GRUY FEDERAL, INC.

LOGGING AND CORING PLAN
FOR
E.G.S.P. CORE SITE NO. IB-1ILL

JENKINS NO. 1 SIMPSON WELL
WAYNE COUNTY, ILLINOIS

#369

Submitted to

U.S. Department of Energy
Morgantown Energy Technology Center

Under Contract No. DE-RP05-79MC08382

by

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

August 1, 1979

G
The Gruy Companies
Since 1950

GRUY FEDERAL, INC.

CONSULTANTS IN ENERGY SYSTEMS

August 1, 1979

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

2001 JEFFERSON DAVIS HWY., SUITE 701
ARLINGTON, VIRGINIA 22202
703/892-2700

Mr. Charles Byrer
U.S. Department of Energy
Morgantown Energy Technology Center
Post Office Box 880
Morgantown, W. Va. 26505

Re: Contract No. DE-RP05-79MC08382
Subcontracting Plan to Core and
Log Jenkins No. 1 Simpson Well,
Wayne County, Illinois

Dear Mr. Byrer:

Gruy Federal is pleased to submit the enclosed subcontracting plan for obtaining 420 feet of oriented core and logs of the Devonian New Albany shale section in the subject well, which is to be spudded in the third week of August. This well is strategically located in Wayne County, Illinois, at the southern end of the Clay City anticlinal belt. It is being drilled to test the Dutch Creek sandstone, which underlies the Devonian shale, and represents an opportunity to obtain, at low cost, information on the radioactive and non-radioactive Devonian shale present at this location. This information may prove instrumental in selecting other sites for evaluation wells in the Devonian shales of the Illinois Basin.

A recent petrographic study of the New Albany shale from samples taken north and south of this location has revealed the presence of "synaeresis cracks" as well as several definable facies within this unit (R. D. Harvey and others, First Eastern Gas Shales Symposium, METC, October 1977, pp. 239-265). The structural setting suggests the possibility of fracturing; however, there is no direct evidence, since only two wells have been drilled through the shale in this area. Therefore there are at least two possible sources of permeability within the New Albany shale at this location.

A copy of Form 60 for DOE's portion of the cost of this operation is included at the end of the text.

Sincerely,

GRUY FEDERAL, INC.

James H. Hartsock

James H. Hartsock
Vice President, Engineering

JHH:wdc
encl.

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INTRODUCTION

The Devonian shales of the Appalachian, Illinois, and Michigan Basins (Fig. 1) have been under intensive study since the early 1970's as potential sources of large volumes of natural gas. Gruy Federal, Inc. (Gruy) of Houston has been selected by the U.S. Department of Energy (DOE) as prime contractor for the evaluation of this unconventional gas source.

Gruy and Mr. Gordon T. Jenkins, an independent oil producer, have reached an agreement which will allow Gruy to utilize a well being drilled by Mr. Jenkins to obtain (through subcontracting) cores and logs of the Devonian New Albany shales of the Illinois Basin. A copy of this agreement is included as Appendix A.

The Illinois State Geological Survey and the Department of Energy have expressed agreement on the desirability of the information from this site, which is located in southern Wayne County, Illinois (Fig. 2).

The subject well is a deep test passing through the Devonian shale. Therefore the only cost of obtaining this information will be the additional expenses incurred by the operator, plus a small fee for the inconvenience and delay caused by extensive coring and logging activities.

GEOLOGICAL SETTING

The site lies within the Fairfield sub-basin of the central part of the Illinois Basin, south and east of the southern end of the Clay City Anticlinal Belt (Fig. 2).

The specific location of the proposed drilling site is 400 feet north and 300 feet east of the SW corner, SE1/4 SW1/4 Sec. 17, T3S, R8E (Fig. 3). The nearest deep control well is the A. J. Poorman No. 5 (NW1/4 SW1/4 Sec. 19, T3S, R8E), located about one mile to the southwest in the Mills Shoals Field of White County (Fig. 3). A shallower well (Fox No. 1) lies immediately to the north of the proposed site.

The stratigraphic column for south central Illinois shows the position of the New Albany Shale between the Borden Shale, Osage Series, of the Lower Mississippian and the Middle Devonian Dutch Creek Formation (Fig. 4).

The uppermost unit of the New Albany Shale is considered to be of Kinderhookian age (lowermost Mississippian)(Fig. 4). Most of the shale, however, is Upper Devonian in age. Underlying the New Albany is the Dutch Creek Formation, predominantly a carbonate section but locally sandstone, which forms the top of the Middle Devonian in the Mills Shoals Field (R. C. Haas, personal communication). The principal oil-producing units in this field are Mississippian sandstones and limestones and Middle Devonian carbonates.

Specifically, above the New Albany Shale are (in ascending order) the Warsaw, Salem, St. Louis, St. Genevieve, and Aux Vases Formations, all of Mississippian age. Below the New Albany, the Middle Devonian Dutch Creek Formation is also a prospective oil-producing unit. A drillstem test in the Jenkins No. 5 Poorman produced water with a show of oil, indicating that if structural elevation could be gained this sand should be oil-productive.

