CONFIDENTIAL

Release Date

Ferrellgas, Inc. (Buckeye Gas Prod Co. L.P.
NW NW Sec. 8-T18N.R24E. Apache Cty

sl

COUNTY Apache AREA 16 mi/E. Holbrook LEASE NO. Suburban Fee

WELL NAME ~~Suburban Companies #1 Fee Strat~~ Buckeye Gas Products Co. ~~Williams Energy Co~~

LOCATION NW/NW SEC 8 TWP 18N RANGE 24E FOOTAGE 150'FWL-1500FNL

ELEV 5299 GR 5301 KB SPUD DATE 6-16-71 STATUS injected COMP. DATE 7-26-71 TOTAL DEPTH 1101'

CONTRACTOR J. O. Barnes, Casa Grande, AZ 85222

CASING SIZE	DEPTH	CEMENT	LINER SIZE & DEPTH
13 3/8"	141' GL	155 SKS	NA
9 5/8"	890' GL	260 SKS	
7"	899' GL	Hung- uncemented	
~~4 1/2"~~	~~1067' GL~~	~~Hung - uncemented~~	

DRILLED BY ROTARY X

DRILLED BY CABLE TOOL

PRODUCTIVE RESERVOIR NA

INITIAL PRODUCTION salt storage

FORMATION TOPS	DEPTHS	SOURCE L.L.	SOURCE E.L.	REMARKS
Surface	0-313'	X		sand, clay and sandy lime
Coconino	314'-1101'	X		sand, salt

ELECTRIC LOGS	PERFORATED INTERVALS	PROD. INTERVALS
GRN	NA	NA

SAMPLE LOG

SAMPLE DESCRP.

SAMPLE NO. 1665

CORE ANALYSIS

DSTs

REMARKS

APP. TO PLUG

PLUGGING REP.

COMP. REPORT X

WATER WELL ACCEPTED BY

BOND CO. ~~The Aetna Casualty & Security Co.~~ ~~Federal Insurance Company~~ St. Paul Fire + Marine Ins. Co. file for P/N 778

BOND NO. ~~8047-02-65~~ 40S-32083

DATE 1-15-80

BOND AMT. $ 25,000 ✓

CANCELLED 6-16-71

ORGANIZATION REPORT 4-23-71

FILING RECEIPT 2890

LOC. PLAT X

WELL BOOK X

PLAT BOOK X

API NO. 02-001-20142

DATE ISSUED 6-16-71

DEDICATION None (Stat Test)

PERMIT NUMBER 556

CONFIDENTIAL

Release Date 2-26-72

(over)

DRILL STEM TEST

NO.	FROM	TO	RESULTS
			NA

CORE RECORD

NO.	FROM	TO	RECOVERY	REMARKS
				NA

REMEDIAL HISTORY

DATE STARTED	COMPLETED	WORK PERFORMED	NEW PERFORATIONS

ADDITIONAL INFORMATION

CONFIDENTIAL

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: SUBURBAN COMPANIES	Address: P. O. Box 3478, Tulsa, Oklahoma 74101
Federal, State or Indian Lease Number or name of lessor if fee lease: Suburban Companies	Well Number: 1 / Field & Reservoir: Unnamed
Location: 150' FWL, 1500' FNL	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.) feet	Elevation of casing hd. flange feet
June 16, 1971	June 29, 1971	inject	5299	5301

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.
1101 G.L.	----	Salt-solution well	---

Producing interval (s) for this completion	Rotary tools used (interval)	Cable tools used (interval)
Salt - 900' to 1101'	G.L. to T.D.	----

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

Type of electrical or other logs run (check logs filed with the commission)	Date filed
Gamma-Ray Neutron *	June 30, 1971

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	17-1/2"	13-3/8"	48	141' G.L.	155	0
Protection	12-1/4"	9-5/8"	32.75	890' G.L.	260	0
Solution	8-3/4"	7 "	20	899' G.L.	Hung - uncemented	
Solution		4-1/2"	9.5	1067' G.L.	Hung - uncemented	

TUBING RECORD

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

LINER RECORD

Size in.	Top ft.	Bottom ft.	Sacks cement	Screen (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 bbls.	Gas prod. during test MCF	Water prod. during test bbls.	Oil gravity ° API (Corr)

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

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 Manager of Operations of the Suburban Co's (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.

Date 7/26/71 Signature Robert J. Wirth

Permit No. 556

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'	Sand and clay
	40'	144'	Shale with sand stringers
	144'	222'	Clay and sandy shale
	222'	313'	Sandy lime with shale stringers
Coconino	313'	681'	Sand
	681'	786'	Sand and shale
	786'	900'	Salt with anhydrite
	900'	1101'	Salt with anhydrite stringers.

RECEIVED
AUG 9
O & G CO

* 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 [illegible]ll.

This Well Completion or Recompletion rep[illegible]nd well log shall be filed with the State of Arizon[illegible] & 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: 325

WELL DATA

ZERO @ GL

T.D. DOWELL 973 FT OPERATOR 978 FT ✓

CASING SIZE 9-5/8 IN DEPTH 891 FT

LINER - FT

INTERMEDIATE 7 IN DEPTH 869 FT

TUBING 4-1/2 IN DEPTH OUT FT

WILLIAMS ENERGY COMPANY

WELL NO: 1

ADAMANA STORAGE TERMINAL

APRIL 15,1979 556

PRODUCTION: STORAGE

GENERAL COMMENTS

DID NOT SURVEY BELOW 960 DUE TO PIPE IN WELL.

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 15,1979

WELL NO. 1 JOB NO. 325

RADII IN FT

DEPTH	N	S	E	W	NE	SW	SE	NW
892	1.7	1.3	1.8	1.2	1.9	1.3	1.6	1.7
894	2.5	2.1	2.4	2.1	2.5	2.0	2.3	2.5
896	3.2	2.6	3.1	2.8	3.2	2.7	2.9	3.1
897	6.5	5.8	6.4	6.1	6.7	6.0	6.0	6.1
898	25.2	26.9	23.8	22.9	26.0	25.7	24.7	24.9
900	28.2	20.7	29.0	20.1	27.4	20.9	22.9	21.0
902	24.2	18.5	27.1	15.9	25.7	15.9	20.8	16.7
904	13.5	10.4	10.9	11.2	10.8	9.2	7.0	13.7
906	3.9	4.1	3.6	5.3	3.6	4.1	3.7	4.0
908	3.8	2.2	2.6	4.1	2.8	3.1	2.3	2.9
909	2.6	1.1	1.9	2.2	2.3	1.6	1.1	2.6
910	1.3	0.7	0.9	1.1	1.1	0.8	0.7	1.3
911	87.0	73.0	82.0	70.0	79.0	71.0	76.0	72.0
912	87.0	73.0	81.0	69.0	80.0	71.0	76.0	72.0
915	83.0	74.0	85.0	73.0	90.0	73.0	76.0	76.0
920	68.0	71.0	76.0	73.0	65.0	70.0	71.0	74.0
925	75.0	73.0	78.0	76.0	66.0	73.0	73.0	79.0
930	72.0	66.0	73.0	75.0	74.0	67.0	69.0	75.0

RADII IN FT

DEPTH	N	S	E	W	NE	SW	SE	NW
935	76.0	70.0	72.0	80.0	76.0	74.0	71.0	81.0
940	81.0	72.0	72.0	82.0	75.0	79.0	72.0	84.0
942	82.0	74.0	99.0	89.0	90.0	74.0	89.0	80.0
945	75.0	69.0	98.0	72.0	73.0	69.0	70.0	76.0
950	70.0	58.0	67.0	66.0	67.0	57.0	64.0	69.0
955	57.0	49.0	61.0	64.0	62.0	56.0	56.0	62.0
960	52.0	45.0	45.0	50.0	51.0	52.0	39.0	51.0

DOWELL SONAR CALIPER SURVEY

WILLIAMS ENERGY COMPANY ADAMANA STORAGE TERMINAL APRIL 15,1979

WELL NO: 1 JOB NO: 325

RADII IN FEET

DEPTH	ANGLE	N	S	E	W	NE	SW	SE	NW
945	90	75.0	69.0	98.0	71.0	72.0	68.0	69.0	76.0
945	95	63.0	61.0	66.0	60.0	62.0	58.0	64.0	64.0
945	100	59.0	55.0	59.0	56.0	58.0	51.0	61.0	60.0
945	105	51.0	50.0	54.0	47.0	52.0	47.0	55.0	52.0
945	110	45.0	45.0	45.0	44.0	49.0	45.0	50.0	46.0
945	115	44.0	43.0	42.0	41.0	44.0	41.0	46.0	41.0
945	120	36.0	40.0	39.0	38.0	37.0	39.0	39.0	39.0
945	125	34.0	37.0	39.0	33.0	35.0	36.0	37.0	34.0
945	130	32.0	35.0	35.0	31.0	32.0	35.0	34.0	33.0
945	135	30.0	32.0	32.0	29.0	31.0	30.0	30.0	31.0
945	140	30.4	30.6	30.9	28.2	30.3	30.4	29.9	29.4
945	145	28.8	28.7	29.6	27.4	29.0	28.1	28.7	28.1
945	150	28.4	26.8	27.6	26.1	28.1	26.7	27.7	26.3
945	155	27.7	25.6	26.9	25.5	26.8	25.8	26.4	25.8
945	160	27.0	25.1	25.6	24.5	26.0	24.5	26.2	25.8
945	165	26.2	25.2	25.4	24.7	25.5	24.5	26.8	26.0
945	170	27.2	26.5	27.0	26.2	27.2	25.2	26.9	27.8
945	175	28.9	28.2	28.4	28.3	28.1	29.0	28.4	28.3

DOWELL SONAR CALIPER SURVEY

WILLIAMS ENERGY COMPANY ADAMANA STORAGE TERMINAL APRIL 15,1979

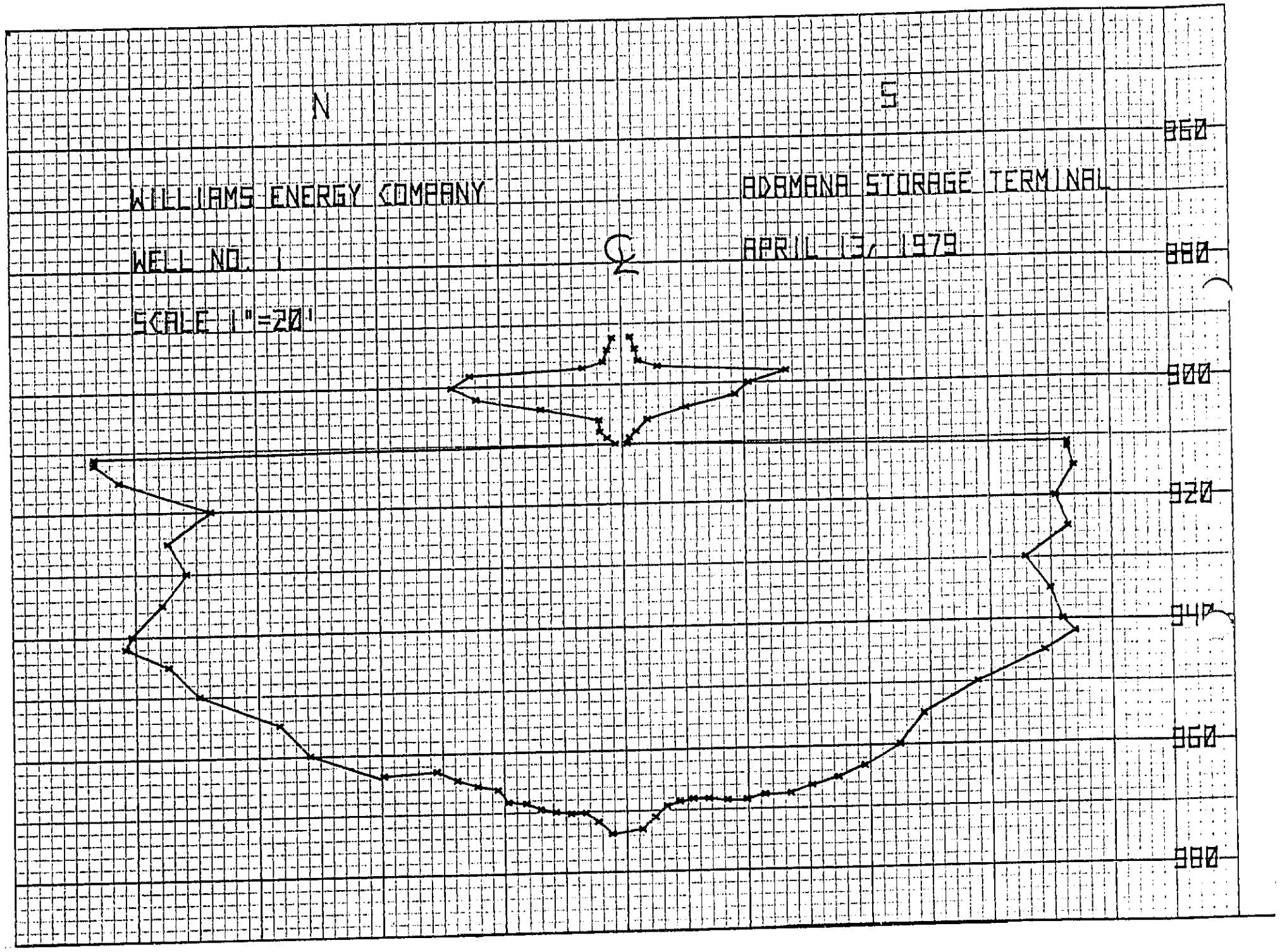
WELL NO: 1 JOB NO: 325

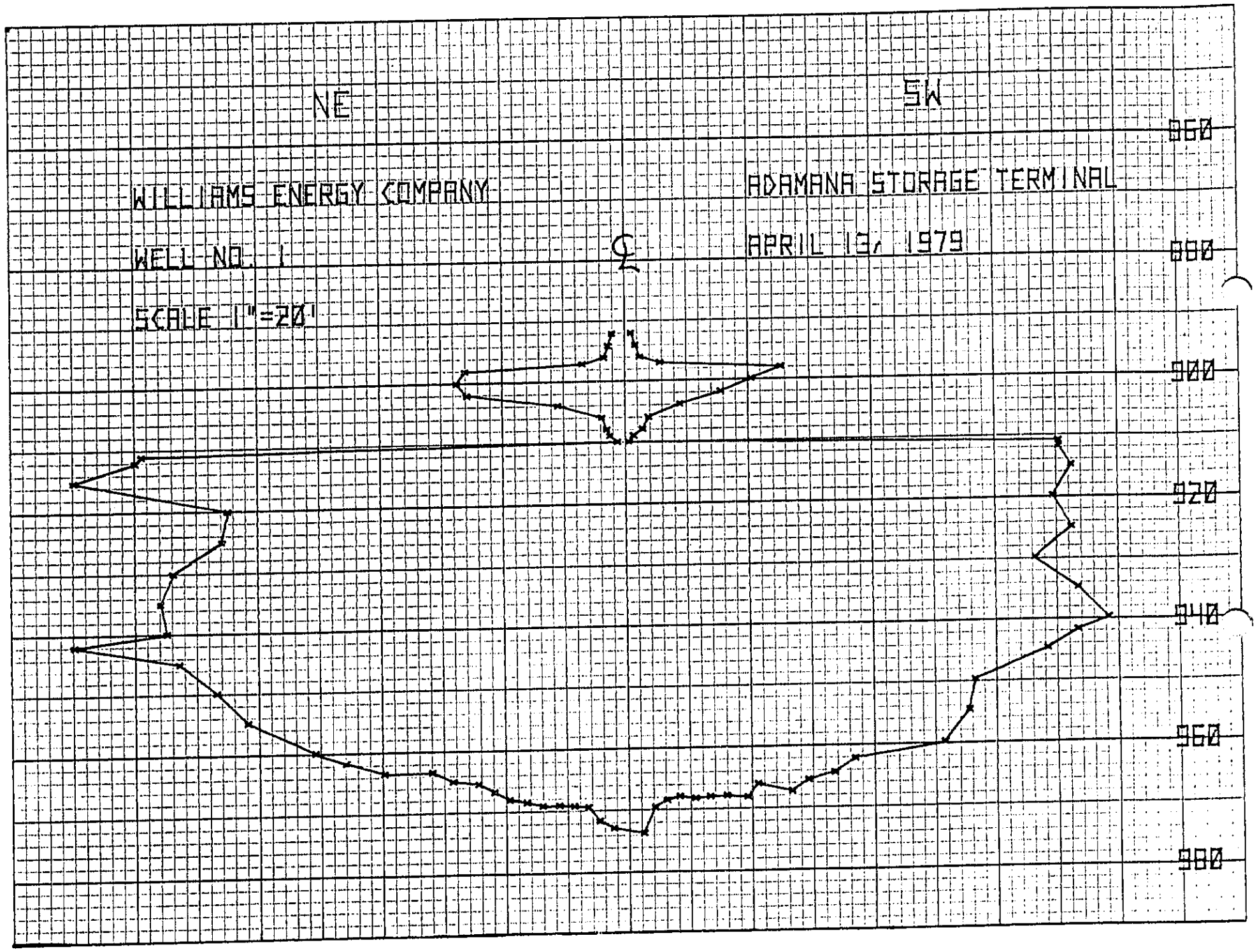
VOLUME CALCULATIONS

DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
892	0	0	0	0
894	24	24	4	4
896	43	67	8	12
897	69	136	12	24
898	869	1005	155	179
900	3884	4889	692	871
902	3278	8167	584	1454
904	1655	9822	295	1749
906	371	10193	66	1815
908	79	10271	14	1829
909	20	10291	4	1833
910	7	10299	1	1834
911	6310	16609	1124	2958
912	18668	35276	3324	6282
915	57795	93071	10293	16575
920	89930	183001	16016	32591
925	85361	268361	15202	47792
930	86188	354549	15349	63142

VOLUME CALCULATIONS

DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
935	85518	440067	15230	78371
940	91113	531179	16226	94598
942	41147	572326	7328	101926
945	61030	633356	10869	112794
950	78834	712189	14039	126834
955	60120	772309	10707	137540
960	44967	817275	8008	145549
INCLUDES VOLUME BELOW 960		845255		150532


N
S
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 1
APRIL 13, 1979
SCALE 1"=20'
960
880
900
920
940
860
980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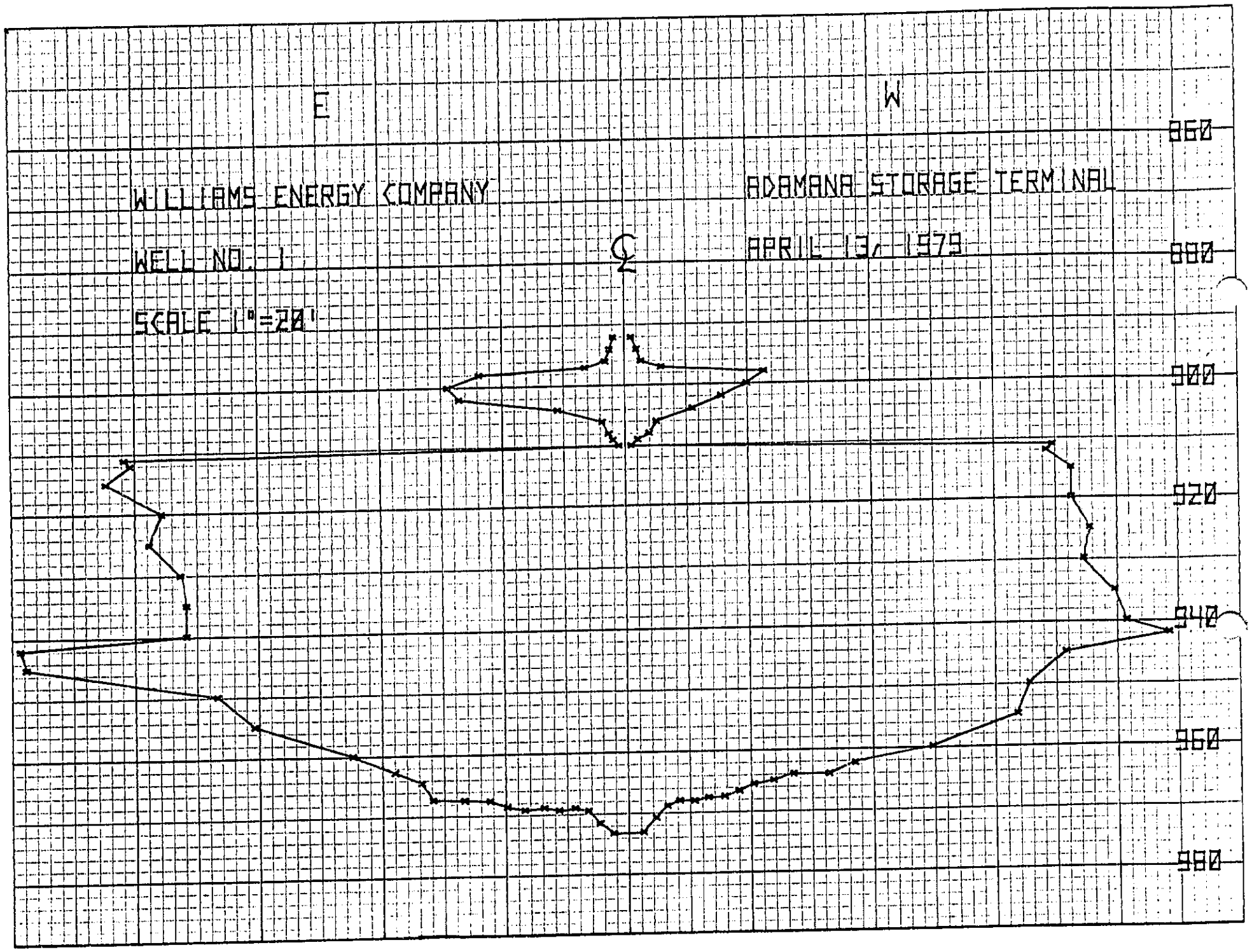
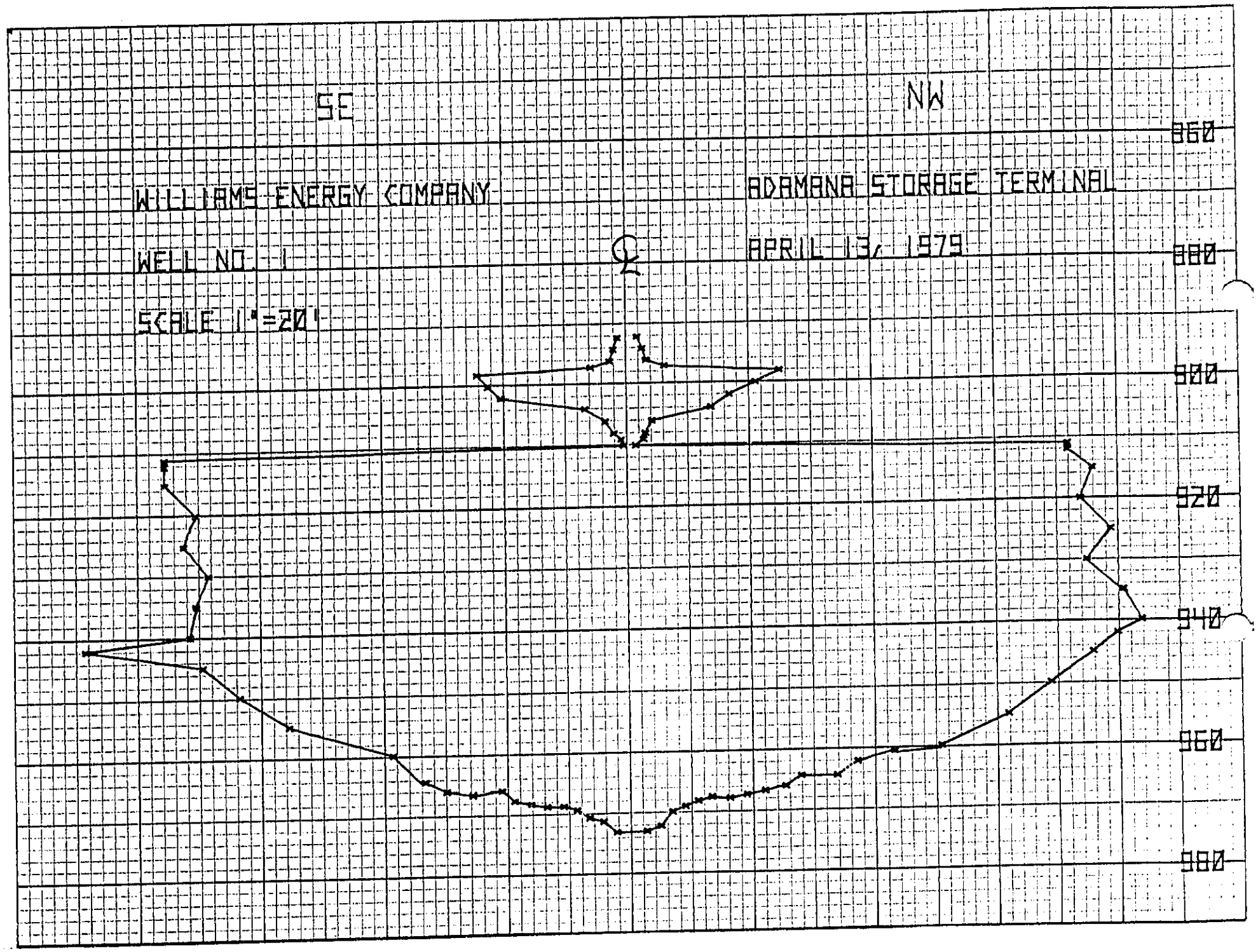
SW
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 1
APRIL 13, 1979
SCALE 1"=20'
℄
860
880
900
920
940
960
980


E
W
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 1
APRIL 13, 1979
SCALE 1"=20'
℄
860
880
900
920
940
960
980


SE
NW
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 1
APRIL 13, 1979
SCALE 1"=20'
360
380
400
420
440
460
480

November 8, 1971

Memo to: Suburban Companies Core Test #1
NW/NW Sec. 8-T18N-R24E
Apache County
Our File #554

Suburban Companies #1 Fee Strat
SW/NW Sec-8-T18N-R24E
Apache County
Our File #556

Suburban Companies #2 Fee Strat
NW/NW Sec-8-T18N-R24E
Apache County
Our File #557

Suburban Companies Water Well #1
Sec 8-T18N-R24E
Apache County
Our File #562

Memo from: Mr. W. E. Allen, Director
Enforcement Section

On November 5, 1971 the writer visited the Suburban locations. Williams Brothers, the general contractor on this installation, had crews installing the various lines, pumps, loading racks, and related facilities required to complete the installation project. Bert Savoy, William Brothers representative, told me that the #1 Well Reservoir had been enlarged to 2300 barels capacity. This reservoir had been filled with 2300 gallons of propane. The reservoir for #2 Well is presently being built. It has a present capacity of approximately 2100 barels. The ultimate capacity will be 150,000 barels. Another 30 days we will probably see all construction work completed on this project.

September 10, 1971

Memo from: Mr. W. E. Allen, Director
Enforcement Section

Memo to: Suburban Companies Strat Test #1-&2
Our File #556 and #~~[illegible]~~ 557

Talked with Bob Wiruth regarding reports that they routinely keep on receipts and disbursements of LPG in and out of their storage projects. Wiruth is sending us information that they have available which may help in developing a form "Transporters and Storers Monthly Report" for our use.

W

Oil & Gas Conservation Comm
4515 North Seventh Ave
Phoenix Ariz 85013

Surburban Gas Well #1 Adamana Ariz
Sec 8, T.18N R-24E G&SR B&M
150' From West Line 1500' From North Line
Unnamed Field T.D. 1101 G.L. - Elevation 5299'

13 3/8 Csg Set @ 141' G.L.
9 5/8 Csg Set @ 890.50' G.L.

RECEIVED
JUL 8 1971
O & G CONS. COMM.

556

July 1, 1971

Memo from W. E. Allen, Director
Enforcement Section

Memo to: Suburban Companies #1 Fee Strat
SW/4 NW/4 Sec. 8-T18N-R24E
Apache County
Our File #556

Red Johnson, Fenix and Scisson, called to report that the above referenced well had reached total depth of 1101'. 9-5/8" casing had been set at 890.5' and cemented to overlap the surface casing. Their plans are to move the rig and drill a water well. Following this they will drill their #2 strat test.

WELL SITE CHECK

By W.E.A.

Date 6-24-71

Contractor J.O. Barnes

Spud Date 6-16-71 2PM

Type Rig _____ Rotary x Cable ____

Samples _____

Pipe 13 3/8 @ 140'

Water Zones 320-350

Lost Circ. Zones _____

Formation Tops _____

Cores, Logs, DST _____

Crews 3 - 8hrs.

Person(s) Contacted Red Johnson. F&S.

Present Operations Drlg 12 1/4" hole at. 641'

Drilling with Air ____ Mud x

Size Hole 12 1/4"

Size Drill Pipe 4"

Type Bit Hughes

No. Bit ✓ Drilling Rate ____

Formation _____

Lithology _____

REMARKS, PHOTO, MAP

Water flow encountered at approx. 320' Had to mud up to contain it.

WELL NAME Suburban #1 Fee Strat.

Permit No. 556

Confidential Yes No

APPLICATION FOR PERMIT TO DRILL OR RE-ENTER

APPLICATION TO DRILL ☒ RE-ENTER OLD WELL ☐

SUBURBAN COMPANIES, c/o Fenix & Scisson, Inc.
NAME OF COMPANY OR OPERATOR

P. O. Box 15609 — Tulsa (City) — Oklahoma 74115 (State)
Address

J. O. Barnes
Drilling Contractor

P. O. Box 141, Casa Grande, Arizona 85222
Address

DESCRIPTION OF WELL AND LEASE

Federal, State or Indian Lease Number, or if fee lease, name of lessor	Well number: 1	Elevation (ground): 5299.0
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: 530 feet	
Number of acres in lease: 114.00	Number of wells on lease, including this well, completed in or drilling to this reservoir: One	
If lease, purchased with one or more wells drilled, from whom purchased: Name: Not applicable	Address	
Well location (give footage from section lines): 150' FWL, 1500' FNL	Section—township—range or block and survey: Sec. 8, T-18N, R-24E G&SR B&M	Dedication (Comply with Rule 105): None
Field and reservoir (if wildcat, so state): Unnamed field	County: Apache	
Distance, in miles, and direction from nearest town or post office: 16 miles east of Holbrook		
Proposed depth: 1100'	Rotary or cable tools: Rotary	Approx. date work will start: June 10, 1971
Bond Status / Amount	Organization Report: On file X Or attached	Filing Fee of $25.00: Attached X

Remarks:

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the Manager of Operations of the The Suburban Cos (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.

