

SIDE ONE

STATE CORPORATION COMMISSION OF KANSAS
OIL & GAS CONSERVATION DIVISION
WELL COMPLETION FORM
ACO-1 WELL HISTORY
DESCRIPTION OF WELL AND LEASE

Operator: License # 05398
Name: ARCO Oil & Gas Company
Address Box 1610
Midland, TX 79702
City/State/Zip
Purchaser: NA
Operator Contact Person: Ken W. Gosnell
Phone (915) 688-5672

Contractor: Name: H-30 Drilling Co.
License: _____

Wellsite Geologist: Ben Francka

Designate Type of Completion
 New Well Re-Entry Workover
 Oil SWD Temp. Abd.
 Gas Inj Delayed Comp.
 Dry Other (Core, Water Supply, etc.)

If OWO: old well info as follows:
Operator: _____
Well Name: _____
Comp. Date _____ Old Total Depth _____

Drilling Method:
 Mud Rotary Air Rotary Cable
11-29-90 12-12-90 12-14-90
Spud Date Date Reached TD Completion Date

API NO. 15- 067-21108-0000
County Grant
NE SW SE Sec. 20 Twp. 29 Rge. 38 East West
982.3 Ft. North from Southeast Corner of Section
1320 Ft. West from Southeast Corner of Section
(NOTE: Locate well in section plat below.)
Lease Name E.G. Biernecki "A" Well # 1
Field Name Wildcat
Producing Formation NA
Elevation: Ground 3129 KB 3140
Total Depth 5800 PBSD _____

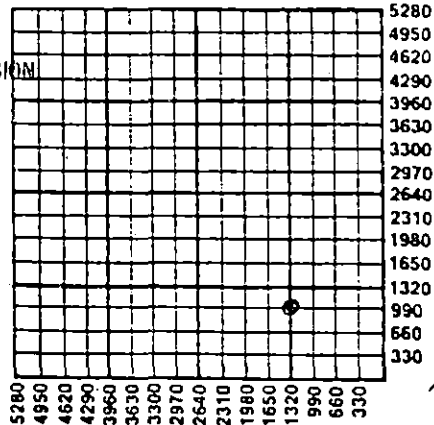
RECEIVED

STATE CORPORATION COMMISSION

MAY 13 1991

5-13-1991

CONSERVATION DIVISION
Wichita, Kansas



API 15-067-21108-0000

Amount of Surface Pipe Set and Cemented at 1800 Feet
Multiple Stage Cementing Collar Used? Yes No
If yes, show depth set _____ Feet
If Alternate II completion, cement circulated from _____
feet depth to _____ w/ _____ sx cmt.

INSTRUCTIONS: This form shall be completed in triplicate and filed with the Kansas Corporation Commission, 200 Colorado Derby Building, Wichita, Kansas 67202, within 120 days of the spud date of any well. Rule 82-3-130, 82-3-107 and 82-3-106 apply. Information on side two of this form will be held confidential for a period of 12 months if requested in writing and submitted with the form. See rule 82-3-107 for confidentiality in excess of 12 months. One copy of all wireline logs and drillers time log shall be attached with this form. ALL CEMENTING TICKETS MUST BE ATTACHED. Submit CP-4 form with all plugged wells. Submit CP-111 form with all temporarily abandoned wells. Any recompletion, workover or conversion of a well requires filing of ACO-2 within 120 days from commencement date of such work.

All requirements of the statutes, rules and regulations promulgated to regulate the oil and gas industry have been fully complied with and the statements herein are complete and correct to the best of my knowledge.

Signature Ken W. Gosnell
Title Regulatory Coordinator Date 5-6-91

Subscribed and sworn to before me this 6th day of May, 19 91.
Notary Public Karla D. Thompson
Notary Public, State of Texas
Date Commission Expires 11-2-92

K.C.C. OFFICE USE ONLY
F Letter of Confidentiality Attached
C Wireline Log Received
C Drillers Timelog Received
Distribution
 KCC SWD/Rep NGPA
 KGS Plug Other (Specify)

SIDE TWO

Operator Name ARCO Oil & Gas Company Lease Name E.G. Biernecki "A" Well # 1
 Sec. 20 Twp. 29S Rge. 38 East County Grant
 West

INSTRUCTIONS: Show important tops and base of formations penetrated. Detail all cores. Report all drill stem tests giving interval tested, time tool open and closed, flowing and shut-in pressures, whether shut-in pressure reached static level, hydrostatic pressures, bottom hole temperature, fluid recovery, and flow rates if gas to surface during test. Attach extra sheet if more space is needed. Attach copy of log.

Drill Stem Tests Taken (Attach Additional Sheets.)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Formation Name	<input checked="" type="checkbox"/> Log	<input type="checkbox"/> Sample
Samples Sent to Geological Survey	<input type="checkbox"/> Yes <input type="checkbox"/> No	Chase	2346	Top
Cores Taken	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Council Grove	2661	
Electric Log Run (Submit Copy.)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Admire	2933	
		Shawnee	3316	
		Heebner	3802	
		Lansing	3903	
		Marmaton	4474	
		Atoka	5033	
		Morrow	5161	
		Lo Morrow	5470	
		Chester	5493	
		St. Louis	5648	

Core #1 5620-5659
Core #2 5659-5686

CASING RECORD <input type="checkbox"/> New <input type="checkbox"/> Used							
Report all strings set-conductor, surface, intermediate, production, etc.							
Purpose of String	Size Hole Drilled	Size Casing Set (In O.D.)	Weight Lbs./Ft.	Setting Depth	Type of Cement	# Sacks Used	Type and Percent Additives
Conductor		16"		45	4 yds grout		
Surface	12 1/4	8 5/8	24	1800	Halco lite	750	1/4# FC
					Prem Plus	150	2%CC+1/2#FC
PERFORATION RECORD				Acid, Fracture, Shot, Cement Squeeze Record			
Shots Per Foot	Specify Footage of Each Interval Perforated			(Amount and Kind of Material Used) Depth			
				100 sx H		4859-5166	
				100 sx C		2431-2673	
				100 sx C		2109-2364	
				50 sx C		1617-1802	
				150 sx C		190-744	
TUBING RECORD				Liner Run <input type="checkbox"/> Yes <input type="checkbox"/> No			
	Size	Set At	Packer At	12 sx 0-40			
Date of First Production	Producing Method <input type="checkbox"/> Flowing <input type="checkbox"/> Pumping <input type="checkbox"/> Gas Lift <input type="checkbox"/> Other (Explain)						
Estimated Production Per 24 Hours	Oil	Bbls.	Gas	Mcf	Water	Bbls.	Gas-Oil Ratio Gravity

Disposition of Gas: Vented Sold Used on Lease (If vented, submit ACO-18.)

