P-W

Ferrellgas, Inc. (Buckeye Gas Prod. Co.)
NW/NW Sec 8 T18N R24E Apache Cty 602

COUNTY Apache AREA 16 mi W to Holbrook LEASE NO. Williams Eng. Co.

WELL NAME ~~WILLIAMS ENERGY COMPANY~~ Buckeye Gas Products Co WELL NO. 3 LPG Stg

LOCATION NW/NW SEC 8 TWP 18N RANGE 24E FOOTAGE 1336.34 S & 1144.36 E of NW/ corner

ELEV 5306.62 GR 5310 KB SPUD DATE 12-3-72 STATUS COMP. DATE 12-21-72 TOTAL DEPTH 1140

CONTRACTOR ns

CASING SIZE	DEPTH	CEMENT	LINER SIZE & DEPTH
13 3/8" O.D.	138	150 sx	
9 5/8" O.D.	940	300 sx	
7" O.D.	949	None- solution string	
4 1/2 O.D.	1099	None- solution string	

DRILLED BY ROTARY X

DRILLED BY CABLE TOOL

PRODUCTIVE RESERVOIR

INITIAL PRODUCTION NA- storage well

FORMATION TOPS	DEPTHS	SOURCE L.L.	SOURCE E.L.	REMARKS
Coconino	330	X		Sample set from 160 to 1110
Salt	894	X		

ELECTRIC LOGS	PERFORATED INTERVALS	PROD. INTERVALS
Comp. Neutron-G.R.	Not Perforated	-

SAMPLE LOG

SAMPLE DESCRP. -

SAMPLE NO. 1716

CORE ANALYSIS -

DSTs None

REMARKS This well is used as a storage reservoir for LPG Storage

APP. TO PLUG

PLUGGING REP.

COMP. REPORT X

WATER WELL ACCEPTED BY

BOND CO. ~~The Aetna Casualty & Surety Co.~~ ~~Federal Insurance Company~~ St. Paul Fire + Marine Ins. Co. Folder PH 776 BOND NO. ~~8047-02-65~~ 40S- 32083

DATE ~~4-12-71~~ 1-15-80

BOND AMT. $ 25,000 CANCELLED ~~3-7-80~~ ORGANIZATION REPORT 11-21-72

FILING RECEIPT 2939 LOC. PLAT X WELL BOOK X PLAT BOOK X

API NO. 02-001-20178 DATE ISSUED 11-13-72 DEDICATION Na (storage well)

PERMIT NUMBER 602

(over)

RECEIVED
JUN 22 1982
O & G CONS. COMM.
RECEIVED
JUN 30 1982
O & G CONS. COMM.

WELL COMPLETION OR RECOMPLETION REPORT AND WELL LOG

DESIGNATE TYPE OF COMPLETION:

New Well [X] Work-Over [ ] Deepen [ ] Plug Back [ ] Same Reservoir [ ] Different Reservoir [ ] Oil [ ] Gas [ ] Dry [ ]

DESCRIPTION OF WELL AND LEASE

Operator: BUCKEYE GAS PRODUCTS CO.	Address: P.O. BOX 3478 TULSA, OK. 74101
Federal, State or Indian Lease Number or name of lessor if free lease: BUCKEYE GAS PRODUCTS CO.	Well Number: C3 — Field & Reservoir: ADAMANA, AZ.
Location: 1336.34 FSL - 1144.36 FWL	County: APACHE
Sec. TWP-Range or Block & Survey: SECTION 8 T-18N, R-24E G. & S.R. B. & M.	

Date spudded	Date total depth reached	Date completed, ready to produce	Elevation (DF, RKB, RT or Gr.)	Elevation of casing hd. flange
12-3-72	12-17-72	12-21-72	5306 feet	5310 feet

Total depth	P.B.T.D.	Single, dual or triple completion?	If this is a dual or triple completion, furnish separate report for each completion.
1116		SALT SOLUTION	

Producing interval (s) for this completion	Rotary tools used (interval)	Cable tools used (interval)
943.87 TO 1102.46	G.L. TO T.D.	

Was this well directionally drilled?	Was directional survey made?	Was copy of directional survey filed?	Date filed
NO	NO	NO	

Type of electrical or other logs run (check logs filed with the commission): GAMMA-RAY COMPENSTED NEUTRON POROSITY LOG. (OVER) — Date filed:

CASING RECORD

Casing (report all strings set in well — conductor, surface, intermediate, producing, etc.)

Purpose	Size hole drilled	Size casing set	Weight (lb./ft.)	Depth set	Sacks cement	Amt. pulled
SURFACE	17½	13 3/8	48 lbs.	141.99	150	
PROTECTION	12¼	9 5/8	32.3	943.87	250	
INTERMEDIATE	12¼	7"	20	952.90	HUNG-UNCEMENTED	
SOLUTION	12¼	4½	9.5	1102.46	HUNG-UNCEMENTED	

TUBING RECORD

Size	Depth set	Packer set at
in.	ft.	ft.

LINER RECORD

Size	Top	Bottom	Sacks cement	Screen (ft)
in.	ft.	ft.		

PERFORATION RECORD

Number per ft.	Size & type	Depth Interval

ACID, SHOT, FRACTURE, CEMENT SQUEEZE RECORD

Am't. & kind of material used	Depth Interval

INITIAL PRODUCTION

Date of first production: | Producing method (indicate if flowing, gas lift or pumping—if pumping, show size & type of pump:)

Date of test	Hrs. tested	Choke size	Oil prod. during test	Gas prod. during test	Water prod. during test	Oil gravity
			bbls.	MCF	bbls.	°API (Corr)

Tubing pressure	Casing pressure	Cal'ted rate of Production per 24 hrs.	Oil	Gas	Water	Gas—oil ratio
			bbls.	MCF	bbls.	

Disposition of gas (state whether vented, used for fuel or sold):

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the Financial Mgr. of the Buckeye Gas Products Co (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

6-28-82
Date

Amado Padilla
Signature

Permit No. 602

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION
Well Completion or Recompletion Report and Well Log
File One Copy
Form No. 4

DETAIL OF FORMATIONS PENETRATED

FORMATION	TOP	BOTTOM	DESCRIPTION*
SURFACE SOIL	0	20	SAND
	20	56	RED CLAY
	56	140	CLAY AND SAND SHELLS
	140	186	SAND SHELLS AND CLAY
	186	194	SAND
	194	218	SANDY SHALE
	218	290	SHALEY SAND
	290	330	SAND SHALE
COCONINO	330	795	COCONINO
	795	802	SHALE
	802	806	ANHYDRITE
	806	824	SHALE
	824	836	ANHYDRITE
	836	846	SHALE
	846	852	ANHYDRITE
	852	872	SAND
	872	878	SHALE
	878	886	POTASH
	886	894	SANDY SHALE
	894	1118	SALT
	1118	1140	SHALE
			LOGS RAN CEMENT BOND LOG. GAMMA RAY NEUTRON SONIC LOG.

* Show all important zones of porosity, detail of all cores, and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries.

INSTRUCTIONS:

Attach drillers log or other acceptable log of well.

This Well Completion or Recompletion re[illegible] and well log shall be filed with the State of Arizona [illegible] Gas Conservation Commission not later than thirty days after project completion.

Form No. 4 •

WELL COMPLETION OR RECOMPLETION REPORT AND WELL LOG

DESIGNATE TYPE OF COMPLETION:

New Well [X] Work-Over [ ] Deepen [ ] Plug Back [ ] Same Reservoir [ ] Different Reservoir [ ] Oil [ ] Gas [ ] Dry [X]

DESCRIPTION OF WELL AND LEASE

Operator: Williams Energy Company	Address: P. O. Box 3478 Tulsa, Oklahoma 74101
Federal, State or Indian Lease Number or name of lessor if fee lease: Williams Energy Company	Well Number: 3 / Field & Reservoir: Unnamed
Location: 1336.34 South & 1144.36 East of N.W. Corner	County: Apache
Sec. TWP-Range or Block & Survey: Sec. 8 T-18-N, R-24-E, G. & S.R.B. & M.	

Date spudded	Date total depth reached	Date completed, ready to produce	Elevation (DF, RKB, RT or Gr.) feet	Elevation of casing hd. flange feet
12/3/~~73~~ 72	12/17/72	Dry	5306	5308

Total depth	P.B.T.D.	Single, dual or triple completion?	If this is a dual or triple completion, furnish separate report for each completion.
1140	Surface	Single	

Producing interval (s) for this completion	Rotary tools used (interval)	Cable tools used (interval)
None	0-1140	No

Was this well directionally drilled?	Was directional survey made?	Was copy of directional survey filed?	Date filed
No	N/A	N/A	N/A

Type of electrical or other logs run (check logs filed with the commission)	Date filed
Compensated Neutron Log	With this report

CASING RECORD

Casing (report all strings set in well—conductor, surface, intermediate, producing, etc.)

Purpose	Size hole drilled	Size casing set	Weight (lb./ft.)	Depth set	Sacks cement	Amt. pulled
Surface	17½"	13 3/8" OD	48	138'	150	0
Protection	12¼"	9 5/8" OD	32.3	940'	300	0
Solution	12¼"	7 "OD	20.0	949'	Hung-uncemented	
Solution	---	4 1/2" OD	9.5	1099'	Hung-uncemented	

TUBING RECORD			LINER RECORD				
Size in.	Depth set ft.	Packer set at ft.	Size in.	Top ft.	Bottom ft.	Sacks cement	Screen (ft.)

PERFORATION RECORD			ACID, SHOT, FRACTURE, CEMENT SQUEEZE RECORD	
Number per ft.	Size & type	Depth Interval	Am't. & kind of material used	Depth Interval

INITIAL PRODUCTION

Date of first production	Producing method (indicate if flowing, gas lift or pumping—if pumping, show size & type of pump:)
N/A	N/A

Date of test	Hrs. tested	Choke size	Oil prod. during test	Gas prod. during test	Water prod. during test	Oil gravity
N/A	N/A	N/A	N/A bbls.	N/A MCF	N/A bbls.	N/A API (Corr)

Tubing pressure	Casing pressure	Cal'ted rate of Production per 24 hrs.	Oil	Gas	Water	Gas—oil ratio
N/A	N/A	N/A	N/A bbls.	N/A MCF	N/A bbls.	N/A

Disposition of gas (state whether vented, used for fuel or sold): N/A

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the Manager of Operations of the Williams Energy Company (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

3/27/73
Date

Robert Wyatt
Signature

RECEIVED
MAR 29 1973
O & G CONS. COMM.

Permit No. 602

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION.
Well Completion or Recompletion Report and Well Log
File One Copy
Form No. 4

(Complete Reverse Side)

DETAIL OF FORMATIONS PENETRATED

Formation	Top	Bottom	Description*
Surface	0	20	Surface Soil
	20	56	Red Clay
	56	140	Clay & Sand Shells
	140	186	Sand Shells & Clay
	186	194	Sand
	194	218	Sandy Shale
	218	290	Shaley Sand
	290	330	Sandy Shale -Top Coconino Zone
Coconino	330	795	Sand - Top Coconino
	795	802	Shale
	802	806	Anhydrite
	806	824	Shale
	824	836	Anhydrite
	836	846	Shale
	846	852	Anhydrite
	852	872	Sand
	872	878	Shale
	878	886	Potash
	886	894	Sandy Shale
	894	1118	Salt
	1118	1140	Shale

* Show all important zones of porosity, detail of all cores, and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries.

INSTRUCTIONS:

Attach drillers log or other acceptable log of well.

This Well Completion or Recompletion report and well log shall be filed with the State of Arizona Oil & Gas Conservation Commission not later than thirty days after project completion.

Form No. 4

DOWELL SONAR CALIPER SURVEY

TREATMENT NO: 11-42-0273 JOB NO: 324

WELL DATA

ZERO @ 4 FT AGL

T.D. DOWELL 1021 FT OPERATOR 1023 FT

CASING SIZE 9-5/8 IN DEPTH 944 FT

LINER - FT

INTERMEDIATE * IN DEPTH * FT

TUBING 4-1/2 IN DEPTH OUT FT

WILLIAMS ENERGY COMPANY

WELL NO: 3

ADAMANA STORAGE TERMINAL

APRIL 13,1979 602

PRODUCTION: STORAGE

GENERAL COMMENTS

MAILING ADDRESS

STREET/BOX: P.O. BOX 849

CITY: HOLBROOK STATE: ARIZONA

ZIP: 86025

ATTN: MR. ARMANDO PADILLA

MR. ARMANDO PADILLA
COMPANY REPRESENTATIVE

HL VAN METRE
DOWELL ENGINEER

DOWELL SONAR CALIPER SURVEY

WILLIAMS ENERGY COMPANY ADAMAWA STORAGE TERMINAL APRIL 13,1979

WELL NO. 3 JOB NO. 324

RADII IN FT

DEPTH	N	S	E	W	NE	SW	SE	NW
944	0.8	0.9	1.0	1.0	0.9	1.1	1.0	0.8
950	0.8	1.0	1.0	1.0	0.9	1.1	1.0	0.8
951	2.5	2.0	1.5	2.3	1.6	2.2	1.9	3.1
952	2.4	1.9	2.1	3.3	1.9	2.7	2.0	3.1
954	3.3	3.2	2.8	3.7	3.0	3.5	3.0	3.5
955	66.0	63.0	62.0	64.0	64.0	65.0	62.0	65.0
958	65.0	63.0	60.0	64.0	65.0	64.0	63.0	64.0
960	67.0	61.0	62.0	63.0	65.0	63.0	61.0	65.0
965	68.0	62.0	63.0	63.0	66.0	63.0	62.0	67.0
970	69.0	62.0	65.0	64.0	69.0	63.0	62.0	67.0
975	71.0	63.0	68.0	66.0	69.0	64.0	63.0	67.0
980	73.0	67.0	68.0	71.0	73.0	68.0	65.0	70.0
985	77.0	69.0	70.0	72.0	74.0	70.0	71.0	72.0
990	78.0	74.0	74.0	66.0	75.0	72.0	73.0	67.0
995	85.0	84.0	82.0	80.0	87.0	82.0	81.0	84.0
998	81.0	84.0	82.0	80.0	87.0	81.0	81.0	84.0
1000	56.0	57.0	65.0	55.0	62.0	60.0	60.0	59.0
1005	50.0	53.0	52.0	49.0	52.0	50.0	49.0	54.0

RADII IN FT

DEPTH	N	S	E	W	NE	SW	SE	NW
1010	47.0	47.0	48.0	42.0	45.0	43.0	45.0	48.0
1015	37.0	39.0	39.0	34.0	38.0	38.0	38.0	42.0
1018	27.0	32.0	31.0	30.0	31.0	27.0	30.0	30.0
1020	21.8	9.9	12.3	8.7	21.0	9.4	10.3	9.0
1021	3.2	1.1	1.4	2.1	2.5	1.4	1.2	3.1

DOWELL SONAR CALIPER SURVEY

WILLIAMS ENERGY COMPANY ADAMANA STORAGE TERMINAL APRIL 13,1979

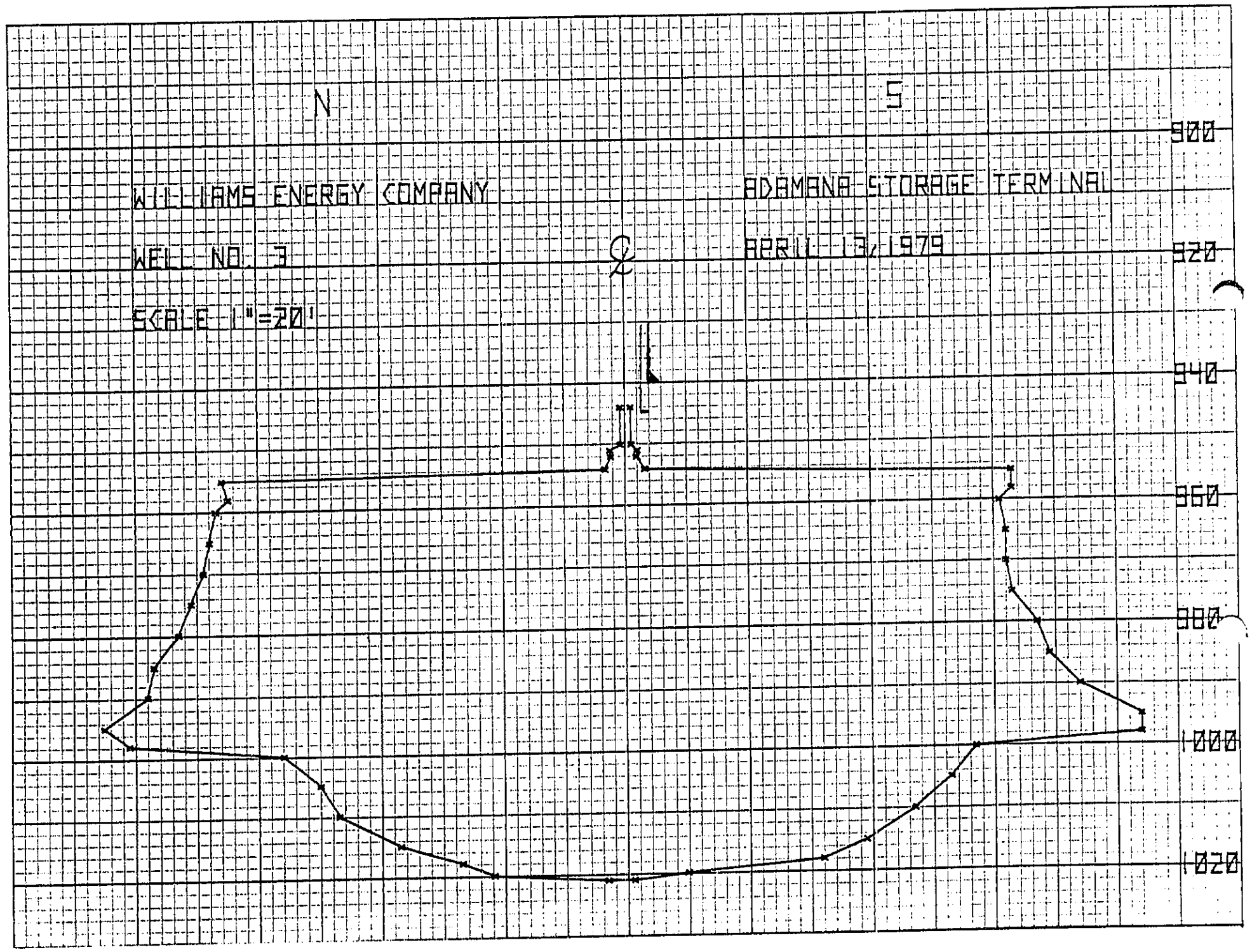
WELL NO: 3 JOB NO: 324

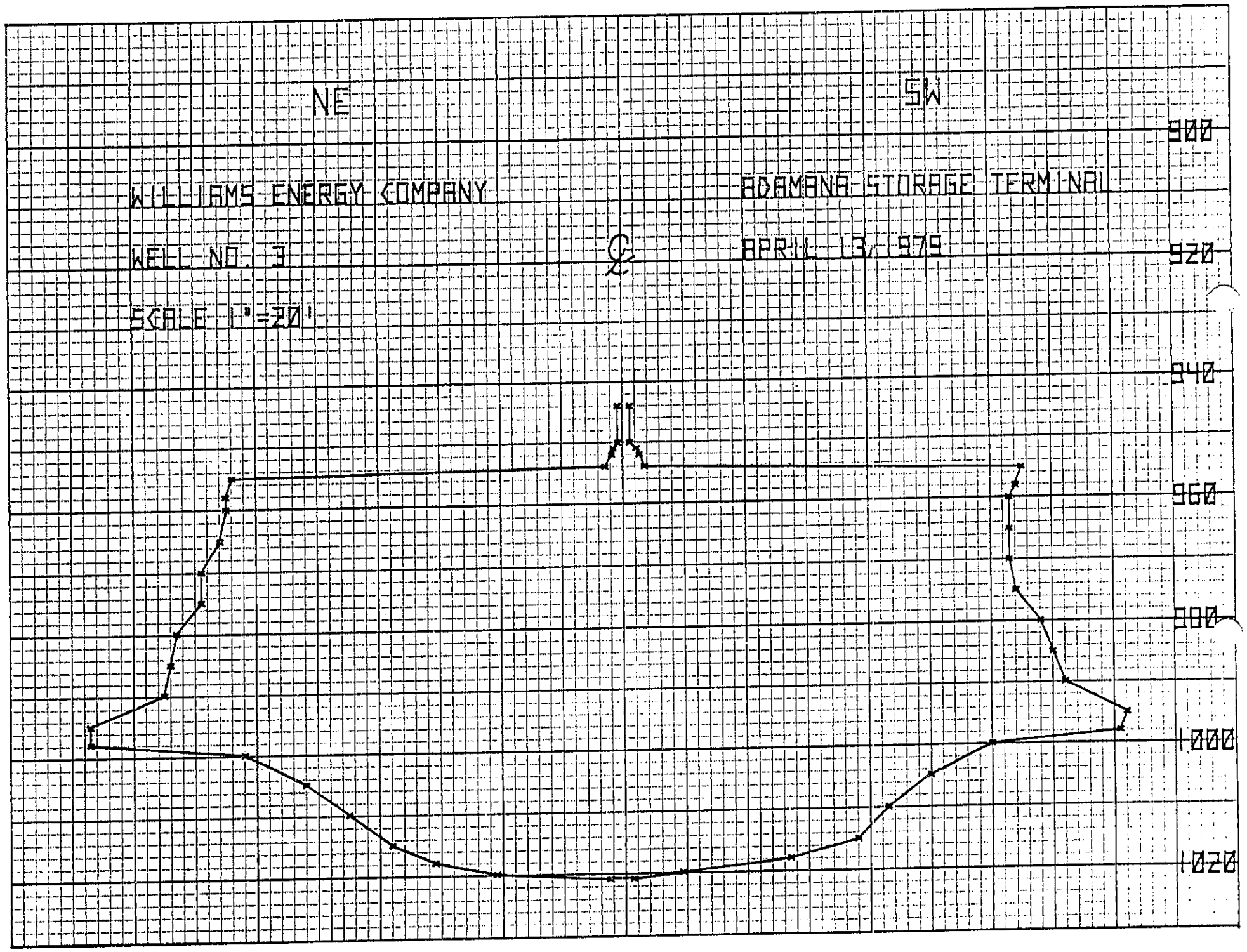
VOLUME CALCULATIONS

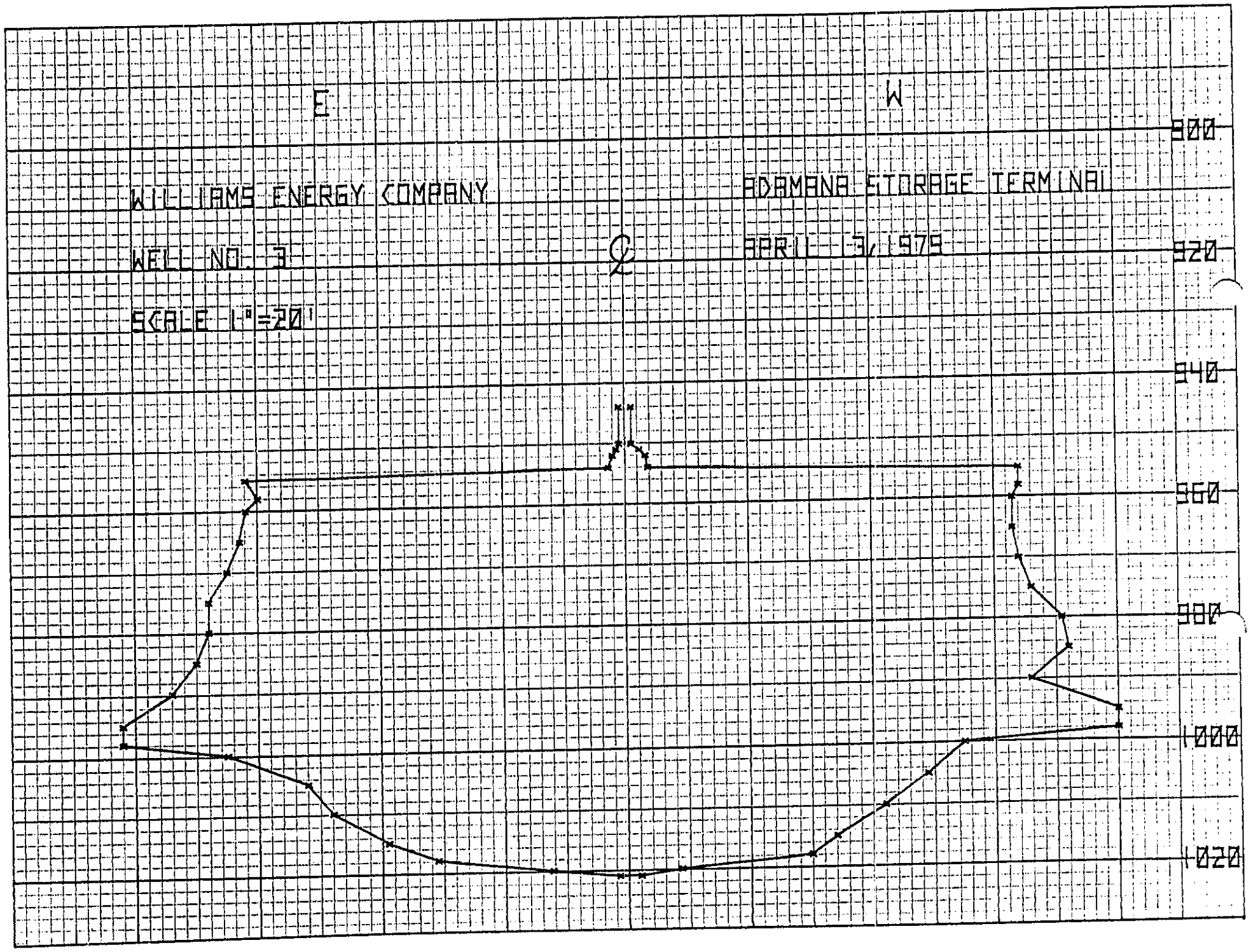
DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
944	0	0	0	0
950	17	17	3	3
951	8	25	1	4
952	17	42	3	7
954	52	94	9	17
955	4492	4586	800	817
958	38170	42755	6798	7614
960	25250	68005	4497	12111
965	63974	131978	11393	23504
970	65972	197950	11749	35253
975	67948	265898	12101	47354
980	72465	338363	12905	60259
985	78973	417336	14064	74323
990	81779	499115	14564	88887
995	94660	593775	16858	105745
998	64682	658456	11519	117265
1000	32116	690571	5720	122984
1005	48461	739031	8630	131614

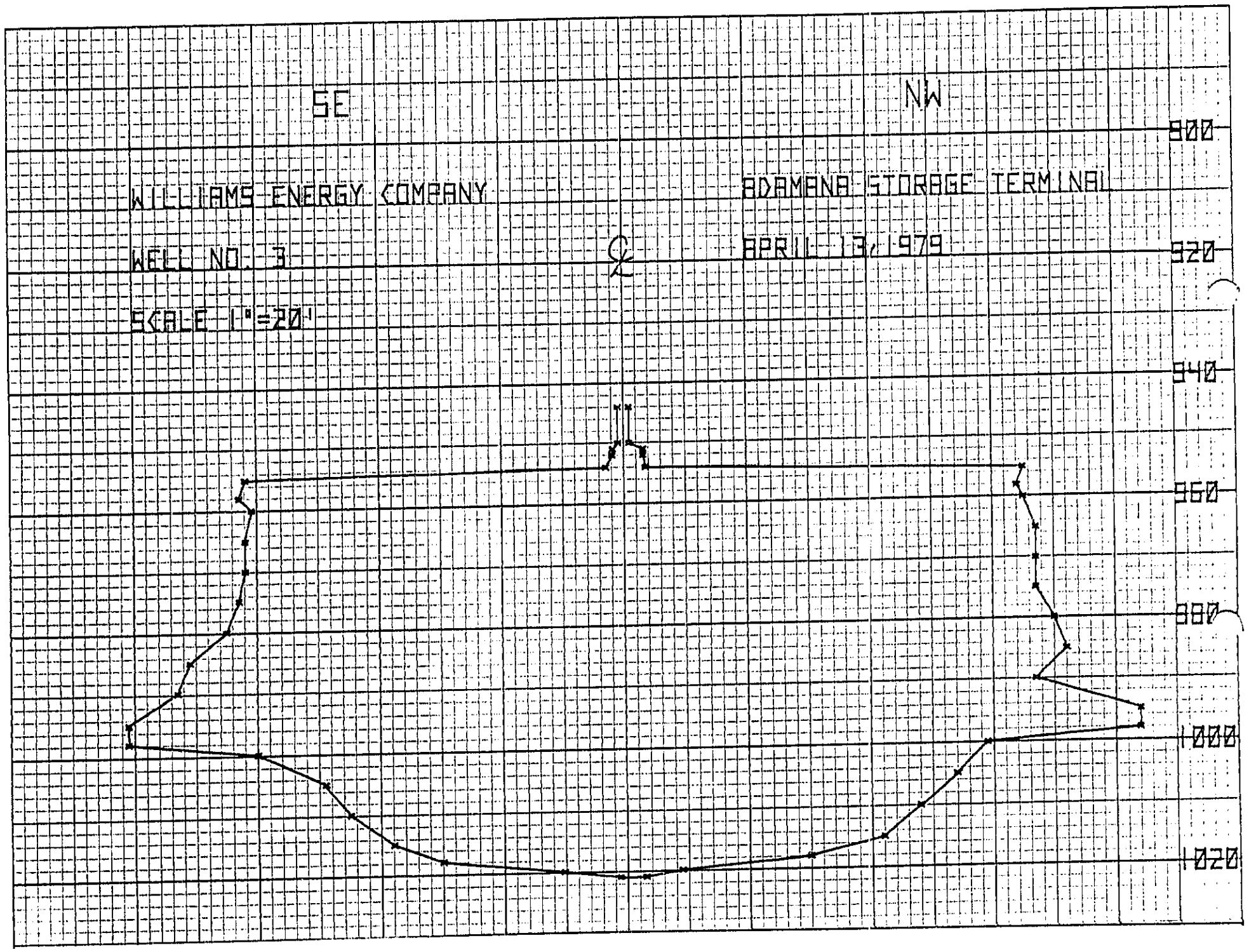
VOLUME CALCULATIONS

DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
1010	36869	775900	6566	138180
1015	27582	803482	4912	143093
1018	10627	814108	1892	144985
1020	2942	817050	524	145509
1021	228	817277	41	145550


N
S
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 3
APRIL 13, 1979
SCALE 1"=20'
900
920
940
960
980
1000
1020


NE
SW
900
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 3
APRIL 13, 979
920
SCALE 1"=20'
940
960
980
1000
1020


E
W
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 3
APRIL 13, 1979
SCALE 1"=20'
900
920
940
960
980
1000
1020


SE
NW
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 3
APRIL 13, 1979
SCALE 1"=20'
℄
800
820
840
860
880
1000
1020

3-1-73

Samples on the following wells have been received.

Williams Energy Co, #3 - #4 - #5 - #6
Sec.8-18N-24E
Apache C. Ariz.

Permit # 602-603-606-607

Jo Ratcliff

Four Corners Sample Cut

RECEIVED
MAR 05 1973
O & G CONS. COMM.

FARMINGTON, N.M.
MAR 1
AM
1973

John Hanson Patriot

U.S. Postage 6¢

OIL & GAS CONSERVATION COMMISSION
STATE OF ARIZONA
4515 N. 7th AVE.
TELEPHONE: 271-5161
PHOENIX, ARIZONA 85013

January 17, 1973

Memo to File: Williams Energy Company Well No. 3
NW/NW Sec 8-T18N-R24E
Apache County, Permit 602

Williams Energy Company Well No. 4
NW/NW Sec 8-T18N-R24E
Apache County
Permit No. 603

Memo from J. Bannister

Williams Energy Company of Oklahoma called today and advised that their two above wells will be completed this weekend. They have decided to drill at least two more wells to create another cavern. It is their intention to move the rig from 550'. Paper work will be submitted as soon as the survey has been made. I granted them verbal permission to move the rig.

JB/rlb

APPLICATION FOR PERMIT TO DRILL OR RE-ENTER

APPLICATION TO DRILL [X] RE-ENTER OLD WELL [ ]

WILLIAMS ENERGY COMPANY
NAME OF COMPANY OR OPERATOR

P. O. Box 3478 — Address
Tulsa — City
Oklahoma — State

Unknown at the time of application
Drilling Contractor

Address

DESCRIPTION OF WELL AND LEASE

Federal, State or Indian Lease Number, or if fee lease, name of lessor: Williams Energy Company	Well number: 3	Elevation (ground): 5306.62
Nearest distance from proposed location to property or lease line: 150 feet	Distance from proposed location to nearest drilling, completed or applied—for well on the same lease: 550 feet	
Number of acres in lease: 114	Number of wells on lease, including this well, completed in or drilling to this reservoir: 4	
If lease, purchased with one or more wells drilled, from whom purchased: N/A	Name	Address
Well location (give footage from section lines): 1336.34 South & 1144.36 East of N.W. Corner	Section—township—range or block and survey: Sec. 8 T-18-N, R24E, G.& S.R. B & M	Dedication (Comply with Rule 105)
Field and reservoir (if wildcat, so state): Unnamed	County: Apache	
Distance, in miles, and direction from nearest town or post office: 16 miles west to Holbrook, Arizona		
Proposed depth: 1100	Rotary or cable tools: Rotary	Approx. date work will start: November 1, 1972
Bond Status / Amount	Organization Report: On file Yes Or attached	Filing Fee of $25.00: Attached Yes

Remarks:

Request that Commission grant an exception to Rule 105 describing minimum distances since these wells are a part of a propane storage cavern complex in a salt strata.

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the Manager of Operations of the Williams Energy Company (~~company~~), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

Robert Wirth
Signature

10/19/72
Date

RECEIVED
OCT 24 1972
O & G CONS. COMM.

Permit Number: 602
Approval Date: 11-13-72
Approved By: W E Allen

Notice: Before sending in this form be sure that you have given all information requested. Much unnecessary correspondence will thus be avoided.

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION
Application to Drill or Re-enter
File Two Copies

Form No. 3

(Complete Reverse Side)

1. Operator shall outline the dedicated acreage for *both* oil and gas wells on the plat.

2. A registered professional engineer or land surveyor registered in the State of Arizona or approved by the Commission shall show on the plat the location of the well and certify this information in the space provided.

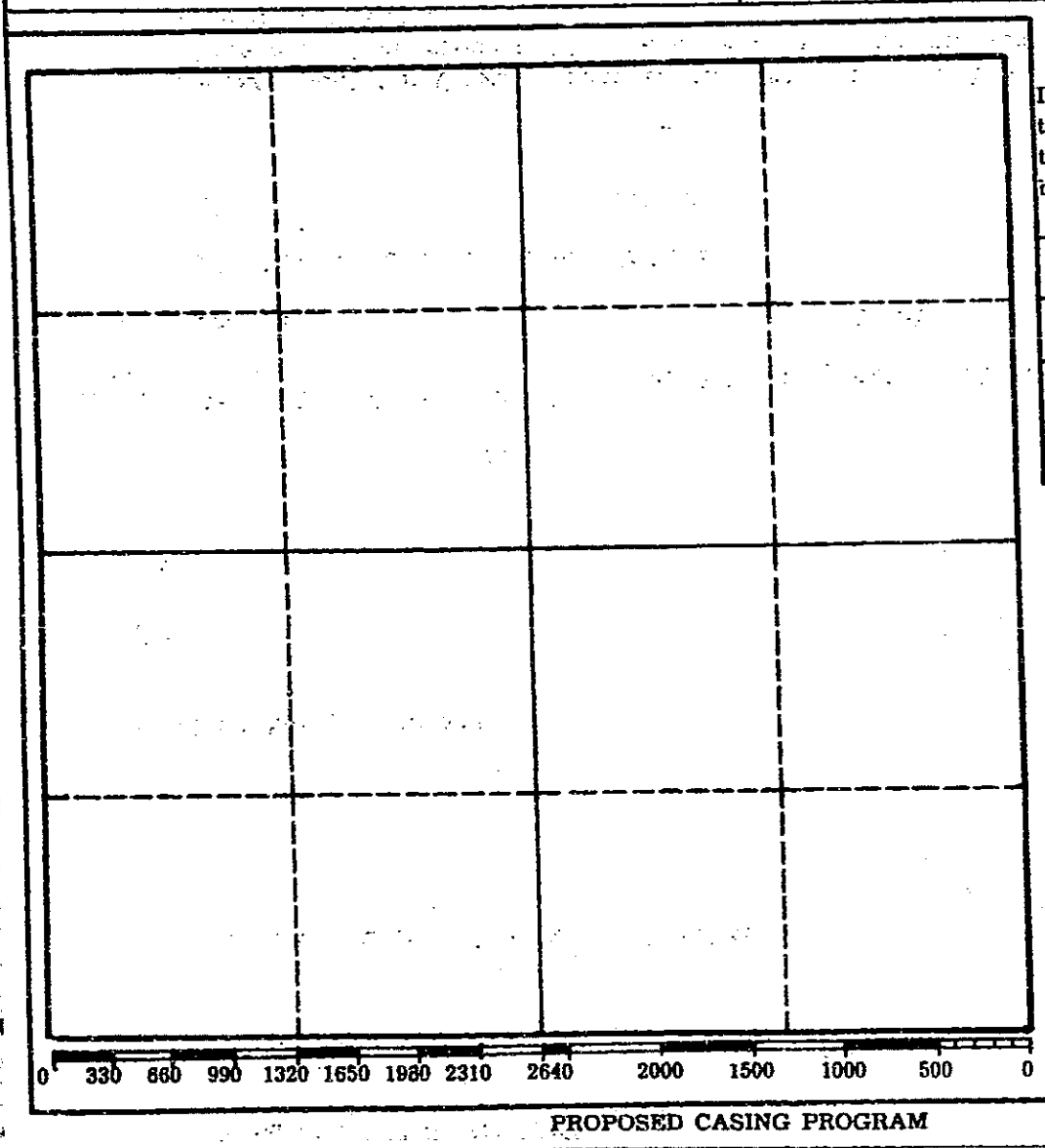
3. All distances shown on the plat must be from the outer boundaries of the Section.

4. Is the Operator the only owner in the dedicated acreage outlined on the plat below? YES__X__NO_____

5. If the answer to question four is "no," have the interests of all the owners been consolidated by communitization agreement or otherwise? YES_____NO_____. If answer is "yes," Type of Consolidation_____

6. If the answer to question four is "no," list all the owners and their respective interests below:

Owner	Land Description



CERTIFICATION

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Name

Position

Company

Date

I hereby certify that the well location shown on the plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

Registered Professional Engineer and/or Land Surveyor

Certificate No.

PROPOSED CASING PROGRAM

Size of Casing	Weight	Grade & Type	Top	Bottom	Cementing Depths	Sacks Cement
13 3/8"	48	H-40	G.L.	150'	Top to Bottom	
9 5/8"	32.3	H-40	G.L.	850'	Top to Bottom	

PERMIT TO DRILL

This constitutes the permission and authority from the

OIL AND GAS CONSERVATION COMMISSION,
STATE OF ARIZONA,

To: WILLIAMS ENERGY COMPANY
(OPERATOR)

to drill a well to be known as

WILLIAMS ENERGY COMPANY WELL NO. 3
(WELL NAME)

located 1336.34 South & 1144.36 East of N.W. Corner

Section 8 Township 18N Range 24E, APACHE County, Arizona.

The NA (LPG STORAGE WELL) of said Section, Township and Range is dedicated to this well.

Said well is to be drilled substantially as outlined in the attached Application and must be drilled in full compliance with all applicable laws, statutes, rules and regulations of the State of Arizona.

Issued this 13th day of November, 19 72.

OIL AND GAS CONSERVATION COMMISSION

By W.B. Allen
EXECUTIVE SECRETARY

PRIOR TO BEING ALLOWED TO PRODUCE THIS WELL YOU MUST BE IN FULL COMPLIANCE WITH RULE 105, SECTION A THRU G (SPACING), WITH RESPECT TO THE PRODUCT TO BE PRODUCED.

PERMIT Nº 602

RECEIPT NO. 2939
API NO. 02-001-20178
SAMPLES ARE REQUIRED

State of Arizona
Oil & Gas Conservation Commission
Permit to Drill

FORM NO. 27

DOWELL

SONAR CALIPER REPORT

DOWELL SONAR CALIPER SURVEY

JOB NO: 324

TREATMENT NO: 11-42-0273

WELL DATA

ZERO @ 4 FT AGL

T.D. DOWELL 1021 FT

CASING SIZE 9-5/8 IN

INTERMEDIATE * IN

TUBING 4-1/2 IN

OPERATOR 1023 FT

DEPTH 944 FT
LINER - FT
DEPTH * FT

DEPTH OUT FT

WILLIAMS ENERGY COMPANY

WELL NO: 3

ADAMANA STORAGE TERMINAL

APRIL 13,1979

#602

PRODUCTION: STORAGE

GENERAL COMMENTS

MAILING ADDRESS

STREET/BOX: P.O. BOX 849

CITY: HOLBROOK STATE: ARIZONA

ZIP: 86025

ATTN: MR. ARMANDO PADILLA

MR. ARMANDO PADILLA
COMPANY REPRESENTATIVE

HL VAN METRE
DOWELL ENGINEER

DOWELL SONAR CALIPER SURVEY

WILLIAMS ENERGY COMPANY ADAMANA STORAGE TERMINAL APRIL 13,1979

WELL NO. 3 JOB NO. 324

RADII IN FT

DEPTH	N	S	E	W	NE	SW	SE	NW	
944	0.8	0.9	1.0	1.0	0.9	1.1	1.0	0.8	
950	0.8	1.0	1.0	1.0	0.9	1.1	1.0	0.8	
951	2.5	2.0	1.5	2.3	1.6	2.2	1.9	3.1	
952	2.4	1.9	2.1	3.3	1.9	2.7	2.0	3.1	
954	3.3	3.2	2.8	3.7	3.0	3.5	3.0	3.5	
955	66.0	63.0	62.0	64.0	64.0	65.0	62.0	65.0	
958	65.0	63.0	60.0	64.0	65.0	64.0	63.0	64.0	
960	67.0	61.0	62.0	63.0	65.0	63.0	61.0	65.0	
965	68.0	62.0	63.0	63.0	66.0	63.0	62.0	67.0	
970	69.0	62.0	65.0	64.0	69.0	63.0	62.0	67.0	
975	71.0	63.0	68.0	66.0	69.0	64.0	63.0	67.0	
980	73.0	67.0	68.0	71.0	73.0	68.0	65.0	70.0	
985	77.0	69.0	70.0	72.0	74.0	70.0	71.0	72.0	
990	78.0	74.0	74.0	66.0	75.0	72.0	73.0	67.0	
995	85.0	84.0	82.0	80.0	87.0	82.0	81.0	84.0	✓ max radius
998	81.0	84.0	82.0	80.0	87.0	81.0	81.0	84.0	
1000	56.0	57.0	65.0	55.0	62.0	60.0	60.0	59.0	
1005	50.0	53.0	52.0	49.0	52.0	50.0	49.0	54.0	

RADII IN FT

DEPTH	N	S	E	W	NE	SW	SE	NW
1010	47.0	47.0	48.0	42.0	45.0	43.0	45.0	48.0
1015	37.0	39.0	39.0	34.0	38.0	38.0	38.0	42.0
1018	27.0	32.0	31.0	30.0	31.0	27.0	30.0	30.0
1020	21.8	9.9	12.3	8.7	21.0	9.4	10.3	9.0
1021	3.2	1.1	1.4	2.1	2.5	1.4	1.2	3.1

DOWELL SONAR CALIPER SURVEY

WILLIAMS ENERGY COMPANY ADAMANA STORAGE TERMINAL APRIL 13,1979

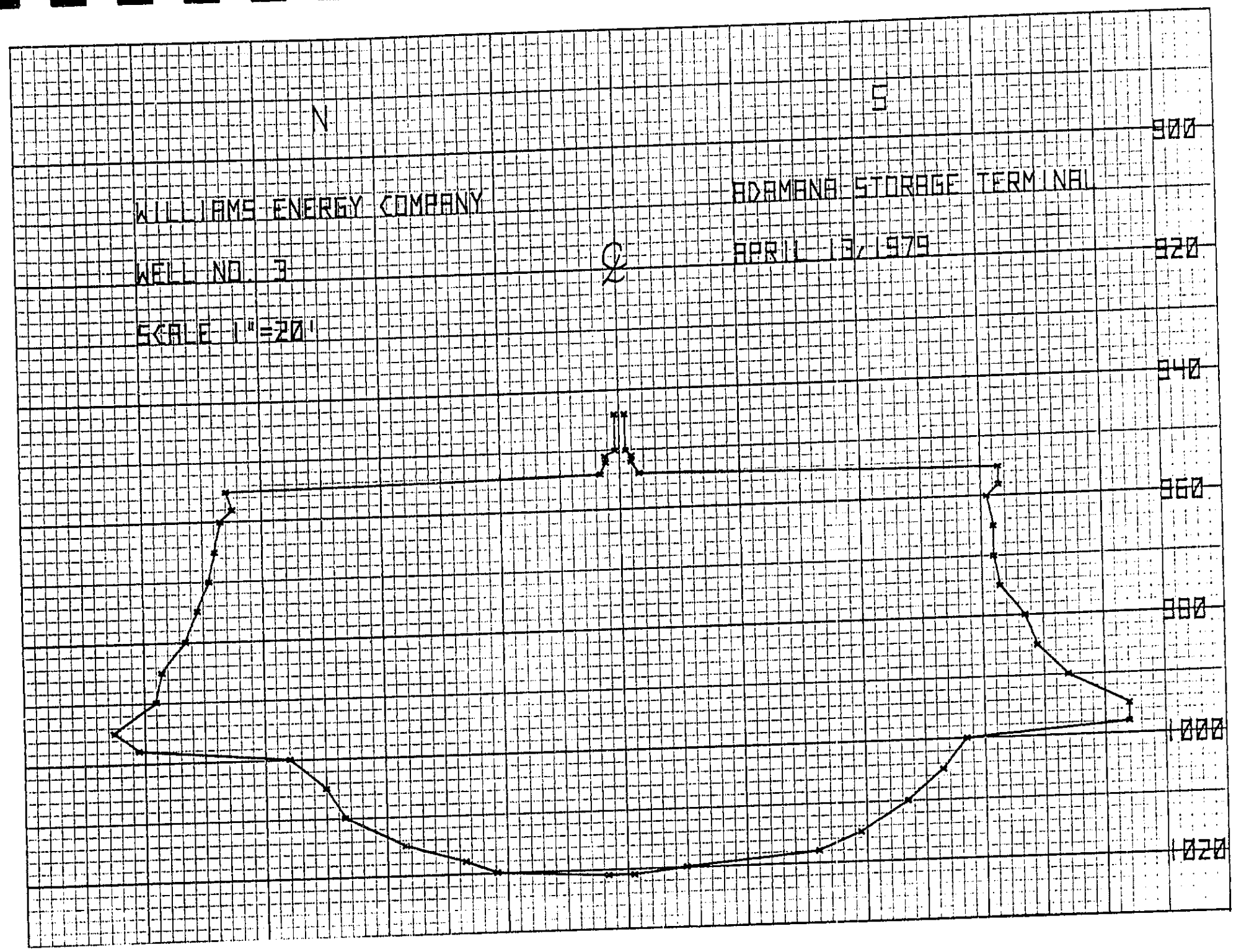
WELL NO: 3 JOB NO: 324

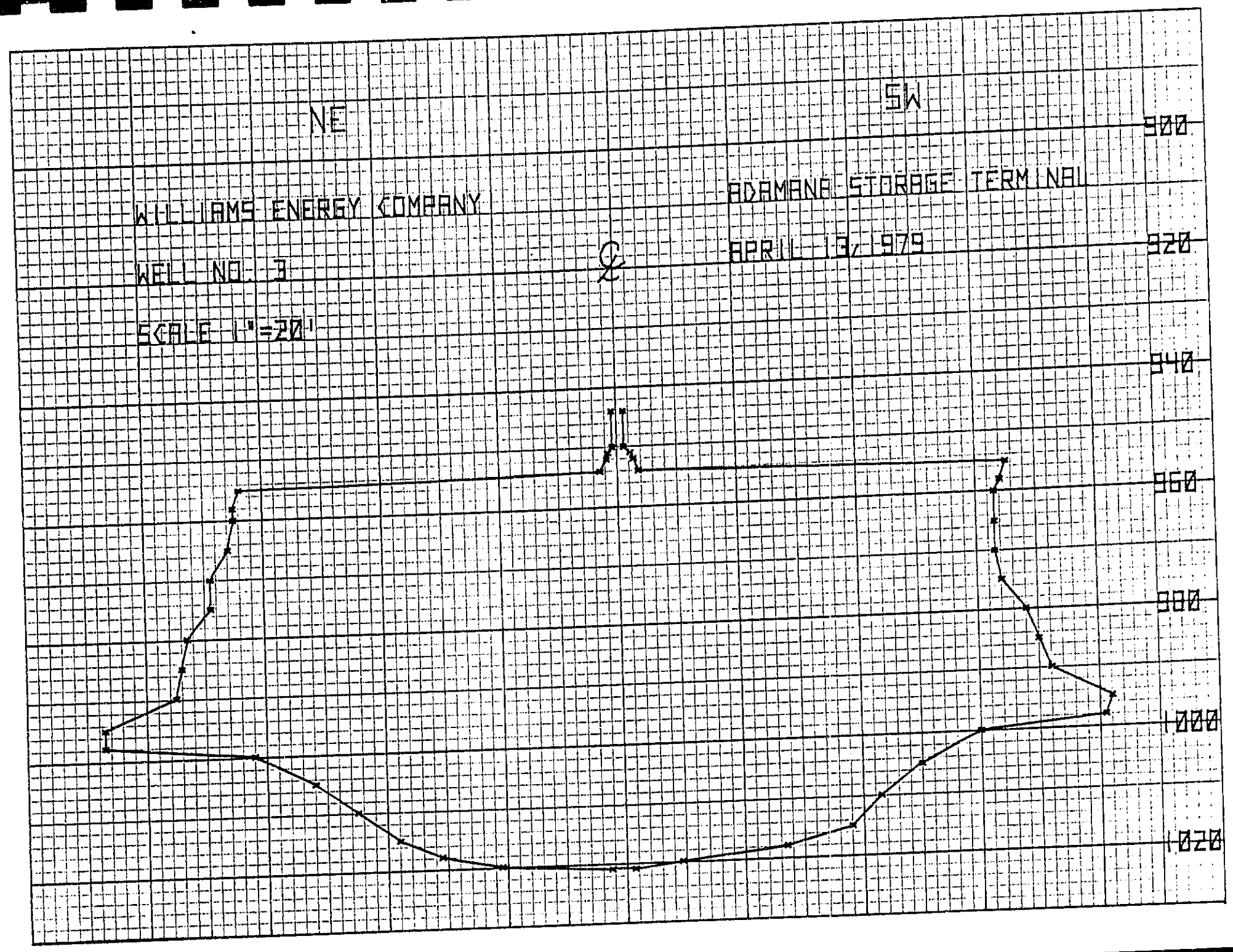
VOLUME CALCULATIONS

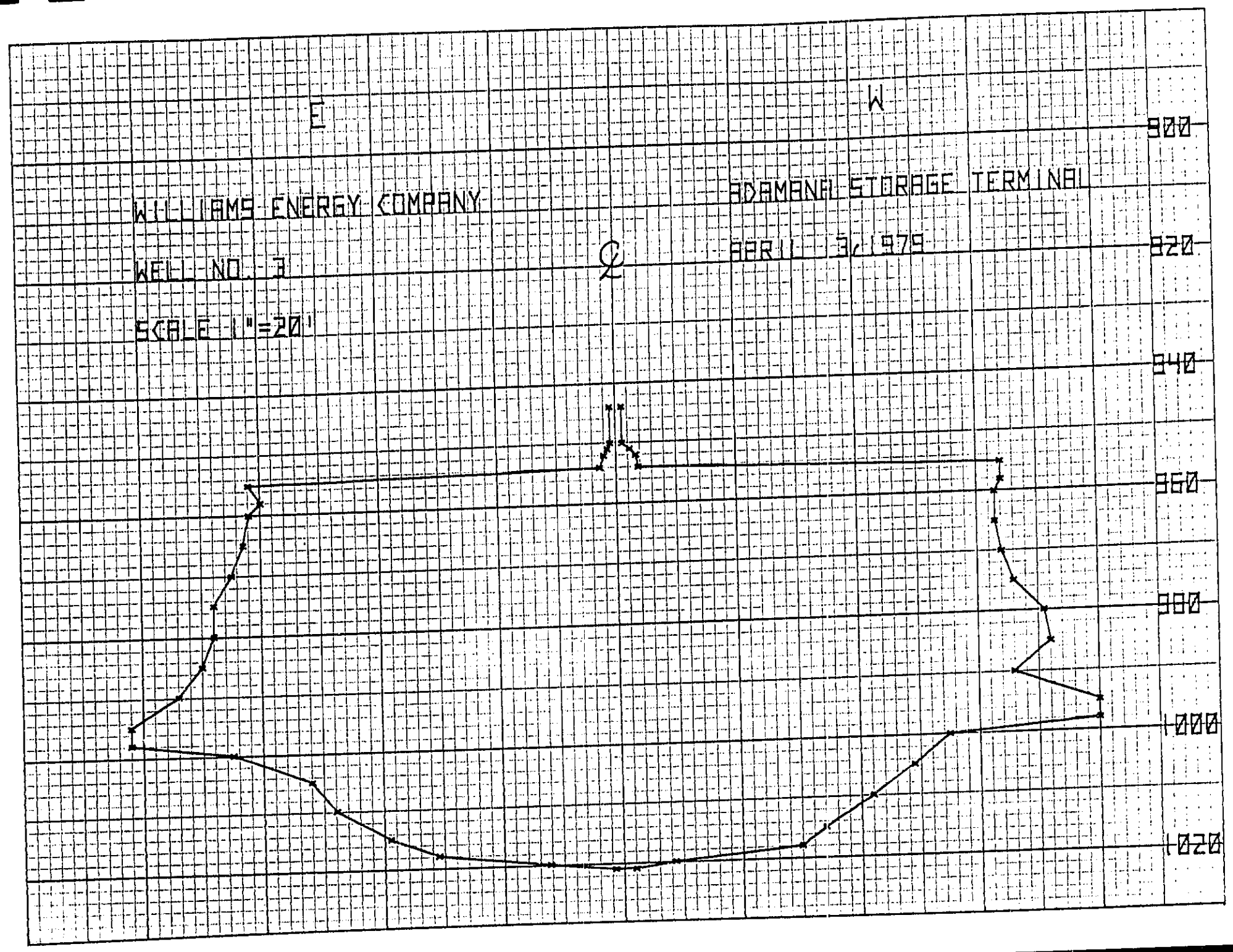
DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
944	0	0	0	0
950	17	17	3	3
951	8	25	1	4
952	17	42	3	7
954	52	94	9	17
955	4492	4586	800	817
958	38170	42755	6798	7614
960	25250	68005	4497	12111
965	63974	131978	11393	23504
970	65972	197950	11749	35253
975	67948	265898	12101	47354
980	72465	338363	12905	60259
985	78973	417336	14064	74323
990	81779	499115	14564	88887
995	94660	593775	16858	105745
998	64682	658456	11519	117265
1000	32116	690571	5720	122984
1005	48461	739031	8630	131614

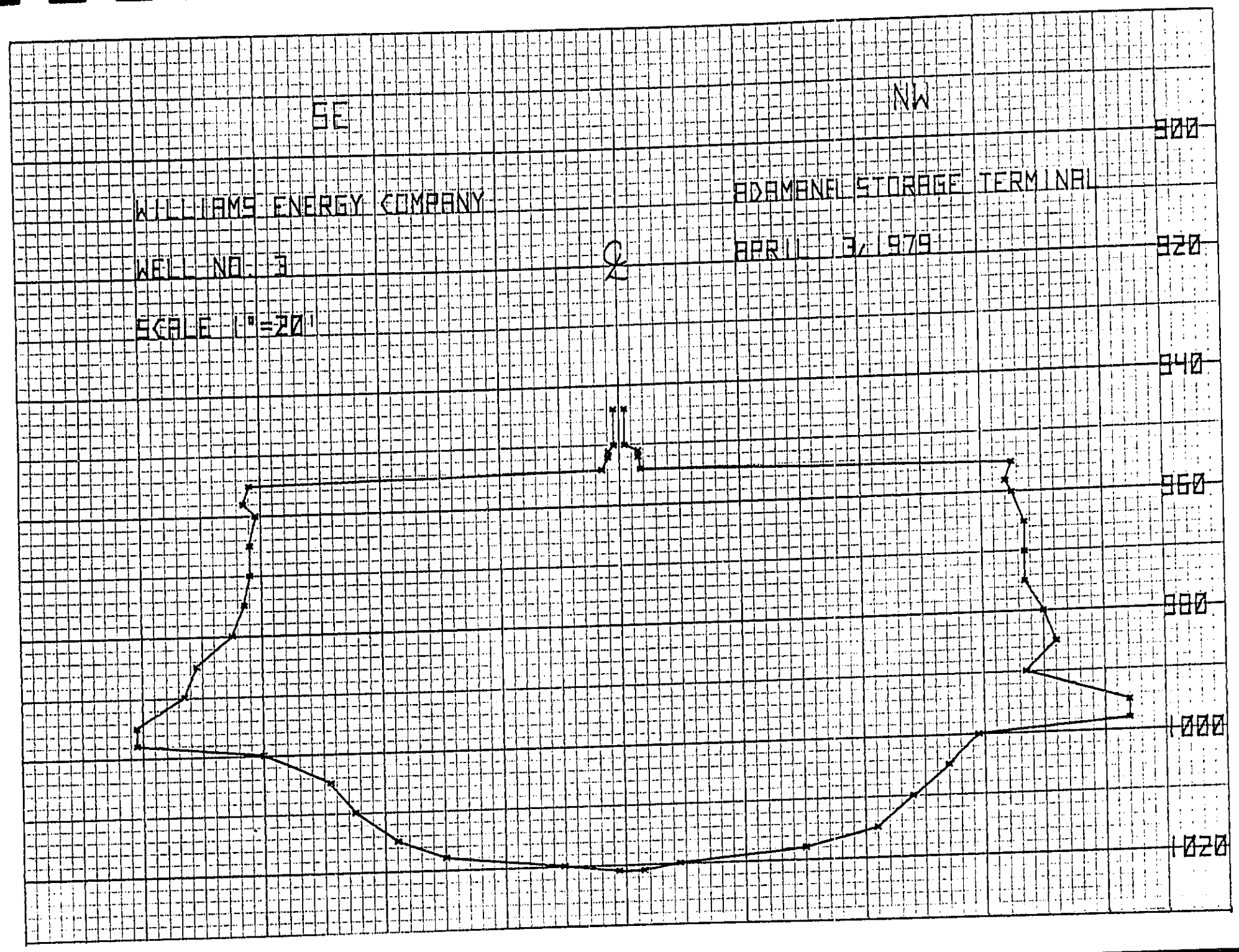
VOLUME CALCULATIONS

DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
1010	36869	775900	6566	138180
1015	27582	803482	4912	143093
1018	10627	814108	1892	144985
1020	2942	817050	524	145509
1021	228	817277	41	145550


N
S
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 3
APRIL 13, 1979
SCALE 1"=20'
900
920
940
960
980
1000
1020


NE
SW
900
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
APRIL 13, 1979
920
WELL NO. 3
℄
SCALE 1"=20'
940
960
980
1000
1020


E
W
WILLIAMS ENERGY COMPANY
ADAMANAL STORAGE TERMINAL
WEL NO. 3
APRIL 3, 1979
SCALE 1"=20'
900
920
940
960
980
1000
1020


SE
NW
WILLIAMS ENERGY COMPANY
ADAMANEL STORAGE TERMINAL
WELL NO. 3
APRIL 3, 1979
SCALE 1"=20'
900
920
940
960
980
1000
1020

DIGITAL SURVEYS, INC. 10700 CORPORATE DR. STE.100 STAFFORD, TX 77477
TELEPHONE (713)240-6777 FAX (713)240-6129

DIGITAL SURVEYS, INC.

SONAR SURVEY

AZ OIL & GAS
CONSERVATION COMMISSION
JUL 3 1991

FERRELLGAS

WELL NO. 3

MAY 29,1991

P/N 602

ADAMANA ARIZONA

SONAR OPERATOR:	JEFF A. CHILDRESS
HOIST OPERATOR:	JEFF A. CHILDRESS
JOB NO.:	221
PERMANENT DATUM:	B.H.F.
ZERO POINT:	B.H.F.
CASING DIA.:	9.625"
CASING DEPTH:	944.0'
INTERMEDIATE DIA.:	4.50"
INTERMEDIATE DEPTH:	1007.0'
TUBING DIA.:	N/A
TUBING DEPTH:	N/A
TOTAL DEPTH:	1008.0'
GAGE T.D.:	1008.0'
SONAR T.D.:	1008.0'

REMARKS: SONAR WAS PERFORMED THROUGH 4.5" TUBING

VOLUME REPORT

DEPTH feet	DEPTH meters	INCR ft³	TOTAL ft³	INCR gal	TOTAL gal	INCR bbls	TOTAL bbls
944	287.7	0	0	0.0	0	0.0	0
946	288.3	147	147	1099.6	1099	26.1	26
948	288.9	311	459	2326.4	3433	55.3	81
949	289.2	196	655	1466.1	4899	34.9	116
950	289.5	5470	6125	40918.3	45818	974.2	1090
951	289.8	14539	20664	108758.9	154577	2589.3	3680
952	290.1	14553	35218	108863.7	263448	2591.8	6272
954	290.7	29322	64540	219343.2	482791	5222.2	11494
956	291.3	30517	95057	228282.4	711073	5435.0	16929
958	291.9	33132	128190	247843.9	958925	5900.8	22830
960	292.6	35825	164015	267988.9	1226914	6380.4	29211
962	293.2	37337	201352	279299.4	1506213	6649.7	35860
964	293.8	38565	239918	288485.4	1794706	6868.4	42729
966	294.4	39783	279702	297596.7	2092310	7085.3	49814
968	295.0	40348	320050	301823.2	2394134	7185.9	57000
970	295.6	40943	360993	306274.1	2700408	7291.9	64292
972	296.2	42595	403589	318631.8	3019047	7586.1	71879
974	296.8	44796	448386	335096.4	3354151	7978.1	79857
976	297.4	46396	494782	347065.2	3701216	8263.1	88120
978	298.0	47856	542638	357986.8	4059203	8523.1	96643
980	298.7	48184	590823	360440.4	4419651	8581.5	105225
982	299.3	52313	643136	391327.3	4810978	9316.9	114542
984	299.9	56632	699769	423635.6	5234622	10086.1	124628
986	300.5	55316	755085	413791.3	5648413	9851.7	134480
988	301.1	52720	807805	394371.9	6042785	9389.4	143870
990	301.7	49703	857509	371803.2	6414596	8852.1	152722
992	302.3	46514	904023	347947.9	6762544	8284.1	161006
994	302.9	42691	946715	319350.0	7081901	7603.2	168609
996	303.5	38686	985401	289390.6	7371292	6889.9	175499
998	304.1	33140	1018542	247903.7	7619203	5902.2	181402
1000	304.8	28528	1047070	213403.7	7832607	5080.8	186483
1002	305.4	22971	1070041	171834.5	8004441	4091.1	190574
1004	306.0	14625	1084666	109402.3	8113844	2604.7	193179
1005	306.3	5130	1089797	38374.9	8152226	913.6	194092
1006	306.6	4047	1093844	30273.5	8182500	720.7	194813
1007	306.9	2169	1096014	16225.2	8198732	386.2	195200
1008	307.2	871	1096886	6515.5	8205255	155.1	195355

VOLUME REPORT

DEPTH feet	DEPTH meters	INCR ft^3	TOTAL ft^3	INCR m^3	TOTAL m^3	INCR bbls	TOTAL bbls
944	287.7	0	0	0.0	0	0.0	0
946	288.3	147	147	4.1	4	26.1	26
948	288.9	311	459	8.8	12	55.3	81
949	289.2	196	655	5.5	18	34.9	116
950	289.5	5470	6125	154.9	173	974.2	1090
951	289.8	14539	20664	411.7	585	2589.3	3680
952	290.1	14553	35218	412.1	997	2591.8	6272
954	290.7	29322	64540	830.3	1827	5222.2	11494
956	291.3	30517	95057	864.2	2692	5435.0	16929
958	291.9	33132	128190	938.2	3630	5900.8	22830
960	292.6	35825	164015	1014.5	4644	6380.4	29211
962	293.2	37337	201352	1057.3	5702	6649.7	35860
964	293.8	38565	239918	1092.1	6794	6868.4	42729
966	294.4	39783	279702	1126.6	7921	7085.3	49814
968	295.0	40348	320050	1142.6	9063	7185.9	57000
970	295.6	40943	360993	1159.5	10223	7291.9	64292
972	296.2	42595	403589	1206.2	11429	7586.1	71879
974	296.8	44796	448386	1268.6	12698	7978.1	79857
976	297.4	46396	494782	1313.9	14012	8263.1	88120
978	298.0	47856	542638	1355.2	15367	8523.1	96643
980	298.7	48184	590823	1364.5	16732	8581.5	105225
982	299.3	52313	643136	1481.5	18213	9316.9	114542
984	299.9	56632	699769	1603.8	19817	10086.1	124628
986	300.5	55316	755085	1566.5	21384	9851.7	134480
988	301.1	52720	807805	1493.0	22877	9389.4	143870
990	301.7	49703	857509	1407.5	24284	8852.1	152722
992	302.3	46514	904023	1317.2	25601	8284.1	161006
994	302.9	42691	946715	1209.0	26810	7603.2	168609
996	303.5	38686	985401	1095.5	27906	6889.9	175499
998	304.1	33140	1018542	938.5	28845	5902.2	181402
1000	304.8	28528	1047070	807.9	29653	5080.8	186483
1002	305.4	22971	1070041	650.5	30303	4091.1	190574
1004	306.0	14625	1084666	414.1	30717	2604.7	193179
1005	306.3	5130	1089797	145.2	30863	913.6	194092
1006	306.6	4047	1093844	114.6	30977	720.7	194813
1007	306.9	2169	1096014	61.4	31039	386.2	195200
1008	307.2	871	1096886	24.6	31063	155.1	195355

MAJOR COMPASS RADII

Depth & Radii in feet

DEPTH	TILT	N	NE	E	SE	S	SW	W	NW
944	90	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
946	90	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
948	90	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
949	90	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
950	90	72.1	73.2	60.5	59.5	67.2	71.9	68.7	67.7
951	90	70.7	73.2	60.9	60.5	69.9	68.3	69.9	71.9
952	90	70.7	73.2	60.9	60.5	69.9	68.3	69.9	71.9
954	90	69.7	74.4	71.5	59.7	62.8	71.7	67.0	68.3
956	90	72.9	74.0	72.5	61.3	65.4	75.2	69.3	71.7
958	90	75.6	77.6	76.8	75.8	65.6	76.4	75.8	74.8
960	90	73.2	78.2	79.5	75.8	76.2	76.6	78.2	74.8
962	90	76.4	78.9	79.7	76.8	76.6	77.2	78.4	75.6
964	90	76.8	78.4	81.3	81.3	79.7	78.0	78.2	77.6
966	90	77.6	80.3	83.7	82.5	79.9	78.6	79.3	79.1
968	90	76.6	78.4	81.5	83.5	81.7	79.3	80.1	79.5
970	90	81.9	78.2	80.7	83.7	82.5	81.1	82.5	81.5
972	90	81.1	80.9	79.9	84.1	84.8	87.4	82.1	82.1
974	90	84.2	84.6	81.9	87.0	86.4	85.8	85.8	85.0
976	90	86.0	86.6	86.4	86.4	89.0	87.8	85.2	86.0
978	90	84.8	88.4	85.8	88.0	90.1	90.3	86.8	89.6
980	90	85.1	85.8	84.6	87.3	92.7	88.2	86.7	85.3
982	90	98.4	91.7	92.1	97.6	94.3	95.1	96.2	99.2
984	90	95.6	90.7	91.3	98.6	92.3	97.2	95.4	98.6
986	90	93.5	89.9	92.5	97.6	89.8	92.1	94.7	95.4
988	90	92.5	87.8	92.1	91.3	89.2	89.6	90.3	90.5
990	90	92.1	85.0	85.6	91.1	84.6	88.8	87.6	90.3
992	90	89.4	78.7	81.1	88.6	80.7	89.2	83.7	85.4
994	90	84.4	74.4	70.7	88.0	78.2	85.6	81.1	85.4
996	90	75.0	66.6	74.4	78.4	77.2	82.7	77.4	77.2
998	90	74.6	58.3	75.0	71.7	51.6	76.2	75.2	74.6
1000	90	56.1	56.9	69.3	65.0	55.2	73.2	75.0	72.9
1002	90	24.3	57.9	59.1	46.7	65.6	69.7	71.1	26.5
1004	90	22.2	23.3	31.6	20.1	58.8	59.1	56.3	23.9
1005	90	22.2	23.3	31.6	20.1	58.8	59.1	56.3	23.9
1006	90	22.8	21.4	31.6	15.0	59.1	58.4	23.1	24.8
1007	90	19.0	21.6	24.1	13.3	27.8	22.0	16.2	10.3
1008	90	16.9	11.8	13.5	6.2	13.1	17.1	12.0	6.2

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 944 ft TILT: 90 degrees

0	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
45	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
90	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
135	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
180	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
225	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
270	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
315	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4

AZ DEPTH: 946 ft TILT: 90 degrees

0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
45	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
90	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
135	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
180	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
225	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
270	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
315	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1

AZ DEPTH: 948 ft TILT: 90 degrees

0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
45	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
90	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
135	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
180	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
225	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
270	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
315	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9

AZ DEPTH: 949 ft TILT: 90 degrees

0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
45	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
90	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
135	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
180	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
225	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
270	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
315	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9

AZ DEPTH: 950 ft TILT: 90 degrees

0	72.1	71.3	71.5	71.9	72.7	73.2	73.2	74.8	74.4
45	73.2	73.4	72.5	71.3	71.1	71.1	72.7	71.1	64.4
90	60.5	60.5	60.1	59.7	60.1	58.5	57.7	59.3	59.3
135	59.5	61.1	63.6	62.8	62.4	62.4	62.6	63.0	64.8
180	67.2	67.9	71.3	71.7	71.9	72.7	73.0	72.5	72.1
225	71.9	71.9	69.1	67.2	66.6	66.0	65.4	64.8	68.9
270	68.7	68.7	69.3	68.5	67.0	67.7	68.3	67.2	68.5
315	67.7	67.7	67.7	68.7	68.7	70.9	72.3	72.7	72.3

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 951 ft TILT: 90 degrees

0	70.7	71.9	72.5	73.2	74.6	74.8	74.4	73.0	73.2
45	73.2	69.5	69.5	69.9	68.9	71.1	68.5	69.9	61.5
90	60.9	60.3	58.3	56.9	56.5	57.5	56.7	57.9	58.9
135	60.5	61.1	60.9	61.3	62.6	64.8	64.6	65.8	68.1
180	69.9	70.3	69.9	70.9	69.7	70.3	69.1	69.7	68.5
225	68.3	68.5	68.9	68.1	67.3	67.7	68.5	68.1	70.1
270	69.9	69.5	69.1	68.5	68.9	69.3	69.7	71.7	71.7
315	71.9	70.7	70.9	70.1	70.7	70.9	71.5	71.1	70.7

AZ DEPTH: 952 ft TILT: 90 degrees

0	70.7	71.9	72.5	73.2	74.6	74.8	74.4	73.0	73.2
45	73.2	69.5	69.5	69.9	68.9	71.1	68.5	69.9	61.5
90	60.9	60.3	58.3	56.9	56.5	57.5	56.7	57.9	58.9
135	60.5	61.1	60.9	61.3	62.6	64.8	64.6	65.8	68.1
180	69.9	70.3	69.9	70.9	69.7	70.3	69.1	69.7	68.5
225	68.3	68.5	68.9	68.1	67.3	67.7	68.5	68.1	70.1
270	69.9	69.5	69.1	68.5	68.9	69.3	69.7	71.7	71.7
315	71.9	70.7	70.9	70.1	70.7	70.9	71.5	71.1	70.7

AZ DEPTH: 954 ft TILT: 90 degrees

0	69.7	71.5	73.0	72.7	71.3	71.3	71.3	73.2	73.6
45	74.4	75.4	74.8	73.4	73.4	72.9	71.9	70.1	70.3
90	71.5	70.1	68.3	64.0	62.2	61.5	60.3	59.7	59.3
135	59.7	59.1	59.7	60.1	61.7	61.8	62.0	63.4	61.8
180	62.8	64.8	66.4	66.6	72.3	70.1	71.5	71.7	72.3
225	71.7	71.5	71.9	71.5	72.3	70.3	69.1	69.5	67.9
270	67.0	68.9	69.7	69.7	68.9	68.7	67.7	67.5	67.3
315	68.3	67.9	69.3	70.3	68.9	68.5	69.9	69.9	71.7

AZ DEPTH: 956 ft TILT: 90 degrees

0	72.9	73.2	73.8	73.2	74.0	73.6	73.8	71.5	72.7
45	74.0	73.8	76.2	76.0	76.6	75.0	76.8	74.8	74.2
90	72.5	74.0	73.4	73.2	73.6	65.0	62.4	58.9	62.4
135	61.3	61.1	62.0	61.7	62.0	64.4	64.6	64.0	66.0
180	65.4	66.2	67.9	67.7	68.7	70.7	73.8	73.4	72.5
225	75.2	73.8	73.4	71.9	72.3	73.2	71.9	73.4	70.1
270	69.3	69.9	70.1	70.7	71.7	70.9	70.3	71.3	71.5
315	71.7	71.7	71.5	72.1	72.5	71.9	71.5	71.9	72.3

AZ DEPTH: 958 ft TILT: 90 degrees

0	75.6	74.4	75.2	74.8	74.4	76.0	75.8	75.8	76.8
45	77.6	75.2	77.2	77.0	77.6	77.6	78.0	78.4	76.8
90	76.8	77.8	77.8	76.4	74.8	74.4	74.0	73.0	75.8
135	75.8	76.0	76.2	73.6	62.6	63.8	62.8	62.6	63.4
180	65.6	67.9	69.9	75.2	75.6	75.0	74.8	75.0	73.8
225	76.4	77.2	76.8	77.6	76.6	76.2	75.8	76.0	76.0
270	75.8	75.2	73.8	74.8	75.0	74.8	74.8	74.8	75.2
315	74.8	75.0	74.6	73.2	72.7	73.0	73.8	73.6	73.8

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 960 ft TILT: 90 degrees

0	73.2	74.4	74.2	73.2	74.0	75.4	75.6	75.6	76.8
45	78.2	78.4	79.3	79.7	79.7	78.2	78.7	79.1	79.1
90	79.5	79.3	78.9	78.7	78.7	78.7	76.8	76.6	76.2
135	75.8	76.8	75.8	76.2	75.8	76.6	77.2	76.8	77.2
180	76.2	76.6	77.0	76.6	76.6	77.0	76.8	77.0	76.4
225	76.6	76.4	77.0	77.0	77.6	77.6	77.8	77.6	77.6
270	78.2	77.2	76.4	76.2	75.8	75.4	75.0	75.0	75.2
315	74.8	74.0	74.4	73.4	75.0	74.0	74.6	71.9	72.5

AZ DEPTH: 962 ft TILT: 90 degrees

0	76.4	76.4	77.6	78.0	77.0	78.6	78.7	78.7	78.6
45	78.9	79.3	80.1	78.7	79.1	79.3	78.6	80.1	79.7
90	79.7	79.5	80.7	79.5	79.7	78.4	76.8	77.6	78.0
135	76.8	78.0	77.2	76.8	77.0	76.8	77.0	77.4	77.0
180	76.6	77.4	75.6	76.4	76.4	76.0	77.2	76.6	77.2
225	77.2	76.8	77.6	77.4	78.9	78.4	78.7	77.8	78.4
270	78.4	78.0	76.6	77.0	76.2	75.6	76.8	74.8	75.6
315	75.6	75.6	75.6	76.2	76.4	75.6	75.0	75.4	77.0

AZ DEPTH: 964 ft TILT: 90 degrees

0	76.8	76.4	77.0	76.8	76.6	76.6	78.2	77.0	77.8
45	78.4	78.4	78.7	78.7	78.9	79.9	79.3	80.3	80.3
90	81.3	81.3	79.9	80.7	81.1	81.1	83.5	82.1	82.3
135	81.3	83.1	81.7	81.9	80.9	78.6	79.3	81.1	79.7
180	79.7	79.3	80.3	79.5	78.6	78.6	78.6	78.4	78.7
225	78.0	77.6	78.0	77.6	77.8	77.8	78.2	78.0	77.8
270	78.2	78.9	78.7	78.9	78.7	79.3	79.3	79.7	78.7
315	77.6	78.6	78.2	78.2	77.8	77.6	77.2	77.2	76.4

AZ DEPTH: 966 ft TILT: 90 degrees

0	77.6	78.6	80.3	79.1	78.2	78.4	78.9	79.5	79.1
45	80.3	79.9	80.7	80.9	80.9	82.1	81.1	81.3	82.1
90	83.7	81.5	83.7	83.5	82.9	83.1	82.9	82.5	82.7
135	82.5	81.3	81.7	80.9	80.9	80.7	78.9	79.5	79.7
180	79.9	78.9	79.3	79.3	79.3	79.7	80.3	78.6	78.2
225	78.6	79.1	79.5	78.4	79.1	80.3	80.1	80.3	80.7
270	79.3	79.9	80.3	80.3	80.1	79.3	78.6	79.1	79.5
315	79.1	78.9	78.7	77.2	76.6	76.6	77.2	77.6	77.8

AZ DEPTH: 968 ft TILT: 90 degrees

0	76.6	77.0	77.4	77.8	77.8	77.4	78.0	78.6	78.6
45	78.4	78.0	79.1	79.9	80.1	80.1	81.1	81.3	81.1
90	81.5	82.1	83.3	83.1	82.9	82.5	83.1	83.5	83.1
135	83.5	81.5	81.9	82.5	84.2	82.5	80.9	82.5	81.1
180	81.7	79.9	80.3	80.1	79.3	79.5	79.5	78.7	78.6
225	79.3	80.5	80.3	79.7	80.1	79.3	79.5	78.6	78.7
270	80.1	80.1	80.9	81.3	80.1	80.5	81.7	79.7	79.9
315	79.5	77.0	78.7	78.7	79.5	79.1	78.9	77.6	76.6