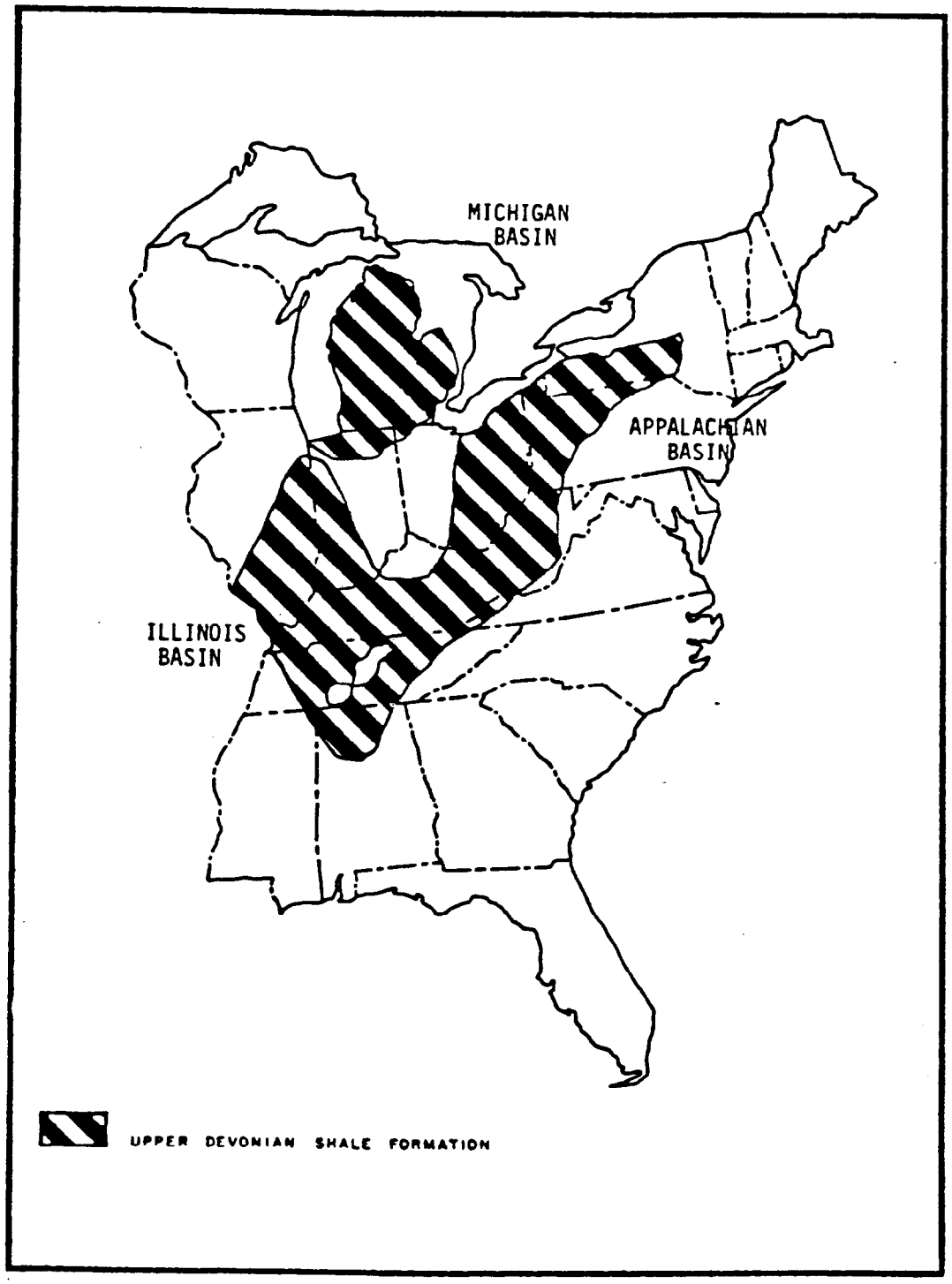


FIGURE 1 DEVONIAN SHALE BASIN. (AFTER FOSTER, 1975)