METHOD OF COMPLETION: Open Hole Perforation Dually Completed Commingled Other (Specify) _____

Production Interval _____

WELL DATA

FIELD _____ SEC. _____ TWP. _____ RNG. _____ COUNTY Grant STATE KS.

FORMATION NAME _____ TYPE _____

FORMATION THICKNESS _____ FROM _____ TO _____

INITIAL PROD. OIL _____ BPD. WATER _____ BPD. GAS _____ MCFD _____

PRESENT PROD. OIL _____ BPD. WATER _____ BPD. GAS _____ MCFD _____

COMPLETION DATE _____ MUD TYPE _____ MUD WT. 9.0

PACKER TYPE _____ SET AT _____

BOTTOM HOLE TEMP _____ PRESSURE _____

MISC. DATA _____ TOTAL DEPTH 5802'

	NEW USED	WEIGHT	SIZE	FROM	TO	MAXIMUM PSI ALLOWABLE
CASING	<u>DP</u>	<u>16.6</u>	<u>7/8</u>	<u>K.B.</u>	<u>5166'</u>	
LINER						
TUBING						
OPEN HOLE						SHOTS/FT.
PERFORATIONS						
PERFORATIONS						
PERFORATIONS						

JOB DATA

CALLER OUT	ON LOCATION	JOB STARTED	JOB COMPLETED
DATE <u>12-13-90</u>	DATE <u>12-13-90</u>	DATE <u>12-4-90</u>	DATE <u>12-4-90</u>
TIME <u>11:30</u>	TIME <u>22:00</u>	TIME <u>08:10</u>	TIME <u>12:15</u>

TOOLS AND ACCESSORIES

TYPE AND SIZE	QTY.	MAKE
FLOAT COLLAR		
FLOAT SHOE		
GUIDE SHOE		
CENTRALIZERS		
BOTTOM PLUG		
TOP PLUG		
HEAD		
PACKER		
OTHER		

PERSONNEL AND SERVICE UNITS

NAME	UNIT NO. & TYPE	LOCATION
<u>C. Davis</u>	<u>71322</u> <u>37158</u> <u>PRUD</u>	<u>Liberal, KS.</u>
<u>T. Payne</u>	<u>11210</u> <u>15476</u> <u>RCM</u>	<u>" "</u>
<u>H. Meyer</u>	<u>59018</u> <u>Bulk</u> <u>4734</u>	<u>Hwy 10, KS.</u>
<u>G. C. Powell</u>	<u>09976</u> <u>Bulk</u> <u>5303</u>	<u>" "</u>

MATERIALS

TREAT. FLUID _____ DENSITY _____ LB/GAL-API

DISPL. FLUID _____ DENSITY _____ LB/GAL-API

PROP. TYPE _____ SIZE _____ LB.

PROP. TYPE _____ SIZE _____

ACID TYPE _____ GAL _____

ACID TYPE _____ GAL _____

ACID TYPE _____ GAL _____

SURFACTANT TYPE _____ GAL _____

NE AGENT TYPE _____ GAL _____

FLUID LOSS ADD. TYPE _____ GAL-LB _____

GELLING AGENT TYPE _____ GAL-LB _____

FRIC. RED. AGENT TYPE _____ GAL-LB _____

BREAKER TYPE _____ GAL-LB _____

BLOCKING AGENT TYPE _____ GAL-LB _____

PERFRAC BALLS TYPE _____ QTY. _____

OTHER _____

OTHER _____

RECEIVED
STATE CORPORATION COMMISSION

MAY 13 1991

CONSERVATION DIVISION
Wichita, Kansas

DEPARTMENT CONSERVATION

DESCRIPTION OF JOB P.T.A. 1005540 - 5166' 1005550 2207'
1005550 - 27 1/4", 505550 - 1460', 1505550 - 7 1/4",
10:15 to 60'

JOB DONE THRU: TUBING DP, CASING ANNULUS TBG/ANN.

CUSTOMER REPRESENTATIVE X

HALLIBURTON OPERATOR C. E. Darr

COPIES REQUESTED _____

CEMENT DATA

STAGE	NUMBER OF SACKS	CEMENT	BRAND	BULK SACKED	ADDITIVES	YIELD CU.FT./SK.	MIXED LBS./GAL.
<u>1</u>	<u>100</u>	<u>H</u>		<u>B</u>		<u>1.88</u>	<u>15.6</u>
<u>2</u>	<u>440</u>	<u>C</u>		<u>B</u>		<u>1.32</u>	<u>11.8</u>

PRESSURES IN PSI

SUMMARY

VOLUMES

CIRCULATING _____ DISPLACEMENT _____ PRESLUSH: BBL-GAL _____ TYPE _____

BREAKDOWN _____ MAXIMUM _____ LOAD & BKDN: BBL-GAL _____ PAD: BBL-GAL _____

AVERAGE _____ FRACTURE GRADIENT _____ TREATMENT: BBL-GAL _____ DISPL: BBL-GAL _____

SHUT-IN: INSTANT _____ 5-MIN. _____ 15-MIN. _____ CEMENT SLURRY: BBL-GAL 125

HYDRAULIC HORSEPOWER _____ TOTAL VOLUME: BBL-GAL _____

ORDERED _____ AVAILABLE _____ USED _____ REMARKS _____

AVERAGE RATES IN BPM _____

TREATING _____ DISPL _____ OVERALL _____

CEMENT LEFT IN PIPE _____

FEET _____ REASON _____

DISTRICT Liberal, Ks.