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 970 ft TILT: 90 degrees

0	81.9	80.9	79.7	80.3	79.5	80.1	78.9	78.6	78.2
45	78.2	77.6	78.2	78.6	79.7	79.7	78.7	80.1	79.9
90	80.7	81.5	81.3	82.3	82.3	82.3	82.5	82.9	83.7
135	83.7	83.9	83.5	84.2	84.1	83.9	83.7	83.7	83.1
180	82.5	83.7	83.5	82.9	85.0	81.5	81.5	80.7	81.3
225	81.1	81.5	79.7	79.7	80.7	81.3	80.7	81.3	81.5
270	82.5	81.5	81.1	80.7	79.5	79.7	81.1	81.7	81.5
315	81.5	80.5	81.7	80.7	80.3	80.1	79.5	78.2	79.5

AZ DEPTH: 972 ft TILT: 90 degrees

0	81.1	82.5	82.7	83.5	83.9	81.9	82.3	82.3	82.7
45	80.9	81.3	81.1	81.7	81.7	82.9	81.1	81.1	79.9
90	79.9	79.5	80.5	81.5	82.7	83.1	83.5	83.7	84.1
135	84.1	84.4	84.4	84.6	84.4	84.8	84.6	85.8	85.8
180	84.8	85.4	85.4	84.4	82.7	85.2	85.8	86.6	87.2
225	87.4	87.8	86.4	85.8	85.6	85.6	84.2	83.7	83.7
270	82.1	83.1	84.6	83.1	83.7	83.3	83.3	82.5	80.5
315	82.1	83.5	83.1	83.9	82.1	83.1	83.3	82.9	83.3

AZ DEPTH: 974 ft TILT: 90 degrees

0	84.2	84.8	85.4	85.4	84.8	84.4	85.0	85.8	84.8
45	84.6	86.4	84.8	84.6	83.3	83.1	82.3	82.9	81.7
90	81.9	83.1	84.2	84.1	85.0	85.8	86.6	85.8	85.6
135	87.0	86.8	87.0	87.8	88.8	86.4	87.4	86.2	86.4
180	86.4	86.0	85.8	86.8	86.8	87.0	86.0	85.8	86.4
225	85.8	85.6	85.4	85.6	85.4	84.6	84.4	84.4	86.0
270	85.8	85.6	85.2	85.8	85.0	85.2	85.0	86.2	85.8
315	85.0	85.2	85.6	85.8	84.6	86.0	84.8	84.2	84.1

AZ DEPTH: 976 ft TILT: 90 degrees

0	86.0	85.8	84.8	85.0	85.4	84.6	84.8	85.8	86.6
45	86.6	85.6	86.0	86.2	86.0	82.7	87.0	86.4	86.2
90	86.4	84.2	83.1	84.4	82.3	83.9	83.5	84.6	85.8
135	86.4	85.6	87.0	87.2	86.8	87.4	87.4	87.2	88.0
180	89.0	88.8	88.4	89.2	87.6	88.2	88.6	88.8	88.6
225	87.8	88.2	87.2	86.6	86.6	87.2	86.2	86.8	85.8
270	85.2	85.6	86.2	86.2	86.4	86.2	86.2	86.0	85.6
315	86.0	87.6	87.2	86.6	87.0	86.8	86.0	86.4	86.6

AZ DEPTH: 978 ft TILT: 90 degrees

0	84.8	86.8	86.0	87.6	87.8	87.6	87.2	86.6	87.6
45	88.4	88.6	88.6	87.2	87.2	87.6	85.4	84.8	84.2
90	85.8	83.7	87.0	86.4	86.2	86.4	88.2	87.0	88.2
135	88.0	89.2	88.2	88.6	89.6	90.5	89.9	90.9	91.1
180	90.1	89.2	92.3	90.7	90.1	90.5	90.7	90.1	89.9
225	90.3	88.0	87.0	86.2	86.2	88.0	87.6	89.9	86.2
270	86.8	86.6	87.0	87.4	88.0	88.4	89.0	89.9	89.9
315	89.6	89.4	88.8	88.4	88.0	87.8	87.2	87.0	87.0

5 DEGREE RADII REPORT

Radii in feet

AZ	DEPTH: 980 ft			TILT: 90 degrees					
0	85.1	85.8	86.1	84.8	83.6	83.6	83.6	87.6	86.2
45	85.8	86.4	86.4	86.6	86.9	86.6	84.6	84.7	83.8
90	84.6	82.9	87.6	86.3	84.4	86.1	85.4	89.4	87.0
135	87.3	88.0	87.8	88.2	90.1	91.1	91.2	91.5	93.7
180	92.7	93.8	93.1	91.0	90.4	89.3	85.9	87.5	88.1
225	88.2	88.9	87.3	87.1	86.3	85.6	86.3	86.2	86.3
270	86.7	86.9	87.7	87.7	85.9	85.2	85.4	85.5	86.9
315	85.3	84.8	86.5	85.5	85.6	85.4	85.3	85.5	85.5

AZ	DEPTH: 982 ft			TILT: 90 degrees					
0	98.4	97.8	96.4	94.9	95.3	94.5	92.7	91.5	91.7
45	91.7	91.7	91.9	91.5	90.7	90.9	90.7	91.3	91.3
90	92.1	92.5	91.7	92.3	93.1	93.3	93.9	94.7	97.6
135	97.6	99.2	98.4	98.6	98.0	94.7	95.3	94.7	96.6
180	94.3	92.3	93.7	95.6	94.1	94.7	93.3	94.9	94.3
225	95.1	94.5	93.7	90.9	96.6	96.8	96.0	96.0	95.1
270	96.2	96.0	97.0	96.6	97.8	97.8	98.8	97.8	99.6
315	99.2	101.1	101.3	101.7	97.0	99.0	98.4	100.0	99.2

AZ	DEPTH: 984 ft			TILT: 90 degrees					
0	95.6	94.9	95.3	94.9	92.1	91.1	89.9	89.2	90.5
45	90.7	89.4	88.4	86.0	87.4	88.0	88.0	88.6	89.8
90	91.3	91.7	90.7	93.3	94.3	95.3	95.6	96.0	96.8
135	98.6	99.4	98.0	97.6	96.2	95.8	95.4	95.8	93.9
180	92.3	91.9	92.9	96.2	95.6	96.0	100.2	97.8	93.9
225	97.2	94.9	93.3	93.9	93.9	93.3	93.3	93.5	93.9
270	95.4	96.0	95.8	96.2	98.8	96.2	96.6	97.2	97.8
315	98.6	98.4	98.2	98.0	97.4	97.0	96.4	96.0	95.6

AZ	DEPTH: 986 ft			TILT: 90 degrees					
0	93.5	94.3	93.3	89.8	86.6	88.0	89.4	90.1	89.8
45	89.9	84.6	84.4	83.9	85.6	86.8	87.8	88.8	91.9
90	92.5	93.7	95.3	96.4	96.6	97.0	96.4	98.6	98.2
135	97.6	97.2	96.2	93.9	93.3	92.9	90.9	89.2	89.9
180	89.8	91.5	91.9	101.1	103.1	100.8	100.6	95.6	93.7
225	92.1	91.9	91.7	91.9	91.3	91.1	92.3	91.7	93.9
270	94.7	92.1	91.9	90.7	92.5	94.7	93.1	96.2	95.8
315	95.4	95.1	95.1	95.4	96.0	97.6	94.5	93.3	94.3

AZ	DEPTH: 988 ft			TILT: 90 degrees					
0	92.5	89.4	85.0	86.0	88.4	89.2	87.6	84.8	84.4
45	87.8	87.8	86.8	83.7	84.4	86.8	86.4	89.0	92.1
90	92.1	95.1	93.3	94.9	93.9	92.9	93.1	92.3	91.9
135	91.3	89.4	87.0	87.0	86.8	86.0	86.2	86.6	87.4
180	89.2	88.6	90.7	93.9	100.0	93.7	92.1	89.9	90.1
225	89.6	88.4	89.2	89.6	89.2	89.8	91.5	90.9	91.3
270	90.3	89.6	90.5	89.9	89.6	89.9	89.6	89.0	88.8
315	90.5	90.7	93.3	91.5	89.9	90.3	91.1	91.7	92.1

5 DEGREE RADII REPORT

Radii in feet

AZ	DEPTH: 990 ft			TILT: 90 degrees					
0	92.1	92.7	92.5	91.9	84.6	84.6	83.1	84.6	88.2
45	85.0	85.2	82.9	82.1	79.3	78.9	81.1	81.9	83.7
90	85.6	85.4	85.8	86.6	87.2	89.9	89.8	89.8	91.3
135	91.1	89.8	86.4	89.8	87.2	86.8	86.6	86.2	84.1
180	84.6	83.7	85.2	85.6	84.4	88.8	89.4	94.7	91.9
225	88.8	87.6	86.8	85.8	86.8	87.8	86.6	87.4	88.2
270	87.6	90.1	88.4	92.5	92.1	91.5	91.1	91.1	90.9
315	90.3	89.9	89.4	89.8	90.1	90.7	90.9	91.3	91.7

AZ	DEPTH: 992 ft			TILT: 90 degrees					
0	89.4	89.4	90.1	85.4	81.9	83.3	80.5	78.4	78.6
45	78.7	78.4	80.9	83.1	78.7	76.2	76.8	76.6	78.6
90	81.1	81.9	80.5	81.7	82.7	85.2	86.2	87.2	89.0
135	88.6	85.8	85.4	85.0	84.2	83.7	83.1	82.5	83.1
180	80.7	80.3	79.9	80.7	81.3	82.3	84.8	89.8	92.7
225	89.2	87.4	85.2	84.1	83.5	84.2	84.1	84.1	83.7
270	83.7	87.0	87.0	88.6	88.2	87.6	87.2	86.4	86.0
315	85.4	85.0	84.6	82.7	84.4	87.2	85.4	88.2	87.8

AZ	DEPTH: 994 ft			TILT: 90 degrees					
0	84.4	84.1	83.7	84.4	84.2	77.8	76.4	77.6	74.6
45	74.4	78.6	76.6	63.4	62.0	61.3	61.8	64.2	67.3
90	70.7	77.8	80.1	79.7	79.5	82.5	82.7	82.3	86.2
135	88.0	86.8	83.9	83.3	83.1	77.4	84.6	82.9	78.6
180	78.2	78.2	76.0	79.5	81.1	81.1	82.3	86.2	86.8
225	85.6	85.2	83.1	81.7	81.1	81.1	81.1	80.5	80.7
270	81.1	81.7	82.5	83.3	84.1	83.5	84.4	84.8	85.0
315	85.4	85.6	86.0	85.8	85.2	84.8	84.2	83.9	83.7

AZ	DEPTH: 996 ft			TILT: 90 degrees					
0	75.0	79.9	81.7	78.7	78.7	78.0	74.2	75.0	74.0
45	66.6	60.3	59.3	60.1	59.9	59.7	60.5	60.7	66.8
90	74.4	74.8	74.8	75.8	76.6	78.4	77.8	77.0	77.8
135	78.4	78.7	78.4	77.8	77.6	78.4	78.6	79.1	77.6
180	77.2	78.6	77.8	78.4	79.1	79.7	84.1	80.5	81.3
225	82.7	80.5	78.7	77.2	78.2	78.6	78.2	76.8	77.6
270	77.4	77.0	75.8	78.4	76.4	78.2	80.9	81.7	81.7
315	77.2	78.6	81.1	77.8	76.8	75.6	75.6	77.2	74.8

AZ	DEPTH: 998 ft			TILT: 90 degrees					
0	74.6	70.5	56.3	55.0	53.6	55.6	57.7	57.3	58.3
45	58.3	57.9	58.3	59.1	59.7	64.4	72.5	73.2	73.6
90	75.0	75.8	76.6	77.2	77.6	76.6	77.2	74.0	73.2
135	71.7	67.9	65.6	57.5	37.5	40.6	39.4	38.5	45.1
180	51.6	58.7	64.0	73.2	79.5	76.8	75.8	75.8	75.4
225	76.2	75.6	76.2	75.0	75.4	75.0	73.6	74.2	74.6
270	75.2	75.4	76.6	76.0	76.8	76.8	76.0	75.6	73.6
315	74.6	71.7	71.7	72.1	73.6	72.7	76.8	79.1	77.4

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 1000 ft TILT: 90 degrees

0	56.1	55.6	55.0	53.8	53.2	53.4	54.8	54.8	56.0
45	56.9	56.9	57.1	58.3	58.7	59.5	64.4	68.5	68.9
90	69.3	69.9	74.4	75.8	74.4	71.3	63.0	69.3	68.9
135	65.0	64.8	54.0	42.2	40.6	40.2	42.2	45.5	49.7
180	55.2	58.3	64.6	66.8	73.6	72.9	73.8	72.9	72.9
225	73.2	71.5	73.0	73.4	73.4	73.2	72.5	75.0	75.0
270	75.0	76.0	76.2	74.6	74.2	71.7	71.9	74.0	71.9
315	72.9	67.0	71.1	70.7	68.7	66.0	61.8	60.1	59.5

AZ DEPTH: 1002 ft TILT: 90 degrees

0	24.3	21.0	20.8	32.6	33.2	53.2	54.2	54.0	56.1
45	57.9	58.3	58.3	53.2	56.3	56.9	57.3	58.1	58.5
90	59.1	59.5	56.7	53.6	49.5	49.1	49.1	46.7	48.1
135	46.7	44.9	46.5	45.3	47.3	48.5	50.5	51.8	62.2
180	65.6	69.3	70.7	71.3	70.3	68.7	70.3	69.5	69.7
225	69.7	70.3	68.1	68.3	67.0	68.3	70.5	72.3	70.1
270	71.1	70.9	69.1	68.5	66.0	66.0	64.6	63.0	29.2
315	26.5	24.9	24.9	22.4	22.0	23.9	24.9	26.9	26.1

AZ DEPTH: 1004 ft TILT: 90 degrees

0	22.2	22.6	22.2	24.1	28.8	27.1	25.4	23.1	23.9
45	23.3	23.9	26.0	28.8	33.9	34.4	34.3	33.5	33.3
90	31.6	31.1	30.7	29.9	30.5	29.0	25.8	24.8	26.0
135	20.1	19.6	22.2	24.6	26.5	30.3	37.7	38.2	38.6
180	58.8	57.4	57.3	58.2	59.1	58.6	61.2	60.6	59.7
225	59.1	58.6	58.4	59.7	60.6	62.5	59.0	57.1	55.6
270	56.3	55.4	56.5	56.9	65.5	45.8	42.2	29.2	25.0
315	23.9	22.8	19.9	22.9	24.8	23.9	22.6	22.6	21.6

AZ DEPTH: 1005 ft TILT: 90 degrees

0	22.2	22.6	22.2	24.1	28.8	27.1	25.4	23.1	23.9
45	23.3	23.9	26.0	28.8	33.9	34.4	34.3	33.5	33.3
90	31.6	31.1	30.7	29.9	30.5	29.0	25.8	24.8	26.0
135	20.1	19.6	22.2	24.6	26.5	30.3	37.7	38.2	38.6
180	58.8	57.4	57.3	58.2	59.1	58.6	61.2	60.6	59.7
225	59.1	58.6	58.4	59.7	60.6	62.5	59.0	57.1	55.6
270	56.3	55.4	56.5	56.9	65.5	45.8	42.2	29.2	25.0
315	23.9	22.8	19.9	22.9	24.8	23.9	22.6	22.6	21.6

AZ DEPTH: 1006 ft TILT: 90 degrees

0	22.8	24.1	18.6	17.9	17.9	18.2	19.9	18.8	19.0
45	21.4	21.4	26.0	29.2	29.7	30.5	32.9	32.9	31.2
90	31.6	31.4	31.4	30.9	30.9	25.6	19.0	20.3	18.0
135	15.0	14.8	16.3	20.7	23.7	24.6	26.5	26.3	38.6
180	59.1	58.2	58.8	59.1	59.0	57.6	58.4	59.1	59.5
225	58.4	32.4	28.8	25.4	26.9	27.7	25.6	23.5	21.6
270	23.1	22.2	23.7	23.7	20.3	19.4	23.7	27.5	29.2
315	24.8	26.0	22.6	23.7	23.3	23.5	22.4	22.6	21.8

5 DEGREE RADII REPORT

Radii in feet

AZ	DEPTH: 1007 ft			TILT: 90 degrees					
0	19.0	16.7	16.0	14.5	14.8	16.0	18.2	17.7	19.0
45	21.6	19.6	19.7	21.6	23.9	22.0	23.5	24.8	23.1
90	24.1	27.1	26.5	28.6	12.0	9.0	8.6	8.6	12.4
135	13.3	11.4	11.4	12.0	12.4	15.0	17.3	23.9	26.2
180	27.8	37.8	33.7	34.8	20.9	20.9	22.4	22.8	23.7
225	22.0	22.4	23.1	24.3	23.3	20.9	22.8	22.2	18.8
270	16.2	16.7	17.1	17.9	17.9	17.3	16.0	18.2	23.3
315	10.3	9.6	9.6	10.5	14.3	14.1	22.9	21.4	22.9

AZ	DEPTH: 1008 ft			TILT: 90 degrees					
0	16.9	11.3	10.3	10.1	10.1	10.1	10.3	10.3	11.1
45	11.8	13.1	14.3	14.3	13.7	14.1	13.9	13.7	13.5
90	13.5	12.0	9.9	7.9	6.9	6.9	6.9	6.0	6.0
135	6.2	6.0	6.0	6.0	6.4	6.9	7.3	7.5	9.8
180	13.1	13.9	23.3	28.6	29.5	20.1	19.6	19.4	19.2
225	17.1	16.5	16.3	6.7	15.0	15.2	15.4	14.3	12.8
270	12.0	10.5	10.1	9.8	9.8	9.8	9.0	6.0	6.2
315	6.2	7.5	8.8	7.3	6.2	6.4	6.2	7.7	12.2

MAXIMUM HORIZONTAL RADII

AZM deg	RADIUS ft	DEPTH ft
0	98.4	982
2	98.4	982
4	98.0	982
6	97.6	982
8	97.8	982
10	96.4	982
12	95.3	982
14	95.4	984
16	95.3	982
18	95.6	982
20	95.3	982
22	94.3	982
24	95.6	982
26	93.5	982
28	93.3	982
30	92.7	982
32	92.5	982
34	91.7	982
36	91.3	982
38	91.7	982
40	91.7	982
42	91.3	982
44	91.5	982
46	92.1	982
48	91.9	982
50	91.7	982
52	91.7	982
54	91.9	982
56	91.9	982
58	92.1	982
60	91.5	982
62	90.5	982
64	90.7	982
66	90.7	982
68	90.7	982
70	90.9	982
72	90.9	982
74	90.5	982
76	90.9	982
78	91.3	982
80	91.3	982
82	91.1	982
84	91.3	982
86	94.1	988
88	92.7	986
90	92.5	986
92	97.6	988
94	96.8	988
96	94.9	986
98	96.2	986
100	95.3	986
102	96.4	986
104	97.0	986
106	95.8	986
108	95.6	986
110	96.6	986
112	97.0	986
114	97.0	986
116	97.0	986
118	96.8	986
120	96.4	986
122	99.2	986
124	98.8	986
126	98.6	986
128	98.4	986
130	98.2	986
132	98.2	982
134	98.0	984
136	99.4	984
138	99.2	984
140	99.4	984
142	99.8	982
144	99.8	982
146	97.8	984
148	97.6	984
150	98.6	982
152	98.0	982
154	97.8	982
156	98.4	982
158	96.2	982
160	95.8	984
162	95.4	982
164	96.0	984
166	95.3	982
168	96.4	984
170	95.8	984
172	94.9	982
174	96.6	982
176	96.6	982
178	95.4	982

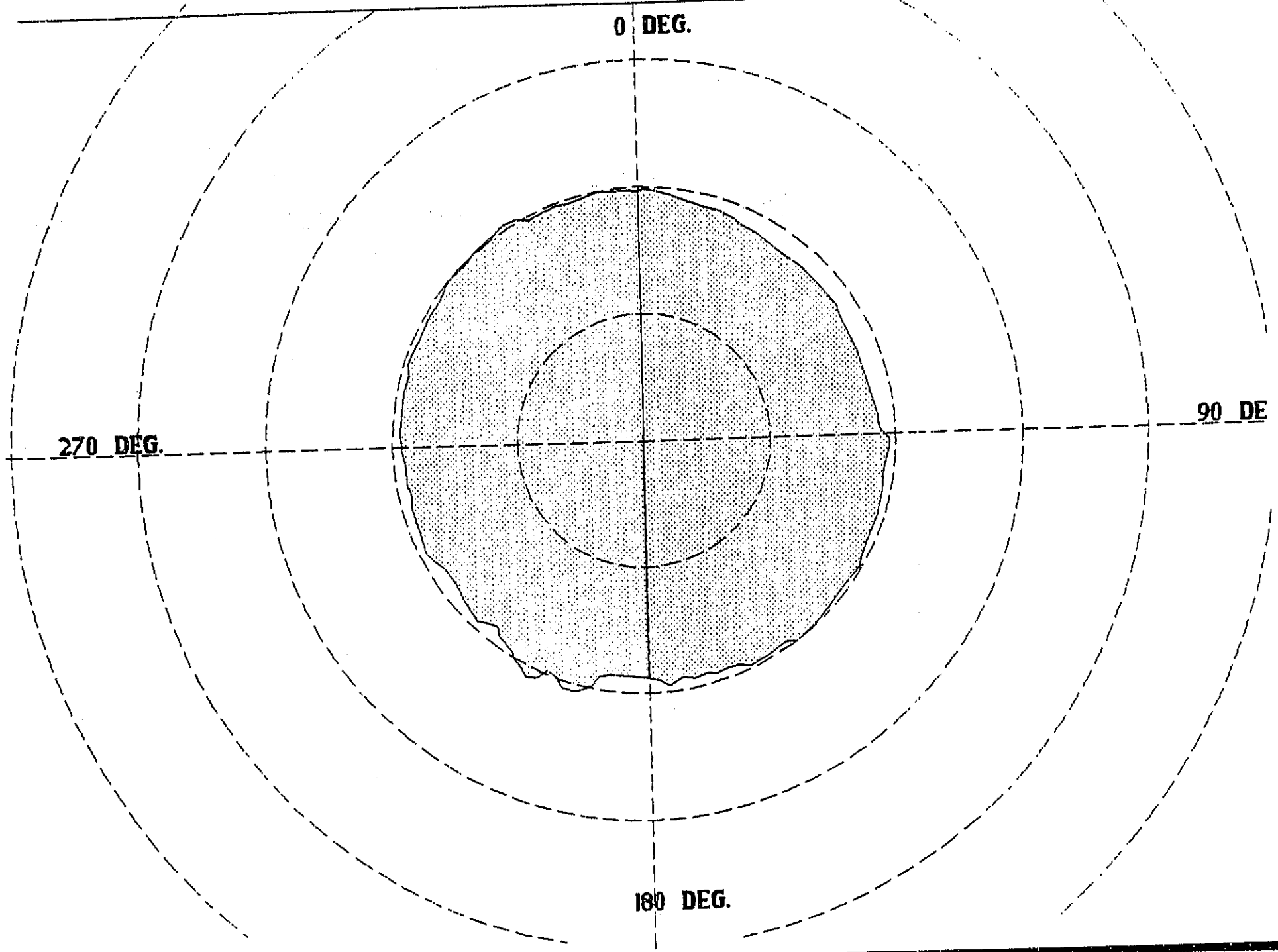
MAXIMUM HORIZONTAL RADII

AZM deg	RADIUS ft	DEPTH ft
180	94.3	982
182	94.2	980
184	93.6	980
186	94.0	980
188	93.5	982
190	93.7	982
192	94.5	982
194	99.4	986
196	102.9	986
198	103.5	986
200	103.1	986
202	100.2	986
204	97.2	986
206	104.5	986
208	104.5	986
210	100.6	986
212	101.3	984
214	98.0	986
216	98.0	984
218	95.4	990
220	94.3	982
222	95.1	984
224	97.8	984
226	96.6	984
228	95.3	984
230	94.9	984
232	94.1	982
234	93.7	984
236	94.3	982
238	93.5	984
240	93.9	984
242	96.8	982
244	96.8	982
246	96.6	982
248	96.2	982
250	96.8	982
252	95.3	982
254	96.4	982
256	95.8	982
258	95.6	982
260	96.0	982
262	95.6	982
264	94.7	982
266	95.4	982
268	95.6	982
270	96.2	982
272	96.8	982
274	96.0	982
276	96.6	984
278	97.2	982
280	97.0	982
282	97.2	982
284	96.6	982
286	97.2	984
288	96.6	982
290	98.8	984
292	97.2	982
294	97.6	982
296	98.0	982
298	97.4	982
300	98.8	982
302	98.2	982
304	97.8	982
306	97.8	982
308	99.2	982
310	99.6	982
312	100.2	982
314	99.4	982
316	99.2	982
318	99.8	982
320	101.1	982
322	101.1	982
324	101.1	982
326	101.5	982
328	102.7	982
330	101.7	982
332	99.0	982
334	97.6	982
336	97.4	984
338	97.8	982
340	99.0	982
342	98.2	982
344	97.8	982
346	99.0	982
348	97.0	982
350	100.0	982
352	99.0	982
354	99.2	982
356	99.2	982
358	97.6	982

Maximum radius : 104.5
On Azmuth deg : 208

SCALE : 1" = 50'

MAXIMUM RADIUS PLOT



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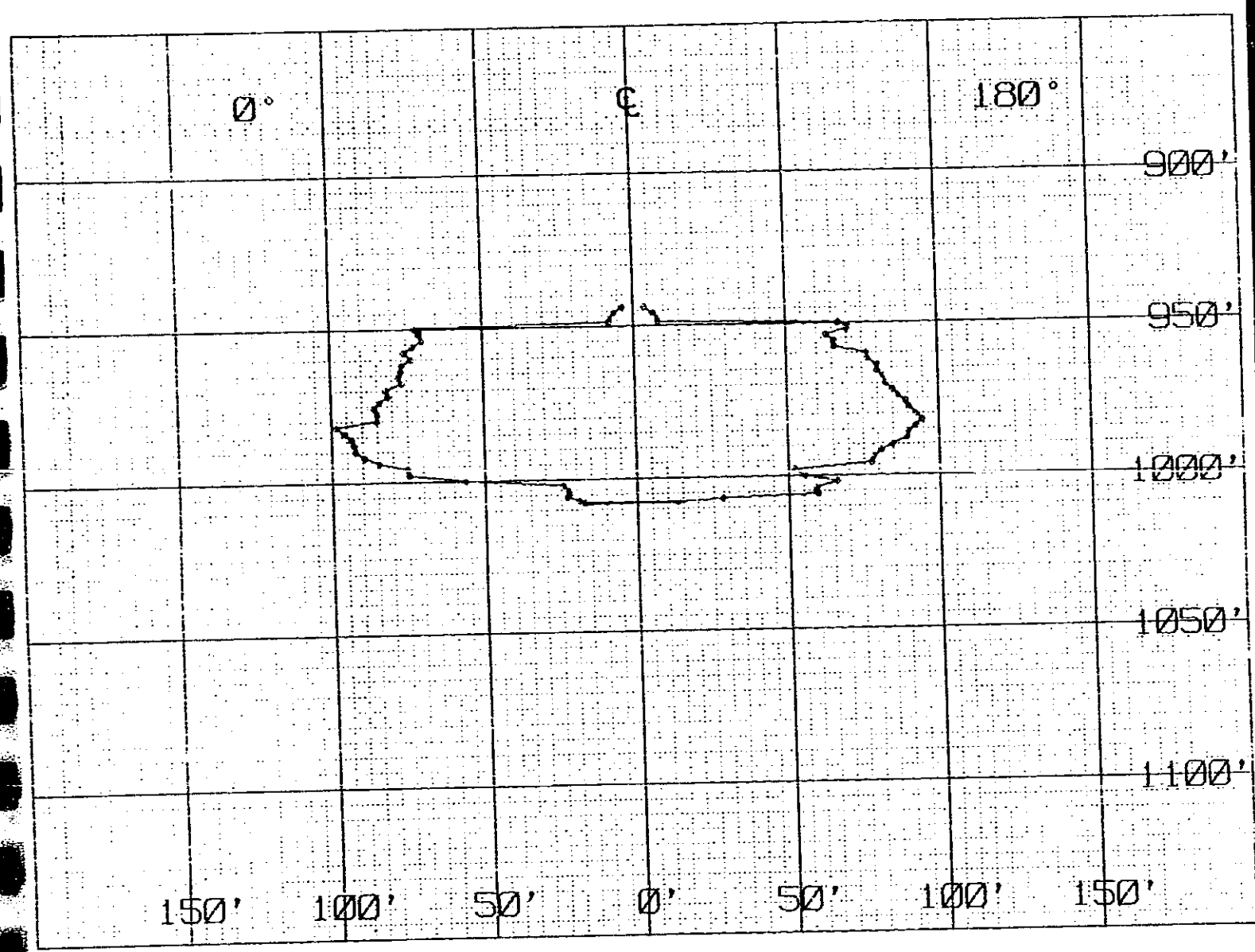

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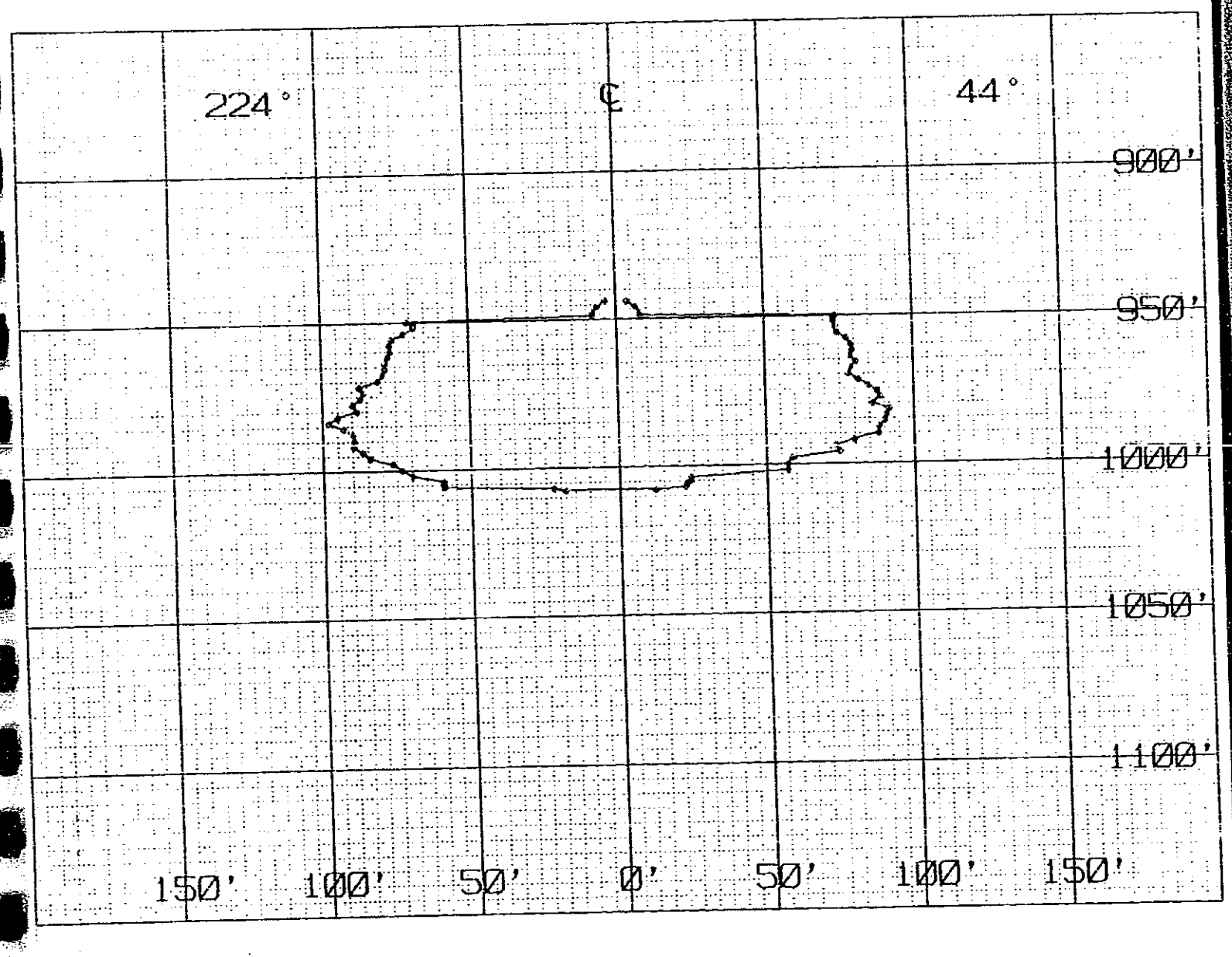

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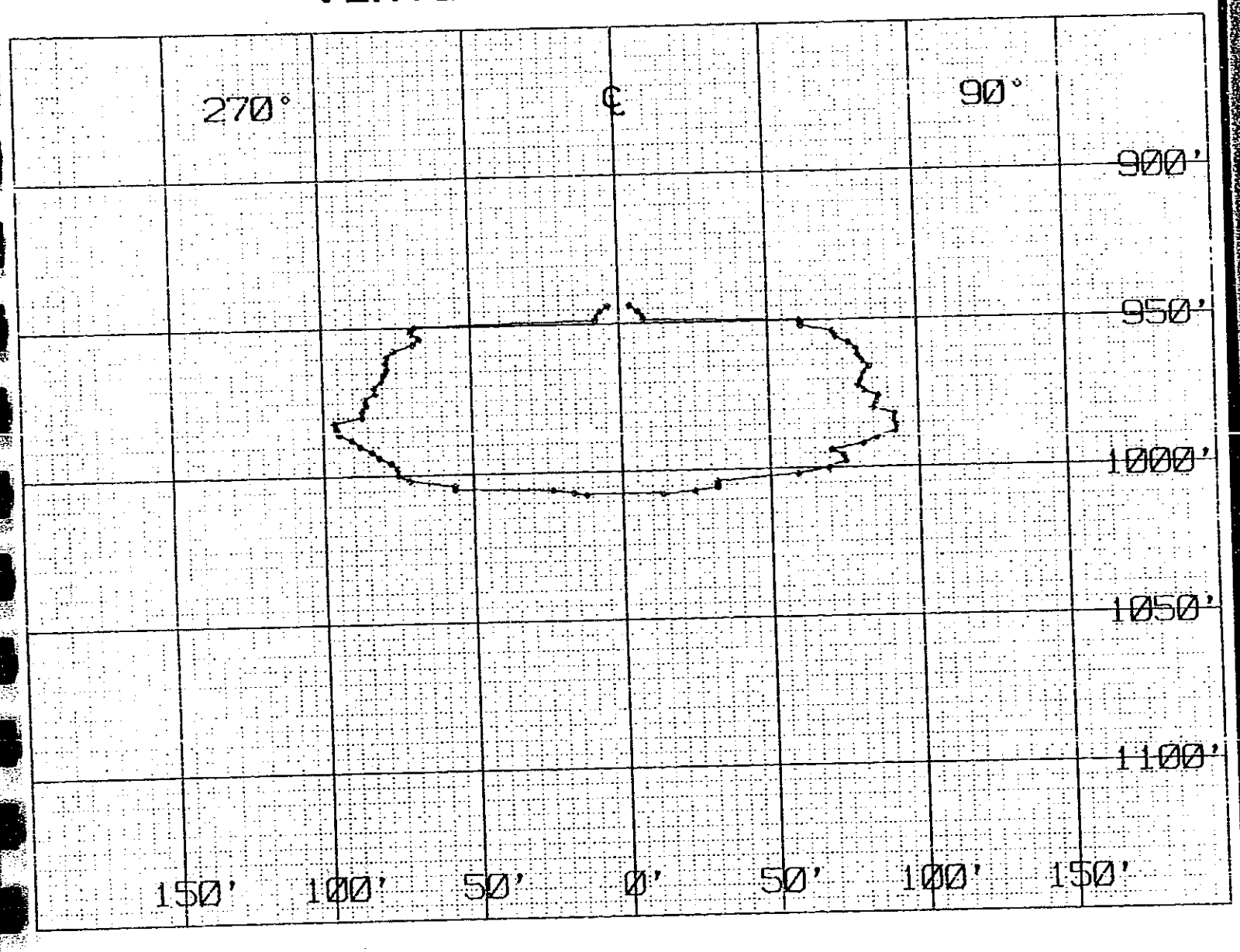

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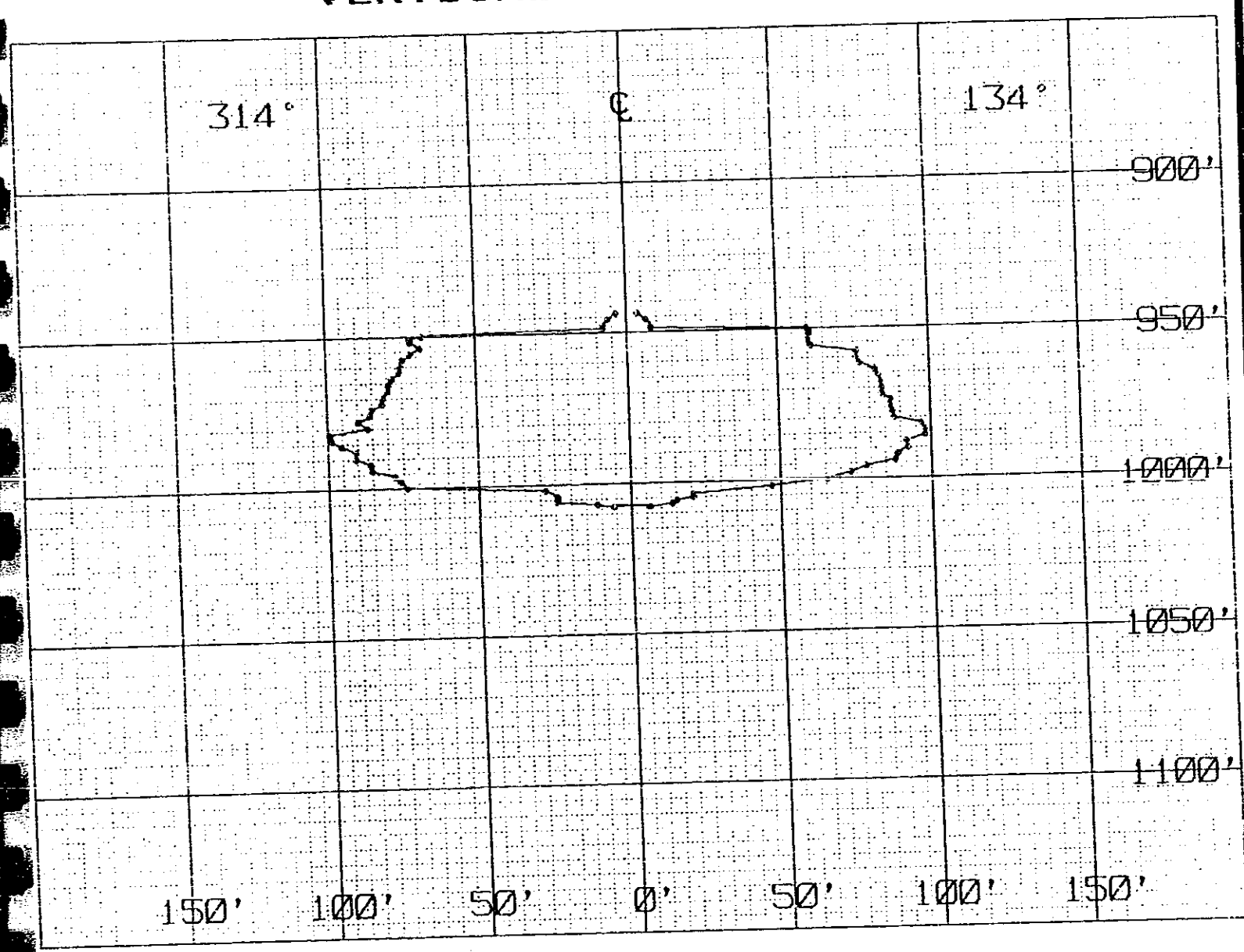

DIGITAL SURVEYS, INC.

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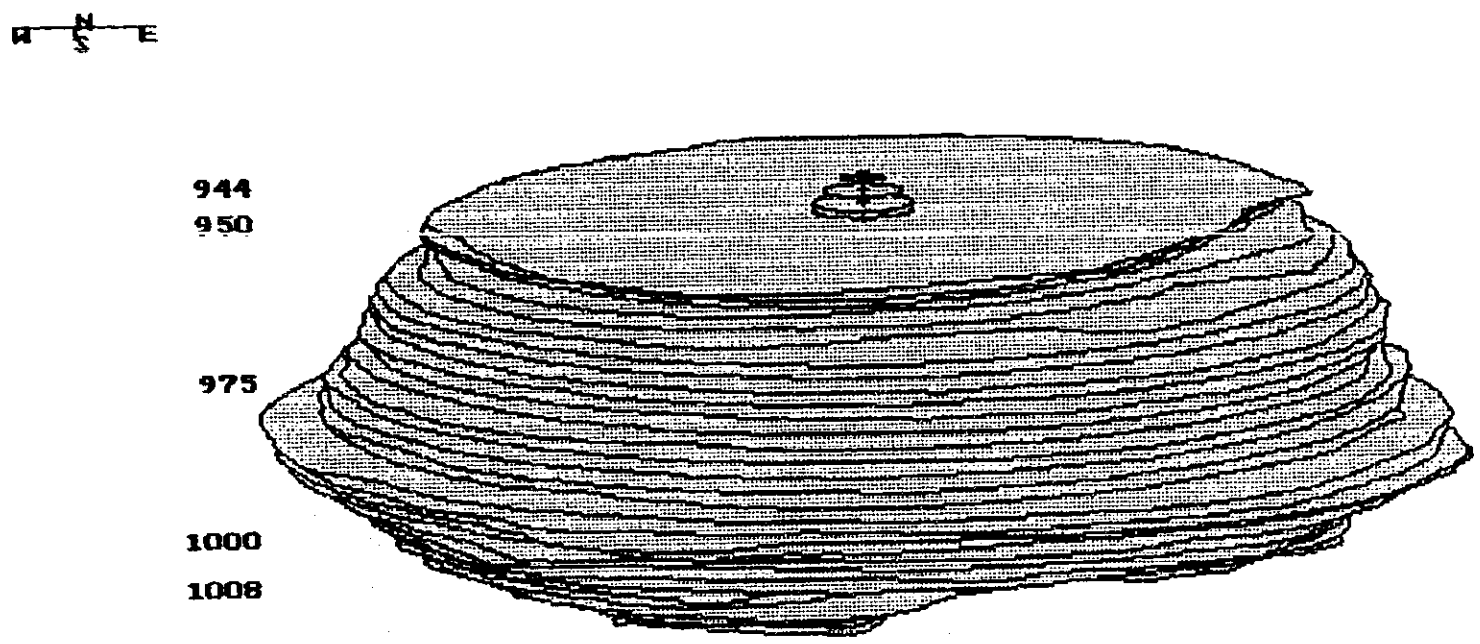

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DIGITAL SURVEYS, INC.

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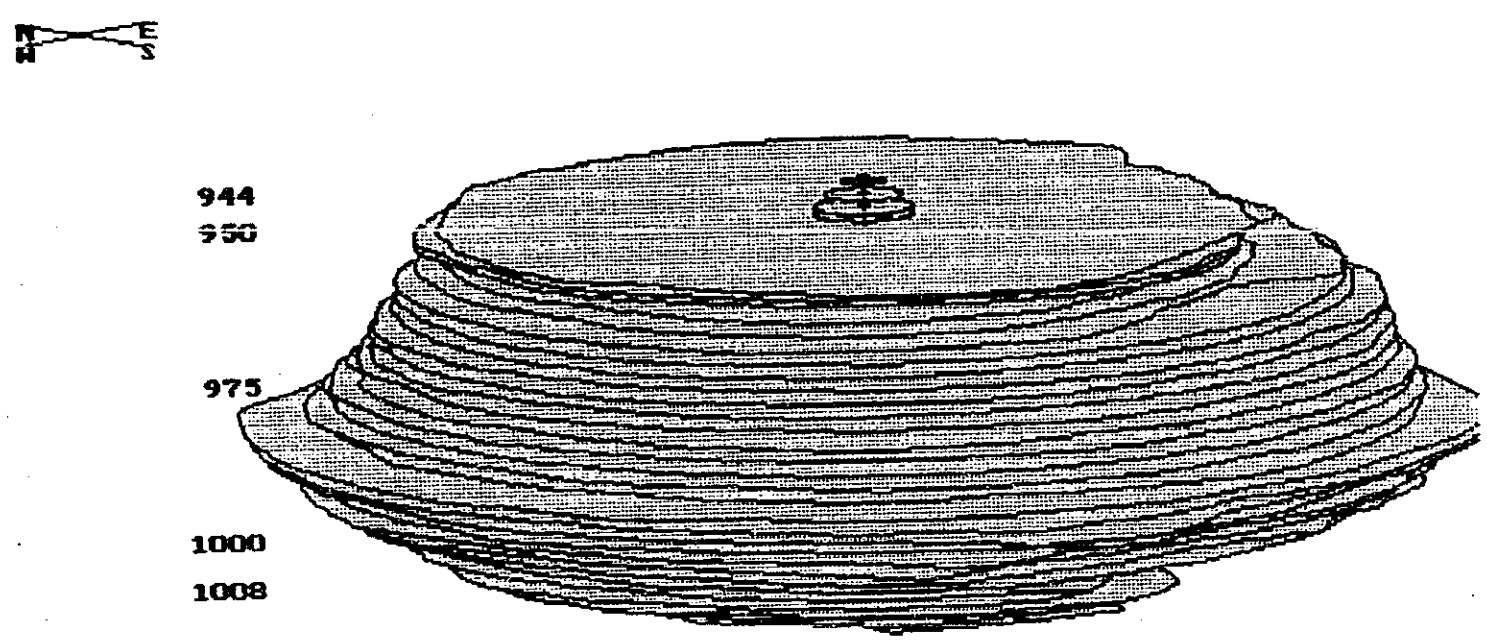

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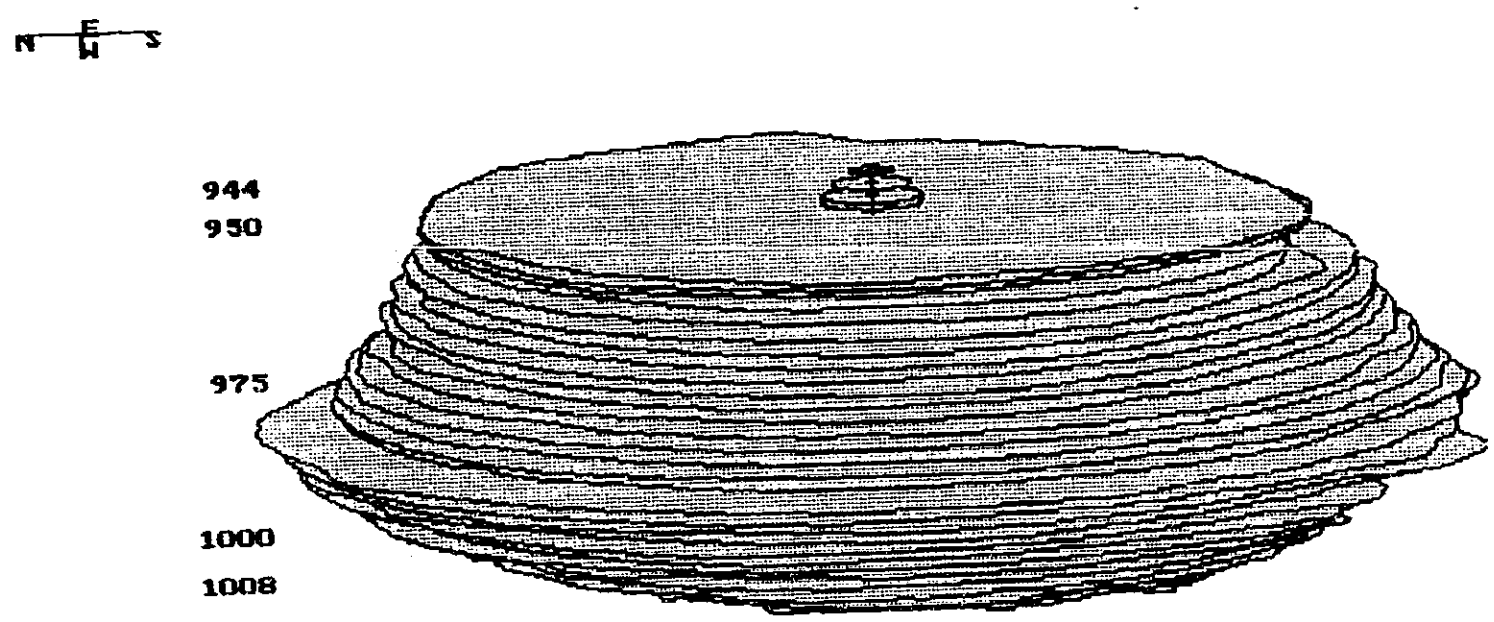

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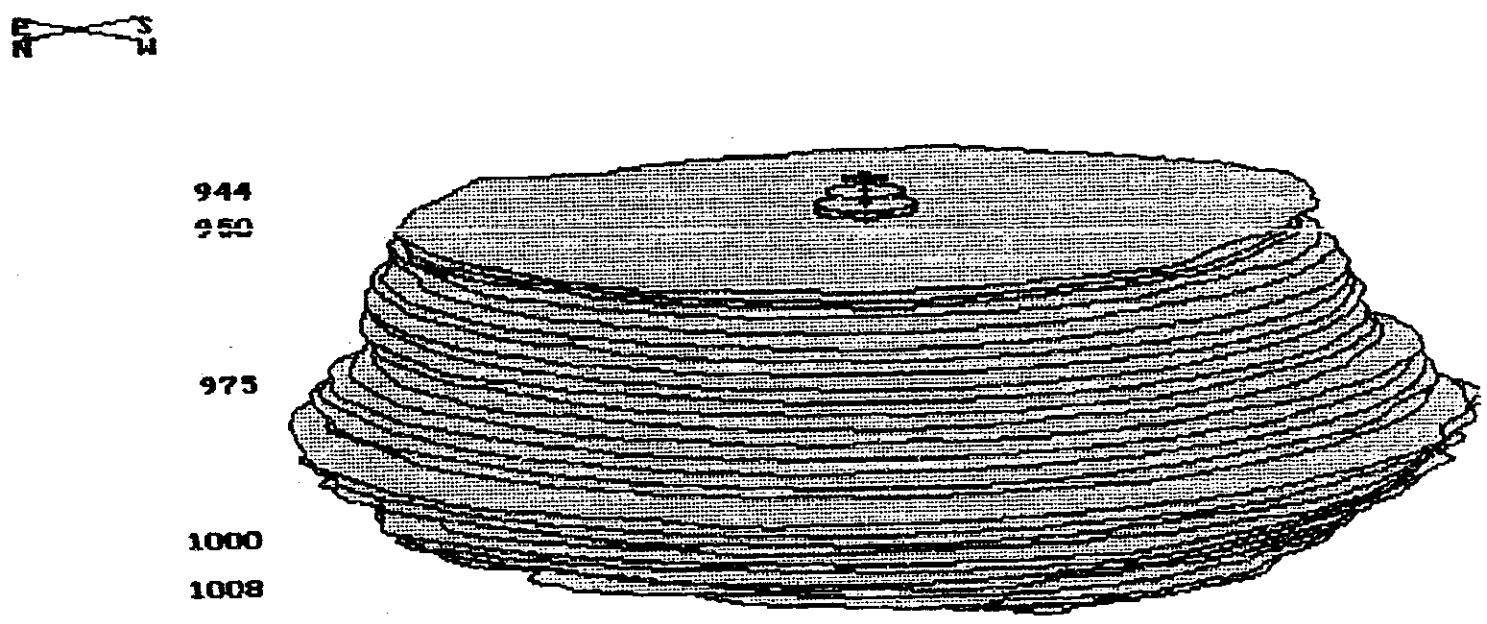

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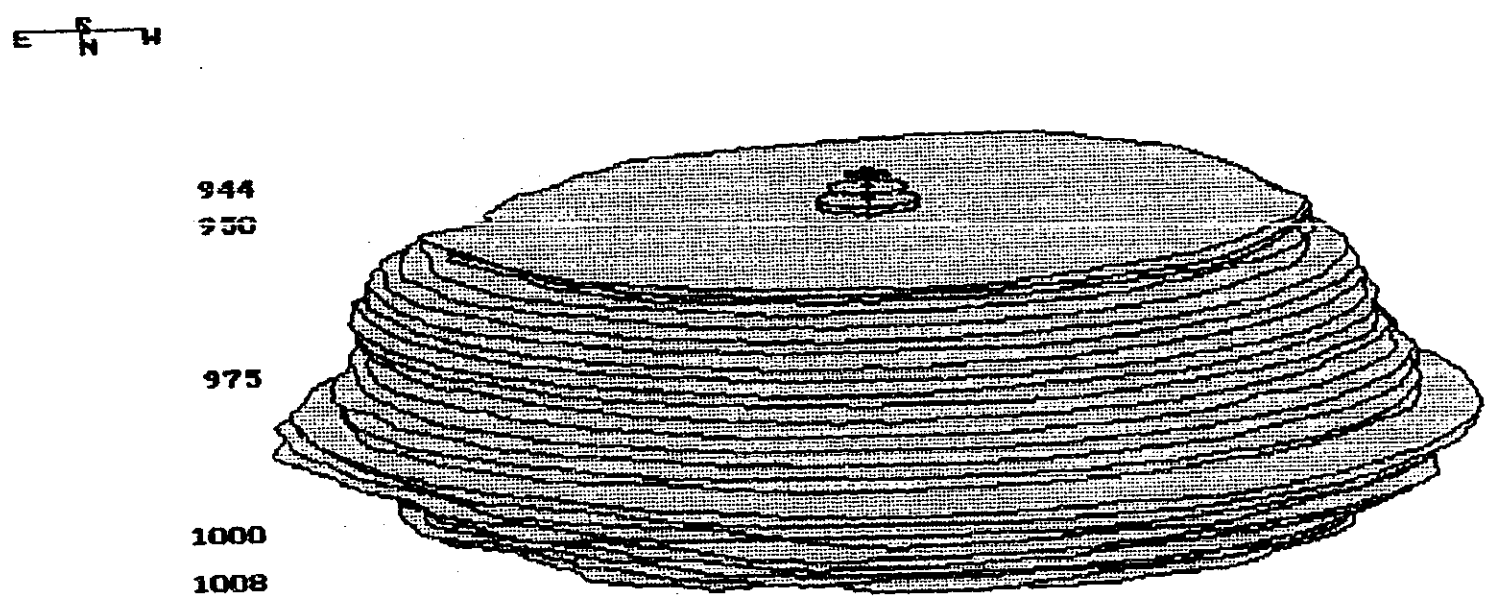

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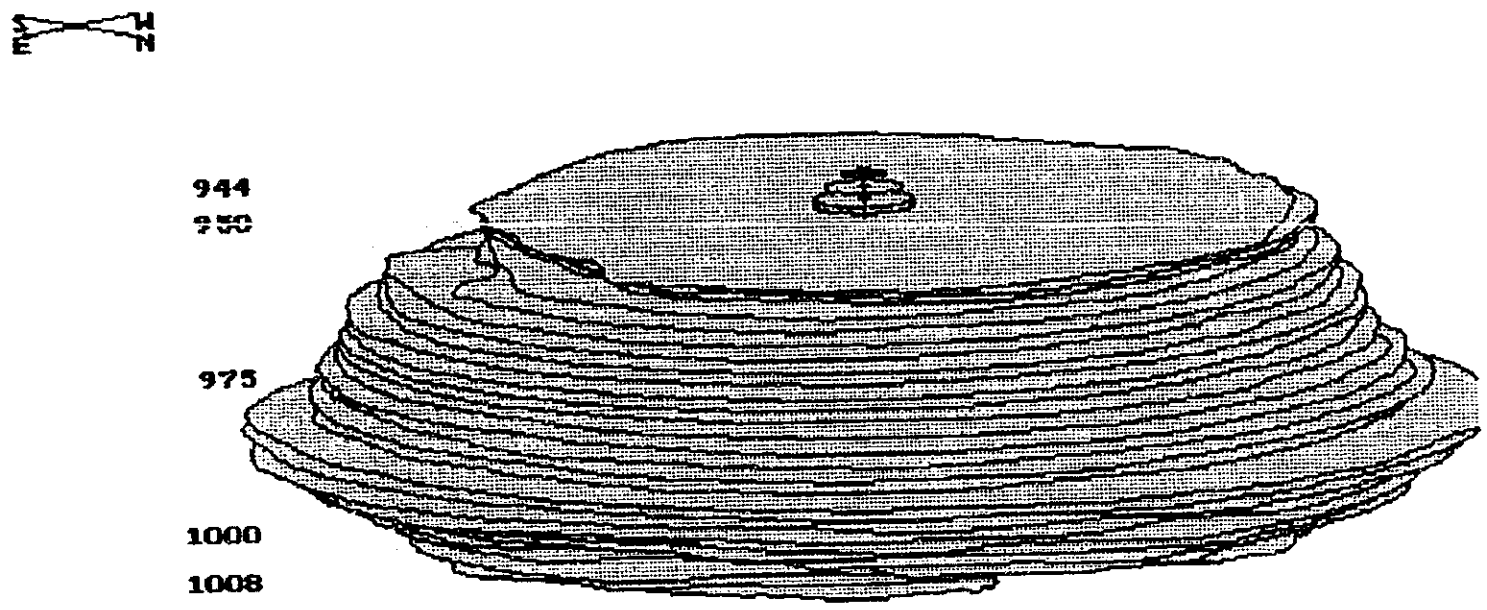

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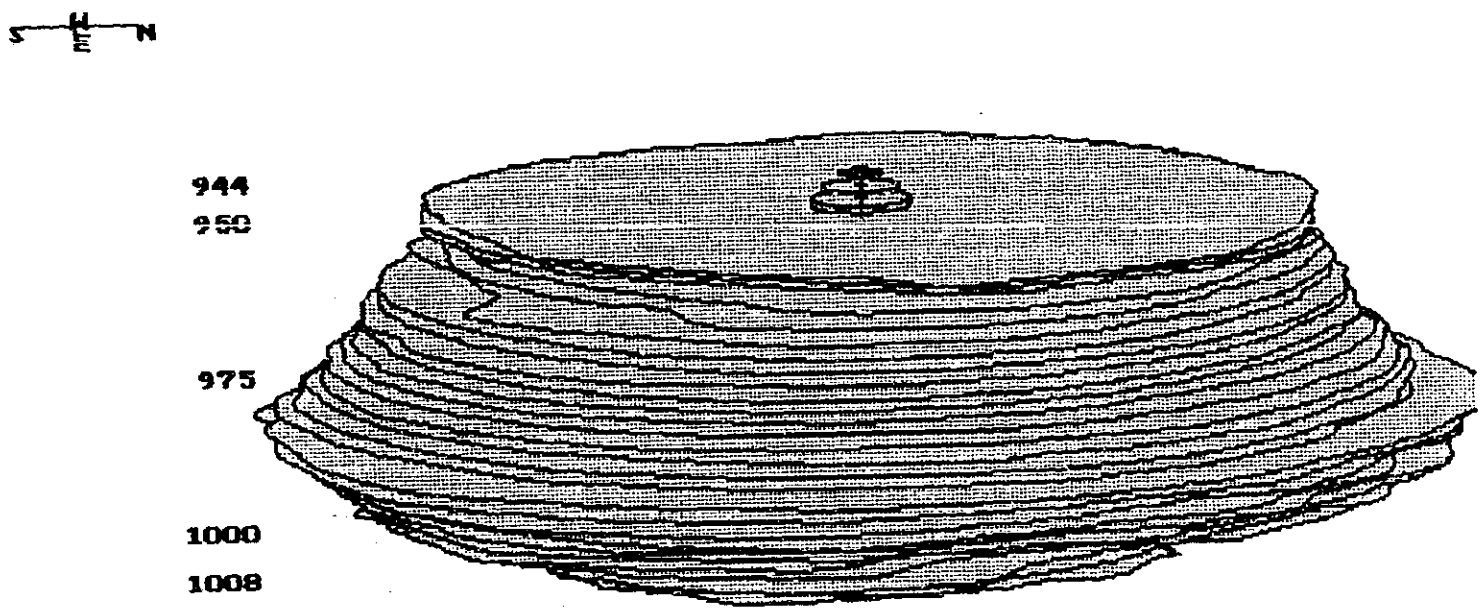

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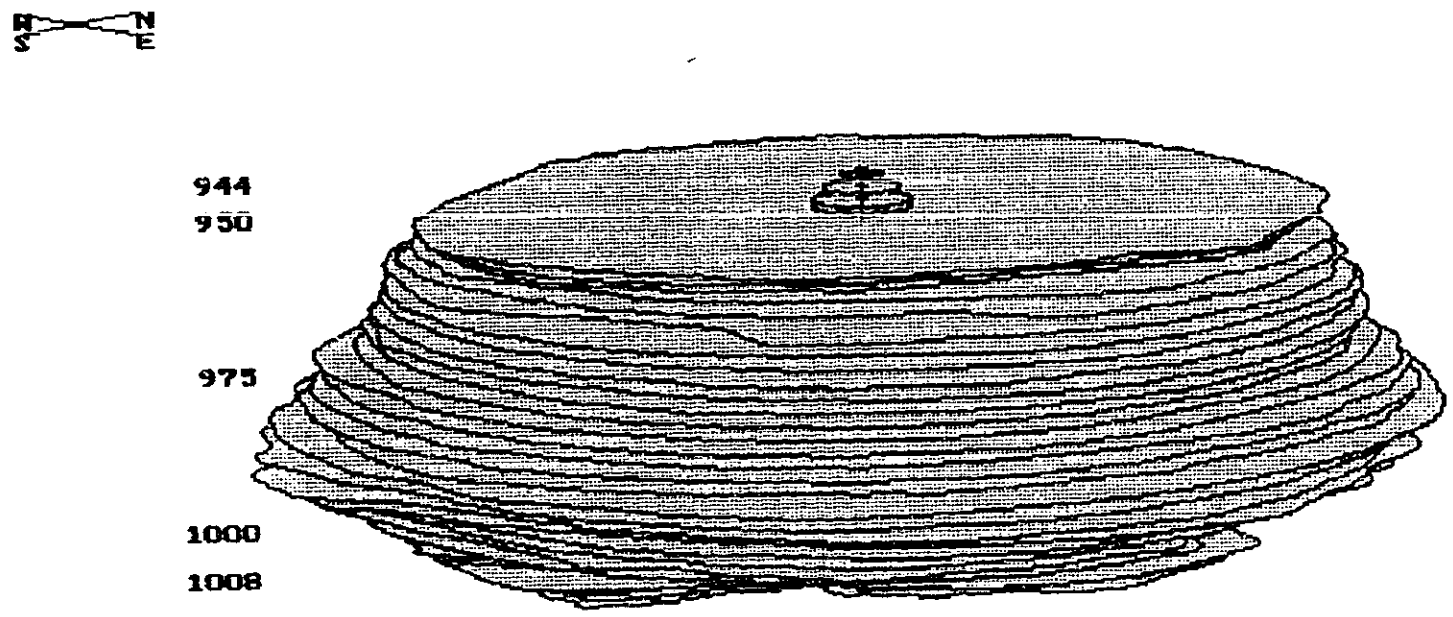

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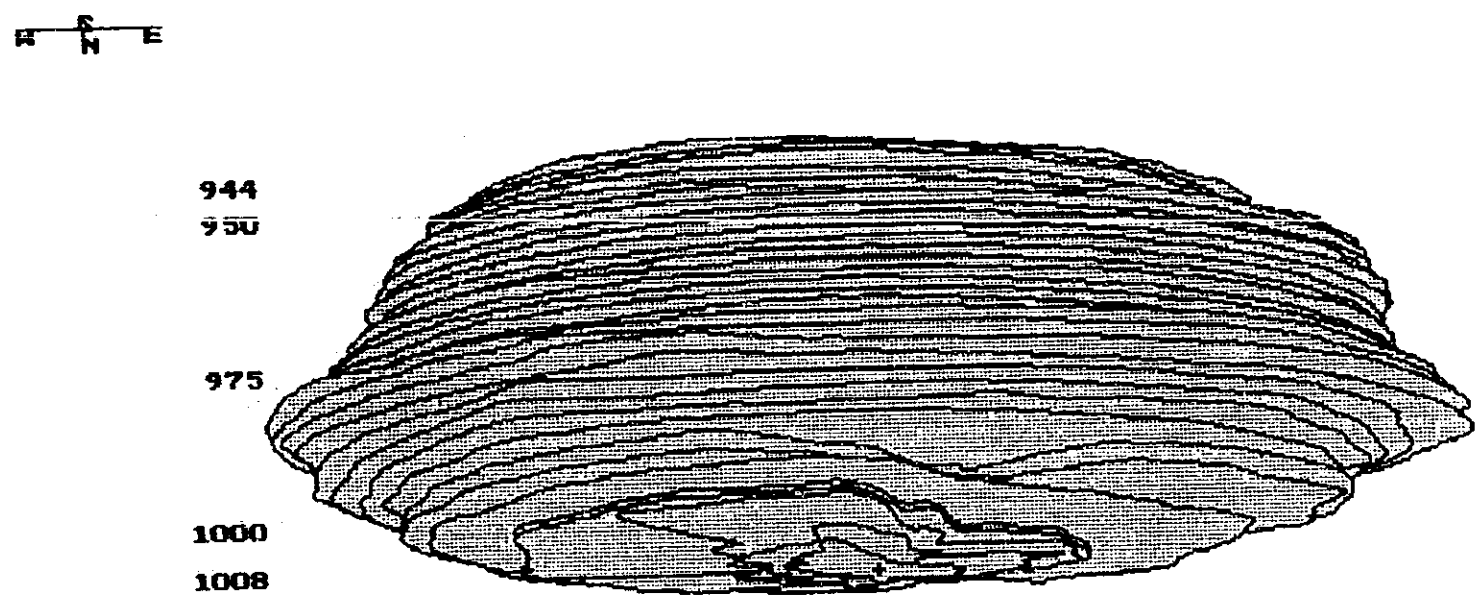

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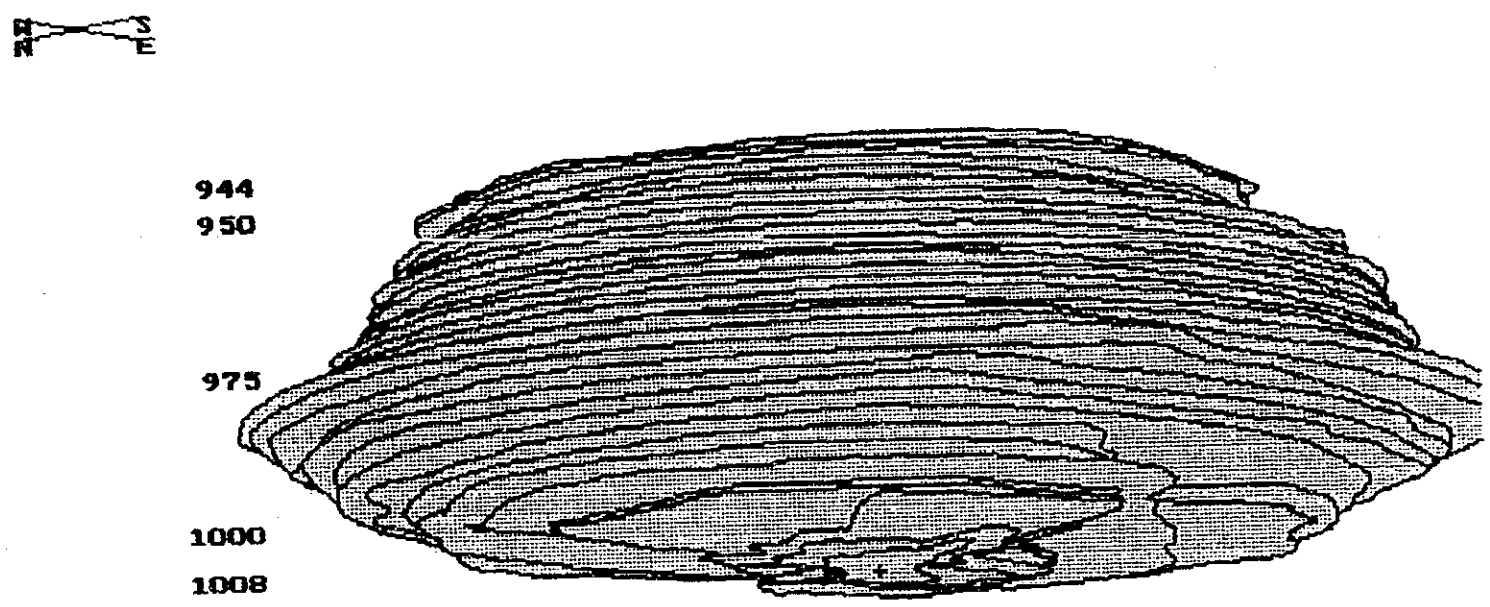

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DIGITAL SURVEYS, INC.

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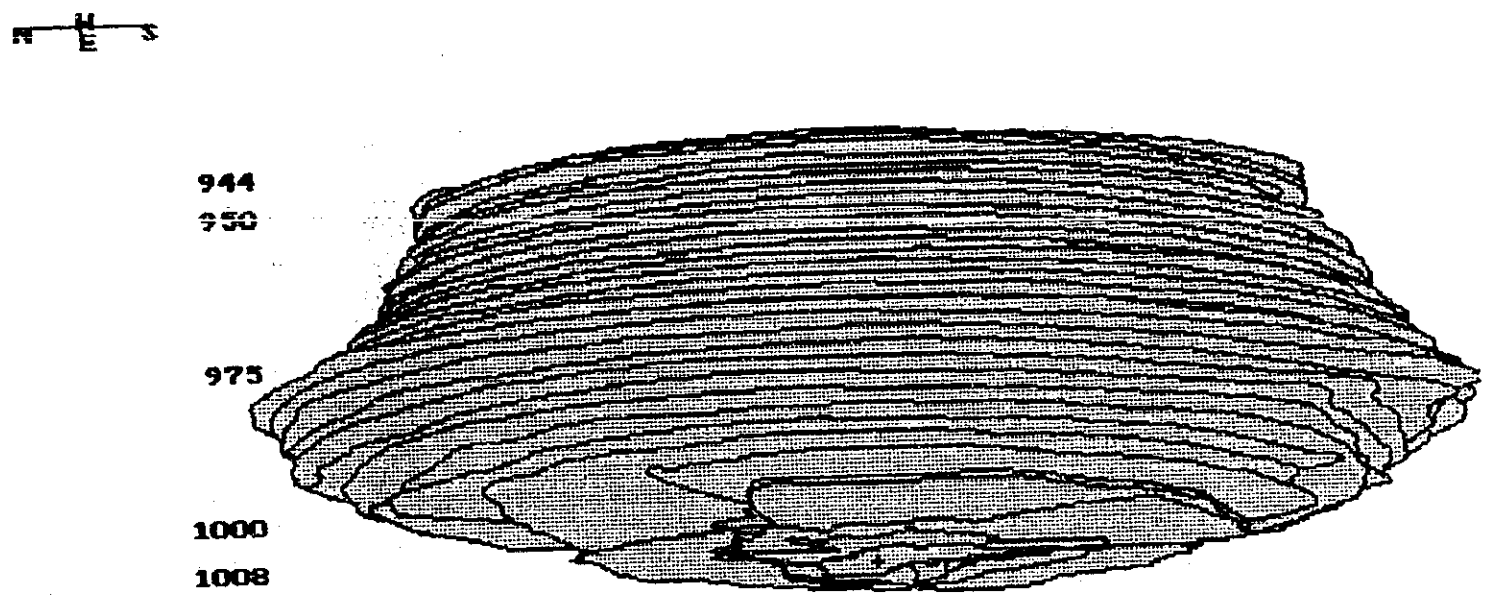

FERRELLGAS WELL 3

DIGITAL SURVEYS, INC.

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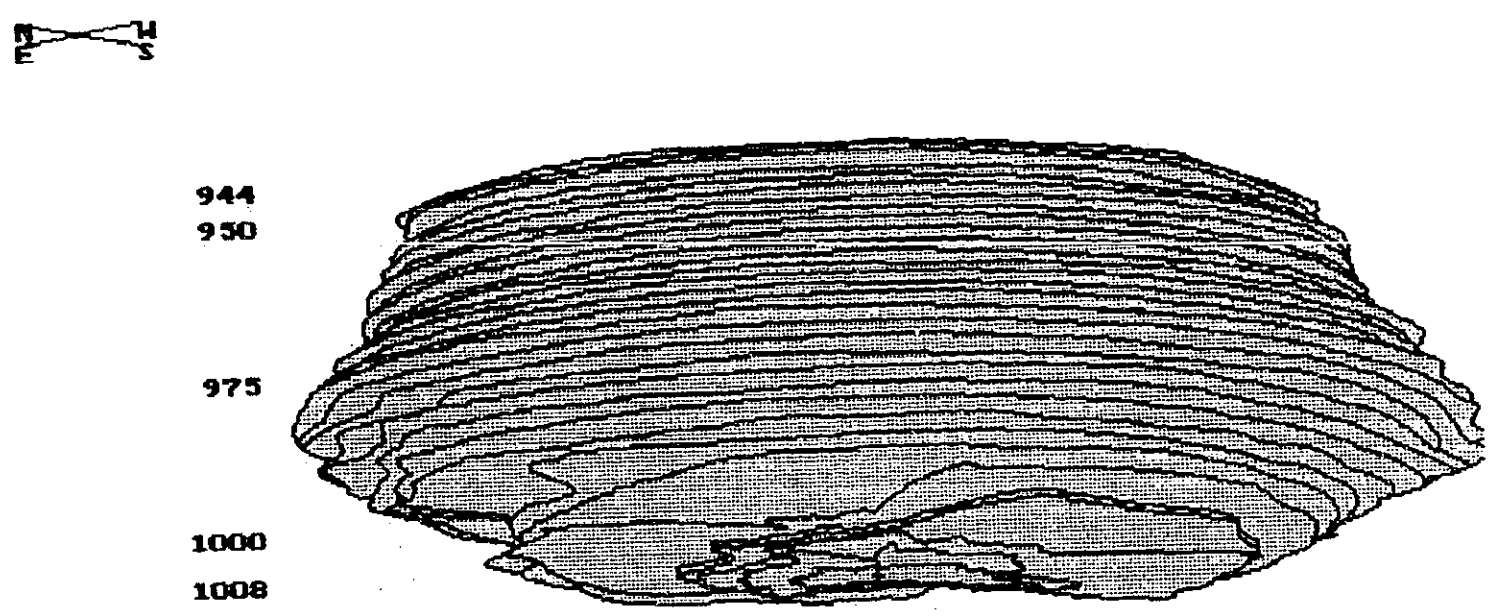

FERRELLGAS WELL 3

DIGITAL SURVEYS, INC.

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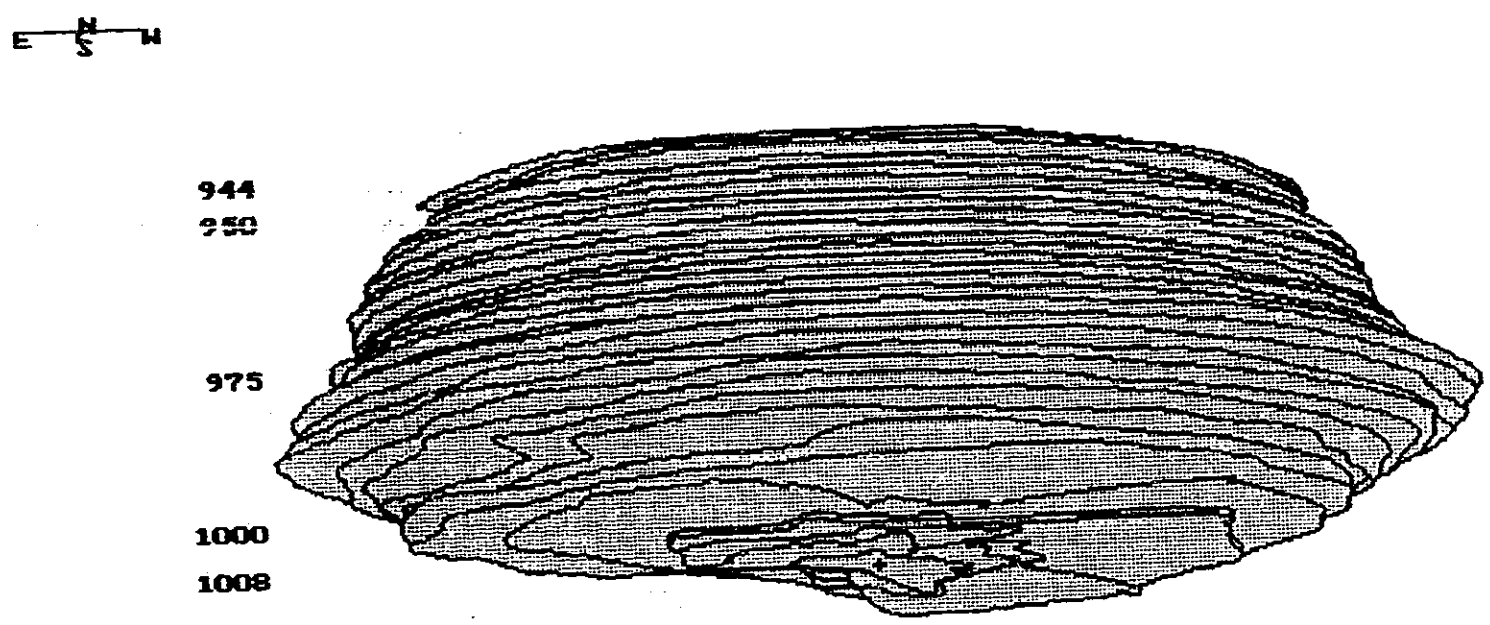

FERRELLGAS WELL 3

DIGITAL SURVEYS, INC.

