

BW - 6

SONAR TESTS

SONAR & WELL TESTING SERVICES, INC.

SONAR CALIPER SURVEY

21. 10. 1996
RECEIVED

1996 10 19 8 52

TREATMENT NO:

JOB NO: 3092

WELL DATA

T.D. SONAR:	497 ft.	T.D. OPERATOR:	500 ft.
CASING SIZE:	5 1/2 in.	CASING DEPTH:	452 ft.
INTERMEDIATE SIZE:		INTER. DEPTH:	
TUBING SIZE:	2 7/8 in.	TUBING DEPTH:	out

I & W, Inc.

Eugenie No. 1

Carlsbad, N.M.

October 19, 1996

GENERAL COMMENTS:

Zero at 5 1/2 in. casing flange.
No depth corrections.

MAILING ADDRESS:

P.O. Box 939
Lovington, N.M. 88260

Attn: George Parchman

CUSTOMER REP:

George Parchman

SONAR ENGINEER:

Bill Schnitger

SONAR & WELL TESTING SERVICES
SONAR CALIPER SURVEY

PAGE 1

I & W, Inc.
Eugenie No.1

October 19, 1996
JOB NO: 3092

VOLUME CALCULATIONS

	DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLs	BBLs
ABOVE	452	54,064.	54,064.	9,629.	9,629.
	454	25,738.	79,802.	4,584.	14,213.
	456	20,976.	100,779.	3,736.	17,949.
	458	16,519.	117,297.	2,942.	20,892.
	460	13,125.	130,422.	2,338.	23,229.
	462	10,355.	140,777.	1,844.	25,074.
	464	8,270.	149,047.	1,473.	26,546.
	466	6,968.	156,015.	1,241.	27,787.
	468	5,628.	161,643.	1,002.	28,790.
	470	4,247.	165,890.	756.	29,546.
	472	3,092.	168,982.	551.	30,097.
	474	2,126.	171,108.	379.	30,476.
	476	1,405.	172,513.	250.	30,726.
	478	678.	173,190.	121.	30,846.
	480	139.	173,329.	25.	30,871.
	482	10.	173,339.	2.	30,873.
	484	28.	173,368.	5.	30,878.
	486	33.	173,400.	6.	30,884.
	488	8.	173,408.	1.	30,885.
	490	18.	173,426.	3.	30,888.
	492	29.	173,455.	5.	30,894.
	494	20.	173,475.	4.	30,897.

SONAR & WELL TESTING SERVICES
SONAR CALIPER SURVEY

PAGE 2

I & W, Inc.
Eugenie No.1

October 19, 1996
JOB NO: 3092

VOLUME CALCULATIONS

DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLs	BBLs
496	10.	173,485.	2.	30,899.
497	3.	173,487.	0.	30,899.

SONAR & WELL TESTING SERVICES
SONAR CALIPER SURVEY

PAGE 1

I & W, Inc.
Eugenie No.1

October 19, 1996
JOB NO: 3092

RADII IN FEET

DEPTH	ANGLE	N	S	E	W	NE	SW	SE	NW
452	90	63.1	65.1	66.4	70.5	65.5	73.1	65.4	70.4
454	90	63.4	57.5	57.3	62.3	61.2	64.7	61.8	63.9
456	90	48.2	56.6	46.8	63.5	47.2	65.6	51.8	52.9
458	90	39.4	50.3	46.2	46.4	41.6	60.9	46.4	44.7
460	90	36.4	46.3	45.1	42.1	39.0	58.7	45.4	40.6
462	90	32.9	44.8	42.5	38.1	33.9	34.0	43.5	35.9
464	90	26.5	43.9	39.9	36.3	28.6	32.6	38.3	27.3
466	90	24.1	40.7	36.9	33.1	28.2	28.1	36.4	25.4
468	90	21.8	33.4	33.7	30.2	26.3	25.8	29.1	22.6
470	90	19.2	31.6	30.0	24.0	20.4	22.7	24.3	21.6
472	90	15.9	21.5	26.0	21.0	16.9	20.0	19.9	17.5
474	90	14.6	18.9	21.0	16.0	16.0	14.5	15.5	14.6
476	90	10.0	10.6	17.0	14.0	10.9	13.5	16.0	12.0
478	90	4.7	5.4	5.5	10.2	4.0	10.4	2.1	8.2
480	90	1.8	1.5	2.1	1.1	1.6	1.4	1.9	1.2
482	90	0.9	0.7	0.8	0.8	0.9	0.8	0.9	0.8
484	90	3.6	3.5	2.7	0.8	3.1	3.0	3.3	3.7
486	90	0.8	2.3	0.8	0.8	0.9	0.7	0.8	0.8
488	90	1.0	1.1	0.8	1.2	0.8	1.2	1.1	1.2
490	90	1.8	2.3	1.0	2.0	0.8	4.2	2.9	2.3
492	90	2.2	1.9	0.6	2.8	0.9	2.8	0.8	3.1
494	90	1.8	0.7	1.6	0.9	1.7	1.4	0.8	2.3

SONAR & WELL TESTING SERVICES
SONAR CALIPER SURVEY

PAGE 2

I & W, Inc.
Eugenie No.1

October 19, 1996
JOB NO: 3092

		RADII IN FEET							
DEPTH	ANGLE	N	S	E	W	NE	SW	SE	NW
496	90	1.3	0.8	1.0	1.4	1.2	0.8	1.1	0.8
497	90	0.9	0.8	0.7	0.7	0.7	0.7	0.8	0.8

SONAR & WELL TESTING SERVICES
SONAR CALIPER SURVEY
UPS

PAGE 3

I & W, Inc.
Eugenie No.1

October 19, 1996
JOB NO: 3092

RADII IN FEET

DEPTH	ANGLE	N	S	E	W	NE	SW	SE	NW
462	1	16.8	16.7	16.6	17.0	16.6	17.1	16.6	16.8
462	5	16.5	16.5	16.5	16.5	16.6	16.5	16.6	16.2
462	10	16.5	16.4	16.4	16.4	16.6	16.3	16.4	16.3
462	15	16.4	16.5	16.2	16.2	16.6	16.2	16.4	16.0
462	20	16.6	17.0	16.8	16.7	16.9	16.7	16.8	16.8
462	25	17.6	17.4	17.0	17.4	17.4	17.1	17.3	17.6
462	30	18.2	18.0	17.4	17.5	17.8	17.4	17.5	18.1
462	35	19.5	19.0	18.1	17.9	18.9	18.4	18.5	18.5
462	40	20.1	19.6	19.1	18.5	19.9	19.1	19.6	19.1
462	45	21.7	21.1	21.3	19.8	21.8	19.9	21.1	20.9
462	50	23.6	22.6	22.5	21.4	23.1	21.8	23.0	22.1
462	55	25.3	24.0	23.5	22.8	26.9	24.3	24.2	23.8
462	60	28.4	27.7	27.6	27.9	29.1	27.4	29.1	29.8
462	65	36.2	34.7	34.0	36.3	35.2	34.2	35.0	34.4
462	70	44.8	40.9	40.6	41.1	41.3	38.2	45.3	44.8
462	75	58.6	50.0	57.7	57.0	56.5	51.7	53.6	58.1
462	80	68.0	67.8	63.4	69.0	63.9	67.3	61.9	65.1
462	85	45.7	52.7	45.5	65.8	46.4	64.7	49.0	46.2

SONAR & WELL TESTING SERVICES
 SONAR CALIPER SURVEY
 DOWNS

I & W, Inc.
 Eugenie No.1

October 19, 1996
 JOB NO: 3092

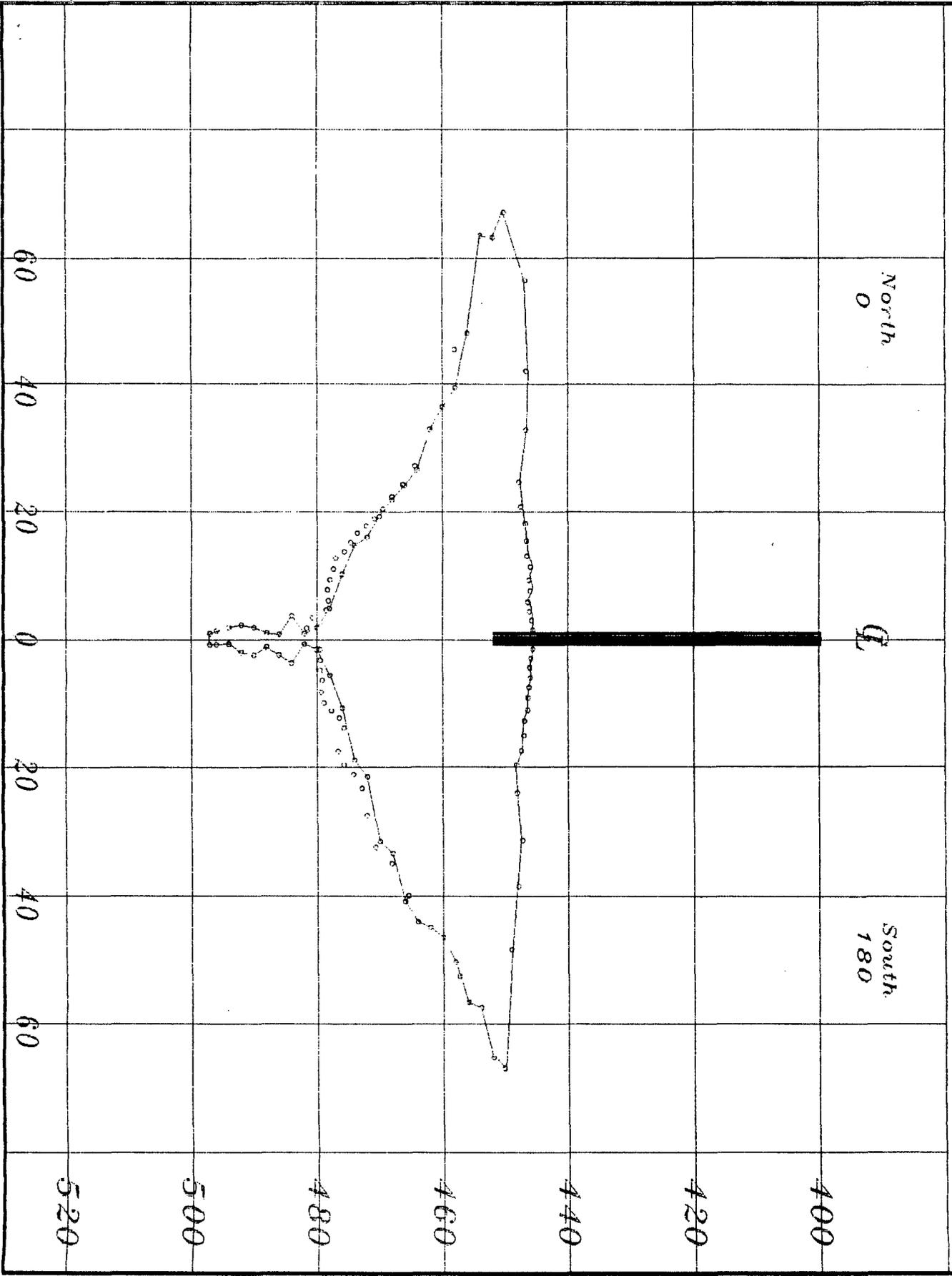
RADII IN FEET

DEPTH	ANGLE	N	S	E	W	NE	SW	SE	NW
462	95	27.2	40.0	37.7	36.0	31.9	29.5	36.4	28.1
462	100	24.6	35.5	35.4	33.7	30.9	27.9	34.6	26.0
462	105	23.1	33.6	31.9	29.0	27.9	25.3	26.8	24.5
462	110	21.7	29.3	29.5	26.5	25.3	24.2	25.1	22.8
462	115	20.8	25.7	27.5	23.5	22.7	23.9	24.2	23.1
462	120	20.4	24.4	26.8	22.4	22.0	22.9	22.8	22.2
462	125	20.2	23.9	24.7	21.7	21.5	21.2	21.8	21.5
462	130	19.7	22.8	23.7	21.8	19.6	19.5	22.1	21.0
462	135	19.3	19.4	21.9	21.2	19.2	19.6	21.8	20.1
462	140	19.6	18.9	20.8	21.4	18.9	20.0	21.2	19.8
462	145	18.8	19.2	19.2	21.3	18.8	20.8	20.0	18.5
462	150	18.4	19.5	18.8	21.8	18.7	20.0	19.3	17.7
462	155	18.0	19.1	18.4	21.4	17.8	21.0	18.4	17.6
462	160	17.2	18.3	17.6	20.8	17.8	20.4	18.2	17.2
462	165	17.1	18.1	17.5	20.9	18.3	18.9	17.4	17.4
462	170	19.0	17.7	17.3	18.2	18.2	17.7	17.1	19.0
462	175	19.7	17.6	17.3	17.9	18.6	17.9	17.3	18.2

I & W, Inc.
Eugenie No. 1

VERTICAL CROSS SECTION

Carlsbad, N.M.
October 19, 1996
Job Number - 3092



I & W, Inc.
Eugenie No. 1

VERTICAL CROSS SECTION

Carlsbad, N.M.
October 19, 1996
Job Number - 3092

Southwest
225

0

Northeast
45

60

40

20

0

20

40

60

520

500

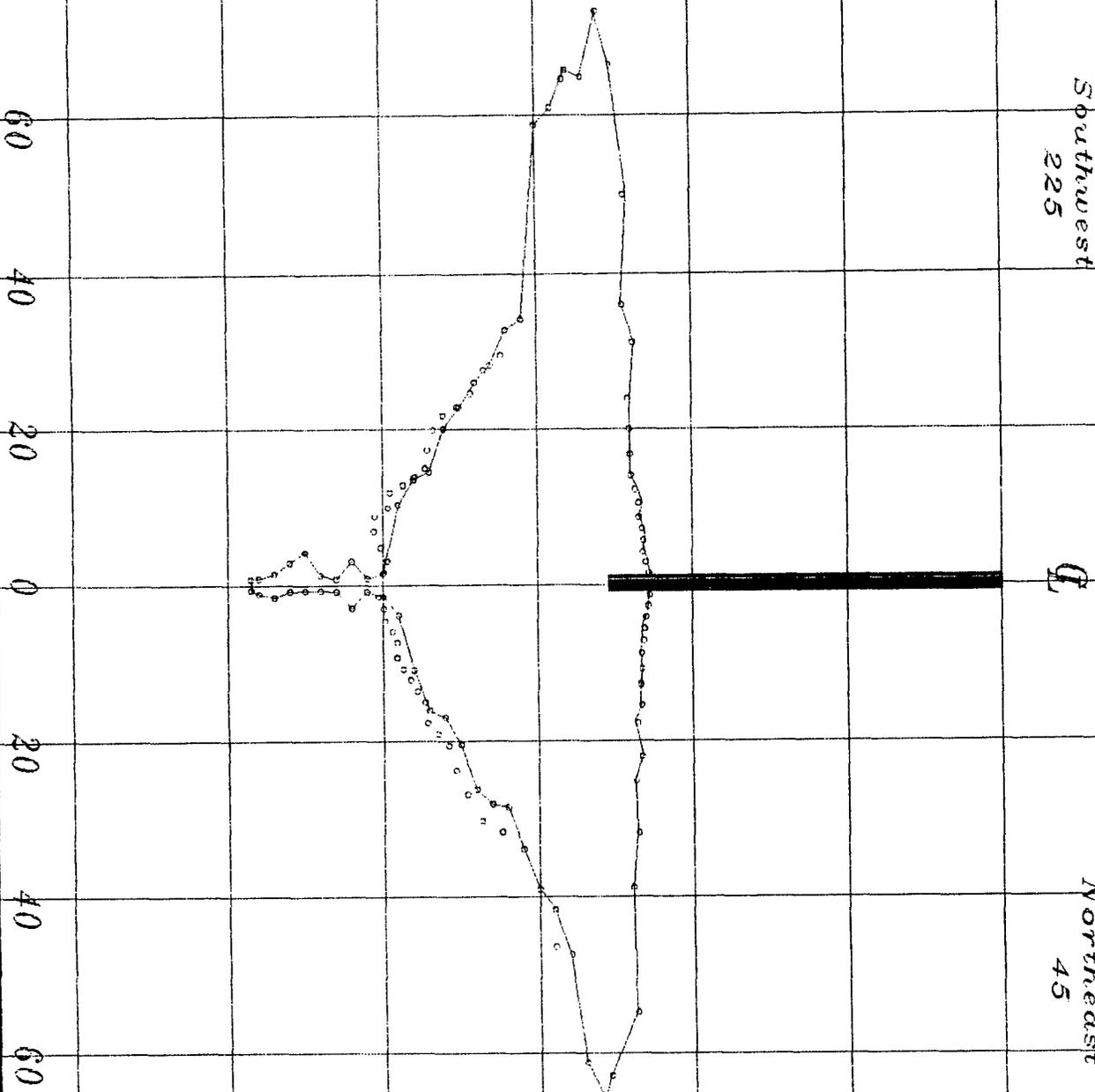
480

460

440

420

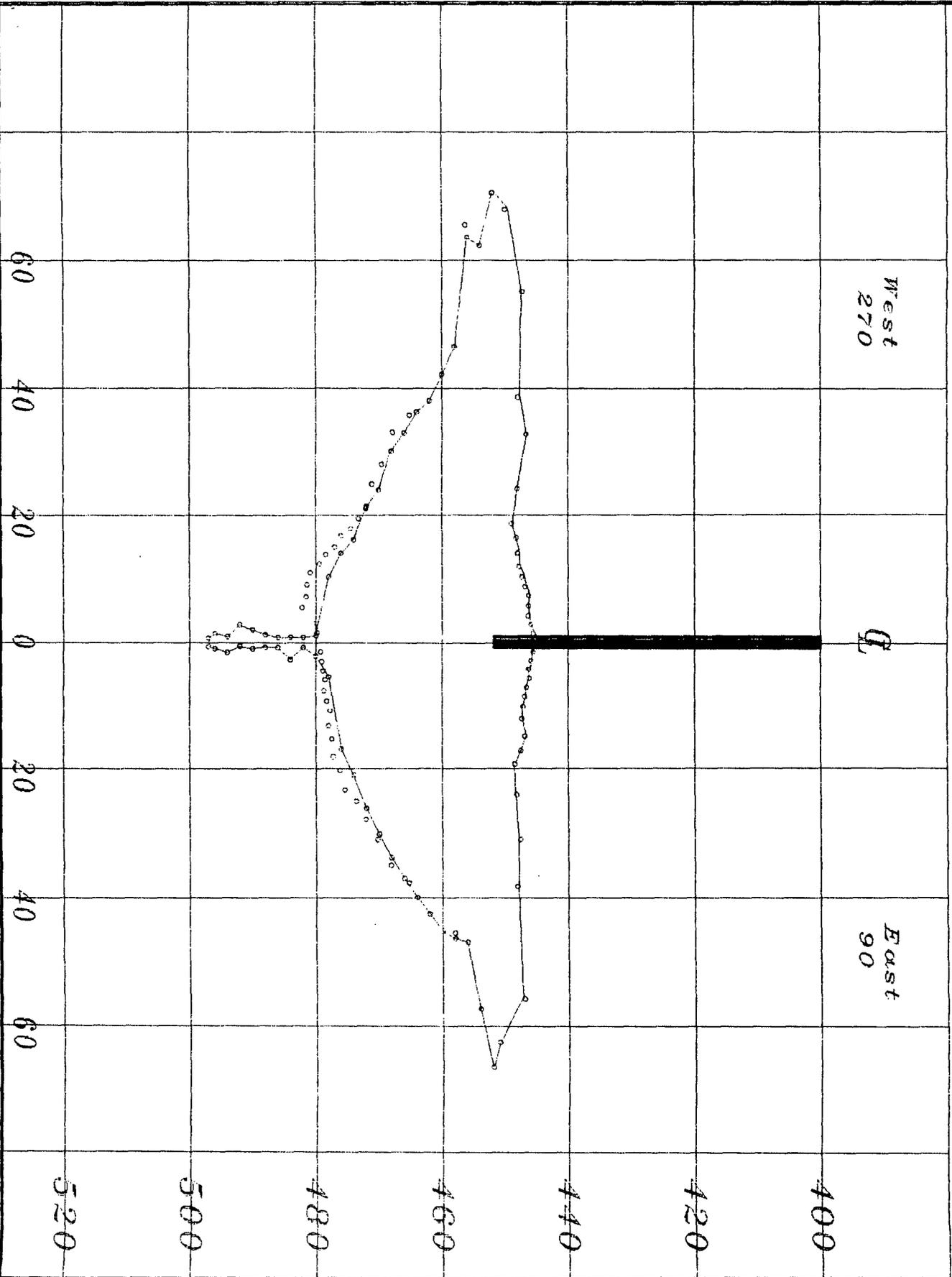
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I & W, Inc.
Eugenie No. 1

VERTICAL CROSS SECTION

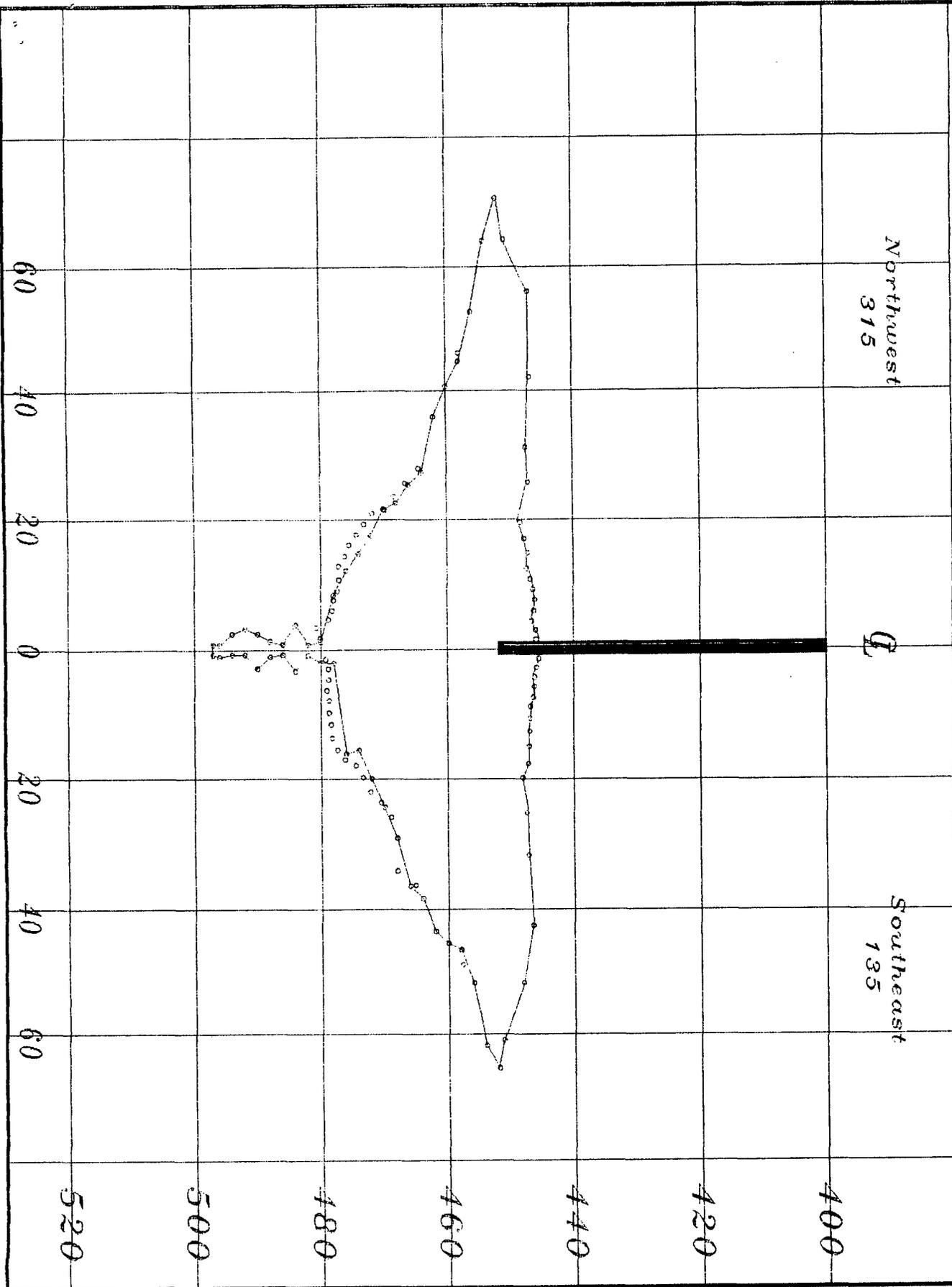
Carlsbad, N.M.
October 19, 1996
Job Number - 3092



