KANSAS GEOLOGICAL SURVEY
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Influence of the Lawrence Alluvial Sanitary
Landfill Upon Local Groundwater Quality

by

L.R. Hathaway
B. Carr

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Kansas Geological Survey
1930 Constant Avenue
University of Kansas
Lawrence, KS 66047-3726

Table 1. Depths and Slotted Intervals for Wells Drilled March, 1974

Well No.	Depth Drilled (ft.)	Depth Cased (ft.)	Interval Slotted (below LSD)	Amount of Pipe Above LSD
1	abandoned			
2	48	45.2	27.2-31.2	1.5
3	31	31	10.7-20.3	2.5
4	37.5	37.5	18-28	2.0
5	38.5	38.5	18.5-38.5	1.0
6	38.5	38.5	18.5-38.5	1.0
7	61	58.5	42.5-52.5	1.0
8	18	18	8-18	1.5
9	29	28.7	8.7-28.7	2.3
10	38.5	37.5	7.5-37.5	3.0
11	39.5	39.5	9.5-39.5	1.0
12	86*	79.5	19.5-59.5	1.0
13	25	25	5-25	
14	sanded-in			

*6 feet below bedrock

figure 3. Temperature Variation.

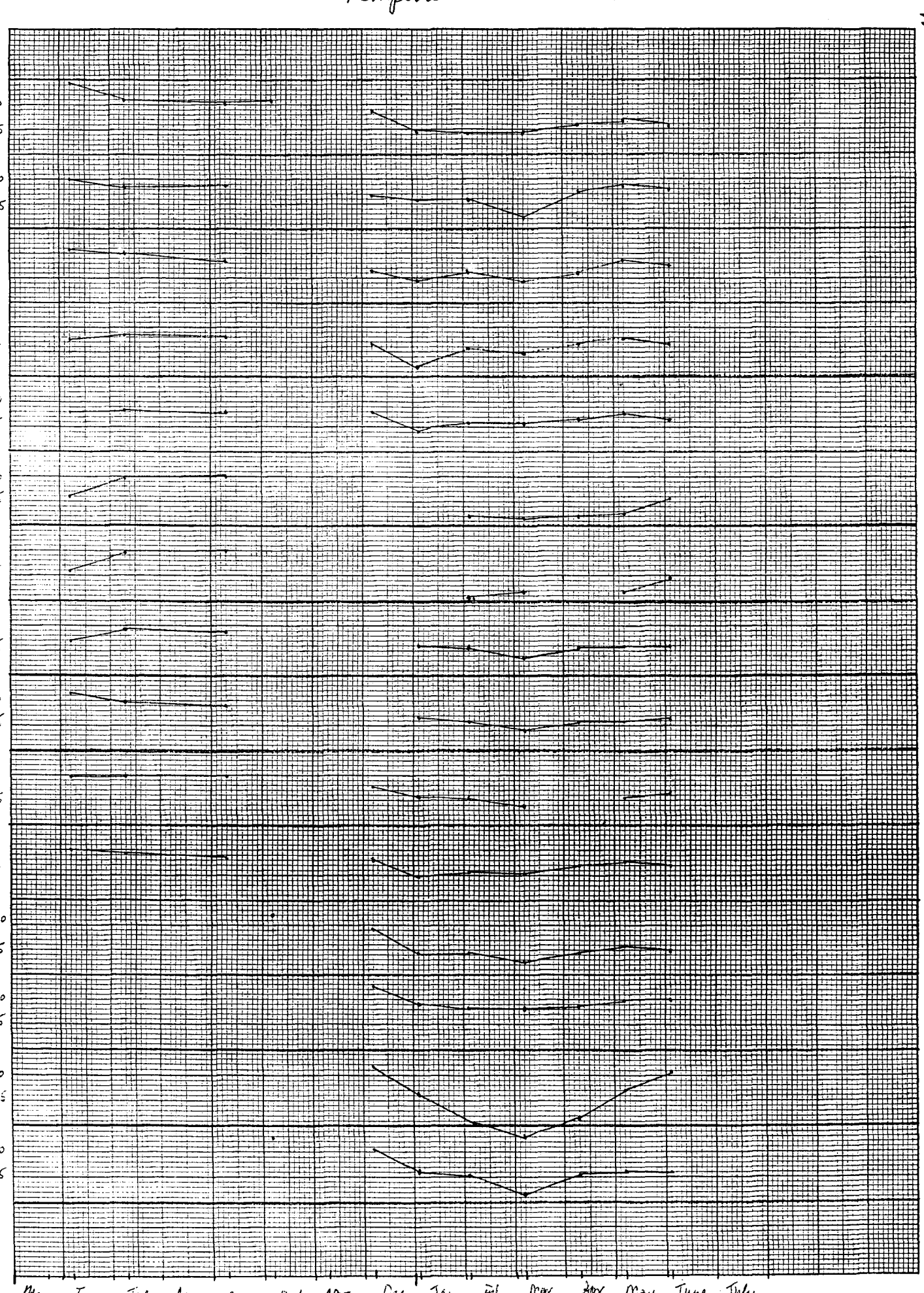


Figure 7.