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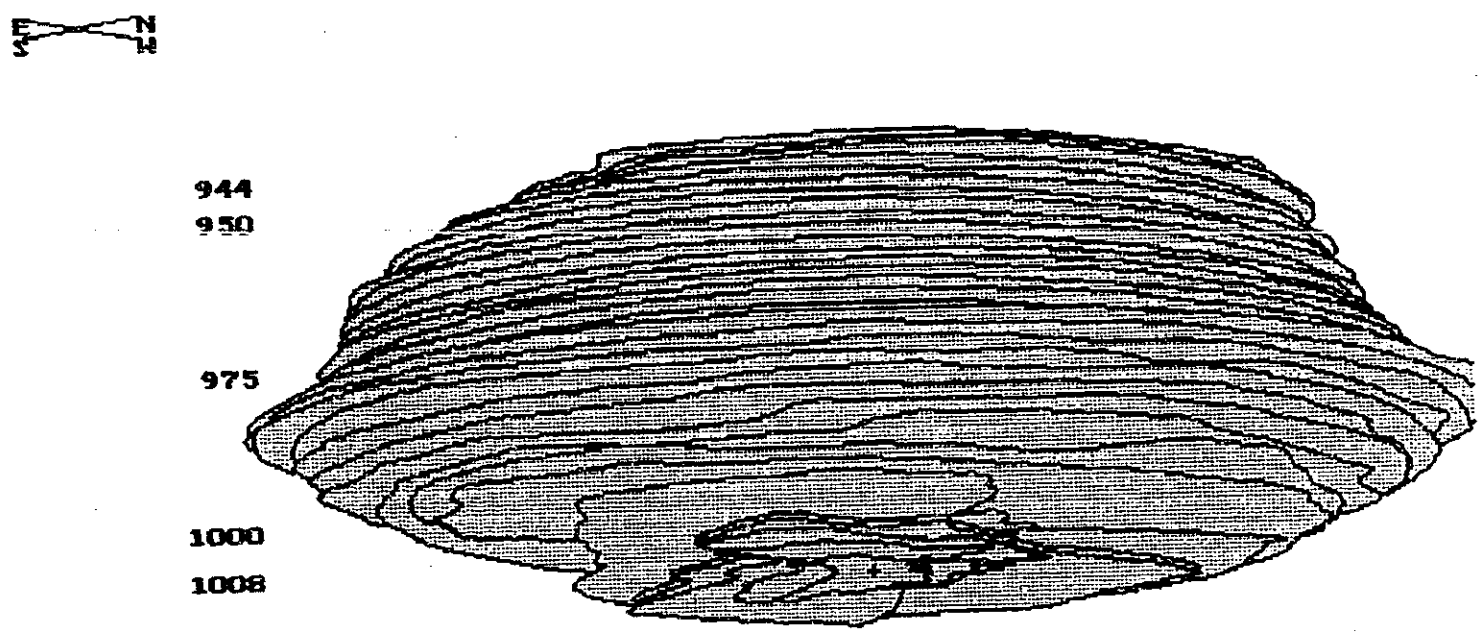

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05/29/91

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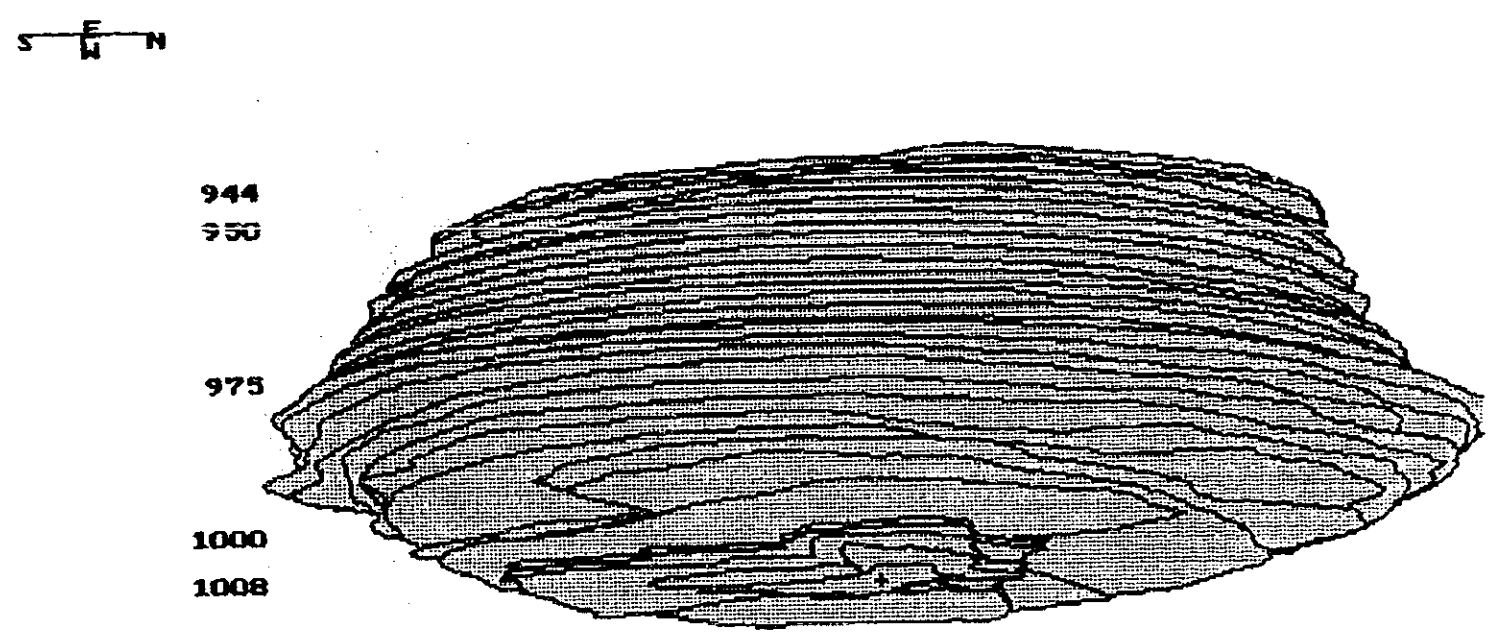

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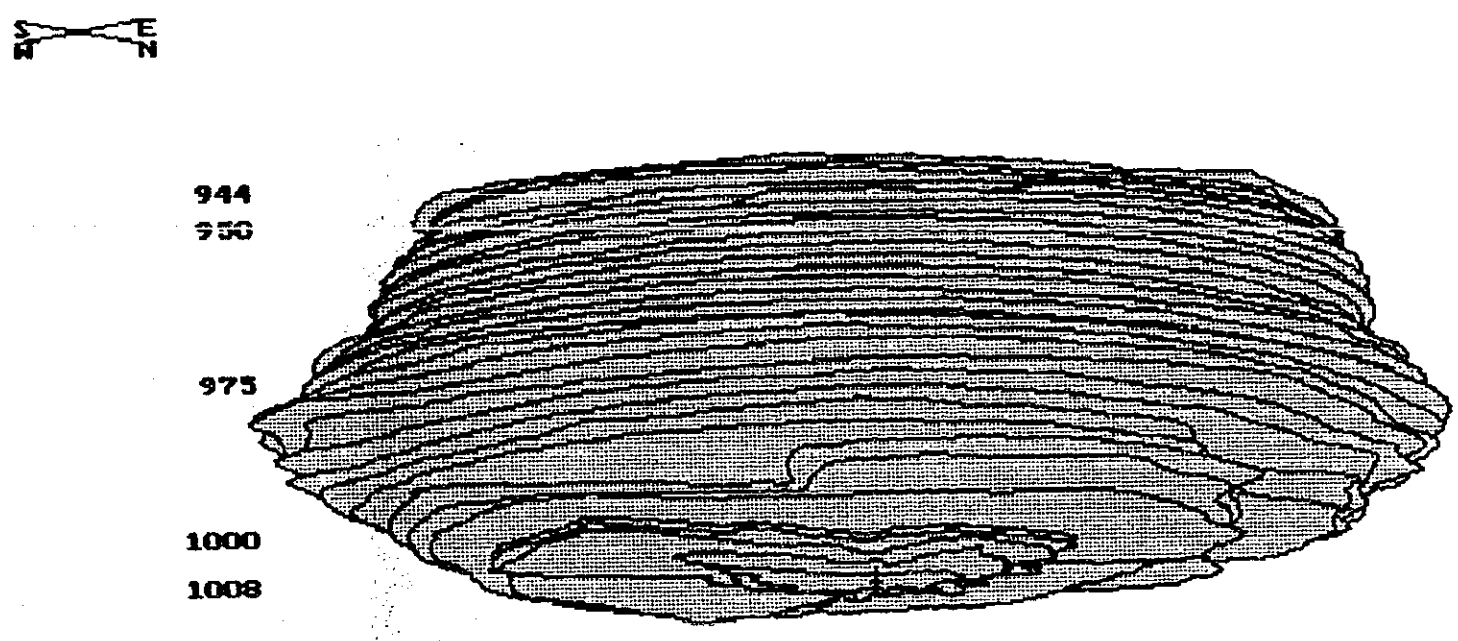


FERRELLGAS WELL 3

FERRELLGAS
HOLBROOK, AZ
STORAGE WELL NO. 3
MARCH 11, 1996
SONAR-THRU-PIPE SURVEY

SONARWIRE
INC.

SONARWIRE, INC.
P.O. BOX 576
ABITA SPRINGS, LA 70420

(504) 893-9221

Survey conducted by: Gary McCool

FERRELLGAS
HOLBROOK, AZ
STORAGE WELL NO. 3
MARCH 11, 1996
SONAR-THRU-PIPE SURVEY

P/N 602

Survey from 942 ft. to 1007 ft.
Sonar T.D. at 1010 ft.
9 5/8 inch cemented casing at 940 ft.
4 1/2 inch tubing at 1006 ft.
Zero sonar tool at B.H.F.
Site personnel: Mr. Dale Thompson

APR 1996
ARIZONA GEOLOGICAL SURVEY

SONARWIRE INC.
Depth versus Volume

FERRELLGAS
HOLBROOK, AZ

STORAGE WELL NO. 3
Mon, Mar 11, 1996

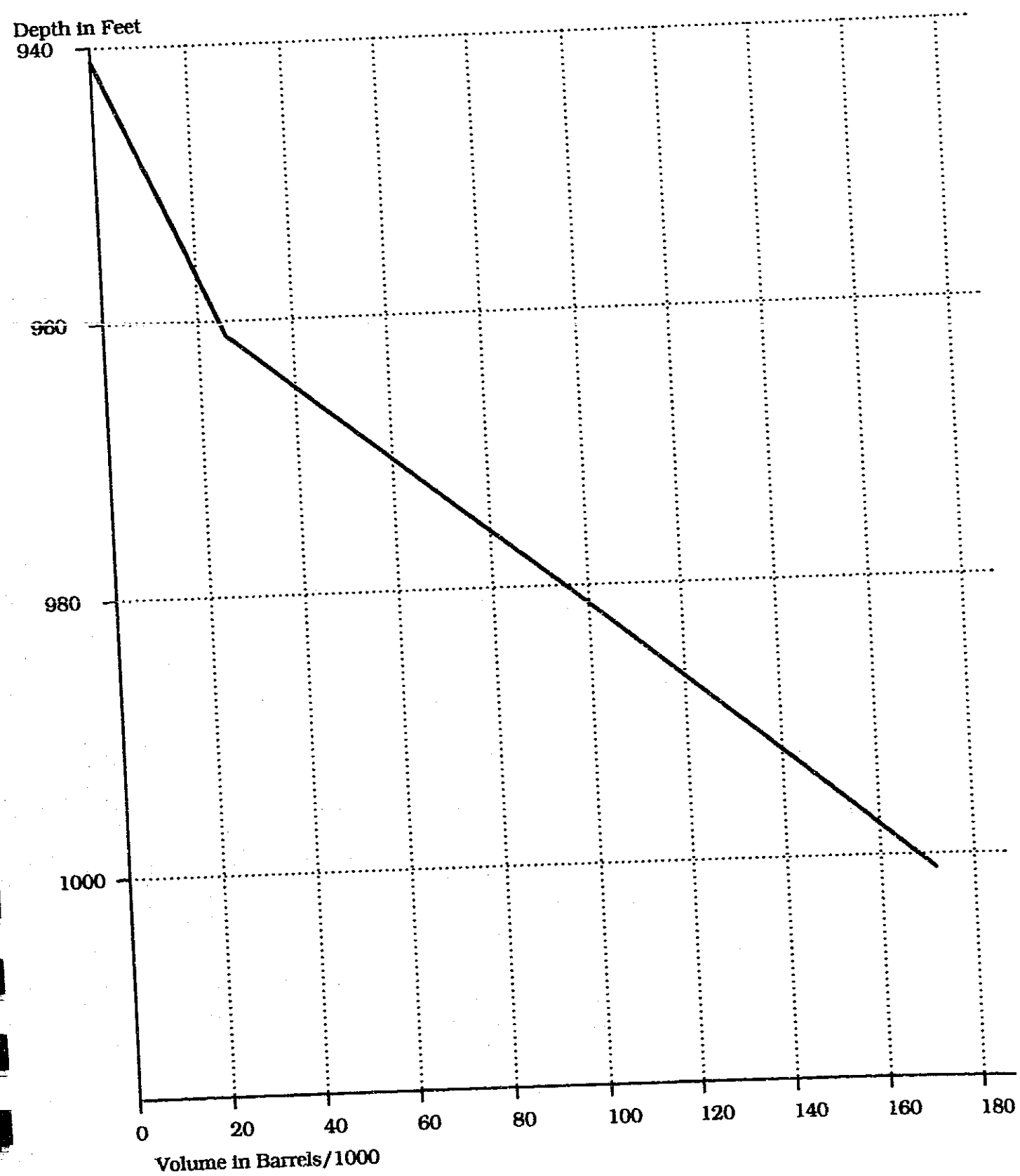
Depth	Cubic ft. per ft.	Cubic ft. total	Barrels per ft.	Barrels total
941	0.9	0.9	0.2	0.2
942	39.3	40.2	7.0	7.2
943	134.7	174.9	24.0	31.1
944	180.6	355.5	32.2	63.3
945	233.4	588.9	41.6	104.9
946	248.7	837.6	44.3	149.2
947	264.5	1102.1	47.1	196.3
948	280.8	1382.9	50.0	246.3
949	297.7	1680.5	53.0	299.3
950	307.6	1988.1	54.8	354.1
951	318.4	2306.5	56.7	410.8
952	11638.8	13945.3	2073.0	2483.8
953	12052.5	25997.8	2146.7	4630.4
954	14443.5	40441.3	2572.5	7202.9
955	17082.4	57523.7	3042.5	10245.4
956	16826.1	74349.8	2996.8	13242.3
957	16573.6	90923.4	2951.9	16194.2
958	16885.2	107808.6	3007.4	19201.5
959	17204.6	125013.2	3064.3	22265.8
960	17404.2	142417.4	3099.8	25365.6
961	17608.9	160026.3	3136.3	28501.9
962	17752.1	177778.4	3161.8	31663.7
963	17899.1	195677.6	3188.0	34851.7
964	18002.6	213680.1	3206.4	38058.1
965	18108.0	231788.2	3225.2	41283.3
966	18440.6	250228.8	3284.4	44567.7
967	18778.8	269007.6	3344.6	47912.3
968	18969.9	287977.5	3378.7	51291.0
969	19163.9	307141.4	3413.2	54704.2
970	19720.5	326861.9	3512.4	58216.6
971	20291.4	347153.3	3614.0	61830.7
972	20665.5	367818.7	3680.7	65511.4
973	21047.5	388866.2	3748.7	69260.1
974	21460.0	410326.2	3822.2	73082.3
975	21879.9	432206.0	3897.0	76979.2
976	21861.9	454067.9	3893.8	80873.0
977	21849.8	475917.7	3891.6	84764.6
978	24285.3	500203.0	4325.4	89090.0
979	26875.0	527078.0	4786.7	93876.7
980	26748.7	553826.8	4764.2	98640.8
981	26637.0	580463.8	4744.3	103385.1
982	26599.5	607063.2	4737.6	108122.6
983	26569.9	633633.1	4732.3	112854.9
984	26350.3	659983.4	4693.2	117548.1
985	26150.3	686133.7	4657.6	122205.7
986	24923.0	711056.7	4439.0	126644.7
987	23741.7	734798.5	4228.6	130873.3

Depth	Cubic ft. per ft.	Cubic ft. total	Barrels per ft.	Barrels total
988	22991.4	757789.9	4094.9	134968.2
989	22257.1	780047.0	3964.2	138932.4
990	20807.5	800854.5	3706.0	142638.4
991	19415.5	820270.0	3458.1	146096.4
992	18851.0	839121.0	3357.5	149453.9
993	18300.5	857421.5	3259.5	152713.4
994	17123.9	874545.5	3049.9	155763.3
995	15989.3	890534.8	2847.8	158611.1
996	16390.5	906925.3	2919.3	161530.4
997	16801.9	923727.2	2992.5	164522.9
998	15877.2	939604.4	2827.9	167350.8
999	14983.3	954587.7	2668.6	170019.4
1000	14740.3	969328.1	2625.4	172644.8
1001	14502.4	983830.5	2583.0	175227.8
1002	12146.3	995976.7	2163.3	177391.1
1003	10058.0	1006034.7	1791.4	179182.5
1004	7083.9	1013118.6	1261.7	180444.2
1005	5035.8	1018154.5	896.9	181341.2
1006	5388.5	1023543.0	959.7	182300.9
1007	6367.2	1029910.1	1134.0	183434.9
1008	4147.8	1034058.0	738.8	184173.7
1009	2886.3	1036944.3	514.1	184687.8
1010	2031.5	1038975.8	361.8	185049.6
1011	1501.3	1040477.1	267.4	185317.0
1012	990.5	1041467.5	176.4	185493.4
1013	451.7	1041919.3	80.5	185573.9
1014	128.2	1042047.4	22.8	185596.7
1015	61.3	1042108.7	10.9	185607.6

FERRELLGAS
HOLBROOK, AZ

SONARWIRE, INC
Depth vs Volume

STORAGE WELL NO. 3
Mon, Mar 11, 1996



SONARWIRE INC.
Max Radius & Depth vs Bearing

FERRELLGAS
HOLBROOK, AZ

STORAGE WELL NO. 3
Mon, Mar 11, 1996

This table lists the maximum radius (in feet) found at each of the 128 bearings at which soundings were taken. Also listed after each radius, (separated by ':'), is the depth (in feet) at which that maximum radius was found. Bearings are shown, (in degrees), for each row of four 'radius : depth' pairs.

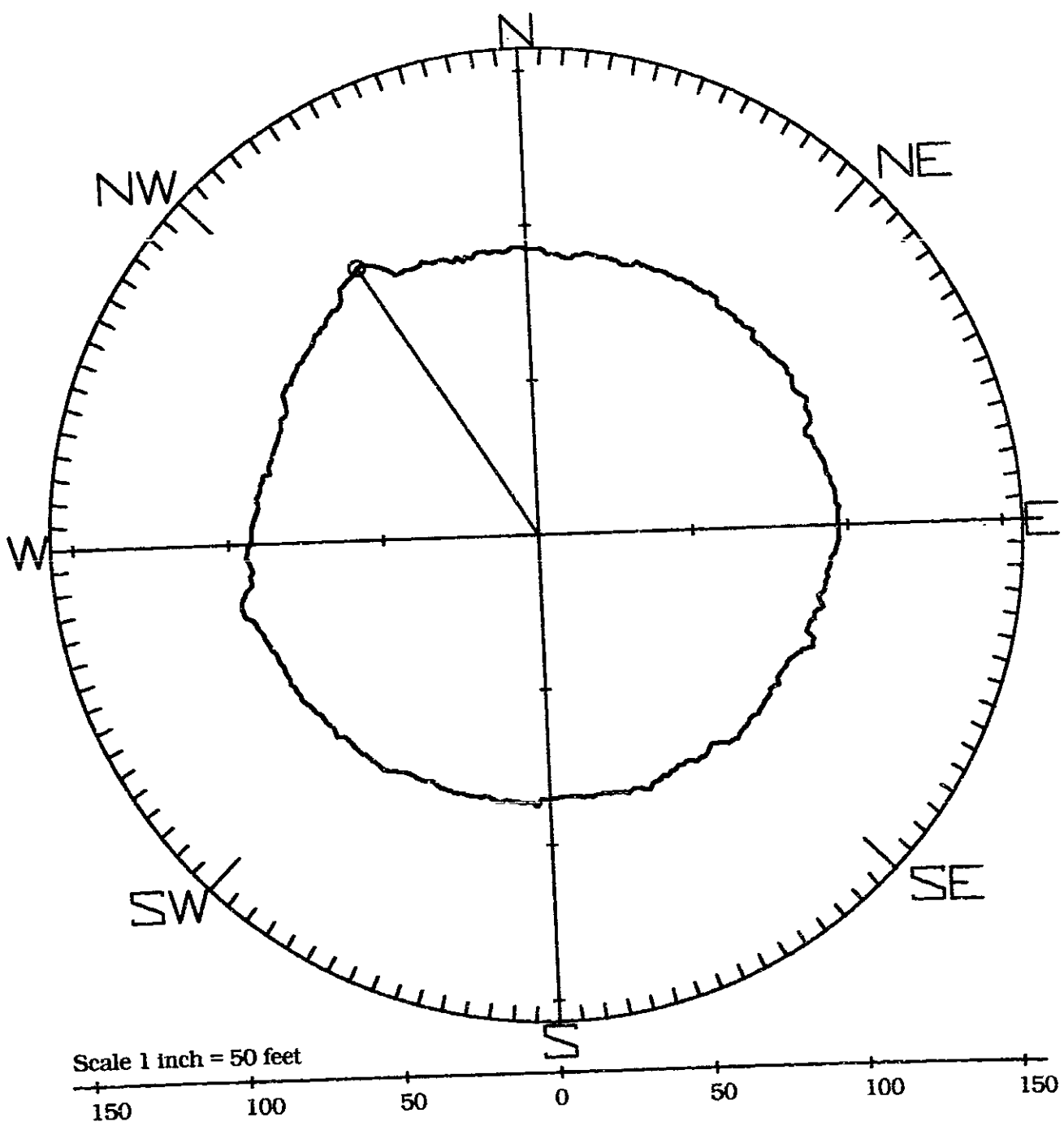
Bearing	+0.0		+2.8		+5.6		+8.4	
0.0	92.7:	980	92.7:	980	91.9:	980	91.1:	984
11.3	91.9:	980	92.7:	980	92.7:	980	92.7:	980
22.5	94.2:	978	94.2:	978	94.9:	978	94.9:	978
33.8	95.7:	978	95.7:	978	96.4:	978	95.7:	978
45.0	95.7:	978	96.4:	978	96.4:	978	95.7:	978
56.3	96.4:	978	97.2:	978	97.2:	978	98.0:	980
67.5	97.2:	980	96.4:	980	94.2:	978	94.9:	978
78.8	95.7:	984	96.4:	984	97.2:	984	97.9:	984
90.0	97.2:	984	97.2:	984	97.2:	984	94.9:	982
101.3	94.9:	982	94.2:	982	94.9:	982	93.4:	982
112.5	94.9:	984	95.7:	984	92.7:	982	90.4:	982
123.8	91.1:	982	90.4:	982	91.1:	980	91.1:	982
135.0	91.1:	988	91.8:	988	91.1:	988	88.1:	980
146.3	88.9:	980	88.9:	980	87.3:	980	88.1:	980
157.5	88.1:	980	89.6:	980	88.1:	980	87.3:	980
168.8	86.6:	978	86.6:	978	85.8:	980	85.1:	976
180.0	85.8:	978	88.1:	978	86.6:	978	86.6:	978
191.3	87.3:	978	87.3:	978	87.3:	980	88.1:	982
202.5	88.1:	980	88.1:	982	88.1:	982	88.1:	980
213.8	89.6:	982	91.1:	982	91.1:	978	91.1:	978
225.0	91.1:	978	92.7:	982	91.9:	978	92.7:	978
236.3	93.4:	978	93.4:	978	94.2:	978	93.4:	978
247.5	93.4:	978	94.9:	982	95.7:	982	98.7:	982
258.8	98.7:	982	97.2:	982	94.2:	982	94.9:	978
270.0	94.2:	982	92.7:	982	92.7:	982	91.1:	980
281.3	91.9:	980	91.1:	980	89.6:	978	89.6:	978
292.5	89.6:	978	90.4:	980	91.1:	978	94.2:	978
303.8	94.2:	978	94.2:	978	94.9:	982	94.9:	982
315.0	96.4:	982	97.2:	982	98.0:	982	101.8:	982
326.3	102.5:	980	104.0:	982	103.3:	982	98.0:	982
337.5	95.7:	978	95.7:	980	94.2:	980	93.4:	980
348.8	92.7:	980	93.4:	980	92.7:	980	93.4:	980

Between 940 and 1015 foot depths, maximum radius was 104.0 feet at bearing 328.1 at 982.0 foot depth

FERRELLGAS
STORAGE WELL NO. 3
HOLBROOK, AZ

SONARWIRE, INC
Max Range vs Bearing

Mon, Mar 11, 1996
Azimuth=328.1 deg
Max Radius= 104.0 ft.
Depth= 982.0 ft.



SONARWIRE INC.
Wall Ranges versus Depth (ft.)

FERRELLGAS
HOLBROOK, AZ

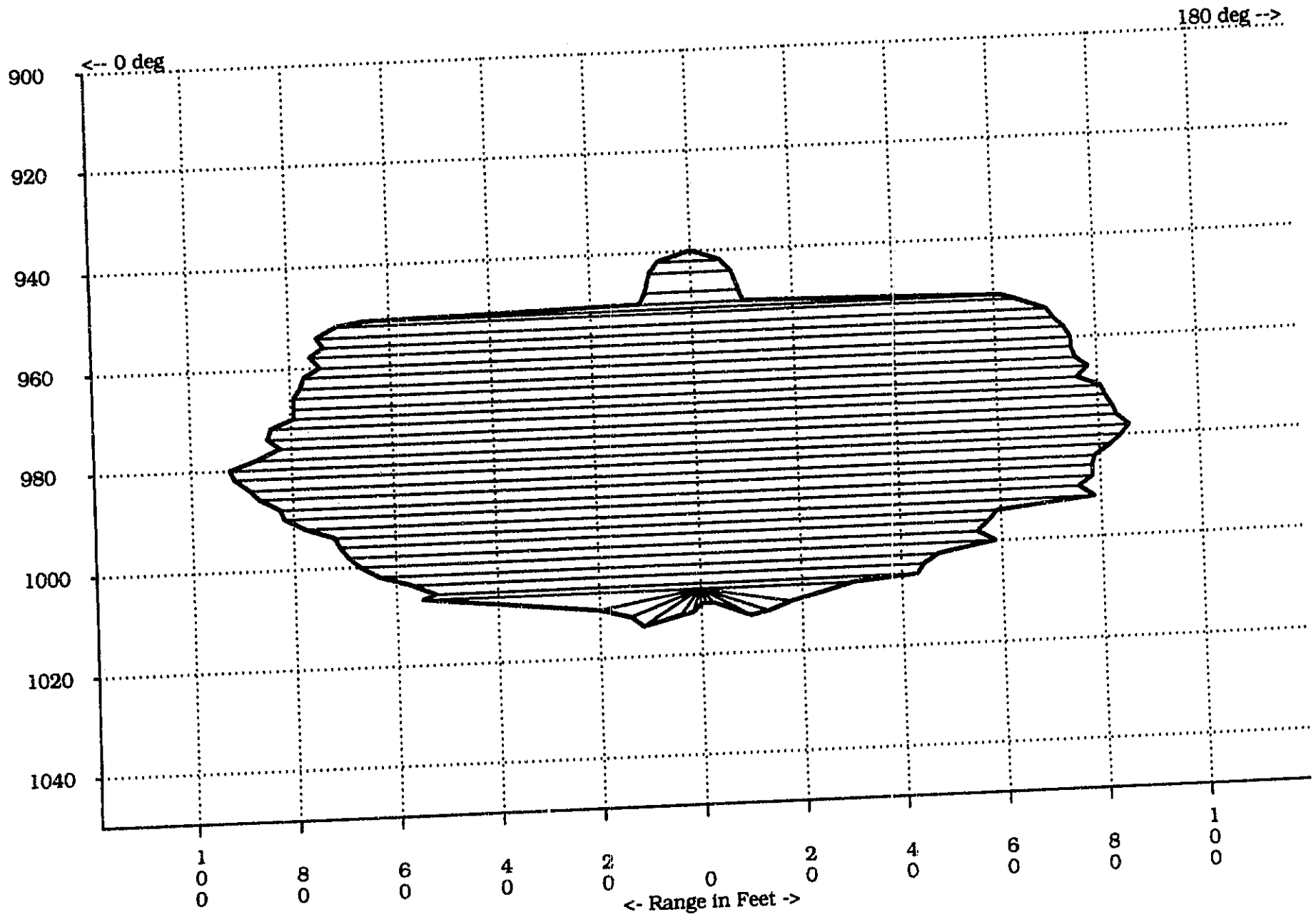
STORAGE WELL NO. 3
Mon, Mar 11, 1996

Depth	Tilt	N	NE	E	SE	S	SW	W	NW
940	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
942	0	6.7	6.7	6.3	5.9	5.9	6.3	6.7	7.2
944	0	8.4	8.9	8.9	8.4	8.0	7.6	8.0	8.9
948	0	9.7	9.7	10.1	10.1	9.3	9.3	10.1	9.7
950	0	10.6	10.0	10.0	9.4	10.0	10.6	11.2	11.2
951	0	65.5	58.7	58.7	66.1	61.4	65.5	64.8	68.2
952	0	70.9	60.1	58.7	65.5	64.1	64.1	64.8	68.8
954	0	74.9	74.9	71.5	71.5	70.2	66.1	69.5	72.9
956	0	73.6	74.2	70.2	72.2	71.5	72.2	72.2	74.9
958	0	76.3	73.6	74.2	74.9	73.6	71.5	74.2	76.9
960	0	74.2	74.2	76.3	74.2	74.9	72.9	76.3	76.9
962	0	77.6	75.6	75.6	75.6	74.9	74.2	76.3	77.6
964	0	78.3	73.6	75.6	76.3	75.6	76.3	76.9	79.6
966	0	79.7	77.5	77.5	78.2	78.2	76.7	76.7	79.0
968	0	79.7	78.2	77.5	79.0	75.9	75.2	78.2	82.0
970	0	79.7	81.3	82.0	81.3	80.5	78.2	80.5	82.8
972	0	84.3	79.7	82.0	81.3	81.3	82.0	82.0	82.0
974	0	85.1	82.0	81.3	82.8	82.8	83.5	81.3	87.3
976	0	82.8	81.3	82.8	83.5	83.5	84.3	85.8	91.1
978	0	87.3	94.9	94.2	85.8	85.8	91.1	92.7	93.4
980	0	92.7	91.1	91.1	87.3	84.3	89.6	90.4	94.9
982	0	91.9	91.9	91.9	89.6	82.0	88.9	93.4	95.7
984	0	88.8	88.1	97.2	90.4	79.0	86.6	88.8	94.1
986	0	87.1	87.8	86.4	85.1	78.3	86.4	85.1	88.4
988	0	83.0	85.0	83.7	91.1	78.3	87.0	82.3	82.3
990	0	82.1	78.5	79.7	78.5	75.6	80.9	78.5	82.1
992	0	78.0	78.0	76.8	72.1	78.6	78.0	78.0	79.8
994	0	72.4	70.9	70.9	71.9	59.2	71.4	71.9	72.4
996	0	71.4	75.4	70.4	72.9	57.7	70.4	69.9	73.9
998	0	69.9	69.4	68.3	69.4	55.2	61.8	69.4	72.4
1000	0	67.5	67.9	68.3	65.4	58.6	54.4	66.7	60.3
1002	0	63.7	61.6	51.9	55.7	47.2	44.7	65.8	68.3
1004	0	57.4	20.7	35.0	50.6	44.3	42.6	62.0	61.6
1006	0	52.7	26.3	21.8	43.0	43.0	31.4	59.2	58.7
1007	0	55.2	25.8	16.7	18.7	30.4	27.3	37.5	56.2
1007	-10	20.8	13.7	23.3	17.7	18.2	21.3	11.6	22.3
1007	-20	15.2	14.3	7.8	9.9	14.1	13.9	8.4	13.3
1007	-30	13.7	12.9	4.9	9.3	11.4	9.3	8.0	9.9
1007	-50	6.5	5.3	4.0	3.0	3.8	3.6	4.0	4.9
1007	-70	5.0	4.4	3.3	3.2	3.3	3.1	3.5	4.0
1007	-90	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1

FERRELLGAS
HOLBROOK, AZ

SONARWIRE, INC
Vertical Cross-Section

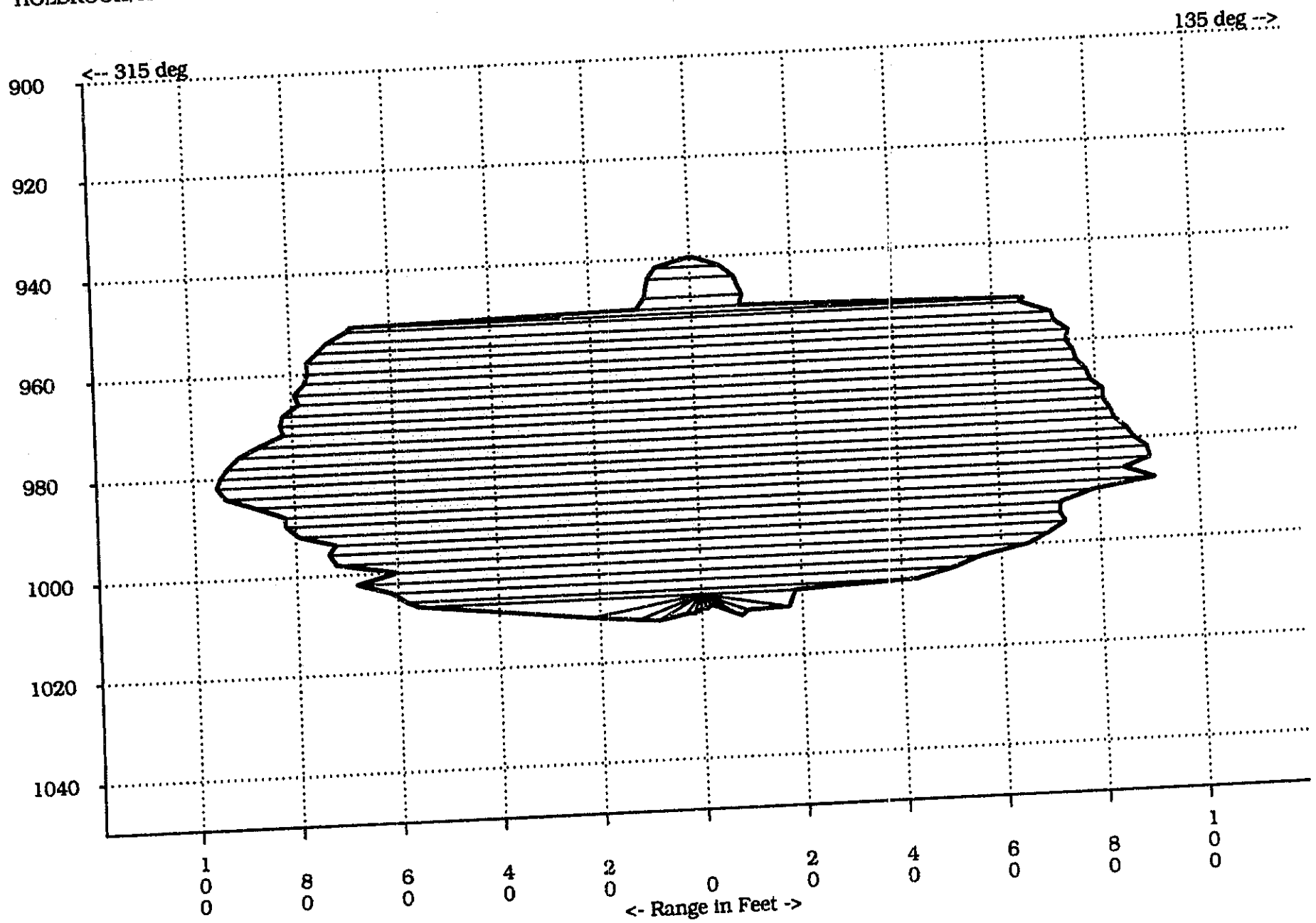
STORAGE WELL NO. 3
Mon, Mar 11, 1996



FERRELLGAS
HOLBROOK, AZ

SONARWIRE, INC
Vertical Cross-Section

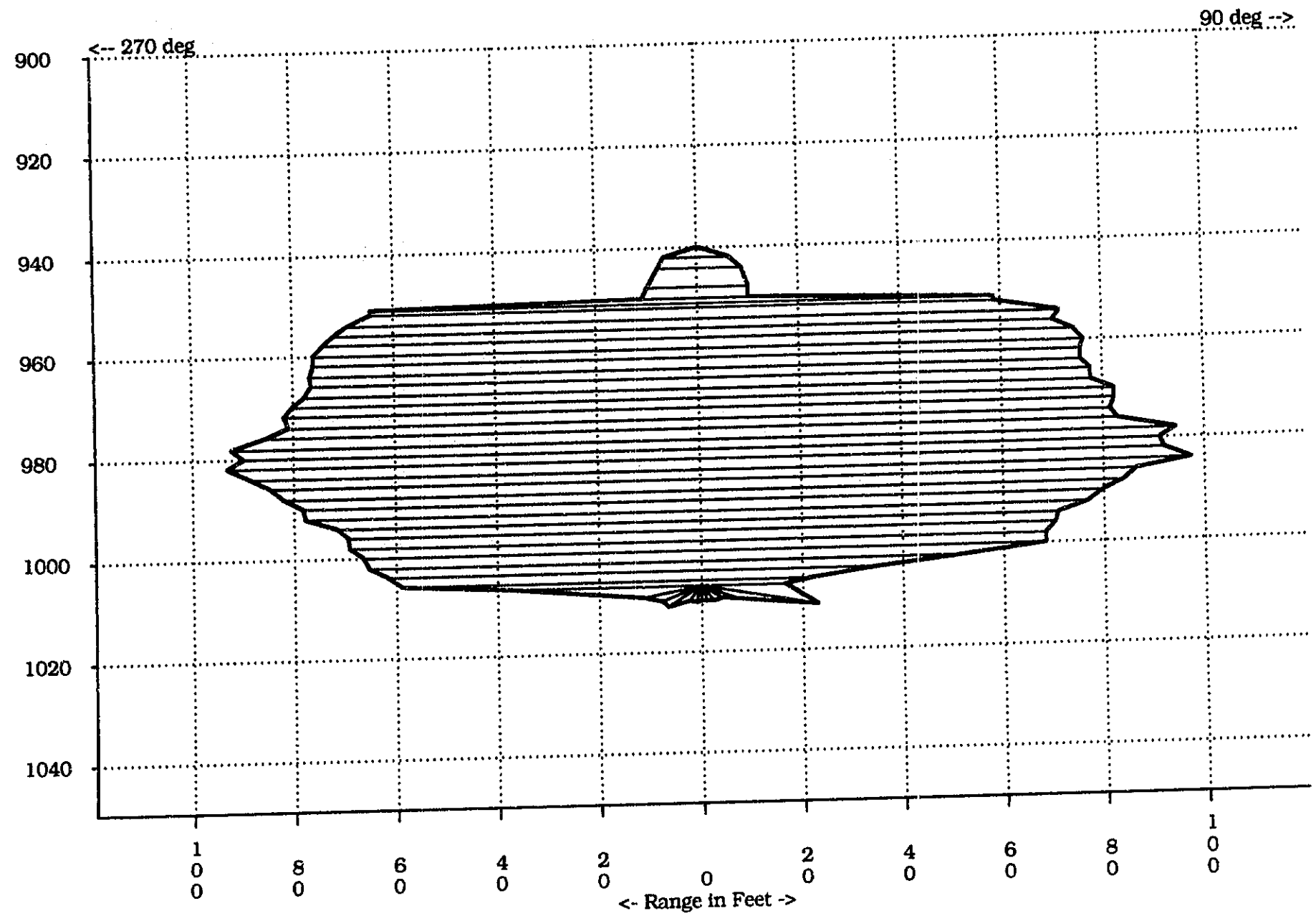
STORAGE WELL NO. 3
Mon, Mar 11, 1996



FERRELLGAS
HOLBROOK, AZ

SONARWIRE, INC
Vertical Cross-Section

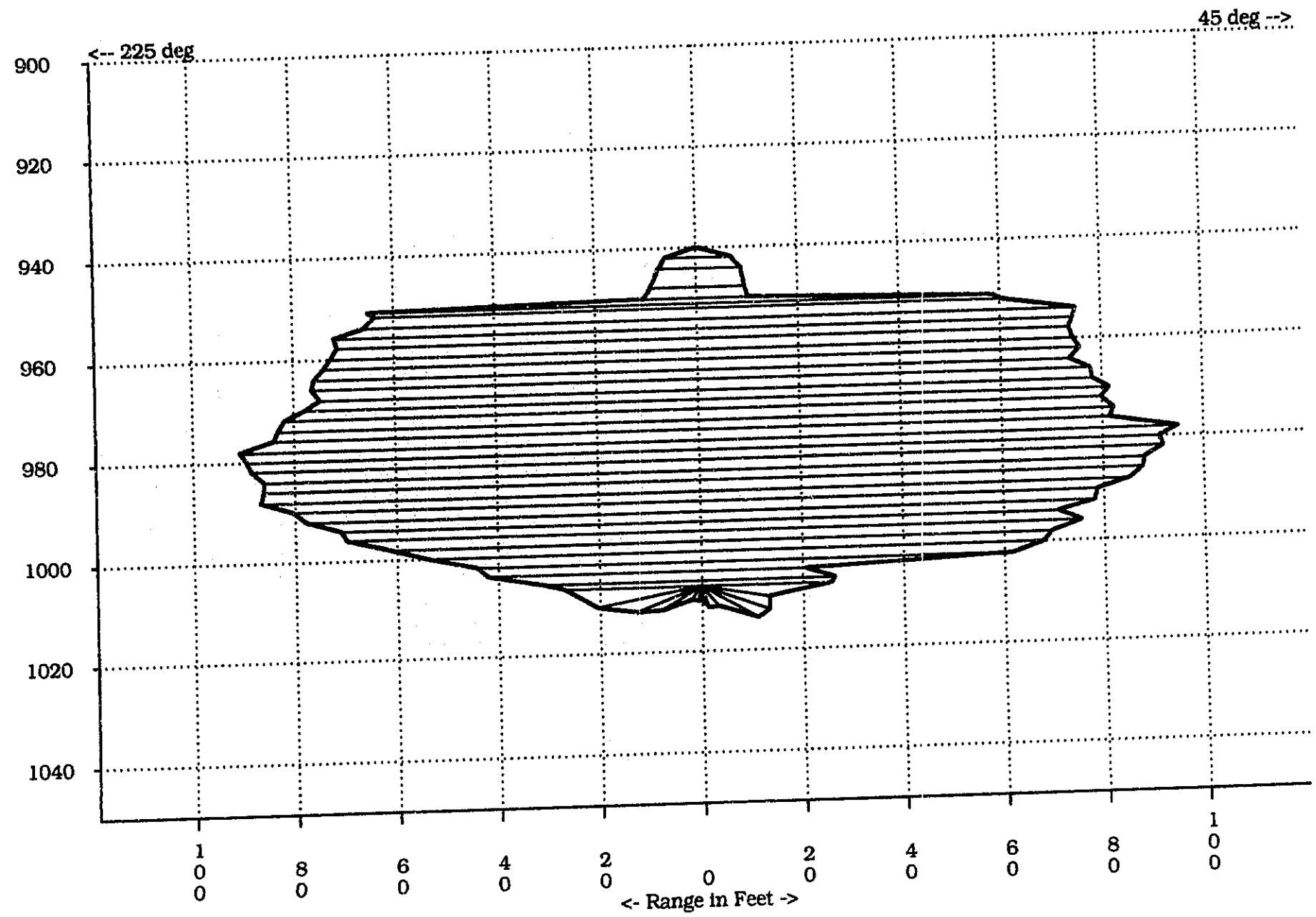
STORAGE WELL NO. 3
Mon, Mar 11, 1996



FERRELLGAS
HOLBROOK, AZ

SONARWIRE, INC
Vertical Cross-Section

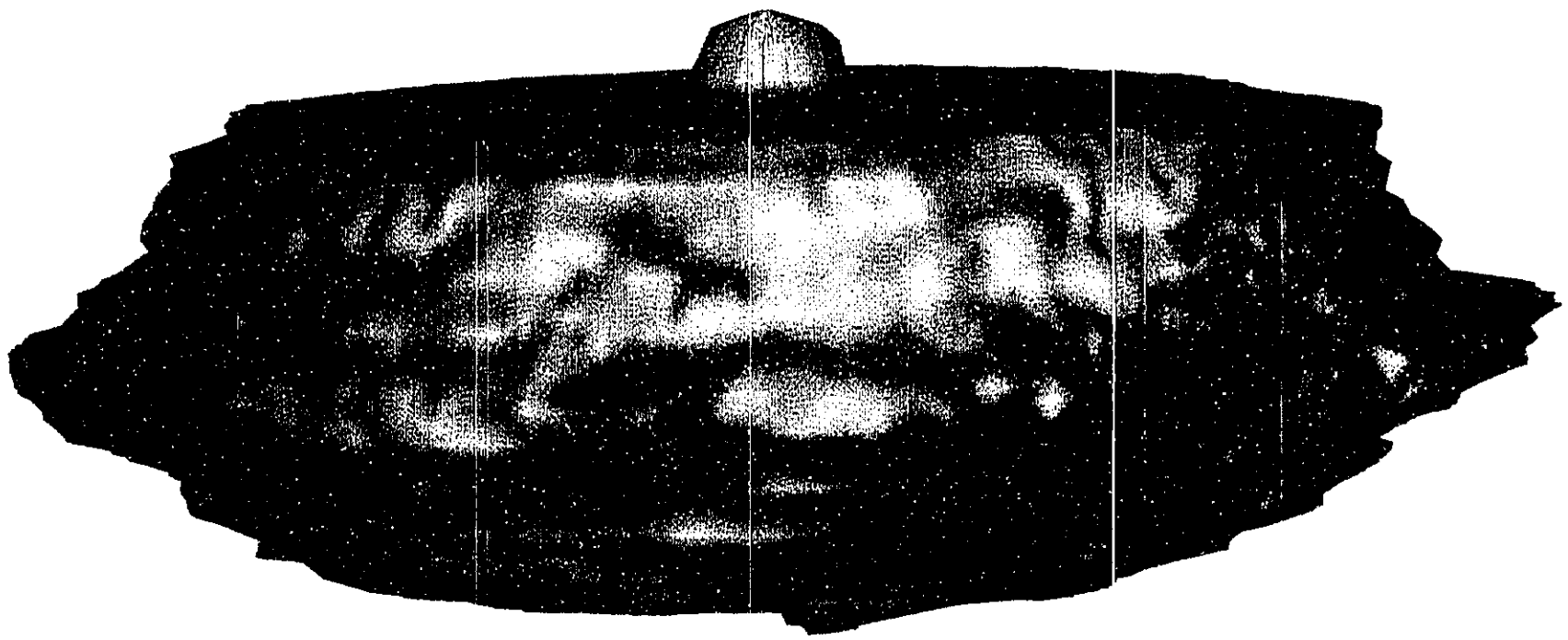
STORAGE WELL NO. 3
Mon, Mar 11, 1996



3D SHADE PLOT

FERRELLGAS
HOLBROOK, AZ
STORAGE WELL NO. 3
MARCH 11, 1996

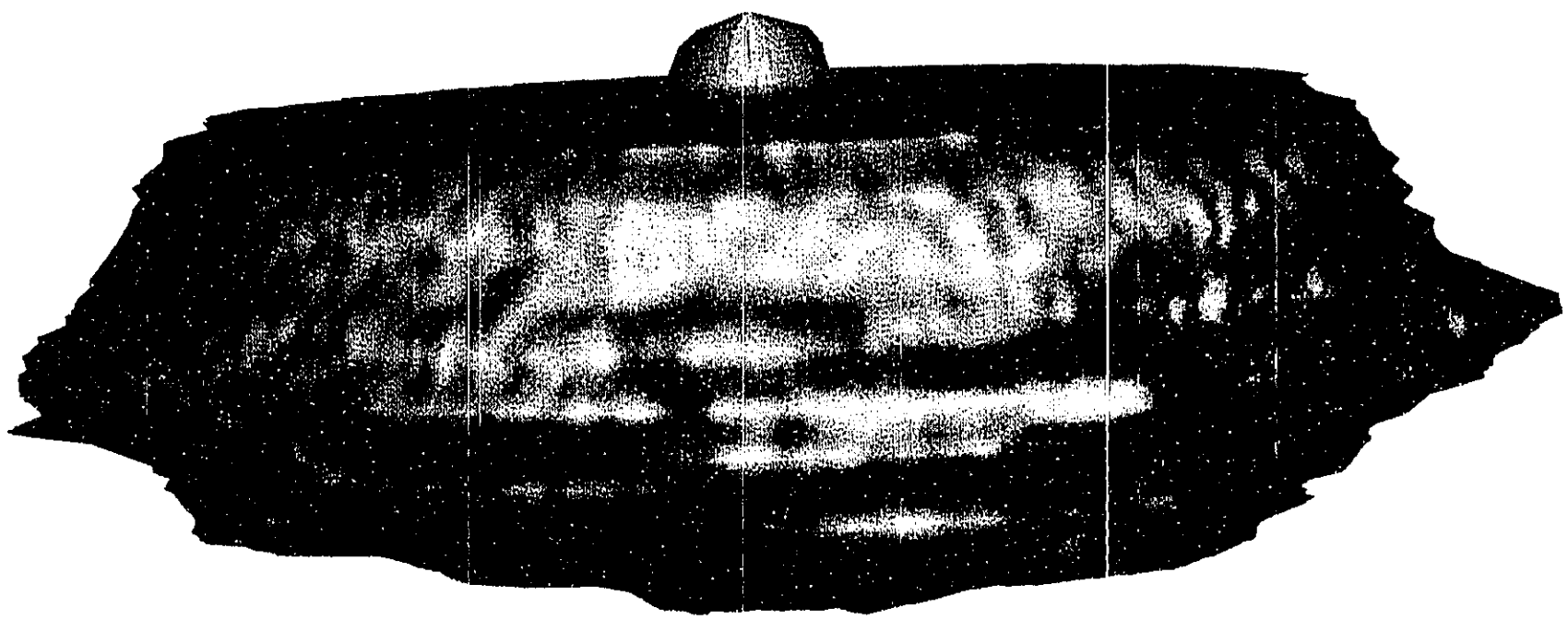
VIEWING AZIMUTH: 45
AXIS TILT: -5 DEG



3D SHADE PLOT

FERRELLGAS
HOLBROOK, AZ
STORAGE WELL NO. 3
MARCH 11, 1996

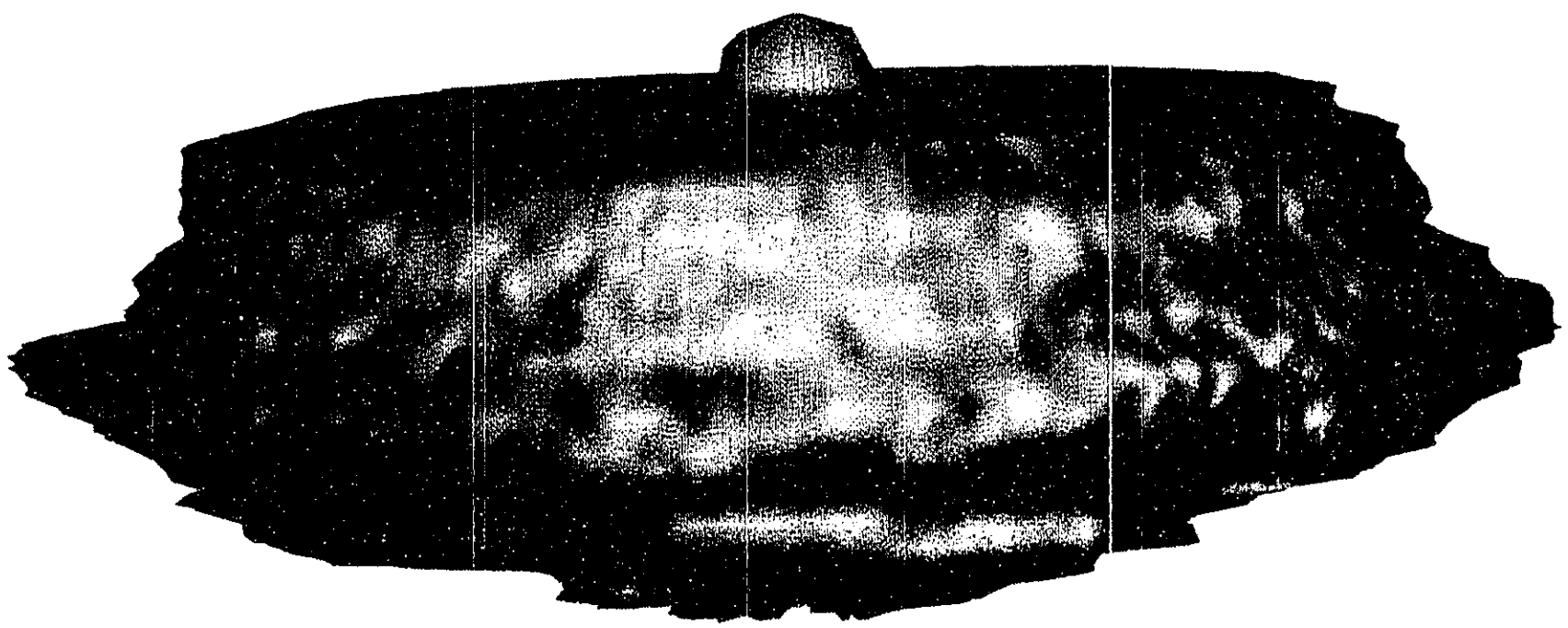
VIEWING AZIMUTH: 135
AXIS TILT: -5 DEG



3D SHADE PLOT

FERRELLGAS
HOLBROOK, AZ
STORAGE WELL NO. 3
MARCH 11, 1996

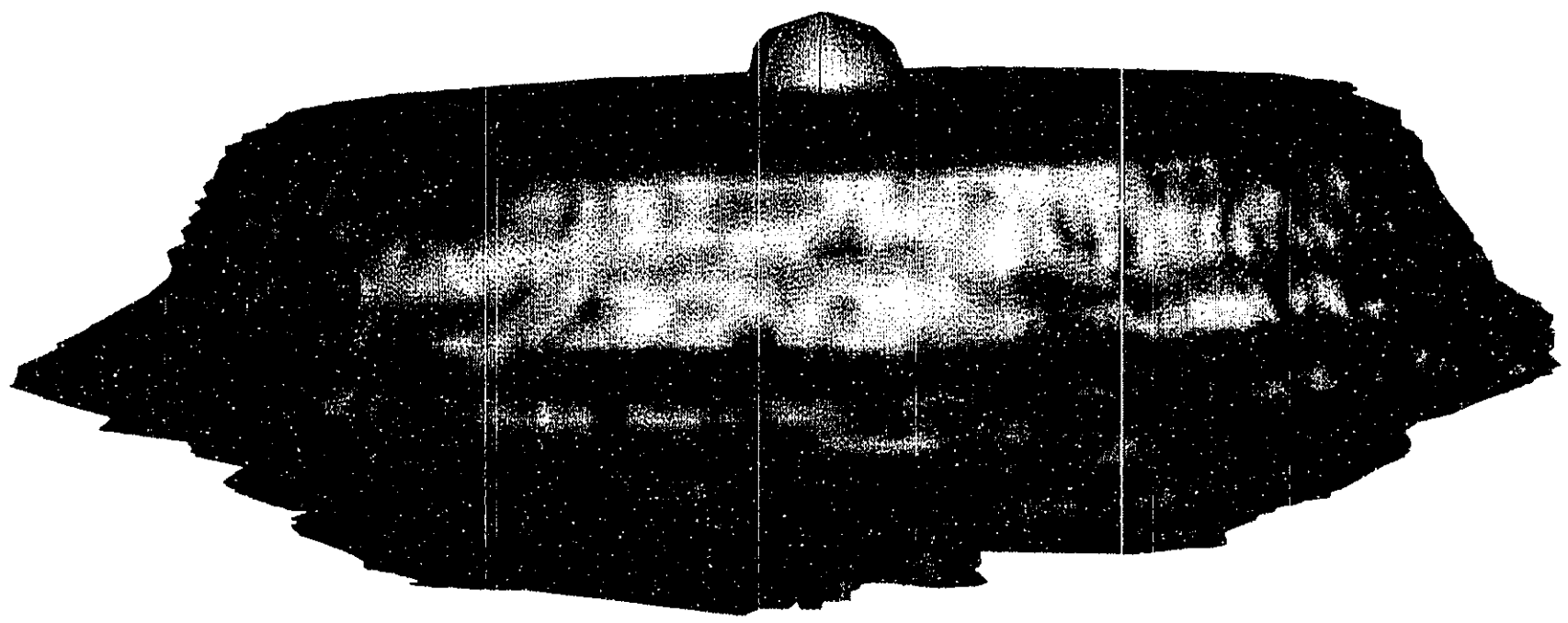
VIEWING AZIMUTH: 225
AXIS TILT: -5 DEG



3D SHADE PLOT

FERRELLGAS
HOLBROOK, AZ
STORAGE WELL NO. 3
MARCH 11, 1996

VIEWING AZIMUTH: 315
AXIS TILT: -5 DEG



SONARWIRE INC.
Wall Ranges versus Depth (ft.)

FERRELLGAS
HOLBROOK, AZ

STORAGE WELL NO. 3
Mon, Mar 11, 1996

Depth: 940 Tilt: 0 Range: 25.0 VOS: 5952

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
22.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
45.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
67.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
90.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
112.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
135.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
157.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
180.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
202.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
225.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
247.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
270.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
292.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
315.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
337.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Depth: 942 Tilt: 0 Range: 100.0 VOS: 5954

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
22.5	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
45.0	6.7	6.7	6.7	6.7	6.7	6.7	6.3	6.3
67.5	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
90.0	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
112.5	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
135.0	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
157.5	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
180.0	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
202.5	5.9	5.9	6.3	6.3	6.3	6.3	6.3	6.3
225.0	6.3	6.7	6.7	6.7	6.7	6.7	6.7	6.7
247.5	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
270.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
292.5	6.7	7.2	7.2	7.2	7.2	7.2	7.2	7.2
315.0	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
337.5	7.2	7.2	7.2	7.2	7.2	7.2	6.7	6.7

Depth: 944 Tilt: 0 Range: 100.0 VOS: 5954

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
22.5	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.9
45.0	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
67.5	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
90.0	8.9	8.4	8.4	8.4	8.4	8.4	8.4	8.4
112.5	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
135.0	8.4	8.4	8.0	8.0	8.0	8.0	8.0	8.0
157.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
180.0	8.0	8.0	8.0	7.6	7.6	7.6	7.6	7.6
202.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
225.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6	8.0
247.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
270.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.4
292.5	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
315.0	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
337.5	8.9	8.9	8.9	8.9	8.9	8.9	8.4	8.4

Depth: 948 Tilt: 0 Range: 100.0 VOS: 5954

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	9.7	9.7	9.3	9.3	9.3	9.3	9.3	9.3
22.5	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.7
45.0	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
67.5	9.7	9.7	9.7	9.7	10.1	10.1	10.1	10.1
90.0	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
112.5	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
135.0	10.1	10.1	10.1	10.1	9.7	9.7	9.7	9.7
157.5	9.7	9.7	9.7	9.7	9.7	9.3	9.3	9.3
180.0	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
202.5	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
225.0	9.3	9.3	9.7	9.7	9.7	9.7	9.7	9.7
247.5	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
270.0	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
292.5	10.5	10.5	10.5	10.5	10.1	10.1	10.1	10.1
315.0	9.7	9.7	9.7	9.7	9.7	9.7	10.1	10.1
337.5	10.1	10.1	10.1	10.1	10.1	9.7	9.7	9.7

Depth: 950 Tilt: 0 Range: 140.0 VOS: 5954

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
22.5	10.6	10.6	10.6	10.6	10.6	10.0	10.0	10.0
45.0	10.0	10.0	10.0	10.0	9.4	9.4	9.4	9.4
67.5	9.4	9.4	9.4	10.0	10.0	10.0	10.0	10.0
90.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.4
112.5	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
135.0	9.4	10.0	10.0	10.0	10.0	10.0	10.0	10.0
157.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
180.0	10.0	10.0	10.6	10.6	10.6	10.6	10.6	10.6
202.5	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
225.0	10.6	10.6	10.6	10.6	10.6	10.6	10.6	11.2
247.5	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
270.0	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
292.5	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
315.0	11.2	11.2	11.2	11.2	11.2	11.2	11.2	10.6
337.5	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6

Depth: 951 Tilt: 0 Range: 160.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	65.5	65.5	65.5	65.5	64.8	63.4	63.4	62.8
22.5	62.8	62.8	62.1	62.1	62.1	61.4	60.7	59.4
45.0	58.7	58.7	58.7	58.7	58.0	58.7	57.4	57.4
67.5	58.7	58.7	58.7	58.7	57.4	58.0	58.7	58.7
90.0	58.7	58.7	60.1	60.7	62.1	60.1	60.7	61.4
112.5	62.1	62.8	65.5	65.5	65.5	66.1	66.8	66.8
135.0	66.1	66.1	66.8	66.8	66.1	65.5	64.1	64.8
157.5	65.5	65.5	65.5	64.1	63.4	63.4	62.8	63.4
180.0	61.4	62.1	61.4	62.1	62.1	62.8	62.8	62.8
202.5	62.8	65.5	63.4	65.5	64.1	64.1	64.8	65.5
225.0	65.5	64.1	64.8	64.1	63.4	63.4	63.4	64.1
247.5	64.1	66.1	65.5	64.8	64.1	64.8	64.8	64.8
270.0	64.8	64.8	65.5	66.8	67.5	66.1	65.5	66.1
292.5	66.1	66.1	66.1	66.8	66.8	67.5	67.5	68.2
315.0	68.2	68.2	68.2	68.8	70.2	70.9	70.9	70.9
337.5	70.9	70.9	70.2	70.2	69.5	69.5	69.5	66.1

Depth: 952 Tilt: 0 Range: 160.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	70.9	70.9	70.2	70.2	69.5	69.5	68.8	68.2
22.5	66.8	65.5	64.8	64.8	64.1	64.1	62.8	61.4
45.0	60.1	60.1	58.7	57.4	55.3	55.3	55.3	56.0
67.5	56.7	57.4	58.0	58.0	58.7	58.7	59.4	59.4
90.0	58.7	58.0	58.7	58.7	59.4	60.7	62.1	60.1
112.5	60.7	61.4	61.4	62.8	62.8	62.8	64.1	64.8
135.0	65.5	66.1	66.1	66.1	64.8	65.5	65.5	66.1
157.5	66.8	66.1	65.5	64.8	65.5	64.8	64.8	64.1
180.0	64.1	65.5	66.1	65.5	62.8	64.1	64.8	64.8
202.5	66.1	65.5	66.1	64.8	65.5	64.8	64.8	64.1
225.0	64.1	64.8	66.1	66.1	64.8	65.5	65.5	64.8
247.5	64.1	64.1	64.8	64.1	64.8	64.8	64.1	65.5
270.0	64.8	64.8	65.5	65.5	65.5	65.5	66.8	66.1
292.5	66.8	67.5	67.5	66.8	66.8	67.5	67.5	68.2
315.0	68.8	68.8	68.2	68.2	68.8	68.8	69.5	70.2
337.5	70.9	71.5	70.9	69.5	69.5	70.2	70.2	70.9

Depth: 954 Tilt: 0 Range: 160.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	74.9	74.9	75.6	75.6	75.6	75.6	74.9	74.9
22.5	74.9	74.9	74.9	74.2	74.2	74.9	74.9	74.9
45.0	74.9	74.9	74.2	74.2	73.6	73.6	73.6	73.6
67.5	72.9	72.9	73.6	73.6	72.9	72.9	72.2	71.5
90.0	71.5	72.2	72.2	72.2	72.9	71.5	72.2	72.9
112.5	72.9	72.9	72.2	72.2	72.2	72.2	72.2	72.2
135.0	71.5	70.9	70.9	70.2	68.8	68.8	69.5	68.2
157.5	68.2	68.8	68.8	70.9	70.2	70.9	69.5	70.2
180.0	70.2	70.2	71.5	70.9	70.9	70.2	69.5	69.5
202.5	68.8	68.2	68.2	66.8	66.1	66.1	66.1	66.1
225.0	66.1	65.5	65.5	65.5	65.5	65.5	65.5	65.5
247.5	65.5	65.5	67.5	70.2	70.2	70.2	70.9	70.9
270.0	69.5	70.2	70.2	70.2	70.9	70.9	72.9	72.9
292.5	72.9	73.6	74.9	74.2	74.2	74.9	73.6	72.9
315.0	72.9	72.9	74.2	74.9	74.9	72.2	72.9	72.9
337.5	73.6	73.6	72.9	72.9	72.9	72.9	73.6	74.2

Depth: 956 Tilt: 0 Range: 160.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	73.6	74.2	73.6	72.2	72.9	72.9	72.9	72.9
22.5	72.9	73.6	73.6	74.2	74.2	74.2	74.2	74.2
45.0	74.2	74.2	74.9	73.6	74.2	73.6	73.6	73.6
67.5	73.6	73.6	73.6	72.9	72.2	72.9	72.2	70.9
90.0	70.2	69.5	69.5	69.5	70.2	70.2	70.9	70.9
112.5	70.9	70.9	71.5	71.5	72.2	72.2	72.2	72.2
135.0	72.2	72.2	72.2	71.5	72.2	72.9	74.2	72.9
157.5	70.9	72.2	71.5	72.2	72.2	71.5	71.5	70.2
180.0	71.5	71.5	70.9	70.2	69.5	70.9	70.2	73.6
202.5	72.2	71.5	71.5	71.5	71.5	71.5	70.9	72.9
225.0	72.2	68.8	72.2	71.5	72.9	72.9	72.9	70.9
247.5	71.5	72.2	72.2	73.6	72.2	72.9	72.2	72.2
270.0	72.2	72.9	72.9	72.9	74.2	74.2	74.9	74.9
292.5	75.6	75.6	74.9	74.9	74.9	75.6	74.9	74.2
315.0	74.9	75.6	75.6	75.6	76.3	76.3	75.6	75.6
337.5	74.9	74.9	74.9	74.2	74.2	74.2	73.6	73.6

Depth: 958 Tilt: 0 Range: 160.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	76.3	76.3	76.9	76.9	76.3	75.6	74.2	71.5
22.5	72.9	73.6	74.2	73.6	72.9	72.2	72.9	72.9
45.0	73.6	74.2	74.9	75.6	75.6	75.6	74.2	74.2
67.5	73.6	73.6	73.6	74.9	74.2	72.9	73.6	73.6
90.0	74.2	74.2	72.9	72.9	74.2	73.6	73.6	72.2
112.5	72.2	72.9	73.6	72.9	73.6	74.2	74.2	74.9
135.0	74.9	74.2	74.2	74.2	76.3	76.3	75.6	74.9
157.5	75.6	75.6	75.6	75.6	75.6	74.9	72.9	73.6
180.0	73.6	73.6	73.6	73.6	73.6	73.6	72.9	73.6
202.5	73.6	74.2	73.6	71.5	72.9	73.6	73.6	72.2
225.0	71.5	71.5	72.2	71.5	71.5	72.9	72.9	72.9
247.5	72.2	71.5	73.6	73.6	73.6	74.9	74.2	74.9
270.0	74.2	74.2	74.2	73.6	74.9	74.2	74.9	74.2
292.5	74.9	75.6	75.6	75.6	75.6	76.9	75.6	76.3
315.0	76.9	76.9	75.6	77.6	76.9	76.9	76.3	76.9
337.5	76.9	76.3	76.3	76.3	76.3	76.3	76.3	77.6

Depth: 960 Tilt: 0 Range: 160.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	74.2	74.2	74.9	74.2	74.2	74.2	73.6	73.6
22.5	74.2	73.6	74.2	75.6	75.6	76.3	75.6	74.2
45.0	74.2	74.2	74.9	74.9	74.9	74.9	75.6	74.9
67.5	74.2	74.2	75.6	75.6	76.3	76.3	75.6	75.6
90.0	76.3	76.3	74.2	74.9	74.9	75.6	75.6	74.9
112.5	74.9	74.9	72.9	74.2	74.9	74.9	74.9	74.9
135.0	74.2	73.6	73.6	74.2	74.9	75.6	74.9	74.2
157.5	74.2	73.6	74.2	73.6	74.2	74.2	74.2	75.6
180.0	74.9	74.9	74.9	73.6	74.2	74.2	73.6	72.9
202.5	71.5	73.6	74.2	73.6	72.9	72.9	73.6	72.9
225.0	72.9	73.6	74.2	73.6	74.9	74.2	74.9	74.9
247.5	74.9	74.9	74.2	75.6	74.9	74.9	74.9	76.3
270.0	76.3	76.9	76.9	75.6	76.9	76.3	76.3	77.6
292.5	78.3	78.3	78.3	79.0	79.6	79.6	79.0	78.3
315.0	76.9	77.6	77.6	77.6	77.6	79.0	81.0	81.0
337.5	81.0	79.6	77.6	76.3	76.9	76.9	76.9	74.9

Depth: 962 Tilt: 0 Range: 160.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	77.6	77.6	78.3	78.3	77.6	76.9	76.3	75.6
22.5	75.6	74.9	74.9	74.9	74.9	75.6	74.9	74.2
45.0	75.6	75.6	75.6	73.6	74.2	74.2	75.6	76.3
67.5	75.6	74.9	74.2	74.9	75.6	75.6	75.6	75.6
90.0	75.6	75.6	75.6	74.9	74.9	75.6	75.6	74.2
112.5	74.2	74.2	74.2	74.9	74.9	75.6	76.3	76.3
135.0	75.6	75.6	75.6	74.9	74.2	74.2	74.9	74.9
157.5	74.9	75.6	74.9	74.9	74.9	74.9	76.3	75.6
180.0	74.9	74.2	75.6	74.9	73.6	74.2	74.2	73.6
202.5	74.2	74.2	73.6	73.6	73.6	73.6	74.2	74.2
225.0	74.2	74.9	74.2	74.9	75.6	74.9	74.2	74.9
247.5	74.9	74.9	74.9	75.6	74.9	75.6	76.3	76.3
270.0	76.3	75.6	77.6	77.6	77.6	77.6	76.3	76.3
292.5	76.9	77.6	78.3	76.9	76.9	77.6	78.3	78.3
315.0	77.6	77.6	77.6	78.3	79.0	79.0	79.6	79.6
337.5	79.6	77.6	78.3	78.3	76.9	78.3	78.3	77.6

Depth: 964 Tilt: 0 Range: 160.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	78.3	78.3	77.6	77.6	76.9	76.9	76.9	76.3
22.5	76.3	75.6	74.9	74.2	74.2	74.9	74.2	74.2
45.0	73.6	74.2	74.2	74.9	75.6	76.3	76.3	76.9
67.5	76.3	76.9	76.3	76.3	75.6	75.6	75.6	75.6
90.0	75.6	75.6	76.3	76.9	76.3	76.3	75.6	76.9
112.5	75.6	74.9	75.6	75.6	75.6	75.6	76.3	76.9
135.0	76.3	75.6	75.6	75.6	76.9	75.6	76.9	75.6
157.5	75.6	75.6	76.9	76.3	75.6	74.9	75.6	75.6
180.0	75.6	75.6	74.9	74.2	74.9	73.6	74.2	74.9
202.5	74.2	73.6	73.6	73.6	74.2	74.9	74.9	75.6
225.0	76.3	76.3	76.3	75.6	75.6	75.6	76.3	75.6
247.5	75.6	76.9	77.6	77.6	77.6	76.9	77.6	76.9
270.0	76.9	77.6	77.6	77.6	79.0	79.0	80.3	79.0
292.5	79.0	78.3	78.3	79.0	80.3	81.0	81.0	80.3
315.0	79.6	79.6	80.3	81.0	81.7	81.7	81.7	80.3
337.5	79.6	79.0	78.3	77.6	77.6	76.9	76.9	77.6

Depth: 966 Tilt: 0 Range: 180.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	79.7	79.7	79.0	78.2	77.5	77.5	76.7	77.5
22.5	78.2	78.2	77.5	77.5	77.5	76.7	76.7	76.7
45.0	77.5	77.5	78.2	77.5	77.5	76.7	76.7	76.7
67.5	75.9	76.7	75.9	75.9	75.9	76.7	76.7	77.5
90.0	77.5	77.5	77.5	77.5	76.7	77.5	76.7	77.5
112.5	76.7	78.2	75.9	78.2	78.2	77.5	76.7	77.5
135.0	78.2	78.2	78.2	79.0	78.2	78.2	78.2	77.5
157.5	77.5	78.2	78.2	78.2	79.0	79.0	78.2	77.5
180.0	78.2	76.7	76.7	76.7	77.5	76.7	76.7	76.7
202.5	78.2	77.5	75.9	75.9	75.9	75.2	75.2	76.7
225.0	76.7	75.9	75.2	75.2	74.4	75.2	75.9	76.7
247.5	76.7	76.7	75.9	76.7	75.9	75.2	75.9	76.7
270.0	76.7	76.7	75.9	76.7	76.7	77.5	78.2	78.2
292.5	78.2	78.2	77.5	79.0	79.0	79.0	78.2	78.2
315.0	79.0	79.0	79.7	79.7	81.3	81.3	80.5	81.3
337.5	81.3	80.5	81.3	81.3	80.5	81.3	81.3	81.3

Depth: 968 Tilt: 0 Range: 180.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	79.7	79.0	79.0	78.2	78.2	78.2	78.2	79.0
22.5	79.0	80.5	79.7	79.7	78.2	79.0	79.7	79.0
45.0	78.2	79.0	78.2	78.2	79.0	77.5	75.2	75.2
67.5	75.9	76.7	75.9	76.7	76.7	76.7	77.5	78.2
90.0	77.5	78.2	78.2	77.5	76.7	77.5	77.5	78.2
112.5	79.7	81.3	78.2	79.0	77.5	78.2	79.7	79.7
135.0	79.0	79.0	79.0	79.7	79.0	77.5	77.5	77.5
157.5	76.7	75.2	75.9	76.7	77.5	76.7	76.7	76.7
180.0	75.9	76.7	77.5	77.5	77.5	76.7	76.7	76.7
202.5	76.7	77.5	77.5	77.5	76.7	75.2	74.4	75.2
225.0	75.2	75.2	75.2	75.9	75.9	75.9	75.9	77.5
247.5	76.7	76.7	77.5	77.5	76.7	78.2	78.2	78.2
270.0	78.2	78.2	79.0	79.0	79.7	79.7	79.7	79.0
292.5	79.0	79.7	81.3	81.3	79.7	79.7	83.5	83.5
315.0	82.0	82.0	82.0	82.0	82.8	83.5	82.8	82.0
337.5	81.3	80.5	81.3	81.3	80.5	80.5	80.5	79.7

Depth: 970 Tilt: 0 Range: 180.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	79.7	79.0	79.0	79.0	78.2	79.7	81.3	80.5
22.5	79.0	79.7	80.5	80.5	79.7	79.0	80.5	80.5
45.0	81.3	79.7	79.0	79.7	79.7	79.7	81.3	80.5
67.5	81.3	79.7	80.5	80.5	81.3	82.8	83.5	81.3
90.0	82.0	82.8	81.3	79.0	80.5	81.3	80.5	79.0
112.5	79.0	79.0	79.7	79.7	79.7	80.5	80.5	80.5
135.0	81.3	80.5	80.5	80.5	80.5	80.5	79.7	80.5
157.5	80.5	79.0	80.5	79.7	82.0	82.0	82.0	81.3
180.0	80.5	79.7	79.7	80.5	79.7	79.7	79.0	80.5
202.5	80.5	79.7	79.7	80.5	77.5	78.2	78.2	78.2
225.0	78.2	79.0	78.2	78.2	79.7	79.0	79.0	79.0
247.5	79.0	79.7	82.0	82.8	81.3	81.3	81.3	80.5
270.0	80.5	82.8	82.8	83.5	83.5	82.0	82.8	83.5
292.5	82.0	82.0	83.5	83.5	83.5	82.0	82.8	82.8
315.0	82.8	82.0	82.8	82.8	82.8	82.8	83.5	82.8
337.5	82.0	82.0	83.5	84.3	81.3	79.7	78.2	79.7

Depth: 972 Tilt: 0 Range: 180.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	84.3	82.0	82.0	82.8	84.3	82.8	82.0	83.5
22.5	82.8	82.8	82.0	81.3	82.0	81.3	80.5	80.5
45.0	79.7	79.7	79.7	80.5	79.7	81.3	81.3	79.0
67.5	82.0	82.0	82.0	82.0	82.8	82.8	82.8	82.0
90.0	82.0	82.0	82.0	81.3	82.8	82.0	82.0	82.0
112.5	82.8	82.8	82.0	82.0	82.0	82.8	81.3	82.0
135.0	81.3	82.8	82.0	81.3	81.3	80.5	81.3	79.0
157.5	79.7	80.5	80.5	79.0	81.3	80.5	79.7	79.7
180.0	81.3	80.5	80.5	80.5	81.3	82.0	82.0	82.0
202.5	82.0	81.3	83.5	83.5	82.8	82.8	82.0	82.8
225.0	82.0	83.5	83.5	82.0	81.3	80.5	80.5	80.5
247.5	79.0	79.0	79.0	79.0	79.0	79.0	79.7	82.0
270.0	82.0	81.3	82.0	82.8	83.5	83.5	84.3	84.3
292.5	82.8	82.8	82.8	85.8	83.5	82.8	82.8	82.8
315.0	82.0	84.3	85.1	85.1	85.1	87.3	88.1	85.1
337.5	85.8	85.1	83.5	83.5	84.3	84.3	82.8	82.8

Depth: 974 Tilt: 0 Range: 180.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	85.1	84.3	83.5	83.5	84.3	83.5	83.5	84.3
22.5	84.3	83.5	82.8	82.8	82.8	82.8	83.5	82.8
45.0	82.0	82.0	82.0	82.8	82.8	82.8	82.0	83.5
67.5	82.0	81.3	82.8	82.8	82.8	83.5	82.8	82.8
90.0	81.3	82.8	84.3	88.1	85.8	84.3	85.1	85.1
112.5	85.8	85.1	84.3	83.5	82.0	82.8	82.0	82.8
135.0	82.8	83.5	82.0	81.3	82.0	82.0	81.3	81.3
157.5	82.0	81.3	80.5	80.5	81.3	82.0	82.0	83.5
180.0	82.8	82.8	82.8	82.0	82.0	82.0	82.8	83.5
202.5	84.3	84.3	84.3	85.1	84.3	84.3	83.5	82.8
225.0	83.5	84.3	83.5	82.0	81.3	80.5	80.5	80.5
247.5	82.0	81.3	81.3	82.0	80.5	79.7	80.5	82.0
270.0	81.3	82.0	82.0	82.8	84.3	83.5	82.8	82.8
292.5	83.5	85.1	87.3	85.8	85.1	85.1	85.1	87.3
315.0	87.3	86.6	87.3	88.1	88.1	88.9	88.9	88.9
337.5	87.3	88.1	86.6	85.1	85.1	85.8	85.8	86.6

Depth: 976 Tilt: 0 Range: 180.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	82.8	82.8	82.0	82.0	82.8	84.3	83.5	82.8
22.5	81.3	81.3	80.5	80.5	80.5	80.5	80.5	81.3
45.0	81.3	81.3	83.5	84.3	84.3	85.8	84.3	85.8
67.5	87.3	84.3	82.8	83.5	84.3	84.3	85.1	85.1
90.0	82.8	84.3	85.1	82.8	82.8	84.3	84.3	84.3
112.5	85.1	85.1	85.8	85.8	84.3	84.3	84.3	82.8
135.0	83.5	84.3	84.3	84.3	83.5	84.3	83.5	84.3
157.5	85.1	86.6	85.8	86.6	85.8	84.3	85.1	85.1
180.0	83.5	84.3	85.8	83.5	82.8	82.8	82.0	83.5
202.5	84.3	82.8	84.3	83.5	82.8	82.0	83.5	84.3
225.0	84.3	86.6	85.1	84.3	85.1	82.8	82.8	84.3
247.5	84.3	88.9	87.3	88.1	85.1	85.1	85.1	86.6
270.0	85.8	86.6	87.3	87.3	88.9	88.1	88.1	86.6
292.5	88.1	86.6	87.3	88.1	88.9	90.4	88.9	91.1
315.0	91.1	91.9	92.7	92.7	91.1	93.4	94.2	91.9
337.5	91.1	88.9	82.8	82.8	82.0	82.0	82.8	82.8

