

BW - 028

**NOTICE OF
VIOLATIONS
(NOVs)**

Chavez, Carl J, EMNRD

From: Patterson, Bob [bpatterson@keyenergy.com]
Sent: Monday, May 03, 2010 1:17 PM
To: Chavez, Carl J, EMNRD; Griswold, Jim, EMNRD
Cc: Molleur, Loren; Gibson, Dan; Miller, Robyn
Subject: FW: Annual BW-28 Report.xls
Attachments: BW #28 Chemical Analysis; MIT Casing Test BW #28; C-103 BW #28; Echo Log State #1 BW#28; Annual BW-28 Report.xls

Following are the requirements for the annual report:

1. Cover sheet marked as "Annual Brine Well Report, name of operator, E permit #, API# of well(s), date of report, and person submitting report.
2. Brief summary of brine wells operations including description and reason for any remedial or major work on the well. Copy of C-103.
3. Production volumes as required above in 21.G. including a running total to be carried over to each year. The maximum and average injection pressure.
4. A copy of the chemical analysis as required above in 21.H.
5. A copy of any mechanical integrity test chart, including the type of test, open to formation or casing test.
6. Brief explanation describing deviations from normal production methods.
7. A copy of any leaks and spills reports.
8. If applicable, results of any groundwater monitoring.
9. Information required from cavity/subsidence 21.F. above.
10. An Area of Review (AOR) summary.
11. Sign-off requirements pursuant to WQCC Subsection G 20.6.2.5101.

Bob Patterson | Key Energy Services, LLC | Area Manager, Trucking
Division | O: 575.394.2586 | C: 575.631.7597



CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

February 24, 2010

Bob Patterson
Key Energy
P.O. Box 99
Eunice, NM 88231

Re: Water Samples

Enclosed are the results of analyses for sample number H19264, received by the laboratory on 02/15/10 at 11:10 am.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydrocarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.2	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

Total Number of Pages of Report: 3 (includes Chain of Custody)

Sincerely,

Celey D. Keene
Laboratory Director

This report conforms with NELAP requirements.



PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
KEY ENERGY
ATTN: BOB PATTERSON
P.O. BOX 99
EUNICE, NM 88231
FAX TO: (575) 394-2584

Receiving Date: 02/15/10
Reporting Date: 02/23/10
Project Number: NOT GIVEN
Project Name: NOT GIVEN
Project Location: NOT GIVEN

Sampling Date: 02/15/10
Sample Type: WATER
Sample Condition: INTACT
Sample Received By: JH
Analyzed By: HM

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u S/cm)	T-Alkalinity (mgCaCO ₃ /L)
ANALYSIS DATE:		02/21/10	02/21/10	02/21/10	02/21/10	02/17/10	02/17/10
H19264-1	FRESH WATER	12	93.0	16.5	3.1	778	136
H19264-2	BRINE WATER	99,100	2,120	146	110	296,000	58.0
Quality Control		NR	51.3	52.5	2.96	1,427	NR
True Value QC		NR	50.0	50.0	3.00	1,413	NR
% Recovery		NR	103	105	98.8	101	NR
Relative Percent Difference		NR	6.4	1.9	3.8	0.9	NR

METHODS:	SM3500-Ca-D	3500-Mg E	8049	120.1	310.1
----------	-------------	-----------	------	-------	-------

	Cl (mg/L)	SO ₄ (mg/L)	CO ₃ (mg/L)	HCO ₃ (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:	02/17/10	02/17/10	02/17/10	02/17/10	02/17/10	02/16/10
H19264-1	80	79.1	0	166	7.99	467
H19264-2	154,000	4,420	0	68.3	6.51	261,000
Quality Control	510	43.0	NR	976	7.01	NR
True Value QC	500	40.0	NR	1000	7.00	NR
% Recovery	102	108	NR	97.6	100	NR
Relative Percent Difference	< 0.1	6.5	NR	1.2	0.1	1.3

METHODS:	SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1
----------	-------------	-------	-------	-------	-------	-------

Chemist

Date

PLEASE NOTE: **Liability and Damages.** Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.



101 East Marland, Hobbs, NM 88240

(575) 393-2326 Fax (575) 393-2476

Page _____ of _____

[illegible]

† Cardinal cannot accept verbal changes. Please fax written changes to 575-393-2476.

10



PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

February 24, 2010

Bob Patterson
Key Energy
P.O. Box 99
Eunice, NM 88231

Re: Water Samples

Enclosed are the results of analyses for sample number H19264, received by the laboratory on 02/15/10 at 11:10 am.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydrocarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.2	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

Total Number of Pages of Report: 3 (includes Chain of Custody)

Sincerely,

Celey D. Keene
Laboratory Director

This report conforms with NELAP requirements.



PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
KEY ENERGY
ATTN: BOB PATTERSON
P.O. BOX 99
EUNICE, NM 88231
FAX TO: (575) 394-2584

Receiving Date: 02/15/10
Reporting Date: 02/23/10
Project Number: NOT GIVEN
Project Name: NOT GIVEN
Project Location: NOT GIVEN

Sampling Date: 02/15/10
Sample Type: WATER
Sample Condition: INTACT
Sample Received By: JH
Analyzed By: HM

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (μ S/cm)	T-Alkalinity (mgCaCO ₃ /L)
ANALYSIS DATE:		02/21/10	02/21/10	02/21/10	02/21/10	02/17/10	02/17/10
H19264-1	FRESH WATER	12	93.0	16.5	3.1	778	136
H19264-2	BRINE WATER	99,100	2,120	146	110	296,000	56.0
Quality Control		NR	51.3	52.5	2.96	1,427	NR
True Value QC		NR	50.0	50.0	3.00	1,413	NR
% Recovery		NR	103	105	98.8	101	NR
Relative Percent Difference		NR	6.4	1.9	3.8	0.9	NR

METHODS:	SM3500-Ca-D	3500-Mg E	8049	120.1	310.1
----------	-------------	-----------	------	-------	-------

		Cl (mg/L)	SO ₄ (mg/L)	CO ₃ (mg/L)	HCO ₃ (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		02/17/10	02/17/10	02/17/10	02/17/10	02/17/10	02/16/10
H19264-1	FRESH WATER	80	79.1	0	166	7.99	467
H19264-2	BRINE WATER	154,000	4,420	0	68.3	6.51	261,000
Quality Control		510	43.0	NR	976	7.01	NR
True Value QC		500	40.0	NR	1000	7.00	NR
% Recovery		102	108	NR	97.6	100	NR
Relative Percent Difference		< 0.1	6.5	NR	1.2	0.1	1.3

METHODS:	SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1
----------	-------------	-------	-------	-------	-------	-------

Chad Keene
Chemist

02/24/10
Date

PLEASE NOTE: **Liability and Damages.** Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.



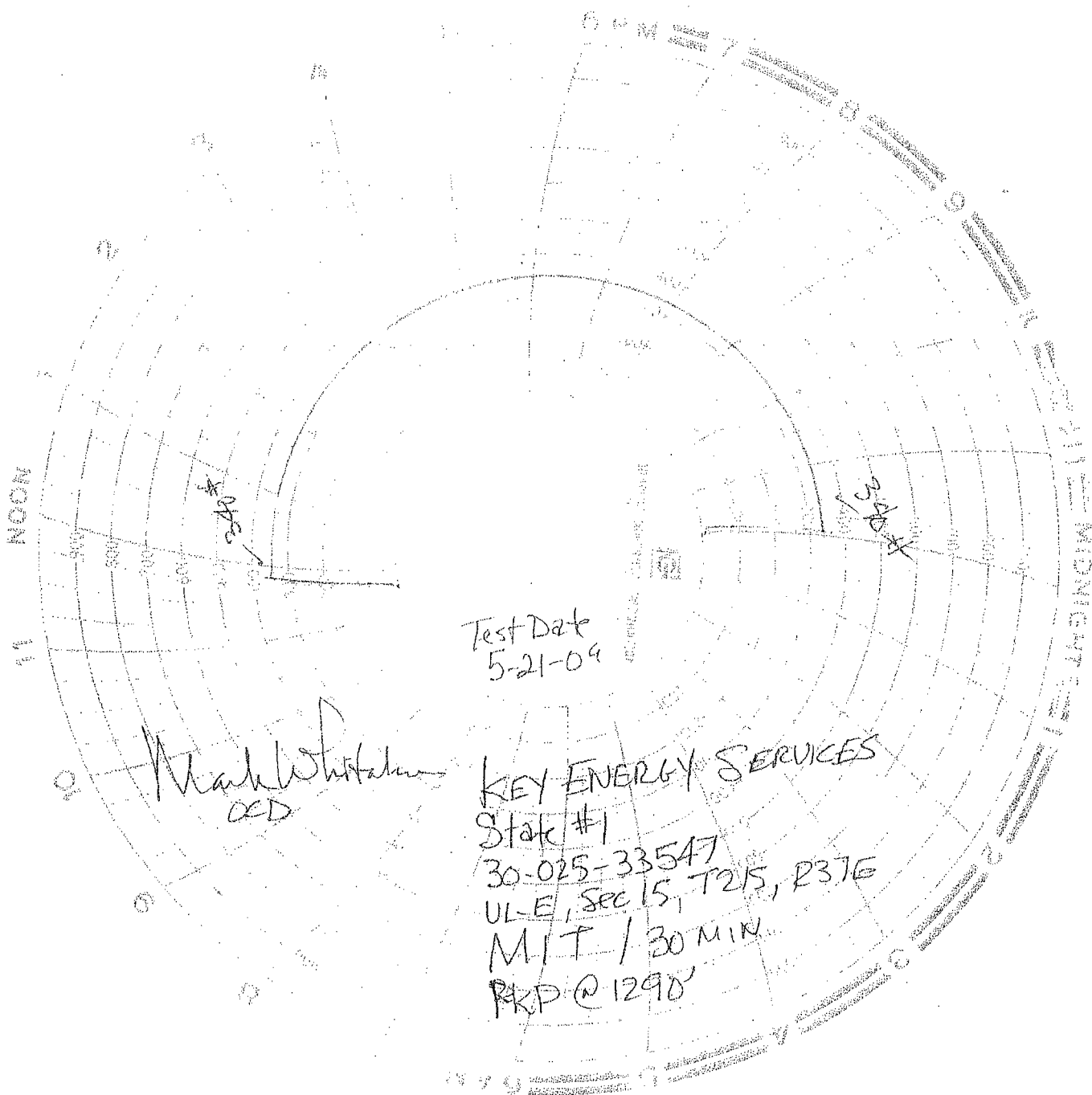
Page _____ of _____

+ Cardinal cannot accept verbal changes. Please fax written changes to 575-393-2476.

10

Chavez, Carl J, EMNRD

From: Email 2, Scan [scan2email2@keyenergy.com]
Sent: Tuesday, April 20, 2010 4:37 PM
To: Patterson, Bob
Subject: MIT Casing Test BW #28
Attachments: SKMBT_75010042022370.pdf



Chavez, Carl J, EMNRD

From: Email 2, Scan [scan2email2@keyenergy.com]
Sent: Tuesday, April 20, 2010 4:37 PM
To: Patterson, Bob
Subject: C-103 BW #28\
Attachments: SKMBT_75010042022360.pdf

Office

Energy, Minerals and Natural Resources

5/25/2009

District I

1625 N. French Dr., Hobbs, NM 88240

District II

1301 W. Grand Ave., Artesia, NM 88210

District III

1000 Rio Brazos Rd., Aztec, NM 87417

District IV

1220 S. St. Francis Dr., Santa Fe, NM 87505

RECEIVED
MAY 26 2009
HOBBSDUC
CONSERVATION DIVISION

1400 South St. Francis Dr.

Santa Fe, NM 87505

WELL API NO.

30-025-33547 ✓

5. Indicate Type of Lease

STATE ☒ FEE ☐ ✓

6. State Oil & Gas Lease No.

MS-0004

7. Lease Name or Unit Agreement Name

State

8. Well Number # 1

9. OGRID Number

19797 ✓

10. Pool name or Wildcat

BSW-SALADO ✓

SUNDRY NOTICES AND REPORTS ON WELLS

(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well: Oil Well ☐ / Gas Well ☐ Other ☒ Brine Well

2. Name of Operator

Key Energy Services

3. Address of Operator

P.O. Box 99 Eunice NM 88231

4. Well Location

Unit Letter E : 1340 feet from the North line and 330 feet from the West line
Section 15 Township 21S Range 37E NMPM County Lea ✓

11. Elevation (Show whether DR, RKB, RT, GR, etc.)

Pit or Below-grade Tank Application ☐ or Closure ☐

Pit type _____ Depth to Groundwater _____ Distance from nearest fresh water well _____ Distance from nearest surface water _____

Pit Liner Thickness: _____ mil Below-Grade Tank: Volume _____ bbls: Construction Material _____

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐TEMPORARILY ABANDON ☐ CHANGE PLANS ☐PULL OR ALTER CASING ☐ MULTIPLE COMPL ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐ ALTERING CASING ☐COMMENCE DRILLING OPNS. ☐ P AND A ☐CASING/CEMENT JOB ☐OTHER: Sonor Test & MIT ☐OTHER: ☒

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

5-19-2009 MI- RUPU Install BOP, POH with 2 7/8 Tbg and 6 1/4 Bit

5-19-2010 SION

5-20-2009 RU Key Wire Line and Sonor Tool, Run Sonor test on Brine Well, POH with sonor tool.

5-20-2010 SION

5-21-2009 RIH with Packer and 2 7/8 Tbg and 6 1/4 bit to 1300', Pressure test to 300#, Pressure Test leaked 30# in 20 minutes. OCD Rep on location advised to Pull up to 1290' and Retest. Pull up to 1290' with Packer and Tbg. Retest to 340#, Test held good for 30 minutes. POH with packer and tbg. RIH with 6 1/4 Bit and tbg to 1300' And SION.

5/22/2009 RU Reverse and power swivel and drill to 1701', Circulate well for 30 minutes. SION

5/23/2009 Pull BOP and flange will head back up & return to production.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE

Sam Blins

TITLE

MANAGER

DATE

5-25-09

Type or print name

E-mail address:

Telephone

For state use only

APPROVED BY:

Terry W. Hill

TITLE

DISTRICT 1 SUPERVISOR

DATE

MAY 27 2009

Conditions of Approval (if any):

Chavez, Carl J, EMNRD

From: Email 2, Scan [scan2email2@keyenergy.com]
Sent: Tuesday, April 20, 2010 4:38 PM
To: Patterson, Bob
Subject: Echo Log State #I BW#28
Attachments: SKMBT_75010042022372.pdf



SOCON Sonar Well Services, Inc.

ECHO - LOG

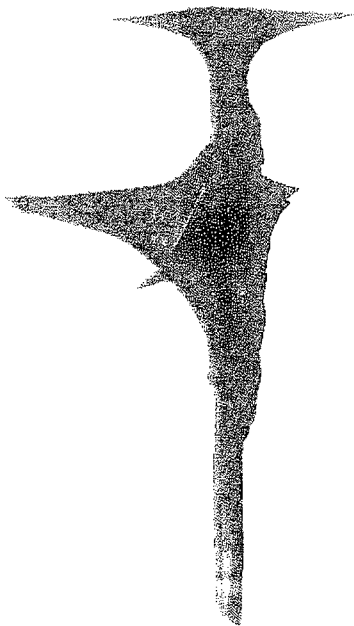
Key Energy Services

Cavern No: State S 1

Eunice, New Mexico

05/20/2009

093035



SOCON Sonar Well Services, Inc.

11133 I-45 South, Ste. E

Conroe, Texas 77302

Phone (936) 441-5801

Fax (936) 539-6847

e-mail: soconusa@socon.com



SOCON Sonar Well Services, Inc.

Cavern No: State S 1

093035

05/20/2009

Results of the Cavern Survey

by means of Echo-Sounding

in the cavern

Cavern No: State S 1

Date: 05/20/2009

093035

Customer:

Key Energy Services

Eunice, New Mexico

- 1: Rig up and run ~15' 250 lb CCL and sinker bar to 1410'.
- 2: Pull guage tool up and hang up on 3-5/8" casing.
- 3: Pull loose and go back down but can only get to a depth oh 1381'.
- 4: Pull guage tool to surface and rig up sonar tool.
- 5: Sonar from 1350' to 1371' and set down.
- 6: Attempt to survey roof area from 1351 - 1352 - 1353 - 1354. Swing arm will not extend full range as it hits the pipe or cavern wall.
- 7: Remove sonar tool from cavern and attach 4' - 70 lb sinker bar to the tool.
- 8: Sonar from 1371' to 1382' and set down. Can not get sonar tool any deeper.
- 9: While coming out of well the tool hangs at the casing seat. Pull ~ 800 lbs of line weight and tool comes free.
- 10: End of Sonar Survey

Responsible for the survey:

Surveyor:	HL Van Metre
Leadership:	Mr. Sam Blevins
Interpreter:	HL Van Metre
Control:	Mr. Richard Lawrence



SOCOLP Sonar Well Services, Inc.

Cavern No: State S 1

093035

05/20/2009

Contents

Summary of results

Legend

Enclosures:

Volume (diagrams and lists)

Diameter and radii (diagrams and lists)

Perspective views

Maximum plots (top view)

Horizontal sections

Maximum plot (side view)

Vertical sections



Summary of results

Well details

All depths are given as:	MD
Datum level for all depths:	BHF
Shoe of the cemented 8-5/8" - casing:	1350.0 ft
Shoe of the - casing during the surveying:	1350.0 ft
Reference depth for ECHO-LOG:	1350.0 ft
Depth correction:	0.0 ft
Pressure at the well head:	0.0 psi

Details of survey equipment

Measuring vehicle used:	L 10
Tools used:	XN02 - R185 - 1

General details

Number of runs:	2
Measured horizontal sections:	33
Measured tilted sections:	0
Lowest survey depth:	1382.0 ft



SOCON Sonar Well Services, Inc.