Specific Conductance Variation

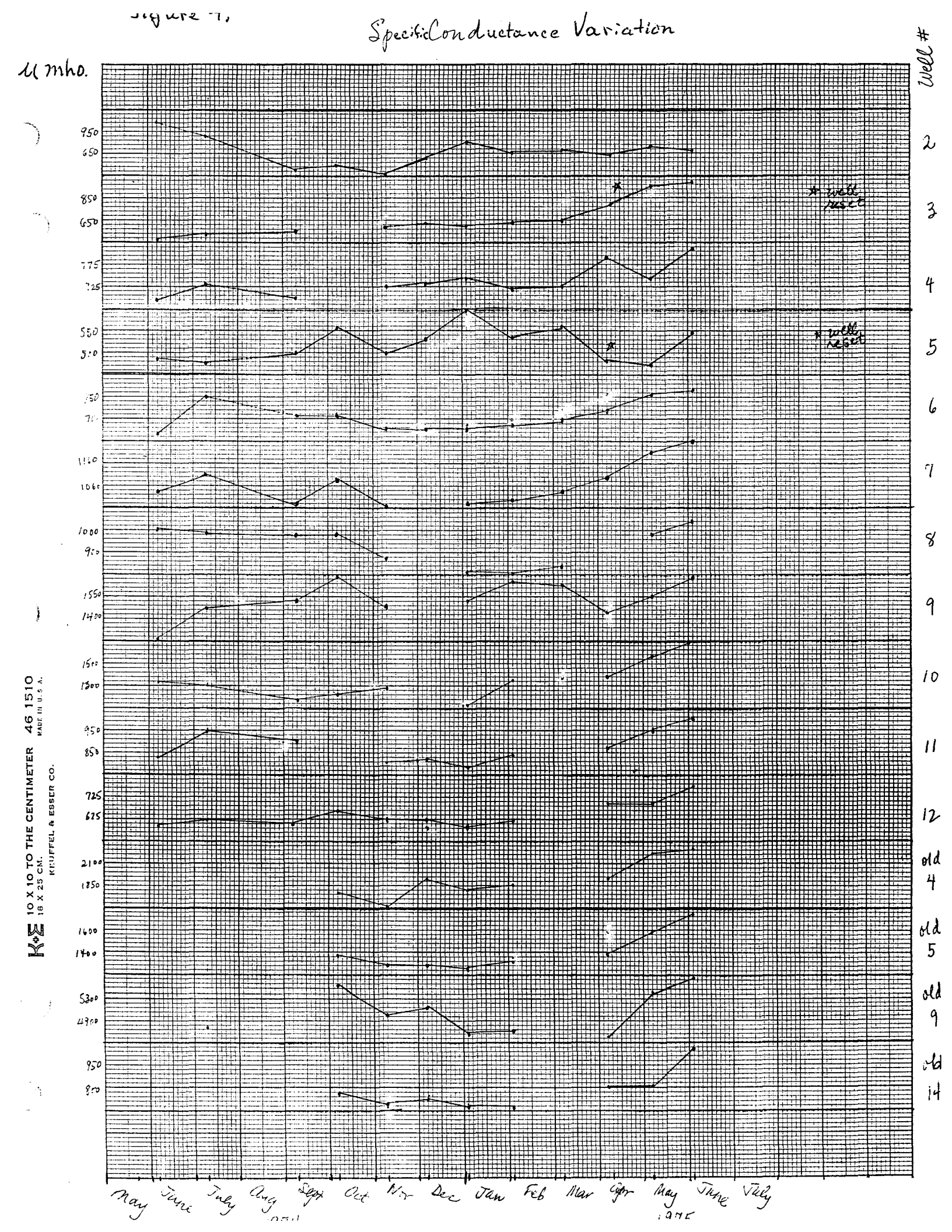