DATE 12-13-70

TO: HALLIBURTON SERVICES YOU ARE HEREBY REQUESTED TO FURNISH EQUIPMENT AND SERVICEMEN TO DELIVER AND OPERATE THE SAME AS AN INDEPENDENT CONTRACTOR TO: Harco O. I. #602 (CUSTOMER) AND DELIVER AND SELL PRODUCTS, SUPPLIES, AND MATERIALS FOR THE PURPOSE OF SERVICING

WELL NO. #102 LEASE CG District: "D" SEC. _____ TWP. _____ RANGE _____

FIELD _____ COUNTY GRAVY STATE Ks. OWNED BY Some

THE FOLLOWING INFORMATION WAS FURNISHED BY THE CUSTOMER OR HIS AGENT

Table with columns: FORMATION NAME, TYPE, NEW USED, WEIGHT, SIZE, FROM, TO, MAX. ALLOW. P.S.I. Includes rows for CASING, LINER, TUBING, OPEN HOLE, PERFORATIONS.

PREVIOUS TREATMENT: DATE _____ TYPE _____ MATERIALS _____

TREATMENT INSTRUCTIONS: TREAT THRU TUBING ANNULUS CASING TUBING/ANNULUS HYDRAULIC HORSEPOWER ORDERED
D.P. 6" 1005K5 "H" at 5166'
2nd 1005K5 "C" at 2673' - 1005K5 "C" at 2361'
4th 505K5 "C" at 1802' - 5th 1505K5 "C" at 744' -
6th 105K5 "D" 60'

CUSTOMER OR HIS AGENT WARRANTS THE WELL IS IN PROPER CONDITION TO RECEIVE THE PRODUCTS, SUPPLIES, MATERIALS, AND SERVICES

- As consideration, the above-named Customer agrees THIS CONTRACT MUST BE SIGNED BEFORE WORK IS COMMENCED
a) To pay Halliburton in accord with the rates and terms stated in Halliburton's current price list...
b) To defend, indemnify, release and hold harmless Halliburton its divisions subsidiaries parent and affiliated companies...
c) That because of the uncertainty of variable well conditions and the necessity of relying on facts and supporting services furnished by others...
d) That Halliburton warrants only title to the products, supplies and materials and that the same are free from defects...
e) That Customer shall, at its risk and expense, attempt to recover any Halliburton equipment, tools or instruments which are lost in the well...
f) To waive the provisions of the Deceptive Trade Practices - Consumer Protection Act...
g) That this contract shall be governed by the law of the state where services are performed or materials are furnished...
h) That Halliburton shall not be bound by any changes or modifications in this contract except where such changes or modification is made in writing...

I HAVE READ AND UNDERSTAND THIS CONTRACT AND REPRESENT THAT I AM AUTHORIZED TO SIGN THE SAME AS CUSTOMER'S AGENT

SIGNED _____ CUSTOMER

DATE 12-13-70

TIME 2:30 A.M. P.M.

We certify that the Fair Labor Standards Act of 1938, as amended, has been complied with in the production of goods and/or with respect to services furnished under this contract.

CUSTOMER

HALLIBURTON SERVICES
JOB LOG

WF NO #1 LEASE EG Bernick, A" MET NO. 043023
CUSTOMER Acco Oil & Gas PAGE NO. 1
JOB TYPE P.T.A. ORIGINAL DATE 12-13-90

FORM 2013 R-2

CHART NO	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS		PRESSURE (PSI)		DESCRIPTION OF OPERATION AND MATERIALS
				T	C	TUBING	CASING	
	12:30							CALLING OUT
	02:00							on loc. Tel. H. w/ O.P.
1	01:08							Drill Pipe 2 5166' 100SKS "H" 1st Plug
2	01:10			1		3000		Press Test Lines
3	01:13	3	14	1		50		Pump H ₂ O spacer Ahead of Cement
4	01:15	3	21.72	1		50		Pump Cement
5	01:26	3	30	1		50		Pump H ₂ O spacer Behind Cement
6	01:27	3.5	64.6	17		100		Pump Mud Displacement
7	01:51			0				Shut Down - Knock Loose - Pull O.P.
								Drill Pipe 2 2673' 2nd Plug 100SKS
1	05:50	3	13.0	1		50		Pump H ₂ O spacer Ahead of Cement
2	05:55	3	23.5	1		50		Pump Cement
3	06:14	3	3.0	1		100		Pump spacer Behind Cement
4	06:15	4	24.0	1		150		Pump Mud Displacement
5	06:21			0				Shut Down - Knock Loose - Pull O.P.
								Drill Pipe 2 2364' 3rd Plug 100
1	07:19	5	29.0	2		200		Pump H ₂ O spacer Ahead of Cement
2	07:25	4	23.5	1		150		Pump Cement
3	07:31	3	3.0	1		150		Pump spacer Behind Cement
4	07:33	4	24.0	1		200		Pump Mud Displacement
5	07:40			0				Shut Down - Knock Loose - Pull O.P.
								Drill Pipe 2 1902' 4th Plug 50 SKS
1	08:30	2.5	9.0	1		100		Pump H ₂ O spacer Ahead of Cement
2	08:34	3	11.7	1		150		Pump Cement
3	08:38	3	3.0	1		100		Pump spacer Behind Cement
4	08:39	3	19.9	1		100		Pump Mud Displacement
5	08:45			0				Shut Down - Knock Loose - Pull O.P.
								Drill Pipe 2 744' 5th Plug 150s
1	09:20	2.0	6.0	1		50		Pump H ₂ O spacer Ahead of Cement
2	09:23	5	35.2	1		100		Pump Cement
3	09:31	3	2.0	1		100		Pump spacer Behind Cement
4	09:32			0				Shut Down - Knock Loose - Pull O.P.
								Drill Pipe 2 60' 6th Plug 1.
1	11:15	1.0	2.5	1		0		Pump Cement
2	11:20			0				Shut Down - Knock Loose - Pull O.P.
3	11:35	1.0	9.0	1		0		Shut Down - Knock Loose - Pull O.P.

