Appendix H1 - Analysis Methods of Slug Testing Procedures

Data Processing

Slug testing data were downloaded from the data logger and processed using WinSITU 2000 (In-Situ, Inc., 2000) to convert water levels to displacement. Normalized displacement was then calculated in a spreadsheet by dividing measured displacement values by the initial displacement. Processed data were plotted and analyzed using Aqtesolv 3.50 (HydroSOLVE, Inc., 2003). Table H1-1 shows the screen and aquifer depths for each well which were used as input parameters for Aqtesolv. The screen depths are measured from the top of the aquifer (from the water table for an unconfined aquifer) for the analysis.

Methods of Analysis

Three methods, the Kansas Geological Survey model (KGS; Hyder *et al*., 1994), Butler (1998) method, and Bouwer and Rice (1976) method were used to analyze the processed data.

The KGS model can account for a low permeability material around the well screen (i.e., skin), such as the residue of drilling mud that was not removed from the formation during the well development. The KGS model may be used with or without well skin

The Butler method accounts for the momentum balance of the water column in the well; it was used where an oscillatory response was observed or when fitting with the KGS method resulted in a systematic misfit. The oscillatory response is typically recorded in wells installed in aquifers of high conductivity or in wells with a high water column above the top of casing. The Butler method uses a dimensionless damping factor, C(D), which defines the well as critically damped when C(D)=1; it is under-damped when C(D) < 1 and over-damped when C(D) > 1.

For tests conducted on water table wells that were not modeled well by either of the two methods described above, the Bouwer and Rice method was used. This method accounts for the drainage of the gravel pack during tests on wells screened across the water table. Seven of the shallow wells were screened across the water table. Butler (1998) suggests fitting the Bouwer and Rice method solution within a normalized head range of 0.2-0.3 for optimum results.

Estimated Aquifer Properties The main objective was to estimate the horizontal hydraulic conductivity of the aquifer zones screened by the tested wells. All tests that did not exhibit oscillations or the effects of sand-pack drainage were analyzed with the KGS model without skin. The skin effect, specific storage, and anisotropy ratio (K_z/K_r) were held constant because they in general cannot be uniquely resolved from slug tests (e.g., Butler, 1998). The anisotropy ratio was held constant at 0.1 for all three methods to account for higher horizontal than vertical hydraulic conductivity, typical of unconsolidated sediments. The specific storage (S_s) was found to have a minimal impact on the estimation of K_r, so it was fixed to 1.0×10^{-5} ft^{-1} based on a range of plausible values from 9.9×10^{-6} ft^{-1} to 2.69×10^{-4} ft^{-1} for sands and gravels (Table H1-2) calculated using the soil matrix compressibility equation by Domenico and Schwartz (1990). This S_s value was chosen to represent a wide variety of sediments since slug tests were performed on 66 wells. The effect of the value of S_s on the estimated K_r is negligible for slug tests (e.g., Beckie and Harvey, 2002). The estimation of the

hydraulic conductivity of the well skin with the KGS model was attempted for several tests but was inconclusive.

Results of Analysis

Table H1-3 summarizes the methods used for each well in addition to the results of each parameter. This appendix contains the fit curve plots from Aqtesolv. The response of some wells differed when the slug was inserted (slug-in test) into the well than when it was removed (slug-out test); for some wells, different methods were used to analyze the slug-in tests and the slug-out tests. The best fit was selected as the representative result of the test. If, however, the results of the slug-in and slug-out tests were similar, the average was taken as the representative result. Table H1-4 shows the representative hydraulic conductivity results along with the statistical summary.

The average horizontal hydraulic conductivity (K_r) for all wells and methods is 53.5 ft/day. The overall minimum K_r of 0.47 ft/day was estimated for MW24D and the overall maximum of 263.8 ft/day for MW2. The average K_r for the shallow (water table) wells is higher, 67.99 ft/day (Table H1-5), than for the deeper wells, 39.86 ft/day (Table H1-6). For the shallow wells, the minimum K_r of 0.78 was estimated for MW12 and the maximum of 263.8 was estimated for MW2. For the deeper wells, the minimum K_r of 0.47 was estimated for MW24D and the maximum of 131.89 was estimated for MW13B. The Bouwer and Rice method was used to analyze the slug tests of 9 wells. The results of these tests are summarized in Table H1-7. Most of these wells are shallow. Three of the wells were screened across the water table. The average K_r for the 9 wells is 47.7 ft/day. The minimum K_r of 0.78 ft/day was estimated for MW12 and the maximum of 194.3 ft/day for MW6.

