

CRA, INC.

Woodward CH-1

Dipmeter Report

Computer Inventoried

SCHLUMBERGER WELL SURVEYING CORPORATION

HOUSTON, TEXAS

November 26, 1965

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 Survey ran on your Woodward CH-1, Bourbon County, Kansas. 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 discussed below.

The sand interval from 772-784 is a channel sand which strikes east-west with thicker sand being south of this well. Sediments in this interval were transported from east to west, consequently, cleaner sand can be expected to the west. A location west of this well and slightly south of strike should find the sand slightly thicker, provided you don't cross the axis of the channel system.

The shaley sand interval from 636-70 is a bar-type sand system which strikes N30E-S30W with thicker sand being N60W from this well. Structural dip appears to be one degree or less to the west.

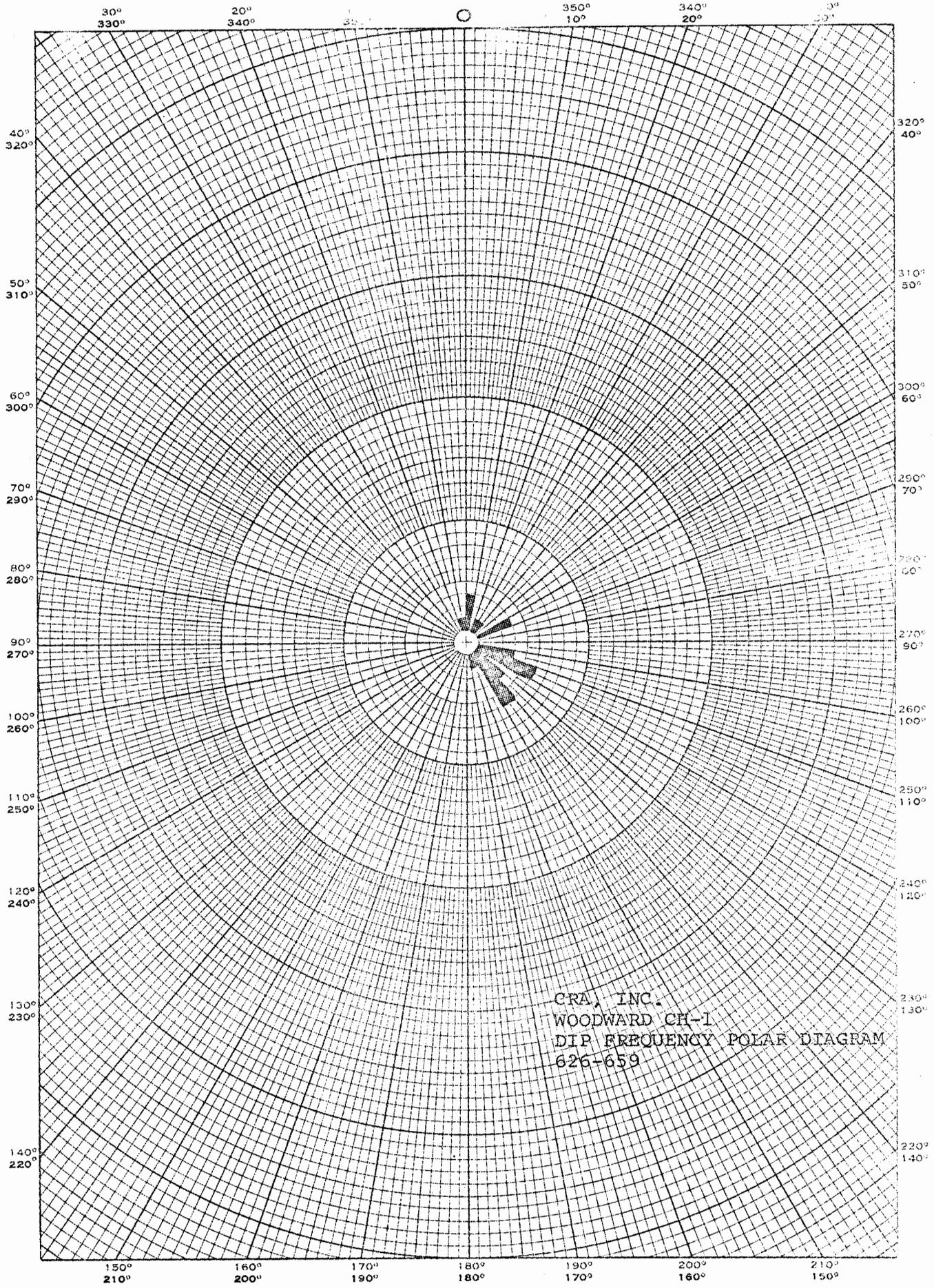
The above interpretations represent our best judgement, and we are happy to give them to you. Nevertheless, since all interpretations are based on inferences from electrical and other measurements, we cannot and do not guarantee their accuracy or correctness, and we shall not be liable or responsible, 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.

