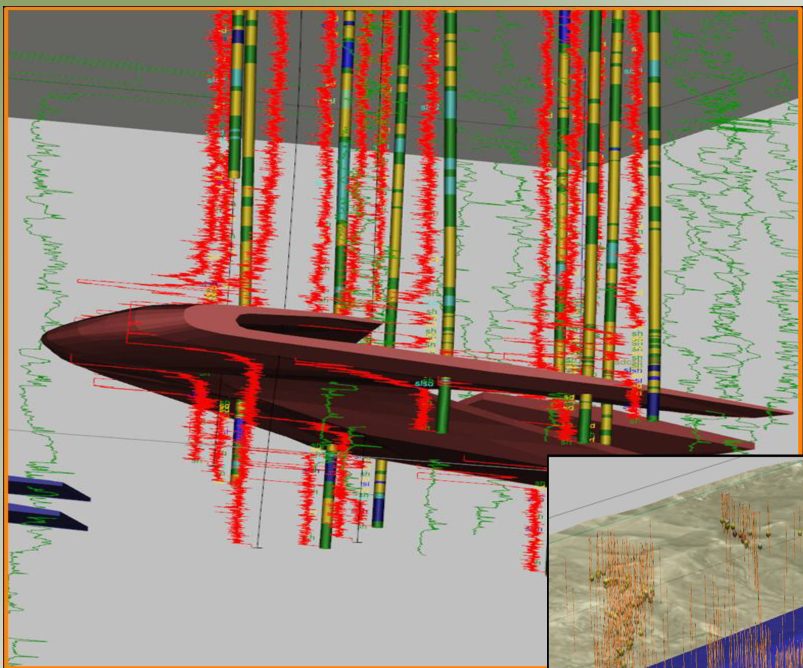
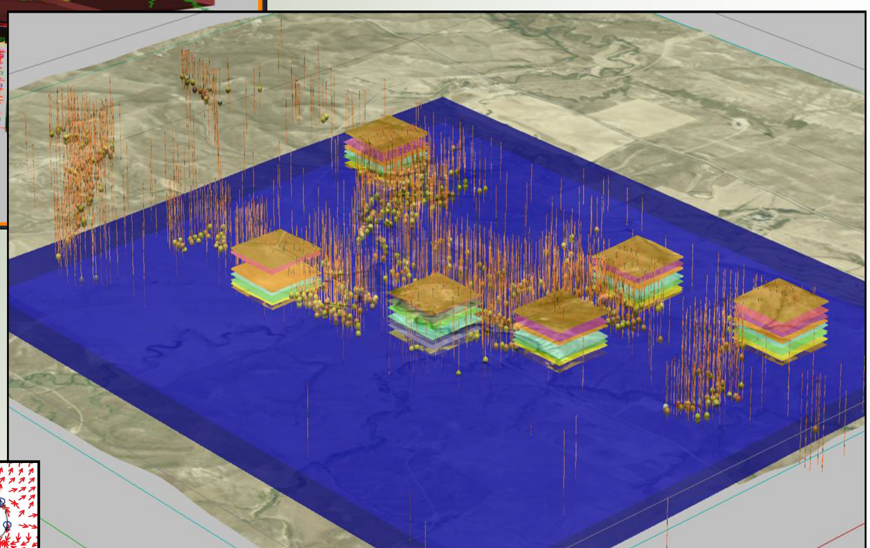
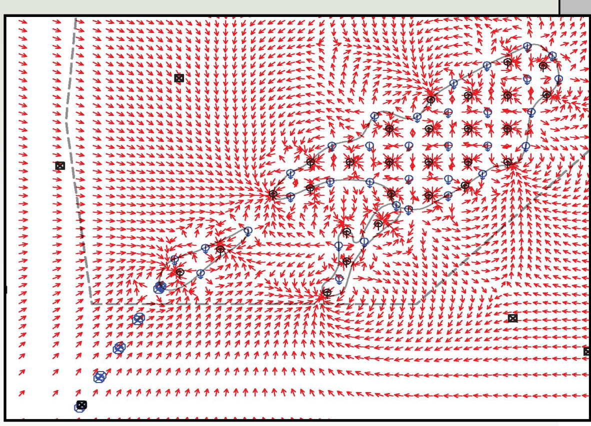
Ross ISR Project USNRC License Application
Crook County, Wyoming





December 2010



Technical Report
Volume 4 of 6
Addenda 2.7-D through 2.7-H

STRATA
ENERGY

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SURFACE WATER QUALITY

DATA SUMMARY

Ross ISR Project Baseline Water Quality
Reservoirs and Surface Water Monitoring Stations

Parameter	Units	CSRES02				CSRES03					CSRES04	HBRES04 (Oshoto Reservoir)						P15507S			P15508S	P17592S
		3Q09	4Q09	2Q10	3Q10	3Q09	4Q09	2Q10	3Q10	4Q10	3Q09	3Q09	4Q09	1Q10	2Q10	3Q10	4Q10	2Q10	3Q10	4Q10	4Q10	4Q10
Field																						
Field Conductivity	umhos/cm	173.4	127.5	266	359	307	469	467	602	985	153.7	654	860	1265	872	890	1106	1413	1862	3640	2700	2890
Field pH	s.u.	10.24	8.4	7.92	7.36	10.19	9.2	9.47	9.78	9	9.85	9.24	9.25	8.1	8.85	9.46	9.29	9.2	9.93	10.2	9.68	9.29
Field turbidity	NTUs		49.6	620	379		8.91	4.8	15.72	101			14.23	5.13	8.42	4.32	26	31.4	596	328	86.9	23.4
Temperature	Deg C	30.4	7.5	18.3	28.8	24.6	8.2	16.7	26.6	19.8	24.2	23.4	7.9	1.7	9	23.9	16.6	10.7	25.2	20.6	18.4	19.2
Dissolved oxygen	mg/l		8	3.87	0.46		7.66	5.3	4.32	7.11			6.78		9.42	5.34	6.67	11.32		10.14	9.87	4.88
Dissolved oxygen, pct	%			42.4	6.1			54.5	54.2	79					81.8	63.9	68.8			114	105.9	52.8
General																						
Alkalinity (as CaCO3)	mg/l	72	47	113	147	117	164	136	154	346	72	301	353	444	390	430	507	639	1210	1700	1220	1090
Ammonia	mg/l	<0.1	<0.1	5.6	4	<0.1	<0.1	<0.1	0.1	0.6	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	0.2	0.2	0.1	<0.1	0.1
Fluoride	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.1	<0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.7	0.5	0.5
Laboratory conductivity	umhos/cm	156	108	240	327	296	441	444	544	1000	143	713	791	969	827	965	1090	1220	2010	2910	2130	2270
Laboratory pH	s.u.	7.5	7.7	8.1	7.5	10	8.6	8.7	9.2	8.5	9.5	9.1	8.8	8.3	8.7	9.2	8.9	8.9	9.2	9.9	9.4	9
Laboratory turbidity	NTUs	294	7.6	490	315	2.4	43.1	9.2	9.9	101	6.2	10.5	11.5	3.7	6.6	3.1	19.1	27.3	392	229	69.4	18.7
Laboratory Dissolved Oxygen	mg/l	<1	10			10	10				10	10	13	5								
Nitrate/Nitrite	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Dissolved Solids	mg/l	500	110	220	370	200	290	270	420	760	100	460	520	680	560	640	730	970	1510	2320	1560	1710
Total Suspended Solids	mg/l	252	58	210	80	6	10	40	19	134	<5	12	13	7	6	<5	24	37	530	240	86	8
Major Ions																						
Calcium	mg/l	20	11	30	34	25	30	35	28	54	16	20	20	29	24	15	16	43	16	10	13	18
Magnesium	mg/l	4	2	5	7	8	14	13	12	26	4	17	18	25	20	23	24	46	42	43	36	33
Potassium	mg/l	14	9	17	23	9	13	8	14	29	7	10	12	14	11	12	14	11	31	27	16	18
Sodium	mg/l	3	<1	5	5	22	37	38	69	119	4	123	131	171	148	177	226	212	467	739	494	515
Bicarbonate	mg/l	88	58	138	179	56	190	149	106	398	64	292	385	539	429	347	520	635	1130	965	1030	1080
Carbonate	mg/l	<5	<5	<5	<5	43	5	9	41	12	11	37	23	<5	23	88	49	71	169	548	226	123
Chloride	mg/l	20	3	6	9	3	5	3	5	9	<1	8	8	9	8	7	8	7	12	21	8	20
Sulfate	mg/l	<1	<1	3	1	32	48	81	111	169	3	66	70	95	79	97	96	163	54	84	90	224
Metals																						
Aluminum, dissolved	mg/l	0.3	0.2	1.4	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic, dissolved	mg/l	0.028	<0.005	0.005	0.021	0.007	<0.005	<0.005	0.012	0.022	0.009	0.01	0.006	<0.005	<0.005	0.008	0.007	0.006	0.016	0.052	0.015	0.013
Barium, dissolved	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron, dissolved	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	0.4	0.2	0.2
Cadmium, dissolved	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium, dissolved	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper, dissolved	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron, dissolved	mg/l	8.32	0.2	0.92	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	0.08	0.13	0.06	0.08	0.18
Iron, total	mg/l	15.1	1.68	19.7	16.7	0.08	0.22	0.42	0.45	1.32	0.46	0.12	0.14	0.1	0.25	0.07	0.13	1.14	6.28	1.06	1.3	0.77
Lead, dissolved	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Manganese, total	mg/l	1.05	0.14	0.94	1.24	<0.02	0.07	0.03	0.06	1.12	0.04	0.08	0.05	0.16	0.04	0.03	0.07	0.11	0.34	0.12	0.09	0.08
Mercury	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum, dissolved	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	<0.02	<0.02
Nickel, dissolved	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium, dissolved	mg/l	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver, dissolved	mg/l				<0.003				<0.003	<0.003						<0.003	<0.003		<0.003	<0.003	<0.003	<0.003
Uranium, dissolved	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	0.002	0.005	<0.001	0.006	0.006	0.007	0.007	0.009	0.008	0.019	0.021	0.087	0.027	0.02
Uranium, suspended	mg/l			<0.001	<0.001			<0.001	<0.001							<0.001		<0.001	0.003			
Vanadium, dissolved	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02
Zinc, dissolved	mg/l	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Radiological																						
Lead 210, dissolved	pCi/l			<1	<1			<1	<1							<1		1.46	<1			
Lead 210, suspended	pCi/l			3.26	<1			<1	<1							<1		1.55	<1			
Polonium 210, dissolved	pCi/l			<1	<1			<1	<1							<1		<1	<1			
Polonium 210, suspended	pCi/l			<1	<1			<1	<1							<1		<1	<1			
Ra-226, dissolved	pCi/l	<2.7	<0.2	<0.2	<0.2	0.46	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	0.31	<0.2	<0.2	<0.2	<0.2
Ra-226, suspended	pCi/l			1.12	<0.2			<0.2	<0.2							<0.2		<0.2	0.3			
Ra-228, Dissolved	pCi/l	<1	1.22	<1	<1	<1	1.52	<1	<1	<1	<1	<1	1.1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Th-230, dissolved	pCi/l			<0.2	<0.2			<0.2	<0.2							<0.2		<0.2	<0.2			
Th-230, suspended	pCi/l			0.28	<0.2			<0.2	<0.2							<0.2		0.28	0.46			
Gross Alpha	pCi/l	2.15	<2	3.85	7.4	<2	<2	3.4	2.5	11.1	<2	5.1	9.1	5.5	3.1	7.34	9.5	13.6	27.3	48.7	15	16.3
Gross Beta	pCi/l	16.8	10.5	20.3	28.7	8.9	12.1	8.6	12.1	27.6	6.9	8.1	22.9	12.7	11.3	11.5	13	12.9	44.4	48.5	20	20
QA/QC																						
Anion Sum	meq/L	1.98	1.02	2.49	3.21	3.09	4.43	4.5	5.53	10.72	1.48	7.63	8.74	11.12	9.65	10.82	12.39	16.38	25.69	36.47	26.58	27.01
Cation Sum	meq/L	1.83	0.93	2.5	3.09	3.02	4.53	4.67	5.76	10.72	1.49	8.02	8.45	11.29	9.51	10.63	12.96	15.48	25.37	36.87	25.55	26.44
Total Anion/Cation Balance	%	3.94	4.62	0.16	1.81	1.16	1.13	1.92	2.04	0.01	0.34	2.47	1.68	0.76	0.72	0.92	2.24	2.83	0.62	0.55	1.97	1.07
Total Dissolved Solids (calc)	mg/l	100	50	130	170	170	250	260	330	610	80	430	470	610	520	590	690	870	1350	1950	1390	1480

Ross ISR Project Baseline Water Quality
Reservoirs and Surface Water Monitoring Stations

		SW-1		SW-2		SW-3		TSRES01	TWRES01					TWRES02		
Parameter	Units	1Q10	2Q10	1Q10	2Q10	1Q10	2Q10	4Q09	3Q09	4Q09	2Q10	3Q10	4Q10	2Q10	3Q10	4Q10
Field																
Field Conductivity	umhos/cm	933	1200	422	1348	909	1209	2720	147.3	218	188.5	156.9	247	414	281	1801
Field pH	s.u.	8.06	8.39	7.62	8.35	8.5	8.86	8.87	9.53	8.99	10.64	9.61	9.47	9.03	10.46	10.32
Field turbidity	NTUs	14.14	9.1	11.68	3.86	14.9	16.29	63	6.76	62.4	10.85	6.05	64.4	11.91	3.22	26.5
Temperature	Deg C	1.8	9.8	3.2	7.8	2.4	10	5.5	18.6	9.2	20.5	20.2	15	15.5	21.8	18.9
Dissolved oxygen	mg/l	6.92	7.28	10.46	7.59	7.89	8.77	6.78	6.87	7.21	3.91	4.9	5.87	4.37	6.72	10.73
Dissolved oxygen, pct	%	49.9	64.6	81	63.4	57.5	78.3				44	55	59.1	44.7	77.6	116.8
General																
Alkalinity (as CaCO3)	mg/l	331	497	118	600	357	586	1080	64	95	55	59	116	183	107	732
Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Fluoride	mg/l	0.2	0.2	<0.1	0.3	0.1	0.3	0.3	0.1	0.1	<0.1	0.1	0.2	0.1	<0.1	1.7
Laboratory conductivity	umhos/cm	795	1110	283	1250	794	1120	2000	146	213	129	133	231	397	273	1870
Laboratory pH	s.u.	8.2	8.7	8.1	8.6	8.3	8.8	8.6	8.8	8	9.2	8.7	8.5	8.6	9.8	10
Laboratory turbidity	NTUs	12.7	7.7	8.9	2.3	12.8	14.4	58.4	6.7	56.8	5.8	4.8	62	9.1	2.2	24.8
Laboratory Dissolved Oxygen	mg/l	8		10		9		12	9	13						
Nitrate/Nitrite	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Dissolved Solids	mg/l	580	790	220	940	580	800	1360	110	120	100	100	170	250	210	1190
Total Suspended Solids	mg/l	<5	7	7	6	14	14	62	9	74	14	6	44	8	<5	<5
Major Ions																
Calcium	mg/l	17	37	14	58	24	32	41	13	19	12	11	21	38	14	5
Magnesium	mg/l	12	24	6	29	25	35	60	3	5	3	3	5	18	10	5
Potassium	mg/l	11	11	6	7	10	11	24	10	12	9	10	14	5	5	5
Sodium	mg/l	154	204	37	216	129	196	440	7	9	7	8	15	24	26	427
Bicarbonate	mg/l	404	542	144	655	435	619	1190	71	116	49	68	137	209	51	363
Carbonate	mg/l	<5	32	<5	38	<5	47	66	<5	<5	9	<5	<5	7	39	261
Chloride	mg/l	7	8	3	10	4	7	10	1	4	<1	<1	2	2	2	3
Sulfate	mg/l	98	147	26	168	92	102	136	4	8	5	5	4	28	27	235
Metals																
Aluminum, dissolved	mg/l	0.2	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	1.5
Arsenic, dissolved	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.006	<0.005	<0.005	0.006	<0.005	<0.005	0.007	<0.005
Barium, dissolved	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron, dissolved	mg/l	<0.1	0.1	<0.1	<0.1	<0.1	0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6
Cadmium, dissolved	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium, dissolved	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper, dissolved	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron, dissolved	mg/l	0.33	0.08	0.26	0.14	0.34	0.07	0.07	0.34	0.18	0.2	0.35	<0.05	<0.05	<0.05	0.8
Iron, total	mg/l	0.95	0.37	0.64	0.32	0.87	0.58	1.95	0.78	2.62	0.43	0.64	1.35	0.37	0.06	1.29
Lead, dissolved	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Manganese, total	mg/l	0.17	0.05	0.11	0.05	0.17	0.21	0.25	0.03	0.12	0.02	0.03	0.07	0.03	0.03	0.03
Mercury	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum, dissolved	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nickel, dissolved	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium, dissolved	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver, dissolved	mg/l											<0.003	<0.003		<0.003	<0.003
Uranium, dissolved	mg/l	0.008	0.011	0.003	0.02	0.009	0.014	0.028	<0.001	<0.001	<0.001	<0.001	0.001	0.006	0.003	0.002
Uranium, suspended	mg/l										<0.001	<0.001		<0.001	<0.001	
Vanadium, dissolved	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc, dissolved	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Radiological																
Lead 210, dissolved	pCi/l										1.29	<1		<1	<1	
Lead 210, suspended	pCi/l										<1	<1		<1	<1	
Polonium 210, dissolved	pCi/l										<1	<1		<1	<1	
Polonium 210, suspended	pCi/l										<1	<1		<1	<1	
Ra-226, dissolved	pCi/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.29	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ra-226, suspended	pCi/l										<0.2	<0.2		<0.2	<0.2	
Ra-228, Dissolved	pCi/l	<1	<1	<1	1.3	<1	<1	<1	1.25	1.34	<1	<1	<1	<1	<1	<1
Th-230, dissolved	pCi/l										<0.2	<0.2		<0.2	<0.2	
Th-230, suspended	pCi/l										<0.2	<0.2		<0.2	<0.2	
Gross Alpha	pCi/l	8.8	7.3	4	7.9	7.3	6	23	<2	2.25	<2	3.55	2.5	5.6	3.61	4.8
Gross Beta	pCi/l	8.6	9.7	6	7.4	11.2	9.8	31.4	8.7	13.1	9.3	9.26	14.3	11.6	5.99	3.9
QA/QC																
Anion Sum	meq/L	8.85	13.21	2.97	15.78	9.18	14.03	24.76	1.4	2.17	1.21	1.28	2.45	4.31	2.75	19.69
Cation Sum	meq/L	8.76	13	2.97	14.86	9.16	13.3	26.69	1.48	2.09	1.33	1.38	2.48	4.48	2.79	19.37
Total Anion/Cation Balance	%	0.48	0.8	0	2.98	0.11	2.66	3.74	2.78	1.88	4.95	3.83	0.45	1.97	0.72	0.8
Total Dissolved Solids (calc)	mg/l	500	730	160	850	500	730	1360	80	120	70	70	130	220	150	680

ADDENDUM 2.7-E

SURFACE WATER QUALITY

FIELD SHEETS AND LABORATORY REPORTS

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: CS RES 02 **Date:** 8-6-09

Time: 1430

Landowner
Name: Carol Strong
Address
Phone#

Legal Location
Qtr/Qtr
SEC 19
TWN 53
RNG 67

Photos

Photo Roll

Picture #(s) 9

Stock ✓

Domestic

SEO Permitted Facility Name: Bath #2 ? **Permit No.** P155065S ?

Location (Decimal Degrees)
Lat 44.56424
Long 104.95227
Elev. 4236

GEO XH
503790.36E
4934545.44N
4162.4'

Water Quality
pH 10.24
Cond. 173.4 MS
Temp. °C 30.4

Water Level (ft): N/A

% Combustible Gas:

Comments: Turbitity = 522 NTU D.O. = 11.19 mg/l - Reservoir low. 12" in deepest part. Water very colored (yellowish/Brown. Not much odor

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: CS RES 03 **Date:** 8-6-09

Time: 1600

Landowner

Name: Carol Strong

Address

Phone#

Legal Location

Qtr/Qtr ~~SE~~ SESE

SEC 18

TWN 53

RNG 67

Photos

Photo Roll

Picture #(s) 10

Stock ✓

Domestic

SEO Permitted Facility Name: Butte #1 **Permit No.** P175925

Location (Decimal Degrees)

Lat 44.57346 504240.04

Long 104.94660 4935569.08N

Elev. 4173 4103.8

Water Quality

pH 10.19

Cond. 307

Temp. °C 24.6

Water Level (ft): N/A **% Combustible Gas:**

Comments: Turbidity = 2.52 NTU D.O. = 5.69 - Whitney (Ranch Hand) for C.S. said drillers were putting water into this res. Water clear with no odor.

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: CS RES 04 **Date:** 8-6-09

Time: 1730

Landowner
Name: Carol Strong
Address
Phone#

Legal Location
Qtr/Qtr SESE
SEC 18
TWN 53
RNG 67

Photos

Photo Roll
Picture #(s) 11

Stock ✓
Domestic

SEO Permitted Facility Name: **Permit No.**

Location (Decimal Degrees)
Lat 44.57279
Long 104.94731
Elev. 4180

GEO XH
504185.47
4935496.87
4113.4'

Water Quality
pH 9.85
Cond. 153.7
Temp. °C 24.2

Water Level (ft): **% Combustible Gas:**

Comments: Turbidity = 5.77 D.O. = 5.35
Small reservoir just upstream of CS RES 03

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: HB RES 04 **Date:** 10-22-09 **Time:** 1330
(Oshoto Reservoir)

Landowner
Name: Harry Berger
Address
Phone#

Legal Location
Qtr/Qtr SW NE
SEC 18
TWN 53
RNG 67

Picture #(s) 4

Stock ✓

Domestic

SEO Permitted Facility Name: Oshoto Reservoir **Permit No.** P6046R

Location (Decimal Degrees)
Lat —
Long —
Elev. —

Water Quality
pH 9.25
Cond. 860 µS
Temp. °C 7.9°C
Turbidity (ntu) 14.23
D.O. (mg/L) 6.78 mg/l 57.9%

Water Level (ft): Same as last Qtr. **% Combustible Gas:** —

Casing Height (ft): — **Ambient Air Temp:** 10.8°C

Comments: Water slightly dirty - no odor - 8 sample bottles

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: TW RES 01 **Date:** 9/1 **Time:** 0945

Landowner
Name: WESLEY
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s) 4

Stock ✓
Domestic

SEO Permitted Facility Name:

Permit No. NP

Location (Decimal Degrees)
Lat 44.58914
Long -104.94300
Elev. 4146

Water Quality
pH 9.53
Cond. 147.3
Temp. °C 18.6
Turbidity (ntu) 6.76
D.O. (mg/L) 6.87mg/l / 77.3%

Water Level (ft): --

% Combustible Gas:

Casing Height (ft): —

Ambient Air Temp: 19.4

Comments: Reservoir low - (0.5 to 1.5 Ac. ft) - Lots of frogs

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 9/10/2009
Report ID: S0908115001

Work Order: S0908115
Collection Date: 8/6/2009 2:30:00 PM
Date Received: 8/7/2009 2:06:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0908115-002
Client Sample ID: CS RES 02
COC: 125601

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	10.24			s.u.	08/06/2009 1430	Field
Conductivity	~~170400~~ 173.4 R.F.			µmhos/cm	08/06/2009 1430	Field
Temperature	30.4			°C	08/06/2009 1430	Field
General Parameters						
pH	7.5	0.1		s.u.	08/24/2009 1326 CK	SM 4500 H B
Electrical Conductivity	156	5		µmhos/cm	08/24/2009 1326 CK	SM 2510B
Total Dissolved Solids (180)	500	10		mg/L	08/10/2009 1210 AMB	SM 2540
Solids, Total Dissolved (Calc)	100	10		mg/L	09/09/2009 1553 WN	SM 1030E
Total Suspended Solids	252	5		mg/L	08/10/2009 145 SNS	SM 2540
Alkalinity, Total (As CaCO3)	72	5		mg/L	08/11/2009 135 CK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	08/18/2009 1509 SK	EPA 350.1
Oxygen, Dissolved	ND	1	H	mg/L	08/07/2009 1430 KO	SM 4500-O G
Gross Alpha	2.15 ± 0.95	2		pCi/L	08/22/2009 2015 SH	SM 7110B
Gross Beta	16.8 ± 1.7	3		pCi/L	08/22/2009 2015 SH	SM 7110B
Radium 226	ND	2.7		pCi/L	08/17/2009 000 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	08/20/2009 2221 SH	Ra-05
Turbidity	294	0.1		NTU	08/07/2009 1711 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	88	5		mg/L	08/11/2009 135 CK	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	08/11/2009 135 CK	SM 2320B
Chloride	20	1		mg/L	08/12/2009 1223 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	08/24/2009 1326 CK	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	08/13/2009 1546 SK	EPA 353.2
Sulfate	ND	1		mg/L	08/12/2009 1223 KO	EPA 300.0
Cations						
Calcium	20	1		mg/L	08/28/2009 1515 DG	EPA 200.7
Magnesium	4	1		mg/L	08/28/2009 1515 DG	EPA 200.7
Potassium	14	1		mg/L	08/28/2009 1515 DG	EPA 200.7
Sodium	3	1		mg/L	08/28/2009 1515 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 9/10/2009
Report ID: S0908115001

Work Order: S0908115
Collection Date: 8/6/2009 2:30:00 PM
Date Received: 8/7/2009 2:06:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0908115-002
Client Sample ID: CS RES 02
COC: 125601

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	1.43	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Chloride	0.54	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Fluoride	ND	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Sulfate	ND	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Calcium	0.99	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Magnesium	0.35	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Potassium	0.35	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Sodium	0.13	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Cation / Anion Balance						
Cation Sum	1.83	0		meq/L	09/09/2009 1553 WN	SM 1030E
Anion Sum	1.98	0		meq/L	09/09/2009 1553 WN	SM 1030E
Cation-Anion Difference	0.14	0		meq/L	09/09/2009 1553 WN	SM 1030E
Dissolved Metals						
Aluminum	0.3	0.1		mg/L	08/11/2009 008 DG	EPA 200.7
Arsenic	0.028	0.005		mg/L	08/10/2009 1144 MS	EPA 200.8
Barium	ND	0.5		mg/L	08/10/2009 1144 MS	EPA 200.8
Boron	ND	0.1		mg/L	08/11/2009 008 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	08/10/2009 1144 MS	EPA 200.8
Chromium	ND	0.01		mg/L	08/11/2009 008 DG	EPA 200.7
Copper	ND	0.01		mg/L	08/10/2009 1144 MS	EPA 200.8
Iron	8.32	0.05		mg/L	08/11/2009 008 DG	EPA 200.7
Lead	ND	0.02		mg/L	08/10/2009 1144 MS	EPA 200.8
Mercury	ND	0.001		mg/L	08/11/2009 1244 RS	EPA 245.1
Molybdenum	ND	0.02		mg/L	08/10/2009 1144 MS	EPA 200.8
Nickel	ND	0.01		mg/L	08/11/2009 008 DG	EPA 200.7
Selenium	ND	0.005		mg/L	08/10/2009 1144 MS	EPA 200.8
Uranium	ND	0.001		mg/L	08/10/2009 1144 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	08/10/2009 1144 MS	EPA 200.8
Zinc	0.05	0.01		mg/L	08/11/2009 008 DG	EPA 200.7
Total Metals - 200.2						
Iron	15.1	0.05		mg/L	08/11/2009 425 DG	EPA 200.7
Manganese	1.05	0.02		mg/L	08/11/2009 425 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL
- O Outside the Range of Dilutions
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Maltson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 9/10/2009
Report ID: S0908115001

Work Order: S0908115
Collection Date: 8/6/2009 4:00:00 PM
Date Received: 8/7/2009 2:06:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0908115-003
Client Sample ID: CS RES 03
COC: 125601

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	10.19			s.u.	08/06/2009 1600	Field
Conductivity	307			µmhos/cm	08/06/2009 1600	Field
Temperature	24.6			°C	08/06/2009 1600	Field
General Parameters						
pH	10.0	0.1		s.u.	08/24/2009 1330 CK	SM 4500 H B
Electrical Conductivity	296	5		µmhos/cm	08/24/2009 1330 CK	SM 2510B
Total Dissolved Solids (180)	200	10		mg/L	08/31/2009 1050 AMB	SM 2540
Solids, Total Dissolved (Calc)	170	10		mg/L	09/09/2009 1553 WN	SM 1030E
Total Suspended Solids	6	5		mg/L	08/10/2009 150 SNS	SM 2540
Alkalinity, Total (As CaCO3)	117	5		mg/L	08/11/2009 204 CK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	08/18/2009 1510 SK	EPA 350.1
Oxygen, Dissolved	10	1	H	mg/L	08/07/2009 1430 KO	SM 4500-O G
Gross Alpha	ND	2		pCi/L	08/22/2009 2015 SH	SM 7110B
Gross Beta	8.9 ± 1.4	3		pCi/L	08/22/2009 2015 SH	SM 7110B
Radium 226	0.46 ± 0.23	0.2		pCi/L	08/17/2009 000 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	08/20/2009 2221 SH	Ra-05
Turbidity	2.4	0.1		NTU	08/07/2009 1714 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	56	5		mg/L	08/11/2009 204 CK	SM 2320B
Alkalinity, Carbonate as CO3	43	5		mg/L	08/11/2009 204 CK	SM 2320B
Chloride	3	1		mg/L	08/27/2009 1326 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	08/11/2009 204 CK	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	08/13/2009 1547 SK	EPA 353.2
Sulfate	32	1		mg/L	08/27/2009 1326 KO	EPA 300.0
Cations						
Calcium	25	1		mg/L	08/11/2009 014 DG	EPA 200.7
Magnesium	8	1		mg/L	08/11/2009 014 DG	EPA 200.7
Potassium	9	1		mg/L	08/11/2009 014 DG	EPA 200.7
Sodium	22	1		mg/L	08/11/2009 014 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
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O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

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Client Sample ID: CS RES 03
COC: 125601

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	0.91	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Carbonate as CO3	1.42	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Chloride	0.09	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Fluoride	ND	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Sulfate	0.66	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Calcium	1.23	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Magnesium	0.63	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Potassium	0.22	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Sodium	0.93	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Cation / Anion Balance						
Cation Sum	3.02	0		meq/L	09/09/2009 1553 WN	SM 1030E
Anion Sum	3.09	0		meq/L	09/09/2009 1553 WN	SM 1030E
Cation-Anion Balance	1.16	0		%	09/09/2009 1553 WN	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	08/11/2009 014 DG	EPA 200.7
Arsenic	0.007	0.005		mg/L	08/10/2009 1148 MS	EPA 200.8
Barium	ND	0.5		mg/L	08/10/2009 1148 MS	EPA 200.8
Boron	ND	0.1		mg/L	08/11/2009 014 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	08/10/2009 1148 MS	EPA 200.8
Chromium	ND	0.01		mg/L	08/11/2009 014 DG	EPA 200.7
Copper	ND	0.01		mg/L	08/10/2009 1148 MS	EPA 200.8
Iron	ND	0.05		mg/L	08/11/2009 014 DG	EPA 200.7
Lead	ND	0.02		mg/L	08/10/2009 1148 MS	EPA 200.8
Mercury	ND	0.001		mg/L	08/11/2009 1250 RS	EPA 245.1
Molybdenum	ND	0.02		mg/L	08/10/2009 1148 MS	EPA 200.8
Nickel	ND	0.01		mg/L	08/11/2009 014 DG	EPA 200.7
Selenium	ND	0.005		mg/L	08/10/2009 1148 MS	EPA 200.8
Uranium	ND	0.001		mg/L	08/10/2009 1148 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	08/10/2009 1148 MS	EPA 200.8
Zinc	ND	0.01		mg/L	08/11/2009 014 DG	EPA 200.7
Total Metals - 200.2						
Iron	0.08	0.05		mg/L	08/11/2009 427 DG	EPA 200.7
Manganese	ND	0.02		mg/L	08/11/2009 427 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 9/10/2009
Report ID: S0908115001

Work Order: S0908115
Collection Date: 8/6/2009 5:30:00 PM
Date Received: 8/7/2009 2:06:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0908115-004
Client Sample ID: CS RES 04
COC: 125601

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.85			s.u.	08/06/2009 1730	Field
Conductivity	~~153700~~ 153.7 R.F.			µmhos/cm	08/06/2009 1730	Field
Temperature	24.2			°C	08/06/2009 1730	Field
General Parameters						
pH	9.5	0.1		s.u.	08/24/2009 1333 CK	SM 4500 H B
Electrical Conductivity	143	5		µmhos/cm	08/24/2009 1333 CK	SM 2510B
Total Dissolved Solids (180)	100	10		mg/L	08/31/2009 1050 AMB	SM 2540
Solids, Total Dissolved (Calc)	80	10		mg/L	09/09/2009 1553 WN	SM 1030E
Total Suspended Solids	ND	5		mg/L	08/10/2009 155 SNS	SM 2540
Alkalinity, Total (As CaCO3)	72	5		mg/L	08/11/2009 244 CK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	08/18/2009 1511 SK	EPA 350.1
Oxygen, Dissolved	10	1	H	mg/L	08/07/2009 1430 KO	SM 4500-O G
Gross Alpha	ND	2		pCi/L	08/23/2009 238 SH	SM 7110B
Gross Beta	6.9 ± 1.4	3		pCi/L	08/23/2009 238 SH	SM 7110B
Radium 226	0.20 ± 0.20	0.2		pCi/L	08/21/2009 1547 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	08/27/2009 2014 SH	Ra-05
Turbidity	6.2	0.1		NTU	08/07/2009 1717 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	64	5		mg/L	08/11/2009 244 CK	SM 2320B
Alkalinity, Carbonate as CO3	11	5		mg/L	08/11/2009 244 CK	SM 2320B
Chloride	ND	1		mg/L	08/27/2009 1335 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	08/11/2009 244 CK	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	08/13/2009 1548 SK	EPA 353.2
Sulfate	3	1		mg/L	08/27/2009 1335 KO	EPA 300.0
Cations						
Calcium	16	1		mg/L	08/11/2009 016 DG	EPA 200.7
Magnesium	4	1		mg/L	08/11/2009 016 DG	EPA 200.7
Potassium	7	1		mg/L	08/11/2009 016 DG	EPA 200.7
Sodium	4	1		mg/L	08/11/2009 016 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL
- O Outside the Range of Dilutions
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT:	Western Water Consultants 1849 Terra Sheridan, WY 82801	**Date Reported:**	9/10/2009
		Report ID:	S0908115001
		Work Order:	S0908115
Project:	Ross Project	**Collection Date:**	8/6/2009 5:30:00 PM
Lab ID:	S0908115-004	**Date Received:**	8/7/2009 2:06:00 PM
Client Sample ID:	CS RES 04	**Sampler:**	RF
COC:	125601	**Matrix:**	Water

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	1.05	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Carbonate as CO3	0.37	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Chloride	ND	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Fluoride	ND	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Sulfate	0.05	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Calcium	0.79	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Magnesium	0.34	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Potassium	0.18	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Sodium	0.17	0.01		meq/L	09/09/2009 1553 WN	SM 1030E
Cation / Anion Balance						
Cation Sum	1.49	0		meq/L	09/09/2009 1553 WN	SM 1030E
Anion Sum	1.48	0		meq/L	09/09/2009 1553 WN	SM 1030E
Cation-Anion Difference	0.01	0		meq/L	09/09/2009 1553 WN	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	08/11/2009 016 DG	EPA 200.7
Arsenic	0.009	0.005		mg/L	08/10/2009 1151 MS	EPA 200.8
Barium	ND	0.5		mg/L	08/10/2009 1151 MS	EPA 200.8
Boron	ND	0.1		mg/L	08/11/2009 016 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	08/10/2009 1151 MS	EPA 200.8
Chromium	ND	0.01		mg/L	08/11/2009 016 DG	EPA 200.7
Copper	ND	0.01		mg/L	08/10/2009 1151 MS	EPA 200.8
Iron	0.10	0.05		mg/L	08/11/2009 016 DG	EPA 200.7
Lead	ND	0.02		mg/L	08/10/2009 1151 MS	EPA 200.8
Mercury	ND	0.001		mg/L	08/11/2009 1251 RS	EPA 245.1
Molybdenum	ND	0.02		mg/L	08/10/2009 1151 MS	EPA 200.8
Nickel	ND	0.01		mg/L	08/11/2009 016 DG	EPA 200.7
Selenium	ND	0.005		mg/L	08/10/2009 1151 MS	EPA 200.8
Uranium	ND	0.001		mg/L	08/10/2009 1151 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	08/10/2009 1151 MS	EPA 200.8
Zinc	ND	0.01		mg/L	08/11/2009 016 DG	EPA 200.7
Total Metals - 200.2						
Iron	0.46	0.05		mg/L	08/11/2009 430 DG	EPA 200.7
Manganese	0.04	0.02		mg/L	08/11/2009 430 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson

Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT:	Western Water Consultants 1849 Terra Sheridan, WY 82801	**Date Reported:**	8/26/2009
		Report ID:	S0908047002 (Replaces S0908047001)
		Work Order:	S0908047
Project:	Ross Project	**Collection Date:**	8/4/2009 1:50:00 PM
Lab ID:	S0908047-002	**Date Received:**	8/5/2009 8:17:00 AM
Client Sample ID:	HB RES 04 (Oshoto Reservoir)	**Sampler:**	RF
COC:	125599	**Matrix:**	Water

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.24			s.u.	08/04/2009 1350	Field
Conductivity	654			µmhos/cm	08/04/2009 1350	Field
Temperature	23.4			℃	08/04/2009 1350	Field
General Parameters						
pH	9.1	0.1		s.u.	08/06/2009 000 CK	SM 4500 H B
Electrical Conductivity	713	5		µmhos/cm	08/06/2009 000 CK	SM 2510B
Total Dissolved Solids (180)	460	10		mg/L	08/05/2009 1520 MJH	SM 2540
Solids, Total Dissolved (Calc)	430	10		mg/L	08/20/2009 1555 WN	SM 1030E
Total Suspended Solids	12	5		mg/L	08/06/2009 1015 SNS	SM 2540
Alkalinity, Total (As CaCO3)	301	5		mg/L	08/06/2009 1602 CK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	08/04/2009 000 SK	EPA 350.1
Oxygen, Dissolved	10	1	H	mg/L	08/18/2009 000 CJM	SM 4500-O G
Gross Alpha	5.1 ± 1.4	2		pCi/L	08/16/2009 827 SH	SM 7110B
Gross Beta	8.1 ± 2.0	3		pCi/L	08/16/2009 827 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	08/12/2009 1827 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	08/14/2009 118 SH	Ra-05
Turbidity	10.5	0.1		NTU	08/05/2009 1232 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	292	5		mg/L	08/06/2009 1602 CK	SM 2320B
Alkalinity, Carbonate as CO3	37	5		mg/L	08/06/2009 1602 CK	SM 2320B
Chloride	8	1		mg/L	08/11/2009 826 KO	EPA 300.0
Fluoride	0.2	0.1		mg/L	08/06/2009 1602 CK	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	08/13/2009 1322 SK	EPA 353.2
Sulfate	66	1		mg/L	08/11/2009 826 KO	EPA 300.0
Cations						
Calcium	20	1		mg/L	08/05/2009 2213 DG	EPA 200.7
Magnesium	17	1		mg/L	08/05/2009 2213 DG	EPA 200.7
Potassium	10	1		mg/L	08/05/2009 2213 DG	EPA 200.7
Sodium	123	1		mg/L	08/05/2009 2213 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Reviewed by: Connie J Mattson

Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT:	Western Water Consultants 1849 Terra Sheridan, WY 82801	**Date Reported:**	8/26/2009
		Report ID:	S0908047002 (Replaces S0908047001)
		Work Order:	S0908047
Project:	Ross Project	**Collection Date:**	8/4/2009 1:50:00 PM
Lab ID:	S0908047-002	**Date Received:**	8/5/2009 8:17:00 AM
Client Sample ID:	HB RES 04 (Oshoto Reservoir)	**Sampler:**	RF
COC:	125599	**Matrix:**	Water

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	4.78	0.01		meq/L	08/20/2009 1555 WN	SM 1030E
Carbonate as CO3	1.22	0.01		meq/L	08/20/2009 1555 WN	SM 1030E
Chloride	0.23	0.01		meq/L	08/20/2009 1555 WN	SM 1030E
Fluoride	ND	0.01		meq/L	08/20/2009 1555 WN	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	08/20/2009 1555 WN	SM 1030E
Sulfate	1.37	0.01		meq/L	08/20/2009 1555 WN	SM 1030E
Calcium	1.00	0.01		meq/L	08/20/2009 1555 WN	SM 1030E
Magnesium	1.41	0.01		meq/L	08/20/2009 1555 WN	SM 1030E
Potassium	0.25	0.01		meq/L	08/20/2009 1555 WN	SM 1030E
Sodium	5.34	0.01		meq/L	08/20/2009 1555 WN	SM 1030E
Cation / Anion Balance						
Cation Sum	8.02	0		meq/L	08/20/2009 1555 WN	SM 1030E
Anion Sum	7.63	0		meq/L	08/20/2009 1555 WN	SM 1030E
Cation-Anion Balance	2.47	0		%	08/20/2009 1555 WN	SM 1030E
Cation-Anion Difference	0.38	0		meq/L	08/20/2009 1555 WN	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	08/05/2009 2213 DG	EPA 200.7
Arsenic	0.010	0.005		mg/L	08/05/2009 1556 MS	EPA 200.8
Barium	ND	0.5		mg/L	08/05/2009 1556 MS	EPA 200.8
Boron	ND	0.1		mg/L	08/05/2009 2213 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	08/05/2009 1556 MS	EPA 200.8
Chromium	ND	0.01		mg/L	08/05/2009 2213 DG	EPA 200.7
Copper	ND	0.01		mg/L	08/05/2009 1556 MS	EPA 200.8
Iron	ND	0.05		mg/L	08/05/2009 2213 DG	EPA 200.7
Lead	ND	0.02		mg/L	08/05/2009 1556 MS	EPA 200.8
Mercury	ND	0.001		mg/L	08/07/2009 1241 RS	EPA 245.1
Molybdenum	ND	0.02		mg/L	08/05/2009 1556 MS	EPA 200.8
Nickel	ND	0.01		mg/L	08/05/2009 2213 DG	EPA 200.7
Selenium	ND	0.005		mg/L	08/05/2009 1556 MS	EPA 200.8
Uranium	0.006	0.001		mg/L	08/05/2009 1556 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	08/05/2009 1556 MS	EPA 200.8
Zinc	ND	0.01		mg/L	08/05/2009 2213 DG	EPA 200.7
Total Metals - 200.2						
Iron	0.12	0.05		mg/L	08/24/2009 2319 DG	EPA 200.7
Manganese	0.08	0.02		mg/L	08/24/2009 2319 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Reviewed by: Connie J Mattson

Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 9/23/2009
Report ID: S0909036001

Work Order: S0909036
Collection Date: 9/1/2009 9:45:00 AM
Date Received: 9/2/2009 8:44:00 AM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0909036-001
Client Sample ID: TW RES 01
COC: 125607

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.53			s.u.	09/01/2009 945	Field
Conductivity	147.3			µmhos/cm	09/01/2009 945	Field
Dissolved Oxygen	6.87			mg/L	09/01/2009 945	Field
Turbidity	6.76			NTU	09/01/2009 945	Field
Temperature	18.6			°C	09/01/2009 945	Field
General Parameters						
pH	8.8	0.1		s.u.	09/03/2009 1553 CK	SM 4500 H B
Electrical Conductivity	146	5		µmhos/cm	09/03/2009 1553 CK	SM 2510B
Total Dissolved Solids (180)	110	10		mg/L	09/02/2009 1525 SNS	SM 2540
Solids, Total Dissolved (Calc)	80	10		mg/L	09/09/2009 1148 KO	SM 1030E
Total Suspended Solids	9	5		mg/L	09/02/2009 1425 SNS	SM 2540
Alkalinity, Total (As CaCO3)	64	5		mg/L	09/03/2009 1553 CK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	09/09/2009 1204 SK	EPA 350.1
Oxygen, Dissolved	9	1	H	mg/L	09/02/2009 000 CJM	SM 4500-O G
Gross Alpha	ND	2		pCi/L	09/16/2009 2211 SH	SM 7110B
Gross Beta	8.7 ± 1.4	3		pCi/L	09/16/2009 2211 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	09/17/2009 000 SH	SM 7500-Ra B
Total Radium 228	1.25 ± 0.48	1		pCi/L	09/23/2009 107 SH	Ra-05
Turbidity	6.7	0.1		NTU	09/02/2009 1157 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	71	5		mg/L	09/03/2009 1553 CK	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	09/03/2009 1553 CK	SM 2320B
Chloride	1	1		mg/L	09/02/2009 1735 KO	EPA 300.0
Fluoride	0.1	0.1		mg/L	09/03/2009 1553 CK	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	09/10/2009 1426 SK	EPA 353.2
Sulfate	4	1		mg/L	09/02/2009 1735 KO	EPA 300.0
Cations						
Calcium	13	1		mg/L	09/02/2009 2241 DG	EPA 200.7
Magnesium	3	1		mg/L	09/02/2009 2241 DG	EPA 200.7
Potassium	10	1		mg/L	09/02/2009 2241 DG	EPA 200.7
Sodium	7	1		mg/L	09/02/2009 2241 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 9/23/2009
Report ID: S0909036001

Work Order: S0909036
Collection Date: 9/1/2009 9:45:00 AM
Date Received: 9/2/2009 8:44:00 AM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0909036-001
Client Sample ID: TW RES 01
COC: 125607

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	1.15	0.01		meq/L	09/09/2009 1148 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	09/09/2009 1148 KO	SM 1030E
Chloride	0.04	0.01		meq/L	09/09/2009 1148 KO	SM 1030E
Fluoride	ND	0.01		meq/L	09/09/2009 1148 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	09/09/2009 1148 KO	SM 1030E
Sulfate	0.07	0.01		meq/L	09/09/2009 1148 KO	SM 1030E
Calcium	0.62	0.01		meq/L	09/09/2009 1148 KO	SM 1030E
Magnesium	0.28	0.01		meq/L	09/09/2009 1148 KO	SM 1030E
Potassium	0.26	0.01		meq/L	09/09/2009 1148 KO	SM 1030E
Sodium	0.30	0.01		meq/L	09/09/2009 1148 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	1.48	0		meq/L	09/09/2009 1148 KO	SM 1030E
Anion Sum	1.40	0		meq/L	09/09/2009 1148 KO	SM 1030E
Cation-Anion Difference	0.07	0		meq/L	09/09/2009 1148 KO	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	09/02/2009 2241 DG	EPA 200.7
Arsenic	0.006	0.005		mg/L	09/02/2009 1230 MS	EPA 200.8
Barium	ND	0.5		mg/L	09/02/2009 1230 MS	EPA 200.8
Boron	ND	0.1		mg/L	09/02/2009 2241 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	09/02/2009 1230 MS	EPA 200.8
Chromium	ND	0.01		mg/L	09/02/2009 2241 DG	EPA 200.7
Copper	ND	0.01		mg/L	09/02/2009 1230 MS	EPA 200.8
Iron	0.34	0.05		mg/L	09/02/2009 2241 DG	EPA 200.7
Lead	ND	0.02		mg/L	09/02/2009 1230 MS	EPA 200.8
Mercury	ND	0.001		mg/L	09/04/2009 923 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	09/02/2009 1230 MS	EPA 200.8
Nickel	ND	0.01		mg/L	09/02/2009 2241 DG	EPA 200.7
Selenium	0.005	0.005		mg/L	09/02/2009 1230 MS	EPA 200.8
Uranium	ND	0.001		mg/L	09/02/2009 1230 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	09/02/2009 1230 MS	EPA 200.8
Zinc	ND	0.01		mg/L	09/02/2009 2241 DG	EPA 200.7
Total Metals - 200.2						
Iron	0.78	0.05		mg/L	09/04/2009 453 DG	EPA 200.7
Manganese	0.03	0.02		mg/L	09/04/2009 453 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Page 2 of 2

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: CS RES 02 **Date:** 10-23-09 **Time:** 1200

Landowner
Name: Carol Strong
Address
Phone#

Legal Location
Qtr/Qtr SW NE
SEC 19
TWN 53
RNG 67

Picture #(s) 1

Stock

Domestic

SEO Permitted Facility Name: NP

Permit No. NP

Location (Decimal Degrees)
Lat
Long
Elev.
} already taken

Water Quality
pH 8.40
Cond. 127.5 µS
Temp. °C 7.5
Turbidity (ntu) 49.6
D.O. (mg/L) 8.00 mg/L / 64.8%

Water Level (ft): —

% Combustible Gas: —

Casing Height (ft): —

Ambient Air Temp:

Comments: Reservoir low - 100 x 60 x 3 ? - Water is dirty - no odor - 8 sample bottles

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: CS RES 03 **Date:** 10-23-09 **Time:** 1300

Landowner
Name: Carol Strong
Address
Phone#

Legal Location
Qtr/Qtr SESE
SEC 18
TWN 53
RNG 67

Picture #(s) 2

Stock ✓

Domestic

SEO Permitted Facility Name: NP

Permit No. NP

Location (Decimal Degrees)
Lat
Long
Elev.
already taken

Water Quality
pH 9.20
Cond. 469µS
Temp. °C 8.2
Turbidity (ntu) 8.91
D.O. (mg/L) 7.66mg/l / 66.4%

Water Level (ft): —

% Combustible Gas: —

Casing Height (ft): —

Ambient Air Temp: 9.4°C

Comments: Reservoir low - Water slightly dirty - no odor - Took sample at CS RES 03, but not at CS RES 04 since they are close to each other. Water spills from 04 into 03. - 8 sample bottles

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: HB RES 04 **Date:** 10-22-09 **Time:** 1330
(Oshoto Reservoir)

Landowner
Name: Harry Berger
Address
Phone#

Legal Location
Qtr/Qtr SW NE
SEC 18
TWN 53
RNG 67

Picture #(s) 4

Stock ✓

Domestic

SEO Permitted Facility Name: Oshoto Reservoir **Permit No.** P6046R

Location (Decimal Degrees)
Lat —
Long —
Elev. —

Water Quality
pH 9.25
Cond. 860 µS
Temp. °C 7.9°C
Turbidity (ntu) 14.23
D.O. (mg/L) 6.78mg/l 57.9%

Water Level (ft): Same as last Qtr.

% Combustible Gas: —

Casing Height (ft): —

Ambient Air Temp: 10.8°C

Comments: Water slightly dirty - no odor - 8 sample bottles

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: TS RES 01 **Date:** 10-22-09 **Time:** 1100

Landowner
Name: Tony Sworda
Address
Phone#

Legal Location
Qtr/Qtr NESW
SEC 13
TWN 53
RNG 68

Picture #(s) 2

Stock ✓

Domestic ·

SEO Permitted Facility Name: —

Permit No. —

Location (Decimal Degrees)
Lat N 44.57734 GEO XH YES
Long W 105.97478
Elev. 4198

Water Quality
pH 8.87
Cond. 2.72 mS
Temp. ° C 5.5
Turbidity (ntu) 63.0
D.O. (mg/L) 6.78 mg/L / 59.0%

Water Level (ft): —

% Combustible Gas: —

Casing Height (ft): —

Ambient Air Temp: 7.5°C

Comments: Reservoir Full and spilling - water dirty - no odor - Small reservoir 200' x 250' x 4'?
8 sample bottles

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: TW RES 01 **Date:** 10-22-09 **Time:** 1200

Landowner
Name: TJ Wesley
Address
Phone#

Legal Location
Qtr/Qtr SESE
SEC 7
TWN 53
RNG 67

Picture #(s) 3

Stock ✓
Domestic

SEO Permitted Facility Name: ——
Permit No. ——

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 8.99
Cond. 218 μS
Temp. °C 9.2
Turbidity (ntu) 62.4
D.O. (mg/L) 7.21mg/l / 63.3%

Water Level (ft): 1/8 full
% Combustible Gas: ——
Casing Height (ft): ——
Ambient Air Temp: 7.5°C

Comments: Reservoir low - small 80' x 100' x 2' ?
water dirty - no odor - 8 sample bottles

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 11/12/2009
Report ID: S0910365001

Work Order: S0910365
Collection Date: 10/23/2009 12:00:00 PM
Date Received: 10/23/2009 4:17:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0910365-001
Client Sample ID: CS RES 02
COC: 130767

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	8.40			s.u.	10/23/2009 1200	Field
Conductivity	1275			µmhos/cm	10/23/2009 1200	Field
Dissolved Oxygen	8.00			mg/L	10/23/2009 1200	Field
Turbidity	49.6			NTU	10/23/2009 1200	Field
Temperature	7.5			°C	10/23/2009 1200	Field
General Parameters						
pH	7.7	0.1		s.u.	10/26/2009 2024 CK	SM 4500 H B
Electrical Conductivity	108	5		µmhos/cm	10/26/2009 2024 CK	SM 2510B
Total Dissolved Solids (180)	110	10		mg/L	10/26/2009 1140 AMB	SM 2540
Solids, Total Dissolved (Calc)	50	10		mg/L	11/02/2009 1223 KO	SM 1030E
Total Suspended Solids	58	5		mg/L	10/27/2009 055 SNS	SM 2540
Alkalinity, Total (As CaCO3)	47	5		mg/L	10/26/2009 2024 CK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	10/30/2009 1301 SK	EPA 350.1
Oxygen, Dissolved	10	1		mg/L	10/23/2009 1636 KO	SM 4500-O G
Gross Alpha	ND	2		pCi/L	11/09/2009 000 SH	SM 7110B
Gross Beta	10.5 ± 1.5	3		pCi/L	11/09/2009 000 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	11/06/2009 2034 SH	SM 7500-Ra B
Total Radium 228	1.22 ± 0.83	1		pCi/L	11/11/2009 245 SH	Ra-05
Turbidity	7.6	0.1		NTU	10/23/2009 1707 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	58	5		mg/L	10/26/2009 2024 CK	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	10/26/2009 2024 CK	SM 2320B
Chloride	3	1		mg/L	10/26/2009 1625 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	10/26/2009 2024 CK	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/28/2009 1603 SK	EPA 353.2
Sulfate	ND	1		mg/L	10/26/2009 1625 KO	EPA 300.0
Cations						
Calcium	11	1		mg/L	10/28/2009 1919 DG	EPA 200.7
Magnesium	2	1		mg/L	10/28/2009 1919 DG	EPA 200.7
Potassium	9	1		mg/L	10/28/2009 1919 DG	EPA 200.7
Sodium	ND	1		mg/L	10/28/2009 1919 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

INTER-MOUNTAIN LABS
Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 11/12/2009
Report ID: S0910365001

Work Order: S0910365
Collection Date: 10/23/2009 12:00:00 PM
Date Received: 10/23/2009 4:17:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0910365-001
Client Sample ID: CS RES 02
COC: 130767

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	0.94	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Chloride	0.07	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Fluoride	ND	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Sulfate	ND	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Calcium	0.52	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Magnesium	0.18	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Potassium	0.22	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Sodium	ND	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	0.93	0		meq/L	11/02/2009 1223 KO	SM 1030E
Anion Sum	1.02	0		meq/L	11/02/2009 1223 KO	SM 1030E
Cation-Anion Difference	0.08	0		meq/L	11/02/2009 1223 KO	SM 1030E
Dissolved Metals						
Aluminum	0.2	0.1		mg/L	10/28/2009 1919 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	10/26/2009 1121 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/26/2009 1121 MS	EPA 200.8
Boron	ND	0.1		mg/L	10/28/2009 1919 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	10/26/2009 1121 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/28/2009 1919 DG	EPA 200.7
Copper	ND	0.01		mg/L	10/26/2009 1121 MS	EPA 200.8
Iron	0.20	0.05		mg/L	10/28/2009 1919 DG	EPA 200.7
Lead	ND	0.02		mg/L	10/26/2009 1121 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/27/2009 1101 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/26/2009 1121 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/28/2009 1919 DG	EPA 200.7
Selenium	ND	0.005		mg/L	10/26/2009 1121 MS	EPA 200.8
Uranium	ND	0.001		mg/L	10/26/2009 1121 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/26/2009 1121 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/28/2009 1919 DG	EPA 200.7
Total Metals						
Iron	1.68	0.05		mg/L	10/29/2009 116 DG	EPA 200.7
Manganese	0.14	0.02		mg/L	10/29/2009 116 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 11/12/2009
Report ID: S0910365001

Work Order: S0910365
Collection Date: 10/23/2009 1:00:00 PM
Date Received: 10/23/2009 4:17:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0910365-002
Client Sample ID: CS RES 03
COC: 130767

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.20			s.u.	10/23/2009 1300	Field
Conductivity	469			µmhos/cm	10/23/2009 1300	Field
Dissolved Oxygen	7.66			mg/L	10/23/2009 1300	Field
Turbidity	8.91			NTU	10/23/2009 1300	Field
Temperature	8.2			°C	10/23/2009 1300	Field
General Parameters						
pH	8.6	0.1		s.u.	10/26/2009 2045 CK	SM 4500 H B
Electrical Conductivity	441	5		µmhos/cm	10/26/2009 2045 CK	SM 2510B
Total Dissolved Solids (180)	290	10		mg/L	10/26/2009 1145 AMB	SM 2540
Solids, Total Dissolved (Calc)	250	10		mg/L	11/02/2009 1223 KO	SM 1030E
Total Suspended Solids	10	5		mg/L	10/27/2009 105 SNS	SM 2540
Alkalinity, Total (As CaCO3)	164	5		mg/L	10/26/2009 2045 CK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	10/30/2009 1302 SK	EPA 350.1
Oxygen, Dissolved	10	1		mg/L	10/23/2009 1636 KO	SM 4500-O G
Gross Alpha	ND	2		pCi/L	11/09/2009 000 SH	SM 7110B
Gross Beta	12.1 ± 1.6	3		pCi/L	11/09/2009 000 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	11/09/2009 1721 SH	SM 7500-Ra B
Total Radium 228	1.52 ± 0.84	1		pCi/L	11/11/2009 245 SH	Ra-05
Turbidity	43.1	0.1		NTU	10/23/2009 1710 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	190	5		mg/L	10/26/2009 2045 CK	SM 2320B
Alkalinity, Carbonate as CO3	5	5		mg/L	10/26/2009 2045 CK	SM 2320B
Chloride	5	1		mg/L	10/26/2009 1719 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	10/26/2009 2045 CK	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/28/2009 1610 SK	EPA 353.2
Sulfate	48	1		mg/L	10/26/2009 1719 KO	EPA 300.0
Cations						
Calcium	30	1		mg/L	10/28/2009 1922 DG	EPA 200.7
Magnesium	14	1		mg/L	10/28/2009 1922 DG	EPA 200.7
Potassium	13	1		mg/L	10/28/2009 1922 DG	EPA 200.7
Sodium	37	1		mg/L	10/28/2009 1922 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 11/12/2009
Report ID: S0910365001

Work Order: S0910365
Collection Date: 10/23/2009 1:00:00 PM
Date Received: 10/23/2009 4:17:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0910365-002
Client Sample ID: CS RES 03
COC: 130767

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	3.11	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Carbonate as CO3	0.17	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Chloride	0.14	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Fluoride	ND	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Sulfate	0.99	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Calcium	1.47	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Magnesium	1.12	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Potassium	0.32	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Sodium	1.60	0.01		meq/L	11/02/2009 1223 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	4.53	0		meq/L	11/02/2009 1223 KO	SM 1030E
Anion Sum	4.43	0		meq/L	11/02/2009 1223 KO	SM 1030E
Cation-Anion Balance	1.13	0		%	11/02/2009 1223 KO	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	10/28/2009 1922 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	10/26/2009 1131 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/26/2009 1131 MS	EPA 200.8
Boron	ND	0.1		mg/L	10/28/2009 1922 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	10/26/2009 1131 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/28/2009 1922 DG	EPA 200.7
Copper	ND	0.01		mg/L	10/26/2009 1131 MS	EPA 200.8
Iron	ND	0.05		mg/L	10/28/2009 1922 DG	EPA 200.7
Lead	ND	0.02		mg/L	10/26/2009 1131 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/27/2009 1103 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/26/2009 1131 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/28/2009 1922 DG	EPA 200.7
Selenium	ND	0.005		mg/L	10/26/2009 1131 MS	EPA 200.8
Uranium	0.002	0.001		mg/L	10/26/2009 1131 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/26/2009 1131 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/28/2009 1922 DG	EPA 200.7
Total Metals						
Iron	0.22	0.05		mg/L	10/29/2009 125 DG	EPA 200.7
Manganese	0.07	0.02		mg/L	10/29/2009 125 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Page 4 of 4

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 11/12/2009
Report ID: S0910346001

Work Order: S0910346
Collection Date: 10/22/2009 1:30:00 PM
Date Received: 10/22/2009 3:33:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0910346-002
Client Sample ID: HB RES 04 (Oshoto Reservoir)
COC: 131108

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.25			s.u.	10/22/2009 1330	Field
Conductivity	860			µmhos/cm	10/22/2009 1330	Field
Dissolved Oxygen	6.78			mg/L	10/22/2009 1330	Field
Turbidity	14.23			NTU	10/22/2009 1330	Field
Temperature	7.9			°C	10/22/2009 1330	Field
General Parameters						
pH	8.8	0.1		s.u.	10/26/2009 1654 CK	SM 4500 H B
Electrical Conductivity	791	5		µmhos/cm	10/26/2009 1654 CK	SM 2510B
Total Dissolved Solids (180)	520	10		mg/L	10/26/2009 925 AMB	SM 2540
Solids, Total Dissolved (Calc)	470	10		mg/L	10/30/2009 851 KO	SM 1030E
Total Suspended Solids	13	5		mg/L	10/27/2009 035 SNS	SM 2540
Alkalinity, Total (As CaCO3)	353	5		mg/L	10/26/2009 1654 CK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	10/30/2009 1220 SK	EPA 350.1
Oxygen, Dissolved	13	1	H	mg/L	10/23/2009 1100 KO	SM 4500-O G
Gross Alpha	9.1 ± 3.2	2		pCi/L	11/09/2009 000 SH	SM 7110B
Gross Beta	22.9 ± 3.0	3		pCi/L	11/09/2009 000 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	11/09/2009 2030 SH	SM 7500-Ra B
Total Radium 228	1.10 ± 0.70	1		pCi/L	11/10/2009 2145 SH	Ra-05
Turbidity	11.5	0.1		NTU	10/23/2009 1555 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	385	5		mg/L	10/26/2009 1654 CK	SM 2320B
Alkalinity, Carbonate as CO3	23	5		mg/L	10/26/2009 1654 CK	SM 2320B
Chloride	8	1		mg/L	10/23/2009 1354 KO	EPA 300.0
Fluoride	0.2	0.1		mg/L	10/26/2009 1654 CK	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/28/2009 1525 SK	EPA 353.2
Sulfate	70	1		mg/L	10/23/2009 1354 KO	EPA 300.0
Cations						
Calcium	20	1		mg/L	10/29/2009 220 DG	EPA 200.7
Magnesium	18	1		mg/L	10/29/2009 220 DG	EPA 200.7
Potassium	12	1		mg/L	10/29/2009 220 DG	EPA 200.7
Sodium	131	1		mg/L	10/29/2009 220 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 11/12/2009
Report ID: S0910346001

Work Order: S0910346
Collection Date: 10/22/2009 1:30:00 PM
Date Received: 10/22/2009 3:33:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0910346-002
Client Sample ID: HB RES 04 (Oshoto Reservoir)
COC: 131108

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	6.30	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Carbonate as CO3	0.75	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Chloride	0.21	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Fluoride	ND	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Sulfate	1.46	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Calcium	1.00	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Magnesium	1.47	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Potassium	0.29	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Sodium	5.67	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	8.45	0		meq/L	10/30/2009 851 KO	SM 1030E
Anion Sum	8.74	0		meq/L	10/30/2009 851 KO	SM 1030E
Cation-Anion Balance	1.68	0		%	10/30/2009 851 KO	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	10/23/2009 1531 MS	EPA 200.7
Arsenic	0.006	0.005		mg/L	10/23/2009 1629 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/23/2009 1629 MS	EPA 200.8
Boron	0.1	0.1		mg/L	10/23/2009 1531 MS	EPA 200.7
Cadmium	ND	0.002		mg/L	10/23/2009 1629 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/23/2009 1531 MS	EPA 200.7
Copper	ND	0.01		mg/L	10/23/2009 1629 MS	EPA 200.8
Iron	ND	0.05		mg/L	10/23/2009 1531 MS	EPA 200.7
Lead	ND	0.02		mg/L	10/23/2009 1629 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/27/2009 944 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/23/2009 1629 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/23/2009 1531 MS	EPA 200.7
Selenium	ND	0.005		mg/L	10/23/2009 1629 MS	EPA 200.8
Uranium	0.006	0.001		mg/L	10/23/2009 1629 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/23/2009 1629 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/23/2009 1531 MS	EPA 200.7
Total Metals						
Iron	0.14	0.05		mg/L	10/29/2009 041 DG	EPA 200.7
Manganese	0.05	0.02		mg/L	10/29/2009 041 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 11/12/2009
Report ID: S0910347001

Work Order: S0910347
Collection Date: 10/22/2009 11:00:00 AM
Date Received: 10/22/2009 3:33:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0910347-001
Client Sample ID: TS RES 01
COC: 131109

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	8.87			s.u.	10/22/2009 1100	Field
Conductivity	272			µmhos/cm	10/22/2009 1100	Field
Dissolved Oxygen	6.78			mg/L	10/22/2009 1100	Field
Turbidity	63.0			NTU	10/22/2009 1100	Field
Temperature	5.5			°C	10/22/2009 1100	Field
General Parameters						
pH	8.6	0.1		s.u.	10/26/2009 1707 CK	SM 4500 H B
Electrical Conductivity	2000	5		µmhos/cm	10/26/2009 1707 CK	SM 2510B
Total Dissolved Solids (180)	1360	10		mg/L	10/26/2009 930 AMB	SM 2540
Solids, Total Dissolved (Calc)	1360	10		mg/L	10/30/2009 1143 KO	SM 1030E
Total Suspended Solids	62	5		mg/L	10/27/2009 040 SNS	SM 2540
Alkalinity, Total (As CaCO3)	1080	5		mg/L	10/26/2009 1707 CK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	10/30/2009 1221 SK	EPA 350.1
Oxygen, Dissolved	12	1	H	mg/L	10/23/2009 1100 KO	SM 4500-O G
Gross Alpha	23.0 ± 3.9	2		pCi/L	11/09/2009 000 SH	SM 7110B
Gross Beta	31.4 ± 4.3	4.12		pCi/L	11/09/2009 000 SH	SM 7110B
Radium 226	0.29 ± 0.09	0.2		pCi/L	11/09/2009 2030 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	11/10/2009 2145 SH	Ra-05
Turbidity	58.4	0.1		NTU	10/23/2009 1558 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	1190	5		mg/L	10/26/2009 1707 CK	SM 2320B
Alkalinity, Carbonate as CO3	66	5		mg/L	10/26/2009 1707 CK	SM 2320B
Chloride	10	1		mg/L	10/23/2009 1403 KO	EPA 300.0
Fluoride	0.3	0.1		mg/L	10/26/2009 1707 CK	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/28/2009 1526 SK	EPA 353.2
Sulfate	136	1		mg/L	10/23/2009 1403 KO	EPA 300.0
Cations						
Calcium	41	1		mg/L	10/23/2009 1533 MS	EPA 200.7
Magnesium	60	1		mg/L	10/23/2009 1533 MS	EPA 200.7
Potassium	24	1		mg/L	10/23/2009 1533 MS	EPA 200.7
Sodium	440	1		mg/L	10/23/2009 1533 MS	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 11/12/2009
Report ID: S0910347001

Work Order: S0910347
Collection Date: 10/22/2009 11:00:00 AM
Date Received: 10/22/2009 3:33:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0910347-001
Client Sample ID: TS RES 01
COC: 131109

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	19.44	0.01		meq/L	10/30/2009 1143 KO	SM 1030E
Carbonate as CO3	2.19	0.01		meq/L	10/30/2009 1143 KO	SM 1030E
Chloride	0.27	0.01		meq/L	10/30/2009 1143 KO	SM 1030E
Fluoride	0.01	0.01		meq/L	10/30/2009 1143 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	10/30/2009 1143 KO	SM 1030E
Sulfate	2.83	0.01		meq/L	10/30/2009 1143 KO	SM 1030E
Calcium	2.06	0.01		meq/L	10/30/2009 1143 KO	SM 1030E
Magnesium	4.89	0.01		meq/L	10/30/2009 1143 KO	SM 1030E
Potassium	0.60	0.01		meq/L	10/30/2009 1143 KO	SM 1030E
Sodium	19.13	0.01		meq/L	10/30/2009 1143 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	26.69	0		meq/L	10/30/2009 1143 KO	SM 1030E
Anion Sum	24.76	0		meq/L	10/30/2009 1143 KO	SM 1030E
Cation-Anion Balance	3.74	0		%	10/30/2009 1143 KO	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	10/23/2009 1533 MS	EPA 200.7
Arsenic	0.005	0.005		mg/L	10/23/2009 1640 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/23/2009 1640 MS	EPA 200.8
Boron	0.3	0.1		mg/L	10/23/2009 1533 MS	EPA 200.7
Cadmium	ND	0.002		mg/L	10/23/2009 1640 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/23/2009 1533 MS	EPA 200.7
Copper	ND	0.01		mg/L	10/23/2009 1640 MS	EPA 200.8
Iron	0.07	0.05		mg/L	10/23/2009 1533 MS	EPA 200.7
Lead	ND	0.02		mg/L	10/23/2009 1640 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/27/2009 946 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/23/2009 1640 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/23/2009 1533 MS	EPA 200.7
Selenium	0.005	0.005		mg/L	10/23/2009 1640 MS	EPA 200.8
Uranium	0.028	0.001		mg/L	10/23/2009 1640 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/23/2009 1640 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/23/2009 1533 MS	EPA 200.7
Total Metals						
Iron	1.95	0.05		mg/L	10/29/2009 043 DG	EPA 200.7
Manganese	0.25	0.02		mg/L	10/29/2009 043 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Page 2 of 2

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 11/12/2009
Report ID: S0910346001

Work Order: S0910346
Collection Date: 10/22/2009 12:00:00 PM
Date Received: 10/22/2009 3:33:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0910346-001
Client Sample ID: TW RES 01
COC: 131108

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	8.99			s.u.	10/22/2009 1200	Field
Conductivity	218			µmhos/cm	10/22/2009 1200	Field
Dissolved Oxygen	7.21			mg/L	10/22/2009 1200	Field
Turbidity	62.4			NTU	10/22/2009 1200	Field
Temperature	9.2			°C	10/22/2009 1200	Field
General Parameters						
pH	8.0	0.1		s.u.	10/26/2009 1644 CK	SM 4500 H B
Electrical Conductivity	213	5		µmhos/cm	10/26/2009 1644 CK	SM 2510B
Total Dissolved Solids (180)	120	10		mg/L	10/26/2009 920 AMB	SM 2540
Solids, Total Dissolved (Calc)	120	10		mg/L	10/30/2009 851 KO	SM 1030E
Total Suspended Solids	74	5		mg/L	10/27/2009 030 SNS	SM 2540
Alkalinity, Total (As CaCO3)	95	5		mg/L	10/26/2009 1644 CK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	10/30/2009 1219 SK	EPA 350.1
Oxygen, Dissolved	13	1	H	mg/L	10/23/2009 1100 KO	SM 4500-O G
Gross Alpha	2.25 ± 0.91	2		pCi/L	11/09/2009 000 SH	SM 7110B
Gross Beta	13.1 ± 1.6	3		pCi/L	11/09/2009 000 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	11/09/2009 2030 SH	SM 7500-Ra B
Total Radium 228	1.34 ± 0.72	1		pCi/L	11/10/2009 2145 SH	Ra-05
Turbidity	56.8	0.1		NTU	10/23/2009 1552 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	116	5		mg/L	10/26/2009 1644 CK	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	10/26/2009 1644 CK	SM 2320B
Chloride	4	1		mg/L	10/23/2009 1300 KO	EPA 300.0
Fluoride	0.1	0.1		mg/L	10/26/2009 1644 CK	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/28/2009 1524 SK	EPA 353.2
Sulfate	8	1		mg/L	10/23/2009 1300 KO	EPA 300.0
Cations						
Calcium	19	1		mg/L	10/23/2009 1521 MS	EPA 200.7
Magnesium	5	1		mg/L	10/23/2009 1521 MS	EPA 200.7
Potassium	12	1		mg/L	10/23/2009 1521 MS	EPA 200.7
Sodium	9	1		mg/L	10/23/2009 1521 MS	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Page 1 of 4

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 11/12/2009
Report ID: S0910346001

Work Order: S0910346
Collection Date: 10/22/2009 12:00:00 PM
Date Received: 10/22/2009 3:33:00 PM
Sampler: RF
Matrix: Water

Project: Ross Project
Lab ID: S0910346-001
Client Sample ID: TW RES 01
COC: 131108

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	1.90	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Chloride	0.10	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Fluoride	ND	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Sulfate	0.16	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Calcium	0.96	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Magnesium	0.41	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Potassium	0.31	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Sodium	0.40	0.01		meq/L	10/30/2009 851 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	2.09	0		meq/L	10/30/2009 851 KO	SM 1030E
Anion Sum	2.17	0		meq/L	10/30/2009 851 KO	SM 1030E
Cation-Anion Difference	0.08	0		meq/L	10/30/2009 851 KO	SM 1030E
Dissolved Metals						
Aluminum	0.2	0.1		mg/L	10/23/2009 1521 MS	EPA 200.7
Arsenic	ND	0.005		mg/L	10/23/2009 1619 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/23/2009 1619 MS	EPA 200.8
Boron	ND	0.1		mg/L	10/23/2009 1521 MS	EPA 200.7
Cadmium	ND	0.002		mg/L	10/23/2009 1619 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/23/2009 1521 MS	EPA 200.7
Copper	ND	0.01		mg/L	10/23/2009 1619 MS	EPA 200.8
Iron	0.18	0.05		mg/L	10/23/2009 1521 MS	EPA 200.7
Lead	ND	0.02		mg/L	10/23/2009 1619 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/27/2009 942 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/23/2009 1619 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/23/2009 1521 MS	EPA 200.7
Selenium	ND	0.005		mg/L	10/23/2009 1619 MS	EPA 200.8
Uranium	ND	0.001		mg/L	10/23/2009 1619 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/23/2009 1619 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/23/2009 1521 MS	EPA 200.7
Total Metals						
Iron	2.62	0.05		mg/L	10/29/2009 038 DG	EPA 200.7
Manganese	0.12	0.02		mg/L	10/29/2009 038 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: Ben Schiffer **Date:** 1/9/10 **Time:** ~~[illegible]~~ 15:20

Landowner
Name: Berger

Address Cabin Cr Rd

Phone#

Legal Location
Qtr/Qtr
SEC 18
TWN 53
RNG 67

Picture #(s) 3

Stock

Domestic

SEO Permitted Facility Name: Oshoto Reservoir HBRES04 **Permit No.**

Location (Decimal Degrees)
Lat 44.58218°
Long -104.95387°
Elev. —

Water Quality
pH 8.10
Cond. 1,265 µS
Temp. °C 1.7°C
Turbidity (ntu) 5.13
D.O. (mg/L) N/A

Water Level (ft): N/A **% Combustible Gas:** N/A

Casing Height (ft): N/A **Ambient Air Temp:** 20°F

Comments: Sampled at water hole used for obtaining drinking water

Sampled @ 15:20

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: DLMR (SW-1) **Date:** 3-9-10 **Time:** 1330
Downstream Little Missouri River

Landowner
Name:
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s) 5, 6

Stock

Domestic

SEO Permitted Facility Name:

Permit No.

Location (Decimal Degrees)
Lat 44.58801
Long 104.93767
Elev. 4134

Water Quality
pH 8.06
Cond. 933
Temp. °C 1.8
Turbidity (ntu) 14.14
D.O. (mg/L) 6.92 mg/l 49.9 %

Water Level (ft):

% Combustible Gas: —

Casing Height (ft):

Ambient Air Temp: 30°c Wind 5-10 MPH

Comments: Estimated flow = 2-3 CFS. Water slightly rusty colored. Took sample on D.S. side of culvert on New Haven Road by field office.

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: ULMR (SW-2) **Date:** 3-9-10 **Time:** 1110
upstream Little Missouri River

Landowner
Name:
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s) 1, 2

Stock

Domestic

SEO Permitted Facility Name:

Permit No.

Location (Decimal Degrees) etrex
Lat 44.56989
Long 104.96164
Elev. 4167

Water Quality
pH 7.62
Cond. 422 µS
Temp. ° C 3.2
Turbidity (ntu) 11.68
D.O. (mg/L) 10.46 mg/l 81.0 %

Water Level (ft):

% Combustible Gas: ——

Casing Height (ft):

Ambient Air Temp: 35°F Wind 10mph

Comments: Surface water quality and quantity monitoring. Snow runoff. Water color is slightly rusty. * Estimated flow is = 2-3 CFS. Water flowing under and over ice.

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: Deadman Creek (SW-3) **Date:** 3-9-10 **Time:** 1230

Landowner
Name:
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s) 3,4

Stock

Domestic

SEO Permitted Facility Name:

Permit No.

Location (Decimal Degrees)
Lat 44.57568
Long 104.96368
Elev. 4177

Water Quality
pH 8.50
Cond. 909 µS
Temp. °C 2.4
Turbidity (ntu) 14.90
D.O. (mg/L) 7.89 mg/l 57.5 %

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp: 30°C - Wind 5-10 mph.

Comments: Estimated flow = 1-2 CFS. Water color is slightly rusty. Took sample and flow from D.S. side of D-Road Culvert.

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 2/4/2010
Report ID: S1001120001

Work Order: S1001120
Collection Date: 1/9/2010 3:20:00 PM
Date Received: 1/11/2010 8:00:00 AM
Sampler: BS
Matrix: Water

Project: Ross ISR
Lab ID: S1001120-002
Client Sample ID: Oshoto Res (HBRES04)
COC: 107702

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	8.10			s.u.	01/09/2010 1520	Field
Conductivity	1265			µmhos/cm	01/09/2010 1520	Field
Dissolved Oxygen	5.2			mg/L	01/09/2010 1520	Field
Turbidity	5.13			NTU	01/09/2010 1520	Field
Temperature	1.7			°C	01/09/2010 1520	Field
General Parameters						
pH	8.3	0.1		s.u.	01/13/2010 1424 KO	SM 4500 H B
Electrical Conductivity	969	5		µmhos/cm	01/13/2010 1424 KO	SM 2510B
Total Dissolved Solids (180)	680	10	H	mg/L	01/28/2010 1400 AMB	SM 2540
Solids, Total Dissolved (Calc)	610	10		mg/L	01/18/2010 1055 KO	SM 1030E
Total Suspended Solids	7	5		mg/L	01/12/2010 1500 AMB	SM 2540
Alkalinity, Total (As CaCO3)	444	5		mg/L	01/13/2010 1424 KO	SM 2320B
Nitrogen, Ammonia (As N)	0.3	0.1		mg/L	01/13/2010 1052 KO	EPA 350.1
Oxygen, Dissolved	5	1	H	mg/L	01/11/2010 000 CJM	SM 4500-O G
Gross Alpha	5.5 ± 2.1	2		pCi/L	01/18/2010 1748 SH	SM 7110B
Gross Beta	12.7 ± 2.6	3		pCi/L	01/18/2010 1748 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	01/27/2010 1318 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	01/28/2010 2335 SH	Ra-05
Turbidity	3.7	0.1	H	NTU	01/12/2010 1433 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	539	5		mg/L	01/13/2010 1424 KO	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	01/13/2010 1424 KO	SM 2320B
Chloride	9	1		mg/L	01/14/2010 1718 KO	EPA 300.0
Fluoride	0.2	0.1		mg/L	01/13/2010 1424 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	01/26/2010 1659 SK	EPA 353.2
Sulfate	95	1		mg/L	01/14/2010 1718 KO	EPA 300.0
Cations						
Calcium	29	1		mg/L	01/12/2010 1840 DG	EPA 200.7
Magnesium	25	1		mg/L	01/12/2010 1840 DG	EPA 200.7
Potassium	14	1		mg/L	01/12/2010 1840 DG	EPA 200.7
Sodium	171	1		mg/L	01/12/2010 1840 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 2/4/2010
Report ID: S1001120001

Work Order: S1001120
Collection Date: 1/9/2010 3:20:00 PM
Date Received: 1/11/2010 8:00:00 AM
Sampler: BS
Matrix: Water

Project: Ross ISR
Lab ID: S1001120-002
Client Sample ID: Oshoto Res (HBRES04)
COC: 107702

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	8.82	0.01		meq/L	01/18/2010 1055 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	01/18/2010 1055 KO	SM 1030E
Chloride	0.26	0.01		meq/L	01/18/2010 1055 KO	SM 1030E
Fluoride	0.01	0.01		meq/L	01/18/2010 1055 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	01/18/2010 1055 KO	SM 1030E
Sulfate	1.98	0.01		meq/L	01/18/2010 1055 KO	SM 1030E
Calcium	1.43	0.01		meq/L	01/18/2010 1055 KO	SM 1030E
Magnesium	2.03	0.01		meq/L	01/18/2010 1055 KO	SM 1030E
Potassium	0.36	0.01		meq/L	01/18/2010 1055 KO	SM 1030E
Sodium	7.45	0.01		meq/L	01/18/2010 1055 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	11.29	0		meq/L	01/18/2010 1055 KO	SM 1030E
Anion Sum	11.12	0		meq/L	01/18/2010 1055 KO	SM 1030E
Cation-Anion Balance	0.76	0		%	01/18/2010 1055 KO	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	01/12/2010 1840 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	01/13/2010 1235 MS	EPA 200.8
Barium	ND	0.5		mg/L	01/13/2010 1235 MS	EPA 200.8
Boron	ND	0.1		mg/L	01/12/2010 1840 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	01/13/2010 1235 MS	EPA 200.8
Chromium	ND	0.01		mg/L	01/12/2010 1840 DG	EPA 200.7
Copper	ND	0.01		mg/L	01/13/2010 1235 MS	EPA 200.8
Iron	0.06	0.05		mg/L	01/12/2010 1840 DG	EPA 200.7
Lead	ND	0.02		mg/L	01/13/2010 1235 MS	EPA 200.8
Mercury	ND	0.001		mg/L	01/13/2010 1422 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	01/13/2010 1235 MS	EPA 200.8
Nickel	ND	0.01		mg/L	01/12/2010 1840 DG	EPA 200.7
Selenium	ND	0.005		mg/L	01/13/2010 1235 MS	EPA 200.8
Uranium	0.007	0.001		mg/L	01/13/2010 1235 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	01/13/2010 1235 MS	EPA 200.8
Zinc	ND	0.01		mg/L	01/12/2010 1840 DG	EPA 200.7
Total Metals						
Iron	0.10	0.05		mg/L	01/13/2010 2214 DG	EPA 200.7
Manganese	0.16	0.02		mg/L	01/13/2010 2214 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Connie J Mattson
Connie Mattson, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 3/24/2010
Report ID: S1003144001

Project: Ross ISR
Lab ID: S1003144-003
Client Sample ID: SW-1
COC: 127399

Work Order: S1003144
Collection Date: 3/9/2010 1:30:00 PM
Date Received: 3/10/2010 8:04:00 AM
Sampler: RF
Matrix: Water

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	8.06			s.u.	03/09/2010 1330	Field
Conductivity	933			µmhos/cm	03/09/2010 1330	Field
Dissolved Oxygen	6.92			mg/L	03/09/2010 1330	Field
Dissolved Oxygen (pct)	49.9			%	03/09/2010 1330	Field
Turbidity	14.14			NTU	03/09/2010 1330	Field
Temperature	1.8			°C	03/09/2010 1330	Field
General Parameters						
pH	8.2	0.1		s.u.	03/10/2010 1723 KO	SM 4500 H B
Electrical Conductivity	795	5		µmhos/cm	03/10/2010 1723 KO	SM 2510B
Total Dissolved Solids (180)	580	10		mg/L	03/10/2010 1400 AMB	SM 2540
Solids, Total Dissolved (Calc)	500	10		mg/L	03/16/2010 641 KO	SM 1030E
Total Suspended Solids	ND	5		mg/L	03/11/2010 1320 AMB	SM 2540
Alkalinity, Total (As CaCO3)	331	5		mg/L	03/10/2010 1723 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	03/11/2010 1517 SK	EPA 350.1
Oxygen, Dissolved	8	1	H	mg/L	03/10/2010 1255 KO	SM 4500-O G
Gross Alpha	8.8 ± 1.7	2		pCi/L	03/21/2010 1101 SH	SM 7110B
Gross Beta	8.6 ± 1.9	3		pCi/L	03/21/2010 1101 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	03/19/2010 1345 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	03/23/2010 153 SH	Ra-05
Turbidity	12.7	0.1		NTU	03/10/2010 1608 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	404	5		mg/L	03/10/2010 1723 KO	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	03/10/2010 1723 KO	SM 2320B
Chloride	7	1		mg/L	03/11/2010 054 KO	EPA 300.0
Fluoride	0.2	0.1		mg/L	03/10/2010 1723 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	03/10/2010 2030 SK	EPA 353.2
Sulfate	98	1		mg/L	03/11/2010 054 KO	EPA 300.0
Cations						
Calcium	17	1		mg/L	03/15/2010 2014 DG	EPA 200.7
Magnesium	12	1		mg/L	03/15/2010 2014 DG	EPA 200.7
Potassium	11	1		mg/L	03/15/2010 2014 DG	EPA 200.7
Sodium	154	1		mg/L	03/15/2010 2014 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT:	Western Water Consultants 1849 Terra Sheridan, WY 82801	**Date Reported:**	3/24/2010
		Report ID:	S1003144001
		Work Order:	S1003144
Project:	Ross ISR	**Collection Date:**	3/9/2010 1:30:00 PM
Lab ID:	S1003144-003	**Date Received:**	3/10/2010 8:04:00 AM
Client Sample ID:	SW-1	**Sampler:**	RF
COC:	127399	**Matrix:**	Water

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	6.61	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Chloride	0.19	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Fluoride	ND	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Sulfate	2.03	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Calcium	0.82	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Magnesium	0.95	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Potassium	0.27	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Sodium	6.71	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	8.76	0		meq/L	03/16/2010 641 KO	SM 1030E
Anion Sum	8.85	0		meq/L	03/16/2010 641 KO	SM 1030E
Cation-Anion Balance	0.48	0		%	03/16/2010 641 KO	SM 1030E
Dissolved Metals						
Aluminum	0.2	0.1		mg/L	03/11/2010 1708 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	03/11/2010 1013 MS	EPA 200.8
Barium	ND	0.5		mg/L	03/11/2010 1013 MS	EPA 200.8
Boron	ND	0.1		mg/L	03/11/2010 1708 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	03/11/2010 1013 MS	EPA 200.8
Chromium	ND	0.01		mg/L	03/11/2010 1708 DG	EPA 200.7
Copper	ND	0.01		mg/L	03/11/2010 1013 MS	EPA 200.8
Iron	0.33	0.05		mg/L	03/11/2010 1708 DG	EPA 200.7
Lead	ND	0.02		mg/L	03/11/2010 1013 MS	EPA 200.8
Mercury	ND	0.001		mg/L	03/16/2010 852 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	03/11/2010 1013 MS	EPA 200.8
Nickel	ND	0.01		mg/L	03/11/2010 1708 DG	EPA 200.7
Selenium	ND	0.005		mg/L	03/11/2010 1013 MS	EPA 200.8
Uranium	0.008	0.001		mg/L	03/11/2010 1013 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	03/11/2010 1013 MS	EPA 200.8
Zinc	ND	0.01		mg/L	03/11/2010 1708 DG	EPA 200.7
Total Metals						
Iron	0.95	0.05		mg/L	03/11/2010 2111 DG	EPA 200.7
Manganese	0.17	0.02		mg/L	03/11/2010 2111 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 3/24/2010
Report ID: S1003144001

Work Order: S1003144
Collection Date: 3/9/2010 11:10:00 AM
Date Received: 3/10/2010 8:04:00 AM
Sampler: RF
Matrix: Water

Project: Ross ISR
Lab ID: S1003144-001
Client Sample ID: SW-2
COC: 127399

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	7.62			s.u.	03/09/2010 1110	Field
Conductivity	422			µmhos/cm	03/09/2010 1110	Field
Dissolved Oxygen	10.46			mg/L	03/09/2010 1110	Field
Dissolved Oxygen (pct)	81.0			%	03/09/2010 1110	Field
Turbidity	11.68			NTU	03/09/2010 1110	Field
Temperature	3.2			°C	03/09/2010 1110	Field
General Parameters						
pH	8.1	0.1		s.u.	03/10/2010 1702 KO	SM 4500 H B
Electrical Conductivity	283	5		µmhos/cm	03/10/2010 1702 KO	SM 2510B
Total Dissolved Solids (180)	220	10		mg/L	03/10/2010 1350 AMB	SM 2540
Solids, Total Dissolved (Calc)	160	10		mg/L	03/16/2010 641 KO	SM 1030E
Total Suspended Solids	7	5		mg/L	03/11/2010 1310 AMB	SM 2540
Alkalinity, Total (As CaCO3)	118	5		mg/L	03/10/2010 1702 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	03/11/2010 1515 SK	EPA 350.1
Oxygen, Dissolved	10	1	H	mg/L	03/10/2010 1255 KO	SM 4500-O G
Gross Alpha	4.0 ± 1.2	2		pCi/L	03/20/2010 2108 SH	SM 7110B
Gross Beta	6.0 ± 1.4	3		pCi/L	03/20/2010 2108 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	03/19/2010 1110 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	03/23/2010 153 SH	Ra-05
Turbidity	8.9	0.1		NTU	03/10/2010 1604 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	144	5		mg/L	03/10/2010 1702 KO	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	03/10/2010 1702 KO	SM 2320B
Chloride	3	1		mg/L	03/11/2010 021 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	03/10/2010 1702 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	03/10/2010 2027 SK	EPA 353.2
Sulfate	26	1		mg/L	03/11/2010 021 KO	EPA 300.0
Cations						
Calcium	14	1		mg/L	03/11/2010 1657 DG	EPA 200.7
Magnesium	6	1		mg/L	03/11/2010 1657 DG	EPA 200.7
Potassium	6	1		mg/L	03/11/2010 1657 DG	EPA 200.7
Sodium	37	1		mg/L	03/11/2010 1657 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 6

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 3/24/2010
Report ID: S1003144001

Project: Ross ISR
Lab ID: S1003144-001
Client Sample ID: SW-2
COC: 127399

Work Order: S1003144
Collection Date: 3/9/2010 11:10:00 AM
Date Received: 3/10/2010 8:04:00 AM
Sampler: RF
Matrix: Water

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	2.36	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Chloride	0.07	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Fluoride	ND	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Sulfate	0.54	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Calcium	0.71	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Magnesium	0.49	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Potassium	0.16	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Sodium	1.60	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	2.97	0		meq/L	03/16/2010 641 KO	SM 1030E
Anion Sum	2.97	0		meq/L	03/16/2010 641 KO	SM 1030E
Cation-Anion Balance	0.00	0		%	03/16/2010 641 KO	SM 1030E
Dissolved Metals						
Aluminum	0.2	0.1		mg/L	03/11/2010 1657 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	03/11/2010 952 MS	EPA 200.8
Barium	ND	0.5		mg/L	03/11/2010 952 MS	EPA 200.8
Boron	ND	0.1		mg/L	03/11/2010 1657 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	03/11/2010 952 MS	EPA 200.8
Chromium	ND	0.01		mg/L	03/11/2010 1657 DG	EPA 200.7
Copper	ND	0.01		mg/L	03/11/2010 952 MS	EPA 200.8
Iron	0.26	0.05		mg/L	03/11/2010 1657 DG	EPA 200.7
Lead	ND	0.02		mg/L	03/11/2010 952 MS	EPA 200.8
Mercury	ND	0.001		mg/L	03/16/2010 845 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	03/11/2010 952 MS	EPA 200.8
Nickel	ND	0.01		mg/L	03/11/2010 1657 DG	EPA 200.7
Selenium	ND	0.005		mg/L	03/11/2010 952 MS	EPA 200.8
Uranium	0.003	0.001		mg/L	03/11/2010 952 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	03/11/2010 952 MS	EPA 200.8
Zinc	ND	0.01		mg/L	03/11/2010 1657 DG	EPA 200.7
Total Metals						
Iron	0.64	0.05		mg/L	03/11/2010 2107 DG	EPA 200.7
Manganese	0.11	0.02		mg/L	03/11/2010 2107 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

INTER-MOUNTAIN LABS
Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT:	Western Water Consultants 1849 Terra Sheridan, WY 82801	**Date Reported:**	3/24/2010
		Report ID:	S1003144001
		Work Order:	S1003144
Project:	Ross ISR	**Collection Date:**	3/9/2010 12:30:00 PM
Lab ID:	S1003144-002	**Date Received:**	3/10/2010 8:04:00 AM
Client Sample ID:	SW-3	**Sampler:**	RF
COC:	127399	**Matrix:**	Water

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	8.50			s.u.	03/09/2010 1230	Field
Conductivity	909			µmhos/cm	03/09/2010 1230	Field
Dissolved Oxygen	7.89			mg/L	03/09/2010 1230	Field
Dissolved Oxygen (pct)	57.5			%	03/09/2010 1230	Field
Turbidity	14.90			NTU	03/09/2010 1230	Field
Temperature	2.4			°C	03/09/2010 1230	Field
General Parameters						
pH	8.3	0.1		s.u.	03/10/2010 1713 KO	SM 4500 H B
Electrical Conductivity	794	5		µmhos/cm	03/10/2010 1713 KO	SM 2510B
Total Dissolved Solids (180)	580	10		mg/L	03/10/2010 1355 AMB	SM 2540
Solids, Total Dissolved (Calc)	500	10		mg/L	03/16/2010 641 KO	SM 1030E
Total Suspended Solids	14	5		mg/L	03/11/2010 1315 AMB	SM 2540
Alkalinity, Total (As $CaCO_3$)	357	5		mg/L	03/10/2010 1713 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	03/11/2010 1516 SK	EPA 350.1
Oxygen, Dissolved	9	1	H	mg/L	03/10/2010 1255 KO	SM 4500-O G
Gross Alpha	7.3 ± 2.3	2		pCi/L	03/20/2010 2108 SH	SM 7110B
Gross Beta	11.2 ± 2.6	3		pCi/L	03/20/2010 2108 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	03/19/2010 1345 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	03/23/2010 153 SH	Ra-05
Turbidity	12.8	0.1		NTU	03/10/2010 1606 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO_3	435	5		mg/L	03/10/2010 1713 KO	SM 2320B
Alkalinity, Carbonate as CO_3	ND	5		mg/L	03/10/2010 1713 KO	SM 2320B
Chloride	4	1		mg/L	03/11/2010 038 KO	EPA 300.0
Fluoride	0.1	0.1		mg/L	03/10/2010 1713 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	03/10/2010 2028 SK	EPA 353.2
Sulfate	92	1		mg/L	03/11/2010 038 KO	EPA 300.0
Cations						
Calcium	24	1		mg/L	03/15/2010 2012 DG	EPA 200.7
Magnesium	25	1		mg/L	03/15/2010 2012 DG	EPA 200.7
Potassium	10	1		mg/L	03/15/2010 2012 DG	EPA 200.7
Sodium	129	1		mg/L	03/15/2010 2012 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 3/24/2010
Report ID: S1003144001

Project: Ross ISR
Lab ID: S1003144-002
Client Sample ID: SW-3
COC: 127399

Work Order: S1003144
Collection Date: 3/9/2010 12:30:00 PM
Date Received: 3/10/2010 8:04:00 AM
Sampler: RF
Matrix: Water

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	7.13	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Chloride	0.12	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Fluoride	ND	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Sulfate	1.91	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Calcium	1.19	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Magnesium	2.09	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Potassium	0.24	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Sodium	5.62	0.01		meq/L	03/16/2010 641 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	9.16	0		meq/L	03/16/2010 641 KO	SM 1030E
Anion Sum	9.18	0		meq/L	03/16/2010 641 KO	SM 1030E
Cation-Anion Balance	0.11	0		%	03/16/2010 641 KO	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	03/11/2010 1706 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	03/11/2010 1002 MS	EPA 200.8
Barium	ND	0.5		mg/L	03/11/2010 1002 MS	EPA 200.8
Boron	ND	0.1		mg/L	03/11/2010 1706 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	03/11/2010 1002 MS	EPA 200.8
Chromium	ND	0.01		mg/L	03/11/2010 1706 DG	EPA 200.7
Copper	ND	0.01		mg/L	03/11/2010 1002 MS	EPA 200.8
Iron	0.34	0.05		mg/L	03/11/2010 1706 DG	EPA 200.7
Lead	ND	0.02		mg/L	03/11/2010 1002 MS	EPA 200.8
Mercury	ND	0.001		mg/L	03/16/2010 846 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	03/11/2010 1002 MS	EPA 200.8
Nickel	ND	0.01		mg/L	03/11/2010 1706 DG	EPA 200.7
Selenium	ND	0.005		mg/L	03/11/2010 1002 MS	EPA 200.8
Uranium	0.009	0.001		mg/L	03/11/2010 1002 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	03/11/2010 1002 MS	EPA 200.8
Zinc	ND	0.01		mg/L	03/11/2010 1706 DG	EPA 200.7
Total Metals						
Iron	0.87	0.05		mg/L	03/11/2010 2109 DG	EPA 200.7
Manganese	0.17	0.02		mg/L	03/11/2010 2109 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: CS RES 02 **Date:** 5-18-10 **Time:** 1245

Landowner
Name: Strong
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s) —

Stock ✓

Domestic

SEO Permitted Facility Name: —

Permit No. —

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 7.92
Cond. 266 μS
Temp. °C 18.3
Turbidity (ntu) 620
D.O. (mg/L) 3.87 mg/l 42.4%

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp: 65°F - Windy

Comments: Additional 4.14 Diss. & Sus. - Water turbid - no odor

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: CG RES 03 **Date:** 5-20-10 **Time:** 1230

Landowner
Name: Strong
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s) —

Stock ✓

Domestic

SEO Permitted Facility Name: —

Permit No.

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 9.47
Cond. 467 µS
Temp. °C 16.7
Turbidity (ntu) 4.80
D.O. (mg/L) 5.30 mg/l 54.5%

Water Level (ft):

% Combustible Gas: —

Casing Height (ft):

Ambient Air Temp: 60°F / Windy

Comments: Reservoir 1/4 full - Water clear - no odor
Collected water for 4.14 Diss. & Sus.

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: HBRES04 Osboto Reservoir **Date:** 4-14-10 **Time:** 1000

Landowner
Name: Harry Berger
Address
Phone#

Legal Location
Qtr/Qtr E = SWNE
SEC 16
TWN 53
RNG 67

Picture #(s)

Stock

Domestic

SEO Permitted Facility Name: Oshoto Reservoir Harry Berger **Permit No.** P6046R

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 8.85
Cond. 872 µS
Temp. °C 9.0
Turbidity (ntu) 8.42
D.O. (mg/L) 7.42 mg/l 81.8%

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp: 50°F, 15-25 mph Wind

Comments: Water is slightly turbid - light brown in Color - no odor. Reservoir is full - At spillway height. - Not flowing through spillway, but Close

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: P 15507S Swanda **Date:** 5/5/10 **Time:** 1500

Landowner
Name: Tony Swanda
Address
Phone#

Legal Location
Qtr/Qtr NWSE
SEC 13
TWN 53
RNG 68

Picture #(s) 21

Stock ✓

Domestic

SEO Permitted Facility Name: Deadman #1

Permit No. P 15507S

Location (Decimal Degrees)
Lat N 44.57617
Long W 104.97282
Elev. 4166

Water Quality
pH 9.20
Cond. 1413 µS
Temp. °C 10.7
Turbidity (ntu) 31.4
D.O. (mg/L) 11.32 105.6 %

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp:

Comments: sampled for 4.14 dissolved and suspended - Filtered 2gal - saved filters.

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: TWRES01 **Date:** 6-23-10 **Time:** 1000

Landowner
Name: T. J. Wesley
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s)

Stock ✓

Domestic

SEO Permitted Facility Name: —

Permit No.

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 10.64
Cond. 188.5 µS
Temp. °C 20.5
Turbidity (ntu) 10.85
D.O. (mg/L) 3.91/44.0

Water Level (ft): 1/2 full

% Combustible Gas:

Casing Height (ft): —

Ambient Air Temp:

Comments: Water slightly turbid (light brown) — no odor — heavy rainfall last night.

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: TW RES02 **Date:** 5-21-10 **Time:** 1100

Landowner
Name: Wesley
Address
Phone#

Legal Location
Qtr/Qtr SESE
SEC 12
TWN 53
RNG 68

Picture #(s) 3, 4

Stock ✓

Domestic

SEO Permitted Facility Name: --

Permit No. --

Location (Decimal Degrees)
Lat 44.58871
Long 104.96687
Elev. 4267

Water Quality
pH 9.03
Cond. 414 μS
Temp. °C 15.5
Turbidity (ntu) 11.91
D.O. (mg/L) 4.37 mg/l 44.7%

Water Level (ft): 1/4 full

% Combustible Gas:

Casing Height (ft): ——

Ambient Air Temp: 60°F

Comments: Water slightly turbid - no odor - Reservoir dimensions - 150' X 75' X 3'

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: DLMR (SW-1) **Date:** 4-13-10 **Time:** 1230
Downstream Little Missouri River

Landowner
Name:
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s) 2

Stock

Domestic

SEO Permitted Facility Name:

Permit No.

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 8.39
Cond. 1200 µS
Temp. °C 9.8
Turbidity (ntu) 9.10
D.O. (mg/L) 7.28 mg/l 64.6 %

Water Level (ft): Flow = < 0.25 CFS

% Combustible Gas: —

Casing Height (ft):

Ambient Air Temp: 45 °F

Comments: Water slightly turbid - no odor - light brown in color. Estimated flow - not enough to measure. Sampled in same location as previous sample.

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name ULMR (SW-2) **Date:** 4-13-10 **Time:** 0830
Upstream Little Missouri River

Landowner
Name:
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s) 1

Stock

Domestic

SEO Permitted Facility Name:

Permit No.

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 8.35
Cond. 1348 μS
Temp. °C 7.8
Turbidity (ntu) 3.86
D.O. (mg/L) 63.4 % 7.59 mg/l

Water Level (ft): Flow = <0.25 CFS

% Combustible Gas: —

Casing Height (ft):

Ambient Air Temp: 40°F

Comments: Water - slightly turbid - light brown color. Flow was estimated - not enough to measure. Took sample from same location as previous sample

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: DMC (SW-3) **Date:** 4-13-10 **Time:** 1130
Deadman Creek

Landowner
Name: ______
Address ______
Phone# ______

Legal Location
Qtr/Qtr ______
SEC ______
TWN ______
RNG ______

Picture #(s) 3

Stock ______
Domestic ______

SEO Permitted Facility Name: ______
Permit No. ______

Location (Decimal Degrees)
Lat ______
Long ______
Elev. ______

Water Quality
pH 8.86
Cond. 1209 µS
Temp. °C 10.0
Turbidity (ntu) 16.29
D.O. (mg/L) 8.77 mg/l 78.3 %

Water Level (ft): Flow = < 0.25 CFS **% Combustible Gas:** –

Casing Height (ft): ______ **Ambient Air Temp:** 45°F

Comments: Water slightly turbid - no odor - light brown in color. - Flow was estimated - not enough to measure - Sample at same location as previous sample.

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT:	Western Water Consultants 1849 Terra Sheridan, WY 82801	**Date Reported:**	6/28/2010
		Report ID:	S1005250002 (Replaces S1005250001)
		Work Order:	S1005250
Project:	Ross ISR	**Collection Date:**	5/18/2010 12:45:00 PM
Lab ID:	S1005250-003	**Date Received:**	5/19/2010 10:07:00 AM
Client Sample ID:	CSRES02	**Sampler:**	RF
COC:	131164	**Matrix:**	Water

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	7.92	s.u.			05/18/2010 1245	Field
Conductivity	266	µm		hos/cm	05/18/2010 1245	Field
Dissolved Oxygen	3.87	mg		/L	05/18/2010 1245	Field
Dissolved Oxygen (pct)	42.4			%	05/18/2010 1245	Field
Turbidity	620	NT		U	05/18/2010 1245	Field
Temperature	18.3	°C			05/18/2010 1245	Field
General Parameters						
pH	8.1	0.1		s.u.	05/19/2010 2145 KO	SM 4500 H B
Electrical Conductivity	240	5		µmhos/cm	05/26/2010 1320 KO	SM 2510B
Total Dissolved Solids (180)	220	10		mg/L	05/20/2010 1031 MJH	SM 2540
Solids, Total Dissolved (Calc)	130	10		mg/L	06/02/2010 846 KO	SM 1030E
Total Suspended Solids	210	5		mg/L	05/19/2010 1703 MJH	SM 2540
Alkalinity, Total (As CaCO3)	113	5		mg/L	05/19/2010 2145 KO	SM 2320B
Nitrogen, Ammonia (As N)	5.6	0.1		mg/L	06/02/2010 1453 AS	EPA 350.1
Gross Alpha	3.85 ± 0.97	2		pCi/L	06/21/2010 910 SH	SM 7110B
Gross Beta	20.3 ± 1.3	3		pCi/L	06/21/2010 910 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	06/13/2010 1533 SH	SM 7500-Ra B
Radium 226 (Suspended)	1.12 ± 0.16	0.2		pCi/L	06/14/2010 1845 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	06/14/2010 304 SH	Ra-05
Lead 210	ND	1		pCi/L	06/10/2010 1437 SH	OTW01
Lead 210 Suspended	3.26 ± 0.56	1		pCi/L	06/10/2010 1901 SH	OTW01
Polonium 210	ND	1		pCi/L	06/08/2010 2013 SH	OTW01
Polonium 210 Suspended	ND	1		pCi/L	06/09/2010 1821 SH	OTW01
Thorium 230	ND	0.2	L	pCi/L	06/19/2010 000 WN	ACW10
Thorium 230 Suspended	0.28±0.11	0.2	L	pCi/L	06/19/2010 000 WN	ACW10
Uranium Suspended	0.353	0.001		mg/L	05/25/2010 1340 MS	EPA 200.8
Turbidity	490	0.1		NTU	05/19/2010 1454 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	138	5		mg/L	05/19/2010 2145 KO	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	05/19/2010 2145 KO	SM 2320B
Chloride	6	1		mg/L	05/25/2010 000 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	05/19/2010 2145 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	05/28/2010 1644 AS	EPA 353.2
Sulfate	3	1		mg/L	05/25/2010 000 KO	EPA 300.0

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 7 of 9

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 6/28/2010
Report ID: S1005250002
(Replaces S1005250001)
Work Order: S1005250
Collection Date: 5/18/2010 12:45:00 PM
Date Received: 5/19/2010 10:07:00 AM
Sampler: RF
Matrix: Water

Project: Ross ISR
Lab ID: S1005250-003
Client Sample ID: CSRES02
COC: 131164

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cations						
Calcium	30	1		mg/L	06/01/2010 1203 RS	EPA 200.7
Magnesium	5	1		mg/L	05/20/2010 1357 RS	EPA 200.7
Potassium	17	1		mg/L	05/20/2010 1357 RS	EPA 200.7
Sodium	5	1		mg/L	06/01/2010 1203 RS	EPA 200.7
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	2.26	0.01		meq/L	06/02/2010 846 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	06/02/2010 846 KO	SM 1030E
Chloride	0.17	0.01		meq/L	06/02/2010 846 KO	SM 1030E
Fluoride	ND	0.01		meq/L	06/02/2010 846 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	06/02/2010 846 KO	SM 1030E
Sulfate	0.05	0.01		meq/L	06/02/2010 846 KO	SM 1030E
Calcium	1.47	0.01		meq/L	06/02/2010 846 KO	SM 1030E
Magnesium	0.37	0.01		meq/L	06/02/2010 846 KO	SM 1030E
Potassium	0.42	0.01		meq/L	06/02/2010 846 KO	SM 1030E
Sodium	0.23	0.01		meq/L	06/02/2010 846 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	2.50	0		meq/L	06/02/2010 846 KO	SM 1030E
Anion Sum	2.49	0		meq/L	06/02/2010 846 KO	SM 1030E
Cation-Anion Balance	0.16	0		%	06/02/2010 846 KO	SM 1030E

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Page 8 of 9

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 6/28/2010
Report ID: S1005250002
(Replaces S1005250001)
Work Order: S1005250
Collection Date: 5/18/2010 12:45:00 PM
Date Received: 5/19/2010 10:07:00 AM
Sampler: RF
Matrix: Water

Project: Ross ISR
Lab ID: S1005250-003
Client Sample ID: CSRES02
COC: 131164

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	1.4	0.1		mg/L	05/20/2010 1357 RS	EPA 200.7
Arsenic	0.005	0.005		mg/L	05/19/2010 1810 MS	EPA 200.8
Barium	ND	0.5		mg/L	05/19/2010 1810 MS	EPA 200.8
Boron	ND	0.1		mg/L	05/20/2010 1357 RS	EPA 200.7
Cadmium	ND	0.002		mg/L	05/19/2010 1810 MS	EPA 200.8
Chromium	ND	0.01		mg/L	05/20/2010 1357 RS	EPA 200.7
Copper	ND	0.01		mg/L	05/19/2010 1810 MS	EPA 200.8
Iron	0.92	0.05		mg/L	05/20/2010 1357 RS	EPA 200.7
Lead	ND	0.02		mg/L	05/19/2010 1810 MS	EPA 200.8
Mercury	ND	0.001		mg/L	05/21/2010 1215 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	05/19/2010 1810 MS	EPA 200.8
Nickel	ND	0.01		mg/L	05/20/2010 1357 RS	EPA 200.7
Selenium	0.006	0.005		mg/L	05/19/2010 1810 MS	EPA 200.8
Uranium	ND	0.001		mg/L	05/19/2010 1810 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	05/19/2010 1810 MS	EPA 200.8
Zinc	ND	0.01		mg/L	05/20/2010 1357 RS	EPA 200.7
Total Metals						
Iron	19.7	0.05		mg/L	05/20/2010 1810 RS	EPA 200.7
Manganese	0.94	0.02		mg/L	05/20/2010 1810 RS	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 6/30/2010
Report ID: S1005311001

Work Order: S1005311
Collection Date: 5/20/2010 12:30:00 PM
Date Received: 5/21/2010 3:44:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1005311-001
Client Sample ID: CSRES03
COC: 131149

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.47	s.u.			05/20/2010 1230	Field
Conductivity	467	µm		hos/cm	05/20/2010 1230	Field
Dissolved Oxygen	5.30	mg		/L	05/20/2010 1230	Field
Dissolved Oxygen (pct)	54.5			%	05/20/2010 1230	Field
Turbidity	4.80	NT		U	05/20/2010 1230	Field
Temperature	16.7	°C			05/20/2010 1230	Field
General Parameters						
pH	8.7	0.1		s.u.	05/25/2010 1502 KO	SM 4500 H B
Electrical Conductivity	444	5		µmhos/cm	06/03/2010 1353 KO	SM 2510B
Total Dissolved Solids (180)	270	10		mg/L	05/24/2010 1655 MJH	SM 2540
Solids, Total Dissolved (Calc)	260	10		mg/L	06/04/2010 758 KO	SM 1030E
Total Suspended Solids	40	5		mg/L	05/25/2010 1050 MJH	SM 2540
Alkalinity, Total (As CaCO3)	136	5		mg/L	06/03/2010 1353 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	06/08/2010 1500 AS	EPA 350.1
Gross Alpha	3.4 ± 1.5	2		pCi/L	06/30/2010 125 SH	SM 7110B
Gross Beta	8.6 ± 2.6	3		pCi/L	06/30/2010 125 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	06/14/2010 1502 SH	SM 7500-Ra B
Radium 226 (Suspended)	ND	0.2		pCi/L	06/15/2010 1640 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	06/19/2010 029 SH	Ra-05
Lead 210	ND	1		pCi/L	06/19/2010 1803 SH	OTW01
Lead 210 Suspended	ND	1		pCi/L	06/19/2010 2226 SH	OTW01
Polonium 210	ND	1		pCi/L	06/24/2010 2111 SH	OTW01
Polonium 210 Suspended	ND	1		pCi/L	06/25/2010 1822 SH	OTW01
Thorium 230	ND	0.2	L	pCi/L	06/18/2010 000 WN	ACW10
Thorium 230 Suspended	ND	0.2	L	pCi/L	06/18/2010 000 WN	ACW10
Uranium Suspended	0.017	0.001		mg/L	05/26/2010 1001 MS	EPA 200.8
Turbidity	9.2	0.1		NTU	05/21/2010 1626 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	149	5		mg/L	06/03/2010 1353 KO	SM 2320B
Alkalinity, Carbonate as CO3	9	5		mg/L	06/03/2010 1353 KO	SM 2320B
Chloride	3	1		mg/L	05/24/2010 2045 KO	EPA 300.0
Fluoride	0.2	0.1		mg/L	05/25/2010 1502 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	06/04/2010 1535 AS	EPA 353.2
Sulfate	81	1		mg/L	05/24/2010 2045 KO	EPA 300.0

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: awn
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 6/30/2010
Report ID: S1005311001

Work Order: S1005311
Collection Date: 5/20/2010 12:30:00 PM
Date Received: 5/21/2010 3:44:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1005311-001
Client Sample ID: CSRES03
COC: 131149

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cations						
Calcium	35	1		mg/L	05/24/2010 1554 RS	EPA 200.7
Magnesium	13	1		mg/L	06/01/2010 1212 RS	EPA 200.7
Potassium	8	1		mg/L	06/01/2010 1212 RS	EPA 200.7
Sodium	38	1		mg/L	06/01/2010 1212 RS	EPA 200.7
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	2.43	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Carbonate as CO3	0.29	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Chloride	0.07	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Fluoride	0.01	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Sulfate	1.68	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Calcium	1.74	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Magnesium	1.08	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Potassium	0.20	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Sodium	1.65	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	4.67	0		meq/L	06/04/2010 758 KO	SM 1030E
Anion Sum	4.50	0		meq/L	06/04/2010 758 KO	SM 1030E
Cation-Anion Balance	1.92	0		%	06/04/2010 758 KO	SM 1030E

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 6/30/2010
Report ID: S1005311001

Work Order: S1005311
Collection Date: 5/20/2010 12:30:00 PM
Date Received: 5/21/2010 3:44:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1005311-001
Client Sample ID: CSRES03
COC: 131149

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	05/24/2010 1554 RS	EPA 200.7
Arsenic	ND	0.005		mg/L	05/24/2010 1223 MS	EPA 200.8
Barium	ND	0.5		mg/L	05/24/2010 1223 MS	EPA 200.8
Boron	ND	0.1		mg/L	05/24/2010 1554 RS	EPA 200.7
Cadmium	ND	0.002		mg/L	05/24/2010 1223 MS	EPA 200.8
Chromium	ND	0.01		mg/L	05/24/2010 1554 RS	EPA 200.7
Copper	ND	0.01		mg/L	05/24/2010 1223 MS	EPA 200.8
Iron	ND	0.05		mg/L	05/24/2010 1554 RS	EPA 200.7
Lead	ND	0.02		mg/L	05/24/2010 1223 MS	EPA 200.8
Mercury	ND	0.001		mg/L	05/25/2010 1309 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	05/24/2010 1223 MS	EPA 200.8
Nickel	ND	0.01		mg/L	05/24/2010 1554 RS	EPA 200.7
Selenium	ND	0.005		mg/L	05/24/2010 1223 MS	EPA 200.8
Uranium	0.002	0.001		mg/L	05/24/2010 1223 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	05/24/2010 1223 MS	EPA 200.8
Zinc	ND	0.01		mg/L	05/24/2010 1554 RS	EPA 200.7
Total Metals						
Iron	0.42	0.05		mg/L	05/24/2010 1754 RS	EPA 200.7
Manganese	0.03	0.02		mg/L	05/24/2010 1754 RS	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: AW

Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 4/29/2010
Report ID: S1004178001

Work Order: S1004178
Collection Date: 4/14/2010 10:00:00 AM
Date Received: 4/14/2010 3:34:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1004178-002
Client Sample ID: HB RES 04
COC: 128478

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	8.85	s.u.			04/14/2010 1000	Field
Conductivity	872	µm		hos/cm	04/14/2010 1000	Field
Dissolved Oxygen	9.42	mg		/L	04/14/2010 1000	Field
Dissolved Oxygen (pct)	81.8			%	04/14/2010 1000	Field
Turbidity	8.42	NT		U	04/14/2010 1000	Field
Temperature	9.0	°C			04/14/2010 1000	Field
General Parameters						
pH	8.7	0.1		s.u.	04/17/2010 128 KO	SM 4500 H B
Electrical Conductivity	827	5		µmhos/cm	04/17/2010 128 KO	SM 2510B
Total Dissolved Solids (180)	560	10		mg/L	04/16/2010 1310 AMB	SM 2540
Solids, Total Dissolved (Calc)	520	10		mg/L	04/21/2010 1424 KO	SM 1030E
Total Suspended Solids	6	5		mg/L	04/15/2010 1430 AMB	SM 540
Alkalinity, Total (As CaCO3)	390	5		mg/L	04/17/2010 128 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	04/22/2010 926 SK	EPA 350.1
Gross Alpha	3.1 ± 1.7	2.00		pCi/L	04/27/2010 000 SH	SM 7110B
Gross Beta	11.3 ± 2.6	3.00		pCi/L	04/27/2010 000 SH	SM 7110B
Radium 226	0.20 ± 0.09	0.200		pCi/L	04/28/2010 1500 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	04/29/2010 129 SH	Ra-05
Turbidity	6.6	0.1		NTU	04/15/2010 820 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	429	5		mg/L	04/17/2010 128 KO	SM 2320B
Alkalinity, Carbonate as CO3	23	5		mg/L	04/17/2010 128 KO	SM 2320B
Chloride	8	1		mg/L	04/15/2010 2231 KO	EPA 300.0
Fluoride	0.2	0.1		mg/L	04/17/2010 128 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	04/20/2010 1446 SK	EPA 353.2
Sulfate	79	1		mg/L	04/15/2010 2231 KO	EPA 300.0
Cations						
Calcium	24	1		mg/L	04/16/2010 144 DG	EPA 200.7
Magnesium	20	1		mg/L	04/16/2010 144 DG	EPA 200.7
Potassium	11	1		mg/L	04/16/2010 144 DG	EPA 200.7
Sodium	148	1		mg/L	04/16/2010 144 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 4/29/2010
Report ID: S1004178001

Work Order: S1004178
Collection Date: 4/14/2010 10:00:00 AM
Date Received: 4/14/2010 3:34:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1004178-002
Client Sample ID: HB RES 04
COC: 128478

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	7.03	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Carbonate as CO3	0.75	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Chloride	0.21	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Fluoride	ND	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Sulfate	1.63	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Calcium	1.20	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Magnesium	1.61	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Potassium	0.27	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Sodium	6.42	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	9.51	0		meq/L	04/21/2010 1424 KO	SM 1030E
Anion Sum	9.65	0		meq/L	04/21/2010 1424 KO	SM 1030E
Cation-Anion Balance	0.72	0		%	04/21/2010 1424 KO	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	04/16/2010 144 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	04/15/2010 1006 MS	EPA 200.8
Barium	ND	0.5		mg/L	04/15/2010 1006 MS	EPA 200.8
Boron	ND	0.1		mg/L	04/16/2010 144 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	04/15/2010 1006 MS	EPA 200.8
Chromium	ND	0.01		mg/L	04/16/2010 144 DG	EPA 200.7
Copper	ND	0.01		mg/L	04/15/2010 1006 MS	EPA 200.8
Iron	ND	0.05		mg/L	04/16/2010 144 DG	EPA 200.7
Lead	ND	0.02		mg/L	04/15/2010 1006 MS	EPA 200.8
Mercury	ND	0.001		mg/L	04/16/2010 927 BK	EPA 245.2
Molybdenum	ND	0.02		mg/L	04/15/2010 1006 MS	EPA 200.8
Nickel	ND	0.01		mg/L	04/16/2010 144 DG	EPA 200.7
Selenium	ND	0.005		mg/L	04/15/2010 1006 MS	EPA 200.8
Uranium	0.007	0.001		mg/L	04/15/2010 1006 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	04/15/2010 1006 MS	EPA 200.8
Zinc	ND	0.01		mg/L	04/16/2010 144 DG	EPA 200.7
Total Metals						
Iron	0.25	0.05		mg/L	04/16/2010 1357 DG	EPA 200.7
Manganese	0.04	0.02		mg/L	04/16/2010 1357 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Page 4 of 4

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 7/8/2010
Report ID: S1005071002
(Replaces S1005071001)
Work Order: S1005071
Collection Date: 5/5/2010 3:00:00 PM
Date Received: 5/6/2010 9:06:00 AM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1005071-001
Client Sample ID: P15507S
COC: 131142

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.20	s.u.			05/05/2010 1500	Field
Conductivity	1413	µm		hos/cm	05/05/2010 1500	Field
Dissolved Oxygen	11.32	mg		/L	05/05/2010 1500	Field
Turbidity	31.4	NT		U	05/05/2010 1500	Field
Temperature	10.7	°C			05/05/2010 1500	Field
General Parameters						
pH	8.9	0.1		s.u.	05/10/2010 1813 KO	SM 4500 H B
Electrical Conductivity	1220	5		µmhos/cm	05/10/2010 1813 KO	SM 2510B
Total Dissolved Solids (180)	970	10		mg/L	05/07/2010 852 MJH	SM 2540
Solids, Total Dissolved (Calc)	870	10		mg/L	05/12/2010 1107 KO	SM 1030E
Total Suspended Solids	37	5		mg/L	05/06/2010 1725 LJK	SM 2540
Alkalinity, Total (As CaCO3)	639	5		mg/L	05/10/2010 1813 KO	SM 2320B
Nitrogen, Ammonia (As N)	0.2	0.1		mg/L	05/27/2010 1417 AS	EPA 350.1
Gross Alpha	13.6 ± 2.4	2		pCi/L	05/20/2010 1045 SH	SM 7110B
Gross Beta	12.9 ± 2.1	3		pCi/L	05/20/2010 1045 SH	SM 7110B
Radium 226 (Dissolved)	.31 ± 0.08	0.2		pCi/L	05/26/2010 1115 SH	SM 7500-Ra B
Radium 226 (Suspended)	ND	0.2		pCi/L	05/26/2010 1745 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	05/23/2010 2210 SH	Ra-05
Lead 210	1.46 ± 0.80	1		pCi/L	05/27/2010 854 LJK	OTW01
Lead 210 Suspended	1.55 ± 0.99	1		pCi/L	05/27/2010 000 LJK	OTW01
Polonium 210	ND	1		pCi/L	05/22/2010 1740 SH	OTW01
Polonium 210 Suspended	ND	1		pCi/L	05/25/2010 1539 SH	OTW01
Thorium 230	ND	0.2		pCi/L	06/03/2010 000 WN	ACW10
Thorium 230 Suspended	0.28±0.14	0.2		pCi/L	06/03/2010 000 WN	ACW10
Uranium Suspended	ND	0.001		mg/L	05/12/2010 1457 MS	EPA 200.8
Turbidity	27.3	0.1		NTU	05/06/2010 1511 ML	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	635	5		mg/L	05/10/2010 1813 KO	SM 2320B
Alkalinity, Carbonate as CO3	71	5		mg/L	05/10/2010 1813 KO	SM 2320B
Chloride	7	1		mg/L	05/06/2010 2132 KO	EPA 300.0
Fluoride	0.3	0.1		mg/L	05/10/2010 1813 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	05/07/2010 1503 SK	EPA 353.2
Sulfate	163	1		mg/L	05/06/2010 2132 KO	EPA 300.0

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level
E	Value above quantitation range
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL
O	Outside the Range of Dilutions
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
L	Analyzed by a contract laboratory
ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 3

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 7/8/2010
Report ID: S1005071002
(Replaces S1005071001)
Work Order: S1005071
Collection Date: 5/5/2010 3:00:00 PM
Date Received: 5/6/2010 9:06:00 AM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1005071-001
Client Sample ID: P15507S
COC: 131142

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cations						
Calcium	43	1		mg/L	05/06/2010 1929 DG	EPA 200.7
Magnesium	46	1		mg/L	05/06/2010 1929 DG	EPA 200.7
Potassium	11	1		mg/L	05/06/2010 1929 DG	EPA 200.7
Sodium	212	1		mg/L	05/06/2010 1929 DG	EPA 200.7
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	10.41	0.01		meq/L	05/12/2010 1107 KO	SM 1030E
Carbonate as CO3	2.35	0.01		meq/L	05/12/2010 1107 KO	SM 1030E
Chloride	0.20	0.01		meq/L	05/12/2010 1107 KO	SM 1030E
Fluoride	0.01	0.01		meq/L	05/12/2010 1107 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	05/12/2010 1107 KO	SM 1030E
Sulfate	3.39	0.01		meq/L	05/12/2010 1107 KO	SM 1030E
Calcium	2.14	0.01		meq/L	05/12/2010 1107 KO	SM 1030E
Magnesium	3.80	0.01		meq/L	05/12/2010 1107 KO	SM 1030E
Potassium	0.29	0.01		meq/L	05/12/2010 1107 KO	SM 1030E
Sodium	9.24	0.01		meq/L	05/12/2010 1107 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	15.48	0		meq/L	05/12/2010 1107 KO	SM 1030E
Anion Sum	16.38	0		meq/L	05/12/2010 1107 KO	SM 1030E
Cation-Anion Balance	2.83	0		%	05/12/2010 1107 KO	SM 1030E

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 7/8/2010
Report ID: S1005071002
(Replaces S1005071001)
Work Order: S1005071
Collection Date: 5/5/2010 3:00:00 PM
Date Received: 5/6/2010 9:06:00 AM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1005071-001
Client Sample ID: P15507S
COC: 131142

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	05/06/2010 1929 DG	EPA 200.7
Arsenic	0.006	0.005		mg/L	05/06/2010 1517 MS	EPA 200.8
Barium	ND	0.5		mg/L	05/06/2010 1517 MS	EPA 200.8
Boron	0.1	0.1		mg/L	05/06/2010 1929 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	05/06/2010 1517 MS	EPA 200.8
Chromium	ND	0.01		mg/L	05/06/2010 1929 DG	EPA 200.7
Copper	ND	0.01		mg/L	05/06/2010 1517 MS	EPA 200.8
Iron	0.08	0.05		mg/L	05/06/2010 1929 DG	EPA 200.7
Lead	ND	0.02		mg/L	05/06/2010 1517 MS	EPA 200.8
Mercury	ND	0.001		mg/L	05/11/2010 1000 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	05/06/2010 1517 MS	EPA 200.8
Nickel	ND	0.01		mg/L	05/06/2010 1929 DG	EPA 200.7
Selenium	ND	0.005		mg/L	05/06/2010 1517 MS	EPA 200.8
Uranium	0.019	0.001		mg/L	05/06/2010 1517 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	05/06/2010 1517 MS	EPA 200.8
Zinc	ND	0.01		mg/L	05/06/2010 1929 DG	EPA 200.7
Total Metals						
Iron	1.14	0.05		mg/L	05/07/2010 1530 DG	EPA 200.7
Manganese	0.11	0.02		mg/L	05/07/2010 1530 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 8/5/2010
Report ID: S1006462001

Work Order: S1006462
Collection Date: 6/23/2010 10:00:00 AM
Date Received: 6/24/2010 8:06:00 AM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1006462-001
Client Sample ID: TW RES01
COC: 135254

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	10.64			s.u.	06/23/2010 1000	Field
Conductivity	188.5			µmhos/cm	06/23/2010 1000	Field
Dissolved Oxygen	3.91			mg/L	06/23/2010 1000	Field
Dissolved Oxygen (pct)	44.0			%	06/23/2010 1000	Field
Turbidity	10.85			NTU	06/23/2010 1000	Field
Temperature	20.5			°C	06/23/2010 1000	Field
General Parameters						
pH	9.2	0.1		s.u.	06/25/2010 1941 KO	SM 4500 H B
Electrical Conductivity	129	5		µmhos/cm	06/25/2010 1941 KO	SM 2510B
Total Dissolved Solids (180)	100	10		mg/L	07/01/2010 845 MJH	SM 2540
Solids, Total Dissolved (Calc)	70	10		mg/L	07/06/2010 910 KO	SM 1030E
Total Suspended Solids	14	5		mg/L	06/28/2010 1155 MJH	SM 2540
Alkalinity, Total (As CaCO3)	55	5		mg/L	06/25/2010 1941 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	07/06/2010 1630 AS	EPA 350.1
Gross Alpha	ND	2		pCi/L	07/13/2010 2116 SH	SM 7110B
Gross Beta	9.3 ± 1.5	3		pCi/L	07/13/2010 2116 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	07/28/2010 1124 SH	SM 7500-Ra B
Radium 226 (Suspended)	ND	0.2		pCi/L	07/29/2010 1630 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	07/20/2010 120 SH	Ra-05
Lead 210 (Dissolved)	1.29 ± 0.58	1		pCi/L	07/27/2010 1317 SH	OTW01
Lead 210 (Suspended)	ND	1		pCi/L	07/23/2010 2138 SH	OTW01
Polonium 210 (Dissolved)	ND	1		pCi/L	07/27/2010 1756 SH	OTW01
Polonium 210 (Suspended)	ND	1		pCi/L	07/26/2010 2319 SH	OTW01
Thorium 230 (Dissolved)	ND	0.2	L	pCi/L	07/30/2010 000 LJK	ACW10
Thorium 230 (Suspended)	ND	0.2	L	pCi/L	07/30/2010 000 LJK	ACW10
Uranium Suspended	ND	0.001		mg/L	07/01/2010 1412 MS	EPA 200.8
Turbidity	5.8	0.1		NTU	06/25/2010 922 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	49	5		mg/L	06/25/2010 1941 KO	SM 2320B
Alkalinity, Carbonate as CO3	9	5		mg/L	06/25/2010 1941 KO	SM 2320B
Chloride	ND	1		mg/L	06/29/2010 000 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	06/25/2010 1941 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	07/08/2010 1147 AS	EPA 353.2
Sulfate	5	1		mg/L	06/29/2010 000 KO	EPA 300.0

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Lacey Ketron
Lacey Ketron, Project Manager

INTER-MOUNTAIN LABS

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 8/5/2010
Report ID: S1006462001

Work Order: S1006462
Collection Date: 6/23/2010 10:00:00 AM
Date Received: 6/24/2010 8:06:00 AM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1006462-001
Client Sample ID: TW RES01
COC: 135254

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cations						
Calcium	12	1		mg/L	07/01/2010 1709 DG	EPA 200.7
Magnesium	3	1		mg/L	07/01/2010 1709 DG	EPA 200.7
Potassium	9	1		mg/L	07/01/2010 1709 DG	EPA 200.7
Sodium	7	1		mg/L	07/01/2010 1709 DG	EPA 200.7
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	0.80	0.01		meq/L	07/06/2010 910 KO	SM 1030E
Carbonate as CO3	0.28	0.01		meq/L	07/06/2010 910 KO	SM 1030E
Chloride	ND	0.01		meq/L	07/06/2010 910 KO	SM 1030E
Fluoride	ND	0.01		meq/L	07/06/2010 910 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	07/06/2010 910 KO	SM 1030E
Sulfate	0.11	0.01		meq/L	07/06/2010 910 KO	SM 1030E
Calcium	0.57	0.01		meq/L	07/06/2010 910 KO	SM 1030E
Magnesium	0.23	0.01		meq/L	07/06/2010 910 KO	SM 1030E
Potassium	0.23	0.01		meq/L	07/06/2010 910 KO	SM 1030E
Sodium	0.29	0.01		meq/L	07/06/2010 910 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	1.33	0		meq/L	07/06/2010 910 KO	SM 1030E
Anion Sum	1.21	0		meq/L	07/06/2010 910 KO	SM 1030E
Cation-Anion Balance	4.95	0		%	07/06/2010 910 KO	SM 1030E

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Lacey Ketron
Lacey Ketron, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 8/5/2010
Report ID: S1006462001

Work Order: S1006462
Collection Date: 6/23/2010 10:00:00 AM
Date Received: 6/24/2010 8:06:00 AM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1006462-001
Client Sample ID: TW RES01
COC: 135254

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	06/25/2010 1438 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	06/25/2010 1559 MS	EPA 200.8
Barium	ND	0.5		mg/L	06/25/2010 1559 MS	EPA 200.8
Boron	ND	0.1		mg/L	06/25/2010 1438 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	06/25/2010 1559 MS	EPA 200.8
Chromium	ND	0.01		mg/L	06/25/2010 1438 DG	EPA 200.7
Copper	ND	0.01		mg/L	06/25/2010 1559 MS	EPA 200.8
Iron	0.20	0.05		mg/L	06/25/2010 1438 DG	EPA 200.7
Lead	ND	0.02		mg/L	06/25/2010 1559 MS	EPA 200.8
Mercury	ND	0.001		mg/L	07/01/2010 826 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	06/25/2010 1559 MS	EPA 200.8
Nickel	ND	0.01		mg/L	06/25/2010 1438 DG	EPA 200.7
Selenium	ND	0.005		mg/L	06/25/2010 1559 MS	EPA 200.8
Uranium	ND	0.001		mg/L	06/25/2010 1559 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	06/25/2010 1559 MS	EPA 200.8
Zinc	ND	0.01		mg/L	06/25/2010 1438 DG	EPA 200.7
Total Metals						
Iron	0.43	0.05		mg/L	06/28/2010 1643 DG	EPA 200.7
Manganese	0.02	0.02		mg/L	06/28/2010 1643 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: Lacey Ketron

Lacey Ketron, Project Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 6/30/2010
Report ID: S1005311001

Work Order: S1005311
Collection Date: 5/21/2010 11:00:00 AM
Date Received: 5/21/2010 3:44:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1005311-002
Client Sample ID: TWRES02
COC: 131149

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.03	s.u.			05/21/2010 1100	Field
Conductivity	414	µm		hos/cm	05/21/2010 1100	Field
Dissolved Oxygen	4.37	mg		/L	05/21/2010 1100	Field
Dissolved Oxygen (pct)	44.7			%	05/21/2010 1100	Field
Turbidity	11.91	NT		U	05/21/2010 1100	Field
Temperature	15.5	°C			05/21/2010 1100	Field
General Parameters						
pH	8.6	0.1		s.u.	05/25/2010 1512 KO	SM 4500 H B
Electrical Conductivity	397	5		µmhos/cm	05/25/2010 1512 KO	SM 2510B
Total Dissolved Solids (180)	250	10		mg/L	05/24/2010 1700 MJH	SM 2540
Solids, Total Dissolved (Calc)	220	10		mg/L	06/04/2010 758 KO	SM 1030E
Total Suspended Solids	8	5		mg/L	05/25/2010 1055 MJH	SM 540
Alkalinity, Total (As CaCO3)	183	5		mg/L	05/25/2010 1512 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	06/08/2010 1501 AS	EPA 350.1
Gross Alpha	5.6 ± 2.3	2		pCi/L	06/29/2010 1914 SH	SM 7110B
Gross Beta	11.6 ± 2.5	3		pCi/L	06/29/2010 1914 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	06/14/2010 1502 SH	SM 7500-Ra B
Radium 226 (Suspended)	ND	0.2		pCi/L	06/15/2010 1640 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	06/19/2010 029 SH	Ra-05
Lead 210	ND	1		pCi/L	06/19/2010 1803 SH	OTW01
Lead 210 Suspended	ND	1		pCi/L	06/19/2010 2226 SH	OTW01
Polonium 210	ND	1		pCi/L	06/24/2010 2111 SH	OTW01
Polonium 210 Suspended	ND	1		pCi/L	06/25/2010 1822 SH	OTW01
Thorium 230	ND	0.2	L	pCi/L	06/18/2010 000 WN	ACW10
Thorium 230 Suspended	ND	0.2	L	pCi/L	06/18/2010 000 WN	ACW10
Uranium Suspended	0.003	0.001		mg/L	05/26/2010 1003 MS	EPA 200.8
Turbidity	9.1	0.1		NTU	05/21/2010 1628 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	209	5		mg/L	05/25/2010 1512 KO	SM 2320B
Alkalinity, Carbonate as CO3	7	5		mg/L	05/25/2010 1512 KO	SM 2320B
Chloride	2	1		mg/L	05/24/2010 2208 KO	EPA 300.0
Fluoride	0.1	0.1		mg/L	05/25/2010 1512 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	06/04/2010 1536 AS	EPA 353.2
Sulfate	28	1		mg/L	05/24/2010 2208 KO	EPA 300.0

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: *[signature]*
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 6/30/2010
Report ID: S1005311001

Work Order: S1005311
Collection Date: 5/21/2010 11:00:00 AM
Date Received: 5/21/2010 3:44:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1005311-002
Client Sample ID: TWRES02
COC: 131149

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cations						
Calcium	38	1		mg/L	05/24/2010 1601 RS	EPA 200.7
Magnesium	18	1		mg/L	05/24/2010 1601 RS	EPA 200.7
Potassium	5	1		mg/L	05/24/2010 1601 RS	EPA 200.7
Sodium	24	1		mg/L	05/24/2010 1601 RS	EPA 200.7
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	3.42	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Carbonate as CO3	0.23	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Chloride	0.06	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Fluoride	ND	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Sulfate	0.58	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Calcium	1.89	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Magnesium	1.44	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Potassium	0.12	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Sodium	1.02	0.01		meq/L	06/04/2010 758 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	4.48	0		meq/L	06/04/2010 758 KO	SM 1030E
Anion Sum	4.31	0		meq/L	06/04/2010 758 KO	SM 1030E
Cation-Anion Balance	1.97	0		%	06/04/2010 758 KO	SM 1030E

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: *[signature]*
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 6/30/2010
Report ID: S1005311001

Work Order: S1005311
Collection Date: 5/21/2010 11:00:00 AM
Date Received: 5/21/2010 3:44:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1005311-002
Client Sample ID: TWRES02
COC: 131149

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	05/24/2010 1601 RS	EPA 200.7
Arsenic	ND	0.005		mg/L	05/24/2010 1226 MS	EPA 200.8
Barium	ND	0.5		mg/L	05/24/2010 1226 MS	EPA 200.8
Boron	ND	0.1		mg/L	05/24/2010 1601 RS	EPA 200.7
Cadmium	ND	0.002		mg/L	05/24/2010 1226 MS	EPA 200.8
Chromium	ND	0.01		mg/L	05/24/2010 1601 RS	EPA 200.7
Copper	ND	0.01		mg/L	05/24/2010 1226 MS	EPA 200.8
Iron	ND	0.05		mg/L	05/24/2010 1601 RS	EPA 200.7
Lead	ND	0.02		mg/L	05/24/2010 1226 MS	EPA 200.8
Mercury	ND	0.001		mg/L	05/25/2010 1312 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	05/24/2010 1226 MS	EPA 200.8
Nickel	ND	0.01		mg/L	05/24/2010 1601 RS	EPA 200.7
Selenium	ND	0.005		mg/L	05/24/2010 1226 MS	EPA 200.8
Uranium	0.006	0.001		mg/L	05/24/2010 1226 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	05/24/2010 1226 MS	EPA 200.8
Zinc	ND	0.01		mg/L	05/24/2010 1601 RS	EPA 200.7
Total Metals						
Iron	0.37	0.05		mg/L	05/24/2010 1756 RS	EPA 200.7
Manganese	0.03	0.02		mg/L	05/24/2010 1756 RS	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level
E	Value above quantitation range
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL
O	Outside the Range of Dilutions
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
L	Analyzed by a contract laboratory
ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 4/29/2010
Report ID: S1004178001

Work Order: S1004178
Collection Date: 4/13/2010 12:30:00 PM
Date Received: 4/14/2010 3:34:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1004178-001
Client Sample ID: SW-1
COC: 128478

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	8.39	s.u.			04/13/2010 1230	Field
Conductivity	1200	µm		hos/cm	04/13/2010 1230	Field
Dissolved Oxygen	7.28	mg		/L	04/13/2010 1230	Field
Dissolved Oxygen (pct)	64.6			%	04/13/2010 1230	Field
Turbidity	9.10	NT		U	04/13/2010 1230	Field
Temperature	9.8	°C			04/13/2010 1230	Field
General Parameters						
pH	8.7	0.1		s.u.	04/17/2010 113 KO	SM 4500 H B
Electrical Conductivity	1110	5		µmhos/cm	04/17/2010 113 KO	SM 2510B
Total Dissolved Solids (180)	790	10		mg/L	04/16/2010 1305 AMB	SM 2540
Solids, Total Dissolved (Calc)	730	10		mg/L	04/21/2010 1424 KO	SM 1030E
Total Suspended Solids	7	5		mg/L	04/15/2010 1425 AMB	SM 540
Alkalinity, Total (As CaCO3)	497	5		mg/L	04/17/2010 113 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	04/22/2010 925 SK	EPA 350.1
Gross Alpha	7.3 ± 2.2	2.00		pCi/L	04/27/2010 000 SH	SM 7110B
Gross Beta	9.7 ± 2.7	3.00		pCi/L	04/27/2010 000 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	04/28/2010 1500 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	04/28/2010 2121 SH	Ra-05
Turbidity	7.7	0.1		NTU	04/15/2010 818 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	542	5		mg/L	04/17/2010 113 KO	SM 2320B
Alkalinity, Carbonate as CO3	32	5		mg/L	04/17/2010 113 KO	SM 2320B
Chloride	8	1		mg/L	04/15/2010 2216 KO	EPA 300.0
Fluoride	0.2	0.1		mg/L	04/17/2010 113 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	04/20/2010 1445 SK	EPA 353.2
Sulfate	147	1		mg/L	04/15/2010 2216 KO	EPA 300.0
Cations						
Calcium	37	1		mg/L	04/16/2010 141 DG	EPA 200.7
Magnesium	24	1		mg/L	04/16/2010 141 DG	EPA 200.7
Potassium	11	1		mg/L	04/16/2010 141 DG	EPA 200.7
Sodium	204	1		mg/L	04/16/2010 141 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 4

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 4/29/2010
Report ID: S1004178001

Work Order: S1004178
Collection Date: 4/13/2010 12:30:00 PM
Date Received: 4/14/2010 3:34:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1004178-001
Client Sample ID: SW-1
COC: 128478

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	8.88	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Carbonate as CO3	1.05	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Chloride	0.21	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Fluoride	0.01	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Sulfate	3.05	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Calcium	1.85	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Magnesium	2.00	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Potassium	0.28	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Sodium	8.85	0.01		meq/L	04/21/2010 1424 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	13.00	0		meq/L	04/21/2010 1424 KO	SM 1030E
Anion Sum	13.21	0		meq/L	04/21/2010 1424 KO	SM 1030E
Cation-Anion Balance	0.80	0		%	04/21/2010 1424 KO	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	04/16/2010 141 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	04/15/2010 1003 MS	EPA 200.8
Barium	ND	0.5		mg/L	04/15/2010 1003 MS	EPA 200.8
Boron	0.1	0.1		mg/L	04/16/2010 141 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	04/15/2010 1003 MS	EPA 200.8
Chromium	ND	0.01		mg/L	04/16/2010 141 DG	EPA 200.7
Copper	ND	0.01		mg/L	04/15/2010 1003 MS	EPA 200.8
Iron	0.08	0.05		mg/L	04/16/2010 141 DG	EPA 200.7
Lead	ND	0.02		mg/L	04/15/2010 1003 MS	EPA 200.8
Mercury	ND	0.001		mg/L	04/16/2010 926 BK	EPA 245.2
Molybdenum	ND	0.02		mg/L	04/15/2010 1003 MS	EPA 200.8
Nickel	ND	0.01		mg/L	04/16/2010 141 DG	EPA 200.7
Selenium	ND	0.005		mg/L	04/15/2010 1003 MS	EPA 200.8
Uranium	0.011	0.001		mg/L	04/15/2010 1003 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	04/15/2010 1003 MS	EPA 200.8
Zinc	ND	0.01		mg/L	04/16/2010 141 DG	EPA 200.7
Total Metals						
Iron	0.37	0.05		mg/L	04/16/2010 1345 DG	EPA 200.7
Manganese	0.05	0.02		mg/L	04/16/2010 1345 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 4/29/2010
Report ID: S1004177001

Work Order: S1004177
Collection Date: 4/13/2010 8:30:00 AM
Date Received: 4/14/2010 3:34:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1004177-001
Client Sample ID: SW-2
COC: 128483

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	8.35	s.u.			04/13/2010 830	Field
Conductivity	1348	µm		hos/cm	04/13/2010 830	Field
Dissolved Oxygen	7.59	mg		/L	04/13/2010 830	Field
Dissolved Oxygen (pct)	63.4			%	04/13/2010 830	Field
Turbidity	3.86	NT		U	04/13/2010 830	Field
Temperature	7.8	°C			04/13/2010 830	Field
General Parameters						
pH	8.6	0.1		s.u.	04/17/2010 028 KO	SM 4500 H B
Electrical Conductivity	1250	5		µmhos/cm	04/17/2010 028 KO	SM 2510B
Total Dissolved Solids (180)	940	10		mg/L	04/16/2010 1255 AMB	SM 2540
Solids, Total Dissolved (Calc)	850	10		mg/L	04/21/2010 1426 KO	SM 1030E
Total Suspended Solids	6	5		mg/L	04/15/2010 1415 AMB	SM 540
Alkalinity, Total (As CaCO3)	600	5		mg/L	04/17/2010 028 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	04/22/2010 917 SK	EPA 350.1
Gross Alpha	7.9 ± 2.5	2.00		pCi/L	04/27/2010 000 SH	SM 7110B
Gross Beta	7.4 ± 2.6	3.00		pCi/L	04/27/2010 000 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	04/28/2010 1500 SH	SM 7500-Ra B
Total Radium 228	1.30 ± 0.78	1.00		pCi/L	04/28/2010 2121 SH	Ra-05
Turbidity	2.3	0.1		NTU	04/15/2010 814 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	655	5		mg/L	04/17/2010 028 KO	SM 2320B
Alkalinity, Carbonate as CO3	38	5		mg/L	04/17/2010 028 KO	SM 2320B
Chloride	10	1		mg/L	04/15/2010 2145 KO	EPA 300.0
Fluoride	0.3	0.1		mg/L	04/17/2010 028 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	04/20/2010 1442 SK	EPA 353.2
Sulfate	168	1		mg/L	04/15/2010 2145 KO	EPA 300.0
Cations						
Calcium	58	1		mg/L	04/16/2010 125 DG	EPA 200.7
Magnesium	29	1		mg/L	04/16/2010 125 DG	EPA 200.7
Potassium	7	1		mg/L	04/16/2010 125 DG	EPA 200.7
Sodium	216	1		mg/L	04/16/2010 125 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 4/29/2010
Report ID: S1004177001

Work Order: S1004177
Collection Date: 4/13/2010 8:30:00 AM
Date Received: 4/14/2010 3:34:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1004177-001
Client Sample ID: SW-2
COC: 128483

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	10.73	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Carbonate as CO3	1.26	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Chloride	0.27	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Fluoride	0.01	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Sulfate	3.49	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Calcium	2.86	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Magnesium	2.40	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Potassium	0.18	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Sodium	9.40	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	14.86	0		meq/L	04/21/2010 1426 KO	SM 1030E
Anion Sum	15.78	0		meq/L	04/21/2010 1426 KO	SM 1030E
Cation-Anion Balance	2.98	0		%	04/21/2010 1426 KO	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	04/16/2010 125 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	04/15/2010 948 MS	EPA 200.8
Barium	ND	0.5		mg/L	04/15/2010 948 MS	EPA 200.8
Boron	ND	0.1		mg/L	04/16/2010 125 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	04/15/2010 948 MS	EPA 200.8
Chromium	ND	0.01		mg/L	04/16/2010 125 DG	EPA 200.7
Copper	ND	0.01		mg/L	04/15/2010 948 MS	EPA 200.8
Iron	0.14	0.05		mg/L	04/16/2010 125 DG	EPA 200.7
Lead	ND	0.02		mg/L	04/15/2010 948 MS	EPA 200.8
Mercury	ND	0.001		mg/L	04/16/2010 919 BK	EPA 245.2
Molybdenum	ND	0.02		mg/L	04/15/2010 948 MS	EPA 200.8
Nickel	ND	0.01		mg/L	04/16/2010 125 DG	EPA 200.7
Selenium	ND	0.005		mg/L	04/15/2010 948 MS	EPA 200.8
Uranium	0.020	0.001		mg/L	04/15/2010 948 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	04/15/2010 948 MS	EPA 200.8
Zinc	ND	0.01		mg/L	04/16/2010 125 DG	EPA 200.7
Total Metals						
Iron	0.32	0.05		mg/L	04/16/2010 1338 DG	EPA 200.7
Manganese	0.05	0.02		mg/L	04/16/2010 1338 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 4/29/2010
Report ID: S1004177001

Work Order: S1004177
Collection Date: 4/13/2010 11:30:00 AM
Date Received: 4/14/2010 3:34:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1004177-002
Client Sample ID: SW-3
COC: 128483

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	8.86	s.u.			04/13/2010 1130	Field
Conductivity	1209	µm		hos/cm	04/13/2010 1130	Field
Dissolved Oxygen	8.77	mg		/L	04/13/2010 1130	Field
Dissolved Oxygen (pct)	78.3			%	04/13/2010 1130	Field
Turbidity	16.29	NT		U	04/13/2010 1130	Field
Temperature	10.0	°C			04/13/2010 1130	Field
General Parameters						
pH	8.8	0.1		s.u.	04/17/2010 044 KO	SM 4500 H B
Electrical Conductivity	1120	5		µmhos/cm	04/17/2010 044 KO	SM 2510B
Total Dissolved Solids (180)	800	10		mg/L	04/16/2010 1300 AMB	SM 2540
Solids, Total Dissolved (Calc)	730	10		mg/L	04/21/2010 1426 KO	SM 1030E
Total Suspended Solids	14	5		mg/L	04/15/2010 1420 AMB	SM 2540
Alkalinity, Total (As CaCO3)	586	5		mg/L	04/17/2010 044 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	04/22/2010 924 SK	EPA 350.1
Gross Alpha	6.0 ± 2.3	2.00		pCi/L	04/27/2010 000 SH	SM 7110B
Gross Beta	9.8 ± 2.7	3.00		pCi/L	04/27/2010 000 SH	SM 7110B
Radium 226	ND	0.2		pCi/L	04/28/2010 1500 SH	SM 7500-Ra B
Total Radium 228	ND	1		pCi/L	04/28/2010 2121 SH	Ra-05
Turbidity	14.4	0.1		NTU	04/15/2010 816 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	619	5		mg/L	04/17/2010 044 KO	SM 2320B
Alkalinity, Carbonate as CO3	47	5		mg/L	04/17/2010 044 KO	SM 2320B
Chloride	7	1		mg/L	04/15/2010 2201 KO	EPA 300.0
Fluoride	0.3	0.1		mg/L	04/17/2010 044 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	04/20/2010 1444 SK	EPA 353.2
Sulfate	102	1		mg/L	04/15/2010 2201 KO	EPA 300.0
Cations						
Calcium	32	1		mg/L	04/16/2010 132 DG	EPA 200.7
Magnesium	35	1		mg/L	04/16/2010 132 DG	EPA 200.7
Potassium	11	1		mg/L	04/16/2010 132 DG	EPA 200.7
Sodium	196	1		mg/L	04/16/2010 132 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 4/29/2010
Report ID: S1004177001

Work Order: S1004177
Collection Date: 4/13/2010 11:30:00 AM
Date Received: 4/14/2010 3:34:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1004177-002
Client Sample ID: SW-3
COC: 128483

