

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-1(F)	10/13/2003	1142	1.50	31.71	np	23.44	0.00	8.27		
MW-1(F)	10/22/2003	820	0.62	31.71	np	23.87	0.00	7.84		
MW-1(F)	11/12/2003	1130	0.56	31.71	np	23.03	0.00	8.68		Iron
MW-1(F)	12/16/2003	1358	0.34	31.71	np	17.25	0.00	14.46		
MW-1(F)	1/11/2004	1628	4.26	31.71	np	16.33	0.00	15.38		Iron
MW-1(F)	1/15/2004	800	3.86	31.71	np	16.21	0.00	15.50		Iron
MW-1(F)	2/12/2004	945	-2.53	31.71	np	15.61	0.00	16.10		
MW-1(F)	3/18/2004	1355	1.23	31.71	np	17.82	0.00	13.89		
MW-1(F)	4/12/2004	1105	-2.84	31.71	np	18.20	0.00	13.51		
MW-1(F)	4/15/2004	730	1.78	31.71	np	18.36	0.00	13.35		
MW-1(F)	5/19/2004	1307	1.86	31.71	np	19.98	0.00	11.73		
MW-1(F)	6/16/2004	1246	1.78	31.71	np	20.76	0.00	10.95		
MW-1(F)	7/19/2004	1042	-2.94	31.71	np	21.82	0.00	9.89		
MW-1(F)	7/20/2004	1838	-0.48	31.71	np	21.90	0.00	9.81		
MW-1(F)	8/17/2004	1330	2.69	31.71	np	22.92	0.00	8.79		
MW-1(F)	9/16/2004	1320	3.67	31.71	np	23.18	0.00	8.53		
MW-1(M)	8/28/2002	1151	-1.99	14.53	9.61	10.08	0.47	4.86	18.27	
MW-1(M)	9/12/2002	1029	-2.84	14.53	9.34	9.88	0.54	5.12		
MW-1(M)	9/13/2002	1536	1.12	14.53	9.13	9.34	0.21	5.37		
MW-1(M)	10/11/2002	1141	-1.52	14.53	9.49	9.92	0.43	4.98	19.41	
MW-1(M)	11/15/2002	1118	3.51	14.53	7.11	7.19	0.08	7.41		
MW-1(M)	12/13/2002	841	4.39	14.53	6.54	6.57	0.03	7.99		
MW-1(M)	1/14/2003	1117	3.45	14.53	6.79	6.81	0.02	7.74		
MW-1(M)	2/12/2003	1126	2.12	14.53	7.55	7.56	0.01	6.98		
MW-1(M)	3/13/2003	1018	3.86	14.53	6.37	6.45	0.08	8.15		
MW-1(M)	4/14/2003	1147	4.17	14.53	np	6.57	0.00	7.96		Product seep visible
MW-1(M)	5/14/2003	1054	2.59	14.53	8.67	8.70	0.03	5.86		Product seep visible
MW-1(M)	6/17/2003	1431	2.05	14.53	9.19	9.25	0.06	5.33		Product seep visible
MW-1(M)	7/14/2003	1215	0.11	14.53	9.56	9.71	0.15	4.95		Product seep visible
MW-1(M)	8/13/2003	1350	3.00	14.53	9.31	9.32	0.01	5.22		Product seep visible
MW-1(M)	9/12/2003	1432	3.21	14.53	np	8.10	0.00	6.43		Product seep visible
MW-1(M)	10/13/2003	846	-2.52	14.53	9.31	9.33	0.02	5.22		Product seep visible
MW-1(M)	11/12/2003	1445	3.39	14.53	np	6.96	0.00	7.57		Product seep visible
MW-1(M)	12/16/2003	943	1.46	14.53	7.58	7.59	0.01	6.95		Product seep visible
MW-1(M)	1/11/2004	1350	4.01	14.53	np	6.58	0.00	7.95	Product globule	Product seep visible

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Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-1(M)	2/12/2004	1423	-2.19	14.53	8.64	8.65	0.01	5.89		Product seep visible
MW-1(M)	3/18/2004	930	3.90	14.53	np	7.60	0.00	6.93	Strong odor	Product seep slt visible
MW-1(M)	4/12/2004	902	0.43	14.53	7.56	7.57	0.01	6.97		Product seep visible
MW-1(M)	6/16/2004	1030	-0.35	14.53	9.39	9.41	0.01	5.13		Product seep slightly visible
MW-1(M)	7/19/2004	858	-5.63	14.53	9.00	9.03	0.01	5.51		Product seep slightly visible
MW-1(M)	8/17/2004	1020	-3.83	14.53	9.55	9.58	0.01	4.96		Product seep slightly visible
MW-1(M)	9/16/2004	932	-2.05	14.53	8.46	8.47	0.01	6.07		Product seep visible
MW-1(M)	4/11/2006	1314	1.94	14.53	np	6.73	0.00	7.80		
MW-1(M)	12/7/2006	1555	3.04	14.53	np	6.45	0.00	8.08		
MW-2(M)	8/28/2002	1122	-3.21	15.00	np	8.65	0.00	6.35	17.90	
MW-2(M)	9/12/2002	1015	-2.84	15.00	np	8.69	0.00	6.31		
MW-2(M)	9/13/2002	1520	1.12	15.00	np	9.70	0.00	5.30		
MW-2(M)	10/11/2002	1036	-2.45	15.00	np	8.95	0.00	6.05	19.03	
MW-2(M)	11/15/2002	930	2.73	15.00	np	8.55	0.00	6.45		
MW-2(M)	12/13/2002	814	4.26	15.00	np	8.08	0.00	6.92		
MW-2(M)	1/14/2003	1039	3.45	15.00	np	6.58	0.00	8.42		
MW-2(M)	2/12/2003	1042	2.12	15.00	np	6.47	0.00	8.53		
MW-2(M)	3/13/2003	940	3.86	15.00	np	5.91	0.00	9.09		
MW-2(M)	4/14/2003	1103	4.35	15.00	np	6.02	0.00	8.98		
MW-2(M)	5/14/2003	1008	1.15	15.00	np	6.91	0.00	8.09		
MW-2(M)	6/17/2003	1354	0.45	15.00	np	7.51	0.00	7.49		
MW-2(M)	7/14/2003	1132	0.11	15.00	np	8.02	0.00	6.98		
MW-2(M)	8/13/2003	1324	1.76	15.00	np	8.34	0.00	6.66		
MW-2(M)	9/12/2003	1318	2.26	15.00	np	8.58	0.00	6.42		
MW-2(M)	10/13/2003	852	-2.52	15.00	np	8.62	0.00	6.38		
MW-2(M)	10/15/2003	1300	2.26	15.00	np	8.62	0.00	6.38		
MW-2(M)	11/12/2003	1432	3.39	15.00	np	8.29	0.00	6.71		
MW-2(M)	12/16/2003	910	2.67	15.00	np	6.86	0.00	8.14		
MW-2(M)	1/11/2004	1348	4.01	15.00	np	6.27	0.00	8.73		
MW-2(M)	1/12/2004	1200	-0.09	15.00	np	6.39	0.00	8.61		
MW-2(M)	2/12/2004	1418	-2.19	15.00	np	6.14	0.00	8.86		
MW-2(M)	3/18/2004	1023	3.90	15.00	np	6.66	0.00	8.34		
MW-2(M)	4/12/2004	944	-1.26	15.00	np	6.98	0.00	8.02		
MW-2(M)	4/14/2004	1730	-2.47	15.00	np	7.07	0.00	7.93		
MW-2(M)	6/16/2004	1023	-1.94	15.00	np	7.77	0.00	7.23		
MW-2(M)	7/19/2004	834	-5.63	15.00	np	8.12	0.00	6.88		

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MW-2(M)	7/22/2004	1757	2.45	15.00	np	8.18	0.00	6.82		
MW-2(M)	8/17/2004	1015	-3.83	15.00	np	8.52	0.00	6.48		
MW-2(M)	9/16/2004	928	-3.70	15.00	np	8.27	0.00	6.73		
MW-2(M)	4/11/2006	1256	1.97	15.00	np	6.68	0.00	8.32		
MW-2(M)	12/7/2006	1530	3.04	15.00	np	6.42	0.00	8.58		
MW-3(M)	8/28/2002	1345	1.05	15.42	9.45	10.17	0.72	5.87	17.51	
MW-3(M)	9/12/2002	1025	-2.84	15.42	9.42	10.12	0.70	5.90		
MW-3(M)	9/13/2002	1547	2.52	15.42	9.51	9.88	0.37	5.86		
MW-3(M)	10/11/2002	1155	-1.52	15.42	9.61	10.67	1.06	5.66	18.44	
MW-3(M)	11/15/2002	1134	3.51	15.42	9.07	9.70	0.63	6.26		
MW-3(M)	12/13/2002	906	4.39	15.42	8.68	9.02	0.34	6.69		
MW-3(M)	1/14/2003	1130	2.16	15.42	7.54	8.15	0.61	7.80		
MW-3(M)	2/12/2003	1142	0.66	15.42	7.61	8.18	0.57	7.73		
MW-3(M)	3/13/2003	1037	2.91	15.42	7.01	7.91	0.90	8.29		
MW-3(M)	4/14/2003	1207	4.17	15.42	7.06	8.29	1.23	8.19		
MW-3(M)	5/14/2003	1101	2.59	15.42	7.78	8.94	1.16	7.48		
MW-3(M)	6/17/2003	1500	2.05	15.42	8.42	9.15	0.73	6.90		
MW-3(M)	7/14/2003	1226	0.11	15.42	8.86	9.57	0.71	6.46		
MW-3(M)	8/13/2003	1403	3.00	15.42	9.06	9.64	0.58	6.28		
MW-3(M)	9/12/2003	1449	3.21	15.42	9.26	9.59	0.33	6.11		
MW-3(M)	10/13/2003	921	-2.52	15.42	9.35	9.79	0.44	6.01		
MW-3(M)	10/23/2003	939	2.62	15.42	9.15	9.60	0.45	6.21		
MW-3(M)	11/12/2003	1438	3.39	15.42	8.99	9.16	0.17	6.41		
MW-3(M)	12/16/2003	1003	1.46	15.42	7.76	8.21	0.45	7.60		
MW-3(M)	1/11/2004	1359	4.01	15.42	7.19	8.09	0.90	8.11		
MW-3(M)	2/12/2004	1437	-0.76	15.42	7.32	8.79	1.47	7.90		
MW-3(M)	3/18/2004	925	2.49	15.42	7.77	8.51	0.74	7.55		
MW-3(M)	4/12/2004	915	0.43	15.42	7.95	8.58	0.63	7.38		
MW-3(M)	5/19/2004	1054	-1.19	15.42	8.55	9.35	0.80	6.76		
MW-3(M)	6/16/2004	1045	-0.35	15.42	8.70	9.52	0.82	6.61		
MW-3(M)	7/19/2004	855	-5.63	15.42	8.94	9.53	0.59	6.40		
MW-3(M)	8/17/2004	1033	-1.98	15.42	9.30	9.83	0.53	6.05		
MW-3(M)	9/16/2004	944	-2.05	15.42	9.10	9.35	0.25	6.29		
MW-3(M)	10/19/2004	1304	2.05	15.42	8.70	8.80	0.10	6.71		
MW-3(M)	11/16/2004	1100	-0.12	15.42	8.46	8.67	0.21	6.93		
MW-3(M)	12/13/2004	913	-0.09	15.42	7.95	8.22	0.27	7.43		

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MW-3(M)	3/29/2005	935	-3.67	15.42	8.00	8.34	0.34	7.37		
MW-3(M)	4/11/2006	1344	3.56	15.42	7.61	7.96	0.00	7.46		
MW-3(M)	12/4/2006	1435	0.44	15.42	np	7.58	0.00	7.84		Odors
MW-4(M)	8/28/2002	1302	-0.50	15.50	9.16	9.45	0.29	6.30	20.59	
MW-4(M)	9/12/2002	1042	-3.10	15.50	9.21	9.58	0.37	6.24		
MW-4(M)	9/13/2002	1544	1.12	15.50	9.26	9.39	0.13	6.22		
MW-4(M)	10/11/2002	1122	-2.45	15.50	9.46	9.77	0.31	6.00	21.11	
MW-4(M)	11/15/2002	1108	3.51	15.50	9.08	9.12	0.04	6.41		
MW-4(M)	12/13/2002	850	4.39	15.50	np	8.66	0.00	6.84		
MW-4(M)	1/14/2003	1106	3.45	15.50	np	7.18	0.00	8.32		
MW-4(M)	2/12/2003	1112	2.12	15.50	6.95	7.92	0.97	8.42		
MW-4(M)	3/13/2003	1007	3.86	15.50	6.46	7.49	1.03	8.91		
MW-4(M)	4/14/2003	1137	4.17	15.50	6.28	8.89	2.61	8.88		
MW-4(M)	5/14/2003	1126	2.59	15.50	7.18	9.48	2.30	8.02		
MW-4(M)	6/17/2003	1452	2.05	15.50	7.98	8.78	0.80	7.42		
MW-4(M)	7/14/2003	1232	1.80	15.50	8.53	8.79	0.26	6.94		
MW-4(M)	8/13/2003	1303	1.76	15.50	8.87	9.14	0.27	6.59		
MW-4(M)	9/12/2003	1445	3.21	15.50	9.07	9.28	0.21	6.40		
MW-4(M)	10/13/2003	914	-2.52	15.50	9.17	9.32	0.15	6.31		
MW-4(M)	10/23/2003	918	1.04	15.50	8.95	9.05	0.10	6.54		
MW-4(M)	11/12/2003	1501	3.39	15.50	np	8.85	0.00	6.65		
MW-4(M)	12/16/2003	918	2.67	15.50	np	7.45	0.00	8.05		
MW-4(M)	1/11/2004	1344	4.01	15.50	np	6.86	0.00	8.64		Product globules in bailer
MW-4(M)	2/12/2004	1408	-2.19	15.50	6.45	8.69	2.24	8.76		Odor
MW-4(M)	3/18/2004	1010	3.90	15.50	6.97	9.16	2.19	8.25		
MW-4(M)	4/12/2004	919	0.43	15.50	7.34	8.81	1.47	7.97		
MW-4(M)	5/19/2004	1055	-1.19	15.50	8.06	8.77	0.71	7.35		
MW-4(M)	6/16/2004	1013	-1.94	15.50	8.27	8.90	0.63	7.15		
MW-4(M)	7/19/2004	839	-5.63	15.50	8.66	8.78	0.12	6.82		
MW-4(M)	8/17/2004	1008	-3.83	15.50	9.04	9.27	0.23	6.43		
MW-4(M)	9/16/2004	922	-3.70	15.50	8.87	8.93	0.06	6.62		
MW-4(M)	10/19/2004	1256	2.05	15.50	np	8.50	0.00	7.00		
MW-4(M)	11/16/2004	1115	-0.12	15.50	np	8.14	0.00	7.36		
MW-4(M)	12/13/2004	907	-0.09	15.50	np	7.58	0.00	7.92		
MW-4(M)	3/29/2005	1010	-3.67	15.50	np	7.80	0.00	7.70		
MW-4(M)	4/11/2006	1251	1.97	15.50	7.00	8.74	1.74	8.27		