Depth: 978 Tilt: 0 Range: 180.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	87.3	87.3	85.8	85.1	87.3	87.3	87.3	89.6
22.5	94.2	94.2	94.9	94.9	95.7	95.7	96.4	95.7
45.0	94.9	96.4	94.9	95.7	96.4	96.4	95.7	96.4
67.5	94.2	93.4	94.2	94.9	94.9	94.2	94.2	94.2
90.0	94.2	91.9	91.1	91.1	87.3	88.1	88.1	89.6
112.5	90.4	89.6	89.6	88.9	89.6	89.6	88.1	85.8
135.0	85.8	86.6	87.3	86.6	86.6	86.6	86.6	86.6
157.5	85.8	87.3	87.3	86.6	85.1	85.8	85.1	84.3
180.0	85.8	88.1	86.6	86.6	87.3	86.6	85.1	85.8
202.5	87.3	86.6	85.8	87.3	88.9	88.9	91.1	91.1
225.0	91.1	91.1	91.9	92.7	93.4	93.4	93.4	92.7
247.5	92.7	91.9	93.4	91.1	88.9	88.9	92.7	94.9
270.0	92.7	90.4	89.6	89.6	89.6	90.4	88.9	89.6
292.5	87.3	89.6	90.4	94.2	93.4	94.2	94.2	92.7
315.0	93.4	93.4	94.2	97.2	97.2	96.4	96.4	94.9
337.5	94.2	92.7	88.1	87.3	88.1	86.6	87.3	85.8

Depth: 980 Tilt: 0 Range: 180.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	92.7	92.7	87.3	88.1	91.9	92.7	92.7	91.9
22.5	92.7	92.7	92.7	91.9	92.7	91.9	91.9	91.9
45.0	91.1	94.2	92.7	93.4	93.4	94.9	94.2	98.0
67.5	96.4	93.4	94.2	90.4	91.9	91.9	92.7	91.1
90.0	91.1	90.4	91.9	92.7	91.9	91.9	91.1	89.6
112.5	89.6	88.9	87.3	88.9	88.9	87.3	91.1	87.3
135.0	87.3	87.3	88.1	88.1	88.9	87.3	87.3	87.3
157.5	88.1	88.1	88.1	86.6	85.8	85.8	84.3	83.5
180.0	84.3	84.3	85.1	85.1	85.1	86.6	87.3	87.3
202.5	86.6	86.6	87.3	88.1	88.1	89.6	88.1	90.4
225.0	89.6	90.4	91.1	91.9	92.7	92.7	93.4	93.4
247.5	93.4	94.2	94.2	94.2	93.4	93.4	92.7	89.6
270.0	90.4	90.4	91.1	91.1	91.1	91.1	88.9	89.6
292.5	89.6	90.4	90.4	90.4	91.9	90.4	91.1	92.7
315.0	94.9	95.7	96.4	95.7	102.5	96.4	94.9	94.2
337.5	94.9	94.9	94.2	93.4	91.9	93.4	92.7	93.4

Depth: 982 Tilt: 0 Range: 180.0 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	91.9	91.1	91.1	89.6	89.6	92.7	92.7	91.9
22.5	91.9	91.9	89.6	91.1	91.1	93.4	93.4	90.4
45.0	91.9	92.7	91.9	91.9	90.4	91.1	91.9	93.4
67.5	94.9	90.4	88.1	89.6	93.4	92.7	93.4	94.2
90.0	91.9	92.7	90.4	94.9	94.2	92.7	93.4	91.1
112.5	92.7	92.7	90.4	89.6	91.1	90.4	90.4	90.4
135.0	89.6	87.3	85.8	87.3	86.6	86.6	86.6	86.6
157.5	87.3	85.1	85.1	84.3	84.3	83.5	82.8	82.0
180.0	82.0	81.3	82.8	83.5	83.5	85.8	87.3	88.1
202.5	88.1	87.3	88.1	88.1	89.6	91.1	91.1	91.1
225.0	88.9	91.9	91.1	91.1	92.7	92.7	93.4	92.7
247.5	93.4	94.9	95.7	98.7	98.7	94.2	93.4	94.2
270.0	93.4	92.7	91.9	90.4	89.6	88.9	89.6	88.9
292.5	88.1	88.1	90.4	91.1	88.9	91.1	94.9	94.9
315.0	95.7	97.2	97.2	101.8	102.5	104.0	100.2	94.2
337.5	89.6	89.6	90.4	91.9	91.9	91.9	91.9	91.9

Depth: 984 Tilt: 0 Range: 179.9 VOS: 5955

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	88.8	90.4	90.4	90.4	88.1	88.1	88.8	89.6
22.5	91.1	91.9	92.6	92.6	92.6	90.4	90.4	89.6
45.0	88.1	87.3	86.6	87.3	87.3	86.6	85.8	86.6
67.5	88.1	92.6	92.6	94.1	95.7	96.4	97.2	97.2
90.0	97.2	97.2	96.4	91.9	91.9	91.9	90.4	91.9
112.5	94.9	90.4	90.4	88.8	88.8	90.4	91.1	90.4
135.0	90.4	89.6	88.1	85.8	85.8	85.8	86.6	86.6
157.5	85.8	85.8	88.1	85.8	84.3	82.0	81.2	80.5
180.0	79.0	78.2	79.7	80.5	81.2	80.5	82.0	81.2
202.5	81.2	80.5	80.5	82.0	82.8	85.0	85.8	85.8
225.0	86.6	86.6	88.1	90.4	89.6	89.6	89.6	91.1
247.5	92.6	93.4	91.9	91.9	91.9	91.1	91.1	88.8
270.0	88.8	88.1	89.6	88.8	88.8	88.1	88.8	89.6
292.5	88.8	88.1	86.6	85.8	86.6	88.8	88.8	91.1
315.0	94.1	94.9	95.7	96.4	97.9	98.7	97.9	95.7
337.5	94.9	93.4	88.8	87.3	88.8	89.6	87.3	89.6

Depth: 986 Tilt: 0 Range: 160.0 VOS: 5956

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	87.1	86.4	86.4	87.1	86.4	88.4	89.1	89.8
22.5	87.8	86.4	85.7	87.8	85.7	85.7	85.7	84.4
45.0	87.8	86.4	85.7	85.7	87.1	86.4	87.1	83.7
67.5	83.0	83.7	84.4	86.4	87.8	86.4	87.1	87.8
90.0	86.4	87.1	89.1	89.1	89.8	88.4	87.1	89.1
112.5	87.8	88.4	89.8	89.8	87.8	89.8	89.1	86.4
135.0	85.1	85.1	85.7	85.7	83.7	83.7	83.0	82.4
157.5	81.0	81.7	81.0	81.7	79.7	78.3	77.0	77.0
180.0	78.3	78.3	77.6	79.0	80.3	81.7	82.4	84.4
202.5	85.7	86.4	87.1	86.4	85.7	86.4	86.4	85.7
225.0	86.4	86.4	87.8	88.4	88.4	88.4	89.1	87.1
247.5	87.1	87.8	85.1	87.1	86.4	86.4	85.1	85.7
270.0	85.1	85.7	87.1	87.1	87.8	87.1	87.1	87.8
292.5	88.4	89.1	89.8	90.5	89.8	89.1	89.8	89.8
315.0	88.4	89.1	89.8	90.5	90.5	89.8	92.5	87.8
337.5	85.7	85.1	85.1	85.1	84.4	85.7	87.1	88.4

Depth: 988 Tilt: 0 Range: 159.9 VOS: 5956

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	83.0	84.3	84.3	83.7	83.7	84.3	84.3	84.3
22.5	85.7	85.0	85.7	83.7	82.3	83.7	84.3	85.0
45.0	85.0	85.0	84.3	83.7	83.0	82.3	83.0	83.0
67.5	81.6	82.3	81.0	82.3	81.0	83.7	82.3	83.7
90.0	83.7	82.3	83.7	85.0	84.3	85.0	86.4	86.4
112.5	86.4	86.4	86.4	87.0	87.7	88.4	88.4	89.7
135.0	91.1	91.8	89.1	84.3	82.3	80.3	80.3	81.6
157.5	81.6	81.6	81.6	81.0	79.6	78.3	78.9	79.6
180.0	78.3	77.6	76.9	76.9	76.2	77.6	76.2	78.3
202.5	77.6	78.3	80.3	80.3	81.0	81.0	82.3	85.7
225.0	87.0	87.0	87.0	86.4	87.0	86.4	87.7	86.4
247.5	86.4	86.4	87.7	86.4	85.0	83.7	84.3	83.0
270.0	82.3	81.6	83.7	83.7	83.7	82.3	82.3	81.6
292.5	81.0	81.6	82.3	83.0	83.0	82.3	83.7	83.0
315.0	82.3	83.0	84.3	87.0	90.4	92.4	90.4	89.7
337.5	87.0	85.7	83.7	82.3	82.3	81.0	81.0	83.0

Depth: 990 Tilt: 0 Range: 140.0 VOS: 5958

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	82.1	82.1	81.5	80.9	80.3	79.7	78.5	78.5
22.5	78.0	77.4	75.6	75.6	75.6	76.2	78.0	78.5
45.0	78.5	78.5	78.0	78.5	79.1	79.7	79.1	79.1
67.5	79.1	79.7	79.1	78.0	78.0	79.1	78.5	78.0
90.0	79.7	79.1	79.7	78.5	78.0	77.4	74.4	76.2
112.5	79.1	79.7	80.3	77.4	76.8	78.5	76.8	77.4
135.0	78.5	79.1	78.5	79.1	78.0	76.2	76.8	75.0
157.5	74.4	74.4	73.2	72.6	74.4	74.4	73.2	73.2
180.0	75.6	77.4	76.2	75.6	76.2	76.8	76.2	76.2
202.5	79.1	78.0	79.1	79.7	79.7	80.3	80.9	80.9
225.0	80.9	80.3	80.3	80.3	80.3	80.9	79.1	78.5
247.5	78.0	78.5	78.0	78.0	77.4	77.4	78.5	78.0
270.0	78.5	78.0	77.4	79.1	79.7	80.3	78.5	76.8
292.5	77.4	78.0	77.4	78.0	80.3	80.9	80.9	81.5
315.0	82.1	80.9	82.1	79.7	79.1	79.7	79.1	78.5
337.5	78.0	78.5	79.1	79.7	82.1	81.5	80.3	81.5

Depth: 992 Tilt: 0 Range: 140.0 VOS: 5958

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	78.0	77.4	77.4	76.2	76.2	76.8	76.8	76.2
22.5	75.6	75.0	75.6	76.2	76.2	76.2	77.4	76.2
45.0	78.0	76.8	76.2	78.0	77.4	78.6	76.8	78.6
67.5	78.0	79.2	78.0	76.8	75.6	76.2	76.8	76.2
90.0	76.8	76.2	74.4	75.6	75.0	75.0	72.7	73.8
112.5	72.7	72.7	73.8	75.0	73.3	73.3	72.7	71.5
135.0	72.1	71.5	72.1	74.4	73.8	75.0	75.6	75.6
157.5	75.6	76.8	77.4	78.0	78.6	78.6	78.0	78.0
180.0	78.6	78.6	78.6	79.8	79.8	79.8	80.3	80.9
202.5	80.9	79.2	78.0	78.0	77.4	77.4	77.4	77.4
225.0	78.0	78.6	78.6	77.4	76.2	76.2	75.6	75.6
247.5	77.4	77.4	77.4	76.8	77.4	76.2	77.4	78.6
270.0	78.0	79.2	76.8	78.0	79.8	79.2	79.8	78.6
292.5	78.0	77.4	75.6	75.6	75.6	75.6	75.6	79.2
315.0	79.8	79.8	80.3	80.9	80.3	80.3	79.2	78.0
337.5	76.8	78.0	79.2	76.2	76.8	76.8	77.4	78.0

Depth: 994 Tilt: 0 Range: 119.9 VOS: 5956

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	72.4	72.4	71.4	72.9	72.9	72.9	72.4	72.4
22.5	71.9	71.9	71.9	72.4	71.4	71.4	71.4	71.4
45.0	70.9	70.9	70.9	70.9	70.9	70.9	71.4	71.4
67.5	71.9	71.9	71.4	71.4	71.4	71.4	70.9	71.4
90.0	70.9	71.4	71.4	70.3	70.3	69.8	69.3	69.8
112.5	70.3	70.3	71.4	71.4	72.4	71.9	71.9	71.4
135.0	71.9	71.9	71.9	71.9	71.9	69.8	69.8	70.9
157.5	70.3	70.3	70.9	70.9	70.9	70.9	69.8	59.2
180.0	59.2	58.7	59.2	58.7	59.7	59.2	70.9	70.9
202.5	71.4	71.9	71.9	71.9	72.4	72.4	71.9	71.9
225.0	71.4	71.4	71.9	71.9	71.4	71.4	70.9	70.9
247.5	70.9	70.3	70.3	70.9	70.9	70.9	71.4	71.4
270.0	71.9	71.9	71.9	71.9	72.4	71.9	71.9	72.4
292.5	72.4	71.9	72.9	72.4	72.9	72.4	72.4	72.4
315.0	72.4	72.9	72.9	72.9	73.4	72.9	72.9	72.4
337.5	71.9	72.4	71.9	72.4	72.4	72.4	72.4	71.9

Depth: 996 Tilt: 0 Range: 120.0 VOS: 5958

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	71.4	71.4	71.9	71.9	71.4	75.9	75.4	75.4
22.5	74.9	74.4	74.4	73.9	73.9	73.9	74.4	74.9
45.0	75.4	75.9	76.4	74.9	74.9	74.9	73.4	72.9
67.5	72.9	73.4	73.4	72.4	71.9	71.4	70.4	69.9
90.0	70.4	70.9	70.9	70.9	69.9	71.9	70.9	72.9
112.5	72.9	73.4	73.4	73.4	73.4	72.9	72.9	72.4
135.0	72.9	71.9	70.4	69.9	69.4	69.4	69.9	70.4
157.5	70.4	69.9	69.4	66.3	57.2	57.7	57.2	57.2
180.0	57.7	57.2	58.2	58.2	57.7	58.7	67.3	68.3
202.5	69.4	69.4	68.3	69.4	69.4	69.4	69.4	69.9
225.0	70.4	71.4	72.4	72.4	72.4	71.9	72.4	72.4
247.5	72.9	72.9	72.4	72.4	72.9	73.4	70.4	70.4
270.0	69.9	69.9	69.9	69.9	70.4	70.4	70.4	70.9
292.5	70.4	70.4	70.9	70.9	71.4	71.9	72.9	73.9
315.0	73.9	74.9	75.9	76.9	76.9	75.4	77.5	75.4
337.5	74.4	74.9	73.9	73.4	73.9	73.9	73.4	72.4

Depth: 998 Tilt: 0 Range: 120.0 VOS: 5958

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	69.9	70.4	69.4	69.4	68.3	69.9	68.8	69.4
22.5	69.4	68.8	68.8	69.4	70.4	70.4	70.4	69.4
45.0	69.4	68.8	68.3	68.8	69.4	69.4	69.4	69.9
67.5	69.9	69.9	70.4	70.4	70.4	68.3	68.8	68.8
90.0	68.3	66.8	67.3	67.8	68.3	67.8	67.3	67.8
112.5	67.8	68.3	68.8	69.4	68.8	68.8	69.4	69.9
135.0	69.4	69.9	70.4	67.8	68.8	68.8	68.8	69.9
157.5	69.4	69.4	69.4	69.9	69.9	69.9	69.9	54.2
180.0	55.2	55.2	54.7	54.7	55.2	54.7	54.7	56.2
202.5	56.2	55.7	55.2	54.2	53.2	54.7	56.7	59.2
225.0	61.8	63.8	70.4	71.4	71.9	71.9	70.9	70.9
247.5	70.9	70.4	70.4	69.4	69.9	70.4	70.4	69.9
270.0	69.4	69.4	69.4	68.8	68.3	69.4	69.4	69.4
292.5	68.8	68.8	68.8	68.8	69.9	71.9	71.9	72.4
315.0	72.4	71.9	71.4	71.9	72.4	72.4	72.4	71.9
337.5	70.9	70.4	69.9	69.4	69.4	69.4	69.4	69.9

Depth: 1000 Tilt: 0 Range: 100.0 VOS: 5960

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	67.5	68.8	67.9	68.3	68.8	69.2	69.2	68.8
22.5	70.0	69.2	68.8	66.7	66.7	67.1	66.7	67.5
45.0	67.9	68.3	67.9	68.8	68.8	68.8	67.9	67.9
67.5	67.9	68.3	68.8	68.8	69.2	70.0	70.9	67.5
90.0	68.3	68.8	67.9	67.1	65.0	65.8	64.5	65.8
112.5	66.2	65.4	65.8	65.8	63.3	64.5	65.8	64.5
135.0	65.4	67.5	68.3	68.8	70.0	70.4	70.4	71.3
157.5	71.7	70.4	69.6	70.0	70.0	71.3	70.0	65.4
180.0	58.6	54.0	53.2	53.2	53.6	51.0	51.9	51.9
202.5	51.9	53.2	54.0	54.8	54.4	54.8	54.4	54.8
225.0	54.4	55.7	55.7	56.1	55.3	63.3	66.7	66.2
247.5	66.7	66.2	66.7	67.1	67.9	67.9	67.5	67.1
270.0	66.7	66.7	66.2	66.7	66.2	66.2	65.8	65.8
292.5	65.4	64.1	62.9	62.9	62.4	62.0	61.6	60.3
315.0	60.3	59.1	58.2	58.6	59.5	59.5	59.5	59.9
337.5	59.9	60.7	61.6	63.3	63.7	65.4	66.2	66.7

Depth: 1002 Tilt: 0 Range: 100.0 VOS: 5960

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	63.7	63.3	63.7	62.9	61.6	62.0	62.4	63.3
22.5	63.7	63.7	63.7	63.3	63.3	63.3	62.9	62.4
45.0	61.6	59.9	59.5	58.2	56.5	54.0	51.9	49.4
67.5	47.7	47.7	48.1	48.5	48.9	49.4	50.2	51.5
90.0	51.9	51.9	50.6	50.6	51.0	51.0	51.9	51.9
112.5	52.3	53.6	53.6	54.4	55.7	56.1	56.5	56.1
135.0	55.7	53.6	53.2	52.3	51.0	50.2	49.8	49.8
157.5	49.8	49.4	48.9	48.9	48.5	48.1	47.7	47.7
180.0	47.2	47.2	46.4	46.4	46.0	45.6	45.6	45.1
202.5	44.7	44.3	44.3	43.9	44.3	44.3	44.3	44.7
225.0	44.7	46.4	48.9	51.5	54.4	57.0	61.2	63.3
247.5	66.7	67.5	65.8	65.8	66.2	66.7	66.2	66.2
270.0	65.8	65.8	66.2	66.7	66.2	65.8	65.0	65.0
292.5	65.4	65.0	64.5	64.1	64.1	66.2	67.1	67.1
315.0	68.3	67.5	67.5	68.3	68.3	68.3	68.3	68.3
337.5	67.9	66.7	66.7	65.0	64.5	64.5	64.1	63.7

Depth: 1004 Tilt: 0 Range: 100.0 VOS: 5960

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	57.4	57.0	57.0	58.2	60.7	62.0	61.2	50.6
22.5	46.0	43.9	38.0	34.2	26.6	22.8	21.9	21.5
45.0	20.7	20.2	20.2	19.8	19.8	19.4	19.4	19.0
67.5	19.0	21.9	22.4	23.2	24.9	26.2	27.4	30.4
90.0	35.0	38.8	44.3	48.1	49.4	49.8	51.0	52.3
112.5	52.7	53.2	54.0	54.4	54.0	53.6	52.7	51.9
135.0	50.6	49.8	48.5	47.2	46.0	45.1	44.7	44.3
157.5	44.7	44.7	45.1	45.1	44.7	44.7	44.3	44.3
180.0	44.3	43.5	42.6	42.6	41.8	41.8	41.8	42.2
202.5	42.6	42.6	42.6	43.0	43.5	43.5	44.3	43.9
225.0	42.6	41.3	40.5	39.7	39.7	40.5	41.3	43.0
247.5	45.1	52.3	51.9	54.0	63.7	63.3	62.9	61.6
270.0	62.0	62.4	62.9	62.4	61.6	61.6	60.7	60.7
292.5	60.3	60.3	60.7	60.7	60.7	61.2	61.6	61.6
315.0	61.6	62.0	62.0	62.0	62.4	62.9	63.7	63.7
337.5	63.7	62.9	62.4	61.6	61.2	60.3	59.5	58.6

Depth: 1006 Tilt: 0 Range: 120.0 VOS: 5961

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	52.7	52.7	54.2	53.7	53.7	53.2	50.6	45.6
22.5	43.5	41.0	37.5	34.9	32.4	29.9	28.9	27.3
45.0	26.3	25.8	24.8	18.7	18.2	17.2	17.2	17.2
67.5	17.2	18.2	17.2	17.2	18.2	18.7	20.3	20.8
90.0	21.8	23.3	47.6	48.6	49.1	50.1	53.2	53.2
112.5	51.1	49.6	48.1	46.1	45.6	44.6	43.5	43.0
135.0	43.0	43.0	42.5	42.5	42.0	41.5	40.5	40.5
157.5	40.5	42.0	42.5	43.0	43.5	44.0	44.0	43.5
180.0	43.0	43.0	42.5	41.0	39.0	37.0	32.9	31.9
202.5	29.4	30.4	30.4	30.4	31.4	31.4	31.4	31.4
225.0	31.4	31.9	31.9	32.9	33.9	33.9	34.9	36.5
247.5	37.0	40.0	54.2	56.7	58.2	58.2	58.2	59.2
270.0	59.2	58.7	58.2	58.2	57.7	57.2	57.7	57.2
292.5	57.7	58.7	59.2	59.7	59.7	60.8	60.3	59.7
315.0	58.7	58.2	58.2	58.7	59.7	60.3	59.7	60.3
337.5	59.2	57.7	56.7	54.7	54.7	54.7	52.2	52.2

Depth: 1007 Tilt: 0 Range: 120.0 VOS: 5961

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	55.2	53.2	51.6	51.6	50.1	28.4	26.8	26.3
22.5	25.8	25.8	25.3	25.3	25.3	25.3	25.3	25.8
45.0	25.8	25.8	25.8	25.8	25.3	24.8	24.8	24.3
67.5	23.3	21.8	21.3	19.7	19.7	19.7	17.2	16.7
90.0	16.7	16.7	16.7	17.2	17.2	17.2	17.7	17.7
112.5	17.7	17.7	17.7	17.7	18.2	18.2	18.2	18.2
135.0	18.7	19.2	19.2	20.3	21.3	20.3	20.3	23.8
157.5	27.8	31.4	31.9	29.9	29.9	30.4	29.4	30.9
180.0	30.4	29.9	29.4	29.4	26.8	26.3	25.8	25.8
202.5	27.3	27.3	27.3	26.8	30.9	30.4	29.4	27.3
225.0	27.3	23.8	19.2	18.2	18.2	18.7	18.7	19.2
247.5	17.7	20.3	20.8	21.8	24.8	35.4	36.5	37.0
270.0	37.5	37.5	53.7	55.2	55.7	57.2	57.2	56.7
292.5	56.7	56.7	57.2	57.2	55.7	55.2	55.7	55.7
315.0	56.2	58.2	58.7	59.2	59.7	58.7	57.7	57.7
337.5	57.7	57.7	58.2	60.8	60.3	58.7	58.2	56.7

Depth: 1007 Tilt: -10 Range: 120.0 VOS: 5961

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	20.8	20.3	19.7	19.7	19.2	18.7	18.7	18.7
22.5	18.2	18.2	18.2	17.7	18.2	16.7	16.2	15.2
45.0	13.7	13.2	13.7	13.2	13.7	14.2	14.2	14.2
67.5	14.2	14.7	15.2	16.2	19.7	21.8	21.8	22.3
90.0	23.3	23.8	23.8	23.3	22.8	20.3	19.7	19.2
112.5	18.7	18.2	18.7	18.7	18.7	18.7	18.7	18.2
135.0	17.7	17.2	17.2	15.2	14.2	15.2	14.2	14.2
157.5	13.2	13.7	13.2	12.7	12.7	13.2	14.7	15.7
180.0	18.2	18.2	19.7	21.3	21.8	21.8	21.8	21.3
202.5	21.3	22.3	21.8	22.3	22.3	21.8	21.8	21.3
225.0	21.3	21.8	21.8	23.3	24.3	25.3	25.3	24.3
247.5	22.3	22.8	23.3	23.3	23.3	21.8	21.3	20.3
270.0	11.6	11.1	10.6	10.6	10.6	11.1	11.6	12.2
292.5	19.7	18.7	18.7	18.7	19.2	20.3	20.8	21.8
315.0	22.3	27.3	28.4	28.9	30.4	30.4	30.4	30.4
337.5	20.3	20.3	20.3	19.7	19.7	21.3	21.3	20.3

Depth: 1007 Tilt: -20 Range: 50.0 VOS: 5961

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	15.2	15.0	15.0	14.8	14.3	14.3	14.8	14.6
22.5	14.1	14.3	13.5	14.1	13.9	14.1	14.1	14.3
45.0	14.3	12.0	12.0	11.0	10.8	10.5	10.1	10.3
67.5	10.5	10.5	10.5	11.4	11.6	11.6	12.7	12.4
90.0	7.8	7.4	7.6	7.0	7.0	6.3	6.3	6.1
112.5	6.5	7.4	8.2	8.9	9.3	9.5	9.5	9.7
135.0	9.9	10.1	10.5	11.0	11.2	11.0	10.8	11.2
157.5	11.4	11.6	11.6	12.0	13.3	13.7	13.9	14.1
180.0	14.1	14.1	14.3	13.5	13.9	13.9	13.7	13.7
202.5	13.3	13.7	13.9	14.1	13.9	13.5	13.7	12.9
225.0	13.9	14.3	14.8	15.6	9.3	9.1	8.6	8.2
247.5	8.2	8.4	8.0	8.0	8.0	8.0	8.0	8.4
270.0	8.4	8.4	8.6	8.6	9.3	9.1	9.3	9.7
292.5	10.1	10.3	10.3	10.3	12.2	12.9	13.3	13.3
315.0	13.3	13.5	13.7	13.9	15.0	20.9	20.9	20.7
337.5	20.0	20.0	20.2	19.6	17.7	17.5	17.3	16.2

Depth: 1007 Tilt: -30 Range: 50.0 VOS: 5961

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	13.7	13.3	13.5	13.5	13.3	12.9	12.9	12.9
22.5	13.1	13.1	13.3	13.1	13.1	12.9	12.9	12.9
45.0	12.9	12.9	12.7	12.7	10.5	10.3	9.5	9.1
67.5	8.6	8.4	8.4	7.0	7.2	5.7	5.5	5.1
90.0	4.9	4.9	4.9	4.9	4.9	4.9	4.4	4.2
112.5	4.2	4.4	6.5	7.2	7.4	7.6	8.2	8.9
135.0	9.3	9.5	9.7	10.1	9.9	9.9	10.3	10.5
157.5	11.2	11.4	10.8	10.5	11.6	12.2	12.0	11.6
180.0	11.4	10.8	10.8	10.5	10.5	10.3	10.8	10.8
202.5	10.8	11.0	10.5	10.1	10.3	10.1	9.9	9.7
225.0	9.3	9.5	8.9	8.4	8.0	8.0	8.0	8.0
247.5	8.2	8.4	8.6	8.2	8.2	8.2	8.2	8.0
270.0	8.0	8.2	8.4	8.2	8.0	8.0	7.8	7.6
292.5	7.8	8.2	8.6	8.6	8.6	8.9	9.1	9.3
315.0	9.9	10.5	12.0	12.2	12.9	15.0	15.4	15.0
337.5	15.2	15.2	15.2	15.0	14.3	14.3	14.1	13.7

Depth: 1007 Tilt: -50 Range: 50.0 VOS: 5961

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	6.5	6.7	6.7	6.7	6.7	6.5	6.5	6.5
22.5	6.5	6.3	5.9	5.7	5.7	5.7	5.7	5.3
45.0	5.3	4.9	4.6	4.6	4.6	4.4	4.4	4.2
67.5	4.0	4.0	4.0	3.8	4.0	3.8	3.8	4.0
90.0	4.0	3.6	3.6	3.6	3.6	3.4	3.4	3.4
112.5	3.2	3.0	3.4	3.2	3.0	3.2	3.2	3.0
135.0	3.0	4.2	4.2	4.2	4.2	4.2	4.0	4.0
157.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.8
180.0	3.8	3.8	3.8	4.0	4.0	4.0	3.8	3.8
202.5	3.8	3.8	3.6	3.6	3.6	3.6	3.6	3.6
225.0	3.6	3.6	3.6	3.6	3.4	3.4	3.6	3.4
247.5	3.6	3.6	3.6	3.6	3.6	3.6	3.8	3.8
270.0	4.0	4.0	4.0	4.2	4.0	4.2	4.2	4.4
292.5	4.4	4.4	4.4	4.6	4.4	4.4	4.6	4.6
315.0	4.9	5.1	5.1	5.1	5.1	5.1	5.1	5.3
337.5	5.5	5.5	5.9	6.1	6.1	6.3	6.3	6.3

Depth: 1007 Tilt: -70 Range: 25.0 VOS: 5961

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	5.0	5.0	4.9	4.9	4.9	5.0	5.0	5.0
22.5	4.9	4.9	4.7	4.6	4.6	4.4	4.4	4.4
45.0	4.4	4.4	4.3	4.3	4.2	4.2	4.1	3.9
67.5	3.7	3.5	3.5	3.5	3.4	3.4	3.3	3.4
90.0	3.3	3.4	3.4	3.3	3.4	3.3	3.3	3.4
112.5	3.3	3.2	3.3	3.2	3.1	3.1	3.1	3.2
135.0	3.2	3.2	3.2	3.2	3.2	3.3	3.3	3.4
157.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.3
180.0	3.3	3.4	3.4	3.5	3.4	3.4	3.3	3.3
202.5	3.3	3.2	3.1	3.1	3.1	3.1	3.1	3.0
225.0	3.1	3.0	3.0	3.0	2.8	2.8	2.8	2.8
247.5	3.0	3.0	3.0	3.1	3.3	3.3	3.4	3.5
270.0	3.5	3.6	3.6	3.6	3.6	3.7	3.7	3.7
292.5	3.7	3.7	3.7	3.7	3.8	3.8	4.0	4.1
315.0	4.0	4.0	4.1	4.4	4.6	4.7	5.0	5.0
337.5	5.0	5.0	5.0	5.0	4.9	5.0	5.0	5.0

Depth: 1007 Tilt: -90 Range: 25.0 VOS: 5961

Bearing	+ 0.0	+ 2.8	+ 5.6	+ 8.4	+11.3	+14.1	+16.9	+19.7
0.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
22.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
45.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
67.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
90.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
112.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
135.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
157.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
180.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
202.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
225.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
247.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
270.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
292.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
315.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
337.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1

FERRELLGAS LPG FACILITY

Operator: Ferrellgas Inc.

Bond Company: Travelers Casualty and Surety Co. of America

Bond No.: 030 S 103626358 BCM

Amount: $25,000.00

Date approved: 8/01/96

Permits covered by this bond:

556 (Cavern 01)
557 (Cavern 02)
562 (Water well)
✓ 602 (Cavern 03)
603 (Cavern 04)
606 (Cavern 05)
607 (Cavern 06)
646 (Cavern 07)
647 (Cavern 08)
648 (Cavern 09)
671 (Cavern 10)
672 (Cavern 11)
776 (Cavern 12 -- not developed)
777 (Expired)
778* (Expired)

* Bond in Permit #778

May 20, 1996

Memo to Ferrellgas files
From: Steve Rauzi SR
Re: Discussion of volume verification in May 17, 1996 Commission meeting

All of the Commissioners present agreed that the sonar method was the best available technology to determine cavity shapes. They agreed that accepting volumetric measurements would be appropriate as long as sonar measurements continued to be used. Dr. Nations noted that sonar determinations could be waived in individual cases in appropriate situations.

State of Arizona
Arizona Geological Survey
416 W. Congress, Suite 100
Tucson, Arizona 85701
(520) 770-3500

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

May 1, 1996

Memo: Dale Thompson, Ferrellgas, Adamana — 9 pages total
Fax #: 524-2635
From: Steve Rauzi, Oil & Gas Administrator
Re: Volume verification surveys pursuant to A.A.C. R12-7-182(D)

I examined the sonar surveys on several of your storage wells after receiving the three sonar surveys run in March 1996. My analysis indicates that sonar surveys do not provide an exact picture of the shape and change of shape from survey to survey. On the other hand, sonar surveys, even when run by different companies and tools, do provide a good picture of the general shape and change in shape of a cavity as shown on the attached Exhibits 3 through 8.

The increase then decrease in sonar-determined volume for cavities 3 and 6 on Exhibit 1 is of special concern to me. I'm not sure if the discrepancy is due to running sonar in open hole versus through-pipe, different companies and tools, differences in tool design or calculation parameters, or improved technology through time. One way to verify sonar-determined volumes would be to complement them with volumetric measurements. The generally consistent cavity shape, change in shape, and rate of maximum radius increase over the last 16 years shown by the sonar survey results on the attached Exhibits 2 through 8 confirms the general integrity of the shape your caverns.

However, in light of the increase then decrease in sonar-determined volume in cavities 3 and 6 shown on Exhibit 1, it would be beneficial and appropriate to complement the sonar-determined volume verifications with volumetric measurements. As a result, I plan to recommend that the Oil and Gas Conservation Commission accept volumetric measurements and sonar surveys run on alternate five year cycles to provide a more accurate tracking and verification of cavity volumes; alternatively, to accept volumetric measurements annually complemented with sonar surveys at least every ten years or whenever a cavity is reentered and worked over, starting a new ten-year cycle.

Please feel free to comment on any aspect my analysis or reasoning. Also, I look forward to receiving your latest volumetric measurements pursuant to our discussion before the Commission's next meeting on May 17.

ADAMANA SONAR METHOD VOLUME VERIFICATION HISTORY

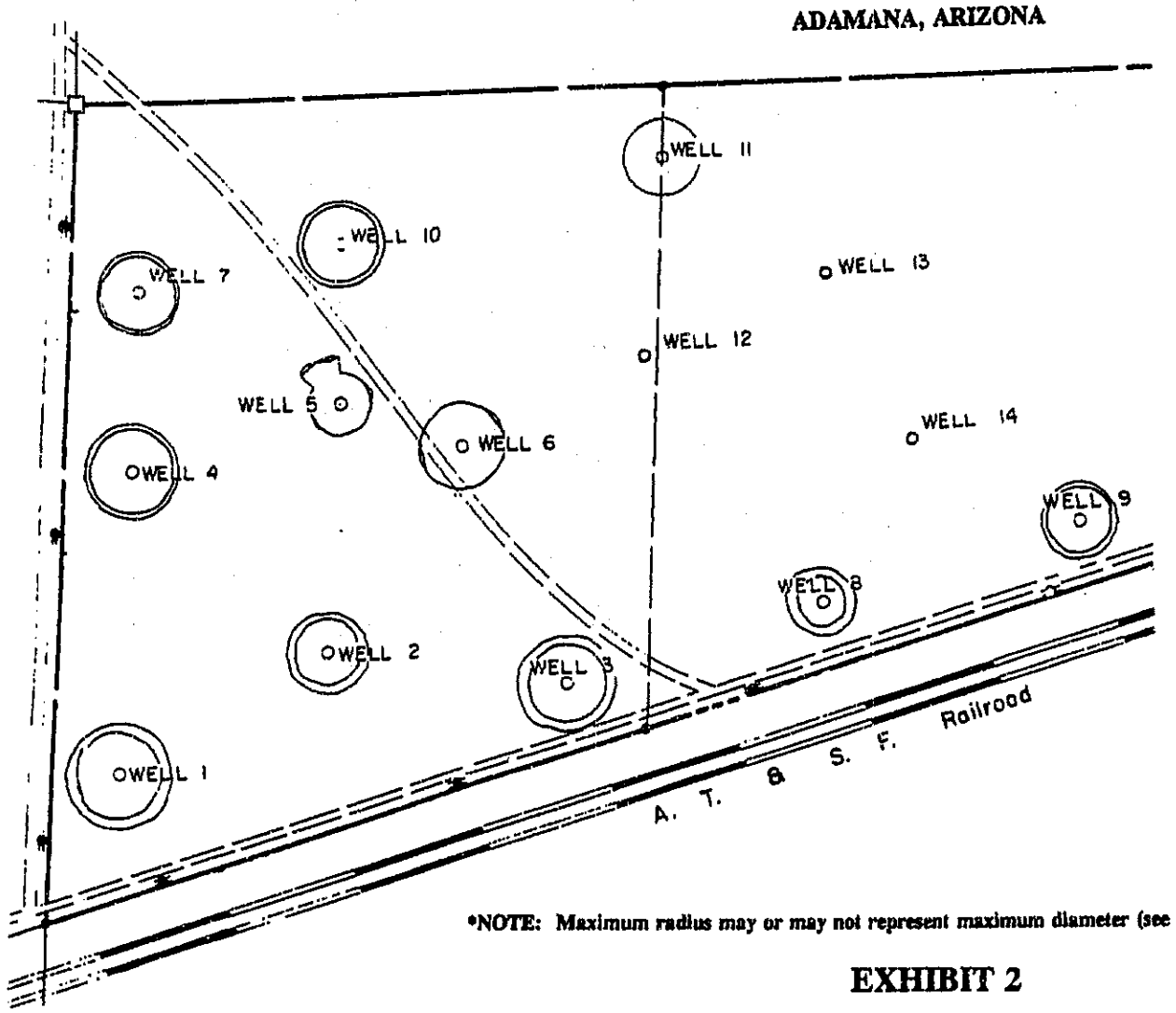
Permit	Well No.	TD	Cavern	Initial Sonar	Max Radius	Sonar Volume	Second Sonar	Max Radius	Sonar Volume	Third Sonar	Max Radius	Sonar Volume
556	1	1101'	900-985'	4/79 Dowell	99'@942'	150,532 bbls	3/92 Digital*	118'@944'	176,119 bbls			
557	2	1112'	906-995'	4/79 Dowell	74'@958'	149,008 bbls	2/89 MicroGage	90'@970'	193,563 bbls	2/95 Sonarwire**	89'@938'	197,559 bbls
602	3	1140'	944-1008'	4/79 Dowell	87'@995'	145,550 bbls	5/91 Digital*	104'@986'	195,355 bbls	3/96 Sonarwire*	104'@982'	185,607 bbls
603	4	1120'	950-1007'	4/80 Dowell	97'@945'	158,244 bbls	3/92 Digital	102'@978'	189,616 bbls			
606	5	1119'	938-1035'	---		---	3/89 MicroGage	100'@1026'	165,922 bbls	3/95 Sonarwire**	101'@1026'	169,615 bbls
607	6	1120'	924-1027'	4/80 Dowell	93'@952'	146,458 bbls	5/91 Digital*	94'@964'	200,659 bbls	3/96 Sonarwire*	90'@1006'	176,893 bbls
646	7	1152'	951-1079'	4/80 Dowell	84'@1055'	171,283 bbls	5/91 Digital	90'@1074'	179,122 bbls	3/96 Sonarwire**	90'@1066'	199,654 bbls
647	8	1132'	956-1069'	4/80 Dowell	57'@1060'	110,892 bbls	3/92 Digital*	72'@1054'	140,952 bbls			
648	9	1125'	973-1065'	4/80 Dowell	71'@1030'	108,222 bbls	3/92 Digital*	81'@1015'	168,797 bbls			
671	10	1150'	978-1042'	4/79 Dowell	85'@988'	128,541 bbls	3/89 MicroGage	99'@990'	164,567 bbls	2/95 Sonarwire**	98'@988'	168,792 bbls
672	11	1176'	960-1101'	---		---	3/89 MicroGage	84'@1070'	227,718 bbls	3/95 Sonarwire**	84'@1070'	244,537 bbls
776	12	1200'	Cavern not developed									
TOTAL CAPACITY									2,031,123 bbls 85,307,166 gallons			

* Sonar through one string of pipe
** Sonar through two strings of pipe

EXHIBIT 1

CAVERN MAXIMUM RADIUS* PLOT, FERRELLGAS LPG-STORAGE FACILITY

ADAMANA, ARIZONA



INDICATED RADIUS INCREASE THROUGH TIME BY SONAR MEASUREMENT

Well No.	TD	Cavern	Initial Sonar	Max Radius	Latest Sonar	Max Radius	Sonar Volume	Indicated net Increase
1	1101'	900-985'	4/79	99'@942'	3/92	118'@944'	176,119 bbls	19'/13yr (1.5'/yr)
2	1112'	906-995'	4/79	74'@958'	2/95	89'@938'	197,559 bbls	15'/16yr (1'/yr)
3	1140'	944-1008'	4/79	87'@995'	3/96	104'@982'	185,607 bbls	17'/17yr (1'/yr)
4	1150'	950-1007'	4/80	97'@945'	3/92	102'@978'	189,616 bbls	5'/12yr (.5'/yr)
5	1119'	938-1035'	3/89	100'@1026'	3/95	101'@1026'	169,615 bbls	1'/6yr (.2'/yr)
6	1130'	924-1027'	4/80	93'@952'	3/96	94'@1006'	176,893 bbls	1'/16yr (.06'/yr)
7	1132'	951-1079'	4/80	84'@1055'	3/96	90'@1066'	199,654 bbls	6'/16yr (.4'/yr)
8	1132'	956-1069'	4/80	57'@1060'	3/92	72'@1054'	140,952 bbls	39'/12yr (3'/yr)
9	1135'	973-1065'	4/80	71'@1030'	3/92	81'@1015'	168,797 bbls	10'/12yr (.8'/yr)
10	1130'	978-1042'	4/79	85'@988'	2/95	98'@988'	168,792 bbls	13'/16yr (.8'/yr)
11	1176'	960-1101'	3/89	84'@1070'	3/95	84'@1070'	244,537 bbls	0'/6yr (—/yr)
12	1230'	Cavern not developed						

*NOTE: Maximum radius may or may not represent maximum diameter (see Well 5 above & Exhibits 3-5)

EXHIBIT 2

SLR APR '96

SCALE : 1" = 50'

MAXIMUM RADIUS PLOT

FERRELLGAS WELL 5

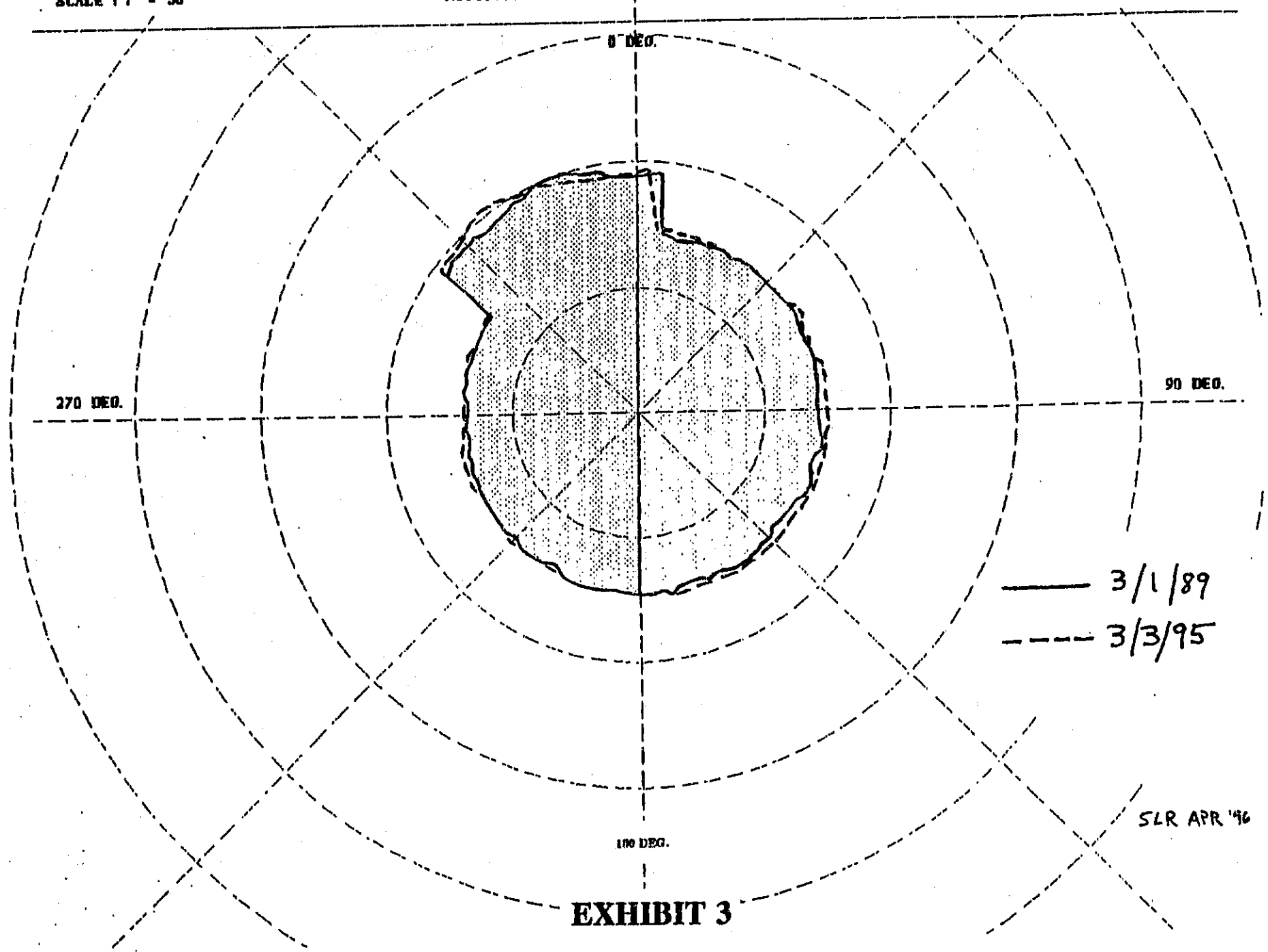


EXHIBIT 3

VERTICAL CROSSECTION

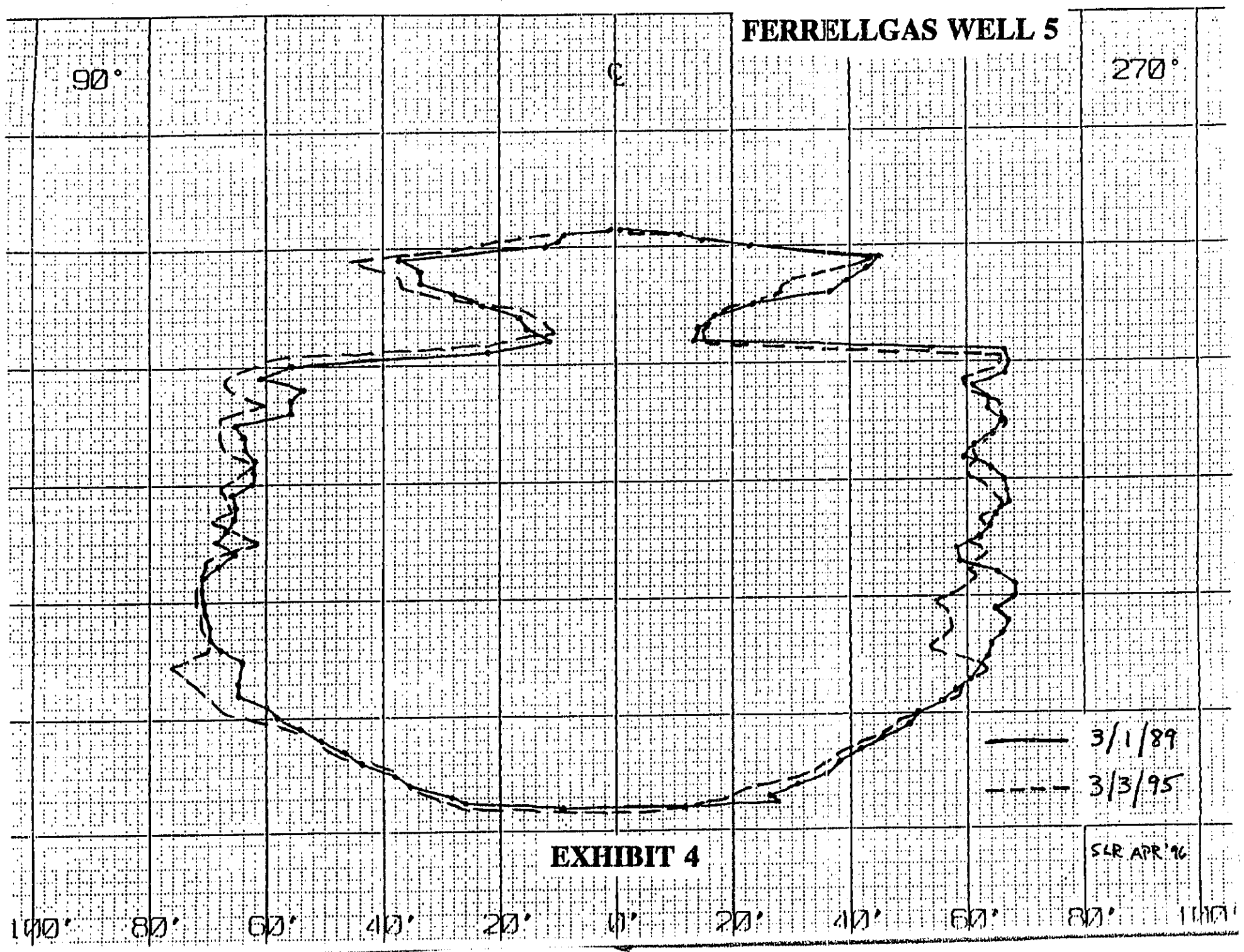


EXHIBIT 4

VERTICAL CROSSECTION

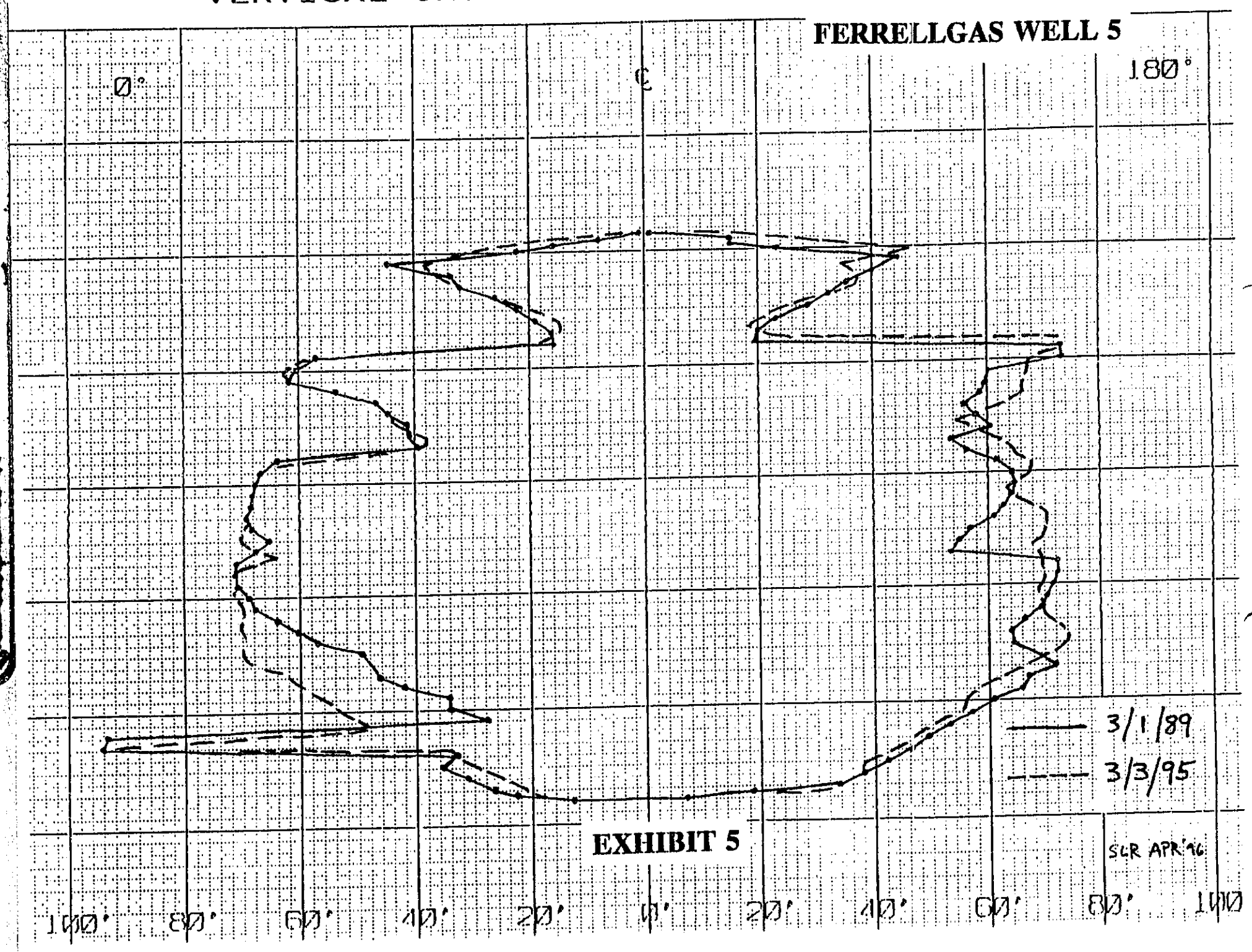


EXHIBIT 5

SCALE : 1" = 50'

MAXIMUM RADIUS PLOT

FERRELLGAS WELL 6

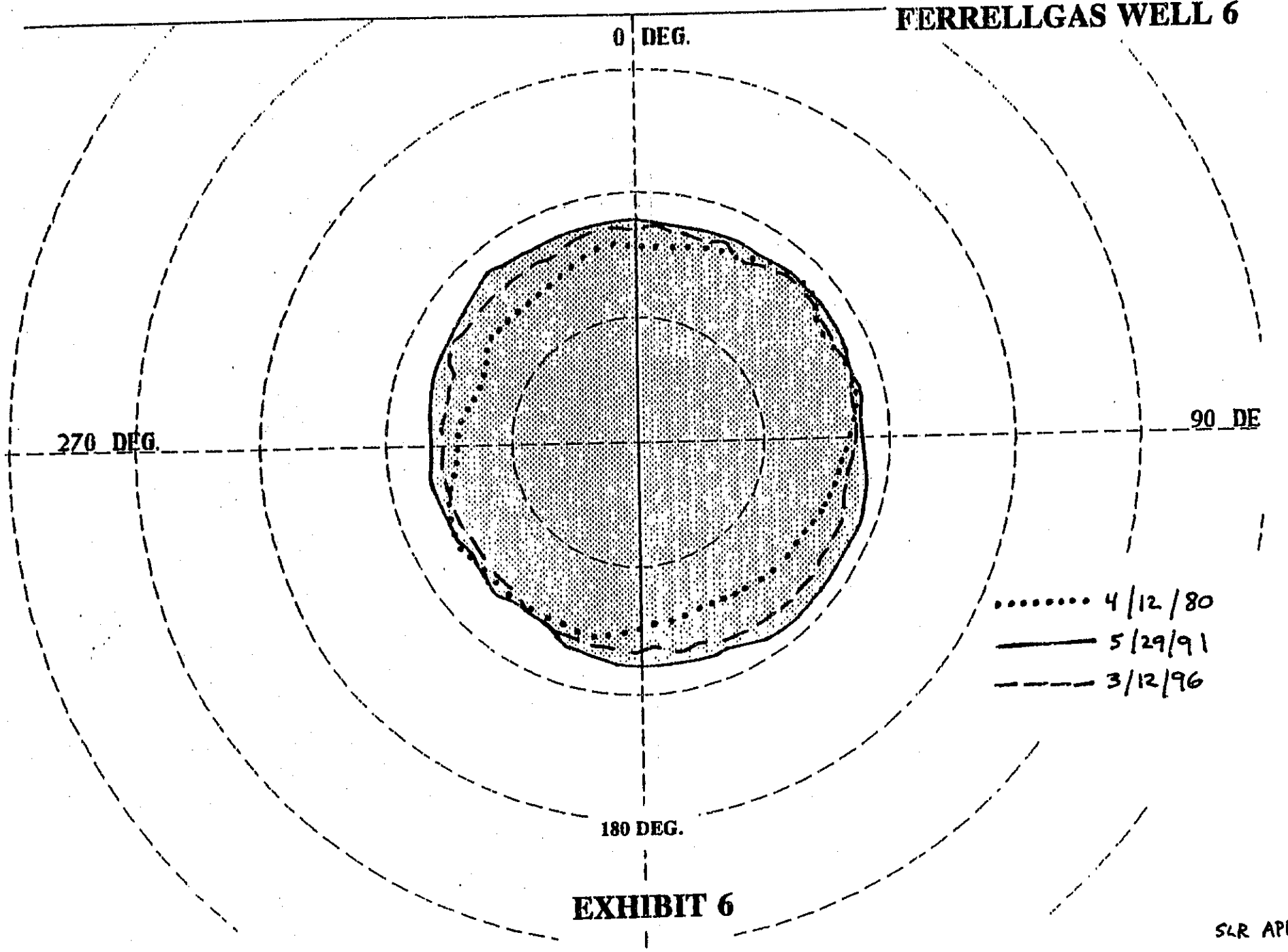


EXHIBIT 6

SLR APR'96

FERRELLGAS WELL 6

180 DEG. **0 DEG.**

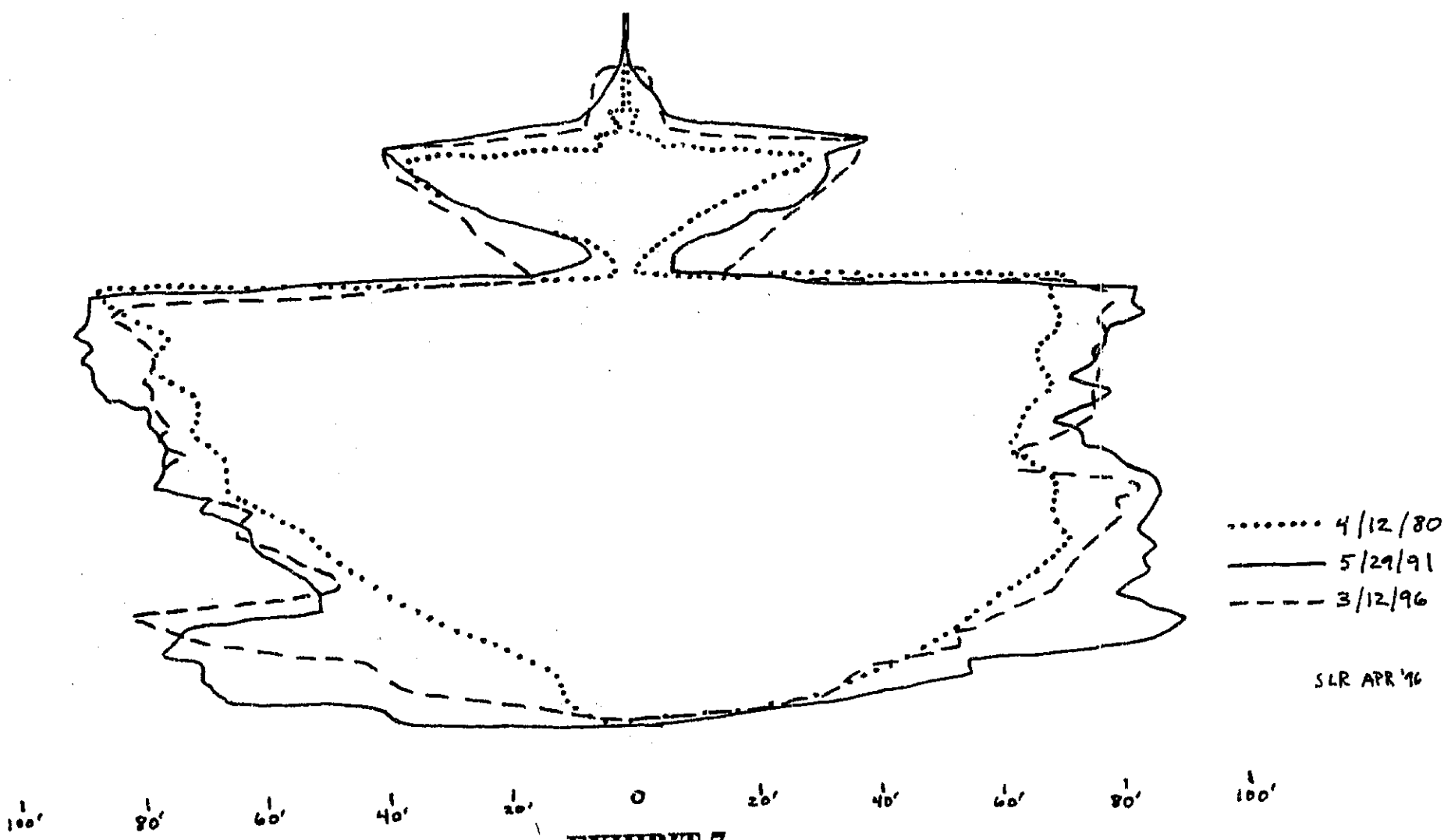


EXHIBIT 7

FERRELLGAS WELL 6

270 DEG. **90 DEG.**

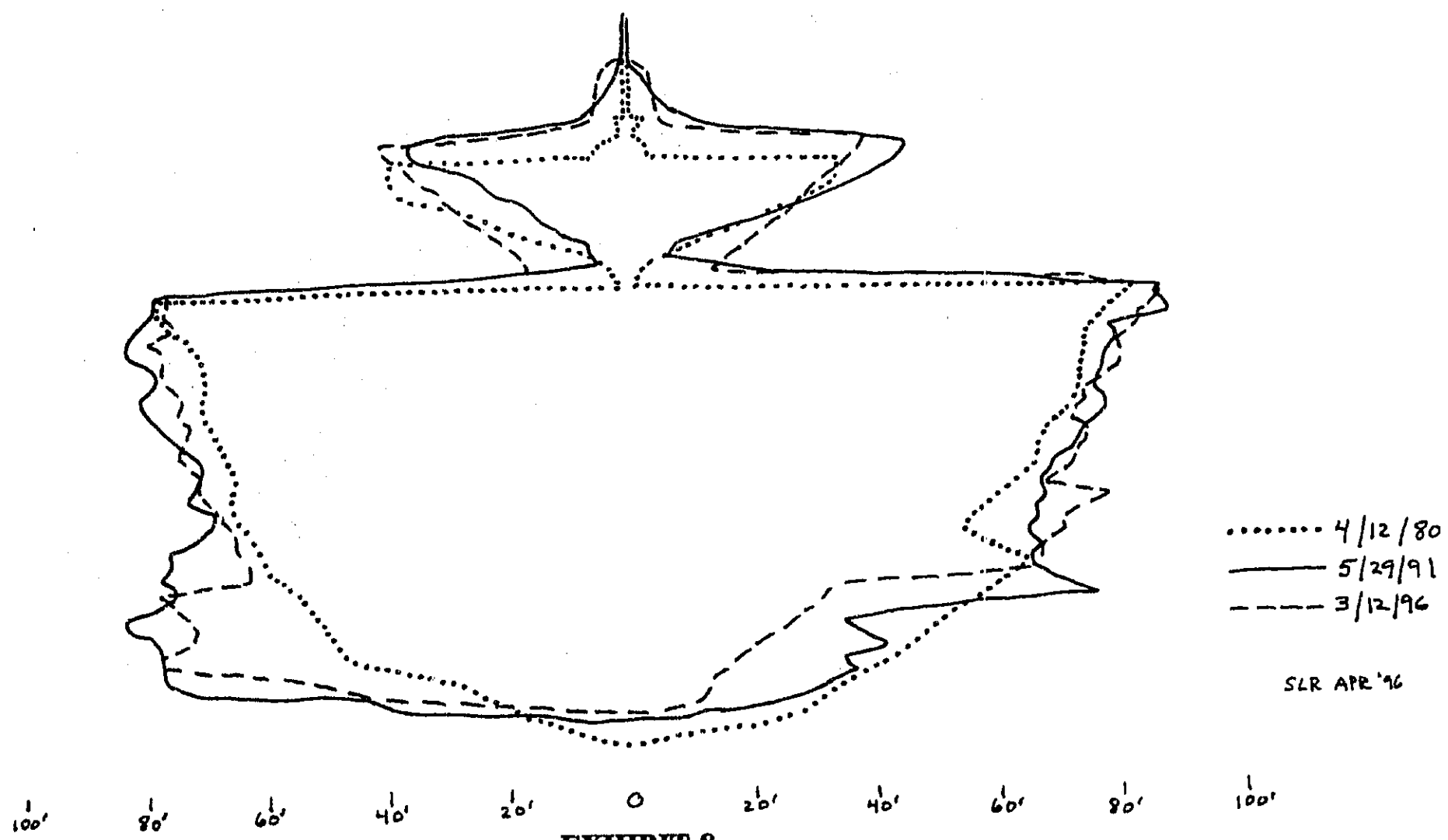


EXHIBIT 8

FERRELLGAS WELL 6

270 DEG. **90 DEG.**

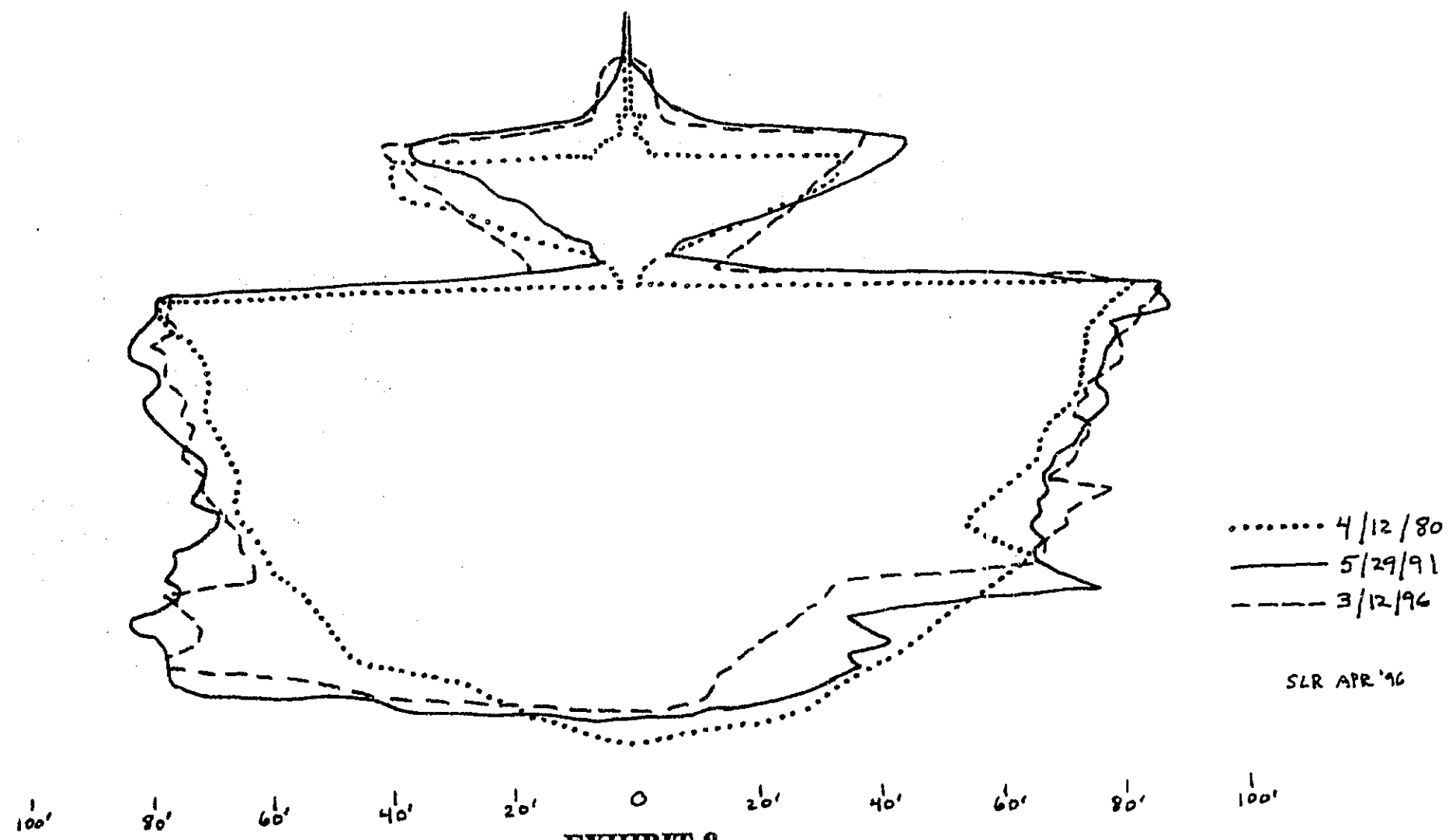


EXHIBIT 8

Ferrellgas

April 24, 1996

To: Steve Rauzi
Arizona Geological Survey

From: Dale Thompson
Ferrell North America

Subject: Cavern Capacities

Steve, as of October 30, 1996 these are the last known capacities on all the Caverns at the Adamana Storage Facility. (Capacities are in gallons).

602

Cavern #1	8,496,730
Cavern #2	6,900,978
Cavern #3	7,368,738
Cavern #4	8,676,071
Cavern #5	6,884,626
Cavern #6	7,886,657
Cavern #7	8,068,158
Cavern #8	6,349,044
Cavern #9	6,969,816
Cavern #10	7,792,578
Cavern #11	10,601,992

If we can be of further assistance please contact us at (520) 524-3229.

Sincerely,

Dale Thompson

Adamana Road • P.O. Box 1624 • Holbrook, Arizona 86025 • 602-524-3778

Ferrellgas

April 9, 1996

Steve L. Rauzi, Administrator
Oil and Gas Program
5150 N. 16th St., Ste. B141
Phoenix, Arizona 85016

file 602

APR 1996
ARIZONA GEOLOGICAL SURVEY

Dear Steve,

After our discussion on March 11, 1996 about "volumetric measurement" of our storage caverns I did some research.

Our past records on last known capacities indicate a more exact method of yearly cavern measurement. Due to the fact that almost all of our caverns are filled and emptied on a yearly basis, I feel this would be more accurate and more often a "yearly" measurement program.

Considering the reasons stated above, I would like to request the Adamana Facility perform the volumetric measurement program on a yearly basis and sonar measurement method every "ten years".

Steve, as you can see by our past sonar reports any increase in size has been very minute over the years. With the acceptance of the commission, my plan would be to sonar any cavern that had to be worked over; otherwise, all caverns would receive the sonar method on a "ten year" basis. All "volumetric measurement" information on our Adamana caverns can be submitted to your office on a yearly or five and/or ten year basis whichever you and the commission would prefer.

Steve, please let me know what you think and how to resolve this matter. Thank you for your time and consideration.

Sincerely,

Dale Thompson

Dale Thompson
Terminal Manager

Adamana Road • P.O. Box 1024 • Holbrook, Arizona 86025 • 602-524-3229

State of Arizona
Arizona Geological Survey
845 North Park Avenue, #100
Tucson, Arizona 85719
(602) 882-4795

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

July 13, 1993

Ms. Brenda Davis, Mail Drop 5
Ferrellgas
One Liberty Plaza
Liberty, Missouri 64068

Re: Ferrellgas wells in Arizona
Approval of blanket bond #U1665522, United Pacific Insurance Company
Release of blanket bond #400 GV 7009, St. Paul Fire and Marine Insurance Company

Dear Ms. Davis:

I have enclosed an approved copy of the referenced blanket bond #U1665522 effective July 16, 1993, for all wells operated by Ferrellgas in Arizona.

This letter represents the Oil and Gas Conservation Commission's approval to release the referenced blanket bond #400 GV 7009 effective July 16, 1993.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil & Gas Program Administrator

Enclosure

c Ms. Mary T. Flanigan, St. Paul Seaboard, Overland Park, Kansas

State of Arizona
Arizona Geological Survey
845 North Park Avenue, #100
Tucson, Arizona 85719
(602) 882-4795

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

June 29, 1993

602

Ms. Kathy Cordera
Martin Insurance
P. O. Box 8418
Prairie Village, Kansas 66208-0418

FAX 913-676-9145 one copy of bond form No 2 6/29 @ 7:20 am SLR

Dear Ms. Cordera:

In response to your telephone call this morning, I have enclosed two blank copies of the Oil and Gas Conservation Commission's Performance Bond. File two copies of the completed bond form to my attention at the letterhead address.

Our records show that Ferrellgas currently has twelve storage wells and one freshwater well under bond.

Let me know if I can be of further assistance.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil & Gas Program Administrator

Enclosures

State of Arizona
Arizona Geological Survey
845 North Park Avenue, #100
Tucson, Arizona 85719
(602) 882-4795

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

May 20, 1993

602

Ms. Mary T. Flanigan
Attorney-in-Fact
St. Paul Seaboard
P. O. Box 935
Overland Park, Kansas 66201-0935

Re: Ferrellgas, Inc. blanket performance Bond No. 400 GV 7009

Dear Ms. Flanigan:

I received your certified letter No. P 105-228-862 requesting the St. Paul Fire and Marine Insurance Company's release from obligation under the captioned bond because the captioned bond is being replaced by United Pacific Insurance Company Bond #U1665502 effective June 25, 1993.

A.A.C. R12-7-103 requires a performance bond to remain in effect until (1) the wells under the bond have been plugged and abandoned as approved by the Oil and Gas Conservation Commission, or (2) the a new blanket bond is posted for the wells. I have not received or approved a replacement bond for the captioned bond.

As a result, I cannot release St. Paul Fire and Marine Insurance Company's obligation under the captioned bond until the United Pacific Insurance Company Bond #U1665502 is received by this office and approved.

Please let me know if I can be of further assistance in this matter.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil & Gas Program Administrator

c Mr. Greg Greer, Ferrellgas, P.O. Box 4644, Houston, Texas 77216
Mr. Dale Thompson, Ferrellgas, P.O. Box 1024, Holbrook, Arizona 86025

ADAMANA VOLUME VERIFICATION SURVEYS
(all by the sonar method)

Permit	Well	Survey Date	Survey Date	Current Status
556	1	4/79	3/92	In compliance
557	2	4/79	2/89	In compliance
602	3	4/79	5/91	In compliance
603	4	4/80	3/92	In compliance
606	5	---	3/89	In compliance
607	6	4/80	5/91	In compliance
646	7	4/80	5/91	In compliance
647	8	4/80	3/92	In compliance
648	9	4/80	3/92	In compliance
671	10	4/79	3/89	In compliance
672	11	---	3/89	In compliance
776	12			CAVERN NOT DEVELOPED

Ferrellgas

May 21, 1991

AZ OIL & GAS
CONSERVATION COMMISSION

MAY 24 1991

Mr. Dan Brennan
Executive Director
Oil & Gas Commission
State of Arizona
5150 N. 16TH ST.
Phoenix, Az 85016

Re: Sonaring of Ferrellgas Adamana, Arizona LPG Underground Storage Wells #3, #6 & #7

Dear Mr. Brennan:

Pursuant to our conversation of May 21, I have ordered the sonaring of Adamana Wells #3, #6 & #7 to commence as soon as possible. This work will be scheduled in the next 30 to 60 days. We will inform your office in advance of the exact date so that you can witness, if you so desire.

As discussed, wells #1, #4, #8 and #9 will be sonared at the earliest possible time. As you know these wells are currently active and we must wait for the winter outhaul season before the product can be removed. This should be done by next February 28 and we will schedule the sonar activity for these wells at that time.

If you have any questions please feel free to call me at (713)876-5515.

	Permit #
# 1	556
3	602
4	603
6	607
7	646
8	647
9	648

Best Regards,

Richard M. Gehring
Manager
Storage Operations

xc: Brad Mallory - Moab
Dale Thompson - Adamana

P.O. Box 4644, Houston, Texas 77210
16800 Greenspoint Park Drive • Suite 225 - South Atrium • Houston, Texas 77060 • Telephone: 713/874-9494

602

Oil and Gas Conservation Commission
STATE OF ARIZONA
3110 N. 19th AVENUE, SUITE 190
PHOENIX, ARIZONA 85015
PHONE: (602) 255-5161

January 11, 1989

Mr. Glenn Mace
Ferrellgas
Granada Building, Suite 216
3316 East 32nd Street
Tulsa, OK 74135

Dear Mr. Mace:

As we discussed during your visit yesterday, Oil and Gas Conservation Commission Rule 12-7-181.1.i requires that "...a flare or other safety system shall be installed at or near each brine pit..." As you know, the Ferrellgas facility at Adamana does not have a flare installed at present since the dismantling of the rusted-out older system.

Thus it appears that your operation is not in compliance with this rule. Therefore, it is necessary for Ferrellgas to install such a device to come into compliance. Failure to comply would cause the Commission to invoke R12-7-181.1.i which involves shutting down the operation.

You indicated that it will take some time to design, fabricate, and install the flare system. We would hope that this can be completed before the next scheduled inspection of the facility which will be around the end of May 1989.

Although we did not specifically discuss this issue, Rule 12-7-181.1.i.v requires verification of the capacity of each storage cavern every five years. This has not been accomplished since 1979 and 1980. Thus your operation is not in compliance with this rule. It will be necessary for Ferrellgas to begin to verify these capacities very soon. I realize this is the busy season, but as soon as activity declines and caverns are shut in for a few days, the logs can be run.

I was thinking about the possible problem with liquid propane in extremely cold weather. One way to solve the problem is to include an oil-water separator in the flow line from the caverns to the pits. A simple "drip" system might work, or an actual oil-water separator such as is used at gas-condensate wells. We sure don't want to burn up any pit liners.

We will expect to hear from you regularly concerning your progress in the matter of the flare and the sonar.

Very truly yours,

Daniel J. Brennan
Executive Director

June 2, 1978

Mr. Bob Larsen
Williams Energy Company
P.O. Box 3478
Mail Drop #33-1
Tulsa, Oklahoma 74101

Dear Mr. Larsen:

During a visit yesterday to your LPG storage area at Adamana, Mr. Sam Snyder informed me that you have replaced Dan Dougherty as Manager of Storage Terminals.

The purpose of my visit to this terminal was to discuss our Rule 706. This rule was recently adopted by the Arizona Oil and Gas Conservation Commission at a public hearing. Mr. Dougherty attended this hearing.