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	10.14	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Carbonate as CO3	1.57	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Chloride	0.18	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Fluoride	0.01	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Sulfate	2.11	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Calcium	1.59	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Magnesium	2.89	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Potassium	0.27	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Sodium	8.53	0.01		meq/L	04/21/2010 1426 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	13.30	0		meq/L	04/21/2010 1426 KO	SM 1030E
Anion Sum	14.03	0		meq/L	04/21/2010 1426 KO	SM 1030E
Cation-Anion Balance	2.66	0		%	04/21/2010 1426 KO	SM 1030E
Dissolved Metals						
Aluminum	ND	0.1		mg/L	04/16/2010 132 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	04/15/2010 959 MS	EPA 200.8
Barium	ND	0.5		mg/L	04/15/2010 959 MS	EPA 200.8
Boron	0.1	0.1		mg/L	04/16/2010 132 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	04/15/2010 959 MS	EPA 200.8
Chromium	ND	0.01		mg/L	04/16/2010 132 DG	EPA 200.7
Copper	ND	0.01		mg/L	04/15/2010 959 MS	EPA 200.8
Iron	0.07	0.05		mg/L	04/16/2010 132 DG	EPA 200.7
Lead	ND	0.02		mg/L	04/15/2010 959 MS	EPA 200.8
Mercury	ND	0.001		mg/L	04/16/2010 924 BK	EPA 245.2
Molybdenum	ND	0.02		mg/L	04/15/2010 959 MS	EPA 200.8
Nickel	ND	0.01		mg/L	04/16/2010 132 DG	EPA 200.7
Selenium	ND	0.005		mg/L	04/15/2010 959 MS	EPA 200.8
Uranium	0.014	0.001		mg/L	04/15/2010 959 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	04/15/2010 959 MS	EPA 200.8
Zinc	ND	0.01		mg/L	04/16/2010 132 DG	EPA 200.7
Total Metals						
Iron	0.58	0.05		mg/L	04/16/2010 1341 DG	EPA 200.7
Manganese	0.21	0.02		mg/L	04/16/2010 1341 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: CS RES 02 **Date:** 8-10-10 **Time:** 1530

Landowner
Name: Strong
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s)

Stock ✓

Domestic

SEO Permitted Facility Name: —

Permit No. —

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 7.36
Cond. 359 µS
Temp. ° C 28.8°C
Turbidity (ntu) 379
D.O. (mg/L) 0.46 / 6.1%

Water Level (ft): 1/8 FULL

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp: 90°F

Comments: Water turbid - no odor

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: CS RES03 **Date:** 8-10-10 **Time:** 1600

Landowner
Name: Strong
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s) –

Stock ✓

Domestic

SEO Permitted Facility Name: –

Permit No. –

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 9.78
Cond. 602 µS
Temp. °C 26.6
Turbidity (ntu) 15.72
D.O. (mg/L) 4.32 / 54.2 %

Water Level (ft): 1/8 full

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp: 90 °F

Comments: Water turbid - no odor

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: HB RES04 Dakota Ave. **Date:** 7-21-10 **Time:** 1500

Landowner
Name: Berger
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s)

Stock ✓

Domestic

SEO Permitted Facility Name:

Permit No. P6046R

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 9.46
Cond. 890 µS
Temp. °C 23.9
Turbidity (ntu) 4.32
D.O. (mg/L) 5.34 / 63.9

Water Level (ft): Res 95% full

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp: 75°F

Comments: Water slightly turbid (light Brown/yellow - no odor

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: P155075 **Date:** 8-24-10 **Time:** 1330

Landowner
Name: Swanda
Address
Phone#

Legal Location
Qtr/Qtr NWSE
SEC 13
TWN T53
RNG R68

Picture #(s)

Stock ✓

Domestic

SEO Permitted Facility Name: Deadman #1

Permit No. P155075

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 9.93
Cond. 1862 µS
Temp. °C 25.2
Turbidity (ntu) 596
D.O. (mg/L) turbidity to high to measure

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp: 80°F

Comments: One reservoir in a chain of reservoirs - Reservoirs include: TSRES01, P155073, TSRES02, and P155083. Water very turbid (596) - greenish/yellow color - Could not measure D.O. due to turbidity - No odor

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: TW RES 01 **Date:** 7-22-10 **Time:** 0900

Landowner
Name: Wesley
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s)

Stock ✓

Domestic

SEO Permitted Facility Name:

Permit No. —

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 9.61
Cond. 156.9 µS
Temp. °C 20.2
Turbidity (ntu) 6.05
D.O. (mg/L) 4.90 / 55%

Water Level (ft): Res 1/4 full

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp: 70°F

Comments:

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: TWRES02 **Date:** 7-22-10 **Time:** 1030

Landowner
Name: Wesley
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s)

Stock ✓

Domestic

SEO Permitted Facility Name:

Permit No. —

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 10.46
Cond. 281 µS
Temp. °C 21.8
Turbidity (ntu) 3.22
D.O. (mg/L) 6.72 / 77.6%

Water Level (ft): Res 1/4 full

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp: 70°F

Comments: Water slightly turbid (yellow/brown) - no odor

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/12/2010
Report ID: S1008198001

Work Order: S1008198
Collection Date: 8/10/2010 3:30:00 PM
Date Received: 8/12/2010 9:08:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1008198-001
Client Sample ID: CS RES 02
COC: 131165

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	7.36	s.u.			08/10/2010 1530	Field
Conductivity	359	µm		hos/cm	08/10/2010 1530	Field
Dissolved Oxygen	0.46	mg		/L	08/10/2010 1530	Field
Dissolved Oxygen (pct)	6.1			%	08/10/2010 1530	Field
Turbidity	379	NT		U	08/10/2010 1530	Field
Temperature	28.8	°C			08/10/2010 1530	Field
General Parameters						
pH	7.5	0.1		s.u.	08/13/2010 1950 KO	SM 4500 H B
Electrical Conductivity	327	5		µmhos/cm	08/13/2010 1950 KO	SM 2510B
Total Dissolved Solids (180)	370	10		mg/L	08/12/2010 1710 AMB	SM 2540
Solids, Total Dissolved (Calc)	170	10		mg/L	08/25/2010 744 KO	SM 1030E
Total Suspended Solids	80	5		mg/L	08/16/2010 1040 AMB	SM 2540
Alkalinity, Total (As CaCO3)	147	5		mg/L	08/18/2010 1217 KO	SM 2320B
Nitrogen, Ammonia (As N)	4.0	0.1		mg/L	08/25/2010 1506 AS	EPA 350.1
Turbidity	315	0.1		NTU	08/12/2010 1414 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	179	5		mg/L	08/18/2010 1217 KO	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	08/18/2010 1217 KO	SM 2320B
Chloride	9	1		mg/L	08/16/2010 1401 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	08/13/2010 1950 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	08/20/2010 1519 AS	EPA 353.2
Sulfate	1	1		mg/L	08/16/2010 1401 KO	EPA 300.0
Cations						
Calcium	34	1		mg/L	08/19/2010 1821 DG	EPA 200.7
Magnesium	7	1		mg/L	08/19/2010 1821 DG	EPA 200.7
Potassium	23	1		mg/L	08/19/2010 1821 DG	EPA 200.7
Sodium	5	1		mg/L	08/19/2010 1821 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL
- O Outside the Range of Dilutions
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: *[signature]*
Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 21

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/12/2010
Report ID: S1008198001

Work Order: S1008198
Collection Date: 8/10/2010 3:30:00 PM
Date Received: 8/12/2010 9:08:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1008198-001
Client Sample ID: CS RES 02
COC: 131165

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	2.93	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Chloride	0.25	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Fluoride	ND	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Sulfate	0.02	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Calcium	1.69	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Magnesium	0.58	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Potassium	0.59	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Sodium	0.22	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	3.09	0		meq/L	08/25/2010 744 KO	SM 1030E
Anion Sum	3.21	0		meq/L	08/25/2010 744 KO	SM 1030E
Cation-Anion Balance	1.81	0		%	08/25/2010 744 KO	SM 1030E
Radio Chemistry						
Gross Alpha	7.4 ± 1.6	2		pCi/L	09/29/2010 1956 SH	SM 7110B
Gross Beta	28.7 ± 2.3	3		pCi/L	09/29/2010 1956 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	09/21/2010 1236 SH	SM 7500-Ra B
Radium 226 (Suspended)	ND	0.2		pCi/L	09/25/2010 1558 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	09/21/2010 2313 SH	Ra-05
Lead 210 (Dissolved)	ND	1		pCi/L	09/02/2010 1801 SH	OTW01
Lead 210 (Suspended)	ND	1		pCi/L	09/08/2010 2213 SH	OTW01
Polonium 210 (Dissolved)	ND	1		pCi/L	09/02/2010 1801 SH	OTW01
Polonium 210 (Suspended)	ND	1		pCi/L	09/08/2010 2213 SH	OTW01
Thorium 230 (Dissolved)	ND	0.2	L	pCi/L	09/24/2010 1127 WN	ACW10
Thorium 230 (Suspended)	ND	0.2	L	pCi/L	09/24/2010 1127 WN	ACW10
Uranium Suspended	ND	0.001		mg/L	08/23/2010 1048 MS	EPA 200.8

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/12/2010
Report ID: S1008198001

Work Order: S1008198
Collection Date: 8/10/2010 3:30:00 PM
Date Received: 8/12/2010 9:08:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1008198-001
Client Sample ID: CS RES 02
COC: 131165

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	0.2	0.1		mg/L	08/12/2010 1725 DG	EPA 200.7
Arsenic	0.021	0.005		mg/L	08/12/2010 1423 MS	EPA 200.8
Barium	ND	0.5		mg/L	08/12/2010 1423 MS	EPA 200.8
Boron	ND	0.1		mg/L	08/12/2010 1725 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	08/12/2010 1423 MS	EPA 200.8
Chromium	ND	0.01		mg/L	08/12/2010 1725 DG	EPA 200.7
Copper	ND	0.01		mg/L	08/12/2010 1423 MS	EPA 200.8
Iron	0.20	0.05		mg/L	08/12/2010 1725 DG	EPA 200.7
Lead	ND	0.02		mg/L	08/12/2010 1423 MS	EPA 200.8
Mercury	ND	0.001		mg/L	08/17/2010 935 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	08/12/2010 1423 MS	EPA 200.8
Nickel	ND	0.01		mg/L	08/12/2010 1725 DG	EPA 200.7
Selenium	ND	0.005		mg/L	08/12/2010 1423 MS	EPA 200.8
Silver	ND	0.003		mg/L	08/12/2010 1423 MS	EPA 200.8
Uranium	ND	0.001		mg/L	08/12/2010 1423 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	08/12/2010 1423 MS	EPA 200.8
Zinc	ND	0.01		mg/L	08/12/2010 1725 DG	EPA 200.7
Total Metals						
Iron	16.7	0.05		mg/L	08/13/2010 1345 DG	EPA 200.7
Manganese	1.24	0.02		mg/L	08/13/2010 1345 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/12/2010
Report ID: S1008198001

Work Order: S1008198
Collection Date: 8/10/2010 4:00:00 PM
Date Received: 8/12/2010 9:08:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1008198-002
Client Sample ID: CS RES 03
COC: 131165

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.78	s.u.			08/10/2010 1600	Field
Conductivity	602	µm		hos/cm	08/10/2010 1600	Field
Dissolved Oxygen	4.32	mg		/L	08/10/2010 1600	Field
Dissolved Oxygen (pct)	54.2			%	08/10/2010 1600	Field
Turbidity	15.72	NT		U	08/10/2010 1600	Field
Temperature	26.6	°C			08/10/2010 1600	Field
General Parameters						
pH	9.2	0.1		s.u.	08/13/2010 2000 KO	SM 4500 H B
Electrical Conductivity	544	5		µmhos/cm	08/13/2010 2000 KO	SM 2510B
Total Dissolved Solids (180)	420	10		mg/L	08/12/2010 1715 AMB	SM 2540
Solids, Total Dissolved (Calc)	330	10		mg/L	08/25/2010 744 KO	SM 1030E
Total Suspended Solids	19	5		mg/L	08/16/2010 1045 AMB	SM 2540
Alkalinity, Total (As CaCO3)	154	5		mg/L	08/23/2010 1252 KO	SM 2320B
Nitrogen, Ammonia (As N)	0.1	0.1		mg/L	08/25/2010 1507 AS	EPA 350.1
Turbidity	9.9	0.1		NTU	08/12/2010 1416 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	106	5		mg/L	08/23/2010 1252 KO	SM 2320B
Alkalinity, Carbonate as CO3	41	5		mg/L	08/23/2010 1252 KO	SM 2320B
Chloride	5	1		mg/L	08/16/2010 1412 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	08/13/2010 2000 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	08/20/2010 1520 AS	EPA 353.2
Sulfate	111	1		mg/L	08/16/2010 1412 KO	EPA 300.0
Cations						
Calcium	28	1		mg/L	08/12/2010 1727 DG	EPA 200.7
Magnesium	12	1		mg/L	08/12/2010 1727 DG	EPA 200.7
Potassium	14	1		mg/L	08/12/2010 1727 DG	EPA 200.7
Sodium	69	1		mg/L	08/12/2010 1727 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/12/2010
Report ID: S1008198001

Work Order: S1008198
Collection Date: 8/10/2010 4:00:00 PM
Date Received: 8/12/2010 9:08:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1008198-002
Client Sample ID: CS RES 03
COC: 131165

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	1.73	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Carbonate as CO3	1.35	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Chloride	0.13	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Fluoride	ND	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Sulfate	2.31	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Calcium	1.37	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Magnesium	1.00	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Potassium	0.36	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Sodium	3.01	0.01		meq/L	08/25/2010 744 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	5.76	0		meq/L	08/25/2010 744 KO	SM 1030E
Anion Sum	5.53	0		meq/L	08/25/2010 744 KO	SM 1030E
Cation-Anion Balance	2.04	0		%	08/25/2010 744 KO	SM 1030E
Radio Chemistry						
Gross Alpha	2.5 ± 0.7	2		pCi/L	09/29/2010 1956 SH	SM 7110B
Gross Beta	12.1 ± 1.1	3		pCi/L	09/29/2010 1956 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	09/21/2010 1236 SH	SM 7500-Ra B
Radium 226 (Suspended)	ND	0.2		pCi/L	09/25/2010 1558 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	09/21/2010 2313 SH	Ra-05
Lead 210 (Dissolved)	ND	1		pCi/L	09/17/2010 1605 SH	OTW01
Lead 210 (Suspended)	ND	1		pCi/L	09/08/2010 2213 SH	OTW01
Polonium 210 (Dissolved)	ND	1		pCi/L	09/17/2010 1605 SH	OTW01
Polonium 210 (Suspended)	ND	1		pCi/L	09/08/2010 2213 SH	OTW01
Thorium 230 (Dissolved)	ND	0.2	L	pCi/L	09/24/2010 1127 WN	ACW10
Thorium 230 (Suspended)	ND	0.2	L	pCi/L	09/24/2010 1127 WN	ACW10
Uranium Suspended	ND	0.001		mg/L	08/23/2010 1055 MS	EPA 200.8

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/12/2010
Report ID: S1008198001

Work Order: S1008198
Collection Date: 8/10/2010 4:00:00 PM
Date Received: 8/12/2010 9:08:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1008198-002
Client Sample ID: CS RES 03
COC: 131165

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	08/12/2010 1727 DG	EPA 200.7
Arsenic	0.012	0.005		mg/L	08/12/2010 1427 MS	EPA 200.8
Barium	ND	0.5		mg/L	08/12/2010 1427 MS	EPA 200.8
Boron	ND	0.1		mg/L	08/12/2010 1727 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	08/12/2010 1427 MS	EPA 200.8
Chromium	ND	0.01		mg/L	08/12/2010 1727 DG	EPA 200.7
Copper	ND	0.01		mg/L	08/12/2010 1427 MS	EPA 200.8
Iron	ND	0.05		mg/L	08/12/2010 1727 DG	EPA 200.7
Lead	ND	0.02		mg/L	08/12/2010 1427 MS	EPA 200.8
Mercury	ND	0.001		mg/L	08/17/2010 937 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	08/12/2010 1427 MS	EPA 200.8
Nickel	ND	0.01		mg/L	08/12/2010 1727 DG	EPA 200.7
Selenium	ND	0.005		mg/L	08/12/2010 1427 MS	EPA 200.8
Silver	ND	0.003		mg/L	08/12/2010 1427 MS	EPA 200.8
Uranium	0.002	0.001		mg/L	08/12/2010 1427 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	08/12/2010 1427 MS	EPA 200.8
Zinc	ND	0.01		mg/L	08/12/2010 1727 DG	EPA 200.7
Total Metals						
Iron	0.45	0.05		mg/L	08/13/2010 1347 DG	EPA 200.7
Manganese	0.06	0.02		mg/L	08/13/2010 1347 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level
E	Value above quantitation range
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL
O	Outside the Range of Dilutions
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
L	Analyzed by a contract laboratory
ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT:	Western Water Consultants 1849 Terra Sheridan, WY 82801	**Date Reported:**	8/25/2010
		Report ID:	S1007313001
		Work Order:	S1007313
Project:	ROSS	**Collection Date:**	7/21/2010 3:00:00 PM
Lab ID:	S1007313-005	**Date Received:**	7/22/2010 8:07:00 AM
Client Sample ID:	HBRES04 (Oshoto Reservoir)	**Sampler:**	RF
COC:	131154	**Matrix:**	Water

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.46	s.u.			07/21/2010 1500	Field
Conductivity	890	µm		hos/cm	07/21/2010 1500	Field
Dissolved Oxygen	5.34	mg		/L	07/21/2010 1500	Field
Dissolved Oxygen (pct)	63.9			%	07/21/2010 1500	Field
Turbidity	4.32	NT		U	07/21/2010 1500	Field
Temperature	23.9	°C			07/21/2010 1500	Field
General Parameters						
pH	9.2	0.1		s.u.	07/23/2010 2203 LJK	SM 4500 H B
Electrical Conductivity	965	5		µmhos/cm	07/23/2010 2203 LJK	SM 2510B
Total Dissolved Solids (180)	640	10		mg/L	07/22/2010 1230 MJH	SM 2540
Solids, Total Dissolved (Calc)	590	10		mg/L	07/29/2010 753 KO	SM 1030E
Total Suspended Solids	ND	5		mg/L	07/22/2010 958 MJH	SM 2540
Alkalinity, Total (As CaCO3)	430	5		mg/L	07/23/2010 2203 LJK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	07/30/2010 1617 AS	EPA 350.1
Gross Alpha	7.34 ± 1.58	2		pCi/L	08/21/2010 1206 SH	SM 7110B
Gross Beta	11.5 ± 2.0	3.5		pCi/L	08/21/2010 1206 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	08/16/2010 1825 SH	SM 7500-Ra B
Radium 226 (Suspended)	ND	0.2		pCi/L	08/13/2010 2222 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	08/24/2010 224 SH	Ra-05
Lead 210 (Dissolved)	ND	1		pCi/L	08/15/2010 2316 SH	OTW01
Lead 210 (Suspended)	ND	1		pCi/L	08/17/2010 000 SH	OTW01
Polonium 210 (Dissolved)	ND	1		pCi/L	08/14/2010 2028 SH	OTW01
Polonium 210 (Suspended)	ND	1		pCi/L	08/17/2010 000 SH	OTW01
Thorium 230 (Dissolved)	ND	0.2	L	pCi/L	08/09/2010 000 WN	ACW10
Thorium 230 (Suspended)	ND	0.2	L	pCi/L	08/09/2010 000 WN	ACW10
Uranium Suspended	ND	0.001		mg/L	07/26/2010 1720 MS	EPA 200.8
Turbidity	3.1	0.1		NTU	07/21/2010 1426 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	347	5		mg/L	07/23/2010 2203 LJK	SM 2320B
Alkalinity, Carbonate as CO3	88	5		mg/L	07/23/2010 2203 LJK	SM 2320B
Chloride	7	1		mg/L	07/28/2010 000 KO	EPA 300.0
Fluoride	0.2	0.1		mg/L	07/26/2010 1533 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	07/30/2010 1509 AS	EPA 353.2
Sulfate	97	1		mg/L	07/28/2010 000 KO	EPA 300.0

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL
- O Outside the Range of Dilutions
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- L Analyzed by a contract laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 8/25/2010
Report ID: S1007313001

Work Order: S1007313
Collection Date: 7/21/2010 3:00:00 PM
Date Received: 7/22/2010 8:07:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1007313-005
Client Sample ID: HBRES04 (Oshoto Reservoir)
COC: 131154

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cations						
Calcium	15	1		mg/L	07/27/2010 1351 DG	EPA 200.7
Magnesium	23	1		mg/L	07/22/2010 1339 RS	EPA 200.7
Potassium	12	1		mg/L	07/27/2010 1351 DG	EPA 200.7
Sodium	177	1		mg/L	07/22/2010 1339 RS	EPA 200.7
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	5.68	0.01		meq/L	07/29/2010 753 KO	SM 1030E
Carbonate as CO3	2.92	0.01		meq/L	07/29/2010 753 KO	SM 1030E
Chloride	0.18	0.01		meq/L	07/29/2010 753 KO	SM 1030E
Fluoride	ND	0.01		meq/L	07/29/2010 753 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	07/29/2010 753 KO	SM 1030E
Sulfate	2.02	0.01		meq/L	07/29/2010 753 KO	SM 1030E
Calcium	0.76	0.01		meq/L	07/29/2010 753 KO	SM 1030E
Magnesium	1.89	0.01		meq/L	07/29/2010 753 KO	SM 1030E
Potassium	0.29	0.01		meq/L	07/29/2010 753 KO	SM 1030E
Sodium	7.68	0.01		meq/L	07/29/2010 753 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	10.63	0		meq/L	07/29/2010 753 KO	SM 1030E
Anion Sum	10.82	0		meq/L	07/29/2010 753 KO	SM 1030E
Cation-Anion Balance	0.92	0		%	07/29/2010 753 KO	SM 1030E

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 8/25/2010
Report ID: S1007313001

Work Order: S1007313
Collection Date: 7/21/2010 3:00:00 PM
Date Received: 7/22/2010 8:07:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1007313-005
Client Sample ID: HBRES04 (Oshoto Reservoir)
COC: 131154

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	07/23/2010 1906 RS	EPA 200.7
Arsenic	0.008	0.005		mg/L	07/22/2010 1130 MS	EPA 200.8
Barium	ND	0.5		mg/L	07/22/2010 1130 MS	EPA 200.8
Boron	0.1	0.1		mg/L	07/23/2010 1906 RS	EPA 200.7
Cadmium	ND	0.002		mg/L	07/22/2010 1130 MS	EPA 200.8
Chromium	ND	0.01		mg/L	07/23/2010 1906 RS	EPA 200.7
Copper	ND	0.01		mg/L	07/22/2010 1130 MS	EPA 200.8
Iron	ND	0.05		mg/L	07/23/2010 1906 RS	EPA 200.7
Lead	ND	0.02		mg/L	07/22/2010 1130 MS	EPA 200.8
Mercury	ND	0.001		mg/L	07/23/2010 913 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	07/22/2010 1130 MS	EPA 200.8
Nickel	ND	0.01		mg/L	07/23/2010 1906 RS	EPA 200.7
Selenium	ND	0.005		mg/L	07/22/2010 1130 MS	EPA 200.8
Silver	ND	0.003		mg/L	07/22/2010 1130 MS	EPA 200.8
Uranium	0.009	0.001		mg/L	07/22/2010 1130 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	07/22/2010 1130 MS	EPA 200.8
Zinc	ND	0.01		mg/L	07/23/2010 1906 RS	EPA 200.7
Total Metals						
Iron	0.07	0.05		mg/L	07/23/2010 1931 RS	EPA 200.7
Manganese	0.03	0.02		mg/L	07/23/2010 1931 RS	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/21/2010
Report ID: S1008471001

Work Order: S1008471
Collection Date: 8/24/2010 1:30:00 PM
Date Received: 8/25/2010 4:17:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1008471-004
Client Sample ID: P15507S
COC: 131167

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.93	s.u.			08/24/2010 1330	Field
Conductivity	1862	µmhos/cm			08/24/2010 1330	Field
Turbidity	596.0	NT		U	08/24/2010 1330	Field
Temperature	25.2	°C			08/24/2010 1330	Field
General Parameters						
pH	9.2	0.1		s.u.	08/26/2010 1803 KO	SM 4500 H B
Electrical Conductivity	2010	5		µmhos/cm	08/26/2010 1803 KO	SM 2510B
Total Dissolved Solids (180)	1510	10		mg/L	08/27/2010 1135 AMB	SM 2540
Solids, Total Dissolved (Calc)	1350	10		mg/L	09/03/2010 757 KO	SM 1030E
Total Suspended Solids	530	5		mg/L	08/30/2010 1205 AMB	SM 2540
Alkalinity, Total (As CaCO3)	1210	5		mg/L	08/26/2010 1803 KO	SM 2320B
Nitrogen, Ammonia (As N)	0.2	0.1		mg/L	09/08/2010 955 AS	EPA 350.1
Turbidity	392	0.1		NTU	08/26/2010 1320 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	1130	5		mg/L	08/26/2010 1803 KO	SM 2320B
Alkalinity, Carbonate as CO3	169	5		mg/L	08/26/2010 1803 KO	SM 2320B
Chloride	12	1		mg/L	08/26/2010 1727 KO	EPA 300.0
Fluoride	0.5	0.1		mg/L	08/26/2010 1803 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	08/31/2010 1749 AS	EPA 353.2
Sulfate	54	1		mg/L	08/26/2010 1727 KO	EPA 300.0
Cations						
Calcium	16	1		mg/L	08/30/2010 1047 DG	EPA 200.7
Magnesium	42	1		mg/L	08/30/2010 1047 DG	EPA 200.7
Potassium	31	1		mg/L	08/30/2010 1047 DG	EPA 200.7
Sodium	467	1		mg/L	08/30/2010 1047 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/21/2010
Report ID: S1008471001

Work Order: S1008471
Collection Date: 8/24/2010 1:30:00 PM
Date Received: 8/25/2010 4:17:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1008471-004
Client Sample ID: P15507S
COC: 131167

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	18.59	0.01		meq/L	09/03/2010 757 KO	SM 1030E
Carbonate as CO3	5.62	0.01		meq/L	09/03/2010 757 KO	SM 1030E
Chloride	0.32	0.01		meq/L	09/03/2010 757 KO	SM 1030E
Fluoride	0.02	0.01		meq/L	09/03/2010 757 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	09/03/2010 757 KO	SM 1030E
Sulfate	1.11	0.01		meq/L	09/03/2010 757 KO	SM 1030E
Calcium	0.80	0.01		meq/L	09/03/2010 757 KO	SM 1030E
Magnesium	3.47	0.01		meq/L	09/03/2010 757 KO	SM 1030E
Potassium	0.79	0.01		meq/L	09/03/2010 757 KO	SM 1030E
Sodium	20.29	0.01		meq/L	09/03/2010 757 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	25.37	0		meq/L	09/03/2010 757 KO	SM 1030E
Anion Sum	25.69	0		meq/L	09/03/2010 757 KO	SM 1030E
Cation-Anion Balance	0.62	0		%	09/03/2010 757 KO	SM 1030E
Radio Chemistry						
Gross Alpha	27.3 ± 4.7	2		pCi/L	10/02/2010 2207 SH	SM 7110B
Gross Beta	44.4 ± 4.4	3		pCi/L	10/02/2010 2207 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	10/05/2010 834 SH	SM 7500-Ra B
Radium 226 (Suspended)	0.3 ± 0.1	0.2		pCi/L	09/25/2010 1558 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	10/10/2010 2120 SH	Ra-05
Lead 210 (Dissolved)	ND	1		pCi/L	09/29/2010 1616 SH	OTW01
Lead 210 (Suspended)	ND	1		pCi/L	09/23/2010 1443 SH	OTW01
Polonium 210 (Dissolved)	ND	1		pCi/L	09/29/2010 1616 SH	OTW01
Polonium 210 (Suspended)	ND	1		pCi/L	09/23/2010 1443 SH	OTW01
Thorium 230 (Dissolved)	ND	0.2		pCi/L	10/20/2010 1407 WN	ACW10
Thorium 230 (Suspended)	0.46±0.16	0.2		pCi/L	10/20/2010 1407 WN	ACW10
Uranium Suspended	0.003	0.001		mg/L	09/08/2010 1150 MS	EPA 200.8

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/21/2010
Report ID: S1008471001

Work Order: S1008471
Collection Date: 8/24/2010 1:30:00 PM
Date Received: 8/25/2010 4:17:00 PM
Sampler: RF
Matrix: Water

Project: ROSS ISR
Lab ID: S1008471-004
Client Sample ID: P15507S
COC: 131167

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	08/30/2010 1047 DG	EPA 200.7
Arsenic	0.016	0.005		mg/L	08/26/2010 1705 MS	EPA 200.8
Barium	ND	0.5		mg/L	08/26/2010 1705 MS	EPA 200.8
Boron	0.3	0.1		mg/L	08/30/2010 1047 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	08/26/2010 1705 MS	EPA 200.8
Chromium	ND	0.01		mg/L	08/30/2010 1047 DG	EPA 200.7
Copper	ND	0.01		mg/L	08/26/2010 1705 MS	EPA 200.8
Iron	0.13	0.05		mg/L	08/30/2010 1047 DG	EPA 200.7
Lead	ND	0.02		mg/L	08/26/2010 1705 MS	EPA 200.8
Mercury	ND	0.001		mg/L	08/31/2010 813 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	08/26/2010 1705 MS	EPA 200.8
Nickel	ND	0.01		mg/L	08/30/2010 1047 DG	EPA 200.7
Selenium	ND	0.005		mg/L	08/26/2010 1705 MS	EPA 200.8
Silver	ND	0.003		mg/L	08/26/2010 1705 MS	EPA 200.8
Uranium	0.021	0.001		mg/L	08/26/2010 1705 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	08/26/2010 1705 MS	EPA 200.8
Zinc	ND	0.01		mg/L	08/30/2010 1047 DG	EPA 200.7
Total Metals						
Iron	6.28	0.05		mg/L	08/30/2010 1710 DG	EPA 200.7
Manganese	0.34	0.02		mg/L	08/30/2010 1710 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level
E	Value above quantitation range
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL
O	Outside the Range of Dilutions
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
L	Analyzed by a contract laboratory
ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 9/1/2010
Report ID: S1007330001

Work Order: S1007330
Collection Date: 7/22/2010 9:00:00 AM
Date Received: 7/23/2010 8:50:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1007330-001
Client Sample ID: TW RES01
COC: 128480

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.61	s.u.			07/22/2010 900	Field
Conductivity	156.9	µm		hos/cm	07/22/2010 900	Field
Dissolved Oxygen	4.90	mg		/L	07/22/2010 900	Field
Dissolved Oxygen (pct)	55.0			%	07/22/2010 900	Field
Turbidity	6.05	NT		U	07/22/2010 900	Field
Temperature	20.2	°C			07/22/2010 900	Field
General Parameters						
pH	8.7	0.1		s.u.	07/23/2010 2349 LJK	SM 4500 H B
Electrical Conductivity	133	5		µmhos/cm	07/23/2010 2349 LJK	SM 2510B
Total Dissolved Solids (180)	100	10		mg/L	07/23/2010 1010 MJH	SM 2540
Solids, Total Dissolved (Calc)	70	10		mg/L	07/27/2010 907 KO	SM 1030E
Total Suspended Solids	6	5		mg/L	07/27/2010 1005 MJH	SM 540
Alkalinity, Total (As CaCO3)	59	5		mg/L	07/23/2010 2349 LJK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	08/04/2010 1108 AS	EPA 350.1
Turbidity	4.8	0.1		NTU	07/23/2010 1245 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	68	5		mg/L	07/23/2010 2349 LJK	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	07/23/2010 2349 LJK	SM 2320B
Chloride	ND	1		mg/L	07/26/2010 1930 KO	EPA 300.0
Fluoride	0.1	0.1		mg/L	07/26/2010 1653 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	07/30/2010 1527 AS	EPA 353.2
Sulfate	5	1		mg/L	07/26/2010 1930 KO	EPA 300.0
Cations						
Calcium	11	1		mg/L	07/23/2010 1759 RS	EPA 200.7
Magnesium	3	1		mg/L	07/23/2010 1759 RS	EPA 200.7
Potassium	10	1		mg/L	07/23/2010 1759 RS	EPA 200.7
Sodium	8	1		mg/L	07/23/2010 1759 RS	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 9/1/2010
Report ID: S1007330001

Work Order: S1007330
Collection Date: 7/22/2010 9:00:00 AM
Date Received: 7/23/2010 8:50:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1007330-001
Client Sample ID: TW RES01
COC: 128480

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	1.10	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Chloride	ND	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Fluoride	ND	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Sulfate	0.09	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Calcium	0.52	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Magnesium	0.26	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Potassium	0.25	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Sodium	0.34	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	1.38	0		meq/L	07/27/2010 907 KO	SM 1030E
Anion Sum	1.28	0		meq/L	07/27/2010 907 KO	SM 1030E
Cation-Anion Balance	3.83	0		%	07/27/2010 907 KO	SM 1030E
Radio Chemistry						
Gross Alpha	3.55 ± 0.95	2		pCi/L	08/23/2010 1542 SH	SM 7110B
Gross Beta	9.26 ± 1.40	3		pCi/L	08/23/2010 1542 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	08/29/2010 1816 SH	SM 7500-Ra B
Radium 226 (Suspended)	ND	0.2		pCi/L	08/30/2010 2112 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	08/26/2010 2301 SH	Ra-05
Lead 210 (Dissolved)	ND	1		pCi/L	08/20/2010 2106 SH	OTW01
Lead 210 (Suspended)	ND	1		pCi/L	08/21/2010 1941 SH	OTW01
Polonium 210 (Dissolved)	ND	1		pCi/L	08/24/2010 1523 SH	OTW01
Polonium 210 (Suspended)	ND	1		pCi/L	08/24/2010 1249 SH	OTW01
Thorium 230 (Dissolved)	ND	0.2	L	pCi/L	08/13/2010 000 WN	ACW10
Thorium 230 (Suspended)	ND	0.2	L	pCi/L	08/13/2010 000 WN	ACW10
Uranium Suspended	ND	0.001		mg/L	08/02/2010 1821 MS	EPA 200.8

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level
E	Value above quantitation range
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL
O	Outside the Range of Dilutions
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
L	Analyzed by a contract laboratory
ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 9/1/2010
Report ID: S1007330001

Work Order: S1007330
Collection Date: 7/22/2010 9:00:00 AM
Date Received: 7/23/2010 8:50:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1007330-001
Client Sample ID: TW RES01
COC: 128480

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	07/23/2010 1759 RS	EPA 200.7
Arsenic	0.006	0.005		mg/L	07/23/2010 1315 MS	EPA 200.8
Barium	ND	0.5		mg/L	07/23/2010 1315 MS	EPA 200.8
Boron	ND	0.1		mg/L	07/23/2010 1759 RS	EPA 200.7
Cadmium	ND	0.002		mg/L	07/23/2010 1315 MS	EPA 200.8
Chromium	ND	0.01		mg/L	07/23/2010 1759 RS	EPA 200.7
Copper	ND	0.01		mg/L	07/23/2010 1315 MS	EPA 200.8
Iron	0.35	0.05		mg/L	07/23/2010 1759 RS	EPA 200.7
Lead	ND	0.02		mg/L	07/23/2010 1315 MS	EPA 200.8
Mercury	ND	0.001		mg/L	07/27/2010 827 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	07/23/2010 1315 MS	EPA 200.8
Nickel	ND	0.01		mg/L	07/23/2010 1759 RS	EPA 200.7
Selenium	ND	0.005		mg/L	07/23/2010 1315 MS	EPA 200.8
Silver	ND	0.003		mg/L	07/23/2010 1315 MS	EPA 200.8
Uranium	ND	0.001		mg/L	07/23/2010 1315 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	07/23/2010 1315 MS	EPA 200.8
Zinc	ND	0.01		mg/L	07/23/2010 1759 RS	EPA 200.7
Total Metals						
Iron	0.64	0.05		mg/L	07/26/2010 2038 DG	EPA 200.7
Manganese	0.03	0.02		mg/L	07/26/2010 2038 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 9/1/2010
Report ID: S1007330001

Work Order: S1007330
Collection Date: 7/22/2010 10:30:00 AM
Date Received: 7/23/2010 8:50:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1007330-002
Client Sample ID: TW RES02
COC: 128480

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	10.46	s.u.			07/22/2010 1030	Field
Conductivity	281	µm		hos/cm	07/22/2010 1030	Field
Dissolved Oxygen	6.72	mg		/L	07/22/2010 1030	Field
Dissolved Oxygen (pct)	77.6			%	07/22/2010 1030	Field
Turbidity	3.22	NT		U	07/22/2010 1030	Field
Temperature	21.8	°C			07/22/2010 1030	Field
General Parameters						
pH	9.8	0.1		s.u.	07/24/2010 001 LJK	SM 4500 H B
Electrical Conductivity	273	5		µmhos/cm	07/24/2010 001 LJK	SM 2510B
Total Dissolved Solids (180)	210	10		mg/L	07/23/2010 1015 MJH	SM 2540
Solids, Total Dissolved (Calc)	150	10		mg/L	07/27/2010 907 KO	SM 1030E
Total Suspended Solids	ND	5		mg/L	07/27/2010 1010 MJH	SM 2540
Alkalinity, Total (As CaCO3)	107	5		mg/L	07/24/2010 001 LJK	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	08/04/2010 1109 AS	EPA 350.1
Turbidity	2.2	0.1		NTU	07/23/2010 1247 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	51	5		mg/L	07/24/2010 001 LJK	SM 2320B
Alkalinity, Carbonate as CO3	39	5		mg/L	07/24/2010 001 LJK	SM 2320B
Chloride	2	1		mg/L	07/26/2010 2023 KO	EPA 300.0
Fluoride	ND	0.1		mg/L	07/26/2010 1657 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	07/30/2010 1528 AS	EPA 353.2
Sulfate	27	1		mg/L	07/26/2010 2023 KO	EPA 300.0
Cations						
Calcium	14	1		mg/L	07/23/2010 1802 RS	EPA 200.7
Magnesium	10	1		mg/L	07/23/2010 1802 RS	EPA 200.7
Potassium	5	1		mg/L	07/23/2010 1802 RS	EPA 200.7
Sodium	26	1		mg/L	07/23/2010 1802 RS	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 9/1/2010
Report ID: S1007330001

Work Order: S1007330
Collection Date: 7/22/2010 10:30:00 AM
Date Received: 7/23/2010 8:50:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1007330-002
Client Sample ID: TW RES02
COC: 128480

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	0.84	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Carbonate as CO3	1.30	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Chloride	0.04	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Fluoride	ND	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Sulfate	0.56	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Calcium	0.68	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Magnesium	0.84	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Potassium	0.11	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Sodium	1.14	0.01		meq/L	07/27/2010 907 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	2.79	0		meq/L	07/27/2010 907 KO	SM 1030E
Anion Sum	2.75	0		meq/L	07/27/2010 907 KO	SM 1030E
Cation-Anion Balance	0.72	0		%	07/27/2010 907 KO	SM 1030E
Radio Chemistry						
Gross Alpha	3.61 ± 0.81	2		pCi/L	08/22/2010 1038 SH	SM 7110B
Gross Beta	5.99 ± 1.10	3		pCi/L	08/22/2010 1038 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	08/29/2010 1816 SH	SM 7500-Ra B
Radium 226 (Suspended)	ND	0.2		pCi/L	08/30/2010 2112 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	08/26/2010 2301 SH	Ra-05
Lead 210 (Dissolved)	ND	1		pCi/L	08/20/2010 2106 SH	OTW01
Lead 210 (Suspended)	ND	1		pCi/L	08/21/2010 1941 SH	OTW01
Polonium 210 (Dissolved)	ND	1		pCi/L	08/24/2010 1523 SH	OTW01
Polonium 210 (Suspended)	ND	1		pCi/L	08/24/2010 1249 SH	OTW01
Thorium 230 (Dissolved)	ND	0.2	L	pCi/L	08/13/2010 000 WN	ACW10
Thorium 230 (Suspended)	ND	0.2	L	pCi/L	08/13/2010 000 WN	ACW10
Uranium Suspended	ND	0.001		mg/L	08/02/2010 1828 MS	EPA 200.8

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 9/1/2010
Report ID: S1007330001

Work Order: S1007330
Collection Date: 7/22/2010 10:30:00 AM
Date Received: 7/23/2010 8:50:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1007330-002
Client Sample ID: TW RES02
COC: 128480

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	07/23/2010 1802 RS	EPA 200.7
Arsenic	0.007	0.005		mg/L	07/23/2010 1319 MS	EPA 200.8
Barium	ND	0.5		mg/L	07/23/2010 1319 MS	EPA 200.8
Boron	ND	0.1		mg/L	07/23/2010 1802 RS	EPA 200.7
Cadmium	ND	0.002		mg/L	07/23/2010 1319 MS	EPA 200.8
Chromium	ND	0.01		mg/L	07/23/2010 1802 RS	EPA 200.7
Copper	ND	0.01		mg/L	07/23/2010 1319 MS	EPA 200.8
Iron	ND	0.05		mg/L	07/23/2010 1802 RS	EPA 200.7
Lead	ND	0.02		mg/L	07/23/2010 1319 MS	EPA 200.8
Mercury	ND	0.001		mg/L	07/27/2010 829 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	07/23/2010 1319 MS	EPA 200.8
Nickel	ND	0.01		mg/L	07/23/2010 1802 RS	EPA 200.7
Selenium	ND	0.005		mg/L	07/23/2010 1319 MS	EPA 200.8
Silver	ND	0.003		mg/L	07/23/2010 1319 MS	EPA 200.8
Uranium	0.003	0.001		mg/L	07/23/2010 1319 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	07/23/2010 1319 MS	EPA 200.8
Zinc	ND	0.01		mg/L	07/23/2010 1802 RS	EPA 200.7
Total Metals						
Iron	0.06	0.05		mg/L	07/26/2010 2040 DG	EPA 200.7
Manganese	0.03	0.02		mg/L	07/26/2010 2040 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level
E	Value above quantitation range
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL
O	Outside the Range of Dilutions
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
L	Analyzed by a contract laboratory
ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: CSRES 03/04 **Date:** 10-4-10 **Time:** 1450

Landowner
Name: Strong
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s)

Stock ✓

Domestic

SEO Permitted Facility Name:

Permit No. —

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 9.00
Cond. 985 µS
Temp. °C 19.8
Turbidity (ntu) 101
D.O. (mg/L) 7.11 / 79.0

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp:

Comments: Res low - almost dry - water turbid - no odor

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: HB RES 04 Oshoto Res. **Date:** 10-5-10 **Time:** 1430

Landowner
Name: Berger
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s)

Stock

Domestic

SEO Permitted Facility Name:

Permit No. P6046R

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 9.29
Cond. 1106 µS
Temp. °C 16.6
Turbidity (ntu) 26.0
D.O. (mg/L) 6.67/ 68.8

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp:

Comments: Water turbid - color is light yellow/ brown - no odor

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: P155075 Deadman #1 **Date:** 10-5-10 **Time:** 1600

Landowner
Name: Swanda
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s)

Stock ✓

Domestic

SEO Permitted Facility Name: Deadman #1 **Permit No.** P155075

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 10.20
Cond. 3.64 mS
Temp. °C 20.6
Turbidity (ntu) 328
D.O. (mg/L) 10.14/114

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp:

Comments: Water turbid - color is light yellow/brown - no odor

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: P155085 Deadman #2 **Date:** 10-5-10 **Time:** 1510

Landowner
Name: Swanda
Address
Phone#

Legal Location
Qtr/Qtr NW SW
SEC 18
TWN 53
RNG 67

Picture #(s) 2

Stock ✓

Domestic

SEO Permitted Facility Name: Deadman #2 **Permit No.** P155085

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 7.68
Cond. 2.70 mS
Temp. °C 18.4
Turbidity (ntu) 86.9
D.O. (mg/L) 7.87 / 105.90

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp:

Comments: Water turbid - color is light yellow/ brown - no odor.

* First sample for this res.

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: P175925 Butte #1 Stock-RES **Date:** 10-5-10 **Time:** 1330

Landowner
Name: Swanda
Address
Phone#

Legal Location
Qtr/Qtr SWSW
SEC 18
TWN 53
RNG 67

Picture #(s) 1

Stock ✓

Domestic

SEO Permitted Facility Name:

Permit No. P175925

Location (Decimal Degrees)
Lat 44.57291
Long 104.96346
Elev. 4208

Water Quality
pH 9.29
Cond. 2.89 mS
Temp. °C 19.2
Turbidity (ntu) 23.4
D.O. (mg/L) 4.88 / 52.8

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp:

Comments: First sample for this res. - water turbid - colored light yellow/brown - no odor.

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: TWRES01 **Date:** 10-5-10 **Time:** 1015

Landowner
Name: WESLEY
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s)

Stock ✓

Domestic

SEO Permitted Facility Name:

Permit No. —

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 9.47
Cond. 247 µS
Temp. °C 15.0
Turbidity (ntu) 64.4
D.O. (mg/L) 5.87 / 59.1

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp:

Comments: Water turbid - light yellow/brown - no odor

WWC ENGINEERING
LANDOWNER WATER SAMPLING FORM
For STRATA ENERGY

Name: TW RES 02 **Date:** 10-5-10 **Time:** 1145

Landowner
Name:
Address
Phone#

Legal Location
Qtr/Qtr
SEC
TWN
RNG

Picture #(s)

Stock ✓

Domestic

SEO Permitted Facility Name:

Permit No. —

Location (Decimal Degrees)
Lat
Long
Elev.

Water Quality
pH 10.32
Cond. 1801 µS
Temp. °C 18.4
Turbidity (ntu) 26.5
D.O. (mg/L) 10.73 / 116.8

Water Level (ft):

% Combustible Gas:

Casing Height (ft):

Ambient Air Temp:

Comments: water slightly turbid - color is light yellow/brown - no odor

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/26/2010
Report ID: S1010074001

Work Order: S1010074
Collection Date: 10/4/2010 2:50:00 PM
Date Received: 10/5/2010 4:25:00 PM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010074-005
Client Sample ID: CS RES 03
COC: 131169

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.00	s.u.			10/04/2010 1450	Field
Conductivity	985	µm		hos/cm	10/04/2010 1450	Field
Dissolved Oxygen	7.11	mg		/L	10/04/2010 1450	Field
Dissolved Oxygen (pct)	79.0			%	10/04/2010 1450	Field
Turbidity	101	NT		U	10/04/2010 1450	Field
Temperature	19.8	°C			10/04/2010 1450	Field
General Parameters						
pH	8.5	0.1		s.u.	10/06/2010 2157 KO	SM 4500 H B
Electrical Conductivity	1000	5		µmhos/cm	10/06/2010 2157 KO	SM 2510B
Total Dissolved Solids (180)	760	10		mg/L	10/07/2010 1320 JF	SM 2540
Solids, Total Dissolved (Calc)	610	10		mg/L	10/14/2010 1334 KO	SM 1030E
Total Suspended Solids	134	5		mg/L	10/06/2010 1700 JF	SM 2540
Alkalinity, Total (As CaCO3)	346	5		mg/L	10/06/2010 2157 KO	SM 2320B
Nitrogen, Ammonia (As N)	0.6	0.1		mg/L	10/11/2010 1521 AS	EPA 350.1
Turbidity	101	0.1		NTU	10/06/2010 1408 AS	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	398	5		mg/L	10/06/2010 2157 KO	SM 2320B
Alkalinity, Carbonate as CO3	12	5		mg/L	10/06/2010 2157 KO	SM 2320B
Chloride	9	1		mg/L	10/06/2010 1912 KO	EPA 300.0
Fluoride	0.1	0.1		mg/L	10/07/2010 1851 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/15/2010 1516 AS	EPA 353.2
Sulfate	169	1		mg/L	10/06/2010 1912 KO	EPA 300.0
Cations						
Calcium	54	1		mg/L	10/06/2010 1520 DG	EPA 200.7
Magnesium	26	1		mg/L	10/06/2010 1520 DG	EPA 200.7
Potassium	29	1		mg/L	10/06/2010 1520 DG	EPA 200.7
Sodium	119	1		mg/L	10/06/2010 1520 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/26/2010
Report ID: S1010074001

Work Order: S1010074
Collection Date: 10/4/2010 2:50:00 PM
Date Received: 10/5/2010 4:25:00 PM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010074-005
Client Sample ID: CS RES 03
COC: 131169

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	6.53	0.01		meq/L	10/14/2010 1334 KO	SM 1030E
Carbonate as CO3	0.39	0.01		meq/L	10/14/2010 1334 KO	SM 1030E
Chloride	0.25	0.01		meq/L	10/14/2010 1334 KO	SM 1030E
Fluoride	ND	0.01		meq/L	10/14/2010 1334 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	10/14/2010 1334 KO	SM 1030E
Sulfate	3.52	0.01		meq/L	10/14/2010 1334 KO	SM 1030E
Calcium	2.69	0.01		meq/L	10/14/2010 1334 KO	SM 1030E
Magnesium	2.10	0.01		meq/L	10/14/2010 1334 KO	SM 1030E
Potassium	0.74	0.01		meq/L	10/14/2010 1334 KO	SM 1030E
Sodium	5.17	0.01		meq/L	10/14/2010 1334 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	10.72	0		meq/L	10/14/2010 1334 KO	SM 1030E
Anion Sum	10.72	0		meq/L	10/14/2010 1334 KO	SM 1030E
Cation-Anion Balance	0.01	0		%	10/14/2010 1334 KO	SM 1030E
Radio Chemistry						
Gross Alpha	11.1 ± 2.9	2		pCi/L	10/20/2010 2011 SH	SM 7110B
Gross Beta	27.6 ± 4.0	3		pCi/L	10/20/2010 2011 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	10/15/2010 1356 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	10/18/2010 2347 SH	Ra-05

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: *[signature]*
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/26/2010
Report ID: S1010074001

Work Order: S1010074
Collection Date: 10/4/2010 2:50:00 PM
Date Received: 10/5/2010 4:25:00 PM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010074-005
Client Sample ID: CS RES 03
COC: 131169

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	10/06/2010 1520 DG	EPA 200.7
Arsenic	0.022	0.005		mg/L	10/06/2010 1251 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/06/2010 1251 MS	EPA 200.8
Boron	ND	0.1		mg/L	10/06/2010 1520 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	10/06/2010 1251 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/06/2010 1520 DG	EPA 200.7
Copper	ND	0.01		mg/L	10/06/2010 1251 MS	EPA 200.8
Iron	ND	0.05		mg/L	10/06/2010 1520 DG	EPA 200.7
Lead	ND	0.02		mg/L	10/06/2010 1251 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/07/2010 938 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/06/2010 1251 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/06/2010 1520 DG	EPA 200.7
Selenium	ND	0.005		mg/L	10/06/2010 1251 MS	EPA 200.8
Silver	ND	0.003		mg/L	10/06/2010 1251 MS	EPA 200.8
Uranium	0.005	0.001		mg/L	10/06/2010 1251 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/06/2010 1251 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/06/2010 1520 DG	EPA 200.7
Total Metals						
Iron	1.32	0.05		mg/L	10/08/2010 1412 DG	EPA 200.7
Manganese	1.12	0.02		mg/L	10/08/2010 1412 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: AN

Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 2:30:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-002
Client Sample ID: HBRES04
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.29	s.u.			10/05/2010 1430	Field
Conductivity	1106	µm		hos/cm	10/05/2010 1430	Field
Dissolved Oxygen	6.67	mg		/L	10/05/2010 1430	Field
Dissolved Oxygen (pct)	68.8			%	10/05/2010 1430	Field
Turbidity	26.0	NT		U	10/05/2010 1430	Field
Temperature	16.6	°C			10/05/2010 1430	Field
General Parameters						
pH	8.9	0.1		s.u.	10/08/2010 1920 KO	SM 4500 H B
Electrical Conductivity	1090	5		µmhos/cm	10/08/2010 1920 KO	SM 2510B
Total Dissolved Solids (180)	730	10		mg/L	10/08/2010 1625 JF	SM 2540
Solids, Total Dissolved (Calc)	690	10		mg/L	10/14/2010 739 KO	SM 1030E
Total Suspended Solids	24	5		mg/L	10/08/2010 840 JF	SM 2540
Alkalinity, Total (As CaCO3)	507	5		mg/L	10/08/2010 1920 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	10/11/2010 1544 AS	EPA 350.1
Turbidity	19.1	0.1		NTU	10/07/2010 1329 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	520	5		mg/L	10/08/2010 1920 KO	SM 2320B
Alkalinity, Carbonate as CO3	49	5		mg/L	10/08/2010 1920 KO	SM 2320B
Chloride	8	1		mg/L	10/08/2010 1340 KO	EPA 300.0
Fluoride	0.2	0.1		mg/L	10/08/2010 1920 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/12/2010 1715 AS	EPA 353.2
Sulfate	96	1		mg/L	10/08/2010 1340 KO	EPA 300.0
Cations						
Calcium	16	1		mg/L	10/08/2010 1141 DG	EPA 200.7
Magnesium	24	1		mg/L	10/08/2010 1141 DG	EPA 200.7
Potassium	14	1		mg/L	10/08/2010 1141 DG	EPA 200.7
Sodium	226	1		mg/L	10/08/2010 1141 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Page 4 of 12

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 2:30:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-002
Client Sample ID: HBRES04 (Oshoto Reservoir)
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	8.52	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Carbonate as CO3	1.62	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Chloride	0.22	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Fluoride	0.01	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Sulfate	2.00	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Calcium	0.79	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Magnesium	1.99	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Potassium	0.35	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Sodium	9.82	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	12.96	0		meq/L	10/14/2010 739 KO	SM 1030E
Anion Sum	12.39	0		meq/L	10/14/2010 739 KO	SM 1030E
Cation-Anion Balance	2.24	0		%	10/14/2010 739 KO	SM 1030E
Radio Chemistry						
Gross Alpha	9.5 ± 1.8	2		pCi/L	10/24/2010 1109 SH	SM 7110B
Gross Beta	13.0 ± 2.0	3		pCi/L	10/24/2010 1109 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	10/20/2010 847 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	10/23/2010 910 TWP	Ga-Tech

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: AJK

Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 2:30:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-002
Client Sample ID: HBRES04 (Oshoto Reservoir)
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	10/08/2010 1141 DG	EPA 200.7
Arsenic	0.007	0.005		mg/L	10/07/2010 1340 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/07/2010 1340 MS	EPA 200.8
Boron	0.1	0.1		mg/L	10/08/2010 1141 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	10/07/2010 1340 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/08/2010 1141 DG	EPA 200.7
Copper	ND	0.01		mg/L	10/07/2010 1340 MS	EPA 200.8
Iron	ND	0.05		mg/L	10/08/2010 1141 DG	EPA 200.7
Lead	ND	0.02		mg/L	10/07/2010 1340 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/12/2010 928 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/07/2010 1340 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/08/2010 1141 DG	EPA 200.7
Selenium	ND	0.005		mg/L	10/07/2010 1340 MS	EPA 200.8
Silver	ND	0.003		mg/L	10/07/2010 1340 MS	EPA 200.8
Uranium	0.008	0.001		mg/L	10/07/2010 1340 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/07/2010 1340 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/08/2010 1141 DG	EPA 200.7
Total Metals						
Iron	0.13	0.05		mg/L	10/10/2010 1038 DG	EPA 200.7
Manganese	0.07	0.02		mg/L	10/10/2010 1038 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 4:00:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-004
Client Sample ID: P15507S
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	10.20	s.u.			10/05/2010 1600	Field
Conductivity	3640	µm		hos/cm	10/05/2010 1600	Field
Dissolved Oxygen	10.14	mg		/L	10/05/2010 1600	Field
Dissolved Oxygen (pct)	114			%	10/05/2010 1600	Field
Turbidity	328	NT		U	10/05/2010 1600	Field
Temperature	20.6	°C			10/05/2010 1600	Field
General Parameters						
pH	9.9	0.1		s.u.	10/08/2010 1948 KO	SM 4500 H B
Electrical Conductivity	2910	5		µmhos/cm	10/08/2010 1948 KO	SM 2510B
Total Dissolved Solids (180)	2320	10		mg/L	10/08/2010 1635 JF	SM 2540
Solids, Total Dissolved (Calc)	1950	10		mg/L	10/14/2010 739 KO	SM 1030E
Total Suspended Solids	240	5		mg/L	10/08/2010 850 JF	SM 2540
Alkalinity, Total (As CaCO3)	1700	5		mg/L	10/08/2010 1948 KO	SM 2320B
Nitrogen, Ammonia (As N)	0.1	0.1		mg/L	10/11/2010 1552 AS	EPA 350.1
Turbidity	229	0.1		NTU	10/07/2010 1333 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	965	5		mg/L	10/08/2010 1948 KO	SM 2320B
Alkalinity, Carbonate as CO3	548	5		mg/L	10/08/2010 1948 KO	SM 2320B
Chloride	21	1		mg/L	10/08/2010 1444 KO	EPA 300.0
Fluoride	0.7	0.1		mg/L	10/08/2010 1948 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/12/2010 1717 AS	EPA 353.2
Sulfate	84	1		mg/L	10/08/2010 1444 KO	EPA 300.0
Cations						
Calcium	10	1		mg/L	10/08/2010 1150 DG	EPA 200.7
Magnesium	43	1		mg/L	10/08/2010 1150 DG	EPA 200.7
Potassium	27	1		mg/L	10/08/2010 1150 DG	EPA 200.7
Sodium	739	1		mg/L	10/08/2010 1150 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 4:00:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-004
Client Sample ID: P15507S
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	15.81	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Carbonate as CO3	18.27	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Chloride	0.60	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Fluoride	0.03	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Sulfate	1.74	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Calcium	0.51	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Magnesium	3.52	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Potassium	0.70	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Sodium	32.14	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	36.87	0		meq/L	10/14/2010 739 KO	SM 1030E
Anion Sum	36.47	0		meq/L	10/14/2010 739 KO	SM 1030E
Cation-Anion Balance	0.55	0		%	10/14/2010 739 KO	SM 1030E
Radio Chemistry						
Gross Alpha	48.7 ± 6.0	2		pCi/L	10/24/2010 1109 SH	SM 7110B
Gross Beta	48.5 ± 5.7	3		pCi/L	10/24/2010 1109 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	10/20/2010 847 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	10/23/2010 1500 TWP	Ga-Tech

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: [signature]
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 4:00:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-004
Client Sample ID: P15507S
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	10/08/2010 1150 DG	EPA 200.7
Arsenic	0.052	0.005		mg/L	10/07/2010 1354 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/07/2010 1354 MS	EPA 200.8
Boron	0.4	0.1		mg/L	10/08/2010 1150 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	10/07/2010 1354 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/08/2010 1150 DG	EPA 200.7
Copper	ND	0.01		mg/L	10/07/2010 1354 MS	EPA 200.8
Iron	0.06	0.05		mg/L	10/08/2010 1150 DG	EPA 200.7
Lead	ND	0.02		mg/L	10/07/2010 1354 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/12/2010 939 BK	EPA 245.1
Molybdenum	0.06	0.02		mg/L	10/07/2010 1354 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/08/2010 1150 DG	EPA 200.7
Selenium	ND	0.005		mg/L	10/07/2010 1354 MS	EPA 200.8
Silver	ND	0.003		mg/L	10/07/2010 1354 MS	EPA 200.8
Uranium	0.087	0.001		mg/L	10/07/2010 1354 MS	EPA 200.8
Vanadium	0.03	0.02		mg/L	10/07/2010 1354 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/08/2010 1150 DG	EPA 200.7
Total Metals						
Iron	1.06	0.05		mg/L	10/10/2010 1043 DG	EPA 200.7
Manganese	0.12	0.02		mg/L	10/10/2010 1043 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: *[signature]*
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 3:10:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-003
Client Sample ID: P15508S
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.68	s.u.			10/05/2010 1510	Field
Conductivity	2700	µm		hos/cm	10/05/2010 1510	Field
Dissolved Oxygen	9.87	mg		/L	10/05/2010 1510	Field
Dissolved Oxygen (pct)	105.90			%	10/05/2010 1510	Field
Turbidity	86.9	NT		U	10/05/2010 1510	Field
Temperature	18.4	°C			10/05/2010 1510	Field
General Parameters						
pH	9.4	0.1		s.u.	10/08/2010 1933 KO	SM 4500 H B
Electrical Conductivity	2130	5		µmhos/cm	10/08/2010 1933 KO	SM 2510B
Total Dissolved Solids (180)	1560	10		mg/L	10/08/2010 1630 JF	SM 2540
Solids, Total Dissolved (Calc)	1390	10		mg/L	10/14/2010 739 KO	SM 1030E
Total Suspended Solids	86	5		mg/L	10/08/2010 845 JF	SM 2540
Alkalinity, Total (As CaCO3)	1220	5		mg/L	10/08/2010 1933 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	10/11/2010 1545 AS	EPA 350.1
Turbidity	69.4	0.1		NTU	10/07/2010 1331 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	1030	5		mg/L	10/08/2010 1933 KO	SM 2320B
Alkalinity, Carbonate as CO3	226	5		mg/L	10/08/2010 1933 KO	SM 2320B
Chloride	8	1		mg/L	10/08/2010 1349 KO	EPA 300.0
Fluoride	0.5	0.1		mg/L	10/08/2010 1933 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/12/2010 1716 AS	EPA 353.2
Sulfate	90	1		mg/L	10/08/2010 1349 KO	EPA 300.0
Cations						
Calcium	13	1		mg/L	10/08/2010 1148 DG	EPA 200.7
Magnesium	36	1		mg/L	10/08/2010 1148 DG	EPA 200.7
Potassium	16	1		mg/L	10/08/2010 1148 DG	EPA 200.7
Sodium	494	1		mg/L	10/08/2010 1148 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 3:10:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-003
Client Sample ID: P15508S
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	16.90	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Carbonate as CO3	7.54	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Chloride	0.21	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Fluoride	0.02	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Sulfate	1.88	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Calcium	0.65	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Magnesium	2.99	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Potassium	0.39	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Sodium	21.50	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	25.55	0		meq/L	10/14/2010 739 KO	SM 1030E
Anion Sum	26.58	0		meq/L	10/14/2010 739 KO	SM 1030E
Cation-Anion Balance	1.97	0		%	10/14/2010 739 KO	SM 1030E
Radio Chemistry						
Gross Alpha	15.0 ± 3.5	2		pCi/L	10/24/2010 1109 SH	SM 7110B
Gross Beta	20.0 ± 3.9	3		pCi/L	10/24/2010 1109 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	10/20/2010 847 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	10/23/2010 1202 TWP	Ga-Tech

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 3:10:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-003
Client Sample ID: P15508S
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	10/08/2010 1148 DG	EPA 200.7
Arsenic	0.015	0.005		mg/L	10/07/2010 1350 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/07/2010 1350 MS	EPA 200.8
Boron	0.2	0.1		mg/L	10/08/2010 1148 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	10/07/2010 1350 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/08/2010 1148 DG	EPA 200.7
Copper	ND	0.01		mg/L	10/07/2010 1350 MS	EPA 200.8
Iron	0.08	0.05		mg/L	10/08/2010 1148 DG	EPA 200.7
Lead	ND	0.02		mg/L	10/07/2010 1350 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/12/2010 937 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/07/2010 1350 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/08/2010 1148 DG	EPA 200.7
Selenium	ND	0.005		mg/L	10/07/2010 1350 MS	EPA 200.8
Silver	ND	0.003		mg/L	10/07/2010 1350 MS	EPA 200.8
Uranium	0.027	0.001		mg/L	10/07/2010 1350 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/07/2010 1350 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/08/2010 1148 DG	EPA 200.7
Total Metals						
Iron	1.30	0.05		mg/L	10/10/2010 1041 DG	EPA 200.7
Manganese	0.09	0.02		mg/L	10/10/2010 1041 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 1:30:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-001
Client Sample ID: P17592S
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.29	s.u.			10/05/2010 1330	Field
Conductivity	2890	µm		hos/cm	10/05/2010 1330	Field
Dissolved Oxygen	4.88	mg		/L	10/05/2010 1330	Field
Dissolved Oxygen (pct)	52.8			%	10/05/2010 1330	Field
Turbidity	23.4	NT		U	10/05/2010 1330	Field
Temperature	19.2	°C			10/05/2010 1330	Field
General Parameters						
pH	9.0	0.1		s.u.	10/08/2010 1909 KO	SM 4500 H B
Electrical Conductivity	2270	5		µmhos/cm	10/08/2010 1909 KO	SM 2510B
Total Dissolved Solids (180)	1710	10		mg/L	10/08/2010 1620 JF	SM 2540
Solids, Total Dissolved (Calc)	1480	10		mg/L	10/14/2010 739 KO	SM 1030E
Total Suspended Solids	8	5		mg/L	10/08/2010 835 JF	SM 540
Alkalinity, Total (As CaCO3)	1090	5		mg/L	10/08/2010 1909 KO	SM 2320B
Nitrogen, Ammonia (As N)	0.1	0.1		mg/L	10/11/2010 1543 AS	EPA 350.1
Turbidity	18.7	0.1		NTU	10/07/2010 1327 KB	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	1080	5		mg/L	10/08/2010 1909 KO	SM 2320B
Alkalinity, Carbonate as CO3	123	5		mg/L	10/08/2010 1909 KO	SM 2320B
Chloride	20	1		mg/L	10/08/2010 1331 KO	EPA 300.0
Fluoride	0.5	0.1		mg/L	10/08/2010 1909 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/12/2010 1714 AS	EPA 353.2
Sulfate	224	1		mg/L	10/08/2010 1331 KO	EPA 300.0
Cations						
Calcium	18	1		mg/L	10/08/2010 1139 DG	EPA 200.7
Magnesium	33	1		mg/L	10/08/2010 1139 DG	EPA 200.7
Potassium	18	1		mg/L	10/08/2010 1139 DG	EPA 200.7
Sodium	515	1		mg/L	10/08/2010 1139 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: *[signature]*
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 1:30:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-001
Client Sample ID: P17592S
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	17.66	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Carbonate as CO3	4.10	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Chloride	0.55	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Fluoride	0.02	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Sulfate	4.66	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Calcium	0.88	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Magnesium	2.70	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Potassium	0.46	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Sodium	22.39	0.01		meq/L	10/14/2010 739 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	26.44	0		meq/L	10/14/2010 739 KO	SM 1030E
Anion Sum	27.01	0		meq/L	10/14/2010 739 KO	SM 1030E
Cation-Anion Balance	1.07	0		%	10/14/2010 739 KO	SM 1030E
Radio Chemistry						
Gross Alpha	16.3 ± 3.5	2		pCi/L	10/24/2010 1109 SH	SM 7110B
Gross Beta	20.0 ± 3.9	3		pCi/L	10/24/2010 1109 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	10/20/2010 847 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	10/23/2010 552 TWP	Ga-Tech

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra
Sheridan, WY 82801

Date Reported: 10/27/2010
Report ID: S1010106001

Work Order: S1010106
Collection Date: 10/5/2010 1:30:00 PM
Date Received: 10/6/2010 10:57:00 AM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010106-001
Client Sample ID: P17592S
COC: 131171

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	10/08/2010 1139 DG	EPA 200.7
Arsenic	0.013	0.005		mg/L	10/07/2010 1336 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/07/2010 1336 MS	EPA 200.8
Boron	0.2	0.1		mg/L	10/08/2010 1139 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	10/07/2010 1336 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/08/2010 1139 DG	EPA 200.7
Copper	ND	0.01		mg/L	10/07/2010 1336 MS	EPA 200.8
Iron	0.18	0.05		mg/L	10/08/2010 1139 DG	EPA 200.7
Lead	ND	0.02		mg/L	10/07/2010 1336 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/12/2010 927 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/07/2010 1336 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/08/2010 1139 DG	EPA 200.7
Selenium	ND	0.005		mg/L	10/07/2010 1336 MS	EPA 200.8
Silver	ND	0.003		mg/L	10/07/2010 1336 MS	EPA 200.8
Uranium	0.020	0.001		mg/L	10/07/2010 1336 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/07/2010 1336 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/08/2010 1139 DG	EPA 200.7
Total Metals						
Iron	0.77	0.05		mg/L	10/10/2010 1036 DG	EPA 200.7
Manganese	0.08	0.02		mg/L	10/10/2010 1036 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by: *[signature]*
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/26/2010
Report ID: S1010075001

Work Order: S1010075
Collection Date: 10/5/2010 10:15:00 AM
Date Received: 10/5/2010 4:26:00 PM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010075-004
Client Sample ID: TWRES01
COC: 131170

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	9.47	s.u.			10/05/2010 1015	Field
Conductivity	247	µm		hos/cm	10/05/2010 1015	Field
Dissolved Oxygen	5.87	mg		/L	10/05/2010 1015	Field
Dissolved Oxygen (pct)	59.1			%	10/05/2010 1015	Field
Turbidity	64.4	NT		U	10/05/2010 1015	Field
Temperature	15.0	°C			10/05/2010 1015	Field
General Parameters						
pH	8.5	0.1		s.u.	10/06/2010 2303 KO	SM 4500 H B
Electrical Conductivity	231	5		µmhos/cm	10/06/2010 2303 KO	SM 2510B
Total Dissolved Solids (180)	170	10		mg/L	10/07/2010 1350 JF	SM 2540
Solids, Total Dissolved (Calc)	130	10		mg/L	10/15/2010 1447 KO	SM 1030E
Total Suspended Solids	44	5		mg/L	10/06/2010 1705 JF	SM 2540
Alkalinity, Total (As CaCO3)	116	5		mg/L	10/06/2010 2303 KO	SM 2320B
Nitrogen, Ammonia (As N)	ND	0.1		mg/L	10/11/2010 1527 AS	EPA 350.1
Turbidity	62.0	0.1		NTU	10/06/2010 1410 AS	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	137	5		mg/L	10/06/2010 2303 KO	SM 2320B
Alkalinity, Carbonate as CO3	ND	5		mg/L	10/06/2010 2303 KO	SM 2320B
Chloride	2	1		mg/L	10/06/2010 2057 KO	EPA 300.0
Fluoride	0.2	0.1		mg/L	10/07/2010 1911 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/12/2010 1658 AS	EPA 353.2
Sulfate	4	1		mg/L	10/06/2010 2057 KO	EPA 300.0
Cations						
Calcium	21	1		mg/L	10/11/2010 1336 DG	EPA 200.7
Magnesium	5	1		mg/L	10/06/2010 1540 DG	EPA 200.7
Potassium	14	1		mg/L	10/06/2010 1540 DG	EPA 200.7
Sodium	15	1		mg/L	10/06/2010 1540 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/26/2010
Report ID: S1010075001

Work Order: S1010075
Collection Date: 10/5/2010 10:15:00 AM
Date Received: 10/5/2010 4:26:00 PM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010075-004
Client Sample ID: TWRES01
COC: 131170

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	2.24	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Chloride	0.04	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Fluoride	0.01	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Sulfate	0.07	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Calcium	1.07	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Magnesium	0.40	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Potassium	0.35	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Sodium	0.65	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	2.48	0		meq/L	10/15/2010 1447 KO	SM 1030E
Anion Sum	2.45	0		meq/L	10/15/2010 1447 KO	SM 1030E
Cation-Anion Balance	0.45	0		%	10/15/2010 1447 KO	SM 1030E
Radio Chemistry						
Gross Alpha	2.5 ± 0.7	2		pCi/L	10/22/2010 2301 SH	SM 7110B
Gross Beta	14.3 ± 1.3	3		pCi/L	10/22/2010 2301 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	10/16/2010 1528 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	10/22/2010 2042 SH	Ra-05

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/26/2010
Report ID: S1010075001

Work Order: S1010075
Collection Date: 10/5/2010 10:15:00 AM
Date Received: 10/5/2010 4:26:00 PM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010075-004
Client Sample ID: TWRES01
COC: 131170

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	ND	0.1		mg/L	10/06/2010 1540 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	10/06/2010 1327 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/06/2010 1327 MS	EPA 200.8
Boron	ND	0.1		mg/L	10/06/2010 1540 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	10/06/2010 1327 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/06/2010 1540 DG	EPA 200.7
Copper	ND	0.01		mg/L	10/06/2010 1327 MS	EPA 200.8
Iron	ND	0.05		mg/L	10/06/2010 1540 DG	EPA 200.7
Lead	ND	0.02		mg/L	10/06/2010 1327 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/12/2010 852 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/06/2010 1327 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/06/2010 1540 DG	EPA 200.7
Selenium	ND	0.005		mg/L	10/06/2010 1327 MS	EPA 200.8
Silver	ND	0.003		mg/L	10/06/2010 1327 MS	EPA 200.8
Uranium	0.001	0.001		mg/L	10/06/2010 1327 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/06/2010 1327 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/06/2010 1540 DG	EPA 200.7
Total Metals						
Iron	1.35	0.05		mg/L	10/08/2010 1437 DG	EPA 200.7
Manganese	0.07	0.02		mg/L	10/08/2010 1437 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/26/2010
Report ID: S1010075001

Work Order: S1010075
Collection Date: 10/5/2010 11:45:00 AM
Date Received: 10/5/2010 4:26:00 PM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010075-007
Client Sample ID: TW RES02
COC: 131170

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Field						
pH	10.32	s.u.			10/05/2010 1145	Field
Conductivity	1801	µm		hos/cm	10/05/2010 1145	Field
Dissolved Oxygen	10.73	mg		/L	10/05/2010 1145	Field
Dissolved Oxygen (pct)	116.8			%	10/05/2010 1145	Field
Turbidity	26.5	NT		U	10/05/2010 1145	Field
Temperature	18.9	°C			10/05/2010 1145	Field
General Parameters						
pH	10.0	0.1		s.u.	10/07/2010 003 KO	SM 4500 H B
Electrical Conductivity	1870	5		µmhos/cm	10/07/2010 003 KO	SM 2510B
Total Dissolved Solids (180)	1190	10		mg/L	10/07/2010 1410 JF	SM 2540
Solids, Total Dissolved (Calc)	680	10		mg/L	10/15/2010 1447 KO	SM 1030E
Total Suspended Solids	ND	5		mg/L	10/06/2010 1710 JF	SM 2540
Alkalinity, Total (As CaCO3)	732	5		mg/L	10/07/2010 003 KO	SM 2320B
Nitrogen, Ammonia (As N)	0.1	0.1		mg/L	10/11/2010 1536 AS	EPA 350.1
Turbidity	24.8	0.1		NTU	10/06/2010 1412 AS	SM 2130
Anions						
Alkalinity, Bicarbonate as HCO3	363	5		mg/L	10/07/2010 003 KO	SM 2320B
Alkalinity, Carbonate as CO3	261	5		mg/L	10/07/2010 003 KO	SM 2320B
Chloride	3	1		mg/L	10/06/2010 2126 KO	EPA 300.0
Fluoride	1.7	0.1		mg/L	10/08/2010 1427 KO	SM 4500FC
Nitrogen, Nitrate-Nitrite (as N)	ND	0.1		mg/L	10/12/2010 1701 AS	EPA 353.2
Sulfate	235	1		mg/L	10/06/2010 2126 KO	EPA 300.0
Cations						
Calcium	5	1		mg/L	10/06/2010 1547 DG	EPA 200.7
Magnesium	5	1		mg/L	10/06/2010 1547 DG	EPA 200.7
Potassium	5	1		mg/L	10/06/2010 1547 DG	EPA 200.7
Sodium	427	1		mg/L	10/06/2010 1547 DG	EPA 200.7

These results apply only to the samples tested. **RL - Reporting Limit**

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/26/2010
Report ID: S1010075001

Work Order: S1010075
Collection Date: 10/5/2010 11:45:00 AM
Date Received: 10/5/2010 4:26:00 PM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010075-007
Client Sample ID: TW RES02
COC: 131170

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Cation/Anion-Milliequivalents						
Bicarbonate as HCO3	ND	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Carbonate as CO3	ND	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Chloride	0.07	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Fluoride	0.08	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Nitrate + Nitrite as N	ND	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Sulfate	4.88	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Calcium	0.25	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Magnesium	0.42	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Potassium	0.11	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Sodium	18.58	0.01		meq/L	10/15/2010 1447 KO	SM 1030E
Cation / Anion Balance						
Cation Sum	19.37	0		meq/L	10/15/2010 1447 KO	SM 1030E
Anion Sum	19.69	0		meq/L	10/15/2010 1447 KO	SM 1030E
Cation-Anion Balance	0.80	0		%	10/15/2010 1447 KO	SM 1030E
Radio Chemistry						
Gross Alpha	4.8 ± 2.4	2		pCi/L	10/24/2010 1109 SH	SM 7110B
Gross Beta	3.9 ± 3.5	3		pCi/L	10/24/2010 1109 SH	SM 7110B
Radium 226 (Dissolved)	ND	0.2		pCi/L	10/16/2010 1528 SH	SM 7500-Ra B
Radium 228 (Dissolved)	ND	1		pCi/L	10/22/2010 2042 SH	Ra-05

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

Inter-Mountain Laboratories, Inc
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Sample Analysis Report

CLIENT: Western Water Consultants
1849 Terra Avenue
Sheridan, WY 82801

Date Reported: 10/26/2010
Report ID: S1010075001

Work Order: S1010075
Collection Date: 10/5/2010 11:45:00 AM
Date Received: 10/5/2010 4:26:00 PM
Sampler: RF
Matrix: Water

Project: ROSS
Lab ID: S1010075-007
Client Sample ID: TW RES02
COC: 131170

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Dissolved Metals						
Aluminum	1.5	0.1		mg/L	10/06/2010 1547 DG	EPA 200.7
Arsenic	ND	0.005		mg/L	10/06/2010 1338 MS	EPA 200.8
Barium	ND	0.5		mg/L	10/06/2010 1338 MS	EPA 200.8
Boron	0.6	0.1		mg/L	10/06/2010 1547 DG	EPA 200.7
Cadmium	ND	0.002		mg/L	10/06/2010 1338 MS	EPA 200.8
Chromium	ND	0.01		mg/L	10/06/2010 1547 DG	EPA 200.7
Copper	ND	0.01		mg/L	10/06/2010 1338 MS	EPA 200.8
Iron	0.80	0.05		mg/L	10/06/2010 1547 DG	EPA 200.7
Lead	ND	0.02		mg/L	10/06/2010 1338 MS	EPA 200.8
Mercury	ND	0.001		mg/L	10/12/2010 858 BK	EPA 245.1
Molybdenum	ND	0.02		mg/L	10/06/2010 1338 MS	EPA 200.8
Nickel	ND	0.01		mg/L	10/06/2010 1547 DG	EPA 200.7
Selenium	ND	0.005		mg/L	10/06/2010 1338 MS	EPA 200.8
Silver	ND	0.003		mg/L	10/06/2010 1338 MS	EPA 200.8
Uranium	0.002	0.001		mg/L	10/06/2010 1338 MS	EPA 200.8
Vanadium	ND	0.02		mg/L	10/06/2010 1338 MS	EPA 200.8
Zinc	ND	0.01		mg/L	10/06/2010 1547 DG	EPA 200.7
Total Metals						
Iron	1.29	0.05		mg/L	10/08/2010 1444 DG	EPA 200.7
Manganese	0.03	0.02		mg/L	10/08/2010 1444 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	L	Analyzed by a contract laboratory
M	Value exceeds Monthly Ave or MCL	ND	Not Detected at the Reporting Limit
O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits

Reviewed by:
Wade Nieuwsma, Assistant Laboratory Manager

ADDENDUM 2.7-F

AQUIFER TEST REPORT

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Ross Project 2010 Pumping Tests Results and Analysis

1.0 INTRODUCTION

This report presents the results of the 2010 aquifer testing program conducted at the Strata Energy (Strata) Ross ISR Project. Seven separate pumping tests, ranging from 24 to 72 hours in pumping time, were conducted at six well clusters located within the proposed Ross Project area. Well cluster locations are depicted on Figure 1. Five of the six well clusters consist of four wells, each of which is completed in one of four discrete intervals, being: 1) the ore zone (OZ - the mining target), 2) the deep monitoring interval (DM - the first discrete aquifer beneath the ore zone), 3) the shallow monitoring interval (SM - the first discrete aquifer above the ore zone), or 4) the surficial aquifer (SA - the shallow water table aquifer). The sixth well cluster consists of seven wells, four of which are completed in one of these four intervals with three additional wells completed in the ore zone.

1.1 Purpose and Scope

This report is a component of a comprehensive license/permit application for the Ross ISR Project and designed to describe the methods and techniques used to measure the hydraulic characteristics (e.g., hydraulic conductivity (K), transmissivity (T), and storativity (S)) of the ore zone along with a tabulation of the test results. In addition, confinement and hydraulic isolation of the ore zone from the overlying and underlying aquifers is demonstrated, along with assessing the vertical and horizontal anisotropy within the ore zone unit.

1.2 Report Organization

To facilitate review, this report is designed as a stand-alone document. Monitoring well completion information is summarized in Table 1. Table 2 is a drawdown response summary and Table 3 presents the aquifer hydraulics summary. Field data forms and plots of the time-drawdown data and analytical results for each test are contained in Appendices 1 through 7.

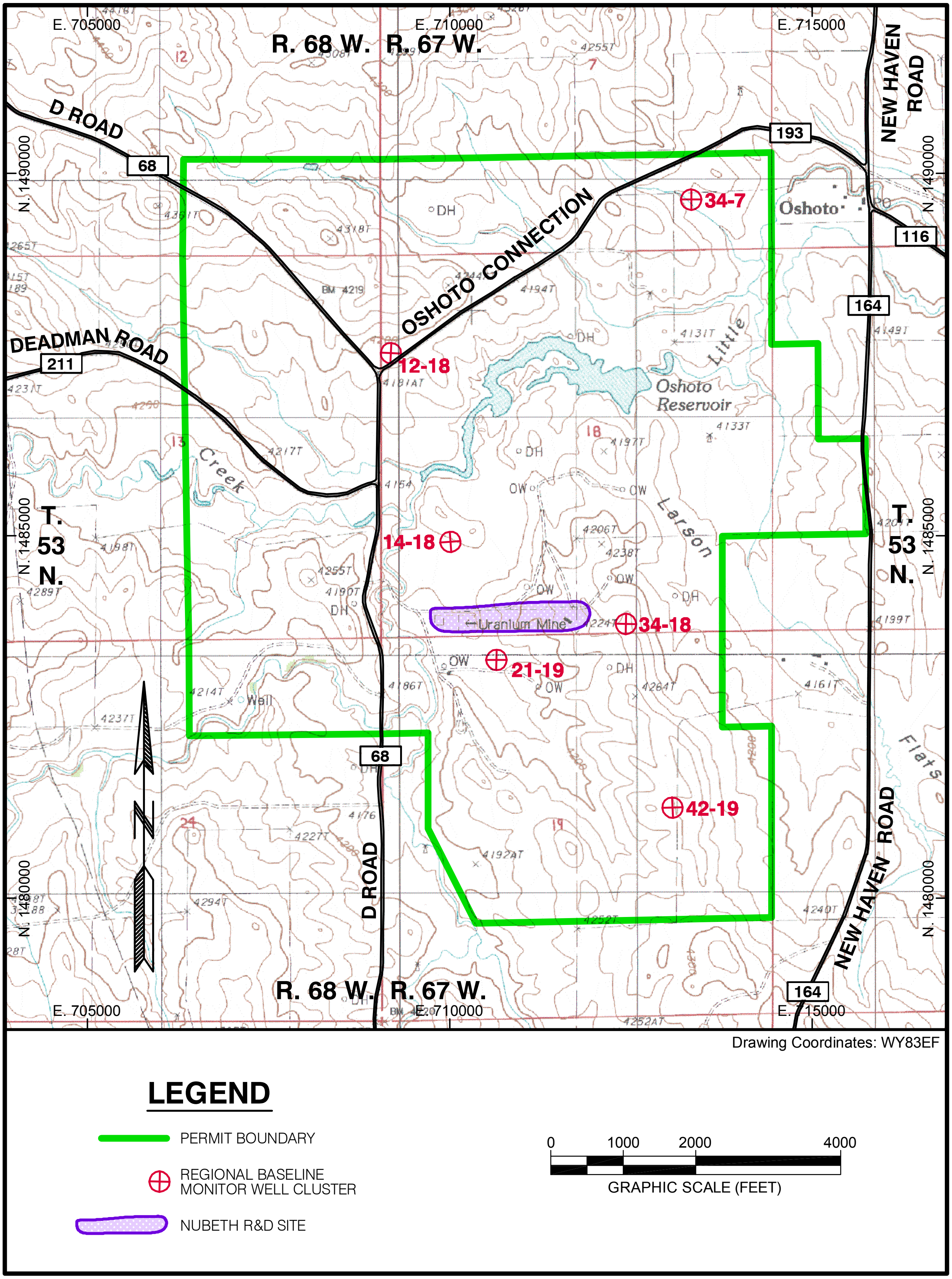


Figure 1. Groundwater Monitor Well Cluster Locations within the Project Area

K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_ER_HYD_CLUSTERS.dwg, TRA_2.7-F_FIGURE_1, 12/13/2010 1:08:26 PM

Table 1. Strata Energy/Ross ISR Project Aquifer Test Well Completion Information

Date Pumping Test Began	Regional Baseline Well ID	Geologic Unit Monitored	Well Type	Radial Distance from Pumping Well (ft)	Depth to Top of Screen (ft bgs)	Depth to Bottom of Screen (ft bgs)	Well Screen Length (ft)
July 7, 2010	34-7 OZ	Lower Lance Formation/Upper Fox Hills Sandstone	Pumping	0.00	318.50	378.50	60.00
	34-7 SA	Quaternary Alluvium/Colluvium	Observation	65.95	42.00	52.00	10.00
	34-7 SM	Lance Formation	Observation	92.70	210.00	245.00	35.00
	34-7 DM	Lower Fox Hills Sandstone	Observation	77.95	472.00	487.00	15.00
July 9, 2010	42-19 OZ	Lower Lance Formation/Upper Fox Hills Sandstone	Pumping	0.00	470.00	560.00	90.00
	42-19 SA	Quaternary Alluvium/Colluvium	Observation	49.24	98.00	108.00	10.00
	42-19 SM	Lance Formation	Observation	70.89	260.00	290.00	30.00
	42-19 DM	Lower Fox Hills Sandstone	Observation	52.46	600.00	610.00	10.00
July 12, 2010	34-18 OZ	Lower Lance Formation/Upper Fox Hills Sandstone	Pumping	0.00	460.00	565.00	105.00
	34-18 SA	Quaternary Alluvium/Colluvium	Observation	46.46	50.00	70.00	20.00
	34-18 SM	Lance Formation	Observation	70.55	278.00	298.00	20.00
	34-18 DM	Lower Fox Hills Sandstone	Observation	48.96	600.00	620.00	20.00
July 13, 2010	14-18 OZ	Lower Lance Formation/Upper Fox Hills Sandstone	Pumping	0.00	499.00	529.00	30.00
	14-18 SA	Quaternary Alluvium/Colluvium	Observation	52.99	35.00	65.00	30.00
	14-18 SM	Lance Formation	Observation	71.92	282.00	327.00	45.00
	14-18 DM	Lower Fox Hills Sandstone	Observation	52.35	570.00	585.00	15.00
July 15, 2010	21-19 OZ	Lower Lance Formation/Upper Fox Hills Sandstone	Pumping	0.00	433.00	468.00	35.00
	21-19 SA	Quaternary Alluvium/Colluvium	Observation	55.23	20.00	30.00	10.00
	21-19 SM	Lance Formation	Observation	72.03	260.00	315.00	55.00
	21-19 DM	Lower Fox Hills Sandstone	Observation	44.48	550.00	565.00	15.00

Table 1. Strata Energy/Ross ISR Project Aquifer Test Well Completion Information (Continued)

Date Pumping Test Began	Regional Baseline Well ID	Geologic Unit Monitored	Well Type	Radial Distance from Pumping Well (ft)	Depth to Top of Screen (ft bgs)	Depth to Bottom of Screen (ft bgs)	Well Screen Length (ft)
July 21, 2010	12-18 OZ	Lower Lance Formation/Upper Fox Hills Sandstone	Pumping	0.00	474.00	584.00	110.00
	12-18 SA	Quaternary Alluvium/Colluvium	Observation	47.80	63.00	103.00	40.00
	12-18 SM	Lance Formation	Observation	71.00	342.00	352.00	10.00
	12-18 DM	Lower Fox Hills Sandstone	Observation	48.55	612.00	632.00	20.00
	OW1B57-1	Lower Lance Formation/Upper Fox Hills Sandstone	Observation	71.00	529.00[1]	536.00[1]	7.00[1]
	OW1B58-1	Lower Lance Formation/Upper Fox Hills Sandstone	Observation	70.05	513.00	531.00	18.00
	OW1B60-1	Lower Lance Formation/Upper Fox Hills Sandstone	Observation	70.25	509.00	525.00	16.00
July 27, 2010	OW1B57-1	Lower Lance Formation/Upper Fox Hills Sandstone	Pumping	0.00	529.00[1]	536.00[1]	7.00[1]
	OW1B58-1	Lower Lance Formation/Upper Fox Hills Sandstone	Observation	102.20	513.00	531.00	18.00
	OW1B60-1	Lower Lance Formation/Upper Fox Hills Sandstone	Observation	141.20	509.00	525.00	16.00
	12-18 OZ	Lower Lance Formation/Upper Fox Hills Sandstone	Observation	71.00	474.00	584.00	110.00
	12-18 SA	Quaternary Alluvium/Colluvium	Observation	114.00	63.00	103.00	40.00
	12-18 SM	Lance Formation	Observation	107.10	342.00	352.00	10.00
	12-18 DM	Lower Fox Hills Sandstone	Observation	60.30	612.00	632.00	20.00

[1] Well screen was not used in well OW1B57-1. Depths and length shown designate the open hole intake interval.

Table 2. Strata Energy/Ross ISR Project Pumping Test Drawdown and Response Summary

Regional Baseline Well ID	Well Type	Initial Depth to Water[1] (ft)	Water Level Elevation (ft amsl)	Constant Discharge Rate (gpm)	Duration of Pumping (min)	Maximum Drawdown (ft)	Time After Pump On For First Drawdown Response (min)	Specific Capacity (gpm/ft)
34-7 OZ	Pumping	84.73	4051.8	14.90	1442.00	28.01	0.00	0.53
34-7 SA	Observation	22.06	4113.3			no effects	no effects	
34-7 SM	Observation	56.07	4079.0			no effects	no effects	
34-7 DM	Observation	88.73	4046.4			no effects	no effects	
42-19 OZ	Pumping	301.21	3981.3	2.30	1443.00	47.98	0.00	0.05
42-19 SA	Observation	dry	-			n/a	n/a	
42-19 SM	Observation	155.60	4130.7			no effects	no effects	
42-19 DM	Observation	287.17	3981.3			no effects	no effects	
34-18 OZ	Pumping	279.83	3967.7	5.30	1448.00	64.33	0.00	0.08
34-18 SA	Observation	dry	-			n/a	n/a	
34-18 SM	Observation	136.12	4111.8			no effects	no effects	
34-18 DM	Observation	272.52	4375.9			no effects	no effects	
14-18 OZ	Pumping	155.43	4001.1	5.30	1448.00	117.21	0.00	0.05
14-18 SA	Observation	22.7	4134.1			no effects	no effects	
14-18 SM	Observation	66.60	4089.7			no effects	no effects	
14-18 DM	Observation	158.00	3998.1			no effects	no effects	
21-19 OZ	Pumping	214.26	3954.2	5.30	1460.00	42.88	0.00	0.12
21-19 SA	Observation	10.8	4158.2			no effects	no effects	
21-19 SM	Observation	84.84	4086.1			no effects	no effects	
21-19 DM	Observation	196.25	3973.7			no effects	no effects	

Table 2. Strata Energy/Ross ISR Project Pumping Test Drawdown and Response Summary (Continued)

Regional Baseline Well ID	Well Type	Initial Depth to Water[1] (ft amsl)	Water Level Elevation (ft amsl)	Constant Discharge Rate (gpm)	Duration of Pumping (min)	Maximum Drawdown (ft)	Time After Pump On For First Drawdown Response (min)	Specific Capacity (gpm/ft)
12-18 OZ	Pumping	170.55	4017.3	5.30	4358.00	21.99	0.00	0.24
12-18 SA	Observation	47.63	4138.3			no effects	no effects	
12-18 SM	Observation	91.00	4096.1			no effects	no effects	
12-18 DM	Observation	176.04	4013.3			no effects	no effects	
OW1B57-1	Observation	170.29	4017.5			5.61	0.00	
OW1B58-1	Observation	169.98	4017.7			7.15	0.00	
OW1B60-1	Observation	167.04	4017.4			7.11	0.00	
OW1B57-1	Pumping	170.58	4017.5	5.66	1444.00	48.21	0.00	0.12
OW1B58-1	Observation	170.90	4017.7			5.03	0.00	
OW1B60-1	Observation	167.91	4017.4			6.18	0.00	
12-18 OZ	Observation	171.79	4017.3			5.05	0.00	
12-18 SA	Observation	47.61	4138.3			no effects	no effects	
12-18 SM	Observation	91.16	4096.1			no effects	no effects	
12-18 DM	Observation	175.99	4013.3			no effects	no effects	

[1] Below measuring point (top of casing) when test began.

Table 3. Strata Energy/Ross ISR Project Pumping Test Summary of Hydraulic Characteristics

Regional Baseline Well ID	Well Type	Interpretation Method	Transmissivity (ft^2/day)	Aquifer Thickness (ft)	Hydraulic Conductivity (ft/day)	Storativity (unitless)
34-7 OZ	Pumping	Cooper Jacob Straight Line Drawdown	367.60	60.00	6.13	n/a
		Theis Recovery	172.50	60.00	2.88	n/a
42-19 OZ	Pumping	Cooper Jacob Straight Line Drawdown	12.70	90.00	0.14	n/a
		Theis Recovery	13.40	90.00	0.15	n/a
34-18 OZ	Pumping	Cooper Jacob Straight Line Drawdown	26.20	105.00	0.25	n/a
		Theis Recovery	19.80	105.00	0.19	n/a
14-18 OZ	Pumping	Cooper Jacob Straight Line Drawdown	3.80	30.00	0.13	n/a
		Theis Recovery	23.80	30.00	0.79	n/a
21-19 OZ	Pumping	Cooper Jacob Straight Line Drawdown	34.70	35.00	0.99	n/a
		Theis Recovery	25.60	35.00	0.73	n/a
12-18 OZ	Pumping	Cooper Jacob Straight Line Drawdown	116.90	94.00	1.24	n/a
		Theis Recovery	70.80	94.00	0.75	n/a
OW1B57-1	Observation	Cooper Jacob Straight Line Drawdown	102.20	25.00	4.08	1.50E-04
		Theis Recovery	96.70	25.00	3.86	
		Hantush (Confined – Partial Penetration)	99.10	25.00	3.97	1.50E-04
OW1B58-1	Observation	Cooper Jacob Straight Line Drawdown	88.20	18.00	4.90	5.70E-05
		Theis Recovery	80.50	18.00	4.47	
		Hantush (Confined – Partial Penetration)	88.10	18.00	4.89	5.80E-05
OW1B60-1	Observation	Cooper Jacob Straight Line Drawdown	88.40	16.00	5.53	6.10E-05
		Theis Recovery	84.50	16.00	5.28	
		Hantush (Confined – Partial Penetration)	88.20	16.00	5.51	6.20E-05

Table 3. Strata Energy/Ross ISR Project Pumping Test Summary of Hydraulic Characteristics (Continued)

Regional Baseline Well ID	Well Type	Interpretation Method	Transmissivity (ft^2/day)	Aquifer Thickness (ft)	Hydraulic Conductivity (ft/day)	Storativity (unitless)
OW1B57-1	Pumping	Cooper Jacob Straight Line Drawdown	81.00	25.00	3.24	
		Theis Recovery	80.30	25.00	3.21	
OW1B58-1	Observation	Cooper Jacob Straight Line Drawdown	137.10	18.00	7.62	1.00E-05
		Theis Recovery	92.70	18.00	5.15	
		Hantush (Confined – Partial Penetration)	111.00	18.00	6.17	3.50E-05
OW1B60-1	Observation	Cooper Jacob Straight Line Drawdown	113.60	16.00	7.10	4.00E-06
		Theis Recovery	96.20	16.00	6.01	
		Hantush (Confined – Partial Penetration)	90.80	16.00	5.68	1.30E-05
12-18 OZ	Observation	Theis Drawdown (Confined)	103.90	94.00	1.11	1.10E-04
		Cooper Jacob Straight Line Drawdown	105.60	94.00	1.12	1.00E-04
		Theis Recovery	93.20	94.00	0.99	
		Minimum	**3.80**		**0.13**	**4.00E-06**
		Maximum	**367.60**		**7.62**	**1.50E-04**
		Median	**88.30**		**3.55**	**6.10E-05**
		Geometric Mean	**65.62**		**1.91**	**4.54E-05**
		Average	**87.78**		**3.26**	**6.70E-05**

2.0 SITE CHARACTERIZATION

2.1 Stratigraphy

A comprehensive discussion of the Ross area hydrostratigraphy is presented in Section 2.7.3. The units discussed in this report (SA, SM, OZ, and DM) are discrete stratigraphic intervals within the lower Lance and upper Fox Hills formations.

2.1.1 Surficial Aquifer (SA)

The surficial aquifer (SA) is the first, or upper-most, water-bearing unit at the Ross ISR Project. The SA unit is under water table conditions. The SA aquifer wells are completed in the first unconfined water-bearing interval encountered within the Ross ISR Project Area. Total depths of the SA wells range from 22 feet bgl (at the 21-19 SA well site) to 97 feet bgl (at the dry 42-19 SA well site). Two of the SA wells, 42-19 SA and 34-18 SA, are dry. The depths to water in the SA wells range from 11.87 feet bgl (at the 21-19 SA well site) to 51.59 feet bgl (at the 12-18 SA well site).

2.1.2 Shallow Monitoring Unit (SM)

The SM unit consists of a Lance Formation non-ore bearing sandstone overlying the ore zone. The SM unit will be monitored for vertical excursion from the ore zone. The SM unit consists of very fine grained sandstone that can be correlated across the Ross ISR Project Area. The SM unit is separated from the ore zone by interbedded sandstones, siltstones and claystones. The SM sandstone is the first areally consistent, water-bearing interval that lies stratigraphically above the OZ unit. The distance from the base of the SM screened interval to the top of the OZ interval is variable, ranging from 73 feet at the 34-7 well cluster to 180 feet at the 42-19 well cluster. The SM unit is a confined aquifer, with confining heads ranging from approximately 250 feet in well cluster 12-18 to 120 feet in well cluster 42-19. Confining head, a term used interchangeably with hydraulic head or hydrostatic head, is defined herein as the height of a vertical column of water above the top of the monitoring unit. Table 4 presents head data for the various monitoring units in the proposed project area. The heads in the SM unit are 27 to 149 feet higher than those in the ore zone.

Table 4. Heads in Various Ross Monitoring Units (July 2010 Data)

Well Cluster	SM Head (ft, amsl)	OZ Head (ft, amsl)	DM Head (ft, amsl)
12-18	4,096.1	4,017.3	4,013.3
14-18	4,089.7	4,001.1	3,998.1
21-19	4,086.1	3,954.2	3,973.7
34-18	4,111.8	3,967.7	3,975.9
34-7	4,079.0	4,051.8	4,046.4
42-19	4,130.7	3,981.3	3,997.3

2.1.3 Ore Zone Aquifer (OZ)

As its name implies, the ore zone (OZ) is the mining target at the proposed Ross ISR Project. The ore zone consists of uranium-bearing sandstone units within the upper Fox Hills Formation (FH horizon) and the lower Lance Formation (LT horizon). A single ore zone monitoring well located at all six of the well clusters is completed within the entire ore-bearing interval, which ranges from up to 110 feet thick (at the 12-18 well cluster) down to 30 feet thick (at the 14-18 well cluster), from the highest identified ore-bearing interval to the lowest identified ore-bearing interval. Beneath the base of the ore zone is a dark grey claystone, referred to as the BFH horizon, or the Lower Confining Unit. At only the 12-18 well cluster, three additional monitoring wells were installed in the ore zone (wells OW1B57-1, OW1B58-1 and OW1B60-1), the intake portion of each only partially penetrating the aquifer. As shown in Table 1, the intake section of these three wells ranges from just 7 feet to 18 feet of the entire 110-foot thick ore zone unit at this particular location.

Typically, the ore-bearing roll front sands are very fine grained and are interbedded with claystones. The ore zone is a confined aquifer, with confining heads ranging from around 300 feet at all well clusters except at the 42-19 well cluster where the ore zone confining head is approximately 200 feet.

2.1.4 Deep Monitoring Unit (DM)

The DM unit wells are completed in the first discrete sandstone beneath the ore zone. The DM unit (BFS horizon) is isolated within the Lower Confining Unit (BFH shale horizon). Typically, the top of the DM screen interval ranges from 28 feet to 93 feet below the base of the OZ screened interval, with well 12-18 OZ and 12-18 DM having the least vertical separation, and wells 34-7 OZ and 34-7 DM having the greatest vertical separation. The DM unit is a confined aquifer, with confining heads ranging from 330 feet at the 42-19 well cluster to 440 feet in the 12-18 well cluster. The heads in the DM unit are lower than the OZ heads in some locations, and higher than the OZ heads in others. The groundwater model (Addendum 2.7-H) discusses in detail how pumpage during the last 30 years from oil field water supply wells completed in the OZ and DM units that are located within the proposed project area has apparently depressed the aquifers' hydrostatic heads from background conditions, particularly in the southern portion of the proposed project area. The heads in the SM, OZ, and DM wells at the various clusters are presented in Table 4.

2.2 Previous Investigations

Previous tests were conducted at the Ross site by Nubeth in 1977 (Manera 1977 and Hamilton 1977) and in 1978 (Manera 1978). In the 1977 studies, Manera and Hamilton analyzed the same data set with both reports reporting essentially the same results. A 72-hour pumping test was conducted on a pumping well completed in the ore zone with observation wells completed in the ore zone, the interval overlying the ore zone referred to by Manera as the "A" zone, and the water table aquifer (referred to as the SA unit by Strata). The Nubeth "A" zone is the first sandy interval above a persistent shale aquitard (referred to as the Upper Confining Unit by Strata) overlying the ore zone. The "A" zone includes the SM unit and various sandstone horizons beneath it.

The purpose of the 1977 test was to measure hydraulic parameters of T, K, and S within the ore zone and to determine the degree of hydraulic isolation of the ore zone from the overlying intervals. The test site was located in the SE¼ of the SW¼ of Section 18, T53N, R67W, slightly north of the 21-19 well cluster (see Figure 1). Four wells each were completed in the water table aquifer (SA unit), the “A” zone, and ore zone. The screened intervals of the pumping well was 105 feet in thickness, with 20 feet of blank between a 5-foot screened interval and a 100-foot screened interval. Ore zone transmissivity (T) values measured from the pumping test ranged from 11 ft^2/day to 25 ft^2/day, with an average T of 18.5 ft^2/day. Using an aquifer thickness of 100 feet, ore zone hydraulic conductivity (K) measured by Manera ranged from 0.10 ft/day to 0.25 ft/day, with an average K of 0.18 ft/day. Storativity (S) values ranged from 8.6×10^{-5} to 2.5×10^{-4} with an average of 1.4×10^{-4}. No effects from pumping were noted in the wells completed in the overlying SM interval.

The 1978 study was conducted in the same vicinity as the 1977 study (Figure 1). This study consisted of a proposed mining pattern comprised of a five spot program with one pumping well and six observation wells, all completed in the ore zone unit. Transmissivity values ranged from 12.8 ft^2/day to 29.4 ft^2/day, and averaged 17.5 ft^2/day, with an average K of 0.22 ft/day. Storativity values ranged from 4.5×10^{-5} to 8.3×10^{-5} and averaged 5.8×10^{-5}.

3.0 2010 PUMPING TEST PROCEDURES

3.1 Well Installation, Completion and Borehole Abandonment

All baseline monitoring wells were constructed using conventional mud-rotary drilling techniques. At each of the six well clusters a 6¼-inch diameter pilot hole was drilled to a depth through the DM interval, and geophysical logs consisting of natural gamma, resistivity and SP were acquired. Following logging, the target completion intervals for the deep monitor (DM), ore zone (OZ), shallow monitor (SM) and surficial aquifer (SA) were selected.

Each well consisted of a pilot hole drilled to the top of the target interval and reamed to 8¾ inches to allow installation of casing and screen assembly.

The wells were constructed with 5-inch diameter, SDR-17 PVC well casing. PVC well centralizers were placed at 60-foot intervals to the top of the target aquifer interval. The annular space between the casing and the borehole wall was then filled with cement slurry consisting of a 14.6 to 15.0 pound per gallon mixture of Type I cement and 2 percent bentonite, using positive displacement. After allowing the cement to cure for at least 72 hours the target intervals were under-reamed to 7 inches in diameter across the target interval.

The intake interval consists of 3-inch diameter, 0.010-inch slot rod-based PVC V-wire well screen with a 10-20 silica sand filter pack. Following filter pack placement, air-lift development was conducted until turbidity readings stabilized. The wells were again logged to assess the completeness of the filter pack installation. Section 1.2 of the TR includes a detailed description of well construction materials, methods and development employed by Strata.

Dedicated submersible pumps, sounding tubes and recording pressure transducers were installed in the SM, OZ and DM wells to expedite groundwater sample collection and document groundwater level elevations. Well completion data are presented in Table 1.

3.1.1 Exploration Hole Abandonment

Prior to conducting the two aquifer tests at the 12-18 well cluster, all exploration boreholes within a 522-foot radius of well 12-18 OZ were located, reentered and plugged with cement starting at the bottom of the hole and filling it to the surface. Some 55 boreholes were plugged, and the abandonment records are included in Appendix 8. The 522-foot radius was calculated according to the theory that in a partially penetrating well, the vertical component of flow is negligible if the well is located more than the distance described by:

$$(1.5)(b)\left(\frac{K_h}{K_z}\right)^{1/2}$$

Where b is aquifer thickness and K_h and K_z are horizontal and vertical hydraulic conductivity, respectively (Fetter 1987). At well cluster 12-18, the OZ interval thickness (b) is 110 feet, and using the assumption that that K_h is 10 and K_z is 1, the distance at which vertical flow is negligible is 522 feet, decreasing to 165 feet as the ratio of K_h to K_z approaches 1.

Strata's decision to plug all exploration drill holes at only the 12-18 well cluster and not at the other five monitoring well clusters prior to conducting the aquifer tests was based primarily on economics. Some of the richest uranium ore grades are found in the area of the 12-18 well cluster; therefore, that site in particular is considered to be a likely location to initiate ISR production for the Ross Project. As such, the results of the aquifer tests conducted at the 12-18 well cluster were considered most important with respect to mineability issues. Meticulous abandonment procedures ensure that the hydraulic characteristics and confinement of the ore zone were not anthropogenically compromised via vertical hydraulic communication that may be created by drill holes within the pump tests' area of influence. Ultimately, Strata intends to locate and abandon all exploration boreholes in the same manner at all areas targeted for ISR production within the proposed project area.

3.2 Pumping Test Equipment/Discharge Management

All OZ wells are equipped with dedicated Grundfos submersible 2 hp (Model 16 S20-18) pumps powered by a portable generator. The pumps are set on 1.25-inch diameter galvanized steel drop pipe. Pump setting depths ranged from 288 feet in well 34-7 OZ to 469 feet in well 14-18 OZ. Discharge rate was regulated using a Dole orifice valve, pressure gage, and gate valve combination. During testing, constant pressure at the well head was maintained by adjusting the gate valve. Typically, the discharge rates of each of the seven tests varied by less than 10 percent during the test.

Field parameters of electrical conductivity, pH, temperature, dissolved oxygen, oxidation-reduction potential and turbidity were measured on a regular basis and recorded during the course of each test. Discharge was authorized through a temporary WYPDES discharge permit WYG720229. In accordance with the permit, the discharge was monitored for flow, TDS, TSS, pH, radium, and uranium.

3.3 Background Monitoring/Antecedent Conditions

As each of the monitoring wells were installed, the monitoring of background/antecedent conditions began with acquisition of manual groundwater level measurements (starting January 2010) using an electric water level meter. Dedicated, In-Situ Inc. Level TROLL® non-vented pressure transducers were installed with the well pumps in March 2010. Dedicated pressure transducer depth settings are presented in Table 2, while transducer specifications are presented in Table 5. Transducer accuracy, as stated by the manufacturer, is ±0.1 percent of full-scale reading (i.e., 100 to 300 psi); therefore, the limit of accuracy varies from 0.1 to 0.3 psi, or about 0.2 to 0.7 feet.

Table 5. Monitor Well Pressure Transducer Specifications

Well Type	**Transducer**	**Parameters Measured**	**Accuracy/Resolution**
SA, SM	Level Troll 500 100 psi	temp, pressure level	Temp ±0.1° C/0.01°C Press. ± 0.1%/± 0.005%
OZ, DM	Level Troll 500 300 psi	temp, pressure level	Temp ±0.1° C/0.01°C Press. ± 0.1%/± 0.005%

Continuous barometric pressure data collection at the proposed project area began in March 2010 with installation of In-Situ's Baro TROLL® at Strata's Oshoto field office. A graph of barometric pressure for July 2010 is presented in Figure 2, and as shown, the average barometric pressure was 12.7 psi. The maximum pressure change that month was a drop of 0.26 psi, which occurred during the period from July 8 through July 13.

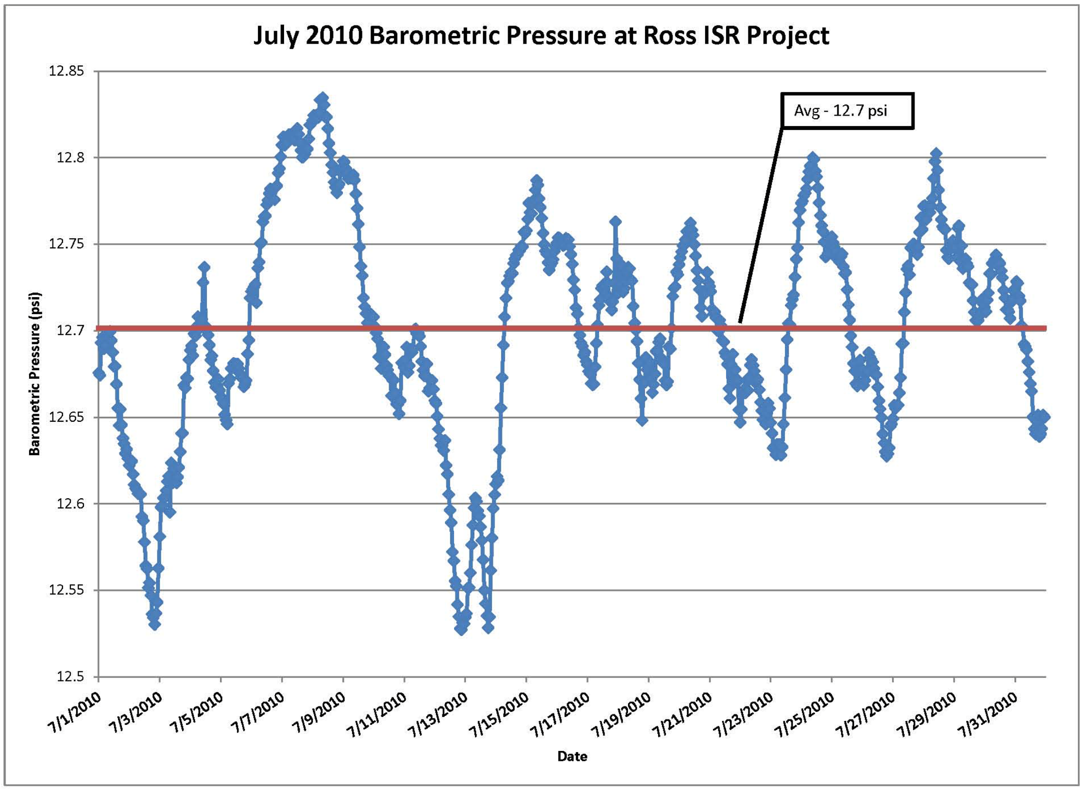


Figure 2. Ross Area Barometric Pressure July 2010

A non-vented pressure transducer measures the total head (or absolute pressure), which is the sum of the barometric pressure head and the water surface elevation (potentiometric) head. As such, barometric effects can alter water level data that is recorded by a non-vented pressure transducer. In general, barometric effects and water level change is more pronounced in confined aquifers. Water level observations made during aquifer tests are susceptible to distortions due to the influence of fluctuating barometric pressure. Therefore, in order for a non-vented pressure transducer to record representative changes in water levels, the barometric pressure effects must be subtracted. In-Situ Inc's Win-Situ® BaroMerge™ software was used to compensate for barometric pressure effects and correct the non-vented transducer water level data.

Groundwater level hydrographs for each monitoring well are included in Addendum 2.7-G in the TR. The period of record is January through October 2010. Data acquisition will continue through permit approval. The current potentiometric surfaces, hydraulic gradients, and recharge/discharge areas for the DM, OZ, SM, and SA aquifer units are addressed in Section 2.7.3.3 of the TR.

During the test period, all transducers at the cluster being tested were set to record data each minute. The minute by minute data for each well are presented in Appendices 1 through 7. An interesting phenomena is readily and consistently apparent in the DM well data and in some of the SM well data that consists of minor (<0.1 to 0.2 feet), and rapidly occurring water level fluctuations. These very rapid fluctuations can be manually measured with an electric water level meter, confirming that they are not attributable to "instrument noise" via the recording pressure transducers. The cause of these fluctuations is currently unknown. In addition, slight perturbations can be noted on time-drawdown data collected during the pumping tests, these perturbations had no effect on the slope or shape of the semi-log or log-log drawdown curves.

Due to the low permeability of the DM zone, water level recovery to hydrostatic equilibrium following scheduled water quality sample collection can take as long as a month. Due to water quality sampling that occurred in June, the DM well hydrographs were on a rising limb when the aquifer tests were conducted in July. This antecedent water level trend in the DM aquifer is noted in the following aquifer test analysis discussions.

3.4 Test Procedures and Methods of Analysis

As noted above, the baseline monitoring wells completed in the SM, OZ, and DM units were equipped with dedicated submersible pumps and recording pressure transducers. Prior to conducting the aquifer tests in July 2010, the discharge flow rates and resulting time-drawdown data were recorded during scheduled water quality sample collection. Based on the well responses during pumping, the optimum pumping rate for the aquifer tests was estimated, eliminating the need for extensive pre-testing. Based on the OZ well performance when water quality sampled, the pre-selected discharge rates were, for the most part, adequate to stress the well for the purposes of aquifer analysis.

The Aquifer^{Win32} (ESI 2003) software package was used for the analysis of the aquifer test data using various analytical methods. The raw transducer data were downloaded from the Level TROLLS to a handheld computer in the field, then transferred into In-Situ Inc.'s Win-Situ® software in the office. The original Level TROLL log files (".wsl" file extension) were then corrected to eliminate barometric pressure effects from the measurements with the BaroMerge software ("-BaroMerge.wsl" file extension), which were then converted into Excel files (".xls" file extension). The time-drawdown data, along with the pumping rates and well completion information, were then imported into the Aquifer^{Win32} program for analysis.

Prior to conducting these pumping tests, water level records from the OZ wells were compared to the barometric pressure records, and it was noted that the transmission of barometric pressure effects is very close to instantaneous, typical of confined aquifers. These data records also show that changes to water levels in response to barometric pressure changes are relatively small. For example, a barometric pressure increase of 0.2 psi recorded from June 5 through June 7, 2010, induced a water level decline of roughly 0.2 feet in well 12-18 OZ. The barometric pressure recorded at Strata's Oshoto field office during the entire month of June, the time of year that typically brings intense thunderstorms to northeastern Wyoming, fluctuated between a low of 12.53 psi and a high of 12.84 psi. Therefore, the barometric efficiency, or sensitivity to barometric change, for the ore zone aquifer was discounted for these aquifer tests because the scale of water level changes from barometric pressure compared to the scale of drawdown by pumping would be insignificant and induce essentially no error in the drawdown data.

4.0 WELL CLUSTER PUMPING TESTS

4.1 34-7

4.1.1 Well Locations and Completion Intervals

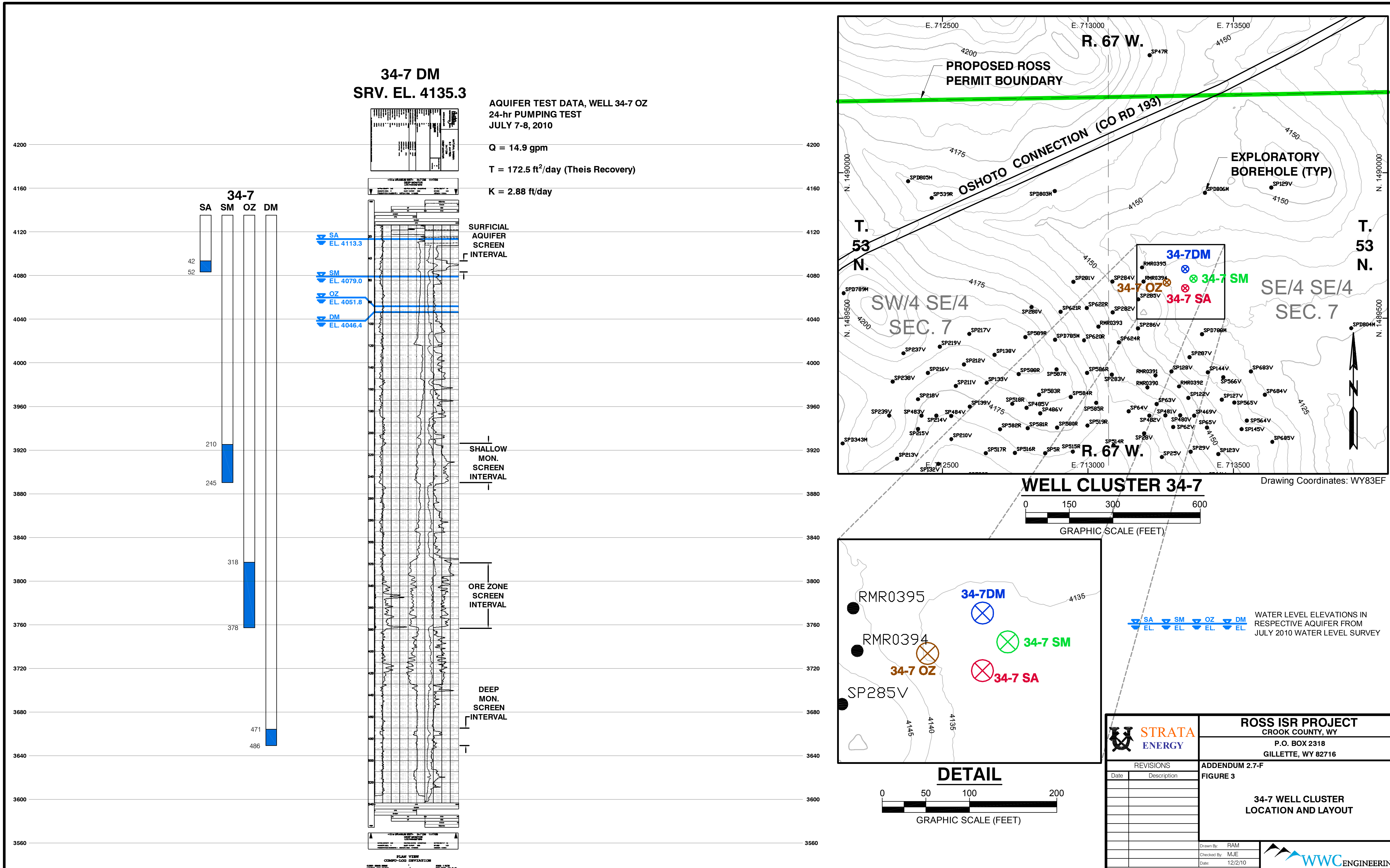
The 34-7 well cluster is located in the SE¼ SE¼ of Section 7, T53N, R67W as depicted on Figure 1. The well cluster consists of one well each completed in the SA, SM, OZ and DM monitoring intervals. Figure 3 depicts the distances between wells and the type log at that location with respective completion intervals and water level elevations. The 34-7 well cluster was tested on July 7-8, 2010 by pumping the OZ well and observing responses in the pumping well, the overlying SM and SA wells, and the underlying DM well.

4.1.2 Pumping Rate and Duration

The pumping phase of the constant rate test at the 34-7 well cluster was initiated at 1545 hours, on July 7 and ended on July 8 at 1545 hours, for a total duration of 1,440 minutes, or 24 hours. The weighted average discharge rate for 24 hours was 14.9 gpm. In effort to maintain constant discharge, a Dole flow control valve rated at 15 gpm was used. Dole valves are designed to deliver a constant rate of water flow over a wide pressure range. Despite the Dole valve's intended function, test personnel endeavored to maintain constant discharge pressure and flow rate by making minor adjustments with the gate valve during drawdown. Field data sheets and time-drawdown plots are presented in Appendix 1.

4.1.3 Well Responses

The drawdown and recovery plot for the pumped well is presented in Appendix 1, as are the hydrographs of wells 34-7 SM and 34-7 DM. Total drawdown in the pumped well was 28.01 feet. Twenty-four feet of drawdown occurred in the first 10 minutes of the test. The steep portion of the semi-log drawdown curve (approximately the first 30 minutes of pumping) is attributed to the rapid removal of water held in well bore storage. Drawdown diminished slightly as the result of an undetectable decline in discharge rate from roughly



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200 minutes to 1,100 minutes into the test, this can be seen on the time-drawdown plot for the pumped well. Roughly 0.5 foot of recovery had occurred over that time interval, so the discharge rate was adjusted up slightly and maintained until the pumping period ended. No response was observed in the SA, SM or DM wells at this site during the entire drawdown and recovery period.

4.1.4 Determination of Aquifer Parameters

The time-drawdown data from the pumped well, 34-7 OZ, were analyzed using the Cooper–Jacob drawdown (1946) method and the Theis recovery (1935) method. The analyses are presented in Appendix 1 and results are summarized in Table 3. The Theis recovery analysis is likely more representative of actual aquifer conditions than the Cooper–Jacob analysis, as the Theis analysis is not affected by well entrance losses or the slight adjustments that were made in the pumping rate.

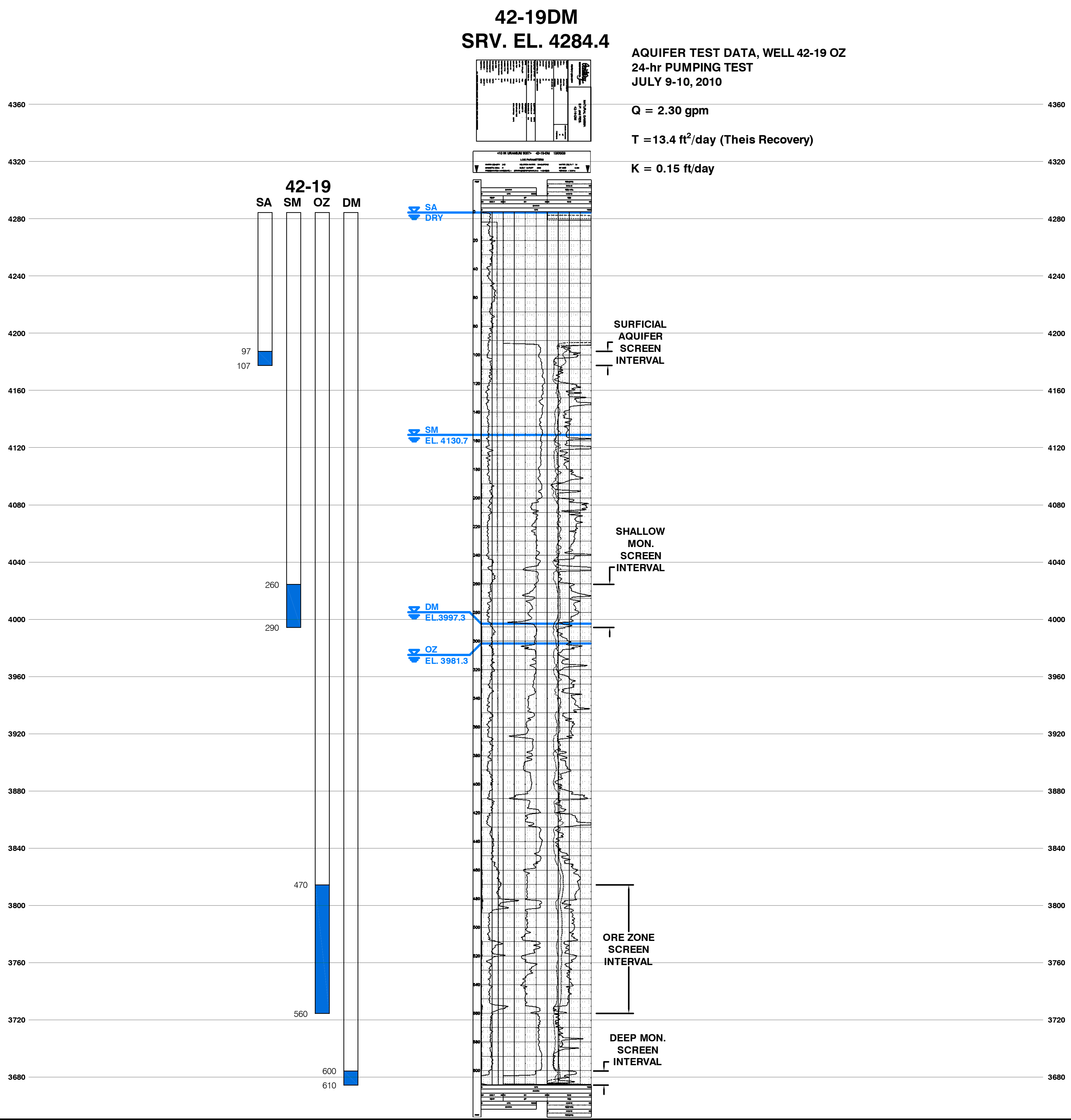
4.2 42-19

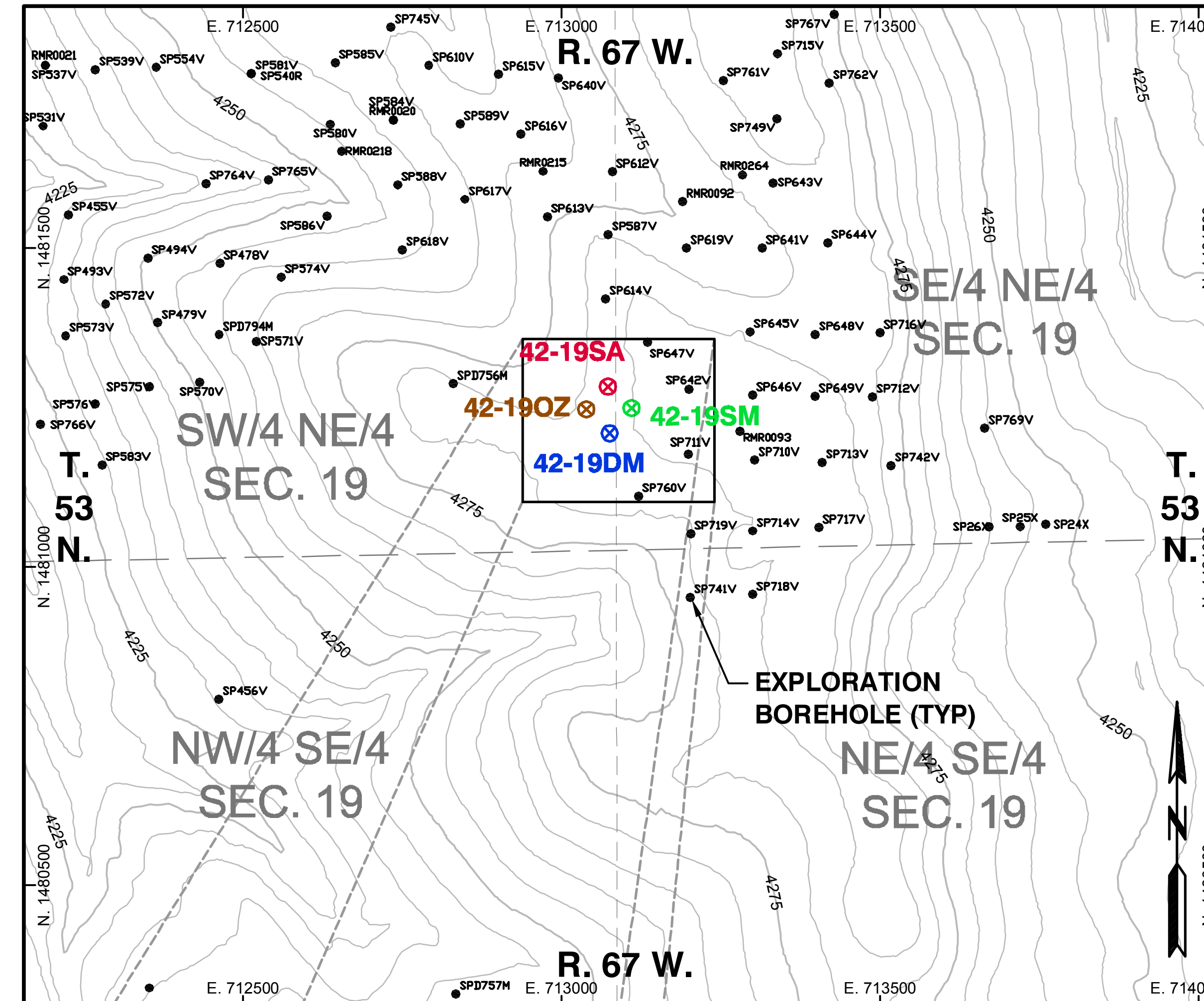
4.2.1 Well Locations and Completion Intervals

The 42-19 well cluster is located in the SW¼ NE¼ of Section 19, T53N, R67W as depicted on Figure 1. The well cluster consists of one well each completed in the SA, SM, OZ and DM monitoring intervals. Figure 4, depicts the distances between wells and the type log at that location with respective completion intervals and water level elevations. The 42-19 well cluster was tested on July 9-10, 2010 by pumping the OZ well and observing responses in the pumping well, the overlying SM and SA wells, and the underlying DM well.

4.2.2 Pumping Rate and Duration

The pumping phase of the constant rate test at the 42-19 well cluster was initiated at 0930, for a total duration of 1,443 minutes, or 24 hours and 3 minutes. The weighted average discharge rate for 24 hours was 2.3 gpm. A Dole flow control valve rated at 4 gpm was utilized to assist in maintaining a



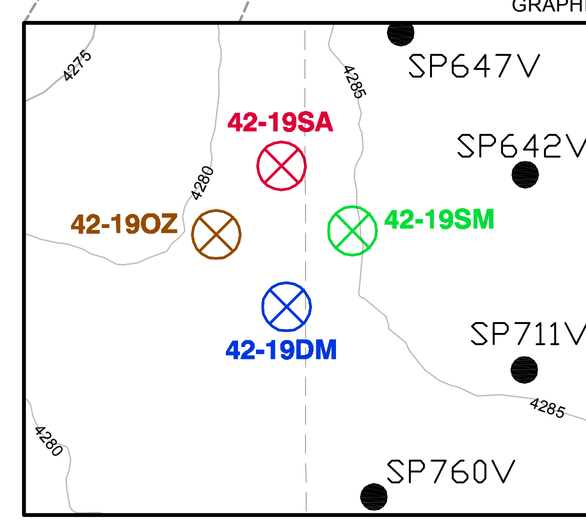


WELL CLUSTER 42-19

Drawing Coordinates: WY83EF

0 150 300 600

GRAPHIC SCALE (FEET)



DETAIL

0 50 100 200

GRAPHIC SCALE (FEET)

SA EL. SM EL. OZ EL. DM EL. WATER LEVEL ELEVATIONS IN RESPECTIVE AQUIFER FROM JULY 2010 WATER LEVEL SURVEY

STRATA ENERGY	ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716
REVISIONS (Date / Description)	ADDENDUM 2.7-F FIGURE 4 42-19 WELL CLUSTER LOCATION AND LAYOUT
FILE: ROSS_ATR_OW_CL_42-19	Drawn By: MBM Checked By: MJE Date: 12/2/10 WWC ENGINEERING

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constant discharge rate. Field data sheets and time-drawdown plots are presented in Appendix 2.

4.2.3 Well Responses

The drawdown and recovery plot for the pumped well, 42-19 OZ, and the hydrographs of wells 42-19 SM and 42-19 DM are included in Appendix 2. Total drawdown in the pumped well was 47.98 feet. No drawdown response was observed in the SM well, while the hydrograph for the DM well depicts a water level decline of about 0.05 feet approximately 500 minutes into the test. The 0.05-foot decline observed in the DM unit cannot be attributed to the compromised integrity of the shale layer (referred to by Strata as the Lower Confining Unit) between the OZ and DM screened intervals caused by unplugged exploration holes. None of the boreholes in the vicinity of the 42-19 well cluster penetrate the DM interval. The cause of the slight perturbation noted in the DM water level during pumping of the OZ well is unclear, but probably just due to a natural antecedent fluctuation.

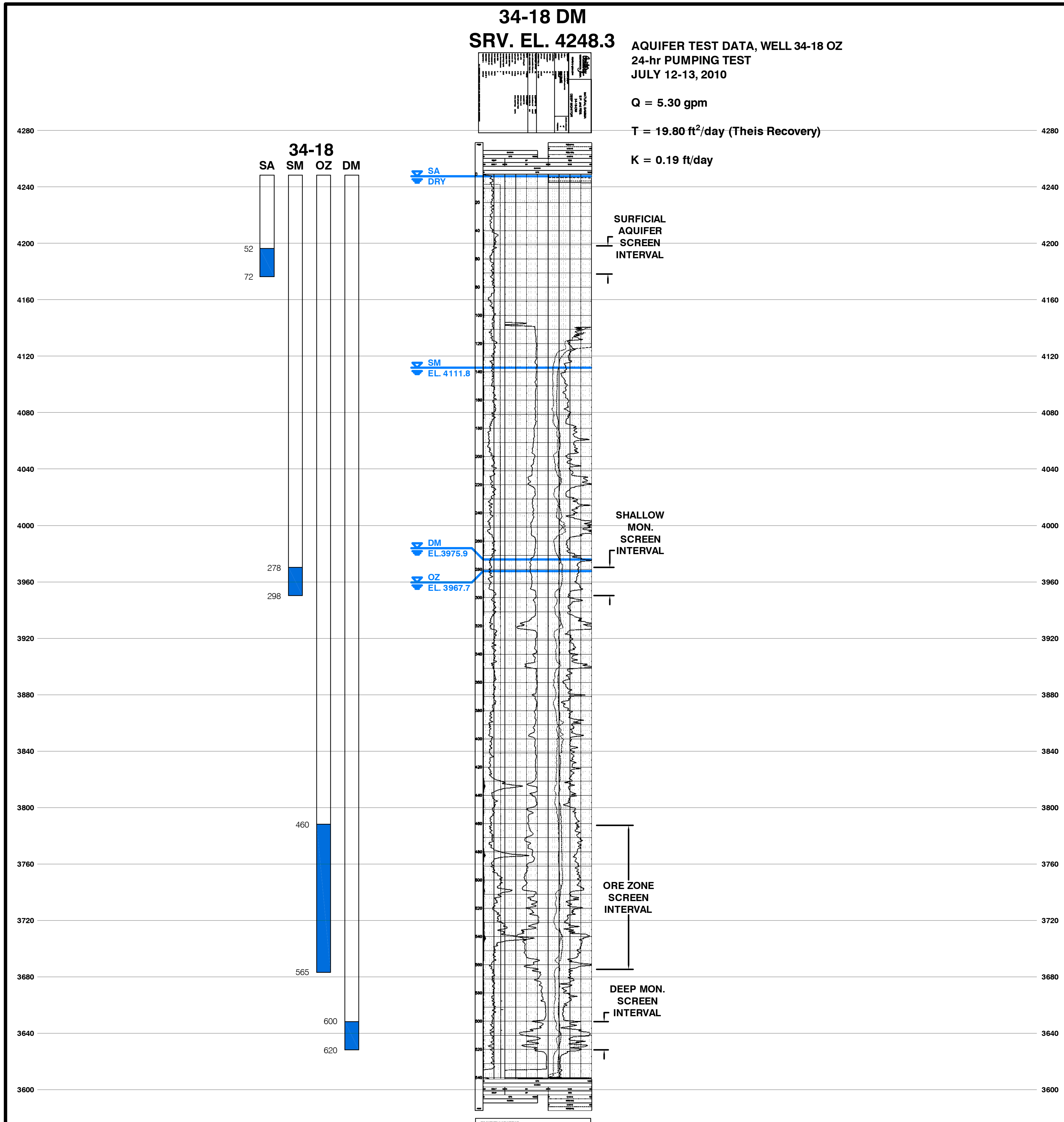
4.2.4 Determination of Aquifer Parameters

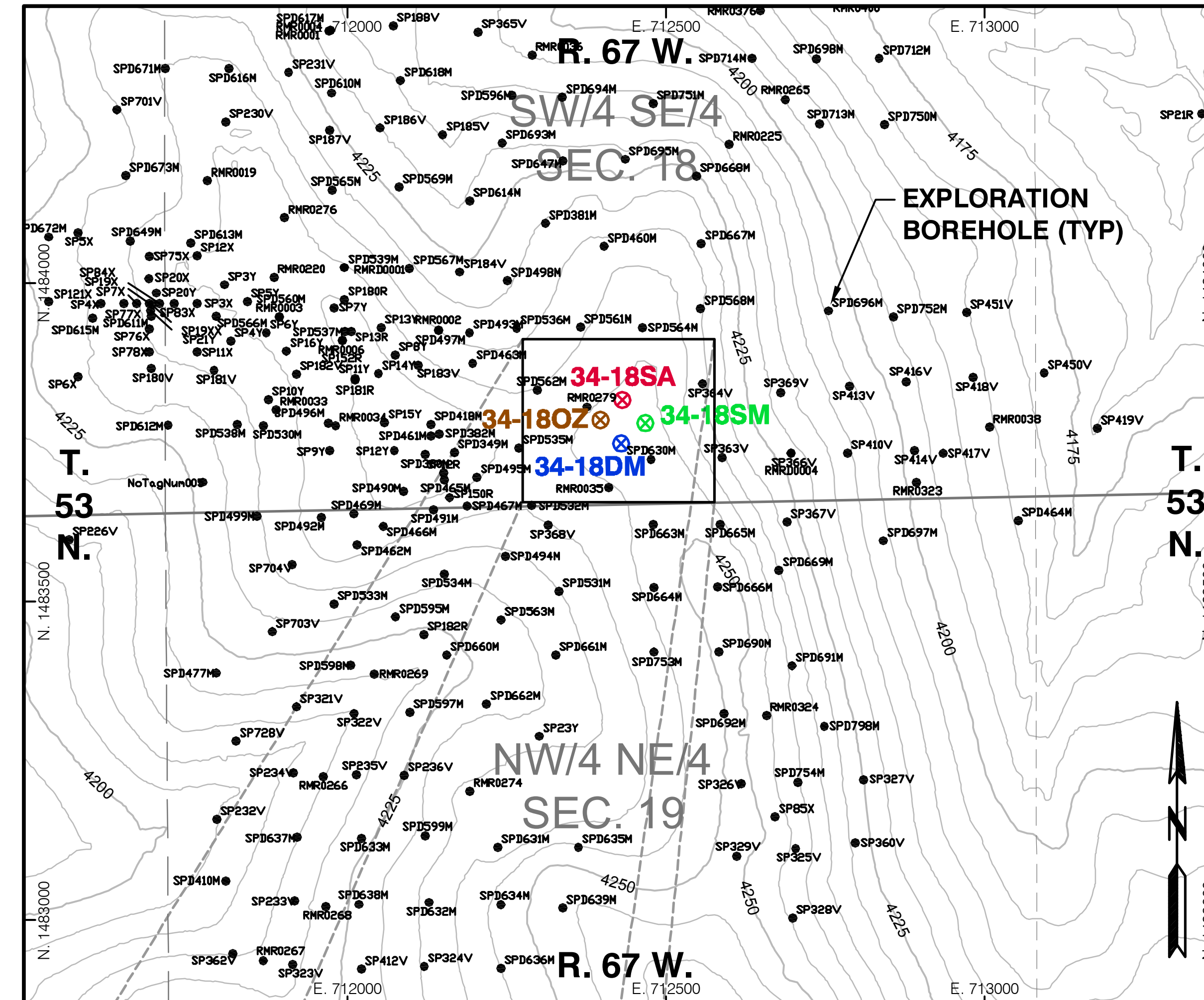
The time-drawdown data from the pumped well, 42-19 OZ, were analyzed using the Cooper-Jacob drawdown method and the Theis recovery method. The aquifer parameters determined by the Cooper-Jacob drawdown method closely compare with the Theis recovery method. The analyses are presented in Appendix 2 and results are summarized in Table 3.

4.3 34-18

4.3.1 Well Locations and Completion Intervals

The 34-18 well cluster is located in the SW¼ SE¼ of Section 18, T53N, R67W as depicted on Figure 1. The well cluster consists of one well each completed in the SA, SM, OZ and DM monitoring intervals. Figure 5 depicts the distances between wells and the type log at that location with respective completion intervals and water level elevations. The 34-18 well cluster was



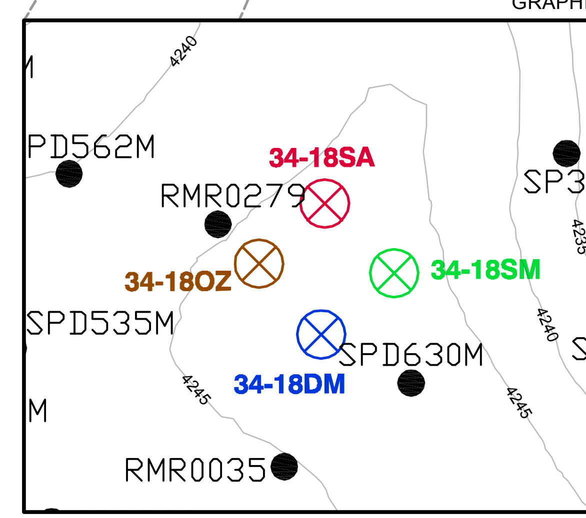


WELL CLUSTER 34-18

0 150 300 600

GRAPHIC SCALE (FEET)

Drawing Coordinates: WY83EF



DETAIL

0 50 100 200

GRAPHIC SCALE (FEET)

SA EL. SM EL. OZ EL. DM EL. WATER LEVEL ELEVATIONS IN RESPECTIVE AQUIFER FROM JULY 2010 WATER LEVEL SURVEY

STRATA ENERGY

ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

REVISIONS	
Date	Description

ADDENDUM 2.7-F
FIGURE 5

34-18 WELL CLUSTER LOCATION AND LAYOUT

Drawn By: RAM
Checked By: MJE
Date: 12/2/10

FILE: ROSS_ATR_OW_CL_34-18

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tested on July 12-13, 2010 by pumping the OZ well and observing responses in the pumping well, the overlying SM well, and the underlying DM well. The SA unit at this location is dry; therefore, well 34-18 SA was not monitored during the test.

4.3.2 Pumping Rate and Duration

The pumping phase of the constant rate test at the 34-18 well cluster was initiated at 1332 hours on July 12 and ended on July 13 at 1332 hours, for a total duration of 1,440 minutes, or 24 hours. The time-weighted average discharge rate for 24 hours was 5.3 gpm. A Dole flow control valve rated at 6 gpm was utilized to assist in maintaining a constant discharge rate. Field data sheets and time-drawdown plots are presented in Appendix 3.

4.3.3 Well Responses

The drawdown and recovery plot for the pumped well, 34-18 OZ, and the hydrographs of wells 34-18 SM and 34-18 DM are included in Appendix 3. Total drawdown in the pumped well was 64.33 feet. No drawdown response from pumping was observed in the SM well, while the hydrograph for the DM well depicts a water level decline of about 0.25 feet during the pumping phase of the test. There are a number of unplugged exploration boreholes in the vicinity of the 34-18 cluster, some of which penetrate the DM interval. Therefore, the apparent drawdown observed in the DM well may be attributed to the compromised integrity of the shale layer (Lower Confining Unit) between the OZ and DM screened intervals caused by unplugged exploration holes.

4.3.4 Determination of Aquifer Parameters

The time-drawdown data from the pumped well, 34-18 OZ, were analyzed using the Cooper-Jacob drawdown method and the Theis recovery method. Aquifer parameters measured in well 34-18 OZ are summarized in Table 3, and the analyses are presented in Appendix 3. Transmissivity estimates are similar between the Cooper-Jacob drawdown and Theis recovery methods; however, the recovery data are not affected by well entrance losses, and therefore likely to be more representative of actual aquifer conditions.

4.4 14-18

4.4.1 Well Location and Completion Intervals

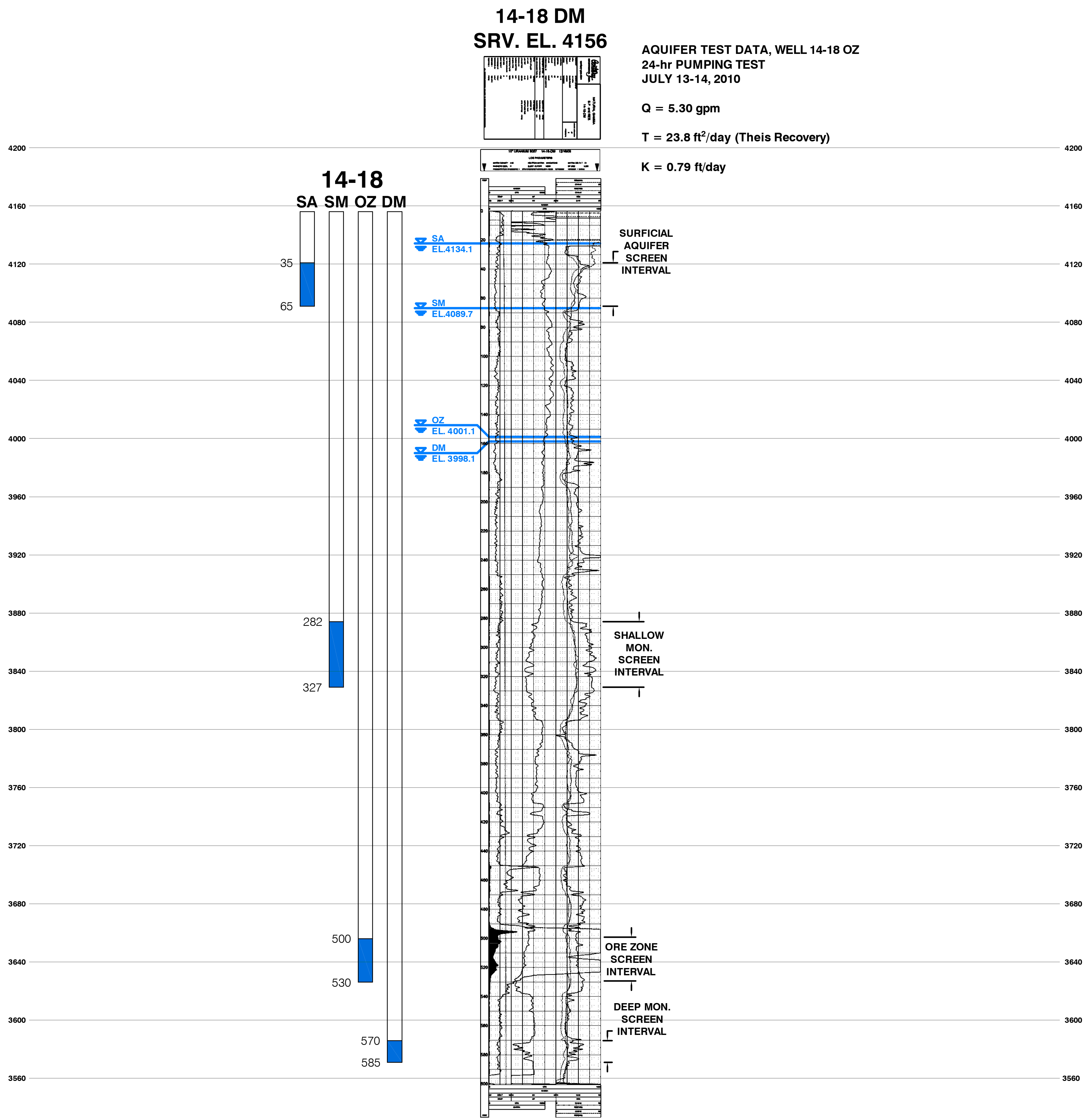
The 14-18 well cluster is located in the SW¼ SW¼ of Section 18, T53N, R67W as depicted on Figure 1. The well cluster consists of one well each completed in the SA, SM, OZ and DM monitoring intervals. Figure 6 depicts the distances between wells and the type log at that location with respective completion intervals and water level elevations. The 14-18 well cluster was tested on July 13-14, 2010 by pumping the OZ well and observing responses in the pumping well, the overlying SA and SM wells, and the underlying DM well.

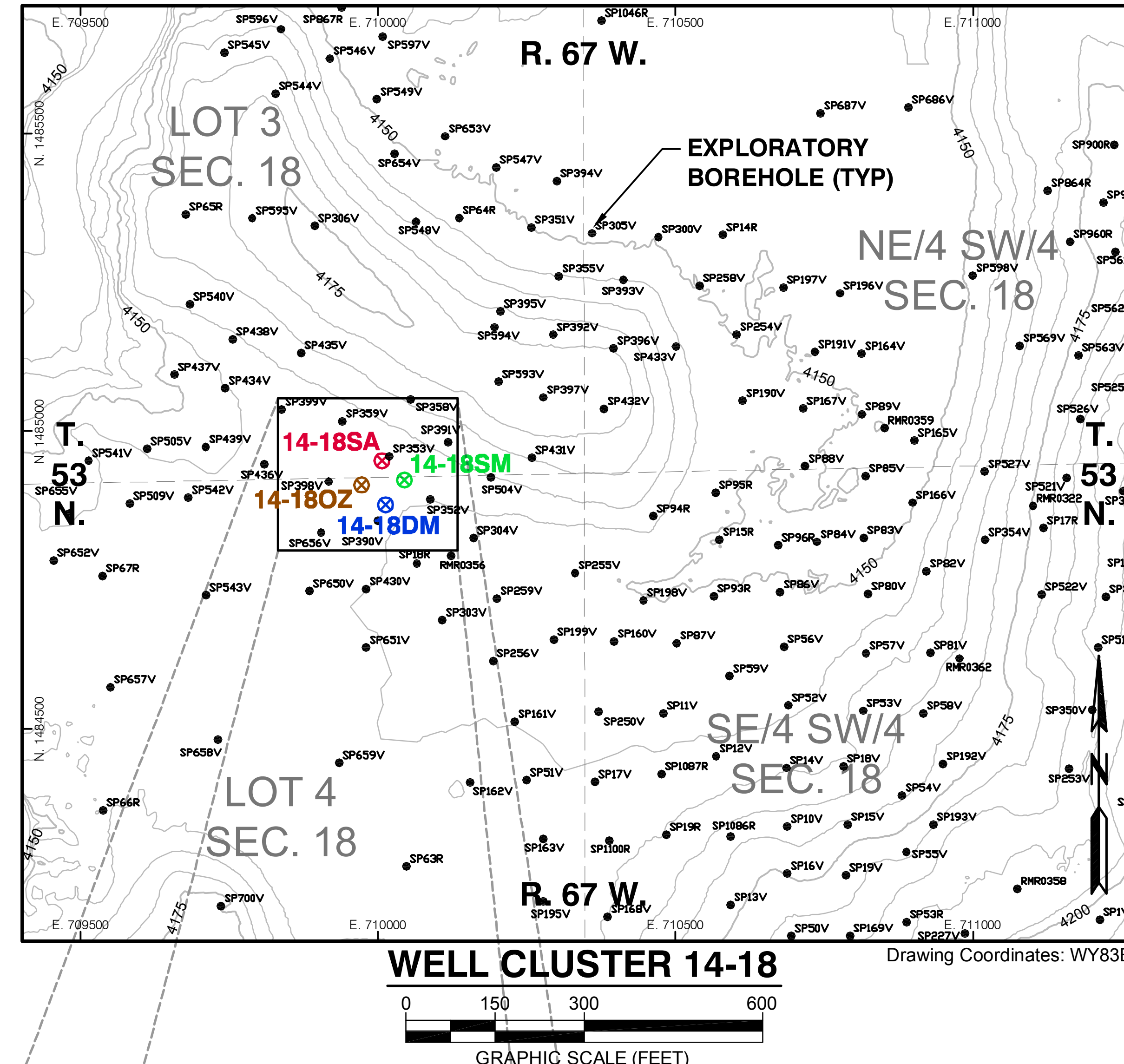
4.4.2 Pumping Rate and Duration

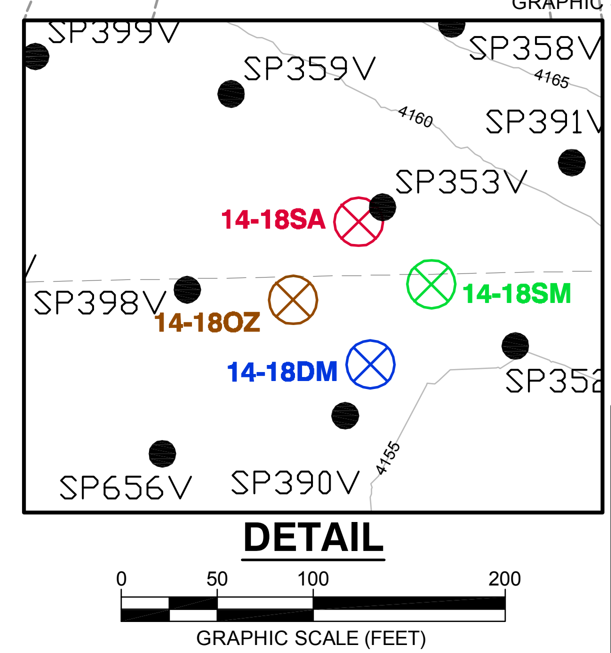
The pumping phase of the constant rate test at the 14-18 well cluster was initiated at 1436 hours on July 13 and ended on July 14 at 1436 hours, for total duration of 1,440 minutes, or 24 hours. The time-weighted average discharge rate for 24 hours was 5.3 gpm. A Dole flow control valve rated at 6 gpm was utilized to assist in maintaining a constant discharge rate. Field data sheets and time-drawdown plots are presented in Appendix 4.