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


Sam Fain

EUGENE DIETZSEN CO.
MADE IN U. S. A.

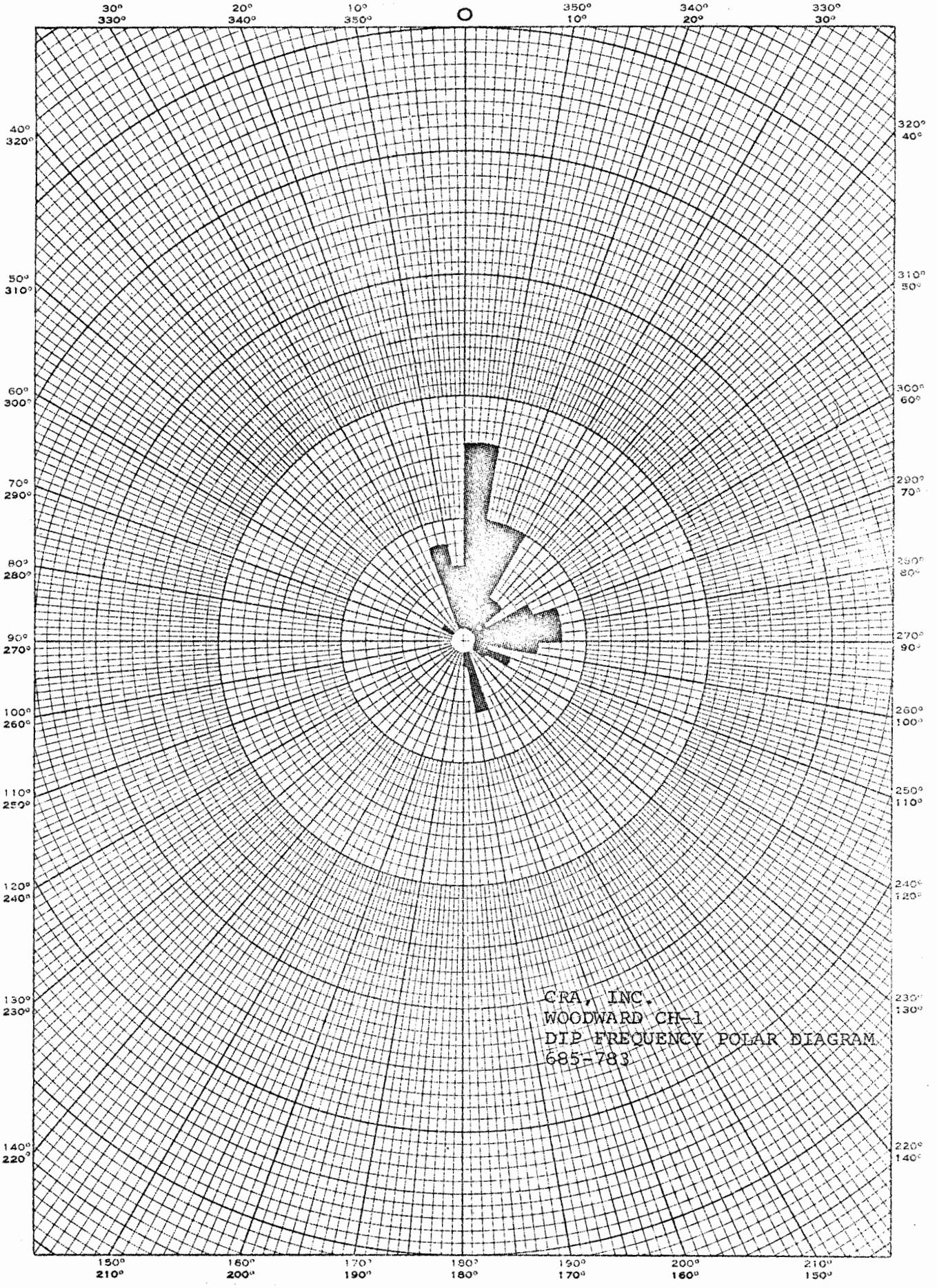
NO. 340-P DIETZSEN GRAPH PAPER
POLAR CO-ORDINATE



