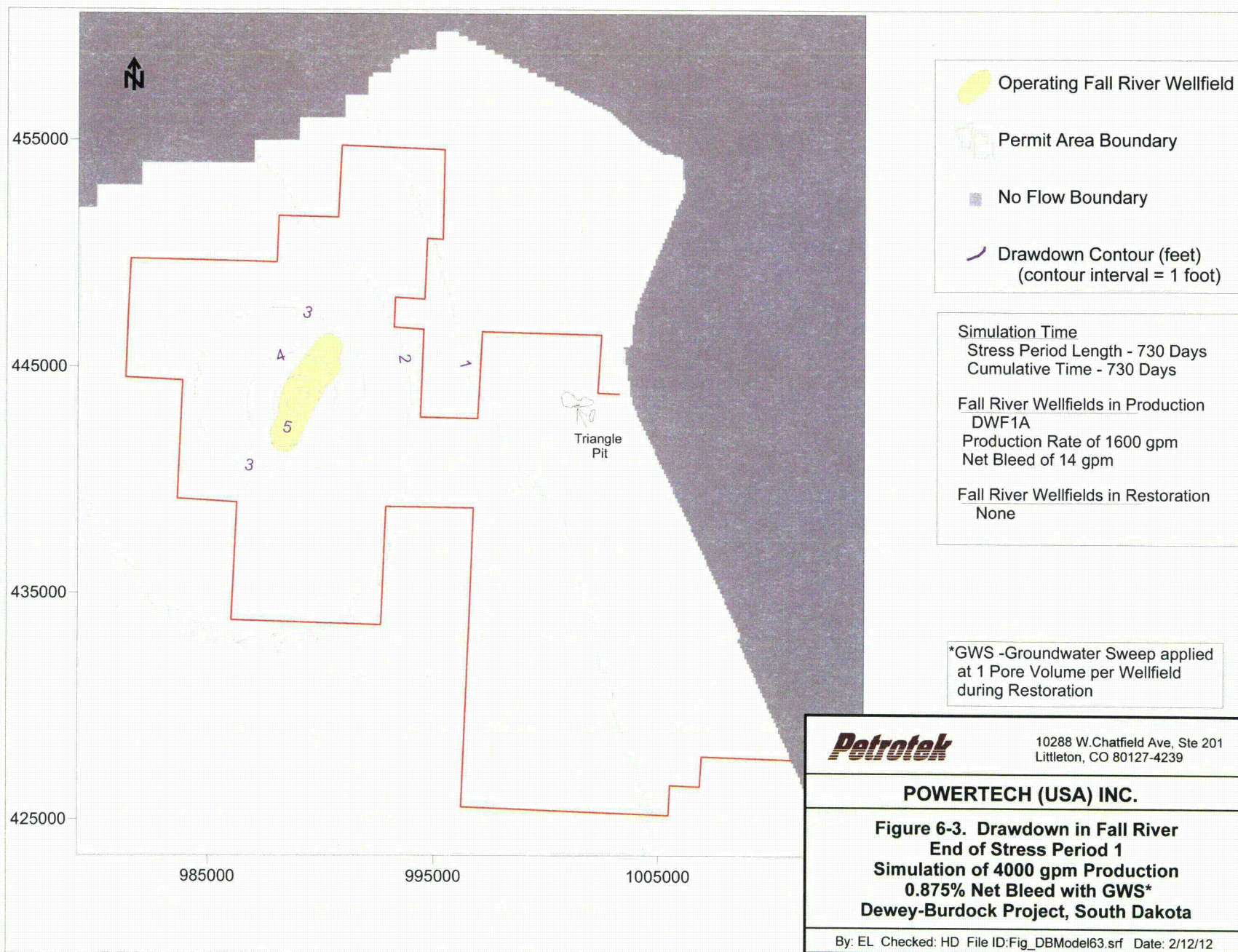
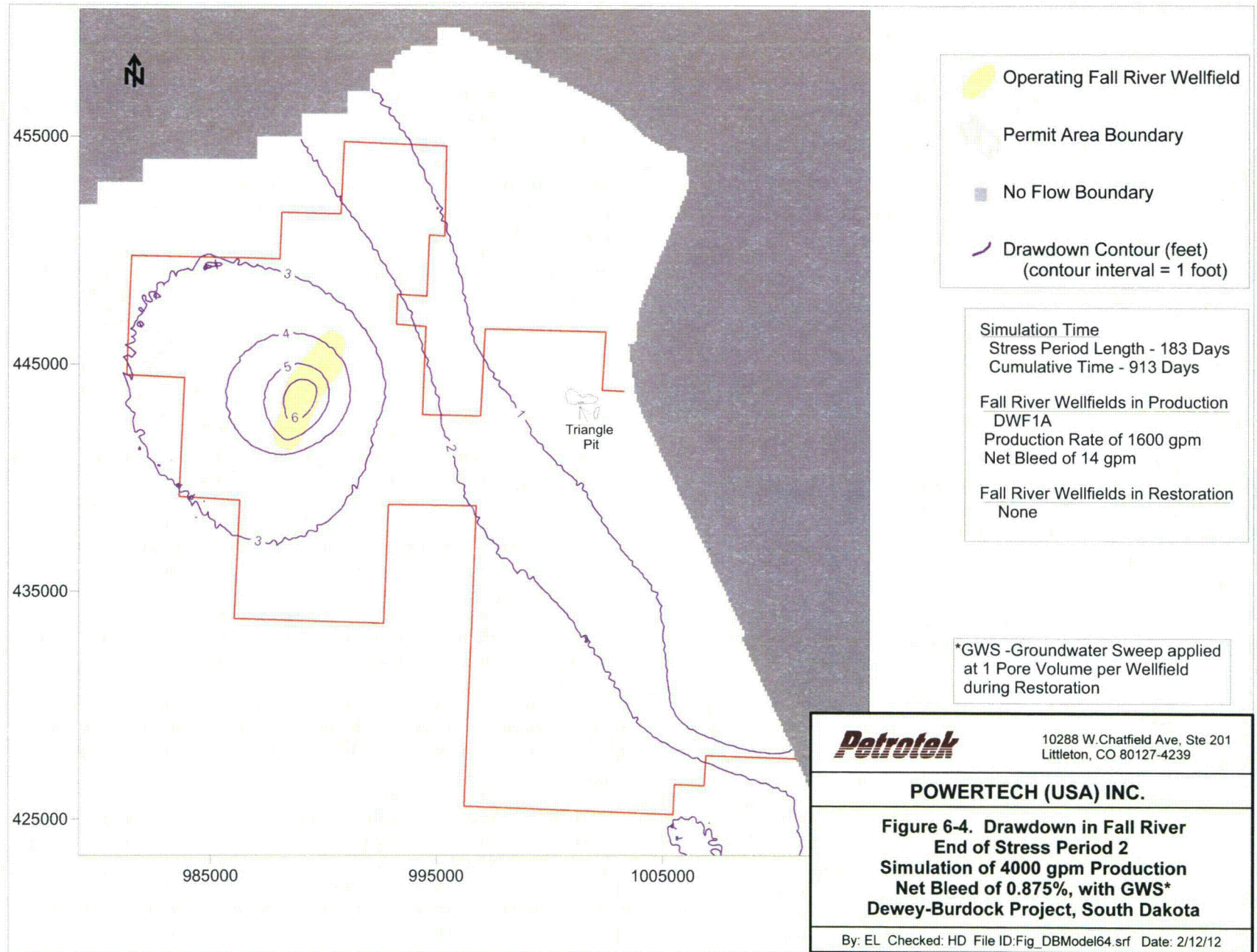


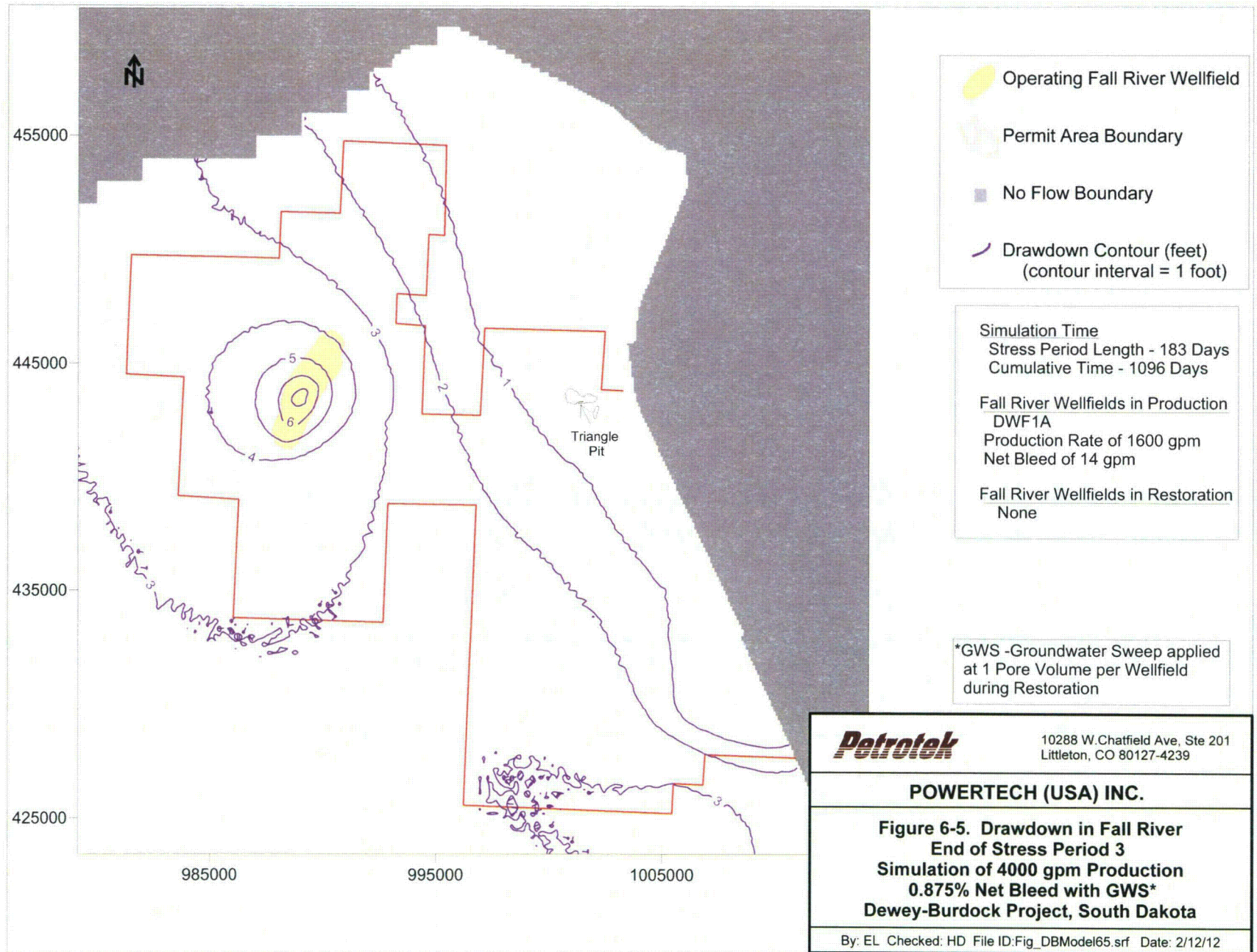
Figure 6-2. Production and Restoration Schedule and Net Rates of Extraction for Simulation of 4000 gpm Production, 0.875 % Net Bleed with Groundwater Sweep
Dewey Burdock Project, South Dakota

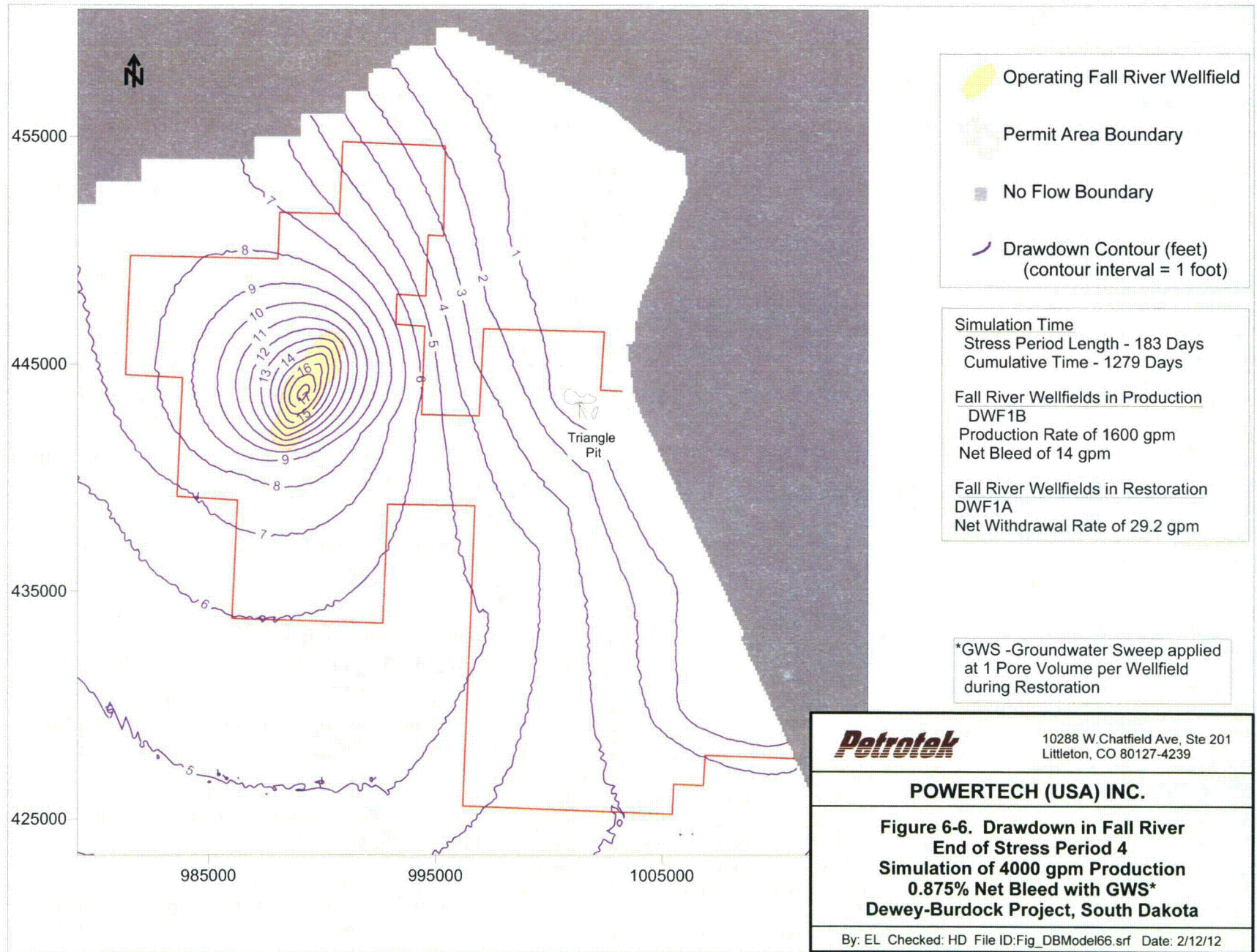
Wellfield	No. Patterns	Production Rate (gpm)	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5				Yr 6				Yr 7				Yr 8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
			SP1				SP2				SP3				SP4				SP5				SP6				SP7				SP8				SP9				SP10				SP11				SP12																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
Burdock Mine																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
BWF1	120	2400	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	26.7	26.7	26.7	26.7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

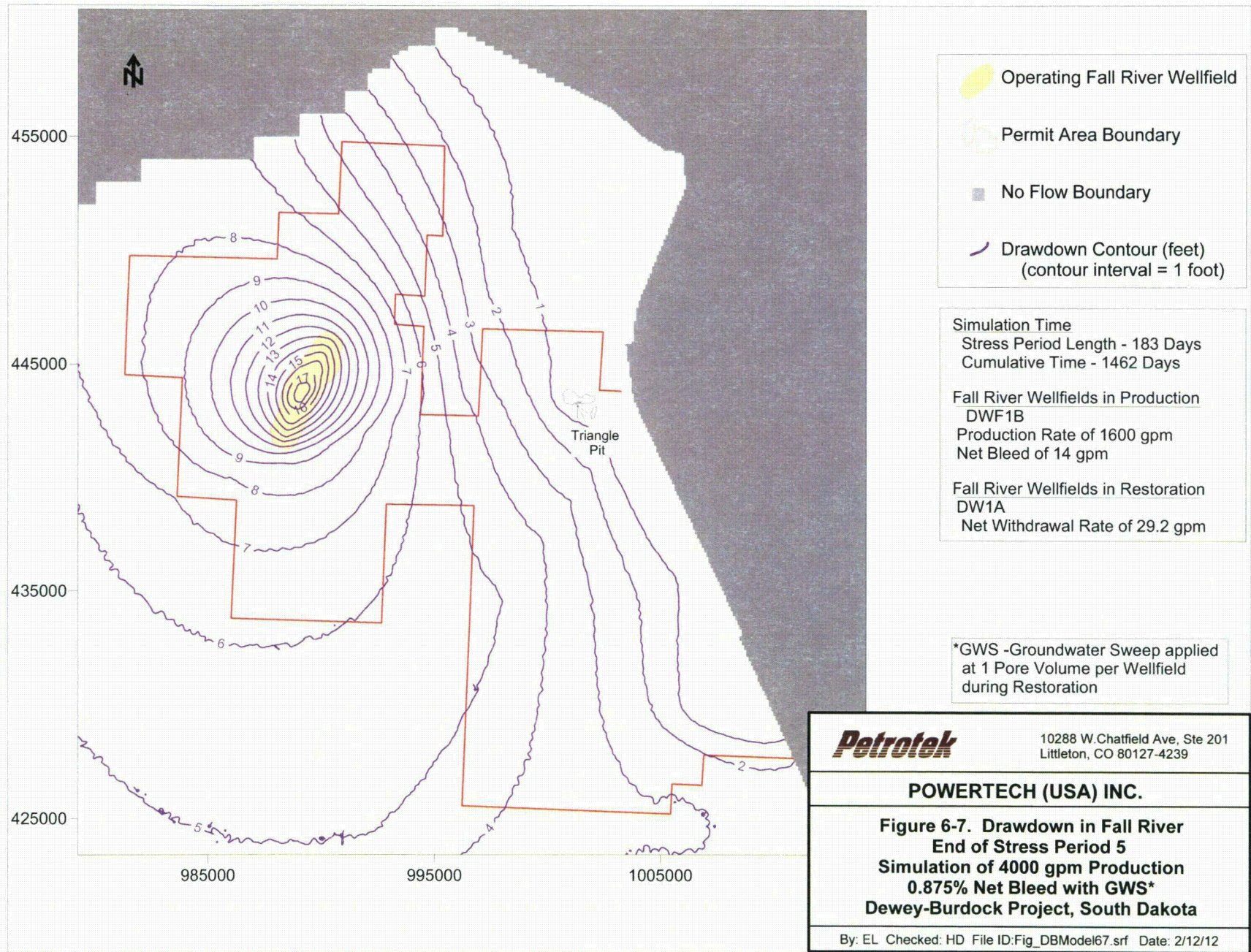
SP - Stress Period Yr - Year gpm - gallons per minute
 Values in Columns are the Net Extraction Rate per Stress Period (in gpm)
 Net Extraction Rate During Production is Calculated by Multiplying the Production Rate for the Wellfield by the Net Bleed Rate of 0.875 %
 Net Extraction Rate During Restoration is the Sum of Net Extraction from Reverse Osmosis (RO) and Groundwater Sweep (GWS)
 Net extraction from RO is equal to 1% of the 500 gpm RO rate (5 gpm)
 GWS rate is Calculated by Dividing One Wellfield Pore Volume by the Number of Minutes in the Stress Period
 Wellfield Pore Volume Calculation is Provided in Table 6-1

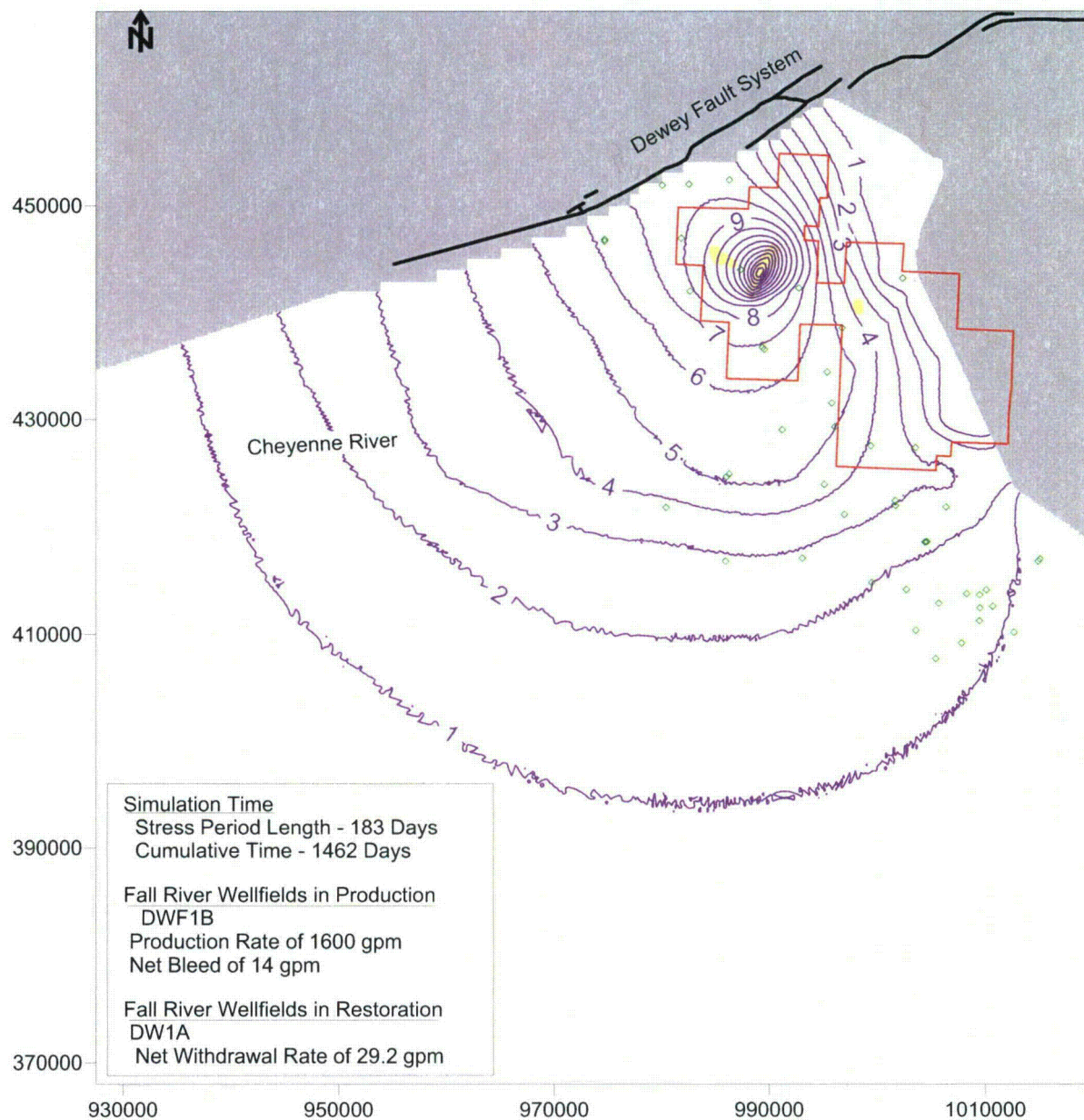












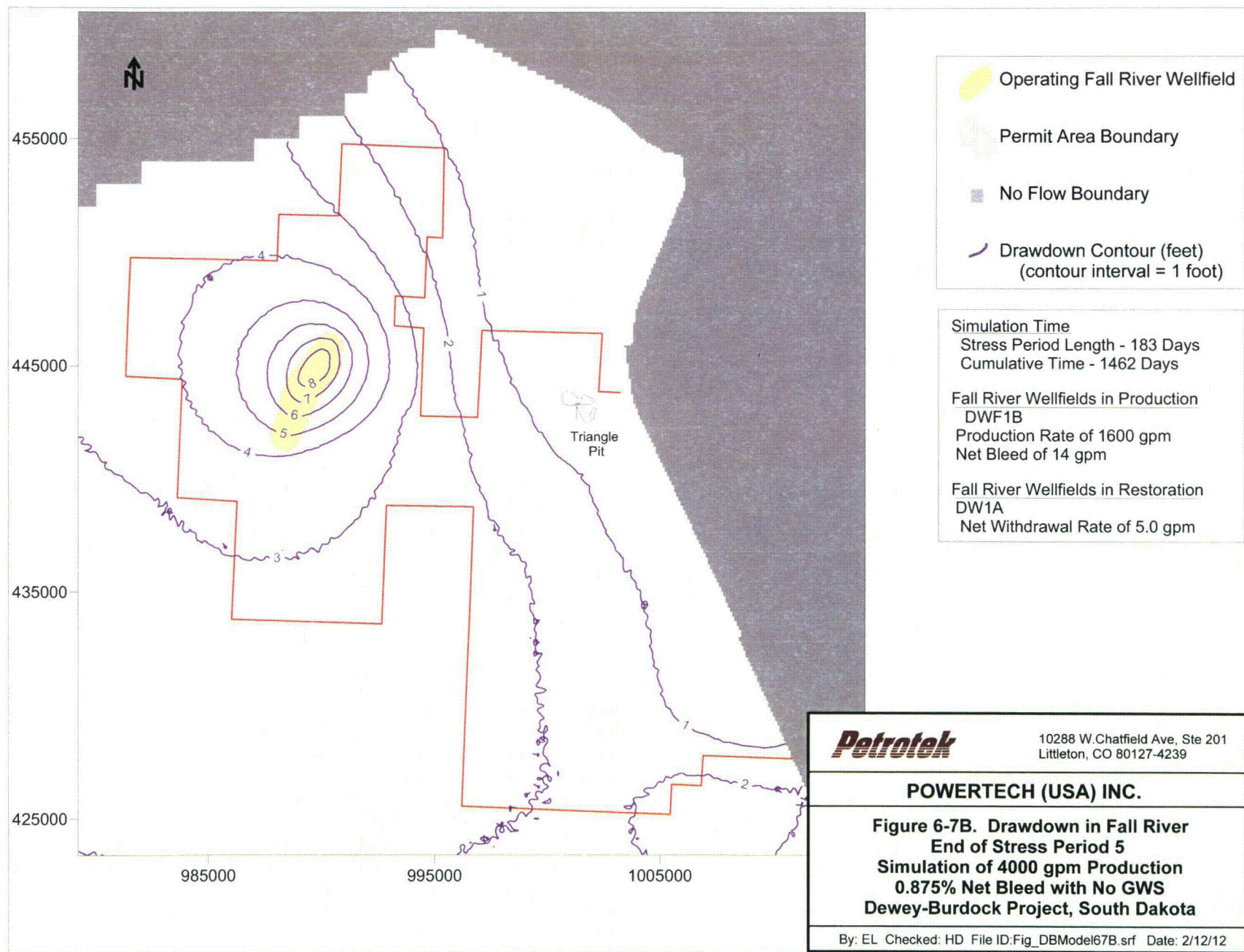
Petrotek

10288 W. Chatfield Ave, Ste 201
Littleton, CO 80127-4239

POWERTECH (USA) INC.

