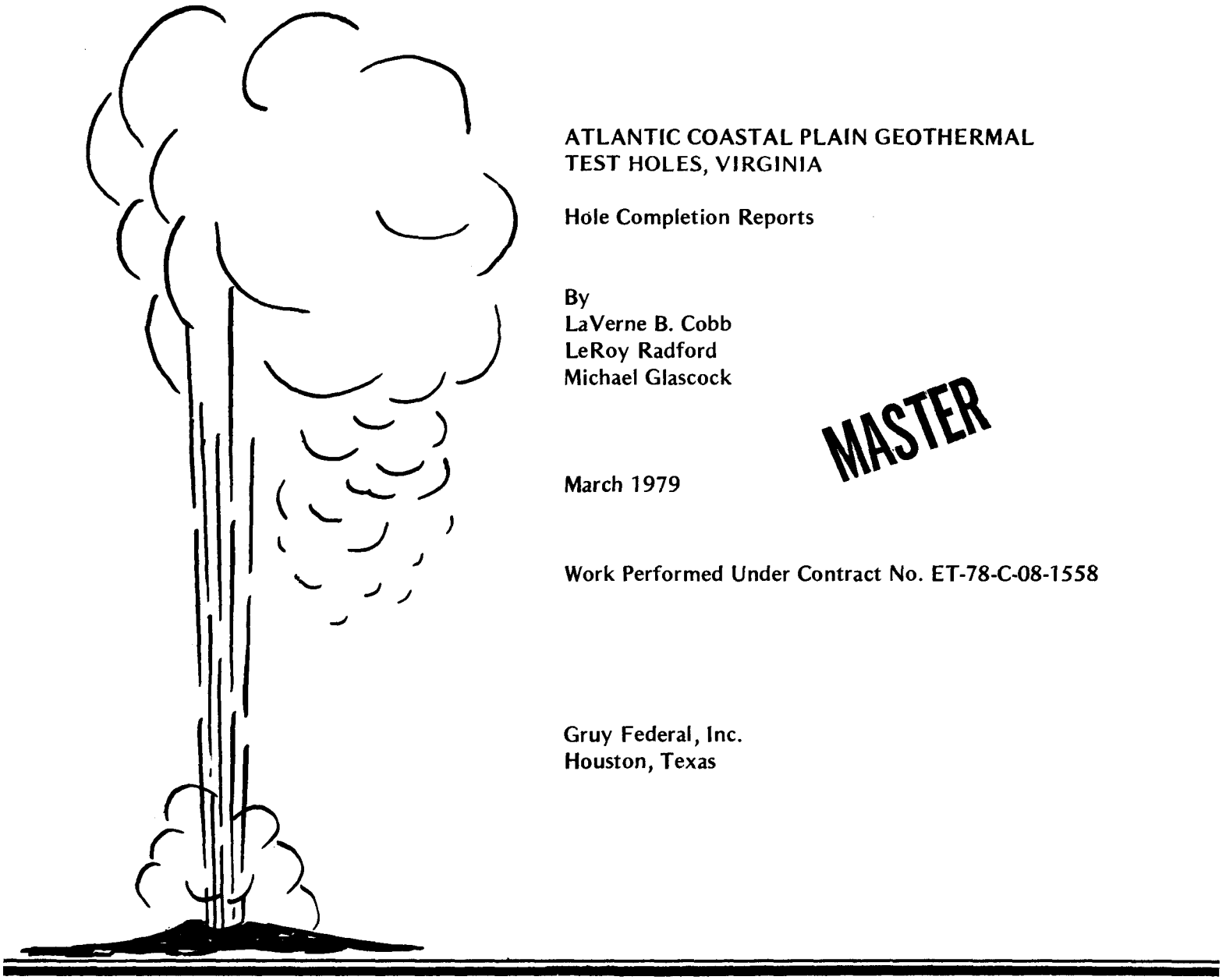
NVO-1558-4(Vol.3)



ATLANTIC COASTAL PLAIN GEOTHERMAL TEST HOLES, VIRGINIA

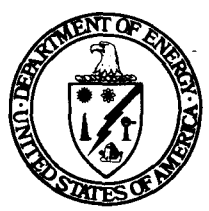
Hole Completion Reports

By
LaVerne B. Cobb
LeRoy Radford
Michael Glascock

March 1979

Work Performed Under Contract No. ET-78-C-08-1558

Gruy Federal, Inc.
Houston, Texas



U. S. DEPARTMENT OF ENERGY

Geothermal Energy

NOTICE

NVO-1558-4(Vol.3)
Distribution Category UC-66a

ATLANTIC COASTAL PLAIN

GEOTHERMAL TEST HOLES

VIRGINIA

HOLE COMPLETION REPORTS

LaVerne B. Cobb

LeRoy Radford

Michael Glascock

March 1979

Work Performed Under Contract

ET-78-C-08-1558

GRUY FEDERAL, INC.
2500 Tanglewilde, Suite 150
Houston, Texas 77063

FOREWORD

This document summarized work performed by Gruy Federal, Inc. as part of the Atlantic Coastal Plain Geothermal Drilling Program under DOE contract No. Et-78-C-08-1558. Five of sixteen holes drilled in Virginia under this program are summarized in this document.

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Volume III of III

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LIST OF FIGURES

ABSTRACT

A description of the Atlantic Coastal Plain Geothermal Drilling Program and data for the following Geothermal test holes drilled in Virginia are summarized in this report:

Site No. 55	Accomac
Site No. 56	Eastville
Site No. 60	Hampton
Site No. 59	Smith Point
Site No. 25-B	Suffolk

SECTION 2. HOLE DATA REPORTS

XII. Site No. 55, Accomac/Tasley, Virginia

A. Site Location

The location of Site No. 55, Accomac/Tasley, Virginia, heat flow measurement hole is shown on Figure 12-1, a section of USGS 7½' Quadrangle "Accomac, Virginia". The coordinates of the drill site are longitude 75° 43' 09" W, latitude 37° 42' 32" N. The site, located in an open field west of the fairgrounds on State Route 178, has a ground elevation of approximately 40 feet above sea level.

B. Lease/Letter Agreements, Permits, Licenses

Access to Site No. 55 was obtained by permission of the owner by fee lease agreement (Exhibit XII-1). A Commonwealth of Virginia Certification of Completion permit was required and is shown in Exhibit XII-2.

C. Environmental Information Survey

The environmental information checklist, supplementary information required for the "Environmental Assessment, Geothermal Exploratory Drilling Program, Eastern United States, Coastal Plains and Piedmont Provinces" (DOE/EA-0015), is shown in Exhibit XII-3.

D. Drilling Activities

Drilling activities at Site No. 55, Accomac, Virginia, began November 26, 1978 and were completed on November 28, 1978. Figure 12-2, a schematic diagram of the completed hole, summarizes data for Site No. 55. The daily drilling reports are shown in Exhibit XII-4 and Exhibit XII-5 is an operations summary of Site No. 55. Cores and cuttings taken from the hole during drilling were delivered to VPI&SU. No electric logs were run on this hole. Temperature logs were run by VPI&SU after the hole was cased; however, these data were not made available to Gruy.

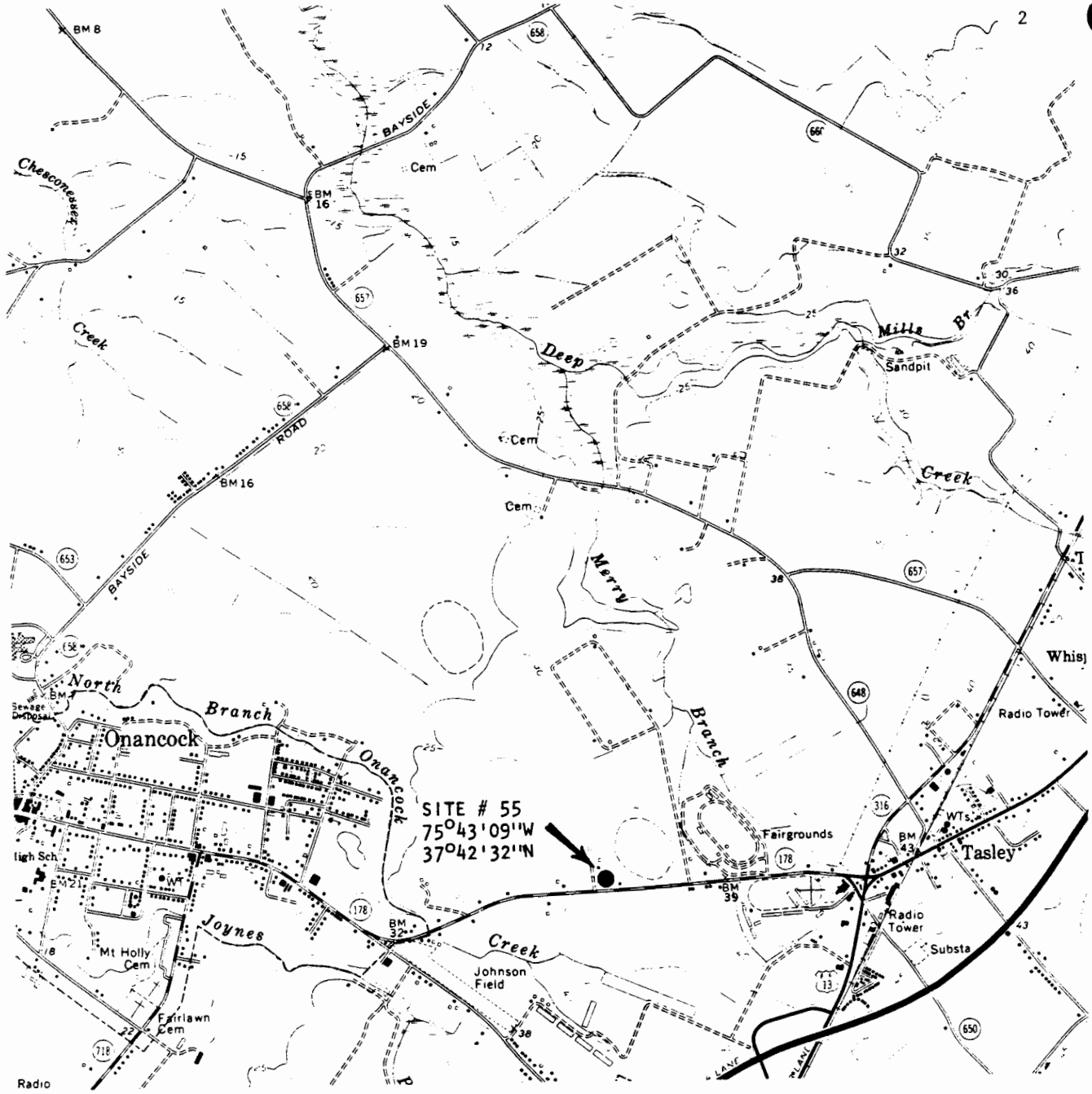


FIGURE 12-1 LOCATION SITE #55, ACCOMAC, VA.
LONGITUDE 75°43'09" W, LATITUDE 37°42'32" N

ACCOMAC, VA.
N3737.5—W7537.5/7.5

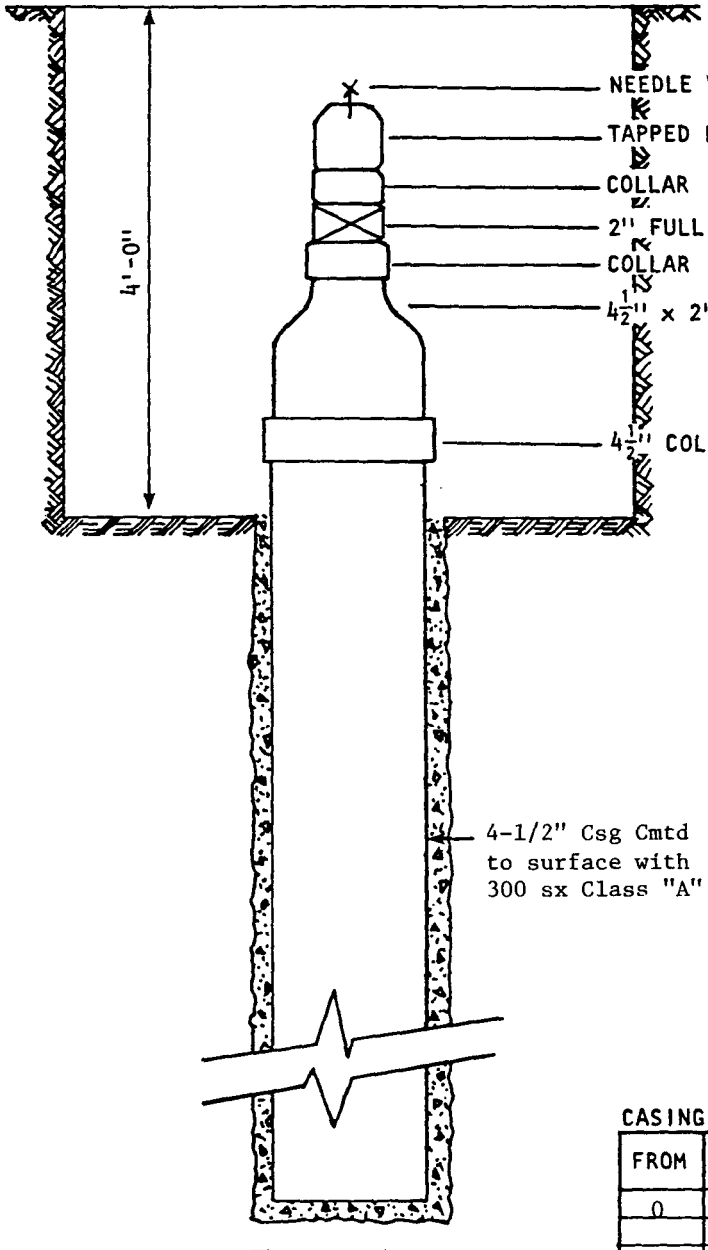
1968

AMS 5859 II NW—SERIES V834

GRUY FEDERAL, INC.

SITE NO. 55
WELL NAME Accomac
LOCATION: LAT. 37°42'32"N
LONG. 75°43'09"W

RIG: Energy Service Company Rig No 17 COUNTY Accomack STATE Virginia
DATE SPUDED: November 26, 1978 DATE COMPLETED: November 28, 1978



TD 1034'
PBTD 1009'

ALL DEPTHS REFERENCE KDB + 11' to GL

CORES:

NO.	FROM	TO	RECOVERY
1	555	580	20'
2	954	979	6'
3	979	1004	7'

HOLE SIZE:

DEPTH		HOLE	CSG.	MUD*	
FROM	TO	SIZE IN.	SIZE IN.	VIS.	WT.
0	1034	6-3/4	4-1/2	45	9.5

*Approximate

CASING:

FROM	TO	SIZE IN.	WT #/FT	GRADE	THREAD	NO. JTS
0	1011	4-1/2	9.5	J55	ST&C	28

FIGURE 12-2 WELL SCHEMATIC WITH COMPLETION INFORMATION

E. Site Preparation, Layout and Cleanup

Prior to initiation of drilling at Accomac, Virginia, the site area was almost level and had an ungroomed grass covering. For site preparation, a bulldozer dug two pits 35' long, 5' wide, and 4' deep. The 4' x 4' cellar was dug by hand 4' deep and boarded over. After the hole was completed, the wellhead was installed and an iron grate was placed over the cellar and locked. The mud pit was vacuumed and the site was backfilled and leveled.

F. EXHIBITS

GRUY FEDERAL, Inc.
Form: Geo - 1
EXHIBIT XII-1

#55

STATE OF Virginia)
:ss
COUNTY OF Accomack)

LEASE CONTRACT FOR GEOTHERMAL MEASUREMENT

This Lease Contract, made and entered into as of this the 6th day of November, 1978 by and between Van Kesteren Farms, Inc.

of Onancock, Virginia 23417,
herein referred to as "GRANTOR", whether one or more and GRUY FEDERAL, Inc., a Texas Corporation, of Suite 150, 2500 Tanglewilde, Houston, Texas 77063, herein referred to as "GRANTEE", as follows:

WITNESSETH: That Grantor for and in consideration of One Hundred and no/100 ($ 100.00) Dollars in hand paid to Grantor by Grantee and for other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, Grantor until November 6, 1979, does grant the use and by these presents does loan, lease and let to Grantee the land situation in Accomack County, State of Virginia, as more particularly described in Exhibit "A", attached hereto and incorporated herein by reference, together with a servitude of passage on, over and crossing the lands, including existing roadways, trails, bridges and the like lying and being situation on the leased land or adjacent lands owned by Grantor or in which Grantor has the right of passage, so that Grantee may have access to the bore hole site later described in this agreement with the sole and exclusive right to Grantee, acting as contractor and agent for the Division of Geothermal Energy, U. S. Department of Energy:

1. To use a self contained portable truck drilling rig unit, with associated equipment, to conduct a geothermal (heat) resource scientific experimental test involving the drilling, casing and testing of an approximately 1,000' deep geothermal temperature measurement bore hole from a location, to be selected mutually by representatives of the Grantor and Grantee, on the leased lands, with Grantee utilizing during such testing operations the services of scientific and technical representatives and facilities of Virginia Polytechnical Institute and State University, Blacksburg, Virginia, the State Geological office, the U. S. Geological Survey, and the U. S. Department of Energy. Such testing operations shall consist of logging the bore hole, collecting formation samples, and keeping the bore hole filled with fresh water and conducting periodic temperature tests.

2. At the end of the testing period Grantee shall take steps necessary to properly plug and abandon the bore hole in accordance with government regulations; EXCEPT that if Grantor so elects, Grantor may take over the bore hole in its then present condition at Grantor's risk and expense. In case of such election, Grantor agrees to execute and appropriate release of Grantee from any future obligation in respect to such bore hole.

3. During the time Grantee conducts its operations on the leased premises, Grantee shall remain responsible for accidents, injuries and damages arising out of its operations on the leased site and agrees to restore the surface of the land as near as practicable to its condition prior to Grantee's operations.

4. Grantee shall have no right to produce any minerals from the bore hole nor shall it have any ownership of minerals or production under the leased bore hole site.

In witness whereof, the GRANTOR has executed this instrument effective the day first above written.

John Van Kesteren, President

This Instrument Prepared By:
GRUY FEDERAL, Inc.
Suite 150, 2500 Tanglewilde
Houston, Texas 77063
W. Edward Gilliam

Exhibit "A"

That certain bore hole site of approximately one acre lying 0.6 mile northwest of the intersection of Routes Alternate US #13, and state routes 316 and 178, Accomack County, Virginia and more particularily described as follows:

Accomac Quadrangle
Accomack County, Virginia
U. S. Department of Interior Geological Survey Map
Coordinates: 75° 42' 55"
37° 42' 49"

Final site selection to be by mutual agreement between Grantor and Grantee.

