base is thick beds of dolomite and anhydrite with basal black shale
LOWER SAN ANDRES #3, brown and gray salt with thin interbeds of shale and sandstone with basal anhydrite and dolomitic shale
LOWER SAN ANDRES #2, brown and gray salt with thin interbeds of shale with basal anhydrite and shale
LOWER SAN ANDRES #1, gray dolomite and anhydrite with a basal shale
GLORIETA, interbedded red brown salt, sandstone, siltstone and shale
UPPER CLEAR FORK, interbedded brown salt, siltstone, and shale with basal dolomite
TUBB, red brown and gray siltstone
LOWER CLEAR FORK, interbedded gray brown salt, siltstone, shale and gray anhydrite
RED CAVE, reddish brown, brown and gray siltstone and shale with some sandstone: basal portion also has thin beds of anhydrite
WICHITA, interbedded gray anhydrite, shale and limestone
WOLFCAMP, upper dolomite capping thick sequence of limestone with shale at base
PENNSYLVANIAN, interbedded arkosic sandstone, limestone and shale
PRECAMBRIAN, rhyolite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
recovery	1	3575.9- 1413.7
recovery	1	1468.5- 1490.5
drawdown	1	1468.5- 1490.5
drawdown	1	3575.9- 1413.7
drill stem	1	1463.1- 1522.8
drill stem	1	2133.6- 2258.3
drill stem	1	2015.2- 2023.9
drill stem	1	1466.7- 1475.2

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: creep;, strength;, density;, porosity;, water content;, hardness;, shake durability;, indirect tensile;, direct shear;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: permeability;, clay mineralogy;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;, isotopic analysis;, gas analysis;, age dating;

-----REFERENCES-----

WELL NAME: Mansfield #1
REFERENCES:

(1) Stone and Webster Engineering Corporation, 1982. Well Completion Report Mansfield No. 1 Palo Duro Basin, Draft, for ONWI, Vol. 1
(2) Stone and Webster Engineering Corporation, 1983. Pumping Test and Fluid Sampling Report Mansfield No. 1 Well Palo Duro Basin, ONWI/SUB/83/E512-05000-T9
(3) Martin, R. J., 1983. Laboratory Testing of Rock and Salt Samples For Static Moduli, Pynamic Moduli and Triaxial Compressive Strength, July 26, Applied Research Associates Inc, to Stone & Webster
(4) Means, J. L. et al, July 1983. The Organic Geochemistry of Deep Ground Waters and Radionuclide Partitioning Experiments Under Hydrothermal Conditions, Battelle Columbus Laboratories, ONWI-448
(5) Laul, J. C., et al, 1983. An Aspect of Th and Ra Chemistry in the Wolfcamp and Granite Wash Aquifers, Palo Duro Basin, Texas, Abstract 1983, American Geophysical Union Spring Meeting

WELL NAME: Mansfield #2
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Oldham
STATE: TX
LATITUDE: NR deg-min
LONGITUDE: NR deg-min
SECTION/BLOCK: Sec 6, Block H-3, A-

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	1125.3	(3692)
TOTAL DEPTH OF HOLE:	237.1	(778)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)	INTERVAL, m(ft)	
31.1 (12-1/4)	0.0- 220.4	(0-723)
17.2 (6-3/4)	220.4- 237.1	(723-778)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)	TOTAL DEPTH, m(ft)	
24.5 (9-5/8)	221.6	(722)
34.7 (13-5/8)	5.5	(18)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
	220.4- 237.7	17.3

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: DECEMBER 11, 1982
STATUS OF WELL: open

MONITORING:
water level monitoring - preliminary indications show water level about 141.7m (465 feet) (12/10/82)

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m
LOWER SEVEN RIVERS	209.4- 237.1

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, open hole logs

CORE LOGS
YES, storage log

MUD LOGS
NA

GEOPHYSICAL LOGS
YES, density, neutron, dual induction

-----LITHOLOGY-----

-----FORMATION TESTS-----

NR	NAME	NUMBER	INTERVAL, m
	pump		221.9- 231.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: isotopic analysis;, dissolved organic and inorganic materials;, gas analysis;, age dating;

-----REFERENCES-----

WELL NAME: Mansfield #2

REFERENCES:

(1) Stone & Webster Engineering Corporation, June 1983. Well Completion Report Dissolution Zone Water Wells Palo Duro Basin, ONWI/SUB/83/E512-05000-T10

WELL NAME: Rex White #1
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Randall
STATE: TX
LATITUDE: NR deg-min
LONGITUDE: NR deg-min
SECTION/BLOCK: Sec 17, Block 8

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1089.1	(3573)
GROUND LEVEL ELEV.:	1085.4	(3561)
TOTAL DEPTH OF HOLE:	1220.0	(4001.5)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
21.6	(8-1/2)	0.0- 1219.2	(0-4000)
44.4	(17-1/2)	0.0- 28.0	(0-92)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
34.0	(13-3/8)	28.0	(92)
24.4	(9-5/8)	167.6	(550)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	3.7- 309.1	305.4
10.2	572.0- 572.8	0.8

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: SEPTEMBER 28, 1978
STATUS OF WELL: plugged

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
DOCKUM	81.7-	121.9
PERMIAN	121.9-	144.5
ALIBATES	144.5-	205.1
SALADO SALT	205.1-	350.5
UPPER SAN ANDRES	350.5-	532.5
LOWER SAN ANDRES	532.5-	619.4
BASAL SAN ANDRES	619.4-	675.1
GLORIETA	675.1-	748.0
CLEAR FORK	748.0-	921.1
TUBB	921.1-	984.5
LOWER CLEAR FORK	984.5-	1114.1
RED CAVE	1114.1-	1200.9
WICHITA	1200.9-	1219.5

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions, photographs

CORE LOGS
YES, storage log

MUD LOGS
YES, gas chromatograph, drilling rate, gas detector

GEOPHYSICAL LOGS
YES, dual laterolog, dual induction, variable density, compensated sonic, fracture ID, density

-----LITHOLOGY-----

NR
NR
NR
SALADO SALT, firmsalt with considerable anhydrite and somewhat shaley
UPPER SAN ANDRES, massive, clean, hard salt zone with minor anhydrite and shale breaks
LOWER SAN ANDRES, massive, clean, firm crystalline salt, dolomite
BASAL SAN ANDRES, clean, hard crystalline salt
SAN ANDRES/TOP GLORIETA
UPPER CLEAR FORK, clean, hard salt with some shale zones and anhydrite beds
hree significant shale breaks with thickest being 2.4m (8 feet)
NR
LOWER CLEAR FORK, clean, hard crystalline salt, anhydrite and dolomite
RED CAVE, dark anhydrite and red shale
PANHANDLE (PANHANDLE LIME), dolomite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
repeat formation	1	112.8- 121.9
repeat formation	1	171.9- 1109.8

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: creep;, strength;, density;, thermal properties;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: petrographic analysis;, x-ray analysis;

HYDROCHEMICAL TESTS: organo-geochem tests;, normalized paraffin;

-----REFERENCES-----

WELL NAME: Rex White #1
REFERENCES:

(1) Gruy Federal, Inc, December 22 1978. Hole Completion Report DOE-Gruy Federal, Inc-Rex H. White #1 Randall County, Texas. ONWI/SubE512-01700-2, LaVerne Cobb (mgr)
(2) Texas Bureau of Economic Geology, 1982. Summary Well Report DOE-Gruy Federal #1 Rex White Randall County, Texas, University of Texas-Austin
(3) Pfeifle, T.W. et al, April 1983. Constitutive Properties of Salt from Four Sites, RE/SPEC Inc, ONWI-314
(4) Fukui, L.M., May 2, 1983. Summary of Petrographic and Chemical Data for Palo Duro Basin Samples, Bendix Field Engineering Corporation, for ONWI
(5) Lagedrost U.F. et al, 1983. Thermal Property and Density Measurements of Samples taken from Drilling Cores from Potential Geologic Media, December, Fiber Materials Inc, BMI/ONWI-522

WELL NAME: Sawyer #1
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Donley
STATE: TX
LATITUDE: 35-00 deg-min
LONGITUDE: 100-52 deg-min
SECTION/BLOCK: Sec 5, Block G

-----WELL HISTORY-----

DRILL COMPLETION DATE: OCTOBER 14, 1981
STATUS OF WELL: plugged

MONITORING:

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	789.3	(2589.6)
GROUND LEVEL ELEV.:	786.7	(2580.1)
TOTAL DEPTH OF HOLE:	1464.9	(4806)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
44.4	(17-1/2)	0.0- 20.1	(0-66)
31.1	(12-1/4)	20.1- 102.7	(66-337)
21.6	(8-1/2)	102.7- 1200.3	(337-3938)
12.1	(4-3/4)	1200.3- 1464.9	(3938-4806)

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
OVERBURDEN	0.0-	21.9
YATES	21.9-	32.6
UPPER SEVEN RIVERS	32.6-	42.1
LOWER SEVEN RIVERS	42.1-	104.5
QUEEN/GRAYBURG	104.5-	133.5
UPPER SAN ANDRES	133.5-	190.8
LOWER SAN ANDRES UNIT 5	190.8-	230.4
LOWER SAN ANDRES UNIT 4	230.4-	256.0
LOWER SAN ANDRES UNIT 3	256.0-	267.0
LOWER SAN ANDRES UNIT 2	267.0-	284.4
GLORIETA	284.4-	341.4
UPPER CLEAR FORK	341.4-	471.5
TUBB	471.5-	527.0
LOWER CLEAR FORK	527.0-	643.4
RED CAVE	643.4-	718.1
WICHITA	718.1-	894.3
WOLFCAMP	894.3-	1086.0
PENNSYLVANIAN UNDIFF	1086.0-	1362.5
ELLENBURGER	1362.5-	1453.3
PRECAMBRIAN UNDIFF	1453.3-	1464.9

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
33.9	(13-3/8)	20.1	(66)
24.5	(9-5/8)	102.7	(337)
13.9	(5-1/2)	1200.3	(3938)
10.2	(4)	1453.3	(4768)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	20.1- 1200.3	1180.2

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log, final core log

CORE LOGS
YES, continuous core, sample status log, storage log

MUD LOGS
YES, gas detector, gas chromatograph, H2S detector, pump stroke counter, depth meter, mud check twice daily

GEOPHYSICAL LOGS
YES, dual laterolog, compensated neutron, formation density, gamma, dual induction, dipmeter log, compensated sonic, cement bond log, temperature, fracture ID, microlog, sonic waveform, variable density, caliper, spontaneous potential, Cyberlook, Coriband, directional

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	966.8- 972.0
fluid samples	1297.9- 1323.5
fluid samples	1371.6- 1374.7
fluid samples	1437.5- 1446.6
fluid samples	1403.3- 1414.3

-----LITHOLOGY-----

OVERBURDEN, NR
YATES, reddish brown siltstone
UPPER SEVEN RIVERS, broken shale and anhydrite
LOWER SEVEN RIVERS, broken interbedded reddish-brown siltstone and light gray anhydrite
QUEEN/GRAYBURG, interbedded gray, red brown siltstone with occasional anhydrite and shale
UPPER SAN ANDRES, interbedded brown siltstone, shale and gray anhydrite
LOWER SAN ANDRES #5, interbedded gray anhydrite and shales of various colors
LOWER SAN ANDRES #4, interbedded sandy siltstone, limestone and shale
LOWER SAN ANDRES #3, salt and brown shale
LOWER SAN ANDRES #2, salt and brown shale
GLORIETA, salt/mudstone with red brown shale and siltstone
UPPER CLEAR FORK, salt/mudstone, salt, brown shale with occasional anhydrite
TUBB, gray anhydrite, gray and brown siltstone interbedded with greenish-gray shale
LOWER CLEAR FORK, gray and brown shale, salt and brown siltstone with occasional anhydrite and limestone
RED CAVE, gray anhydrite interbedded with greenish gray and red brown shale and dolomite
WICHITA, dolomite interbedded with shale and anhydrite
WOLFCAMP, dolomite and limestone with occasional shale and anhydrite
PENNSYLVANIAN, light gray limestone, white to orange arkosic sandstone interbedded with gray shale
ELLENBURGER, white limestone and dolomite, occasional cherty with basal sand
PRECAMBRIAN, red rhyolite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drill stem	1	899.2- 951.9
pump	1	966.8- 972.0
pump	1	1297.9- 1323.5
pump	1	1371.6- 1374.7
pump		1403.3- 1414.3

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;, isotopic analysis;, gas analysis;, age dating;

-----REFERENCES-----

WELL NAME: Sawyer #1
REFERENCES:

(1) Stone & Webster Engineering Corporation, 1982. Well Completion Report Sawyer No. 1 Palo Duro Basin, Volume 1, Draft
(2) Stone & Webster Engineering Corporation, 1983. Pumping Test and Fluid Sampling Report Sawyer No. 1 Well Palo Duro Basin, ONWI/SUB/83/E512-05000-T5
(3) Means, J. L. et al, July 1983. The Organic Geochemistry of Deep Ground Waters and Radionuclide Partitioning Experiments Under Hydrothermal Conditions, Battelle Columbus Laboratories, ONWI-448
(4) Laul, J. C. et al, 1983. An Aspect of Th and Ra Chemistry in the Wolfcamp and Granite Wash Aquifers, Palo Duro Basin, Texas, Abstract 1983, American Geophysical Union Spring Meeting

WELL NAME: Sawyer #2
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Donley
STATE: TX
LATITUDE: NR deg-min
LONGITUDE: NR deg-min
SECTION/BLOCK: Sec 5, Block G

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	786.4	(2580)
TOTAL DEPTH OF HOLE:	239.0	(784)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
31.1	(12-1/4)	0.0- 232.3	(0-762)
17.2	(6-3/4)	232.3- 239.0	(762-784)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
22.0	(8-5/8)	232.6	(763)
33.9	(13-3/8)	9.1	(30)

-----CORES TAKEN-----

CORES SIZE, cm INTERVAL, m LENGTH, m

-----SAMPLES TAKEN-----

TEST INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: OCTOBER 13, 1982
STATUS OF WELL: open

MONITORING:
water level monitoring

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
LOWER SAN ANDRES UNIT 4	230.4-	239.0

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, open hole logs

CORE LOGS
YES, storage log

MUD LOGS
NA

GEOPHYSICAL LOGS
YES, cement bond, gamma

-----LITHOLOGY-----

-----FORMATION TESTS-----

NR	NAME	NUMBER	INTERVAL, m

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: isotopic analysis;, dissolved organic and inorganic materials;, age dating;

-----REFERENCES-----

WELL NAME: Sawyer #2

REFERENCES:

(1) Stone & Webster Engineering Corporation, June 1983. Well Completion Report Dissolution Zone Water Wells Palo Duro Basin, ONWI/SUB/83/E512-05000-T10

WELL NAME: TOG-1
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Freestone
STATE: TX
LATITUDE: 31-32 deg-min
LONGITUDE: 95-58 deg-min
SECTION/BLOCK: NR

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	113.0	(370.86)
GROUND LEVEL ELEV.:	109.6	(359.78)
TOTAL DEPTH OF HOLE:	413.1	(1355.7)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
40.6	(16)	0.0-	17.4	(0-57)
38.1	(15)	17.4-	108.2	(57-355)
29.2	(11-1/2)	108.2-	219.8	(355-721)
22.2	(8-3/4)	219.8-	413.1	(721-1355.7)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
40.6	(16)	17.4	(57)
32.4	(12-3/4)	106.7	(350)
24.5	(9-5/8)	219.8	(721)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m		LENGTH, m
10.2	198.4-	219.8	21.4
10.2	221.9-	411.8	189.9

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
sidewall	137.2- 204.2

-----WELL HISTORY-----

DRILL COMPLETION DATE: NOVEMBER 7, 1979
STATUS OF WELL: plugged

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
REKLAW	0.0-	15.2
CARRIZO	15.2-	51.8
WILCOX	51.8-	217.3
UPPER CAPROCK	217.3-	276.2
LOWER CAPROCK	276.2-	354.5
SALT	354.5-	413.1

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions

CORE LOGS
YES, conventional core

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, microlog, micro laterolog, SP, BHC, gamma, neutron porosity, fracture ID, compensated density, variable density, differential temperature, temperature

-----LITHOLOGY-----

REKLAW, fine grained white to yellow-brown sand, trace of ironstone and lignite
CARRIZO, medium gray fine grained silty sand
WILCOX, interbedded light to medium aray fine grained sand, gray siltstone and gray silty claystone
UPPER CAPROCK, gray limestone
LOWER CAPROCK, dark gray anhydrite
SALT, almost pure halite, clear to white to light gray

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drill stem		121.9- 209.1

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: NR;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NR;

HYDROCHEMICAL TESTS: NR;

-----REFERENCES-----

WELL NAME: TOG-1
REFERENCES:
(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Reports Site TOG-1, ONWI-186

WELL NAME: TOH-2A
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Leon
STATE: TX
LATITUDE: 31-31 deg-min
LONGITUDE: 95-57 deg-min
SECTION/BLOCK: NR

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	114.2	(374.8)
TOTAL DEPTH OF HOLE:	1036.3	(3400)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
66.0	(26)	0.0-	17.1	(0-56)
38.1	(15)	17.1-	107.3	(56-352)
25.1	(9-7/8)	107.3-	577.6	(352-1895)
25.1	(9-7/8)	588.3-	1036.3	(1930-3400)
30.5	(12)	577.6-	588.3	(1895-1930)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
40.6	(16)	17.1	(56)
27.3	(10-3/4)	106.7	(350)
16.8	(6-5/8)	577.6	(1895)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	580.3- 586.1

-----WELL HISTORY-----

DRILL COMPLETION DATE: SEPTEMBER 27, 1979
STATUS OF WELL: plugged

MONITORING:
water level monitoring. Water levels between (305.4 feet and 299.6 feet) 93.1-91.3m from 10/2/79 to 3/4/80

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
QUEEN CITY	0.0-	95.1
MARQUEZ SHALE	95.1-	125.0
NEWBY SAND	125.0-	140.8
CARRIZO	140.8-	176.8
WILCOX	176.8-	740.7
MIDWAY	740.7-	939.4
NAVARRO-UPPER	939.4-	1017.4
NACATOCH	1017.4-	1026.6
NAVARRO-LOWER	1026.6-	1036.3

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions

CORE LOGS
YES, conventional core

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, electric, induction electric, micro laterolog, SP, cement bond, sonic, gamma, gamma-gamma, fracture ID, dual caliper, caliper, dip, temperature

-----LITHOLOGY-----

QUEEN CITY, orange to clear fine to medium grained sand interbedded light gray to brown gray silty clay and light to medium gray silty sand
MARQUEZ SHALE, medium-dark gray siltstone, traces of glauconite, pyrite, lignite
NEWBY SAND, medium gray to clear very fine to medium grained sand
CARRIZO, predominantly light gray fine grained sand
WILCOX, interbedded sequence of sands to shales
MIDWAY, medium gray siltstone and claystone
NAVARRO-UPPER, limestone with medium gray silty marlstone
NACATOCH, interbedded marlstone and sandstone, some interbedded limestone
NAVARRO-LOWER, marlstone and white limestone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		580.3- 586.1
repeat formation		106.7- 1036.3

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: NR;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: permeability;, grain size analysis;, field content;

HYDROCHEMICAL TESTS: water quality;, water chemistry;

-----REFERENCES-----

WELL NAME: TOH-2A
REFERENCES:

(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Reports Site TOH-2, ONWI-187
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Area Characterization Report East Texas Study Area, Volume VIII Appendix, ONWI-118
(3) Slaughter, George M. et al, February 1982. Permeability of Selected Sediments in the Vicinity of Five Salt Domes in the Gulf Interior Region, Law Engineering Testing Company, ONWI-356

WELL NAME: TOH-5D
SRP CONTACT: CS Kuntz

-----LOCATION-----

SUBBASIN/DOME: Gulf Interior
COUNTY/PARISH: Freestone
STATE: TX
LATITUDE: 31-33 deg-min
LONGITUDE: 95-56 deg-min
SECTION/BLOCK: NR

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	129.0	(423.7)
TOTAL DEPTH OF HOLE:	205.1	(673)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
66.0	(26)	0.0-	15.3	(0-50.7)
20.0	(7.87)	15.3-	204.9	(50.7-672.6)
29.2	(11.5)	15.3-	182.9	(50.7-600)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
35.5	(14)	15.3	(50.7)
16.8	(6-5/8)	144.2	(473)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	144.2- 150.3

-----WELL HISTORY-----

DRILL COMPLETION DATE: OCTOBER 18, 1979
STATUS OF WELL: plugged

MONITORING:
Water levels between 86.1-85.4m (282.4 feet and 280.4 feet) from 10/17/79 to 3/4/80

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
QUEEN CITY	0.0-	100.0
REKLAW	100.0-	139.6
CARRIZO	139.6-	184.1
WILCOX	184.1-	205.1

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, lithologic descriptions

CORE LOGS
NA

MUD LOGS
YES, gas monitoring

GEOPHYSICAL LOGS
YES, induction electric, lateral log, SP, cement bond, sonic, gamma, caliper

-----LITHOLOGY-----

QUEEN CITY, orange to clear fine to medium grained sand, medium-dark gray silty sand fine grained, interbedded siltstones and sands with some dark gray clays
REKLAW-MARQUEZ SHALE, medium to dark gray locally sandy siltstone interbedded with brown-greenish gray clay
REKLAW-NEWBY SAND, medium gray to clear sand locally silty fine to medium grained
CARRIZO, clear to light gray fine silty sand followed by sandy silt and clear to white clay
WILCOX, fine to medium grained sand interbedded with siltstone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drawdown and recovery		144.2- 150.3

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NR;

LAB TESTS: NR;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: grain size analysis;

HYDROCHEMICAL TESTS: water quality;

-----REFERENCES-----

WELL NAME: TOH-5D
REFERENCES:
(1) Law Engineering Testing Company, 1982. Gulf Coast Salt Domes Well Completion Report: Site TOH-5, ONWI-188
(2) Law Engineering Testing Company, July 1982. Gulf Coast Salt Domes Geologic Area Characterization Report East Texas Study Area, Volume VIII Appendix, ONWI-118

WELL NAME: Zeeck #1
SRP CONTACT: PL Archer

-----LOCATION-----

SUBBASIN/DOME: Permian
COUNTY/PARISH: Swisher
STATE: TX
LATITUDE: 34-38 deg-min
LONGITUDE: 101-41 deg-min
SECTION/BLOCK: Sec 28, M-15

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1039.4	(3420)
GROUND LEVEL ELEV.:	1039.4	(3410)
TOTAL DEPTH OF HOLE:	2328.7	(7640)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
44.4	(17-1/2)	0.0- 7.9	(0-26)
31.1	(12-1/4)	7.9- 312.1	(26-1024)
21.6	(8-1/2)	312.1- 2328.7	(1024-7640)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
34.0	(13-3/8)	7.9	(26)
24.4	(9-5/8)	312.1	(1024)
14.4	(5-1/2)	2261.9	(7421)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	315.5- 348.7	33.2
10.2	574.6- 945.5	370.9
10.2	1618.2- 1761.8	143.6
10.2	1798.3- 1846.5	48.2
10.2	2225.1- 2252.9	27.8

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	925.1- 2202.2

-----WELL HISTORY-----

DRILL COMPLETION DATE: AUGUST 1, 1982
STATUS OF WELL: open

MONITORING:
LOWER SAN ANDRES UNIT 4 is being monitored biweekly for pressure buildup.