The KGS method was used to analyze the slug tests of 29 wells. The results of these tests are summarized in Table H1-7. Three of these wells were screened across the water table. The average K_r for the 29 wells is 21.9 ft/day. The minimum K_r of 0.47 ft/day was estimated for MW24D and the maximum K_r of 113.8 ft/day for MW8A.

The Butler method was used to analyze the slug tests of 31 wells. The results of these tests are summarized in Table H1-7. Only one of these wells was screened across the water table. An oscillatory response was observed in 9 of these wells. The tests at the 22 remaining wells did not exhibit oscillatory response but a systematic misfit for the KGS method indicated that the acceleration of the water column was significant (the misfit was not due to the skin effects because the test response was fast, indicating high K_r). The average K_r for all the tests analyzed by the Butler method is 86.97 ft/day. The average K_r for the wells with oscillating test response is 109 ft/day, with the minimum K_r of 82.2 ft/day at MW25D, and the maximum K_r of 131.9 at MW13B. The average K_r for the non-oscillating tests was 77.96 ft/day, with the minimum K_r of 6.59 ft/day at MW26D and the maximum K_r of 263.8 ft/day at MW2. This minimum result from MW26D is an average of K_r values from the Butler and KGS methods because both methods yielded very similar results (Table H1-2). The K_r values estimated by the Butler method are significantly higher than the K_r values from the KGS or Bouwer and Rice methods.

References

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Table H1-1
Summary of Well Properties for Slug Test Analysis
Omega Chemical Superfund Site