I & W, Inc.
Eugenie No. 1

VERTICAL CROSS SECTION

Carlsbad, N.M.
October 19, 1996
Job Number - 3092

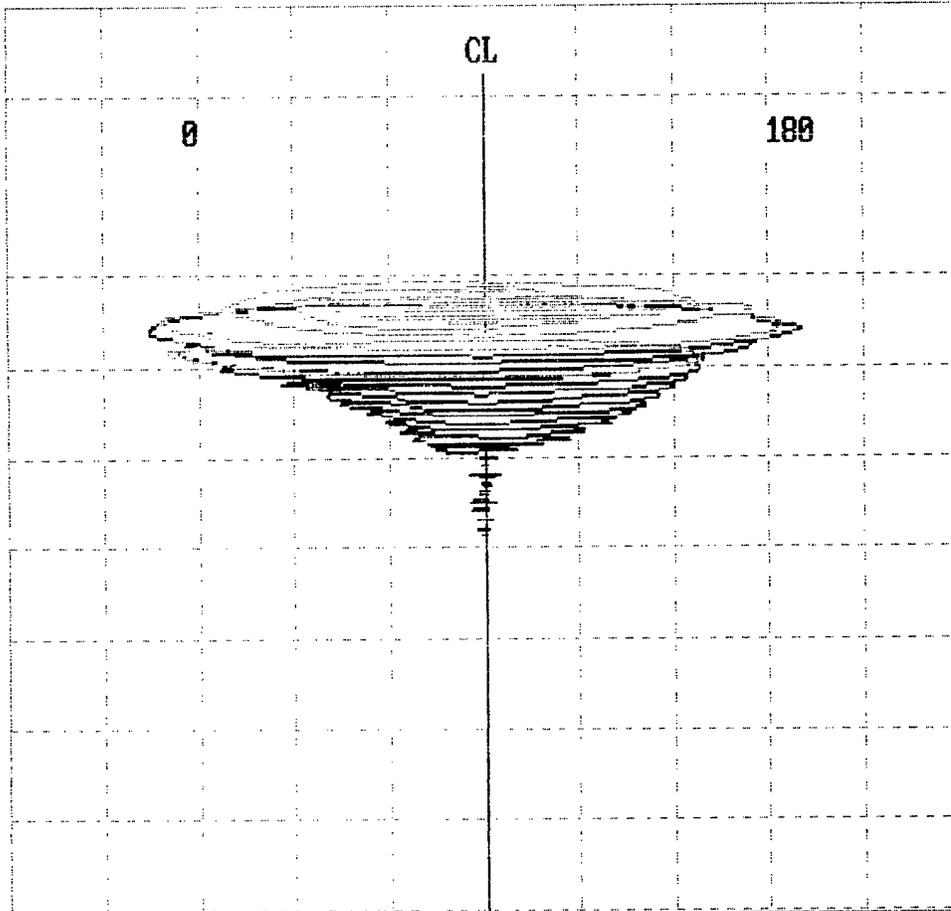


I & W, Inc.
Eugenie No.1

VERT = 20
HORZ = 20

October 19, 1996
JOB NO: 3092

300 Ft

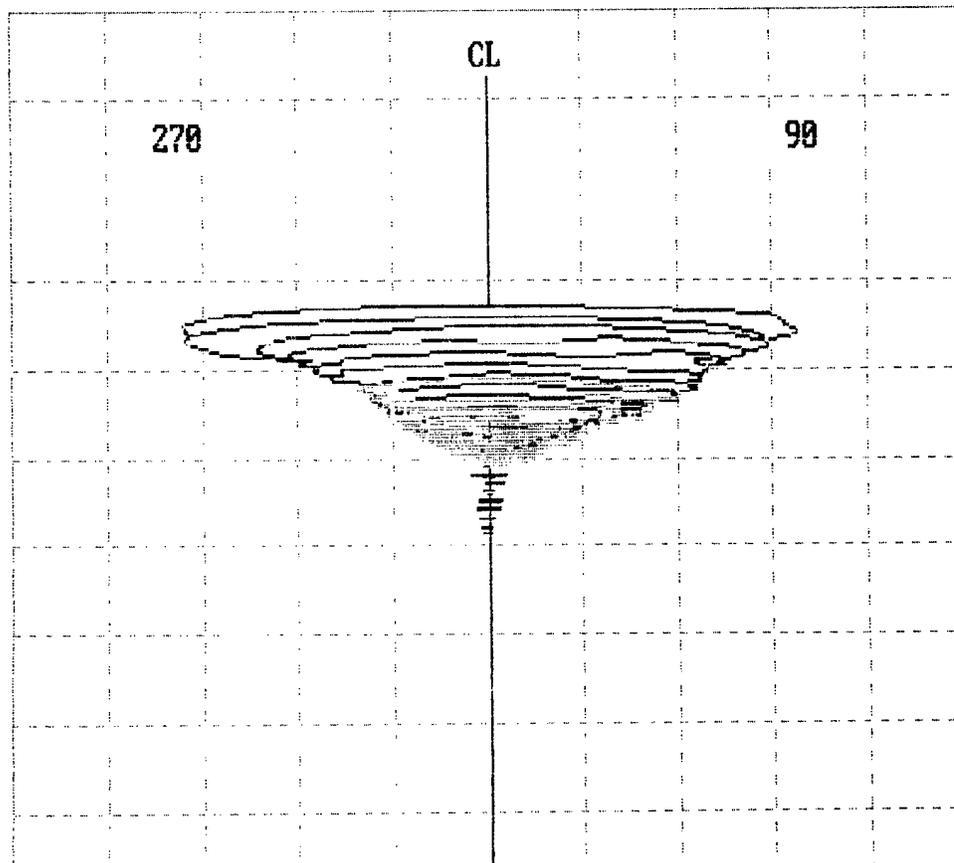


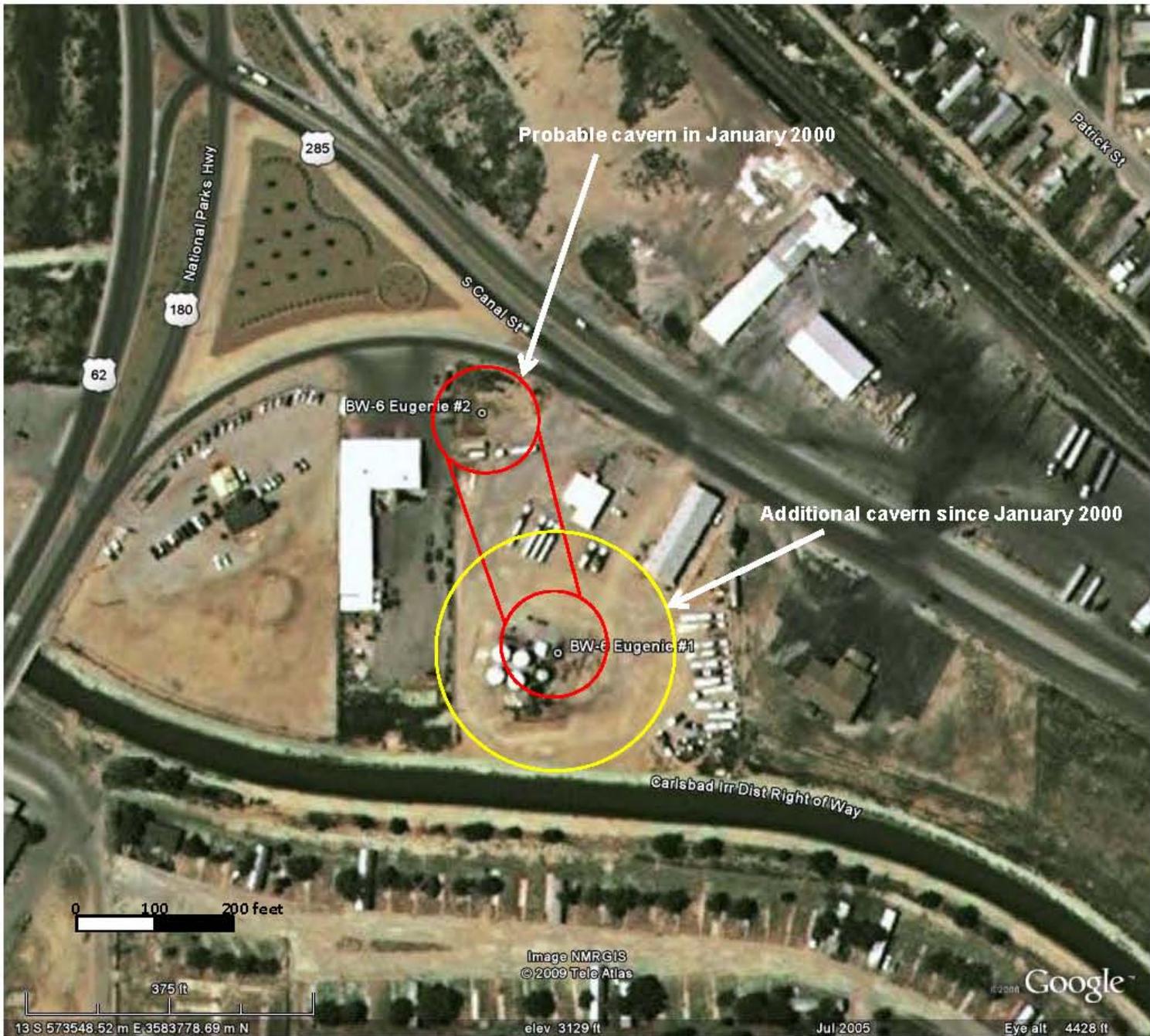
I & W, Inc.
Eugenie No.1

VERT = 20
HORZ = 20

October 19, 1996
JOB NO: 3092

300 Ft





BW - 6

SONAR TESTS



SOCON Sonar Well Services, Inc.

ECHO - LOG

I&W Inc.

Eugenie #1

Carlsbad, New Mexico

1st. Survey

08/30/2007

073055



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.

Eugenie #1

073055

08/30/2007

Results of the Cavern Survey

By means of Echo-Sounding

In the cavern

Eugenie #1

Date: 08/30/2007

073055

Customer: I&W Inc.

Carlsbad, New Mexico

Responsible for the survey:

Surveyor:	Richard Lawrence
Leadership:	Kevin Wilson
Interpreter:	Gunte Happe
Control:	Richard Lawrence



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

Logs



Summary of results

Well details

All depths are given as:	MD
Datum level for all depths:	BHF
Shoe of the cemented 7"-casing:	442 ft
Reference depth for ECHO-LOG:	442 ft
Depth correction:	-4 ft
Pressure at the well head:	0 psi

Details of survey equipment

Measuring vehicle used:	L 110
Tools used:	Echo tool BSF 39, BSF 39

General details

Number of runs:	1
Measured horizontal sections:	12
Measured tilted sections:	42
Lowest survey depth:	466.0 ft



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 5/15 degree intervals:

Minimum radius:	0.0 ft
Depth:	468.9 ft
Direction:	0°

Maximum radius:	85.5 ft
Depth:	445.0 ft
Direction:	180°

Highest point of cavern:	434.7 ft
Horizontal distance:	4.2 ft
Direction:	240°

Lowest point of cavern:	473.8 ft
Horizontal distance:	71.0 ft
Direction:	300°

Lowest point in the measuring axis: 468.9 ft

Determination out of 37 horizontal sections in the depths between 444 ft and 473 ft at 5 degree intervals:

Maximum radius:	85.9 ft
Depth:	445.0 ft
Direction:	181°

Maximum diameter:	158.1 ft
Depth:	445.0 ft
Direction:	1 - 181°

Volume

Volume: **47,823 bbls**

Depth range: **444 ft <--> 473 ft**



Interpretation

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

1810.0 m/s (5938.3 ft/s) in brine (measured)

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

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

444.0 ft	445.0 ft	450.0 ft	452.0 ft	454.0 ft	456.0 ft	458.0 ft
460.0 ft	462.0 ft	464.0 ft	465.0 ft	466.0 ft		

The following 7 sections are constructed:

467.0 ft	468.0 ft	469.0 ft	470.0 ft	471.0 ft	472.0 ft	473.0 ft
----------	----------	----------	----------	----------	----------	----------

Tilted sections

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

26 sections of these with upwards-tilted echo-transducer:

Depth / Tilting Angle

444.0 / 4	444.0 / 6	455.0 / 8	455.0 / 72	455.0 / 78	455.0 / 84
460.0 / 3	460.0 / 6	460.0 / 8	460.0 / 12	460.0 / 15	460.0 / 18
460.0 / 21	460.0 / 24	460.0 / 27	460.0 / 30	460.0 / 33	460.0 / 39
460.0 / 45	460.0 / 51	460.0 / 57	460.0 / 63	460.0 / 69	460.0 / 75
460.0 / 81	460.0 / 87				

16 sections of these with downwards-tilted echo-transducer:

Depth / Tilting Angle

444.0 / 2	444.0 / 4	444.0 / 6	455.0 / 12	455.0 / 18	455.0 / 24
455.0 / 30	455.0 / 36	455.0 / 42	455.0 / 48	455.0 / 57	455.0 / 63
455.0 / 75	455.0 / 78	455.0 / 81	455.0 / 84		



Vertical sections

The shape of the cavern was determined by interpretation of all horizontally and tilted measured data and is presented by 12 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.



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)

- N** Magnetic north determined with compass inside the tool
(Magnetic compass in areas without tubing)
(Fibre gyro compass in areas with tubing)

- (N)** Assumed north direction (for sections in magnetic disturbed surroundings without fibre gyro compass)

- a** Longest extension in section
(Without considering of hidden leached pockets)

- b** Longest extension in section perpendicular to a
(Without considering of hidden leached pockets)

- a/b** Ratio of longest extensions in section which are perpendicular to each other

- (xx m²)** Area in actual section resulting from hidden leached pockets

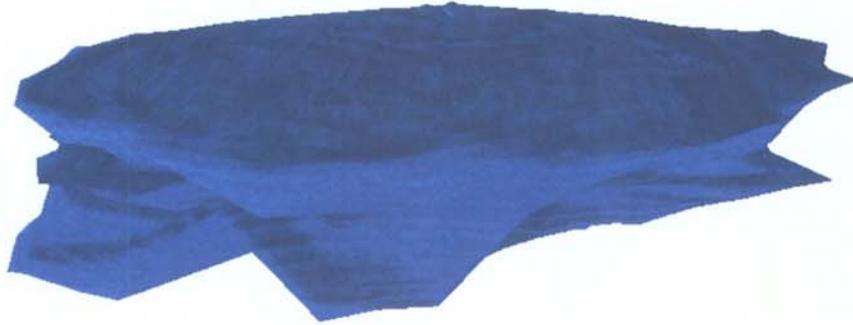
- r~** Average radius

- 021835 29.04 2002 Job number and survey date

Eugenie #1

073055

08/30/2007



Eugenie #1 --> 0° <--



Eugenie #1 --> 60° <--



Eugenie #1 --> 120° <--

Eugenie #1

073055

08/30/2007



Eugenie #1 --> 180° <--



Eugenie #1 --> 240° <--



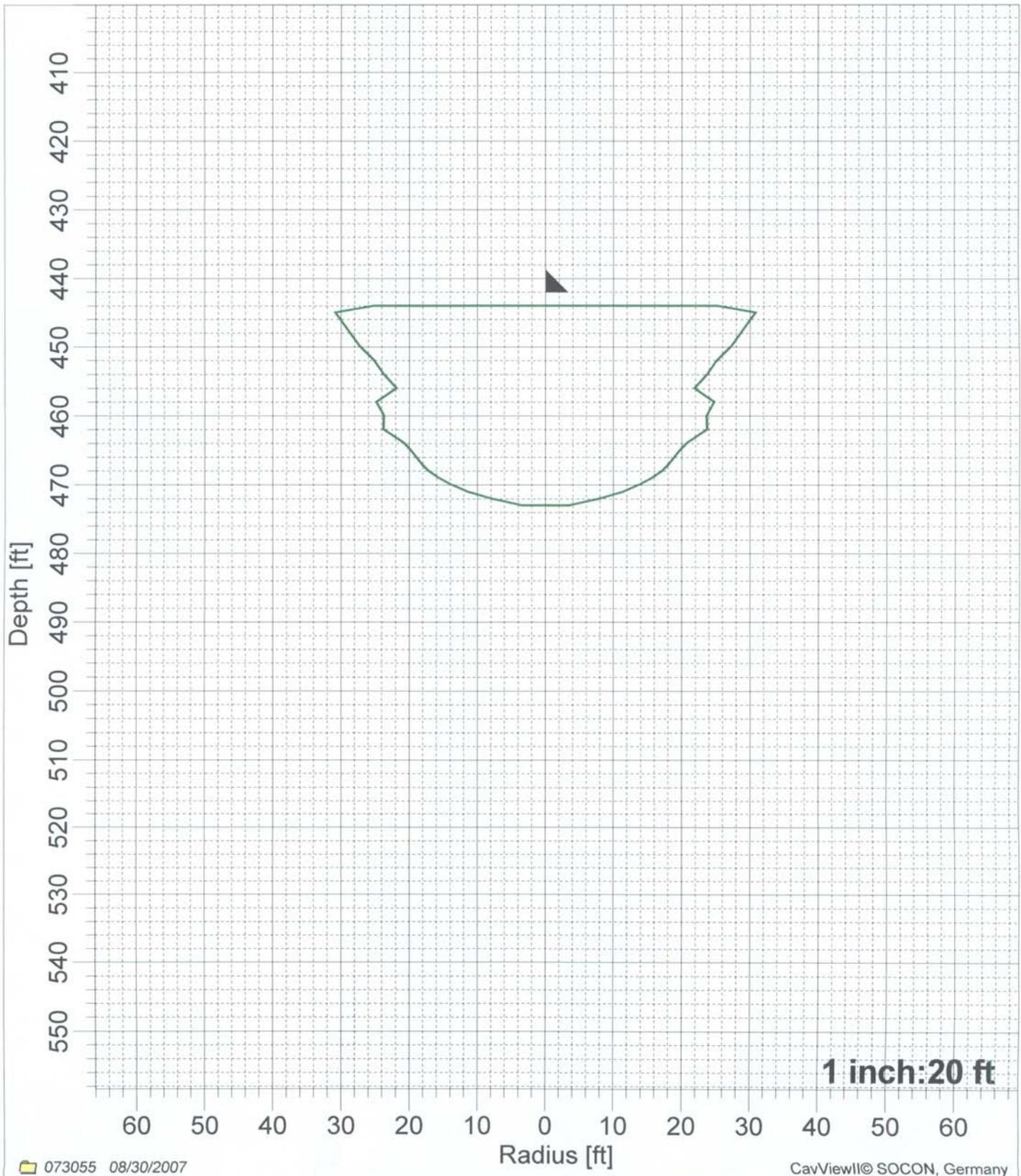
Eugenie #1 --> 300° <--



Eugenie #1

AVERAGE RADIUS

08/30/2007

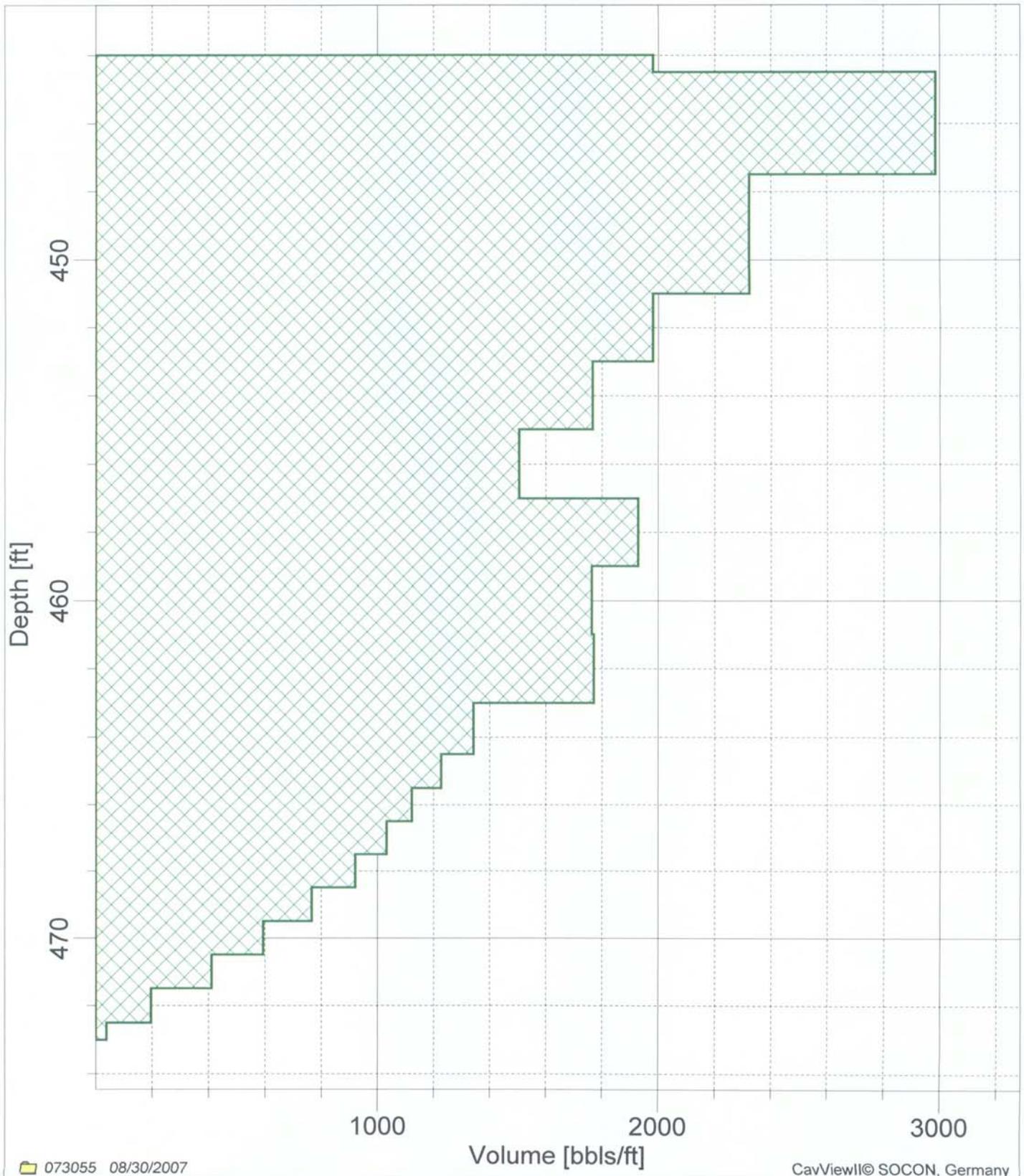


073055 08/30/2007

CaViewII© SOCON, Germany

5 1/2" : 442.0 ft

Average radius (08/30/2007)



073055 08/30/2007

CavViewII© SOCON, Germany

Partial volume



SOCON Sonar Well Services, Inc.

Volume list

Cavern: Eugenie #1

073055

08/30/2007

Depth [ft]	Radius [ft]	Area [ft ²]	Depth range [ft]		Volume [bbls]	
			from	to	partial	total
444.0	59.5	11126	444.0	444.5	991	991
445.0	73.1	16767	444.5	447.5	8959	9949
450.0	64.4	13044	447.5	451.0	8131	18080
452.0	59.5	11122	451.0	453.0	3962	22042
454.0	56.2	9918	453.0	455.0	3533	25575
456.0	51.9	8454	455.0	457.0	3011	28586
458.0	58.7	10833	457.0	459.0	3859	32445
460.0	56.1	9902	459.0	461.0	3527	35972
462.0	56.3	9946	461.0	463.0	3543	39514
464.0	49.0	7538	463.0	464.5	2014	41528
465.0	46.8	6891	464.5	465.5	1227	42756
466.0	44.8	6304	465.5	466.5	1123	43878
467.0	43.0	5799	466.5	467.5	1033	44911
468.0	40.6	5178	467.5	468.5	922	45833
469.0	37.0	4303	468.5	469.5	766	46600
470.0	32.6	3339	469.5	470.5	595	47195
471.0	27.1	2313	470.5	471.5	412	47606
472.0	18.8	1107	471.5	472.5	197	47804
473.0	8.3	216	472.5	473.0	19	47823

Eugenie #1

TOTAL VOLUME

08/30/2007



073055 08/30/2007

CavViewII© SOCON, Germany



Total volume = 47822.9 bbls



Table of volumes (foot by foot)

Job-No.: 073055, Name: Eugenie #1, Date: 08/30/2007

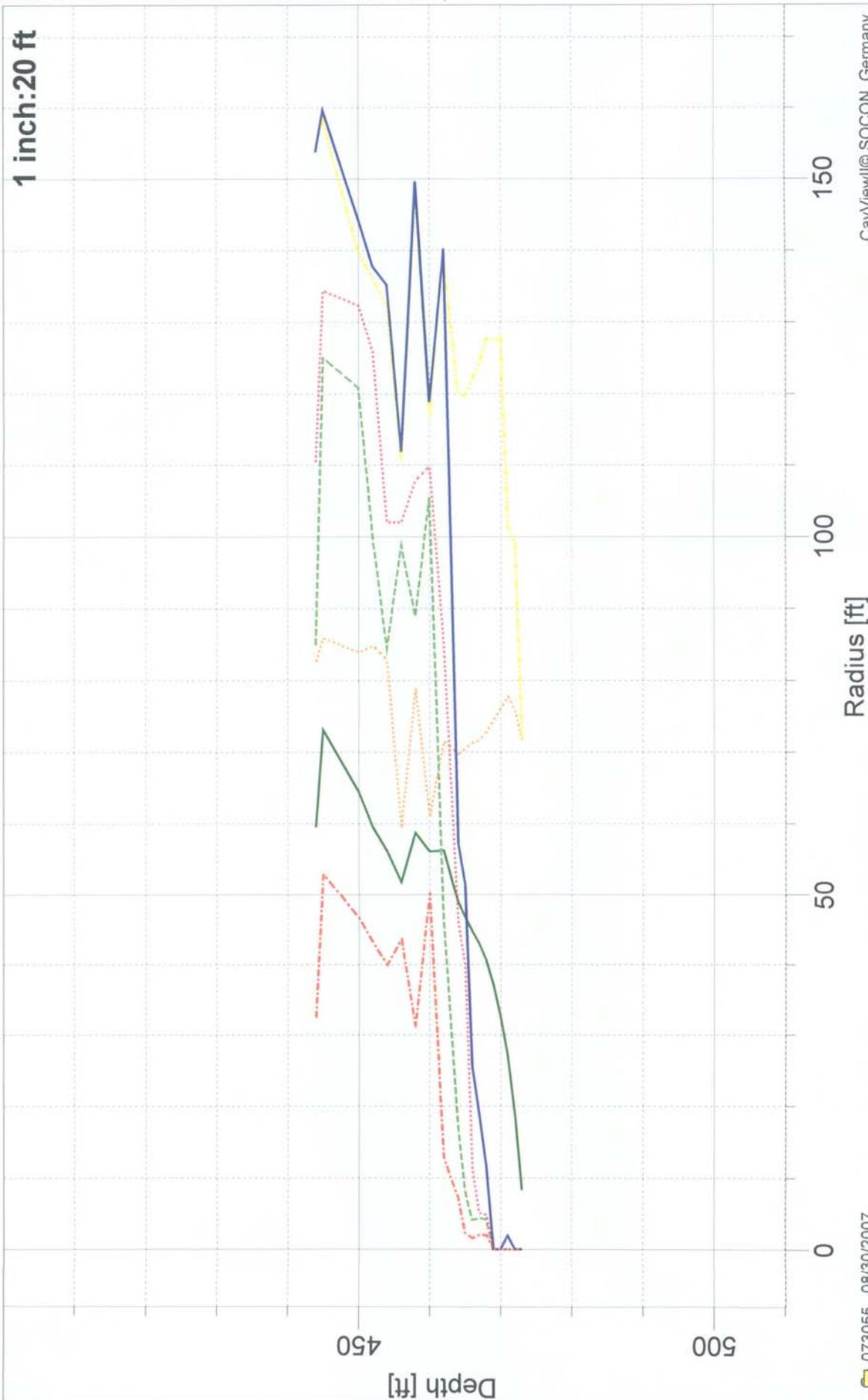
depth [ft]	volume [bbls]								
								444	0
445	2484	446	5470	447	8456	448	11111	449	13434
450	15757	451	18080	452	20061	453	22042	454	23808
455	25575	456	27081	457	28586	458	30516	459	32445
460	34208	461	35972	462	37743	463	39514	464	40857
465	42142	466	43317	467	44395	468	45372	469	46217
470	46897	471	47400	472	47705	473	47823		

Eugenie #1

RADII / DIAMETERS

08/30/2007

1 inch:20 ft



073055 08/30/2007

Average radius
Minimum diameter
Largest perpendicular extension

Minimum radius
Maximum diameter

Maximum radius
Largest extension

CavView© SOCON, Germany



SOCON Sonar Well Services, Inc.