CRA, INC.
WOODWARD CH-1
DIP FREQUENCY POLAR DIAGRAM
626-659

EUGENE DIETZGEN CO.
MADE IN U. S. A.

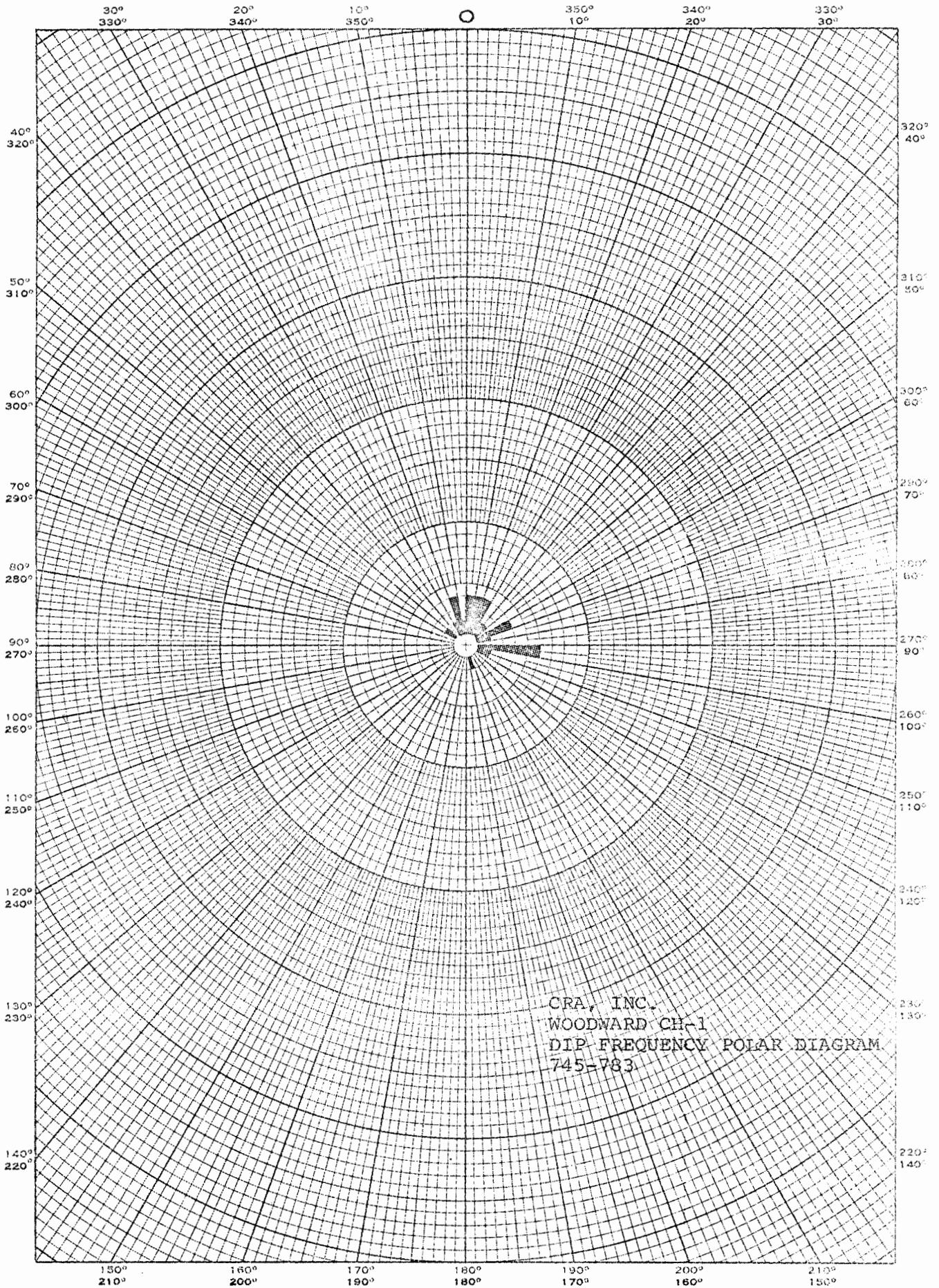
NO. 940-P DIETZGEN GRAPH PAPER
POLAR CO-ORDINATE