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
OGALLALA	0.0-	43.6
DOCKUM	43.6-	288.6
DEWEY LAKE	288.6-	304.2
ALIBATES	304.2-	316.4
SALADO	316.4-	362.1
YATES	362.1-	394.1
UPPER SEVEN RIVERS	394.1-	467.9
LOWER SEVEN RIVERS	467.9-	527.9
QUEEN/GRAYBURG	527.8-	613.9
UPPER SAN ANDRES	613.9-	784.6
LOWER SAN ANDRES UNIT 5	784.6-	832.7
LOWER SAN ANDRES UNIT 4	832.7-	918.7
LOWER SAN ANDRES UNIT 3	918.7-	943.1
LOWER SAN ANDRES UNIT 2	943.1-	963.2
LOWER SAN ANDRES UNIT 1	963.2-	971.7
GLORIETA	971.7-	1096.7
UPPER CLEAR FORK	1096.7-	1250.0
TUBB	1250.0-	1337.2
LOWER CLEAR FORK	1337.2-	1478.3
RED CAVE	1478.3-	1494.8
WICHITA	1494.8-	1638.6
WOLFCAMP	1638.6-	2176.3
PENNSYLVANIAN UNDIFF	2176.3-	2328.7

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log, final core log, photographs

CORE LOGS
YES, sample status log, storage log

MUD LOGS
YES, gas detector, gas chromatograph, infrared analyzer, pump stroke counter, drilling rate

GEOPHYSICAL LOGS
YES, resistivity, microresistivity, sonic, temperature compensated neutron, photoelectric density, continuous dipmeter, fracture ID, continuous directional, natural gamma ray spectrometer, caliper, dual laterolog, gamma ray, SP, digital sonic, well seismic logs, Cyberlook Coriband, Cluster, Geogram, Well Seismic report, computed directional

-----LITHOLOGY-----

OGALLALA, Mostly fluvial coarse to finesands weakly cemented with thin localized beds of gravel. Also local zones of caliche from zero to 10 feet in thickness
DOCKUM, series of dark brown to brownish red fluvial sandstone
DEWEY LAKE, dark brownish red shale
ALIBATES, two beds of white anhydrite separated by a shale bed
SALADO, dark brownish red shale and siltstone base is marked by a thin anhydrite
YATES, dark brownish red shale with occasional bed of siltstone
UPPER SEVEN RIVERS, composed mainly of salt with occasional bed of shale and anhydrite. Unit is capped by siltstone
LOWER SEVEN RIVERS, Consists of interbedded siltstone and shale with a medial tight sandstone and a base of salt and anhydrite. Upper siltstone may be porous and contain brine
QUEEN/GRAYBURG, upper portion is interbedded shale and siltstone. The lower portion consists of two siltstone beds separated by shale. Base of unit is shale. The basal siltstone may be porous and contain brine
UPPER SAN ANDRES, Upper portion of the formation consists of massive beds. This upper portion contains a favorale salt horizon, below which the salt quality deteriorates with the presence of more thin shale beds. The base of the formation
LOWER SAN ANDRES UNIT 5, The upper portion is mostly salt with some shale interbeds. A favorable salt horizon is located in this unit. The base of the unit is anhydrite shale
LOWER SAN ANDRES UNIT 4, Massive salt bed containing occasional shale interbeds less than 5 feet thick overlying massive dolomite and thick bedded shale. Contains the thickest favorable salt horizon
LOWER SAN ANDRES UNIT 3, Massive salt beds interbedded with thick shale. Contains one thick anhydrite bed
LOWER SAN ANDRES UNIT 2,Massive salt overlying thick shale beds and a massive dolomite
LOWER SAN ANDRES UNIT 1, Dolomite and shale
UPPER CLEAR FORK, The formation is composed mostly of evaporites (salt, mixed salt and mudstone, and anhydrite), interbedded with shale exhibiting little or no porosity
TUBB, consists of shale interbedded with slightly porous siltstone
he middle portion and the base may contain evaporites
LOWER CLEAR FORK, Evaporites interbedded with shale. Middle portion marked by massive salt bed. Porosity is generally very low
RED CAVE, Mostly red shale with occasional beds of anhydrite. No porosity
WICHITA, Upper portion consists of dolomite interbedded with shale and occasional anhydrite bed. Lower portion consists mostly of limestone with an occasional shale bed, the average porosity is low
WOLFCAMP, Upper 250 feet is porous dolomite underlain by limestone interbedded with shale. Lower half is dolomite interbedded with shale
PENNSYLVANIAN, Top is limestone followed by massive beds of shale,limestone, and arkosic sandstone (Granite Wash). Lower half is interbedded arkosic sandstne and shale. Limestone and arkosic generally porous but highly variable

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drill stem	1	310.6- 318.2
drill stem	1	892.2- 945.8
drill stem	1	925.1- 945.8
drill stem	1	1635.3- 1689.2
pump		2178.1- 2202.2

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NONE;

LAB TESTS: strength;, index;, thermal;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: petrographic analysis;

HYDROCHEMICAL TESTS: gas analysis;, isotopic analysis;, age dating;, dissolved organic and inorganic materials;

-----REFERENCES-----

WELL NAME: Zeeck #1
REFERENCES:
(1) Stone & Webster Engineering Corporation, 1983. Well Completion Report Zeeck #1, Palo Duro Basin, 1983
(2) BFEC, Summary of Petrographic and Chemical Data for Palo Duro Basin Samples Examined by BFEC
(3) Stone & Webster Engineering Corporation, 1983. Laboratory Test Program for Zeeck #1, OPBST-634
(4) Stone & Webster Engineering Corporation, Pump Testing Summary Report for Zeeck #1

UTAH

- Borehole Summaries

UTAH
BORINGS

*COUNTY	WELL NAME	DEPTH METERS	(FEET)	STATUS OF WELL*
Grand	Salt Valley #1	393.2	(1290)	capped
	Salt Valley #2	374.0	(1227)	capped
	Salt Valley #3	1241.8	(4074)	capped
	Salt Valley #4	161.2	(529)	capped
	Salt Valley #5	128.0	(420)	capped
	Salt Valley #6	161.0	(528)	capped
	Salt Valley #7	134.0	(440)	capped
	Salt Valley #8	175.0	(574)	capped
	Salt Valley #9	137.0	(449.5)	capped
San Juan	Elk Ridge #1	1061.3	(3482)	plugged and site
	Gibson Dome #1	1945.9	(6384)	capped
	Kubat #1	1101.0	(3612)	plugged

* WELL NAME	COUNTY	DEPTH METERS	(FEET)	STATUS OF WELL*
Elk Ridge #1	San Juan	1061.3	(3482)	plugged and site
Gibson Dome #1	San Juan	1945.9	(6384)	capped
Kubat #1	San Juan	1101.0	(3612)	plugged
Salt Valley #1	Grand	393.2	(1290)	capped
Salt Valley #2	Grand	374.0	(1227)	capped
Salt Valley #3	Grand	1241.8	(4074)	capped
Salt Valley #4	Grand	161.2	(529)	capped
Salt Valley #5	Grand	128.0	(420)	capped
Salt Valley #6	Grand	161.0	(528)	capped
Salt Valley #7	Grand	134.0	(440)	capped
Salt Valley #8	Grand	175.0	(574)	capped
Salt Valley #9	Grand	137.0	(449.5)	capped

WELL NAME: Elk Ridge #1
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: San Juan
STATE: UT
LATITUDE: 37-33 deg-min
LONGITUDE: 109-48 deg-min
SECTION/BLOCK: Sec 31, T37S R19E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	2033.3	(6671)
GROUND LEVEL ELEV.:	2029.4	(6658)
TOTAL DEPTH OF HOLE:	1061.3	(3482)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
31.1	(12-1/4)	0.0- 124.1	(0-407)
6.4	(2-1/2)	127.7- 1061.3	(419-3482)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
24.4	(9-5/8)	125.9	(413)
11.4	(4-1/2)	131.1	(430)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
6.4	127.7- 1061.3	933.6

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
well cuttings	0.0- 124.1

-----WELL HISTORY-----

DRILL COMPLETION DATE: OCTOBER 3, 1981
STATUS OF WELL: plugged

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
CEDAR MESA	0.0-	256.0
ELEPHANT CANYON	256.0-	395.0
HONAKER TRAIL	395.0-	769.3
PARADOX	769.3-	1009.5
PINKERTON TRAIL	1009.5-	1061.3

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, photographs

CORE LOGS
YES, storage log, continuous core

MUD LOGS
YES, gas detector

GEOPHYSICAL LOGS
YES, temperature, neutron, density (borehole compensated), Synthetic seismogram, dual laterology, gamma ray, compro (acoustic), elastic properties, 3D velocity, caliper

-----LITHOLOGY-----

CEDAR MESA, light colored, quartz rich sandstone with calcareous sandstone and silty calcareous sandstone interbeds
ELEPHANT CANYON, mixture of sandstone, siltstone and calcareous sandstone and sandy siltstone
HONAKER TRAIL, limestone intermixed with calcareous sandstone and siltstone as well as sandy dolomite limestone and some cherty limestone
PARADOX, halite with interbeds of anhydrite, silty anhydrite, and siltstone
PINKERTON TRAIL, mixture of dolomitic siltstone, silty limestone, limestone and cherty limestone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
constant rate pumpout	1	131.0- 498.6
recovery	1	131.0- 498.6

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: NA;

-----REFERENCES-----

WELL NAME: Elk Ridge #1
REFERENCES:

(1) Woodward Clyde Consultants, 1982. Completion Report for Elk Ridge No.2 Borehole, ONWI-401
(2) Thackston, J. W., 1983. Results of Hydraulic Tests at Gibson Dome No. 1, Elk Ridge No. 1 , and E. J. Kubat Boreholes, Woodward-Clyde Consultants, ONWI-491

WELL NAME: Gibson Dome #1
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: San Juan
STATE: UT
LATITUDE: 37-17 deg-min
LONGITUDE: 102-42 deg-min
SECTION/BLOCK: Sec 21, T30S R21E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1508.5	(4949)
GROUND LEVEL ELEV.:	1503.3	(4932)
TOTAL DEPTH OF HOLE:	1945.9	(6384)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)	INTERVAL, m(ft)	
(17-1/2)	0.0- 759.6	(0-2492
(12-1/4)	759.6- 1673.1	(2492-5489
(8-3/4)	1673.1- 1945.9	(5489-6384

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
34.0	(13-3/8)	759.6	(2492)
24.4	(9-5/8)	1673.1	(5489)
14.0	(5-1/2)	1945.9	(6384)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	125.0- 1945.9	1820.9

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	128.3- 1897.4

-----WELL HISTORY-----

DRILL COMPLETION DATE: FEBRUARY 20, 1981
STATUS OF WELL: capped

MONITORING:
during time frame of testing. No post testing monitoring.

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
CUTLER	0.0-	164.6
CEDAR MESA	164.6-	207.0
ELEPHANT CANYON	207.0-	377.7
HONAKER TRAIL	377.7-	798.0
PARADOX	798.0-	1678.6
PINKERTON TRAIL	1678.6-	1741.6
MOLAS	1741.6-	1786.5
LEADVILLE LIMESTONE	1786.5-	1929.7
OURAY LIMESTONE	1929.7-	1945.9

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log, lithologic summary log, photographs

CORE LOGS
YES, sample status log, storage log

MUD LOGS
YES, total gas analyzer, gas chromatograph, H2S detector, pit volume totalizer

GEOPHYSICAL LOGS
YES. acoustic, induction, focused, temperature, variable density, density, neutron, gamma ray, caliper, SP, dipmeter, directional survey, fracture id, continuous flowmeter, fluid travel, collar log, spectral gamma, Saraband, Geogram

-----LITHOLOGY-----

CUTLER, medium to light-red arkosic sandstone interbedded with light red silty sandstone
CEDAR MESA, pale red to grayish-red arkosic sandstone with a few thin, silty arkosic sandstone interbeds
ELEPHANT CANYON, grayish-red siltstone, interbedded with sandy siltstone and silty limestone, and pink to red limestone
HONAKER TRAIL, interbeds of calcerous sandstone, siltstone, mudstone, and shale with silty limestone, dolomitic siltstone and gray limestone
PARADOX, halite interbedded with dolomitic and argillaceous siltstone,anhydrite, and with some dolomite, limestone, and clay stone
PINKERTON TRAIL, limestone and shale interbedded with anhydrite, siltstone and dolomite
MOLAS, limestone interbedded with shale and dolomite with local thin beds of siltstone, sandstone, and mudstone
LEADVILLE, limestone and dolomite with minor chert
OURAY, limestone

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
drill stem	1	164.6- 207.0
drill stem	2	207.0- 377.7
drill stem	4	377.7- 798.0
drill stem	7	798.0- 1678.6
drill stem	3	1786.5- 1929.7

-----GEOMECHANICAL TESTS-----

FIELD TESTS: unloading tests, 3 successful at 1458-1507 meters, 1090-1120 meters, and 963 and 1020 meters;, hydraulic fracturing tests, 5 were successful at 954-958,

LAB TESTS: index;, strength;, thermal;, creep;, compression;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: mineralogic analysis;, bromine distribution;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;, isotopic analysis;

-----REFERENCES-----

WELL NAME: Gibson Dome #1
REFERENCES:

(1) Woodward Clyde Consultants, 1982. Well Completion Report for Gibson Dome #1 Borehole, ONWI-388
(2) Pfeifle, T.W. et al, 1983. Constitutive Properties of Salt from Four Sites, ONWI-314, RE/SPEC Inc
(3) Nelson, R.A. et al, 1982. Insitu and Laboratory Geotechnical Test Results from Borehole GD-1 in Southeast Utah, ONWI-400, Woodward Clyde Consultants
(4) Thackston J. W., 1983. Results of Hydraulic Tests at Gibson Dome No. 1, Elk Ridge No. 1, and E. J. Kubat Boreholes, Woodward-Clyde Consultants, ONWI-491
(5) Hite, Robert J., 1983. Preliminary Mineralogical and Geochemical Data From the D.O.E. Gibson Dome Corehole No. 1, San Juan County, Utah, U.S. Geological Survey, Preliminary Report, Open-File Report 83-780
(6) Pfeifle, T. W. et al, 1982. Preliminary Constitutive Properties for Salt and Nonsalt From Four Potential Repository Sites, Appendix D, RE/SPEC Inc, ONWI-450
(7) Sass, T. H. et al, 1983. Thermal Data From Well GD-1, Gibson Dome, Paradox Valley, Utah, U.S. Geological Survey, Open-File Report 83-476
(8) Means, J. L. et al, July 1983. The Organic Geochemistry of Deep Ground Waters and Radionuclide Partitioning Experiments Under Hydrothermal Conditions, Battelle Columbus Laboratories, ONWI-448

WELL NAME: Kubat #1
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: San Juan
STATE: UT
LATITUDE: NR-NR deg-min
LONGITUDE: NR-NR deg-min
SECTION/BLOCK: Sec 23, T37S R19E

-----WELL HISTORY-----

DRILL COMPLETION DATE: SEPTEMBER 20, 1981
STATUS OF WELL: plugged

MONITORING:

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	2019.0	(6624)
GROUND LEVEL ELEV.:	2014.1	(6608)
TOTAL DEPTH OF HOLE:	1101.0	(3612)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
22.2	(8-3/4)	0.0- 1101.0	(0-3612)

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m
CEDAR MESA	0.0- 225.6
ELEPHANT CANYON	225.6- 359.7
HONAKER TRAIL	359.7- 670.6
PARADOX	670.6- 902.2
PINKERTON TRAIL	902.2- 960.1
MOLAS	960.1- 1021.1

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
27.3	(10-3/4)	39.6	(130)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m
10.2	39.6- 54.9	15.3
10.2	396.2- 426.7	30.5

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, photographs

CORE LOGS
YES

MUD LOGS
YES, gas chromatograph, H2S detector, gas detector

GEOPHYSICAL LOGS
YES, sonic, caliper, compensated density, compensated neutron, dipmeter, directional, dual laterolog, elastic properties, fracture ID, gamma ray, temperature, 3-D velocity, vertical seismic profile survey, synthetic seismogram survey

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
plug material	39.6- 54.9
plug material	396.2- 426.7

-----LITHOLOGY-----

NR

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
long-term injection	2	1023.5- 1089.7
pressure fall-off	2	1023.5- 1089.7
short-term injection	1	1023.5- 1089.7
slug	3	1023.5- 1089.7

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: separator;, hydrocarbon analysis;

HYDROCHEMICAL TESTS: gas analysis;, dissolved organic and inorganic materials;

-----REFERENCES-----

WELL NAME: Kubat #1

REFERENCES:

(1) Woodward-Clyde Consultants, 1982. E. J. Kubat Borehole, Elk Ridge Study Area of the Paradox Basin Region San Juan, Utah, A Completion Report, ONWI-403

(2) Thackston, J. W., 1983. Results of Hydraulic Tests at Gibson Dome No. 1, Elk Ridge No. 1, and E. J. Kubat Boreholes, ONWI-491

WELL NAME: Salt Valley #1
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: Grand
STATE: UT
LATITUDE: 38-43 deg-min
LONGITUDE: 109-36 deg-min
SECTION/BLOCK: Sec 5, T23S R20E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1472.2	(4830.5)
GROUND LEVEL ELEV.:	1468.8	(4819)
TOTAL DEPTH OF HOLE:	393.2	(1290)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)		
44.4	(17-1/2)	0.0-	29.6	(0-97)
31.1	(12-1/4)	29.6-	236.5	(97-776)
22.2	(8-3/4)	236.5-	393.2	(776-1290)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
33.9	(13-3/8)	29.6	(97)
24.5	(9-5/8)	231.3	(759)

-----CORES TAKEN-----

CORES SIZE, cm INTERVAL, m LENGTH, m

-----SAMPLES TAKEN-----

TEST INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: AUGUST 12, 1978
STATUS OF WELL: capped

MONITORING:
Depth to static water level = 113.4m

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
CAPROCK	0.0-	196.3
PARADOX (SALT)	196.3-	393.2

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log

CORE LOGS
NA

MUD LOGS
YES, drilling rate, gas detector, gas chromatograph, H2S detector

GEOPHYSICAL LOGS
YES, acoustic borehole compensated, caliper, computer processed logs, density/neutron borehole compensated, gamma ray/induction survey, magnetic inclinometer survey, seisviewer survey, temperature log, 3-D velocity, 3-D velocity (cement bond log)

-----LITHOLOGY-----

CAPROCK, silty sandstone with intervals of dolomite and a zone of interbedded siltstone and anhydrite
SALT, massive halite with occasional intervals of siltstone and interbeds of shale - siltstone - anhydrite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
swab test	1	29.6- 164.3
injection	1	280.4- 295.7
injection	1	301.8- 317.0
injection	1	323.7- 393.2

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;

-----REFERENCES-----

WELL NAME: Salt Valley #1
REFERENCES:

(1) Woodward-Clyde Consultants, 1979. Completion Report for a Three-Hole Drilling and Testing Program, Salt Valley Anticline, Grand County, Utah, Volume 1 and 2, ONWI-34
(2) Wollitz, L. E., et al, 1982. Results of Hydraulic Tests in U.S. Department of Energy's Wells DOE-4,5,6,7,8 and 9, Salt Valley, Grand County, Utah, U.S. Geological Survey, Open-File Report 82-346

WELL NAME: Salt Valley #2
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: Grand
STATE: UT
LATITUDE: 38-41 deg-min
LONGITUDE: 109-38 deg-min
SECTION/BLOCK: Sec 5, T23S R20E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1467.1	(4813.4)
GROUND LEVEL ELEV.:	1463.7	(4802)
TOTAL DEPTH OF HOLE:	374.0	(1227)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
22.2	(8-3/4)	29.0- 374.0	(95-1227)
31.7	(12-1/2)	0.0- 206.7	(0-678)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
33.9	(13-3/8)	29.0	(95)
24.5	(9-5/8)	206.7	(678)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: AUGUST 24, 1978
STATUS OF WELL: capped

MONITORING:
Depth to static water level = 112.2m

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m	
CAPROCK	0.0-	170.7
PARADOX (SALT)	170.7-	374.0

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log

CORE LOGS
NA

MUD LOGS
YES, drilling rate, gas detector, gas chromatograph, H2S detector

GEOPHYSICAL LOGS
YES, acoustic borehole compensated, caliper, computer processed logs, density/neutron borehole compensated, gamma ray/induction survey, magnetic inclinometer survey, seisviewer survey, temperature log, 3-D velocity

-----LITHOLOGY-----

CAPROCK, intervals of sandstone, limey mudstone, shaley dolomite, gypsum, dolomite and limey shales
SALT, massive halite

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
pump	1	29.0- 163.1
injection	1	211.8- 374.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: NA;

-----REFERENCES-----

WELL NAME: Salt Valley #2
REFERENCES:

(1) Woodward-Clyde Consultants, 1979. Completion Report for A Three-Hole Drilling and Testing Program, Salt Valley Anticline, Grand County Utah, Volume 1 and 2, ONWI-34
(2) Wollitz, L. etal, 1982. Results of Hydraulic Tests in U.S. Department of Energy's Wells DOE-4,5,6,7,8, AND 9, Salt Valley, Grand County, Utah, Open File Report 82-346, U.S. Geological Survey

WELL NAME: Salt Valley #3
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: Grand
STATE: UT
LATITUDE: 38-41 deg-min
LONGITUDE: 109-37 deg-min
SECTION/BLOCK: Sec 5, T23N R20E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:	1470.8	(4825.5)
GROUND LEVEL ELEV.:	1467.3	(4814)
TOTAL DEPTH OF HOLE:	1241.8	(4074)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
31.1	(12-1/4)	29.6- 1241.8	(97-4074)
22.2	(8-3/4)	32.6- 158.5	(107-520)
44.4	(17-1/2)	0.0- 230.1	(0-755)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
33.9	(13-3/8)	230.1	(755)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m

-----WELL HISTORY-----

DRILL COMPLETION DATE: NOVEMBER 5, 1978
STATUS OF WELL: capped

MONITORING:

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m
CAPROCK	0.0- 170.7
PARADOX (SALT)	170.7- 1241.8

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, field boring log, photographs

CORE LOGS
YES, storage log

MUD LOGS
YES, drilling rate, gas detector, gas chromatograph, H2S detector, pump stroke counter, pit level totalizer, fluid flow sensor

GEOPHYSICAL LOGS
YES, acoustic borehole compensated, caliper, computer processed logs, density/neutron borehole compensated, gamma ray/induction survey, magnetic inclinometer survey, seisviewer survey, temperature log, 3-D velocity

-----LITHOLOGY-----

CAPROCK, silty limestone, intervals of silty-sandy dolomites, limey-sandy mudstone, limey siltstones, claystones and gypsum
SALT, dominant halite with numerous interbeds of dolomitic black shales, anhydrite, dolomite, sandstone, sandy dolomite, mudstone, dolomitic mudstone and common halite veins

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
swab	1	29.6- 158.5
swab	1	29.6- 178.6
drill stem	1	428.2- 466.7
drill stem	1	417.0- 1015.3
drill stem	1	1135.4- 1177.5
drill stem	1	1176.5- 1228.1
drill stem	1	1057.7- 1109.2
drill stem	1	999.8- 1051.3
drill stem	1	740.1- 791.6
drill stem	1	630.6- 682.2
drill stem	1	557.8- 609.3
drill stem	1	491.3- 542.9
swab and injection	1	230.1- 1241.8

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NONE;

LAB TESTS: physical properties;, marker beds; , thermal;, density;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: hydrocarbon analysis;, petrographic analysis;, kerogen analysis;, gas inclusion analysis;, bromine distribution;, halite distribution;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;

-----REFERENCES-----

WELL NAME: Salt Valley #3
REFERENCES:

(1) Woodward-Clyde Consultants, 1979. Completion Report for A Three-Hole Drilling and Testing Program, Salt Valley Anticline, Grand County, Utah, Volume 1 and 2, ONWI-34
(2) Lagedrost, JF et al 1983. Thermal Property and Density Measurments of samples taken from Drilling Cores from Potential Geologic Media, December, Fiber Materials Inc, BMI/ONWI-522.