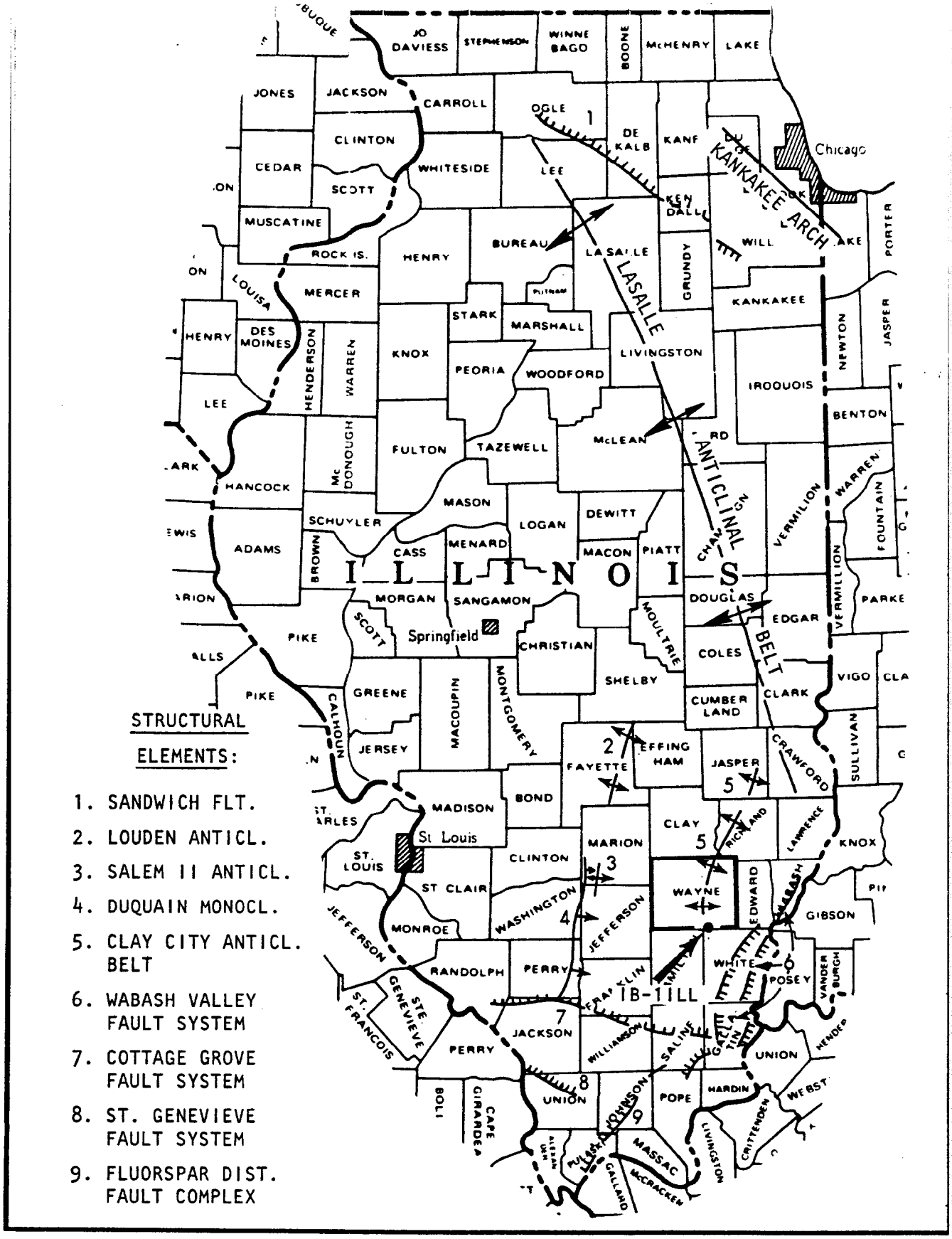


FIGURE 2 LOCATION OF E.G.S.P. CORE SITE IB-1ILL IN RELATION TO MAJOR STRUCTURES

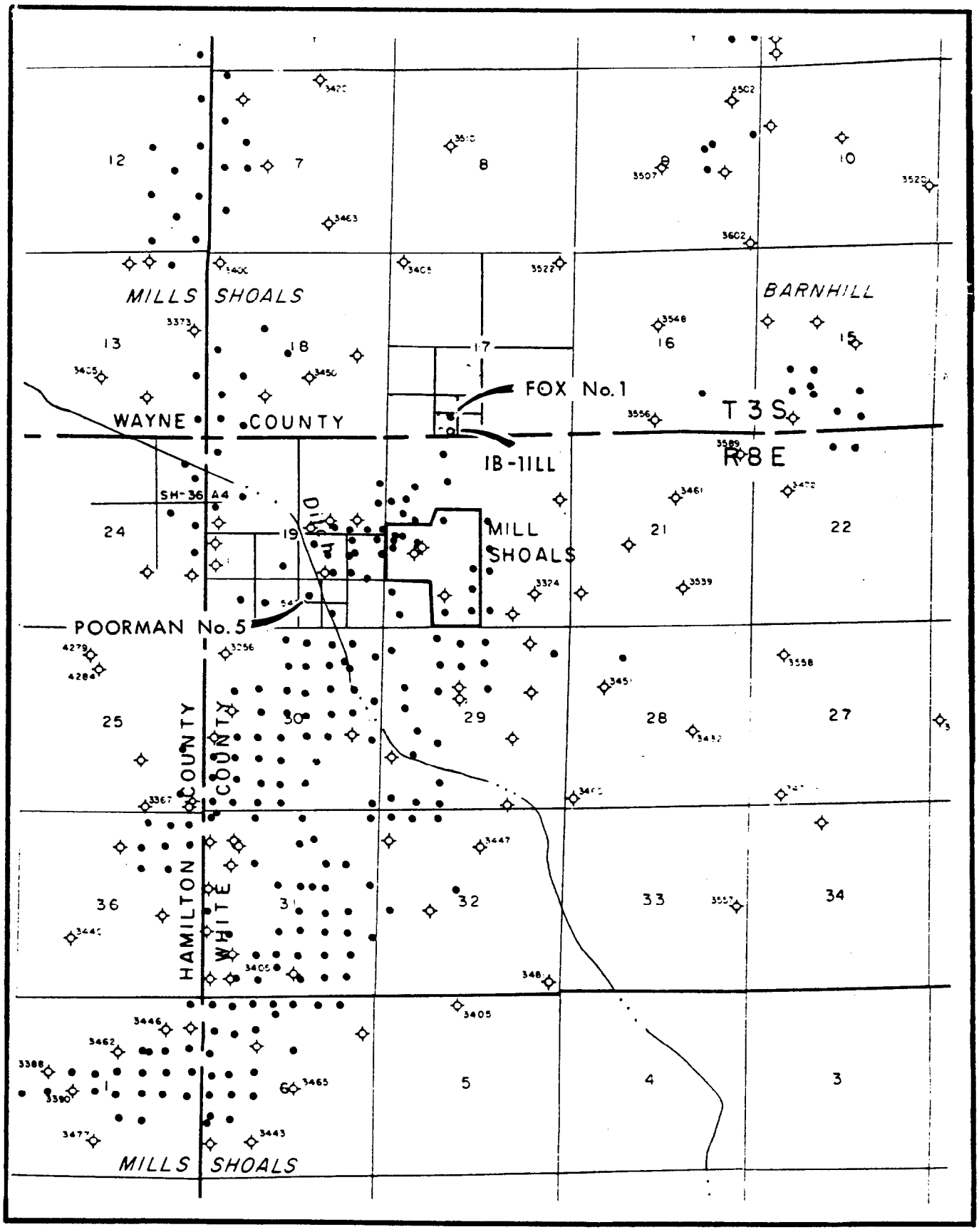


FIGURE 3 SPECIFIC LOCATION OF PROSPECTIVE E.G.S.P. CORE SITE NO. IB-1ILL.

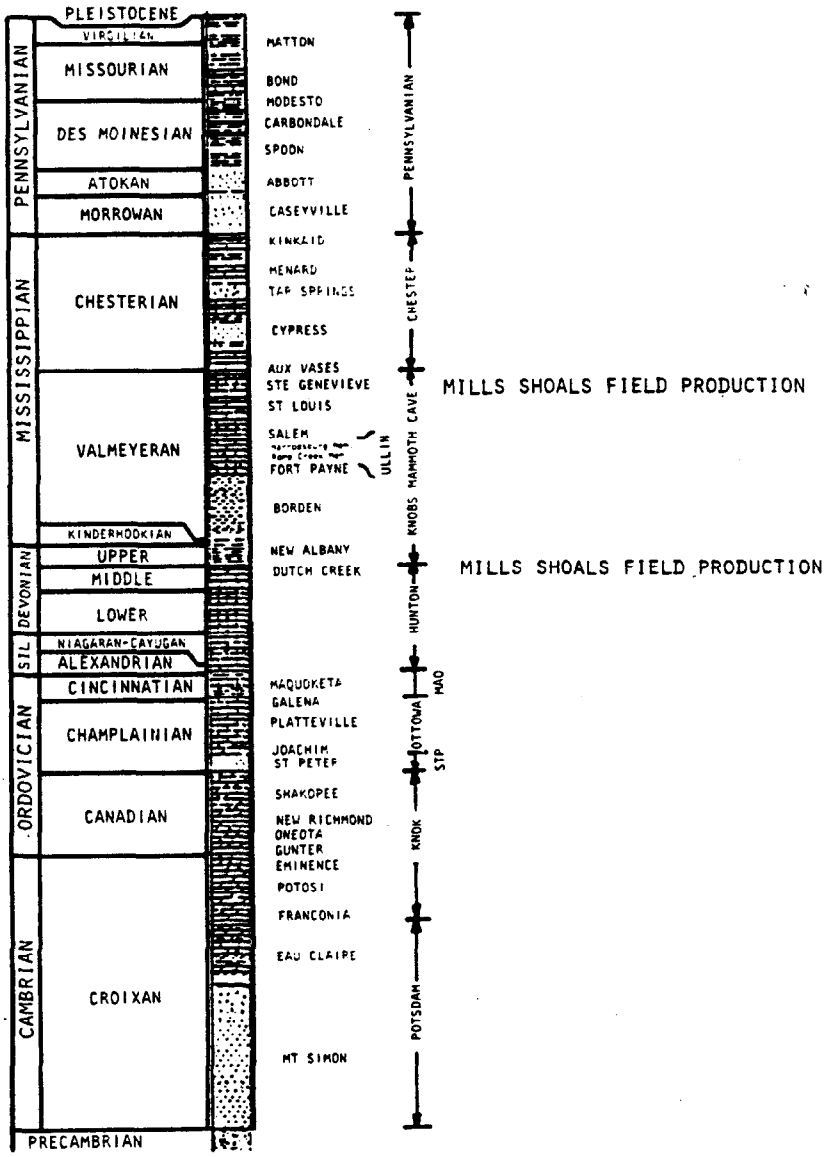


FIGURE 4 GEOLOGIC COLUMN SHOWING THE STRATIGRAPHIC POSITION OF THE NEW ALBANY SHALE IN THE ILLINOIS BASIN.

Structure maps provided by the operator, drawn on top of the Warsaw and Dutch Creek Formations (Figs. 5 and 6), indicate a low-relief anticlinal feature which trends northeast through the prospective well site.

PROGNOSIS

Using the Poorman No. 5 well for deep control (electric log included as Fig. 7) and the Fox No. 1 (located a few hundred feet north of the prospective site) for shallower correlation, the prognosis for the principal formation tops to be encountered at the prospective site is given below.

FORMATION	POORMAN NO. 5 KB = 386 ft.		SIMPSON (NEW SITE) KB = 392 ft. (est.)	
	Depth	Thickness	Depth	Thickness
St. Genevieve	-2892 (3386 KB)*	878	-2940 (3332 KB)* (Fox No. 1)	825
Warsaw	-3770 (4156 KB)*	774	-3765 (4157 KB)*	774
New Albany Shale	-4544 (4930 KB)*	270	-4539 (4930 KB)*	270
Lime Unit¶	-4814 (5200 KB)*	208	-4809 (5201 KB)§	208
Dutch Creek	-5022 (5408 KB)*		-5017 (5401 KB)*	

*E-log basis

¶Limestone unit within the Albany Shale

§Recommended coring interval -4498 (4890 KB) to -4819 (5310 KB) = 420 ft.