**Figure 6-7A. Drawdown in Fall River
Across the Model Domain, End of Stress Period 5
4,000 gpm Production, 0.875% Bleed, with GWS
Dewey-Burdock Project, South Dakota**

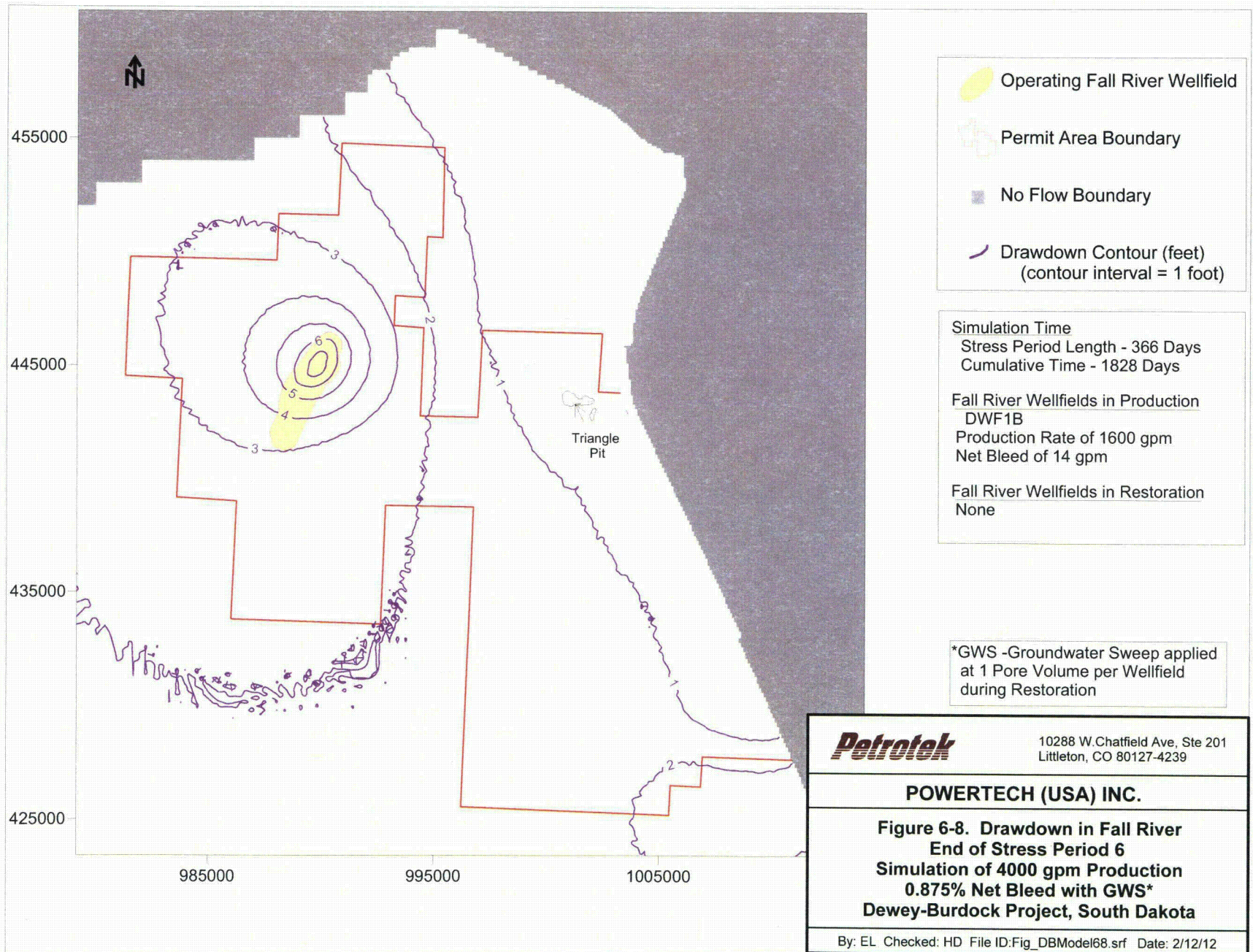
By: EL Checked: HD File ID: Fig_DBModel67A.srf Date: 2/12/12

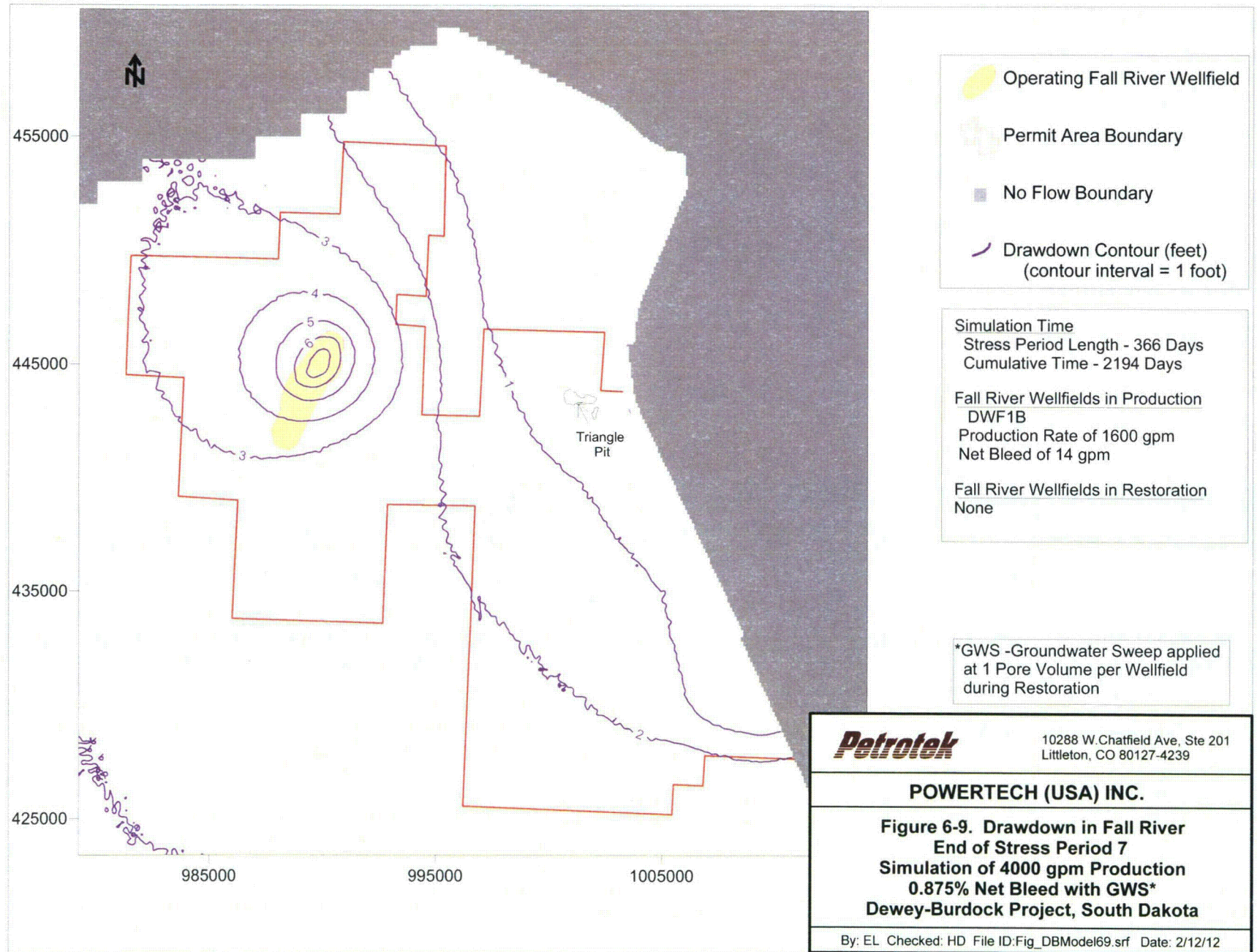


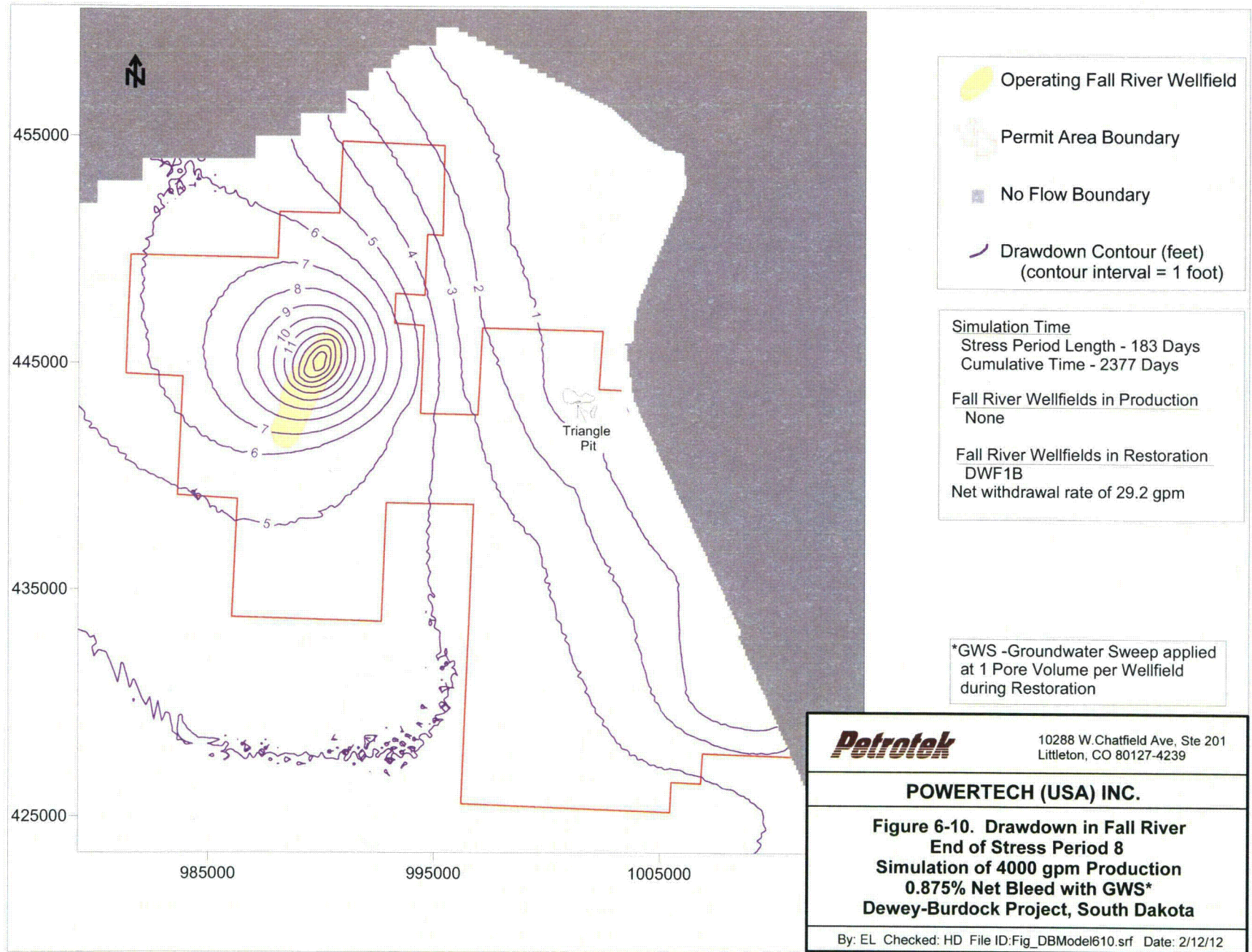
Petrotek

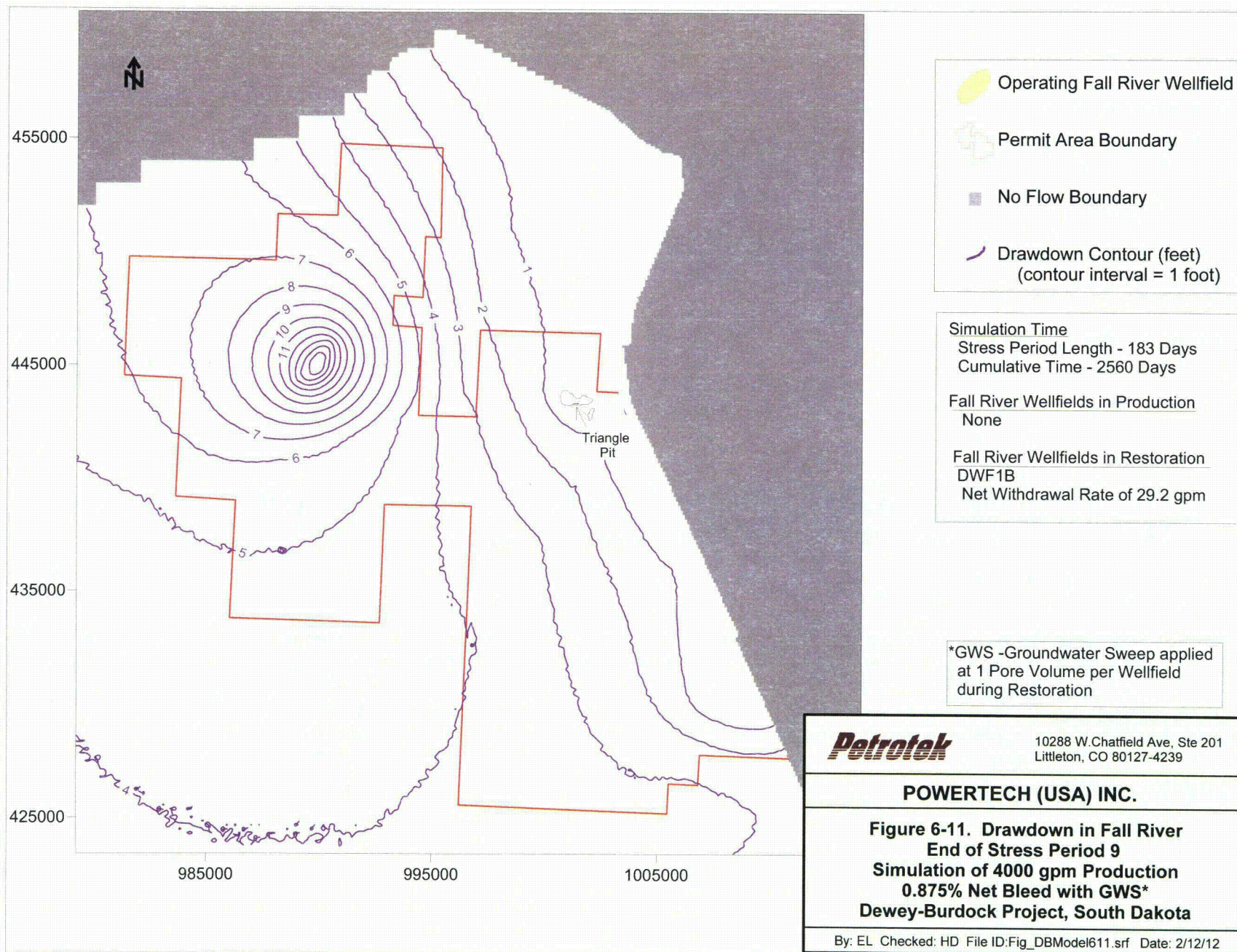
10288 W. Chatfield Ave, Ste 201
Littleton, CO 80127-4239

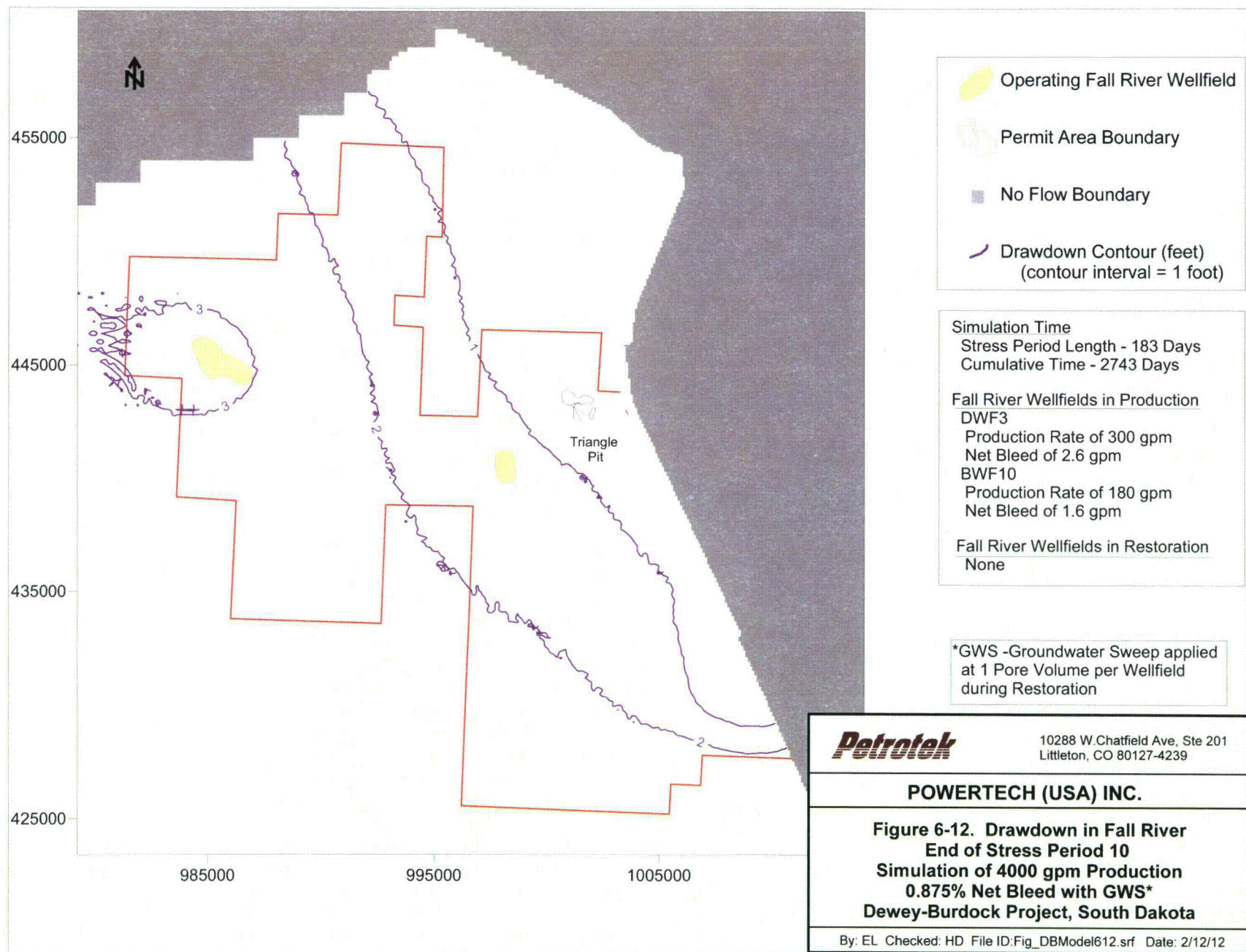
POWERTECH (USA) INC.