4.4.3 Well Responses

The drawdown and recovery plot for the pumped well, 14-18 OZ, and the hydrographs of wells 14-18 SM and 14-18 DM are included in Appendix 4. Total drawdown in the pumped well was 117.21 feet. No drawdown response from pumping was observed in the SM well, while the hydrograph for the DM well depicts a water level decline of approximately 0.20 feet during the pumping phase of the test. Similar to the 34-18 well cluster, there are a number of unplugged exploration boreholes in proximity to the 14-18 well cluster, some of which penetrate the DM interval. Therefore, the apparent minor drawdown







SA EL. SM EL. OZ EL. DM EL. WATER LEVEL ELEVATIONS IN RESPECTIVE AQUIFER FROM JULY 2010 WATER LEVEL SURVEY

STRATA ENERGY

ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

REVISIONS

Date	Description

ADDENDUM 2.7-F
FIGURE 6

14-18 WELL CLUSTER LOCATION AND LAYOUT

Drawn By: RAM
Checked By: MJE
Date: 12/2/10

FILE: ROSS_ATR_OW_CL_14-18

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observed in the DM well may be attributed to a compromised Lower Confining Unit within the radius of influence.

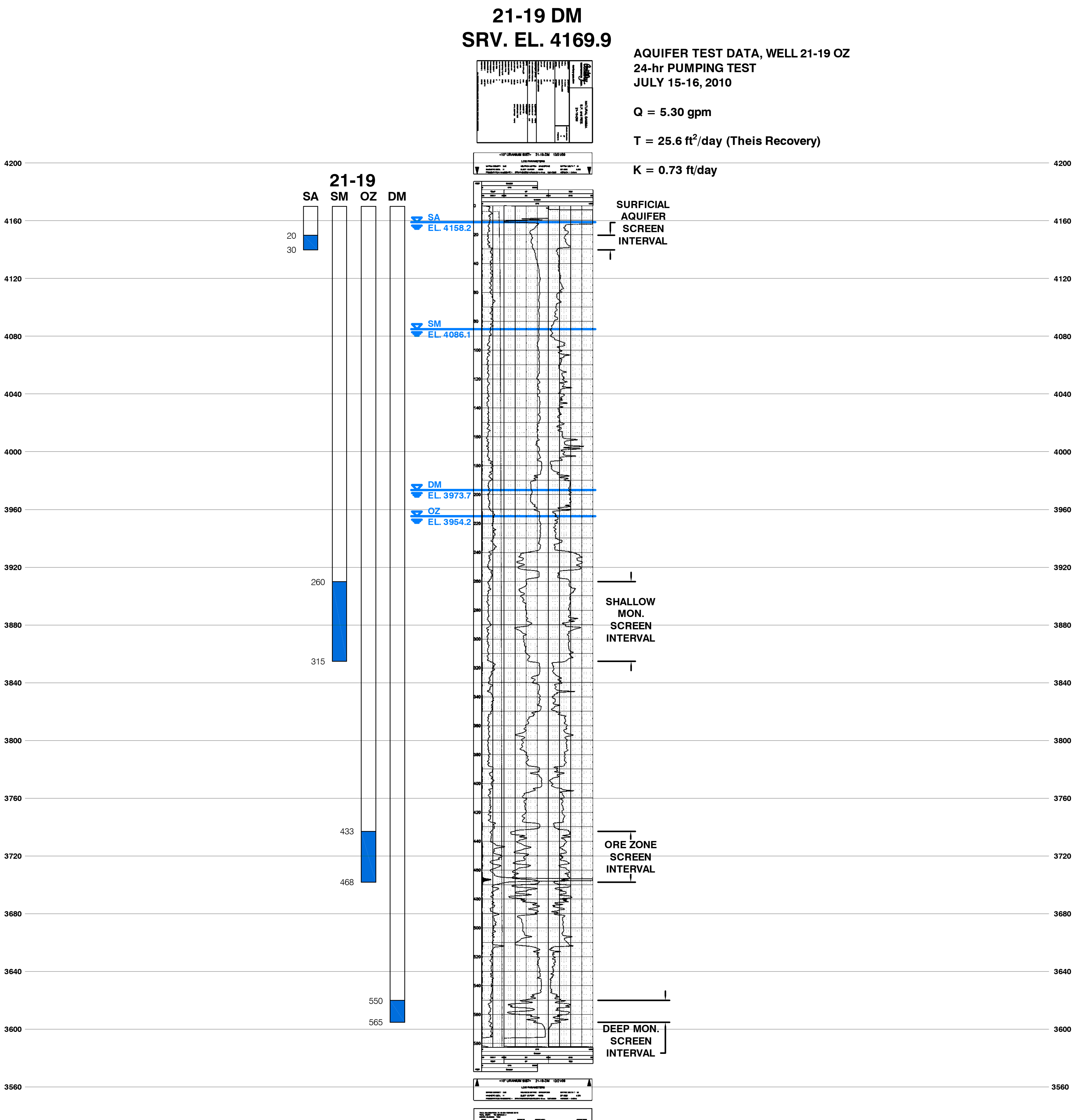
4.4.4 Determination of Aquifer Parameters

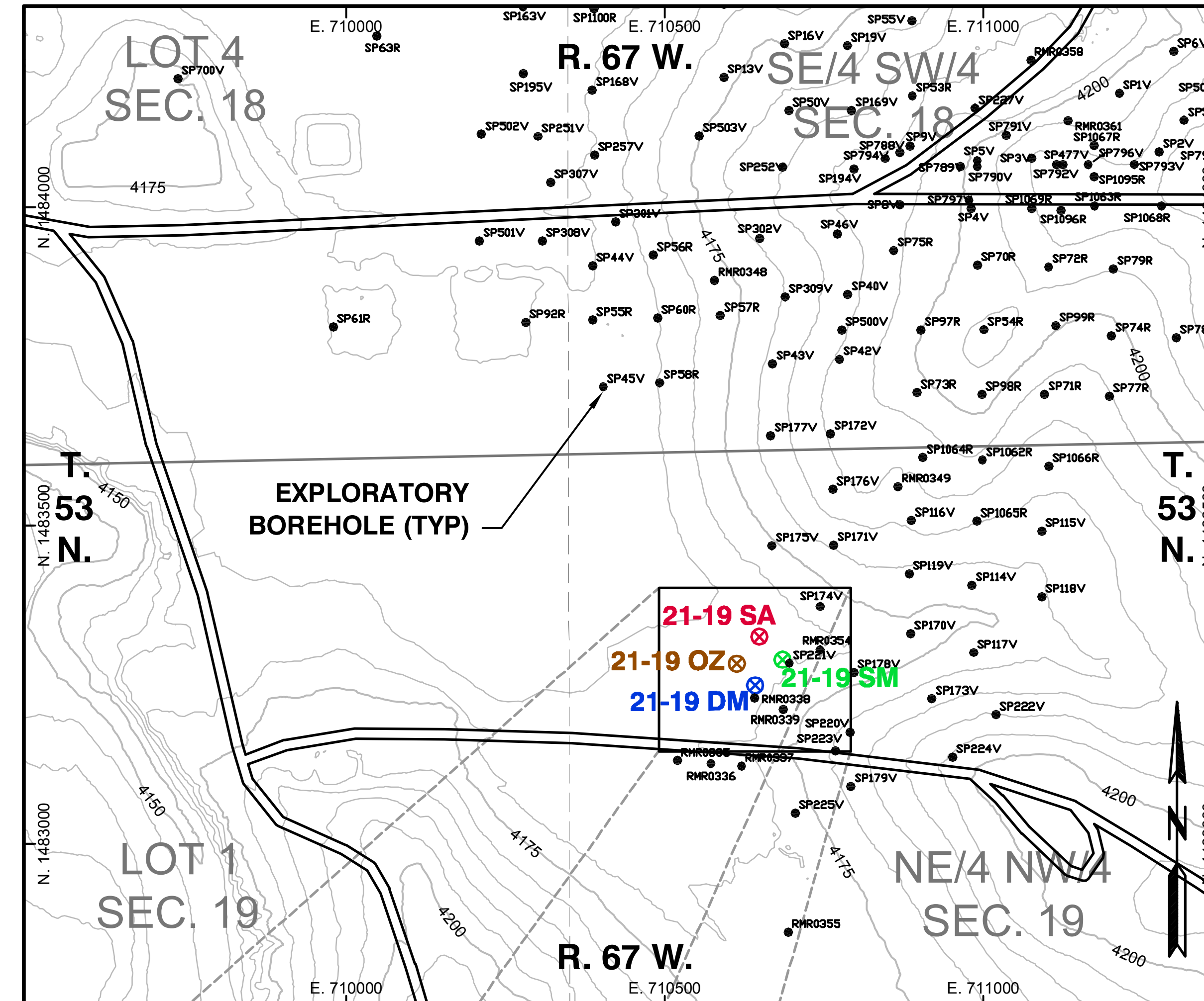
The time-drawdown data from the pumped well, 14-18 OZ, were analyzed using the Cooper-Jacob drawdown method and the Theis recovery method. Aquifer parameters measured in well 14-18 OZ are summarized in Table 3, and the analyses are presented in Appendix 4. The transmissivity estimated by the Cooper-Jacob drawdown method is significantly lower (by a factor of 6) from that determined by the Theis recovery method. The Theis method results are believed to be more representative of actual aquifer conditions. The exact cause of the discrepancy between the transmissivity values measured by the Cooper-Jacob and the Theis methods is most likely related to low well efficiency, which results in excess drawdown. The factors contributing to low well efficiency are either design or construction related. The time-recovery data and Theis recovery analysis for a pumping well is considered more accurate than the time-drawdown data and Cooper-Jacob drawdown analysis because well efficiency is not a factor. The efficiency of pumped well 14-18 OZ was not determined. Well efficiency cannot be determined without the existence of time-drawdown data from a nearby monitoring well completed in the same interval.

4.5 21-19

4.5.1 Well Locations and Completion Intervals

The 21-19 well cluster is located in the NE¼ NW¼ of Section 19, T53N, R67W as depicted on Figure 1. The well cluster consists of one well each completed in the SA, SM, OZ and DM monitoring intervals. Figure 7 depicts the distances between wells and the type log at that location with respective completion intervals and water level elevations. The 21-19 well cluster was tested on July 15-16, 2010 by pumping the OZ well and observing responses in the pumping well, the overlying SM well, and the underlying DM well.

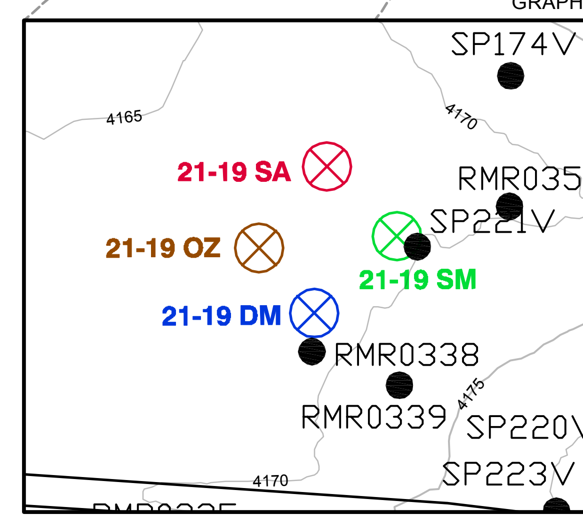




WELL CLUSTER 21-19

Drawing Coordinates: WY83EF

GRAPHIC SCALE (FEET)



DETAIL

GRAPHIC SCALE (FEET)

WATER LEVEL ELEVATIONS IN RESPECTIVE AQUIFER FROM JULY 2010 WATER LEVEL SURVEY

STRATA ENERGY

ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

REVISIONS

Date	Description

ADDENDUM 2.7-F
FIGURE 7

21-19 WELL CLUSTER LOCATION AND LAYOUT

Drawn By: RAM
Checked By: MJE
Date: 12/2/10

FILE: ROSS_ATR_OW_CL_21-19

WWC ENGINEERING
www.wwcengineering.com

K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_ATR_OW_CL_21-19.dwg, TRA_2.7-F_FIGURE_7, 12/13/2010 12:49:56 PM

4.5.2 Pumping Rate and Duration

The pumping phase of the constant rate test at the 21-19 well cluster was initiated at 0950 hours on July 15 and ended on July 16 at 1010 hours, for a total duration of 1,460 minutes, or 24 hours and 20 minutes. The time-weighted average discharge rate through the entire test was 5.3 gpm. A Dole flow control valve rated at 6 gpm was utilized to assist in maintaining a constant discharge rate. Field data sheets and time-drawdown plots are presented in Appendix 5.

4.5.3 Well Responses

The drawdown and recovery plot for the pumped well, 21-19 OZ, and the hydrographs of well 21-19 SM and 21-19 DM are included in Appendix 5. Total drawdown in the pumped well was 42.88 feet. No drawdown responses were observed in the SA, SM or DM wells.

4.5.4 Determination of Aquifer Parameters

The time-drawdown data from the pumped well, 21-19 OZ, were analyzed using the Cooper-Jacob drawdown method and the Theis recovery method. Aquifer parameters measured in well 21-19 OZ well are presented in Table 3, and the analyses are presented in Appendix 5. The transmissivity estimated by the Cooper-Jacob drawdown method is slightly higher than that determined using the Theis recovery method. As discussed previously, the transmissivity value determined using the time-drawdown data and Cooper-Jacob drawdown method is considered less accurate than by using the time-recovery data and Theis recovery method due to factors affecting well efficiency.

4.6 12-18

4.6.1 Well Locations and Completion Intervals

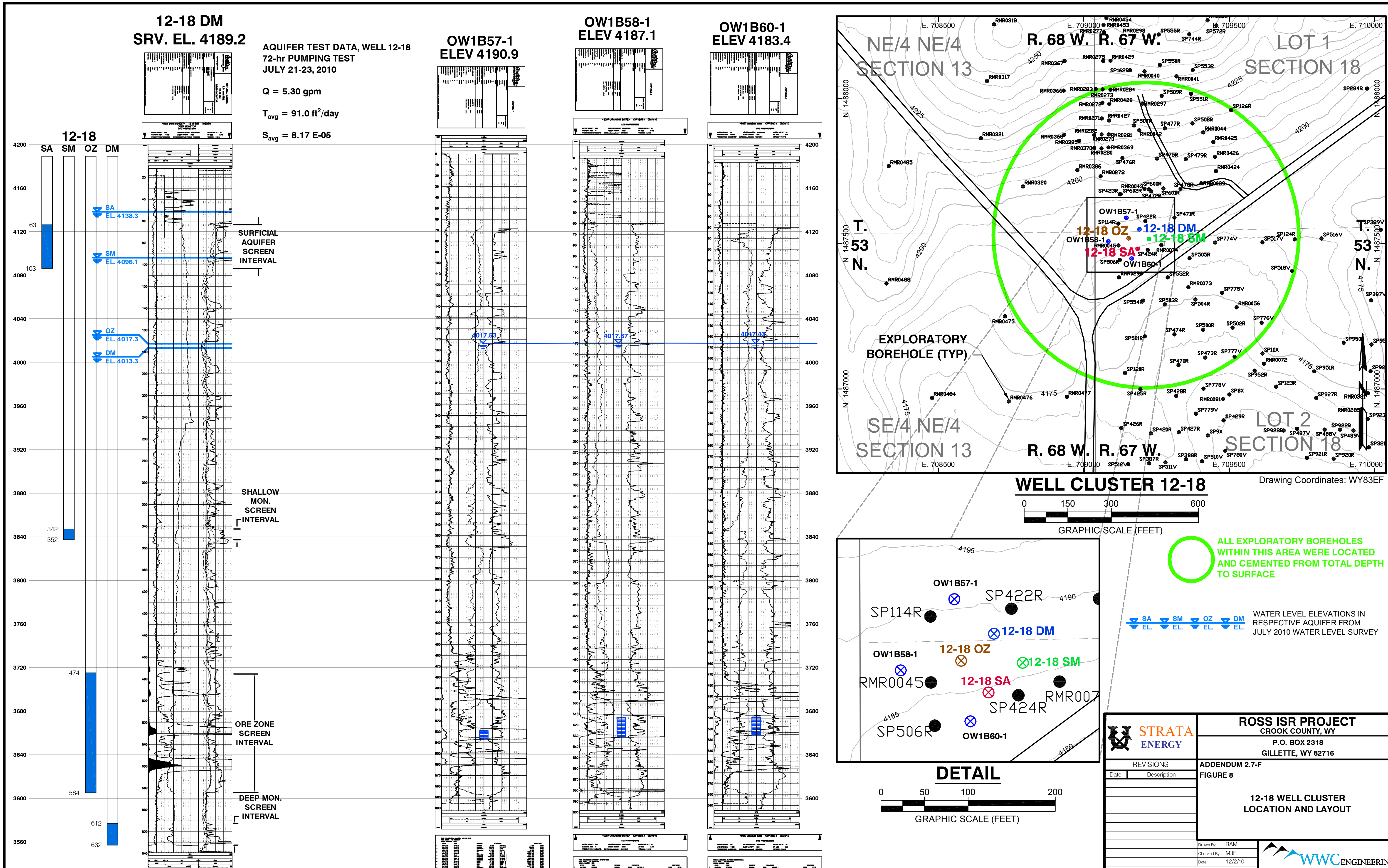
The 12-18 well cluster is located in the SW¼ NW¼ of Section 18, T53N, R67W as depicted on Figure 1. The well cluster consists of one well each completed in the SA, SM, and DM monitoring intervals, with three additional observation wells that partially penetrate the ore zone. This site was selected for more comprehensive testing because ISR mining will most likely be initiated near this site upon permit approval. The entire well cluster is depicted in detail on Figure 8, which shows the distances between wells and the geophysical borehole logs with respective well completion intervals and water level elevations. The 12-18 well cluster was tested on July 21-24, 2010 by pumping the OZ well and observing responses in the pumping well, the overlying SA and SM wells, the OZ partial penetration wells (OW1B57-1, OW1B58-1, and OW1B60-1), and the underlying DM well.

The 12-18 OZ well fully penetrates the OZ aquifer at this site, while observation wells OW1B57-1, OW1B58-1, and OW1B60-1 were completed as partially penetrating wells that target specific roll front sands. These observation wells were located approximately 70 feet from the pumping well, and were spaced to replicate mining conditions. As discussed in Section 3.1.1, some 55 exploration boreholes within a 522-foot radius of well 12-18 OZ were located, reentered and cemented from the bottom up to ensure no interference from unplugged boreholes.

4.6.2 Pumping Rate and Duration

The pumping phase of the constant rate test at the 12-18 well cluster was initiated at 0921 hours on July 21 and ended on July 24 at 1000 hours, for a total duration of 4,359 minutes, or 72 hours and 39 minutes. The time-weighted average discharge rate through the entire test was 5.3 gpm. A Dole flow control valve rated at 6 gpm was utilized to assist in maintaining a constant discharge rate. Field data sheets and time-drawdown plots are presented in Appendix 6.

This is the first of two tests that were conducted by Strata at the 12-18 well cluster.



K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_ATR_OW_CL_12-18.dwg, TRA_2.7-F_FIGURE_8, 12/13/2010 1:18:39 PM

4.6.3 Well Responses

The drawdown and recovery plots for the pumped well, 12-18 OZ, and the partial penetration wells, OW1B57-1, OW1B58-1, and OW1B60-1, are included in Appendix 6. The hydrographs of wells 12-18 SA, 12-18 SM and 12-18 DM are also included in Appendix 6. Total drawdown in the pumped well was 21.99 feet. No drawdown responses from pumping were observed in the SA, SM or DM wells. Drawdown response in the partial penetration observation wells began immediately upon initiation of pumping, with 5.61 feet of total drawdown measured in well OW1B57-1, 7.15 feet of total drawdown measured in well OW1B58-1, and 7.11 feet of total drawdown measured in well OW1B60-1 (Table 2).

4.6.4 Determination of Aquifer Parameters

The time-drawdown data from the pumped well, 12-18 OZ, were analyzed using the Cooper-Jacob drawdown method and the Theis recovery method. The time-drawdown data from the partially penetrating observation wells, OW1B57-1, OW1B58-1 and OW1B60-1, were analyzed using the Cooper-Jacob drawdown method, the Hantush (1961) method for confined partially penetrating wells, and the Theis recovery method. The Cooper-Jacob method was valid (where u in the Theis nonequilibrium well equation is less than 0.01) after 266 minutes in observation well OW1B57-1, 114 minutes in well OW1B58-1, and 122 minutes in well OW1B60-1. Aquifer parameters measured in pumping well 12-18 OZ and observation wells OW1B57-1, OW1B58-1 and OW1B60-1 are presented in Table 3, and the analyses are presented in Appendix 6.

The transmissivity estimated for the pumping well by the Cooper-Jacob drawdown method is somewhat higher than that determined using the Theis recovery method. As discussed previously, the transmissivity value determined by the time-drawdown data and the Cooper-Jacob drawdown method (116.9

ft^2/day) is considered less accurate than the time-recovery data and the Theis recovery method (70.8 ft^2/day) due to factors affecting well efficiency.

The transmissivity values estimated for the three partially penetrating observation wells using the time-drawdown data and the Cooper-Jacob and Hantush methods are all similar and comparable to the transmissivity values determined by using the recovery data and Theis recovery method. Furthermore, transmissivities determined for the three partial penetration observation wells are also comparable to the transmissivity determined for the pumping well, ranging from a low of 84.5 ft^2/day to a high of 102.2 ft^2/day, with a median of 88.2 ft^2/day.

Storativity values determined by the Cooper-Jacob and Hantush analyses using time-drawdown data from the three observation wells were appropriate for a confined aquifer, ranging from 1.5 x 10^{-4} (dimensionless) to 6.2 x 10^{-5}, with a median value of 6.2 x 10^{-5}.

4.7 OW1B57-1

The second aquifer test at the 12-18 well cluster was performed by pumping partial penetration well OW1B57-1 and observing responses in the pumping well, the other two partial penetration wells (OW1B58-1 and OW1B60-1), the fully penetrating OZ well, the overlying SA and SM wells, and the underlying DM well. Well OW1B57-1, which is completed within a 7-foot thick sand that targets a specific uranium roll front, was pumped for 24 hours in order to collect additional data, including that which would provide the calculation of vertical and horizontal anisotropy within the ore zone interval.

4.7.1 Pumping Rate and Duration

The pumping phase of the second constant rate test at the 12-18 well cluster was initiated at 1205 hours on July 27 and ended on July 28 at 1209 hours, for a total duration of 1444 minutes, or 24 hours and 4 minutes. The time-weighted average discharge rate through the entire test was 5.66 gpm. Field data sheets and time-drawdown plots are presented in Appendix 7.

4.7.2 Well Responses

The drawdown and recovery plots for the pumped well, OW1B57-1, the partial penetration wells, OW1B58-1 and OW1B60-1, and well 12-18 OZ are included in Appendix 7. The hydrographs of wells 12-18 SA, 12-18 SM and 12-18 DM are also included in Appendix 7. Total drawdown in the pumped well was 48.21 feet. Drawdown in the pumping well essentially ceased after approximately 200 minutes. No drawdown responses from pumping were observed in the SA, SM or DM wells. Drawdown response in the ore zone observation wells began immediately upon the initiation of pumping, with 5.05 feet of the total drawdown measured in well 12-18 OZ, 5.03 feet of total drawdown measured in OW1B58-1, and 6.18 feet of total drawdown measured in OW1B60-1. Drawdown response in the ore zone observation wells continued throughout the entire pumping phase of the test (Table 3).

4.7.3 Determination of Aquifer Parameters

The open interval (an underreamed borehole having no well screen) for the pumping well, OW1B57-1, targets a 7-foot thick sandstone in the ore zone aquifer. Based on the electric logs of this well, this 7-foot sandstone interval is the lower portion of a 25-foot thick sandstone within the ore zone unit that is bound above and below by shales. As stated above, over 48 feet of drawdown occurred in the pumped well during the first two hours of the test, and after approximately 200 minutes of pumping at a rate of 5.66 gpm, high vertical leakage from above the open interval essentially equaled the pumping rate and drawdown effectively stopped. Therefore, the Cooper-Jacob straight line drawdown method of analysis is not considered valid for this test. The recovery data from the pumping well were analyzed using the Theis recovery method.

The time-drawdown data from the partially penetrating observation wells, OW1B58-1 and OW1B60-1, were analyzed using the Cooper-Jacob drawdown method, the Hantush method for confined partially penetrating wells, and the Theis recovery method. The time-drawdown data from the fully penetrating observation well, 12-18 OZ, were analyzed using the Cooper-Jacob drawdown method, the Theis (1935) drawdown method, and the Theis recovery method. The Cooper-Jacob method was valid (where u in the Theis nonequilibrium well equation is less than 0.01) after 172 minutes in well 12-18 OZ, 118 minutes in well OW1B58-1, and 102 minutes in well OW1B60-1.

The transmissivity determined for the pumping well using only the recovery data is 80.3 ft^2/day. The transmissivity determined for the two partially penetrating observation wells using the Cooper-Jacob and Hantush methods are all similar and comparable to the transmissivity values determined using the Theis recovery method. Those values range from 92.7 - 137.1 ft^2/day, with a median of 103.6 ft2/day. The transmissivity determined for the fully penetrating OZ well using both drawdown and recovery data are also very similar and comparable to the transmissivity values determined for the partial penetration wells. Those values range from 93.2 ft^2/day to 105.6 ft^2/day.

Storativity values determined by the Cooper-Jacob, Hantush, and Theis analyses using time-drawdown data from the three observation wells were appropriate for a confined aquifer, ranging from 1.0×10^{-4} to 4.0×10^{-6}, with a median value of 2.4×10^{-5}.

Aquifer parameters measured in the pumping well OW1B57-1 and observation wells OW1B58-1, OW1B60-1 and 12-18 OZ are summarized in Table 3, and the analyses are presented in Appendix 7.

Vertical anisotrophy within the ore zone aquifer was determined at the 12-18 well cluster using the Hantush (1961) solution method for partially penetrating wells. Time-drawdown data from each of the partially penetrating observation wells were analyzed using the Hantush (1961) method, which is included in the Aquifer^{Win32} (ESI 2003) software. Hantush type curves are based on site-specific well construction information and aquifer thickness. Aquifer^{Win32} optimizes the K_z/K_r (where K_z is the effective vertical hydraulic conductivity and K_r is the effective horizontal hydraulic conductivity) type curve match. The Hantush analysis plots for both aquifer tests conducted at the 12-

18 well cluster are included in Appendices 6 and 7. Hantush solution plots of the drawdown data from all of the partially penetrating observation wells, for both pumping tests, followed the K_z/K_r = 1.0 type curve, indicating the effective vertical and horizontal hydraulic conductivities are essentially equal.

Horizontal anisotropy within the ore zone aquifer was also measured at the 12-18 well cluster, using the method described by Masila and Randolph (1987). This method uses a least squares approximation described by Neuman and others (1984) to resolve the tensor of transmissivity. Based on the data collected at the 12-18 site, the ore zone is slightly anisotropic, with an anisotropy ratio of approximately 2.6:1. The direction of major transmissivity is to the north 22° east with T_{major} = 152 ft^2/day and a T_{minor} of 58 ft^2/day. Figure 9 depicts the 12-18 well cluster and the major and minor transmissivity axes. Additional discussion on horizontal anisotropy within the ore zone aquifer is included in Addendum 2.7-H (Groundwater Model) in the TR.

4.8 Laboratory Core Analysis

Core samples from hole number 477V were selected by Nubeth for measurement of intrinsic permeability in the laboratory (Hamilton 1977), while samples from six cores (hole numbers RMRD 0001 through RMRD 0004, RMD0006, and RMD0007) recovered from within the proposed Ross Project area were selected by Strata in 2009 and 2010 for measurement of intrinsic permeability in the laboratory. The intrinsic permeability, in millidarcies (mD), and porosity values measured in the laboratory for samples selected from these seven core holes are tabulated in Appendix 9. Intrinsic permeability is a property of the core material (rock) only and does not include any fluid physical properties (e.g., viscosity). Intrinsic permeability, in mD, is converted to hydraulic conductivity, in ft/day, using various fluid properties of the site groundwater and the gravitational constant. The corresponding hydraulic conductivity values are included in Appendix 9.

Core sample data tabulated in Appendix 9 are grouped according to lithology type. A total of 24 sandstone samples, 5 siltstone samples, 11 shale

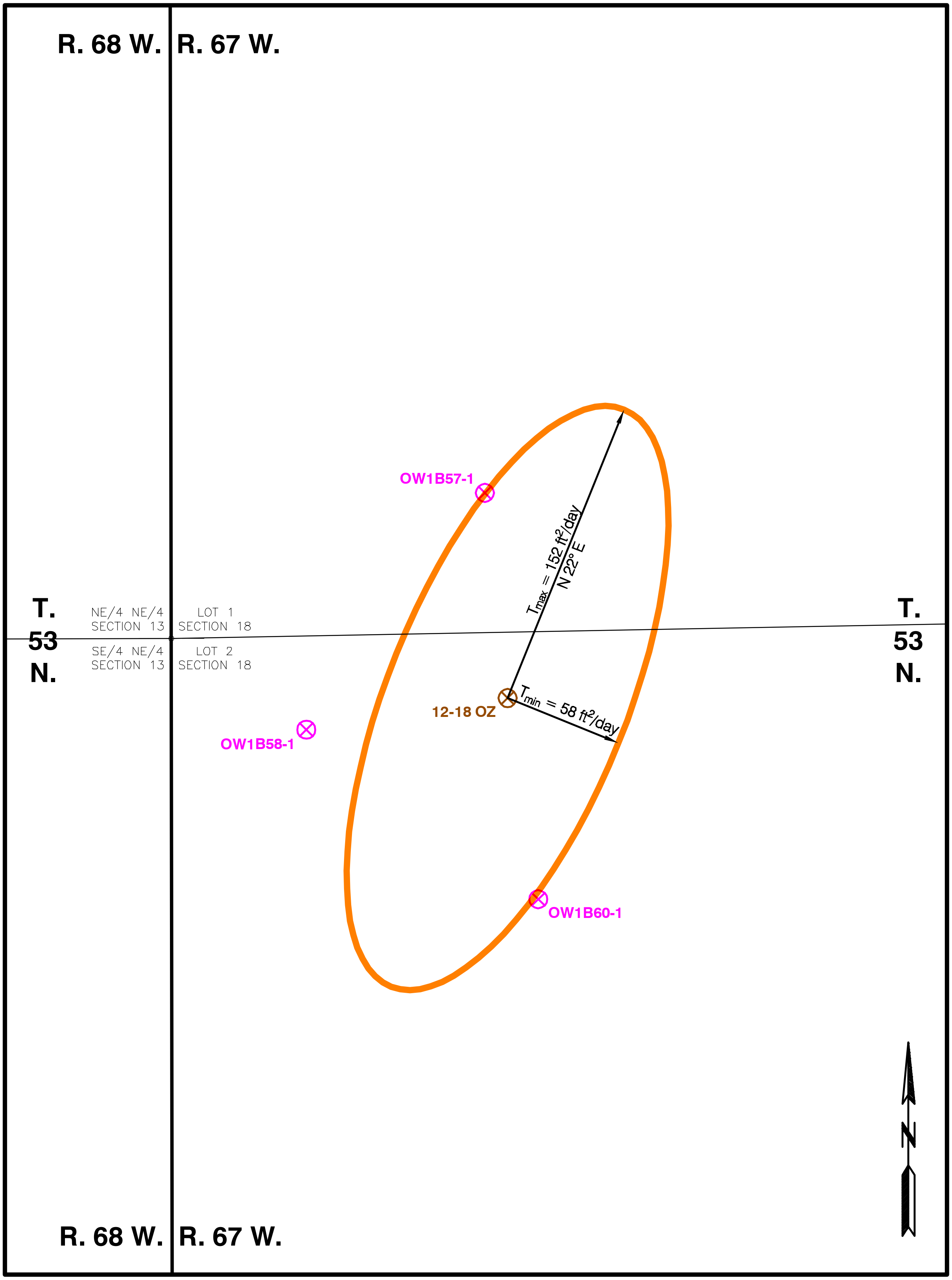


Figure 9. Ellipsoid of Anisotropy Depicting Direction and Magnitude of Major and Minor Direction of Transmissivity about the 12-18 OZ Well.

samples, 7 shale/sandstone mix samples, 5 sandstone/siltstone samples, and 1 cemented sandstone sample were analyzed for horizontal and/or vertical permeabilities.

Analysis of the sandstone core samples indicate that the horizontal hydraulic conductivity ranges from 2.4 to 11.9 ft/day, with an average (arithmetic mean) of 5.1 ft/day. Vertical hydraulic conductivities of the sandstone samples are, on the average, about two-thirds (68 percent) of the horizontal values, ranging from 0.4 to 6.0 ft/day and averaging 3.5 ft/day. The ratio of vertical to horizontal hydraulic conductivity (K_v/K_h) for the sandstone units ranges from 0.09 to 0.99.

Analysis of the siltstone core samples indicate that the horizontal hydraulic conductivity ranges from about 0.1 to 0.7 ft/day, with an average of approximately 0.33 ft/day. Vertical hydraulic conductivities of the siltstone samples are, on the average, about 47 percent of the horizontal values, ranging from about 0.03 to 0.46 ft/day and averaging around 0.16 ft/day. The K_v/K_h ratio for the siltstone units ranges from 0.05 to 0.88.

Analysis of the shale core samples indicate that the horizontal hydraulic conductivity ranges from 0.007 to 0.163 ft/day, with an average of 0.074 ft/day. Vertical hydraulic conductivities of the shale samples are, on the average, about 4 percent of the horizontal values, ranging from essentially zero to 0.01 ft/day and averaging around 0.003 ft/day. The K_v/K_h ratio for the shale units ranges from essentially zero to 0.29.

From the core analyses data, the average horizontal hydraulic conductivities, ranging from highest to lowest, are: 5.10 ft/day for sandstone, 1.17 ft/day for sandstone/siltstone mix, 0.81 ft/day for shale/sandstone mix, 0.33 ft/day for siltstone, and 0.07 ft/day for shale. In conclusion, the shale unit aquitards have horizontal hydraulic conductivities several orders of magnitude lower than the hydraulic conductivities of the ore zone sandstone units. In addition, the very low vertical hydraulic conductivities of the shales, some being less than 0.001 ft/day, are a measure of the degree of groundwater confinement that the shale units provide.

In addition, the intrinsic permeability values and corresponding hydraulic conductivity values determined in the laboratory for the sandstones are comparable to the permeabilities determined from the aquifer test transmissivities. While this is an important conclusion, it should be noted that the intrinsic permeability measured in the laboratory is of only a very small, site-specific sample of the material in question. The intrinsic permeability determined from a core sample is therefore not a spatial average of a heterogeneous block of material. Conversely, an aquifer pumping test results in a value representing a much larger volume of material. The most accurate and reliable method for determining the permeability of a rock mass is by an aquifer test performed under in situ conditions. Due to the discontinuous and interbedded characteristics of the sandstones within the ore zone unit, with increased thickness and area the more variable and anisotropic the ore zone aquifer's permeability becomes. Discrepancies between hydraulic conductivity determined from pumping test transmissivity and sandstone core results are likely due to different lithologies between the core and well screen intervals. Agreement between the laboratory and field pumping test hydraulic conductivity determinations are, however, reasonable.

5.0 SUMMARY AND CONCLUSIONS

This section summarizes the hydraulic characteristics of the ore zone aquifer within the proposed Ross Project area. A summary of the aquifer parameters for the Ross area as determined by aquifer pumping tests and laboratory core analyses follows:

- In July 2010, Strata conducted seven aquifer pump tests at six separate well clusters (Figure 1). A total of 32 determinations of transmissivity (Table 3) were made for the ore zone, ranging from a minimum 3.8 ft^2/day to a maximum of 367.6 ft^2/day with an average of 88.3 ft^2/day. Various aquifer test analysis methods were employed to analyze the time-drawdown and recovery data recorded during each test, and the method(s) most representative of actual aquifer conditions are indicated as such.

- A total of 12 determinations of storativity (Table 3) were made for the ore zone from two separate pumping tests that were conducted at Strata's 12-18 well cluster (Figure 1). Storage coefficients are appropriate for a confined aquifer, ranging from 4.0×10^{-6} to 1.5×10^{-4} with a median of 6.1×10^{-5} and an average of 6.7×10^{-5}.

- Results of the previous aquifer tests conducted at the Ross site by Nubeth in 1977 and 1978 (Manera 1977 and 1978, Hamilton 1977) are comparable to the Strata test results. Transmissivity values fall within the same range (11 ft^2/day minimum to 29.4 ft^2/day maximum), as do the storativity values (1.4×10^{-4} to 5.8×10^{-5}).

- No effects from pumping were measured in any of the overlying SA or SM unit wells at the six well clusters. Water levels in two of the six underlying DM unit wells at the six well cluster sites may have declined slightly during pumping due to vertical leakage across the Lower Confining Unit via unplugged exploration drill holes located in close proximity to the respective well cluster. Prior to conducting the aquifer tests, all exploration drill holes in the vicinity of only the 12-18 well cluster were located and plugged to ensure that the confinement of the ore zone was not anthropogenically compromised by any open drill holes.

- Hydraulic conductivities determined from the aquifer test transmissivities ranged from 0.13 to 7.62 ft/day with a median of 3.55 ft/day and an average of 3.26 ft/day. These hydraulic conductivities are in the range of text book values for fine-grained sand, very fine-grained sand and silt (Bureau of Reclamation 1977).

- Laboratory measurements of horizontal and vertical hydraulic conductivity were made on core samples of the various lithology types in the Lance-Fox Hills formations. The measured horizontal hydraulic conductivity of the sandstone (ore zone unit) samples ranged from 2.4 to 11.9 ft/day and the average value was 5.1 ft/day. These values are comparable to those determined from the aquifer pumping tests. The ratio of K_v/K_h ranged from 0.09 to 0.99 and average 0.68.

- Laboratory measurements of horizontal and vertical hydraulic conductivity that were made on shale core samples indicate that the horizontal hydraulic conductivity ranges from 0.007 to 0.163 ft/day, with an average of 0.074 ft/day. Vertical hydraulic conductivities of the shale samples are, on the average, about 4 percent of the horizontal values, ranging from essentially zero to 0.01 ft/day and averaging around 0.003 ft/day. The K_v/K_h ratio for the shale units ranges from essentially zero to 0.29.

Strata conducted these seven aquifer tests using state-of-the-art equipment and analyzed the time-drawdown data using the most advanced software available. The transmissivity and storativity values that were determined should therefore be considered precise and objective.

The specific capacity (a well's yield per unit of drawdown, typically measured as gpm/ft) of each of the pumping wells are given in Table 2. For the seven pumped wells, the specific capacities range from a high of 0.53 gpm/ft to a low of 0.05 gpm/ft. The amount of drawdown required to produce a particular yield is determined by the hydraulic nature of the aquifer, the well design, and/or the construction and development of the well. By definition, the less efficient a well is, the lower its specific capacity will be. Much care was taken by Strata to construct each of the cluster wells with the highest efficiency possible. However, well efficiency is believed to be a factor at one of the two pumping wells having the lowest specific capacity (well 14-18 OZ). Partial penetration wells will typically have a low efficiency because excessive drawdown will occur in a well with limited open area to the aquifer. In summary, a direct relationship exists between each of the wells' specific capacities and the aquifer's transmissivity determined by the drawdown measured at that respective well: the higher the specific capacity, the greater the transmissivity.

The hydraulic conductivity of the aquifer is typically calculated by dividing the transmissivity value by the well's screen length, assuming the well was constructed such that the intake zone is placed in exactly the same depth interval as the aquifer. Excluding the ore zone wells in the 12-18 well cluster, the hydraulic conductivity values for the ore zone at the other five well clusters were calculated by dividing the transmissivity by the ore zone well screen length. It should be noted that the well screen length at each of these five ore zone wells may not necessarily represent the exact ore zone aquifer thickness due to the presence of interbedded, relatively impermeable shales within the perforation interval. These estimated hydraulic conductivity values are considered representative of the entire ore zone unit and are useful for a regional application, such as a groundwater flow model because they represent a composite or average value.

Hydraulic conductivity values at the 12-18 well cluster were calculated by dividing the pumping test transmissivities by the thickness of the aquifer and not the respective well's screen length. The aquifer thickness at each of the ore zone well locations was determined by referring to the respective well's boring lithologic log and electric log. As such, the aquifer thickness values were made with considerable certainty based on the intensive subsurface exploration that has been conducted in area. Nevertheless, aquifer thicknesses are considered to be judgment calls and the listed hydraulic conductivity values listed in Table 3 should therefore be considered subjective.

The Lance and Fox Hills formations in the Oshoto, Wyoming area are stratigraphically complex (Buswell 1982). The variable hydraulic characteristics of the ore zone sandstones, as determined by aquifer pump testing and laboratory core sample analyses, reflect the aquifer's complex and variable lithology. Furthermore, the variable hydraulic characteristics of the ore zone aquifer are directly related to the occurrence of uranium ore deposits in the area. Buswell (1982) described the development of uranium roll fronts as being governed primarily by the sediments' depositional environment, and that there is a relationship between sediment depositional patterns and roll front development. The permeable sandstones act as a conduit for groundwater movement downdip and downgradient, and the heterogeneous permeability of the host sandstones modified the migration of groundwater such that ore deposits formed in response to increased flow through the more permeable channel sands (Buswell 1982). The low permeability of interbedded sediments coupled with a higher incidence of organic and inorganic reductants contributed to the precipitation and preservation of uranium in those areas (Buswell 1982). Uranium grade and thickness of roll front deposits is dependent upon the rate and volume of uranyl-bearing groundwater flow. Where large volumes of water were funneled into an alteration area, larger and higher grade ore deposits were formed. Conversely, roll fronts that have a small volume of groundwater flowing across the geochemical interface will produce discontinuous, low grade deposits (Buswell 1982).

The aquifer tests in 1977, 1978 and 2010 indicate that the ore zone is a confined aquifer. The laboratory core data for shale samples indicate extremely low permeabilities; horizontal hydraulic conductivities being several orders of magnitude lower than the hydraulic conductivities of the ore zone sandstone units. In addition, the very low vertical hydraulic conductivities of the shales, some being less than 0.001 ft/day, are a measure of the degree of groundwater confinement that the shale units provide. These data indicate that the Upper and Lower Confining Units can serve as aquitards for ISR operations.

The two tests conducted at the 12-18 well cluster provide site-specific data at the operational scale of a prospective ISR wellfield. Ore grades and volume are favorable at this location, as are the most permeable horizons in the ore zone unit.

6.0 REFERENCES

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Appendix 1
34-7 Well Cluster
July 7, 2010 Aquifer Test
Field Data Form and
Plots of Time-Drawdown and Analyses

WWC ENGINEERING

AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY

Pumped Well No. 34-7 OZ Observation Well No's. 34-7 SA
34-7 SM
34-7 DM

Type of Pump Test: ☒ Constant Discharge ☐ Step-Drawdown

Pumped Well Casing ID 5.0 inches

Distance Between Pumped and Observation Wells * feet

* 34-7 SA = 65.95', 34-7 SM = 92.70', 34-7 DM = 77.95'

Water Level Measurements by: ☒ electric tape and ☒ pressure transducer

Discharge Measurements by: ☒ bucket/stopwatch ☐ flow meter ☐ flume/weir

(15 gpm Dole valve used)

Screen/Perforation Interval(s) (below land surface) 318.50' – 378.50'

Depth of Pump Intake (below land surface) 288.5 feet (dedicated 2 h.p.)

Depth of Static Water Level (from measurement point) 84.94 feet

Height of Measurement Point (above land surface) 1.87 feet

Elevation of Measurement Point 4,136.75 feet a.m.s.l.

Pump On Date 07 / 07 / 2010 Time 1545 AM/PM

Pump Off Date 07 / 08 / 2010 Time 1547 AM/PM

Weather Conditions Fair-partly cloudy, calm, 70's ° F. Rained 2 days ago.

Test Performed by Fuller, Collier

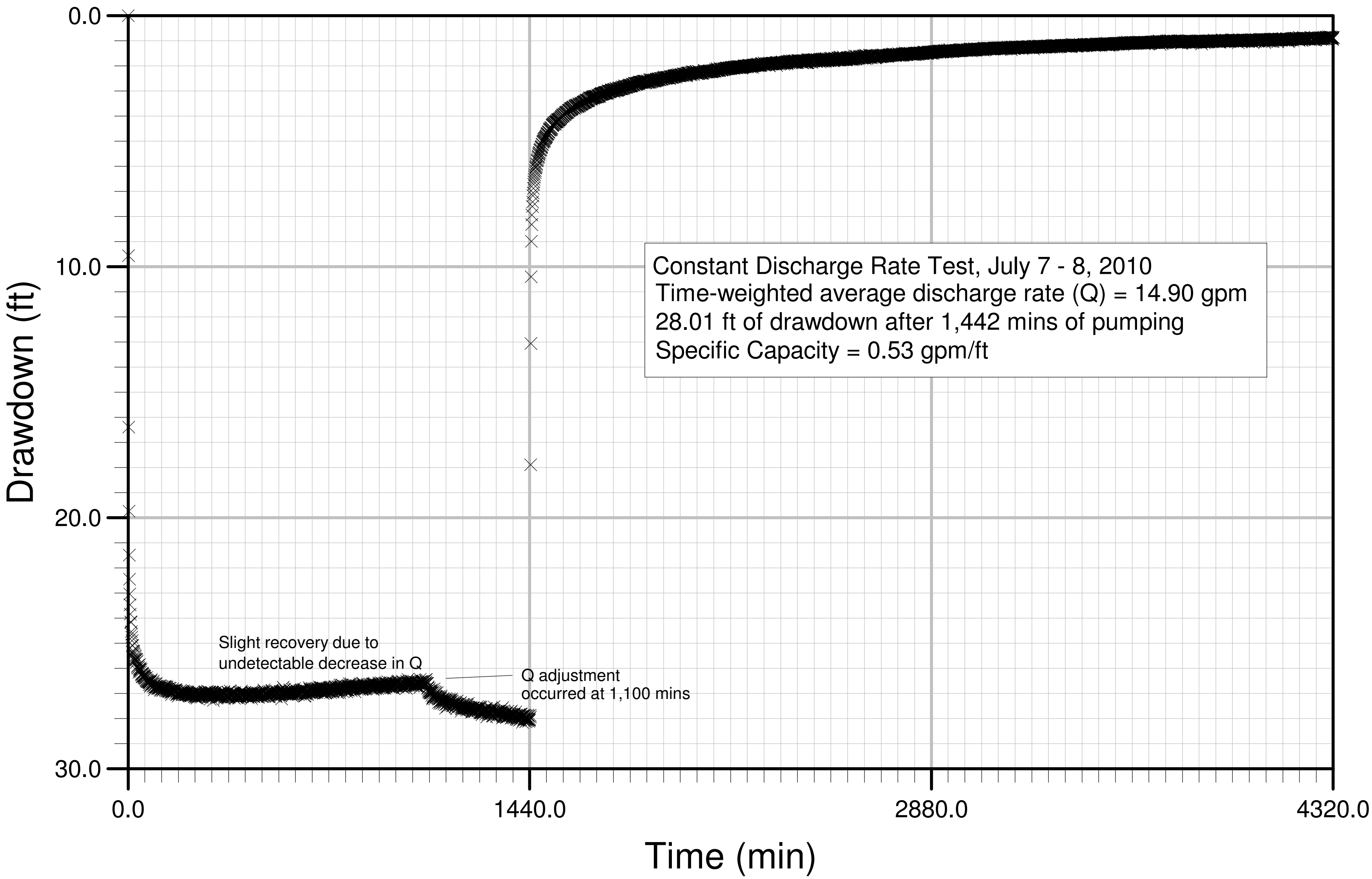
WWC ENGINEERING

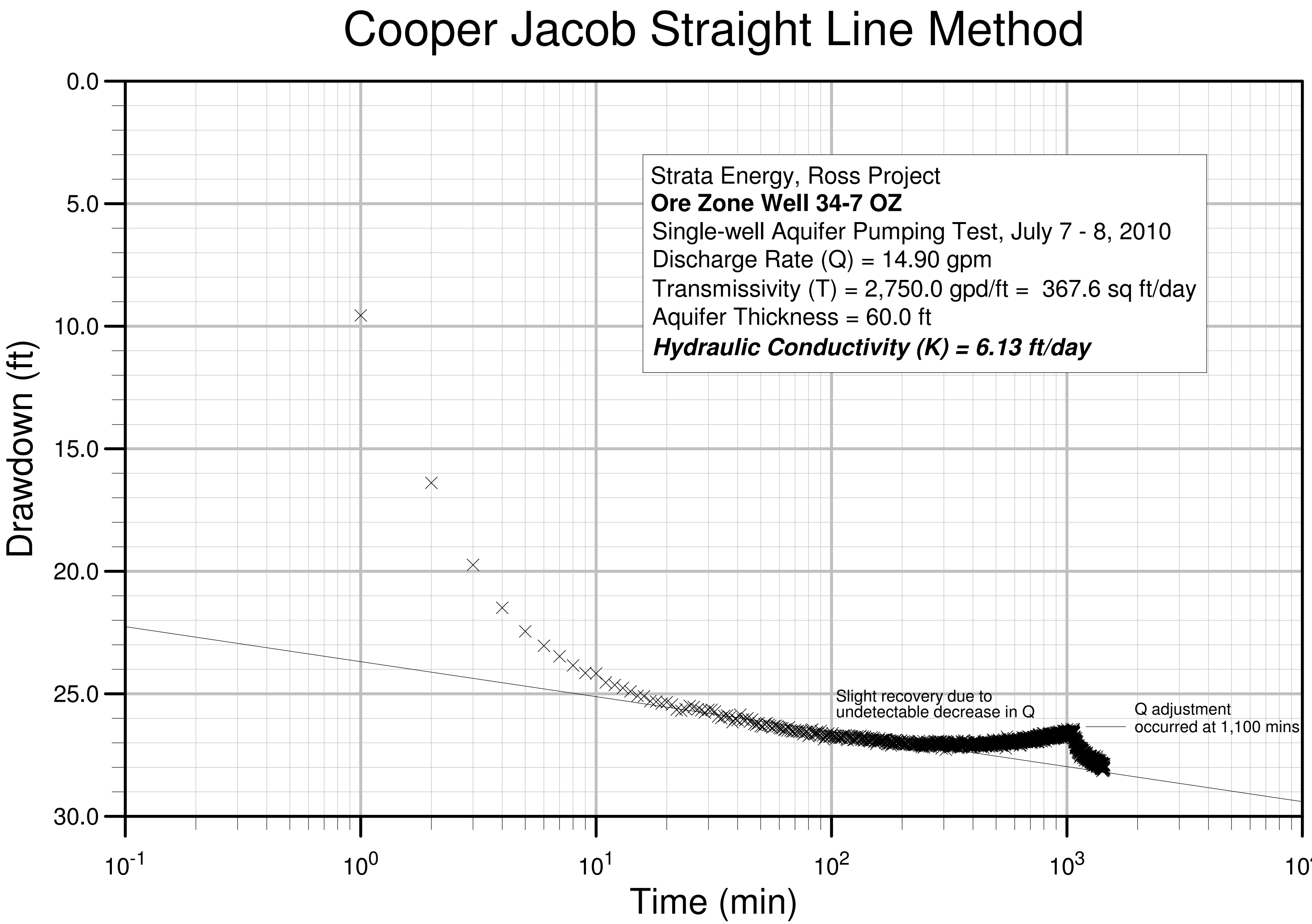
AQUIFER TEST FIELD DATA

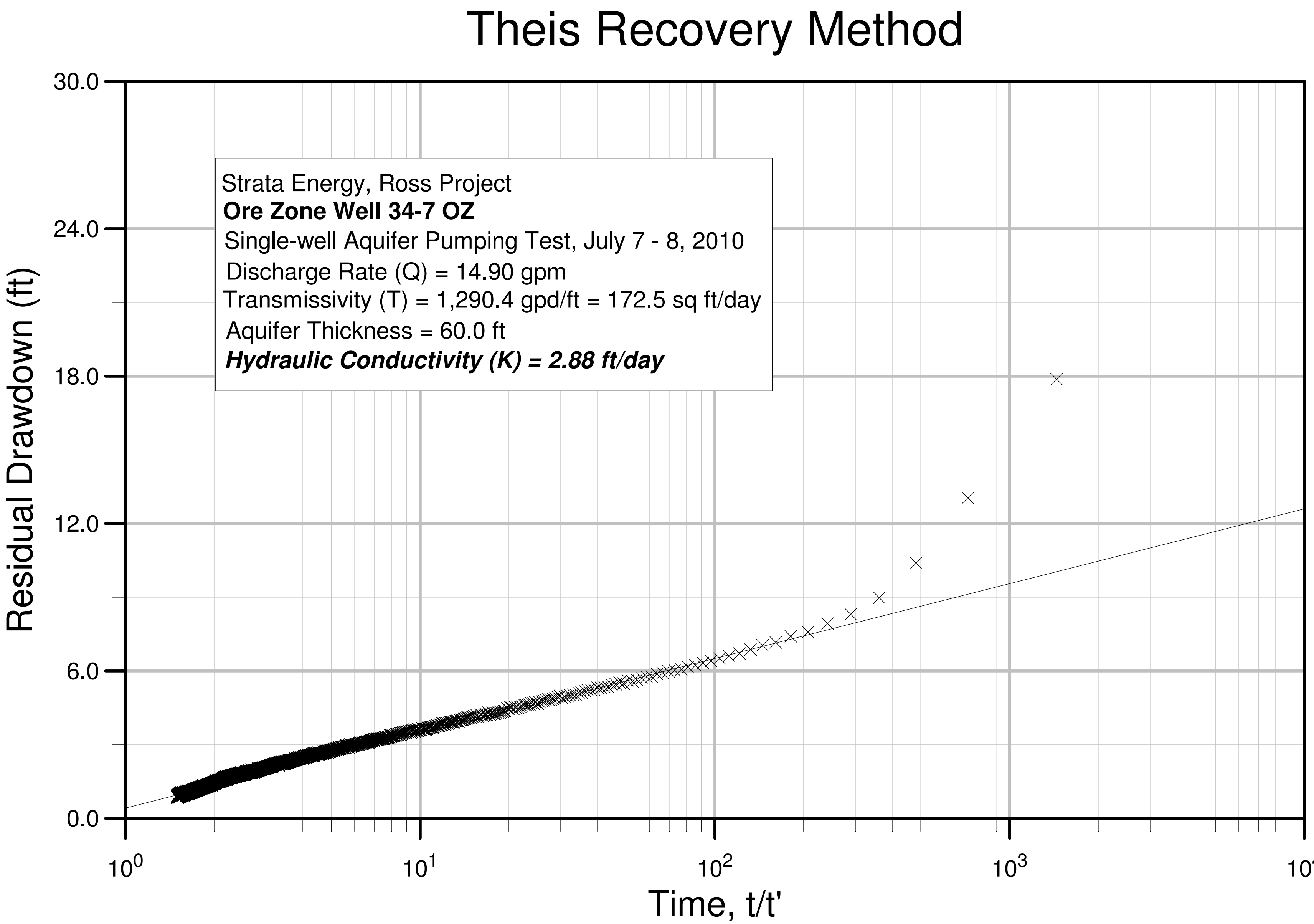
Project/Client ROSS/STRATA ENERGY Well No. 34-7 OZ

TIME			WATER LEVEL DATA			
Date	Clock Time	(**t**) Elapsed Time Since Pump ON or OFF (min)	Depth to Water Below M.P. (ft)	(**s**) Drawdown/ Recovery (ft)	(**Q**) Discharge (gpm)	COMMENTS
7-07-10	1545	ON, 0	84.94	0	15.80	Pressure gauge @ 70 psi.
	1546	1	98.02	13.08	15.80	5 gal/19 sec. @ 70 psi.
	1547	2	101.06	16.12		
	1548	3	104.49	19.55	15.80	5 gal/19 sec.
	1550	5	107.23	22.29		
	1551	6	107.97	23.03	15.80	5 gal/19 sec. @70 psi.
	1557	12	108.65	23.71		
	1558	13	109.75	24.81		
	1602	17	110.02	25.08	15.80	Gate valve adjusted to maintain 70 psi.
	1632	47	111.05	26.11	15.80	Constant pressure hard to maintain.
	1809	144	111.73	26.79	15.00	5 gal/20 sec. @75 psi.
	1850	185	111.91	26.97	15.00	5 gal/19-20 sec.
7-08-10	0938	1073	111.72	26.78	15.00	Discharge diminished slightly-adjusted up.
	1401	1336	112.75	27.81	14.30	5 gal/21 sec @ 75 psi. Discharge adjusted.
	1545	OFF, 1440	112.95	28.01	15.00	5 gal/20 sec @ 70 psi. Collected sample.
						Recovery data recorded by pressure transducer.

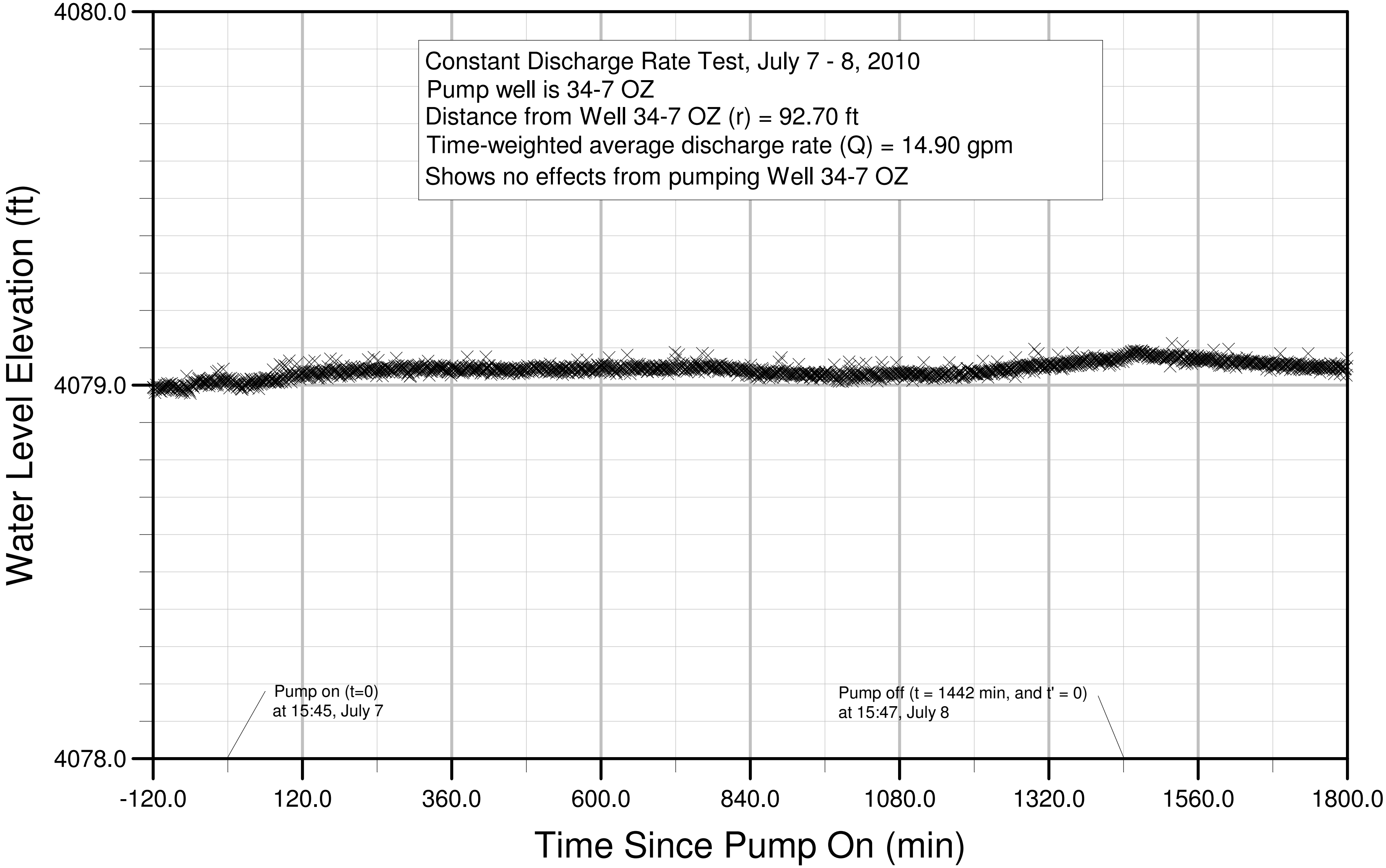
Drawdown and Recovery, Pump Well 34-7 OZ

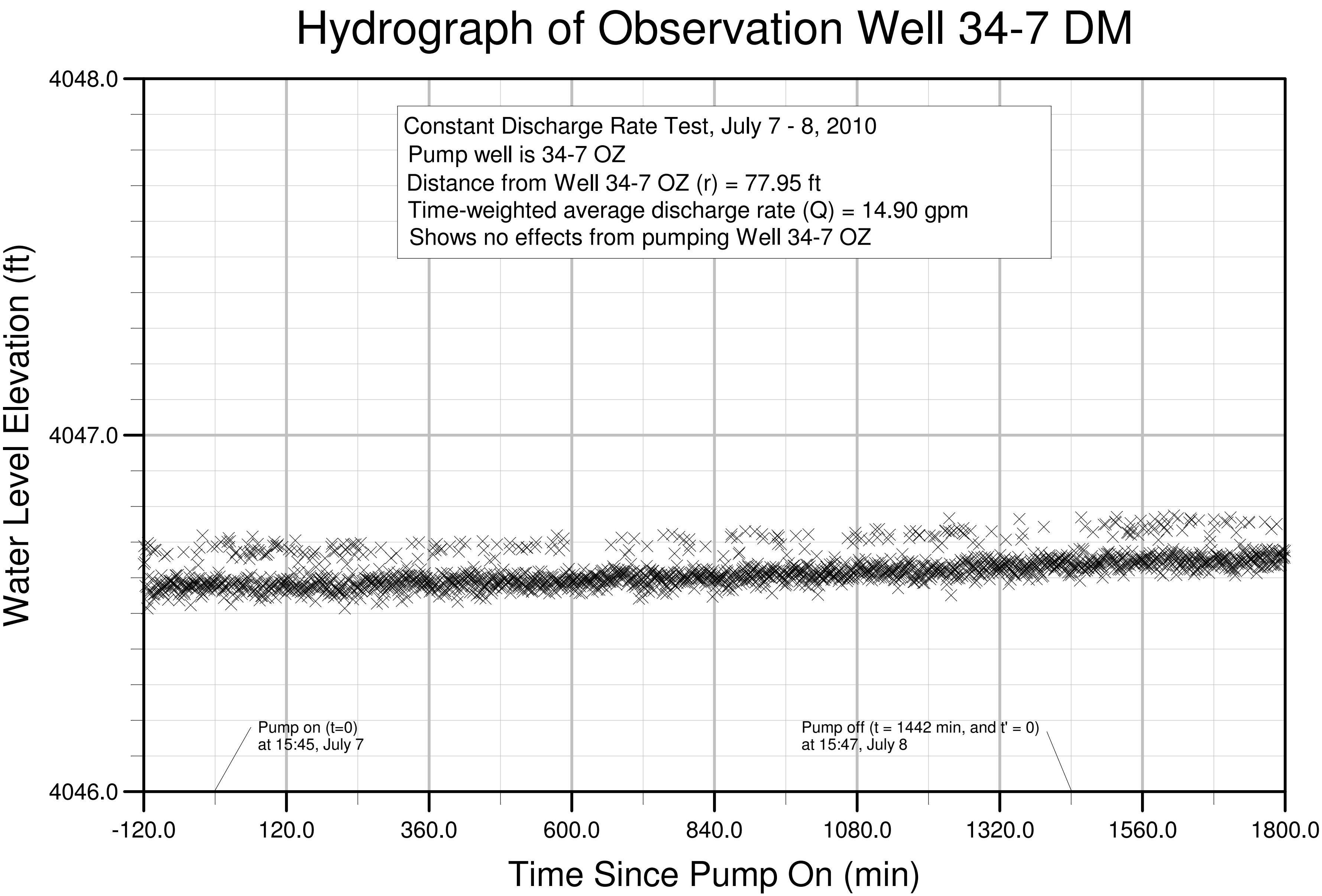



Cooper Jacob Straight Line Method
Strata Energy, Ross Project
Ore Zone Well 34-7 OZ
Single-well Aquifer Pumping Test, July 7 - 8, 2010
Discharge Rate (Q) = 14.90 gpm
Transmissivity (T) = 2,750.0 gpd/ft = 367.6 sq ft/day
Aquifer Thickness = 60.0 ft
Hydraulic Conductivity (K) = 6.13 ft/day
Slight recovery due to undetectable decrease in Q
Q adjustment occurred at 1,100 mins
Drawdown (ft)
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Time (min)
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}


Theis Recovery Method
Strata Energy, Ross Project
Ore Zone Well 34-7 OZ
Single-well Aquifer Pumping Test, July 7 - 8, 2010
Discharge Rate (Q) = 14.90 gpm
Transmissivity (T) = 1,290.4 gpd/ft = 172.5 sq ft/day
Aquifer Thickness = 60.0 ft
Hydraulic Conductivity (K) = 2.88 ft/day
Residual Drawdown (ft)
30.0
24.0
18.0
12.0
6.0
0.0
10^0
10^1
10^2
10^3
10^4
Time, t/t'

Hydrograph of Observation Well 34-7 SM




Hydrograph of Observation Well 34-7 DM
Constant Discharge Rate Test, July 7 - 8, 2010
Pump well is 34-7 OZ
Distance from Well 34-7 OZ (r) = 77.95 ft
Time-weighted average discharge rate (Q) = 14.90 gpm
Shows no effects from pumping Well 34-7 OZ
Water Level Elevation (ft)
4048.0
4047.0
4046.0
Pump on (t=0)
at 15:45, July 7
Pump off (t = 1442 min, and t' = 0)
at 15:47, July 8
-120.0
120.0
360.0
600.0
840.0
1080.0
1320.0
1560.0
1800.0
Time Since Pump On (min)

Appendix 2
42-19 Well Cluster
July 9, 2010 Aquifer Test
Field Data Form and
Plots of Time-Drawdown and Analyses

WWC ENGINEERING

AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY

Pumped Well No. 42-19 OZ Observation Well No's. 42-19 SA
42-19 SM
42-19 DM

Type of Pump Test: ☒ Constant Discharge ☐ Step-Drawdown

Pumped Well Casing ID 5.0 inches

Distance Between Pumped and Observation Wells * feet

* 42-19 SA = 49.24', 42-19 SM = 70.89', 42-19 DM = 42.46'

Water Level Measurements by: ☒ electric tape and ☒ pressure transducer

Discharge Measurements by: ☒ bucket/stopwatch ☐ flow meter ☐ flume/weir

(4 gpm Dole valve used)

Screen/Perforation Interval(s) (below land surface) 470' – 560'

Depth of Pump Intake (below land surface) 440 feet (dedicated 2 h.p.)

Depth of Static Water Level (from measurement point) 301.31 feet

Height of Measurement Point (above land surface) 1.38 feet

Elevation of Measurement Point 4,282.62 feet a.m.s.l.

Pump On Date 07 / 09 / 2010 Time 0930 AM/PM

Pump Off Date 07 / 10 / 2010 Time 0930 AM/PM

Weather Conditions Dry, sunny, calm, 80's ° F.

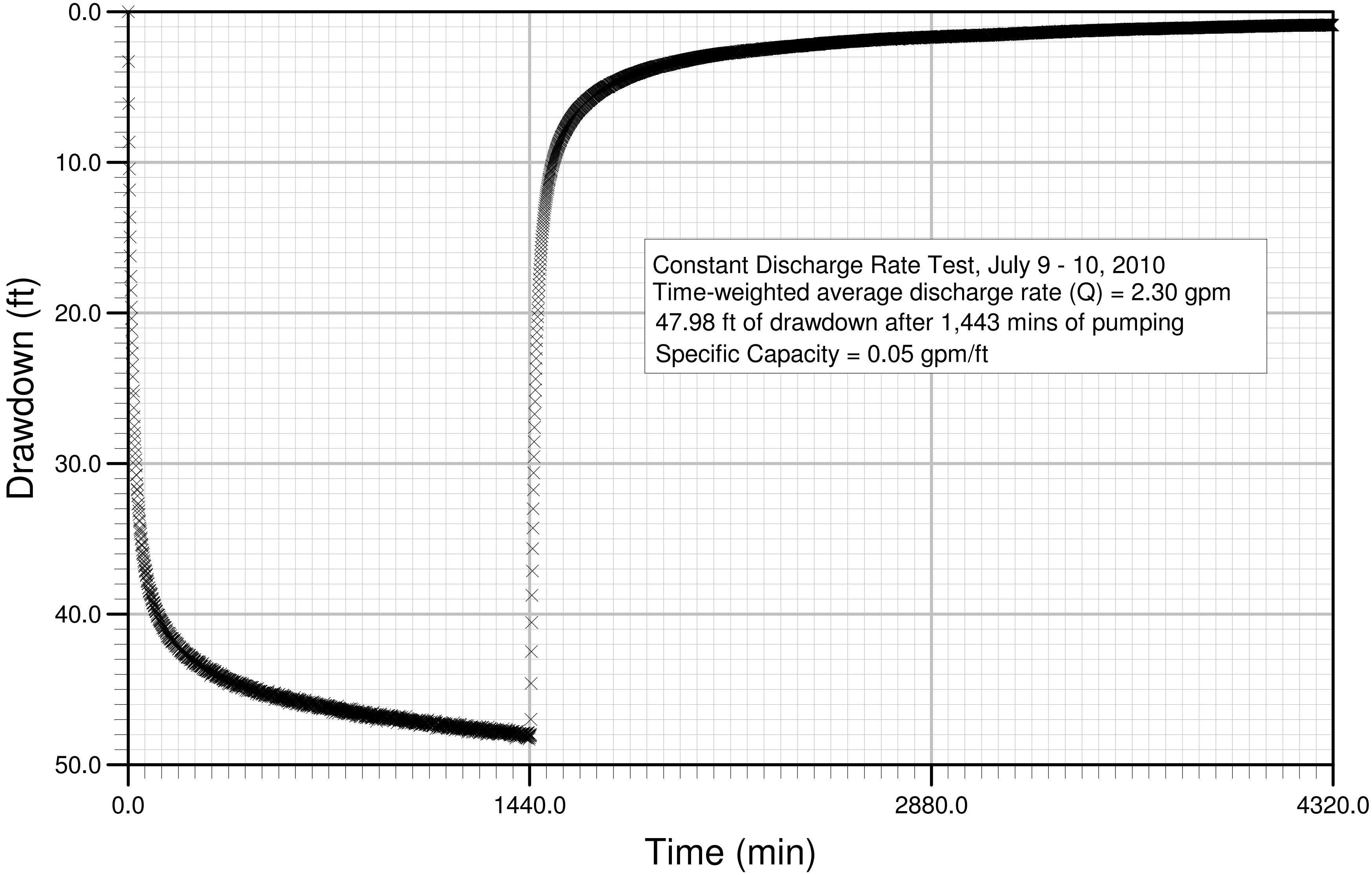
Test Performed by Fuller

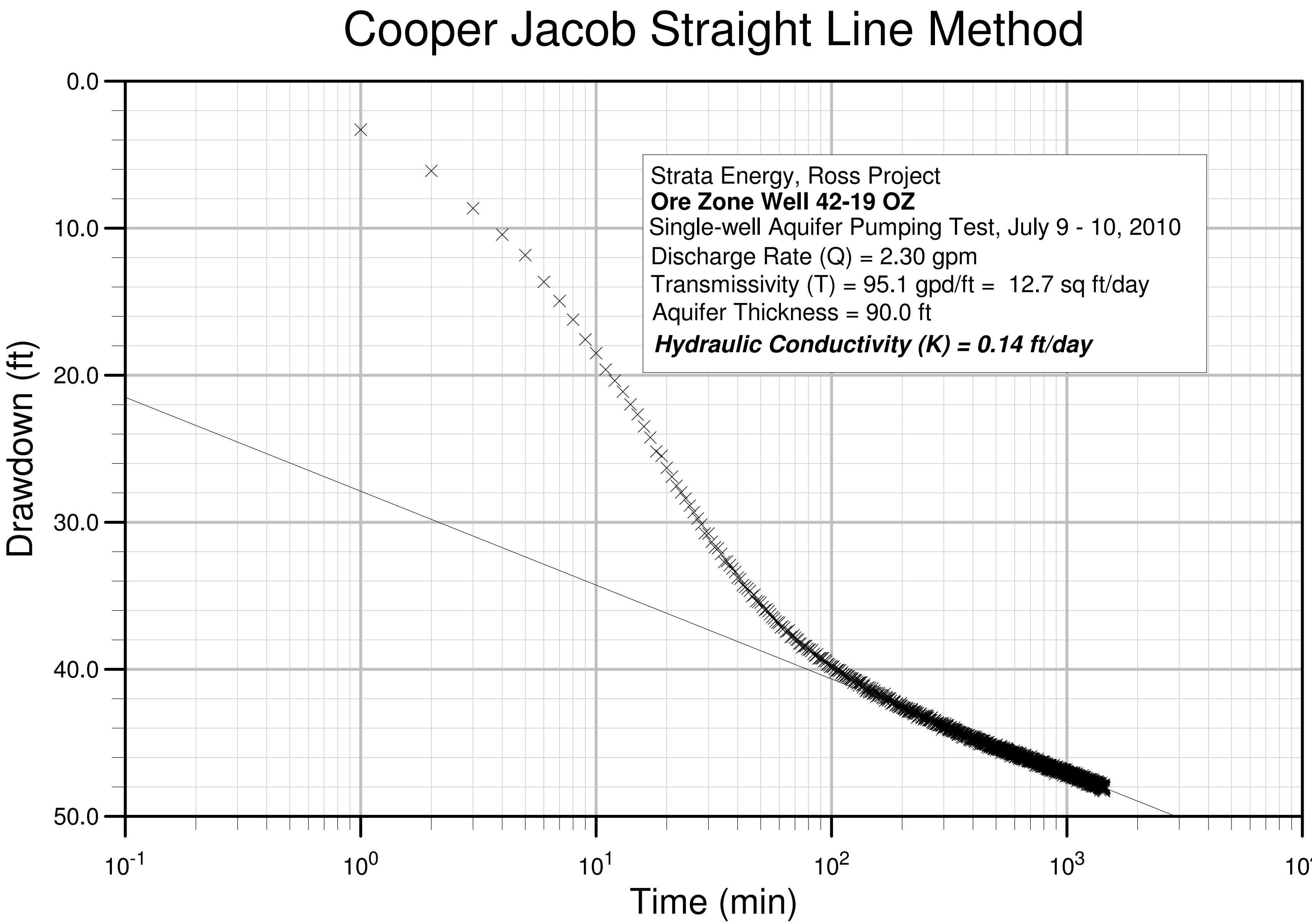
AQUIFER TEST FIELD DATA

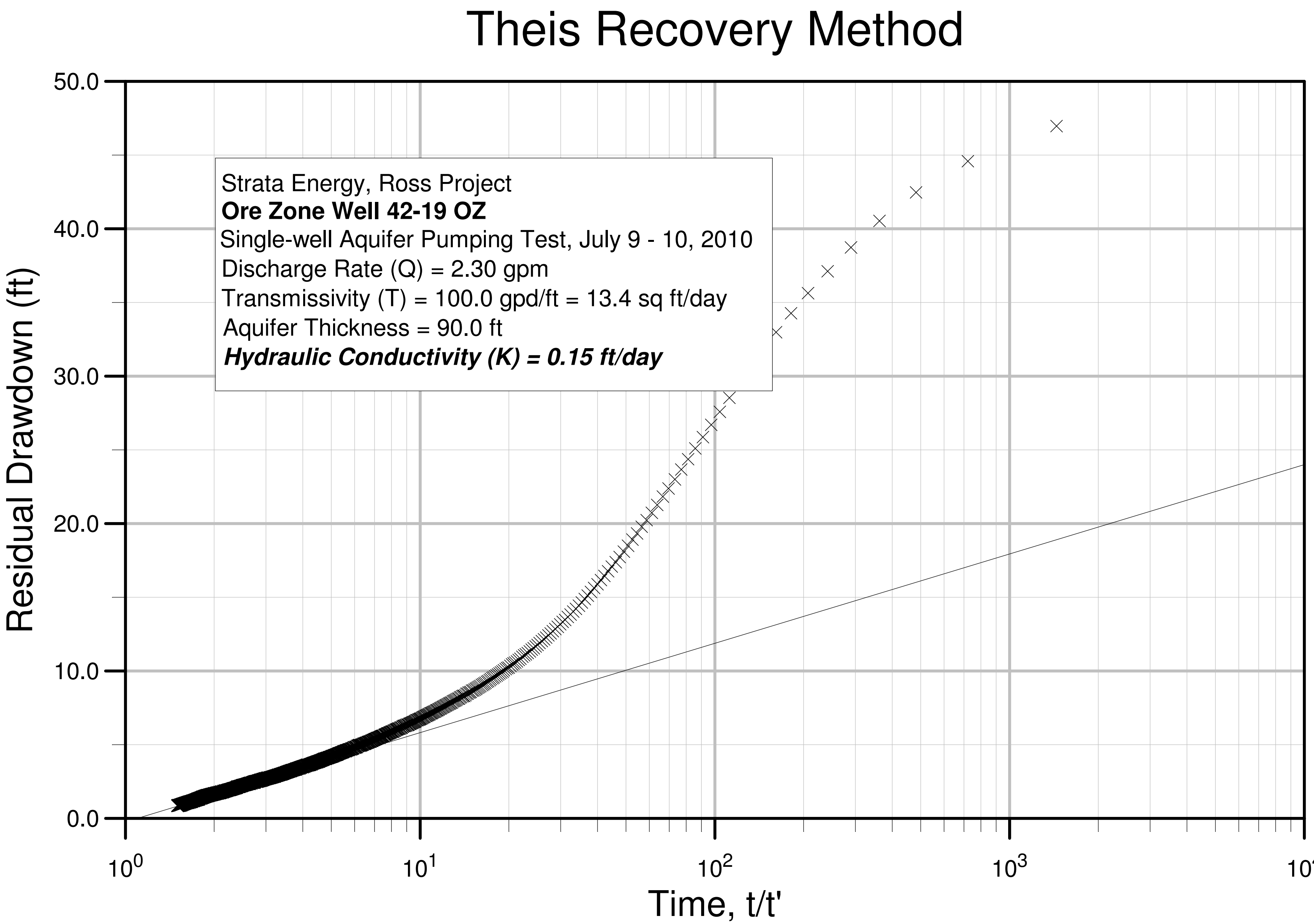
Project/Client ROSS/STRATA ENERGY Well No. 42-19 OZ

TIME			WATER LEVEL DATA			
Date	Clock Time	(**t**) Elapsed Time Since Pump ON or OFF (min)	Depth to Water Below M.P. (ft)	(**s**) Drawdown/ Recovery (ft)	(**Q**) Discharge (gpm)	COMMENTS
7-09-10	0930	ON, 0	301.31	0		Pressure gauge @ 90 psi.
	0931	1	302.81	1.50	2.4	5 gal/130 sec.
	0933	3	309.29	7.98		92 psi
	0935	5	311.03	9.72		
	0940	10	319.43	18.12	2.4	5 gal/130 sec.
	0950	20	327.18	25.87	2.4	5 gal/130 sec., 87 psi
	1010	40	335.06	33.75	2.3	5 gal/136 sec., 85 psi
	1100	90	340.50	39.19	2.3	5 gal/133 sec., 83 psi
	1200	150	342.82	41.51	2.3	5 gal/133 sec., 82 psi
	1430	300	345.20	43.89	2.3	5 gal/133 sec., 80 psi
	1800	510	346.80	45.49	2.3	5 gal/133 sec., 80 psi
7-10-10	0830	1380	346.80	48.14	2.3	5 gal/133 sec., 80 psi
	0930	OFF, 1440	349.52	48.21	2.3	Water quality sample collected.
						Recovery data recorded by pressure transducer.

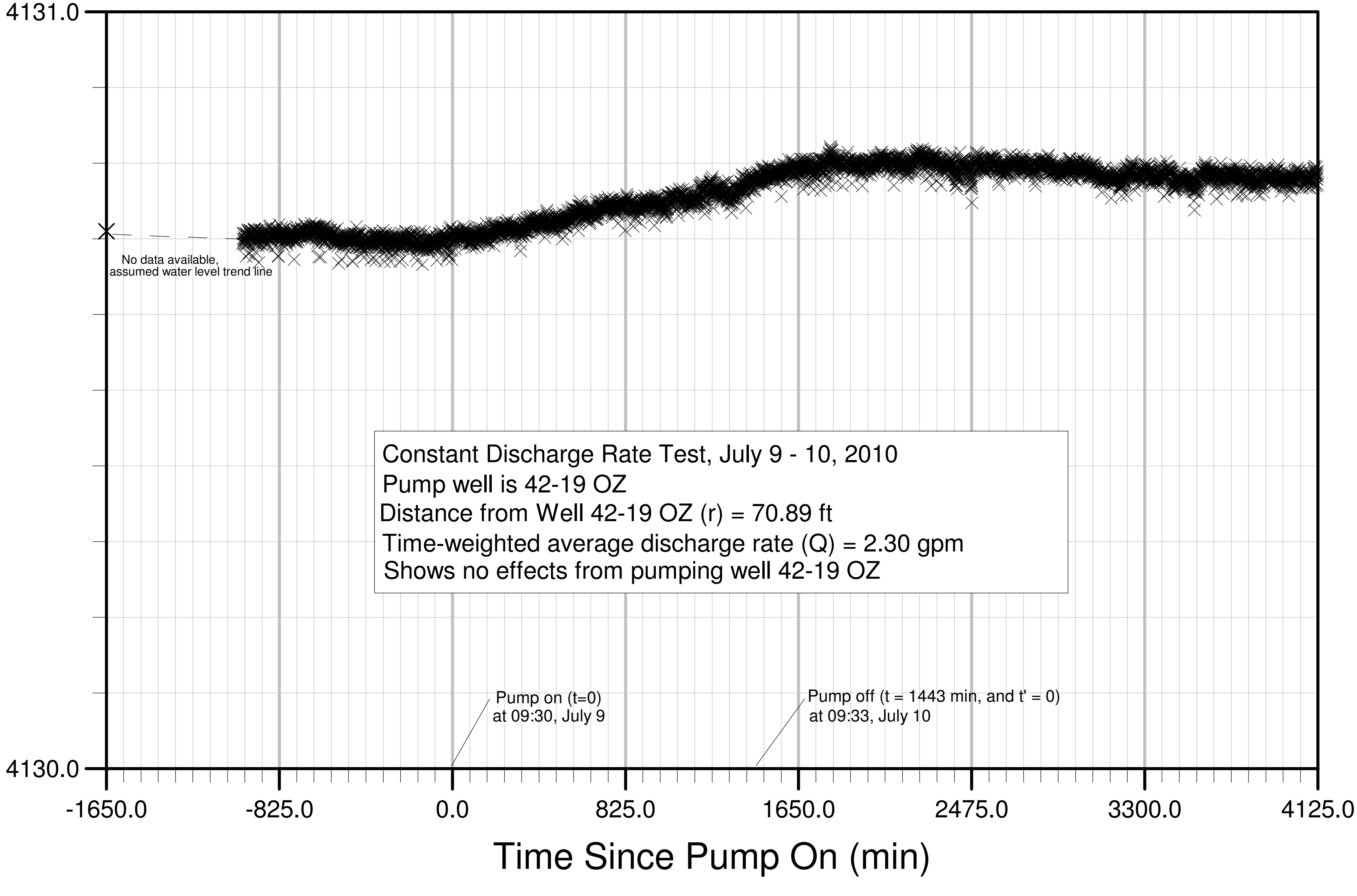
Drawdown and Recovery, Pump Well 42-19 OZ



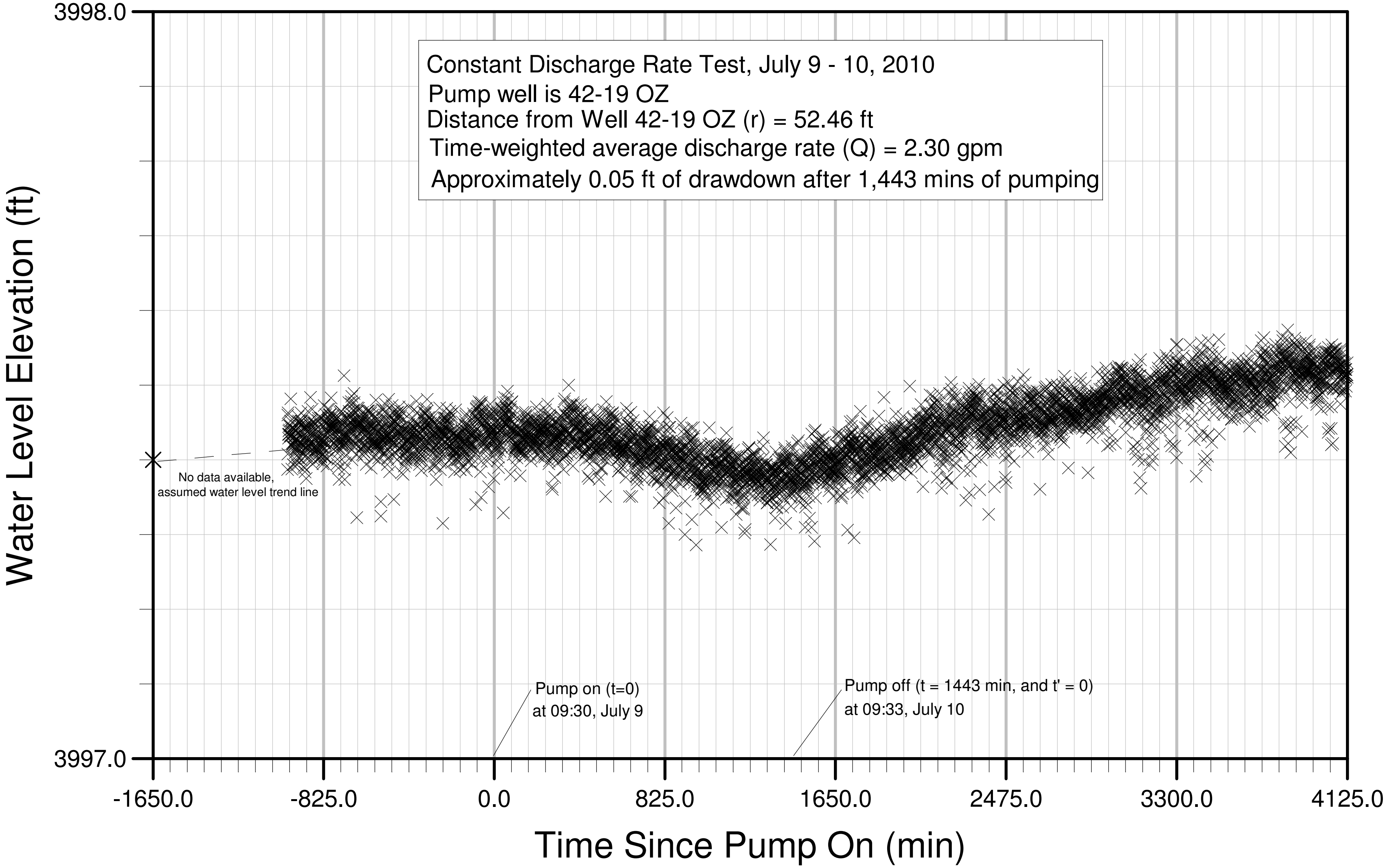

Cooper Jacob Straight Line Method
Strata Energy, Ross Project
Ore Zone Well 42-19 OZ
Single-well Aquifer Pumping Test, July 9 - 10, 2010
Discharge Rate (Q) = 2.30 gpm
Transmissivity (T) = 95.1 gpd/ft = 12.7 sq ft/day
Aquifer Thickness = 90.0 ft
Hydraulic Conductivity (K) = 0.14 ft/day
Drawdown (ft)
0.0
10.0
20.0
30.0
40.0
50.0
Time (min)
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}


Theis Recovery Method
Strata Energy, Ross Project
Ore Zone Well 42-19 OZ
Single-well Aquifer Pumping Test, July 9 - 10, 2010
Discharge Rate (Q) = 2.30 gpm
Transmissivity (T) = 100.0 gpd/ft = 13.4 sq ft/day
Aquifer Thickness = 90.0 ft
Hydraulic Conductivity (K) = 0.15 ft/day
Residual Drawdown (ft)
50.0
40.0
30.0
20.0
10.0
0.0
Time, t/t'
10^0
10^1
10^2
10^3
10^4

Hydrograph of Observation Well 42-19 SM



Hydrograph of Observation Well 42-19 DM



Appendix 3
34-18 Well Cluster
July 12, 2010 Aquifer Test
Field Data Form and
Plots of Time-Drawdown and Analyses

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AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY

Pumped Well No. 34-18 OZ Observation Well No's. 34-18 SA
34-18 SM
34-18 DM

Type of Pump Test: ☒ Constant Discharge ☐ Step-Drawdown

Pumped Well Casing ID 5.0 inches

Distance Between Pumped and Observation Wells * feet

* 34-18 SA = 46.46', 34-18 SM = 70.55', 34-18 DM = 48.96'

Water Level Measurements by: ☒ electric tape and ☒ pressure transducer

Discharge Measurements by: ☒ bucket/stopwatch ☐ flow meter ☐ flume/weir

(6 gpm Dole valve used)

Screen/Perforation Interval(s) (below land surface) 460' – 565'

Depth of Pump Intake (below land surface) 430 feet (dedicated 2 h.p.)

Depth of Static Water Level (from measurement point) 279.99 feet

Height of Measurement Point (above land surface) 1.51 feet

Elevation of Measurement Point 4,247.65 feet a.m.s.l.

Pump On Date 07 / 12 / 2010 Time 1332 AM/PM

Pump Off Date 07 / 13 / 2010 Time 1332 AM/PM

Weather Conditions Dry, breezy, clear, mid 80's ° F

Test Performed by Rogers, Evers

WWC ENGINEERING

AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY Well No. 34-18 OZ

TIME			WATER LEVEL DATA			
Date	Clock Time	(t) Elapsed Time Since Pump ON or OFF (min)	Depth to Water Below M.P. (ft)	(s) Drawdown/ Recovery (ft)	(Q) Discharge (gpm)	COMMENTS
7-12-10	1332	ON, 0	279.99	0		Pressure gauge @ 75psi
	1337	5			6.0	5 gal/50 sec.
	1340	8	313.10	33.11		
	1342	10	315.95	35.96		
	1343	11			6.0	5 gal/50 sec.
	1345	13	319.89	39.90		
	1350	18	323.96	43.97	5.66	5 gal/53 sec.
	1355	23	326.58	46.59	5.66	5 gal/53 sec.
	1400	28	328.48	48.49	5.56	5 gal/54 sec.
	1405	33	329.94	49.95	5.56	5 gal/54 sec.
	1415	43	331.45	51.46	5.56	5 gal/54 sec.
	1420	48	332.41	52.42		Approx. 68 psi
	1432	60	333.60	53.61	5.56	5 gal/54 sec.
	1442	70	334.42	54.43	5.26	5 gal/57 sec.
	1452	80	334.93	54.94	5.45	5 gal/55 sec.
	1502	90	335.48	55.49	5.45	5 gal/55 sec.
	1512	100	335.50	55.51	5.45	5 gal/55 sec.
	1532	120	336.57	55.58	5.26	5 gal/57 sec.

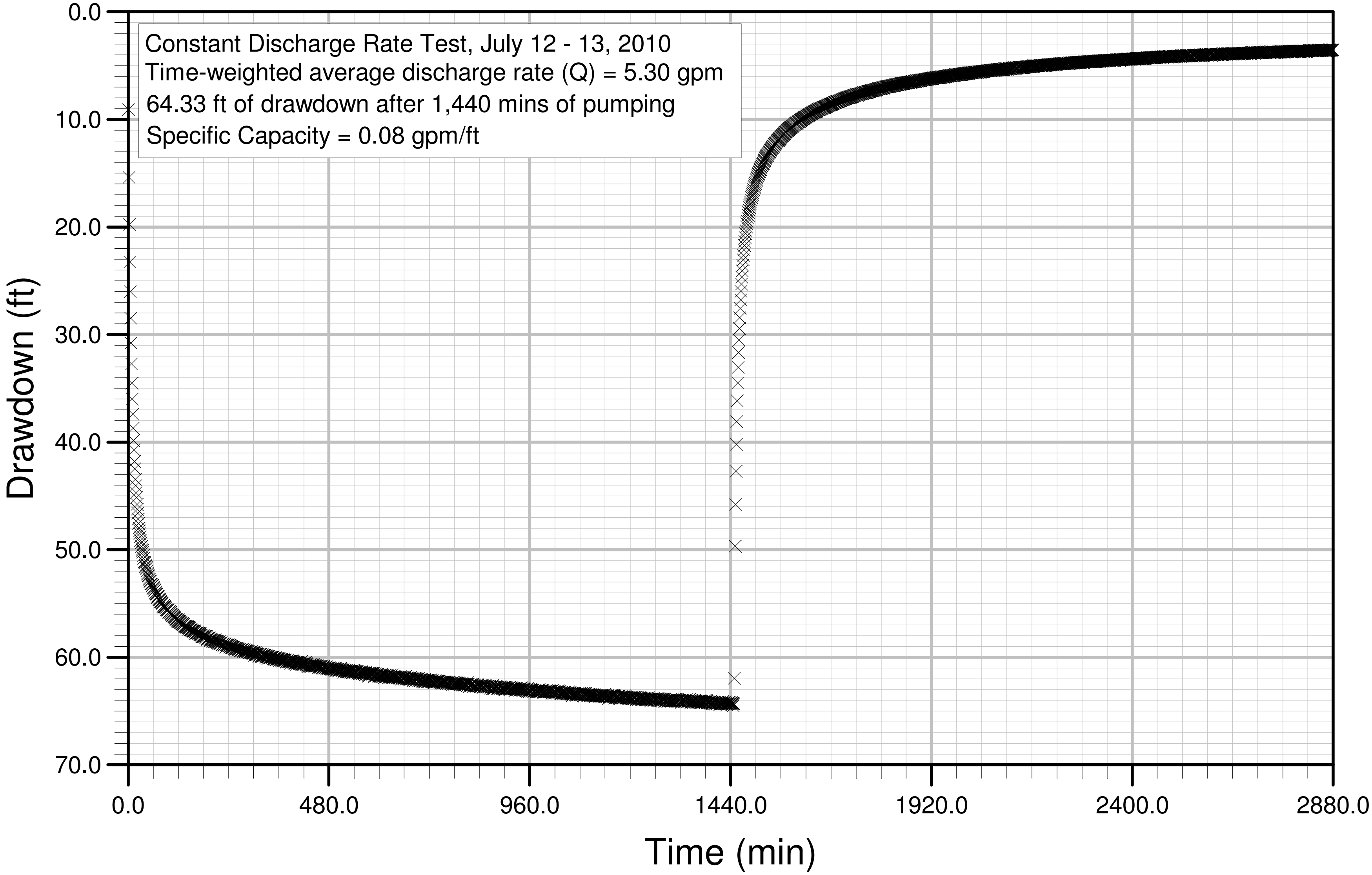
WWC ENGINEERING

AQUIFER TEST FIELD DATA

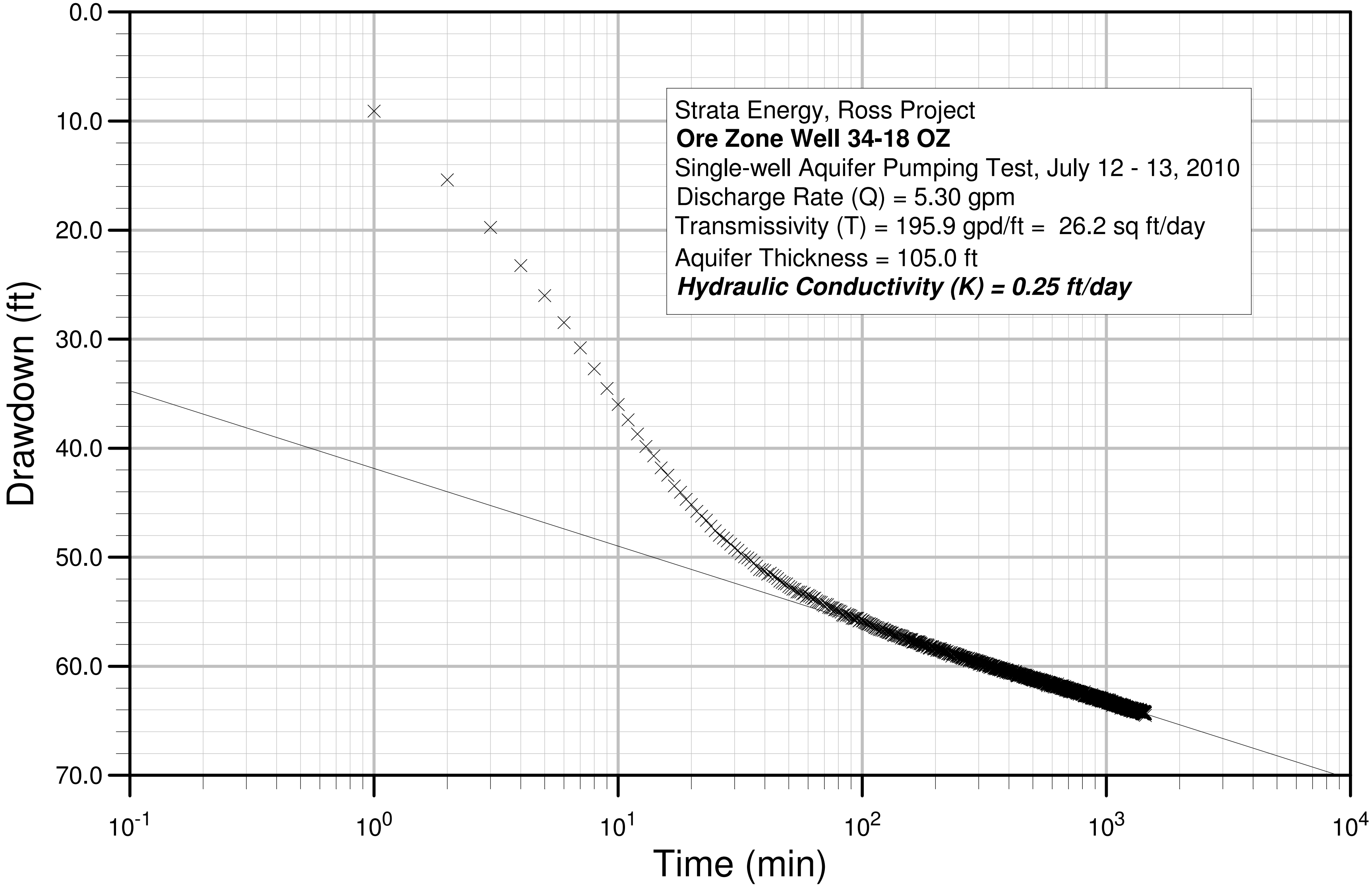
Project/Client ROSS/STRATA ENERGY Well No. 34-18 OZ

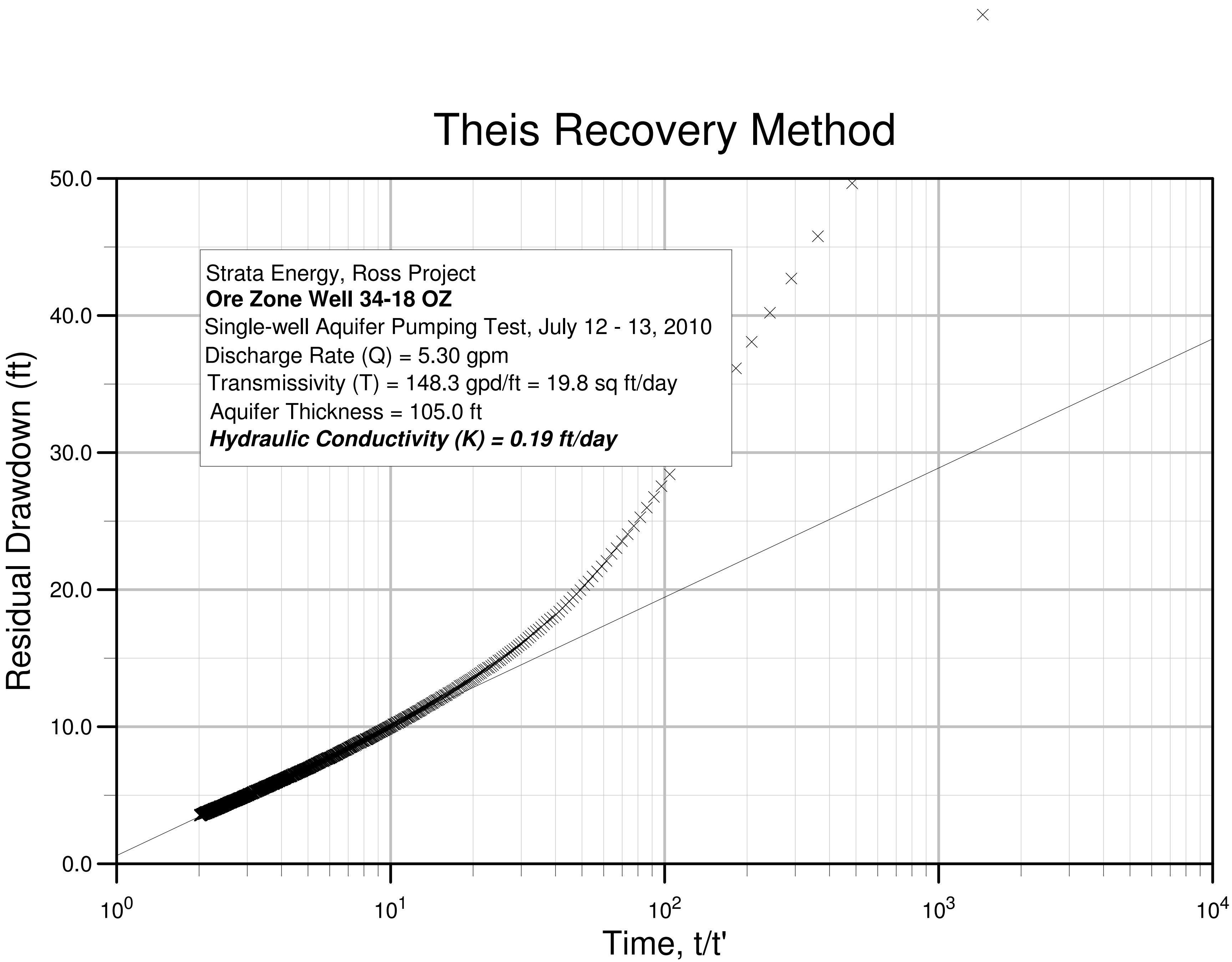
TIME			WATER LEVEL DATA			
Date	Clock Time	(**t**) Elapsed Time Since Pump ON or OFF (min)	Depth to Water Below M.P. (ft)	(**s**) Drawdown/ Recovery (ft)	(**Q**) Discharge (gpm)	COMMENTS
7-12-10	1608	156	337.56	57.57	5.26	5 gal/57 sec.
	1632	180	338.04	58.05	5.26	5 gal/57 sec.
	1702	210	338.07	58.08	5.26	5 gal/57 sec.
	1732	240	339.06	59.07	5.26	5 gal/57 sec.
	1802	270	339.40	59.41	5.26	5 gal/57 sec.
	1832	300	339.58	59.59	5.26	5 gal/57 sec.
7-13-10	0602	1020	343.20	63.21	5.26	5 gal/57 sec.
	0732	1110	343.25	63.26	5.17	5 gal/58 sec., 65 psi
	0832	1170	343.44	63.45	5.17	5 gal/58 sec.
	1115	1333	344.09	64.10	5.17	5 gal/58 sec.
	1232	1380	344.02	64.03	5.17	5 gal/58 sec.
	1332	OFF, 1440	344.29	64.30	5.17	Water quality sample collected
						Recovery data recorded by pressure transducer.

Drawdown and Recovery, Pump Well 34-18 OZ

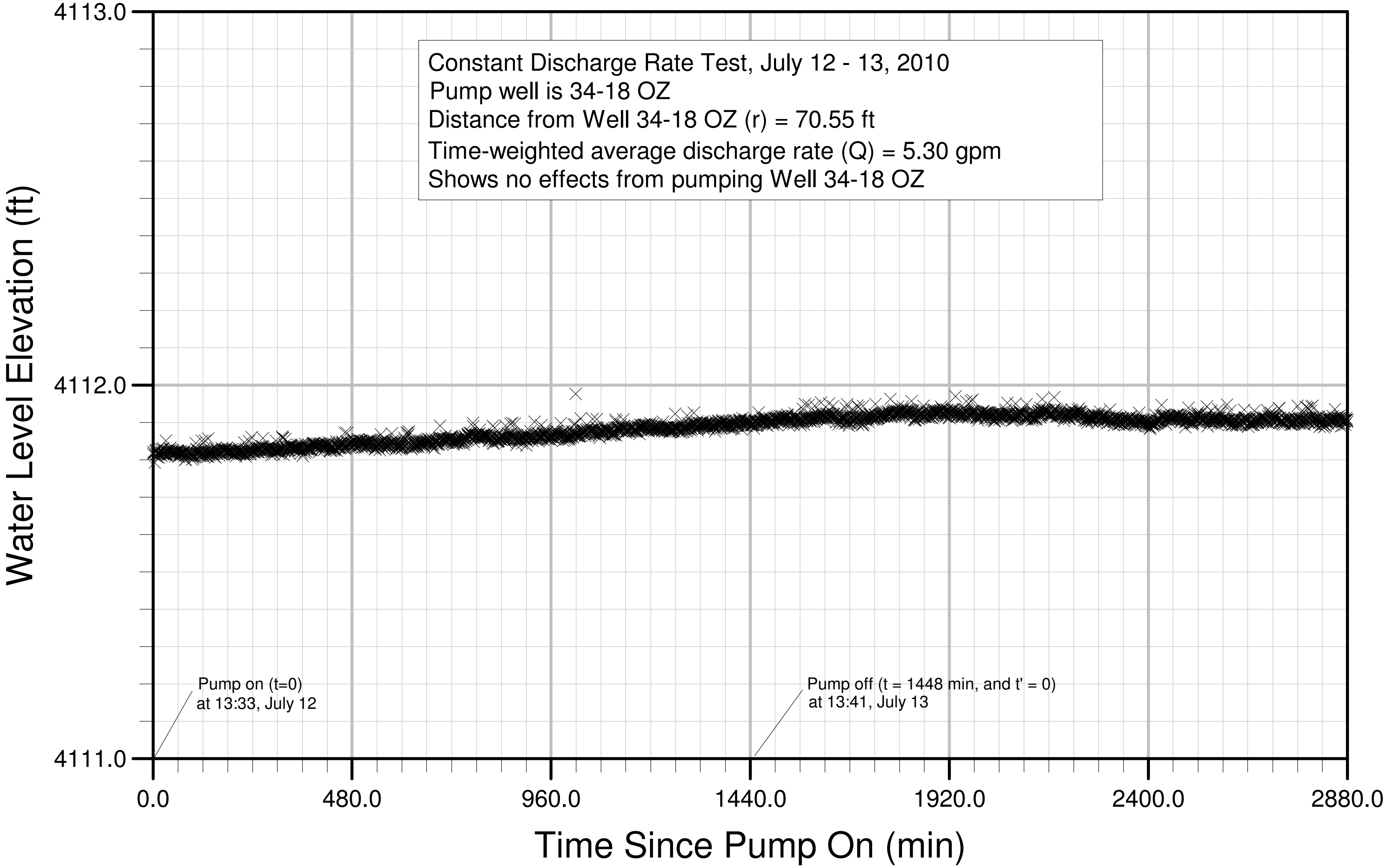


Cooper Jacob Straight Line Method

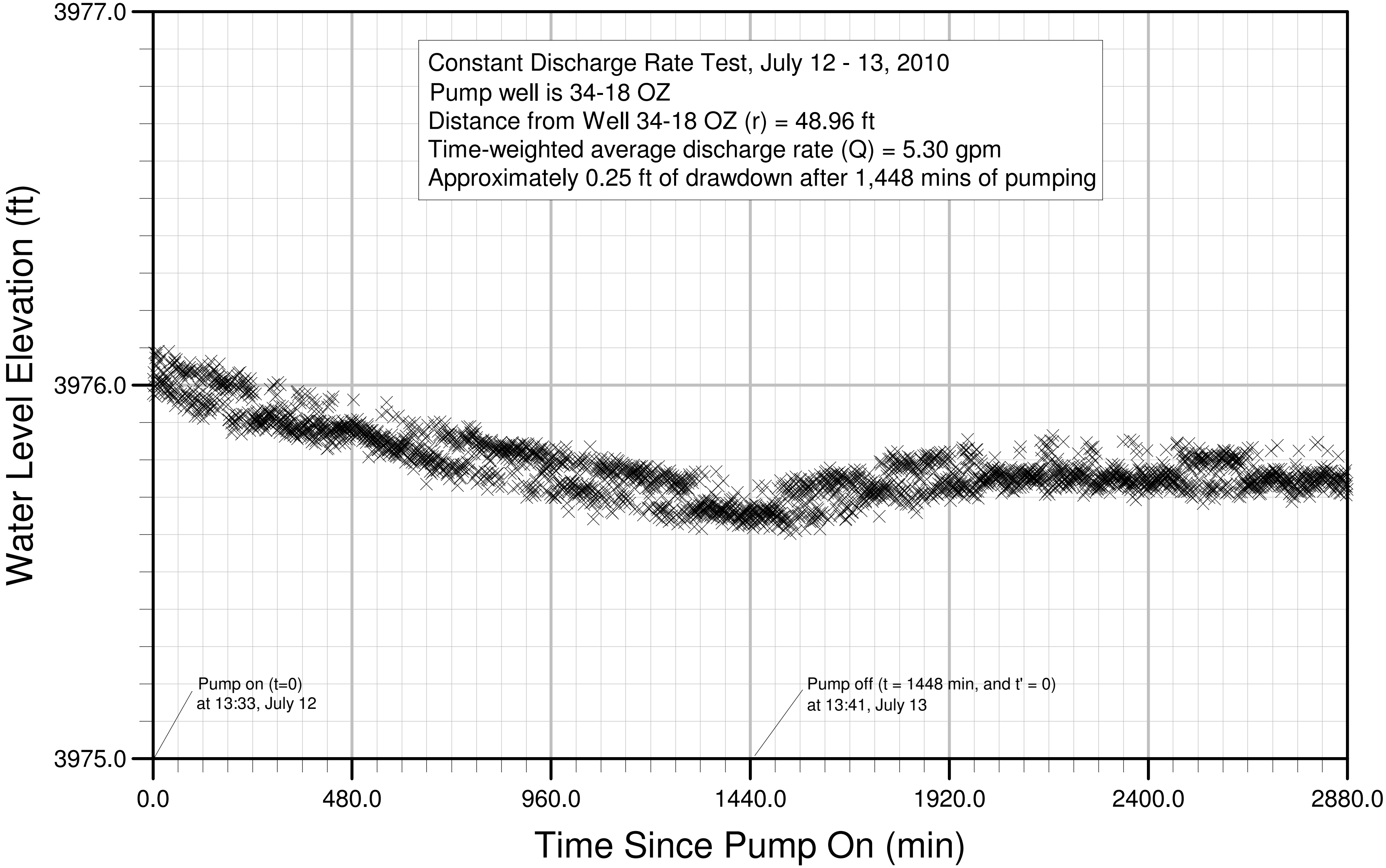



Theis Recovery Method
Strata Energy, Ross Project
Ore Zone Well 34-18 OZ
Single-well Aquifer Pumping Test, July 12 - 13, 2010
Discharge Rate (Q) = 5.30 gpm
Transmissivity (T) = 148.3 gpd/ft = 19.8 sq ft/day
Aquifer Thickness = 105.0 ft
Hydraulic Conductivity (K) = 0.19 ft/day
Residual Drawdown (ft)
Time, t/t'
50.0
40.0
30.0
20.0
10.0
0.0
10^0
10^1
10^2
10^3
10^4

Hydrograph of Observation Well 34-18 SM



Hydrograph of Observation Well 34-18 DM



Appendix 4
14-18 Well Cluster
July 13, 2010 Aquifer Test
Field Data Form and
Plots of Time-Drawdown and Analyses

WWC ENGINEERING

AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY

Pumped Well No. 14-18 OZ Observation Well No's. 14-18 SA, 14-18 SM, 14-18 DM

Type of Pump Test: ☒ Constant Discharge ☐ Step-Drawdown

Pumped Well Casing ID 5.0 inches

Distance Between Pumped and Observation Wells * feet

* 14-18 SA = 52.99', 14-18 SM = 71.92', 14-18 DM = 52.35'

Water Level Measurements by: ☒ electric tape and ☒ pressure transducer

Discharge Measurements by: ☒ bucket/stopwatch ☐ flow meter ☐ flume/weir

(6 gpm Dole valve used)

Screen/Perforation Interval(s) (below land surface) 499' – 529'

Depth of Pump Intake (below land surface) 469 feet (dedicated 2 h.p.)

Depth of Static Water Level (from measurement point) 155.54 feet

Height of Measurement Point (above land surface) 1.18 feet

Elevation of Measurement Point 4,156.47 feet a.m.s.l.

Pump On Date 07 / 13 / 2010 Time 1436 AM/PM

Pump Off Date 07 / 14 / 2010 Time 1436 AM/PM

Weather Conditions Dry, breezy, clear, mid 80's ° F

Test Performed by Rogers, Evers

WWC ENGINEERING

AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY Well No. 14-18 OZ

TIME			WATER LEVEL DATA			
Date	Clock Time	(t) Elapsed Time Since Pump ON or OFF (min)	Depth to Water Below M.P. (ft)	(s) Drawdown/ Recovery (ft)	(Q) Discharge (gpm)	COMMENTS
7-13-10	1436	ON, 0	155.54	0		Pressure gauge @ 70 psi
	1439	3	173.27	17.73	5.88	5 gal/51 sec.
	1441	5	177.68	22.17		
	1444	8	182.49	26.95	5.45	5 gal/55 sec.
	1446	10	183.47	27.93		
	1450	14	186.15	30.61	5.66	5 gal/53 sec.
	1454	18	188.79	33.25		
	1456	20	189.54	34.00		
	1500	24	191.59	36.05	5.45	5 gal/55 sec.
	1506	30	194.46	38.92		
	1516	40	197.69	42.15	5.45	5 gal/55 sec.
	1521	45	199.10	43.56	5.36	5 gal/56 sec.
	1526	50	201.29	45.75		
	1531	55	202.45	46.91	5.26	5 gal/57 sec.
	1536	60	203.20	47.66		
	1546	70	207.05	51.51	5.26	5 gal/57 sec.
	1556	80	210.69	55.15	5.26	5 gal/57 sec.
	1606	90	212.98	57.44		

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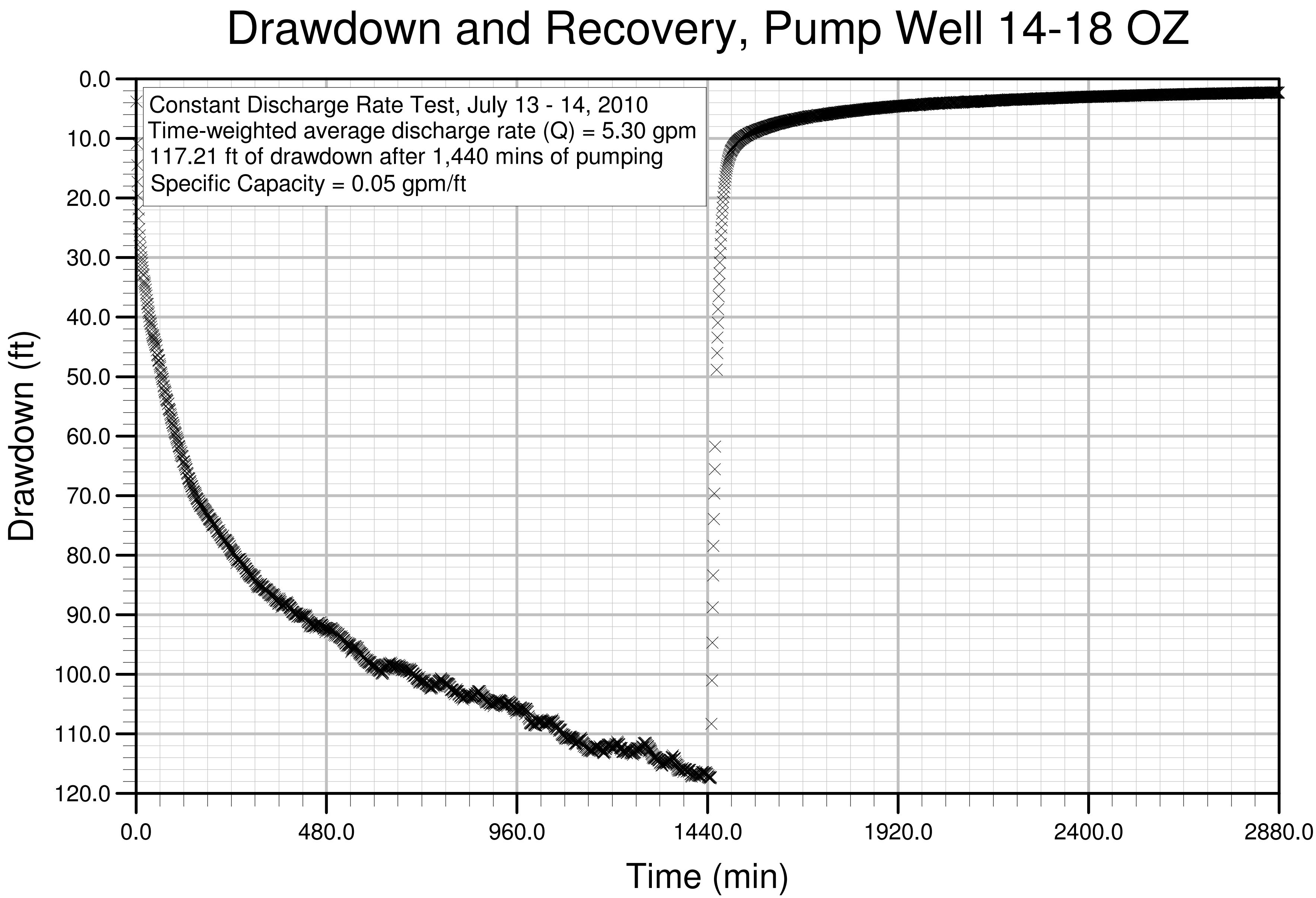
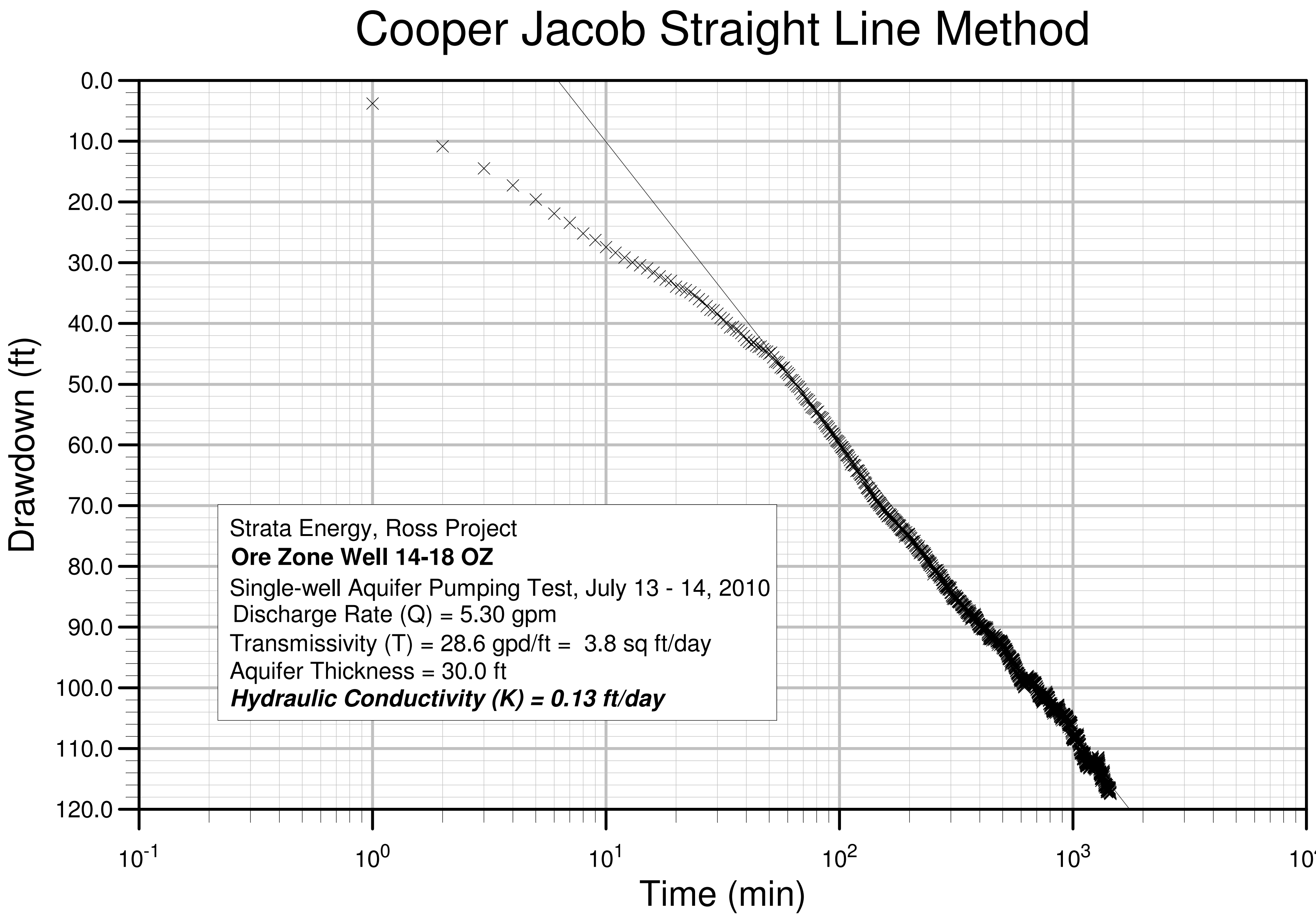
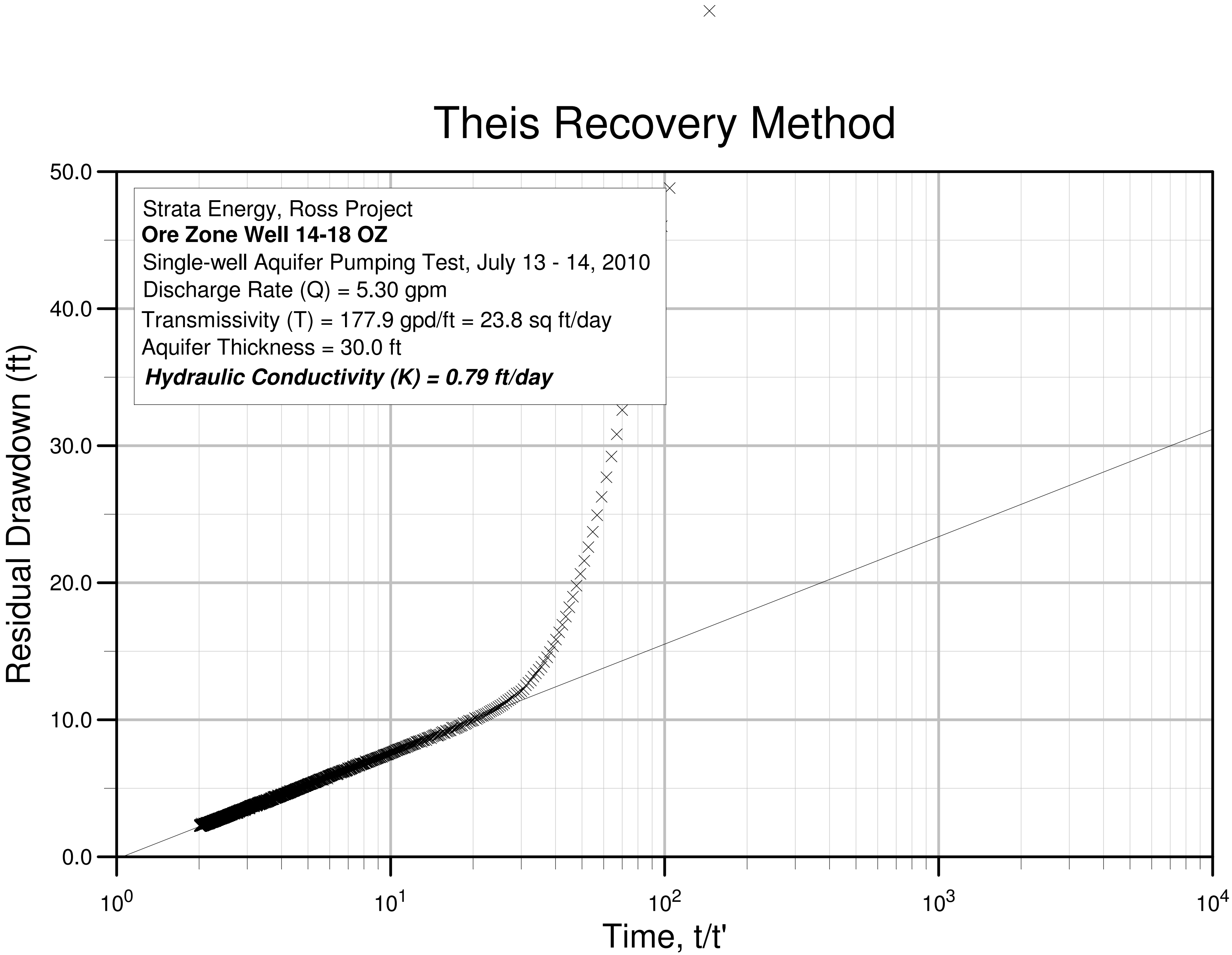
AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY Well No. 14-18 OZ

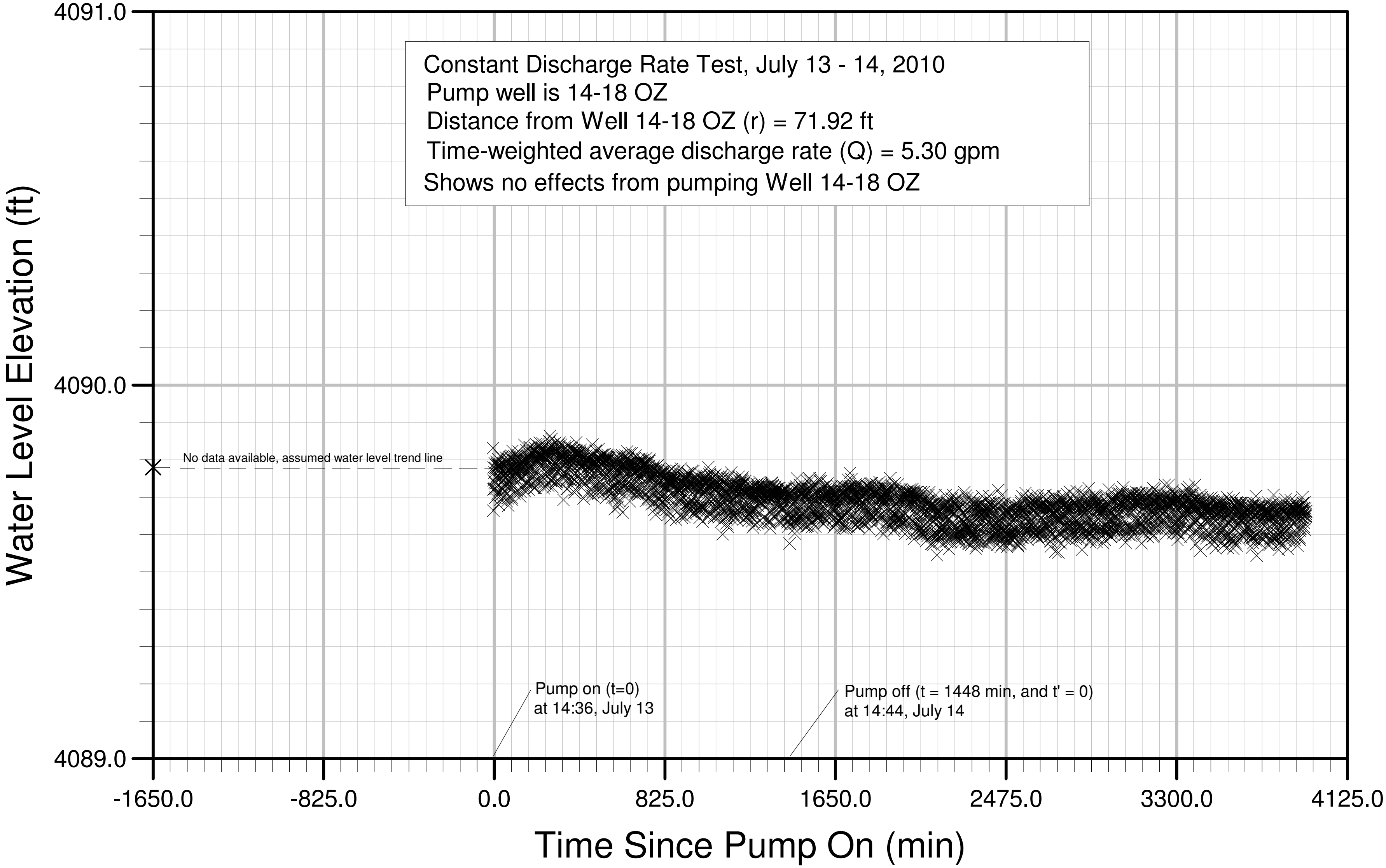
TIME			WATER LEVEL DATA			
Date	Clock Time	(**t**) Elapsed Time Since Pump ON or OFF (min)	Depth to Water Below M.P. (ft)	(**s**) Drawdown/ Recovery (ft)	(**Q**) Discharge (gpm)	COMMENTS
7-13-10	1616	100	215.01	59.47		
	1626	110	217.64	62.10	5.26	5 gal/57 sec.
	1646	130	222.38	66.84		
	1706	150	225.44	69.90		
	1726	170	227.77	72.23	5.26	5 gal/57 sec.
	1746	190	230.18	74.64		
	1806	210	232.16	76.62		
	1826	230	233.09	77.55	5.26	5 gal/57 sec.
7-14-10	0702	986	261.28	105.74		
	0726	1010	263.40	107.86	5.17	5 gal/58 sec.
	0826	1070	264.29	108.75		
	0926	1130	267.24	111.70	5.26	5 gal/57 sec.
	1306	1350	269.11	113.57	5.26	5 gal/57 sec.
	1336	1380	271.40	115.86	5.26	5 gal/57 sec.
	1436	OFF, 1440	272.35	116.81		Water quality sample collected.
						Recovery data recorded by pressure transducer.


Drawdown and Recovery, Pump Well 14-18 OZ
Constant Discharge Rate Test, July 13 - 14, 2010
Time-weighted average discharge rate (Q) = 5.30 gpm
117.21 ft of drawdown after 1,440 mins of pumping
Specific Capacity = 0.05 gpm/ft
Drawdown (ft)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
Time (min)
0.0
480.0
960.0
1440.0
1920.0
2400.0
2880.0

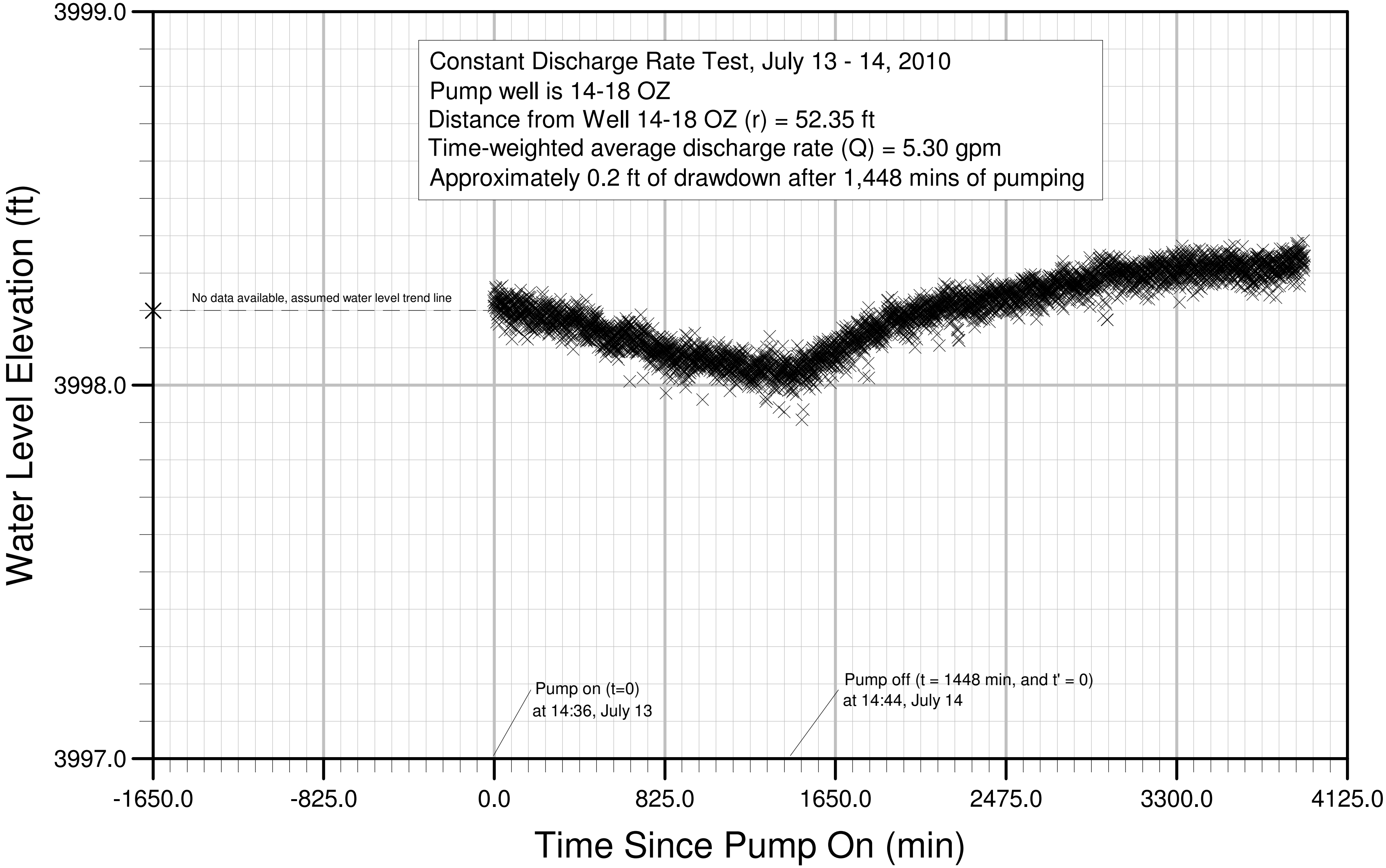

Cooper Jacob Straight Line Method
Drawdown (ft)
Time (min)
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
Strata Energy, Ross Project
Ore Zone Well 14-18 OZ
Single-well Aquifer Pumping Test, July 13 - 14, 2010
Discharge Rate (Q) = 5.30 gpm
Transmissivity (T) = 28.6 gpd/ft = 3.8 sq ft/day
Aquifer Thickness = 30.0 ft
Hydraulic Conductivity (K) = 0.13 ft/day


Theis Recovery Method
Strata Energy, Ross Project
Ore Zone Well 14-18 OZ
Single-well Aquifer Pumping Test, July 13 - 14, 2010
Discharge Rate (Q) = 5.30 gpm
Transmissivity (T) = 177.9 gpd/ft = 23.8 sq ft/day
Aquifer Thickness = 30.0 ft
Hydraulic Conductivity (K) = 0.79 ft/day
Residual Drawdown (ft)
Time, t/t'
50.0
40.0
30.0
20.0
10.0
0.0
10^0
10^1
10^2
10^3
10^4

Hydrograph of Observation Well 14-18 SM



Hydrograph of Observation Well 14-18 DM



Appendix 5
21-19 Well Cluster
July 15, 2010 Aquifer Test
Field Data Form and
Plots of Time-Drawdown and Analyses

WWC ENGINEERING

AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY

Pumped Well No. 21-19 OZ Observation Well No's. 21-19 SA
21-19 SM
21-19 DM

Type of Pump Test: ☒ Constant Discharge ☐ Step-Drawdown

Pumped Well Casing ID 5.0 inches

Distance Between Pumped and Observation Wells * feet

* 21-19 SA = 55.23', 21-19 SM = 72.03′, 21-19 DM = 44.48'

Water Level Measurements by: ☒ electric tape and ☒ pressure transducer

Discharge Measurements by: ☒ bucket/stopwatch ☐ flow meter ☐ flume/weir

(6 gpm Dole valve used)

Screen/Perforation Interval(s) (below land surface) 433' – 468'

Depth of Pump Intake (below land surface) 403 feet (dedicated 2 h.p.)

Depth of Static Water Level (from measurement point) 214.35 feet

Height of Measurement Point (above land surface) 1.38 feet

Elevation of Measurement Point 4,168.54 feet a.m.s.l.

Pump On Date 07 / 15 / 2010 Time 0950 AM/PM

Pump Off Date 07 / 16 / 2010 Time 1010 AM/PM

Weather Conditions Dry, breezy, clear, high 80's ° F

Test Performed by Rogers, Evers

WWC ENGINEERING

AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY Well No. 21-19 OZ

TIME			WATER LEVEL DATA			
Date	Clock Time	(**t**) Elapsed Time Since Pump ON or OFF (min)	Depth to Water Below M.P. (ft)	(**s**) Drawdown/ Recovery (ft)	(**Q**) Discharge (gpm)	COMMENTS
7-15-10	0950	ON, 0	214.35	0	5.88	5 gal/51 sec., pressure gauge @ 70 psi
	0952	2	230.25	15.90		
	0953	3	233.00	18.65		
	0954	4	235.13	20.78		
	0955	5	237.30	22.95		
	0956	6	238.68	24.33	5.88	5 gal/51 sec.
	0957	7	239.93	25.58		
	0958	8	241.32	26.97		
	0959	9	242.12	27.77		
	1000	10	242.77	28.42	5.88	5 gal/51 sec.
	1002	12	244.18	29.83		
	1004	14	244.98	30.63		
	1006	16	245.91	31.56		
	1008	18	246.48	32.13		
	1010	20	246.82	32.47	5.77	5 gal/52 sec.
	1012	22	247.34	32.99		
	1014	24	247.41	33.06		
	1016	26	247.75	33.40	5.77	5 gal/52 sec.

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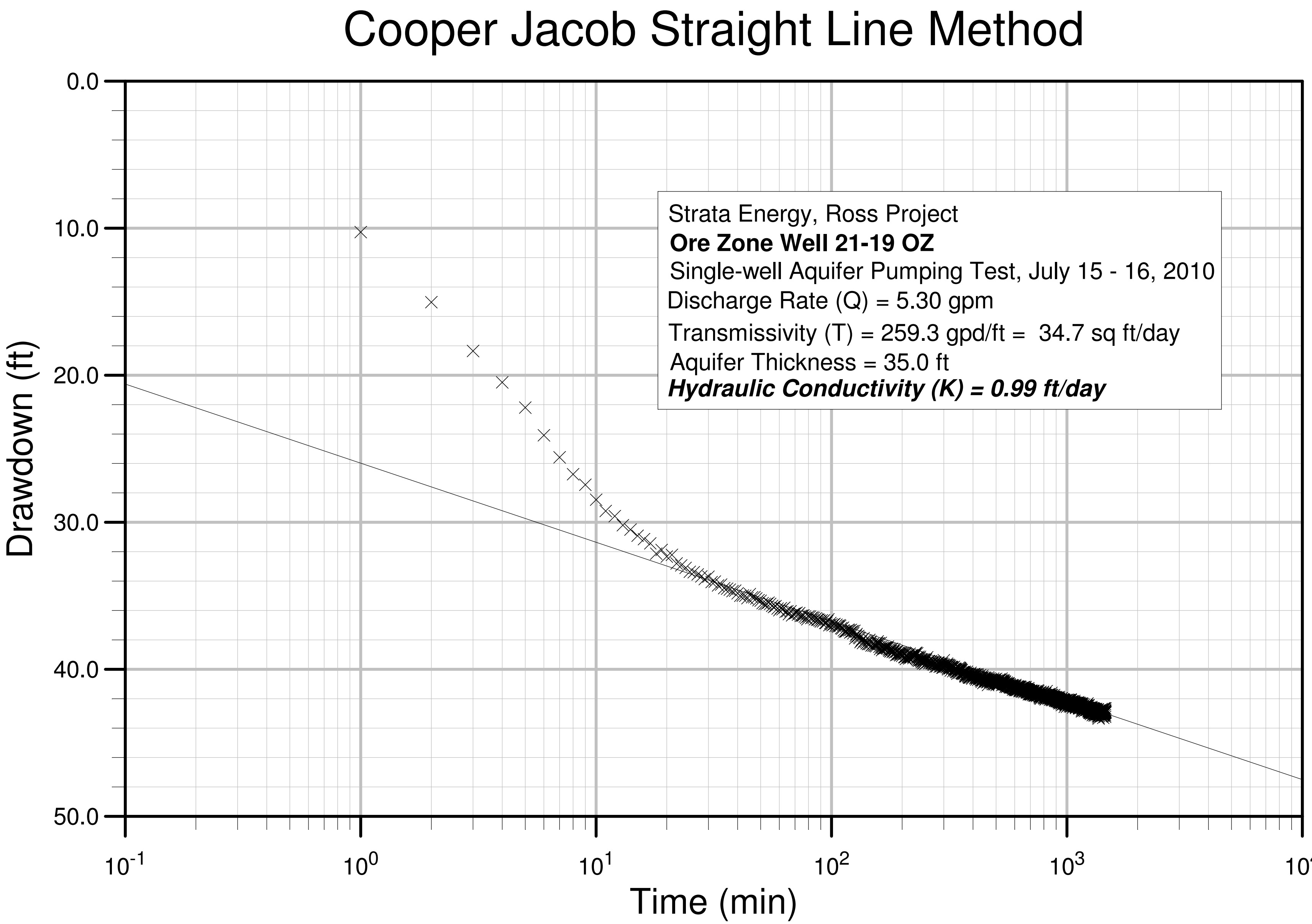
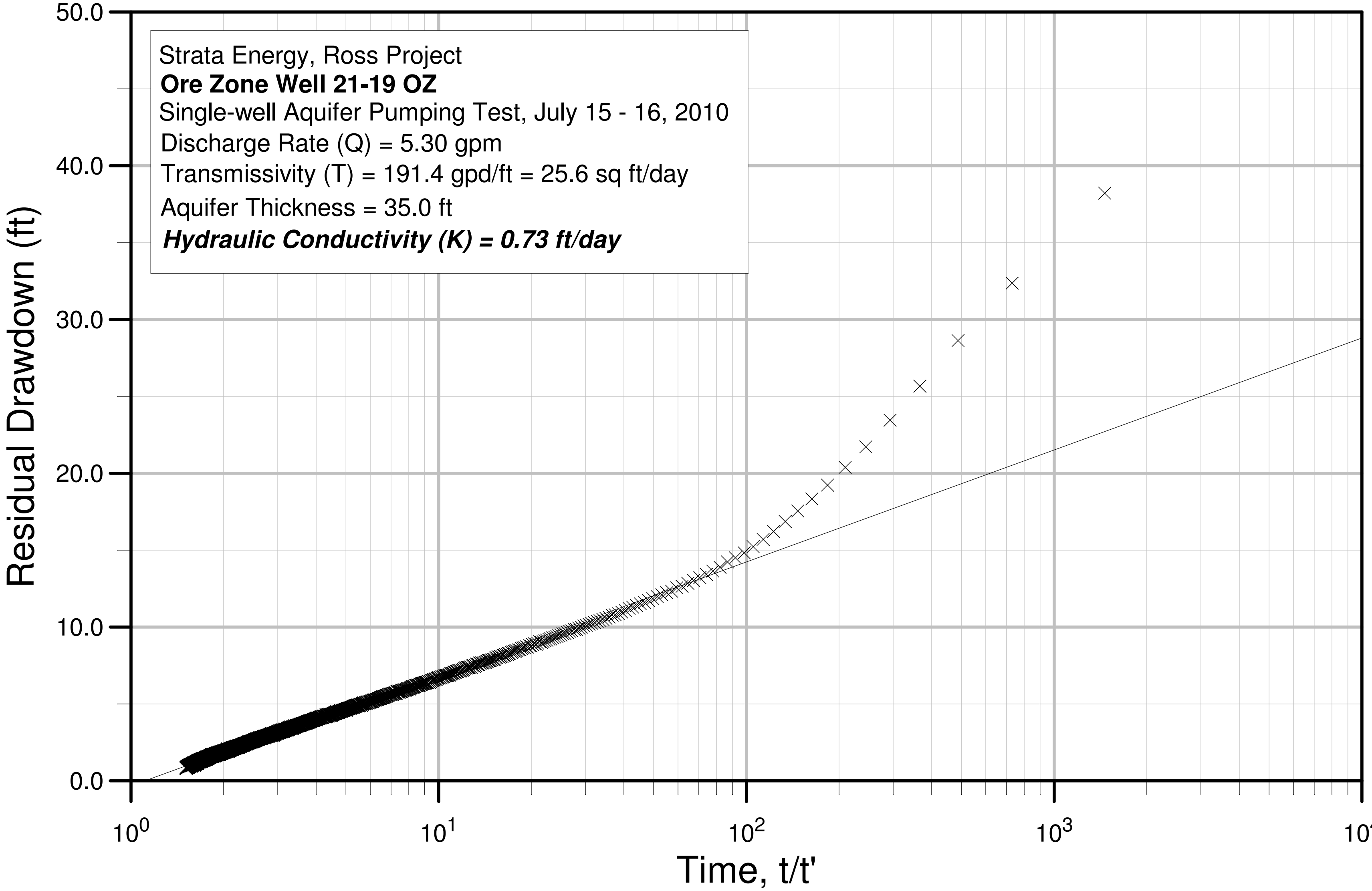
AQUIFER TEST FIELD DATA

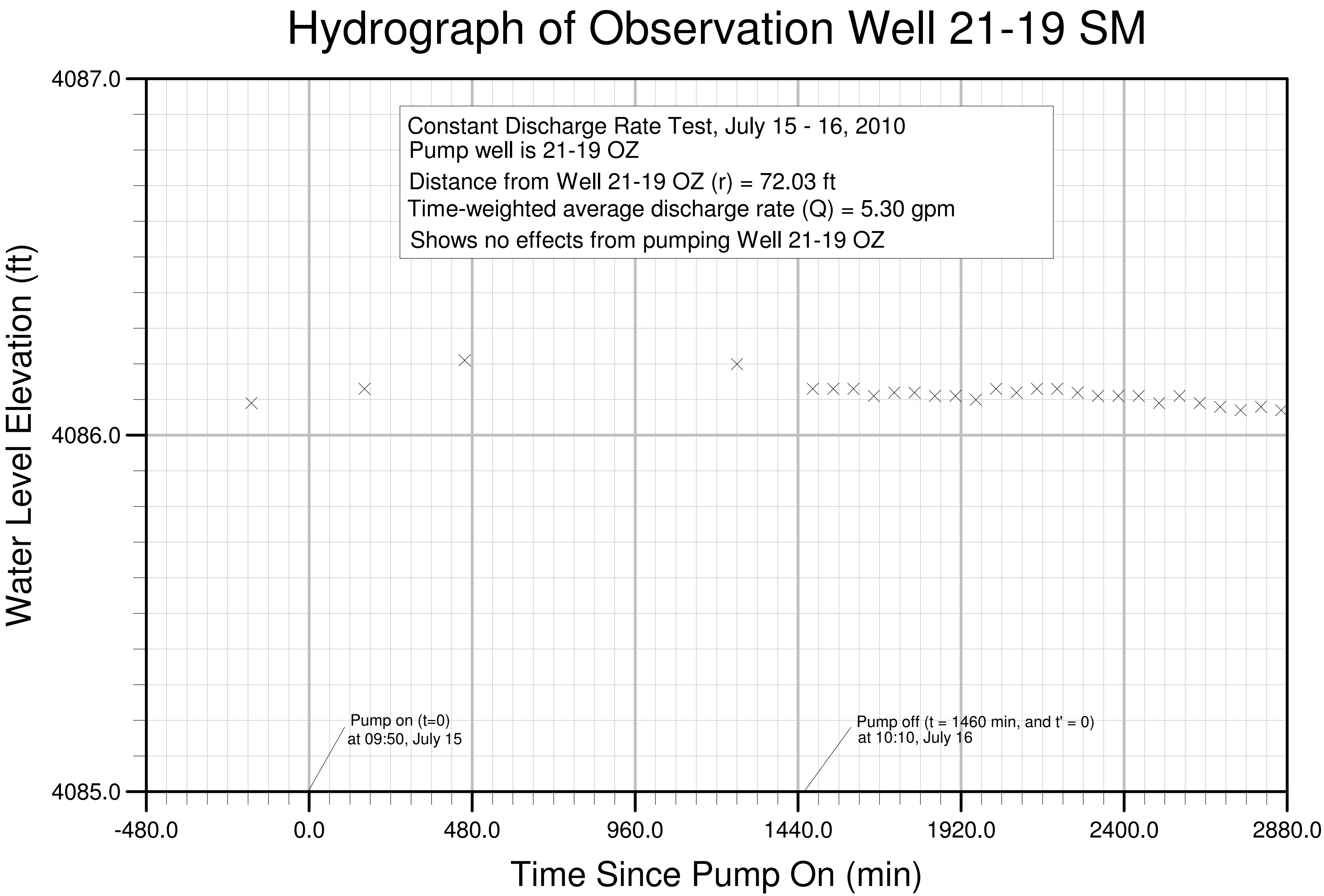
Project/Client ROSS/STRATA ENERGY Well No. 21-19 OZ

TIME			WATER LEVEL DATA			
Date	Clock Time	(**t**) Elapsed Time Since Pump ON or OFF (min)	Depth to Water Below M.P. (ft)	(**s**) Drawdown/ Recovery (ft)	(**Q**) Discharge (gpm)	COMMENTS
7-15-10	1020	30	248.55	34.20		
	1025	35	249.04	34.69	5.66	5 gal/53 sec.
	1030	40	249.33	34.98		
	1035	45	249.58	35.23		
	1040	50	249.89	35.54		
	1050	60	250.26	35.91	5.77	5 gal/52 sec.
	1155	125	251.81	37.46	5.56	5 gal/54 sec.
	1230	160	252.67	38.32		
	1250	180	253.09	38.74		
	1350	240	253.51	39.16	5.26	5 gal/57 sec.
	1450	300	254.46	40.11	5.45	5 gal/55 sec.
	1550	360	254.74	40.39	5.45	5 gal/55 sec.
	1630	400	254.95	40.60	5.36	5 gal/56 sec.
	1810	500	255.23	40.88	5.36	5 gal/56 sec.
	1850	540	255.49	41.14	5.26	5 gal/57 sec.
7-16-10	0630	1240	257.36	43.01	5.17	5 gal/58 sec.
	0650	1260	257.51	43.16	5.17	5 gal/58 sec.
	0950	1440	257.51	43.16	5.17	5 gal/58 sec.
	1010	OFF, 1460				Water quality sample collected. Recovery data recorded by pressure transducer.