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

• BWCM No. _____

(Certification of Completion/County Permit)

tate Water Control Board
. O. Box 11143
111 North Hamilton St.
ichmond, Va. 23230

SWCB Permit _____
County Permit _____

Certification of inspecting official:
This well does _____ does not _____ meet code/low requirements.
S. _____
Date _____
For Office Use

ACCOMAC QUAD

County/City Stamp

•Virginia Plane Coordinates
_____ N
_____ E

Latitude & Longitude
37°42'32" N
75°43'09" W

•Topo. Map No. _____
•Elevation 40 ft.
•Formation _____
•Lithology _____
•River Basin _____
•Province _____
•Type Logs _____
•Cuttings EACH 10ft
•Water Analysis _____
•Aquifer Test _____

•Owner VAN KESTEREN FARMS, INC.
•Well Designation or Number SITE # 55
Address ONANCOCK, VIRGINIA 23417
Phone _____

•Drilling Contractor GRUY FEDERAL INC.
Address 2500 TANGLEWILDE #150 HOUSTON
Phone _____ TEXAS

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well: I _____, IIA _____
IIB _____, IIIA _____, IIIB _____

WELL LOCATION: 0.5 (feet/miles) WEST (direction) of ROAD 316 on ROAD 178
and _____ feet/miles _____ (direction) of _____
(If possible please include map showing location marked)

Date started Nov. 26 • Date completed Nov. 29 Type rig ROTARY

WELL DATA: New ✓ Reworked _____ Deepened _____
•Total depth 1034 ft. _____ ft.
•Depth to bedrock — _____ ft.
•Hole size (Also include reamed zones)
• 7 7/8 inches from 0 to 1034 ft.
• _____ inches from _____ to _____ ft.
• _____ inches from _____ to _____ ft.
•Casing size (I.D.) and material
• 4 1/2 inches from 2 to 1011 ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
•Screen size and mesh for each zone (where applicable)
• _____ inches from _____ to _____ ft.
•Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
•Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
•Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
•Mesh size _____ Type _____
•Gravel pack
•From _____ to _____ ft.
•From _____ to _____ ft.
•Grout
•From 2 to 1011 ft., Type CLASS A
•From _____ to _____ ft., Type _____

2. WATER DATA • Water temperature _____ °F
•Static water level (unpumped level-measured) _____ ft
•Stabilized measured pumping water level _____ ft
•Stabilized yield _____ gpm after _____ hours
Natural Flow: Yes _____ No _____, flow rate: _____ g pm
Comment on quality _____

3. WATER ZONES: From _____ To _____
From _____ To _____ . From _____ To _____
From _____ To _____ . From _____ To _____

4. USE DATA:
Type of use: Drinking _____, Livestock Watering _____,
Irrigation _____ Food processing _____, Household _____
Manufacturing _____, Fire safety _____, Cleaning _____
Recreation _____, Aesthetic _____, Cooling or heating _____
Injection _____, Other _____
•Type of facility: Domestic _____, Public water supply _____
Public institution _____ Farm _____, Industry _____
Commercial _____, Other _____

5. PUMP DATA: Type _____ • Rated H.P. _____
•Intake depth _____ •Capacity _____ at _____ head

6. WELLHEAD: Type well seal SEE FIGURE #4
Pressure tank _____ gal., Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected _____ yes _____ no
Date _____, Disinfectant used _____
Amount _____, Hours used _____

8. ABANDONMENT (where applicable) •yes _____ no _____
Casing pulled yes _____ no _____ not applicable _____
Plugging grout From _____ to _____ material _____

Owner _____ BWCM No. 8

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)				11.	12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)
DEPTH (feet)		TYPE OF ROCK OR SOIL	REMARKS	Drilling	
From	To	(color, material, fossils, hardness, etc.)	(water, caving, cavities, broken, core, shot, (etc.)	Time (Min.)	
		THE DESCRIPTIONS OF THIS WELL ARE UNPUBLISHED. FOR INFORMATION CALL OR WRITE VIRGINIA POLYTECH. INST. GEOPHYSICS DEPT. DR. JOE LAMBIASE (703) 961-6112			

State Water Control Board Regional Offices

Valley Reg. Off.
116 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Southwest Reg. Off.
408 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

West Central Reg. Off.
Executive Park
5306 A Peters Creek Road
Roanoke, Va. 24019
703-563-0354

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

13. Well lot dedicated? _____; Size _____ ft. X _____ ft.; Well house? _____
Distance to nearest pollutant source _____ ft., Type _____
Distance to nearest property line _____ ft., Building _____ ft.

14. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature Michael R. Gbrunta (Seal), Date FEB. 10, 1979
(Well driller or authorized person)

License No. _____

SITE-SPECIFIC ENVIRONMENTAL INFORMATION CHECKLIST

HEAT GRADIENT HOLES

ATLANTIC COASTAL PLAIN GEOTHERMAL TEST PROGRAM

Site No. 55 State Vir.

Location Onancock, Virginia
75°43'09" — 37°42'32"

A. GENERAL

1. Has federal, state and/or local environmental assessment been conducted previously for the proposed drill site? Yes____ No X If yes, provide a copy, if available.

2. Have all required permits, licenses, and/or agreements for the proposed drill site been obtained? Yes X No____ If no, explain. ____

3. Does the drill site fall within the habitat of rare or endangered species? Yes____ No X If yes, explain. EASTERN FLYWAY, BUT NO SPECIES OCCUPY THE AREA AT THE TEST SITE.

4. Are known archeological sites, historic sites, prime or unique farmland, or natural landmarks within or visible from the site area? Yes____ No X If yes, explain. ____

5. Will casing left in the hole protect all ground water aquifers? Yes X No____ If no, explain. ____

6. Will a directional survey be conducted in the drill hole? Yes____ No X If yes, at what interval? ____feet. If no, explain. NOT NECESSARY FOR 1000' NONPRODUCING HOLE

7. Will expected continuous noise levels from site operations be 65 dBA or less at the nearest residence? Yes____ No X If no, explain.
EACH 8V-71 GMC ENGINE EQUIPPED WITH TWO 4" No. SRU04-0196 MAXIM SILENCERS; MAXIMUM NOISE LEVEL 32.0dBA, 250 CENTER FREQUENCY; FOR RESIDENTIAL USE.

B. SITE CONSTRUCTION

1. Will additional land clearing be required for the drilling and data collection activities (e.g., preparation of drill pad, road construction, mud reserve pits, pipeline)? Yes X No____ If yes, describe.
LEVEL PAD AND TWO EARTH PITS (35'x5'x4' EACH)

2. Will the drill site and related roads be treated to minimize dust? Yes____ No X If no, explain. NOT NECESSARY DUE TO PAVED ROADS AND SOIL CONDITIONS.

3. Are portable sanitary facilities or an approved septic system to be used at the drill site? Yes X No____ If no, explain. ____

4. Will liquid and solid wastes be disposed in accordance with local regulations? Yes X No____ If no, explain. ____

5. Will erosion control be required for excavated areas? Yes____ No X If yes, explain. ____

6. Upon completion of proposed drilling and data collection activities, will the site be restored to as natural a condition as possible by regrading, filling, and reseeding? Yes X No ____ If no, explain. ____

C. SAFETY

1. Will blowout preventers be used? Yes ____ No X If no, explain. NOT NECESSARY FOR 1000' HOLE. D.O.E. GAVE APPROVAL

2. Will fire extinguishers be located onsite? Yes X No ____ If no, explain. ____

3. Will engineering and mud logging personnel be onsite during drilling operations? Yes X No ____ If no, explain. ____

4. Does an emergency plan exist for evacuating personnel? Yes X No ____ If no, explain. ____

5. Will the drilling operations be conducted under a safety policy that ensures safe operating procedures and attention to job safety and health protection? Yes X No ____ If no, explain. ____

Completed from onsite inspection by:

Michael R. Glasscock
Signature

Position: FIELD ENGINEER

Date: Nov. 20, 1978

SAFETY POLICY

1. The safety policies of Gruy Federal, Inc. are defined by the joint requirements of:
   a. the Occupational Safety and Health Act of 1970, as defined and enforced by the Occupational Safety and Health Administration (OSHA) of the Department of Labor with respect to job safety and health protection, and
   b. the safe operating procedures, inspection and training programs, and accident investigation forms of the International Association of Drilling Contractors, whether involving drilling rigs or other equipment.

2. OSHA requirements are summarized in the 10" X 16" plastic laminated JOB SAFETY AND HEALTH PROTECTION sign, GPO: 1974 0 - 537-604; IADC procedures and inspection and report forms are summarized in the booklet Outline for Drilling Rig Safety Program, compiled by the IADC Safety Publications Subcommittee, revised 1976. Both of these documents are required to be displayed, reviewed at regular intervals by all supervisory personnel, and followed in concept and practice in all Gruy Federal operations involving job safety and health protection.

3. All Gruy Federal subcontractors and/or third party services are required to maintain meaningful and effective safety programs that include scheduled training and drills for personnel, and scheduled maintenance and testing of safety equipment.

4. In addition, all Gruy Federal field operations and all subcontractors and/or third party services to Gruy Federal field operations are required to maintain familiarity with and follow the recommended safe operating procedures and guidelines of the Accident Prevention Manual, IADC, revised edition, October, 1975.

5. The Gruy Federal Project Manager or his designated field representative shall have responsibility for maintaining these safety policies through:
   a. inspection of all equipment and materiel,
   b. inspection of personnel and equipment performance in safety drill or demonstration upon request, and
   c. shutdown or exclusion from the job of any operation, materiel or personnel whose temporary condition or malfunction violates or jeopardizes the requirements of these safety policies.

February, 1978

Alan Lohse
Executive Vice President

EXHIBIT XII-4

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Accomac No. 55

DATE November 26, 1978 COUNTY Accomac STATE Virginia

REPORT NO. 1 REPORTED BY Radford

DEPTH 453 PROGRESS 453

ACTIVITY AT REPORT TIME Repairing swivel

TIME LOG FROM	TO	ELAPSED	OPERATIONS
0800	0930	1½	Moving rig to Accomac No. 55
0930	1400	5½	Rig up
1400	1530	1½	Mix mud and drill rat hole
1530	1930	4	Drill 0-453'
1930	2000	½	POH to change swivel packing
2000	0600	10	Re pack swivel. RIH swivel still leaking. POH . Prepare to replace wash pipe and swivel packing.

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Accomac No. 55

DATE November 27, 1978 COUNTY Accomac STATE Virginia

REPORT NO. 2 REPORTED BY Radford

DEPTH 954 PROGRESS 501

ACTIVITY AT REPORT TIME Washing to bottom with core barrel

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	1400	8	Work on Swivel
1400	1430	½	RIH with bit
1430	1600	1½	Drill to 555'
1600	1830	2½	POH with bit. Picked up core barrel. RIH and break circulation
1830	1900	½	Core 555' to 580'
1900	2000	1	POH. Dress core barrel. 20' recovered
2000	2100	1	RIH with bit
2100	2400	3	Drill 580' to 954'
2400	0130	1½	Circulate and POH with bit
0130	0300	1½	Pull up core barrel and RIH
0300	0430	1½	Clean suction on pump and pull caps on valves
0430	0600	1½	Wash to bottom with core barrel

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Accomac #55

DATE 11/28/78 COUNTY Accomac STATE Va.

REPORT NO. 3 REPORTED BY Radford

DEPTH 1034' PROGRESS 80'

ACTIVITY AT REPORT TIME Rigging down - Raining and boggy

TIME LOG FROM	TO	ELAPSED	OPERATIONS
0600	0700	1	Finished washing to BTM and circ.
0700	0800	1	cored 954' - 979'
0800	1130	3.5	POH - LD core bbl 6' recovery
1130	1230	1	WIH w/core bbl
1230	1400	1.5	Cored 979' - 1004'
1400	1700	3	POH and LD core bbl. 7' recovery WIH w/bit and drilled to 1034'
1900	1830	1.5	POH laying down DP
1830	2100	2.5	Rig up to run 4½ csg.
2100	2300	2	Run 28 jts. 4½" 9.5# J-55 ST&C - A total of 1002' pipe set
2300	0100	2	RU to cement
0100	0200	1	Cmt w/300 sx Class A cmt, circ cmt & bumped plug w/1000 psi RD cmt eqpt
0200	0600	4	Rig down and prepare to move.

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Accomac #55

DATE November 29, 1978 COUNTY Accomac STATE Va.

REPORT NO. 4 REPORTED BY Radford

DEPTH 1034' PROGRESS

ACTIVITY AT REPORT TIME Preparing to move to Eastville #56

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	0900	3	Rigging down

FINAL REPORT - WELL COMPLETE

December 13, 1978

OPERATIONS SUMMARY

OPERATOR : Gruy Federal Inc.
LEASE : Accomack
WELL : No. 55
COUNTY : Accomack, Virginia

****

11/26/78 Report #1. TD 453'. Activity at report time: Repairing swivel. Elapsed time: 1½ hrs. loading rig Accomack #55. 5½ hrs. RU. 1½ hrs. mix mud & drl. mouse hole. 4 hrs. drl. from 0'-453'. ½ hr. POH to change swivel packing. 10 hrs. replace swivel packing. RIH. Swivel still leaked. POH to repair swivel. Wash pipe had washed out to spot in btm. Had to changed out hole swivel assem.

11/27/78 Report #2. TD 453'. Elapsed time: 8 hrs. working on swivel. ½ hr. TIH w/bit. 1½ hrs. drl. to 555'. 1½ hrs. POH & PU core barrel. 1 hr. TIH w/core barrel & safe to circ. ½ hr. coring from 555'-580'. 1 hr. POH to redress core barrel. Had 20' recovery. 1 hr. TIH w/bit. 3 hrs. drl. from 555'-954'. 1½ hrs. circ. & POH w/bit. 1½ hrs. PU core barrel & TIH w/core barrel. 1½ hrs. work on pump. 1½ hrs. washing core barrel. to btm.

11/28/78 Report #3. Activity at report time: RD. TD 1034'. Elapsed time: 1 hr. TIH, circ. for core. 1 hr. circ. from 954'-979'. 3½ hrs. POH w/core barrel. Redress core barrel, had 6' recovery. 1 hr. TIH w/core barrel. 1½ hrs. coring from 979'-1004'. 3 hrs. POH w/core barrel. LD core barrel & redress, had 7' recovery. TIH w/bit. Drl. 30'. 1½ hrs. LD D.P. 2½ hrs. RU to run 4½" csg. 2 hrs. run 4½" csg. 28 jts. Pipe tally @ 1002'. Kelly bushing measurement is 1011'. 2 hrs. RU Halliburton. Water truck stuck. Had to use dozer to pull water truck in. 1 hr. cmt. w/300 sks. of Class "A" cmt. Cmt. circ. Bump plug @ 1000# press. RD Halliburton. 4 hrs. RD.

XIII. Site No. 56, Eastville, Virginia

A. Site Location

The location of Site No. 56, Eastville, Virginia, heat flow measurement hole is shown on Figure 13-1, a section of USGS 7½' Quadrangle "Cheriton, Virginia". The coordinates of the drill site are longitude 75° 59' 32" W, latitude 37° 21' 16" N. The site, located east of Wilkins Beach in a grove of pine trees along State Route 666, has a ground elevation of approximately 16 feet above sea level.

B. Lease/Letter Agreements, Permits, Licenses

Access to Site No. 56 was obtained by permission of the owner by fee lease agreement (Exhibit XIII-1). A Commonwealth of Virginia Certification of Completion permit was required and is shown in Exhibit XIII-2.

C. Environmental Information Survey

The environmental information checklist, supplementary information required for the "Environmental Assessment, Geothermal Exploratory Drilling Program, Eastern United States, Coastal Plains and Piedmont Provinces" (DOE/EA-0015), is shown in Exhibit XIII-3.

D. Drilling Activities

Drilling activities at Site No. 56, Eastville, Virginia, began November 29, 1978 and were completed on November 30, 1978. Figure 12-2, a schematic diagram of the completed hole, summarizes data for Site No. 56. The daily drilling reports are shown in Exhibit XIII-4 and Exhibit XIII-5 is an operations summary of Site No. 56. Cores and cuttins taken from the hole during drilling were delivered to VPI&SU. No electric logs were run on this hole. Temperature logs were run by VPI&SU after the hole was cased; however, these data were not made available to Gruy.