Well ID	Nominal Casing Diameter (in)	Actual Casing Radius (ft)	Borehole Diameter (in)	Borehole Radius (ft)	DTW (ft bgs)	Top of Aquifer (ft bgs)	Bottom of Aquifer (ft bgs)	Aquifer Thickness	Depth to Top of Screen (ft bgs)	Depth to Bottom of Screen (ft bgs)	Top of Screen Depth Below Top of Aquifer (ft)	Bottom of Screen Depth Below Top of Aquifer (ft)	Lithology of Screened Interval [(b)]
MW1A	4	0.167	10	0.417	32.51	38	60	22	45	60	7	22	SW, SM, SP
MW1B	4	0.167	10	0.417	32.39	35	85	50	75	85.4	40	50.4	SP, GP, ML
MW2	4	0.167	10	0.417	29.02	29.02	60	30.98	45	60	15.98	30.98	SW, SM, SP
MW3	4	0.167	10	0.417	28.57	28.57	51	22.43	37.8	48	9.23	19.43	SM, SP, ML
MW4A	4	0.167	10	0.417	24.56	32	53	21	42.7	53	10.7	21	SW, SM, SP
MW4B	2	0.085	10	0.417	24.47	64	79.5	15.5	69.7	80	5.7	16	SP
MW4C	2	0.085	10	0.417	26.1	89	98	9	88.7	99	0	10	ML, SM, SP
MW5	4	0.167	10	0.417	26.31	44	53	9	43.3	53.3	0	9.3	ML, SP, SW
MW6	4	0.167	10	0.417	26.16	26.16	47.5	21.34	37.1	47.5	10.94	21.34	SP, SW
MW7	4	0.167	10	0.417	22.21	30.5	46	15.5	35.8	46	5.3	15.5	SP, SW
MW8A	4	0.167	10	0.417	27.93	29	45	16	30	45	1	16	SP, SW, SM
MW8B	2	0.085	10	0.417	27.72	29	74	45	65	75	36	46	SM, SP
MW8C	2	0.085	10	0.417	28.5	89	93	4	86.7	91.7	0	2.7	SM, ML
MW8D	4	0.167	8	0.333	32.36	63	150	87	110	120	47	57	SP
MW9A	4	0.167	10	0.417	26.25	26.25	48	21.75	25	35	0	8.75	SP, ML, SM
MW9B	4	0.167	10	0.417	29.87	53	61	8	49.8	60	0	7	CL, SP
MW10	4	0.167	10	0.417	33.73	33.73	62	28.27	52	62	18.27	28.27	CL, ML, SW, SM
MW11	4	0.167	10	0.417	36.58	36.58	55	18.42	40	50	3.42	13.42	SP, SW
MW12	2	0.080	6	0.250	83.11	83.11	89	5.89	82	97	0	13.89	ML, SC, CL
MW13B	2	0.080	10	0.417	80.33	122	133	11	123	133	1	11	SP, SM
MW14	2	0.080	6	0.250	46.2	55	76	21	60	75	5	20	SP
MW15	2	0.080	6	0.250	24.41	36	74	38	50	70	14	34	SP, ML, SW
MW16A	2	0.080	8.75	0.365	46.37	46.37	59	12.63	45	60	0	13.63	SP, SM, SW, GP
MW16B	2	0.080	8.75	0.365	47.03	104	115	11	106	116	2	12	SC, GP, GW
MW16C	2	0.080	8.75	0.365	49.35	146	166	20	149	164	3	18	SP, GP, SM
MW17A	2	0.080	8.75	0.365	64.17	64.17	74	9.83	56	71	0	6.83	ML, SP
MW17B	2	0.080	8.75	0.365	63.54	94	104.5	10.5	94	104	0	10	ML, SP
MW17C	2	0.080	8.75	0.365	74.64	169	191.5	22.5	172	182	3	13	SP, SM
MW18A	2	0.080	8.75	0.365	26.88	52.5	80	27.5	56	71	3.5	18.5	SP, SW, SM, GW
MW18B	2	0.080	8.75	0.365	26.89	90	102.5	12.5	90	100	0	10	SP, GP, GM
MW18C	2	0.080	8.75	0.365	28.5	146	185	39	146	161	0	15	ML, SP, SW
MW20A	2	0.080	10	0.417	66.78	68	93	25	75	90	7	22	SP, SM
MW20B	2	0.080	10	0.417	67.22	117	137	20	122	132	5	15	SP
MW20C	2	0.080	10	0.417	81.18	179	194	15	180	190	1	11	SP
MW21	2	0.080	6	0.250	50.1	57	81.5	24.5	64	79	7	22	SP, SW
MW22	2	0.080	6	0.250	62.34	66	94	28	74	89	8	23	SP, ML
MW23A	4	0.158	8	0.333	27.8	27.8	66	38.2	35	55	7.2	27.2	SP
MW23B	2	0.080	10	0.417	28.25	87	97	10	82	97	0	10	SP, SM, GP
MW23C	2	0.080	10	0.417	30.91	133	161.5	28.5	145	160	12	27	SP, SM
MW23D	2	0.080	10	0.417	31.69	175	195	20	175	185	0	10	SP, SM
MW24A	4	0.158	16	0.667	36.8	36.8	74	37.2	50	70	13.2	33.2	SP, GP
MW24B	2	0.080	16	0.667	41.24	108	130	22	110	125	2	17	SP
MW24C	4	0.158	16	0.667	41.6	134	164	30	140	160	6	26	SP
MW24D	2	0.080	16	0.667	41.9	168	190	22	173	178	5	10	CL
MW25A	4	0.158	14.5	0.604	37.46	37.46	70	32.54	45	65	7.54	27.54	SP, SM
MW25B	2	0.080	14.5	0.604	37.55	85	115	30	90	110	5	25	ML, SP, SM
MW25C	4	0.158	14.5	0.604	39.3	138	151	13	140	150	2	12	SM, ML
MW25D	2	0.080	14.5	0.604	51.23	192	209	17	194	209	2	17	CL, SP
MW26A	4	0.158	14.5	0.604	67.6	67.6	95	27.4	70	90	2.4	22.4	SP
MW26B	2	0.080	14.5	0.604	67.69	105	135	30	105	120	0	15	SP, SC, SM

Table H1-1
Summary of Well Properties for Slug Test Analysis
Omega Chemical Superfund Site