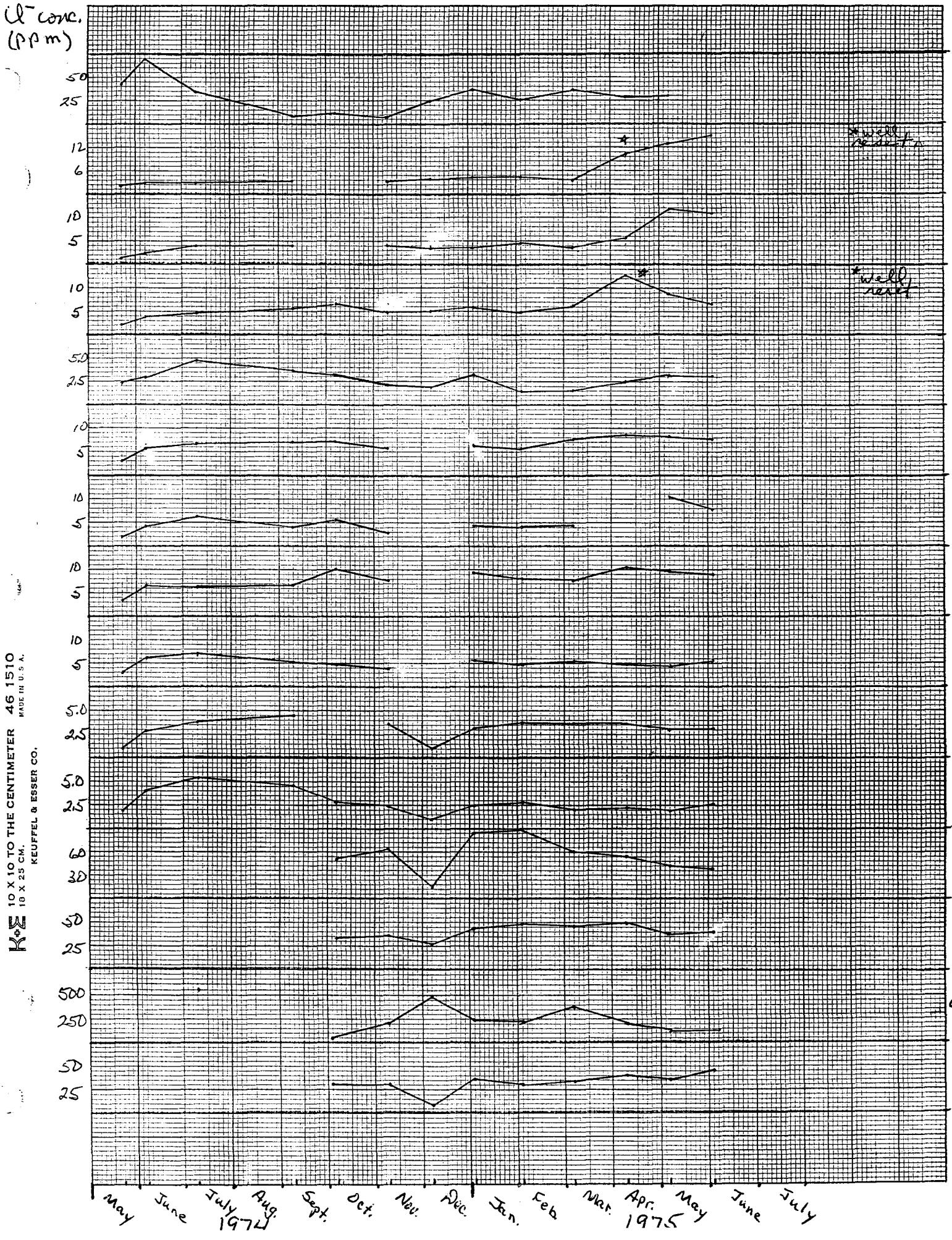