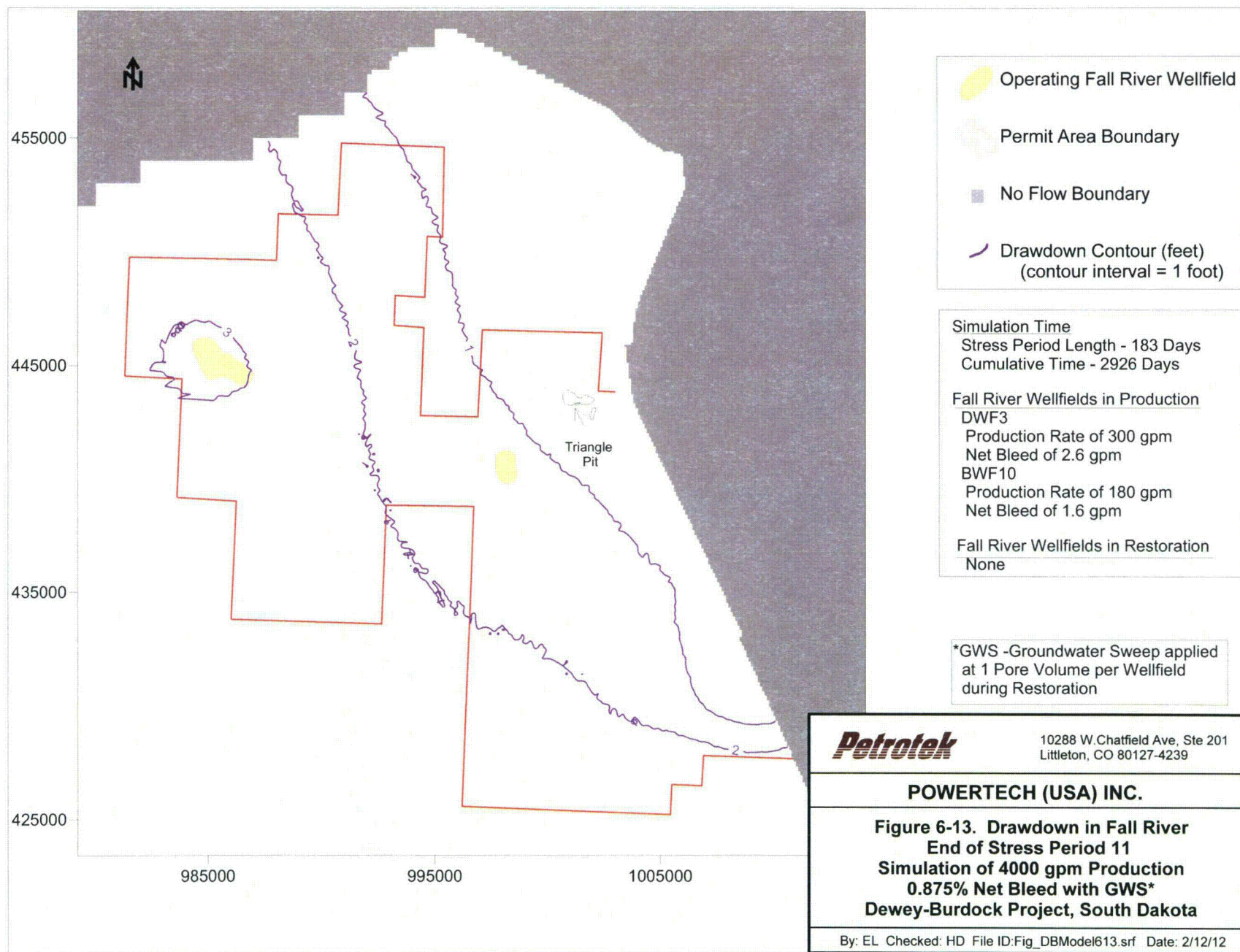


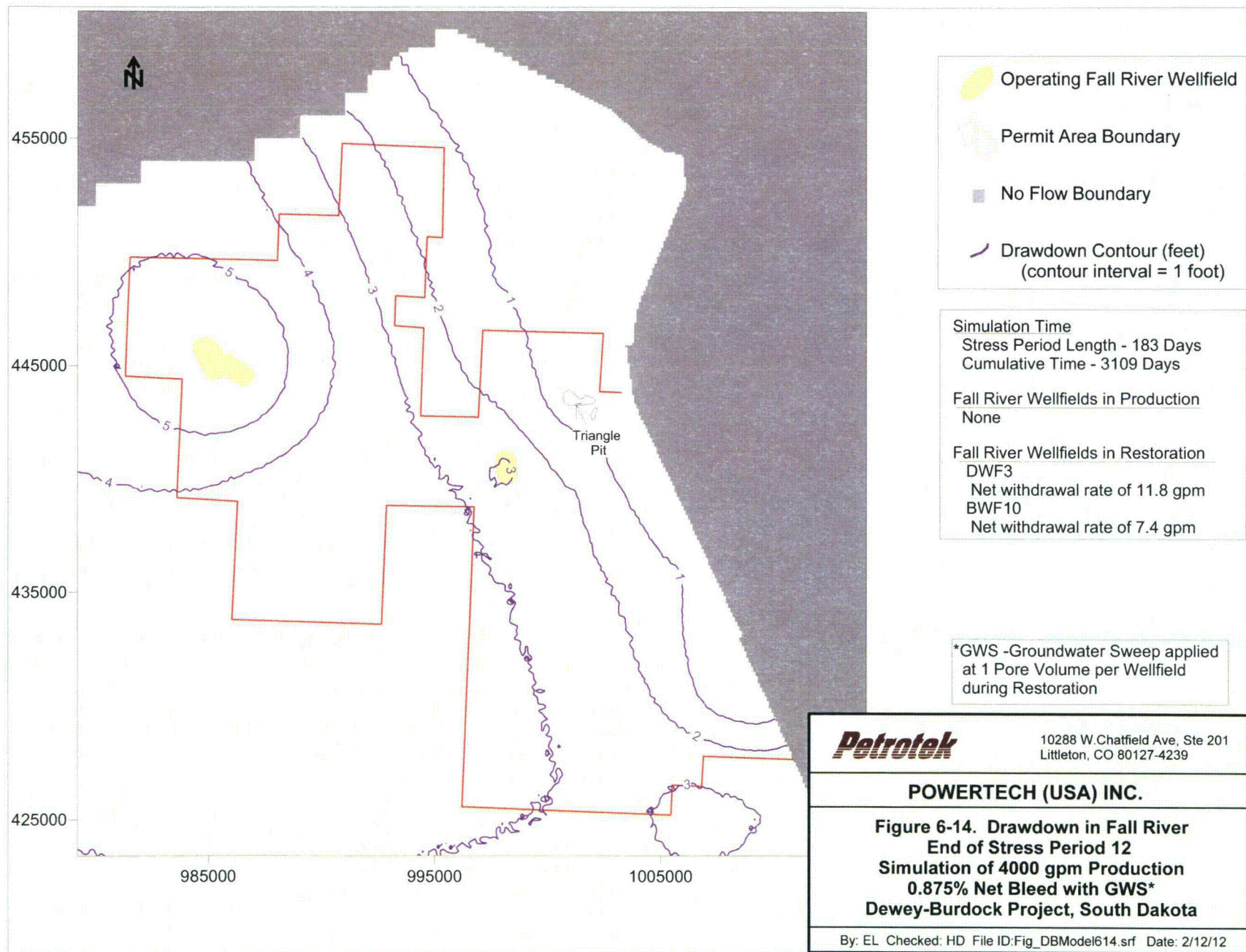


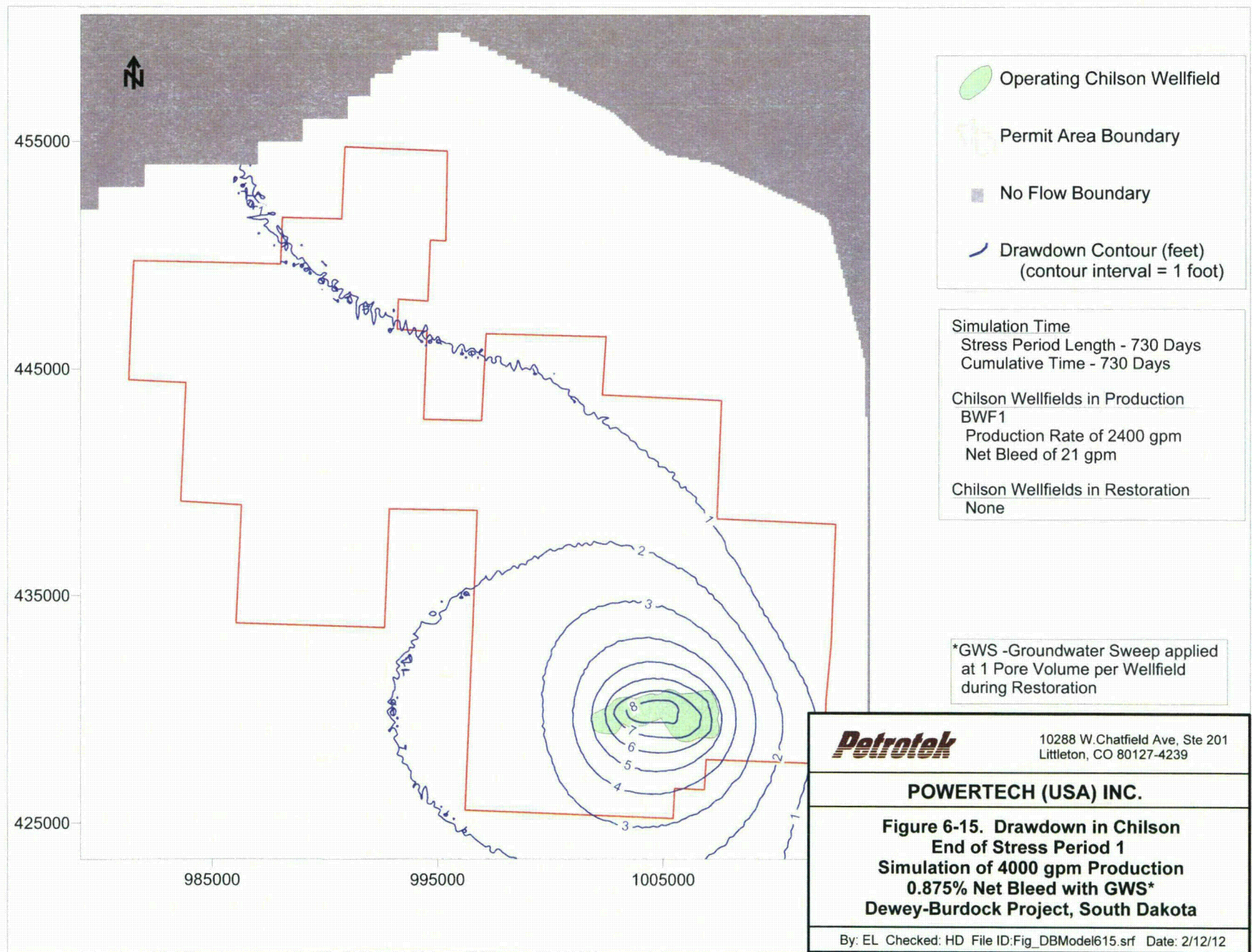


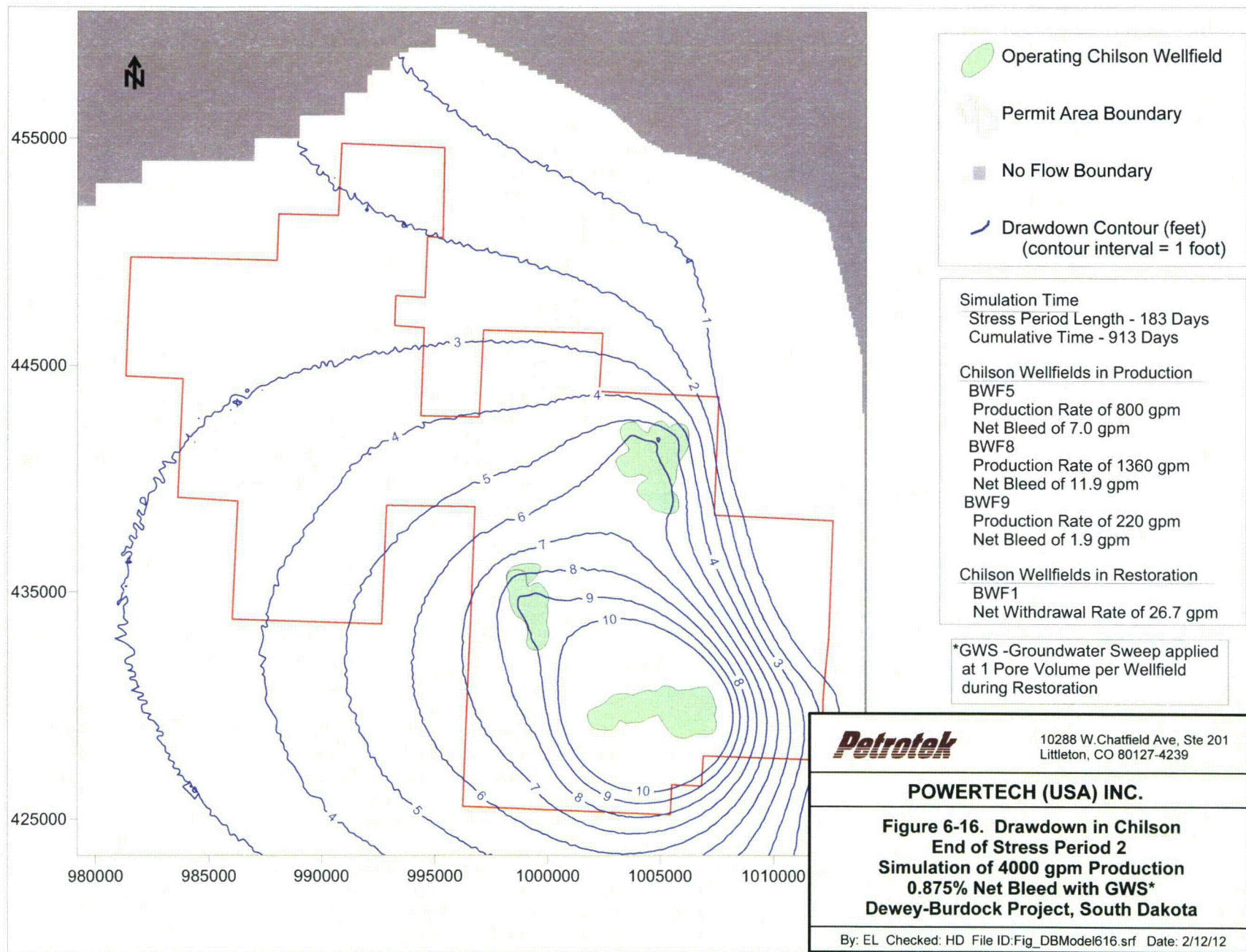


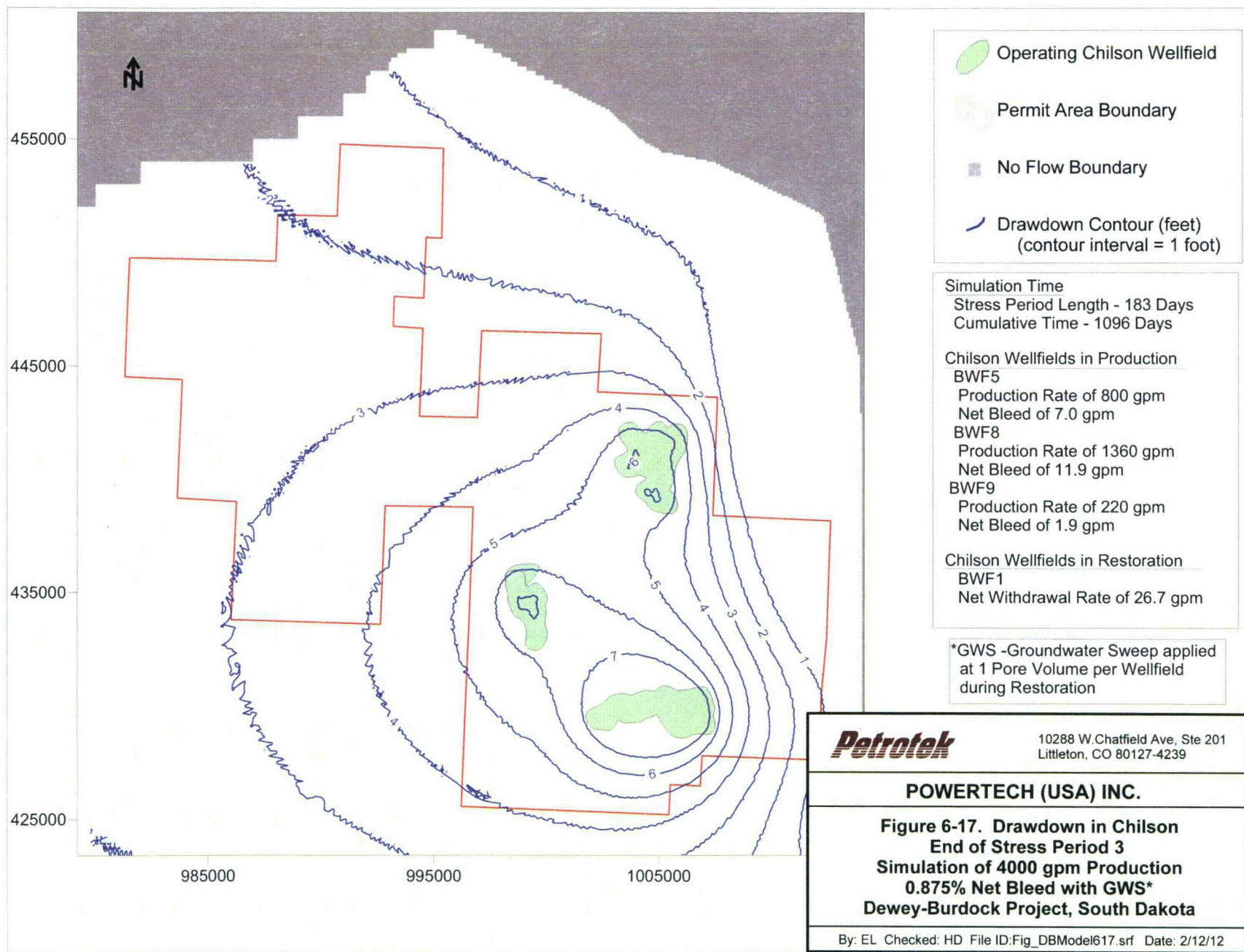


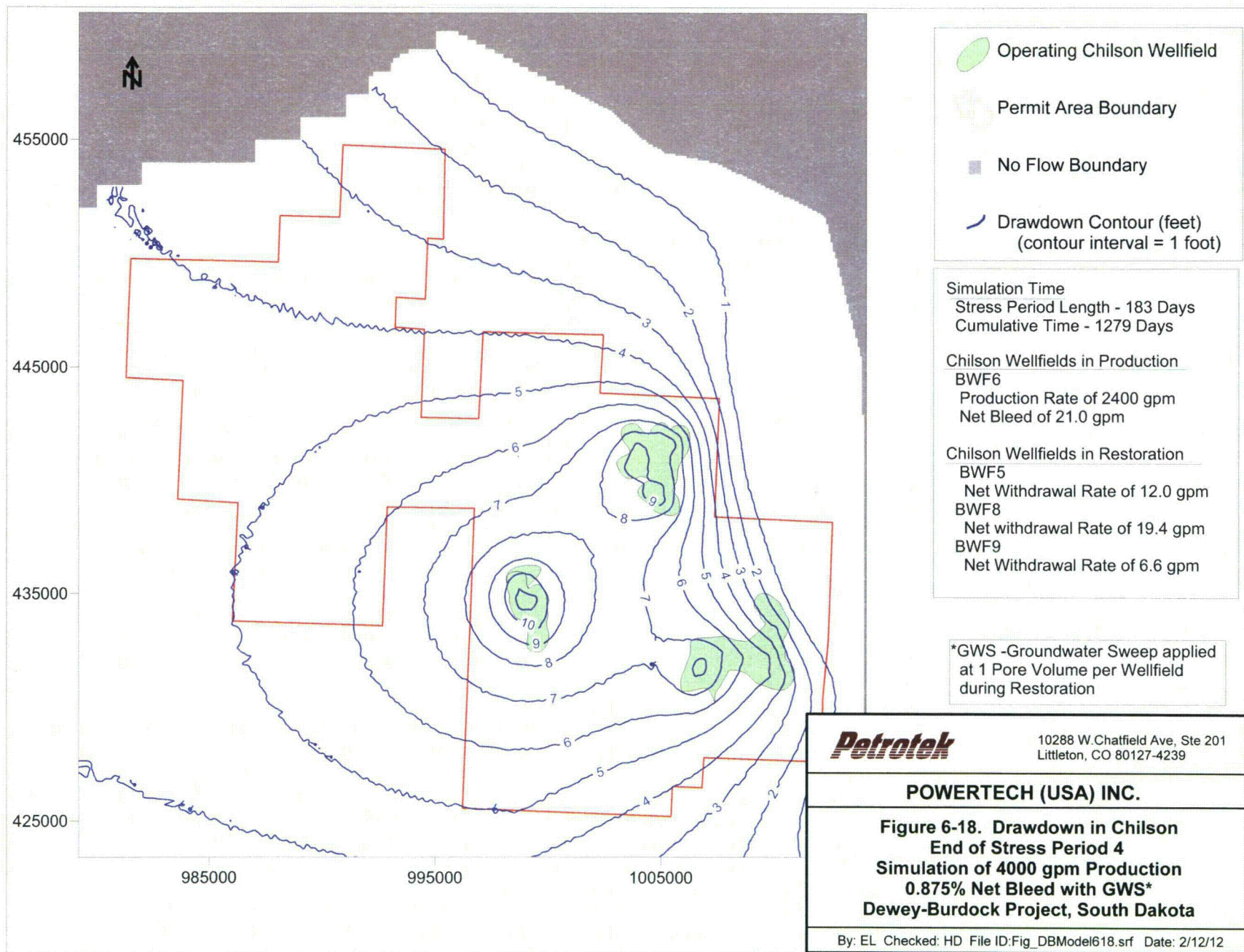


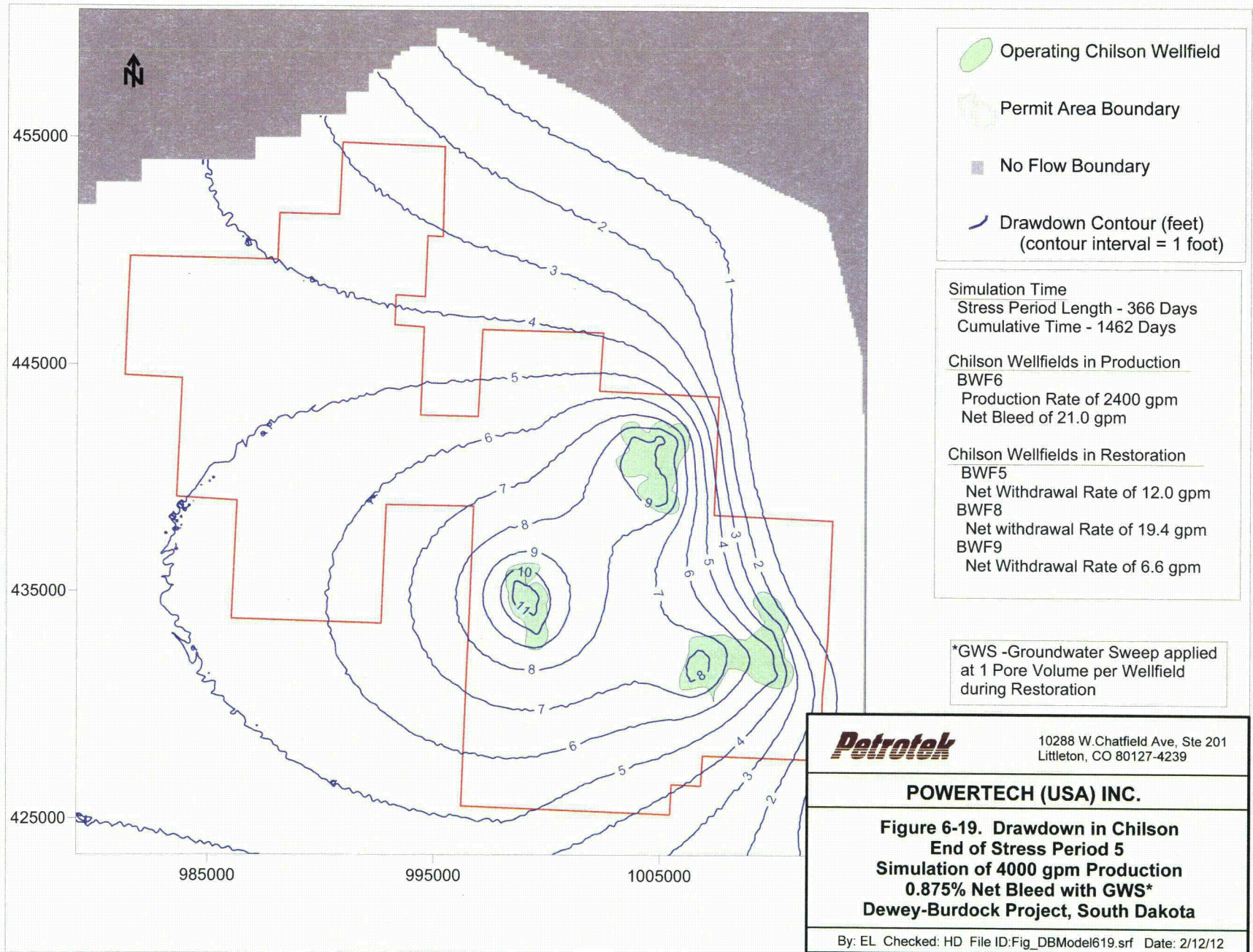


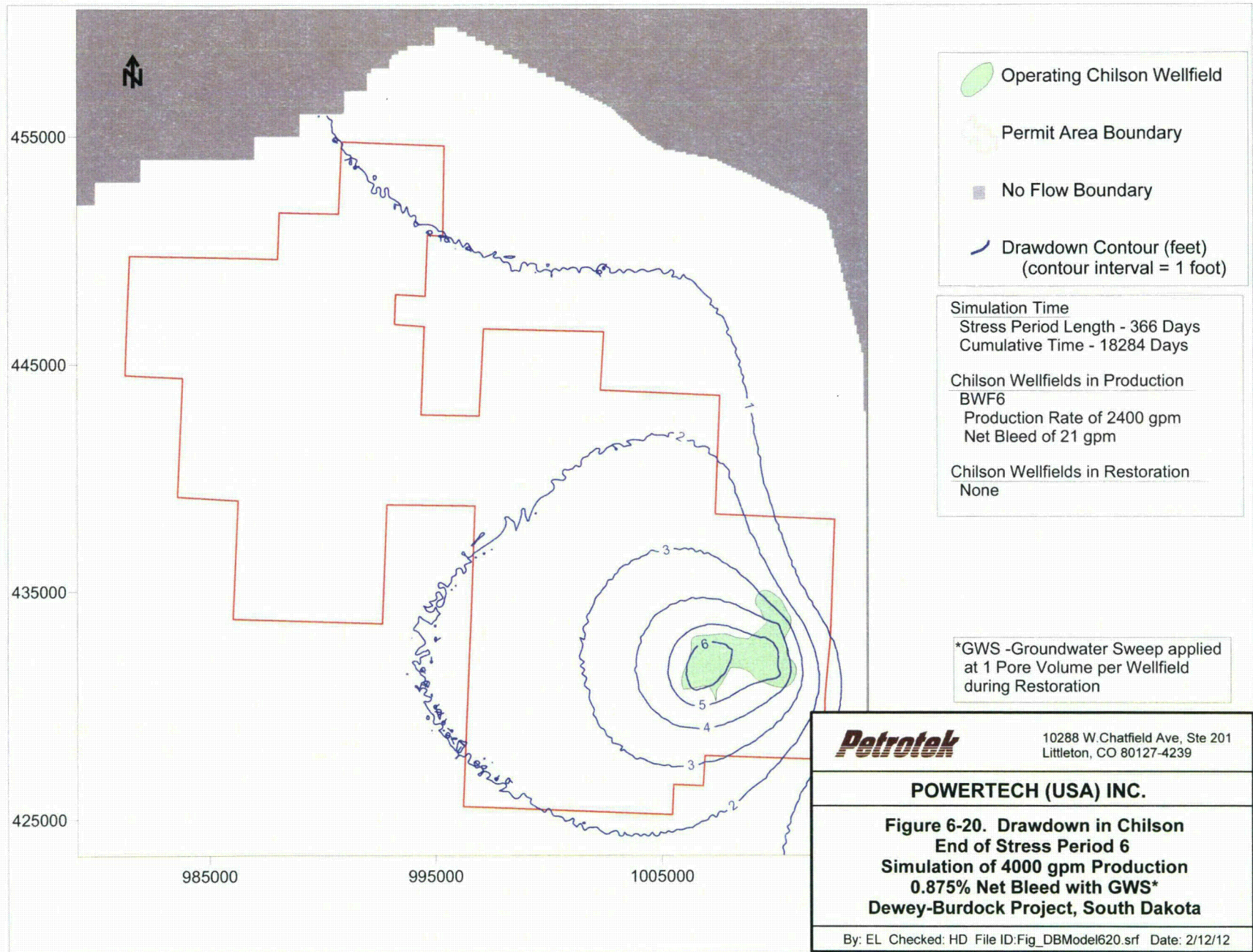