Well ID	Nominal Casing Diameter (in)	Actual Casing Radius (ft)	Borehole Diameter (in)	Borehole Radius (ft)	DTW (ft bgs)	Top of Aquifer (ft bgs)	Bottom of Aquifer (ft bgs)	Aquifer Thickness	Depth to Top of Screen (ft bgs)	Depth to Bottom of Screen (ft bgs)	Top of Screen Depth Below Top of Aquifer (ft)	Bottom of Screen Depth Below Top of Aquifer (ft)	Lithology of Screened Interval [b]
MW26C	2	0.080	14.5	0.604	73.56	145	170	25	145	160	0	15	CL, SM
MW26D	2	0.080	14.5	0.604	72.42	180	216	36	185	205	5	25	SP, SM
MW27A	4	0.158	14.5	0.604	77.17	77.17	110	32.83	90	110	12.83	32.83	SP
MW27B	4	0.158	14.5	0.604	76.99	144	164	20	144	164	0	20	SW, SC, SP
MW27C	2	0.080	14.5	0.604	84.32	180	190	10	180	190	0	10	MH
MW27D	2	0.080	14.5	0.604	83.25	200	210	10	200	210	0	10	CL, SP, SM
MW28	4	0.158	8	0.333	73.94	73.94	110	36.06	85	105	11.06	31.06	SP, SC
MW29	4	0.158	8	0.333	80.66	87	113	26	90	110	3	23	SP
MW30	4	0.158	8	0.333	91.88	95	115	20	95	115	0	20	SP
OW3B	4	0.167	10	0.417	72.82	99	140	41	112	122	13	23	SP
OW4A	4	0.168	10	0.417	57.37	57.37	79	21.63	49.8	69.8	0	12.43	ML, SM, CL, SP, SW
OW4B	4	0.168	10	0.417	60.46	108	132	24	112	122.3	4	14.3	SP
OW5	4	0.167	10	0.417	28.55	39	52	13	30	50	0	11	CL, ML, SM, SW, SP
OW6	4	0.168	10	0.417	46.15	46.15	61.5	15.35	38	58	0	11.85	SM, ML, SP
OW7	4	0.168	10	0.417	75.1	75.1 [a]	90.9 [a]	15.8	70.9	90.9	0	15.8	CL, ML
OW8B	4	0.167	10	0.417	75.76	113	129	16	116	126	3	13	ML, SM, SP

[a] Screened in silt/clay - assumed aquifer top and bottom to be equal to screen length
[b] Symbols based on Unified Soil Classification System

Table H1-2
Range of Plausible Values of Specific Storage Coefficient
Omega Chemical Superfund Site

Porosity (n)	**Specific Storage (S_s) (ft^{-1})**			
	dense gravel	*sand*	*sand*	*loose sand*
n=0.1	1.41E-05	2.71E-05	5.40E-05	2.69E-04
n=0.3	1.13E-05	2.14E-05	4.23E-05	2.10E-04
n=0.4	9.90E-06	1.85E-05	3.65E-05	1.80E-04

$S_s = \rho*g*[(1-n)*\beta_p+n*\beta_w]$
Domenico and Schwartz, 1990; eq. 4.33

	symbol	*unit*	*value*
density of water	ρ	kg/m^3	1000
gravitational acceleration	g	m/s^2	9.81
compressibility of water at 25° C	β_w	m^2/N	4.80E-10
compressibility of matrix	β_p	m^2/N	see below

β_p values (m^2/N) from Table 4.1 in Domenico and Schwartz (1990):

1.00E-07	loose sand
2.00E-08	sand
5.20E-09	dense gravel
3.30E-10	rock (upper limit)