Table of radii and diameters

Cavern: Eugenie #1

073055

08/30/2007

Depth [ft]	Radius [MIN]		Radius [MAX]		Diameter [MIN]		[MAX]	
	[ft]	[°]	[ft]	[°]	[ft]	[°]	[ft]	[°]
444.0	32.5	113	82.6	180	84.9	113 <-> 293	154.6	0 <-> 180
445.0	53.0	72	85.9	181	125.0	76 <-> 256	158.1	1 <-> 181
450.0	46.7	6	83.9	191	120.8	126 <-> 306	139.7	171 <-> 351
452.0	43.2	332	84.9	197	100.0	27 <-> 207	136.1	12 <-> 192
454.0	40.0	31	82.9	196	84.4	26 <-> 206	132.5	16 <-> 196
456.0	43.6	350	59.4	270	98.8	44 <-> 224	110.6	90 <-> 270
458.0	31.1	335	78.9	305	88.9	155 <-> 335	148.1	125 <-> 305
460.0	50.4	33	61.0	263	105.5	33 <-> 213	117.2	83 <-> 263
462.0	12.8	36	71.5	96	46.8	36 <-> 216	139.5	86 <-> 266
464.0	7.2	203	69.7	270	17.5	25 <-> 205	120.1	75 <-> 255
465.0	2.3	34	70.5	270	8.3	14 <-> 194	119.6	0 <-> 180
466.0	1.6	190	71.3	270	4.1	95 <-> 275	121.9	0 <-> 180
467.0	2.0	102	71.7	270	4.3	98 <-> 278	124.2	15 <-> 195
468.0	2.0	100	72.8	240	4.2	98 <-> 278	127.7	15 <-> 195
469.0	0.0	1	74.5	240	0.0	1 <-> 181	127.5	0 <-> 180
470.0	0.0	1	76.1	240	0.0	1 <-> 181	127.8	0 <-> 180
471.0	0.0	1	77.8	240	0.0	1 <-> 181	101.4	120 <-> 300
472.0	0.0	1	75.7	240	0.0	1 <-> 181	99.3	120 <-> 300
473.0	0.0	0	71.7	300	0.0	1 <-> 181	71.7	120 <-> 300



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Table of radii in N-E-S-W-NE-SE-SW-NW presentation

Cavern: Eugenie #1

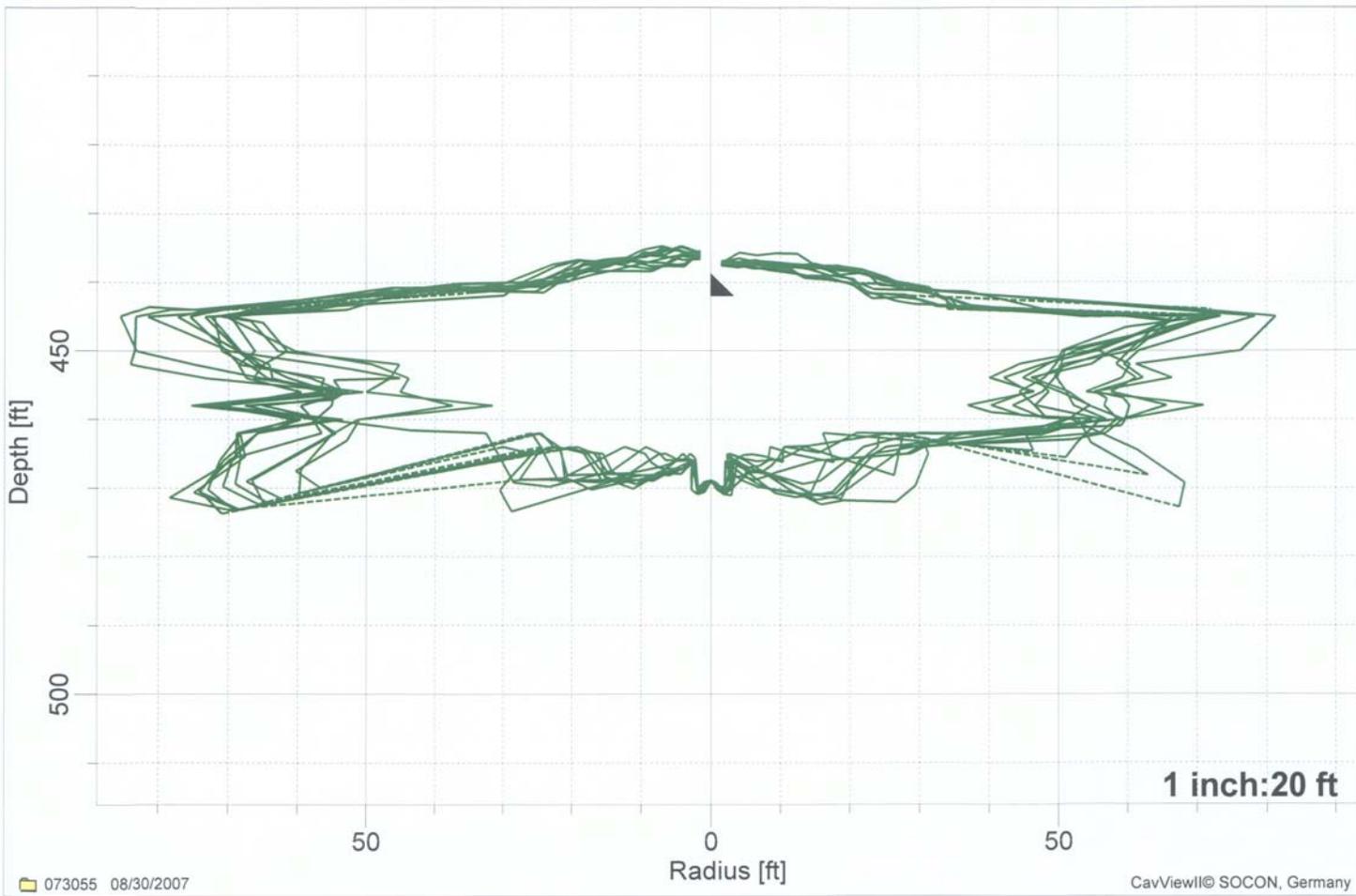
073055

08/30/2007

Depth [ft]	<R> [ft]	N [ft]	E [ft]	S [ft]	W [ft]	NE [ft]	SE [ft]	SW [ft]	NW [ft]
444.0	59.5	72.0	42.7	82.6	60.0	35.7	46.7	73.0	63.3
445.0	73.1	72.1	59.5	85.5	69.7	61.7	72.6	77.3	69.6
450.0	64.4	50.6	60.8	83.2	66.2	55.7	60.2	68.6	61.5
452.0	59.5	49.6	50.7	74.9	68.6	47.9	58.3	67.9	65.0
454.0	56.2	48.0	49.7	69.1	67.4	42.1	61.2	58.0	66.4
456.0	51.9	44.3	51.1	54.7	59.4	45.7	57.6	53.1	50.5
458.0	58.7	46.5	52.1	55.1	71.3	40.3	65.6	67.6	72.2
460.0	56.1	51.7	56.9	57.4	59.6	54.8	59.1	57.8	53.5
462.0	56.3	56.1	70.3	54.9	68.2	48.4	36.9	56.5	68.7
464.0	49.0	60.4	25.3	56.6	69.7	17.2	29.3	63.5	68.4
465.0	46.8	62.1	23.6	57.5	70.5	10.3	23.6	67.0	68.3
466.0	44.8	63.6	22.6	58.4	71.3	10.3	21.3	69.9	68.3
467.0	43.0	65.0	21.7	59.2	71.7	3.2	20.9	70.9	68.5
468.0	40.6	66.4	20.7	59.6	72.1	3.1	20.4	71.8	68.7
469.0	37.0	67.9	19.7	59.7	72.5	2.9	19.9	72.8	68.9
470.0	32.6	68.0	18.8	59.7	72.9	2.8	19.5	73.8	68.0
471.0	27.1	67.8	0.0	30.1	72.0	0.0	19.0	73.2	66.3
472.0	18.8	67.6	0.0	29.5	70.7	0.0	0.0	70.9	64.6
473.0	8.3	0.0	0.0	28.9	69.5	0.0	0.0	68.6	0.0



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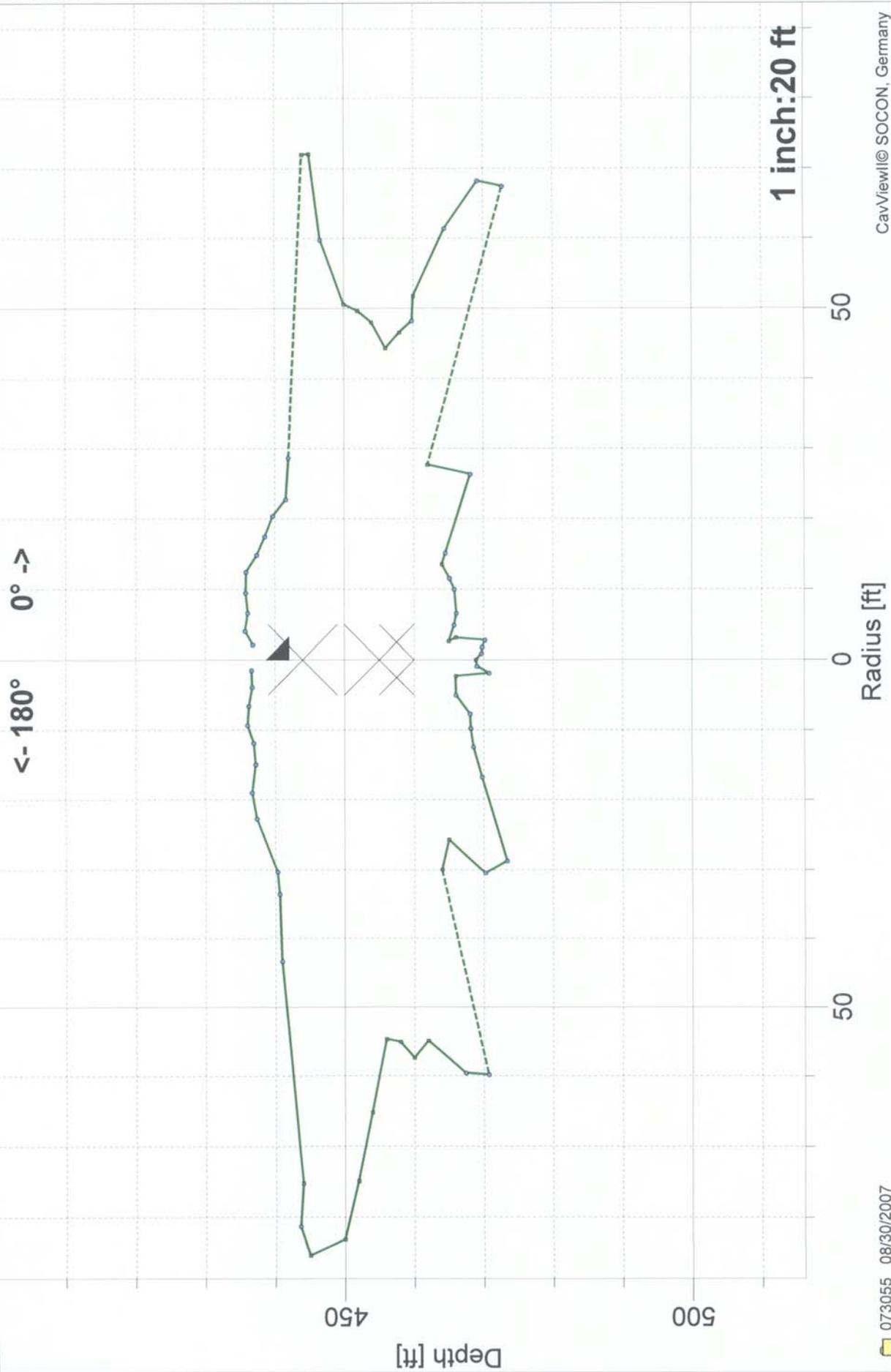
5 1/2" : 442.0 ft



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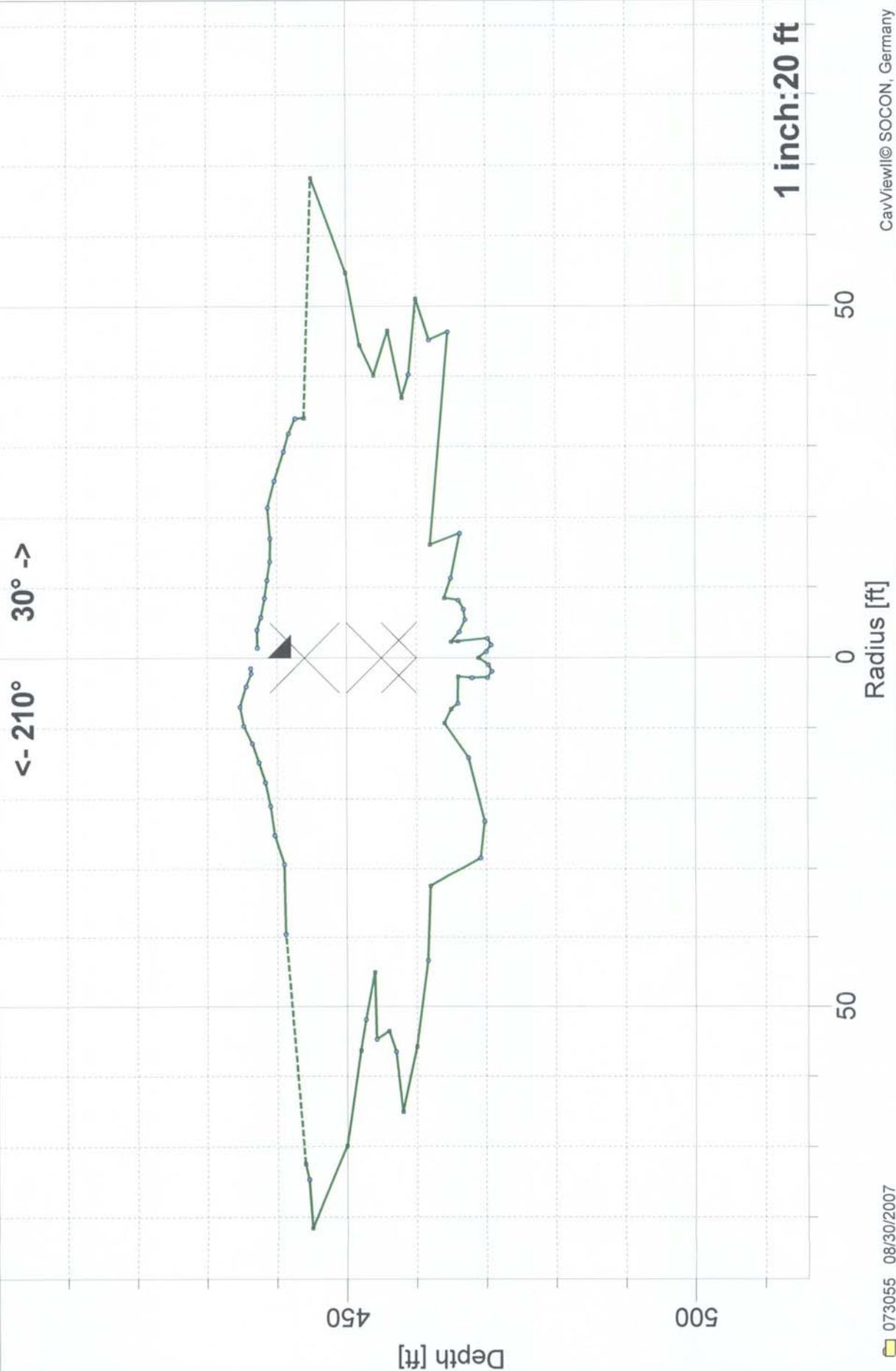
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Eugenie #1



08/30/2007

Eugenie #1



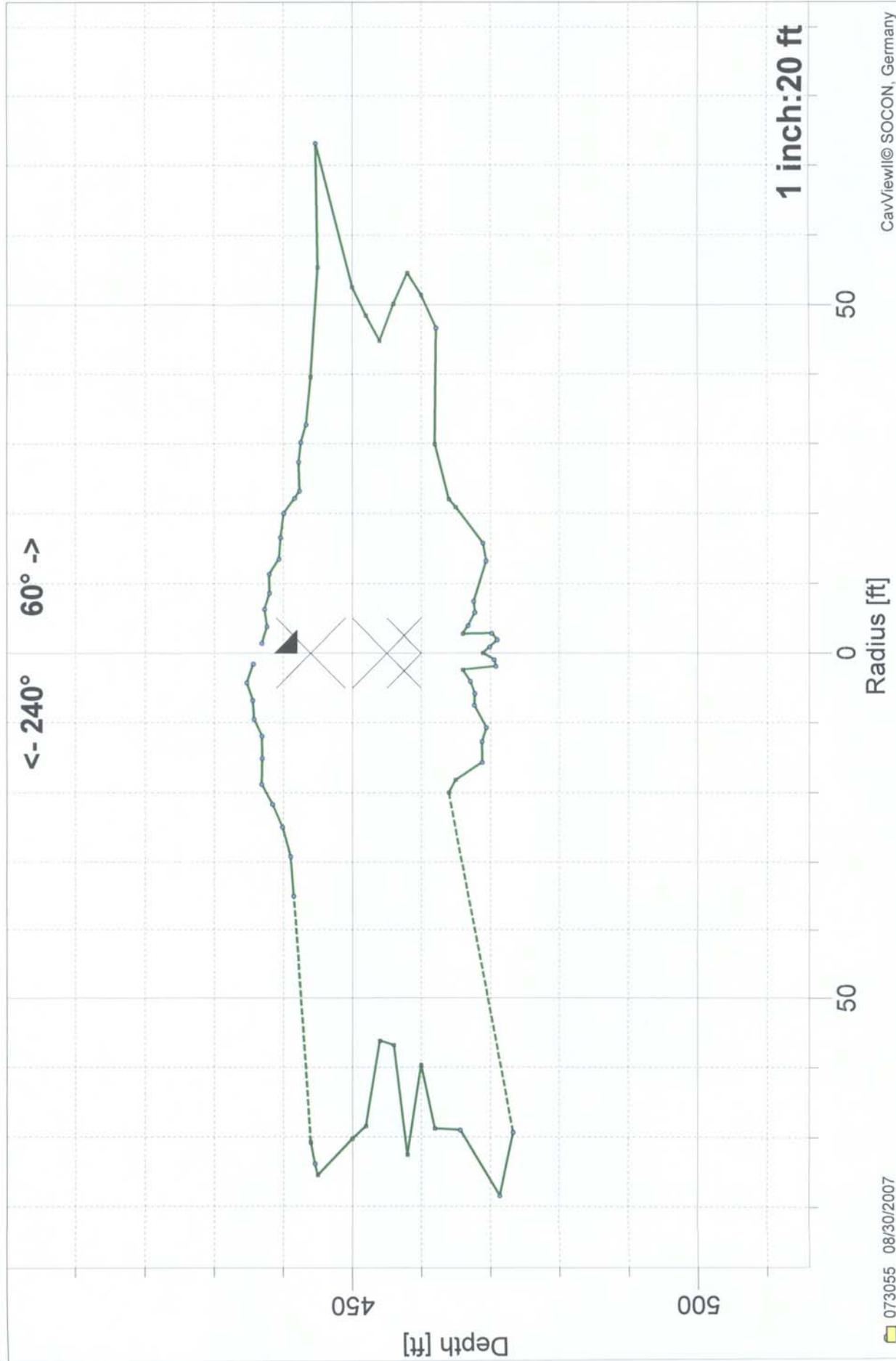
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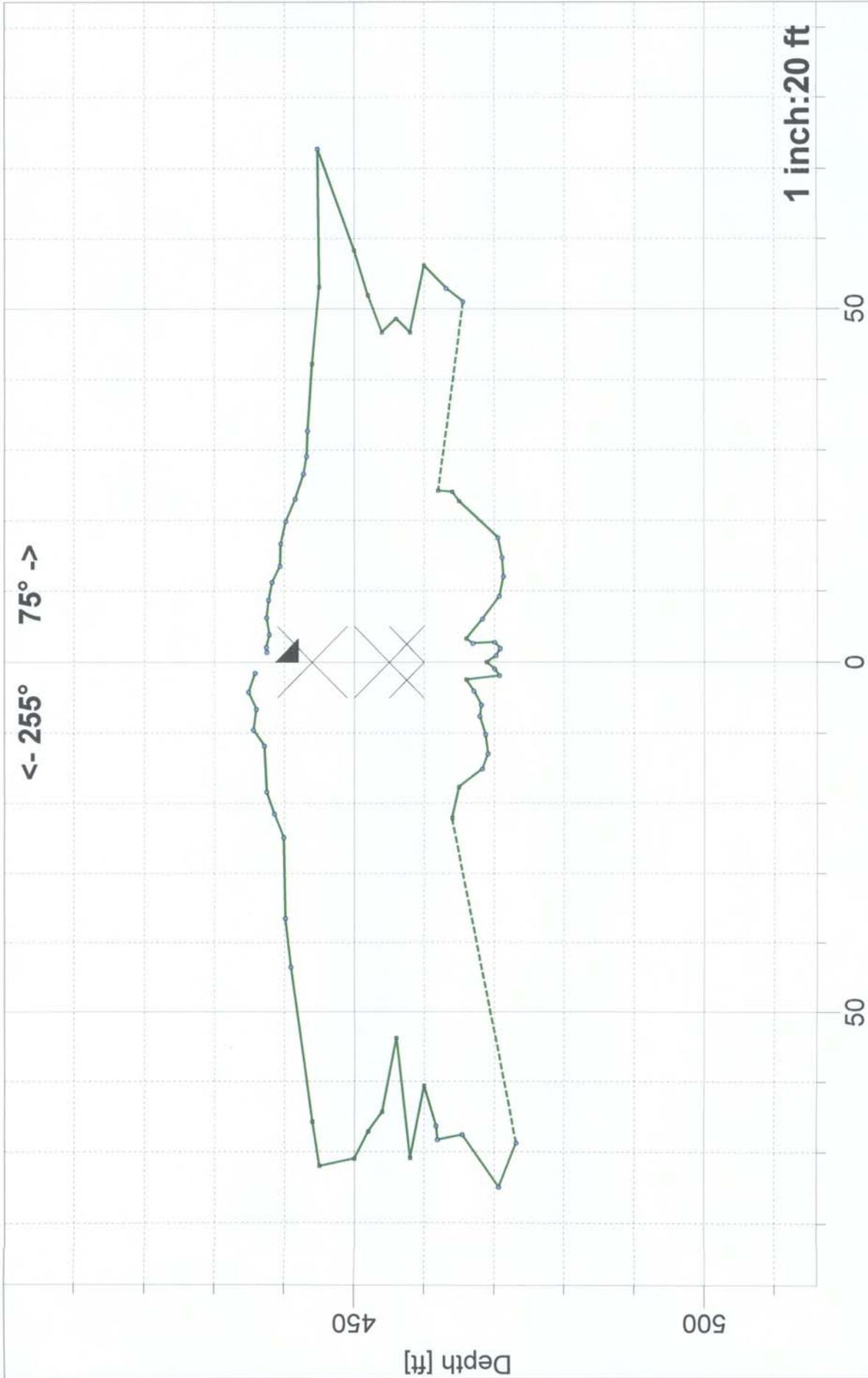
Eugenie #1



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Eugenie #1

<- 255° 75° ->



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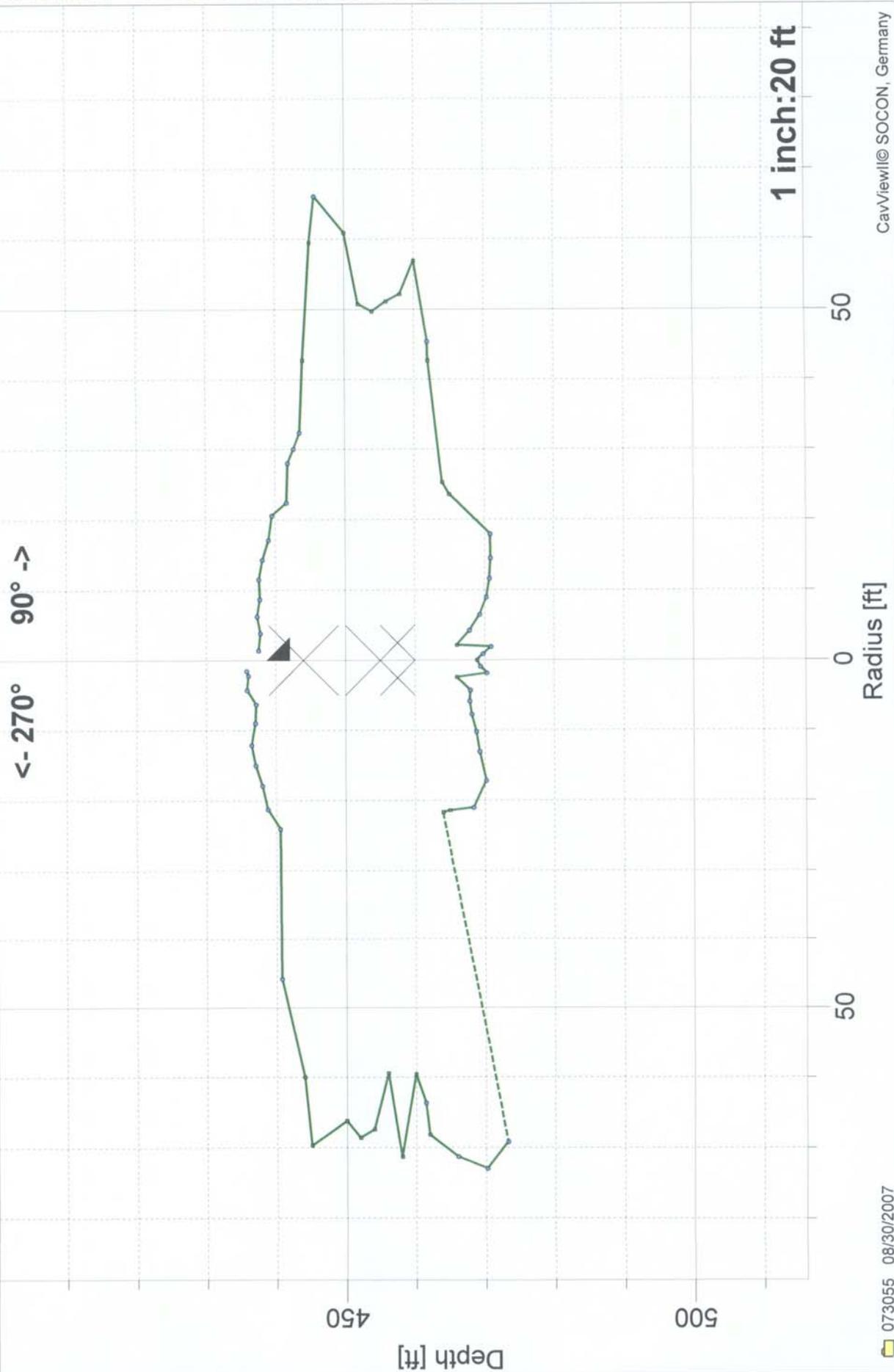
5 1/2" : 442.0 ft Tilting position