WELL NAME: Salt Valley #4
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: Grand
STATE: UT
LATITUDE: 109-44 deg-min
LONGITUDE: 38-50 deg-min
SECTION/BLOCK: Sec 5, T23S R20E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	1463.8	(4802)
TOTAL DEPTH OF HOLE:	161.2	(529)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)	INTERVAL, m(ft)	
20.0 (7-7/8)	0.0- 161.2	(0-529)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)	TOTAL DEPTH, m(ft)	
15.0 (5-9/10)	133.8	(439)
25.0 (9-5/6)	4.6	(15)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	134.0- 150.0

-----WELL HISTORY-----

DRILL COMPLETION DATE: SEPTEMBER 7, 1979
STATUS OF WELL: capped

MONITORING:
Depth to static water level = 110.6m

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m

-----LOGS TAKEN-----

LITHOLOGIC LOGS
NA

CORE LOGS
NA

MUD LOGS
YES, H2S detector

GEOPHYSICAL LOGS
YES, caliper, neutron, gamma-gamma, gamma

-----LITHOLOGY-----

NR

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
pump		134.0- 150.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;

-----REFERENCES-----

WELL NAME: Salt Valley #4

REFERENCES:

(1) Wollitz, L. E. et al, 1982. Results of Hydraulic Tests in U.S. Department of Energy's Wells DOE-4,5,6,7,8, and 9, Salt Valley, Grand County, Utah, U.S. Geological Survey, Open-File Report 82-346

WELL NAME: Salt Valley #5
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: Grand
STATE: UT
LATITUDE: NR-NR deg-min
LONGITUDE: NR-NR deg-min
SECTION/BLOCK: Sec 5, T23S R20E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	1463.8	(4802)
TOTAL DEPTH OF HOLE:	128.0	(420)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
20.0	(7-7/8)	0.0- 128.0	(0-420)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
15.0	(5-9/10)	134.0	(440)
25.0	(9-5/6)	4.6	(15)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	110.0- 125.0

-----WELL HISTORY-----

DRILL COMPLETION DATE: SEPTEMBER 6, 1979
STATUS OF WELL: capped

MONITORING:
Depth to static water level = 108.6m

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m

-----LOGS TAKEN-----

LITHOLOGIC LOGS
NA

CORE LOGS
NA

MUD LOGS
YES, H2S detector

GEOPHYSICAL LOGS
YES, neutron, gamma-gamma, gamma

-----LITHOLOGY-----

NR

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
pump		110.0- 125.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;

-----REFERENCES-----

WELL NAME: Salt Valley #5
REFERENCES:

(1) Wollitz, L. E., et al, 1982. Results of Hydraulic Tests in U.S. Department of Energy's Wells DOE-4,5,6,7,8, and 9, Salt Valley, Grand County, Utah, U.S. Geological Survey, Open-File Report 82-346

WELL NAME: Salt Valley #6
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: Grand
STATE: UT
LATITUDE: NR-NR deg-min
LONGITUDE: NR-NR deg-min
SECTION/BLOCK: Sec 5, T23S R20E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	1466.2	(4811)
TOTAL DEPTH OF HOLE:	161.0	(528)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
20.0	(7-7/8)	0.0- 161.0	(0-528)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
15.0	(5-9/10)	133.0	(436)
25.0	(9-5/6)	4.4	(14.5)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	133.0- 148.0

-----WELL HISTORY-----

DRILL COMPLETION DATE: SEPTEMBER 24, 1979
STATUS OF WELL: capped

MONITORING:
Depth to static water level = 108.3m

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m

-----LOGS TAKEN-----

LITHOLOGIC LOGS
YES, well cuttings, lithologic descriptions,

CORE LOGS
NA

MUD LOGS

GEOPHYSICAL LOGS
YES, caliper, neutron, gamma-gamma, gamma,

-----LITHOLOGY-----

-----FORMATION TESTS-----

NR	NAME	NUMBER	INTERVAL, m
	pump		133.0- 148.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;

-----REFERENCES-----

WELL NAME: Salt Valley #6

REFERENCES:

(1) Wollitz, L. E., et al, 1982. Results of Hydraulic Tests in U.S. Department of Energy's Wells DOE-4,5,6,7,8, and 9, Salt Valley, Grand County, Utah, U.S. Geological Survey, Open-File Report 82-346

WELL NAME: Salt Valley #7
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: Grand
STATE: UT
LATITUDE: NR-NR deg-min
LONGITUDE: NR-NR deg-min
SECTION/BLOCK: Sec 5, T23S R20E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	1465.9	(4809)
TOTAL DEPTH OF HOLE:	134.0	(440)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
20.0	(7-7/8)	0.0- 134.0	(0-440)

-----CASING SUMMARY-----

CASING DIAM., cm(in)		TOTAL DEPTH, m(ft)	
15.0	(5-9/10)	118.0	(387)
25.0	(9-5/6)	5.8	(19)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	118.0- 133.0

-----WELL HISTORY-----

DRILL COMPLETION DATE: SEPTEMBER 23, 1979
STATUS OF WELL: capped

MONITORING:
Depth to static water level = 104.1m

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m

-----LOGS TAKEN-----

LITHOLOGIC LOGS
NA

CORE LOGS
NA

MUD LOGS
H2S detector

GEOPHYSICAL LOGS
YES, neutron, gamma-gamma, gamma

-----LITHOLOGY-----

-----FORMATION TESTS-----

NR	NAME	NUMBER	INTERVAL, m
	pump		118.0- 133.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;

-----REFERENCES-----

WELL NAME: Salt Valley #7

REFERENCES:

(1) Wollitz, L. E., et al, 1982. Results of Hydraulic Tests in U.S. Department of Energy's Wells DOE-4,5,6,7,8, and 9, Salt Valley, Grand County, Utah, U.S. Geological Survey, Open-File Report 82-346

WELL NAME: Salt Valley #8
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: Grand
STATE: UT
LATITUDE: NR-NR deg-min
LONGITUDE: NR-NR deg-min
SECTION/BLOCK: Sec 5, T23S R20E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	1469.0	(4820)
TOTAL DEPTH OF HOLE:	175.0	(574)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
20.0	(7-7/8)	0.0- 175.0	(0-574)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
15.0	(5-9/10)	145.0	(476)
25.0	(9-5/6)	10.7	(35)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	145.0- 160.0

-----WELL HISTORY-----

DRILL COMPLETION DATE: OCTOBER 23, 1979
STATUS OF WELL: capped

MONITORING:
Depth to static water level = 102.8m

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m

-----LOGS TAKEN-----

LITHOLOGIC LOGS
NA

CORE LOGS
NA

MUD LOGS
H2S detector

GEOPHYSICAL LOGS
YES, caliper, neutron, gamma-gamma, gamma, single point resistivity

-----LITHOLOGY-----

NR

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
pump		145.0- 160.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;

-----REFERENCES-----

WELL NAME: Salt Valley #8

REFERENCES:

(1) Wollitz, L. E., et al, 1982. Results of Hydraulic Tests in U.S. Department of Energy's Wells DOE-4,5,6,7,8, and 9, Salt Valley, Grand County, Utah, U.S. Geological Survey, Open-File Report 82-346

WELL NAME: Salt Valley #9
SRP CONTACT: SS Nelson

-----LOCATION-----

SUBBASIN/DOME: Paradox
COUNTY/PARISH: Grand
STATE: UT
LATITUDE: NR-NR deg-min
LONGITUDE: NR-NR deg-min
SECTION/BLOCK: Sec 5, T23S R20E

--REFERENCE ELEVATIONS AND TOTAL DEPTH--

	M	(ft)
KELLY BUSHING ELEV.:		
GROUND LEVEL ELEV.:	1469.3	(4820)
TOTAL DEPTH OF HOLE:	137.0	(449.5)

-----DRILLING PROGRAM-----

BIT DIAM., cm(in)		INTERVAL, m(ft)	
20.0	(7-7/8)	0.0- 137.0	(0-449.5)

-----CASING SUMMARY-----

CASING DIAM.,cm(in)		TOTAL DEPTH, m(ft)	
15.0	(5-9/10)	121.0	(397)
25.0	(9-5/6)	10.3	(34)

-----CORES TAKEN-----

CORES SIZE, cm	INTERVAL, m	LENGTH, m

-----SAMPLES TAKEN-----

TEST	INTERVAL, m
fluid samples	121.0- 137.0

-----WELL HISTORY-----

DRILL COMPLETION DATE: OCTOBER 26, 1979
STATUS OF WELL: capped

MONITORING:
Depth to static water level = 103.6m

-----FORMATIONS PENETRATED-----

NAME	INTERVAL, m

-----LOGS TAKEN-----

LITHOLOGIC LOGS
NA

CORE LOGS
NA

MUD LOGS
H2S detector

GEOPHYSICAL LOGS
YES, neutron, gamma-gamma, gamma

-----LITHOLOGY-----

NR

-----FORMATION TESTS-----

NAME	NUMBER	INTERVAL, m
pump		121.0- 137.0

-----GEOMECHANICAL TESTS-----

FIELD TESTS: NA;

LAB TESTS: NA;

-----GEOCHEMICAL TESTS-----

ROCK SAMPLE TESTS: NA;

HYDROCHEMICAL TESTS: dissolved organic and inorganic materials;

-----REFERENCES-----

WELL NAME: Salt Valley #9

REFERENCES:

(1) Wollitz, L. E., et al, 1982. Results of Hydraulic Tests in U.S. Department of Energy's Wells DOE-4,5,6,7,8, and 9, Salt Valley, Grand County, Utah, U.S. Geological Survey, Open-File Report 82-346

INDEX TO DESIGN DATA

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II. Exploratory Shaft Design	(TBD)	
III. Repository Design	[4]	
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B. Spent Fuel (BWR)	(1)	
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IV. Manufactured Materials	(TBD)	

WASTE PACKAGE DESIGN FOR COMMERCIAL HLW

WASTE TYPE :, commercial high level waste
WASTE MATERIAL :, borosilicate glass
OVERPACK MATERIAL :B, A216-77 low carbon steel grade WCA
CANISTER MATERIAL :, stainless steel
CANISTER DIMENSIONS [diameter, length]:, 56.0, 409.0 cm
WASTE FORM WEIGHT [gross, net] :, 3425, 2560 kg
RADIOACTIVITY CONTENT, DESIGN :, 6.58 X 10E5 Ci
CANISTER SURFACE RAD. LEVEL [total] :, 1.51 X 10E8 mrem/hr
CANISTER SURFACE RAD. LEVEL [neutron] :, 1.44 X 10E4 mrem/hr
CANISTER SURFACE RAD. LEVEL [gamma] :, 1.51 X 10E8 mrem/hr
OVERPACK SURFACE RADIATION LEVEL :, 1.6 X 10E6 mrem/hr
OVERPACK DIMENSIONS [diameter, length]:, 76.3, 446.8 cm
OVERPACK THICKNESS[wall, head, bottom]:, 8.9, 16.4, 16.4 cm
OVERPACK WEIGHT[tot.lifting,body,head]:, 10710, NR, NR kg
OVERPACK CORROSION, ALLOWANCE [depth] :, 1.92 cm
OVERPACK CORROSION, PREDICTED [medium,depth(cm) after 1000 yrs]:
, expected brine, 0.14
, unlimited brine, 1.92
HEAT LOAD, DESIGN :, 9500 W
PEAK TEMPERATURE [(in deg C)for waste form,canister,overpack] :
, 480, NR, 230
LEACH RATE :, 2 X 10E-6 g/sq-cm/day
WASTE PACKAGE COSTS [date, components] :, 1983, 19600 dollars
SOURCES:
, (1) Westinghouse Electric Company, 1983. Waste Package Reference Conceptual Designs for a Repository in Salt, E512-06400, ONWI-517
, (2) Baxter, R. G., 1981. Description of DWPF Reference Waste Form and Canister, E.I. DuPont de Nemours and Company, Aiken, SC

WASTE PACKAGE DESIGN FOR SPENT FUEL (BWR)

WASTE TYPE :, spent fuel
WASTE MATERIAL :, BWR fuel assemblies (30 each)
OVERPACK MATERIAL :B, A216-77 low carbon steel grade WCA
CANISTER MATERIAL :, low carbon steel
CANISTER DIMENSIONS [diameter, length]:, 62.0, 435.0 cm
WASTE FORM WEIGHT [gross, net] :, 8810, 8310 kg
RADIOACTIVITY CONTENT, DESIGN :, 1.4 X 10E6 Ci
CANISTER SURFACE RAD. LEVEL [total] :, <2.8 X 10E7 mrem/hr
CANISTER SURFACE RAD. LEVEL [neutron] :, <6.0 X 10E3 mrem/hr
CANISTER SURFACE RAD. LEVEL [gamma] :, <2.8 X 10E7 mrem/hr
OVERPACK SURFACE RADIATION LEVEL :, NR mrem/hr
OVERPACK DIMENSIONS [diameter, length]:, 84.5, 481.5 cm
OVERPACK THICKNESS[wall, head, bottom]:, 10.0, 18.3, 18.3 cm
OVERPACK WEIGHT[tot.lifting,body,head]:, 18700, NR, NR kg
OVERPACK CORROSION, ALLOWANCE [depth] :, NR cm
OVERPACK CORROSION, PREDICTED [medium,depth(cm) after 1000 yrs]:
, NR, NR
HEAT LOAD, DESIGN :, 5700 W
PEAK TEMPERATURE [(in deg C)for waste form,canister,overpack] :
, NR, NR, NR
LEACH RATE :, 10E-5 g/sq-cm/day
WASTE PACKAGE COSTS [date, components] :, 1983, 24870 dollars
SOURCES:
, (1) Westinghouse Electric Company, 1983. Waste Package Reference Conceptual Designs for a Repository in Salt, E512-06400, ONWI-517
, (2) Baxter, R.G., 1981. Description of DWPF Reference Waste Form and Canister, E.I. DuPont de Nemours and Company, Aiken, SC

WASTE PACKAGE DESIGN FOR SPENT FUEL (PWR)

WASTE TYPE :, spent fuel
WASTE MATERIAL :, PWR fuel assemblies (12 each)
OVERPACK MATERIAL :B, A216-77 low carbon steel grade WCA
CANISTER MATERIAL :, low carbon steel
CANISTER DIMENSIONS [diameter, length]:, 62.0, 400.0 cm
WASTE FORM WEIGHT [gross, net] :, 8390, 7920 kg
RADIOACTIVITY CONTENT, DESIGN :, 4 X 10E6 Ci
CANISTER SURFACE RAD. LEVEL [total] :, 2.85 X 10E7 mrem/hr
CANISTER SURFACE RAD. LEVEL [neutron] :, 6.05 X 10E3 mrem/hr
CANISTER SURFACE RAD. LEVEL [gamma] :, 2.85 X 10E7 mrem/hr
OVERPACK SURFACE RADIATION LEVEL :, 1.9 X 10E5 mrem/hr
OVERPACK DIMENSIONS [diameter, length]:, 84.5, 446.5 cm
OVERPACK THICKNESS[wall, head, bottom]:, 10.0, 18.3, 18.3 cm
OVERPACK WEIGHT[tot.lifting,body,head]:, 17640, NR, NR kg
OVERPACK CORROSION, ALLOWANCE [depth] :, 2.30 cm
OVERPACK CORROSION, PREDICTED [medium,depth(cm) after 1000 yrs]:
, expected brine, 0.07
, unlimited brine, 2.30
HEAT LOAD, DESIGN :, 6600 W
PEAK TEMPERATURE [(in deg C)for waste form,canister,overpack] :
, 348, NR, 175
LEACH RATE :, 10E-5 g/sq-cm/day
WASTE PACKAGE COSTS [date, components] :, 1983, 23330 dollars
SOURCES:
, (1) Westinghouse Electric Company, 1983. Waste Package Reference Conceptual Designs for a Repository in Salt, E512-06400, ONWI-517
, (2) Baxter, R. G., 1981. Description of DWPF Reference Waste Form and Canister, E.I. duPont de Nemours and Company, Aiken, SC

WASTE PACKAGE DESIGN FOR DEFENSE HIGH LEVEL WASTE

WASTE TYPE :, defense high level waste
WASTE MATERIAL :, borosilicate glass
OVERPACK MATERIAL :B, A216-77 low carbon steel grade WCA
CANISTER MATERIAL :, 304L stainless steel
CANISTER DIMENSIONS [diameter, length]:, 61.0, 300.0 cm
WASTE FORM WEIGHT [gross, net] :, 1940, 1470 kg
RADIOACTIVITY CONTENT, DESIGN :, 1.5 X 10E5 Ci
CANISTER SURFACE RAD. LEVEL [total] :, 2.56 X 10E7 mrem/hr
CANISTER SURFACE RAD. LEVEL [neutron] :, 7.28 X 10E1 mrem/hr
CANISTER SURFACE RAD. LEVEL [gamma] :, 2.56 X 10E7 mrem/hr
OVERPACK SURFACE RADIATION LEVEL :, 3.3 X 10E5 mrem/hr
OVERPACK DIMENSIONS [diameter, length]:, 80.8, 338.5 cm
OVERPACK THICKNESS[wall, head, bottom]:, 8.6, 16.7, 16.7 cm
OVERPACK WEIGHT[tot.lifting,body,head]:, 7970, NR, NR kg
OVERPACK CORROSION, ALLOWANCE [depth] :, 0.95 cm
OVERPACK CORROSION, PREDICTED [medium,depth(cm) after 1000 yrs]:
, expected brine, 0.04
, unlimited brine, 0.95
HEAT LOAD, DESIGN :, 423 W
PEAK TEMPERATURE [(in deg C)for waste form,canister,overpack] :
, 110, NR, 98
LEACH RATE :, 1 X 10E-7 g/sq-cm/day
WASTE PACKAGE COSTS [date, components] :, 1983, 15810 dollars
WASTE PACKAGE COSTS [date, defense waste] :, 1983, 11.00 dollars/kg
SOURCES:
, (1) Westinghouse Electric Company, 1983. Waste Package Reference Conceptual Designs for a Repository in Salt, E512-06400, ONWI-517
, (2) Baxter R. G., 1981. Description of DWPF Reference Waste Form and Canister, E.I. duPont de Nemours and Company, Aiken, SC

CHLW - GLA

RECORD TYPE :repository design
WASTE TYPE :, commercial high level waste
WASTE MATERIAL :, borosilicate glass
TUNNEL DIMENSIONS[length,height,width]:, 152.4, 5.79, 4.57 m
ROWS OF BOREHOLES/TUNNEL :, 1
BOREHOLE DIMENSIONS [diameter, depth] :, 82.0, 637.0 cm
SPACINGS [waste packages, tunnels] :, 24.17, 26.2 m
TUNNEL SURFACE RADIATION LEVEL :, 1.6 mrem/hr
PEAK SALT TEMPERATURE :, 230 deg C
LOCAL AREAL THERMAL LOADING :, 15.0 W/sq-m
INITIALIZATION [date,authorities,field numbers,source] :
931022, ME Balmert, MJ Golis, UNK, all, (1)
SOURCES:
, (1) Westinghouse Electric Company, 1983. Waste Package Reference Conceptual Designs for a Repository in Salt, E510-06400, ONWI-517

BWR - Spent Fuel

RECORD TYPE :repository design
WASTE TYPE :, spent fuel
WASTE MATERIAL :, BWR fuel assemblies (30 each)
TUNNEL DIMENSIONS[length,height,width]:, 152.4, 6.40, 4.57 m
ROWS OF BOREHOLES/TUNNEL :, 1
BOREHOLE DIMENSIONS [diameter, depth] :, 90.0, 622.0 cm
SPACINGS [waste packages, tunnels] :, 22.14, 20.1 m
TUNNEL SURFACE RADIATION LEVEL :, NR mrem/hr
PEAK SALT TEMPERATURE :, NR deg C
LOCAL AREAL THERMAL LOADING :, NR W/sq-m
INITIALIZATION [date,authorities,field numbers,source] :
831022, ME Balmert, MJ Golis, UNK, all, (1)
SOURCES:
, (1) Westinghouse Electric Company, 1983. Waste Package Reference Conceptual Designs for a Repository in Salt, E512-06400, ONWI-517

PWR - spent fuel

RECORD TYPE :repository design
WASTE TYPE :, spent fuel
WASTE MATERIAL :, PWR fuel assemblies (12 each)
TUNNEL DIMENSIONS[length,height,width]:, 152.4, 6.40, 4.57 m
ROWS OF BOREHOLES/TUNNEL :, 1
BOREHOLE DIMENSIONS [diameter, depth] :, 90.0, 587.0 cm
SPACINGS [waste packages, tunnels] :, 22.14, 20.1 m
TUNNEL SURFACE RADIATION LEVEL :, 1.8 mrem/hr
PEAK SALT TEMPERATURE :, 175 deg C
LOCAL AREAL THERMAL LOADING :, 14.83 W/sq-m
INITIALIZATION [date,authorities,field numbers,source] :
831022, ME Balmert, MJ Golis, UNK, all, (1)
SOURCES:
, (1), Westinghouse Electric Company, 1983. Waste Package Reference Conceptual Designs for a Repository in Salt, E512-06400, ONWI-517

DHLW - glass

RECORD TYPE :repository design
WASTE TYPE :, defense high level waste
WASTE MATERIAL :, borosilicate glass
TUNNEL DIMENSIONS[length,height,width]:, 152.5, 5.18, 5.79 m
ROWS OF BOREHOLES/TUNNEL :, 2
BOREHOLE DIMENSIONS [diameter, depth] :, 86.0, 449.0 cm
SPACINGS [waste packages, tunnels] :, 2.13, 19.8 m
TUNNEL SURFACE RADIATION LEVEL :, 1.9 mrem/hr
PEAK SALT TEMPERATURE :, 98 deg C
LOCAL AREAL THERMAL LOADING :, 20.0 W/sq-m
INITIALIZATION [date,authorities,field numbers,source] :
831022, ME Balmert, MJ Golis, UNK, all, (1)
SOURCES:
, (1) Westinghouse Electric Company, 1983. Waste Package Reference Conceptual Designs for a Repository in Salt, E512-06400, ONWI-517

INDEX

PERFORMANCE ASSESSMENTS

A. Total System (Post Closure)

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- Nuclide Inventory
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- Release

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- Sorption

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- Worker Dose
- Population Dose

GLOSSARY

Computer Codes Used in EA related Performance Assessments

TEMP ..... Finite line source analytical heat transfer

BRINEMIG ..... Models brine migration

WAPPA ..... Corrosion, radiation effects, thermomechanical response of canister and radionuclide leaching and transport from the waste package

SWENT ..... 3-D finite-difference transient water flow and energy solute and radionuclide transport in saturated porous media

ORIGEN-2 ..... Isoptpic decay-chain analysis to determine radionuclide build-up during reactor operations and isotopic composition thermal and radiation output of waste as functions of time

BORHOL ..... Scenario code addressing dissolution of salt using U2 concept

- Computer Codes Used in EA related Environmental Analyses

EPA-Valley ..... Air quality model, gaussian plume, multiple source, complex terrain

EPA-Industrial ..... Air quality model for simple terrain. Source Complex.

HEC 1 & 2 ..... Probable maximum flood, surface water profile. Army Corp of Engineers

Environmental ..... Area noise prediction based on multiple noise sources.

GASPAR ..... Rad doses due to airborn releases.

HIWAY ..... Rad dose due to truck transport

RAIL ..... Rad dose due to rail transport

GRAVTEST ..... Population gravity model

DBFRE ..... Accoustical field data processing

IMGRID ..... Geographical information processing

NWS, VERSION IP ..... ReformatsNWS TD1440 hourly Met. Data for use by NUS codes

NWSSTAB, VERSION IP ..... Reformats NWT TD1440 hourly Met. Data for use by NUS codes

GLOSSARY

(Continued)

UFD, VERSION 5P ..... Calculates Joint Freq. Dist. of Wind Speed/Wind Dir. by Stability class

NOSWR, VERSION 2P ..... Calculates wind direction freq. and Aug. wind speed by 16 sectors

WINDPLOT, VERSION 1P ..... Plots wind roses determinedby NUSWR output statistics

TORNADO, REV. 1 ..... Calculates Statistical characteris of tornados for input to SARs and ERs based on actual observation data

JSTAR, VERSION 1P ..... Reformats JFDs in STAR Format for Input to ISCLT

CRSPREP3, RAND, LEVEL 4 ..... Met. Data Preprocessing Code for Input to ISCST

ESCLT, VERSION 4 ..... Long-Term Air Quality Dispersion Model, Multiple Source Configuration

ESCST, VERSION 4 ..... Short-term Air Quality Dispersion Model, Multiple Source Configuration

NOQDOQ, VERSION 1P .....Calculates Routine Release Long-Term Diffusion estimates per U.S. NRC Reg. Guide 1.145

PAVAN, VERSION 1P ..... Calculates Realistic Accident Short-Term difussion estimates per U.S.NRC Reg. Guide 1.145

NETTEMP, VERSION 3P ..... Summarize hourly avg. temp., Dew Pt., Rel. humidity, absolute humidity, wet bulb temp. on monthly/ seasonal/annual

Conversion Factors for Commonly Used U.S. and SI Metric Units

Multiply by	to convert SI metric units to U.S units		To convert U.S. units to SI metric units multiply by
		LENGTH	
.3937	inch (in)	centimeter (cm)	2.5400
3.2808	foot (ft)	meter (m)	.3048
1.0936	yard (yd)	meter	.9144
.6214	mile (U.S. statute) (mi)	kilometer (km)	1.6093
		AREA	
.1550	square inch (in^2)	square centimeter (cm^2)	6.4516
10.7639	square foot (ft^2)	square meter (m^2)	.0929
.00025	acre (a)	square meter	4,046.8560
2.4710	acre	hectare (ha)	.4047
2,470.9661	acre	square kilometer (km^2)	.0004
.3861	square mile (section) (mi^2)	square kilometer	2.5900
.0039	square mile	hectare	258.9985
		VOLUME	
.0610	cubic inch (in^3)	cubic centimeter (cm^3)	16.3871
35.3146	cubic foot (ft^3)	cubic meter (m^3)	.0283
1.3079	cubic yard (yd^3)	cubic meter	.7646
.2759	cord (cd)	cubic meter	3.6246
28.3777	bushel (bu)	cubic meter	.0352
.0008	acre-foot (ac-ft)	cubic meter	1,233.4820
6.2898	barrel (42 U.S. gal)(bl)	cubic meter	.1590

Conversion Factors for Commonly Used U.S. and SI Metric Units (Continued)

Multiply by to convert SI metric units to U.S units		To convert U.S. units to SI metric units multiply by	
		CAPACITY (Liquid Measure)	
2.1134	pint (pt)	liter (l)	.4732
1.0567	quart (qt)	liter	.9464
.2642	gallon (gal)	liter	3.7854
		(Dry Measure)	
1.8162	pint	liter	.5506
1,816.2005	pint	cubic meter	.0005506
908.1003	quart	cubic meter	.0011
227.0199	gallon	cubic meter	.0044
		MASS AND WEIGHT	
.0353	ounce (avoirdupois) (oz)	gram (g)	28.3495
2.2046	pound (avoirdupois) (lb)	kilogram (kg)	.4536
1.1023	ton (t)	metric ton (t)	.9072
		MASS/AREA	
.8922	pound per acre (lb/a)	kilogram per hectare	1.1209
.4461	ton per acre (t/a)	metric ton per hectare (t/ha)	2.2417
.0159	bushel per acre (56 lb/bu)	kilogram per hectare	62.7704
		MASS/VOLUME	
.0624	pound per cubic foot (lb/ft^3)	kilogram per cubic meter (kg/m^3)	16.0185
1.3600	ton per acre-foot (t/ac-ft)	kilogram per cubic meter	.7353

