SCHLUMBERGER WELL SURVEYING CORPORATION

HOUSTON, TEXAS

January 17, 1966

PLEASE REPLY TO:
SUITE 1120 WICHITA PLAZA BLDG.
WICHITA, KANSAS 67202

CRA, Inc.
Box 445
Wellington, Kansas

Gentlemen:

This report is intended to summarize our interpretation of the Continuous Dipmeter Surveys ran on your Woodward No. 6, 8, and 9. Included in this report is the graphic presentation of dip calculations, the tabular presentation of dip calculations and a series of dip frequency polar diagrams the interpretation of which is below.

Woodward No. 6

The Bartlesville Sand (interval 590-655) is missing in this well. Dip patterns indicate this well is on the southeast side of the bar which strikes N60E-S60W. This strike indicates the sand may thin or possibly pinch out on the south end of the bar. Another explanation might be a thinning of the bar near this location. This location definitely limits the width of the bar sand.

Woodward No. 8

The Bartlesville Sand from 618-654 is a bar sand striking N30E-S30W with thicker sand to the S60E of this well. Since the width of the bar is undetermined, a strike location is recommended with only slight preference toward the axis of the bar.

Woodward No. 9

The Bartlesville Sand from 651-678 is a bar sand striking N15W-S15E with thicker sand to the N75E of this well.

A map is also included in this report. This map contains the strikes and arrows toward thicker sands on all of the wells. In the case where no sand is present the arrows point in the direction of the sand bar. It is readily apparent that No. 6 Woodward is the only well on the east (or SE) side of the bar system. Extreme care must be