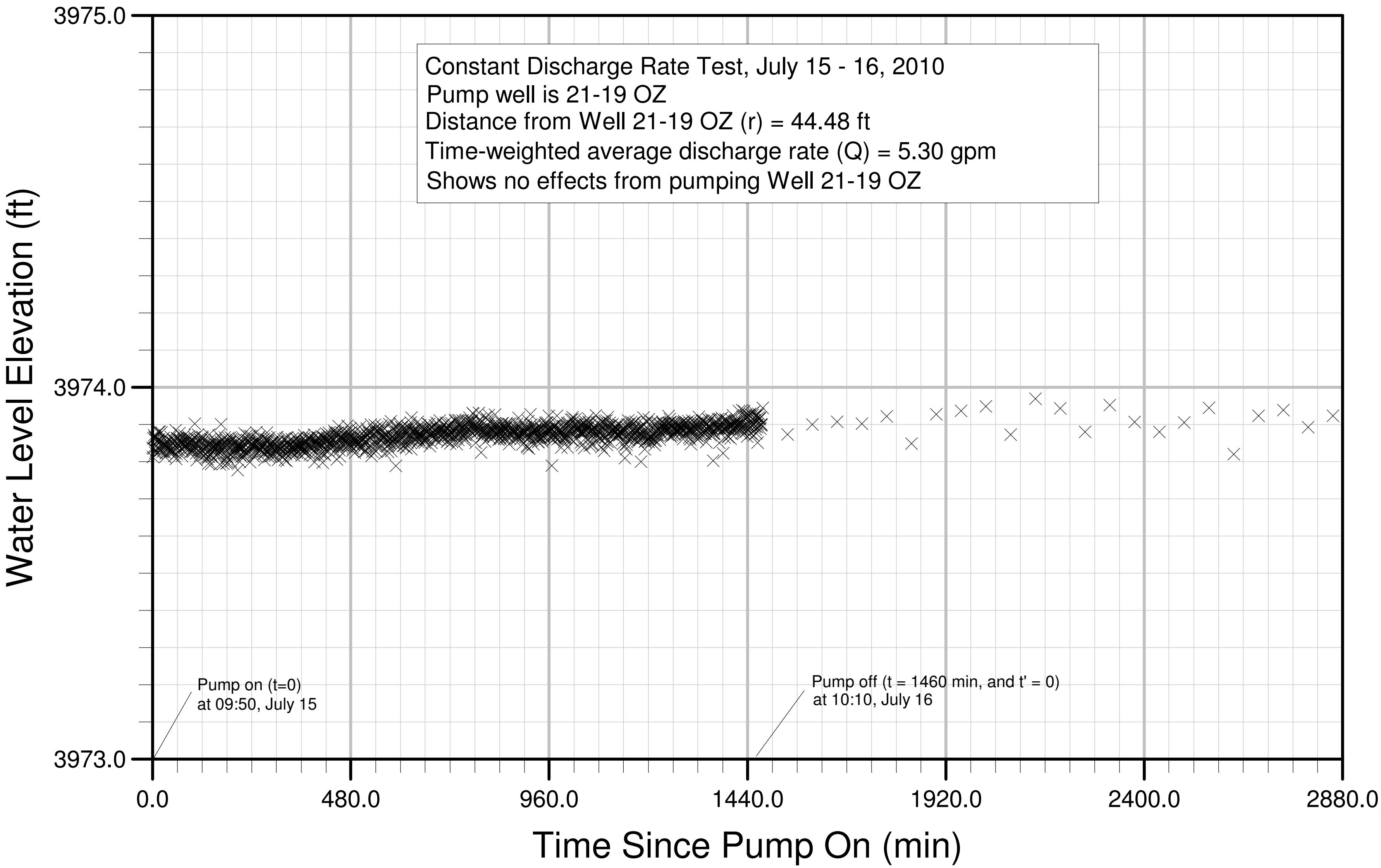

Cooper Jacob Straight Line Method
Strata Energy, Ross Project
Ore Zone Well 21-19 OZ
Single-well Aquifer Pumping Test, July 15 - 16, 2010
Discharge Rate (Q) = 5.30 gpm
Transmissivity (T) = 259.3 gpd/ft = 34.7 sq ft/day
Aquifer Thickness = 35.0 ft
Hydraulic Conductivity (K) = 0.99 ft/day
Drawdown (ft)
0.0
10.0
20.0
30.0
40.0
50.0
Time (min)
10-1
100
101
102
103
104

Theis Recovery Method




Hydrograph of Observation Well 21-19 SM
Constant Discharge Rate Test, July 15 - 16, 2010
Pump well is 21-19 OZ
Distance from Well 21-19 OZ (r) = 72.03 ft
Time-weighted average discharge rate (Q) = 5.30 gpm
Shows no effects from pumping Well 21-19 OZ
Pump on (t=0)
at 09:50, July 15
Pump off (t = 1460 min, and t' = 0)
at 10:10, July 16
Water Level Elevation (ft)
4087.0
4086.0
4085.0
Time Since Pump On (min)
-480.0
0.0
480.0
960.0
1440.0
1920.0
2400.0
2880.0

Hydrograph of Observation Well 21-19 DM



Appendix 6
12-18 Well Cluster
(12-18 OZ Pumping Well)
July 21, 2010 Aquifer Test
Field Data Form and
Plots of Time-Drawdown and Analyses

WWC ENGINEERING

AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY

Pumped Well No. 12-18 OZ Observation Well No's.

12-18 SA	OW1B57-1
12-18 SM	OW1B58-1
12-18 DM	OW1B60-1

Type of Pump Test: ☒ Constant Discharge ☐ Step-Drawdown

Pumped Well Casing ID 5.0 inches

Distance Between Pumped and Observation Wells * feet

* 12-18 SA = 47.80', 12-18 SM = 71.00', 12-18 DM = 48.55', OW1B57-1 = 71.00',

OW1B58-1 = 70.05', OW1B60-1 = 70.25'

Water Level Measurements by: ☒ electric tape and ☒ pressure transducer

Discharge Measurements by: ☒ bucket/stopwatch ☐ flow meter ☐ flume/weir

(5gpm Dole valve used)

Screen/Perforation Interval(s) (below land surface) 474' – 584'

Depth of Pump Intake (below land surface) 444 feet (dedicated 2 h.p.)

Depth of Static Water Level (from measurement point) 170.74 feet

Height of Measurement Point (above land surface) 1.43 feet

Elevation of Measurement Point 4,188.07 feet a.m.s.l.

Pump On Date 07 / 21 / 2010 Time 0921 AM/PM

Pump Off Date 07 / 24 / 2010 Time 1000 AM/PM

Weather Conditions Dry, calm, 70's-80's ° F, sunny

Test Performed by Collier, Rogers, Fuller, Evers, Schiffer

WWC ENGINEERING

AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY Well No. 12-18 OZ

TIME			WATER LEVEL DATA			
Date	Clock Time	(**t**) Elapsed Time Since Pump ON or OFF (min)	Depth to Water Below M.P. (ft)	(**s**) Drawdown/ Recovery (ft)	(**Q**) Discharge (gpm)	COMMENTS
7-21-10	0921	ON, 0	170.74	0		Pressure gauge @ 75psi
	0925	4	184.65	13.91		
	0927	6	186.78	16.04	5.77	5 gal/52 sec.
	0931	10	188.23	17.49		
	0933	12	188.45	17.71		
	0936	15	188.58	17.84		
	0940	19	189.04	18.30		
	0947	26	189.22	18.48	5.36	5gal/56 sec.
	1015	54	189.89	19.15		
	1026	65	189.98	19.24		
	1058	97	190.10	19.36		
	1110	109	190.29	19.55	5.36	5gal/56 sec.
	1125	124	190.42	19.68		
	1149	148	190.46	19.74	5.36	5gal/56 sec. @ 72psi
	1220	179	190.63	19.89		
	1300	219	190.81	20.07		
	1321	240	191.03	20.29		H_20 quality sample collected
	1430	309	191.10	20.36		

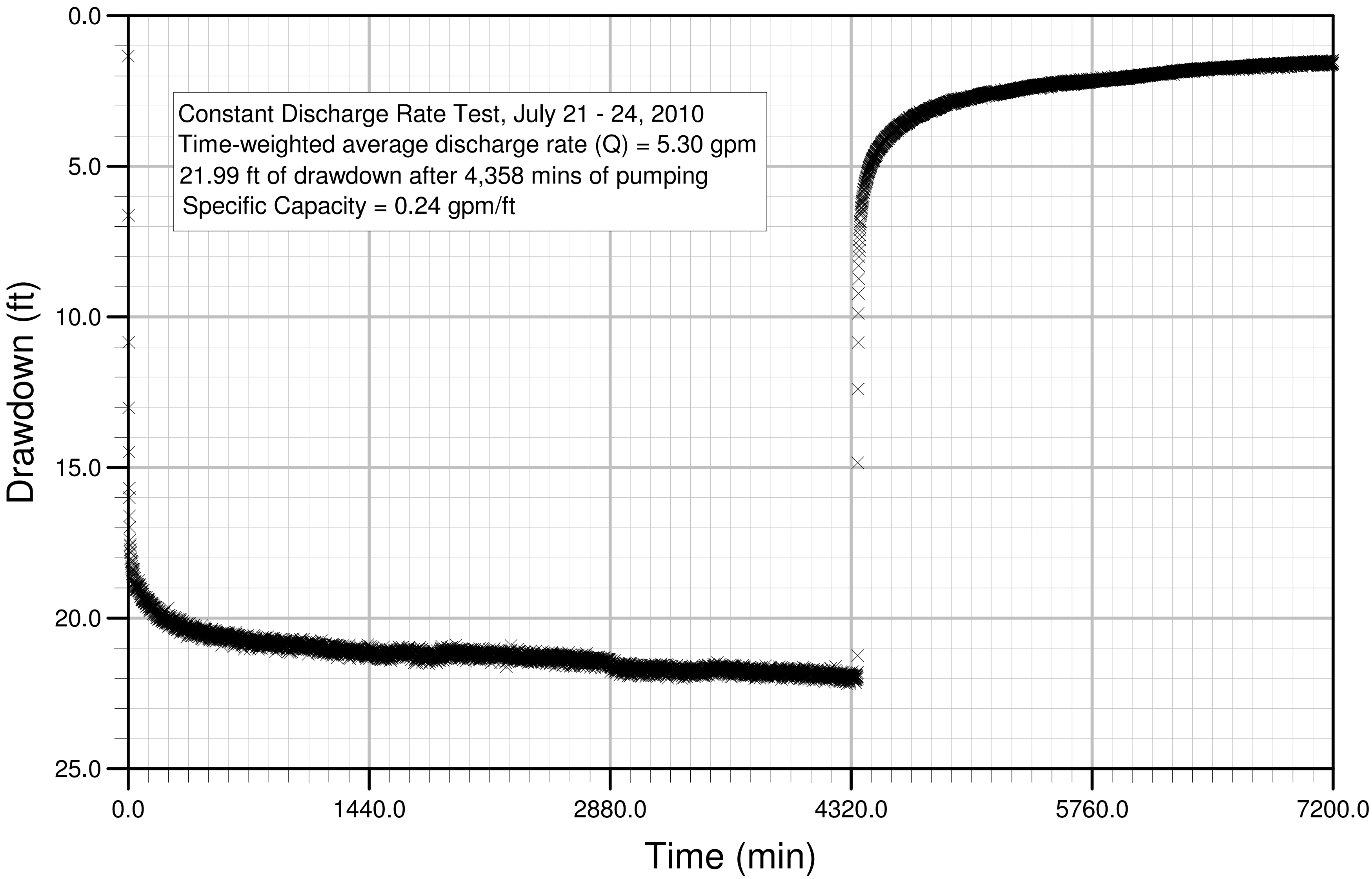
WWC ENGINEERING

AQUIFER TEST FIELD DATA

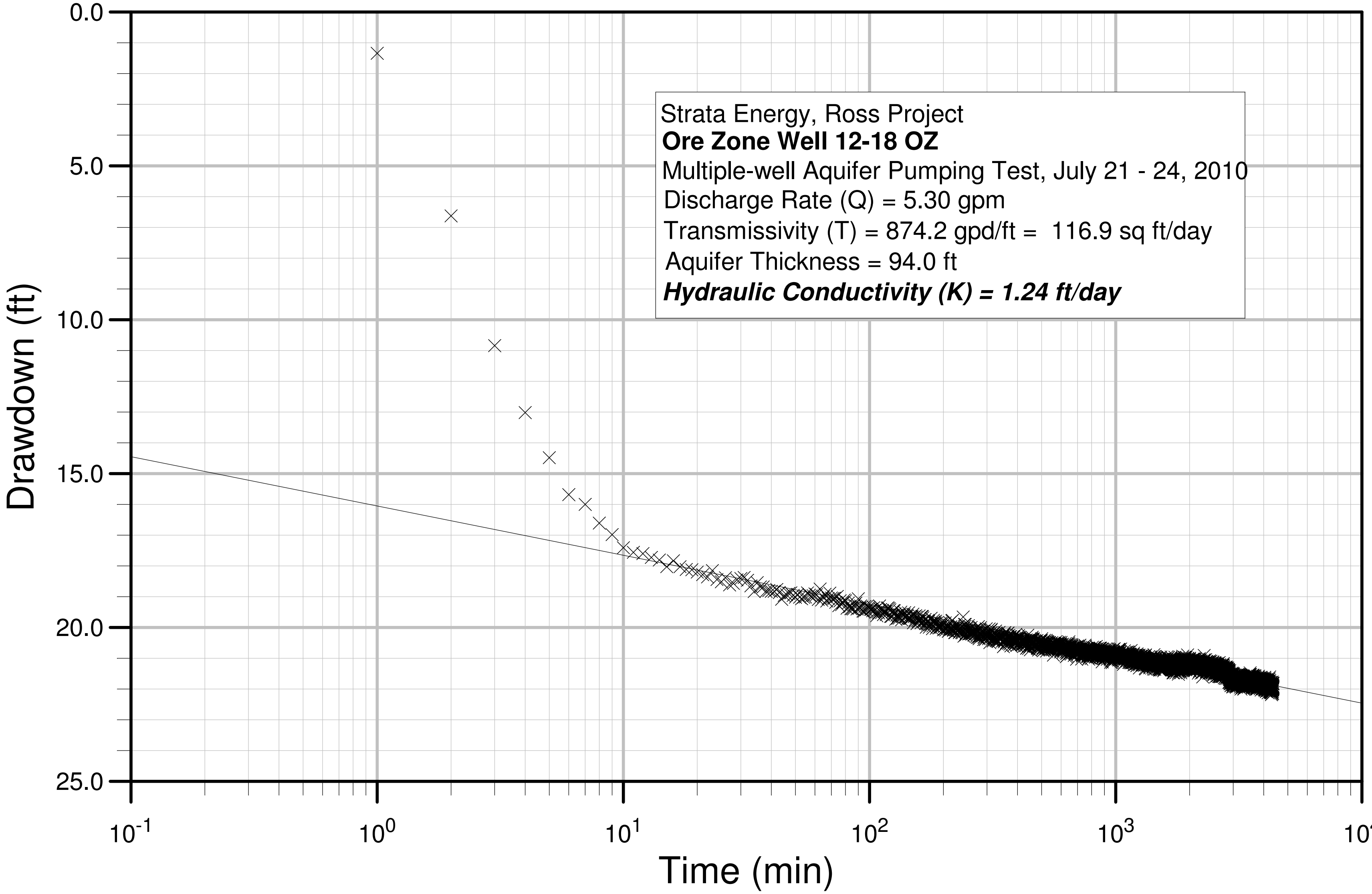
Project/Client ROSS/STRATA ENERGY Well No. 12-18 OZ

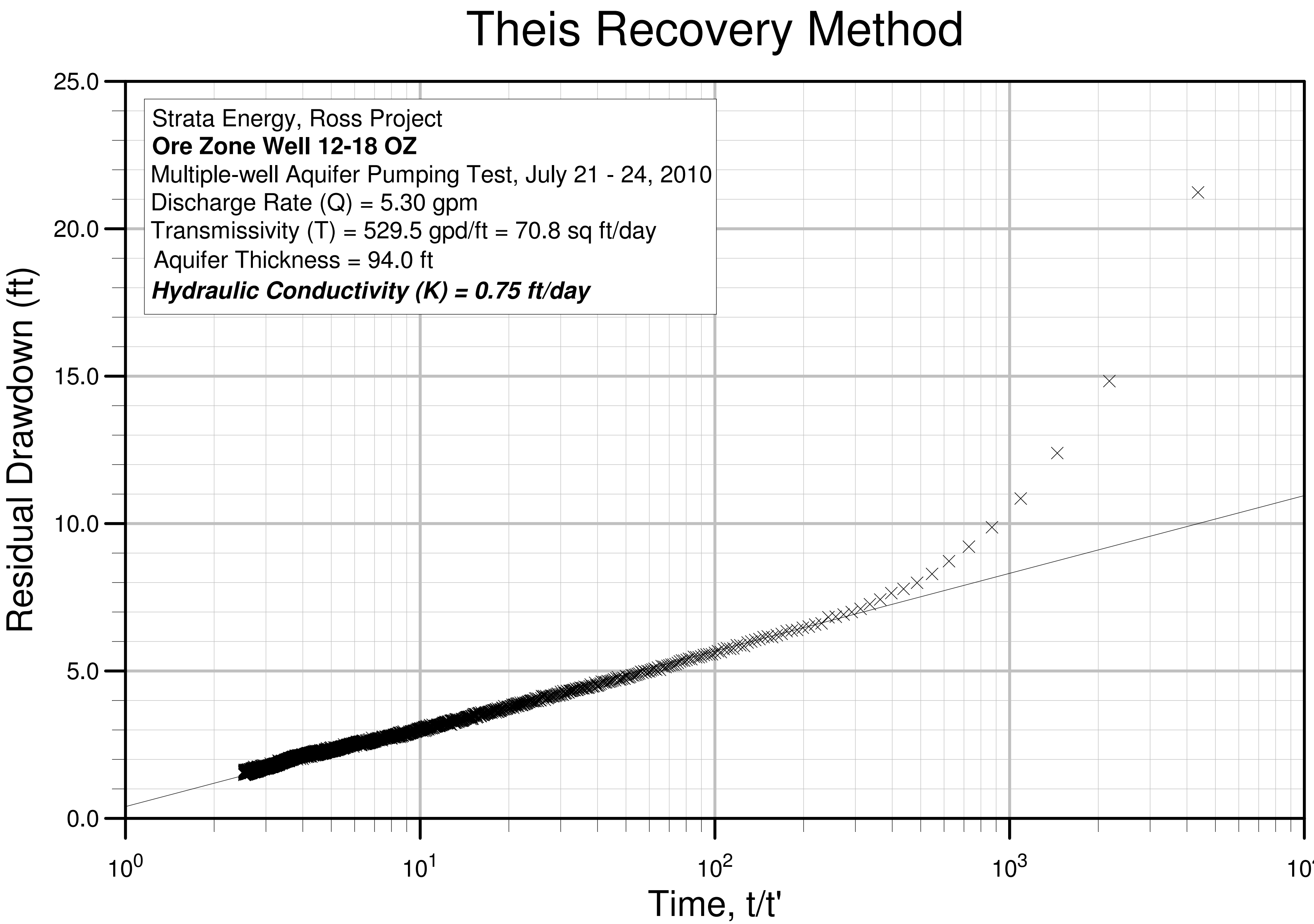
TIME			WATER LEVEL DATA			
Date	Clock Time	(**t**) Elapsed Time Since Pump ON or OFF (min)	Depth to Water Below M.P. (ft)	(**s**) Drawdown/ Recovery (ft)	(**Q**) Discharge (gpm)	COMMENTS
7-21-10	1513	352	191.28	20.54	5.36	5 gal/56 sec. @ 72psi
	1702	461	191.39	20.65	5.36	
7-22-10	0818	1377	192.02	21.28	5.26	5 gal/57 sec. @ 72psi
	0920	1439	192.09	21.35	5.26	5 gal/57 sec. H20 quality sampled.
	1200	1599	191.99	21.25	5.17	5 gal/58 sec.
	1357	1716	192.04	21.30	5.17	5 gal/58 sec.
	1627	1866	192.08	21.34	5.17	5 gal/58 sec. @ 72psi
7-23-10	0919	2319	192.59	21.85	5.00	5 gal/60 sec. @ 70psi
	0951	2351	192.59	21.85	5.17	Pressure increase to 75psi, 5 gal/58 sec.
7-24-10	0905	4304	191.67	20.93	5.00	5 gal/60 sec.
	0920	4319	191.63	20.89	5.00	
	0955	4354	191.68	20.94	5.00	5 gal/60 sec. @ 76psi
	1000	OFF, 4359	191.68	20.94	5.00	H20 quality sample collected
						Recovery data recorded by pressure transducer.

Drawdown and Recovery, Pump Well 12-18 OZ

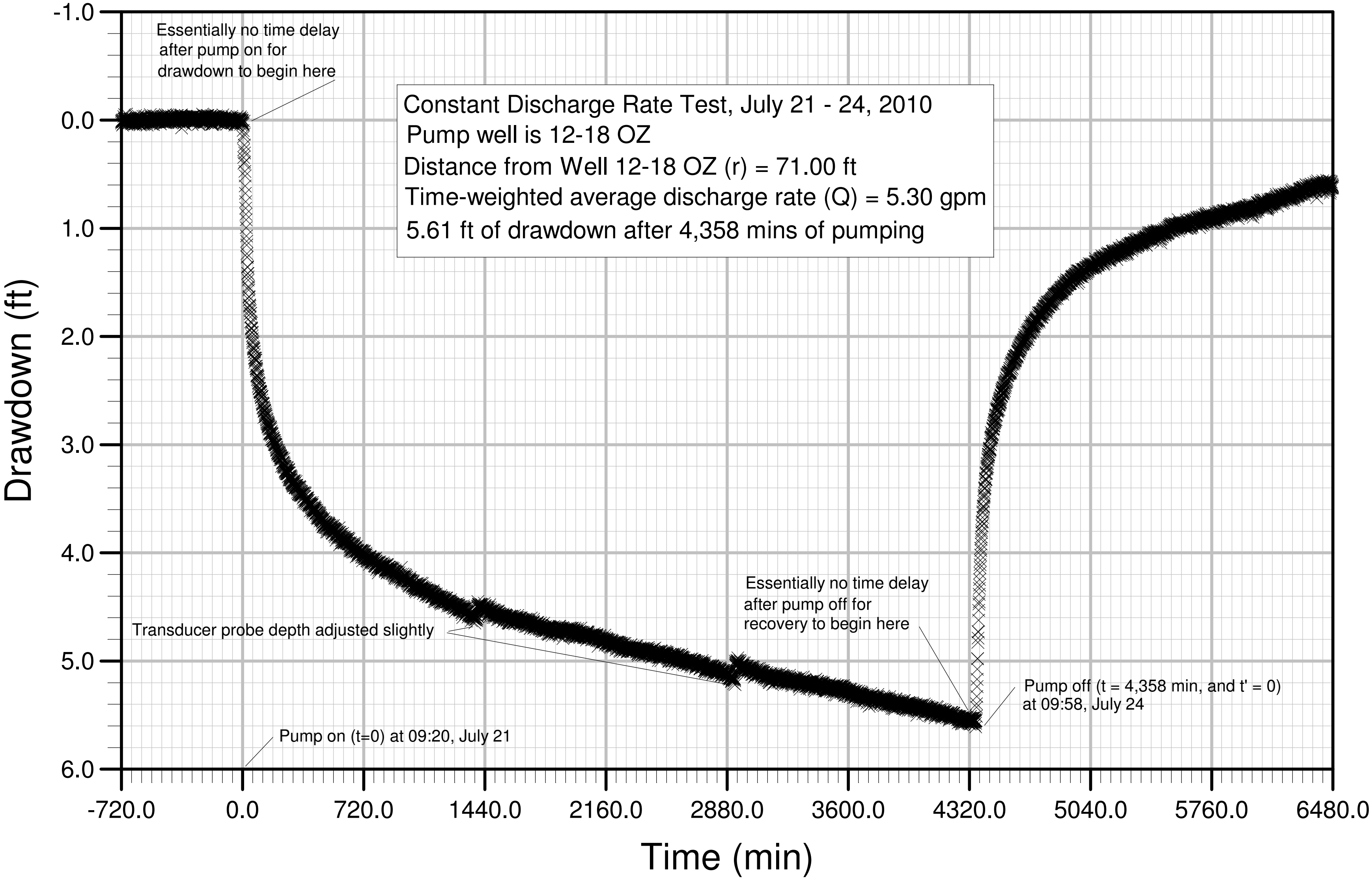


Cooper Jacob Straight Line Method

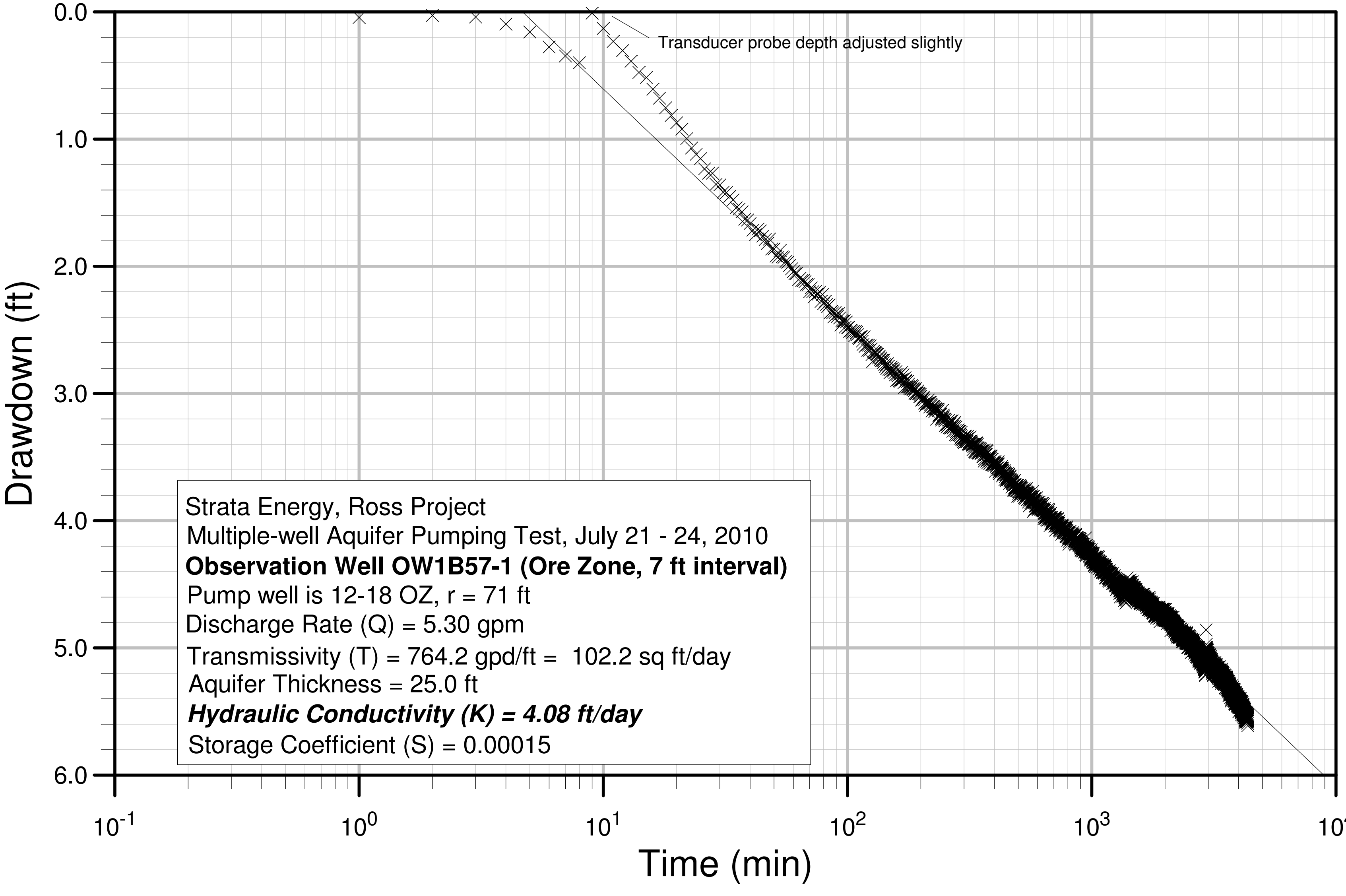


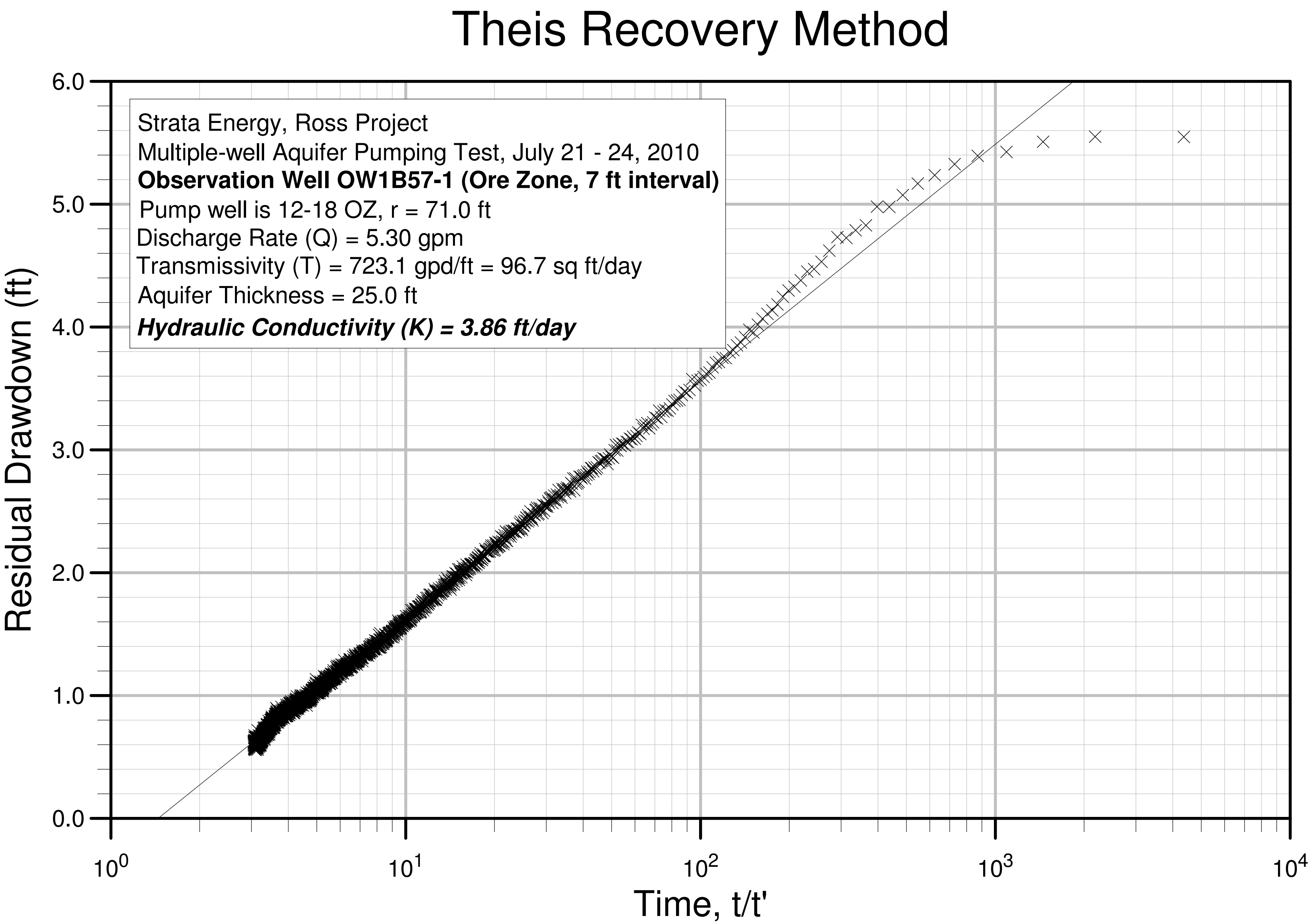

Theis Recovery Method
Strata Energy, Ross Project
Ore Zone Well 12-18 OZ
Multiple-well Aquifer Pumping Test, July 21 - 24, 2010
Discharge Rate (Q) = 5.30 gpm
Transmissivity (T) = 529.5 gpd/ft = 70.8 sq ft/day
Aquifer Thickness = 94.0 ft
Hydraulic Conductivity (K) = 0.75 ft/day
Residual Drawdown (ft)
25.0
20.0
15.0
10.0
5.0
0.0
10^0
10^1
10^2
10^3
10^4
Time, t/t'

Drawdown and Recovery, Obs. Well OW1B57-1

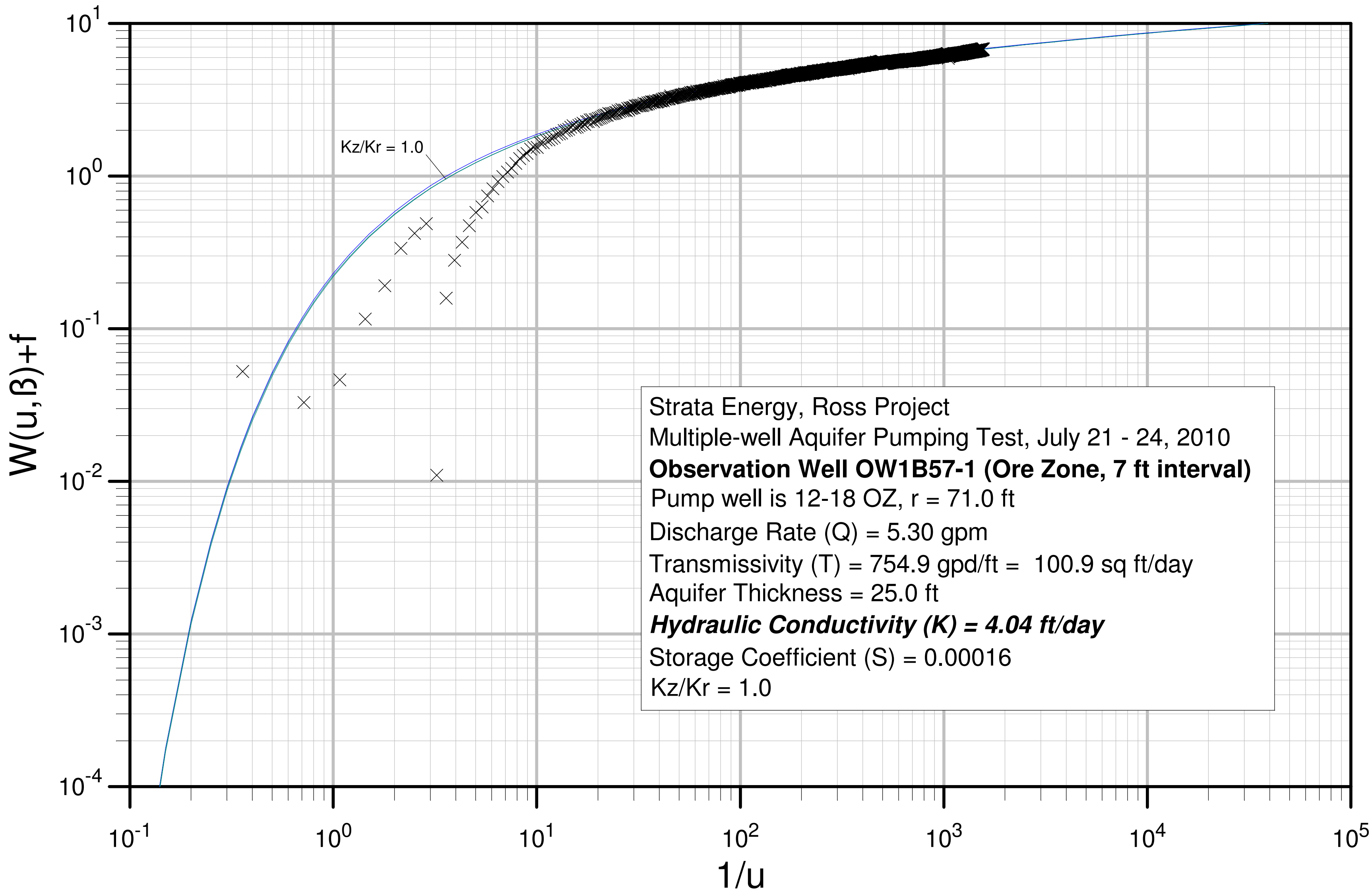


Cooper Jacob Straight Line Method

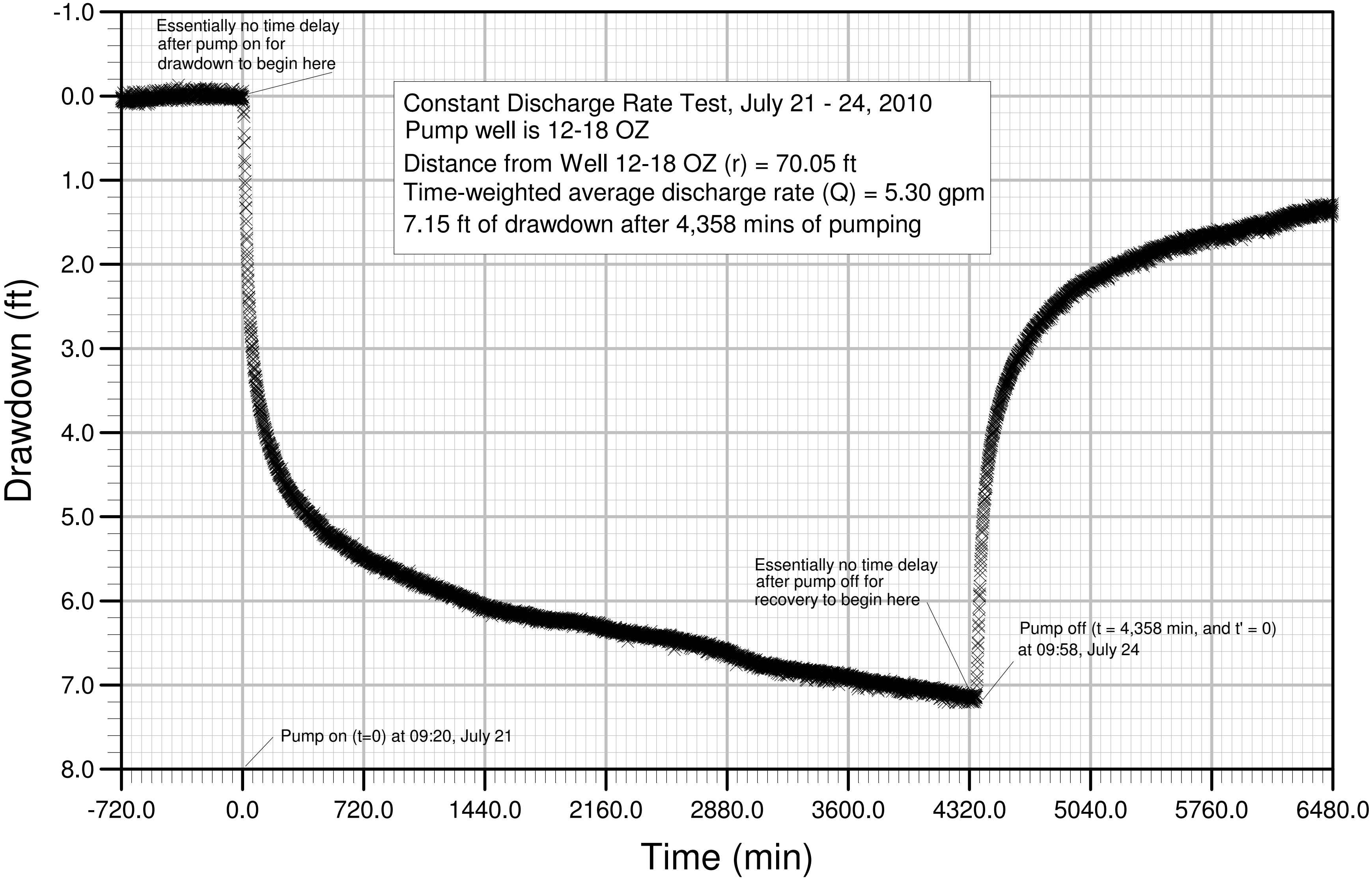



Theis Recovery Method
Strata Energy, Ross Project
Multiple-well Aquifer Pumping Test, July 21 - 24, 2010
Observation Well OW1B57-1 (Ore Zone, 7 ft interval)
Pump well is 12-18 OZ, r = 71.0 ft
Discharge Rate (Q) = 5.30 gpm
Transmissivity (T) = 723.1 gpd/ft = 96.7 sq ft/day
Aquifer Thickness = 25.0 ft
Hydraulic Conductivity (K) = 3.86 ft/day
Residual Drawdown (ft)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
10^0
10^1
10^2
10^3
10^4
Time, t/t'

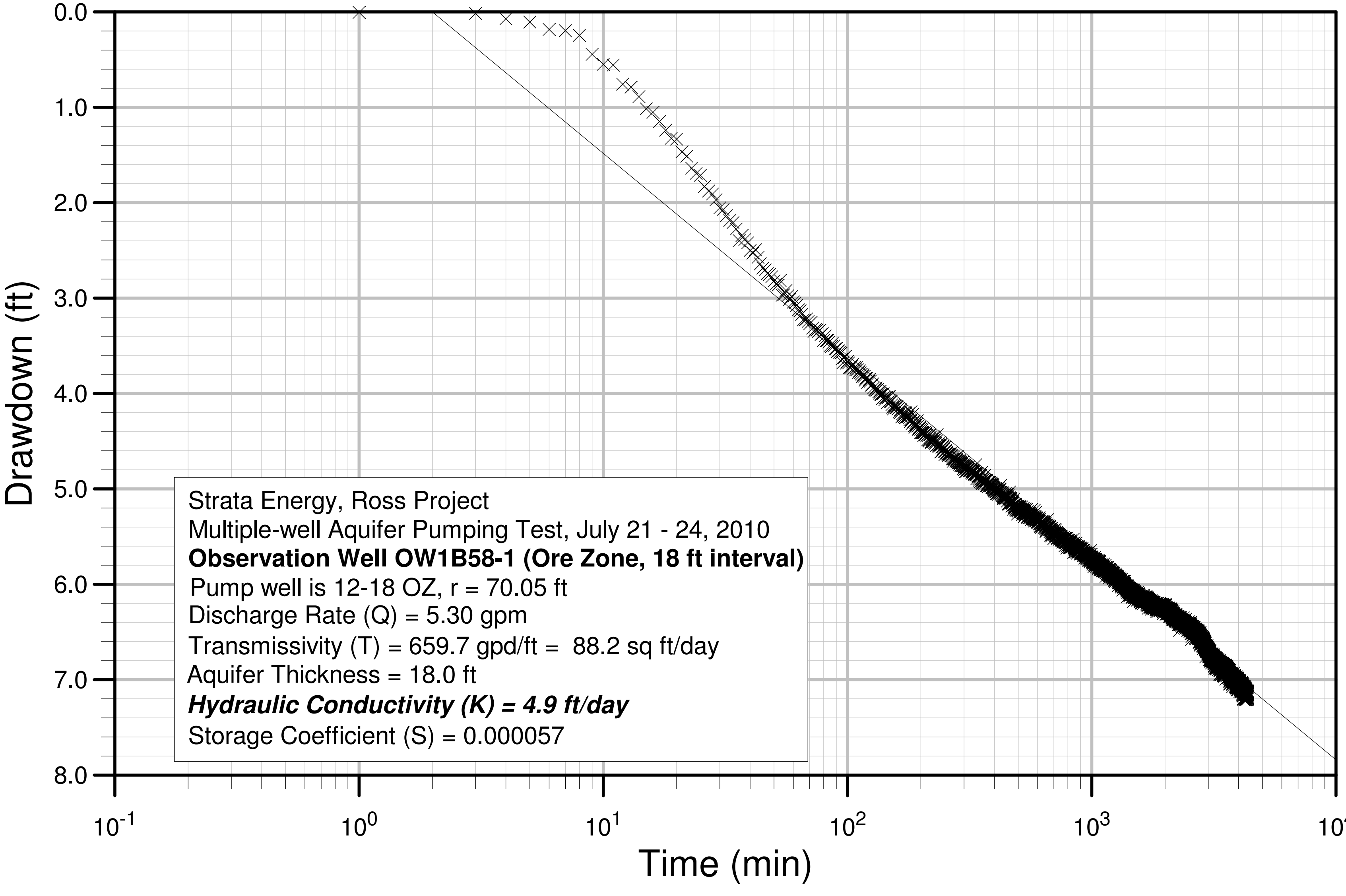
Hantush, 1961 (Confined Partial Penetration Method)

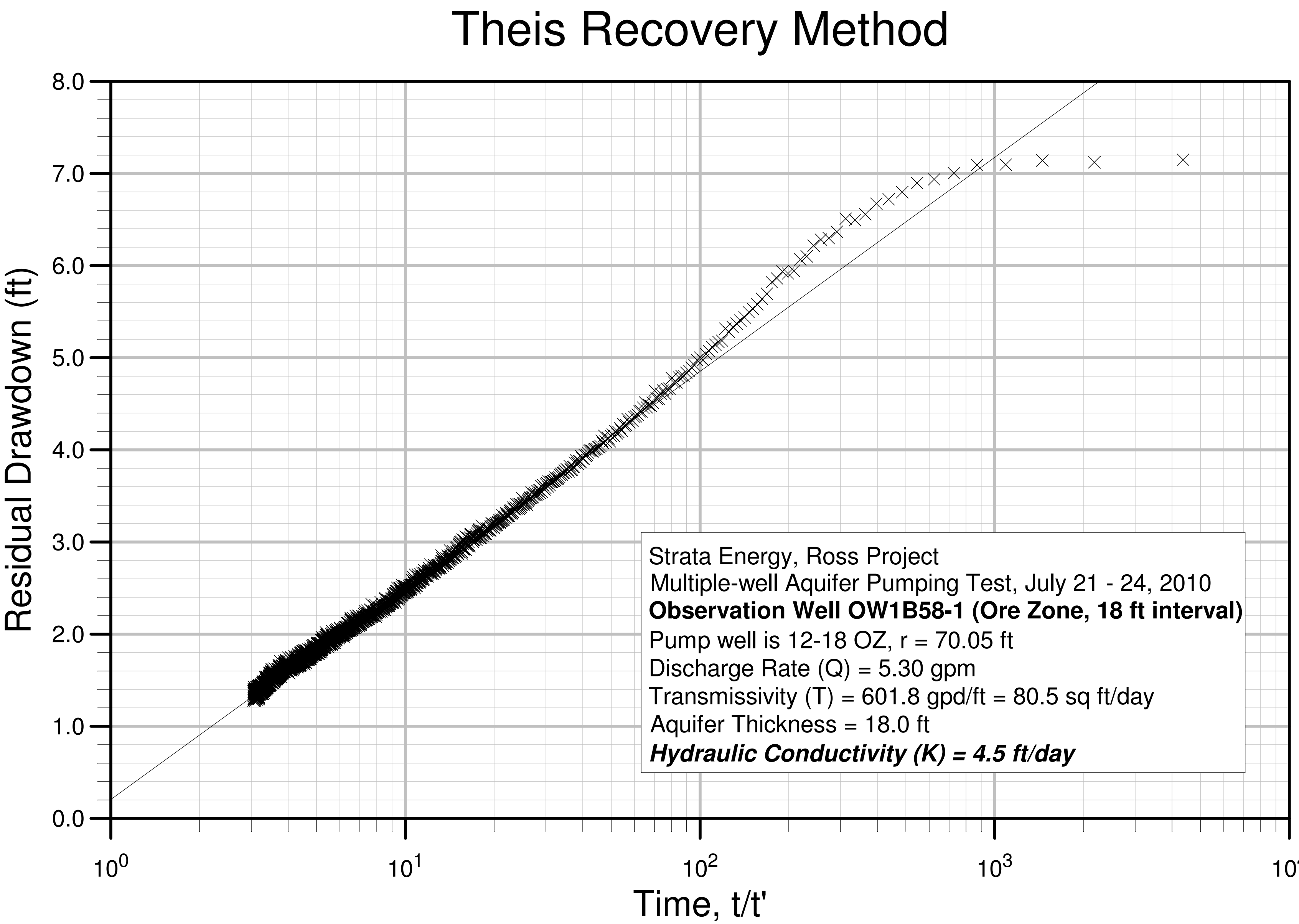


Drawdown and Recovery, Obs. Well OW1B58-1

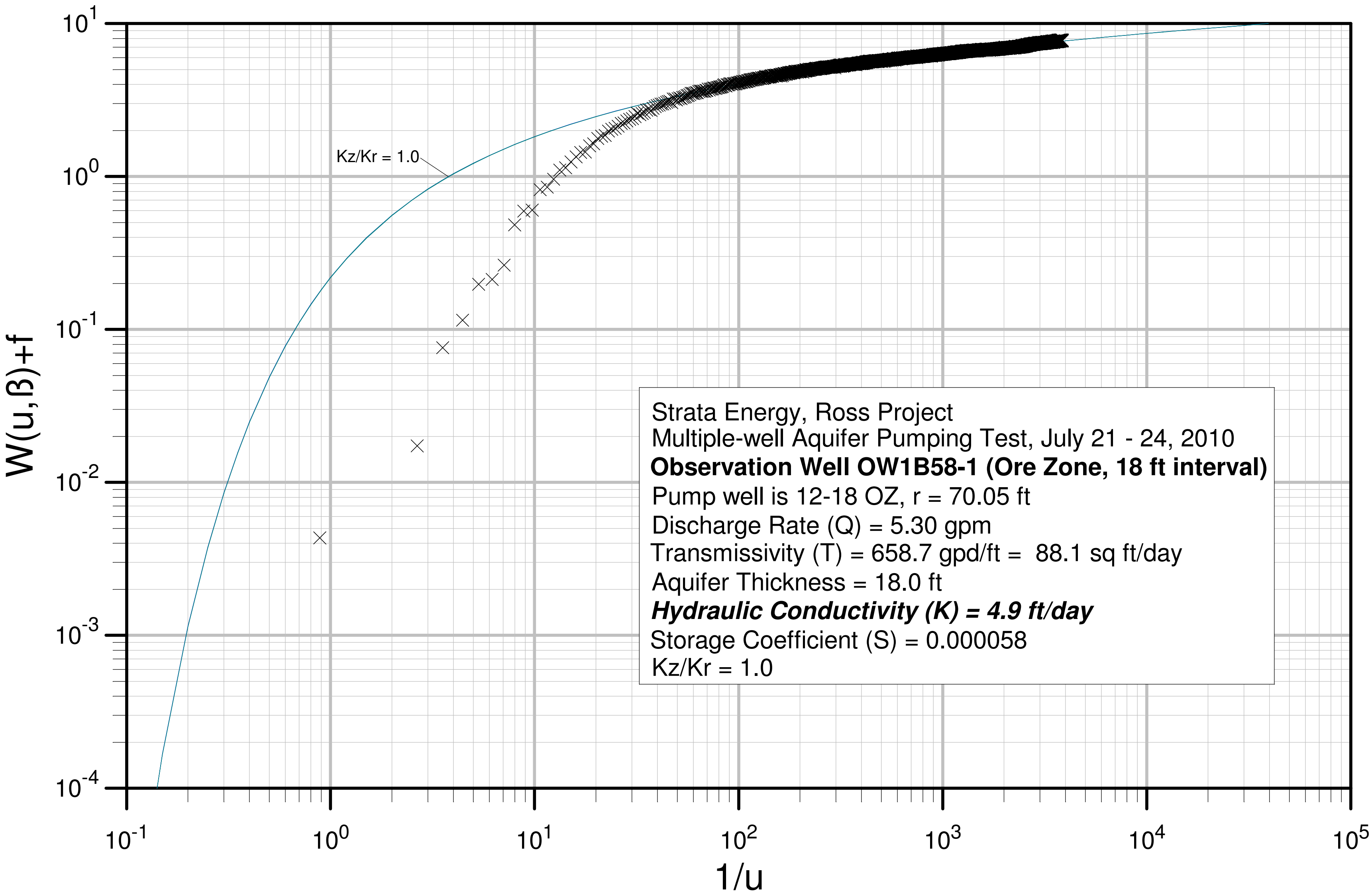


Cooper Jacob Straight Line Method

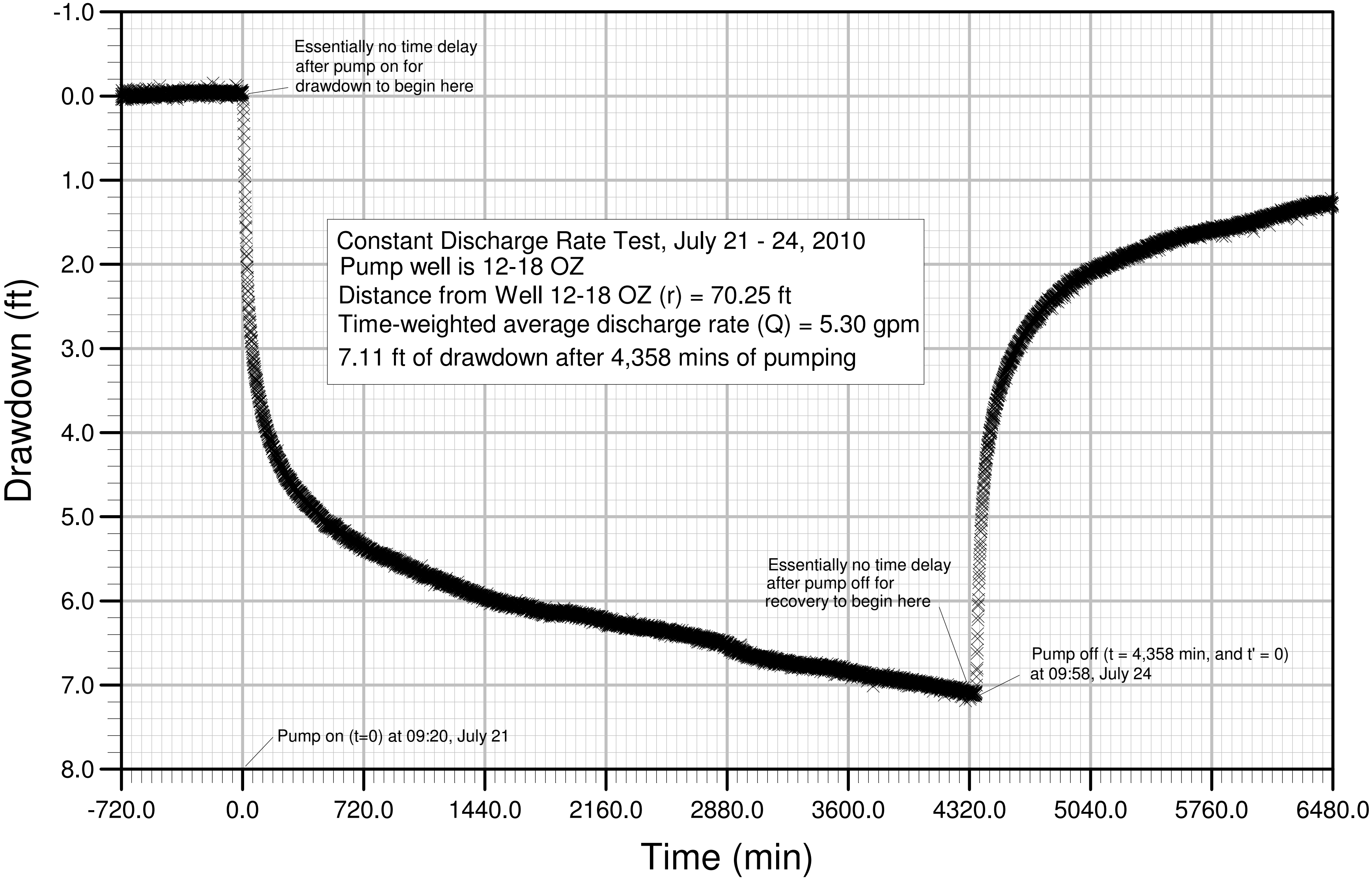



Theis Recovery Method
Residual Drawdown (ft)
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
10^0
10^1
10^2
10^3
10^4
Time, t/t'
Strata Energy, Ross Project
Multiple-well Aquifer Pumping Test, July 21 - 24, 2010
Observation Well OW1B58-1 (Ore Zone, 18 ft interval)
Pump well is 12-18 OZ, r = 70.05 ft
Discharge Rate (Q) = 5.30 gpm
Transmissivity (T) = 601.8 gpd/ft = 80.5 sq ft/day
Aquifer Thickness = 18.0 ft
Hydraulic Conductivity (K) = 4.5 ft/day

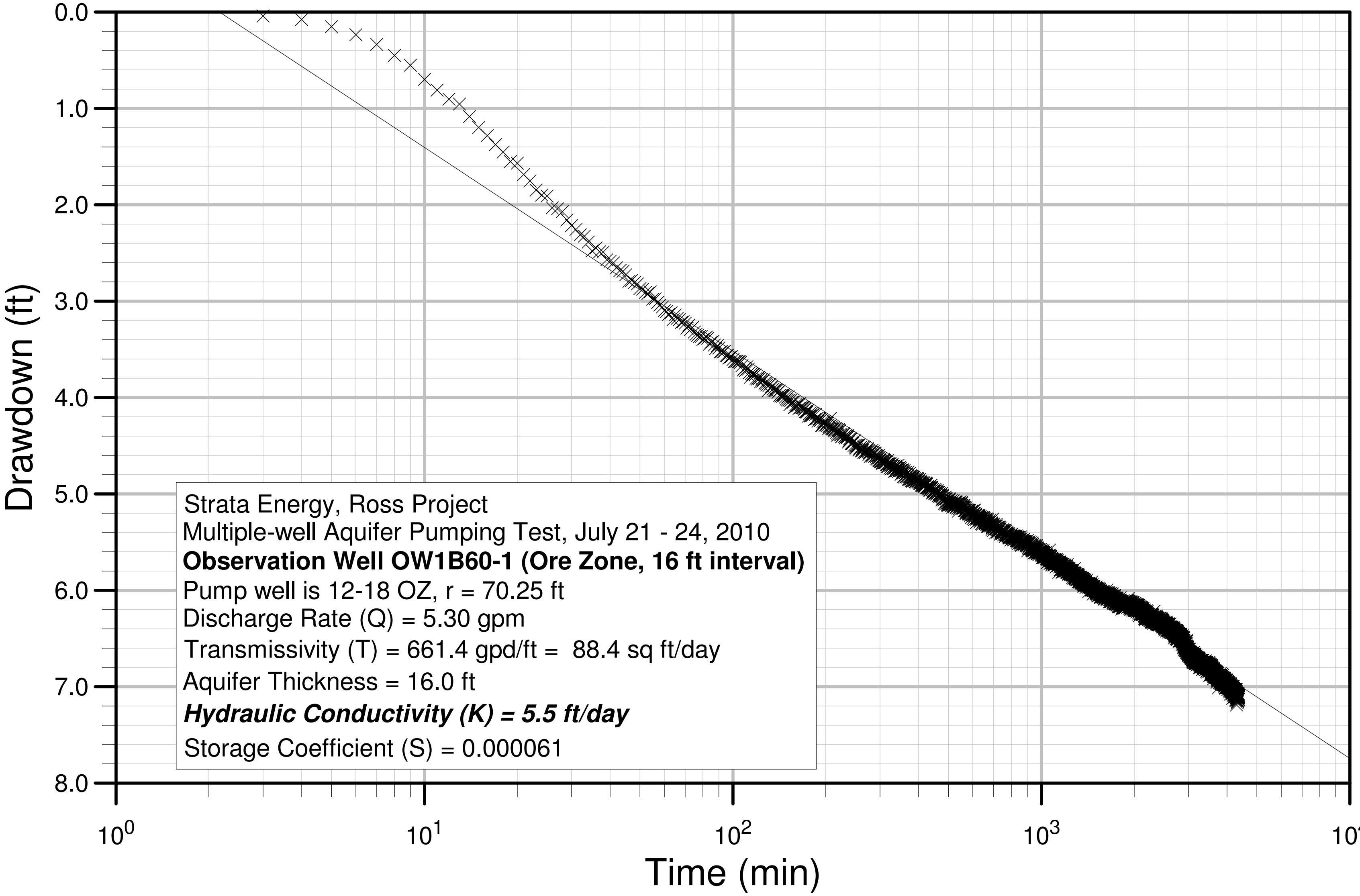
Hantush, 1961 (Confined Partial Penetration Method)

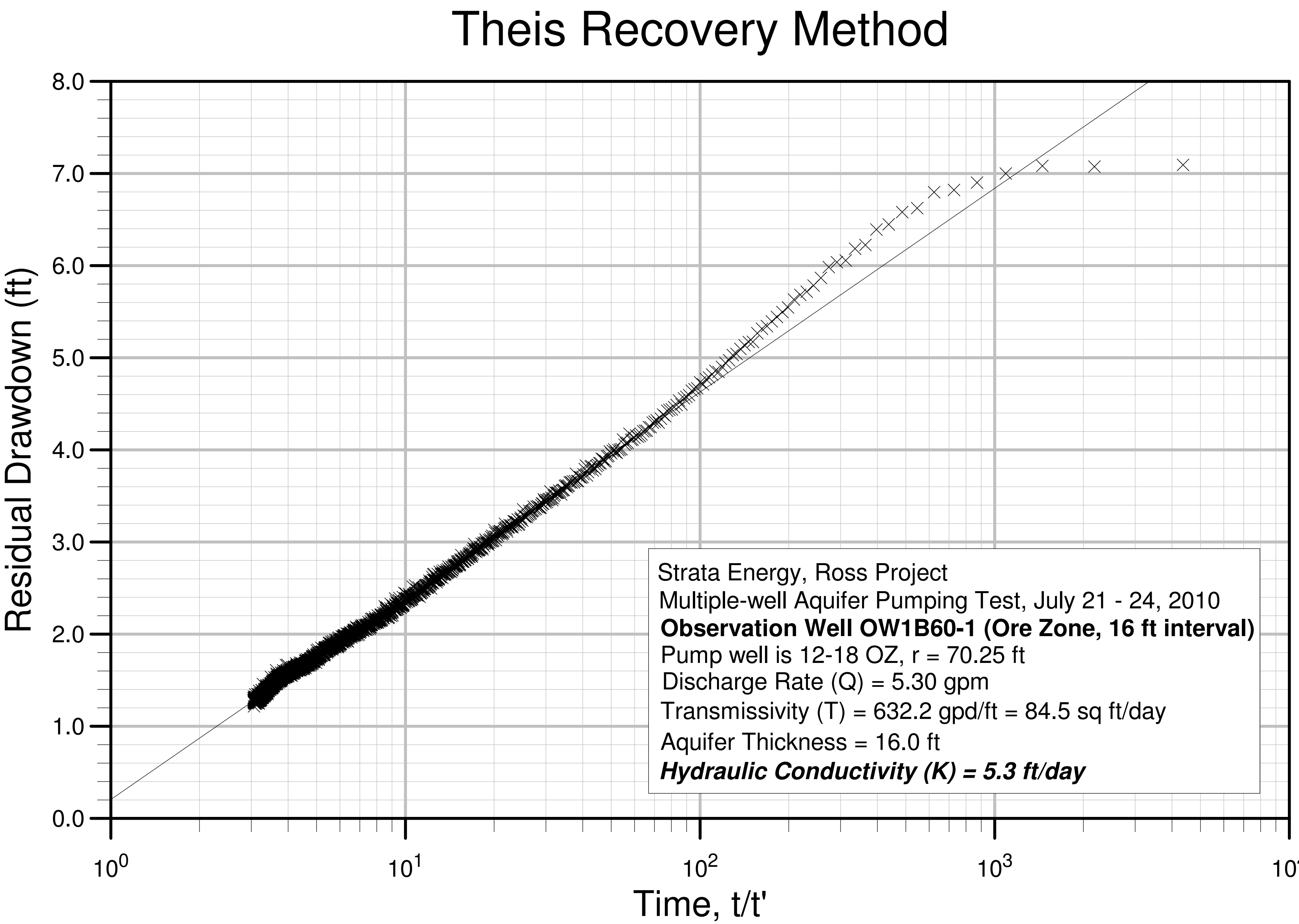


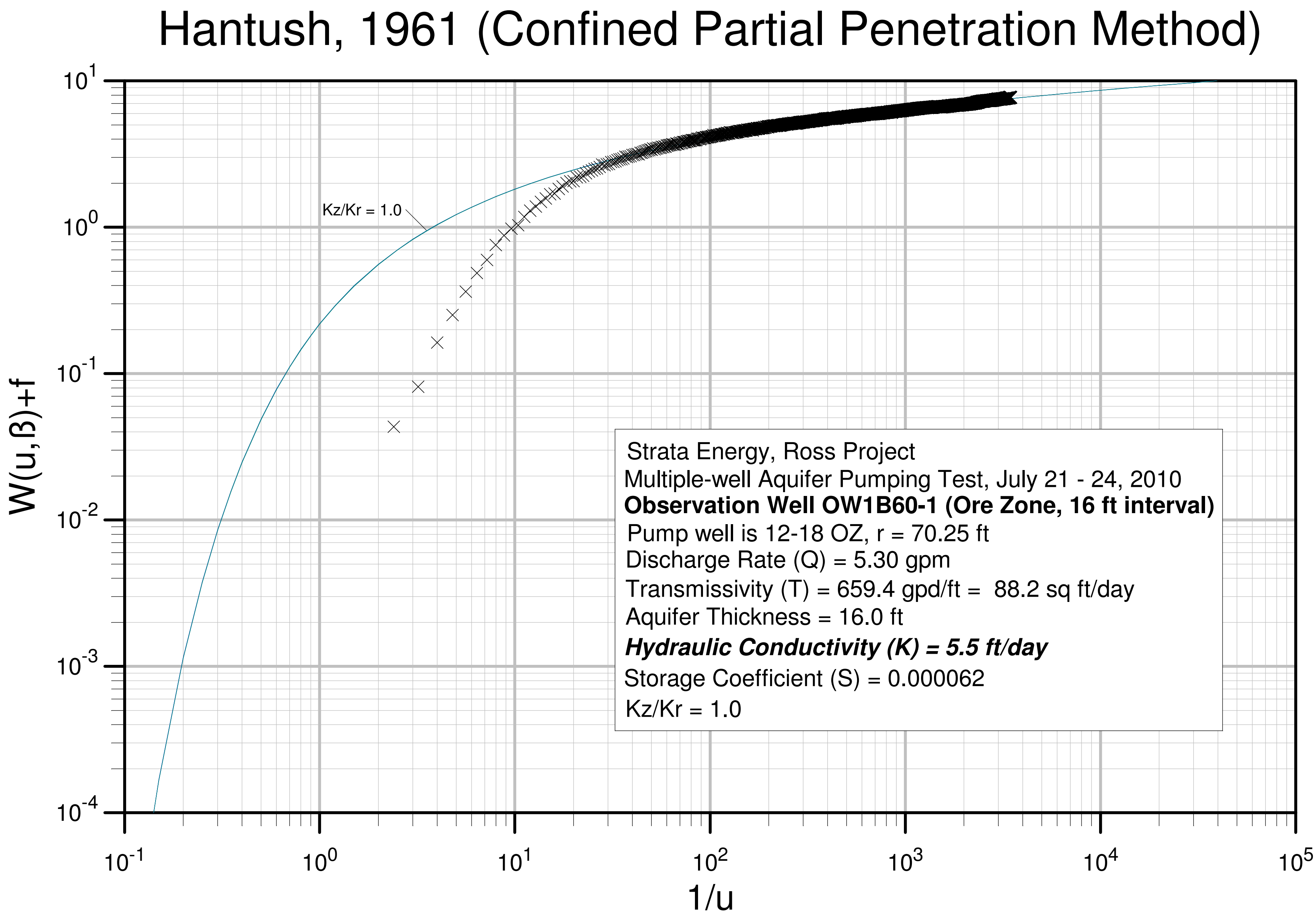
Drawdown and Recovery, Obs. Well OW1B60-1



Cooper Jacob Straight Line Method

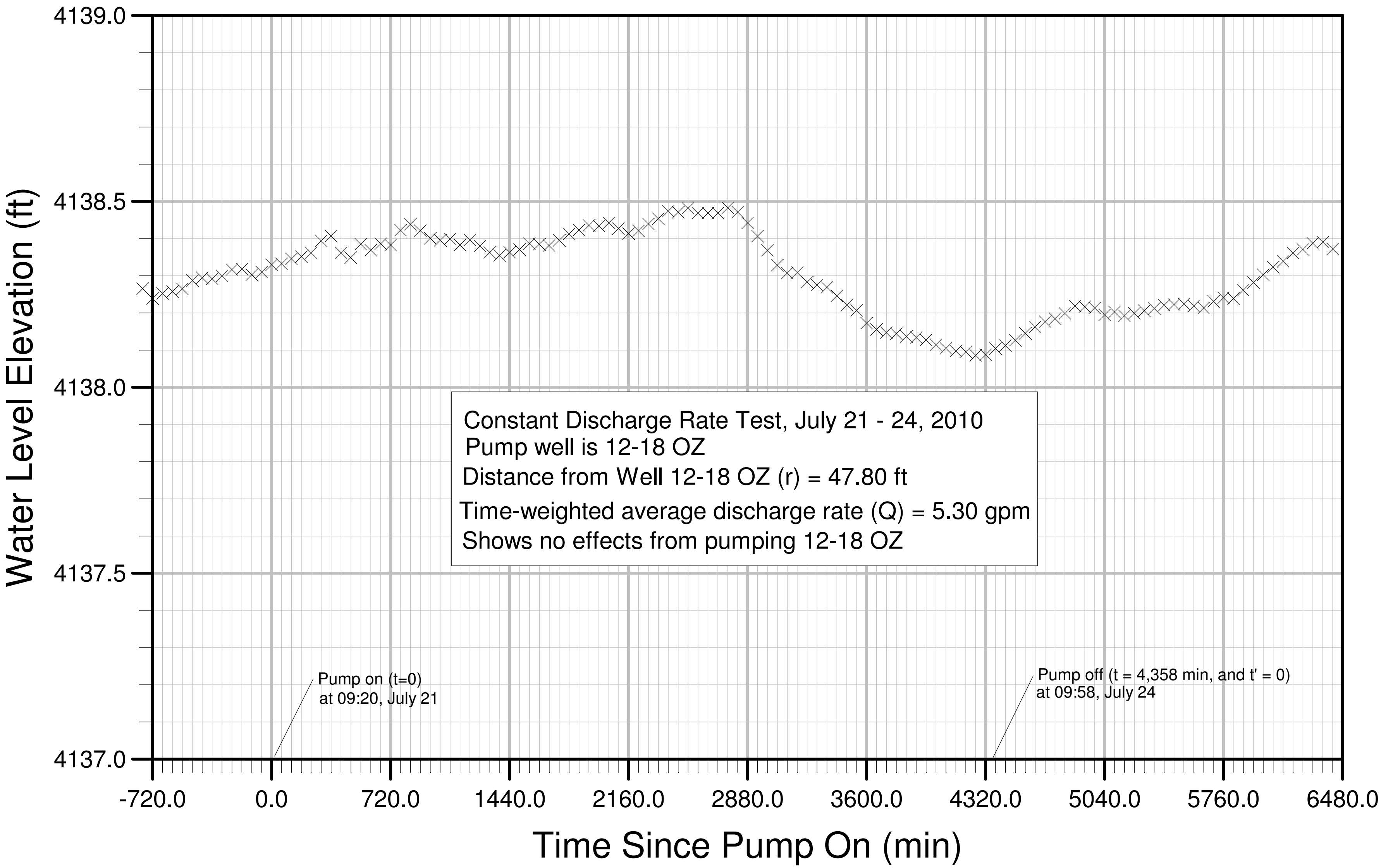



Theis Recovery Method
Residual Drawdown (ft)
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
10^0
10^1
10^2
10^3
10^4
Time, t/t'
Strata Energy, Ross Project
Multiple-well Aquifer Pumping Test, July 21 - 24, 2010
Observation Well OW1B60-1 (Ore Zone, 16 ft interval)
Pump well is 12-18 OZ, r = 70.25 ft
Discharge Rate (Q) = 5.30 gpm
Transmissivity (T) = 632.2 gpd/ft = 84.5 sq ft/day
Aquifer Thickness = 16.0 ft
Hydraulic Conductivity (K) = 5.3 ft/day

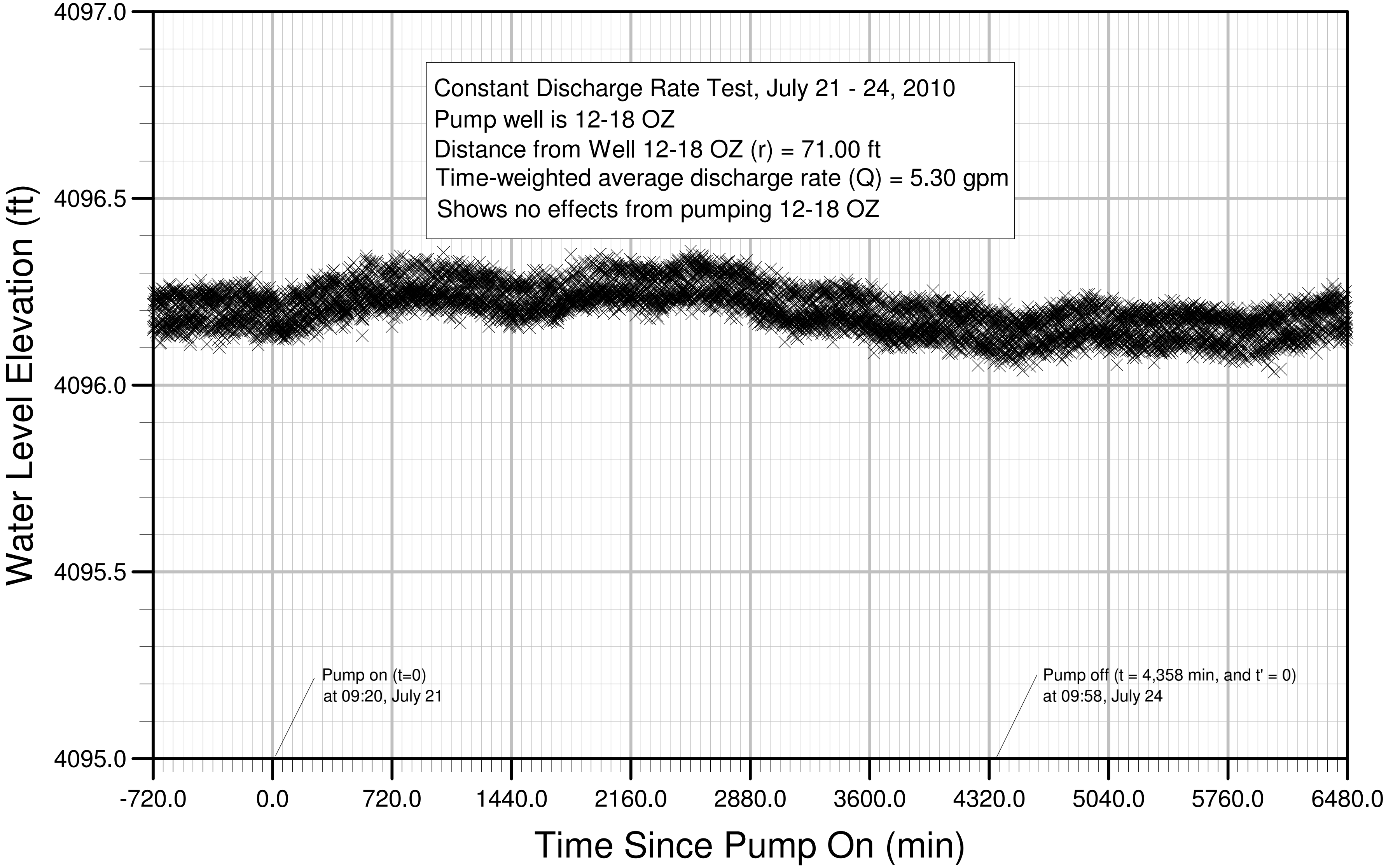


Hantush, 1961 (Confined Partial Penetration Method)
W(u,β)+f
1/u
Kz/Kr = 1.0
Strata Energy, Ross Project
Multiple-well Aquifer Pumping Test, July 21 - 24, 2010
Observation Well OW1B60-1 (Ore Zone, 16 ft interval)
Pump well is 12-18 OZ, r = 70.25 ft
Discharge Rate (Q) = 5.30 gpm
Transmissivity (T) = 659.4 gpd/ft = 88.2 sq ft/day
Aquifer Thickness = 16.0 ft
Hydraulic Conductivity (K) = 5.5 ft/day
Storage Coefficient (S) = 0.000062
Kz/Kr = 1.0

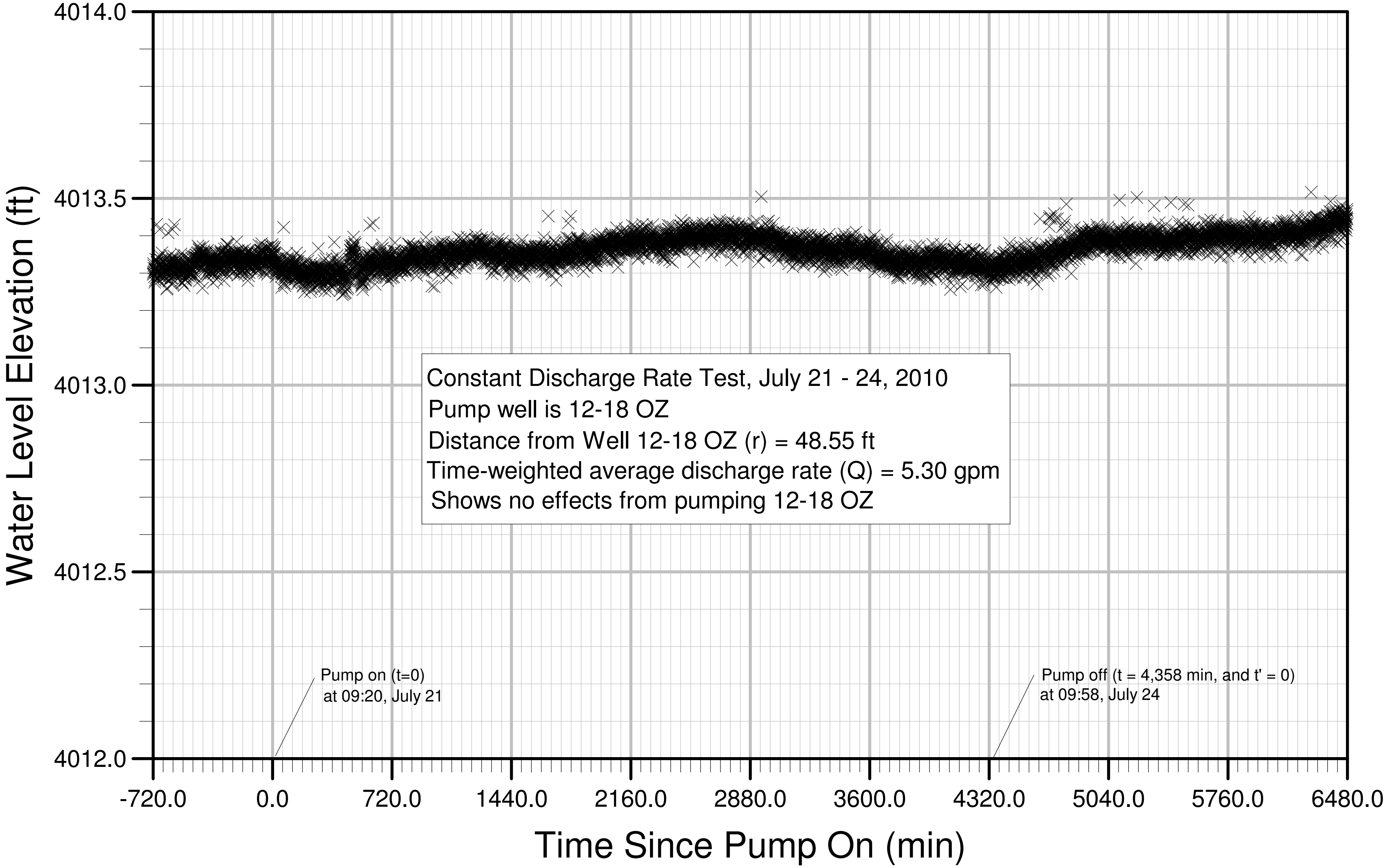
Hydrograph of Observation Well 12-18 SA



Hydrograph of Observation Well 12-18 SM



Hydrograph of Observation Well 12-18 DM



Appendix 7
12-18 Well Cluster
(OW1B57-1 Pumping Well)
July 27, 2010 Aquifer Test
Field Data Form and
Plots of Time-Drawdown and Analyses

AQUIFER TEST FIELD DATA

Project/Client ROSS/STRATA ENERGY

Pumped Well No. OW1B57-1 Observation Well No's.

12-18 SA	12-18 OZ
12-18 SM	OW1B58-1
12-18 DM	OW1B60-1

Type of Pump Test: ☒ Constant Discharge ☐ Step-Drawdown

Pumped Well Casing ID 5.0 inches

Distance Between Pumped and Observation Wells * feet

* 12-18 SA = 114.00', 12-18 SM = 107.10', 12-18 DM = 60.30', 12-18 OZ = 71.00',

OW1B58-1 = 102.20', OW1B60-1 = 141.20'

Water Level Measurements by: ☐ electric tape and ☒ pressure transducer

Discharge Measurements by: ☒ bucket/stopwatch ☐ flow meter ☐ flume/weir

Screen/Perforation Interval(s) (below land surface) 529' – 536'

Depth of Pump Intake (below land surface) 400 feet

Depth of Static Water Level (above transducer) 220.32 feet

Height of Measurement Point (above land surface) N/A feet

Elevation of Measurement Point N/A feet a.m.s.l.

Pump On Date 07 / 27 / 2010 Time 1205 AM/PM

Pump Off Date 07 / 28 / 2010 Time 1209 AM/PM

Weather Conditions Dry, calm, clear 70's ° F

Test Performed by Fuller

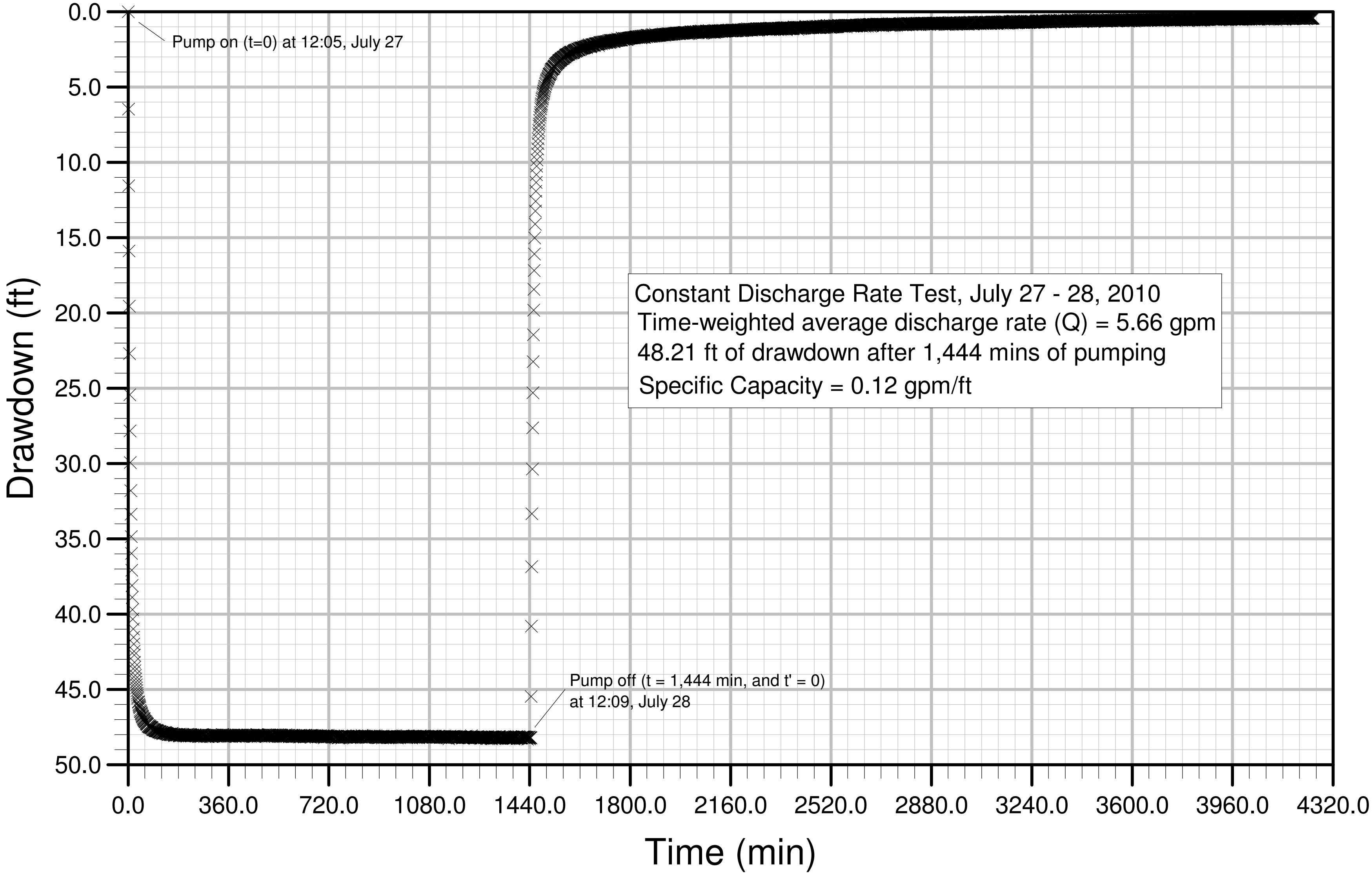
WWC ENGINEERING

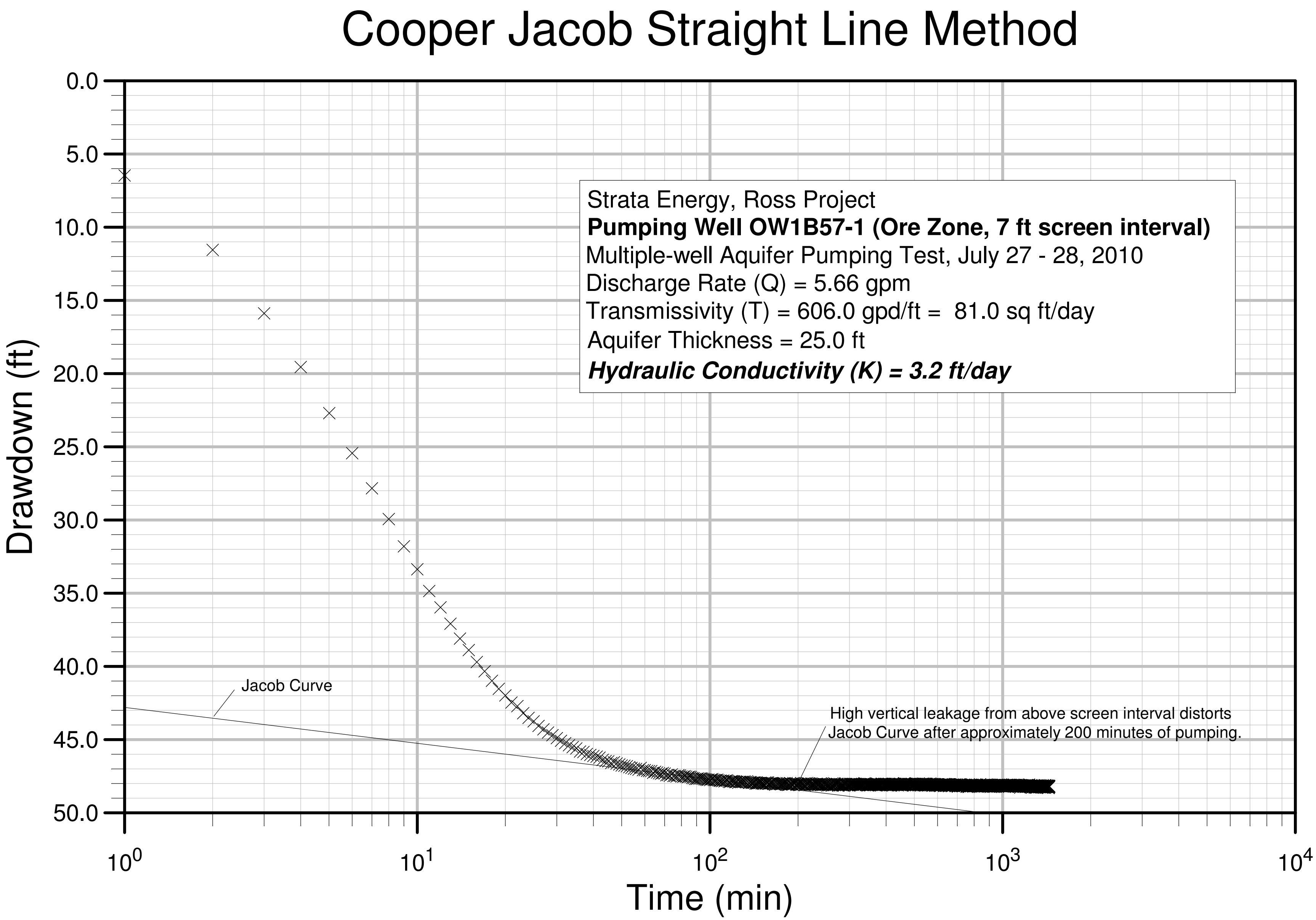
AQUIFER TEST FIELD DATA

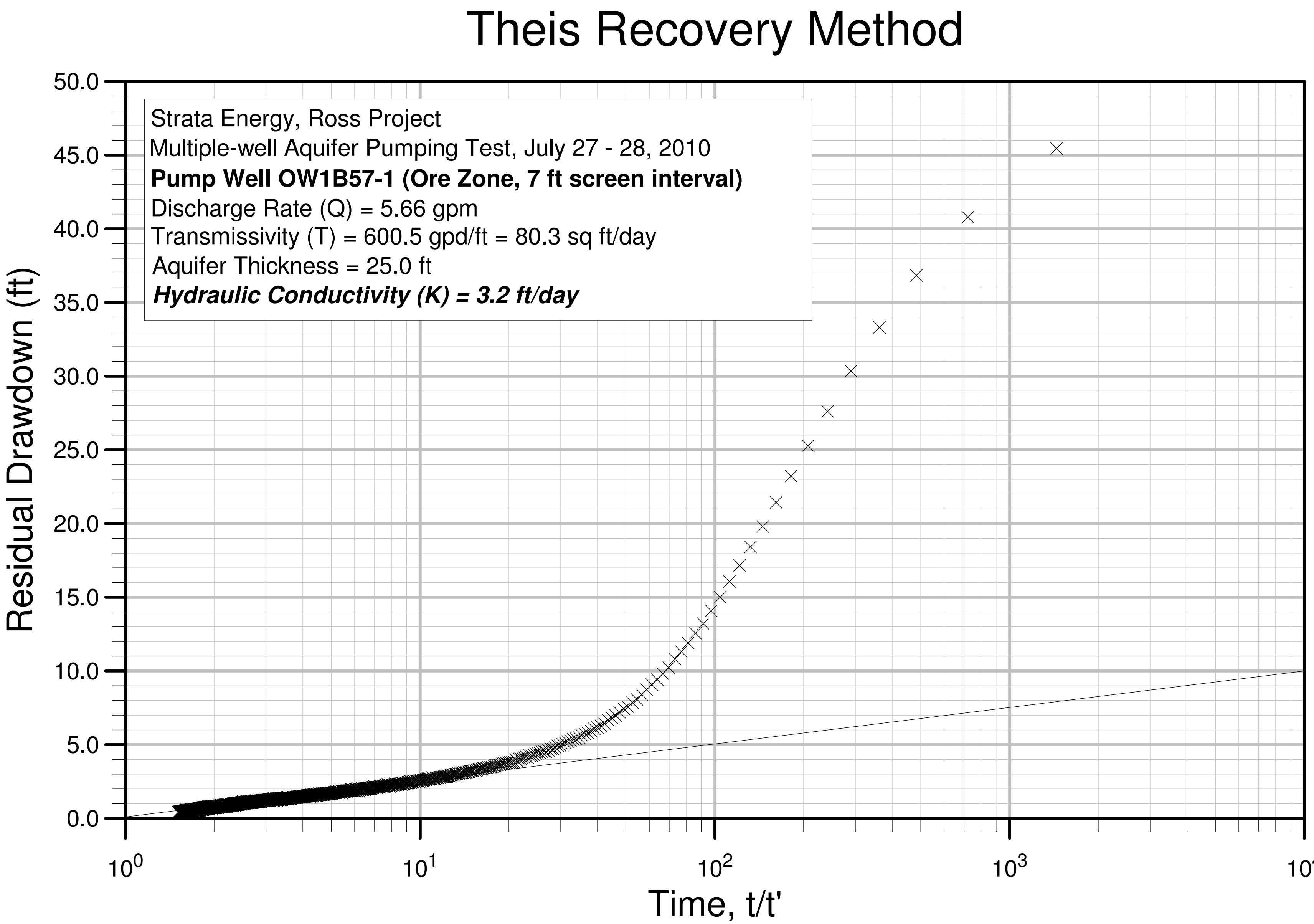
Project/Client ROSS/STRATA ENERGY Well No. OW1B57-1

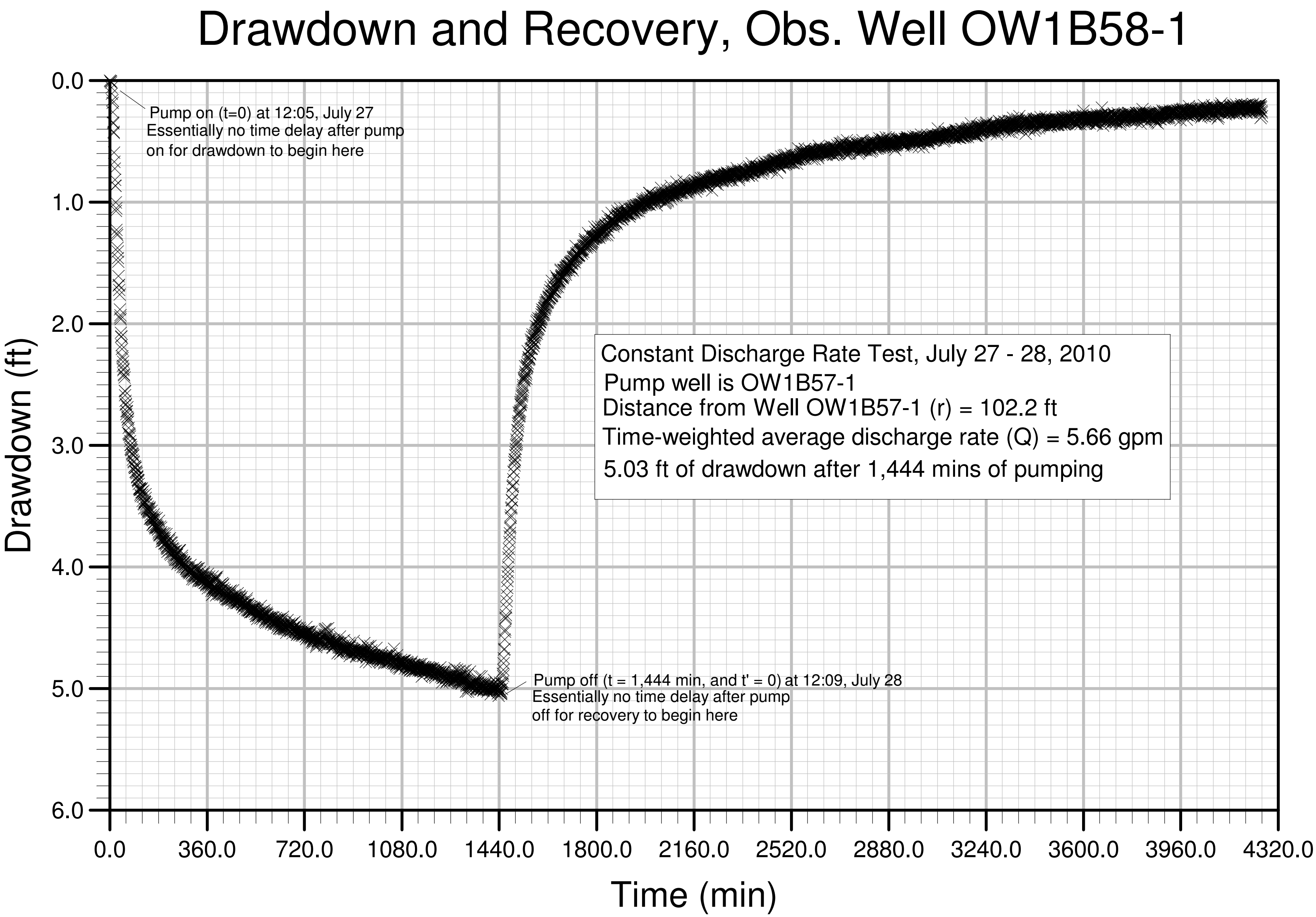
TIME			WATER LEVEL DATA			
Date	Clock Time	(**t**) Elapsed Time Since Pump ON or OFF (min)	Depth of Water Above Transducer (ft)	(**s**) Drawdown/ Recovery (ft)	(**Q**) Discharge (gpm)	COMMENTS
7-27-10	1205	ON, 0	220.32	0		*Depth of water over transducer
	1206	1	213.86	6.46	5.7	5 gal/53 sec., 75 psi
	1208	3	204.44	15.88		
	1210	5	197.63	22.69	5.7	5 gal/53 sec., 73 psi
	1230	25	176.58	43.74	5.8	5 gal/52 sec., 75 psi
	1250	45	173.85	46.47		
	1350	60	173.25	47.07	5.8	5 gal/52 sec., 75 psi
	1500	175	172.27	48.05		
	1700	295	172.27	48.05	5.7	5 gal/53 sec.,75 psi
	1800	355	172.28	48.04	5.7	5 gal/53 sec., 75 psi
7-28-10	0900	1255	172.16	48.16	5.7	5 gal/53 sec., 75 psi
	1030	1345	172.11	48.21	5.7	5 gal/53 sec., 75 psi
	1209	OFF, 1444	172.11	48.21	5.7	Water quality sample collected
						Recover data recorded by pressure transducer

Drawdown and Recovery, Pump Well OW1B57-1

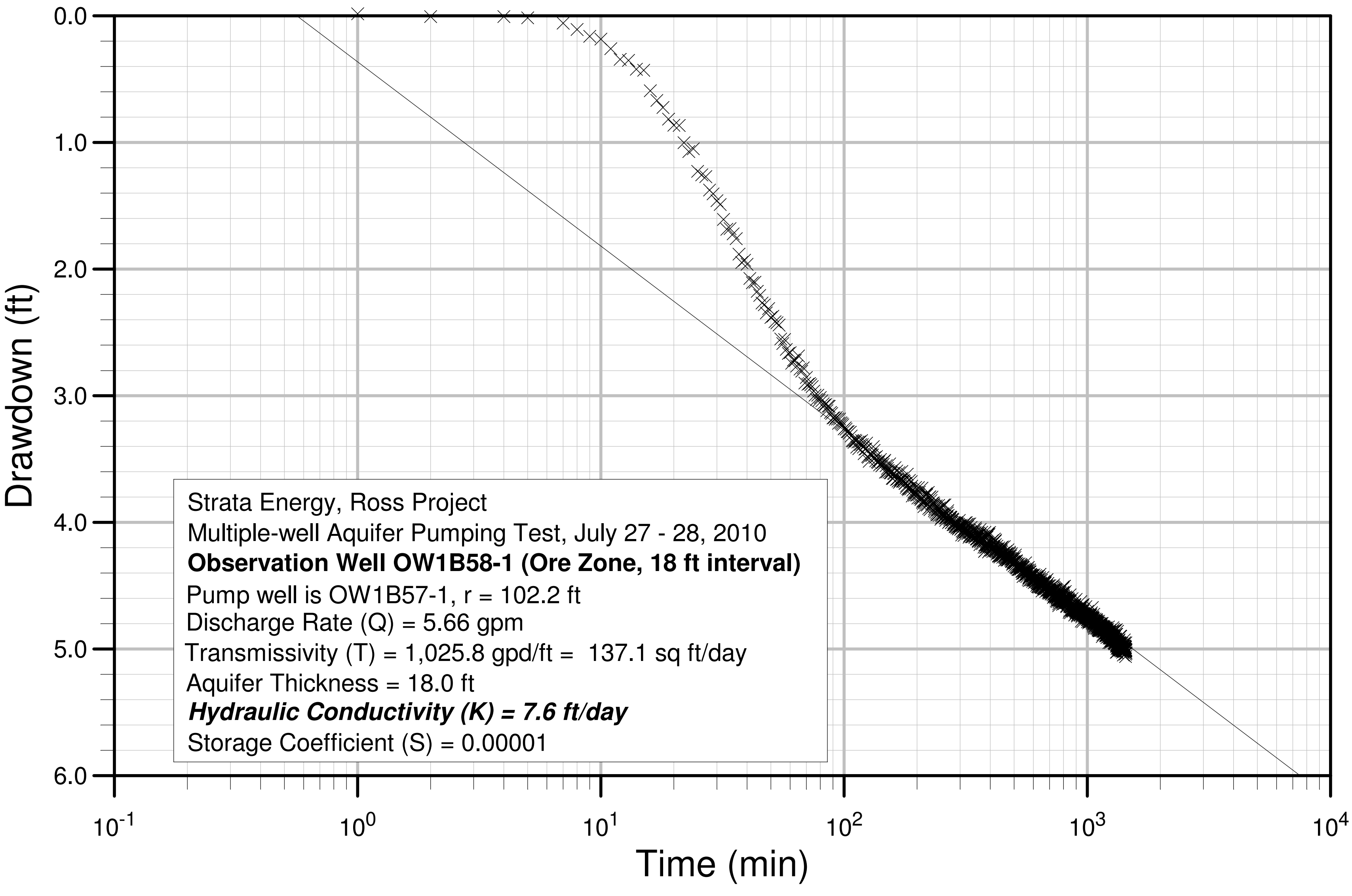


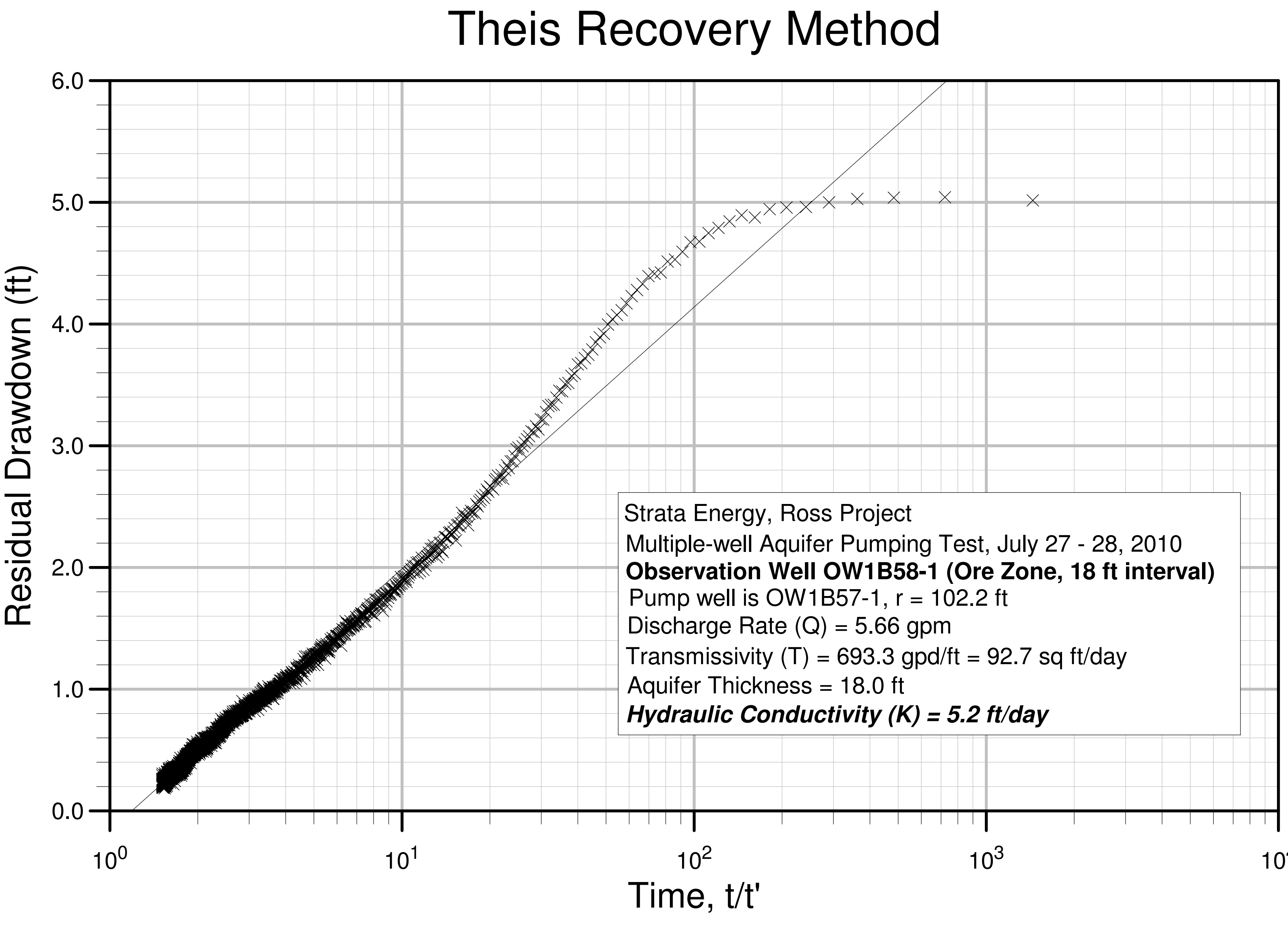

Cooper Jacob Straight Line Method
Strata Energy, Ross Project
Pumping Well OW1B57-1 (Ore Zone, 7 ft screen interval)
Multiple-well Aquifer Pumping Test, July 27 - 28, 2010
Discharge Rate (Q) = 5.66 gpm
Transmissivity (T) = 606.0 gpd/ft = 81.0 sq ft/day
Aquifer Thickness = 25.0 ft
Hydraulic Conductivity (K) = 3.2 ft/day
Jacob Curve
High vertical leakage from above screen interval distorts
Jacob Curve after approximately 200 minutes of pumping.
Drawdown (ft)
Time (min)
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
10^0
10^1
10^2
10^3
10^4


Theis Recovery Method
Strata Energy, Ross Project
Multiple-well Aquifer Pumping Test, July 27 - 28, 2010
Pump Well OW1B57-1 (Ore Zone, 7 ft screen interval)
Discharge Rate (Q) = 5.66 gpm
Transmissivity (T) = 600.5 gpd/ft = 80.3 sq ft/day
Aquifer Thickness = 25.0 ft
Hydraulic Conductivity (K) = 3.2 ft/day
Residual Drawdown (ft)
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
10^0
10^1
10^2
10^3
10^4
Time, t/t'

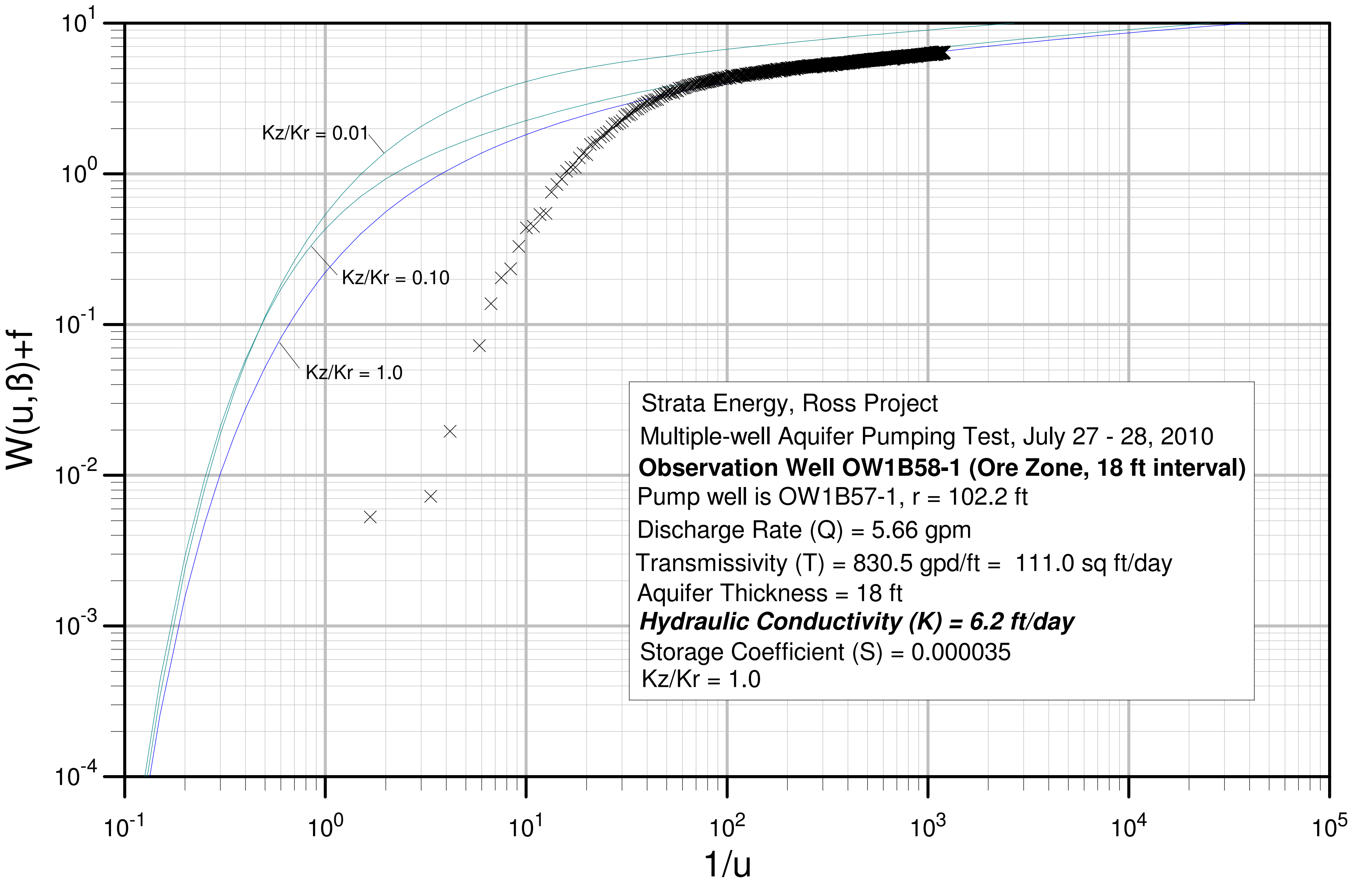

Drawdown and Recovery, Obs. Well OW1B58-1
Drawdown (ft)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
Time (min)
0.0
360.0
720.0
1080.0
1440.0
1800.0
2160.0
2520.0
2880.0
3240.0
3600.0
3960.0
4320.0
Pump on (t=0) at 12:05, July 27
Essentially no time delay after pump
on for drawdown to begin here
Constant Discharge Rate Test, July 27 - 28, 2010
Pump well is OW1B57-1
Distance from Well OW1B57-1 (r) = 102.2 ft
Time-weighted average discharge rate (Q) = 5.66 gpm
5.03 ft of drawdown after 1,444 mins of pumping
Pump off (t = 1,444 min, and t' = 0) at 12:09, July 28
Essentially no time delay after pump
off for recovery to begin here

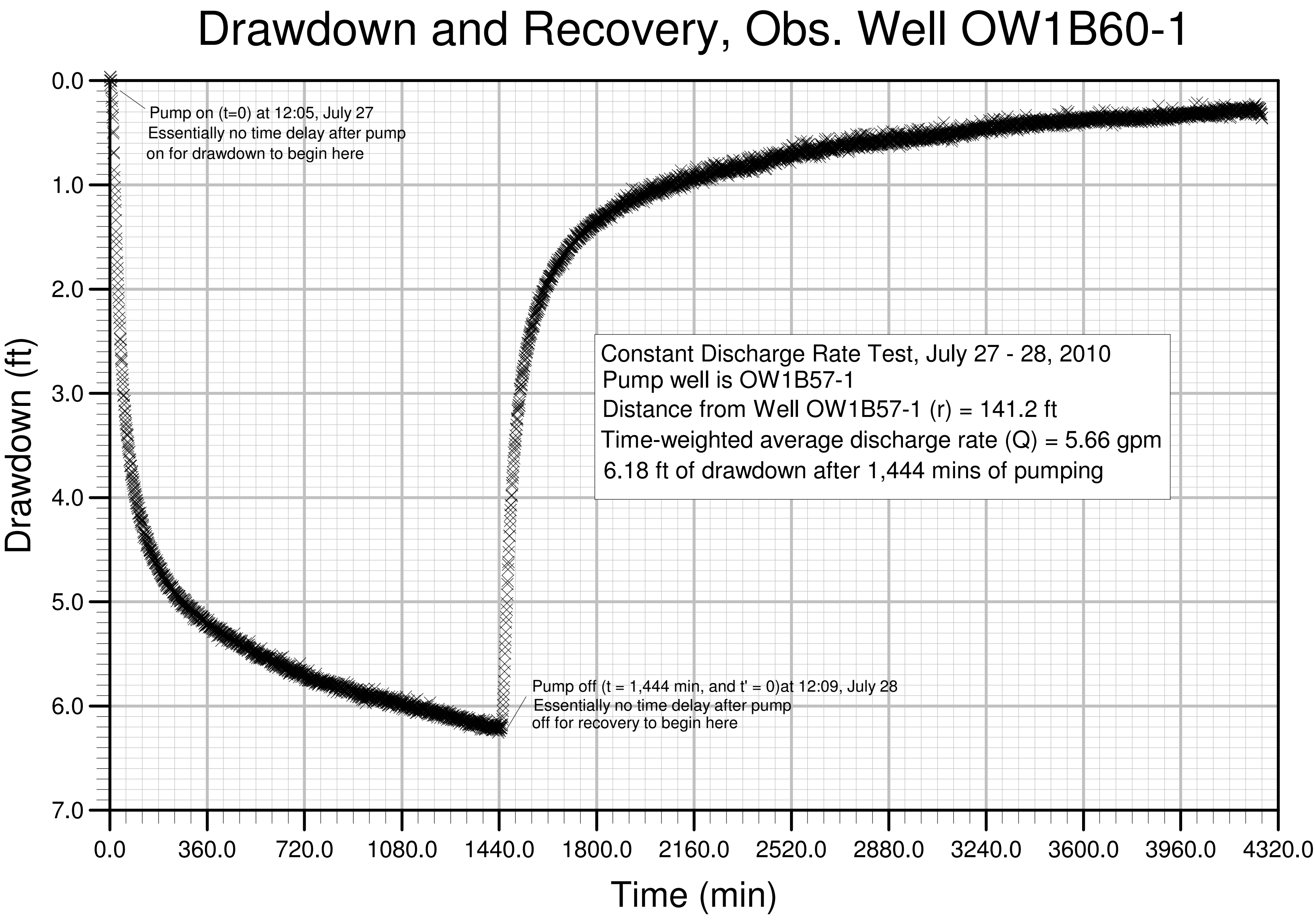
Cooper Jacob Straight Line Method



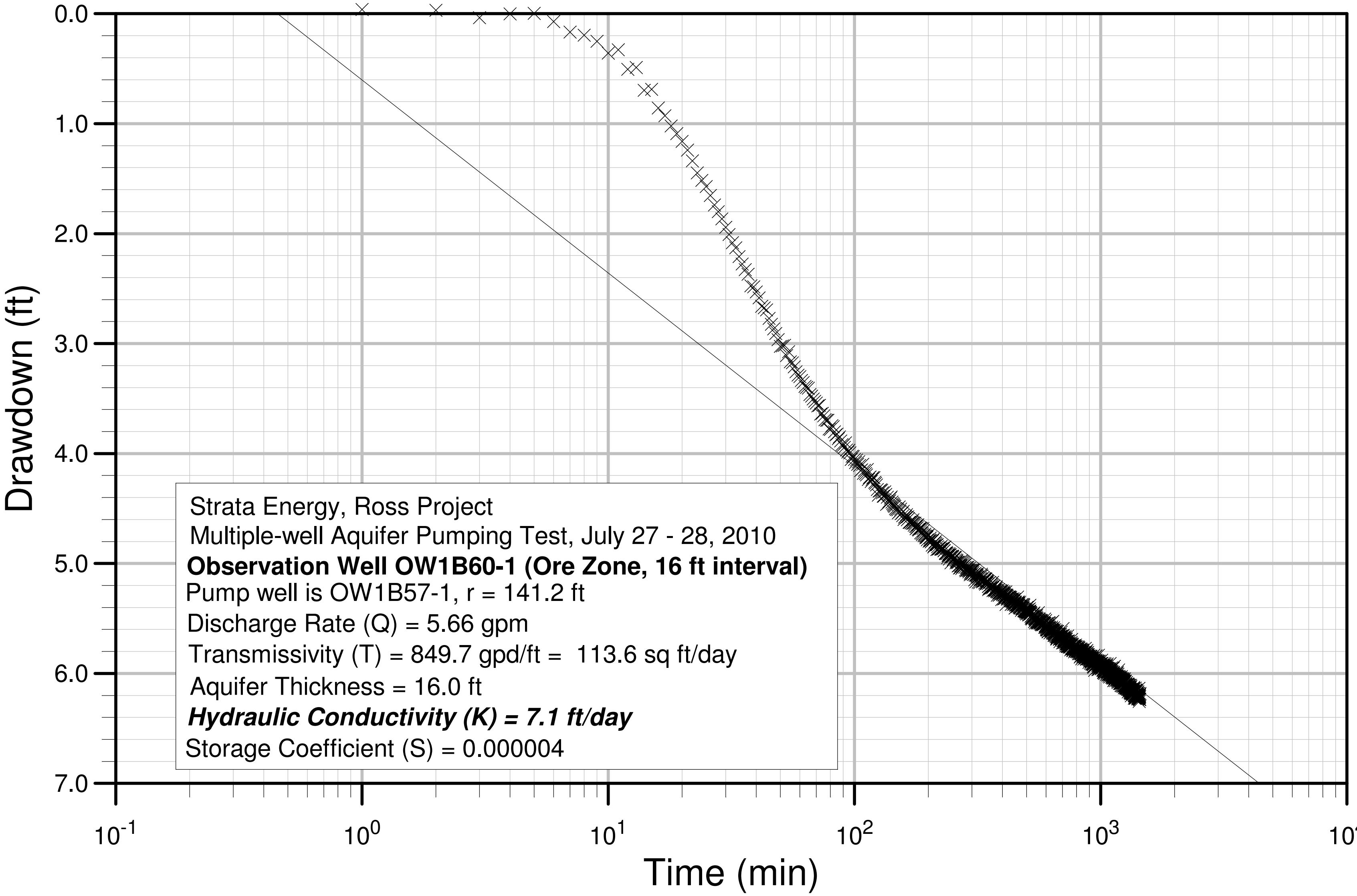

Theis Recovery Method
Residual Drawdown (ft)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
10^0
10^1
10^2
10^3
10^4
Time, t/t'
Strata Energy, Ross Project
Multiple-well Aquifer Pumping Test, July 27 - 28, 2010
Observation Well OW1B58-1 (Ore Zone, 18 ft interval)
Pump well is OW1B57-1, r = 102.2 ft
Discharge Rate (Q) = 5.66 gpm
Transmissivity (T) = 693.3 gpd/ft = 92.7 sq ft/day
Aquifer Thickness = 18.0 ft
Hydraulic Conductivity (K) = 5.2 ft/day

Hantush, 1961 (Confined Partial Penetration Method)

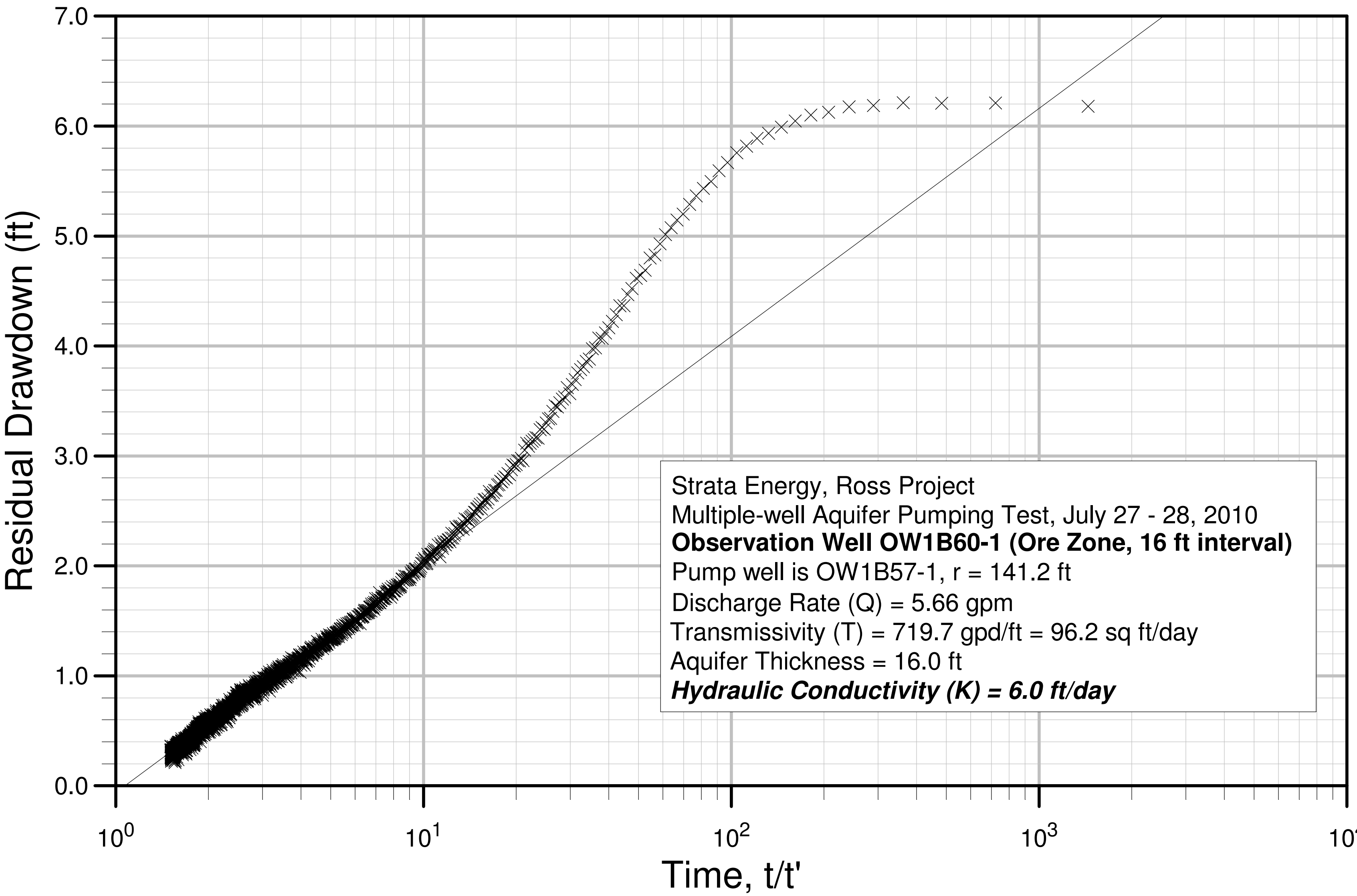



Drawdown and Recovery, Obs. Well OW1B60-1
Drawdown (ft)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
Time (min)
0.0
360.0
720.0
1080.0
1440.0
1800.0
2160.0
2520.0
2880.0
3240.0
3600.0
3960.0
4320.0
Pump on (t=0) at 12:05, July 27
Essentially no time delay after pump
on for drawdown to begin here
Constant Discharge Rate Test, July 27 - 28, 2010
Pump well is OW1B57-1
Distance from Well OW1B57-1 (r) = 141.2 ft
Time-weighted average discharge rate (Q) = 5.66 gpm
6.18 ft of drawdown after 1,444 mins of pumping
Pump off (t = 1,444 min, and t' = 0)at 12:09, July 28
Essentially no time delay after pump
off for recovery to begin here

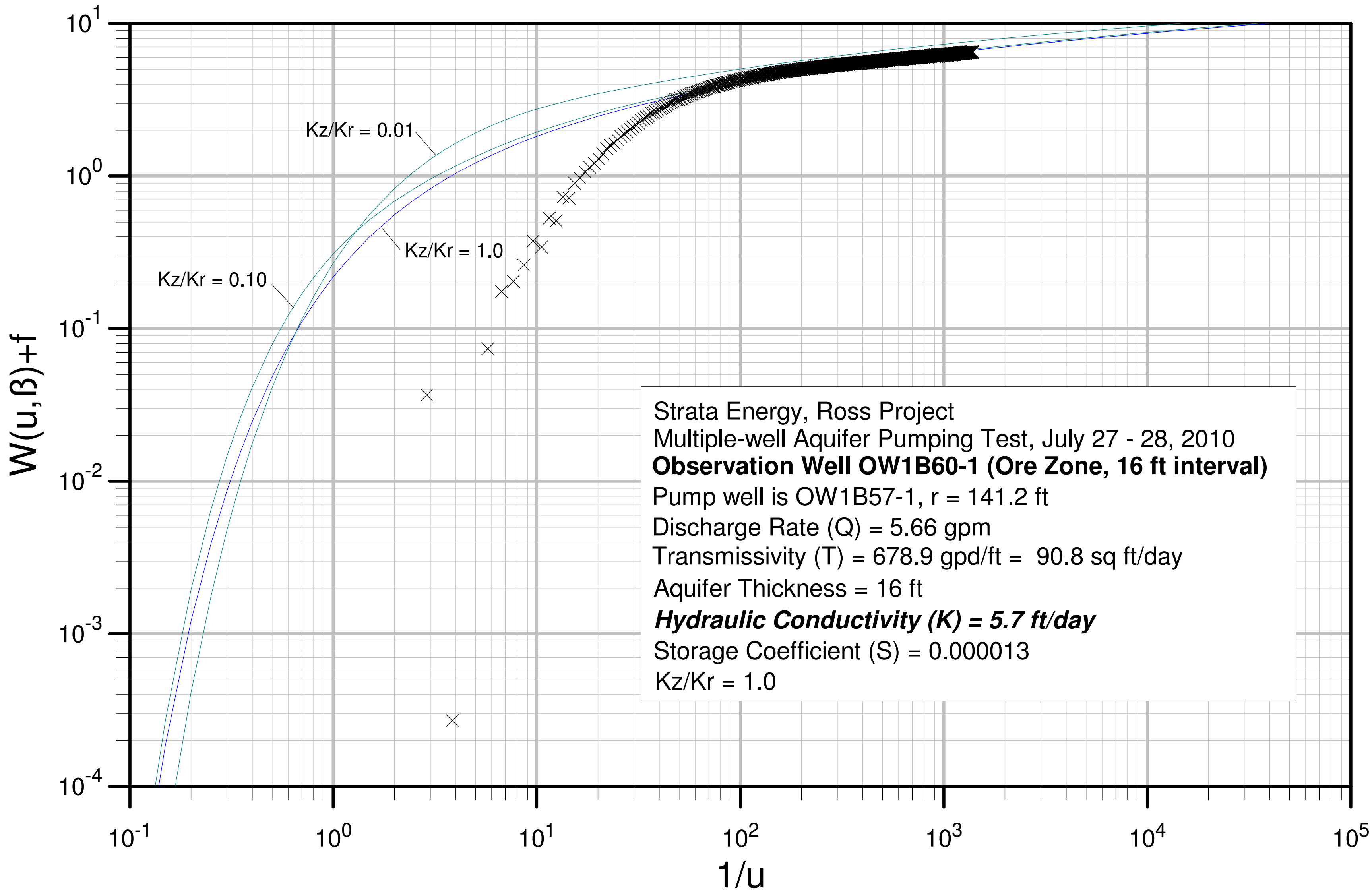
Cooper Jacob Straight Line Method

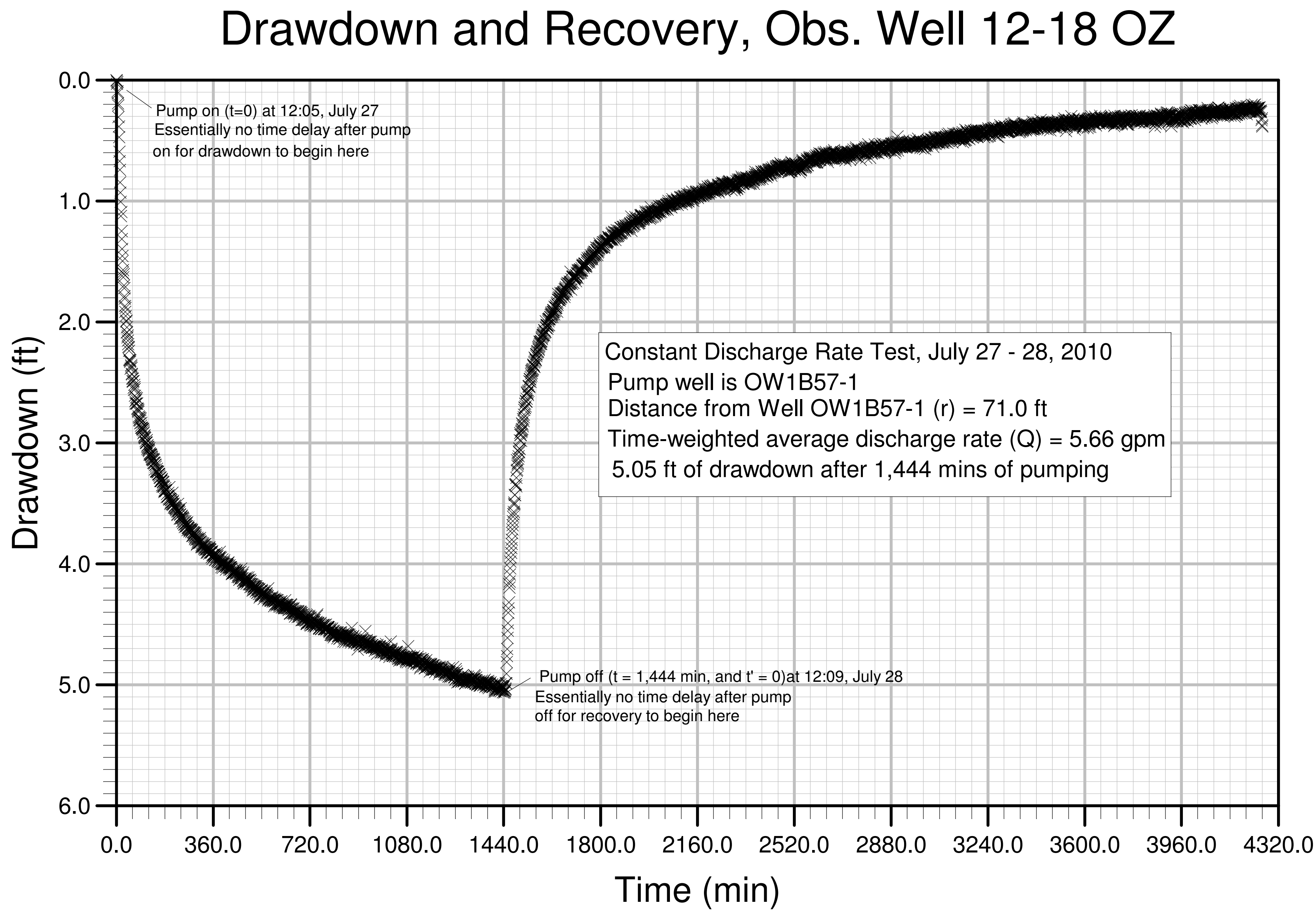


Theis Recovery Method

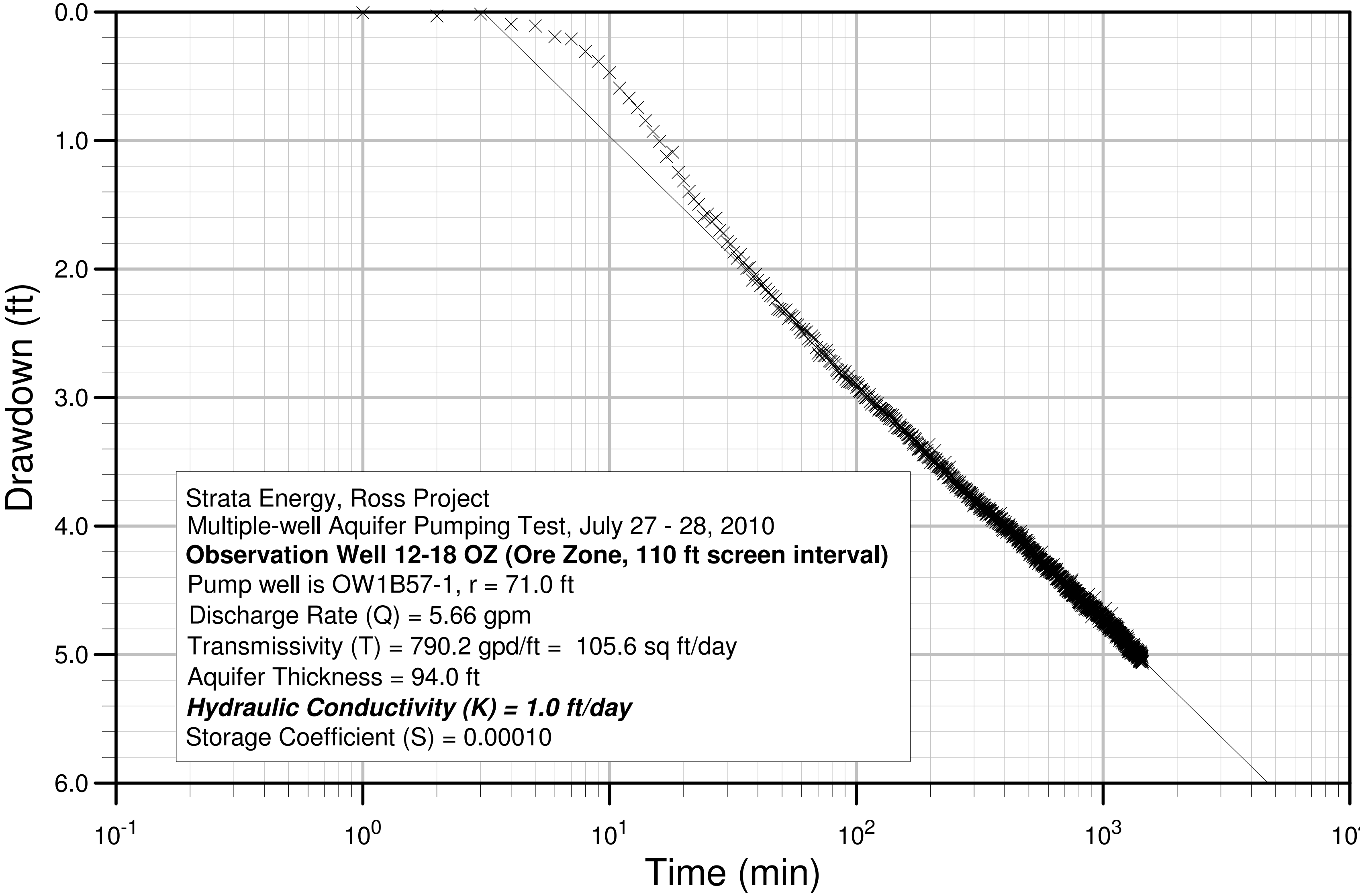


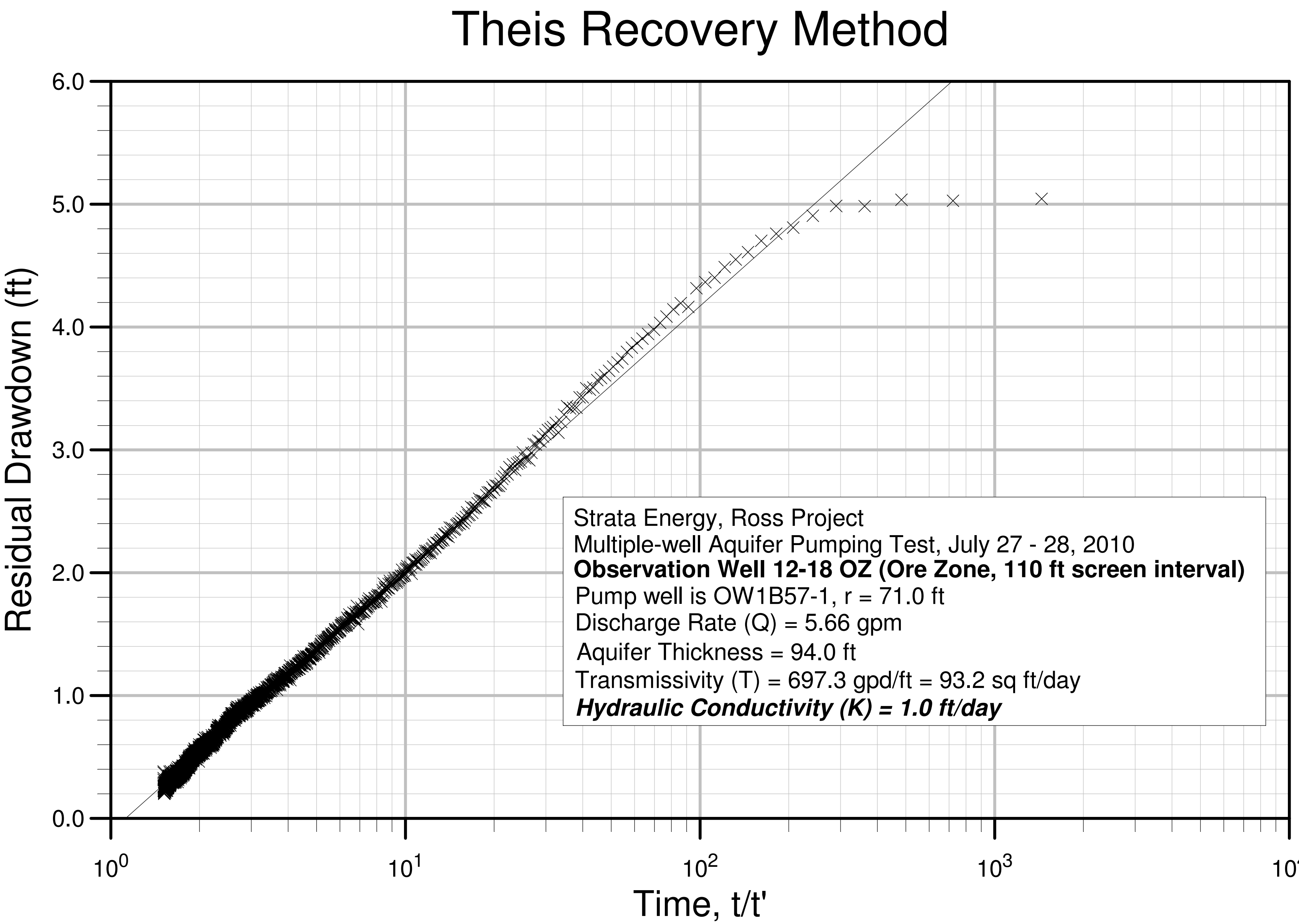
Hantush, 1961 (Confined Partial Penetration Method)



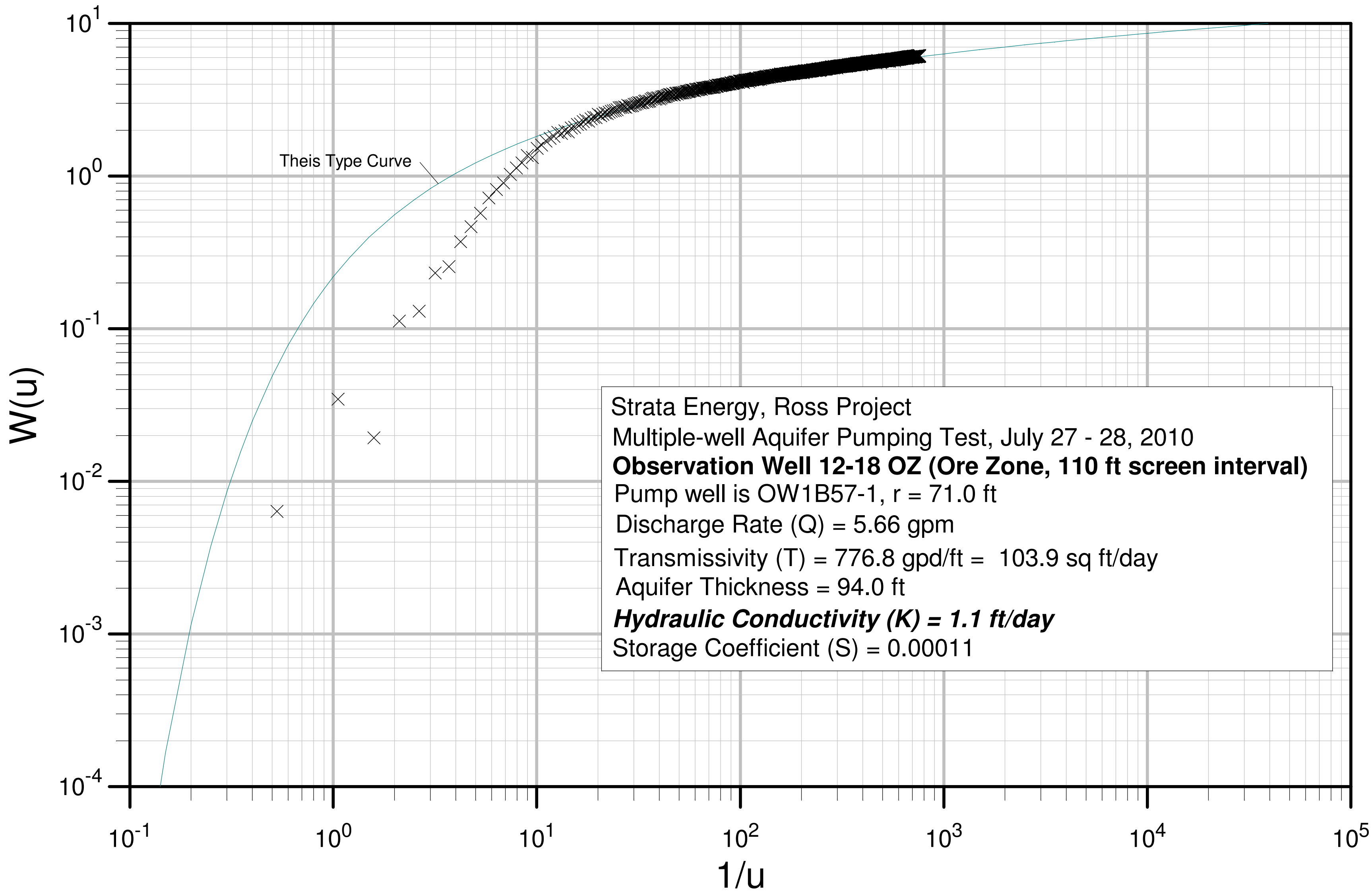

Drawdown and Recovery, Obs. Well 12-18 OZ
Drawdown (ft)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
Time (min)
0.0
360.0
720.0
1080.0
1440.0
1800.0
2160.0
2520.0
2880.0
3240.0
3600.0
3960.0
4320.0
Pump on (t=0) at 12:05, July 27
Essentially no time delay after pump
on for drawdown to begin here
Pump off (t = 1,444 min, and t' = 0)at 12:09, July 28
Essentially no time delay after pump
off for recovery to begin here
Constant Discharge Rate Test, July 27 - 28, 2010
Pump well is OW1B57-1
Distance from Well OW1B57-1 (r) = 71.0 ft
Time-weighted average discharge rate (Q) = 5.66 gpm
5.05 ft of drawdown after 1,444 mins of pumping

Cooper Jacob Straight Line Method

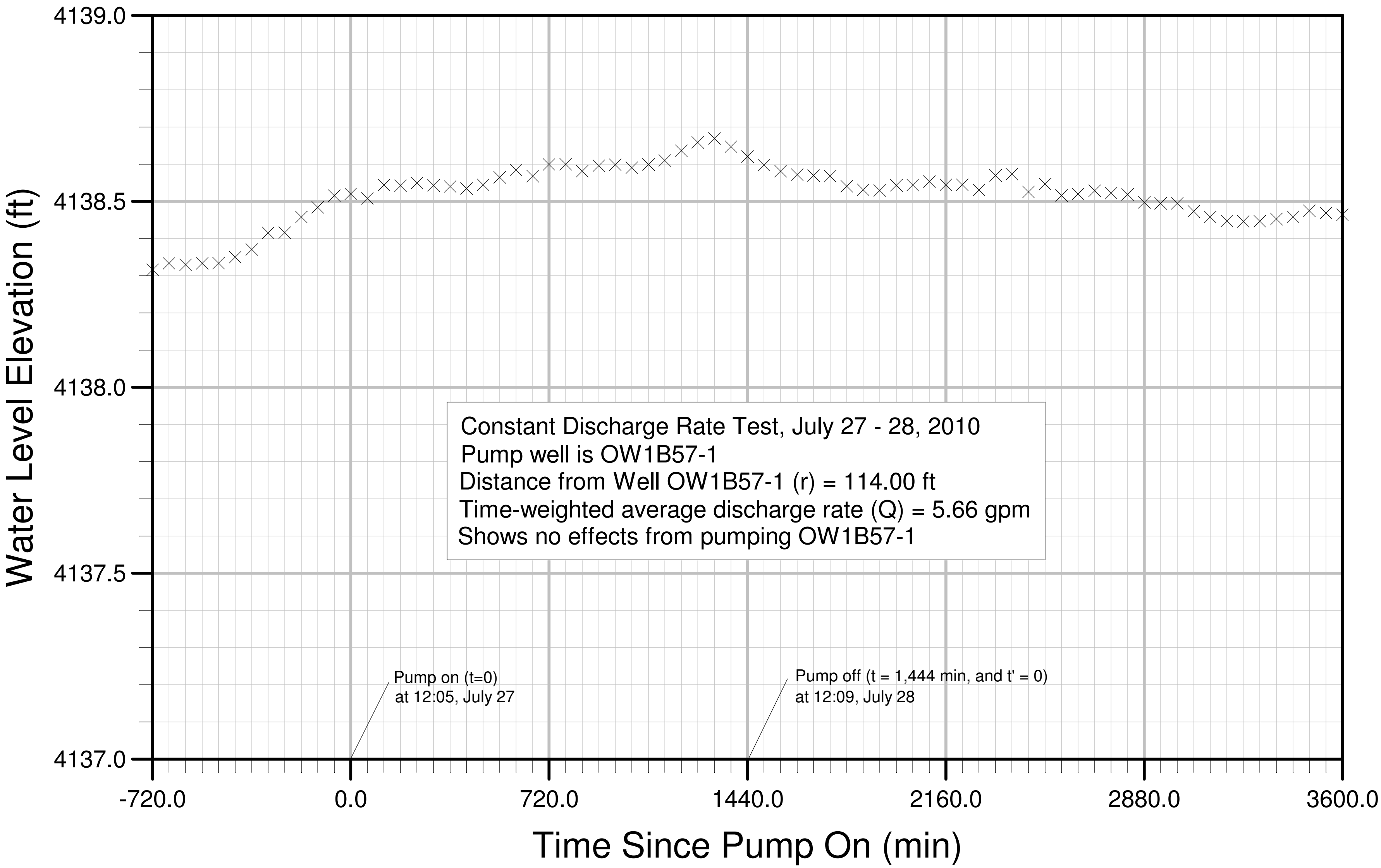


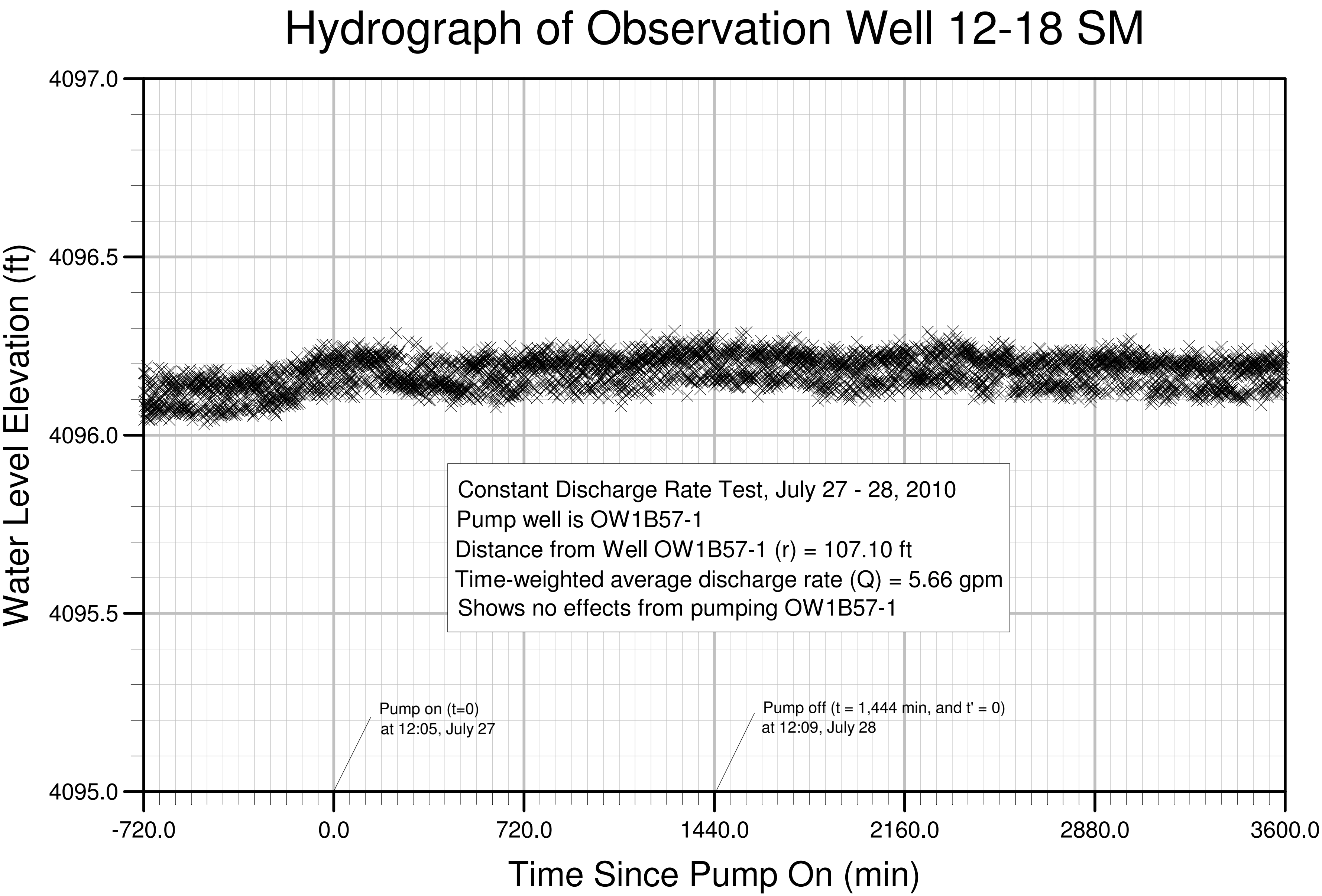

Theis Recovery Method
Residual Drawdown (ft)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
10^0
10^1
10^2
10^3
10^4
Time, t/t'
Strata Energy, Ross Project
Multiple-well Aquifer Pumping Test, July 27 - 28, 2010
Observation Well 12-18 OZ (Ore Zone, 110 ft screen interval)
Pump well is OW1B57-1, r = 71.0 ft
Discharge Rate (Q) = 5.66 gpm
Aquifer Thickness = 94.0 ft
Transmissivity (T) = 697.3 gpd/ft = 93.2 sq ft/day
Hydraulic Conductivity (K) = 1.0 ft/day

Theis Method (Confined)

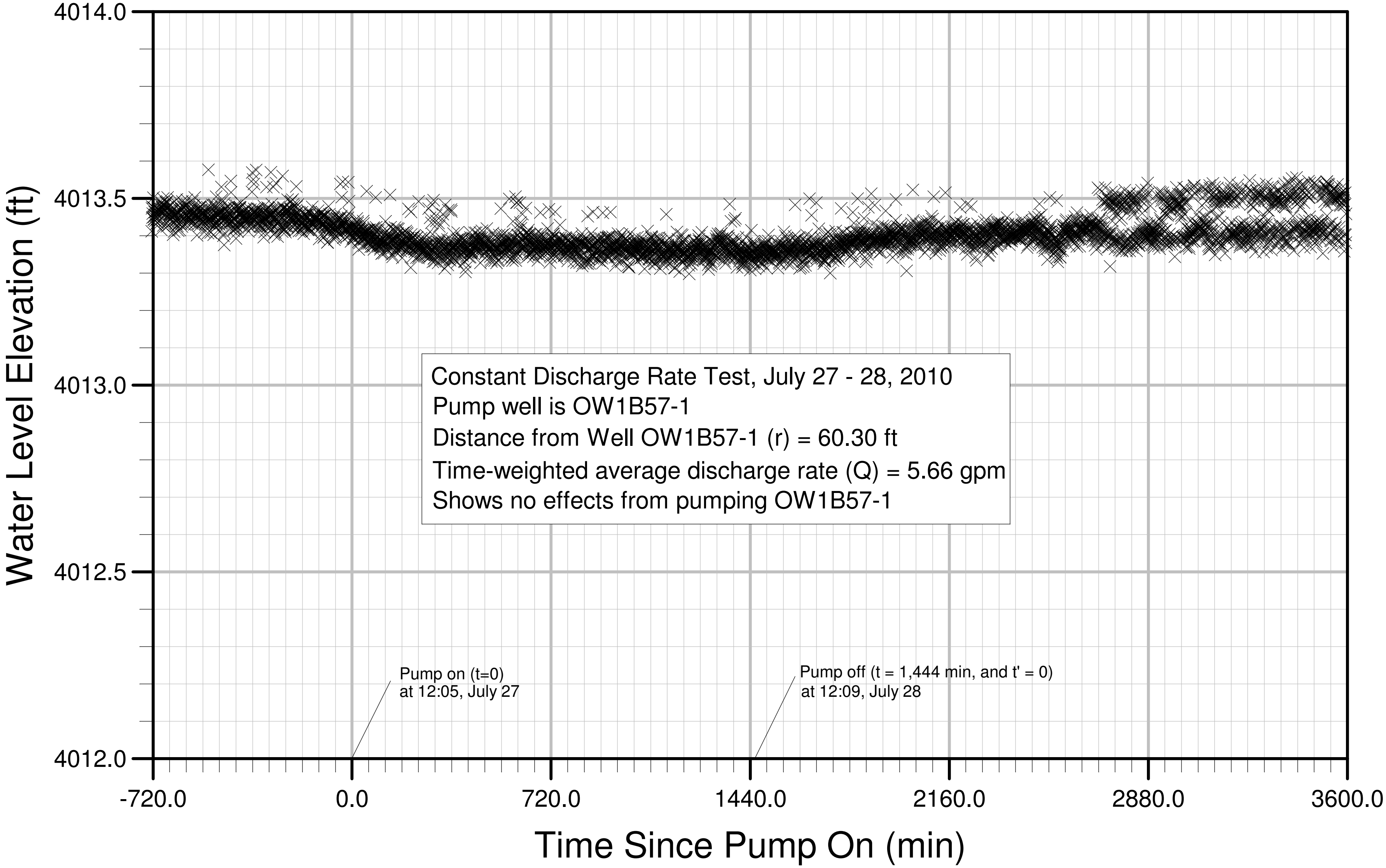


Hydrograph of Observation Well 12-18 SA




Hydrograph of Observation Well 12-18 SM
Water Level Elevation (ft)
4097.0
4096.5
4096.0
4095.5
4095.0
Time Since Pump On (min)
-720.0
0.0
720.0
1440.0
2160.0
2880.0
3600.0
Constant Discharge Rate Test, July 27 - 28, 2010
Pump well is OW1B57-1
Distance from Well OW1B57-1 (r) = 107.10 ft
Time-weighted average discharge rate (Q) = 5.66 gpm
Shows no effects from pumping OW1B57-1
Pump on (t=0)
at 12:05, July 27
Pump off (t = 1,444 min, and t' = 0)
at 12:09, July 28

Hydrograph of Observation Well 12-18 DM



Appendix 8
Abandonment Records for Boreholes Plugged in the Vicinity of the 12-18 OZ Well Cluster

6-11-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0273

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR 0273 Date: 6-11-10

Project: ROSS ISR Contractor: Pronghorn Drilling Inc

Lease: ______ Driller: Russ Taylor

Total Hole/Well Depth: 660

SEALING:

Reason: Exploration hole ✓, Final well abandonment____, Integrity failure____, DNC____ (check one)

Sealing material: Type Cement, Number of bags 64, Gallons of slurry 742,

Sealing method: Rig ✓, Drop pipe____, Hose____ (check one)

Sealed interval: From 660 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth____ ft., Plug Depth____ ft., Type marker____

General area: Topsoil replacement date____, Reseed date____

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Tripout
Allow to settle 48 hrs, Top off w/ Dry Cement up to within
2Ft of surface then Bent Chips + Rebar marker

Supervisor: ______

6-11-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0270

Parameters		
Hole diameter	5.25	inches
Hole Depth	640	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.
Cement slurry calculation		
Hole depth x capacity of hole x 1.20	719.68	gallons cement slurry
Cement calculation		
Total cement slurry / gallons cement slurry per lb. dry cement	5834.9	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	62.1	bags dry cement
Bentonite calculation		
Total lbs. dry cement x .04	233.4	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite
Mix water calculation		
Gallons of mix water per bag cement x bags of cement	484.2	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR 0270
Project: ROSS ISR
Lease: ______
Date: 6-11-10
Contractor: Pronghorn Drilling INC
Driller: Ross Taylor

Total Hole/Well Depth: 640

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 62, Gallons of slurry 719,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 640 ft. to ______ ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Trip, Trip out
Allow to settle 48 hrs, top off w/ Dry Cement up to within 2 Ft
of surface then Bent Chips + Repar mrkr

Supervisor: ______

6-10-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR476

Parameters		
Hole diameter	5.25	inches
Hole Depth	670	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.
Cement slurry calculation		
Hole depth x capacity of hole x 1.20	753.415	gallons cement slurry
Cement calculation		
Total cement slurry / gallons cement slurry per lb. dry cement	6108.4	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	65.0	bags dry cement
Bentonite calculation		
Total lbs. dry cement x .04	244.3	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.9	bags bentonite
Mix water calculation		
Gallons of mix water per bag cement x bags of cement	506.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 476

Date: 6-10-10

Project: Ross ISR

Contractor: Pronghorn Drilling Inc

Lease: ______

Driller: Russ Taylor

Total Hole/Well Depth: 670

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 65, Gallons of slurry 753,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 670 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Trip out
Allow to settle 48 hrs. Top off w/Dry cement up to within
2Ft of Surface then Bent Chips + Rebar marker

Supervisor: ______

6-10-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR423

Parameters		
Hole diameter	5.25	inches
Hole Depth	651	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.
Cement slurry calculation		
Hole depth x capacity of hole x 1.20	732.0495	gallons cement slurry
Cement calculation		
Total cement slurry / gallons cement slurry per lb. dry cement	5935.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	63.1	bags dry cement
Bentonite calculation		
Total lbs. dry cement x .04	237.4	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite
Mix water calculation		
Gallons of mix water per bag cement x bags of cement	492.5	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 423

Date: 6-10-10

Project: Ross ISR

Contractor: Pronghorn Drilling Inc

Lease: ______

Driller: Russ Taylor

Total Hole/Well Depth: 651

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 63, Gallons of slurry 732,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 651 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

WAsh hole to ~~___~~ Btm, Cement thru Pipe, Trip out
Allow to Settle 48 hrs. Top off w/ Dry Cement up to within
2 Ft of Surface then Bent Chips & Rebar mrkr

Supervisor: ______

6-10-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0280

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR 0280
Date: 6-10-10
Project: Ross ISR
Contractor: Pronghorn Drilling Inc
Lease: ______
Driller: Russ Taylor

Total Hole/Well Depth: 660

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 64, Gallons of slurry 742,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 660 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

Wash hole to Btm, cement thru Pipe, Trip out
Allow to settle 48 hrs, Top off w/Dry Cement up to within
2 Ft of surface then Bent chips + Rebar mrkr

Supervisor: ______

Cemented By
Hose Reel

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0282

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

Cemented By
Hose Reel

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0320

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

Cemented By Hose Reel

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0368

Parameters

Hole diameter	5.25	inches
Hole Depth	680	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	764.66	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6199.6	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	66.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	248.0	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	5.0	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	514.4	gallons

Cemented By
Hose Reel

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR 369

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

Cemented By
Hose Reel

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0370

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

Cemented By
Hose Reel

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0385

Parameters

Hole diameter	5.25 inches
Hole Depth	660 ft.
Weight / bag dry cement	94 lbs.
Mix water / bag dry cement	7.8 gallons
Mix water/ lb. dry cement	0.082979 gallons
Bentonite percentage	4 %
Slurry weight	14.1 lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55
Gallons cement slurry / bag dry cement	11.6 gallons
Gallons cement slurry / lb. dry cement	0.12334 gallons
Excess cement return	0 %
Capacity of hole	1.1245 gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17 gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2 lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0 bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7 lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8 bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3 gallons

Cemented By
Hose Reel

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # RMR0386

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

6-10-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0045

Parameters		
Hole diameter	5.25	inches
Hole Depth	620	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.
Cement slurry calculation		
Hole depth x capacity of hole x 1.20	697.19	gallons cement slurry
Cement calculation		
Total cement slurry / gallons cement slurry per lb. dry cement	5652.6	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	60.1	bags dry cement
Bentonite calculation		
Total lbs. dry cement x .04	226.1	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.5	bags bentonite
Mix water calculation		
Gallons of mix water per bag cement x bags of cement	469.0	gallons

CAN'T FINE YET DUE TO PIPELINE

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	RMR 0045	Date:	6-10-10
Project:	ROSS ISR	Contractor:	Pronghorn Drilling
Lease:		Driller:	Russ Taylor

Total Hole/Well Depth: 620

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 100, Gallons of slurry 697,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 620 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth______ ft., Plug Depth______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Tripout Allow to settle 48hrs, Top off w/ Dry Cement upto within 2Ft of surface then Bent Chips + Rebar mrkr

Supervisor: ______

6-9-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPV775

Parameters

Hole diameter	5.25	inches
Hole Depth	600	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	674.7	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5470.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	58.2	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	218.8	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.4	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	453.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPU 775

Project: Ross ISR

Lease: ______

Date: 6-9-10

Contractor: Pronghorn Drilling Inc

Driller: Russ Taylor

Total Hole/Well Depth: 600'

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 58, Gallons of slurry 674,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 600 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

WASH hole to Btm, Cement thru Drill Pipe, Tripout Allow to settle 48 hrs, TopoFF with Dry cement upto within 2 Ft of SurFACE ~~w/ Dry~~ Then Bent Chips + Rebar mrkr

Supervisor: ______

6-9-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0074

Parameters

Hole diameter	5.25	inches
Hole Depth	600	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	674.7	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5470.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	58.2	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	218.8	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.4	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	453.9	gallons

CAN'T FINE YET DUE TO PIPELINE

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR0074 Date: 6-9-10

Project: Ross ISR Contractor: Pronghorn Drilling Inc

Lease: ______ Driller: Russ Taylor

Total Hole/Well Depth: 600'

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 58, Gallons of slurry 674,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 600 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Trip out
Allow to settle 48 hrs. Top off w/ Dry cement up to within
2Ft of Surface then Bent. Chips + Rebar mrkr

Supervisor: ______

6-9-18 b

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0056

Parameters		
Hole diameter	5.25	inches
Hole Depth	600	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.
Cement slurry calculation		
Hole depth x capacity of hole x 1.20	674.7	gallons cement slurry
Cement calculation		
Total cement slurry / gallons cement slurry per lb. dry cement	5470.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	58.2	bags dry cement
Bentonite calculation		
Total lbs. dry cement x .04	218.8	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.4	bags bentonite
Mix water calculation		
Gallons of mix water per bag cement x bags of cement	453.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR0056 Date: 6-9-10

Project: ROSS ISR Contractor: Pronghorn Drilling Inc

Lease: ______ Driller: Russ Taylor

Total Hole/Well Depth: 600'

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 58, Gallons of slurry 674,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 600 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Wash hole to Btm, cement thru Drill Pipe, Trip out
Allow to settle 48 hrs, Top off w/ Dry cement up to
within 2Ft of surface then Bent Chips + Rebar mrkr

Supervisor: ______

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Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPR120

Parameters

Hole diameter	5.25	inches
Hole Depth	690	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	775.905	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6290.8	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	66.9	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	251.6	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	5.0	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	522.0	gallons

CAN'T FINE YET DUE TO PIPELINE

6-3-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR470

Parameters

Hole diameter	5.25	inches
Hole Depth	630	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	708.435	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5743.7	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	229.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	476.6	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 470 Date: 6-3-10

Project: Ross ISR Contractor: Pronghorn Drilling INC

Lease: ____________ Driller: Ross Taylor

Total Hole/Well Depth: 630

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 61, Gallons of slurry 708,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 630 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ft., Plug Depth ______ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

WAsh hole to Btm, Cement thru Drill Pipe, Trip out Allow to settle 48 hrs, Top off w/Dry Cement up to within 2Ft of Surface then Bent Chips + Rebar marker

Supervisor: ______________

6-3-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR500

Parameters

Hole diameter	5.25	inches
Hole Depth	630	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	708.435	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5743.7	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	229.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	476.6	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 500

Date: 6-3-10

Project: Ross ISR

Contractor: Pronghorn Drilling Inc

Lease: ______

Driller: Russ Taylor

Total Hole/Well Depth: 630

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 61, Gallons of slurry 708,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 630 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Trip out Allow to settle 48 hrs, Top off w/ Dry Cement up to within 2 Ft of surface then Bent chips + Rebar marker

Supervisor: ______

6-2-10

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPR503

Parameters

Hole diameter	5.25 inches
Hole Depth	630 ft.
Weight / bag dry cement	94 lbs.
Mix water / bag dry cement	7.8 gallons
Mix water/ lb. dry cement	0.082979 gallons
Bentonite percentage	4 %
Slurry weight	14.1 lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55
Gallons cement slurry / bag dry cement	11.6 gallons
Gallons cement slurry / lb. dry cement	0.12334 gallons
Excess cement return	0 %
Capacity of hole	1.1245 gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	708.435 gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5743.7 lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.1 bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	229.7 lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6 bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	476.6 gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 503
Date: 6-2-10
Project: ROSS ISR
Contractor: Pronghorn Drilling INC
Lease:
Driller: Ross Taylor

Total Hole/Well Depth: 630

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 61, Gallons of slurry 708,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 630 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

wash hole to Btm, cement thru Drill Pipe, Trip out
Allow to settle 48 hrs, Top off w/ Dry Cement up to within 2 Ft
of surface then Bent chips + Rebar marker

Supervisor:

6-2-10

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPR501

Parameters

Hole diameter	5.25	inches
Hole Depth	630	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	708.435	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5743.7	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	229.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	476.6	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	SPR 501	Date:	6-2-10
Project:	Ross ISR	Contractor:	Pronghorn Drilling Inc
Lease:		Driller:	Russ Taylor

Total Hole/Well Depth: 630

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 61, Gallons of slurry 708,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 630 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth__________ ft., Plug Depth __________ ft., Type marker__________

General area: Topsoil replacement date__________, Reseed date__________

REMARKS:

WAsh hole to Btm, Cement thru Drill Pipe, Trip out
Allow to settle 48 hrs. Top off w/ Dry Cement up to within 2Ft
of surface then Bent Chips + Rebar marker

Supervisor: __________

6-2-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR474

Parameters

Hole diameter	5.25	inches
Hole Depth	630	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	708.435	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5743.7	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	229.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	476.6	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 474

Date: 6-2-10

Project: Ross ISR

Contractor: Pronghorn Drilling INC

Lease: ____

Driller: Russ Taylor

Total Hole/Well Depth: 630

SEALING:

Reason: Exploration hole ✓, Final well abandonment____, Integrity failure____, DNC____ (check one)

Sealing material: Type cement, Number of bags 61, Gallons of slurry 708,

Sealing method: Rig ✓, Drop pipe____, Hose____ (check one)

Sealed interval: From 630 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth____ ft., Plug Depth____ ft., Type marker____

General area: Topsoil replacement date____, Reseed date____

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Trip out

Allow to settle 48 hrs, Top off w/ Dry cement up to within

2ft of surface then Bent. Chips + Rebar marker

Supervisor: ____

6-1-10

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPR473

Parameters

Hole diameter	5.25	inches
Hole Depth	630	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	708.435	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5743.7	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	229.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	476.6	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 473 Date: 6-1-10

Project: Ross ISR Contractor: Pronghorn Drilling INC

Lease: ______ Driller: Russ Taylor

Total Hole/Well Depth: 630

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type cement, Number of bags 61, Gallons of slurry 708,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 630 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

wash hole to Btm, cement thru Drill Pipe, Trip out
Allow to settle 48 hrs, Top off w/ Dry cement up to within 2 Ft of
Surface then Bent chips + Rebar marker

Supervisor: ______

6-1-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR502

Parameters

Hole diameter	5.25	inches
Hole Depth	630	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	708.435	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5743.7	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	229.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	476.6	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	SPR 502	Date:	6-1-10
Project:	ROSS ISR	Contractor:	Pronghorn Drilling Inc
Lease:		Driller:	Russ Taylor

Total Hole/Well Depth: 630

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 61, Gallons of slurry 708,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 630 ft. to 0 ft.