Table H1-3														
Summary of Slug Test Analysis Results														
Omega Chemical Superfund Site														
		KGS					**Butler**				**B&R**			
Well ID	**Method(s) Used**	**Kr (ft/min)**	**Kr (ft/day)**	**T (ft^2/day)**	**Ss (ft-1)**	**Kz/Kr**	**K (ft/min)**	**K (ft/day)**	**T (ft^2/day)**	**C(D)**	**K (ft/min)**	**K (ft/day)**	**T (ft^2/day)**	**y(0)**
MW1A	Butler						0.1554	223.776	4923.072	0.8074				
MW1B	KGS	0.003962	5.70528	285.264	1.00E-05	0.1								
MW2	Butler						0.1832	263.808	8172.772	0.9773				
MW3	KGS	0.005344	7.69536	172.6069	1.00E-05	0.1								
MW4A	Butler in						0.1085	156.24	3281.04	1.37				
MW4A	Butler out						0.08731	125.7264	2640.254	1.4				
MW4B	Butler						0.02595	37.368	579.204	1.096				
MW4C	KGS	0.02724	39.2256	353.0304	1.00E-05	0.1								
MW5	KGS	0.03883	55.9152	503.2368	1.00E-05	0.1								
MW6	B&R (in) & Butler (out)						0.1213	174.672	3727.5	1.036	0.1485	213.84	4563.3456	1
MW7	Butler in						0.169	243.36	3772.08	1.05				
MW7	Butler out						0.1189	171.216	2653.848	1.179				
MW8A	KGS - in	0.1121	161.424	2582.784	1.00E-05	0.1								
MW8A	KGS - out	0.07903	113.8032	1820.851	1.00E-05	0.1								
MW8B	KGS	0.02609	37.5696	1690.632	1.00E-05	0.1								
MW8C	KGS	0.0335	48.24	192.96	1.00E-05	0.1								
MW8D	KGS	0.01039	14.9616	1301.659	1.00E-05	0.1								
MW9A	B&R (out) & KGS (in)	0.000896	1.289952	28.05646	1.00E-05	0.1					0.000813	1.171008	25.469424	0.422
MW9B	KGS	0.03663	52.7472	421.9776	1.00E-05	0.1								
MW10	Butler						0.02671	38.4624	1087.332	1.429				
MW11	B&R (in)										0.06883	99.1152	1825.702	1
MW11	B&R (out)										0.04945	71.208	1311.6514	1.051
MW12	B&R										0.00054	0.778032	4.5826085	0.991
MW13B	Butler in						0.09159	131.8896	1450.786	0.5909				
MW13B	Butler out						0.116	167.04	1837.44	0.4175				
MW14	Butler in						0.0777	111.888	2349.648	0.5859				
MW14	Butler out						0.1492	214.848	4511.808	0.586				
MW15	B&R (out) & KGS (in)	0.001418	2.04192	77.59296	1.00E-05	0.1					0.00587	8.4528	321.2064	1
MW16A	Butler (in1) & B&R (out)						0.2513	361.872	4570.443	0.3365	0.01008	14.5152	183.32698	0.813
MW16B	Butler in						0.07416	106.7904	1174.694	0.7013				
MW16B	Butler out						0.07918	114.0192	1254.211	0.4777				
MW16C	KGS	0.01317	18.9648	379.296	1.00E-05	0.1								
MW17A	KGS	0.001116	1.60704	15.7972	1.00E-05	0.1								
MW17B	Butler						0.07317	105.3648	1106.33	0.5823				
MW17C	KGS	0.01958	28.1952	634.392	1.00E-05	0.1								
MW18A	Butler						0.01923	27.6912	761.508	0.8438				
MW18B	KGS	0.003545	5.1048	63.81	1.00E-05	0.1								
MW18C	Butler						0.004553	6.55632	255.6965	2.6				
MW20A	Butler						0.02988	43.0272	1075.68	0.9646				
MW20B	Butler in						0.08789	126.5616	2531.232	0.5242				
MW20B	Butler out						0.04506	64.8864	1297.728	0.6879				
MW20C	Butler in						0.08328	119.9232	1798.848	0.5142				
MW20C	Butler out						0.06205	89.352	1340.28	0.4324				
MW21	Butler in						0.1168	168.192	4120.704	0.5142				
MW21	Butler out						0.03529	50.8176	1245.031	0.861				
MW22	Butler in1						0.2849	410.256	11487.17	0.3942				
MW22	Butler out1						0.0275	39.6	1108.8	0.9226				
MW23A	B&R in										0.0029	4.176	159.5232	1
MW23A	B&R out										0.01796	25.8624	987.94368	0.994
MW23B	KGS	0.004195	6.0408	60.408	1.00E-05	0.1								
MW23C	KGS	0.003311	4.76784	135.8834	1.00E-05	0.1								
MW23D	KGS	0.005925	8.532	170.64	1.00E-05	0.1								
MW24A	Butler in						0.06939	99.9216	3717.084	1.071				
MW24A	Butler out						0.03992	57.4848	2138.435	0.8515				
MW24B	KGS in	0.01343	19.3392	425.4624	1.00E-05	0.1								
MW24B	Butler out						0.01028	14.8032	325.6704	1.209				
MW24C	KGS	0.03151	45.3744	1361.232	1.00E-05	0.1								
MW24D	KGS in	0.000325	0.468	10.296	1.00E-05	0.1								
MW24D	KGS out	0.000255	0.367488	8.084736	1.00E-05	0.1								
MW25A	B&R										0.03645	52.488	1707.9595	0.77
MW25B	KGS	0.004697	6.76368	202.9104	1.00E-05	0.1								
MW25C	KGS	0.000635	0.914832	11.89282	1.00E-05	0.1								
MW25D	Butler in						0.05708	82.1952	1397.318	0.4021				
MW25D	Butler out						0.04122	59.3568	1009.066	0.4058				
MW26A	B&R										0.0355	51.12	1400.688	1.125
MW26B	Butler in						0.05883	84.7152	2541.456	0.5318				
MW26B	Butler out						0.03553	51.1632	1534.896	0.5689				
MW26C	KGS	0.001358	1.95552	48.888	1.00E-05	0.1								
MW26D	KGS in	0.004178	6.01632	216.5875	1.00E-05	0.1								
MW26D	Butler out						0.004972	7.15968	257.7485	1.14				
MW27A	B&R in										0.01026	14.7744	485.04355	1.019
MW27B	Butler in						0.007957	11.45808	229.1616	1.682				
MW27B	Butler out						0.008768	12.62592	252.5184	1.443				
MW27C	KGS	0.00148	2.1312	21.312	1.00E-05	0.1								
MW27D	Butler in						0.0688	99.072	990.72	0.4375				
MW27D	Butler out						0.03482	50.1408	501.408	0.5685				