exercised in developing this project as the width of the system is not defined. The sediments were transported from east (or SE) to west (or NW) and the western side of the bar will probably be the steeper side. Recommended locations are NE-SE-NW of Sec. 13-25S-21E and NW-NW-SE of Sec. 12-25S-21E. These locations are strike wells to No. 9 Woodward and No. 8 Woodward respectively and slightly toward thicker sand to account for the curvature of the bar system.

The interpretations of Dipmeter logs and the geological conclusions which are discussed in this report represent our best judgment. Nevertheless, since all interpretations and the conclusions reached are based on inferences from electrical and other measurements, as well as geological data which necessarily includes the consideration of some unproven factors, we must advise you that we cannot and do not guarantee their accuracy or correctness and shall not be liable or responsible, except in the case of willful negligence on our part, for any loss, costs, damages or expenses that may be incurred or sustained from such interpretations or the geological conclusions set out in this report.

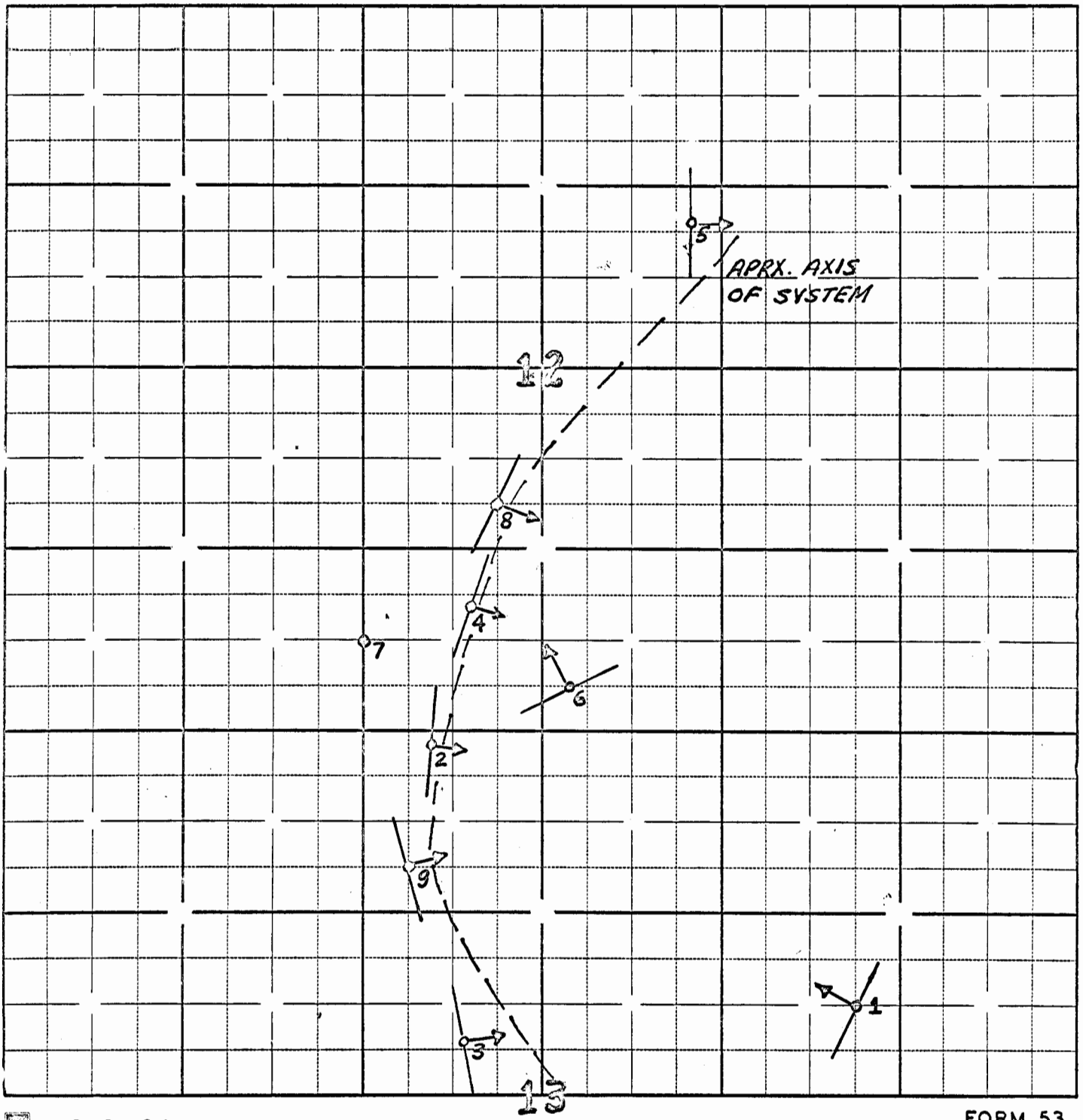
Thank you for calling Schlumberger on these wells. If we can be of further assistance, please feel free to call on us at any time.