Conversion Factors for Commonly Used U.S. and SI Metric Units (Continued)

Multiply by to convert SI metric units to U.S units		To convert U.S. units to SI metric units multiply by	
	VELOCITY (length/time)		
3.2808	foot per second (ft/sec)	meter per second (m/s)	.3048
2.2371	mile per hour (mi/hr)	meter per second	.4470
.6214	mile per hour	kilometer per hour (km/h)	1.6093
1.9439	knot	kilometer per hour	.5144
	FLOW		
35.3146	cubic foot per second (ft^3/sec)	cubic meter per second (m^3/s)	.0283
2,119.0930	cubic foot per minute (ft^3/min)	cubic meter per second	.00047
15,850.3220	gallon per minute (gal/min)	cubic meter per second	.0000631
	ENERGY		
.00095	British thermal unit (Btu)	joule (J)	1,055.0560
.2388	calorie	joule	4.1868
	POWER		
3.4121	British thermal unit per hour (Btu/hr)	watt (W)	.2931
.0013	horsepower	watt	746.0000
14.3404	calorie per minute	watt	.0697
	PRESSURE		
.0000098	atmosphere	pascal (pa)	101,325.0000
.000145	pound per square inch (lb/in^2)	pascal	6,894.7570
	MASS AND WEIGHT		
$t_f = 1.8t_c + 32$	degrees Fahrenheit	degrees celsius (^oC)	$t_c = (t_f-32)/1.8$
$t_f = 1.8t_k-459.67$	degrees Fahrenheit	degrees kelvin (^oK)	$t_k = (t_f + 459.67)/1.8$

M. Gol.

FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS
		62	18.9	125	38.1	188	57.3	251	76.5	314	95.7	377	114.9
		63	19.2	126	38.4	189	57.6	252	76.8	315	96.0	378	115.2
1	.3	64	19.5	127	38.7	190	57.9	253	77.1	316	96.3	379	115.5
2	.6	65	19.8	128	39.0	191	58.2	254	77.4	317	96.6	380	115.8
3	.9	66	20.1	129	39.3	192	58.5	255	77.7	318	96.9	381	116.1
4	1.2	67	20.4	130	39.6	193	58.8	256	78.0	319	97.2	382	116.4
5	1.5	68	20.7	131	39.9	194	59.1	257	78.3	320	97.5	383	116.7
6	1.8	69	21.0	132	40.2	195	59.4	258	78.6	321	97.8	384	117.0
7	2.1	70	21.3	133	40.5	196	59.7	259	78.9	322	98.1	385	117.3
8	2.4	71	21.6	134	40.8	197	60.0	260	79.2	323	98.5	386	117.7
9	2.7	72	21.9	135	41.1	198	60.4	261	79.6	324	98.8	387	118.0
10	3.0	73	22.3	136	41.5	199	60.7	262	79.9	325	99.1	388	118.3
11	3.4	74	22.6	137	41.8	200	61.0	263	80.2	326	99.4	389	118.6
12	3.7	75	22.9	138	42.1	201	61.3	264	80.5	327	99.7	390	118.9
13	4.0	76	23.2	139	42.4	202	61.6	265	80.8	328	100.0	391	119.2
14	4.3	77	23.5	140	42.7	203	61.9	266	81.1	329	100.3	392	119.5
15	4.6	78	23.8	141	43.0	204	62.2	267	81.4	330	100.6	393	119.8
16	4.9	79	24.1	142	43.3	205	62.5	268	81.7	331	100.9	394	120.1
17	5.2	80	24.4	143	43.6	206	62.8	269	82.0	332	101.2	395	120.4
18	5.5	81	24.7	144	43.9	207	63.1	270	82.3	333	101.5	396	120.7
19	5.8	82	25.0	145	44.2	208	63.4	271	82.6	334	101.8	397	121.0
20	6.1	83	25.3	146	44.5	209	63.7	272	82.9	335	102.1	398	121.3
21	6.4	84	25.6	147	44.8	210	64.0	273	83.2	336	102.4	399	121.6
22	6.7	85	25.9	148	45.1	211	64.3	274	83.5	337	102.7	400	121.9
23	7.0	86	26.2	149	45.4	212	64.6	275	83.8	338	103.0	401	122.2
24	7.3	87	26.5	150	45.7	213	64.9	276	84.1	339	103.3	402	122.5
25	7.6	88	26.8	151	46.0	214	65.2	277	84.4	340	103.6	403	122.8
26	7.9	89	27.1	152	46.3	215	65.5	278	84.7	341	103.9	404	123.1
27	8.2	90	27.4	153	46.6	216	65.8	279	85.0	342	104.2	405	123.4
28	8.5	91	27.7	154	46.9	217	66.1	280	85.3	343	104.5	406	123.8
29	8.8	92	28.0	155	47.2	218	66.4	281	85.6	344	104.9	407	124.1
30	9.1	93	28.3	156	47.5	219	66.8	282	86.0	345	105.2	408	124.4
31	9.4	94	28.7	157	47.9	220	67.1	283	86.3	346	105.5	409	124.7
32	9.8	95	29.0	158	48.2	221	67.4	284	86.6	347	105.8	410	125.0
33	10.1	96	29.3	159	48.5	222	67.7	285	86.9	348	106.1	411	125.3
34	10.4	97	29.6	160	48.8	223	68.0	286	87.2	349	106.4	412	125.6
35	10.7	98	29.9	161	49.1	224	68.3	287	87.5	350	106.7	413	125.9
36	11.0	99	30.2	162	49.4	225	68.6	288	87.8	351	107.0	414	126.2
37	11.3	100	30.5	163	49.7	226	68.9	289	88.1	352	107.3	415	126.5
38	11.6	101	30.8	164	50.0	227	69.2	290	88.4	353	107.6	416	126.8
39	11.9	102	31.1	165	50.3	228	69.5	291	88.7	354	107.9	417	127.1
40	12.2	103	31.4	166	50.6	229	69.8	292	89.0	355	108.2	418	127.4
41	12.5	104	31.7	167	50.9	230	70.1	293	89.3	356	108.5	419	127.7
42	12.8	105	32.0	168	51.2	231	70.4	294	89.6	357	108.8	420	128.0
43	13.1	106	32.3	169	51.5	232	70.7	295	89.9	358	109.1	421	128.3
44	13.4	107	32.6	170	51.8	233	71.0	296	90.2	359	109.4	422	128.6
45	13.7	108	32.9	171	52.1	234	71.3	297	90.5	360	109.7	423	128.9
46	14.0	109	33.2	172	52.4	235	71.6	298	90.8	361	110.0	424	129.2
47	14.3	110	33.5	173	52.7	236	71.9	299	91.1	362	110.3	425	129.5
48	14.6	111	33.8	174	53.0	237	72.2	300	91.4	363	110.6	426	129.8
49	14.9	112	34.1	175	53.3	238	72.5	301	91.7	364	110.9	427	130.2
50	15.2	113	34.4	176	53.6	239	72.8	302	92.1	365	111.3	428	130.5
51	15.5	114	34.7	177	54.0	240	73.2	303	92.4	366	111.6	429	130.8
52	15.8	115	35.1	178	54.3	241	73.5	304	92.7	367	111.9	430	131.1
53	16.2	116	35.4	179	54.6	242	73.8	305	93.0	368	112.2	431	131.4
54	16.5	117	35.7	180	54.9	243	74.1	306	93.3	369	112.5	432	131.7
55	16.8	118	36.0	181	55.2	244	74.4	307	93.6	370	112.8	433	132.0
56	17.1	119	36.3	182	55.5	245	74.7	308	93.9	371	113.1	434	132.3
57	17.4	120	36.6	183	55.8	246	75.0	309	94.2	372	113.4	435	132.6
58	17.7	121	36.9	184	56.1	247	75.3	310	94.5	373	113.7	436	132.9
59	18.0	122	37.2	185	56.4	248	75.6	311	94.8	374	114.0	437	133.2
60	18.3	123	37.5	186	56.7	249	75.9	312	95.1	375	114.3	438	133.5
61	18.6	124	37.8	187	57.0	250	76.2	313	95.4	376	114.6	439	133.8

FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS
440	134.1	503	153.3	566	172.5	629	191.7	692	210.9	755	230.1	818	249.3
441	134.4	504	153.6	567	172.8	630	192.0	693	211.2	756	230.4	819	249.6
442	134.7	505	153.9	568	173.1	631	192.3	694	211.5	757	230.7	820	249.9
443	135.0	506	154.2	569	173.4	632	192.6	695	211.8	758	231.0	821	250.2
444	135.3	507	154.5	570	173.7	633	192.9	696	212.1	759	231.3	822	250.5
445	135.6	508	154.8	571	174.0	634	193.2	697	212.4	760	231.7	823	250.9
446	135.9	509	155.1	572	174.3	635	193.6	698	212.8	761	232.0	824	251.2
447	136.2	510	155.4	573	174.7	636	193.9	699	213.1	762	232.3	825	251.5
448	136.6	511	155.8	574	175.0	637	194.2	700	213.4	763	232.6	826	251.8
449	136.9	512	156.1	575	175.3	638	194.5	701	213.7	764	232.9	827	252.1
450	137.2	513	156.4	576	175.6	639	194.8	702	214.0	765	233.2	828	252.4
451	137.5	514	156.7	577	175.9	640	195.1	703	214.3	766	233.5	829	252.7
452	137.8	515	157.0	578	176.2	641	195.4	704	214.6	767	233.8	830	253.0
453	138.1	516	157.3	579	176.5	642	195.7	705	214.9	768	234.1	831	253.3
454	138.4	517	157.6	580	176.8	643	196.0	706	215.2	769	234.4	832	253.6
455	138.7	518	157.9	581	177.1	644	196.3	707	215.5	770	234.7	833	253.9
456	139.0	519	158.2	582	177.4	645	196.6	708	215.8	771	235.0	834	254.2
457	139.3	520	158.5	583	177.7	646	196.9	709	216.1	772	235.3	835	254.5
458	139.6	521	158.8	584	178.0	647	197.2	710	216.4	773	235.6	836	254.8
459	139.9	522	159.1	585	178.3	648	197.5	711	216.7	774	235.9	837	255.1
460	140.2	523	159.4	586	178.6	649	197.8	712	217.0	775	236.2	838	255.4
461	140.5	524	159.7	587	178.9	650	198.1	713	217.3	776	236.5	839	255.7
462	140.8	525	160.0	588	179.2	651	198.4	714	217.6	777	236.8	840	256.0
463	141.1	526	160.3	589	179.5	652	198.7	715	217.9	778	237.1	841	256.3
464	141.4	527	160.6	590	179.8	653	199.0	716	218.2	779	237.4	842	256.6
465	141.7	528	160.9	591	180.1	654	199.3	717	218.5	780	237.7	843	256.9
466	142.0	529	161.2	592	180.4	655	199.6	718	218.8	781	238.1	844	257.3
467	142.3	530	161.5	593	180.7	656	200.0	719	219.2	782	238.4	845	257.6
468	142.6	531	161.9	594	181.1	657	200.3	720	219.5	783	238.7	846	257.9
469	143.0	532	162.2	595	181.4	658	200.6	721	219.8	784	239.0	847	258.2
470	143.3	533	162.5	596	181.7	659	200.9	722	220.1	785	239.3	848	258.5
471	143.6	534	162.8	597	182.0	660	201.2	723	220.4	786	239.6	849	258.8
472	143.9	535	163.1	598	182.3	661	201.5	724	220.7	787	239.9	850	259.1
473	144.2	536	163.4	599	182.6	662	201.8	725	221.0	788	240.2	851	259.4
474	144.5	537	163.7	600	182.9	663	202.1	726	221.3	789	240.5	852	259.7
475	144.8	538	164.0	601	183.2	664	202.4	727	221.6	790	240.8	853	260.0
476	145.1	539	164.3	602	183.5	665	202.7	728	221.9	791	241.1	854	260.3
477	145.4	540	164.6	603	183.8	666	203.0	729	222.2	792	241.4	855	260.6
478	145.7	541	164.9	604	184.1	667	203.3	730	222.5	793	241.7	856	260.9
479	146.0	542	165.2	605	184.4	668	203.6	731	222.8	794	242.0	857	261.2
480	146.3	543	165.5	606	184.7	669	203.9	732	223.1	795	242.3	858	261.5
481	146.6	544	165.8	607	185.0	670	204.2	733	223.4	796	242.6	859	261.8
482	146.9	545	166.1	608	185.3	671	204.5	734	223.7	797	242.9	860	262.1
483	147.2	546	166.4	609	185.6	672	204.8	735	224.0	798	243.2	861	262.4
484	147.5	547	166.7	610	185.9	673	205.1	736	224.3	799	243.5	862	262.7
485	147.8	548	167.0	611	186.2	674	205.4	737	224.6	800	243.8	863	263.0
486	148.1	549	167.3	612	186.5	675	205.7	738	224.9	801	244.1	864	263.4
487	148.4	550	167.6	613	186.8	676	206.0	739	225.2	802	244.5	865	263.7
488	148.7	551	167.9	614	187.1	677	206.4	740	225.6	803	244.8	866	264.0
489	149.0	552	168.3	615	187.5	678	206.7	741	225.9	804	245.1	867	264.3
490	149.4	553	168.6	616	187.8	679	207.0	742	226.2	805	245.4	868	264.6
491	149.7	554	168.9	617	188.1	680	207.3	743	226.5	806	245.7	869	264.9
492	150.0	555	169.2	618	188.4	681	207.6	744	226.8	807	246.0	870	265.2
493	150.3	556	169.5	619	188.7	682	207.9	745	227.1	808	246.3	871	265.5
494	150.6	557	169.8	620	189.0	683	208.2	746	227.4	809	246.6	872	265.8
495	150.9	558	170.1	621	189.3	684	208.5	747	227.7	810	246.9	873	266.1
496	151.2	559	170.4	622	189.6	685	208.8	748	228.0	811	247.2	874	266.4
497	151.5	560	170.7	623	189.9	686	209.1	749	228.3	812	247.5	875	266.7
498	151.8	561	171.0	624	190.2	687	209.4	750	228.6	813	247.8	876	267.0
499	152.1	562	171.3	625	190.5	688	209.7	751	228.9	814	248.1	877	267.3
500	152.4	563	171.6	626	190.8	689	210.0	752	229.2	815	248.4	878	267.6
501	152.7	564	171.9	627	191.1	690	210.3	753	229.5	816	248.7	879	267.9
502	153.0	565	172.2	628	191.4	691	210.6	754	229.8	817	249.0	880	268.2

FEET	METERS	FEET	METERS	FEET	METERS
881	268.5	944	287.7	1007	306.9
882	268.8	945	288.0	1008	307.2
883	269.1	946	288.3	1009	307.5
884	269.4	947	288.6	1010	307.9
885	269.8	948	289.0	1011	308.2
886	270.1	949	289.3	1012	308.5
887	270.4	950	289.6	1013	308.8
888	270.7	951	289.9	1014	309.1
889	271.0	952	290.2	1015	309.4
890	271.3	953	290.5	1016	309.7
891	271.6	954	290.8	1017	310.0
892	271.9	955	291.1	1018	310.3
893	272.2	956	291.4	1019	310.6
894	272.5	957	291.7	1020	310.9
895	272.8	958	292.0	1021	311.2
896	273.1	959	292.3	1022	311.5
897	273.4	960	292.6	1023	311.8
898	273.7	961	292.9	1024	312.1
899	274.0	962	293.2	1025	312.4
900	274.3	963	293.5	1026	312.7
901	274.6	964	293.8	1027	313.0
902	274.9	965	294.1	1028	313.3
903	275.2	966	294.4	1029	313.6
904	275.5	967	294.7	1030	313.9
905	275.8	968	295.0	1031	314.3
906	276.2	969	295.4	1032	314.6
907	276.5	970	295.7	1033	314.9
908	276.8	971	296.0	1034	315.2
909	277.1	972	296.3	1035	315.5
910	277.4	973	296.6	1036	315.8
911	277.7	974	296.9	1037	316.1
912	278.0	975	297.2	1038	316.4
913	278.3	976	297.5	1039	316.7
914	278.6	977	297.8	1040	317.0
915	278.9	978	298.1	1041	317.3
916	279.2	979	298.4	1042	317.6
917	279.5	980	298.7	1043	317.9
918	279.8	981	299.0	1044	318.2
919	280.1	982	299.3	1045	318.5
920	280.4	983	299.6	1046	318.8
921	280.7	984	299.9	1047	319.1
922	281.0	985	300.2	1048	319.4
923	281.3	986	300.5	1049	319.7
924	281.6	987	300.8	1050	320.0
925	281.9	988	301.1	1051	320.3
926	282.2	989	301.5	1052	320.7
927	282.6	990	301.8	1053	321.0
928	282.9	991	302.1	1054	321.3
929	283.2	992	302.4	1055	321.6
930	283.5	993	302.7	1056	321.9
931	283.8	994	303.0	1057	322.2
932	284.1	995	303.3	1058	322.5
933	284.4	996	303.6	1059	322.8
934	284.7	997	303.9	1060	323.1
935	285.0	998	304.2	1061	323.4
936	285.3	999	304.5	1062	323.7
937	285.6	1000	304.8	1063	324.0
938	285.9	1001	305.1	1064	324.3
939	286.2	1002	305.4	1065	324.6
940	286.5	1003	305.7	1066	324.9
941	286.8	1004	306.0	1067	325.2
942	287.1	1005	306.3	1068	325.5
943	287.4	1006	306.6	1069	325.8

FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS
1070	326.1	1133	345.3	1196	364.5	1259	383.7
1071	326.4	1134	345.6	1197	364.9	1260	384.1
1072	326.7	1135	346.0	1198	365.2	1261	384.4
1073	327.1	1136	346.3	1199	365.5	1262	384.7
1074	327.4	1137	346.6	1200	365.8	1263	385.0
1075	327.7	1138	346.9	1201	366.1	1264	385.3
1076	328.0	1139	347.2	1202	366.4	1265	385.6
1077	328.3	1140	347.5	1203	366.7	1266	385.9
1078	328.6	1141	347.8	1204	367.0	1267	386.2
1079	328.9	1142	348.1	1205	367.3	1268	386.5
1080	329.2	1143	348.4	1206	367.6	1269	386.8
1081	329.5	1144	348.7	1207	367.9	1270	387.1
1082	329.8	1145	349.0	1208	368.2	1271	387.4
1083	330.1	1146	349.3	1209	368.5	1272	387.7
1084	330.4	1147	349.6	1210	368.8	1273	388.0
1085	330.7	1148	349.9	1211	369.1	1274	388.3
1086	331.0	1149	350.2	1212	369.4	1275	388.6
1087	331.3	1150	350.5	1213	369.7	1276	388.9
1088	331.6	1151	350.8	1214	370.0	1277	389.2
1089	331.9	1152	351.1	1215	370.3	1278	389.5
1090	332.2	1153	351.4	1216	370.6	1279	389.8
1091	332.5	1154	351.7	1217	370.9	1280	390.1
1092	332.8	1155	352.0	1218	371.3	1281	390.5
1093	333.2	1156	352.4	1219	371.6	1282	390.8
1094	333.5	1157	352.7	1220	371.9	1283	391.1
1095	333.8	1158	353.0	1221	372.2	1284	391.4
1096	334.1	1159	353.3	1222	372.5	1285	391.7
1097	334.4	1160	353.6	1223	372.8	1286	392.0
1098	334.7	1161	353.9	1224	373.1	1287	392.3
1099	335.0	1162	354.2	1225	373.4	1288	392.6
1100	335.3	1163	354.5	1226	373.7	1289	392.9
1101	335.6	1164	354.8	1227	374.0	1290	393.2
1102	335.9	1165	355.1	1228	374.3	1291	393.5
1103	336.2	1166	355.4	1229	374.6	1292	393.8
1104	336.5	1167	355.7	1230	374.9	1293	394.1
1105	336.8	1168	356.0	1231	375.2	1294	394.4
1106	337.1	1169	356.3	1232	375.5	1295	394.7
1107	337.4	1170	356.6	1233	375.8	1296	395.0
1108	337.7	1171	356.9	1234	376.1	1297	395.3
1109	338.0	1172	357.2	1235	376.4	1298	395.6
1110	338.3	1173	357.5	1236	376.7	1299	395.9
1111	338.6	1174	357.8	1237	377.0	1300	396.2
1112	338.9	1175	358.1	1238	377.3	1301	396.5
1113	339.2	1176	358.4	1239	377.7	1302	396.9
1114	339.6	1177	358.8	1240	378.0	1303	397.2
1115	339.9	1178	359.1	1241	378.3	1304	397.5
1116	340.2	1179	359.4	1242	378.6	1305	397.8
1117	340.5	1180	359.7	1243	378.9	1306	398.1
1118	340.8	1181	360.0	1244	379.2	1307	398.4
1119	341.1	1182	360.3	1245	379.5	1308	398.7
1120	341.4	1183	360.6	1246	379.8	1309	399.0
1121	341.7	1184	360.9	1247	380.1	1310	399.3
1122	342.0	1185	361.2	1248	380.4	1311	399.6
1123	342.3	1186	361.5	1249	380.7	1312	399.9
1124	342.6	1187	361.8	1250	381.0	1313	400.2
1125	342.9	1188	362.1	1251	381.3	1314	400.5
1126	343.2	1189	362.4	1252	381.6	1315	400.8
1127	343.5	1190	362.7	1253	381.9	1316	401.1
1128	343.8	1191	363.0	1254	382.2	1317	401.4
1129	344.1	1192	363.3	1255	382.5	1318	401.7
1130	344.4	1193	363.6	1256	382.8	1319	402.0
1131	344.7	1194	363.9	1257	383.1	1320	402.3
1132	345.0	1195	364.2	1258	383.4	1321	402.6

FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS
1322	403.0	1385	422.2	1574	479.8	1448	441.4	1511	460.6	1637	499.0	1700	518.2
1323	403.3	1386	422.5	1575	480.1	1449	441.7	1512	460.9	1638	499.3	1701	518.5
1324	403.6	1387	422.8	1576	480.4	1450	442.0	1513	461.2	1639	499.6	1702	518.8
1325	403.9	1388	423.1	1577	480.7	1451	442.3	1514	461.5	1640	499.9	1703	519.1
1326	404.2	1389	423.4	1578	481.0	1452	442.6	1515	461.8	1641	500.2	1704	519.4
1327	404.5	1390	423.7	1579	481.3	1453	442.9	1516	462.1	1642	500.5	1705	519.7
1328	404.8	1391	424.0	1580	481.6	1454	443.2	1517	462.4	1643	500.8	1706	520.0
1329	405.1	1392	424.3	1581	481.9	1455	443.5	1518	462.7	1644	501.1	1707	520.3
1330	405.4	1393	424.6	1582	482.2	1456	443.8	1519	463.0	1645	501.4	1708	520.6
1331	405.7	1394	424.9	1583	482.5	1457	444.1	1520	463.3	1646	501.7	1709	520.9
1332	406.0	1395	425.2	1584	482.8	1458	444.4	1521	463.6	1647	502.0	1710	521.2
1333	406.3	1396	425.5	1585	483.1	1459	444.7	1522	463.9	1648	502.3	1711	521.5
1334	406.6	1397	425.8	1586	483.4	1460	445.0	1523	464.2	1649	502.6	1712	521.8
1335	406.9	1398	426.1	1587	483.7	1461	445.3	1524	464.5	1650	502.9	1713	522.1
1336	407.2	1399	426.4	1588	484.0	1462	445.6	1525	464.8	1651	503.2	1714	522.4
1337	407.5	1400	426.7	1589	484.3	1463	445.9	1526	465.1	1652	503.5	1715	522.7
1338	407.8	1401	427.0	1590	484.6	1464	446.2	1527	465.4	1653	503.8	1716	523.0
1339	408.1	1402	427.3	1591	484.9	1465	446.5	1528	465.7	1654	504.1	1717	523.3
1340	408.4	1403	427.6	1592	485.2	1466	446.8	1529	466.0	1655	504.5	1718	523.7
1341	408.7	1404	427.9	1593	485.6	1467	447.1	1530	466.3	1656	504.8	1719	524.0
1342	409.0	1405	428.2	1594	485.9	1468	447.5	1531	466.7	1657	505.1	1720	524.3
1343	409.4	1406	428.6	1595	486.2	1469	447.8	1532	467.0	1658	505.4	1721	524.6
1344	409.7	1407	428.9	1596	486.5	1470	448.1	1533	467.3	1659	505.7	1722	524.9
1345	410.0	1408	429.2	1597	486.8	1471	448.4	1534	467.6	1660	506.0	1723	525.2
1346	410.3	1409	429.5	1598	487.1	1472	448.7	1535	467.9	1661	506.3	1724	525.5
1347	410.6	1410	429.8	1599	487.4	1473	449.0	1536	468.2	1662	506.6	1725	525.8
1348	410.9	1411	430.1	1600	487.7	1474	449.3	1537	468.5	1663	506.9	1726	526.1
1349	411.2	1412	430.4	1601	488.0	1475	449.6	1538	468.8	1664	507.2	1727	526.4
1350	411.5	1413	430.7	1602	488.3	1476	449.9	1539	469.1	1665	507.5	1728	526.7
1351	411.8	1414	431.0	1603	488.6	1477	450.2	1540	469.4	1666	507.8	1729	527.0
1352	412.1	1415	431.3	1604	488.9	1478	450.5	1541	469.7	1667	508.1	1730	527.3
1353	412.4	1416	431.6	1605	489.2	1479	450.8	1542	470.0	1668	508.4	1731	527.6
1354	412.7	1417	431.9	1606	489.5	1480	451.1	1543	470.3	1669	508.7	1732	527.9
1355	413.0	1418	432.2	1607	489.8	1481	451.4	1544	470.6	1670	509.0	1733	528.2
1356	413.3	1419	432.5	1608	490.1	1482	451.7	1545	470.9	1671	509.3	1734	528.5
1357	413.6	1420	432.8	1609	490.4	1483	452.0	1546	471.2	1672	509.6	1735	528.8
1358	413.9	1421	433.1	1610	490.7	1484	452.3	1547	471.5	1673	509.9	1736	529.1
1359	414.2	1422	433.4	1611	491.0	1485	452.6	1548	471.8	1674	510.2	1737	529.4
1360	414.5	1423	433.7	1612	491.3	1486	452.9	1549	472.1	1675	510.5	1738	529.7
1361	414.8	1424	434.0	1613	491.6	1487	453.2	1550	472.4	1676	510.9	1739	530.1
1362	415.1	1425	434.3	1614	492.0	1488	453.5	1551	472.8	1677	511.2	1740	530.4
1363	415.4	1426	434.7	1615	492.3	1489	453.9	1552	473.1	1678	511.5	1741	530.7
1364	415.8	1427	435.0	1616	492.6	1490	454.2	1553	473.4	1679	511.8	1742	531.0
1365	416.1	1428	435.3	1617	492.9	1491	454.5	1554	473.7	1680	512.1	1743	531.3
1366	416.4	1429	435.6	1618	493.2	1492	454.8	1555	474.0	1681	512.4	1744	531.6
1367	416.7	1430	435.9	1619	493.5	1493	455.1	1556	474.3	1682	512.7	1745	531.9
1368	417.0	1431	436.2	1620	493.8	1494	455.4	1557	474.6	1683	513.0	1746	532.2
1369	417.3	1432	436.5	1621	494.1	1495	455.7	1558	474.9	1684	513.3	1747	532.5
1370	417.6	1433	436.8	1622	494.4	1496	456.0	1559	475.2	1685	513.6	1748	532.8
1371	417.9	1434	437.1	1623	494.7	1497	456.3	1560	475.5	1686	513.9	1749	533.1
1372	418.2	1435	437.4	1624	495.0	1498	456.6	1561	475.8	1687	514.2	1750	533.4
1373	418.5	1436	437.7	1625	495.3	1499	456.9	1562	476.1	1688	514.5	1751	533.7
1374	418.8	1437	438.0	1626	495.6	1500	457.2	1563	476.4	1689	514.8	1752	534.0
1375	419.1	1438	438.3	1627	495.9	1501	457.5	1564	476.7	1690	515.1	1753	534.3
1376	419.4	1439	438.6	1628	496.2	1502	457.8	1565	477.0	1691	515.4	1754	534.6
1377	419.7	1440	438.9	1629	496.5	1503	458.1	1566	477.3	1692	515.7	1755	534.9
1378	420.0	1441	439.2	1630	496.8	1504	458.4	1567	477.6	1693	516.0	1756	535.2
1379	420.3	1442	439.5	1631	497.1	1505	458.7	1568	477.9	1694	516.3	1757	535.5
1380	420.6	1443	439.8	1632	497.4	1506	459.0	1569	478.2	1695	516.6	1758	535.8
1381	420.9	1444	440.1	1633	497.7	1507	459.3	1570	478.5	1696	516.9	1759	536.1
1382	421.2	1445	440.4	1634	498.0	1508	459.6	1571	478.8	1697	517.3	1760	536.5
1383	421.5	1446	440.7	1635	498.4	1509	459.9	1572	479.2	1698	517.6	1761	536.8
1384	421.8	1447	441.1	1636	498.7	1510	460.3	1573	479.5	1699	517.9	1762	537.1

FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS
1763	537.4	1826	556.6	1889	575.8	1952	595.0	2015	614.2	2078	633.4	2141	652.6
1764	537.7	1827	556.9	1890	576.1	1953	595.3	2016	614.5	2079	633.7	2142	652.9
1765	538.0	1828	557.2	1891	576.4	1954	595.6	2017	614.8	2080	634.0	2143	653.2
1766	538.3	1829	557.5	1892	576.7	1955	595.9	2018	615.1	2081	634.3	2144	653.5
1767	538.6	1830	557.8	1893	577.0	1956	596.2	2019	615.4	2082	634.6	2145	653.8
1768	538.9	1831	558.1	1894	577.3	1957	596.5	2020	615.7	2083	634.9	2146	654.1
1769	539.2	1832	558.4	1895	577.6	1958	596.8	2021	616.0	2084	635.2	2147	654.4
1770	539.5	1833	558.7	1896	577.9	1959	597.1	2022	616.3	2085	635.5	2148	654.7
1771	539.8	1834	559.0	1897	578.2	1960	597.4	2023	616.6	2086	635.8	2149	655.0
1772	540.1	1835	559.3	1898	578.5	1961	597.7	2024	616.9	2087	636.1	2150	655.3
1773	540.4	1836	559.6	1899	578.8	1962	598.0	2025	617.2	2088	636.4	2151	655.6
1774	540.7	1837	559.9	1900	579.1	1963	598.3	2026	617.5	2089	636.7	2152	655.9
1775	541.0	1838	560.2	1901	579.4	1964	598.6	2027	617.8	2090	637.0	2153	656.2
1776	541.3	1839	560.5	1902	579.7	1965	598.9	2028	618.1	2091	637.3	2154	656.5
1777	541.6	1840	560.8	1903	580.0	1966	599.2	2029	618.4	2092	637.6	2155	656.9
1778	541.9	1841	561.1	1904	580.3	1967	599.5	2030	618.8	2093	638.0	2156	657.2
1779	542.2	1842	561.4	1905	580.7	1968	599.9	2031	619.1	2094	638.3	2157	657.5
1780	542.6	1843	561.8	1906	581.0	1969	600.2	2032	619.4	2095	638.6	2158	657.8
1781	542.9	1844	562.1	1907	581.3	1970	600.5	2033	619.7	2096	638.9	2159	658.1
1782	543.2	1845	562.4	1908	581.6	1971	600.8	2034	620.0	2097	639.2	2160	658.4
1783	543.5	1846	562.7	1909	581.9	1972	601.1	2035	620.3	2098	639.5	2161	658.7
1784	543.8	1847	563.0	1910	582.2	1973	601.4	2036	620.6	2099	639.8	2162	659.0
1785	544.1	1848	563.3	1911	582.5	1974	601.7	2037	620.9	2100	640.1	2163	659.3
1786	544.4	1849	563.6	1912	582.8	1975	602.0	2038	621.2	2101	640.4	2164	659.6
1787	544.7	1850	563.9	1913	583.1	1976	602.3	2039	621.5	2102	640.7	2165	659.9
1788	545.0	1851	564.2	1914	583.4	1977	602.6	2040	621.8	2103	641.0	2166	660.2
1789	545.3	1852	564.5	1915	583.7	1978	602.9	2041	622.1	2104	641.3	2167	660.5
1790	545.6	1853	564.8	1916	584.0	1979	603.2	2042	622.4	2105	641.6	2168	660.8
1791	545.9	1854	565.1	1917	584.3	1980	603.5	2043	622.7	2106	641.9	2169	661.1
1792	546.2	1855	565.4	1918	584.6	1981	603.8	2044	623.0	2107	642.2	2170	661.4
1793	546.5	1856	565.7	1919	584.9	1982	604.1	2045	623.3	2108	642.5	2171	661.7
1794	546.8	1857	566.0	1920	585.2	1983	604.4	2046	623.6	2109	642.8	2172	662.0
1795	547.1	1858	566.3	1921	585.5	1984	604.7	2047	623.9	2110	643.1	2173	662.3
1796	547.4	1859	566.6	1922	585.8	1985	605.0	2048	624.2	2111	643.4	2174	662.6
1797	547.7	1860	566.9	1923	586.1	1986	605.3	2049	624.5	2112	643.7	2175	662.9
1798	548.0	1861	567.2	1924	586.4	1987	605.6	2050	624.8	2113	644.1	2176	663.3
1799	548.3	1862	567.5	1925	586.7	1988	605.9	2051	625.2	2114	644.4	2177	663.6
1800	548.6	1863	567.8	1926	587.1	1989	606.3	2052	625.5	2115	644.7	2178	663.9
1801	549.0	1864	568.2	1927	587.4	1990	606.6	2053	625.8	2116	645.0	2179	664.2
1802	549.3	1865	568.5	1928	587.7	1991	606.9	2054	626.1	2117	645.3	2180	664.5
1803	549.6	1866	568.8	1929	588.0	1992	607.2	2055	626.4	2118	645.6	2181	664.8
1804	549.9	1867	569.1	1930	588.3	1993	607.5	2056	626.7	2119	645.9	2182	665.1
1805	550.2	1868	569.4	1931	588.6	1994	607.8	2057	627.0	2120	646.2	2183	665.4
1806	550.5	1869	569.7	1932	588.9	1995	608.1	2058	627.3	2121	646.5	2184	665.7
1807	550.8	1870	570.0	1933	589.2	1996	608.4	2059	627.6	2122	646.8	2185	666.0
1808	551.1	1871	570.3	1934	589.5	1997	608.7	2060	627.9	2123	647.1	2186	666.3
1809	551.4	1872	570.6	1935	589.8	1998	609.0	2061	628.2	2124	647.4	2187	666.6
1810	551.7	1873	570.9	1936	590.1	1999	609.3	2062	628.5	2125	647.7	2188	666.9
1811	552.0	1874	571.2	1937	590.4	2000	609.6	2063	628.8	2126	648.0	2189	667.2
1812	552.3	1875	571.5	1938	590.7	2001	609.9	2064	629.1	2127	648.3	2190	667.5
1813	552.6	1876	571.8	1939	591.0	2002	610.2	2065	629.4	2128	648.6	2191	667.8
1814	552.9	1877	572.1	1940	591.3	2003	610.5	2066	629.7	2129	648.9	2192	668.1
1815	553.2	1878	572.4	1941	591.6	2004	610.8	2067	630.0	2130	649.2	2193	668.4
1816	553.5	1879	572.7	1942	591.9	2005	611.1	2068	630.3	2131	649.5	2194	668.7
1817	553.8	1880	573.0	1943	592.2	2006	611.4	2069	630.6	2132	649.8	2195	669.0
1818	554.1	1881	573.3	1944	592.5	2007	611.7	2070	630.9	2133	650.1	2196	669.3
1819	554.4	1882	573.6	1945	592.8	2008	612.0	2071	631.2	2134	650.5	2197	669.7
1820	554.7	1883	573.9	1946	593.1	2009	612.4	2072	631.6	2135	650.8	2198	670.0
1821	555.0	1884	574.3	1947	593.5	2010	612.7	2073	631.9	2136	651.1	2199	670.3
1822	555.4	1885	574.6	1948	593.8	2011	613.0	2074	632.2	2137	651.4	2200	670.6
1823	555.7	1886	574.9	1949	594.1	2012	613.3	2075	632.5	2138	651.7	2201	670.9
1824	556.0	1887	575.2	1950	594.4	2013	613.6	2076	632.8	2139	652.0	2202	671.2
1825	556.3	1888	575.5	1951	594.7	2014	613.9	2077	633.1	2140	652.3	2203	671.5

FEET	METERS
2204	671.8
2205	672.1
2206	672.4
2207	672.7
2208	673.0
2209	673.3
2210	673.6
2211	673.9
2212	674.2
2213	674.5
2214	674.8
2215	675.1
2216	675.4
2217	675.7
2218	676.1
2219	676.4
2220	676.7
2221	677.0
2222	677.3
2223	677.6
2224	677.9
2225	678.2
2226	678.5
2227	678.8
2228	679.1
2229	679.4
2230	679.7
2231	680.0
2232	680.3
2233	680.6
2234	680.9
2235	681.2
2236	681.5
2237	681.8
2238	682.2
2239	682.5
2240	682.8
2241	683.1
2242	683.4
2243	683.7
2244	684.0
2245	684.3
2246	684.6
2247	684.9
2248	685.2
2249	685.5
2250	685.8
2251	686.1
2252	686.4
2253	686.7
2254	687.0
2255	687.3
2256	687.6
2257	687.9
2258	688.2
2259	688.6
2260	688.9
2261	689.2
2262	689.5
2263	689.8
2264	690.1
2265	690.4
2266	690.7

FEET	METERS
2267	691.0
2268	691.3
2269	691.6
2270	691.9
2271	692.2
2272	692.5
2273	692.8
2274	693.1
2275	693.4
2276	693.7
2277	694.0
2278	694.3
2279	694.6
2280	695.0
2281	695.3
2282	695.6
2283	695.9
2284	696.2
2285	696.5
2286	696.8
2287	697.1
2288	697.4
2289	697.7
2290	698.0
2291	698.3
2292	698.6
2293	698.9
2294	699.2
2295	699.5
2296	699.8
2297	700.1
2298	700.4
2299	700.7
2300	701.0
2301	701.4
2302	701.7
2303	702.0
2304	702.3
2305	702.6
2306	702.9
2307	703.2
2308	703.5
2309	703.8
2310	704.1
2311	704.4
2312	704.7
2313	705.0
2314	705.3
2315	705.6
2316	705.9
2317	706.2
2318	706.5
2319	706.8
2320	707.1
2321	707.4
2322	707.8
2323	708.1
2324	708.4
2325	708.7
2326	709.0
2327	709.3
2328	709.6
2329	709.9

FEET	METERS
2330	710.2
2331	710.5
2332	710.8
2333	711.1
2334	711.4
2335	711.7
2336	712.0
2337	712.3
2338	712.6
2339	712.9
2340	713.2
2341	713.5
2342	713.9
2343	714.2
2344	714.5
2345	714.8
2346	715.1
2347	715.4
2348	715.7
2349	716.0
2350	716.3
2351	716.6
2352	716.9
2353	717.2
2354	717.5
2355	717.8
2356	718.1
2357	718.4
2358	718.7
2359	719.0
2360	719.3
2361	719.6
2362	719.9
2363	720.3
2364	720.6
2365	720.9
2366	721.2
2367	721.5
2368	721.8
2369	722.1
2370	722.4
2371	722.7
2372	723.0
2373	723.3
2374	723.6
2375	723.9
2376	724.2
2377	724.5
2378	724.8
2379	725.1
2380	725.4
2381	725.7
2382	726.0
2383	726.3
2384	726.7
2385	727.0
2386	727.3
2387	727.6
2388	727.9
2389	728.2
2390	728.5
2391	728.8
2392	729.1

FEET	METERS
2393	729.4
2394	729.7
2395	730.0
2396	730.3
2397	730.6
2398	730.9
2399	731.2
2400	731.5
2401	731.8
2402	732.1
2403	732.4
2404	732.7
2405	733.1
2406	733.4
2407	733.7
2408	734.0
2409	734.3
2410	734.6
2411	734.9
2412	735.2
2413	735.5
2414	735.8
2415	736.1
2416	736.4
2417	736.7
2418	737.0
2419	737.3
2420	737.6
2421	737.9
2422	738.2
2423	738.5
2424	738.8
2425	739.1
2426	739.5
2427	739.8
2428	740.1
2429	740.4
2430	740.7
2431	741.0
2432	741.3
2433	741.6
2434	741.9
2435	742.2
2436	742.5
2437	742.8
2438	743.1
2439	743.4
2440	743.7
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2443	744.6
2444	744.9
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2447	745.9
2448	746.2
2449	746.5
2450	746.8
2451	747.1
2452	747.4
2453	747.7
2454	748.0
2455	748.3

FEET	METERS
2456	748.6
2457	748.9
2458	749.2
2459	749.5
2460	749.8
2461	750.1
2462	750.4
2463	750.7
2464	751.0
2465	751.3
2466	751.6
2467	752.0
2468	752.3
2469	752.6
2470	752.9
2471	753.2
2472	753.5
2473	753.8
2474	754.1
2475	754.4
2476	754.7
2477	755.0
2478	755.3
2479	755.6
2480	755.9
2481	756.2
2482	756.5
2483	756.8
2484	757.1
2485	757.4
2486	757.7
2487	758.0
2488	758.4
2489	758.7
2490	759.0
2491	759.3
2492	759.6
2493	759.9
2494	760.2
2495	760.5
2496	760.8
2497	761.1
2498	761.4
2499	761.7
2500	762.0
2501	762.3
2502	762.6
2503	762.9
2504	763.2
2505	763.5
2506	763.8
2507	764.1
2508	764.4
2509	764.8
2510	765.1
2511	765.4
2512	765.7
2513	766.0
2514	766.3
2515	766.6
2516	766.9
2517	767.2
2518	767.5

FEET	METERS
2519	767.8
2520	768.1
2521	768.4
2522	768.7
2523	769.0
2524	769.3
2525	769.6
2526	769.9
2527	770.2
2528	770.5
2529	770.8
2530	771.2
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2532	771.8
2533	772.1
2534	772.4
2535	772.7
2536	773.0
2537	773.3
2538	773.6
2539	773.9
2540	774.2
2541	774.5
2542	774.8
2543	775.1
2544	775.4
2545	775.7
2546	776.0
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2548	776.6
2549	776.9
2550	777.2
2551	777.6
2552	777.9
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2555	778.8
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2557	779.4
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2563	781.2
2564	781.5
2565	781.8
2566	782.1
2567	782.4
2568	782.7
2569	783.0
2570	783.3
2571	783.7
2572	784.0
2573	784.3
2574	784.6
2575	784.9
2576	785.2
2577	785.5
2578	785.8
2579	786.1
2580	786.4
2581	786.7

FEET	METERS
2582	787.0
2583	787.3
2584	787.6
2585	787.9
2586	788.2
2587	788.5
2588	788.8
2589	789.1
2590	789.4
2591	789.7
2592	790.1
2593	790.4
2594	790.7
2595	791.0
2596	791.3
2597	791.6
2598	791.9
2599	792.2
2600	792.5
2601	792.8
2602	793.1
2603	793.4
2604	793.7
2605	794.0
2606	794.3
2607	794.6
2608	794.9
2609	795.2
2610	795.5
2611	795.8
2612	796.1
2613	796.5
2614	796.8
2615	797.1
2616	797.4
2617	797.7
2618	798.0
2619	798.3
2620	798.6
2621	798.9
2622	799.2
2623	799.5
2624	799.8
2625	800.1
2626	800.4
2627	800.7
2628	801.0
2629	801.3
2630	801.6
2631	801.9
2632	802.2
2633	802.5
2634	802.9
2635	803.2
2636	803.5
2637	803.8
2638	804.1
2639	804.4
2640	804.7
2641	805.0
2642	805.3
2643	805.6
2644	805.9

FEET	METERS
2645	806.2
2646	806.5
2647	806.8
2648	807.1
2649	807.4
2650	807.7
2651	808.0
2652	808.3
2653	808.6
2654	808.9
2655	809.3
2656	809.6
2657	809.9
2658	810.2
2659	810.5
2660	810.8
2661	811.1
2662	811.4
2663	811.7
2664	812.0
2665	812.3
2666	812.6
2667	812.9
2668	813.2
2669	813.5
2670	813.8
2671	814.1
2672	814.4
2673	814.7
2674	815.0
2675	815.3
2676	815.7
2677	816.0
2678	816.3
2679	816.6
2680	816.9
2681	817.2
2682	817.5
2683	817.8
2684	818.1
2685	818.4
2686	818.7
2687	819.0
2688	819.3
2689	819.6
2690	819.9
2691	820.2
2692	820.5
2693	820.8
2694	821.1
2695	821.4
2696	821.8
2697	822.1
2698	822.4
2699	822.7
2700	823.0
2701	823.3
2702	823.6
2703	823.9
2704	824.2
2705	824.5
2706	824.8
2707	825.1

FEET	METERS
2708	825.4
2709	825.7
2710	826.0
2711	826.3
2712	826.6
2713	826.9
2714	827.2
2715	827.5
2716	827.8
2717	828.2
2718	828.5
2719	828.8
2720	829.1
2721	829.4
2722	829.7
2723	830.0
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2725	830.6
2726	830.9
2727	831.2
2728	831.5
2729	831.8
2730	832.1
2731	832.4
2732	832.7
2733	833.0
2734	833.3
2735	833.6
2736	833.9
2737	834.2
2738	834.6
2739	834.9
2740	835.2
2741	835.5
2742	835.8
2743	836.1
2744	836.4
2745	836.7
2746	837.0
2747	837.3
2748	837.6
2749	837.9
2750	838.2
2751	838.5
2752	838.8
2753	839.1
2754	839.4
2755	839.7
2756	840.0
2757	840.3
2758	840.6
2759	841.0
2760	841.3
2761	841.6
2762	841.9
2763	842.2
2764	842.5
2765	842.8
2766	843.1
2767	843.4
2768	843.7
2769	844.0
2770	844.3

FEET	METERS
2771	844.6
2772	844.9
2773	845.2
2774	845.5
2775	845.8
2776	846.1
2777	846.4
2778	846.7
2779	847.0
2780	847.4
2781	847.7
2782	848.0
2783	848.3
2784	848.6
2785	848.9
2786	849.2
2787	849.5
2788	849.8
2789	850.1
2790	850.4
2791	850.7
2792	851.0
2793	851.3
2794	851.6
2795	851.9
2796	852.2
2797	852.5
2798	852.8
2799	853.1
2800	853.5
2801	853.8
2802	854.1
2803	854.4
2804	854.7
2805	855.0
2806	855.3
2807	855.6
2808	855.9
2809	856.2
2810	856.5
2811	856.8
2812	857.1
2813	857.4
2814	857.7
2815	858.0
2816	858.3
2817	858.6
2818	858.9
2819	859.2
2820	859.5
2821	859.9
2822	860.2
2823	860.5
2824	860.8
2825	861.1
2826	861.4
2827	861.7
2828	862.0
2829	862.3
2830	862.6
2831	862.9
2832	863.2
2833	863.5

FEET	METERS
2834	863.8
2835	864.1
2836	864.4
2837	864.7
2838	865.0
2839	865.3
2840	865.6
2841	865.9
2842	866.3
2843	866.6
2844	866.9
2845	867.2
2846	867.5
2847	867.8
2848	868.1
2849	868.4
2850	868.7
2851	869.0
2852	869.3
2853	869.6
2854	869.9
2855	870.2
2856	870.5
2857	870.8
2858	871.1
2859	871.4
2860	871.7
2861	872.0
2862	872.3
2863	872.7
2864	873.0
2865	873.3
2866	873.6
2867	873.9
2868	874.2
2869	874.5
2870	874.8
2871	875.1
2872	875.4
2873	875.7
2874	876.0
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2876	876.6
2877	876.9
2878	877.2
2879	877.5
2880	877.8
2881	878.1
2882	878.4
2883	878.7
2884	879.1
2885	879.4
2886	879.7
2887	880.0
2888	880.3
2889	880.6
2890	880.9
2891	881.2
2892	881.5
2893	881.8
2894	882.1
2895	882.4
2896	882.7

FEET	METERS
2897	883.0
2898	883.3
2899	883.6
2900	883.9
2901	884.2
2902	884.5
2903	884.8
2904	885.1
2905	885.5
2906	885.8
2907	886.1
2908	886.4
2909	886.7
2910	887.0
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2912	887.6
2913	887.9
2914	888.2
2915	888.5
2916	888.8
2917	889.1
2918	889.4
2919	889.7
2920	890.0
2921	890.3
2922	890.6
2923	890.9
2924	891.2
2925	891.6
2926	891.9
2927	892.2
2928	892.5
2929	892.8
2930	893.1
2931	893.4
2932	893.7
2933	894.0
2934	894.3
2935	894.6
2936	894.9
2937	895.2
2938	895.5
2939	895.8
2940	896.1
2941	896.4
2942	896.7
2943	897.0
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2945	897.6
2946	898.0
2947	898.3
2948	898.6
2949	898.9
2950	899.2
2951	899.5
2952	899.8
2953	900.1
2954	900.4
2955	900.7
2956	901.0
2957	901.3
2958	901.6
2959	901.9

FEET	METERS
2960	902.2
2961	902.5
2962	902.8
2963	903.1
2964	903.4
2965	903.7
2966	904.0
2967	904.4
2968	904.7
2969	905.0
2970	905.3
2971	905.6
2972	905.9
2973	906.2
2974	906.5
2975	906.8
2976	907.1
2977	907.4
2978	907.7
2979	908.0
2980	908.3
2981	908.6
2982	908.9
2983	909.2
2984	909.5
2985	909.8
2986	910.1
2987	910.4
2988	910.8
2989	911.1
2990	911.4
2991	911.7
2992	912.0
2993	912.3
2994	912.6
2995	912.9
2996	913.2
2997	913.5
2998	913.8
2999	914.1
3000	914.4
3001	914.7
3002	915.0
3003	915.3
3004	915.6
3005	915.9
3006	916.2
3007	916.5
3008	916.8
3009	917.2
3010	917.5
3011	917.8
3012	918.1
3013	918.4
3014	918.7
3015	919.0
3016	919.3
3017	919.6
3018	919.9
3019	920.2
3020	920.5
3021	920.8
3022	921.1