Rule 706, as adopted, doesn't affect your storage terminal as it now exists, except Sections C and D. These sections primarily pertain to safety features. The safety feature of immediate concern to this commission is the installation of a flare system.

This Commission does not intend to dictate or even recommend a particular design for this system. We do retain the right to approve the system that you select. The system that Mr. Snyder has discussed with you is not acceptable to the Commission.

We are enclosing a copy of Rule 706, together with a copy of the general rules and regulations of the Commission. You will note that some of these general rules also pertain to your operation.

This Commission has enjoyed a very pleasant working relationship with Williams Energy and be assured that we want to cooperate with you and your staff to the fullest extent.

Your prompt attention to the installation of the flare system will be much appreciated.

Let us know if we can be of any help whatsoever.

Very truly yours,

W. E. Allen
Director
Enforcement Section

WEA/vb

Enc.

March 28, 1978

Mr. Dan J. Dougherty
Manager of Storage Terminal
Williams Energy Company
P.O. Box 3478
Tulsa, Oklahoma 74101

Dear Dan:

Recent developments connected with the underground storage of LPG in Arizona have caused this Commission to make a study of various safety devices which would tend to prevent any accidents from occurring during the pumping of LPG into a storage reservoir. It has been concluded that a flare system, properly installed and operated in a proper manner, would be the safest and most economical of all safety systems.

These conclusions make it necessary that this Commission request all operators of LPG storage projects within the State to install a flare system at their respective storage sites as quickly as possible. The Commission does not intend to dictate to the operator the technical design of this system, but does retain the right to approve the system selected.

Your full and early cooperation in the installation of such a safety system is expected.

Very truly yours,

W. F. Allen
Director
Enforcement Section

WFA/vb

William E. Allen
Activity Report
October 8, 1975
Page 2

Williams Energy has completed their 9th well for LPG storage at Adamana. Williams Energy had a bad primary cement job on their No. 8 well. I plan to check on the repair of this cementing job tomorrow and then go on to the Dineh-Bi-Keyah and check Kerr-McGee's progress on their waterflood installations.

602

Williams Energy has completed the drilling of 2 additional storage wells in the Adamana area and they have one permit outstanding.

RECEIVED
SEP 10 1973
O & G CONS. COMM.

OFFICE OF
Oil and Gas Conservation Commission
STATE OF ARIZONA
4515 NORTH 7TH AVE.
PHOENIX, ARIZONA 85013
PHONE: (602) 271-5161

January 20, 1975

Mr. R. J. Wiruth
Manager of Operations
Williams Energy Company
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Adamana Storage Project

You are aware that this office occasionally inspects all field operations including storage projects. We find your project at Adamana to be in first class condition and your supervisor, Mr. Sam Snyder is always most cooperative. It is indeed a pleasure to work with people like Sam.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

WILLIAMS ENERGY COMPANY
9 EAST FOURTH STREET
P. O. BOX 3478
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

January 2, 1975

DJD:1:75

Mr. W. E. Allen
Director, Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Bill:

Attached are prints reflecting the well development history for the Adamana underground storage. Please note that wells #1 and #2 had no additional washing since last year report, as 1974 washing activity was concentrated on the smaller new caverns. We have placed LPG in all six wells to meet the 1974/1975 winter demand.

Upon depletion of LPG from wells three through six, it is our intent to initiate washing until resumption of storage in 1975. Should the season not allow time to develop these wells to optimum size, some washing may continue in 1976.

I wish to thank you for your assistance while I was stationed in Arizona, and I look forward to working with you through my new position in Tulsa.

Very truly yours,

WILLIAMS ENERGY COMPANY

Dan J. Dougherty

Dan J. Dougherty
Operations Department

DJD:ak

RECEIVED
JAN 1975
O & G CONS. COMM.

WILLIAMS ENERGY COMPANY
9 East Fourth Street
P. O. Box 3478
Tulsa, Oklahoma 74101
Phone: (918) 583-1711

January 2, 1974

RJW:3:74

Mr. W. E. Allen
Director, Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North Seventh Avenue
Phoenix, Arizona 85013

Dear Bill:

Attached are copies of drawings showing the well development history for Adamana Underground Storage installation. You will note that we have placed propane in all wells, except number three, and this well continued to wash during the fall and winter of 1973. It is our intention that upon depletion of propane from wells four thru six, we will again initiate washing. It is our intent to take all six wells to 150,000 barrels.

In reviewing our schedule, it appears that obtaining this goal in all wells prior to the resumption of storage in 1974 is optimistic. Therefore, some washing may continue in 1975.

I also wish to advise you that Williams Energy Company has contracted with Fenix & Scisson of Tulsa, Oklahoma to conduct sonar surveys on some of the wells at Adamana. This engineering work will commence during the month of March, and will provide some structural information that we feel is necessary. Should you desire to observe any of this work, please feel free to stop by. Also, if we find any information that we feel may be of interest to you, I will pass the same on.

Thank you for your assistance, and I look forward to working with you in 1974.

DRAWINGS OF WELLS USED FOR UNDERGROUND STORAGE ARE FILED IN NO. 607A.

Very truly yours,

WILLIAMS ENERGY COMPANY

R. J. Wiruth
Manager of Operations

RJW:dh

Enclosures

RECEIVED
JAN - 1974
O & G CONS. COMM.

#602

DOXOL

ONE OF THE WILLIAMS COMPANIES

Uregas

OFFICE OF
Oil and Gas Conservation Commission
STATE OF ARIZONA
4515 NORTH 7TH AVE.
PHOENIX, ARIZONA 85013
PHONE: (602) 271-5161

April 16, 1973

Mr. D. J. Doughtery
Williams Energy Company
P. O. Box 35
Holbrook, Arizona 86025

RE: LPG STORAGE PROJECT

Dear Mr. Doughtery:

On a recent visit to your storage project at Adamana, it was noticed that at times brine was allowed to flow directly from the well to the ground. This brine or salt water then collected in a low spot just north of your fence line and also just north of the railroad right of way. This is in violation of Rule 306 and 307 of the Rules and Regulations of the Oil and Gas Conservation Commission. This situation has been called to the attention of both Mr. Greer and Mr. Sam Snyder.

If at times it is necessary to purge your wells in this manner, the brine or salt water must be contained in a suitable vessel or pit that has been prepared in such a manner that it is impervious to seepage.

Please instruct your employees to stop the practice of allowing the brines or salt water to escape to the ground.

Should you have any questions regarding this matter, please feel free to contact this office.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

Enclosure

602

WILLIAMS ENERGY COMPANY
9 EAST FOURTH STREET
P. O. BOX 3478
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

March 27, 1973

RJW:232:73

Mr. W. E. Allen
Director, Enforcement Section
Oil & Gas Conservation Commission
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

Enclosed you will find the completion reports and compensated neutron logs for wells number 3, 4, 5, and 6. I trust that this will complete the reporting requirements for these wells until our washing report is due.

Our schedule calls for us to store propane in three of these wells starting in August, even though they will not be completed. They will be empty sometime in December, and washing will resume with completion forecasted in May 1974.

Yours very truly,

WILLIAMS ENERGY COMPANY

R. J. Wiruth

R. J. Wiruth
Manager of Operations

RJW:dh

Enclosures

RECEIVED
MAR 29 1973
O & G CONS. COMM.

March 5, 1973

Mr. Robert Wiruth
Williams Energy Company
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Williams Energy Well Nos. 3, 4, 5, & 6
NW/NW Sec 8-T18N-R24E
Apache County
Permit Nos. 602, 603, 606 & 607

Dear Mr. Wiruth:

Since the samples for the above referenced wells have been delivered to Four Corners Sample Cut in Farmington, New Mexico, we are assuming that these wells have been completed in so far as the drilling and casing of the wells are concerned. Please refer to Rules 107, 108 & 109, of the Rules and Regulations of the Arizona Oil and Gas Conservation Commission and submit the necessary reports; Form 25, on the cementing of the casing strings in these holes and Form 4, Completion Report.

At the time you have completed enlarging the reservoir for LPG Storage, we will need to be advised of the approximate capacity and shapes of the storage areas.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

November 13, 1972

Mr. Robert Wiruth
Williams Energy Company
P. O. Box 3478
Tulsa, Oklahoma 74101

Dear Mr. Wiruth:

Since you are now operating in Arizona under the name of Williams Energy Company, it will be necessary that you furnish this Commission with an updated Organization Report.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

Enc.

November 13, 1972

Mr. Frank Getscher
P. O. Box 98
Scottsdale, Arizona 85252

Dear Mr. Getscher:

The following permits were issued since November 6, 1972.

Williams Energy Company Well No. 3
NW/NW Sec 8-T18NOR24E
Apache County
Permit No. 602

Williams Energy Company Well No. 4
NW/NW Sec 8-T18N-R24E
Apache County
Permit No. 603

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

November 13, 1972

Mrs. Jo Ratcliff
Four Corners Sample Cut Association
P. O. Box 899
Farmington, New Mexico 87401

Dear Mrs. Ratcliff:

The following permits were issued since November 6, 1972.

Williams Energy Company Well No. 3
NW/NW Sec 8-T18N-R24E
Apache County
Permit No. 602

Williams Energy Company Well No. 4
NW/NW Sec 8-T18N-R24E
Apache County
Permit No. 603

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

November 13, 1972

Mr. Robert Wiruth
Williams Energy Company
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Williams Energy Company Well No. 3 and 4
NW/NW Sec 8-T18N-R24E
Apache County
Permit Nos. 602 and 603

Dear Mr. Wiruth:

Enclosed please find Receipt Nos. 2939 and 2940 covering the $25 filing fee, a copy of your approved Applications for Permit to Drill and Permit to Drill Nos. 602 and 603.

Also enclosed are miscellaneous instruction sheets concerning samples and other Commission requirements.

Sincerely yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

Encs.

264-9177

WILLIAMS ENERGY COMPANY
NATIONAL BANK OF TULSA BUILDING
P.O. BOX 3478
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

November 10, 1972

RJW:380:72

Mr. W. E. Allen
Director, Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

Per your request of October 24, 1972, please find an executed Rider advising that the Surety Bond Number 8047-02-65 has had the Principal changed to Williams Energy Company. Also, the bond has been increased to cover the Numbers 3 and 4 wells.

You will note that one copy of the Rider has a space for the signature of the Obligee. Please obtain this signature and return the executed copy to me so I can forward to our insurance company.

Should you need additional information to process our application, please advise.

Very truly yours,

WILLIAMS ENERGY COMPANY

R. J. Wiruth

R. J. Wiruth
Manager of Operations

RJW:sw

Enclosures

RECEIVED
NOV 13 1972
O & G CONS. COMM.

DOXOL 602

WILLIAMS ENERGY COMPANY
NATIONAL BANK OF TULSA BUILDING
P.O. BOX 3478
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

October 26, 1972

RJW:360:72

Mr. W. E. Allen, Director
Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

In accordance with my letter to you dated October 18, 1972, J. O. Barnes Drilling Company, P. O. Box 141, Casa Grande, Arizona, 85222, has been selected to drill our #3 and #4 wells. This will change the approximate date work will start on to December 1, 1972 for the #3 well, and December 13, 1972 for the #4 well.

I trust that this information will allow you to complete our applications. Should you have any questions, please contact me.

Very truly yours,

WILLIAMS ENERGY COMPANY

R. J. Wiruth
Manager of Operations

RJW:sw

cc: Leroy Caldwell
Dan Dougherty

RECEIVED
OCT 30 1972
O & G CONS. COMM.

DOXOL 602

WA

WILLIAMS ENERGY COMPANY
NATIONAL BANK OF TULSA BUILDING
P.O. BOX 3478
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

October 26, 1972

RJW:360:72

Mr. W. E. Allen, Director
~~Enforcement Section~~
Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

In accordance with my letter to you dated October 18, 1972, J. O. Barnes Drilling Company, P. O. Box 141, Casa Grande, Arizona, 85222, has been selected to drill our #3 and #4 wells. This will change the approximate date work will start on to December 1, 1972 for the #3 well, and December 13, 1972 for the #4 well.

I trust that this information will allow you to complete our applications. Should you have any questions, please contact me.

Very truly yours,

WILLIAMS ENERGY COMPANY

R. J. Wiruth
Manager of Operations

RJW:sw

cc: Leroy Caldwell
Dan Dougherty

RECEIVED
OCT 30 1972
O & G CONS. COMM.

October 24, 1972

Mr. R. J. Wiruth
Williams Energy Company
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Federal Insurance Company Bond No. 8047-02-65 - amount of $25,000

Dear Mr. Wiruth:

The above referenced bond was issued to cover operations of The Suburban Companies in the State of Arizona. Your current Application to Drill indicates the operator to be the Williams Energy Company. In order for the existing bond to cover these operations, it will be necessary for the bonding company to notify the Commission in writing that this bond will also cover the operations conducted in the name of Williams Energy Company.

This consent of surety by the bonding company will need to indicate the name of the operator, well name, and legal description of the wells.

As quickly as this consent of surety is received, the drilling permits will be issued.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

cc - Marsh & McLennan, Inc.
1579 East 21st Street
Tulsa, Oklahoma 74114

602

WILLIAMS ENERGY COMPANY

NATIONAL BANK OF TULSA BUILDING
P.O. BOX 3478
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

October 18, 1972

RJW:324:72

Mr. W. E. Allen, Director
Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

Enclosed are duplicate Applications to Drill for the #3 and #4 storage wells at our Adamana L.P. Terminal. Also enclosed is a check for $50.00 covering the application fee and a certified plat map showing the location of the wells in relation to the existing facilities.

I trust that this will allow you to proceed with the application. I will forward the name of the drilling contractor upon completion of the selection process.

Very truly yours,

WILLIAMS ENERGY COMPANY

R. J. Wiruth

R. J. Wiruth
Manager of Operations

RJW:sw
Enclosures
cc: Leroy Caldwell

RECEIVED
OCT 24 1972
O & G CONS. COMM.

P-W

Ferrell Gas, Inc. (Buckeye Gas Prod.)
NW NW Sec. 8-T18N-R24E. Apache Cty 603

COUNTY Apache AREA 16 mi E. of Holbrook LEASE NO. Williams Energy Co. Fee

WELL NAME ~~WILLIAMS ENERGY COMPANY WELL NO. 4~~ Buckeye Products Gas Co. Adamana

LOCATION NW/NW SEC 8 TWP 18N RANGE 24E FOOTAGE 823.59 S & 150 E of NW/corner

ELEV 5324.86 GR 5329 KB SPUD DATE 1-3-73 STATUS COMP. DATE 1-23-73 TOTAL DEPTH 1120

CONTRACTOR ns

CASING SIZE	DEPTH	CEMENT	LINER SIZE & DEPTH
13 3/8" O.D.	136	150 sx	
9 5/8" O.D.	923	300 sx	
7 " O.D.	938	None	Solution string
~~4½ O.D.~~	~~1099~~	~~None~~	~~Solution String~~

DRILLED BY ROTARY X
DRILLED BY CABLE TOOL
PRODUCTIVE RESERVOIR
INITIAL PRODUCTION NA-storage well

FORMATION TOPS	DEPTHS	SOURCE L.L.	SOURCE E.L.	REMARKS
Coconino	339		X	Sample set from 160-980
Salt	898		X	

ELECTRIC LOGS	PERFORATED INTERVALS	PROD. INTERVALS
Comp. Neutron-		
G.R., Caliper		

SAMPLE LOG
SAMPLE DESCRP. X
SAMPLE NO. 1717
CORE ANALYSIS
DSTs None

REMARKS This well used as a storage reservoir for LP Gas

APP. TO PLUG
PLUGGING REP.
COMP. REPORT X

WATER WELL ACCEPTED BY

BOND CO. ~~Federal Insurance Company~~ The Aetna Casualty & Surety Co. St. Paul Fire & Marine Ins. Co. effective 8/1/76 BOND NO. ~~8047-02-65~~ S40-32083

BOND AMT. $ 25,000 CANCELLED ~~3-7-80~~ DATE ~~4-12-71~~ 1-15-80 ORGANIZATION REPORT 11-21-72

FILING RECEIPT 2940 LOC. PLAT X WELL BOOK X PLAT BOOK X

API NO. 02-001-20179 DATE ISSUED 11-13-72 DEDICATION NA Storage Well

PERMIT NUMBER 603

(over)

RECEIVED
JUN 22 1982
O & G CONS. COMM.

WELL COMPLETION OR RECOMPLETION REPORT AND WELL LOG

DESIGNATE TYPE OF COMPLETION:

New Well [X] Work-Over [ ] Deepen [ ] Plug Back [ ] Same Reservoir [ ] Different Reservoir [ ] Oil [ ] Gas [ ] Dry [ ]

DESCRIPTION OF WELL AND LEASE

Operator: BUCKEYE GAS PRODUCTS CO.	Address: P.O. BOX 3478 TULSA, OK. 74101
Federal, State or Indian Lease Number or name of lessor if free lease: BUCKEYE GAS PRODUCTS CO.	Well Number: C4 / Field & Reservoir: ADAMANA, AZ.
Location: 823.59 FSL - 150.00 FWL	County: APACHE
Sec. TWP-Range or Block & Survey: SEC. 8, T-18N R-24E G. & S.R. B. & M.	

Date spudded	Date total depth reached	Date completed, ready to produce	Elevation (DF, RKB, RT or Gr.) feet	Elevation of casing hd. flange feet
1-3-73	1-19-73	1-23-73	5325	5329

Total depth	P.B.T.D.	Single, dual or triple completion?	If this is a dual or triple completion, furnish separate report for each completion.
1120		SALT SOLUTION	

Producing interval (s) for this completion	Rotary tools used (interval)	Cable tools used (interval)
927 FT. TO 1103	G.L. TO T.D.	

Was this well directionally drilled?	Was directional survey made?	Was copy of directional survey filed?	Date filed
NO	NO	NO	

Type of electrical or other logs run (check logs filed with the commission): SEE OTHER SIDE — Date filed:

CASING RECORD

Casing (report all strings set in well — conductor, surface, intermediate, producing, etc.)

Purpose	Size hole drilled	Size casing set	Weight (lb./ft.)	Depth set	Sacks cement	Amt. pulled
SURFACE	17½	13 3/8	48 lbs.	140	150	
PROTECTION	12¼	9 5/8	32.3	927	300	
INTERMEDIATE	12¼	7	20	942	–	942'
SOLUTION	12¼	4½	9.5	~~1103~~ 1002.58'	–	

March 21, 1972

TUBING RECORD

Size	Depth set	Packer set at
in.	ft.	ft.

LINER RECORD

Size	Top	Bottom	Sacks cement	Screen (ft)
in.	ft.	ft.		

PERFORATION RECORD

Number per ft.	Size & type	Depth Interval

ACID, SHOT, FRACTURE, CEMENT SQUEEZE RECORD

Am't. & kind of material used	Depth Interval

INITIAL PRODUCTION

Date of first production: | Producing method (indicate if flowing, gas lift or pumping—if pumping, show size & type of pump:)

Date of test	Hrs. tested	Choke size	Oil prod. during test	Gas prod. during test	Water prod. during test	Oil gravity
			bbls.	MCF	bbls.	°API (Corr)

Tubing pressure	Casing pressure	Cal'ted rate of Production per 24 hrs.	Oil	Gas	Water	Gas—oil ratio
			bbls.	MCF	bbls.	

Disposition of gas (state whether vented, used for fuel or sold):

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the Mgr. of the Buckeye (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

6-28-82
Date

Armando Padilla
Signature

Permit No. 603

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION
Well Completion or Recompletion Report and Well Log
File One Copy
Form No. 4

DETAIL OF FORMATIONS PENETRATED

FORMATION	TOP	BOTTOM	DESCRIPTION*
SURFACE SOIL	0	40	SAND
	40	66	RED CLAY
	66	150	CLAY AND SAND SHELLS
	150	192	SNAD SHELLS AND CLAY
	192	220	SAND
	220	246	SHALE
	246	300	SANDY SHALE
COCONINO	300	794	COCONINO
	794	818	SHALE
	818	821	ANHYDRITE
	821	824	SHALE
	824	838	ANHYDRITE
	838	852	SHALE
	852	858	ANHYDRITE
	858	865	SHALE
	865	878	SALT
	878	886	POTASH
	886	889	SALT
	889	898	SANDY SHALE
	898	1112	SALT
	1112	1120	SHALE
			LOGS RAN
			GAMMA RAY NEUTRON LOG

* Show all important zones of porosity, detail of all cores, and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries.

INSTRUCTIONS:

Attach drillers log or other acceptable log of well.

This Well Completion or Recompletion report and well log shall be filed with the State of Arizona Oil & Gas Conservation Commission not later than thirty days after project completion.

Form No. 4

RECEIVED

WELL COMPLETION OR RECOMPLETION REPORT AND WELL LOG

DESIGNATE TYPE OF COMPLETION:

New Well [X] Work-Over [ ] Deepen [ ] Plug Back [ ] Same Reservoir [ ] Different Reservoir [ ] Oil [ ] Gas [ ] Dry [X]

DESCRIPTION OF WELL AND LEASE

Operator: Williams Energy Company	Address: P. O. Box 3478 Tulsa, Oklahoma 74101
Federal, State or Indian Lease Number or name of lessor if fee lease: Williams Energy Company	Well Number: 4 — Field & Reservoir: Unnamed
Location: 823.59' South & 150.00 East of N.W. Corner	County: Apache
Sec. TWP-Range or Block & Survey: Sec. 8, T-18-N, R-24-E, G. & S.R.B. & M.	

Date spudded	Date total depth reached	Date completed, ready to produce	Elevation (DF, RKB, RT or Gr.) feet	Elevation of casing hd. flange feet
1/3/73	1/19/73	Dry	5324.86	5326

Total depth	P.B.T.D.	Single, dual or triple completion?	If this is a dual or triple completion, furnish separate report for each completion.
1120'		Salt Solution well	

Producing interval (s) for this completion	Rotary tools used (interval)	Cable tools used (interval)
None	0' to 1120'	NO

Was this well directionally drilled?	Was directional survey made?	Was copy of directional survey filed?	Date filed
NO	NO	N/A	N/A

Type of electrical or other logs run (check logs filed with the commission)	Date filed
Compensated Neutron Log	With this report

CASING RECORD

Casing (report all strings set in well—conductor, surface, intermediate, producing, etc.)

Purpose	Size hole drilled	Size casing set	Weight (lb./ft.)	Depth set	Sacks cement	Amt. pulled
Surface	17½"	13 3/8"	48	136'	150	0
Protection	12¼"	9 5/8"	32.75	923'	300	0
Solution	12¼"	7 "	20	938'	Hung-uncemented	
Solution	---	4 1/2"	9.5	1099'	Hung-uncemented	

TUBING RECORD

Size	Depth set	Packer set at
in.	ft.	ft.

LINER RECORD

Size	Top	Bottom	Sacks cement	Screen (ft.)
in.	ft.	ft.		

PERFORATION RECORD

Number per ft.	Size & type	Depth Interval

ACID, SHOT, FRACTURE, CEMENT SQUEEZE RECORD

Amt. & kind of material used	Depth Interval

INITIAL PRODUCTION

Date of first production	Producing method (indicate if flowing, gas lift or pumping—if pumping, show size & type of pump:)
N/A	

Date of test	Hrs. tested	Choke size	Oil prod. during test	Gas prod. during test	Water prod. during test	Oil gravity
N/A	N/A	N/A	N/A bbls.	N/A MCF	N/A bbls.	N/A °API (Corr)

Tubing pressure	Casing pressure	Cal'ted rate of Production per 24 hrs.	Oil	Gas	Water	Gas—oil ratio
N/A	N/A	N/A	N/A bbls.	N/A MCF	N/A bbls.	N/A

Disposition of gas (state whether vented, used for fuel or sold):
N/A

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the Manager of Operations of the Williams Energy Company (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

3/27/73
Date

Robert Wurth
Signature

RECEIVED
MAR 29 1973
O & G CONS. COMM.

Permit No. 603

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION
Well Completion or Recompletion Report and Well Log
File One Copy
Form No. 4

(Complete Reverse Side)

DETAIL OF FORMATIONS PENETRATED

Formation	Top	Bottom	Description*
Surface	0	40	Surface Soil
	40	66	Red Clay
	66	150	Clay and Sand Shells
	150	192	Sand Shells and Clay
	192	220	Sand
	220	246	Shale
	246	300	Shaley Sand
	300	339	Sandy Shale - Top Coconino Zone
Coconino	339	794	Sand - Top Coconino
	794	818	Sand
	818	821	Anhydrite
	821	824	Shale
	824	838	Anhydrite
	838	852	Shale
	852	858	Anhydrite
	858	865	Shale
	865	878	Salt
	878	886	Potash
	886	889	Salt
	889	898	Sandy - Shale
	898	1112	Salt
	1112	1120	Shale

* Show all important zones of porosity, detail of all cores, and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries.

INSTRUCTIONS:

Attach drillers log or other acceptable log of well.

This Well Completion or Recompletion report and well log shall be filed with the State of Arizona Oil & Gas Conservation Commission not later than thirty days after project completion.

Form No. 4

P.O. Drawer 3337, 700 S. Tucker, Farmington, New Mexico 87499
(505) 327-4961 • 24-Hour Dispatch (505) 325-6892 • (505) 327-0416

PLEASE REMIT TO: BIG A WELL SERVICE

INVOICE #: 14034

MARCH 24, 1997

TO: FERRELLGAS
P. O. BOX 1024
HOLBROOK, AZ 86025

WELL: ADAMANA STG TRM #4
LOCATION: APACHE AZ
UNIT NO.: 17
OPERATOR: NICK JAMES
34-ST-Y

P/N 603

FOR: TO CHARGE YOU FOR WORKOVER OPERATIONS

DATE	WORKORDER #	RIG TIME	TRAVEL TIME
03/21/97	67634	11.0	4.5
03/24/97	67635	6.5	4.5
		17.5	9.0

RIG TIME	17.5	HOURS	@	129.00	$ 2,257.50
CREW TRAVEL TIME	9.0	HOURS	@	74.00	666.00
PICK-UP	1	DAY	@	74.00	74.00
POWER TONGS	1	DAY	@	125.00	125.00
SPIDERS & SLIPS	1	DAY	@	30.00	30.00
ELEVATORS	1	DAY	@	30.00	30.00
PIPE DOPE	1	CAN	@	42.50	42.50
STATE PERMIT FEE	1	EACH	@	188.00	188.00
TOOLPUSHER/1 MA	1	DAY	@	240.00	240.00
					$ 3,653.00
				ARIZONA NO TAX	0.00
					$ 3,653.00

THANK YOU

SIGNED James Sagner

INTEREST CHARGED AT THE RATE OF 1.5% PER MONTH OR 18% PER ANNUM ON ACCOUNTS NOT PAID WITHIN 30 DAYS. ALL COSTS AND REASONABLE ATTORNEY FEES FOR COLLECTION WILL BE PAID BY PURCHASER.

14034

BIG A WELL SERVICE
P. O. DRAWER 3337
FARMINGTON, N.M. 87499
PHONE: (505) 327-4961

67634
1322

COMPANY Farcel Gas
LEASE Lamong Storage Terminal
WELL NUMBER 4
STATE/COUNTY Az Apache
SEC. ____ TS ____ R ____
NW ☐ OW ☐ INC. ☐ COMP ☐
UNIT # 17

34-5t-Y

DAILY OPERATIONS

DATE Mar 21, 97 Fri

FROM	TO	
8:30-		Drove rig from well #6 to #4, Spotted in & rigged up rig, floor & tongs,
		pulled doughnut with spear, changed elevators & pick with 1002.75'
		of 4½" tubeing, had 3 stabilizers on tubeing. Ate lunch, cleaned up
		collars & tallied 24 new jts. RIH with new tubeing & 3 subs, landed
		tubeing on doughnut at 1002.58', put away all equipment and
	6:00	rigged down rig, cleaned up loc
6:00-	10:30	Pulled dog house back to Farmington.
		Toolpusher charge per day 240.00

BIG A	RENTAL		COST
111		PICKUP	
✓		POWER TONGS	125.00
		STRIPPER HEAD RECTOR HYDRAULIC	N.C
✓		COMPANION FLANGE	N.C
		B.O.P.	
		CLOSING UNIT	
		POWER SWIVEL USED ☐ STO-BY ☐	
		PUMP & PIT	
		HOSES (HIGH PRESS.) NUMBER ( )	
		PIPE RACKS	
		CATWALK	
		SWAB TOOLS	
		SWAB JARS	
		TONG HEADS 1¼☐ 1½☐ 3½☐ 4½☐	
		DEPTHOMETER	
		SPIDER & SLIPS 1"☐ 1¼☐ 1½☐ 2 1/16☐	
✓		3½☐ 4½☐	30.00
✓		ELEVATORS LYT☐ 4½☐	30.00
		STEEL LINE FOR B.O.P.	
		BLOW LINE, STANDS & FLOW TEE	
		B.O.P. RAMS ADDITIONAL 2½☐	
		MUD PIT ADDITIONAL	
		STANDING VALVE ( ) DROPS	
		ROD STRIPPER HEAD	
		ROD FISHING TOOLS	
		SAND PUMP	
		PARAFFIN KNIFE	

BIG A	RENTAL		COST
		STRIPPER RUBBERS	
		SWAB CUPS SIZE TYPE	
		OIL SAVER RUBBERS	
		TONG DIES	
		SLIP SEGMENTS	
		OIL SAVER BRASS	
✓		PIPE DOPE (1) CANS	42.50
		DIESEL GALS.	

EMPLOYEES TIME	HOURS	
RIG TIME At 127.00 per hr	11	$1419.00
TRAVEL TIME At 74.00 per hr	4½	
OPR. Nick James	15½	333.00
DRK. Alex Valencia	15½	
F.H. Vernon Begay	15½	
F.H. Gilbert Bennette	15½	
F.H.		

OPR. SIGNATURE Nick James

TOOL PUSHER SIG. ____

ACCEPTED BY: D. Allen

TOTAL DAILY COST $ 2219.50

D.A

san juan repro Form 525-2

P/N 603

COMPANY Ferrel Gas

LEASE Navajo Storage Terminal

WELL NUMBER #4

STATE/COUNTY Az Apache

SEC. _____ TS _____ R _____

NW ☐ OW ☐ INC. ☐ COMP ☐

BIG A WELL SERVICE

P. O. DRAWER 3337
FARMINGTON, N.M. 87499
PHONE: (505) 327-4961

67635
1322

UNIT # 17

DATE mar 24, 97 mon

34-st-Y

DAILY OPERATIONS

FROM	TO	
6:30	11:00	Travel from Farmington to wellsite #4
11:00	5:30	Started rig, got paper work signed, & Roaded rig back to Farmington
		Az state roading permit Fee 188.00

BIG A	RENTAL		COST
111		PICKUP	74.00
		POWER TONGS	
		STRIPPER HEAD RECTOR HYDRAULIC	
		COMPANION FLANGE	
		B.O.P.	
		CLOSING UNIT	
		POWER SWIVEL USED ☐ STD-BY ☐	
		PUMP & PIT	
		HOSES (HIGH PRESS.) NUMBER ( )	
		PIPE RACKS	
		CATWALK	
		SWAB TOOLS	
		SWAB JARS	
		TONG HEADS 1¼☐ 1½☐ 3½☐ 4½☐	
		DEPTHOMETER	
		SPIDER & SLIPS 1"☐ 1¼☐ 1½☐ 2 1/16☐ 3½☐ 4½☐	
		ELEVATORS LYT☐ 3½☐	
		STEEL LINE FOR B.O.P.	
		BLOW LINE, STANDS & FLOW TEE	
		B.O.P. RAMS ADDITIONAL 2½☐	
		MUD PIT ADDITIONAL	
		STANDING VALVE ( ) DROPS	
		ROD STRIPPER HEAD	
		ROD FISHING TOOLS	
		SAND PUMP	
		PARAFFIN KNIFE	

BIG A	RENTAL	Final ticket	COST
		STRIPPER RUBBERS	
		SWAB CUPS SIZE TYPE	
		OIL SAVER RUBBERS	
		TONG DIES	
		SLIP SEGMENTS	
		OIL SAVER BRASS	
		PIPE DOPE ( ) CANS	
		DIESEL GALS.	

EMPLOYEES TIME	HOURS	
RIG TIME 129.00 per hr	6½	$838.50
TRAVEL TIME 74.00 per hr	4½	
OPR. Nick Jones	11	333.00
DRK. David Hunter	11	
F.H. Vernon Begay	11	
F.H. Gilbert Benally	11	
F.H.		

OPR. SIGNATURE Nick Jones

TOOL PUSHER SIG. [illegible]

ACCEPTED BY: [illegible]

TOTAL DAILY COST $ 1433.50

san juan repro Form 525-2

P/N 603

WILLIAMS ENERGY COMPANY
9 EAST FOURTH STREET
P. O. BOX 3478
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

January 2, 1975

DJD:1:75

Mr. W. E. Allen
Director, Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Bill:

Attached are prints reflecting the well development history for the Adamana underground storage. Please note that wells #1 and #2 had no additional washing since last year report, as 1974 washing activity was concentrated on the smaller new caverns. We have placed LPG in all six wells to meet the 1974/1975 winter demand.

Upon depletion of LPG from wells three through six, it is our intent to initiate washing until resumption of storage in 1975. Should the season not allow time to develop these wells to optimum size, some washing may continue in 1976.

I wish to thank you for your assistance while I was stationed in Arizona, and I look forward to working with you through my new position in Tulsa.

Very truly yours,

WILLIAMS ENERGY COMPANY

Dan J. Dougherty

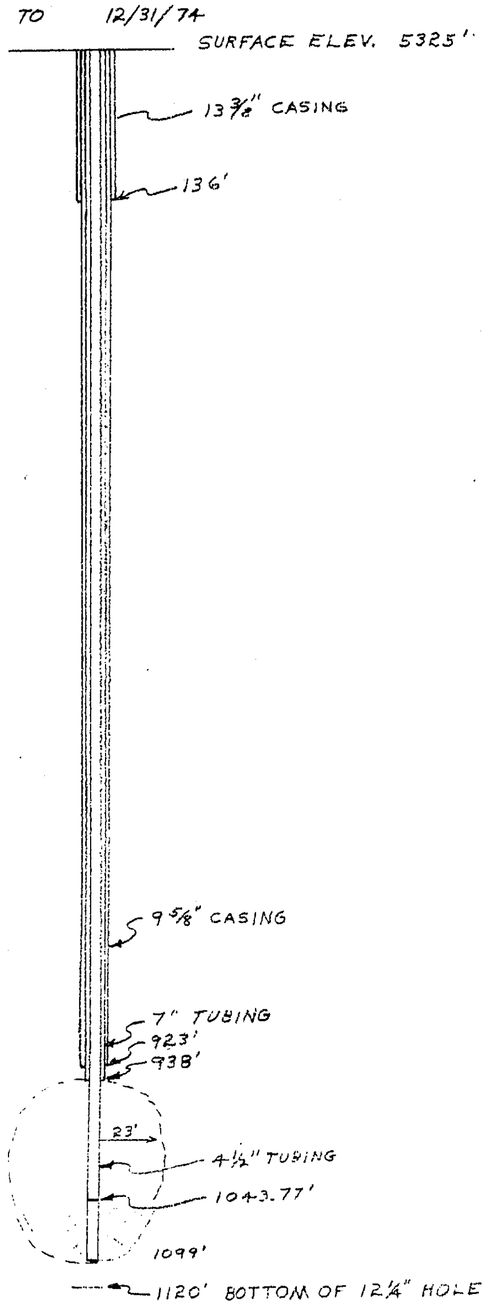
Dan J. Dougherty
Operations Department

DJD:ak

RECEIVED
JAN 1 1975
O & G CONS. COMM.

WELL #4

FROM 12/31/73
TO 12/31/74



NOTE: ON 8-23-74 4½" WAS SET AT 1043.77' DUE TO PLUGGING.
43,737 bbls. BUTANE STORED
CAPACITY 50,080 bbls.

Williams Energy Company
Adamana LPG Terminal

WELL DEVELOPMENT HISTORY

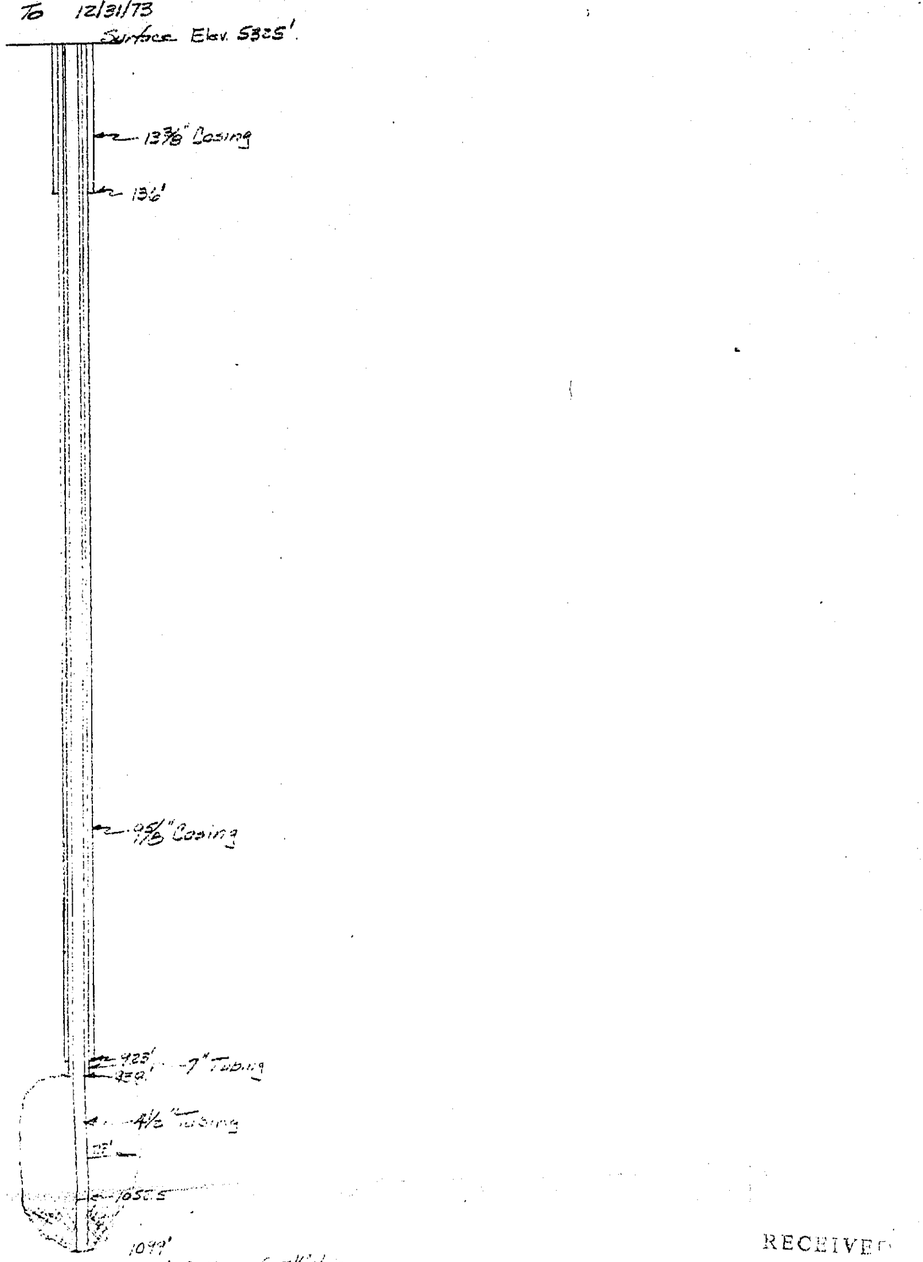
DRAWN BY: D.J. DOUGHERTY
DATE: 12-31-74

RECEIVED
JAN 06 1975
O & G CONS. COMM.

SCALE VERT 1" = 100'
HORZ NONE

Well #4

From 2/6/73
To 12/31/73



Note: Started producing on 2/6/73
On 8/23/73 4 1/2" was set
at 1052.5' due to plugging
Filled with Propane
Capacity 47,335 Bbls.
Working resumed on 12/21/73.
Capacity 12/31/73 50,080 Bbls

Scale: Vert 1" = 100'
Horz None

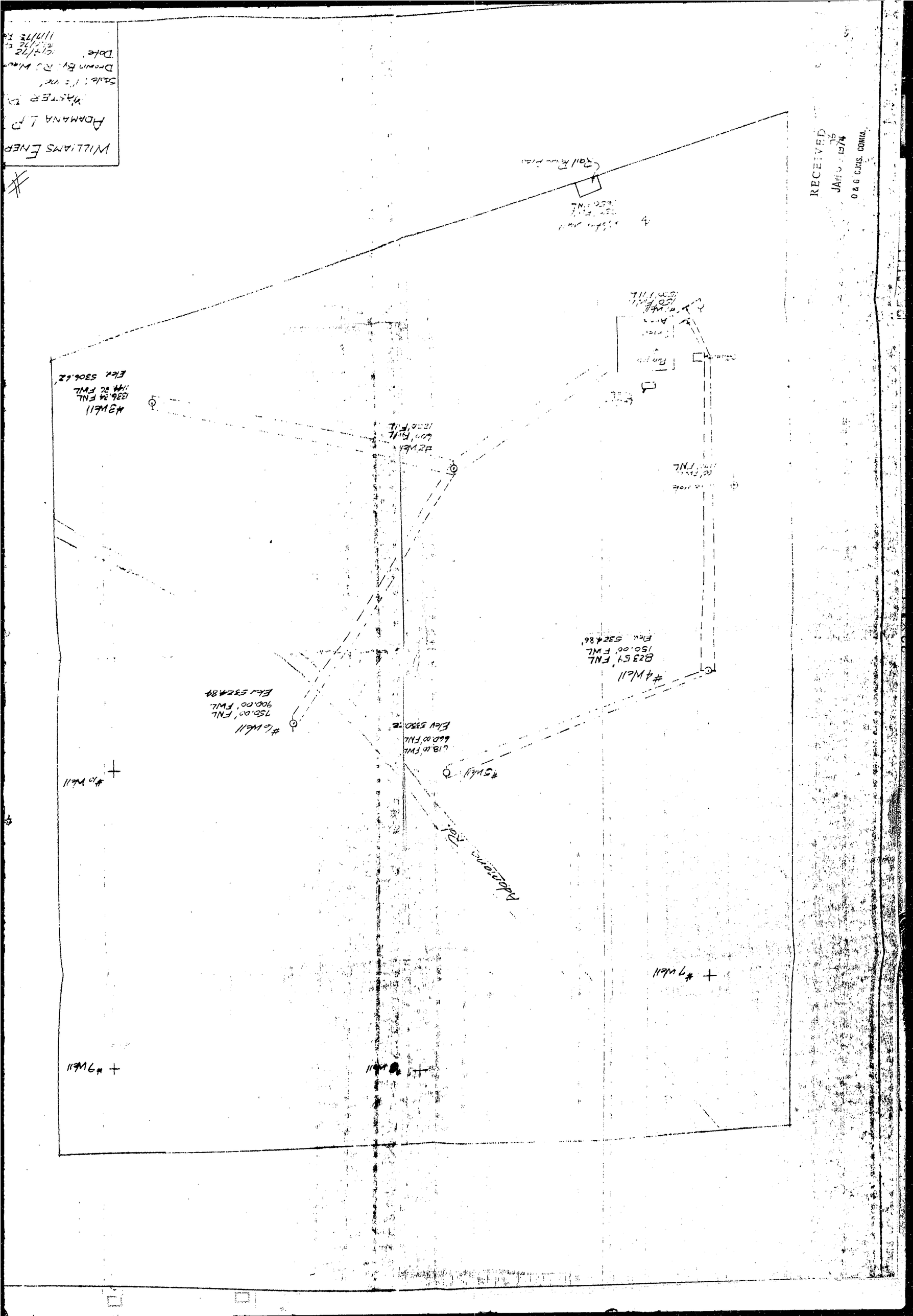
RECEIVED
JAN 0 6 1975
O & G CONS. COMM.

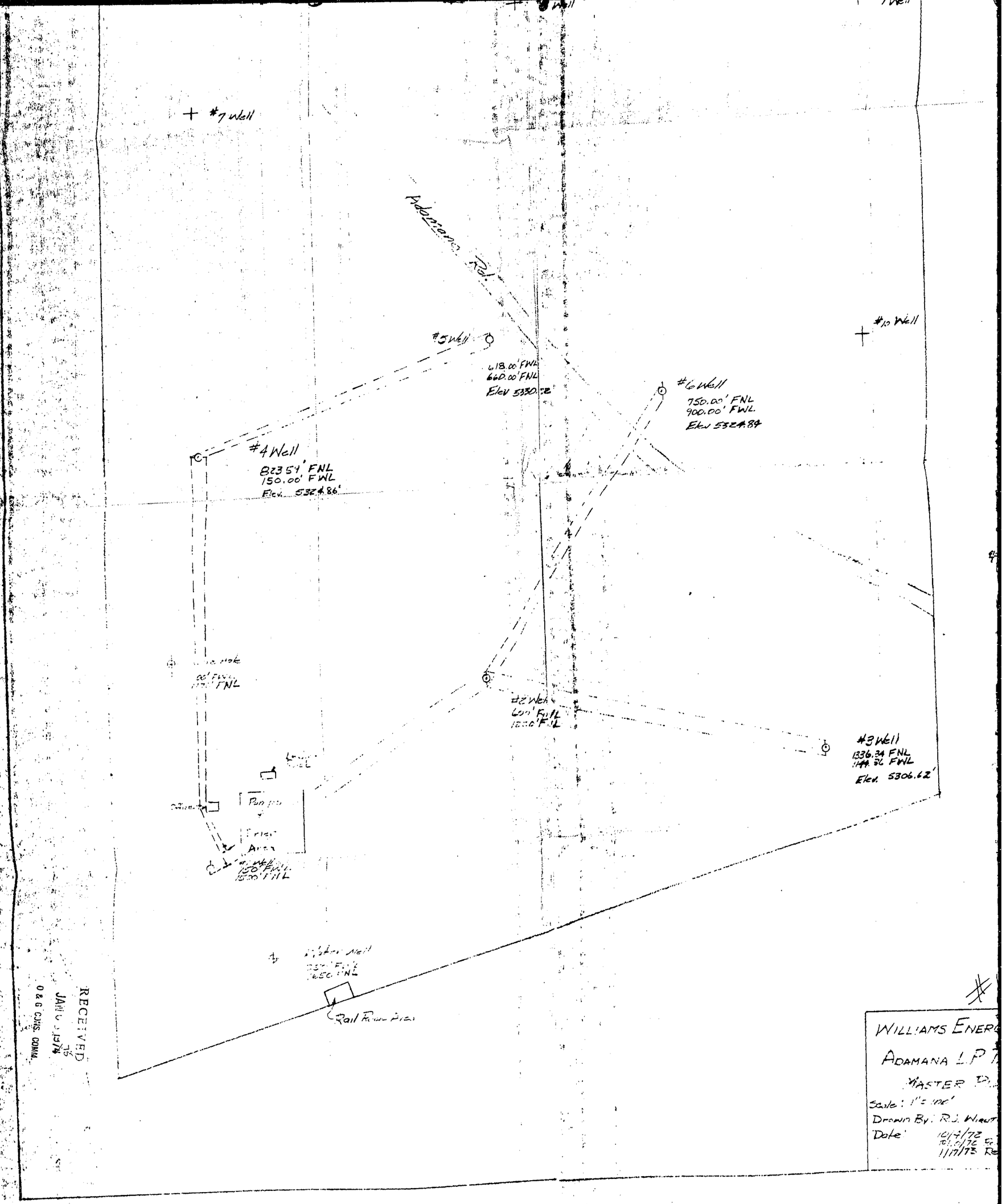
WILLIAMS ENERGY COMPANY
ADAMANA L.P.G. TERMINAL

Well Development History

Drawn By R.J. Wirth
Date 12/31/73

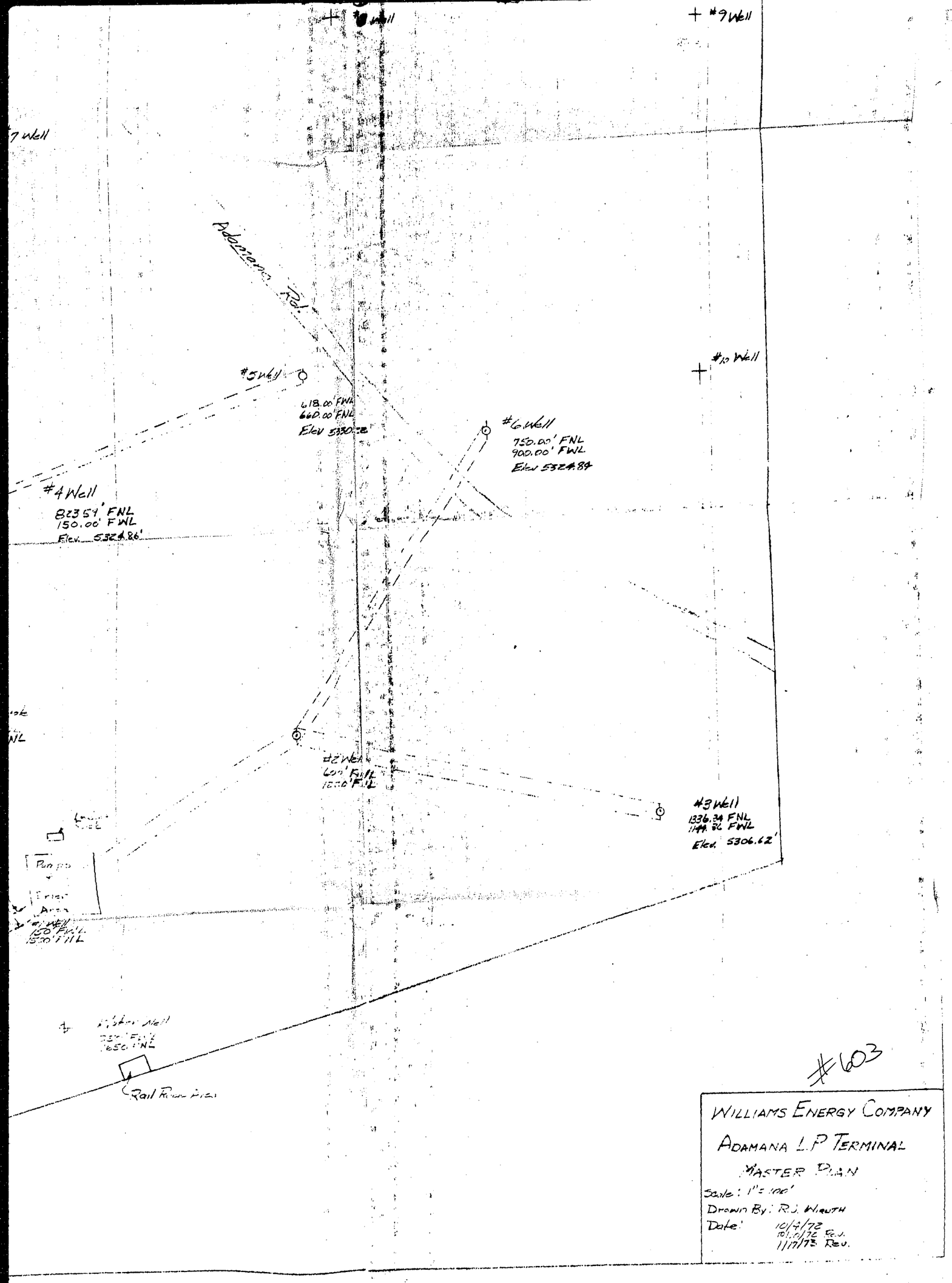
Adamana LP Terminal
Master Plan
file # 603


WILLIAMS ENER
ADAMANA L P
MASTER
Scale: 1" = 100'
Drawn By: R.J. Wa
Date:
#3Well
1838.34 FNL
1144.82 FWL
Elev. 5306.62'
#2Well
#4Well
2323.54' FNL
150.00' FWL
Elev. 5324.86'
#6Well
750.00' FNL
900.00' FWL
Elev 5324.84
#5Well
618.00' FWL
660.00' FNL
Elev 5330.2
#10 Well
#9Well
#7Well
#8Well
Adamana Rd.
Rail Road Track
RECEIVED
JAN 1974
O & G CONS. COMM.



RECEIVED
JAN 1974
O & G CONS. COMM.

Carroll Gas, Inc. (Buckeye Gas Prod.)
... Corlan-R24E, Apache Cty 603



#603

WILLIAMS ENERGY COMPANY

ADAMANA L.P TERMINAL

MASTER PLAN

Scale: 1" = 100'

Drawn By: R.J. Wirth

Date: 10/4/72
10/10/72 Rev.
1/17/73 Rev.

Murrell Gas, Inc. (Buckeye Gas Prod.)
C-LION-R24E, Apache Cty 603

3-1-73 WP

Samples on the following wells have been received.

Williams Energy Co, #3 - #4 - #5 - #6
Sec.8-18N-24E
Apache C. Ariz.

Permit # 602-603-606-607

Joe Ketchoff

Four Corners Sample Cut

RECEIVED
MAR 05 1973
O & G CONS. COMM.

#603

January 17, 1973

Memo to File: Williams Energy Company Well No. 3
NW/NW Sec 8-T18N-R24E
Apache County, Permit 602

Williams Energy Company Well No. 4
NW/NW Sec 8-T18N-R24E
Apache County
Permit No. 603

Memo from J. Bannister

Williams Energy Company of Oklahoma called today and advised that their two abovege wells will be completed this weekend. They have decided to drill at least two more wells to create another cavern. It is their intention to move the rig from 550'. Paper work will be submitted as soon as the survey has been made. I granted them verbal permission to move the rig.

JB/rlb

APPLICATION FOR PERMIT TO DRILL OR RE-ENTER

APPLICATION TO DRILL XX RE-ENTER OLD WELL ☐

Williams Energy Company
NAME OF COMPANY OR OPERATOR

P. O. Box 3478 — Address
Tulsa — City
Oklahoma 74101 — State

Unknown at the time of Application
Drilling Contractor

Address

DESCRIPTION OF WELL AND LEASE

Federal, State or Indian Lease Number, or if fee lease, name of lessor: Williams Energy Company	Well number: 4	Elevation (ground): 5324.86'
Nearest distance from proposed location to property or lease line: 150 feet	Distance from proposed location to nearest drilling, completed or applied—for well on the same lease: 600' feet	
Number of acres in lease: 114	Number of wells on lease, including this well, completed in or drilling to this reservoir: 4	
If lease, purchased with one or more wells drilled, from whom purchased: N/A — Name	Address	
Well location (give footage from section lines): 823.59 South & 150.00' East of N.W. Corner	Section—township—range or block and survey: Sec 8, T-18-N, R24E G & S.R B & M	Dedication (Comply with Rule 105)
Field and reservoir (if wildcat, so state): Unnamed	County: Apache	
Distance, in miles, and direction from nearest town or post office: 16 miles West to Holbrook, Arizona		
Proposed depth: 1100'	Rotary or cable tools: Rotary	Approx. date work will start: November 15, 1972
Bond Status / Amount	Organization Report: On file X Or attached	Filing Fee of $25.00: Attached X

Remarks:
Request that Commission grant an exception to Rule 105 describing minimum distances since these wells are a part of a propane storage cavern complex in a salt strata.

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the Manager of Operations of the Williams Energy Company (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

Robert Wirth
Signature

10/19/72
Date

RECEIVED
OCT 24 1972
O & G Cons. Comm.

Permit Number: 603
Approval Date: 11-13-72
Approved By: W.E. Allen

Notice: Before sending in this form be sure that you have given all information requested. Much unnecessary correspondence will thus be avoided.

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION
Application to Drill or Re-enter
File Two Copies

Form No. 3

(Complete Reverse Side)

1. Operator shall outline the dedicated acreage for *both* oil and gas wells on the plat.

2. A registered professional engineer or land surveyor registered in the State of Arizona or approved by the Commission shall show on the plat the location of the well and certify this information in the space provided.

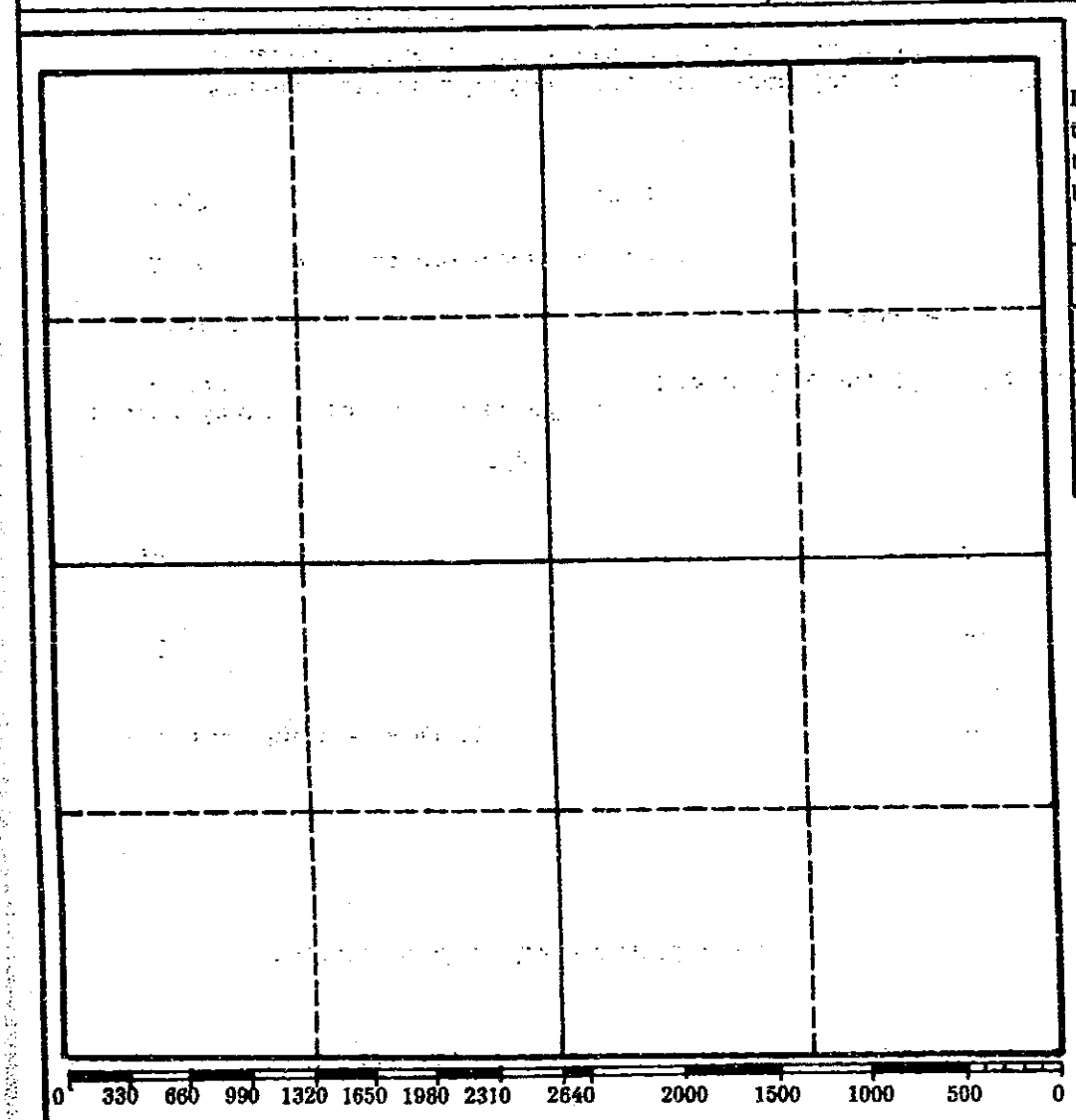
3. All distances shown on the plat must be from the outer boundaries of the Section.

4. Is the Operator the only owner in the dedicated acreage outlined on the plat below? YES__X__ NO_____.

5. If the answer to question four is "no," have the interests of all the owners been consolidated by communitization agreement or otherwise? YES_____ NO_____. If answer is "yes," Type of Consolidation_____

6. If the answer to question four is "no," list all the owners and their respective interests below:

Owner	Land Description



CERTIFICATION

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Name

Position

Company

Date

I hereby certify that the well location shown on the plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

Registered Professional Engineer and/or Land Surveyor

Certificate No.

PROPOSED CASING PROGRAM

Size of Casing	Weight	Grade & Type	Top	Bottom	Cementing Depths	Sacks Cement
13 3/8"	48	H-40	G.L.	150'	Top to Bottom	
9 5/8"	32.3	H-[illegible]	G.L.	850'	Top to Bott[illegible]	

PERMIT TO DRILL

This constitutes the permission and authority from the

OIL AND GAS CONSERVATION COMMISSION,
STATE OF ARIZONA,

To: WILLIAMS ENERGY COMPANY
(OPERATOR)

to drill a well to be known as

WILLIAMS ENERGY COMPANY WELL NO. 4
(WELL NAME)

located 823.59 South & 150.00 East of N.W. Corner

Section 8 Township 18N Range 24E, Apache County, Arizona.

The NA (LPG STORAGE WELL) of said Section, Township and Range is dedicated to this well.

Said well is to be drilled substantially as outlined in the attached Application and must be drilled in full compliance with all applicable laws, statutes, rules and regulations of the State of Arizona.

Issued this 13th day of November, 19 72.

OIL AND GAS CONSERVATION COMMISSION

By W. E. [illegible]
EXECUTIVE SECRETARY

PRIOR TO BEING ALLOWED TO PRODUCE THIS WELL YOU MUST BE IN FULL COMPLIANCE WITH RULE 105, SECTION A THRU G (SPACING), WITH RESPECT TO THE PRODUCT TO BE PRODUCED.

PERMIT No. 603

RECEIPT NO. 2940

API NO. 02-001-20179

State of Arizona
Oil & Gas Conservation Commission
Permit to Drill

FORM NO. 27

SAMPLES ARE REQUIRED

WILLIAMS ENERGY COMPANY No. 55729

Uregas

DOXOL

Batch 64

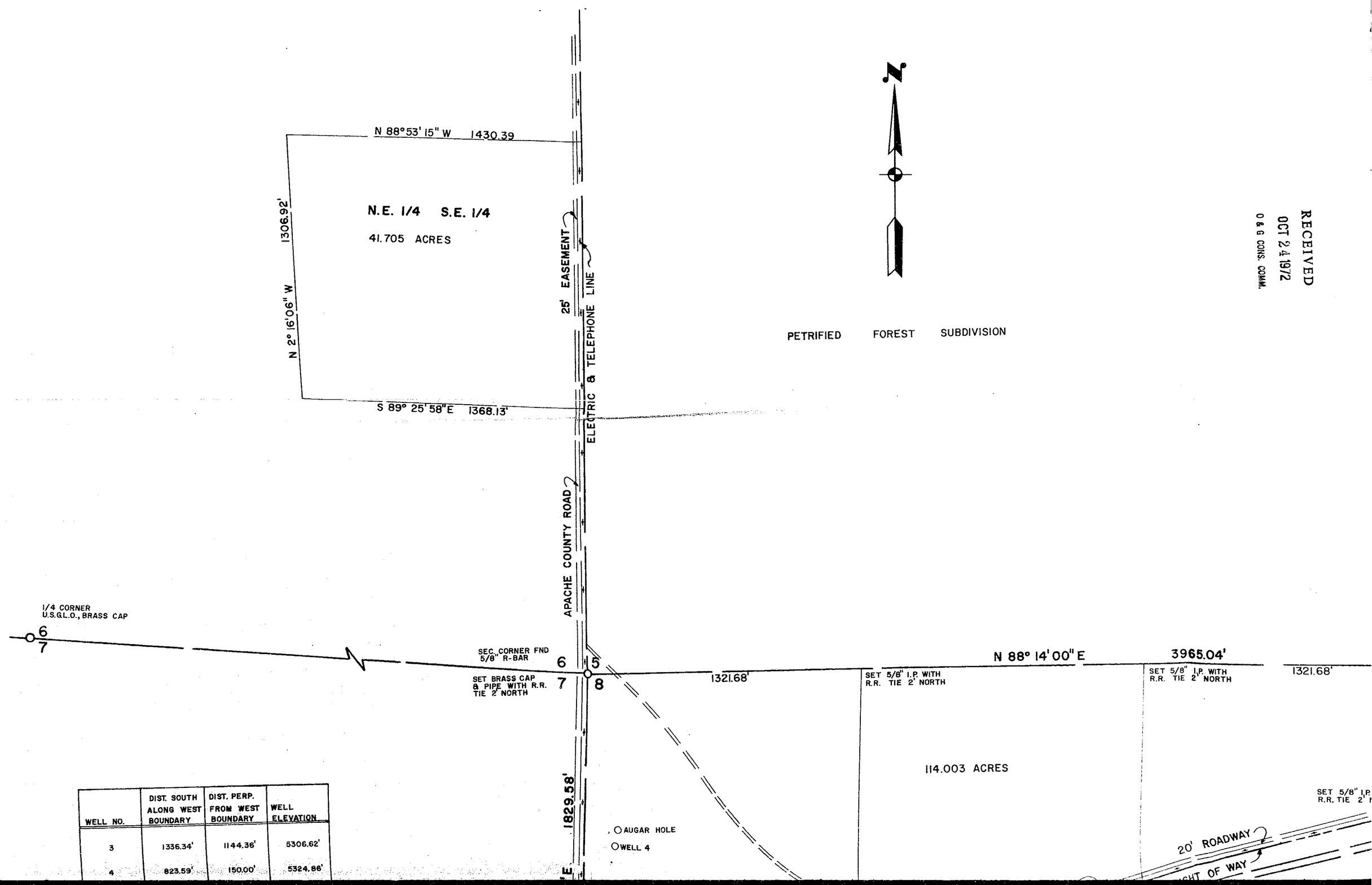
VOUCHER		INVOICE			INVOICE AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
MO.	NUMBER	MO.	DAY	NUMBER			
		10	18	1853			50 00

602 & 603

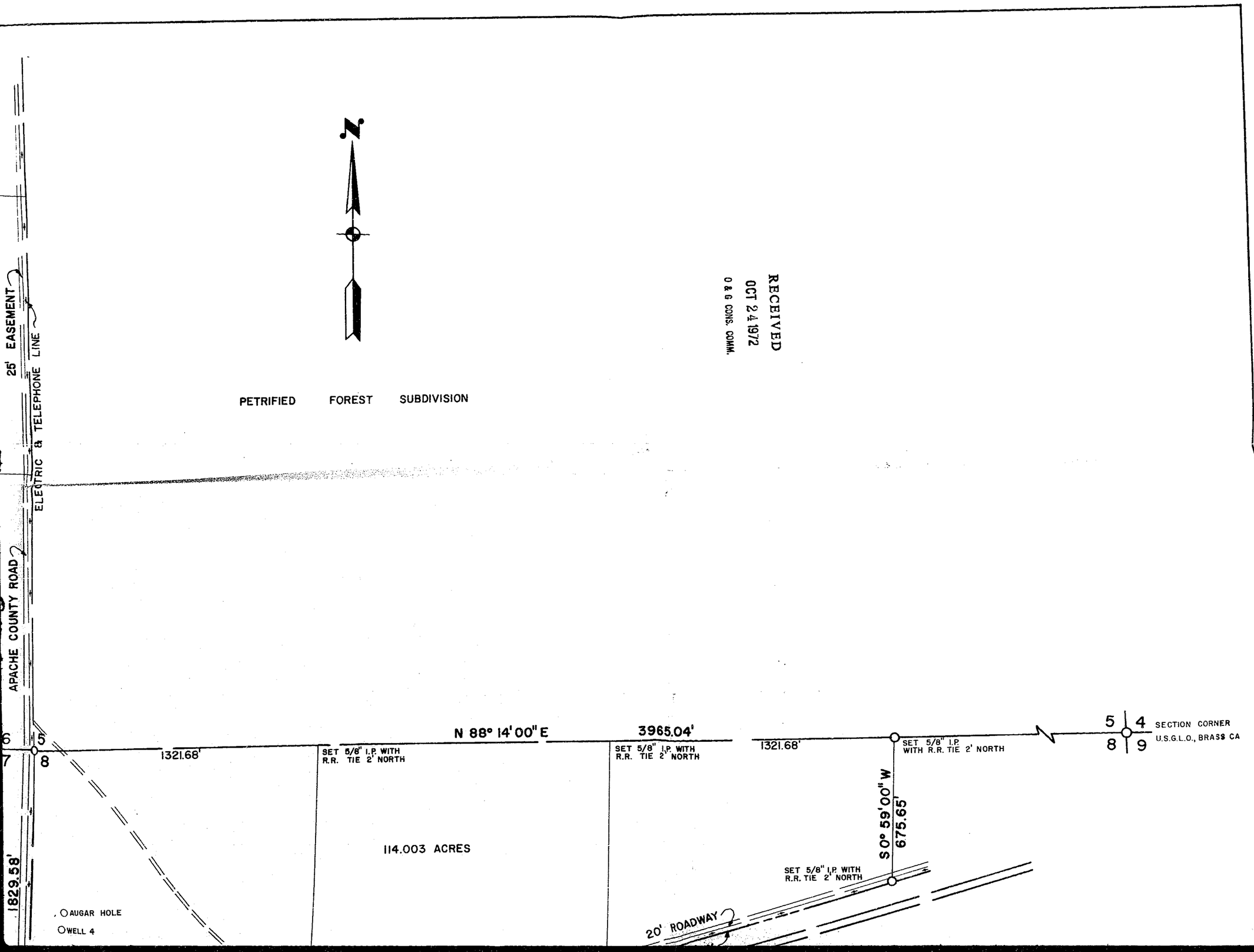
REMITTANCE STATEMENT - PLEASE DETACH CHECK BEFORE DEPOSITING

RECEIVED
OCT 24 1972
O & G CONS. COMM.

RECEIVED
OCT 24 1972
O & G CONS. COMM.

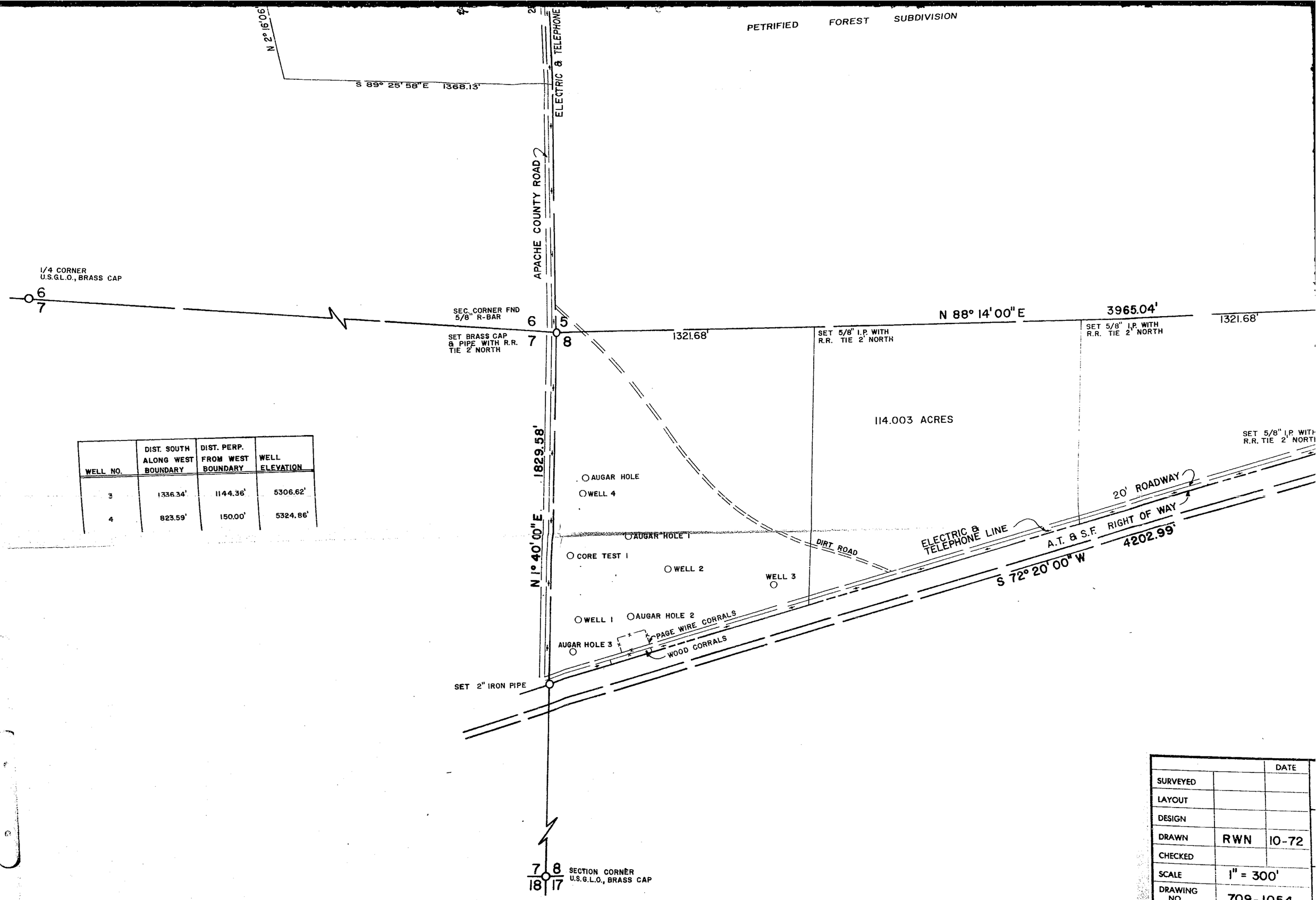


WELL NO.	DIST. SOUTH ALONG WEST BOUNDARY	DIST. PERP. FROM WEST BOUNDARY	WELL ELEVATION
3	1336.34'	1144.36'	5306.62'
4	823.59'	150.00'	5324.86'



RECEIVED
OCT 24 1972
O & G CONS. COMM.

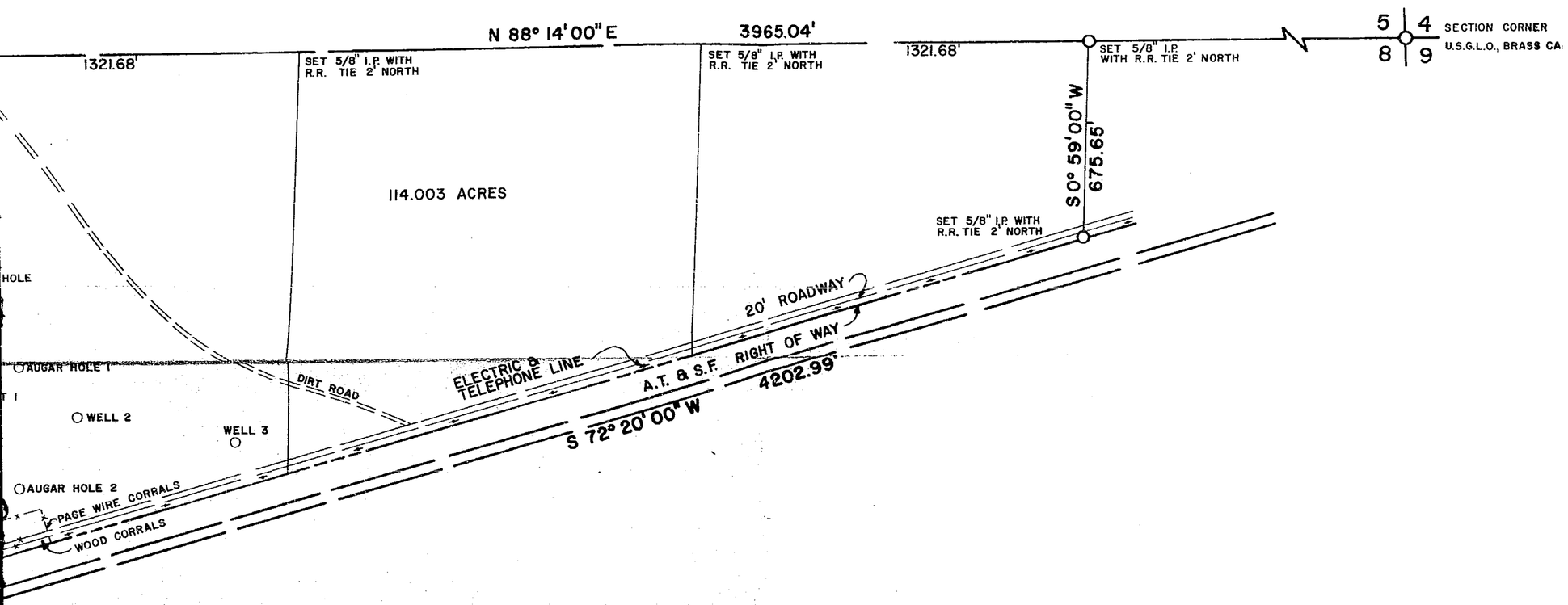
Powell Gas, Inc. (Buckeye Gas Prod.)
Well #2-8H-R242, Apache Cty 603



WELL NO.	DIST. SOUTH ALONG WEST BOUNDARY	DIST. PERP. FROM WEST BOUNDARY	WELL ELEVATION
3	1336.34'	1144.36'	5306.62'
4	823.59'	150.00'	5324.86'

		DATE
SURVEYED		
LAYOUT		
DESIGN		
DRAWN	RWN	10-72
CHECKED		
SCALE	1" = 300'	
DRAWING NO.	709-1054	

PETRIFIED FOREST SUBDIVISION



		DATE
SURVEYED		
LAYOUT		
DESIGN		
DRAWN	RWN	10-72
CHECKED		
SCALE	1" = 300'	
DRAWING NO.	709-1054	

Greer Engineering Company
POST OFFICE DRAWER T • HOLBROOK, ARIZONA 86025

TOPOGRAPHICAL SURVEY
SEC. 6 & 8, T18N, R24E, G.&S.R.B.&M.
APACHE COUNTY, ARIZONA

PREPARED FOR WILLIAMS ENERGY COMPANY
TULSA, OKLAHOMA

10-72

603

Cornell Gas, Inc. (Buckeye Gas Prod.)
T18N-R24E, Apache Cty 603

DIGITAL SURVEYS, INC.