RECEIVED
JUN 15 1971
O & G CONS. COMM.

Signature: Robert J. Wilsmith

Date: 6/9/71

Permit Number: 556
Approval Date: 6-16-71
Approved By: John Bannister

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.

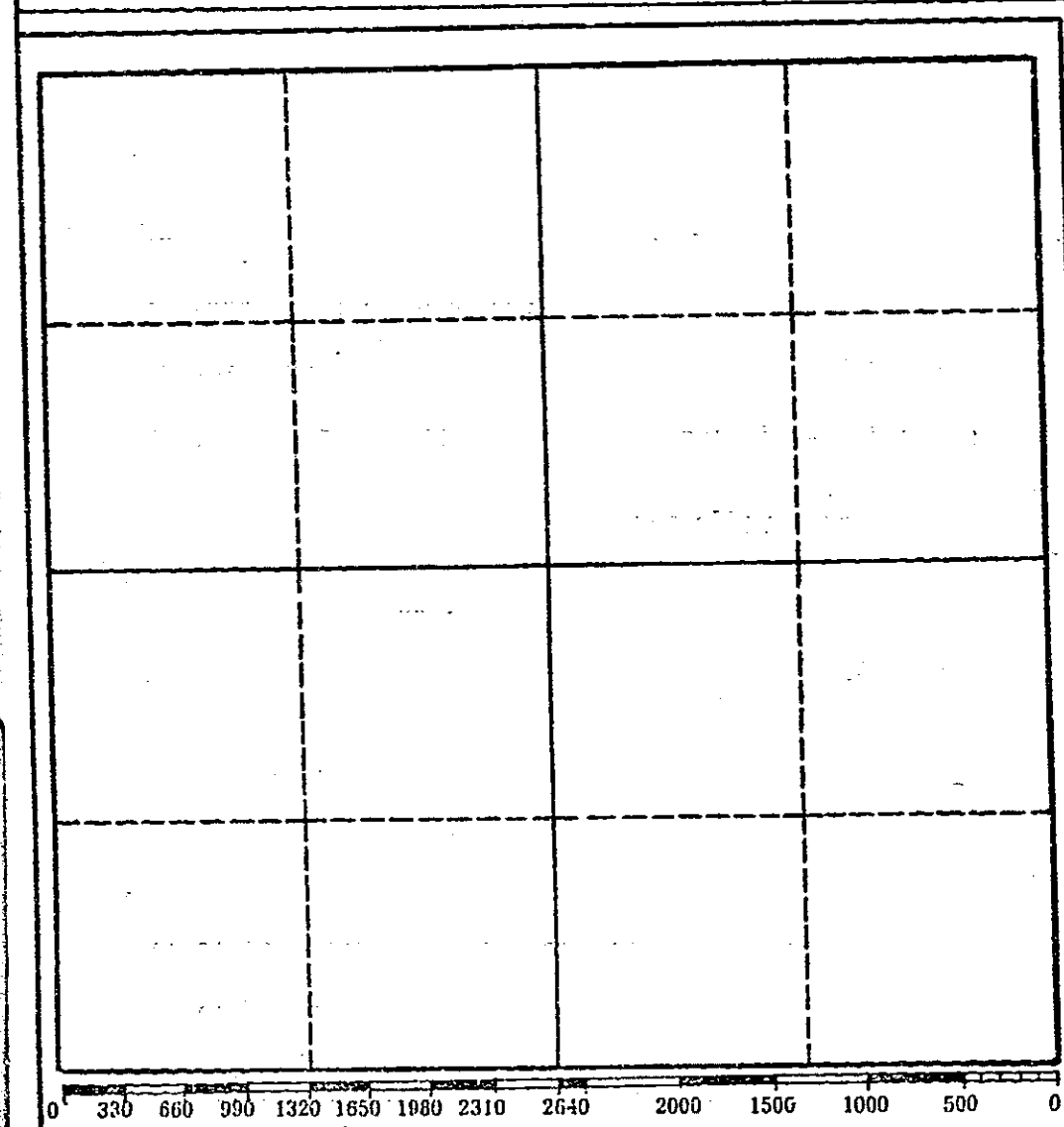
3. All distances shown on the plat must be from the outer boundaries of the Section.

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: SUBURBAN COMPANIES
(OPERATOR)

to drill a well to be known as

SUBURBAN COMPANIES #1 FEE STRAT
(WELL NAME)

located 150' FWL - 1500' FNL

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

The None (Strat Test) 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 16th day of JUNE, 19 71.

OIL AND GAS CONSERVATION COMMISSION

By W.E.C. for John Bannister
EXECUTIVE SECRETARY

PERMIT Nº 556

RECEIPT NO. 2890
API NO. 02-001-20142

State of Arizona
Oil & Gas Conservation Commission
Permit to Drill
FORM NO. 27

SAMPLES ARE REQUIRED

DIGITAL SURVEYS, INC.

SONAR SURVEY

PIN 556

Ferrellgas

WELL NO. 1

MARCH 18,1992

ADAMANA, ARIZONA

CUSTOMER REP.:	MR. THOMPSON
SONAR OPERATOR:	BOB POLLOCK
HOIST OPERATOR:	" "
JOB NO.:	253
PERMANENT DATUM:	B.H.F.
ZERO POINT:	B.H.F.
CASING DIA.:	N/A
CASING DEPTH:	
INTERMEDIATE DIA.:	4.5"
INTERMEDIATE DEPTH:	984'
TUBING DIA.:	N/A
TUBING DEPTH:	OUT
TOTAL DEPTH:	985'
GAGE T.D.:	N/A
SONAR T.D.:	985'

REMARKS:
SURVEYED THRU 4.5" TUBING STRING

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
900	274.3	0	0	0.0	0	0.0	0
901	274.6	16	16	.4	0	2.8	2
902	274.9	21	37	.5	1	3.7	6
903	275.2	26	63	.7	1	4.6	11
904	275.5	42	106	1.1	3	7.4	18
905	275.8	150	256	4.2	7	26.7	45
906	276.1	1145	1402	32.4	39	203.9	249
907	276.4	2636	4038	74.6	114	469.4	719
908	276.7	2699	6738	76.4	190	480.6	1200
909	277.0	2260	8999	64.0	254	402.5	1602
910	277.3	1916	10916	54.2	309	341.2	1944
911	277.6	1630	12546	46.1	355	290.3	2234
912	277.9	1214	13761	34.3	389	216.2	2450
913	278.2	649	14410	18.3	408	115.5	2566
914	278.5	205	14616	5.8	413	36.5	2603
915	278.8	64	14681	1.8	415	11.3	2614
916	279.1	50	14731	1.4	417	8.9	2623
917	279.5	37	14769	1.0	418	6.5	2630
918	279.8	20	14789	.5	418	3.5	2633
919	280.1	26	14816	.7	419	4.6	2638
920	280.4	8133	22949	230.3	649	1448.4	4087
921	280.7	23482	46432	665.0	1314	4182.1	8269
922	281.0	23414	69846	663.0	1978	4170.0	12439
924	281.6	46083	115930	1305.0	3283	8207.3	20647
926	282.2	45134	161064	1278.1	4561	8038.3	28685
928	282.8	44916	205981	1272.0	5833	7999.5	36685
930	283.4	45825	251806	1297.7	7131	8161.4	44846
932	284.0	46317	298124	1311.6	8442	8249.0	53095
934	284.6	45458	343582	1287.3	9730	8096.0	61191
936	285.2	43267	386850	1225.3	10955	7705.8	68897
938	285.9	41381	428231	1171.9	12127	7369.9	76267
940	286.5	42665	470897	1208.2	13335	7598.6	83866
942	287.1	47662	518559	1349.7	14685	8488.6	92355
944	287.7	55854	574414	1581.7	16267	9947.5	102303
946	288.3	58636	633051	1660.5	17928	10443.0	112746
948	288.9	52165	685216	1477.3	19405	9290.5	122036
950	289.5	42825	728042	1212.8	20618	7627.1	129664
952	290.1	36111	764153	1022.6	21640	6431.3	136095
954	290.7	33345	797499	944.3	22585	5938.7	142034
956	291.3	30290	827789	857.8	23442	5394.6	147429
958	291.9	27264	855054	772.1	24215	4855.7	152285
960	292.6	24645	879700	697.9	24913	4389.2	156674
962	293.2	22183	901883	628.2	25541	3950.7	160625
964	293.8	19933	921817	564.5	26105	3550.0	164175
966	294.4	17390	939207	492.4	26598	3097.1	167272
968	295.0	14711	953919	416.6	27014	2620.0	169892
970	295.6	12278	966197	347.7	27362	2186.7	172079
972	296.2	9338	975535	264.4	27627	1663.0	173742
974	296.8	6739	982274	190.8	27817	1200.2	174942
975	297.1	2631	984906	74.5	27892	468.5	175411
976	297.4	1998	986905	56.5	27949	355.8	175767
977	297.7	971	987876	27.4	27976	172.9	175940
978	298.0	365	988242	10.3	27987	65.0	176005
979	298.3	239	988481	6.7	27993	42.5	176048

VOLUME REPORT

DEPTH feet	DEPTH meters	INCR ft^3	TOTAL ft^3	INCR m^3	TOTAL m^3	INCR bbls	TOTAL bbls
980	298.7	158	988640	4.4	27998	28.1	176076
981	299.0	104	988744	2.9	28001	18.5	176095
982	299.3	65	988810	1.8	28003	11.5	176107
983	299.6	42	988852	1.1	28004	7.4	176114
984	299.9	20	988873	.5	28004	3.5	176118
985	300.2	6	988879	.1	28005	1.0	176119

MAJOR COMPASS RADII

Depth & Radii in feet

DEPTH	TILT	N	NE	E	SE	S	SW	W	NW
900	90	2.4	2.7	2.5	2.0	1.1	1.1	2.0	2.3
901	90	2.7	2.5	2.4	2.6	2.2	2.3	2.3	2.5
902	90	3.0	3.0	2.8	2.6	2.4	2.2	2.4	2.8
903	90	3.2	3.5	3.2	3.2	2.8	2.8	2.8	3.2
904	90	3.5	4.9	3.3	4.9	4.3	4.3	3.9	4.1
905	90	9.8	8.2	9.4	9.4	9.4	9.4	9.2	9.0
906	90	26.7	26.5	29.4	27.7	28.0	28.6	28.0	24.5
907	90	30.5	32.6	33.1	32.0	28.8	27.7	28.2	30.9
908	90	26.7	30.5	31.8	30.3	28.2	24.8	25.6	27.5
909	90	22.8	27.7	29.7	28.6	24.1	22.4	23.1	22.4
910	90	21.1	26.7	28.2	27.3	23.1	20.3	20.9	19.0
911	90	17.9	24.3	26.5	24.8	22.6	19.0	17.7	16.7
912	90	16.5	20.3	18.8	19.0	18.8	15.8	14.1	14.3
913	90	10.7	12.8	12.8	10.7	6.9	10.7	10.9	10.9
914	90	4.5	5.2	4.3	4.5	4.5	5.2	4.9	5.8
915	90	4.1	3.7	3.7	3.8	4.1	4.6	4.7	5.2
916	90	3.2	3.9	3.1	3.3	3.5	3.6	4.2	4.5
917	90	3.1	3.5	3.3	3.1	2.5	2.7	3.3	3.8
918	90	1.5	2.3	2.3	1.3	1.3	1.5	2.2	2.6
919	90	3.9	4.1	4.0	3.6	3.4	3.7	3.8	3.8
920	90	84.8	91.0	94.6	91.9	85.3	83.8	81.0	76.1
921	90	87.2	89.5	95.1	92.1	85.0	84.0	80.4	83.3
922	90	85.3	87.8	87.8	85.0	90.6	85.2	80.6	79.3
924	90	86.5	85.2	83.3	85.7	89.1	86.7	81.6	82.5
926	90	81.6	80.6	89.1	80.3	89.1	88.0	84.8	83.6
928	90	82.9	85.0	81.0	86.7	86.1	85.5	82.1	84.8
930	90	88.5	84.4	82.9	85.0	86.8	85.3	84.2	85.5
932	90	89.9	86.3	82.7	83.6	88.0	85.0	85.2	86.5
934	90	90.6	85.9	82.3	81.8	85.3	82.3	85.2	85.3
936	90	88.4	81.8	80.1	77.2	81.0	80.1	81.0	85.9
938	90	85.0	76.7	79.1	78.4	81.2	77.2	80.8	84.6
940	90	83.6	79.1	83.5	81.2	81.6	81.2	93.6	94.0
942	90	89.3	84.4	85.9	85.2	91.0	93.8	93.6	91.9
944	90	90.2	98.5	107.8	115.1	99.3	94.4	87.8	90.8
946	90	94.2	95.7	102.3	103.6	94.0	88.7	84.2	89.1
948	90	92.9	80.8	81.6	98.0	89.3	86.1	77.8	85.3
950	90	79.5	78.9	78.7	80.3	78.2	72.5	70.8	78.9
952	90	77.4	76.7	74.4	77.0	70.8	70.8	66.1	75.9
954	90	75.0	71.4	72.5	74.6	69.7	67.2	64.0	74.0
956	90	69.9	66.7	73.7	67.6	67.8	59.1	64.4	71.2
958	90	68.0	65.2	67.4	64.4	64.6	55.9	62.0	66.3
960	90	63.3	61.8	66.1	61.2	60.3	54.0	60.1	62.5
962	90	61.2	58.4	61.4	59.3	59.0	50.8	59.0	59.1
964	90	56.1	52.0	57.1	55.6	58.4	49.3	49.9	56.9
966	90	53.9	48.6	52.4	48.0	53.7	46.1	46.5	49.5
968	90	48.2	41.6	49.5	46.1	46.3	45.6	42.9	45.8
970	90	44.4	34.4	47.6	42.7	46.1	44.2	39.9	42.0
972	90	27.1	29.5	34.4	39.7	42.2	37.1	35.6	31.6
974	90	23.7	27.5	33.5	31.4	35.6	30.5	32.9	25.6
975	90	20.3	25.0	22.9	29.4	29.5	30.1	30.3	24.1

MAJOR COMPASS RADII

Depth & Radii in feet

DEPTH	TILT	N	NE	E	SE	S	SW	W	NW
976	90	13.3	16.7	19.0	25.8	29.5	30.1	28.4	16.3
977	90	9.8	12.8	16.9	9.2	11.3	12.6	10.3	9.4
978	90	9.8	10.3	10.5	8.2	10.7	9.6	8.2	7.9
979	90	6.9	8.4	8.2	6.4	7.1	9.2	7.9	6.5
980	90	5.6	7.1	7.3	6.4	6.7	7.7	6.0	5.2
981	90	4.0	5.0	5.5	5.3	5.2	5.7	4.4	3.9
982	90	4.3	4.7	4.0	4.4	4.3	3.9	4.0	4.2
983	90	3.5	3.8	3.4	3.2	3.2	2.8	3.2	3.0
984	90	2.3	1.6	2.1	1.8	2.0	2.3	2.1	2.1
985	90	.8	.8	.8	.8	.8	.8	.8	.8

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 900 ft TILT: 90 degrees

0	2.4	2.4	2.4	2.3	2.1	2.1	2.6	2.6	2.8
45	2.7	2.6	2.6	2.5	2.5	2.6	2.5	2.5	2.6
90	2.5	2.5	2.5	2.5	2.3	2.3	2.2	2.1	2.1
135	2.0	2.0	2.2	2.1	2.2	2.2	1.0	1.1	1.2
180	1.1	1.1	1.1	1.3	1.3	1.2	1.2	1.3	1.3
225	1.1	1.5	1.6	1.9	1.9	1.9	1.9	1.9	2.0
270	2.0	2.1	2.2	2.3	2.4	2.4	2.4	2.3	2.3
315	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.4	2.4

AZ DEPTH: 901 ft TILT: 90 degrees

0	2.7	3.0	2.7	2.6	2.7	2.7	2.6	2.5	2.5
45	2.5	2.7	2.7	2.6	2.7	2.7	2.5	2.4	2.4
90	2.4	2.4	2.4	2.5	2.5	2.5	2.6	2.5	2.6
135	2.6	2.5	2.6	2.6	2.7	2.4	2.3	2.3	2.3
180	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3
225	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
270	2.3	2.3	2.3	2.3	2.3	2.5	2.5	2.5	2.5
315	2.5	2.5	2.6	2.7	2.9	2.7	2.7	2.7	2.7

AZ DEPTH: 902 ft TILT: 90 degrees

0	3.0	2.8	2.8	2.8	2.8	2.8	3.0	2.8	3.0
45	3.0	3.2	3.0	2.8	2.8	3.0	3.0	2.8	2.8
90	2.8	2.6	2.6	3.0	3.0	3.0	2.8	2.8	2.8
135	2.6	2.8	3.0	2.8	2.8	2.8	2.8	2.6	2.4
180	2.4	2.4	2.4	2.4	2.6	2.4	2.6	2.4	2.4
225	2.2	2.2	2.4	2.4	2.4	2.6	2.4	2.4	2.6
270	2.4	2.4	2.6	2.4	2.6	2.6	2.6	2.6	2.8
315	2.8	2.8	2.8	2.8	2.8	3.0	2.8	3.0	2.8

AZ DEPTH: 903 ft TILT: 90 degrees

0	3.2	3.2	3.2	3.3	3.3	3.3	3.3	3.2	3.5
45	3.5	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
90	3.2	3.2	3.2	3.2	3.3	3.2	3.2	3.2	3.2
135	3.2	3.2	3.2	3.2	3.2	3.0	3.0	2.8	2.8
180	2.8	2.8	2.8	2.8	2.8	2.8	3.0	2.8	2.8
225	2.8	3.0	2.8	2.8	2.6	2.8	2.8	2.8	2.8
270	2.8	3.0	2.8	2.8	3.0	3.2	3.2	3.2	3.2
315	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2

AZ DEPTH: 904 ft TILT: 90 degrees

0	3.5	3.7	4.1	3.7	3.7	4.7	5.0	5.0	5.0
45	4.9	4.9	4.9	4.9	4.7	4.3	3.9	3.9	3.5
90	3.3	3.5	3.5	3.9	4.5	4.7	4.7	4.7	4.7
135	4.9	4.7	4.3	4.1	3.7	4.5	3.3	3.3	3.3
180	4.3	4.5	4.3	4.3	3.3	3.7	4.5	4.3	4.5
225	4.3	3.7	4.3	4.5	3.3	4.3	3.9	3.3	3.3
270	3.9	4.1	3.9	3.7	4.7	4.3	4.7	4.7	4.9
315	4.1	3.5	3.5	3.5	4.1	4.3	3.5	3.7	3.5

5 DEGREE RADII REPORT

Radii in feet

AZ	DEPTH: 905 ft				TILT: 90 degrees				
0	9.8	9.2	9.2	9.4	9.0	9.0	8.8	8.4	9.0
45	8.2	9.6	9.6	8.4	8.2	8.1	8.4	8.6	8.4
90	9.4	9.6	9.9	8.8	9.6	9.2	9.4	9.4	9.0
135	9.4	9.9	9.6	9.2	9.4	8.6	9.4	9.2	9.4
180	9.4	9.6	9.6	9.8	9.4	9.4	8.8	9.0	8.8
225	9.4	9.8	9.6	9.2	9.4	10.3	9.9	9.9	9.2
270	9.2	9.8	9.4	9.2	9.4	9.8	9.8	9.6	9.8
315	9.0	9.8	9.4	9.6	9.2	9.9	9.8	9.8	9.2

AZ	DEPTH: 906 ft				TILT: 90 degrees				
0	26.7	26.9	26.9	26.9	26.0	24.1	24.8	24.8	25.2
45	26.5	27.1	27.7	28.0	27.1	26.9	27.8	28.2	29.9
90	29.4	28.6	27.7	27.7	28.0	28.8	27.7	26.5	27.5
135	27.7	28.0	27.5	27.3	27.8	28.2	29.4	27.5	28.8
180	28.0	26.7	30.5	29.5	26.9	27.8	29.0	27.8	27.7
225	28.6	28.6	28.2	28.6	28.0	28.8	28.4	28.4	27.8
270	28.0	28.0	25.4	28.0	27.1	26.3	27.5	25.0	26.3
315	24.5	24.1	26.3	25.0	23.3	26.3	27.5	27.3	25.2

AZ	DEPTH: 907 ft				TILT: 90 degrees				
0	30.5	29.2	29.5	30.3	31.1	29.5	31.4	32.0	32.6
45	32.6	33.3	32.9	33.9	34.1	33.1	32.6	31.6	32.2
90	33.1	31.4	32.0	31.6	31.8	31.2	31.8	32.0	30.7
135	32.0	30.5	30.7	29.7	29.9	27.5	32.2	30.9	32.6
180	28.8	35.0	32.9	32.4	32.6	28.8	28.0	30.1	28.0
225	27.7	27.5	26.9	27.5	28.6	28.0	27.3	27.8	28.2
270	28.2	26.5	27.5	29.0	28.4	27.7	30.5	30.1	30.7
315	30.9	29.5	31.6	29.0	29.7	30.9	29.2	29.9	30.7

AZ	DEPTH: 908 ft				TILT: 90 degrees				
0	26.7	28.8	30.9	30.1	29.2	31.1	33.3	30.9	29.7
45	30.5	31.8	29.4	29.0	30.3	31.8	31.1	31.1	31.1
90	31.8	32.2	32.4	31.6	32.9	31.4	32.0	31.1	30.9
135	30.3	30.1	29.9	29.5	28.2	27.3	26.3	26.0	26.7
180	28.2	25.4	25.0	25.8	26.5	25.6	26.7	26.3	25.2
225	24.8	23.5	24.5	24.5	24.6	24.6	25.0	25.4	24.6
270	25.6	26.5	26.0	25.6	26.0	27.3	24.6	24.5	27.7
315	27.5	26.0	25.8	26.3	24.5	24.8	25.2	24.6	25.6

AZ	DEPTH: 909 ft				TILT: 90 degrees				
0	22.8	25.0	27.7	26.9	27.7	27.7	28.4	27.8	27.5
45	27.7	27.3	27.5	27.1	27.8	28.0	28.6	30.5	29.2
90	29.7	33.1	32.6	31.8	31.6	32.2	32.0	31.6	28.2
135	28.6	27.7	27.7	27.7	27.1	26.5	24.8	25.2	23.9
180	24.1	23.1	23.1	22.9	22.9	22.4	22.0	23.1	22.6
225	22.4	21.8	22.4	22.8	21.8	22.4	21.3	21.4	21.8
270	23.1	22.6	22.8	23.1	22.9	23.3	22.2	21.3	21.3
315	22.4	20.7	21.3	21.8	21.4	21.3	21.1	21.8	21.6

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 910 ft TILT: 90 degrees

AZ									
0	21.1	22.0	23.9	25.4	26.0	26.2	26.3	26.3	26.3
45	26.7	26.0	26.2	25.8	25.6	26.0	27.5	28.0	28.4
90	28.2	29.7	29.9	29.7	29.7	29.7	29.7	29.5	28.8
135	27.3	27.5	26.5	26.3	25.8	25.2	24.6	24.6	23.7
180	23.1	22.9	22.2	21.4	21.4	21.4	21.6	20.7	20.1
225	20.3	20.3	20.9	20.3	19.7	19.7	19.7	19.6	19.9
270	20.9	20.9	21.4	21.3	20.7	20.3	20.1	20.1	19.6
315	19.0	19.2	19.6	19.0	18.6	18.4	18.6	19.7	20.3

AZ DEPTH: 911 ft TILT: 90 degrees

AZ									
0	17.9	18.8	20.3	21.1	22.8	23.7	25.0	24.8	25.0
45	24.3	24.8	24.3	24.1	24.6	24.3	24.1	26.2	25.4
90	26.5	25.8	26.9	27.5	27.5	26.5	26.9	27.7	25.6
135	24.8	25.0	24.8	25.0	23.9	23.9	23.1	23.3	22.6
180	22.6	22.0	21.4	20.1	19.6	19.2	19.4	19.0	18.6
225	19.0	19.0	18.2	18.8	17.9	17.9	17.7	17.1	17.1
270	17.7	18.6	18.2	18.8	19.7	18.0	17.9	17.5	17.1
315	16.7	16.0	16.7	16.5	16.2	16.5	16.2	16.9	17.3

AZ DEPTH: 912 ft TILT: 90 degrees

AZ									
0	16.5	17.1	16.7	18.6	20.7	21.8	22.4	22.4	20.3
45	20.3	20.3	19.9	19.0	19.9	19.9	19.6	19.4	19.2
90	18.8	18.8	16.0	15.8	18.8	18.4	21.3	16.7	17.1
135	19.0	18.0	18.6	20.9	21.3	20.9	19.0	18.8	18.4
180	18.8	19.2	18.0	17.3	17.1	16.9	16.7	16.2	14.8
225	15.8	14.7	14.5	15.6	15.4	15.6	15.4	14.5	13.7
270	14.1	15.2	15.8	16.7	16.2	15.2	15.2	14.8	14.1
315	14.3	14.5	13.9	13.9	13.9	13.5	13.7	15.0	15.4

AZ DEPTH: 913 ft TILT: 90 degrees

AZ									
0	10.7	8.8	9.4	9.2	9.0	10.7	10.1	13.3	12.4
45	12.8	12.2	12.4	12.6	13.1	13.1	13.3	12.8	11.6
90	12.8	11.4	13.0	12.0	11.8	11.8	11.6	11.8	10.9
135	10.7	10.3	11.1	9.8	9.4	8.8	8.6	8.2	9.0
180	6.9	7.3	7.3	8.4	9.0	9.4	9.6	10.3	10.7
225	10.7	10.7	11.1	11.3	11.6	11.1	11.4	11.8	11.1
270	10.9	10.5	10.1	11.1	11.3	10.7	11.1	11.4	11.1
315	10.9	11.1	11.1	11.1	10.7	11.4	10.9	11.1	11.1

AZ DEPTH: 914 ft TILT: 90 degrees

AZ									
0	4.5	4.3	4.3	4.7	4.9	4.9	5.0	4.9	5.2
45	5.2	5.2	5.0	5.0	4.7	4.5	4.5	4.3	4.3
90	4.3	4.5	4.3	4.5	4.9	4.9	4.7	4.7	4.5
135	4.5	4.3	4.1	4.3	4.3	4.3	4.3	4.3	4.3
180	4.5	4.5	4.7	4.5	4.3	4.7	4.7	4.7	5.0
225	5.2	5.2	5.2	4.5	5.0	4.9	5.0	4.9	4.9
270	4.9	5.0	4.9	4.9	4.9	5.0	5.0	5.8	6.0
315	5.8	5.6	5.4	5.0	5.0	4.9	4.7	4.5	4.5

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 915 ft TILT: 90 degrees

0	4.1	3.8	3.9	3.8	3.7	3.7	3.8	3.9	3.8
45	3.7	3.8	4.0	4.0	4.2	4.2	4.0	3.9	3.8
90	3.7	3.7	3.5	3.6	3.7	3.6	3.8	3.9	3.8
135	3.8	3.9	3.8	3.8	3.9	4.0	3.9	4.0	3.9
180	4.1	4.0	4.1	4.2	4.5	4.5	4.5	4.5	4.6
225	4.6	4.6	4.6	4.7	4.6	4.7	4.6	4.7	4.6
270	4.7	4.7	4.7	4.7	4.7	4.8	4.8	5.0	5.2
315	5.2	5.1	4.9	4.7	4.7	4.7	4.3	4.4	4.1

AZ DEPTH: 916 ft TILT: 90 degrees

0	3.2	3.5	3.5	3.6	3.6	3.6	3.8	3.7	3.8
45	3.9	3.9	3.8	3.9	3.7	3.8	3.6	3.4	3.1
90	3.1	3.1	3.1	3.2	3.3	3.4	3.4	3.4	3.4
135	3.3	3.4	3.3	3.3	3.4	3.4	3.3	3.4	3.4
180	3.5	3.3	3.3	3.3	3.3	3.5	3.5	3.4	3.7
225	3.6	3.8	3.8	4.0	4.0	3.9	3.9	3.8	4.0
270	4.2	4.1	4.3	4.2	4.3	4.4	4.5	4.5	4.4
315	4.5	4.3	4.1	4.1	4.1	3.8	3.6	3.4	3.3

AZ DEPTH: 917 ft TILT: 90 degrees

0	3.1	3.1	3.1	3.1	3.1	3.3	3.3	3.4	3.3
45	3.5	3.5	3.6	3.6	3.5	3.6	3.4	3.4	3.2
90	3.3	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.3
135	3.1	3.1	3.1	3.1	2.8	2.7	2.5	2.6	2.7
180	2.5	2.6	2.4	2.4	2.5	2.5	2.5	2.6	2.8
225	2.7	2.8	2.5	2.7	2.8	2.8	2.8	3.1	3.3
270	3.3	3.2	3.5	3.6	3.6	3.6	3.6	3.7	3.8
315	3.8	3.6	3.6	3.6	3.5	3.4	3.2	3.3	3.1

AZ DEPTH: 918 ft TILT: 90 degrees

0	1.5	1.6	1.7	1.9	2.4	2.3	2.4	2.1	2.3
45	2.3	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1
90	2.3	2.1	1.9	1.8	1.4	1.4	1.5	1.4	1.3
135	1.3	1.4	1.3	1.3	1.3	1.5	1.4	1.4	1.4
180	1.3	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5
225	1.5	1.6	1.6	1.6	1.5	1.5	1.6	1.7	2.1
270	2.2	2.2	2.3	2.3	2.2	2.2	2.1	2.5	2.6
315	2.6	2.7	2.7	2.7	2.6	2.6	2.6	1.6	1.6

AZ DEPTH: 919 ft TILT: 90 degrees

0	3.9	3.9	3.9	3.9	4.1	4.1	4.0	3.9	4.0
45	4.1	3.9	3.9	3.9	3.7	3.7	3.7	3.8	3.8
90	4.0	4.1	3.9	3.7	3.7	3.7	3.5	3.5	3.5
135	3.6	3.7	3.7	3.8	3.8	3.6	3.7	3.6	3.5
180	3.4	3.3	3.3	3.5	3.5	3.5	3.5	3.7	3.6
225	3.7	3.8	3.9	3.9	3.9	3.9	4.0	4.0	3.8
270	3.8	3.8	3.9	3.9	4.0	3.9	3.8	3.8	3.8
315	3.8	3.9	3.8	3.7	3.8	3.8	4.0	3.8	3.8