CRA, INC.
WOODWARD CH-1
DIP FREQUENCY POLAR DIAGRAM
685-783

EUGENE DIETZGEN CO.
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NO. 340-P. DIETZGEN GRAPH PAPER
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JOB NO. 417

SCHLUMBERGER WELL SURVEYING CORPORATION
CONTINUOUS DIPMETER CALCULATIONS

C. R. A., INC.
WOODWARD COREHOLE NO. 1
BOURBON COUNTY, KANSAS

DEPTH	DIP	DIP AZM	DIP BRG	DEV	DEV AZM
353	1.9	298	N 62 W	0.0	328
354	1.9	178	S 2 E	0.0	328
355	4.7	171	S 9 E	0.0	328
356	1.1	148	S 32 E	0.0	328
357	2.8	227	S 47 W	0.0	328
358	3.7	178	S 2 E	0.0	328
359	2.8	189	S 9 W	0.0	328
361	2.9	124	S 56 E	0.0	323
363	5.6	168	S 12 E	0.0	318
365	4.4	133	S 47 E	0.0	313
367	5.7	158	S 22 E	0.0	308
369	6.5	168	S 12 E	0.0	313
371	6.6	168	S 12 E	0.0	313
373	6.5	163	S 17 E	0.0	318
374	1.9	108	S 72 E	0.0	318
375	8.6	239	S 59 W	0.0	318
377	3.8	348	N 12 W	0.0	318
379	2.9	239	S 59 W	0.0	318
380	5.8	277	N 83 W	0.0	318
381	7.5	283	N 77 W	0.0	313
383	6.7	278	N 82 W	0.0	313
385	4.8	290	N 70 W	0.0	313
386	6.7	288	N 72 W	0.0	313
387	6.1	322	N 38 W	0.0	313
389	5.8	332	N 28 W	0.0	313
392	5.0	329	N 31 W	0.0	318
393	4.7	341	N 19 W	0.0	318
394	4.4	323	N 37 W	0.0	323
395	3.3	323	N 37 W	0.0	323
396	4.4	323	N 37 W	0.0	323
397	2.9	342	N 18 W	0.0	323
399	1.1	263	S 83 W	0.0	323
401	3.3	318	N 42 W	0.0	318
402	4.7	341	N 19 W	0.0	318
403	4.4	318	N 42 W	0.0	318
405	3.3	318	N 42 W	0.0	318
406	5.0	302	N 58 W	0.0	313
407	7.8	299	N 61 W	0.0	313
409	5.0	319	N 41 W	0.0	308
410	5.8	327	N 33 W	0.0	308