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5 1/2" : 442.0 ft

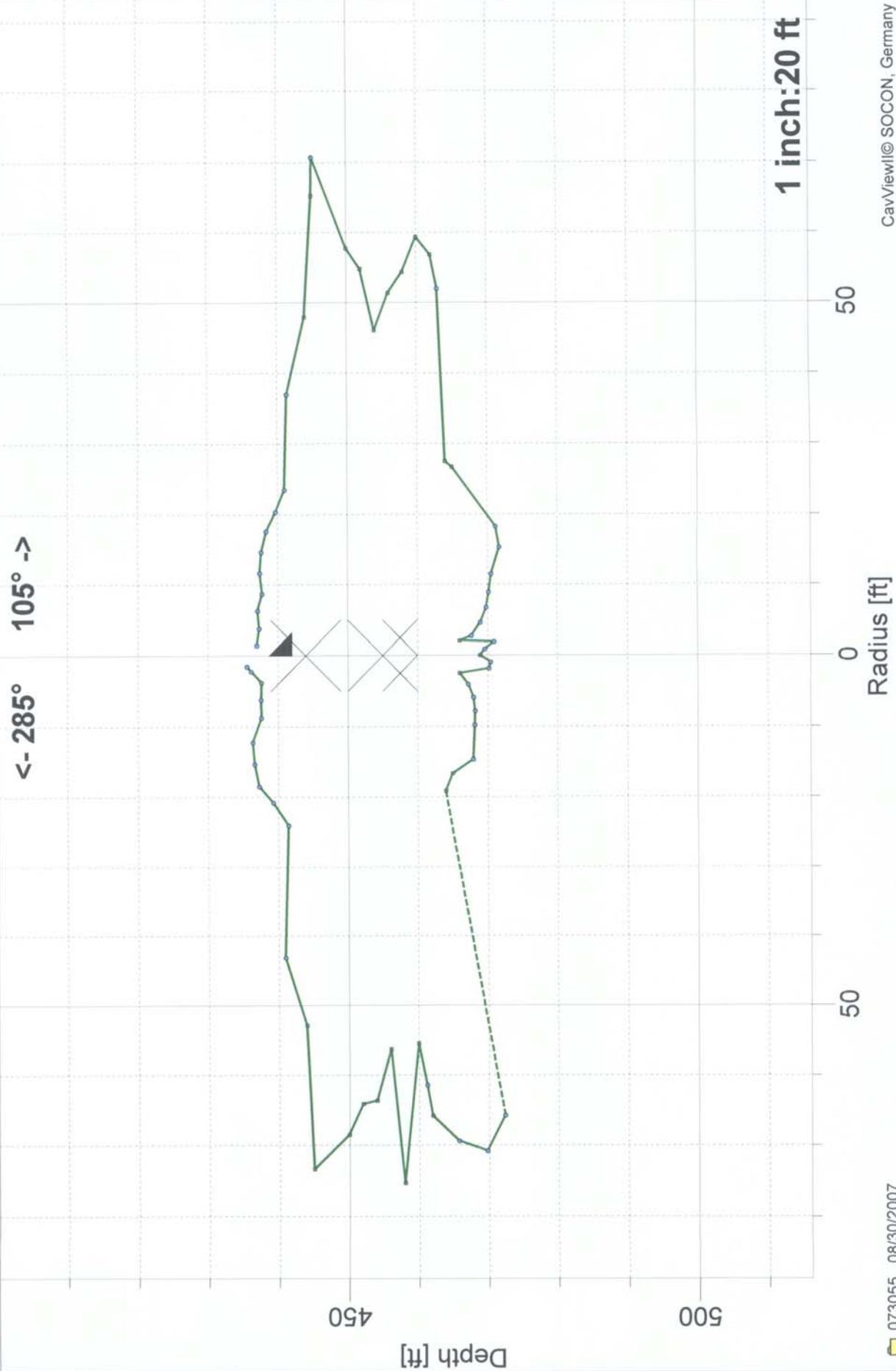
Tiling position



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Eugenie #1



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Tilting position

5 1/2" : 442.0 ft

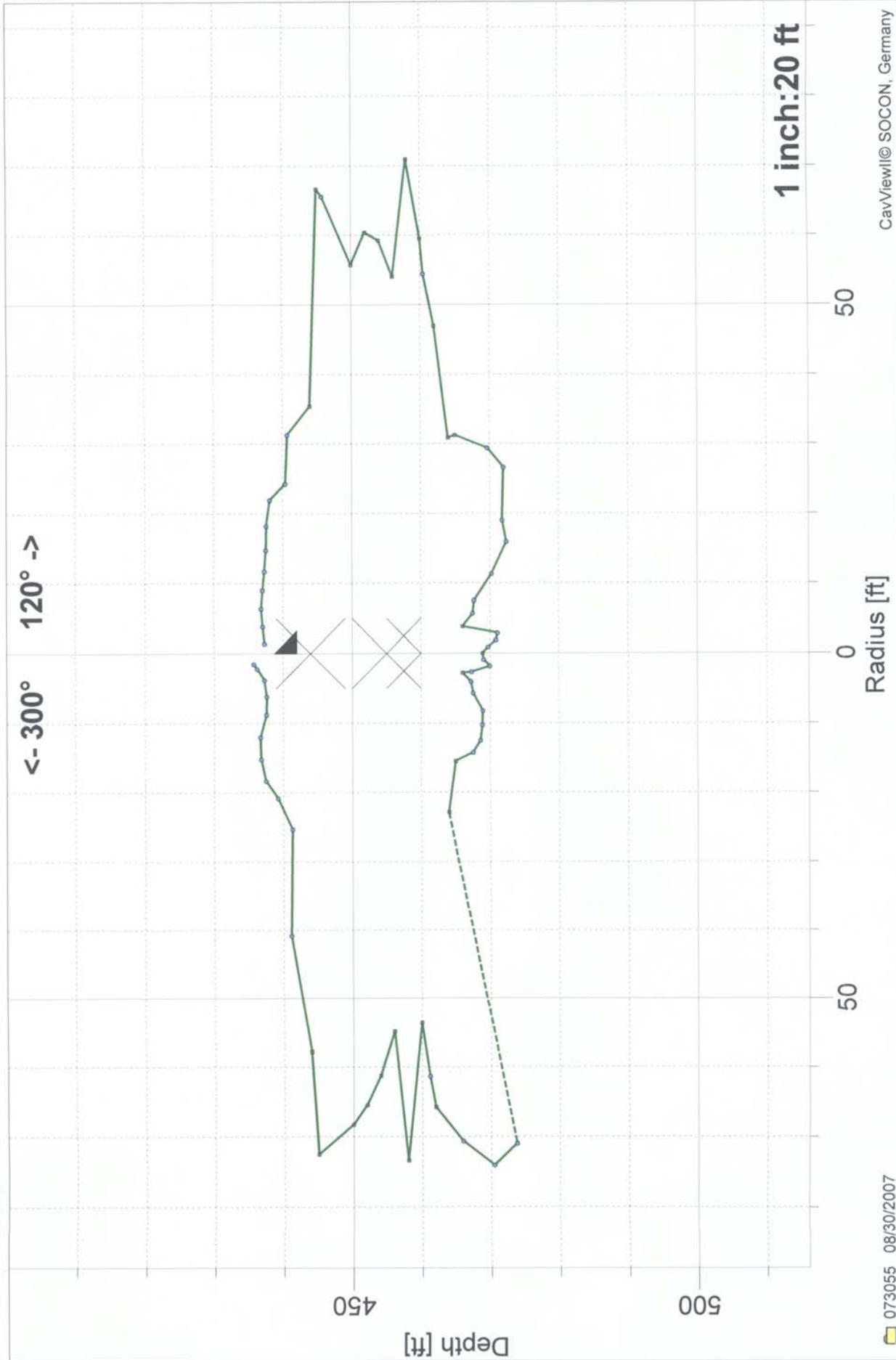
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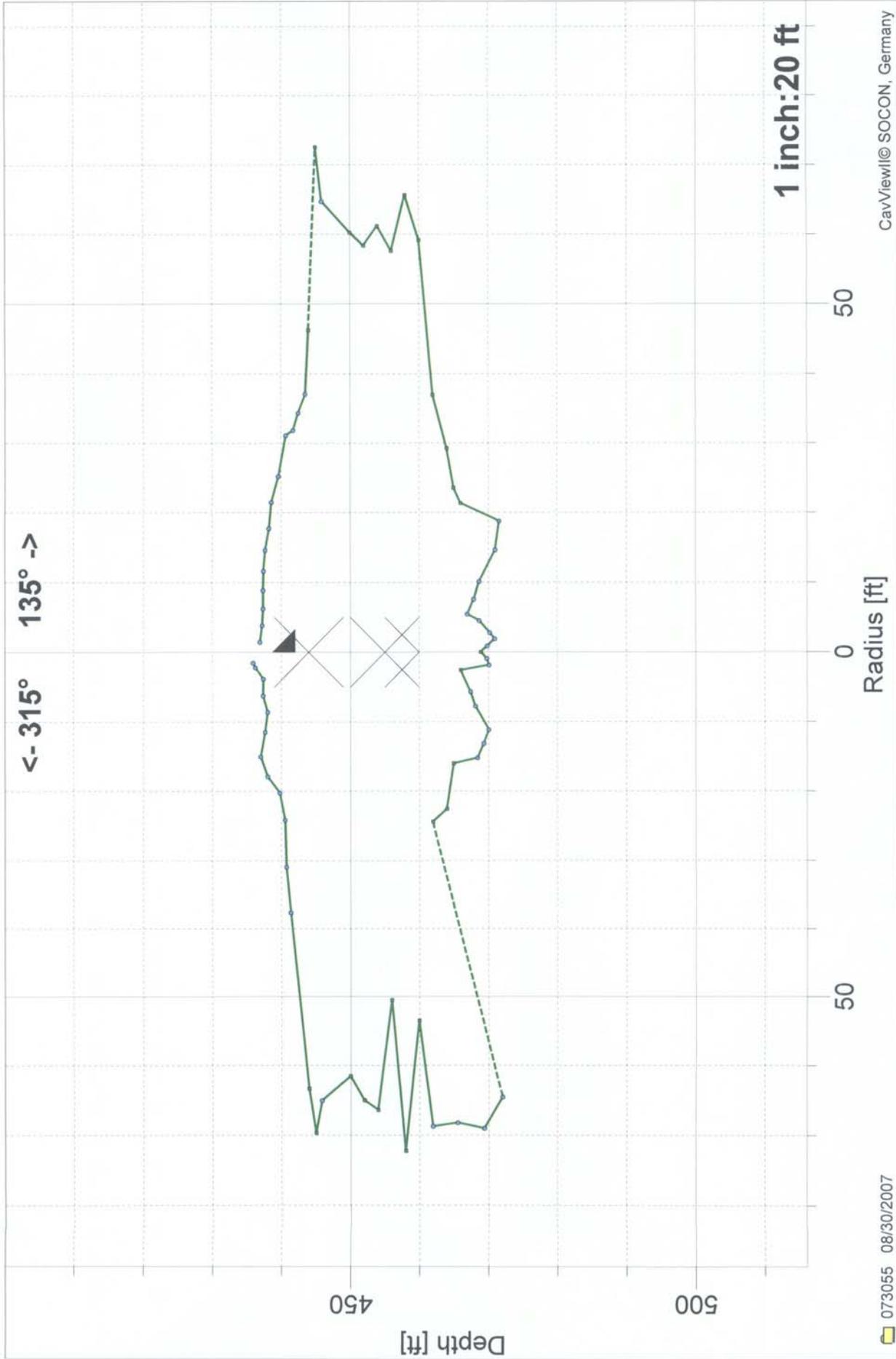


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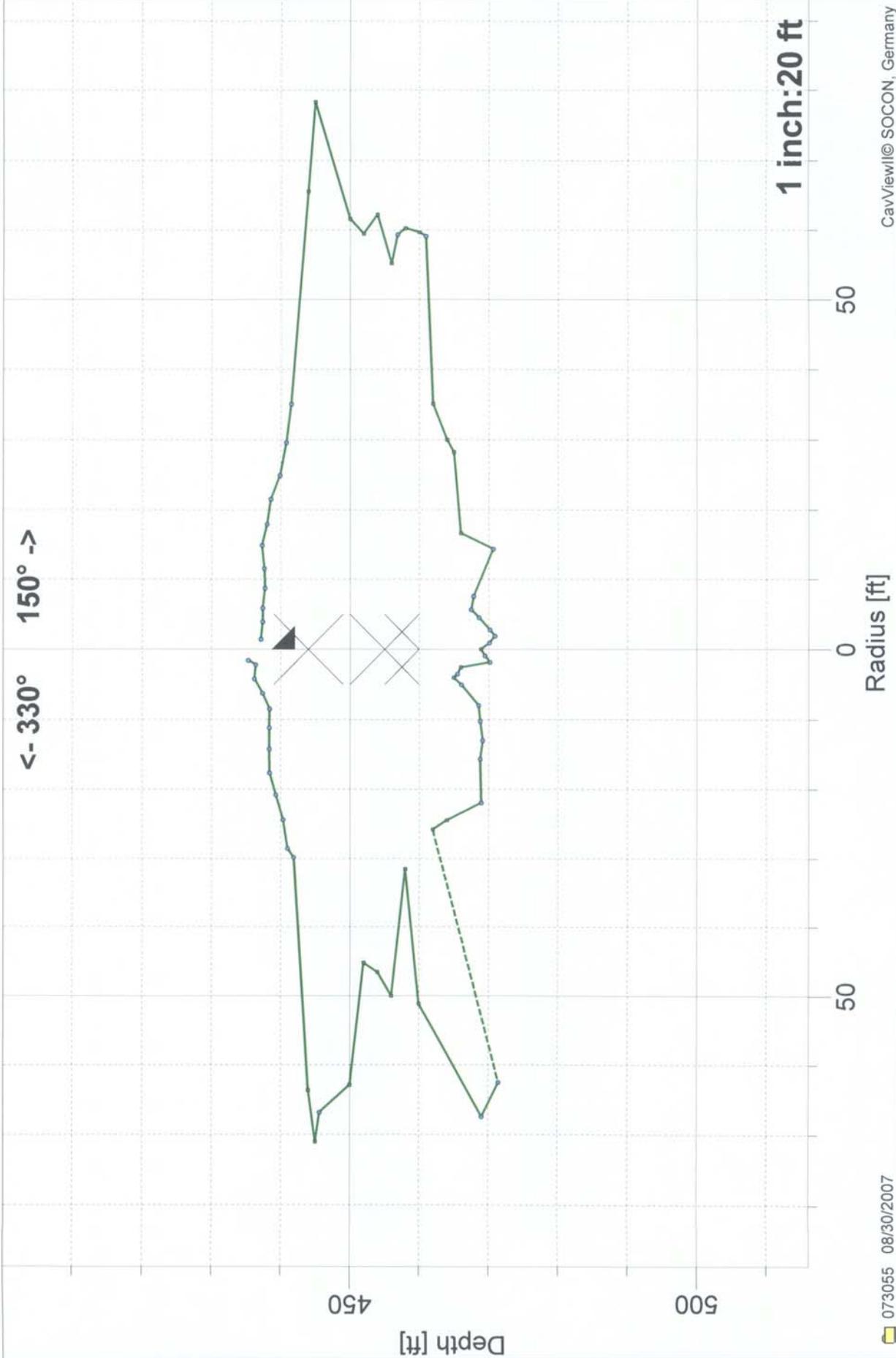
Eugenie #1

<- 315° 135° ->



08/30/2007

Eugenie #1

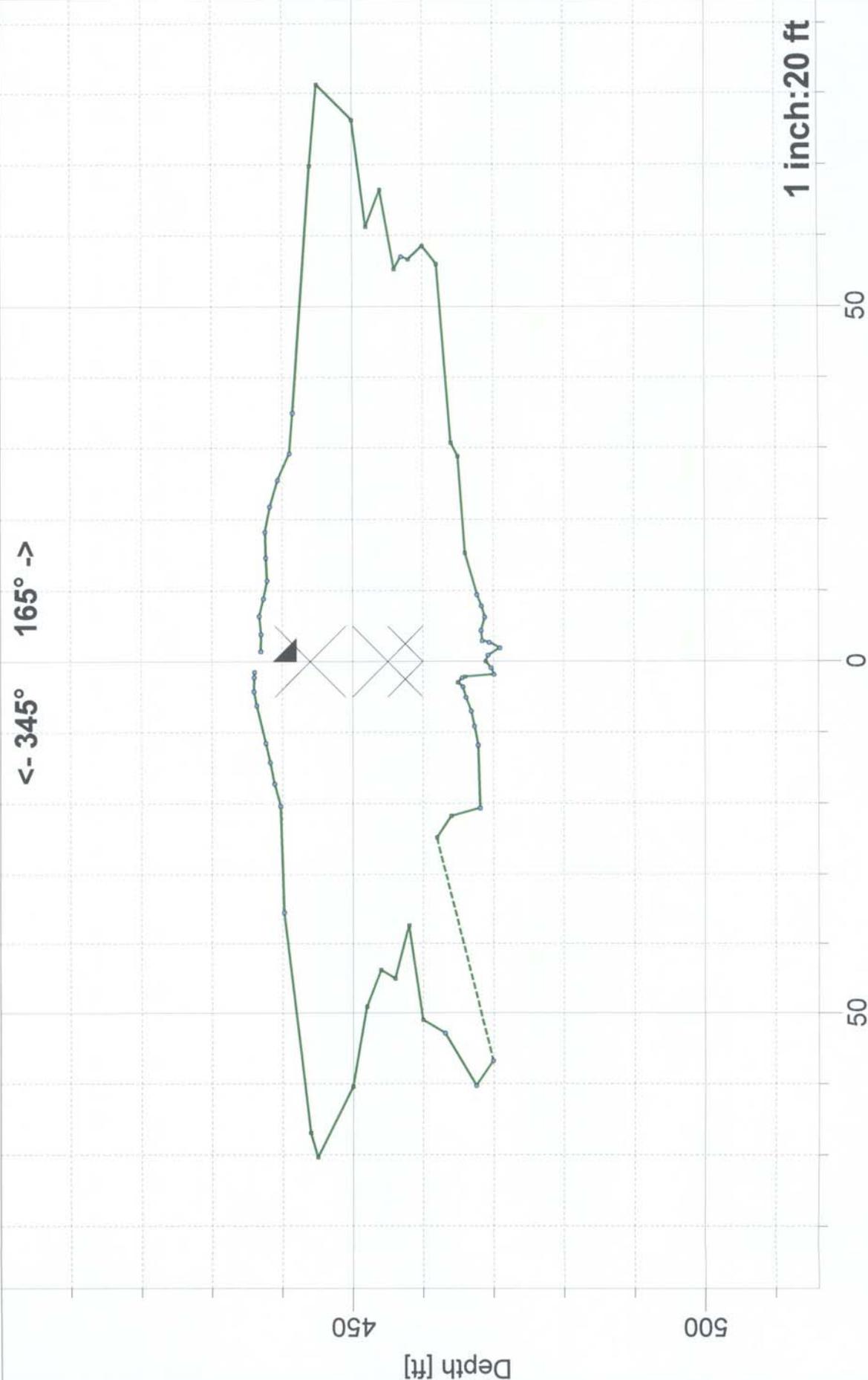




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Eugenie #1



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5 1/2" : 442.0 ft
Tilting position



HORIZONTAL SECTIONS

Cavern: Eugenie #1

Report No.: 073055

Utilized speed of sound: 1810.0 m/s (5938.3 ft/s)

Measuring date: 08/30/2007

Scale: 1: 50

Horizontal sections measured at following depths:

444.0 ft	445.0 ft	450.0 ft	452.0 ft	454.0 ft	456.0 ft	458.0 ft
460.0 ft	462.0 ft	464.0 ft	465.0 ft	466.0 ft		

The following 7 sections are constructed:

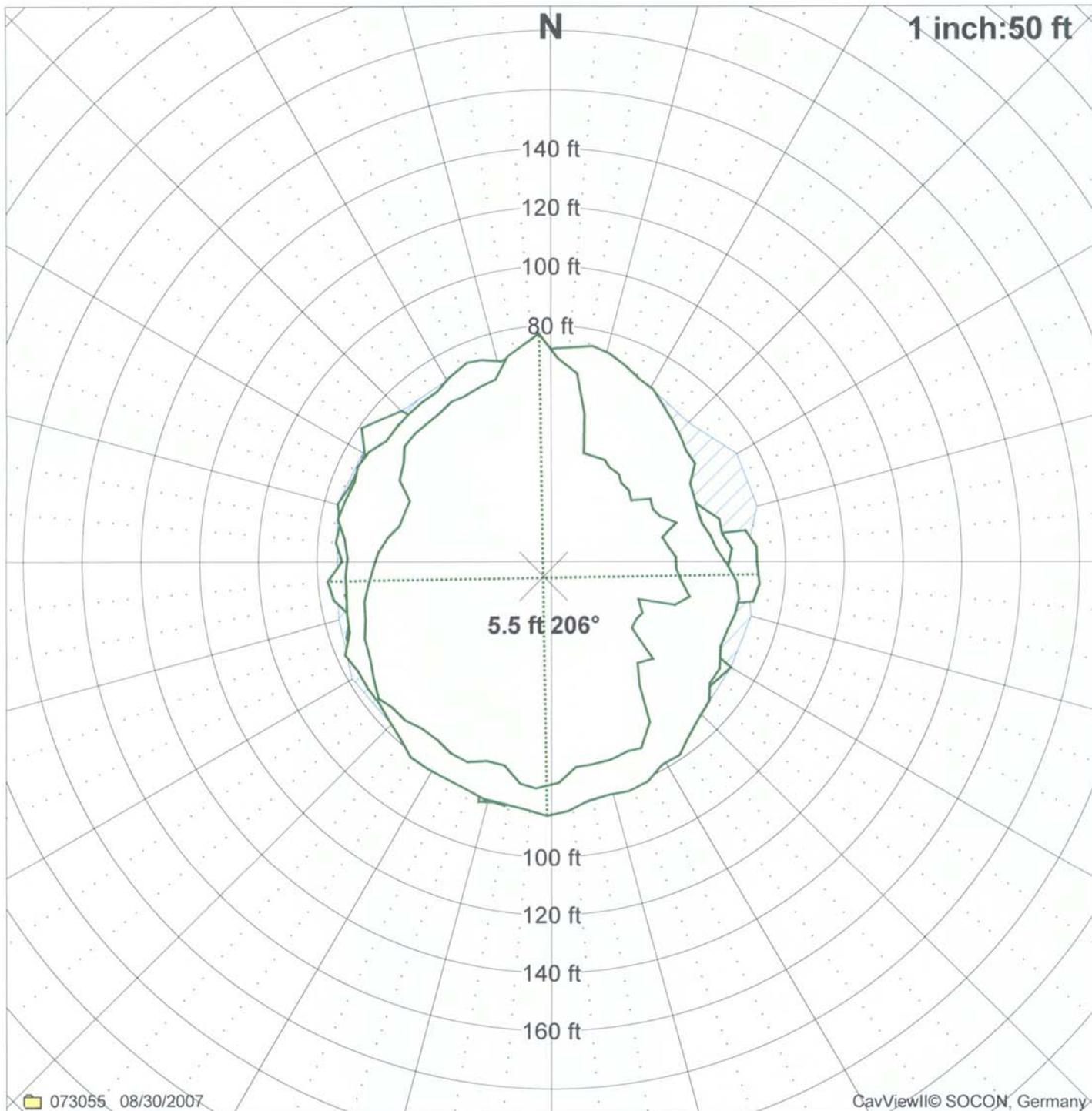
467.0 ft	468.0 ft	469.0 ft	470.0 ft	471.0 ft	472.0 ft	473.0 ft
----------	----------	----------	----------	----------	----------	----------

Eugenie #1

MAXPLOT

08/30/2007

1 inch:50 ft



073055 08/30/2007

CavViewII© SOCON, Germany

Vertical maximum plot

Horizontal sections

..... a/b

Center of gravity

d_{max} : 161.9 ft 177° <--> 357° r_{min} : 66.5 ft -> 43° r_{\sim} : 74.8 ft r_{max} : 85.9 ft -> 181°

a/b = 1.109 a = 163.0 ft (181°-357°) b = 147.0 ft (93°-265°)

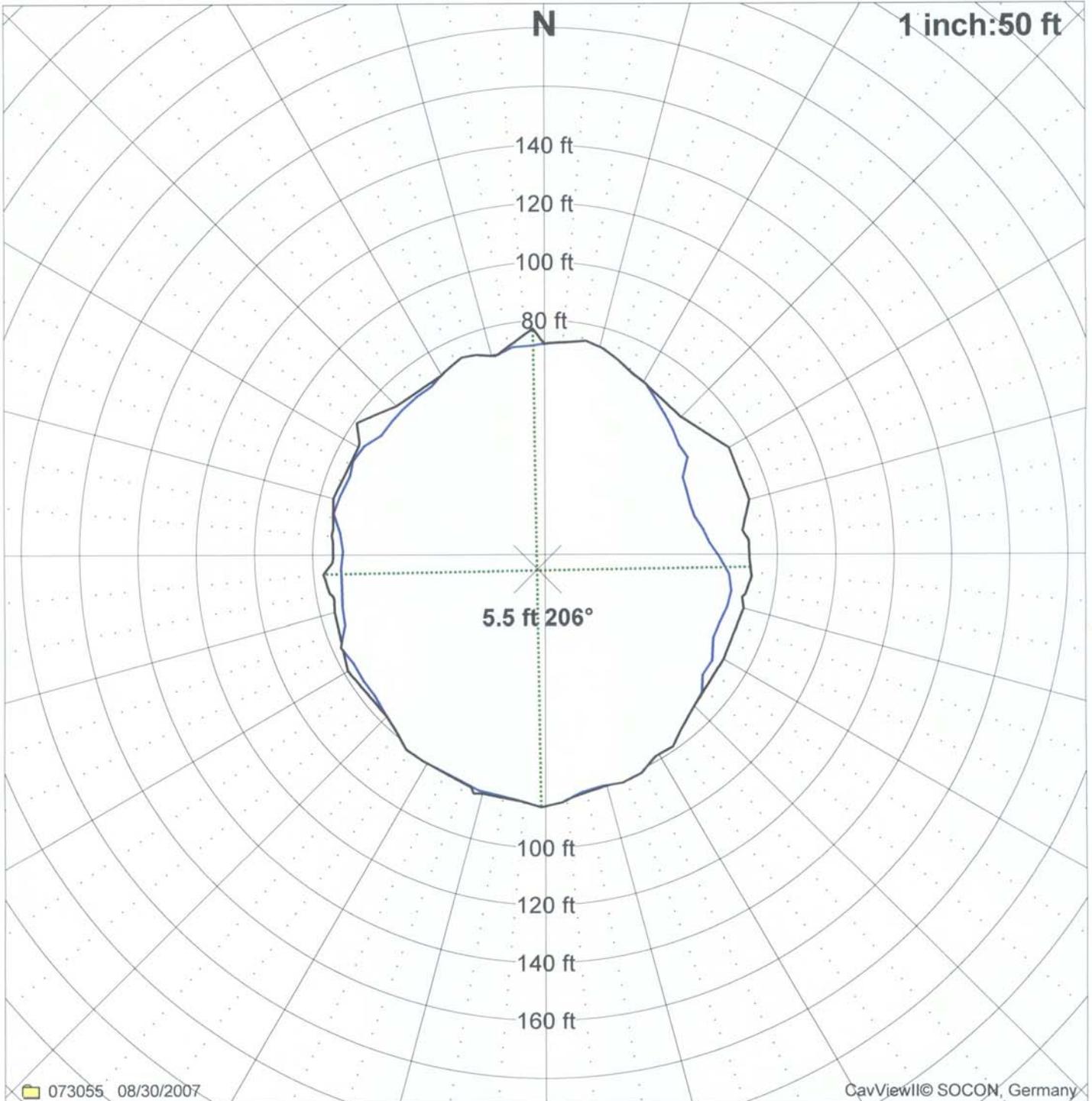
Area from vertical sections: 17217 ft², Area from horizontal and vertical sections: 17559 ft²