Figure 6. Cl Variation



10 X 10 TO THE CENTIMETER 46 1510
10 X 25 CM.
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same creek. Persistent values of 1-5 ppm for NH_4^+ in wells 7 and 8 suggest a general groundwater movement in a west to southwest direction. NO_3^- values obtained for wells 3, 9 and 11 suggest possible effects from agricultural and/or domestic activity which tend to complicate interpretation of possible effects of the landfill upon groundwater quality in the area. Another unknown, which was not studied in this investigation, is the effect of ponds which have developed in borrow areas to the north of the landfill on the areal groundwater quality. The relatively high specific conductances noted for wells 9 and 10 suggest these ponds may be a factor in local ground water quality. At the time of this report there is little evidence for the movement of leachate highly contaminated with inorganic salts from the local vicinity of the landfill. This study does not consider the potential release and migration of undesirable organics in the landfill leachate, primarily because of the possibility of contamination from the PVC casing and the lack of ready access to instrumentation (G.C. - Mass Spec.) necessary for such work.

Table 2. Temperature (C°)

Date	Well Number 2	3	4	5	6	7	8	9	10	11	12	13	old 4	old 5	old 9	old 14
5/21/74	-	-	-	-	-	-	-	-	--	--	--	--	-	-	-	--
6/6	17.1	15.0	15.3	13.8	14.0	13.0	13.0	13.5	15.7	14.8	15.0	--	-	-	-	--
6/24	14.2	13.9	13.8	13.8	13.9	1.37	14.0	13.5	13.2	14.1	14.0	--	-	-	-	--
7/8	15.4	14.2	15.0	14.1	14.2	14.8	14.8	14.6	14.8	15.0	14.6	--	-	-	-	--
7/22	-	-	-	-	-	-	-	-	--	--	--	--	-	-	-	--
9/9	15.0	14.4	14.1	14.0	14.0	15.0	15.0	14.4	14.5	14.9	14.1	--	-	-	-	--
9/23	14.7	13.8	14.1	14.0	13.7	15.0	15.0	14.0	14.8	14.3	14.0	--	-	16.5	20.0	--
10/7	15.3	-	-	-	-	-	-	-	--	--	--	--	16.0	-	-	16.3
10/25	14.9	14.2	14.3	13.5	14.0	15.0	15.0	15.1	14.7	14.2	14.0	--	15.9	17.7	19.0	16.4
11/8	-	-	-	-	-	-	-	-	--	--	--	--	-	-	-	--
11/22	15.1	13.9	14.2	13.9	14.0	14.5	14.5	14.5	14.8	14.6	14.0	--	16.1	16.9	17.4	16.1
12/6	14.4	13.3	13.2	13.2	14.0	-	-	-	--	13.8	14.0	--	14.5	16.3	15.7	15.1

	Well Number															
Date	2	3	4	5	6	7	8	9	10	11	12	13	old 4	old 5	old 9	old 14
1/3/75	12.2	12.9	12.2	11.0	12.0	-	-	13.0	13.4	12.8	12.4	--	12.1	14.5	13.1	13.0
1/17	13.9	13.1	13.7	12.9	13.0	12.4	11.9	13.4	12.4	13.0	13.1	--	13.1	15.0	11.7	13.2
2/3	13.1	12.2	11.8	12.9	12.3	12.1	11.5	13.6	12.9	12.7	13.1	--	12.9	14.9	10.9	13.1
2/20	12.0	13.0	13.1	12.8	12.9	11.0	10.2	12.9	12.9	12.7	12.9	--	12.2	14.1	10.3	12.6
3/6	12.0	11.0	12.1	12.4	12.7	10.8	10.8	11.8	12.0	11.9	12.7	--	11.4	14.0	9.0	10.8
3/20	13.0	13.4	13.7	13.3	13.4	13.0	12.8	13.7	13.0	13.6	13.4	--	12.7	14.4	10.9	12.8
4/9*	12.9	13.7	13.0	13.2	13.2	11.0	-	12.8	12.8	--	13.5	12.5	12.2	14.3	10.7	12.7
4/23	13.0	14.0	14.8	13.0	13.2	11.4	11.0	12.9	13.3	12.9	13.5	13.2	13.0	15.7	12.2	13.2
5/7	13.3	14.2	14.2	13.8	13.8	11.3	10.9	13.0	12.8	12.7	13.8	12.9	12.9	14.9	13.5	13.1
6/2	12.9	13.9	13.8	13.2	13.1	12.8	12.3	13.0	13.2	13.2	13.4	14.8	12.4	14.9	15.4	13.0
6/18	14.3	-	-	14.0	13.2	15.0	14.0	14.0	13.8	14.2	13.7	17.0	14.0	16.0	17.3	14.7

*Well 3 and 5 reset prior to collection.