SURFACE RECLAMATION:

cific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

WASH hole to Btm, cement thru Drill Pipe, Trip out Allow to settle 48 hrs, Top off w/ Dry Cement up to within 2Ft of surface then Bent chips + Rebar marker

Supervisor: ______

☆ Done with RMR 0039 same hole

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR601

Parameters

Hole diameter	5.25	inches
Hole Depth	600	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	674.7	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5470.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	58.2	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	218.8	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.4	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	453.9	gallons

6-1-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPV777

Parameters

Hole diameter	5.25	inches
Hole Depth	602	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	676.949	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5488.5	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	58.4	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	219.5	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.4	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	455.4	gallons

CAN'T FINE YET DUE TO PIPELINE

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	SPV 777	Date:	6-1-10
Project:	ROSS ISR	Contractor:	Pronghorn Drilling INC
Lease:		Driller:	Russ TAylor

Total Hole/Well Depth: 602

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 58, Gallons of slurry 676,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 602 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______________ ft., Plug Depth ______________ ft., Type marker________________

General area: Topsoil replacement date___________________, Reseed date___________________

REMARKS:

WASh hole to Btm, cement thru Drill Pipe, Tripout
Allow to settle 48 hrs, Topoff w/ Dry cement ~~#~~ up to within 2 Ft
of Surface then Bent chips + ReBAr marker

Supervisor: ____________________

5-31-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPV776

Parameters

Hole diameter	5.25	inches
Hole Depth	600	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	674.7	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5470.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	58.2	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	218.8	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.4	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	453.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPV 776 Date: 5-31-10

Project: Ross ISR Contractor: Pronghorn Drilling INC

Lease: ______ Driller: Ross Taylor

Total Hole/Well Depth: 600

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 58, Gallons of slurry 674,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 600 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Trip out
Allow to settle 48 hrs, Top off w/Dry Cement up to within 2 Ft
of Surface then Bent Chips + Rebar marker

Supervisor: ______

5-31-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR504

Parameters

Hole diameter	5.25	inches
Hole Depth	635	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	714.0575	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5789.3	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.6	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	231.6	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	480.4	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 504

Date: 5-31-10

Project: Ross ISR

Contractor: Pronghorn Drilling INC

Lease: ______

Driller: Russ Taylor

Total Hole/Well Depth: 635

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 62, Gallons of slurry 714,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 635 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Trip out
Allow to settle 48 hrs, Top off w/ Dry Cement up to within 2Ft
of surface then Bent Chips + Rebar marker

Supervisor: ______

5-31-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPV518

Parameters

Hole diameter	5.25	inches
Hole Depth	640	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	719.68	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5834.9	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	62.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	233.4	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	484.2	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPV 518 Date: 5-31-10

Project: Ross ISR Contractor: Pronghorn Drilling

Lease: ______ Driller: Russ Taylor

Total Hole/Well Depth: 640

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 62, Gallons of slurry 720,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 640 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

wash hole to Btm, Cement thru Drill Pipe, Trip out, Allow to settle 48 hrs. Top off w/ Dry Cement up to within [illegible]s 2Ft of Surface then Bent chips + Rebar marker

Supervisor: ______

5-30-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR425

Parameters

Hole diameter	5.25	inches
Hole Depth	630	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	708.435	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5743.7	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	229.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	476.6	gallons

5-30-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPV517

Parameters

Hole diameter	5.25	inches
Hole Depth	620	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	697.19	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5652.6	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	60.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	226.1	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.5	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	469.0	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	SPV 517	Date:	5-30-10
Project:	Ross ISR	Contractor:	Pronghorn Drilling INC
Lease:		Driller:	Russ Taylor

Total Hole/Well Depth: 620

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 60, Gallons of slurry 697,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 620 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth________ ft., Plug Depth ________ ft., Type marker________

General area: Topsoil replacement date________, Reseed date________

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Tripout
Allow to settle 48 hrs, Top off w/Dry cement up to within ~~48 hrs~~
2 Ft of surface then Bent chips + Rebar Marker

Supervisor: ____________

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 425

Date: 5-30-10

Project: ROSS ISR

Contractor: Pronghorn Drilling INC

Lease: ____________

Driller: Russ TAylor

Total Hole/Well Depth: 630

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 61, Gallons of slurry 708,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 630 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

WAsh hole to Btm, Cement thru Drill Pipe, Trip out Allow to settle 48 hrs, top of w/ Dry Cement up to within 2Ft of surFAce then Bent Chips + Rebar marker

Supervisor: ____________

~~SPV-515~~
5-30-10

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPV515

Parameters

Hole diameter	5.25	inches
Hole Depth	641	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	720.8045	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5844.0	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	62.2	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	233.8	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	484.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPV 515 Date: 5-30-10

Project: Ross ISR Contractor: Pronghorn Drilling Inc

Lease: ______ Driller: Russ Taylor

Total Hole/Well Depth: 641

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 62, Gallons of slurry 720,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 641 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

Wash hole to Btm, Cement thru Pipe, Trip out, Allow to Settle 48 hrs, Top off w/Dry Cement up to within 2Ft of surface then Bent chips + Rebar marker

Supervisor: ______

5-29-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0073

Parameters

Hole diameter	5.25	inches
Hole Depth	600	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	674.7	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5470.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	58.2	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	218.8	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.4	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	453.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	RMR 0073	Date:	5-29-10
Project:	Ross ISR	Contractor:	Pronghorn Drilling Inc
Lease:		Driller:	Ross Taylor

Total Hole/Well Depth: 600

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 58, Gallons of slurry 674,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 600 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth________ ft., Plug Depth ________ ft., Type marker________

General area: Topsoil replacement date________, Reseed date________

REMARKS:

WAsh hole to Btm, Cement thru Drill Pipe, Trip out ~~top o~~ Allow to settle 48 hrs, Top off w/Dry Cement up to within 2Ft of Surface then Bent chips + ReBAr marker

Supervisor: ________

5-29-10

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR124

Parameters

Hole diameter	5.25	inches
Hole Depth	670	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	753.415	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6108.4	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	65.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	244.3	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.9	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	506.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 124
Date: 5-29-10
Project: Ross ISR
Contractor: Pronghorn Drilling Inc
Lease: ____________________
Driller: Russ Taylor

Total Hole/Well Depth: 670

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 65, Gallons of slurry 753,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 670 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______________ ft., Plug Depth ______________ ft., Type marker______________

General area: Topsoil replacement date__________________, Reseed date__________________

REMARKS:

wash hole to Btm, Cement thru Drill Pipe, Trip out
top off w/Dry cement up to within 2 Ft of surface
then Bent chips + Rebar marker

Supervisor: ____________________

5-28-10

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPR554

Parameters

Hole diameter	5.25	inches
Hole Depth	630	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	708.435	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5743.7	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	229.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	476.6	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 554

Date: 5-28-10

Project: Ross ISR

Contractor: Pronghorn Drilling Inc

Lease: ______

Driller: Russ Taylor

Total Hole/Well Depth: 630'

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 61, Gallons of slurry 708,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 630 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Trip out
Allow to settle 48hrs, top OFF w/ Dry Cement up to 2Ft of Surface
then Bent chips + Rebar marker

Supervisor: ______

RMR
272

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0272

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	RWR 0272	Date:	5-19-10
Project:	Ross ISR	Contractor:	Pronghorn Drilling Inc
Lease:		Driller:	Russ Taylor

Total Hole/Well Depth: 660

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 64, Gallons of slurry 742,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 660 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

WASh hole to Btm, Cement thru Drill Pipe, Tripout
Allow to settle 48 hrs, Top off w/ Dry cement up to within
2Ft of surface then Bent Chips + Rebar mrkr

Supervisor: ______

RMR 271

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # RMR0271

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR0271

Date: 5-19-10

Project: Ross ISR

Contractor: Pronghorn Drilling Inc

Lease:

Driller: Russ Taylor

Total Hole/Well Depth: 660

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 64, Gallons of slurry 742,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 660 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Wash hole to Btm, Cement thru Drill Pipe, Trip Pipe
Allow to Settle 48hrs, Top off w/Dry Cement to within
2Ft of surface then Bent. Chips + Rebar mrkr

Supervisor:

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # RMR0284

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR0284
Project: ROSS ISR
Lease:
Date: 5-19-10
Contractor: Pronghorn Drilling Inc
Driller: Ross Taylor

Total Hole/Well Depth: 660

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 64, Gallons of slurry 742,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 660 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

wAsh Hole to Btm, Cement thru Pipe, Tripout
Allow to settle 48 hrs then top off w/ Dry Cement
w/ Dry Cement up to 2Ft of surface then Bent Chips + Rebar
mrkr

Supervisor: ______

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPV774

Parameters

Hole diameter	5.25	inches
Hole Depth	600	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	674.7	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5470.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	58.2	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	218.8	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.4	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	453.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	SPV774	Date:	5-20-10
Project:	ROSS ISR	Contractor:	Pronghorn Drilling INC
Lease:		Driller:	Russ Taylor

Total Hole/Well Depth: 600

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 58, Gallons of slurry 674,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 600 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth________ ft., Plug Depth ________ ft., Type marker________

General area: Topsoil replacement date________, Reseed date________

REMARKS:

WAsh hole to Btm, Cement thru Pipe. Trip out Allow to settle 48 hrs. Top off w/ Dry cement up to within 2Ft of surface then Bent chips + RebAr marker

Supervisor: ________________

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPR505

Parameters

Hole diameter	5.25	inches
Hole Depth	680	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	764.66	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6199.6	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	66.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	248.0	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	5.0	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	514.4	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 505
Project: ROSS ISR
Lease:
Date: 5-20-10
Contractor: Pronghorn Drilling Inc
Driller: Russ Taylor

Total Hole/Well Depth: 680'

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 66, Gallons of slurry 764,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 680 ft. to 0 ft.

SURFACE RECLAMATION:

;ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

WashHole to Btm, Cement thru Drill Pipe, Trip out + Allow to settle 48 hours. Top off w/ Dry Cement to 2ft of surface then Bent chips + Rebar mrkr

Supervisor: ______

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPR552

Parameters

Hole diameter	5.25	inches
Hole Depth	630	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	708.435	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5743.7	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	61.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	229.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	476.6	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 552

Date: 5-20-10

Project: Ross ISR

Contractor: Pronghorn Drilling Inc

Lease: ____________

Driller: Russ Taylor

Total Hole/Well Depth: 630'

SEALING:

Reason: Exploration hole ✓, Final well abandonment____, Integrity failure____, DNC____ (check one)

Sealing material: Type Cement, Number of bags 61, Gallons of slurry 708,

Sealing method: Rig ✓, Drop pipe____, Hose____ (check one)

Sealed interval: From 630 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth____ ft., Plug Depth____ ft., Type marker____

General area: Topsoil replacement date____, Reseed date____

REMARKS:

Wash hole to Btm, Cement Thru Drill Pipe, Trip out. Allow to settle 48 hrs. Top off With Dry Cement up to within 2 Ft of surFace then Bent chips + Rebar marker

Supervisor: ____________

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # RMR0278

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR 0278 | Date: 5-18-10
Project: Ross ISR | Contractor: Pronghorn Drilling Inc
Lease: ____ | Driller: Russ Taylor

Total Hole/Well Depth: 660'

SEALING:

Reason: Exploration hole ✓, Final well abandonment ____, Integrity failure ____, DNC ____ (check one)

Sealing material: Type Cement, Number of bags 64, Gallons of slurry 742,

Sealing method: Rig ✓, Drop pipe ____, Hose ____ (check one)

Sealed interval: From 660 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ____ ft., Plug Depth ____ ft., Type marker ____

General area: Topsoil replacement date ____, Reseed date ____

REMARKS:

Wash hole to BTM, Cement Thru Pipe, Tripout
Allow to settle 48 hrs. Bring to within 2Ft of
Surface w/Dry Cement Then Bent. Chips + Rebar mrkr

Supervisor: ____

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # RMR0281

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR 281 Date: 5-18-10

Project: ROSS ISR Contractor: Pronghorn Drilling

Lease: ______ Driller: Russ Taylor

Total Hole/Well Depth: 660'

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 64, Gallons of slurry 742,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 660 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

WASh to BTM, Cement Thru Pipe, Trip out

Allow to settle 48 hrs. Bring to within 2Ft

of surFAce w/ Dry Cement Then Bent chips + Rebar mrkr

Supervisor: ______

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPR424

Parameters

Hole diameter	5.25	inches
Hole Depth	651	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	732.0495	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5935.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	63.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	237.4	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	492.5	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 424 Date: 5-18-10

Project: Ross ISR Contractor: Pronghorn Drilling Inc

Lease: ______ Driller: Russ Taylor

Total Hole/Well Depth: 650'

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 63, Gallons of slurry 732,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 650 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

WAsh hole to BTM, Cement Thru Drill Pipe, Trip out
Allow to settle 48 hrs Then Bring to within 2Ft
OF surFAce w/ Dry Cement Then Bent chips + RebAr mrkr

Supervisor: ______

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPR506

Parameters

Hole diameter	5.25	inches
Hole Depth	651	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	732.0495	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5935.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	63.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	237.4	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	492.5	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	SPR 506	Date:	5-17-10
Project:	Ross ISR	Contractor:	Pronghorn Drilling Inc
Lease:		Driller:	Russ Taylor

Total Hole/Well Depth: 651

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type cement, Number of bags 63, Gallons of slurry 732,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 651 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth________ ft., Plug Depth ________ ft., Type marker________

General area: Topsoil replacement date________, Reseed date________

REMARKS:

Wash hole to Btm, Pump Cement thru Drill Pipe
Trip Pipe. Allow to settle 48 hrs. Top off w/Dry Cement
up to 2ft of surface then Bent chips + Rebar marker

Supervisor: ________

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR114

Parameters

Hole diameter	5.25	inches
Hole Depth	840	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	944.58	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	7658.3	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	81.5	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	306.3	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	6.1	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	635.5	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 114 | Date: 5-17-10

Project: ROSS ISR | Contractor: Pronghorn Drilling INC

Lease: ______ | Driller: Russ Togby

Total Hole/Well Depth: 840

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 81.5, Gallons of slurry 945,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 840 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

WAsh hole to Btm, Cement thru Drill Pipe, Tripout
Allow to settle 48 hrs. Top off w/Dry Cement up to 2Ft
of SurFAce then Bent Chips + RePAr maker

Supervisor: ______

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # RMR0039

Parameters

Hole diameter	5.25	inches
Hole Depth	620	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	697.19	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5652.6	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	60.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	226.1	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.5	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	469.0	gallons

CAN'T FINE YET DUE TO PIPELINE

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR 0039 Date: 5-17-10

Project: ROSS ISR Contractor: Pronghorn Drilling INC

Lease: ______ Driller: Russ Taylor

Total Hole/Well Depth: 620

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 60, Gallons of slurry 697,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 620 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

WAsh hole to Btm, Cement thru Drill Pipe, Trip out
Allow to Settle 48 hrs. Top off w/ Dry cement up to 2Ft
From Surface then Bent Chips + Rebar marker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0042

Parameters

Hole diameter	5.25	inches
Hole Depth	660	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	742.17	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6017.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	64.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	240.7	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.8	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	499.3	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR0042
Date: 5-16-10
Project: Ross ISR
Contractor: Pronghorn Drilling Inc
Lease:
Driller: Russ Taylor

Total Hole/Well Depth: 660

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 64, Gallons of slurry 742,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 660 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Wash hole to Btm, Pump Cement thru Pipe to surface, Trip Pipe
Allow to settle 48 hrs, Top off w/ Dry Cement up to 2Ft of surface
then Bent chips + Rebar marker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0044

Parameters

Hole diameter	5.25	inches
Hole Depth	640	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	719.68	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5834.9	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	62.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	233.4	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	484.2	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR 0044

Date: 5-16-10

Project: Ross ISR

Contractor: Pronghorn Drilling Inc

Lease: ______

Driller: Russ Taylor

Total Hole/Well Depth: 640'

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 62, Gallons of slurry 720,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 640 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

WASh hole to BTM Pump Cement Thru Drill Pipe to SurFace, Trip Pipe + Allow to settle 48 hrs. Top oFF with Dry Cement up to 2Ft then Bent. Chips + Rebar marker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR602

Parameters

Hole diameter	5.25	inches
Hole Depth	1312	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	1475.344	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	11961.6	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	127.3	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	478.5	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	9.6	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	992.6	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 602
Date: 4-29-02
Project: Ross ISR
Contractor: Pronghorn Drilling Inc
Lease: ______
Driller: Russ Taylor

Total Hole/Well Depth: 1312

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 127, Gallons of slurry 1475,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 1312 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

Wash hole to Bottom Pump Cement thru Drill Pipe in 2 stages. Allow Cement to settle 48 hrs + top off with Dry Cement up to within 2 Ft of surface then Bring to surface with Bent Chips + Rebar marker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # RMR0043

Parameters

Hole diameter	5.25	inches
Hole Depth	620	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	697.19	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5652.6	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	60.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	226.1	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.5	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	469.0	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: RMR 43
Project: Ross ISR
Lease: ______
Date: 4-28-10
Contractor: Pronghorn Drilling Inc
Driller: Ross Taylor

Total Hole/Well Depth: 620

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 60, Gallons of slurry 697,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 620 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

WAsh hole to BTM Pump cement thru Drill Pipe + Trip out Allow Cement to Settle 48 hrs + Top off w/Dry Cement Up to within 2 Ft of Surface then Bent Chip to top w/Rebar marker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR126

Parameters

Hole diameter	5.25	inches
Hole Depth	690	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	775.905	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6290.8	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	66.9	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	251.6	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	5.0	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	522.0	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR-126

Date: 4-27-10

Project: Ross ISR

Contractor: Pronghorn Drilling

Lease: ______

Driller: Ross Taylor

Total Hole/Well Depth: 690'

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 67, Gallons of slurry 776,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 690 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

WASh hole to Bottom Cement thru Drill Pipe + Trip out
Allow Cement to settle 48 hrs + top off w/ Dry Cement
to within 2 Ft of Surface And bring to surface w/ Bent Chips
+ Rebar marker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR507

Parameters

Hole diameter	5.25	inches
Hole Depth	670	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	753.415	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6108.4	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	65.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	244.3	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.9	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	506.9	gallons

CAN'T FINE YET DUE TO PIPELINE

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 507   Date: 4-28-10

Project: Ross ISR   Contractor: Pronghorn Drilling Inc

Lease: ______   Driller: Ross Taylor

Total Hole/Well Depth: 670

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 65, Gallons of slurry 753,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 670 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

Wash Hole to TD Pump cement Thru Drill Pipe to surface Trip Pipe. Allow to settle 48 hrs. top off w/ Dry cement up to 2Ft From top then Bent chips w/ Rebar marker to surface

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR509

Parameters

Hole diameter	5.25	inches
Hole Depth	670	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	753.415	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6108.4	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	65.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	244.3	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.9	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	506.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 509　　Date: 4-28-10

Project: Ross ISR　　Contractor: Pronghorn Drilling Inc

Lease: ______　　Driller: Ross Taylor

Total Hole/Well Depth: 670

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 65, Gallons of slurry 753,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 670 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Wash Hole to TD Pump Cement Thru Drill Pipe, Trip Pipe + Allow Cement to Settle 48 hrs Then top w/ Dry Cement to within 2 Ft of Surface. Finish w/ Bent chips + Rebar marker

Supervisor: ______

Abandonment Cementing Worksheet
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20-Apr-10

HOLE # SPR551

Parameters

Hole diameter	5.25	inches
Hole Depth	670	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	753.415	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6108.4	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	65.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	244.3	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.9	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	506.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR 551

Date: 5-28-10

Project: Ross ISR

Contractor: Pronghorn Drilling Inc

Lease: ______

Driller: Ross Taylor

Total Hole/Well Depth: 670

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 65, Gallons of slurry 753,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 670 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Wash to TD Cement thru Drill Pipe then Trip out
Allow to Settle 48 hrs then top off w/ Dry Cement
And top off to within 2 ft off Surface w/ Bent Chips + Rebar
marker to Surface

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR508

Parameters

Hole diameter	5.25	inches
Hole Depth	690	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	775.905	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6290.8	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	66.9	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	251.6	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	5.0	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	522.0	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR-508

Date: 4-27-10

Project: Ross ISR

Contractor: Pronghorn Drilling Inc

Lease: ______

Driller: Russ Taylor

Total Hole/Well Depth: 690

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 67, Gallons of slurry 776,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 690 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

WASh hole to TD Pump Cement Slurry Thru Drill Pipe, Trip Pipe Allow to Settle 48 hrs Top off w/Dry Cement to within 2 Ft From Surface Fill to Top w/ Bent Chips + Repar Marker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR477

Parameters

Hole diameter	5.25	inches
Hole Depth	670	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	753.415	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6108.4	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	65.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	244.3	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.9	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	506.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	SPR-477	Date:	4-27-10
Project:	Ross ISR	Contractor:	Pronghorn Drilling Inc
Lease:		Driller:	Ross Taylor

Total Hole/Well Depth: 670'

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 65, Gallons of slurry 753,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 670 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth________ ft., Plug Depth ________ ft., Type marker________

General area: Topsoil replacement date________, Reseed date________

REMARKS:

Wash hole to Bottom Cement thru Drill Pipe, Trip out
Allow to Settle 48hrs top off to within 2Ft w/ Dry Cement
And Bring to Surface w/ Bent chips + Rebar marker

Supervisor: ________

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR475

Parameters		
Hole diameter	5.25	inches
Hole Depth	670	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.
Cement slurry calculation		
Hole depth x capacity of hole x 1.20	753.415	gallons cement slurry
Cement calculation		
Total cement slurry / gallons cement slurry per lb. dry cement	6108.4	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	65.0	bags dry cement
Bentonite calculation		
Total lbs. dry cement x .04	244.3	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.9	bags bentonite
Mix water calculation		
Gallons of mix water per bag cement x bags of cement	506.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR-475 Date: 5-23-10

Project: Ross ISR Contractor: Pronghorn Drilling Inc

Lease: ______ Driller: Russ Taylor

Total Hole/Well Depth: 670

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 65, Gallons of slurry 753,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 670 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

Wash Hole to Bottom Pump Cement Slurry thru Drill Pipe to Surface Allow to settle. Dry Bag w/cement within 2 Feet of Surface then 2 Ft ~ 0' w/ Bent Chips + Rebar marker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR600

Parameters

Hole diameter	5.25	inches
Hole Depth	610	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	685.945	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5561.4	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	59.2	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	222.5	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.4	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	461.5	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR-600
Date: 4-22-10
Project: ROSS ISR
Contractor: Pronghorn Drilling Inc
Lease: ______
Driller: Ross Taylor

Total Hole/Well Depth: 610'

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 59, Gallons of slurry 686,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 610 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

WAsh to BTM w/Drill Pipe cement Back to Surface Thru Pipe. Allow to settle Dry BAg Cement to 2 Feet then to SurFAce with Bent Chips + Rebar MArker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR472

Parameters

Hole diameter	5.25	inches
Hole Depth	651	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	732.0495	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5935.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	63.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	237.4	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	492.5	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR - 472
Date: 4-22-10
Project: Ross ISR
Contractor: Pronghorn Drilling Inc
Lease: ______
Driller: Ross Taylor

Total Hole/Well Depth: 650'

SEALING:

Reason: Exploration hole ✓, Final well abandonment ______, Integrity failure ______, DNC ______ (check one)

Sealing material: Type Cement, Number of bags 63, Gallons of slurry 732,

Sealing method: Rig ✓, Drop pipe ______, Hose ______ (check one)

Sealed interval: From 650 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ______ ft., Plug Depth ______ ft., Type marker ______

General area: Topsoil replacement date ______, Reseed date ______

REMARKS:

wash to Btm Slurry Pumped thru Drill Pipe
Topped off w/ Dry Cement to within 2 Feet of surface
Then 2' - 0' with Bent Chips + Rebar For marker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR479

Parameters

Hole diameter	5.25	inches
Hole Depth	670	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	753.415	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	6108.4	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	65.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	244.3	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.9	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	506.9	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR - 479 Date: 4-26-10

Project: Ross ISR Contractor: Pronghorn Drilling Inc

Lease: ______ Driller: Ross Taylor

Total Hole/Well Depth: 670

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 65, Gallons of slurry 753,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 670 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Wash to Bottom with Drill Pipe Pump Cement Slurry thru Pipe to Surface. Allow to settle Fill w/ Dry Cement within 2 Ft' of surface Place Bent Chips 2Ft - 0' w/ Rebar marker

Supervisor: ______

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR422

Parameters

Hole diameter	5.25	inches
Hole Depth	650	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	730.925	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5926.1	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	63.0	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	237.0	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	491.7	gallons

.0726 .50 5

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR - 422

Date: 4-21-10

Project: Ross ISR

Contractor: Pronghorn Drilling

Lease: ______

Driller: Russ Taylor

Total Hole/Well Depth: 650'

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 63, Gallons of slurry 731,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 650 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth______ ft., Plug Depth ______ ft., Type marker______

General area: Topsoil replacement date______, Reseed date______

REMARKS:

Bentchip seal Placed Last 2 Feet w/ Rebar marker
+ Hole stake Pit Reclaimed
Dry Cement Brought up to 2 Feet

Supervisor: ______

13.8
14.1

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR471

Parameters

Hole diameter	5.25	inches
Hole Depth	651	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	732.0495	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5935.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	63.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	237.4	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	492.5	gallons

650
651
651
1952

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number: SPR-471
Date: 4-21-10
Project: Ross ISR
Contractor: Pronghorn Drilling
Lease: ____
Driller: Russ Taylor

Total Hole/Well Depth: 651

SEALING:

Reason: Exploration hole ✓, Final well abandonment ____, Integrity failure ____, DNC ____ (check one)

Sealing material: Type Cement, Number of bags 63, Gallons of slurry 732,

Sealing method: Rig ✓, Drop pipe ____, Hose ____ (check one)

Sealed interval: From 651 ft. to 0 ft.

SURFACE RECLAMATION:

:ific to location: Casing cutoff depth ____ ft., Plug Depth ____ ft., Type marker ____

General area: Topsoil replacement date ____, Reseed date ____

REMARKS:

Topped off w/ Dry Cement up to 2 Feet From surface then Bent Chips to surface w/ Repar & hole stake to mark Hole

Supervisor: ____

Abandonment Cementing Worksheet
K:\Peninsula_Minerals\09142\Strata\017 Wellfield Permitting\[dnccementingCalcs.xls]Sheet1
20-Apr-10

HOLE # SPR478

Parameters

Hole diameter	5.25	inches
Hole Depth	651	ft.
Weight / bag dry cement	94	lbs.
Mix water / bag dry cement	7.8	gallons
Mix water/ lb. dry cement	0.082979	gallons
Bentonite percentage	4	%
Slurry weight	14.1	lbs. / gal.
Cu. ft.cement slurry / bag cement	1.55	
Gallons cement slurry / bag dry cement	11.6	gallons
Gallons cement slurry / lb. dry cement	0.12334	gallons
Excess cement return	0	%
Capacity of hole	1.1245	gallons / ft.

Cement slurry calculation

Hole depth x capacity of hole x 1.20	732.0495	gallons cement slurry

Cement calculation

Total cement slurry / gallons cement slurry per lb. dry cement	5935.2	lbs. dry cement
Total lbs. dry cement / lbs. per bag dry cement	63.1	bags dry cement

Bentonite calculation

Total lbs. dry cement x .04	237.4	lbs. bentonite
Total lbs. bentonite / lbs. per bag bentonite	4.7	bags bentonite

Mix water calculation

Gallons of mix water per bag cement x bags of cement	492.5	gallons

STRATA ENERGY--ABANDONMENT RECORD

Hole/Well Number:	SPR-478	Date:	4-21-10
Project:	Ross ISR	Contractor:	Pronghorn Drilling
Lease:		Driller:	Russ Taylor

Total Hole/Well Depth: 651

SEALING:

Reason: Exploration hole ✓, Final well abandonment______, Integrity failure______, DNC______ (check one)

Sealing material: Type Cement, Number of bags 63, Gallons of slurry 732,

Sealing method: Rig ✓, Drop pipe______, Hose______ (check one)

Sealed interval: From 651 ft. to 0 ft.

SURFACE RECLAMATION:

ific to location: Casing cutoff depth________ ft., Plug Depth ________ ft., Type marker________

General area: Topsoil replacement date________, Reseed date________

REMARKS:

Bent chip seal Last 2 Feet w/ Rebar + hole stake
At SurFace Pit Reclaimed
Dry Cement Brought up to 2 Foot From SurFace

Supervisor: ____________

Appendix 9
Ross Project Core Permeability Data

Laboratory Core Analyses for Lance-Fox Hills Formations, Ross Project

Parameters for Sandstone Samples								
			Horizontal Permeability (K_h)		Vertical Permeability (K_v)			
Sample Number[1]	**Depth (ft)**	**Porosity (%)**	**millidarcies**	**ft/day**	**millidarcies**	**ft/day**	**K_v/K_h**	**Lithology**
RMRD 0004	520.3	40.7	4266	8.8				Sandstone; minor shale
RMRD 0004	509.8	46.6	2496	5.2				Sandstone, very fine-grained, gray, subrounded to subangular
RMRD 0004	510.5	45.9	5718	11.9				Sandstone; very fine-grained gray, subrounded to subangular
RMRD 0004	504.8	43.9	1135	2.4				Sandstone; very fine-grained, gray, with thin 1-2cm shale breaks
RMRD 0003	451.9	41.3	1772	3.7				Sandstone; very fine-grained, dark gray, coarsening upwards sequence
RMRD 0003	446.5	38.9	1261	2.6				Sandstone; very fine-grained dark gray, coarsening upwards sequence
RMRD 0003	440.4	42.0	2075	4.3				Sandstone; very fine-grained, light gray, angular to subangular
RMRD 0001	578.6	42.2	2719	5.6				Sandstone; fine-grained, light gray, common shale clasts to 12 cm
RMRD 0001	534.0	41.1	1828	3.8				Sandstone; minor shale
Nubeth 477V	379.8		1754	3.6	1604	3.3	0.91	Sandstone
Nubeth 477V	381.8		1834	3.8	597	1.2	0.33	Sandstone
Nubeth 477V	390.3		2240	4.6	2032	4.2	0.91	Sandstone
Nubeth 477V	411.0		2927	6.1	2152	4.5	0.74	Sandstone
Nubeth 477V	433.5		2652	5.5	2187	4.5	0.82	Sandstone
Nubeth 477V	450.5		1467	3.0	1262	2.6	0.86	Sandstone
Nubeth 477V	500.0	34.0	1934	4.0	1915	4.0	0.99	Sandstone
Nubeth 477V	506.5	37.8	2253	4.7	1239	2.6	0.55	Sandstone
Nubeth 477V	507.0	35.6	1971	4.1	184	0.4	0.09	Sandstone
Nubeth 477V	511.0	36.2	3380	7.0	2160	4.5	0.64	Sandstone
Nubeth 477V	517.0	28.6	3944	8.2	2892	6.0	0.73	Sandstone
Nubeth 477V	543.0	36.4	2629	5.5	2291	4.8	0.87	Sandstone
Nubeth 477V	557.0	32.2	2629	5.5	2291	4.8	0.87	Sandstone
RMD00007-016	456.0	41.7	2193	4.5	669	1.4	0.31	Sandstone; light gray, firm, moderately friable
RMRD 0003	482.1	42.2	1988	4.1				Silt; very fine-grained sandstone, gray
Average		**39.3**	**2461**	**5.1**	**1677**	**3.5**	**0.68**	

Laboratory Core Analyses for Lance-Fox Hills Formations, Ross Project

Sample Number[1]	Depth (ft)	Porosity (%)	Horizontal Permeability (K_h) millidarcies	Horizontal Permeability (K_h) ft/day	Vertical Permeability (K_v) millidarcies	Vertical Permeability (K_v) ft/day	K_v/K_h	Lithology
Parameters for Siltstone Samples								
RMRD 0001	543	38.8	87	0.180				Siltstone; with thin sandy layers
Nubeth 477V	508	32.8	317	0.657	16	0.033	0.05	Siltstone/mudstone
Nubeth 477V	524	19.6	51	0.106	34	0.071	0.67	Siltstone/mudstone
Nubeth 477V	531	27.6	254	0.527	223	0.462	0.88	Siltstone/mudstone
RMD0007-015	448.4	33.4	79.2	0.164	25.4	0.053	0.32	Siltstone; dark gray, laminated, few breaks on bedding, firm
Average		**30.4**	**157.6**	**0.327**	**74.6**	**0.155**	**0.47**	
Parameters Shale Samples								
RMRD 0001	589.5	37.4	78.6	0.163				Shale; black dense
RMRD 0001	588.8	38.1	65	0.135				Shale; black dense
Nubeth 477V	482.5	24.1	1.5	0.003	0.01	0.000	0.007	Shale/siltstone
Nubeth 477V	490.6	27.8	38	0.079	5	0.010	0.132	Shale/mudstone
Nubeth 477V	421		3.5	0.007	0.77	0.002	0.286	Shale/siltstone
Nubeth 477V	544	29.8	14	0.029	0.9	0.002	0.069	Shale
Nubeth 477V	573	25.9	8.8	0.018	0.01	0.000	0.001	Shale;
RMD0006-001A	325	24.1	68.4	0.142	0.5	0.001	0.007	Claystone; gray, competent, few carbonaceous laminations
RMD0006-002A	333.5	24.2	71.5	0.148	0.0	0.000	0.000	Claystone; light brown, bioturbation, competent
RMD0006-004A	465.5	30.2	17.7	0.037	4.25	0.009	0.240	Claystone/siltstone; interlaminated, even claystones are silty
RMD0007-018	477.2	28.7	27.3	0.057	0.0	0.000	0.000	Claystone; dark gray, firm
Average		**29.0**	**35.8**	**0.074**	**1.3**	**0.003**	**0.04**	
Parameters for Shale/Sandstone Mix Samples								
RMRD 0003	473.7	42.9	1460	3.027				Shale; gray with sandstone interbeds 1-2cm
RMRD 0003	473	40.7	830	1.721				Shale; gray with sandstone interbeds 1-2cm
RMRD 0003	458.7	34.5	151	0.313				Shale; with sand
RMRD 0003	454.3	34.0	80.5	0.167				Shale; with sand
RMRD 0002	407.5	28.9	38.5	0.080				Sandstone; fine-grained, shaley, shale clasts to 8cm
RMRD 0004	502	38.6	156	0.323				Shale; dark gray, with sandstone beds
RMD0006-003A	434.6	28.8	22.3	0.046	13.8	0.029	0.62	Clay pebble zone in sand matrix
Average		**35.5**	**391**	**0.811**	**13.8**	**0.029**	**0.04**	

Laboratory Core Analyses for Lance-Fox Hills Formations, Ross Project

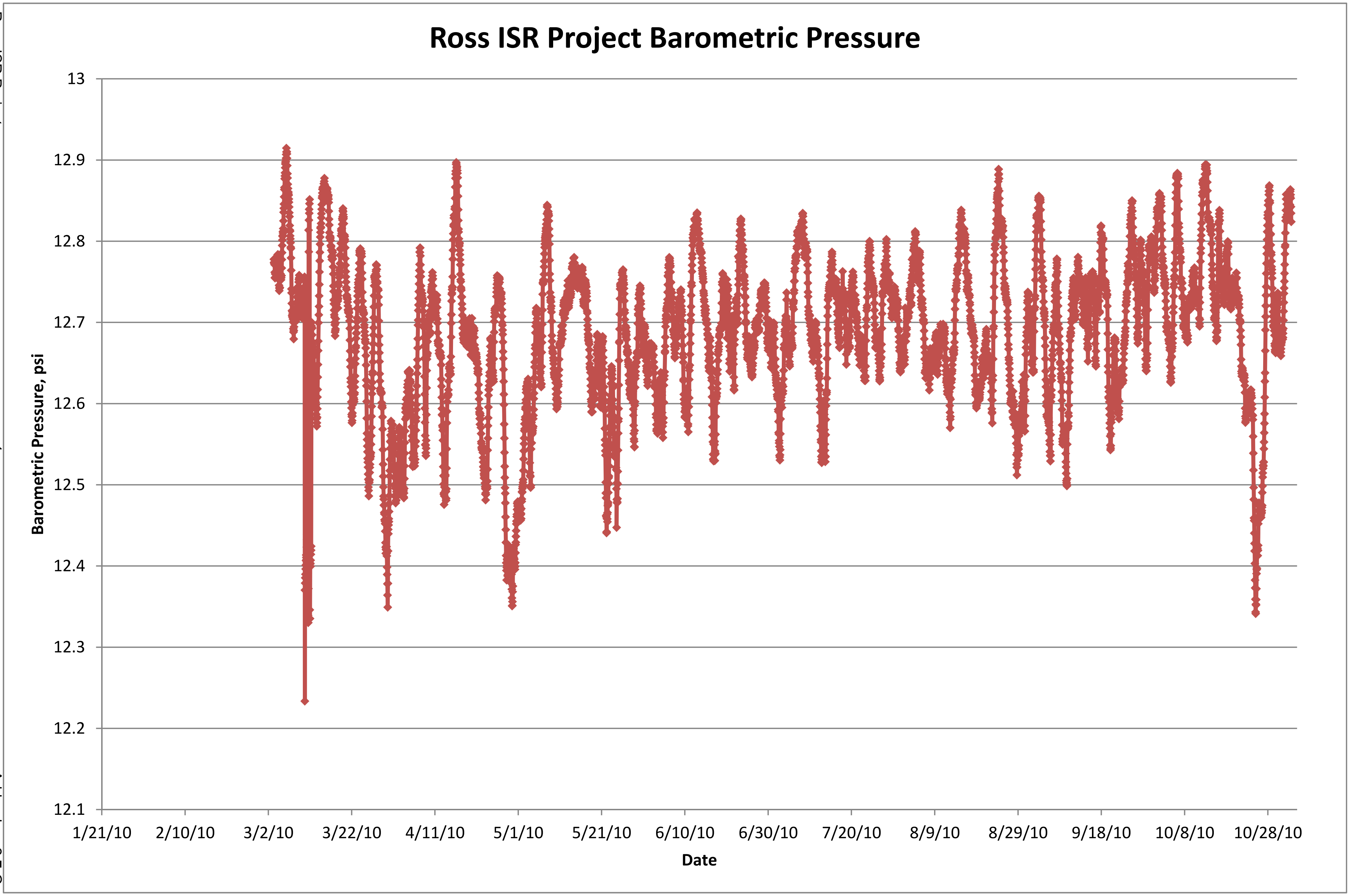
Parameters for Sandstone/Siltstone Mix Samples								
			Horizontal Permeability (K_h)		Vertical Permeability (K_v)			
Sample Number[1]	**Depth (ft)**	**Porosity (%)**	**millidarcies**	**ft/day**	**millidarcies**	**ft/day**	**K_v/K_h**	**Lithology**
RMRD 0003	491.1	43.4	345	0.715				Sandstone; very fine-grained, silty, carbonaceous laminations above lower shale contact
RMRD 0003	462.7	45.3	990	2.053				Sandstone; very fine-grained, light gray, with silt, poorly sorted
RMRD 0001	560.8	38.8	605	1.255				Sandstone, with silt
RMD0007-017	469.2	37.4	689	1.429	214	0.444	0.31	Sandstone; silty, light gray, with numerous dark clay fragments
RMRD 0001	571.12	31.9	179	0.371				Sandstone; very fined-grained, light gray.
Average		**39.4**	**561.6**	**1.165**	**214**	**0.444**	**0.38**	
Parameters for Cemented Sandstone Sample								
RMRD 0001	585.9	14.3	1.56	0.003				Sandstone; carbonate cement at 585' to 586'

[1] Nubeth sample (core hole number 477V) information is from Hamilton (1977). Numbers RMRD 0001 through RMRD 0004 and RMD0006 and RMD0007 are from core samples collected by Strata in 2009-2010.

ADDENDUM 2.7-G

REGIONAL BASELINE MONITOR

WELL HYDROGRAPHS


Ross ISR Project Barometric Pressure
Barometric Pressure, psi
13
12.9
12.8
12.7
12.6
12.5
12.4
12.3
12.2
12.1
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
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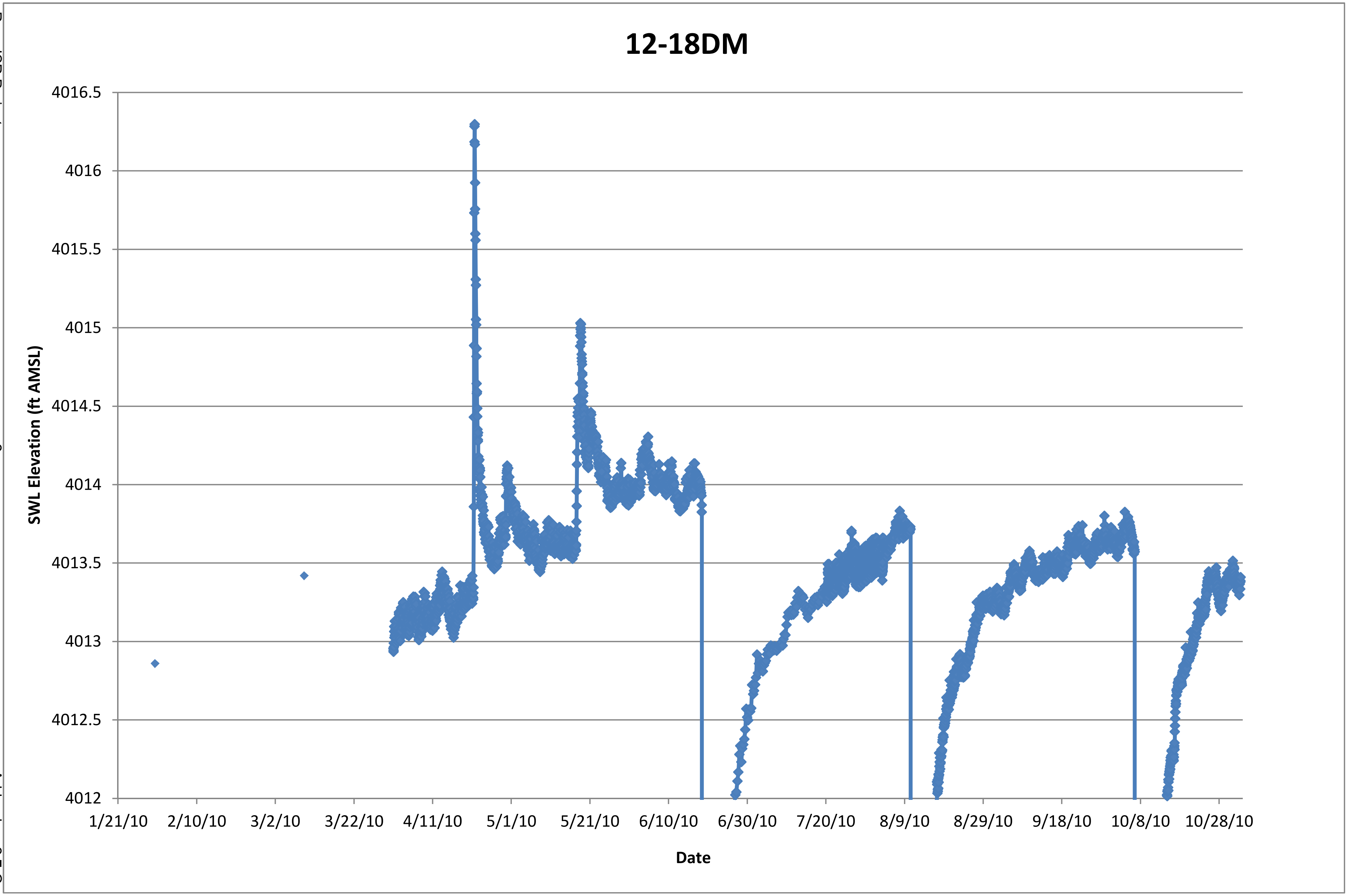
7/20/10
8/9/10
8/29/10
9/18/10
10/8/10
10/28/10
Date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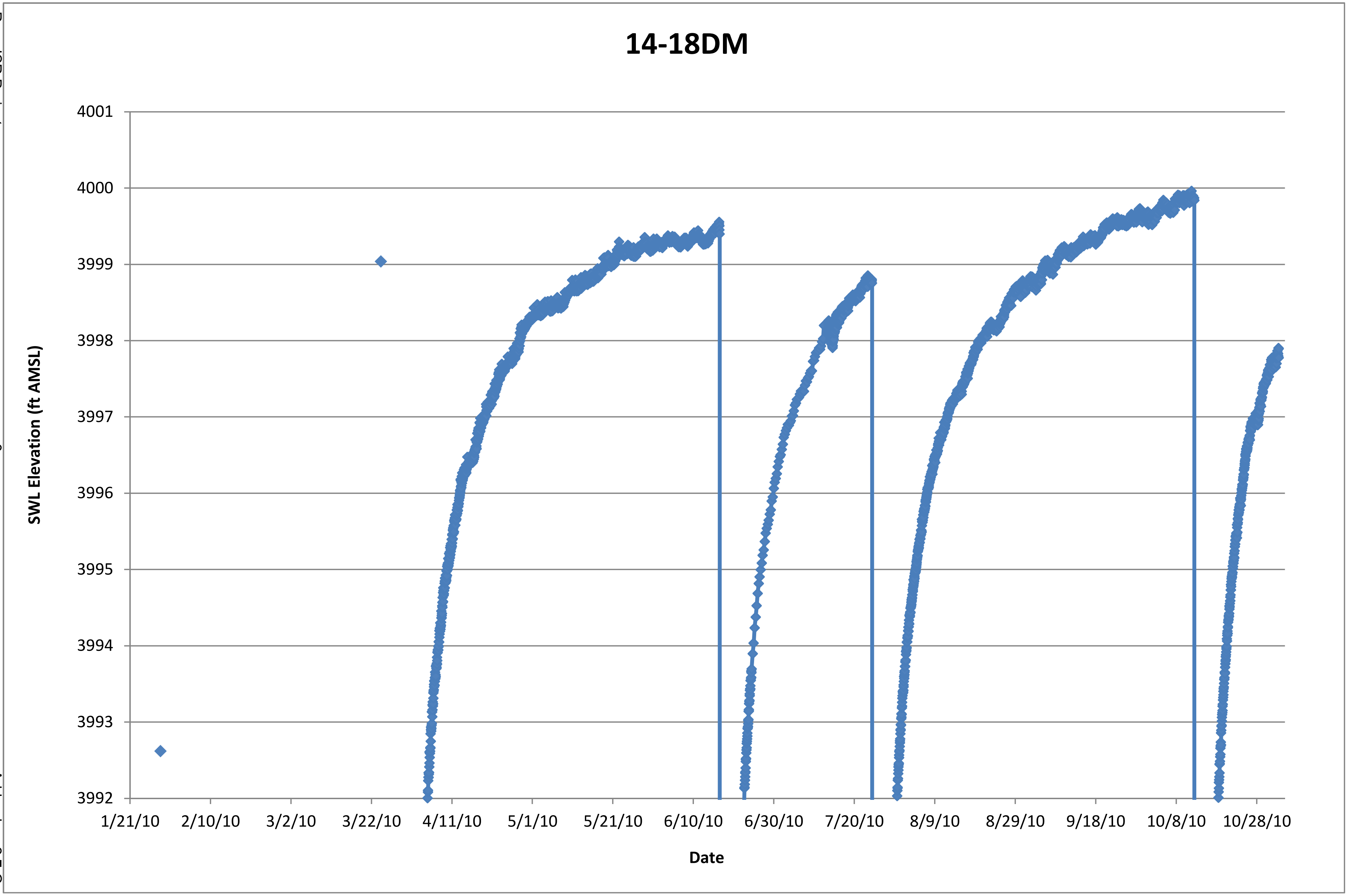
SWL Elevation (ft AMSL)
4016.5
4016
4015.5
4015
4014.5
4014
4013.5
4013
4012.5
4012
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
6/10/10
6/30/10
7/20/10
8/9/10
8/29/10
9/18/10
10/8/10
10/28/10
Date


14-18DM
SWL Elevation (ft AMSL)
4001
4000
3999
3998
3997
3996
3995
3994
3993
3992
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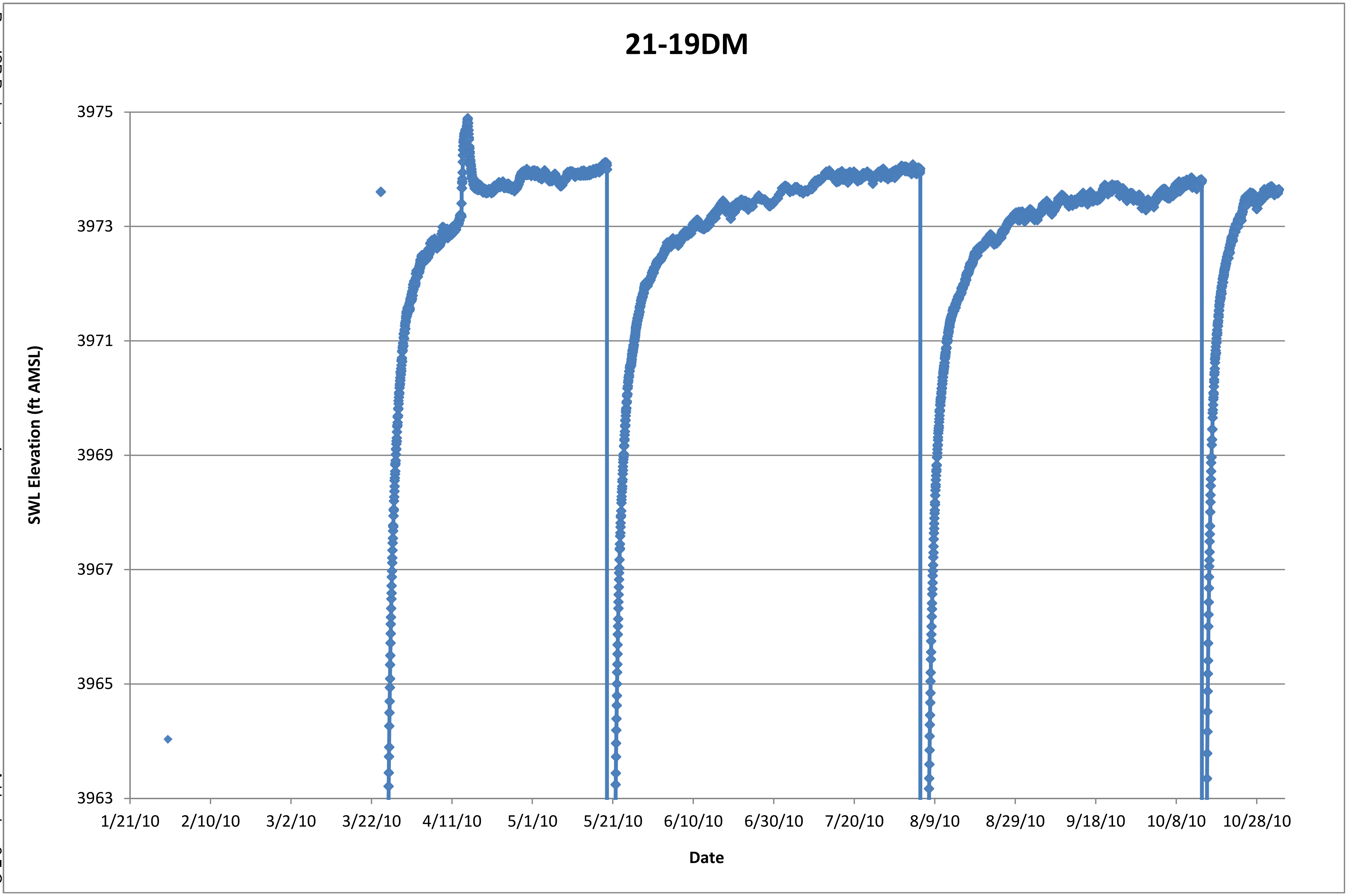
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
6/10/10
6/30/10
7/20/10
8/9/10
8/29/10
9/18/10
10/8/10
10/28/10
Date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SWL Elevation (ft AMSL)
3975
3973
3971
3969
3967
3965
3963
1/21/10
2/10/10
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3/22/10
4/11/10
5/1/10
5/21/10
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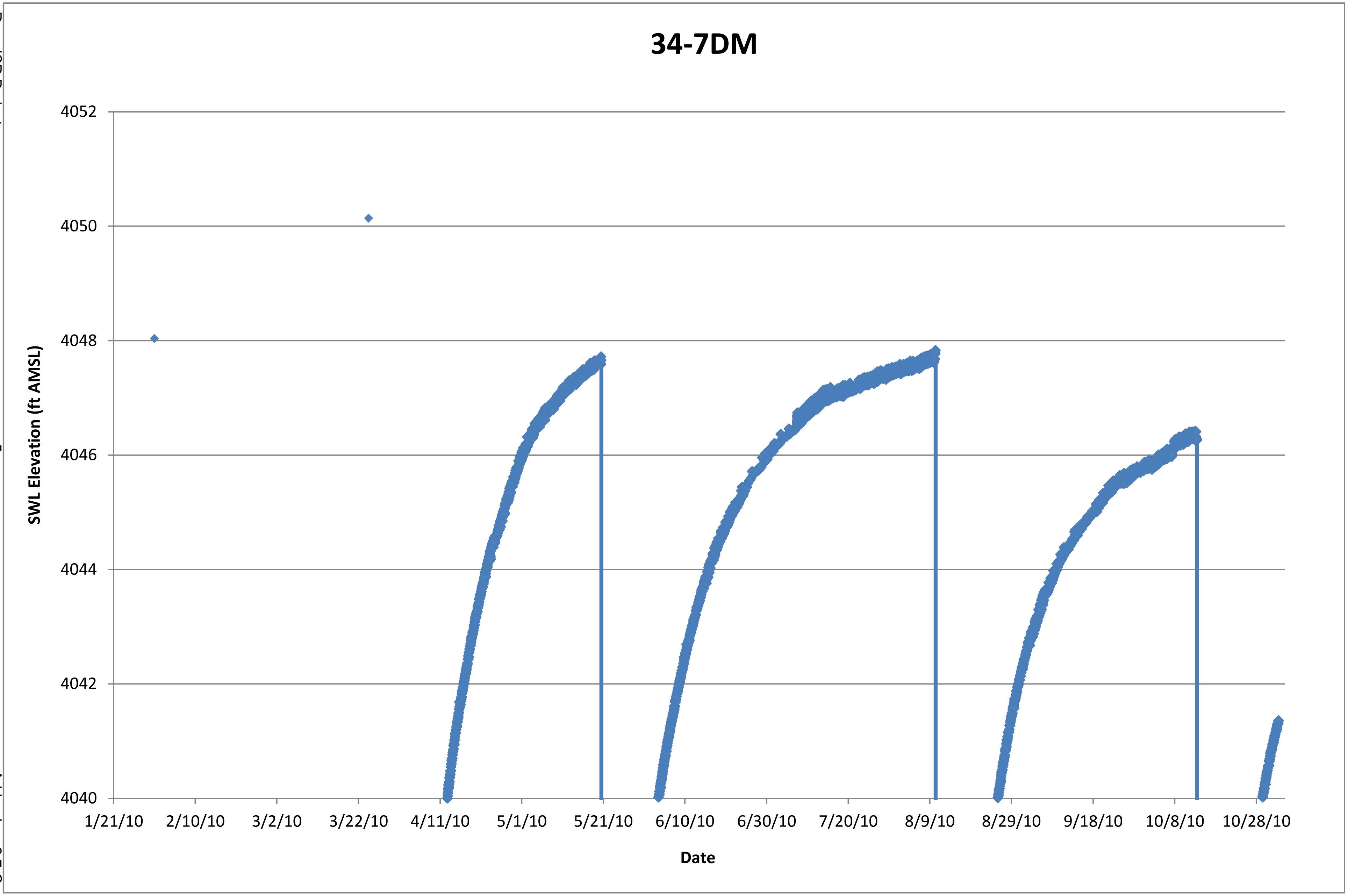
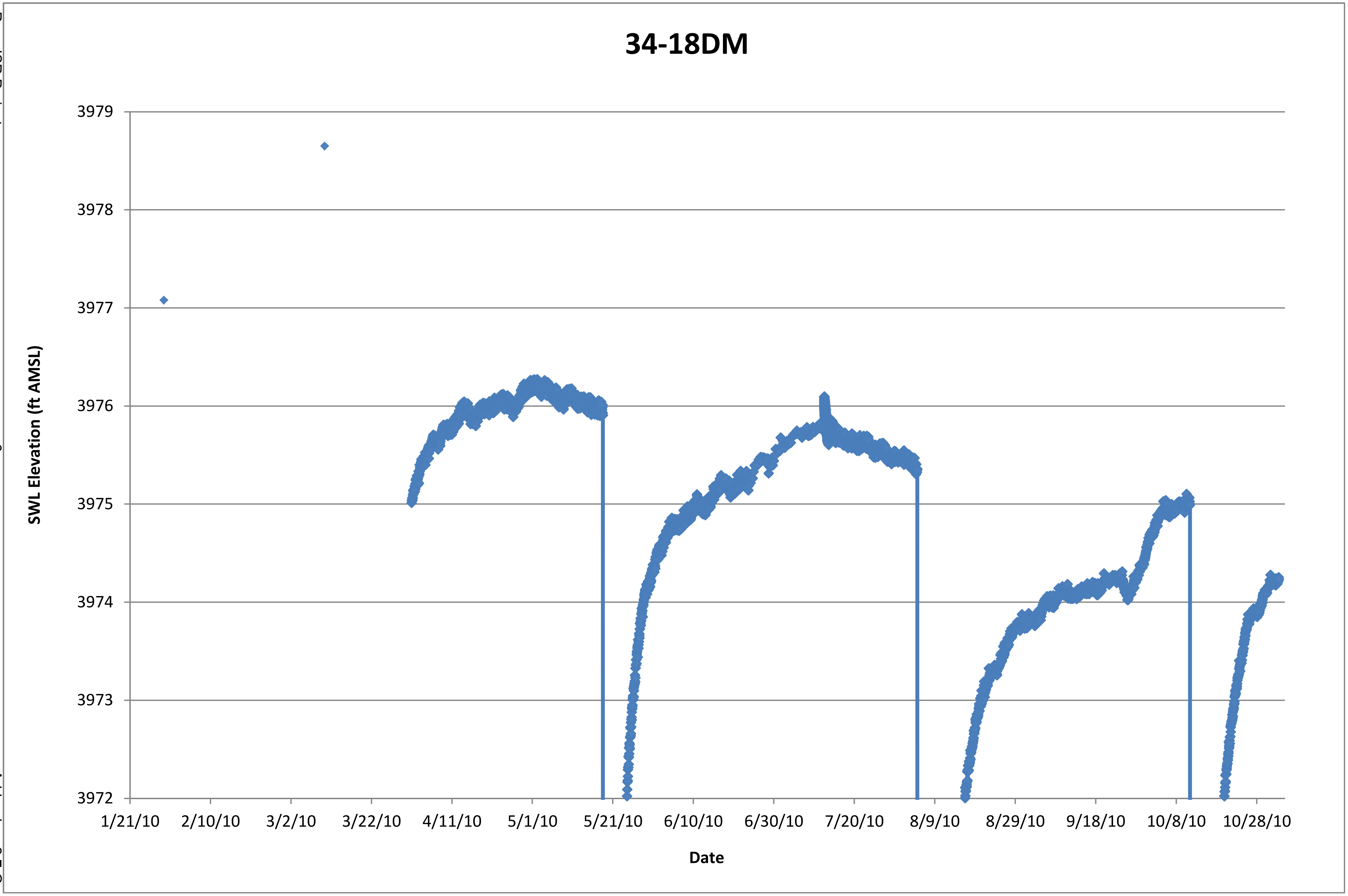
10/8/10
10/28/10
Date


34-7DM
4052
4050
4048
4046
4044
4042
4040
SWL Elevation (ft AMSL)
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
6/10/10
6/30/10
7/20/10
8/9/10
8/29/10
9/18/10
10/8/10
10/28/10
Date


34-18DM
SWL Elevation (ft AMSL)
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3978
3977
3976
3975
3974
3973
3972
1/21/10
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3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
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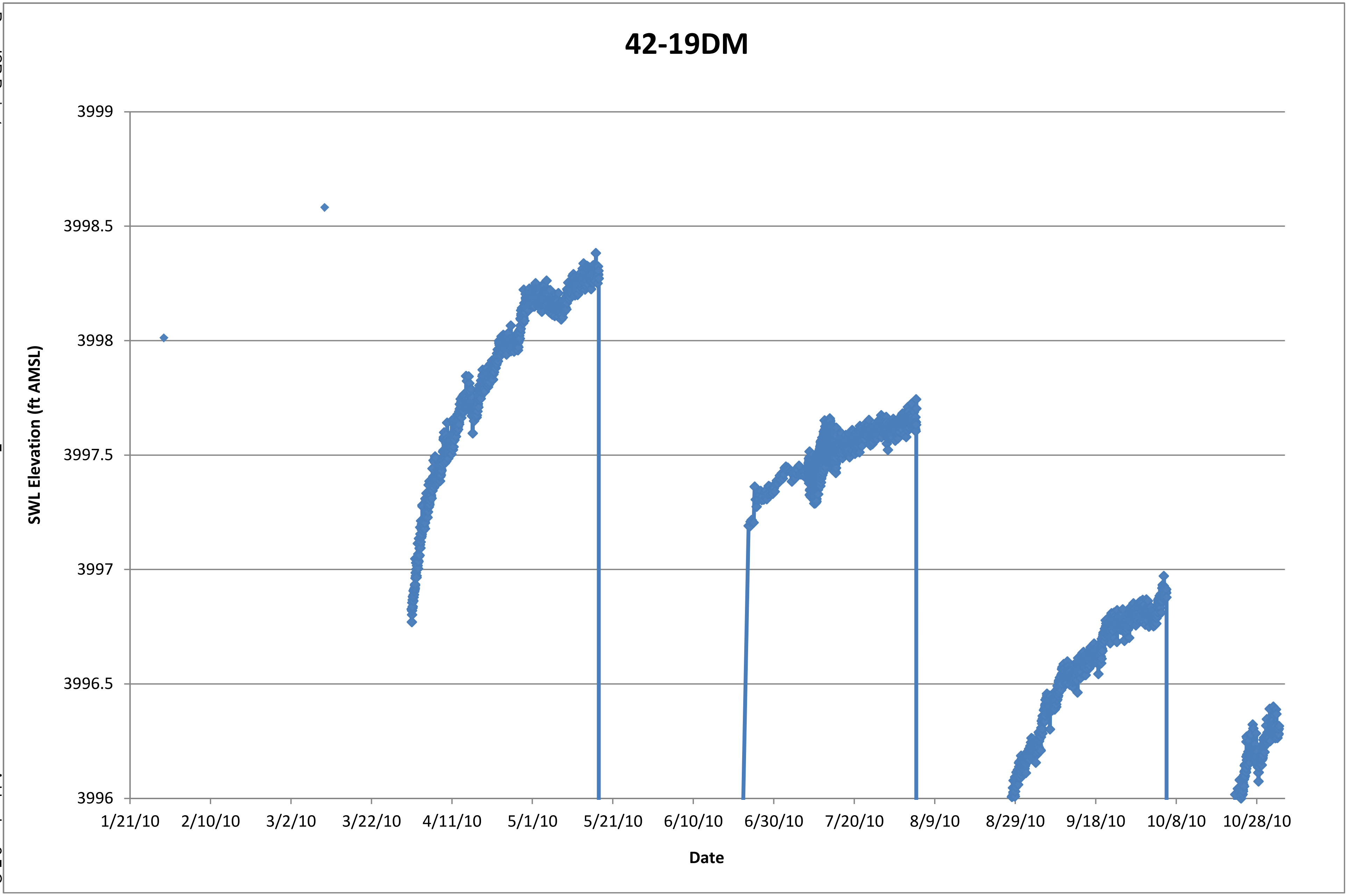
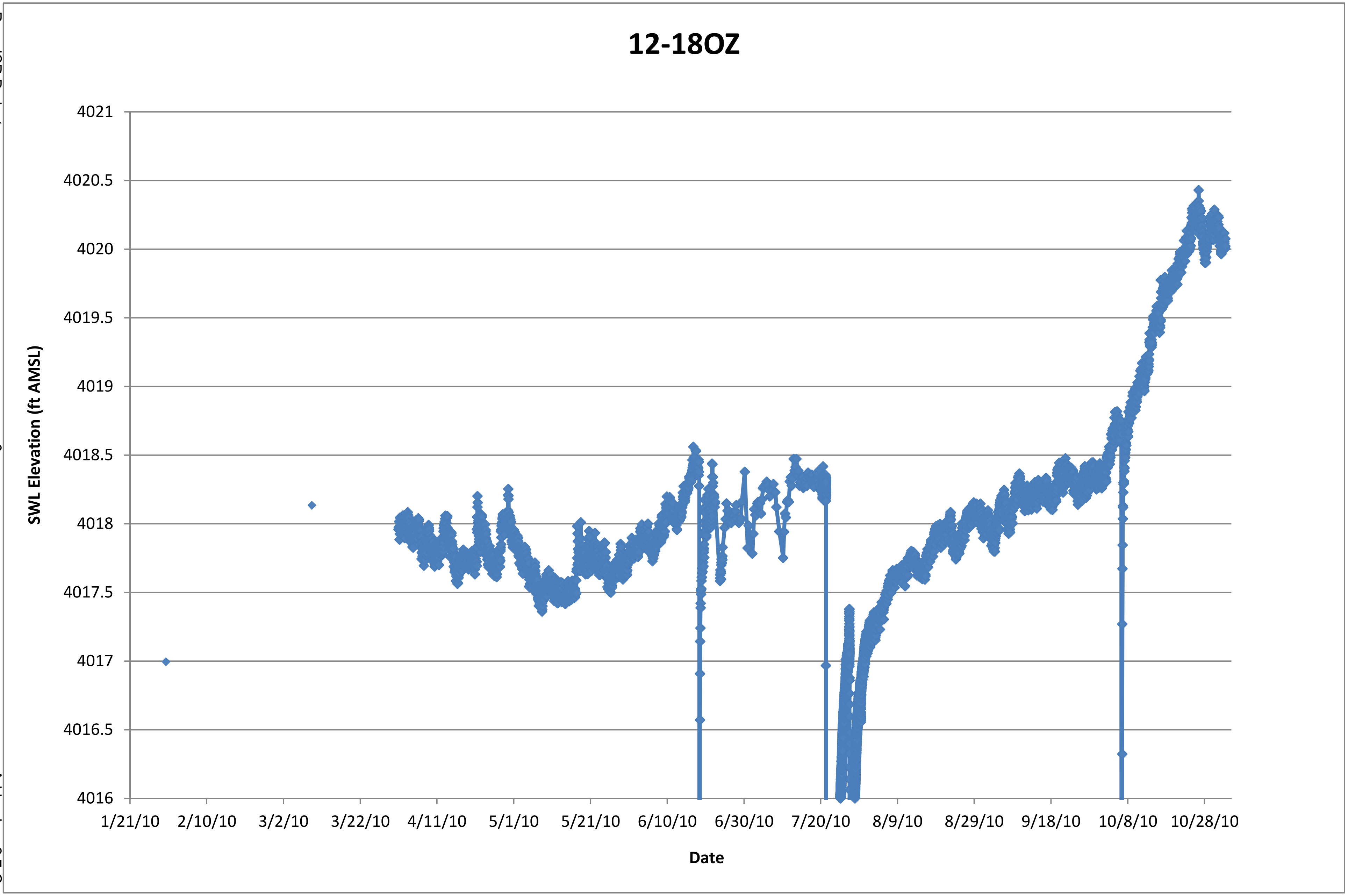
10/8/10
10/28/10
Date


42-19DM
3999
3998.5
3998
3997.5
3997
3996.5
3996
SWL Elevation (ft AMSL)
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
6/10/10
6/30/10
7/20/10
8/9/10
8/29/10
9/18/10
10/8/10
10/28/10
Date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SWL Elevation (ft AMSL)
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4020.5
4020
4019.5
4019
4018.5
4018
4017.5
4017
4016.5
4016
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
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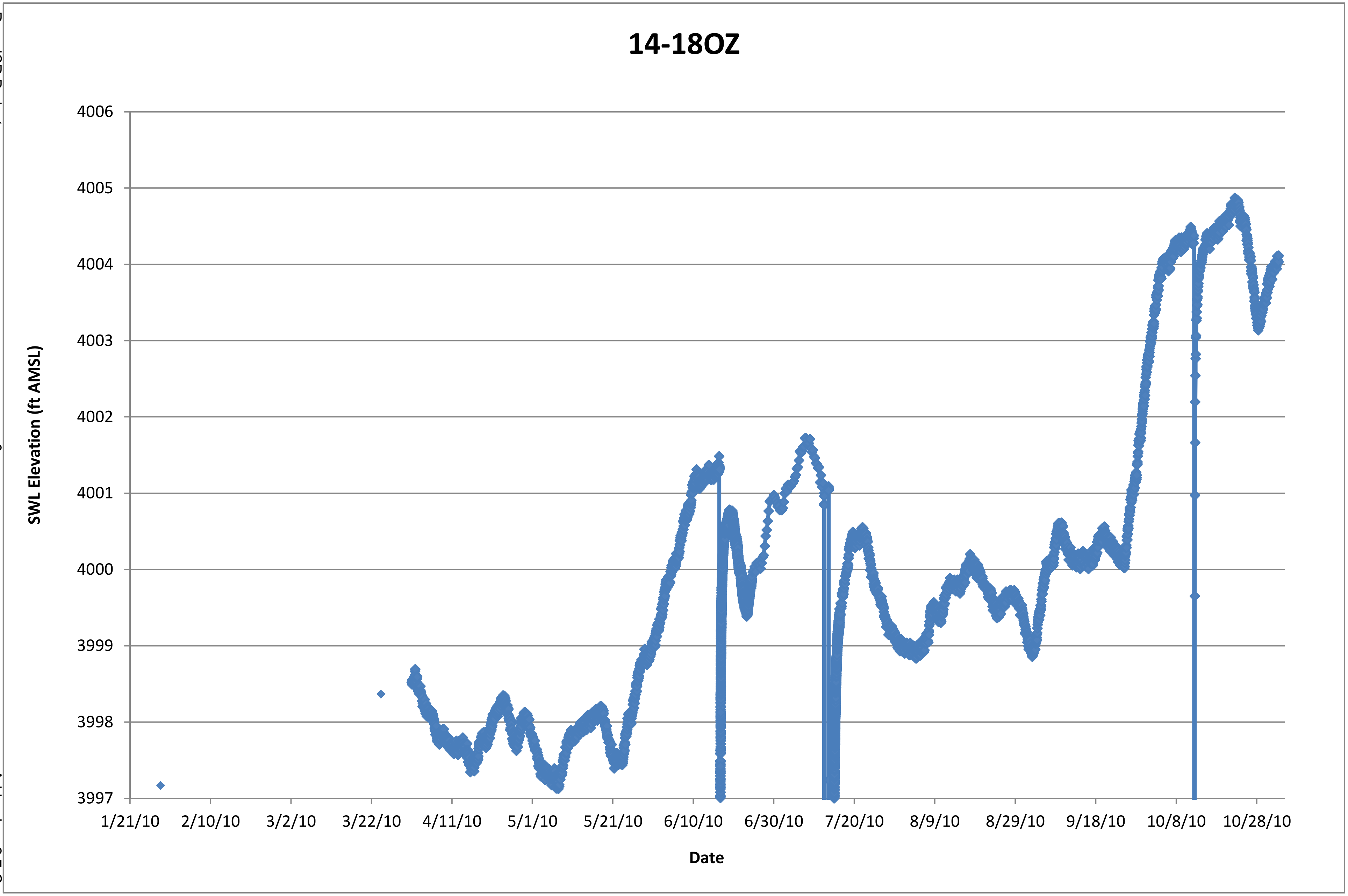

14-18OZ
SWL Elevation (ft AMSL)
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4005
4004
4003
4002
4001
4000
3999
3998
3997
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2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
6/10/10
6/30/10
7/20/10
8/9/10
8/29/10
9/18/10
10/8/10
10/28/10
Date


21-19OZ
3970
3968
3966
3964
3962
3960
3958
3956
3954
3952
3950
SWL Elevation (ft AMSL)
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
6/10/10
6/30/10
7/20/10
8/9/10
8/29/10
9/18/10
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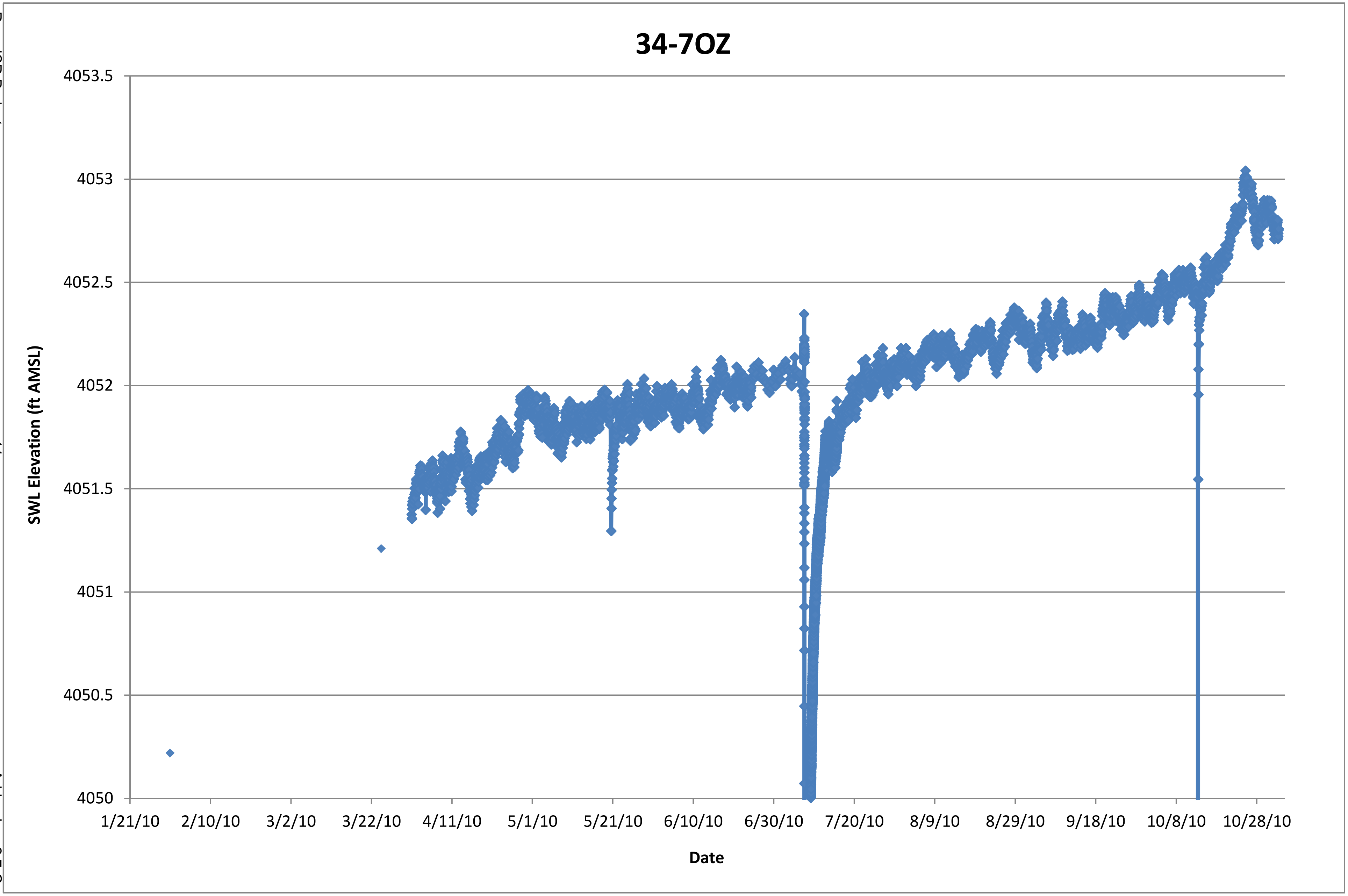
10/28/10
Date


34-7OZ
4053.5
4053
4052.5
4052
4051.5
4051
4050.5
4050
SWL Elevation (ft AMSL)
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
6/10/10
6/30/10
7/20/10
8/9/10
8/29/10
9/18/10
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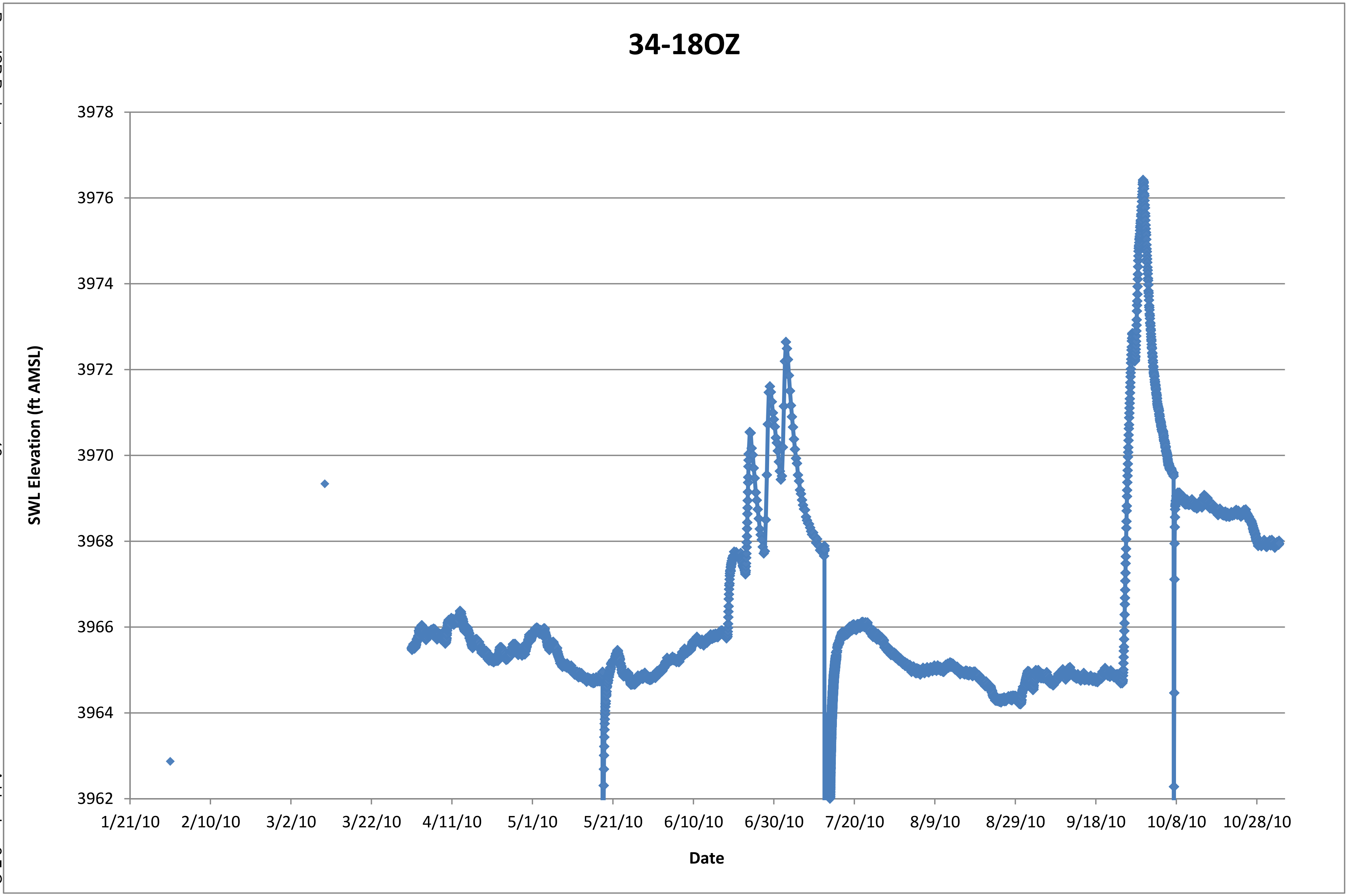
10/28/10
Date



34-18OZ
SWL Elevation (ft AMSL)
3978
3976
3974
3972
3970
3968
3966
3964
3962
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
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8/29/10
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10/28/10
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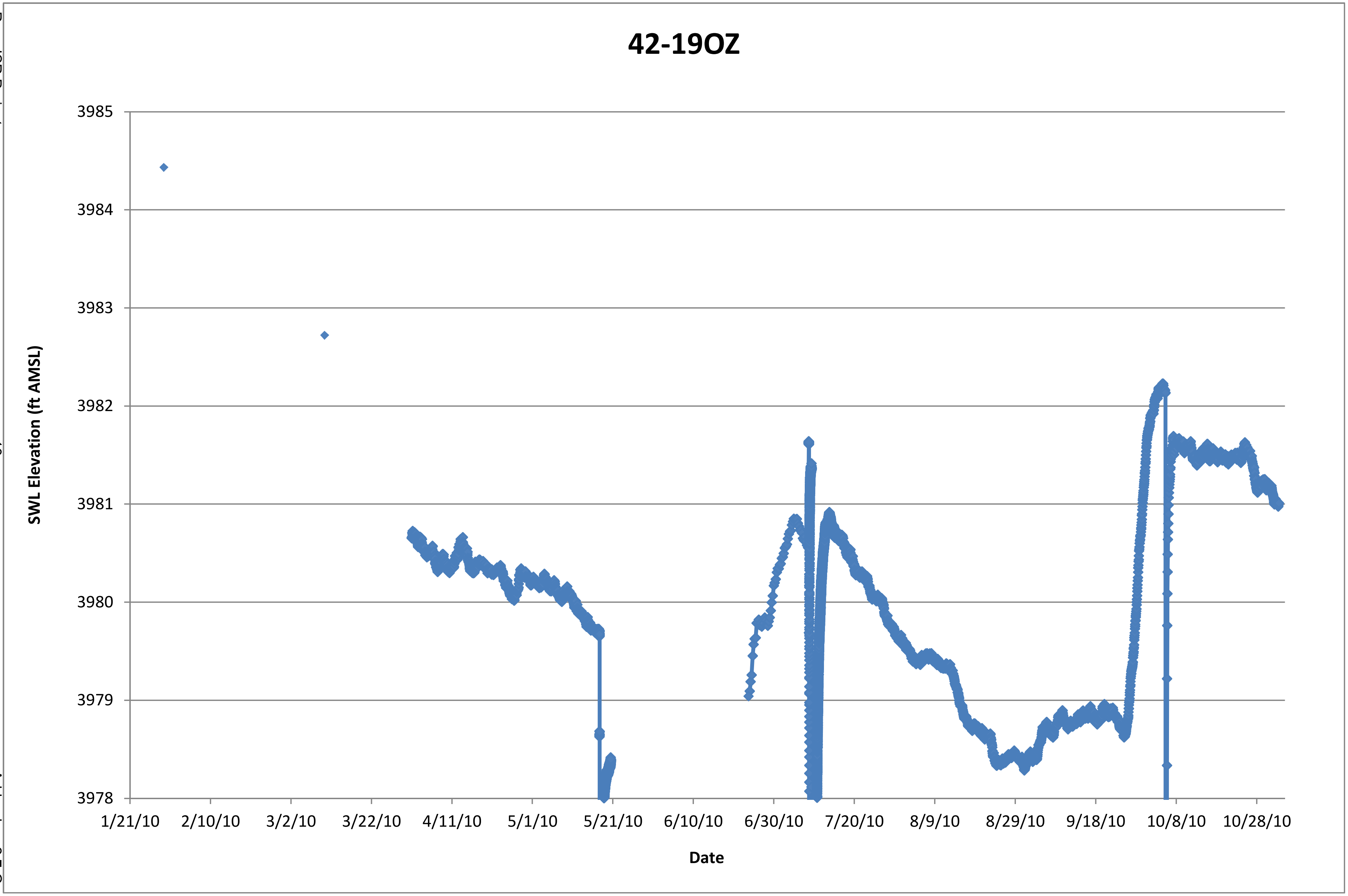
42-19OZ
SWL Elevation (ft AMSL)
3985
3984
3983
3982
3981
3980
3979
3978
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
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10/28/10
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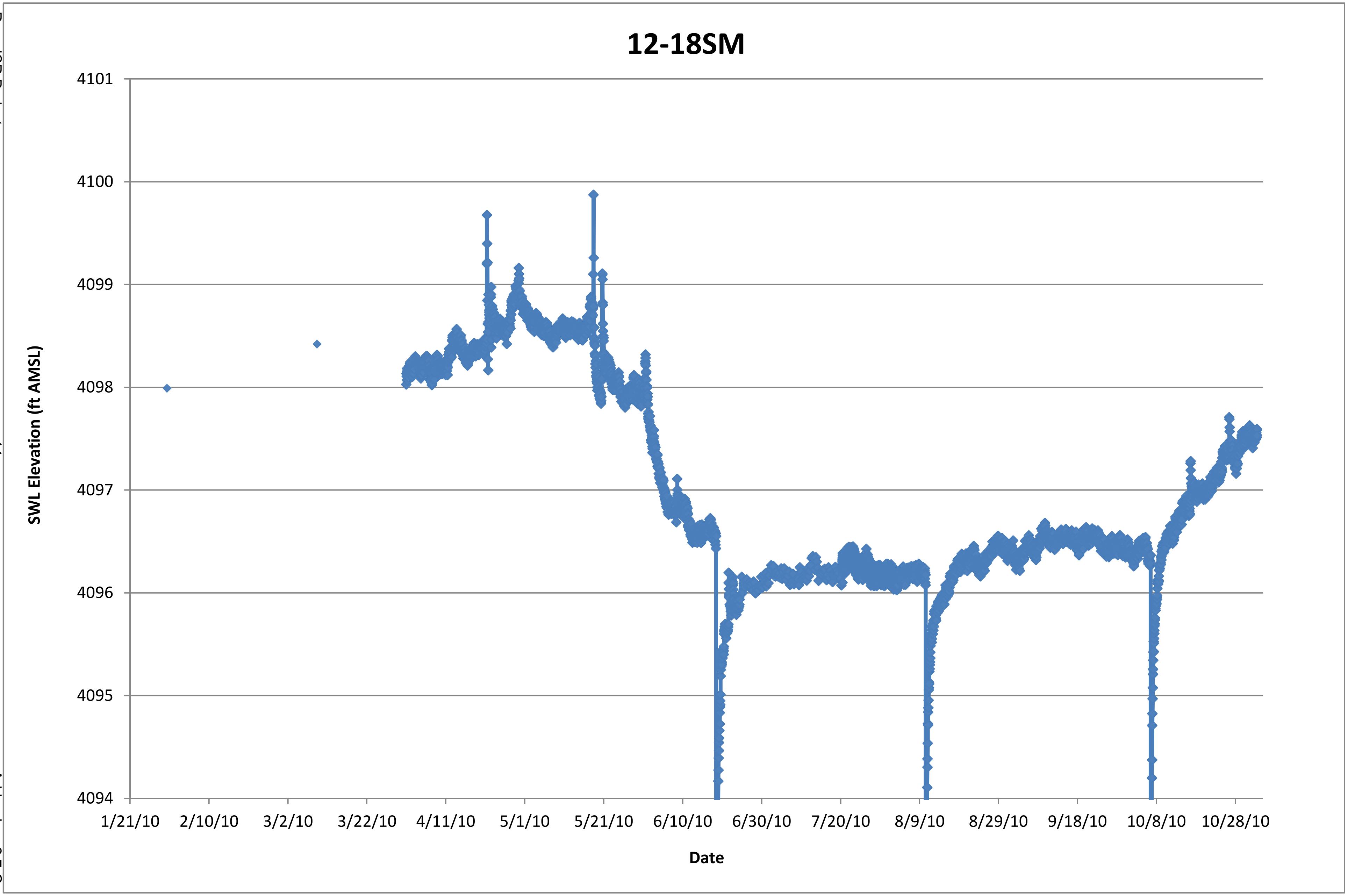
12-18SM
SWL Elevation (ft AMSL)
4101
4100
4099
4098
4097
4096
4095
4094
1/21/10
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3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
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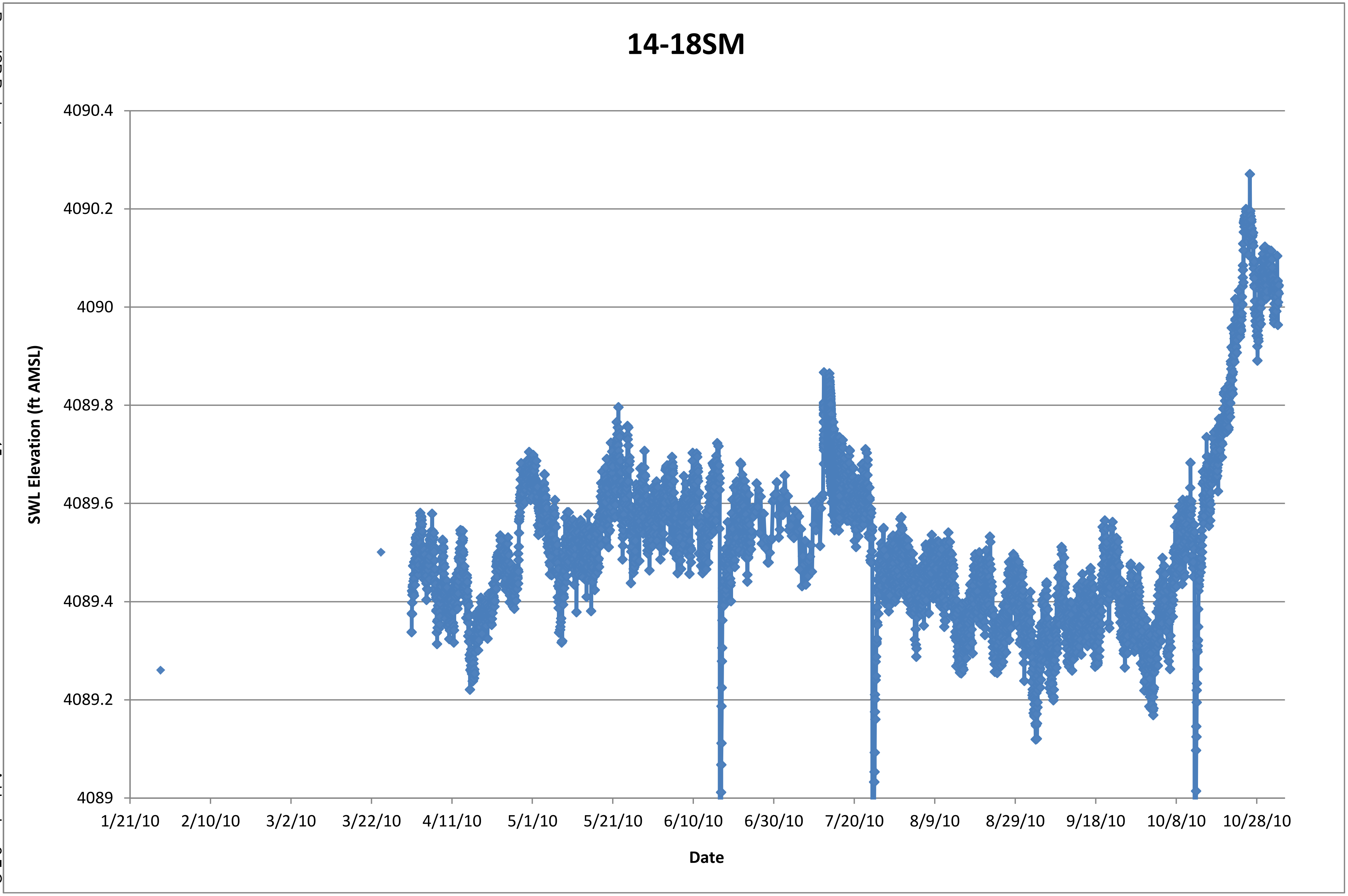
10/28/10
Date


14-18SM
SWL Elevation (ft AMSL)
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4090
4089.8
4089.6
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1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
6/10/10
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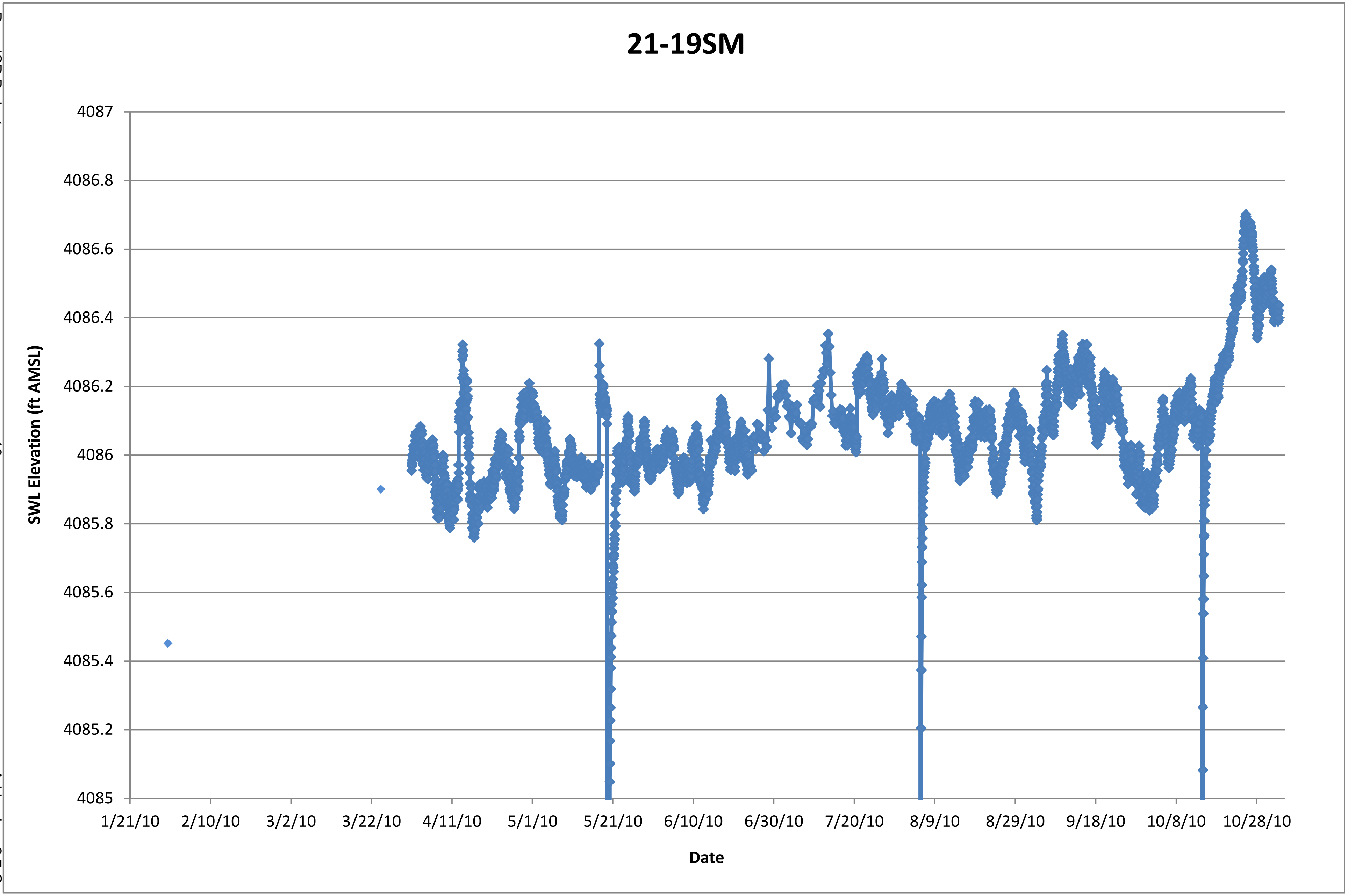
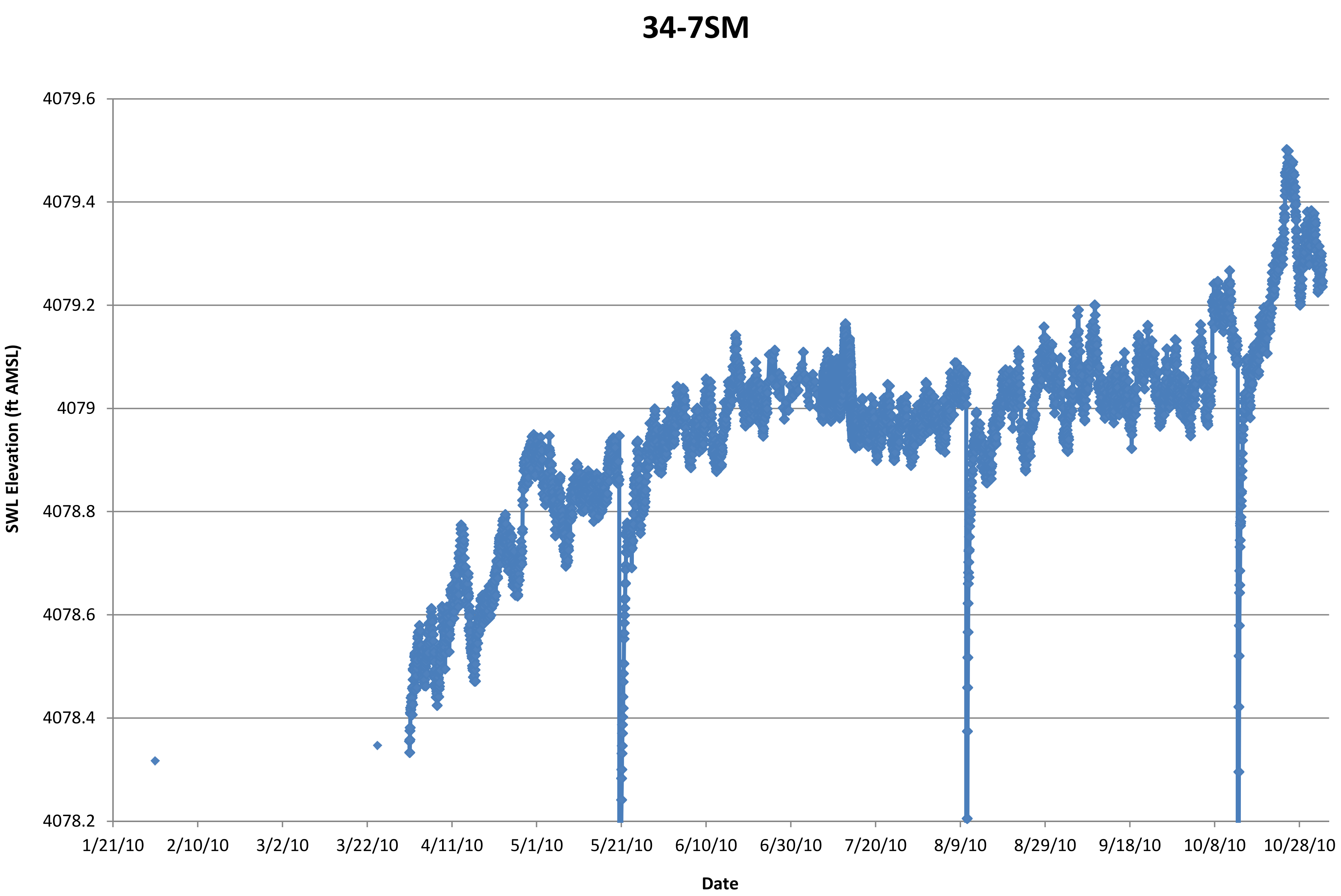
8/9/10
8/29/10
9/18/10
10/8/10
10/28/10
Date

Ross ISR Project

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SWL Elevation (ft AMSL)
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4079.4
4079.2
4079
4078.8
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4078.4
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1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
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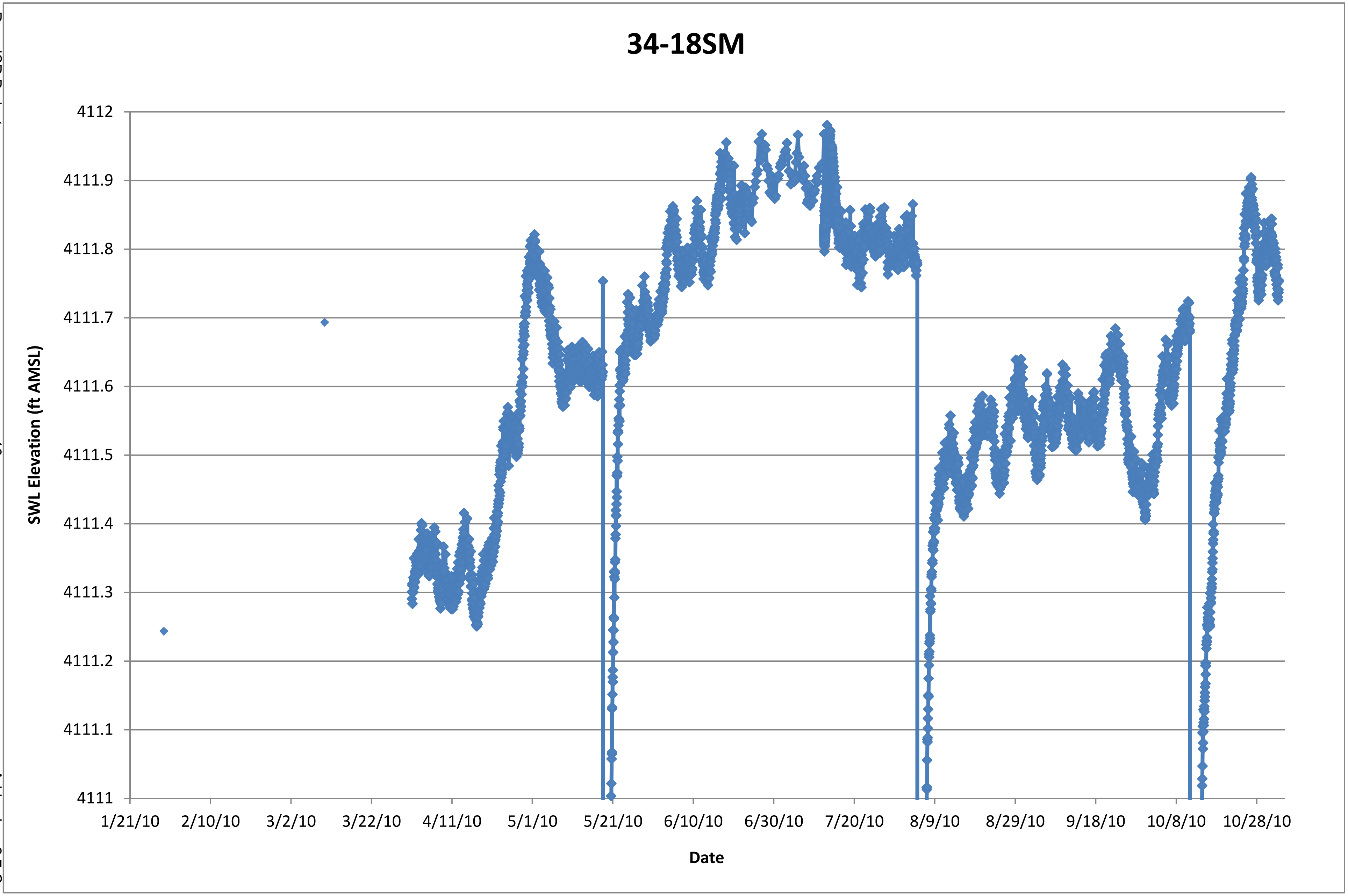
10/8/10
10/28/10
Date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SWL Elevation (ft AMSL)
4112
4111.9
4111.8
4111.7
4111.6
4111.5
4111.4
4111.3
4111.2
4111.1
4111
1/21/10
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3/2/10
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10/28/10
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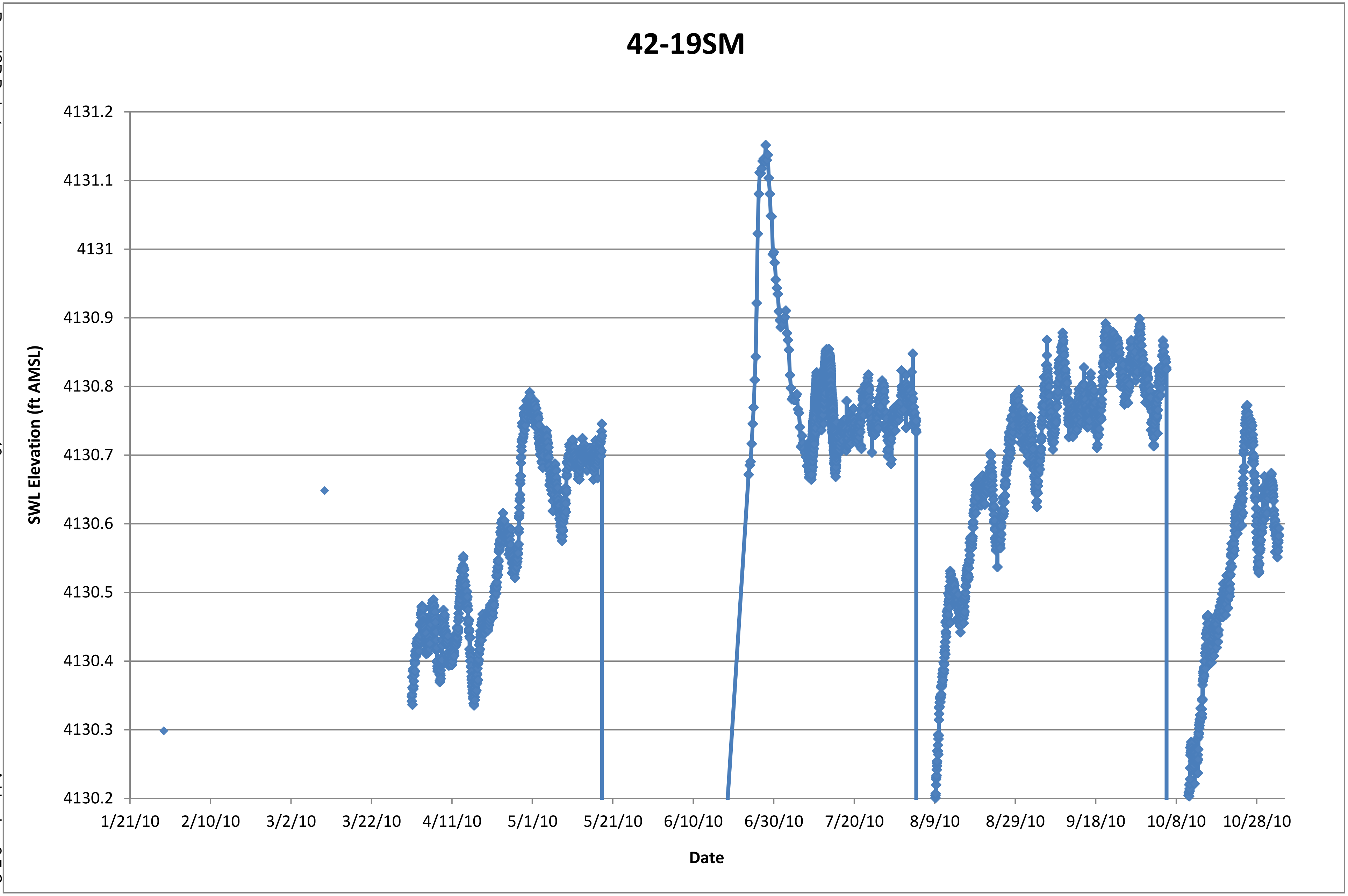
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SWL Elevation (ft AMSL)
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4131.1
4131
4130.9
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4130.7
4130.6
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4130.4
4130.3
4130.2
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
5/1/10
5/21/10
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10/28/10
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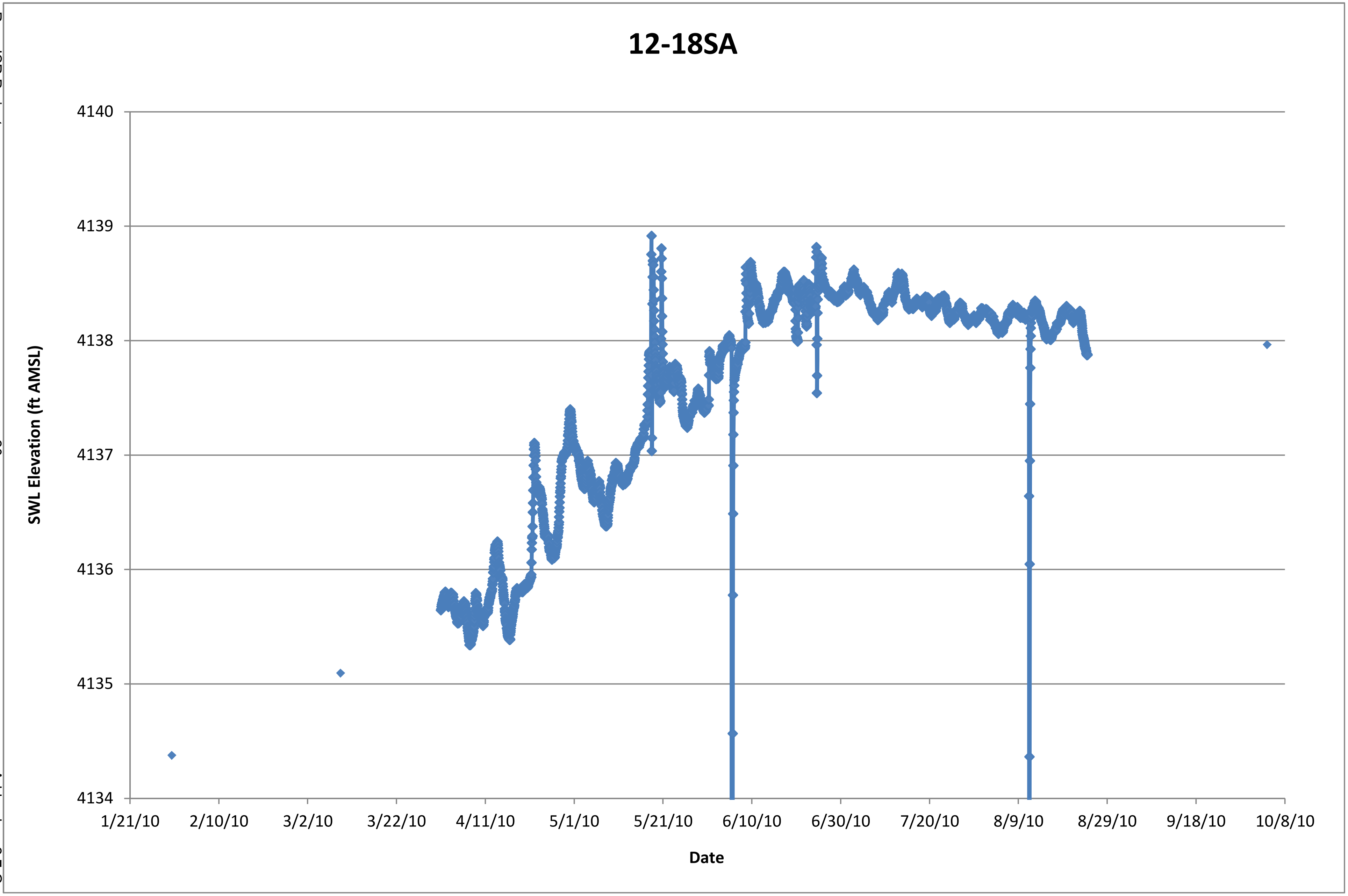
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SWL Elevation (ft AMSL)
4140
4139
4138
4137
4136
4135
4134
1/21/10
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3/2/10
3/22/10
4/11/10
5/1/10
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6/30/10
7/20/10
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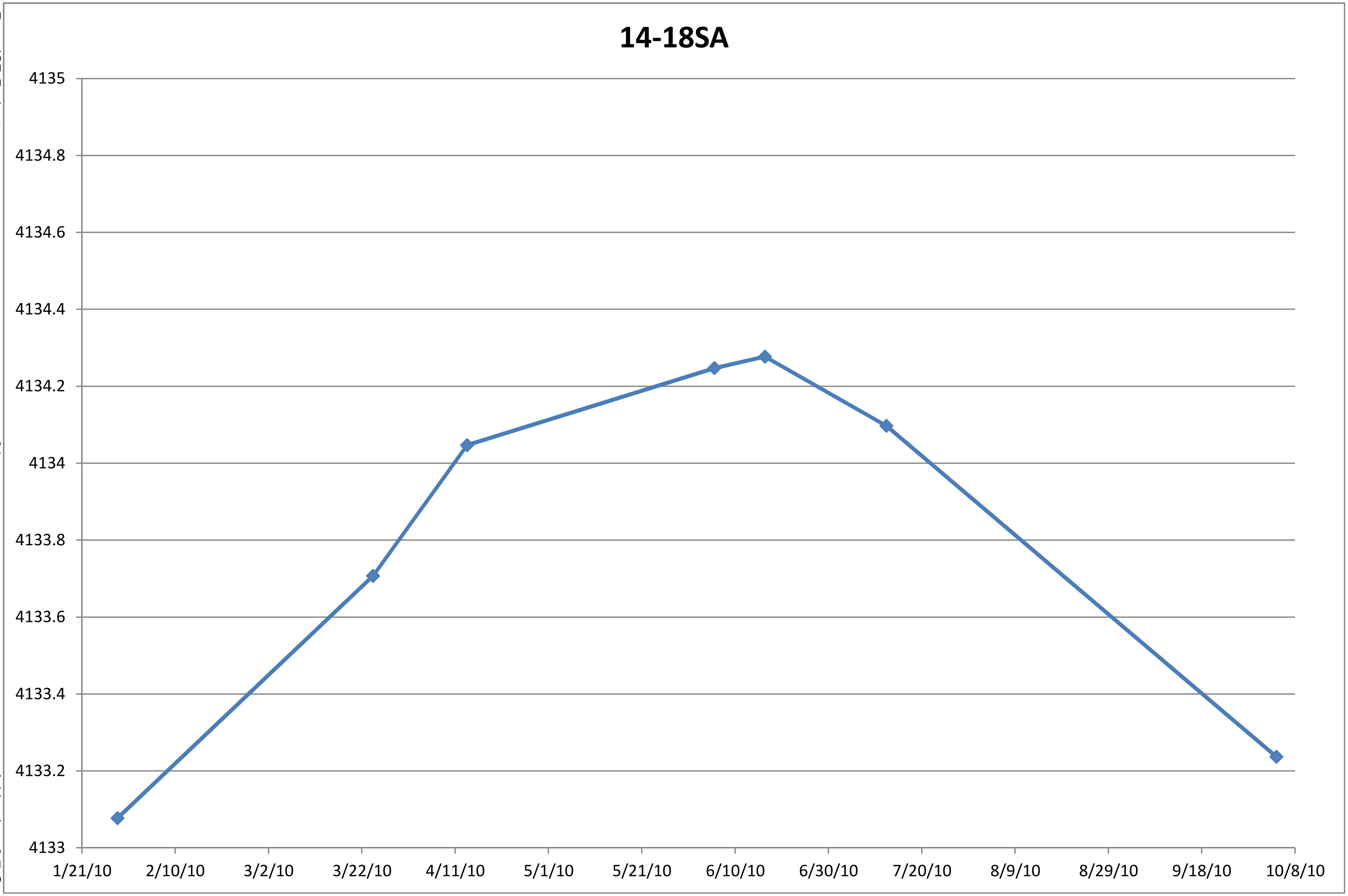
8/29/10
9/18/10
10/8/10
Date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4134.6
4134.4
4134.2
4134
4133.8
4133.6
4133.4
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4133
1/21/10
2/10/10
3/2/10
3/22/10
4/11/10
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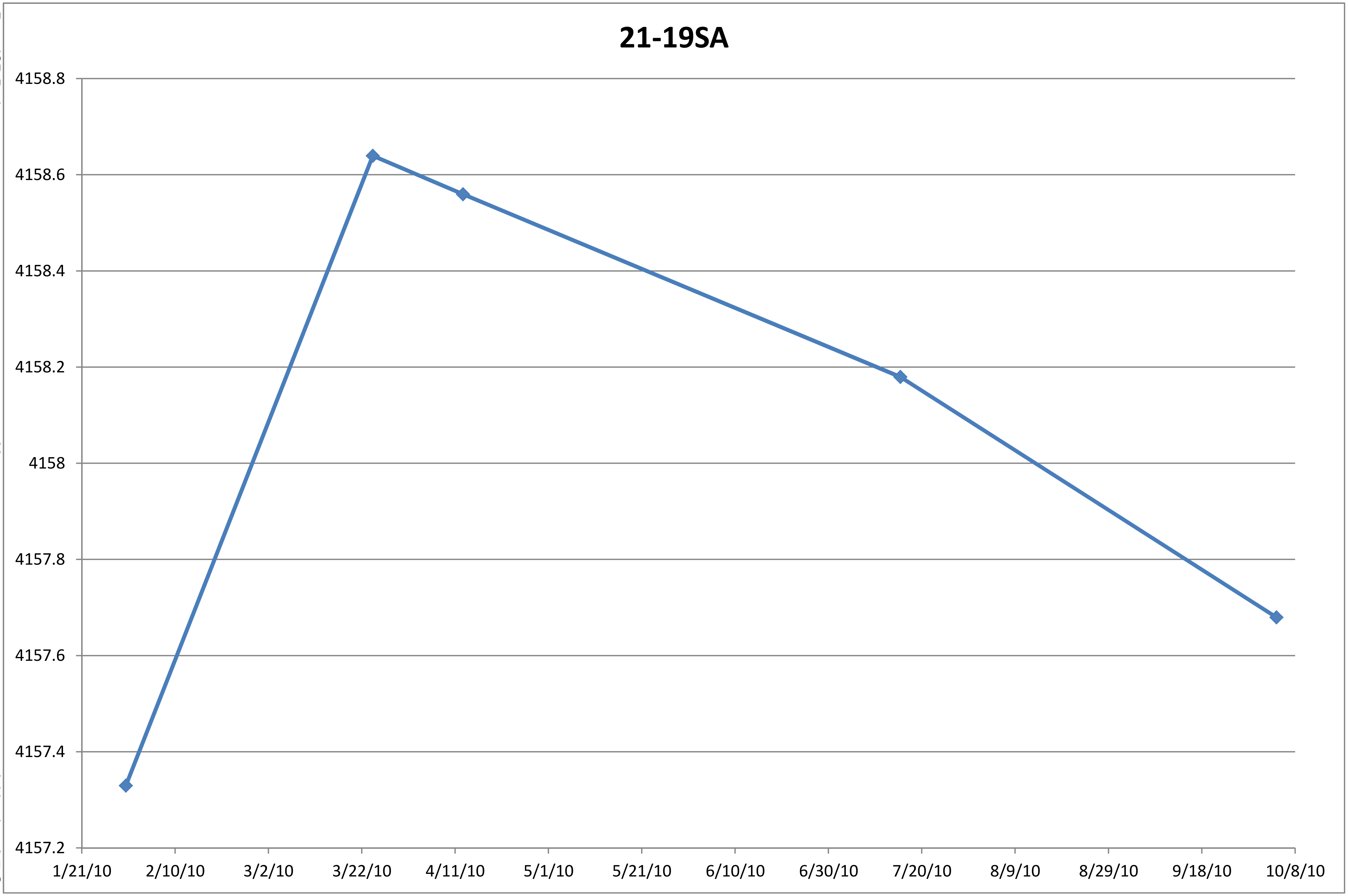
9/18/10
10/8/10


21-19SA
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4158.6
4158.4
4158.2
4158
4157.8
4157.6
4157.4
4157.2
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2/10/10
3/2/10
3/22/10
4/11/10
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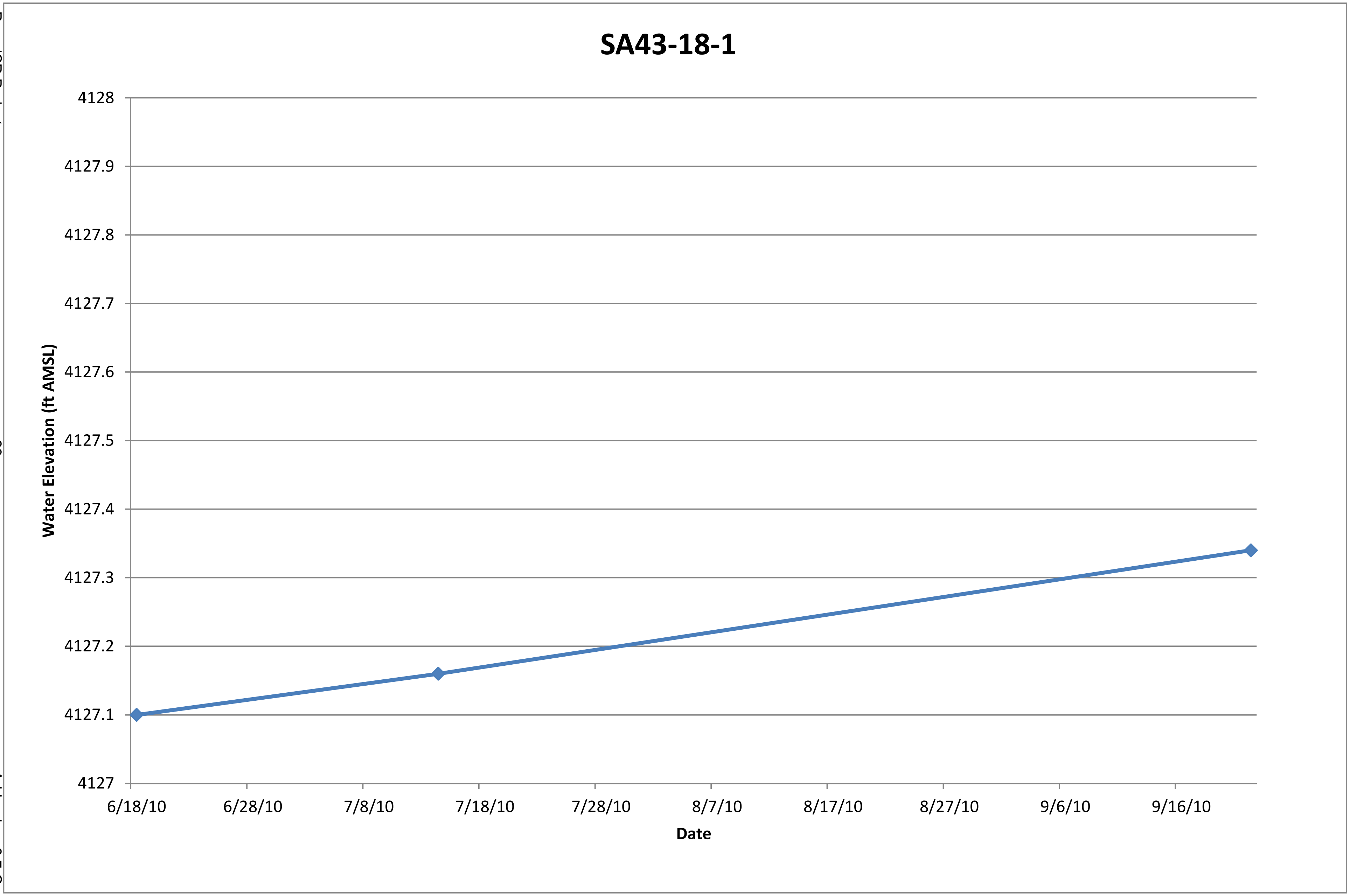
9/18/10
10/8/10


SA43-18-1
Water Elevation (ft AMSL)
4128
4127.9
4127.8
4127.7
4127.6
4127.5
4127.4
4127.3
4127.2
4127.1
4127
6/18/10
6/28/10
7/8/10
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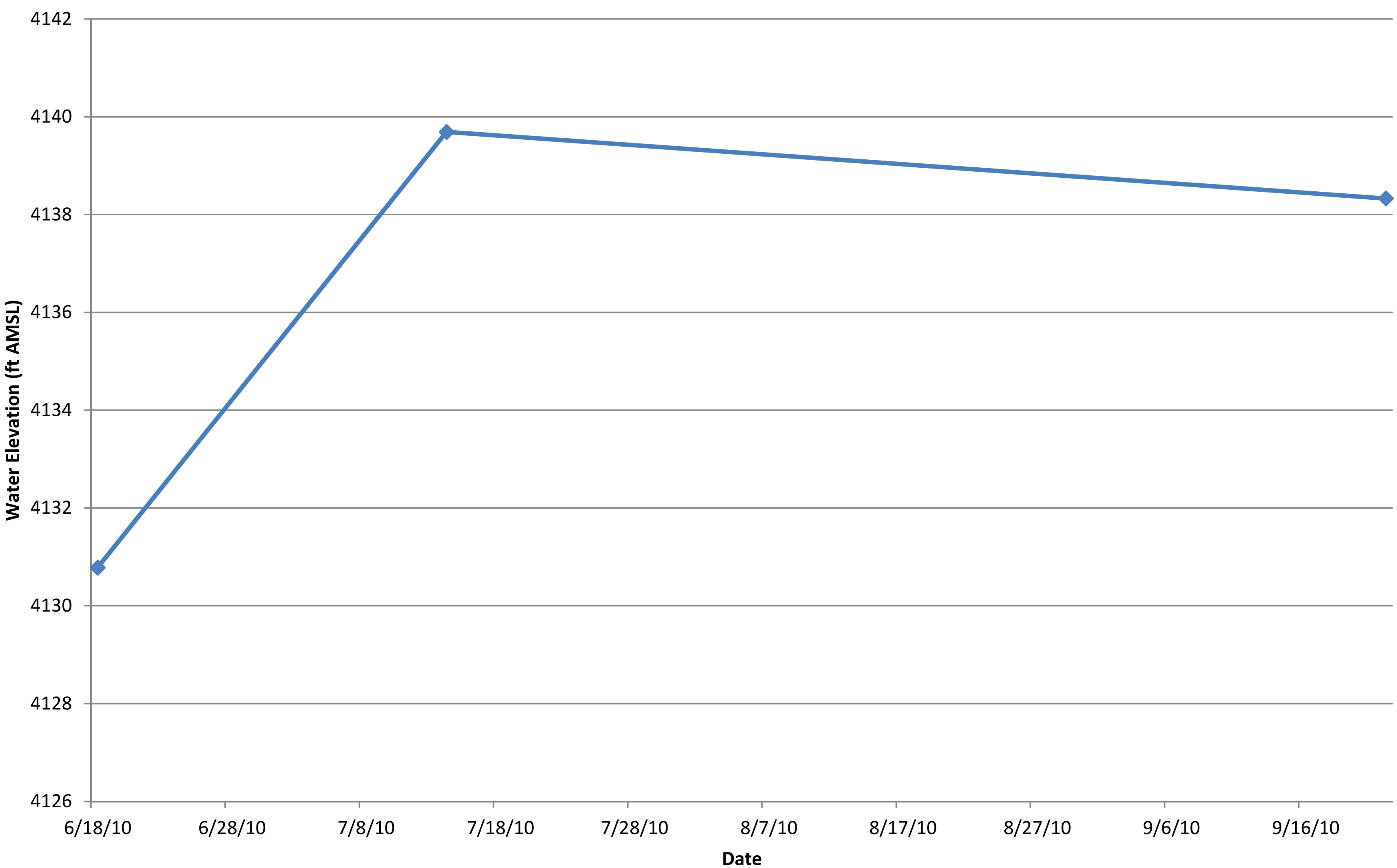
8/7/10
8/17/10
8/27/10
9/6/10
9/16/10
Date

SA43-18-2


Water Elevation (ft AMSL)
4142
4140
4138
4136
4134
4132
4130
4128
4126
6/18/10
6/28/10
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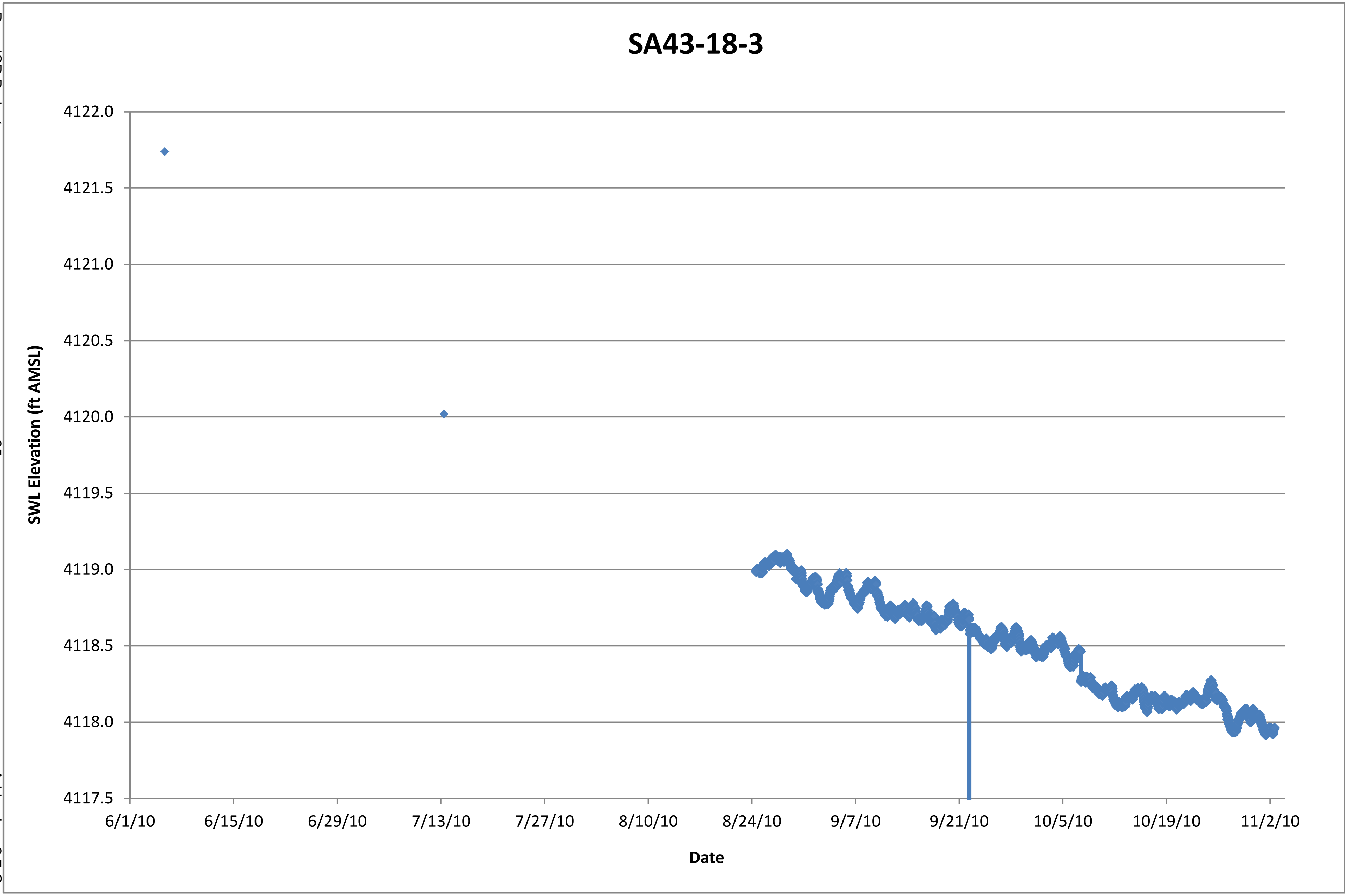
7/28/10
8/7/10
8/17/10
8/27/10
9/6/10
9/16/10
Date


SA43-18-3
SWL Elevation (ft AMSL)
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4121.5
4121.0
4120.5
4120.0
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4118.0
4117.5
6/1/10
6/15/10
6/29/10
7/13/10
7/27/10
8/10/10
8/24/10
9/7/10
9/21/10
10/5/10
10/19/10
11/2/10
Date

ADDENDUM 2.7-H

GROUNDWATER MODEL

EXECUTIVE SUMMARY
GROUNDWATER MODELING OF POTENTIAL IMPACTS
ASSOCIATED WITH THE ROSS ISR URANIUM PROJECT

This executive summary is intended to orient the reader to the groundwater model developed in support of the Ross ISR Uranium Project. Enough detail is provided within this summary to generally describe the model development and results. However, as the name implies, this is a summary and the interested reader is referred to the whole report for specific details related to the modeling effort.