RECEIVED
BY
MAY 13 1991
CONSERVATION DIVISION
Wichita, Kansas

Thanks C. Faust & Crew

CUSTOMER

WORK ORDER CONTRACT
AND PRE-TREATMENT DATA

ORIGINAL

ATTACH TO
INVOICE & TICKET NO. 043161

DISTRICT Liberal Ks

DATE 11-30-90

TO: HALLIBURTON SERVICES

YOU ARE HEREBY REQUESTED TO FURNISH EQUIPMENT AND SERVICEMEN TO DELIVER AND OPER

THE SAME AS AN INDEPENDENT CONTRACTOR TO: Arco Oil & Gas

(CUSTOMER)

AND DELIVER AND SELL PRODUCTS, SUPPLIES, AND MATERIALS FOR THE PURPOSE OF SERVICING

WELL NO. A-1

LEASE E.C. Bierneck

SEC. 20

TWP. 29S

RANGE 3d

FIELD Saw Wylusses

COUNTY Grant

STATE Ks

OWNED BY Some

THE FOLLOWING INFORMATION WAS FURNISHED BY THE CUSTOMER OR HIS AGENT

FORMATION NAME	TYPE	NEW USED	WEIGHT	SIZE	FROM	TO	MAX. A P.S.
FORMATION THICKNESS	FROM TO						
PACKER TYPE	SET AT						
TOTAL DEPTH	MUD WEIGHT						
BORE HOLE							
INITIAL PROD.	OIL BPD, H ₂ O BPD, GAS MCF						
PRESENT PROD.	OIL BPD, H ₂ O BPD, GAS MCF						
CASING		N	24	8 5/8	0	1803	
LINER							
TUBING							
OPEN HOLE		RECEIVED					SHOT
PERFORATIONS		STATE CORPORATION COMMISSION					
PERFORATIONS		MAY 13 1991					
PERFORATIONS							

PREVIOUS TREATMENT: DATE TYPE

CONSERVATION DIVISION

MATERIALS

TREATMENT INSTRUCTIONS: TREAT THRU TUBING ANNULUS CASING TUBING/ANNULUS HYDRAULIC HORSEPOWER ORDERED

Cement 8 5/8 Surface

CUSTOMER OR HIS AGENT WARRANTS THE WELL IS IN PROPER CONDITION TO RECEIVE THE PRODUCTS, SUPPLIES, MATERIALS, AND SERVICES

As consideration, the above-named Customer agrees:

THIS CONTRACT MUST BE SIGNED BEFORE WORK IS COMMENCED

- a) To pay Halliburton in accord with the rates and terms stated in Halliburton's current price list. Invoices are payable NET by the 20th of the following month after date of invoice. Upon Customer's payment of Customer's account by the last day of the month following the month in which the invoice is dated, Customer agrees to pay interest thereon after default at the highest lawful rate but never to exceed 18% per annum. In the event it becomes necessary to employ attorneys to enforce collection of said account, Customer agrees to pay all collection costs and attorney's fees of 20% of the amount of the unpaid account.
- b) To defend, indemnify, release and hold harmless Halliburton, its divisions, subsidiaries, parent and affiliated companies and the officers, directors, employees, agents and servants of all of them from any claims, liability, expenses, attorneys fees, and costs of defense to the extent permitted by law for:
 1. Damage to property owned by, in the possession of, or leased by Customer, and/or the well owner (if different from Customer) including, but not limited to, surface and subsurface. "well owner" shall include working and royalty interest owners.
 2. Reservoir, formation, or well loss or damage, subsurface trespass or any action in the nature thereof.
 3. Personal injury or death or property damage (including, but not limited to, damage to the reservoir formation or well, or any damages whatsoever, growing out of or in any way connected with, pollution, subsurface pressure, losing control of the well and/or a well blowout or the use of radioactive material.
- c) The defense, indemnity, release and hold harmless obligations of Customer provided for in this Section b) and Section c) below shall apply to claims or liability even if caused or contributed to by negligence, strict liability, or the unseaworthiness of any vessel owned, operated, or furnished by Halliburton or any defect in the date, products, supplies, materials, or equipment of Halliburton in the preparation, design, manufacture, distribution, or marketing thereof, or from a failure to warn any person of such defect. Such defense, indemnity, release and hold harmless obligations shall not apply where the claims or liability are caused by the gross negligence or willful misconduct of Halliburton. The term "Halliburton" as used in said Sections b) and c) shall mean Halliburton, its subsidiaries, parent and affiliated companies, and the officers, directors, employees, agents and servants of all of them.
- d) That because of the uncertainty of variable well conditions and the necessity of relying on facts and supporting services furnished by others, Halliburton is unable to guarantee the effectiveness of its supplies or materials, nor the results of any treatment or service, nor the accuracy of any chart interpretation, research analysis, job recommendation or other data furnished by Halliburton. It will use its best efforts in gathering such information and their best judgment in interpreting it, but Customer agrees that Halliburton shall not be liable for and Customer shall indemnify for any damages arising from the use of such information.
- e) That Halliburton warrants only title to the products, supplies and materials and that the same are free from defects in workmanship and materials. THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE WHICH EXTEND BEYOND THOSE STATED IN THE IMMEDIATELY PRECEDING SENTENCE. Halliburton's liability and Customer's exclusion of cause of action (whether in contract, tort, breach of warranty or otherwise) arising out of the sale or use of any products, supplies or materials is expressly limited to the replacement of such products or materials on their return to Halliburton or, at Halliburton's option, to the allowance to the Customer of credit for the cost of such items. In no event shall Halliburton be liable for specific, punitive or consequential damages.
- f) That Customer shall, at its risk and expense, attempt to recover any Halliburton equipment, tools or instruments which are lost in the well and if such equipment, tools or instruments are not recovered, shall pay Halliburton its replacement cost unless such loss is due to the sole negligence of Halliburton. If Halliburton equipment, tools or instruments are damaged in the well, Customer shall, at the lesser of its replacement cost or the cost of repairs unless such damage is caused by the sole negligence of Halliburton. In the case of equipment, tools or instruments for marine or offshore use, in addition to the foregoing, be fully responsible for loss of or damage to any of Halliburton's equipment, tools or instruments which occurs at any time after delivery to Customer and returned to the landing, unless such loss or damage is caused by the sole negligence of Halliburton.
- g) To waive the provisions of the Deceptive Trade Practices - Consumer Protection Act, to the extent permitted by law.
- h) That this contract shall be governed by the law of the state where services are performed or materials are furnished.
- i) That Halliburton shall not be bound by any changes or modifications in this contract, except where such change or modification is made in writing by a duly authorized executive officer of Halliburton.

I HAVE READ AND UNDERSTAND THIS CONTRACT AND REPRESENT THAT I AM AUTHORIZED TO SIGN THE SAME AS CUSTOMER'S AGENT

SIGNED

DATE

11-30-90

TIME

3:00 P.M.

We certify that the Fair Labor Standards Act of 1938, as amended, has been complied with in the production of goods and/or with respect to services furnished under this contract.