Cavern No: State S 1

093035

05/20/2009

Maximum and minimum dimensions with ref. to the measuring axis

Reference direction: magnetic north

Determination out of 12 vertical sections derived from horizontally and tilted measured data at 15 degree intervals:

Minimum radius: 0.1 ft
Depth: 1382.0 ft
Direction: 345°

Maximum radius: 15.8 ft
Depth: 1360.0 ft
Direction: 195°

Highest point of cavern: 1350.0 ft
Horizontal distance: 4.9 ft
Direction: 0°

Lowest point of cavern: 1382.0 ft
Horizontal distance: 0.1 ft
Direction: 345°

Lowest point in the measuring axis: 1382.0 ft

Determination out of 33 horizontal sections in the depths between 1350' and 1382' at 5 degree intervals:

Maximum radius: 15.8 ft
Depth: 1360.0 ft
Direction: 195°

Maximum diameter: 17.6 ft
Depth: 1360.0 ft
Direction: 15 - 195°

Volume

Volume: 49.6 Bbls

Depth range: 1350.0 ft <--> 1382.0 ft



SOCON Sonar Well Services, LLC

Cavern No: State S 1

093035

05/20/2009

Interpretation

Supposing a rectilinear propagation of ultrasonic waves all recorded echo travel times were converted into distances by using the subsequent speeds of sound:

5880 feet/second in brine (default)

In the case of recording several echoes along one trace of echo signals, the representative echo signal was selected according to the level of amplitude, transmission time, and density of measured points and the shape of the cavern.

Horizontal sections

33 horizontal sections at following measured depths are included as graphical plots in this report:

1350.0 ft	1351.0 ft	1352.0 ft	1353.0 ft	1354.0 ft	1355.0 ft	1356.0 ft
1357.0 ft	1358.0 ft	1359.0 ft	1360.0 ft	1361.0 ft	1362.0 ft	1363.0 ft
1364.0 ft	1365.0 ft	1366.0 ft	1367.0 ft	1368.0 ft	1369.0 ft	1370.0 ft
1371.0 ft	1372.0 ft	1373.0 ft	1374.0 ft	1375.0 ft	1376.0 ft	1377.0 ft
1378.0 ft	1379.0 ft	1380.0 ft	1381.0 ft	1382.0 ft		

Tilted sections

0 sections recorded with tilted echo-transducer at following measured depths are presented in the vertical sections:

Vertical sections

The shape of the cavern was determined by interpretation of all horizontally and tilted measured data and is presented by 36 vertical sections in this report.



Maximum plots (top view)

The maximum plot presents the largest extension of the cavern in a top view. The first picture shows the areas of all horizontal sections and the area resulting out of the vertical sections (hatched). The resulting total area is shown in the second picture (cross hatching) together with the largest single area.

In both pictures the total centre of gravity of the cavern is shown with its distance and its direction referring to the measuring axis.

The total centre of gravity is derived out of the envelope, which is the connection line of the largest cavern extension in every direction

Perspective views

Several perspective drawings are included in this report to give a quick review of detailed relations.

Pockets in the cavern wall

Pockets in the cavern wall, which have been identified by the tilted echo-transducer, were transferred from the vertical sections to the respective horizontal sections.

The resulting additional areas have been added to the calculated areas.



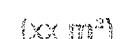
SOCCON Sonar Well Services, Inc.

Cavern No: State S 1

093035

05/20/2009

LEGEND

-  Measured point recorded with horizontal adjusted ultrasonic transducer
-  Measured point recorded with tilted or vertical orientated ultrasonic transducer
-  Interpolated point derived from the vertical sections
-  Connection line between two measured points in order to calculate the volume
-  Assumed connection line (in areas which are not sufficiently covered by measured points)
-  Magnetic north determined with compass inside the tool
(magnetic compass in areas without tubing)
(fibre gyro compass in areas with tubing)
-  Assumed north direction (for sections in magnetic disturbed surroundings without fibre gyro compass)
-  Longest extension in section
(without considering of hidden leached pockets)
-  Longest extension in section perpendicular to a
(without considering of hidden leached pockets)
-  Ratio of longest extensions in section which are perpendicular to each other
-  Area in actual section resulting from hidden leached pockets
-  Average radius

 021835 29.04.2002 Job number and survey date

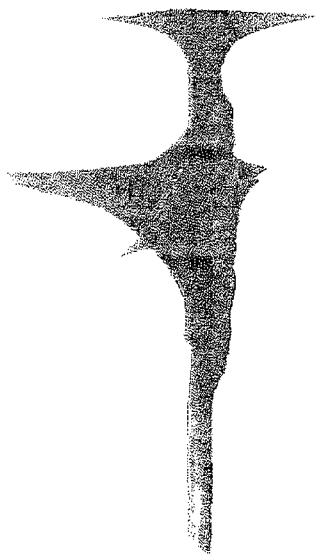


SUCCON Sonar Well Services, Inc.

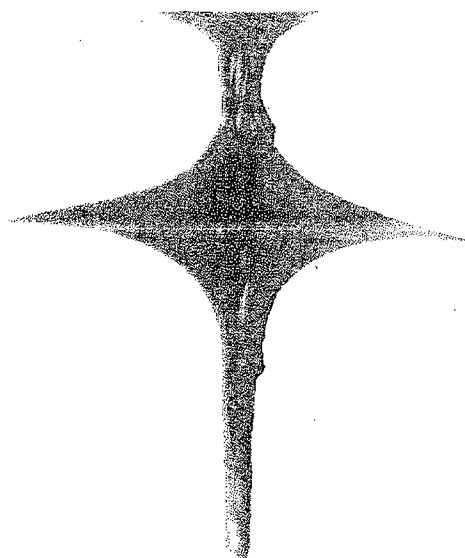
Cavern No: State S 1

093035

05/20/2009



Cavern No: State S 1 --> 0° <--



Cavern No: State S 1 --> 60° <--

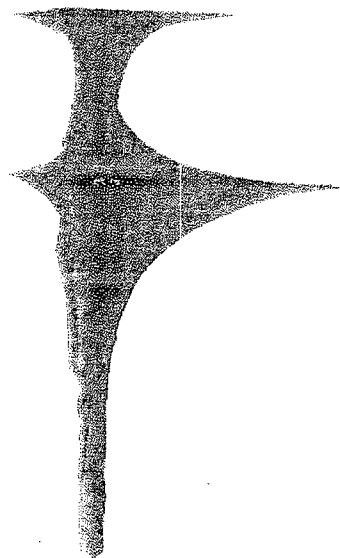


SOCON Sonar Well Services, Inc.

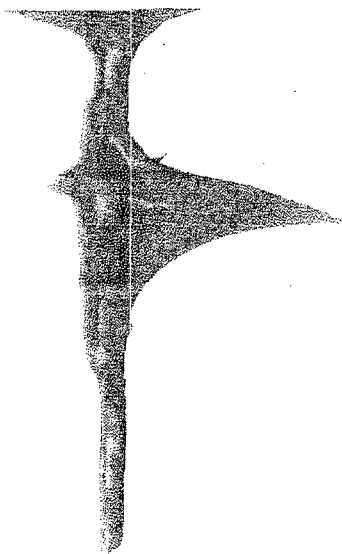
Cavern No: State S 1

093035

05/20/2009



Cavern No: State S 1 → 120° ←



Cavern No: State S 1 → 180° ←

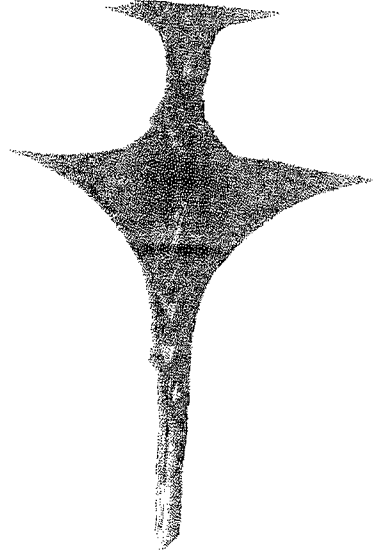


SOCON Solar Well Services, Inc.

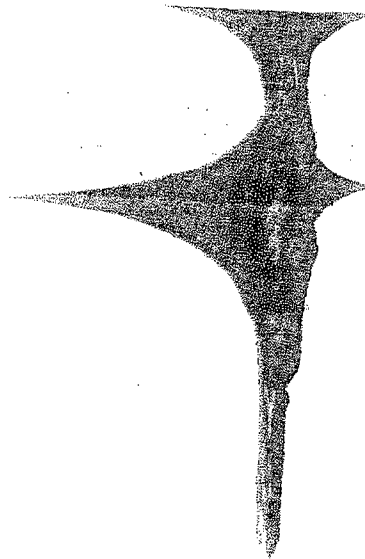
Cavern No: State S 1

093035

05/20/2009



Cavern No: State S 1 → 240° ←



Cavern No: State S 1 → 300° ←

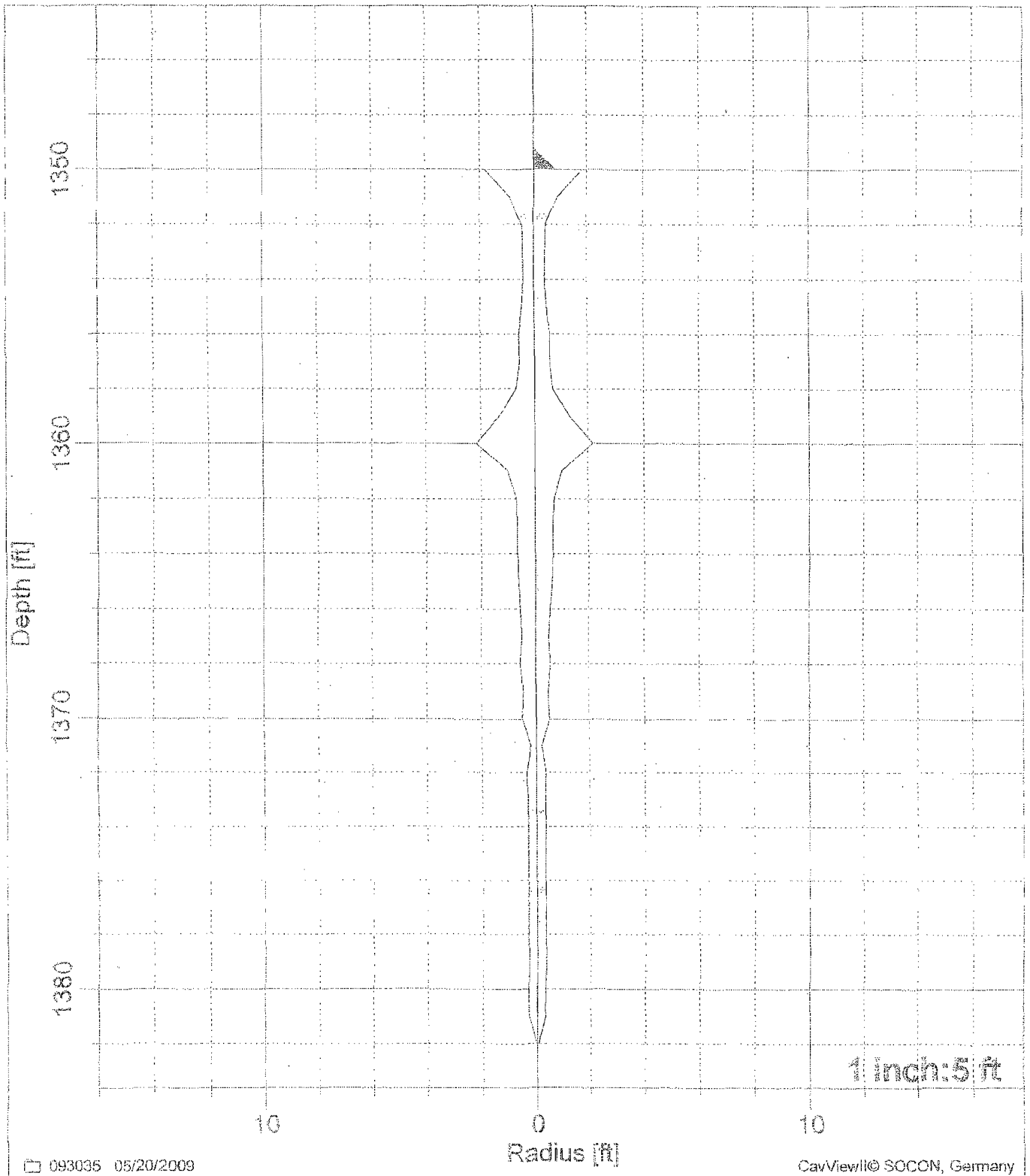


SOCON Sonar Well Services, Inc.

Cavern No: State S 1

AVERAGE RADIUS

05/20/2009



8-5/8" : 1350.0 ft

Average radius (05/20/2009)

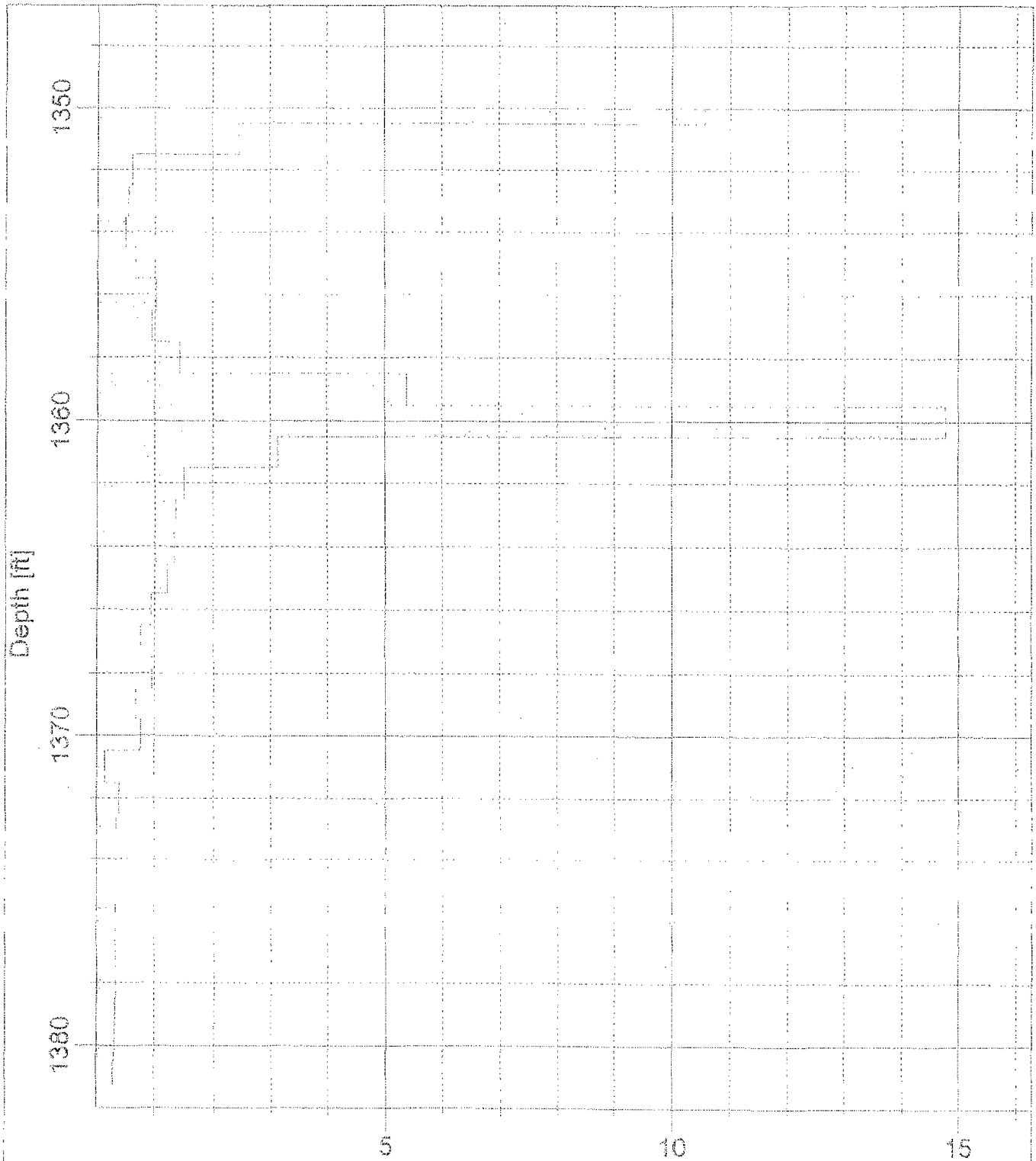


SOCOM Sonar Well Services, Inc.

Cavern No: State S 1

PARTIAL VOLUME

05/20/2009



093035 05/20/2009

CavViewII© SOCOM, Germany

Partial volume



SOCCO Sonar Well Services, Inc.