5 DEGREE RADII REPORT

Radii in feet

AZ	DEPTH: 920 ft				TILT: 90 degrees				
0	84.8	85.7	81.6	81.8	82.5	83.3	86.8	88.7	89.7
45	91.0	90.8	90.8	90.1	89.5	93.8	93.8	96.3	95.3
90	94.6	93.1	90.6	87.8	88.2	86.8	87.2	89.1	91.0
135	91.9	92.5	93.3	93.1	93.1	91.7	89.5	88.2	85.9
180	85.3	85.9	85.2	85.7	85.3	85.0	84.6	83.8	83.8
225	83.8	84.4	83.3	84.2	83.1	81.9	81.6	81.2	81.4
270	81.0	80.6	80.3	80.8	82.1	83.1	81.4	78.2	75.9
315	76.1	78.0	77.6	79.5	81.0	84.8	87.0	83.3	82.9

AZ	DEPTH: 921 ft				TILT: 90 degrees				
0	87.2	88.9	81.8	83.5	81.9	80.4	82.9	86.8	88.5
45	89.5	90.1	90.2	90.1	90.1	93.3	95.3	95.7	95.1
90	95.1	94.4	91.4	90.2	87.8	87.0	86.7	87.8	90.6
135	92.1	92.3	92.9	92.9	93.4	92.1	90.6	88.7	86.1
180	85.0	85.9	84.8	85.5	86.1	85.5	85.0	84.4	83.8
225	84.0	83.6	83.5	83.6	82.5	81.9	81.8	81.2	80.8
270	80.4	80.3	80.4	80.3	82.1	80.1	79.5	88.7	87.2
315	83.3	81.8	81.0	81.8	85.9	87.8	85.3	86.5	88.4

AZ	DEPTH: 922 ft				TILT: 90 degrees				
0	85.3	86.8	87.4	84.6	84.4	82.5	82.7	83.1	84.8
45	87.8	88.2	89.3	90.4	89.3	88.0	86.5	85.9	86.7
90	87.8	87.0	83.8	85.3	86.8	86.7	85.7	84.4	84.0
135	85.0	89.1	90.6	92.1	94.4	93.1	92.7	92.9	92.3
180	90.6	88.2	86.7	85.9	87.0	87.6	87.4	87.0	86.3
225	85.2	84.6	84.2	84.2	83.3	83.1	83.1	82.3	81.4
270	80.6	80.3	80.6	80.8	83.1	83.3	83.8	83.3	80.8
315	79.3	80.6	81.9	83.1	83.8	85.2	85.2	86.3	86.7

AZ	DEPTH: 924 ft				TILT: 90 degrees				
0	86.5	85.0	84.2	85.2	85.0	82.9	81.0	81.8	82.3
45	85.2	87.2	87.8	89.9	89.7	89.3	87.0	81.6	82.1
90	83.3	81.6	83.1	79.3	79.3	81.9	82.7	86.1	85.3
135	85.7	88.0	93.4	92.7	91.7	93.3	91.6	91.6	91.6
180	89.1	87.6	87.8	80.0	87.8	88.0	86.3	88.4	86.3
225	86.7	85.5	84.8	85.5	85.0	85.3	84.8	83.8	82.3
270	81.6	81.9	81.8	81.2	81.2	82.3	82.9	83.8	82.9
315	82.5	81.2	81.4	81.0	82.1	82.5	83.5	85.3	85.2

AZ	DEPTH: 926 ft				TILT: 90 degrees				
0	81.6	83.3	85.7	84.2	82.7	81.9	81.9	83.3	83.5
45	80.6	80.6	80.6	81.4	84.4	85.9	86.1	88.2	89.5
90	89.1	85.7	83.3	83.6	82.5	80.4	77.6	78.0	79.1
135	80.3	83.1	84.2	83.5	80.8	85.0	86.1	87.6	88.5
180	89.1	90.1	90.1	88.7	85.9	85.7	85.0	86.3	87.4
225	88.0	87.6	87.8	85.9	85.3	85.3	84.8	85.2	84.8
270	84.8	84.2	82.5	81.8	81.8	81.6	82.1	82.7	84.4
315	83.6	83.5	83.1	84.0	83.3	82.3	82.1	81.9	82.5

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 928 ft TILT: 90 degrees

0	82.9	83.8	83.1	81.4	81.0	82.3	83.3	83.8	84.8
45	85.0	86.1	86.3	84.4	83.5	83.5	82.9	82.9	82.1
90	81.0	81.0	82.9	85.0	85.9	87.4	85.3	84.2	87.8
135	86.7	88.5	87.4	85.9	84.8	89.1	87.6	86.8	86.1
180	86.1	83.3	85.0	88.5	87.4	86.8	85.7	86.3	85.7
225	85.5	86.1	85.7	85.5	85.0	83.8	83.3	82.7	82.1
270	82.1	83.1	84.6	85.7	84.2	86.8	87.2	85.0	84.4
315	84.8	84.6	83.8	85.2	86.5	87.6	86.1	85.7	84.6

AZ DEPTH: 930 ft TILT: 90 degrees

0	88.5	86.3	85.0	84.4	84.8	84.4	83.6	83.5	84.4
45	84.4	85.9	86.1	86.7	85.9	84.4	84.2	84.4	84.0
90	82.9	81.9	83.3	85.3	85.9	86.3	85.5	85.0	83.5
135	85.0	86.7	87.4	85.3	83.8	84.2	85.7	87.4	88.0
180	86.8	88.2	89.3	88.7	89.9	89.1	88.0	86.5	86.1
225	85.3	86.5	86.3	87.2	85.3	83.3	83.8	83.5	84.0
270	84.2	84.4	83.6	85.9	86.5	86.3	86.8	86.7	86.3
315	85.5	86.3	86.1	85.7	87.2	87.8	87.0	87.4	88.2

AZ DEPTH: 932 ft TILT: 90 degrees

0	89.9	87.6	87.4	87.0	86.5	85.3	84.2	86.3	86.3
45	86.3	85.9	87.0	86.1	85.2	83.8	84.4	83.6	83.1
90	82.7	81.4	84.4	84.2	84.6	83.6	83.8	83.3	82.7
135	83.6	84.6	85.5	81.0	81.0	79.9	83.8	86.5	87.4
180	88.0	87.4	87.4	87.8	89.1	87.2	86.1	84.4	83.8
225	85.0	86.7	86.7	87.0	86.1	86.3	84.2	83.5	84.2
270	85.2	85.5	84.8	86.3	86.7	87.2	86.8	87.4	86.5
315	86.5	86.5	87.0	87.6	89.3	90.1	90.1	89.5	90.6

AZ DEPTH: 934 ft TILT: 90 degrees

0	90.6	89.3	88.4	89.5	88.4	87.4	88.0	88.4	87.4
45	85.9	85.5	80.8	82.3	84.8	82.9	80.1	76.1	81.4
90	82.3	81.8	82.9	81.8	78.4	80.1	79.3	81.0	82.9
135	81.8	77.2	78.0	79.3	80.6	80.6	84.8	83.6	83.6
180	85.3	86.3	84.6	84.2	81.4	81.8	79.9	81.0	82.3
225	82.3	82.7	82.5	83.3	82.5	81.0	83.1	84.6	84.4
270	85.2	86.1	35.9	85.7	85.5	86.3	85.0	85.0	85.5
315	85.3	84.8	87.4	88.5	89.1	89.1	89.3	90.6	89.9

AZ DEPTH: 936 ft TILT: 90 degrees

0	88.4	87.4	86.8	86.1	86.1	86.3	86.1	86.1	84.6
45	81.8	78.7	77.4	79.9	80.1	78.2	75.5	76.7	78.0
90	80.1	80.6	79.1	78.7	77.0	78.0	77.2	79.7	79.9
135	77.2	76.1	76.5	77.4	77.8	79.5	79.7	77.2	80.3
180	81.0	83.1	81.6	79.7	77.8	77.0	76.7	77.8	80.6
225	80.1	79.9	81.2	79.1	78.6	78.4	79.1	81.6	82.1
270	81.0	83.3	85.0	84.8	84.6	84.2	84.0	85.0	85.7
315	85.9	85.2	85.2	87.4	86.7	86.7	88.2	88.7	88.2

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 938 ft TILT: 90 degrees

0	85.0	85.0	85.2	85.2	84.8	84.8	83.8	80.8	78.2
45	76.7	75.7	77.6	78.4	77.8	77.8	76.5	79.1	80.3
90	79.1	80.1	79.9	80.3	79.5	77.8	78.9	78.6	78.2
135	78.4	76.7	77.2	78.4	79.9	80.4	78.4	78.0	80.8
180	81.2	79.1	78.0	76.7	74.6	75.0	78.4	77.2	77.2
225	77.2	72.5	74.6	75.5	73.5	76.3	78.9	80.3	82.7
270	80.8	84.4	84.8	86.8	86.7	85.7	85.7	87.0	83.5
315	84.6	85.3	85.7	85.0	85.9	86.1	85.3	84.6	83.8

AZ DEPTH: 940 ft TILT: 90 degrees

0	83.6	82.7	82.5	82.7	83.3	83.3	82.3	81.0	78.6
45	79.1	82.3	79.9	81.9	81.4	85.3	81.9	81.4	83.3
90	83.5	81.9	81.9	81.9	81.2	83.5	80.1	82.5	81.4
135	81.2	81.9	82.7	84.2	82.5	79.7	83.6	87.6	85.0
180	81.6	81.9	81.4	78.7	77.8	78.2	79.5	81.2	81.2
225	81.2	76.3	71.8	76.1	78.9	82.9	84.6	87.4	91.4
270	93.6	94.6	97.4	96.3	96.3	94.0	92.5	89.3	93.3
315	94.0	90.4	89.7	88.7	88.2	86.8	86.7	86.8	83.1

AZ DEPTH: 942 ft TILT: 90 degrees

0	89.3	83.5	84.2	82.7	83.5	85.9	85.7	83.1	86.7
45	84.4	85.0	86.3	79.9	81.6	86.7	93.8	91.0	89.1
90	85.9	85.9	89.9	87.6	84.4	85.5	85.0	82.3	82.3
135	85.2	83.5	84.4	85.2	85.2	87.2	88.4	89.1	90.6
180	91.0	92.5	91.9	95.3	94.4	94.0	94.8	94.0	96.8
225	93.8	94.2	94.4	94.8	95.0	93.8	93.8	93.3	92.1
270	93.6	93.1	93.4	94.6	95.7	96.1	97.4	99.5	95.9
315	91.9	91.9	95.1	93.3	92.9	95.0	90.1	88.7	88.2

AZ DEPTH: 944 ft TILT: 90 degrees

0	90.2	88.2	88.9	92.3	93.4	93.8	93.6	92.3	92.7
45	98.5	100.2	101.9	102.9	99.5	97.4	98.0	99.3	102.1
90	107.8	110.0	112.5	111.5	114.2	114.0	115.1	109.8	108.7
135	115.1	113.8	107.8	106.5	106.3	100.8	102.3	98.0	98.2
180	99.3	99.7	96.5	95.0	95.9	95.7	98.7	97.0	96.1
225	94.4	92.5	91.2	93.3	95.5	92.7	89.9	91.0	90.6
270	87.8	91.4	94.0	92.9	92.7	93.8	97.0	91.9	91.4
315	90.8	94.0	95.5	97.6	97.4	99.7	100.4	98.0	96.5

AZ DEPTH: 946 ft TILT: 90 degrees

0	94.2	97.2	94.4	94.2	96.3	97.4	96.5	95.3	95.0
45	95.7	94.8	96.3	96.8	95.5	93.8	94.2	94.6	98.0
90	102.3	103.2	104.0	108.0	103.6	105.9	105.7	104.0	102.5
135	103.6	104.9	101.4	97.8	97.8	93.8	93.4	93.3	93.8
180	94.0	92.9	94.0	93.8	95.0	94.2	94.6	92.7	88.5
225	88.7	89.7	87.8	87.4	88.0	91.9	86.1	85.5	85.3
270	84.2	85.3	85.9	88.2	88.9	86.7	88.2	86.7	88.4
315	89.1	87.2	91.6	95.0	93.3	95.3	95.5	93.4	93.8

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 948 ft TILT: 90 degrees

0	92.9	90.8	84.6	84.0	83.6	85.3	89.1	85.5	82.9
45	80.8	84.8	84.6	87.2	82.1	83.1	82.5	82.1	81.8
90	81.6	83.8	85.7	99.1	98.0	100.2	94.6	98.7	100.4
135	98.0	95.5	97.4	96.3	93.4	92.5	89.9	88.5	88.4
180	89.3	90.6	88.4	88.0	88.7	87.4	89.1	90.1	91.0
225	86.1	82.1	81.6	83.6	83.6	83.8	81.9	81.2	79.9
270	77.8	80.1	82.3	81.4	82.3	82.9	83.6	82.9	83.1
315	85.3	87.2	85.0	85.0	89.7	91.9	90.2	92.3	90.1

AZ DEPTH: 950 ft TILT: 90 degrees

0	79.5	80.1	81.2	79.5	78.7	80.1	78.6	77.8	80.3
45	78.9	77.8	78.9	77.0	76.9	76.7	77.2	77.0	78.4
90	78.7	81.2	81.2	81.8	82.7	81.8	81.6	81.9	81.2
135	80.3	79.7	79.1	78.9	79.3	79.9	79.3	79.7	77.4
180	78.2	71.2	70.8	76.3	74.2	76.1	77.2	76.7	77.6
225	72.5	70.1	72.1	70.4	72.9	73.5	74.0	70.6	68.8
270	70.8	71.2	72.5	73.7	74.6	75.7	75.2	76.7	78.0
315	78.9	78.9	79.3	78.7	79.3	81.0	79.5	77.8	77.8

AZ DEPTH: 952 ft TILT: 90 degrees

0	77.4	79.3	76.1	75.7	77.6	77.8	78.9	76.1	77.0
45	76.7	76.9	76.1	75.9	75.2	72.9	75.0	75.7	75.5
90	74.4	76.7	77.0	78.0	77.6	76.7	77.4	78.0	77.6
135	77.0	77.6	76.9	76.7	76.1	75.4	71.4	71.2	70.8
180	70.8	70.3	70.8	70.3	70.1	69.9	70.8	71.4	72.3
225	70.8	67.8	68.2	67.8	67.8	69.3	70.8	71.2	68.2
270	66.1	65.4	70.3	69.5	72.5	73.8	73.5	74.2	74.6
315	75.9	77.8	77.2	75.9	76.3	77.8	79.3	76.9	77.2

AZ DEPTH: 954 ft TILT: 90 degrees

0	75.0	75.5	74.4	75.4	75.0	74.8	74.2	73.3	72.7
45	71.4	71.4	71.4	70.3	70.1	70.6	71.0	72.5	72.9
90	72.5	74.0	73.8	74.6	75.5	74.2	74.2	74.0	75.5
135	74.6	73.5	72.5	72.7	71.4	72.5	70.8	69.7	69.5
180	69.7	69.5	69.3	68.9	67.8	69.1	68.0	69.1	68.6
225	67.2	66.9	65.7	67.6	67.6	66.1	65.2	62.7	63.1
270	64.0	66.9	68.0	68.4	70.4	71.0	71.8	72.0	71.0
315	74.0	72.7	75.0	74.8	75.0	74.6	73.5	72.7	74.4

AZ DEPTH: 956 ft TILT: 90 degrees

0	69.9	69.7	71.4	70.8	67.8	67.1	68.9	66.3	65.7
45	66.7	67.6	65.0	63.9	65.0	66.1	68.8	69.3	70.4
90	73.7	74.4	74.0	74.0	73.7	72.1	72.0	68.4	68.0
135	67.6	68.2	69.1	70.1	69.3	68.0	69.7	67.1	67.8
180	67.8	66.9	64.4	62.2	61.0	60.6	61.2	61.2	59.3
225	59.1	60.3	60.3	59.9	59.7	61.6	61.8	61.6	62.9
270	64.4	65.7	66.1	67.6	68.4	68.4	69.9	68.2	69.1
315	71.2	70.6	70.1	70.6	70.3	70.3	70.8	72.5	72.1

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 958 ft TILT: 90 degrees

0	68.0	67.8	67.8	68.9	69.1	64.8	63.9	64.4	65.5
45	65.2	63.9	62.9	63.1	61.4	62.0	63.7	68.2	68.8
90	67.4	69.5	69.9	69.7	68.9	67.6	66.9	67.2	65.9
135	64.4	64.2	64.4	65.9	65.9	65.7	65.9	65.0	64.6
180	64.6	63.5	59.0	61.2	56.5	57.1	56.1	55.7	56.5
225	55.9	56.3	57.3	57.6	59.5	58.4	58.4	59.9	60.1
270	62.0	62.2	62.5	63.3	65.0	65.4	64.8	64.8	66.1
315	66.3	68.2	67.8	67.6	68.8	68.4	66.9	68.2	68.2

AZ DEPTH: 960 ft TILT: 90 degrees

0	63.3	63.5	63.1	63.1	63.3	61.6	60.5	61.6	62.2
45	61.8	62.0	61.2	59.7	59.5	59.7	59.5	61.0	63.9
90	66.1	65.5	65.5	65.7	66.9	63.7	63.1	62.5	62.3
135	61.2	62.3	61.4	61.4	61.4	62.7	62.2	62.3	61.2
180	60.3	59.5	60.8	54.8	55.2	54.2	54.0	54.0	52.9
225	54.0	54.0	53.5	53.9	54.2	54.8	58.2	57.8	58.6
270	60.1	59.1	59.9	60.8	62.0	61.4	63.1	62.9	62.3
315	62.5	63.7	62.7	63.9	62.9	64.8	64.8	64.0	62.9

AZ DEPTH: 962 ft TILT: 90 degrees

0	61.2	61.6	59.9	59.7	59.1	59.0	60.1	58.4	58.0
45	58.4	59.0	59.1	59.0	59.0	57.8	57.3	57.1	59.1
90	61.4	61.8	64.2	60.8	55.9	55.4	57.3	59.7	60.3
135	59.3	59.0	57.8	59.5	59.0	59.0	59.5	59.5	59.0
180	59.0	58.4	56.9	55.4	55.2	52.7	53.1	52.2	51.4
225	50.8	51.2	51.0	51.8	51.0	51.8	52.4	52.5	52.0
270	59.0	58.2	58.4	57.3	57.3	58.2	58.0	59.0	59.3
315	59.1	59.7	61.4	60.6	58.6	61.0	60.1	63.5	62.5

AZ DEPTH: 964 ft TILT: 90 degrees

0	56.1	56.1	56.9	56.9	57.3	56.1	54.2	52.5	52.2
45	52.0	50.8	52.7	54.8	54.8	56.9	56.3	55.9	57.1
90	57.1	58.0	57.8	56.3	55.2	55.2	54.6	54.0	54.8
135	55.6	55.7	55.0	54.2	55.0	57.6	56.7	56.3	57.6
180	58.4	58.2	55.4	54.0	54.0	54.2	51.8	51.6	50.8
225	49.3	50.3	49.9	50.1	50.1	48.8	49.5	49.7	50.3
270	49.9	50.1	50.8	52.5	53.5	59.0	59.0	59.0	55.9
315	56.9	56.1	55.7	56.1	55.7	55.4	55.0	56.1	56.1

AZ DEPTH: 966 ft TILT: 90 degrees

0	53.9	50.5	51.6	51.2	51.0	51.2	49.7	50.1	49.0
45	48.6	48.4	48.2	50.7	51.4	51.2	51.6	52.0	53.5
90	52.4	51.2	51.8	52.7	53.3	51.0	51.4	50.1	49.1
135	48.0	49.7	50.3	50.1	51.0	52.4	53.1	53.5	53.1
180	53.7	51.2	51.2	50.8	50.8	49.0	47.3	48.0	47.6
225	46.1	47.1	46.7	46.7	46.7	46.5	45.9	46.5	46.3
270	46.5	47.5	47.1	47.6	46.7	48.2	48.2	49.0	50.1
315	49.5	50.3	49.9	54.4	55.0	57.6	58.8	58.8	55.7

5 DEGREE RADII REPORT

Radii in feet

AZ	DEPTH: 968 ft			TILT: 90 degrees					
0	48.2	47.8	47.1	49.0	49.5	48.6	51.0	52.2	42.6
45	41.6	41.2	41.2	41.6	41.4	47.1	47.3	50.8	49.9
90	49.5	49.1	49.1	48.6	47.1	47.3	48.2	46.7	46.3
135	46.1	46.1	46.5	47.5	46.3	49.5	47.1	45.0	45.2
180	46.3	45.2	45.6	44.8	45.6	48.2	47.8	46.5	45.6
225	45.6	45.2	45.0	44.4	44.6	44.4	43.7	43.7	44.2
270	42.9	42.6	42.6	42.7	43.9	43.9	45.0	44.6	45.0
315	45.8	47.6	47.3	48.4	48.0	47.3	47.3	47.8	47.3

AZ	DEPTH: 970 ft			TILT: 90 degrees					
0	44.4	46.1	45.6	41.0	37.1	37.3	36.9	34.6	36.3
45	34.4	33.9	37.1	46.1	44.2	42.4	43.5	43.7	41.8
90	47.6	47.3	48.2	43.1	42.7	45.2	45.9	44.8	43.9
135	42.7	41.8	42.4	42.2	41.4	43.5	43.1	43.9	45.8
180	46.1	43.1	43.7	42.7	42.2	42.6	43.7	43.5	44.6
225	44.2	40.9	42.0	40.5	41.4	40.3	40.5	39.7	38.8
270	39.9	38.4	38.0	38.0	36.5	37.3	39.3	40.7	41.6
315	42.0	42.0	42.9	43.7	44.4	45.9	45.2	42.0	44.1

AZ	DEPTH: 972 ft			TILT: 90 degrees					
0	27.1	29.9	31.6	31.1	30.9	29.4	30.3	30.5	29.4
45	29.5	30.3	31.1	31.4	31.8	32.2	33.5	33.3	33.5
90	34.4	34.4	35.0	34.6	34.6	36.9	37.1	37.8	39.0
135	39.7	41.0	40.5	40.5	41.0	42.2	41.8	42.0	41.0
180	42.2	42.7	43.9	41.8	41.6	40.7	40.1	37.7	36.5
225	37.1	37.7	36.5	36.5	36.1	36.0	36.1	36.3	35.4
270	35.6	34.8	34.4	33.3	31.6	32.7	32.6	31.2	31.2
315	31.6	31.4	29.4	27.3	26.2	25.8	25.4	25.6	26.5

AZ	DEPTH: 974 ft			TILT: 90 degrees					
0	23.7	24.8	25.4	26.5	26.9	27.7	27.8	28.0	27.8
45	27.5	26.7	26.5	26.3	25.8	26.0	25.4	25.0	26.0
90	33.5	34.4	34.8	33.3	34.4	34.3	33.3	31.8	31.4
135	31.4	34.3	34.3	34.4	35.2	36.1	37.1	35.6	36.9
180	35.6	35.4	32.6	36.3	38.2	37.3	36.3	34.3	33.1
225	30.5	29.9	29.7	29.9	29.9	35.0	33.9	34.4	32.7
270	32.9	31.2	30.7	30.1	29.7	29.2	29.2	29.4	26.9
315	25.6	26.0	24.6	19.6	19.6	22.9	20.9	21.3	23.3

AZ	DEPTH: 975 ft			TILT: 90 degrees					
0	20.3	22.9	23.9	24.1	23.7	23.5	23.5	23.5	26.2
45	25.0	25.6	24.5	23.7	23.1	21.6	23.1	21.3	20.7
90	22.9	24.6	25.4	26.3	26.0	26.3	27.7	27.8	28.0
135	29.4	32.9	33.9	35.8	34.6	35.2	35.0	34.6	33.1
180	29.5	29.9	31.1	30.9	32.9	32.6	30.7	31.1	29.2
225	30.1	29.5	29.7	29.7	30.3	30.9	30.3	31.4	30.3
270	30.3	29.0	28.0	29.4	28.2	28.0	28.0	26.7	25.0
315	24.1	23.9	19.4	18.4	19.0	19.4	18.8	19.0	19.7

5 DEGREE RADII REPORT

Radii in feet

AZ DEPTH: 976 ft TILT: 90 degrees

0	13.3	13.9	13.7	14.7	14.1	16.7	16.2	16.5	16.2
45	16.7	17.5	17.3	17.5	17.3	17.5	17.9	18.4	19.4
90	19.0	18.8	19.0	19.9	20.1	21.6	25.6	25.2	24.6
135	25.8	26.2	30.3	29.2	30.1	32.2	35.6	34.6	32.7
180	29.5	27.8	22.4	20.9	18.6	18.8	20.3	27.8	31.4
225	30.1	31.1	30.1	30.7	29.7	29.5	30.3	31.1	27.7
270	28.4	26.7	25.8	25.4	25.8	21.1	16.0	16.9	16.2
315	16.3	16.5	16.7	13.1	12.6	12.8	13.0	12.6	15.2

AZ DEPTH: 977 ft TILT: 90 degrees

0	9.8	10.1	10.1	10.3	10.7	10.7	10.9	11.4	11.6
45	12.8	13.7	14.3	15.0	15.2	16.7	16.9	16.7	17.1
90	16.9	16.7	17.1	17.5	11.3	9.9	9.0	8.6	9.4
135	9.2	9.9	9.8	10.1	10.1	10.5	10.3	9.8	10.1
180	11.3	11.3	13.3	13.5	13.9	13.7	13.7	13.5	14.1
225	12.6	12.0	10.9	11.1	11.3	11.4	11.1	11.1	10.9
270	10.3	10.1	9.4	9.9	9.6	9.4	9.4	9.2	9.4
315	9.4	9.2	9.4	9.2	8.8	8.8	8.8	9.6	9.4

AZ DEPTH: 978 ft TILT: 90 degrees

0	9.8	9.8	9.8	9.9	9.9	9.8	9.8	9.9	10.1
45	10.3	9.8	10.5	11.6	15.6	12.4	13.5	12.4	9.4
90	10.5	9.6	8.2	7.9	7.9	8.2	8.2	8.4	8.2
135	8.2	9.0	8.8	9.0	8.6	8.6	9.6	9.8	10.7
180	10.7	12.6	11.6	11.8	11.8	10.3	9.9	10.3	10.3
225	9.6	9.4	9.4	9.6	9.2	8.8	8.6	8.6	8.6
270	8.2	8.2	8.1	8.1	8.4	8.2	8.1	8.1	8.1
315	7.9	7.9	8.2	8.6	8.2	8.6	9.0	9.2	9.8

AZ DEPTH: 979 ft TILT: 90 degrees

0	6.9	6.9	6.9	7.3	7.5	8.2	8.4	8.4	8.6
45	8.4	8.4	8.2	8.4	8.2	7.9	8.2	8.2	8.2
90	8.2	8.4	8.4	8.6	8.6	6.5	6.4	6.5	6.5
135	6.4	6.7	6.7	7.7	7.7	7.5	7.3	7.3	7.3
180	7.1	6.9	7.1	7.3	7.3	7.9	9.0	9.6	9.6
225	9.2	9.0	9.0	8.8	8.4	7.7	8.4	8.1	7.5
270	7.9	7.3	7.3	6.9	6.7	6.4	6.4	6.5	6.4
315	6.5	6.9	6.9	6.7	6.5	6.7	6.7	6.9	6.9

AZ DEPTH: 980 ft TILT: 90 degrees

0	5.6	6.0	5.8	6.0	6.2	6.4	6.5	6.5	6.7
45	7.1	7.1	7.1	7.9	7.3	7.7	7.5	7.3	7.3
90	7.3	7.3	7.1	6.9	6.0	5.6	5.6	5.2	5.4
135	6.4	6.4	6.2	6.2	6.4	6.7	6.7	6.9	6.5
180	6.7	6.7	6.5	6.7	6.7	6.9	6.9	7.3	7.7
225	7.7	7.3	7.7	7.3	7.1	6.9	6.5	6.2	6.4
270	6.0	6.0	5.8	5.6	5.6	5.6	4.9	5.4	5.2
315	5.2	5.2	5.2	5.4	5.6	5.4	5.6	5.4	5.6

5 DEGREE RADII REPORT

Radii in feet

AZ	DEPTH: 981 ft				TILT: 90 degrees				
0	4.0	4.1	4.4	4.6	4.7	4.7	4.8	5.0	5.1
45	5.0	5.0	5.0	5.0	5.1	5.3	5.8	6.0	5.6
90	5.5	5.4	5.9	5.4	5.4	5.2	4.9	4.7	5.0
135	5.3	5.4	5.4	5.4	5.4	5.1	5.1	5.1	5.2
180	5.2	5.2	5.5	5.4	5.5	5.4	5.6	5.5	6.2
225	5.7	5.4	5.3	5.3	5.1	4.9	5.0	5.0	5.0
270	4.4	4.5	4.3	4.1	4.1	4.0	4.0	3.9	3.9
315	3.9	3.9	3.9	4.1	4.0	4.0	4.0	4.0	4.0

AZ	DEPTH: 982 ft				TILT: 90 degrees				
0	4.3	4.4	4.4	4.6	4.4	4.4	4.7	4.9	4.9
45	4.7	4.7	4.5	4.2	4.1	3.9	3.9	4.0	4.0
90	4.0	4.0	4.1	4.1	4.2	4.3	4.3	4.3	4.3
135	4.4	4.5	4.4	4.3	4.2	4.2	4.2	4.3	4.3
180	4.3	4.2	4.2	3.9	3.9	3.8	3.6	3.6	3.6
225	3.9	4.1	4.0	3.8	4.0	3.9	4.0	4.0	4.0
270	4.0	4.0	4.3	4.2	4.5	4.3	4.4	4.3	4.1
315	4.2	4.0	4.0	4.0	4.0	4.0	3.9	4.0	4.2

AZ	DEPTH: 983 ft				TILT: 90 degrees				
0	3.5	3.5	2.3	2.2	2.2	2.2	2.4	2.3	2.3
45	3.8	3.1	3.0	3.1	3.2	3.1	3.3	3.7	3.6
90	3.4	3.2	3.3	3.1	3.1	3.2	3.1	3.2	3.2
135	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.5	3.2
180	3.2	3.2	3.2	3.4	3.3	3.3	3.4	3.1	2.9
225	2.8	2.8	2.8	2.9	2.9	3.1	3.3	3.3	3.2
270	3.2	3.2	3.1	3.2	3.1	3.0	3.0	3.0	3.0
315	3.0	2.9	2.9	3.0	2.9	3.1	3.1	3.5	3.5

AZ	DEPTH: 984 ft				TILT: 90 degrees				
0	2.3	2.2	2.2	2.0	2.1	2.1	1.6	1.6	1.6
45	1.6	1.6	1.6	1.6	1.5	2.2	2.3	2.5	2.3
90	2.1	2.1	2.0	2.0	2.0	1.8	1.8	1.8	1.8
135	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0
180	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.5	2.8
225	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1
270	2.1	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
315	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.1	2.3