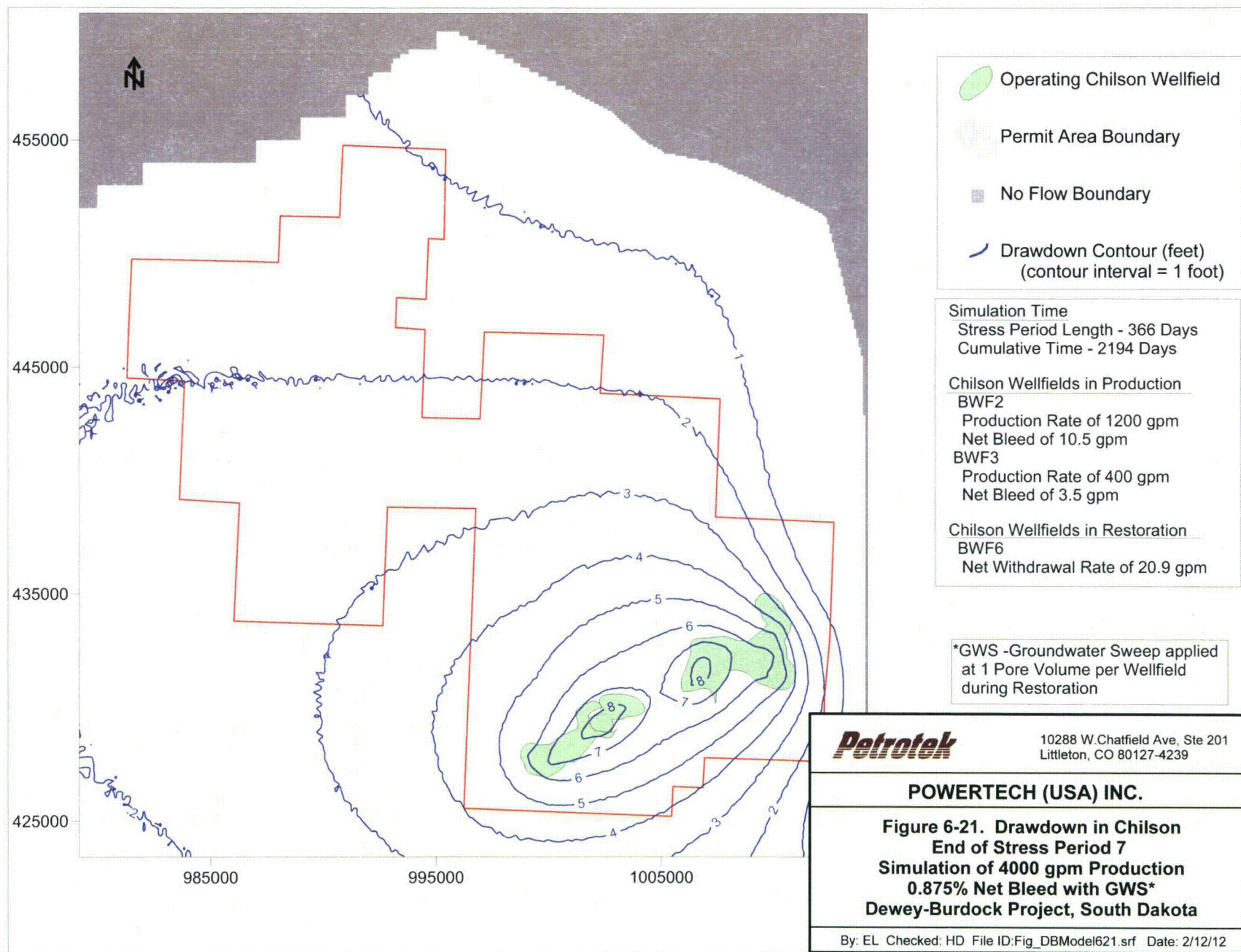


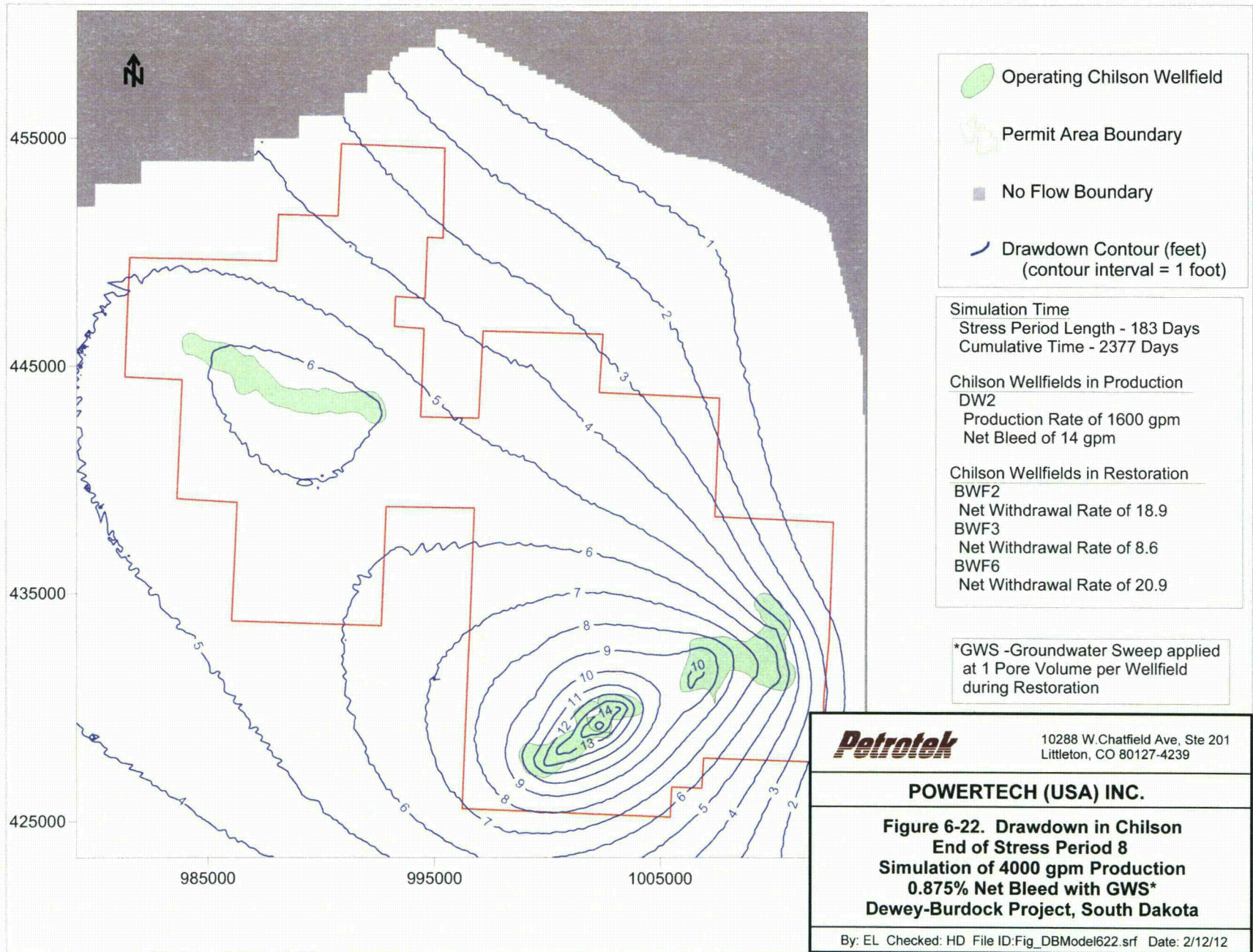


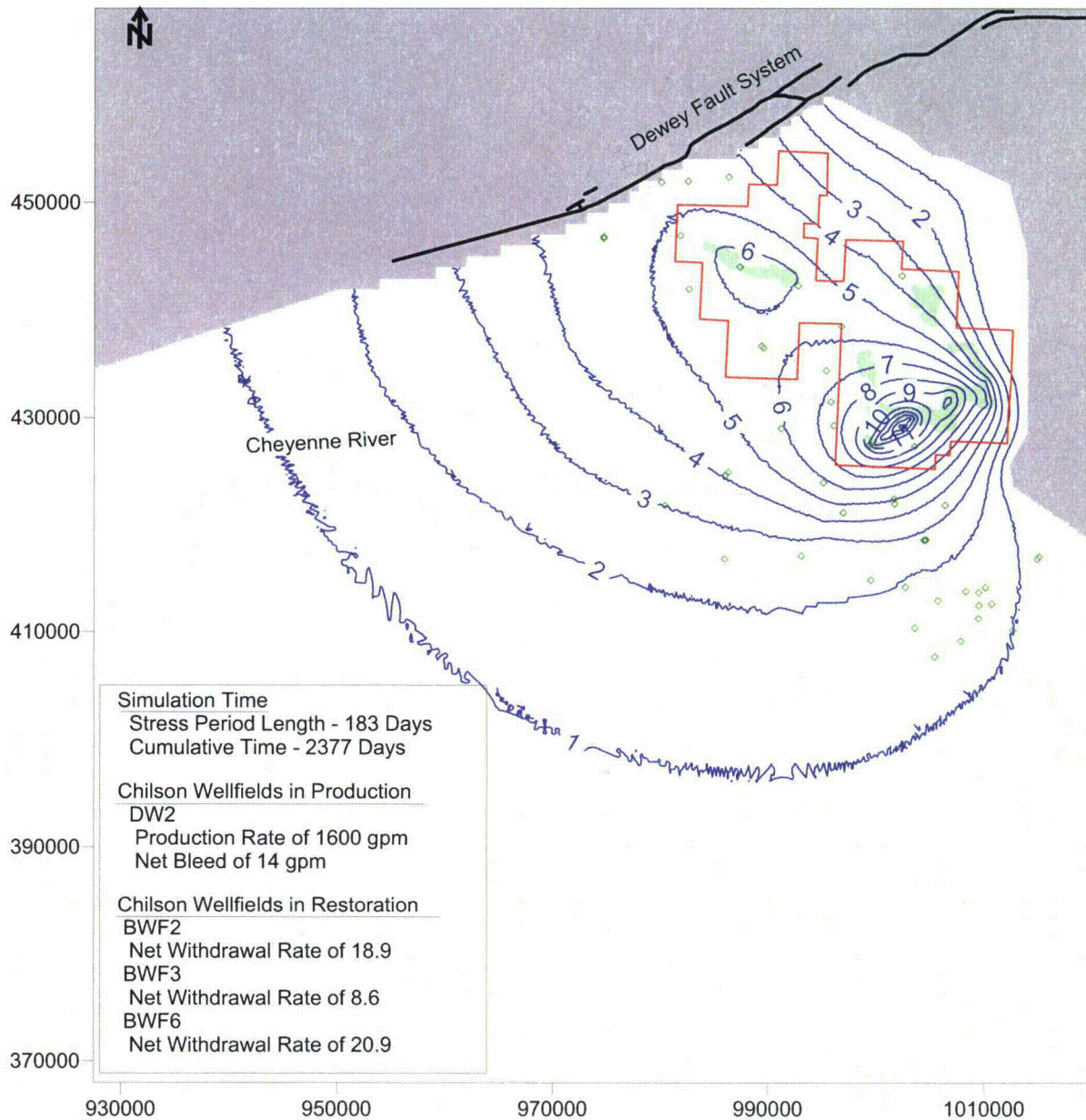












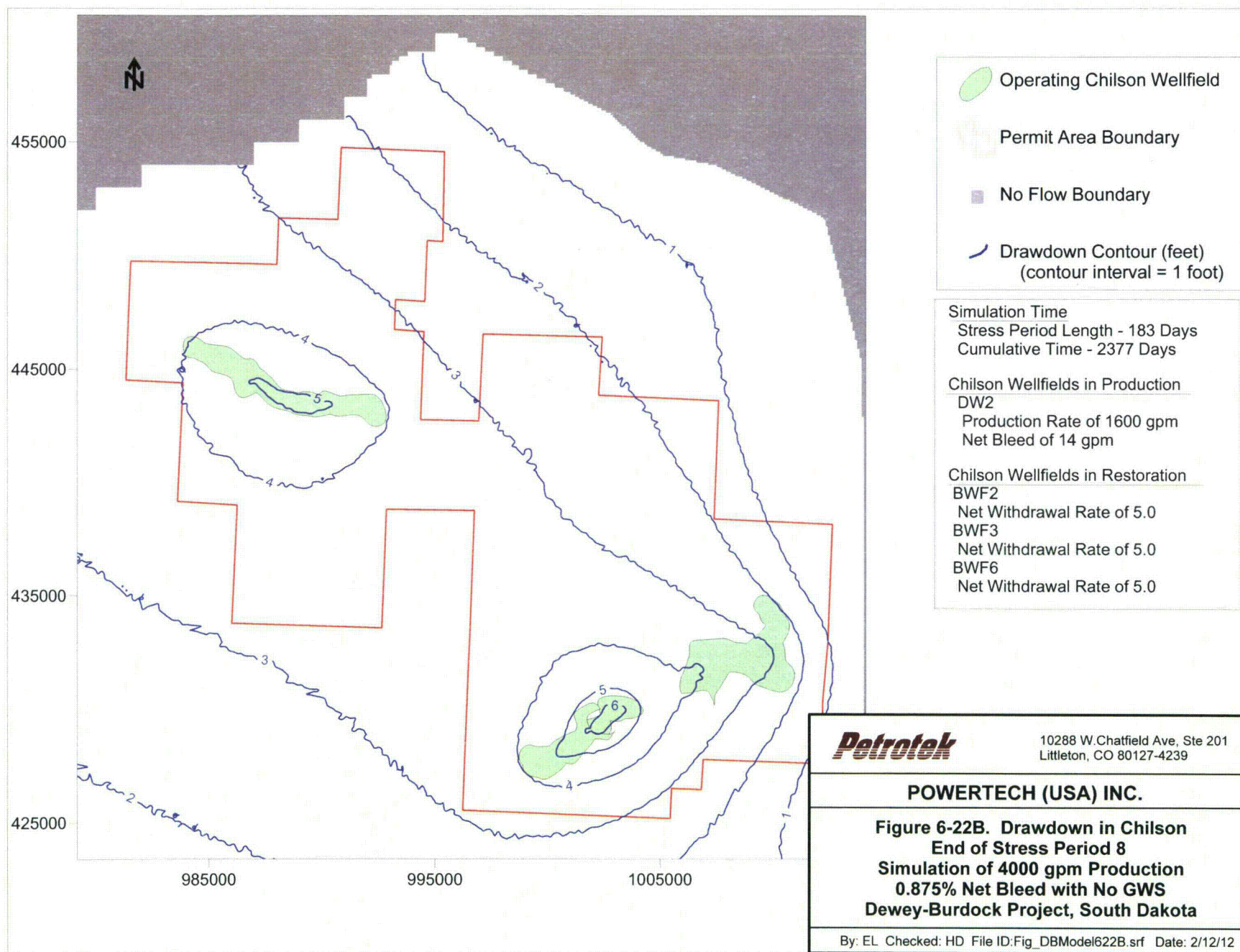
Petrotek

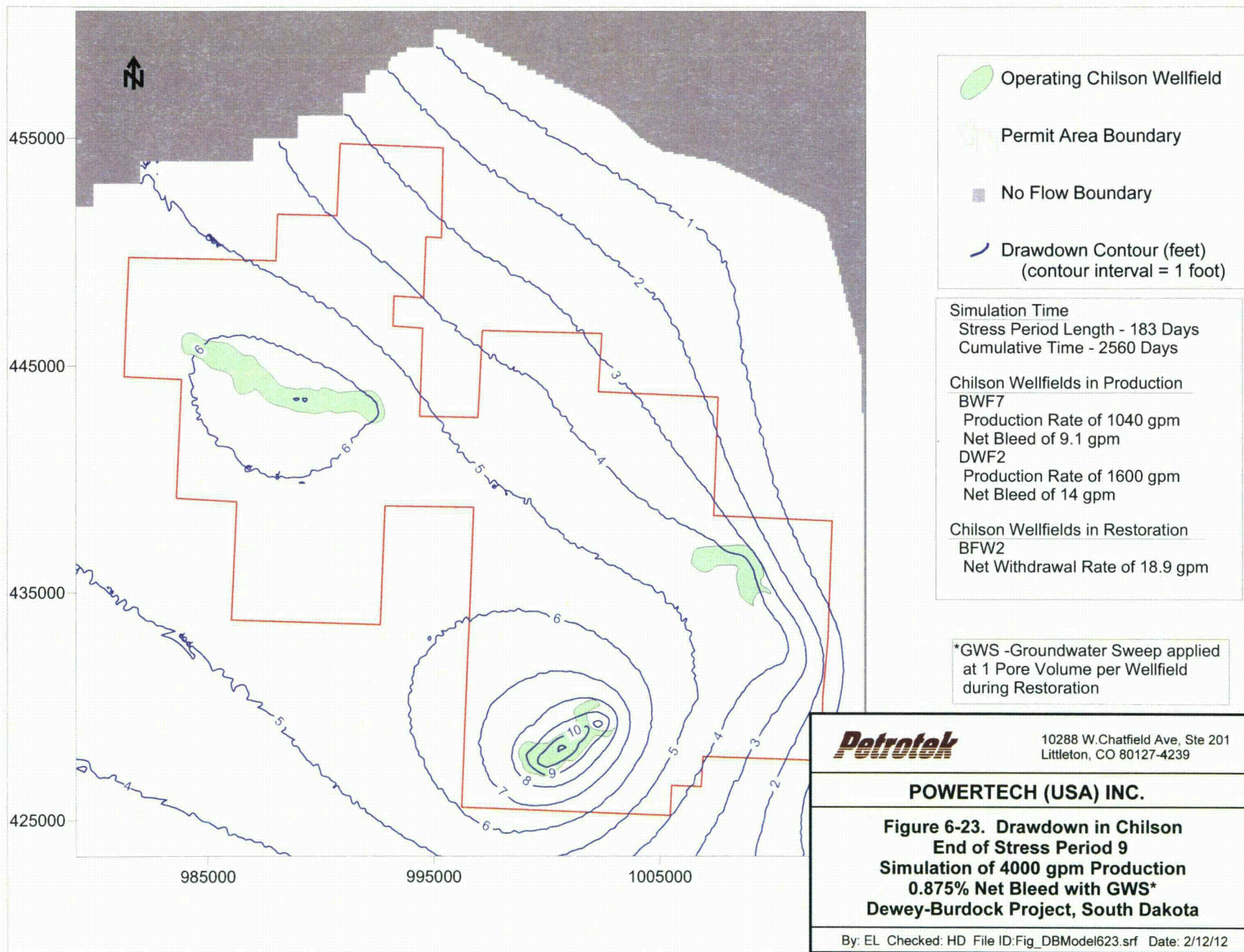
10288 W. Chatfield Ave, Ste 201
 Littleton, CO 80127-4239

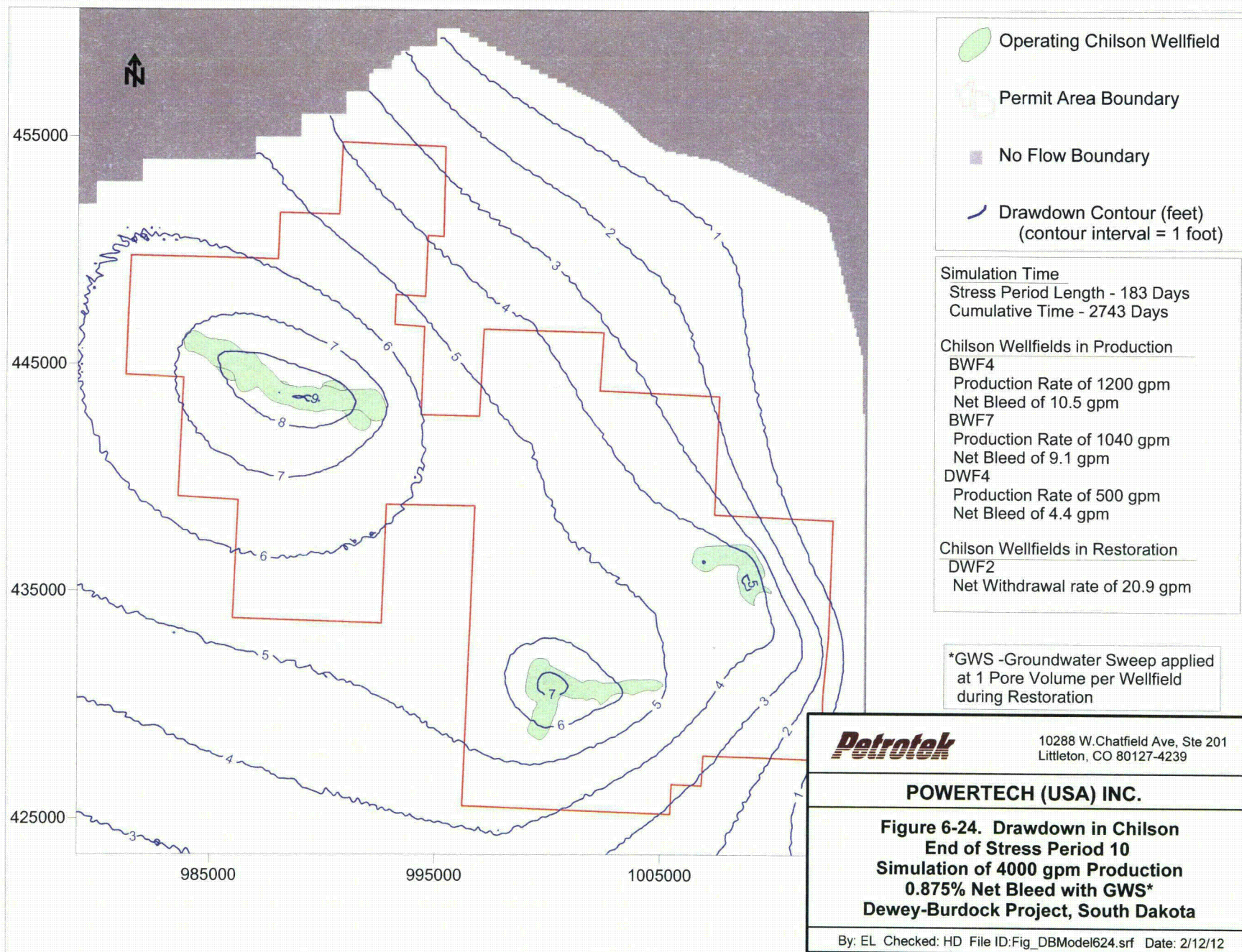
POWERTECH (USA) INC.