BURGESS, VA.—MD.
NE/4 HEATHSVILLE 15' QUADRANGLE
N3752.5—W7615/7.5

1968

AMS 5759 IV NE—SERIES V834

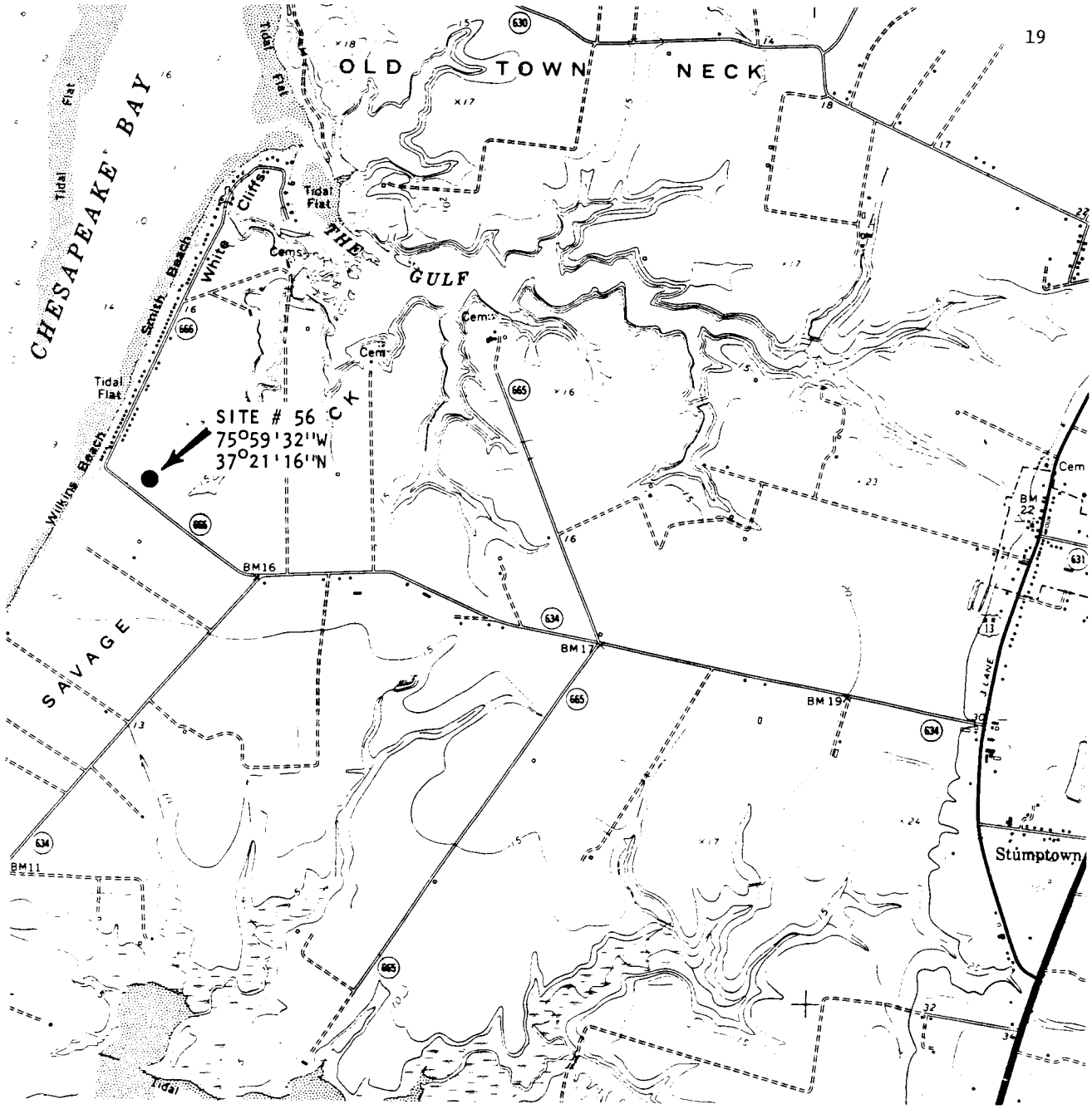


FIGURE 13-1 LOCATION SITE #56, EASTVILLE, VA.
LONGITUDE 75°59'32" W, LATITUDE 37°21'16" N

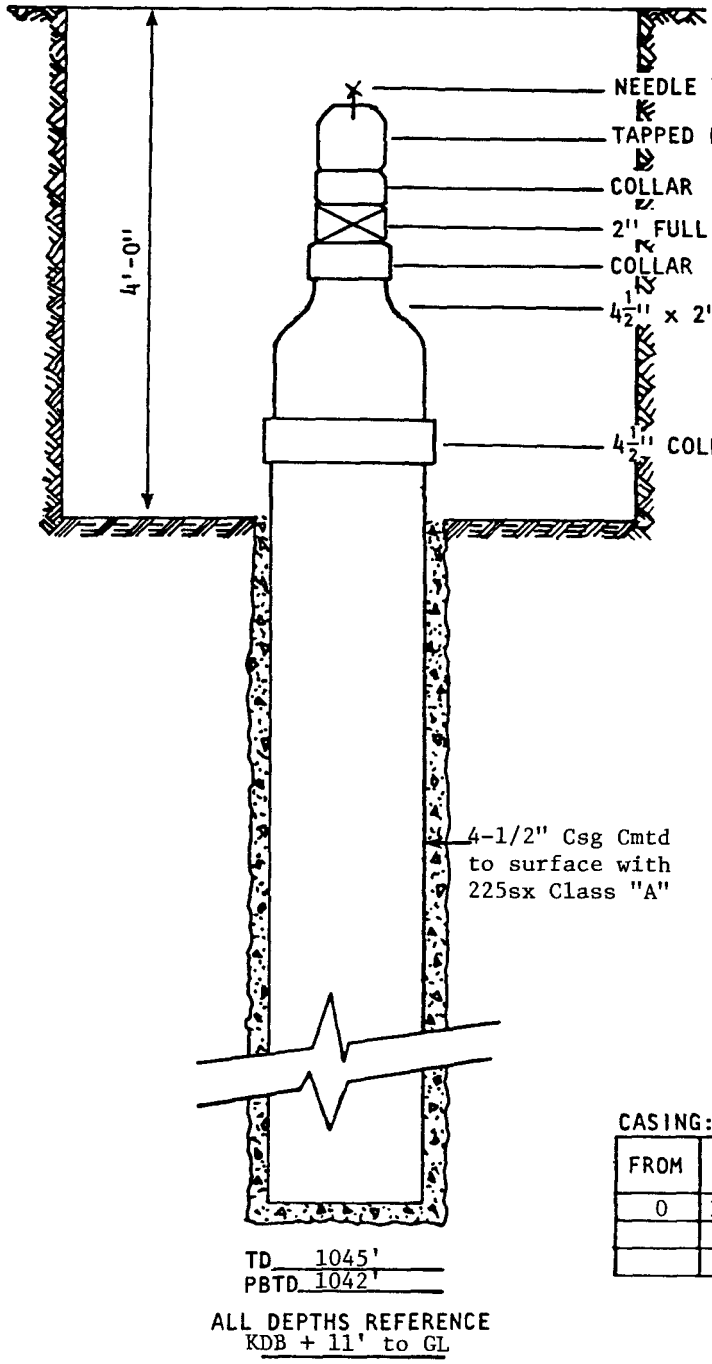
CHERITON, VA.
N3715—W7552.5/7.5

1968

AMS 5858 IV SW—SERIES V834

GRUY FEDERAL, INC.

SITE NO. 56
WELL NAME Eastville
LOCATION: LAT. 37°21'16"N
LONG. 75°59'32"W
RIG: Energy Service Company Rig No 17 COUNTY Northampton STATE Virginia
DATE SPUDED: November 29, 1978 DATE COMPLETED: November 30, 1978



CORES:

NO.	FROM	TO	RECOVERY
1	401	476	13'
2	985	1015	0

HOLE SIZE:

DEPTH		HOLE	CSG.	MUD*	
FROM	TO	SIZE IN.	SIZE IN.	VIS.	WT.
0	1045	6-3/4	4-1/2	4.5	9.5

*Approximate

CASING:

FROM	TO	SIZE IN.	WT #/FT	GRADE	THREAD	NO. JTS
0	1044	4-1/2	9.5	J55	ST&C	25

FIGURE 13-2 WELL SCHEMATIC WITH COMPLETION INFORMATION

E. Site Preparation, Layout and Cleanup

Prior to initiation of drilling at Eastville, Virginia, the site area was almost level and was located in a grove of pine trees. For site preparation, a bulldozer dug two pits 35' long, 5' wide, and 4' deep, and cleared one acre of pine trees. The 4' x 4' cellar was dug by hand 4' deep and boarded over. After the hole was completed, the wellhead was installed and an iron grate was placed over the cellar and locked. The mud pit was vacuumed and the site was backfilled and leveled.

L. Gbf

GRUY FEDERAL, Inc.
Form: Geo - 1
EXHIBIT XIII-1
#56

STATE OF Virginia)
:ss
COUNTY OF Northampton)

LEASE CONTRACT FOR GEOTHERMAL MEASUREMENT

This Lease Contract, made and entered into as of this the 18th day of November, 1978 by and between Thomas Smith

_____,

of Eastville, Virginia,
herein referred to as "GRANTOR", whether one or more and GRUY FEDERAL, Inc., a Texas Corporation, of Suite 150, 2500 Tanglewilde, Houston, Texas 77063, herein referred to as "GRANTEE", as follows:

WITNESSETH: That Grantor for and in consideration of One Hundred and no/00 ($100.00) Dollars in hand paid to Grantor by Grantee and for other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, Grantor until November 18, 1979, does grant the use and by these presents does loan, lease and let to Grantee the land situation in Northampton County, State of Virginia, as more particularly described in Exhibit "A", attached hereto and incorporated herein by reference, together with a servitude of passage on, over and crossing the lands, including existing roadways, trails, bridges and the like lying and being situation on the leased land or adjacent lands owned by Grantor or in which Grantor has the right of passage, so that Grantee may have access to the bore hole site later described in this agreement with the sole and exclusive right to Grantee, acting as contractor and agent for the Division of Geothermal Energy, U. S. Department of Energy:

1. To use a self contained portable truck drilling rig unit, with associated equipment, to conduct a geothermal (heat) resource scientific experimental test involving the drilling, casing and testing of an approximately 1,000' deep geothermal temperature measurement bore hole from a location, to be selected mutually by representatives of the Grantor and Grantee, on the leased lands, with Grantee utilizing during such testing operations the services of scientific and technical representatives and facilities of Virginia Polytechnical Institute and State University, Blacksburg, Virginia, the State Geological office, the U. S. Geological Survey, and the U. S. Department of Energy. Such testing operations shall consist of logging the bore hole, collecting formation samples, and keeping the bore hole filled with fresh water and conducting periodic temperature tests.

2. At the end of the testing period Grantee shall take steps necessary to properly plug and abandon the bore hole in accordance with government regulations; EXCEPT that if Grantor so elects, Grantor may take over the bore hole in its then present condition at Grantor's risk and expense. In case of such election, Grantor agrees to execute and appropriate release of Grantee from any future obligation in respect to such bore hole.

3. During the time Grantee conducts its operations on the leased premises, Grantee shall remain responsible for accidents, injuries and damages arising out of its operations on the leased site and agrees to restore the surface of the land as near as practicable to its condition prior to Grantee's operations.

4. Grantee shall have no right to produce any minerals from the bore hole nor shall it have any ownership of minerals or production under the leased bore hole site.

In witness whereof, the GRANTOR ha S executed this instrument effective the day first above written.

Thomas Smith
Thomas Smith

_____

_____

_____

This Instrument Prepared By:
GRUY FEDERAL, Inc.
Suite 150, 2500 Tanglewilde
Houston, Texas 77063

GRUY FEDERAL, INC.
CONSULTANTS IN ENERGY SYSTEMS

2500 TANGLEWILDE SUITE 150
HOUSTON, TEXAS 77063
713/785-9200

1911 JEFFERSON DAVIS HWY., SUITE 500
ARLINGTON, VIRGINIA 22202
703/920-0113

Exhibit "A"

That certain bore hole site of approximately one acre lying north of State Route #666 about 0.45 mile northwest of the road junction of State Routes #666 and #634 and more particularily described as follows:

Cheriton Quadrangle
Northampton County, Virginia
U. S. Department of Interior Geological Survey Map
Coordinates: 75° 59' 35"
37° 21' 19"

And also on land owned by Grantor and known as Tax Parcel 718, Tax Map (aerial photograph) ANP 2GG-18.

Final site selection to be by mutual agreement between Grantor and Grantee's representative.

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA

EXHIBIT XIII-2

24

WATER WELL COMPLETION REPORT

• SWCM No. _____

(Certification of Completion/County Permit)

State Water Control Board
P. O. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit _____
County Permit _____

Certification of inspecting official:
This well does _____ does not _____
meet code/law requirements.
S. _____
Date _____

For Office Use

CHERITON QUAD.

County/City Stamp

• Virginia Plane Coordinates
_____ N
_____ E

Latitude & Longitude
37° 21' 16" N
75° 59' 32" W

Topo. Map No. _____
Elevation 16 ft.
Formation _____
Lithology _____
River Basin _____
Province _____
Type Logs _____
Cuttings EACH 10 ft.
Water Analysis _____
Aquifer Test _____

• Owner THOMAS SMITH EASTVILLE, VIRGINIA
• Well Designation or Number SITE #56
Address _____
Phone _____

• Drilling Contractor GRUY FEDERAL INC.
Address 2500 TANGLEWILDE #150 HOUSTON
Phone _____ TEXAS

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well: I _____, IIA _____
IIB _____, IIIA _____, IIIB _____

WELL LOCATION: 0.4 (feet/miles WEST (direction) of ROAD 634 ON ROAD 666
and _____ feet/miles _____ (direction) of _____
(If possible please include map showing location marked)

Date started Nov. 29 • Date completed DEC. 1 Type rig ROTARY

WELL DATA: New ✓ Reworked _____ Deepened _____

• Total depth 1045 ft. _____ ft.
• Depth to bedrock _____ ft.
• Hole size (Also include reamed zones)
  • 7 7/8 inches from 0 to 1045 ft.
  • _____ inches from _____ to _____ ft.
  • _____ inches from _____ to _____ ft.
• Casing size (I.D.) and material
  • 4 1/2 inches from 2 to 1044 ft.
  Material _____
  Wt. per foot _____ or wall thickness _____ in.
  • _____ inches from _____ to _____ ft.
  Material _____
  Wt. per foot _____ or wall thickness _____ in.
  • _____ inches from _____ to _____ ft.
  Material _____
  Wt. per foot _____ or wall thickness _____ in.
• Screen size and mesh for each zone (where applicable)
  • _____ inches from _____ to _____ ft.
  • Mesh size _____ Type _____
  • _____ inches from _____ to _____ ft.
  • Mesh size _____ Type _____
  • _____ inches from _____ to _____ ft.
  • Mesh size _____ Type _____
  • _____ inches from _____ to _____ ft.
  • Mesh size _____ Type _____
• Gravel pack
  • From _____ to _____ ft.
  • From _____ to _____ ft.
• Grout
  • From 2 to 1044 ft., Type CLASS A
  • From _____ to _____ ft., Type _____

2. **WATER DATA** • Water temperature _____ °F
  • Static water level (unpumped level-measured) _____ ft
  • Stabilized measured pumping water level _____ ft
  • Stabilized yield _____ gpm after _____ hours
  Natural Flow: Yes _____ No _____, flow rate: _____ g pm
  Comment on quality _____
3. **WATER ZONES:** From _____ To _____
  From _____ To _____ . From _____ To _____
  From _____ To _____ . From _____ To _____
4. **USE DATA:**
  Type of use: Drinking _____, Livestock Watering _____
  Irrigation _____ Food processing _____, Household _____
  Manufacturing _____, Fire safety _____, Cleaning _____
  Recreation _____, Aesthetic _____, Cooling or heating _____
  Injection _____, Other _____
  • Type of facility: Domestic _____, Public water supply _____
  Public institution _____ Farm _____, Industry _____
  Commercial _____, Other _____
5. **PUMP DATA:** Type _____ • Rated H.P. _____
  • Intake depth _____ • Capacity _____ at _____ head
6. **WELLHEAD:** Type well seal SEE FIGURE #4
  Pressure tank _____ gal., Loc. _____
  Sample tap _____, Measurement port _____
  Well vent _____, Pressure relief valve _____
  Gate valve _____, Check valve (when required) _____
  Electrical disconnect switch on power supply _____
7. **DISINFECTION:** Well disinfected _____ yes _____ no
  Date _____, Disinfectant used _____
  Amount _____, Hours used _____
8. **ABANDONMENT** (where applicable) • yes _____ no _____
  Casing pulled yes _____ no _____ not applicable _____
  Plugging grout From _____ to _____ material _____

Owner _____ BWCM No._____

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)				11.	12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)
DEPTH (feet)		TYPE OF ROCK OR SOIL	REMARKS	Drilling Time (Min.)	
From	To	(color, material, fossils, hardness, etc.)	(water, caving, cavities, broken, core, shot, (etc.)		
		THE DESCRIPTIONS OF THIS WELL ARE UNPUBLISHED. FOR INFORMATION CALL OR WRITE VIRGINIA POLYTECH INST. GEOPHYSICS DEPT. DR. JOE LAMBIASE (703) 961-6112			

State Water Control Board Regional Offices

Valley Reg. Off.
116 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Southwest Reg. Off.
408 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

West Central Reg. Off.
Executive Park
5306 A Peters Creek Road
Roanoke, Va. 24019
703-563-0354

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

13. Well lot dedicated? _____; Size _____ ft. X _____ ft.; Well house? _____
Distance to nearest pollutant source _____ ft., Type _____
Distance to nearest property line _____ ft., Building _____ ft.

14. I certify that the information contained herein is true and correct and that this we and/or system has been installed and constructed in accordance with the requirement for well construction as specified in compliance with appropriate county or independer city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature Michael K. Glascock (Seal), Date FEB. 11, 1979
(Well driller or authorized person)

License No. _____

SITE-SPECIFIC ENVIRONMENTAL INFORMATION CHECKLIST

HEAT GRADIENT HOLES

ATLANTIC COASTAL PLAIN GEOTHERMAL TEST PROGRAM

Site No. _____ State Virginia

Location Eastville, Virginia
75°59'32" - 37°21'16"

A. GENERAL

1. Has federal, state and/or local environmental assessment been conducted previously for the proposed drill site? Yes____ No X If yes, provide a copy, if available.

2. Have all required permits, licenses, and/or agreements for the proposed drill site been obtained? Yes X No____ If no, explain. _____

3. Does the drill site fall within the habitat of rare or endangered species? Yes____ No X If yes, explain. EASTERN FLYWAY, BUT NO SPECIES OCCUPY THE AREA AT THE TEST SITE.

4. Are known archeological sites, historic sites, prime or unique farmland, or natural landmarks within or visible from the site area? Yes____ No X If yes, explain. _____

5. Will casing left in the hole protect all ground water aquifers? Yes X No____ If no, explain. _____

6. Will a directional survey be conducted in the drill hole? Yes____ No X If yes, at what interval? _____ feet. If no, explain. NOT NECESSARY FOR 1000' NONPRODUCING HOLE

7. Will expected continuous noise levels from site operations be 65 dBA or less at the nearest residence? Yes____ No X If no, explain. EACH 8V-71 GMC ENGINE EQUIPPED WITH TWO 4" NO. SRV04-C196 MAXIM SILENCERS; MAXIMUM NOISE LEVEL 32.0 dBA, 250 CENTER FREQUENCY; FOR RESIDENTIAL USE.

B. SITE CONSTRUCTION

1. Will additional land clearing be required for the drilling and data collection activities (e.g., preparation of drill pad, road construction, mud reserve pits, pipeline)? Yes X No____ If yes, describe. LEVEL PAD AND TWO EARTH PITS (35'X 5'X 4' EACH)

2. Will the drill site and related roads be treated to minimize dust? Yes____ No X If no, explain. NOT NECESSARY DUE TO PAVED ROADS AND SOIL CONDITIONS.