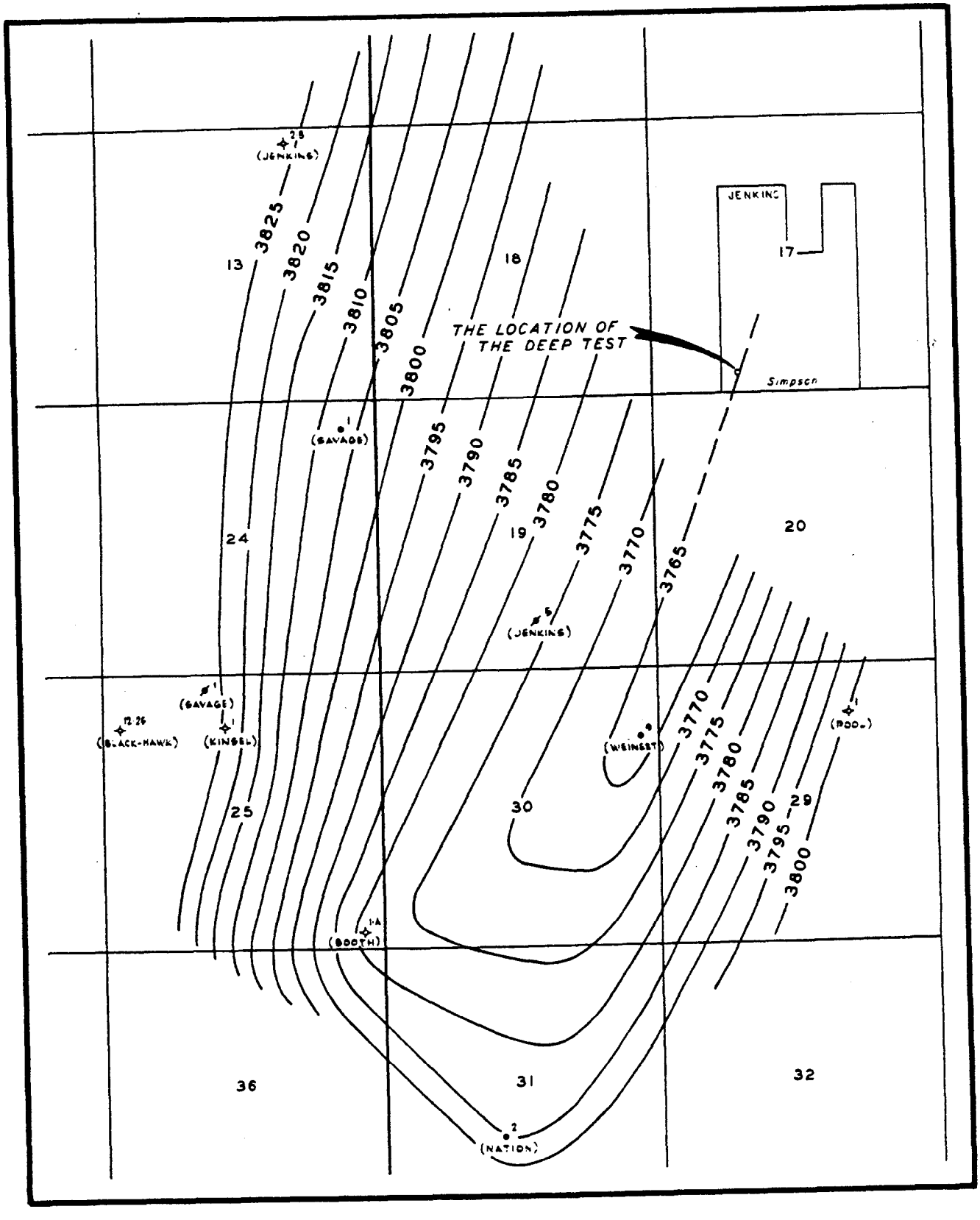


FIGURE 5 STRUCTURE AT TOP OF WARSAW FORMATION
(SUPPLIED BY OPERATOR, G.T. JENKINS)

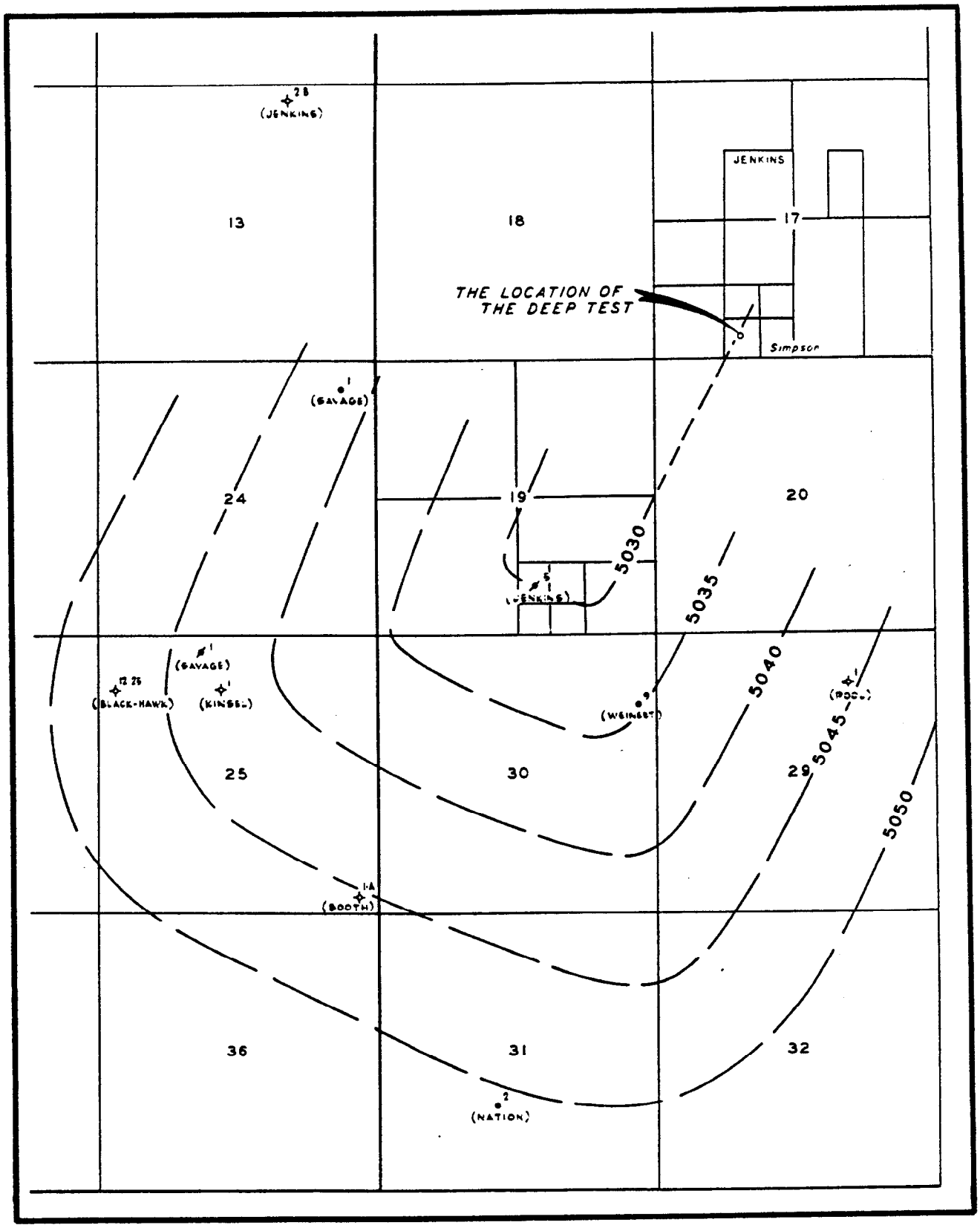
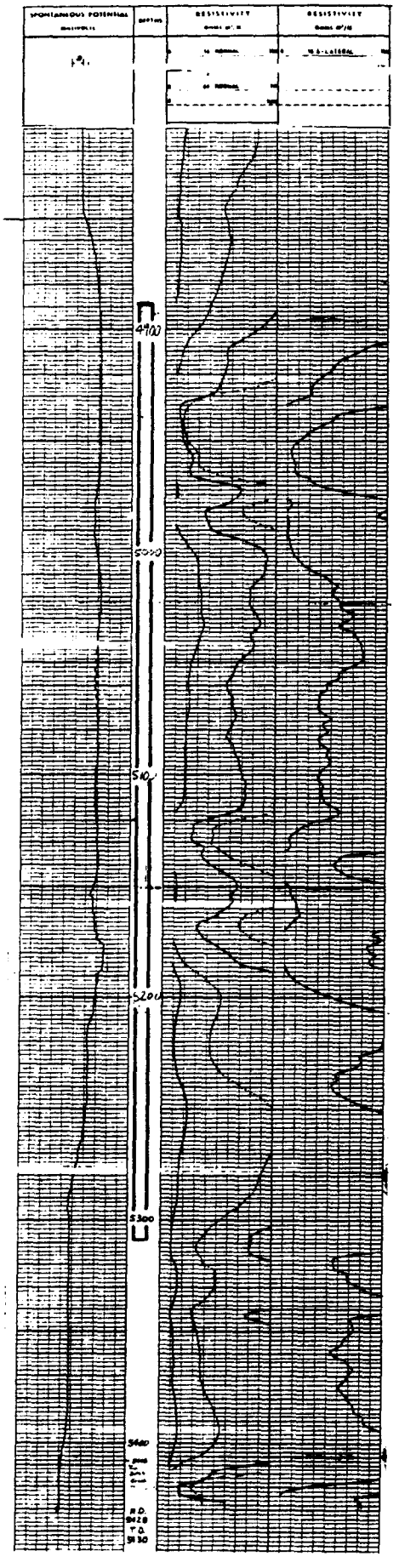


