

Table 6

Summary of Calculated Vertical Hydraulic Gradients

Table 6
Summary of Calculated Vertical Hydraulic Gradients
Site-Wide Ground Water RIR
Hoffmann-La Roche Facility - Nutley and Clifton, New Jersey

Well ID	Total Depth (feet)	Measurement Date	Groundwater Elevation (feet amsl)	Vertical Hydraulic Gradient (-/+)	Flow Direction
Vertical Gradient Between Zone S1 and Zone S2					
53RI-MW4	14	9/16/13	119.25		
MW-16AW	44	9/16/13	118.9	-0.012	Downward
MW-8W	25	9/16/13	125.72		
MW-7W	71.5	9/16/13	125.26	-0.010	Downward
MW-229A	13	9/16/13	119.18		
MW-229B	50	9/16/13	118.315	-0.023	Downward
MW-44	18.5	9/16/13	117.71		
MW-44B	45	9/16/13	114.85	-0.108	Downward
MW-207A	15	9/16/13	107.85		
MW-207B	48	9/16/13	106.03	-0.055	Downward
MW-213B	50	9/16/13	119.35		
MW-213C	80	9/16/13	117.932	-0.047	Downward
MW-226A	15	9/16/13	108.877		
MW-226B	45	9/16/13	104.933	-0.131	Downward
ART-MW-3	15.5	9/16/13	108.54		
ART-MW-6	40	9/16/13	104.2	-0.177	Downward
MW-186A	17	9/16/13	108.54		
MW-186-2	38	9/16/13	101.885	-0.317	Downward
MW-90	27.5	9/16/13	98.27		
MW-78	45.5	9/16/13	98.93	0.037	Upward
MW-93	14	9/16/13	98.27		
MW-87	45	9/16/13	99.01	0.024	Upward
MW-94	17	9/16/13	99.08		
MW-22A	45	9/16/13	98.99	-0.003	Downward
MW-92	18.5	9/16/13	99.05		
MW-84	45	9/16/13	98.87	-0.007	Downward
MW-208A	15	9/16/13	99.75		
MW-208B	45	9/16/13	99.48	-0.009	Downward
MW-214A	25	9/16/13	101.41		
MW-214B	50	9/16/13	101.2	-0.008	Downward
MW-7B	15	9/16/13	97.53		
MW-7C	30	9/16/13	97.52	-0.001	Downward
MW-201A	25	9/16/13	111.39		
MW-201	37	9/16/13	111.38	-0.001	Downward
MW-170A	17	9/16/13	106.367		
MW-170B	40	9/16/13	106.579	0.009	Upward
MW-169A	17	9/16/13	104.98		
MW-169B	37	9/16/13	103.11	-0.094	Downward
MW-168A	17	9/16/13	104.37		
MW-168B	37	9/16/13	101.74	-0.132	Downward
MW-167A	17	9/16/13	105.4		
MW-167B	37	9/16/13	105	-0.020	Downward
MW-209A	18	9/16/13	97.94		
MW-209B	40	9/16/13	97.41	-0.024	Downward
MW-103A	16	9/16/13	93.51		
MW-103B	38	9/16/13	96.23	0.124	Upward
MW-104A	13.5	9/16/13	90.99		
MW-104B	34	9/16/13	92.03	0.051	Upward
MW-105A	12	9/16/13	95.70		
MW-105B	40	9/16/13	96.45	0.027	Upward
MW-106A	13	9/16/13	90.78		
MW-106B	34	9/16/13	94.41	0.173	Upward
MW-62	21	9/16/13	94.86		
MW-63	41.5	9/16/13	93.98	-0.043	Downward
MW-68	13	9/16/13	91.61		
MW-71	34	9/16/13	92.7	0.052	Upward
MW-72	20	9/16/13	92.87		
MW-74	40	9/16/13	93.18	0.016	Upward
MW-25	13	9/16/13	94.01		
MW-26A	50.5	9/16/13	94.72	0.019	Upward
MW-125	15	9/16/13	105.91		
MW-125A	33	9/16/13	99.43	-0.360	Downward
MW-15A	15	9/16/13	100.91		
MW-15B	30	9/16/13	101.21	0.020	Upward
MW-128	17.5	9/16/13	102.3		
MW-128B	40	9/16/13	105.32	0.134	Upward
MW-60G	25	9/16/13	110.76		
MW-224B	40	9/16/13	110.76	0.000	No Gradient
MW-191A	14.5	9/16/13	111.11		
MW-191B	47	9/16/13	106.83	-0.132	Downward