3. Are portable sanitary facilities or an approved septic system to be used at the drill site? Yes X No____ If no, explain. _____

4. Will liquid and solid wastes be disposed in accordance with local regulations? Yes X No____ If no, explain. _____

5. Will erosion control be required for excavated areas? Yes____ No X If yes, explain. _____

6. Upon completion of proposed drilling and data collection activities, will the site be restored to as natural a condition as possible by regrading, filling, and reseeding? Yes X No ___ If no, explain. ___

C. SAFETY

1. Will blowout preventers be used? Yes ___ No X If no, explain. NOT NECESSARY FOR 1000' HOLE. D.O.E. GAVE APPROVAL

2. Will fire extinguishers be located onsite? Yes X No ___ If no, explain. ___

3. Will engineering and mud logging personnel be onsite during drilling operations? Yes X No ___ If no, explain. ___

4. Does an emergency plan exist for evacuating personnel? Yes X No ___ If no, explain. ___

5. Will the drilling operations be conducted under a safety policy that ensures safe operating procedures and attention to job safety and health protection? Yes Y No ___ If no, explain. ___

Completed from onsite inspection by:

Michael R. Glascock
Signature

Position: FIELD ENGINEER

Date: Nov. 22, 1978

SAFETY POLICY

1. The safety policies of Gruy Federal, Inc. are defined by the joint requirements of:
   a. the Occupational Safety and Health Act of 1970, as defined and enforced by the Occupational Safety and Health Administration (OSHA) of the Department of Labor with respect to job safety and health protection, and
   b. the safe operating procedures, inspection and training programs, and accident investigation forms of the International Association of Drilling Contractors, whether involving drilling rigs or other equipment.

2. OSHA requirements are summarized in the 10" X 16" plastic laminated JOB SAFETY AND HEALTH PROTECTION sign, GPO: 1974 0 - 537-604; IADC procedures and inspection and report forms are summarized in the booklet Outline for Drilling Rig Safety Program, compiled by the IADC Safety Publications Subcommittee, revised 1976. Both of these documents are required to be displayed, reviewed at regular intervals by all supervisory personnel, and followed in concept and practice in all Gruy Federal operations involving job safety and health protection.

3. All Gruy Federal subcontractors and/or third party services are required to maintain meaningful and effective safety programs that include scheduled training and drills for personnel, and scheduled maintenance and testing of safety equipment.

4. In addition, all Gruy Federal field operations and all subcontractors and/or third party services to Gruy Federal field operations are required to maintain familiarity with and follow the recommended safe operating procedures and guidelines of the Accident Prevention Manual, IADC, revised edition, October, 1975.

5. The Gruy Federal Project Manager or his designated field representative shall have responsibility for maintaining these safety policies through:
   a. inspection of all equipment and materiel,
   b. inspection of personnel and equipment performance in safety drill or demonstration, upon request, and
   c. shutdown or exclusion from the job of any operation, materiel or personnel whose temporary condition or malfunction violates or jeopardizes the requirements of these safety policies.

February, 1978

Alan Lohse
Executive Vice President

GRUY FEDERAL, INC.
2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Eastville #56

DATE November 29, 1978 COUNTY Northampton STATE Va.

REPORT NO. 1 REPORTED BY Radford

DEPTH 554' PROGRESS 554'

ACTIVITY AT REPORT TIME Drilling

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0900	1700	8	Moved from Accomac #55 and rig up
1700	1800	1	Mix mud and drill mouse hole
1800	2000	2	Drill from "0" to 401'
2000	2100	1	Circ and POH for core #1
2100	2200	1	PU core bbl. and GIH
2200	2300	1	Cored 401 - 426' and POH
2300	2400	1	LD Core bbl. - 13' recvry - WIH w/bit and hole caving
2400	0200	2	Wash to btm
0200	0300	1	Drill 426' - 460'
0300	0330	.5	Repair pump
0330	0600	2.5	Drill 450 - 554'

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Eastville #56

DATE November 30, 1978 COUNTY North Hampton STATE Virginia

REPORT NO. 2 REPORTED BY Radford

DEPTH 1045' PROGRESS

ACTIVITY AT REPORT TIME Rigging down & moving to Hampton

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	1100	5	Drld 554 - 985
1100	1230	1.5	Circ and POH for Core #2 - PU core bbl & RIH
1230	1400	1.5	Cored 985 - 1015' No recovery
1400	1500	1	WIH w/bit - Drld to 1045' - Circ
1500	1630	1.5	POH - laying down DP
1630	1800	1.5	RU to run 4½" csg
1800	1900	1	Ran 25 jts 4½" csg, 9.5# J-55 ST&C, total of 1035' - set at 1044'
1800	2200	3	Wash 3 jts csg to btm
2200	2230	.5	RU and cmt w/225 sx Class A - cmt circ bumped plug w/1000 psi ok.
2230	0600	7.5	Rigging down
			Bogging down in mud - dragging off location w/doze

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Eastville #56

DATE December 1, 1978 COUNTY North Hampton STATE Virginia

REPORT NO. 3 REPORTED BY Radford/Cottrell

DEPTH 1045' PROGRESS

ACTIVITY AT REPORT TIME Prepare to move to Hampton #60

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	1100	5	Rigging down and prepare to move

December 14, 1978

OPERATIONS SUMMARY

OPERATOR : Gruy Federal Inc.
LEASE : Eastville
WELL : No. 56
COUNTY : North Hampton, Virginia

****

11/29/78 Report #1. Activity at report time: Drlg. Elapsed time: 2 hrs. RD. 8 hrs. move rig from Accomack #55 to Eastville #56 & RU. 1 hr. drl. mouse hole. 2 hrs. drlg. from 0'-401'. 1 hr. circ. & POH for core #1. 1 hr. PU core barrel & RIH. 1 hr. core from 401'-426' & POH. 1 hr. LD core barrel, redress. Had 13' recovery. SIH. Get in hole ½ stand. 2 hrs. PU singles & washed to btm. 1 hr. drl. from 426'-460'. ½ hr. work on pump. 2½ hrs. drlg. from 450'-454'.

11/30/78 Report #2. TD 1034'. Activity at report time: RD & WO daylight to move. Elapsed time: 1 hr. worked on pump. Pmpd. suction plug w/tree leaves & limbs. 5 hrs. drl. from 554'-985'. 1½ hrs. circ. & POH for core #2. TIH w/core barrel. 1½ hrs. cut 25' core from 985'-1015'. POH w/core barrel, no recovery. 1 hr. TIH w/bit to drl. 30'-1046'. Circ. & LD D.P., 1½ hrs. 1½ hrs. LD D.P. & start RD floor on rig while WO water & csg. to be MI w/dozer. 1½ hrs. RU to run 4½" csg. Had to use dozer to move csg. 1 hr. run 4½" csg. 25 jts. Tally @ 1035'. Set @ 1044' KB measurements. 3 hrs. washing last 3 jts. to btm. ½ hr. RU Halliburton. Cmt. w/225 sks. of Class "A" cmt. Circ. cmt. Bump plug. 7½ hrs. RD, WO daylight to lower rig.

XIV. Site No. 60, Hampton, Virginia

A. Site Location

The location of Site No. 60, Hampton, Virginia, heat flow measurement hole is shown on Figure 14-1, a section of USGS 7½' Quadrangle "Hampton, Virginia". The coordinates of the drill site are longitude 76° 19' 02" W, latitude 37° 02' 13" N. The site, located in an agricultural field northeast of Barnes Cemetery along East Pembroke line, has a ground elevation of approximately 12 feet above sea level.

B. Lease/Letter Agreements, Permits, Licenses

Access to Site No. 60 was obtained by permission of the owner by fee lease agreement (Exhibit XIV-1). A Commonwealth of Virginia Certification of Completion permit was required and is shown in Exhibit XIV-2.

C. Environmental Information Survey

The environmental information checklist, supplementary information required for the "Environmental Assessment, Geothermal Exploratory Drilling Program, Eastern Unites States, Coastal Plains and Piedmont Provinces" (DOE/EA-0015), is shown in Exhibit XIV-3.

D. Drilling Activities

Drilling activities at Site No. 60, Hampton, Virginia, began December 1, 1978 and were completed on December 4, 1978. Figure 14-2, a schematic diagram of the completed hole, summarizes data for Site No. 60. The daily drilling reports are shown in Exhibit XIV-4 and Exhibit XIV-5 is an operations summary of Site No. 60. Cores and cuttings taken from the hole during drilling were delivered to VPI&SU. No electric logs were run on this hole. Temperature logs were run by VPI&SU after the hole was cased; however, these data were not made available to Gruy.

BOWERS HILL, VA.
SW/4 NEWPORT NEWS 15 QUADRANGLE
N3645—W7622.5/7.5

1965
PHOTOREVISED 1970
AMS 5757 IV SW—SERIES V834

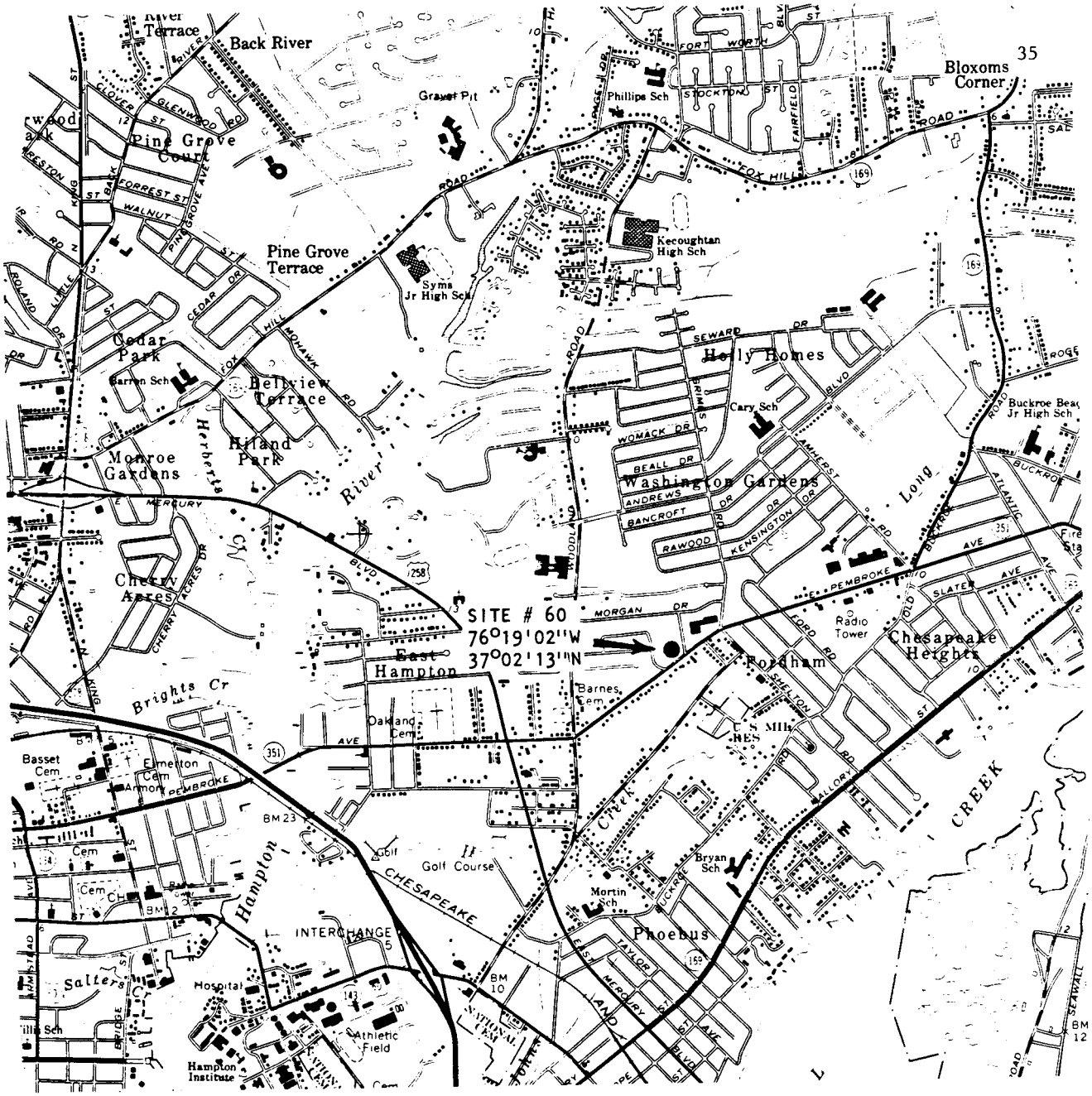


FIGURE 14-1 LOCATION SITE #60, HAMPTON, VA.
LONGITUDE 76°19'02" W, LATITUDE 37°02'13" N

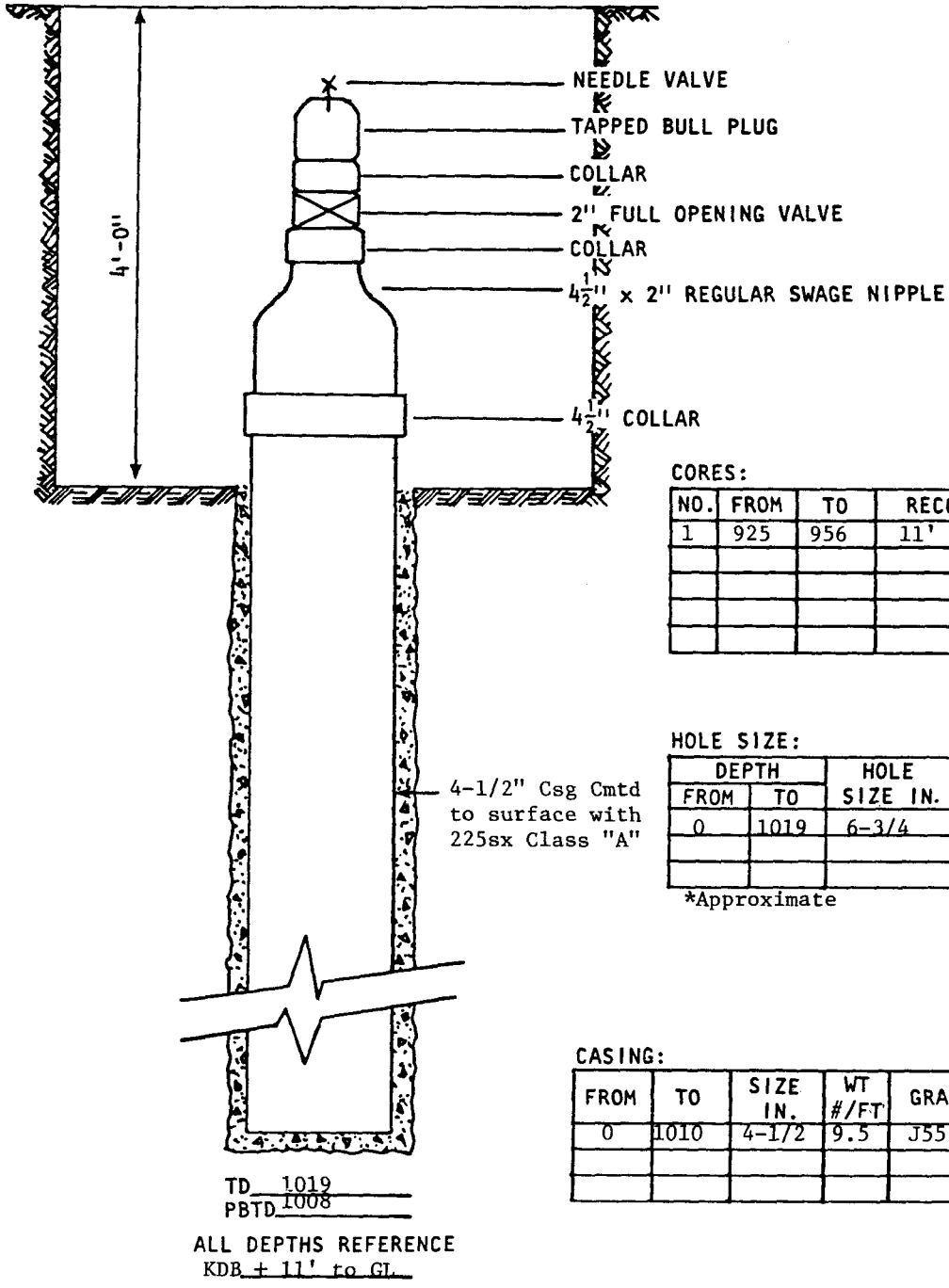
HAMPTON, VA.
SE/4 HAMPTON 15' QUADRANGLE
N3700—W7615/7.5

1965
PHOTOREVISED 1970
AMS 5758 III SE—SERIES V834

GRUY FEDERAL, INC.

SITE NO. 60
WELL NAME Hampton
LOCATION: LAT. 37°02'13"N
LONG. 76°19'02"W

RIG: Energy Service Company Rig No 17 COUNTY Hampton STATE Virginia
DATE SPUDED: December 1, 1978 DATE COMPLETED: December 4, 1978



CORES:

NO.	FROM	TO	RECOVERY
1	925	956	11'

HOLE SIZE:

DEPTH		HOLE	CSG.	MUD *	
FROM	TO	SIZE IN.	SIZE IN.	VIS.	WT.
0	1019	6-3/4	4-1/2	45	9.5

*Approximate

CASING:

FROM	TO	SIZE IN.	WT #/FT	GRADE	THREAD	NO. JTS
0	1010	4-1/2	9.5	J55	ST&C	25

FIGURE 14-2 WELL SCHEMATIC WITH COMPLETION INFORMATION

E. Site Preparation, Layout and Cleanup

Prior to initiation of drilling at Hampton, Virginia, the site area was almost level and was used as an agricultural field. For site preparation, a bulldozer dug two pits 35' long, 5' wide and 4' deep. The 4' x 4' cellar was dug by hand 4' deep and boarded over. After the hole was completed, the wellhead was installed and an iron grate was placed over the cellar and locked. The mud pit was vacuumed and the site was backfilled and leveled.

STATE OF Virginia)
CITY :ss
~~COUNTY~~ OF Hampton)

LEASE CONTRACT FOR GEOTHERMAL MEASUREMENT

This Lease Contract, made and entered into as of this the 20th day of November, 1978 by and between Harden Enterprises, Inc.

of 1511-1513 East Pembroke Avenue, Hampton, Virginia, herein referred to as "GRANTOR", whether one or more and GRUY FEDERAL, Inc., a Texas Corporation, of Suite 150, 2500 Tanglewilde, Houston, Texas 77063, herein referred to as "GRANTEE", as follows:

WITNESSETH: That Grantor for and in consideration of One Hundred and no/00 ($100.00) Dollars in hand paid to Grantor by Grantee and for other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, Grantor until November 20, 1979, does grant the use and by these presents does loan, lease and let to Grantee the land situation in Hampton City ~~County~~, State of Virginia, as more particularly described in Exhibit "A", attached hereto and incorporated herein by reference, together with a servitude of passage on, over and crossing the lands, including existing roadways, trails, bridges and the like lying and being situation on the leased land or adjacent lands owned by Grantor or in which Grantor has the right of passage, so that Grantee may have access to the bore hole site later described in this agreement with the sole and exclusive right to Grantee, acting as contractor and agent for the Division of Geothermal Energy, U. S. Department of Energy:

1. To use a self contained portable truck drilling rig unit, with associated equipment, to conduct a geothermal (heat) resource scientific experimental test involving the drilling, casing and testing of an approximately 1,000' deep geothermal temperature measurement bore hole from a location, to be selected mutually by representatives of the Grantor and Grantee, on the leased lands, with Grantee utilizing during such testing operations the services of scientific and technical representatives and facilities of Virginia Polytechnical Institute and State University, Blacksburg, Virginia, the State Geological office, the U. S. Geological Survey, and the U. S. Department of Energy. Such testing operations shall consist of logging the bore hole, collecting formation samples, and keeping the bore hole filled with fresh water and conducting periodic temperature tests.