Table 3. Specific Conductance (μmhos)

Date	Well Number 2	3	4	5	6	7	8	9	10	11	12	13	old 4	old 5	old 9	old 14
5/21/74	-	-	-	-	-	-	-	-	--	--	--	--	-	-	-	--
6/6	1068	470	694	484	594	1033	1005	1260	1330	833	595	--	-	-	-	--
6/24	847	462	681	459	832	979	898	1300	1280	822	593	--	-	-	-	--
7/8	890	578	731	476	849	1106	986	1470	1300	942	620	--	-	-	-	--
7/22	-	-	-	-	-	-	-	-	--	--	--	--	2020	1950	5540	1380
9/9	427	543	701	499	719	976	981	1521	1173	895	604	--	-	-	-	--
9/23	424	589	792	543	741	1081	745	1520	987	912	669	--	-	1133	5050	--
10/7	490	-	-	553	721	1086	980	1680	1220	--	663	--	1760	1360	5420	726
10/25	434	640	789	529	688	1073	963	1700	1300	847	664	--	1790	1350	5470	738
11/8	388	585	725	497	627	963	872	1470	1280	807	625	--	1610	1280	5000	690
11/22	363	581	706	492	610	972	850	1510	1280	807	621	--	1770	1230	5080	717
12/6	592	615	731	530	633	-	-	-	-	817	616	--	1922	1280	5140	716

	Well Number															
Date	2	3	4	5	6	7	8	9	10	11	12	13	old 4	old 5	old 9	old 14
1/3/75	800	602	744	599	633	979	810	1520	1132	786	593	--	1800	1240	4660	676
1/17	714	614	741	521	635	976	811	1540	1280	830	607	--	1820	1280	4570	679
2/3	688	627	722	533	665	999	805	1650	1350	832	614	--	1860	1330	4720	668
2/20	794	670	765	578	729	1086	879	1710	1390	872	654	--	2000	1400	4920	691
3/6	691	646	725	557	697	1035	838	1640	--	--	--	--	-	-	-	--
3/20	-	-	-	-	-	-	-	-	--	--	--	--	-	-	-	--
4/9*	638	781	789	480	761	1095	-	1441	1380	869	698	1010	1940	1380	4600	800
4/23	760	818	1960	450	746	1110	897	1430	1490	853	641	1068	2060	1499	5200	759
5/7	760	954	741	471	868	1210	982	1549	1560	946	701	883	2210	1580	5400	810
6/2	682	990	810	545	905	1260	1040	1675	1690	1000	770	1020	2270	1740	5650	1060
6/18	673	-	-	785	785	1280	962	1750	1775	1060	787	890	2320	1750	5800	1010

*Wells 3 and 5 reset prior to collection.

Table 4. Chloride (ppm)

Date	Well Number 2	3	4	5	6	7	8	9	10	11	12	13	old 4	old 5	old 9	old 14
5/21/74	42	2.0	1.2	2.0	2.3	3.0	1.9	3.4	3.0	1.0	1.8	--	-	-	-	--
6/6	69	2.8	2.4	3.8	2.8	5.7	4.2	6.3	6.0	2.8	4.0	--	-	-	-	--
6/24	30	2.4	3.0	5.0	7.1	7.0	4.4	7.8	8.3	4.1	7.4	--	-	-	-	--
7/8	34	2.7	4.0	4.7	4.7	6.6	6.2	6.2	7.0	3.8	5.3	--	-	-	-	--
7/22	-	-	-	-	-	-	-	-	--	--	--	--	63	77	286	50
9/9	7.8	3.4	4.0	5.5	3.6	7.0	4.0	6.7	5.1	4.5	4.6	--	-	-	-	--
9/23	8.9	3.9	4.1	5.3	3.2	8.7	6.6	7.5	5.1	3.6	3.4	--	-	30	453	--
10/7	12	-	-	6.3	3.1	7.1	5.5	10	4.8	--	2.8	--	50	33	398	31
10/25	7.8	3.0	3.9	5.1	2.3	5.8	4.9	8.0	5.8	3.1	2.4	--	44	33	271	31
11/8	6.8	3.2	4.0	4.8	2.1	5.7	2.9	7.6	3.9	3.6	2.4	--	63	36	206	32
11/22	7.7	3.1	3.3	4.8	1.9	6.1	3.4	8.6	5.2	3.3	2.6	--	60	38	256	31
12/6	24	3.8	3.4	5.0	1.8	-	-	-	--	3.4	2.7	--	52	38	325	33