AZ	DEPTH: 985 ft				TILT: 90 degrees				
0	.8	.8	.7	.8	.8	1.0	.9	.8	.8
45	.8	.9	.9	1.0	1.0	1.0	.9	.9	.8
90	.8	.8	.8	.8	.8	.8	.8	.8	.8
135	.8	.8	.8	.8	.9	.9	.8	.8	.8
180	.8	.8	.8	.8	.8	.8	.8	.8	.8
225	.8	.8	.8	.8	.9	.9	.9	.9	.9
270	.8	.8	.9	.8	.8	.8	.8	.8	.8
315	.8	.8	.8	.8	.8	.8	.8	.8	.8

MAXIMUM HORIZONTAL RADII

AZM deg	RADIUS ft	DEPTH ft
0	94.2	946
2	95.0	946
4	96.8	946
6	97.6	946
8	97.4	946
10	94.4	946
12	94.6	946
14	94.6	946
16	94.0	944
18	97.2	946
20	96.3	946
22	95.5	946
24	97.2	946
26	97.6	946
28	96.5	946
30	96.5	946
32	96.8	946
34	95.9	946
36	94.8	946
38	94.4	946
40	95.0	946
42	97.0	946
44	99.3	944
46	97.8	944
48	100.6	944
50	100.2	944
52	101.0	944
54	101.4	944
56	102.5	944
58	102.7	944
60	102.9	944
62	101.9	944
64	99.1	944
66	99.9	944
68	98.9	944
70	97.4	944
72	97.0	944
74	97.6	944
76	98.3	944
78	99.1	944
80	99.3	944
82	101.0	944
84	101.7	944
86	102.5	944
88	104.6	944
90	107.8	944
92	107.8	944
94	109.3	944
96	111.0	944
98	112.1	944
100	112.5	944
102	112.3	944
104	111.5	944
106	111.5	944
108	114.0	944
110	114.2	944
112	114.4	944
114	114.6	944
116	113.6	944
118	114.2	944
120	115.1	944
122	112.3	944
124	110.0	944
126	109.7	944
128	109.3	944
130	108.7	944
132	108.1	944
134	112.7	944
136	117.6	944
138	116.8	944
140	113.8	944
142	109.7	944
144	108.5	944
146	107.2	944
148	109.8	944
150	106.5	944
152	109.3	944
154	106.8	944
156	105.9	944
158	105.9	944
160	100.8	944
162	101.2	944
164	100.4	944
166	104.2	944
168	97.8	944
170	98.0	944
172	97.0	944
174	98.2	944
176	98.3	944
178	98.7	944

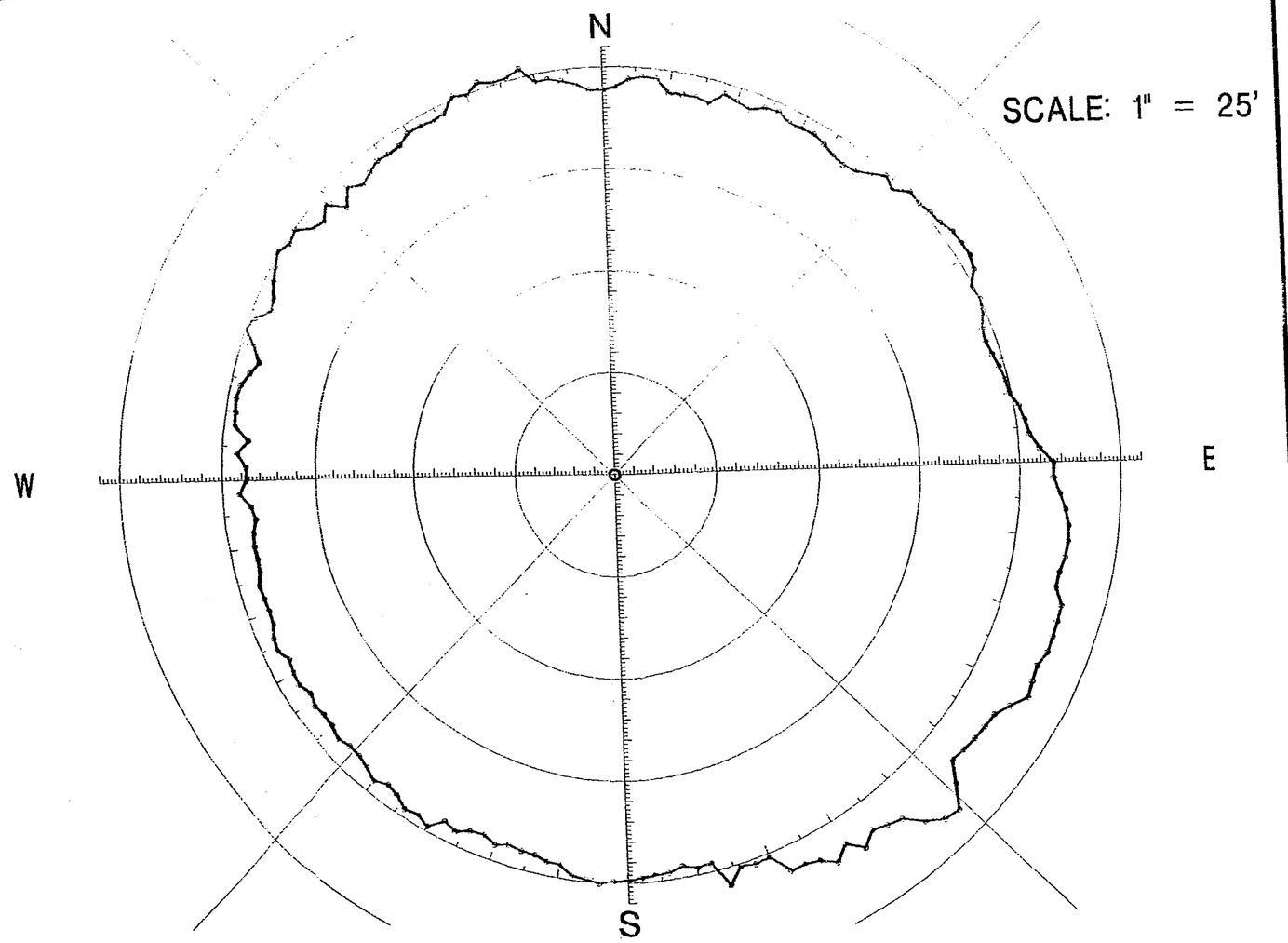
MAXIMUM HORIZONTAL RADII

AZM deg	RADIUS ft	DEPTH ft
180	99.3	944
182	99.5	944
184	100.0	944
186	99.3	944
188	98.7	944
190	96.5	944
192	96.5	944
194	95.5	942
196	95.3	942
198	94.8	944
200	95.9	944
202	94.6	944
204	95.0	944
206	96.7	944
208	95.5	944
210	98.7	944
212	97.2	944
214	98.0	944
216	96.3	944
218	95.3	946
220	96.8	942
222	95.5	944
224	94.6	942
226	94.4	944
228	95.3	944
230	94.2	942
232	94.2	942
234	95.0	942
236	94.0	942
238	95.1	942
240	94.8	942
242	94.0	942
244	95.7	942
246	95.3	944
248	94.0	942
250	93.8	942
252	94.0	942
254	94.4	942
256	93.3	942
258	93.1	942
260	93.3	942
262	92.9	942
264	91.7	942
266	92.7	942
268	95.5	940
270	93.6	940
272	93.6	942
274	96.1	940
276	93.3	940
278	97.2	940
280	97.4	940
282	97.8	940
284	97.2	940
286	95.5	940
288	93.6	942
290	96.3	940
292	99.7	940
294	98.3	942
296	94.8	940
298	95.7	942
300	97.4	942
302	98.7	942
304	100.2	942
306	98.7	942
308	99.5	942
310	95.9	942
312	94.4	942
314	96.7	940
316	92.7	944
318	96.1	942
320	94.0	944
322	95.1	944
324	96.3	942
326	95.9	944
328	96.1	944
330	97.6	944
332	97.6	944
334	97.2	944
336	97.6	944
338	100.6	944
340	99.7	944
342	101.6	944
344	100.4	944
346	100.6	944
348	101.9	944
350	98.0	944
352	98.0	944
354	97.0	944
356	95.9	944
358	94.2	946

Maximum radius : 117.6
On Azmuth deg : 136

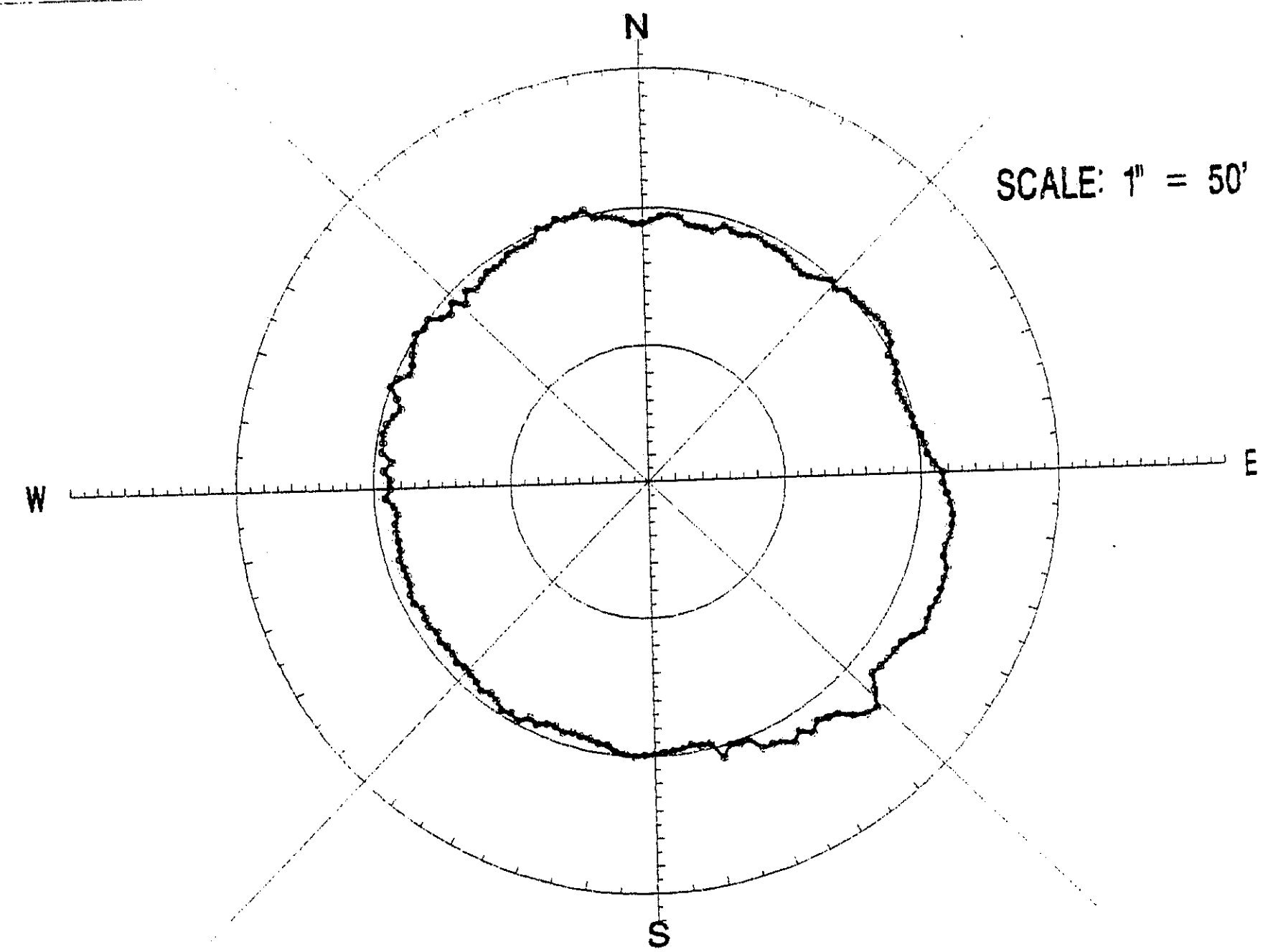
MAXIMUM RADIUS PLOT

03/18/92	Ferrellgas Inc.	No.: 1



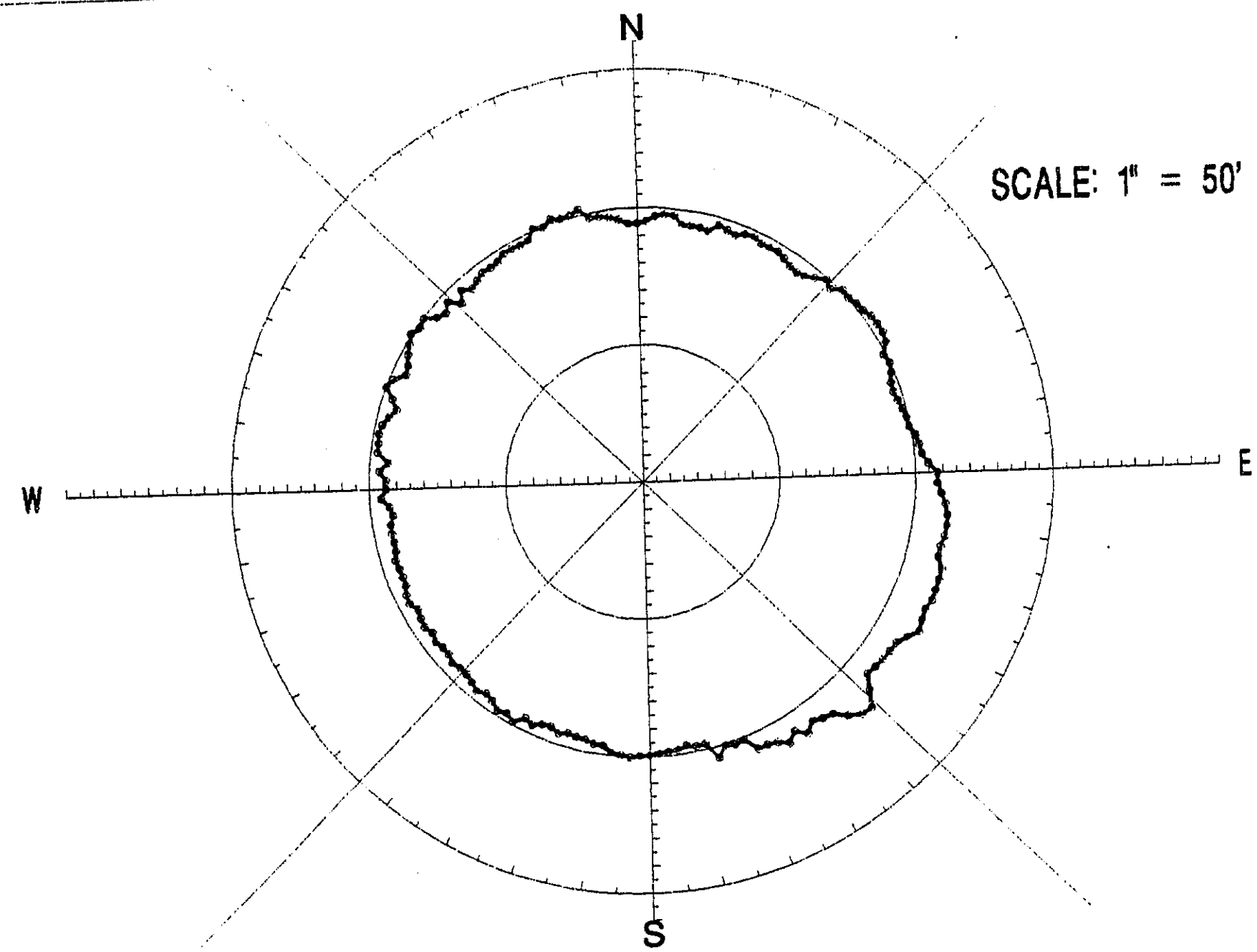
MAXIMUM RADIUS PLOT

03/18/92 | Ferrellgas Inc. | No.: 1

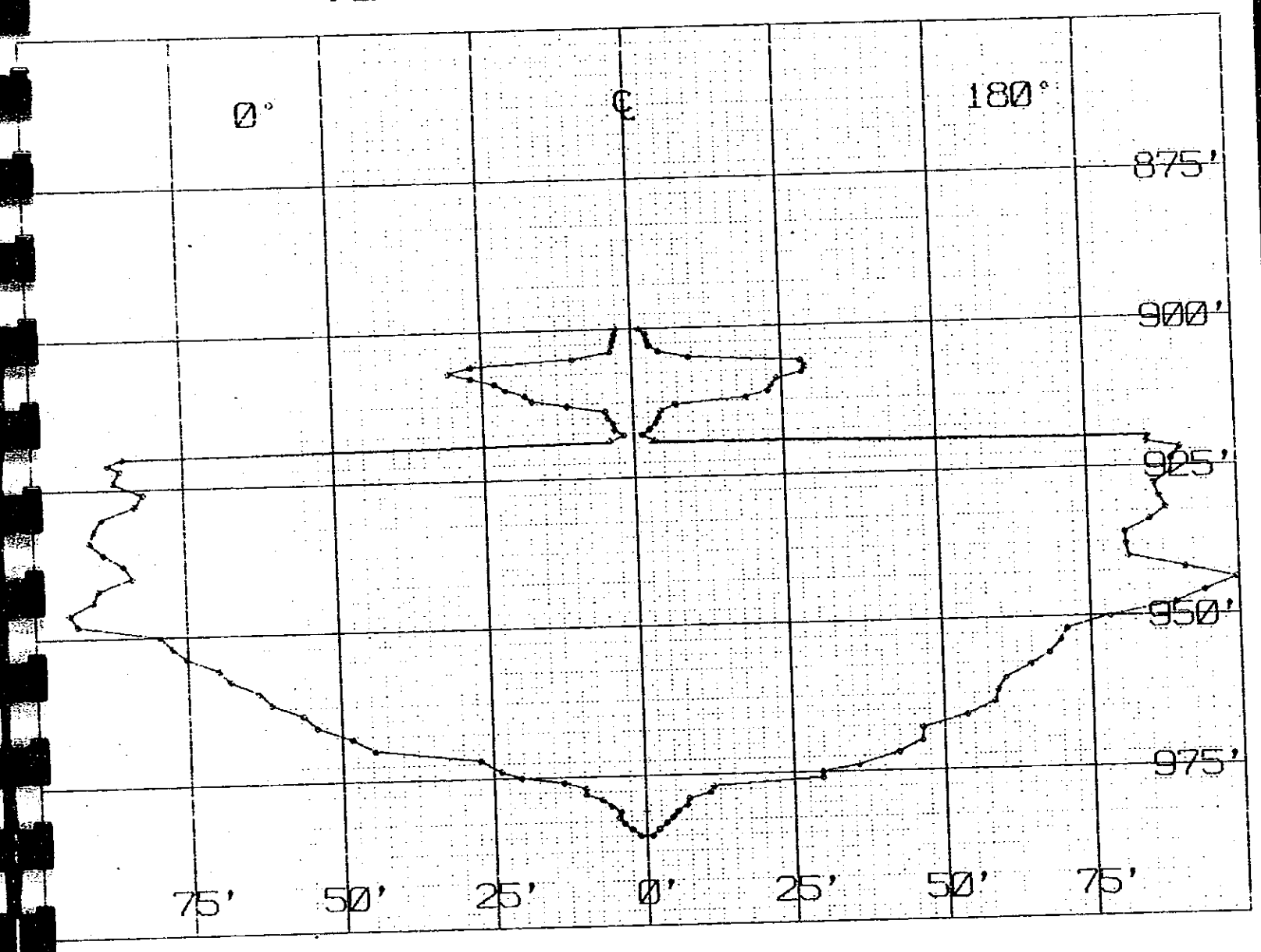


MAXIMUM RADIUS PLOT

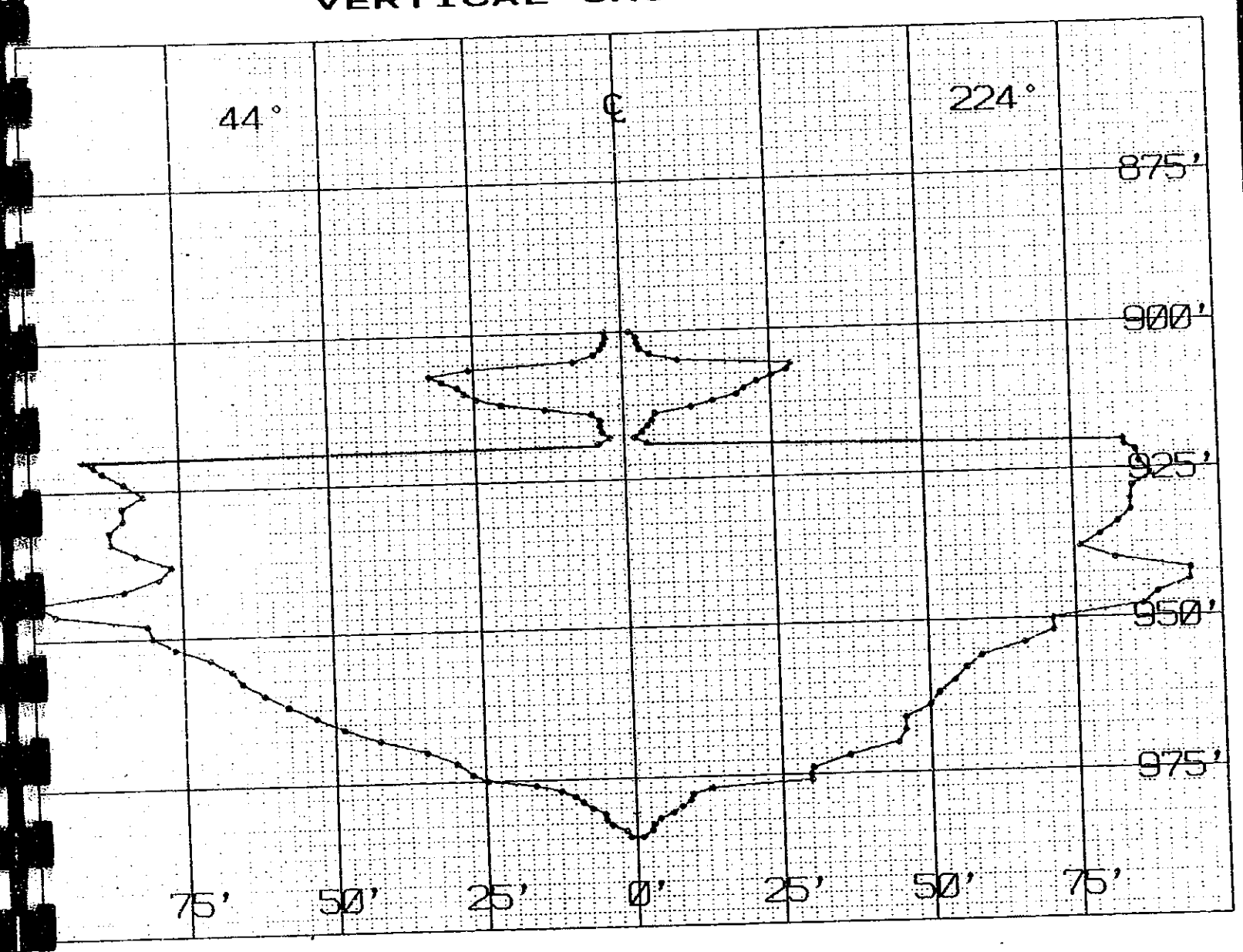
03/18/92 | Ferrellgas Inc. | No.: 1

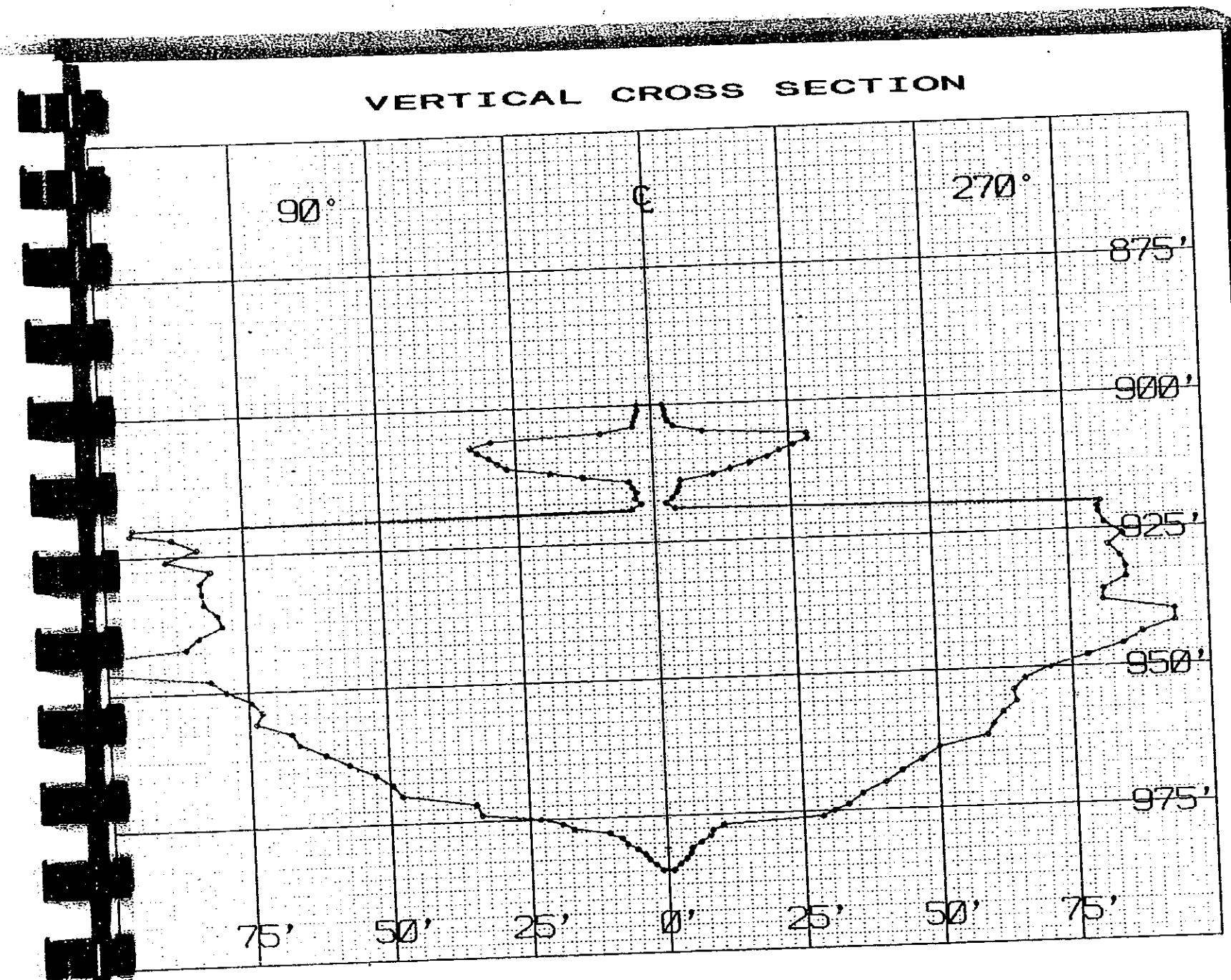


VERTICAL CROSS SECTION

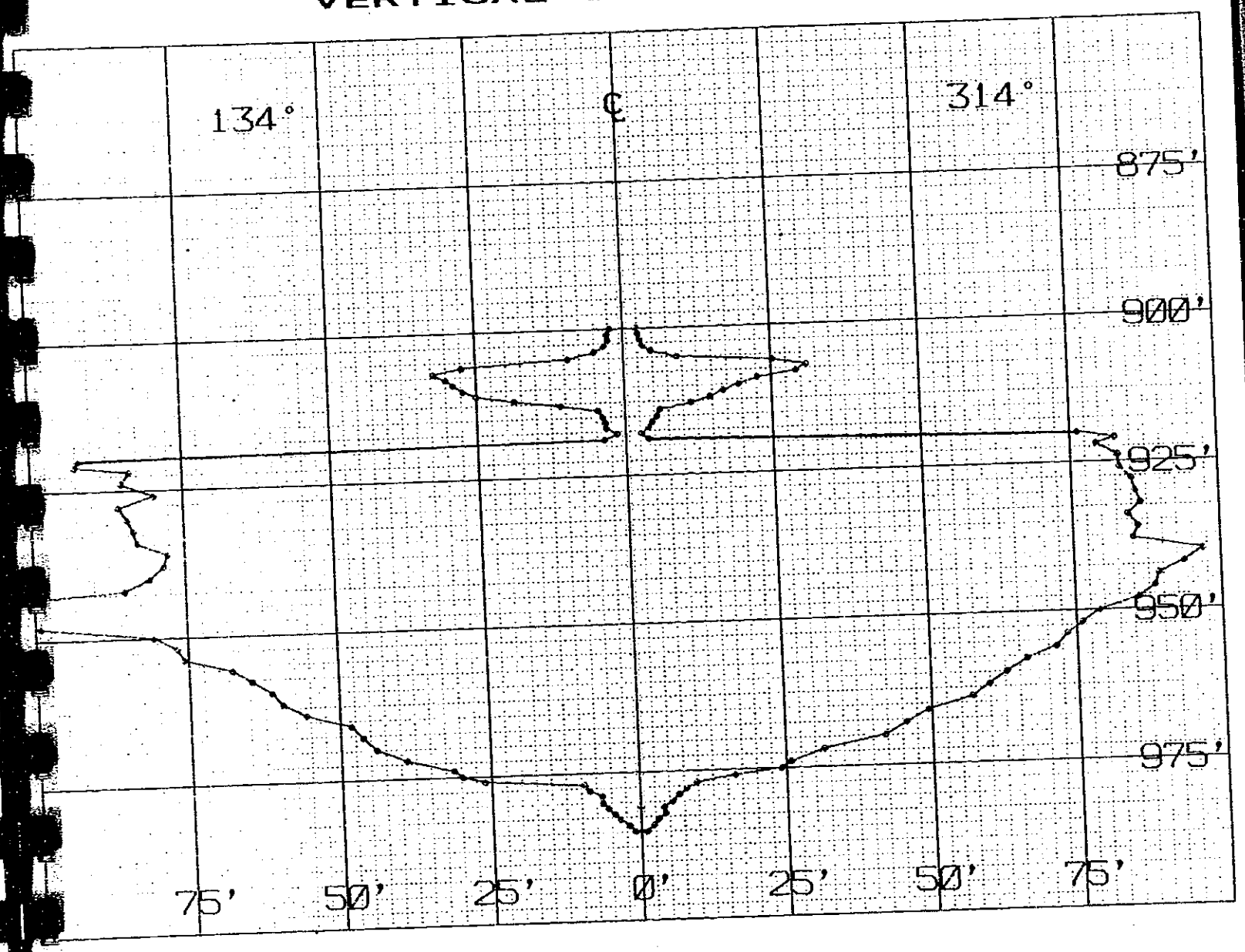


VERTICAL CROSS SECTION




VERTICAL CROSS SECTION
90°
℄
270°
875'
900'
925'
950'
975'
75'
50'
25'
0'
25'
50'
75'

VERTICAL CROSS SECTION



DIGITAL SURVEYS, INC.