2. At the end of the testing period Grantee shall take steps necessary to properly plug and abandon the bore hole in accordance with government regulations; EXCEPT that if Grantor so elects, Grantor may take over the bore hole in its then present condition at Grantor's risk and expense. In case of such election, Grantor agrees to execute and appropriate release of Grantee from any future obligation in respect to such bore hole.

3. During the time Grantee conducts its operations on the leased premises, Grantee shall remain responsible for accidents, injuries and damages arising out of its operations on the leased site and agrees to restore the surface of the land as near as practicable to its condition prior to Grantee's operations.

4. Grantee shall have no right to produce any minerals from the bore hole nor shall it have any ownership of minerals or production under the leased bore hole site.

In witness whereof, the GRANTOR ___ has executed this instrument effective the day first above written.

Lenwood G. Harden, President

Randolph E. Leake, Sr., Vice President

This Instrument Prepared By:
GRUY FEDERAL, Inc.
Suite 150, 2500 Tanglewilde
Houston, Texas 77063
W. Edward McCain

GRUY FEDERAL, INC.
CONSULTANTS IN ENERGY SYSTEMS

2500 TANGLEWILDE SUITE 150
HOUSTON, TEXAS 77063
713/785-9200

1911 JEFFERSON DAVIS HWY., SUITE 500
ARLINGTON, VIRGINIA 22202
703/920-0113

Exhibit "A"

That certain bore hole site of approximately one acre lying north of Pembroke Avenue at 1511-1513 Pembroke Avenue, City of Hampton, Virginia and more particularily described as follows:

Hampton Quadrangle
Hampton City, Virginia
U. S. Department of Interior Geological Survey Map
Coordinates: 76° 19'02"
37° 02'10"

Also known as parcel 16, Tax Map 12 L, City Assessor's Office, City of Hampton, Virginia and platted therewith and bounded now as follows:

On the North by: Charles L. Mendel
On the East by: Several Lots
On the South by: Pembroke Avenue
On the West by: Charles L. Mendel Easement

and more fully described in Deed Book 408 at Page 873

EXHIBIT XIV-2 40

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

• BWCM No. _____

(Certification of Completion/County Permit)

State Water Control Board
P. O. Box 11143
111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit _____
County Permit _____

Certification of inspecting official:
This well does _____ does not _____ meet code/low requirements.
S. _____
Date _____

For Office Use

HAMPTON QUAD

County/City Stamp

• Virginia Plane Coordinates
_____ N
_____ E

Latitude & Longitude
37° 02' 13" N
76° 19' 02" W

• Topo. Map No. _____
• Elevation 12 ft.
• Formation _____
• Lithology _____
• River Basin _____
• Province _____
• Type Logs _____
• Cuttings EACH 10 ft.
• Water Analysis _____
• Aquifer Test _____

• Owner HARDEN ENTERPRISES, INC.
• Well Designation or Number SITE #60
Address 1511-1513 EAST HEMBROKE AVE. HAMPTON VIR.
Phone _____

• Drilling Contractor GRUY FEDERAL INC.
Address 2500 TANGLEWILDE #150 HOUSTON TEXAS
Phone _____

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well: I _____, IIA _____ IIB _____, IIIA _____, IIIB _____

WELL LOCATION: 0.5 (feet/miles EAST direction) of ROAD 258 ON ROAD 351
and _____ feet/miles _____ (direction) of _____
(If possible please include map showing location marked)

Date started DEC. 1 • Date completed DEC. 5 Type rig ROTARY

WELL DATA: New ✓ Reworked _____ Deepened _____
• Total depth 1019' ft.
• Depth to bedrock — ft.
• Hole size (Also include reamed zones)
• 7 7/8 inches from 0 to 1019 ft.
• _____ inches from _____ to _____ ft.
• _____ inches from _____ to _____ ft.
• Casing size (I.D.) and material
• 4 1/2 inches from 2 to 1010 ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• Screen size and mesh for each zone (where applicable)
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• Gravel pack
• From _____ to _____ ft.
• From _____ to _____ ft.
• Grout
• From 2 to 1010 ft., Type CLASS A
• From _____ to _____ ft., Type _____

2. WATER DATA • Water temperature _____ °F
• Static water level (unpumped level-measured) _____ ft.
• Stabilized measured pumping water level _____ ft.
• Stabilized yield _____ gpm after _____ hours
Natural Flow: Yes _____ No _____, flow rate: _____ g pm
Comment on quality _____

3. WATER ZONES: From _____ To _____
From _____ To _____ . From _____ To _____
From _____ To _____ . From _____ To _____

4. USE DATA:
Type of use: Drinking _____, Livestock Watering _____
Irrigation _____ Food processing _____, Household _____
Manufacturing _____, Fire safety _____, Cleaning _____
Recreation _____, Aesthetic _____, Cooling or heating _____
Injection _____, Other _____
• Type of facility: Domestic _____, Public water supply _____
Public institution _____, Farm _____, Industry _____
Commercial _____, Other _____

5. PUMP DATA: Type _____ • Rated H.P. _____
• Intake depth _____ • Capacity _____ at _____ head

6. WELLHEAD: Type well seal SEE FIGURE #4
Pressure tank _____ gal., Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected _____ yes _____ no
Date _____, Disinfectant used _____
Amount _____, Hours used _____

8. ABANDONMENT (where applicable) • yes _____ no _____
Casing pulled yes _____ no _____ not applicable _____
Plugging grout From _____ to _____ material _____

Owner _____ BWCM No. 41

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)				11.	12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)
DEPTH (feet)		TYPE OF ROCK OR SOIL	REMARKS		
From	To	(color, material, fossils, hardness, etc.)	(water, caving, cavities, broken, core, shot, (etc.)	Drilling Time (Min.)	
	THE UNPUBLISHED.	DESCRIPTIONS OF THIS WELL ARE FOR INFORMATION CALL OR WRITE VIRGINIA POLYTECH INST. GEOPHYSICS DEPT. DR. JOE LAMBIASE (703) 961-6112			

State Water Control Board Regional Offices

Valley Reg. Off.
116 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Southwest Reg. Off.
408 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

West Central Reg. Off.
Executive Park
5306 A Peters Creek Road
Roanoke, Va. 24019
703-563-0354

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

13. Well lot dedicated? _____; Size _____ ft. X _____ ft.; Well house? _____
Distance to nearest pollutant source _____ ft., Type _____
Distance to nearest property line _____ ft., Building _____ ft.

14. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature Michael R. Hancock (Seal), Date FEB 12, 1979
(Well driller or authorized person)

License No. _____

SITE-SPECIFIC ENVIRONMENTAL INFORMATION CHECKLIST

HEAT GRADIENT HOLES

ATLANTIC COASTAL PLAIN GEOTHERMAL TEST PROGRAM

Site No. 60 State VIRGINIA

Location HAMPTON, VIRGINIA
76° 19' 02" — 37° 02' 13"
"Hampton" Quad, City of Hampton, Va

A. GENERAL

1. Has federal, state and/or local environmental assessment been conducted previously for the proposed drill site? Yes____ No X If yes, provide a copy, if available.

2. Have all required permits, licenses, and/or agreements for the proposed drill site been obtained? Yes X No____ If no, explain. ____

3. Does the drill site fall within the habitat of rare or endangered species? Yes____ No X If yes, explain. EASTERN FLYWAY, BUT NO SPECIES OCCUPY THE AREA AT THE TEST SITE

4. Are known archeological sites, historic sites, prime or unique farmland, or natural landmarks within or visible from the site area? Yes____ No X If yes, explain. ____

5. Will casing left in the hole protect all ground water aquifers? Yes X No____ If no, explain. ____

6. Will a directional survey be conducted in the drill hole? Yes____ No X If yes, at what interval? ____feet. If no, explain. NOT NECESSARY FOR 1000' NONPRODUCING HOLE

7. Will expected continuous noise levels from site operations be 65 dBA or less at the nearest residence? Yes____ No X If no, explain. EACH 8V-71 GMC ENGINE EQUIPPED WITH TWO 4" NO. SRVC4-0196 MAXIM SILENCERS; MAXIMUM NOISE LEVEL 32.0 dBA, 250 CENTER FREQUENCY; FOR RESIDENTIAL USE

B. SITE CONSTRUCTION

1. Will additional land clearing be required for the drilling and data collection activities (e.g., preparation of drill pad, road construction, mud reserve pits, pipeline)? Yes X No____ If yes, describe. LEVEL PAD AND TWO EARTH PITS (35'x5'x4' EACH)

2. Will the drill site and related roads be treated to minimize dust? Yes____ No X If no, explain. NOT NECESSARY DUE TO PAVED ROADS AND SOIL CONDITIONS.

3. Are portable sanitary facilities or an approved septic system to be used at the drill site? Yes X No____ If no, explain. _____

4. Will liquid and solid wastes be disposed in accordance with local regulations? Yes X No____ If no, explain. _____

5. Will erosion control be required for excavated areas? Yes____ No X If yes, explain. _____

6. Upon completion of proposed drilling and data collection activities, will the site be restored to as natural a condition as possible by regrading, filling, and reseeding? Yes X No ____ If no, explain. ____

C. SAFETY

1. Will blowout preventers be used? Yes ____ No X If no, explain. NOT NECESSARY FOR 1000' HOLE D.O.E. GAVE APPROVAL

2. Will fire extinguishers be located onsite? Yes X No ____ If no, explain. ____

3. Will engineering and mud logging personnel be onsite during drilling operations? Yes X No ____ If no, explain. ____

4. Does an emergency plan exist for evacuating personnel? Yes X No ____ If no, explain. ____

5. Will the drilling operations be conducted under a safety policy that ensures safe operating procedures and attention to job safety and health protection? Yes X No ____ If no, explain. ____

Completed from onsite inspection by:

Michael R. Gluck
Signature

Position: FIELD ENGINEER

Date: DEC 4, 1978

SAFETY POLICY

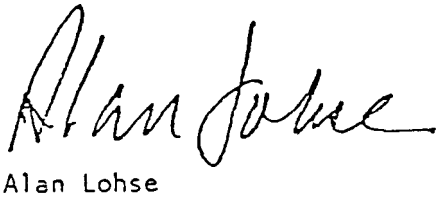
1. The safety policies of Gruy Federal, Inc. are defined by the joint requirements of:
   a. the Occupational Safety and Health Act of 1970, as defined and enforced by the Occupational Safety and Health Administration (OSHA) of the Department of Labor with respect to job safety and health protection, and
   b. the safe operating procedures, inspection and training programs, and accident investigation forms of the International Association of Drilling Contractors, whether involving drilling rigs or other equipment.

2. OSHA requirements are summarized in the 10" X 16" plastic laminated JOB SAFETY AND HEALTH PROTECTION sign, GPO: 1974 0 - 537-604; IADC procedures and inspection and report forms are summarized in the booklet Outline for Drilling Rig Safety Program, compiled by the IADC Safety Publications Subcommittee, revised 1976. Both of these documents are required to be displayed, reviewed at regular intervals by all supervisory personnel, and followed in concept and practice in all Gruy Federal operations involving job safety and health protection.

3. All Gruy Federal subcontractors and/or third party services are required to maintain meaningful and effective safety programs that include scheduled training and drills for personnel, and scheduled maintenance and testing of safety equipment.

4. In addition, all Gruy Federal field operations and all subcontractors and/or third party services to Gruy Federal field operations are required to maintain familiarity with and follow the recommended safe operating procedures and guidelines of the Accident Prevention Manual, IADC, revised edition, October, 1975.

5. The Gruy Federal Project Manager or his designated field representative shall have responsibility for maintaining these safety policies through:
   a. inspection of all equipment and materiel,
   b. inspection of personnel and equipment performance in safety drill or demonstration, upon request, and
   c. shutdown or exclusion from the job of any operation, materiel or personnel whose temporary condition or malfunction violates or jeopardizes the requirements of these safety policies.



February, 1978

Alan Lohse
Executive Vice President

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Hampton #60

DATE December 1, 1978 COUNTY Hampton, STATE Virginia

REPORT NO. 1 REPORTED BY Radford

DEPTH PROGRESS

ACTIVITY AT REPORT TIME Rigging Up

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
1100	1500	4	Move to Hampton #60
1500	0600	15	Spotting equipment, location muddy, using bulldozers to spot equipment, wait on daylite to raise mast.

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Hampton #60

DATE December 2, 1978 COUNTY Hampton STATE Virginia

REPORT NO. 2 REPORTED BY Radford

DEPTH 925 PROGRESS

ACTIVITY AT REPORT TIME Washing to bottom with core barrel

TIME LOG FROM	TO	ELAPSED	OPERATIONS
0600	1400	8	Rig up
1400	1900	5	Drilled 0 - 553
1900	2130	2.5	Lost returns. Pulled up one stand. Rebuild mud volume. WIH to bottom with full returns.
2130	0230	5	Drilled 553 - 925
0230	0330	1	POH and PU core barrel
0330	0600	2.5	WIH with core barrel. Hit bridge. Washing to bottom

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Hampton #60

DATE December 3, 1978 COUNTY Hampton STATE Virginia

REPORT NO. 3 REPORTED BY Radford

DEPTH 1019' PROGRESS 94'

ACTIVITY AT REPORT TIME Rigging down and waiting to move

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	1000	4	Washing to bottom with core barrel
1000	1030	.5	Cored from 925 to 956
1030	1130	1	POH, layed down core barrel, recovered 11'
1130	1530	4	WIH. Drilled from 956 to 1019'
1530	1800	2.5	Layed down DP. Rig up to run 4½" csg.
1800	2000	2	Ran 25 jts 4½" J-55, 9.5 ST&C csg. Total of 999'. Set at 1010'.
2000	2030	.5	Cement with 225 sacks class A cement. Circulated and bumped plug with 1,000 psi okay.
2030	0600	9.5	Rig down and wait to move
			Moving to Smith Point #55

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Hampton #60

DATE 12-4-78 COUNTY Hampton STATE Virginia

REPORT NO. 4 REPORTED BY Radford

DEPTH 1019' PROGRESS

ACTIVITY AT REPORT TIME Waiting on legal moving time

TIME LOG FROM	TO	ELAPSED	OPERATIONS
0600	0600	24	Rig down and load out. Move rig and trucks to easy road access. Weather poor. Next location probably have to be pulled on to. Wait on moving time. Repair rig equipment.

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Hampton #60

DATE December 5, 1978 COUNTY Hampton STATE Virginia

REPORT NO. 5 REPORTED BY Radford

DEPTH 1019' PROGRESS

ACTIVITY AT REPORT TIME Waiting to move

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	0900	3	Waiting to move
			Final report - well complete

December 28, 1978

OPERATIONS SUMMARY

OPERATOR : Gruy Federal Inc.
LEASE : Hampton
WELL : No. 60
COUNTY : Hampton, Virginia

****

12/1/78 Report #1. Elapsed time: 4 hrs. move to Hampton #60. 13 hrs. spotting equipment location muddy using dozer to spot equipment . WO day light to raise mast.

12/2/78 Report #2. TD 925'. Activity at report time: Washed to btm. w/core barrel. 8 hrs. RU. 5 hrs. drl. from 0'-553'. 2½ hrs. build up mud volume. 5 hrs. RIH to btm. Regain circ. Drl. from 553'-925'. 1 hr. POH & PU core barrel. 2½ hrs. start in hole w/core barrel. Hit bridge. Started washing to btm.

12/3/78 Report #3. TD 1019'. Activity at report time: RD & waiting to move. Elapsed time: 4 hrs. washing to btm. w/core barrel. ½ hr. core from 925'-956'. 1 hr. POH, LD core barrel, had 11' recovery. 4 hrs. drl. from 956'-1019'. 2½ hrs. LD D.P. RU to run 4½" csg. 2 hrs. run 4½" csg. Run 25 jts. Tally measurements: 999', set @ 1010'. ½ hr. cmtg. w/225 sks. of Class "A" cmt. Cmt. circ. Bump plug w/1000 press. 9½ RD & WO day light to move.

12/4/78 Report #4. Elapsed time: 24 hrs. RD & loaded out. WO legal time on Monday morning to move.

12/5/78 Report #5. Elapsed time: Wait to move. FINAL REPORT.

XV. Site No. 59, Smith Point, Virginia

A. Site Location

The location of Site No. 59, Smith Point, Virginia, heat flow measurement hole is shown on Figure 15-1, a section of USGS 7½' Quadrangle "Burgess, Virginia". The coordinates of the drill site are longitude 76° 15' 03" W, latitude 37° 52' 59" N. The site, located adjacent to the Smith Point Campground along State Route 651, has a ground elevation of approximately 10 feet above sea level.

B. Lease/Letter Agreements, Permits, Licenses

Access to Site No. 59 was obtained by permission of the owner by fee lease agreement (Exhibit XV-1). A Commonwealth of Virginia Certification of Completion permit was required and is shown in Exhibit XV-2.

C. Environmental Information Survey

The environmental information checklist, supplementary information required for the Environmental Assessment, Geothermal Exploratory Drilling Program, Eastern United States, Coastal Plains and Piedmont Provinces (DOE/EA-0015), is shown in Exhibit XV-3.

D. Drilling Activities

Drilling activities at Site No. 59, Smith Point, Virginia, began December 5, 1978 and were completed December 7, 1978. Figure 15-2, a schematic diagram of the completed hole, summarizes data for Site No. 59. The daily drilling reports are shown in Exhibit XV-4 and Exhibit XV-5 is an operations summary of Site No. 59. Cores and cuttings taken from the hole during drilling were delivered to VPI&SU. No electric logs were run on this hole. Temperature logs were run by VPI&SU after the hole was cased; however, these data were not made available to Gruy.