BACKGROUND

Strata Energy (Strata) plans to develop the Ross in situ recovery (ISR) uranium project in western Crook County approximately 20 miles north of Moorcroft, WY, adjacent to the ranching community of Oshoto. Strata has developed a groundwater model to analyze the potential direct, indirect, and cumulative hydrological effects of the project on both regional and individual wellfield bases. The primary goals of the regional groundwater model were to:

1) Identify potential impacts (if any) to adjacent water rights.
2) Estimate long-term impacts from ISR operations.
3) Identify potential impacts to the surficial aquifer and surface impoundments.

Modeling goals on an individual wellfield basis were to:
1) Estimate adequate perimeter monitoring well offset/setback distances for the wellfield.
2) Demonstrate the ability to identify and remedy a lateral excursion (i.e., lixiviants moving past the monitor wells).
3) Wellfield optimization, including bleed.
4) Evaluate restoration time/efficiency.

HYDROGEOLOGY

The Ross ISR Project is located on the eastern periphery of the Powder River structural basin and western margin of the Black Hills uplift. Within the proposed project area, uranium deposits lie primarily within the Upper Cretaceous Fox Hills and Lance Formations. Underlying the Lance Formation is the Fox Hills Formation, which overlies the Upper Cretaceous Pierre Shale. The dominant structural feature in the vicinity of the Ross Project area is the

Black Hills Monocline, an area of near-vertical dip on the western flank of the Black Hills Uplift. West of the monocline, strata are nearly flat-lying (2 degree dip westward into the Powder River Basin). The Pierre Shale outcrop to the east of the project area provides a natural hydrologic barrier to easterly groundwater movement within the project area.

The proposed ISR operations will focus on uranium mineralization within the Fox Hills aquifer and lower Lance Formation aquifers. The ore-containing aquifer is referred to as the ore zone (OZ). The OZ is a highly confined regional aquifer separated from overlying and underlying aquifers by a persistent shale. The unit underlying the OZ is referred to as the deep monitoring zone (DM) and is separated from the OZ aquifer by up to 50 feet of shale. Underlying the DM is the Pierre Shale, a regional confining layer. The nearest aquifer overlying the OZ unit is called the shallow monitoring zone (SM), which is separated from the OZ unit aquifer by approximately 20 to 35 feet of shale. The SM aquifer is also confined by shale of varying in thickness which typically ranges from 10 to 25 feet or more. Above the SM several thin sandstone and shale complexes exist between the SM and the ground surface. The thin sandstone and shale complexes located above the SM are not regionally extensive and the water-bearing strata are thin and discontinuous. For the purposes of this model, this marginal water-bearing portion of the Lance formation is referenced to as the Lance aquitards. Overlying the Lance aquitards is the water table aquifer, referred to within the project area as the SA or surficial aquifer unit.

Within the proposed project area, groundwater flow directions are variable; within the SA aquifer flow is in a generally easterly direction while groundwater flow in the Lance and Fox Hills strata is down dip, generally to the west and the north. The Fox Hills and Lance outcrops located at the eastern edge of the proposed project area are recharge zones for the SM and OZ aquifers. Recharge also enters the project area from the south. Figure ES-1 depicts the conceptual groundwater flow system within the Ross Project area.

GROUNDWATER USE

Wells completed within the proposed Ross Project area provide water for stock, domestic, and industrial uses. Except at the outcrop, the SM and OZ aquifers are deeper than the typical reported completion depths of the stock wells within the project area. Most of the stock/domestic wells (typically low yield) within the area appear to be completed within the thin sands of the Lance Formation aquitards. Due to the hydrologic separation between the Lance Formation aquitards and the OZ and SM aquifers, the Lance aquitards are not expected to be impacted by ISR operations. Near the OZ and SM outcrop on the eastern periphery of the Ross project area the aquifers are much shallower and several stock/domestic wells located in this area are likely completed within the OZ aquifer.

Several operating oil fields are located within the greater Oshoto region. These fields produce from the Minnelusa Formation, and are currently undergoing waterflood operations. The water flood source wells are completed in the OZ interval. Three oil field water supply wells owned by Merit Energy Company (Merit) are located within the Ross Project area and have been in operation since approximately 1980. Due to withdrawals, pumping from the industrial wells over the last 30 years, the 2010 OZ potentiometric surface exhibits a well defined cone of depression. Much is known about the OZ aquifer within the region because the 30 years of pumping have essentially served as a long-term regional pumping test. By simulating pumping over the last 30 years, the calibrated groundwater model was verified by comparing measured and modeled changes to the potentiometric surface.

Pre-1980 potentiometric surfaces were developed for the OZ and SM aquifers using well completion and head data from the Wyoming State Engineer's Office, the Wyoming Oil and Gas Conservation Commission, the historic Nubeth research and development uranium project, and ground surface elevations from naturally occurring seeps emanating from the Fox Hills outcrop some 7 to 11 miles north of the Ross Project. Monitor wells constructed by Strata Energy in 2009 and 2010 were used in development of the 2010 potentiometric surfaces for all the layers.

MODEL CONSTRUCTION

The numerical groundwater model utilizes the USGS modular finite-difference groundwater model MODFLOW (MacDonald and Harbaugh, 1988) and the pre/post processor Groundwater Vistas (Rumbaugh and Rumbaugh, 2002). Groundwater Vistas and MODFLOW were chosen for this modeling effort because they are widely used and accepted by both industry and regulatory agencies.

The model grid is oriented parallel to the geologic strike of the Fox Hills outcrop, which is generally north-south. The model domain covers approximately 22 square miles. The finite difference grid consists of 176 rows and 165 columns. The model contains of seven layers which are described below and depicted on Figure ES-2.

Layer 1 Represents the SA unit. This layer includes the top 20 feet of the entire model domain.

Layer 2 Represents the Lance aquitard above the SM confining interval. Within the Lance Formation are a number of thin sands sandwiched between shales. These sands form small discontinuous aquifers that are believed to provide recharge as well as receive recharge from the alluvial system where they come into contact with it.

Layer 3 Represents the SM confining interval.

Layer 4 Represents the Shallow Monitoring (SM) zone. This is the first aquifer above the OZ confining interval and will be monitored during ISR.

Layer 5 Represents the OZ confining interval. This is a thick shale that separates the OZ aquifer from the SM aquifer.

Layer 6 Represents the OZ unit.

Layer 7 Represent the Fox Hills basal confining shale between the OZ and the DM units, which is simulated.

Hydraulic Parameters

The hydraulic parameters used in the groundwater model include hydraulic conductivity, storage, recharge, and evapotranspiration. The hydraulic conductivity values used within the model were based on pumping tests performed by Nubeth in the late 1970's and by Strata in 2010. Where measured data were not available, hydraulic conductivity was estimated using literature values. Through the calibration process initial estimated hydraulic conductivity values were adjusted in order to meet head targets. Calibrated horizontal and vertical hydraulic conductivities used within the model are presented in Tables 1 and 2.

Table 1. Horizontal Hydraulic Conductivity Summary

		Model Hydraulic Conductivity Values (ft/day)			
Layer	**Aquifer Unit**	**Minimum**	**Maximum**	**Predominant Inside Ross Project area**	**Predominant Outside Ross Project area**
1	Alluvium/top 20 feet	5.00	15.00	5.00	5.00
2	Lance aquitard	0.10	0.10	0.10	0.10
3	Confining unit	$7x10^{-4}$	$7x10^{-4}$	$7x10^{-4}$	$7x10^{-4}$
4	Lance SM	0.003	3.00	Varies	0.32
5	Confining unit	$5.0x10^{-4}$	$5.0x10^{-4}$	$5.0x10^{-4}$	$5.0x10^{-4}$
6	Lance/Fox Hills OZ	0.01	3.00	Varies	0.19

Table 2. Vertical Hydraulic Conductivity Summary

		Model Hydraulic Conductivity Values (ft/day)			
Layer	**Aquifer Unit**	**Minimum**	**Maximum**	**Predominant Inside Ross Project area**	**Predominant Outside Ross Project area**
1	Alluvium/top 20 feet	3.00	10.00	3.00	3.00
2	Lance aquitard	0.54	0.54	0.54	0.54
3	Confining unit	$1.45x10^{-5}$	$1.45x10^{-5}$	$1.45x10^{-5}$	$1.45x10^{-5}$
4	Lance SM	0.002	2.1	Varies	0.21
5	Confining unit	$6.5x10^{-6}$	$6.5x10^{-6}$	$6.5x10^{-6}$	$6.5x10^{-6}$
6	OZ	0.08	2.10	Varies	0.12

Storage coefficients were developed for each layer based on measured data and/or research on similar materials. Storage coefficients were then adjusted within the estimated ranges during model calibration. MODFLOW2000 utilizes specific storage (Ss) rather than a storage coefficient. As such, all storage coefficients were converted to a specific storage value prior to input in the model by multiplying the storage coefficient by the model layer thickness. Each layer was assigned a unique specific storage value which did not vary spatially. Specific storage values used for each layer are summarized in Table 3.

Table 3. Summary of Specific Storage Values by Layer

Layer	Aquifer Unit	Model Specific Storage Values (1/ft)
1	Alluvium/top 20 feet 1	0.19 within alluvium, 0.1 outside of alluvium[1]
2	Lance aquitard	$5x10^{-7}$
3	Confining unit	$4x10^{-6}$
4	Lance SM	$7.6x10^{-6}$
5	Confining unit	$4x10^{-6}$
6	Lance/Fox Hills OZ	$9.7x10^{-6}$

[1]Alluvium values are specific yield (dimensionless)

Water enters the model vertically as recharge from infiltration and horizontally as regional groundwater flow from areas adjacent to the model. Flow from adjacent areas is indirectly calculated through the calibration process and the use of general head boundaries. The distribution of recharge from natural precipitation within the project area was developed based on USDA-NRCS soils data. Vertical recharge throughout the model domain varied from 0.07 inch per year to 0.22 inch per year.

Boundary Conditions

Water leaves the model domain by three mechanisms: 1) water flow is within the confined aquifers downgradient to the north and to the west, 2) water within the alluvium is removed by evapotranspiration, and 3) water leaves the project area through alluvial underflow. Water is also removed artificially by pumping wells. Pumping wells within the project area are treated as transient stresses.

General head boundary conditions were positioned to simulate the natural gradient. Evapotranspiration and underflow are simulated by drains located where Good Lad Creek and the Little Missouri River cross the Pierre Shale outcrop. Model boundary conditions vary slightly from layer to layer and are discussed in detail in Section 4.4 of the full report.

CALIBRATION

Model calibration and verification was accomplished in two steps. The first step was a steady-state Pre-1980 simulation. The goal of the steady-state simulation was to match, as closely as possible, the modeled potentiometric surface elevations to measured pre-1980 potentiometric surface elevations. To calibrate the steady state model, two parameters, recharge and hydraulic conductivity, were adjusted until the modeled potentiometric surface matched the pre-1980 potentiometric surface developed from available well data

The second calibration step (verification) involved the construction of a transient model. Wells were inserted into the model and assigned variable pumping rates for each stress period based on available pumping records to simulate the industrial wells within the model domain. The goal of the transient portion of the model was to match the drawdown that has occurred over the last 30 years due to withdrawals from the industrial wells. Monitor well data collected by Strata in 2009 and 2010 were used to calibrate the transient runs. During the calibration process hydraulic conductivity values were adjusted until the modeled 2010 head distribution closely fit measured values.

It was not possible to calibrate the transient model using homogenous layer properties. Furthermore, hydraulic conductivity information from 1978 and 2010 pumping tests indicates that the hydraulic conductivity within the SM and the OZ layers is not constant throughout the proposed Ross Project area. To add realistic heterogeneity to the hydraulic conductivity and improve model predictions, another calibration technique known as pilot points was utilized in conjunction with PEST (a model-independent parameter estimation program). With this method, measured hydraulic conductivity values were inserted into the model as targets. User-defined pilot points were then inserted into the model. Each pilot point was given an initial value and a minimum and maximum range based on measured hydraulic properties. PEST was then used to develop hydraulic conductivity estimates based on target well head data and known hydraulic conductivity targets for each pilot point. The pilot point calibration procedure was used only within and immediately adjacent to the proposed Ross Project area because no hydraulic conductivity data are available outside of the project area. Pilot point calibration was performed only for the hydraulic conductivity within the SM and OZ aquifers. Due to the pilot point techniques used to calibrate the model, the calibrated model represents a reasonable, non unique solution. To the extent that additional targets can be collected the model calibration and the hydraulic conductivity heterogeneity can be further refined.

The resulting hydraulic conductivity distribution yielded a very good fit between the modeled and measured head values within the OZ aquifer. Figure ES-3 shows the 2010 modeled potentiometric surface within the OZ aquifer. Within the OZ aquifer, the calibration was good with the largest residual less than 2.5% of the total estimated drawdown near the industrial water supply wells. The residuals within the SM zone are higher (up to 21 feet). However, the confidence interval for the calibration targets is plus or minus 20 feet, as a result, calibration within the SM was considered acceptable.

A sensitivity analysis was performed on the calibrated model to determine which parameters most impacted the calibration. In these analyses six parameters, horizontal hydraulic conductivity, vertical hydraulic conductivity, specific storage, recharge, general head boundary elevations, and general head conductance were varied. The most sensitive parameter within the groundwater model is the hydraulic conductivity, both vertical and horizontal.

OPERATION SIMULATION

The calibrated model was used to simulate ISR operations within the Ross Project area. The ISR simulation was a generalized scenario based on currently mapped mineralization. The simulation included two ISR units (unit 1 and unit 2) operating simultaneously. The ISR units were further divided into modules containing approximately 40 production wells each. A total of 10 modules within unit 1 and 7 modules within unit 2 were simulated.

The ISR operations were divided into three stages, including ISR production, groundwater sweep, and groundwater restoration. During production, each recovery well was estimated to operate at 17.5 gpm with a bleed rate of 1.25 percent (0.219 gpm per production well). A 3 month sweep period was simulated with an estimated flowrate of 1.31 gpm per recovery well. Modeled aquifer restoration activities lasted approximately 6 months. During typical restoration activities each recovery well operated at 12.8 gpm. The bleed rate during restoration depended on if restoration occurred concurrent with ISR production in other wellfields. With excess bleed available from adjacent modules, bleed was 3.2 percent (0.41 gpm per recovery well). When excess water was not available from adjacent modules, the estimated restoration bleed was 8.8 percent (1.125 gpm per production well).

To simulate the regional impacts of ISR, bleed rates were assigned to each recovery well during ISR, groundwater sweep, and restoration, thus simulating the net withdrawal from the aquifer that would be expected from balanced wellfields. Operations of the three existing industrial wells within the project area during ISR recovery presents a unique problem. Strata has been in communication with the owner of these wells, Merit Energy Co. (Merit), and is currently exploring alternative water sources that would allow Merit to suspend use of the wells before and during ISR operations. Currently the goal is to discontinue use of the Merit wells approximately two years prior to ISR.

Given the uncertainty associated with the future status of the Merit wells, two ISR scenarios have been simulated. Scenario 1 assumes an alternative water supply is found and the Merit wells are taken out of operation 2 years prior to ISR and kept out of operation until full aquifer recovery occurs after ISR operations. Scenario 2 assumes no alternative water supply and that the Merit oil field water supply wells are in operation during ISR operations.

As would be expected, the bulk of ISR impacts occur within the OZ aquifer. Predicted impacts to the SM aquifer are minimal during ISR operations. Although the impacts within layers 1 and 2 are minimal, minor impacts occur near the outcrop of the OZ aquifer. Conceptually, near the outcrop, water from the Little Missouri River infiltrates into the SM and OZ aquifers. Water not infiltrating into the OZ and SM aquifers exits the model via drains installed where Good Lad Creek and the Little Missouri River cross the outcrop. Prior to ISR operations an estimated 1.5 gpm was leaving the model via the drains. At the end of ISR operations no water was exiting the model via the drains, indication that a minimal increase in exfiltration may occur in the ephemeral streams where they cross the outcrop.

Figures ES-4 and ES-5 present modeled drawdowns within the OZ aquifer at the end of restoration activities during ISR scenarios 1 and 2, respectively. Figure ES-66 presents the available OZ potentiometric head above the top of the OZ aquifer in 2010. A comparison between Figures ES-5 and ES-6 indicates that at the end of ISR operations the potentiometric surface will remain above the top of the OZ aquifer. For approximately 1 year near the end of the restoration period, however, the OZ potentiometric surface drops below the top of the OZ aquifer immediately adjacent to industrial well 19XX-State (the phenomenon is short-lived and the water level recovers to above the top of the aquifer prior to the end of ISR aquifer recovery operations) under both scenarios. A review of the activities in this area indicates that, during the period in which the potentiometric surface drops below the top of the OZ aquifer, simultaneous groundwater sweep and restoration activities are occurring within the adjacent wellfields. The simulated scenario tends to be conservative because groundwater sweep and restoration activities were simulated at maximum rates without optimizing the wellfield progression. Adjustments in the wellfield progression schedule and flowrates will minimize the possibility that the potentiometric surface will drop below the top of the aquifer.

IMPACTS

To assess the impacts on wells within the region, simulated water levels were monitored during the ISR simulation at the locations of wells completed in the OZ aquifer. The maximum modeled decrease in head that occurred in each well during the ISR simulation is presented in Table 4. As shown on Table 4, drawdowns within Scenario #1 are less severe than drawdowns in Scenario #2. In fact, within Scenario #1 industrial well 22X-19 experienced a significant net increase in head due to the assumption that use of the well was discontinued. Well locations are depicted on Figure ES-3.

Table 4. Maximum Modeled Well Drawdowns during ISR Simulation

Well	Layer	Use	Drawdown Scenario #1 (ft)	Drawdown Scenario #2 (ft)
*Strong Well	6(OZ)	Domestic/ stock	5	7.3
SOPHIA #1A	6(OZ)	Industrial	14.7	26.3
KIEHL WATER WELL #2	4(SM) & 6 (OZ)	Industrial	1.8 - SM 1.6 - OZ	2.3 - SM 3.4 - OZ
22X-19	6(OZ)	Industrial	-50	110
19XX STATE	6(OZ)	Industrial	79	158
789V STATE	6(OZ)	Industrial	101	176
ENL Kiehl Well #1	6(OZ)	Industrial	3.2	5.0
WSW#1 West Kiehl Unit	6(OZ)	Industrial	-0.8	1.8
*WESLEY TW02 P103666W2	6(OZ)	Domestic/ stock	30.8	33.1

* Modeled drawdowns may be overestimated due to model edge effects.

Based on ISR simulations, the three industrial wells currently in use by Merit may be impacted. If these wells continue to operate during ISR operations, water levels within the OZ aquifer may drop to the point that the potentiometric head within the aquifer locally drops below the top of the aquifer. This decrease in the potentiometric head may have implications for ISR operations as well as for Merit.

The ISR simulation modeled herein assumes a constant bleed and constant sweep. Under the modeled ISR scenario, interference between wellfields has been noted. To minimize interference, Strata is currently exploring other options such as alternate ISR progression scenarios, pre-ISR aquifer conditioning, and alternate ISR operation schedules. This groundwater model offers Strata a planning tool that can be used to minimize wellfield interference and optimize ISR production.

If arrangements can be made to temporarily suspend pumping from the Merit water supply wells, the regional impacts presented in Scenario 1 are likely the most realistic impacts. Due to the abstraction introduced by the Merit wells, ISR wellfields located immediately adjacent to Merit's wells will be difficult to operate with Merit's wells in operation. The abstraction caused by Merit's wells decreases substantially at distances more than 0.25 mile from the wells. As such, it may be possible for the Merit wells to continue operating during active ISR in the northernmost and southernmost proposed wellfields. Further modeling will be necessary to determine the most efficient method to operate ISR wellfields if Merit's wells are operated during ISR operations.

RECOVERY SIMULATION

Recovery was simulated for 5, 10, 20, 50 and 100-year periods after cessation of ISR operations. In general, drawdowns within the SM layer are minor (up to 15 feet in scenario 2 and 5 feet in scenario 1). Within the OZ aquifer full recovery takes between 5 and 10 years for scenario 1. For scenario 2 recovery to a maximum residual drawdown of 10 feet takes between 10 and 20 years with most of recovery occurring within the first 10 years (recovery vs. time follows an exponential curve).

To asses monitor ring spacing and excursion recovery an ISR simulation with both injection and production wells was developed for a sample wellfield using a model with 25 foot grid spacing. Operation of a balanced ISR wellfield was then simulated for 90 days. At an upgradient and downgradient location within the sample wellfield an out-of-balance well pattern was simulated to evaluate monitor ring spacing and excursion recovery. Each out-of-balance wellfield was simulated by shutting down one recovery well operating at 17.5 gpm for 30 days while the injection wells were allowed to operate at normal rates. At the end of 30 days, the recovery well was started again and the injection rate within the pattern were reduced by a net 17.3 gpm for 45 days.

Results of the excursion simulation indicate that a monitor ring well spacing on 600 foot centers (both laterally and perpendicular from the wellfield) would be adequate to detect an excursion even on the upgradient side of the wellfield. Typical head responses during the excursion simulation are presented in Figure ES-7. The excursion simulation also indicated it would be possible to recover an excursion 600 feet from the wellfield within 20 days or less on both the upgradient and downgradient sides of the wellfield. Since the groundwater velocity is proportional to hydraulic conductivity, an increase in the local hydraulic conductivity would result in an increased travel distance during an excursion. However, the head change and the excursion recovery time would be similar. The simulated excursion recovery is expected to be realistic even with different field conditions.

FLARE EVALUATION

A horizontal flare evaluation was performed using MODPATH Version 3.0 on a representative wellfield. Groundwater Vista's Telescopic Mesh Refinement (TMR) tool was used to develop a model with increased grid resolution within wellfield. The domain of the flare model was a smaller domain with tighter grid spacing (12.5 feet within the wellfield and 25 feet outside the wellfield). To further simplify the refined model, only the regional ore zone (which was divided into 3 layers for this analysis) and the ore zone confining shale were simulated. Throughout the horizontal flare evaluation a constant bleed of 1.25% was maintained. Flowrates within the recovery wells varied from approximately 11 gpm to 19.7 gpm with an average recovery rate of 16.2 gpm per well. To simulate flare an ISR simulation with both injection wells and recovery wells was modeled using MODFLOW. The ISR simulation started with a steady state pre-ISR potentiometric surface and then continued through 21 months of active ISR operations. Sixteen hypothetical particles were placed in each cell containing an injection well. MODPATH was then used to track the particle movement throughout the simulation. The ratio of the area calculated from the circumscribed particle traces to the wellfield area provides the horizontal wellfield flare factor. The calculated horizontal flare ratio was 1.32 for the current wellfield layout and is shown on Figure ES-8. In general, the calculated flare is believed to be a conservative horizontal flare estimate. Additional well placement optimization will likely minimize the total expected flare.

The flare simulation included injection and recovery well flowrates, well placement, and wellfield shape. During the simulation, changes to well flow rates were found to significantly affect the flare. Well placement can also significantly affect not only the flare but the efficiency of the ISR operations. In general, a more regular the well pattern results in a more efficient wellfield, assuming the formation has relatively homogeneous hydraulic properties.

CONCLUSIONS

The groundwater model includes three separate phases; calibration to steady state, verification to current conditions, transient, and uranium recovery simulation. The steady state simulation represents pre-1980 conditions. There are several existing wells within the project area that may be impacted by proposed ISR. The results of the model indicate that the most impacted wells will be the oilfield water supply wells located within the Ross Project area. If these wells continue operating during ISR, water levels within these wells could decrease below the level of the pumps. Modeling indicates that existing stock and domestic wells within the region will see only minor drawdowns as a result of ISR operations. The Ross ISR Project is expected to decrease the heads within the OZ aquifer which in turn may increase the amount of water infiltrated to the OZ aquifer where it outcrops beneath the Little Missouri River and Good Lad Creek alluvium. The effects would be minor, as the modeled increase in infiltrated water at the outcrops was less than 2 gpm.

The model was also used to evaluate monitor well offset distances as well as to evaluate the ability of the proposed wellfield to recover any potential excursions in the ore zone aquifer. During the excursion analysis the model demonstrated that monitor wells could be effectively placed up to 600 feet from the wellfield and a potential excursion could be recovered back to the monitor well in less than 30 days. The model also demonstrates that a monitoring system that continuously monitors water levels within the monitor wells could be effectively used to detect excursions.

Based on experience gained during ISR and excursion simulations, the model also expected to be a useful tool for final wellfield planning and operations. The model will assist in balancing wellfields, progression planning and bleed rate optimization.

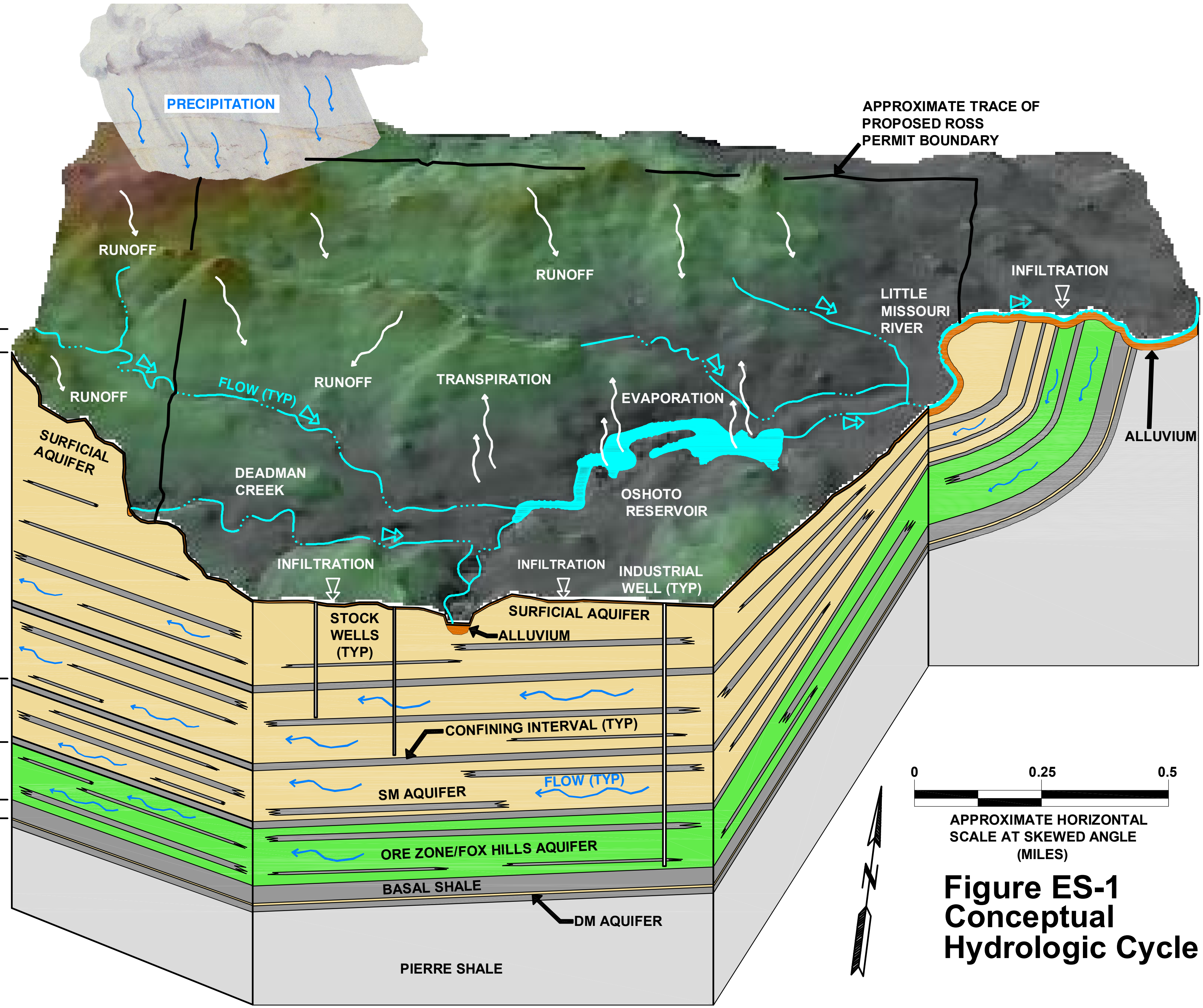

Figure ES-1 Conceptual Hydrologic Cycle

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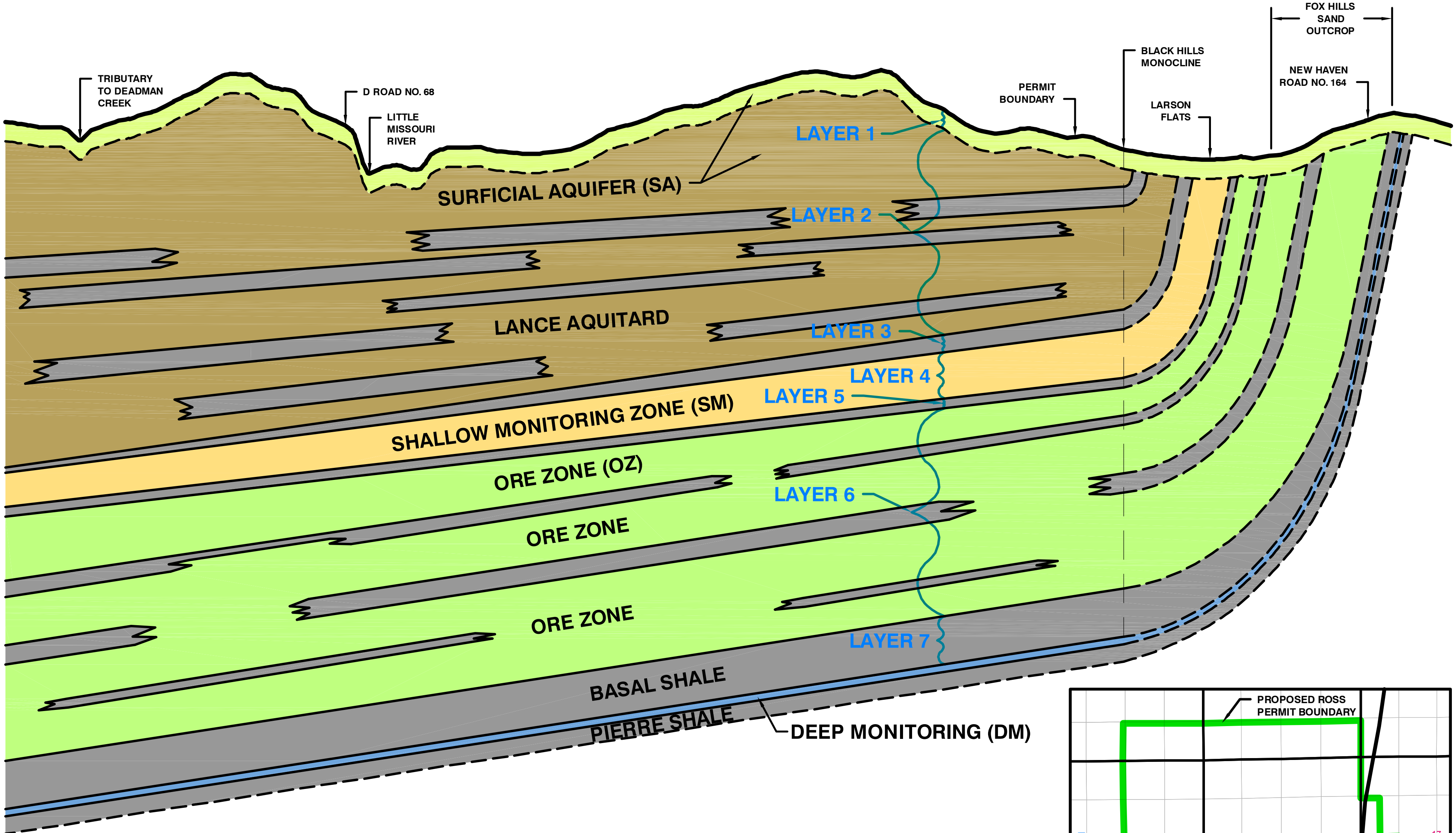

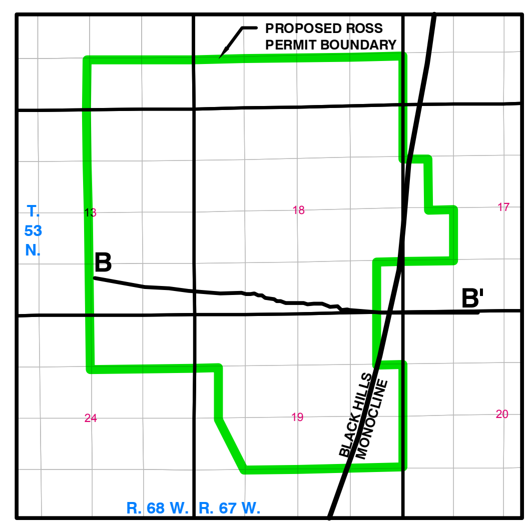

Black Hills Monocline adapted from Sutherland, W.M., 2008, Geologic Map of the Devils Tower 30' X 60' Quadrangle, Crook County, Wyoming, Butte and Lawrence Counties, South Dakota, and Carter County Montana: Wyoming State Geological Survey Map Series 81, Scale 1:100,000.

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennigton Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

CONCEPTUAL CROSS SECTION B-B'

NOT TO SCALE

Figure ES-2.

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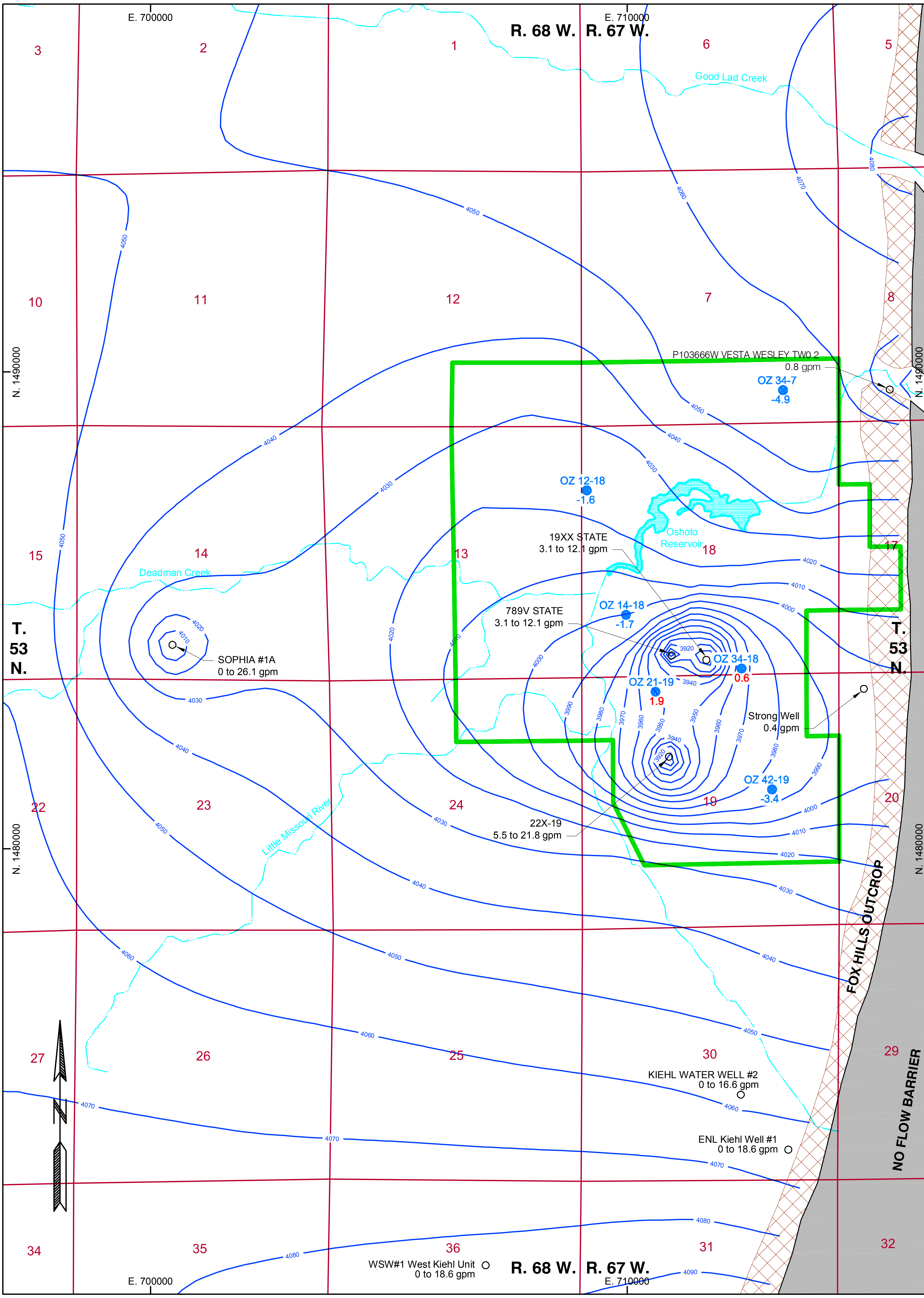

ROSS PROJECT AREA

Drawing Coordinates: WY83EF

LEGEND

PROPOSED ROSS PERMIT BOUNDARY

4100 POTENTIOMETRIC SURFACE

Est WS 2 -1.4 TARGET (COMPUTED WL HIGHER THAN OBSERVED)

Est WS 1 4.5 TARGET (COMPUTED WL LOWER THAN OBSERVED)

KIEHL WATER WELL #2 0 to 16.6 gpm — ADJACENT WATERWELLS IN OPERATION WITH FLOWRATE DURING VERIFICATION

0 1000 2000 4000

GRAPHIC SCALE (FEET)

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennington Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

STRATA ENERGY

REVISIONS

Date	Description

ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

GWM TECHNICAL REPORT
FIGURE ES-3

2010 MODEL VERIFIED SURFACE FOR LAYER 6 (OZ)

Drawn By: RAM
Checked By: RBM
Date: 10-10

WWC ENGINEERING
www.wwcengineering.com

FILE: ROSS_GWM_CALIB_POT_SURF

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Strata Energy-Ross Project

GW-Model ISR Simulation Layer 6 (OZ) Stress Period 25 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Modeled Drawdown At The End Of ISR Operations

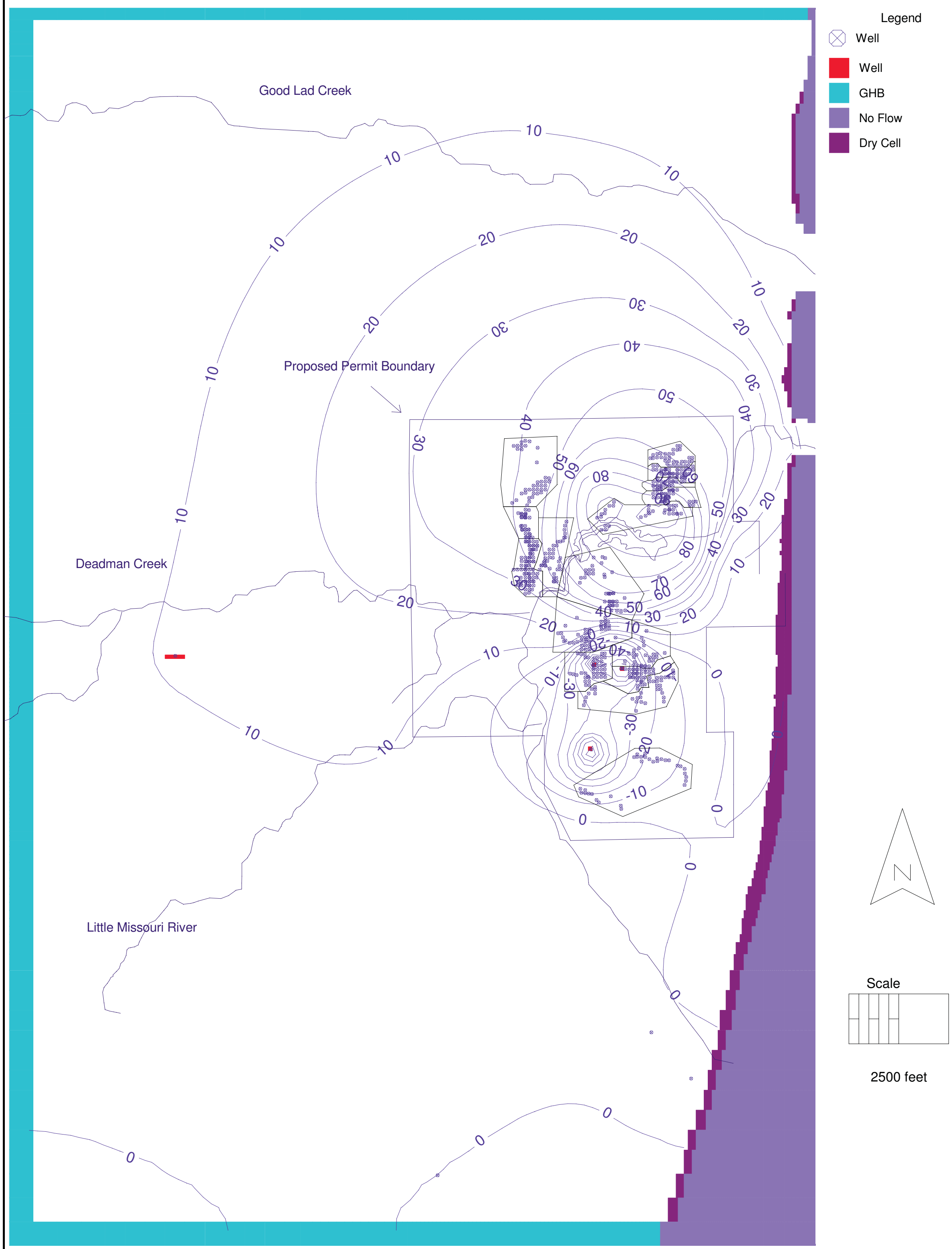


Figure ES-4

Strata Energy-Ross Project

GW-Model Mine Simulation Layer 6 (OZ) Stress Period 25 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Drawdown At The End Of ISR Operations

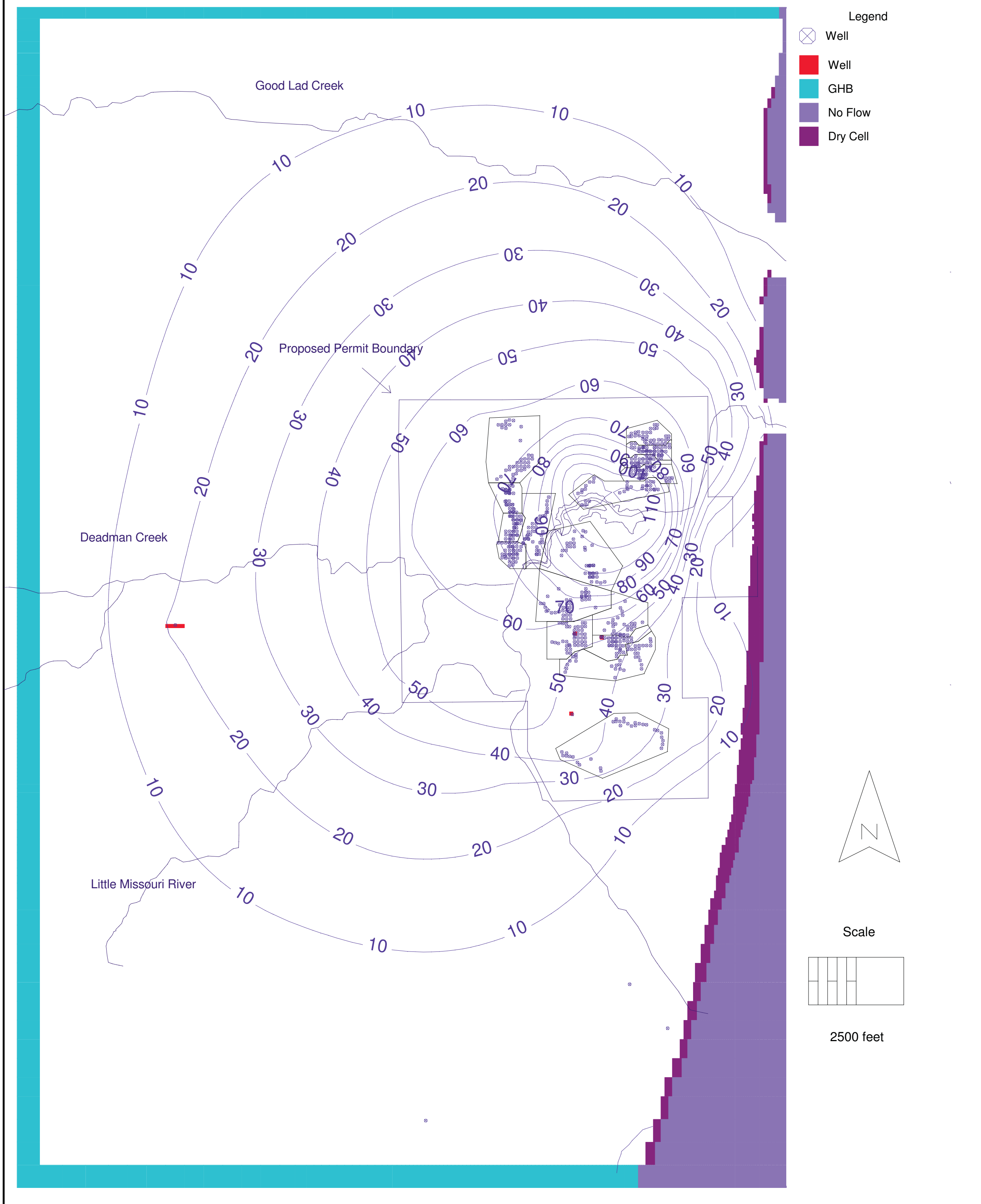
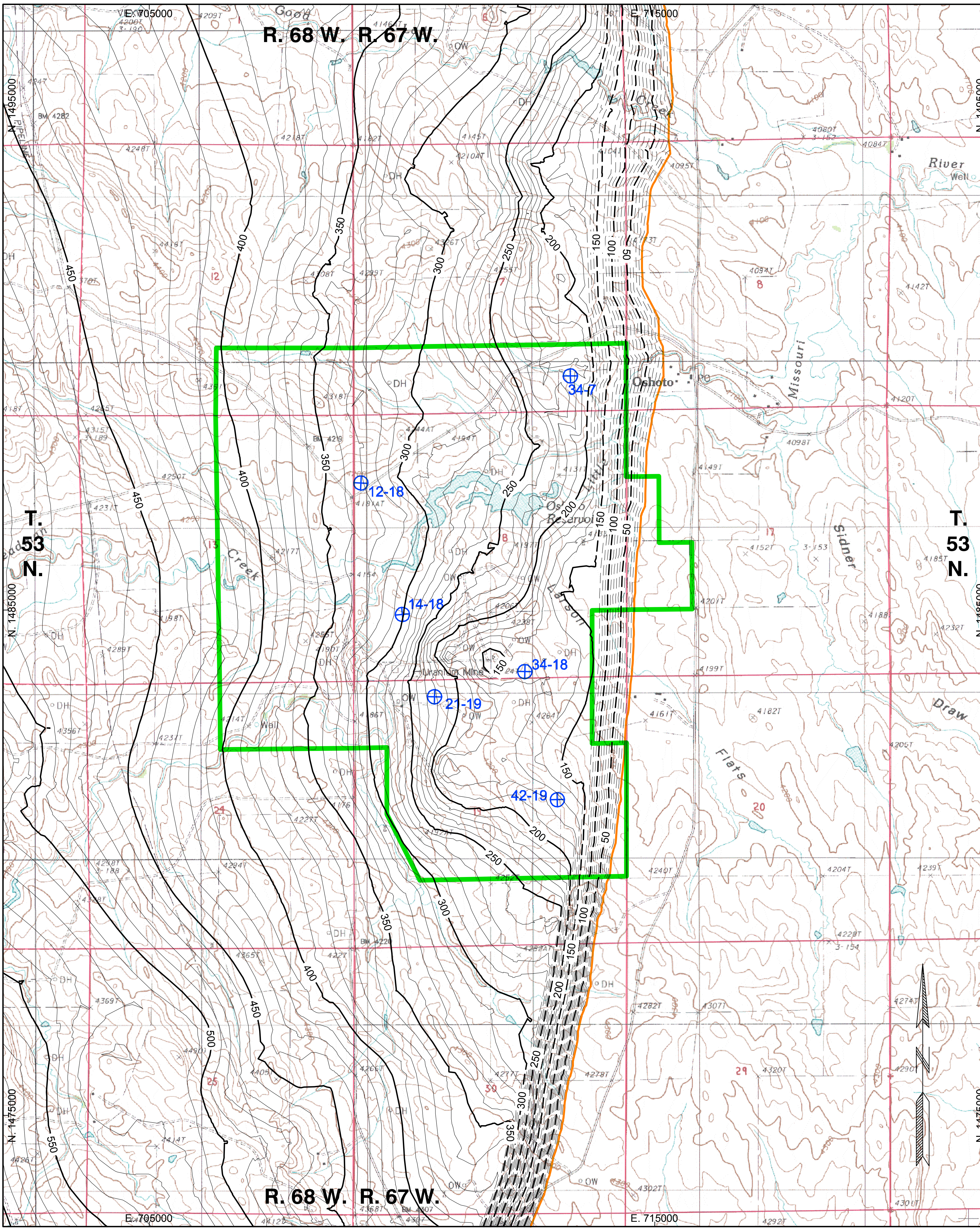


Figure ES-5



Drawing Coordinates: WY83EF

LEGEND

PROPOSED ROSS PERMIT BOUNDARY

100 / 100 ISOPACH LINE (10' CONTOUR INTERVAL) OF POTENTIOMETRIC HEAD ABOVE ORE ZONE INTERVAL. CONTOUR LINES ARE DASHED WHERE POTENTIOMETRY AND STATIGRAPHIC STRUCTURE WERE PROJECTED ALONG THE BLACK HILLS MONOCLINE FLEXURE.

EDGE OF AQUIFER

21-19 ⊕ REGIONAL BASELINE MONITOR WELL CLUSTER

NOTE:

TOP OF ORE ZONE SURFACE DERIVED FROM GEMCOM GEMS© SOFTWARE CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT OF SITE SPECIFIC GROUNDWATER MODEL. 2010 POTENTIOMETRIC SURFACE GENERATED FROM GW VISTAS© GROUNDWATER MODEL USING MODFLOW. THIS FIGURE REPRESENTS THE DIFFERENCE BETWEEN THOSE TWO SURFACES.

0 1000 2000 4000

GRAPHIC SCALE (FEET)

STRATA ENERGY

REVISIONS	
Date	Description

ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

GWM TECHNICAL REPORT
FIGURE ES-6

ISOPACH OF AVAILABLE POTENTIOMETRIC HEAD IN 2010 ABOVE THE ORE ZONE AQUIFER

Drawn By: RAM
Checked By: BJS
Date: 11/21/10

WWC ENGINEERING
www.wwcengineering.com

FILE: ROSS_GEO_OZ_CONHEAD_ISO.DWG

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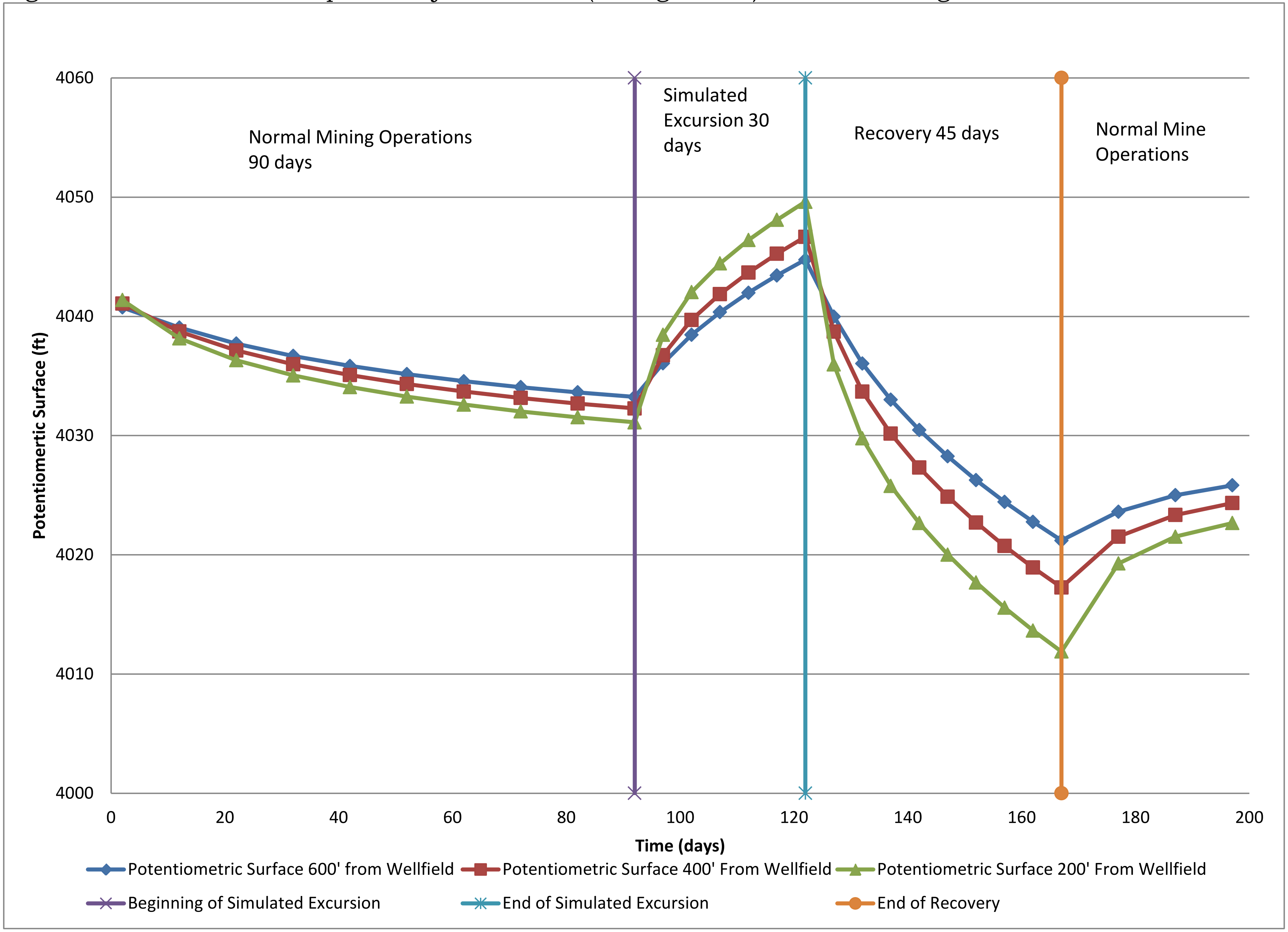
Figure ES-7. Head Response Adjacent to SW (downgradient) Wellfield during Simulated Excursion



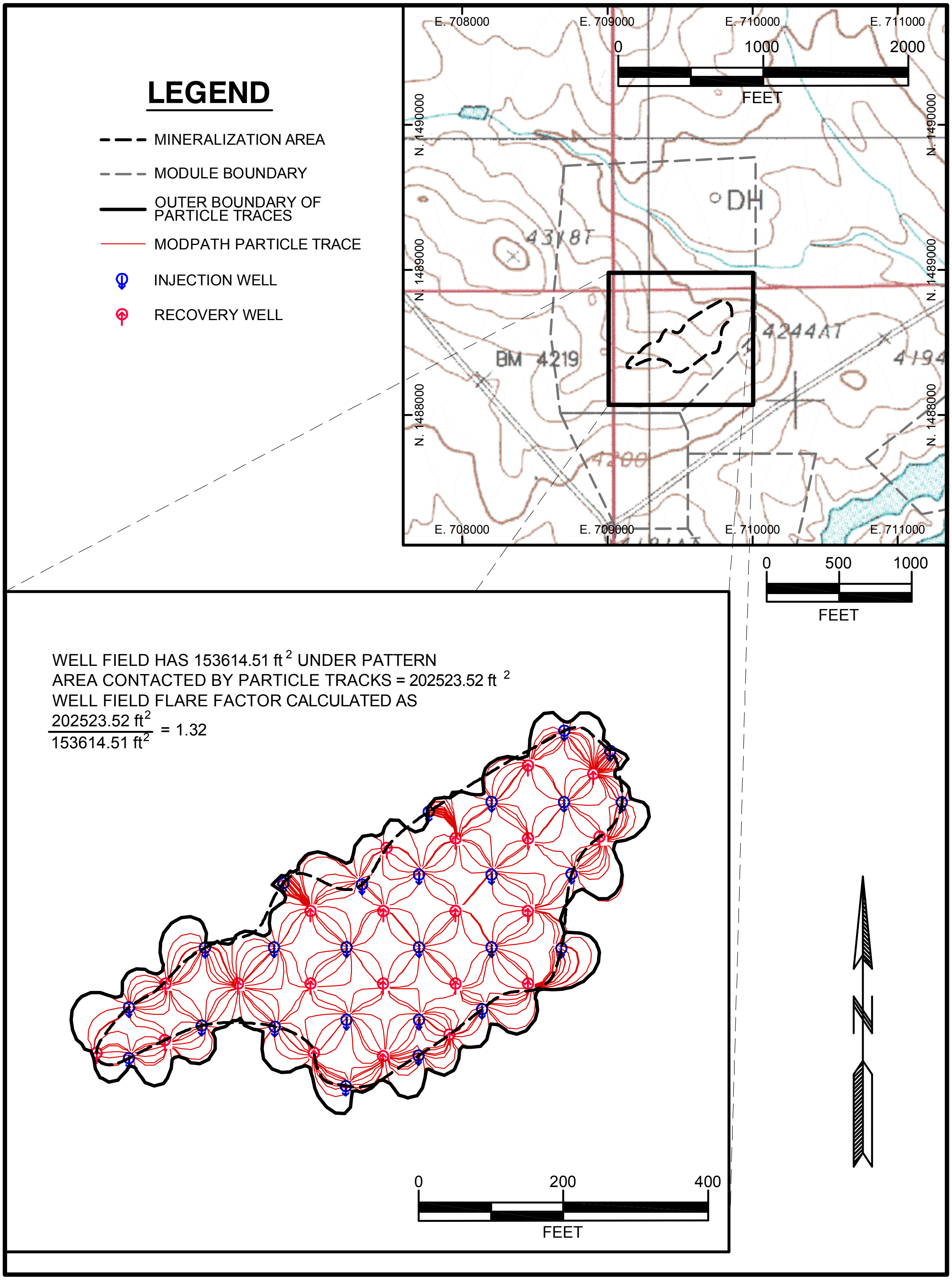


Figure ES-8. Wellfield Flare at 1.25% Bleed

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GROUNDWATER MODELING OF POTENTIAL IMPACTS ASSOCIATED WITH THE ROSS ISR URANIUM PROJECT

1.0 INTRODUCTION

Strata Energy (Strata) plans to develop an *in-situ* recovery (ISR) uranium facility in western Crook County near Oshoto, WY. The project is known as the Ross ISR Project and is located on private, state, and federal surface. The proposed permit boundary encompasses 1,721 acres and is roughly 2 miles north-south and 1.5 miles east-west. The project area is located approximately 20 miles north of Moorcroft, WY adjacent to the ranching community of Oshoto, WY. The general location of the proposed Ross ISR project area is depicted on Figure 1.0-1.

As part of the permitting process, Strata is required to analyze the potential direct, indirect, and cumulative hydrological effects of the project. WWC Engineering was commissioned to develop a numerical groundwater flow model to estimate groundwater impacts resulting from the proposed Ross ISR Project as well as analyze and optimize planned recovery operations. The groundwater model was constructed to evaluate both regional as well as localized impacts from ISR operations and to optimize wellfields.

The primary goals of the regional groundwater modeling activities were as follows:

1) Identify potential impacts (if any) to adjacent water rights
2) Estimate long-term impacts from ISR operations
3) Identify potential influences to the surficial aquifer and surface impoundments

The primary goals of the localized groundwater modeling activities were as follows:

1) Estimate adequate perimeter well offset/setback distances for the wellfield
2) Demonstrate the ability to identify and remedy a lateral excursion (i.e., lixiviants moving past the monitor wells)
3) Wellfield optimization

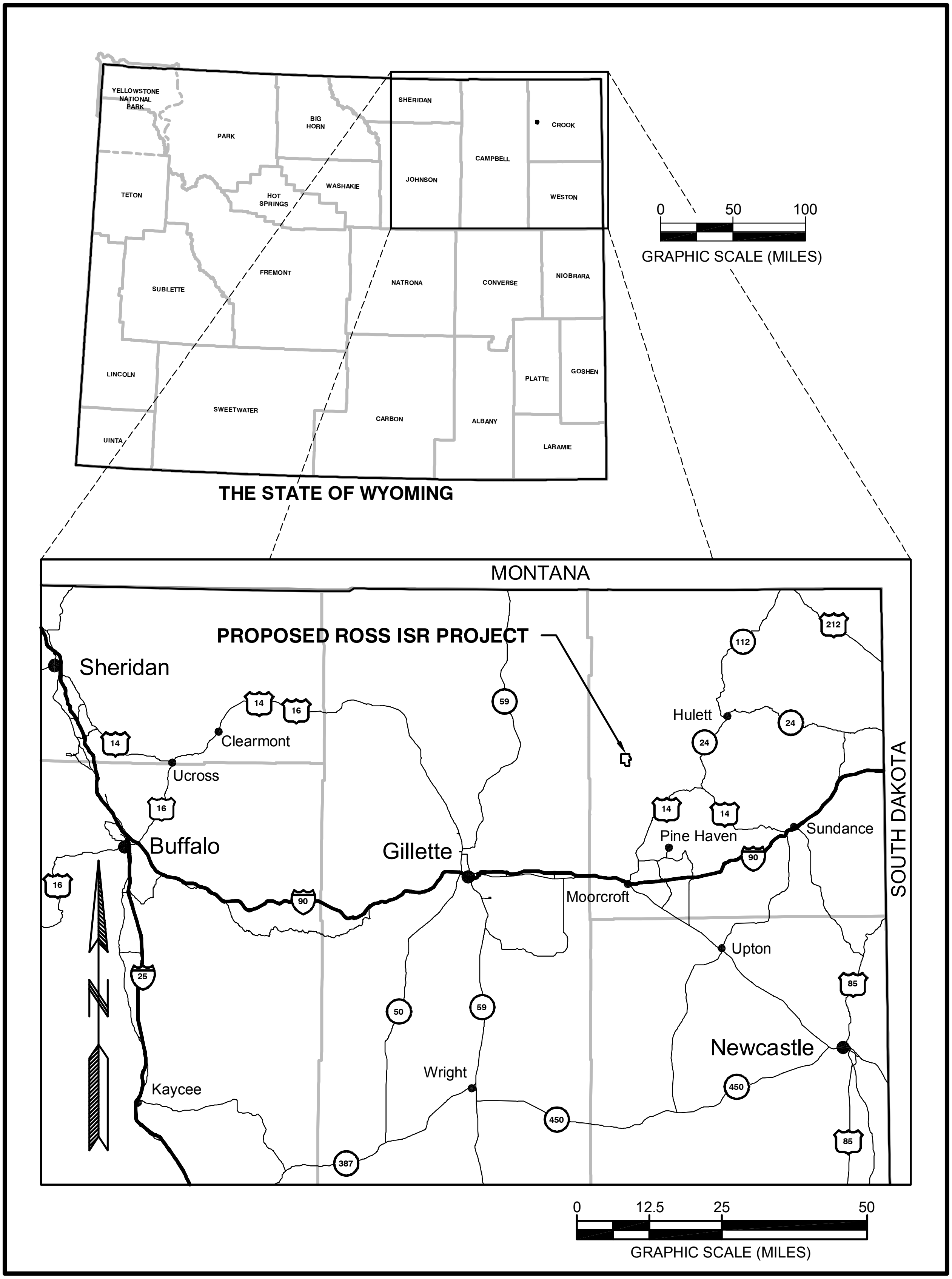

Figure 1.0-1. Ross Project General Location Map

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4) Optimize wellfield bleed rate
5) Evaluate restoration time/efficiency analysis

This report presents the model conceptualization, documentation, and results for the numerical model used to estimate impacts to the groundwater flow system resulting from the Ross ISR Project. The numerical groundwater model presented herein utilizes the United States Geological Survey (USGS) modular finite-difference groundwater model, MODFLOW (MacDonald and Harbaugh 1988) and the pre/post processor Groundwater Vistas (Rumbaugh and Rumbaugh 2002). The Ross ISR groundwater model was developed primarily to evaluate impacts within and immediately adjacent to the proposed project area. To minimize edge effects, the northern, western, and southern edges of the model extend approximately 10,000 feet from the project boundaries.

The Black Hills Monocline is located near the eastern edge of the permit boundary and the outcrop of the Pierre Shale which forms a natural hydrologic barrier. As such, the eastern portion of the model is represented by a no-flow boundary. Within the proposed project area Strata has acquired a significant amount of borehole and hydrogeological information. Outside of the project area borehole data and hydrogeological information are sparse. The results of this model therefore become less reliable with distance from the proposed project area.

Following standard practice, simplifying assumptions were made in order to construct the model. Hydrogeological information was limited to a few observation points, the most reliable of which include monitor well and aquifer test results developed in 1978 and 1979 for the Nubeth R&D solution mining project and the more recent pump testing performed in 2010 by WWC Engineering in support of the Ross Project. In general, the model is most accurate near the monitor wells and within the layers in which the monitor wells were completed and where hydraulic data is available. Understandably, results become less reliable further from the monitor wells.

2.0 CONCEPTUAL MODEL

2.1 Hydrogeologic Setting

The Ross ISR Project is located on the eastern periphery of the Powder River structural basin and western margin of the Black Hills uplift. The Powder River Basin is an asymmetrical synclinal basin bounded by the Black Hills uplift on the east, the Miles City Arch on the north, the Big Horn Uplift and Casper Arch on the west and the Laramie Uplift and Hartville Uplift on the south. The regional stratigraphic column is depicted in Figure 2.1-1. Within the proposed project area the uranium deposits lie primarily within the Upper Cretaceous Fox Hills and Lance Formations. The proposed project area is situated near the Lance Formation outcrop. Underlying the Lance Formation is the Fox Hills Formation, which overlies the upper Cretaceous Pierre Shale. The dominant structural feature in the vicinity of the proposed Ross project area is the Black Hills Monocline, an area of near-vertical dip on the western flank of the Black Hills Uplift. West of the monocline, strata are nearly flat-lying (2 degree dip westward into the Powder River Basin). Figure 2.1-2 portrays the bedrock geology along with a line representing the western edge of the Black Hills Monocline in the Oshoto Area. East of this line the strata dip steeply with the Fox Hills Formation outcropping less than 1,000 feet east of the proposed Ross project area. An 85 degree dip to the west was measured by WWC Engineering just east of Oshoto in the SESW, Sec 8, T53N, R67W. Figure 2.1-3 depicts a generalized geologic cross section within the Oshoto area.

The Pierre Shale is a thick marine shale (roughly 2,400 feet thick in the proposed project area) that generally yields very little water and represents a regional confining interval (Langford 1964). The Fox Hills Formation is a sequence of marginal marine to estuarine sediments deposited during the eastward regression of the late Cretaceous Interior Seaway. In the area of the Black Hills Uplift and Powder River Basin, offshore marine deposits of the Pierre Shale grade upward into transitional marine sediments of the near-shore Fox Hills Formation. The Fox Hills Formation has been divided into an upper

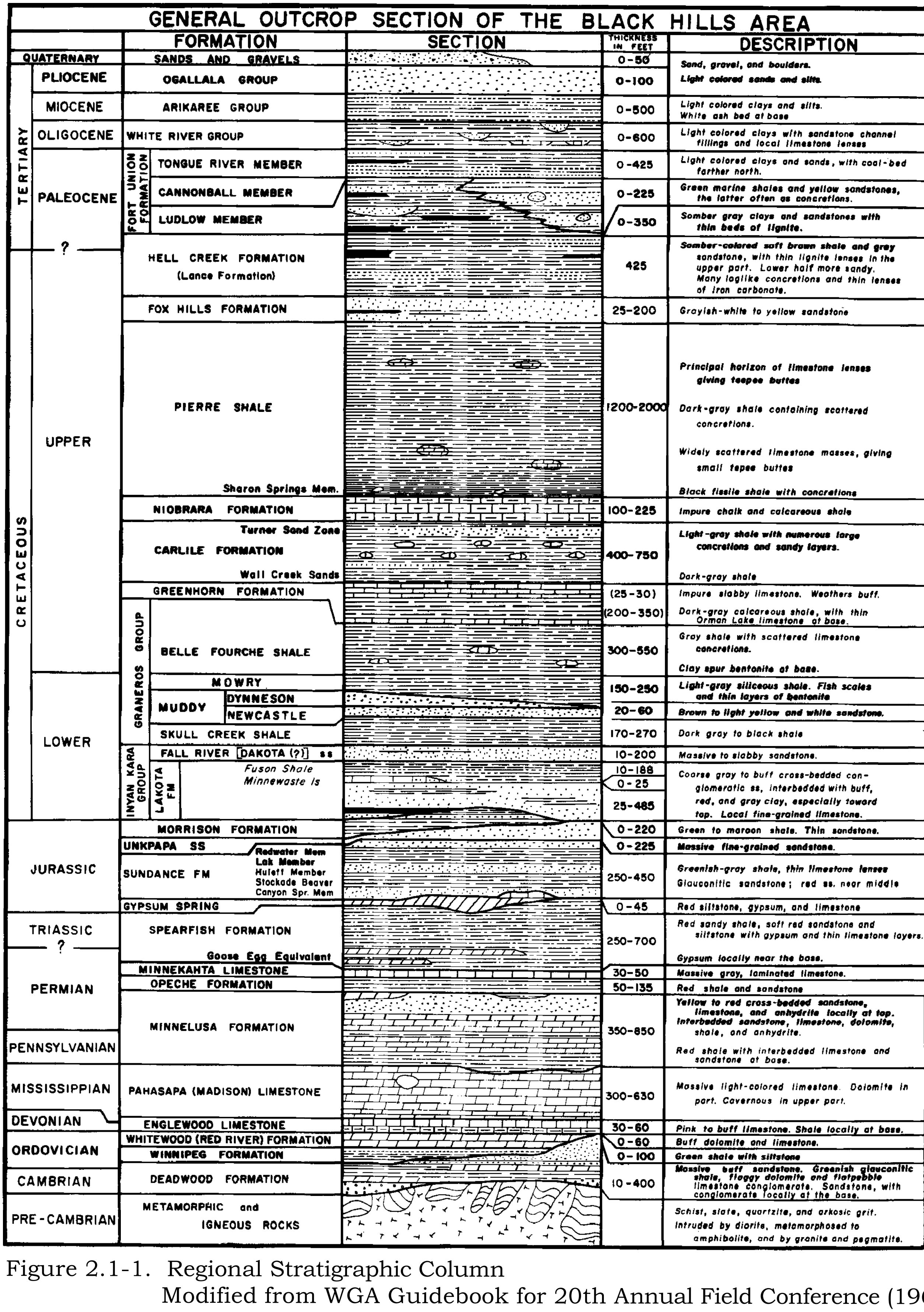
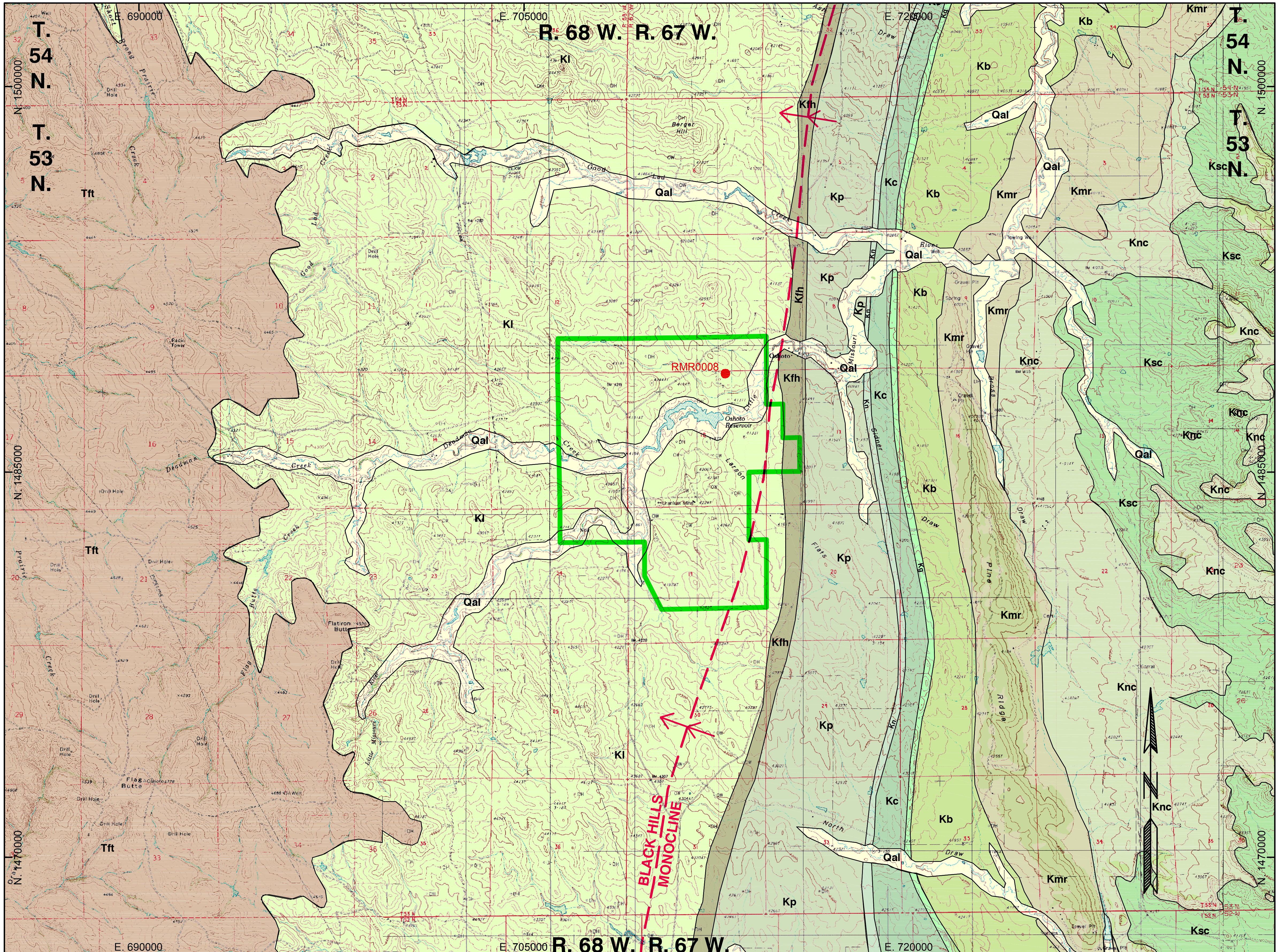


Figure 2.1-1. Regional Stratigraphic Column
Modified from WGA Guidebook for 20th Annual Field Conference (1968)



ROSS PROJECT AREA

LEGEND

PROPOSED ROSS PERMIT BOUNDARY

MONOCLINAL AXIS

RMR0008 LOCATION OF BORING FOR TYPE LOG

MAP UNITS

Qal		Alluvium (Holocene)
Tft		Fort Union Formation, Tullock Member (Tertiary)
Kl		Lance Formation (Upper Cretaceous)
Kfh		Fox Hills Formation (Upper Cretaceous)
Kp		Pierre Shale (Upper Cretaceous)
Kn		Niobrara Formation (Upper Cretaceous)
Kc		Carlile Shale (Upper Cretaceous)
Kg		Greenhorn Formation (Upper Cretaceous)
Kb		Belle Fourche Shale (Upper Cretaceous)
Kmr		Mowry Shale (Lower Cretaceous)
Knc		Newcastle Sandstone (Lower Cretaceous)
Ksc		Skull Creek Shale (Lower Cretaceous)

Adapted from Sutherland (2008) and Halberg, et al. (2002).

Drawing Coordinates: WY83EF

0 2000 4000 8000

GRAPHIC SCALE (FEET)

STRATA ENERGY

ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

REVISIONS

Date	Description

GWM TECHNICAL REPORT
FIGURE 2.1-2

ROSS PROJECT AREA BEDROCK GEOLOGY

Drawn By: MBM
Checked By: BJS
Date: 11/17/10

FILE: ROSS_ER_GEOLOGY

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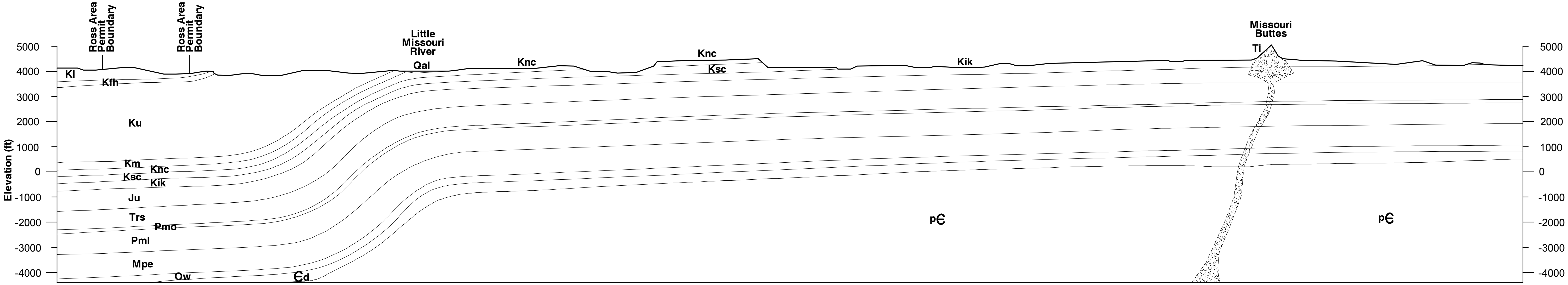
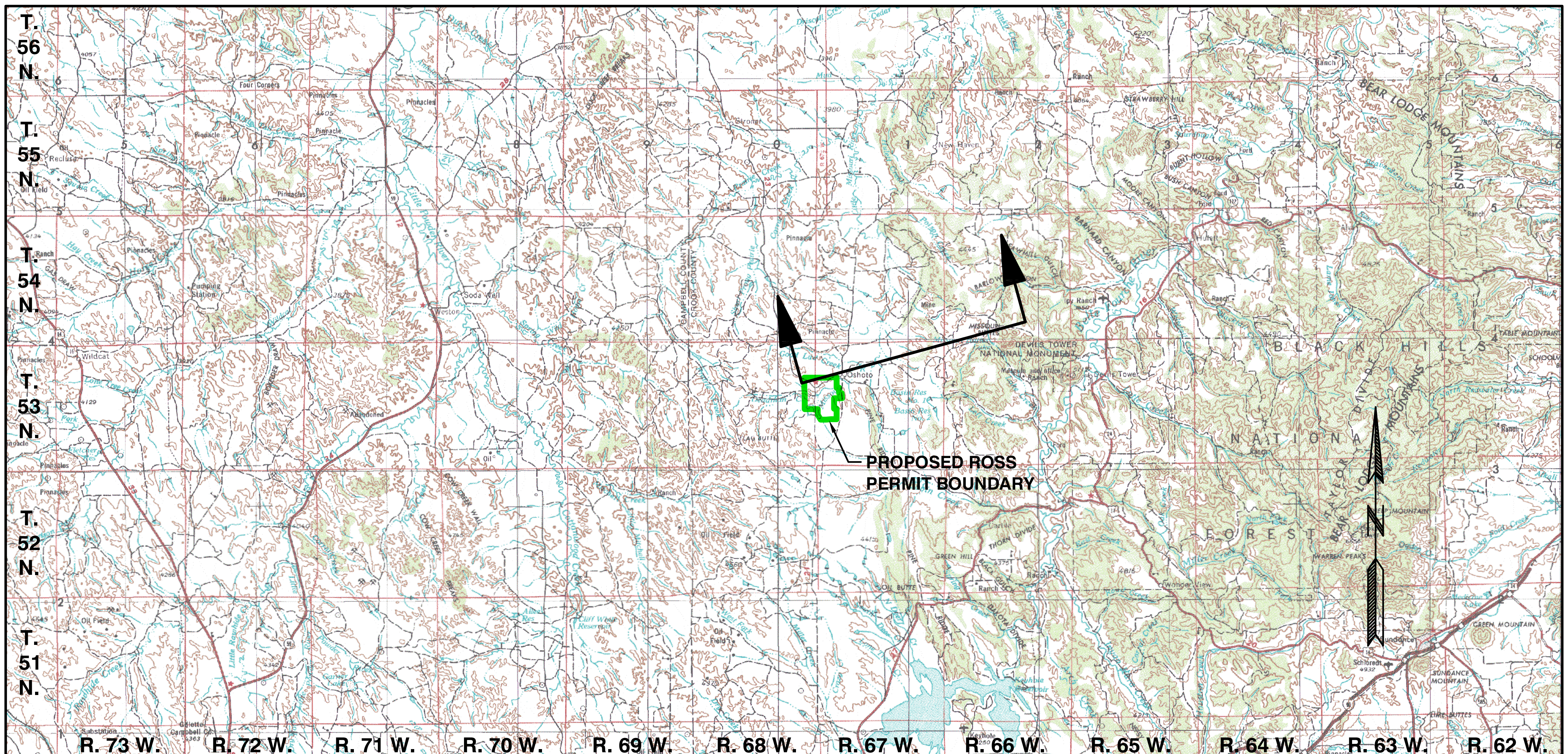


Modified from: Whitcomb et.al., 1958
Occurence of Ground Water in the Eastern Powder River Basin and Western Black Hills
N.E. Wyoming WGA Thirteenth Annual Field Conference



CROSS SECTION LOCATION

0 3 6 12
GRAPHIC SCALE (MILES)

LEGEND

Qal	Quaternary Alluvium
Ti	Tertiary Intrusives
Kl	Lance Formation
Kfh	Fox Hills Formation
Ku	Upper Cretaceous, undivided
Km	Mowry Shale
Knc	Newcastle Sandstone
Ksc	Skull Creek Shale
Kik	Inyan Kara Group
Ju	Jurassic, undivided
Trs	Spearfish Formation
Pmo	Minnekahta Limestone and Opeche Formation
Pml	Minnelusa Sandstone
Mpe	Pahasapa and Englewood Limestones
Ow	Whitewood Limestone
Єd	Deadwood Formation
pЄ	Precambrian

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ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

REVISIONS

Date	Description

GWM TECHNICAL REPORT
FIGURE 2.1-3

GENERALIZED GEOLOGIC CROSS SECTION DEPICTING BLACK HILLS MONOCLINE IN THE OSHOTO AREA

Drawn By: MBM
Checked By: MJE
Date: 11/22/10

WWC ENGINEERING
www.wwcengineering.com

FILE: ROSS_ER_GEO_XS_PRB

K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_ER_GEO_XS_PRB.dwg, GWM_FIGURE_2.1-3, 12/18/2010 12:43:46 PM and a lower unit by Dodge and Spencer (1977). Sediments of the lower unit consist of offshore-marine and transitional-marine shale, siltstone, and very fine-grained sandstone and is not known to contain uranium ore deposits. The estuarine sediments of the upper unit consist of uranium-bearing organic, thinly-bedded claystone, siltstone, and sandstone (Dodge and Spencer 1977). The Lance Formation, which lies conformably upon the Fox Hills Formation, records the deposition of continental deposits following withdrawal of the Upper Cretaceous Sea in the Powder River Basin (Dunlap 1958). The Lance Formation depositional environment has been interpreted as being fluvio-deltaic in origin (Buswell 1982). The Lance Formation consists of a mixture of non-marine deposited sandstones and floodplain mudstones with thin beds of coal (Connor 1992). Within the proposed project area, mineralization primarily occurs within the sandstones of the upper Fox Hills Formation and overlying lower Lance Formation.

2.2 Hydrostratigraphic Units

For the purpose of this modeling study, the primary units of interest are the Fox Hills Formation and the overlying Lance Formation. Specifically, the sandstones of the upper Fox Hills Formation and the lower Lance Formation are targeted for uranium ISR. For the purposes of this analysis, the targeted ISR unit is also referred to as the ore zone (OZ). The uranium ore-bearing sands of the upper Fox Hills and lower Lance formations are saturated and capable of transmitting groundwater; therefore, the OZ is defined as an aquifer. Regulations require that the overlying and underlying aquifers stratigraphically closest to the uranium mineralization be monitored during ISR to identify any vertical excursions as well as characterized to determine the level of hydraulic isolation with the OZ. The first water-bearing interval that lies stratigraphically above the OZ is within the Lance Formation and is referred to as the Shallow Monitoring Zone (SM). The first water-bearing interval that lies stratigraphically below the uranium-bearing sands of the OZ in the upper Fox Hills is a thin sandstone near the base of the Fox Hills Formation and is referred to as the

Deep Monitoring Zone (DM). Figure 2.2-1 details the hydrostratigraphic units within the Ross project area.

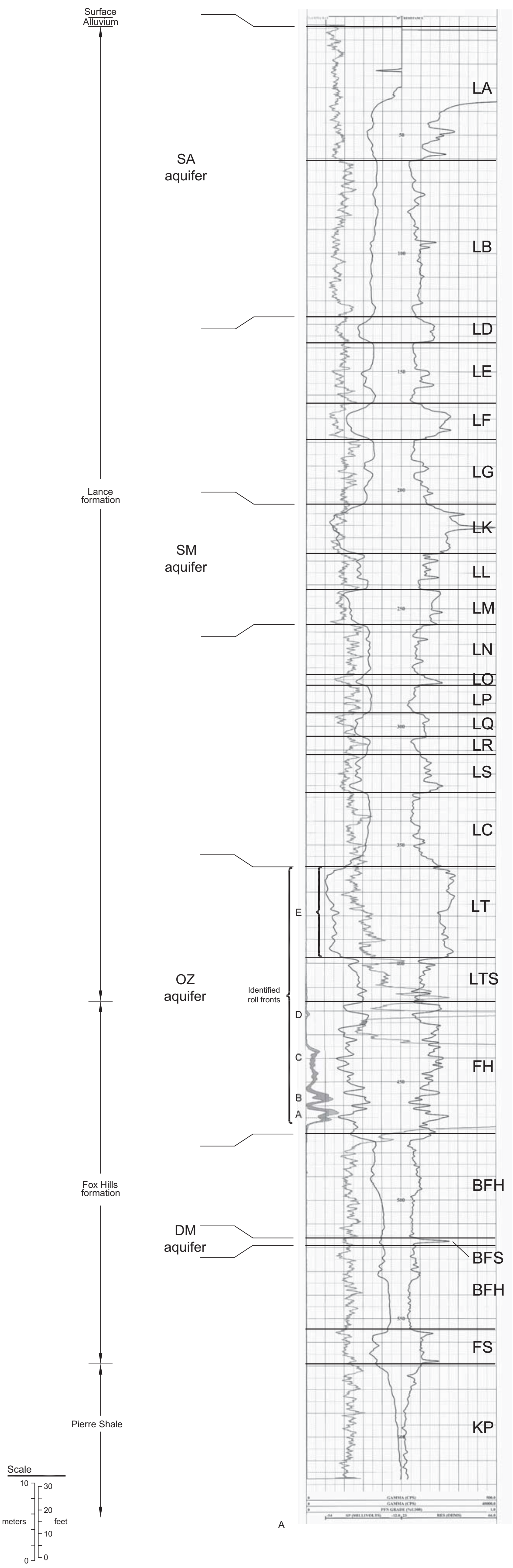
Underlying the Fox Hills Formation are the dark gray, silty marine shales of the Pierre Shale. Due to the thickness (greater than 2,000 feet) and low permeability, the Pierre Shale is considered a regional confining layer. Between the OZ and the DM is a very fine-grained shale interval roughly 50 feet thick, which is believed to be continuous throughout the model area and serves as a confining unit. Several additional shale units have been identified within the Lance Formation. These shale units (shales, claystones, mudstones and siltstones) may serve as localized confining units. For example, overlying the OZ aquifer is a sequence of thinly interbedded mudstones, claystones, and siltstones that typically ranges from around 55 to 145 feet thick and that has been determined to be areally continuous throughout the proposed project area. This fine-grained sedimentary sequence is referred to as the Upper Confining Unit.

Measured hydrostatic elevations indicate that aquifers within the project area are artesian with heads decreasing into each successive lower unit. Several sandstone and shale zones have been noted on the bore logs between the SM and the ground surface. The thin sandstone and shale complexes located above the SM are not regionally extensive and the water-bearing strata are thin and discontinuous. As such, for the purposes of this model, this marginal water-bearing portion of the Lance formation is called the Lance aquitards.

2.3 Groundwater Flow System

Within the proposed project area the groundwater flow is complicated due to the fact that surface waters drain in a generally easterly direction while the underlying strata dip to the west as shown on Figure 2.3-1 which depicts the conceptual water cycle near Oshoto, Wyoming. Groundwater within the alluvial groundwater system associated with the Little Missouri River flows to the east. The saturated alluvium is a source of groundwater recharge to

Drill Hole RMR008



Unit	Thickness	Description
	>10' variable	Unconsolidated alluvium, weathered bedrock and soil
LA	>40' variable	Sandstone (fluvial)
LB	40'–60'	Mudstone and claystone
LD	5'–20'	Sandstone (fluvial)
LE	10'–30'	Mudstone and claystone
LF	10'–20'	Sandstone (fluvial)
LG	10'–25'	Siltstone and claystone
LK	10'–20'	Sandstone (fluvial)
LL	10'–20'	Interbedded sandstone, claystone and siltstone
LM	5'–25'	Sandstone (fluvial)
LN	10'–30'	Claystone and siltstone with interbedded sandstone
LO	0'–10'	Sandstone (fluvial)
LP	5'–15'	Siltstone and claystone
LQ	5'–15'	Sandstone (fluvial)
LR	5'–15'	Siltstone and claystone
LS	10'–25'	Sandstone with interbedded siltstone and claystone
LC	20'–35'	Mudstone/claystone (Upper Confining Unit)
LT	30'–40'	Sandstone (fluvial), occasional mineralization
LTS	0'–20'	Sandstone, laterally variable and shaley in areas
FH	50'–65'	Sandstone (marine) with interbedded mudstone
BFH	30'–50'	Claystone (marine) (Lower Confining Unit)
BFS	10'–30'	Sandstone, often silty and clayey
BFH	30'–50'	Claystone (marine) (Lower Confining Unit)
FS	20'–35'	Basal sandstone, often silty and clayey
KP	2000'+	Claystone (marine)

STRATA ENERGY

STRATIGRAPHIC NOMENCLATURE
Used Within Proposed Ross Permit Area

Figure 2.2-1

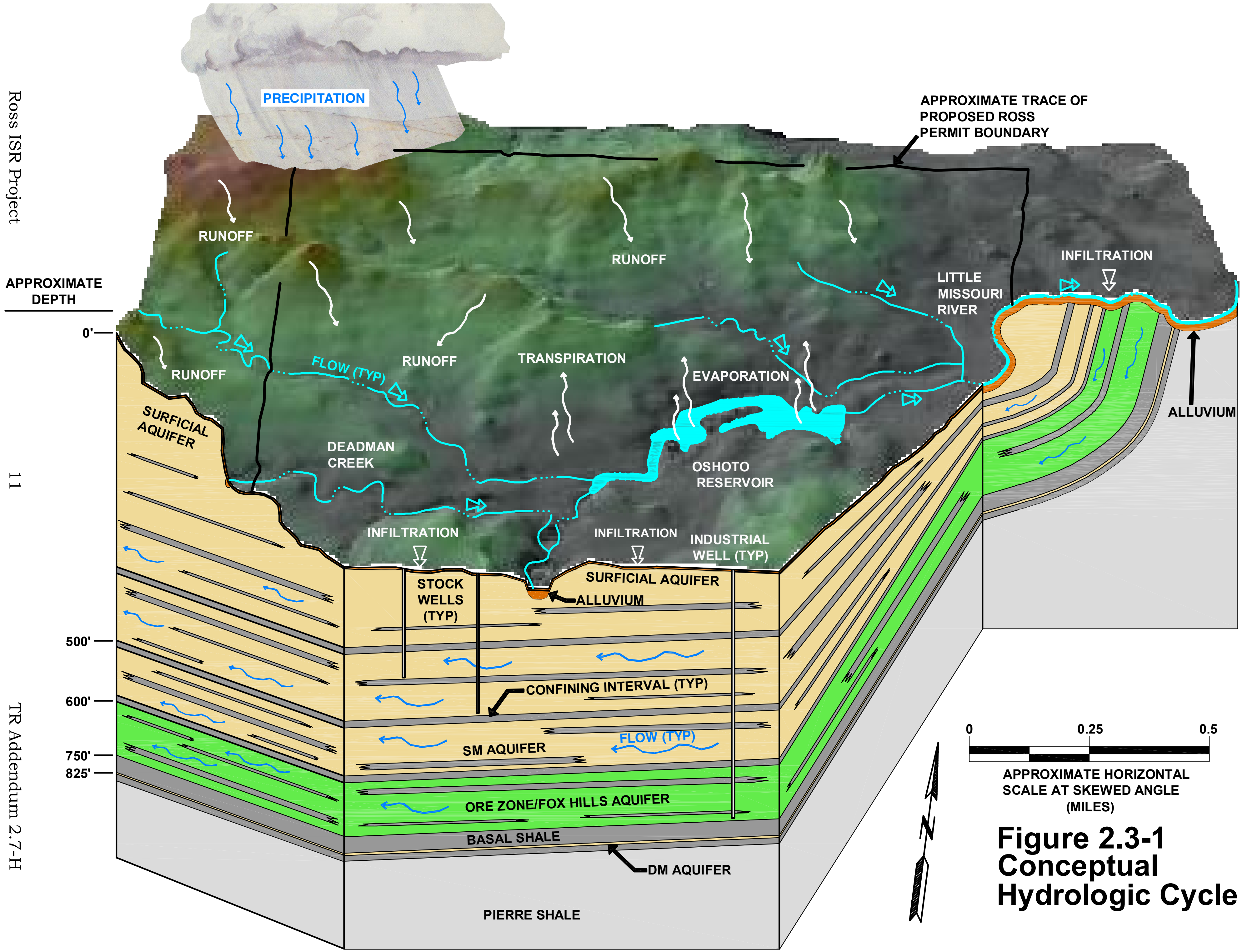


Figure 2.3-1
Conceptual
Hydrologic Cycle

K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_GWM_3D_WATER.dwg, GWM_FIGURE_2.3-1, 12/21/2010 9:54:20 AM the permeable subcropping strata that dip westerly. Groundwater flow in the Lance and Fox Hills strata is down dip, generally to the west and the north as shown on Figure 2.3-1. The Fox Hills and Lance outcrops at the eastern edge of the proposed project area are believed to be the principal recharge areas for the SM and OZ aquifers. Based on information presented by Buswell (1982) and water level information measured at the Fox Hills outcrop, groundwater within the proposed project area may also have a northerly component of flow, which means that recharge may also enter the project area from the south. With the exception of lateral recharge from the adjacent formation, the most significant recharge to the Fox Hills and Lance aquifers within the proposed project area is expected to occur as vertical groundwater leakage from the alluvium in the areas where the Little Missouri River and Good Lad Creek cross the Fox Hills and Lance Formation outcrops (see Figure 2.3-1). Recharge may also occur from natural precipitation at the outcrops outside of the areas of alluvial deposits, although recharge occurring at the outcrops outside of the alluvium is believed to be minor compared to that occurring at the subcrops beneath the saturated stream valleys.

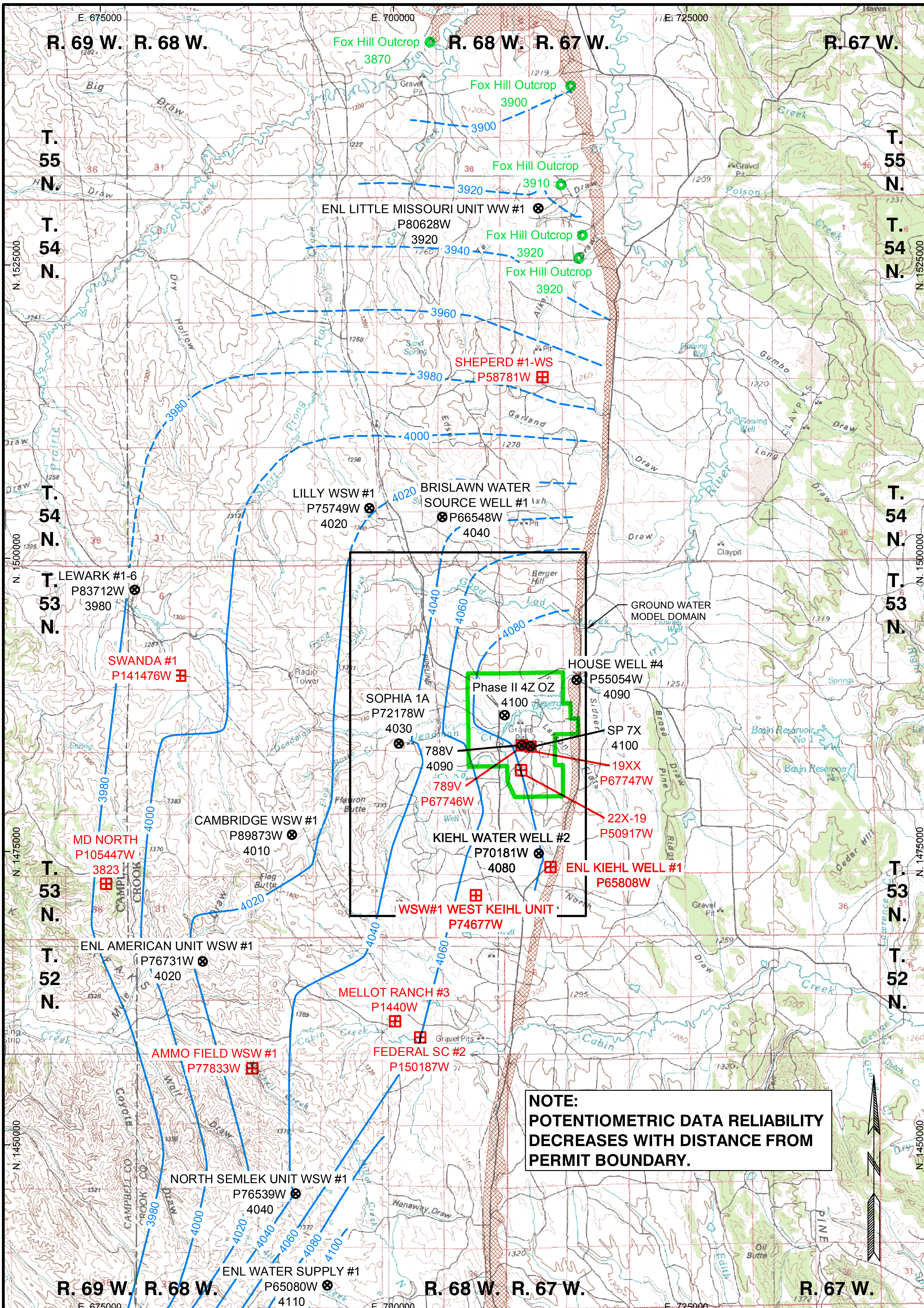
Within the greater Oshoto region, there are several oilfields currently in operation. Most of the oilfields target the Minnelusa Formation which is several thousand feet below the OZ aquifer. However, beginning in the late 1970s/ early 1980s, the oil companies began injecting water into the oil-bearing formation to stimulate oil production. The water used to flood the oilfields originates from Fox Hills Formation wells. Many of the Fox Hills wells used to stimulate the oilfield have been in operation for up to 30 years. As a result, within the Fox Hills Formation the 2010 potentiometric surface has been lowered near the Fox Hills oilfield water supply wells. Since most of the water supply wells have been constructed since 1980, the 1980 potentiometric surface is considered the pre-abstraction potentiometric surface.

A review of the Wyoming State Engineer's water rights database indicates that most of the permitted stock and domestic wells within the region are completed within Lance sandstones not in hydrologic communication with the

OZ aquifer. Furthermore, it is believed that only a small portion of the stock and domestic wells may be completed within the SM aquifer. Due to the fact that throughout the Ross project area the SM and OZ aquifers are relatively deep for stock and domestic wells (400 ft +) the only portions of these aquifers believed to supply stock and domestic wells are those right at the outcrop where the aquifers are relatively shallow. As depicted on Figure 2.3-1, most of the local stock and domestic wells are not in hydraulic communication with the OZ aquifer and will be minimally impacted by ISR operations within the OZ. Section 4.9 describes impacts to adjacent wells within the Ross project area in more detail.

The pre- 1980 hydrostatic head map developed for the OZ aquifer (Figure 2.3-2 in the Oshoto area indicates that its potentiometric surface elevation decreases in the down-dip direction. The potentiometric surface presented on Figure 2.3-2 is based on pre-abstraction (pre-1980) hydrostatic information obtained from an exhaustive search of completed wells within the greater Ross area and historical data from previous ISR attempts within the proposed project area. Within the proposed Ross Project area, unpublished data from the Nubeth Research and Development Project conducted by Nuclear Dynamics in the late 1970s was the most reliable potentiometric data source (Hamilton 1979; Manera 1978; and Stoick 1980). The data compiled for the Nubeth Project were obtained from a few monitor wells located within the historic Nubeth project area.

Well completion and head data from the Wyoming State Engineer's Office database (SEO 2010) and the Wyoming Oil and Gas Conservation Commission database (WOGCC 2010) were used to help develop the regional pre-1980 potentiometric surface. In addition to well data, naturally occurring seeps from the Fox Hills outcrop were used as additional data points in developing the OZ potentiometric surface map. As depicted on Figure 2.3-2, several miles north of the proposed Ross Project area the Little Missouri River flows back across the Black Hills Monocline near its intersection with Prairie Creek. At this location



Drawing Coordinates: WY83EF

0 3/4 1-1/2 3
GRAPHIC SCALE (MILES)

LEGEND

- PROPOSED ROSS PERMIT BOUNDARY
- 4000 — POTENTIOMETRIC SURFACE
- POTENTIOMETRIC SURFACE INFERRED
- P76539W 4040 — WELL COMPLETED IN ORE ZONE WITH 1980 WATER LEVEL
- P141476W 3951 — INDUSTRIAL WELL FROM WHICH A PRE-1980 WATER LEVEL COULD NOT BE OBTAINED
- Fox Hill Outcrop 3920 — FOX HILLS POTENTIOMETRIC SURFACE INFERRED FROM AERIAL PHOTO ANALYSIS WITH WATER LEVEL
- FOX HILLS OUTCROP

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Date	Description

FILE:

ROSS ISR PROJECT
CROOK COUNTY, WY
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GWM TECHNICAL REPORT
FIGURE 2.3-2

APPROXIMATE PRE-1980 POTENTIOMETRIC SURFACE FOR THE OZ AND AQUIFER DATA POINTS USED TO DEVELOP SURFACE

Drawn By: RAV
Checked By: BJS
Date: 10-20-10

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www.wwcengineering.com

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Prairie Creek bisects the Fox Hills outcrop. The ground surface elevation at this location is lower than the potentiometric surface elevation of the OZ near the proposed Ross Project area. A review of aerial photography of the area indicates several areas of alkali deposits where water appears to be emanating/discharging from the Fox Hills outcrop. Based on this evidence, the ground surface elevation at the alkali zones was considered to be the potentiometric surface elevation for the OZ aquifer in the area where Prairie Creek bisects the outcrop.

The information collected from the SEO and WOGCC databases included well completion locations, intervals, and initial estimated water surface elevations. Within the database there are many instances where information is missing or not deemed reliable. As a result, not all of the wells in the database were useful in preparing the initial pre-1980 potentiometric surface. Furthermore, within the greater Oshoto area, there are several water supply wells used for oilfield stimulation. Based on SEO and WOGCC records, most of these water supply wells originate within the Fox Hills sandstones and well construction started about 1980. As a result, many of the wells constructed after 1985 are believed to have been impacted by drawdowns from previously constructed oilfield water supply wells. Figure 2.3-2 depicts and Table 2.3-1 details the locations of the wells used to develop the pre-1980 potentiometric surface. In addition, industrial wells permitted by the SEO since 1980 from which reliable water level data could not be obtained are also included on Figure 2.3-2. The SEO and WOGCC records do not always indicate whether a well is currently in operation, although it is often possible to accurately estimate production rates from the WOGCC database if the operation of the oilfield is understood. Within the model domain operational flow rates for the industrial wells have been researched and are documented later in this report. Outside of the model domain less is known about the operation of the industrial facilities. However, not all of the industrial wells shown on Figure 2.3-2 are believed to be currently in operation. The naturally occurring seep locations used to develop the potentiometric surface are also depicted in Figure

Table 2.3-1. Wells and Points Used to Establish the Pre Abstraction Potentiometric Surface for the Ore Zone

SEO Permit #	**Name**	**Data Source***	**Lat**	**Long**	**Water level**
P55054W	House Well #4	SEO	44.5874	-104.9385	4095.0
NA	788V	Nubeth	44.5722	-104.9567	4089.7
NA	Phase II 4Z OZ	Nubeth	44.5792	-104.9621	4099.0
NA	SP 7X	Nubeth	44.5719	-104.9537	4098.6
P70181W	Kiehl Water Well #1	SEO	44.5437	-104.9467	4081.0
P83712W	Lewark #1-6	SEO	44.6086	-105.0830	3980.0
P72178W	Sophia #1A	SEO	44.5728	-104.9967	4030.0
P89873W	Cambridge WSW #1	SEO	44.5475	-105.0370	4045.0
P76731W	ENL American Unit WSW #1	SEO	44.5218	-105.0610	4025.0
P76539W	North Semlek Unit WSW #1	SEO	44.4674	-105.0307	4041.0
P65080W	ENL Water Supply #1	SEO	44.4460	-105.0204	4112.0
P75749W	Lily WSW #1	SEO	44.6277	-105.0062	4023.0
P66548W	Brislawn Water Source Well #1	SEO	44.6256	-104.9823	4036.0
P80628W	ENL Little Missouri Unit WW #1	SEO	44.6977	-104.9507	3924.0
NA	Fox hills outcrop inferred point from seep	Topo/areal photography	44.7366	-104.9860	3875.0
NA	Fox hills outcrop inferred point from seep	Topo/areal photography	44.7263	-104.9399	3899.0
NA	Fox hills outcrop inferred point from seep	Topo/areal photography	44.7032	-104.9432	3915.0
NA	Fox hills outcrop inferred point from seep	Topo/areal photography	44.6914	-104.9362	3923.0
NA	Fox hills outcrop inferred point from seep	Topo/areal photography	44.6860	-104.9375	3925.0

* SEO=Wyoming State Engineers Office online database. SEO well location and water levels were cross checked with the Wyoming Oil and Gas Conservation Commission's (WOGCC) online database for wells included in the WOGCC database.

2.3-2 and detailed in Table 2.3-1. With the limited number of wells northwest of the model domain, the pre-1980 regional potentiometric surface shown on Figure 2.3-2 is approximate. Fortunately, the information collected from the various Nubeth reports is quite dependable and the pre-1980 potentiometric surface within the project area is considered reliable. The pre-1980 potentiometric surface extends to the edge of the groundwater model domain in most places, which allows boundary conditions to be established for use within the groundwater model.

In order to establish an initial pre-1980 potentiometric surface for the SM aquifer, an approach similar to that taken to define the OZ aquifer potentiometric surface was initially attempted. However, the SM aquifer is not as regionally continuous as the OZ aquifer and it was therefore difficult to correlate the SM aquifer from well to well, especially when a well was at a significant distance from the proposed Ross Project area and geologic cross sections and boreholes were not available. In general, all of the wells within the region that are used for industrial purposes are believed to target the OZ aquifer. As a result, there are very few wells representative of pre-1980 SM aquifer heads. Furthermore, a review of all the wells in the SEO database indicated that the information contained within the database is, in many cases, not detailed enough to ascertain whether or not the well was completed within an equivalent SM aquifer. Even if it was possible to determine that the well was completed in the target SM aquifer, there was still uncertainty in the accuracy of the reported water levels and the ground surface elevation from which the water levels were measured. As a result, it was not possible to develop an accurate potentiometric surface for the SM aquifer using wells from the SEO database. As an alternative to creating an independent potentiometric surface for the SM aquifer, the initial SM potentiometric surface was approximated by adjusting the OZ potentiometric surface up by 30 feet as described in the following paragraphs.

Three oilfield water supply wells (789V, 19XX, and 22X-19) exist within the proposed Ross project area and are depicted on Figure 2.3-2. According to WOGCC records, these wells have been in operation since approximately 1980. Based on the results of WWC's aquifer pump tests and groundwater monitoring (WWC 2010), it was noted that due to the oilfield water supply wells within the project area the OZ potentiometric surface has been significantly impacted (the 2010 potentiometric surface is detailed within Section 4.7.2). Of the monitor wells constructed by WWC, 34-7OZ at just over a mile away from the nearest pumping well, is at the greatest distance from these industrial wells. The water level at well 34-7SM was approximately 30 feet higher than the water level at well 34-7OZ in 2010.

In the 1977 aquifer test for the Nubeth Project, potentiometric surfaces for two sandstone zones were measured (Hamilton 1977). The potentiometric surface of the sand zone equivalent to the OZ aquifer was approximately 4,089 feet, while the potentiometric surface of the next aquifer above the OZ was 4,127 to 4,130 feet (40 feet higher). A review of the completion intervals reported for the upper aquifer indicate that it was completed in the SM zone, as well as additional sands above the SM aquifer. Since the completion interval for the Nubeth well includes several sands above the SM zone, the potentiometric elevation measured at this well is likely higher than would be expected if the well were completed in only the SM zone. Based on the data presented above, the SM potentiometric surface was approximated in the groundwater model at 30 feet above the elevation of the OZ potentiometric surface.

The upper-most Lance Formation sandstones (approximately 300-500 ft above the ore zone) in the proposed project area are believed to be in hydraulic communication with the alluvial aquifer system where they come into contact. At these locations, the alluvial system and these Lance sandstones have the same potentiometric surface. The upper-most sandstones within the Lance Formation in the proposed project area are discontinuous and do not form a regional aquifer. Groundwater flow within these sandstones is expected to parallel the SM and the OZ groundwater movement flowing to the west and the north where upper Lance sandstones are locally continuous. The recharge mechanism for these upper-most Lance sandstone is primarily from infiltration during precipitation events and from alluvial aquifers that are in communication with the sandstone. To the west of the project area the Little Missouri River, Good Lad Creek, and Prairie Creek have incised valleys which may capture some of the water flowing downdip within these perched Lance sandstones. Several shales with very low permeability exist between the upper-most Lance sandstones and the SM and OZ aquifers, therefore they are not believed to be in hydraulic communication (except very near their respective outcrops). As such, the upper Lance sandstones are not detailed to a great degree within the model. Rather, a potentiometric surface was developed based on measured alluvial water levels and the stream channel elevations within the project area. These water surfaces were then extrapolated out to the edges of the model domain where they were used to help establish the boundary conditions.

2.4 Hydrologic Boundaries

The hydrologic boundaries within the model include both internal and external boundaries. The model boundaries also vary from layer to layer. The hydrologic boundaries within the model are described within the following sections.

2.4.1 External Boundaries

The primary physical groundwater flow boundary is the Pierre Shale outcrop to the east. Since the underlying impermeable Pierre Shale outcrops just east of the Fox Hills outcrop, it serves as a hydrologic barrier to groundwater movement to or from the east. As a result, the Pierre Shale outcrop is represented by a no flow boundary.

To the south, west, and north of the Ross Project area, where there are no known natural hydrologic boundaries within either the Lance Formation or Fox Hills Formation, these model boundaries within the Lance and Fox Hills Formations are represented by general head boundaries. Heads assigned to the general head boundaries were based on pre-1980 SEO well data, Nubeth data, and extrapolated potentiometric surfaces discussed in the previous section. The surficial drainage boundaries of the Little Missouri River, Deadman Creek, and Good Lad Creek roughly coincide with the south, west and north boundaries of the model domain, respectively. The top layer within the model is hydraulically connected to the surficial drainage system. Each drainage divide is represented by a no-flow boundary in the top layer of the model. Where the surficial drainages extend beyond the model domain the boundary is represented by a recharge boundary condition.

2.4.2 Internal Boundaries

The only internal features that have been identified within the Ross model area are several small ephemeral streams. The streams are predominantly located within the uppermost layer of the model. Since the streams are not perennial, they were not modeled as streams. However, the streams do provide a mechanism for recharge where they cross the Lance and Fox Hills outcrops. Within the model the streams are represented by regions of higher permeability located in the bottoms of the drainages. This effectively simulates the water-bearing alluvium located within the ephemeral streams.

2.5 Hydraulic Properties

Hydraulic properties needed to characterize each aquifer or confining unit include hydraulic conductivity, storage coefficient (for confined aquifers), specific yield (for unconfined aquifers), and leakance. Available information for each of these properties is described within the following sections.

2.5.1 Hydraulic Conductivity

Hydraulic conductivity is one of the most critical hydraulic parameters as shown later in this report. Within the OZ Aquifer the hydraulic conductivity has been measured by pump testing at several locations within the Ross project area from historic Nubeth testing and testing conducted in 2010. Outside of the project area no measured hydraulic conductivity is available. A small amount of hydraulic conductivity information is available within the project area for the SM aquifer. No site specific hydraulic conductivity information is available for the confining layers or the surficial aquifers. As a result, published literature was relied on to estimate hydraulic conductivities for the surficial and confining layers. Hydraulic conductivity values available for each of the layers are detailed within this section.

2.5.1.1 Pierre Shale

The Pierre Shale is roughly 2,200 feet thick in the project area. Locally, the Pierre Shale is relatively uniform and void of any water-bearing strata and acts as a regional confining layer. Site-specific hydraulic conductivity tests have not been performed for the Pierre Shale, but the hydraulic conductivity has been estimated on the order of 2.6×10^{-10} to 2.6×10^{-9} ft/day by Neuzil (1993) outside of the region. Estimates of the vertical hydraulic conductivity outside of the region for the Pierre Shale are in the range of 5×10^{-8} to 5×10^{-4} ft/day (Kansas Geological Survey 1991). The thickness and low permeability of the Pierre Shale makes it a regional confining unit. On the east side of the project area the Pierre Shale outcrop marks the eastern extent of the overlying Ross area aquifers.

2.5.1.2 Fox Hills Formation

Within the project area, the Fox Hills Formation consists of lower and upper sandstone members separated by interbedded shales and silts. The sandstone members represent the water-bearing strata within the lower Fox Hills Formation. Both sandstone units are believed to be continuous throughout the project area although in places they are relatively thin. The lower sandstone member contains two sandstone packages, of which the upper package is the nearest aquifer below the uranium-bearing sands in the upper Fox Hills Formation, and is also referred to as the deep monitoring zone (DM). The DM zone is separated from the upper Fox Hills ore-bearing sandstone by 30 to 50 feet of shale. Recent head data from monitor wells completed in the DM zone and overlying OZ interval indicate there is a downward vertical gradient with up to 14 feet of head differential between the two zones. Aquifer tests performed in July of 2010 by WWC Engineering indicate the DM zone is hydraulically isolated from overlying water-bearing units. Furthermore, analyses of water quality performed by WWC in 2010 in the DM zone and the OZ unit indicate a distinct difference in the chemical characteristics. These differences in water quality suggest no mixing of water between the two zones. No aquifer tests have been performed to determine the hydraulic conductivity of the DM sands. However, when WWC Engineering has collected water samples from the DM zone it has had a very small yield. The DM monitor wells typically pump dry at a pumping rate of less than ½ gallon per minute. The bore logs for the monitor wells indicate that the DM sandstone is finer grained and contains more silt than the OZ sands. As such, the hydraulic conductivity of the DM zone is expected to be less than the hydraulic conductivities measured in the ore-bearing Fox Hills sandstone presented in this report. The DM aquifer was not modeled with the 7 layer groundwater model. As discussed in the following paragraphs, the intervening shale between the two aquifers effectively isolates them from each other which means that any attempt to model the DM would show negligible response to changes in the overlying OZ aquifer.

Due to the thickness (30 to 50 feet) of shale and silt separating the DM zone from the OZ aquifer and the observed head differential between the OZ and DM, this interval is considered to be a confining interval. This interval is also referred to as the basal confining unit for the purposes of the model. Although vertical hydraulic conductivities are not available for the basal confining shale, the vertical hydraulic conductivity is expected to be comparable to that of the Pierre Shale, which has been estimated to range from 5×10^{-8} to 5×10^{-4} ft/day.

The sandstones within the upper Fox Hills Formation contain uranium and are the primary target of the Ross ISR Project. Due to the variable nature of the near-shore depositional environment in which the sandstones were deposited, the thickness and lithologies vary across the project area with sometimes significant differences over short distances. This phenomenon can be seen on the geologic cross sections contained in Strata's permit applications for the Ross ISR uranium project. The upper Fox Hills Formation ranges from thick, bedded, blocky sandstones to thin, interbedded sandstones, siltstones and shales. Within the project area the gross sand thickness of the upper Fox Hills Formation is approximately 150 feet, although local variations of up to 50 feet or more are not unusual. The upper Fox Hills sandstones, shales, and silts have been studied extensively through core analysis and aquifer tests. Hydraulic parameters for the Fox Hills formation and adjacent shales measured from core data are summarized in Table 2.5-1. Hydraulic parameters for the OZ aquifer measured from aquifer tests are summarized on Table 2.5-2. For the purposes of the regional groundwater model, hydraulic parameters measured from the aquifer tests are considered more applicable than the core data. The aquifer tests were performed at several locations within the modeled layer and are considered more representative of that entire layer, whereas core data are representative only of conditions at the specific location from which the core was collected.

The multiple well partial penetration tests performed near the 12-18OZ monitor well were the only aquifer tests from which the vertical to horizontal anisotropy could be estimated. Results from the 12-18OZ pump tests indicate the vertical to horizontal anisotropy within ore-bearing sands is approximately 1. As shown on Table 2.5-1, the ratio of vertical hydraulic conductivity to horizontal hydraulic conductivity measured from the cores is approximately 0.7. Within the shales the vertical to horizontal anisotropy is much greater. The vertical hydraulic conductivity in the shale is at least an order of magnitude less than the horizontal hydraulic conductivity; in many cases the vertical hydraulic conductivity was measured several orders or magnitude lower than the horizontal hydraulic conductivity. The locations of the core holes and monitoring wells, where pump tests were conducted, which were used to develop hydraulic conductivity estimates are presented on Figure 2.5-1.

2.5.1.3 The Lance Formation

The Lance Formation depositional environment has been interpreted as being fluvio-deltaic in origin (Tschudy 1975). The Lance Formation consists of a mixture of non-marine deposited sandstones and floodplain mudstones with thin beds of coal (Connor 1992). The depositional environment of the Lance Formation created a stratigraphy that is complicated and vertically heterogeneous. Within the Ross ISR Project area, the lower portions of the Lance formation have specific project implications due to several factors including the presence of uranium, a shale confining layer, and the first water-

Table 2.5-1. Core Data-Hydraulic Parameters for Fox Hills Formation

Sample Number[1]	Depth (ft)	Porosity (%)	Horizontal K (ft/day)	Vertical K (ft/day)	Ratio of Vert to Horiz K	Lithology
Hydraulic Parameters for Fox Hills Formation Sandstones						
RMRD 0004	520.3	40.7	8.8			Sandstone minor shale
RMRD 0004	509.8	46.6	5.2			Sandstone very fine grained grey
RMRD 0004	510.5	45.9	11.9			Sandstone very fine grained grey
RMRD 0004	504.8	43.9	2.4			Sandstone very fine grained gray with shale thin 1-2 cm shale breaks
RMRD 0003	451.9	41.3	3.7			Sandstone very fine grained dark grey coarsening upwards sequence.
RMRD 0003	446.5	38.9	2.6			Sandstone very fine grained dark grey coarsening upwards sequence.
RMRD 0003	440.4	42.0	4.3			Sandstone very fine grained light grey
RMRD 0001	578.6	42.2	5.6			Sandstone fine grained light grey shale commons shale clasts to 12 cm
RMRD 0001	534	41.1	3.8			Sandstone minor shale
Nubeth 477V	379.8		3.6	3.3	0.91	sandstone
Nubeth 477V	381.8		3.8	1.2	0.33	sandstone
Nubeth 477V	390.3		4.6	4.2	0.91	sandstone
Nubeth 477V	411		6.1	4.5	0.74	sandstone
Nubeth 477V	433.5		5.5	4.5	0.82	sandstone
Nubeth 477V	450.5		3.0	2.6	0.86	sandstone
Nubeth 477V	500	34	4.0	4.0	0.99	sandstone
Nubeth 477V	506.5	37.8	4.7	2.6	0.55	sandstone
Nubeth 477V	507	35.6	4.1	0.4	0.09	sandstone
Nubeth 477V	511	36.2	7.0	4.5	0.64	sandstone
Nubeth 477V	517	28.6	8.2	6.0	0.73	sandstone
Nubeth 477V	543	36.4	5.5	4.8	0.87	sandstone
Nubeth 477V	557	32.2	5.5	4.8	0.87	sandstone
RMD0007	456	41.7	4.5	1.4	0.31	Sandstone; light grey, firm, moderately friable.
RMRD 0003	482.1	42.24	4.12			silt very fine grained grey
		Average	**5.1**	**3.5**	**0.7**	
		STDEV	**2.1**	**1.6**	**0.3**	
Hydraulic Parameters for Fox Hills Formation Silt						
RMRD 0001	543	38.8	0.18			siltstone siltstone with thin sandy layers
Nubeth 477V	508	32.8	0.66	0.03	0.05	siltstone/mudstone
Nubeth 477V	524	19.6	0.11	0.07	0.67	siltstone/mudstone
Nubeth 477V	531	27.6	0.53	0.46	0.88	siltstone/mudstone
RMD0007	448.4	33.4	0.16	0.05	0.32	Siltstone, dark grey, laminated, few breaks on bedding, firm.
		Average	**0.3**	**0.2**	**0.5**	
		STDEV	**0.2**	**0.2**	**0.4**	
Hydraulic Parameters for Fox Hills Formation Cemented Sandstone						
RMRD 0001	585.9	14.3	0.003			Sandstone Carbonate Cement at 585' to 586'

Table 2.5-1. Core Data-Hydraulic Parameters for Fox Hills Formation (Continued)

Sample Number[1]	Depth (ft)	Porosity (%)	Horizontal K (ft/day)	Vertical K (ft/day)	Ratio of Vert to Horiz K	Lithology
Hydraulic Parameters for Fox Hills Formation Shale						
RMRD 0001	589.5	37.4	0.163			Shale Black dense
RMRD 0001	588.8	38.1	0.135			Shale Black dense
Nubeth 477V	482.5	24.1	0.003	0.00002	0.007	shale/siltstone
Nubeth 477V	490.6	27.8	0.079	0.010	0.132	shale/mudstone
Nubeth 477V	417-421		0.007	0.002	0.220	shale/siltstone
Nubeth 477V	544	29.8	0.029	0.002	0.064	shale
Nubeth 477V	573	25.9	0.018	0.00002	0.001	shale
RMD0006	325	24.1	0.142	0.001	0.007	Claystone; grey, competent, few carbonaceous laminations
RMD0006	333.5	24.2	0.148			Claystone; light brown, bioturbation, competent
RMD0006	465.5	30.2	0.037	0.009	0.240	Claystone siltstone; interlaminated, even claystones are silty
RMD0007	477.2	28.7	0.057			Claystone; dark grey, firm
		Average	**0.074**	**0.003**	**0.096**	
		STDEV	**0.062**	**0.004**	**0.103**	
Hydraulic Parameters for Fox Hills Formation Shale/Sandstone mix						
RMRD 0003	473.7	42.9	3.03			Shale grey with sandstone 1-2 cm sandstone interbeds
RMRD 0003	473	40.7	1.72			Shale grey with sandstone 1-2 cm sandstone interbeds
RMRD 0003	458.7	34.5	0.31			Shale with sand
RMRD 0003	454.3	34.0	0.17			Shale with sand
RMRD 0002	407.5	28.9	0.08			Sandstone fine grained shaly shale clasts to 8 cm
RMRD 0004	502	38.6	0.32			Shale dark grey with sandstone shale with thin sandstone beds
RMD0006	434.6	28.8	0.05	0.03	0.62	Clay pebble zone in sand matrix
		Average	**0.81**	**0.03**	**0.62**	
		STDEV	**1.14**			
Hydraulic Parameters for Fox Hills Formation Sandstone/Silt Mix						
RMRD 0003	491.1	43.4	0.72			Sandstone very fine grained silty carbon and py stringers above lower shale contact
RMRD 0003	462.7	45.3	2.05			Sandstone very fine grained light grey with silt poorly sorted
RMRD 0001	560.8	38.8	1.25			Sandstone with silt
RMD0007	469.2	37.4	1.43	0.44	0.31	Silty sandstone; light grey with numerous dark clay fragments
RMRD 0001	571.12	31.9	0.37			Sandstone very fined grained light grey Fine to very fine grained
		Average	**1.16**	**0.44**	**0.31**	
		STDEV	**0.55**			

[1]Nubeth sample information is from Hamilton, 1977. RMRD 0001, RMRD 0002, RMRD 0003, RMRD 0004 data are from core analysis conducted by Strata in 2009-2010.

Table 2.5-2. Summary of Aquifer Parameters from Pump Tests in the Ore Zone

2010 Pump Tests for Strata Energy in 2010 (WWC 2010)						
Well ID	**Well Type**	**Interpretation Method**	**Transmissivity (ft^2/day)**	**Contributing Aquifer Thickness (ft)**	**Hydraulic Conductivity[2] (ft/day)**	**Storativity (unitless)**
34-7 OZ	Pumping	Theis Recovery	172.50	60	2.88	n/a
42-19 OZ	Pumping	Theis Recovery	13.40	90	0.15	n/a
34-18 OZ	Pumping	Theis Recovery	19.80	105	0.19	n/a
14-18 OZ	Pumping	Theis Recovery	23.80	30	0.79	n/a
21-19 OZ	Pumping	Theis Recovery	25.60	35	0.73	n/a
12-18 OZ	Pumping	Theis Recovery	70.80	94	0.75	n/a
OW1B57-1[1]	Obs. Well	Theis Recovery	96.70	25	3.86	0.0001600
OW1B58-1[1]	Obs. Well	Theis Recovery	80.5	18	4.50	0.0000580
OW1B60-1[1]	Obs. Well	Theis Recovery	84.5	16	5.30	0.0000620
OW1B57-1[1]	Pumping	Theis Recovery	80.30	25	3.21	n/a
OW1B58-1[1]	Obs. Well	Hantush, 1961	111.00	18	6.17	0.0000350
OW1B60-1[1]	Obs. Well	Hantush, 1961	90.80	16	5.68	0.0000130
12-18 OZ	Obs. Well	Theis Drawdown (Confined)	103.90	94	1.11	0.0001100

1977 Pump Tests for Nuclear Dynamic, Inc. (Hamilton 1977, pg 4)

Well ID	**Well Type**	**Interpretation Method**	**Transmissivity (ft^2/day)**	**Aquifer Thickness (ft)**	**Hydraulic Conductivity (ft/day)**	**Storativity (unitless)**
788V	Obs. Well	Theis	19.22	121.00	0.16	0.0000850
789V	Pumping	Jacob Recovery	18.46	118.00	0.16	n/a
791V	Obs. Well	Theis	21.24	114.00	0.19	0.0000990
797V	Obs. Well	Theis	16.83	119.00	0.14	0.0002400

1977 Pump Tests for Nuclear Dynamic, Inc. (Manera 1978)

Well ID	**Well Type**	**Interpretation Method**	**Transmissivity (ft^2/day)**	**Aquifer Thickness (ft)**	**Hydraulic Conductivity (ft/day)**	**Storativity (unitless)**
SP3X	Obs. Well	Jacob Recovery	13.90	85.00	0.16	0.0000500
SP4X	Obs. Well	Jacob Recovery	12.83	85.00	0.15	0.0000750
SP6X	Obs. Well	Jacob Recovery	17.51	85.00	0.21	0.0000450
SP11X	Obs. Well	Jacob Recovery	24.87	85.00	0.29	0.0000500
SP12X	Obs. Well	Jacob Recovery	17.25	85.00	0.20	0.0000470
SP19X	Pumping	Jacob Recovery	29.41	85.00	0.35	n/a
SP78X	Obs. Well	Jacob Recovery	14.30	85.00	0.17	0.0000830

[1] Partially penetrating wells located near 12-18OZ.
[2] Hydraulic conductivity values are in the horizontal direction.

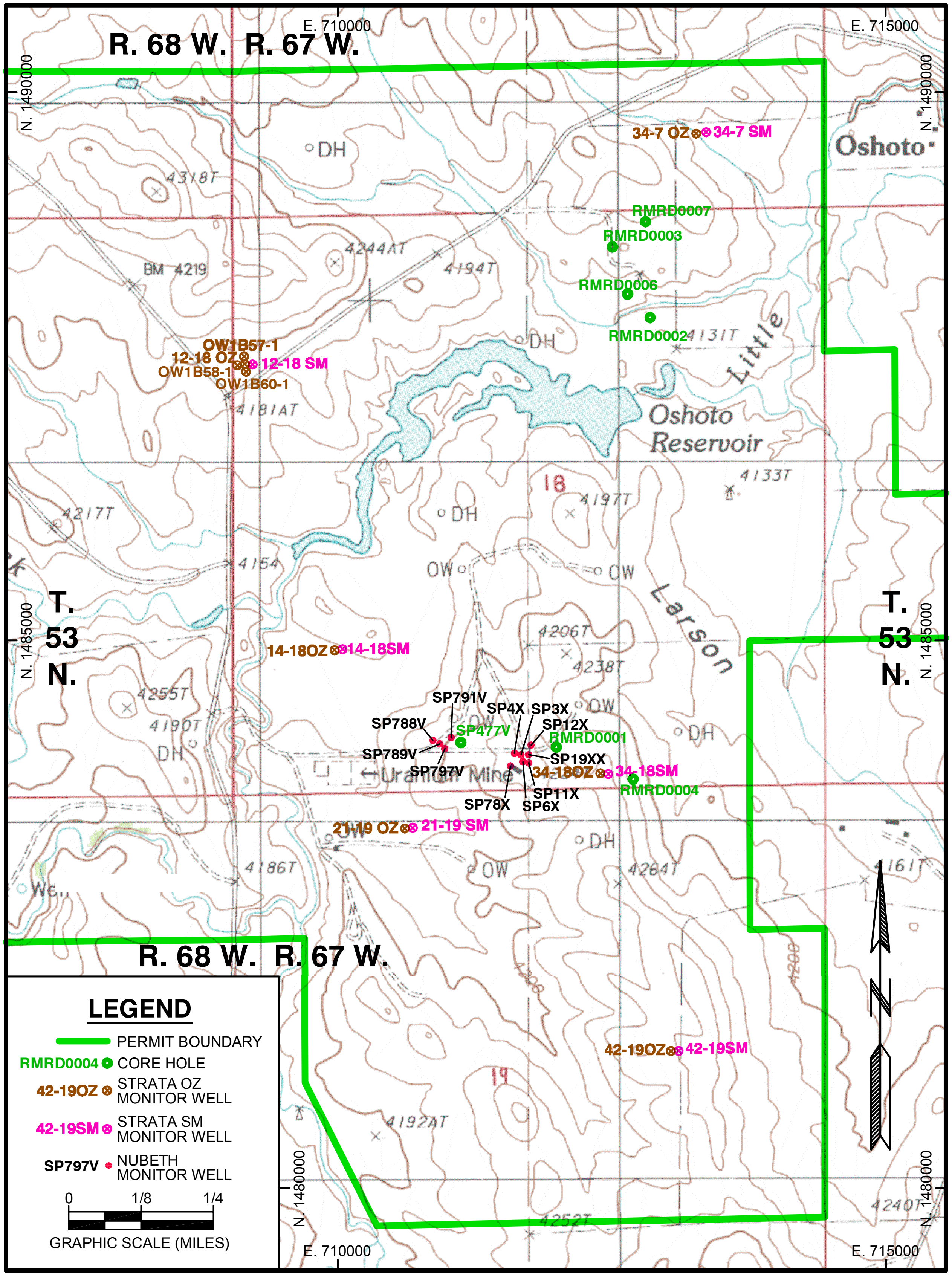


Figure 2.5-1. Locations of Core Holes and Monitoring Wells Used to Develop Hydraulic Conductivity Estimates

bearing interval above the ore-bearing zone. At the base of the Lance Formation, the uranium-bearing sandstone ranges in thickness from 30 to 50 feet within the Ross ISR Project area. Above the uranium-bearing sandstone a shale layer varying in thickness from 20 feet to 35 feet, locally called the OZ confining shale acts as upper confinement. The OZ confining shale serves as a confining unit that separates the mineralized sands from the water-bearing SM zone immediately above. The core test results presented in Table 2.5-1 for the shales are the only available measured hydraulic conductivity values for the confining shale. As such, core sample hydraulic conductivity values were used as initial starting values for the hydraulic conductivity of the confining shale. Hydraulic conductivity values for the confining intervals were then adjusted during the model calibration process until horizontal and vertical hydraulic conductivity values of 5×10^{-4} and 6.5×10^{-6} ft/ day, respectively, were utilized for the upper confining shale. This vertical hydraulic conductivity value is comparable to the published values for the Pierre Shale which range from 5×10^{-4} to 5×10^{-8} ft/day.

The shallow monitoring zone (SM) is located above the OZ confining shale. Hydraulic conductivities within the project area for the SM aquifer have been estimated based on drawdowns measured during baseline sampling from 2010. Within the Ross Project area the hydraulic conductivities measured within the SM aquifer range from 0.004 ft/day to 0.8 ft/day. The measured hydraulic conductivity values in the SM aquifer are presented in Table 2.5-3.

Table 2.5-3. Hydraulic Conductivity Values for the SM Aquifer

Based on 2010 water sampling recovery curves (WWC 2010)						
Well ID	**Well Type**	**Interpretation Method**	**Transmissivity (ft^2/day)**	**Screened Thickness (ft)**	**Hydraulic Conductivity (ft/day)**	**Storativity (unitless)**
34-7 SM	Pumping	Theis Recovery	29.10	35	0.800	n/a
42-19 SM	Pumping	Theis Recovery	0.15	30	0.005	n/a
34-18 SM	Pumping	Theis Recovery	0.09	20	0.004	n/a
14-18 SM	Pumping	Theis Recovery	33.44	45	0.740	n/a
21-19 SM	Pumping	Theis Recovery	20.00	55	0.360	n/a
12-18 SM	Pumping	Theis Recovery	6.80	10	0.700	n/a

Above the SM zone is a confining shale referred to as the SM confining shale. No project-specific hydraulic parameters have been measured for the SM confining shale. As with the OZ confining shale, an estimated hydraulic conductivity value for the SM confining aquifer was derived through trial and error during the calibration process. Calibrated horizontal and vertical hydraulic conductivity values of 7×10^{-4} and 1.45×10^{-5} ft/day, respectively, were utilized for the SM confining shale. This value for vertical hydraulic conductivity is comparable to the published values for the Pierre Shale which range from 5×10^{-8} to 5×10^{-4} ft/day.

Above the SM confining shale is a sequence of thin sands, shales, and silt which varies in thickness from zero feet where it has been eroded off at the outcrop to nearly 1,000 feet near the west edge of the model domain. This region is referred to as the Lance aquitards. Many of the thin sands contain water; however these sands are generally discontinuous and while they may be used locally for stock and domestic wells they are not regional. Hydraulic parameters for the Lance aquitards have not been extensively studied. Due to the number of confining shale intervals within the Lance aquitards, they have only minimal influence on the OZ aquifer. Because the Lance aquitards are intersected by the ephemeral tributaries to the Little Missouri River and Good Lad Creek, they have a much greater impact on the surficial drainages and alluvial system. As such, the only hydraulic conductivity values developed for the Lance aquitards were the model calibrated horizontal and vertical hydraulic conductivity values of 1 and 0.54 ft/day, respectively. These values are higher than would be expected if the Lance aquitards were truly modeled, however, the model calibrated values represent a flow system where water recharges the Lance aquitards through natural precipitation and either travels down dip to the west or discharges into surficial aquifers, depending on the topography. Since the primary focus of this modeling exercise is on the SM and OZ aquifers, and the Lance aquitards have minimal effects on the SM and OZ aquifers, the Lance aquitards serve as a place holder in the model and are not modeled in detail.

2.5.1.4 Alluvium

There is a minimal amount of alluvium within the Ross Project area and the alluvium only has implications to the OZ where it crosses the OZ outcrop. Small areas of alluvium have been mapped within the model domain by the USGS. The mapped alluvium lies adjacent to the main channels of the Little Missouri River and Good Lad Creek within 1 mile of where the drainages cross the Fox Hills outcrop. Where the alluvium occurs it forms a surficial aquifer. In locations where a perched Lance Formation sandstone lens is in communication with the alluvium, the surficial aquifer may extend from the alluvium into the sandstone lens. No hydraulic conductivity measurements have been performed on the alluvium within the project area. However, within the region, the hydraulic conductivity of the alluvium of the Belle Fourche River has been estimated to range from 0.1 to 24 ft/day with an average in the range of 5 ft/day (Whitcomb and Morris 1964). The alluvium of the Little Missouri River and Good Lad Creek is thought to have hydraulic conductivities along the same order of magnitude as the Belle Fourche River.

2.5.2 Storage/Specific Yield

An average storativity (S) and specific yield (Sy) were assumed to be uniformly distributed in each layer. For confined aquifers, changes in storage are calculated using specific storage (Ss). Ss is calculated by dividing the storativity by the aquifer thickness. For unconfined aquifers Sy is used to calculate changes in storage. The surficial aquifer (layer 1) is the only aquifer within this model which is not confined. As such, Sy was used in layer 1 with the rest of the layers using Ss values.

The storativity for the OZ aquifer has been measured at several locations within the Ross Project area and is summarized in Table 2.5-1. Measured values of storativity within the OZ aquifer range from 1.3×10^{-5} to 2.4×10^{-4} with an average of 8.1×10^{-5}. The corresponding specific storage values assuming an average aquifer thickness of 100 feet in the OZ aquifer would range from 1.3×10^{-7} to 2.4×10^{-6} with an average of 8.1×10^{-7}. No measured values of storativity are available for the other layers. However, due to noted similarities between the OZ and SM aquifers the storativity within the SM aquifer is assumed to be similar to that of the OZ aquifer.

Within the shale confining layers there are no measured storativity values available. As such, an initial value of Ss for the shale confining layers was estimated based on textbook values and then adjusted during calibration of the model. Using Equation (2.5-1) from Freeze and Cherry (1979).

(Equation 2.5-1) $$Ss=\rho g(\alpha+n\beta)$$

Where:

- ρ=density of water = 1 000 kg/m^3
- g=acceleration of gravity = 9.8 m/s^2
- α=aquifer compressibility = 1.5 x 10^{-11} to 1.5 x 10^{-9} N/m^2 (elastic compressibility of shale, Carmichael 1986)
- n=porosity = 0.29 (Average value Table 2.5-1)
- β=compressibility of water (4.6 x 10^{-10} N/m^2)

The resulting calculated value of Ss is in the range of 4.4 x 10^{-7} ft^{-1} to 5 x 10^{-6} ft^{-1}. The confining layers are composed primarily of over consolidated shale. The onsite geologist overseeing the coring operation reported that when core from the confining shale was hit with a geologist's hammer it was more likely to break than dent which indicates the shale is well consolidated. As such, the confining shale possesses a very low elastic compressibility. The low elastic compressibility of the shale means that when hydraulic head is decreased within the shale, very little compaction of the shale will occur. Hart et al., (2006) presented measured Ss values for the Maquoketa Formation Shale in Wisconsin. Their values ranged from 6.8 x 10^{-7} ft^{-1} to 2 x 10^{-6} ft^{-1} with the lower bound being a minimum Ss value. As such, an Ss value of 5 x 10^{-6} ft^{-1} is a reasonable approximation of the Ss in the Ross area confining shales.

As with the confining layers, there have been no measurements of specific storage within the Lance aquitards. Ss values measured from the OZ aquifer are the best estimates available for the Lance aquitards. As such, Ss values for the Lance aquitards were estimated within the measured range of Ss values for the OZ aquifer (1.3×10^{-7} to 2.4×10^{-6}).

The Sy for the surficial aquifer has not been measured within the project area. However, Whitcomb and Morris (1964) compiled estimated Sy values for the alluvium and the Lance Formation within the region. Based on their measured values, Sy was estimated at 0.19 for the alluvium and 0.10 for the bedrock Lance Formation aquifers.

2.5.3 Leakance

MODFLOW can calculate leakance between the model layers automatically. The leakance is calculated based on the vertical hydraulic conductivity and the layer thickness. Given the low permeability in the vertical direction within the OZ confining shale, the leakance between the SM and OZ layers is expected to be low.

2.6 Water Budget

2.6.1 Recharge

Recharge within the OZ and SM aquifers is expected to be a twofold process with recharge entering the aquifers from the outcrop as well as flowing into the Ross area from the south. The primary source of surficial recharge at the outcrop is expected to be the Little Missouri and Good Lad Creek alluvial systems where they cross the outcrop of each aquifer. Additional recharge may also occur from natural precipitation along the outcrop, although this recharge is limited due to low precipitation rates and relatively high evapotranspiration rates in comparison to precipitation rates.

Recharge to the surficial aquifers is expected to primarily occur via natural precipitation. A small portion of the natural precipitation infiltrates into the Lance formation. A portion of this infiltrated water then finds its way into the alluvium of the Little Missouri and Good Lad Creek. Another portion of the water infiltrated into the Lance Formation travels downdip into the formation to the west.

It is difficult to ascertain just what portion of total precipitation ends up as runoff or recharge. The amount of precipitation that infiltrates and percolates down to the water table will vary based on topography, vegetation, soils, and climatic conditions. Within the recharge zone portion of the Ross Project Area, there are a number of different vegetative covers, soils, and topographical features. Driscoll and Carter (2001) developed recharge estimates for the Black Hills Region of South Dakota. Although their study area did not include the Ross Project area the study was performed within the same region and is thought to be applicable to conditions within the Ross Project area. In general the recharge rates developed by Driscoll and Carter were highly variable ranging from 0.04 inches per year within the Cretaceous-Sequence Confining Unit and up to 2.93 inches per year within the Madison and Minnelusa Formations. Since the Ross Project area lies on the western periphery of the Black Hills where precipitation is much less and the Lance Formation is much less permeable, recharge within the Ross Area is thought to be much closer to 0.04 inches per year than 2.93 inches per year.

Recharge rates can be highly affected by conditions on the soil horizon. The bulk of precipitation returns to the atmosphere through evapotranspiration. Recharge only occurs when water infiltrates below the plant root depth (Carter and Driscoll 2001). To account for conditions on the soil horizon soils mapping developed by the NRCS (USDA NRCS 2009) was used to spatially vary the recharge rates throughout the model area. Hydrologic information compiled by the NRCS for each soil complex was used to approximate infiltration rates for each expected soil complex. Section 4.2.3 describes the process used to develop initial recharge rate estimates in more detail.

2.6.2 Evapotranspiration

Along the main channels of the ephemeral drainages within the Ross Project area there are several locations where wetland vegetation has been identified. Evapotranspiration (ET) at these locations is expected to result in water removed from the alluvial system. Grass ET estimates for the Moorcroft area range from 31.44 to 44.74 inches per year with a mean of 36.85 inches per year (Pochop, et al. 1992). Assuming an average precipitation rate of 13 inches per year, the resulting net annual evapotranspiration rate is 23.85 inches per year. Using an aerial photograph, the locations of significant wetland vegetation were identified within the model. These areas were assigned an initial evapotranspiration rate of 23.85 inches per year. Adjustments to the areal extent of evapotranspiration as well as the evapotranspiration rates were then made during the calibration process in order to meet target discharge rates and heads within the project area.

2.6.3 Drains

As described in Section 2.3, within the lower confined layers groundwater flow is to the west and north into the Powder River Basin. Within the domain of the model no natural drains exist for the confined layers. Water supply wells constructed for oilfield development within the Fox Hills Formation serve as artificial drains. However, the water supply wells were modeled as wells rather than drains. Within the surficial layer the alluvium of Good Lad Creek and the Little Missouri River serve as drains to the system. After water in the alluvium crosses the Pierre Shale outcrop, it no longer has a hydrologic connection to the modeled system. Drains installed in both the Little Missouri and the Good Lad drainages where they cross the outcrop simulate water leaving the model. No field measurements have been taken to characterize the true alluvial underflow leaving the model at the drains. Given the wide variability of estimates which may be used to calculate the size of the alluvium and the hydraulic conductivity within the alluvium, estimates of alluvial underflow vary from nearly 0 gallons per minute (gpm) to as much as 10 gpm. The drains also represent water leaving from evapotranspiration and surficial runoff from the alluvium, which is harder to quantify. For the purposes of model calibration a pre-abstraction steady state target outflow of less than 10 gpm was maintained at the drains.

3.0 COMPUTER CODES

3.1 Software

The numerical groundwater model utilizes the USGS modular finite-difference groundwater model MODFLOW (MacDonald and Harbaugh 1988) and the pre/post processor Groundwater Vistas (Rumbaugh and Rumbaugh 2002). Groundwater Vistas with MODFLOW2000 and MODFLOW88/96 were chosen for this modeling effort because they are widely accepted within the groundwater modeling community. Groundwater Vistas and MODFLOW have been used to construct other groundwater flow models for ISR projects in the past and are widely used and accepted by both industry and regulatory agencies.

3.2 MODFLOW Input Files

Eight MODFLOW packages were used in the Ross ISR Project groundwater model. The packages include:

- Basic - Basic Package containing starting heads, constant heads, and some options
- Block centered flow - bcf used in MODFLOW88/96, contains aquifer property data and grid spacings.
- Output Control – Determines what model results to print and save to files during simulation
- Solver – PCG2 was primarily utilized to solve the partial differential equations in MODFLOW although for calibration purposes other solvers were used to help achieve convergence
- Well – Well boundary conditions
- Drain - Drain boundary conditions package
- General Head – General head boundary conditions
- Recharge – Recharge boundary condition
- ET-Evapotranspiration boundary condition

In addition to the MODFLOW packages described above two packages specific to MODFLOW2000 were used. They include:

- LPF-Layer-Property Flow
- DIS-Discretization

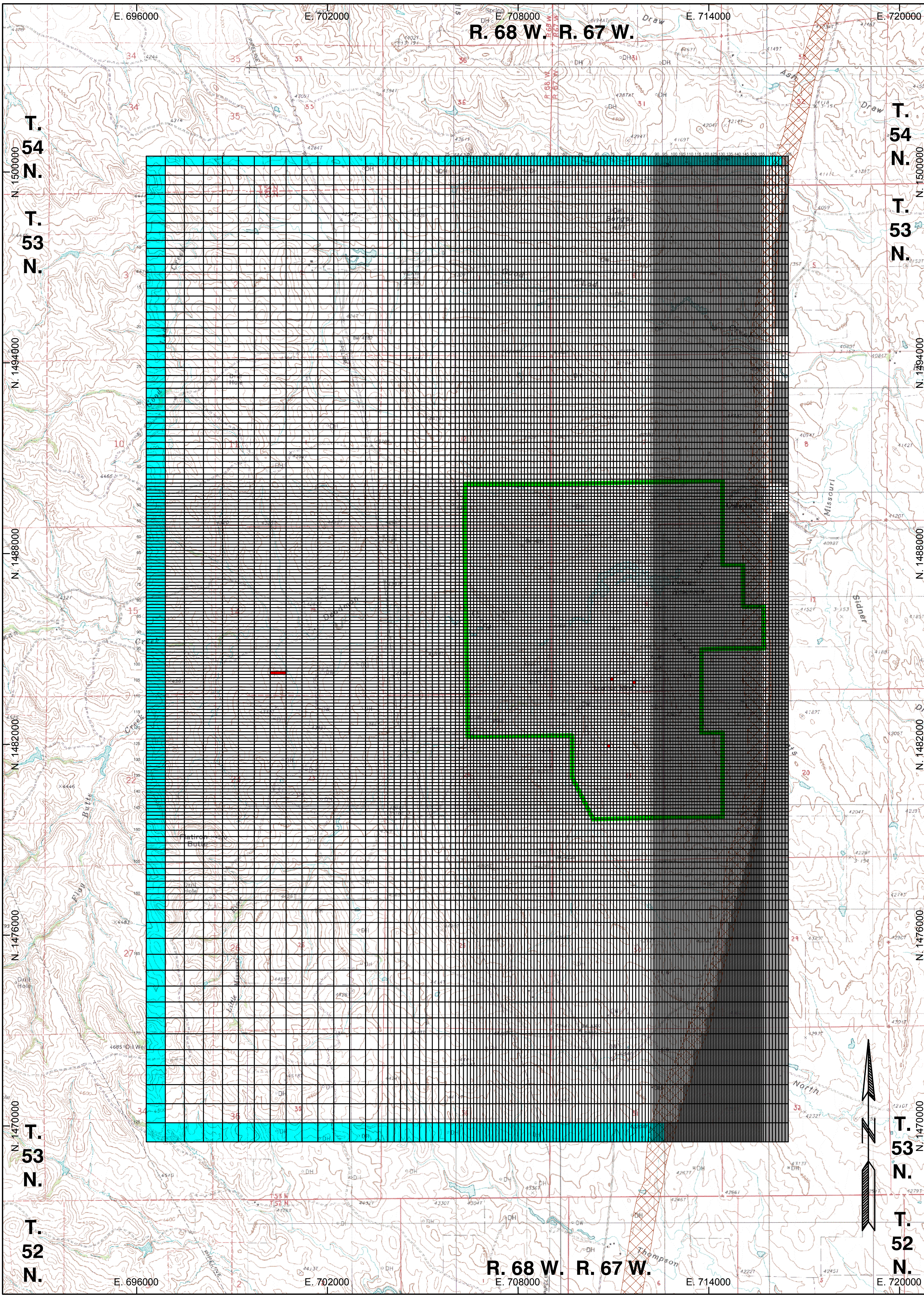
3.3 Limitations and Assumptions

As with any modeling software there are a number of limitations and assumptions built into the code. MacDonald and Harbaugh (1988) describe limitations and assumptions within the MODFLOW code in detail. Rumbaugh and Rumbaugh (2002) describe the limitations and assumptions built into Groundwater Vistas. Many of the assumptions and limitations within the modeling software are the result of inaccuracies inherent in modeling a natural system and are generally similar for all modeling software. Limitations and assumptions specific to this modeling effort are primarily due to the paucity of data on physical and hydraulic characteristics of the aquifers and confining units, as described in detail within this report.