SONAR SURVEY

Ferrelgas

WELL NO. 4

MARCH 18,1992

ADAMANA, ARIZONA

CUSTOMER REP.:	MR. THOMPSON
SONAR OPERATOR:	BOB POLLOCK
HOIST OPERATOR:	" "
JOB NO.:	252
PERMANENT DATUM:	B.H.F.
ZERO POINT:	B.H.F.
CASING DIA.:	7.0"
CASING DEPTH:	943'
INTERMEDIATE DIA.:	4.5"
INTERMEDIATE DEPTH:	OUT
TUBING DIA.:	N/A
TUBING DEPTH:	OUT
TOTAL DEPTH:	1008'
GAGE T.D.:	1008'
SONAR T.D.:	1007'
REMARKS:	

DIGITAL SURVEYS, INC. 10700 CORPORATE DR. STE.100 STAFFORD, TX 77477
TELEPHONE (713)240-6777 FAX (713)240-6129

VOLUME REPORT

DEPTH feet	DEPTH meters	INCR ft^3	TOTAL ft^3	INCR m^3	TOTAL m^3	INCR bbls	TOTAL bbls
950	289.5	134776	134776	3816.8	3816	24003.6	24003
952	290.1	38218	172994	1082.3	4899	6806.6	30810
954	290.7	40751	213745	1154.0	6053	7257.7	38067
956	291.3	42354	256099	1199.4	7252	7543.2	45611
958	291.9	42538	298638	1204.6	8457	7576.0	53187
960	292.6	41864	340502	1185.5	9643	7455.9	60643
962	293.2	40547	381049	1148.2	10791	7221.4	67864
964	293.8	39537	420586	1119.6	11910	7041.5	74906
966	294.4	40594	461181	1149.6	13060	7229.7	82136
968	295.0	42462	503644	1202.5	14263	7562.4	89698
970	295.6	44316	547960	1255.0	15518	7892.6	97591
972	296.2	46230	594191	1309.2	16827	8233.5	105825
974	296.8	47168	641359	1335.7	18163	8400.6	114226
976	297.4	47670	689029	1350.0	19513	8490.0	122716
978	298.0	46848	735878	1326.7	20840	8343.6	131059
980	298.7	43710	779589	1237.8	22077	7784.7	138844
982	299.3	39628	819217	1122.2	23200	7057.7	145902
984	299.9	35871	855088	1015.8	24216	6388.6	152291
986	300.5	32970	888058	933.7	25149	5871.9	158163
988	301.1	30259	918317	856.9	26006	5389.1	163552
990	301.7	27385	945703	775.5	26782	4877.2	168429
992	302.3	25017	970721	708.4	27490	4455.5	172885
994	302.9	22303	993024	631.6	28122	3972.1	176857
996	303.5	19843	1012867	561.9	28684	3534.0	180391
998	304.1	17478	1030345	494.9	29179	3112.8	183504
1000	304.8	14587	1044933	413.1	29592	2597.9	186102
1002	305.4	11271	1056205	319.1	29911	2007.3	188110
1004	306.0	6364	1062569	180.2	30091	1133.4	189243
1005	306.3	1558	1064128	44.1	30136	277.4	189521
1006	306.6	492	1064620	13.9	30150	87.6	189608
1007	306.9	45	1064665	1.2	30151	8.0	189616

MAJOR COMPASS RADII

Depth & Radii in feet

DEPTH	TILT	N	NE	E	SE	S	SW	W	NW
950	90	47.1	85.9	85.5	88.0	95.9	90.2	53.3	42.7
952	90	59.5	85.9	81.4	86.8	94.0	87.2	69.7	50.5
954	90	71.8	87.2	80.6	85.2	94.8	84.2	88.4	59.0
956	90	76.3	83.8	80.3	78.9	91.4	83.5	87.2	67.2
958	90	75.7	78.9	80.6	81.2	89.9	88.4	90.2	77.4
960	90	73.3	77.2	74.4	77.0	82.3	89.3	90.2	73.3
962	90	72.0	83.1	72.1	76.9	81.6	89.5	78.4	70.1
964	90	71.6	81.9	69.7	73.7	88.4	86.7	83.1	70.4
966	90	89.9	90.1	71.2	71.4	82.7	85.9	85.2	70.6
968	90	93.8	77.4	70.8	79.5	85.0	83.8	92.5	74.2
970	90	95.7	80.4	70.8	83.1	91.9	85.0	92.7	92.5
972	90	94.4	80.1	79.9	84.4	94.8	88.4	85.9	89.3
974	90	87.2	86.1	85.0	81.9	95.1	88.7	87.4	75.5
976	90	88.2	87.0	96.3	79.5	91.4	94.0	89.9	86.3
978	90	78.7	85.2	96.8	76.7	86.5	89.1	90.6	81.0
980	90	69.3	77.6	93.6	73.8	85.9	87.6	84.6	82.9
982	90	68.9	81.4	88.0	72.0	83.3	83.5	75.2	77.0
984	90	66.5	69.9	81.2	68.8	77.4	78.2	76.1	72.1
986	90	64.0	73.5	78.7	66.1	77.2	77.4	70.8	69.7
988	90	61.4	59.1	76.1	68.6	71.2	72.3	67.1	63.7
990	90	56.3	62.7	69.5	59.7	68.9	71.2	66.1	62.7
992	90	55.6	58.6	68.6	57.6	65.2	67.6	60.8	59.7
994	90	50.7	50.7	63.7	53.5	61.8	61.2	57.4	55.6
996	90	49.9	52.5	59.0	50.5	59.3	58.6	57.1	54.8
998	90	48.6	48.2	55.2	46.3	48.2	54.0	50.8	50.3
1000	90	42.4	44.2	46.3	40.9	45.2	49.9	47.1	48.6
1002	90	39.7	39.2	36.9	36.9	34.3	44.4	38.0	39.9
1004	90	35.4	26.0	4.9	6.4	11.6	23.7	33.3	32.6
1005	90	9.8	6.7	5.4	4.7	8.4	19.4	33.9	31.2
1006	90	6.3	5.1	4.2	3.2	4.7	4.6	3.6	3.8
1007	90	3.4	3.1	2.9	1.4	2.9	3.0	2.6	3.1

MAJOR COMPASS RADII

Depth & Radii in feet

DEPTH	TILT	N	NE	E	SE	S	SW	W	NW
960	00	18.4	18.4	18.6	18.6	18.4	18.4	18.2	18.4
960	05	18.4	18.6	18.8	18.8	18.8	18.4	18.2	18.2
960	10	18.6	18.6	19.2	19.0	19.2	18.8	18.4	18.4
960	15	18.6	19.4	19.7	19.7	19.6	19.0	18.8	18.6
960	20	18.8	19.7	20.1	20.1	20.1	19.4	18.8	18.8
960	25	19.4	20.7	20.9	20.7	20.7	19.9	19.2	19.4
960	30	19.7	21.3	21.8	21.8	21.4	21.1	20.1	19.9
960	35	22.0	22.8	24.8	24.1	24.6	22.8	22.0	21.4
960	40	23.1	24.5	26.7	26.3	26.3	24.5	23.1	22.6
960	45	24.6	27.1	29.2	29.2	28.8	26.9	25.0	24.3
960	50	27.1	30.7	32.4	32.7	32.4	29.7	27.7	26.3
960	55	30.1	35.0	36.9	37.1	37.5	33.3	30.7	29.5
960	60	30.1	33.3	36.9	37.1	37.3	34.6	30.9	29.5
960	65	34.6	38.6	43.7	46.7	43.9	41.4	36.0	34.1
960	70	39.3	47.6	51.4	53.3	53.9	46.5	41.2	37.7
960	75	47.5	53.1	62.9	91.2	98.7	61.8	50.1	44.8
960	80	55.4	68.2	78.2	93.8	103.2	75.7	61.6	50.5
960	85	74.0	87.2	80.6	83.6	96.1	84.4	81.2	62.7
960	90	73.3	77.2	74.4	77.0	82.3	89.3	90.2	73.3

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 950 ft TILT: 90 degrees

AZ									
0	47.1	45.6	52.4	52.5	60.8	70.3	81.6	81.8	86.8
45	85.9	88.7	87.8	87.2	84.8	86.1	85.9	84.8	85.0
90	85.5	84.4	82.9	80.6	82.9	83.3	84.6	83.1	89.7
135	88.0	87.8	86.1	91.4	90.8	97.0	97.4	96.8	95.7
180	95.9	95.9	99.3	99.1	100.6	99.1	99.1	97.2	92.3
225	90.2	89.9	88.7	87.6	87.2	77.0	69.1	54.8	54.6
270	53.3	46.3	46.1	49.5	44.2	43.9	42.9	42.0	41.8
315	42.7	40.7	39.3	39.2	42.6	41.0	48.2	42.9	45.4

AZ DEPTH: 952 ft TILT: 90 degrees

AZ									
0	59.5	62.7	58.8	77.2	77.8	81.0	81.6	81.8	84.0
45	85.9	87.0	87.6	87.0	86.3	85.3	84.6	84.6	81.6
90	81.4	80.8	82.9	79.7	79.5	80.1	82.3	83.3	85.3
135	86.8	83.5	86.3	87.8	89.3	92.9	95.5	96.3	95.7
180	94.0	96.8	96.5	97.0	96.5	98.9	98.0	96.8	92.9
225	87.2	87.6	87.6	88.7	88.2	88.9	78.7	69.1	71.6
270	69.7	69.5	62.7	59.5	53.3	53.3	53.1	51.4	50.3
315	50.5	50.5	48.8	51.6	52.4	50.8	53.7	52.2	56.1

AZ DEPTH: 954 ft TILT: 90 degrees

AZ									
0	71.8	76.1	77.4	81.2	81.2	81.4	82.9	85.9	85.5
45	87.2	86.7	88.0	81.0	85.9	82.5	83.3	82.5	80.4
90	80.6	79.9	78.6	78.7	79.1	81.2	81.4	81.0	81.6
135	85.2	81.8	86.7	89.5	94.4	95.1	95.0	94.4	94.2
180	94.8	95.1	96.3	95.5	95.1	97.2	95.9	92.3	86.1
225	84.2	86.3	87.0	85.0	85.9	88.7	89.3	90.1	89.1
270	88.4	86.8	79.1	78.2	64.4	58.0	60.5	58.6	57.6
315	59.0	57.6	58.4	56.9	56.7	58.0	60.8	61.4	63.1

AZ DEPTH: 956 ft TILT: 90 degrees

AZ									
0	76.3	75.5	78.6	79.1	81.4	79.1	80.8	84.6	84.2
45	83.8	83.3	81.2	76.9	79.7	80.4	80.8	80.4	80.1
90	80.3	81.0	79.1	78.2	78.6	81.8	83.1	83.3	83.6
135	78.9	80.3	86.5	89.3	90.2	91.7	93.1	91.4	91.6
180	91.4	94.8	95.7	92.1	92.3	93.4	95.1	93.1	89.3
225	83.5	82.9	83.5	83.5	83.5	90.6	92.3	89.3	90.1
270	87.2	78.2	77.4	76.7	72.0	71.6	74.8	65.9	68.9
315	67.2	68.0	69.1	69.5	72.9	71.6	77.2	76.5	76.5

AZ DEPTH: 958 ft TILT: 90 degrees

AZ									
0	75.7	74.4	75.9	77.4	77.2	77.8	78.9	80.3	77.4
45	78.9	83.3	84.4	84.8	82.5	76.5	79.5	77.8	79.1
90	80.6	78.2	79.9	80.8	79.9	82.3	83.3	83.3	81.6
135	81.2	76.1	75.9	77.6	82.1	86.7	87.6	89.9	91.7
180	89.9	89.1	93.1	91.7	91.6	91.4	92.3	93.3	90.8
225	88.4	83.5	83.6	81.6	82.5	82.9	82.5	85.5	90.1
270	90.2	86.1	82.3	82.5	81.8	81.0	80.1	78.6	77.8
315	77.4	77.8	73.5	71.8	71.8	69.1	75.9	77.8	74.4

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 960 ft TILT: 90 degrees

0	73.3	73.5	75.2	76.1	76.1	76.9	78.6	79.3	78.0
45	77.2	80.1	83.6	86.1	82.3	78.9	79.1	73.5	72.0
90	74.4	75.2	81.6	83.3	83.6	83.5	83.8	82.7	80.8
135	77.0	79.1	78.9	73.7	77.8	85.3	86.5	83.8	81.4
180	82.3	92.3	91.4	87.6	85.7	85.5	89.1	87.8	86.5
225	89.3	90.8	87.4	81.8	82.7	82.5	85.3	89.5	88.9
270	90.2	89.3	88.9	82.1	78.6	79.7	83.5	80.6	77.0
315	73.3	71.2	70.8	70.8	69.5	69.1	75.4	74.2	73.3

AZ DEPTH: 962 ft TILT: 90 degrees

0	72.0	74.0	76.3	77.4	79.9	82.3	83.5	84.6	84.0
45	83.1	82.5	82.9	82.5	78.6	74.4	73.5	70.6	71.4
90	72.1	72.0	75.4	74.6	76.1	78.2	78.4	78.4	77.8
135	76.9	72.9	69.9	74.0	83.8	84.4	82.5	81.9	89.5
180	81.6	86.3	83.8	84.2	84.4	85.0	86.1	88.4	88.5
225	89.5	88.2	82.3	82.1	81.9	89.1	89.9	85.3	80.1
270	78.4	78.4	78.4	80.6	80.8	79.5	79.3	75.4	71.6
315	70.1	70.4	67.8	72.7	74.8	73.1	72.3	72.1	73.8

AZ DEPTH: 964 ft TILT: 90 degrees

0	71.6	72.9	74.4	75.5	76.1	79.9	77.6	85.3	96.1
45	81.9	81.2	80.8	77.4	74.0	71.6	71.8	72.0	69.5
90	69.7	70.3	71.0	72.1	74.4	74.4	75.2	77.2	77.2
135	73.7	68.2	71.8	82.5	84.0	84.6	82.9	80.1	83.3
180	88.4	85.5	81.2	83.5	84.4	83.5	82.1	82.1	85.9
225	86.7	85.9	87.8	93.8	93.3	91.4	88.7	88.7	88.4
270	83.1	78.7	78.4	78.2	80.8	80.3	78.7	76.3	73.5
315	70.4	69.7	68.8	67.6	71.8	74.2	73.1	71.0	71.4

AZ DEPTH: 966 ft TILT: 90 degrees

0	89.9	92.9	93.6	94.2	94.2	93.1	93.4	95.9	94.2
45	90.1	82.3	80.4	78.4	72.3	70.1	70.6	70.1	69.9
90	71.2	70.6	71.0	69.5	71.8	73.7	75.9	77.4	73.8
135	71.4	74.2	81.2	82.3	83.8	84.0	85.2	85.0	85.3
180	82.7	79.3	89.9	88.4	81.8	84.8	82.1	84.4	83.6
225	85.9	85.9	90.6	94.4	92.7	92.1	88.9	85.5	89.9
270	85.2	80.8	78.2	78.0	80.6	80.4	78.4	77.2	74.6
315	70.6	69.3	69.9	68.0	70.8	72.7	73.7	71.8	91.6

AZ DEPTH: 968 ft TILT: 90 degrees

0	93.8	92.9	93.1	90.8	94.2	88.4	80.4	78.9	79.7
45	77.4	74.6	71.8	71.0	70.1	70.8	70.8	70.8	69.5
90	70.8	71.0	73.8	75.2	75.7	79.1	79.5	80.4	78.4
135	79.5	83.1	79.3	82.7	87.8	87.4	90.4	91.4	88.4
180	85.0	86.5	86.5	84.8	84.6	84.4	83.1	84.4	83.6
225	83.8	87.4	91.4	90.6	87.8	87.6	92.5	88.7	90.8
270	92.5	87.4	85.0	81.2	80.8	77.6	77.8	68.9	69.7
315	74.2	77.4	82.5	82.3	81.0	83.1	89.1	93.8	93.4

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 970 ft TILT: 90 degrees

0	95.7	93.6	91.9	86.3	87.6	86.3	85.5	80.1	78.7
45	80.4	79.3	76.7	74.8	72.3	71.6	71.8	74.6	72.3
90	70.8	76.1	75.7	77.6	76.5	79.3	80.8	80.3	81.8
135	83.1	82.9	84.4	88.2	90.1	90.2	91.9	89.7	91.0
180	91.9	95.3	96.8	88.0	87.8	84.4	84.4	84.8	82.3
225	85.0	87.2	90.6	88.4	80.1	77.8	88.9	86.1	90.6
270	92.7	91.9	92.3	91.4	91.4	90.1	88.4	85.9	93.1
315	92.5	88.5	82.1	75.0	78.7	78.6	94.0	95.3	93.6

AZ DEPTH: 972 ft TILT: 90 degrees

0	94.4	90.1	85.3	85.9	86.3	85.5	85.7	85.9	91.8
45	80.1	78.6	80.6	76.3	75.5	72.5	72.3	75.2	77.2
90	79.9	77.2	78.7	78.6	78.4	81.0	80.8	86.1	85.2
135	84.4	82.3	84.8	88.0	89.3	87.8	91.4	93.6	95.0
180	94.8	98.5	97.6	97.0	95.1	101.0	88.5	89.7	82.1
225	88.4	89.9	88.5	87.2	90.6	89.7	87.6	80.1	87.8
270	85.9	91.7	91.4	91.7	90.6	80.8	83.8	82.7	85.9
315	89.3	93.4	93.6	91.4	76.9	77.0	74.8	95.5	94.0

AZ DEPTH: 974 ft TILT: 90 degrees

0	87.2	86.8	82.9	84.4	86.1	85.5	82.5	87.0	87.4
45	86.1	81.6	81.0	79.3	78.4	82.5	79.7	81.2	79.1
90	85.0	87.0	91.4	90.6	85.9	85.0	82.3	80.8	80.1
135	81.9	83.1	84.6	83.6	88.4	88.4	91.2	91.9	93.6
180	95.1	96.3	94.4	95.1	96.8	98.5	98.3	93.3	87.4
225	88.7	88.4	90.8	89.1	87.8	87.6	87.4	87.6	89.7
270	87.4	88.2	89.7	87.4	86.5	85.7	85.7	85.3	75.9
315	75.5	73.1	75.5	89.7	93.6	95.9	93.8	88.0	87.2

AZ DEPTH: 976 ft TILT: 90 degrees

0	88.2	82.9	83.1	81.9	80.6	83.1	84.2	85.2	87.0
45	87.0	87.2	88.4	86.7	81.6	83.5	86.1	97.8	95.3
90	96.3	94.4	92.9	91.2	88.5	87.6	85.9	82.3	81.9
135	79.5	79.5	79.3	80.4	83.1	85.5	87.4	89.9	91.6
180	91.4	91.7	92.9	93.8	93.8	93.1	91.9	95.5	95.1
225	94.0	91.4	94.8	91.9	88.7	88.0	87.6	88.2	88.7
270	89.9	89.5	88.7	88.4	86.3	80.1	80.8	82.5	82.5
315	86.3	85.5	76.1	75.5	74.0	75.7	88.2	88.7	88.2

AZ DEPTH: 978 ft TILT: 90 degrees

0	78.7	78.2	77.4	78.9	74.8	77.0	79.9	81.4	84.2
45	85.2	86.5	88.0	88.9	89.5	93.1	91.9	95.3	100.2
90	96.8	92.3	88.4	86.3	83.6	82.3	80.8	79.1	76.3
135	76.7	77.8	76.3	79.1	82.7	82.9	86.7	86.7	87.6
180	86.5	86.8	89.1	85.2	89.7	91.4	91.0	89.7	91.6
225	89.1	92.9	89.3	94.0	90.4	87.6	89.3	84.8	88.9
270	90.6	88.7	86.1	86.8	88.9	85.2	82.5	83.1	85.2
315	81.0	80.3	78.6	73.3	81.8	83.3	83.6	82.3	80.3

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 980 ft TILT: 90 degrees

0	69.3	72.7	69.5	69.1	75.9	72.1	73.3	76.3	77.2
45	77.6	81.4	84.0	84.2	84.6	89.5	88.5	90.4	91.4
90	93.6	93.8	89.9	87.4	85.9	84.6	84.0	78.9	74.2
135	73.8	73.8	74.0	77.2	76.7	80.6	79.1	84.8	84.4
180	85.9	84.4	84.8	85.7	82.7	83.8	82.1	84.2	88.0
225	87.6	85.5	84.4	83.8	79.9	85.7	74.8	91.9	83.5
270	84.6	81.4	86.8	81.2	80.6	77.8	74.0	75.2	84.2
315	82.9	77.4	81.0	80.6	80.8	82.9	73.7	71.8	73.7

AZ DEPTH: 982 ft TILT: 90 degrees

0	68.9	69.3	67.6	66.3	70.1	71.0	73.5	76.3	79.9
45	81.4	80.1	82.3	82.1	85.2	84.6	85.7	90.4	86.5
90	88.0	85.5	85.2	81.9	81.2	75.9	73.1	71.6	70.8
135	72.0	71.0	71.4	71.0	72.9	76.1	77.0	84.4	82.3
180	83.3	81.9	80.8	85.2	81.6	80.1	80.3	80.4	77.2
225	83.5	82.5	81.8	79.7	76.1	79.5	80.1	78.7	76.1
270	75.2	75.7	75.4	75.2	72.1	72.0	71.0	73.3	77.8
315	77.0	81.0	69.9	71.0	69.3	68.0	69.7	70.6	70.1

AZ DEPTH: 984 ft TILT: 90 degrees

0	66.5	65.0	65.0	64.4	64.8	64.6	67.6	68.4	69.5
45	69.9	72.9	76.3	78.0	78.9	79.3	83.3	83.5	81.0
90	81.2	80.6	81.9	78.9	77.2	74.0	70.4	68.2	68.0
135	68.8	67.4	68.2	69.5	68.9	68.6	70.4	73.1	74.8
180	77.4	79.3	79.5	78.9	80.1	77.4	77.8	79.3	78.6
225	78.2	76.1	80.4	81.2	79.1	78.4	75.2	74.8	72.3
270	76.1	75.7	72.7	72.3	69.9	70.1	69.7	67.6	69.1
315	72.1	71.6	71.2	71.2	68.9	70.4	67.1	65.7	66.9

AZ DEPTH: 986 ft TILT: 90 degrees

0	64.0	62.0	62.9	61.2	62.5	65.5	67.6	72.3	72.9
45	73.5	74.0	74.8	75.4	76.9	76.5	79.1	78.7	78.6
90	78.7	78.2	76.1	74.2	71.2	68.4	65.4	65.5	65.5
135	66.1	67.4	67.6	68.8	70.3	74.0	73.7	74.2	74.6
180	77.2	76.3	76.7	74.8	73.7	74.8	74.4	75.2	76.7
225	77.4	74.8	75.0	74.2	72.3	71.6	69.3	69.3	70.4
270	70.8	72.3	71.4	68.4	67.1	66.5	68.9	67.1	68.8
315	69.7	67.8	67.6	67.4	64.6	65.0	65.4	63.9	64.4

AZ DEPTH: 988 ft TILT: 90 degrees

0	61.4	59.7	59.0	59.7	59.5	58.0	58.0	57.6	58.4
45	59.1	62.0	61.6	65.7	67.4	70.4	72.5	73.5	73.8
90	76.1	75.5	73.8	74.2	75.2	74.2	73.7	69.7	69.9
135	68.6	64.0	63.7	63.9	63.1	65.4	63.9	65.5	68.4
180	71.2	72.5	71.2	73.5	73.8	72.1	73.3	70.3	70.3
225	72.3	71.4	72.5	73.5	73.8	72.7	71.8	68.6	70.6
270	67.1	67.8	69.1	68.6	65.5	63.3	64.2	63.9	64.8
315	63.7	63.1	63.3	64.4	66.1	66.5	64.4	61.8	62.0

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 990 ft TILT: 90 degrees

0	56.3	54.8	55.7	55.4	58.0	59.1	58.4	59.3	61.0
45	62.7	63.5	65.7	67.2	68.0	71.2	70.3	70.3	71.4
90	69.5	70.3	69.1	67.1	65.2	64.6	62.3	61.4	59.9
135	59.7	59.7	59.9	61.4	62.3	60.6	62.9	65.4	68.4
180	68.9	69.7	69.9	70.4	69.5	69.5	67.6	66.5	70.6
225	71.2	72.0	69.1	70.6	66.3	66.9	65.4	66.1	64.6
270	66.1	66.5	64.2	63.1	60.1	59.0	60.5	60.5	61.6
315	62.7	61.6	62.3	63.3	63.1	62.2	60.6	58.6	57.8

AZ DEPTH: 992 ft TILT: 90 degrees

0	55.6	52.2	52.4	52.9	54.6	55.2	55.9	56.7	57.3
45	58.6	60.8	61.4	62.9	61.2	65.0	68.4	66.5	67.6
90	68.6	67.6	66.7	65.7	65.7	63.1	61.4	59.0	57.8
135	57.6	57.3	57.4	57.3	59.0	58.2	60.6	62.7	64.8
180	65.2	67.2	68.2	68.0	69.3	69.3	65.0	65.9	62.0
225	67.6	70.3	63.9	58.0	56.9	64.4	62.7	62.7	61.0
270	60.8	63.3	63.9	63.3	63.5	60.8	59.5	57.3	58.2
315	59.7	61.2	60.5	59.9	59.3	60.8	59.9	56.9	56.3

AZ DEPTH: 994 ft TILT: 90 degrees

0	50.7	49.5	49.0	49.1	49.5	49.3	49.5	48.8	49.7
45	50.7	51.6	51.6	57.6	58.0	60.8	65.2	67.4	64.2
90	63.7	65.4	65.7	62.9	63.9	61.2	57.3	57.1	54.8
135	53.5	53.9	54.4	53.5	52.0	52.0	55.7	56.5	56.7
180	61.8	58.6	62.2	62.9	60.6	60.6	61.4	61.6	61.0
225	61.2	61.6	58.0	63.1	62.5	60.1	56.5	58.0	58.8
270	57.4	59.0	61.2	60.5	59.3	59.0	55.7	56.5	55.2
315	55.6	57.1	56.5	57.3	56.9	54.2	52.9	52.5	51.6

AZ DEPTH: 996 ft TILT: 90 degrees

0	49.9	47.3	46.3	47.6	47.6	46.7	47.8	49.9	51.4
45	52.5	54.0	55.7	57.3	58.0	60.1	62.2	62.9	61.8
90	59.0	58.2	58.8	57.1	58.8	55.7	54.4	52.0	51.0
135	50.5	48.0	47.6	52.4	54.8	54.0	55.0	54.4	57.1
180	59.3	58.4	58.0	58.8	58.8	59.0	60.5	58.4	57.1
225	58.6	56.3	59.0	55.7	55.4	56.3	56.7	56.5	56.1
270	57.1	57.6	54.0	54.0	55.6	53.7	53.3	54.4	55.4
315	54.8	54.4	54.4	54.4	53.3	52.4	50.5	50.5	51.0

AZ DEPTH: 998 ft TILT: 90 degrees

0	48.6	45.0	44.1	44.2	45.8	44.8	44.2	45.4	47.8
45	48.2	48.8	50.5	52.9	54.4	55.9	58.2	56.9	55.9
90	55.2	54.2	54.0	54.0	51.6	50.5	46.7	46.7	46.5
135	46.3	45.2	44.6	44.2	45.2	44.8	45.4	49.7	49.0
180	48.2	48.8	49.9	51.4	51.6	55.4	54.2	54.6	54.2
225	54.0	51.2	51.4	49.9	52.2	52.7	52.5	52.7	52.0
270	50.8	51.6	50.1	51.2	51.2	49.9	50.3	50.8	51.8
315	50.3	51.0	51.2	50.3	50.1	50.1	49.1	49.0	48.6

5 DEGREE RADII REPORT

Radii in feet

AZ	DEPTH: 1000 ft				TILT: 90 degrees				
0	42.4	42.7	40.5	40.1	41.8	42.4	42.0	42.2	43.5
45	44.2	46.7	46.1	46.5	49.7	55.0	52.5	52.2	50.3
90	46.3	50.7	48.8	49.0	48.0	47.3	46.1	42.4	42.2
135	40.9	42.6	42.0	39.5	41.2	43.1	42.9	41.8	44.4
180	45.2	46.1	46.7	47.5	52.4	48.2	43.1	44.4	48.8
225	49.9	52.4	47.6	42.9	42.9	45.9	47.5	47.8	43.3
270	47.1	47.6	48.2	46.5	42.9	44.2	45.8	46.9	46.1
315	48.6	45.8	47.8	47.3	47.1	46.9	45.9	45.9	44.6

AZ	DEPTH: 1002 ft				TILT: 90 degrees				
0	39.7	35.2	35.0	36.3	36.3	37.8	36.3	37.7	39.7
45	39.2	37.5	40.9	44.2	44.1	41.0	43.7	44.8	42.0
90	36.9	36.1	39.2	38.4	39.0	37.3	36.3	36.5	36.9
135	36.9	36.1	33.5	32.9	33.1	34.3	35.4	32.9	33.5
180	34.3	35.0	36.7	37.8	41.8	42.2	42.9	43.1	38.8
225	44.4	36.3	38.8	36.3	38.8	38.4	38.0	38.0	38.0
270	38.0	39.3	40.1	40.7	40.9	39.2	40.3	41.0	42.9
315	39.9	39.2	40.9	42.9	42.7	42.0	37.3	42.4	36.7

AZ	DEPTH: 1004 ft				TILT: 90 degrees				
0	35.4	33.3	32.6	33.1	33.1	33.1	32.7	31.6	26.2
45	26.0	25.8	28.0	27.1	15.2	12.2	13.7	8.8	9.2
90	4.9	4.9	4.9	5.0	5.2	5.2	5.4	5.6	6.2
135	6.4	6.2	6.5	7.5	6.5	9.4	9.8	10.5	11.1
180	11.6	13.3	12.8	14.1	20.7	20.9	21.8	20.1	22.6
225	23.7	24.8	26.3	27.7	30.7	31.6	36.0	36.3	36.3
270	33.3	35.0	35.6	33.1	34.1	35.6	35.4	32.6	32.9
315	32.6	32.0	37.1	35.6	36.1	35.6	37.3	33.5	32.7

AZ	DEPTH: 1005 ft				TILT: 90 degrees				
0	9.8	9.6	9.2	8.4	7.9	6.9	6.7	6.7	6.7
45	6.7	6.7	8.2	8.4	8.4	7.7	7.5	7.7	6.4
90	5.4	5.4	5.4	5.2	5.0	4.9	4.9	5.0	4.7
135	4.7	4.7	4.7	4.7	4.3	4.7	4.9	5.4	6.4
180	8.4	9.0	10.3	10.9	11.3	13.0	15.8	15.8	19.6
225	19.4	20.1	24.3	25.4	29.5	31.4	34.8	35.2	33.5
270	33.9	33.3	33.7	30.5	30.9	33.1	34.4	32.4	31.1
315	31.2	30.7	30.7	32.0	30.7	34.6	30.3	15.4	9.4

AZ	DEPTH: 1006 ft				TILT: 90 degrees				
0	6.3	6.3	6.0	5.2	5.3	5.5	6.0	5.4	5.2
45	5.1	5.0	4.8	4.6	4.7	4.7	4.6	4.4	4.1
90	4.2	4.1	4.1	3.9	3.8	3.8	3.6	3.4	3.3
135	3.2	2.9	3.0	3.1	3.1	3.2	3.3	3.6	4.1
180	4.7	5.6	5.6	5.5	5.6	5.4	5.5	5.2	4.9
225	4.6	3.7	7.8	7.8	3.8	3.8	3.7	3.6	3.5
270	3.6	3.5	3.2	3.2	3.2	3.2	3.3	3.4	3.6
315	3.8	4.0	4.0	4.1	3.9	3.8	8.3	7.2	6.8

5 DEGREE RADII REPORT

Radii in feet

DEPTH: 1007 ft TILT: 90 degrees

AZ									
0	3.4	3.2	3.3	3.4	3.7	3.6	3.4	3.6	3.3
45	3.1	3.1	3.1	3.1	3.1	3.1	3.0	3.0	3.0
90	2.9	2.8	2.8	2.8	2.0	1.7	1.7	1.5	1.5
135	1.4	1.4	1.5	1.5	1.6	1.8	1.8	2.0	2.1
180	2.9	4.0	3.9	3.1	3.1	3.0	3.0	2.9	2.9
225	3.0	3.0	3.1	3.1	3.1	3.0	3.1	3.0	2.6
270	2.6	2.6	2.7	2.8	3.1	3.1	3.1	3.1	3.1
315	3.1	3.1	3.0	3.1	3.0	3.1	3.0	3.2	3.3

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 960 ft TILT: 00 degrees

0	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4
45	18.4	18.4	18.4	18.4	18.4	18.4	18.6	18.4	18.6
90	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
135	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.4
180	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.0	18.4
225	18.4	18.2	18.4	18.2	18.2	18.2	18.2	18.2	18.2
270	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.4
315	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.0	18.4

AZ DEPTH: 960 ft TILT: 05 degrees

0	18.4	18.4	18.4	18.4	18.4	18.4	18.6	18.4	18.6
45	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.8
90	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8
135	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8
180	18.8	18.8	18.8	18.8	18.6	18.6	18.6	18.6	18.4
225	18.4	18.4	18.4	18.4	18.4	18.4	18.2	18.2	18.2
270	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2
315	18.2	18.2	18.4	18.4	18.4	18.4	18.4	18.4	18.4

AZ DEPTH: 960 ft TILT: 10 degrees

0	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
45	18.6	18.8	18.8	19.0	19.0	19.0	19.0	19.2	19.2
90	19.2	19.2	19.2	19.2	19.0	19.0	19.2	19.2	19.2
135	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.2
180	19.2	19.0	19.0	19.0	19.0	19.0	18.8	18.8	18.8
225	18.8	18.6	18.6	18.6	18.6	18.4	18.4	18.4	18.4
270	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4
315	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.6

AZ DEPTH: 960 ft TILT: 15 degrees

0	18.6	18.8	18.8	18.8	19.0	19.0	19.2	19.2	19.2
45	19.4	19.4	19.4	19.6	19.6	19.6	19.6	19.7	19.7
90	19.7	19.6	19.7	19.7	19.4	19.7	19.7	19.7	19.7
135	19.7	19.7	19.7	19.7	19.6	19.7	19.6	19.6	19.6
180	19.6	19.6	19.6	19.6	19.6	19.6	19.4	19.0	19.2
225	19.0	19.0	19.0	18.8	18.8	18.8	18.8	18.8	18.8
270	18.8	18.8	18.8	18.8	18.8	18.6	18.8	18.6	18.6
315	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6

AZ DEPTH: 960 ft TILT: 20 degrees

0	18.8	19.0	19.2	19.2	19.4	19.4	19.4	19.4	19.6
45	19.7	19.7	19.9	19.9	19.9	19.9	20.1	20.1	20.1
90	20.1	19.9	20.1	20.1	20.1	20.1	20.1	20.1	20.1
135	20.1	19.9	20.1	20.1	20.1	20.1	20.1	20.1	20.1
180	20.1	19.9	19.9	19.7	19.7	19.7	19.6	19.6	19.6
225	19.4	19.4	19.2	19.2	19.2	19.2	19.2	19.2	19.2
270	18.8	18.8	18.8	19.0	18.8	18.8	19.0	19.0	19.0
315	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 960 ft TILT: 25 degrees

0	19.4	19.4	19.6	19.6	19.9	20.1	20.3	20.5	20.5
45	20.7	20.7	20.7	20.9	20.9	20.9	20.9	20.9	20.9
90	20.9	20.9	21.1	20.9	20.9	20.7	20.9	20.7	21.1
135	20.7	20.9	20.9	21.1	20.9	20.9	20.9	20.9	20.7
180	20.7	20.5	20.5	20.5	20.3	20.1	20.1	20.1	20.1
225	19.9	19.9	19.7	19.7	19.6	19.6	19.6	19.4	19.4
270	19.2	19.2	18.8	19.2	19.2	19.4	19.2	19.2	19.2
315	19.4	19.4	19.2	19.4	19.4	19.4	19.4	19.2	19.2

AZ DEPTH: 960 ft TILT: 30 degrees

0	19.7	19.7	19.7	19.9	20.1	20.5	20.7	21.1	20.9
45	21.3	21.4	21.4	21.4	21.4	21.8	22.0	21.8	21.6
90	21.8	21.8	21.8	21.8	22.0	21.8	21.8	21.8	21.8
135	21.8	21.8	22.0	21.8	21.8	22.0	21.8	21.8	21.8
180	21.4	21.6	21.6	21.6	21.4	21.3	21.1	21.1	20.9
225	21.1	20.9	20.9	20.9	20.7	20.5	20.5	20.5	20.3
270	20.1	19.6	19.7	19.6	19.7	19.7	19.7	19.7	19.6
315	19.9	19.9	19.9	19.9	19.9	19.9	19.4	19.7	19.7

AZ DEPTH: 960 ft TILT: 35 degrees

0	22.0	21.6	21.8	21.8	22.0	22.2	22.2	22.4	22.4
45	22.8	22.9	23.3	23.5	24.5	25.2	24.8	24.5	24.6
90	24.8	25.0	25.4	25.2	25.2	24.3	24.5	24.3	24.8
135	24.1	24.3	24.3	24.3	24.6	25.4	24.8	24.5	24.8
180	24.6	24.5	24.5	24.5	23.9	23.5	23.3	22.8	22.6
225	22.8	22.8	22.6	22.4	22.4	22.4	22.2	22.0	22.0
270	22.0	21.6	21.4	21.1	21.3	21.3	21.4	21.3	21.4
315	21.4	21.4	21.4	21.6	21.3	21.4	21.4	21.3	21.8

AZ DEPTH: 960 ft TILT: 40 degrees

0	23.1	22.9	23.1	23.1	23.3	23.3	23.7	24.1	24.5
45	24.5	24.8	25.2	25.6	26.0	26.7	26.7	26.5	26.3
90	26.7	26.5	26.3	26.3	26.7	26.5	26.3	26.3	26.9
135	26.3	26.2	26.2	26.7	26.5	26.3	27.1	26.9	26.3
180	26.3	26.3	25.8	25.4	25.0	24.8	24.5	24.5	24.5
225	24.5	24.3	23.9	23.9	23.9	23.9	23.3	23.1	22.9
270	23.1	22.6	22.4	22.4	22.8	22.6	22.6	22.6	22.8
315	22.6	22.9	22.6	22.8	22.4	22.6	22.6	22.8	22.8

AZ DEPTH: 960 ft TILT: 45 degrees

0	24.6	24.8	25.0	25.2	25.2	25.4	26.0	26.0	26.3
45	27.1	27.5	27.8	28.6	29.0	29.4	29.0	29.2	29.2
90	29.2	29.2	29.5	29.4	28.8	29.9	30.3	29.5	29.7
135	29.2	29.5	29.4	29.0	29.2	29.2	29.5	29.4	29.2
180	28.8	29.0	29.0	28.0	28.6	27.8	27.7	27.3	27.1
225	26.9	26.5	26.2	26.0	26.2	26.0	25.4	25.4	25.4
270	25.0	24.5	24.3	24.3	24.5	24.5	24.5	24.5	24.1
315	24.3	24.1	24.3	24.3	24.1	24.3	24.5	24.5	24.5

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 960 ft TILT: 50 degrees

AZ									
0	27.1	27.1	27.3	27.8	28.4	28.8	29.5	29.9	30.1
45	30.7	31.2	31.4	31.8	31.8	32.7	32.9	33.1	32.4
90	32.4	32.4	33.5	32.6	32.6	32.7	32.6	32.6	32.7
135	32.7	32.6	32.6	33.1	32.7	32.7	32.9	32.7	32.9
180	32.4	31.8	31.6	32.2	32.2	31.4	30.9	31.1	30.5
225	29.7	29.7	29.2	29.0	28.4	28.4	28.0	28.2	27.7
270	27.7	27.1	27.3	26.7	26.9	26.7	26.9	26.7	26.3
315	26.3	26.5	26.7	26.9	26.9	27.5	27.7	27.5	27.1

AZ DEPTH: 960 ft TILT: 55 degrees

AZ									
0	30.1	30.3	30.7	31.4	32.0	32.7	32.7	33.3	34.4
45	35.0	35.2	35.6	36.3	36.7	37.3	36.9	36.3	36.3
90	36.9	37.3	37.7	37.5	37.8	37.7	37.7	36.9	37.3
135	37.1	37.3	37.3	37.1	37.1	36.9	36.9	36.1	36.9
180	37.5	37.8	36.9	35.8	36.7	35.6	35.6	34.3	33.9
225	33.3	33.5	33.3	32.9	32.4	31.6	31.2	31.2	30.9
270	30.7	30.1	29.7	29.5	29.4	29.4	29.5	29.4	29.7
315	29.5	29.2	29.2	29.2	29.0	29.2	29.7	29.9	30.1

AZ DEPTH: 960 ft TILT: 60 degrees

AZ									
0	30.1	30.3	30.5	31.2	32.0	32.4	32.7	32.7	33.5
45	33.3	34.6	35.0	35.0	35.8	36.5	37.1	36.9	36.1
90	36.9	37.3	37.3	37.3	38.6	37.8	37.5	37.8	37.3
135	37.1	37.3	37.1	36.5	36.7	36.9	36.7	36.5	36.7
180	37.3	38.0	37.7	37.1	36.7	36.0	36.0	36.5	36.0
225	34.6	34.1	33.5	33.1	32.2	31.4	31.2	31.1	30.9
270	30.9	30.7	30.5	29.9	29.9	29.7	29.4	29.4	29.2
315	29.5	29.5	29.2	29.0	29.0	29.2	29.4	29.9	30.1

AZ DEPTH: 960 ft TILT: 65 degrees

AZ									
0	34.6	35.0	35.0	35.8	36.5	36.3	37.1	36.9	37.8
45	38.6	39.3	40.3	41.2	42.2	42.9	43.3	43.9	44.1
90	43.7	44.2	44.2	44.6	44.8	44.2	44.1	43.7	43.9
135	46.7	45.9	45.8	46.3	45.8	44.4	44.4	42.7	43.7
180	43.9	43.3	43.3	44.6	43.3	43.3	43.1	42.4	41.8
225	41.4	40.5	40.3	39.2	38.6	37.7	36.5	36.7	36.0
270	36.0	35.0	35.0	34.6	34.3	33.7	33.7	33.3	34.3
315	34.1	33.9	34.3	33.5	32.9	33.1	33.3	33.7	34.4

AZ DEPTH: 960 ft TILT: 70 degrees

AZ									
0	39.3	40.3	41.2	42.6	42.9	43.7	45.0	45.8	45.8
45	47.6	47.5	48.6	50.5	50.7	51.0	50.5	51.4	52.2
90	51.4	52.4	51.0	50.3	51.6	55.2	52.5	51.4	53.5
135	53.3	54.0	50.5	52.0	52.4	53.5	54.8	55.2	51.6
180	53.9	52.4	51.8	50.5	52.9	50.1	50.3	49.7	48.2
225	46.5	46.3	45.0	45.4	44.2	43.5	42.6	42.7	41.8
270	41.2	40.7	40.5	39.5	39.0	38.2	38.6	38.6	37.8
315	37.7	37.5	38.0	38.0	38.2	38.2	38.4	39.0	39.5

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 960 ft TILT: 75 degrees

0	47.5	47.1	48.2	48.0	48.2	49.9	50.5	50.3	53.3
45	53.1	55.4	56.5	58.6	59.1	62.0	63.5	64.0	65.7
90	62.9	64.6	64.4	62.9	67.2	87.4	88.9	88.4	89.9
135	91.2	91.2	90.2	89.9	91.0	91.4	92.7	96.8	99.5
180	98.7	98.3	100.0	99.1	99.7	99.3	98.7	81.6	64.8
225	61.8	61.6	58.8	58.2	55.9	55.0	53.5	51.4	51.8
270	50.1	48.4	47.5	47.3	47.5	47.3	46.5	46.3	45.4
315	44.8	45.0	44.2	43.9	44.6	45.4	45.4	45.8	45.6

AZ DEPTH: 960 ft TILT: 80 degrees

0	55.4	56.3	58.2	60.5	63.1	61.6	62.2	65.9	65.5
45	68.2	63.3	71.8	72.3	74.0	71.6	71.8	76.5	81.4
90	78.2	80.8	81.2	86.3	87.6	91.9	92.3	93.3	95.9
135	93.8	95.5	96.7	97.2	99.3	101.2	102.5	103.1	101.6
180	103.2	100.4	106.3	103.1	102.5	100.2	100.4	94.6	76.3
225	75.7	76.9	72.0	68.8	65.4	66.9	65.7	66.1	61.6
270	61.6	58.8	56.7	54.8	52.9	53.7	53.7	52.2	51.6
315	50.5	50.5	51.8	52.0	52.0	52.5	52.5	53.3	55.9

AZ DEPTH: 960 ft TILT: 85 degrees

0	74.0	75.5	77.8	78.9	79.3	81.9	82.5	81.8	87.2
45	87.2	88.5	85.3	86.7	86.1	80.1	82.3	81.9	81.4
90	80.6	80.8	81.8	78.9	79.7	80.4	83.8	81.6	87.4
135	83.6	84.0	85.7	86.3	90.8	91.0	94.8	96.1	96.1
180	96.1	96.5	96.3	96.8	99.3	99.3	96.3	93.6	88.5
225	84.4	85.5	85.7	89.3	88.9	89.5	89.3	85.9	80.8
270	81.2	74.4	70.6	69.9	68.9	68.9	65.7	65.2	64.6
315	62.7	63.1	64.2	64.8	66.3	68.0	66.9	68.0	73.8

AZ DEPTH: 960 ft TILT: 90 degrees

0	73.3	73.5	75.2	76.1	76.1	76.9	78.6	79.3	78.0
45	77.2	80.1	83.6	86.1	82.3	78.9	79.1	73.5	72.0
90	74.4	75.2	81.6	83.3	83.6	83.5	83.8	82.7	80.8
135	77.0	79.1	78.9	73.7	77.8	85.3	86.5	83.8	81.4
180	82.3	92.3	91.4	87.6	85.7	85.5	89.1	87.8	86.5
225	89.3	90.8	87.4	81.8	82.7	82.5	85.3	89.5	88.9
270	90.2	89.3	88.9	82.1	78.6	79.7	83.5	80.6	77.0
315	73.3	71.2	70.8	70.8	69.5	69.1	75.4	74.2	73.3

MAXIMUM HORIZONTAL RADII

AZM deg	RADIUS ft	DEPTH ft
0	95.7	970
2	94.0	970
4	94.4	970
6	93.4	966
8	93.6	968
10	93.6	966
12	93.8	966
14	94.4	966
16	94.0	966
18	91.0	966
20	94.2	966
22	94.0	966
24	93.4	966
26	92.7	966
28	92.7	966
30	93.4	966
32	95.0	966
34	95.5	966
36	96.3	966
38	95.1	964
40	96.1	964
42	94.8	964
44	90.6	966
46	89.7	966
48	88.4	976
50	88.7	950
52	88.4	950
54	88.7	976
56	88.2	954
58	90.8	976
60	88.9	978
62	88.5	978
64	88.7	978
66	90.2	978
68	90.6	978
70	93.1	978
72	91.9	978
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92	96.8	976
94	94.4	976
96	94.4	976
98	93.4	976
100	92.9	976
102	92.1	976
104	91.2	976
106	91.2	976
108	88.9	976
110	88.5	976
112	88.0	976
114	87.6	976
116	87.6	976
118	86.7	976
120	85.9	976
122	85.3	976
124	84.2	960
126	88.9	972
128	86.7	950
130	89.7	950
132	89.5	950
134	88.7	950
136	87.2	950
138	88.7	950
140	87.8	950
142	89.3	950
144	86.3	952
146	87.2	954
148	91.4	950
150	91.4	950
152	90.1	950
154	94.2	954
156	94.8	954
158	94.8	954
160	97.0	950
162	96.5	950
164	96.8	950
166	98.2	950
168	96.8	950
170	96.8	950
172	95.7	950
174	96.5	972
176	95.5	950
178	95.9	950

MAXIMUM HORIZONTAL RADII

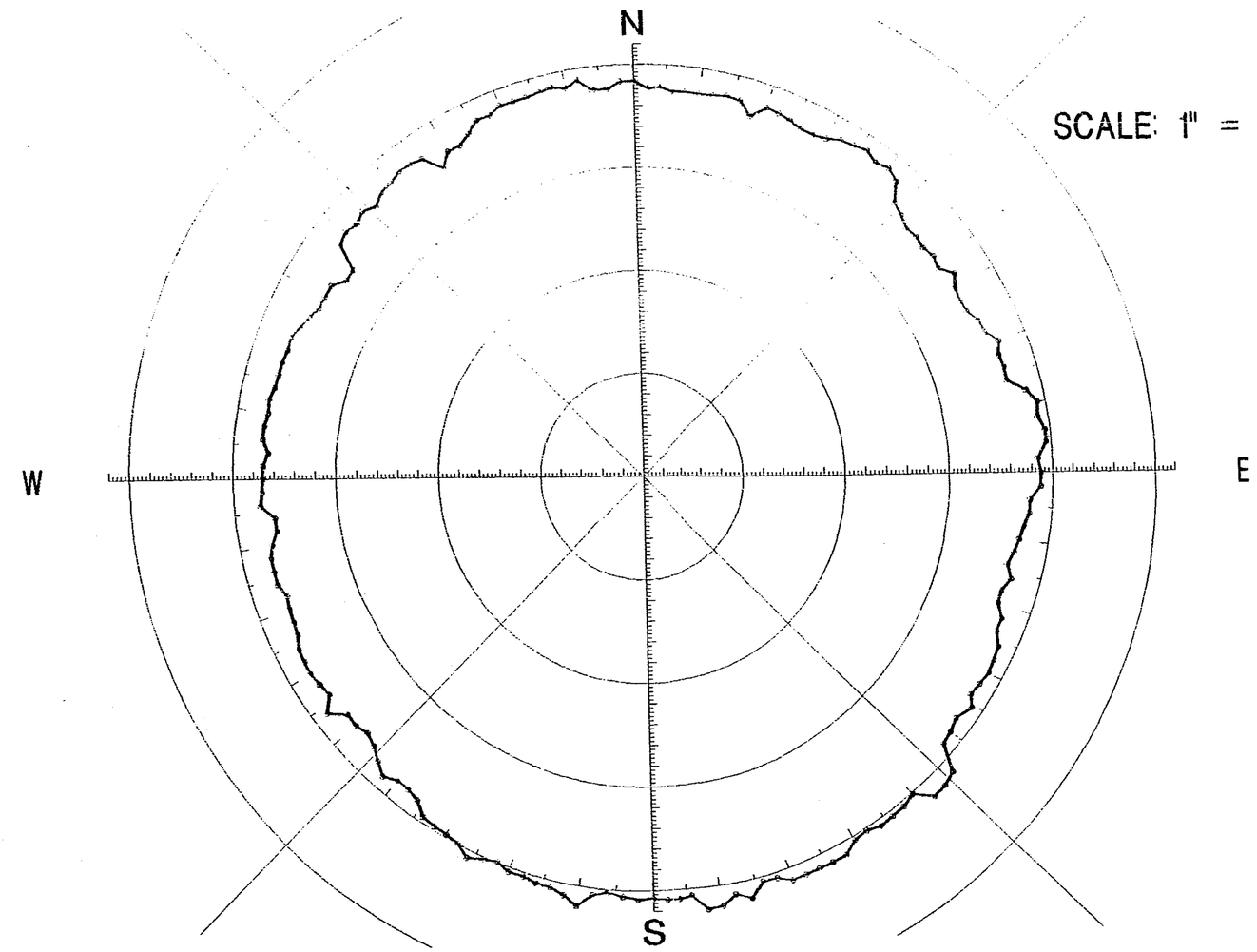
AZM deg	RADIUS ft	DEPTH ft
180	95.9	950
182	96.7	972
184	99.7	972
186	97.6	970
188	100.2	972
190	99.3	950
192	98.9	950
194	99.7	950
196	98.7	950
198	100.8	950
200	100.6	950
202	99.5	950
204	100.4	972
206	101.7	972
208	99.7	972
210	99.1	950
212	98.9	950
214	98.5	950
216	95.9	950
218	95.1	976
220	95.1	976
222	96.8	976
224	95.0	976
226	93.1	976
228	91.9	978
230	92.9	978
232	92.7	968
234	96.5	976
236	93.3	976
238	93.8	966
240	94.4	966
242	94.2	964
244	94.0	964
246	92.7	964
248	92.3	964
250	92.1	966
252	91.6	956
254	92.9	956
256	92.9	968
258	92.9	968
260	91.9	980
262	90.2	956
264	90.2	956
266	93.4	970
268	92.9	970

AZM deg	RADIUS ft	DEPTH ft
270	92.7	970
272	92.5	968
274	91.4	970
276	92.9	972
278	92.9	970
280	92.3	970
282	92.7	972
284	91.9	972
286	91.7	972
288	91.7	972
290	91.4	970
292	91.7	970
294	90.6	970
296	89.5	970
298	88.4	970
300	88.4	970
302	88.4	970
304	86.1	974
306	86.1	970
308	92.1	970
310	93.1	970
312	92.1	970
314	93.3	970
316	91.7	970
318	93.3	972
320	93.4	972
322	94.2	972
324	94.0	972
326	93.3	972
328	88.5	972
330	91.4	972
332	91.2	972
334	92.7	974
336	94.8	974
338	94.6	974
340	95.9	974
342	95.7	974
344	95.7	974
346	96.1	970
348	96.5	970
350	95.5	972
352	97.0	972
354	94.2	972
356	94.0	972
358	95.7	970

aximum radius : 101.9
n Azmuth deg : 86

MAXIMUM RADIUS PLOT

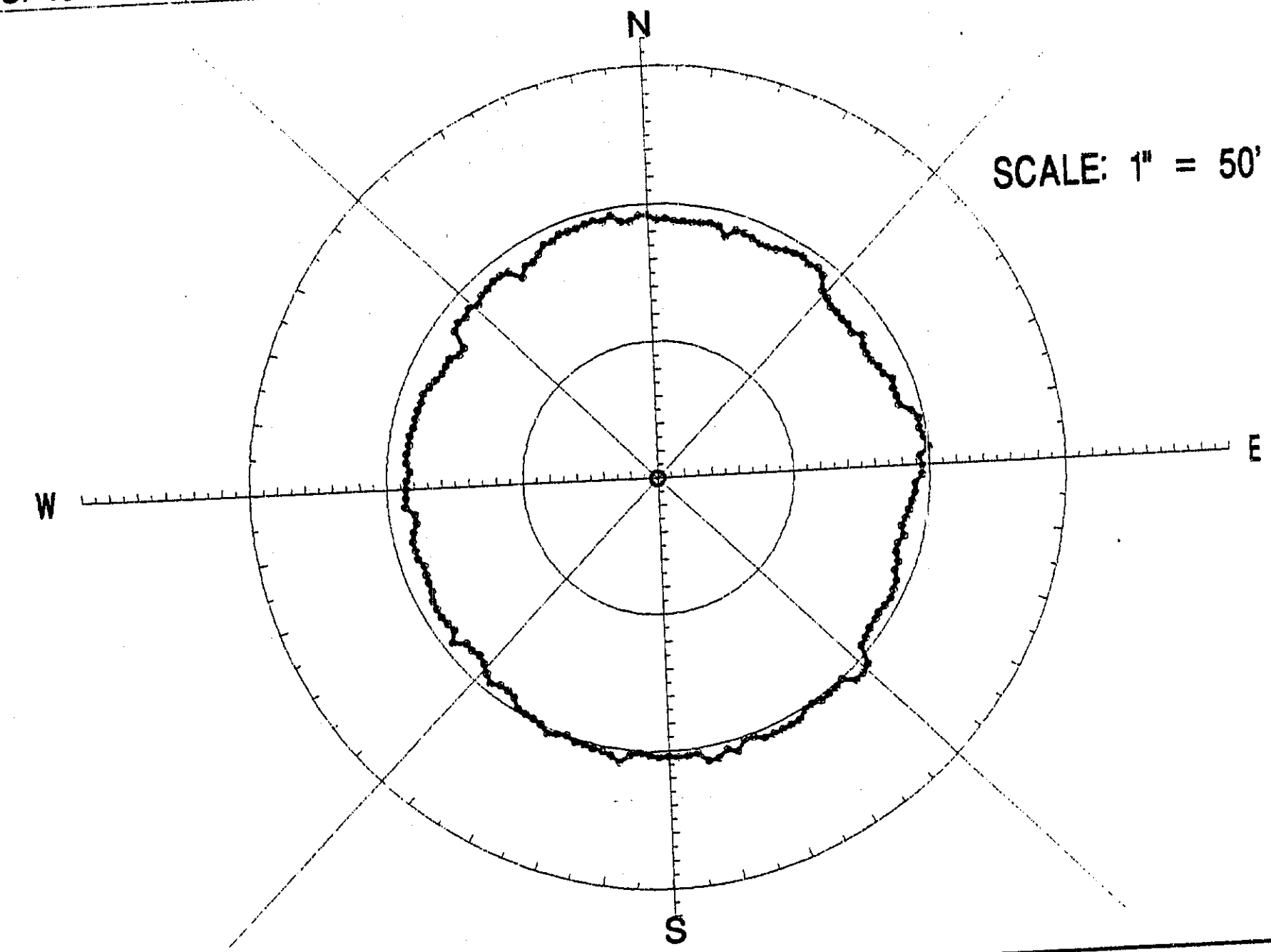
03/18/92	Ferrellgas Inc.	No.: 4



Ferrell Gas, Inc. (Buckeye Gas Prod.)
C-710N-R24E. Apache Cty 603

MAXIMUM RADIUS PLOT

03/18/92 | Ferrellgas Inc. | No.: 4



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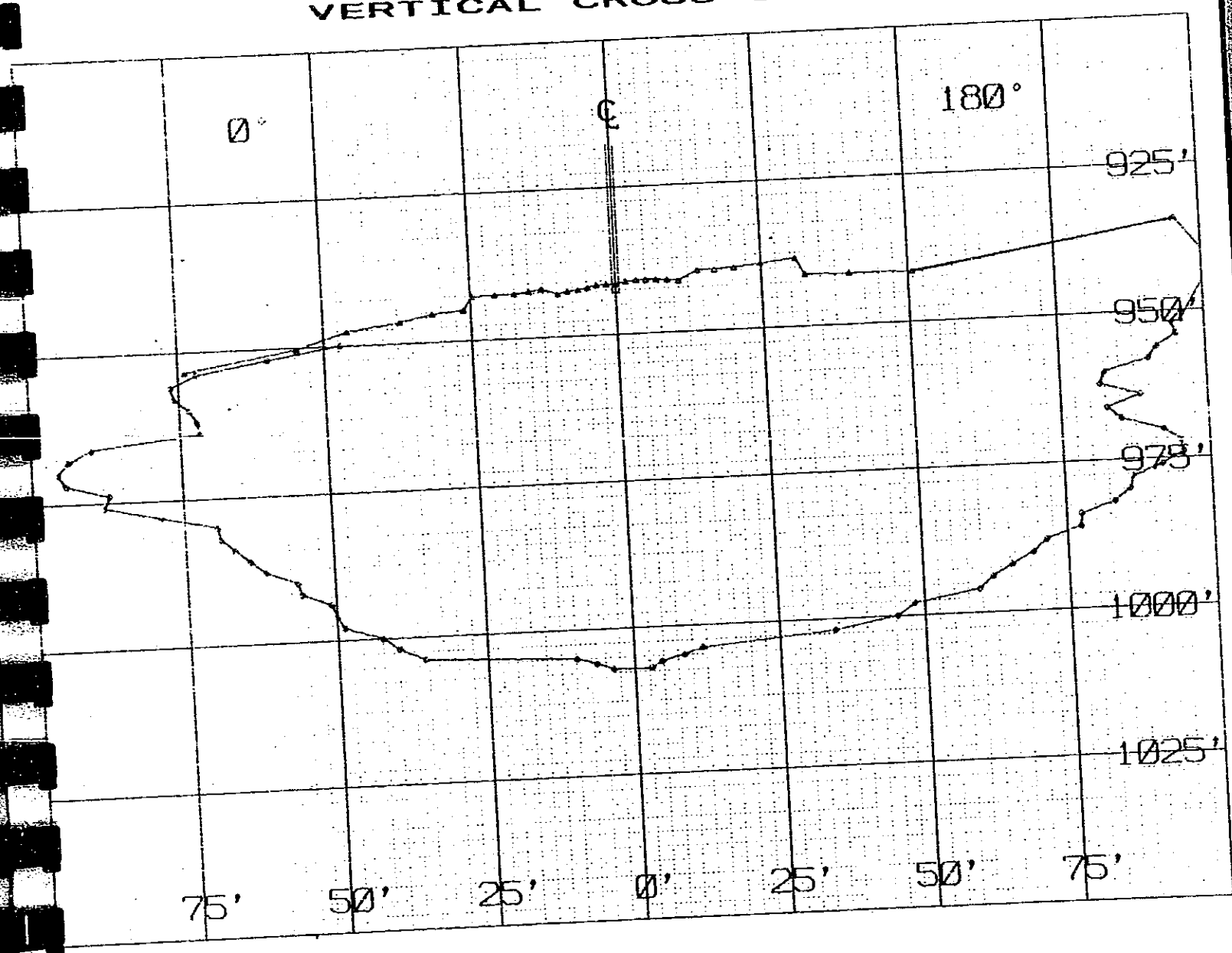

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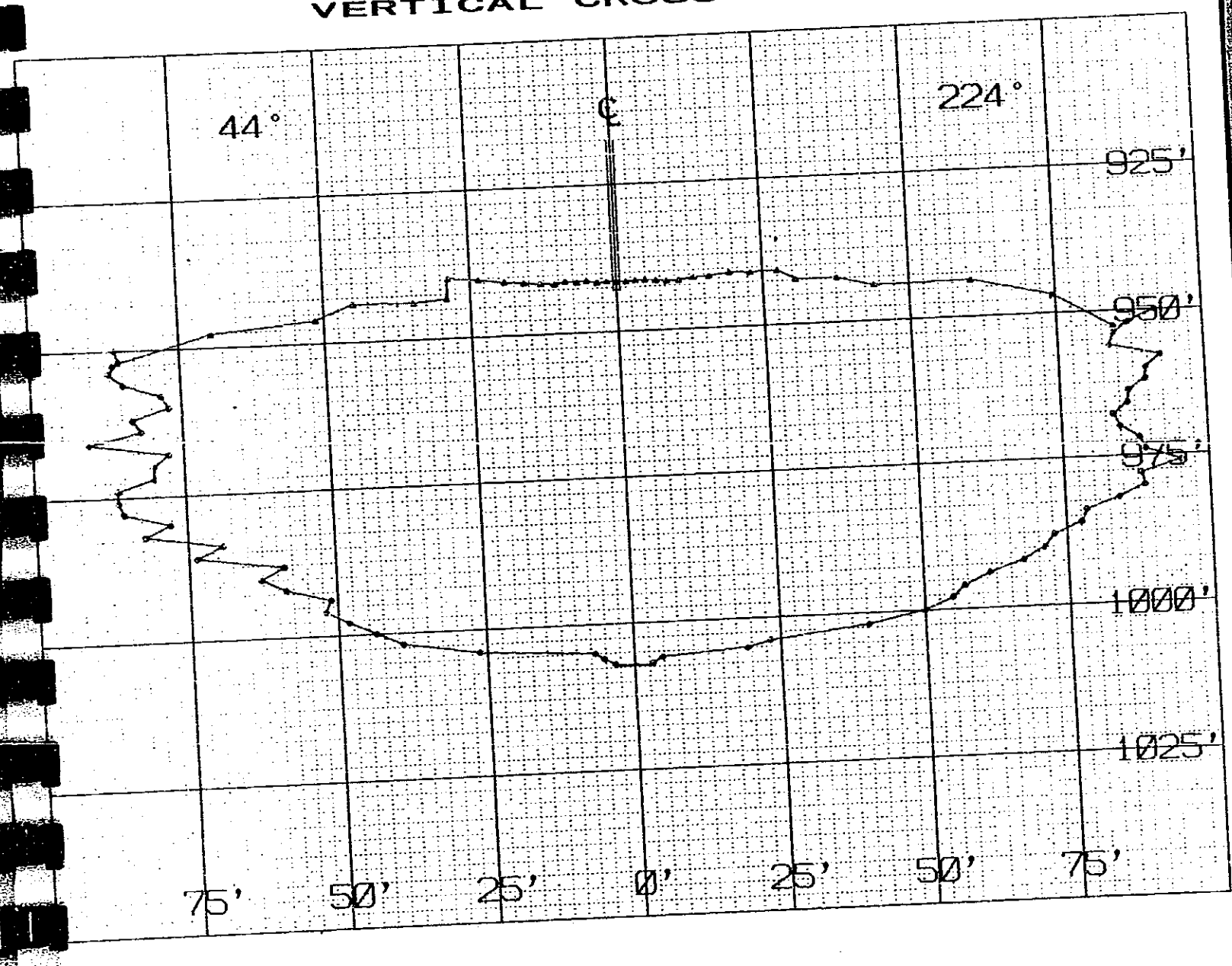

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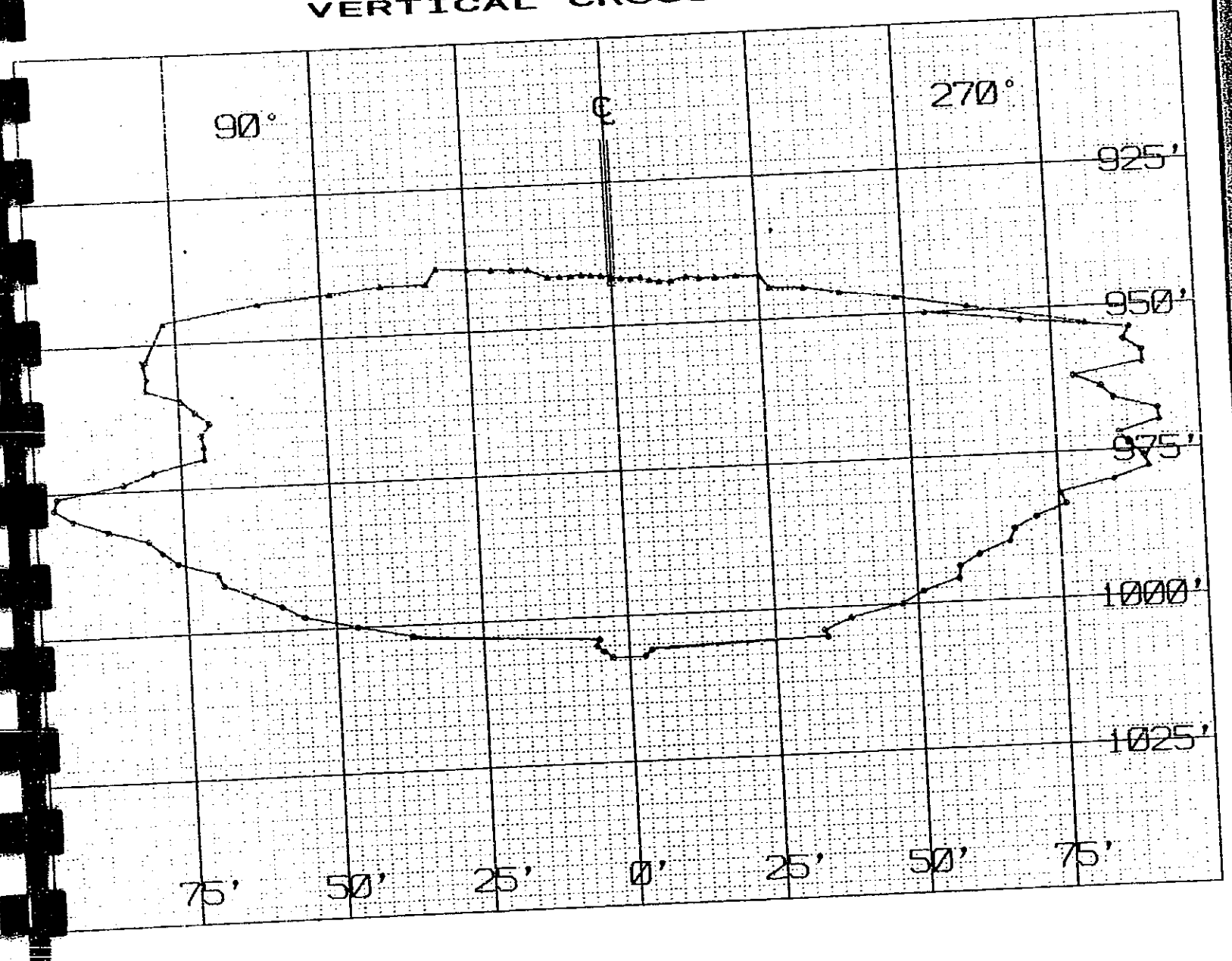

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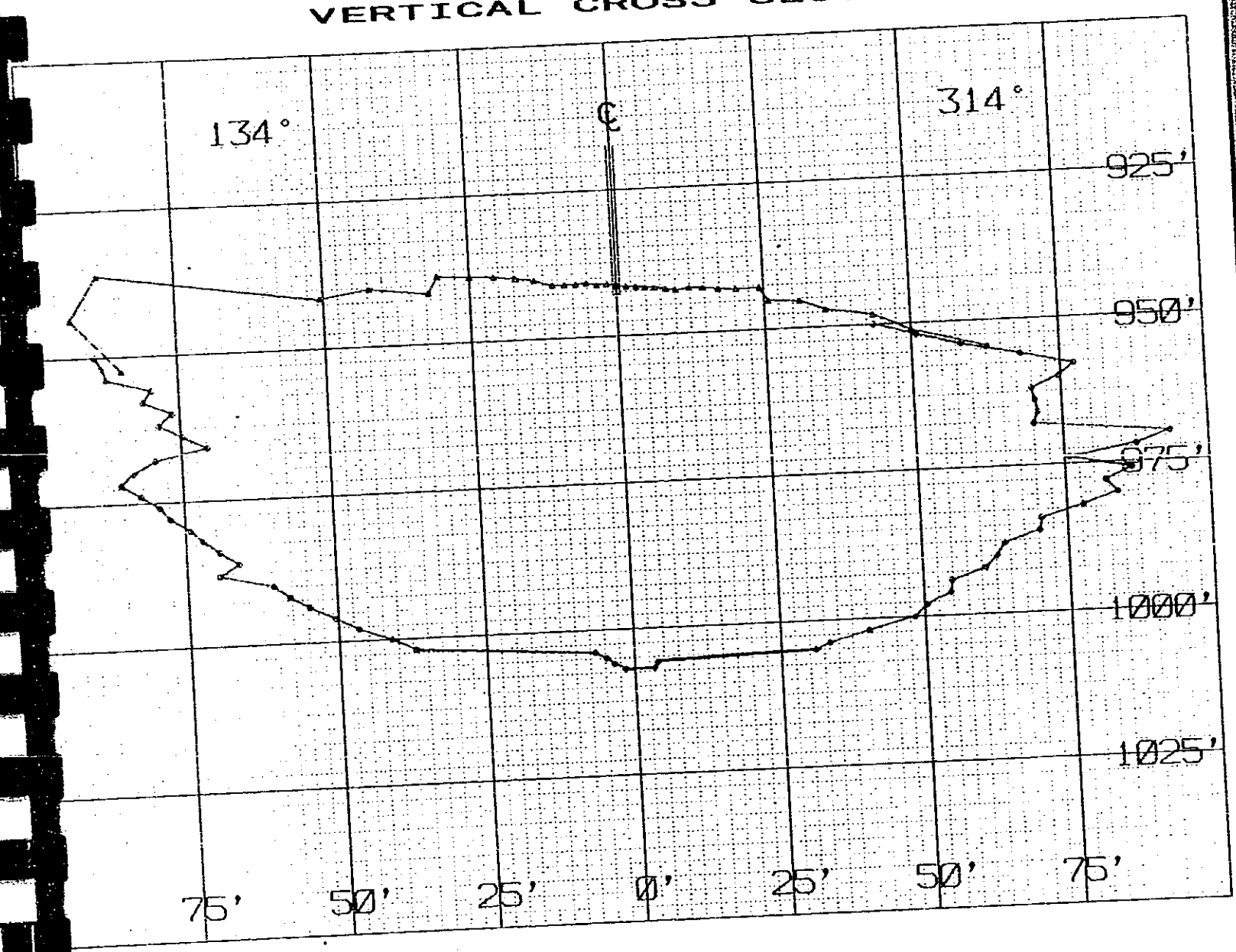

DIGITAL SURVEYS, INC.