CUSTOMER



JOB SUMMARY

HALLIBURTON DIVISION

ONE

HALLIBURTON LOCATION

Liberal Ms

ORIGINAL

BILLED ON TICKET NO. 043161

WELL DATA

FIELD SW Ulysses SEC. 20 TWP. 29S RNG. 38W COUNTY Grant STATE KS

FORMATION NAME	TYPE	NEW USED	WEIGHT	SIZE	FROM	TO	MAXIMUM PSI ALLOWABLE
CASING		N	24	8 7/8	0	1803	
LINER							
TUBING							
OPEN HOLE							SHOTS/FT.
PERFORATIONS							
PERFORATIONS							
PERFORATIONS							

INITIAL PROD: OIL _____ BPD. WATER _____ BPD. GAS _____ MCFD
 PRESENT PROD: OIL _____ BPD. WATER _____ BPD. GAS _____ MCFD
 COMPLETION DATE _____ MUD TYPE _____ MUD WT. _____
 PACKER TYPE _____ SET AT _____
 BOTTOM HOLE TEMP. _____ PRESSURE _____
 MISC. DATA _____ TOTAL DEPTH _____

JOB DATA

CALLED OUT	ON LOCATION	JOB STARTED	JOB COMPLETED
DATE <u>11-30</u>	DATE <u>11-30</u>	DATE <u>11-30</u>	DATE <u>11-30</u>
TIME <u>1200</u>	TIME <u>1400</u>	TIME <u>2114</u>	TIME <u>2300</u>

PERSONNEL AND SERVICE UNITS

NAME	UNIT NO. & TYPE	LOCATION
<u>L. Smith</u>	<u>40048</u>	<u>Liberal Ms</u>
	<u>C4463</u>	
<u>B. Youngs</u>	<u>7181 P</u>	
	<u>D4472</u>	
<u>G. Evans</u>	<u>0525</u>	<u>Horton K.</u>
	<u>E0233</u>	
<u>P. Cline</u>	<u>3842</u>	
	<u>B4372</u>	
<u>P. Ponderuis</u>	<u>1539</u>	
	<u>E0825</u>	

TOOLS AND ACCESSORIES

TYPE AND SIZE	QTY.	MAKE
FLOAT COLLAR		
FLOAT SHOE	<u>Comp</u>	
GUIDE SHOE		
CENTRALIZERS		
BOTTOM FLUG		
TOP PLUG	<u>8 7/8 1</u>	<u>Howco</u>
HEAD	<u>1 1</u>	<u>"</u>
PACKER		
OTHER		

MATERIALS

TREAT. FLUID _____ DENSITY _____ LB/GAL. API
 DISPL. FLUID _____ DENSITY _____ LB/GAL. API
 PROP. TYPE _____ SIZE _____ LB.
 ACID TYPE _____ GAL. _____ %
 ACID TYPE _____ GAL. _____ %
 ACID TYPE _____ GAL. _____ %
 SURFACTANT TYPE _____ GAL. _____
 NE AGENT TYPE _____ GAL. _____ IN.
 FLUID LOSS ADD. TYPE _____ GAL.-LB. _____ IN.
 GELLING AGENT TYPE _____ GAL.-LB. _____ IN.
 FRIC. RED. AGENT TYPE _____ GAL.-LB. _____ IN.
 BREAKER TYPE _____ GAL.-LB. _____ IN.
 BLOCKING AGENT TYPE _____ GAL.-LB. _____
 PERFPAC BALLS TYPE _____ QTY. _____
 OTHER _____

RECEIVED
STATE CORPORATION COMMISSION

MAY 13 1991

CONSERVATION DIVISION
Wichita, Kansas

DEPARTMENT Com
 DESCRIPTION OF JOB Cement 8 7/8 Surface Pipe
 JOB DONE THRU: TUBING CASING ANNULUS TBG/ANN.
 CUSTOMER REPRESENTATIVE X Ad
 HALLIBURTON OPERATOR Smith COPIES REQUESTED _____

CEMENT DATA

STAGE	NUMBER OF SACKS	CEMENT	BRAND	BULK SACKED	ADDITIVES	YIELD CU.FT./SK.	MIXED LBS./GAL.
	<u>750</u>	<u>6 7/8 Poz Premium Plus</u>	<u>B</u>	<u>1/4 Floccle</u>		<u>1.84</u>	<u>12.7</u>
	<u>150</u>	<u>Premium Plus</u>	<u>B</u>	<u>270 cc 1/4 Floccle</u>		<u>1.32</u>	<u>14.1</u>

PRESSURES IN PSI

SUMMARY

VOLUMES

CIRCULATING _____ DISPLACEMENT _____ PRESLUSH: BBL-GAL. 20 TYPE Water
 BREAKDOWN _____ MAXIMUM _____ LOAD & BKON: BBL-GAL. _____ PAD: BBL-GAL. _____
 AVERAGE _____ FRACTURE GRADIENT _____ TREATMENT: BBL-GAL. _____ DISPL: BBL-GAL. 110
 SHUT-IN: INSTANT _____ 5-MIN. _____ 15-MIN. _____ CEMENT SLURRY: BBL-GAL. 245-35
 ORDERED _____ AVAILABLE _____ USED _____ TOTAL VOLUME: BBL-GAL. _____
 TREATING _____ DISPL. _____ OVERALL _____ CEMENT LEFT IN PIPE _____
 SPEED 44.26 REASON Shoe Jt.

HALLIBURTON SERVICES
JOB LOG

WELL NO. A-1 LEASE B. Bierbeck TICKET NO. 043

FLUID Acid Oil + Gas ORIGINAL PAGE NO. 1

FORM 2013 R-2

JOB TYPE Cement 2 3/8 Surface DATE 11-30-

CHART NO.	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS		PRESSURE (PSI)		DESCRIPTION OF OPERATION AND
				T	C	TUBING	CASING	
	1200							Called out
	1400							on loc - Making Bit 7
	1700							Call w/drill pipe
	1830							Start casing
	1930							B.C on loc
	2055							Head on & circulating
	2110							Have Safety Meeting
	2114						2700	Pressure Test Lines
	2117	8	20				300	Pump Winters
	2120	8	35				300	Pump Cement
	2154		280					Shut Down Release
	2156	4					200	Start Displacement
	2211	4	60				300	Circulating Good
	2219	2	90				400	Slow Rate
	2227	1	106				500	Slow Rate
	2230		113				1200	Landed Plug + wa
	2235							Pressure Holding - Re
	X							Float Held
	2300							Job complete
								Circulated 52 BB