Sam Fain

Sam Fain

Township 25S, Range 21E, County BOURBON, State KANSAS,

NUMBERS ARE WELL NO.
ARROWS INDICATE SAND THICKENING DIRECTION
LINES INDICATE SAND STRIKE DIRECTION



FORM 53

JOB NO. 509

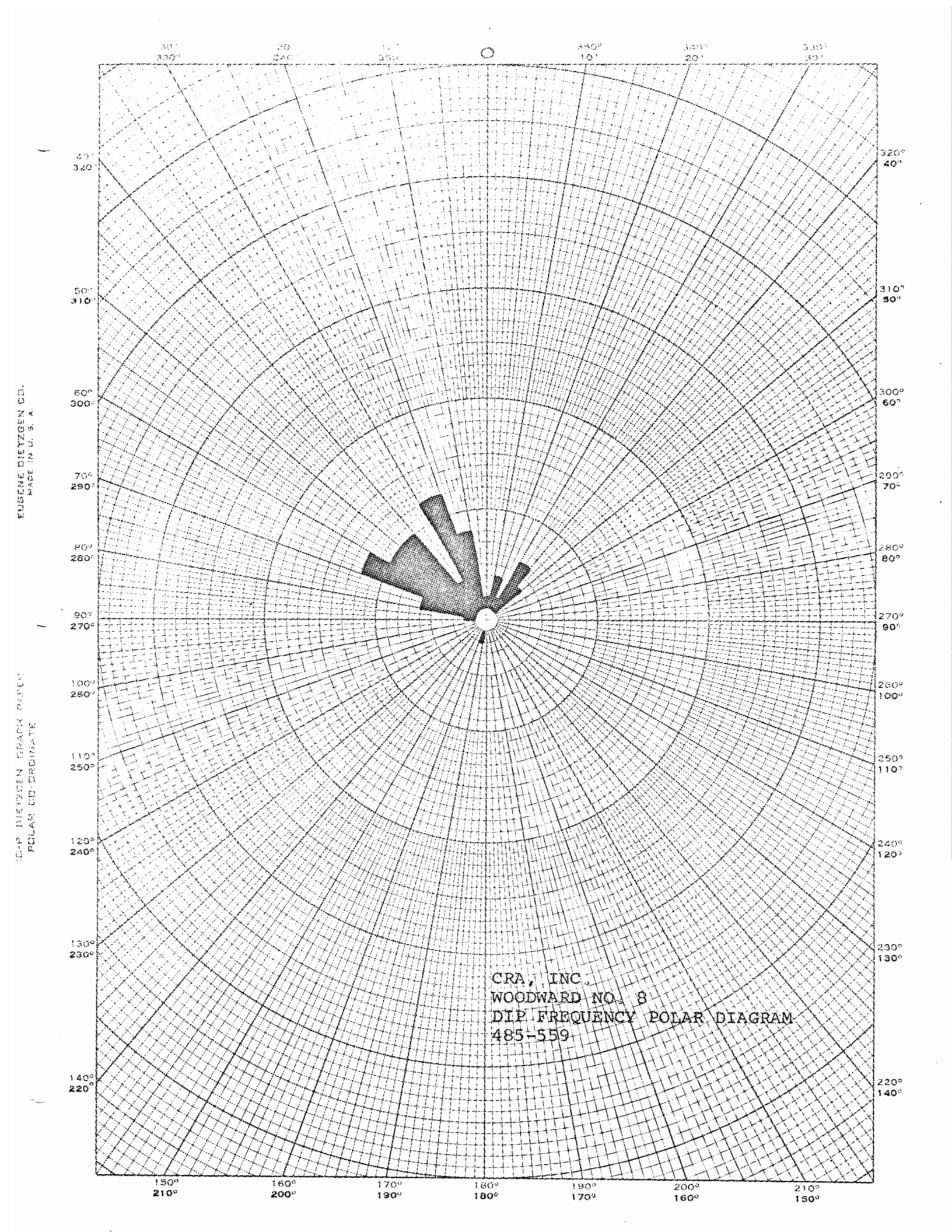
SCHLUMBERGER WELL SURVEYING CORPORATION
CONTINUOUS DIPMETER CALCULATIONS

CRA, INC.
WOODWARD NO. 8
BOURBON COUNTY, KANSAS

DEPTH	DIP	DIP AZM	DIP BRG	DEV	DEV AZM
399	2.9	19	N 19 E	0.0	98
400	3.8	8	N 8 E	0.0	98
401	1.1	33	N 33 E	0.0	93
403	2.9	14	N 14 E	0.0	93
405	2.2	31	N 31 E	0.0	91
407	2.2	31	N 31 E	0.0	91
408	3.8	1	N 1 E	0.0	91
409	2.9	50	N 50 E	0.0	91
410	1.9	58	N 58 E	0.0	88
411	1.9	58	N 58 E	0.0	88
412	1.9	58	N 58 E	0.0	88
415	2.9	69	N 69 E	0.0	88
416	2.2	28	N 28 E	0.0	88
418	5.5	23	N 23 E	0.0	83
419	4.0	9	N 9 E	0.0	83
422	4.0	9	N 9 E	0.0	83
425	2.2	23	N 23 E	0.0	83
427	2.9	42	N 42 E	0.0	83
428	1.9	53	N 53 E	0.0	83
429	1.9	53	N 53 E	0.0	83
431	4.0	74	N 74 E	0.0	88
433	2.9	64	N 64 E	0.0	83
435	4.0	97	S 83 E	0.0	83
439	1.9	53	N 53 E	0.0	83
441	1.9	233	S 53 W	0.0	83
443	4.2	37	N 37 E	0.0	83
446	1.1	23	N 23 E	0.0	83
447	3.0	97	S 83 E	0.0	78
449	4.0	64	N 64 E	0.0	78
451	3.8	48	N 48 E	0.0	78
452	4.0	92	S 88 E	0.0	78
453	3.8	108	S 72 E	0.0	78
454	2.9	59	N 59 E	0.0	78
456	1.1	78	N 78 E	0.0	78
457	1.9	48	N 48 E	0.0	78
460	4.4	198	S 18 W	0.0	78
463	3.4	18	N 18 E	0.0	78
465	4.9	55	N 55 E	0.0	78
467	9.5	312	N 48 W	0.0	78
469	3.1	37	N 37 E	0.0	78
477	2.9	104	S 76 E	0.0	63
479	4.8	35	N 35 E	0.0	58