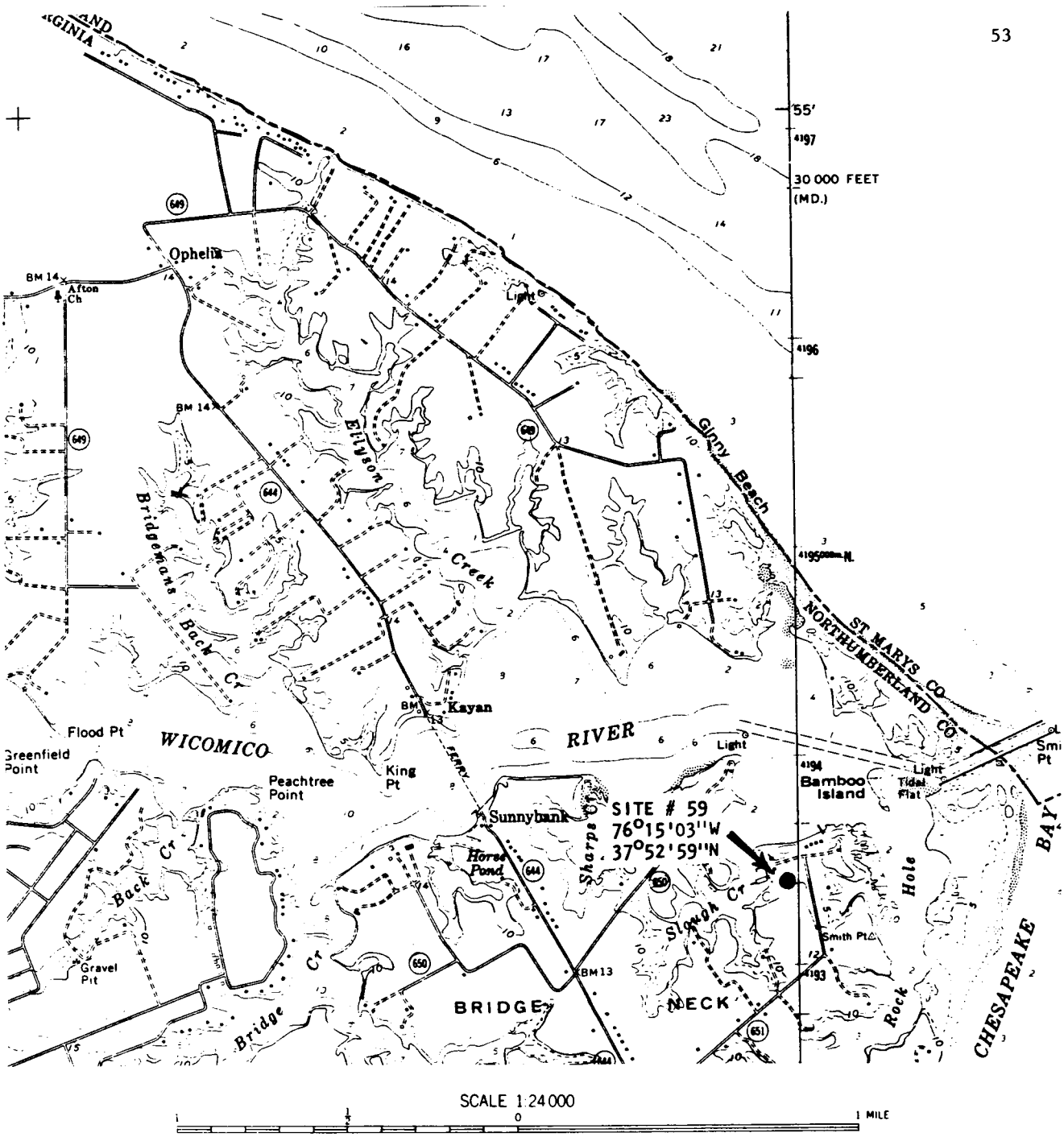
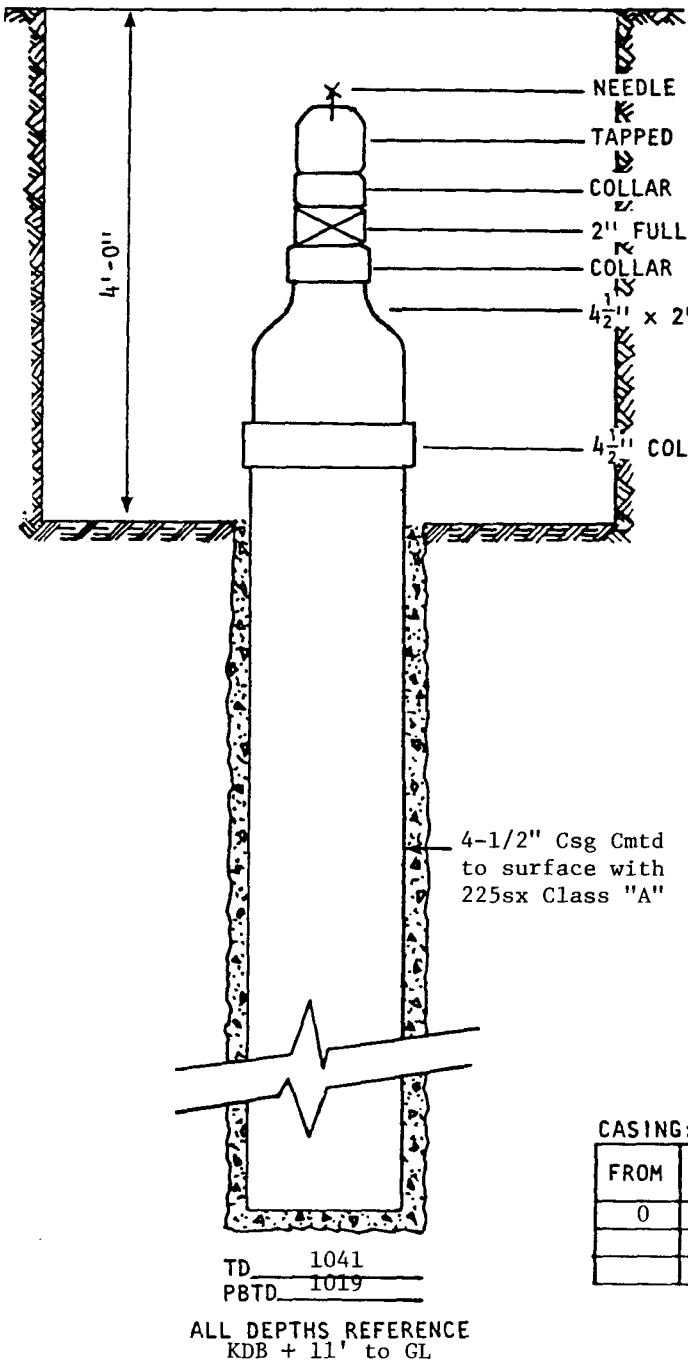


FIGURE 15-1 LOCATION SITE #59, SMITH POINT, VA,
LONGITUDE $76^{0}15'03''$ W, LATITUDE $37^{0}52'59''$ N

GRUY FEDERAL, INC.

SITE NO. 59
WELL NAME Smith Point
LOCATION: LAT. 37°52'59"N
LONG. 76°15'03"W

RIG: Energy Service Company Rig No 17 COUNTY Northumberland STATE Virginia
DATE SPUDED: December 5, 1978 DATE COMPLETED: December 7, 1978



CORES:

NO.	FROM	TO	RECOVERY
1	484	515	31'
2	986	T011	11'

HOLE SIZE:

DEPTH		HOLE	CSG.	MUD*	
FROM	TO	SIZE IN.	SIZE IN.	VIS.	WT.
0	1041	6-3/4	4-1/2	4.5	9.5

*Approximate

CASING:

FROM	TO	SIZE IN.	WT #/FT	GRADE	THREAD	NO. JTS
0	1021	4-1/2	9.5	J55	ST&C	25

FIGURE 15-2 WELL SCHEMATIC WITH COMPLETION INFORMATION

E. Site Preparation, Layout and Cleanup

Prior to initiation of drilling at Smith Point, Virginia, the site area was almost level and had an ungroomed grass covering. For site preparation, a bulldozer dug two pits 35' long, 5' wide and 4' deep. The 4' x 4' cellar was dug by hand 4' deep and boarded over. After the hole was completed, the wellhead was installed and an iron grate was placed over the cellar and locked. Due to weather conditions following drilling, the mud pit was not vacuumed and the site was not backfilled and leveled before all equipment left Virginia; therefore, arrangements have been made with the landowner and subcontractor to complete the site cleanup as weather conditions permit.

STATE OF Virginia)
:ss
COUNTY OF Northumberland)

LEASE CONTRACT FOR GEOTHERMAL MEASUREMENT

This Lease Contract, made and entered into as of this the 28th day of November, 1978 by and between Donald P. Chamblee, Jr. and Linda S. Chamblee, his wife, of Rt. 1, Box 392, Reedville, Virginia 22539, herein referred to as "GRANTOR", whether one or more and GRUY FEDERAL, Inc., a Texas Corporation, of Suite 150, 2500 Tanglewilde, Houston, Texas 77063, herein referred to as "GRANTEE", as follows:

WITNESSETH: That Grantor for and in consideration of One Hundred and No/100 ($100.00) Dollars in hand paid to Grantor by Grantee and for other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, Grantor until November 28, 1979, does grant the use and by these presents does loan, lease and let to Grantee the land situation in Northumberland County, State of Virginia, as more particularly described in Exhibit "A", attached hereto and incorporated herein by reference, together with a servitude of passage on, over and crossing the lands, including existing roadways, trails, bridges and the like lying and being situation on the leased land or adjacent lands owned by Grantor or in which Grantor has the right of passage, so that Grantee may have access to the bore hole site later described in this agreement with the sole and exclusive right to Grantee, acting as contractor and agent for the Division of Geothermal Energy, U. S. Department of Energy:

1. To use a self contained portable truck drilling rig unit, with associated equipment, to conduct a geothermal (heat) resource scientific experimental test involving the drilling, casing and testing of an approximately 1,000' deep geothermal temperature measurement bore hole from a location, to be selected mutually by representatives of the Grantor and Grantee, on the leased lands, with Grantee utilizing during such testing operations the services of scientific and technical representatives and facilities of Virginia Polytechnical Institute and State University, Blacksburg, Virginia, the State Geological office, the U. S. Geological Survey, and the U. S. Department of Energy. Such testing operations shall consist of logging the bore hole, collecting formation samples, and keeping the bore hole filled with fresh water and conducting periodic temperature tests..

2. At the end of the testing period Grantee shall take steps necessary to properly plug and abandon the bore hole in accordance with government regulations; EXCEPT that if Grantor so elects, Grantor may take over the bore hole in its then present condition at Grantor's risk and expense. In case of such election, Grantor agrees to execute and appropriate release of Grantee from any future obligation in respect to such bore hole.

3. During the time Grantee conducts its operations on the leased premises, Grantee shall remain responsible for accidents, injuries and damages arising out of its operations on the leased site and agrees to restore the surface of the land as near as practicable to its condition prior to Grantee's operations.

4. Grantee shall have no right to produce any minerals from the bore hole nor shall it have any ownership of minerals or production under the leased bore hole site.

In witness whereof, the GRANTOR s have executed this instrument effective the day first above written.

Donald P. Chamblee, Jr.

Linda S. Chamblee

This Instrument Prepared By:
GRUY FEDERAL, Inc.
Suite 150, 2500 Tanglewilde
Houston, Texas 77063

GRUY FEDERAL, INC.
CONSULTANTS IN ENERGY SYSTEMS

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
713/785-9200

1911 JEFFERSON DAVIS HWY., SUITE 500
ARLINGTON, VIRGINIA 22202
703/920-0113

Exhibit "A"

Being that certain bore hole site of approximately one acre lying at the end of State Route #651 adjacent to Smith Point Marina and more particularily described as follows:

Burgess Quadrangle
Northumberland County
U. S. Department of Interior Geological Survey Map
Coordinates: 76° 15' 02"
37° 53' 00"

Further, and more fully described in that deed between John Clark and Doris Evelyn Rose Clark, husband and wife and Donald P. Chamblee, Jr. and Linda S. Chamblee, husband and wife dated July 20, 1976 and recorded in Deed Book 183 at Page 154, Clerk"s Office of the Circuit Court of No rthumberland, Virginia.

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT
(Certification of Completion/County Permit)

• BWCM No. _____

State Water Control Board
P. O. Box 11143
1111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit _____
County Permit _____
Certification of inspecting official:
This well does ____ does not ____ meet code/low requirements.
S. _____
Date _____
For Office Use

BURGESS QUAD.

County/City Stamp

• Virginia Plane Coordinates
_____ N
_____ E
Latitude & Longitude
37° 52' 59" N
76° 15' 03" W
• Topo. Map No. _____
• Elevation 10 ft.
• Formation _____
• Lithology _____
• River Basin _____
• Province _____
• Type Logs _____
• Cuttings EACH 10 FT.
• Water Analysis _____
• Aquifer Test _____

• Owner DONALD P. CHAMBLEE JR & LINDA S. CHAMBLEE
• Well Designation or Number SITE # 59
Address Rt. 1, Box 392 REEDVILLE, VIR. 22539
Phone _____
• Drilling Contractor GRUY FEDERAL INC.
Address 2500 TANGLEWILDE #150 HOUSTON
Phone _____ TEXAS

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well: I _____, IIA _____
IIB _____, IIIA _____, IIIB _____

WELL LOCATION: 0.9 (~~feet~~/miles NORTH direction) of ROAD 652 ON ROAD 651
and _____ feet/miles _____ (direction) of _____
(If possible please include map showing location marked)

Date started DEC. 5 • Date completed DEC. 7 Type rig ROTARY

1. WELL DATA: New ✓ Reworked _____ Deepened _____
• Total depth 1041' ft.
• Depth to bedrock — ft.
• Hole size (Also include reamed zones)
• 7 7/8 inches from 0 to 1041 ft.
• _____ inches from _____ to _____ ft.
• _____ inches from _____ to _____ ft.
• Casing size (I.D.) and material
• 4 1/2 inches from 2 to 1021 ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• Screen size and mesh for each zone (where applicable)
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• Gravel pack
• From _____ to _____ ft.
• From _____ to _____ ft.
• Grout
• From 2 to 1021 ft., Type CLASS A
• From _____ to _____ ft., Type _____

2. WATER DATA • Water temperature _____ °F
• Static water level (unpumped level-measured) _____ ft
• Stabilized measured pumping water level _____ ft
• Stabilized yield _____ gpm after _____ hours
Natural Flow: Yes ____ No ____, flow rate: _____ g pm
Comment on quality _____
3. WATER ZONES: From _____ To _____
From _____ To _____ . From _____ To _____
From _____ To _____ . From _____ To _____
4. USE DATA:
Type of use: Drinking _____, Livestock Watering _____
Irrigation _____ Food processing _____, Household _____
Manufacturing _____, Fire safety _____, Cleaning _____
Recreation _____, Aesthetic _____, Cooling or heating _____
Injection _____, Other _____
• Type of facility: Domestic _____, Public water supply _____
Public institution _____ Farm _____, Industry _____
Commercial _____, Other _____
5. PUMP DATA: Type _____ • Rated H.P. _____
• Intake depth _____ • Capacity _____ at _____ head
6. WELLHEAD: Type well seal SEE FIGURE #4
Pressure tank _____ gal., Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____
7. DISINFECTION: Well disinfected _____ yes _____ no
Date _____, Disinfectant used _____
Amount _____, Hours used _____
8. ABANDONMENT (where applicable) • yes _____ no _____
Casing pulled yes _____ no _____ not applicable _____
Plugging grout From _____ to _____ material _____

BWCM No._____

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)				11.	12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)
DEPTH (feet)		TYPE OF ROCK OR SOIL	REMARKS		
From	To	(color, material, fossils, hardness, etc.)	(water, caving, cavities, broken, core, shot, (etc.)	Drilling Time (Min.)	
		THE DESCRIPTIONS OF THIS WELL ARE UNPUBLISHED. FOR INFORMATION CALL OR WRITE VIRGINIA POLYTECH GEOPHYSICS DEPT. DR. JOE LAMBIASE (703) 961-6112	INST.		

State Water Control Board Regional Offices

Valley Reg. Off.
116 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Southwest Reg. Off.
408 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

West Central Reg. Off.
Executive Park
5306 A Peters Creek Road
Roanoke, Va. 24019
703-563-0354

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

13. Well lot dedicated? _____; Size _____ ft. X _____ ft.; Well house? _____
Distance to nearest pollutant source _____ ft., Type _____
Distance to nearest property line _____ ft., Building _____ ft.

14. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature Michael R. Hancock (Seal), Date FEB. 13 1979
(Well driller or authorized person)

License No._____

SITE-SPECIFIC ENVIRONMENTAL INFORMATION CHECKLIST

HEAT GRADIENT HOLES

ATLANTIC COASTAL PLAIN GEOTHERMAL TEST PROGRAM

Site No. 59 State VIRGINIA

Location SMITHS POINT VIRGINIA
76°15'03" — 37°52'59"
"Burgess" Quad, Northumberland Co. Va

A. GENERAL

1. Has federal, state and/or local environmental assessment been conducted previously for the proposed drill site? Yes____ No X If yes, provide a copy, if available.

2. Have all required permits, licenses, and/or agreements for the proposed drill site been obtained? Yes X No____ If no, explain. ____

3. Does the drill site fall within the habitat of rare or endangered species? Yes____ No X If yes, explain. EASTERN FLYWAY, BUT NO SPECIES OCCUPY THE AREA AT THE TEST SITE.

4. Are known archeological sites, historic sites, prime or unique farmland, or natural landmarks within or visible from the site area? Yes____ No X If yes, explain. ____

5. Will casing left in the hole protect all ground water aquifers? Yes X No____ If no, explain. ____

6. Will a directional survey be conducted in the drill hole? Yes____ No X If yes, at what interval? ____ feet. If no, explain. NOT NECESSARY FOR 1000' NONPRODUCING HOLE

7. Will expected continuous noise levels from site operations be 65 dBA or less at the nearest residence? Yes____ No X If no, explain. EACH 8V-71 GMC ENGINE EQUIPPED WITH TWO 4" IVC SRV04-0196 MAXIM SILENCERS, MAXIMUM NOISE LEVEL 32.0dBA, 250 CENTER FREQUENCY, FOR RESIDENTIAL USE

B. SITE CONSTRUCTION

1. Will additional land clearing be required for the drilling and data collection activities (e.g., preparation of drill pad, road construction, mud reserve pits, pipeline)? Yes X No____ If yes, describe. LEVEL PAD AND TWO EARTH PITS (35'X5'X4'EACH)

2. Will the drill site and related roads be treated to minimize dust? Yes____ No X If no, explain. NOT NECESSARY DUE TO PAVED ROADS AND SOIL CONDITION.