Eugenie #1

MAXPLOT

08/30/2007

1 inch:50 ft



..... a/b

⊗ Center of gravity

□ Horizontal/vertical maximum plot

▭ Largest single area

d_{max} : 161.9 ft 177° <--> 357° r_{min} : 66.5 ft -> 43° r_{\sim} : 74.8 ft r_{max} : 85.9 ft -> 181°

$a/b = 1.109$ $a = 163.0$ ft (181°-357°) $b = 147.0$ ft (93°-265°)

Largest single area: 16767 ft² in depth: 445.0 ft, Area from horizontal and vertical sections: 17559 ft²

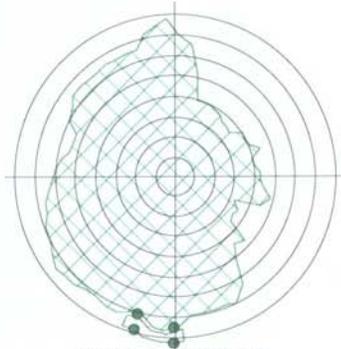


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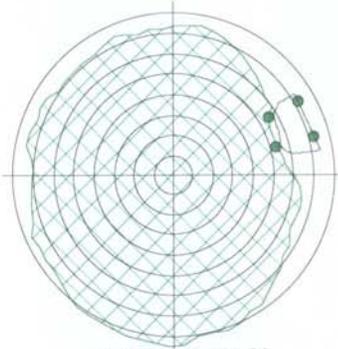
Horizontal slices 1 - 12



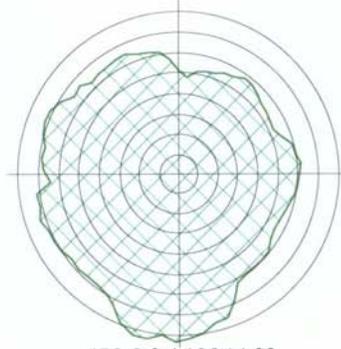
Cavity: Eugenie #1 Report number: 073055 Date: 08/30/2007



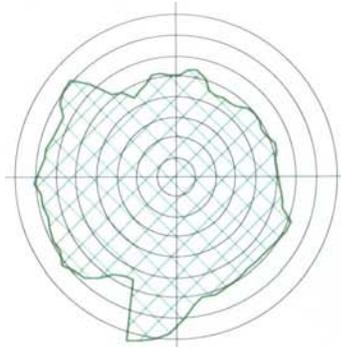
444.0 ft / 10820 ft²



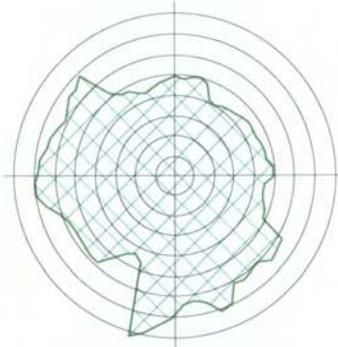
445.0 ft / 16175 ft²



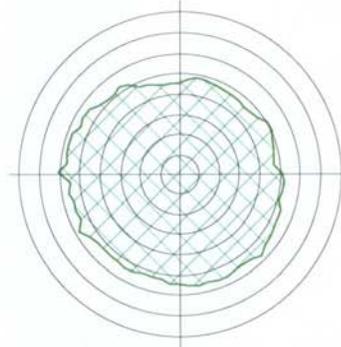
450.0 ft / 13044 ft²



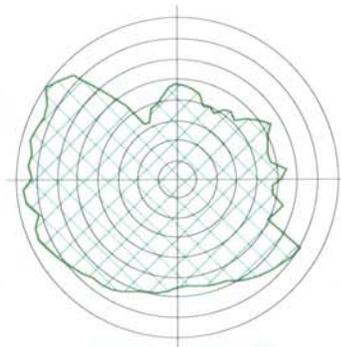
452.0 ft / 11122 ft²



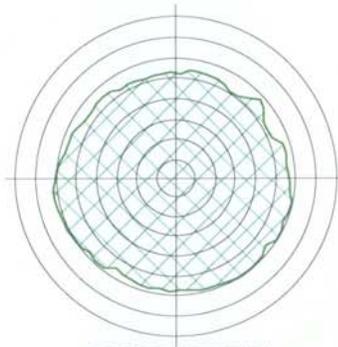
454.0 ft / 9918 ft²



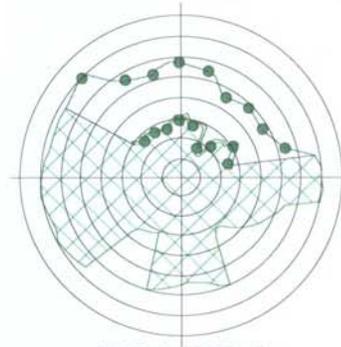
456.0 ft / 8454 ft²



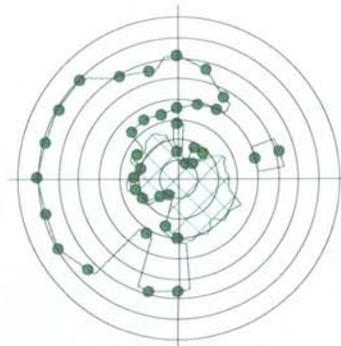
458.0 ft / 10833 ft²



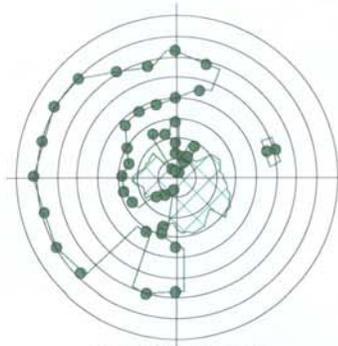
460.0 ft / 9902 ft²



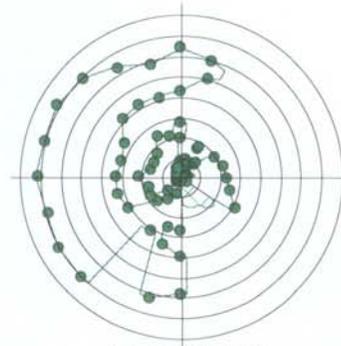
462.0 ft / 7260 ft²



464.0 ft / 1563 ft²



465.0 ft / 1086 ft²



466.0 ft / 168 ft²

The distance between 2 circles equals 10 ft

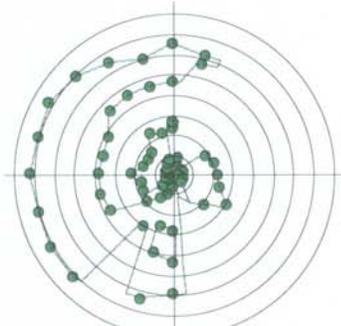


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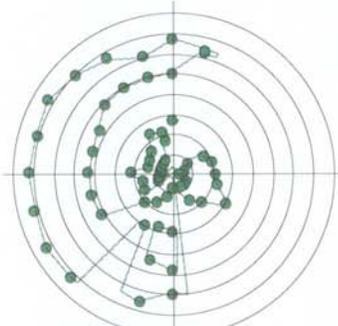
Horizontal slices 13 - 19



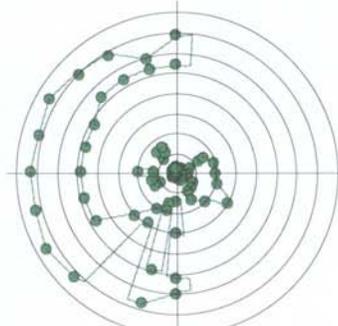
Cavity: Eugenie #1 Report number: 073055 Date: 08/30/2007



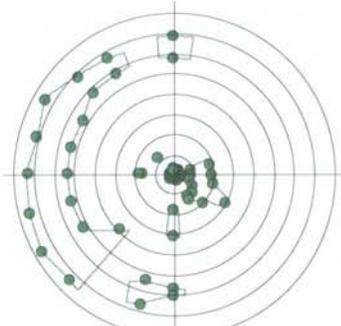
467.0 ft / 69 ft²



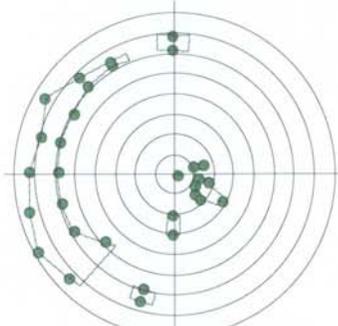
468.0 ft / 32 ft²



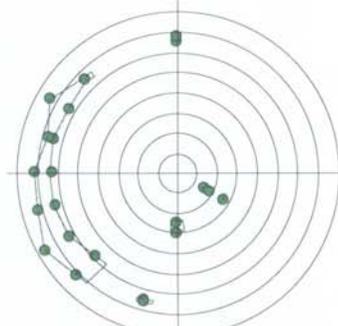
469.0 ft / 0 ft²



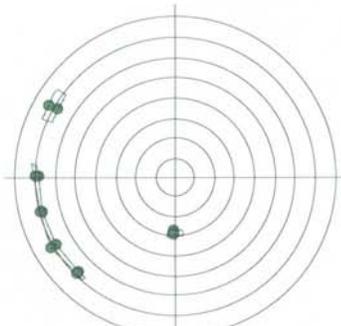
470.0 ft / 0 ft²



471.0 ft / 11 ft²



472.0 ft / 0 ft²



473.0 ft / 0 ft²

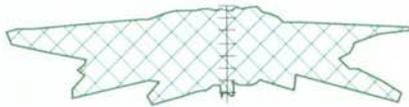


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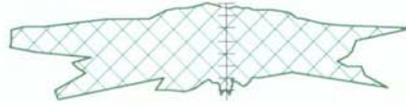
Vertical slices 1 - 12



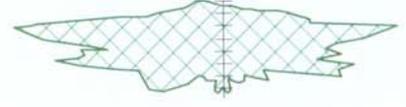
Cavity: Eugenie #1 Report number: 073055 Date: 08/30/2007



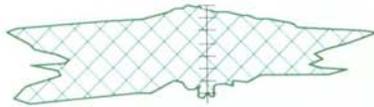
180° 0°



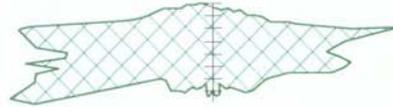
195° 15°



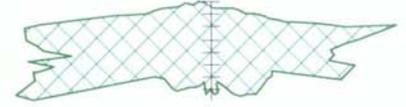
210° 30°



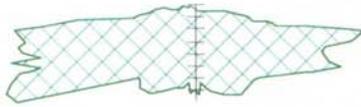
225° 45°



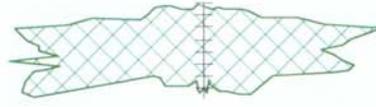
240° 60°



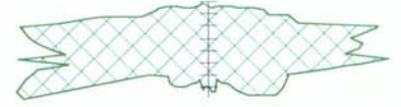
255° 75°



270° 90°



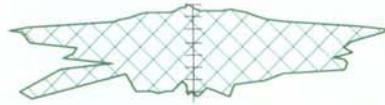
285° 105°



300° 120°



315° 135°



330° 150°



345° 165°

Range from 434 ft to 473 ft, step 5 ft



Weather: CARLSBAD, NM | Now: 79°F | High: 101°F | Low: 71°F | 5-Day Forecast

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Monitor readings prompt group to re-cap well

By Reid Wright
Current-Argus Staff Writer

Posted: 07/13/2010 09:11:42 PM MDT

CARLSBAD — After some perplexing monitoring readings, workers decided to temporarily re-cap the I&W brine well with a blowout protector after re-drilling the well over the weekend.

"We saw some things that made us uneasy," said Don Purvis, co-chair of the Brine Well Working Group Technical Subcommittee. "We just want to make sure we really understand what is happening."

The subcommittee opted to take a two-week hiatus and keep the well sealed until the situation is better understood.

The subcommittee had initially planned to drill into the lower segment of the cavern and conduct a sonar study of the entire cavern to determine its size and shape. However, after drilling into the cavern and conducting a sonar study of the upper portion Saturday, workers decided to err on the side of safety and withdraw after surface tilt meters began to show movement as brine was released from the well, said Leo Van Sambeek of RESPEC Inc.

Van Sambeek emphasized that after the well was re-capped by the blowout protector, it was rendered just as safe as it was before the concrete sealing the well was re-drilled.

"That cavern is just as secure today as it was last week," he said.

In fact, Van Sambeek said, workers are better off than they were before re-entry because they are now able to get inside the cavity and monitor the pressure of the salt water that fills the cavern.

Although the pressure of the main well changed as salt water was released, pressure of a

shallow monitoring well nearby did not change. This has experts vexed because the two wells had previously paralleled each other in pressure, Van Sambeek said.

The I&W brine well was ordered sealed in concrete in 2008 by the state oil conservation division after two similar wells collapsed in 2008, creating large holes in the desert floor. Re-drilling of the well began Friday.

The well is located at the intersection of U.S. 285 and U.S. 62/180 — commonly referred to as the "South Y."

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ECHO - LOG

I&W Inc.

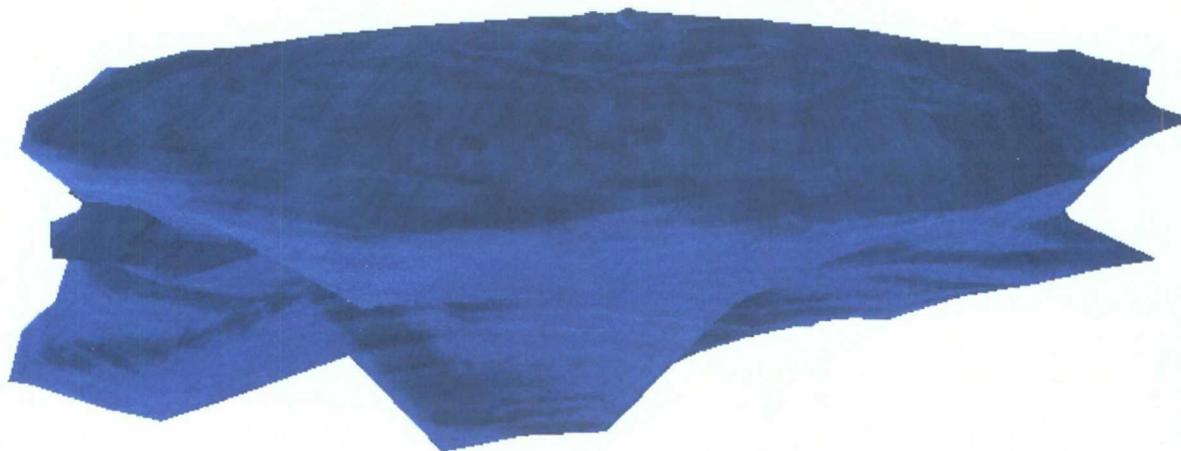
Eugenie #1

Carlsbad, New Mexico

1st. Survey

08/30/2007

073055



SOCON Sonar Well Services, Inc.

11133 I-45 South, Ste. E
Phone (936) 441-5801

Conroe, Texas 77302
Fax (936) 539-6847

e-mail: soconusa@socon.com



SOCON Sonar Well Services, Inc.

Eugenie #1

073055

08/30/2007

Results of the Cavern Survey

By means of Echo-Sounding

In the cavern

Eugenie #1

Date: 08/30/2007

073055

Customer: I&W Inc.

Carlsbad, New Mexico

Responsible for the survey:

Surveyor:	Richard Lawrence
Leadership:	Kevin Wilson
Interpreter:	Gunte Happe
Control:	Richard Lawrence



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

Logs



Summary of results

Well details

All depths are given as:	MD
Datum level for all depths:	BHF
Shoe of the cemented 7"-casing:	442 ft
Reference depth for ECHO-LOG:	442 ft
Depth correction:	-4 ft
Pressure at the well head:	0 psi

Details of survey equipment

Measuring vehicle used:	L 110
Tools used:	Echo tool BSF 39, BSF 39

General details

Number of runs:	1
Measured horizontal sections:	12
Measured tilted sections:	42
Lowest survey depth:	466.0 ft



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 5/15 degree intervals:

Minimum radius:	0.0 ft
Depth:	468.9 ft
Direction:	0°

Maximum radius:	85.5 ft
Depth:	445.0 ft
Direction:	180°

Highest point of cavern:	434.7 ft
Horizontal distance:	4.2 ft
Direction:	240°

Lowest point of cavern:	473.8 ft
Horizontal distance:	71.0 ft
Direction:	300°

Lowest point in the measuring axis:	468.9 ft
-------------------------------------	----------

Determination out of 37 horizontal sections in the depths between 444 ft and 473 ft at 5 degree intervals:

Maximum radius:	85.9 ft
Depth:	445.0 ft
Direction:	181°

Maximum diameter:	158.1 ft
Depth:	445.0 ft
Direction:	1 - 181°

Volume

Volume:	47,823 bbls
---------	-------------

Depth range:	444 ft <--> 473 ft
--------------	--------------------



Interpretation

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

1810.0 m/s (5938.3 ft/s) in brine (measured)

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

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

444.0 ft	445.0 ft	450.0 ft	452.0 ft	454.0 ft	456.0 ft	458.0 ft
460.0 ft	462.0 ft	464.0 ft	465.0 ft	466.0 ft		

The following 7 sections are constructed:

467.0 ft	468.0 ft	469.0 ft	470.0 ft	471.0 ft	472.0 ft	473.0 ft
----------	----------	----------	----------	----------	----------	----------

Tilted sections

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

26 sections of these with upwards-tilted echo-transducer:

Depth / Tilting Angle

444.0 / 4	444.0 / 6	455.0 / 8	455.0 / 72	455.0 / 78	455.0 / 84
460.0 / 3	460.0 / 6	460.0 / 8	460.0 / 12	460.0 / 15	460.0 / 18
460.0 / 21	460.0 / 24	460.0 / 27	460.0 / 30	460.0 / 33	460.0 / 39
460.0 / 45	460.0 / 51	460.0 / 57	460.0 / 63	460.0 / 69	460.0 / 75
460.0 / 81	460.0 / 87				

16 sections of these with downwards-tilted echo-transducer:

Depth / Tilting Angle

444.0 / 2	444.0 / 4	444.0 / 6	455.0 / 12	455.0 / 18	455.0 / 24
455.0 / 30	455.0 / 36	455.0 / 42	455.0 / 48	455.0 / 57	455.0 / 63
455.0 / 75	455.0 / 78	455.0 / 81	455.0 / 84		



Vertical sections

The shape of the cavern was determined by interpretation of all horizontally and tilted measured data and is presented by 12 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.



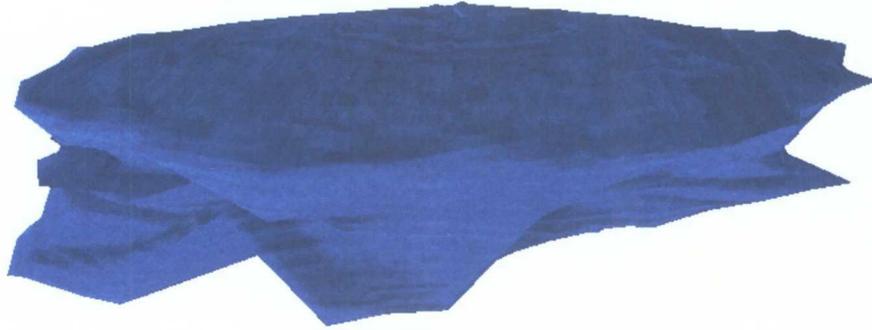
LEGEND

- 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)
- N** Magnetic north determined with compass inside the tool
(Magnetic compass in areas without tubing)
(Fibre gyro compass in areas with tubing)
- (N)** Assumed north direction (for sections in magnetic disturbed surroundings without fibre gyro compass)
- a** Longest extension in section
(Without considering of hidden leached pockets)
- b** Longest extension in section perpendicular to a
(Without considering of hidden leached pockets)
- a/b** Ratio of longest extensions in section which are perpendicular to each other
- (xx m²)** Area in actual section resulting from hidden leached pockets
- r~** Average radius
- ☐ 021835 29.04 2002 Job number and survey date