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MW-4(M)	12/4/2006	1425	2.76	15.50	np	7.02	0.00	8.48		Odors
MW-5(M)	8/28/2002						0.00			
MW-6(M)	8/28/2002	1140	-1.99	13.78	np	7.71	0.00	6.07	18.47	
MW-6(M)	9/12/2002	926	-1.83	13.78	np	8.25	0.00	5.53		
MW-6(M)	9/13/2002	1515	1.12	13.78	np	7.71	0.00	6.07		
MW-6(M)	10/11/2002	1012	-2.51	13.78	np	7.92	0.00	5.86	19.06	
MW-6(M)	11/15/2002	921	2.73	13.78	np	7.41	0.00	6.37		
MW-6(M)	12/13/2002	802	4.26	13.78	np	8.85	0.00	4.93		
MW-6(M)	1/14/2003	1028	3.99	13.78	np	7.01	0.00	6.77		
MW-6(M)	2/12/2003	1031	2.12	13.78	np	6.61	0.00	7.17		
MW-6(M)	3/13/2003	930	4.37	13.78	np	6.93	0.00	6.85		
MW-6(M)	4/14/2003	1053	4.35	13.78	np	6.95	0.00	6.83		
MW-6(M)	5/14/2003	956	1.15	13.78	np	7.14	0.00	6.64		
MW-6(M)	6/17/2003	1402	0.45	13.78	np	7.12	0.00	6.66		
MW-6(M)	7/14/2003	1050	-1.90	13.78	np	7.47	0.00	6.31		
MW-6(M)	8/13/2003	1316	1.76	13.78	np	7.48	0.00	6.30		
MW-6(M)	9/12/2003	1312	2.26	13.78	np	7.56	0.00	6.22		
MW-6(M)	10/22/2003	1530	-2.21	13.78	np	7.00	0.00	6.78		
MW-6(M)	11/12/2003	1348	3.65	13.78	np	8.27	0.00	5.51		Pressure release
MW-6(M)	12/16/2003	857	2.67	13.78	np	5.86	0.00	7.92		
MW-6(M)	1/11/2004	1332	4.01	13.78	np	5.41	0.00	8.37		
MW-6(M)	1/12/2004	8.14	0.52	13.78	np	5.58	0.00	8.20		
MW-6(M)	2/12/2004	1328	-3.40	13.78	np	5.69	0.00	8.09		
MW-6(M)	3/18/2004	941	3.90	13.78	np	6.41	0.00	7.37		
MW-6(M)	4/12/2004	905	0.43	13.78	np	6.49	0.00	7.29		
MW-6(M)	4/13/2004	1045	-0.52	13.78	np	6.45	0.00	7.33		
MW-6(M)	5/19/2004	1135	0.49	13.78	np	6.95	0.00	6.83		
MW-6(M)	6/16/2004	948	-1.94	13.78	np	7.69	0.00	6.09		
MW-6(M)	7/19/2004	827	-5.20	13.78	np	7.45	0.00	6.33		
MW-6(M)	7/19/2004	1505	2.72	13.78	np	7.29	0.00	6.49		
MW-6(M)	8/17/2004	947	-3.83	13.78	np	7.82	0.00	5.96		
MW-6(M)	9/16/2004	857	-3.70	13.78	np	7.56	0.00	6.22		
MW-6(M)	4/11/2006	1305	1.97	13.78	np	6.37	0.00	7.41		
MW-6(M)	12/7/2006	1545	3.04	13.78	np	5.31	0.00	8.47		Odors

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MW-7(M)	8/28/2002	1102	-3.21	14.86	np	8.31	0.00	6.55	18.64	
MW-7(M)	9/12/2002	900	-1.83	14.86	np	8.36	0.00	6.50		
MW-7(M)	9/13/2002	1455	1.12	14.86	np	8.43	0.00	6.43		
MW-7(M)	10/11/2002	957	-2.51	14.86	np	8.58	0.00	6.28	18.93	
MW-7(M)	11/15/2002	914	2.73	14.86	np	8.57	0.00	6.29		
MW-7(M)	12/13/2002	754	4.26	14.86	np	7.70	0.00	7.16		
MW-7(M)	1/14/2003	1017	3.99	14.86	np	6.01	0.00	8.85		
MW-7(M)	2/12/2003	1021	3.06	14.86	np	5.96	0.00	8.90		
MW-7(M)	3/13/2003	920	4.37	14.86	np	5.30	0.00	9.56		
MW-7(M)	4/14/2003	1044	4.35	14.86	np	5.50	0.00	9.36		
MW-7(M)	5/14/2003	947	1.15	14.86	np	6.42	0.00	8.44		
MW-7(M)	6/17/2003	1347	0.45	14.86	np	7.13	0.00	7.73		
MW-7(M)	7/14/2003	1124	-1.90	14.86	np	7.66	0.00	7.20		
MW-7(M)	8/13/2003	1311	1.76	14.86	np	8.03	0.00	6.83		
MW-7(M)	9/12/2003	1307	2.26	14.86	np	8.27	0.00	6.59		
MW-7(M)	10/13/2003	852	-2.52	14.86	np	8.30	0.00	6.56		
MW-7(M)	10/13/2003	1547	2.54	14.86	np	8.27	0.00	6.59		
MW-7(M)	11/12/2003	1356	3.65	14.86	np	7.96	0.00	6.90		
MW-7(M)	12/16/2003	903	2.67	14.86	np	6.41	0.00	8.45		
MW-7(M)	1/11/2004	1335	4.01	14.86	np	5.77	0.00	9.09		
MW-7(M)	1/12/2004	940	-1.27	14.86	np	5.81	0.00	9.05		
MW-7(M)	2/12/2004	1333	-3.40	14.86	np	5.53	0.00	9.33		
MW-7(M)	3/18/2004	946	3.90	14.86	np	6.23	0.00	8.63		
MW-7(M)	4/12/2004	931	-1.26	14.86	np	6.51	0.00	8.35		
MW-7(M)	4/12/2004	1725	-1.44	14.86	np	6.63	0.00	8.23		
MW-7(M)	5/19/2004	1139	0.49	14.86	np	7.20	0.00	7.66		
MW-7(M)	6/16/2004	957	-1.94	14.86	np	7.42	0.00	7.44		
MW-7(M)	7/19/2004	829	-5.20	14.86	np	7.80	0.00	7.06		
MW-7(M)	7/19/2004	1550	2.50	14.86	np	7.81	0.00	7.05		
MW-7(M)	9/16/2004	903	-3.70	14.86	np	7.91	0.00	6.95		
MW-7(M)	4/11/2006	1301	1.97	14.86	np	6.23	0.00	8.63		
MW-8(M)	8/28/2002	1326	-0.50	15.23	9.69	11.08	1.39	5.37	18.89	
MW-8(M)	9/12/2002	1036	-3.10	15.23	9.60	10.85	1.25	5.48		
MW-8(M)	9/13/2002	1540	1.12	15.23	9.70	10.41	0.71	5.44		
MW-8(M)	10/11/2002	1211	-1.52	15.23	9.89	10.91	1.02	5.22	18.74	
MW-8(M)	11/15/2002	1126	3.51	15.23	8.57	9.26	0.69	6.58		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-8(M)	12/13/2002	859	4.39	15.23	8.04	8.81	0.77	7.10		
MW-8(M)	1/14/2003	1123	3.45	15.23	8.20	8.53	0.33	6.99		
MW-8(M)	2/12/2003	1133	0.66	15.23	8.27	8.75	0.48	6.90		
MW-8(M)	3/13/2003	1029	3.86	15.23	np	8.22	0.00	7.01		
MW-8(M)	4/14/2003	1158	4.17	15.23	np	7.72	0.00	7.51		
MW-8(M)	5/14/2003	1042	2.59	15.23	8.71	9.45	0.74	6.43		
MW-8(M)	6/17/2003	1440	2.05	15.23	8.91	9.77	0.86	6.22		
MW-8(M)	7/14/2003	1221	0.11	15.23	9.32	9.79	0.47	5.85		
MW-8(M)	8/13/2003	1357	3.00	15.23	9.36	9.63	0.27	5.84		
MW-8(M)	9/12/2003	1437	3.21	15.23	9.19	9.41	0.22	6.01		
MW-8(M)	10/13/2003	932	-1.55	15.23	9.57	9.92	0.35	5.62		
MW-8(M)	10/23/2003	836	1.04	15.23	9.43	9.86	0.43	5.75		
MW-8(M)	11/12/2003	1442	3.39	15.23	8.81	8.86	0.05	6.41		
MW-8(M)	12/16/2003	954	1.46	15.23	np	8.71	0.00	6.52		
MW-8(M)	1/11/2004	1355	4.01	15.23	np	7.55	0.00	7.68		Sheen in bailer
MW-8(M)	2/12/2004	1430	-2.19	15.23	8.37	8.48	0.11	6.85		
MW-8(M)	3/18/2004	913	2.49	15.23	8.44	8.53	0.09	6.78		
MW-8(M)	4/12/2004	907	0.43	15.23	8.43	8.46	0.03	6.80		
MW-8(M)	5/19/2004	1112	-1.19	15.23	9.04	9.20	0.16	6.17		
MW-8(M)	6/16/2004	1037	-0.35	15.23	9.20	9.30	0.10	6.02		
MW-8(M)	7/19/2004	859	-5.63	15.23	9.34	9.40	0.06	5.88		
MW-8(M)	8/17/2004	1024	-3.83	15.23	9.64	9.90	0.26	5.56		
MW-8(M)	9/16/2004	938	-2.05	15.23	9.41	9.43	0.02	5.82		
MW-8(M)	11/16/2004	944	-1.10	15.23	8.80	8.81	0.01	6.43		
MW-8(M)	12/13/2004	940	1.62	15.23	8.39	8.47	0.08	6.83		
MW-8(M)	3/29/2005	958	-3.67	15.23	8.67	8.75	0.08	6.55		
MW-8(M)	4/11/2006	1317	1.97	15.23	np	7.75	0.00	7.48		
MW-8(M)	12/4/2006	1445	0.44	15.23	np	8.08	0.00	7.15		Odors, iron staining
MW-9(M)	8/28/2002	1357	1.05	15.42	9.35	13.21	3.86	5.58	19.12	
MW-9(M)	9/12/2002	1049	-3.10	15.42	9.30	12.08	2.78	5.77		
MW-9(M)	9/13/2002	1552	1.12	15.42	9.61	10.21	0.60	5.73		
MW-9(M)	10/11/2002	1226	-1.52	15.42	9.75	10.92	1.17	5.52	19.47	
MW-9(M)	11/15/2002	1141	2.61	15.42	9.16	10.28	1.12	6.12		
MW-9(M)	12/13/2002	915	4.39	15.42	8.78	9.79	1.01	6.51		
MW-9(M)	1/14/2003	1137	2.16	15.42	7.76	8.55	0.79	7.56		
MW-9(M)	2/12/2003	1150	0.66	15.42	7.85	8.85	1.00	7.44		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-9(M)	3/13/2003	1045	2.91	15.42	7.35	8.21	0.86	7.96		
MW-9(M)	4/14/2003	1217	4.17	15.42	7.33	8.90	1.57	7.89		
MW-9(M)	5/15/2003	1116	2.59	15.42	8.11	10.30	2.19	7.03		
MW-9(M)	6/17/2003	1508	2.05	15.42	8.44	10.65	2.21	6.70		
MW-9(M)	7/14/2003	1241	1.80	15.42	9.00	9.94	0.94	6.30		
MW-9(M)	8/13/2003	1409	3.00	15.42	9.20	9.80	0.60	6.14		
MW-9(M)	9/12/2003	1456	3.21	15.42	9.38	9.90	0.52	5.97		
MW-9(M)	10/13/2003	939	-1.55	15.42	9.46	10.18	0.72	5.87		
MW-9(M)	10/23/2003	956	2.62	15.42	9.24	9.92	0.68	6.09		
MW-9(M)	11/12/2003	1456	3.39	15.42	9.15	9.49	0.34	6.23		
MW-9(M)	12/16/2003	1009	1.46	15.42	8.02	8.19	0.17	7.38		
MW-9(M)	1/11/2004	1407	4.01	15.42	7.52	7.66	0.14	7.88		
MW-9(M)	2/12/2004	1444	-0.76	15.42	7.76	8.69	0.93	7.54		
MW-9(M)	3/18/2004	919	2.49	15.42	8.07	8.93	0.86	7.24		
MW-9(M)	4/12/2004	912	0.43	15.42	8.21	8.83	0.62	7.13		
MW-9(M)	5/19/2004	1108	-1.19	15.42	8.73	9.83	1.10	6.55		
MW-9(M)	7/19/2004	905	-5.63	15.42	9.05	10.15	1.10	6.23		
MW-9(M)	8/17/2004	1029	-3.83	15.42	9.41	10.44	1.03	5.88		
MW-9(M)	9/16/2004	950	-2.05	15.42	9.22	9.88	0.66	6.12		
MW-9(M)	10/19/2004	1316	0.83	15.42	8.81	9.40	0.59	6.54		
MW-9(M)	11/16/2004	1050	-0.12	15.42	8.62	8.99	0.37	6.75		
MW-9(M)	12/13/2004	927	-0.09	15.42	8.15	8.44	0.29	7.23		
MW-9(M)	3/29/2005	945	3.67	15.42	8.27	8.60	0.33	7.11		
MW-9(M)	4/11/2006	1338	3.56	15.42	7.85	7.95	0.15	7.60		
MW-10(M)	8/28/2002	1430	1.05	16.32	np	11.23	0.00	5.09	19.43	
MW-10(M)	9/12/2002	1005	-2.84	16.32	np	11.10	0.00	5.22		
MW-10(M)	9/13/2002	1526	1.12	16.32	np	11.13	0.00	5.19		
MW-10(M)	10/11/2002	1055	-2.45	16.32	np	11.22	0.00	5.10	19.83	
MW-10(M)	11/15/2002	942	3.50	16.32	np	10.63	0.00	5.69		
MW-10(M)	12/13/2002	821	4.26	16.32	np	10.21	0.00	6.11		
MW-10(M)	1/14/2003	1048	3.45	16.32	np	9.62	0.00	6.70		
MW-10(M)	2/12/2003	1051	2.12	16.32	np	9.91	0.00	6.41		
MW-10(M)	3/13/2003	948	3.86	16.32	np	9.40	0.00	6.92		
MW-10(M)	4/14/2003	1118	4.35	16.32	np	9.10	0.00	7.22		
MW-10(M)	5/15/2003	1019	1.15	16.32	np	10.38	0.00	5.94		
MW-10(M)	6/17/2003	1413	0.45	16.32	np	10.41	0.00	5.91		