Table H1-3														
Summary of Slug Test Analysis Results														
Omega Chemical Superfund Site														
		KGS					**Butler**				**B&R**			
Well ID	**Method(s) Used**	**Kr (ft/min)**	**Kr (ft/day)**	**T (ft^2/day)**	**Ss (ft-1)**	**Kz/Kr**	**K (ft/min)**	**K (ft/day)**	**T (ft^2/day)**	**C(D)**	**K (ft/min)**	**K (ft/day)**	**T (ft^2/day)**	**y(0)**
MW28	Butler						0.01939	27.9216	1006.853	1.257				
MW29	Butler						0.04585	66.024	1716.624	1.295				
MW30	Butler						0.04163	59.9472	1198.944	1.303				
OW3B	Butler	0.004842	6.97248	285.8717	1.00E-05	0.1								
OW3B_10_15	Butler	0.005063	7.29072	298.9195	1.00E-05	0.1								
OW4A	KGS in	0.01883	27.1152	586.5018	1.00E-05	0.1								
OW4A	KGS out	0.02855	41.112	889.2526	1.00E-05	0.1								
OW4B	KGS	0.01155	16.632	399.168	1.00E-05	0.1								
OW5	KGS						0.04085	58.824	764.712	1.189				
OW6	Butler						0.06845	98.568	1513.019	1.263				
OW7	B&R in										0.00068	0.979056	15.469085	0.912
OW7	B&R out										0.000713	1.026864	16.224451	0.441
OW8B	Butler						0.02612	37.6128	601.8048	1.409				

Taken as Representative K Result

Average of the Values are Taken as the Representative K Result

Table H1-4
Summary of Hydraulic Conductivity Results From Slug Tests
Omega Chemical Superfund Site

Well ID	Method of Analysis	Representative K (ft/min)	Representative K (ft/day)
MW1A	Butler	0.1554	224
MW1B	KGS	0.0040	5.7
MW2	Butler	0.1832	264
MW3	KGS	0.0053	7.7
MW4A	Butler	0.0979	141
MW4B	Butler	0.0260	37.4
MW4C	KGS	0.0272	39.2
MW5	KGS	0.0388	55.9
MW6	B&R, Butler	0.1349	194
MW7	Butler	0.1440	207
MW8A	KGS	0.0790	114
MW8B	KGS	0.0261	37.6
MW8C	KGS	0.0335	48.2
MW8D	KGS	0.0104	15.0
MW9A	KGS	0.0009	1.3
MW9B	KGS	0.0366	52.7
MW10	Butler	0.0267	38.5
MW11	B&R	0.0591	85.2
MW12	B&R	0.0005	0.8
MW13B	Butler	0.0916	132
MW14	Butler	0.0777	112
MW15	KGS	0.0014	2.0
MW16A	B&R	0.0101	14.5
MW16B	Butler	0.0742	107
MW16C	KGS	0.0132	19.0
MW17A	KGS	0.0011	1.6
MW17B	Butler	0.0732	105
MW17C	KGS	0.0196	28.2
MW18A	Butler	0.0192	27.7
MW18B	Butler	0.0254	36.5
MW18C	KGS	0.0035	5.1
MW20A	Butler	0.0299	43.0
MW20B	Butler	0.0879	127
MW20C	Butler	0.0833	120
MW21	Butler	0.0353	50.8
MW22	Butler	0.0275	39.6
MW23A	B&R	0.0104	15.0
MW23B	KGS	0.0042	6.0
MW23C	KGS	0.0033	4.8
MW23D	KGS	0.0059	8.5
MW24A	Butler	0.0547	78.7
MW24B	Butler, KGS	0.0119	17.1
MW24C	KGS	0.0315	45.4
MW24D	KGS	0.0003	0.5
MW25A	B&R	0.0365	52.5
MW25B	KGS	0.0047	6.76
MW25C	KGS	0.0006	0.9
MW25D	Butler	0.0571	82.2
MW26A	B&R	0.0355	51.1