03/18/92

View Tilt : 0
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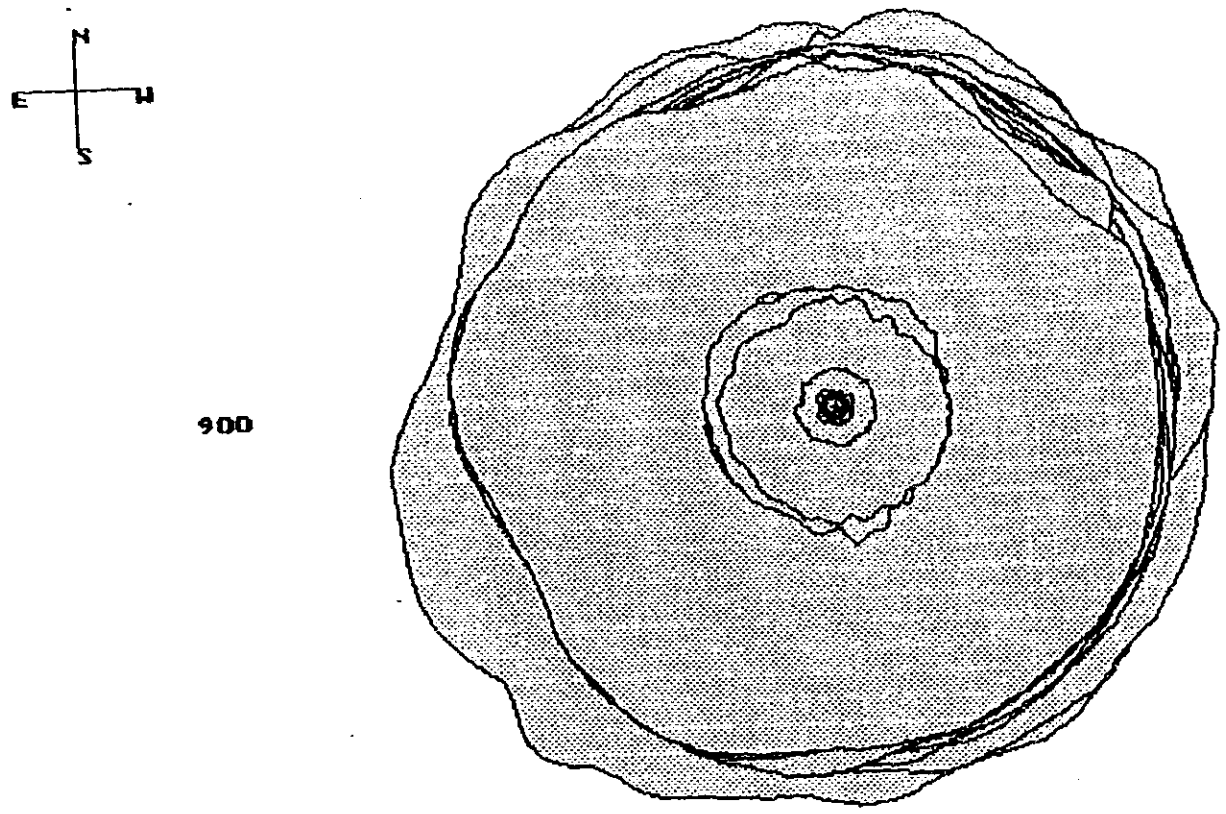

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No.: 1

DIGITAL SURVEYS, INC.

03/18/92

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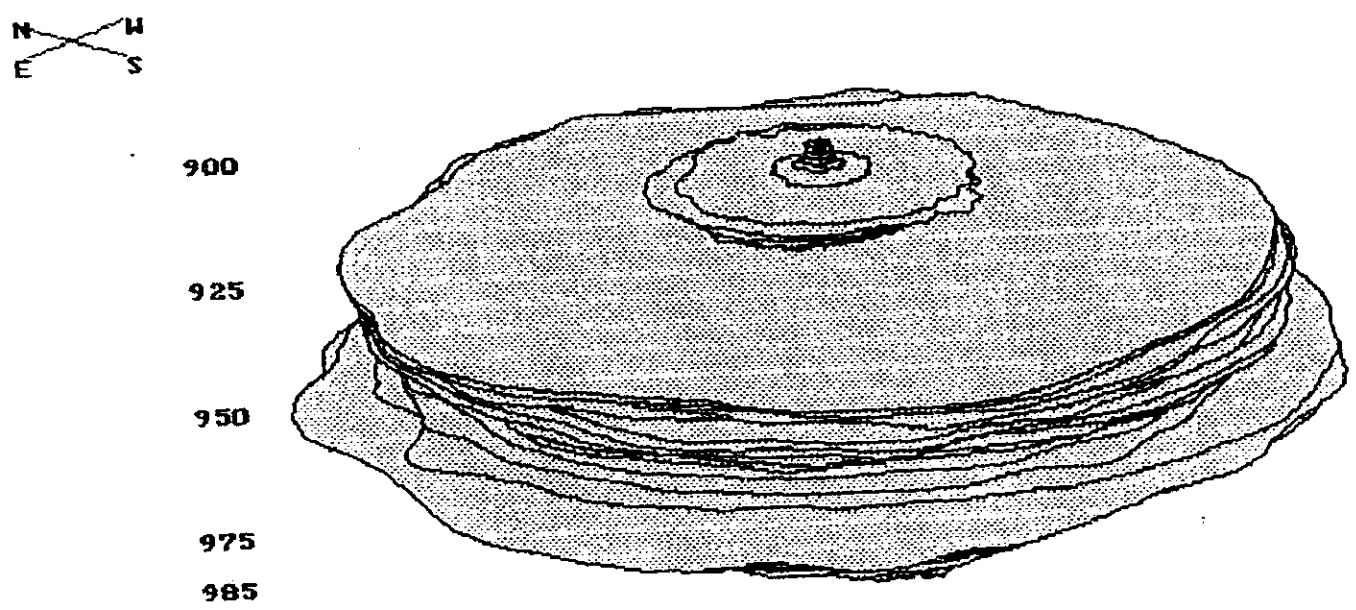
70



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03/18/92

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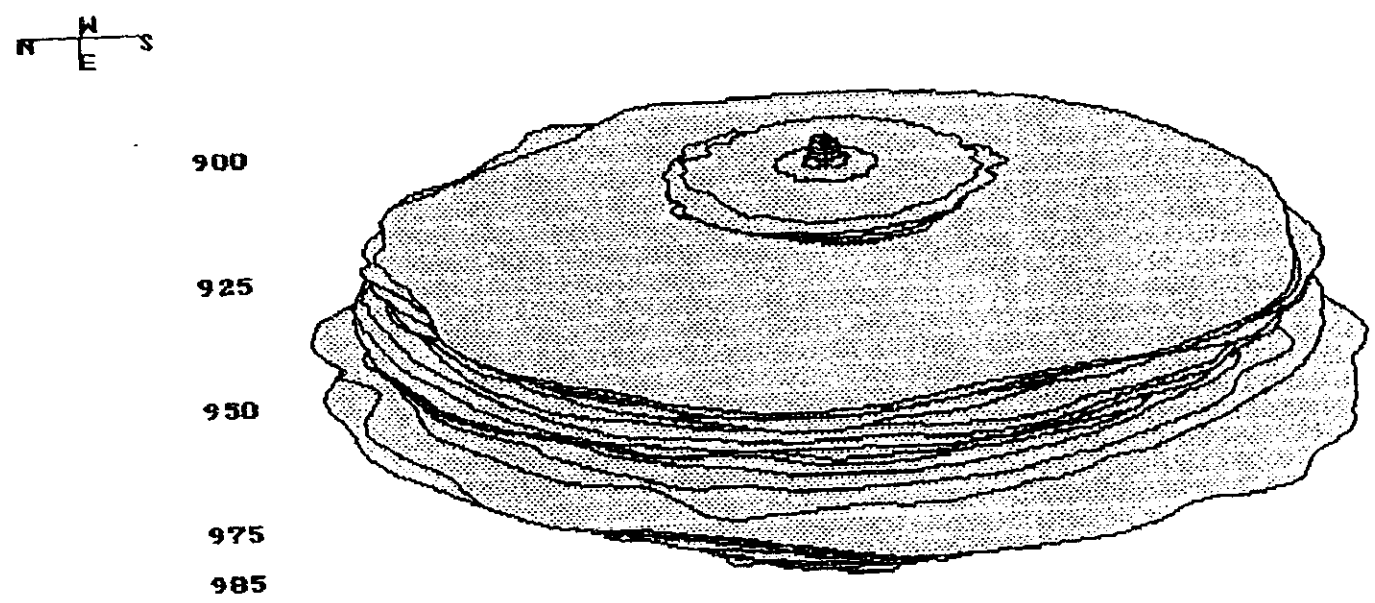

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03/18/92

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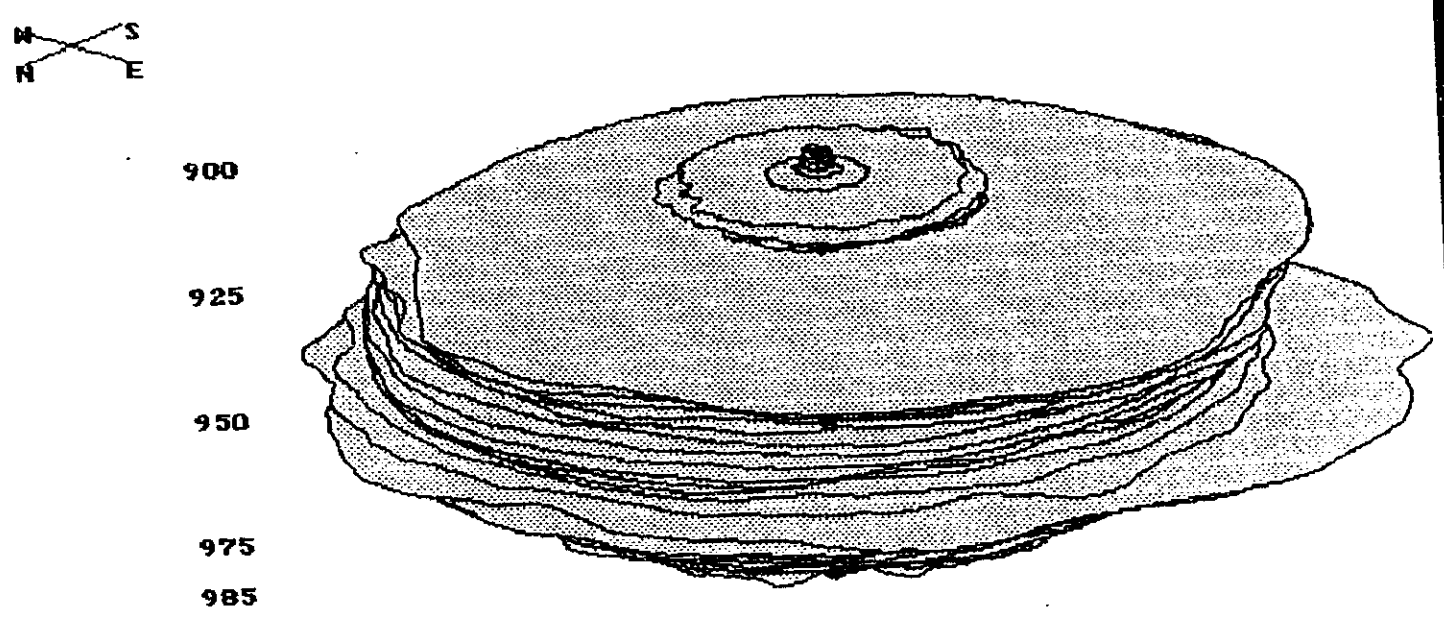

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03/18/92

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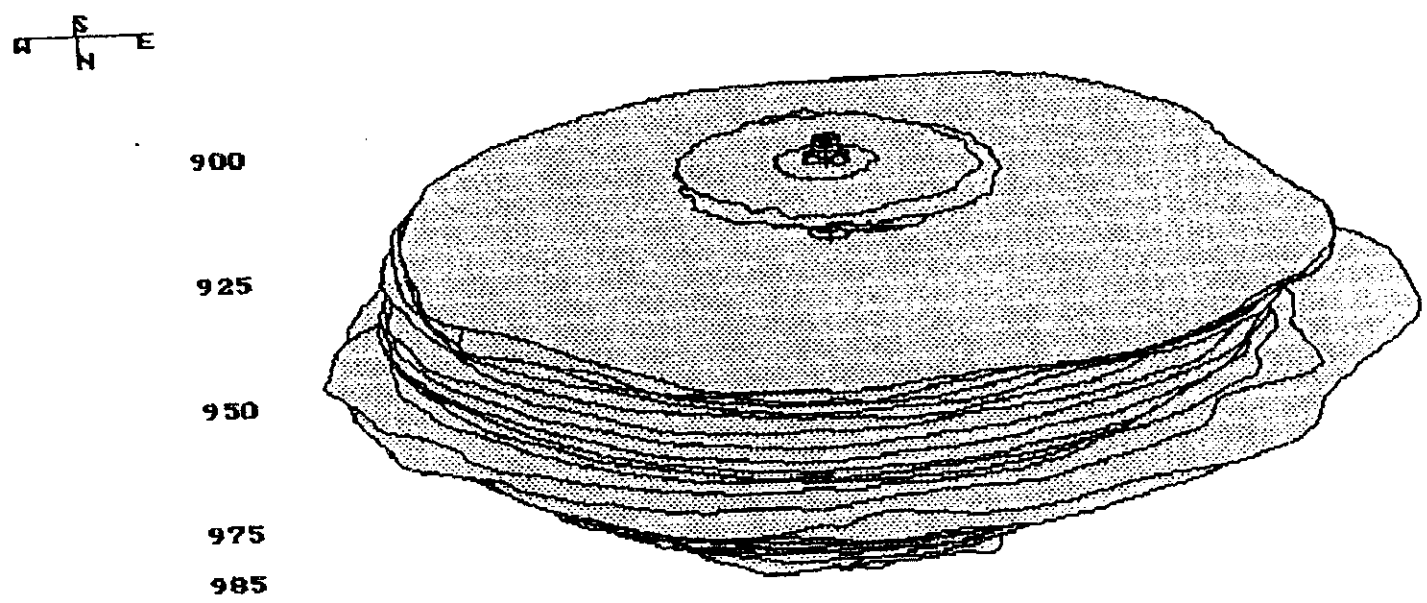

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03/18/92

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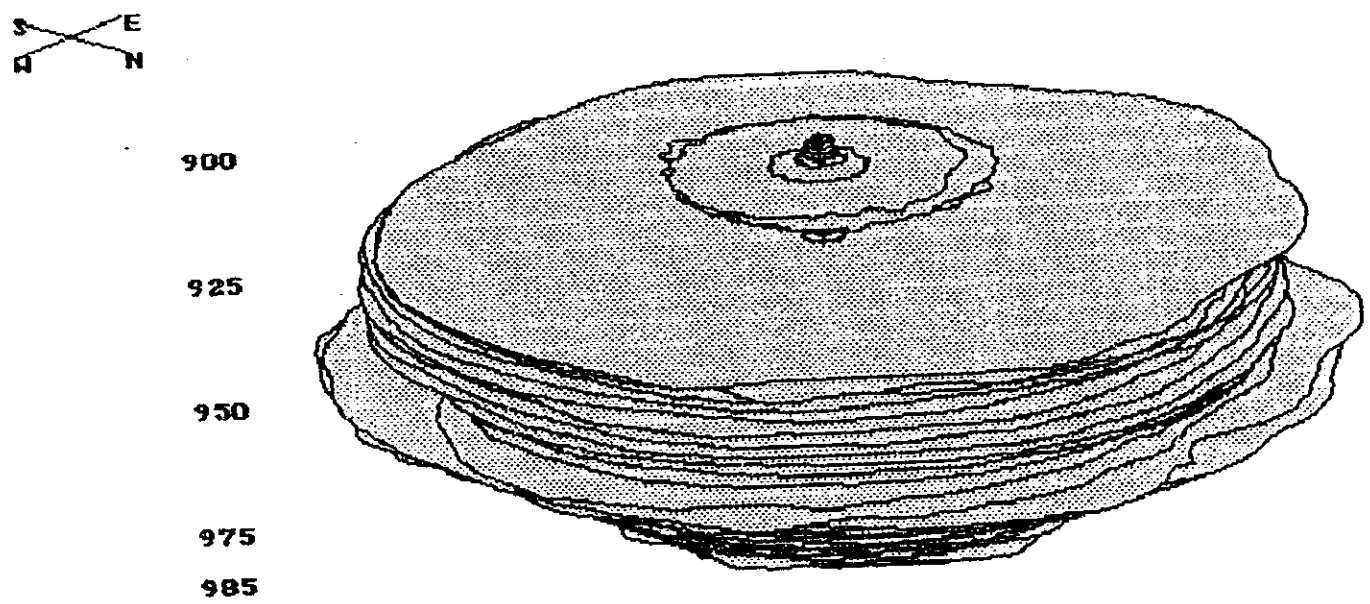

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03/18/92

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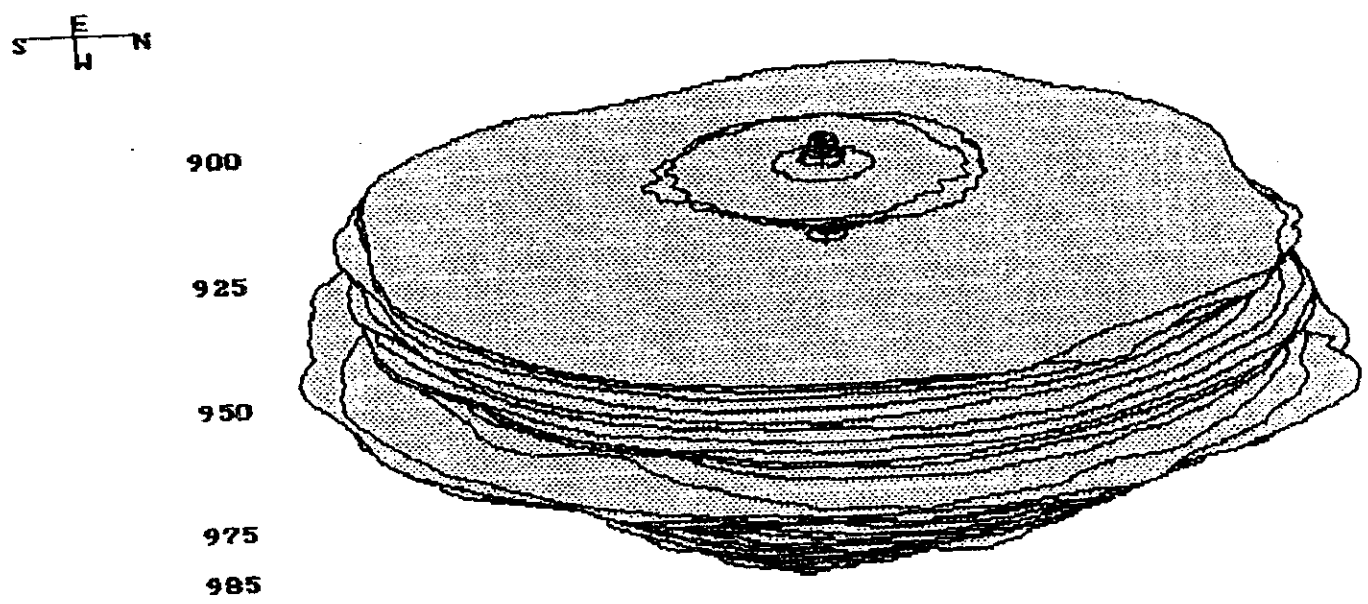

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03/18/92

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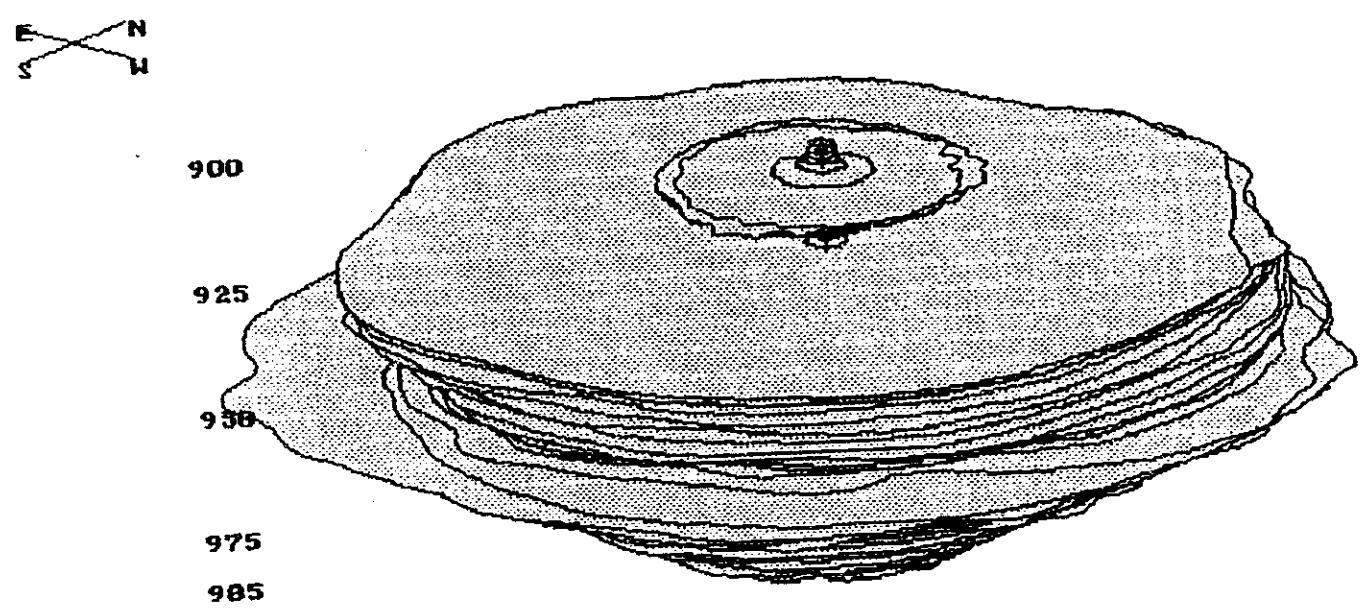

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03/18/92

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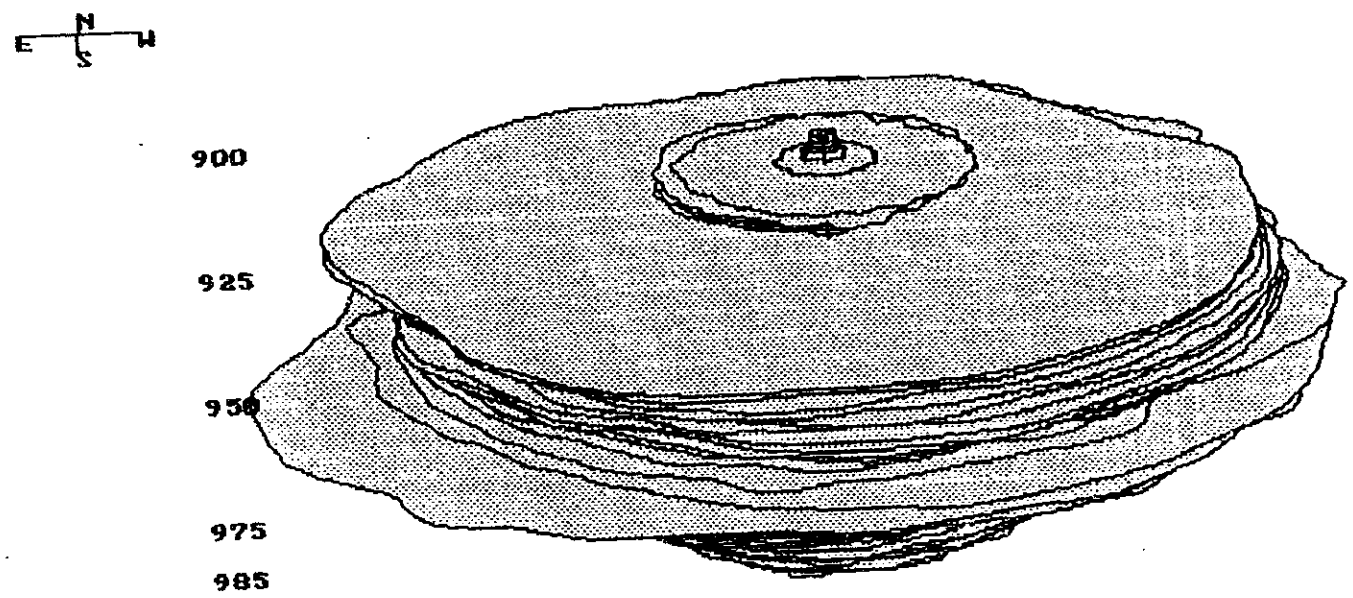

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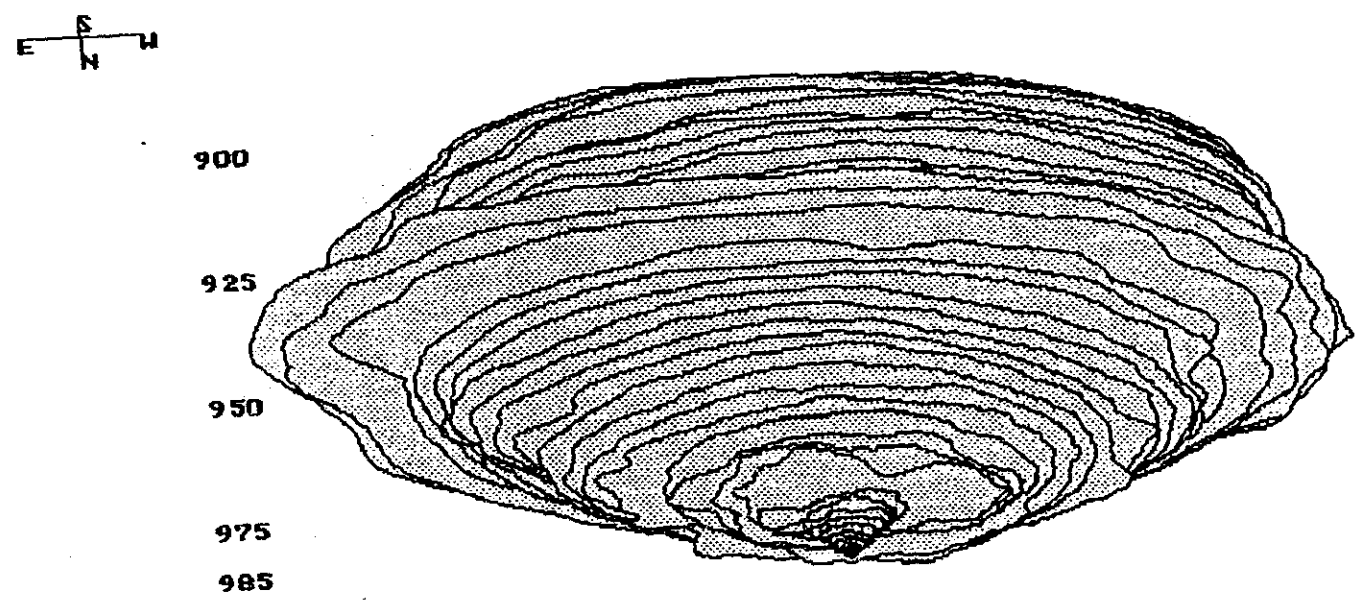

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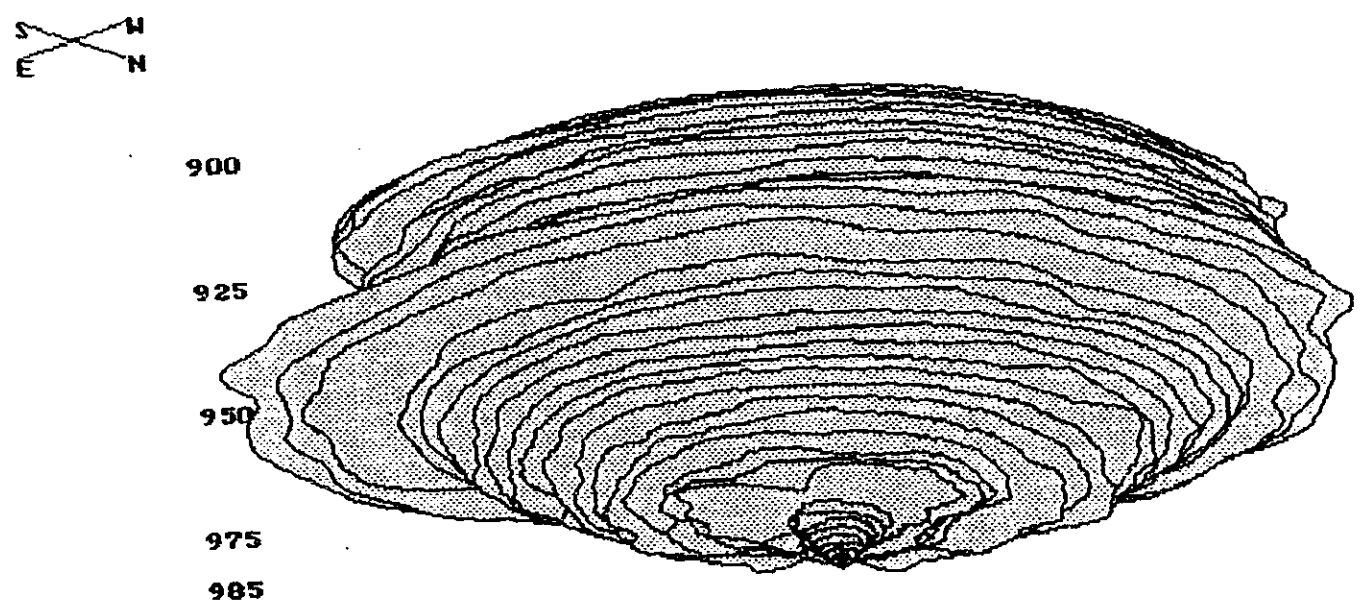