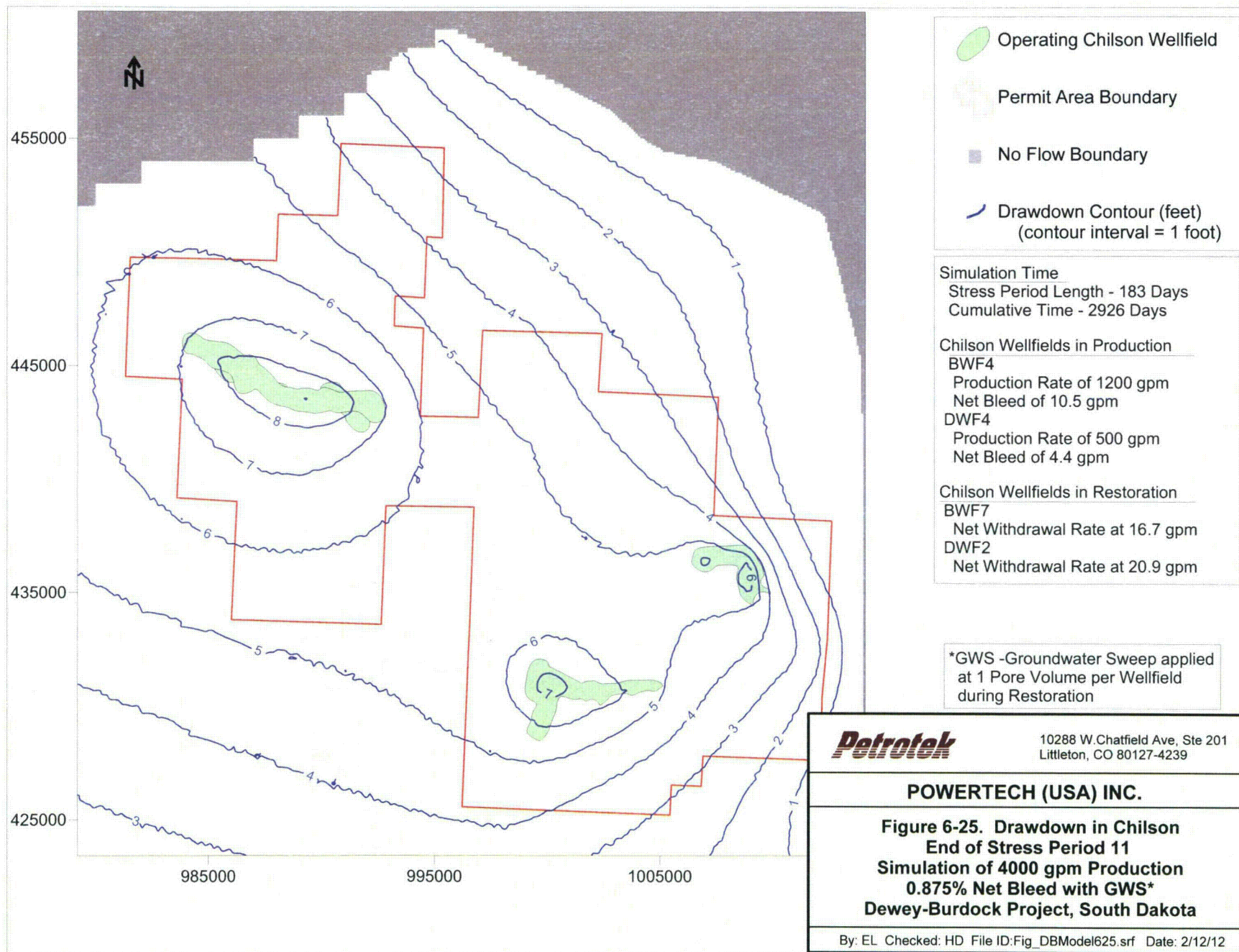
**Figure 6-22A. Drawdown in Chilson
 Across the Model Domain, End of Stress Period 8
 4,000 gpm Production, 0.875% Bleed with GWS
 Dewey-Burdock Project, South Dakota**

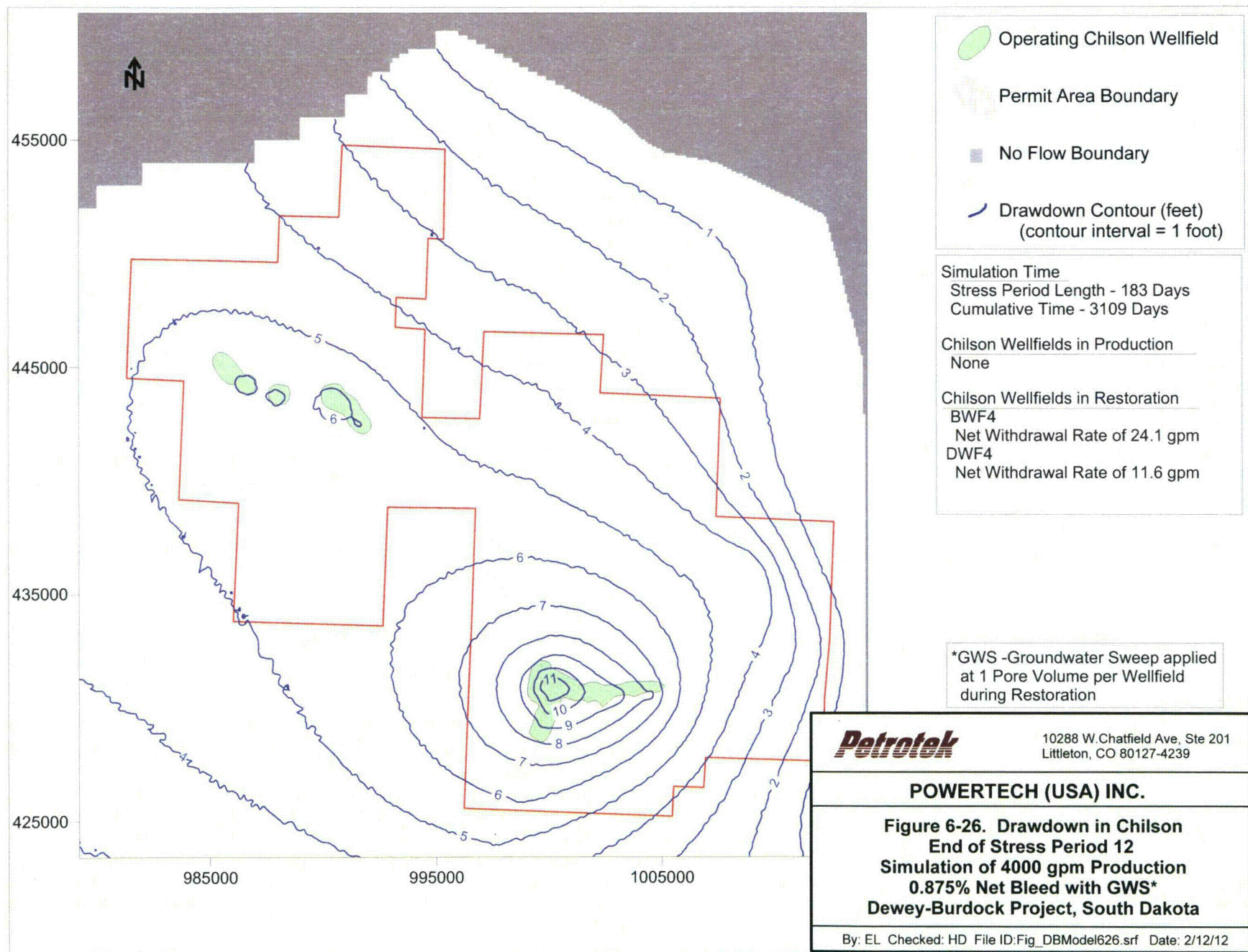
By: EL Checked: HD File ID: Fig_DBModel6_22A.srf Date: 2/12/12

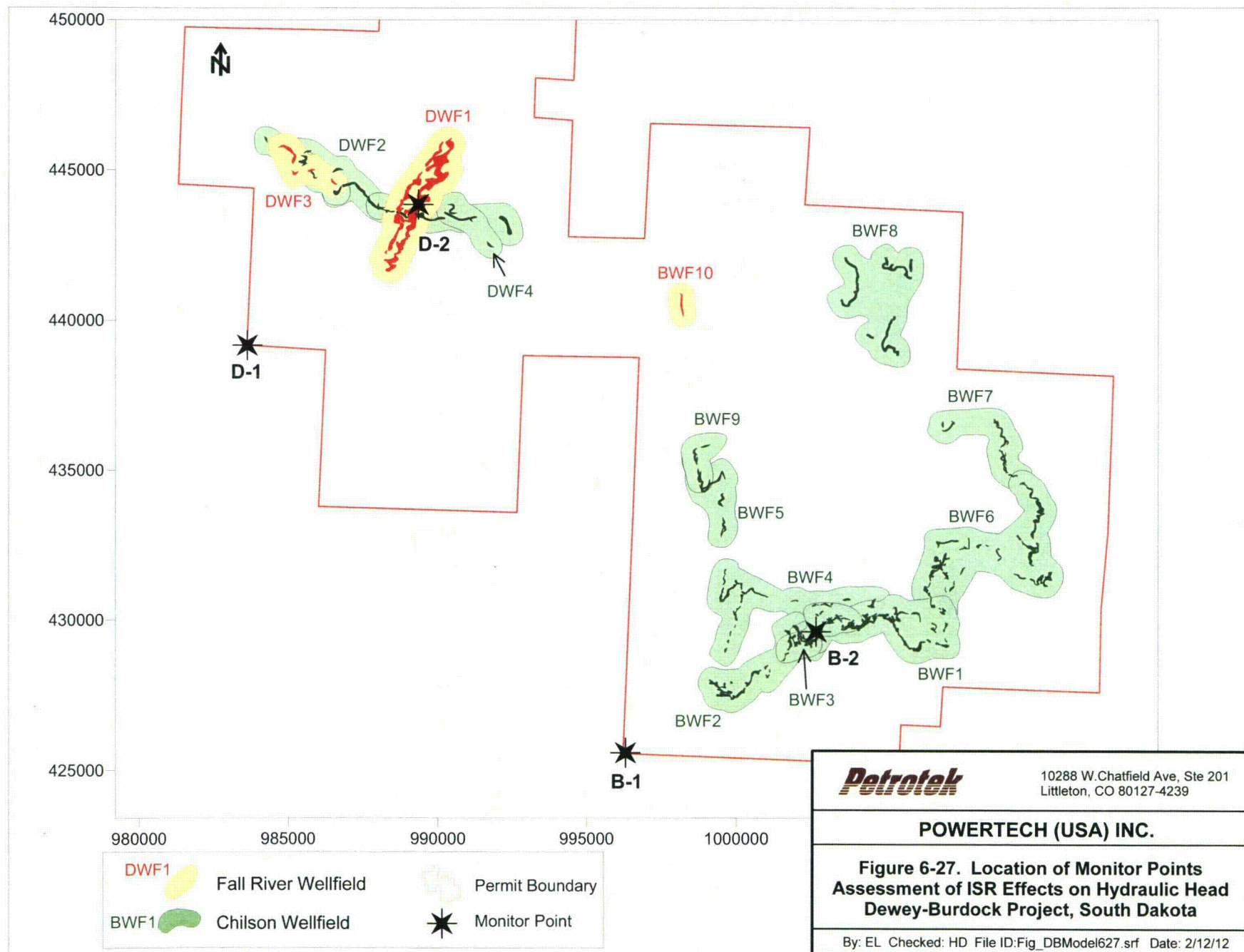


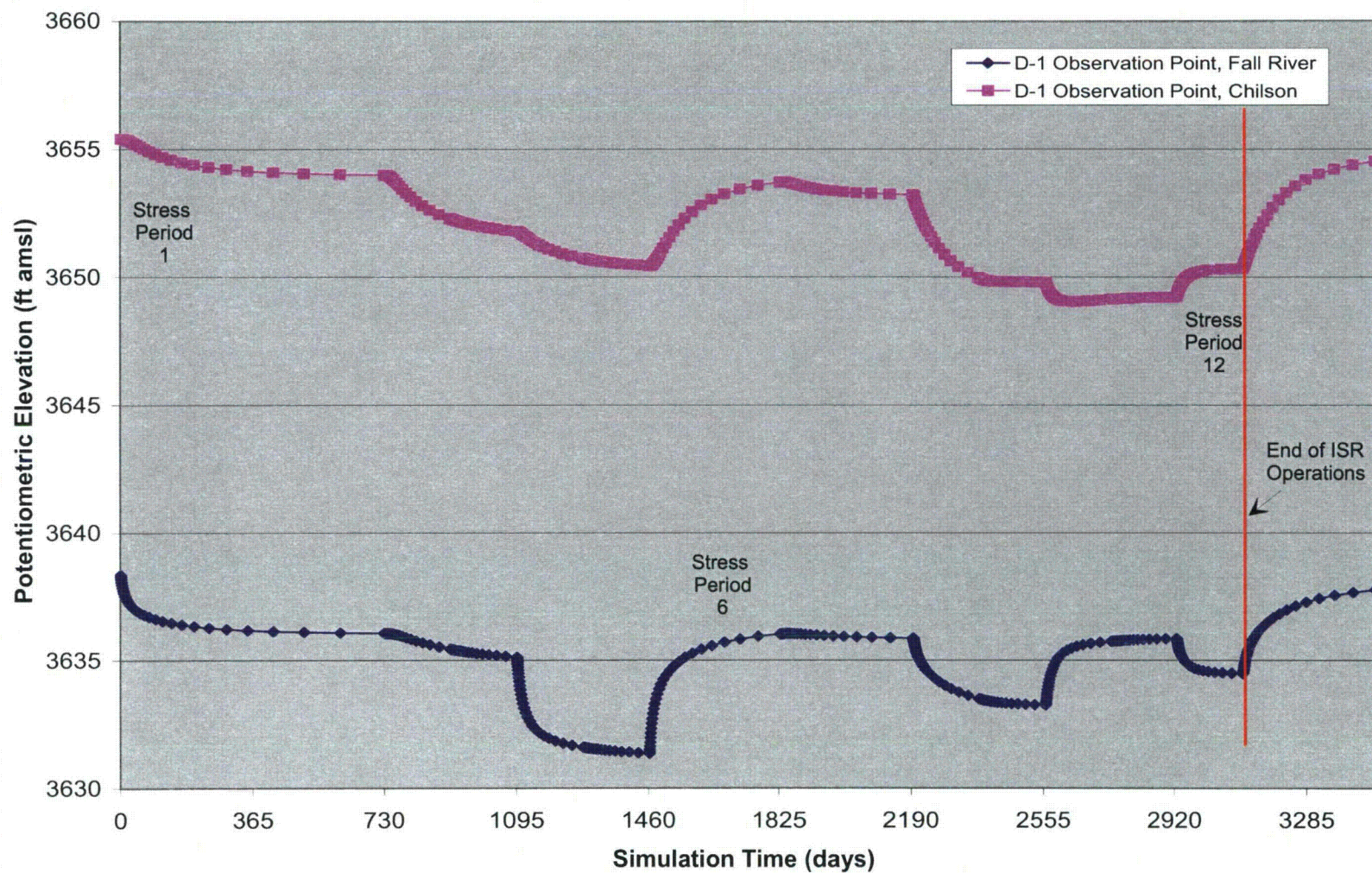












Simulation of 4000 gpm Production
0.875% Net Bleed with Groundwater Sweep

Ground Surface - 3,677 ft amsl
 Top of Fall River - 3,079 ft amsl
 Top of Chilson - 2,892 ft amsl

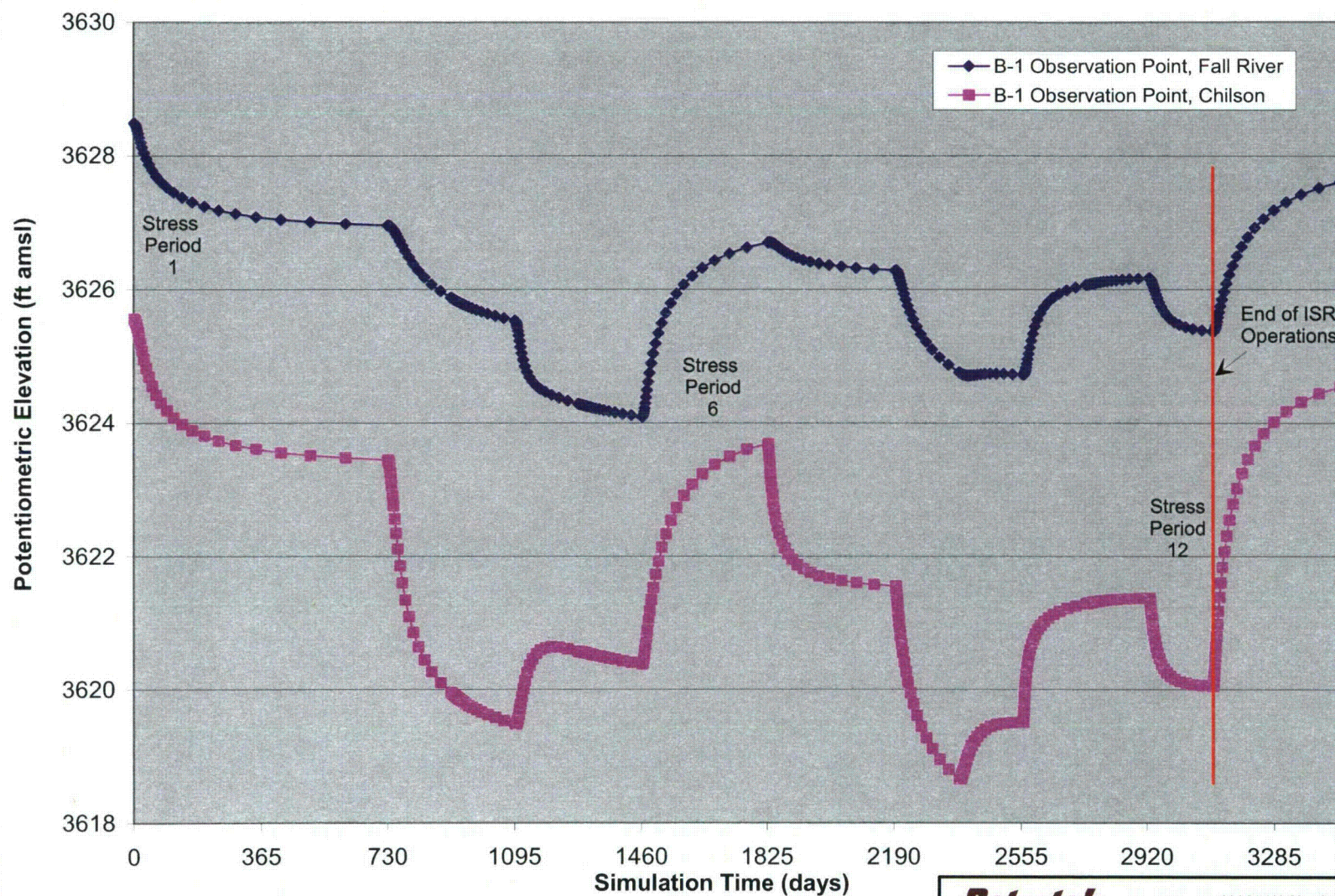
Petrotek

10288 W. Chatfield Ave, Ste 201
 Littleton, CO 80127-4239

POWERTECH (USA) INC.

**Figure 6-28A. Hydrographs of Simulated
 Potentiometric Head at Monitor Point D-1
 Dewey-Burdock Project, South Dakota**

By: EL Checked: HD File ID: Fig_DBModel628.srf Date: 2/21/12



Simulation of 4000 gpm Production
0.875% Net Bleed with Groundwater Sweep

Ground Surface - 3,592 ft amsl
Top of Fall River - 3,266 ft amsl
Top of Chilson - 3,069 ft amsl

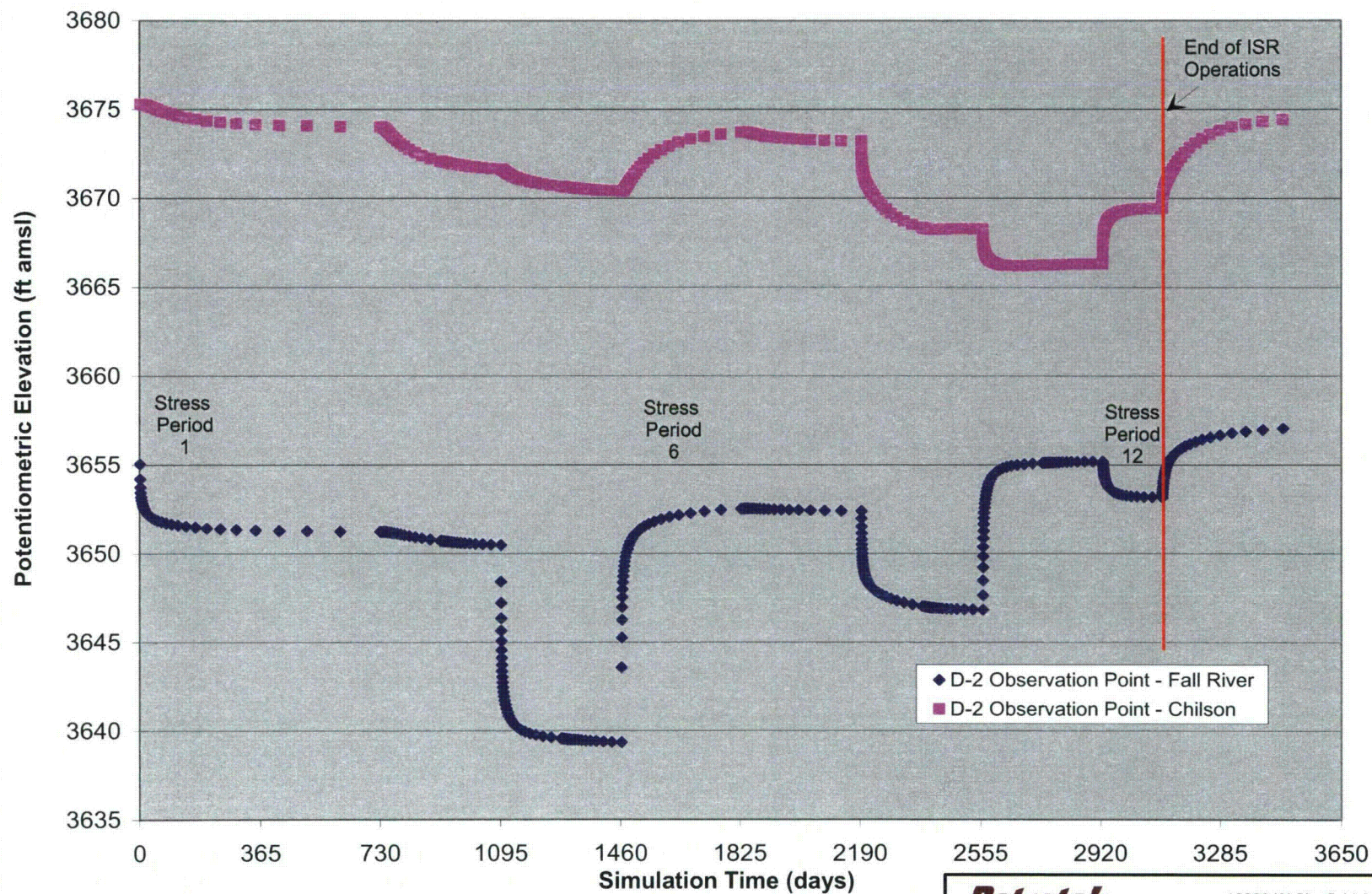
Petrotek

10288 W. Chatfield Ave, Ste 201
Littleton, CO 80127-4239

POWERTECH (USA) INC.

**Figure 6-28B. Hydrographs of Simulated
Potentiometric Head at Monitor Point B-1
Dewey-Burdock Project, South Dakota**

By: EL Checked: HD File ID: Fig_DBModel628B.srf Date: 2/12/12



Simulation of 4000 gpm Production
0.875% Net Bleed with Groundwater Sweep

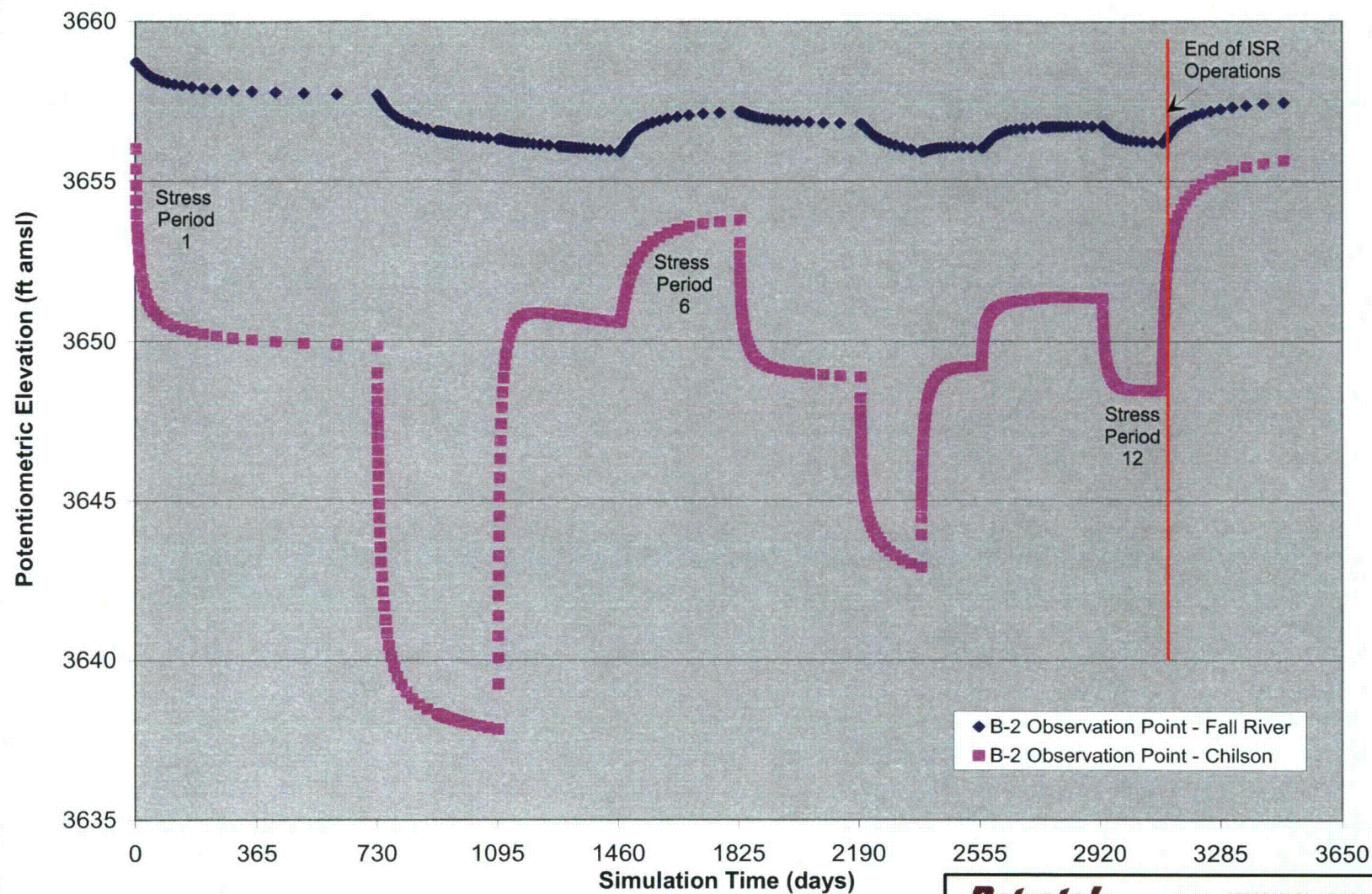
Petrotek

10288 W. Chatfield Ave, Ste 201
Littleton, CO 80127-4239

POWERTECH (USA) INC.