Table H1-4
Summary of Hydraulic Conductivity Results From Slug Tests
Omega Chemical Superfund Site

Well ID	Method of Analysis	Representative K (ft/min)	Representative K (ft/day)
MW26B	Butler	0.0588	84.7
MW26C	KGS	0.0014	2.0
MW26D	Butler, KGS	0.0046	6.6
MW27A	B&R	0.0103	14.8
MW27B	Butler	0.0084	12.0
MW27C	KGS	0.0015	2.1
MW27D	Butler	0.0688	99.1
MW28	Butler	0.0194	27.9
MW29	Butler	0.0459	66.0
MW30	Butler	0.0416	59.9
OW3B	Butler	0.0050	7.1
OW4A	KGS	0.0188	27.1
OW4B	KGS	0.0116	16.6
OW5	KGS	0.0409	58.8
OW6	Butler	0.0685	98.6
OW7	B&R	0.0007	1.0
OW8B	Butler	0.0261	37.6

Notes:
B&R = Bouwer and Rice (1976)
Butler (1998)
KGS (Hyder et al., 1994)

Table H1-5
Summary of Hydraulic Conductivity Results From Slug Tests on Shallow Wells
Omega Chemical Superfund Site

Well ID	Representative K (ft/min)	Representative K (ft/day)	Height of water column above top of screen (ft)
MW1A	0.1554	224	12.5
MW2	0.1832	264	16.0
MW3	0.0053	7.70	9.23
MW4A	0.0979	141	18.1
MW5	0.0388	55.9	17.0
MW6	0.1349	194	10.9
MW7	0.1440	207	13.6
MW8A	0.0790	114	2.07
MW9A	0.0009	1.29	0
MW10	0.0267	38.5	18.3
MW11	0.0591	85.2	3.42
MW12	0.0005	0.78	0
MW14	0.0777	112	13.8
MW15	0.0014	2.04	25.6
MW16A	0.0101	14.5	0
MW17A	0.0011	1.61	0
MW18A	0.0192	27.7	29.1
MW20A	0.0299	43.0	8.22
MW21	0.0353	50.8	13.9
MW22	0.0275	39.6	11.7
MW23A	0.0104	15.0	7.2
MW24A	0.0547	78.7	13.2
MW25A	0.0365	52.5	7.54
MW26A	0.0355	51.1	2.4
MW27A	0.0103	14.8	12.8
MW28	0.0194	27.9	11.1
MW29	0.0459	66.0	9.34
MW30	0.0416	59.9	3.12
OW4A	0.0188	27.1	0
OW5	0.0409	58.8	1.45
OW6	0.0685	98.6	0
OW7	0.0007	0.98	0

Table H1-6
Summary of Hydraulic Conductivity Results From Slug Tests on Deep Wells
Omega Chemical Superfund Site