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CONSERVATION DIVISION
Wichita, Kansas

Thank you

Larry Smith

CUSTOMER

Geoscience Services

FINAL REPORT

Routine Core Analysis

ARCO OIL & GAS COMPANY

**ARCO Biernecki "A" No. 1 Well
Grant County, Kansas**

TTGS File No. 5819

Prepared for:

**ARCO Oil & Gas Company
600 N. Marienfeld
Midland, Texas 79701**

Prepared by:

**TerraTek Geoscience Services
University Research Park
360 Wakara Way
Salt Lake City, Utah 84108**

January 1991

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Wichita, Kansas

Geoscience Services

January 14, 1991

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ARCO OIL & GAS COMPANY
600 N. MARIENFELD
MIDLAND, TX 79701

MAY 13 1991

CONSERVATION DIVISION
Wichita, Kansas

ATTN: MR. BILL GIBBS M10-28

SUBJECT: ROUTINE CORE ANALYSIS RESULTS; ARCO BIERNECKI "A" NO. 1
GRANT COUNTY, KANSAS; TTGS FILE NO. 5819

Dear Mr. Gibbs:

Diamond coring equipment and water base mud were used in the Arco Biernecki "A" No. 1 Well to obtain four-inch diameter cores from the intervals and formation listed on the enclosed Core Interval Summary. A representative of TerraTek Geoscience Services was at wellsite to retrieve the cores and prepare them for transport to the TerraTek laboratory in Dallas, Texas for routine core analysis.

Upon arrival in the laboratory, a core gamma log was recorded. One-inch diameter plug samples were drilled from each foot of core using water as coolant. Residual fluids were removed and measured by means of the solvent distillation extraction technique using toluene. Porosities were determined by measuring grain volumes in a helium expansion porosimeter by Boyle's Law and bulk volumes by mercury displacement. Permeabilities to nitrogen gas were measured in a Hassler sleeve using an orifice-equipped pressure transducer to monitor downstream flow.

The results of the measurements described above are presented following the Core Interval Summary. A plot of the total gamma ray activity appears on the enclosed Teklog, along with plots of grain density, horizontal permeability, porosity and residual fluid saturations. The results are then tabulated on the pages following the Teklog. A permeability versus porosity crossplot is included.

We sincerely appreciate this opportunity to be of service and look forward to working with you again on future projects.

Sincerely,

Kevin R. Francis for

Michael F. McAuley
Laboratory Manager,
Technical Sales Representative

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DISTRIBUTION OF FINAL REPORTS

ARCO OIL & GAS COMPANY

ARCO Biernecki "A" No. 1 Well
Grant County, Kansas

TTGS File No. 5819

2 COPIES SENT TO:

ARCO OIL AND GAS CO.
600 N. MARIENFELD
MIDLAND, TEXAS 79701

ATTN: MR. BILL GIBBS

2 COPIES SENT TO:

AMOCO PRODUCTION CO.
P.O. BOX 800
1670 BROADWAY
DENVER, COLORADO 80201

ATTN: MR. VAN LEIGHTON

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Wichita, Kansas

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CORE INTERVAL SUMMARY

ARCO OIL & GAS COMPANY

ARCO Biernecki "A" No. 1 Well
Grant County, Kansas

TTGS File No. 5819

<u>Core No.</u>	<u>Interval</u>	<u>Formation</u>
1	5620.0 - 5657.0	St. Louis
2	5659.0 - 5686.0	St. Louis

TerraTek Core Services

13628 Gamma Road • Dallas, Texas 75244 • (214) 960-8777 • WATS (800) 338-3182 • FAX (214) 960-2939

ARCO OIL & GAS COMPANY

Well:	ARCO Biernecki 'A' No. 1	State:	Kansas	Date:	14-JAN-1991
Field:	Wildcat	County:	Grant	TTCS File #:	5819
Drilling fluid:	Polymer	Location:	Sec.20-T29S-R38W	Elevation:	2128.6'

PLUG DEAN-STARK ANALYSIS

Sample Number	Depth (feet)	Permeability		Porosity %	Saturation			Grain Density (gm/cc)	Lithology
		Horz (md)	Vert (md)		Oil %	H2O %			
St. Louis Formation									
1	5620.0-21.0	.01		2.3	0.0	94.3	2.68	Ls,vfxl,scy,ool	
2	5621.0-22.0	.01		3.2	0.0	94.1	2.71	Ls,vfxl,slty-scy,ool	
3	5622.0-23.0	.13		5.4	0.0	98.9	2.70	Sd,vfg,v/lmy,slty	
4	5623.0-24.0	.01		2.4	0.0	98.1	2.68	Ls,vfxl,slty-scy	
5	5624.0-25.0	.01		3.9	0.0	98.4	2.69	Sd,vfg,lmy,slty strks	
6	5625.0-26.0	.01		6.4	0.0	73.0	2.74	Ls,vfxl,slty-scy,ool	
7	5626.0-27.0	.01		5.0	0.0	98.6	2.70	Ls,vf-fxl,slty-scy,ool	
8	5627.0-28.0	.02		5.4	0.0	87.9	2.70	Ls,vf-fxl,slty-scy,ool	
9	5628.0-29.0	.08		4.0	0.0	93.9	2.72	Ls,vfxl,v/sdy,slty strks	
10	5629.0-30.0	8.6+		4.9	0.0	98.7	2.71	Ls,vfxl,scy-slty,ool	
11	5630.0-31.0	1.5+		5.2	0.0	96.8	2.72	Ls,vfxl,scy-slty	
12	5631.0-32.0	<.01		0.6	0.0	98.6	2.69	Ls,vfxl,scy-slty,ool	
13	5632.0-33.0	.01		1.4	0.0	94.9	2.68	Ls,vfxl,slty,ool	
14	5633.0-34.0	.01		1.2	0.0	98.2	2.69	Sd,vfg,v/lmy	
15	5634.0-35.0	<.01		1.9	0.0	93.9	2.68	Sd,vfg,lmy	
16	5635.0-36.0	.02		1.9	0.0	84.2	2.69	Ls,vfxl,sl/sdy	
17	5636.0-37.0	.01		1.3	0.0	93.1	2.70	Ls,vfxl,sl/slty-scy	
18	5637.0-38.0	.01		2.2	0.0	94.6	2.68	Sd,vfg,v/lmy slty strks	
19	5638.0-39.0	.01		2.7	0.0	95.0	2.70	Ls,vfxl,scy-slty	