FEET	METERS
3023	921.4
3024	921.7
3025	922.0
3026	922.3
3027	922.6
3028	922.9
3029	923.3
3030	923.6
3031	923.9
3032	924.2
3033	924.5
3034	924.8
3035	925.1
3036	925.4
3037	925.7
3038	926.0
3039	926.3
3040	926.6
3041	926.9
3042	927.2
3043	927.5
3044	927.8
3045	928.1
3046	928.4
3047	928.7
3048	929.0
3049	929.3
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3052	930.3
3053	930.6
3054	930.9
3055	931.2
3056	931.5
3057	931.8
3058	932.1
3059	932.4
3060	932.7
3061	933.0
3062	933.3
3063	933.6
3064	933.9
3065	934.2
3066	934.5
3067	934.8
3068	935.1
3069	935.4
3070	935.7
3071	936.1
3072	936.4
3073	936.7
3074	937.0
3075	937.3
3076	937.6
3077	937.9
3078	938.2
3079	938.5
3080	938.8
3081	939.1
3082	939.4
3083	939.7
3084	940.0
3085	940.3

FEET	METERS
3086	940.6
3087	940.9
3088	941.2
3089	941.5
3090	941.8
3091	942.1
3092	942.5
3093	942.8
3094	943.1
3095	943.4
3096	943.7
3097	944.0
3098	944.3
3099	944.6
3100	944.9
3101	945.2
3102	945.5
3103	945.8
3104	946.1
3105	946.4
3106	946.7
3107	947.0
3108	947.3
3109	947.6
3110	947.9
3111	948.2
3112	948.5
3113	948.9
3114	949.2
3115	949.5
3116	949.8
3117	950.1
3118	950.4
3119	950.7
3120	951.0
3121	951.3
3122	951.6
3123	951.9
3124	952.2
3125	952.5
3126	952.8
3127	953.1
3128	953.4
3129	953.7
3130	954.0
3131	954.3
3132	954.6
3133	955.0
3134	955.3
3135	955.6
3136	955.9
3137	956.2
3138	956.5
3139	956.8
3140	957.1
3141	957.4
3142	957.7
3143	958.0
3144	958.3
3145	958.6
3146	959.9
3147	959.2
3148	959.5

FEET	METERS
3149	959.8
3150	960.1
3151	960.4
3152	960.7
3153	961.0
3154	961.4
3155	961.7
3156	962.0
3157	962.3
3158	962.6
3159	962.9
3160	963.2
3161	963.5
3162	963.8
3163	964.1
3164	964.4
3165	964.7
3166	965.0
3167	965.3
3168	965.6
3169	965.9
3170	966.2
3171	966.5
3172	966.8
3173	967.1
3174	967.4
3175	967.8
3176	968.1
3177	968.4
3178	968.7
3179	969.0
3180	969.3
3181	969.6
3182	969.9
3183	970.2
3184	970.5
3185	970.8
3186	971.1
3187	971.4
3188	971.7
3189	972.0
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3191	972.6
3192	972.9
3193	973.2
3194	973.5
3195	973.8
3196	974.2
3197	974.5
3198	974.8
3199	975.1
3200	975.4
3201	975.7
3202	976.0
3203	976.3
3204	976.6
3205	976.9
3206	977.2
3207	977.5
3208	977.8
3209	978.1
3210	978.4
3211	978.7

FEET	METERS
3212	979.0
3213	979.3
3214	979.6
3215	979.9
3216	980.2
3217	980.6
3218	980.9
3219	981.2
3220	981.5
3221	981.8
3222	982.1
3223	982.4
3224	982.7
3225	983.0
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3227	983.6
3228	983.9
3229	984.2
3230	984.5
3231	984.8
3232	985.1
3233	985.4
3234	985.7
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3237	986.6
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3252	991.2
3253	991.5
3254	991.8
3255	992.1
3256	992.4
3257	992.7
3258	993.1
3259	993.4
3260	993.7
3261	994.0
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3263	994.6
3264	994.9
3265	995.2
3266	995.5
3267	995.8
3268	996.1
3269	996.4
3270	996.7
3271	997.0
3272	997.3
3273	997.6
3274	997.9

FEET	METERS
3275	998.2
3276	998.5
3277	998.8
3278	999.1
3279	999.5
3280	999.8
3281	1000.1
3282	1000.4
3283	1000.7
3284	1001.0
3285	1001.3
3286	1001.6
3287	1001.9
3288	1002.2
3289	1002.5
3290	1002.8
3291	1003.1
3292	1003.4
3293	1003.7
3294	1004.0
3295	1004.3
3296	1004.6
3297	1004.9
3298	1005.2
3299	1005.5
3300	1005.9
3301	1006.2
3302	1006.5
3303	1006.8
3304	1007.1
3305	1007.4
3306	1007.7
3307	1008.0
3308	1008.3
3309	1008.6
3310	1008.9
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3312	1009.5
3313	1009.8
3314	1010.1
3315	1010.4
3316	1010.7
3317	1011.0
3318	1011.3
3319	1011.6
3320	1011.9
3321	1012.3
3322	1012.6
3323	1012.9
3324	1013.2
3325	1013.5
3326	1013.8
3327	1014.1
3328	1014.4
3329	1014.7
3330	1015.0
3331	1015.3
3332	1015.6
3333	1015.9
3334	1016.2
3335	1016.5
3336	1016.8
3337	1017.1

FEET	METERS
3338	1017.4
3339	1017.7
3340	1018.0
3341	1018.3
3342	1018.7
3343	1019.0
3344	1019.3
3345	1019.6
3346	1019.9
3347	1020.2
3348	1020.5
3349	1020.8
3350	1021.1
3351	1021.4
3352	1021.7
3353	1022.0
3354	1022.3
3355	1022.6
3356	1022.9
3357	1023.2
3358	1023.5
3359	1023.8
3360	1024.1
3361	1024.4
3362	1024.8
3363	1025.1
3364	1025.4
3365	1025.7
3366	1026.0
3367	1026.3
3368	1026.6
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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4597	1401.2

FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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4909	1496.3
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FEET	METERS
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FEET	METERS
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FEET	METERS
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5098	1553.9
5099	1554.2
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5101	1554.8

FEET	METERS
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5108	1556.9
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5124	1561.8
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5160	1572.8
5161	1573.1
5162	1573.4
5163	1573.7
5164	1574.0

FEET	METERS
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5166	1574.6
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FEET	METERS
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FEET	METERS
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FEET	METERS
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FEET	METERS
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5475	1668.8
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5477	1669.4
5478	1669.7
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FEET	METERS
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5485	1671.8
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FEET	METERS
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5595	1705.4
5596	1705.7
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5601	1707.2
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5604	1708.1
5605	1708.4

FEET	METERS
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5612	1710.6
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5664	1726.4
5665	1726.7
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5667	1727.3
5668	1727.6

FEET	METERS
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5674	1729.5
5675	1729.8
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5728	1745.9
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5730	1746.5
5731	1746.8

FEET	METERS
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5734	1747.7
5735	1748.0
5736	1748.4
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5774	1759.9
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5778	1761.2
5779	1761.5
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5790	1764.8
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5792	1765.4
5793	1765.7
5794	1766.0

FEET	METERS
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5796	1766.6
5797	1766.9
5798	1767.3
5799	1767.6
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5836	1778.8
5837	1779.1
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5839	1779.7
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5841	1780.4
5842	1780.7
5843	1781.0
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5852	1783.7
5853	1784.0
5854	1784.3
5855	1784.6
5856	1784.9
5857	1785.2

FEET	METERS
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5859	1785.8
5860	1786.1
5861	1786.5
5862	1786.8
5863	1787.1
5864	1787.4
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5873	1790.1
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5891	1795.6
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5894	1796.5
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5898	1797.7
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5910	1801.4
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5916	1803.2
5917	1803.5
5918	1803.8
5919	1804.1
5920	1804.4

FEET	METERS
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5922	1805.0
5923	1805.4
5924	1805.7
5925	1806.0
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5927	1806.6
5928	1806.9
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5931	1807.8
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5934	1808.7
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5957	1815.7
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5983	1823.6

FEET	METERS
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6039	1840.7
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6043	1841.9
6044	1842.2
6045	1842.5
6046	1842.8

FEET	METERS
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6048	1843.5
6049	1843.8
6050	1844.1
6051	1844.4
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6056	1845.9
6057	1846.2
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6059	1846.8
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6061	1847.4
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6078	1852.6
6079	1852.9
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6082	1853.8
6083	1854.1
6084	1854.4
6085	1854.7
6086	1855.0
6087	1855.3
6088	1855.6
6089	1855.9
6090	1856.3
6091	1856.6
6092	1856.9
6093	1857.2
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6095	1857.8
6096	1858.1
6097	1858.4
6098	1858.7
6099	1859.0
6100	1859.3
6101	1859.6
6102	1859.9
6103	1860.2
6104	1860.5
6105	1860.8
6106	1861.1
6107	1861.4
6108	1861.7
6109	1862.0

FEET	METERS
6110	1862.4
6111	1862.7
6112	1863.0
6113	1863.3
6114	1863.6
6115	1863.9
6116	1864.2
6117	1864.5
6118	1864.8
6119	1865.1
6120	1865.4
6121	1865.7
6122	1866.0
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6124	1866.6
6125	1866.9
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6127	1867.5
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6129	1868.1
6130	1868.4
6131	1868.8
6132	1869.1
6133	1869.4
6134	1869.7
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6137	1870.6
6138	1870.9
6139	1871.2
6140	1871.5
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6142	1872.1
6143	1872.4
6144	1872.7
6145	1873.0
6146	1873.3
6147	1873.6
6148	1873.9
6149	1874.2
6150	1874.5
6151	1874.8
6152	1875.2
6153	1875.5
6154	1875.8
6155	1876.1
6156	1876.4
6157	1876.7
6158	1877.0
6159	1877.3
6160	1877.6
6161	1877.9
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6163	1878.5
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6165	1879.1
6166	1879.4
6167	1879.7
6168	1880.0
6169	1880.3
6170	1880.6
6171	1880.9
6172	1881.2

FEET	METERS
6173	1881.6
6174	1881.9
6175	1882.2
6176	1882.5
6177	1882.8
6178	1883.1
6179	1883.4
6180	1883.7
6181	1884.0
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6183	1884.6
6184	1884.9
6185	1885.2
6186	1885.5
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6189	1886.4
6190	1886.7
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6192	1887.3
6193	1887.6
6194	1888.0
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6196	1888.6
6197	1888.9
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6199	1889.5
6200	1889.8
6201	1890.1
6202	1890.4
6203	1890.7
6204	1891.0
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6206	1891.6
6207	1891.9
6208	1892.2
6209	1892.5
6210	1892.8
6211	1893.1
6212	1893.4
6213	1893.7
6214	1894.1
6215	1894.4
6216	1894.7
6217	1895.0
6218	1895.3
6219	1895.6
6220	1895.9
6221	1896.2
6222	1896.5
6223	1896.8
6224	1897.1
6225	1897.4
6226	1897.7
6227	1898.0
6228	1898.3
6229	1898.6
6230	1898.9
6231	1899.2
6232	1899.5
6233	1899.8
6234	1900.1
6235	1900.5

FEET	METERS
6236	1900.8
6237	1901.1
6238	1901.4
6239	1901.7
6240	1902.0
6241	1902.3
6242	1902.6
6243	1902.9
6244	1903.2
6245	1903.5
6246	1903.8
6247	1904.1
6248	1904.4
6249	1904.7
6250	1905.0
6251	1905.3
6252	1905.6
6253	1905.9
6254	1906.2
6255	1906.5
6256	1906.9
6257	1907.2
6258	1907.5
6259	1907.8
6260	1908.1
6261	1908.4
6262	1908.7
6263	1909.0
6264	1909.3
6265	1909.6
6266	1909.9
6267	1910.2
6268	1910.5
6269	1910.8
6270	1911.1
6271	1911.4
6272	1911.7
6273	1912.0
6274	1912.3
6275	1912.6
6276	1912.9
6277	1913.3
6278	1913.6
6279	1913.9
6280	1914.2
6281	1914.5
6282	1914.8
6283	1915.1
6284	1915.4
6285	1915.7
6286	1916.0
6287	1916.3
6288	1916.6
6289	1916.9
6290	1917.2
6291	1917.5
6292	1917.8
6293	1918.1
6294	1918.4
6295	1918.7
6296	1919.0
6297	1919.3
6298	1919.7

FEET	METERS
6299	1920.0
6300	1920.3
6301	1920.6
6302	1920.9
6303	1921.2
6304	1921.5
6305	1921.8
6306	1922.1
6307	1922.4
6308	1922.7
6309	1923.0
6310	1923.3
6311	1923.6
6312	1923.9
6313	1924.2
6314	1924.5
6315	1924.8
6316	1925.1
6317	1925.4
6318	1925.7
6319	1926.1
6320	1926.4
6321	1926.7
6322	1927.0
6323	1927.3
6324	1927.6
6325	1927.9
6326	1928.2
6327	1928.5
6328	1928.8
6329	1929.1
6330	1929.4
6331	1929.7
6332	1930.0
6333	1930.3
6334	1930.6
6335	1930.9
6336	1931.2
6337	1931.5
6338	1931.8
6339	1932.2
6340	1932.5
6341	1932.8
6342	1933.1
6343	1933.4
6344	1933.7
6345	1934.0
6346	1934.3
6347	1934.6
6348	1934.9
6349	1935.2
6350	1935.5
6351	1935.8
6352	1936.1
6353	1936.4
6354	1936.7
6355	1937.0
6356	1937.3
6357	1937.6
6358	1937.9
6359	1938.2
6360	1938.6
6361	1938.9

FEET	METERS
6362	1939.2
6363	1939.5
6364	1939.8
6365	1940.1
6366	1940.4
6367	1940.7
6368	1941.0
6369	1941.3
6370	1941.6
6371	1941.9
6372	1942.2
6373	1942.5
6374	1942.8
6375	1943.1
6376	1943.4
6377	1943.7
6378	1944.0
6379	1944.3
6380	1944.6
6381	1945.0
6382	1945.3
6383	1945.6
6384	1945.9
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6388	1947.1
6389	1947.4
6390	1947.7
6391	1948.0
6392	1948.3
6393	1948.6
6394	1948.9
6395	1949.2
6396	1949.5
6397	1949.8
6398	1950.1
6399	1950.4
6400	1950.7
6401	1951.0
6402	1951.4
6403	1951.7
6404	1952.0
6405	1952.3
6406	1952.6
6407	1952.9
6408	1953.2
6409	1953.5
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6412	1954.4
6413	1954.7
6414	1955.0
6415	1955.3
6416	1955.6
6417	1955.9
6418	1956.2
6419	1956.5
6420	1956.8
6421	1957.1
6422	1957.4
6423	1957.8
6424	1958.1

FEET	METERS
6425	1958.4
6426	1958.7
6427	1959.0
6428	1959.3
6429	1959.6
6430	1959.9
6431	1960.2
6432	1960.5
6433	1960.8
6434	1961.1
6435	1961.4
6436	1961.7
6437	1962.0
6438	1962.3
6439	1962.6
6440	1962.9
6441	1963.2
6442	1963.5
6443	1963.9
6444	1964.2
6445	1964.5
6446	1964.8
6447	1965.1
6448	1965.4
6449	1965.7
6450	1966.0
6451	1966.3
6452	1966.6
6453	1966.9
6454	1967.2
6455	1967.5
6456	1967.8
6457	1968.1
6458	1968.4
6459	1968.7
6460	1969.0
6461	1969.3
6462	1969.6
6463	1969.9
6464	1970.3
6465	1970.6
6466	1970.9
6467	1971.2
6468	1971.5
6469	1971.8
6470	1972.1
6471	1972.4
6472	1972.7
6473	1973.0
6474	1973.3
6475	1973.6
6476	1973.9
6477	1974.2
6478	1974.5
6479	1974.8
6480	1975.1
6481	1975.4
6482	1975.7
6483	1976.0
6484	1976.3
6485	1976.7
6486	1977.0
6487	1977.3

FEET	METERS
6488	1977.6
6489	1977.9
6490	1978.2
6491	1978.5
6492	1978.8
6493	1979.1
6494	1979.4
6495	1979.7
6496	1980.0
6497	1980.3
6498	1980.6
6499	1980.9
6500	1981.2
6501	1981.5
6502	1981.8
6503	1982.1
6504	1982.4
6505	1982.7
6506	1983.1
6507	1983.4
6508	1983.7
6509	1984.0
6510	1984.3
6511	1984.6
6512	1984.9
6513	1985.2
6514	1985.5
6515	1985.8
6516	1986.1
6517	1986.4
6518	1986.7
6519	1987.0
6520	1987.3
6521	1987.6
6522	1987.9
6523	1988.2
6524	1988.5
6525	1988.8
6526	1989.1
6527	1989.5
6528	1989.8
6529	1990.1
6530	1990.4
6531	1990.7
6532	1991.0
6533	1991.3
6534	1991.6
6535	1991.9
6536	1992.2
6537	1992.5
6538	1992.8
6539	1993.1
6540	1993.4
6541	1993.7
6542	1994.0
6543	1994.3
6544	1994.6
6545	1994.9
6546	1995.2
6547	1995.5
6548	1995.9
6549	1996.2
6550	1996.5

FEET	METERS
6551	1996.8
6552	1997.1
6553	1997.4
6554	1997.7
6555	1998.0
6556	1998.3
6557	1998.6
6558	1998.9
6559	1999.2
6560	1999.5
6561	1999.8
6562	2000.1
6563	2000.4
6564	2000.7
6565	2001.0
6566	2001.3
6567	2001.6
6568	2002.0
6569	2002.3
6570	2002.6
6571	2002.9
6572	2003.2
6573	2003.5
6574	2003.8
6575	2004.1
6576	2004.4
6577	2004.7
6578	2005.0
6579	2005.3
6580	2005.6
6581	2005.9
6582	2006.2
6583	2006.5
6584	2006.8
6585	2007.1
6586	2007.4
6587	2007.7
6588	2008.0
6589	2008.4
6590	2008.7
6591	2009.0
6592	2009.3
6593	2009.6
6594	2009.9
6595	2010.2
6596	2010.5
6597	2010.8
6598	2011.1
6599	2011.4
6600	2011.7
6601	2012.0
6602	2012.3
6603	2012.6
6604	2012.9
6605	2013.2
6606	2013.5
6607	2013.8
6608	2014.1
6609	2014.4
6610	2014.8
6611	2015.1
6612	2015.4
6613	2015.7

FEET	METERS
6614	2016.0
6615	2016.3
6616	2016.6
6617	2016.9
6618	2017.2
6619	2017.5
6620	2017.8
6621	2018.1
6622	2018.4
6623	2018.7
6624	2019.0
6625	2019.3
6626	2019.6
6627	2019.9
6628	2020.2
6629	2020.5
6630	2020.8
6631	2021.2
6632	2021.5
6633	2021.8
6634	2022.1
6635	2022.4
6636	2022.7
6637	2023.0
6638	2023.3
6639	2023.6
6640	2023.9
6641	2024.2
6642	2024.5
6643	2024.8
6644	2025.1
6645	2025.4
6646	2025.7
6647	2026.0
6648	2026.3
6649	2026.6
6650	2026.9
6651	2027.2
6652	2027.6
6653	2027.9
6654	2028.2
6655	2028.5
6656	2028.8
6657	2029.1
6658	2029.4
6659	2029.7
6660	2030.0
6661	2030.3
6662	2030.6
6663	2030.9
6664	2031.2
6665	2031.5
6666	2031.8
6667	2032.1
6668	2032.4
6669	2032.7
6670	2033.0
6671	2033.3
6672	2033.7
6673	2034.0
6674	2034.3
6675	2034.6
6676	2034.9

FEET	METERS
6677	2035.2
6678	2035.5
6679	2035.8
6680	2036.1
6681	2036.4
6682	2036.7
6683	2037.0
6684	2037.3
6685	2037.6
6686	2037.9
6687	2038.2
6688	2038.5
6689	2038.8
6690	2039.1
6691	2039.4
6692	2039.7
6693	2040.1
6694	2040.4
6695	2040.7
6696	2041.0
6697	2041.3
6698	2041.6
6699	2041.9
6700	2042.2
6701	2042.5
6702	2042.8
6703	2043.1
6704	2043.4
6705	2043.7
6706	2044.0
6707	2044.3
6708	2044.6
6709	2044.9
6710	2045.2
6711	2045.5
6712	2045.8
6713	2046.1
6714	2046.5
6715	2046.8
6716	2047.1
6717	2047.4
6718	2047.7
6719	2048.0
6720	2048.3
6721	2048.6
6722	2048.9
6723	2049.2
6724	2049.5
6725	2049.8
6726	2050.1
6727	2050.4
6728	2050.7
6729	2051.0
6730	2051.3
6731	2051.6
6732	2051.9
6733	2052.2
6734	2052.5
6735	2052.9
6736	2053.2
6737	2053.5
6738	2053.8
6739	2054.1

FEET	METERS
6740	2054.4
6741	2054.7
6742	2055.0
6743	2055.3
6744	2055.6
6745	2055.9
6746	2056.2
6747	2056.5
6748	2056.8
6749	2057.1
6750	2057.4
6751	2057.7
6752	2058.0
6753	2058.3
6754	2058.6
6755	2058.9
6756	2059.3
6757	2059.6
6758	2059.9
6759	2060.2
6760	2060.5
6761	2060.8
6762	2061.1
6763	2061.4
6764	2061.7
6765	2062.0
6766	2062.3
6767	2062.6
6768	2062.9
6769	2063.2
6770	2063.5
6771	2063.8
6772	2064.1
6773	2064.4
6774	2064.7
6775	2065.0
6776	2065.3
6777	2065.7
6778	2066.0
6779	2066.3
6780	2066.6
6781	2066.9
6782	2067.2
6783	2067.5
6784	2067.8
6785	2068.1
6786	2068.4
6787	2068.7
6788	2069.0
6789	2069.3
6790	2069.6
6791	2069.9
6792	2070.2
6793	2070.5
6794	2070.8
6795	2071.1
6796	2071.4
6797	2071.8
6798	2072.1
6799	2072.4
6800	2072.7
6801	2073.0
6802	2073.3

FEET	METERS
6803	2073.6
6804	2073.9
6805	2074.2
6806	2074.5
6807	2074.8
6808	2075.1
6809	2075.4
6810	2075.7
6811	2076.0
6812	2076.3
6813	2076.6
6814	2076.9
6815	2077.2
6816	2077.5
6817	2077.8
6818	2078.2
6819	2078.5
6820	2078.8
6821	2079.1
6822	2079.4
6823	2079.7
6824	2080.0
6825	2080.3
6826	2080.6
6827	2080.9
6828	2081.2
6829	2081.5
6830	2081.8
6831	2082.1
6832	2082.4
6833	2082.7
6834	2083.0
6835	2083.3
6836	2083.6
6837	2083.9
6838	2084.2
6839	2084.6
6840	2084.9
6841	2085.2
6842	2085.5
6843	2085.8
6844	2086.1
6845	2086.4
6846	2086.7
6847	2087.0
6848	2087.3
6849	2087.6
6850	2087.9
6851	2088.2
6852	2088.5
6853	2088.8
6854	2089.1
6855	2089.4
6856	2089.7
6857	2090.0
6858	2090.3
6859	2090.6
6860	2091.0
6861	2091.3
6862	2091.6
6863	2091.9
6864	2092.2
6865	2092.5

FEET	METERS
6866	2092.8
6867	2093.1
6868	2093.4
6869	2093.7
6870	2094.0
6871	2094.3
6872	2094.6
6873	2094.9
6874	2095.2
6875	2095.5
6876	2095.8
6877	2096.1
6878	2096.4
6879	2096.7
6880	2097.0
6881	2097.4
6882	2097.7
6883	2098.0
6884	2098.3
6885	2098.6
6886	2098.9
6887	2099.2
6888	2099.5
6889	2099.8
6890	2100.1
6891	2100.4
6892	2100.7
6893	2101.0
6894	2101.3
6895	2101.6
6896	2101.9
6897	2102.2
6898	2102.5
6899	2102.8
6900	2103.1
6901	2103.5
6902	2103.8
6903	2104.1
6904	2104.4
6905	2104.7
6906	2105.0
6907	2105.3
6908	2105.6
6909	2105.9
6910	2106.2
6911	2106.5
6912	2106.8
6913	2107.1
6914	2107.4
6915	2107.7
6916	2108.0
6917	2108.3
6918	2108.6
6919	2108.9
6920	2109.2
6921	2109.5
6922	2109.9
6923	2110.2
6924	2110.5
6925	2110.8
6926	2111.1
6927	2111.4
6928	2111.7