03/18/92

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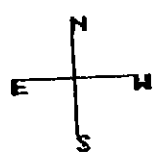

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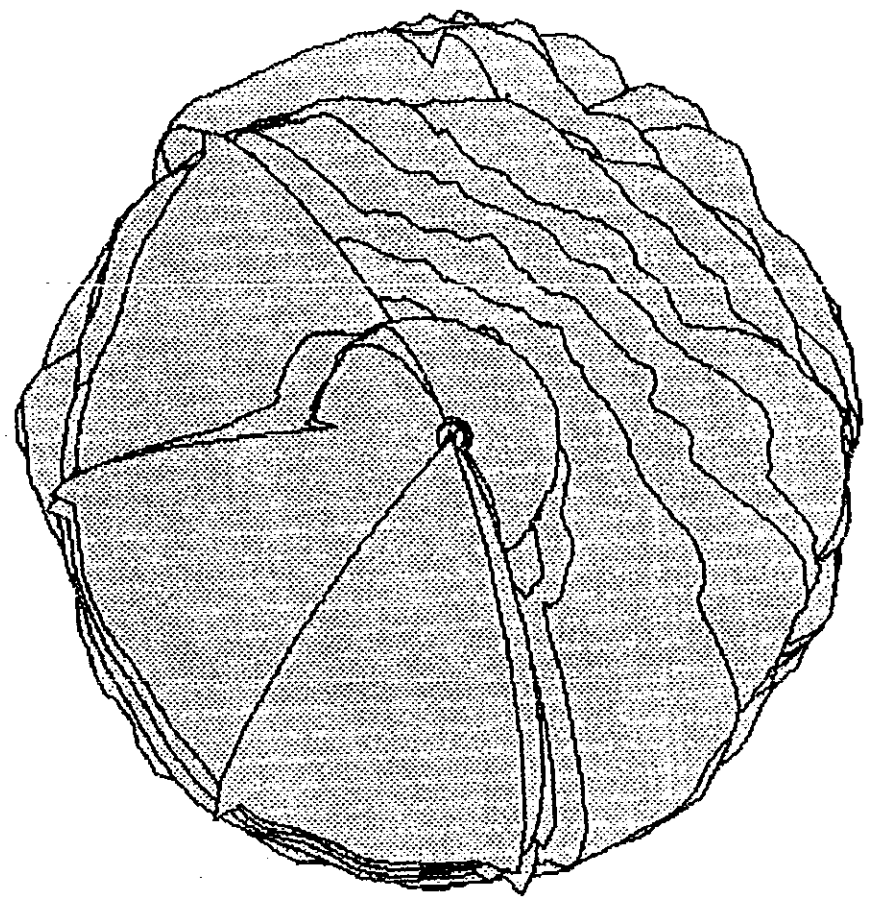

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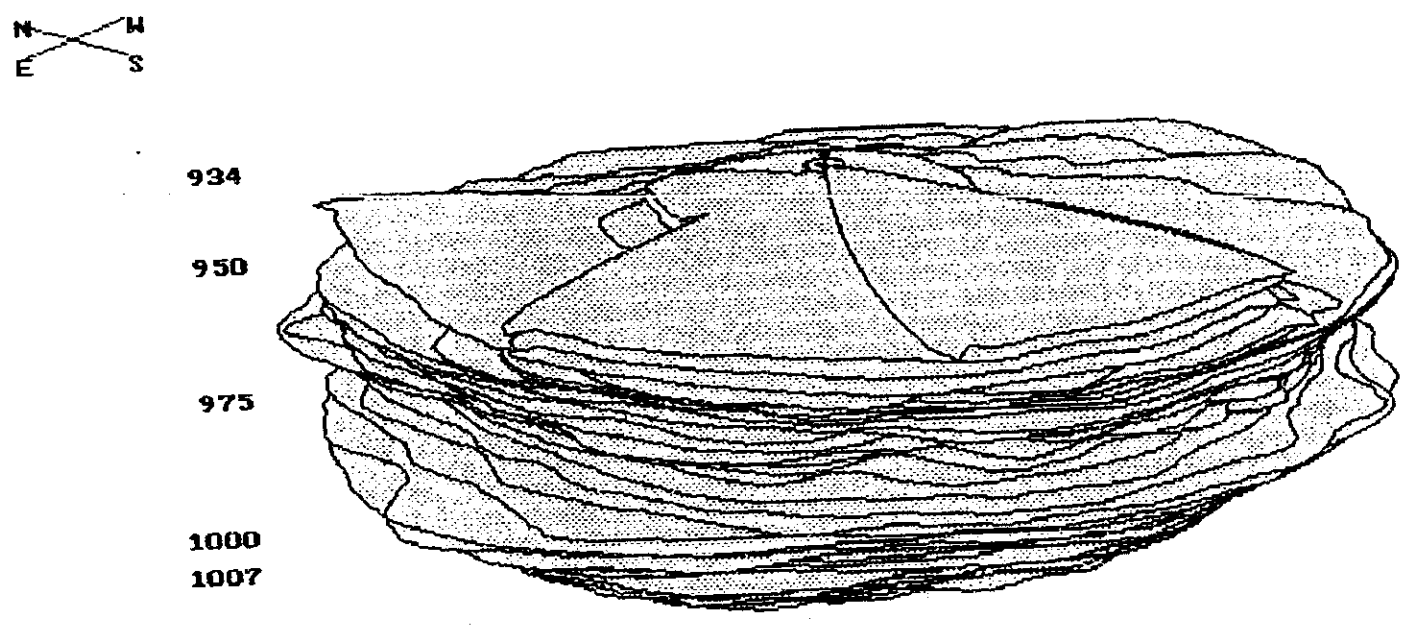

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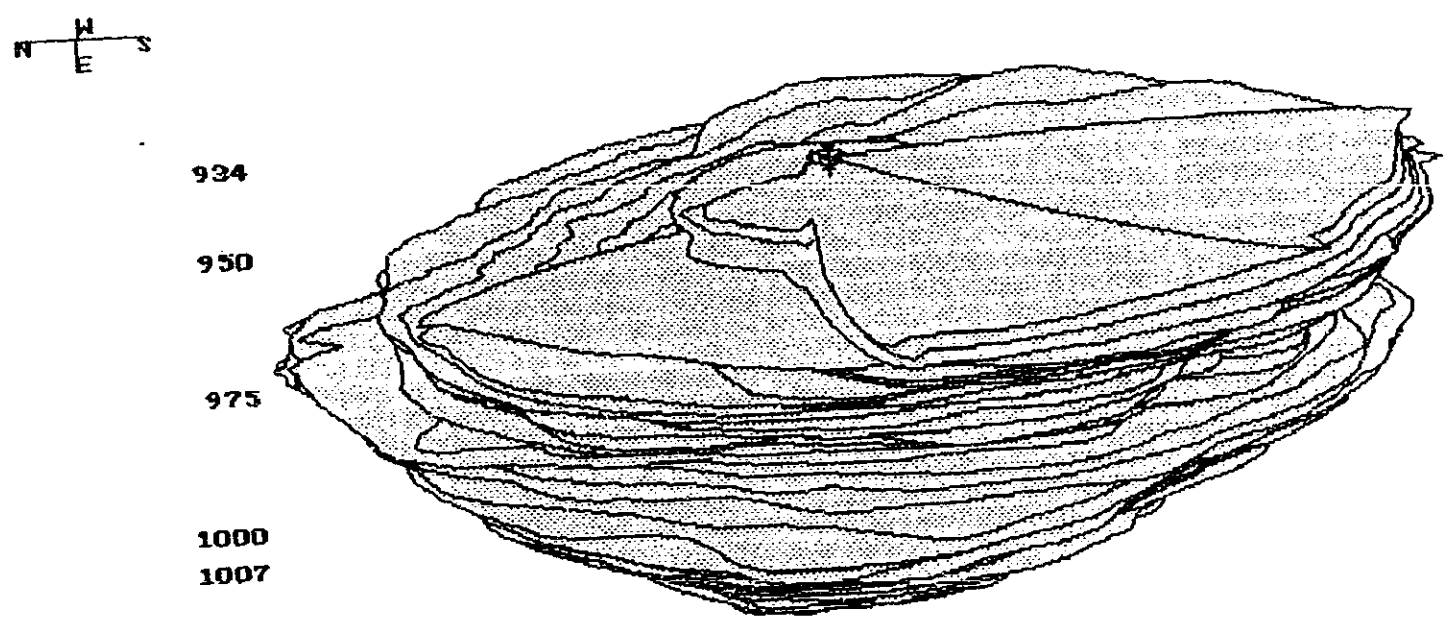

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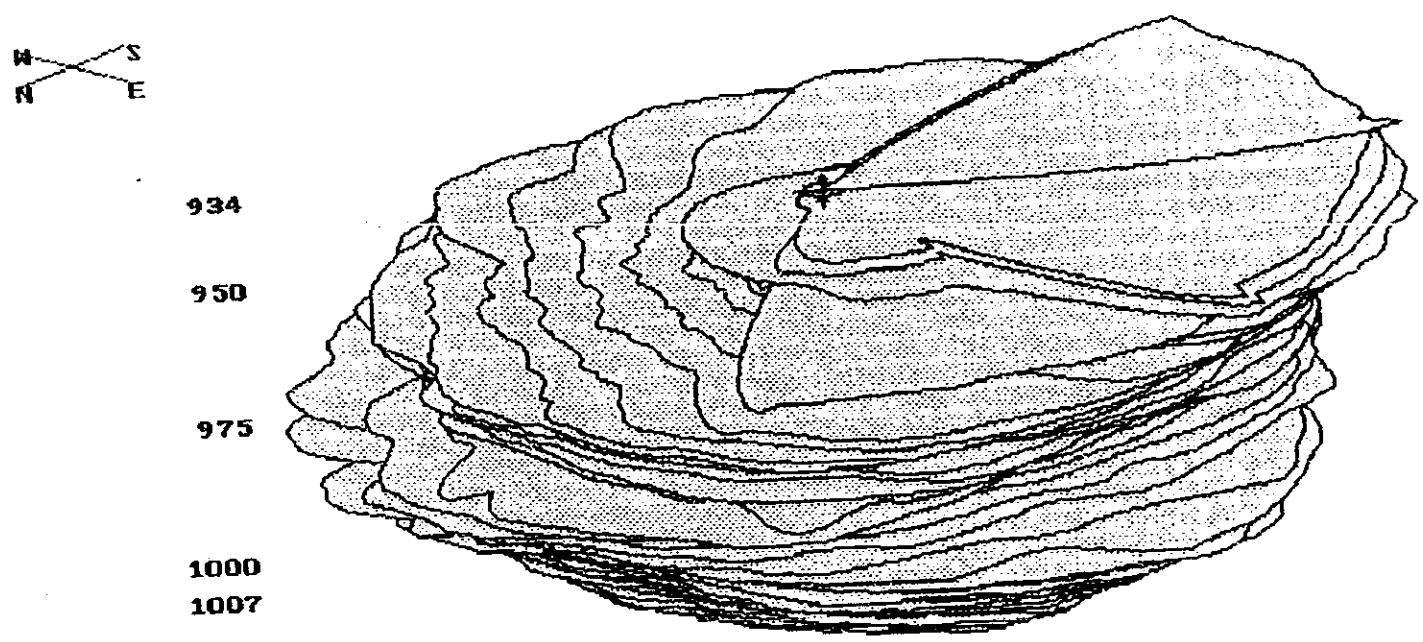

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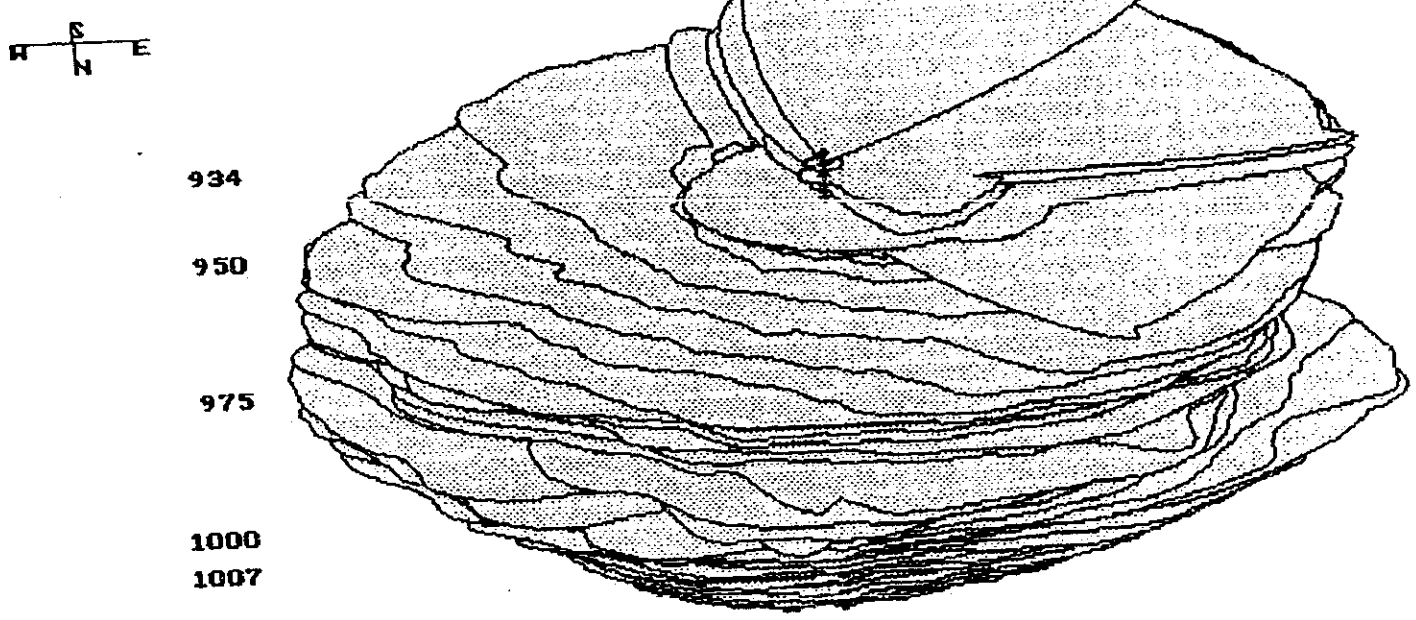

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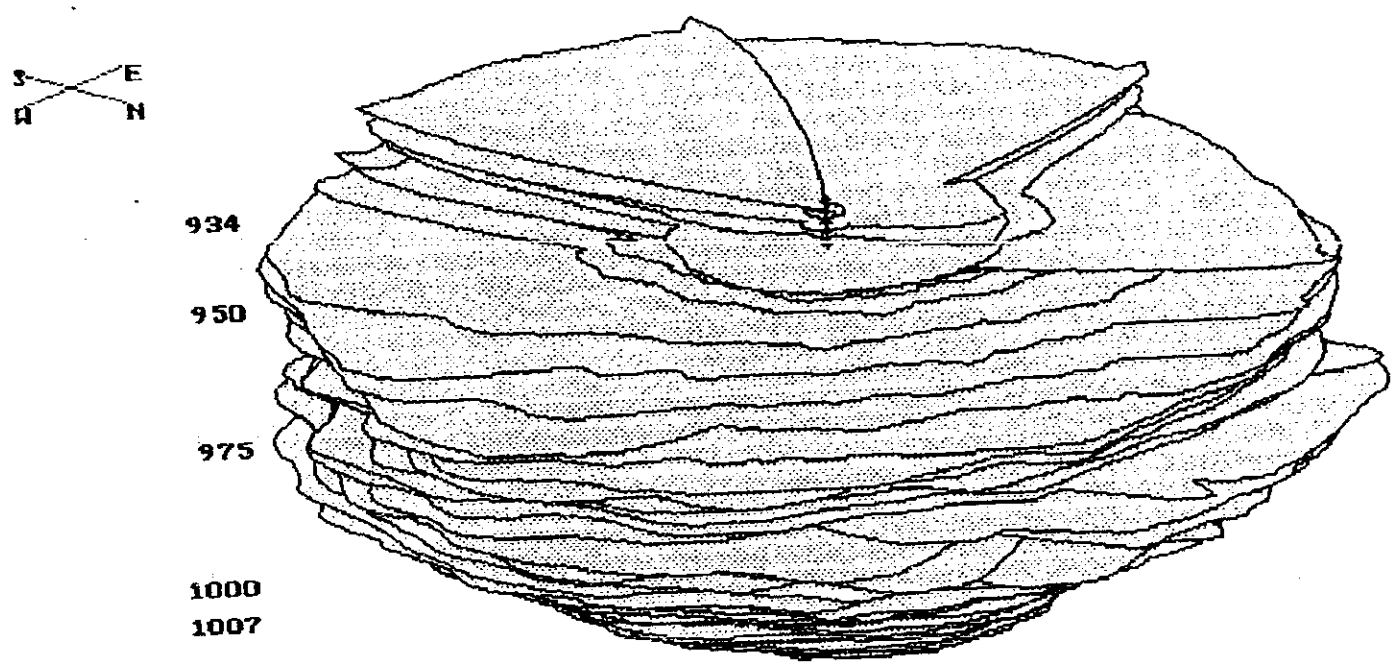

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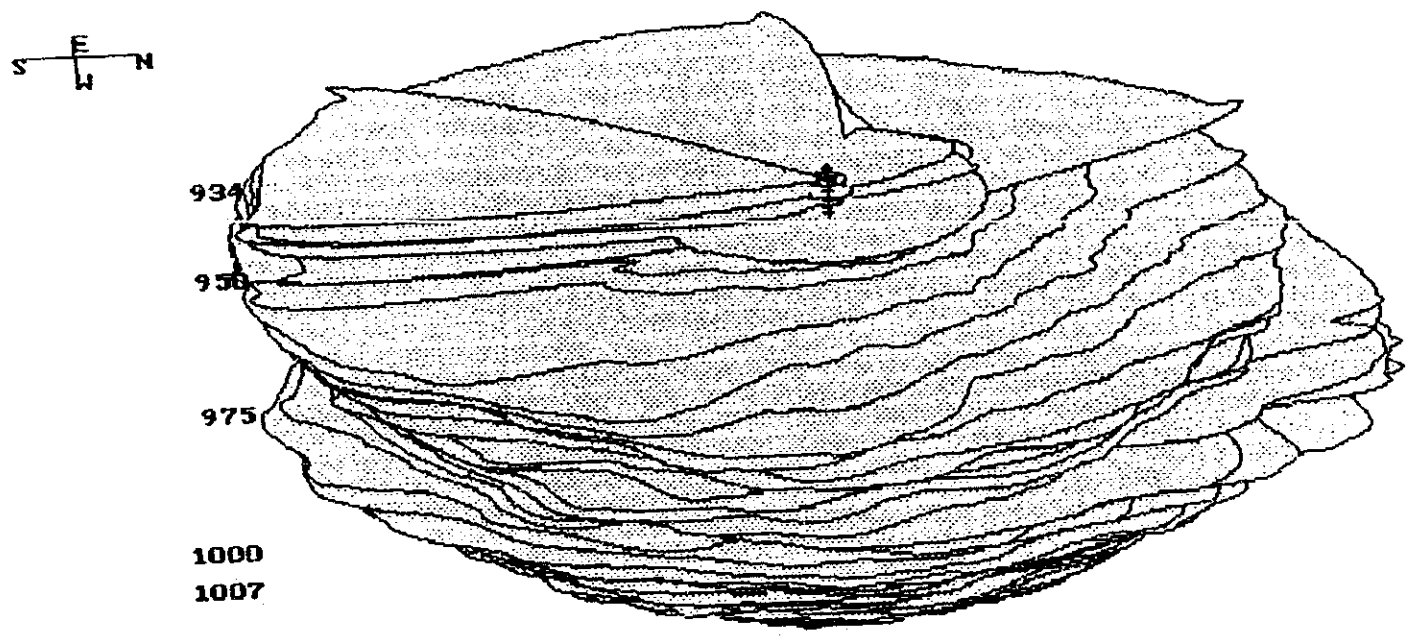

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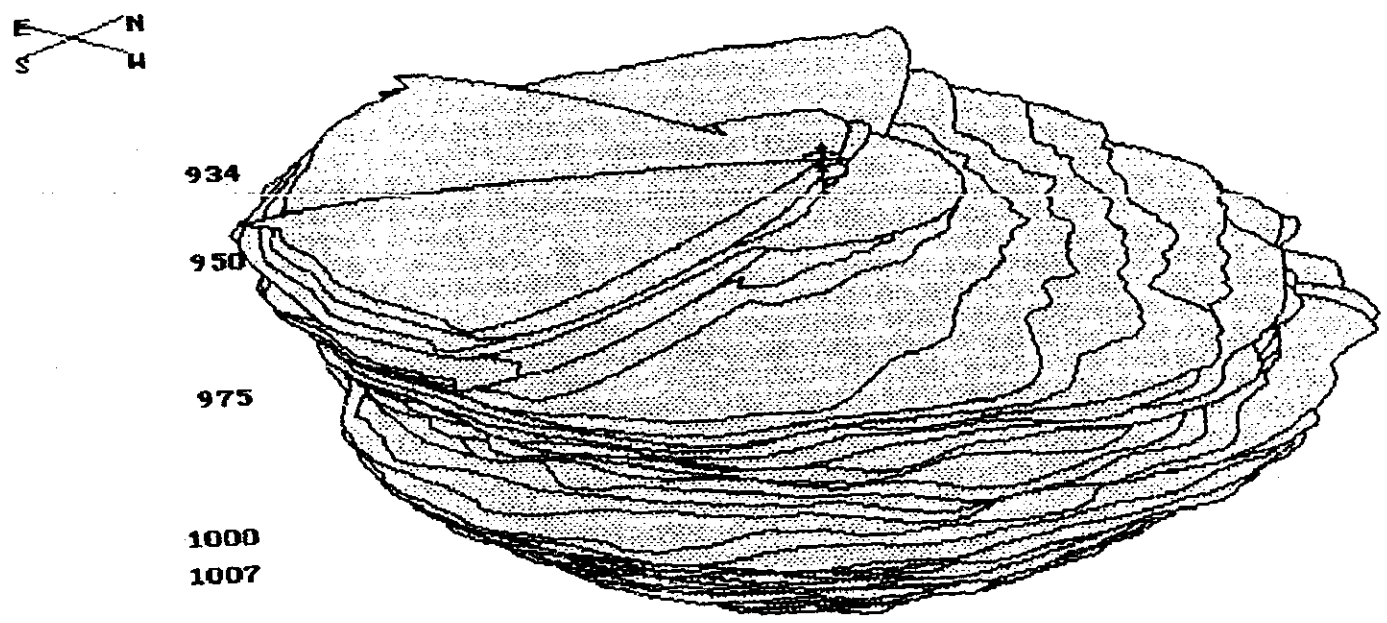

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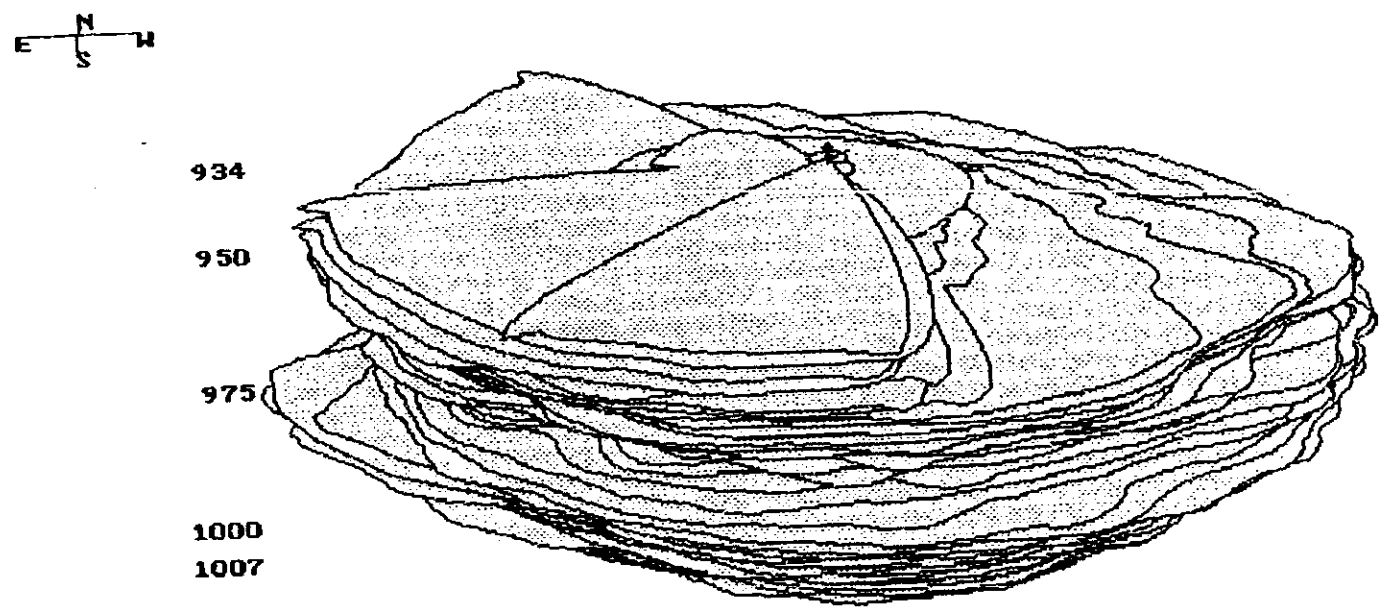

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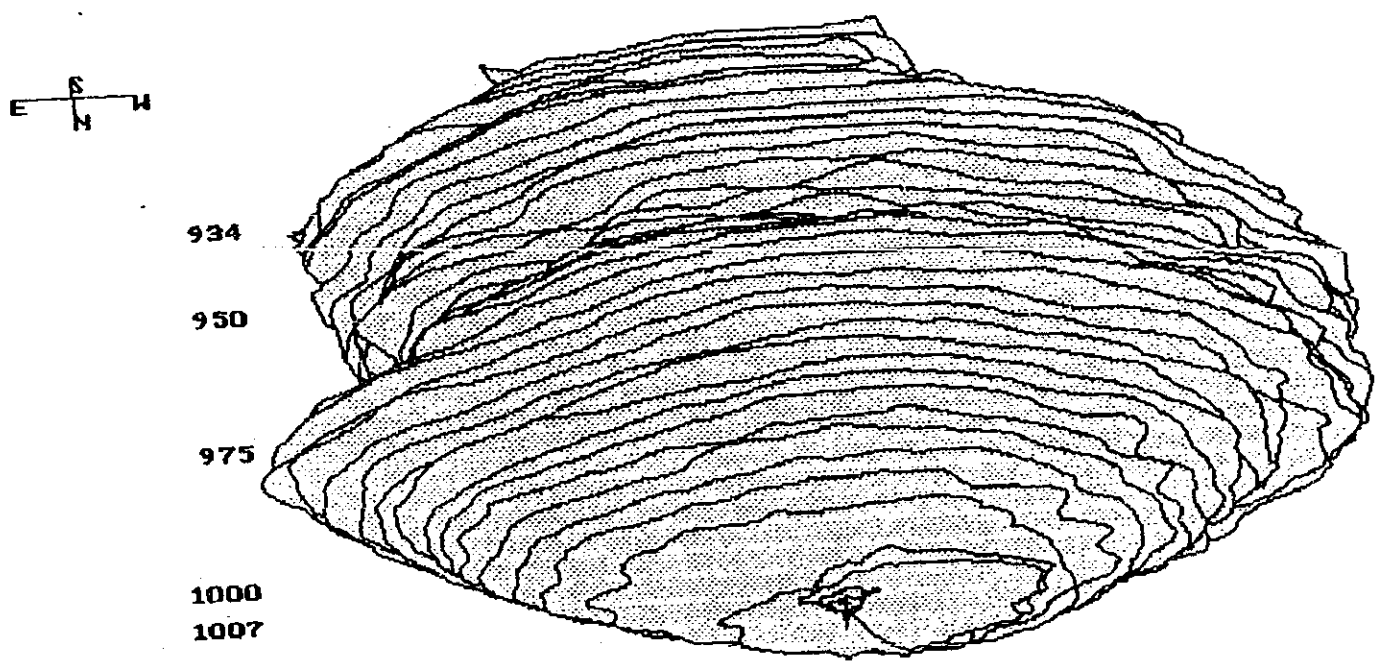

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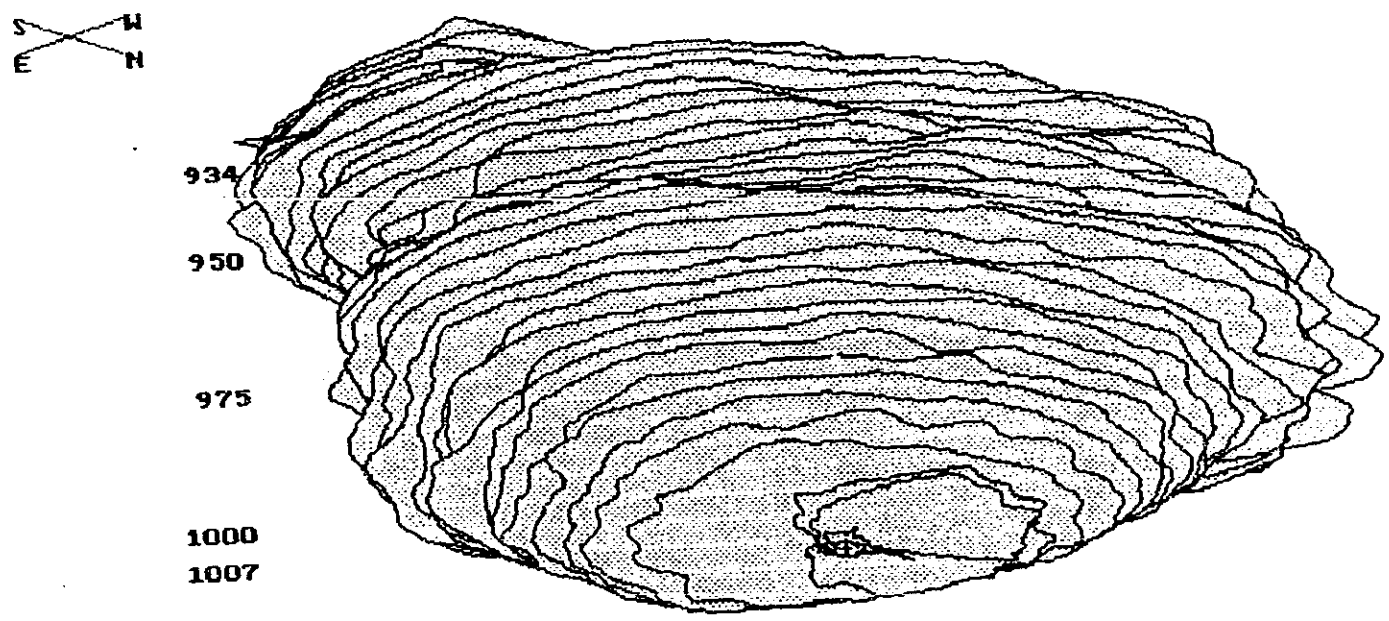

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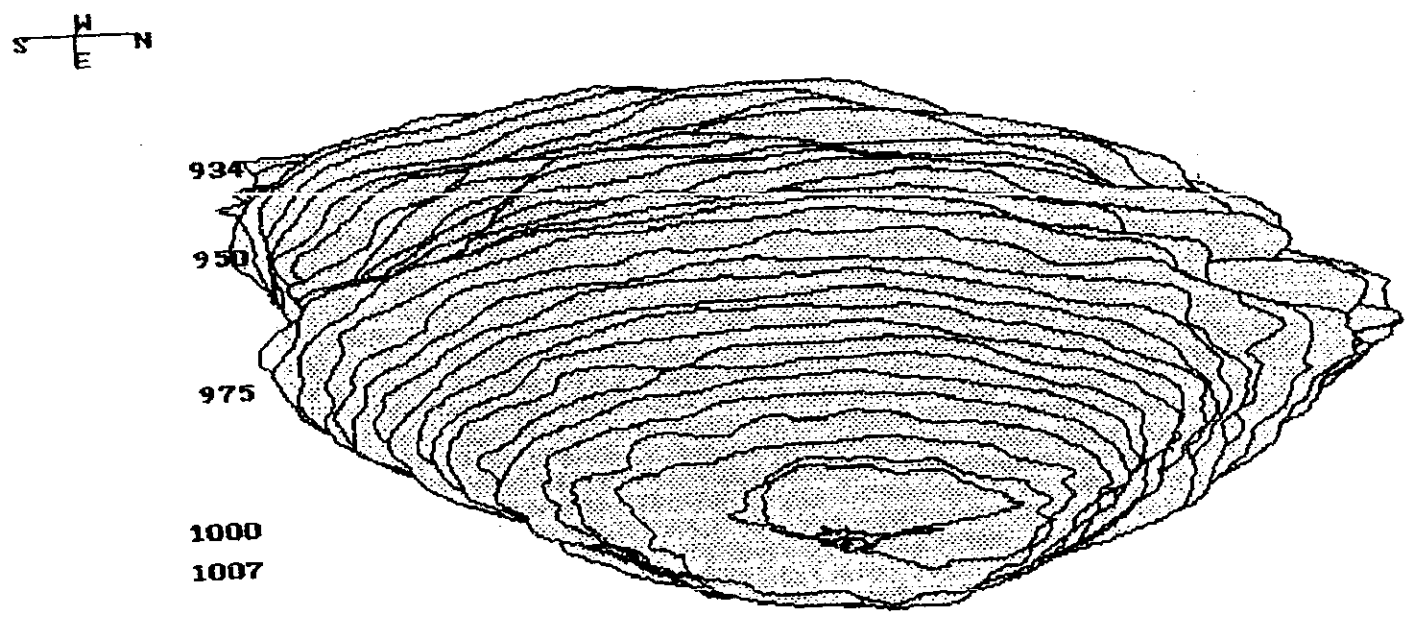

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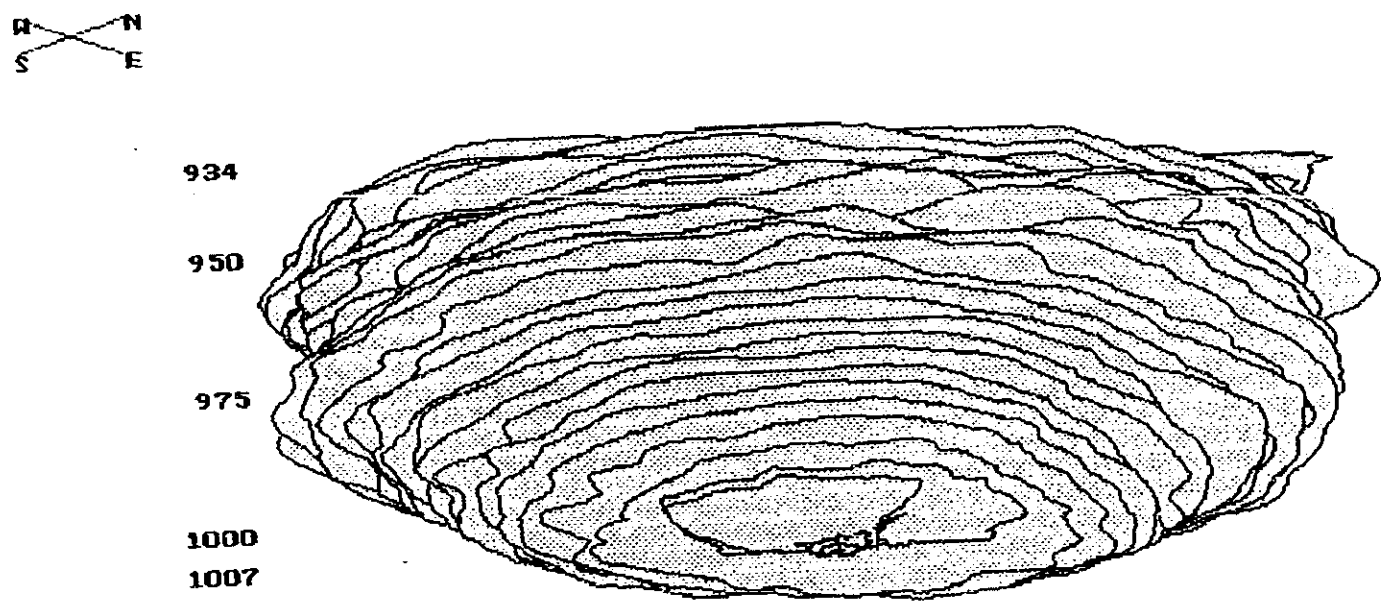

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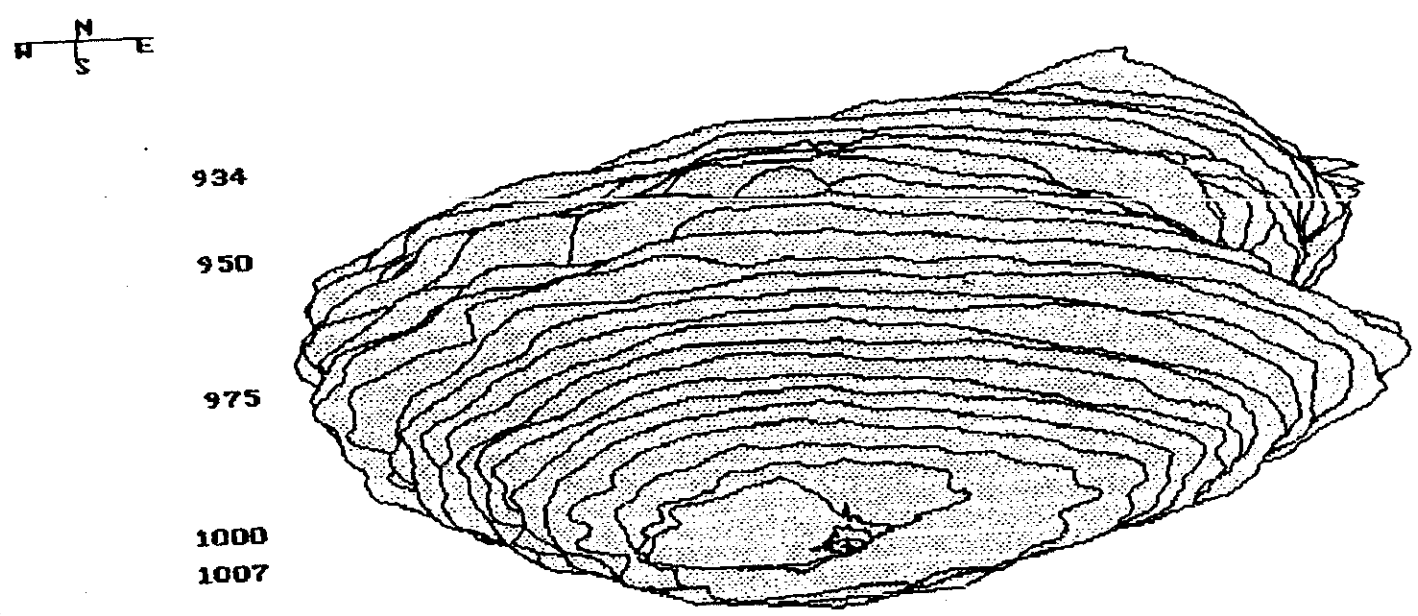

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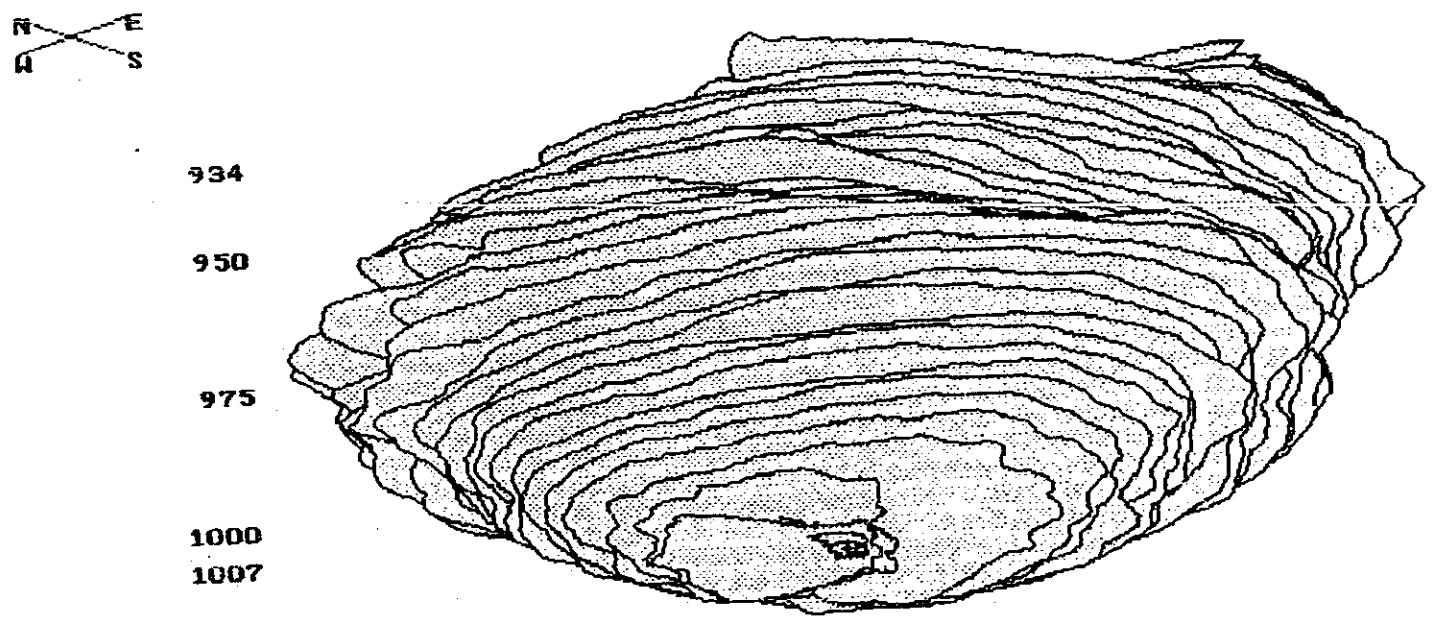

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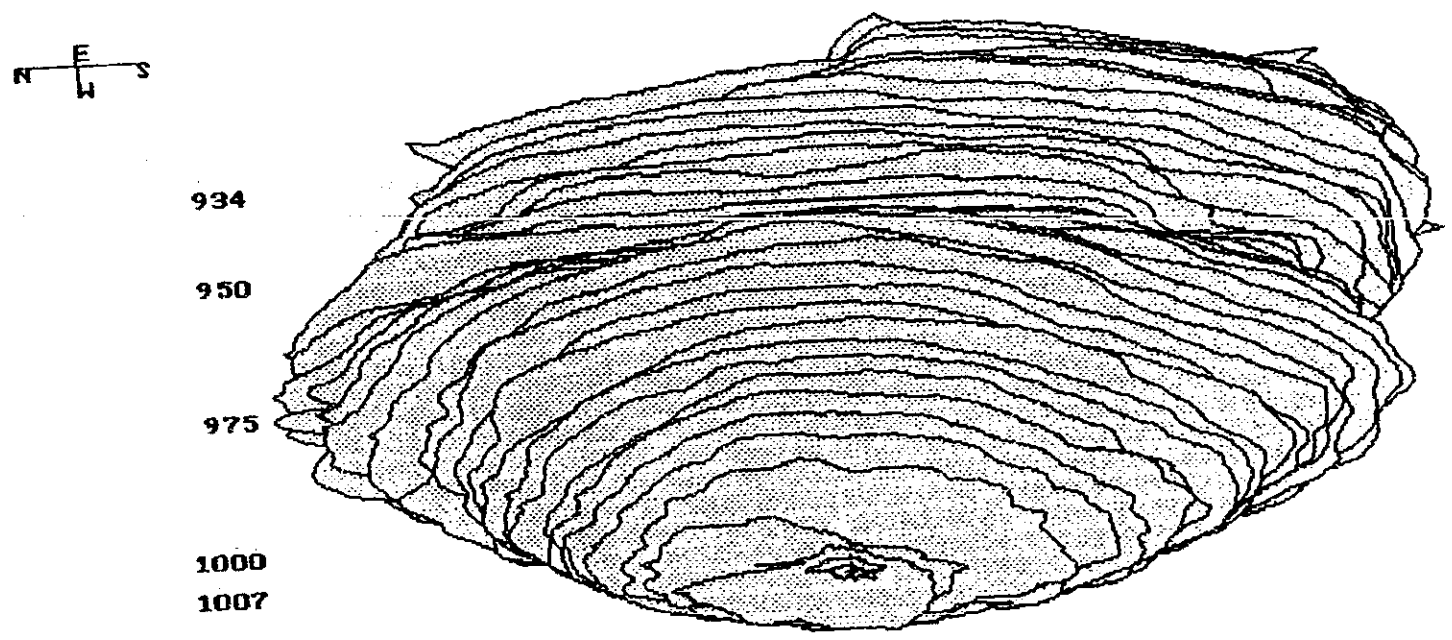

No. = 4

DIGITAL SURVEYS, INC.

03/18/92

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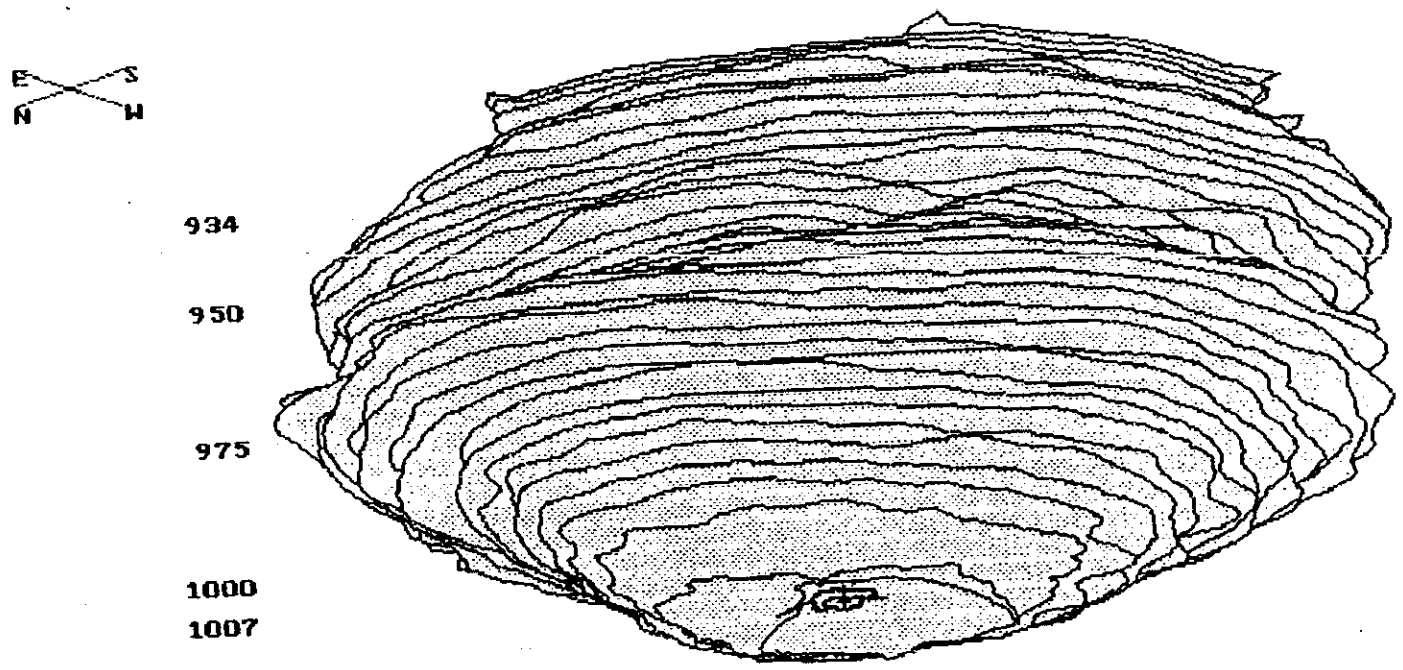
110



No. = 4

DIGITAL SURVEYS, INC.

03/18/92

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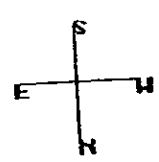
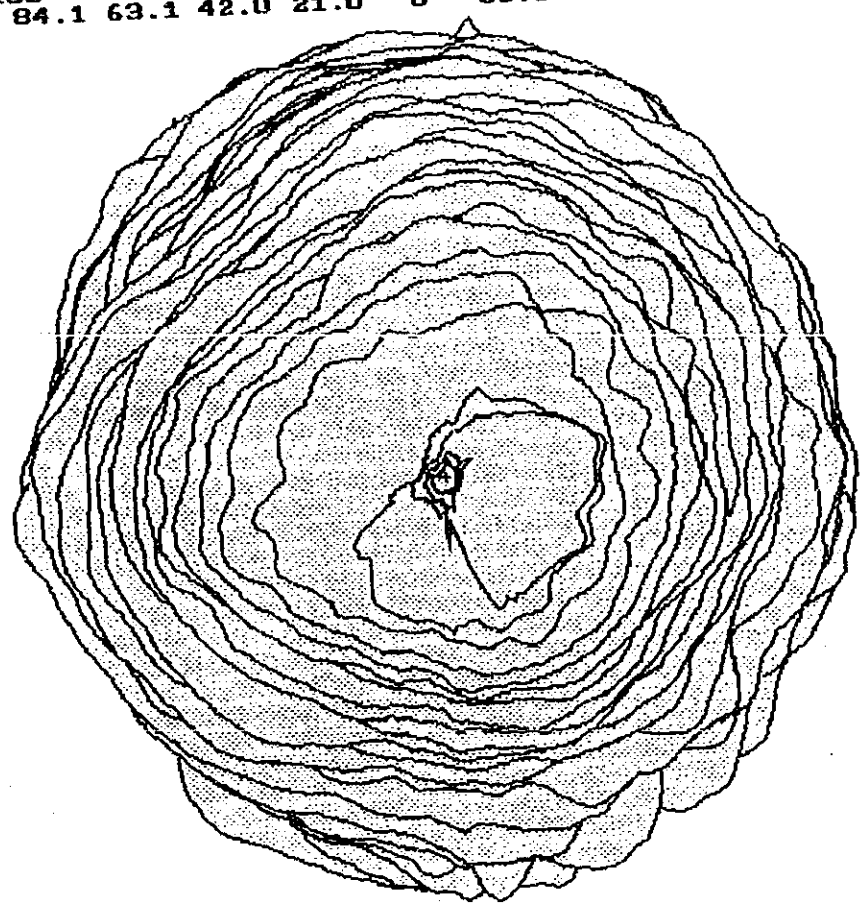


934



No. = 4

DOWELL

BUCKEYE GAS PRODUCTS COMPAN
WELL NO. 4
ASHMORE UGS TERMINAL
APRIL 14, 1980

SONAR CALIPER REPORT

DOWELL SONAR CALIPER SURVEY

TREATMENT NO: 11-42-499 JOB NO: 385

WELL DATA

T.D. DOWELL:	1002 FT	T.D. OPERATOR:	1004 FT
CASING SIZE:	9-5/8 IN	CASING DEPTH:	921 FT
INTERMEDIATE SIZE:	7 IN	INTER. DEPTH:	909 FT
TUBING SIZE:	4-1/2 IN	TUBING DEPTH:	OUT

BUCKEYE GAS PRODUCTS COMPANY
WELL NO. 4
ADAMANA UGS TERMINAL
APRIL 14,1980

62E

GENERAL COMMENTS:

ZERO AT THE BHF.

7 INCH PIPE PULLED FROM 942 FEET TO 909 FEET FOR SURVEY.

MAILING ADDRESS:

PO BOX 849
HOLBROOK, ARIZONA
86025
ATTENTION: MR. ARMANDO PADILLA

CUSTOMER REP:

MR. GREG GREER

DOWELL ENGINEER:

HL VAN METRE

DOWELL SONAR CALIPER SURVEY

BUCKEYE GAS PRODUCTS COMPANY

APRIL 14,1980

WELL NO. 4

ADAMANA UGS TERMINAL

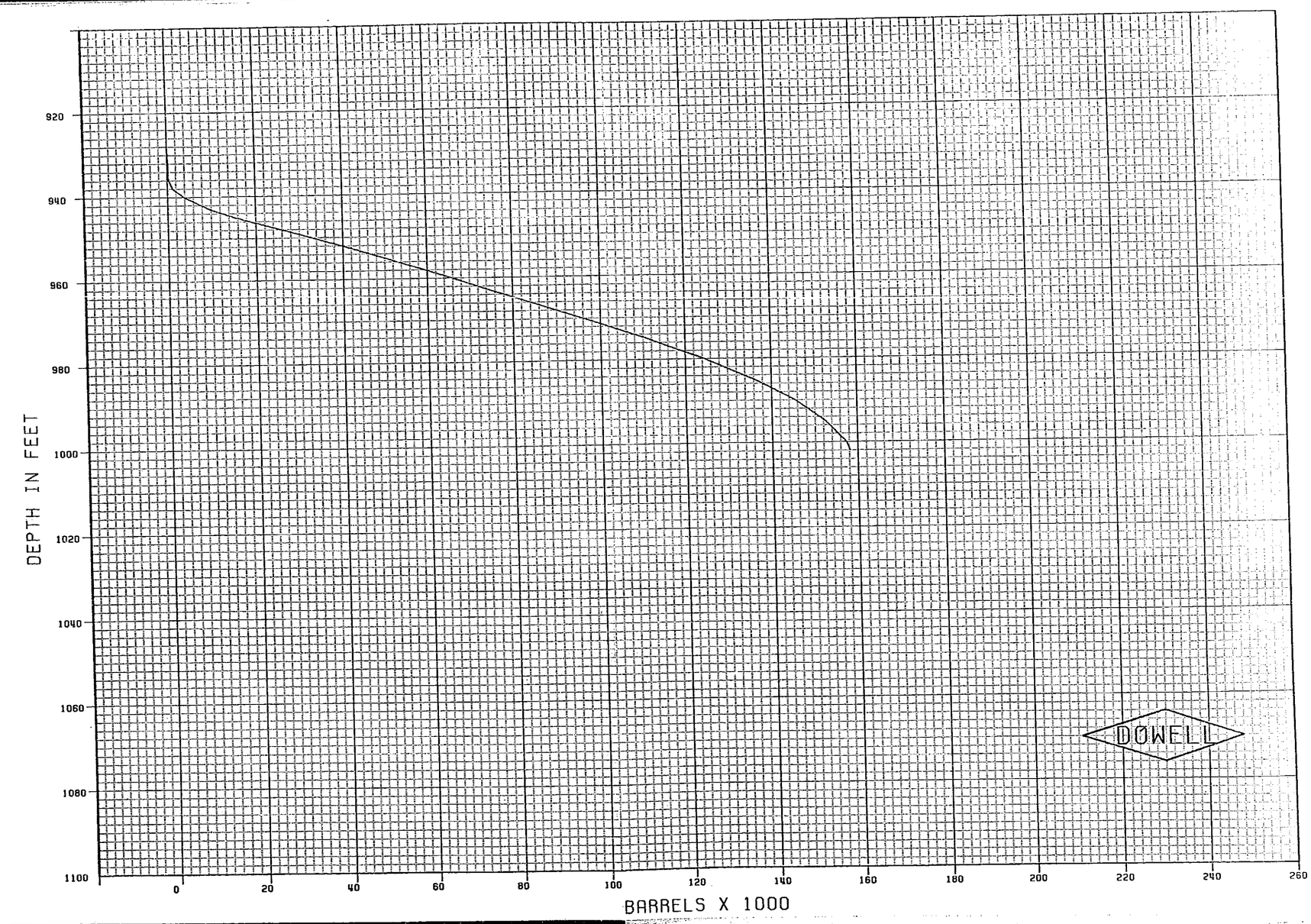
JOB NO: 385

VOLUME CALCULATIONS

DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
922	0.	0.	0.	0.
924	28.	28.	5.	5.
926	16.	44.	3.	8.
928	14.	58.	2.	10.
929	44.	102.	8.	18.
930	198.	299.	35.	53.
932	567.	867.	101.	154.
934	365.	1232.	65.	219.
935	64.	1296.	11.	231.
936	127.	1423.	23.	253.
938	5310.	6733.	946.	1199.
940	15146.	21879.	2698.	3897.
943	33384.	55263.	5946.	9843.
945	31091.	86354.	5538.	15380.
947	38614.	124967.	6877.	22258.
950	60580.	185548.	10790.	33047.
955	94726.	280273.	16871.	49919.
960	89981.	370255.	16026.	65945.
965	85160.	455414.	15168.	81113.
970	83492.	538906.	14871.	95983.
975	83617.	622523.	14893.	110876.
980	76402.	698924.	13608.	124484.
985	65088.	764012.	11593.	136076.
990	52715.	816727.	9389.	145465.
995	39630.	856357.	7058.	152524.
1000	27462.	883819.	4891.	157415.
1002	4653.	888472.	829.	158244.

DEPTH VS. VOLUME

ADAMANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980



Buckeye Gas Prod.)
Apache Cty 603

DOWELL SONAR CALIPER SURVEY

BUCKEYE GAS PRODUCTS COMPANY

APRIL 14,1980

WELL NO. 4

JOB NO: 385

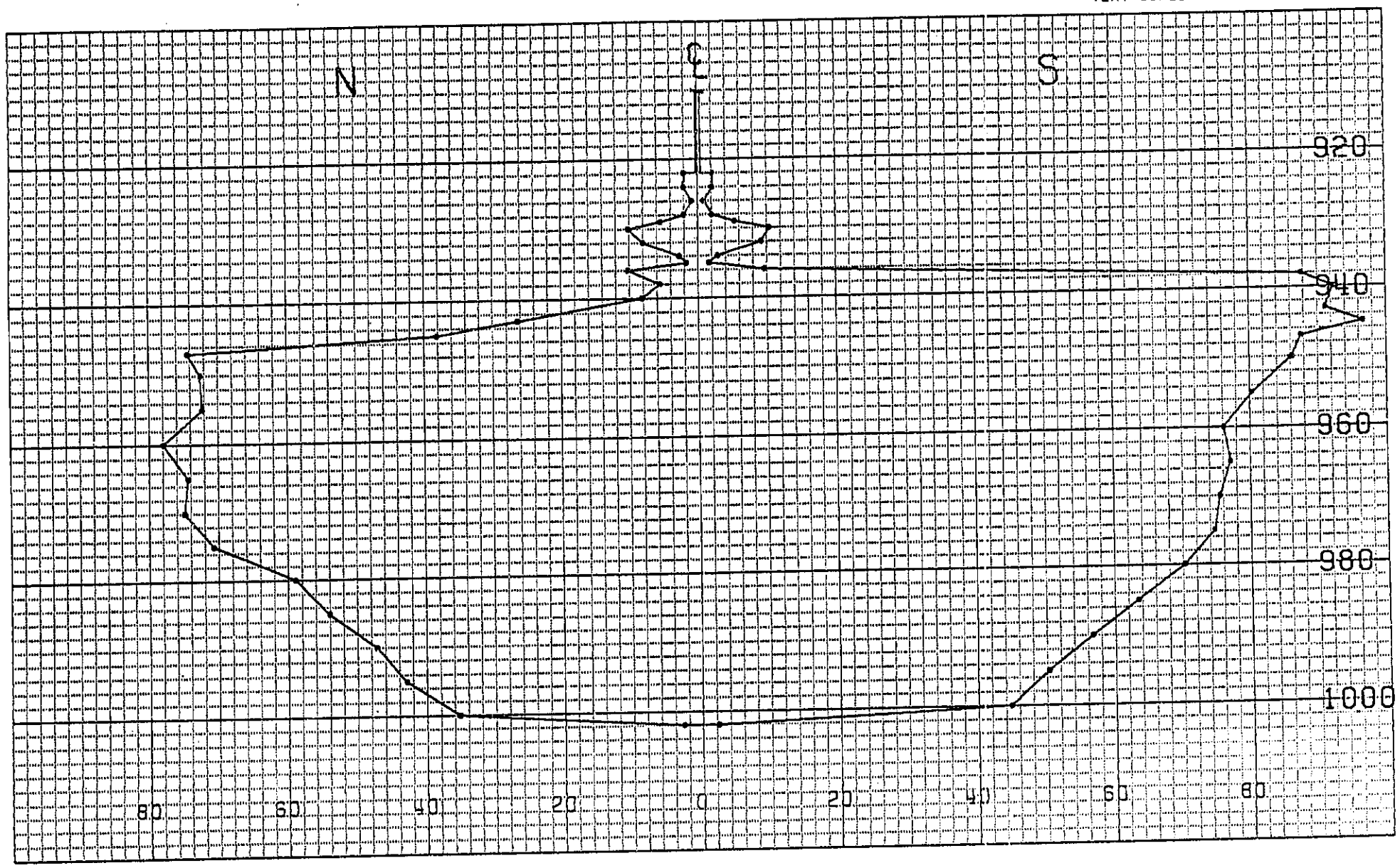
RADII IN FEET

DEPTH	ANGLE	N	S	E	W	NE	SW	SE	NW
922	90	2.0	2.2	2.1	2.2	2.0	2.2	2.2	2.1
924	90	2.1	2.1	2.1	2.3	2.0	2.3	2.2	2.1
926	90	0.9	0.9	1.3	0.8	1.0	0.9	1.2	0.8
928	90	2.0	2.1	2.0	1.7	1.8	2.2	2.0	2.0
929	90	5.5	5.3	5.3	5.4	5.0	5.4	5.2	4.8
930	90	10.2	10.4	10.4	10.4	9.9	10.6	10.4	10.4
932	90	8.1	9.2	8.4	9.3	6.7	9.4	8.6	8.8
934	90	2.7	2.8	3.1	7.6	3.2	3.3	2.7	13.7
935	90	1.7	1.6	1.8	5.5	1.3	1.6	1.4	1.6
936	90	10.2	9.6	10.2	9.7	10.1	9.8	8.8	10.3
938	90	5.6	87.7	49.4	3.4	7.9	3.7	82.3	4.2
940	90	8.2	92.4	58.1	9.6	13.4	17.5	88.4	7.5
943	90	26.4	91.1	84.6	26.9	39.9	82.9	85.8	19.7
945	90	38.2	96.6	81.9	76.7	77.8	87.0	88.5	34.4
947	90	74.4	87.6	86.3	76.9	82.6	86.2	88.7	71.3
950	90	72.6	86.2	74.0	81.2	81.2	84.8	78.9	72.4
955	90	72.3	80.4	76.4	79.6	80.4	81.6	74.0	74.9
960	90	78.0	76.1	64.1	76.0	77.8	76.4	70.0	77.3
965	90	74.4	77.1	66.2	71.6	72.0	80.1	70.2	70.5
970	90	74.9	75.5	65.9	75.9	76.8	81.7	66.9	71.8
975	90	70.7	74.7	65.0	79.7	72.7	80.0	64.0	74.8
980	90	58.9	70.3	68.6	71.4	64.3	73.1	65.2	64.1
985	90	54.1	63.4	75.8	65.0	54.0	67.0	57.9	57.4
990	90	47.2	56.7	61.7	56.4	45.8	59.9	51.0	49.6
995	90	43.0	50.3	52.3	47.9	40.8	53.3	43.6	44.6
1000	90	35.2	44.8	42.4	40.5	36.1	23.8	37.6	40.0
1002	90	2.8	2.3	0.8	32.5	1.2	5.3	1.0	32.5

22-APR-80 12:44:37

BUCKEYE GAS PRODUCTS COMPANY
ADAMANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980
HORZ SCALE: 1 IN. = 20 FEET
VERT SCALE: 1 IN. = 20 FEET

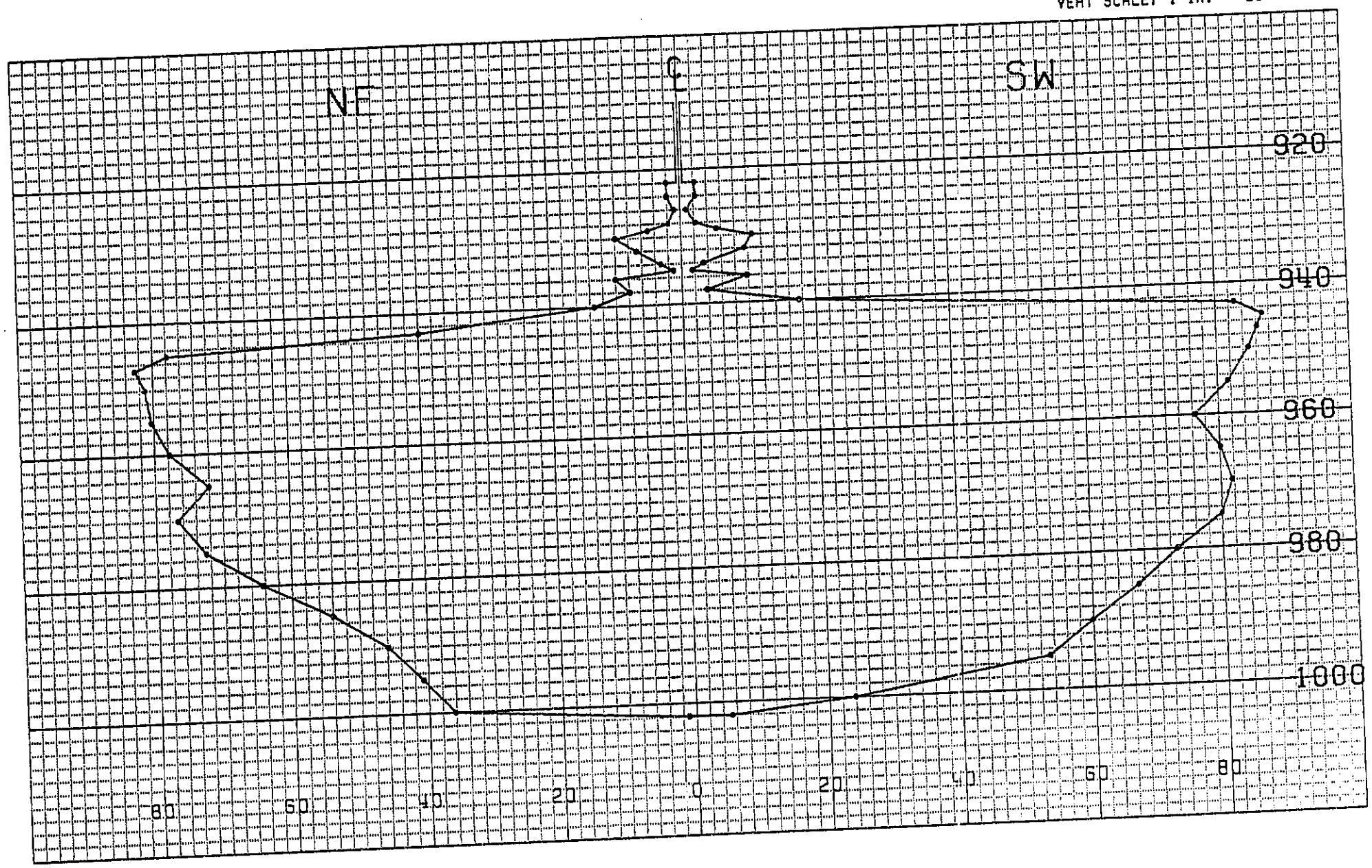
VERTICAL CROSS SECTION



22-APR-80 12:50:40

BUCKEYE GAS PRODUCTS COMPANY
ROAMANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980
HORZ SCALE: 1 IN. = 20 FEET
VERT SCALE: 1 IN. = 20 FEET

VERTICAL CROSS SECTION



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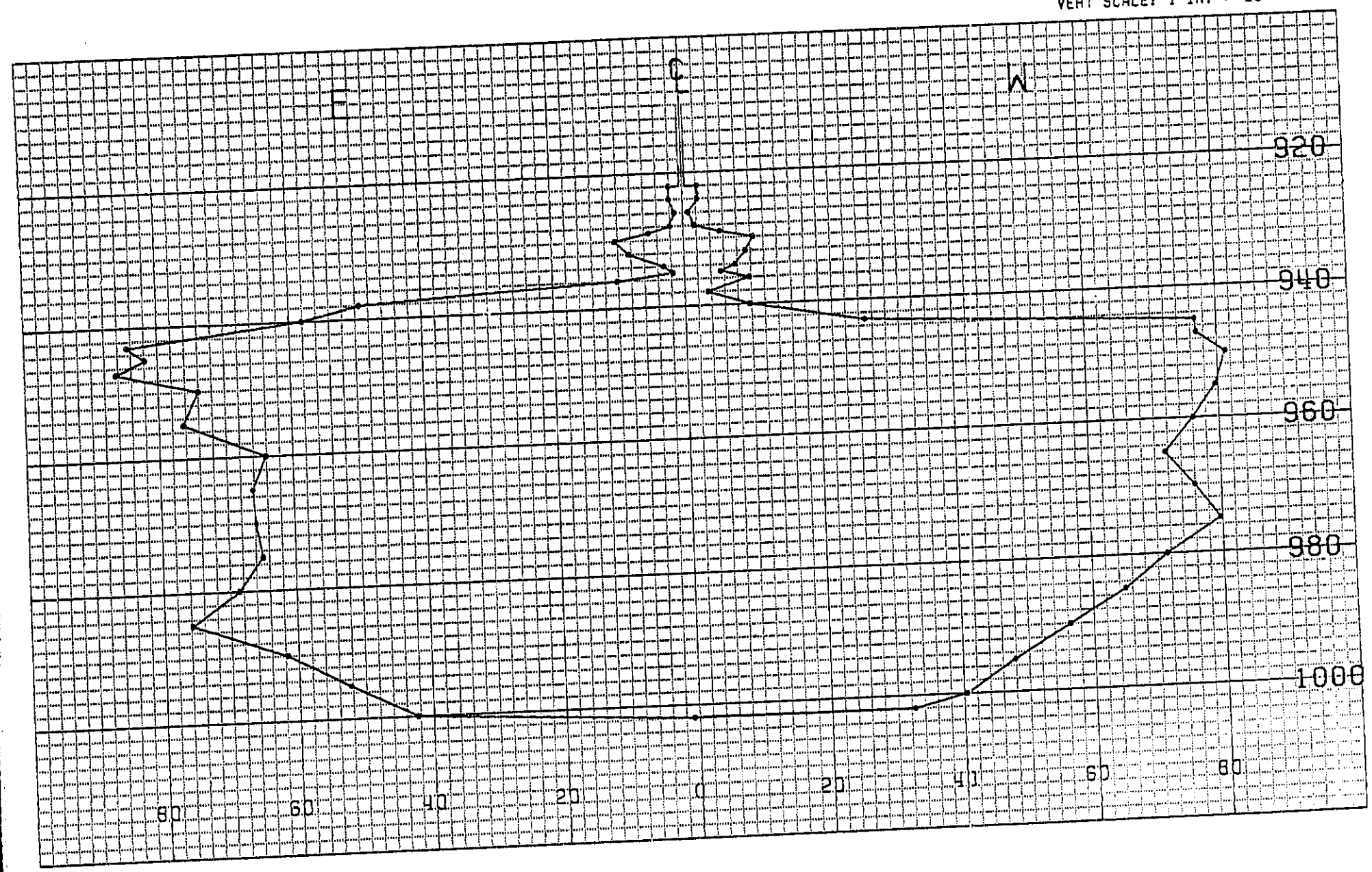
VERTICAL CROSS SECTION

BUCKEYE GAS PRODUCTS COMPANY
ADAMANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980
HORZ SCALE: 1 IN. = 20 FEET
VERT SCALE: 1 IN. = 20 FEET



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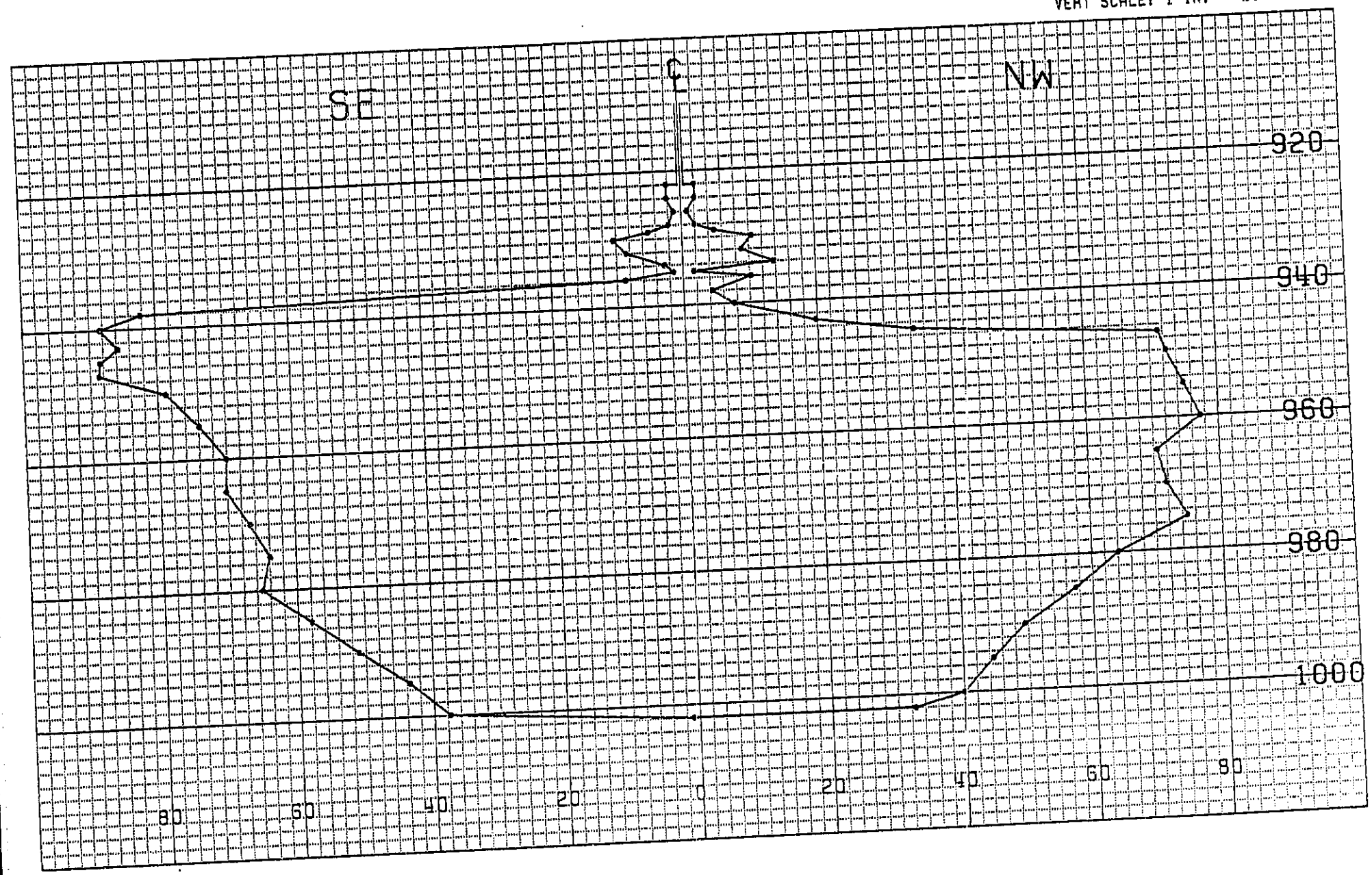
VERTICAL CROSS SECTION

BUCKEYE GAS PRODUCTS COMPANY
ADAMANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980
HORZ SCALE: 1 IN. = 20 FEET
VERT SCALE: 1 IN. = 20 FEET



MAX RADII REPORT

ROANANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980

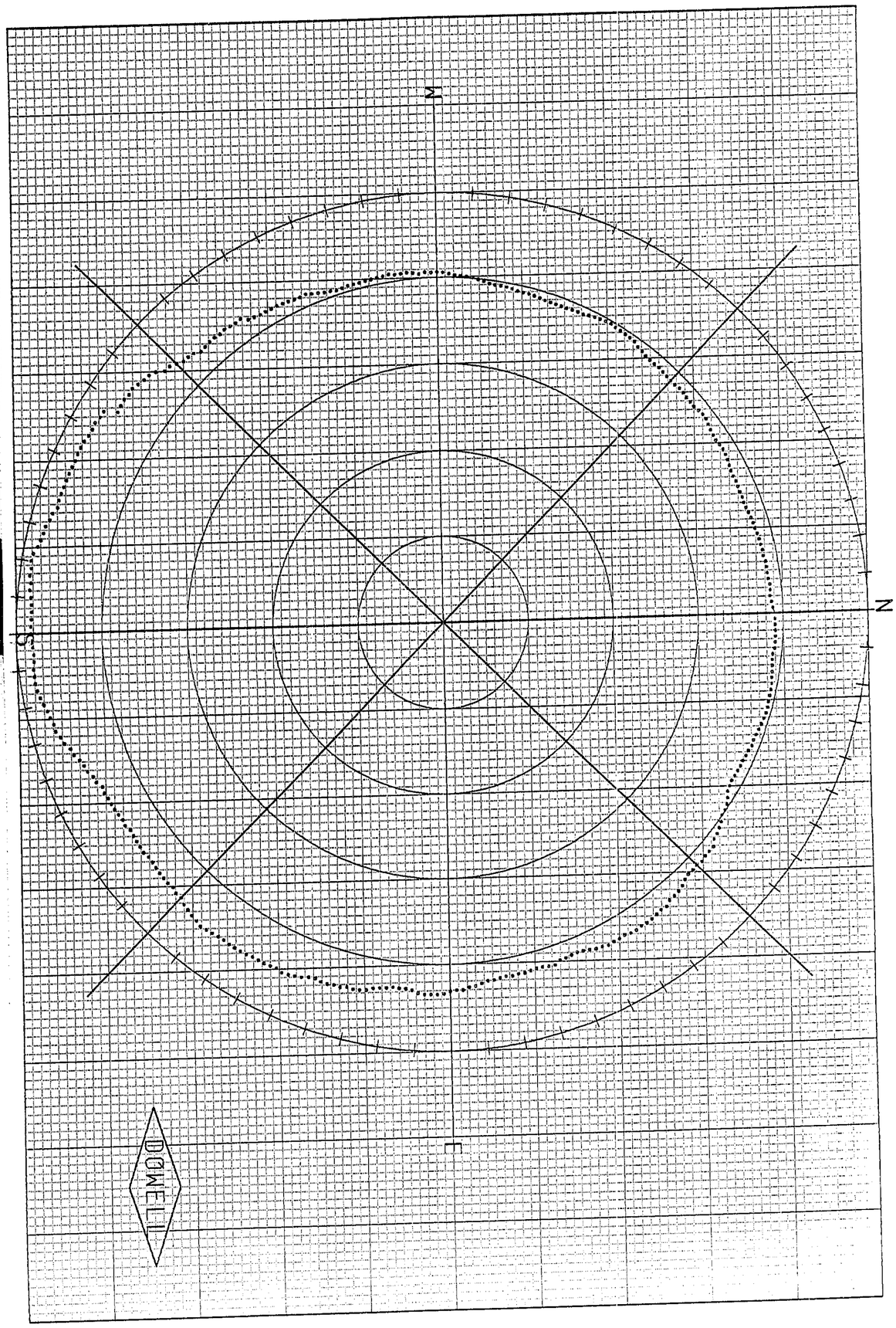
FROM DEPTH-920
THRU DEPTH-1010

AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH
0	78.0	960	45	82.6	947	90	86.3	947	135	88.7	947	180	96.6	945	225	87.0	945	270	81.2	950	315	77.3	960
1	78.2	960	46	82.8	947	91	86.8	947	136	88.8	947	181	96.7	945	226	86.3	945	271	81.2	950	316	77.4	960
2	78.1	960	47	82.8	947	92	87.0	947	137	88.3	947	182	96.5	945	227	86.2	945	272	80.9	950	317	77.6	960
3	78.2	960	48	83.1	947	93	86.9	947	138	88.5	940	183	96.5	945	228	85.9	945	273	80.6	950	318	77.5	960
4	78.3	960	49	83.8	947	94	87.0	947	139	88.4	940	184	96.7	945	229	85.1	950	274	80.4	950	319	77.2	960
5	78.3	960	50	84.2	947	95	86.9	947	140	88.4	940	185	96.9	945	230	85.3	950	275	80.3	950	320	77.2	960
6	78.2	960	51	84.3	947	96	86.2	947	141	88.2	940	186	97.3	945	231	85.4	950	276	80.2	950	321	77.2	960
7	78.0	960	52	84.4	947	97	86.0	947	142	88.0	940	187	97.3	945	232	85.4	950	277	79.9	950	322	77.5	960
8	78.0	960	53	85.1	947	98	86.1	947	143	88.0	940	188	97.7	945	233	85.2	950	278	79.6	950	323	77.7	960
9	78.1	960	54	84.9	947	99	86.0	947	144	88.3	940	189	97.5	945	234	85.4	950	279	79.2	975	324	77.7	960
10	78.3	960	55	85.1	947	100	86.4	947	145	88.1	940	190	97.8	945	235	85.3	950	280	79.0	975	325	77.3	960
11	78.4	960	56	85.3	947	101	86.7	947	146	88.0	940	191	97.6	945	236	85.1	950	281	79.0	975	326	77.0	960
12	78.7	960	57	85.3	947	102	87.0	947	147	88.0	940	192	96.8	945	237	85.2	950	282	79.0	975	327	76.8	960
13	78.8	960	58	85.2	947	103	87.7	947	148	87.8	940	193	96.5	945	238	84.1	950	283	78.8	975	328	76.6	960
14	78.8	960	59	85.4	947	104	88.0	947	149	88.2	940	194	96.2	945	239	83.8	950	284	78.5	975	329	76.8	960
15	78.8	960	60	85.3	947	105	88.1	947	150	88.0	940	195	96.1	945	240	83.4	950	285	78.4	975	330	76.9	960
16	79.0	960	61	84.9	947	106	88.0	947	151	88.3	940	196	95.5	945	241	83.4	945	286	78.5	975	331	76.8	960
17	78.9	960	62	85.1	947	107	88.5	947	152	88.4	940	197	95.2	945	242	83.3	947	287	78.4	975	332	76.7	960
18	78.8	960	63	85.0	947	108	88.4	947	153	88.5	940	198	94.6	940	243	83.4	947	288	78.3	975	333	76.4	960
19	78.7	960	64	85.2	947	109	88.6	947	154	88.5	940	199	94.8	940	244	83.2	947	289	78.1	975	334	76.1	960
20	78.6	960	65	84.8	947	110	88.6	947	155	88.7	940	200	94.8	940	245	83.0	947	290	78.1	975	335	76.1	960
21	78.3	960	66	84.6	947	111	88.2	947	156	88.5	945	201	94.8	940	246	82.8	947	291	78.1	975	336	76.2	960
22	78.2	960	67	84.1	947	112	88.5	947	157	89.3	945	202	94.7	940	247	82.7	947	292	78.1	975	337	76.0	960
23	78.3	960	68	83.8	947	113	89.1	947	158	89.5	945	203	94.7	940	248	82.8	947	293	78.1	975	338	75.9	960
24	77.9	960	69	83.6	947	114	89.5	947	159	90.2	945	204	94.6	940	249	82.3	947	294	78.2	975	339	76.0	960
25	77.9	960	70	83.6	943	115	89.8	947	160	90.5	945	205	94.5	940	250	82.0	947	295	78.4	975	340	75.9	960
26	77.7	960	71	83.8	943	116	90.0	947	161	91.1	945	206	94.6	940	251	81.6	947	296	78.3	975	341	75.9	960
27	77.7	960	72	83.9	943	117	89.5	947	162	91.9	945	207	94.7	940	252	81.4	950	297	78.7	960	342	76.1	960
28	77.6	960	73	84.5	943	118	89.7	947	163	92.2	945	208	94.5	940	253	81.0	955	298	78.9	960	343	76.3	960
29	77.6	960	74	84.4	943	119	89.9	947	164	93.2	945	209	94.3	940	254	81.2	955	299	79.1	960	344	76.4	960
30	77.5	960	75	84.1	943	120	89.8	947	165	93.6	945	210	94.2	940	255	81.4	955	300	79.3	960	345	76.4	960
31	77.7	947	76	84.0	943	121	89.8	947	166	94.3	945	211	94.4	940	256	81.3	955	301	79.4	960	346	76.6	960
32	78.0	950	77	84.2	943	122	90.0	947	167	94.4	945	212	94.0	940	257	81.3	955	302	79.2	960	347	76.8	960
33	78.8	947	78	84.3	943	123	90.1	947	168	94.8	945	213	94.0	940	258	81.3	950	303	79.2	960	348	76.7	960
34	79.4	947	79	84.2	943	124	90.1	947	169	95.1	945	214	91.1	945	259	81.4	950	304	79.0	960	349	76.9	960
35	79.8	947	80	84.4	943	125	90.2	947	170	95.6	945	215	91.3	945	260	81.5	950	305	79.0	960	350	76.9	960
36	79.9	947	81	84.2	943	126	90.0	947	171	96.1	945	216	91.5	945	261	81.6	950	306	78.9	960	351	77.2	960
37	80.7	947	82	84.3	943	127	90.1	947	172	96.4	945	217	91.2	945	262	81.8	950	307	78.3	960	352	77.1	960
38	81.1	947	83	84.6	947	128	90.3	947	173	96.6	945	218	91.5	945	263	81.5	950	308	78.0	960	353	77.1	960
39	81.6	947	84	84.6	947	129	90.5	947	174	96.6	945	219	90.9	945	264	81.5	950	309	77.7	960	354	77.1	960
40	81.8	947	85	85.0	947	130	90.7	947	175	96.6	945	220	90.4	945	265	81.6	950	310	77.6	960	355	77.4	960
41	82.8	947	86	85.4	947	131	90.3	947	176	96.3	945	221	90.2	945	266	81.4	950	311	77.6	960	356	77.3	960
42	82.7	947	87	85.6	947	132	90.1	947	177	96.2	945	222	89.5	945	267	81.0	950	312	77.7	960	357	77.1	960
43	82.8	947	88	86.1	947	133	89.7	947	178	96.3	945	223	88.1	945	268	81.4	950	313	77.6	960	358	77.4	960
44	83.0	947	89	86.1	947	134	89.5	947	179	96.2	945	224	87.9	945	269	81.2	950	314	77.4	960	359	77.7	960

Cornell Gas, Inc. (Buckeye Gas Prod.)
C-1484-R24E. Apache Cty 603

BUCKEYE GAS PRODUCTS COMPANY
ADAMANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980
SCALE: 1 IN. = 20 FEET

MAXIMUM RADII



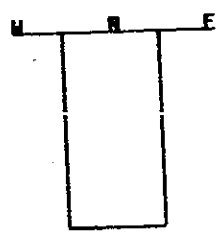
Dowell Gas, Inc. (Buckeye Gas Prod.)
Station-R24E, Apache Cty 603

CUSTOMER INFORMATION
ISOMETRIC VIEW

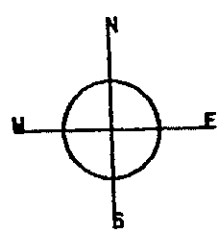
THE FOLLOWING PLOTS, WHICH WE CALL 'ISOMETRIC VIEWS', ARE A METHOD OF SHOWING A 3-DIMENSIONAL OBJECT ON 2-DIMENSIONAL PAPER. OUR GOAL IS TO ILLUSTRATE ON PAPER THE SAME SURVEY INFORMATION AND PERSPECTIVE THAT YOU WOULD GET FROM VIEWING ONE OF OUR PLASTIC MODELS.