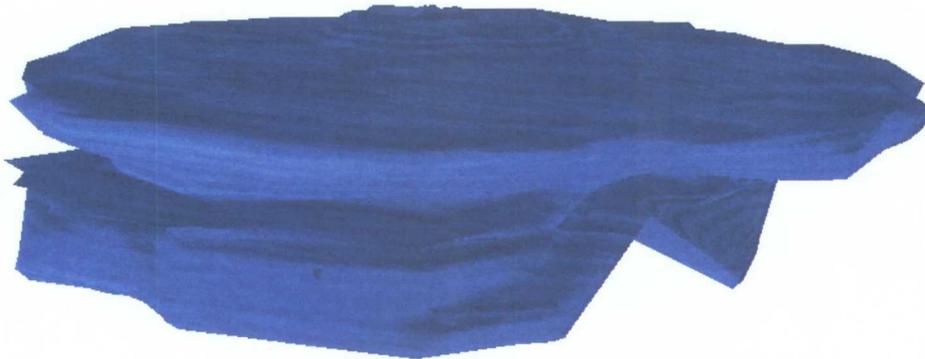
Eugenie #1

073055

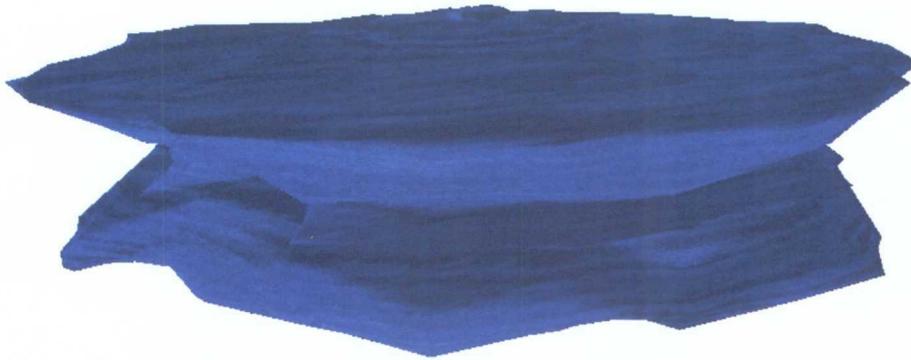
08/30/2007



Eugenie #1 --> 0° <--



Eugenie #1 --> 60° <--



Eugenie #1 --> 120° <--

Eugenie #1

073055

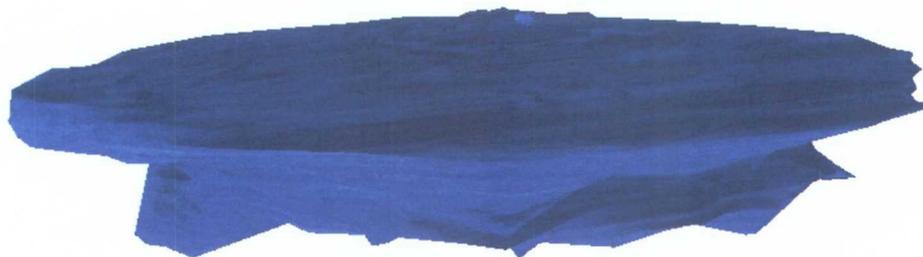
08/30/2007



Eugenie #1 --> 180° <--



Eugenie #1 --> 240° <--

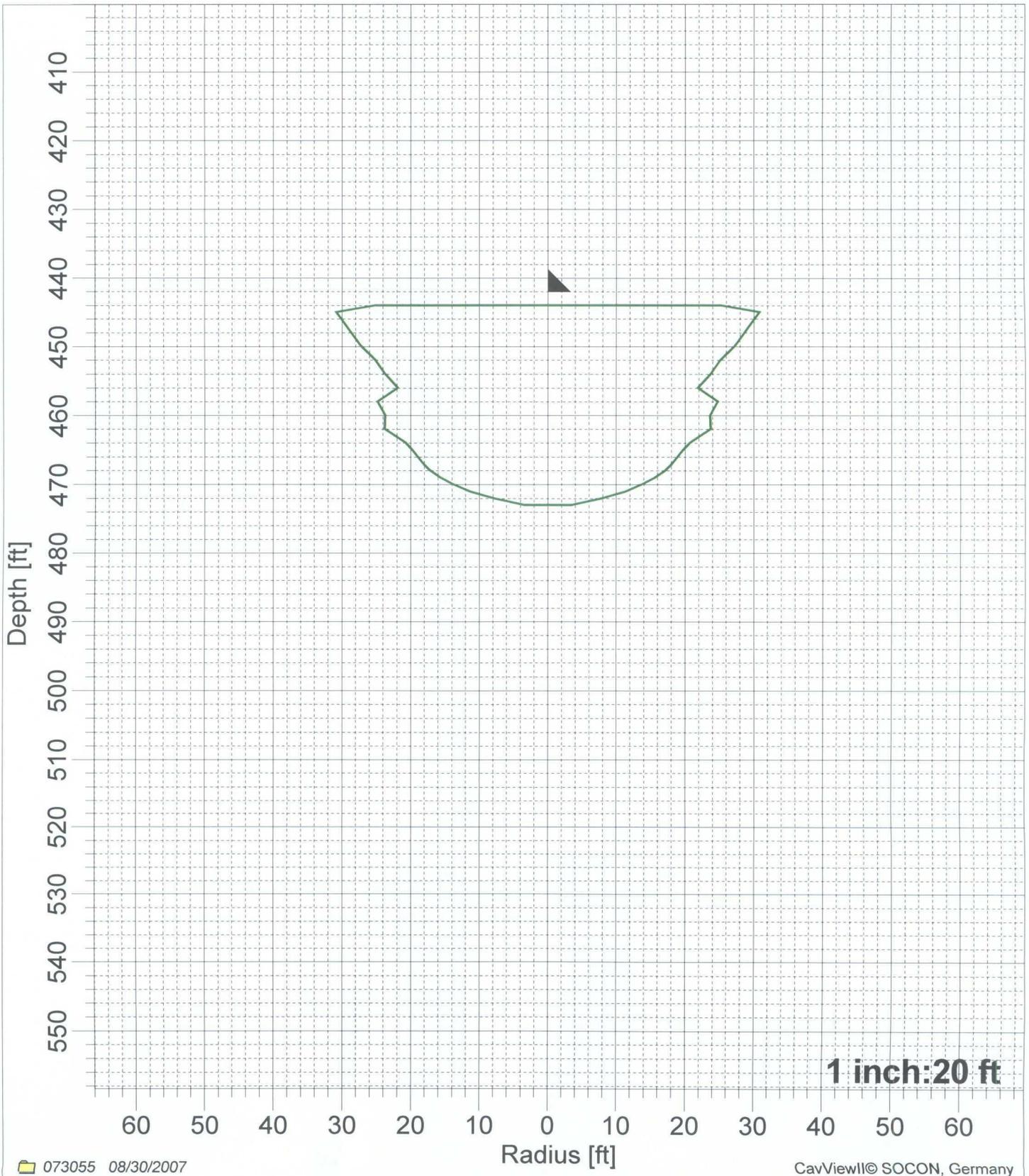


Eugenie #1 --> 300° <--

Eugenie #1

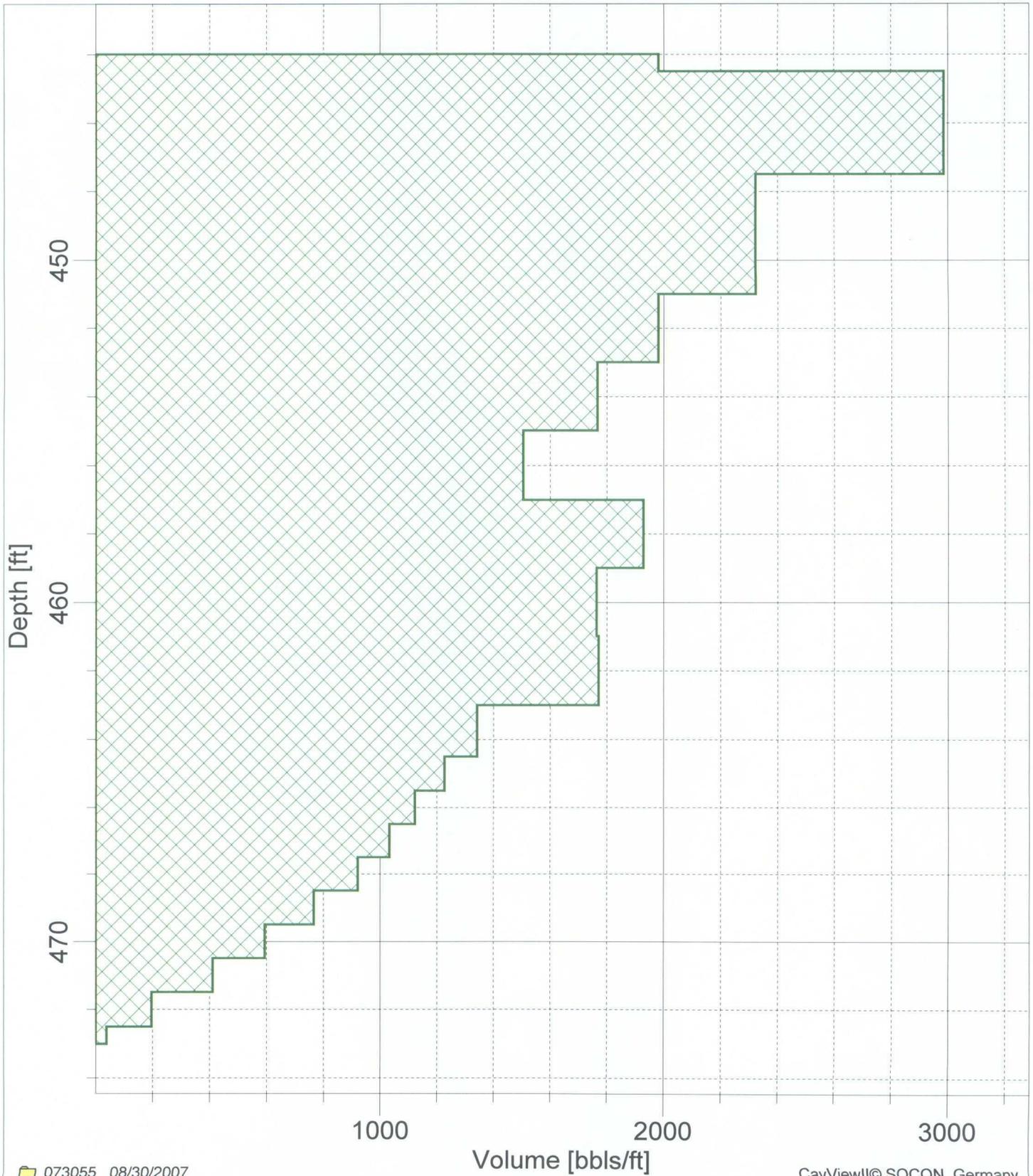
AVERAGE RADIUS

08/30/2007



5 1/2" : 442.0 ft

Average radius (08/30/2007)



073055 08/30/2007

CaViewII© SOCON, Germany

 Partial volume



SOCON Sonar Well Services, Inc.

Volume list

Cavern: Eugenie #1

073055

08/30/2007

Depth [ft]	Radius [ft]	Area [ft ²]	Depth range [ft]		Volume [bbls]	
			from	to	partial	total
444.0	59.5	11126	444.0	444.5	991	991
445.0	73.1	16767	444.5	447.5	8959	9949
450.0	64.4	13044	447.5	451.0	8131	18080
452.0	59.5	11122	451.0	453.0	3962	22042
454.0	56.2	9918	453.0	455.0	3533	25575
456.0	51.9	8454	455.0	457.0	3011	28586
458.0	58.7	10833	457.0	459.0	3859	32445
460.0	56.1	9902	459.0	461.0	3527	35972
462.0	56.3	9946	461.0	463.0	3543	39514
464.0	49.0	7538	463.0	464.5	2014	41528
465.0	46.8	6891	464.5	465.5	1227	42756
466.0	44.8	6304	465.5	466.5	1123	43878
467.0	43.0	5799	466.5	467.5	1033	44911
468.0	40.6	5178	467.5	468.5	922	45833
469.0	37.0	4303	468.5	469.5	766	46600
470.0	32.6	3339	469.5	470.5	595	47195
471.0	27.1	2313	470.5	471.5	412	47606
472.0	18.8	1107	471.5	472.5	197	47804
473.0	8.3	216	472.5	473.0	19	47823

Eugenie #1

TOTAL VOLUME

08/30/2007



073055 08/30/2007

CavViewII© SOCON, Germany



Total volume = 47822.9 bbls



Table of volumes (foot by foot)

Job-No.: 073055, Name: Eugenie #1, Date: 08/30/2007

depth [ft]	volume [bbls]								
								444	0
445	2484	446	5470	447	8456	448	11111	449	13434
450	15757	451	18080	452	20061	453	22042	454	23808
455	25575	456	27081	457	28586	458	30516	459	32445
460	34208	461	35972	462	37743	463	39514	464	40857
465	42142	466	43317	467	44395	468	45372	469	46217
470	46897	471	47400	472	47705	473	47823		



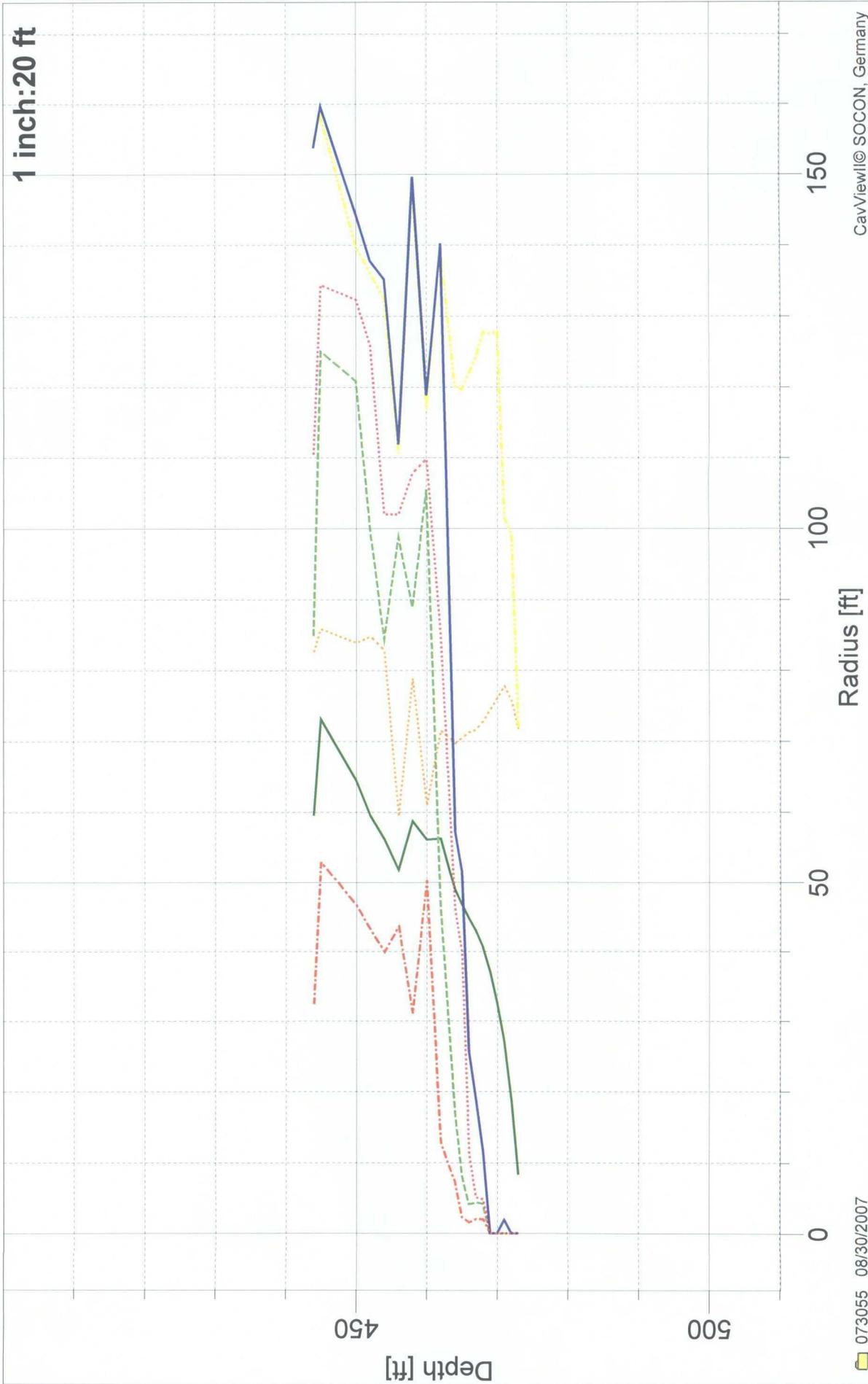
SOCON Sonar Well Services, Inc.

Eugenie #1

RADII / DIAMETERS

08/30/2007

1 inch:20 ft



073055 08/30/2007

CavView© SOCON, Germany

- Average radius
- Minimum diameter
- Largest perpendicular extension
- Minimum radius
- Maximum diameter
- Maximum radius
- Largest extension



SOCON Sonar Well Services, Inc.

Table of radii and diameters

Cavern: Eugenie #1

073055

08/30/2007

Depth [ft]	Radius [MIN]		Radius [MAX]		Diameter [MIN]		Diameter [MAX]	
	[ft]	[°]	[ft]	[°]	[ft]	[°]	[ft]	[°]
444.0	32.5	113	82.6	180	84.9	113 <-> 293	154.6	0 <-> 180
445.0	53.0	72	85.9	181	125.0	76 <-> 256	158.1	1 <-> 181
450.0	46.7	6	83.9	191	120.8	126 <-> 306	139.7	171 <-> 351
452.0	43.2	332	84.9	197	100.0	27 <-> 207	136.1	12 <-> 192
454.0	40.0	31	82.9	196	84.4	26 <-> 206	132.5	16 <-> 196
456.0	43.6	350	59.4	270	98.8	44 <-> 224	110.6	90 <-> 270
458.0	31.1	335	78.9	305	88.9	155 <-> 335	148.1	125 <-> 305
460.0	50.4	33	61.0	263	105.5	33 <-> 213	117.2	83 <-> 263
462.0	12.8	36	71.5	96	46.8	36 <-> 216	139.5	86 <-> 266
464.0	7.2	203	69.7	270	17.5	25 <-> 205	120.1	75 <-> 255
465.0	2.3	34	70.5	270	8.3	14 <-> 194	119.6	0 <-> 180
466.0	1.6	190	71.3	270	4.1	95 <-> 275	121.9	0 <-> 180
467.0	2.0	102	71.7	270	4.3	98 <-> 278	124.2	15 <-> 195
468.0	2.0	100	72.8	240	4.2	98 <-> 278	127.7	15 <-> 195
469.0	0.0	1	74.5	240	0.0	1 <-> 181	127.5	0 <-> 180
470.0	0.0	1	76.1	240	0.0	1 <-> 181	127.8	0 <-> 180
471.0	0.0	1	77.8	240	0.0	1 <-> 181	101.4	120 <-> 300
472.0	0.0	1	75.7	240	0.0	1 <-> 181	99.3	120 <-> 300
473.0	0.0	0	71.7	300	0.0	1 <-> 181	71.7	120 <-> 300



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Table of radii in N-E-S-W-NE-SE-SW-NW presentation

Cavern: Eugenie #1

073055

08/30/2007

Depth [ft]	<R> [ft]	N [ft]	E [ft]	S [ft]	W [ft]	NE [ft]	SE [ft]	SW [ft]	NW [ft]
444.0	59.5	72.0	42.7	82.6	60.0	35.7	46.7	73.0	63.3
445.0	73.1	72.1	59.5	85.5	69.7	61.7	72.6	77.3	69.6
450.0	64.4	50.6	60.8	83.2	66.2	55.7	60.2	68.6	61.5
452.0	59.5	49.6	50.7	74.9	68.6	47.9	58.3	67.9	65.0
454.0	56.2	48.0	49.7	69.1	67.4	42.1	61.2	58.0	66.4
456.0	51.9	44.3	51.1	54.7	59.4	45.7	57.6	53.1	50.5
458.0	58.7	46.5	52.1	55.1	71.3	40.3	65.6	67.6	72.2
460.0	56.1	51.7	56.9	57.4	59.6	54.8	59.1	57.8	53.5
462.0	56.3	56.1	70.3	54.9	68.2	48.4	36.9	56.5	68.7
464.0	49.0	60.4	25.3	56.6	69.7	17.2	29.3	63.5	68.4
465.0	46.8	62.1	23.6	57.5	70.5	10.3	23.6	67.0	68.3
466.0	44.8	63.6	22.6	58.4	71.3	10.3	21.3	69.9	68.3
467.0	43.0	65.0	21.7	59.2	71.7	3.2	20.9	70.9	68.5
468.0	40.6	66.4	20.7	59.6	72.1	3.1	20.4	71.8	68.7
469.0	37.0	67.9	19.7	59.7	72.5	2.9	19.9	72.8	68.9
470.0	32.6	68.0	18.8	59.7	72.9	2.8	19.5	73.8	68.0
471.0	27.1	67.8	0.0	30.1	72.0	0.0	19.0	73.2	66.3
472.0	18.8	67.6	0.0	29.5	70.7	0.0	0.0	70.9	64.6
473.0	8.3	0.0	0.0	28.9	69.5	0.0	0.0	68.6	0.0

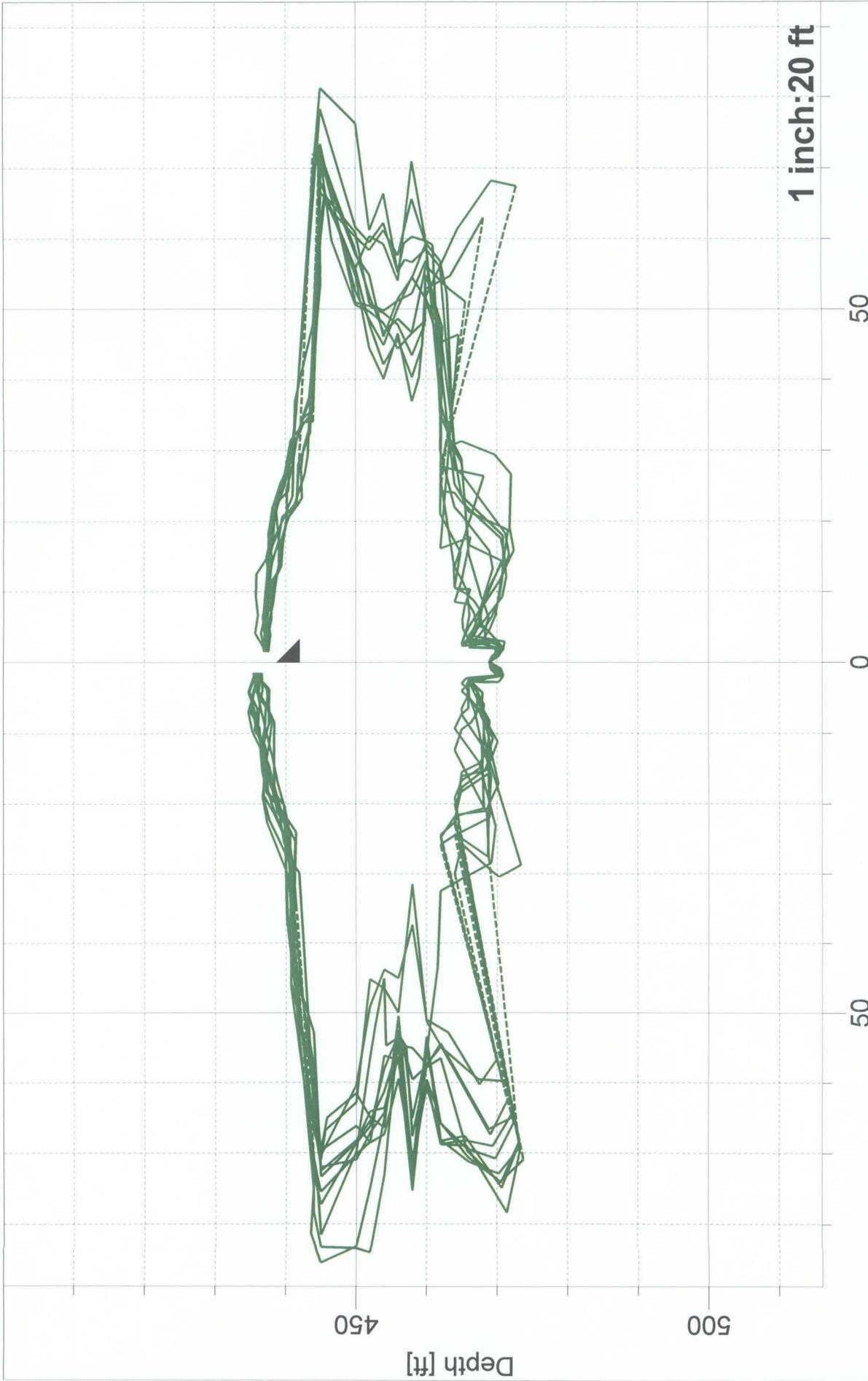


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08/30/2007

MAXPLOT

Eugenie #1



1 inch:20 ft

50

0

50

Radius [ft]

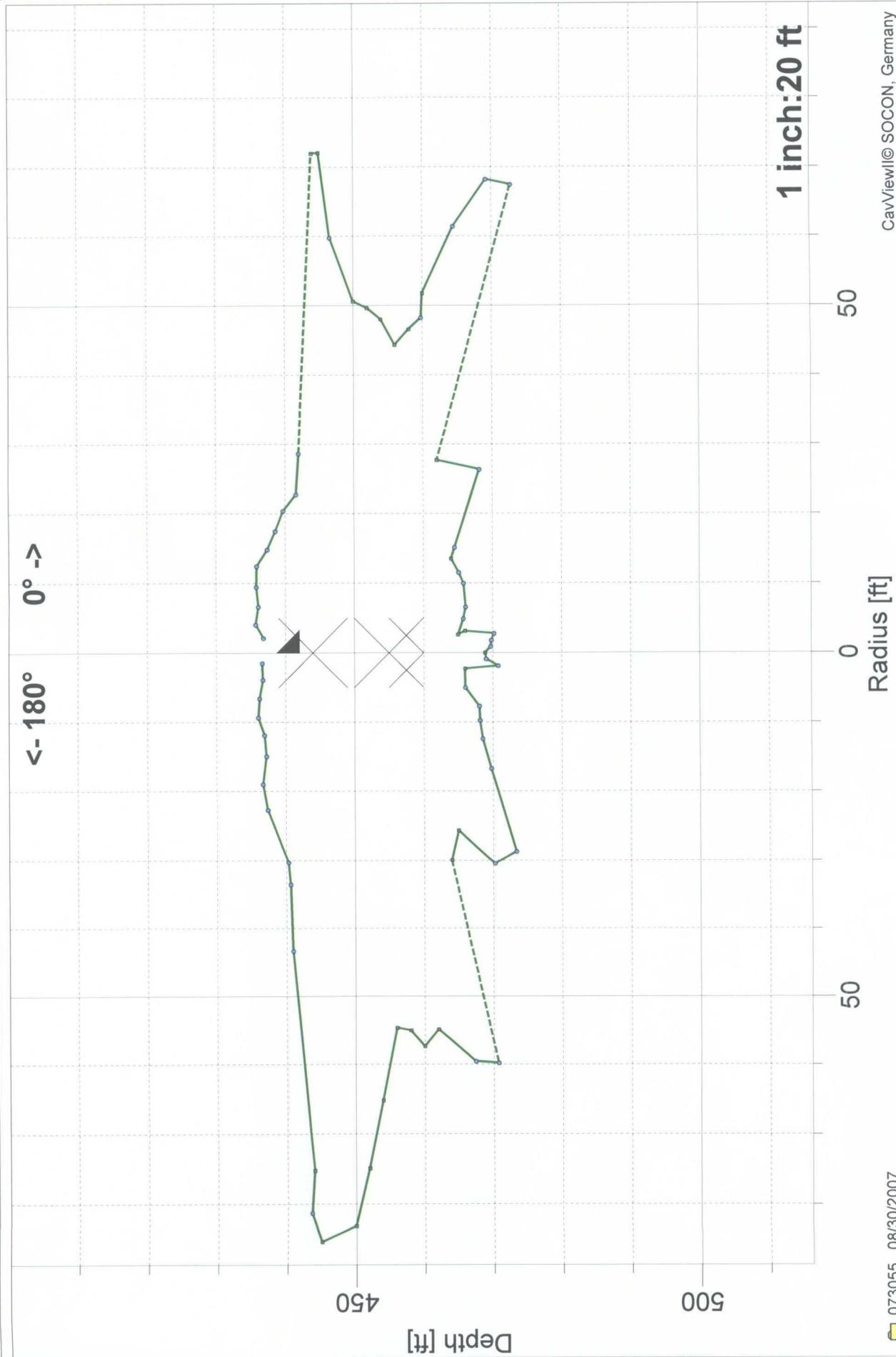
CavView© SOCON, Germany

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5 1/2" : 442.0 ft

08/30/2007

Eugenie #1



CavView!© SOCON, Germany

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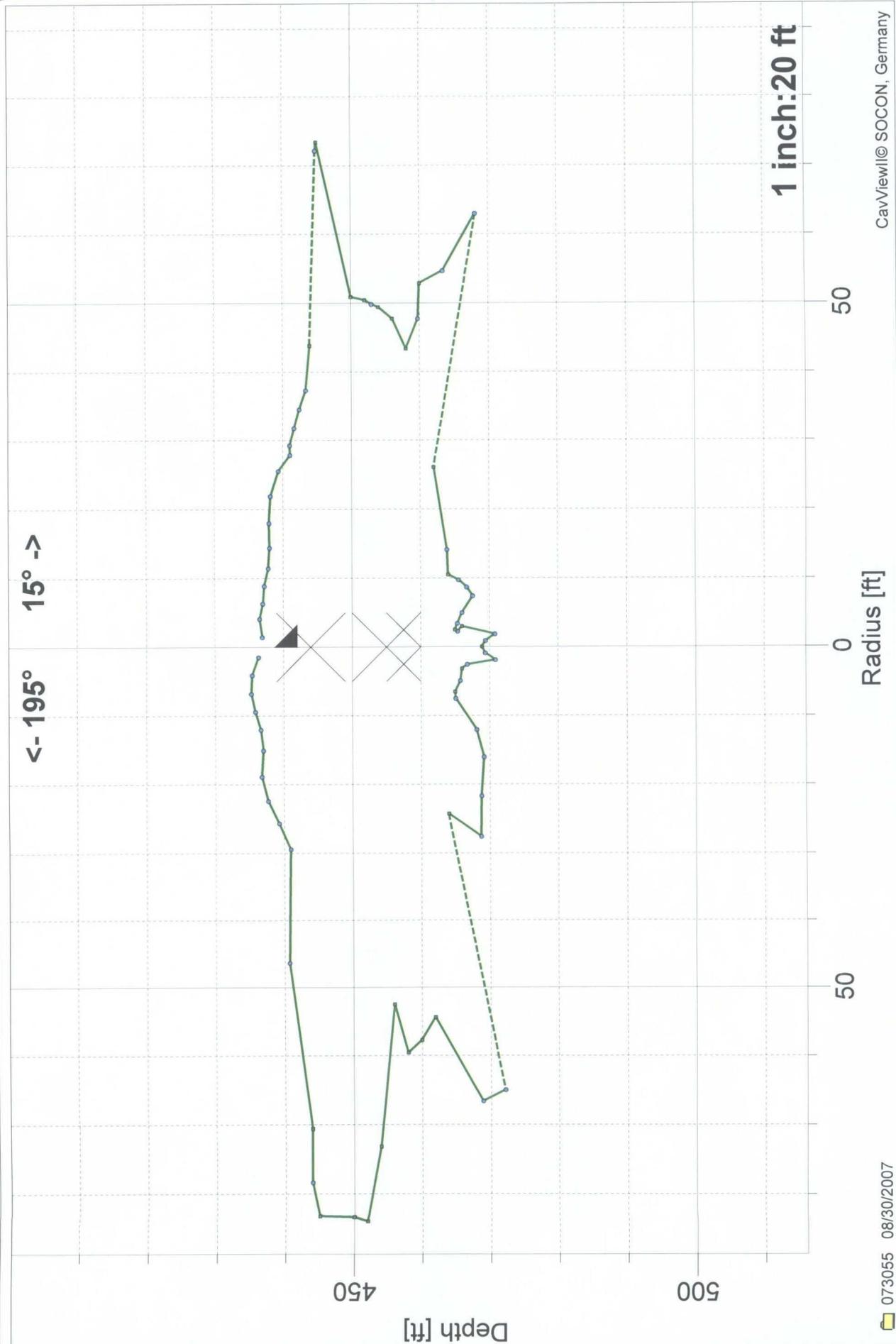
Tilting position

5 1/2" : 442.0 ft

(08/30/2007)