Volume list

Cavern No: State S 1

093035

05/20/2009

Depth [ft]	Radius [ft]	Area [ft ²]	Depth range [ft]		Volume [bbls]	
			from	to	partial	total
1350.0	4.3	59	1350.0	1350.5	5	5
1351.0	2.1	14	1350.5	1351.5	2	8
1352.0	1.0	3	1351.5	1352.5	1	9
1353.0	1.0	3	1352.5	1353.5	1	9
1354.0	0.9	3	1353.5	1354.5	0	9
1355.0	1.1	4	1354.5	1355.5	1	10
1356.0	1.3	6	1355.5	1356.5	1	11
1357.0	1.3	5	1356.5	1357.5	1	12
1358.0	1.6	8	1357.5	1358.5	1	13
1359.0	3.1	30	1358.5	1359.5	5	19
1360.0	5.1	83	1359.5	1360.5	15	34
1361.0	2.4	18	1360.5	1361.5	3	37
1362.0	1.6	8	1361.5	1362.5	1	38
1363.0	1.6	3	1362.5	1363.5	1	40
1364.0	1.5	7	1363.5	1364.5	1	41
1365.0	1.5	7	1364.5	1365.5	1	42
1366.0	1.3	5	1365.5	1366.5	1	43
1367.0	1.2	4	1366.5	1367.5	1	44
1368.0	1.3	5	1367.5	1368.5	1	45
1369.0	1.1	4	1368.5	1369.5	1	45
1370.0	1.2	4	1369.5	1370.5	1	46
1371.0	0.5	1	1370.5	1371.5	0	46
1372.0	0.8	2	1371.5	1372.5	0	47
1373.0	0.8	2	1372.5	1373.5	0	47
1374.0	0.8	2	1373.5	1374.5	0	47
1375.0	0.8	2	1374.5	1375.5	0	48
1376.0	0.8	2	1375.5	1376.5	0	48
1377.0	0.8	2	1376.5	1377.5	0	48
1378.0	0.8	2	1377.5	1378.5	0	49
1379.0	0.7	2	1378.5	1379.5	0	49
1380.0	0.7	2	1379.5	1380.5	0	49
1381.0	0.7	2	1380.5	1381.5	0	50
1382.0	0.1	0	1381.5	1382.0	0	50

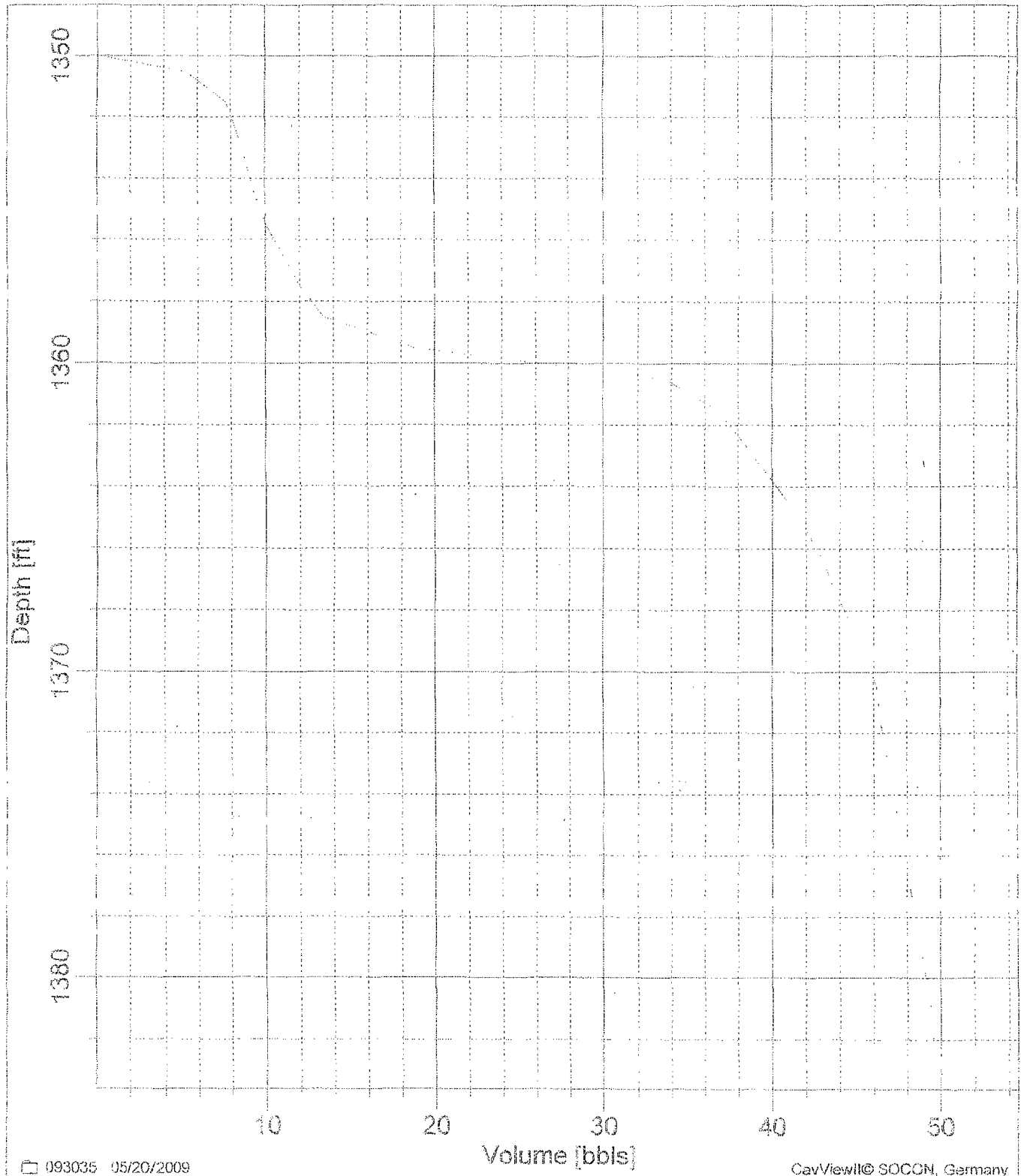


SOCOM Sonar Well Services, Inc.

Cavern No: State S 1

TOTAL VOLUME

05/20/2009



Total volume = 49.6 bbls

Table of volumes (foot by foot)

Job-No.: 093035, Name: Cavern No: State S 1, Date: 05/20/2009

depth	volume	depth	volume	depth	volume	depth	volume	depth	volume
[ft]	[bbls]	[ft]	[bbls]	[ft]	[bbls]	[ft]	[bbls]	[ft]	[bbls]
1350	0	1351	7	1352	8	1353	9	1354	9
1355	10	1356	11	1357	12	1358	13	1359	16
1360	26	1361	35	1362	37	1363	39	1364	40
1365	42	1366	43	1367	43	1368	44	1369	45
1370	46	1371	46	1372	47	1373	47	1374	47
1375	48	1376	48	1377	49	1378	49	1379	49
1380	49	1381	49	1382	50				

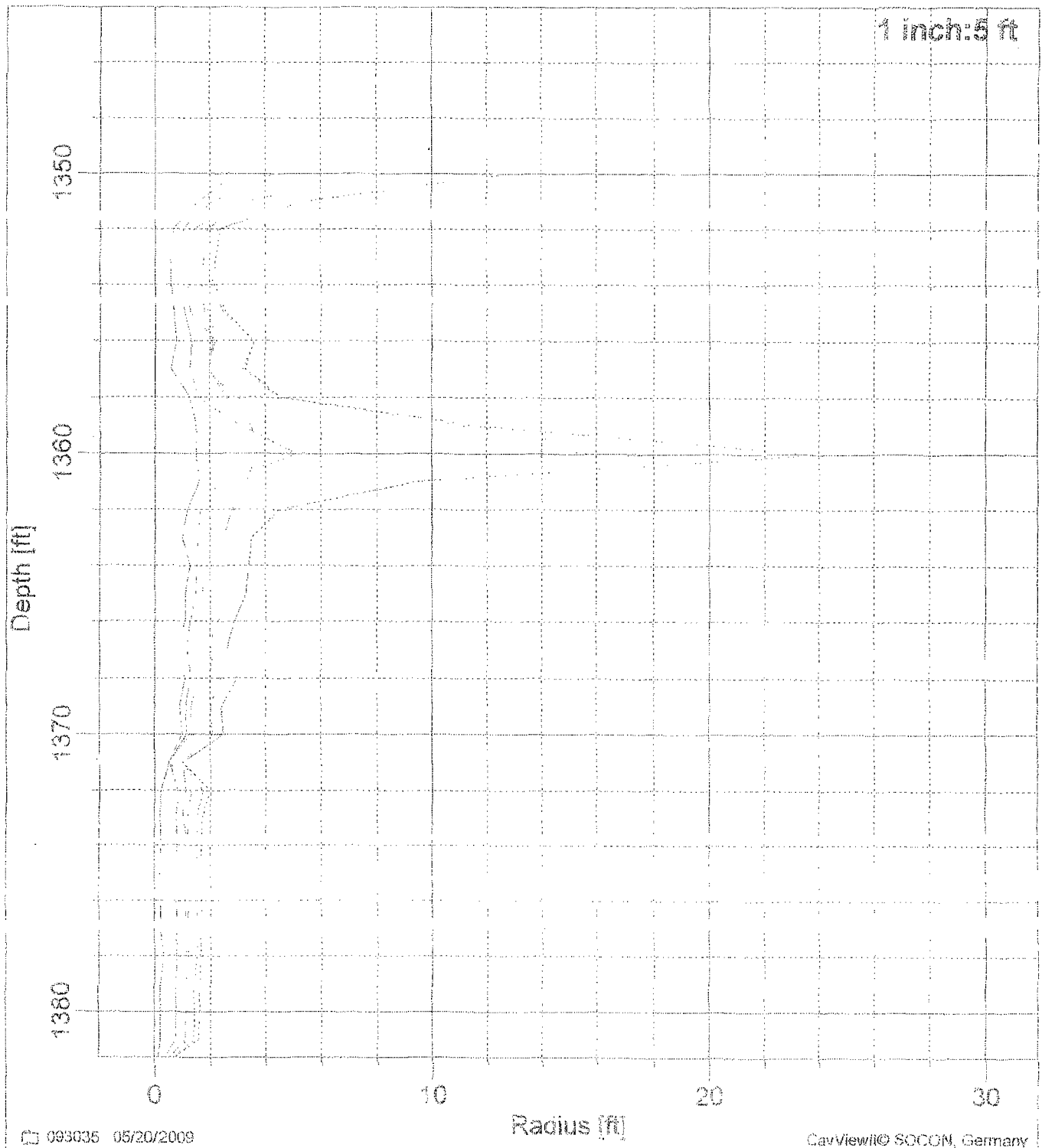


SOCON Sonar Well Services, Inc.

Cavern No: State S 1

RADII / DIAMETERS

05/20/2009



Average radius

Minimum radius

Maximum radius

Minimum diameter

Maximum diameter

Largest extension

Largest perpendicular extension



SOCCO Sonar Well Services, Inc.

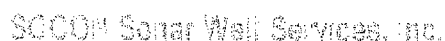
Table of radii and diameters

Cavern No: State S 1

093035

05/20/2009

Depth [ft]	Radius [MIN]		Radius [MAX]		Diameter [MIN]		[MAX]	
	[ft]	[°]	[ft]	[°]	[ft]	[°]	[ft]	[°]
1350.0	3.0	57	8.5	215	7.1	138 <=> 318	11.7	35 <=> 215
1351.0	1.6	147	3.2	205	3.4	145 <=> 325	5.4	25 <=> 205
1352.0	0.7	62	1.4	330	1.9	77 <=> 257	2.3	150 <=> 330
1353.0	0.6	57	1.4	330	1.8	57 <=> 237	2.1	150 <=> 330
1354.0	0.6	67	1.2	320	1.7	109 <=> 289	2.1	150 <=> 330
1355.0	0.7	287	1.3	50	1.8	144 <=> 324	2.5	50 <=> 230
1356.0	0.8	227	2.2	160	2.1	47 <=> 227	3.6	160 <=> 340
1357.0	0.6	247	1.9	55	2.0	77 <=> 257	3.2	55 <=> 235
1358.0	1.3	102	2.9	200	2.6	102 <=> 282	4.5	20 <=> 200
1359.0	1.5	177	8.2	285	3.5	25 <=> 205	11.1	105 <=> 285
1360.0	1.5	92	15.8	195	3.7	165 <=> 345	17.6	15 <=> 195
1361.0	1.6	47	7.6	280	3.3	35 <=> 215	9.4	100 <=> 280
1362.0	1.2	322	2.9	280	2.8	17 <=> 197	4.5	100 <=> 280
1363.0	1.0	115	2.0	15	2.5	115 <=> 295	3.5	30 <=> 210
1364.0	1.3	97	1.8	10	2.8	109 <=> 289	3.4	10 <=> 190
1365.0	1.1	252	1.7	125	2.7	27 <=> 207	3.3	125 <=> 305
1366.0	1.1	242	1.6	135	2.3	60 <=> 240	2.9	135 <=> 315
1367.0	0.8	127	1.4	40	1.9	132 <=> 312	2.6	40 <=> 220
1368.0	1.1	2	1.6	225	2.4	147 <=> 327	3.0	75 <=> 255
1369.0	0.9	167	1.3	0	2.0	77 <=> 257	2.4	130 <=> 310
1370.0	1.0	237	1.3	135	2.1	72 <=> 252	2.5	135 <=> 315
1371.0	0.5	1	0.5	0	1.0	1 <=> 181	1.0	0 <=> 180
1372.0	0.2	56	1.3	295	1.1	30 <=> 210	1.7	10 <=> 190
1373.0	0.2	51	1.2	250	1.0	10 <=> 190	1.5	145 <=> 325
1374.0	0.2	71	1.2	255	1.2	22 <=> 202	1.5	115 <=> 295
1375.0	0.2	66	1.2	260	1.2	22 <=> 202	1.5	130 <=> 310
1376.0	0.2	66	1.2	265	1.1	20 <=> 200	1.5	125 <=> 305
1377.0	0.2	71	1.2	260	1.1	35 <=> 215	1.5	115 <=> 295
1378.0	0.3	41	1.2	265	1.1	15 <=> 195	1.5	85 <=> 265
1379.0	0.2	61	1.2	270	1.1	35 <=> 215	1.4	135 <=> 315
1380.0	0.2	71	1.2	275	1.1	35 <=> 215	1.4	140 <=> 320
1381.0	0.2	61	1.2	280	1.1	3 <=> 183	1.4	120 <=> 300
1382.0	0.1	1	0.1	0	0.2	1 <=> 181	0.2	0 <=> 180



Cavern No: State S 1

093035

05/20/2009

[illegible]

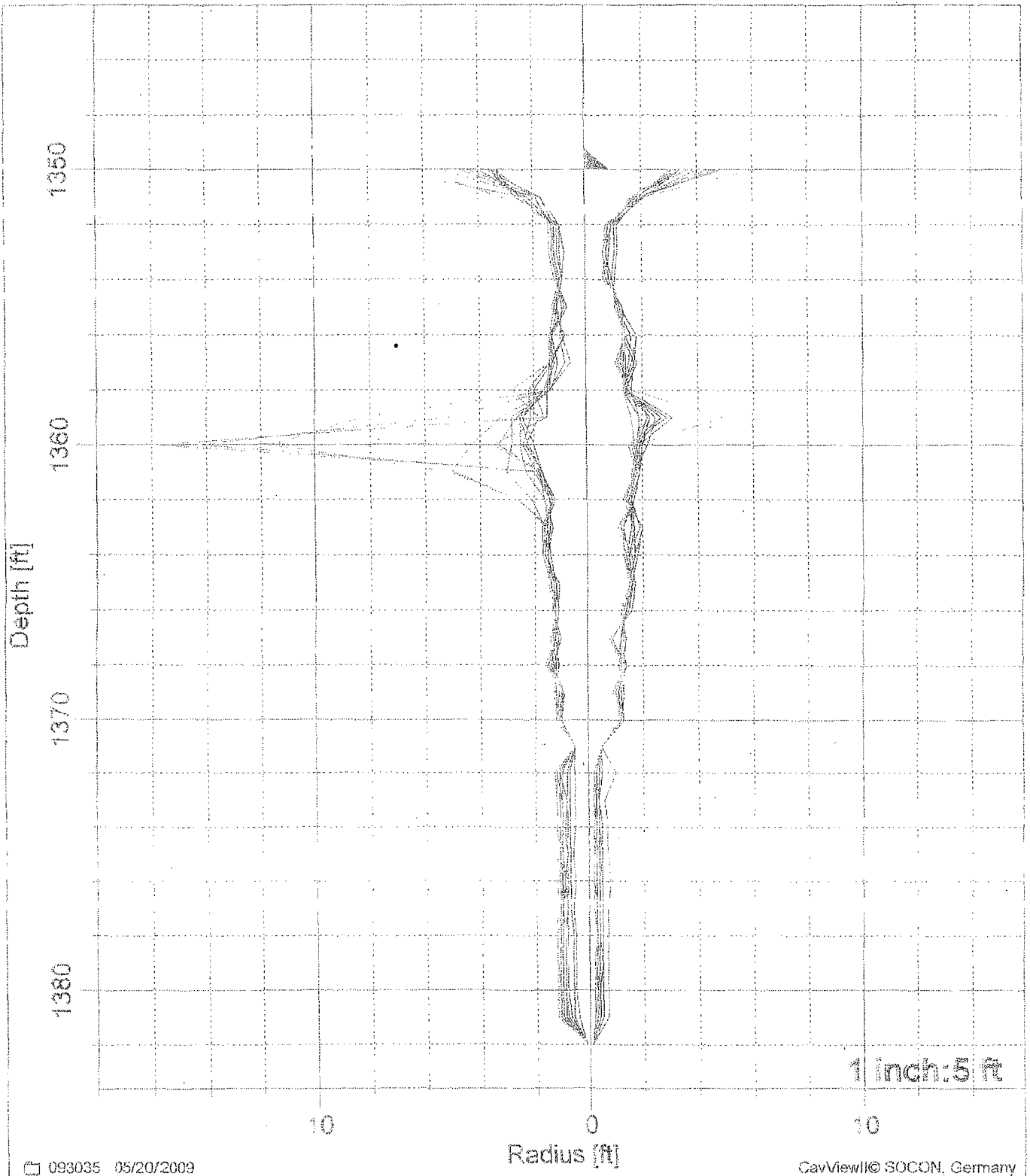


SOCON Sonar Well Services, Inc.