**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-10(M)	7/14/2003	1141	0.11	16.32	np	10.75	0.00	5.57		
MW-10(M)	8/13/2003	1333	3.00	16.32	np	10.77	0.00	5.55		
MW-10(M)	9/12/2003	1348	3.20	16.32	np	10.95	0.00	5.37		
MW-10(M)	10/13/2003	950	-1.55	16.32	np	10.88	0.00	5.44		
MW-10(M)	10/15/2003	1500	3.78	16.32	np	10.85	0.00	5.47		
MW-10(M)	11/12/2003	1334	3.65	16.32	np	10.67	0.00	5.65		
MW-10(M)	12/16/2003	1027	1.46	16.32	np	9.68	0.00	6.64		
MW-10(M)	1/11/2004	1410	4.01	16.32	np	9.32	0.00	7.00		
MW-10(M)	1/13/2004	1050	-1.76	16.32	np	9.55	0.00	6.77		
MW-10(M)	2/12/2004	1305	-3.40	16.32	np	9.95	0.00	6.37		
MW-10(M)	3/18/2004	856	2.49	16.32	np	10.17	0.00	6.15		Iron
MW-10(M)	4/12/2004	910	0.43	16.32	np	10.12	0.00	6.20		
MW-10(M)	4/13/2004	820	2.99	16.32	np	10.19	0.00	6.13		
MW-10(M)	5/19/2004	1124	-1.19	16.32	np	10.56	0.00	5.76		
MW-10(M)	6/16/2004	1110	-0.35	16.32	np	10.69	0.00	5.63		
MW-10(M)	7/19/2004	909	-5.63	16.32	np	10.68	0.00	5.64		
MW-10(M)	7/19/2004	1715	1.56	16.32	np	10.65	0.00	5.67		
MW-10(M)	8/17/2004	1048	-1.98	16.32	np	11.01	0.00	5.31		
MW-10(M)	9/16/2004	1007	-2.05	16.32	np	10.72	0.00	5.60		
MW-10(M)	11/16/2004	1045	-0.12	16.32	np	10.20	0.00	6.12		
MW-10(M)	4/11/2006	1330	3.56	16.32	np	9.68	0.00	6.64		Bugs interfere with reading
MW-10(M)	12/7/2006	1455	4.53	16.32	np	9.62	0.00	6.70		Many bugs on probe/GW
MW-11(M)	8/28/2002	1420	1.05	16.34	np	10.87	0.00	5.47	19.81	
MW-11(M)	9/12/2002	1000	-2.84	16.34	np	10.80	0.00	5.54		
MW-11(M)	9/13/2002	1531	1.12	16.34	np	10.83	0.00	5.51		
MW-11(M)	10/11/2002	1108	-2.45	16.34	np	11.01	0.00	5.33	19.83	
MW-11(M)	11/15/2002	949	3.50	16.34	np	10.37	0.00	5.97		
MW-11(M)	12/13/2002	829	4.26	16.34	np	9.94	0.00	6.40		
MW-11(M)	1/14/2003	1057	3.45	16.34	np	9.08	0.00	7.26		
MW-11(M)	2/12/2003	1058	2.12	16.34	np	9.25	0.00	7.09		
MW-11(M)	3/13/2003	958	3.86	16.34	np	8.71	0.00	7.63		
MW-11(M)	4/14/2003	1127	4.35	16.34	np	8.86	0.00	7.48		
MW-11(M)	5/15/2003	1028	1.15	16.34	np	9.79	0.00	6.55		
MW-11(M)	6/17/2003	1422	0.45	16.34	np	10.02	0.00	6.32		
MW-11(M)	7/14/2003	1149	0.11	16.34	np	10.39	0.00	5.95		
MW-11(M)	8/13/2003	1340	3.00	16.34	np	10.41	0.00	5.93		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-11(M)	9/12/2003	1353	3.20	16.34	np	10.60	0.00	5.74		
MW-11(M)	10/13/2003	956	-1.55	16.34	np	10.72	0.00	5.62		
MW-11(M)	10/15/2003	1720	2.70	16.34	np	10.41	0.00	5.93		
MW-11(M)	11/12/2003	1341	3.65	16.34	np	10.29	0.00	6.05		Slight Odor
MW-11(M)	12/16/2003	1019	1.46	16.34	np	9.27	0.00	7.07		
MW-11(M)	1/11/2004	1414	4.01	16.34	np	8.73	0.00	7.61		
MW-11(M)	1/13/2004	1235	-0.61	16.34	np	9.21	0.00	7.13		Slight Sheen
MW-11(M)	2/12/2004	1311	-3.40	16.34	np	9.43	0.00	6.91		
MW-11(M)	3/18/2004	903	2.49	16.34	np	9.48	0.00	6.86		
MW-11(M)	4/12/2004	948	-1.26	16.34	np	9.60	0.00	6.74		
MW-11(M)	4/13/2004	945	1.05	16.34	np	9.53	0.00	6.81		
MW-11(M)	5/19/2004	1120	-1.19	16.34	np	10.20	0.00	6.14		
MW-11(M)	6/16/2004	1124	-0.35	16.34	np	10.31	0.00	6.03		
MW-11(M)	7/19/2004	907	-5.63	16.34	np	10.49	0.00	5.85		
MW-11(M)	7/21/2004	1646	2.52	16.34	np	10.37	0.00	5.97		
MW-11(M)	8/17/2004	1059	-1.98	16.34	np	10.77	0.00	5.57		
MW-11(M)	9/16/2004	1000	-2.05	16.34	np	10.52	0.00	5.82		
MW-11(M)	4/11/2006	1334	3.56	16.34	np	9.06	0.00	7.28		
MW-11(M)	12/7/2006	1400	4.90	16.34	np	8.96	0.00	7.38		
MW-12(A)	10/13/2003	1152	1.50	30.58	np	20.00	0.00	10.58	25.38	
MW-12(A)	10/22/2003	955	3.54	30.58	np	19.61	0.00	10.97		
MW-12(A)	11/12/2003	1116	0.56	30.58	np	18.87	0.00	11.71		
MW-12(A)	12/16/2003	1345	0.34	30.58	np	15.44	0.00	15.14		
MW-12(A)	1/11/2004	1616	4.26	30.58	np	14.76	0.00	15.82		
MW-12(A)	1/15/2004	940	0.81	30.58	np	14.70	0.00	15.88		
MW-12(A)	2/12/2004	932	-2.53	30.58	np	14.26	0.00	16.32		
MW-12(A)	3/18/2004	1340	1.23	30.58	np	15.27	0.00	15.31		
MW-12(A)	4/12/2004	1208	-4.16	30.58	np	15.85	0.00	14.73		
MW-12(A)	4/16/2004	725	-1.63	30.58	np	16.00	0.00	14.58		
MW-12(A)	5/19/2004	1253	1.86	30.58	np	17.04	0.00	13.54		
MW-12(A)	6/16/2004	1233	1.78	30.58	np	17.61	0.00	12.97		
MW-12(A)	7/19/2004	1122	-2.94	30.58	np	18.15	0.00	12.43		
MW-12(A)	7/22/2004	655	-1.14	30.58	np	18.19	0.00	12.39		
MW-12(A)	8/17/2004	1320	1.62	30.58	np	18.64	0.00	11.94		
MW-12(A)	9/16/2004	1310	3.67	30.58	np	18.74	0.00	11.84		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-13(A)	10/13/2003	1157	1.50	31.36	np	22.68	0.00	8.68	26.42	
MW-13(A)	10/22/2003	1130	3.62	31.36	np	22.34	0.00	9.02		Odor
MW-13(A)	11/12/2003	1122	0.56	31.36	np	22.14	0.00	9.22		
MW-13(A)	12/16/2003	1352	0.34	31.36	np	18.41	0.00	12.95		
MW-13(A)	1/11/2004	1620	4.26	31.36	np	17.39	0.00	13.97		
MW-13(A)	1/15/2004	1130	-1.98	31.36	np	17.28	0.00	14.08		
MW-13(A)	2/12/2004	937	-2.53	31.36	np	16.71	0.00	14.65		
MW-13(A)	3/18/2004	1345	1.23	31.36	np	17.83	0.00	13.53		
MW-13(A)	4/12/2004	1210	-4.16	31.36	np	18.45	0.00	12.91		
MW-13(A)	4/16/2004	927	1.51	31.36	np	18.82	0.00	12.54		
MW-13(A)	5/19/2004	1255	1.86	31.36	np	19.85	0.00	11.51		
MW-13(A)	6/16/2004	1238	1.78	31.36	np	20.53	0.00	10.83		
MW-13(A)	7/19/2004	1124	-2.94	31.36	np	21.33	0.00	10.03		
MW-13(A)	7/22/2004	818	-2.86	31.36	np	21.40	0.00	9.96		
MW-13(A)	8/17/2004	1324	1.62	31.36	np	21.96	0.00	9.40		
MW-13(A)	9/16/2004	1314	3.67	31.36	np	21.92	0.00	9.44		
MW-14(A)	10/13/2003	1203	1.50	23.39	np	15.06	0.00	8.33	18.81	
MW-14(A)	10/21/2003	1645	-1.50	23.39	np	14.70	0.00	8.69		
MW-14(A)	11/12/2003	1056	0.56	23.39	np	14.55	0.00	8.84		Iron
MW-14(A)	12/16/2003	1336	0.34	23.39	np	12.01	0.00	11.38		
MW-14(A)	1/11/2004	1624	4.26	23.39	np	11.47	0.00	11.92		
MW-14(A)	1/15/2004	1250	-2.74	23.39	np	11.41	0.00	11.98		Iron
MW-14(A)	2/12/2004	1106	-3.59	23.39	np	11.07	0.00	12.32		
MW-14(A)	3/18/2004	1226	4.37	23.39	np	11.57	0.00	11.82		
MW-14(A)	4/12/2004	1205	-4.16	23.39	np	11.88	0.00	11.51		
MW-14(A)	4/16/2004	815	-0.11	23.39	np	11.97	0.00	11.42		
MW-14(A)	5/19/2004	1250	1.86	23.39	np	12.50	0.00	10.89		
MW-14(A)	6/16/2004	1226	1.01	23.39	np	12.73	0.00	10.66		
MW-14(A)	7/19/2004	1122	-2.94	23.39	np	13.28	0.00	10.11		
MW-14(A)	7/23/2004	757	-1.63	23.39	np	13.34	0.00	10.05		
MW-14(A)	8/17/2004	1317	1.62	23.39	np	14.21	0.00	9.18		
MW-14(A)	9/16/2004	1304	3.67	23.39	np	13.83	0.00	9.56		
MW-15(A)	10/13/2003	1116	-0.10	16.95	np	9.08	0.00	7.87	14.81	
MW-15(A)	10/20/2003	1340	0.06	16.95	np	8.87	0.00	8.08		
MW-15(A)	11/12/2003	1026	-0.65	16.95	np	8.58	0.00	8.37		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-15(A)	12/16/2003	1239	-0.30	16.95	np	6.35	0.00	10.60		
MW-15(A)	1/11/2004	1529	4.58	16.95	5.77	5.80	0.03	11.18		
MW-15(A)	2/12/2004	1058	-3.59	16.95	5.41	5.90	0.49	11.47		Strong Odor
MW-15(A)	3/18/2004	1230	4.37	16.95	6.10	8.04	1.94	10.56		
MW-15(A)	4/12/2004	1153	-4.16	16.95	6.50	7.26	0.76	10.34		
MW-15(A)	5/19/2004	1403	2.56	16.95	7.25	7.95	0.70	9.60		Very thick dark strong odor
MW-15(A)	6/16/2004	1351	1.80	16.95	7.51	8.28	0.77	9.32		Very strong odor
MW-15(A)	7/19/2004	1131	-1.08	16.95	8.04	8.84	0.80	8.79		Very strong odor
MW-15(A)	8/17/2004	1305	1.62	16.95	8.46	9.27	0.81	8.37		Very strong odor
MW-15(A)	9/16/2004	1255	3.67	16.95	8.40	8.89	0.49	8.48		
MW-15(A)	10/19/2004	1425	3.44	16.95	7.65	8.06	0.41	9.24		
MW-15(A)	3/29/2005	1128	-3.06	16.95	6.45	6.80	0.35	10.45		
MW-15(A)	12/4/2006	1515	0.44	16.95	np	6.21	0.00	10.74		Probe odors and emulsion
MW-16(A)	10/13/2003	1111	-0.10	16.48	np	8.59	0.00	7.89	15.21	
MW-16(A)	10/20/2003	1510	-0.31	16.48	np	8.39	0.00	8.09		
MW-16(A)	11/12/2003	1035	0.56	16.48	np	8.18	0.00	8.30		
MW-16(A)	12/16/2003	1224	-0.19	16.48	np	6.51	0.00	9.97		possible sheen
MW-16(A)	1/11/2004	1523	4.58	16.48	np	6.05	0.00	10.43		Iron
MW-16(A)	1/19/2004	930	5.44	16.48	np	6.04	0.00	10.44		
MW-16(A)	2/12/2004	1110	-3.59	16.48	np	5.81	0.00	10.67		
MW-16(A)	3/18/2004	1221	4.37	16.48	np	6.33	0.00	10.15		
MW-16(A)	4/12/2004	1158	-4.16	16.48	np	6.63	0.00	9.85		
MW-16(A)	4/19/2004	850	2.95	16.48	np	6.68	0.00	9.80		
MW-16(A)	5/19/2004	1357	2.56	16.48	np	7.20	0.00	9.28		
MW-16(A)	6/16/2004	1400	1.80	16.48	np	7.37	0.00	9.11		
MW-16(A)	7/19/2004	1021	-4.71	16.48	np	7.78	0.00	8.70		
MW-16(A)	7/22/2004	1515	1.37	16.48	np	7.81	0.00	8.67		
MW-16(A)	8/17/2004	1312	1.62	16.48	np	8.13	0.00	8.35		
MW-16(A)	9/16/2004	1300	3.67	16.48	np	8.04	0.00	8.44		
MW-17(A)	10/13/2003	1125	-0.10	15.69	np	8.37	0.00	7.32	15.35	
MW-17(A)	10/17/2003	1240	1.23	15.69	np	8.31	0.00	7.38		
MW-17(A)	11/12/2003	1020	-0.65	15.69	np	7.88	0.00	7.81		
MW-17(A)	12/16/2003	1245	-0.30	15.69	np	5.70	0.00	9.99		
MW-17(A)	1/11/2004	1540	4.26	15.69	np	5.00	0.00	10.69		
MW-17(A)	1/19/2004	1130	4.20	15.69	np	5.00	0.00	10.69		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-17(A)	2/12/2004	1047	-3.59	15.69	np	4.66	0.00	11.03		
MW-17(A)	3/18/2004	1245	3.10	15.69	np	5.43	0.00	10.26		
MW-17(A)	4/12/2004	1145	-4.16	15.69	np	5.88	0.00	9.81		
MW-17(A)	4/15/2004	1055	3.34	15.69	np	6.00	0.00	9.69		
MW-17(A)	5/19/2004	1351	2.56	15.69	np	6.66	0.00	9.03		
MW-17(A)	6/16/2004	1338	1.80	15.69	np	6.95	0.00	8.74		
MW-17(A)	7/19/2004	1026	-4.71	15.69	np	7.45	0.00	8.24		
MW-17(A)	7/22/2004	1636	2.92	15.69	np	7.50	0.00	8.19		
MW-17(A)	8/17/2004	1254	1.62	15.69	np	7.86	0.00	7.83		
MW-17(A)	9/16/2004	1245	3.67	15.69	np	7.79	0.00	7.90		
MW-18(A)	10/13/2003	1117	-0.10	16.23	np	8.85	0.00	7.38	15.36	
MW-18(A)	10/21/2003	1300	0.89	16.23	np	8.58	0.00	7.65		
MW-18(A)	11/12/2003	1042	0.56	16.23	np	8.39	0.00	7.84		Possible Sheen
MW-18(A)	12/16/2003	1234	-0.30	16.23	np	6.38	0.00	9.85		
MW-18(A)	1/19/2004	1040	5.35	16.23	np	5.74	0.00	10.49		
MW-18(A)	2/12/2004	1052	-3.59	16.23	np	5.42	0.00	10.81		
MW-18(A)	3/18/2004	1240	3.10	16.23	np	6.10	0.00	10.13		
MW-18(A)	4/12/2004	1148	-4.16	16.23	np	6.55	0.00	9.68		
MW-18(A)	4/15/2004	1000	3.54	16.23	np	6.62	0.00	9.61		
MW-18(A)	5/19/2004	1355	2.56	16.23	np	7.27	0.00	8.96		
MW-18(A)	6/16/2004	1346	1.80	16.23	np	7.50	0.00	8.73		
MW-18(A)	7/19/2004	1025	-4.71	16.23	np	7.98	0.00	8.25		
MW-18(A)	7/21/2004	1535	2.65	16.23	np	8.00	0.00	8.23		
MW-18(A)	8/17/2004	1258	1.62	16.23	np	8.36	0.00	7.87		
MW-18(A)	9/16/2004	1251	3.67	16.23	np	8.29	0.00	7.94		
MW-19(A)	10/13/2003	1049	-0.10	17.98	np	10.59	0.00	7.39	15.30	
MW-19(A)	10/20/2003	1050	2.89	17.98	np	10.43	0.00	7.55		
MW-19(A)	11/12/2003	1145	193.00	17.98	np	10.18	0.00	7.80		
MW-19(A)	1/13/2004	1515	1.91	17.98	np	7.99	0.00	9.99		
MW-19(A)	2/12/2004	1122	-3.59	17.98	np	7.66	0.00	10.32		
MW-19(A)	3/18/2004	1210	4.37	17.98	np	8.26	0.00	9.72		
MW-19(A)	4/12/2004	1133	-4.16	17.98	np	8.60	0.00	9.38		
MW-19(A)	4/15/2004	1545	-3.71	17.98	np	8.67	0.00	9.31		
MW-19(A)	5/19/2004	1243	1.86	17.98	np	9.18	0.00	8.80		
MW-19(A)	7/19/2004	952	-4.71	17.98	np	9.80	0.00	8.18		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-19(A)	7/20/2004	1343	1.28	17.98	np	9.85	0.00	8.13		
MW-19(A)	8/17/2004	1152	-0.05	17.98	np	10.15	0.00	7.83		
MW-19(A)	9/16/2004	1042	-0.04	17.98	np	10.07	0.00	7.91		
MW-20(A)	10/13/2003	1047	-0.10	17.04	np	10.03	0.00	7.01	15.39	
MW-20(A)	10/20/2003	1210	1.90	17.04	np	9.88	0.00	7.16		
MW-20(A)	11/12/2003	1150	1.93	17.04	np	9.65	0.00	7.39		Iron
MW-20(A)	12/16/2003	1410	0.34	17.04	np	8.03	0.00	9.01		Iron
MW-20(A)	1/11/2004	1510	4.58	17.04	np	7.41	0.00	9.63		
MW-20(A)	1/13/2004	1630	3.15	17.04	np	7.44	0.00	9.60		Iron
MW-20(A)	2/12/2004	1126	-3.59	17.04	np	7.11	0.00	9.93		
MW-20(A)	3/18/2004	1215	4.37	17.04	np	7.70	0.00	9.34		Iron
MW-20(A)	4/12/2004	1128	-2.84	17.04	np	8.06	0.00	8.98		
MW-20(A)	4/15/2004	1642	-4.14	17.04	np	8.13	0.00	8.91		Iron
MW-20(A)	5/19/2004	1246	1.86	17.04	np	8.63	0.00	8.41		
MW-20(A)	6/16/2004	1415	1.80	17.04	np	8.86	0.00	8.18		
MW-20(A)	7/19/2004	947	-4.71	17.04	np	9.27	0.00	7.77		
MW-20(A)	7/20/2004	1444	2.36	17.04	np	9.30	0.00	7.74		
MW-20(A)	8/17/2004	1156	-0.05	17.04	np	9.61	0.00	7.43		
MW-20(A)	9/16/2004	1048	-0.04	17.04	np	9.82	0.00	7.22		
MW-21(A)	10/13/2003	1035	-0.10	15.90	np	9.22	0.00	6.68	15.35	
MW-21(A)	10/20/2003	940	3.26	15.90	np	9.11	0.00	6.79		
MW-21(A)	11/12/2003	1156	1.93	15.90	np	8.91	0.00	6.99		
MW-21(A)	12/16/2003	1216	-0.19	15.90	np	7.49	0.00	8.41		Iron
MW-21(A)	1/11/2004	1503	4.58	15.90	np	6.90	0.00	9.00		
MW-21(A)	1/13/2004	1355	0.66	15.90	np	6.89	0.00	9.01		
MW-21(A)	2/12/2004	1135	-3.92	15.90	np	6.66	0.00	9.24		
MW-21(A)	3/18/2004	1202	4.37	15.90	np	7.17	0.00	8.73		
MW-21(A)	4/12/2004	1138	-4.16	15.90	np	7.49	0.00	8.41		
MW-21(A)	4/16/2004	1115	3.53	15.90	np	7.58	0.00	8.32		
MW-21(A)	5/19/2004	1237	1.86	15.90	np	7.99	0.00	7.91		
MW-21(A)	6/16/2004	1219	1.01	15.90	np	8.21	0.00	7.69		
MW-21(A)	7/19/2004	942	-4.71	15.90	np	8.57	0.00	7.33		
MW-21(A)	7/20/2004	1533	2.73	15.90	np	8.60	0.00	7.30		
MW-21(A)	8/17/2004	1201	-0.05	15.90	np	8.90	0.00	7.00		
MW-21(A)	9/16/2004	1037	-0.04	15.90	np	8.82	0.00	7.08		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-22(A)	10/13/2003	1037	-0.10	16.13	np	9.24	0.00	6.89	15.08	
MW-22(A)	10/16/2003	940	0.09	16.13	np	9.21	0.00	6.92		
MW-22(A)	11/12/2003	1203	1.93	16.13	np	8.80	0.00	7.33		
MW-22(A)	12/16/2003	1048	0.48	16.13	np	6.91	0.00	9.22		
MW-22(A)	1/19/2004	815	3.22	16.13	np	6.15	0.00	9.98		
MW-22(A)	3/18/2004	1157	4.37	16.13	np	6.55	0.00	9.58		
MW-22(A)	4/12/2004	1120	-2.84	16.13	np	6.97	0.00	9.16		
MW-22(A)	4/15/2004	1435	-2.62	16.13	np	7.07	0.00	9.06		
MW-22(A)	5/19/2004	1233	1.86	16.13	np	7.66	0.00	8.47		
MW-22(A)	6/16/2004	1210	1.01	16.13	np	7.93	0.00	8.20		
MW-22(A)	7/19/2004	1008	-4.71	16.13	np	8.38	0.00	7.75		
MW-22(A)	7/20/2004	1111	-3.82	16.13	np	8.40	0.00	7.73		
MW-22(A)	8/17/2004	1147	-0.05	16.13	np	8.78	0.00	7.35		
MW-22(A)	9/16/2004	1032	-0.04	16.13	np	8.74	0.00	7.39		
MW-23(A)	10/13/2003	1137	1.50	16.22	np	8.86	0.00	7.36	14.93	
MW-23(A)	10/20/2003	1630	0.49	16.22	np	8.71	0.00	7.51		
MW-23(A)	11/12/2003	1013	-0.65	16.22	np	8.30	0.00	7.92		
MW-23(A)	12/16/2003	1250	-0.30	16.22	np	5.36	0.00	10.86		
MW-23(A)	1/11/2004	1543	4.26	16.22	np	4.57	0.00	11.65		
MW-23(A)	1/15/2004	1745	1.31	16.22	np	4.47	0.00	11.75		
MW-23(A)	2/12/2004	1041	-3.59	16.22	np	4.09	0.00	12.13		
MW-23(A)	3/18/2004	1249	3.10	16.22	np	5.13	0.00	11.09		
MW-23(A)	4/12/2004	1112	-2.84	16.22	np	5.69	0.00	10.53		
MW-23(A)	4/15/2004	1201	2.17	16.22	np	5.80	0.00	10.42		
MW-23(A)	5/19/2004	1349	2.56	16.22	np	6.78	0.00	9.44		
MW-23(A)	6/16/2004	1331	1.80	16.22	np	7.18	0.00	9.04		
MW-23(A)	7/19/2004	1032	-2.94	16.22	np	7.80	0.00	8.42		
MW-23(A)	7/20/2004	1645	2.19	16.22	np	7.83	0.00	8.39		
MW-23(A)	8/17/2004	1239	1.62	16.22	np	8.29	0.00	7.93		
MW-23(A)	9/16/2004	1232	3.67	16.22	np	8.20	0.00	8.02		
MW-24(A)	10/13/2003	1154	1.50	16.56	np	9.15	0.00	7.41	14.87	
MW-24(A)	10/21/2003	1430	-1.43	16.56	np	8.52	0.00	8.04		
MW-24(A)	11/12/2003	942	-0.65	16.56	np	8.17	0.00	8.39		
MW-24(A)	12/16/2003	1304	-0.30	16.56	np	4.45	0.00	12.11		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-24(A)	1/11/2004	1547	4.26	16.56	np	3.96	0.00	12.60		
MW-24(A)	1/15/2004	1630	0.29	16.56	np	3.85	0.00	12.71		
MW-24(A)	2/12/2004	1022	-2.53	16.56	np	4.05	0.00	12.51		Iron
MW-24(A)	3/18/2004	1301	3.10	16.56	np	4.96	0.00	11.60		
MW-24(A)	4/12/2004	1103	-2.84	16.56	np	5.65	0.00	10.91		
MW-24(A)	4/14/2004	1500	-3.92	16.56	np	5.78	0.00	10.78		
MW-24(A)	5/19/2004	1338	2.56	16.56	np	6.94	0.00	9.62		
MW-24(A)	6/16/2004	1312	1.78	16.56	np	7.08	0.00	9.48		
MW-24(A)	7/19/2004	1039	-2.94	16.56	np	7.97	0.00	8.59		
MW-24(A)	7/22/2004	1222	-3.63	16.56	np	8.03	0.00	8.53		
MW-24(A)	8/17/2004	1230	1.62	16.56	np	8.49	0.00	8.07		
MW-24(A)	9/16/2004	1221	2.05	16.56	np	8.02	0.00	8.54		
MW-26(A)	10/13/2003	1150	1.50	16.27	np	9.14	0.00	7.13	15.35	
MW-26(A)	10/17/2003	1600	3.29	16.27	np	9.09	0.00	7.18		
MW-26(A)	11/12/2003	947	-0.65	16.27	np	8.46	0.00	7.81		
MW-26(A)	12/16/2003	1259	-0.30	16.27	np	5.51	0.00	10.76		
MW-26(A)	1/11/2004	1548	4.26	16.27	np	4.69	0.00	11.58		
MW-26(A)	1/15/2004	1600	-0.91	16.27	np	4.65	0.00	11.62		
MW-26(A)	2/12/2004	1026	-2.53	16.27	np	4.43	0.00	11.84		
MW-26(A)	3/18/2004	1305	3.10	16.27	np	5.01	0.00	11.26		
MW-26(A)	4/12/2004	1100	-2.84	16.27	np	5.91	0.00	10.36		
MW-26(A)	4/14/2004	1414	-2.64	16.27	np	6.00	0.00	10.27		
MW-26(A)	5/19/2004	1330	2.56	16.27	np	6.95	0.00	9.32		
MW-26(A)	6/16/2004	1316	1.78	16.27	np	7.31	0.00	8.96		
MW-26(A)	7/19/2004	1037	-2.94	16.27	np	7.98	0.00	8.29		
MW-26(A)	7/12/2004	1140	-3.63	16.27	np	8.02	0.00	8.25		
MW-26(A)	8/17/2004	1226	-0.05	16.27	np	8.50	0.00	7.77		
MW-26(A)	9/16/2004	1217	2.05	16.27	np	8.43	0.00	7.84		
MW-27(A)	10/13/2003	1213	1.50	16.36	np	9.26	0.00	7.10	15.24	
MW-27(A)	10/21/2003	905	2.61	16.36	np	9.02	0.00	7.34		
MW-27(A)	11/12/2003	1000	-0.65	16.36	np	8.54	0.00	7.82		Slight Odor
MW-27(A)	12/16/2003	1329	-0.30	16.36	np	5.74	0.00	10.62		
MW-27(A)	1/11/2004	1556	4.26	16.36	np	4.96	0.00	11.40		
MW-27(A)	1/14/2004	1625	1.19	16.36	np	4.95	0.00	11.41		
MW-27(A)	2/12/2004	1007	-2.53	16.36	np	4.72	0.00	11.64		