08/30/2007

Eugenie #1



CavViewII© SOCON, Germany

073055 08/30/2007

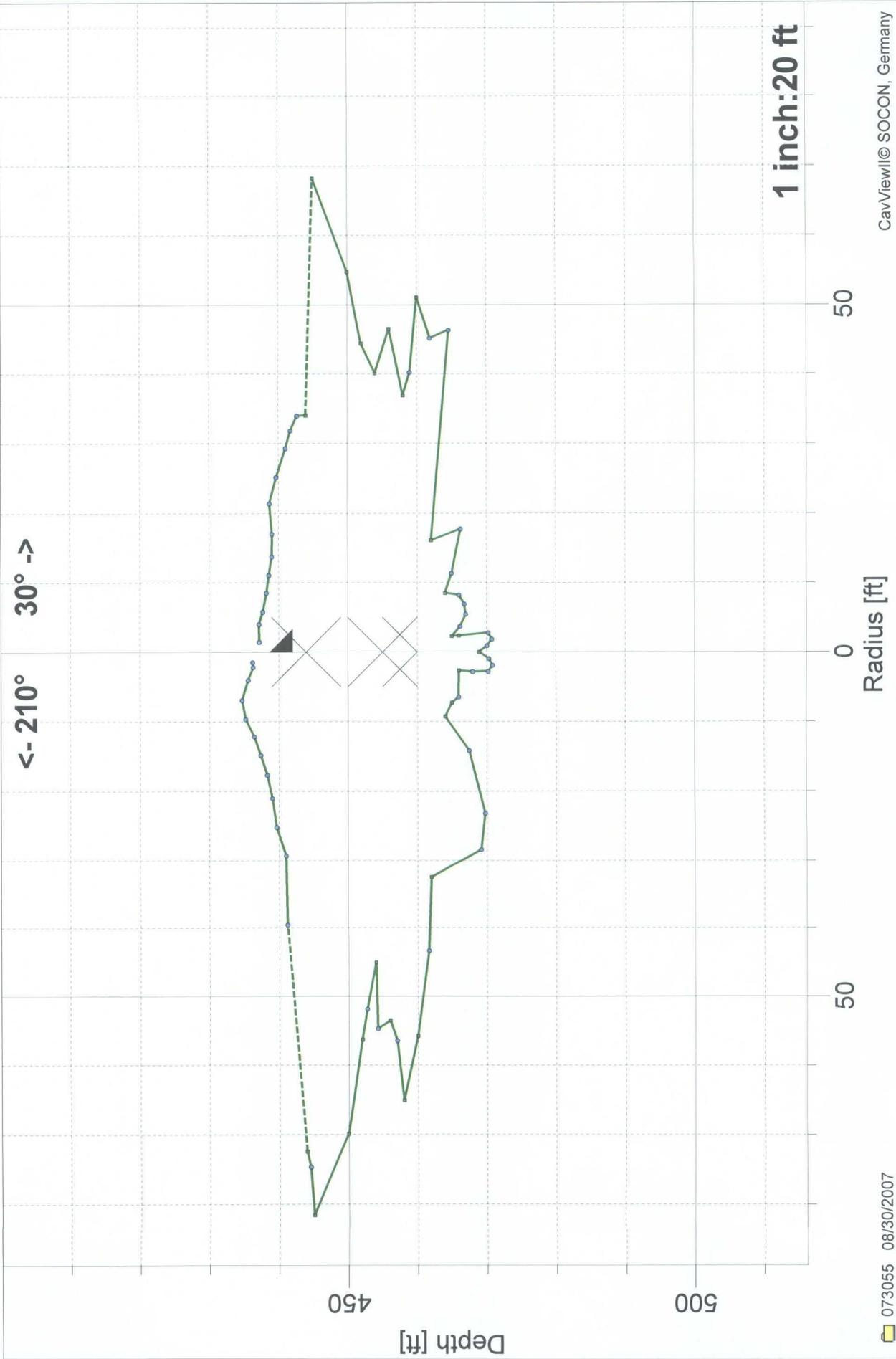
(08/30/2007)

5 1/2" : 442.0 ft

Tilting position

08/30/2007

Eugenie #1



1 inch:20 ft

073055 08/30/2007

(08/30/2007)

5 1/2" : 442.0 ft

Tilting position

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08/30/2007

Eugenie #1



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Tilting position

5 1/2" : 442.0 ft

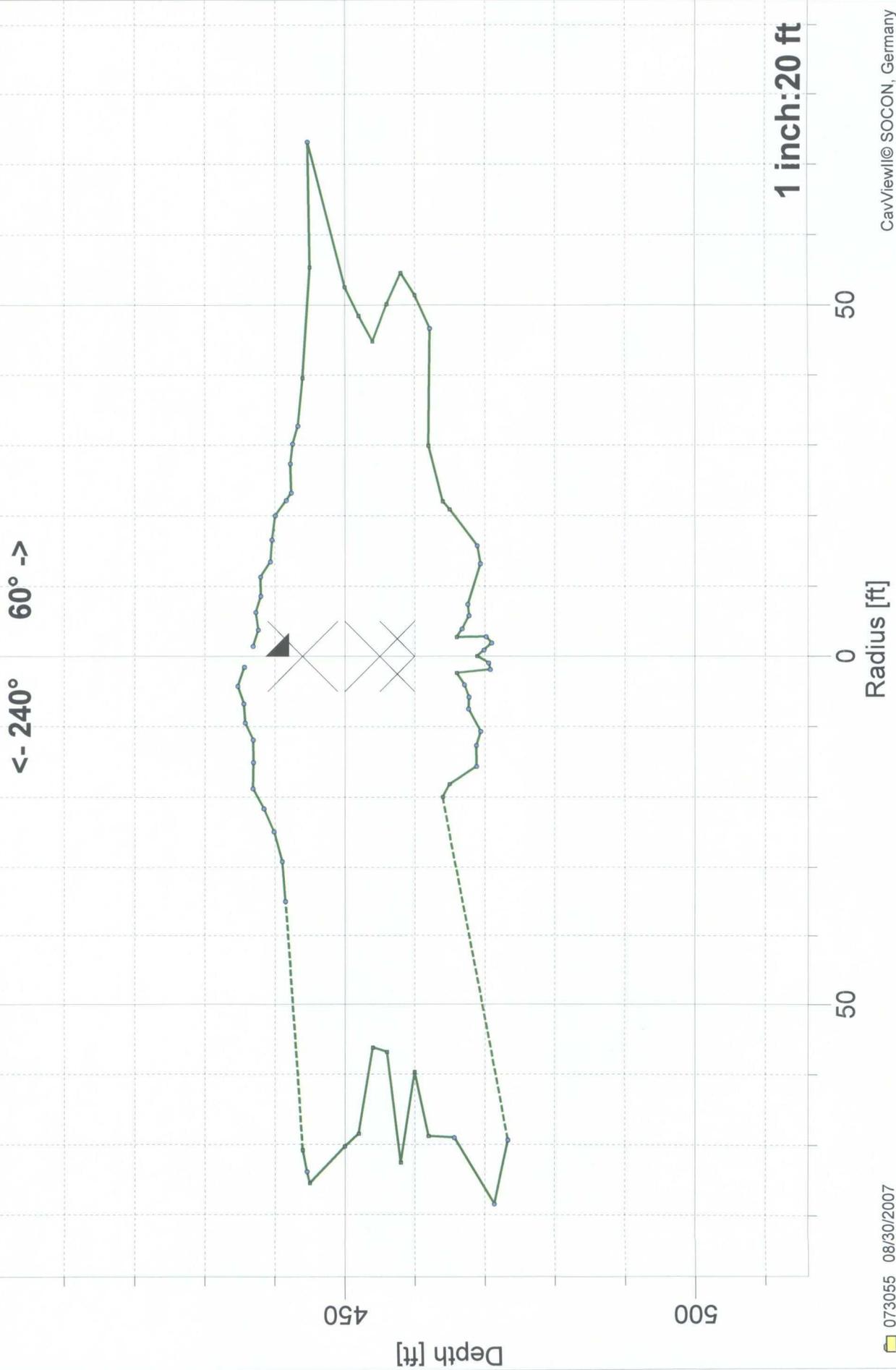
(08/30/2007)



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Eugenie #1



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Tilting position

5 1/2" : 442.0 ft

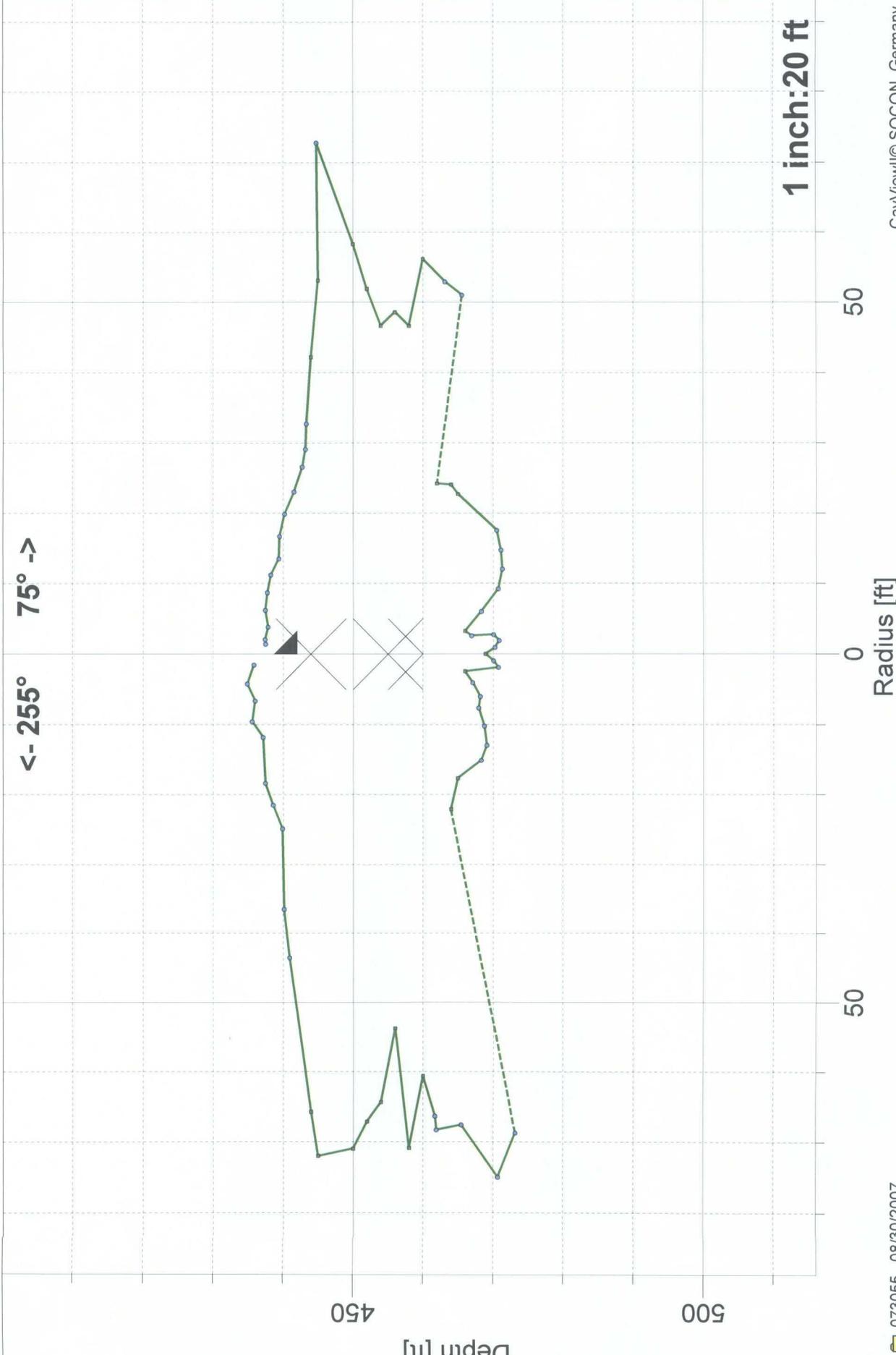
(08/30/2007)



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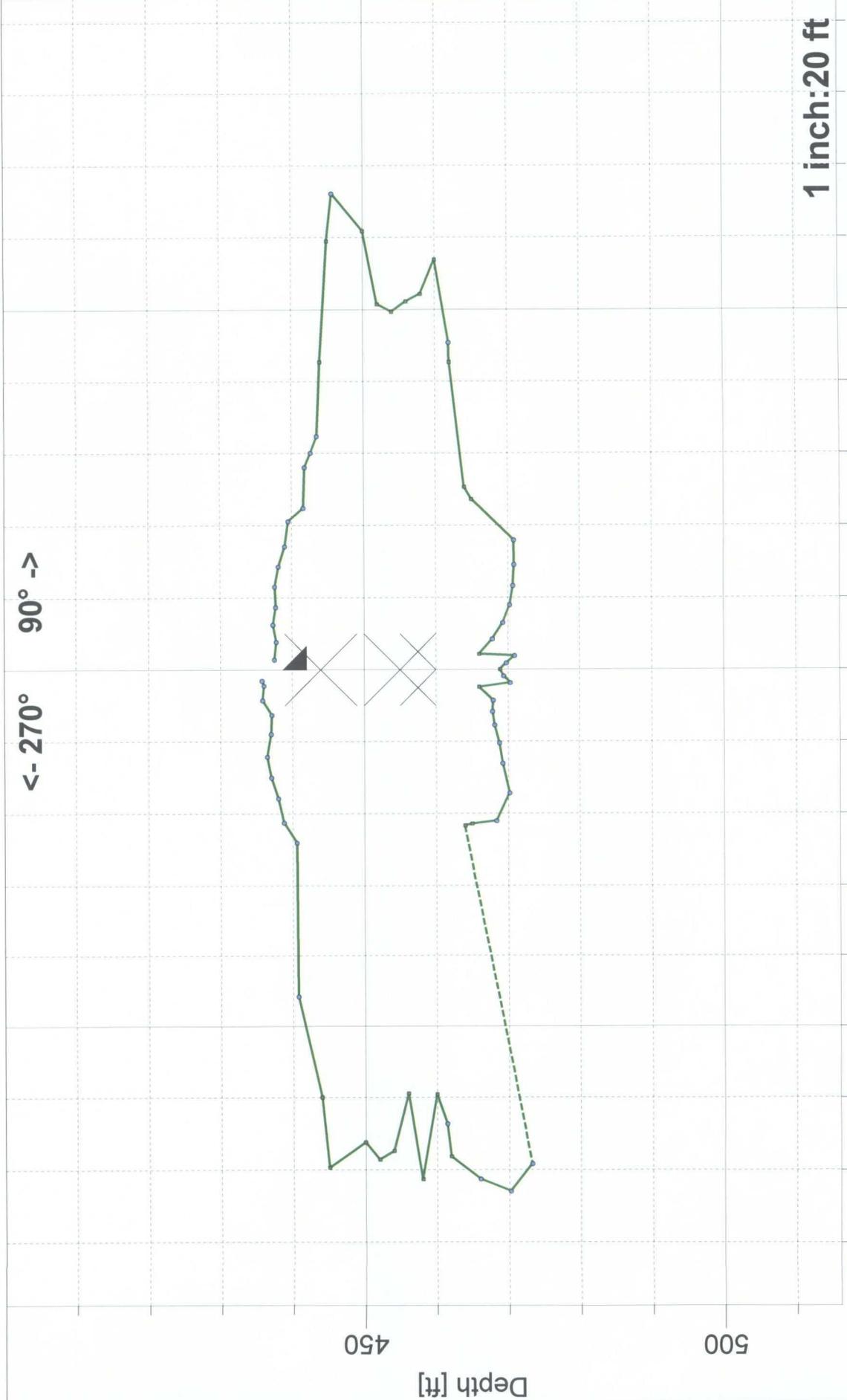
08/30/2007

Eugenie #1



08/30/2007

Eugenie #1



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5 1/2" : 442.0 ft

(08/30/2007)

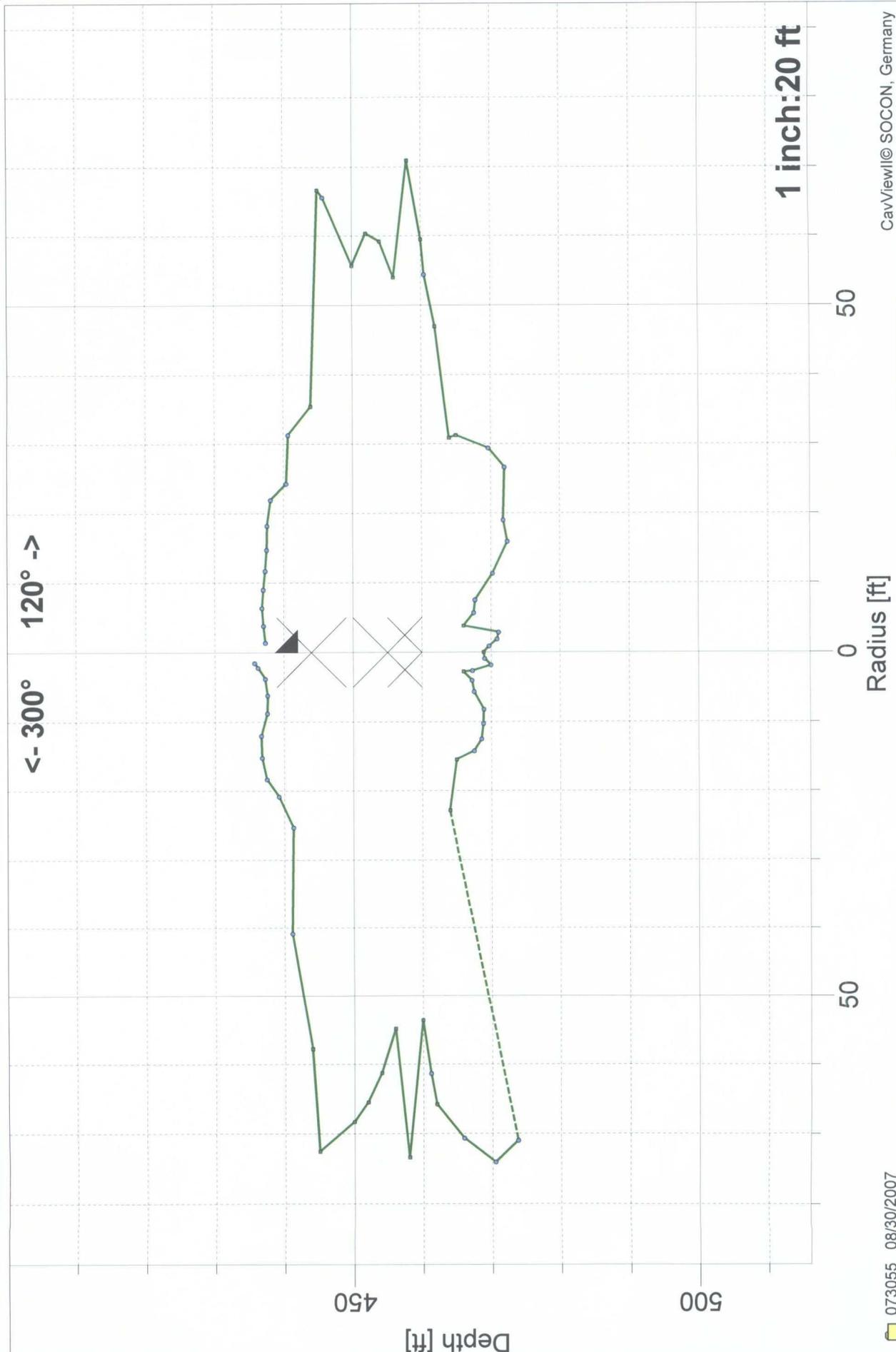
Tilting position



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Eugenie #1

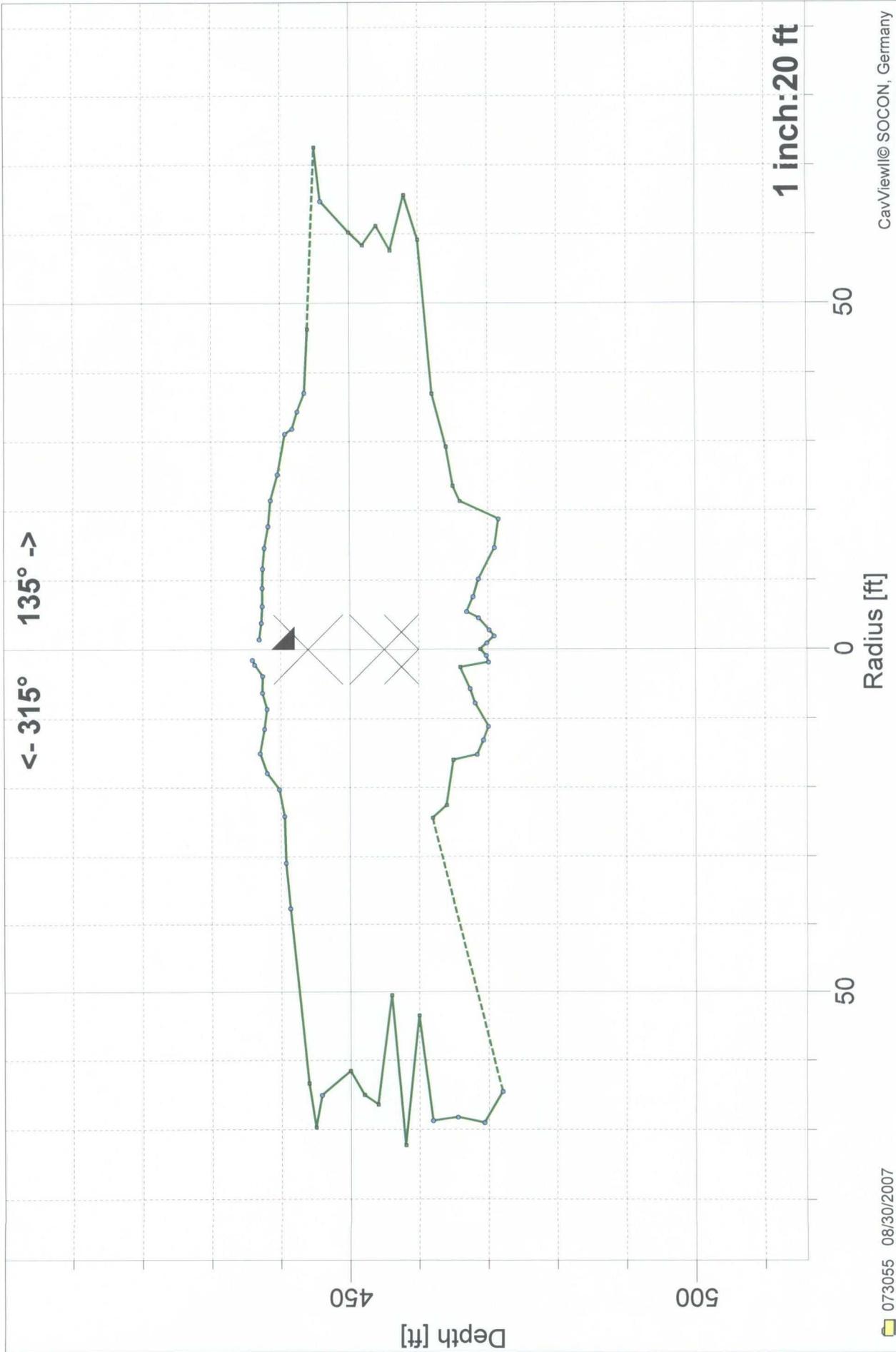




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Eugenie #1

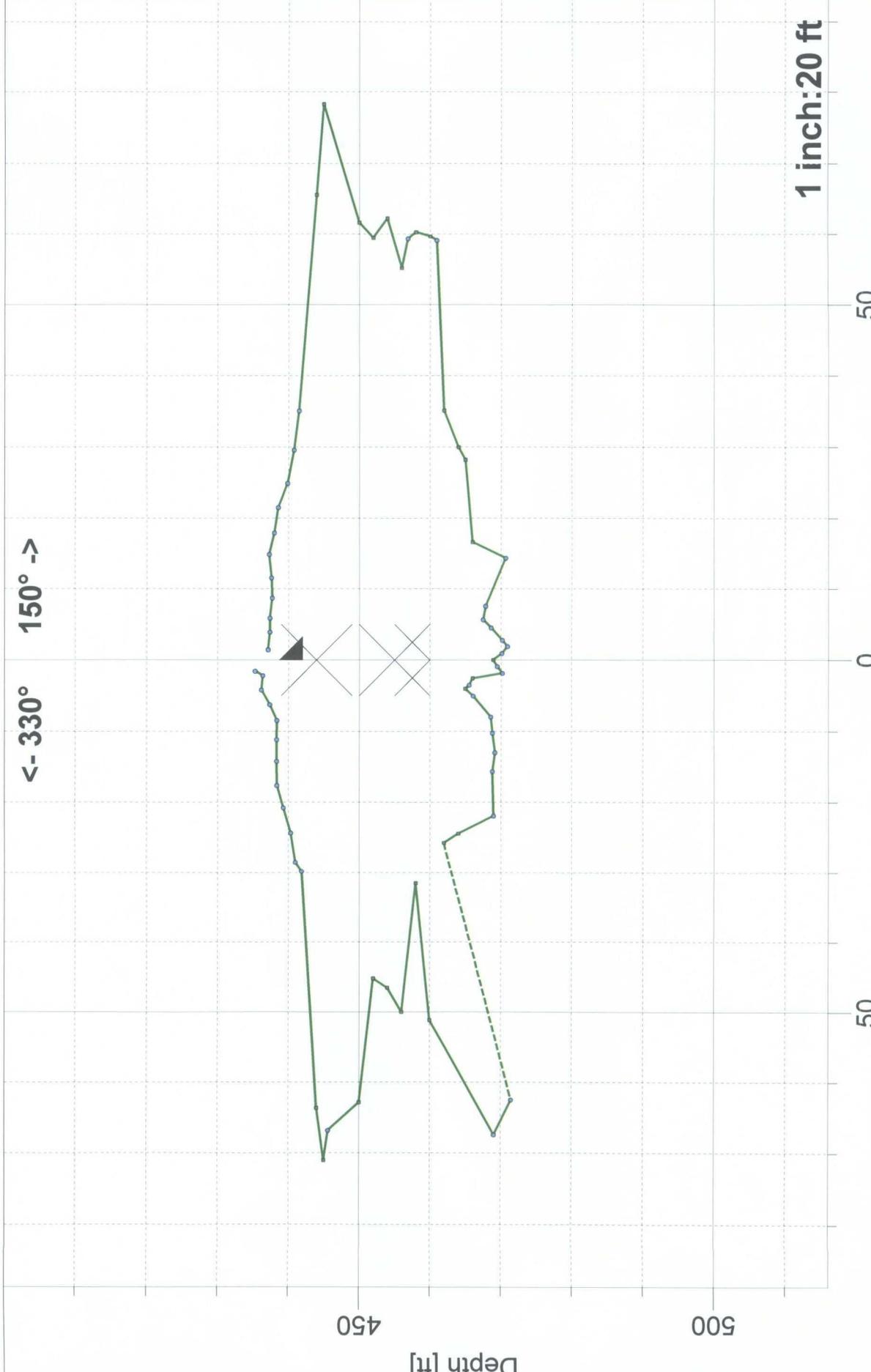




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08/30/2007

Eugenie #1



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(08/30/2007)