4.0 MODEL CONSTRUCTION

4.1 Model Domain

The model grid is oriented parallel to the geologic strike of the Fox Hills outcrop, which is generally north-south. The model area encompasses some 14,376 acres. The model is constructed with a variably spaced grid having a minimum cell spacing of 50 x 100 ft in the project area and a maximum spacing of 300 x 600 ft near the edges of the model area. The maximum increase in size between adjacent cells is limited to less than 1.5 times in order to eliminate numerical errors (Anderson and Woessner 1992). The finite difference grid consists of 176 rows along the north-south axis and 165 columns along the east-west axis, covering distances of 31,000 feet and 20,200 feet, respectively. The model grid is depicted on Figure 4.1-1. The model domain was sized to minimize edge effects. During the initial model development stage a smaller model domain was used. However, edge effects from the smaller model domain were unacceptable. ISR simulation drawdowns discussed within Section 4.9 of this report indicate that with the expanded model domain edge effects are very minor. The model consists of seven layers which are defined as follows:



ROSS PROJECT AREA

Drawing Coordinates: WY83EF

LEGEND

- MODEL GRID
- FOX HILLS OUTCROP (RECHARGE ZONE)
- CONSTANT HEAD BOUNDARY
- NO FLOW BOUNDARY (REPRESENTS CONFIGURATION IN LAYER 6)

0 1500 3000 6000

GRAPHIC SCALE (FEET)

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennington Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

STRATA ENERGY	ROSS ISR PROJECT CROOK COUNTY, WY P.O. BOX 2318 GILLETTE, WY 82716
REVISIONS	GWM TECHNICAL REPORT FIGURE 4.1-1
Date / Description	GROUNDWATER MODEL GRID
Drawn By: RAM Checked By: BJS Date: 10-10	WWC ENGINEERING www.wwcengineering.com
FILE: ROSS_TR_GWM_GRID	

K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_GWM_GRID.dwg, GWM_FIGURE_4.1-1, 12/20/2010 11:25:20 AM

- Layer 1- Represents the alluvial/colluvial aquifers. This layer includes the top 20 feet of the entire model domain.

- Layer 2-Represents the Lance aquitards above the SM confining interval. Within the Lance Formation are a number of thin sands sandwiched between shales. These sands form small discontinuous aquifers that are believed to provide recharge as well as receive recharge from the alluvial system where they come into contact with it.

- Layer 3-Represents the SM confining interval. Located within the Lance Formation, this layer represents a thick shale that separates the SM from the Lance aquitards above.

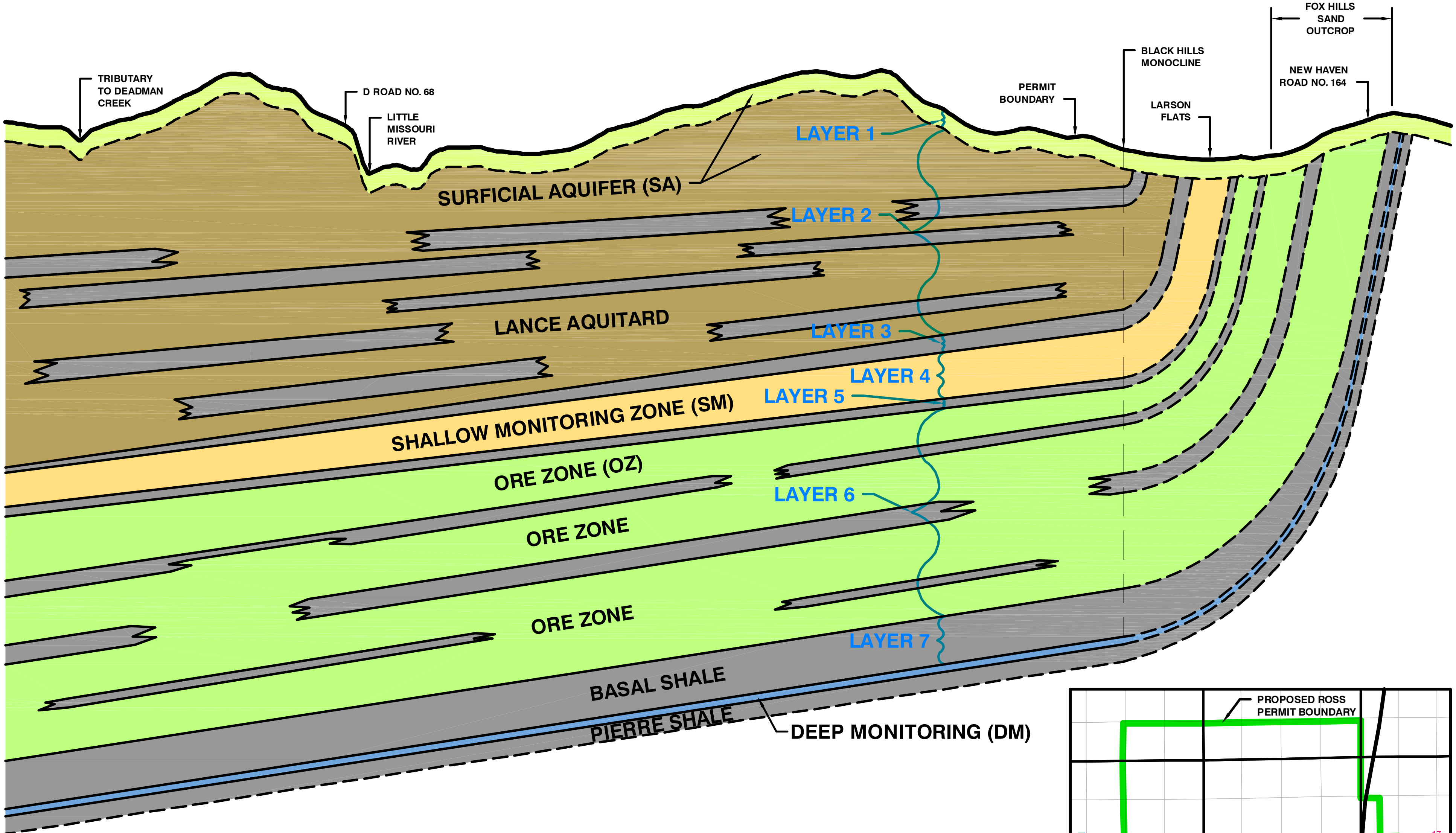
- Layer 4-Represents the Shallow Monitoring (SM) zone. Located within the Lance Formation, this is the first aquifer above the OZ confining interval and will be monitored during ISR.

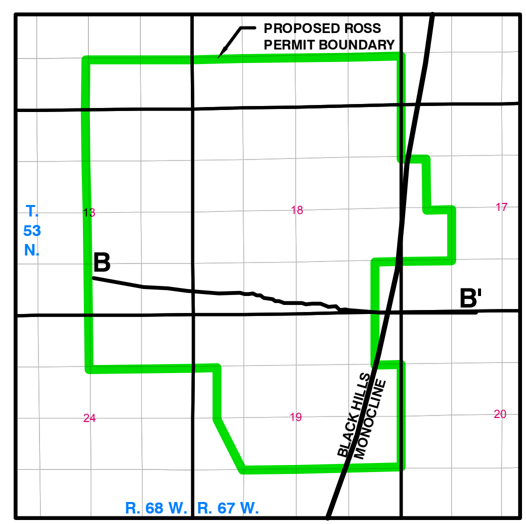
- Layer 5-Represents the OZ confining interval. Located within the Lance formation this is a thick shale that separates the OZ aquifer from the SM aquifer.

- Layer 6-Represents the ore containing aquifer. This aquifer is located within the lower Lance and upper Fox Hills formations.

- Layer 7-Represent the Fox Hills basal confining shale between the OZ and the DM.

The model simulates layer 7 as an impermeable boundary. Given that, the underlying shale averages 50 or more feet thick within the project area, and hydrologic testing do not indicate communication between the OZ and DM, this is a reasonable assumption. Figure 4.1-2 depicts a conceptual cross sectional view within the Ross Project area. The upper and lower surfaces for each layer were developed based on a 2 step process. West of the Black Hills monocline, the layer surfaces were developed based on geologic boreholes within the project area. To develop the layer surfaces, electric logs from current and historical exploration efforts within the greater Oshoto area were loaded into geologic modeling software Gemcom. Picks at each stratigraphic break were made manually for boreholes. Stratigraphy for the groundwater model was based on electric logs from the 2010 monitor well clusters. In areas where the





Black Hills Monocline adapted from Sutherland, W.M., 2008, Geologic Map of the Devils Tower 30' X 60' Quadrangle, Crook County, Wyoming, Butte and Lawrence Counties, South Dakota, and Carter County Montana: Wyoming State Geological Survey Map Series 81, Scale 1:100,000.

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennigton Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

CONCEPTUAL CROSS SECTION B-B'

NOT TO SCALE

Figure 4.1-2.

K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_GWM_CONCEP_XS.dwg, GWM_FIGURE_4.1-2, 12/20/2010 11:26:50 AM geology is complicated between the monitor well clusters and to the north, south, and west of the project area additional boreholes were used to help define the surface. The geologic model was then used to prepare a 3D surface representative of each layer. East of the Black Hills Monocline no borehole information was available. However, the Fox Hills outcrop has been mapped by the USGS. Using the Fox Hills outcrop as a guide, the surface of each layer was extrapolated to the surface. Actual cross sections from the groundwater model cut at various rows are depicted on Figure 4.1-3. The location of each row where the cross sections were cut are presented in Figure 4.1-1.

4.2 Hydraulic Parameters

The hydraulic parameters used in the groundwater model include hydraulic conductivity, storage, recharge, and evapotranspiration. Specific values for each parameter are described in the following sections. As previously described in Section 2.5, the modeling approach was to calculate reasonable starting values (as presented in Section 2.5). Then, during the calibration process the values were updated as necessary to meet the various calibration targets. The calibration process is described in more detail within Section 4.5.

4.2.1 Hydraulic Conductivity

Known hydraulic conductivity information available for the model area is discussed in Section 2.5.1.2. The hydraulic conductivities assigned within the model were based on the data presented in that section and subsequent calibration runs Table 4.2-1 summarizes the horizontal hydraulic conductivity values used for each layer and Table 4.2-2 summarizes the vertical hydraulic conductivity values used for each layer. During the calibration process, the vertical hydraulic conductivity was typically calculated by multiplying the horizontal hydraulic conductivity by 0.7 in all layers except for the shale layers where the vertical hydraulic conductivity was several orders of magnitude lower than the horizontal hydraulic conductivity. Figures 4.2-1, 4.2-2, and 4.2-3 present the spatial distribution of the hydraulic conductivities assigned to

Figure 4.1-3. Actual East West Cross Sections From Various Rows Within the Ground Water Model

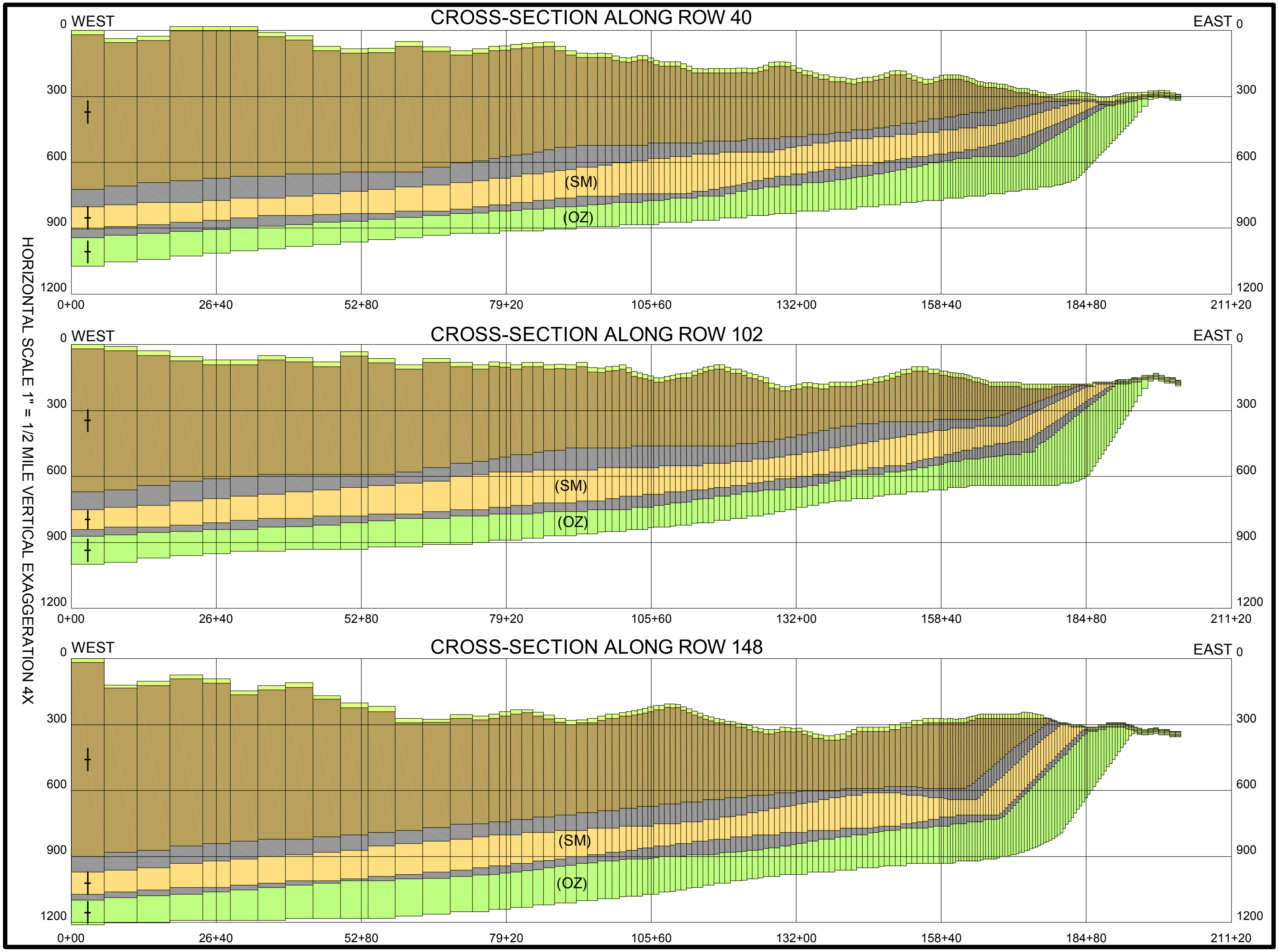


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Table 4.2-1. Summary of Horizontal Hydraulic Conductivity Values Used in the Model

Layer	Aquifer Unit	Model Hydraulic Conductivity values (ft/day)			
		Minimum	**Maximum**	**Predominant Inside Ross Project Area**	**Predominant Outside Ross Project Area**
1	Alluvium/top 20 feet	5.00	15.00	5.00	5.00
2	Lance aquitard	0.10	0.10	0.10	0.10
3	Confining unit	$7x10^{-4}$	$7x10^{-4}$	$7x10^{-4}$	$7x10^{-4}$
4	Lance SM	0.003	3.00	Varies	0.32
5	Confining unit	$5.0x10^{-4}$	$5.0x10^{-4}$	$5.0x10^{-4}$	$5.0x10^{-4}$
6	Lance/Fox Hills OZ	0.01	3.00	Varies	0.19

Table 4.2-2. Summary of Vertical Hydraulic Conductivity Values Used in the Model

Layer	Aquifer Unit	Model Hydraulic Conductivity values (ft/day)			
		Minimum	**Maximum**	**Predominant Inside Ross Project Area**	**Predominant Outside Ross Project Area**
1	Alluvium/top 20 feet	3.00	10.00	3.00	3.00
2	Lance aquitard	0.54	0.54	0.54	0.54
3	Confining unit	$1.45x10^{-5}$	$1.45x10^{-5}$	$1.45x10^{-5}$	$1.45x10^{-5}$
4	Lance SM	0.002	2.1	Varies	0.21
5	Confining unit	$6.5x10^{-6}$	$6.5x10^{-6}$	$6.5x10^{-6}$	$6.5x10^{-6}$
6	Lance/Fox Hills OZ	0.08	2.10	Varies	0.12

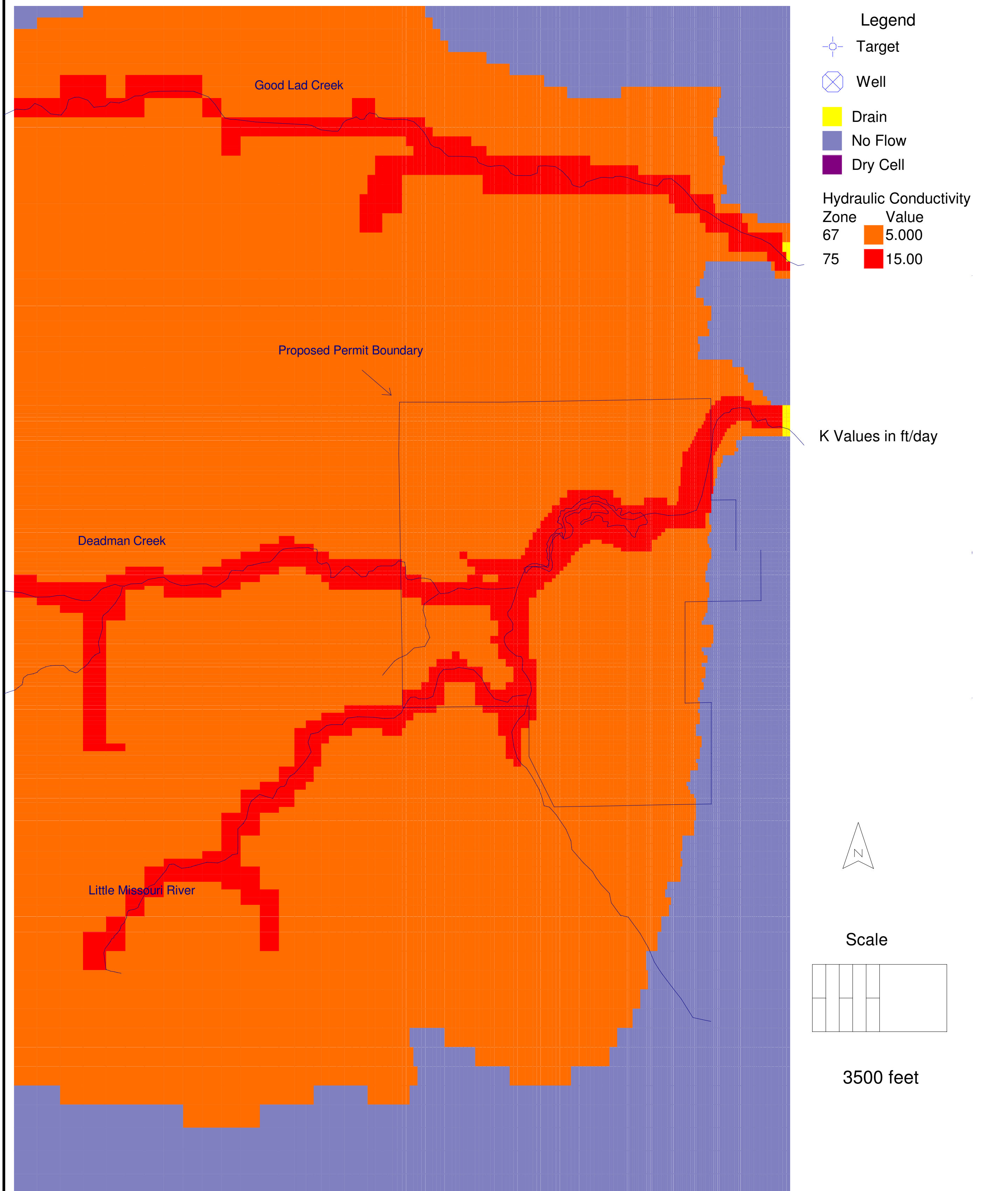


Figure 4.2-1 Spatial Distribution of Hydraulic Conductivity Assigned to Layer 1 (SA)

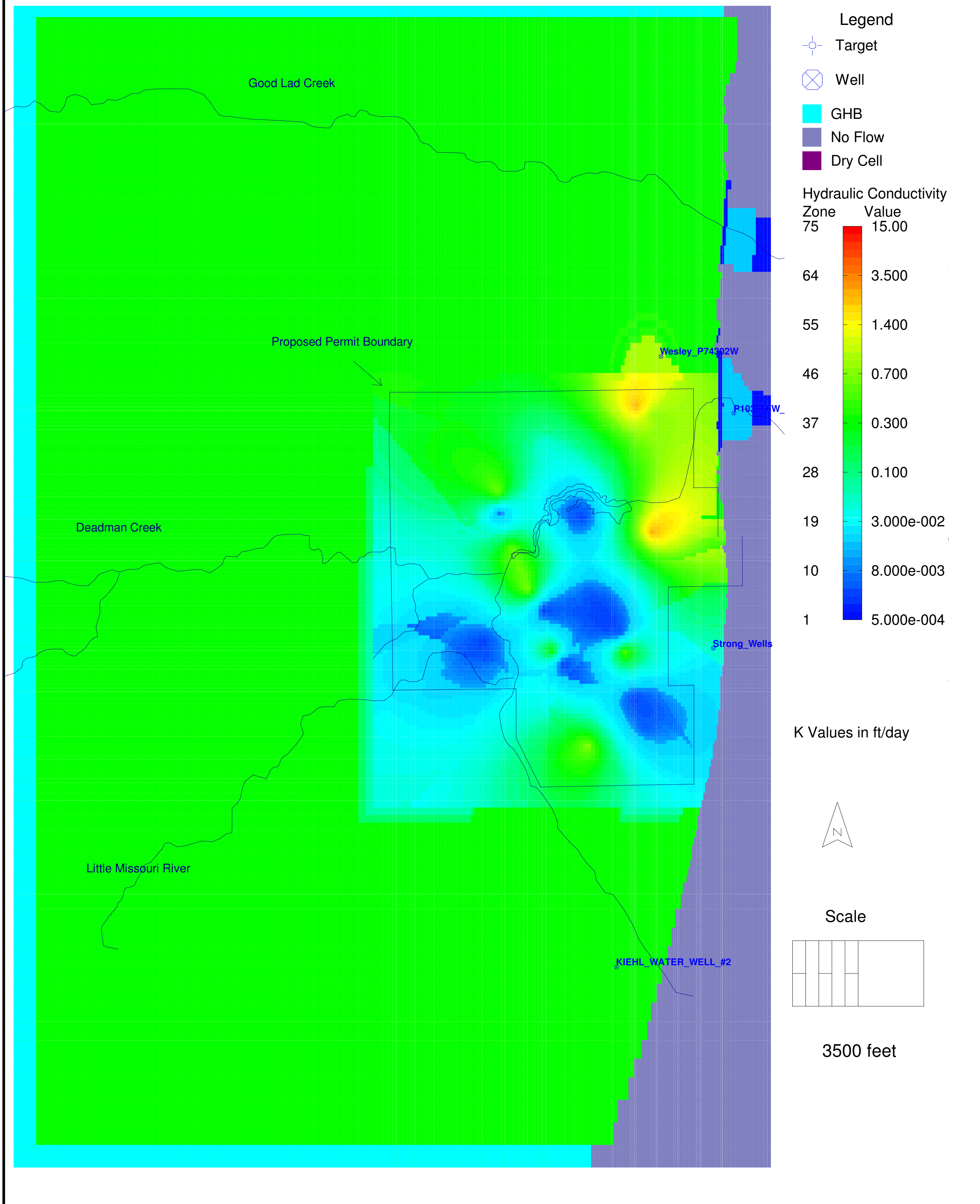


Figure 4.2-2 Spatial Distribution of Hydraulic Conductivity Assigned to Layer 4 (SM)

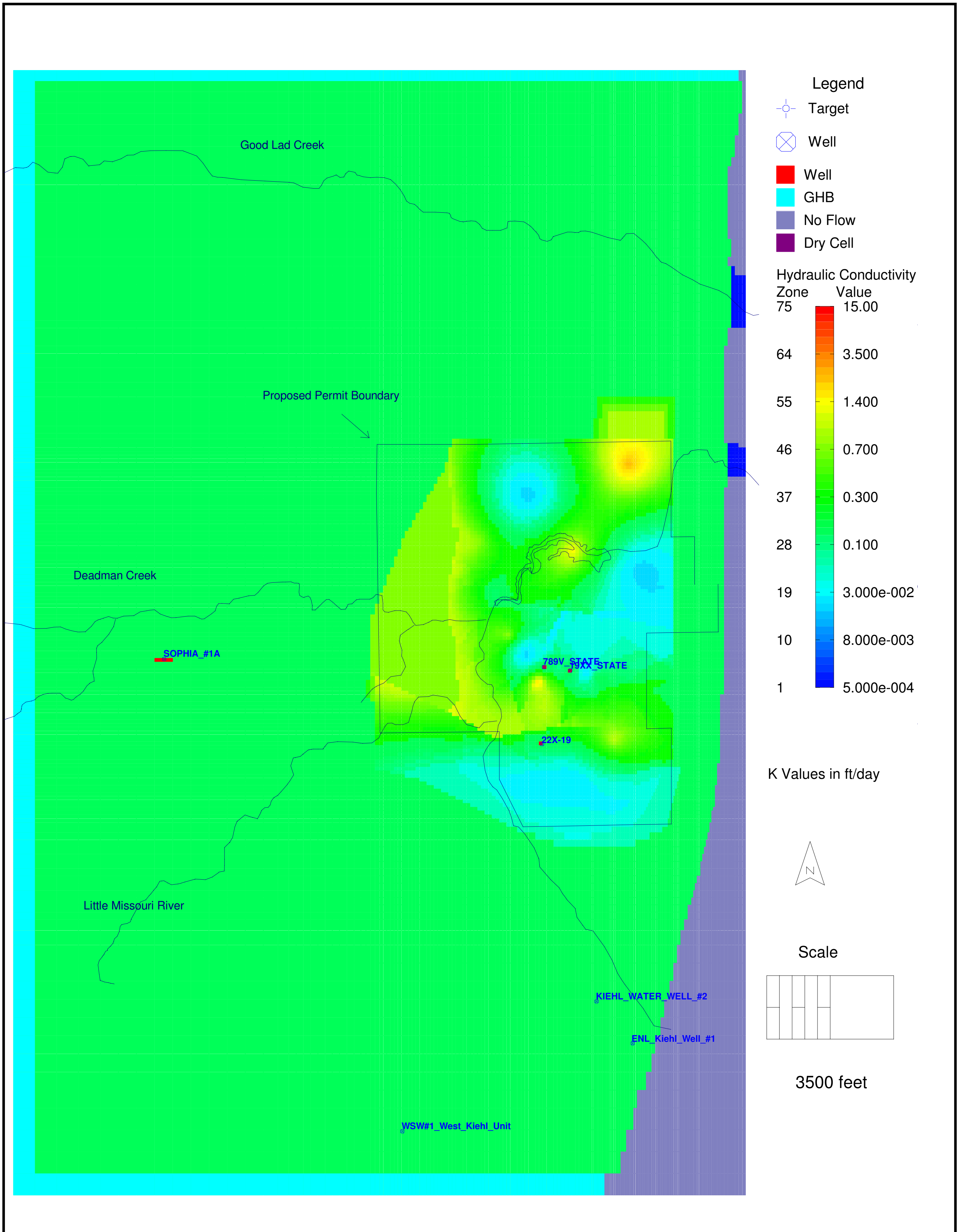


Figure 4.2-3 Spatial Distribution of Hydraulic Conductivity Assigned to Layer 6 (OZ)

layers 1, 4, and 6, respectively. The hydraulic conductivity was not spatially varied within layers 2, 3, and 5 except near the outcrop beneath Good Lad Creek and the Little Missouri River. Groundwater Vistas does not allow layers to truncate prior to the edge of the model. As a result, where the drainages cross the outcrop and the top layers do not become inactive it was necessary to vary the hydraulic conductivity to simulate vertically dipping strata through the layers.

4.2.2 Storage Coefficients

As described in Section 2.5.2, estimated storage coefficients were developed for each layer based on measured data and/or research on similar materials. Storage coefficients were then adjusted within the estimated ranges during model calibration. MODFLOW2000 utilizes specific storage (Ss) rather than a storage coefficient. As such, all storage coefficients were converted to a specific storage value prior to input in the model. Each layer was assigned a unique specific storage value which did not vary spatially. Specific storage values used for each layer are summarized on Table 4.2-3. Since it was possible that the potentiometric surface could drop below the top of the OZ aquifer a specific yield value of 0.1 was assigned to Layer 6.

Table 4.2-3. Summary of Specific Storage Values by Layer

Layer	Aquifer Unit	Model Specific Storage Values (1/ft)
1	Alluvium/top 20 feet [1]	0.19 within alluvium, 0.1 outside of alluvium
2	Lance aquitard	$5x10^{-7}$
3	Confining unit	$4x10^{-6}$
4	Lance SM	$7.6x10^{-6}$
5	Confining unit	$4x10^{-6}$
6	Lance/Fox Hills OZ	$9.7x10^{-6}$

[1]Alluvium values are specific yield (dimensionless)

4.2.3 Recharge

As described in Section 2.6.1 recharge enters the model from adjacent aquifers through the natural groundwater gradient as well as from precipitation and streamflow at the outcrop. Recharge from adjacent areas within the aquifer is indirectly calculated through the calibration process and the use of general head boundaries at the model edge. The distribution of recharge from natural precipitation within the project area was developed based on USDA-NRCS soils data (USDA-NRCS 2009). The NRCS has assigned for (A, B, C, or D) hydrologic soil groups for each mapped soil complex. No soils in the project area are in Group A. A B hydrologic soil group indicates the soil has a moderate infiltration rate, a C represents a soil with a slow infiltration rate, and a D soil has a very slow infiltration rate (Viessman and Lewis 1996). The B, C, and D soils were then assigned recharge coefficients, based on retention loss rates presented by the USBR (1977). Soils with hydraulic ratings of B, C, and D were assigned recharge coefficients of 1, 0.5, and 0.33, respectively. Within the Ross groundwater model domain an initial recharge rate of 0.6 inches per year was assigned to B rated hydrologic soils. The C and D soil recharge rates were assigned by multiplying the respective coefficients by 0.6 inches. Recharge rates applied to each soil type were then adjusted during model calibration until head and discharge targets within the alluvial drains were met. In this way calibrated recharge values for the entire model domain were developed.

Calibrated recharge was applied to the top layer throughout the model domain. In regions where the top layer was inactive (such as a no flow boundary), Groundwater Vistas applies recharge to the next highest active layer (Rumbaugh 2010). For example, at the outcrop where the OZ aquifer has 5 inactive layers above, Groundwater Vistas applies the recharge directly to the OZ layer. Calibrated recharge rates for the soils are presented in Table 4.2-4. Figure 4.2-4 depicts the spatial distribution of recharge within the model domain. For most of the stream drainages, the model domain extends nearly to the top of the respective drainage divides. However, upstream from the domain,

Table 4.2-4. Model Calibrated Recharge Rates within the Ross Project Area

NRCS Hydrologic Soil Rating	Model Calibrated Recharge Rate	
	ft/day	inch/yr
B	$5.1x10^{-5}$	0.22
C	$2.55x10^{-5}$	0.11
D	$1.7x10^{-5}$	0.07

Flag Butte Creek and Deadman Creek have drainage areas of roughly 1,670 acres and 1,231 acres, respectively. Since the upstream drainage area for each drainage is significant, one cell with a higher recharge rate of 3.02×10^{-4} ft/day (1.3 in/yr) was placed at the intersection of the model and the stream channel. This higher rate simulates an increased recharge from the upstream alluvium.

4.3 Sinks

Within the model domain there are three methods by which water naturally leaves the domain: 1) Water within the confined aquifers naturally flows to the north and to the west down dip away from the project area, 2) Water within the alluvium is removed by evapotranspiration, and 3) Water leaves the project area through alluvial flow down the natural drainages. Water is also removed artificially by pumping wells within the project area. The volume of water removed by pumping wells has been significant, however it is not a natural stressor on the system. As such, pumping wells within the project area are treated as transient stressors to the system and are described in more detail later in this report.

General head boundary conditions were used to simulate the natural gradient and thus simulate water leaving the model within the confined layers. The general head boundary conditions are described in more detail within Section 4.4. Within the surficial system evapotranspiration and drains are used to simulate water leaving the model. As described in Section 2.6.2, an evapotranspiration component was assigned to cells in which evapotranspiration is expected to occur. The number of cells with evapotranspiration and the evapotranspiration rate were then adjusted during

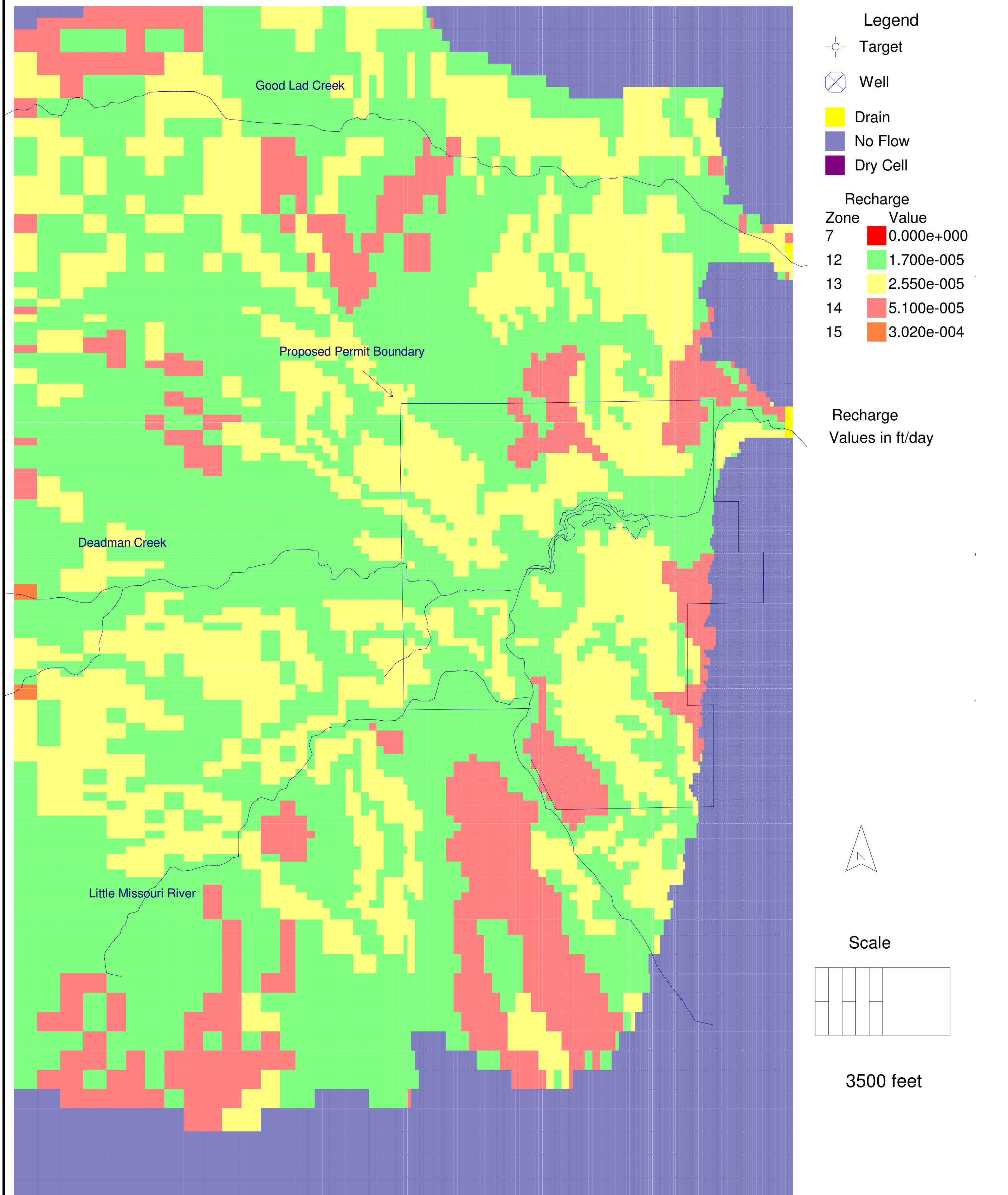


Figure 4.2-4 Spatial Distribution of Recharge Within the Model Domain

model calibration to improve calibration of the model. The calibrated evapotranspiration rate was 4.8 x 10^{-3} ft/day (21 inches per year). The location of the cells in which evapotranspiration were simulated within the model are shown on Figure 4.3-1. Drains were also used to simulate evapotranspiration and alluvial water leaving the model. Drains were installed near the eastern extent of the model where Good Lad Creek and the Little Missouri River cross into the Pierre Shale outcrop. The drains were set at an elevation just below the existing ground surface which represents the alluvial water surface. The locations of the drains within the groundwater model domain are also depicted on Figure 4.3-1.

4.4 Boundary Conditions

The boundary conditions within the model vary slightly from layer to layer. For each layer the boundary conditions are summarized below:

Layer 1 - The boundary conditions within layer 1 are shown on Figures 4.2-1 and 4.3-1. Since Layer 1 represents the surficial system, the drainage divide for each ephemeral drainage serves as a natural no flow boundary. The southern and northern bounds of the model domain cross several natural drainage divides which are represented by no flow boundary cells. Recharge to the surficial system is expected to occur primarily from precipitation. Therefore, a recharge boundary condition is applied to the entire model domain. The eastern portion of the model is represented by a no flow boundary just to the west of the Lance Formation outcrop. This allows recharge to enter directly into the underlying layers that outcrop to the east. Where the Little Missouri River and Good Lad Creek cross the Pierre Shale, drains set at an elevation to represent the alluvial water surface serve as the boundary conditions.

Layers 2 (Lance aquitard), 4 (SM), and 6 (OZ) - These layers are represented by general head boundaries along the south, west and north portions of the model domain. In each layer the east portion of the model is represented by a no flow boundary that follows the outcrop of each respective

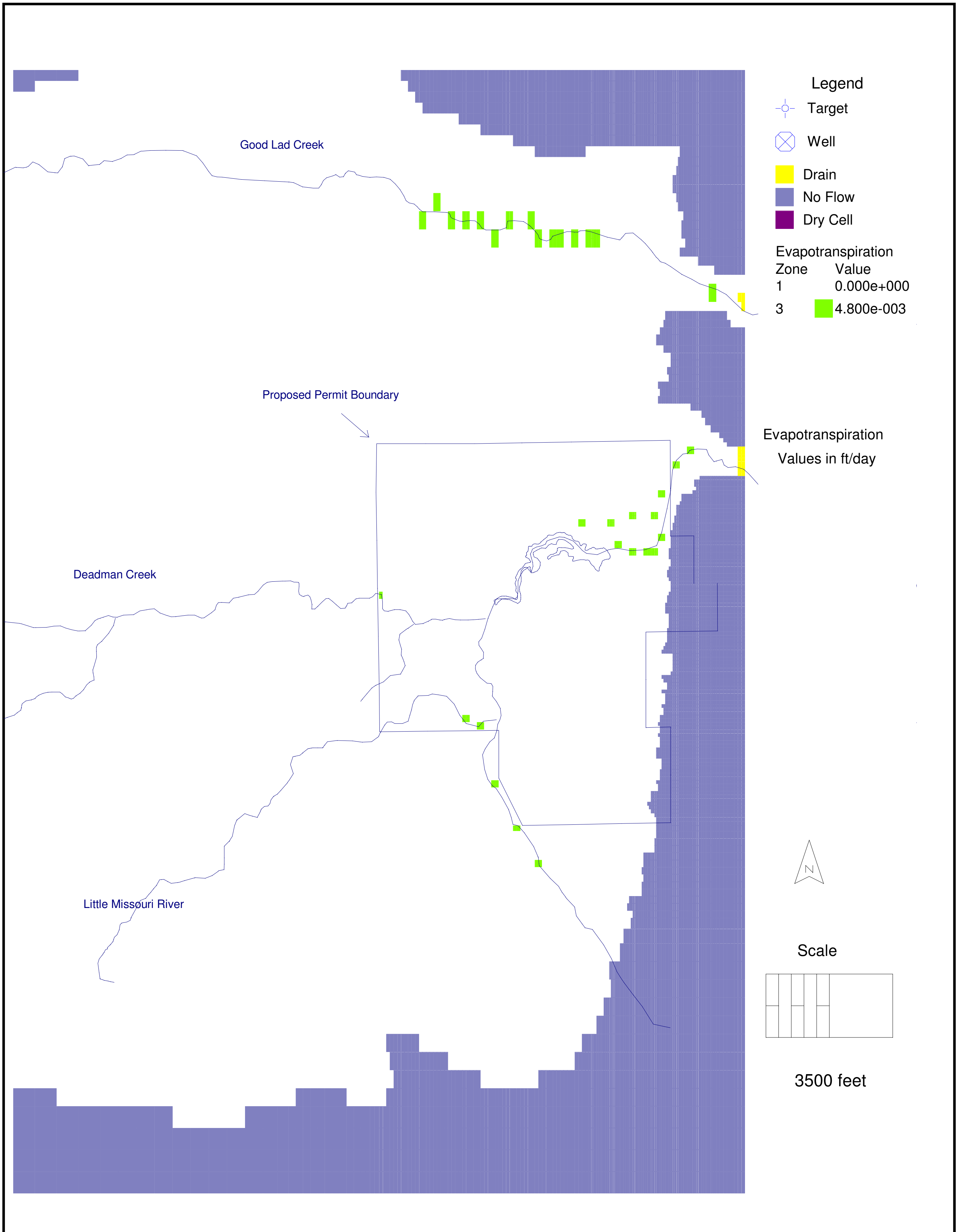


Figure 4.3-1 Spatial Distribution of Evapotranspiration and Drain Cells

underlying layer. General head boundaries were chosen because they can be used to establish a gradient but can be adjusted so that they do not flood the model like a constant head boundary condition might. Each general head boundary was assigned an elevation as well as a conductance term. The elevation for each general head boundary was based on pre-1978 potentiometric surfaces. Figure 2.3-1 depicts the pre-1978 estimated potentiometric surfaces used for the surficial aquifer and the OZ. The general head boundary for the SM surface was based on the OZ surface less 30 feet. The general head boundary for layer 2 was varied from 4,140 to 4,160 feet along the southern and western model boundaries with highest elevation at the southwest corner. The northern general head boundary in layer 2 varied from 4,140 to 4,110 feet decreasing towards the east. The elevations of the general head boundaries are the primary driver of the potentiometric head near the boundaries. The conductance term allows the modeler to, in effect, increase or decrease the hydraulic conductivity from the general head boundary cell. The conductance term for each general head boundary cell was set so that it mimicked the hydraulic conductivity of the adjacent cells as much as possible so as not to flood the system with excess water nor limit the water flow to the point that the resulting drawdowns were unrealistically severe.

Layers 3 and 5 – These layers represent the confining shales. The confining shales are not aquifers and have very low hydraulic conductivities. As such no-flow boundary conditions were placed on all sides of these layers.

4.5 Calibration Targets and Goals

Important features that are available to calibrate the groundwater model include existing water wells, 1977-1979 Nubeth monitoring wells and pump tests, 2010 Strata monitoring wells and pump tests, and stream elevations. Calibration and verification of the model was a two-step process using all available data.

The first calibration step was a steady-state simulation. The goal of the steady-state simulation was to match as close as possible the modeled potentiometric surface elevations to the pre-1980 potentiometric surface elevations for the SM and the OZ aquifers. Impacts from oilfield water supply wells pumping have been much less in the surficial layer as well as the Lance aquitards so it was possible to use newer data to develop these potentiometric surfaces. Discharge volumes from the drains in layer 1 were also used to help calibrate the steady state surface in Layer 1.

The second calibration step (verification) involved the construction of a transient model to simulate the effects of the wells used to provide water for oilfield stimulation. The goal of the transient portion of the model is to match the drawdowns that have occurred over the last 30 years from the pumping. Using MODFLOW2000 it was possible to develop a two stage model where the first time step represents the steady state simulation and the subsequent time steps are transient.

4.6 Numerical Parameters

The PCG2 solver within MODFLOW was utilized as the primary solver package. The maximum number of outer iterations was set at 2,500, the maximum number of inner iterations was set at 250, and the head change criterion for convergence was set to 0.005. Occasionally the PCG2 solver will meet the closure criteria for both head and flux (residual) within outer iterations, but not between successive outer iterations. This results in the model iterating until the maximum number of outer iterations has been reached. Environmental Simulations, Inc. (Rumbaugh and Rumbaugh 2002) has added a modification to the PCG2 solver in MODFLOW to automatically force convergence in this situation. By forcing convergence, the simulation may not be valid. If the simulation is not valid it will show up as an error in the mass balance. Therefore, the mass balance was checked after each simulation to ensure that the simulation was valid.

4.7 Calibration and Verification

Calibration of a regional groundwater model is challenging because relatively little information is available on the subsurface conditions. For example within the Ross model domain all of the hydraulic information available is located within the proposed Ross project area. Virtually no hydraulic conductivity data and very little potentiometric data are available outside of the proposed project boundary. Nevertheless, during the calibration process by taking known information and applying engineering judgment where information is not known, it was possible to develop a calibrated model that reasonably approximates the physical system. In general, during the calibration process much is learned about the system. The primary goal of this modeling exercise is to evaluate impacts from ISR within the OZ aquifer. To that end, the bulk of the calibration and verification process is focused on improving predictions within the OZ aquifer.

Measured or known potentiometric heads throughout the project area are the primary calibration targets. During calibration, model computed water levels are compared to the observed water levels at the calibration targets. Within the Ross Project area calibration targets are available for two discrete time periods, pre-1980 and 2010. The pre-1980 period is considered the pre-abstraction steady state period because before 1980 there were no oilfield water supply wells operating within the OZ aquifer. The period from 1980 to 2010 is considered the transient period because during this period there has been a significant amount of drawdown within the OZ aquifer due to the oilfield water supply wells. Pre-1980 Nubeth water levels are used for the steady state calibration while measurements taken by Strata in 2009 and 2010 are used to calibrate the transient runs. After each simulation the model-computed target levels are subtracted from the observed target levels to produce a residual. A positive residual indicates that the computed water level is lower than the measured level. Conversely, a negative residual indicates that the computed water level is higher than the field measured water level.

Simple statistics are then applied to the residuals to evaluate the improvement, or lack thereof of each successive model simulation. The sum of squared residuals in particular is useful in determining trends towards or away from calibration in successive model runs. The closer the sum of squared residuals is to zero the better the model calibration. Other statistical measures such as the residual mean can also be used to evaluate the effectiveness of the model calibration. A residual mean close to zero indicates that the positive and negative residuals are balanced.

4.7.1 Calibration Approach

The calibration approach was an iterative process continuously moving towards a more refined model. The first step was to construct a working model with the proper number of layers representing the geology within the project area. The first model was a relatively simple steady state model utilizing homogenous hydraulic properties in each layer. A structured sensitivity approach was taken to adjust the parameters. This method takes specified parameters and makes several model runs while changing the parameter over a specified range. Upon a review of the calibration statistics from each model run, the parameter that best optimizes the model results is chosen and the model is updated. This process was repeated until a steady state calibration was achieved.

Once steady state calibration had been achieved, the verification started by adding transient targets as well as pumping wells to the model. The pumping wells are summarized in Table 4.7-1 with flow rates for each well detailed in Appendix A. The figures within Section 4.7.2 detail the locations of the pumping wells. Wells believed to be completed above the SM interval were ignored for the purposes of the model.

The resulting model was a combined steady state and transient model. The first time step was steady state with no wells discharging. Each subsequent time step simulated wells discharging at their estimated discharge rate for each respective time period. A structured sensitivity approach similar to the one taken with the steady state model was then applied to the transient model. Unfortunately, it was not possible to calibrate the transient model using homogenous layer properties. Furthermore hydraulic conductivity information

Table 4.7-1. Summary of Pumping Wells in Ross Groundwater-Model Domain

Well	Easting[1]	Northing[1]	Layer	Use	Flowrate[2] (gpm)
Strong Wells	714963	1483356	6 (OZ)	Domestic/stock	0.4
Sophia #1A	700456.92	1484277.9	6 (OZ)	Oilfield	0 to 26.1
Kiehl Water Well #2	712381.38	1474845.8	4 (SM) and 6 (OZ)	Oilfield	0 to 16.6
22X-19	710875.88	1481932.5	6 (OZ)	Oilfield	5.5 to 21.8
19XX State	711658.65	1483960.9	6 (OZ)	Oilfield	3.1 to 12.1
789V State	710930.43	1484055.2	6 (OZ)	Oilfield	3.1 to 12.1
ENL Kiehl Well #1	713378	1473690	6 (OZ)	Oilfield	0 to 18.6
WSW#1 West Kiehl Unit	707029	1471267	6 (OZ)	Oilfield	0 to 18.6
Wesley TW02 P103666W	715506	1489632	6 (OZ)	Domestic/stock	0.8

1 Easting and northing coordinates based on Wyoming NAD 83 E coordinate system.
2 Flowrates for oilfield wells are variable and detailed within Appendix A.

from the 2010 pump tests indicates that the hydraulic conductivity within the SM and the OZ layers is not constant throughout the proposed Ross Project area.

To add realistic heterogeneity to the hydraulic conductivity distribution within the model another calibration technique known as pilot points was utilized in conjunction with PEST (a model-independent parameter estimation program). With this method known hydraulic conductivity values (from Table 2.5-2) were inserted into the model as hydraulic conductivity targets. User defined pilot points were then inserted into the model. Each pilot point was given an initial value and a minimum and maximum range based on measured hydraulic properties. PEST was then able to develop hydraulic conductivity estimates based on target well head data and known hydraulic conductivity targets for each pilot point. The pilot point calibration procedure was used only within and immediately adjacent the proposed Ross Project area because no hydraulic conductivity data is available outside of the project area. Pilot point calibration was performed only for the hydraulic conductivities within the SM and OZ aquifers.

4.7.2 Verification/Calibration Results

The resulting hydraulic conductivity distribution yielded a very good fit between the modeled potentiometric surface and the target wells within the OZ aquifer. Within the SM aquifer the calibration was acceptable as well. Table 4.7-2 summarizes the calibration targets as well as the calculated residuals and statistics from the calibrated model. Calibrated pre-1980 potentiometric surfaces are presented for the SM and OZ aquifers in Figures 4.7-1 and 4.7-2, respectively. Calibrated 2010 potentiometric surfaces for the surficial aquifer, the SM and the OZ aquifer are presented in Figures 4.7-3, 4.7-4, and 4.7-5. Since the impacts to the surficial aquifer have been minimal for the last 30 years, the 2010 surface presented for the surficial aquifer is considered representative of both the pre-1980 surface and the 2010 surface.

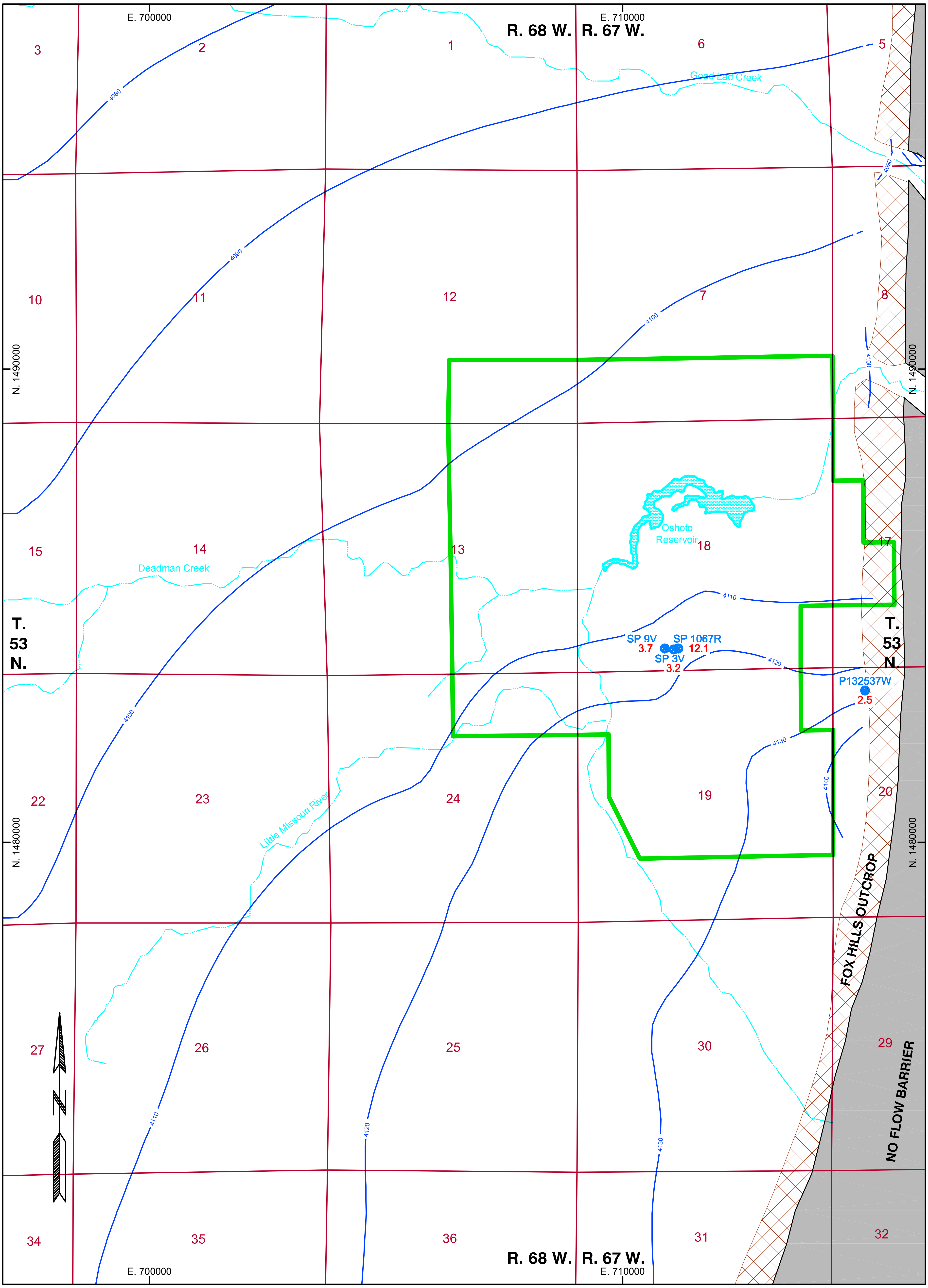
As shown in Table 4.7-2 GW-Vistas allows a weight to be assigned to each calibration target. Most of the calibration targets were assigned a weight of 1. However, since some of the targets within layer 1 were estimated based on stream elevations, these targets were assigned a weight less than one, to account for the fact that the actual elevations had not been physically verified. Several other targets within layers 1 and 2 were assigned weights less than 1 because they were either at wells where the observed water levels were from questionable sources or the targets were believed to be in local aquifers that may be perched. Within the OZ aquifer the simulated drawdown near the oilfield water supply wells is approximately 200 ft. As shown on Table 4.7-2 the largest residual within the OZ aquifer was 4.9 feet at 34-7OZ. The estimated error is therefore less than 2.5% of the total estimated drawdown. The residuals within the SM zone are higher. However, this discrepancy should be put into perspective with the confidence of the calibration targets. The 2010 heads measured by Strata within the SM are quite reliable. As discussed within Section 2.3 there is very little pre-1980 potentiometric data available for the SM aquifer. As a result, the confidence interval for the pre-1980 SM potentiometric surface is plus or minus 20 feet. Given the uncertainty associated with the pre-1980 SM potentiometric surface, the calibration within this aquifer may be

Table 4.7-2. Calibration Targets, Residuals, and Statistics for Calibrated Model

Name	Zone	Time	Easting[1]	Northing[1]	Layer	Observed	Computed	Weight	Residual
Est_WS_1	SA	2010	709226.7	1496147	1	4,131.3	4,126.8	0.5	4.5
Est_WS_4	SA	2010	715804.7	1494403	1	4,085	4,087.1	1	-2.1
43-18-1	SA	2010	713127.1	1485580	1	4,125.3	4,129.4	1	-4.1
Oshoto_Reservoir	SA	2010	711990.9	1487390	1	4,122	4,127.5	1	-5.5
Est_WS_3	SA	2010	713634.8	1495821	1	4,099.4	4,104.9	0.75	-5.5
P55052W	SA	2010	712745.8	1488277	1	4,111	4,122.6	0.75	-11.6
P55054W	SA	2010	715597.5	1489647	2	4,095	4,081.5	1	13.5
P55055W	SA	2010	713564	1491145	2	4,140	4,130.2	1	9.8
SA_21-19	SA	2010	710640.4	1483328	2	4,157	4,149.7	0.75	7.3
Est_WS_2	SA	2010	711021.8	1495786	2	4,115	4,116.4	0.5	-1.4
SA43-18-3	SA	2010	713776.8	1486289	2	4,122.9	4,124.4	1	-1.5
SA_12-18	SA	2010	709207.1	1487495	2	4,134	4,139.7	1	-5.7
SA_34-7	SA	2010	713331.1	1489602	2	4,112.5	4,119.5	1	-7.0
SA_14-18	SA	2010	710003	1484949	2	4,133	4,141.1	0.75	-8.1
SM_42-19	SM	2010	713103.3	1481253	4	4,130.5	4,109.4	1	21.1
SP_1067R	SM	1980	711173.9	1484097	4	4,129.1	4,116.9	1	12.1
SM_34-18	SM	2010	712463.3	1483778	4	4,111	4,100.8	1	10.2
SM_12-18	SM	2010	709220.1	1487513	4	4,101	4,091.0	1	10.0
SP_9V	SM	1980	710885	1484096	4	4,120	4,116.3	1	3.7
SP_3V	SM	1980	711075.4	1484077	4	4,120	4,116.8	1	3.2
P132537W	SM	1980	715117.7	1483205	4	4,129	4,126.5	1	2.5
SM_14-18	SM	2010	710044.8	1484916	4	4,089.3	4,090.6	1	-1.3
SM_21-19	SM	2010	710676.9	1483292	4	4,085.5	4,092.1	1	-6.6
SM_34-7	SM	2010	713357.1	1489635	4	4078.3	4,095.1	1	-16.8
Phase_II_4Z_0Z	OZ	1980	709467.2	1486628	6	4,099	4,089.2	1	9.8
OZ_7X	OZ	1980	711665.9	1483969	6	4,098.6	4,094.7	1	3.9
OZ_21-19	OZ	2010	710590.9	1483295	6	3,951.3	3,949.4	1	1.9
OZ_34-18	OZ	2010	712395.6	1483781	6	3,966	3,965.4	1	0.6
OZ_12-18	OZ	2010	709149.7	1487517	6	4,021	4,022.6	1	-1.6
OZ_14-18	OZ	2010	709971.9	1484905	6	3,998	3,999.7	1	-1.7
OZ_42-19	OZ	2010	713035.6	1481246	6	3,981	3,984.4	1	-3.4
788V	OZ	1980	710838.4	1484032	6	4,089.7	4,093.7	1	-4.0
OZ_34-7	OZ	2010	713265.9	1489620	6	4,051.5	4,056.4	1	-4.9

[1]Northing and Easting coordinates based on WY-NAD83EF

Residual Mean	0.65
Abs. Res. Mean	6.26
Res. Std. Dev.	7.84
Sum of Squares	2043.14
Min. Residual	-16.85
Max. Residual	21.10
Number of Observations	33.00



ROSS PROJECT AREA

Drawing Coordinates: WY83EF

LEGEND

PROPOSED ROSS PERMIT BOUNDARY

4100 POTENTIOMETRIC SURFACE

Est WS 2 -1.4 TARGET (COMPUTED WL HIGHER THAN OBSERVED)

Est WS 1 4.5 TARGET (COMPUTED WL LOWER THAN OBSERVED)

0 1000 2000 4000

GRAPHIC SCALE (FEET)

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennington Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

STRATA ENERGY

ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
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Date	Description

GWM TECHNICAL REPORT
FIGURE 4.7-1

1980 MODEL CALIBRATED SURFACE FOR LAYER 4 (SM)

Drawn By: RAM
Checked By: RBM
Date: 10-10

FILE: ROSS_GWM_CALIB_POT_SURF

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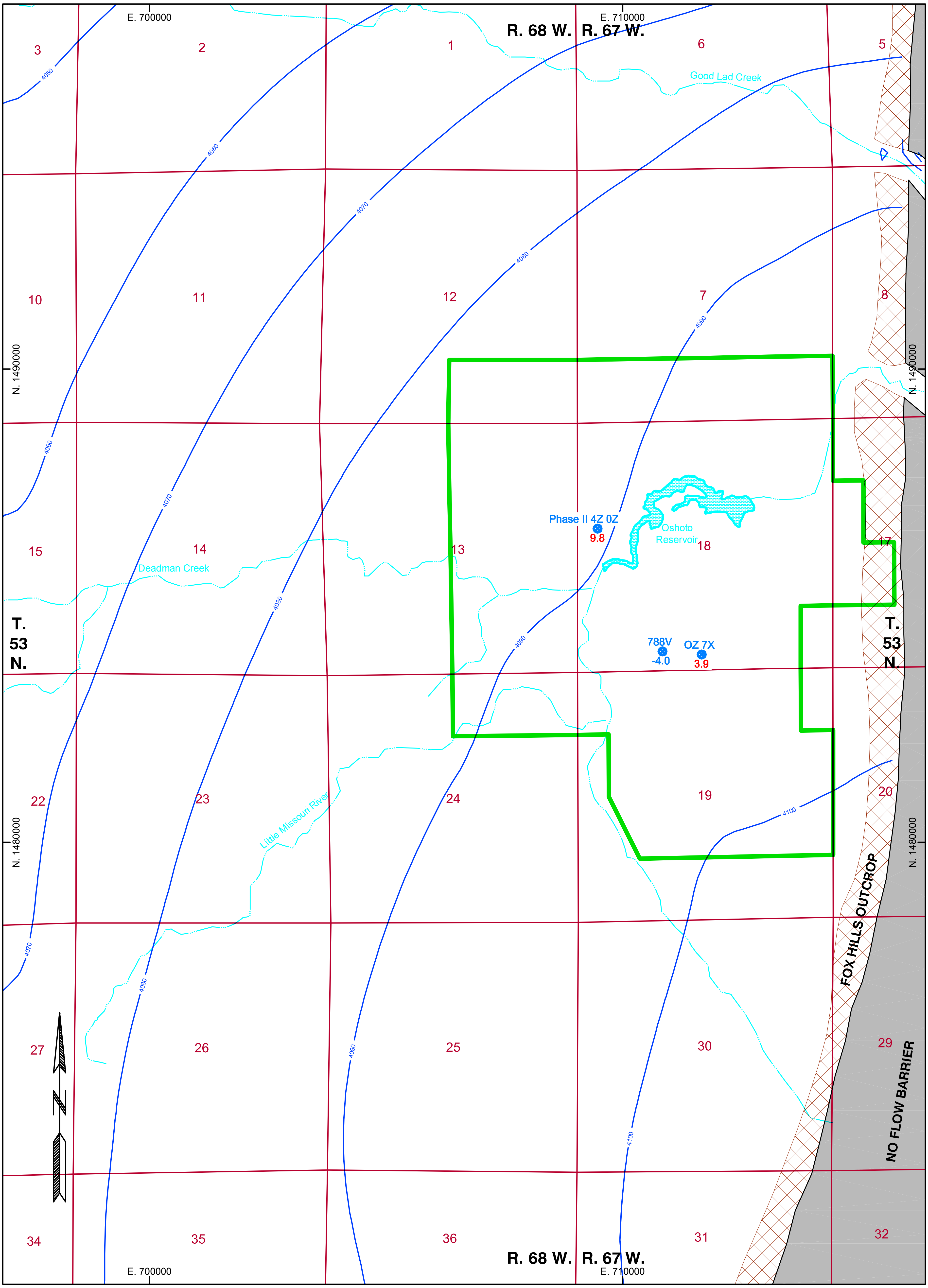

ROSS PROJECT AREA

Drawing Coordinates: WY83EF

LEGEND

PROPOSED ROSS PERMIT BOUNDARY

4100 POTENTIOMETRIC SURFACE

Est WS 2 -1.4 TARGET (COMPUTED WL HIGHER THAN OBSERVED)

Est WS 1 4.5 TARGET (COMPUTED WL LOWER THAN OBSERVED)

0 1000 2000 4000

GRAPHIC SCALE (FEET)

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennigton Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

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FIGURE 4.7-2

1980 MODEL CALIBRATED SURFACE FOR LAYER 6 (OZ)

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Checked By: RBM
Date: 10-10

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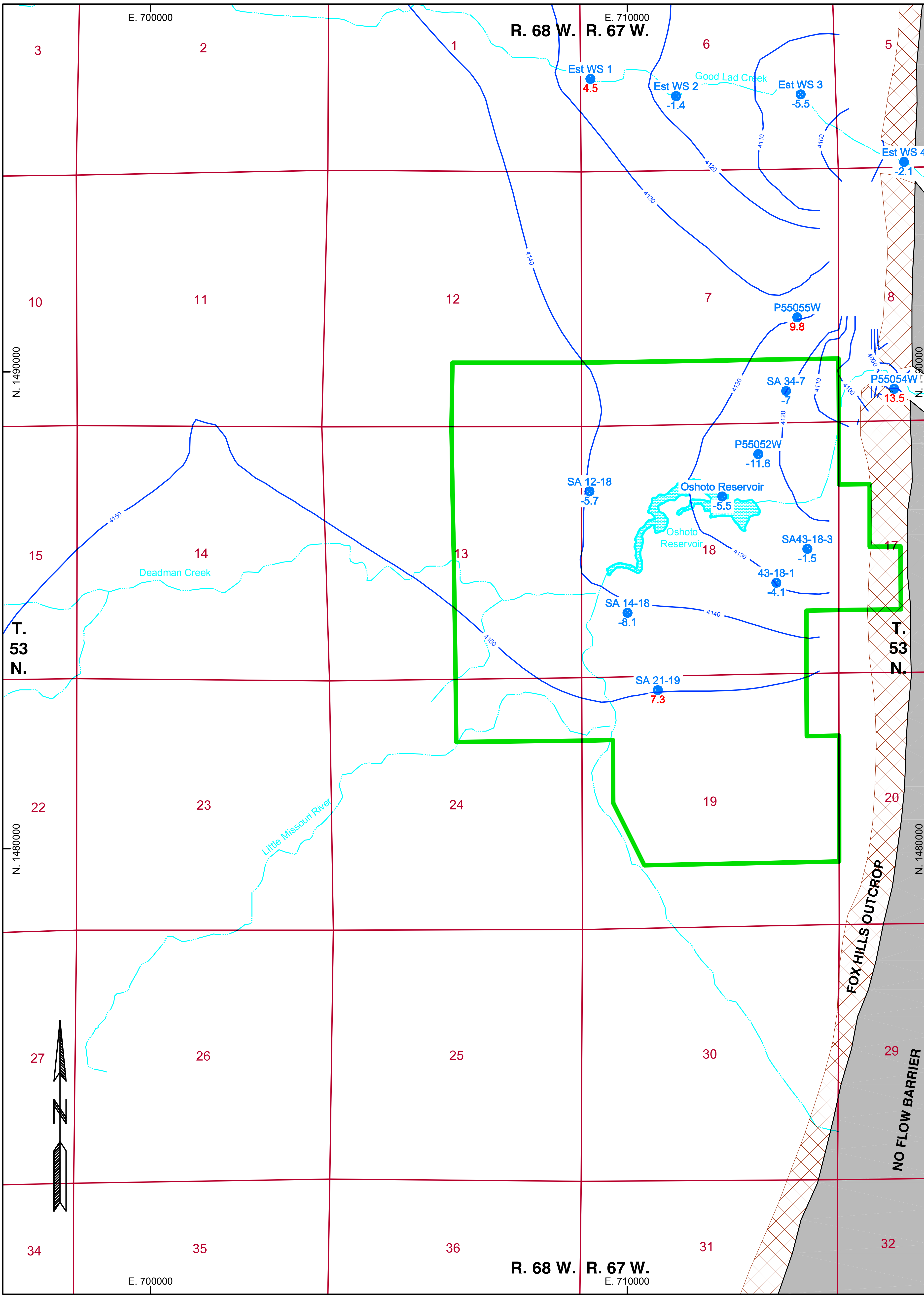

ROSS PROJECT AREA

Drawing Coordinates: WY83EF

LEGEND

PROPOSED ROSS PERMIT BOUNDARY

4100 POTENTIOMETRIC SURFACE

Est WS 2 -1.4 TARGET (COMPUTED WL HIGHER THAN OBSERVED)

Est WS 1 4.5 TARGET (COMPUTED WL LOWER THAN OBSERVED)

0 1000 2000 4000
GRAPHIC SCALE (FEET)

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennington Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

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GWM TECHNICAL REPORT
FIGURE 4.7-3

2010 MODEL VERIFIED SURFACE FOR SURFICIAL AQUIFER

Drawn By: RAM
Checked By: RBM
Date: 10-10

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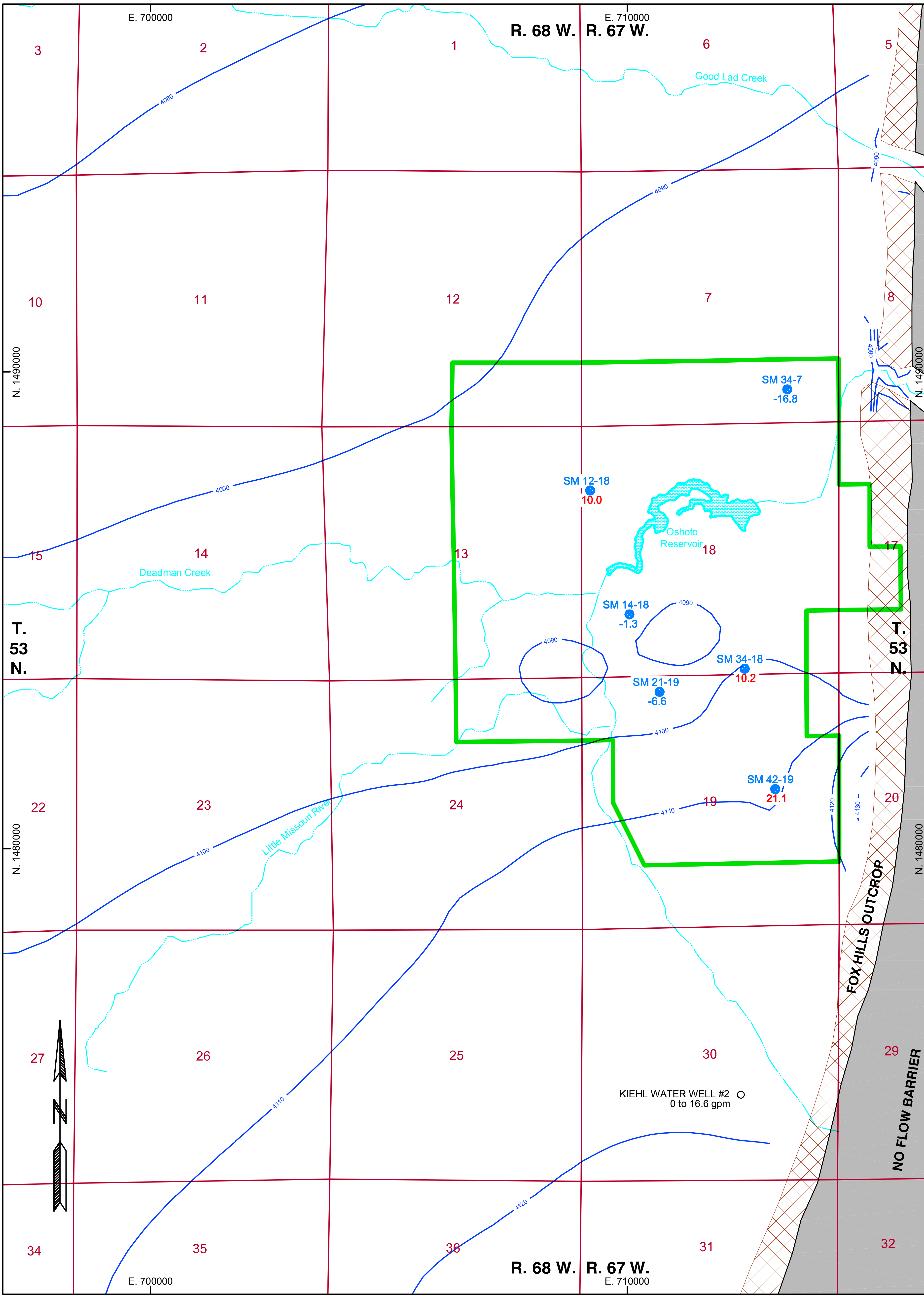

ROSS PROJECT AREA

Drawing Coordinates: WY83EF

LEGEND

- PROPOSED ROSS PERMIT BOUNDARY
- 4100 — POTENTIOMETRIC SURFACE
- Est WS 2 -1.4 — TARGET (COMPUTED WL HIGHER THAN OBSERVED)
- Est WS 1 4.5 — TARGET (COMPUTED WL LOWER THAN OBSERVED)
- KIEHL WATER WELL #2 0 to 16.6 gpm — ADJACENT WATERWELLS IN OPERATION WITH FLOWRATE DURING VERIFICATION

0 1000 2000 4000

GRAPHIC SCALE (FEET)

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennigton Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

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GWM TECHNICAL REPORT
FIGURE 4.7-4

2010 MODEL VERIFIED SURFACE FOR LAYER 4 (SM)

Drawn By: RAM
Checked By: RBM
Date: 10-10

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FILE: ROSS_GWM_CALIB_POT_SURF

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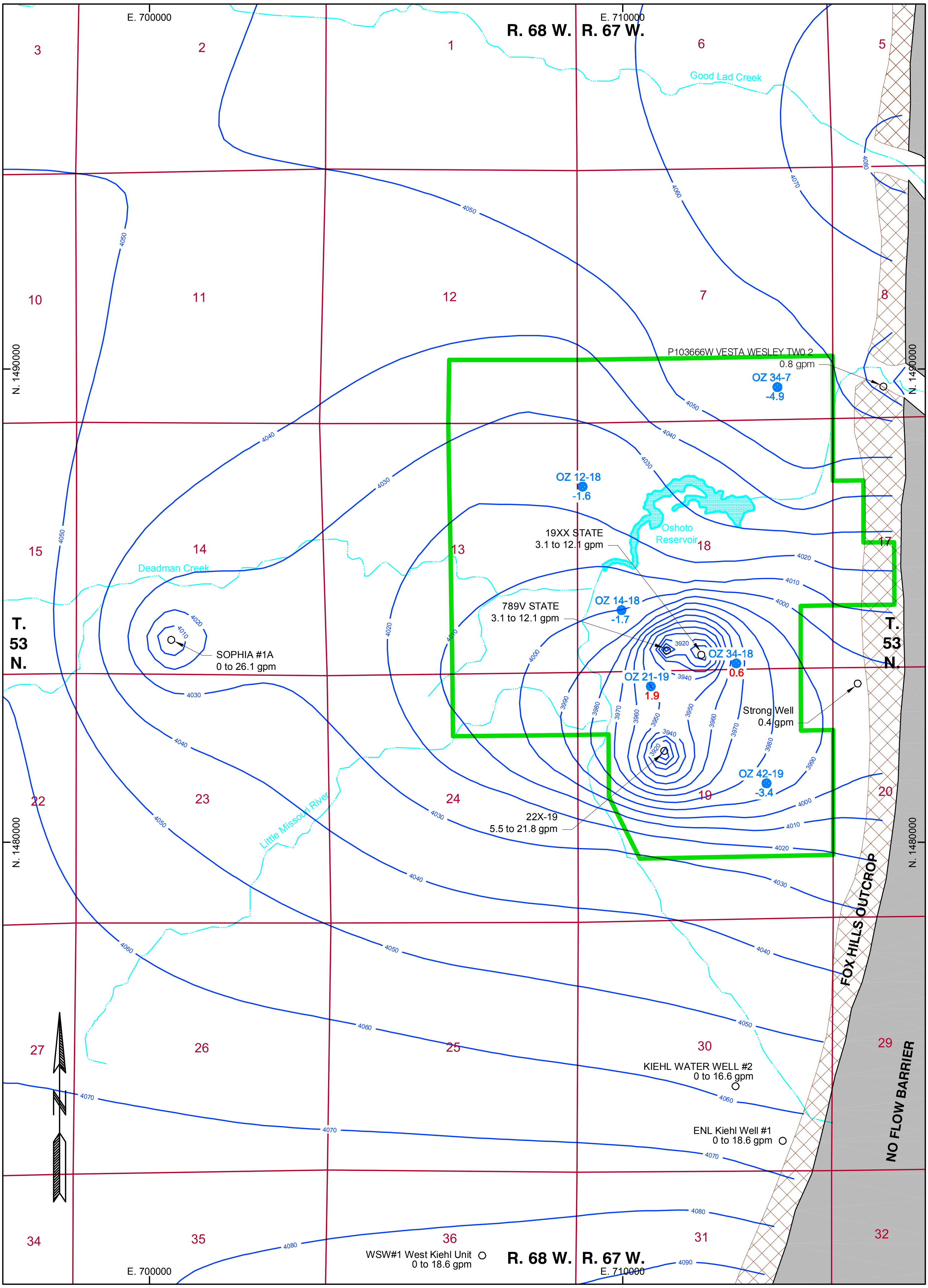

ROSS PROJECT AREA

Drawing Coordinates: WY83EF

LEGEND

PROPOSED ROSS PERMIT BOUNDARY

4100 POTENTIOMETRIC SURFACE

Est WS 2 -1.4 TARGET (COMPUTED WL HIGHER THAN OBSERVED)

Est WS 1 4.5 TARGET (COMPUTED WL LOWER THAN OBSERVED)

KIEHL WATER WELL #2 0 to 16.6 gpm — ADJACENT WATERWELLS IN OPERATION WITH FLOWRATE DURING VERIFICATION

0 1000 2000 4000

GRAPHIC SCALE (FEET)

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennington Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

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GWM TECHNICAL REPORT
FIGURE 4.7-5

2010 MODEL VERIFIED SURFACE FOR LAYER 6 (OZ)

Drawn By: RAM
Checked By: RBM
Date: 10-10

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FILE: ROSS_GWM_CALIB_POT_SURF

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better than reported. Furthermore, the SM aquifer is not as regionally extensive as the OZ aquifer. A review of the geologic cross sections indicates that the 42-19SM and 34-7SM monitor wells are completed within sands that have minimal hydrologic connection, which may explain the large residuals at these well locations.

Many of the calibration targets used within the SA are based on channel elevations. Since some of the elevations were obtained from available topo maps and the water level within the alluvium is expected to vary seasonally, there could be up to 10 feet of error in the target elevations. As a result, residuals of less than 10 feet were deemed reasonable within the SA.

In assessing the adequacy of the calibration it is also necessary to clarify the main goal of the model which was primarily to evaluate the impacts from ISR within the OZ aquifer. For this reason most of the calibration effort was focused on the OZ aquifer (layer 6) with the SM aquifer (layer 4) being the second most important calibration target. Due to the confinement of the OZ and SM aquifers, they have very little contact with the top layers (layers 1 and 2) except at the outcrop. As a result, the primary purpose of layers 1 and 2 within the model were to help develop reasonable recharge estimates for the OZ before, during, and after ISR. Given the supporting role that layers 1 and 2 play within the model, it was not necessary to go through the level of effort that was used to calibrate Layers 4 and 6 (i.e. adding heterogeneity to the hydraulic conductivities.) Furthermore, not as much measured data is available for layers 1 and 2 as is available for layers 4 and 6, so intensive calibration efforts focused on layers 1 and 2 were not justified. Based on all the available information, this calibrated model presents a reasonable calibrated solution. As more site specific aquifer information, and measured water levels become available the model can be updated.

4.8 Sensitivity Analysis

In order to assess which input parameters are most critical to the model results, a sensitivity analysis was performed on the calibrated model to determine which parameters impacted the calibration the most. In this analysis six parameters, horizontal hydraulic conductivity, vertical hydraulic conductivity, specific storage, recharge, general head boundary elevations, and general head conductance were varied. The details and results from the sensitivity analysis for each parameter are presented in the following sections. For each parameter that was varied a number of statistics are presented. The statistics presented are based on the residuals calculated from the head targets described in Table 4.7-2. Most of the statistics such as the sum of square residuals, residual mean, residual standard deviation, and average drawdown are common statistical values calculated on the residuals. For some of the sensitivity evaluations a sensitivity coefficient specific to GW-Vistas is also presented. The sensitivity coefficient is computed as:

Si=(DelRss*ParmValue/(DelParmValue*RSS)

Where Si is the sensitivity coefficient reported by GW-Vistas, DelRss is the change in Sum of Squared Residuals from the base value of the parameter, ParmValue is the initial parameter value for the base case, DelParmValue is the change in parameter value for the sensitivity run, and RSS is the base case sum of squared residuals (Rumbaugh and Rumbaugh 2007).

4.8.1 Model Sensitivity to Horizontal Hydraulic Conductivity

To evaluate the model's sensitivity to horizontal hydraulic conductivity, one zone within each model layer was adjusted both up and down one order of magnitude. Within Layers 1, 4, and 6, heterogeneity has been built into the model within the Ross project area. As such, only the zone with the largest area within the layer was varied. Within layers 4 and 6, zones 38 and 31 were varied, respectively. These zones represent the hydraulic conductivity located outside of the Ross project area (see Figures 4.2-2 and 4.2-3). Within layer 1, zone 67 which lies outside of the alluvium was varied (see Figure 4.2-1). The results of each sensitivity evaluation are presented in Table 4.8-1.

Table 4.8-1. Model Sensitivity to Horizontal Hydraulic Conductivity

Run	Multiplier	Hydraulic K (ft/day)	Sum of Square Residuals	Residual Mean	Residual Std. Dev.	Average Drawdown	Sensitivity
Parameter: Kx Zone: 67 Layer 1 – Alluvial Aquifer							
1	0.1	0.5	2833	7.2	9.3	19.2	3147
2	1	5	2043	6.3	7.8	19.7	0
3	10	50	2092	6.3	7.9	19.7	232
Parameter: Kx Zone: 27 Layer 2 – Alluvial Aquifer/Lance Aquitards							
1	0.1	0.01	40570	24.2	32.2	7.5	45077
2	1	0.1	2043	6.3	7.8	19.7	0
3	10	1	5235	9.2	12.3	21.7	582
Parameter: Kx Zone: 2 Layer 3 – SM Confining Interval							
1	0.1	0.00004	2039	6.3	7.8	19.7	2265
2	1	0.0004	2043	6.3	7.8	19.7	0
3	10	0.004	2062	6.3	7.9	19.7	229
Parameter: Kx Zone: 38 Layer 4 – SM Aquifer							
1	0.1	0.032	2723	7.2	9.0	17.7	3025
2	1	0.32	2043	6.3	7.8	19.7	0
3	10	3.2	5336	9.0	11.8	23.3	593
Parameter: Kx Zone: 1 Layer 5 – OZ Confining Interval							
1	0.1	0.00005	2201	6.6	8.1	-19.8	2445
2	1	0.0005	2043	6.3	7.8	-19.7	0
3	10	0.005	2197	6.6	8.1	-19.8	244
Parameter: Kx Zone: 31 Layer 6 – OZ Aquifer							
1	0.1	0.019	68139	27.1	41.0	-38.0	75708
2	1	0.19	2043	6.3	7.8	-19.7	0
3	10	1.9	21338	17.6	24.6	9.0	2371

As shown on Table 4.8-1, model layers 3 and 5 are not sensitive to changes in horizontal hydraulic conductivity as seen in the lack of variance in the residual sum of squares. Since these layers are the confining layers, the vertical hydraulic conductivity is a much more sensitive parameter. Layer 6 was the most sensitive to changes in horizontal hydraulic conductivity with both an increase and a decrease in hydraulic conductivity significantly affecting the sum of square residuals. Zone 27 was also quite sensitive to an increase in hydraulic conductivity but not as sensitive to a decrease in hydraulic conductivity. Zone 27 represents most of layer 2, although zone 27 is also used in several locations within layers 4 and 6. As such, the increased sensitivity of zone 27 can also be attributed to changes in layers 4 and 6 as well as changes in layer 2. In general, except within the confining intervals represented by layers 3 and 5, the model is quite sensitive to changes in the horizontal hydraulic conductivity. Given that the geologic stratigraphy within the region is such that the sandstone aquifer units are relatively homogeneous horizontally, but have multiple thin shale/siltstone partings that vertically separate each sandstone unit, the fact that the sandstones are sensitive to changes in the horizontal hydraulic conductivity is realistic

4.8.2 Model Sensitivity to Vertical Hydraulic Conductivity

To evaluate the model's sensitivity to vertical hydraulic conductivity, one zone within each model layer was adjusted both up and down one order of magnitude. Within Layers 1, 4, and 6, where heterogeneity has been built into the model within the Ross project area only, the zone with the largest area within the layer was varied. Within layers 4 and 6, zones 38 and 31 were varied, respectively. These zones represent the hydraulic conductivity located outside of the Ross permit boundary. Within layer 1, zone 67 which lies outside of the alluvium was varied. The results of each vertical hydraulic conductivity sensitivity evaluation are presented in Table 4.8-2.

As shown on Table 4.8-2, layers 3 and 5 are the most sensitive to changes in the vertical hydraulic conductivity as seen in the variance in the residual sum of squares. Layer 5 is the most sensitive to an increase in the vertical hydraulic conductivity. Because Layer 5 is so sensitive to an increase in the vertical hydraulic conductivity, the model calibrated value is believed to be realistic within the current model configuration. Furthermore, due to the fact that both an increase and a decrease in the vertical hydraulic conductivity impact the calibration, it is clear that the vertical hydraulic conductivity has been optimized in both layers 3 and 5. Changes in the vertical hydraulic conductivity have almost no impact to the other model layers as the sum of square residuals indicate. In general, it is the confining layers that are most sensitive to changes in the vertical hydraulic conductivity, which is consistent with the site conceptual model.

Table 4.8-2. Model Sensitivity to Vertical Hydraulic Conductivity

Run	Multiplier	Hydraulic K (ft/day)	Sum of Square residuals	Residual Mean	Residual Std. Dev.	Average Drawdown (ft)	Sensitivity
Parameter: Kz Zone: 67 Layer 1 – Alluvial Aquifer							
1	0.1	0.3	2207	6.6	8.2	19.8	2451
2	1	3	2043	6.3	7.8	19.7	0
3	10	30	2042	6.3	7.8	19.7	227
Parameter: Kz Zone: 27 Layer 2 – Alluvial Aquifer/Lance Aquitards							
1	0.1	0.054	2185	6.6	8.1	19.8	2427
2	1	0.54	2043	6.3	7.8	19.7	0
3	10	5.4	2048	6.3	7.8	19.7	227
Parameter: Kz Zone: 2 Layer 3 – SM Confining Interval							
1	0.1	1.45E-06	8447	12.2	15.5	21.4	9384
2	1	1.45E-05	2043	6.3	7.8	19.7	0
3	10	1.45E-04	5141	9.4	12.5	19.4	571
Parameter: Kz Zone: 38 Layer 4 – SM Aquifer							
1	0.1	0.021	2045	6.3	7.8	19.7	2271
2	1	0.21	2043	6.3	7.8	19.7	0
3	10	2.1	2043	6.3	7.8	19.7	227
Parameter: Kz Zone: 1 Layer 5 – OZ Confining Interval							
1	0.1	6.50E-07	7081	11.6	14.6	18.1	7866
2	1	6.50E-06	2043	6.3	7.8	19.7	0
3	10	6.50E-05	24011	19.3	27.0	20.4	2668
Parameter: Kz Zone: 31 Layer 6 – OZ Aquifer							
1	0.1	0.0123	2110	6.3	8.0	20.2	2344
2	1	0.123	2043	6.3	7.8	19.7	0
3	10	1.23	2081	6.3	7.9	19.7	231

4.8.3 Model Sensitivity to Adjustments in Recharge

Within the calibrated model, recharge was determined empirically based on modeling experience. Actual recharge rates are largely unknown and believed to be variable from year to year and season to season. To assess the consequences of gross errors in the recharge rate a sensitivity analysis was performed. The recharge rate was adjusted up and down by 50 percent. The results of these adjustments are presented in Table 4.8-3.

Table 4.8-3. Model Sensitivity to Recharge

Run	Multiplier	Sum of Square Residuals	Residual Mean	Residual Std.
Parameter: Recharge Zone: All Layer: 1-6				
1	0.5	7605	9.8	11.6
2	1	2043	6.3	7.8
3	1.5	3667	-6.4	8.3

As shown in Table 4.8-3 the model is quite sensitive to recharge. Both an increase and a decrease in the recharge rates impacted the model calibration. As expected, when the recharge is increased the mean residual decreases indicating that the water level is generally higher than the observed targets. When the recharge rate is decreased the residual mean increases meaning that the water level is generally lower than the observed target water levels. Overall based comparisons of the sum of residual squares, the calibrated recharge rate is optimized to the current available data. As ISR progresses and additional water level data is available over time, it may be possible to further optimize the recharge rate. However, within the current model configuration the recharge rate is adequate to perform model simulations.

4.8.4 Model Sensitivity to Specific Storage

Storage coefficient and specific yield dictate how much water can be removed from an aquifer per unit of drawdown. Specific yield is used in unconfined aquifers and specific storage is used in confined aquifers. Within the Ross groundwater model layers 2 through 6 are confined and layer 1 is unconfined. A higher storage coefficient or specific yield corresponds to a greater amount of water in storage. To assess how dependent the results of the model were on the storage coefficient (layers 2-6) and specific yield (layer 1), the storage coefficient was adjusted up and down by an order of magnitude. The results of the storage coefficient and specific yield sensitivity analysis are presented in Table 4.8-4.

Table 4.8-4. Model Sensitivity to Specific Storage and Specific Yield

Run	Multiplier	*Specific Storage K (ft/day)	Sum of Squared Residuals	Residual Mean	Residual Std. Dev.	Average Drawdown	Sensitivity
Parameter: Sy Zone: 2 Layer 1 – Alluvial Aquifer							
1	0.1	0.01	2062	6.2	7.9	19.8	2290
2	1	0.1	2043	6.3	7.8	19.7	0
3	10	1	2001	6.3	7.8	19.0	222
Parameter: Ss Zone: 1 Layer 2 – Alluvial Aquifer/Lance Aquitards							
1	0.1	5.00E-08	2043	6.3	7.8	19.7	2269
2	1	5.00E-07	2043	6.3	7.8	19.7	0
3	10	5.00E-06	2045	6.3	7.8	19.6	227
Parameter: Ss Zone: 7 Layer 3 – SM Confining Interval							
1	0.1	4.00E-07	2042	6.3	7.8	19.7	2268
2	1	4.00E-06	2043	6.3	7.8	19.7	0
3	10	4.00E-05	2028	6.3	7.8	19.1	225
Parameter: Ss Zone: 6 Layer 4 – SM Aquifer							
1	0.1	7.60E-07	1978	6.2	7.7	19.6	2197
2	1	7.60E-06	2043	6.3	7.8	19.7	0
3	10	7.60E-05	2073	6.5	7.8	17.1	230
Parameter: Ss Zone: 4 Layer 5 – OZ Confining Interval							
1	0.1	4.00E-07	2050	6.2	7.8	19.7	2277
2	1	4.00E-06	2043	6.3	7.8	19.7	0
3	10	4.00E-05	2036	6.7	7.8	17.2	226
Parameter: Ss Zone: 5 Layer 6 – OZ Aquifer							
1	0.1	9.70E-07	2961	6.9	9.4	19.6	3289
2	1	9.70E-06	2043	6.3	7.8	19.7	0
3	10	9.70E-05	147768	24.7	65.9	6.1	16419

*Specific yield was varied in the sensitivity analysis within unconfined layer 1.

As shown in Table 4.8-4 the specific storage was most sensitive within layer 6. Because most of the significant stressors to the aquifer system (i.e. oilfield water supply wells) are located within layer 6, increases in the storage coefficient increase the water available, which in turn decreases the average drawdown in the aquifer.

Conversely, a decrease in the storage coefficient results in less water thus increasing the drawdown in the aquifer. Due to the fact that the model quite accurately predicts the drawdowns within layer 6 and the storage coefficient is quite sensitive, the calibrated storage coefficient value used in layer 6 is believed to accurately represent the modeled system. Furthermore, the calibrated storage coefficient used in layer 6 is reasonable based on pump test data and literature values. In general the rest of the model layers are not very sensitive to changes in the storage coefficient or specific storage.

4.8.5 Sensitivity to General Head Boundary Head Elevations

Within layers 2, 4, and 6 general head boundaries (GHB) were placed to the south, west, and north of the model domain. The initial heads assigned to the GHB in layers 4 and 6 were based on the pre-1980 potentiometric surface for the OZ aquifer (the heads in the SM were estimated to be 30 feet higher than the heads in the OZ). The heads assigned to the GHB in layer 2 were loosely based on potentiometric surfaces in the surficial aquifer and then calibrated within the model. To evaluate the impacts that an increase or a decrease in the heads assigned to the GHB would have on the calibration of the model, sensitivity analyses were performed assuming that the heads were increased and decreased by 20 feet. Each layer was analyzed separately in order to quantify the impacts that changes to the heads assigned to the GHBs in each layer would have on the model calibration. Table 4.8-5 presents the calculated sensitivity to GHB heads in each layer.

As shown on Table 4.8-5 the model is not particularly sensitive to changes in the head assigned to the GHBs. In general, decreases in the GHB elevations had a greater impact than increases on the calibrated model. The biggest impact to the sum of squared residuals occurred when the GHB head in layer 6 was decreased. A decrease in the GHB head elevation in layer 4 had a similar impact. Increases in the GHB head in layer 6 had almost no impact on the calibration of the model. Given that the expected error within the initial elevation estimates is on the order of ±20 feet and the model is not particularly

Table 4.8-5. Model Sensitivity to Changes in Head Assigned to the GHBs.

Run	Head Change (ft)	Sum of Square Residuals	Residual Mean	Residual St. dev.	Average Drawdown (ft)	Sensitivity
Parameter: GHB Head Reach: 45 Layer 2 – Alluvial Aquifer/Lance Aquitards						
1	-20	3197	7.0	9.2	23.0	152
2	0	2043	6.3	7.8	19.7	2042
3	20	2341	6.9	8.2	16.8	123
Parameter: GHB Head Reach: 46 Layer 4 – SM Aquifer						
1	-20	4942	8.8	10.8	26.3	235
2	0	2043	6.3	7.8	19.7	2042
3	20	2050	6.6	7.1	13.7	108
Parameter: GHB Head Reach: 47 Layer 6 – OZ Aquifer						
1	-20	5391	10.1	11.4	25.3	257
2	0	2043	6.3	7.8	19.7	2042
3	20	2744	7.7	8.4	14.7	144

sensitive over this range, the current modeled GHB heads are considered reasonable approximations of the actual system.

4.8.6 Sensitivity to General Head Boundary Head Conductance.

Within layers 2, 4, and 6 general head boundaries (GHB) were placed to the south, west, and north of the model domains. Each GHB has a conductance term associated with it. The conductance term dictates how much water is released into or out of the model through the GHB. The higher the conductance term the more water the GHB cell is able to absorb from or release into the model. To evaluate impacts an increase or a decrease in the conductance assigned to the GHB would have on the calibration of the model sensitivity analyses were performed assuming the conductance was increased and decreased by a factor of 10. Each layer was analyzed separately in order to quantify the impacts that changes to the conductance assigned to the GHBs in each layer would have on the model calibration. Table 4.8-6 presents the calculated sensitivity to GHB conductance in each layer.

Table 4.8-6. Model Sensitivity to GHB Conductance.

Run	Multiplier	Conductance	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	Sensitivity
Parameter: GHB Head Reach: 45 Layer 2 – Alluvial Aquifer/Lance Aquitards							
1	0.1	0.1	2420	6.9	8.2	16.3	2687
2	1	1	2043	6.3	7.8	19.7	0
3	10	10	2744	6.6	8.8	21.6	305
Parameter: GHB Head Reach: 46 Layer 4 – SM Aquifer							
1	0.1	120	2201	6.6	8.1	19.8	2444
2	1	1200	2043	6.3	7.8	19.7	0
3	10	12000	2044	6.3	7.8	19.7	227
Parameter: GHB Head Reach: 47 Layer 6 – OZ Aquifer							
1	0.1	2.4	2052	6.2	7.8	20.0	2278
2	1	24	2043	6.3	7.8	19.7	0
3	10	240	2199	6.6	8.1	19.8	244

As shown on Table 4.8-6 the model is not very sensitive to changes in the GHB conductance term within the ranges used in the calibrated model. This indicates that the conductance terms are in line with adjacent hydraulic conductivity values. It also indicates that the boundary conditions do not significantly impact the model results.

Based on the sensitivity analysis results presented, the most sensitive parameter within the groundwater model is the hydraulic conductivity, both vertical and horizontal. Fortunately, within the project area where the impacts from gross errors in the hydraulic conductivity will have the most impacts, several measured hydraulic conductivity values were available to improve model calibration. Outside of the Ross Project area the hydraulic conductivity is largely unknown, although calibrated values have been developed. Within the Ross project area there is a significant amount of heterogeneity in the spatial distribution of the hydraulic conductivity. The heterogeneity presented in the calibrated model is based on available head and hydraulic conductivity targets. Due to the pilot point techniques used to calibrate the model, the calibrated model presented herein represents a reasonable calibrated solution but not a unique solution. As a result, except very close to locations where the hydraulic conductivity has been measured, the general hydraulic conductivity trends presented within the model are reasonable although the hydraulic conductivity value assigned to each specific cell may or may not represent actual values encountered in the field. To the extent that additional targets can be collected, the model calibration and the hydraulic conductivity heterogeneity can be further refined.

4.9 ISR Simulation

The calibrated model was used to simulate ISR within the Ross Project area. The primary goal of the ISR simulation described in this section was to evaluate the regional impacts of ISR. As shown on Figure 4.7-5, the presence of three industrial oilfield water supply wells within the Project Area have the potential to significantly impact ISR development. To evaluate the net impacts that would result from the industrial wells, two ISR scenarios were simulated. One scenario assumed that the wells did not operate during ISR operations and the other scenario assumed that the wells did operate during ISR operation.

The ISR process includes both recovery and injection wells. In a balanced wellfield the recovery wells pump at a slightly higher rate than the injection wells which produces a cone of depression around the recovery wells and around the wellfield itself. The excess water removed from the aquifer by the recovery wells is referred to as bleed. The cone of depression developed from the bleed prevents injected fluids from leaving the wellfield.

The proposed ISR process consists of two phases which include uranium recovery followed by groundwater sweep and restoration stability. During the recovery phase, lixiviants are injected using the injection wells and recovered with leached mineral at the recovery wells. The net regional effect of the recovery process is the loss of the bleed water from the system. Locally, it is important to establish expected flow patterns and local impacts that may result from ISR. During the groundwater sweep phase, water is removed from the aquifer but no water is injected into the aquifer. The restoration stability phase is similar to the ISR phase except that the water removed from the aquifer is treated prior to being re-injected. The following sections describe the ISR simulation in more detail.

4.9.1. Wellfield Configuration

Strata is still in the exploratory drilling process within the proposed Ross project area. As a result, delineation of mineralization areas and wellfields have not been finalized. The ISR wellfields and wellfield progression used for this simulation are preliminary based on current available information. As Strata finalizes wellfield delineation through continued exploration, updated simulations can be performed at the Ross ISR Project. The preliminary ISR scenario used in this simulation includes 2 ISR units, units 1 and 2, which will be operated simultaneously. The ISR units are further broken into modules which contain approximately 40 recovery wells each. For this simulation, there were 10 modules within unit 1 and 7 modules within unit 2. ISR simulations started simultaneously within units 1 and 2. Table 4.9-1 depicts the simulated ISR schedule. Figure 4.9-1 depicts the module locations as well as an approximate trace of the mineralization.

4.9.2. Operational Parameters.

During the production simulation each wellfield module was estimated to operate at a maximum rate of 700 gpm which translates to approximately 17.5 gpm per well. Estimated bleed rate during production was estimated at 1.25 percent (8.75 gpm per module, 0.219 gpm per recovery well). Groundwater sweep operations were estimated to remove 50 percent of the pore volume of the wellfield. Based on the 3 month sweep period presented in Table 4.9-1, the estimated flowrate during sweep was 1.31 gpm per recovery well. Aquifer restoration activities were assumed to last approximately 6 months (actual time may vary based on field conditions). The bleed during restoration is expected to vary depending on whether or not restoration is occurring concurrent with ISR in other wellfields. When restoration is occurring in one module and ISR is simultaneously occurring in another module, excess bleed from the module

Table 4.9-1. Simulated ISR Schedule in GW-Vistas

Modflow Stress Period	Begin Stress Period (yr)	End Stress Period (yr)	Module 1-1 & 2-1	Module 1-2 & 2-2	Module 1-3 & 2-3	Module 1-4 & 2-4	Module 1-5 & 2-5	Module 1-6 & 2-6	Module 1-7 & 2-7	Module 1-8	Module 1-9	Module 1-10
1	0	2										
2	2	2.25	ISR	ISR								
3	2.25	2.5	ISR	ISR	ISR							
4	2.5	2.75	ISR	ISR	ISR	ISR						
5	2.75	3	ISR	ISR	ISR	ISR	ISR					
6	3	3.25	ISR	ISR	ISR	ISR	ISR					
7	3.25	3.5	ISR	ISR	ISR	ISR	ISR					
8	3.5	3.75	ISR	ISR	ISR	ISR	ISR					
9	3.75	4			ISR	ISR	ISR	ISR	ISR			
10	4	4.25				ISR	ISR	ISR	ISR	ISR		
11	4.25	4.5					ISR	ISR	ISR	ISR	ISR	
12	4.5	4.75	Sweep	Sweep				ISR	ISR	ISR	ISR	ISR
13	4.75	5	Restore	Restore	Sweep			ISR	ISR	ISR	ISR	ISR
14	5	5.25	Restore	Restore	Restore	Sweep		ISR	ISR	ISR	ISR	ISR
15	5.25	5.5			Restore	Restore	Sweep	ISR	ISR	ISR	ISR	ISR
16	5.5	5.75				Restore	Restore			ISR	ISR	ISR
17	5.75	6					Restore	Sweep			ISR	ISR
18	6	6.25						Restore				ISR
19	6.25	6.5						Restore	Sweep			
20	6.5	6.75							Restore	Sweep		
21	6.75	7							Restore	Restore		
22	7	7.25								Restore	Sweep	
23	7.25	7.5									Restore	Sweep
24	7.5	7.75									Restore	Restore
25	7.75	8										Restore
26	8	13										
27	13	18										
28	18	28										
29	28	58										
30	58	108										

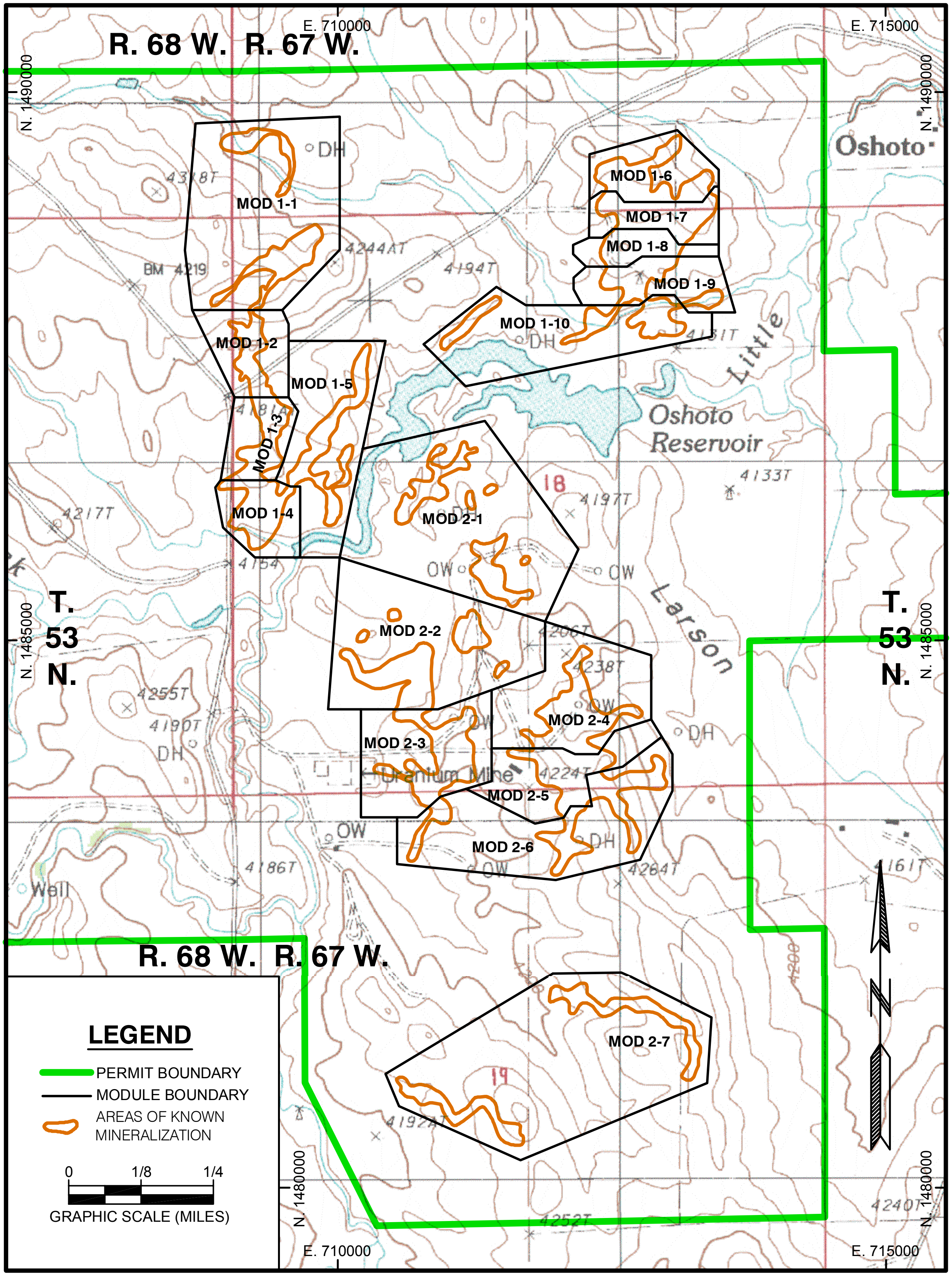


Figure 4.9-1. Simulated Wellfield Layout

K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_GWM_LAYOUT.dwg, GWM_FIGURE_4.9-1, 12/20/2010 11:30:52 AM undergoing ISR will be used to offset RO losses within the module in restoration.

During typical restoration activities, each module is expected to operate at approximately 513 gpm (roughly 12.8 gpm per recovery well assuming 40 production wells per model). When excess bleed is available from adjacent modules, the estimated bleed is 16.5 gpm per module (0.41 gpm per recovery well, or 3.2 percent bleed). When excess water is not available from adjacent modules, the estimated restoration bleed is 45 gpm per module (1.125 gpm per recovery well or 8.8 percent bleed).

The maximum estimated flow rates above were used to develop an ISR simulation. To simulate the regional impacts of ISR each proposed recovery well was imported into the model. Bleed rates were then assigned to each recovery well during ISR, groundwater sweep, and restoration. This has the effect of simulating the net withdrawal from the aquifer that would be expected from balanced wellfields. To evaluate localized impacts to the wellfield, recovery and injection wells were added to the model. The introduction of injection wells increases the complexity of the model and, in order to maintain wellfield balance, is an iterative procedure. For the purposes of this report only a small sample wellfield was simulated with both injection and recovery wells. The localized evaluations that include both recovery and injection wells are described in more detail within Sections 4.11 and 4.12.

During ISR most of the existing industrial, stock, and domestic water wells within the region and tabulated in Table 4.7-1 are expected to continue operating. Table 4.9-2 tabulates the expected discharges during ISR simulation for each well. In general, no changes in flow rates are expected within the stock and domestic wells. Estimated flow rates for the oilfield water supply wells were developed based on average historical flowrates for the last two years of recorded flow (2008 and 2009). Three of the oilfield water supply wells (22X-19, 19XX, and 789V) are located immediately adjacent to modules 2-6 and 2-7. Strata has been in communication with the owner, Merit Energy Co. (Merit), of these wells and is currently exploring alternative water sources that will allow

Table 4.9-2. Well Pump Rates during ISR Simulation

Well	Easting[1]	Northing[1]	Layer	use	Flowrate[2] (gpm)
Strong Wells	714963	1483356	6 (OZ)	Domestic/stock	0.4
Sophia #1A	700456.92	1484277.9	6 (OZ)	Oilfield	10.8
Kiehl Water Well #2	712381.38	1474845.8	4 (SM) and 6 (OZ)	Oilfield	3.4
22X-19	710875.88	1481932.5	6 (OZ)	Oilfield	0/19
19XX State	711658.65	1483960.9	6 (OZ)	Oilfield	0/10.5
789V State	710930.43	1484055.2	6 (OZ)	Oilfield	0/10.5
ENL Kiehl Well #1	713378	1473690	6 (OZ)	Oilfield	3.4
WSW#1 West Kiehl Unit	707029	1471267	6 (OZ)	Oilfield	0
Wesley TW02 P103666W	715506	1489632	6 (OZ)	Domestic/stock	0.8

[1]Easting and northing coordinates based on Wyoming NAD 83 E coordinate system.
[2]Flowrates for 22X-19, 19XX-State, and 789V State vary depending on model scenario.

them to suspend using the wells before and during ISR. Currently, the goal is to have the Merit wells shut off approximately 2 years prior to ISR. Given the uncertainty associated with the future status of the Merit wells, two ISR scenarios have been simulated. Scenario 1 assumes that an alternative water supply is found and the Merit wells are taken out of operation 2 years prior to ISR, and kept out of operation until ISR operations cease. Scenario 2 assumes that an alternative water supply source could not be located and that the Merit oilfield water supply wells are in operation during ISR operations at the assumed 2008-2009 average flow rates.

4.9.3. ISR Simulation Results

Results from Scenario 1, in which the Merit Oil supply wells are assumed to be turned off 2 years prior to ISR and during ISR, are presented in Appendix B. Results from Scenario 2, which simulates the Merit wells operating during ISR, are presented in Appendix C. For layers 4 and 6 the total estimated drawdowns at the end of active ISR and during recovery within each layer are presented as well as potentiometric surfaces before and at the end of ISR operations. Modeled potentiometric surfaces for layer 6 at selected stress periods and time steps during ISR are also included in the appendices. Since modeled drawdowns within layers 1 and 2 are minimal, results for these layers are not included in the appendices.

Although the impacts from ISR within layers 1 and 2 are minimal, modeled impacts do occur near the outcrop of the OZ aquifer. Conceptually, near the outcrop water from the Little Missouri River infiltrates into the SM and OZ aquifers. Water not infiltrating into the OZ and SM aquifers exits the model via drains installed where Good Lad Creek and the Little Missouri River cross the outcrop. Prior to ISR operations, an estimated 1.5 gpm was leaving the model via the drains. At the end of ISR operations no water was exiting the model via the drains. In addition, the cells near the edge of the model and adjacent to the drains had become dry. The dry cell assumption in the model is probably unrealistic due to surface/groundwater interactions which are ignored in the model. Both streams are ephemeral streams and for some portion of the year each stream does flow, although the flow rate varies widely from year to year and season to season. This ephemeral flow is expected to provide additional recharge not accounted for in the model and thus eliminate the dry cells. The resulting impact from lowering the water levels within the OZ is that at the outcrop the water levels are expected to be lowered as shown in the model. The OZ outcrop is relatively narrow, approximately 950 and 800 feet where it intersects the Little Missouri River and Good Lad Creek, respectively. Across the short stream length crossing the OZ outcrop, standing pools of water would be expected to infiltrate faster due to lowered water levels. However, since the length of the outcrop is so short, the net effect to the ephemeral streams is expected to be minimal.

The figures in the appendices show that the bulk of ISR impacts occur within layer 6. For example, at the end of ISR operations the maximum modeled drawdown in layer 6 was approximately 160 feet in Scenario 1 and 200 feet in Scenario 2 whereas the maximum drawdown in layer 4 was 5 feet and 20 feet for scenarios 1 and 2, respectively. In general, the impacts to the SM (layer) are predicted to be minimal during ISR operations. Pump testing indicates isolation of SM relative to OZ, so the minimal impact prediction is reasonable. Assuming Strata is able to find an alternate water supply source for the Merit oil wells as planned, the impacts on the SM will be very minimal as shown in Appendix B.

Regionally, within layer 6, modeled drawdowns occurred primarily within and just north of the Ross Project area. Model predicted drawdowns to the south and to the west were less severe. To assess the impacts on wells within the region, water levels were monitored during the ISR simulation at each well location. The maximum modeled change in head that occurred in each well during the ISR simulations are presented in Table 4.9-3. As shown on Table 4.9-3, the drawdowns within Scenario 1 are much less severe than the drawdowns in Scenario 2. In fact, there was a significant net increase in head within the Merit wells in Scenario 1, as they continue to recover. The Wesley TW02 well had the most severe drawdown of any non oilfield wells within Scenario 1. This well is located within the mapped Fox Hills outcrop and supplies water to Strata's current field office. Within the model this well is located very near the edge of the model. During the ISR simulation, cells adjacent to the one in which well Wesley TW02 is located go dry. As such, the severe drawdown predicted at the well may be as much a product of edge effects and the inherent numerical instability of the modeling equations with adjacent dry cells, as a true result. Furthermore, immediately adjacent to the Wesley TW02 well location, real geological data is unavailable because no boreholes have been drilled, and no site specific hydraulic conductivity values are available. As such, predicted drawdowns presented for the Wesley TW02 well may be over estimated by the model. Nevertheless, it would be prudent to monitor this well during ISR. As additional drilling and hydrologic information becomes available updates to the model may also help yield more realistic results.

The Strong well is also located near the outcrop of the OZ and SM. Because of its proximity to the edge of the model the predicted drawdowns may also be impacted by model edge effects. However, at the location where the Strong well is simulated, the geology is more realistically represented than

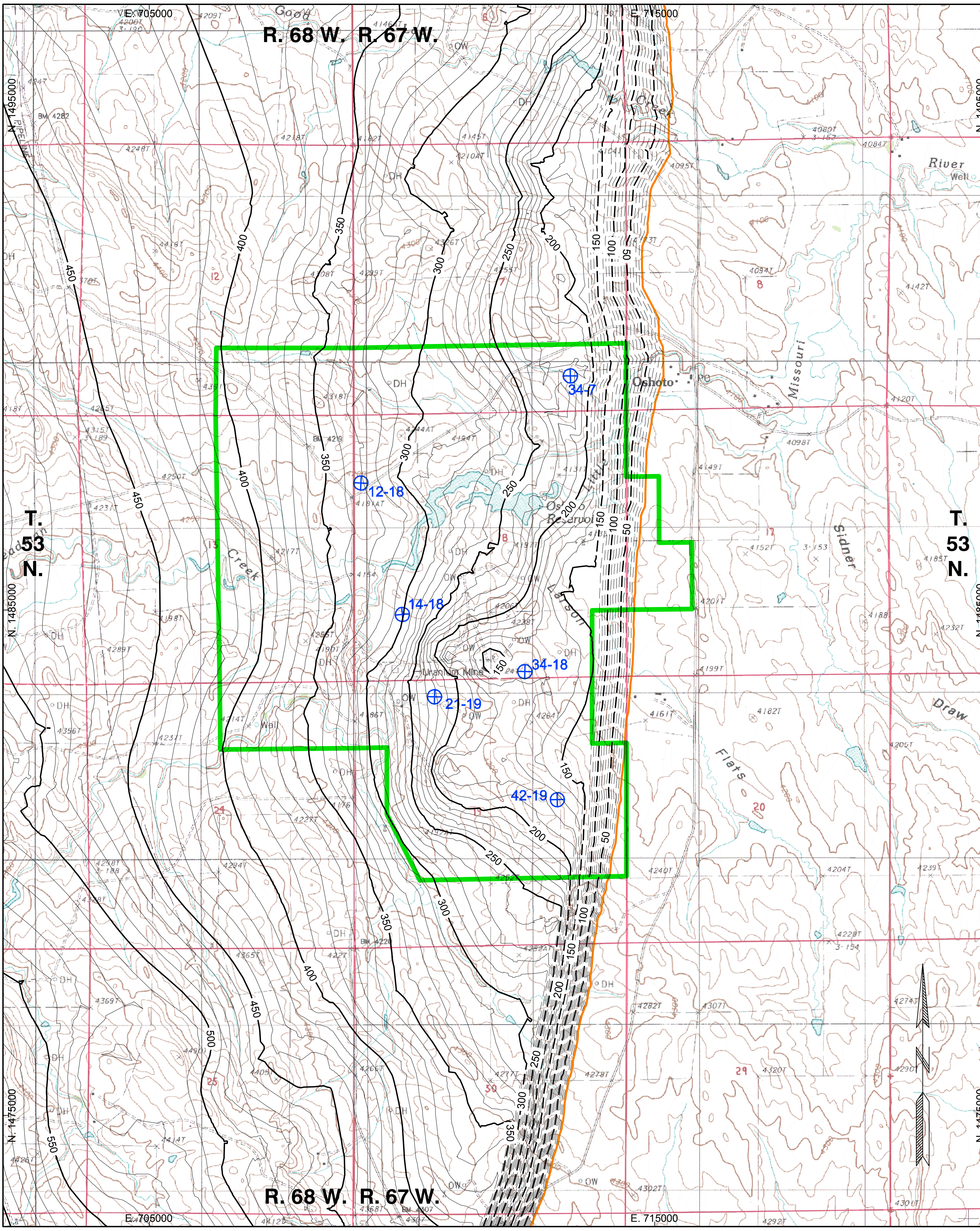
Table 4.9-3. Maximum Modeled Well Drawdowns during ISR Operations

Well	Easting[1]	Northing[1]	Layer	Use	Drawdown Scenario 1 (ft)[2]	Drawdown Scenario 2 (ft)[2]
Strong Wells*	714963	1483356	6 (OZ)	Domestic/stock	5	17.3
Sophia #1A	700456	1484277	6 (OZ)	Oilfield	14.7	26.3
Kiehl Water Well #2	712381	1474845	4 (SM) and 6 (OZ)	Oilfield	1.8–lyr 4 1.6 –lyr 6	2.3 –lyr 4 3.4 –lyr 6
22X-19	710875	1481932	6 (OZ)	Oilfield	-50	110
19XX State	711658	1483960	6 (OZ)	Oilfield	79	158
789V State	710930	1484055	6 (OZ)	Oilfield	101	176
ENL Kiehl Well #1	713378	1473690	6 (OZ)	Oilfield	3.2	5.0
WSW#1 West Kiehl Unit	707029	1471267	6 (OZ)	Oilfield	-0.8	1.8
* Wesley TW02 P103666W	715506	1489632	6 (OZ)	Domestic/stock	30.8	33.1

1 Easting and northing coordinates based on Wyoming NAD 83 E coordinate system.
2 All drawdowns calculated from current 2010 potentiometric surface.
* Drawdowns may be impacted by model edge effects. Modeled drawdowns may be greater than actual.

the geology near the Wesley TW02 well. As a result, the predicted drawdown within the Strong well is believed to be more realistic.

Figure 4.9-2 presents an isopach of the available potentiometric head above the top surface of the OZ aquifer in 2010. As shown on Figure 2.9-2 available head above the top of the OZ aquifer varies from 150 ft near the Merit wells to 400 feet near the western edge of the permit boundary. As shown in Appendix B, simulated ISR drawdowns are in the range of 100 to just over 200 ft near the wellfields when the Merit wells are assumed to be off during ISR operations. Assuming the Merit wells are in operation, the drawdowns are higher. Given the available potentiometric head presented in Figure 4.9-2, operation of the Merit wells and the ISR wellfields simultaneously may cause the potentiometric surface within the OZ aquifer to drop below the top of the aquifer in the region immediately adjacent to the Merit wells if special operational procedures are not followed. Throughout the rest of the wellfield there is enough available potentiometric head that under the modeled



Drawing Coordinates: WY83EF

LEGEND

PROPOSED ROSS PERMIT BOUNDARY

ISOPACH LINE (10' CONTOUR INTERVAL) OF POTENTIOMETRIC HEAD ABOVE ORE ZONE INTERVAL. CONTOUR LINES ARE DASHED WHERE POTENTIOMETRY AND STATIGRAPHIC STRUCTURE WERE PROJECTED ALONG THE BLACK HILLS MONOCLINE FLEXURE.

EDGE OF AQUIFER

21-19 REGIONAL BASELINE MONITOR WELL CLUSTER

NOTE:

TOP OF ORE ZONE SURFACE DERIVED FROM GEMCOM GEMS© SOFTWARE CUSTOMIZED FOR STRATA ENERGY, INC. AND DEVELOPED IN SUPPORT OF SITE SPECIFIC GROUNDWATER MODEL. 2010 POTENTIOMETRIC SURFACE GENERATED FROM GW VISTAS© GROUNDWATER MODEL USING MODFLOW. THIS FIGURE REPRESENTS THE DIFFERENCE BETWEEN THOSE TWO SURFACES.

0 1000 2000 4000

GRAPHIC SCALE (FEET)

STRATA ENERGY

ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

REVISIONS	
Date	Description

GWM TECHNICAL REPORT
FIGURE 4.9-2

ISOPACH OF AVAILABLE POTENTIOMETRIC HEAD IN 2010 ABOVE THE ORE ZONE AQUIFER

Drawn By: RAM
Checked By: BJS
Date: 11/21/10

FILE: ROSS_GEO_OZ_CONHEAD_ISO.DWG

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K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_ER_GEO_OZ_CONHEAD_ISO.dwg, GWM_FIGURE_4.9-2, 12/18/2010 2:47:36 PM scenarios, the potentiometric surface will be maintained above the top of the OZ aquifer.

Based on the ISR simulation, the only wells that are likely to be impacted by ISR operations are the three wells currently in use by Merit for water flood operations within the project area. If these wells continue to operate during ISR operations, the water levels within the OZ aquifer may go below desired levels. Furthermore, the operation of these wells within the active wellfields may result in severe wellfield imbalances. The estimated combined discharge rate for the three Merit wells is approximately 40 gallons per minute, which is equivalent to the bleed that would result from just under 5 modules. Because the discharge rates from the Merit wells are significant, in comparison to the discharge rates from ISR, it will be imperative that Merit use an alternative water source that will not result in drawdowns within the OZ during ISR within the immediate vicinity of the Merit Wells.

In the event that Strata is able to find an alternative water source and eliminate pumping from the Merit wells prior to ISR operations, aquifer recovery is expected to occur rapidly. Within 2 years the water level within each well rises by nearly 100 feet. Under ISR Scenario 1 (Merit wells off) the only period in which problems occur is during stress period 15 where the potentiometric surface drops below the top of the aquifer in several cells within the module 2-5 region. This region is immediately adjacent to well 19XX-State and the potentiometric surface drops below the top of the aquifer during the groundwater sweep simulation. Even though the 19XX-State well is assumed to be off during this time, the lowered potentiometric surface is still likely a result of residual drawdown from the well. Simulation #2 indicates that, with the 19XX-State in operation during ISR operations, the extent of the area in which the potentiometric surface drops below the top of the aquifer covers more cells, which would be expected. In reality, the simulated scenario is probably not reasonable because Strata is proposing to do a selective groundwater sweep and the flow rates would not necessarily be a "one size fits all" scenario for all modules. The estimated 17.5 gpm well flow rate is expected to be closer to the maximum flow rate rather than the minimum. Where the hydraulic conductivity is low a production rate of 17.5 gpm may not be achievable. The current ISR simulation assumes that all recovery well rates will be equal to 17.5 gpm to conservatively predict maximum estimated impacts from ISR production.

The ISR scenario modeled for this report is a conservative simulation to evaluate potential ISR impacts and not the final ISR scenario. Developing the final ISR unit progression will be an iterative procedure that will require balancing flows within each wellfield to maximize efficiency. The ISR simulation modeled for this report assumes a constant bleed and constant sweep. A review of the potentiometric surfaces modeled during ISR simulation indicates that it may be necessary to adjust the bleed rates between modules as well as adjusting the wellfield progression to maximize efficiency. For example, when ISR was simulated in module 2-2 the relic cone of depression left by the Merit wells indicated that a bleed rate of 1.25 percent may be higher than necessary to contain ISR fluids. Conversely, the bleed may have to be increased to optimize ISR production within module 1-6. Furthermore, under the modeled ISR scenario interference between wellfields has been noted. To minimize interference, Strata is currently exploring other options such as alternate mine progression scenarios, pre-ISR aquifer conditioning, and alternate ISR schedules. Strata intends to use this groundwater model as the primary tool to minimize interference and optimize ISR production.

This ISR simulation achieved the goal of predicting regional impacts. If arrangements can be made to temporarily suspend pumping from the Merit oilfield water supply wells, the regional impacts presented in Scenario 1 are probably the most realistic impacts. Due to the abstraction introduced by the Merit wells, the ISR wellfields located immediately adjacent to the wells will be difficult to operate with the Merit wells in operation through ISR operations. Generally, operating a wellfield in the immediate vicinity of the Merit wells will require excessive bleed in order to contain ISR fluids within the wellfield. The abstraction caused by Merit's wells decreases substantially at distances more than 0.25 miles from the wells. As such, it may be possible for the Merit wells to continue operating during active ISR in the northernmost and southernmost proposed wellfields. Further modeling will be required to determine the most efficient way to operate ISR wellfields in tandem with Merit wells.

Scenario 2 likely over-estimates the impacts to the regional aquifer that would result from ISR. As previously mentioned, Strata is currently working with Merit to identify alternative water sources for the oilfield and anticipates that a solution will be arrived at that will eliminate the abstractions caused by the water supply wells. As such, it is unlikely that the Merit wells will be in operation during ISR operations and Scenario 2 likely over estimates net consumptive water use from the OZ aquifer. The groundwater model presented herein is an effective tool that can be used to balance wellfields, help sequence uranium recovery, and predict expected impacts from alternative ISR scenarios. Given the wide variability in aquifer conditions and distance between available measured aquifer parameters, it will be necessary to do additional site specific aquifer testing at each wellfield. Information from the site specific can then be incorporated into the model to improve the resolution of the model. The increased model resolution will help further refine and optimize operational parameters for each wellfield. The simulation presented herein is designed to present to the reader conservative impacts from ISR development. As Strata continues exploration efforts and finalizes the wellfield delineation, several ISR simulation iterations with the groundwater model will be necessary to optimize and develop the final wellfield design packages.

4.10 Recovery

To simulate water-level recovery, the model was run for 5, 10, 20, 50 and 100-year periods after the cessation of ISR operations. In Scenario 1 it was assumed that the Merit water supply wells did not resume pumping after ISR was complete. In Scenario 2 it was assumed that there was no change in operation of Merit's wells before, during, or after the Ross ISR Project. In both scenarios all other domestic and industrial wells within the model domain were assumed to operate at flow rates presented in Table 4.9-2. The residual drawdowns during recovery are presented in Appendices B and C. Residual drawdowns presented in Appendices B and C are based on the 2010 modeled potentiometric surfaces presented in figures 4.7-4 and 4.7-5.

In general, the figures within appendices B and C show that recovery to a residual drawdown of less than 10 feet from the 2010 modeled potentiometric surface is expected to occur quite quickly. Within the SM aquifer, drawdowns at the end of ISR operations for Scenario 1 would be insignificant (less than 10 feet). Within Scenario 2, recovery to a drawdown of less than 10 feet takes less than 5 years. Within the OZ aquifer full recovery takes between 5 and 10 years for Scenario 1. For Scenario 2 recovery to a drawdown of 10 feet takes between 5 and 10 years with most of recovery occurring within the first 5 years (recovery vs. time follows an exponential curve). As previously noted, Scenario 2 assumes the Merit water supply wells continued operating after ISR ceases. The longer recovery time in Scenario 2 is attributed to the Merit wells. Full recovery to pre-Ross levels would not occur until the Merit wells are shut off, but that is outside Strata's control after ISR operations are complete.

4.11. Excursion Control and Retrieval

Based on the results presented herein, Strata has determined that a monitor ring spacing would be effective at identifying an excursion up to 600 ft from the proposed wellfield. To asses monitor ring spacing and excursion recovery an ISR simulation with both injection and recovery wells was developed for a small portion of the wellfield. An excursion simulation utilized an out of balance wellfield in module 1-1 as depicted in Figure 4.11-1. To increase the resolution around module 1-1, model grid spacing was decreased to 25 foot squares within and immediately adjacent to the wellfield. To minimize the number of cells within the model and thus minimize the size of the output files the grid spacing was increased up to 1,000 feet near the outer edges of the model. This excursion simulation assumes that prior to the beginning of the Ross project, the Merit water supply wells had been shut in for

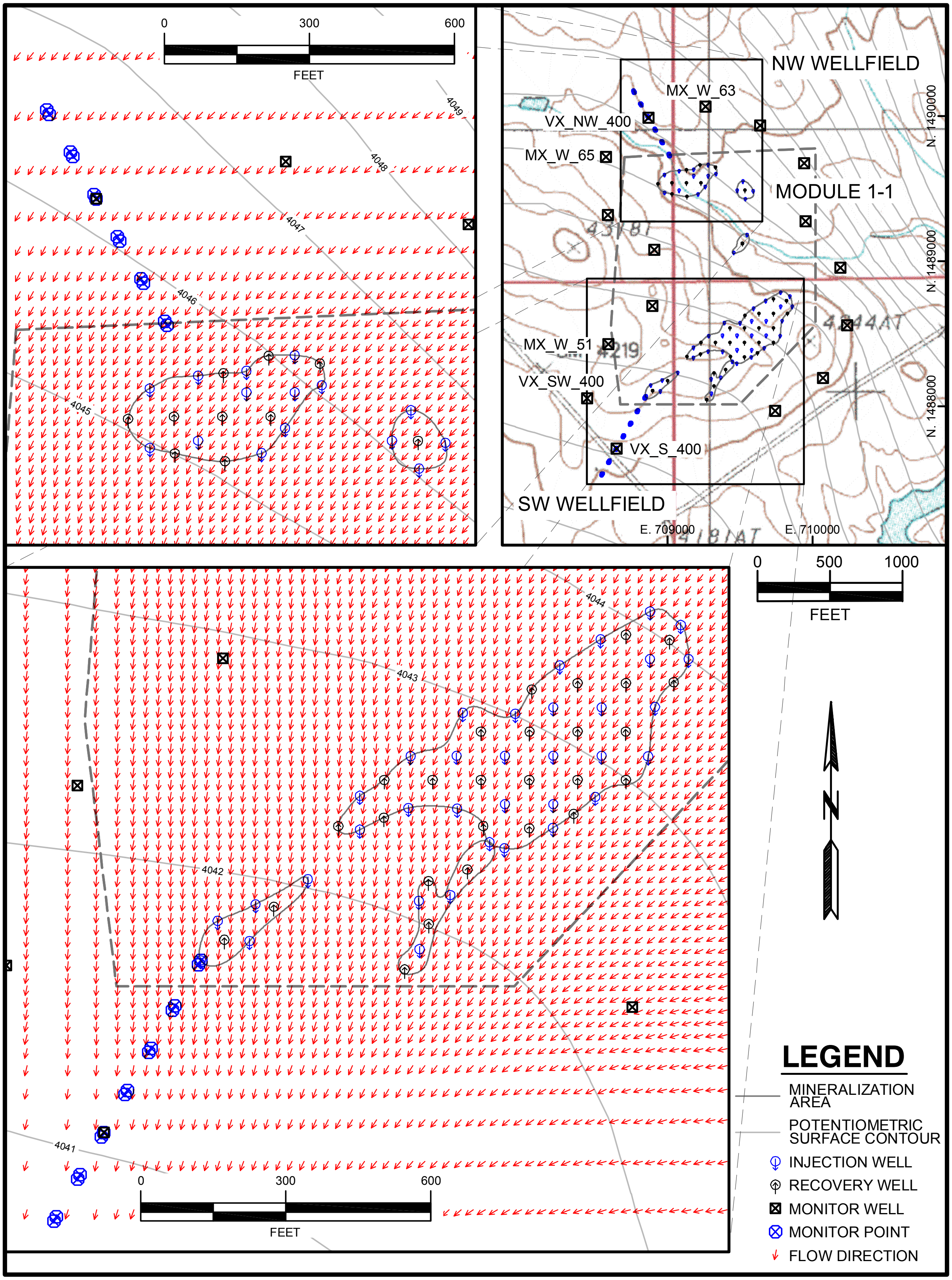


Figure 4.11-1. Pre-ISR Groundwater Flow in Module 1-1

approximately 2 years and follows the assumptions of Scenario 1. All other wells within the region were left operating at the rates described in Table 4.9-2. To simplify the analysis only wellfields within module 1-1 are included in this simulation.

Prior to performing the excursion evaluation, several well patterns within module 1-1 were balanced by trial and error using Groundwater Vistas. For this exercise the wellfield balance was less rigorous than the balance used to describe the flare in Section 4.12. An upgradient wellfield in the north part of module 1-1 and a downgradient wellfield in the southwest portion of module 1-1 were chose to evaluate the monitor well spacing. To conservatively show that an excursion would be detected in the upgradient wells, the bleed in the north wellfield was simulated at a rate higher than normal (i.e. an upgradient monitor well would detect an excursion even when the wellfield cone of depression is steeper than normal away from the well). The north wellfield had 9 recovery wells operating at 17.5 gpm (157.5 gpm total). The wellfield also included 11 injection wells with a combined injection rate of 151.2 gpm. The net bleed in the north wellfield was approximately 4%. The south wellfield was balanced at the average estimated bleed rate of 1.25%. Since the south wellfield simulates an excursion to the downgradient side of the wellfield, the average bleed set to 1.25% is conservative (i.e. a downgradient excursion would be harder to recover if the bleed rate is minimal because the cone of depression is shallower). The southern simulated wellfield had 27 recovery wells operating at 17.5 gpm (472.5 gpm) the southern wellfield had 35 injection wells operating at various flow rates for a total combined injection rate of 466.6 gpm and 1.25% bleed.

Using the balanced module 1-1 wellfield the excursion simulation was broken into five modeled time increments (stress periods). The stress periods represent pre-Ross conditions, ISR operations at Ross, out of balance with possible excursion, out of balance recovery, and back to normal ISR operations. Each stress period is described in more detail below.

Stress period 1 – Lasts 1 day and represents existing conditions with no uranium recovery occurring. The only wells operating during stress period 1 are those described in Table 4.9-2 which are in operation throughout the entire simulation.

Stress period 2 - Represents a 90-day wellfield operation period. This period represents a typical operating scenario with a balanced wellfield.

Stress period 3 – Is a 30-day period that represents the out of balance wellfield used to simulate an excursion. During stress period 3 the wellfield is taken out of balance by shutting off 2 recovery wells at different locations within the wellfield. One of the recovery wells is located on the down gradient, southwest side (SW), of the wellfield and the other is located on the northwest (NW) side of the wellfield (upgradient). Figure 4.11-1 depicts the modeled flow directions and potentiometric surface prior to ISR operation. The flow rates for the unbalanced recovery wells varied from 17.5 gpm in stress period 2 to 0 gpm in stress period 3 and then back to 17.5 gpm for stress periods 4 and 5.

Stress period 4 – Is a 45-day period representing the excursion reversal phase. For this phase the two recovery wells are turned on at their previous 17.5 gpm rate and the adjacent injection wells are either turned off or the injection rate reduced. In order to develop similar comparisons from location to location, the total decrease in injection rate was 17.3 gpm between the adjacent injection wells at both the NW and SW excursion sites.

Stress period 5 – is a 30-day period representing the recommencement of normal ISR operations after the excursion has been corrected. During this period all the injection and recovery wells are turned back to their balanced wellfield production rates.

As shown on Figure 4.11-1, several simulated monitor points were strategically established radiating out from the NW and SW out of balance well locations. The heads recorded by the model during each time step at each monitor point are graphed for the NW and SW simulated wellfield imbalances in Figures 4.11-2 and 4.11-3, respectively. The graphs for each wellfield show potentiometric surfaces for pre-ISR conditions, after 90 days of normal ISR,

Figure 4.11-2. Modeled Potentiometric Surfaces Near the Northwest Simulated Excursion

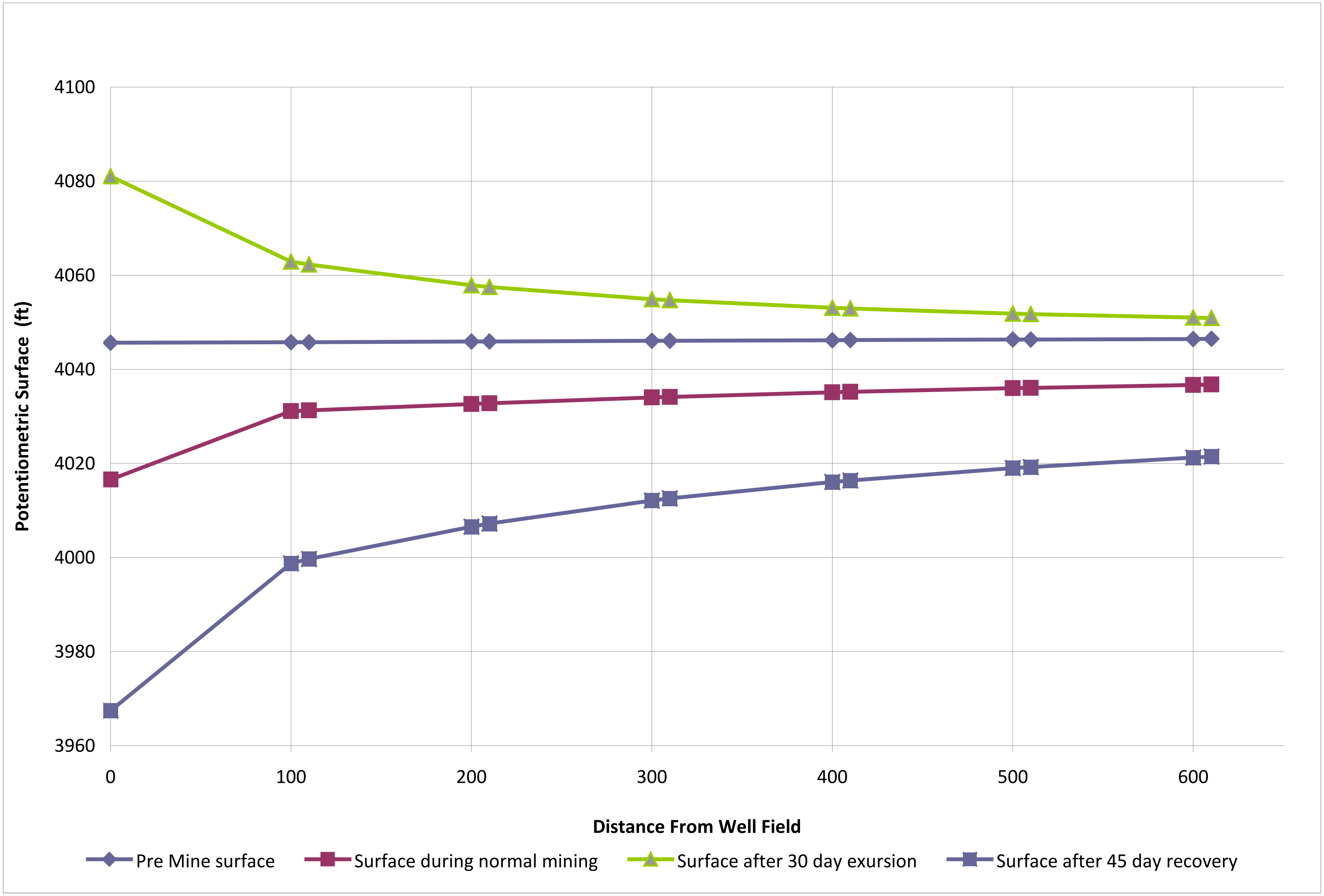
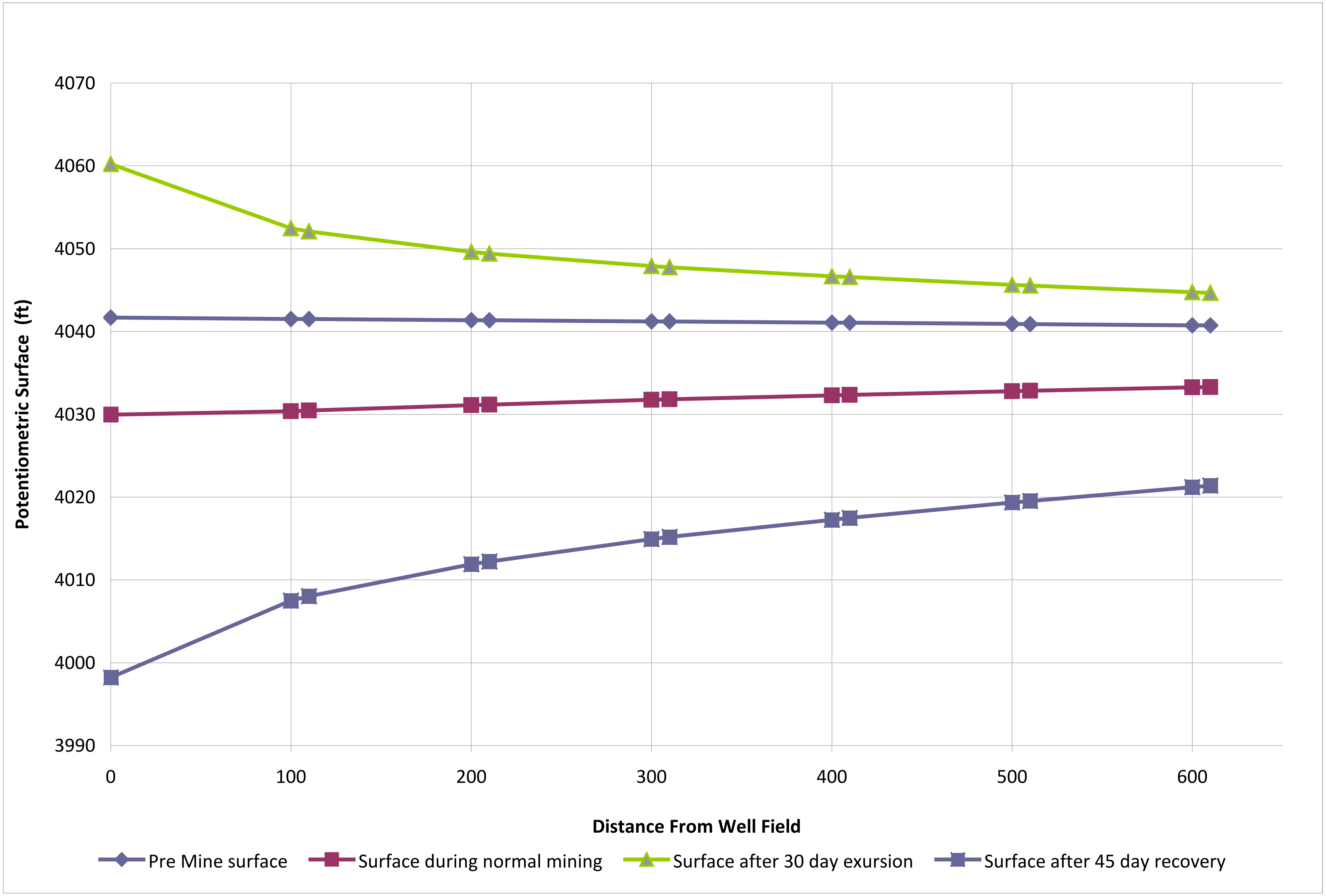


Figure 4.11-3. Modeled Potentiometric Surfaces Near the Southwest Simulated Excursion



after 30 days of excursion simulation, and after 45 days of excursion reversal. Within the SW simulation, the pre-Ross ISR surface indicates that the initial groundwater gradient was actually away from the wellfield which can be seen in Figures 4.11-1 and 4.11-2. Within the NW simulation the gradient is shallow but the recovery wells are down gradient as shown on Figures 4.11-1 and 4.11-3. As shown on Figures 4.11-2 and 4.11-3, during normal ISR, drawdowns are towards the wellfield, which indicates a well-balanced wellfield that is capturing all ISR fluids. Figure 4.11-4 depicts modeled flow directions at each simulation location during normal ISR operations. During the simulated excursion the hydraulic gradient is away from the wellfields. Figure 4.11-5 depicts the location of each simulated out of balance recovery well and the modeled flow direction during the excursion. The simulated surface during recovery is towards the wellfield and much steeper than the potentiometric surface calculated during normal ISR. The steeper potentiometric surface indicates that during recovery fluid is moving towards the wellfield at a much higher rate than during normal ISR operations which is also depicted on Figures 4.11-2. 4.11-3, and 4.11-6

To determine how far the simulated excursion traveled and the time necessary to correct the excursion, monitor points were placed 10 feet apart along the same alignment at specific distances from wellfield (i.e. 200 and 210 feet, 400 and 410 feet, etc.). A hydraulic gradient was then determined at each location. Based on the hydraulic gradient calculated between the two monitor points a groundwater velocity was calculated at each point using Equation 4.11-1.