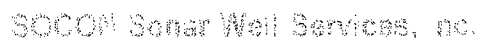
Cavern No: State S 1

MAXPLOT

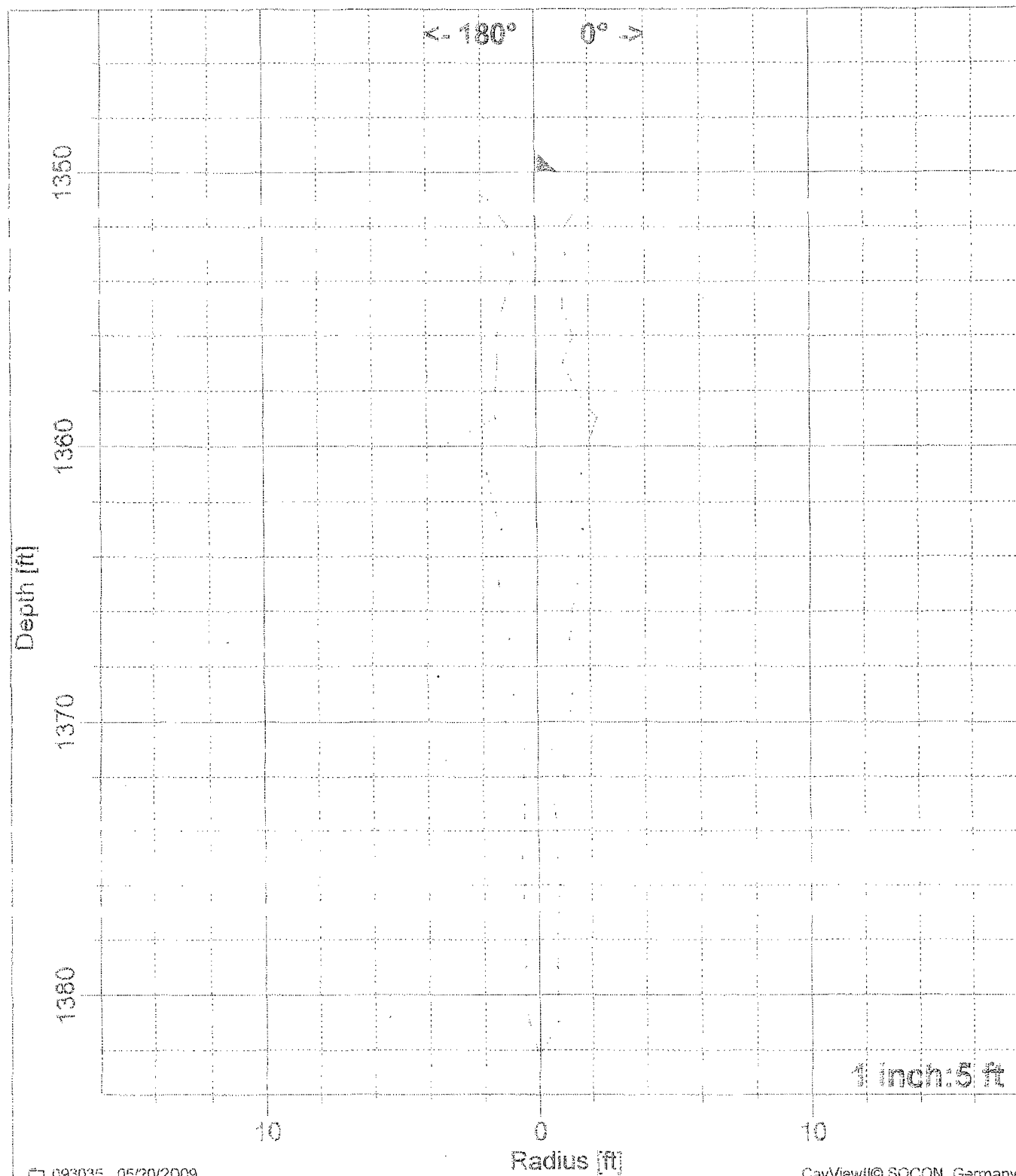
05/20/2009



8-5/8" : 1350.0 ft



05/20/2009



098035 05/20/2009

CavView® SOCOM, Germany

(05/20/2009)

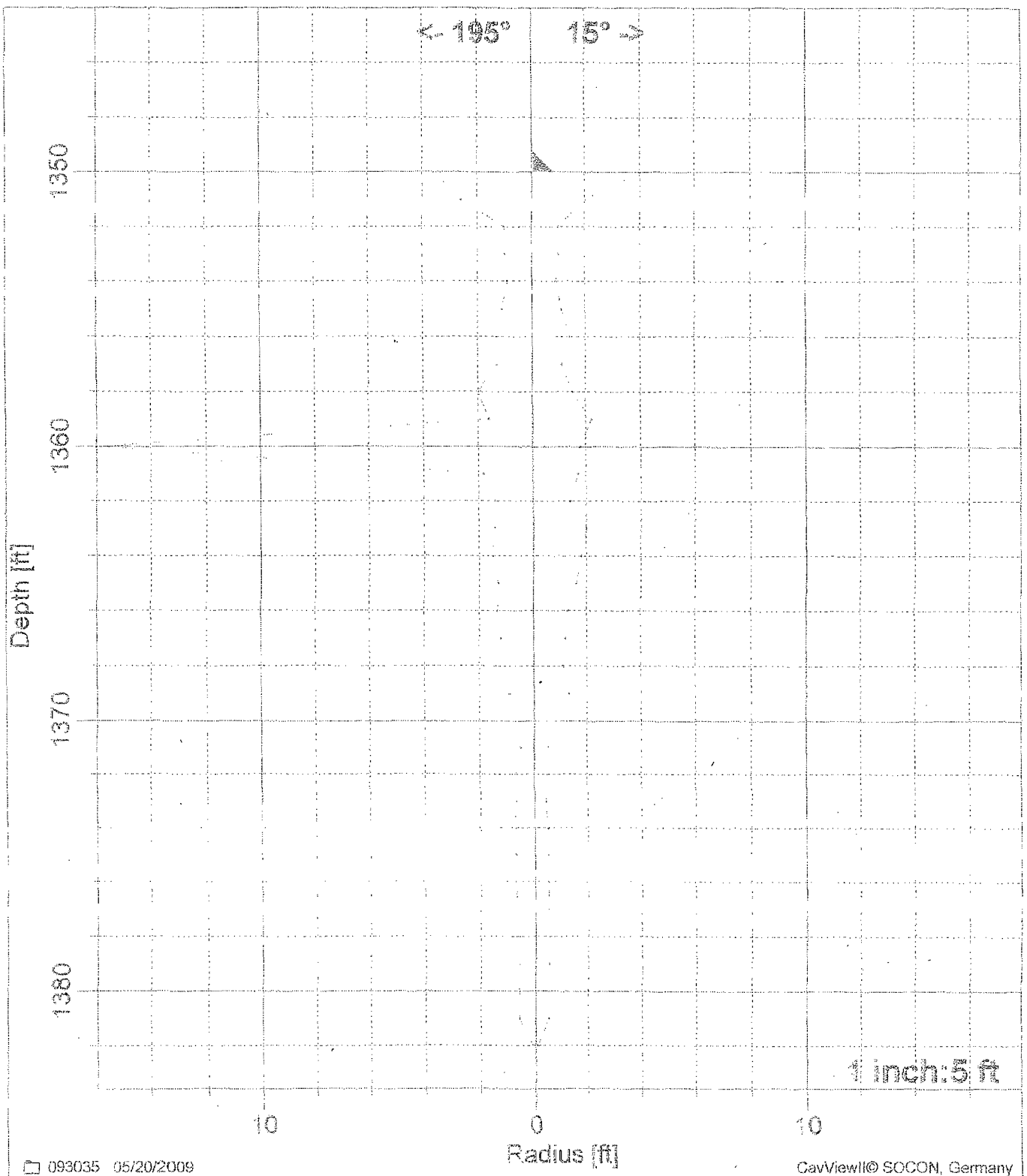
8-5/8" : 1350.0 ft



SOCOM Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



093035 05/20/2009

(05/20/2009)

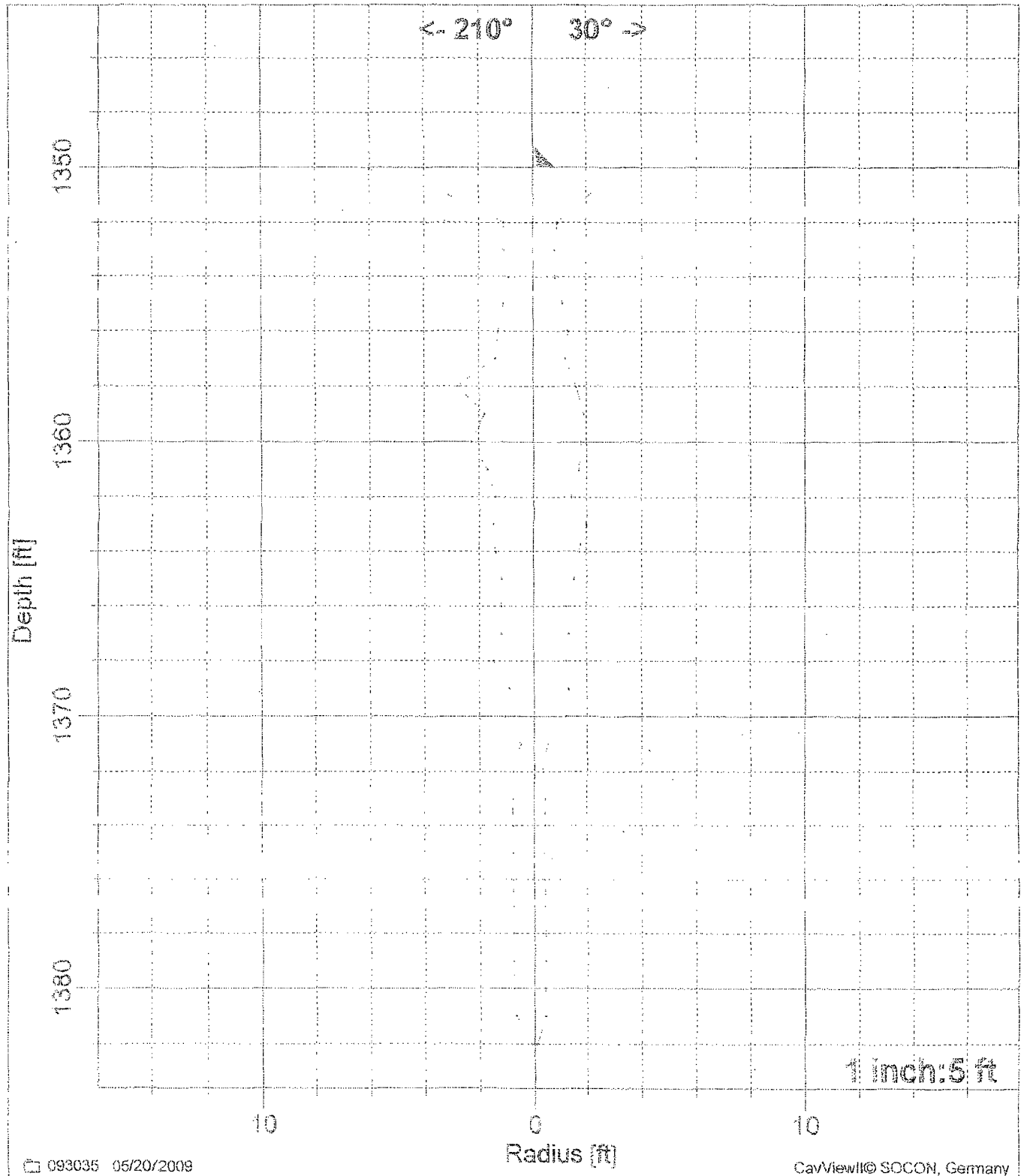
3-5/8" : 1350.0 ft



SOCON Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



093035 05/20/2009

CavViewII© SOCON, Germany

(05/20/2009)

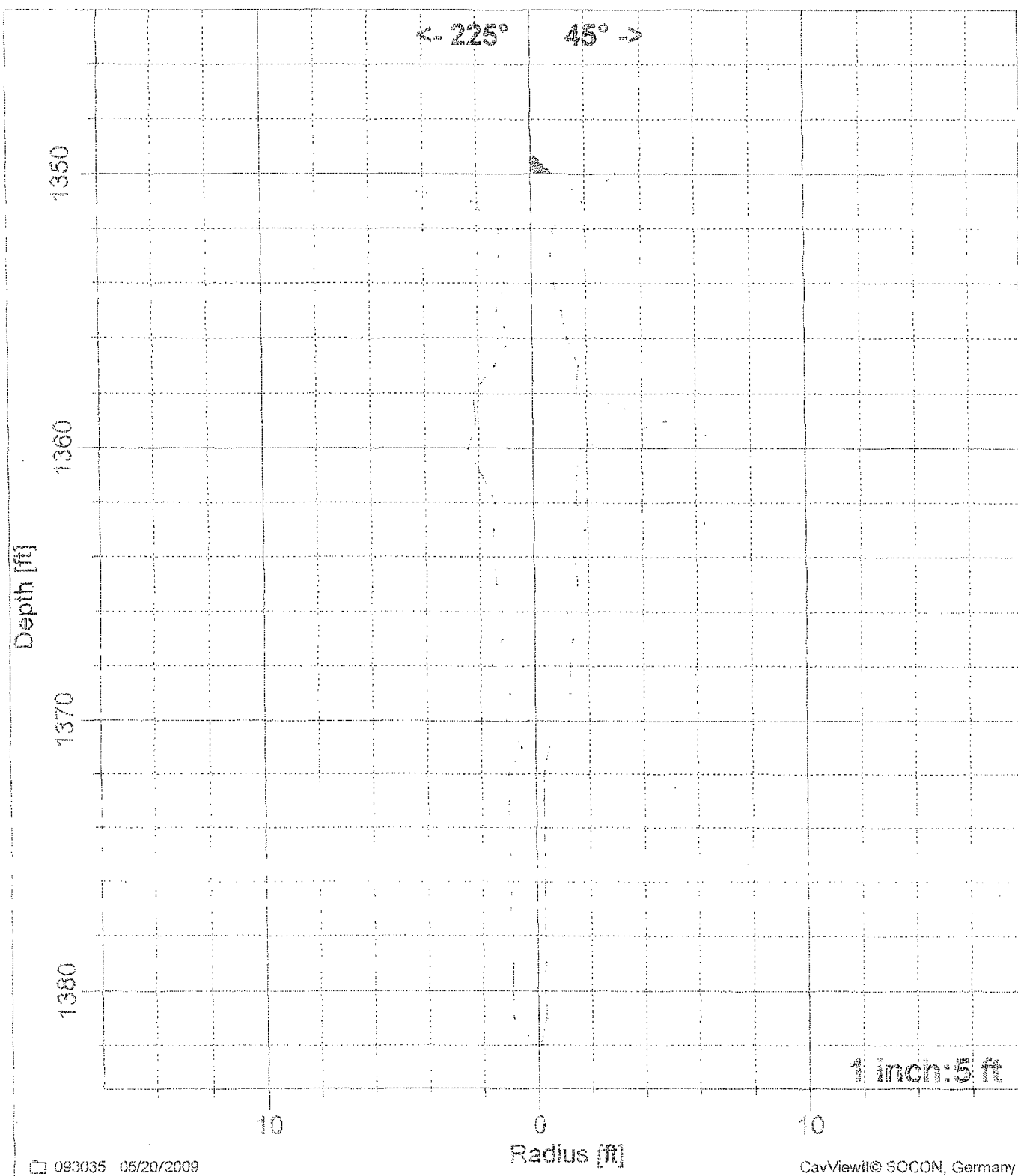
8-5/8" : 1350.0 ft



SOCOM Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



(05/20/2009)