	Well Number															
Date	2	3	4	5	6	7	8	9	10	11	12	13	old 4	old 5	old 9	old 14
1/3/75	38	3.9	3.6	5.9	3.3	6.3	4.2	9.2	5.4	3.1	2.5	--	84	43	242	37
1/17	30	3.4	3.8	5.5	2.0	6.2	3.6	10	4.4	4.2	2.2	--	91	42	215	35
2/3	25	4.1	4.3	4.9	1.4	5.7	4.0	8.0	4.9	3.7	2.8	--	89	48	220	32
2/20	34	3.4	3.2	5.2	1.6	5.8	4.3	7.8	3.9	3.3	1.8	--	57	47	375	30
3/6	36	3.5	3.6	6.2	1.6	7.6	4.4	7.7	5.2	3.6	2.1	--	61	46	369	34
3/20	36	3.4	3.6	5.0	2.0	6.0	3.9	6.8	4.4	3.1	2.4	--	61	43	355	32
4/9*	28	10	5.5	13	2.5	8.4	-	10	4.8	3.7	2.3	11	55	48	200	41
4/23	29	9.4	53	11	2.1	10	4.7	108	7.4	4.3	2.4	10	40	40	97	37
5/7	29	13	12	8.8	3.2	8.1	10	9.7	4.6	3.0	1.8	10	42	38	133	36
6/2	-	15	11	6.4	3.1	7.6	7.8	9.0	5.5	3.1	2.6	9.4	38	40	138	46
6/18	14	-	-	4.1	2.4	6.8	7.5	12	5.3	3.8	5.2	4.2	29	49	323	44

*Wells 3 and 5 reset prior to collection.

Table 5.

NH_4^+ (ppm)