Positive values indicate upward gradients and negative values indicate downward gradients

Table 6
Summary of Calculated Vertical Hydraulic Gradients
Site-Wide Ground Water RIR
Hoffmann-La Roche Facility - Nutley and Clifton, New Jersey

Well ID	Total Depth (feet)	Measurement Date	Groundwater Elevation (feet amsl)	Vertical Hydraulic Gradient (-/+)	Flow Direction
Vertical Gradient Between Zone S1 and Zone S2					
MW-190A	17.5	9/16/13	115.99	-0.360	Downward
MW-190B	43	9/16/13	106.81		
MW-189A	14	9/16/13	111.88	-0.223	Downward
MW-189B	37	9/16/13	106.74		
MW-39A	18.5	9/16/13	110.54	-0.265	Downward
MW-40A	39	9/16/13	105.1		
MW-108A	12	9/16/13	89.2	0.119	Upward
MW-108B	33	9/16/13	91.69		
MW-144A	16.4	9/16/13	91.29	0.027	Upward
MW-144B	37	9/16/13	91.85		
MW-171A	35	9/16/13	86.415	-0.008	Downward
MW-171B	50	9/16/13	86.291		
MW-112	12	9/16/13	83.69	0.285	Upward
MW-112B	43	9/16/13	92.54		
MW-145A	27.5	9/16/13	78.71	0.003	Upward
MW-145B	37.3	9/16/13	78.74		
MW-124A	25	9/16/13	68.54	-0.087	Downward
MW-124B	35	9/16/13	67.67		
Vertical Gradient Between Zone S2 and Zone S3					
MW-230B	50	9/16/13	117.115	0.0004	Slight Upward
MW-230C	80	9/16/13	117.13		
MW-206B	50	9/16/13	117.8	-0.017	Downward
MW-206C	80	9/16/13	117.28		
MW-229B	50	9/16/13	117.937	-0.632	Downward
MW-229C	80	9/16/13	98.99		
MW-44B	45	9/16/13	114.85	-0.120	Downward
MW-44C	80	9/16/13	110.64		
MW-207B	48	9/16/13	106.03	-0.043	Downward
MW-207C	80	9/16/13	104.67		
MW-226B	45	9/16/13	104.933	0.101	Upward
MW-226C	80	9/16/13	108.464		
MW-231B	45	9/16/13	106.536	-0.036	Downward
MW-231C	70	9/16/13	105.625		
MW-186-2	38	9/16/13	101.885	0.0004	Slight Upward
MW-186B	80	9/16/13	101.9		
MW-53	45	9/16/13	99.86	-0.012	Downward
MW-54	70	9/16/13	99.57		
MW-50	45	9/16/13	98.95	0.078	Upward
MW-56	70	9/16/13	100.9		
MW-76	45	9/16/13	99	-0.002	Downward
MW-77	70	9/16/13	98.94		
MW-78	45.5	9/16/13	98.93	-0.001	Downward
MW-79	71	9/16/13	98.91		
MW-87	45	9/16/13	99.01	-0.002	Downward
MW-88	70	9/16/13	98.96		
MW-82	45	9/16/13	98.84	0.004	Upward
MW-83	70	9/16/13	98.93		
MW-22A	45	9/16/13	98.99	-0.003	Downward
MW-86	70	9/16/13	98.92		
MW-84	45	9/16/13	98.87	0.0004	Slight Upward
MW-85	70	9/16/13	98.88		
MW-208B	45	9/16/13	99.48	-0.007	Downward
MW-208C	80	9/16/13	99.24		
MW-214B	50	9/16/13	101.2	-0.012	Downward
MW-214C	80	9/16/13	100.836		
MW-209B	40	9/16/13	97.41	-0.002	Downward
MW-209C	80	9/16/13	97.34		
MW-104B	34	9/16/13	92.03	0.033	Upward
MW-104C	80	9/16/13	93.56		
MW-236B	40	9/16/13	73.607	0.611	Upward
MW-236C	80	9/16/13	98.065		
MW-26A	50.5	9/16/13	94.72	0.008	Upward
MW-25C	80	9/16/13	94.96		
MW-204B	39	9/16/13	98.92	-0.011	Downward
MW-204C	70	9/16/13	98.586		
MW-128B	40	9/16/13	105.32	0.012	Upward
MW-128C	60	9/16/13	105.552		
MW-114	80	9/16/13	110.53	-0.251	Downward
DW-2B	136	9/16/13	96.5		