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03/18/92

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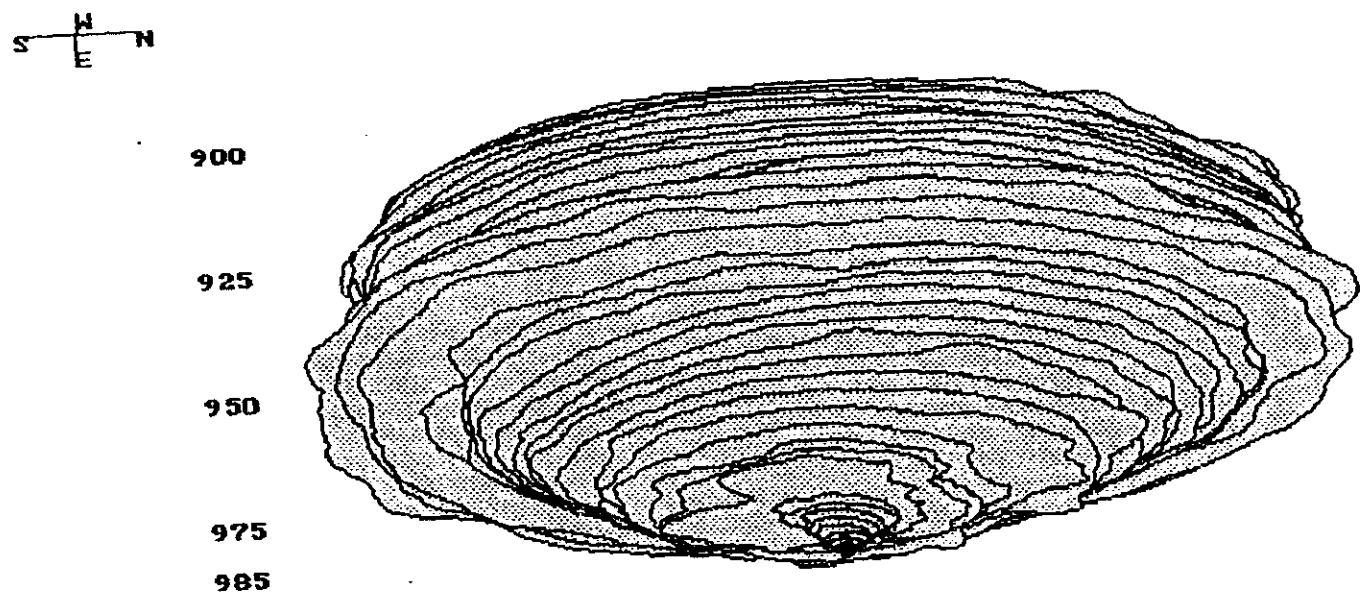

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03/18/92

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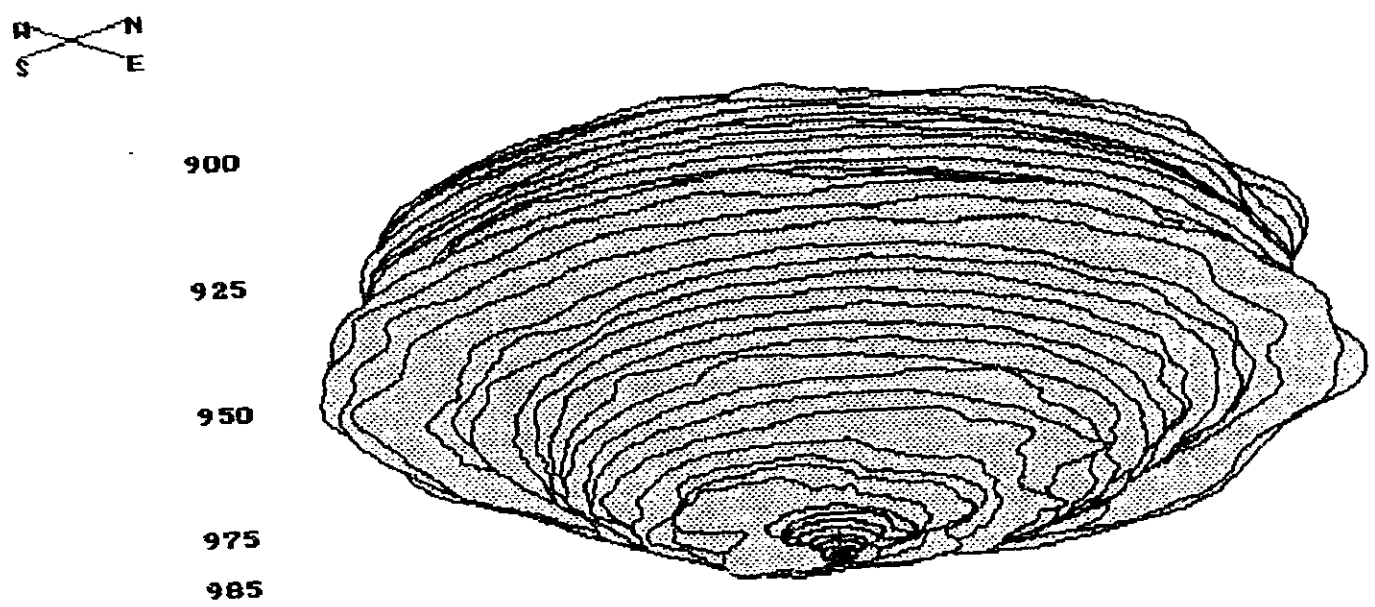

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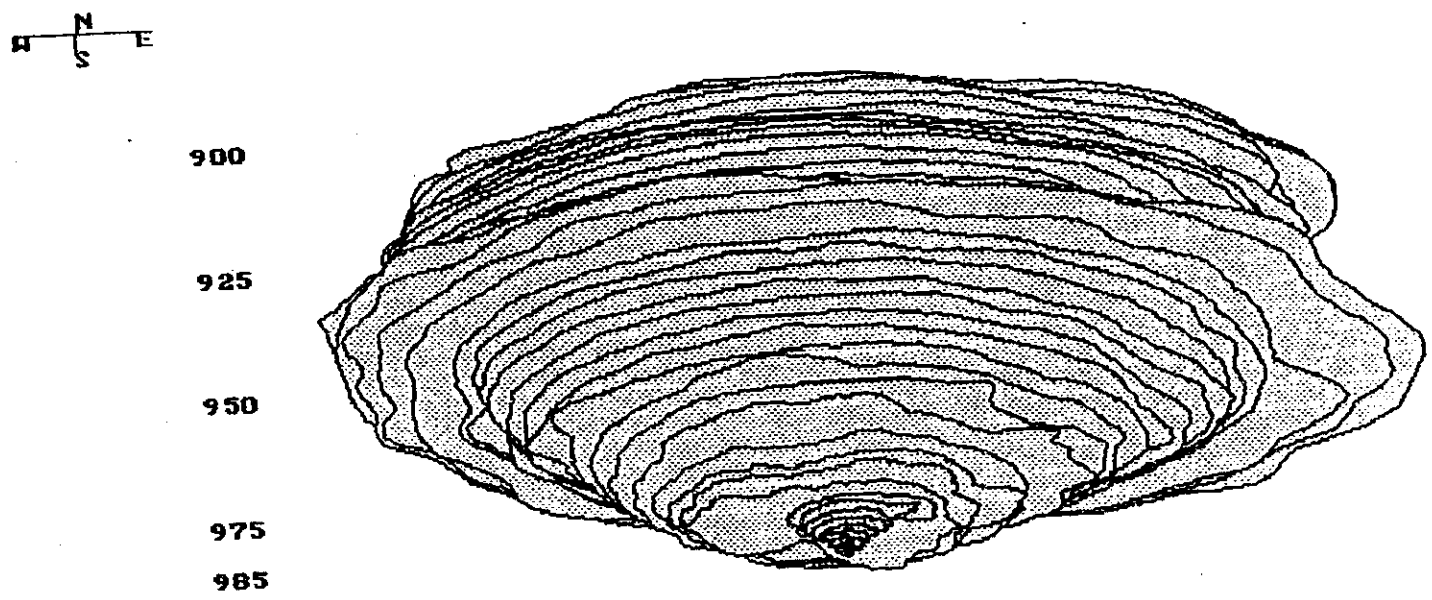

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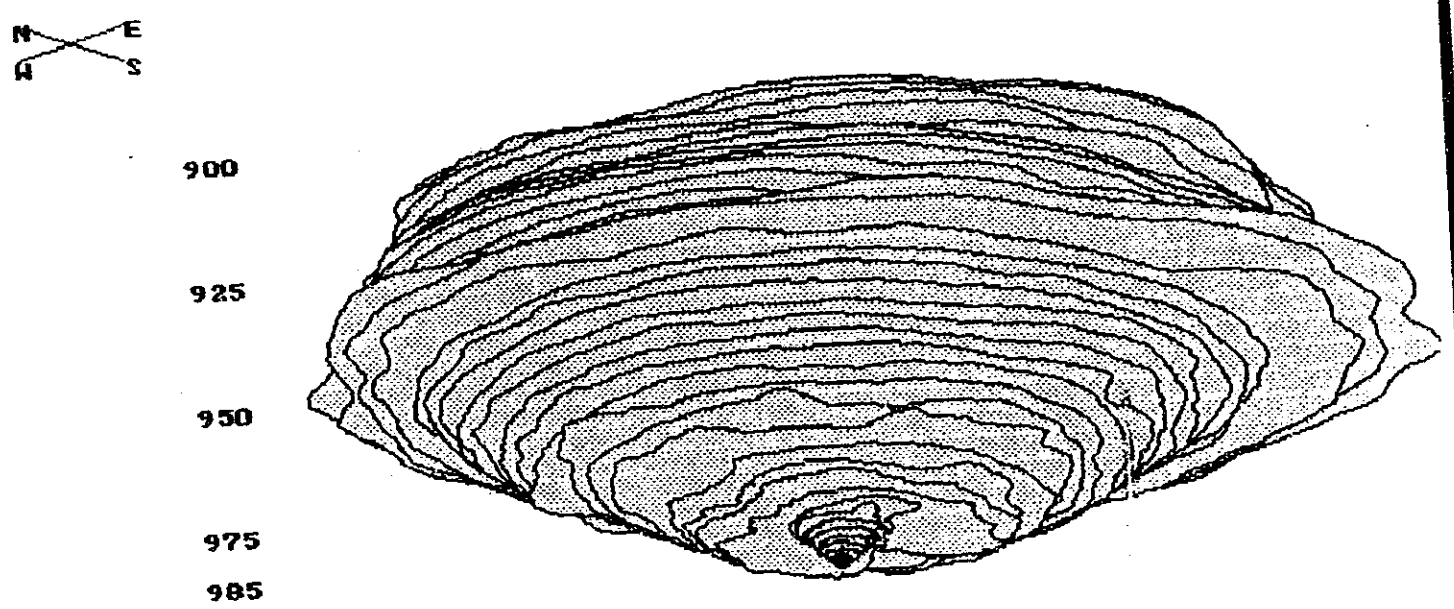

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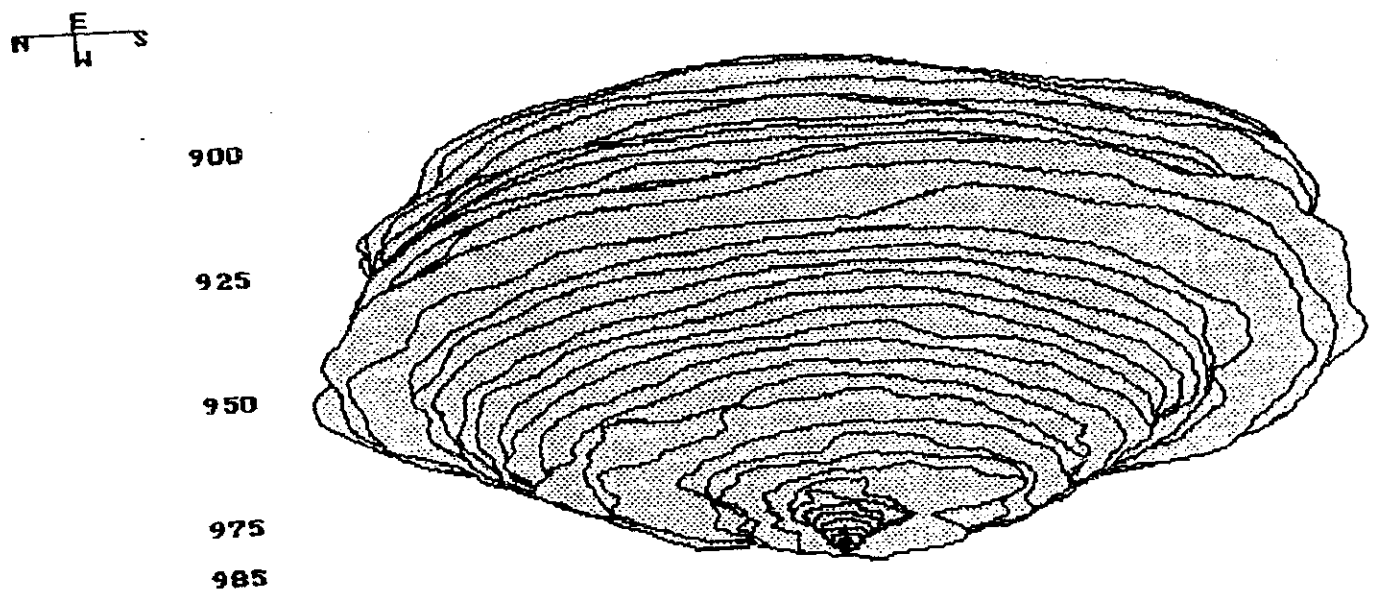

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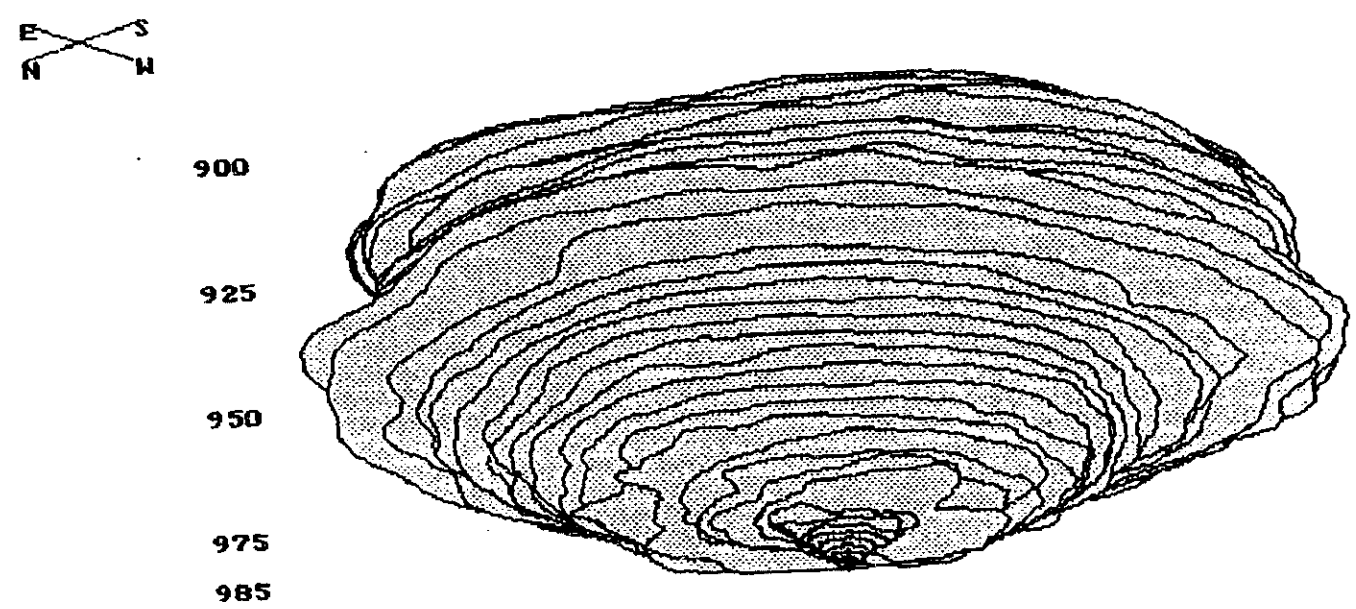

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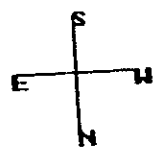

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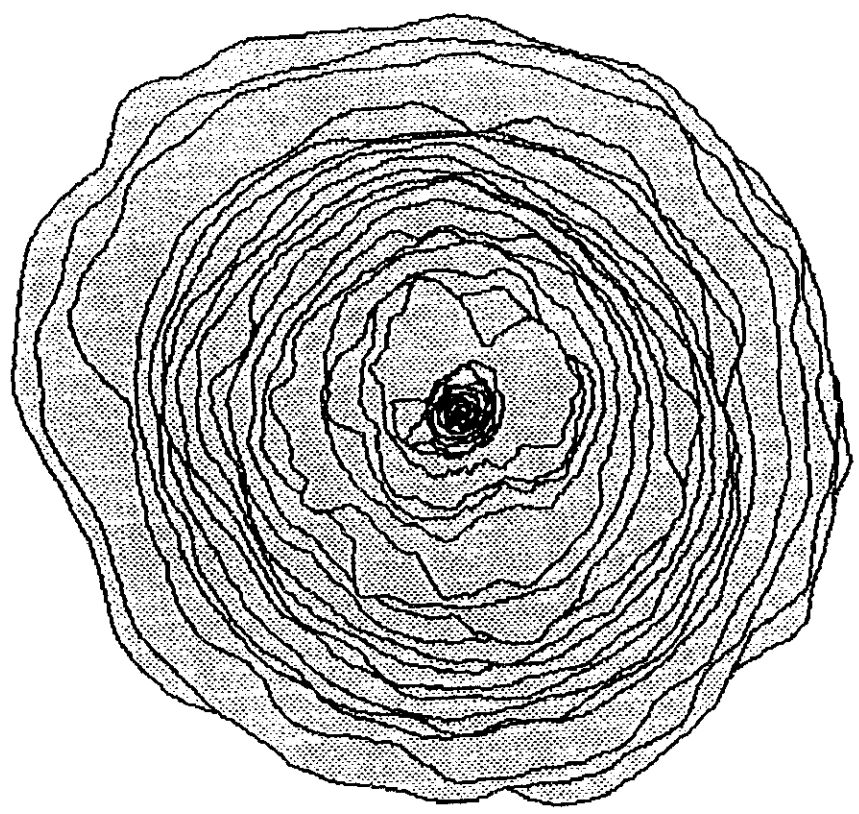

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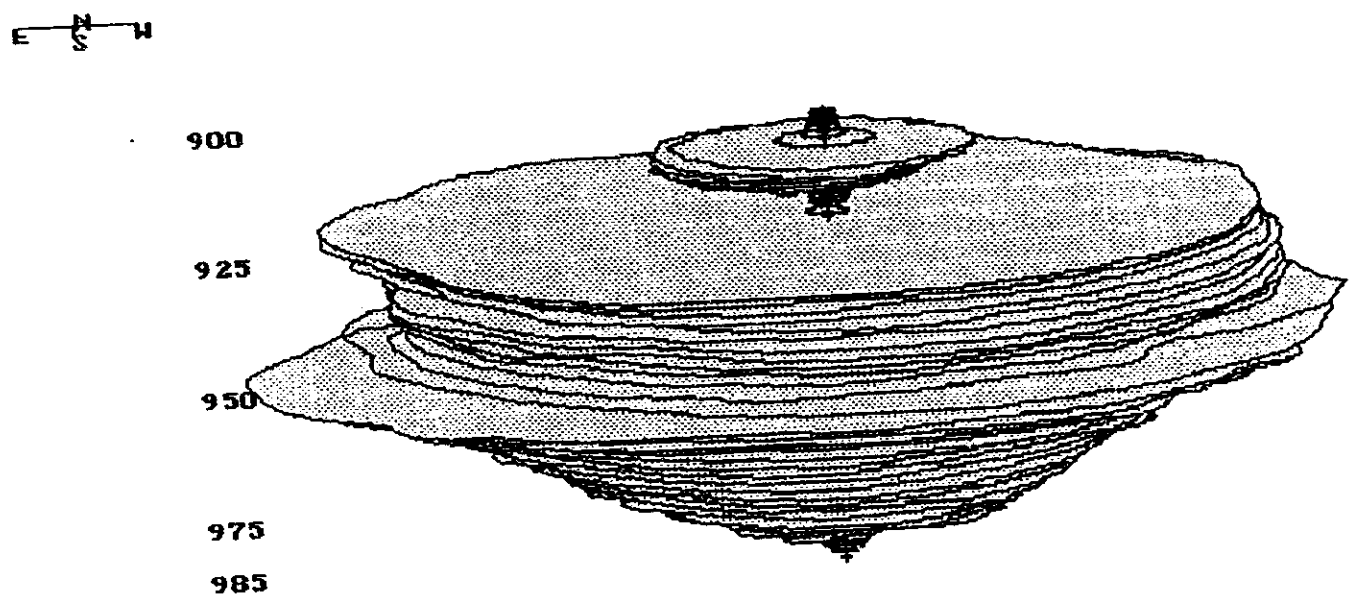

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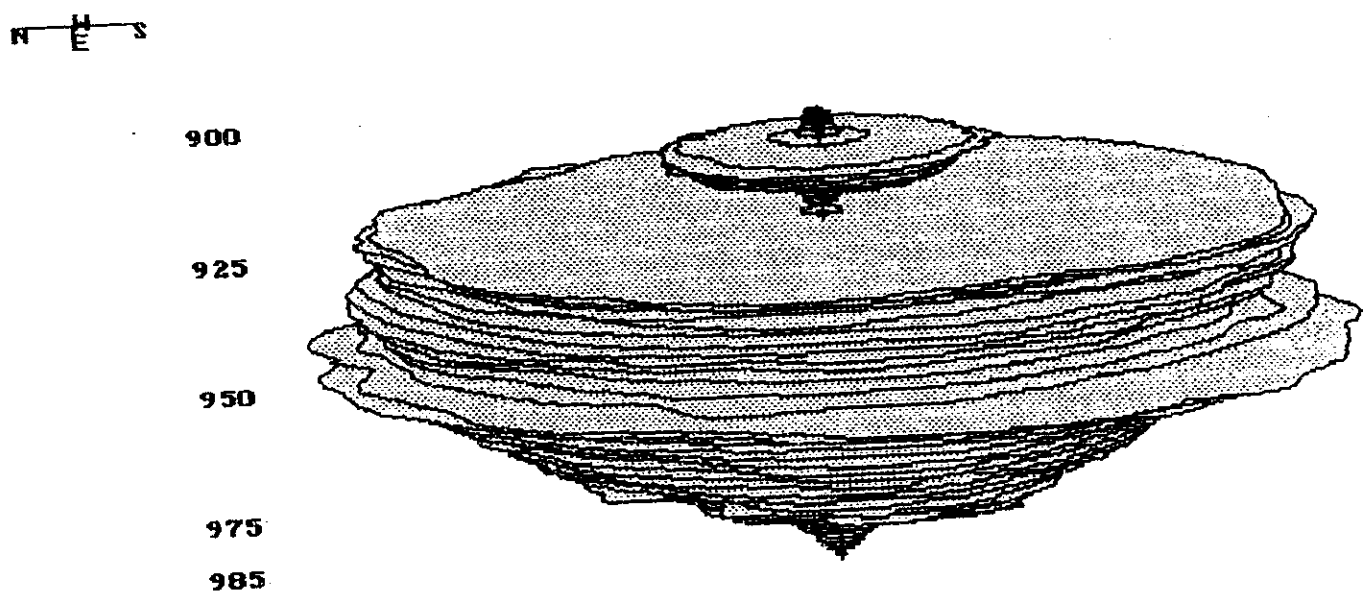

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03/18/92

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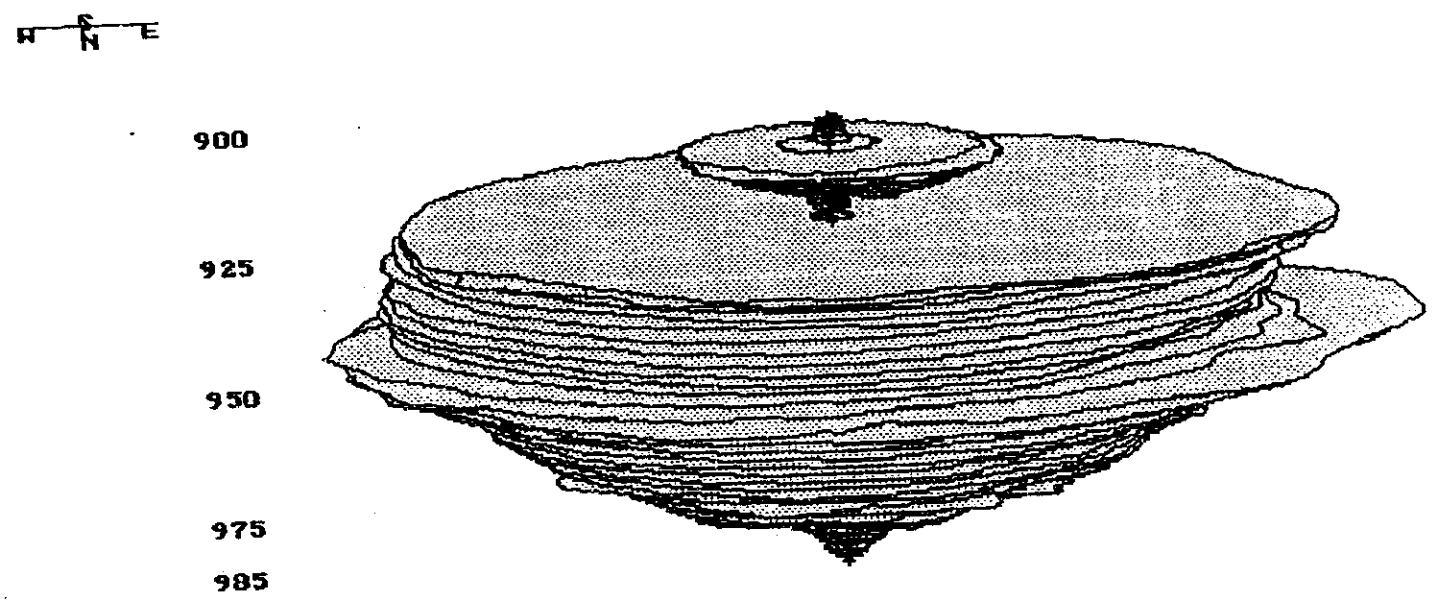

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DIGITAL SURVEYS, INC.

03/18/92

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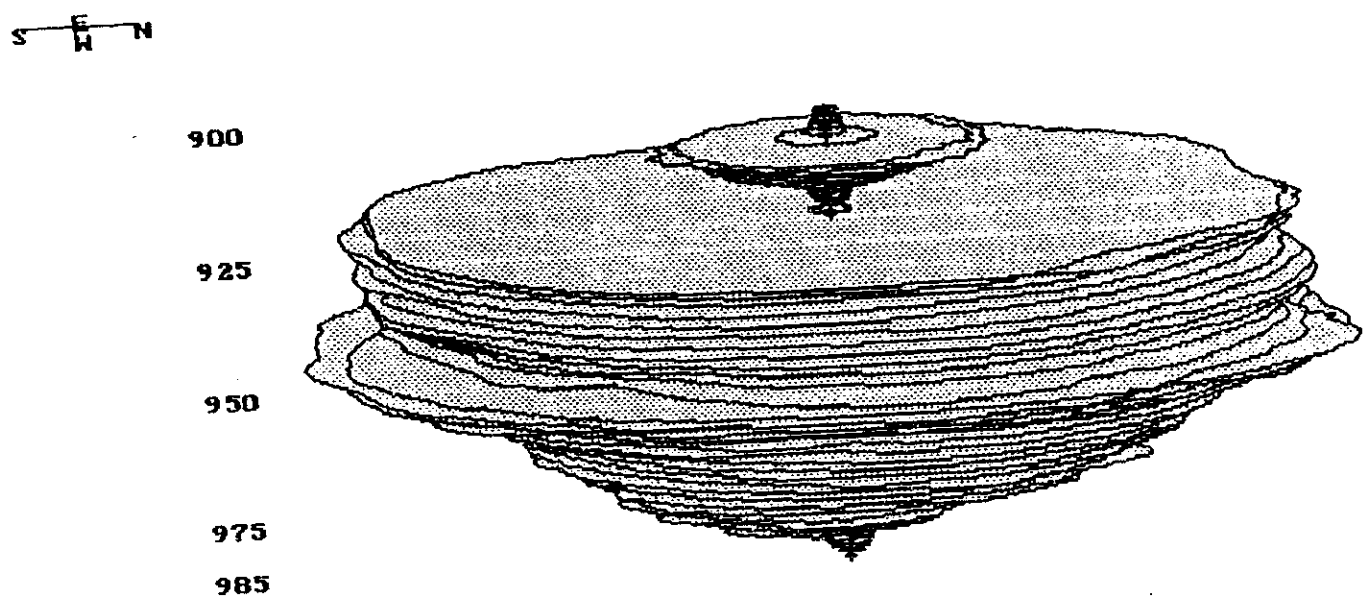


No.: 1

DOWELL

SONAR CALIPER REPORT

DOWELL SONAR CALIPER SURVEY

TREATMENT NO: 11-42-0273

JOB NO: 325

WELL DATA

ZERO @ GL

T.D. DOWELL 973 FT

OPERATOR 978 FT

CASING SIZE 9-5/8 IN

DEPTH 891 FT

LINER - FT

INTERMEDIATE 7 IN

DEPTH 869 FT

TUBING 4-1/2 IN

DEPTH OUT FT

WILLIAMS ENERGY COMPANY

WELL NO: 1

ADAMANA STORAGE TERMINAL

APRIL 15,1979

PRODUCTION: STORAGE

GENERAL COMMENTS

DID NOT SURVEY BELOW 960 DUE TO PIPE IN WELL.