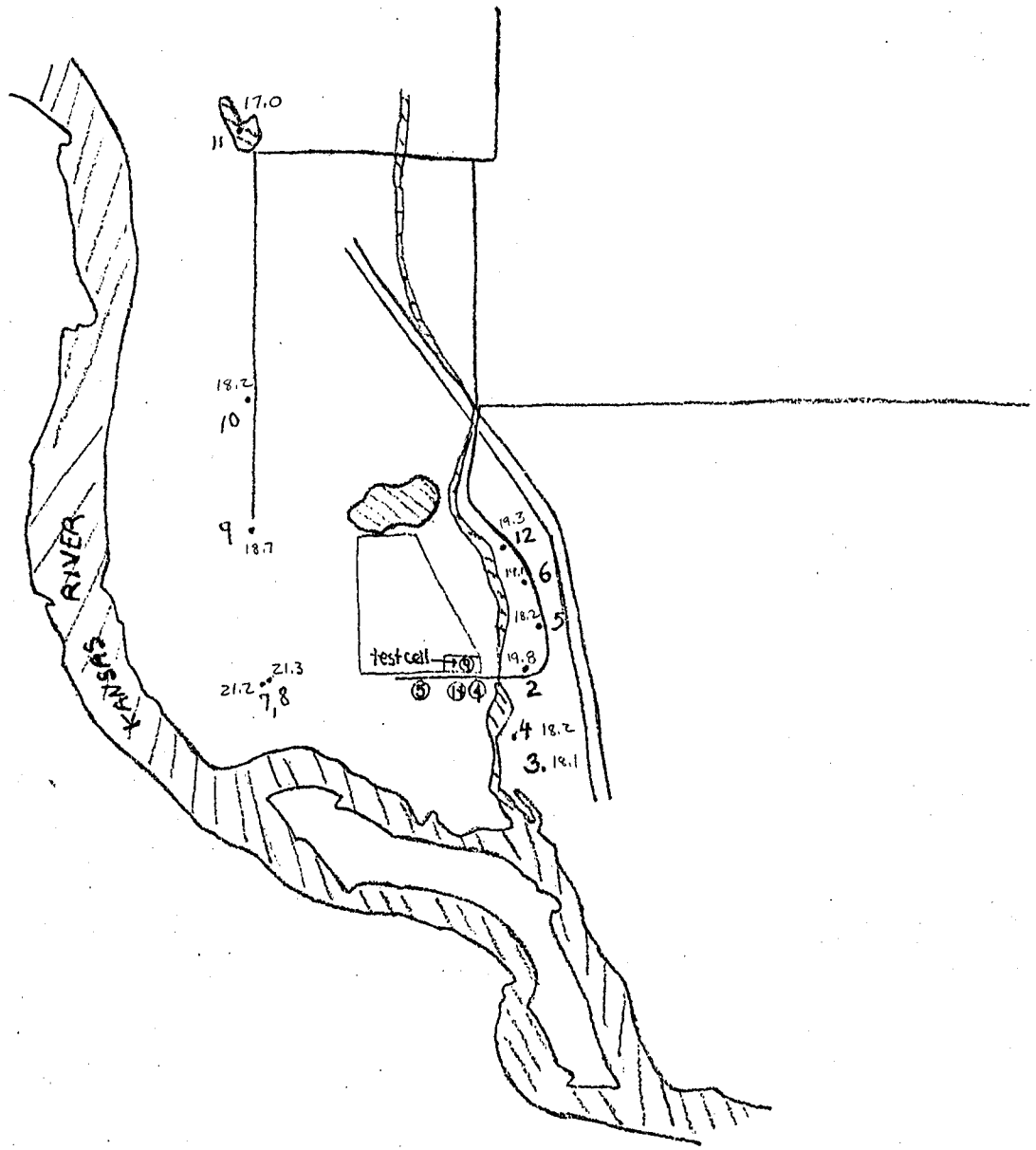
Date	Well Number 2	3	4	5	6	7	8	9	10	11	12	13	old 4	old 5	old 9	old 14
10/25/74	1.4	<1	<1	<1	<1	1.4	1.9	<1	<1	<1	<1	--	9.5	21	408	3.6
11/22	3.4	1.8	1.0	1.5	<1	2.3	5.3	<1	1.5	1.3	<1	--	12	24	400	6.0
12/6	3.0	1.0	<1	<1	<1	-	-	-	--	<1	<1	--	14	27	480	8.0
1/3/75	1.7	<1	<1	<1	<1	1.3	2.3	<1	<1	<1	<1	--	12	27	310	4.0
1/17	1.1	<1	<1	<1	<1	1.3	2.0	<1	1.6	<1	<1	--	15	21	380	3.0
2/20	<1	<1	<1	<1	<1	1.4	2.5	<1	--	<1	<1	--	15	26	326	2.3
3/6	<1	<1	<1	<1	<1	1.4	2.6	<1	<1	<1	<1	--	12	24	320	3.3
3/20	<1	<1	<1	<1	<1	1.5	2.9	<1	<1	<1	<1	--	14	27	313	4.1
4/9*	<1	<1	<1	<1	<1	1.4	-	<1	1.2	<1	<1	1.1	13	25	209	4.1
4/23	<1	<1	<1	<1	<1	<1	2.2	<1	2.2	<1	<1	1.1	14	26	280	4.1
5/7	<1	<1	<1	<1	<1	1.4	1.0	<1	<1	<1	<1	<1	14	27	275	4.0
6/2	1.1	<1	<1	<1	<1	1.1	1.5	<1	<1	<1	<1	<1	13	25	275	4.0
6/18	1.2	-	-	<1	<1	1.1	2.5	<1	2.4	<1	<1	<1	11	23	254	3.7

NO_3^- (ppm)

Date	Well Number															
	2	3	4	5	6	7	8	9	10	11	12	13	old 4	old 5	old 9	old 14
4/23/75	3.8	44	12	3.8	8.0	-	-	41	2.4	12	1.5	0.3	-	-	-	--
5/7	4.0	51	7.4	4.1	5.5	0.5	0.9	33	1.8	23	1.6	1.0	1.0	0.9	1.5	1.3
6/2	0.4	78	6.7	4.4	4.4	0.4	0.7	44	0.8	24	2.1	3.0	1.0	0.7	1.8	1.9
6/18	0.2	-	-	3.7	6.7	0.4	0.8	45	1.9	24	1.1	3.0	0.9	3.6	1.9	1.4