Positive values indicate upward gradients and negative values indicate downward gradients

Table 6
Summary of Calculated Vertical Hydraulic Gradients
Site-Wide Ground Water RIR
Hoffmann-La Roche Facility - Nutley and Clifton, New Jersey

Well ID	Total Depth (feet)	Measurement Date	Groundwater Elevation (feet amsl)	Vertical Hydraulic Gradient (-/+)	Flow Direction
Vertical Gradient Between Zone S2 and Zone S3					
MW-171B	50	9/16/13	86.291	0.048	Upward
MW-171C	80	9/16/13	87.728		
MW-124B	35	9/16/13	67.67	-0.024	Downward
MW-124C	80	9/16/13	66.6		
MW-148A	27.6	9/16/13	65.57	-0.067	Downward
MW-148B	47.82	9/16/13	64.21		
MW-48	18	9/16/13	58.34	0.044	Upward
MW-48B	45	9/16/13	59.53		
Vertical Gradient Between Zone S3 and Zone D1					
DW-13A	90	9/16/13	99.36	-0.032	Downward
DW-13B	180	9/16/13	96.45		
DW-9A	95	9/16/13	98.02	0.256	Upward
DW-9B	142	9/16/13	110.03		
MW-215C	80	9/16/13	93.442	0.061	Upward
DW-11B	100	9/16/13	94.67		
DW-3B	122	9/16/13	95.65	0.002	Upward
DW-3C	226	9/16/13	95.83		
MW-146C	80	9/16/13	67.66	-0.094	Downward
DW-4C	142	9/16/13	61.837		
MW-48B	45	9/16/13	59.53	0.017	Upward
MW-48C	80	9/16/13	60.14		
Vertical Gradient Between Zone D1 and Zone D2					
DW-16A	220	9/16/13	103.21	-0.015	Downward
DW-16B	302	9/16/13	101.97		
DW-14A	180	9/16/13	102.97	-0.097	Downward
DW-14B	237	9/16/13	97.43		
DW-7B	180	9/16/13	101.23	-0.020	Downward
DW-7C	345	9/16/13	97.98		
DW-8B	192	9/16/13	98.11	0.001	Upward
DW-8C	307	9/16/13	98.26		
DW-10B	127	9/16/13	94.72	-0.002	Downward
DW-10C	291	9/16/13	94.38		
DW-5B	146	9/16/13	99.09	-0.016	Downward
DW-5C	315	9/16/13	96.34		
DW-6B	115	9/16/13	96.33	0.003	Upward
DW-6C	291	9/16/13	96.8		
DW-17C	120	9/16/13	59.29	-0.042	Downward
DW-17D	300	9/16/13	51.77		
Vertical Gradient Between Zone D2 and Zone D3					
DW-14B	237	9/16/13	97.43	0.014	Upward
DW-14C	384	9/16/13	99.42		
DW-7C	345	9/16/13	97.98	0.013	Upward
DW-7D	450	9/16/13	99.31		
DW-8C	307	9/16/13	98.26	0.023	Upward
DW-8D	449	9/16/13	101.46		
DW-6C	291	9/16/13	96.8	-0.004	Downward
DW-6D	498	9/16/13	95.95		
Vertical hydraulic gradients were calculated for each well pair as follows: $\frac{\text{Deep Well Ground Water Elev. (ft)} - \text{Shallow Well Ground Water Elev. (ft)}}{\text{Deep Well Total Depth (ft)} - \text{Shallow Well Total Depth (ft)}} = \text{Vertical Hydraulic Gradient (ft/ft)}$ (Todd, D.K., Ground-Water Hydrology, 1980)					

Positive values indicate upward gradients and negative values indicate downward gradients