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 15,1979

JOB NO. 325

WELL NO. 1

RADII IN FT

DEPTH	N	S	E	W	NE	SW	SE	NW
892	1.7	1.3	1.8	1.2	1.9	1.3	1.6	1.7
894	2.5	2.1	2.4	2.1	2.5	2.0	2.3	2.5
896	3.2	2.6	3.1	2.8	3.2	2.7	2.9	3.1
897	6.5	5.8	6.4	6.1	6.7	6.0	6.0	6.1
898	25.2	26.9	23.8	22.9	26.0	25.7	24.7	24.9
900	28.2	20.7	29.0	20.1	27.4	20.9	22.9	21.0
902	24.2	18.5	27.1	15.9	25.7	15.9	20.8	16.7
904	13.5	10.4	10.9	11.2	10.8	9.2	7.0	13.7
906	3.9	4.1	3.6	5.3	3.6	4.1	3.7	4.0
908	3.8	2.2	2.6	4.1	2.8	3.1	2.3	2.9
909	2.6	1.1	1.9	2.2	2.3	1.6	1.1	2.6
910	1.3	0.7	0.9	1.1	1.1	0.8	0.7	1.3
911	87.0	73.0	82.0	70.0	79.0	71.0	76.0	72.0
912	87.0	73.0	81.0	69.0	80.0	71.0	76.0	72.0
915	83.0	74.0	85.0	73.0	90.0	73.0	76.0	76.0
920	68.0	71.0	76.0	73.0	65.0	70.0	71.0	74.0
925	75.0	73.0	78.0	76.0	66.0	73.0	73.0	79.0
930	72.0	66.0	73.0	75.0	74.0	67.0	69.0	75.0

RADII IN FT

DEPTH	N	S	E	W	NE	SW	SE	NW
935	76.0	70.0	72.0	80.0	76.0	74.0	71.0	81.0
940	81.0	72.0	72.0	82.0	75.0	79.0	72.0	84.0
942	82.0	74.0	99.0	89.0	90.0	74.0	89.0	80.0
945	75.0	69.0	98.0	72.0	73.0	69.0	70.0	76.0
950	70.0	58.0	67.0	66.0	67.0	57.0	64.0	69.0
955	57.0	49.0	61.0	64.0	62.0	56.0	56.0	62.0
960	52.0	45.0	45.0	50.0	51.0	52.0	39.0	51.0

DOWELL SONAR CALIPER SURVEY

WILLIAMS ENERGY COMPANY ADAMANA STORAGE TERMINAL APRIL 15,1979

JOB NO: 325

WELL NO: 1

RADII IN FEET

DEPTH	ANGLE	N	S	E	W	NE	SW	SE	NW
945	90	75.0	69.0	98.0	71.0	72.0	68.0	69.0	76.0
945	95	63.0	61.0	66.0	60.0	62.0	58.0	64.0	64.0
945	100	59.0	55.0	59.0	56.0	58.0	51.0	61.0	60.0
945	105	51.0	50.0	54.0	47.0	52.0	47.0	55.0	52.0
945	110	45.0	45.0	45.0	44.0	49.0	45.0	50.0	46.0
945	115	44.0	43.0	42.0	41.0	44.0	41.0	46.0	41.0
945	120	36.0	40.0	39.0	38.0	37.0	39.0	39.0	39.0
945	125	34.0	37.0	39.0	33.0	35.0	36.0	37.0	34.0
945	130	32.0	35.0	35.0	31.0	32.0	35.0	34.0	33.0
945	135	30.0	32.0	32.0	29.0	31.0	30.0	30.0	31.0
945	140	30.4	30.6	30.9	28.2	30.3	30.4	29.9	29.4
945	145	28.8	28.7	29.6	27.4	29.0	28.1	28.7	28.1
945	150	28.4	26.8	27.6	26.1	28.1	26.7	27.7	26.3
945	155	27.7	25.6	26.9	25.5	26.8	25.8	26.4	25.8
945	160	27.0	25.1	25.6	24.5	26.0	24.5	26.2	25.8
945	165	26.2	25.2	25.4	24.7	25.5	24.5	26.8	26.0
945	170	27.2	26.5	27.0	26.2	27.2	25.2	26.9	27.8
945	175	28.9	28.2	28.4	28.3	28.1	29.0	28.4	28.3

DOWELL SONAR CALIPER SURVEY

WILLIAMS ENERGY COMPANY ADAMANA STORAGE TERMINAL APRIL 15,1979

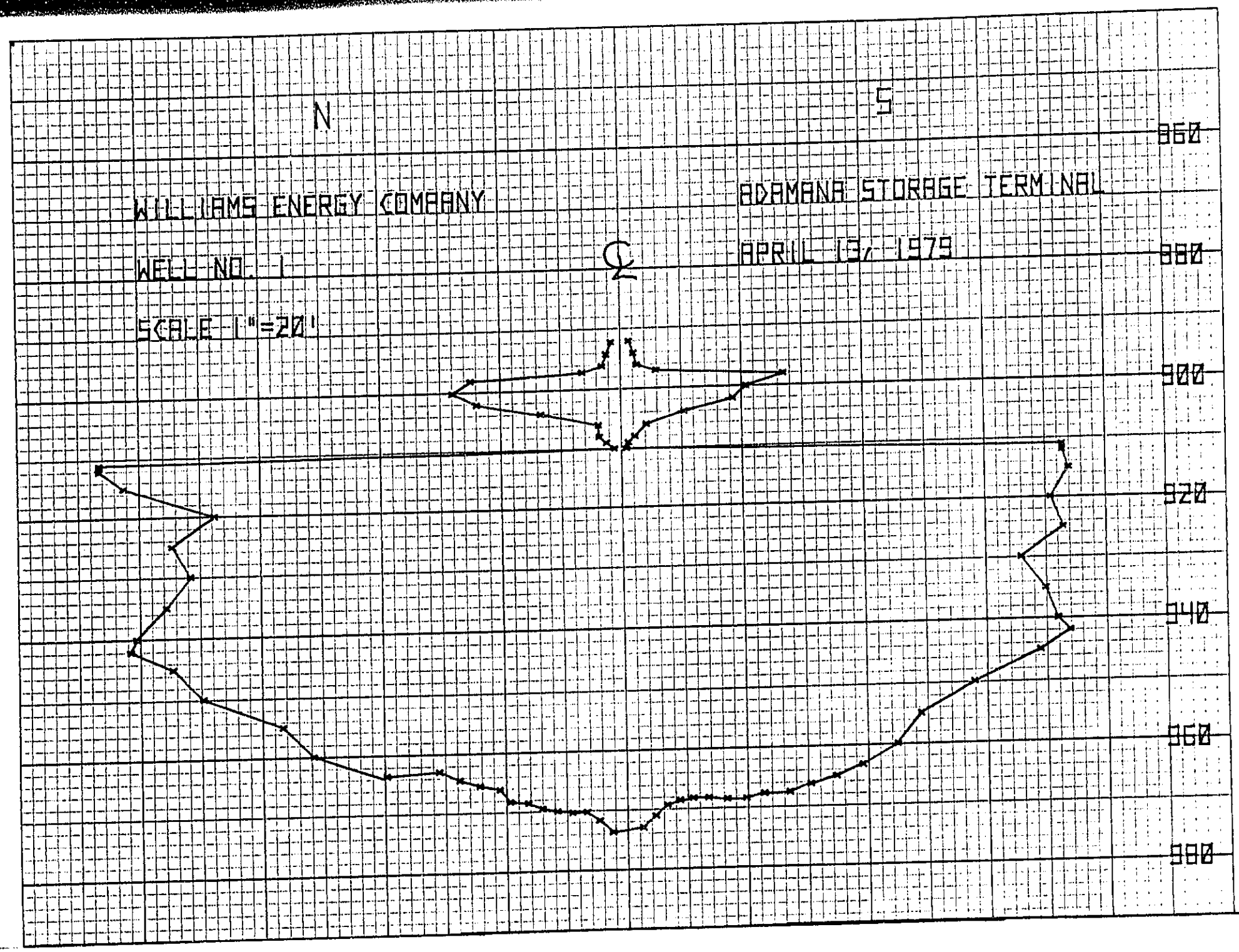
WELL NO: 1 JOB NO: 325

VOLUME CALCULATIONS

DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
892	0	0	0	0
894	24	24	4	4
896	43	67	8	12
897	69	136	12	24
898	869	1005	155	179
900	3884	4889	692	871
902	3278	8167	584	1454
904	1655	9822	295	1749
906	371	10193	66	1815
908	79	10271	14	1829
909	20	10291	4	1833
910	7	10299	1	1834
911	6310	16609	1124	2958
912	18668	35276	3324	6282
915	57795	93071	10293	16575
920	89930	183001	16016	32591
925	85361	268361	15202	47792
930	86188	354549	15349	63142

VOLUME CALCULATIONS

DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
935	85518	440067	15230	78371
940	91113	531179	16226	94598
942	41147	572326	7328	101926
945	61030	633356	10869	112794
950	78834	712189	14039	126834
955	60120	772309	10707	137540
960	44967	817275	8008	145549
INCLUDES VOLUME BELOW 960		845255		150532


N
S
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 1
APRIL 13, 1979
SCALE 1"=20'
860
880
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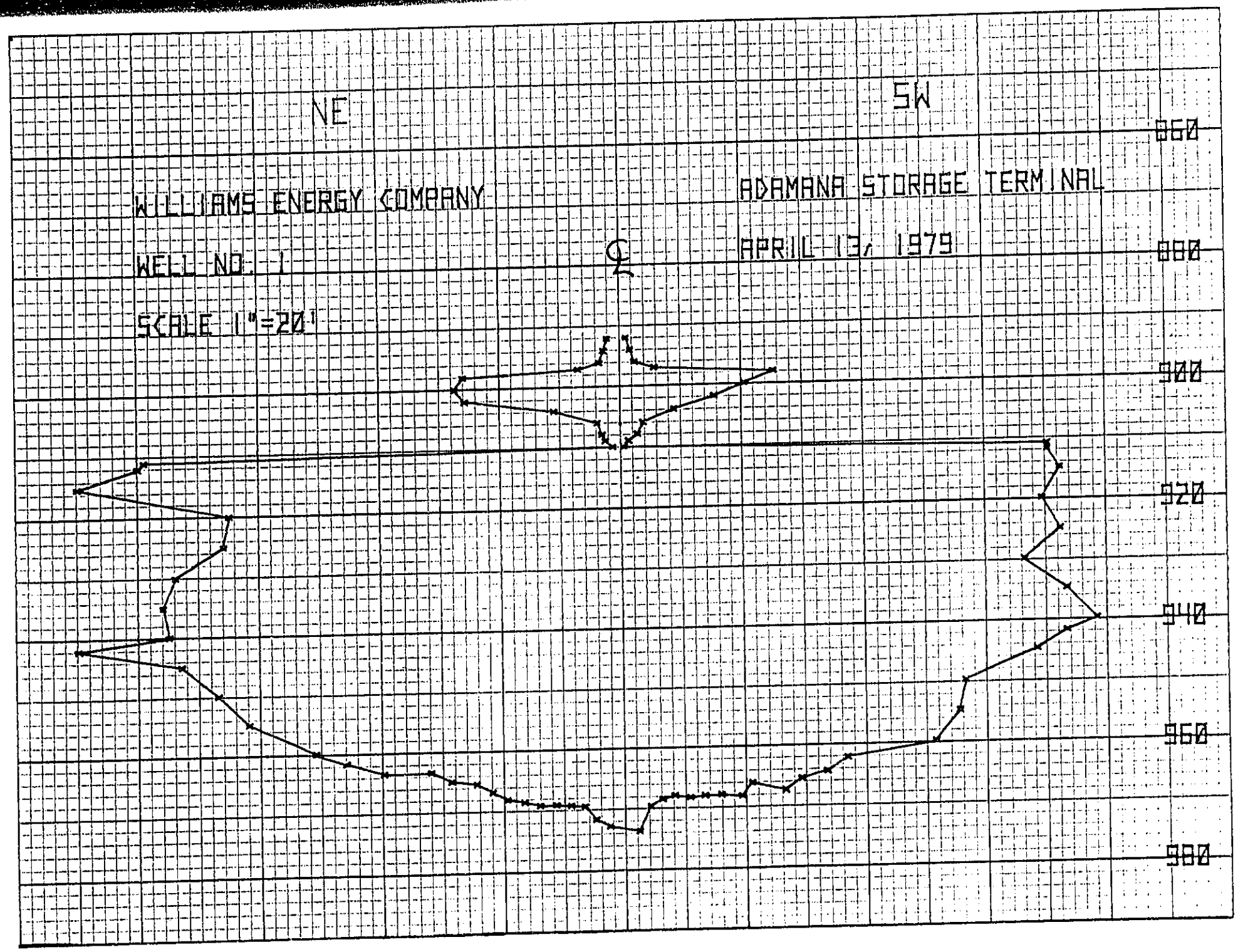
920
940
960
980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ADAMANA STORAGE TERMINAL
WELL NO. 1
APRIL 13, 1979
SCALE 1"=20'
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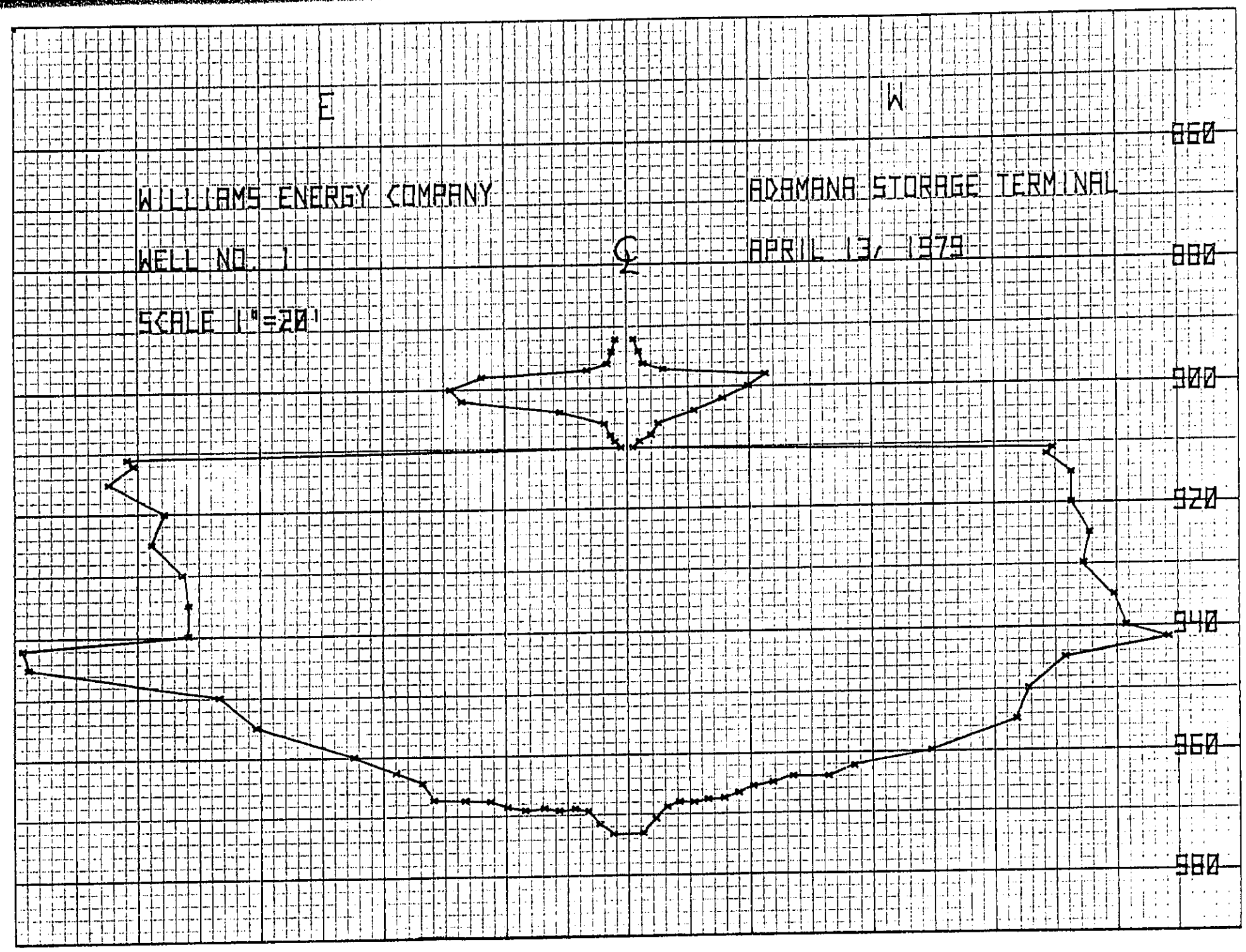
E
W
860
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
WELL NO. 1
APRIL 13, 1979
880
SCALE 1"=20'
900
920
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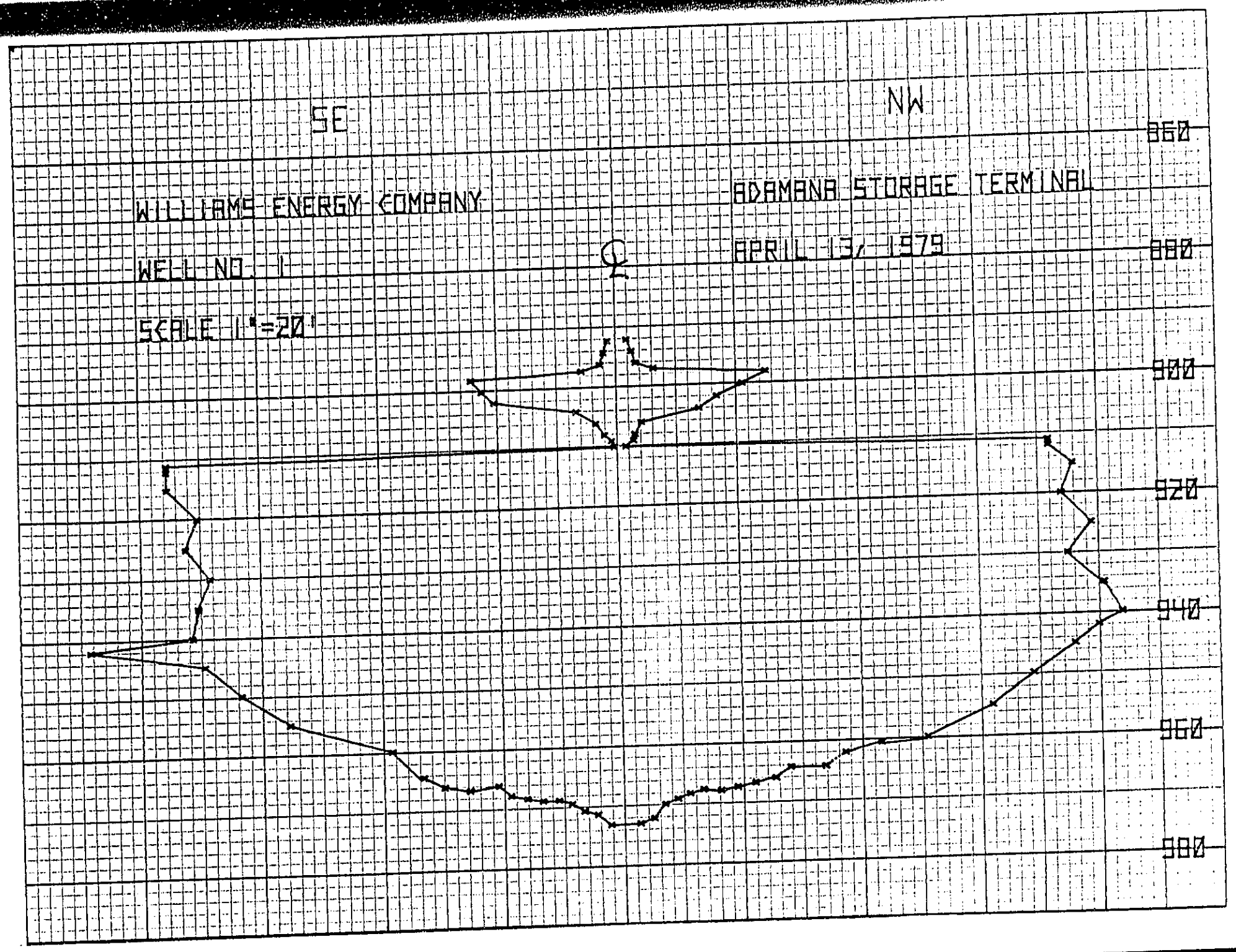

SE
NW
860
WILLIAMS ENERGY COMPANY
ADAMANA STORAGE TERMINAL
APRIL 13, 1979
WELL NO. 1
SCALE 1"=20'
880
900
920
940
960
980

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: SR 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

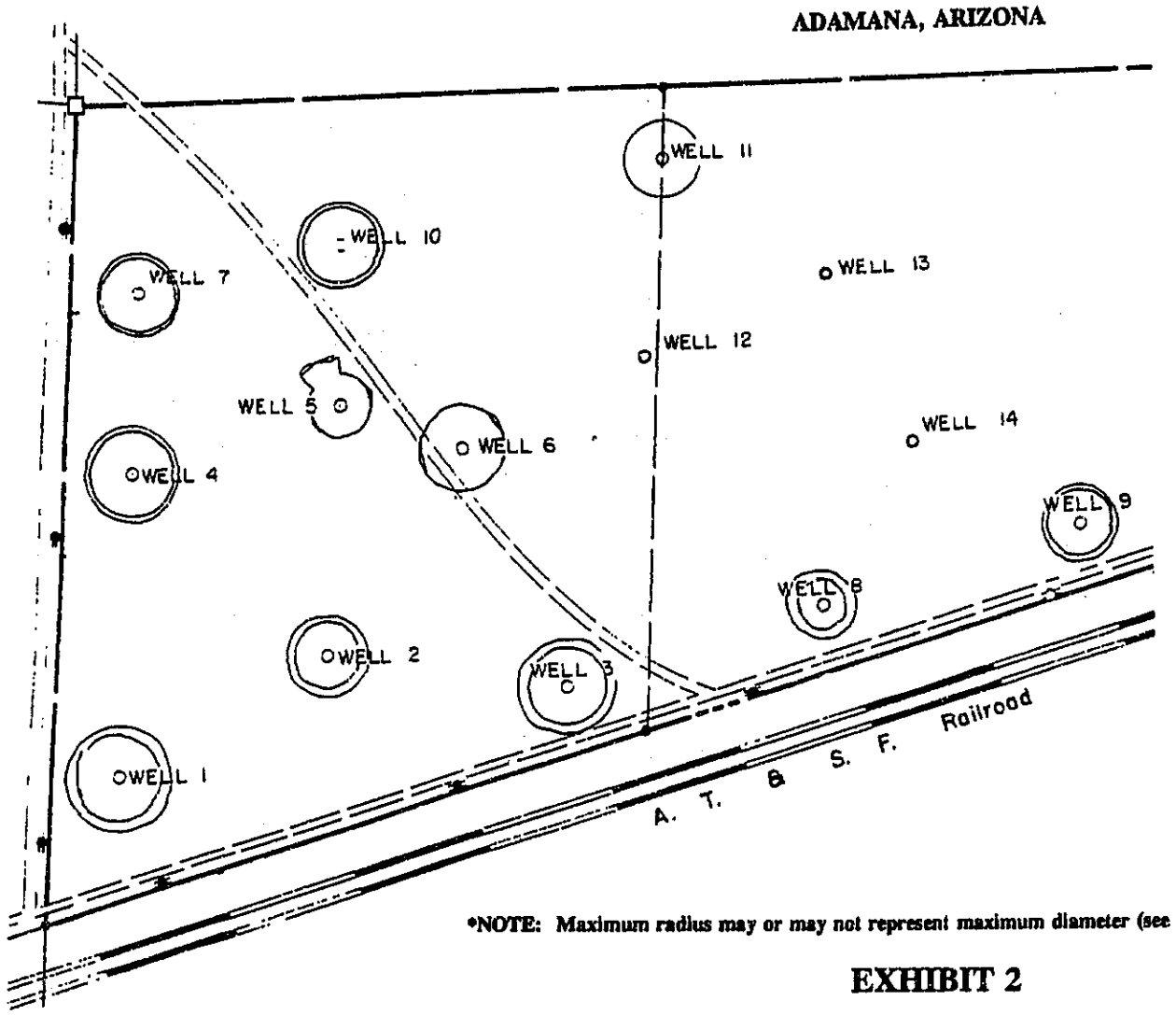
Permit	Well No.	TD	Cavern	Initial Sonar	Max Radius	Sonar Volume	Second Sonar	Max Radius	Sonar Volume	Third Sonar	Max Radius	Sonar Volume
556	1	1101'	900-985'	4/79 Dowell	99'@942'	150,532 bbls	3/92 Digital*	118'@944'	176,119 bbls			
557	2	1112'	906-995'	4/79 Dowell	74'@958'	149,008 bbls	2/89 MicroGage	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	1120'	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	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