TO DEMONSTRATE WHAT THE ISOMETRIC VIEW IS SHOWING, IMAGINE HOW YOU COULD PLOT A CYLINDER:

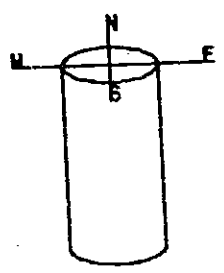
A VERTICAL CROSS SECTION (VIEWED FROM THE SOUTH) WOULD LOOK LIKE:



A TOP VIEW (WE CALL THEM 'PLAN VIEWS') WOULD LOOK LIKE:



IF YOU STOOD BACK AND VIEWED THE CYLINDER FROM ABOVE AND DOWNWARD, (FROM THE SOUTH), IT WOULD LOOK LIKE:



THIS IS AN 'ISOMETRIC VIEW'

THE ISOMETRIC VIEW OF THE CAVITY IS COMPUTER GENERATED FROM INTERPRETED SONAR SURVEY DATA. DOWELL USES AN INTERACTIVE GRAPHICS SYSTEM TO REVIEW AND PROCESS THE ISOMETRIC IMAGES, WHICH ARE THEN PLOTTED. THE DETAILS ABOUT THIS PRESENTATION THAT YOU SHOULD BE AWARE OF:

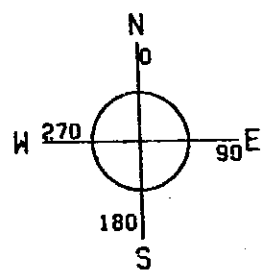
VIEW SELECTION - THE SONAR ENGINEER THAT PERFORMED THE SURVEY, WILL SELECT THE 'VIEWING ANGLE' TO BEST ILLUSTRATE THE FEATURES OF THE CAVITY. THE IMAGE CAN BE ROTATED AROUND THE CAVITY CENTER LINE, AS WELL AS VIEWED FROM NUMEROUS ANGLES.

DATA PRESENTED - TYPICALLY ALL OF THE "HORIZONTAL" SURVEY DATA ARE INCLUDED IN THE ISOMETRIC. THEY WILL APPEAR AS HORIZONTAL SLICES LIKE THE CYLINDER'S TOP OR BOTTOM.

SCALE - YOU CAN'T EASILY MEASURE THE ISOMETRIC VIEW FOR REAL DIMENSIONS, HOWEVER, THE RELATIVE SCALES USED ARE PRINTED IN THE UPPER LEFT HAND CORNER. ALSO, YOU MAY REFERENCE THE COMPASS CYLINDER WHICH APPEARS IN THE UPPER LEFT HAND CORNER. THIS CYLINDER IS 1 INCH LONG BY 1/2 INCH DIAMETER, SO YOU CAN GET A SENSE FOR REAL DIMENSION. IN SOME CASES WE WILL EXPAND OR COMPRESS THE SCALE (FOR EXAMPLE: HORZION EQUAL 150 FEET/INCH, VERTICAL EQUAL 50 FEET/INCH) TO BETTER ILLUSTRATE CAVITY FEATURES.

ORIENTATION - THE ORIENTATION OF THE ISOMETRIC VIEW (WITH REFERENCE TO MAGNETIC NORTH) IS SHOWN BY THE COMPASS CYLINDER AND THE VALUE OF "VIEWING AZIMUTH" IN THE UPPER LEFT-HAND CORNER.

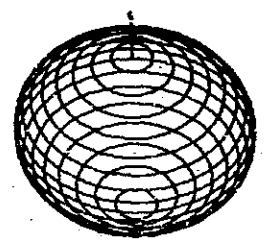
THE AZIMUTH VALUE IS THE COMPASS DEGREE AT THE FRONT OF THE ISOMETRIC IMAGE. THIS IS A TOP-VIEW REFERENCE FOR OUR NUMBERING SYSTEM:



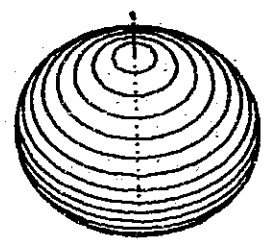
CENTER LINE - WE WILL SHOW THE PLUMB LINE OF THE SURVEY AS A SOLID CENTERLINE ABOVE THE CAVITY ISOMETRIC. INSIDE THE CAVITY, WE WILL MARK THE CENTERLINE OF EACH "HORIZONTAL" SECTION WITH A DOT.

HIDDEN LINES - WE HAVE REMOVED THE LINES OF THE ISOMETRIC THAT YOU COULD NOT SEE IF THE SECTIONS WERE MADE OF OPAQUE PLASTIC.

IF THE HIDDEN LINES OF A SPHERE WERE NOT REMOVED, IT WOULD BE CONFUSING:



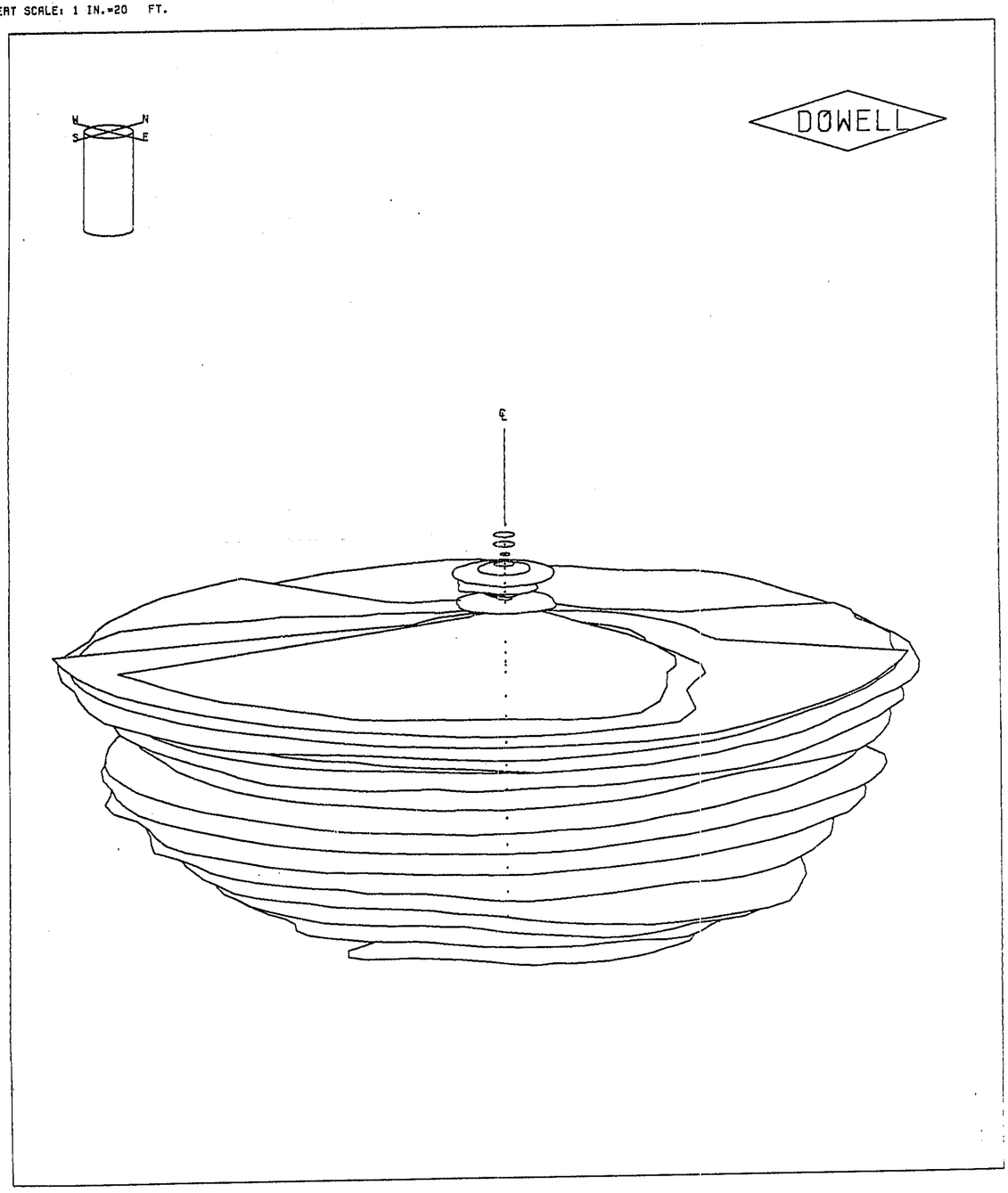
BUT WITH THE HIDDEN LINES REMOVED, IT BECOMES VISIBLE:



22-APR-80 12:32
FROM DEPTH: 920
THRU DEPTH: 1010
VIEWING AZIMUTH: 135
HORZ SCALE: 1 IN.=20 FT.
VERT SCALE: 1 IN.=20 FT.

ISOMETRIC VIEW

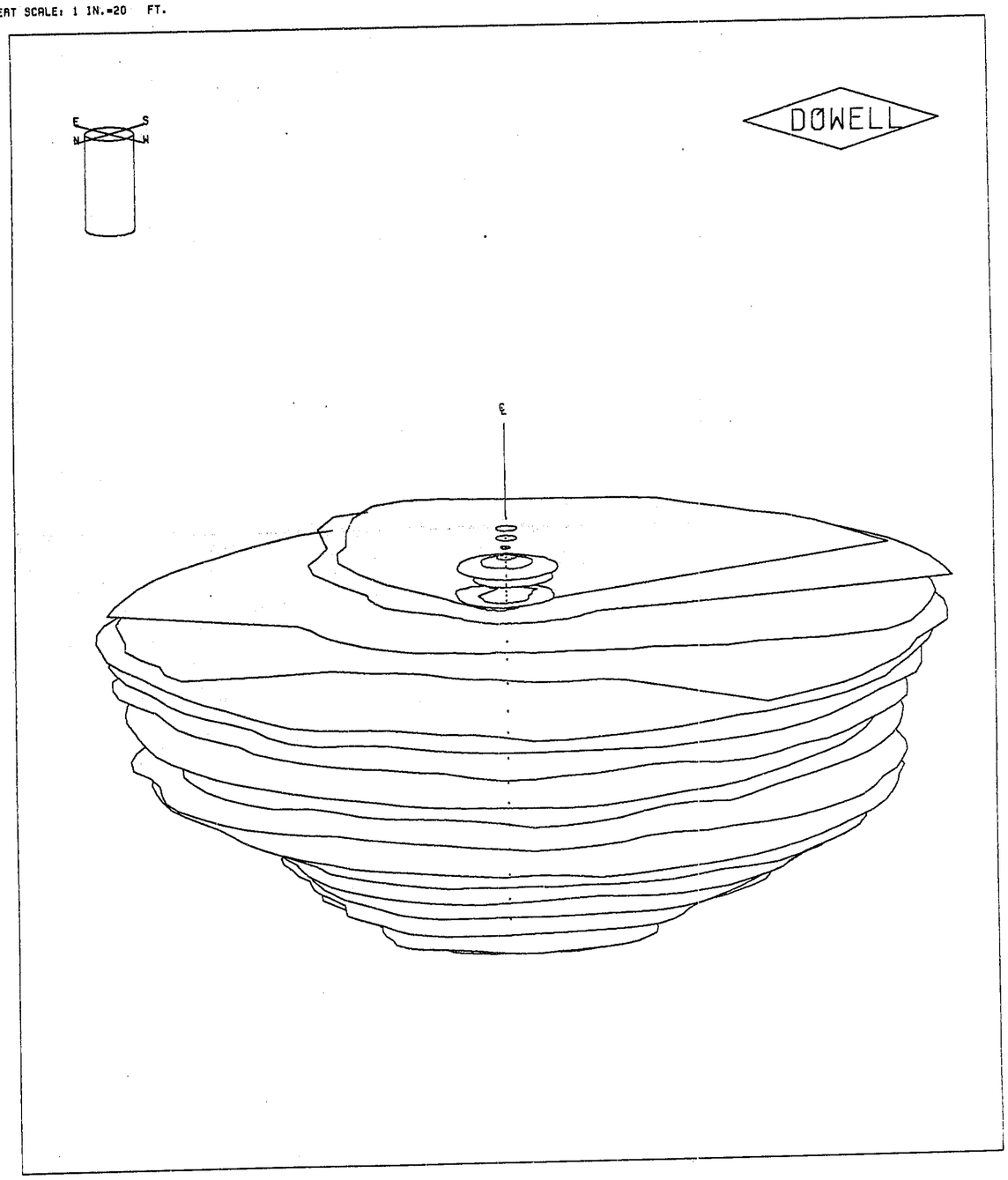
BUCKEYE GAS PRODUCTS COMPANY
ADAMANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980



22-APR-80 12:35
FROM DEPTH: 920
THRU DEPTH: 1010
VIEWING AZIMUTH: 315
HORZ SCALE: 1 IN.=20 FT.
VERT SCALE: 1 IN.=20 FT.

ISOMETRIC VIEW

BUCKEYE GAS PRODUCTS COMPANY
ADAMANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980

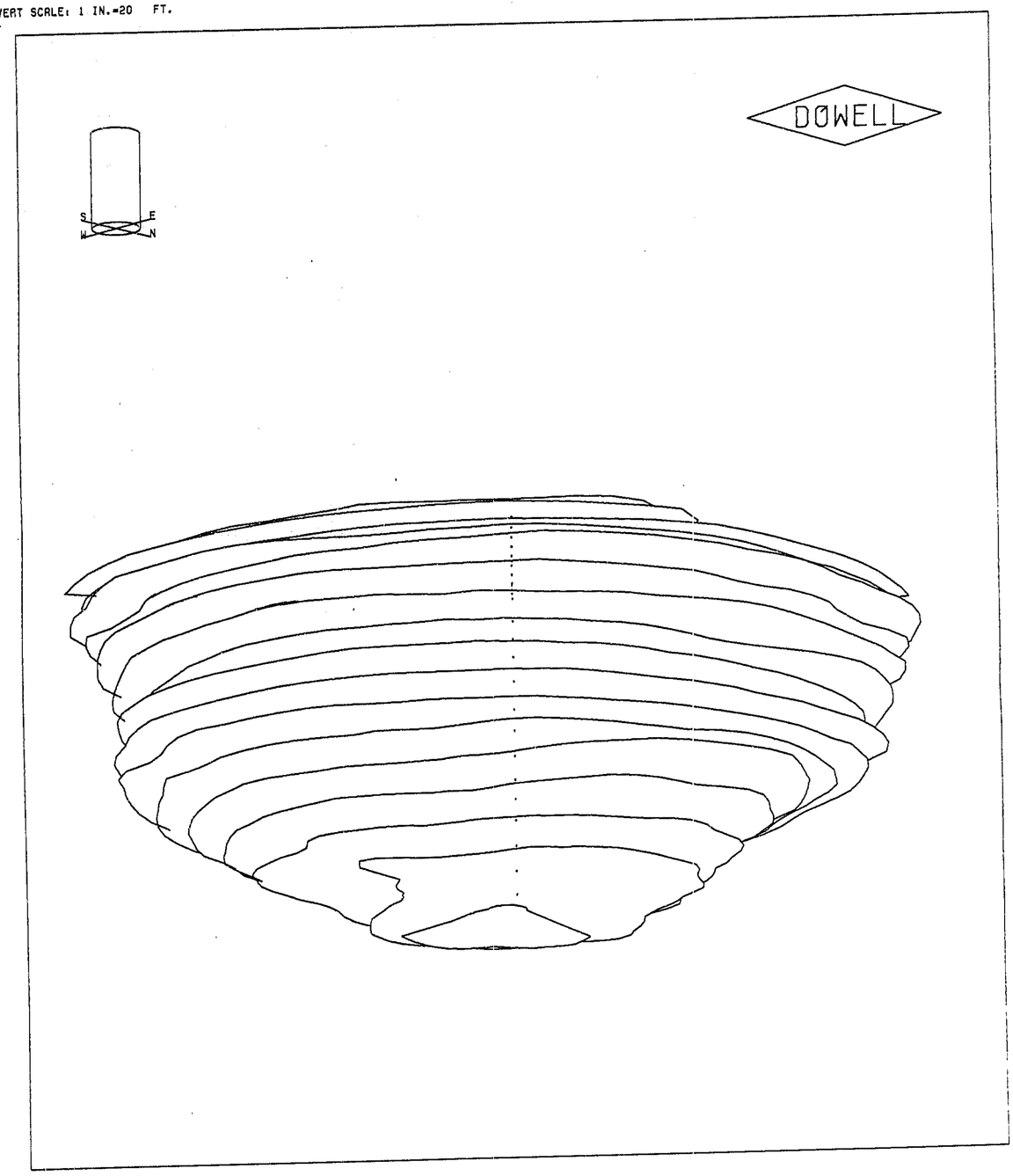


Petroleum Gas, Inc. (Buckeye Gas Prod.)
Well C-41AN-R24E, Apache Cty 603

22-APR-80 12:38
FROM DEPTH: 920
THRU DEPTH: 1010
VIEWING AZIMUTH: 135
HORZ SCALE: 1 IN.=20 FT.
VERT SCALE: 1 IN.=20 FT.

ISOMETRIC VIEW

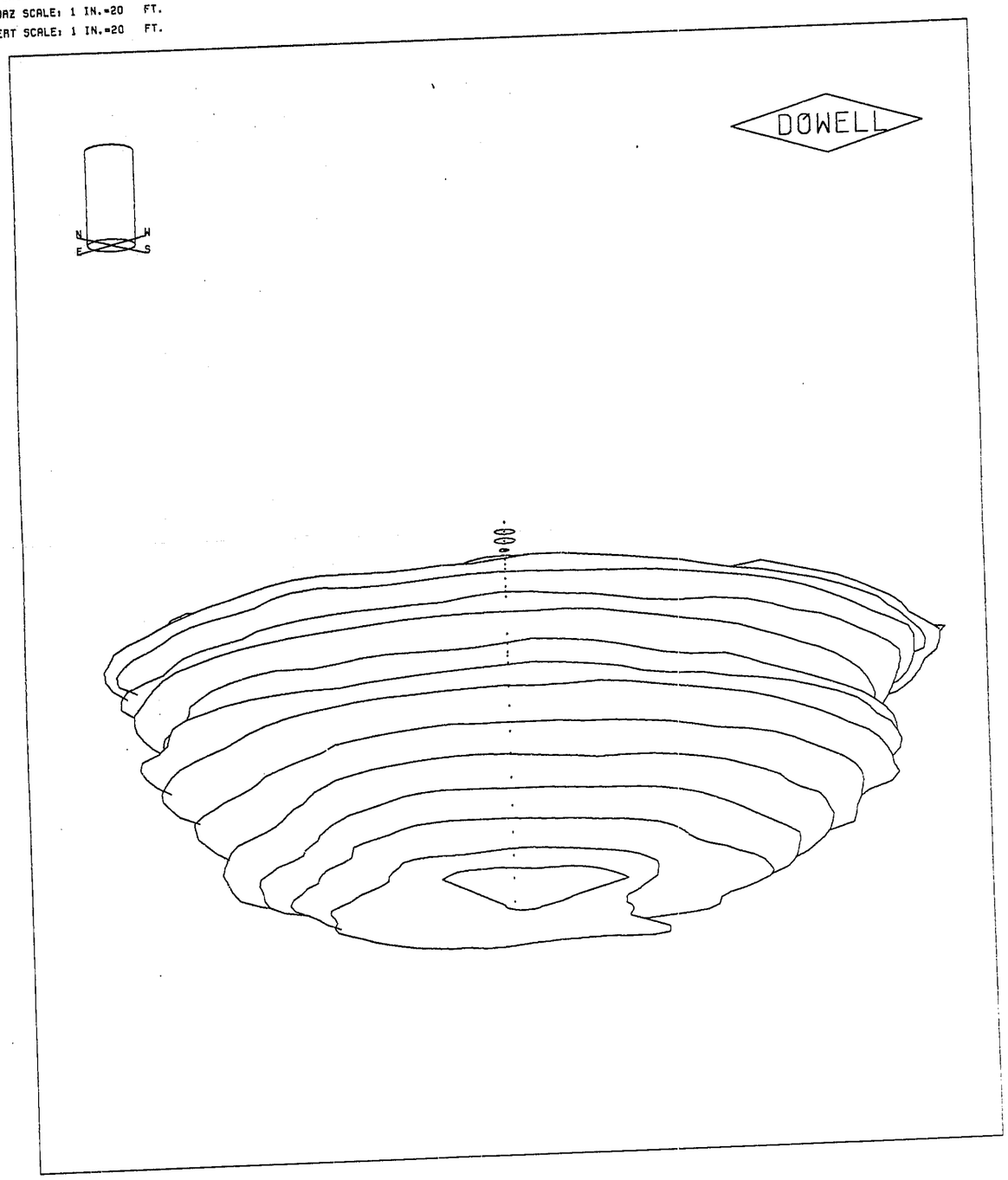
BUCKEYE GAS PRODUCTS COMPANY
ADAMANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980



22-APR-80 12:41
FROM DEPTH: 920
THRU DEPTH: 1010
VIEWING AZIMUTH: 315
HORZ SCALE: 1 IN.=20 FT.
VERT SCALE: 1 IN.=20 FT.

ISOMETRIC VIEW

BUCKEYE GAS PRODUCTS COMPANY
ADAMANA UGS TERMINAL
WELL NO. 4
APRIL 14,1980



FERRELLGAS LPG FACILITY

Operator: Ferrellgas Inc.

Bond Company: Travelers Casualty and Surety Co. of America

Bond No.: 030 S 103626358 BCM

Amount: $25,000.00

Date approved: 8/01/96

Permits covered by this bond:

556 (Cavern 01)
557 (Cavern 02)
562 (Water well)
602 (Cavern 03)
✓ 603 (Cavern 04)
606 (Cavern 05)
607 (Cavern 06)
646 (Cavern 07)
647 (Cavern 08)
648 (Cavern 09)
671 (Cavern 10)
672 (Cavern 11)
776 (Cavern 12 -- not developed)
777 (Expired)
778* (Expired)

* Bond in Permit #778

May 20, 1996

Memo to Ferrellgas files
From: Steve Rauzi SR
Re: Discussion of volume verification in May 17, 1996 Commission meeting

All of the Commissioners present agreed that the sonar method was the best available technology to determine cavity shapes. They agreed that accepting volumetric measurements would be appropriate as long as sonar measurements continued to be used. Dr. Nations noted that sonar determinations could be waived in individual cases in appropriate situations.

State of Arizona
Arizona Geological Survey
416 W. Congress, Suite 100
Tucson, Arizona 85701
(520) 770-3500

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

May 1, 1996

Memo: Dale Thompson, Ferrellgas, Adamana — 9 pages total
Fax #: 524-2635
From: Steve Rauzi, Oil & Gas Administrator
Re: Volume verification surveys pursuant to A.A.C. R12-7-182(D)

I examined the sonar surveys on several of your storage wells after receiving the three sonar surveys run in March 1996. My analysis indicates that sonar surveys do not provide an exact picture of the shape and change of shape from survey to survey. On the other hand, sonar surveys, even when run by different companies and tools, do provide a good picture of the general shape and change in shape of a cavity as shown on the attached Exhibits 3 through 8.

The increase then decrease in sonar-determined volume for cavities 3 and 6 on Exhibit 1 is of special concern to me. I'm not sure if the discrepancy is due to running sonar in open hole versus through-pipe, different companies and tools, differences in tool design or calculation parameters, or improved technology through time. One way to verify sonar-determined volumes would be to complement them with volumetric measurements. The generally consistent cavity shape, change in shape, and rate of maximum radius increase over the last 16 years shown by the sonar survey results on the attached Exhibits 2 through 8 confirms the general integrity of the shape your caverns.

However, in light of the increase then decrease in sonar-determined volume in cavities 3 and 6 shown on Exhibit 1, it would be beneficial and appropriate to complement the sonar-determined volume verifications with volumetric measurements. As a result, I plan to recommend that the Oil and Gas Conservation Commission accept volumetric measurements and sonar surveys run on alternate five year cycles to provide a more accurate tracking and verification of cavity volumes; alternatively, to accept volumetric measurements annually complemented with sonar surveys at least every ten years or whenever a cavity is reentered and worked over, starting a new ten-year cycle.

Please feel free to comment on any aspect my analysis or reasoning. Also, I look forward to receiving your latest volumetric measurements pursuant to our discussion before the Commission's next meeting on May 17.

ADAMANA SONAR METHOD VOLUME VERIFICATION HISTORY

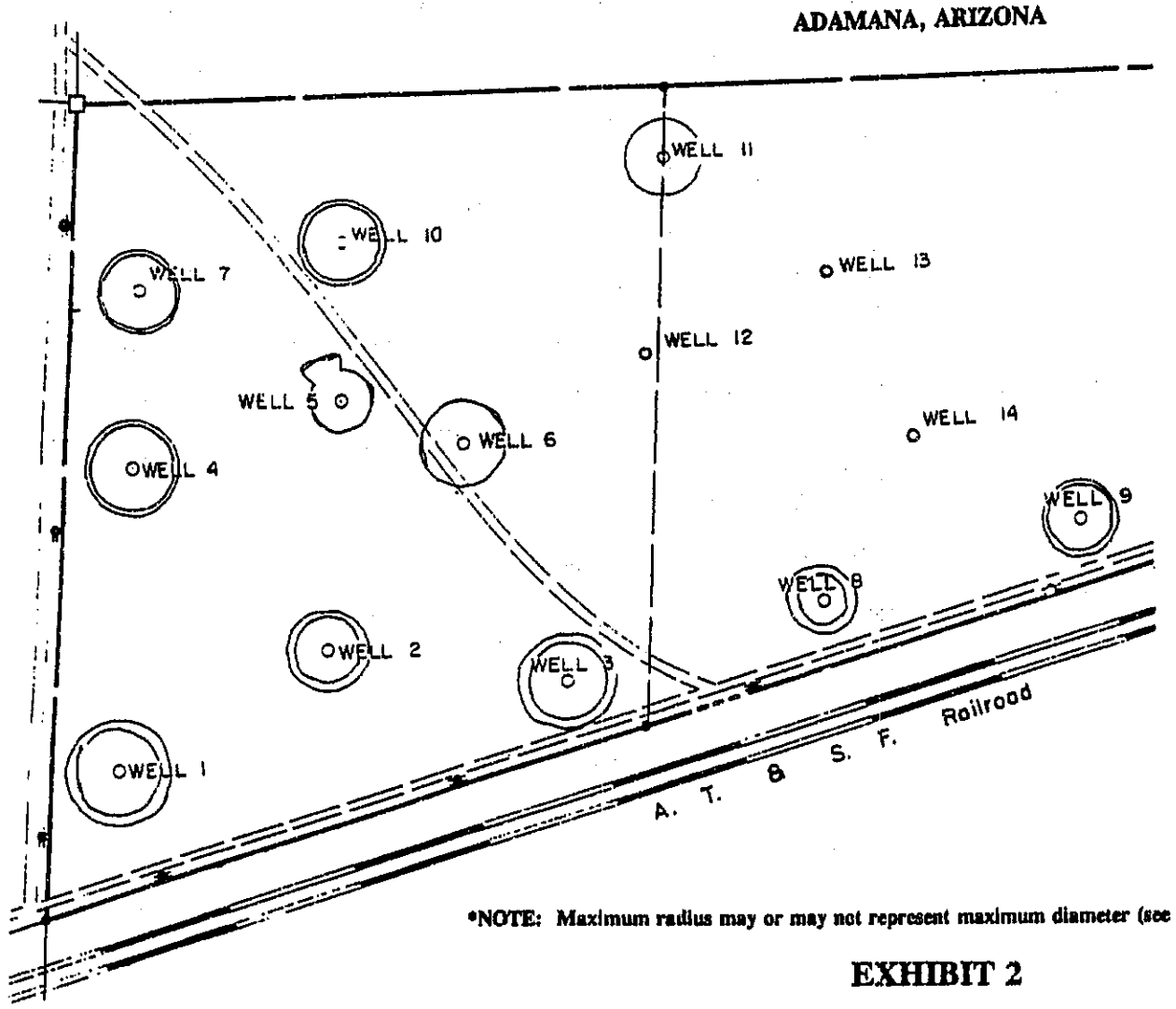
Permit	Well No.	TD	Cavern	Initial Sonar	Max Radius	Sonar Volume	Second Sonar	Max Radius	Sonar Volume	Third Sonar	Max Radius	Sonar Volume
556	1	1101'	900-985'	4/79 Dowell	99'@942'	150,532 bbls	3/92 Digital*	118'@944'	176,119 bbls			
557	2	1112'	906-995'	4/79 Dowell	74'@958'	149,008 bbls	2/89 MicroGage	90'@970'	193,563 bbls	2/95 Sonarwire**	89'@938'	197,559 bbls
602	3	1140'	944-1008'	4/79 Dowell	87'@995'	145,550 bbls	5/91 Digital*	104'@986'	195,355 bbls	3/96 Sonarwire*	104'@982'	185,607 bbls
603	4	1120'	950-1007'	4/80 Dowell	97'@945'	158,244 bbls	3/92 Digital	102'@978'	189,616 bbls			
606	5	1119'	938-1035'	---		---	3/89 MicroGage	100'@1026'	165,922 bbls	3/95 Sonarwire**	101'@1026'	169,615 bbls
607	6	1120'	924-1027'	4/80 Dowell	93'@952'	146,458 bbls	5/91 Digital*	94'@964'	200,659 bbls	3/96 Sonarwire*	90'@1006'	176,893 bbls
646	7	1152'	951-1079'	4/80 Dowell	84'@1055'	171,283 bbls	5/91 Digital	90'@1074'	179,122 bbls	3/96 Sonarwire**	90'@1066'	199,654 bbls
647	8	1132'	956-1069'	4/80 Dowell	57'@1060'	110,892 bbls	3/92 Digital*	72'@1054'	140,952 bbls			
648	9	1125'	973-1065'	4/80 Dowell	71'@1030'	108,222 bbls	3/92 Digital*	81'@1015'	168,797 bbls			
671	10	1150'	978-1042'	4/79 Dowell	85'@988'	128,541 bbls	3/89 MicroGage	99'@990'	164,567 bbls	2/95 Sonarwire**	98'@988'	168,792 bbls
672	11	1176'	960-1101'	---		---	3/89 MicroGage	84'@1070'	227,718 bbls	3/95 Sonarwire**	84'@1070'	244,537 bbls
776	12	1200'	Cavern not developed									
TOTAL CAPACITY									2,031,123 bbls 85,307,166 gallons			

* Sonar through one string of pipe
** Sonar through two strings of pipe

EXHIBIT 1

CAVERN MAXIMUM RADIUS* PLOT, FERRELLGAS LPG-STORAGE FACILITY

ADAMANA, ARIZONA



INDICATED RADIUS INCREASE THROUGH TIME BY SONAR MEASUREMENT

Well No.	TD	Cavern	Initial Sonar	Max Radius	Latest Sonar	Max Radius	Sonar Volume	Indicated net Increase
1	1101'	900-985'	4/79	99'@942'	3/92	118'@944'	176,119 bbls	19'/13yr (1.5'/yr)
2	1111'	906-995'	4/79	74'@958'	2/95	89'@938'	197,559 bbls	15'/16yr (1'/yr)
3	1140'	944-1008'	4/79	87'@995'	3/96	104'@982'	185,607 bbls	17'/17yr (1'/yr)
4	1120'	950-1007'	4/80	97'@945'	3/92	102'@978'	189,616 bbls	5'/12yr (.5'/yr)
5	1110'	938-1035'	3/89	100'@1026'	3/95	101'@1026'	169,615 bbls	1'/6yr (.2'/yr)
6	1120'	924-1027'	4/80	93'@952'	3/96	94'@1006'	176,893 bbls	1'/16yr (.06'/yr)
7	1152'	951-1079'	4/80	84'@1055'	3/96	90'@1066'	199,654 bbls	6'/16yr (.4'/yr)
8	1132'	956-1069'	4/80	57'@1060'	3/92	72'@1054'	140,952 bbls	39'/12yr (3'/yr)
9	1125'	973-1065'	4/80	71'@1030'	3/92	81'@1015'	168,797 bbls	10'/12yr (.8'/yr)
10	1150'	978-1042'	4/79	85'@988'	2/95	98'@988'	168,792 bbls	13'/16yr (.8'/yr)
11	1176'	960-1101'	3/89	84'@1070'	3/95	84'@1070'	244,537 bbls	0'/6yr (--/yr)
12	1200'	Cavern not developed						

*NOTE: Maximum radius may or may not represent maximum diameter (see Well 5 above & Exhibits 3-5)

EXHIBIT 2

SLR APR '96

SCALE : 1" = 50'

MAXIMUM RADIUS PLOT

FERRELLGAS WELL 5

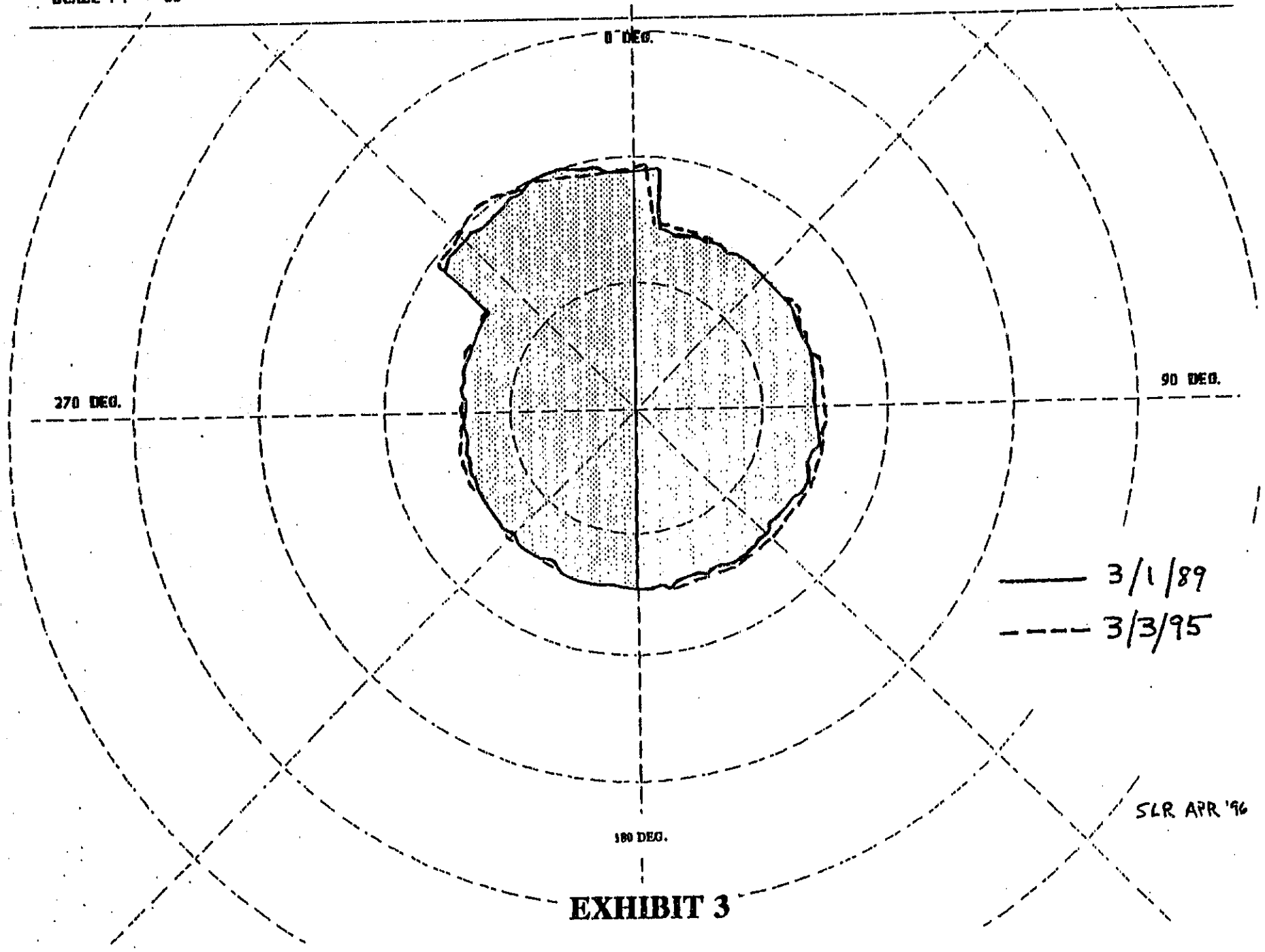


EXHIBIT 3

VERTICAL CROSSECTION

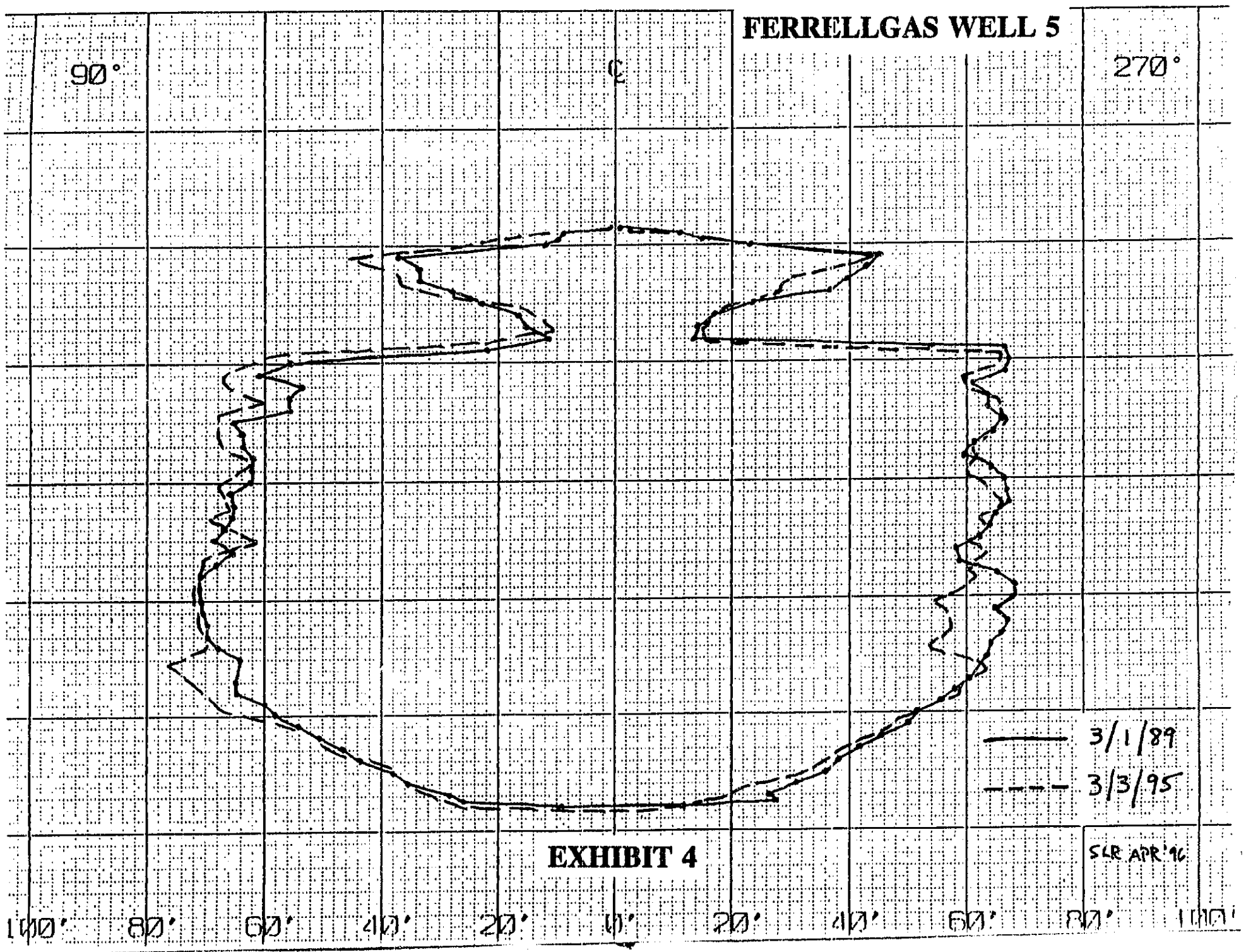


EXHIBIT 4

VERTICAL CROSSECTION

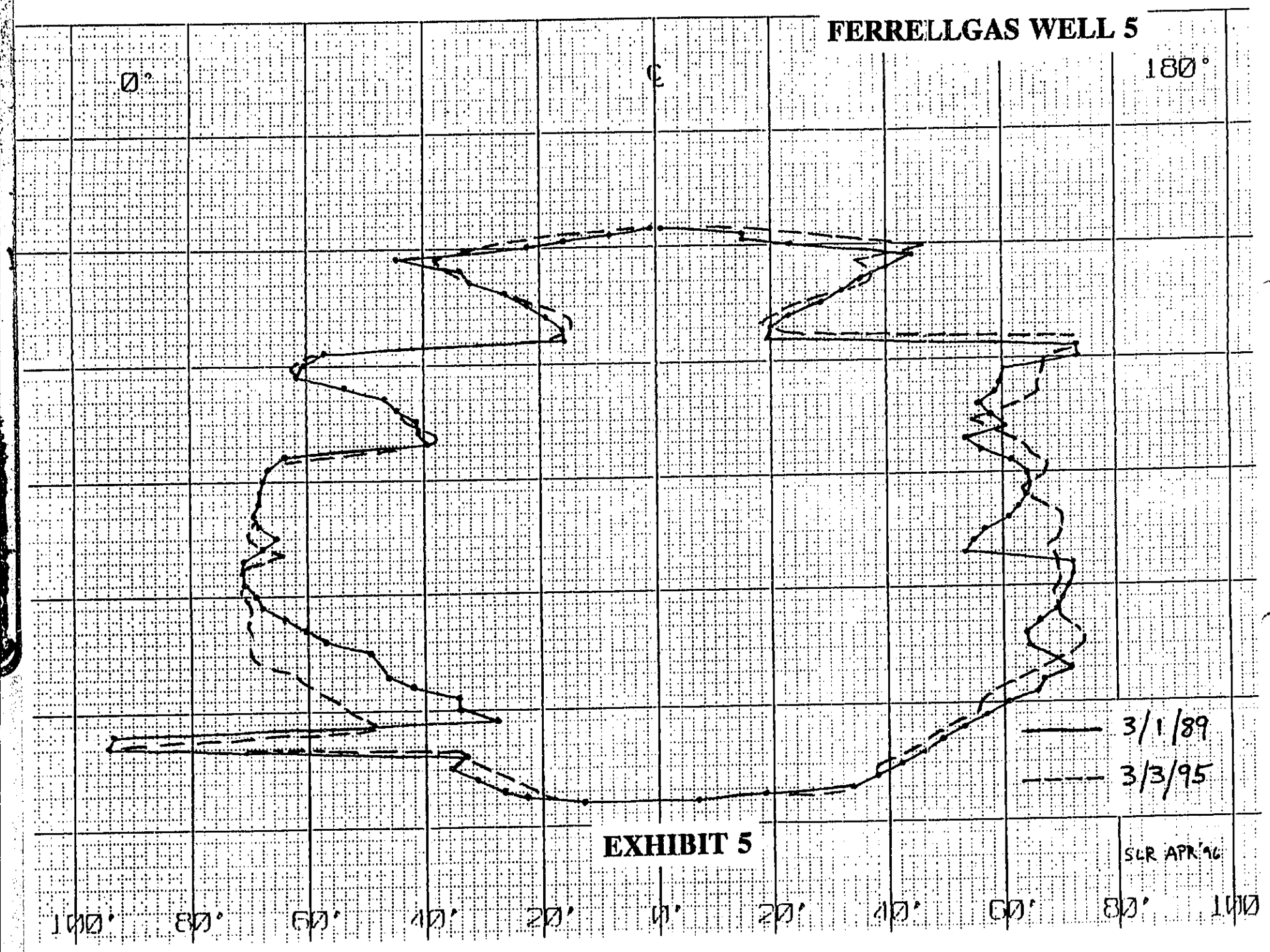


EXHIBIT 5

SCALE : 1" = 50'

MAXIMUM RADIUS PLOT

FERRELLGAS WELL 6

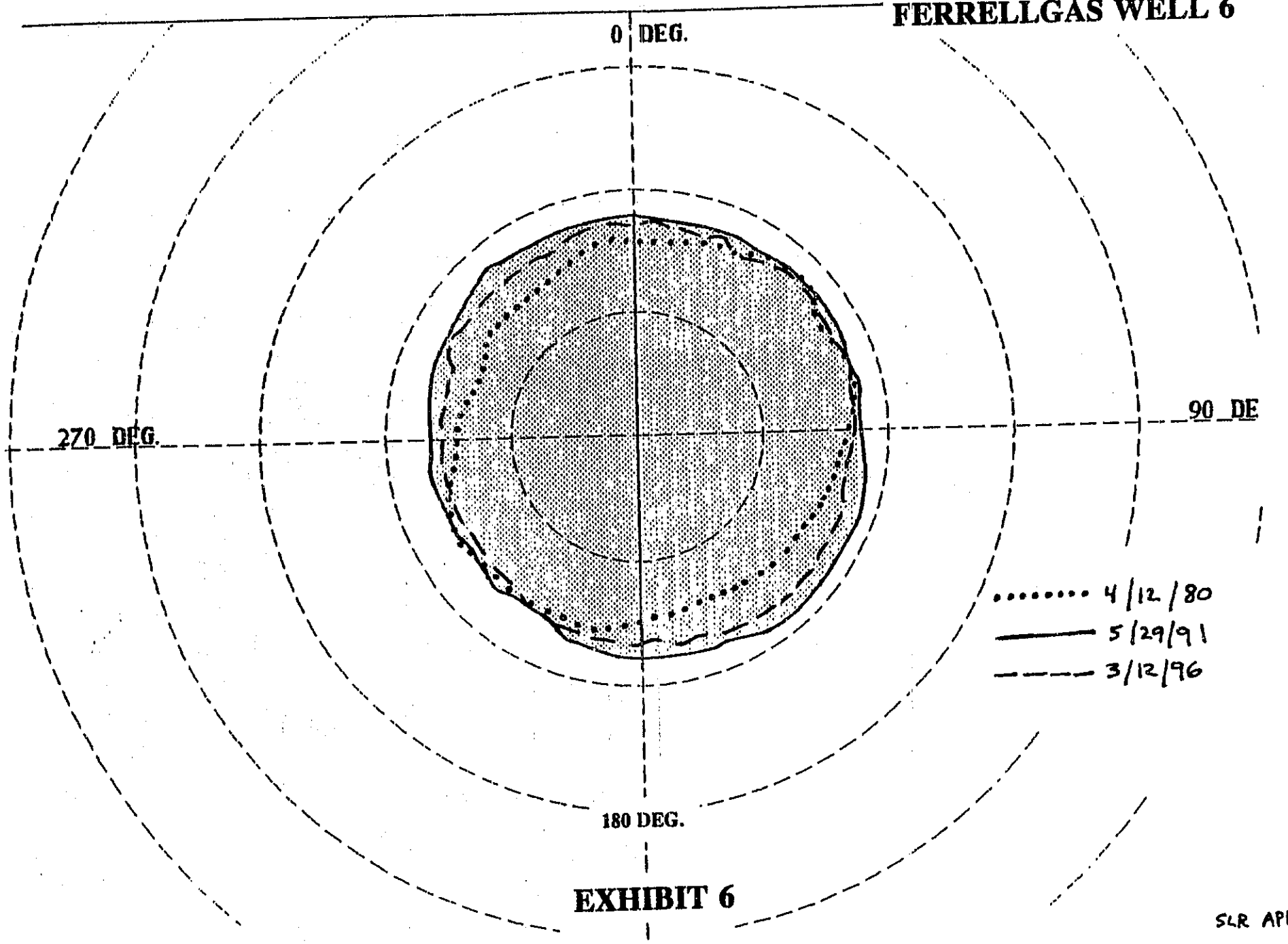


EXHIBIT 6

SLR APR'96

FERRELLGAS WELL 6

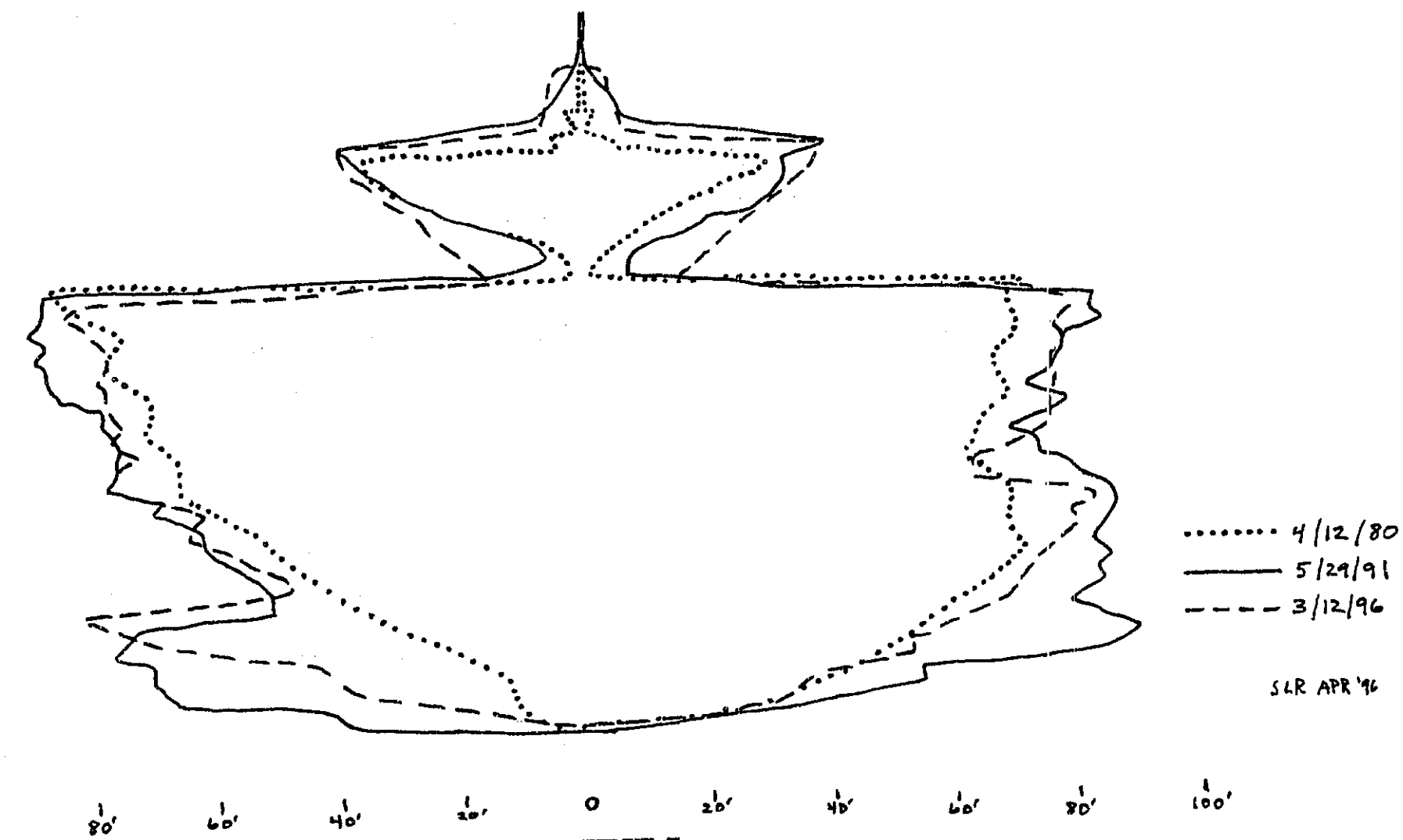


EXHIBIT 7

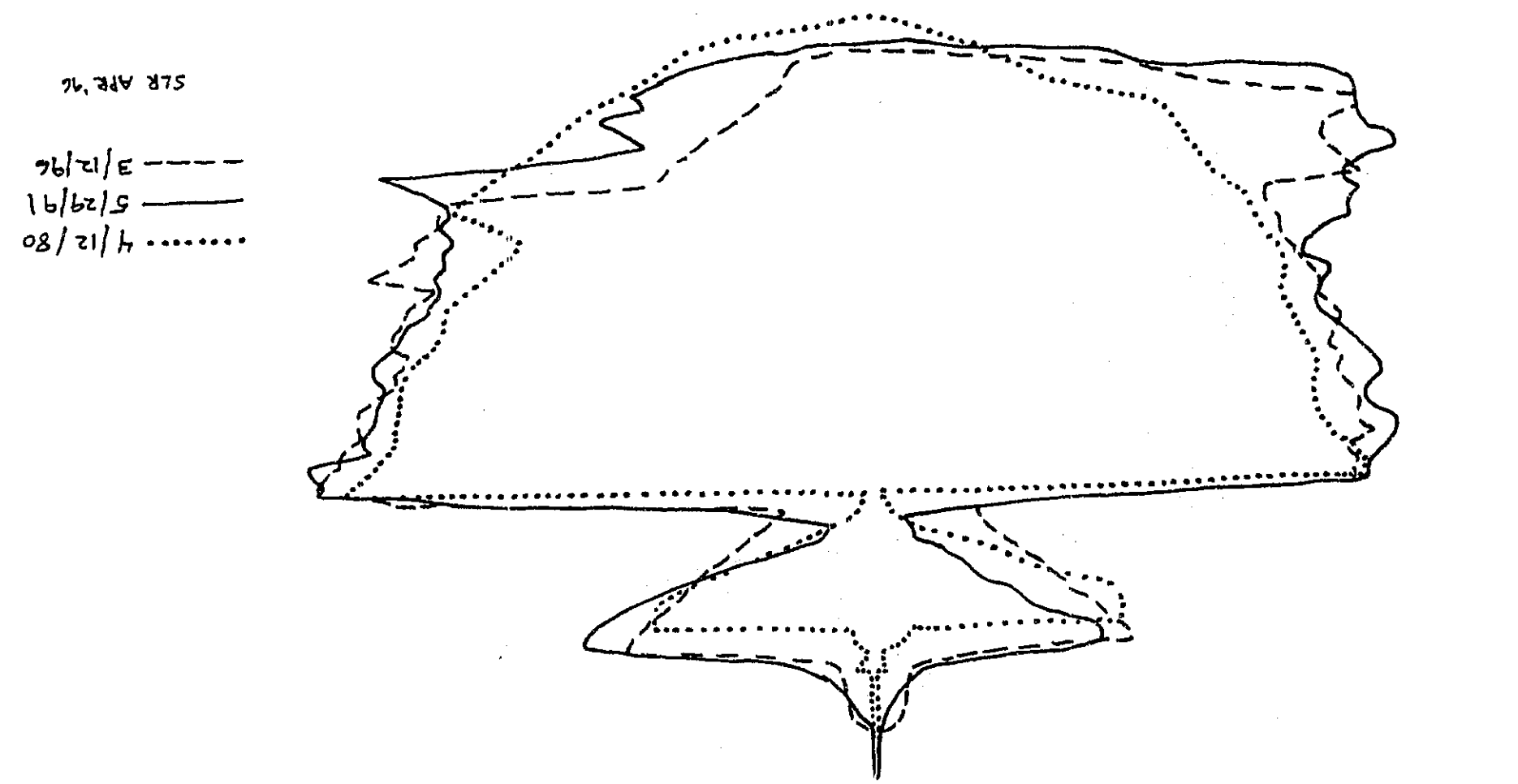

FERRELLGAS WELL 6
270 DEG.
90 DEG.
100'
80'
60'
40'
20'
0
20'
40'
60'
80'
100'
4/12/80
5/29/91
3/12/96
SLR APR.'96

EXHIBIT 8

Ferrellgas

April 24, 1996

To: Steve Rauzi
Arizona Geological Survey

From: Dale Thompson
Ferrell North America

Subject: Cavern Capacities

Steve, as of October 30, 1996 these are the last known capacities on all the Caverns at the Adamana Storage Facility. (Capacities are in gallons).

Cavern #1	8,496,730
Cavern #2	6,900,978
Cavern #3	7,368,738
Cavern #4	8,676,071
Cavern #5	6,884,626
Cavern #6	7,886,657
Cavern #7	8,068,158
Cavern #8	6,349,044
Cavern #9	6,969,816
Cavern #10	7,792,578
Cavern #11	10,601,992

603

If we can be of further assistance please contact us at (520) 524-3229.

Sincerely,

Dale Thompson

Adamana Road • P.O. Box 1624 • Holbrook, Arizona 86025 • 602-524-3229

Ferrellgas

April 9, 1996

Steve L. Rauzi, Administrator
Oil and Gas Program
5150 N. 16th St., Ste. B141
Phoenix, Arizona 85016

file 603

APR 1996
ARIZONA GEOLOGICAL SURVEY

Dear Steve,

After our discussion on March 11, 1996 about "volumetric measurement" of our storage caverns I did some research.

Our past records on last known capacities indicate a more exact method of yearly cavern measurement. Due to the fact that almost all of our caverns are filled and emptied on a yearly basis, I feel this would be more accurate and more often a "yearly" measurement program.

Considering the reasons stated above, I would like to request the Adamana Facility perform the volumetric measurement program on a yearly basis and sonar measurement method every "ten years".

Steve, as you can see by our past sonar reports any increase in size has been very minute over the years. With the acceptance of the commission, my plan would be to sonar any cavern that had to be worked over; otherwise, all caverns would receive the sonar method on a "ten year" basis. All "volumetric measurement" information on our Adamana caverns can be submitted to your office on a yearly or five and/or ten year basis whichever you and the commission would prefer.

Steve, please let me know what you think and how to resolve this matter. Thank you for your time and consideration.

Sincerely,

Dale Thompson

Dale Thompson
Terminal Manager

Adamana Road • P.O. Box 1024 • Holbrook, Arizona 86025 • 602-524-3229

State of Arizona
Arizona Geological Survey
845 North Park Avenue, #100
Tucson, Arizona 85719
(602) 882-4795

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

July 13, 1993

Ms. Brenda Davis, Mail Drop 5
Ferrellgas
One Liberty Plaza
Liberty, Missouri 64068

Re: Ferrellgas wells in Arizona
Approval of blanket bond #U1665522, United Pacific Insurance Company
Release of blanket bond #400 GV 7009, St. Paul Fire and Marine Insurance Company

Dear Ms. Davis:

I have enclosed an approved copy of the referenced blanket bond #U1665522 effective July 16, 1993, for all wells operated by Ferrellgas in Arizona.

This letter represents the Oil and Gas Conservation Commission's approval to release the referenced blanket bond #400 GV 7009 effective July 16, 1993.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil & Gas Program Administrator

Enclosure

c Ms. Mary T. Flanigan, St. Paul Seaboard, Overland Park, Kansas

State of Arizona
Arizona Geological Survey
845 North Park Avenue, #100
Tucson, Arizona 85719
(602) 882-4795

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

June 29, 1993

603

Ms. Kathy Cordera
Martin Insurance
P. O. Box 8418
Prairie Village, Kansas 66208-0418

FAX 913-676-9145 one copy of bond form No 2 6/29 @ 7:20 am SLR

Dear Ms. Cordera:

In response to your telephone call this morning, I have enclosed two blank copies of the Oil and Gas Conservation Commission's Performance Bond. File two copies of the completed bond form to my attention at the letterhead address.

Our records show that Ferrellgas currently has twelve storage wells and one freshwater well under bond.

Let me know if I can be of further assistance.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil & Gas Program Administrator

Enclosures

State of Arizona
Arizona Geological Survey
845 North Park Avenue, #100
Tucson, Arizona 85719
(602) 882-4795

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

May 20, 1993

603

Ms. Mary T. Flanigan
Attorney-in-Fact
St. Paul Seaboard
P. O. Box 935
Overland Park, Kansas 66201-0935

Re: Ferrellgas, Inc. blanket performance Bond No. 400 GV 7009

Dear Ms. Flanigan:

I received your certified letter No. P 105-228-862 requesting the St. Paul Fire and Marine Insurance Company's release from obligation under the captioned bond because the captioned bond is being replaced by United Pacific Insurance Company Bond #U1665502 effective June 25, 1993.

A.A.C. R12-7-103 requires a performance bond to remain in effect until (1) the wells under the bond have been plugged and abandoned as approved by the Oil and Gas Conservation Commission, or (2) the a new blanket bond is posted for the wells. I have not received or approved a replacement bond for the captioned bond.

As a result, I cannot release St. Paul Fire and Marine Insurance Company's obligation under the captioned bond until the United Pacific Insurance Company Bond #U1665502 is received by this office and approved.

Please let me know if I can be of further assistance in this matter.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil & Gas Program Administrator

c Mr. Greg Greer, Ferrellgas, P.O. Box 4644, Houston, Texas 77216
Mr. Dale Thompson, Ferrellgas, P.O. Box 1024, Holbrook, Arizona 86025

State of Arizona
Arizona Geological Survey
845 North Park Avenue, #100
Tucson, Arizona 85719
(602) 882-4795

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

May 11, 1992

P/N 603

Mr. Dale Thompson
Terminal Manager
Ferrellgas
P.O. Box 1024
Holbrook, Arizona 86025

Re: **Sonar surveys of Ferrellgas Storage wells #1, #4, #8, and #9**

Dear Dale,

This letter will acknowledge our receipt of the sonar surveys on the referenced wells.

The attached listing shows that all wells are now in compliance with the capacity verifications required in A.A.C. R12-7-181.1.i.iv.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil and Gas Program Administrator

Enclosure

ADAMANA VOLUME VERIFICATION SURVEYS
(all by the sonar method)

Permit	Well	Survey Date	Survey Date	Current Status
556	1	4/79	3/92	In compliance
557	2	4/79	2/89	In compliance
602	3	4/79	5/91	In compliance
603	4	4/80	3/92	In compliance
606	5	---	3/89	In compliance
607	6	4/80	5/91	In compliance
646	7	4/80	5/91	In compliance
647	8	4/80	3/92	In compliance
648	9	4/80	3/92	In compliance
671	10	4/79	3/89	In compliance
672	11	---	3/89	In compliance
776	12			CAVERN NOT DEVELOPED

State of Arizona
Arizona Geological Survey
845 North Park Avenue, #100
Tucson, Arizona 85719
(602) 882-4795

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

February 26, 1992

#603

Mr. Dale Thompson
Terminal Manager
Ferrellgas
P.O. Box 1024
Holbrook, Arizona 86025

Re: **Sonaring of Ferrellgas Storage wells #1, #4, #8, and #9**

Dear Dale,

This letter is a reminder that the referenced wells are not in compliance with A.A.C. 12-7-181(i)(iv) which requires that capacity determinations on storage wells shall be verified every five years. The enclosed table summarizes our records on these determinations for your wells.

As we have previously discussed, and as Mr. R. M. Gehring has indicated in his letter of May 21, 1991, I anticipate that you will be scheduling these determinations as soon as possible after the winter outhaul season.

I would appreciate learning of your plans in regards to this matter at your earliest convenience.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil and Gas Program Administrator

Enclosure

ADAMANA VOLUME VERIFICATION SURVEYS
(all by the sonar method)

Permit	Well	Survey Date	Survey Date	Current Status
556	1	4/79		NOT IN COMPLIANCE
557	2	4/79	2/89	In compliance
602	3	4/79	5/91	In compliance
603	4	4/80		NOT IN COMPLIANCE
606	5	---	3/89	In compliance
607	6	4/80	5/91	In compliance
646	7	4/80	5/91	In compliance
647	8	4/80		NOT IN COMPLIANCE
648	9	4/80		NOT IN COMPLIANCE
671	10	4/79	3/89	In compliance
672	11	---	3/89	In compliance
776	12			CAVERN NOT DEVELOPED

Ferrellgas

May 21, 1991

AZ OIL & GAS
CONSERVATION COMMISSION

MAY 24 1991

Mr. Dan Brennan
Executive Director
Oil & Gas Commission
State of Arizona
5150 N. 16TH ST.
Phoenix, Az 85016

Re: Sonaring of Ferrellgas Adamana, Arizona LPG Underground Storage Wells #3, #6 & #7

Dear Mr. Brennan:

Pursuant to our conversation of May 21, I have ordered the sonaring of Adamana Wells #3, #6 & #7 to commence as soon as possible. This work will be scheduled in the next 30 to 60 days. We will inform your office in advance of the exact date so that you can witness, if you so desire.

As discussed, wells #1, #4, #8 and #9 will be sonared at the earliest possible time. As you know these wells are currently active and we must wait for the winter outhaul season before the product can be removed. This should be done by next February 28 and we will schedule the sonar activity for these wells at that time.

If you have any questions please feel free to call me at (713)876-5515.

Best Regards,

Richard M. Gehring
Manager
Storage Operations

	Permit #
#1	556
3	602
4	603
6	607
7	646
8	647
9	648

xc: Brad Mallory - Moab
Dale Thompson - Adamana

P.O. Box 4644, Houston, Texas 77210
16800 Greenspoint Park Drive • Suite 225 - South Atrium • Houston, Texas 77060 • Telephone: 713/874-9494

603

Oil and Gas Conservation Commission
STATE OF ARIZONA
3110 N. 19th AVENUE, SUITE 190
PHOENIX, ARIZONA 85015
PHONE: (602) 255-5161

January 11, 1989

Mr. Glenn Mace
Ferrellgas
Granada Building, Suite 216
3316 East 32nd Street
Tulsa, OK 74135

Dear Mr. Mace:

As we discussed during your visit yesterday, Oil and Gas Conservation Commission Rule 12-7-181.1.i requires that "...a flare or other safety system shall be installed at or near each brine pit..." As you know, the Ferrellgas facility at Adamana does not have a flare installed at present since the dismantling of the rusted-out older system.

Thus it appears that your operation is not in compliance with this rule. Therefore, it is necessary for Ferrellgas to install such a device to come into compliance. Failure to comply would cause the Commission to invoke R12-7-181.1.i which involves shutting down the operation.

You indicated that it will take some time to design, fabricate, and install the flare system. We would hope that this can be completed before the next scheduled inspection of the facility which will be around the end of May 1989.

Although we did not specifically discuss this issue, Rule 12-7-181.1.i.v requires verification of the capacity of each storage cavern every five years. This has not been accomplished since 1979 and 1980. Thus your operation is not in compliance with this rule. It will be necessary for Ferrellgas to begin to verify these capacities very soon. I realize this is the busy season, but as soon as activity declines and caverns are shut in for a few days, the logs can be run.

I was thinking about the possible problem with liquid propane in extremely cold weather. One way to solve the problem is to include an oil-water separator in the flow line from the caverns to the pits. A simple "drip" system might work, or an actual oil-water separator such as is used at gas-condensate wells. We sure don't want to burn up any pit liners.

We will expect to hear from you regularly concerning your progress in the matter of the flare and the sonar.

Very truly yours,

Daniel J. Brennan
Executive Director

June 2, 1978

Mr. Bob Larsen
Williams Energy Company
P.O. Box 3478
Mail Drop #33-1
Tulsa, Oklahoma 74101

Dear Mr. Larsen:

During a visit yesterday to your LPG storage area at Adamana, Mr. Sam Snyder informed me that you have replaced Dan Dougherty as Manager of Storage Terminals.

The purpose of my visit to this terminal was to discuss our Rule 706. This rule was recently adopted by the Arizona Oil and Gas Conservation Commission at a public hearing. Mr. Dougherty attended this hearing.

Rule 706, as adopted, doesn't affect your storage terminal as it now exists, except Sections C and D. These sections primarily pertain to safety features. The safety feature of immediate concern to this commission is the installation of a flare system.

This Commission does not intend to dictate or even recommend a particular design for this system. We do retain the right to approve the system that you select. The system that Mr. Snyder has discussed with you is not acceptable to the Commission.

We are enclosing a copy of Rule 706, together with a copy of the general rules and regulations of the Commission. You will note that some of these general rules also pertain to your operation.

This Commission has enjoyed a very pleasant working relationship with Williams Energy and be assured that we want to cooperate with you and your staff to the fullest extent.

Your prompt attention to the installation of the flare system will be much appreciated.

Let us know if we can be of any help whatsoever.

Very truly yours,

W. E. Allen
Director
Enforcement Section

WEA/vb

Enc.

Williams Energy has completed their 9th well for LPG storage at Adamana. Williams Energy had a bad primary cement job on their No. 8 well. I plan to check on the repair of this cementing job tomorrow and then go on to the Dineh-Bi-Keyah and check Kerr-McGee's progress on their waterflood installations.

603

Williams Energy has completed the drilling of 2 additional storage wells in the Adamana area and they have one permit outstanding.

RECEIVED
SEP 10 1975
O & G CONS. COMM.

OFFICE OF
Oil and Gas Conservation Commission
STATE OF ARIZONA
4515 NORTH 7TH AVE.
PHOENIX, ARIZONA 85013
PHONE: (602) 271-5161

January 20, 1975

Mr. R. J. Wiruth
Manager of Operations
Williams Energy Company
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Adamana Storage Project

You are aware that this office occasionally inspects all field operations including storage projects. We find your project at Adamana to be in first class condition and your supervisor, Mr. Sam Snyder is always most cooperative. It is indeed a pleasure to work with people like Sam.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

WILLIAMS ENERGY COMPANY
9 East Fourth Street
P. O. Box 3478
Tulsa, Oklahoma 74101
Phone: (918) 583-1711

January 2, 1974

RJW:3:74

Mr. W. E. Allen
Director, Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North Seventh Avenue
Phoenix, Arizona 85013

Dear Bill:

Attached are copies of drawings showing the well development history for Adamana Underground Storage installation. You will note that we have placed propane in all wells, except number three, and this well continued to wash during the fall and winter of 1973. It is our intention that upon depletion of propane from wells four thru six, we will again initiate washing. It is our intent to take all six wells to 150,000 barrels.

In reviewing our schedule, it appears that obtaining this goal in all wells prior to the resumption of storage in 1974 is optimistic. Therefore, some washing may continue in 1975.

I also wish to advise you that Williams Energy Company has contracted with Fenix & Scisson of Tulsa, Oklahoma to conduct sonar surveys on some of the wells at Adamana. This engineering work will commence during the month of March, and will provide some structural information that we feel is necessary. Should you desire to observe any of this work, please feel free to stop by. Also, if we find any information that we feel may be of interest to you, I will pass the same on.

Thank you for your assistance, and I look forward to working with you in 1974.

DRAWINGS OF WELLS USED FOR UNDERGROUND STORAGE ARE FILED IN NO. 607A.

Very truly yours,

WILLIAMS ENERGY COMPANY

R. J. Wiruth
Manager of Operations

RJW:dh

Enclosures

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JAN - 1974
O & G CONS. COMM.

#603

DOXOL

ONE OF THE WILLIAMS COMPANIES

Uregas

OFFICE OF
Oil and Gas Conservation Commission
STATE OF ARIZONA
4515 NORTH 7TH AVE.
PHOENIX, ARIZONA 85013
PHONE: (602) 271-5161

April 16, 1973

Mr. D. J. Doughtery
Williams Energy Company
P. O. Box 35
Holbrook, Arizona 86025

RE: LPG STORAGE PROJECT

Dear Mr. Doughtery:

On a recent visit to your storage project at Adamana, it was noticed that at times brine was allowed to flow directly from the well to the ground. This brine or salt water then collected in a low spot just north of your fence line and also just north of the railroad right of way. This is in violation of Rule 306 and 307 of the Rules and Regulations of the Oil and Gas Conservation Commission. This situation has been called to the attention of both Mr. Greer and Mr. Sam Snyder.

If at times it is necessary to purge your wells in this manner, the brine or salt water must be contained in a suitable vessel or pit that has been prepared in such a manner that it is impervious to seepage.

Please instruct your employees to stop the practice of allowing the brines or salt water to escape to the ground.

Should you have any questions regarding this matter, please feel free to contact this office.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

Enclosure

603

WILLIAMS ENERGY COMPANY
9 EAST FOURTH STREET
P. O. BOX 3478
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

March 27, 1973

RJW:232:73

Mr. W. E. Allen
Director, Enforcement Section
Oil & Gas Conservation Commission
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

Enclosed you will find the completion reports and compensated neutron logs for wells number 3, 4, 5, and 6. I trust that this will complete the reporting requirements for these wells until our washing report is due.

Our schedule calls for us to store propane in three of these wells starting in August, even though they will not be completed. They will be empty sometime in December, and washing will resume with completion forecasted in May 1974.

Yours very truly,

WILLIAMS ENERGY COMPANY

R. J. Wiruth

R. J. Wiruth
Manager of Operations

RJW:dh

Enclosures

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MAR 29 1973
O & G CONS. COMM.

OFFICE OF
Oil and Gas Conservation Commission
STATE OF ARIZONA
4515 NORTH 7TH AVE.
PHOENIX, ARIZONA 85013
PHONE: (602) 271-5161

March 5, 1973

Mr. Robert Wiruth
Williams Energy Company
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Williams Energy Well Nos. 3, 4, 5, & 6
NW/NW Sec 5-T15N-R24E
Apache County
Permit Nos. 602, 603, 606 & 607

Dear Mr. Wiruth:

Since the samples for the above referenced wells have been delivered to Four Corners Sample Cut in Farmington, New Mexico, we are assuming that these wells have been completed in so far as the drilling and casing of the wells are concerned. Please refer to Rules 107, 108 & 109, of the Rules and Regulations of the Arizona Oil and Gas Conservation Commission and submit the necessary reports: Form 25, on the cementing of the casing strings in these holes and Form 4, Completion Report.

At the time you have completed enlarging the reservoir for LPG Storage, we will need to be advised of the approximate capacity and shapes of the storage areas.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

November 13, 1972

Mr. Robert Wiruth
Williams Energy Company
P. O. Box 3478
Tulsa, Oklahoma 74101

Dear Mr. Wiruth:

Since you are now operating in Arizona under the name of Williams Energy Company, it will be necessary that you furnish this Commission with an updated Organization Report.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

Enc.

November 13, 1972

Mr. Frank Getscher
P. O. Box 98
Scottsdale, Arizona 85252

Dear Mr. Getscher:

The following permits were issued since November 6, 1972.

Williams Energy Company Well No. 3
NW/NW Sec 8-T18NOR24E
Apache County
Permit No. 602

Williams Energy Company Well No. 4
NW/NW Sec 8-T18N-R24E
Apache County
Permit No. 603

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

November 13, 1972

Mrs. Jo Ratcliff
Four Corners Sample Cut Association
P. O. Box 899
Farmington, New Mexico 87401

Dear Mrs. Ratcliff:

The following permits were issued since November 6, 1972.

Williams Energy Company Well No. 3
NW/NW Sec 8-T18N-R24E
Apache County
Permit No. 602

Williams Energy Company Well No. 4
NW/NW Sec 8-T18N-R24E
Apache County
Permit No. 603

Very truly yours,

W. E. Allenb, Director
Enforcement Section

WEA/rlb

November 13, 1972

Mr. Robert Wiruth
Williams Energy Company
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Williams Energy Company Well No. 3 and 4
NW/NW Sec 8-T18N-R24E
Apache County
Permit Nos. 602 and 603

Dear Mr. Wiruth:

Enclosed please find Receipt Nos. 2939 and 2940 covering the $25 filing fee, a copy of your approved Applications for Permit to Drill and Permit to Drill Nos. 602 and 603.

Also enclosed are miscellaneous instruction sheets concerning samples and other Commission requirements.

Sincerely yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

Encs.

WILLIAMS ENERGY COMPANY
NATIONAL BANK OF TULSA BUILDING
P.O. BOX 3378
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

November 10, 1972

RJW:380:72

Mr. W. E. Allen
Director, Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

Per your request of October 24, 1972, please find an executed Rider advising that the Surety Bond Number 8047-02-65 has had the Principal changed to Williams Energy Company. Also, the bond has been increased to cover the Numbers 3 and 4 wells.

You will note that one copy of the Rider has a space for the signature of the Obligee. Please obtain this signature and return the executed copy to me so I can forward to our insurance company.

Should you need additional information to process our application, please advise.

Very truly yours,

WILLIAMS ENERGY COMPANY

R. J. Wiruth
Manager of Operations

RJW:sw

Enclosures

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NOV 13 1972
O & G CONS. COMM.

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WILLIAMS ENERGY COMPANY
NATIONAL BANK OF TULSA BUILDING
P.O. BOX 3479
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

October 26, 1972

RJW:360:72

Mr. W. E. Allen, Director
Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

In accordance with my letter to you dated October 18, 1972, J. O. Barnes Drilling Company, P. O. Box 141, Casa Grande, Arizona, 85222, has been selected to drill our #3 and #4 wells. This will change the approximate date work will start on to December 1, 1972 for the #3 well, and December 13, 1972 for the #4 well.

I trust that this information will allow you to complete our applications. Should you have any questions, please contact me.

Very truly yours,

WILLIAMS ENERGY COMPANY

R. J. Wiruth
Manager of Operations

RJW:sw

cc: Leroy Caldwell
Dan Dougherty

RECEIVED
OCT 30 1972
O & G CONS. COMM.

DOXOL 603

ONE OF THE WILLIAMS COMPANIES

Uregas

October 24, 1972

Mr. R. J. Wiruth
Williams Energy Company
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Federal Insurance Company Bond No. 8047-02-65 - amount of $25,000

Dear Mr. Wiruth:

The above referenced bond was issued to cover operations of The Suburban Companies in the State of Arizona. Your current Application to Drill indicates the operator to be the Williams Energy Company. In order for the existing bond to cover these operations, it will be necessary for the bonding company to notify the Commission in writing that this bond will also cover the operations conducted in the name of Williams Energy Company.

This consent of surety by the bonding company will need to indicate the name of the operator, well name, and legal description of the wells.

As quickly as this consent of surety is received, the drilling permits will be issued.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

cc - Marsh & McLennan, Inc.
1579 East 21st Street
Tulsa, Oklahoma 74114

WILLIAMS ENERGY COMPANY
NATIONAL BANK OF TULSA BUILDING
P.O. BOX 3478
TULSA, OKLAHOMA 74101
PHONE: (918) 583-1711

October 18, 1972

RJW:324:72

Mr. W. E. Allen, Director
Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

Enclosed are duplicate Applications to Drill for the #3 and #4 storage wells at our Adamana L.P. Terminal. Also enclosed is a check for $50.00 covering the application fee and a certified plat map showing the location of the wells in relation to the existing facilities.

I trust that this will allow you to proceed with the application. I will forward the name of the drilling contractor upon completion of the selection process.

Very truly yours,

WILLIAMS ENERGY COMPANY

R. J. Wiruth

R. J. Wiruth
Manager of Operations

RJW:sw
Enclosures
cc: Leroy Caldwell

RECEIVED
OCT 24 1972
O & G CONS. COMM.