+ - Dehydration crack affecting permeability

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ARCO OIL & GAS COMPANY
Well: ARCO Biernecki "A" No. 1

Date: 14-JAN-1991

TICS File #: 5819

PLUG DEAN-STARK ANALYSIS

Sample Number	Depth (feet)	Permeability		Porosity %	Saturation		Grain Density (gm/cc)	Lithology
		Horz (md)	Vert (md)		Oil %	H2O %		
20	5639.0-40.0	.08		2.9	0.0	96.9	2.70	Ls,vf-fxl, sdy-slty,ool
21	5640.0-41.0	.01		2.1	0.0	92.2	2.69	Sd,vfg,v/lmy,slty
22	5641.0-42.0	<.01		2.3	0.0	94.9	2.71	Ls,vfxl, sdy-slty
23	5642.0-43.0	.02		4.2	0.0	96.4	2.71	Ls,vfxl, slty, scat pyr, sdy
24	5643.0-44.0	.01		3.6	0.0	97.0	2.68	Ls,vfxl, slty-sdy
25	5644.0-45.0	.02		0.9	0.0	96.9	2.69	Ls,vf-fxl, v/ool
26	5645.0-46.0	.02		1.6	0.0	96.8	2.69	Ls,vfxl, slty strks,ool
27	5646.0-47.0	.02		1.7	0.0	96.1	2.69	Sd,vfg,v/lmy
28	5647.0-48.0	.02		1.9	0.0	94.6	2.69	Ls,vfxl, sdy,ool
29	5648.0-49.0	.02		1.9	0.0	93.2	2.69	Ls,vf-fxl, slty-sl/sdy,ool
30	5649.0-50.0	.02		1.8	0.0	98.3	2.68	Ls,vf-fxl, slty, sdy,ool
31	5650.0-51.0	.02		1.7	0.0	97.4	2.69	Ls,fxl, slty-sdy,ool
32	5651.0-52.0	.02		1.5	0.0	97.3	2.68	Ls,fxl, slty-sdy,ool
33	5652.0-53.0	.02		1.5	0.0	98.2	2.68	Ls,fxl, slty-sdy,ool
34	5653.0-54.0	.02		1.2	0.0	95.2	2.69	Ls,fxl, slty-sdy
35	5654.0-55.0	.02		1.4	0.0	90.2	2.68	Ls,fxl, slty, sdy
36	5655.0-56.0	.02		1.4	0.0	94.1	2.68	Ls,vf-fxl, sdy, slty strks
37	5656.0-57.0	.03		1.4	0.0	93.5	2.68	Ls,vf-fxl, slty-sdy
38	5659.0-60.0	.01		1.2	0.0	94.1	2.68	Ls,fxl, slty-sdy,ool
39	5660.0-61.0	.01		1.0	0.0	94.8	2.69	Ls,fxl, slty-sdy,ool
40	5661.0-62.0	.02		1.4	0.0	94.3	2.68	Ls,fxl, slty-sdy,ool
41	5662.0-63.0	.02		1.3	0.0	90.6	2.69	Ls,vfxl, sdy,ool
42	5663.0-64.0	.02		1.5	0.0	93.1	2.69	Ls,vfxl, slty-sdy,ool

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ARCO OIL & GAS COMPANY
Well: ARCO Biernecki "A" No. 1

Date: 14-JAN-1991

TICS File #: 5819

PLUG DEAN-STARK ANALYSIS

Sample Number	Depth (feet)	Permeability		Porosity %	Saturation		Grain Density (gm/cc)	Lithology
		Horz (md)	Vert (md)		Oil %	H2O %		
43	5664.0-65.0	.02		1.6	0.0	92.0	2.68	Ls,vf-fxl,slty-sdy strks,ool
44	5665.0-66.0	.02		1.9	0.0	97.3	2.69	Ls,vf-fxl,slty-sdy,ool
45	5666.0-67.0	.02		1.9	0.0	84.9	2.68	Sd,vfg,v/lmy,sl/slty
46	5667.0-68.0	<.01		1.5	0.0	96.5	2.68	Sd,vfg,v/lmy,slty
47	5668.0-69.0	.01		1.2	0.0	95.9	2.69	Ls,vfxl,ool
48	5669.0-70.0	.01		1.4	0.0	89.8	2.69	Ls,vfxl,ool
49	5670.0-71.0	.01		1.9	0.0	94.3	2.69	Ls,vfxl,ool
50	5671.0-72.0	.01		1.8	0.0	99.2	2.69	Ls,vfxl,ool
51	5672.0-73.0	.01		1.9	0.0	96.9	2.68	Ls,vf-fxl,slty-sdy strks,ool
52	5673.0-74.0	.01		2.1	0.0	92.1	2.69	Ls,vf-fxl,slty-sdy,ool
53	5674.0-75.0	<.01		1.5	0.0	93.0	2.68	Ls,vf-fxl,ool
54	5675.0-76.0	.01		1.5	0.0	94.9	2.69	Ls,vf-fxl,slty-sdy,ool
55	5676.0-77.0	.01		1.8	0.0	97.6	2.69	Ls,vfxl,ool
56	5677.0-78.0	.02		3.1	0.0	96.2	2.69	Ls,vfxl,slty-sdy strks,ool
57	5678.0-79.0	.02		3.8	0.0	96.0	2.69	Ls,vf-fxl,ool
58	5679.0-80.0	.02		3.3	0.0	91.9	2.68	Ls,vf-fxl,ool
59	5680.0-81.0	.02		4.1	0.0	89.9	2.69	Ls,vf-fxl,slty,ool
60	5681.0-82.0	.03		4.6	0.0	95.7	2.68	Ls,vf-fxl,slty-sdy,ool
61	5682.0-83.0	.02		4.6	0.0	91.0	2.69	Ls,vfxl,slty-sdy strks,ool
62	5683.0-84.0	.01		3.7	0.0	94.8	2.69	Ls,vfxl,slty-sdy,ool
63	5684.0-85.0	.02		3.6	0.0	94.5	2.69	Ls,vfxl,slty,ool
64	5685.0-86.0	.02		2.5	0.0	98.9	2.68	Ls,vfxl,slty,ool