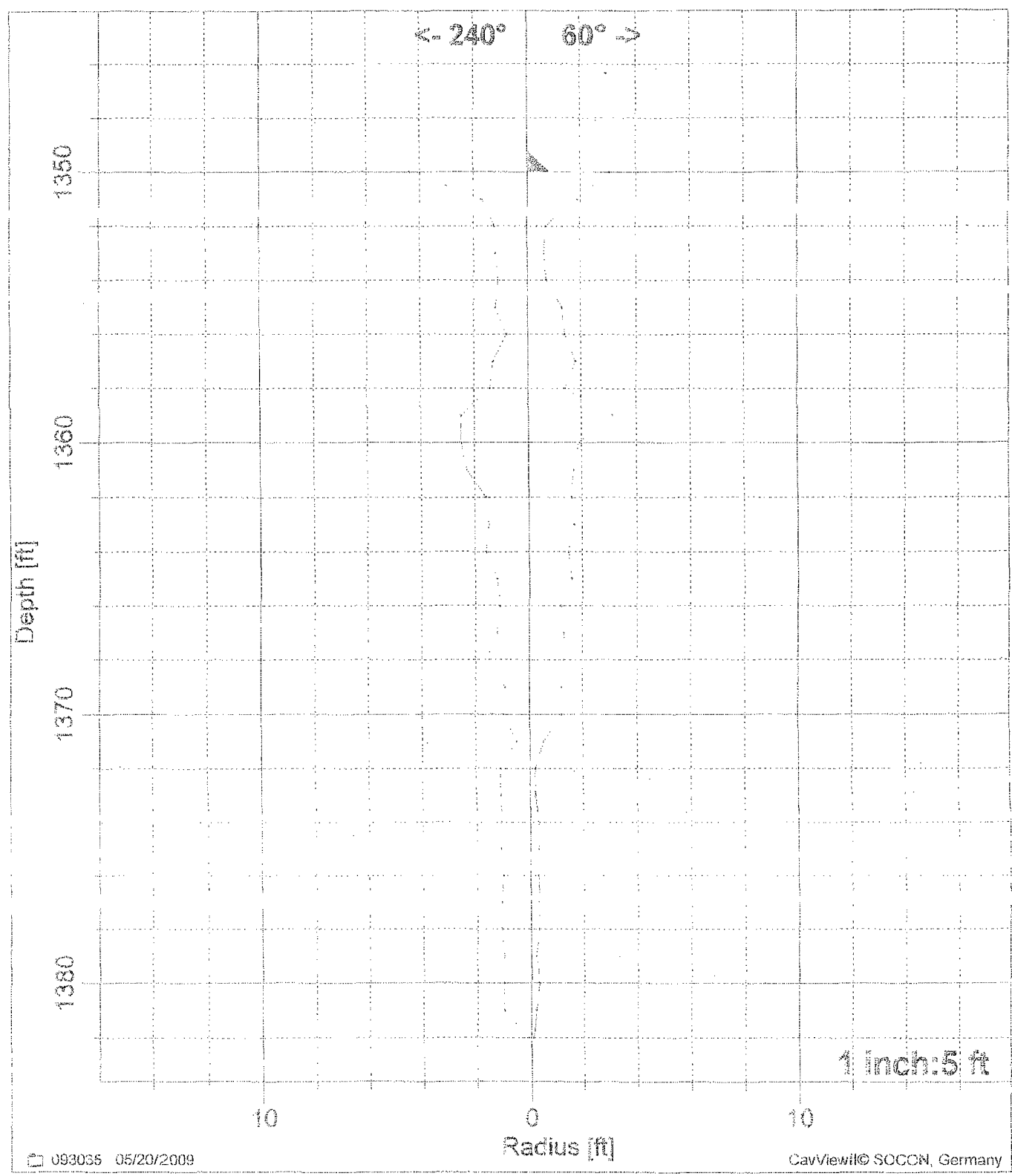
8-5/8" : 1350.0 ft



SOCON Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



093035 05/20/2009

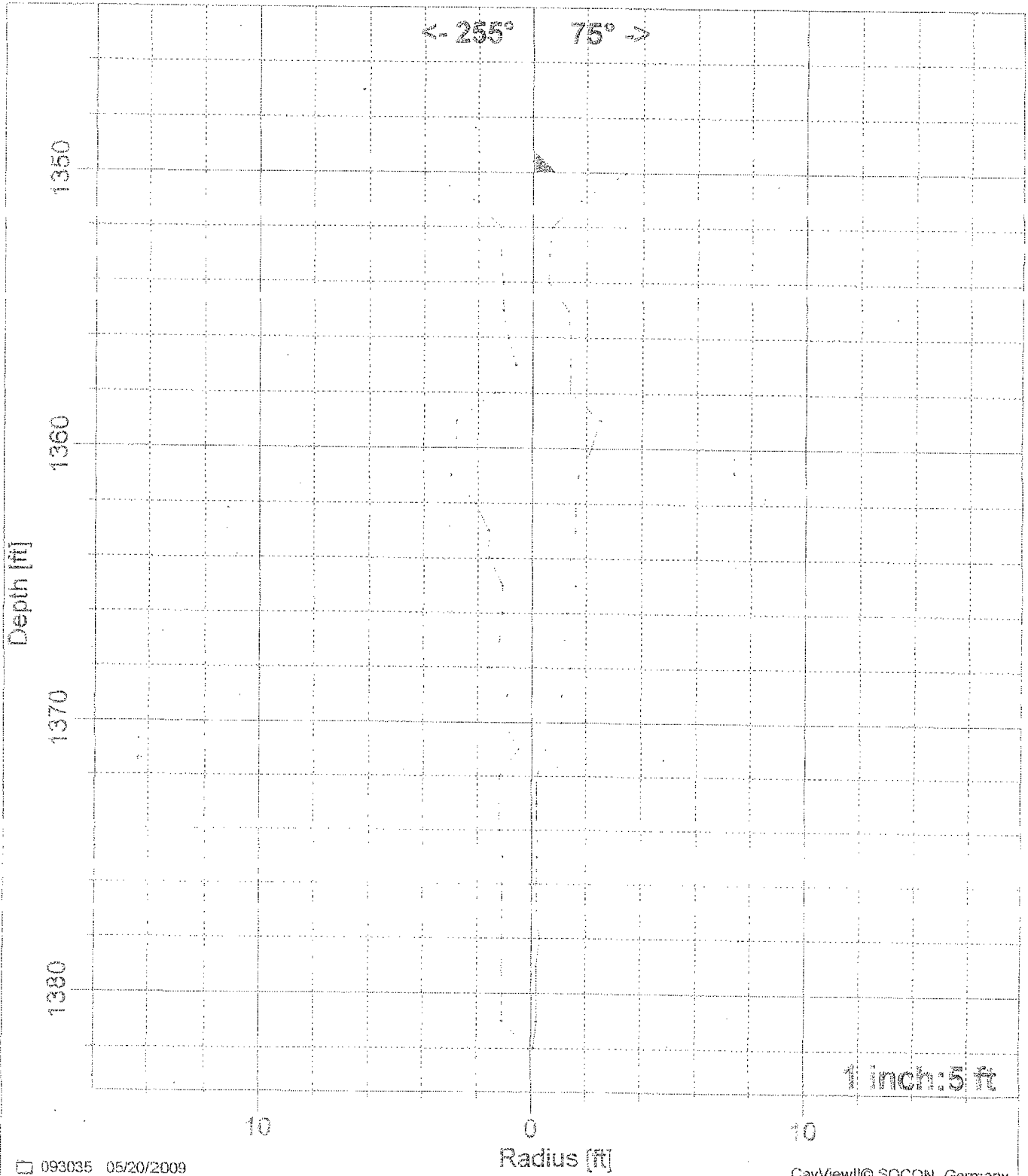
CavView© SOCON, Germany



SOCOM Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



093035 05/20/2009

CavView© SOCOM, Germany

(05/20/2009)

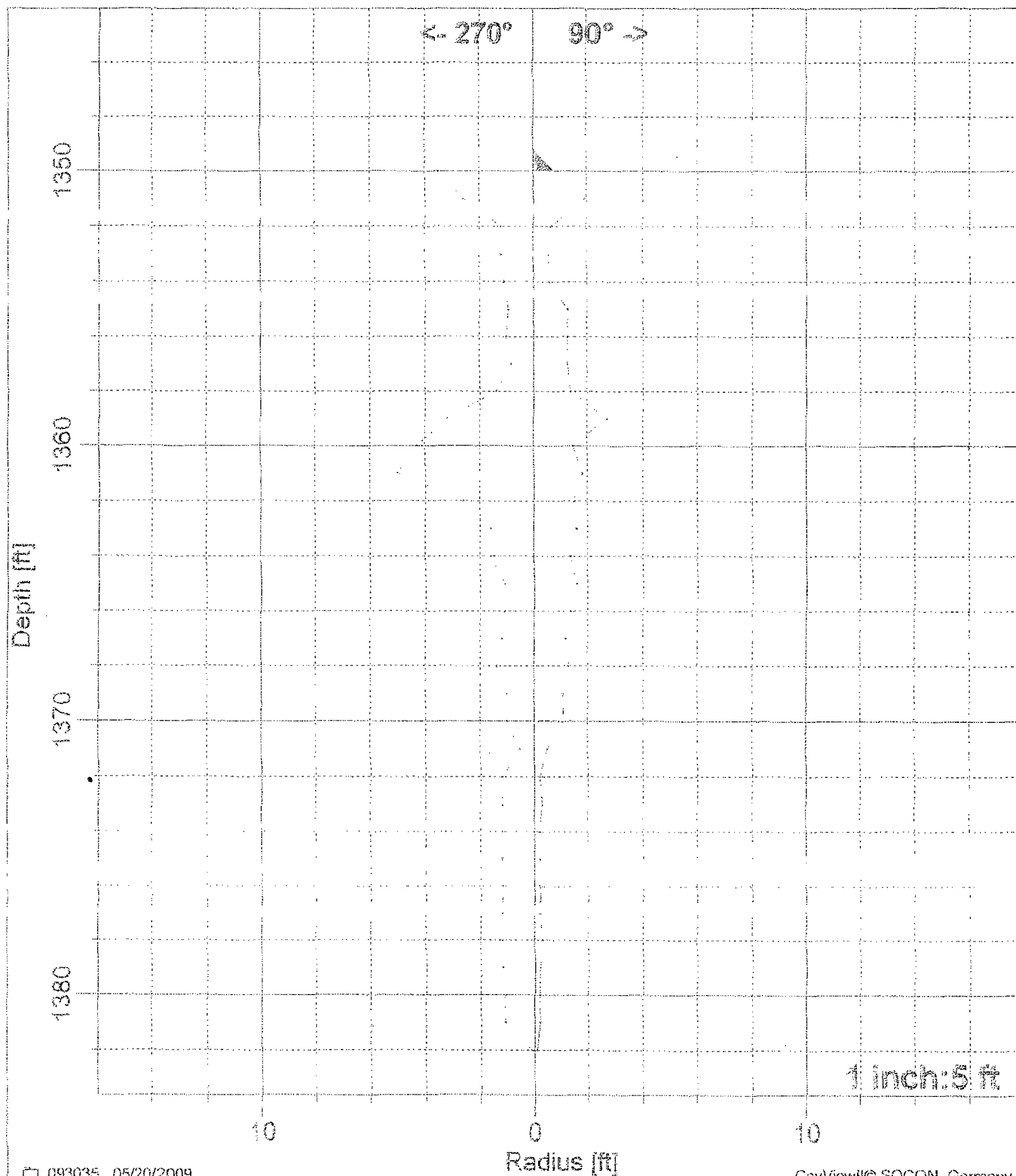
8-5/8" : 1350.0 ft



SOCON Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



093035 05/20/2009

CavView© SOCON, Germany

(05/20/2009)

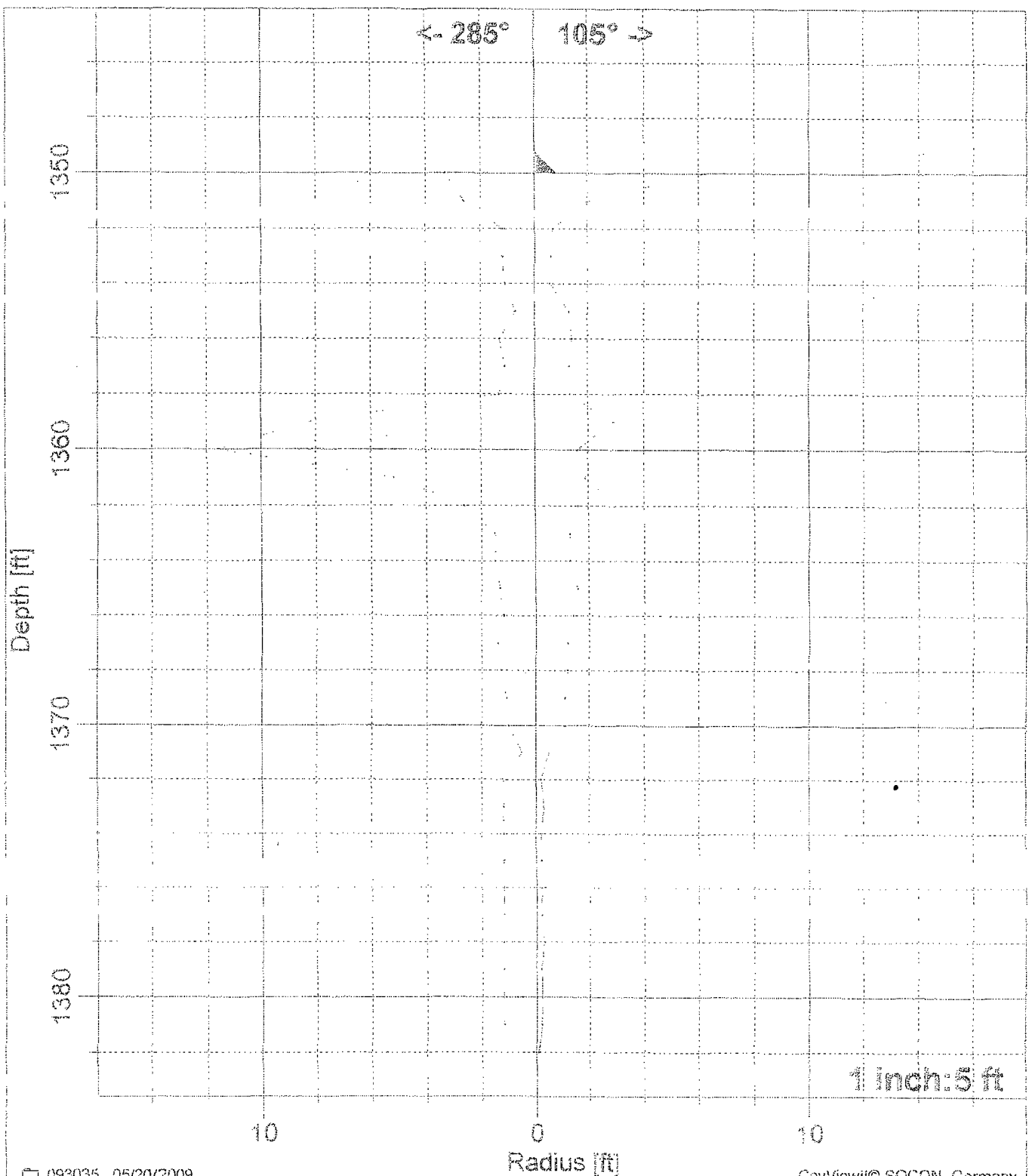
8-5/8" : 1350.0 ft



SOCON Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



093035 05/20/2009

CavView© SOCON, Germany

(05/20/2009)

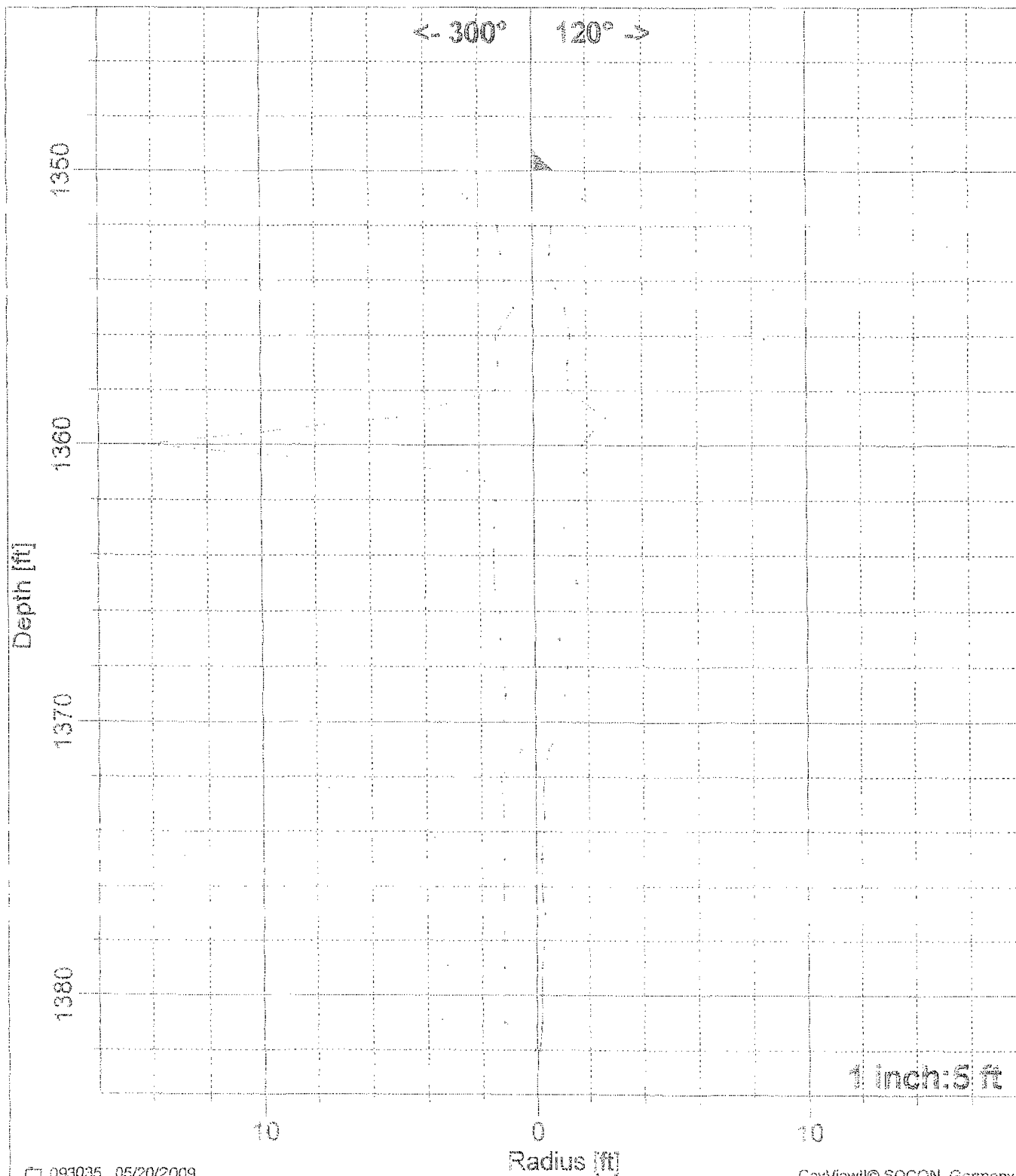
8-5/8" : 1350.0 ft



SOCON Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



(05/20/2009)