FEET	METERS
6929	2112.0
6930	2112.3
6931	2112.6
6932	2112.9
6933	2113.2
6934	2113.5
6935	2113.8
6936	2114.1
6937	2114.4
6938	2114.7
6939	2115.0
6940	2115.3
6941	2115.6
6942	2115.9
6943	2116.3
6944	2116.6
6945	2116.9
6946	2117.2
6947	2117.5
6948	2117.8
6949	2118.1
6950	2118.4
6951	2118.7
6952	2119.0
6953	2119.3
6954	2119.6
6955	2119.9
6956	2120.2
6957	2120.5
6958	2120.8
6959	2121.1
6960	2121.4
6961	2121.7
6962	2122.0
6963	2122.3
6964	2122.7
6965	2123.0
6966	2123.3
6967	2123.6
6968	2123.9
6969	2124.2
6970	2124.5
6971	2124.8
6972	2125.1
6973	2125.4
6974	2125.7
6975	2126.0
6976	2126.3
6977	2126.6
6978	2126.9
6979	2127.2
6980	2127.5
6981	2127.8
6982	2128.1
6983	2128.4
6984	2128.7
6985	2129.1
6986	2129.4
6987	2129.7
6988	2130.0
6989	2130.3
6990	2130.6
6991	2130.9

FEET	METERS
6992	2131.2
6993	2131.5
6994	2131.8
6995	2132.1
6996	2132.4
6997	2132.7
6998	2133.0
6999	2133.3
7000	2133.6
7001	2133.9
7002	2134.2
7003	2134.5
7004	2134.8
7005	2135.1
7006	2135.5
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7008	2136.1
7009	2136.4
7010	2136.7
7011	2137.0
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7014	2137.9
7015	2138.2
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7018	2139.1
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7024	2140.9
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7027	2141.9
7028	2142.2
7029	2142.5
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7032	2143.4
7033	2143.7
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7037	2144.9
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7042	2146.4
7043	2146.7
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7047	2148.0
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7049	2148.6
7050	2148.9
7051	2149.2
7052	2149.5
7053	2149.8
7054	2150.1

FEET	METERS
7055	2150.4
7056	2150.7
7057	2151.0
7058	2151.3
7059	2151.6
7060	2151.9
7061	2152.2
7062	2152.5
7063	2152.8
7064	2153.1
7065	2153.4
7066	2153.7
7067	2154.0
7068	2154.4
7069	2154.7
7070	2155.0
7071	2155.3
7072	2155.6
7073	2155.9
7074	2156.2
7075	2156.5
7076	2156.8
7077	2157.1
7078	2157.4
7079	2157.7
7080	2158.0
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7083	2158.9
7084	2159.2
7085	2159.5
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7087	2160.1
7088	2160.4
7089	2160.8
7090	2161.1
7091	2161.4
7092	2161.7
7093	2162.0
7094	2162.3
7095	2162.6
7096	2162.9
7097	2163.2
7098	2163.5
7099	2163.8
7100	2164.1
7101	2164.4
7102	2164.7
7103	2165.0
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7105	2165.6
7106	2165.9
7107	2166.2
7108	2166.5
7109	2166.8
7110	2167.2
7111	2167.5
7112	2167.8
7113	2168.1
7114	2168.4
7115	2168.7
7116	2169.0
7117	2169.3

FEET	METERS
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7119	2169.9
7120	2170.2
7121	2170.5
7122	2170.8
7123	2171.1
7124	2171.4
7125	2171.7
7126	2172.0
7127	2172.3
7128	2172.6
7129	2172.9
7130	2173.3
7131	2173.6
7132	2173.9
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7135	2174.8
7136	2175.1
7137	2175.4
7138	2175.7
7139	2176.0
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7147	2178.4
7148	2178.7
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7151	2179.7
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7154	2180.6
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7157	2181.5
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7160	2182.4
7161	2182.7
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7164	2183.6
7165	2183.9
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7167	2184.5
7168	2184.8
7169	2185.1
7170	2185.4
7171	2185.7
7172	2186.1
7173	2186.4
7174	2186.7
7175	2187.0
7176	2187.3
7177	2187.6
7178	2187.9
7179	2188.2
7180	2188.5

FEET	METERS
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7182	2189.1
7183	2189.4
7184	2189.7
7185	2190.0
7186	2190.3
7187	2190.6
7188	2190.9
7189	2191.2
7190	2191.5
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7192	2192.1
7193	2192.5
7194	2192.8
7195	2193.1
7196	2193.4
7197	2193.7
7198	2194.0
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7201	2194.9
7202	2195.2
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7206	2196.4
7207	2196.7
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7211	2197.9
7212	2198.2
7213	2198.5
7214	2198.9
7215	2199.2
7216	2199.5
7217	2199.8
7218	2200.1
7219	2200.4
7220	2200.7
7221	2201.0
7222	2201.3
7223	2201.6
7224	2201.9
7225	2202.2
7226	2202.5
7227	2202.8
7228	2203.1
7229	2203.4
7230	2203.7
7231	2204.0
7232	2204.3
7233	2204.6
7234	2205.0
7235	2205.3
7236	2205.6
7237	2205.9
7238	2206.2
7239	2206.5
7240	2206.8
7241	2207.1
7242	2207.4
7243	2207.7

FEET	METERS
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7245	2208.3
7246	2208.6
7247	2208.9
7248	2209.2
7249	2209.5
7250	2209.8
7251	2210.1
7252	2210.4
7253	2210.7
7254	2211.0
7255	2211.4
7256	2211.7
7257	2212.0
7258	2212.3
7259	2212.6
7260	2212.9
7261	2213.2
7262	2213.5
7263	2213.8
7264	2214.1
7265	2214.4
7266	2214.7
7267	2215.0
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7270	2215.9
7271	2216.2
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7274	2217.1
7275	2217.4
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7278	2218.4
7279	2218.7
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7282	2219.6
7283	2219.9
7284	2220.2
7285	2220.5
7286	2220.8
7287	2221.1
7288	2221.4
7289	2221.7
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7291	2222.3
7292	2222.6
7293	2222.9
7294	2223.2
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7296	2223.8
7297	2224.2
7298	2224.5
7299	2224.8
7300	2225.1
7301	2225.4
7302	2225.7
7303	2226.0
7304	2226.3
7305	2226.6
7306	2226.9

FEET	METERS
7307	2227.2
7308	2227.5
7309	2227.8
7310	2228.1
7311	2228.4
7312	2228.7
7313	2229.0
7314	2229.3
7315	2229.6
7316	2229.9
7317	2230.2
7318	2230.6
7319	2230.9
7320	2231.2
7321	2231.5
7322	2231.8
7323	2232.1
7324	2232.4
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7345	2238.8
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7347	2239.4
7348	2239.7
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7351	2240.6
7352	2240.9
7353	2241.2
7354	2241.5
7355	2241.8
7356	2242.1
7357	2242.4
7358	2242.7
7359	2243.1
7360	2243.4
7361	2243.7
7362	2244.0
7363	2244.3
7364	2244.6
7365	2244.9
7366	2245.2
7367	2245.5
7368	2245.8
7369	2246.1

FEET	METERS
7370	2246.4
7371	2246.7
7372	2247.0
7373	2247.3
7374	2247.6
7375	2247.9
7376	2248.2
7377	2248.5
7378	2248.8
7379	2249.1
7380	2249.5
7381	2249.8
7382	2250.1
7383	2250.4
7384	2250.7
7385	2251.0
7386	2251.3
7387	2251.6
7388	2251.9
7389	2252.2
7390	2252.5
7391	2252.8
7392	2253.1
7393	2253.4
7394	2253.7
7395	2254.0
7396	2254.3
7397	2254.6
7398	2254.9
7399	2255.2
7400	2255.5
7401	2255.9
7402	2256.2
7403	2256.5
7404	2256.8
7405	2257.1
7406	2257.4
7407	2257.7
7408	2258.0
7409	2258.3
7410	2258.6
7411	2258.9
7412	2259.2
7413	2259.5
7414	2259.8
7415	2260.1
7416	2260.4
7417	2260.7
7418	2261.0
7419	2261.3
7420	2261.6
7421	2261.9
7422	2262.3
7423	2262.6
7424	2262.9
7425	2263.2
7426	2263.5
7427	2263.8
7428	2264.1
7429	2264.4
7430	2264.7
7431	2265.0
7432	2265.3

FEET	METERS
7433	2265.6
7434	2265.9
7435	2266.2
7436	2266.5
7437	2266.8
7438	2267.1
7439	2267.4
7440	2267.7
7441	2268.0
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7443	2268.7
7444	2269.0
7445	2269.3
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7447	2269.9
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7452	2271.4
7453	2271.7
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7456	2272.6
7457	2272.9
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7459	2273.5
7460	2273.8
7461	2274.1
7462	2274.4
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7464	2275.1
7465	2275.4
7466	2275.7
7467	2276.0
7468	2276.3
7469	2276.6
7470	2276.9
7471	2277.2
7472	2277.5
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7474	2278.1
7475	2278.4
7476	2278.7
7477	2279.0
7478	2279.3
7479	2279.6
7480	2279.9
7481	2280.2
7482	2280.5
7483	2280.8
7484	2281.2
7485	2281.5
7486	2281.8
7487	2282.1
7488	2282.4
7489	2282.7
7490	2283.0
7491	2283.3
7492	2283.6
7493	2283.9
7494	2284.2
7495	2284.5

FEET	METERS
7496	2284.8
7497	2285.1
7498	2285.4
7499	2285.7
7500	2286.0
7501	2286.3
7502	2286.6
7503	2286.9
7504	2287.2
7505	2287.6
7506	2287.9
7507	2288.2
7508	2288.5
7509	2288.8
7510	2289.1
7511	2289.4
7512	2289.7
7513	2290.0
7514	2290.3
7515	2290.6
7516	2290.9
7517	2291.2
7518	2291.5
7519	2291.8
7520	2292.1
7521	2292.4
7522	2292.7
7523	2293.0
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7525	2293.6
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7527	2294.3
7528	2294.6
7529	2294.9
7530	2295.2
7531	2295.5
7532	2295.8
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7534	2296.4
7535	2296.7
7536	2297.0
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7538	2297.6
7539	2297.9
7540	2298.2
7541	2298.5
7542	2298.8
7543	2299.1
7544	2299.4
7545	2299.7
7546	2300.0
7547	2300.4
7548	2300.7
7549	2301.0
7550	2301.3
7551	2301.6
7552	2301.9
7553	2302.2
7554	2302.5
7555	2302.8
7556	2303.1
7557	2303.4
7558	2303.7

FEET	METERS
7559	2304.0
7560	2304.3
7561	2304.6
7562	2304.9
7563	2305.2
7564	2305.5
7565	2305.8
7566	2306.1
7567	2306.4
7568	2306.8
7569	2307.1
7570	2307.4
7571	2307.7
7572	2308.0
7573	2308.3
7574	2308.6
7575	2308.9
7576	2309.2
7577	2309.5
7578	2309.8
7579	2310.1
7580	2310.4
7581	2310.7
7582	2311.0
7583	2311.3
7584	2311.6
7585	2311.9
7586	2312.2
7587	2312.5
7588	2312.9
7589	2313.2
7590	2313.5
7591	2313.8
7592	2314.1
7593	2314.4
7594	2314.7
7595	2315.0
7596	2315.3
7597	2315.6
7598	2315.9
7599	2316.2
7600	2316.5
7601	2316.8
7602	2317.1
7603	2317.4
7604	2317.7
7605	2318.0
7606	2318.3
7607	2318.6
7608	2318.9
7609	2319.3
7610	2319.6
7611	2319.9
7612	2320.2
7613	2320.5
7614	2320.8
7615	2321.1
7616	2321.4
7617	2321.7
7618	2322.0
7619	2322.3
7620	2322.6
7621	2322.9

FEET	METERS
7622	2323.2
7623	2323.5
7624	2323.8
7625	2324.1
7626	2324.4
7627	2324.7
7628	2325.0
7629	2325.3
7630	2325.7
7631	2326.0
7632	2326.3
7633	2326.6
7634	2326.9
7635	2327.2
7636	2327.5
7637	2327.8
7638	2328.1
7639	2328.4
7640	2328.7
7641	2329.0
7642	2329.3
7643	2329.6
7644	2329.9
7645	2330.2
7646	2330.5
7647	2330.8
7648	2331.1
7649	2331.4
7650	2331.7
7651	2332.1
7652	2332.4
7653	2332.7
7654	2333.0
7655	2333.3
7656	2333.6
7657	2333.9
7658	2334.2
7659	2334.5
7660	2334.8
7661	2335.1
7662	2335.4
7663	2335.7
7664	2336.0
7665	2336.3
7666	2336.6
7667	2336.9
7668	2337.2
7669	2337.5
7670	2337.8
7671	2338.1
7672	2338.5
7673	2338.8
7674	2339.1
7675	2339.4
7676	2339.7
7677	2340.0
7678	2340.3
7679	2340.6
7680	2340.9
7681	2341.2
7682	2341.5
7683	2341.8
7684	2342.1

FEET	METERS
7685	2342.4
7686	2342.7
7687	2343.0
7688	2343.3
7689	2343.6
7690	2343.9
7691	2344.2
7692	2344.6
7693	2344.9
7694	2345.2
7695	2345.5
7696	2345.8
7697	2346.1
7698	2346.4
7699	2346.7
7700	2347.0
7701	2347.3
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7707	2349.1
7708	2349.4
7709	2349.7
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7711	2350.3
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7720	2353.1
7721	2353.4
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7726	2354.9
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7731	2356.4
7732	2356.7
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7734	2357.4
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7736	2358.0
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7738	2358.6
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7742	2359.8
7743	2360.1
7744	2360.4
7745	2360.7
7746	2361.0
7747	2361.3

FEET	METERS
7748	2361.6
7749	2361.9
7750	2362.2
7751	2362.5
7752	2362.8
7753	2363.1
7754	2363.4
7755	2363.8
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7757	2364.4
7758	2364.7
7759	2365.0
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7772	2368.9
7773	2369.2
7774	2369.5
7775	2369.8
7776	2370.2
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7779	2371.1
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7781	2371.7
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7783	2372.3
7784	2372.6
7785	2372.9
7786	2373.2
7787	2373.5
7788	2373.8
7789	2374.1
7790	2374.4
7791	2374.7
7792	2375.0
7793	2375.3
7794	2375.6
7795	2375.9
7796	2376.2
7797	2376.6
7798	2376.9
7799	2377.2
7800	2377.5
7801	2377.8
7802	2378.1
7803	2378.4
7804	2378.7
7805	2379.0
7806	2379.3
7807	2379.6
7808	2379.9
7809	2380.2
7810	2380.5

FEET	METERS
7811	2380.8
7812	2381.1
7813	2381.4
7814	2381.7
7815	2382.0
7816	2382.3
7817	2382.7
7818	2383.0
7819	2383.3
7820	2383.6
7821	2383.9
7822	2384.2
7823	2384.5
7824	2384.8
7825	2385.1
7826	2385.4
7827	2385.7
7828	2386.0
7829	2386.3
7830	2386.6
7831	2386.9
7832	2387.2
7833	2387.5
7834	2387.8
7835	2388.1
7836	2388.4
7837	2388.7
7838	2389.1
7839	2389.4
7840	2389.7
7841	2390.0
7842	2390.3
7843	2390.6
7844	2390.9
7845	2391.2
7846	2391.5
7847	2391.8
7848	2392.1
7849	2392.4
7850	2392.7
7851	2393.0
7852	2393.3
7853	2393.6
7854	2393.9
7855	2394.2
7856	2394.5
7857	2394.8
7858	2395.1
7859	2395.5
7860	2395.8
7861	2396.1
7862	2396.4
7863	2396.7
7864	2397.0
7865	2397.3
7866	2397.6
7867	2397.9
7868	2398.2
7869	2398.5
7870	2398.8
7871	2399.1
7872	2399.4
7873	2399.7

FEET	METERS
7874	2400.0
7875	2400.3
7876	2400.6
7877	2400.9
7878	2401.2
7879	2401.5
7880	2401.9
7881	2402.2
7882	2402.5
7883	2402.8
7884	2403.1
7885	2403.4
7886	2403.7
7887	2404.0
7888	2404.3
7889	2404.6
7890	2404.9
7891	2405.2
7892	2405.5
7893	2405.8
7894	2406.1
7895	2406.4
7896	2406.7
7897	2407.0
7898	2407.3
7899	2407.6
7900	2407.9
7901	2408.3
7902	2408.6
7903	2408.9
7904	2409.2
7905	2409.5
7906	2409.8
7907	2410.1
7908	2410.4
7909	2410.7
7910	2411.0
7911	2411.3
7912	2411.6
7913	2411.9
7914	2412.2
7915	2412.5
7916	2412.8
7917	2413.1
7918	2413.4
7919	2413.7
7920	2414.0
7921	2414.4
7922	2414.7
7923	2415.0
7924	2415.3
7925	2415.6
7926	2415.9
7927	2416.2
7928	2416.5
7929	2416.8
7930	2417.1
7931	2417.4
7932	2417.7
7933	2418.0
7934	2418.3
7935	2418.6
7936	2418.9

FEET	METERS
7937	2419.2
7938	2419.5
7939	2419.8
7940	2420.1
7941	2420.4
7942	2420.8
7943	2421.1
7944	2421.4
7945	2421.7
7946	2422.0
7947	2422.3
7948	2422.6
7949	2422.9
7950	2423.2
7951	2423.5
7952	2423.8
7953	2424.1
7954	2424.4
7955	2424.7
7956	2425.0
7957	2425.3
7958	2425.6
7959	2425.9
7960	2426.2
7961	2426.5
7962	2426.8
7963	2427.2
7964	2427.5
7965	2427.8
7966	2428.1
7967	2428.4
7968	2428.7
7969	2429.0
7970	2429.3
7971	2429.6
7972	2429.9
7973	2430.2
7974	2430.5
7975	2430.8
7976	2431.1
7977	2431.4
7978	2431.7
7979	2432.0
7980	2432.3
7981	2432.6
7982	2432.9
7983	2433.2
7984	2433.6
7985	2433.9
7986	2434.2
7987	2434.5
7988	2434.8
7989	2435.1
7990	2435.4
7991	2435.7
7992	2436.0
7993	2436.3
7994	2436.6
7995	2436.9
7996	2437.2
7997	2437.5
7998	2437.8
7999	2438.1

FEET	METERS
8000	2438.4

DATA INPUT FORMS

- Borehole Summaries
- Hydraulic Tests
- Constitutive Properties
- Environmental Information
  - Air Quality/Meterology
  - Noise
  - Surface Water Hydrology/Quality
- Environmental Impacts
  - Air Quality
  - Noise

OLIVE PROMPT

BOREHOLE SUMMARIES

TYPE Record Type _____

WELLID Well I.D. , _____

BASIN Basin , _____ (major) , _____ (minor)

COSTA County/State , _____ (county) , ☐☐ (state)

LATIT Latitude , _____ (degrees) - _____ (minutes)

LONGIT Longitude , _____ (degrees) - _____ (minutes)

SECBLK Section/Block , Sec _____ , _____

DCD Drilling Completion Date , ☐☐☐☐☐☐ (Y Y M M D D)

GELEV Ground Level Elev. , _____ (meters) , (_____) (feet)

KBE Kelly Bushing Elev. , _____ (meters) , (_____) (feet)

TODDEP Total Depth of Borehore , _____ (meters) , (_____) (feet)

DRILTEC Drilling Technique , _____

FLUDPROG Drilling Fluid Program , _____

_____

_____

DRIL PROG Drilling Program

Bit Name	Bit Diameter cm	Bit Diameter inches	Interval Top in Meters	Interval Bottom in Meters	Interval Top-Bottom in Feet
,	,	( ),	,	,	(-)
,	,	( ),	,	,	(-)
,	,	( ),	,	,	(-)

CASUM Casing Summary

Casing Size cm	Casing Size inches	Depth meters	Depth feet
,	( ),	,	( )
,	( ),	,	( )
,	( ),	,	( )
,	( ),	,	( )

LITHLOG Lithologic Logs Taken , ☐ YES ☐ NO ☐ NR,

GEOPLOG Geophysical Logs Taken , ☐ YES ☐ NO ☐ NR,

CORLOG Core Logs Taken , ☐ YES ☐ NO ☐ NR,

MUDLOG Mud Logs Taken , ☐ YES ☐ NO ☐ NR,

FORMPEN Formations Penetrated

Name of Formation (All Caps)	INTERVAL Top in Meters	Bottom in Meters	Top-Bottom in Feet
			(-)
			(-)
			(-)
			(-)
			(-)
			(-)
			(-)
			(-)
			(-)
			(-)
			(-)
			(-)
			(-)

CORES **Core**

Core Diameter cm	(inches)	Interval Top in Meters	Bottom in Meters	Top-Bottom in Feet
, _____ ,	(____),	_____ ,	_____ ,	(____ - ____)
, _____ ,	(____),	_____ ,	_____ ,	(____ - ____)
, _____ ,	(____),	_____ ,	_____ ,	(____ - ____)
, _____ ,	(____),	_____ ,	_____ ,	(____ - ____)
, _____ ,	(____),	_____ ,	_____ ,	(____ - ____)
, _____ ,	(____),	_____ ,	_____ ,	(____ - ____)
, _____ ,	(____),	_____ ,	_____ ,	(____ - ____)

SAMPROG **Sampling Program**

Test	Interval Top in Meters	Bottom in Meters	Top-Bottom in Feet
, _____ ,	_____ ,	_____ ,	(____ - ____)
, _____ ,	_____ ,	_____ ,	(____ - ____)
, _____ ,	_____ ,	_____ ,	(____ - ____)
, _____ ,	_____ ,	_____ ,	(____ - ____)
, _____ ,	_____ ,	_____ ,	(____ - ____)

DST **Drill Stem Test**

No. of Tests Performed	Interval Top in Meters	Bottom in Meters	Top-Bottom in Feet
, ☐ ☐ ☐,	_____ ,	_____ ,	(____ - ____)
, ☐ ☐ ☐,	_____ ,	_____ ,	(____ - ____)
, ☐ ☐ ☐,	_____ ,	_____ ,	(____ - ____)
, ☐ ☐ ☐,	_____ ,	_____ ,	(____ - ____)

AQ **Aquifer Test (including repeat formation testor)**

Test	No. of Tests	Interval Top in Meters	Bottom in Meters	Top-Bottom in Feet
, _____ ,	☐ ☐,	_____ ,	_____ ,	(____ - ____)
, _____ ,	☐ ☐,	_____ ,	_____ ,	(____ - ____)
, _____ ,	☐ ☐,	_____ ,	_____ ,	(____ - ____)
, _____ ,	☐ ☐,	_____ ,	_____ ,	(____ - ____)

MONIT **Hydrogeologic Monitoring** , ☐ YES ☐ NO ☐ NR,

_____

_____

_____

GMFT Geomechanical Field Tests , ☐ YES ☐ NO ☐ NR,

GMLT Geomechanical Lab Tests , ☐ YES ☐ NO ☐ NR,

GCRST Geochemical Rock Sample Tests , ☐ YES ☐ NO ☐ NR,

GCHCT Geochemical Hydrochemical Tests , ☐ YES ☐ NO ☐ NR,

LITH Lithology

Formation (All Caps)	Lithology Description
,	,
,	,

LITH Lithology

Formation (All Caps) | Lithology Description

, _____ , _____
_____
_____
_____
_____ ;

, _____ , _____
_____
_____
_____
_____ ;

, _____ , _____
_____
_____
_____
_____ ;

STATUS Status , ☐ Accepted for Use ☐ Baseline

INITINFO Initialization Information

, ☐☐☐☐☐☐ , _____ ,
Y Y M M D D Database Fields

_____ , _____ ,
Last Name First Initials Source

TDMS Authority

SOURCE Sources (references)

, (1) First Author (last name, initials), et.al., (if two or more authors), Title, Corporate Name, Report No., Date

, (2)

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, (N)

HYDRAULIC TESTS

OLIVE PROMPT	
TYPE 2	Record Type borehole results
WELLID 3	Well I.D., _____
UNIT 4	Unit, _____ (unit), _____ (subunit)
BASIN 11	Basin, _____ (major), _____ (subbasin)
COSTA 12	_____ (county), ☐☐ (state)
TLAB 19	Test Lab, _____
CORSUP 20	Core Supplier, _____
CORID 21	Core ID , _____
SAMID 22	Sample ID , _____
MATID 100	Material ID , _____
FORM 101	Formation , _____; _____; _____;
HORIZ 102	Horizon , _____ (meters), (_____) (feet)
TESIN 103	Test Interval , _____ (meters (top)), _____ (meters (bottom)), (_____ - _____) (feet)
TESFL 104	Test Fluid , _____
HC 281	Hydraulic Conductivity

cm/sec	test category[1]	test type[2]	test conditions[3]
, _____ . _____ x 10E	, _____	, _____	, _____;
, _____ . _____ x 10E	, _____	, _____	, _____;
, _____ . _____ x 10E	, _____	, _____	, _____;
, _____ . _____ x 10E	, _____	, _____	, _____;

(1) Test category: lab, field (short term), field (long term)

(2) Test type: drill stem, pressurized slug, etc.