481	6.9	337	N	23	W	0.0	53
485	5.7	18	N	18	E	0.0	48
487	1.1	48	N	48	E	0.0	48
489	3.3	343	N	17	W	0.0	43
491	1.1	43	N	43	E	0.0	43
493	2.9	347	N	13	W	0.0	28
495	1.9	298	N	62	W	0.0	28
497	3.3	333	N	27	W	0.0	33
499	4.0	324	N	36	W	0.0	38
500	1.1	33	N	33	E	0.0	33
501	2.9	309	N	51	W	0.0	28
503	1.9	298	N	62	W	0.0	28
505	2.2	318	N	42	W	0.0	18
507	4.0	304	N	56	W	0.0	18
508	2.9	299	N	61	W	0.0	18
510	4.0	332	N	28	W	0.0	18
511	1.9	343	N	17	W	0.0	13
513	2.9	337	N	23	W	0.0	18
515	2.2	338	N	22	W	0.0	38
516	3.4	38	N	38	E	0.0	38
517	3.0	24	N	24	E	0.0	43
519	2.0	193	S	13	W	0.0	43
521	4.1	14	N	14	E	0.0	28
523	1.9	348	N	12	W	0.0	18
525	2.9	332	N	28	W	0.0	13
527	2.9	327	N	33	W	0.0	8
528	2.2	308	N	52	W	0.0	8
530	3.3	308	N	52	W	0.0	8
533	4.0	317	N	43	W	0.0	3
536	4.0	292	N	68	W	0.0	338
537	4.8	301	N	59	W	0.0	338
539	5.8	313	N	47	W	0.0	343
541	3.0	334	N	26	W	0.0	353
542	3.0	317	N	43	W	0.0	358
545	3.3	288	N	72	W	0.0	348
547	1.1	38	N	38	E	0.0	338
549	2.9	352	N	8	W	0.0	333
551	2.9	9	N	9	E	0.0	328
553	2.9	282	N	78	W	0.0	323
555	4.5	318	N	42	W	0.0	318
556	5.9	294	N	66	W	0.0	313
557	4.1	299	N	61	W	0.0	313
558	4.0	288	N	72	W	0.0	318
559	5.4	277	N	83	W	0.0	326
563	1.9	296	N	64	W	0.0	326
565	4.8	49	N	49	E	0.0	326
567	6.7	303	N	57	W	0.0	328
569	3.0	314	N	46	W	0.0	333
571	4.9	315	N	45	W	0.0	338
572	5.0	301	N	59	W	0.0	338
573	4.2	292	N	68	W	0.0	338
575	2.3	268	S	88	W	0.0	328
577	5.8	358	N	2	W	0.0	328
579	5.9	345	N	15	W	0.0	326
583	7.1	303	N	57	W	0.0	328
584	5.5	279	N	81	W	0.0	328
585	6.6	277	N	83	W	0.0	328

587	5.7	298	N	62	W	0.0	328
591	10.2	283	N	77	W	0.0	326
593	9.7	270			W	0.0	318
595	3.0	59	N	59	E	0.0	318
597	7.2	259	S	79	W	0.0	303
599	8.3	284	N	76	W	0.0	298
603	8.1	312	N	48	W	0.0	298
605	7.3	236	S	56	W	0.0	288
607	13.6	249	S	69	W	0.0	288
609	12.5	255	S	75	W	0.0	288
612	3.0	302	N	58	W	0.0	283
613	5.3	85	N	85	E	0.0	288
615	5.6	48	N	48	E	0.0	288
616	4.1	18	N	18	E	0.0	288
618	4.4	357	N	3	W	0.0	283
622	4.4	29	N	29	E	0.0	283
624	3.2	117	S	63	E	0.0	278
627	14.8	119	S	61	E	0.0	243
630	2.5	278	N	82	W	0.0	218
633	4.4	212	S	32	W	0.0	198
635	6.8	216	S	36	W	0.8	198
637	5.7	181	S	1	W	0.8	203
638	3.9	148	S	32	E	0.8	203
641	3.5	240	S	60	W	0.8	203
642	2.1	121	S	59	E	0.9	203
643	3.2	165	S	15	E	0.9	203
645	6.8	149	S	31	E	0.9	198
647	6.8	217	S	37	W	0.9	208
649	4.5	221	S	41	W	0.9	208
651	3.4	241	S	61	W	0.9	203
652	0.3					0.9	198
654	3.4	152	S	28	E	0.9	208
656	1.8	121	S	59	E	0.9	213
657	1.7	125	S	55	E	0.9	213
659	3.5	273	N	87	W	0.8	218
661	6.1	336	N	24	W	0.8	228
663	4.9	292	N	68	W	0.8	236
664	3.3	312	N	48	W	0.8	218
665	2.6	244	S	64	W	0.8	218
667	4.0	4	N	4	E	0.8	221
668	4.7	31	N	31	E	0.8	223
669	1.3	337	N	23	W	0.8	218
671	5.2	318	N	42	W	0.8	218
673	6.2	258	S	78	W	0.8	223
675	1.9	147	S	33	E	0.8	228
676	0.3					0.8	233
677	4.5	173	S	7	E	0.8	213
678	2.4	170	S	10	E	0.8	223
679	4.3	180	S			0.8	223
680	2.5	228	S	48	W	0.9	208
681	6.3	156	S	24	E	0.9	223
683	2.4	218	S	38	W	0.9	218
685	15.2	229	S	49	W	0.9	218
687	14.2	245	S	65	W	0.9	218
689	10.5	218	S	38	W	1.0	213
691	7.8	183	S	3	W	1.0	213
693	6.9	179	S	1	E	1.0	213


EUGENE DIETZGEN CO.
MADE IN U. S. A.
K-P DIETZGEN GRAPH PAPER
POLAR COORDINATE
CRA, INC.
WOODWARD NO. 8
DIP FREQUENCY POLAR DIAGRAM
485-559