**Figure 6-29A. Hydrographs of Simulated
Potentiometric Head at Monitor Point D-2
Dewey-Burdock Project, South Dakota**

By: EL Checked: HD File ID: Fig_DBModel629A.srf Date: 2/12/12



Simulation of 4000 gpm Production
0.875% Net Bleed with Groundwater Sweep

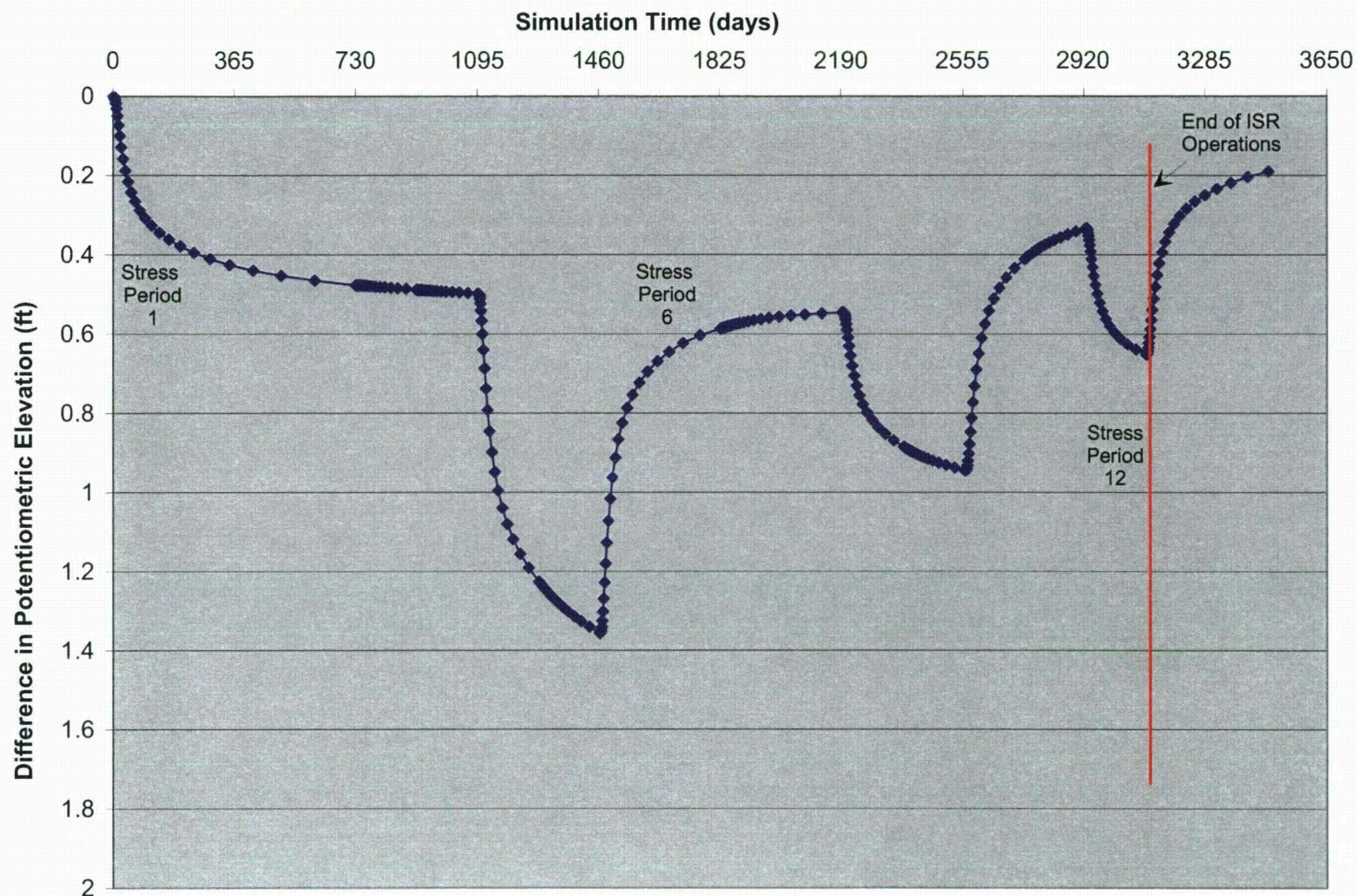
Petrotek

10288 W. Chatfield Ave, Ste 201
Littleton, CO 80127-4239

POWERTECH (USA) INC.

**Figure 6-29B. Hydrographs of Simulated
Potentiometric Head at Monitor Point B-2
Dewey-Burdock Project, South Dakota**

By: EL Checked: HD File ID: Fig_DBModel629B.srf Date: 2/12/12



Simulation of 4000 gpm Production
0.875% Net Bleed with Groundwater Sweep

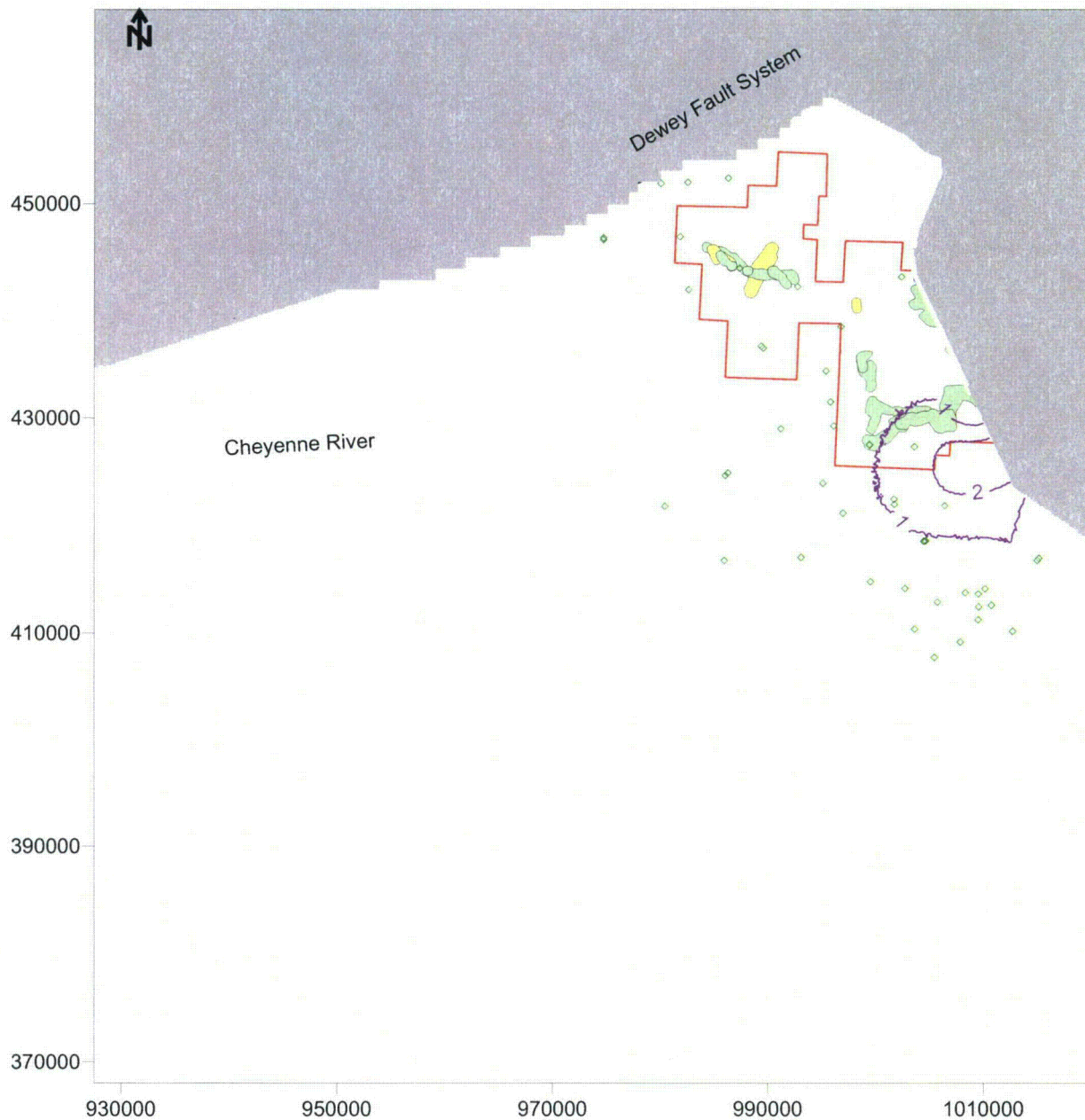
Petrotek

10288 W. Chatfield Ave, Ste 201
Littleton, CO 80127-4239

POWERTECH (USA) INC.

**Figure 6-29C. Difference In Potentiometric Head
at Monitor Point B-2, Without Operation of Fall River Wellfields
Dewey-Burdock Project, South Dakota**

By: EL Checked: HD File ID: Fig_DBModel629C.srf Date: 2/12/12



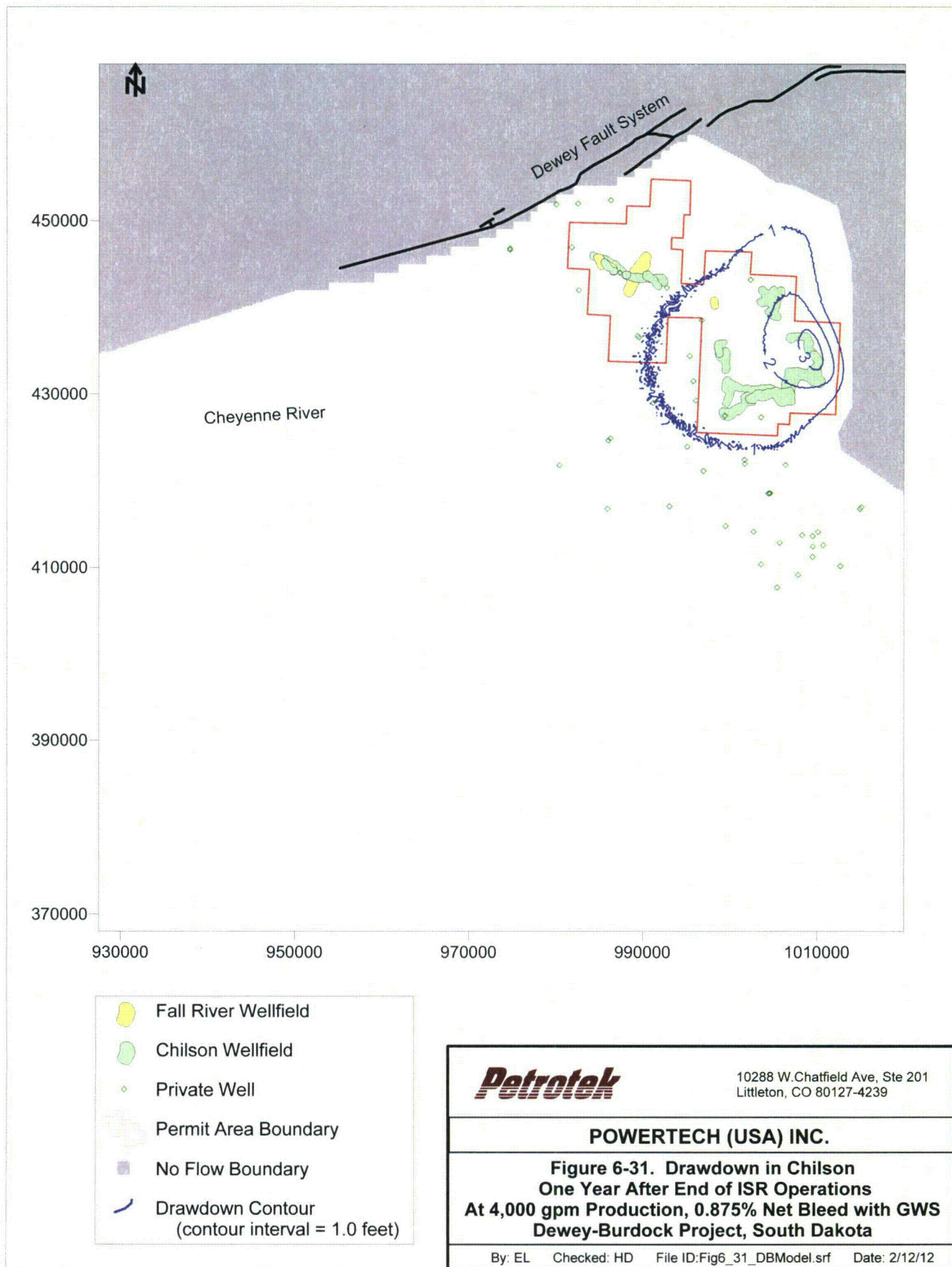
Petrotek

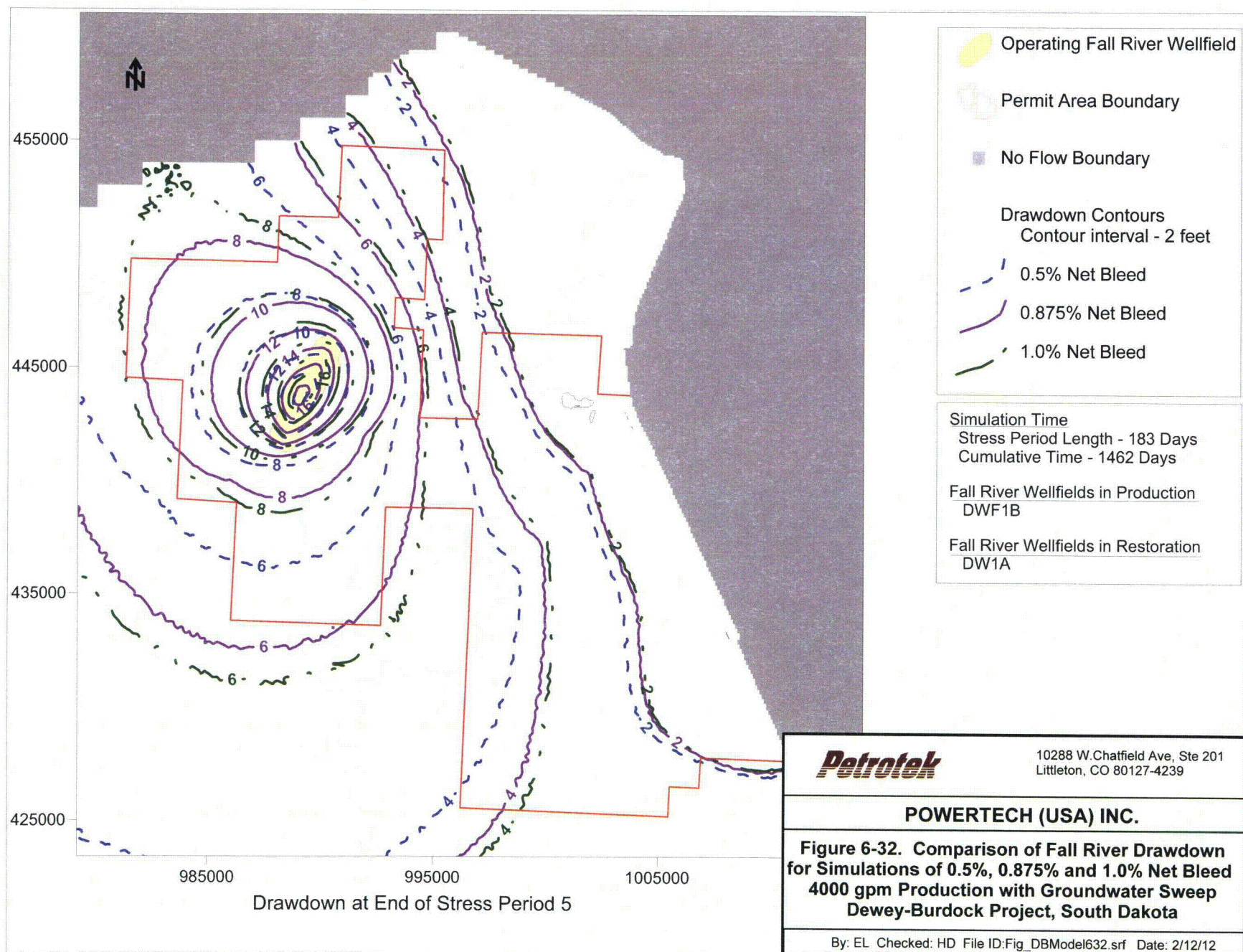
10288 W. Chatfield Ave, Ste 201
Littleton, CO 80127-4239

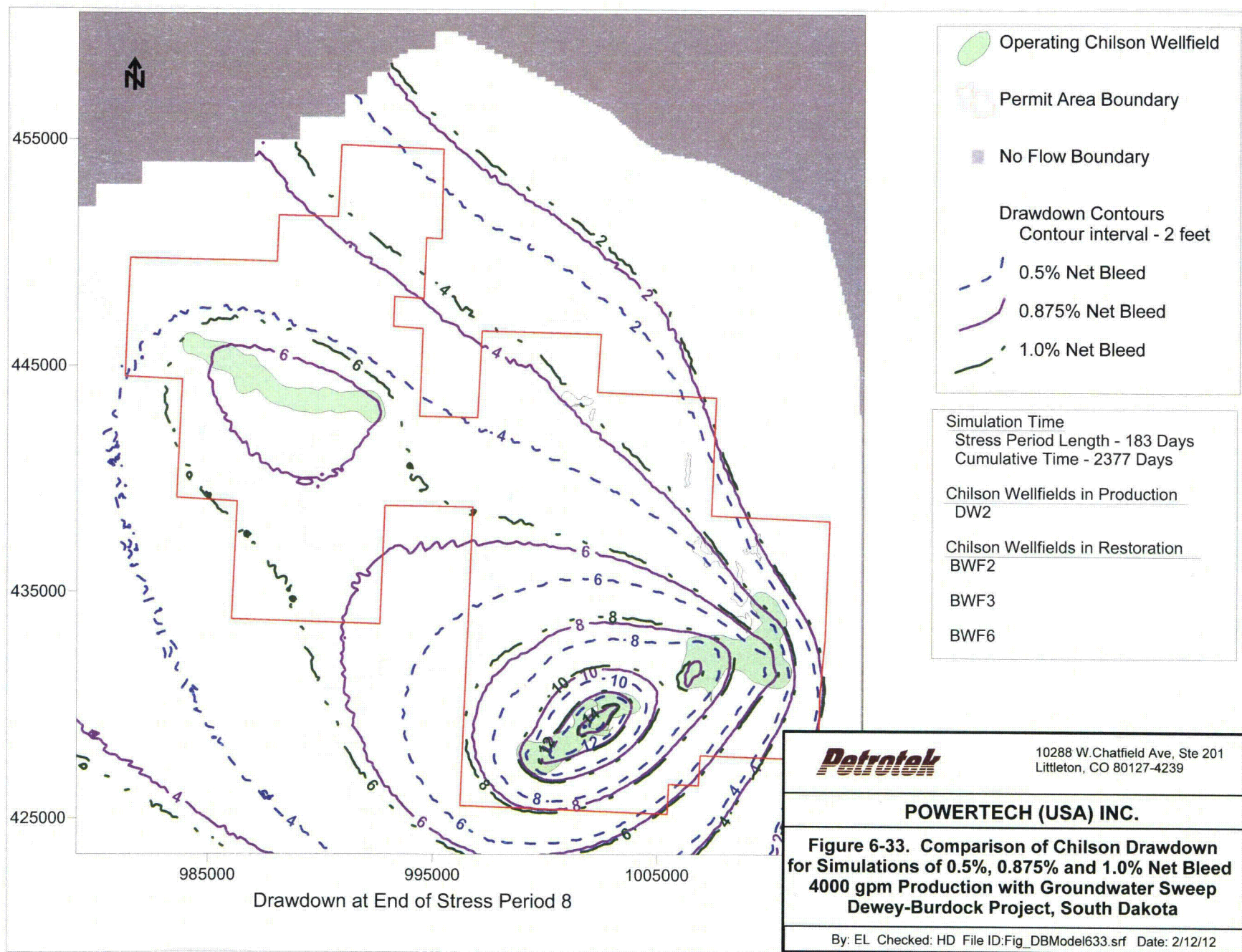
POWERTECH (USA) INC.

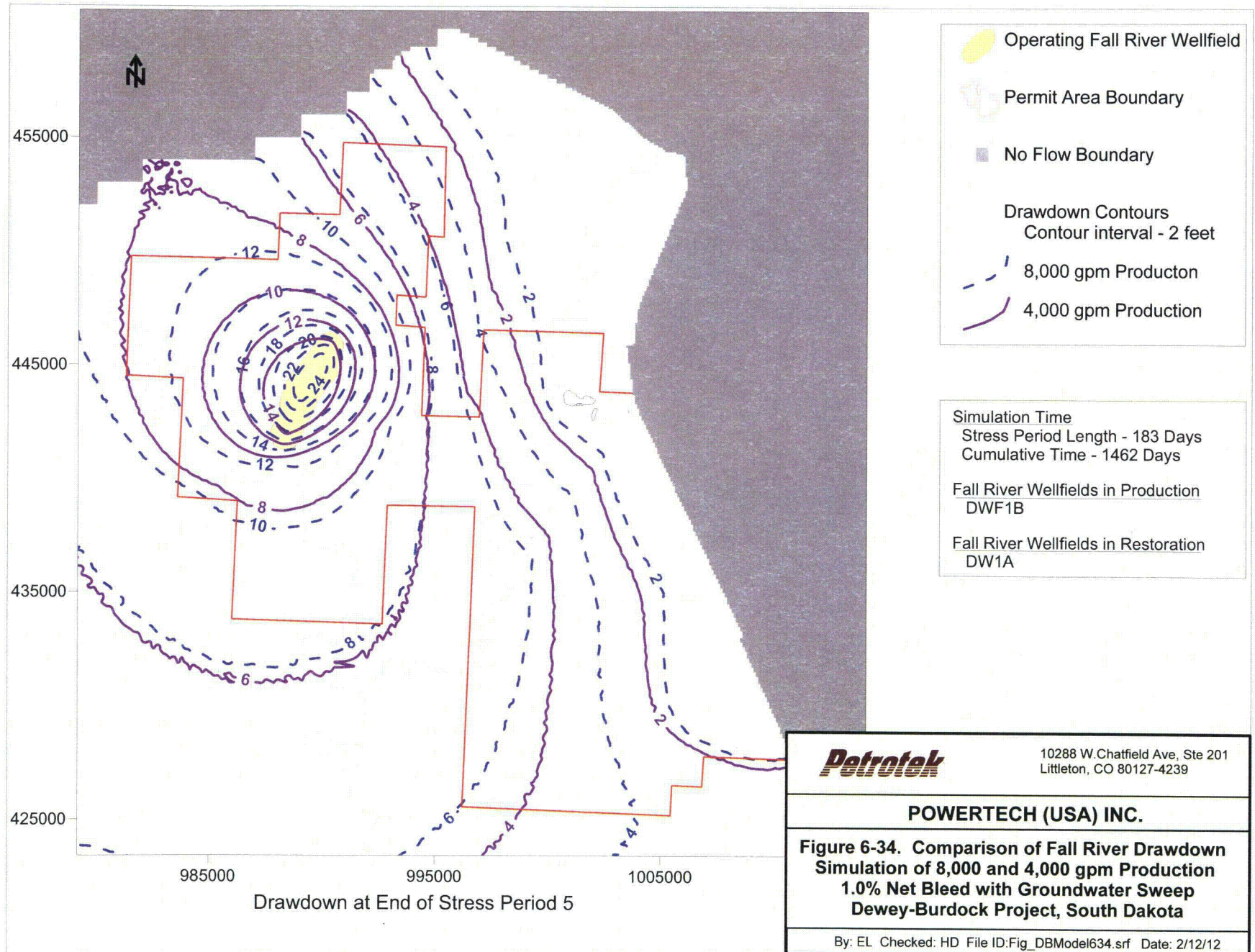
**Figure 6-30. Drawdown in Fall River
One Year After End of ISR Operations
At 4,000 gpm Production, 0.875% Net Bleed with GWS
Dewey-Burdock Project, South Dakota**