411	4.4	308	N 52 W	0.0	308
412	3.9	294	N 66 W	0.0	308
414	2.9	327	N 33 W	0.0	308
415	3.8	338	N 22 W	0.0	308
417	4.4	303	N 57 W	0.0	303
419	5.0	314	N 46 W	0.0	303
420	6.1	307	N 53 W	0.0	298
423	2.2	303	N 57 W	0.0	303
425	5.4	306	N 54 W	0.0	306
427	5.0	317	N 43 W	0.0	306
429	2.2	308	N 52 W	0.0	308
431	1.9	158	S 22 E	0.0	308
433	2.9	349	N 11 W	0.0	308
435	7.7	281	N 79 W	0.0	303
437	7.2	290	N 70 W	0.0	298
439	7.2	306	N 54 W	0.0	298
441	2.9	317	N 43 W	0.0	298
445	4.0	224	S 44 W	0.0	298
447	2.2	238	S 58 W	0.0	298
448	2.9	317	N 43 W	0.0	298
449	2.9	214	S 34 W	0.0	293
450	4.0	274	N 86 W	0.0	288
451	4.0	279	N 81 W	0.0	293
453	1.9	261	S 81 W	0.0	291
455	2.9	269	S 89 W	0.0	288
457	0.0			0.0	288
459	7.7	108	S 72 E	0.0	288
461	5.7	138	S 42 E	0.0	288
463	4.7	131	S 49 E	0.0	288
465	2.2	168	S 12 E	0.0	288
468	4.3	108	S 72 E	0.0	288
471	3.9	89	N 89 E	0.0	283
473	3.8	133	S 47 E	0.0	283
475	2.2	163	S 17 E	0.0	283
476	2.9	199	S 19 W	0.0	278
477	1.1	278	N 82 W	0.0	278
478	1.1	218	S 38 W	0.0	278
479	1.1	98	S 82 E	0.0	278
482	1.1	278	N 82 W	0.0	278
483	1.9	243	S 63 W	0.0	273
485	3.3	268	S 88 W	0.0	268
486	1.9	238	S 58 W	0.0	268
487	1.1	328	N 32 W	0.0	268
489	2.2	323	N 37 W	0.0	263
490	2.9	239	S 59 W	0.0	258
491	2.9	277	N 83 W	0.0	258
493	1.9	228	S 48 W	0.0	258
495	2.2	251	S 71 W	0.0	251
497	3.3	248	S 68 W	0.0	248
498	1.9	218	S 38 W	0.0	248
500	3.3	188	S 8 W	0.0	248
501	3.9	202	S 22 W	0.0	248
504	2.2	243	S 63 W	0.0	243
505	1.9	208	S 28 W	0.0	238
507	2.9	219	S 39 W	0.0	238
509	1.9	203	S 23 W	0.0	233
511	3.9	122	S 58 E	0.0	228