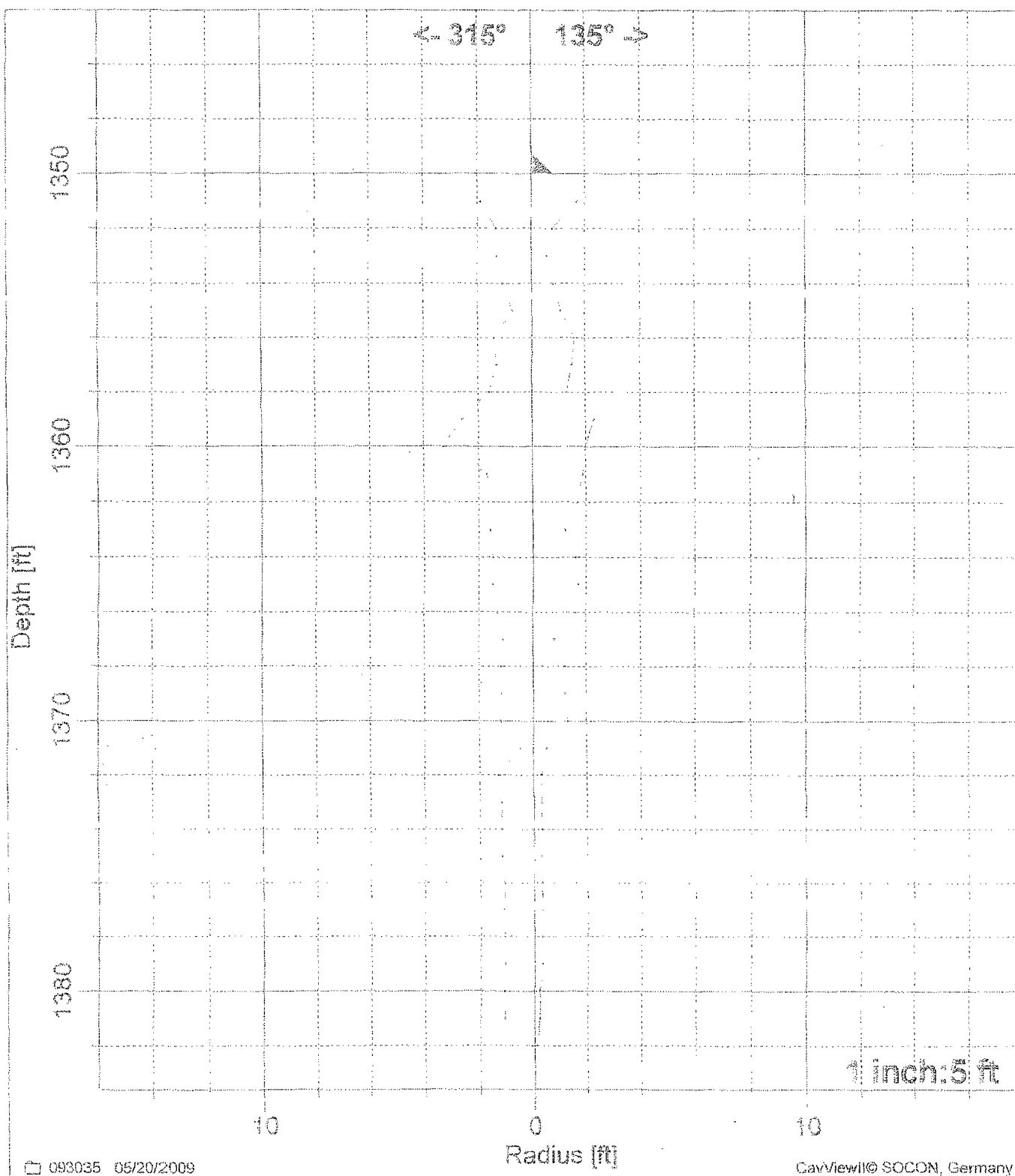
8-5/8" : 1350.0 ft



SOCCON Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



(05/20/2009)

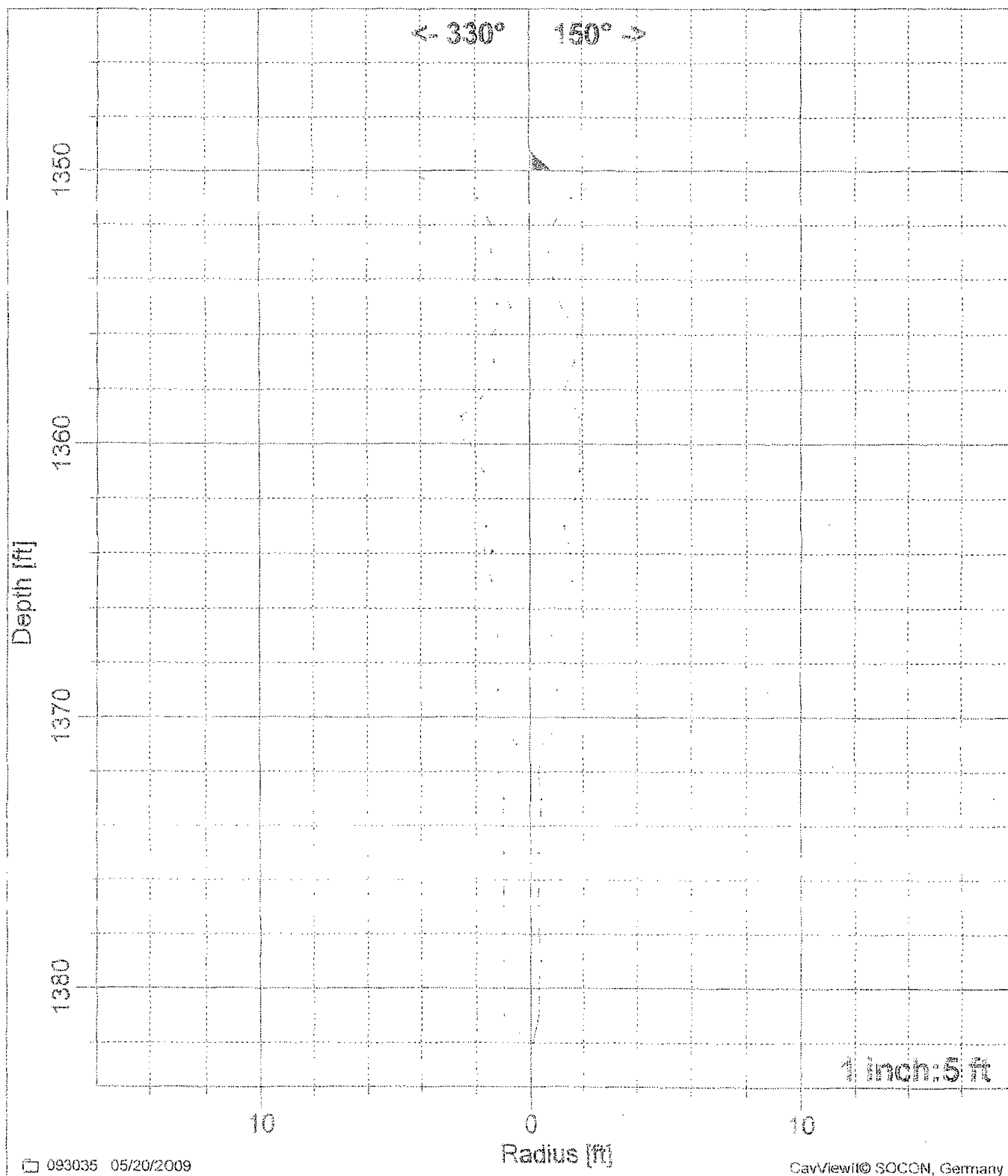
8-5/8" : 1350.0 ft



SOCOM Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



(05/20/2009)

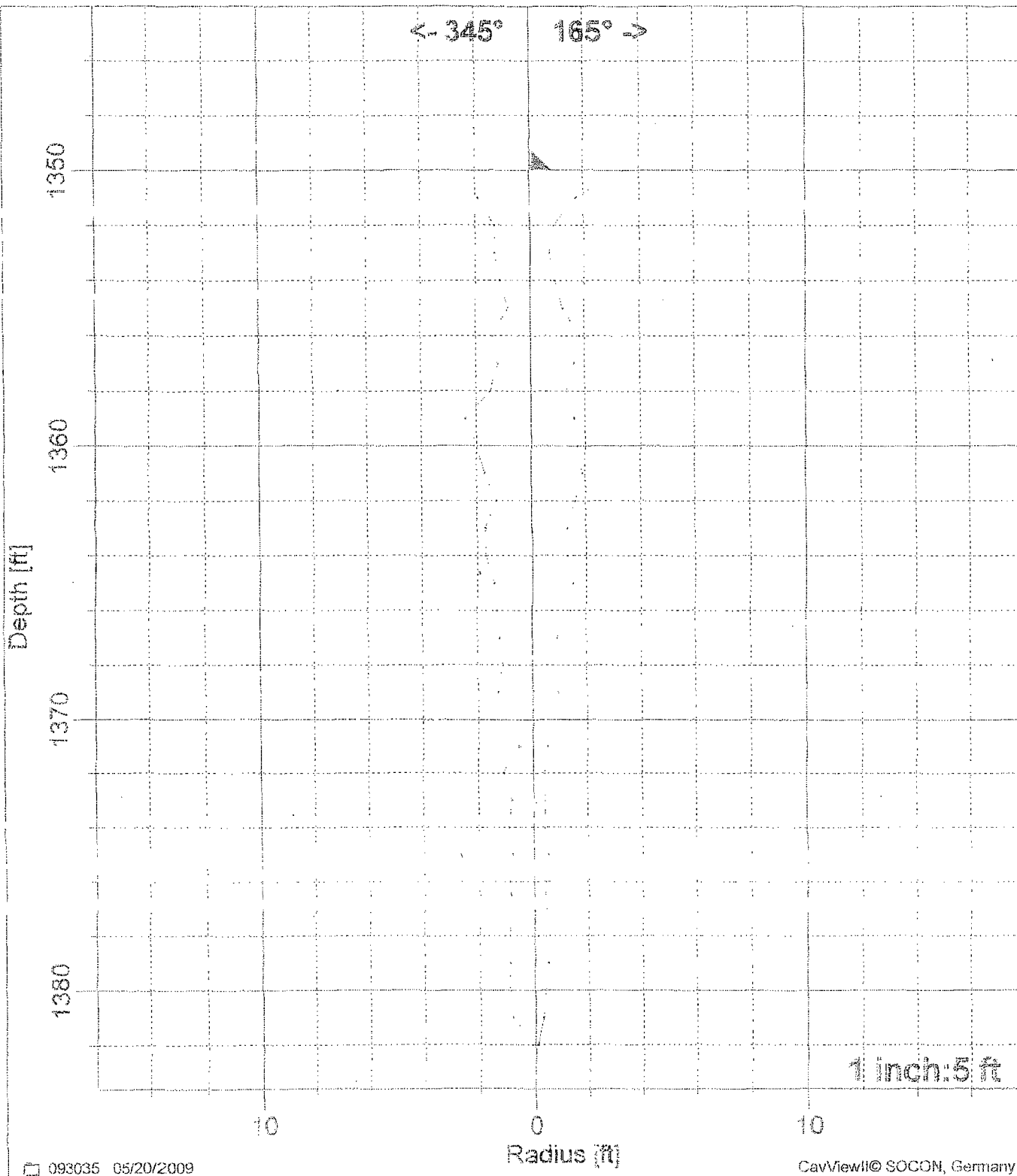
8-5/8" : 1350.0 ft



SOCOM Sonar Well Services, Inc.

Cavern No: State S 1

05/20/2009



— (05/20/2009)

8-5/8" : 1350.0 ft

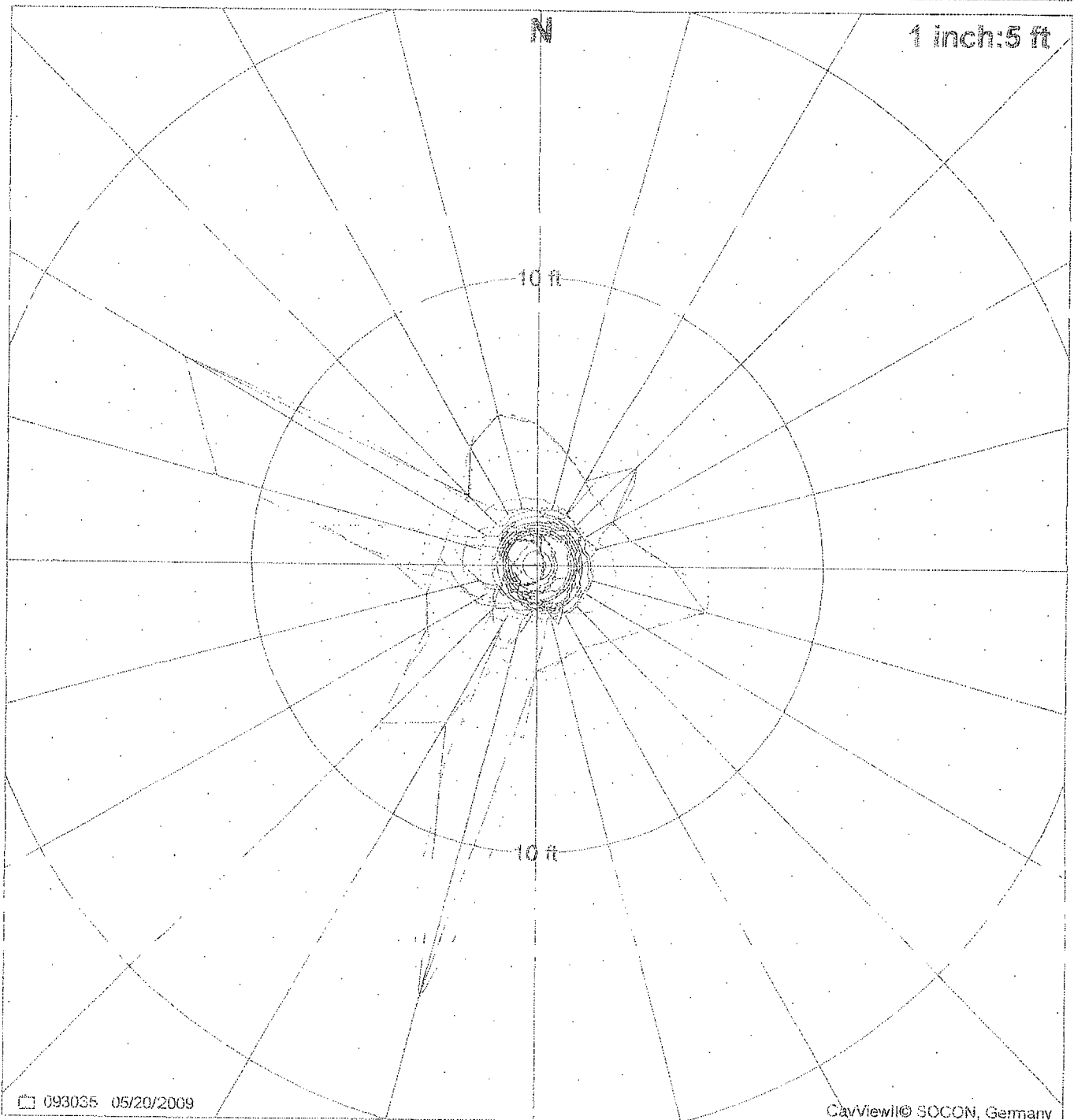


SOCON Sonar Well Services, Inc.

Cavern No: State S 1

MAXPLOT

05/20/2009



Vertical maximum plot

Horizontal sections

d_{max} : 20.7 ft 110° $\leftrightarrow$ 290° r_{min} : 3.1 ft $\rightarrow$ 60° r : 6.3 ft r_{max} : 15.8 ft $\rightarrow$ 195°

$a/b = 1.904$ $a = 23.9$ ft (195°-295°) $b = 12.6$ ft (99°-220°)

Area from vertical sections: 106 ft², Area from horizontal and vertical sections: 124 ft²

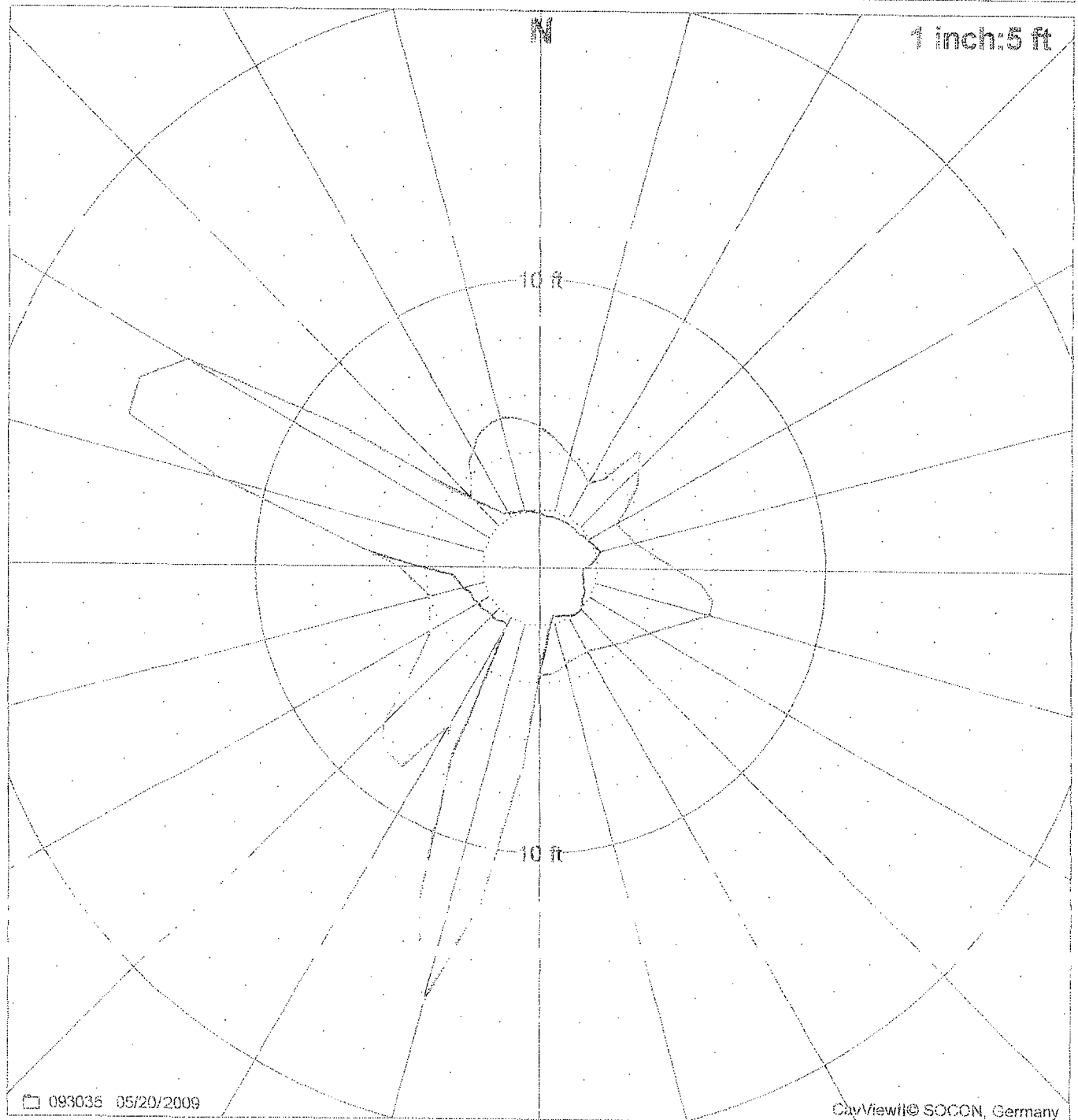


SOCOCON[®] Sonar Well Services, Inc.