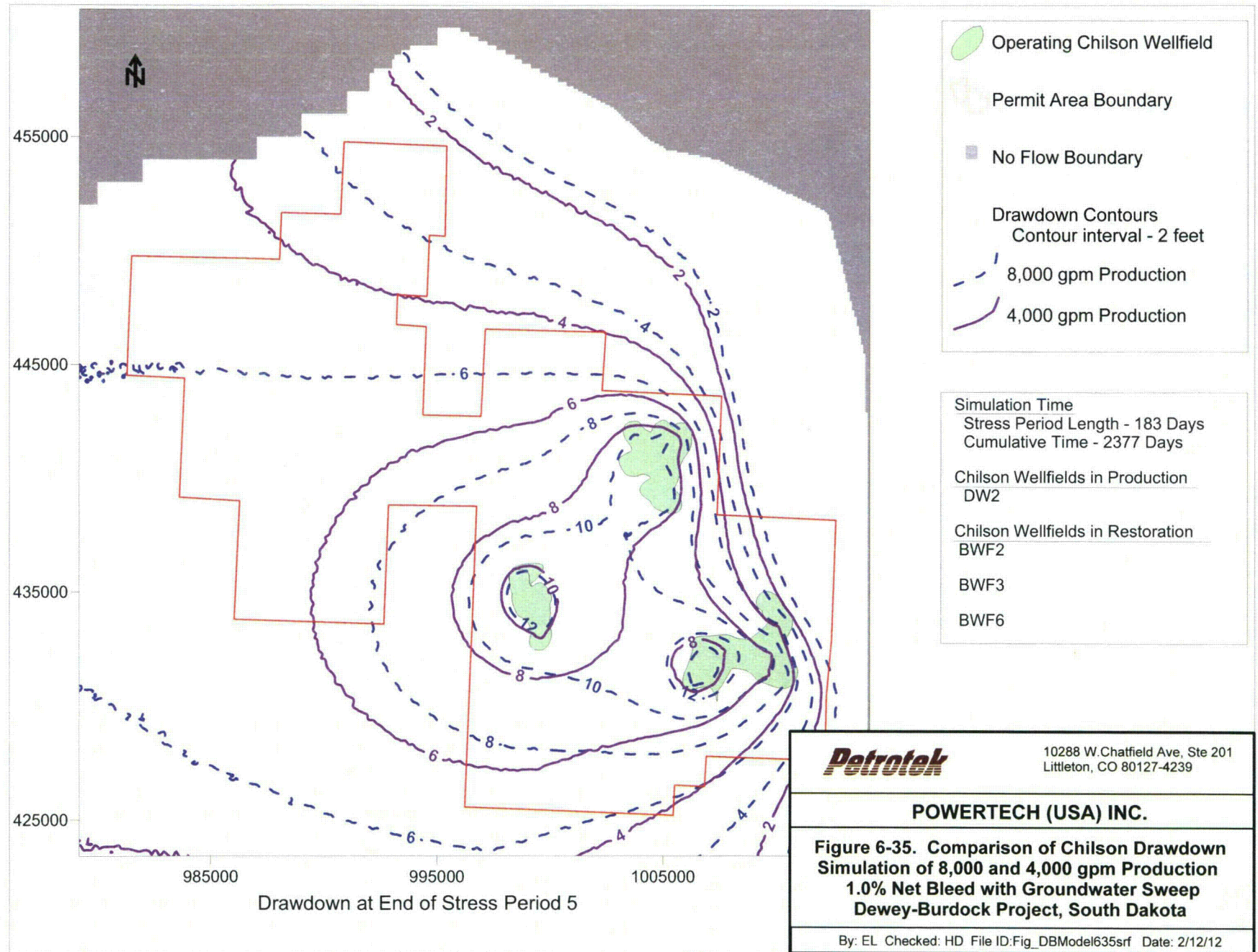
By: EL Checked: HD File ID: Fig6_30_DBModel.srf Date: 2/12/12

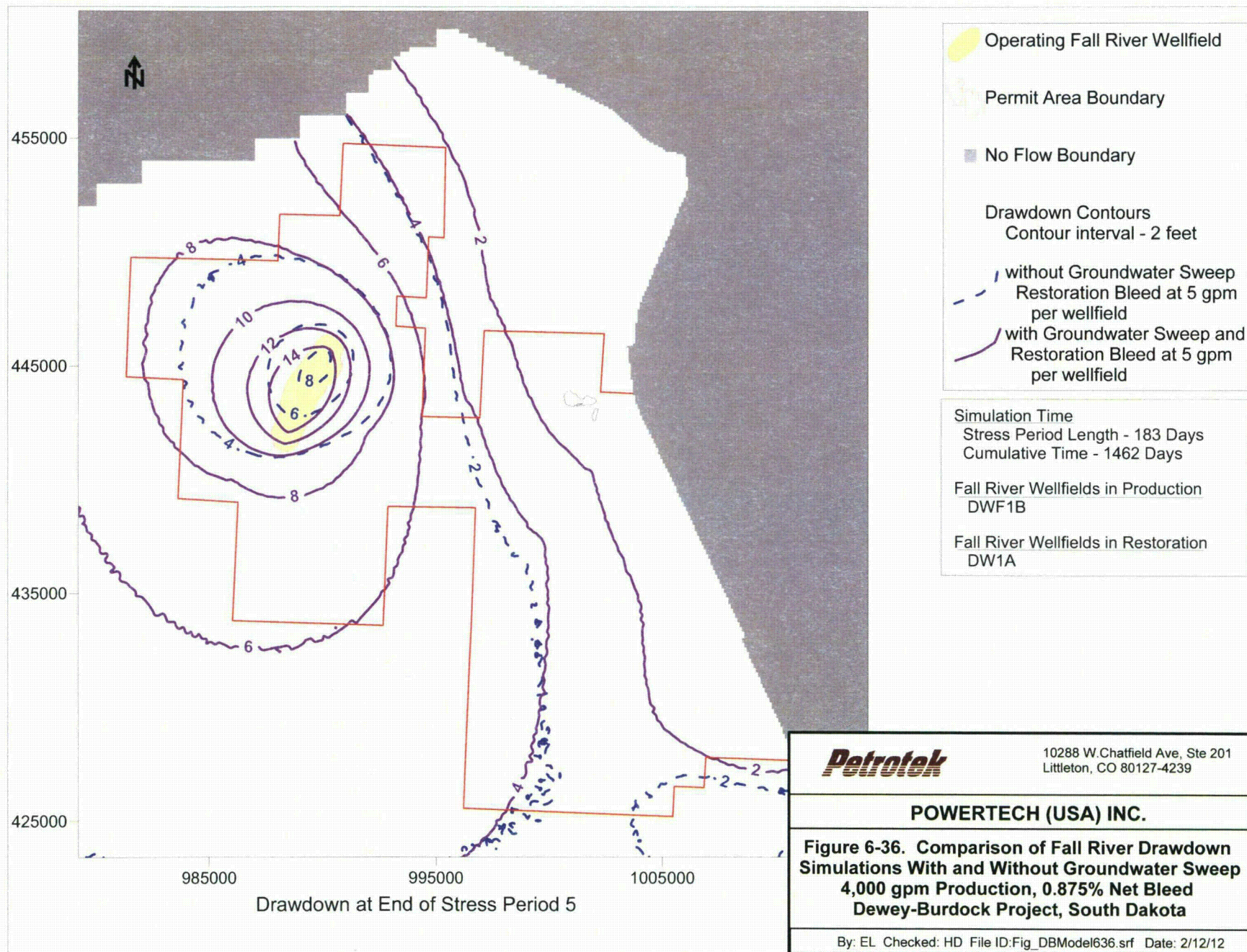


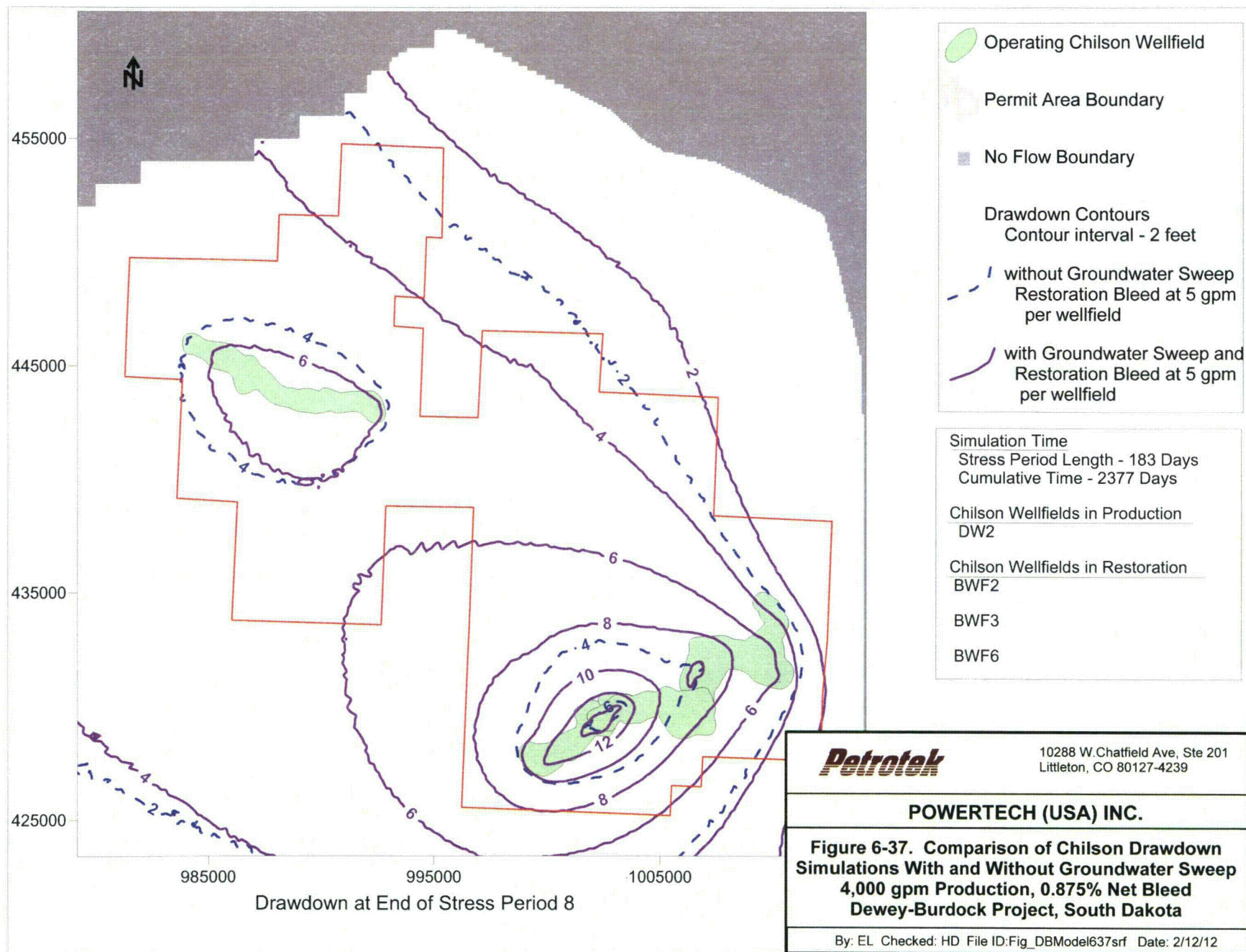


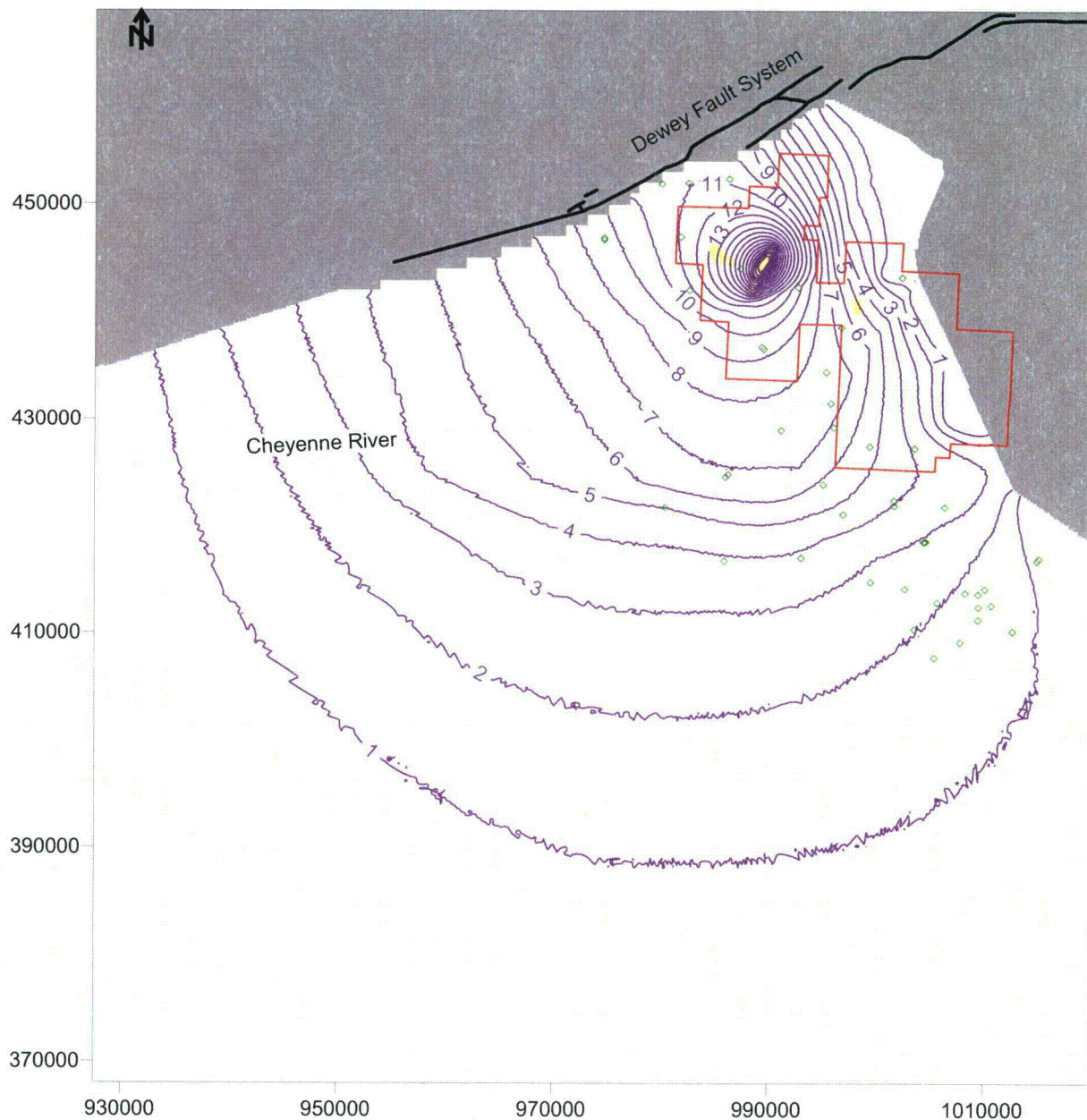












Drawdown at End of Stress Period 5



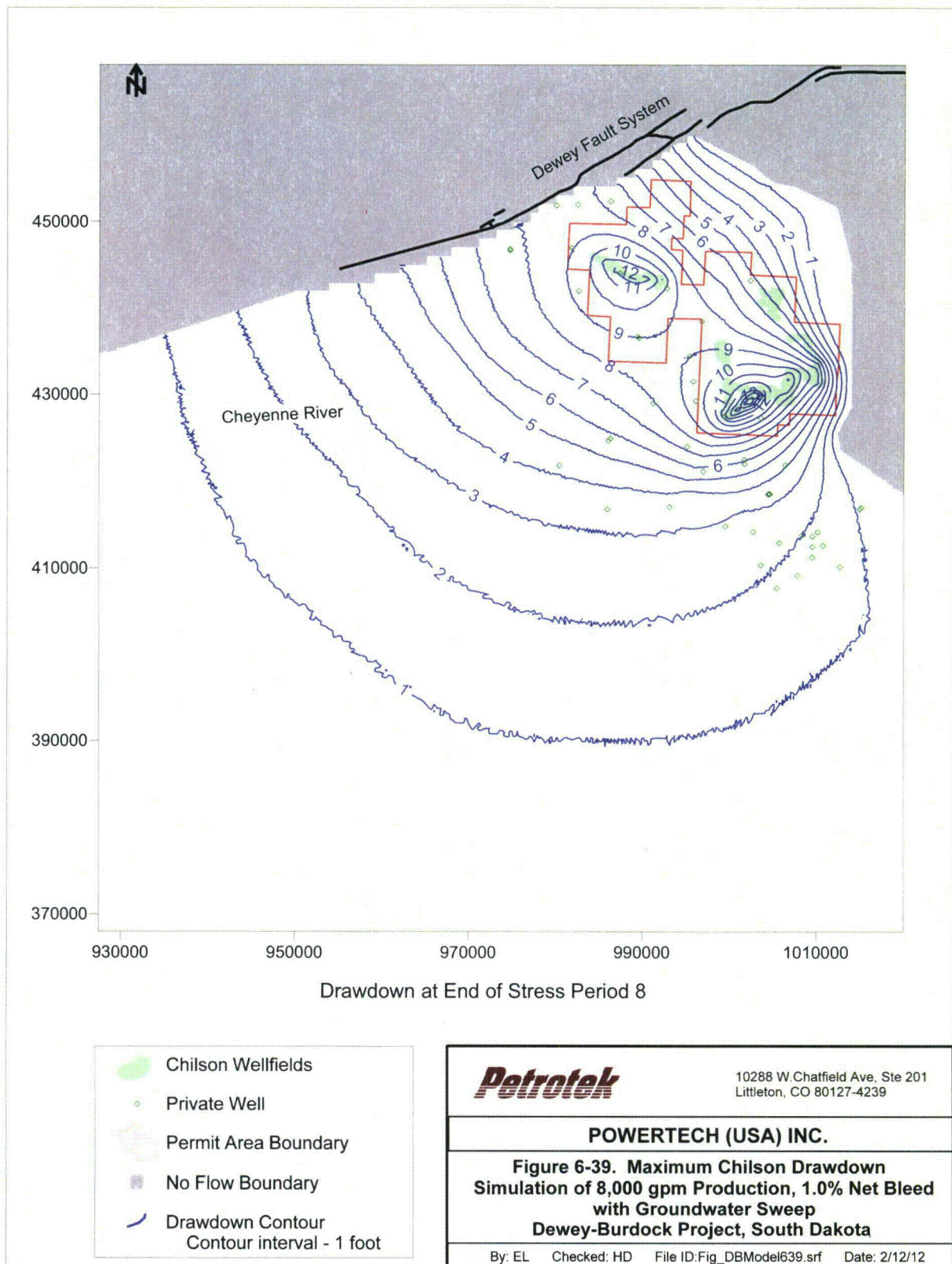
Petrotek

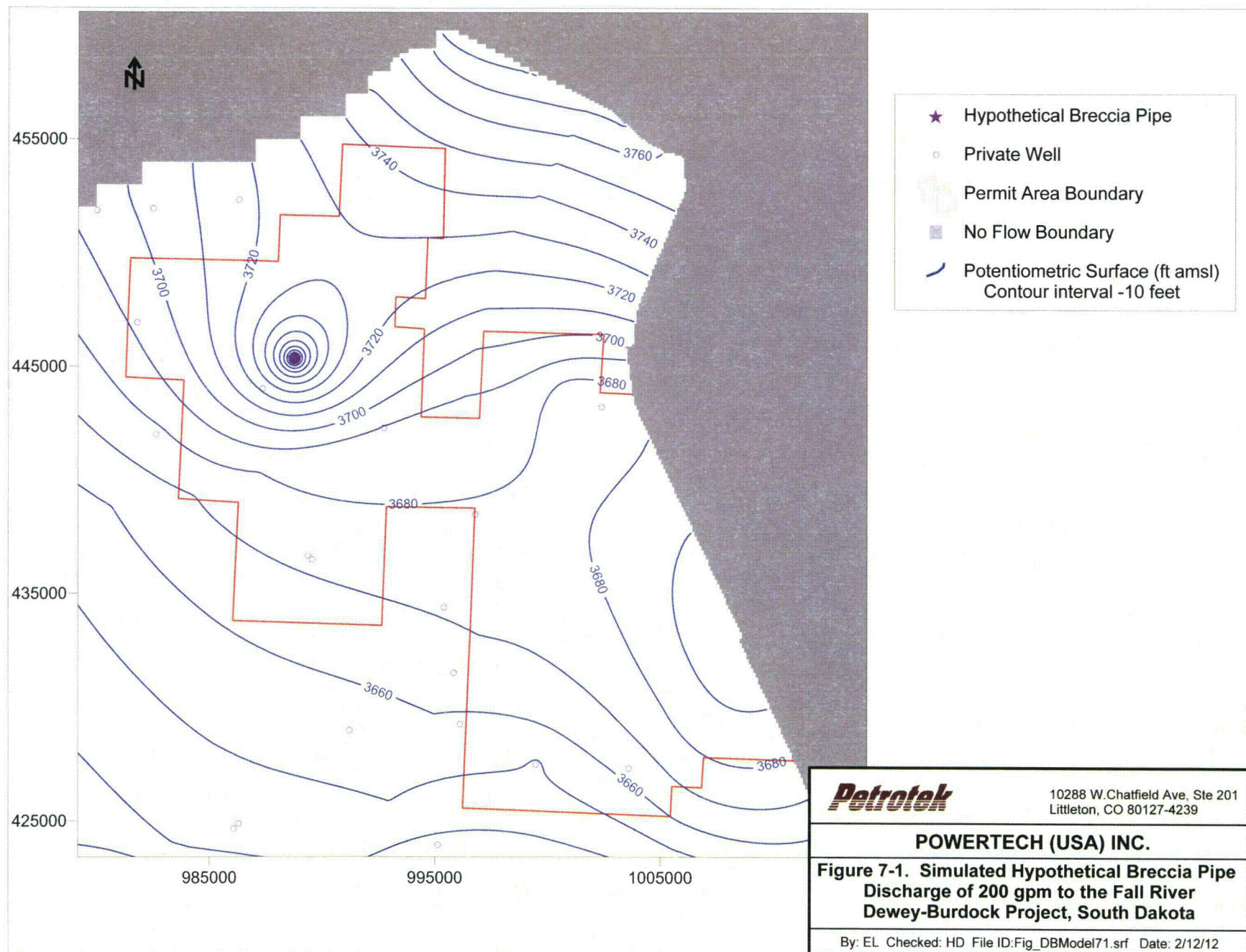
10288 W. Chatfield Ave, Ste 201
Littleton, CO 80127-4239

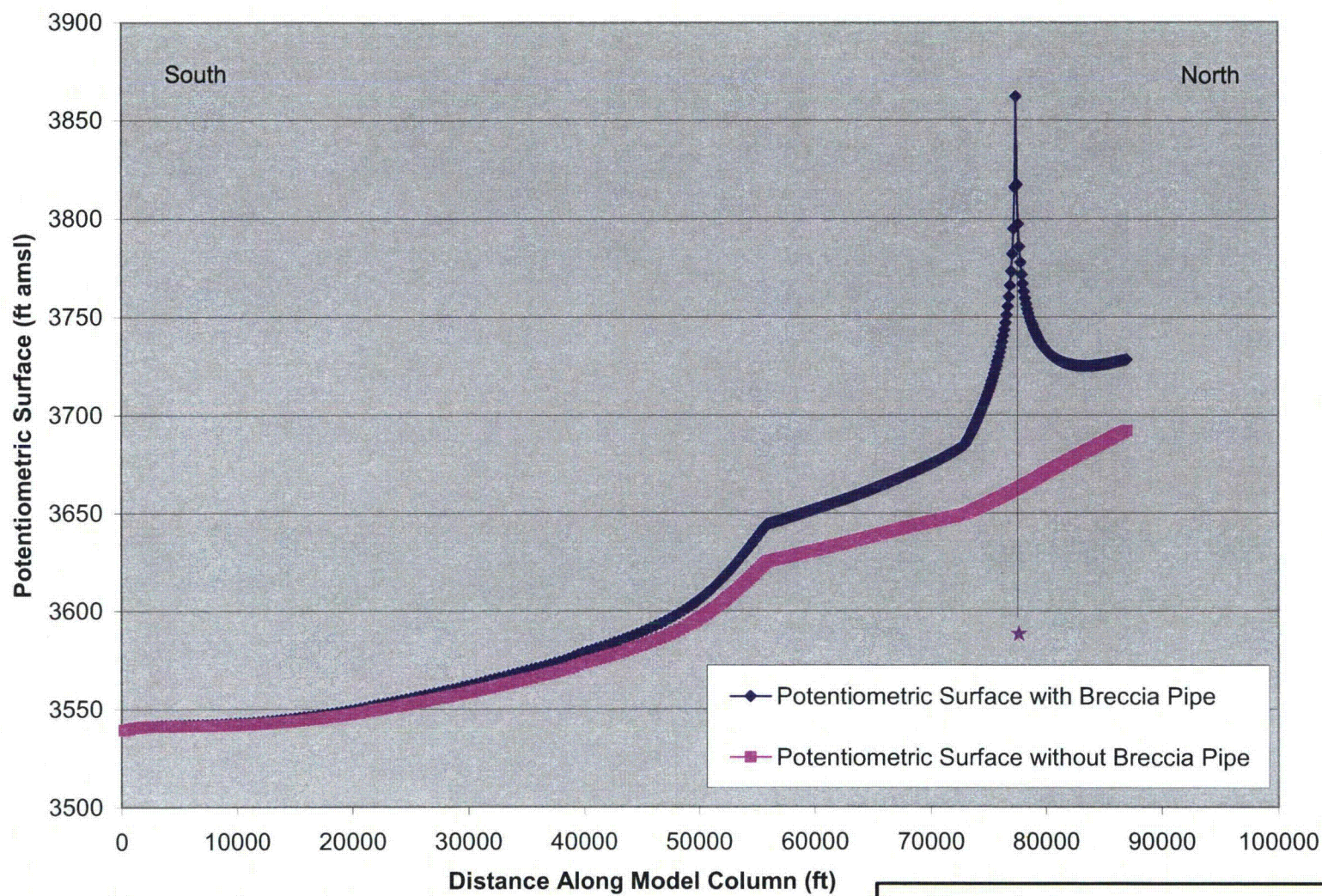
POWERTECH (USA) INC.