FIGURE 6 STRUCTURE AT TOP OF DUTCH CREEK FORMATION
(SUPPLIED BY OPERATOR G.T. JENKINS)

FIGURE 7

ELECTRIC LOG
ON
JENKINS NO. 5, A. J. POORMAN



TOP DEVONIAN SHALE
BORDEN SHALE?

KEROGEN RICH
- RADIOACTIVE -
NEW ALBANY SHALE

ZONE OF
UNCERTAIN LITHOLOGY
SHALE - - CARBONATE

CHARACTERISTICS OF THE NEW ALBANY SHALE

The New Albany Shale is composed of dark greenish-gray to olive-black and black shales with evidence of strong bioturbation (Harvey and others, 1977). Laminations characterize the shale, the laminae varying from fine (2 mm) to massive (>25 mm). Silt laminae composed of illite clay and quartz are quite common. Minor mineral constituents are plagioclase, potassium feldspar, calcite, dolomite, and pyrite.

A striking aspect of the New Albany Shale is the presence of synaeresis joints--irregular polygonal systems of joints or cracks that are now filled with secondary minerals such as pyrite and calcite. These joints are linear and predominantly vertically oriented. They tend to be short (5 to 10 mm) and crooked. Harvey and others (1977) interpret the crooked pyrite-filled synaeresis joints to be an early diagenetic stage in the history of the shale, associated with compaction processes but preceding the development of late-stage joints. Straighter, nearly vertical calcite-filled synaeresis joints are considered to have formed during post-compaction stages of diagenesis. The secondary mineralization within these synaeresis joints may provide permeable channels through the shale.

Although synaeresis produces some tension in sedimentary rocks, regional stresses may have some control over the orientation of the resulting cracks (Abramov, 1961). The proximity of the prospective site to the Clay City Anticline many have an important bearing on the fracture and hence gas properties of the New Albany Shale.

TECHNICAL DISCUSSION OF APPROACHES

If the site is acceptable and DOE provides funds, logging and coring will be accomplished as follows.

TASK I - CORING

The well will be cored from a depth of 4890 to 5310 feet (KB) to obtain 420 feet of oriented core. This interval is essentially the entire Devonian Shale section.

The proposed coring program is as follows:

(1) Mr. G. T. Jenkins, through his drilling contractor (Sledge Drilling Co.), will drill a 7-7/8" hole to the coring point (-4890 ft, or the top of the Borden Shale). The hole will be open from the bottom of 8-5/8" surface casing to the coring point. A Gruy geologist on site will select the exact coring point.

(2) The hole will be drilled with native mud to the coring point. If this fluid is adequate for coring, the coring company will be called on location to take 3-1/2" oriented cores to be retained in plastic sleeves.

(a) Gruy personnel will be on site during coring operations to provide engineering consultation and to ensure that the cores are properly cut and handled. Jenkins, however, will be the designated field operator.

(b) If significant difficulties are encountered with core recovery, or if the operation proceeds at a significantly slower pace (50 feet per day) than anticipated, Gruy will notify the DOE Technical Project Officer.

(3) After coring is completed, Jenkins will continue to drill through the Dutch Creek sandstone with a 7-7/8" bit.

TASK II - LOGGING

Gruy has designed a logging program to provide maximum information at reasonable expense and with the knowledge that the drilling fluid will be native mud. To maximize the quality of the logs obtained, Gruy recommends that they not be run until Jenkins has drilled the additional 100± feet to his objective, so as to minimize any bottomhole effects recorded in the shale section.

The logs selected for this hole are:

Gamma ray (GR)
Compensated neutron (CNL)
Formation density compensated (FDC)
Caliper
Dual induction laterolog (DIL)
Borehole compensated sonic (BHC)
Variable density (VDL)
Fracture identification log (FIL)

Following is a brief discussion of the logging devices and the information each is expected to provide.

(1) Compensated neutron: this is a dual-detector, borehole-compensated porosity device, run in combination with the formation density, gamma-ray, and caliper logs. Its uses are:
   - to delineate porous intervals and determine their porosity
   - to identify gas-bearing zones
   - to identify lithology and evaluate shale content.

(2) Gamma ray: this device records the natural radioactivity of the formations. In sedimentary formations it normally reflects the shale content. It may be run either in open or cased hole and serves as an excellent correlation device.

(3) Compensated formation density: this is a pad-type, dual-detector, borehole-compensated porosity device. When run in combination with the compensated neutron log, its other potential uses are:

- identification of lithology and minerals present
- detection of gas
- determination of hydrocarbon density
- evaluation of complex lithologies.

Density data may be integrated with sonic log information to yield the mechanical properties of the formation matrix. While not conclusive in itself, the density "rho" correction curve may indicate zones of fracturing.

Density logs cross-plotted against the gamma-ray logs of organic-rich intervals run in the same holes have been shown to be linear (Schmoker, 1977). Thus a plot can be produced from the well that allows calibration for the more commonly available gamma-ray logs.

(4) Caliper: the caliper simply records borehole diameter, but it is important for a number of reasons:

- determination of corrections required to calibrate other log responses
- determination of porous/permeable zones, indicated by the presence of mud cake
- identification of fractured zones, where the borehole may be rugose or enlarged or both.

The caliper system is an integral part of the compensated density-neutron system.

(5) Dual induction/laterolog 8: this is a focused resistivity device, which records three resistivity measurements obtained from three different depths of investigation. From the resistivity profile obtained, the depth of filtrate invasion and the true undisturbed formation resistivity may be obtained. This device is used to determine water saturation, porosity, or water salinity when two of the three parameters are known. While not conclusive, this log sometimes provides evidence of fractures (Pirson, 1967).

(6) Borehole-compensated sonic: this is a recording of the time required for a compressional sound wave to traverse one foot of formation. When used in conjunction with other porosity devices, the sonic log yields accurate information on lithology. Integrated sonic transit times are used as time-depth correlations for seismic applications. Sonic "cycle skipping" can sometimes give indication of fractures.

(7) Variable density log: this is a particular presentation of the cement bond log. When run in open hole, the variable-density presentation of the sonic wavetrain may indicate fracturing. When run in its normal cased-hole mode, the log is used to:

- evaluate the effectiveness of the casing-formation cement bond
- locate the top of cement
- check the effectiveness of squeeze cementing.

A casing collar log is normally run in conjunction with this device, where applicable. When combined with sonic and density data, information from this log allows determination of the mechanical properties of the formation matrix.