514	2.9	122	S 58 E	0.0	223
515	2.2	163	S 17 E	0.0	223
517	2.9	144	S 36 E	0.0	223
519	2.2	98	S 82 E	0.0	218
521	0.0			0.0	218
522	1.9	128	S 52 E	0.0	218
523	1.1	153	S 27 E	0.0	213
525	3.8	123	S 57 E	0.0	213
526	2.2	93	S 87 E	0.0	213
528	2.2	148	S 32 E	0.0	208
529	1.1	28	N 28 E	0.0	208
531	1.9	118	S 62 E	0.0	208
533	1.1	268	S 88 W	0.0	208
535	3.8	118	S 62 E	0.0	208
537	2.9	127	S 53 E	0.0	206
541	1.9	173	S 7 E	0.0	203
543	1.9	168	S 12 E	0.0	198
544	2.9	179	S 1 E	0.0	198
545	3.8	223	S 43 W	0.0	193
546	1.9	158	S 22 E	0.0	188
547	2.2	198	S 18 W	0.0	198
548	5.2	153	S 27 E	0.0	188
551	3.9	132	S 48 E	0.0	178
553	2.9	127	S 53 E	0.0	168
555	2.2	108	S 72 E	0.0	168
557	2.2	108	S 72 E	0.0	168
559	2.2	106	S 74 E	0.0	166
561	1.1	103	S 77 E	0.0	163
563	2.2	163	S 17 E	0.0	163
564	2.2	98	S 82 E	0.0	158
567	2.9	199	S 19 W	0.0	158
568	2.2	153	S 27 E	0.0	153
569	1.9	178	S 2 E	0.0	148
571	2.2	148	S 32 E	0.0	148
572	5.8	107	S 73 E	0.0	148
577	5.4	106	S 74 E	0.0	166
583	3.9	94	S 86 E	0.0	168
585	3.3	108	S 72 E	0.0	168
587	3.3	108	S 72 E	0.0	168
589	2.2	108	S 72 E	0.0	168
591	3.0	89	N 89 E	0.0	168
593	1.1	43	N 43 E	0.0	163
597	4.7	135	S 45 E	0.0	158
599	3.3	153	S 27 E	0.0	153
601	5.0	142	S 38 E	0.0	153
603	4.0	139	S 41 E	0.0	153
605	7.9	74	N 74 E	0.0	148
607	4.7	60	N 60 E	0.0	143
611	6.1	32	N 32 E	0.0	143
612	2.2	18	N 18 E	0.0	138
613	1.1	78	N 78 E	0.0	138
615	2.2	18	N 18 E	0.0	138
617	4.8	55	N 55 E	0.0	138
619	3.8	43	N 43 E	0.0	133
621	2.9	92	S 88 E	0.0	133
623	2.9	30	N 30 E	0.0	131
624	2.9	30	N 30 E	0.0	131

625	0.0				0.0	128	
626	2.9	27	N	27	E	0.0	128
627	2.2	8	N	8	E	0.0	128
629	2.9	349	N	11	W	0.0	128
631	1.1	8	N	8	E	0.0	128
633	0.0					0.0	128
634	1.9	38	N	38	E	0.0	128
635	3.3	68	N	68	E	0.0	128
637	8.5	162	S	18	E	0.0	128
640	4.6	103	S	77	E	0.0	126
643	3.9	142	S	38	E	0.0	128
644	3.9	112	S	68	E	0.0	126
645	5.8	107	S	73	E	0.0	126
647	3.8	156	S	24	E	0.0	126
648	0.0					0.0	123
649	2.9	142	S	38	E	0.0	123
650	1.1	63	N	63	E	0.0	123
651	1.9	148	S	32	E	0.0	118
652	2.2	123	S	57	E	0.0	123
653	4.0	132	S	48	E	0.0	118
655	1.1	118	S	62	E	0.0	118
657	2.9	132	S	48	E	0.0	113
658	1.1	113	S	67	E	0.0	113
659	1.1	353	N	7	W	0.0	113
661	1.1	233	S	53	W	0.0	113
663	2.2	293	N	67	W	0.0	113
664	2.9	334	N	26	W	0.0	113
665	1.1	353	N	7	W	0.0	113
667	1.9	23	N	23	E	0.0	113
668	2.9	12	N	12	E	0.0	113
669	2.9	12	N	12	E	0.0	113
671	1.1	168	S	12	E	0.0	108
672	2.9	24	N	24	E	0.0	103
673	2.9	24	N	24	E	0.0	103
675	2.9	19	N	19	E	0.0	98
677	3.8	8	N	8	E	0.0	98
678	4.0	347	N	13	W	0.0	93
679	2.9	12	N	12	E	0.0	91
681	1.9	60	N	60	E	0.0	90
682	1.1	28	N	28	E	0.0	88
683	4.0	42	N	42	E	0.0	88
685	4.0	74	N	74	E	0.0	88
687	5.5	88	N	88	E	0.0	88
688	6.7	353	N	7	W	0.0	88
691	4.0	160	S	20	E	0.0	86
695	1.1	83	N	83	E	0.0	83
697	4.8	166	S	14	E	0.0	83
699	2.9	359	N	1	W	0.0	78
700	4.8	341	N	19	W	0.0	78
702	2.2	18	N	18	E	0.0	78
703	3.3	18	N	18	E	0.0	78
704	5.1	24	N	24	E	0.0	73
707	4.8	26	N	26	E	0.0	63
708	4.0	49	N	49	E	0.0	63
709	3.8	33	N	33	E	0.0	63
712	2.2	178	S	2	E	0.0	58
713	2.9	17	N	17	E	0.0	58