**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-27(A)	4/12/2004	1049	-2.84	16.36	np	6.05	0.00	10.31		
MW-27(A)	4/14/2004	1300	-1.18	16.36	np	6.15	0.00	10.21		
MW-27(A)	5/19/2004	1323	1.86	16.36	np	7.05	0.00	9.31		
MW-27(A)	7/19/2004	1048	-2.94	16.36	np	8.05	0.00	8.31		
MW-27(A)	7/22/2004	1100	-4.85	16.36	np	8.11	0.00	8.25		
MW-28(A)	10/13/2003	1130	1.50	16.13	np	9.05	0.00	7.08	15.36	
MW-28(A)	10/17/2003	1415	1.92	16.13	np	9.01	0.00	7.12		
MW-28(A)	11/12/2003	1007	-0.65	16.13	np	8.51	0.00	7.62		Slight Odor
MW-28(A)	12/16/2003	1254	-0.30	16.13	np	6.12	0.00	10.01		Sheen on Cap
MW-28(A)	1/11/2004	1550	4.26	16.13	np	5.31	0.00	10.82		
MW-28(A)	1/19/2004	1450	-1.95	16.13	np	5.25	0.00	10.88		
MW-28(A)	2/12/2004	1033	-3.59	16.13	np	4.91	0.00	11.22		
MW-28(A)	3/18/2004	1255	3.10	16.13	np	5.77	0.00	10.36		
MW-28(A)	4/12/2004	1110	-2.84	16.13	np	6.25	0.00	9.88		
MW-28(A)	4/14/2004	1612	-4.32	16.13	np	6.31	0.00	9.82		
MW-28(A)	5/19/2004	1346	2.56	16.13	np	7.12	0.00	9.01		
MW-28(A)	6/16/2004	1326	1.78	16.13	np	7.46	0.00	8.67		
MW-28(A)	7/19/2004	1029	-4.71	16.13	np	8.02	0.00	8.11		
MW-28(A)	7/23/2004	905	-3.10	16.13	np	8.10	0.00	8.03		
MW-28(A)	8/17/2004	1235	1.62	16.13	np	8.48	0.00	7.65		
MW-28(A)	9/16/2004	1227	2.05	16.13	np	8.46	0.00	7.67		
MW-29(A)	10/13/2003	1202	1.50	15.84	np	9.88	0.00	5.96	15.37	
MW-29(A)	10/21/2003	1550	-1.89	15.84	np	8.69	0.00	7.15		
MW-29(A)	11/12/2003	934	-0.65	15.84	np	8.33	0.00	7.51		Odor
MW-29(A)	12/16/2003	1309	-0.30	15.84	np	6.02	0.00	9.82		
MW-29(A)	1/11/2004	1552	4.26	15.84	np	5.21	0.00	10.63		
MW-29(A)	1/19/2004	1600	-3.67	15.84	np	5.13	0.00	10.71		
MW-29(A)	2/12/2004	1014	-2.53	15.84	np	4.80	0.00	11.04		
MW-29(A)	3/18/2004	1310	3.10	15.84	np	5.61	0.00	10.23		
MW-29(A)	4/12/2004	1054	-2.84	15.84	np	6.13	0.00	9.71		
MW-29(A)	4/16/2004	1222	3.28	15.84	np	6.25	0.00	9.59		
MW-29(A)	5/19/2004	1330	2.56	15.84	np	6.98	0.00	8.86		
MW-29(A)	6/16/2004	1307	1.78	15.84	np	7.30	0.00	8.54		
MW-29(A)	7/19/2004	1035	-2.94	15.84	np	7.87	0.00	7.97		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-29(A)	7/22/2004	1301	-2.04	15.84	np	7.91	0.00	7.93		
MW-29(A)	8/17/2004	1220	-0.05	15.84	np	8.31	0.00	7.53		Strong Odor
MW-29(A)	9/16/2004	1213	2.05	15.84	np	8.31	0.00	7.53		
MW-30(A)	10/13/2003	1000	-1.55	16.67	np	9.91	0.00	6.76	15.11	
MW-30(A)	10/16/2003	820	1.18	16.67	np	9.90	0.00	6.77		
MW-30(A)	11/12/2003	1221	1.93	16.67	np	9.42	0.00	7.25		Possible slight odor
MW-30(A)	12/16/2003	1201	-0.19	16.67	np	7.49	0.00	9.18		
MW-30(A)	1/11/2004	1452	4.58	16.67	np	6.72	0.00	9.95		
MW-30(A)	1/16/2004	1400	-3.33	16.67	np	6.65	0.00	10.02		
MW-30(A)	2/12/2004	1150	-3.92	16.67	np	6.34	0.00	10.33		
MW-30(A)	4/12/2004	1008	-1.26	16.67	np	7.49	0.00	9.18		
MW-30(A)	4/13/2004	1710	-2.75	16.67	np	7.52	0.00	9.15		
MW-30(A)	5/19/2004	1223	0.49	16.67	np	8.22	0.00	8.45		
MW-30(A)	6/16/2004	1156	1.01	16.67	np	8.55	0.00	8.12		
MW-30(A)	7/19/2004	933	-4.71	16.67	np	9.03	0.00	7.64		
MW-30(A)	7/20/2004	921	-5.40	16.67	np	9.04	0.00	7.63		
MW-30(A)	8/17/2004	1139	-0.05	16.67	np	9.45	0.00	7.22		
MW-30(A)	9/16/2004	1100	-0.04	16.67	np	9.45	0.00	7.22		
MW-31(A)	10/13/2003	950	-1.55	16.23	np	9.81	0.00	6.42	15.31	
MW-31(A)	10/16/2003	1350	2.65	16.23	np	9.77	0.00	6.46		
MW-31(A)	11/12/2003	1210	1.93	16.23	np	9.48	0.00	6.75		Iron
MW-31(A)	12/16/2003	1207	-0.19	16.23	np	7.97	0.00	8.26		
MW-31(A)	1/11/2004	1456	4.58	16.23	np	7.33	0.00	8.90		
MW-31(A)	1/12/2004	1615	4.00	16.23	np	7.36	0.00	8.87		
MW-31(A)	2/12/2004	1141	-3.92	16.23	np	7.12	0.00	9.11		Iron
MW-31(A)	3/18/2004	1152	4.37	16.23	np	7.64	0.00	8.59		
MW-31(A)	4/12/2004	958	-1.26	16.23	np	7.98	0.00	8.25		Iron
MW-31(A)	4/13/2004	1425	-4.26	16.23	np	8.00	0.00	8.23		
MW-31(A)	5/19/2004	1218	0.49	16.23	np	8.56	0.00	7.67		
MW-31(A)	6/16/2004	1204	1.01	16.23	np	8.80	0.00	7.43		
MW-31(A)	7/19/2004	938	-4.71	16.23	np	9.14	0.00	7.09		
MW-31(A)	7/20/2004	1015	-5.25	16.23	np	9.15	0.00	7.08		
MW-31(A)	8/17/2004	1144	-0.05	16.23	np	9.51	0.00	6.72		
MW-31(A)	9/16/2004	1053	-0.04	16.23	np	9.42	0.00	6.81		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-32(A)	10/13/2003	944	-1.55	16.51	np	10.43	0.00	6.08	15.36	
MW-32(A)	10/14/2003	1350	3.21	16.51	np	10.41	0.00	6.10		
MW-32(A)	11/12/2003	1316	3.06	16.51	np	10.07	0.00	6.44		
MW-32(A)	12/16/2003	1039	0.48	16.51	np	8.84	0.00	7.67		
MW-32(A)	1/11/2004	1419	4.01	16.51	np	8.21	0.00	8.30		
MW-32(A)	1/12/2004	1525	3.66	16.51	np	8.30	0.00	8.21		
MW-32(A)	2/12/2004	1241	-3.40	16.51	np	8.50	0.00	8.01		
MW-32(A)	3/18/2004	1056	4.60	16.51	np	8.63	0.00	7.88		
MW-32(A)	4/12/2004	955	-1.26	16.51	np	8.98	0.00	7.53		
MW-32(A)	4/13/2004	1340	-4.26	16.51	np	9.12	0.00	7.39		
MW-32(A)	5/19/2004	1212	0.49	16.51	np	9.56	0.00	6.95		
MW-32(A)	6/16/2004	1130	1.01	16.51	np	9.76	0.00	6.75		
MW-32(A)	7/19/2004	923	-5.63	16.51	np	9.98	0.00	6.53		
MW-32(A)	7/19/2004	1400	2.00	16.51	np	10.00	0.00	6.51		
MW-32(A)	8/17/2004	1103	-1.98	16.51	np	10.31	0.00	6.20		
MW-32(A)	9/16/2004	1022	-2.05	16.51	np	10.15	0.00	6.36		
MW-32(A)	4/11/2006	1355	3.56	16.51	np	8.54	0.00	7.97		
MW-32(A)	12/7/2006	1355	4.90	16.51	np	8.37	0.00	8.14		
MW-33(A)	10/13/2003	937	-1.55	16.14	np	10.87	0.00	5.27	17.31	
MW-33(A)	10/14/2003	838	-2.15	16.14	np	10.70	0.00	5.44		
MW-33(A)	11/12/2003	1328	3.06	16.14	np	10.33	0.00	5.81		
MW-33(A)	12/16/2003	1034	0.48	16.14	np	9.47	0.00	6.67		
MW-33(A)	1/11/2004	1416	4.01	16.14	np	8.92	0.00	7.22		
MW-33(A)	1/12/2004	1425	2.64	16.14	np	9.23	0.00	6.91		
MW-33(A)	4/12/2004	950	-1.26	16.14	np	9.88	0.00	6.26		
MW-33(A)	4/13/2004	715	2.92	16.14	np	9.92	0.00	6.22		
MW-33(A)	5/19/2004	1129	-1.19	16.14	np	10.58	0.00	5.56		
MW-33(A)	6/16/2004	1117	-0.35	16.14	np	10.68	0.00	5.46		
MW-33(A)	7/19/2004	919	-5.63	16.14	np	10.70	0.00	5.44		
MW-33(A)	7/19/2004	1310	0.67	16.14	np	10.76	0.00	5.38		
MW-33(A)	8/17/2004	1053	-1.98	16.14	np	11.02	0.00	5.12		
MW-33(A)	9/16/2004	1017	-2.05	16.14	np	10.75	0.00	5.39		
MW-33(A)	12/7/2006	1410	4.90	16.14	np	9.18	0.00	6.96		
MW-34(A)	10/13/2003	1003	-1.55	15.83	np	9.59	0.00	6.24	15.35	
MW-34(A)	10/15/2003	930	-0.99	15.83	np	9.57	0.00	6.26		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-34(A)	11/12/2003	1308	3.06	15.83	np	9.30	0.00	6.53		
MW-34(A)	12/16/2003	1054	0.48	15.83	np	7.91	0.00	7.92		
MW-34(A)	1/11/2004	1429	4.01	15.83	np	7.28	0.00	8.55		
MW-34(A)	1/13/2004	830	-0.07	15.83	np	7.31	0.00	8.52		
MW-34(A)	2/12/2004	1236	-3.40	15.83	np	7.21	0.00	8.62		
MW-34(A)	3/18/2004	1104	4.60	15.83	np	7.64	0.00	8.19		
MW-34(A)	4/12/2004	1000	-1.26	15.83	np	7.96	0.00	7.87		
MW-34(A)	4/14/2004	720	2.14	15.83	np	8.04	0.00	7.79		
MW-34(A)	5/19/2004	1216	0.49	15.83	np	8.54	0.00	7.29		
MW-34(A)	6/16/2004	1135	1.01	15.83	np	8.76	0.00	7.07		
MW-34(A)	7/19/2004	926	-5.63	15.83	np	9.06	0.00	6.77		
MW-34(A)	7/20/2004	710	-2.99	15.83	np	9.02	0.00	6.81		
MW-34(A)	8/17/2004	1106	-1.98	15.83	np	9.42	0.00	6.41		
MW-34(A)	9/16/2004	1112	-0.04	15.83	np	9.66	0.00	6.17		
MW-34(A)	4/11/2006	1350	3.56	15.83	np	7.59	0.00	8.24		
MW-34(A)	12/7/2006	1345	4.90	15.83	np	7.40	0.00	8.43		
MW-35(A)	10/13/2003	1007	-1.55	16.50	np	9.90	0.00	6.60	15.32	
MW-35(A)	10/16/2003	1115	0.27	16.50	np	9.86	0.00	6.64		
MW-35(A)	11/12/2003	1228	1.93	16.50	np	9.47	0.00	7.03		
MW-35(A)	12/16/2003	1154	-0.19	16.50	np	7.70	0.00	8.80		
MW-35(A)	1/11/2004	1449	4.58	16.50	np	6.95	0.00	9.55		
MW-35(A)	1/16/2004	1230	-2.45	16.50	np	6.87	0.00	9.63		
MW-35(A)	2/12/2004	1236	-3.40	16.50	np	6.53	0.00	9.97		
MW-35(A)	3/18/2004	1143	4.37	16.50	np	7.22	0.00	9.28		
MW-35(A)	4/12/2004	1011	-1.26	16.50	np	7.63	0.00	8.87		
MW-35(A)	4/13/2004	1550	-4.00	16.50	np	7.65	0.00	8.85		
MW-35(A)	5/19/2004	1227	0.49	16.50	np	8.33	0.00	8.17		
MW-35(A)	6/16/2004	1148	1.01	16.50	np	8.63	0.00	7.87		
MW-35(A)	7/19/2004	936	-4.71	16.50	np	9.08	0.00	7.42		
MW-35(A)	7/20/2004	832	-5.40	16.50	np	9.08	0.00	7.42		
MW-35(A)	8/17/2004	1134	-0.05	16.50	np	9.51	0.00	6.99		
MW-35(A)	9/16/2004	1104	-0.04	16.50	np	9.44	0.00	7.06		
MW-35(A)	12/4/2006	1310	4.37	16.50	np	6.43	0.00	10.07		No sheen or odors
MW-35(A)	12/7/2006	910	-1.28	16.50	np	7.03	0.00	9.47		No sheen or odors
MW-36(A)	10/13/2003	1124	-0.10	16.14	np	8.96	0.00	7.18	15.36	