(8) Fracture identification - 4-arm dipmeter: this device is run to determine:

- formation dip and direction
- structural identification
- hole geometry
- location and evaluation of significant fracturing.

If necessary, the information may be processed to yield a hole survey and to convert log depths to true vertical depths.

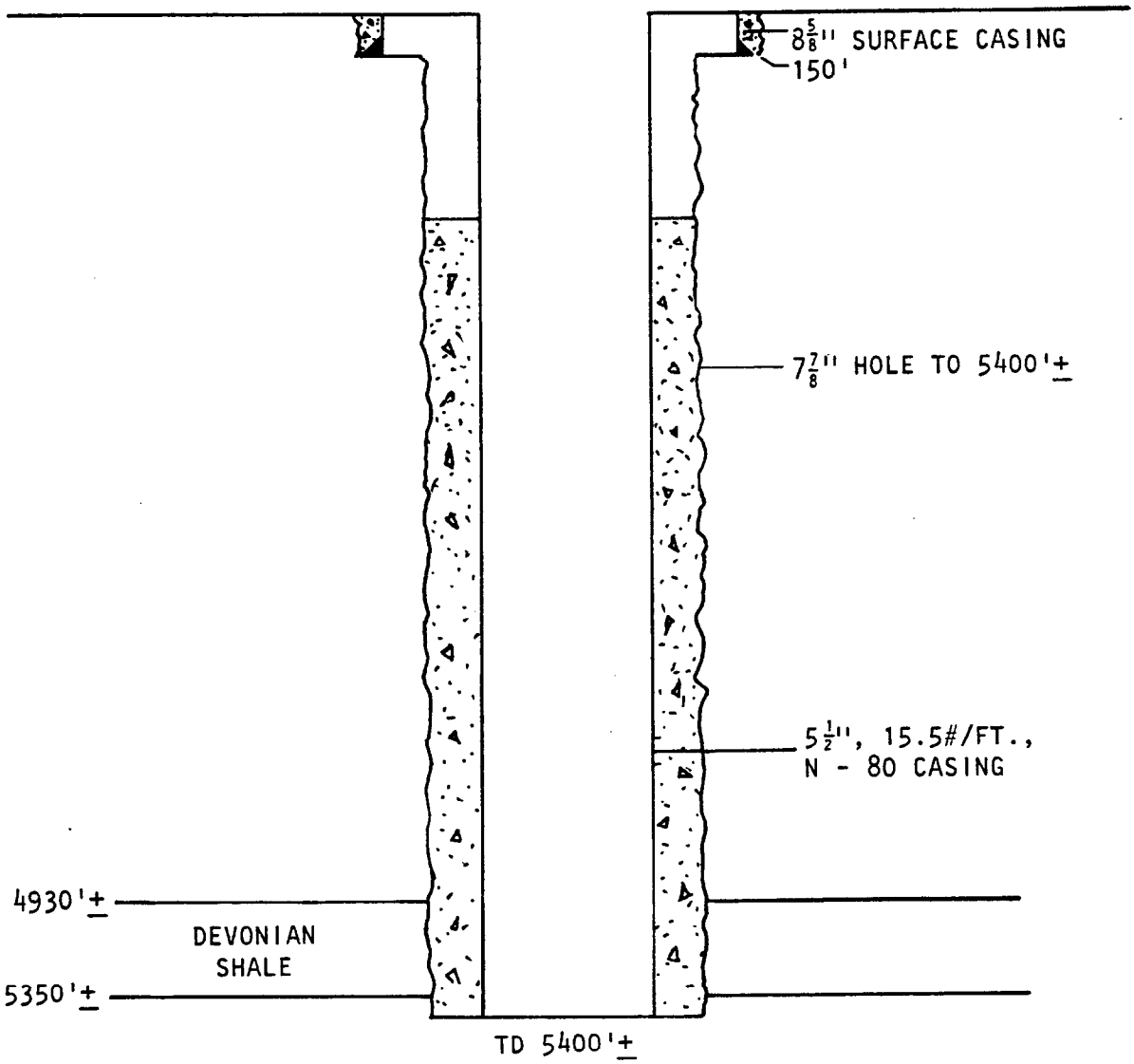
Gruy will have experienced personnel on location who can make preliminary assessments of the logs as they are received from the logging contractor.

The operator is not currently planning a completion in the Devonian Shale; there are three possibly productive horizons above the Devonian and one below. If sufficient indications of production are encountered, the operator will run casing and complete the well (see well schematic, Fig. 8).

If log analyses indicate a high probability that the Devonian Shale will be productive in this location, Gruy will so advise both the operator and the DOE Technical Project Officer.

FIGURE 8

WELL SCHEMATIC
ILLINOIS BASIN WELL
GORDON JENKINS, OPERATOR



CONCLUSION

Logs and cores from the subject well will provide valuable information for evaluation of the Devonian Shale in this portion of the Illinois Basin. Of particular interest is the fact that this well is located near a regionally significant fold, which may have been stress-relieved by fracturing. The existence within the New Albany Shale of small synaeresis cracks or joints now filled with secondary minerals is also significant, since these fissures may provide the permeability necessary for production of gas through the shale.

REFERENCES CITED

Abramov, S. P., 1961, Factors Determining Consolidation of Argillaceous Sediments in the Process of Diagenesis, Acta Universitas Carolinae, Geologica Supplementum 1, pp. 263-275, 2nd Conference on Clay Mineralogy and Petrography in Prague, Universita Karlova, Praha, pp. 263-275.

Foster, J. M., 1975, A "New Gas" Supply - The Devonian Shales, paper SPE 5451 presented at the Eastern Regional Meeting, Society of Petroleum Engineers of AIME, Charleston, West Virginia, Nov. 6-7, 1975.

Harvey, R. D., White, W. A., Cluff, R. M., Frost, J. K., and DuMontelle, P. B., 1977, Petrology of New Albany Shale Group (Upper Devonian and Kinderhookian) in the Illinois Basin, A Preliminary Report, First Eastern Gas Shales Symposium, Morgantown, W. Va., October 1977, pp. 239-265.

Pirson, S. B., 1967, How to Map Fracture Development from Well Logs, World Oil, vol. 164, no. 4, pp. 106-114.

Schmoker, J. W., 1977, The Relationship Between Density and Gamma-Ray Intensity in the Devonian Shale Sequence, Lincoln County, West Virginia, First Eastern Gas Shales Symposium, Morgantown, W. Va., October 1977, pp. 266-271.

Willman, H. B., and others, 1975, Handbook of Illinois Stratigraphy, Illinois State Geological Survey Bulletin 95, 261 p.

(RESEARCH AND DEVELOPMENT)

Approval No. 29-R0184

This form is for use when *(i)* submission of cost or pricing data (see FPR 1-3.807-3) is required and *(ii)* substitution for the Optional Form 59 is authorized by the contracting officer.

PAGE NO. | NO. OF PAGES

NAME OF OFFEROR: Gruy Federal, Inc.