3. Are portable sanitary facilities or an approved septic system to be used at the drill site? Yes X No____ If no, explain. ____

4. Will liquid and solid wastes be disposed in accordance with local regulations? Yes X No____ If no, explain. ____

5. Will erosion control be required for excavated areas? Yes____ No X If yes, explain. ____

6. Upon completion of proposed drilling and data collection activities, will the site be restored to as natural a condition as possible by regrading, filling, and reseeding? Yes X No ____ If no, explain. ____

C. SAFETY

1. Will blowout preventers be used? Yes ____ No X If no, explain. NOT NECESSARY FOR 1000' HOLE D.O.E. GAVE APPROVAL

2. Will fire extinguishers be located onsite? Yes X No ____ If no, explain. ____

3. Will engineering and mud logging personnel be onsite during drilling operations? Yes X No ____ If no, explain. ____

4. Does an emergency plan exist for evacuating personnel? Yes X No ____ If no, explain. ____

5. Will the drilling operations be conducted under a safety policy that ensures safe operating procedures and attention to job safety and health protection? Yes X No ____ If no, explain. ____

Completed from onsite inspection by:

Michael R. Hancock
Signature

Position: FIELD ENGINEER

Date: DEC. 5, 1978

SAFETY POLICY

1. The safety policies of Gruy Federal, Inc. are defined by the joint requirements of:
   a. the Occupational Safety and Health Act of 1970, as defined and enforced by the Occupational Safety and Health Administration (OSHA) of the Department of Labor with respect to job safety and health protection, and
   b. the safe operating procedures, inspection and training programs, and accident investigation forms of the International Association of Drilling Contractors, whether involving drilling rigs or other equipment.

2. OSHA requirements are summarized in the 10" X 16" plastic laminated JOB SAFETY AND HEALTH PROTECTION sign, GPO: 1974 0 - 537-604; IADC procedures and inspection and report forms are summarized in the booklet Outline for Drilling Rig Safety Program, compiled by the IADC Safety Publications Subcommittee, revised 1976. Both of these documents are required to be displayed, reviewed at regular intervals by all supervisory personnel, and followed in concept and practice in all Gruy Federal operations involving job safety and health protection.

3. All Gruy Federal subcontractors and/or third party services are required to maintain meaningful and effective safety programs that include scheduled training and drills for personnel, and scheduled maintenance and testing of safety equipment.

4. In addition, all Gruy Federal field operations and all subcontractors and/or third party services to Gruy Federal field operations are required to maintain familiarity with and follow the recommended safe operating procedures and guidelines of the Accident Prevention Manual, IADC, revised edition, October, 1975.

5. The Gruy Federal Project Manager or his designated field representative shall have responsibility for maintaining these safety policies through:
   a. inspection of all equipment and materiel,
   b. inspection of personnel and equipment performance in safety drill or demonstration, upon request, and
   c. shutdown or exclusion from the job of any operation, materiel or personnel whose temporary condition or malfunction violates or jeopardizes the requirements of these safety policies.

February, 1978

Alan Lohse
Executive Vice President

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Smith Point #59

DATE December 5, 1978 COUNTY Northumberland STATE Virginia

REPORT NO. 1 REPORTED BY Radford

DEPTH 613 PROGRESS 613

ACTIVITY AT REPORT TIME Drilling

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0900	1500	6	Move to Northumberland #59
1500	1900	4	Rig up
1900	2300	4	Drill mouse hole, repair pump, mix mud
2300	0100	2	Drilled 60' - lost returns, mixed mud
0100	0600	5	Drilled 60' - 613'

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Smith Point #59

DATE 12-6-78 COUNTY Northumberland STATE Virginia

REPORT NO. 2 REPORTED BY Radford

DEPTH 1041 PROGRESS 628

Correction to Report #1, 12-5-78 - total depth should be 413' instead of 613'

ACTIVITY AT REPORT TIME Laying down drill pipe

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	0800	2	Drill from 413 to 484
0800	0830	.5	service rig
0830	1100	2.5	POH with bit and WIH with core bbl. Ream 30' to bottom
1100	1300	2	Cored 484' to 515 POH. Lay down core bbl. Recovered 31'.
1300	1930	6.5	WIH with bit. Drill from 515' to 986'
1930	2000	.5	Circ for core #2
2000	2300	3	Repair tongs. POH, PU core bbl and WIH
2300	2330	.5	Core 986' to 1011'
2330	0200	2.5	POH with bbl, layed down, recovered 11'
0200	0330	1.5	Ream and drill from 986 to 1041
0330	0400	.5	Circ
0400	0600	2	Layed down DP

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. Smith Point #59

DATE December 7, 1978 COUNTY Northumberland STATE Virginia

REPORT NO. 3 REPORTED BY Radford

DEPTH 1041 PROGRESS

ACTIVITY AT REPORT TIME MI and Rigging up on City of Suffolk

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	0630	.5	Finish LD DP
0630	0800	1.5	RU to run 4½" csg
0800	0900	1	Ran 25 joints J-55 9.5# ST&C - total of 1010' Set at 1021'
0900	0930	.5	Circ
0930	1030	1	Cmt with 225 sx class A cmt - pumped plug down - plug failed to hold
1030	1200	1.5	Held 500 psi on plug until cmt set.
1200	1300	1	RD and moving to city of Suffolk #25-B location.

FINAL REPORT

December 27, 1978

OPERATIONS SUMMARY

OPERATOR : Gruy Federal Inc.
LEASE : Smith Point
WELL : No. 59
COUNTY : North Cumberland, Virginia

****

12/5/78 Report #1. TD 613'. Activity at report time: Drlg. @ 613'. Elapsed time: 6 hrs. move from Hampton #60 to Smith Point #59 which is 118 miles. 4 hrs. RU. 4 hrs. drl. mouse hole. Work on mud pump & mixed mud. 2 hrs. drl. 60'. Lose circ. Mix mud. 5 hrs. drl. 60' to 613'.

12/6/78 Report #2. TD 1041'. Progress 628'. Activity at report time: LD D.P. Elapsed time: 2 hrs. drlg. from 413'-484'. Correction for report #1 on Smith Pt. #59 was carrying the depth 613' was only 413'. ½ hr. service rig. 2½ hrs. POH w/bit. RIH w/core barrel. Reaming 30' to btm. 2 hrs. core from 484'-515'. Circ. POH. Had 30' recovery. 6½ hrs. RIH w/bit. Drl. from 515'-986'. ½ hr. circ. for core #2. 3 hrs. repairing tongs. POH. RIH w/core barrel. ½ hr. core from 986'-1011'. 2½ hrs. POH w/core barrel. RIH w/bit. Had 11' recovery on core. 1½ hrs. ream & drl. from 986'-1041'. ½ hr. circ. 2 hrs. COH LD D.P.

12/7/78 Report #3. Elapsed time: ½ hr. finish LD D.P. 1½ hrs. RU to run 4½" csg. 1 hr. run 25 jts. of 4½" csg. Set @ 1021'. Tally 1010'. ½ hr. circ. 1 hr. ctm. w/225 sks. of Class "A" cmt. Plug did not hold. Press. up to 1000# did not hold again. Hole shut in valve let set for 1 hr. Open valve & did not loose any press. Did not get fluid back. 2½ hrs. RD & moving to City of Suffolk #25B

XVI. Site No. 25-B, Suffolk, Virginia

A. Site Location

The location of Site No. 25-B, Suffolk, Virginia, heat flow measurement hole is shown on Figure 16-1, a section of USGS 7½' Quadrangle "Bower Hill, Virginia". The coordinates of the drill site are longitude 76° 28' 45" W, latitude 36° 51' 01" N. The site, located on an abandoned Army Nike site, has a ground elevation of approximately 25 feet above sea level.

B. Lease/Letter Agreements, Permits, Licenses

Access to Site No. 25-B was obtained by permission of the Superintendent of the Suffolk School Board by letter agreement (Exhibit XVI-1). A Commonwealth of Virginia Certification of Completion permit was required and is shown in Exhibit XVI-5.

C. Environmental Information Survey

The environmental information checklist, supplementary information required for the"Environmental Assessment, Geothermal Exploratory Drilling Program, Eastern United States, Coastal Plains, and Piedmont Provinces" (DOE/EA-0015), is shown in Exhibit XVI-2.

D. Drilling Activities

Drilling activities at Site No. 25-B, Suffolk, Virginia, began December 7, 1978 and were completed December 12, 1978. Figure 16-2, a schematic diagram of the completed hole, summarizes data for Site No. 25-B. The daily drilling reports are shown in Exhibit XVI-3 and Exhibit XVI-4 is an operations summary of Site No. 25-B. Cores and cuttings taken from the hole during drilling were delivered to VPI&SU. No electric logs were run on this hole. Temperature logs were run by VPI&SU after the holes were cased; however, these data were not made available to Gruy.

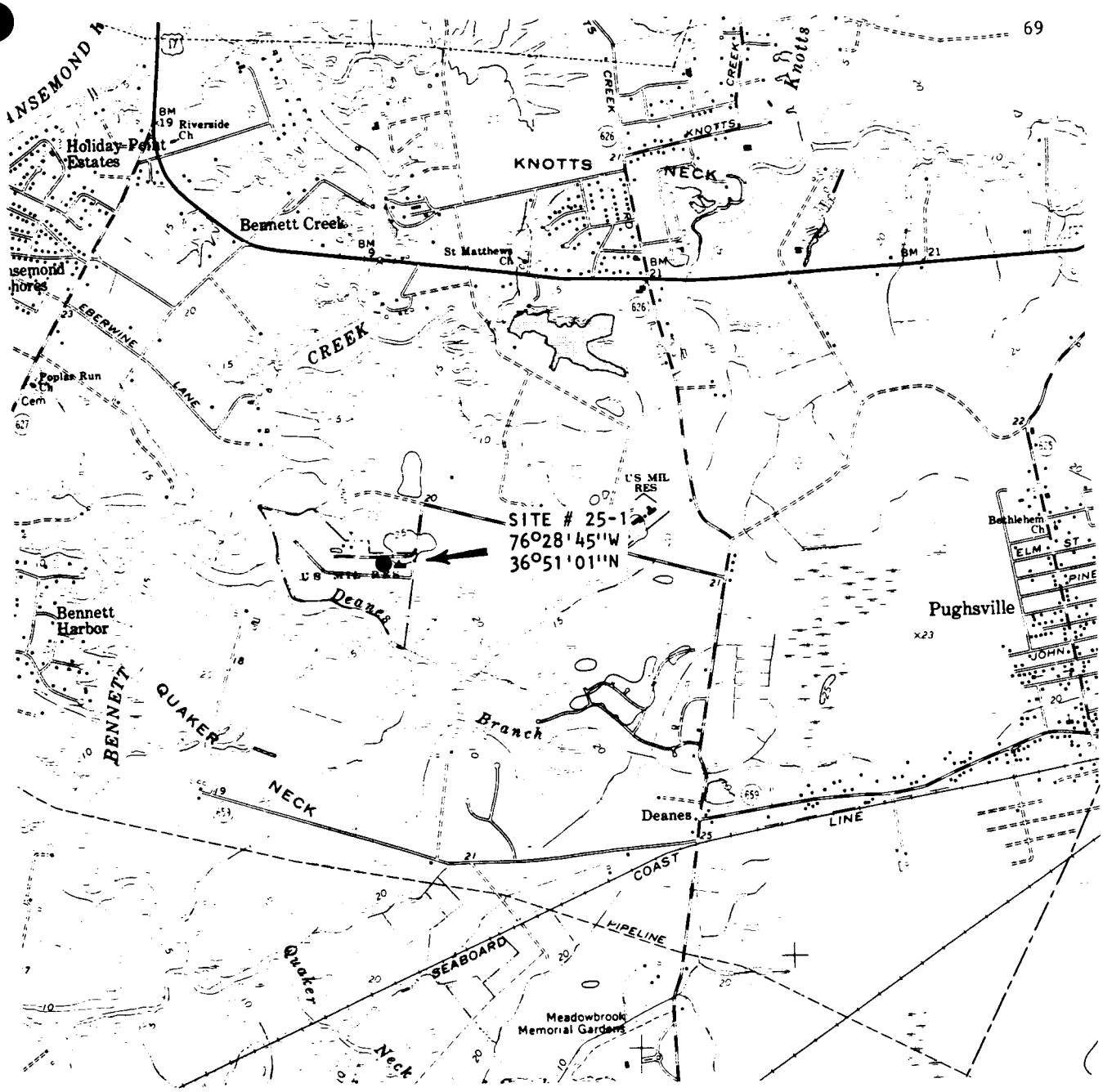
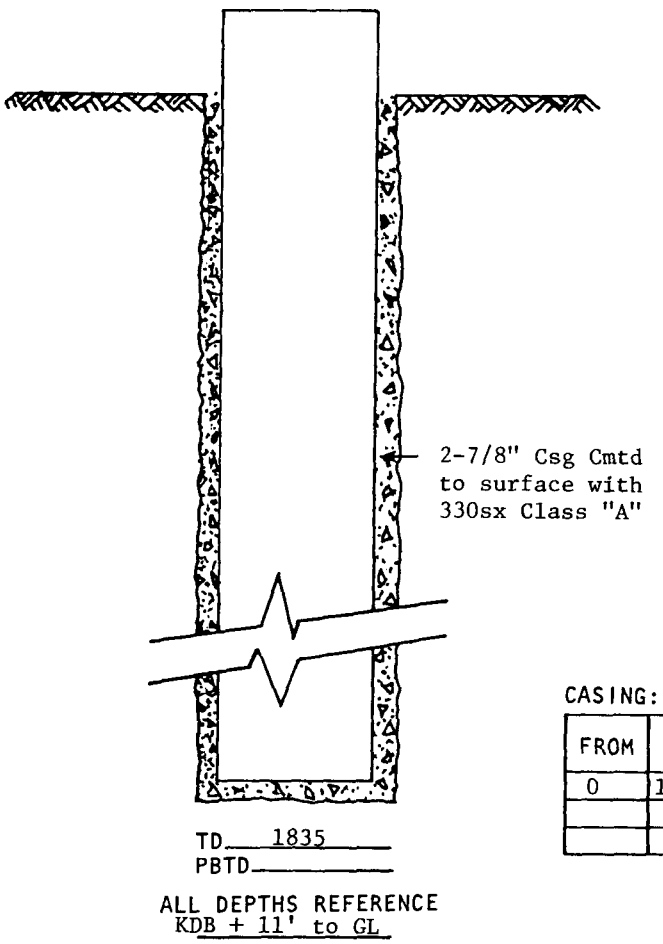


FIGURE 16-1 LOCATION SITE #25B, SUFFOLK, VA.
LONGITUDE 76°28'45" W, LATITUDE 36°51'01" N

SITE NO. 25B
WELL NAME: City of Suffolk
LOCATION: LAT. 36°51'01"N
LONG. 76°28'45"W
RIG: Energy Service Company Rig No 17 COUNTY Suffolk STATE Virginia
DATE SPUDED: December 7, 1978 DATE COMPLETED: December 11, 1978



CORES:

NO.	FROM	TO	RECOVERY

HOLE SIZE:

DEPTH		HOLE	CSG.	MUD*	
FROM	TO	SIZE IN.	SIZE IN.	VIS.	WT.
0	1835	6-3/4	2-7/8	4.5	9.5

*Approximate

CASING:

FROM	TO	SIZE IN.	WT #/FT	GRADE	THREAD	NO. JTS
0	1838	2-7/8	6.5	J55	EUE	61

FIGURE 16-2 WELL SCHEMATIC WITH COMPLETION INFORMATION

E. Site Preparation, Layout and Cleanup

Prior to initiation of drilling at Suffolk, Virginia, the site area was almost level and had an ungroomed grass covering. For site preparation, a bulldozer dug two pits 35' long, 5' wide and 4' deep. After the hole was completed, casing run and cemented, the site was left open for reentry by Virginia Polytechnical Institute at a later date. The mud pits were vacuumed and the site was backfilled and leveled.

A25 (36) 72

EXHIBIT XVI-1

Suffolk Public Schools

POST OFFICE BOX 1549 - SUFFOLK, VIRGINIA 23434 - PHONE 804/539-8797

August 11, 1978

Gruy Federal, Inc.
2500 Tanglewilde, Suite 150
Houston, Texas 77063

Attention: Mr. G. W. Duncan

Dear Mr. Duncan:

The attached agreement is being signed with the understanding that your firm will provide a plan and/or procedures by which the owner could convert this 1000' shaft into a fresh water well. Also, it is understood that your firm would indicate where any equipment needed to make this conversion would be available and an approximate cost as of this date.

It would also be understood that your firm would indicate the various depths of the water veins and/or pockets located within the 1000' well.

Very truly yours,

Forrest L. Frazier, Superintendent

FLF:jc

Enclosure

AUG 14 1978

E022-4

GRUY FEDERAL, INC.
CONSULTANTS IN ENERGY SYSTEMS

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
713/785-9200

1911 JEFFERSON DAVIS HWY., SUITE 500
ARLINGTON, VIRGINIA 22202
703/979-2955

August 2, 1978

Mr. William F. Davis, Chairman
City of Suffolk, Virginia School Board
c/o Mr. Forrest L. Frazier, Superintendant
P. O. Box 1549
Suffolk, Virginia 23434

Dear Sir:

Gruy Federal, Inc. is under Contract ET-78-C-08-1558 with the Division of Geothermal Energy, U. S. Department of Energy, to drill a series of bore holes along the Atlantic Coastal Plain from New Jersey to Florida. The sites have been, or will be, coordinated with the respective State Geological or Water Resources Boards and are under the overall coordination of Dr. J. K. Costain, Virginia Polytechnical Institute and State University, Blacksburg, Virginia.

The purpose of the drilling is to conduct a scientific geological study attempting to find sources of residual heat in the coastal bed rocks. Use of the site described below is critical to the study. The drilling program was started at Fort Monmouth, N. J., and is continuing on the New Jersey coast at present.

Gruy Federal requests permission to drill, case and cement one heat gradient bore hole of 1,000' depth at a site described below:

Bowers Hill Quadrangle
City of Suffolk, Virginia
U. S. Department of Interior Geological Survey
Map Coordinates: N 36 Degrees, 51 Minutes, 00 Seconds
W 76 Degrees, 28 Minutes, 48 Seconds

Final site selection to be by mutual agreement between your representative and a representative of Gruy Federal.

An area of approximately one acre will be required for the site during actual drilling operations for a period of about five days. Some soil disturbace will occur but will be restored to its original condition, leaving only a 4' X 4' X 4' cement lined pit with a hinged steel cover on the site. The cover will be flush with the surface. The 1,000' cased hole will be filled with fresh water. For one year following, scientists from the State, Virginia Polytechnical Institute, the U. S. Geological survey and the U. S. Department of Energy, under Gruy Federal responsibility, will conduct heat gradient measurements of this water.