715	5.1	4	N	4	E	0.0	53
716	4.0	7	N	7	E	0.0	53
719	2.9	7	N	7	E	0.0	48
721	3.3	348	N	12	W	0.0	48
723	2.9	7	N	7	E	0.0	48
724	2.9	7	N	7	E	0.0	48
725	4.0	2	N	2	E	0.0	48
727	3.8	21	N	21	E	0.0	51
728	5.8	67	N	67	E	0.0	48
729	6.7	73	N	73	E	0.0	48
731	4.8	71	N	71	E	0.0	48
733	7.2	116	S	64	E	0.0	48
735	4.0	62	N	62	E	0.0	48
737	2.9	87	N	87	E	0.0	46
738	0.0					0.0	43
741	4.0	360	N			0.0	46
743	4.8	126	S	54	E	0.0	43
745	4.8	66	N	66	E	0.0	43
747	2.2	343	N	17	W	0.0	43
748	1.9	308	N	52	W	0.0	38
749	2.2	338	N	22	W	0.0	38
751	3.8	8	N	8	E	0.0	38
752	2.2	96	S	84	E	0.0	36
755	3.9	162	S	18	E	0.0	28
756	4.7	106	S	74	E	0.0	23
758	11.4	113	S	67	E	0.0	18
760	8.6	44	N	44	E	0.0	18
763	10.4	6	N	6	E	0.0	11
764	10.4	13	N	13	E	0.0	8
765	9.5	38	N	38	E	0.0	8
767	5.8	27	N	27	E	0.0	8
769	6.1	17	N	17	E	0.0	8
770	6.9	24	N	24	E	0.0	8
771	5.8	349	N	11	W	0.0	8
773	9.0	354	N	6	W	0.0	6
777	7.7	80	N	80	E	0.0	358
779	10.4	91	S	89	E	0.0	358
781	4.8	71	N	71	E	0.0	348
783	5.1	92	S	88	E	0.0	343
785	5.9	149	S	31	E	0.0	348
793	9.6	186	S	6	W	0.0	343
795	13.9	206	S	26	W	0.0	338
797	16.3	309	N	51	W	0.0	326
798	15.1	180	S			0.0	338
801	12.4	180	S			0.0	338
803	14.8	208	S	28	W	0.0	343
805	12.4	201	S	21	W	0.0	343
809	13.4	142	S	38	E	0.0	343
811	10.5	202	S	22	W	0.0	343
815	12.0	158	S	22	E	0.0	338
817	11.1	168	S	12	E	0.0	338
819	7.0	174	S	6	E	0.0	338
820	4.5	153	S	27	E	0.0	333
823	4.4	148	S	32	E	0.0	328
824	9.4	142	S	38	E	0.0	328
827	8.7	182	S	2	W	0.0	328
829	4.9	51	N	51	E	0.0	328

831	3.0	189	S	9	W	0.0	328
833	4.5	153	S	27	E	0.0	333
835	3.8	358	N	2	W	0.0	328
836	3.0	309	N	51	W	0.0	328