Cavern No: State S 1

MAXPLOT

05/20/2009



Horizontal/vertical maximum plot

Largest single area

d_{max} : 20.7 ft 110° ↔ 290° r_{min} : 3.1 ft → 60° r : 6.3 ft r_{max} : 15.8 ft → 195°

$a/b = 1.904$ $a = 23.9$ ft (195°-295°) $b = 12.6$ ft (99°-220°)

Largest single area: 83 ft² in depth: 1360.0 ft, Area from horizontal and vertical sections: 124 ft²



SOCOM Sonar Well Services, Inc.

Cavern No: State S 1

093035

05/20/2009

HORIZONTAL SECTIONS

Cavern No: State S 1

Report No.: 093035

Utilized speed of sound: 5880 feet/second

Measuring date: 05/20/2009

Scale: 1: 5

Horizontal sections measured at following depths:

1350.0 ft	1351.0 ft	1352.0 ft	1353.0 ft	1354.0 ft	1355.0 ft	1356.0 ft
1357.0 ft	1358.0 ft	1359.0 ft	1360.0 ft	1361.0 ft	1362.0 ft	1363.0 ft
1364.0 ft	1365.0 ft	1366.0 ft	1367.0 ft	1368.0 ft	1369.0 ft	1370.0 ft
1371.0 ft	1372.0 ft	1373.0 ft	1374.0 ft	1375.0 ft	1376.0 ft	1377.0 ft
1378.0 ft	1379.0 ft	1380.0 ft	1381.0 ft	1382.0 ft		



SOCOM Sonar Well Services, Inc.

Table of radii

Cavern No: State S 1

093035

5/20/2009

Depth: 1350.0 ft

[°]	Radii in [ft]									
0	4.9	4.6	4.3	4.0	3.8	3.6	3.4	3.2	3.1	3.1
50	3.1	3.0	3.0	3.1	3.3	3.4	3.6	4.1	4.7	5.6
100	6.1	6.1	6.1	4.7	4.4	4.1	3.9	3.7	3.5	3.4
150	3.3	3.1	3.2	3.4	3.6	3.7	3.7	3.7	3.7	3.6
200	3.5	4.3	6.3	8.5	8.4	7.8	6.2	4.6	4.4	4.3
250	4.1	4.0	3.8	3.7	3.5	3.4	3.3	3.3	3.3	3.3
300	3.4	3.4	3.4	3.4	3.6	4.4	4.7	5.1	5.3	5.4
350	5.3	5.1								

Depth: 1351.0 ft

[°]	Radii in [ft]									
0	1.9	1.9	2.0	2.0	2.0	2.2	2.1	2.0	2.0	1.9
50	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9
100	2.0	2.0	2.0	2.0	1.9	1.8	1.7	1.7	1.7	1.8
150	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	2.1	2.6
200	3.1	3.2	3.1	3.0	2.9	2.2	2.0	1.9	1.7	1.9
250	2.0	2.2	2.4	2.6	2.6	2.6	2.6	2.6	2.6	2.5
300	2.4	2.2	2.1	1.9	1.8	1.8	1.9	1.9	1.9	1.9
350	1.9	1.9								

Depth: 1352.0 ft

[°]	Radii in [ft]									
0	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.8	0.8	0.8
50	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
100	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8
150	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
200	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3
250	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3
300	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.3
350	1.2	1.2								

Depth: 1353.0 ft

[°]	Radii in [ft]									
0	1.1	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7
50	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
100	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7
150	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	1.0
200	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2
250	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
300	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.3	1.3	1.3
350	1.2	1.2								



SOCOM Sonar Well Services, Inc.

Table of radii

Cavern No: State S 1

093035

5/20/2009

Depth: 1354.0 ft

[°]	Radii in [ft]									
0	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
50	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
100	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8
150	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9
200	0.9	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.1
250	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
300	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.1	1.1
350	1.1	1.0								

Depth: 1355.0 ft

[°]	Radii in [ft]									
0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1
50	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
100	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1
150	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1
200	1.1	1.1	1.1	1.1	1.2	1.3	1.2	1.2	1.2	1.2
250	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.7
300	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8
350	0.9	1.0								

Depth: 1356.0 ft

[°]	Radii in [ft]									
0	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3
50	1.3	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3
100	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.6	1.6	1.6
150	1.8	2.0	2.2	1.8	1.4	1.4	1.4	1.3	1.3	1.3
200	1.3	1.3	1.3	1.2	1.0	0.8	0.8	0.8	0.8	0.8
250	0.8	0.9	0.9	0.9	1.0	1.1	1.2	1.3	1.3	1.3
300	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
350	1.4	1.4								

Depth: 1357.0 ft

[°]	Radii in [ft]									
0	1.0	0.9	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.7
50	1.8	1.9	1.8	1.6	1.5	1.4	1.3	1.3	1.3	1.3
100	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.5	1.5	1.6
150	1.7	1.5	1.5	1.6	1.5	1.4	1.4	1.4	1.3	1.3
200	1.3	1.3	1.4	1.4	1.4	1.4	1.3	1.3	1.3	0.8
250	0.6	0.6	0.7	0.7	0.8	0.8	1.0	1.1	1.3	1.3
300	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2
350	1.1	1.0								



SCCOW Sonar Well Services, Inc.

Table of radii

Cavern No: State S 1

093035

5/20/2009

Depth: 1358.0 ft

[°]	Radii in [ft]									
0	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.7	1.7	1.6
50	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
100	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
150	1.3	1.3	1.3	1.3	1.3	1.4	1.5	1.6	1.7	2.0
200	2.9	2.9	2.8	2.6	2.4	2.2	1.9	1.7	1.4	1.4
250	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.4	1.4
300	1.4	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.5
350	1.5	1.5								

Depth: 1359.0 ft

[°]	Radii in [ft]									
0	2.3	2.3	2.2	2.2	2.2	1.8	1.9	3.5	5.4	4.9
50	4.4	3.7	3.1	2.5	2.3	2.5	2.7	2.7	2.7	2.8
100	2.8	2.9	2.9	2.8	2.7	2.6	2.5	2.3	2.2	2.0
150	1.9	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.6	1.6
200	1.7	1.7	1.8	1.8	2.0	2.1	2.2	2.4	2.5	2.6
250	2.7	2.8	2.9	3.0	3.2	3.4	3.5	8.2	8.1	7.5
300	5.0	4.6	4.2	2.6	2.6	2.6	2.5	2.5	2.4	2.4
350	2.4	2.3								

Depth: 1360.0 ft

[°]	Radii in [ft]									
0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
50	1.8	1.9	1.9	2.0	2.1	2.2	2.0	1.8	1.5	1.5
100	1.5	1.6	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.0
150	1.9	1.8	1.8	1.7	2.0	2.7	3.5	6.9	11.9	15.8
200	12.5	7.4	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.6
250	2.6	2.8	2.9	3.1	4.3	6.1	8.0	11.6	15.3	15.4
300	14.3	8.4	4.4	3.3	2.7	2.3	2.2	2.1	2.1	2.0
350	2.0	1.9								

Depth: 1361.0 ft

[°]	Radii in [ft]									
0	1.7	1.7	1.7	1.7	1.7	1.8	1.7	1.7	1.7	1.6
50	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8
100	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
150	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8
200	1.8	1.8	1.7	1.6	1.8	1.9	2.0	2.2	2.3	2.5
250	2.8	3.0	3.2	3.9	5.0	6.1	7.6	5.2	2.9	2.2
300	2.0	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
350	1.7	1.7								



SOCON Sonar Well Services, Inc.

Table of radii

Cavern No: State S 1

093035

5/20/2009

Depth: 1362.0 ft

[°]	Radii in [ft]									
0	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.5	1.6	1.6
50	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.6
100	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7
150	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.4
200	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.6	1.7
250	1.9	2.1	2.2	2.4	2.6	2.7	2.9	2.6	1.9	1.4
300	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.3	1.3
350	1.3	1.3								

Depth: 1363.0 ft

[°]	Radii in [ft]									
0	1.7	1.7	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9
50	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.5
100	1.4	1.3	1.1	1.0	1.1	1.1	1.2	1.2	1.3	1.3
150	1.3	1.3	1.3	1.3	1.2	1.2	1.3	1.3	1.4	1.4
200	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6
250	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5
300	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7
350	1.7	1.7								

Depth: 1364.0 ft

[°]	Radii in [ft]									
0	1.7	1.7	1.8	1.8	1.8	1.7	1.7	1.6	1.5	1.5
50	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3
100	1.3	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.5	1.5
150	1.5	1.4	1.4	1.3	1.3	1.4	1.5	1.6	1.6	1.5
200	1.5	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.6
250	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5
300	1.5	1.5	1.5	1.5	1.6	1.6	1.7	1.7	1.7	1.7
350	1.7	1.7								

Depth: 1365.0 ft

[°]	Radii in [ft]									
0	1.6	1.5	1.5	1.6	1.5	1.5	1.6	1.6	1.5	1.6
50	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
100	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7
150	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3
200	1.3	1.2	1.2	1.2	1.2	1.4	1.3	1.3	1.2	1.2
250	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.3	1.5	1.5
300	1.5	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4
350	1.5	1.5								



SOCON Sonar Well Services, Inc.

Table of radii

Cavern No: State S 1

093035

5/20/2009

Depth: 1366.0 ft

[°]	Radii in [ft]									
0	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
50	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.4	1.4
100	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.6	1.6	1.6
150	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3
200	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1
250	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2
300	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.3
350	1.3	1.3								

Depth: 1367.0 ft

[°]	Radii in [ft]									
0	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4
50	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
100	1.2	1.2	1.1	1.0	0.9	0.8	0.8	0.8	0.8	0.8
150	0.8	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2
200	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
250	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.4	1.4	1.4
300	1.3	1.2	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2
350	1.2	1.2								

Depth: 1368.0 ft

[°]	Radii in [ft]									
0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3
50	1.3	1.3	1.3	1.4	1.4	1.4	1.3	1.3	1.3	1.3
100	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
150	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4
200	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6
250	1.6	1.6	1.6	1.6	1.4	1.4	1.3	1.3	1.3	1.3
300	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1
350	1.1	1.1								

Depth: 1369.0 ft

[°]	Radii in [ft]									
0	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
50	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1
100	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.1	1.1
150	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
200	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
250	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.1
300	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3
350	1.3	1.3								



SOCON Sonar Well Services, Inc.

Table of radii

Cavern No: State S 1

093035

5/20/2009

Depth: 1370.0 ft

[°]	Radii in [ft]									
0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
50	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1
100	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3
150	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
200	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0
250	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.2
300	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
350	1.2	1.2								

Depth: 1371.0 ft

[°]	Radii in [ft]									
0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
100	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
150	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
200	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
250	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
300	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
350	0.5	0.5								

Depth: 1372.0 ft

[°]	Radii in [ft]									
0	1.0	1.0	1.0	0.5	0.4	0.4	0.3	0.3	0.3	0.3
50	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
100	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
150	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.7
200	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.1	1.1	1.2
250	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3
300	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1
350	1.0	1.0								

Depth: 1373.0 ft

[°]	Radii in [ft]									
0	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
50	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
100	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
150	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.7
200	0.7	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.1	1.1
250	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
300	1.2	1.2	1.2	1.2	1.2	1.1	1.0	1.0	0.9	0.8
350	0.8	0.7								



SOCOM Sonar Well Services, Inc.

Table of radii

Cavern No: State S 1

093035

5/20/2009

Depth: 1374.0 ft

[°]	Radii in [ft]									
0	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3
50	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
100	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4
150	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.7
200	0.7	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.1
250	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
300	1.2	1.2	1.2	1.2	1.1	1.0	1.0	1.0	0.9	0.9
350	0.8	0.8								

Depth: 1375.0 ft

[°]	Radii in [ft]									
0	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3
50	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
100	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
150	0.3	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7
200	0.7	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.1	1.1
250	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
300	1.2	1.2	1.2	1.2	1.1	1.1	1.0	0.9	0.9	0.8
350	0.8	0.7								

Depth: 1376.0 ft

[°]	Radii in [ft]									
0	0.8	0.8	0.8	0.5	0.4	0.4	0.4	0.3	0.3	0.3
50	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
100	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
150	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.7
200	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.1
250	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2
300	1.2	1.2	1.2	1.1	1.1	1.1	1.0	0.9	0.9	0.9
350	0.9	0.8								

Depth: 1377.0 ft

[°]	Radii in [ft]									
0	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3
50	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
100	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
150	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.7
200	0.7	0.7	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.1
250	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
300	1.2	1.2	1.2	1.1	1.1	1.1	1.0	0.9	0.9	0.8
350	0.8	0.7								



SOCCIN Sonar Well Services, Inc.

Table of radii

Cavern No: State S 1

093035

5/20/2009

Depth: 1378.0 ft

[°]	Radii in [ft]									
0	0.7	0.7	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3
50	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
100	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
150	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6
200	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1
250	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2
300	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	0.9	0.9
350	0.8	0.8								

Depth: 1379.0 ft

[°]	Radii in [ft]									
0	0.7	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3
50	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
100	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
150	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6
200	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.0
250	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2
300	1.2	1.2	1.1	1.1	1.1	1.0	1.0	0.9	0.9	0.9
350	0.8	0.8								

Depth: 1380.0 ft

[°]	Radii in [ft]									
0	0.7	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3
50	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
100	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
150	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6
200	0.7	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0
250	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2
300	1.2	1.2	1.2	1.1	1.1	1.0	1.0	0.9	0.9	0.9
350	0.8	0.8								

Depth: 1381.0 ft

[°]	Radii in [ft]									
0	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3
50	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
100	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
150	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6
200	0.6	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.0	1.0
250	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2
300	1.2	1.1	1.1	1.1	1.1	1.0	1.0	0.9	0.9	0.8
350	0.8	0.7								



SOCOM[®] Sonar Well Services, Inc.

Table of radii

Cavern No: State S 1

093035

5/20/2009

Depth: 1382.0 ft

[°]

Radii in (ft)

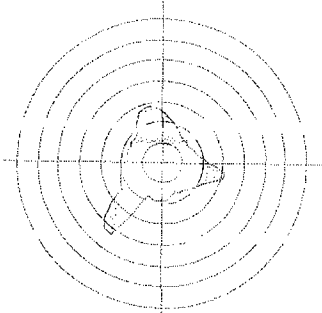
0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
50	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
100	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
150	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
200	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
250	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
300	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
350	0.1	0.1								



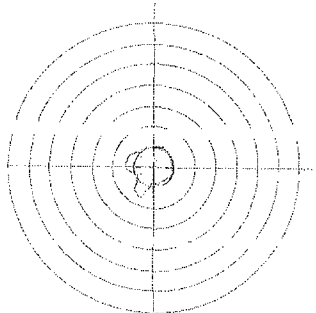
SOCON Sonar Well Services, Inc.

Horizontal slices 1 - 12

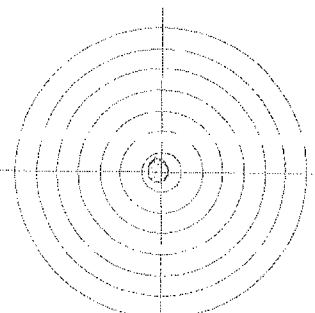
Cavity: Cavern No: State S 1 Report number: 093035 Date: 05/20/2009



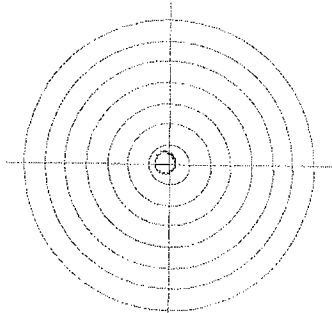
1350.0 ft / 59 ft²



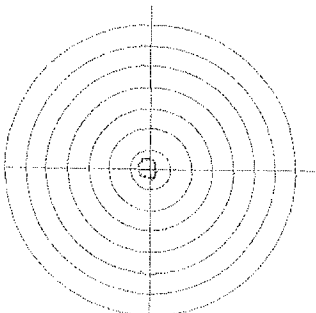
1351.0 ft / 14 ft²



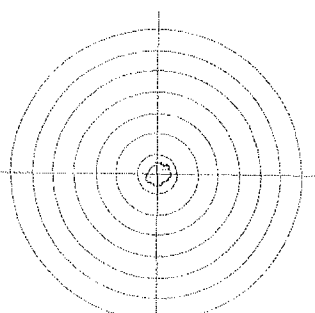
1352.0 ft / 3 ft²



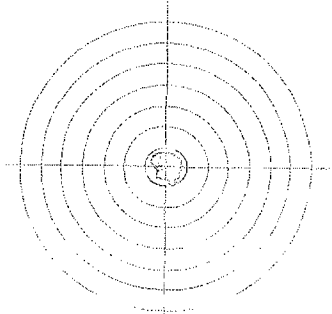
1353.0 ft / 3 ft²



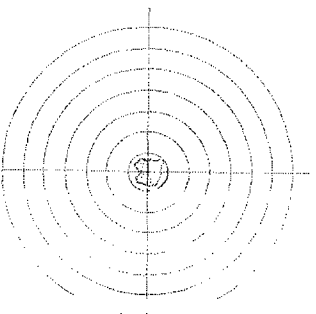
1354.0 ft / 3 ft²



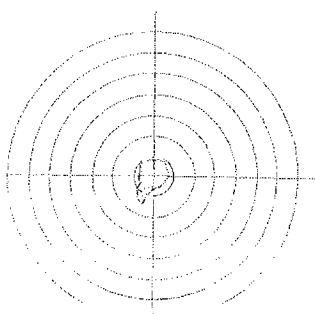
1355.0 ft / 4 ft²



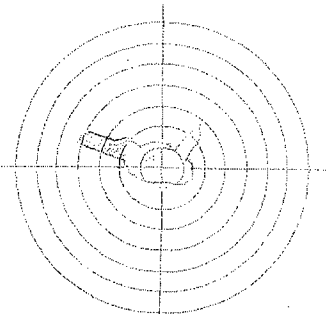
1356.0 ft / 6 ft²



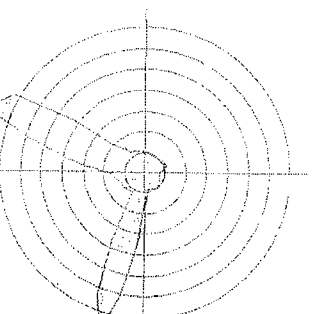
1357.0 ft / 5 ft²



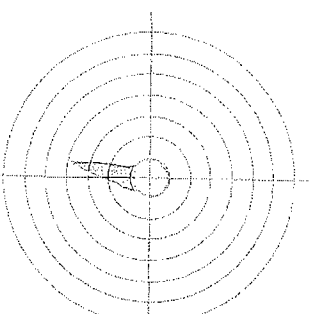
1358.0 ft / 8 ft²



1359.0 ft / 30 ft²



1360.0 ft / 83 ft² (max)



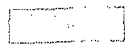
1361.0 ft / 18 ft²

The distance between 2 circles equals 2 ft

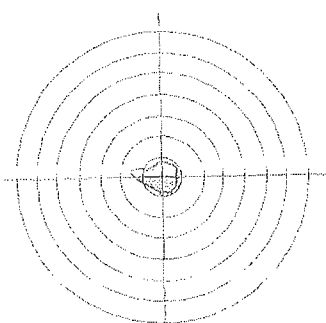


SWS Sonar Well Services, Inc.