Gruy Federal shall be responsible and liable for accidents, injuries or damages arising from its operations. The site will be restored insofar as possible it its original condition, including resodding or replanting grass. At your election, on completing the heat gradient tests, the bore hole will be returned to you for any use deemed appropriate or Gruy Federal will plug and abandon the hole in accordance with federal and state laws.

The Division of Geothermal Energy, Department of Energy, has made an Environmental Impact Assessment of Geothermal Drilling Activity, Coastal Plain and Piedmont Physiographic Provinces, Eastern United States, dated December 1977. NEPA requirements for this action have been met by the Department of Energy and there are no anticipated atmospheric, ecological, environmental or historical site factors developing from this operation.

Your cooperation and assistance in this research are sincerely appreciated. If you have any further questions concerning this matter, please call Mr. G. W. Duncan, Manager, Drilling and Resource Evaluation Division, Houston, Texas at AC 703-785-9200, collect.

The City Manager and the Superintendant of Schools have been briefed on this matter.

If agreeable, you need only to countersign the original of this letter agreement and mail it to Mr. Duncan at our Houston office.

Respectfully yours,

W. Edward McCain

W. Edward McCain
Agent and Attorney-in-fact

Approved Jarvis H. Jarvis

Date 8/1/78

GRUY FEDERAL, INC.
CONSULTANTS IN ENERGY SYSTEMS

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
713/785-9200

1911 JEFFERSON DAVIS HWY., SUITE 500
ARLINGTON, VIRGINIA 22202
703/920-0113

November 21, 1978

Mr. J. D. White, Business and Finance
Office of the Superintendent, Suffolk School Board
510 North Main Street
P. O. Box 1549
Suffolk, Virginia 23434

Ref: (a) Our Telecon 11/20/78
(b) Ltr Agreement dtd Aug. 2, 1978 between Suffolk School Board and Gruy Federal, Inc.

Dear Mr. White:

In accordance with your instructions given during reference (a), the following request is made:

Dr. John Costain has requested that Gruy Federal, Inc. drill a second hole on the site described in reference (b), displacing the second hole only a few feet from the original hole already drilled. However, he desires the second hole to be drilled to a depth of 2,000 Feet, plus or minus, to more adequately test for geothermal measurement. Therefore, it is requested that permission be granted to drill, case and cement one heat gradient hole of 2,000 feet. All other provisions of reference (b) are applicable to this request which shall now be an addendum.

If you have any further questions concerning the above, please call Mr. Richard N. Lane, President, Houston, Texas at AC 713, 785-9200, collect.

The original of this addendum needs only to be countersigned and be returned to me at our Arlington, Virginia office.

Respectfully yours,

RECEIVED
GRUY FEDERAL, INC.
HOUSTON, TEXAS

W. Edward McCain

W. Edward McCain
Agent and Attorney-in-fact

DEC 1 1978

Approved J. D. White

Date 11-23-78

SUFFOLK SCHOOL BOARD
NOV 22 1978
RECEIVED

Form GW-2
1978-10,000

EXHIBIT XVI-2 76

COMMONWEALTH OF VIRGINI

WATER WELL COMPLETION REPORT

(Certification of Completion/County Permit)

• BWCM No. _____

State Water Control Board
P. O. Box 11143
1111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit _____
County Permit _____

Certification of inspecting official:
This well does _____ does not _____ meet code/low requirements.
S. _____
Date _____
For Office Use

BOWERS HILL QUAD

County/City Stamp

• Virginia Plane Coordinates
N _____
E _____

Latitude & Longitude
36° 51' 01" N
76° 28' 45" W

• Topo. Map No. _____
• Elevation 25' ft.
• Formation _____
• Lithology _____
• River Basin _____
• Province _____
• Type Logs _____
• Cuttings EACH 10 ft.
• Water Analysis _____
• Aquifer Test _____

• Owner SUFFOLK SCHOOL BOARD
• Well Designation or Number SITE # 25 B
Address 510 NORTH MAIN ST. SUFFOLK VIR. 23434
Phone _____

• Drilling Contractor GRUY FEDERAL INC.
Address 2500 TANGLEWILDE #150 HOUSTON TEXAS
Phone _____

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well: I _____, IIA _____, IIB _____, IIIA _____, IIIB _____

WELL LOCATION: 1.0 (feet/miles WEST direction) of ROAD 626 on ROAD 757
and _____ feet/miles _____ (direction) of _____
(If possible please include map showing location marked)

Date started 12/7/78 • Date completed 12/12/78 Type rig ROTARY

1. WELL DATA: New ✓ Reworked _____ Deepened _____
• Total depth 1835' ft.
• Depth to bedrock — ft.
• Hole size (Also include reamed zones)
• 7 7/8 inches from 0 to 1835' ft.
• _____ inches from _____ to _____ ft.
• _____ inches from _____ to _____ ft.
• Casing size (I.D.) and material
• 2 7/8 inches from 2 to 1827 ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• Screen size and mesh for each zone (where applicable)
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• Gravel pack
• From _____ to _____ ft.
• From _____ to _____ ft.
• Grout
• From 2 to 1827 ft., Type CLASS A CEMENT
• From _____ to _____ ft., Type _____

2. WATER DATA • Water temperature _____ °F
• Static water level (unpumped level-measured) _____ ft.
• Stabilized measured pumping water level _____ ft.
• Stabilized yield _____ gpm after _____ hours
Natural Flow: Yes _____ No _____, flow rate: _____ gpm
Comment on quality _____

3. WATER ZONES: From _____ To _____
From _____ To _____ . From _____ To _____
From _____ To _____ . From _____ To _____

4. USE DATA:
Type of use: Drinking _____, Livestock Watering _____,
Irrigation _____ Food processing _____, Household _____
Manufacturing _____, Fire safety _____, Cleaning _____
Recreation _____, Aesthetic _____, Cooling or heating _____,
Injection _____, Other _____
• Type of facility: Domestic _____, Public water supply _____,
Public institution _____, Farm _____, Industry _____,
Commercial _____, Other _____

5. PUMP DATA: Type _____ • Rated H.P. _____
• Intake depth _____ • Capacity _____ at _____ head

6. WELLHEAD: Type well seal NONE
Pressure tank _____ gal., Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected _____ yes _____ no
Date _____, Disinfectant used _____
Amount _____, Hours used _____

8. ABANDONMENT (where applicable) • yes _____ no _____
Casing pulled yes _____ no _____ not applicable _____
Plugging grout From _____ to _____ material _____

Owner _____ BWCM No._____

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)

DEPTH (feet) From METERS	To	TYPE OF ROCK OR SOIL (color, material, fossils, hardness, etc.)	REMARKS (water, caving, cavities, broken, core, shot, (etc.)	11. Drilling Time (Min.)
0	91	samples missing		
91	290	fine sand and some clay		
290	291	fine-med. sand some gravel		
291	424	clay		
424	427	fine-very coarse sand		
427	448	clay		
448	475	silty fine-coarse sand		
475	494	clay		
494	499	muddy fine-med sand		
499	503	clay		
503	520	muddy fine-med sand		
520	527	clay		
527	570	muddy fine sand		

The descriptions of this well are unpublished. For more information call or write

Virginia Polytech Inst.
Geophysics Dept.
Dr. Joe Lambiase
(703) 961-6112

12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)

State Water Control Board Regional Offices

Valley Reg. Off.
116 North Main Street
P. O. Box 268
Bridgewater, Va. 22812
703-828-2595

Piedmont Reg. Off.
4010 West Broad Street
P. O. Box 6616
Richmond, Va. 23230
804-257-1006

Southwest Reg. Off.
408 East Main Street
P. O. Box 476
Abingdon, Va. 24210
703-628-5183

Tidewater Reg. Off.
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Va. Beach, Va. 23462
804-499-8742

West Central Reg. Off.
Executive Park
5306 A Peters Creek Road
Roanoke, Va. 24019
703-563-0354

Northern Virginia Reg. Off.
5515 Cherokee Avenue
Suite 404
Alexandria, Va. 22312
703-750-9111

13. Well lot dedicated? _____: Size _____ ft. X _____ ft.; Well house?_____
Distance to nearest pollutant source _____ ft., Type_____
Distance to nearest property line _____ ft., Building _____ft.

14. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature Michael R. Glascock (Seal), Date FEB. 14, 1979
(Well driller or authorized person)

License No._____

SITE-SPECIFIC ENVIRONMENTAL INFORMATION CHECKLIST

HEAT GRADIENT HOLES

ATLANTIC COASTAL PLAIN GEOTHERMAL TEST PROGRAM

Site No. 25 State Va.

Location Bennetts Creek Park and Nike Site - Suffolk, Va

A. GENERAL

1. Has federal, state and/or local environmental assessment been conducted previously for the proposed drill site? Yes____ No X If yes, provide a copy, if available.

2. Have all required permits, licenses, and/or agreements for the proposed drill site been obtained? Yes X No____ If no, explain. ____

3. Does the drill site fall within the habitat of rare or endangered species? Yes____ No X If yes, explain. Eastern Elyway but no species occupy the area at the test site

4. Are known archeological sites, historic sites, prime or unique farmland, or natural landmarks within or visible from the site area? Yes____ No X If yes, explain. ____

5. Will casing left in the hole protect all ground water aquifers? Yes X No____ If no, explain. ____

6. Will a directional survey be conducted in the drill hole? Yes____ No X If yes, at what interval? ____ feet. If no, explain. Not necessary for 1000' non producing hole

7. Will expected continuous noise levels from site operations be 65 dBA or less at the nearest residence? Yes____ No X If no, explain.
EACH 8V-71 GMC ENGINE EQUIPPED WITH TWO 4" NO. SRV04-0196 MAXIM SILENCERS; MAXIMUM NOISE LEVEL 32dBA, 250 CENTER FREQUENCY; FOR RESIDENTIAL USE.

B. SITE CONSTRUCTION

1. Will additional land clearing be required for the drilling and data collection activities (e.g., preparation of drill pad, road construction, mud reserve pits, pipeline)? Yes____ No X If yes, describe.

2. Will the drill site and related roads be treated to minimize dust? Yes____ No X If no, explain. NOT NEEDED PAVED ROADS

3. Are portable sanitary facilities or an approved septic system to be used at the drill site? Yes X No____ If no, explain. ____

4. Will liquid and solid wastes be disposed in accordance with local regulations? Yes X No____ If no, explain. ____

5. Will erosion control be required for excavated areas? Yes____ No X If yes, explain. ____

6. Upon completion of proposed drilling and data collection activities, will the site be restored to as natural a condition as possible by regrading, filling, and reseeding? Yes X No____ If no, explain. ____

C. SAFETY

1. Will blowout preventers be used? Yes X No____ If no, explain.

2. Will fire extinguishers be located onsite? Yes X No____ If no, explain. ____

3. Will engineering and mud logging personnel be onsite during drilling operations? Yes X No____ If no, explain. ____

4. Does an emergency plan exist for evacuating personnel?. Yes X No____ If no, explain. ____

5. Will the drilling operations be conducted under a safety policy that ensures safe operating procedures and attention to job safety and health protection? Yes X No____ If no, explain. ____

Completed from onsite inspection by:

Michael K Gleason
Signature

Position: Field Engineer

Date: Sep 18, 1979

SAFETY POLICY

1. The safety policies of Gruy Federal, Inc. are defined by the joint requirements of:
   a. the Occupational Safety and Health Act of 1970, as defined and enforced by the Occupational Safety and Health Administration (OSHA) of the Department of Labor with respect to job safety and health protection, and
   b. the safe operating procedures, inspection and training programs, and accident investigation forms of the International Association of Drilling Contractors, whether involving drilling rigs or other equipment.

2. OSHA requirements are summarized in the 10" X 16" plastic laminated JOB SAFETY AND HEALTH PROTECTION sign, GPO: 1974 0 - 537-604; IADC procedures and inspection and report forms are summarized in the booklet Outline for Drilling Rig Safety Program, compiled by the IADC Safety Publications Subcommittee, revised 1976. Both of these documents are required to be displayed, reviewed at regular intervals by all supervisory personnel, and followed in concept and practice in all Gruy Federal operations involving job safety and health protection.

3. All Gruy Federal subcontractors and/or third party services are required to maintain meaningful and effective safety programs that include scheduled training and drills for personnel, and scheduled maintenance and testing of safety equipment.

4. In addition, all Gruy Federal field operations and all subcontractors and/or third party services to Gruy Federal field operations are required to maintain familiarity with and follow the recommended safe operating procedures and guidelines of the Accident Prevention Manual, IADC, revised edition, October, 1975.

5. The Gruy Federal Project Manager or his designated field representative shall have responsibility for maintaining these safety policies through:
   a. inspection of all equipment and materiel,
   b. inspection of personnel and equipment performance in safety drill or demonstration, upon request, and
   c. shutdown or exclusion from the job of any operation, materiel or personnel whose temporary condition or malfunction violates or jeopardizes the requirements of these safety policies.

February, 1978

Alan Lohse
Executive Vice President

EXHIBIT XVI-4

GRUY FEDERAL, INC.
2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. City of Suffolk #25B

DATE December 7, 1978 COUNTY Suffolk STATE Virginia

REPORT NO. 1 REPORTED BY Radford

DEPTH PROGRESS

ACTIVITY AT REPORT TIME MI and RU

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
1300	1700	4	Move rig from Smith Point #59 to City of Suffolk #25B
1700	0600	13	Wait on Remainder of equipment and wait on daylite

GRUY FEDERAL, INC.

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HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. City of Suffolk #25B

DATE December 8, 1978 COUNTY Suffolk STATE Virginia

REPORT NO. 2 REPORTED BY Radford

DEPTH 991 PROGRESS 991

ACTIVITY AT REPORT TIME Drilling

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	1200	6	Finished moving to location
1200	1830	6.5	Rig up and mix mud, drill mouse
1830	2300	4.5	Spudded in and drilled to 620'
2300	2400	1	Repair swivel and work on electrical system
2400	0600	6	Drill 620 - 991

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

8

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. City of Suffolk #25B

DATE December 9, 1978 COUNTY Suffolk STATE Virginia

REPORT NO. 3 REPORTED BY Radford

DEPTH 1736 PROGRESS 745

ACTIVITY AT REPORT TIME Drilling at 1736'

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	0800	2	Drill 991 - 1179'
0800	0830	.5	Service rig
0830	2400	15.5	Drilling 1179 - 1612'
2400	0230	2.5	Round trip to change bits
0230	0600	3.5	Drill 1612 - 1736'

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. City of Suffolk #25B

DATE December 10, 1978 COUNTY Suffolk STATE Virginia

REPORT NO. 4 REPORTED BY Radford

DEPTH 1835 PROGRESS 99

ACTIVITY AT REPORT TIME Running 2 7/8" casing

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	0930	3.5	Drld 1736 - 1798'
0930	1200	2.5	Round trip to change bit
1200	2130	9.5	Drld 1798 - 1835'
2130	2230	1	Circ and prepare to lay down DP
2230	0200	3.5	Lay down DP
0200	0300	1	Rig down power swivel, lay down mouse hole
0300	0500	2	Rig up to run 2 7/8" csg.
0500	0600	1	Running 2 7/8" csg.

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. City of Suffolk #25B

DATE December 11, 1978 COUNTY Suffolk STATE Virginia

REPORT NO. 5 REPORTED BY Radford

DEPTH 1835 PROGRESS -

ACTIVITY AT REPORT TIME Preparing to move to Kinston #16A

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	0930	3.5	Running 2 7/8" csg, ran 61 joints, tally 1861.24 6.5 lbs/foot J-55 EUE tubing set at 1835
0930	1130	2	Circ and rig up Halliburton
1130	1300	1.5	Cement with 330 sacks Class A cement. Cement Circulated, displace with 10 3/4 bbls water. Held 400 psi on tubing until cement set.
1300	0600	17	Rig down, load out, prepare to move

Note: casing set at 1827 ft. ground level

GRUY FEDERAL, INC.

2500 TANGLEWILDE, SUITE 150
HOUSTON, TEXAS 77063
(713) 785-9200

DAILY DRILLING REPORT

JOB NO. 3022 WELL NO. City of Suffolk #25B

DATE December 12, 1978 COUNTY Suffolk STATE Virginia

REPORT NO. 6 REPORTED BY Radford

DEPTH 1835 PROGRESS

ACTIVITY AT REPORT TIME Loading out

TIME LOG

FROM	TO	ELAPSED	OPERATIONS
0600	1000	4	Load out equipment, wait on legal moving time, depart to Kinston #16A.
			Final Report - well complete

December 27, 1978

OPERATIONS SUMMARY

OPERATOR : Gruy Federal Inc.
LEASE : City of Suffolk
WELL : No. 25B
COUNTY : Suffolk, Virginia

****

12/7/78 Report #1. Activity at report time: MI & RU. Elapsed time: 4 hrs. move rig. 13 hrs. WO remainder of equipment & day light to RU & raise mast.

12/8/78 Report #2. TD 991'. Activity at report time: Drlg. 6 hrs. finished moving equip. to location from Smith Point. 6½ hrs. mixed mud. Drld. mouse hole. FRU. 4½ hrs. drlg. 0-620'. 1 hrs. repair swivel & work on electrical system. 6 hrs. drlg. from 620-991'.

12/9/78 Report #3. TD 1736'. Activity at report time: Drlg. 2 hrs. drld. from 991'-1179'. ½ hr. service rig. 15½ hrs. drlg. from 1179'-1612'. 2½ hrs. round trip to change bit. 3½ hrs. drlg. from 1612'-1736'.

12/10/78 Report #4. TD 1835'. Activity at report time: Running 2-7/8" csg. 3½ hrs. drld. from 1736'-1798'. 2½ hrs. POH & PU new bit. RIH. 9½ hrs. drlg. from 1798'-1835'. 1 hr. circ. Prep. to LD D.P. 3½ hrs. LD D.P. 1 hr. RD power swivel. LD mouse hole. 2 hrs. RU to run 2-7/8" csg. 1 hr. running 2-7/8" csg.

12/11/78 Report #5. TD 1835'. Activity at report time: Prep. to move to Kinston, North Carolina. 3½ hrs. running 2-7/8" csg. Run 61 jts. Tallied 1861'. Ran 650# J-55, set @ 1835'. 2 hrs. circ. RU Halliburton. 1½ hr. cmt. w/330 sks. Class "A" cmt. Cmt. circ., displ. w/10-3/4" barrel water. Held 400# press. on tbg. until cmt. set. 17 hrs. RD, load out, prep. to move.

12/12/78 Report #6. Activity at report time: Loading out. Elapsed time: 4 hrs. load out equipment. WO legal moving time. Depart for Kinston #16A.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1979—640-092/ 1115