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-36(A)	10/21/2003	1130	2.25	16.14	np	8.78	0.00	7.36		
MW-36(A)	11/12/2003	926	-1.42	16.14	np	8.41	0.00	7.73		
MW-36(A)	12/16/2003	1322	-0.30	16.14	np	5.74	0.00	10.40		
MW-36(A)	1/11/2004	1605	4.26	16.14	np	5.67	0.00	10.47		
MW-36(A)	1/14/2004	1500	0.02	16.14	np	4.63	0.00	11.51		
MW-36(A)	2/12/2004	1002	-2.53	16.14	np	4.19	0.00	11.95		
MW-36(A)	3/18/2004	1328	3.10	16.14	np	4.83	0.00	11.31		
MW-36(A)	4/12/2004	1043	-2.84	16.14	np	5.48	0.00	10.66		
MW-36(A)	4/14/2004	1230	-1.18	16.14	np	5.55	0.00	10.59		
MW-36(A)	5/19/2004	1320	1.86	16.14	np	6.48	0.00	9.66		
MW-36(A)	6/16/2004	1259	1.78	16.14	np	6.87	0.00	9.27		
MW-36(A)	7/19/2004	1046	-2.94	16.14	np	7.54	0.00	8.60		
MW-36(A)	7/22/2004	1011	-5.09	16.14	np	7.60	0.00	8.54		
MW-36(A)	8/17/2004	1215	-0.05	16.14	np	8.33	0.00	7.81		
MW-36(A)	9/16/2004	1205	2.05	16.14	np	8.34	0.00	7.80		
MW-36(A)	12/7/2006	1055	1.34	16.14	np	4.58	0.00	11.56		
MW-37(A)	10/13/2003	1011	-1.55	18.22	np	11.31	0.00	6.91	15.41	
MW-37(A)	10/17/2003	810	1.80	18.22	np	11.23	0.00	6.99		
MW-37(A)	11/12/2003	1242	3.06	18.22	np	10.83	0.00	7.39		
MW-37(A)	12/16/2003	1146	-0.19	18.22	8.39	8.40	0.01	9.83		
MW-37(A)	1/11/2004	1447	4.58	18.22	7.32	7.33	0.01	10.90		
MW-37(A)	2/12/2004	1159	-3.92	18.22	np	6.70	0.00	11.52		Strong odor
MW-37(A)	3/18/2004	1132	4.37	18.22	trace	7.57	trace	10.65		
MW-37(A)	4/12/2004	1015	-1.26	18.22	8.05	8.08	0.03	10.17		
MW-37(A)	5/19/2004	1429	2.56	18.22	9.02	9.07	0.05	9.19		
MW-37(A)	6/16/2004	1142	1.01	18.22	trace	9.42	trace	8.80		
MW-37(A)	7/19/2004	1108	-2.94	18.22	10.12	10.13	0.01	8.10		
MW-37(A)	8/17/2004	1130	-0.05	18.22	8.04	8.05	0.01	10.18		
MW-37(A)	9/16/2004	1116	-0.04	18.22	10.77	10.81	0.04	7.44		
MW-37(A)	4/11/2006	1230	1.97	18.22	np	7.17	0.00	11.05		
MW-37(A)	12/4/2006	1400	2.76	18.22	np	6.21	0.00	12.01		Odors
MW-37(A)	12/7/2006	1030	1.34	18.22	np	6.43	0.00	9.80		
MW-38(A)	10/13/2003	1130	1.50	17.20	np	8.95	0.00	8.25	15.38	
MW-38(A)	10/21/2003	1040	3.15	17.20	np	8.53	0.00	8.67		
MW-38(A)	11/12/2003	919	-1.42	17.20	np	8.33	0.00	8.87		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-38(A)	12/16/2003	1314	-0.30	17.20	np	5.21	0.00	11.99		
MW-38(A)	1/11/2004	1609	4.26	17.20	np	4.26	0.00	12.94		
MW-38(A)	1/14/2004	810	2.72	17.20	np	4.40	0.00	12.80		
MW-38(A)	2/12/2004	954	-2.53	17.20	np	3.72	0.00	13.48		
MW-38(A)	3/18/2004	1322	3.10	17.20	np	4.74	0.00	12.46		
MW-38(A)	4/12/2004	1037	-2.84	17.20	np	5.45	0.00	11.75		
MW-38(A)	4/14/2004	1045	2.07	17.20	np	5.48	0.00	11.72		
MW-38(A)	5/19/2004	1315	1.86	17.20	np	6.48	0.00	10.72		
MW-38(A)	6/16/2004	1254	1.78	17.20	np	6.83	0.00	10.37		
MW-38(A)	7/19/2004	1052	-2.94	17.20	np	7.67	0.00	9.53		
MW-38(A)	7/22/2004	910	-4.31	17.20	np	7.72	0.00	9.48		
MW-38(A)	8/17/2004	1209	-0.05	17.20	np	8.31	0.00	8.89		
MW-38(A)	9/16/2004	1200	2.05	17.20	np	8.10	0.00	9.10		
MW-38(A)	12/7/2006	1045	1.34	17.20	np	4.13	0.00	13.07		
MW-39(A)	10/13/2003	1025	-1.55	17.29	np	9.30	0.00	7.99	15.41	
MW-39(A)	10/16/2003	1540	3.64	17.29	np	9.22	0.00	8.07		
MW-39(A)	12/16/2003	1104	0.48	17.29	np	5.79	0.00	11.50		
MW-39(A)	1/11/2004	1435	4.01	17.29	np	4.71	0.00	12.58		
MW-39(A)	1/16/2004	925	3.77	17.29	np	4.65	0.00	12.64		
MW-39(A)	2/12/2004	1225	-3.92	17.29	np	4.21	0.00	13.08		
MW-39(A)	3/18/2004	1114	4.60	17.29	np	5.12	0.00	12.17		
MW-39(A)	4/12/2004	1032	-2.84	17.29	np	5.80	0.00	11.49		
MW-39(A)	4/14/2004	920	3.58	17.29	np	5.89	0.00	11.40		
MW-39(A)	5/19/2004	1531	1.47	17.29	np	6.85	0.00	10.44		
MW-39(A)	6/16/2004	1433	1.13	17.29	np	7.24	0.00	10.05		
MW-39(A)	7/19/2004	1100	-2.94	17.29	np	8.00	0.00	9.29		
MW-39(A)	7/21/2004	1333	0.54	17.29	np	8.05	0.00	9.24		
MW-39(A)	8/17/2004	1116	-1.98	17.29	np	8.60	0.00	8.69		
MW-39(A)	9/16/2004	1135	2.05	17.29	np	8.51	0.00	8.78		
MW-39(A)	12/4/2006	1320	4.66	17.29	np	5.68	0.00	11.61		Probe odors and emulsion
MW-39(A)	12/7/2006	920	-1.28	17.29	np	5.92	0.00	11.37		Odors casing disturbed
MW-40(A)	10/13/2003	1025	-1.55	16.17	np	9.56	0.00	6.61	15.42	
MW-40(A)	10/17/2003	935	0.70	16.17	np	9.51	0.00	6.66		
MW-40(A)	11/12/2003	1235	3.06	16.17	9.18	9.27	0.09	6.98		Pumped out
MW-40(A)	12/16/2003	1138	-0.19	16.17	np	7.45	0.00	8.72		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-40(A)	1/11/2004	1444	4.58	16.17	np	6.68	0.00	9.49		
MW-40(A)	1/20/2004	800	1.34	16.17	np	6.64	0.00	9.53		
MW-40(A)	2/12/2004	1211	-3.92	16.17	np	6.24	0.00	9.93		Odor
MW-40(A)	3/18/2004	1125	4.60	16.17	np	6.96	0.00	9.21		
MW-40(A)	4/12/2004	1018	-1.26	16.17	np	7.41	0.00	8.76		
MW-40(A)	4/16/2004	1420	0.37	16.17	np	7.48	0.00	8.69		Sheen
MW-40(A)	5/19/2004	1506	2.39	16.17	8.02	8.06	0.04	8.14		
MW-40(A)	6/16/2004	1447	1.13	16.17	8.39	8.41	0.02	7.78		
MW-40(A)	7/19/2004	1106	-2.94	16.17	8.88	8.95	0.07	7.28		
MW-40(A)	8/17/2004	1126	-1.98	16.17	9.30	9.37	0.07	6.86		
MW-40(A)	9/16/2004	1124	-0.04	16.17	np	9.14	0.00	7.03		
MW-40(A)	10/19/2004	1405	3.44	16.17	np	8.70	0.00	7.47		
MW-40(A)	11/16/2004	1037	-0.12	16.17	np	8.24	0.00	7.93		
MW-40(A)	12/13/2004	850	-0.09	16.17	np	7.51	0.00	8.66		
MW-40(A)	3/29/2005	1102	-3.06	16.17	np	7.60	0.00	8.57		
MW-40(A)	12/4/2006	1420	2.76	16.17	np	6.69	0.00	9.48		Odors, product/iron staining
MW-40(A)	12/7/2006	1000	-0.22	16.17	np	6.83	0.00	9.34		
MW-41(A)	10/13/2003	907	-2.52	15.67	np	9.23	0.00	6.44	15.35	
MW-41(A)	10/14/2003	1540	2.91	15.67	np	9.25	0.00	6.42		sheen
MW-41(A)	11/12/2003	1417	3.65	15.67	np	8.91	0.00	6.76		
MW-41(A)	12/16/2003	937	1.46	15.67	np	7.39	0.00	8.28		Odor
MW-41(A)	1/11/2004	1342	4.01	15.67	np	6.72	0.00	8.95		Odor
MW-41(A)	1/16/2004	1125	0.54	15.67	np	7.12	0.00	8.55		Product globules in bailer
MW-41(A)	2/12/2004	1400	-2.19	15.67	6.41	6.71	0.30	9.22		Odor
MW-41(A)	3/18/2004	1004	3.90	15.67	6.95	7.92	0.97	8.57		
MW-41(A)	4/12/2004	922	0.43	15.67	7.29	7.91	0.62	8.29		
MW-41(A)	5/19/2004	1005	-2.92	15.67	8.00	8.25	0.25	7.63		
MW-41(A)	7/19/2004	841	-4.71	15.67	8.64	8.66	0.02	7.03		
MW-41(A)	8/17/2004	958	-3.83	15.67	trace	9.04	trace	6.63		
MW-41(A)	9/16/2004	917	-3.70	15.67	np	8.87	0.00	6.80		
MW-41(A)	11/16/2004	1121	-0.12	15.67	np	8.07	0.00	7.60		
MW-41(A)	3/29/2005	1039	-3.06	15.67	np	7.57	0.00	8.10		
MW-41(A)	4/11/2006	1246	1.97	15.67	7.03	7.36	0.33	8.59		
MW-42(A)	10/13/2003	859	-2.52	15.91	np	9.39	0.00	6.52	15.37	
MW-42(A)	10/15/2003	1100	-0.18	15.91	np	9.38	0.00	6.53		sheen