5 1/2" : 442.0 ft

Tilting position

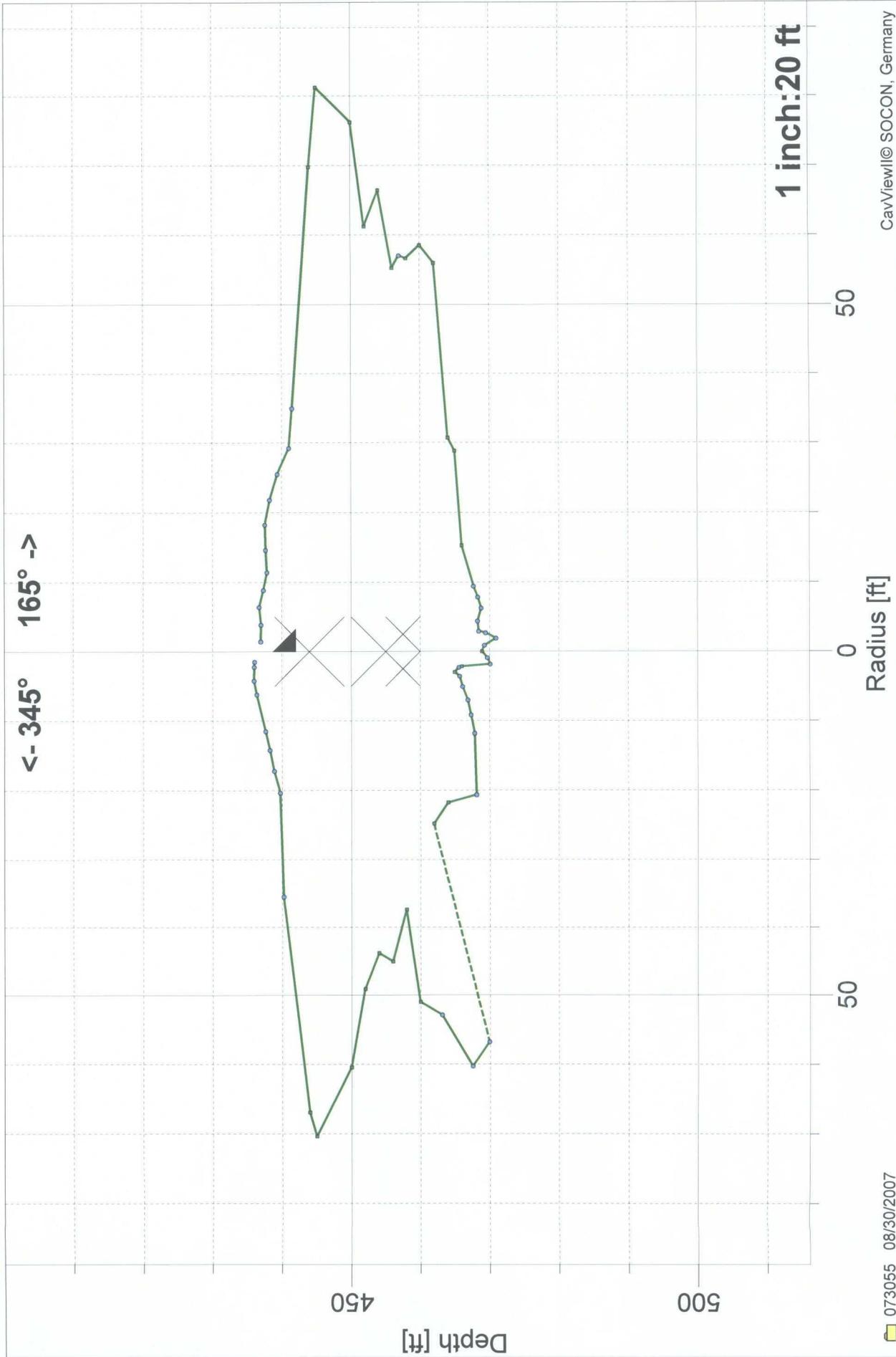


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08/30/2007

Eugenie #1

<- 345° 165° ->





HORIZONTAL SECTIONS

Cavern: Eugenie #1

Report No.: 073055

Utilized speed of sound: 1810.0 m/s (5938.3 ft/s)

Measuring date: 08/30/2007

Scale: 1: 50

Horizontal sections measured at following depths:

444.0 ft	445.0 ft	450.0 ft	452.0 ft	454.0 ft	456.0 ft	458.0 ft
460.0 ft	462.0 ft	464.0 ft	465.0 ft	466.0 ft		

The following 7 sections are constructed:

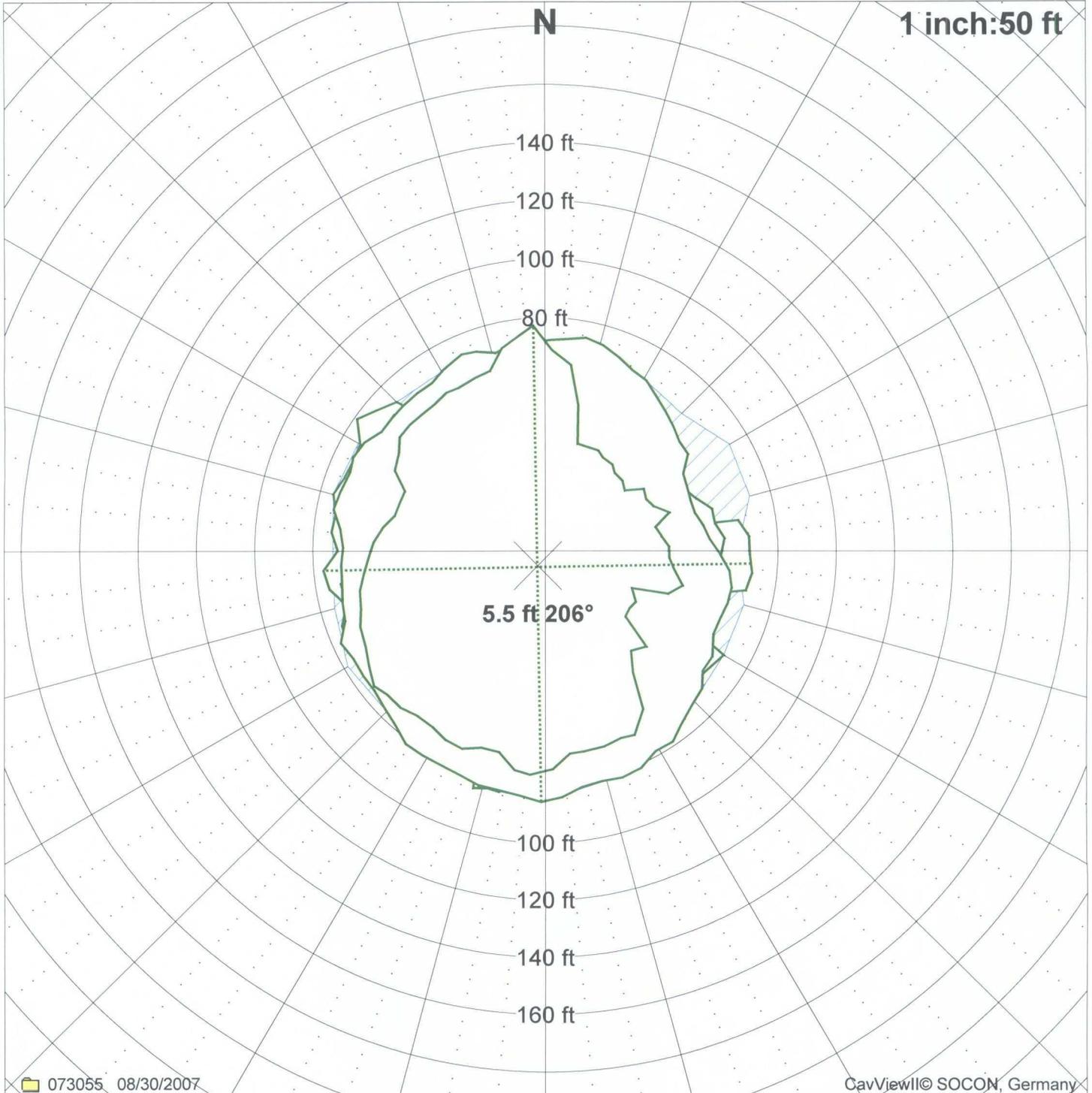
467.0 ft	468.0 ft	469.0 ft	470.0 ft	471.0 ft	472.0 ft	473.0 ft
----------	----------	----------	----------	----------	----------	----------

Eugenie #1

MAXPLOT

08/30/2007

1 inch:50 ft



073055 08/30/2007

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Vertical maximum plot
Center of gravity

Horizontal sections

a/b

d_{max} : 161.9 ft 177° <--> 357° r_{min} : 66.5 ft -> 43° r_{\sim} : 74.8 ft r_{max} : 85.9 ft -> 181°

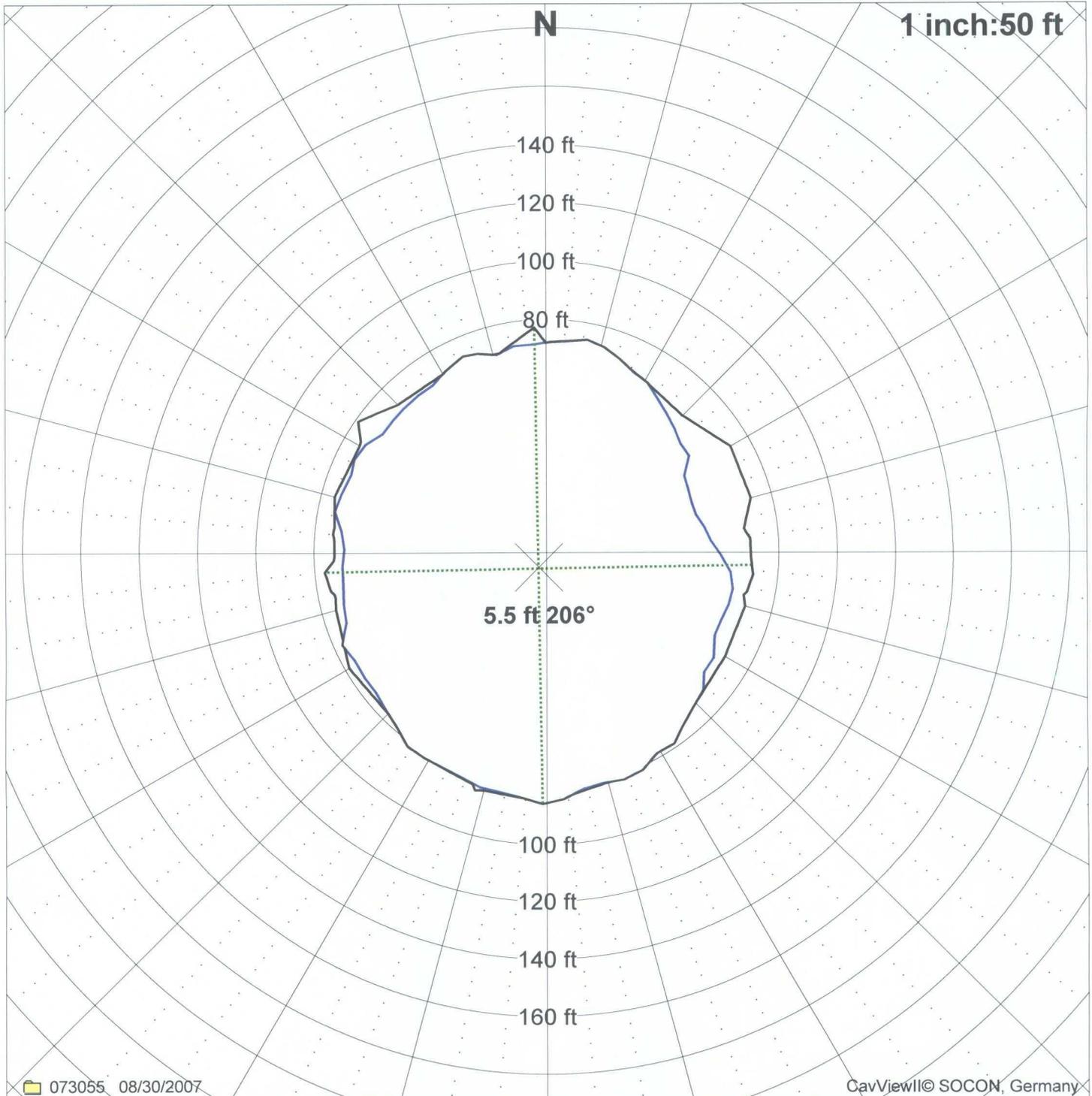
a/b = 1.109 a = 163.0 ft (181°-357°) b = 147.0 ft (93°-265°)

Area from vertical sections: 17217 ft², Area from horizontal and vertical sections: 17559 ft²

Eugenie #1

MAXPLOT

08/30/2007



073055 08/30/2007

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..... a/b

⊗ Center of gravity

□ Horizontal/vertical maximum plot

□ Largest single area

d_{max} : 161.9 ft 177° <--> 357° r_{min} : 66.5 ft -> 43° r_{\sim} : 74.8 ft r_{max} : 85.9 ft -> 181°

$a/b = 1.109$ $a = 163.0$ ft (181°-357°) $b = 147.0$ ft (93°-265°)

Largest single area: 16767 ft² in depth: 445.0 ft, Area from horizontal and vertical sections: 17559 ft²



SOCON Sonar Well Services, Inc.

Table of radii

Cavern: Eugenie #1

73055

8/30/2007

Depth: 444.0 ft

[°]

Radii in [ft]

0	72.0	66.5	58.3	43.8	38.3	38.6	38.2	37.5	36.6	35.7
50	35.1	36.3	39.6	39.5	42.0	42.2	39.5	41.3	42.7	43.6
100	46.1	47.9	41.0	33.4	35.5	35.1	37.9	46.7	46.1	53.9
150	65.5	69.7	69.3	69.7	69.8	71.6	75.2	76.5	73.5	70.6
200	71.7	73.2	72.4	71.4	72.0	73.0	73.9	73.2	70.8	69.1
250	67.6	65.8	64.1	61.9	60.0	57.9	55.0	52.9	52.5	54.7
300	59.1	61.2	63.4	63.3	63.0	63.4	63.6	63.6	64.1	66.9
350	72.2	75.6								

Depth: 445.0 ft

[°]

Radii in [ft]

0	72.1	72.8	74.0	73.4	71.5	69.3	68.2	65.9	63.7	61.7
50	59.9	59.4	55.3	53.7	53.1	53.1	54.7	56.4	59.5	62.9
100	65.0	65.2	64.6	64.4	66.6	67.8	70.6	72.6	74.6	77.8
150	78.3	80.6	81.7	81.3	81.6	83.8	85.5	84.5	83.5	83.3
200	82.3	81.7	81.6	81.6	79.2	77.3	75.9	75.7	75.5	76.6
250	73.6	72.0	70.9	70.4	69.7	70.5	73.3	73.4	72.5	73.0
300	72.5	70.0	69.5	69.6	69.7	69.5	71.0	72.6	72.5	70.4
350	71.2	71.4								

Depth: 450.0 ft

[°]

Radii in [ft]

0	50.6	47.2	49.2	50.9	52.0	53.6	54.8	56.6	56.7	55.7
50	54.2	53.4	52.5	52.3	54.5	58.3	59.1	61.3	60.8	59.9
100	59.0	57.7	56.4	55.9	55.7	56.8	58.8	60.2	60.6	60.3
150	61.6	67.7	74.4	76.2	79.4	82.0	83.2	81.5	83.3	83.5
200	80.5	73.9	69.9	68.3	68.2	68.6	68.1	69.0	70.3	70.4
250	71.8	71.0	71.1	64.7	66.2	67.9	67.5	68.5	69.8	70.1
300	68.2	64.4	64.2	61.5	62.0	62.5	62.8	63.6	61.7	60.4
350	59.6	56.6								

Depth: 452.0 ft

[°]

Radii in [ft]

0	49.6	51.1	52.6	51.2	46.8	44.4	44.4	44.8	45.6	47.9
50	49.1	49.2	48.5	48.6	50.8	51.9	50.4	50.0	50.7	51.7
100	53.2	54.8	58.7	61.2	60.3	59.1	58.4	58.3	58.2	58.3
150	59.4	60.9	61.4	61.2	63.3	68.4	74.9	79.4	82.0	84.1
200	64.3	55.6	56.4	60.3	65.4	67.9	70.3	69.6	68.4	68.0
250	67.0	67.1	67.1	68.5	68.6	66.4	65.5	64.1	62.6	62.4
300	65.5	68.7	69.6	65.0	54.9	49.5	45.2	44.4	46.3	49.1
350	50.7	50.0								

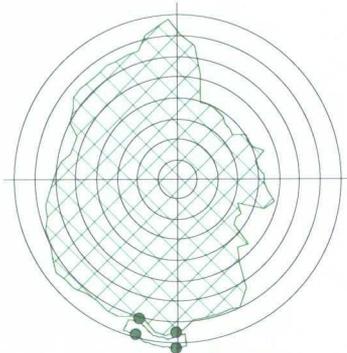


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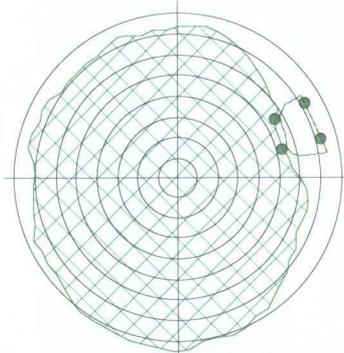
Horizontal slices 1 - 12



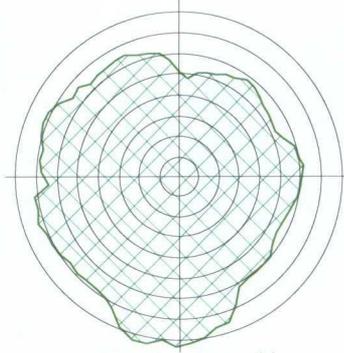
Cavity: Eugenie #1 Report number: 073055 Date: 08/30/2007



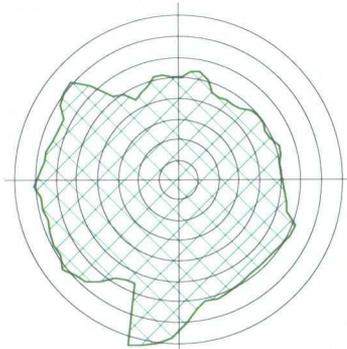
444.0 ft / 10820 ft²



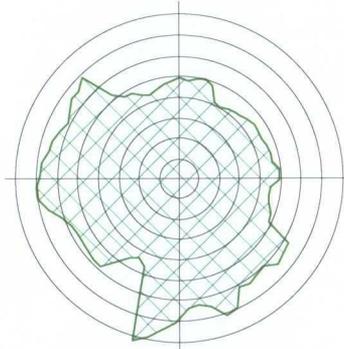
445.0 ft / 16175 ft²



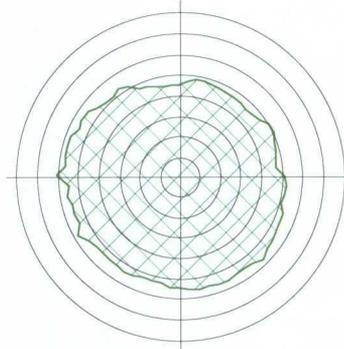
450.0 ft / 13044 ft²



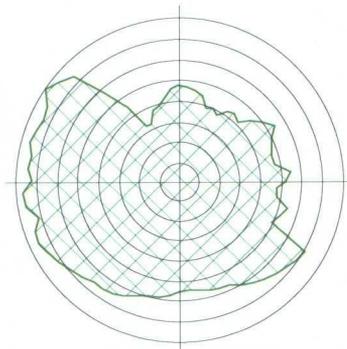
452.0 ft / 11122 ft²



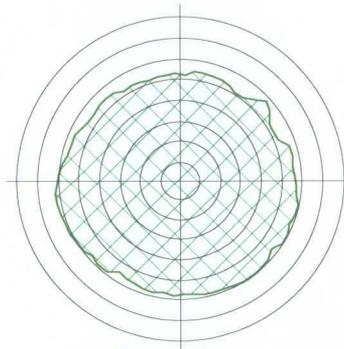
454.0 ft / 9918 ft²



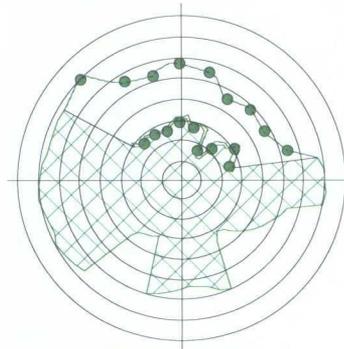
456.0 ft / 8454 ft²



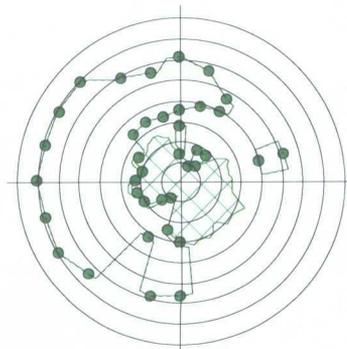
458.0 ft / 10833 ft²



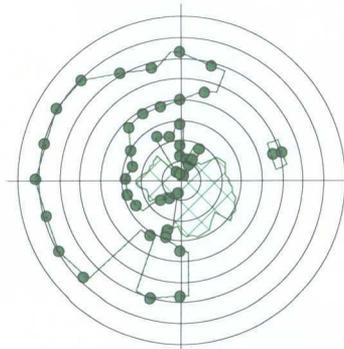
460.0 ft / 9902 ft²



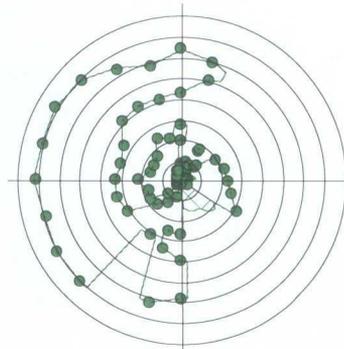
462.0 ft / 7260 ft²



464.0 ft / 1563 ft²



465.0 ft / 1086 ft²



466.0 ft / 168 ft²

The distance between 2 circles equals 10 ft

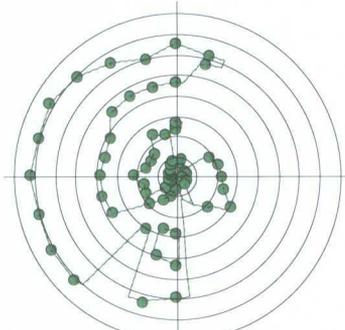


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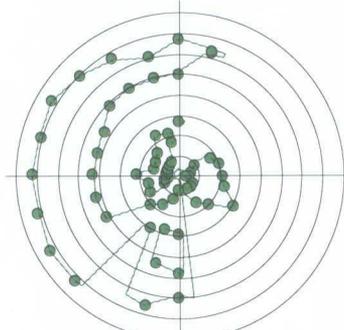
Horizontal slices 13 - 19



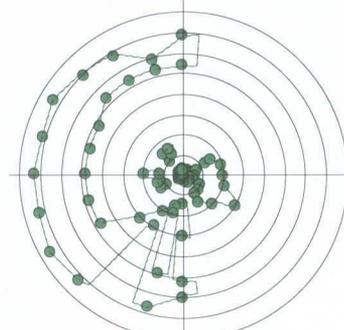
Cavity: Eugenie #1 Report number: 073055 Date: 08/30/2007



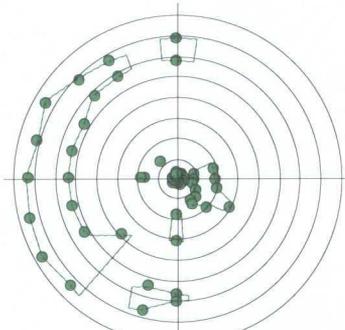
467.0 ft / 69 ft²



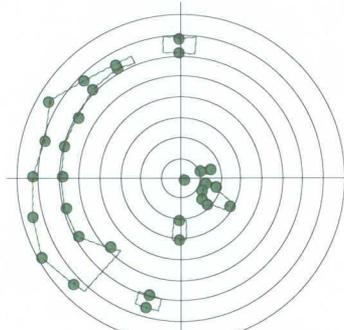
468.0 ft / 32 ft²



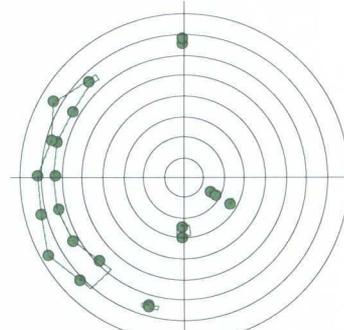
469.0 ft / 0 ft²



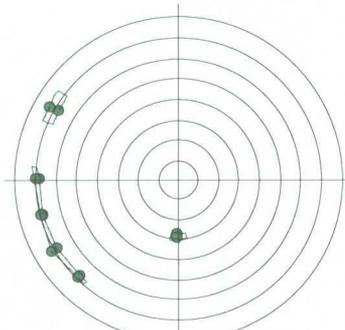
470.0 ft / 0 ft²



471.0 ft / 11 ft²



472.0 ft / 0 ft²



473.0 ft / 0 ft²

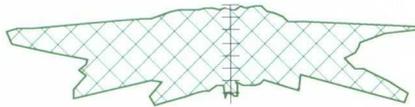


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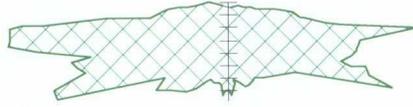
Vertical slices 1 - 12



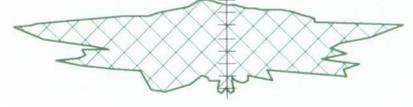
Cavity: Eugenie #1 Report number: 073055 Date: 08/30/2007



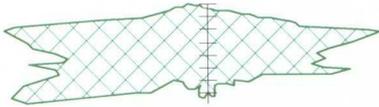
180° 0°



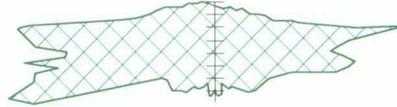
195° 15°



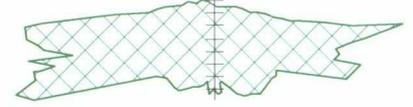
210° 30°



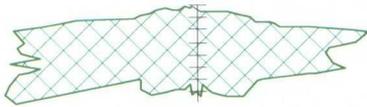
225° 45°



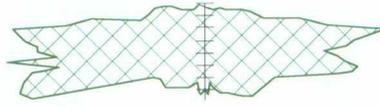
240° 60°



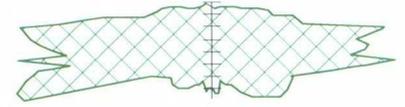
255° 75°



270° 90°



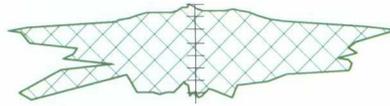
285° 105°



300° 120°



315° 135°



330° 150°



345° 165°

Range from 434 ft to 473 ft, step 5 ft