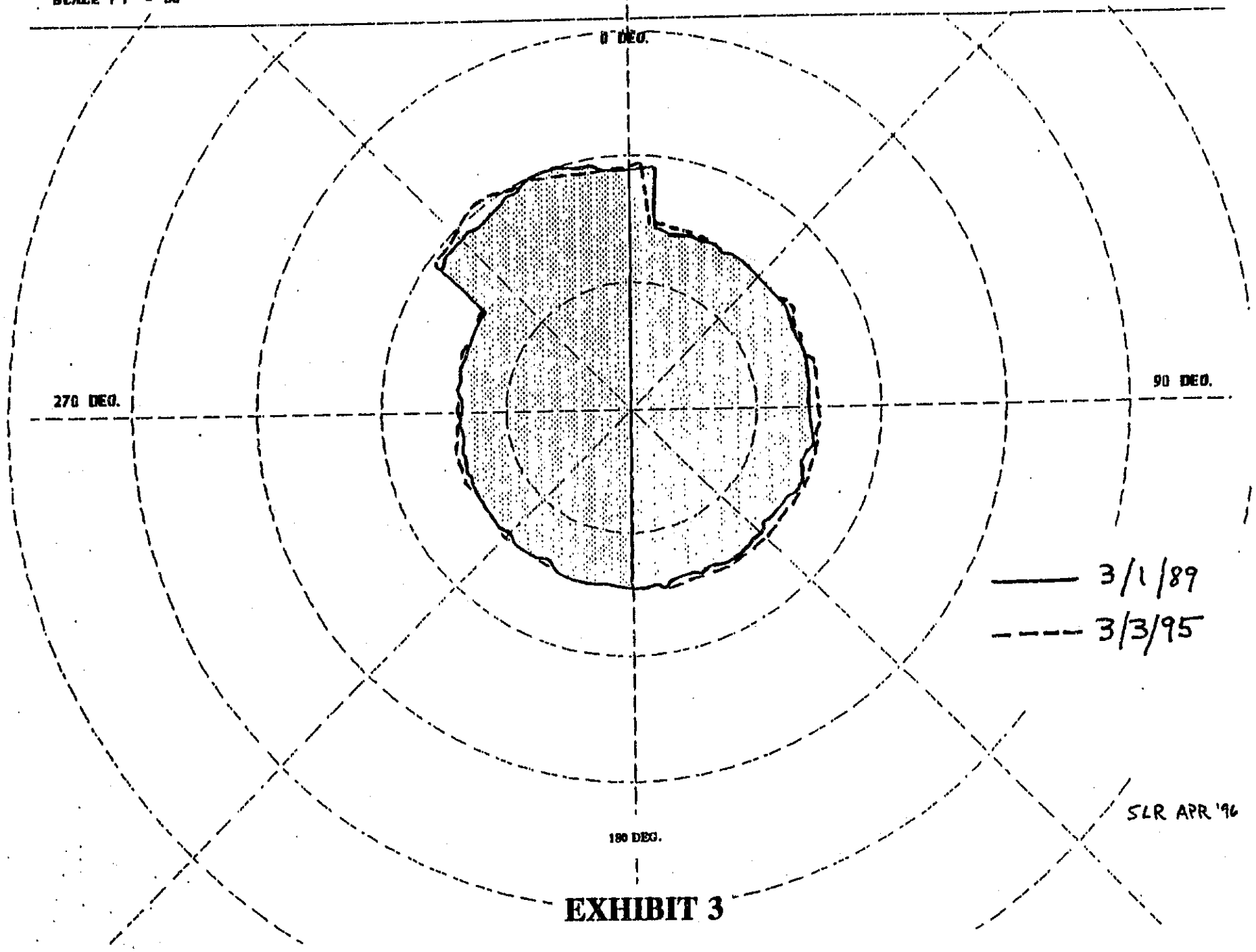


EXHIBIT 3

VERTICAL CROSSECTION

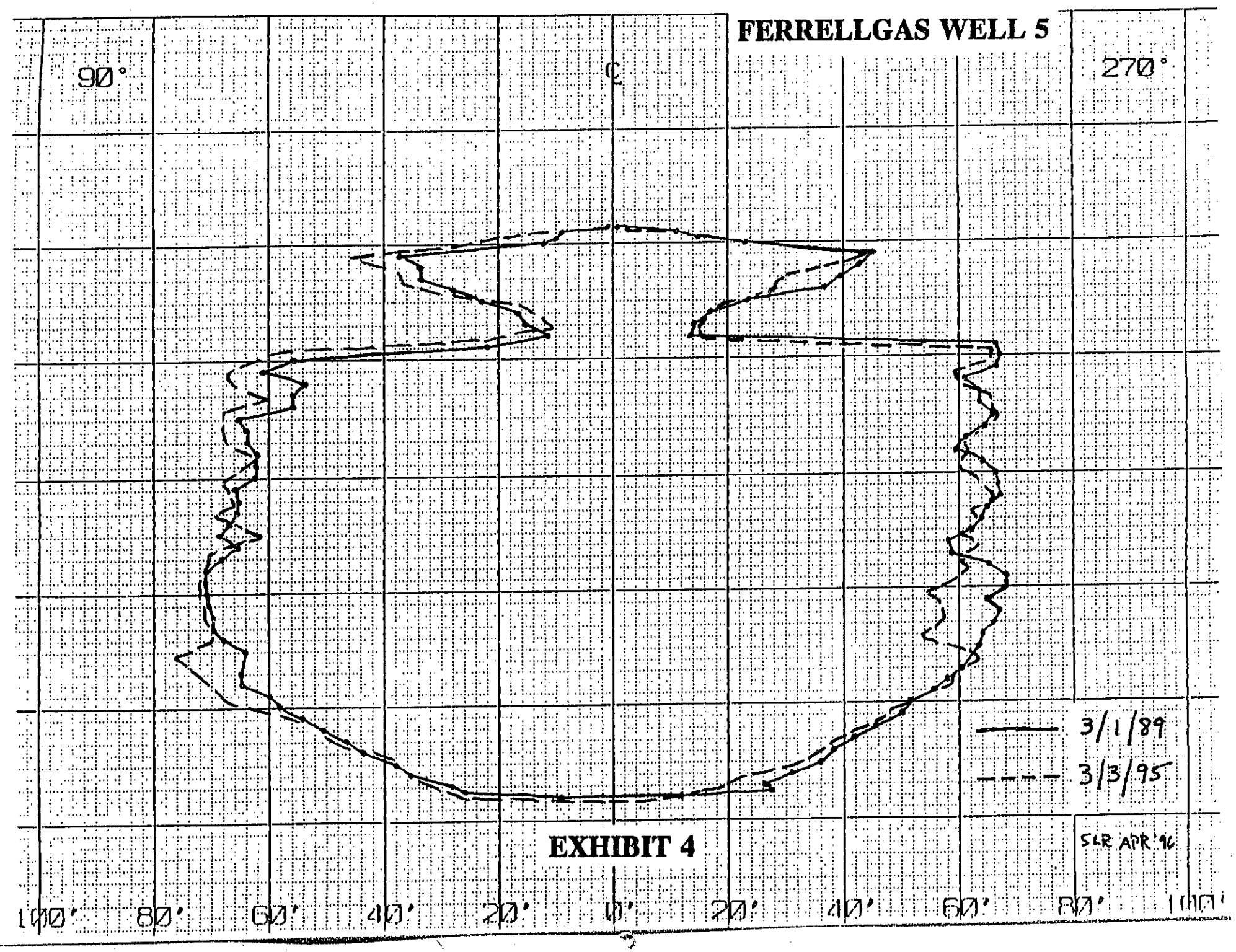


EXHIBIT 4

VERTICAL CROSSECTION

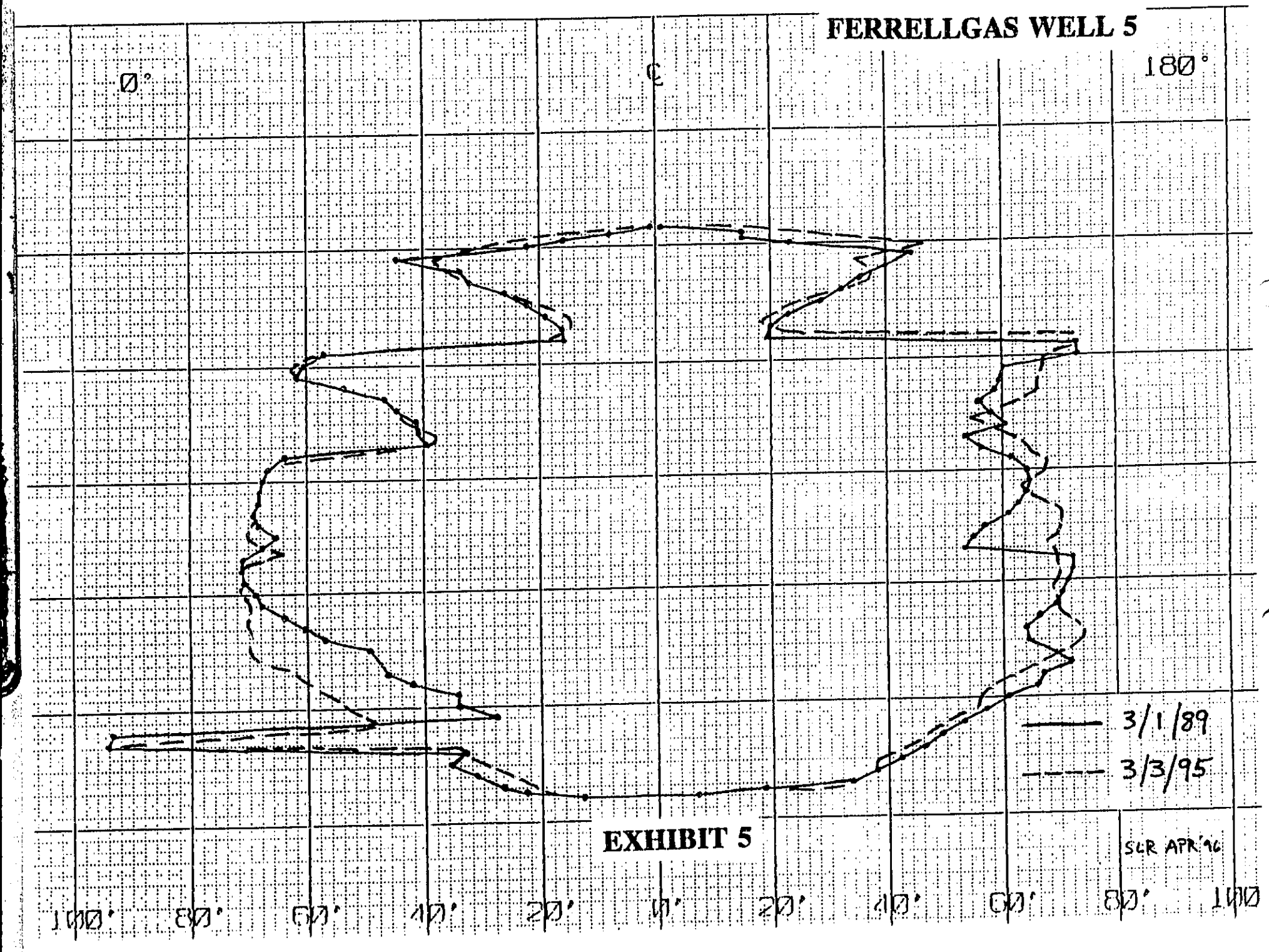


EXHIBIT 5

SCALE : 1" = 50'

MAXIMUM RADIUS PLOT

FERRELLGAS WELL 6

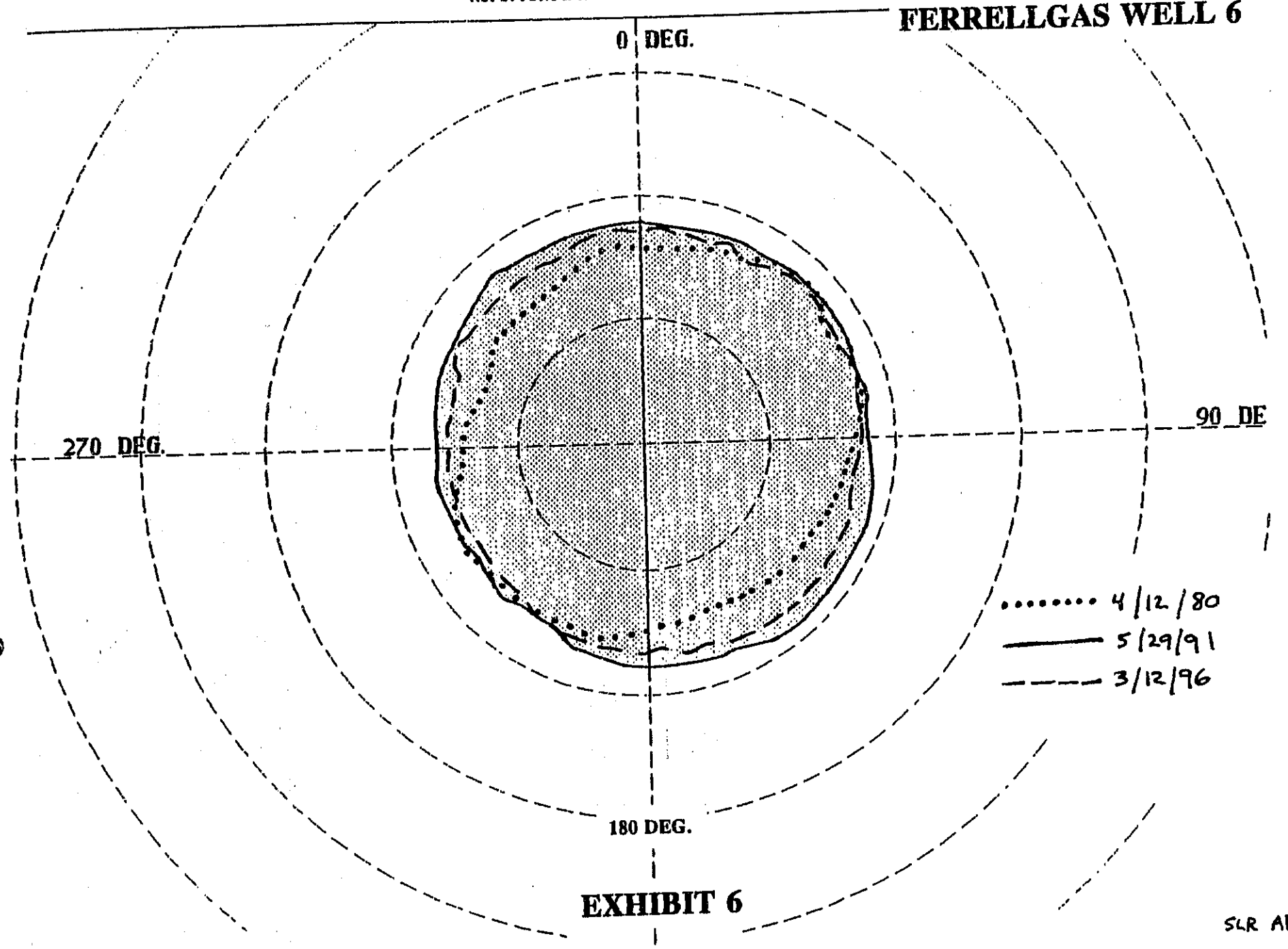


EXHIBIT 6

SLR APR '96

FERRELLGAS WELL 6

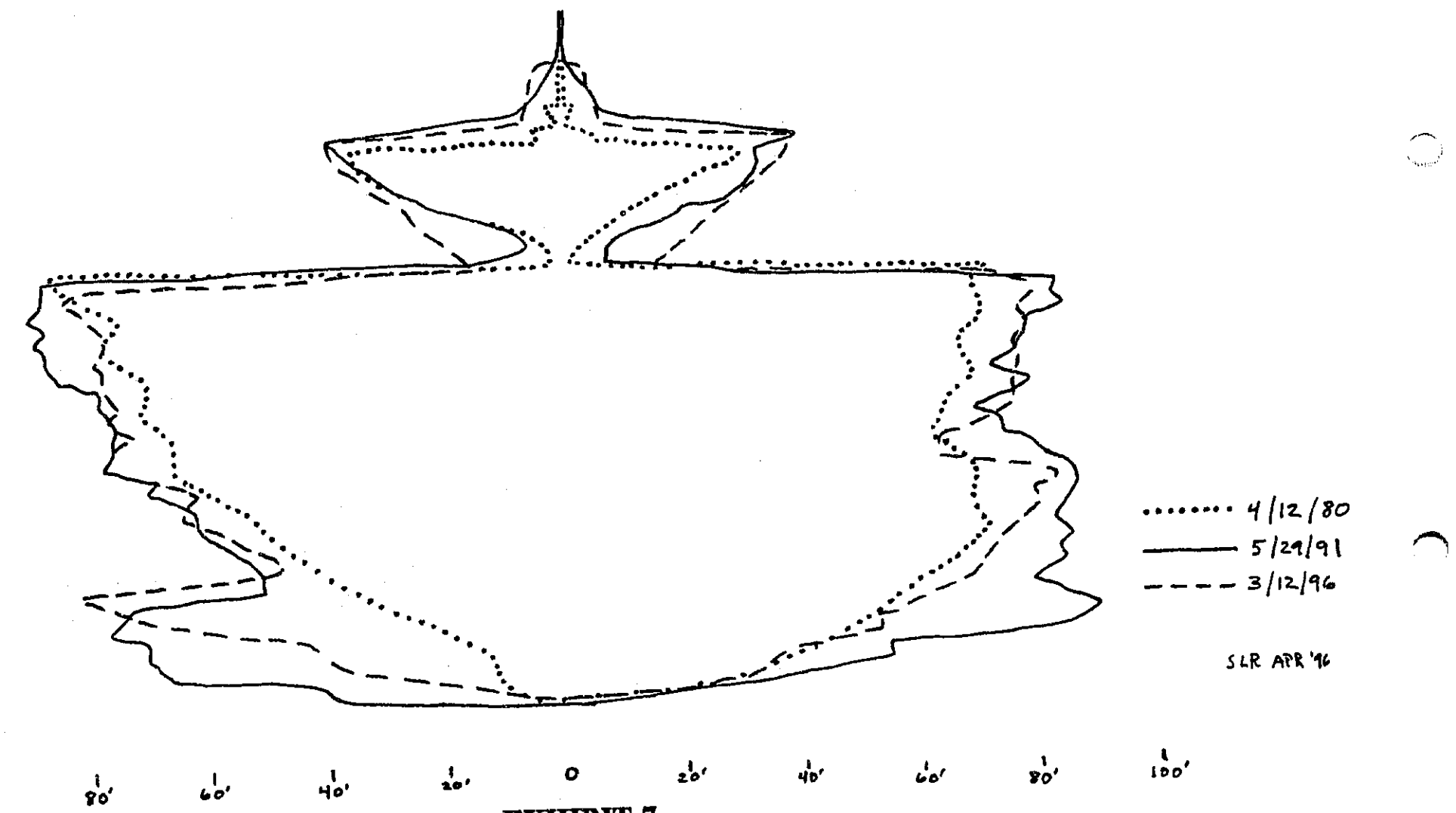


EXHIBIT 7

FERRELLGAS WELL 6

270 DEG.

90 DEG.

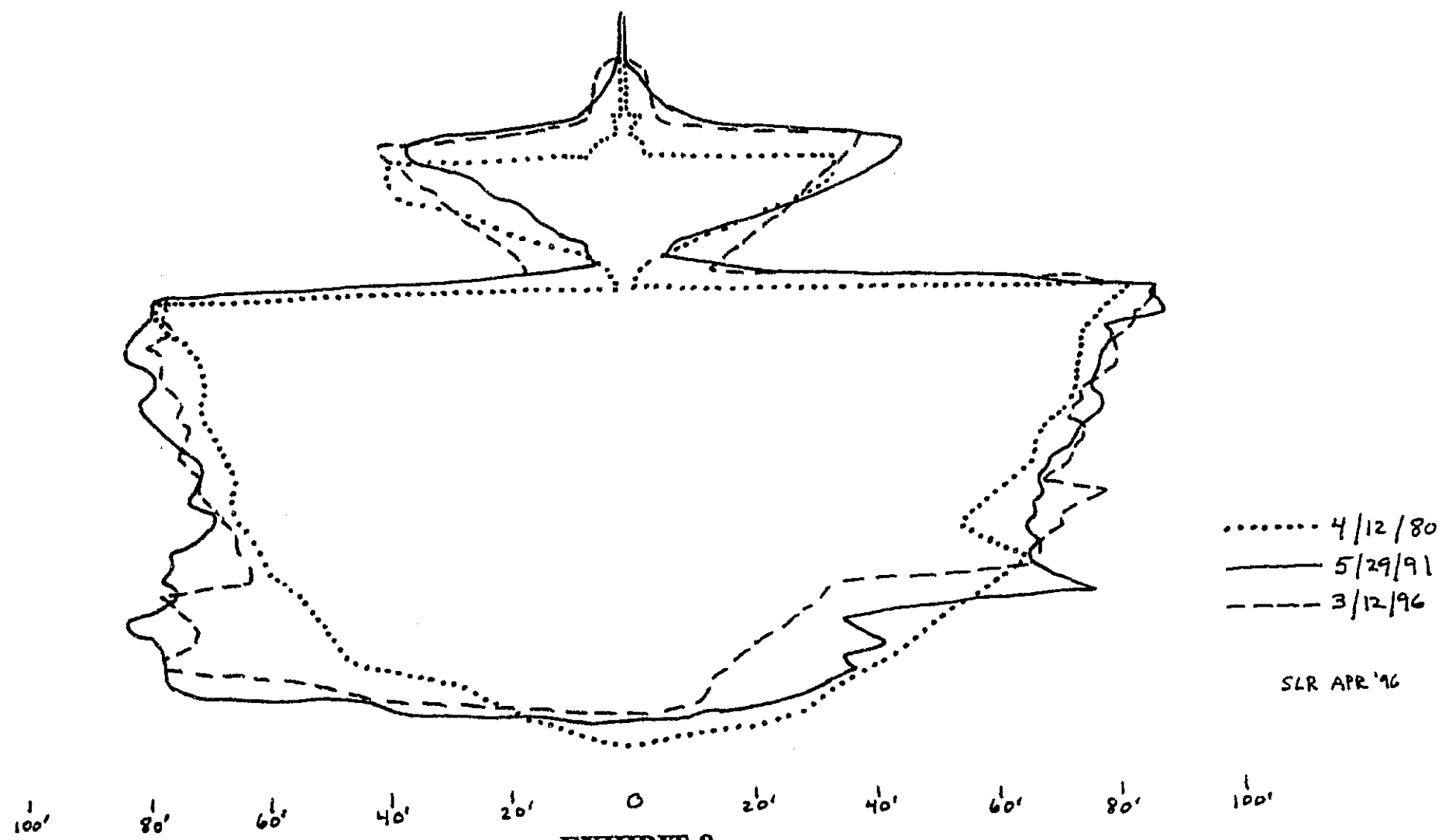


EXHIBIT 8

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).

556

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 • 602-524-3229

Ferrellgas

April 9, 1996

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

file 556

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
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

556

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

556

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

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

P/N 556

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

#556

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

556

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

WEA/vb

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

556

WILLIAMS ENERGY COMPANY

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

October 16, 1972

RJW:318:72

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

Dear Mr. Allen:

In reply to your October 3 letter, I have developed a sketch showing the development history of the #1 and #2 wells. As you can see, we experienced considerable difficulty with the anhydride stringers which are in the salt bed. However, these sketches depict what I feel is a reasonable estimate of the cavern configuration.

Williams Energy Company plans to resume washing operations on these two wells sometime in February 1973 when the propane now in storage has been removed. It is our intention to increase both wells to 150,000 barrels of usable capacity.

Very truly yours,

WILLIAMS ENERGY COMPANY

R. J. Wiruth
Manager of Operations

RJW:sw

Enclosure

November 11, 1971

Mr. Robert J. Wiruth
Manager of Operation
Suburban Companies
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Reports of Receipts and Deliveries (LPG)

Dear Mr. Wiruth:

Attached are several Form 28, Transporters and Storer's Monthly Reports, (LPG). We would appreciate it if you would pass these forms to the department that will be responsible for reporting any receipts or deliveries of LPG into orrfrom your Adamana Project.

We understand that you have now stored some 23,000 barels in the reservoir underlying your No. 1 Well. The results of any testing that you take on this reservoir prior to or during injection of propane would be appreciated.

For information on due dates that the transporters and Storer's Reports are due to be received by this office, refer to Rule 705, Paragraph B, of the Rules and Regulations of the Oil and Gas Conservation Commission.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

55

October 5, 1971

Mr. Robert J. Wiruth
Manager of Operation
Suburban Companies
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Suburban Companies #1 Fee Strat
SW/NW Sec. 8-T18N-R24E
Apache County
Our File #556

Suburban Companies #2 Fee Strat
NW/NW Section 8-T18N-R24E
Apache County
Our File #557

Dear Mr. Wiruth:

Completion Reports (Form 4) have been submitted on the above referenced wells. These reports were submitted pertaining only to the drilling aspect of the wells. At such time as the storage reservoirs are completed, please furnish this office information listing the approximate capacity of each reservoir together with a diagrammatic sketch of the size and shape of said reservoir. We will also require data relating to various tests that you may perform prior to the actual storage of LPG.

Your cooperation in this matter will be appreciated.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

Enc:

556

W A

THE suburban COMPANIES
LP GAS DIVISION
P.O. BOX 3478
TULSA, OKLAHOMA 74101
918-583-1711

September 22, 1971

W. E. Allen
Director, Enforcement Section
Oil and Gas Conservation Commission
4515 N. 7th Ave.
Phoenix, Arizona 85013

Dear Mr. Allen:

In reply to your letter of September 13, we have found samples from the number one Fee Strat located 150 feet FWL and 1500 FNL, section 18-T18N-R24E, Apache County, Permit #556. These samples are being forwarded in a container to your Phoenix, Arizona address.

Yours very truly,

R. J. Wiruth

R. J. Wiruth
Manager of Operations

RJW/lr

RECEIVED
SEP 24 1971
O & G CONS. COMM.

#556

FORM 40 PRINTED IN U.S.A.

WILLIAMS BROTHERS ENGINEERING COMPANY

Inter-Office Correspondence

TO: Oil & Gas Conservation Comission of Arizona

DATE: Sept- 21-71

FROM: B.H. Savoie - Adamana Ariz.

SUBJECT: No. I - well Samples

Enclosed please find samples from the Suburban companys location well #1 F.E.E. strat- 150 S.W.L (150' FWL) - 1500 F.W.L (1500' FNL) - Section 8 - township 18 - Range 24 E, Apache County Arizona, permitt No. 556.

TD 1101

B.H. Savoie

C-Bob Winuth

#1665 Spls 20 - 1100'
Cloth Sacks - some appear
To need washing

RECEIVED
OCT 12 1971
O & G CONS. COMM.

#556

September 13, 1971

Mr. Robert J. Wiruth
Manager of Operation
Suburban Companies
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Suburban Companies #1 Fee Strat
SW/NW Sec. 8-T18n-R24E
Apache County
Our File #556

Suburban Companies Core Test #1
NW/NW Section 8-T18N-R24E
Apache County
Our File #554

Re: Suburban Companies #2 Fee Strat
NW/NW Section 8-T18N-R24E
Apache County
Our File #557

Dear Mr. Wiruth:

According to our records we have received samples from your #1 Core Test located at 1170' FWL and 100' FWL, Section 8-T-18N-R24E, Apache County, permit #554 and your #2 Fee Strat located 600'FWL and 1220'FNL, Section 8-T-18N-R24E, Apache County, permit #557. However, we have not received samples fromyyour #1 Fee Strat located 150' FWL and 1500'FNL Section 8-T-18N-R24E, Apache County, permit #556.

Will you please arrange to have these samples sent either to us or to Four Corner Sample Cut in Farmington, New Mexico. Directives giving instructions for handling samples is attached.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

556

Enc.

THE suburban COMPANIES
LP GAS DIVISION
P.O. BOX 3478
TULSA, OKLAHOMA 74101
918-583-1711

September 8, 1971

Oil & Gas Conservation Commission
State of Arizona
4515 N. 7th Avenue
Phoenix, Arizona 85013

Gentlemen:

Please send us a supply of your "Transporters & Storers Monthly Report", Gas (Form 28) as outlined in Rule 705 of "Proposed Amendments to the Arizona State Wide Rules Pertaining to Oil & Gas".

Very truly yours,

M. J. Kunard

M. J. Kunard
Fuel Accountant

MJK: jp

556
557

RECEIVED
SEP 1 0 1971
O & G CONS. COMM.

August 11, 1971

Mr. H. H. Holloway
Fenix & Scisson, Inc
5805 East Fifteenth Street
Tulsa, Oklahoma

RE: Suburban Companies Core Test #1
NW NW Section 8 T18NR24E
Apache County
Our File 554

RE: Suburban Companies #1 Fee Strat
SW NW Section 8 T18N 24E
Apache County
Our File 556

RE: Suburban Companies #2 Fee Strat
NW NW Section 8 T18N R24E
Apache County
Our file 557

Dear Mr. Holloway:

We have received from Suburban the completion reports on your #1 and #2 wells. We have also received the application to drill water well, however, we are holding this application until such time as we receive a copy of the certified plat designating the location of this well. We have advised Mr. Wiruth of our need for this plat.

Uhts office realizes that your #1 and #2 wells were drilled for storage purposes and not as strat tests, however, for the sake of simplicity and to adhere to our rules and regulations, they have designated for this office as strat tests.

Thank you very much for your past cooperation.

Very truly yours,

W. E. Allen
Director, Enforcement Section

WEA/rlb

556

FENIX & SCISSON, INC.
5805 EAST FIFTEENTH STREET
TULSA, OKLAHOMA

PLEASE REPLY TO:
P. O. Box 15609
TULSA, OKLAHOMA 74115

PHONE (918) 835-9471
TELEX NO. (918) 823-3131
CABLE ADDRESS: FENSON TULSA

August 9, 1971

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

Dear Mr. Allen:

In answer to your letter of August 5 concerning the wells drilled at Adamana for the Suburban Companies, I should like to offer the following information.

The core test has been plugged and abandoned in accordance with your verbal instructions issued to our Mr. Johnson. Our Engineering Department was to have filed the reports on the core hole, but apparently failed to do so. I have checked with them on this and the necessary reports will be filed immediately.

With respect to the Suburban Companies' Nos. 1 and 2 strat tests, I am assuming you mean the Nos. 1 and 2 solution wells drilled for salt storage. The completion reports on these two wells have been submitted to Mr. Wiruth with the Suburban Companies for his signature and transmittal to you. If my assumption here is incorrect, there must be some misunderstanding for to my knowledge no strat tests as such were drilled.

The application to drill the fresh water well and the completion report on this well were also transmitted to Mr. Wiruth on August 2 and August 3 for his signature and transmittal to you.

Very truly yours,

H. H. Holloway

HHH:wi

cc: Mr. R. J. Wiruth

RECEIVED
AUG 11 1971
O & G CONS. COMM.

Permits. 554-556 & 557

THE suburban COMPANIES
LP GAS DIVISION
P.O. BOX 3478
TULSA, OKLAHOMA 74101
918-583-1711

August 5, 1971

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

Dear Mr. Allen:

Attached is the completion reports and one copy of the logs for our storage wells #1 and #2, Apache County, Arizona. The drilling time and bit record have been mailed to you under separate cover from H. H. Johnson, Fenix and Scisson.

Also enclosed is our application to drill a water well at our location. You will find our $25.00 permit fee attached. We have also enclosed the well completion report. We had previously obtained our permit to drill the water well from the Arizona State Land Department. I am sorry for the oversight on our part but I didn't realize that your department also had jurisdiction over water wells.

This should complete our drilling program in Arizona for the present. We appreciate the assistance you have given us during the project. I trust that we have submitted sufficient data to keep us in compliance with the state requirement and we desire that all data supplied remain "confidential".

Sincerely,

R. J. Wiruth

R. J. Wiruth
Mgr., of Operations

RJW:jp
Attachment

file #556

Permit 556 & 557 - 567

ONE OF THE WILLIAMS COMPANIES

August 5, 1971

Mr. H. H. Holloway
Fenix & Scisson, Incorporated
P. O. Box 15609
Tulsa, Oklahoma 74115

Re: Suburban Companies #1 Fee Strat
SW/4 NW/4 Sec. 8-T18N-R24E
Apache County
Our File #556

Suburban Companies #2 Fee Strat
NW/4 NW/4 Sec. 8-T18N-R24E
Apache County
Our File #557

Suburban Companies Core Test #1
NW/4 NW/4 Sec. 8-T18N-R24E
Apache County
Our File #554

Suburban Companies Water Well #1
Sec. 8-T18N-R24E
Apache County

Dear Mr. Holloway:

Please furnish this Commission a Completion Report (Form 4) on your #1 and #2 strat tests as quickly as possible.

Also, advise what your intentions are on your #1 Core test. If this well is to be used as a future water well, we will need a Completion Report (Form 4). If it is to be plugged and abandoned, we will, of course, need an Application to Plug (Form 9) stating the methods you intend to use in plugging this well. Following the plugging we will need a Plugging Report (Form 10) and a Completion Report (Form 4).

We are still waiting for the Application to Drill your water well; and, we will also need a Completion Report (Form 4) on this well.

May we have the above information as quickly as possible.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA:jd

555

FENIX & SCISSON, INC.
5805 EAST FIFTEENTH STREET
TULSA, OKLAHOMA

PLEASE REPLY TO:
P. O. BOX 15609
TULSA, OKLAHOMA 74115

PHONE (918) 835-8471
TELEX NO. (918) 923-3131
CABLE ADDRESS: FENSON TULSA

August 3, 1971

Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Attention: Mr. W. E. Allen

Gentlemen:

We have recently completed the drilling of 2 LPG storage wells for The Suburban Companies in Apache County, Arizona. For your information and record I am attaching a copy of the bit records of these 2 wells.

If you desire additional information, please let me know.

Very truly yours,

H. H. Holloway

HHH:wi
Encl.

cc: Mr. R. J. Wiruth
The Suburban Companies

RECEIVED
AUG 5 1971
O & G CONS. COMM.

BIT NO.		FOOTAGE	RATE	FORMATION
STORAGE WELL NO. 1				
1	OSC1G R.T.	17.5' - 144'	6.5 ft/hr	sand and red shale
2	12-1/4" SV2 R.T.	144 ' - 318'	9.1 ft/hr	red sand
3	12-1/4" OSC R.T.	318 ' - 382'	5. ft/hr	shale and sand
4	12-1/4" OWV R.T.	382 ' - 407'	2.1 ft/hr	sand
5	12-1/4" K2V R.T.	407 ' - 430'	2.1 ft/hr	sand
6	12-1/4" OWV R.T.	430 ' - 515'	3.5 ft/hr	sand
7	12-1/4" M4L New	515 ' - 640'	3.5 ft/hr	sand
8	12-1/4" OWV R.T.	640 ' - 692'	4.4 ft/hr	sand
9	12-1/4" M4L New	692 ' - 900'	6. ft/hr	sand-anhydrite-salt
10	8-5/8" T1A R.T.	900 ' - 1101'	13.2 ft/hr	T.D. 1101' G.L. salt and shale stringers
STORAGE WELL NO. 2				
1	17-1/2" OSC1G RR	0 ' - 150'	5.3 ft/hr	red sand
2	12-1/4" H7 New	150 ' - 342'	4.5 ft/hr	shale and sand
3	12-1/4" M4L New	342 ' - 462'	3. ft/hr	sand
4	12-1/4" H7 New	462 ' - 575'	3. ft/hr	sand
5	12-1/4" M4N New	575 ' - 739'	4.8 ft/hr	sand
6	12-1/4" OWV R.T.	739 ' - 900'	7.5 ft/hr	sand-anhydrite-salt
7	8-5/8" OSC R.T.	900 ' - 1108'	7.7 ft/hr	salt with shale stringers

RECEIVED
AUG 5 1971
O & G CONS. COMM.

June 16, 1971

Mr. Robert J. Wiruth
Manager of Operation
Suburban Companies
P. O. Box 3478
Tulsa, Oklahoma 74101

Re: Suburban Companies #1 Fee Strat
SW/4 NW/4 Sec. 8-T18N-R24E
Apache County
Our File #556

Suburban Companies #2 Fee Strat
NW/4 NW/4 Sec. 8-T18N-R24E
Apache County
Our File #557

Dear Mr. Wiruth:

Enclosed please find Receipt No. 2890 and 2891 covering the two $25 filing fees, copies of your approved Application for Permit to Drill, and Permit To Drill No. 556 and 557.

Very truly yours,

W. E. Allen, Director
Enforcement Section

jd
Enc.

June 9, 1971

Greer Engineering Company
1000 8th Avenue
P. O. Drawer T
Holbrook, Arizona 86025

Attn: Mr. Lacy C. Greer

Re: Suburban Companies locations in Section 8-T18N-R24E,
Apache County

Gentlemen:

In conversation with representatives of Suburban we were informed that you had or were in the process of staking two locations for this company in the above referenced section; and, that as quickly as the locations were staked you would forward this office certified plats indicating their exact location. Would you please forward these plats as quickly as possible.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA:jd

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