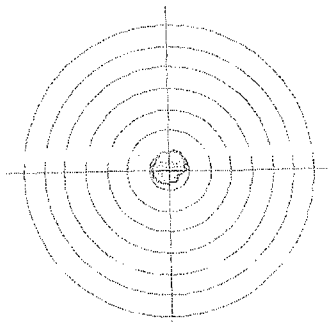
Horizontal slices 13 - 24



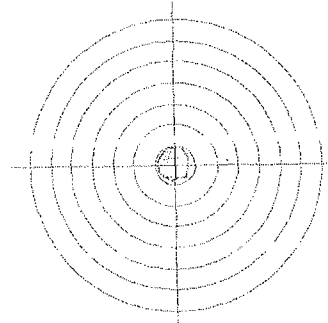
Cavity: Cavern No: State S 1 Report number: 093035 Date: 05/20/2009



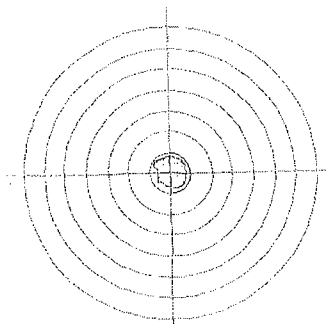
1362.0 ft / 8 ft²



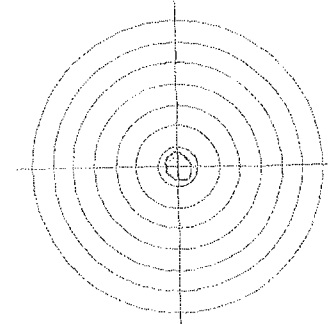
1363.0 ft / 8 ft²



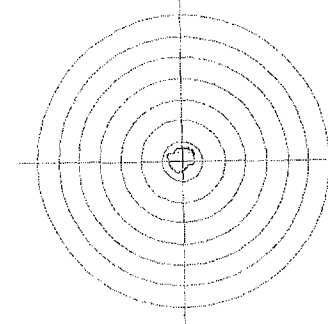
1364.0 ft / 7 ft²



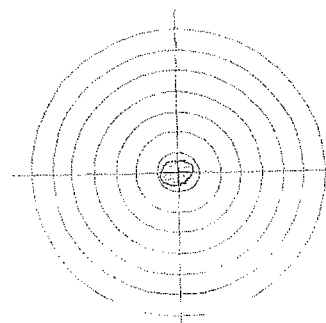
1365.0 ft / 7 ft²



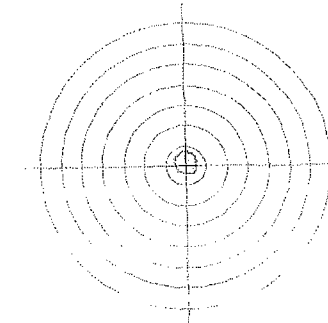
1366.0 ft / 5 ft²



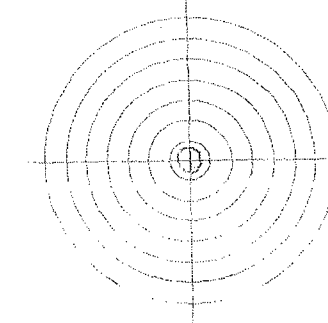
1367.0 ft / 4 ft²



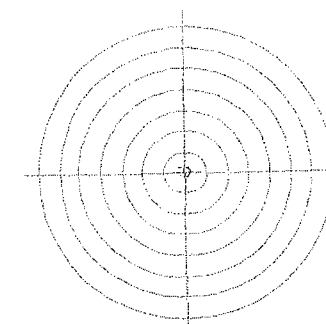
1368.0 ft / 5 ft²



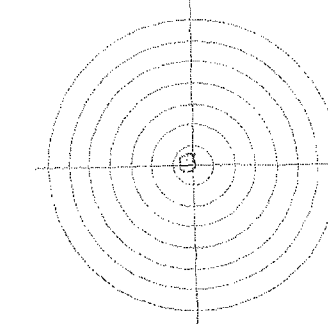
1369.0 ft / 4 ft²



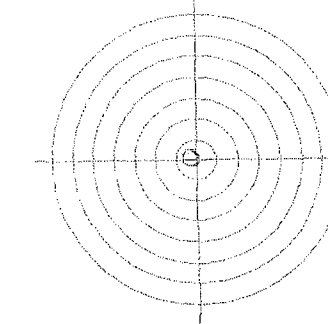
1370.0 ft / 4 ft²



1371.0 ft / 1 ft²



1372.0 ft / 2 ft²



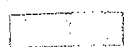
1373.0 ft / 2 ft²

The distance between 2 circles equals 2 ft

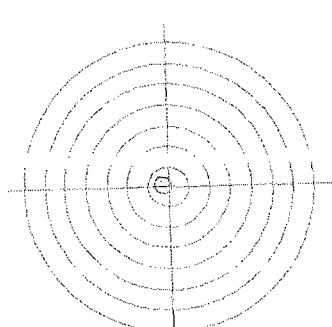


SOCON Sonar Well Services, Inc.

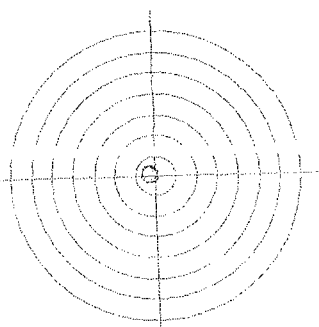
Horizontal slices 25 - 33



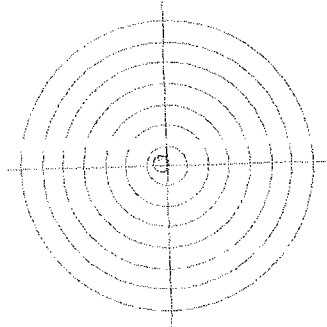
Cavity: Cavern No: State S 1 Report number: 093035 Date: 05/20/2009



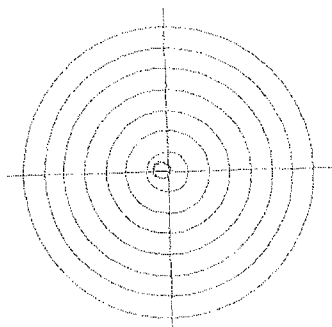
1374.0 ft / 2 ft²



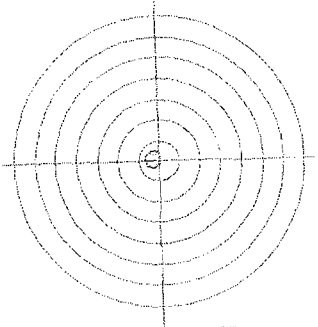
1375.0 ft / 2 ft²



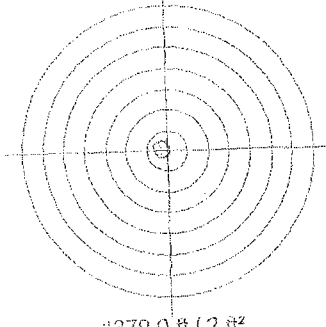
1376.0 ft / 2 ft²



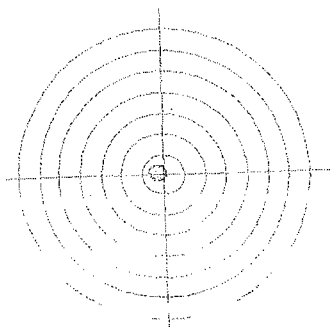
1377.0 ft / 2 ft²



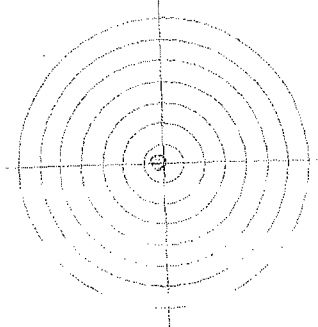
1378.0 ft / 2 ft²



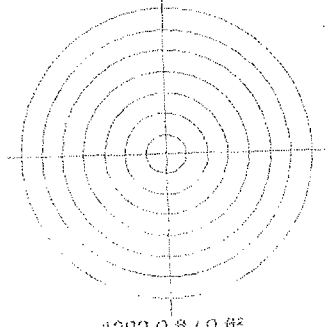
1379.0 ft / 2 ft²



1380.0 ft / 2 ft²



1381.0 ft / 2 ft²



1382.0 ft / 0 ft²

The distance between 2 circles equals 2 ft



SOCON Sonar Well Services, Inc.

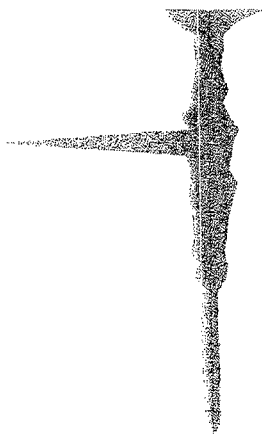
Vertical slices 1 - 6



Cavity: Cavern No: Slate S 1 Report number: 093035 Date: 05/20/2009



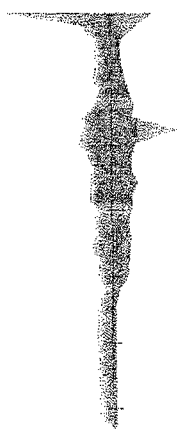
180° 0°



195° 15°



210° 30°



225° 45°



240° 30°



255° 75°



SOCON Sonar Well Services, Inc.

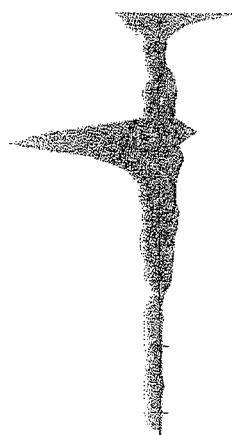
Vertical slices 7 - 12



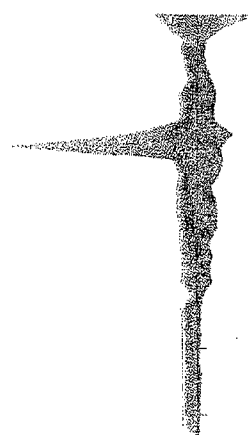
Cavity: Cavern No: State S 1 Report number: 093035 Date: 05/20/2009



270° 90°



285° 105°



300° 120°



315° 135°



330° 150°



345° 165°

Chavez, Carl J, EMNRD

From: Email 2, Scan [scan2email2@keyenergy.com]
Sent: Tuesday, April 20, 2010 4:37 PM
To: Patterson, Bob
Subject: BW #28 Chemical Analysis
Attachments: SKMBT_75010042022371.pdf

Annual Brine Well Report

Key Energy Services, LLC

Brine Well Number BW-28

API Number 30-025-3354

Submitted by Bob Patterson

Item 2: May 19 through May 23, 2009, pulled tubing to run a required Sonar for OCD. C-103, MIT chart, and sonar results attached.

Reversed the flow to pump fresh down the tubing and produce brine through the casing as per OCD request.

Subsidence monuments to be installed by John West Surveying Company in 2010 to monitor for any possible subsidence.

Item 3: In past years including 2009 to record volumns, meter readings from the City of Eunice were used for injection and recorded sales of brine were used for production .Separate meters on the injection line and the production line have been installed to achieve more acturate reporting. Accummative totals are from April 2001 through December 2009. Prior records are not available from the previous operator.

2009 Injection	2009 Production	Total Injection	Total Production
24,977 Bbl.	22,454 Bbl.	457,922 Bbl.	435,916 Bbl.

Item 4: A copy of the chemical Analysis is attached.

Item 5: A copy of the MIT chart on the casing is attached.

Item 6: On June 1, 2009 injection down the tubing and production up the casing began.

Item 7: There were no leaks or spills in 2009.

Item 8: No ground water monitoring is being conducted at this facility.

Item 9: No visual subsidence has been detected. Subsidence monuments will be installed and monitored In 2010.

Item 10: No new well activity occurred in the area of review.

Item 11: Sign off requirements were in accordance to WQCC Subsection G 20.6.2.5101

Chavez, Carl J, EMNRD

Subject: Key Energy Services, LLC NOV Meetings (UICI-5 & BW-28)
Location: OCD Wendell Chino Building

Start: Wed 4/14/2010 9:00 AM
End: Wed 4/14/2010 12:00 PM

Recurrence: (none)

Meeting Status: Meeting organizer

Organizer: Chavez, Carl J, EMNRD
Required Attendees: Altomare, Mikal, EMNRD; VonGonten, Glenn, EMNRD; Chavez, Carl J, EMNRD; Griswold, Jim, EMNRD; wayneprice77@earthlink.net

NOV meeting w/ Wayne Price, et al. of Key Energy Services, LLC.

New Mexico Energy, Minerals and Natural Resources Department

Bill Richardson
Governor

Jon Goldstein
Cabinet Secretary

Jim Noel
Deputy Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division



NOTICE OF VIOLATION

April 1, 2010

Mr. Dan Gibson
Key Energy Services, LLC
6 Desta Drive, Suite 4400
Midland, Texas 79705

VIA CERTIFIED MAIL
RETURN RECEIPT NO: 7001 1940 0004 7923 4887

Re: Discharge Plan Permit Notice of Violation(s) (BW-028)
Key Energy Services, LLC Class III Brine Production Well
State Well No. 1, (API No. 30-025-33547)
1340 FNL and 330 FWL UL: E Section 15 T21S, R37E
Lea County, New Mexico

Dear Mr. Gibson:

The New Mexico Oil Conservation Division (OCD) has not received an Annual Report or any of the various, other reporting documentation required by the reporting provisions of the discharge permit for the Key Energy Services, LLC (hereafter "Key") State Well No. 1 (BW-028). The discharge permit, issued under the New Mexico Underground Injection Control (UIC) Program, established a deadline of January 31, 2010 for Key to submit an annual report to the OCD. Because Key has failed to meet this deadline, the OCD has determined that Key is in violation of the OCD Discharge Permit (BW-028); Water Quality Control Commission (WQCC) Regulations 20.6.2.5208 NMAC, and Federal Underground Injection Control Regulations § 40 CFR 144 & 146, et seq.

New Mexico WQCC 20.6.2.1220 NMAC provides that, where an operator violates the terms of a discharge permit issued pursuant to the Water Quality Act, the operator may be subject to enforcement actions including but not limited to a compliance order, penalty assessment, and action filed in District Court. You were advised via e-mail correspondence dated September 25, 2009 from OCD Environmental Engineer Carl Chavez reminding Key of the submittal due-date of its Annual Report for this site. Mr. Chavez specifically informed Key at that time that OCD was implementing a better report tracking system to monitor reports received by brine operators.

By this Notice, the OCD is hereby advising Key that is required to submit the delinquent Annual Report and any other reporting required by the terms and conditions of discharge permit BW-028

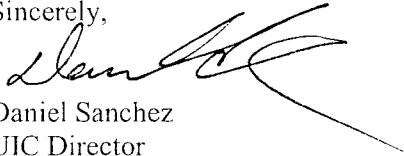


Mr. Gibson
Key Energy Services, LLC
April 1, 2010
Page 2

to the OCD on or before June 30, 2010. The OCD is required to report the violation(s) to the EPA under the Federal Fiscal Year Quarter 2 (January –March) period. Failure to comply with the June 30, 2010 deadline referenced above will result in escalated enforcement under the Federal “Significant non-Compliance” designation. If the Key does not satisfy the reporting requirements by the June 30, 2010 date, it shall immediately shut-in the referenced facility and shall be required to submit a C-103 to the OCD for plugging and abandoning the well no later than September 30, 2010.

Please contact Carl Chavez of my staff at (505) 476-3490 or carlj.chavez@state.nm.us within 14 days of receipt of this NOV to arrange for a compliance and enforcement meeting at the OCD office in Santa Fe, New Mexico. It is imperative that you promptly make arrangements to meet with us if you wish to not only resolve the compliance issue, but also wish to pursue the renewal of your discharge permit for this facility. If Key fails to contact the OCD within 14 days of receipt as indicated, the OCD will assume that Key no longer wishes to seek renewal of the discharge permit for the State Well No. 1, designated BW-028.

Sincerely,



Daniel Sanchez
UIC Director

DS/cc

xc: OCD District I Office, Hobbs
Mikal Altomare, Mikal.altomare@state.nm.us