HOME OFFICE ADDRESS: 2500 Tanglewilde Suite 150, Houston, Texas 77063

SUPPLIES AND/OR SERVICES TO BE FURNISHED: Collection of core materials and data from Devonian Shales-Jenkins-Simpson No 1

DIVISION(S) AND LOCATION(S) WHERE WORK IS TO BE PERFORMED: Houston Tex and job site

TOTAL AMOUNT OF PROPOSAL: $ 78 739

GOV'T SOLICITATION NO.: s/a to DE RP05 79 MC08382

DETAIL DESCRIPTION OF COST ELEMENTS

			EST COST ($)	TOTAL EST COST[1]	REFERENCE[2]
1. DIRECT MATERIAL *(Itemize on Exhibit A)*					
a. PURCHASED PARTS					
b. SUBCONTRACTED ITEMS					
c. OTHER—*(1)* RAW MATERIAL					
(2) YOUR STANDARD COMMERCIAL ITEMS					
(3) INTERDIVISIONAL TRANSFERS *(At other than cost)*					
TOTAL DIRECT MATERIAL					
2. MATERIAL OVERHEAD[3] *(Rate %X$ base=)*					
3. DIRECT LABOR *(Specify)*	ESTIMATED HOURS	RATE/ HOUR	EST COST ($)		
TOTAL DIRECT LABOR					
4. LABOR OVERHEAD *(Specify Department or Cost Center)*[3]	O.H. RATE	X BASE=	EST COST ($)		
TOTAL LABOR OVERHEAD					
5. SPECIAL TESTING *(Including field work at Government installations)*			EST COST ($)		
TOTAL SPECIAL TESTING					
6. SPECIAL EQUIPMENT *(If direct charge) (Itemize on Exhibit A)*					
7. TRAVEL *(If direct charge) (Give details on attached Schedule)*			EST COST ($)		
a. TRANSPORTATION					
b. PER DIEM OR SUBSISTENCE					
TOTAL TRAVEL					
8. CONSULTANTS *(Identify—purpose—rate)*			EST COST ($)		
TOTAL CONSULTANTS					
9. OTHER DIRECT COSTS *(Itemize on Exhibit A)*					
10. *TOTAL DIRECT COST AND OVERHEAD*					
11. GENERAL AND ADMINISTRATIVE EXPENSE *(Rate % of cost element Nos.)*[3]					
12. ROYALTIES[4] Subcontracts $ 75,465 PLUS materials burden (1.3%) 981				76,446	Exhibit A
13. *TOTAL ESTIMATED COST*					
14. FEE OR PROFIT 3.0%				2,293	
15. *TOTAL ESTIMATED COST AND FEE OR PROFIT*				78,739	

OPTIONAL FORM 60
October 1971
General Services Administration
FPR 1-16.806
5060-101

This proposal is submitted for use in connection with and in response to *(Describe RFP, etc.)*
Selection of proposed site for data and testing relative to the Devonian Shales at the Jenkins-Simpson No 1 in the Illinois Basin
and reflects our best estimates as of this date, in accordance with the Instructions to Offerors and the Footnotes which follow.

TYPED NAME AND TITLE	SIGNATURE
Gayland E Daugherty Vice President- Finance	Gayland E. Daugherty

NAME OF FIRM	DATE OF SUBMISSION
Gruy Federal Inc	7/18/79

EXHIBIT A—SUPPORTING SCHEDULE *(Specify. If more space is needed, use reverse)*

COST EL NO.	ITEM DESCRIPTION *(See footnote 5)*		EST COST *($)*
12	Drilling Rig		
	8 rdays at $ 3000 per day	$ 24,000	
	Coring costs	24,210	
	Open well logging	18,255	
	Payment to Operator of Jenkins Well	9,000	
	Total to subcontractor		75,465
12	Materials acquistion burden-Applicable to all materials and		
	~~Subcontract costs~~ Base times 1.3%		981
	Amount presented on line 12 reverse side		76,446

I. HAS ANY EXECUTIVE AGENCY OF THE UNITED STATES GOVERNMENT PERFORMED ANY REVIEW OF YOUR ACCOUNTS OR RECORDS IN CONNECTION WITH ANY OTHER GOVERNMENT PRIME CONTRACT OR SUBCONTRACT WITHIN THE PAST TWELVE MONTHS?

[X] YES [ ] NO *(If yes, identify below.)*

NAME AND ADDRESS OF REVIEWING OFFICE AND INDIVIDUAL	TELEPHONE NUMBER/EXTENSION
DCAA 2320 La Branch Houston Texas Bob Hawkes	A/C 713 226-4128

II. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS PROPOSED CONTRACT?

[ ] YES [X] NO *(If yes, identify on reverse or separate page)*

III. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT?

[X] YES [ ] NO *(If yes, identify.)*: [ ] ADVANCE PAYMENTS [X] PROGRESS PAYMENTS OR [ ] GUARANTEED LOANS

IV. DO YOU NOW HOLD ANY CONTRACT *(Or, do you have any independently financed (IR&D) projects)* FOR THE SAME OR SIMILAR WORK CALLED FOR BY THIS PROPOSED CONTRACT?

[ ] YES [X] NO *(If yes, identify.)*:

V. DOES THIS COST SUMMARY CONFORM WITH THE COST PRINCIPLES SET FORTH IN AGENCY REGULATIONS?

[X] YES [ ] NO *(If no, explain on reverse or separate page)*

See Reverse for Instructions and Footnotes OPTIONAL FORM 60 (10-71)

COST ESTIMATE FOR
ORIENTED CORE ON ILLINOIS BASIN NO. 1
(JENKINS NO. 1 SIMPSON)

Rig cost (8 days @ $3,000/day)	$ 24,000	
Coring	24,210	
Logging	18,255	
Gordon Jenkins	9,000	
Subtotal		$ 75,465
Material handling @1.3%		981
Fee @ 3%		2,293
TOTAL		$ 78,739

ESTIMATED CORING COSTS - ILLINOIS WELL

Regular coring - 420 ft @ $16/ft	$ 6,720	
Mileage, 2 trucks x 400 miles @ $0.75/mile	600	
Engineering, 2 men x 8 days @ $225/day	3,600	
Per diem, 2 men x 8 days @ $45/day	720	
Orientation adapter, 420 ft @ $7.50/ft	3,150	
Plastic sleeve, 420 ft @ $5/ft	2,100	
Plastic caps, 160 @ $3 each	480	
Total regular coring		$ 17,370
Orientation costs:		
Equipment rental, 8 days @ $300/day	2,400	
Core orientation, 8 cores @ $150/core	1,200	
Monal collar rental, 8 days @ $100/day	800	
Loss-in-hole coverage for collar, 8 days @ $15/day	360	
Engineer, 8 days @ $225/day	1,800	
Per diem, 8 days @ $45/day	360	
Mileage, 400 miles @ $0.40/mile	160	
Total orientation costs		$ 6,840
TOTAL ESTIMATED CORING COST		$ 24,210*

*NOTE: 1 bit damaged, cost of salvage could be approximately $3,000 (50% of bit cost)

ILLINOIS SCHLUMBERGER LOGGING

ILLINOIS WELL OPEN-HOLE LOGGING - ESTIMATED COSTS

Tool protection charges, 9 x $35		$ 315
Service charge		1,125
Compensated neutron (CNL)		
Depth 5,400 ft @ $0.27/ft	$ 1,458	
Operation 5,400-1,000 ft @ $0.26/ft	1,144	
		2,602
Gamma ray		
Depth 5,400 ft @ $0.07/ft	378	
Operation 5,400-1,000 ft @ $0.06/ft	264	
		642
Formation density compensated (FDC)		
Depth 5,400 ft @ $0.24/ft	1,296	
Operation 5,400-1,000 ft @ $0.22/ft	968	
		2,264
Caliper		
Depth 5,400 ft @ $0.21/ft	1,134	
Operation 5,400-1,000 ft @ $0.19/ft	836	
		1,970
Dual induction laterolog (DIL)		
Depth 5,400 ft @ $0.25/ft	1,350	
Operation 5,400-1,000 ft @ $0.23/ft	1,102	
		2,362
Sonic - BHC		
Depth 5,400 ft @ $0.25/ft	1,350	
Operation 5,400-1,000 ft @ $0.23/ft	1,012	
		2,362
Variable Density		
Operation 5,400-1,000 ft @ $0.23/ft		1,242
Fracture identification log		
Depth 5,400 ft @ $0.27/ft	1,458	
Operation 5,400-1,000 ft @ $0.27/ft	1,188	
		2,646
Engineer, 2 days @ $200/day		400
Mileage, 500 miles @ $0.65/mile		325
TOTAL ESTIMATED LOGGING		$ 18,255

GRUY FEDERAL, INC.