Equation 4.11-1 $V=-k/n*dh/dl$

Where:

V=velocity (ft/day)
k= hydraulic conductivity (ft/day)
N=porosity (assumed to be 0.3)
dh/dl=hydraulic gradient

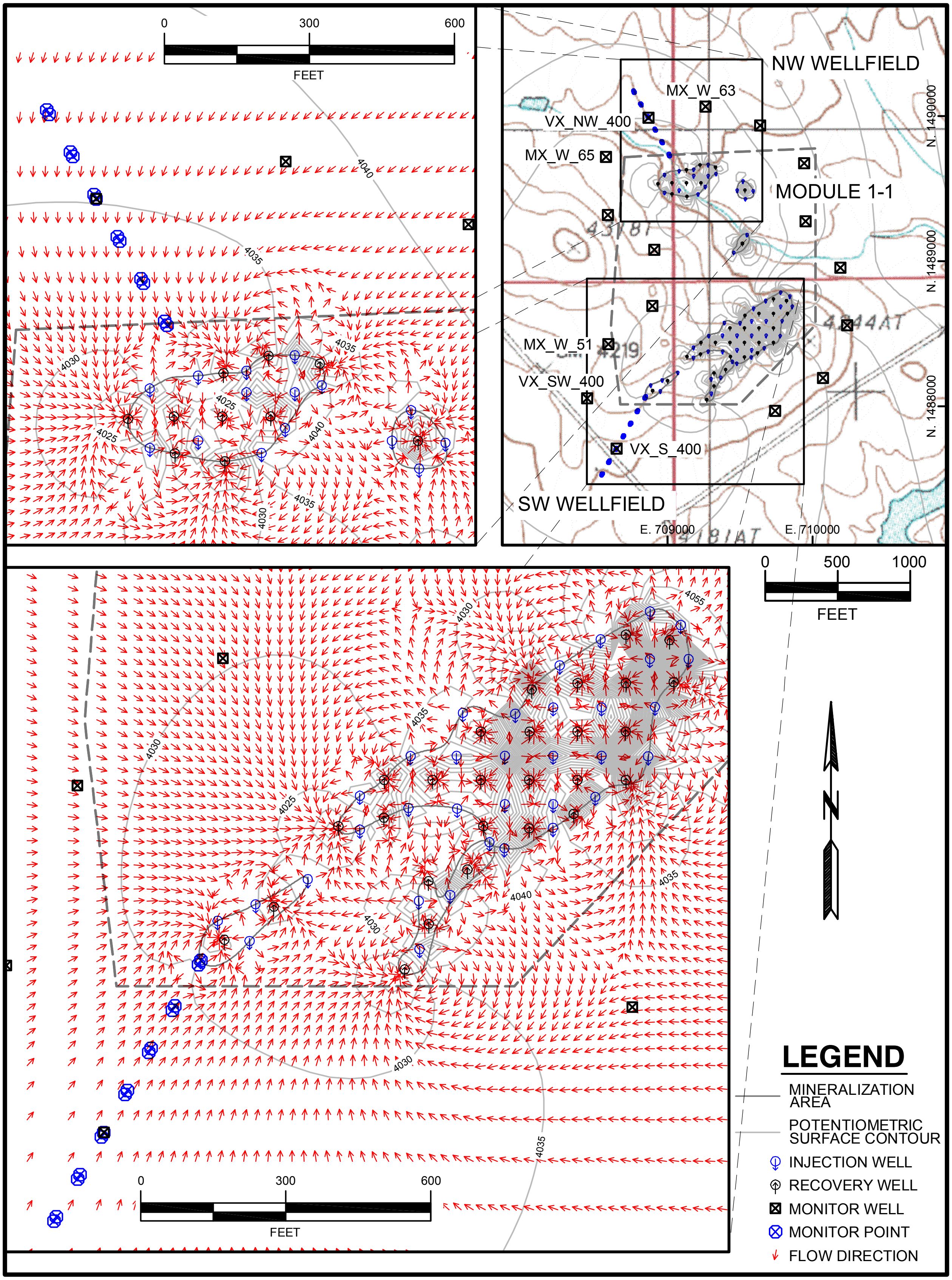


Figure 4.11-4. Groundwater Flow During Normal ISR in Module 1-1

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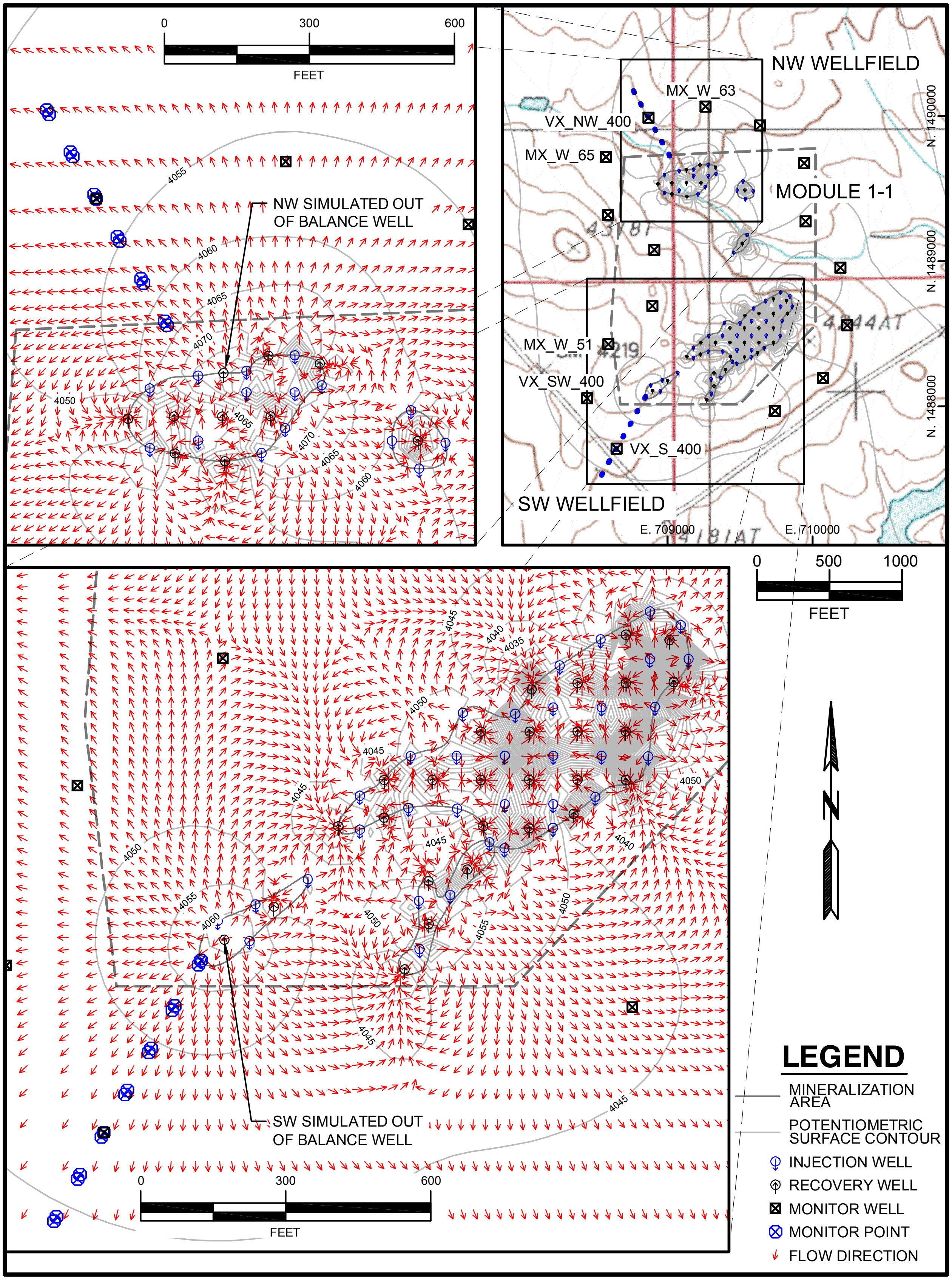

Figure 4.11-5. Groundwater Flow During Excursion in Module 1-1

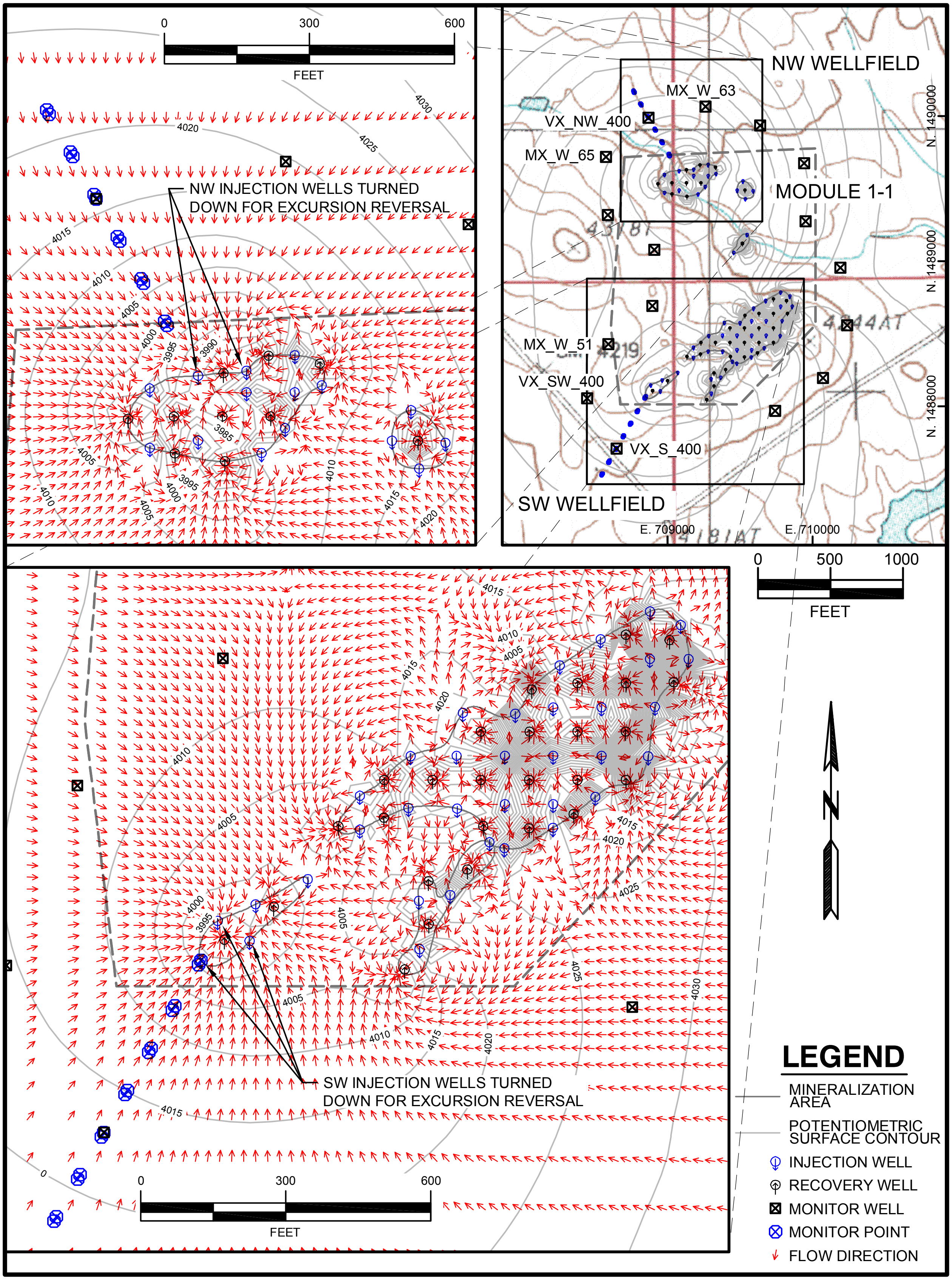

Figure 4.11-6. Groundwater Flow During Excursion Reversal in Module 1-1

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The calculated groundwater velocity at each monitor point was then multiplied by the incremental time in order to determine how far the groundwater moved. Tables 4.11-1 and 4.11-2 demonstrate the actual groundwater movement near the NW and SW simulated excursions, respectively. As shown on Table 4.11-1, the total distance that the groundwater traveled during the simulated 30-day excursion ranged from 1.15 ft to 0.22 feet 200 and 600 feet from the wellfield, respectively, near the NW simulated excursion. The total time that it took to reverse the excursion ranged between 15 and 20 days. Near the SW simulated excursion the water moved a little further ranging from 0.42 to 1.52 feet during the 30 day-excursion 200 and 600 feet from the wellfield, respectively. The time it took to recover the water at the SW wellfield was approximately 20 days. The differences can be attributed to the differences in hydraulic conductivity and the natural gradient at each simulated excursion location. The hydraulic conductivity near the SW excursion area was between 0.75 and 1 ft/day while the hydraulic conductivity near the NW excursion ranged from 0.35 to 0.5 ft/day. The natural groundwater gradient at the SW excursion area is away from the wellfield which also contributes to the longer recovery time.

The results in tables 4.11-1 and 4.11-2 show that using head as the indicator, it is possible to detect and correct an excursion within a 30-day time frame. While the calculated velocity is low, the head change could be easily detected. The change in head is apparent within Figures 4.11-7 and 4.11-8 which show the head response at various distances from the wellfield through the simulation.

Based on the significant and relatively instantaneous (the aquifer remains confined throughout all operations) head change noted at each monitor point during the simulation, recording pressure transducers could be used to monitor the wellfield balance. By watching the day to day trends the wellfield operator can determine which wells may need to be adjusted in order to eliminate the risk of an excursion. Based on the results of this simulation

Table 4.11-1. Modeled Heads and Groundwater Flow Rates at Selected Monitor Points Near NW Simulated Excursion

Distance from wellfield (ft)		610	600	600			410	400	400			210	200	200		
K (ft/day)				0.5					0.4					0.35		
Period	Time (days)	Head (ft)	Head (ft)	Velocity (ft/day)	Dist per day (ft)	Total Dist (ft)	Head (ft)	Head (ft)	Velocity (ft/day)	Dist per day (ft)	Total Dist (ft)	Head (ft)	Head (ft)	Velocity (ft/day)	Dist per day (ft)	Total Dist (ft)
Pre-ISR	2	4046.470	4046.458	0.002	0.00	0.00	4046.217	4046.203	0.002	0.00	0.00	4045.917	4045.901	0.002	0.00	0.00
Normal ISR 90 days	12	4044.508	4044.469	0.007	0.07	0.07	4043.469	4043.401	0.009	0.09	0.09	4041.623	4041.503	0.014	0.14	0.14
	22	4042.814	4042.764	0.008	0.08	0.15	4041.532	4041.450	0.011	0.11	0.20	4039.377	4039.241	0.016	0.16	0.30
	32	4041.458	4041.403	0.009	0.09	0.24	4040.075	4039.988	0.012	0.12	0.32	4037.811	4037.669	0.017	0.17	0.46
	42	4040.345	4040.287	0.010	0.10	0.34	4038.904	4038.814	0.012	0.12	0.44	4036.580	4036.436	0.017	0.17	0.63
	52	4039.410	4039.350	0.010	0.10	0.44	4037.931	4037.839	0.012	0.12	0.56	4035.569	4035.423	0.017	0.17	0.80
	62	4038.609	4038.548	0.010	0.10	0.54	4037.104	4037.010	0.012	0.12	0.68	4034.716	4034.568	0.017	0.17	0.98
	72	4037.913	4037.851	0.010	0.10	0.64	4036.389	4036.295	0.013	0.13	0.81	4033.983	4033.834	0.017	0.17	1.15
	82	4037.303	4037.240	0.010	0.10	0.75	4035.764	4035.669	0.013	0.13	0.94	4033.343	4033.194	0.017	0.17	1.32
	92	4036.762	4036.698	0.011	0.11	0.85	4035.212	4035.117	0.013	0.13	1.06	4032.780	4032.631	0.017	0.17	1.50
Simulated Excursion 30 days	97	4039.395	4039.390	0.001	0.00	0.00	4039.682	4039.725	-0.006	-0.03	-0.03	4041.930	4042.167	-0.028	-0.14	-0.14
	102	4042.309	4042.338	-0.005	-0.02	-0.02	4043.464	4043.561	-0.013	-0.06	-0.09	4047.067	4047.384	-0.037	-0.19	-0.32
	107	4044.895	4044.942	-0.008	-0.04	-0.06	4046.447	4046.567	-0.016	-0.08	-0.17	4050.528	4050.870	-0.040	-0.20	-0.52
	112	4047.149	4047.207	-0.010	-0.05	-0.11	4048.922	4049.053	-0.017	-0.09	-0.26	4053.241	4053.595	-0.041	-0.21	-0.73
	117	4049.138	4049.203	-0.011	-0.05	-0.16	4051.056	4051.195	-0.018	-0.09	-0.35	4055.527	4055.888	-0.042	-0.21	-0.94
	122	4050.920	4050.991	-0.012	-0.06	-0.22	4052.944	4053.088	-0.019	-0.10	-0.45	4057.523	4057.889	-0.043	-0.21	-1.15
Excursion Reversal 45 days	127	4046.877	4046.837	0.007	0.03	0.03	4045.395	4045.274	0.016	0.08	0.08	4040.963	4040.582	0.045	0.22	0.22
	132	4042.144	4042.040	0.017	0.09	0.12	4039.009	4038.783	0.030	0.15	0.23	4031.962	4031.424	0.063	0.31	0.54
	137	4037.949	4037.811	0.023	0.11	0.24	4034.072	4033.805	0.036	0.18	0.41	4026.122	4025.538	0.068	0.34	0.88
	142	4034.329	4034.172	0.026	0.13	0.37	4030.052	4029.763	0.038	0.19	0.60	4021.664	4021.060	0.071	0.35	1.23
	147	4031.165	4030.996	0.028	0.14	0.51	4026.633	4026.331	0.040	0.20	0.80	4017.978	4017.360	0.072	0.36	1.59
	152	4028.358	4028.179	0.030	0.15	0.66	4023.643	4023.332	0.041	0.21	1.01	4014.803	4014.176	0.073	0.37	1.96
	157	4025.833	4025.647	0.031	0.15	0.81	4020.982	4020.663	0.042	0.21	1.22	4012.000	4011.366	0.074	0.37	2.32
	162	4023.539	4023.348	0.032	0.16	0.97	4018.578	4018.255	0.043	0.22	1.44	4009.486	4008.847	0.075	0.37	2.70
	167	4021.436	4021.241	0.033	0.16	1.13	4016.387	4016.059	0.044	0.22	1.66	4007.205	4006.562	0.075	0.38	3.07
Normal ISR 30 days	177	4023.338	4023.215	0.020	0.20	0.20	4020.471	4020.301	0.023	0.23	0.23	4016.394	4016.156	0.028	0.28	0.28
	187	4025.150	4025.055	0.016	0.16	0.36	4022.959	4022.829	0.017	0.17	0.40	4019.844	4019.661	0.021	0.21	0.49
	197	4026.396	4026.312	0.014	0.14	0.50	4024.444	4024.328	0.015	0.15	0.55	4021.600	4021.431	0.020	0.20	0.69

Table 4.11-2. Modeled Heads and Groundwater Flow Rates at Selected Monitor Points Near the SW Simulated Excursion

Distance from wellfield (ft)		610	600	600			410	400	400			210	200	200		
K (ft/day)				0.75					1					0.85		
Period	Time (days)	Head (ft)	Head (ft)	Velocity (ft/day)	Dist per day (ft)	Total Dist (ft)	Head (ft)	Head (ft)	Velocity (ft/day)	Dist per day (ft)	Total Dist (ft)	Head (ft)	Head (ft)	Velocity (ft/day)	Dist per day (ft)	Total Dist (ft)
Pre-ISR	2	4040.731	4040.747	-0.004	0.00	0.00	4041.061	4041.076	-0.005	0.00	0.00	4041.355	4041.369	-0.004	0.00	0.00
Normal ISR 90 days	12	4039.072	4039.062	0.003	0.03	0.03	4038.754	4038.733	0.007	0.07	0.07	4038.197	4038.159	0.011	0.11	0.11
	22	4037.739	4037.717	0.006	0.06	0.08	4037.176	4037.144	0.011	0.11	0.18	4036.374	4036.323	0.014	0.14	0.25
	32	4036.709	4036.681	0.007	0.07	0.15	4036.025	4035.987	0.013	0.13	0.30	4035.110	4035.054	0.016	0.16	0.41
	42	4035.878	4035.846	0.008	0.08	0.23	4035.117	4035.075	0.014	0.14	0.44	4034.131	4034.071	0.017	0.17	0.58
	52	4035.187	4035.152	0.009	0.09	0.32	4034.370	4034.326	0.015	0.15	0.59	4033.333	4033.271	0.018	0.18	0.76
	62	4034.602	4034.565	0.009	0.09	0.41	4033.742	4033.696	0.015	0.15	0.74	4032.666	4032.601	0.018	0.18	0.94
	72	4034.099	4034.061	0.010	0.10	0.51	4033.205	4033.157	0.016	0.16	0.90	4032.097	4032.031	0.019	0.19	1.13
	82	4033.664	4033.624	0.010	0.10	0.61	4032.740	4032.691	0.016	0.16	1.07	4031.606	4031.539	0.019	0.19	1.32
	92	4033.283	4033.242	0.010	0.10	0.71	4032.335	4032.284	0.017	0.17	1.23	4031.177	4031.109	0.019	0.19	1.51
Simulated Excursion 30 days	97	4036.051	4036.069	-0.004	-0.02	-0.02	4036.696	4036.742	-0.015	-0.08	-0.08	4038.321	4038.458	-0.039	-0.19	-0.19
	102	4038.404	4038.448	-0.011	-0.05	-0.08	4039.625	4039.700	-0.025	-0.13	-0.20	4041.858	4042.028	-0.048	-0.24	-0.43
	107	4040.297	4040.354	-0.014	-0.07	-0.15	4041.786	4041.873	-0.029	-0.15	-0.35	4044.264	4044.446	-0.051	-0.26	-0.69
	112	4041.914	4041.980	-0.016	-0.08	-0.23	4043.576	4043.671	-0.032	-0.16	-0.51	4046.211	4046.400	-0.054	-0.27	-0.96
	117	4043.357	4043.429	-0.018	-0.09	-0.32	4045.147	4045.249	-0.034	-0.17	-0.68	4047.900	4048.095	-0.055	-0.28	-1.24
	122	4044.672	4044.749	-0.019	-0.10	-0.42	4046.566	4046.672	-0.035	-0.18	-0.85	4049.415	4049.615	-0.057	-0.28	-1.52
Excursion Reversal 5 days	127	4040.023	4039.987	0.009	0.05	0.05	4038.810	4038.727	0.028	0.14	0.14	4036.173	4035.966	0.059	0.29	0.29
	132	4036.140	4036.053	0.022	0.11	0.15	4033.834	4033.696	0.046	0.23	0.37	4030.036	4029.766	0.076	0.38	0.68
	137	4033.119	4033.008	0.028	0.14	0.29	4030.321	4030.161	0.054	0.27	0.64	4026.076	4025.784	0.083	0.41	1.09
	142	4030.602	4030.476	0.032	0.16	0.45	4027.497	4027.322	0.058	0.29	0.93	4022.974	4022.669	0.087	0.43	1.52
	147	4028.397	4028.259	0.034	0.17	0.62	4025.066	4024.880	0.062	0.31	1.24	4020.335	4020.020	0.089	0.45	1.97
	152	4026.413	4026.266	0.037	0.18	0.80	4022.902	4022.708	0.065	0.32	1.56	4018.005	4017.682	0.092	0.46	2.43
	157	4024.600	4024.446	0.038	0.19	1.00	4020.941	4020.740	0.067	0.33	1.89	4015.906	4015.576	0.094	0.47	2.90
	162	4022.927	4022.767	0.040	0.20	1.20	4019.142	4018.936	0.069	0.34	2.24	4013.992	4013.656	0.095	0.48	3.37
	167	4021.373	4021.208	0.041	0.21	1.40	4017.481	4017.269	0.071	0.35	2.59	4012.230	4011.889	0.097	0.48	3.86
Normal ISR 30 days	177	4023.710	4023.614	0.024	0.24	0.24	4021.632	4021.528	0.035	0.35	0.35	4019.400	4019.278	0.035	0.35	0.35
	187	4025.075	4024.999	0.019	0.19	0.43	4023.425	4023.342	0.028	0.28	0.63	4021.621	4021.521	0.028	0.28	0.63
	197	4025.902	4025.834	0.017	0.17	0.60	4024.414	4024.338	0.025	0.25	0.88	4022.757	4022.664	0.026	0.26	0.89

Figure 4.11-7. Head Response Adjacent to NW Wellfield during Simulated Excursion

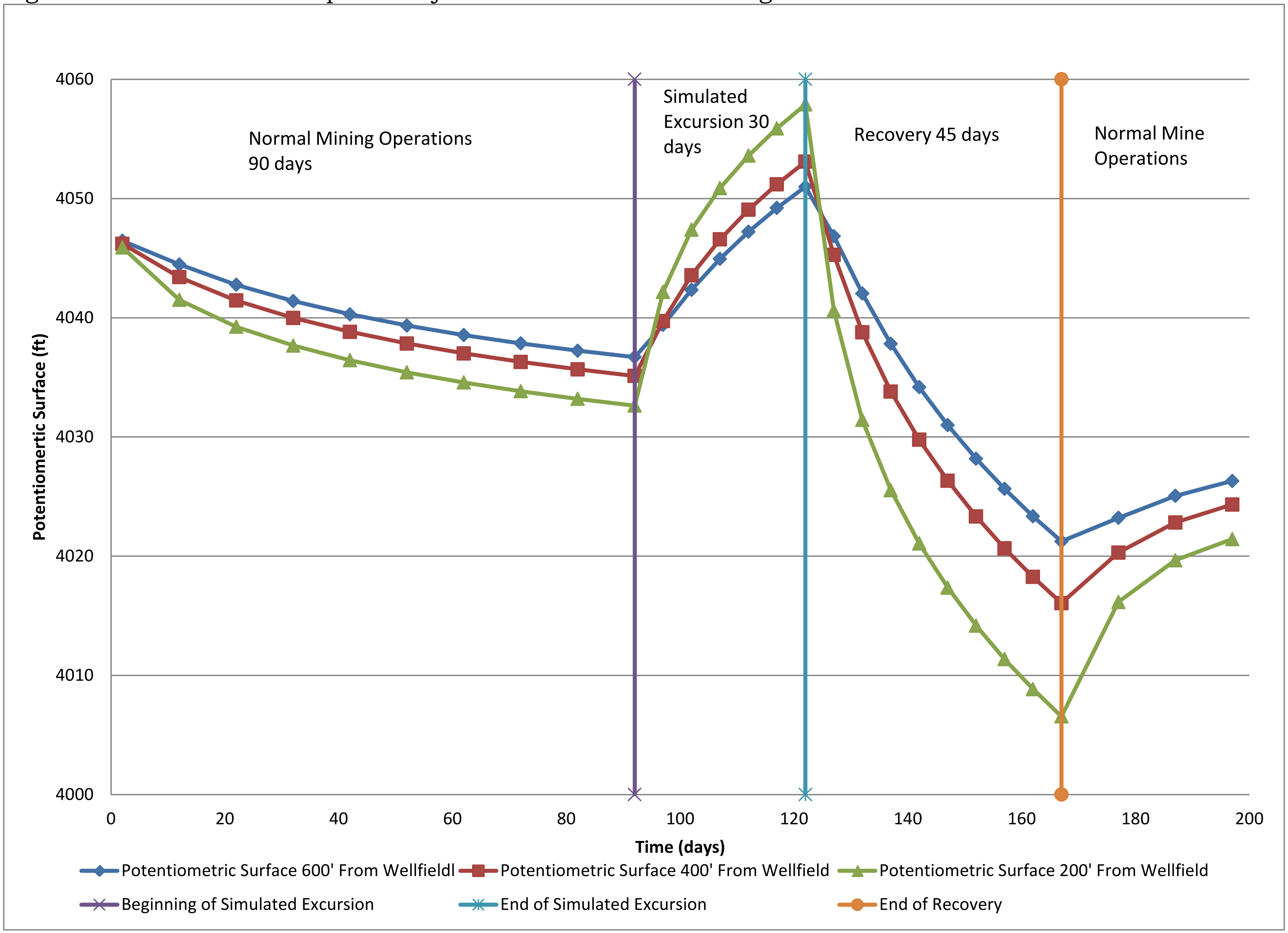
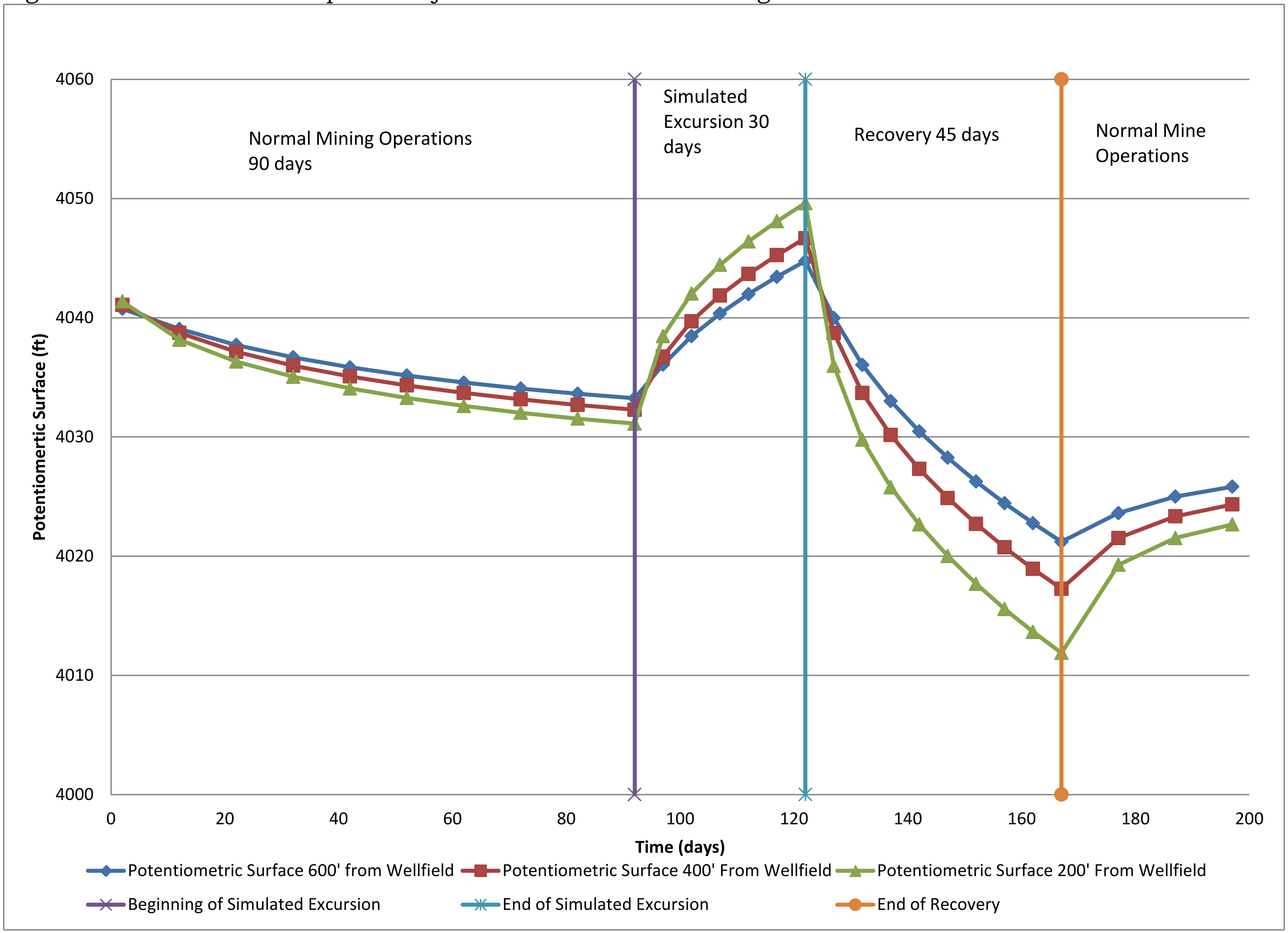


Figure 4.11-8. Head Response Adjacent to SW Wellfield during Simulated Excursion



monitor wells could be successfully placed up to 600 feet from the wellfield and an excursion could be both identified as well as recovered.

To ensure that a potential excursion could not occur undetected between monitor wells, an additional evaluation to check the lateral monitor well spacing was performed. During the excursion simulation presented in Figure 4.11-5 sample monitor wells which are also shown on Figure 4.11-5 were installed on 400 ft spacing laterally around the wellfield. At each simulated excursion location, the head during the excursion at three 400 ft laterally spaced wells was graphed. Figure 4.11-9 shows the head response at the three 400 ft laterally spaced monitor wells near the northwest wellfield excursion and Figure 4.11-10 shows the head response near the southwest wellfield excursion. In both cases, the head response at all three lateral wells indicates that a hydraulic anomaly would have been detected from pressure transducers installed in the monitor wells. Furthermore, the flow vectors in Figure 4.11-5 also indicate that all three sample monitor wells would have seen particles from the modeled excursion. The three sample monitor wells at each simulated excursion location are spaced 400 feet apart. Therefore, the total monitored distance from outside well to outside well is 800 ft. Since an excursion head response is seen in all three wells, it follows that wells spaced 600 ft apart would also see a similar head response. Figures 4.11-7 and 4.11-8 show that the head response 600 ft and 400 ft from the wellfield is also similar. As such, lateral monitor well spacing up to 600 ft is adequate to detect an excursion.

This model was developed primarily to assess regional impacts. As such, it simulates the entire OZ aquifer as one homogenous layer, which is a valid assumption from a regional standpoint. However, at a wellfield scale within the Ross Project area the validity of this assumption varies from location to location. Where the ore containing sandstone is thick, a continuous homogeneous layer assumption is reasonable. Within areas where the sands are thin and locally isolated the thick homogeneous layer assumption used in the model may underestimate the groundwater velocity during an excursion.

Figure 4.11-9. Head Response at Laterally Spaced Monitor Points Adjacent to NW Wellfield during Simulated Excursion

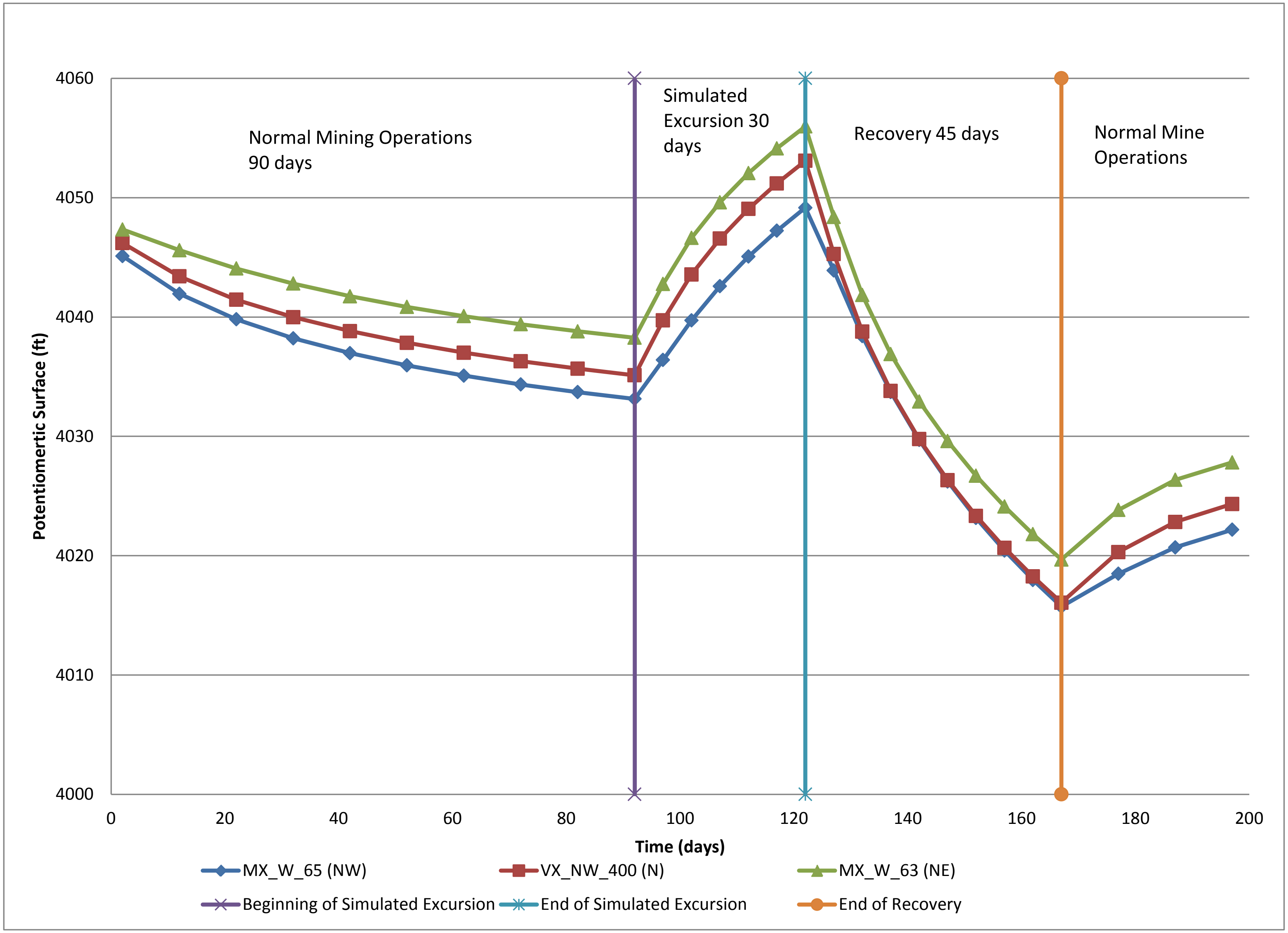
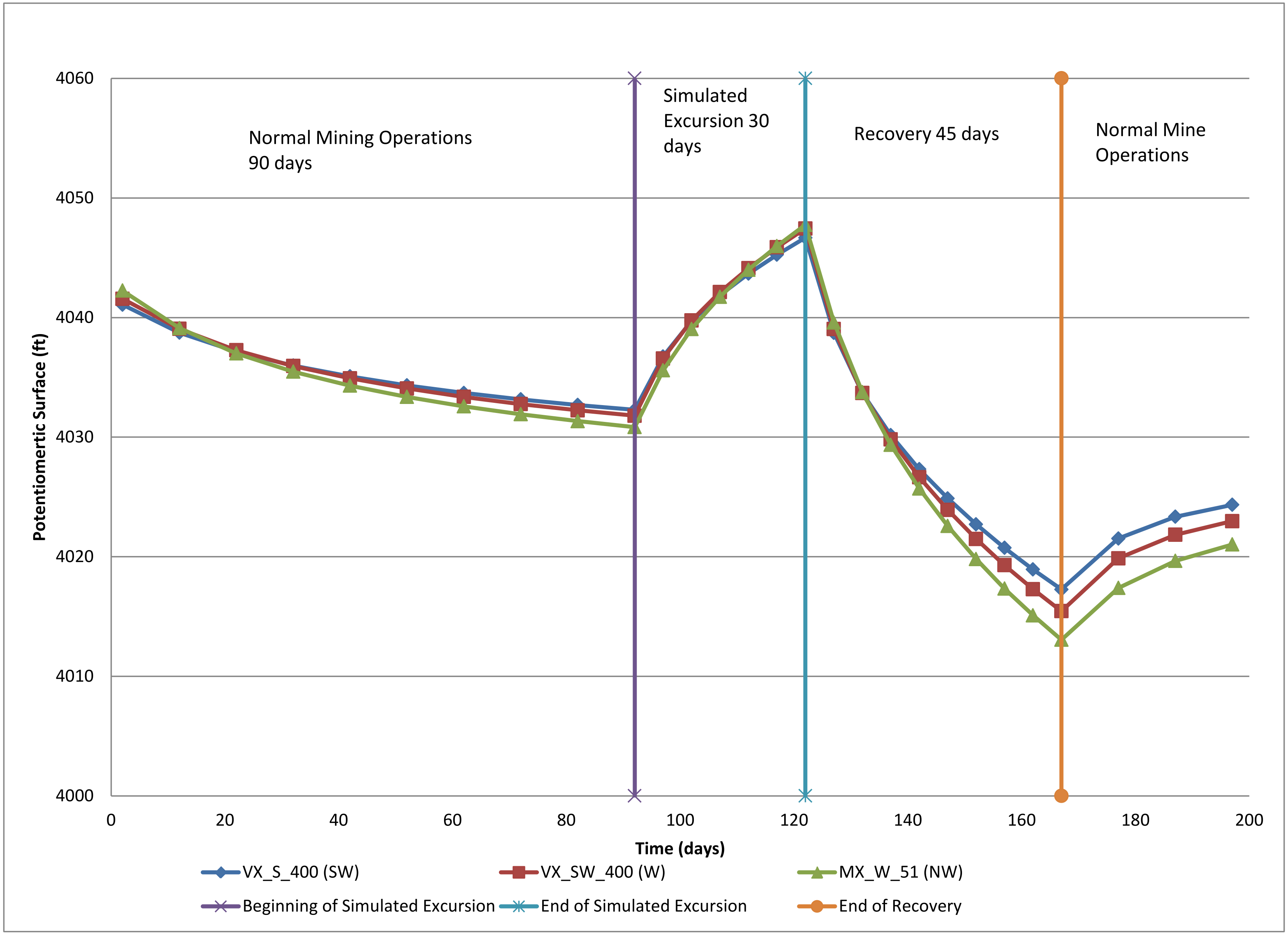


Figure 4.11-10. Head Response at Laterally Spaced Monitor Points Adjacent to SW Wellfield during Simulated Excursion



Aquifer tests performed by WWC Engineering have shown that discrete intervals in which the ore is contained tend to have higher hydraulic conductivities than the aquifer as a whole. For example, the measured hydraulic conductivity in the partially penetrating OW1B58 well near the 12-18 cluster (presented in Table 2.5.2) was as high as 6.2 feet per day over the contributing aquifer.

To evaluate the maximum change in groundwater travel distance from an ore zone sandstone with increased hydraulic conductivity, an additional calculation was performed using a hydraulic conductivity of 6.2 feet per day. The calculation was based on the heads calculated at the SW simulated excursion. As a result of increasing the hydraulic conductivity to 6.2 feet per day, the total travel distance during the 30-day excursion was calculated at 3.5 feet at the 600 foot monitor point. A reversal of 3.7 feet occurred within 20 days. Note that while the total calculated distance of the groundwater flow was greater, the recovery occurred in the same amount of time as previous calculations presented in Table 4.11-2 (just less than 20 days). Since the groundwater velocity is linearly related to the hydraulic conductivity (as shown in Equation 4.11-1), an increase in the local hydraulic conductivity is expected to result in an increased travel distance both during an excursion and the subsequent recovery efforts. However, the head change and the excursion recovery time are expected to be similar for similar recovery efforts.

The results presented herein for a simulated out of balance wellfield depict realistic head changes that could be observed over the simulated time period. Depending on the local geology, stratification, and hydraulic conductivity the distance that the water travels during the simulated excursion and subsequent recovery may vary. In general, the travel distance calculated from an estimated 6.2 ft/day hydraulic conductivity is expected to be a maximum, whereas the travel distance calculated from the lower, model-calibrated hydraulic conductivities are expected to be minimums. In both cases the time to reverse the excursion is expected to be identical.

4.12 Horizontal Flare Evaluation

A horizontal flare evaluation was performed using MODPATH Version 3.0 (Pollack 1994) on a representative wellfield within the Ross Project. The representative wellfield is located within Module 1-1. Figure 4.9-1 shows the location of Module 1-1 in relation to the proposed project area. Adjacent wellfields targeting other roll fronts were ignored in this analysis to minimize abstractions. The sample wellfield consists of 21 recovery wells and 26 injection wells. Throughout the horizontal flare evaluation a constant bleed of 1.25% was maintained. Flowrates within the recovery wells varied from approximately 11 gpm to 19.7 gpm with an average recovery rate of 16.2 gpm per well. The total recovery rate was approximately 340.16 gpm. Injection well operational rates varied from 0.4 gpm to 27 gpm. Throughout the simulation a net bleed of 1.25% was maintained with a resulting injection rate of 335.9 gpm. For this simulation it was necessary to increase the grid resolution in order to more accurately simulate the injection and recovery wells within the wellfield.

Groundwater Vista's Telescopic Mesh Refinement (TMR) tool was used to increase the grid resolution within the modeled wellfield. The TMR tool allows the creation of a more refined model within a subregion of a larger scale model. Using the TMR tool a new model domain approximately 5,000 feet in the east-west direction by 5,335 feet in the north-south direction was delineated. The groundwater vistas TMR tool exported all the aquifer properties such as hydraulic conductivity, specific storage, and potentiometric surfaces for each layer within the selected area to a separate file. The TMR file was then imported into the new model with a smaller domain and tighter grid spacing (12.5 feet within the wellfield and 25 feet outside the wellfield). Using the exported heads from the regional model, the TMR tool automatically sets up new constant head boundary conditions around the new model domain. For this simulation the potentiometric surface used to establish the constant head boundary conditions was a post 2010 potentiometric surface assuming that the Merit industrial wells had been turned off for 2 years. Figure 4.12-1 depicts the refined model domain as well as the initial estimated potentiometric surface used for the flare evaluation presented herein.

Regional model simulations indicate that leakage through the confining shale near the representative wellfield is negligible. As such, to further simplify the refined model, the top four layers were deleted so that the only layers simulated in the flare analysis were the regional ore zone and the ore zone confining shale. Partial penetration pump testing performed by WWC engineering near the location of the representative wellfield indicates that the ore-bearing sandstones have a higher hydraulic conductivity than the rest of the aquifer as a whole. To simulate the higher hydraulic conductivity expected within the ore-bearing sandstone the regionally simulated ore zone was split into three layers. The result was a four layer model bounded on the bottom by an impermeable boundary. The bottom two layers (layers 3 and 4) were each 15 feet thick with the balance of the regionally simulated ore zone making up layer 2. Layer 1 represents the ore zone confining shale. No changes from the regionally calibrated hydraulic conductivity values were made for layers 1, 2, and 4. Within layer 3 the hydraulic conductivity within module 1-1 as well as immediately adjacent to module 1-1 was increased to 3 ft/day (the original hydraulic conductivities ranged from approximately 0.1 ft/day to 0.7 ft/day). This represents a system where sandstones with higher permeability are localized within a relatively small region surrounded by less permeable strata. ISR simulations were performed within layer 3.

To simulate flare an ISR simulation with both injection wells and recovery wells was modeled using MODFLOW. The ISR simulation started with a steady state pre-ISR potentiometric surface and then continued through 21 months of active ISR operations. MODPATH uses the heads and the velocities calculated during the MODFLOW simulation to track the movement of a hypothetical particle. Sixteen hypothetical particles were placed in each cell containing an injection well. The results of the particle tracking are illustrated on Figure 4.12-2. Figure 4.12-3 illustrates the modeled potentiometric surface after 21

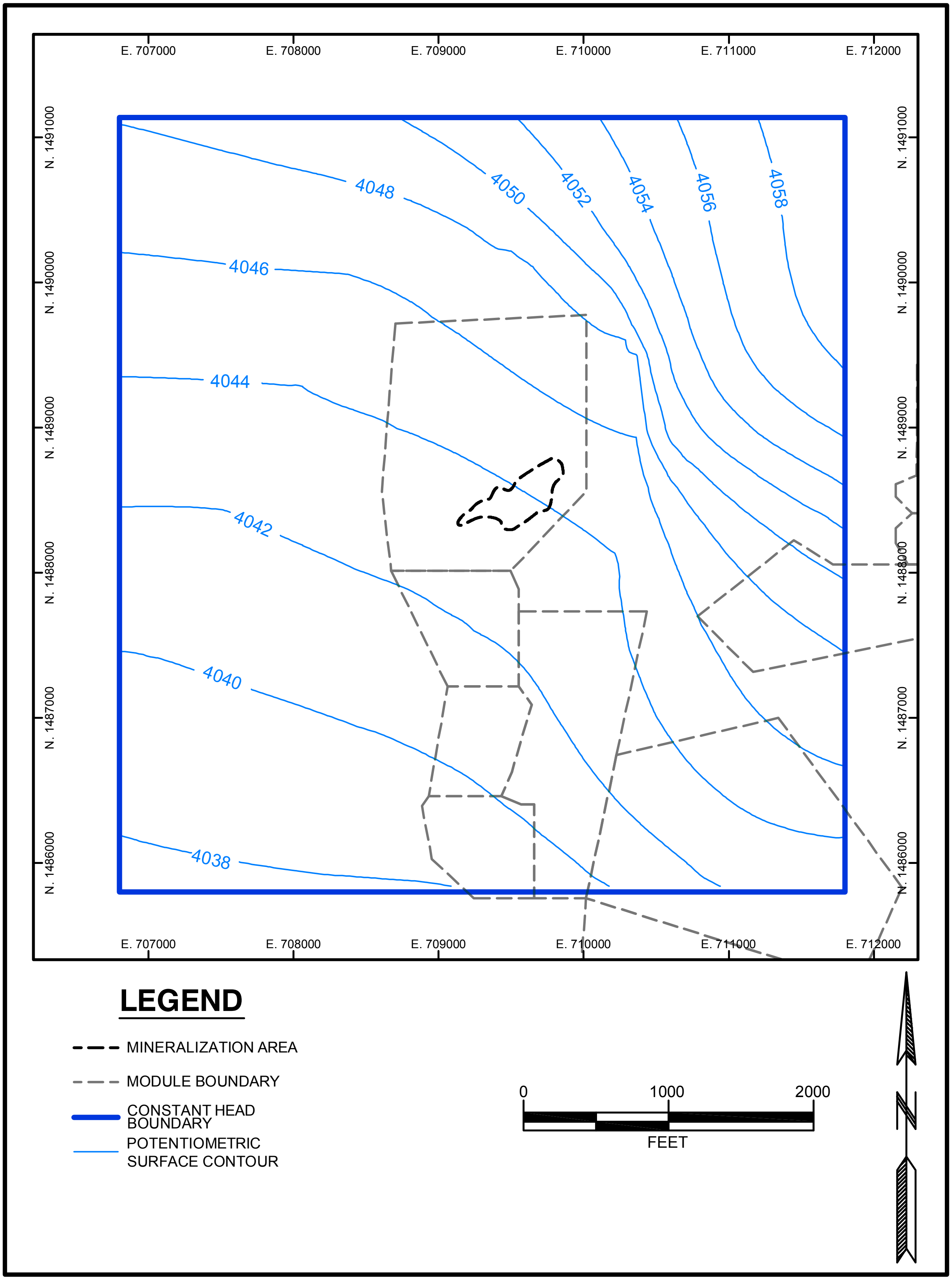


Figure 4.12-1. Refined Model Domain with Pre-ISR Potentiometric Surface

K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_GWM_FLARE_EVAL.dwg, GWM_FIGURE 4.12-1, 12/20/2010 11:56:11 AM

months of ISR operations. The ratio of the area calculated from the circumscribed particle traces to the wellfield area provides the horizontal wellfield flare factor. As illustrated on Figure 4.12-2, the calculated horizontal flare ratio was 1.32 for the current wellfield layout.

In general, the flare presented here is believed to be a conservative estimate of the horizontal flare. As shown in Figure 4.12-2 there are several locations where particle traces indicate well placement could be further optimized to minimize flare outside of the mineralized zone. Furthermore, at several locations the particle traces travel a significant distance from the injection wells and the resulting particle travel path is quite long. These particles with long travel paths move at a much slower rate which also minimizes the migration rate of ISR fluids. As such, even though the particle traces indicate a large flare, the outer portions of flare will contain low concentrations of ISR fluids.

During the flare modeling exercise the flare was found to be most sensitive to injection and recovery well flowrates, well placement, and wellfield shape. During the simulation, changes to well flow rates were found to significantly affect the flare. Well placement can also significantly affect not only the flare but the efficiency of the ISR operations. In general a more regular the well pattern, results in a more efficient wellfield, assuming the formation has relatively homogeneous hydraulic properties. As shown on Figure 4.12-2, wellfield shape also affects the flare. The large blocky portion of the wellfield has less relative flare than the relatively narrow portion of wellfield on the west.

Additional sensitivity simulations were also performed to assess the flare response to changes in hydraulic conductivity. When the hydraulic conductivity was reduced from 3 feet/day to 1 feet/day within module 1-1, the resulting change in the calculated flare was very minimal (less than 1%). When the flare evaluation was performed using the heterogeneous regional calibrated hydraulic conductivity values, the resulting change in the flare was minimal as

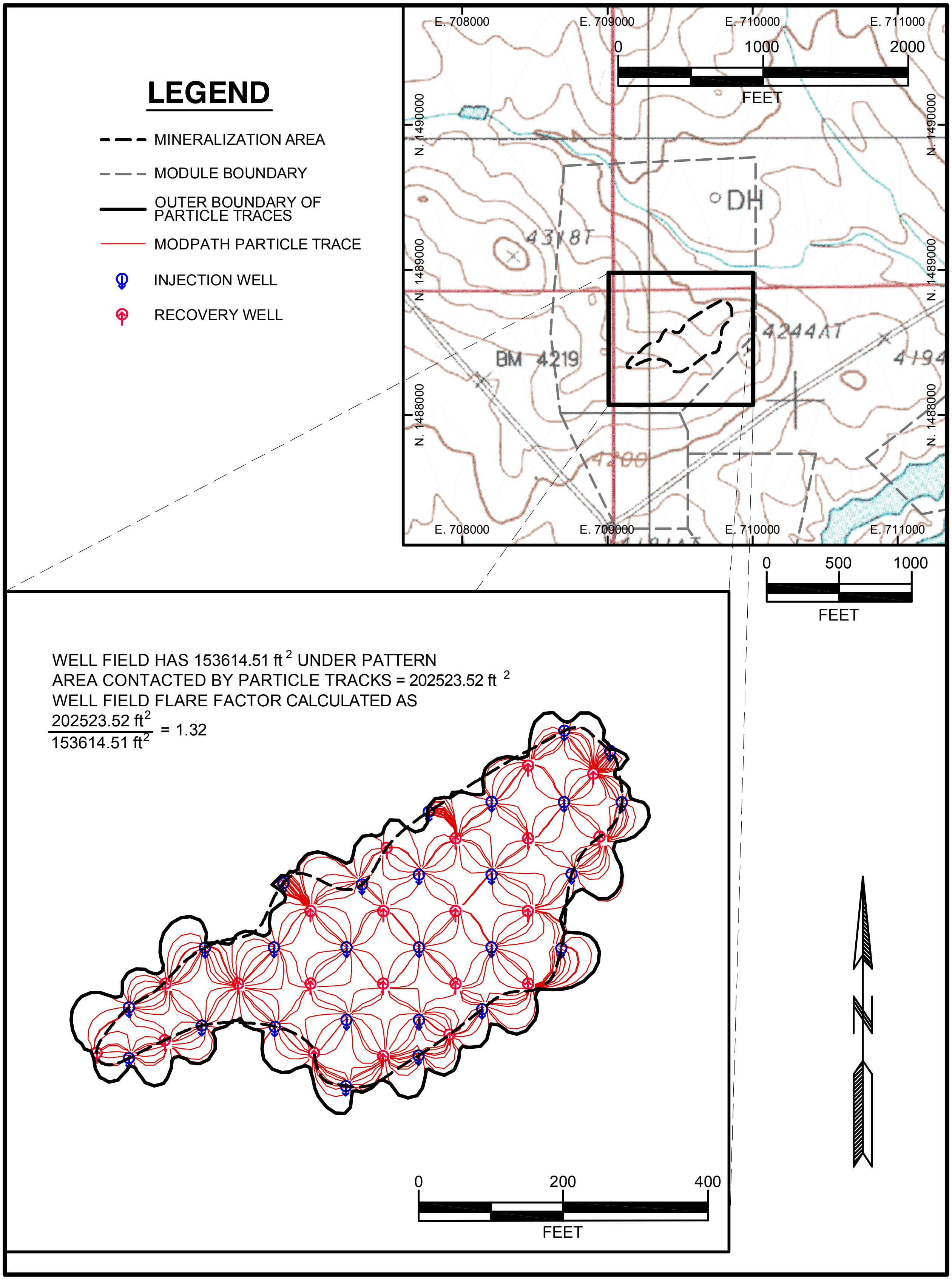


Figure 4.12-2. Wellfield Flare at 1.25% Bleed

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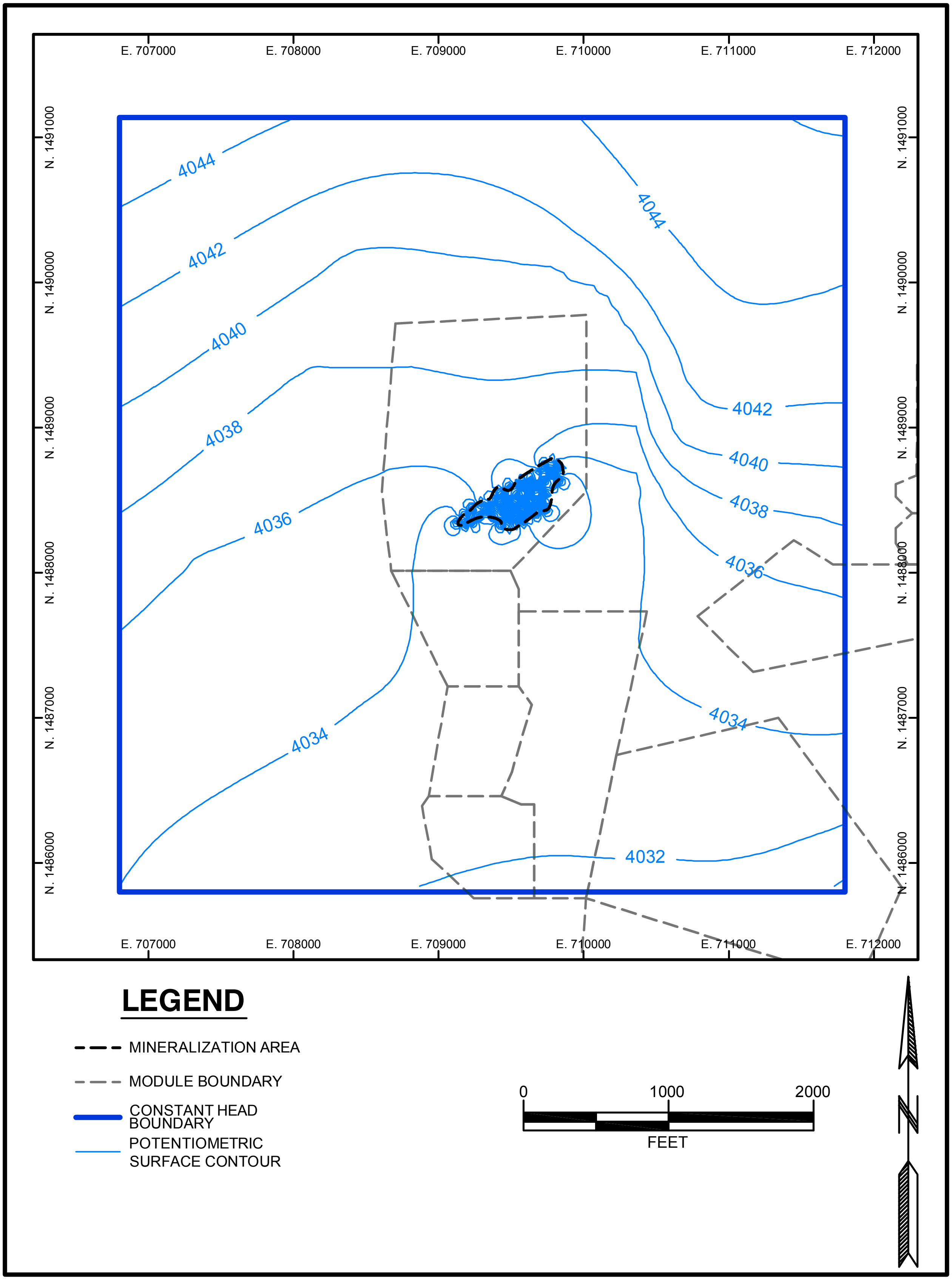

Figure 4.12-3. Potentiometric Surface After 21 Months of ISR Operations

K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_GWM_FLARE_EVAL.dwg, GWM_FIGURE 4.12-3, 12/20/2010 11:56:22 AM

well. During the latter simulation the most significant change was in the well balance where it was noted that due to the heterogeneous hydraulic conductivity values adjustments to the wellfield balance were needed to minimize flare and optimize ISR.

4.13 Summary and Conclusions

The Ross Groundwater Model was constructed primarily to predict the groundwater impacts of ISR uranium recovery within Strata's proposed Ross area and to provide operational feedback. Construction of the model is in keeping with Section 5.2.3 of Strata's Pre-Operational Baseline Monitoring Plan which has been approved by NRC and WDEQ/LQD. The data used to construct the groundwater model was compiled from monitor wells, exploration drilling, and core holes developed by Strata within the last 2 years; monitor wells, exploration drilling, and core holes developed in support of the Nubeth ISR pilot project in the late 1970's; well data available from both the WOGCC and SEO; USGS geological mapping; NRCS soils mapping; and a number of published papers.

The groundwater model includes three separate phases; calibration to steady state, verification to current conditions, transient, and uranium recovery simulation. The steady state simulation represents pre-1980 conditions. The transient verification portion of the groundwater model simulates drawdowns that have occurred in the ore zone from 1980 to 2010, mostly due to wells used to obtain water. Between 1980 and 2010 several oilfield water supply wells have been in operation and have significantly lowered the potentiometric surface within the OZ aquifer. The transient model matched the changes in the pre-1980 aquifer levels to the 2010 aquifer levels based on estimated oilfield water supply well discharge rates reported by the WOGCC. Based on the calibrated and verified model an ISR simulation was performed to predict the drawdowns from the proposed Ross ISR Project.

There are several existing wells within the project area that may be impacted by proposed ISR. The results of the model indicate that the most impacted wells will be the oilfield water supply wells located within the Ross Project area. If these wells continue operating during ISR, water levels within these wells could decrease below the level of the pumps. Modeling indicates that existing stock and domestic wells within the region will see only minor drawdowns as a result of ISR operations. The Ross ISR Project is expected to decrease the heads within the OZ aquifer which in turn may increase the amount of water infiltrated to the OZ aquifer where it outcrops beneath the Little Missouri River and Good Lad Creek alluvium. The effects would be minor, as the modeled increase in infiltrated water at the outcrops was less than 2 gpm.

The model was also used to evaluate monitor well offset distances as well as to evaluate the ability of the proposed wellfield to recover any potential excursions in the ore zone aquifer. During the excursion analysis the model demonstrated that monitor wells could be effectively placed up to 600 feet from the wellfield and a potential excursion could be recovered back to the monitor well in less than 30 days. The model also demonstrates that a monitoring system that continuously monitors water levels within the monitor wells could be effectively used to detect excursions.

Based on experience gained during ISR and excursion simulations, the model also expected to be a useful tool for final wellfield planning and operations. The model can be used to help balance the wellfields and it can be used to help plan progression from module to module. As a byproduct of the wellfield balancing performed with the model, the bleed rate will be optimized for each ISR module. Conditions encountered in the field during operation may require site specific adjustments. However, use of the model will provide a good starting point to commence operations.

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APPENDIX A

Estimated Flow Rates for Oilfield Supply Wells within the Ross GW Model Domain

Estimated Flow Rates for Oil Field Supply Wells Within the Ross Project Area

Year	Modflow Stress Period	Flow rate[1] (gpm)						
		WSW#1 West Kiehl Unit	ENL Kiehl Well #1	KIEHL WATER WELL #2	22X-19	19XX STATE	789V STATE	SOPHIA #1A
All	1	Steady state stress period no flow for wells						
1980*	2	0.0	0.0	0.0	19.8	11.0	11.0	0.0
1980	3	0.0	0.0	0.0	11.1	6.2	6.2	0.0
1981	4	0.0	0.0	0.0	9.2	5.1	5.1	0.0
1981	5	0.0	0.0	0.0	5.5	3.1	3.1	0.0
1982	6	0.0	0.0	0.0	8.8	4.9	4.9	0.0
1982	7	0.0	0.0	0.0	6.4	3.6	3.6	0.0
1983	8	0.0	0.0	0.0	8.6	4.8	4.8	0.0
1983	9	0.0	0.0	0.0	7.2	4.0	4.0	0.0
1984	10	0.0	0.0	0.0	8.3	4.6	4.6	0.0
1984	11	0.0	0.0	0.0	12.2	6.8	6.8	0.0
1985	12	0.0	0.0	0.0	16.7	9.3	9.3	0.0
1985	13	0.0	7.6	7.6	19.3	10.7	10.7	0.0
1986	14	0.0	8.8	8.8	18.3	10.2	10.2	0.0
1986	15	0.0	13.7	13.7	18.7	10.4	10.4	0.0
1987	16	0.0	16.1	16.1	18.1	10.1	10.1	0.0
1987	17	10.3	15.8	15.8	18.7	10.4	10.4	0.0
1988	18	16.6	13.2	13.2	19.0	10.5	10.5	0.0
1988	19	16.2	15.5	15.5	16.1	8.9	8.9	0.0
1989	20	15.3	14.5	14.5	15.8	8.8	8.8	0.0
1989	21	13.7	13.7	13.7	15.5	8.6	8.6	0.0
1990	22	15.5	14.3	14.3	19.5	10.8	10.8	0.0
1990	23	12.0	13.7	13.7	19.3	10.7	10.7	0.0
1991	24	11.5	12.1	12.1	16.1	9.0	9.0	0.0
1991	25	9.9	12.8	12.8	18.9	10.5	10.5	0.0
1992	26	9.7	16.6	16.6	19.1	10.6	10.6	0.0
1992	27	9.5	18.6	18.6	18.6	10.4	10.4	0.0
1993	28	9.1	15.6	15.6	19.4	10.8	10.8	0.0
1993	29	5.4	14.2	14.2	19.4	10.8	10.8	0.0
1994	30	9.5	13.7	13.7	18.4	10.2	10.2	0.0
1994	31	3.4	14.2	14.2	19.1	10.6	10.6	0.0
1995	32	5.6	13.9	13.9	17.6	9.8	9.8	0.0
1995	33	1.8	14.0	14.0	19.6	10.9	10.9	0.0
1996	34	6.9	12.7	12.7	21.4	11.9	11.9	12.5
1996	35	7.6	9.0	9.0	20.2	11.2	11.2	20.6
1997	36	8.1	9.4	9.4	19.7	10.9	10.9	20.5
1997	37	9.1	9.4	9.4	20.0	11.1	11.1	21.4
1998	38	4.7	7.7	7.7	19.6	10.9	10.9	12.4
1998	39	4.0	9.2	9.2	19.6	10.9	10.9	5.1
1999	40	0.0	7.3	7.3	19.6	10.9	10.9	0.0

Estimated Flow Rates for Oil Field Supply Wells Within the Ross Project Area

Year	Modflow Stress Period	Flow rate[1] (gpm)						
		WSW#1 West Kiehl Unit	ENL Kiehl Well #1	KIEHL WATER WELL #2	22X-19	19XX STATE	789V STATE	SOPHIA #1A
1999	41	0.0	6.2	6.2	20.7	11.5	11.5	0.0
2000	42	0.0	5.7	5.7	19.3	10.7	10.7	16.7
2000	43	0.0	5.6	5.6	20.5	11.4	11.4	17.0
2001	44	0.0	5.5	5.5	21.2	11.8	11.8	16.5
2001	45	0.0	4.3	4.3	20.9	11.6	11.6	16.4
2002	46	0.0	5.5	5.5	19.9	11.0	11.0	20.1
2002	47	0.0	4.6	4.6	19.6	10.9	10.9	26.1
2003	48	0.0	5.5	5.5	19.4	10.8	10.8	24.2
2003	49	0.0	7.1	7.1	19.1	10.6	10.6	24.4
2004	50	0.0	6.9	6.9	17.6	9.8	9.8	24.4
2004	51	0.0	1.9	1.9	18.0	10.0	10.0	23.3
2005	52	0.0	8.2	8.2	19.3	10.7	10.7	24.9
2005	53	0.0	7.8	7.8	19.8	11.0	11.0	22.1
2006	54	0.0	6.5	6.5	21.7	12.0	12.0	24.2
2006	55	0.0	5.0	5.0	21.8	12.1	12.1	20.9
2007	56	0.0	4.8	4.8	19.5	10.8	10.8	10.8
2007	57	0.0	2.3	2.3	19.3	10.7	10.7	6.9
2008	58	0.0	4.9	4.9	19.4	10.8	10.8	15.5
2008	59	0.0	5.3	5.3	17.1	9.5	9.5	13.2
2009	60	0.0	2.2	2.2	19.9	11.1	11.1	4.4
2009	61	0.0	1.2	1.2	19.4	10.8	10.8	10.0

[1]Flowrates based on WOGCC database http://wogcc.state.wy.us/

*Production for last 5 months of 1979 added to 1980 flowrate.

Domestic Wells: Monthly discharge rates are not available for domestic wells . Estimated flow rates for domestic wells are estimated based on typical household water use and are assumed to be constant within the groundwater model.

APPENDIX B

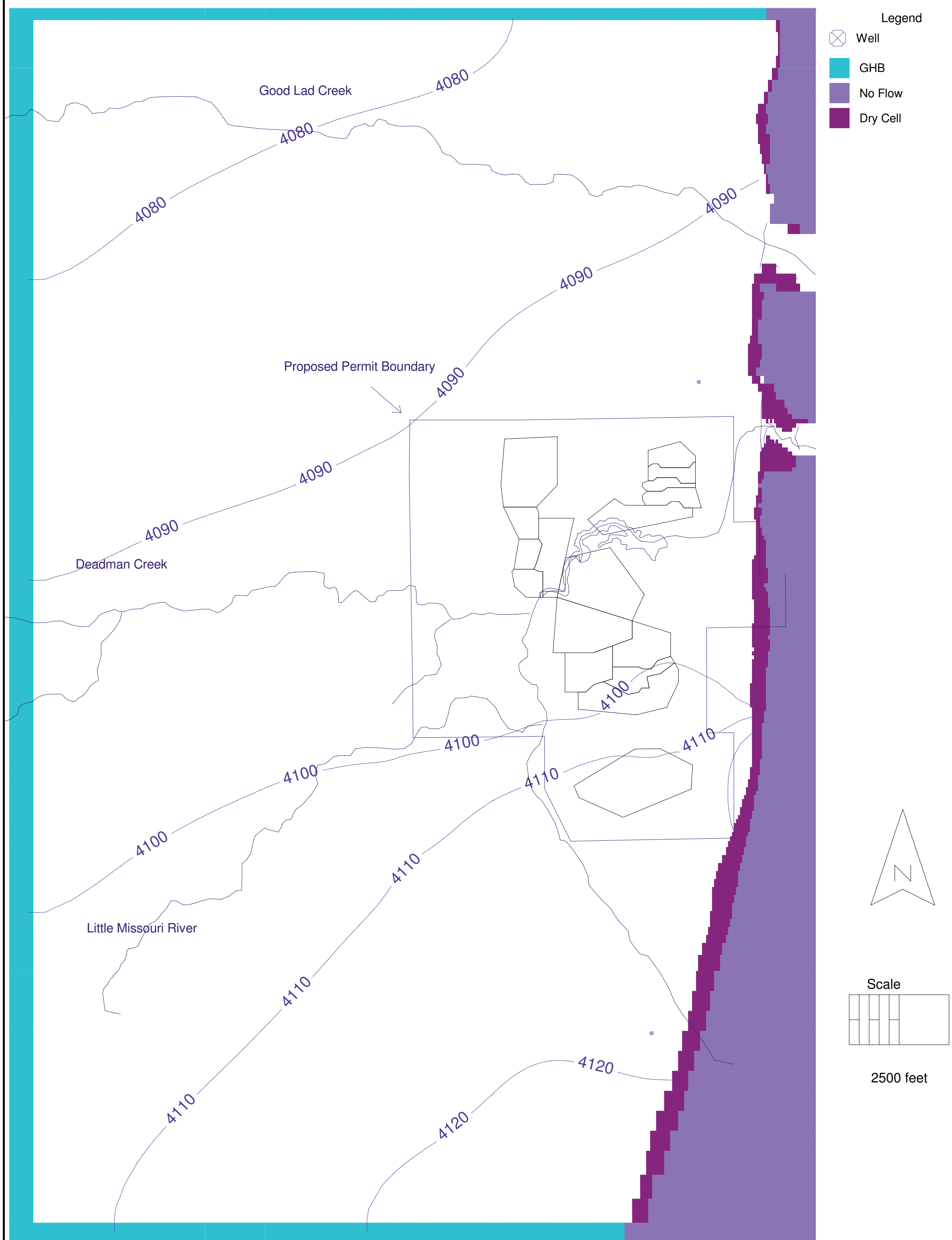
Predicted Drawdowns for Scenario 1, Merit Oil Wells
Shut Off 2 Years Prior to Ross ISR Operations

Strata Energy-Ross Project

GW-Model ISR Simulation Layer 4 (SM) Stress Period 1 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Potentiometric Surface Prior to ISR (Merit Wells Turned Off For 2 years)

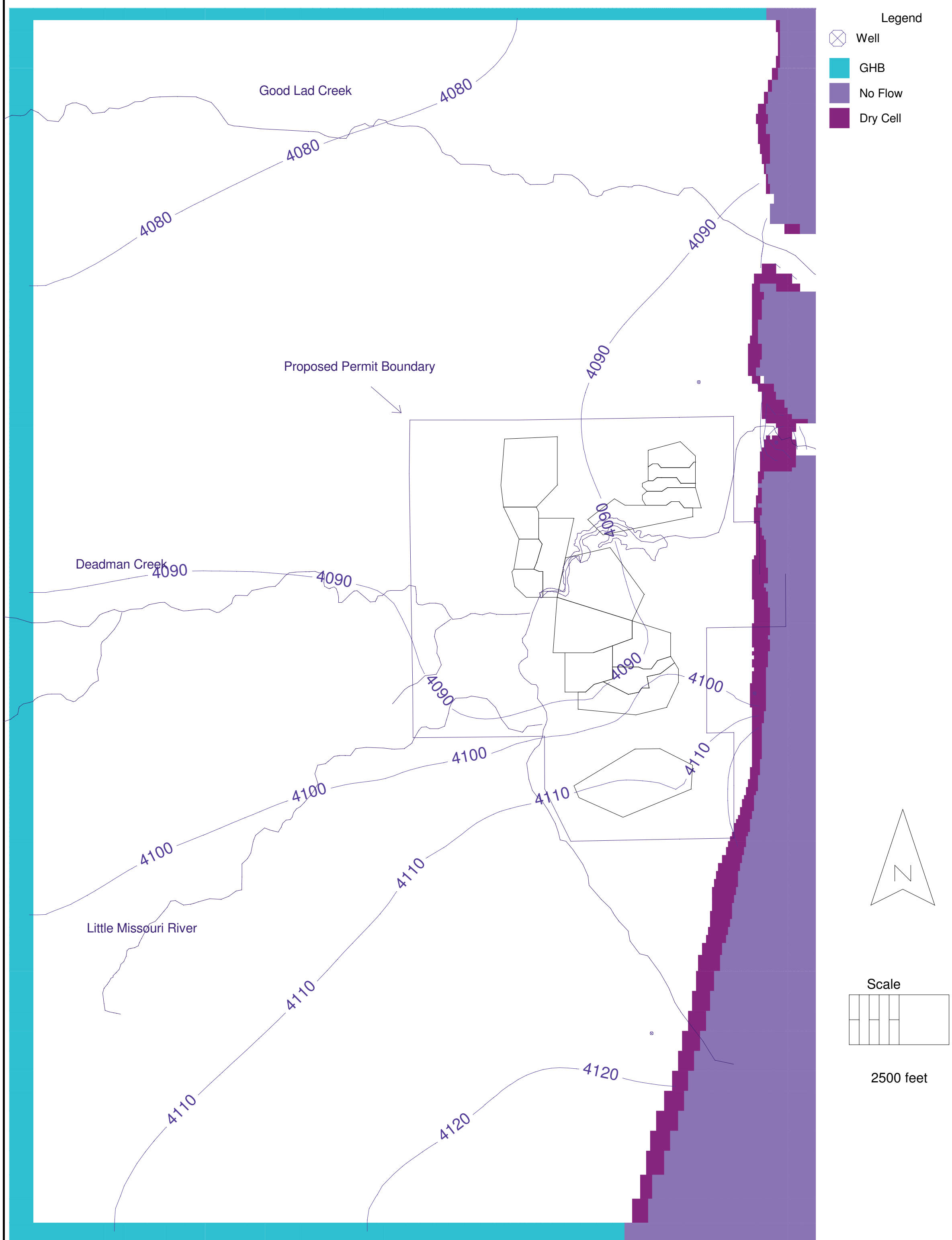


Strata Energy-Ross Project

GW-Model ISR Simulation Layer 4 (SM) Stress Period 25 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Potentiometric Surface At The End Of ISR Operations

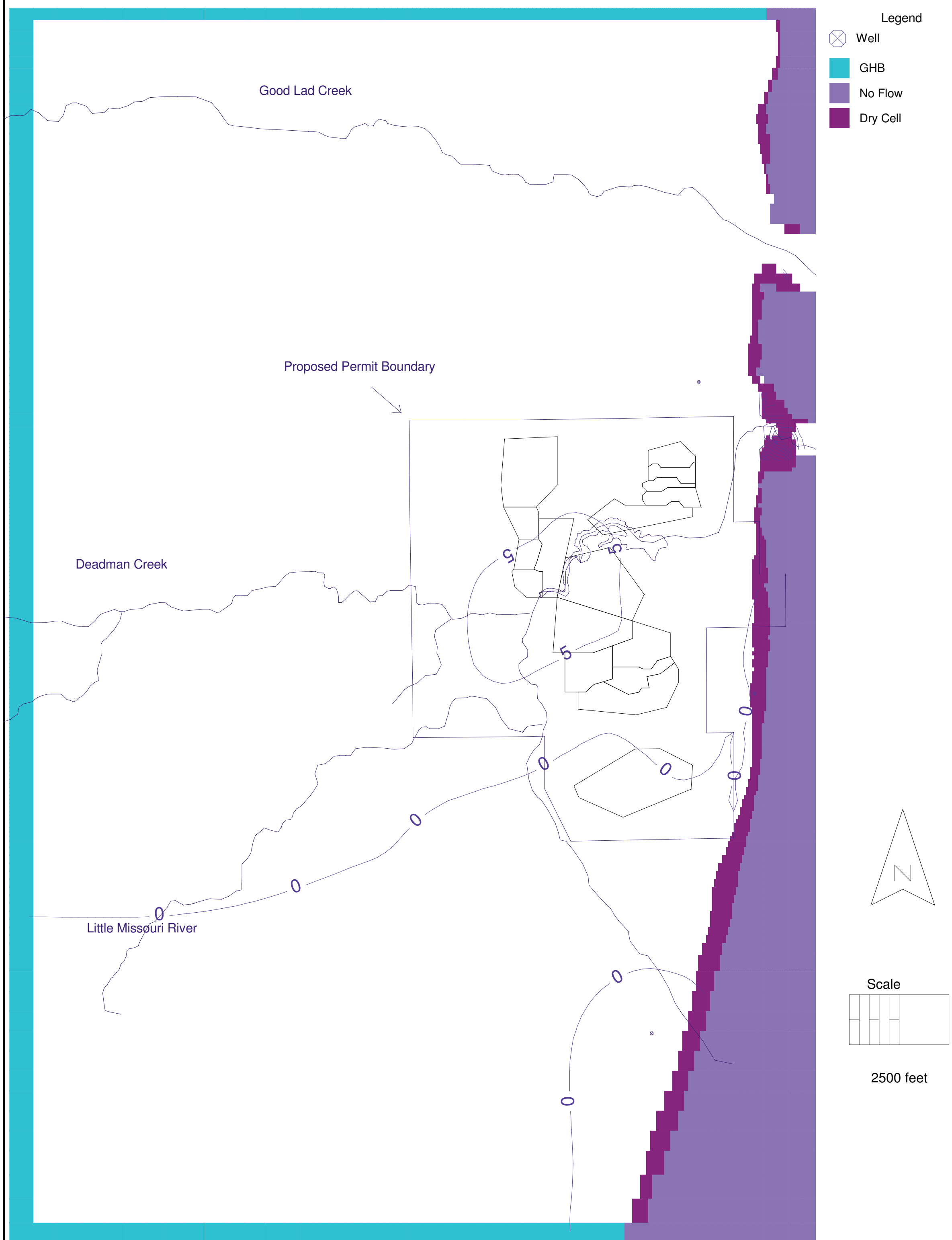


Strata Energy-Ross Project

GW-Model ISR Simulation Layer 4 (SM) Stress Period 25 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Modeled Drawdown At The End Of ISR Operations

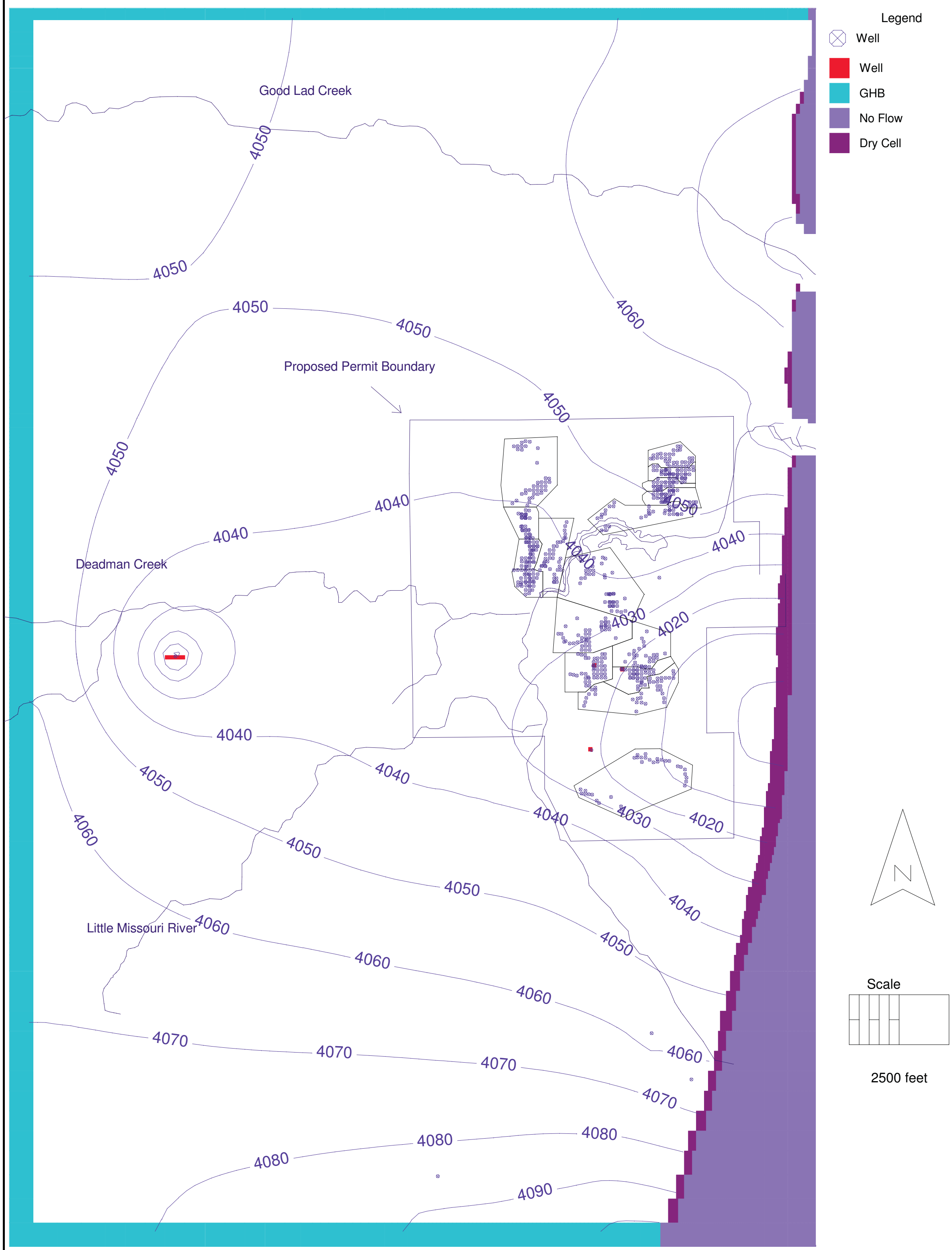


Strata Energy-Ross Project

GW-Model ISR Simulation Layer 6 (OZ) Stress Period 1 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Potentiometric Surface Prior to ISR (Merit Wells Turned Off For 2 years)

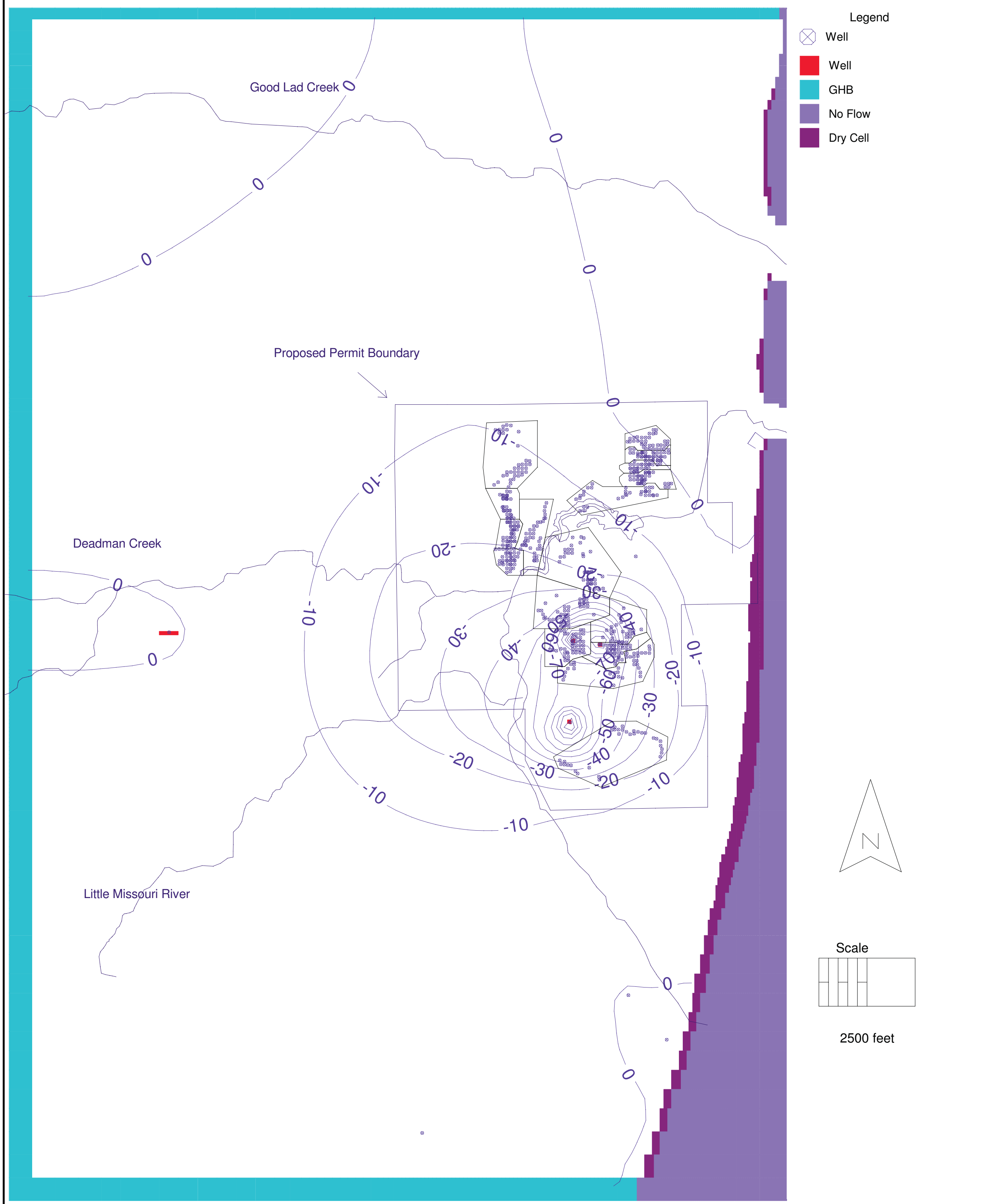


Strata Energy-Ross Project

GW-Model ISR Simulation Layer 6 (OZ) Stress Period 1 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Modeled Recovery Prior To ISR Operations (Merit Wells Turned Off For 2 Years)

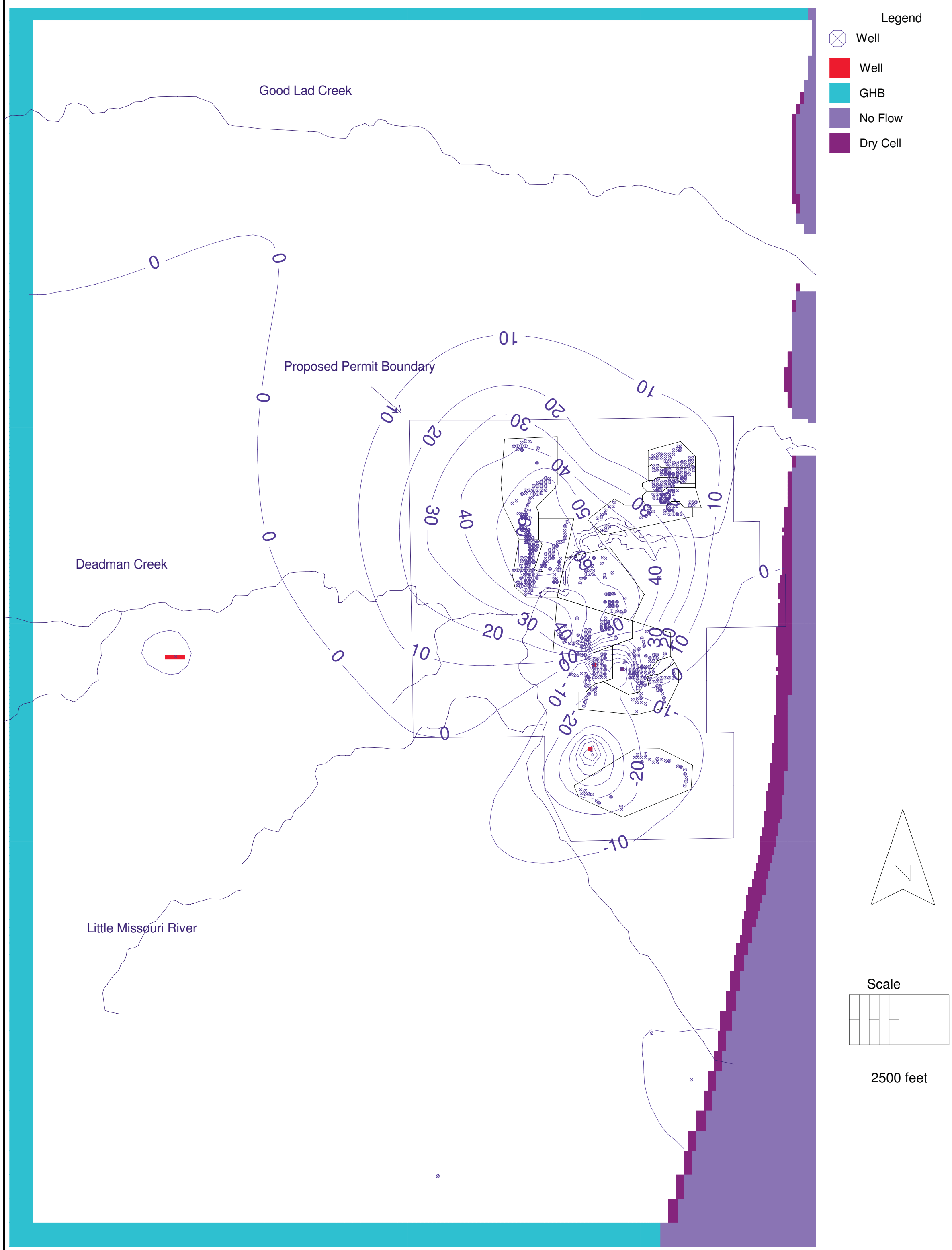


Strata Energy-Ross Project

GW-Model ISR Simulation Layer 6 (OZ) Stress Period 8 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Modeled Drawdown 1.75 Years After Beginning Of ISR Operations

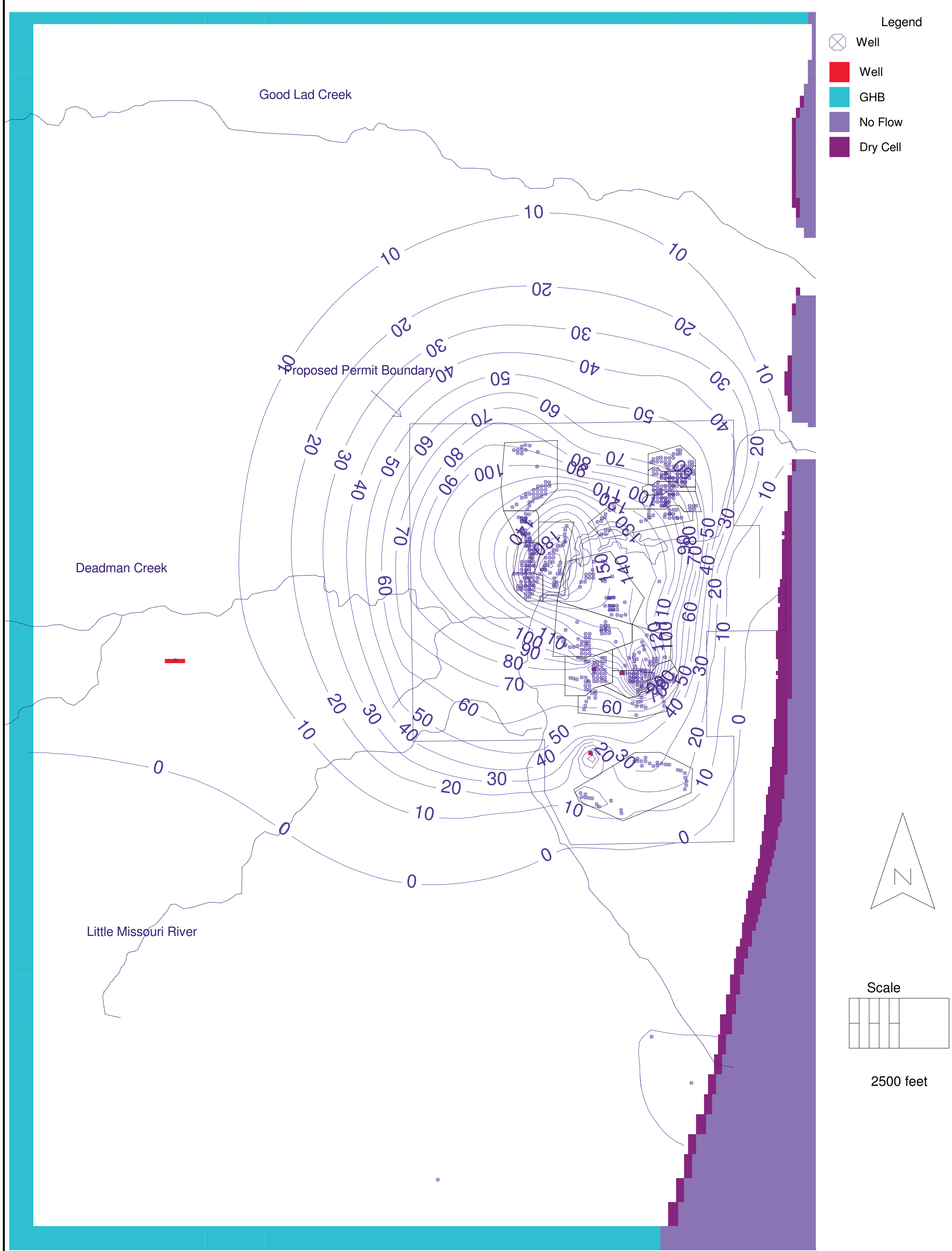


Strata Energy-Ross Project

GW-Model ISR Simulation Layer 6 (OZ) Stress Period 15 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Modeled Drawdown 3.5 Years After Beginning Of ISR Operations

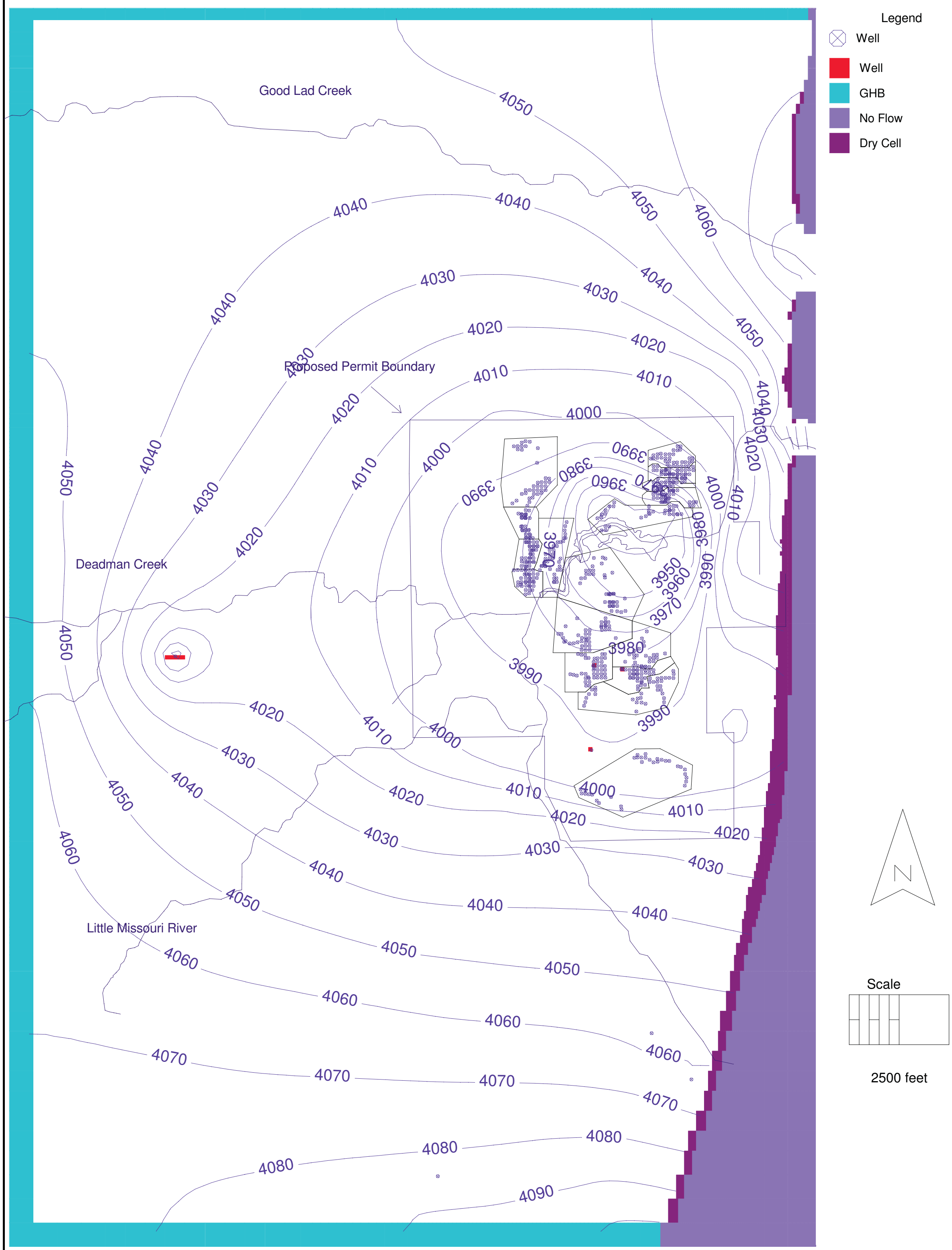


Strata Energy-Ross Project

GW-Model ISR Simulation Layer 6 (OZ) Stress Period 25 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Potentiometric Surface At The End Of ISR Operations

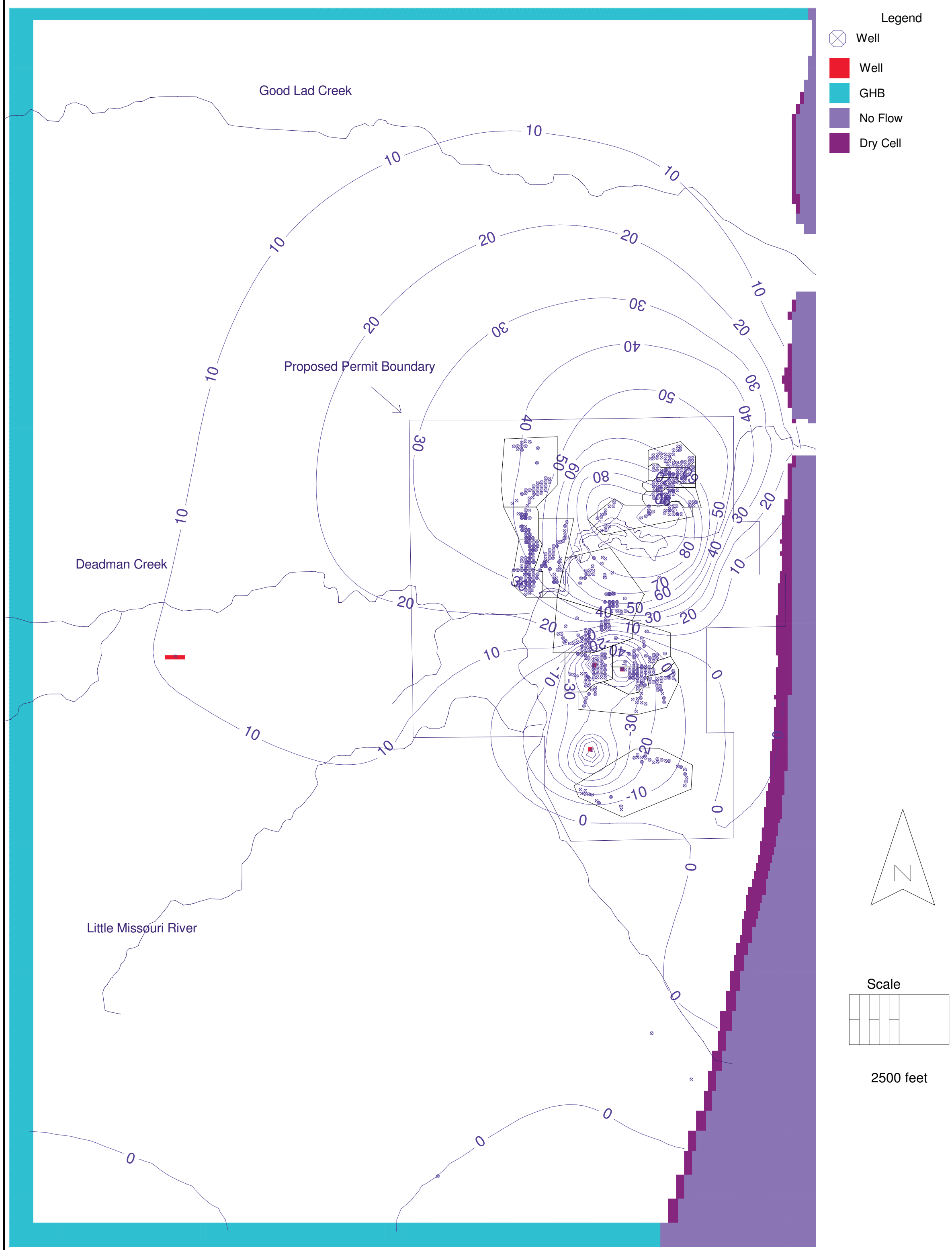


Strata Energy-Ross Project

GW-Model ISR Simulation Layer 6 (OZ) Stress Period 25 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Modeled Drawdown At The End Of ISR Operations

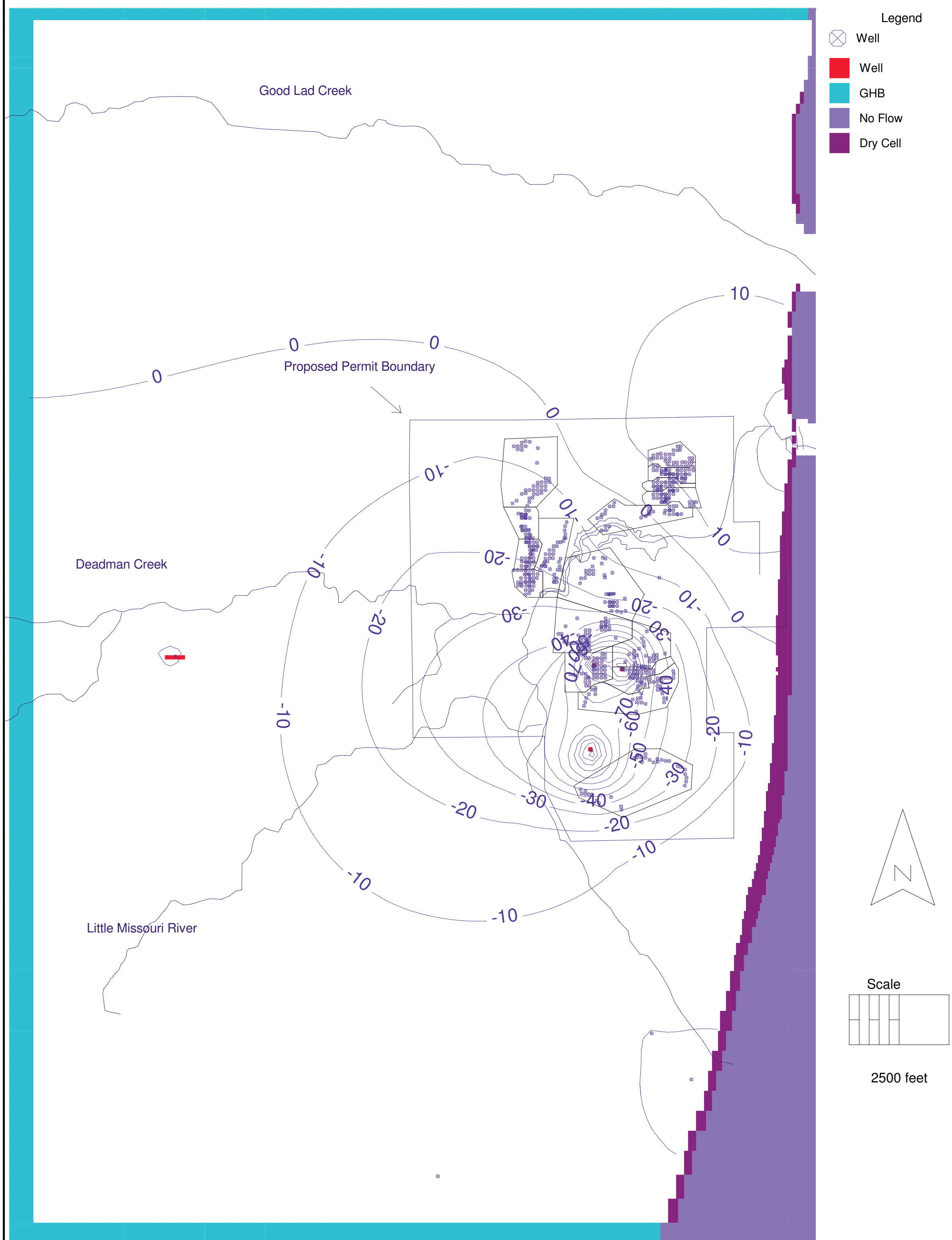


Strata Energy-Ross Project

GW-Model ISR Simulation Layer 6 (OZ) Stress Period 26 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Modeled Drawdown 5 Years After End Of ISR Operations

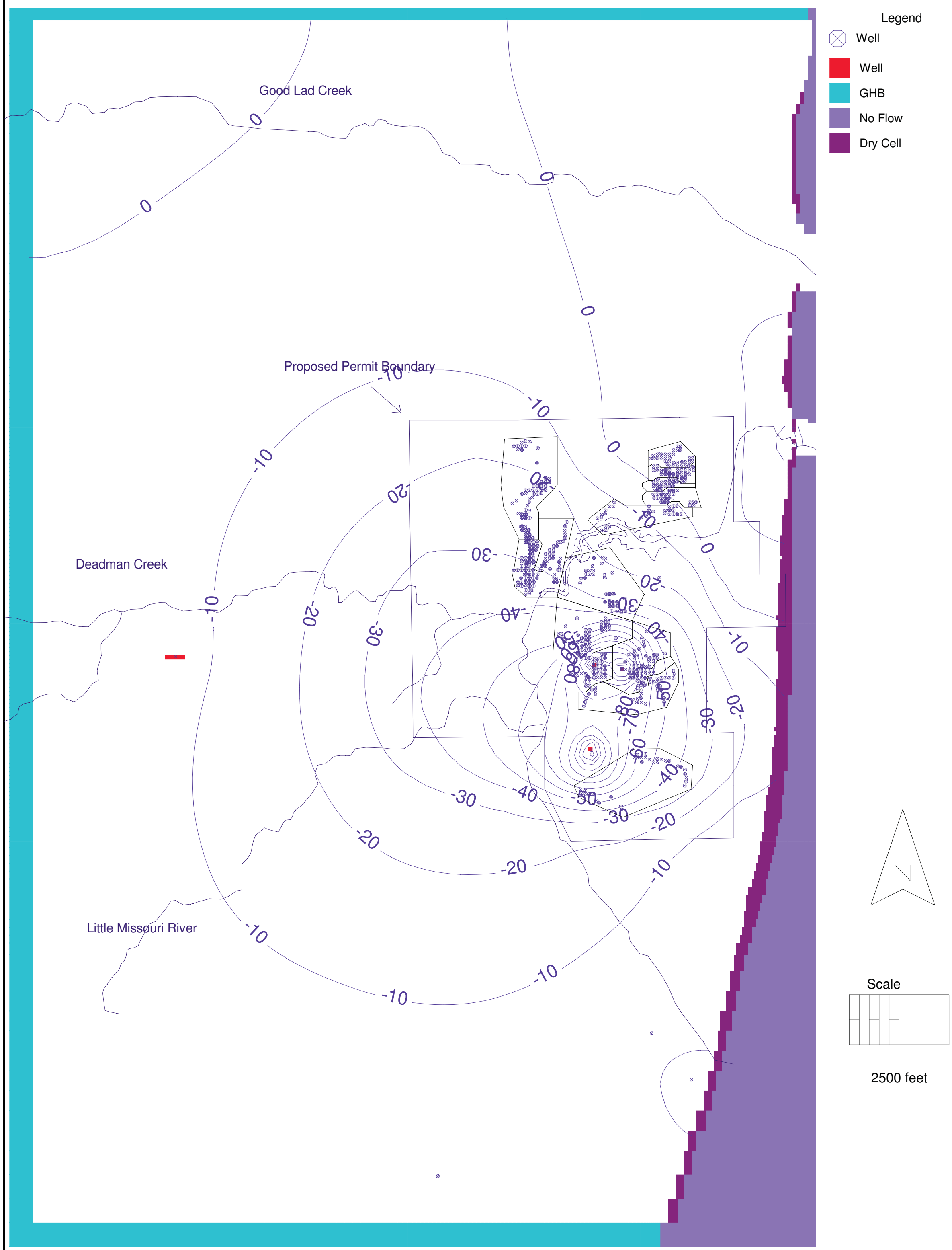


Strata Energy-Ross Project

GW-Model ISR Simulation Layer 6 (OZ) Stress Period 27 Time Step 5

Merit Oil Field Water Supply Wells Not Operating

Modeled Drawdown 10 Years After End Of ISR Operations



APPENDIX C

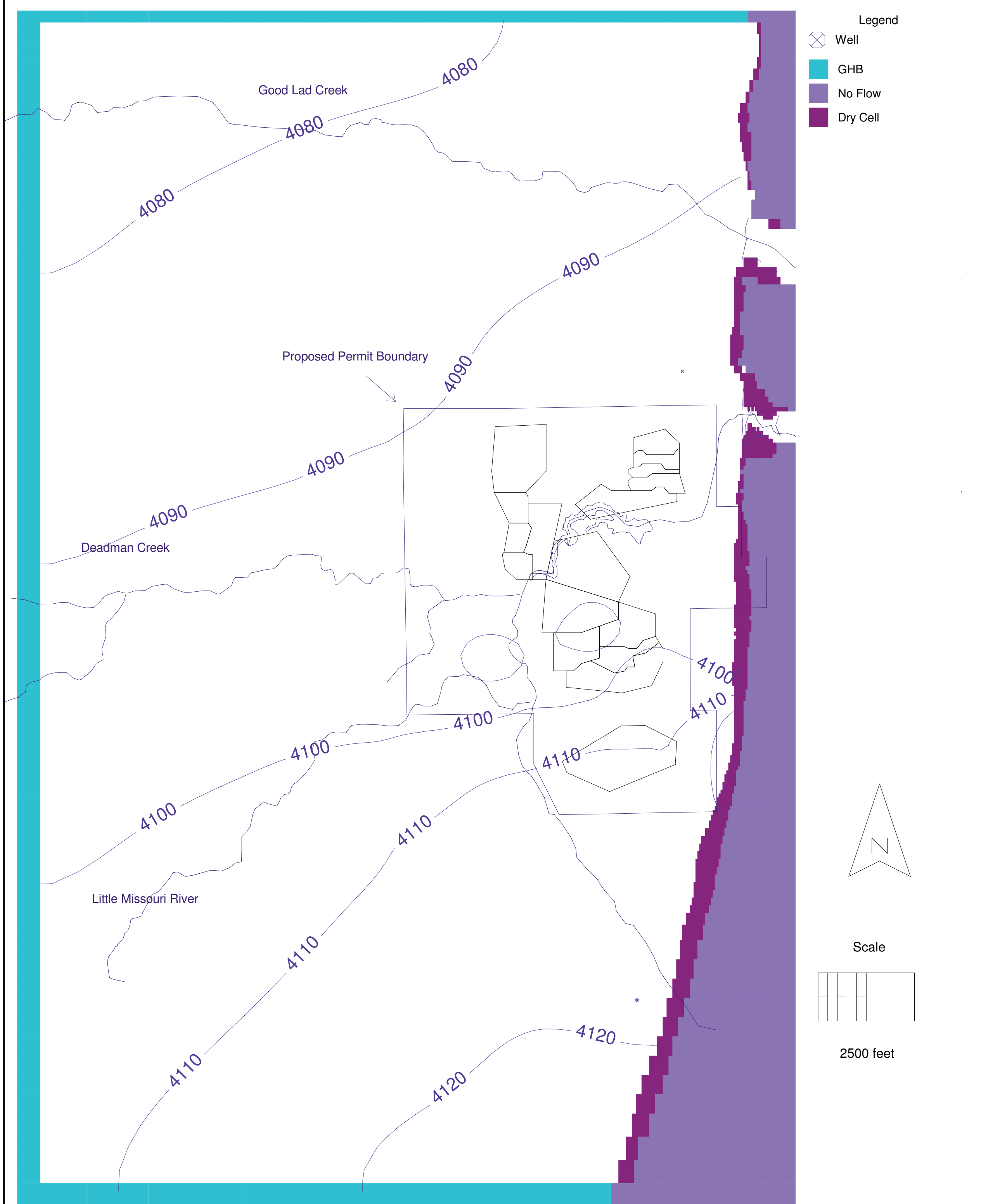
Predicted Drawdowns for Scenario 2, Merit Oil Wells
Operating During ISR Operations

Strata Energy-Ross Project

GW-Model Mine Simulation Layer 4 (SM) Stress Period 1 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Potentiometric Surface Prior to ISR

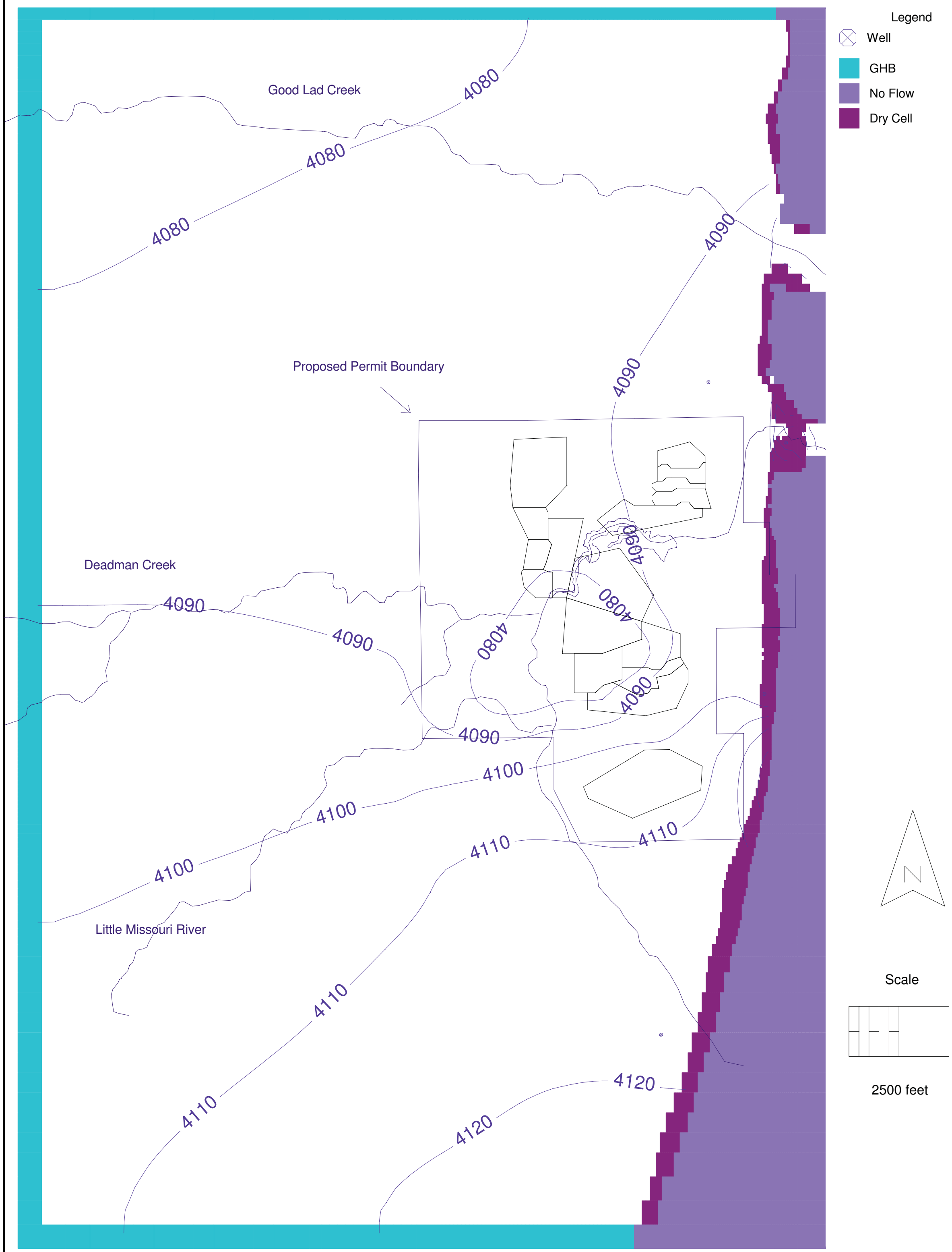


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 4 (SM) Stress Period 25 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Potentiometric Surface At The End Of ISR Operations

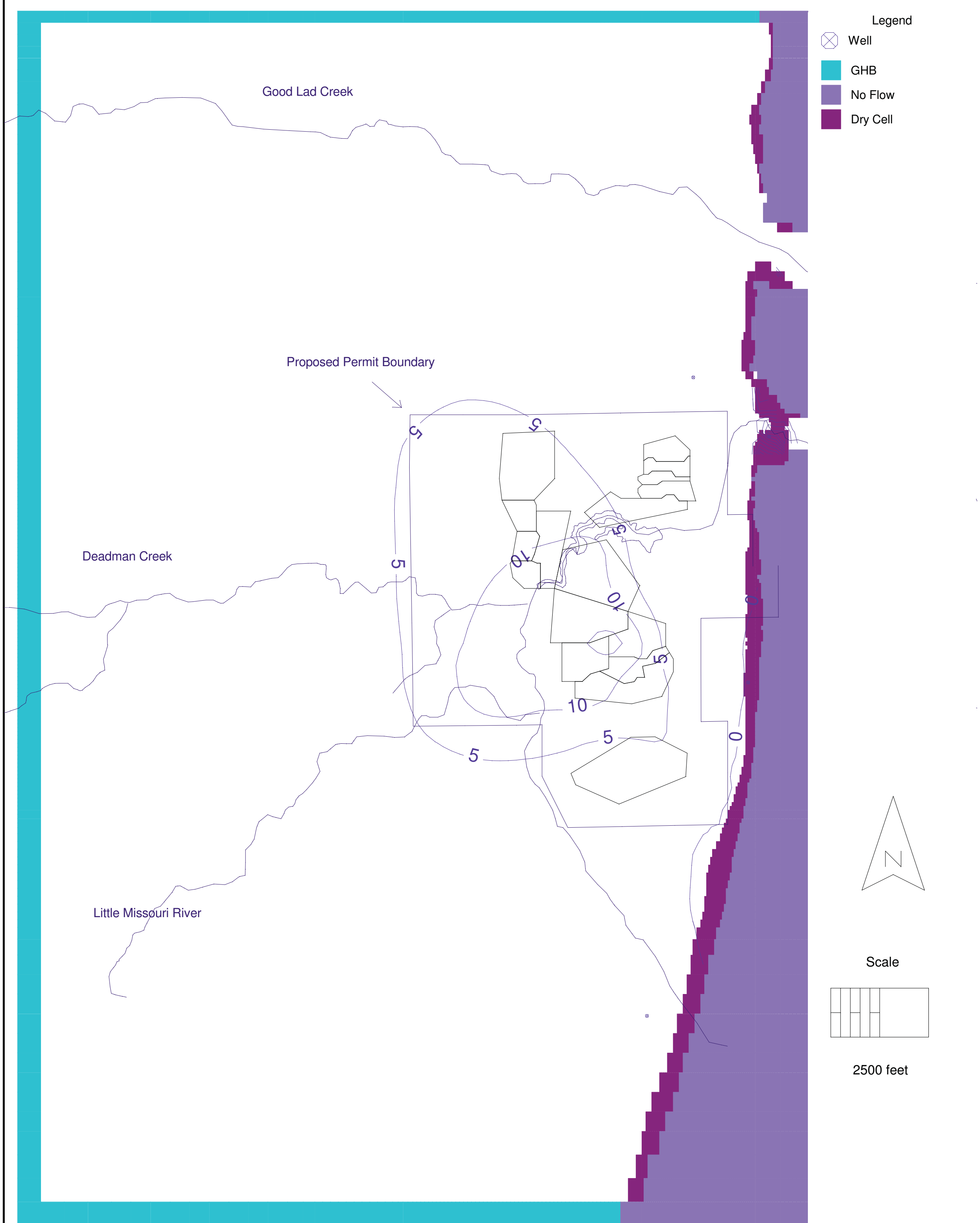


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 4 (SM) Stress Period 25 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Drawdown At The End Of ISR Operations

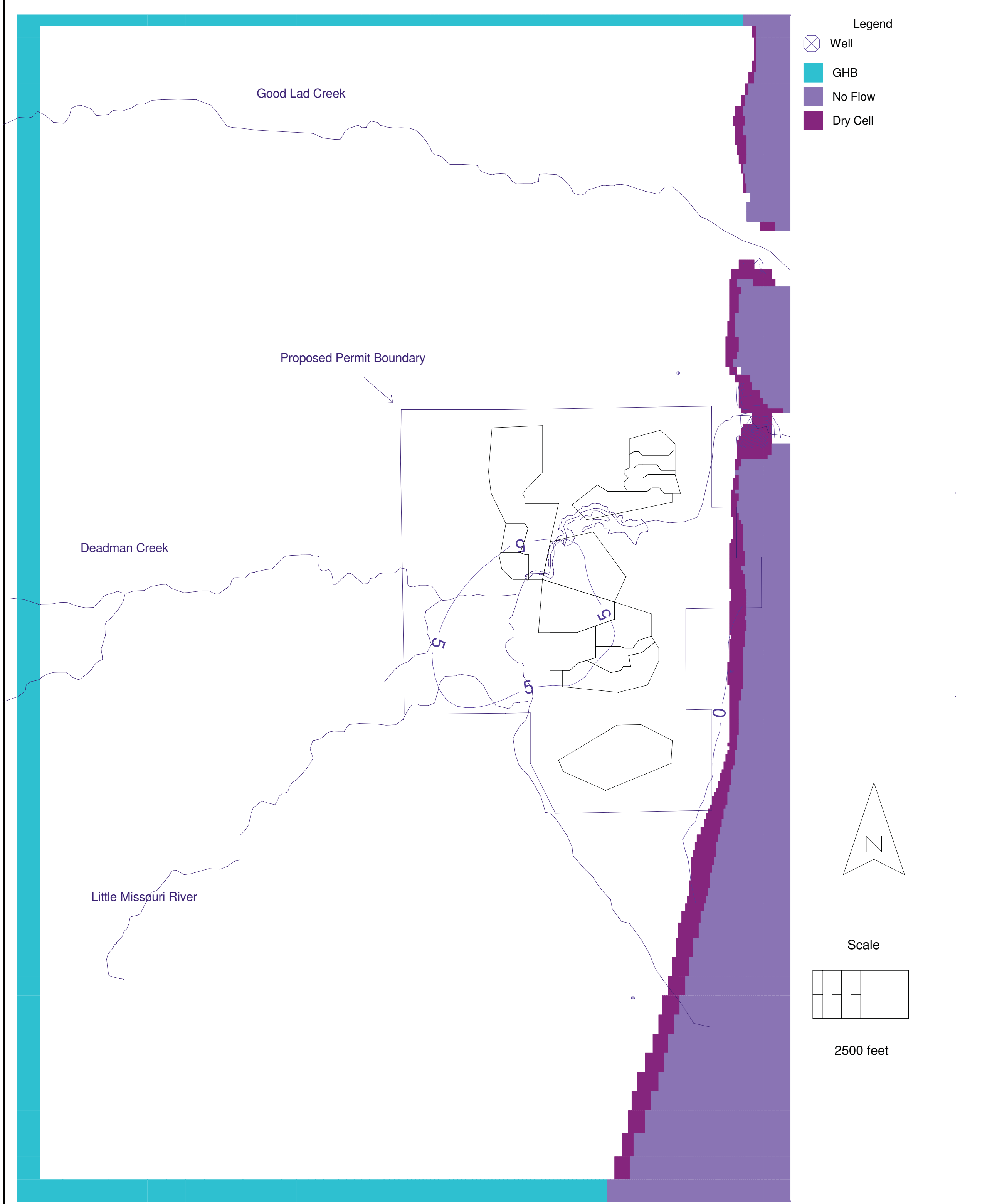


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 4 (SM) Stress Period 26 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Drawdown 5 Years After The End Of ISR Operations

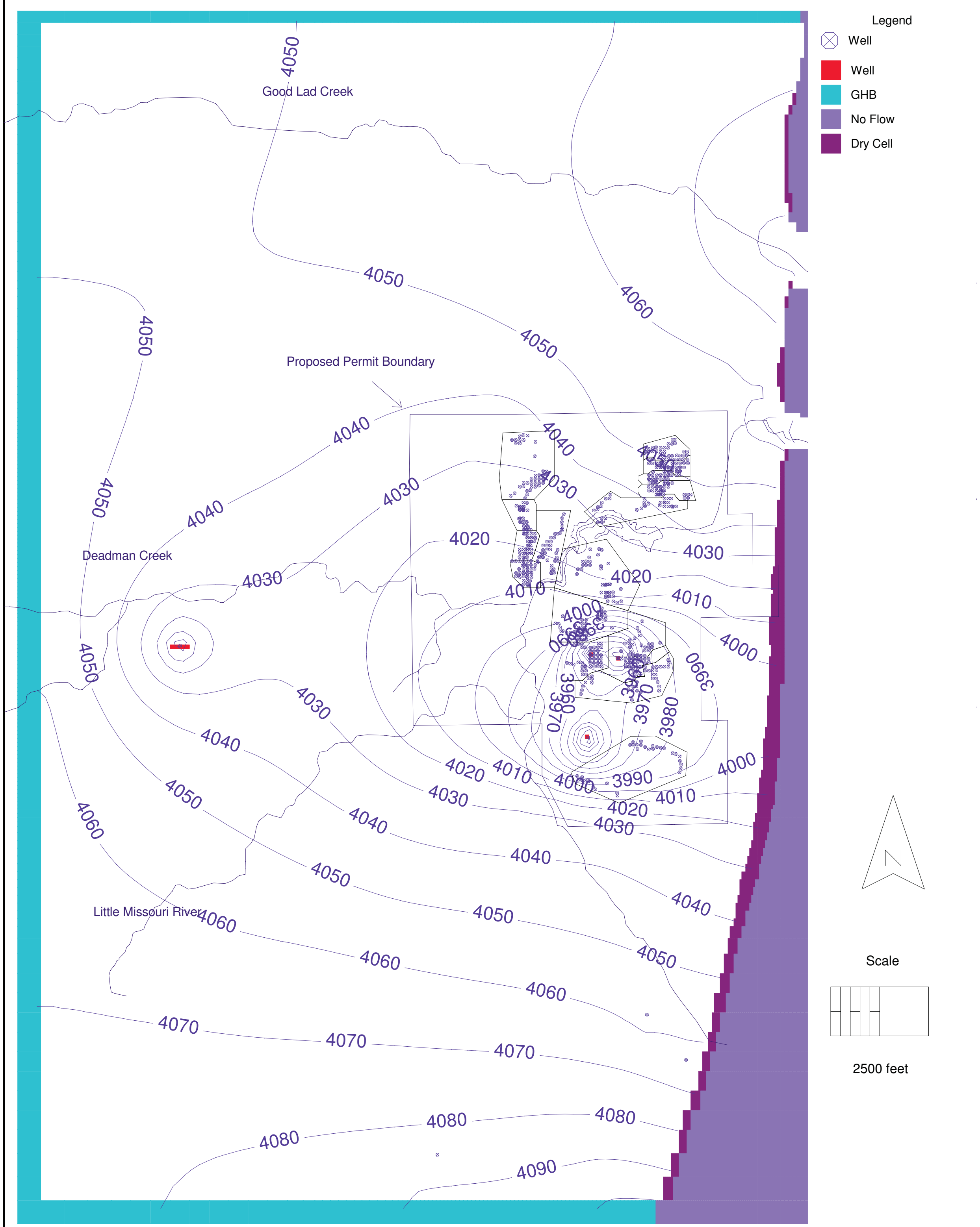


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 6 (OZ) Stress Period 1 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Potentiometric Surface Prior to ISR

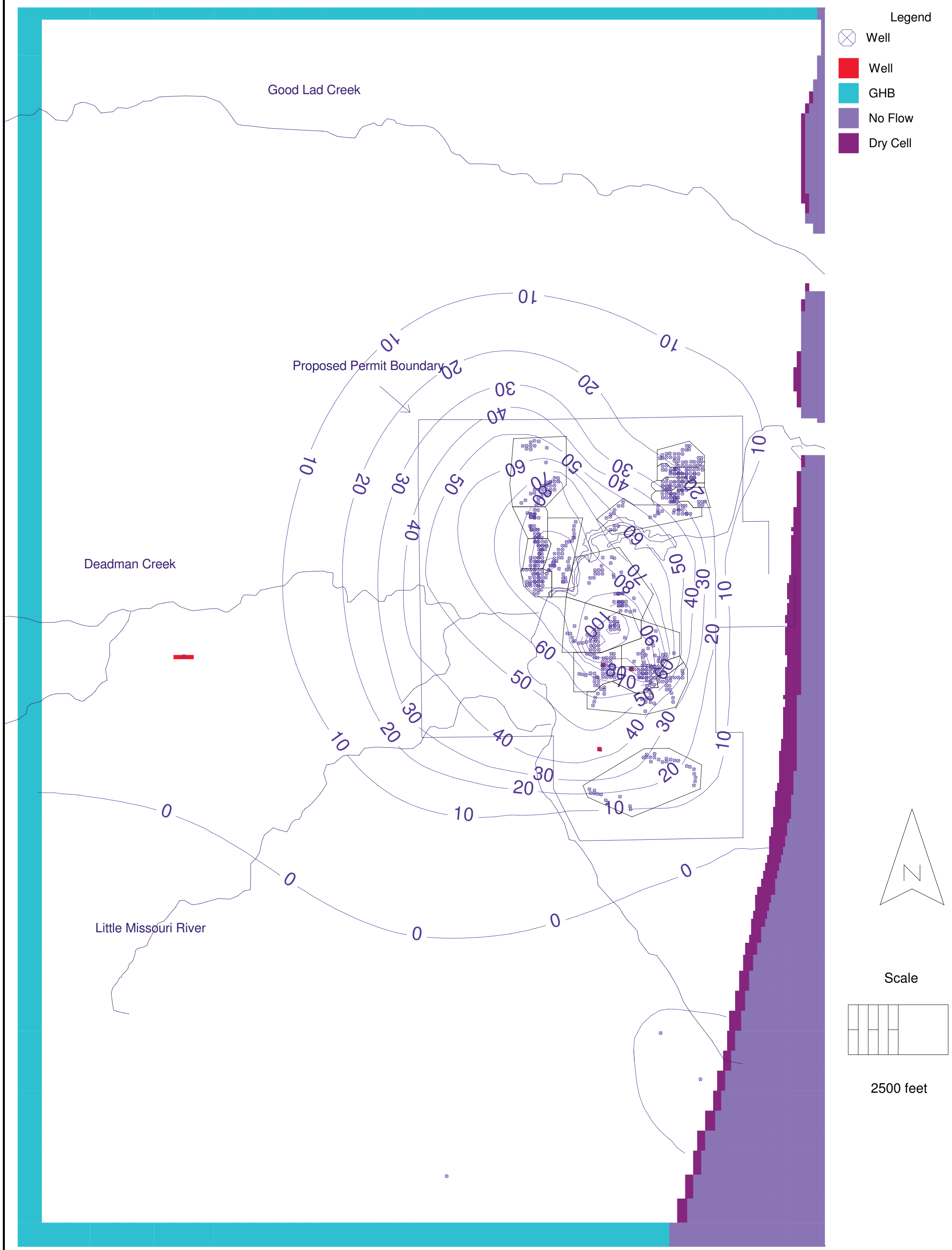


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 6 (OZ) Stress Period 8 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Drawdown 1.75 Years After The Beginning Of ISR Operations

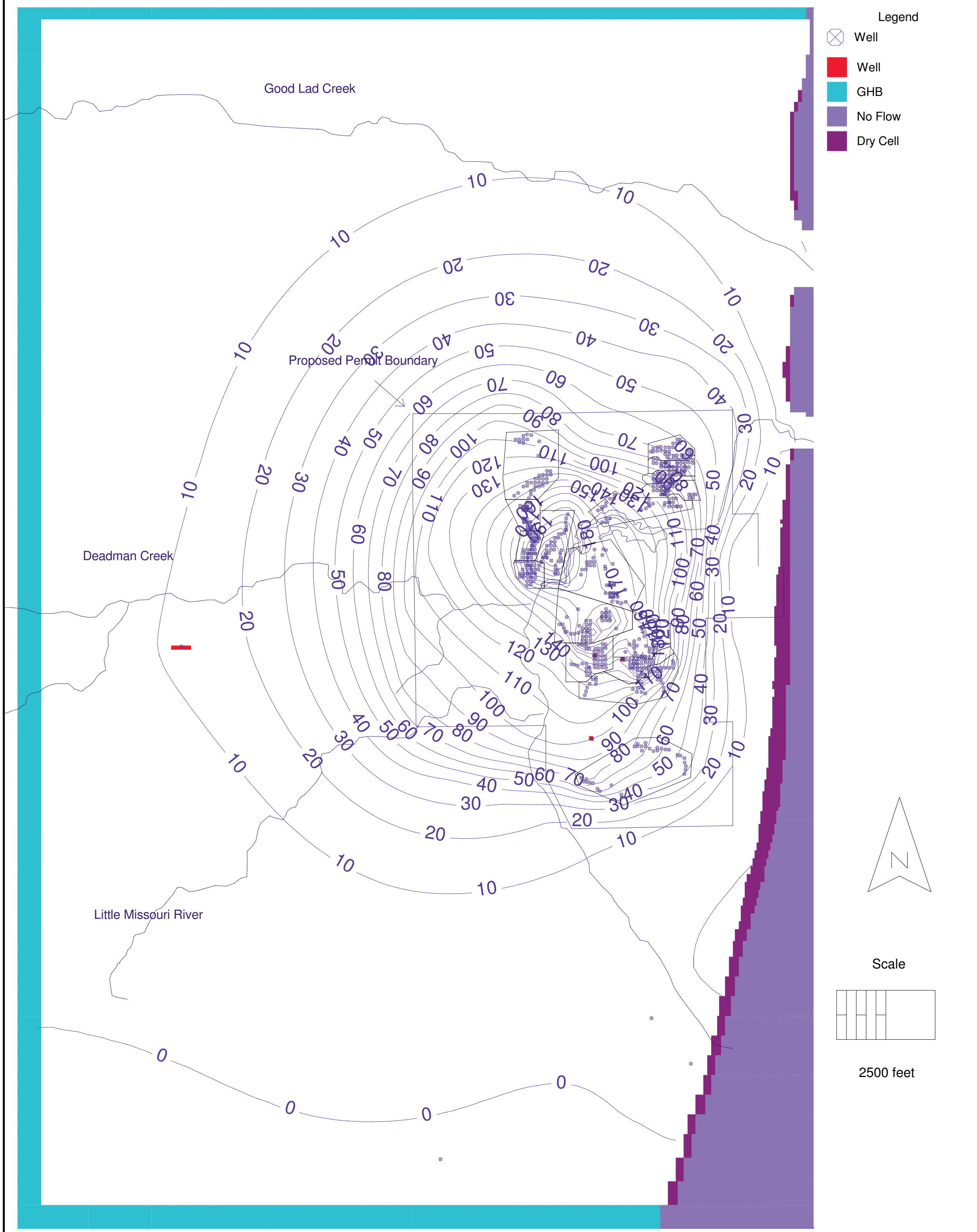


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 6 (OZ) Stress Period 15 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Drawdown 3.5 Years After The Beginning Of ISR Operations

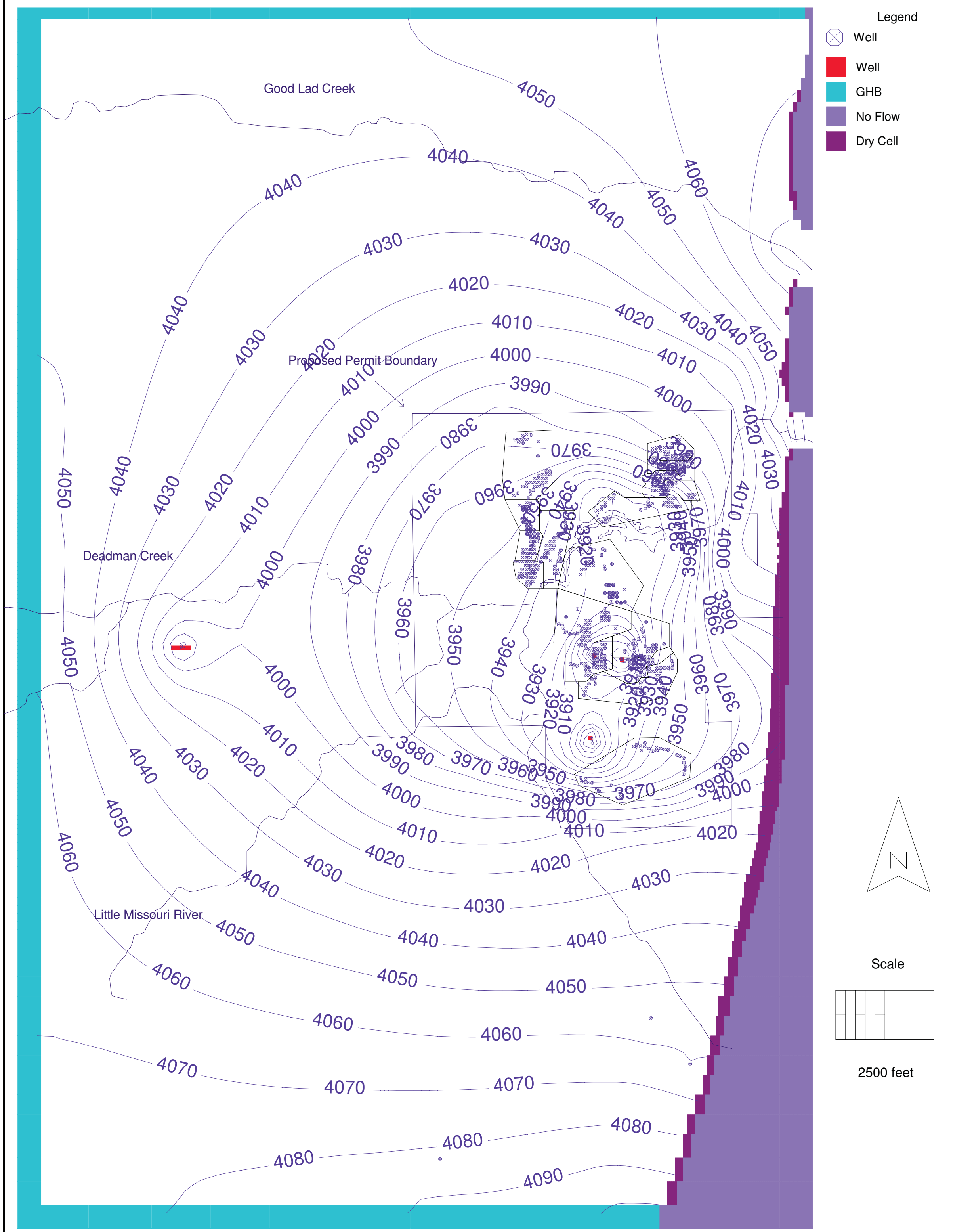


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 6 (OZ) Stress Period 25 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Potentiometric Surface At The End Of ISR Operations

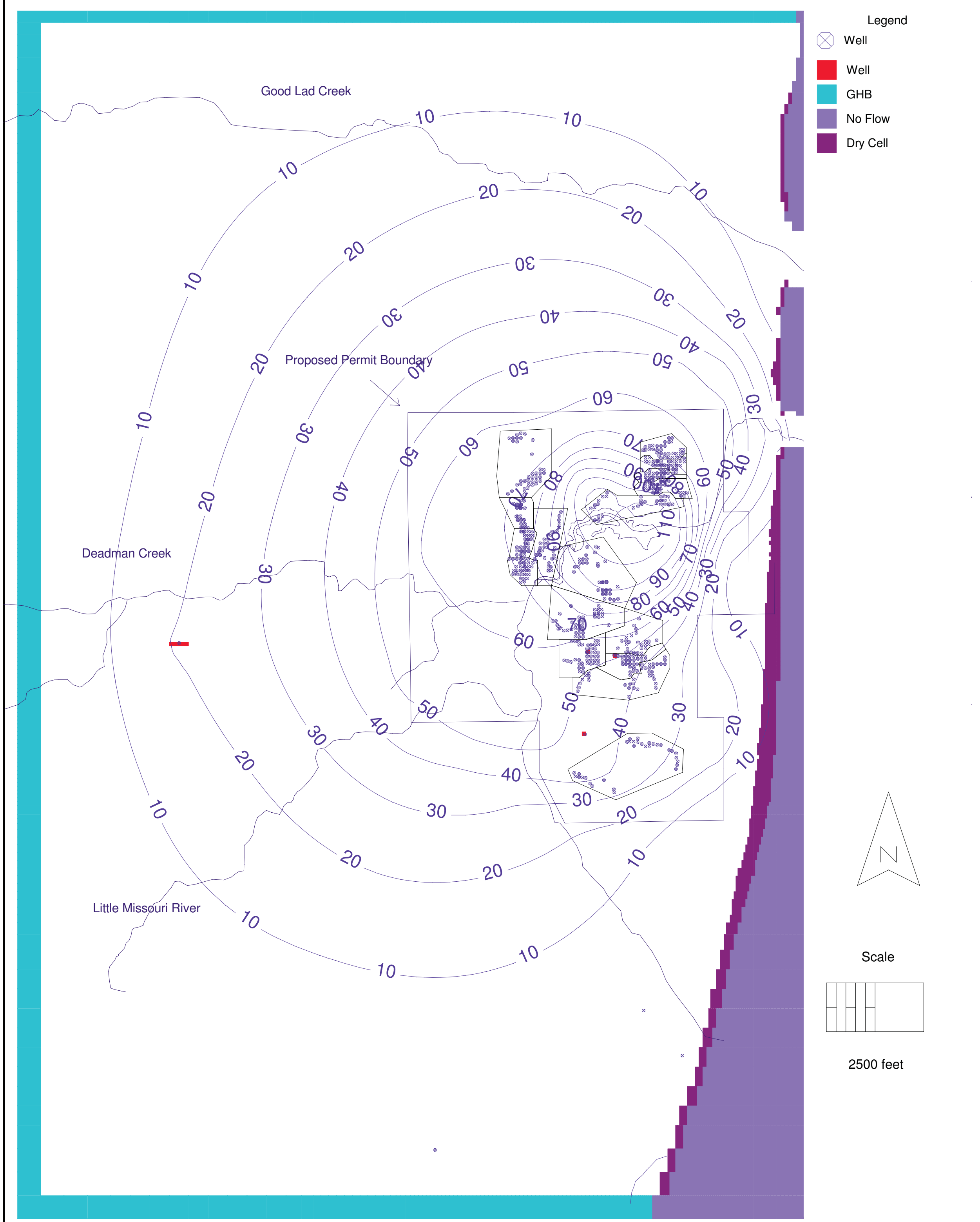


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 6 (OZ) Stress Period 25 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Drawdown At The End Of ISR Operations

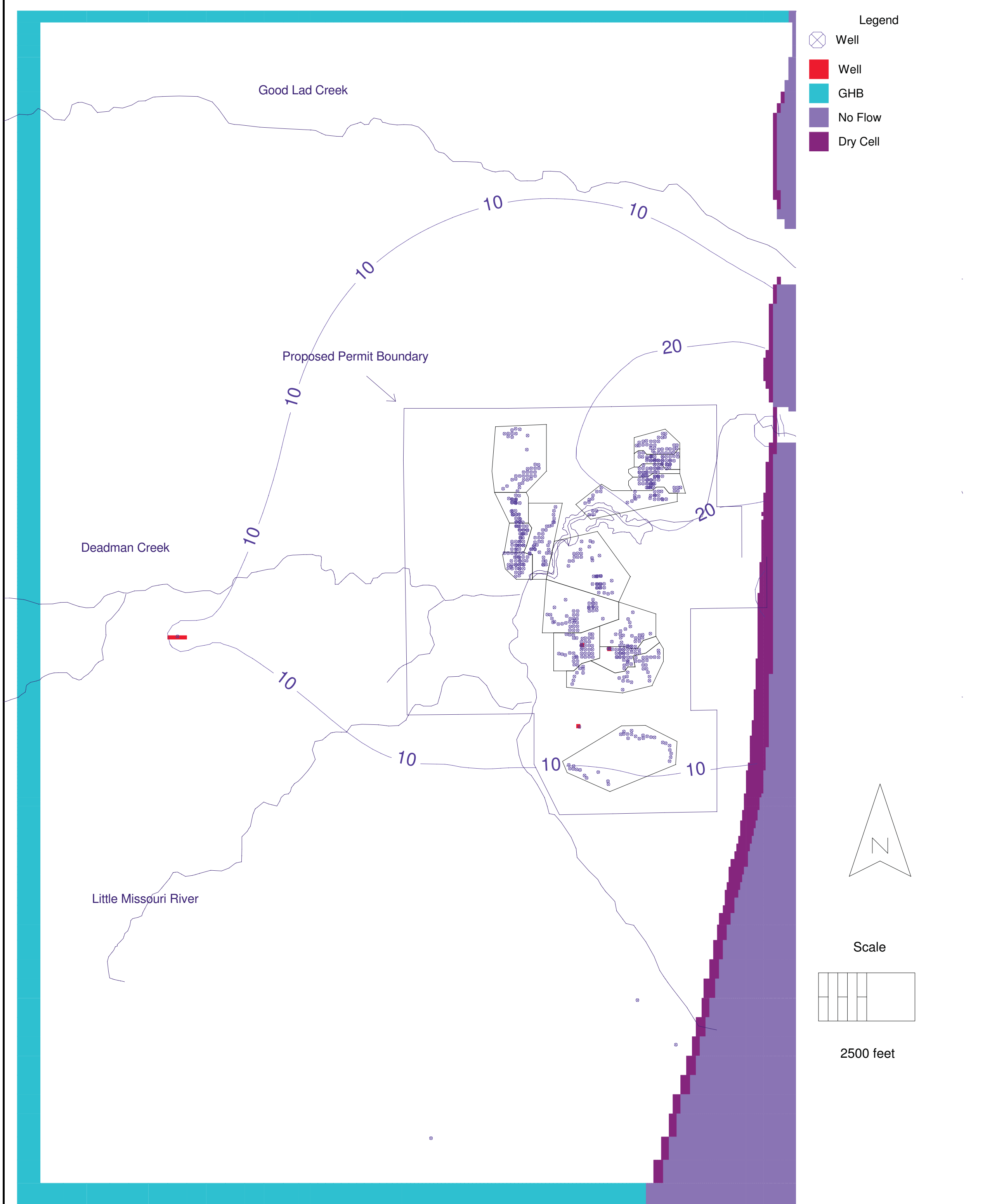


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 6 (OZ) Stress Period 26 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Drawdown 5 Years After The End Of ISR Operations

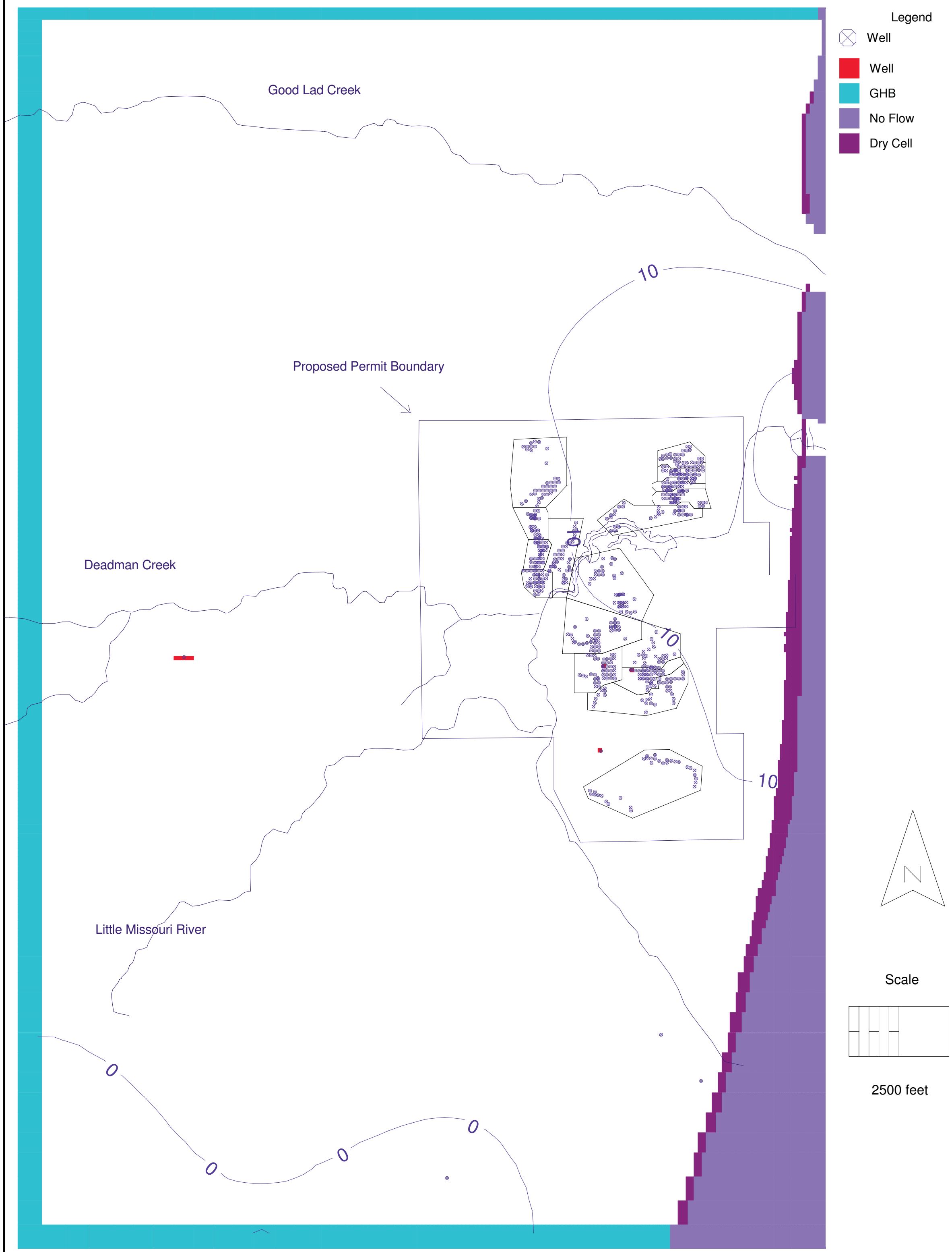


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 6 (OZ) Stress Period 27 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Drawdown 10 Years After The End Of ISR Operations

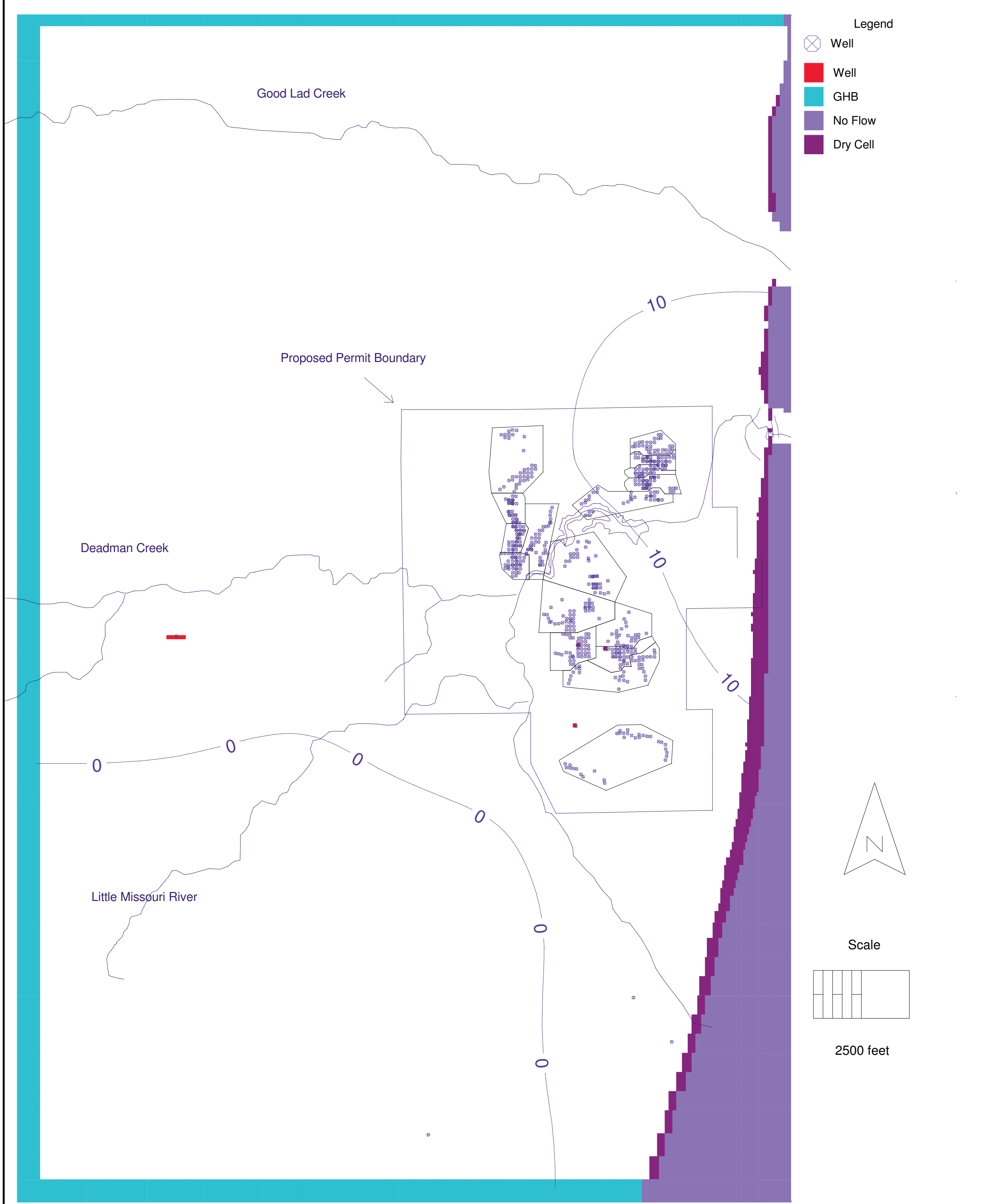


Strata Energy-Ross Project

GW-Model Mine Simulation Layer 6 (OZ) Stress Period 28 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Drawdown 20 Years After The End Of ISR Operations



Strata Energy-Ross Project

GW-Model Mine Simulation Layer 6 (OZ) Stress Period 29 Time Step 5

With Merit Oil Field Water Supply Wells in Operation

Drawdown 50 Years After The End Of ISR Operations