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-42(A)	11/12/2003	1408	3.65	15.91	np	9.06	0.00	6.85		
MW-42(A)	12/16/2003	925	2.67	15.91	np	7.52	0.00	8.39		
MW-42(A)	1/11/2004	1340	4.01	15.91	6.83	6.90	0.07	9.07		
MW-42(A)	2/12/2004	1352	-2.19	15.91	6.41	7.47	1.06	9.34		
MW-42(A)	3/18/2004	957	3.90	15.91	6.91	8.60	1.69	8.75		
MW-42(A)	4/12/2004	926	0.43	15.91	7.29	8.89	1.60	8.38		
MW-42(A)	5/19/2004	1029	-2.92	15.91	8.00	9.50	1.50	7.69		
MW-42(A)	6/16/2004	1007	-1.94	15.91	8.35	8.87	0.52	7.48		
MW-42(A)	7/19/2004	844	-5.63	15.91	8.78	9.15	0.37	7.07		
MW-42(A)	8/17/2004	953	-3.83	15.91	9.20	9.57	0.37	6.65		
MW-42(A)	9/16/2004	911	-3.70	15.91	8.89	8.91	0.02	7.02		
MW-42(A)	10/19/2004	1237	2.05	15.91	8.61	8.68	0.07	7.29		
MW-42(A)	11/16/2004	1129	-0.12	15.91	8.23	8.36	0.13	7.66		
MW-42(A)	12/13/2004	903	-0.09	15.91	np	7.62	0.00	8.29		
MW-42(A)	3/29/2005	1049	-3.06	15.91	7.59	8.30	0.71	8.23		
MW-42(A)	4/11/2006	1241	1.97	15.91	7.20	7.68	0.48	8.64		
MW-43(A)	10/13/2003	857	-2.52	15.94	np	9.07	0.00	6.87	15.35	
MW-43(A)	10/13/2003	1645	0.78	15.94	np	9.01	0.00	6.93		
MW-43(A)	11/12/2003	1403	3.65	15.94	np	8.74	0.00	7.20		
MW-43(A)	12/16/2003	930	1.46	15.94	np	6.97	0.00	8.97		
MW-43(A)	1/11/2004	1337	4.01	15.94	np	6.24	0.00	9.70		
MW-43(A)	1/12/2004	1053	-1.03	15.94	np	6.33	0.00	9.61		
MW-43(A)	2/12/2004	1347	-2.19	15.94	np	6.00	0.00	9.94		
MW-43(A)	3/18/2004	953	3.90	15.94	np	6.62	0.00	9.32		
MW-43(A)	4/12/2004	928	0.43	15.94	np	7.05	0.00	8.89		
MW-43(A)	4/13/2004	1230	-3.33	15.94	np	7.10	0.00	8.84		
MW-43(A)	5/19/2004	1050	-1.19	15.94	np	7.81	0.00	8.13		
MW-43(A)	6/16/2004	1002	-1.94	15.94	np	8.02	0.00	7.92		
MW-43(A)	7/19/2004	850	-5.63	15.94	np	8.52	0.00	7.42		
MW-43(A)	7/21/2004	1133	-2.95	15.94	np	8.56	0.00	7.38		
MW-43(A)	8/17/2004	950	-3.83	15.94	np	8.97	0.00	6.97		
MW-43(A)	9/16/2004	908	-3.70	15.94	np	8.62	0.00	7.32		
MW-43(A)	4/11/2006	1236	1.97	15.94	np	6.87	0.00	9.07		
MW-43(A)	12/7/2006	1615	3.04	15.94	np	6.55	0.00	9.39		Faint odors
MW-44(A)	10/13/2003	1010	-1.55	15.31	np	8.22	0.00	7.09	15.41	



**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-44(A)	10/17/2003	1135	0.72	15.31	np	8.17	0.00	7.14		
MW-44(A)	11/12/2003	1302	3.06	15.31	np	7.95	0.00	7.36		
MW-44(A)	12/16/2003	1132	-0.19	15.31	5.88	6.02	0.14	9.41		
MW-44(A)	1/11/2004	1442	4.58	15.31	5.10	5.24	0.14	10.19		
MW-44(A)	2/12/2004	1217	-3.92	15.31	4.15	4.34	0.19	11.13		Odor
MW-44(A)	3/18/2004	1119	4.60	15.31	4.82	4.99	0.17	10.46		
MW-44(A)	4/12/2004	1020	-1.26	15.31	8.29	9.04	0.75	6.91		
MW-44(A)	5/19/2004	1509	2.39	15.31	6.14	6.91	0.77	9.05		
MW-44(A)	6/16/2004	1439	1.13	15.31	6.37	6.75	0.38	8.88		
MW-44(A)	7/19/2004	1104	-2.94	15.31	7.12	7.57	0.45	8.12		
MW-44(A)	8/17/2004	1121	-1.98	15.31	7.77	8.09	0.32	7.49		
MW-44(A)	9/16/2004	1129	-0.04	15.31	6.68	6.80	0.12	8.61		
MW-44(A)	10/19/2004	1350	3.44	15.31	5.53	5.70	0.17	9.76		
MW-44(A)	11/16/2004	1030	-0.12	15.31	6.05	6.11	0.06	9.25		
MW-44(A)	12/13/2004	856	-0.09	15.31	4.97	5.00	0.03	10.34		
MW-44(A)	3/29/2005	1112	-3.06	15.31	4.82	4.93	0.11	10.48		
MW-44(A)	4/11/2006	1219	3.23	15.31	np	5.03	0.00	10.28		
MW-44(A)	12/7/2006	1010	-0.22	15.31	4.64	4.65	0.01	10.67		
MW-45(A)	10/13/2003	1018	-1.55	17.32	np	9.92	0.00	7.40	17.16	
MW-45(A)	10/16/2003	1730	2.55	17.32	np	9.81	0.00	7.51		
MW-45(A)	11/12/2003	1256	3.06	17.32	np	9.13	0.00	8.19		
MW-45(A)	12/16/2003	1114	0.48	17.32	np	6.41	0.00	10.91		
MW-45(A)	1/11/2004	1440	4.58	17.32	np	5.39	0.00	11.93		
MW-45(A)	1/16/2004	1110	0.54	17.32	np	5.27	0.00	12.05		
MW-45(A)	2/12/2004	1229	-3.92	17.32	np	4.44	0.00	12.88		
MW-45(A)	3/18/2004	1109	4.60	17.32	np	5.69	0.00	11.63		
MW-45(A)	4/12/2004	1029	-1.26	17.32	np	6.35	0.00	10.97		
MW-45(A)	4/14/2004	820	3.11	17.32	np	6.42	0.00	10.90		
MW-45(A)	5/19/2004	1532	1.47	17.32	np	7.41	0.00	9.91		
MW-45(A)	6/16/2004	1425	1.80	17.32	np	7.71	0.00	9.61		
MW-45(A)	7/19/2004	1057	-2.94	17.32	np	8.40	0.00	8.92		
MW-45(A)	7/21/2004	1444	1.91	17.32	np	8.45	0.00	8.87		
MW-45(A)	8/17/2004	1113	-1.98	17.32	np	8.97	0.00	8.35		
MW-45(A)	9/16/2004	1139	2.05	17.32	np	8.80	0.00	8.52		
MW-45(A)	12/4/2006	1330	2.76	17.32	np	5.22	0.00	12.10		Odors
MW-45(A)	12/7/2006	930	-1.28	17.32	np	5.43	0.00	11.89		Odors