(3) Test conditions: H = horizontal V = vertical ET = early time data
LT = late time data

HCMETH 285 HC Methods/Uncertainties , _____

_____

_____

IP 291 Intrinsic Permeability

md	Test Category[1]	Test Type[2]
, _____ . _____ ,	_____ ,	_____ ;
, _____ . _____ ,	_____ ,	_____ ;
, _____ . _____ ,	_____ ,	_____ ;
, _____ . _____ ,	_____ ,	_____ ;

IPMETH 295 IP Methods/Uncertainties , _____

_____

_____

TRMSV 301 Transmissivity

sq-m/day	Test Category[1]	Test Type[2]
, _____ . _____ ,	_____ ,	_____ ;
, _____ . _____ ,	_____ ,	_____ ;
, _____ . _____ ,	_____ ,	_____ ;
, _____ . _____ ,	_____ ,	_____ ;

TVMETH 305 TV Methods/Uncertainties , _____

_____

_____

TRMSB 311 Transmissibility

md-ft/cp	Test Category[1]	Test Type[2]
, _____ ,	_____ ,	_____ ;
, _____ ,	_____ ,	_____ ;
, _____ ,	_____ ,	_____ ;
, _____ ,	_____ ,	_____ ;

TBMETH 315 TB Methods/Uncertainties , _____

_____

_____

(1) Test category: lab, field (short term), field (long term)
(2) Test type: drill stem, pressurized slug, etc.

PL 321 — **Potentiometric Level**

Meters	Feet	Test Category[1]	Test Type[2]
, _____.____,	(_____),	_____,	_____;
, _____.____,	(_____),	_____,	_____;
, _____.____,	(_____),	_____,	_____;

PLMETH 325 — **PL Methods/Uncertainties** , _____

_____

_____

EP 331 — **Effective Porosity**

%	Test Category[1]	Test Type[2]
, _____.____,	_____,	_____;
, _____.____,	_____,	_____;

EPMETH 335 — **EP Methods/Uncertainties** , _____

_____

_____

TOTP 341 — **Total Porosity**

% min	% max	Test Category	Test Type[2]
, _____.____,	_____.____,	_____,	_____;
, _____.____,	_____.____,	_____,	_____;

TPMETH 345 — **TP Methods/Uncertainties** , _____

_____

_____

INITINFO **Initialization Information**
3955

Date	Technical Authority	TDMS Authority	Input Authority
_____, YYMMDD	_____, First initials-last name	_____, First initials-last name	_____, Initials
_____, Datafields			(_____), Source
_____, YYMMDD	_____, First initials-last name	_____, First initials-last name	_____, Initials
_____, Datafields			(_____), Source
_____, YYMMDD	_____, First initials-last name	_____, First initials-last name	_____, Initials
_____, Datafields			(_____), Source
_____, YYMMDD	_____, First initials-last name	_____, First initials-last name	_____, Initials
_____, Datafields			(_____), Source

SOURCE **Sources (references)**
3998 Refer to BPMD Technical Report Format Guide for correct format

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_____;

CONSTITUTIVE PROPERTIES

Type 2	Record Type	borehole results
WELLID 3	Well Name ,	_____
BASIN 11	, _____ basin	, _____ subbasin
COSTA 12	, _____ county	, ☐☐ state
TLAB 19	Test Lab ,	_____
CORSUP 20	Core Supplier ,	_____

		1	2	3
CORID 21	Core ID	, _____	, _____	, _____
SAMID 22	Sample ID	, _____	, _____	, _____
MATID 100	Material ID	, _____	, _____	, _____
FORM 101	Formation	, _____	, _____	, _____
HORIZ 102	Horizon	, ____ . ____ (meters), (____ feet)	, ____ . ____ (meters), (____ feet)	, ____ . ____ (meters), (____ feet)

			1	2	3
CSUMIN 111	Compressive Strength Unconfined (MPa)	(min),	.	.	.
CSUMAX 112		(max),	.	.	.
CSUMEAN 113		(mean),	.	.	.
CSUDEV 114		(std dev),	.	.	.
CSUTEMP 115		test temp (deg C),			
CSUSTR 116		strain rate,			
CSUMETH 117		methods,			
TSIMIN 121	Tensile Strength Indirect (MPa)	(min),	.	.	.
TSIMAX 122		(max),	.	.	.
TSIMEAN 123		(mean),	.	.	.
TSIDEV 124		(std dev),	.	.	.

		1	2	3
TSITEMP 125	test temp (deg C) ,	_____ ,	_____ ,	_____
TSILOAD 126	load rate ,	_____ ,	_____ ,	_____
TSIMETH 129	methods ,	_____ ,	_____ ,	_____
		_____	_____	_____
CLPA 131	A (MPa E-n per sec) ,	_____ ,	_____ ,	_____
CLPN 132	n ,	_____ .	_____ .	_____ .
CLPEA1 133	E_a ,	_____ ,	_____ ,	_____
CLPEA2 134	E_a^* ,	_____ ,	_____ ,	_____
CLPB1 135	B ,	_____ ,	_____ ,	_____
CLPBØ 136	$B_Ø$,	_____ ,	_____ ,	_____
CLPB2 137	B* ,	_____ ,	_____ ,	_____

Creep Law Parameters

			1	2	3
CLPESS1 138		$\dot{E}_{ss}$ (per sec)			
CLPESS2 139		$\dot{E}^{*}_{ss}$ (per sec)			
CLPQR 140		Q/R (deg K)			
CLPTC 140	test conditions				
CLPMETH 149		methods			
FCK 151	Failure Criteria	k (MPa)	.	.	.
FCA 152		alpha (M Pa)	.	.	.
FCB 153		beta (1/MPa)	.	.	.
FCE 154	failure equation				
FCMETH 159		methods			

			1	2	3
YMSMIN 161	Youngs Modulus (Static) (GPa)	(min)	.	.	.
YMSMAX 162		(max)	.	.	.
YMSMEAN 163		(mean)	.	.	.
YMSDEV 164		(std dev)	.	.	.
YMSTEMP 165		test temp (deg C)			
YMSMETH 169		methods			
YMDMIN 171	Youngs Modulus (Dynamic) (GPa)	(min)	.	.	.
YMDMAX 172		(max)	.	.	.
YMDMEAN 173		(mean)	.	.	.
YMDDEV 174		(std dev)	.	.	.
YMDTEMP 175		test temp (deg C)			
YMDMETH 179		methods			

			1	2	3
PRSMIN 181	Poissons Ratio (Static)	(min)	.	.	.
PRSMAX 182		(max)	.	.	.
PRSMEAN 183		(mean)	.	.	.
PRSDEV 184		(std dev)	.	.	.
PRSTEMP 185		test temp (deg C)			
PRSMETH 189		methods			
PRDMIN 191	Poissons Ratio (Dynamic)	(min)	.	.	.
PRDMAX 192		(max)	.	.	.
PRDMEAN 193		(mean)	.	.	.
PRDDEV 194		(std dev)	.	.	.
PRDTEMP 195		test temp (deg C)			
PRDMETH 199		methods			

			1	2	3
DENS 202	Density	(kg/m^3) ,	_____ ,	_____ ,	_____
	Water Content	(%) ,	_____ .	_____ .	_____ .
	Shear Modulus (dynamic) (GPa)	(min) ,	_____ .	_____ .	_____ .
		(max) ,	_____ .	_____ .	_____ .
		(mean) ,	_____ .	_____ .	_____ .
		(std dev) ,	_____ .	_____ .	_____ .
		test temp (deg C) ,	_____ ,	_____ ,	_____
		(methods) ,	_____ ,	_____ ,	_____
			_____	_____	_____

INITINFO
3995

Initialization Information

☐ ☐ ☐ ☐ ☐ ☐, _____,
Y Y M M D D Database Fields

_____/_____, _____, _____;
Technical Authority (First Initials, Last Name) Input Authority (Initials) Source

☐ ☐ ☐ ☐ ☐ ☐, _____,
Y Y M M D D Database Fields

_____/_____, _____, _____;
Technical Authority (First Initials, Last Name) Input Authority (Initials) Source

☐ ☐ ☐ ☐ ☐ ☐, _____,
Y Y M M D D Database Fields

_____/_____, _____, _____;
Technical Authority (First Initials, Last Name) Input Authority (Initials) Source

SOURCE
3998

Sources (references)

Refer to BPMD Technical Report Format Guide for correct format.

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, (3)_____
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, (4)_____
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, (5)_____
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_____;

RECORD TYPE: Baseline Environmental Information

TOPIC: Air Quality/Meteorology

BASIN: _____ (major), _____ (minor)

COUNTY/STATE: _____, [ ] [ ] (state)

LATITUDE/LONGITUDE: _____

TOWN/CITY: _____

SAMPLING SITE I.D. NO.: _____

SAMPLING SITE: _____

MONITOR LOCATION, UTM X COORDINATE: _____ (km)

UTM Y COORDINATE: _____ (km)

TOPOGRAPHIC DESCR: _____

CLIMATIC DESCR: _____

LAND USE DESCR: _____

OBSTRUCTIONS DESCR: _____

DISTANCE FROM CLASS I: _____ (m)

DISTANCE FROM OTHER SOURCES: _____

MONITOR MANUFACTURER: _____

DATA COLLECTION PERIOD: _____

SAMPLING HEIGHT: _____ (m)

FREQUENCY/DURATION OF MEASUREMENTS: _____

_____

_____

AVERAGING PERIOD: _____
(quarterly, monthly, annual)

ATMO. STABILITY CLASS: _____; _____; _____;

AVERAGE WIND SPEED: _____; _____; _____;
(m/s)

WIND SPEED ST. DEV.: _____; _____; _____;

AVERAGE WIND DIRECTION: _____; _____; _____;

WIND DIR. ST. DEV.: _____; _____; _____;

AVE AMBIENT TEMPERATURE: _____(°C)

AMBIENT TEMP ST. DEV.: _____

AVE DEW POINT: _____(°C)

DEW PT. ST. DEV.: _____

DELTA TEMPERATURE: _____

TEMP. ELEVATION RANGE: _____
(m)

AVE RELATIVE HUMIDITY: _____

REL. HUMIDITY ST. DEV.: _____

MEAN ANNUAL PRECIPITATION: _____, _____
(amount-mm) (duration period-hr)
_____, _____
_____, _____
_____, _____
_____, _____

MEAN MONTHLY PRECIPITATION: _____, _____
(amount-mm) (duration period-hr)
_____, _____
_____, _____
_____, _____
_____, _____

MONTH: _____

POINT PRECIPITATION: _____, _____;
(amount-mm) (duration per-hr)

_____, _____;

_____, _____;

_____, _____;

_____, _____;

PT. PRECIPATION RETURN PERIOD: _____(yrs)

HISTORICAL MONTHLY MAX PRECIPATION: _____, _____;
(amount-mm) (date)

HISTORICAL MONTHLY MIN PRECIPATON: _____, _____;

HISTORICAL MONTHLY 24-HR MAX
PRECIPATION: _____, _____;

POLLUTANT: _____

POLLUTANT TIME INTERVAL: _____
(24-hr, 8-hr., etc.)

AVE POLLUTANT CONCENTRATION: _____(ug/m^3)

1st HIGHEST CONCENTRATION: _____(ug/m^3)

2nd HIGHEST CONCENTRATION: _____(ug/m^3)

ODOR DESCRIPTION: _____

INITIALIZATION INFORMATION:

☐☐☐☐☐☐ , _____,

Date Database Fields

_____/_____, _____, _____;

Technical Area Authority TDMS Authority Input Authority Source

DATA SOURCES:

(1) _____

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_____

(2)

⋮

SECONDARY SOURCES:

(1) _____

_____

_____, _____;

Database Fields

(2)

⋮

TOPIC: NOISE

RECORD TYPE: Baseline Environmental Information

BASIN: _____ (major), _____ (minor)

COUNTY/STATE: _____ (County), [ ] [ ] (State)

TOWN/CITY: _____

SAMPLING LOCATION: _____

_____

SURVEY DATES: _____ (beginning) _____ (end)

SEASON: _____

INSTRUMENTATION: _____; _____

SOUND LEVEL CATEGORY: L _____

TIME INTERVAL: _____ (hrs); _____; _____;

DAY/NIGHT DESIGNATION: _____; _____; _____;

WEEK DY/WEEKEND DESIGNATION: _____; _____; _____;

SOUND MEASUREMENT: _____ (dBA); _____; _____;

WIND SPEED: _____ (mph); _____; _____;

WIND DIRECTION: _____; _____; _____;

AVE TEMPERATURE: _____ (°C); _____; _____;

REL HUMIDITY: _____ (%); _____; _____;

BAROMETRIC PRESSURE: _____ (mm Hg); _____; _____;

TRAFFIC COUNT: _____; _____; _____;

_____; _____; _____;

SOUND SOURCES: _____; _____; _____;

_____; _____; _____;

_____; _____; _____;

INITIALIZATION INFORMATION:

□□□□□□ , _____,
Date Database Fields

_____ / _____ , _____ , _____;
Technical Area Authority | TDMS Authority | Input Authority | Source

DATA SOURCES:

(1) _____

_____

_____

(2)
⋮

SECONDARY SOURCES:

(1) _____

_____

_____, _____;
Database Fields

(2)
⋮

RECORD TYPE: Baseline Environmental Information

TOPIC: Surface Water Hydrology/Quality

BASIN: _____ (major), _____ (minor)

COUNTY/STATE: _____ (county), _____ (state)

TOWN/CITY: _____

DRAINAGE BASIN: _____

DRAINAGE AREA: _____ (km^2)

DRAINAGE SUBBASIN: _____

SUBBASIN AREA: _____ (km^2)

STREAM/RIVER: _____

STREAM-BED GRADIENT: _____

SAMPLING STATION: _____

SAMPLING STATION NO: _____

DATA COLLECTION PERIOD: _____

SAMPLING FREQUENCY: _____

_____

SAMPLING AREA: _____ (m^2)

MEAN DISCHARGE: _____ (m^3); _____; _____;

MINIMUM DISCHARGE: _____ (m^3); _____; _____;

MAXIMUM DISCHARGE: _____ (m^3); _____; _____;

INSTANTANEOUS FLOW RATE: _____ (m^3); _____; _____;

MEAN EVAPOTRANSPIRATION: _____ (m^3/sec); _____; _____;

MONTH: _____ (mm); _____; _____;

ANNUAL MEAN WATER SURFACE EVALUATION: _____ (m)

ANNUAL MAX WATER SURFACE EVALUATION: _____ (m)

ANNUAL MIN WATER SURFACE EVALUATION: _____ (m)

ANNUAL SEDIMENTATION RATE: _____ (g/m^3)

PLAYA LAKE:	_____;	_____;	_____;
SHORELINE CONFIG:	_____;	_____;	_____;
PLAYA USE:	_____;	_____;	_____;
PLAYA DEPTH:	_____ (m);	_____;	_____;
PLAYA VOLUME:	_____ (m^3);	_____;	_____;
PLAYA AREA:	_____ (km^2);	_____;	_____;

IMPOUNDMENT:	_____;	_____;	_____;
IMPOUND. LATITUDE:	_____;	_____;	_____;
IMPOUND. LONGIT:	_____;	_____;	_____;
IMPOUND. SURF. AREA:	_____;	_____;	_____;
IMPOUND. USE:	_____;	_____;	_____;
STORAGE:	_____ (m^3);	_____;	_____;
ANNUAL MEAN IMPOUND. WATER SURF ELEV:	_____ (m);	_____;	_____;
ANNUAL MAX IMPOUND. WATER SURF ELEV:	_____ (m);	_____;	_____;
ANNUAL MIN IMPOUND. WATER SURF ELEV:	_____ (m);	_____;	_____;

7-DY 10-YR LOW FLOW DEPTH: _____ (m)

HISTORICAL LOW FLOW DEPTH: _____ (m)

LOW FLOW DATE: | | | | | | |
Y Y M M D D

100-YR FLOOD DEPTH: _____ (m)

100-YR FLOOD DATE: | | | | | | |
Y Y M M D D

HISTORICAL PEAK DISCHARGE RATE: _____ (m^3/s)

HIST. PEAK DISCHARGE DATE: | | | | | | |
Y Y M M D D

PROBABLE MAX FLOOD: (PMF)

(peak flow - mm)	(duration per - hrs)
_____,	_____;
_____,	_____;
_____,	_____;
_____,	_____;
_____,	_____;
_____,	_____;

PROBABLE MAX PRECIPITATION: (PMP)

(depth - mm)	(duration - hr)
_____,	_____;
_____,	_____;
_____,	_____;
_____,	_____;
_____,	_____;

PMP AREA: _____ (km^2)

DIRECT RUNOFF DEPTH: _____

FLOODED WIDTH: _____ (km)

FLOODPLAIN SITE: _____

PROJECTED 100-YR FLOOD: _____, _____;
(peak flow - mm) (duration per - hrs)

_____, _____;

_____, _____;

_____, _____;

_____, _____;

PT. 100-YR PRECIPITATION: _____, _____;
(depth - mm) (duration per - hrs)

_____, _____;

_____, _____;

_____, _____;

_____, _____;

FLOOD MODEL/COMPUTER PROGRAMS: _____

_____

_____

CHANNEL LENGTH: _____ (m)

ELEVATION DIFFERENCE: _____ (m)

LAG TIME: _____ (hrs)

DIRECT RUNOFF CURVE NO: _____

TRAVEL TIME CONSTANT: _____

FLOODING ASSUMPTIONS: _____

_____

_____

_____

CHEMICAL WATER QUALITY:

_____, _____, _____;
(parameter) (mean concentr - mg/ℓ) (st. dev. - mg/ℓ)
_____, _____, _____;

_____, _____, _____;

_____, _____, _____;

PHYSICAL WATER QUALITY:

pH: _____, _____ (su)
(mean) (st. dev)

SPECIFIC GRAVITY: _____, _____ (dimensionless)
(mean) (st. dev)

TEMPERATURE: _____, _____ (^{o}C)
(mean) (st. dev)

SPECIFIC CONDUCTANCE: _____, _____ (micromlos/cm)
(mean) (st. dev)

eH: _____, _____ (volts)
(mean) (st. dev)

TURBIDITY: _____ (JTU)

C-14 AGE: _____ (yrs)

ODOR: _____

COLOR: _____

BIOLOGICAL WATER QUALITY:

_____, _____, _____;
(parameter) (mean conc. - per ml) (st. dev. - per ml)
_____, _____, _____;

RADIOLOGICAL WATER QUALITY:

_____, _____, _____;
(parameter) (mean cone - μg/ℓ) (st. dev. - μg/ℓ)
_____, _____, _____;

_____, _____, _____;

RADIONUCLIDES:

_____, _____, _____;
(parameter) (mean cone - picocuries/ℓ) (st. dev. - picocuries/ℓ)
_____, _____, _____;
_____, _____, _____;

ISOTOPES:

_____, _____, _____;
(parameter) (mean deviation from SMOW) (st. deviation from SMOW)
_____, _____, _____;

AVERAGE PERIOD: _____
(annual, quarterly)

SEASON: _____

INITIALIZATION INFORMATION:

□□□□□□ , _____,
Date Database Fields

_____ / _____ , _____ , _____;
Technical Area Authority TDMS Authority Input Authority Source

DATA SOURCES:

(1) _____

_____

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(2)
⋮

SECONDARY SOURCES:

(1) _____

_____

_____, _____;
Database Fields

(2)
⋮

RECORD TYPE: Environmental Impacts

TOPIC: Air Quality

BASIN: _____ (major), _____ (minor)

COUNTY/STATE: _____ (county), [ ] [ ] (state)

LATITUDE: _____

LONGITUDE: _____

TOWN/CITY: _____

SITE ID NO: _____

UTM X COORDINATE: _____ (km)

UTM Y COORDINATE: _____

SIDE LENGTH OF SOURCE: _____ (m)

CORNER BASE: _____

DISTANCE FROM CLASS I: _____ (m)

CLASS I: _____

ACTIVITY: _____

EMISSION SOURCE: _____

OPERATIONAL QUANTITY: _____

OPERATIONAL DURATION PERIOD: _____

POLLUTANT: _____

SOURCE/EQUIPMENT: _____; _____; _____;

UNIT HP EQUIPMENT: _____; _____; _____;

NO. EQUIP. UNITS: _____; _____; _____;

UNIT HOURS PER DAY: _____; _____; _____;

UNCONTROLLED EXHAUST EMISSION RATE: _____; _____; _____;
(g/s) or (lb/hr)

UNCONTROLLED FUGITIVE EMISSION RATE: _____; _____; _____;

UNCONTROLLED STACK EMISSION RATE: _____; _____; _____;
(g/s) or (lb/hr)

AVE. EMISSION HT: _____ (m)

STACK HT: _____ (m)

STACK DIAMETER: _____ (m)

GAS EXIT TEMP: _____ (°K)

GAS VELOCITY: _____ (m/s)

TOTAL AVE. UNCONTROLLED
EMISSION FACTOR: _____

CONTROL MEASURE: _____

CONTROL MEAS. EFFICIENCY: _____(%)

CONTROLLED HOURLY EMISSION RATE: _____(lb/hr)

CONTROLLED ANNUAL EMISSION RATE: _____(tons/yr)

OTHER ASSUMPTIONS: _____

_____

_____

AVE. BACKGRD POLLUTANT CONCENTRATION: _____ ($\mu g/m^3$)

BACKGRD POLLUTANT CONCENTRATION RATE: _____ - _____
(g/m^3)

BACKGRD TIME INTERVAL: _____

BACKGRD VISUAL RANGE: _____ (m)

INCREMENTAL POLLUTANT CONCENTRATION: _____ ($\mu g/m^3$)

INCREMENTAL TIME INTERVAL: _____

AIR MODEL: _____

MODEL VERSION: _____

STABILITY CLASS: _____ (A to H)

TERRAIN TYPE: _____

ELEVATION: _____ (m)

AREA IMPACTED: _____

AVE. WIND SPEED: _____ (m/s)

WIND SPEED DURATION PERIOD: _____

JT. WIND/STABILITY DATA LOCATION: _____

JT. WIND/STABILITY DATA COLLECTION PERIOD: _____

PLUME DISPERSION COEFFICIENT: _____

VERTICAL STAND. DEV. PLUME DISTRIBUTION: _____ (m)

OPTICAL DEPTH COEFFICIENTS: _____

_____

_____

ASSUMPTIONS USED: _____

_____

_____

BACKGRD SKY PLUME CONTRAST: _____

BACKGRD TERRAIN PLUME CONTRAST: _____

SKY TERRAIN CONTRAST CHANGE: _____

FED. ALLOWABLE PSD INCREMENT: _____ ($\mu g/m^3$)

PSD CLASS: _____

FED. ALLOWABLE NAAQS STANDARD: _____

NAAQS TIME INTERVAL: _____

STATE STANDARD: _____

_____

_____

INITIALIZATION INFORMATION:

☐☐☐☐☐☐ , _____,

Date Database Fields

_____ / _____ , _____ , _____;

Technical Area Authority TDMS Authority Input Authority Source

DATA SOURCES:

(1) _____

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(2)

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SECONDARY SOURCES:

(1) _____

_____

_____, _____;

Database Fields

(2)

⋮

RECORD TYPE: Environmental Impacts

TOPIC: Noise

BASIN: _____ (major), _____ (minor)

COUNTY/STATE: _____ (county) [ ] [ ] (state)

TOWN/CITY: _____

ACTIVITY: _____

EMISSION SOURCE: _____

EMISSION SOURCE LOCATION COORDINATES: _____

EMISSION SOURCE SOUND PRESSURE LEVEL: _____

SOURCE/EQUIPMENT: _____; _____; _____;

DISTANCE FROM EMISSION SOURCE: _____ (m); _____; _____;

NO. OF UNITS: _____; _____; _____;

OPERATIONAL PERIOD: _____ (hrs/dy); _____; _____;

UNIT SOUND PRESSURE: _____ (dBA); _____; _____;

UNIT SOUND POWER: _____ (dBA); _____; _____;

SOUND LEVEL CATEGORY: L _____

TIME INTERVAL: _____ (hrs)

MEASUREMENT LOCATION: _____

RECEIVER ELEVATION: _____ (m); _____; _____;

DAY/NIGHT DESIGNATION: _____; _____; _____;

WEEDY/WEEKEND DESIGNATION: _____: _____; _____;

SOUND MEASUREMENT: _____; _____; _____;

AVE TEMPERATURE: _____ (°C); _____; _____;

RELATIVE HUMIDITY: _____ (%); _____; _____;

NOISE PREDICTION MODEL: _____

MODEL ASSUMPTIONS: _____

_____

_____

_____

FEDERAL NOISE STANDARD: _____

_____

STATE NOISE STANDARD: _____

_____

INITIALIZATION INFORMATION:

□□□□□□ , _____,
Date Database Fields

_____/_____,_____,_____;
Technical Area Authority | TDMS Authority | Input Authority | Source

DATA SOURCES:

(1) _____

_____

_____

(2)
⋮

SECONDARY SOURCES:

(1) _____

_____

_____, _____;
Database Fields

(2)
⋮