Well ID	Representative K (ft/min)	Representative K (ft/day)	Height of water column above top of screen (ft)
MW1B	0.0040	5.71	42.6
MW4B	0.0260	37.4	45.2
MW4C	0.0272	39.2	62.6
MW8B	0.0261	37.6	37.3
MW8C	0.0335	48.2	58.2
MW8D	0.0104	15.0	77.6
MW9B	0.0366	52.7	19.9
MW13B	0.0916	132	42.7
MW16B	0.0742	107	59.0
MW16C	0.0132	19.0	99.7
MW17B	0.0732	105	30.5
MW17C	0.0196	28.2	97.4
MW18B	0.0254	36.5	63.1
MW18C	0.0035	5.10	118
MW20B	0.0879	127	54.8
MW20C	0.0833	120	98.8
MW23B	0.0042	6.04	53.8
MW23C	0.0033	4.77	114
MW23D	0.0059	8.53	143
MW24B	0.0119	17.1	68.8
MW24C	0.0315	45.4	98.4
MW24D	0.0003	0.47	131
MW25B	0.0047	6.76	52.5
MW25C	0.0006	0.91	101
MW25D	0.0571	82.2	143
MW26B	0.0588	84.7	37.3
MW26C	0.0014	1.96	71.4
MW26D	0.0046	6.59	113
MW27B	0.0084	12.0	67.0
MW27C	0.0015	2.13	95.7
MW27D	0.0688	99.1	117
OW3B	0.0050	7.13	39.2
OW4B	0.0116	16.6	51.5
OW8B	0.0261	37.6	40.2

Table H1-7
Summary of Hydraulic Conductivity Results From Slug Tests by Method of Analysis
Omega Chemical Superfund Site

Well ID	Representative K (ft/min)	Representative K (ft/day)	Height of water column above top of screen (ft)
Bouwer and Rice Method			
MW11	0.0591	85.2	3.42
MW12	0.0005	0.78	0
MW16A	0.0101	14.5	0
MW23A	0.0104	15.0	7.20
MW25A	0.0365	52.5	7.54
MW26A	0.0355	51.1	2.40
MW27A	0.0103	14.8	12.8
OW7	0.0007	0.98	0
MW6	0.1349	194	10.9
Butler Method			
MW13B	0.0916	132	42.7
MW14	0.0777	112	13.8
MW16B	0.0742	107	59.0
MW17B	0.0732	105	30.5
MW20B	0.0879	127	54.8
MW20C	0.0833	120	98.8
MW25D	0.0571	82.2	143
MW26B	0.0588	84.7	37.3
MW27D	0.0688	99.1	117
MW6	0.1349	194	10.9
MW1A	0.1554	224	12.5
MW2	0.1832	264	16.0
MW4A	0.0979	141	18.1
MW4B	0.0260	37.4	45.2
MW7	0.1440	207	13.6
MW10	0.0267	38.5	18.3
MW18A	0.0192	27.7	29.1
MW18B	0.0254	36.5	63.1
MW20A	0.0299	43.0	8.22
MW21	0.0353	50.8	13.9
MW22	0.0275	39.6	11.7
MW24A	0.0547	78.7	13.2
MW27B	0.0084	12.0	67.0
MW28	0.0194	27.9	11.1
MW29	0.0459	66.0	9.34
MW30	0.0416	59.9	3.12
OW3B	0.0050	7.13	39.2
OW6	0.0685	98.6	0
OW8B	0.0261	37.6	40.2
MW24B	0.0119	17.1	68.8
MW26D	0.0046	6.59	113
KGS Method			
MW24B	0.0119	17.1	68.8
MW26D	0.0046	6.59	113
MW1B	0.0040	5.71	42.6
MW3	0.0053	7.70	9.23
MW4C	0.0272	39.2	62.6
MW5	0.0388	55.9	17.0
MW8A	0.0790	114	2.07
MW8B	0.0261	37.6	37.3
MW8C	0.0335	48.2	58.2
MW8D	0.0104	15.0	77.6
MW9A	0.0009	1.29	0
MW9B	0.0366	52.7	19.9
MW15	0.0014	2.04	25.6
MW16C	0.0132	19.0	99.7
MW17A	0.0011	1.61	0
MW17C	0.0196	28.2	97.4
MW18C	0.0035	5.10	118
MW23B	0.0042	6.04	53.8
MW23C	0.0033	4.77	114
MW23D	0.0059	8.53	143
MW24C	0.0315	45.4	98.4

Table H1-7
Summary of Hydraulic Conductivity Results From Slug Tests by Method of Analysis
Omega Chemical Superfund Site

Well ID	Representative K (ft/min)	Representative K (ft/day)	Height of water column above top of screen (ft)
MW24D	0.0003	0.47	131
MW25B	0.0047	6.76	52.5
MW25C	0.0006	0.91	101
MW26C	0.0014	1.96	71.4
MW27C	0.0015	2.13	95.7
OW4A	0.0188	27.1	0
OW4B	0.0116	16.6	51.5
OW5	0.0409	58.8	1.45