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-46(A)	10/13/2003	919	-2.52	16.00	np	7.46	0.00	8.54	15.34	
MW-46(A)	10/14/2003	1015	-1.65	16.00	np	7.38	0.00	8.62		
MW-46(A)	11/12/2003	857	-1.42	16.00	np	6.64	0.00	9.36		
MW-46(A)	12/16/2003	837	2.67	16.00	np	3.20	0.00	12.80		
MW-46(A)	1/11/2004	1318	2.89	16.00	np	2.47	0.00	13.53		
MW-46(A)	1/14/2004	1020	-0.22	16.00	np	2.90	0.00	13.10		
MW-46(A)	2/12/2004	901	-1.02	16.00	np	2.26	0.00	13.74		
MW-46(A)	3/18/2004	1040	4.60	16.00	np	3.52	0.00	12.48		
MW-46(A)	4/12/2004	850	0.43	16.00	np	4.20	0.00	11.80		
MW-46(A)	4/12/2004	1555	-2.94	16.00	np	4.21	0.00	11.79		
MW-46(A)	5/19/2004	1145	0.49	16.00	np	5.35	0.00	10.65		
MW-46(A)	6/16/2004	912	-3.55	16.00	np	5.58	0.00	10.42		
MW-46(A)	7/19/2004	818	-5.20	16.00	np	6.41	0.00	9.59		
MW-46(A)	7/21/2004	1005	-5.45	16.00	np	6.45	0.00	9.55		
MW-46(A)	8/17/2004	942	-3.83	16.00	np	7.00	0.00	9.00		
MW-46(A)	9/16/2004	843	-3.70	16.00	np	6.55	0.00	9.45		
MW-47(A)	10/13/2003	907	-2.52	16.39	np	8.42	0.00	7.97	15.37	
MW-47(A)	10/13/2003	1745	-1.15	16.39	np	8.39	0.00	8.00		
MW-47(A)	11/12/2003	911	-1.42	16.39	np	7.65	0.00	8.74		
MW-47(A)	12/16/2003	851	2.67	16.39	np	4.81	0.00	11.58		
MW-47(A)	1/11/2004	1328	2.89	16.39	np	4.03	0.00	12.36		
MW-47(A)	1/14/2004	1230	-2.08	16.39	np	4.35	0.00	12.04		
MW-47(A)	2/12/2004	923	-1.02	16.39	np	3.82	0.00	12.57		
MW-47(A)	3/18/2004	1050	4.60	16.39	np	5.43	0.00	10.96		
MW-47(A)	4/12/2004	846	0.43	16.39	np	5.42	0.00	10.97		
MW-47(A)	4/12/2004	1440	-4.26	16.39	np	5.42	0.00	10.97		
MW-47(A)	5/19/2004	1152	0.49	16.39	np	6.41	0.00	9.98		
MW-47(A)	6/16/2004	929	-3.55	16.39	np	6.68	0.00	9.71		
MW-47(A)	7/19/2004	822	-5.20	16.39	np	7.36	0.00	9.03		
MW-47(A)	7/21/2004	755	-3.75	16.39	np	7.38	0.00	9.01		
MW-47(A)	8/17/2004	932	-3.83	16.39	np	7.88	0.00	8.51		
MW-47(A)	9/16/2004	852	-3.70	16.39	np	7.72	0.00	8.67		
MW-48(A)	10/13/2003	915	-2.52	16.21	np	8.51	0.00	7.70	15.88	
MW-48(A)	10/14/2003	1215	0.87	16.21	np	8.48	0.00	7.73		

**TABLE E-1  
GROUND-WATER MEASUREMENTS**

Astoria Area-Wide Petroleum Site  
Astoria, Oregon

Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
MW-48(A)	11/12/2003	905	-1.42	16.21	np	7.90	0.00	8.31		
MW-48(A)	12/16/2003	844	2.67	16.21	np	5.65	0.00	10.56		
MW-48(A)	1/11/2004	1325	2.89	16.21	np	4.97	0.00	11.24		
MW-48(A)	1/14/2004	1130	-1.44	16.21	np	5.25	0.00	10.96		Iron
MW-48(A)	2/12/2004	910	-1.02	16.21	np	4.80	0.00	11.41		
MW-48(A)	3/18/2004	1046	4.60	16.21	np	5.66	0.00	10.55		
MW-48(A)	4/12/2004	853	0.43	16.21	np	6.12	0.00	10.09		
MW-48(A)	4/12/2004	1345	-5.05	16.21	np	6.14	0.00	10.07		
MW-48(A)	5/19/2004	1159	0.49	16.21	np	6.89	0.00	9.32		
MW-48(A)	6/16/2004	922	-3.55	16.21	np	7.13	0.00	9.08		
MW-48(A)	7/19/2004	815	-5.20	16.21	np	7.63	0.00	8.58		
MW-48(A)	7/21/2004	901	-4.95	16.21	np	7.66	0.00	8.55		
MW-48(A)	8/17/2004	936	-3.83	16.21	np	8.10	0.00	8.11		
MW-48(A)	9/16/2004	848	-3.70	16.21	np	7.98	0.00	8.23		
R-1(M)	10/22/2003	1340	0.58	13.77	np	4.55	0.00	9.22		
R-1(M)	11/12/2003	1449	3.39	13.77	np	5.06	0.00	8.71		
R-1(M)	12/16/2003	948	1.46	13.77	np	3.51	0.00	10.26		
R-1(M)	1/11/2004	1352	4.01	13.77	np	2.87	0.00	10.90		
MW-49(A)	4/11/2006	1325	1.97	16.43	np	10.30	0.00	6.13		
MW-49(A)	12/7/2006	1505	4.53	16.43	np	10.32	0.00	6.11		
MW-50(A)	4/11/2006	1322	1.97	16.32	10.02	10.16	0.14	6.28		
MW-50(A)	12/4/2006	1500	0.44	16.32	10.07	10.44	0.37	6.19		.37' LNAPL - Sock Needed
MW-51(A)	4/11/2006	1224	3.23	16.52	np	6.31	0.00	10.21		
MW-51(A)	12/4/2006	1340	2.76	16.52	np	5.20	0.00	11.32		Odors
MW-51(A)	12/7/2006	1020	-0.22	16.52	np	5.37	0.00	11.15		
Pier2(A)	12/16/2003	1628	1.91	17.37	np	10.51	0.00	6.86	4.95	
Pier2(A)	1/11/2004	1425	4.01	17.37	np	8.33	0.00	9.04	5.03	
Pier2(A)	2/12/2004	1453	-0.76	17.37	np	13.37	0.00	4.00	4.76	
Pier2(A)	3/18/2004	850	2.49	17.37	np	10.50	0.00	6.87	4.38	
Pier2(A)	4/12/2004	937	-1.26	17.37	np	12.07	0.00	5.30	6.56	
Pier2(A)	5/19/2004	1130	0.49	17.37	np	14.37	0.00	3.00	2.51	
Pier2(A)	6/16/2004	1104	-0.35	17.37	np	14.20	0.00	3.17	3.52	

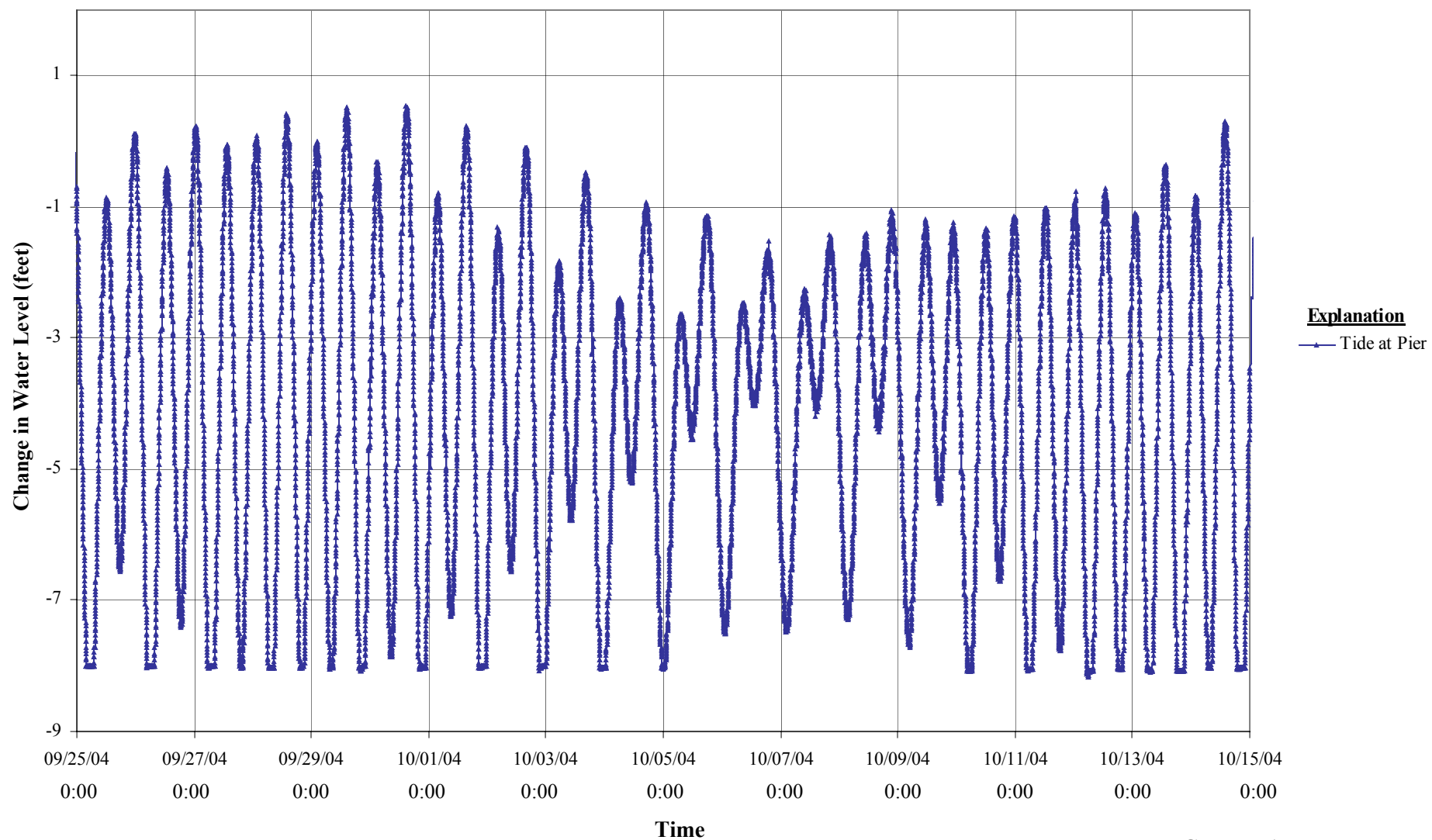
**TABLE E-1**  
**GROUND-WATER MEASUREMENTS**

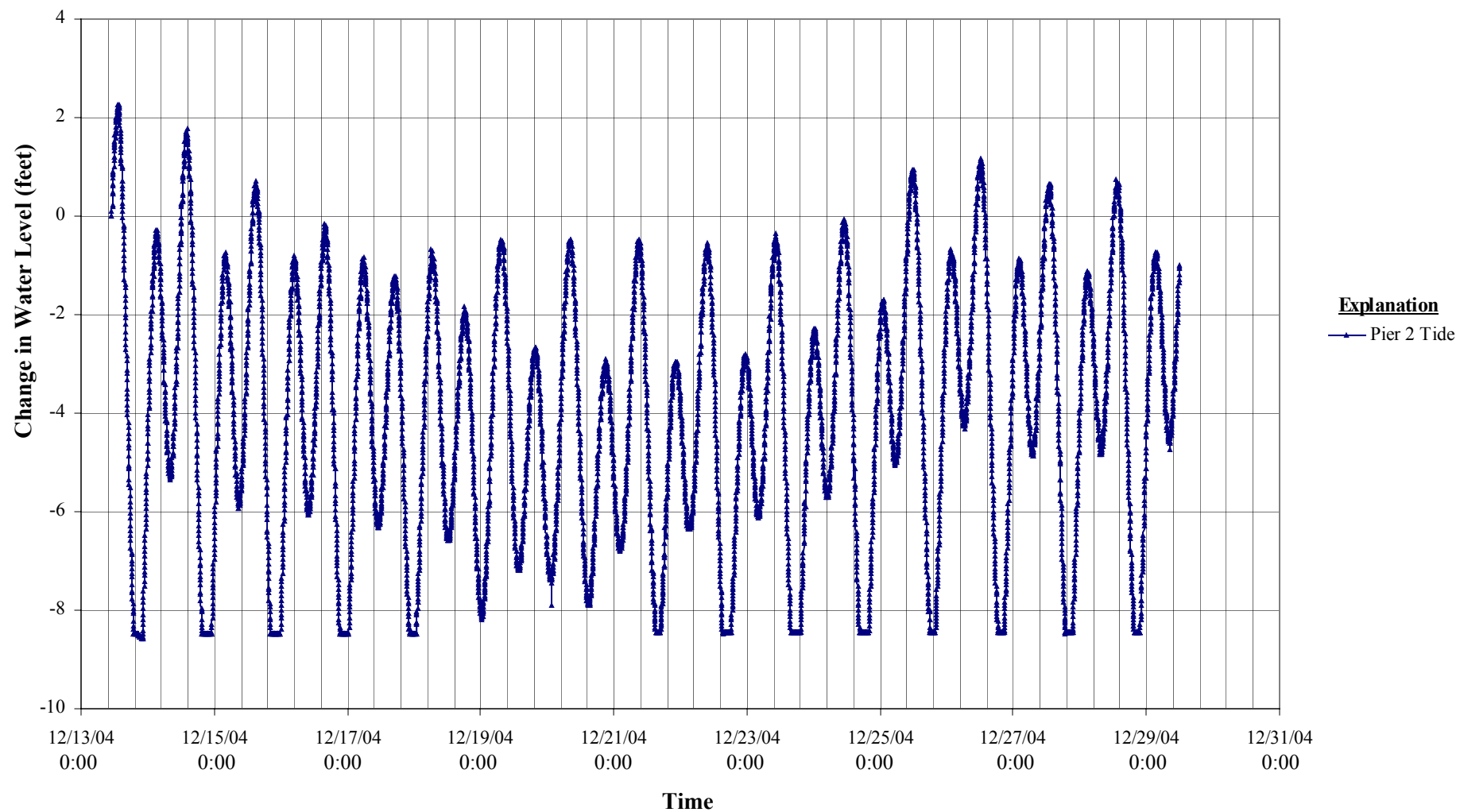
Astoria Area-Wide Petroleum Site  
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Well #	Date	Time	Observed Tide Levels	Top of Casing (feet MSL)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Water Elevation (feet)	Depth to Bottom (feet)	Slip 2 Seep Observations
<b>Pier2(A)</b>	7/19/2004	914	-5.63	17.37	np	18.43	0.00	-1.06	4.57	Tide low
<b>Pier2(A)</b>	8/17/2004	1041	-1.98	17.37	np	16.75	0.00	0.62	2.60	
<b>Pier2(A)</b>	9/16/2004	1011	-2.05	17.37	np	15.71	0.00	1.66	3.71	