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KEY TO LITHOLOGICAL ABBREVIATIONS

Anhy	- Anhydrite/anhydritic	g	- grain	pyr	- pyrite/pyritic
arg	- argillaceous	glauc	- glauconitic	qtz	- quartz
Ark	- Arkosic	Gyp	- Gypsum	Sd	- Sand/Sandstone
Bent	- Bentonite	hal	- halite	sdv	- sandy
biot	- bioturbated	hem	- hematite	Sh	- Shale
brec	- brecciated	incl	- inclusions	shy	- shaley
c	- coarse	Ign	- Igneous	sid	- siderite
calc	- calcareous	lam	- laminations	sil	- siliceous
carb	- carbonaceous	lig	- lignite/lignitic	sl/	- slightly
ccf	- calcite fill fracture	Ls	- Limestone	Sltst	- Siltstone
Cgl	- Conglomerate/ conglomeratic	m	- medium	slty	- silty
chky	- chalky	mic	- micro	stk	- streak(s)
Cht	- Chert	mica	- micaceous	sty	- stylolite
chty	- cherty	Ms	- mudstone	suc	- sucrosic
cly	- clay/clayey	nod	- nodules	Tuff	- Tuff
Dol	- Dolomite/Dolomitic	ool	- oolitic	v/	- very
f	- fine	org	- organic	vc	- very coarse
fis	- fissures	pbl	- pebbles	VF	- vertical fracture
fos	- fossiliferous	pel	- peloids	vf	- very fine
frac	- fractures	pis	- pisolites/pisolitic	vgs	- vugs
		pp	- pinpoint	vgy	- vuggy
				xl	- crystalline

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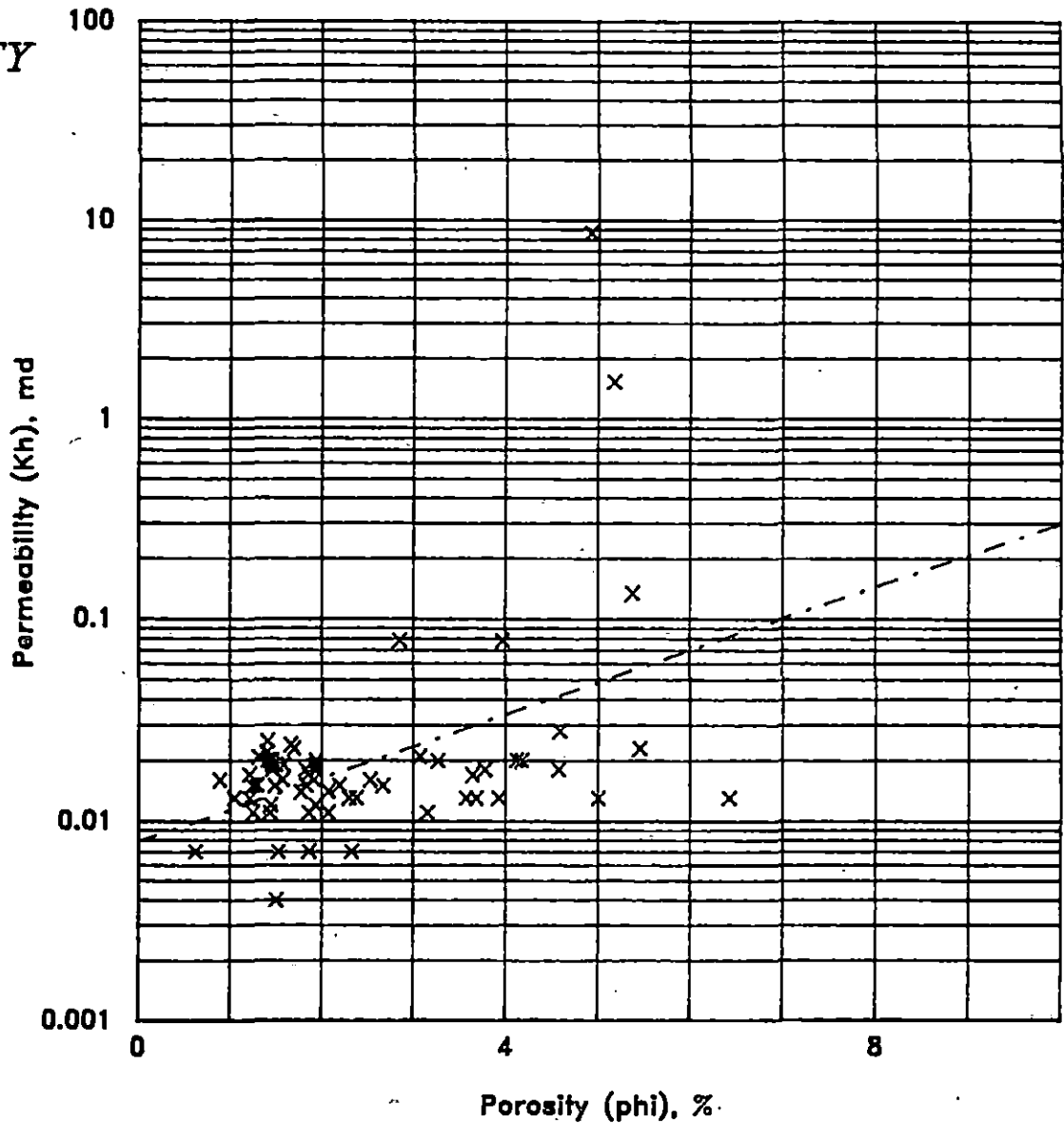
Terra Tek Geoscience Services®

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HORIZONTAL PERMEABILITY VS POROSITY

ARCO OIL & GAS COMPANY
ARCO Biernecki "A" No. 1 Well
Wildcat
Grant County, Kansas
January 14, 1991

Depth Interval: 5620 to 5686 Feet		
TTGS# 5819		
Porosity (phi), %		
Min	Max	Average
0.621	6.427	2.466
Permeability (Kh), md		
Min	Max	Geo. Ave
0.004	8.584	0.019
Equation of the Line		
$\log Kh = \alpha \phi + \beta$		
$\log Kh = 0.1578 \phi - 2.1019$		
Correlation Coefficient : 0.451		
St. Louis Formation		



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