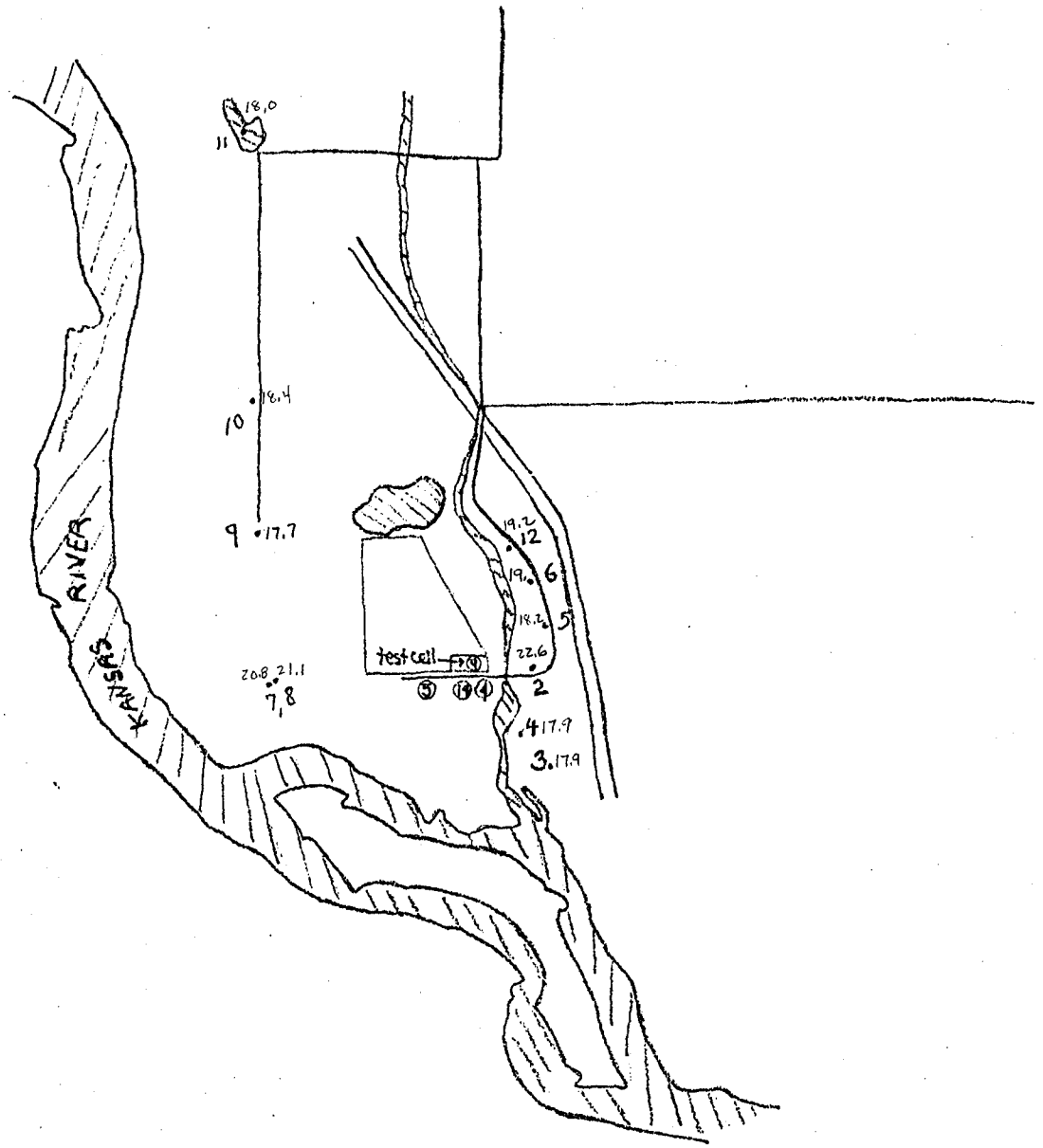
④ Old Test Cell Wells
• New Well Network

5/21/74



④ Old Test Cell Wells
• New Well Network

6/6/74



④ Old Test Cell Wells
• New Well Network

6/24/74