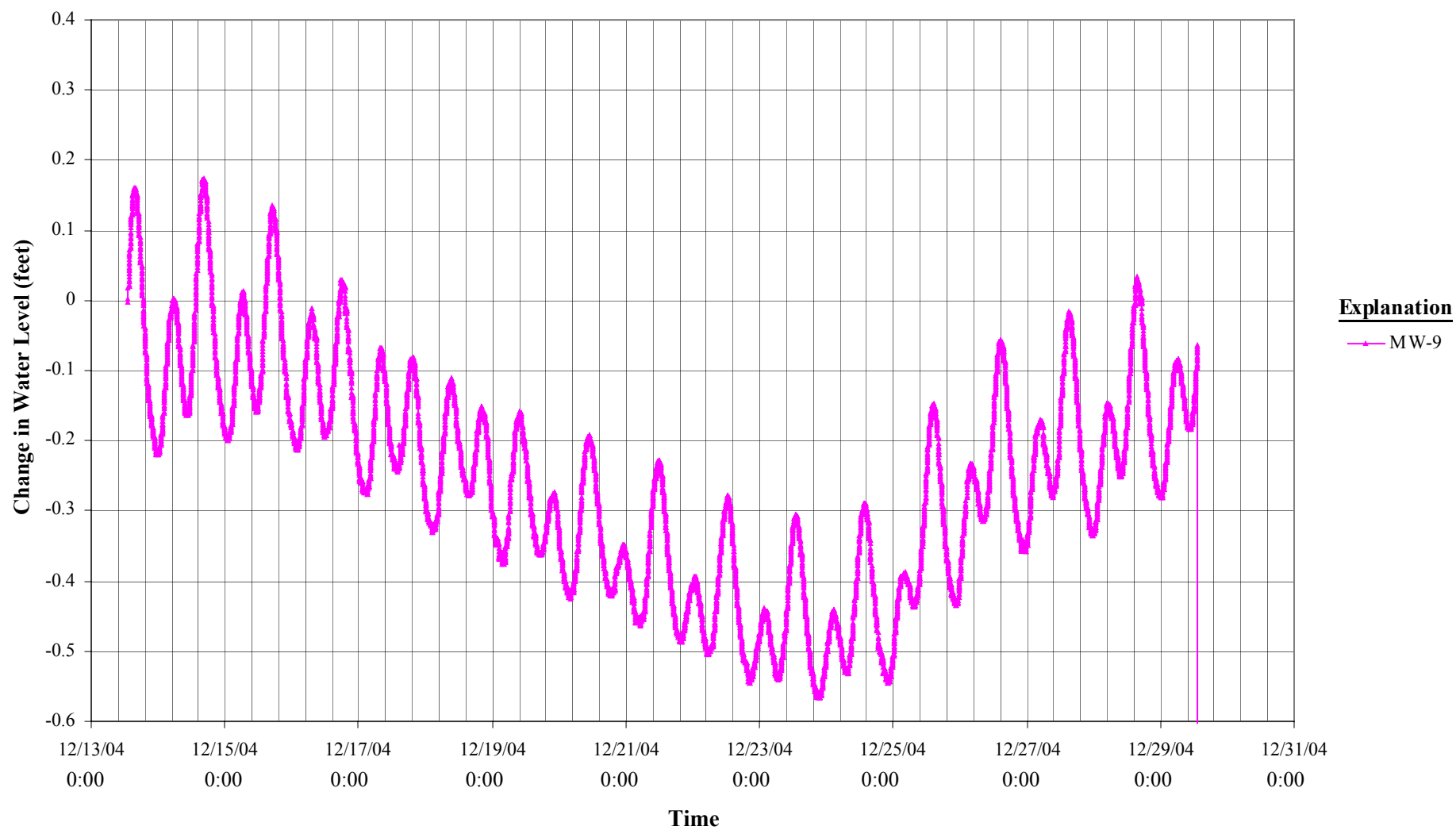
**Note:**

Elevation datum used from November 2003 surge

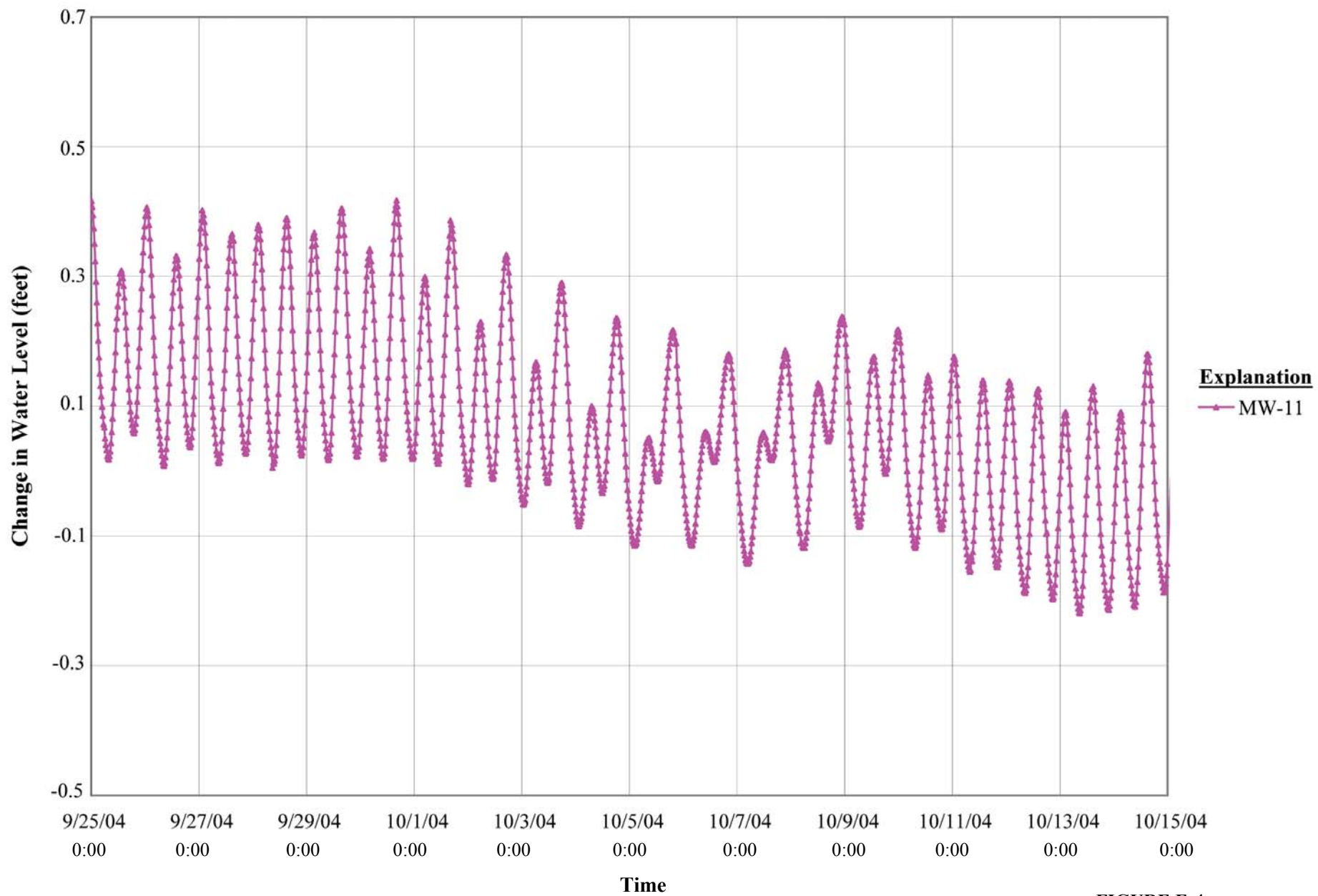




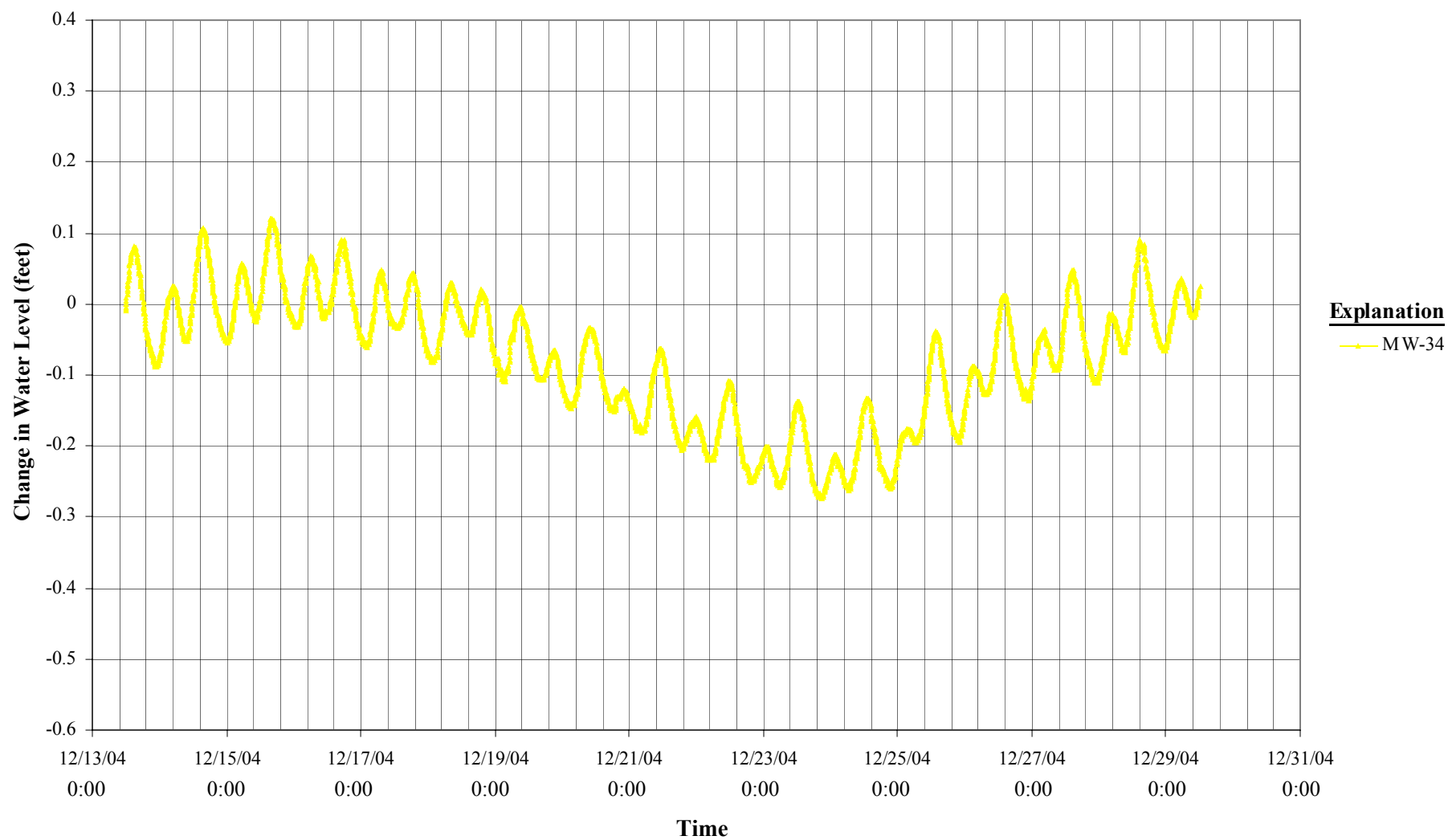
**FIGURE E-2**  
**WATER LEVEL HYDROGRAPH – DECEMBER 2004**  
**PIER 2 MONUMENT**  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
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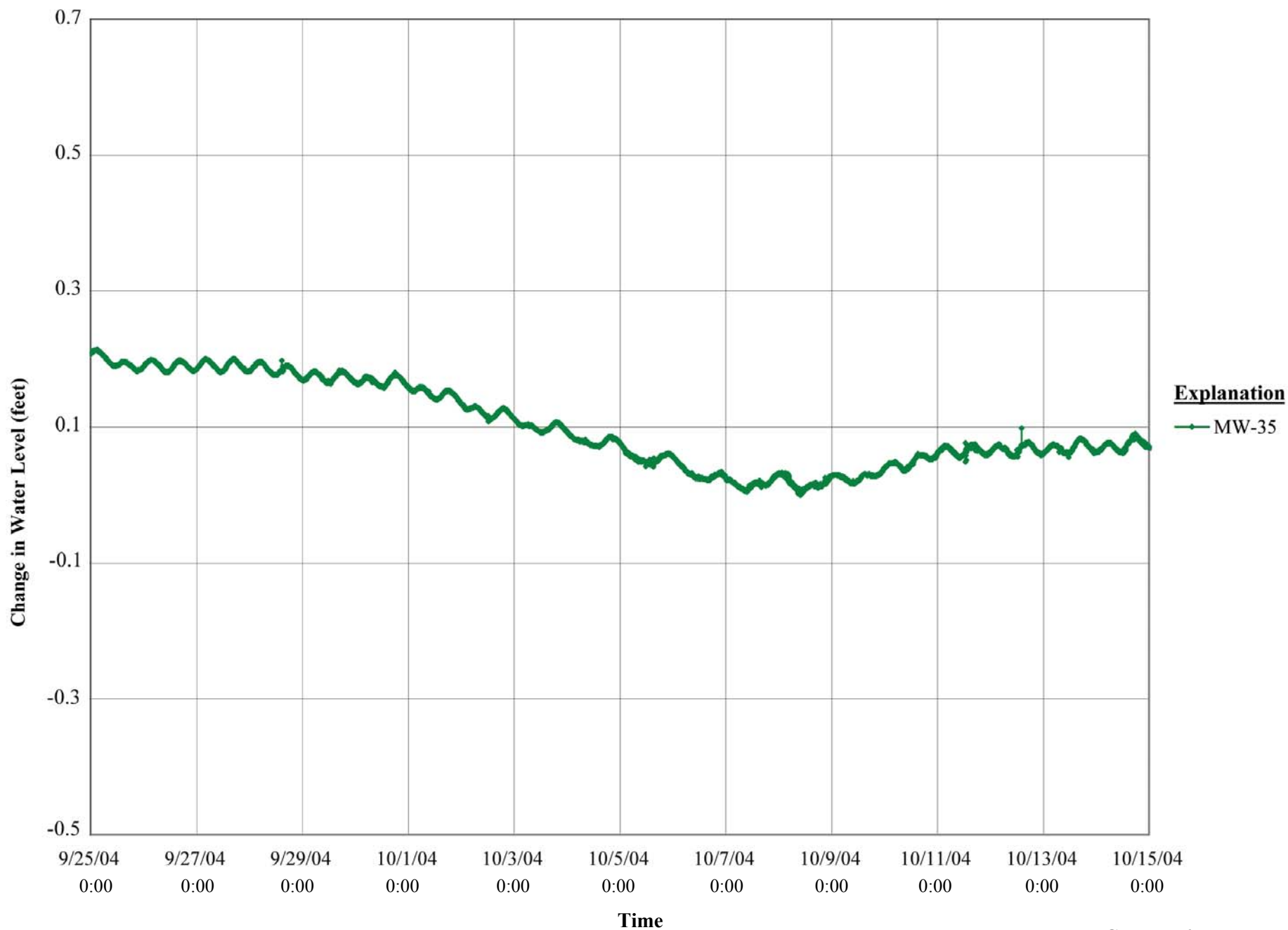
**FIGURE E-3**  
**WATER LEVEL HYDROGRAPH**  
**MW-9**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**







**FIGURE E-5**  
**WATER LEVEL HYDROGRAPH**  
**MW-34**  
 Remedial Investigation/Feasibility Study  
 Astoria Area-Wide Petroleum Site  
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**FIGURE E-6**  
**WATER LEVEL HYDROGRAPH**  
**MW-35**  
**Remedial Investigation/Feasibility Study**  
**Astoria Area-Wide Petroleum Site**  
**Astoria, Oregon**