July 10, 1979

Mr. Gordon T. Jenkins
Fairfield, Illinois

Re: Jenkins No. 1 Simpson Well
Section 17, T-3-S, R-8-E
Wayne County, Illinois

This letter, if accepted by you and two fully executed copies thereof are returned to us by July 31, 1979, shall constitute an agreement between Gordon T. Jenkins ("Jenkins") and Gruy Federal, Inc. ("Gruy") as follows:

I.

A. Gruy is a party to a contract with the Department of Energy, Washington D. C. ("DOE") Contract No. DE-AC05-79MC98382 to carry out a program for the coring and logging of a number of wells in the Appalachian, Illinois and Michigan basins in an attempt to define further the Devonian Shale as an unconventional energy source. Attached hereto as Exhibit "A" is a summary of the General Provisions to which Gruy and all of its subcontractors are bound.

B. (1) Jenkins has advised he plans to commence or cause to be commenced, in or before August, 1979, the actual drilling of a test well from a location approximately 330 feet from the west line and 330 feet from the south line of Section 17, Township 3S, Range 8E, Wayne County, Illinois, and thereafter to continue the drilling of said test well with due diligence, dispatch and in a workmanlike manner to the depth of:

(1) 5,500 feet or

(2) thru the Dutch Creek formation, or

(3) to a depth at which there is encountered lost circulation, mechanical failures (including getting stuck in the hole) or other abnormal conditions which make further drilling impracticable after a good faith effort has been made to overcome same,

whichever depth is the lesser.

(2) Jenkins represents that he has a title approved valid existing oil, gas and mineral lease or leases covering the drillsite tract.

II.

A. Jenkins wishes to cooperate with Gruy in this Devonian shale evaluation effort. Jenkins and Gruy agree as follows:

1. Gruy's coring and logging program of the kerogen-bearing Devonian shale section, estimated top 4,930± feet, is located up the hole from the total depth to which Jenkins plans to drill the subject well through the Dutch Creek (Approximate top 5,408).

2. Gruy will provide experienced engineering and/or drilling personnel to work with Jenkins' technical and operating staff in the planning and execution phases of the coring and logging program. Gruy will be responsible for designating the coring and logging points and intervals. Gruy will designate Jenkins as field operator (subcontractor) for purposes of well operations during the coring and logging program, with Jenkins providing normal field and well supervision.

B. Jenkins, at his sole cost, risk and expense, shall timely commence or cause to be commenced the actual drilling of the subject well and, thereafter,

and continue the drilling of same to the designated coring point. Thereafter, commencing at this coring point, Jenkins, acting for and in behalf of Gruy, will make a good faith effort to carry out the planned coring and logging program in the manner specified in "C" below:

C. 1. As consideration for Jenkins making his well and services available for the coring and logging program, Gruy will pay as an inconvenience premium to Jenkins, 120% of all costs attributable to the coring and logging of the well, including charges for rig time, those incurred for drilling approximately 30-feet of rat hole to accomodate the logging tools, for any additional mud or chemicals required for the coring and logging program and the charges of the coring and logging service companies.

2. Subject to Gruy (DOE) approval, Jenkins shall select and make available at location competently qualified coring and logging service companies to carry out the coring and logging program.

3. Jenkins will be under no obligation, other than to make a good-faith effort to carry out the designated coring and logging program in accordance with established oil field procedures.

4. Gruy shall have the right at anytime to direct Jenkins to cease the coring or logging program whether any one, more or no cores have been taken, or logs run for reasons of borehole conditions, state of fluids or otherwise.

5. Once the coring and/or logging operations have been completed or terminated in the manner contemplated herein, Jenkins shall assume responsibility for all further operations and costs of the well, including operations for drilling, testing, completing, or plugging and abandoning of the well.

6. If, for any reason other than Jenkins' gross negligence, the coring and logging operations cause the hole to be junked or lost, Gruy shall pay Jenkins the sum of $110,000.00 as liquidated damages for the loss of the hole, which said sum shall be the limit of Gruy's liability to Jenkins for such loss.

III.

Neither Gruy (or DOE) shall have any interest in the well (except for any material purchased by Gruy for the account of DOE, which is placed in or on the well) or in the oil and gas lease, minerals, production, or energy recovered from the well, or in any surface or sub-surface equipment therein or thereon purchased by the operator.

IV.

No liability shall be imposed upon Jenkins for failure to drill the well as provided for herein; however, upon failure to do so this agreement shall become null and void and all liabilities and obligations hereunder terminated.

V.

Jenkins agrees to promptly furnish Gruy with an AFE for the costs of drilling the proposed test well with a well program and a copy of his contract with the drilling contractor. Jenkins has advised Gruy that his well program does not contemplate the use of blowout preventors; that he and his consulting

engineer feel that same is not necessary in the immediate area of the Illinois Basin, and it is customary with industry not to install preventors.

VII.

A. Jenkins shall obtain, and at all times while the operations are being carried on hereunder, maintain in effect, insurance by reliable and responsible insurance company or companies as to the following risks:

1. Workman's Compensation insurance to fully comply with the State of Illinois.

2. Employer's liability insurance with limits of not less than $100,000 per employee, and $250,000 per accident.

3. Automobile public liability insurance with limits of not less than $100,000 per person and $300,00 per accident and

4. General public liability insurance with limits of not less than $100,000 per person and $200,000 per accident, and general property damage insurance with limits of no less than $200,000.

B. Gruy advises Jenkins that it carries general liability insurance in the amount of $20MM, Gruy agrees that with the limits of liability noted here and in Paragraph II-C (6) hereof, it will indemnify Jenkins against liability for damages resulting from, or arising out of the coring and logging programs.

VIII.

The rights and liabilities of the parties, hereto, shall be individual and not joint or collective. Each party, hereto, shall be responsible for its share of obligations as set out herein, and shall be liable only for its share of the costs incurred with respect to the property as provided herefore, herein.

IX.

Whenever notice is required or permitted under the terms of this agreement, same shall be in writing and shall be deemed to have been given as sent by telegram, registered mail or delivered by hand addressed to the respective parties as follows:

IF TO JENKINS:	Mr. Gordon T. Jenkins Box 280 Fairfield, Illinois 62837
Business Phone:	(618) 842-6311
Residence Phone:	(618) 842-9839
IF TO GRUY:	Gruy Federal, Inc. 1335 Forest Green Drive Coraopolis, PA. 15108
Attention:	Mr. Robert B. Steffy
Business Phone:	(412) 262-1071
Residence Phone:	(412) 364-0438

GRUY FEDERAL, INC.

This agreement shall be binding on the heirs, successors and assigns of the parties, hereto, subject to approval of the Department of Energy.

If the above conforms to your understanding of the agreement, please sign and return the copies requested in the manner specified above.

Yours very truly,

GRUY FEDERAL, INC.

By James H. Hartsock

James H. Hartsock
Vice President, Engineering

ACCEPTED AND AGREED TO THIS
26th day of July, 1979

Gordon T. Jenkins

Gordon T. Jenkins

EHD:JHH:cas