**Figure 6-38. Maximum Fall River Drawdown
Simulation of 8,000 gpm Production, 1.0% Net Bleed
with Groundwater Sweep
Dewey-Burdock Project, South Dakota**

By: EL Checked: HD File ID: Figs_DBModel638.srf Date: 2/12/12







★ Hypothetical Breccia Pipe Location
(Model Layer 2 Column 227, Row 153)

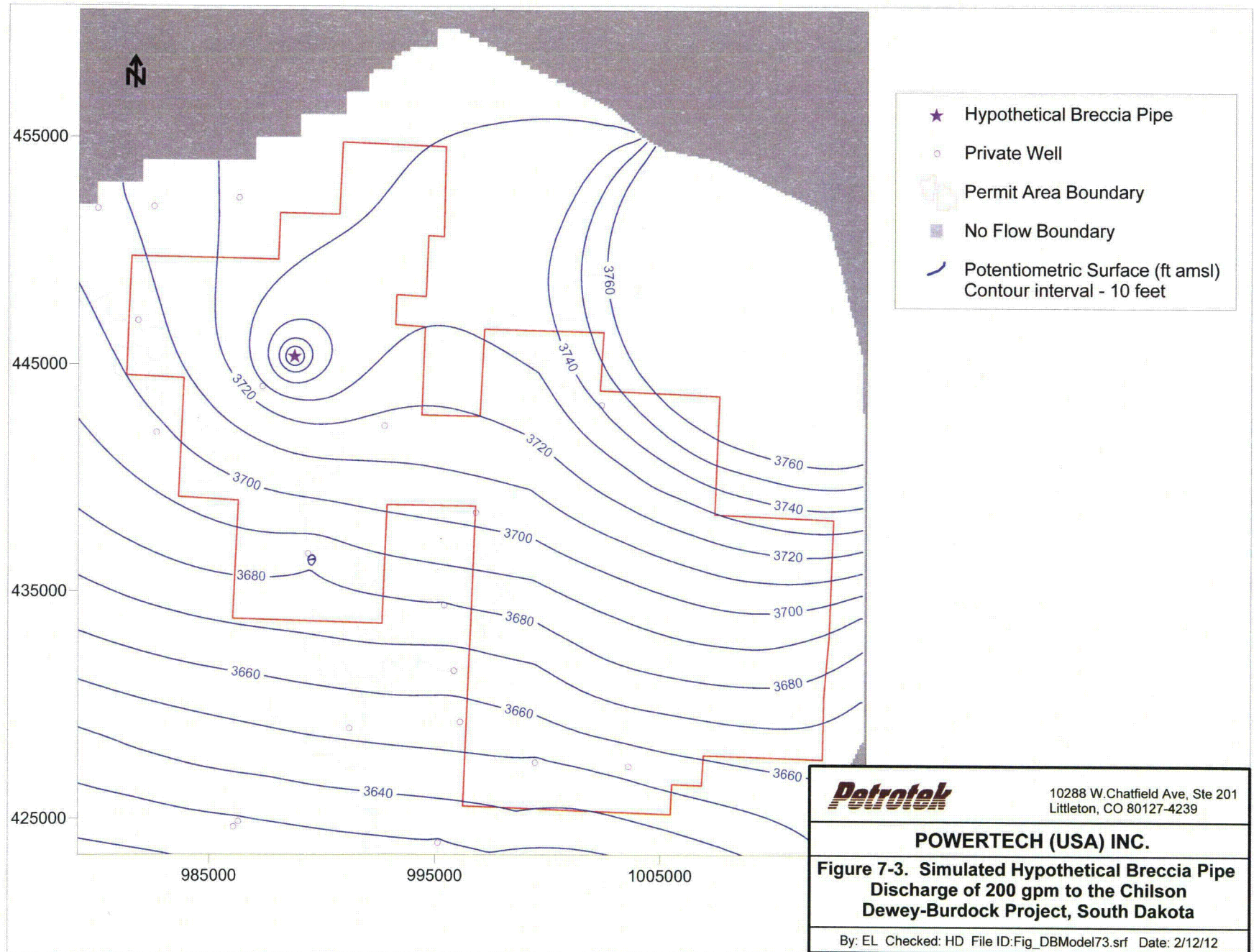
Petrotek

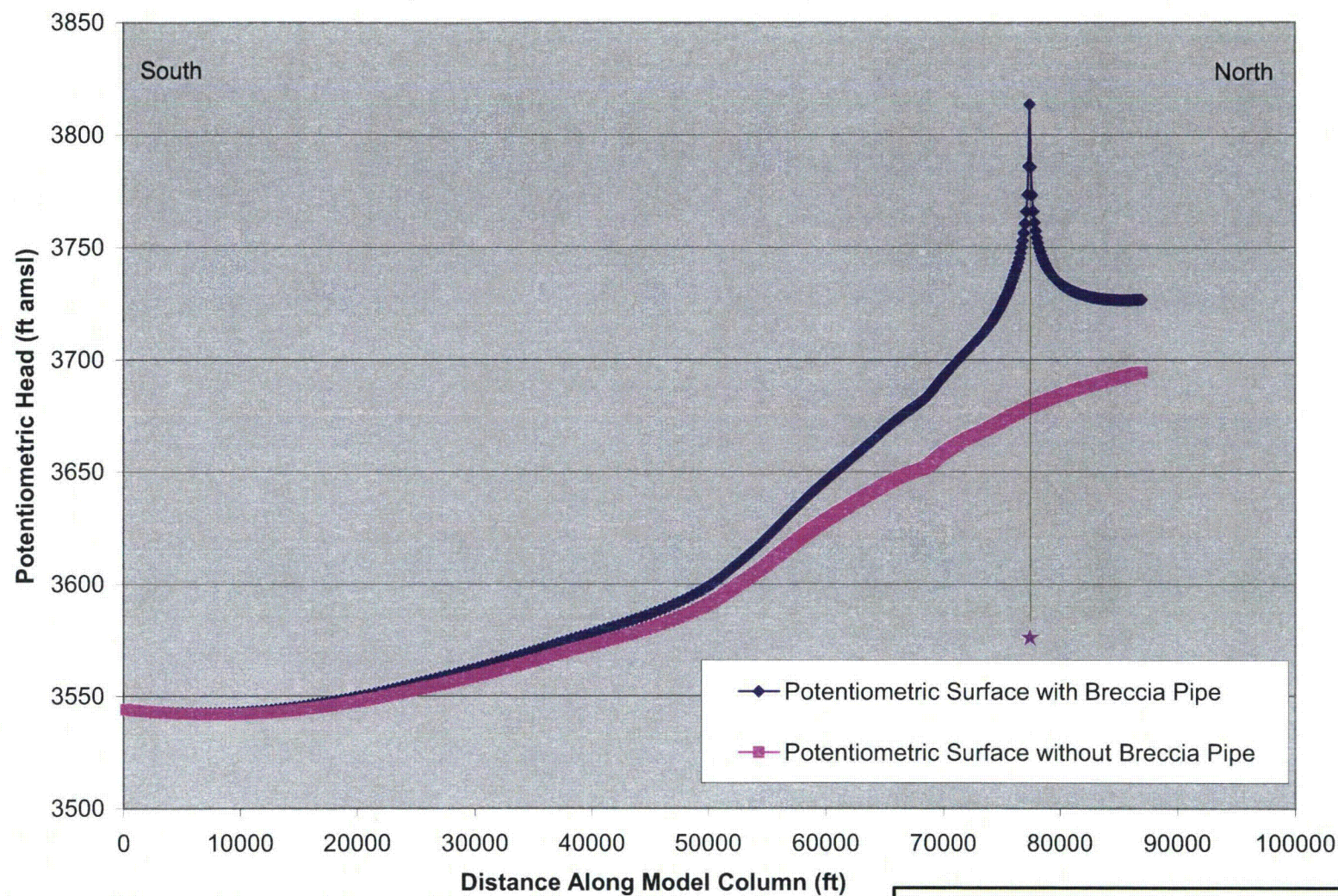
10288 W. Chatfield Ave, Ste 201
Littleton, CO 80127-4239

POWERTECH (USA) INC.

Figure 7-2. Cross-Sectional View of Hypothetical Breccia Pipe Discharge of 200 gpm to the Fall River Dewey-Burdock Project, South Dakota

By: EL Checked: HD File ID: Fig_DBModel72.srf Date: 2/12/12





★ Hypothetical Breccia Pipe Location
(Model Layer 4, Column 227, Row 153)

Petrotek

10288 W. Chatfield Ave, Ste 201
Littleton, CO 80127-4239

POWERTECH (USA) INC.

Figure 7-4. Cross-Sectional View of Hypothetical Breccia Pipe Discharge of 200 gpm to the Chilson Dewey-Burdock Project, South Dakota

By: EL Checked: HD File ID: Fig_DBModel74.srf Date: 2/12/12

Table 3-1. Monitor Well Water Level Data, Dewey-Burdock Project Area

Well ID	Easting*	Northing*	Completion Zone	Total Depth	Top of Casing Elevation	Measure Point Elevation	Water Level Elevation						Avg. W.L. Elevation	Max. W.L. Elevation	Min. W.L. Elevation	Standard Deviation
							8/30/2010	12/13/2010	1/17/2011	2/21/2011	3/21/2011	4/25/2011				
	(ft)	(ft)	-	(ft)	(ft amsl)	(ft amsl)	(ft amsl)	(ft amsl)	(ft amsl)	(ft amsl)	(ft amsl)	(ft amsl)	(ft amsl)	(ft amsl)	(ft amsl)	(ft)
12	995,377	434,379	Chilson	805	3641.14	3641.51	3653.19	3653.46	3654.06	3654.26	3654.09	3654.55	3653.94	3654.55	3653.19	0.511
14	1,002,103	434,723	Fall River	300	3669.88	3669.88	NM	3662.91	3663.07	3663.02	3663.05	3663.15	3663.04	3663.15	3662.91	0.087
38	992,727	442,290	Fall River	494	3638.75	3639.63	3644.96	3646.23	3644.76	3646.61	3646.75	3647.01	3646.05	3647.01	3644.76	0.960
49	987,331	444,023	Fall River	600	3620.86	3621.27	3648.59	3642.36	3642.34	NM	3644.64	3645.47	3644.68	3648.59	3642.34	2.587
436	989,849	454,701	Fall River	590	3739.85	3739.85	NM	3707.48	3707.56	3707.31	3707.36	3707.31	3707.40	3707.56	3707.31	0.111
607	980,219	416,378	Fall River	265	3610.55	3610.58	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
608	980,229	416,455	Chilson	?	3609.26	3609.15	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
609	990,133	447,808	Chilson	1000	3700.67	3700.67	3688.50	3688.85	3686.81	3687.76	3687.75	3688.05	3687.95	3688.85	3686.81	0.707
610	989,998	447,970	Fall River	680	3704.85	3704.85	3691.75	3691.74	3691.51	3691.45	3691.33	3691.52	3691.55	3691.75	3691.33	0.166
611	990,234	453,955	Chilson	804	3737.36	3737.36	NM	3691.99	3690.77	3691.03	3691.32	3691.26	3691.27	3691.99	3690.77	0.455
612	990,153	454,129	Chilson	800	3732.34	3732.34	NM	3694.04	3692.69	3692.90	3693.17	3693.15	3693.19	3694.04	3692.69	0.514
613	990,523	453,776	Fall River	580	3736.93	3736.93	3700.03	3700.20	3700.25	3700.02	3700.00	3700.03	3700.09	3700.25	3700.00	0.108
615	990,571	453,709	Chilson	800	3741.00	3741.00	3689.31	3689.79	3688.49	3688.72	3688.99	3688.99	3689.05	3689.79	3688.49	0.457
616	990,531	453,135	Chilson	835	3751.04	3751.04	NM	3693.43	3692.16	3692.40	3692.63	3692.60	3692.64	3693.43	3692.16	0.478
617	989,425	453,583	Chilson	810	3725.55	3725.55	NM	3692.35	3691.11	3691.33	3691.58	3691.53	3691.58	3692.35	3691.11	0.469
622	991,175	454,034	Chilson	780	3754.91	3754.91	3692.85	3693.33	3692.03	3692.24	3692.50	3692.47	3692.57	3693.33	3692.03	0.463
623	991,085	454,312	Fall River	580	3753.28	3753.28	3708.51	3708.64	3708.65	3708.50	3708.53	3708.55	3708.56	3708.65	3708.50	0.066
628	990,895	449,719	Fall River	520	3731.99	3731.99	3694.78	3694.93	3694.77	3694.69	3694.42	3694.68	3694.71	3694.93	3694.42	0.169
631	1,002,576	449,310	Fall River	80	3745.37	3745.37	3716.86	3716.95	3716.92	3717.11	3717.37	3717.41	3717.10	3717.41	3716.86	0.237
657	989,882	454,730	Chilson	800	3747.58	3747.58	NM	3693.34	3692.06	3692.28	3692.48	3692.53	3692.54	3693.34	3692.06	0.485
680	1,003,477	429,969	Chilson	436	3701.94	3701.94	3661.02	3660.69	3661.06	3661.09	3661.07	3661.45	3661.06	3661.45	3660.69	0.241
681	988,728	443,725	Fall River	600	3626.99	3630.31	3649.22	3643.89	3644.21	NM	3646.05	3646.63	3646.00	3649.22	3643.89	2.146
682	1,003,538	431,258	Chilson	460	3718.24	3718.24	3665.40	3665.14	3665.49	3665.54	3665.45	3665.75	3665.46	3665.75	3665.14	0.199
683	988,611	446,105	Fall River	650	3663.66	3666.64	3662.67	3659.52	3658.88	NM	3660.21	3660.57	3660.37	3662.67	3658.88	1.440
684	1,003,590	429,744	Chilson	423	3689.04	3689.04	NM	3661.57	3661.96	3661.96	3661.95	3662.34	3661.96	3662.34	3661.57	0.272
685	989,088	443,410	Fall River	595	3627.85	3630.35	3666.83	3642.12	3642.58	NM	3645.51	3646.14	3644.09	3666.83	3642.12	10.322
686	1,003,369	429,750	Chilson	428	3692.06	3692.06	NM	3661.23	3661.52	3661.56	3661.48	3661.96	3661.55	3661.96	3661.23	0.263
687	988,480	443,725	Fall River	608	3623.84	3624.79	NM	3641.48	3641.58	NM	3643.99	3644.39	3642.86	3644.39	3641.48	1.545
688	1,003,426	429,974	Fall River	255	3701.26	3701.26	3663.36	3662.81	3663.09	3663.08	3663.06	3663.37	3663.13	3663.37	3662.81	0.211
689	988,715	443,789	Chilson	730	3627.27	3629.69	3684.72	3684.10	3678.86	NM	3684.23	3683.99	3683.18	3684.72	3678.86	2.431
691	988,763	443,698	Fall River	505	3628.88	3630.29	3646.65	3643.51	3643.58	NM	NM	3646.12	3644.97	3646.65	3643.51	1.654
692	1,003,474	430,014	Chilson	335	3704.98	3704.98	NM	3663.21	3663.54	3663.57	3663.54	3663.83	3663.54	3663.83	3663.21	0.220
694	997,116	426,836	Fall River	392	3598.29	3600.69	3650.25	3640.12	3641.29	3641.20	3641.28	3641.64	3641.11	3650.25	3640.12	3.768
695	990,783	439,313	Fall River	508	3597.80	3599.12	3638.98	3634.18	3633.64	3634.95	3634.42	3634.95	3634.43	3638.98	3633.64	1.923
696	996,937	427,142	Chilson	587	3597.96	3599.91	3641.09	3649.16	3649.78	3649.60	3649.58	3650.74	3649.77	3650.74	3641.09	3.583
697	990,748	439,347	Chilson	682	3597.69	3600.30	3679.68	3675.76	3670.51	3678.16	3672.58	3672.69	3674.90	3679.68	3670.51	3.571
698	1,004,308	435,651	Fall River	205	3714.25	3714.25	3679.28	3679.45	3679.38	3679.22	3679.21	3679.35	3679.32	3679.45	3679.21	0.095
705	997,023	453,315	Chilson	460	3826.42	3826.42	NM	3709.77	3709.62	3709.41	3709.53	3709.64	3709.59	3709.77	3709.41	0.134
706	996,988	453,276	Fall River	316	3824.32	3824.32	NM	3725.19	3725.32	3725.10	3725.29	3725.15	3725.21	3725.32	3725.10	0.093
3026	1,012,037	432,833	Chilson	196	3820.48	3820.48	3680.30	3680.89	3680.78	3680.38	3680.46	3680.58	3680.57	3680.89	3680.30	0.231

ft - feet

ft amsl - feet above mean sea level

NM- Not measured

*Coordinates are South Dakota State Plane South, North American Datum 1983

Values in red and italicized not used to calculate average

Table 3-2. Estimated Flow Rates for Private Wells, Dewey-Burdock Project Area

Fall River									
Well ID	Easting*	Northing*	Township	Range	Section	QtrQtr	Depth	Flowing Artesian	Rate
	(ft)	(ft)					(ft bgs)		(gpm)
5	1,003,580	427,284	7S	1E	14	NENW	0	yes	1.50
7	1,001,703	422,417	7S	1E	23	NWNW	200		0.06
8	1,004,451	418,515	7S	1E	23	SWSE	240	yes	0.14
9	1,006,403	421,806	7S	1E	23	NENE	90	no	3.00
18	991,211	428,960	7S	1E	9	SWSW	527	yes	6.00
20	986,071	424,628	7S	1E	17	SWSW	530		0.08
21	980,441	421,760	7S	1E	19	SWNW	910		9.10
23	985,974	416,756	7S	1E	29	NWNW	600	no	0.50
24	993,100	417,037	7S	1E	28	NWNE	600	yes	2.90
25	999,548	414,798	7S	1E	27	NWSE	350		0.10
26	1,003,613	410,375	7S	1E	35	SWNE	350	no	3.26
33	1,009,519	413,664	7S	1E	25	NWSE	96		1.00
38	992,727	442,290	6S	1E	33	NWNW	494	yes	1.50
49	987,331	444,023	6S	1E	32	NWNW	638	yes	1.20
54	1,010,131	414,144	7S	1E	25	NWSE	90		0.40
55	1,009,500	411,244	7S	1E	36	NWNE	92	yes	8.10
63	1,007,846	409,177	7S	1E	36	NESW	100	no	1.50
69	1,009,540	412,447	7S	1E	25	SWSE	130		1.00
115	986,096	457,641	6S	1E	18	SENE	360		0.17
116	986,390	458,112	6S	1E	18	SENE			1.50
138	985,936	459,031	6S	1E	18	NENE	100		0.75
504	1,010,729	412,598	7S	1E	25	SESE	450		3.00
Chilson									
1	996,095	429,228	7S	1E	9	SESE	600	yes	1.50
2	995,123	423,923	7S	1E	16	SESE	650	yes	4.11
3	996,992	421,104	7S	1E	22	SWNW	2400	yes	3.00
12	995,377	434,379	7S	1E	4	SESE	805	yes	3.30
13	996,759	438,470	7S	1E	4	NENE	625	no	0.09
31	1,012,693	410,182	7S	2E	31	SWNW	104		1.30
36	1,014,973	416,772	7S	2E	30	NWNE	330		2.00
42	989,543	436,481	7S	1E	5	SWNE	600	yes	16.20
50	974,693	446,835	41N	60W	28	SWNW	609		0.30
51	995,810	431,487	7S	1E	9	SENE	550	yes	12.90
70	1,008,314	413,771	7S	1E	25	NESW	375		2.00
96	980,028	451,854	41N	60W	22	SWSW	560	yes	0.10
102	985,224	458,314	6S	1E	18	SWNE	267		1.50
109	989,200	459,626	6S	1E	17	NENW	220		0.09
505	1,002,744	414,163	7S	1E	26	NESW	260	no	2.00
508	1,015,129	416,968	7S	2E	19	SWSE	255		10.00
620	1,002,350	443,210	6S	1E	35	NWNW		no	1.00
704	989,365	436,648	7S	1E	5	SWNE	955	yes	1.50
7002	1,001,731	421,931	7S	1E	23	NWNW	500	yes	3.45
8002	1,004,652	418,556	7S	1E	23	SWSE	500	yes	2.03
Inyan Kara ^a									
220	986,271	452,335	6S	1E	19	SENE		yes	0.20
230	1,005,735	412,883	7S	1E	26	SESE			0.60
270	982,507	451,943	6S	1E	19	NW SW		yes	0.80
656	982,628	442,001	6S	1E	31	SENE		yes	6.25
668	999,428	427,450	7S	1E	15	NWNE	574	yes	6.25
2020	986,287	424,858	7S	1E	17	NWSW		yes	1.60
4002	981,813	446,932	6S	1E	30	NWSW		yes	2.72
5002	974,687	446,660	41N	60W	28	SWSW			0.43
8003	1,004,521	418,531	7S	1E	23	SWSE		yes	0.44
8803	1,005,445	407,730	7S	1E	35	SESE		yes	2.10

Coordinates are South Dakota State Plane South, North American Datum 1983

^a - Flow rate split between the Fall River (Layer 2) and Chilson (Layer 4)

Table 5-1. Calibration Statistics, Steady State Simulation, Dewey-Burdock Project Model

Calibration Statistic	Layer 2	Layer 4	Model
Residual Mean	-0.74	0.99	-0.05
Absolute Residual Mean	6.74	5.25	6.14
Residual Standard Deviation	8.42	6.86	7.88
Sum of Squares	1286.5	576.8	1863.3
Residual Mean Squared Error	8.45	6.93	7.88
Minimum Residual	-15.26	-7.66	-15.26
Maximum Residual	16.94	17.41	17.41
Number of Observations	18	12	30
Range in Observations	227.2	125.2	227.2
Scaled Standard Deviation	0.037	0.055	0.035
Scaled Absolute Mean	0.030	0.042	0.027
Scaled Residual Mean Squared	0.037	0.055	0.035

Target ID	Easting* (ft)	Northing* (ft)	Layer	Observed Head (ft amsl)	Simulated Head (ft amsl)	Residual (ft)
14	1,002,103	434,723	2	3663.04	3664.41	-1.37
38	992,726	442,289	2	3646.05	3658.44	-12.39
49	987,330	444,022	2	3644.68	3654.82	-10.14
436	989,848	454,700	2	3707.40	3699.56	7.85
607	980,219	416,378	2	3585.09	3585.57	-0.48
610	989,998	447,969	2	3691.55	3674.66	16.89
623	991,084	454,311	2	3708.56	3706.19	2.38
628	990,894	449,719	2	3694.71	3685.09	9.62
631	1,002,575	449,309	2	3717.10	3717.28	-0.17
683	988,610	446,104	2	3660.37	3664.14	-3.77
685	989,088	443,409	2	3644.10	3656.94	-12.84
688	1,003,425	429,974	2	3663.13	3661.15	1.98
694	997,116	426,836	2	3641.10	3633.04	8.06
695	990,783	439,312	2	3635.19	3650.46	-15.27
698	1,004,307	435,651	2	3679.32	3672.14	7.18
706	996,987	453,276	2	3725.21	3730.49	-5.28
8S2E8 ^a	1,021,243	399,375	2	3530.00	3530.93	-0.93
8S2E20 ^a	1,020,092	386,353	2	3498.00	3502.71	-4.71
12	995,376	434,378	4	3653.94	3656.53	-2.59
608	980,229	416,455	4	3584.37	3585.30	-0.93
609	990,133	447,808	4	3687.95	3687.58	0.37
617	989,425	453,583	4	3691.58	3694.85	-3.27
622	991,174	454,033	4	3692.57	3700.23	-7.66
682	1,003,538	431,257	4	3665.46	3666.09	-0.63
686	1,003,368	429,749	4	3661.55	3657.72	3.83
689	988,715	443,789	4	3683.18	3674.83	8.35
696	996,936	427,141	4	3649.77	3632.36	17.41
697	990,748	439,347	4	3674.90	3667.40	7.50
705	997,022	453,314	4	3709.59	3715.14	-5.55
3026	1,012,037	432,833	4	3680.57	3685.54	-4.98

* Coordinates are South Dakota State Plane South North American Datum 1983

^a - water levels for these locations are from USGS database, unknown date of collection

Table 5-2. Calibration Statistics, Transient Simulation, 2008 Pumping Tests, Dewey-Burdock Project Model

FALL RIVER 2008 TEST

Calibration Statistic	
Residual Mean	-0.59
Absolute Residual Mean	0.97
Residual Standard Deviation	1.22
Sum of Squares	5.52
Residual Mean Squared Error	1.36
Minimum Residual	-2.28
Maximum Residual	0.58
Number of Observations	3
Range in Observations	11.50
Scaled Standard Deviation	0.106
Scaled Absolute Mean	0.085
Scaled Residual Mean Squared	0.118

Target ID	Time	Easting	Northing	Layer	Observed Drawdown	Simulated Drawdown	Residual
	(days)	(ft)	(ft)	-	(ft amsl)	(ft amsl)	(ft)
683	3.1	988,608	446,108	2	1.5	3.78	-2.28
687	3.1	988,480	443,724	2	13.0	12.42	0.58
685	3.1	989,086	443,415	2	9.8	9.86	-0.06

CHILSON 2008 TEST

Calibration Statistic	
Residual Mean	-0.27
Absolute Residual Mean	2.74
Residual Standard Deviation	3.07
Sum of Squares	28.56
Residual Mean Squared Error	3.09
Minimum Residual	-3.79
Maximum Residual	3.70
Number of Observations	3
Range in Observations	13.90
Scaled Standard Deviation	0.221
Scaled Absolute Mean	0.197
Scaled Residual Mean Squared	0.222

Target ID	Time	Easting	Northing	Layer	Observed Drawdown	Simulated Drawdown	Residual
	(days)	(ft)	(ft)	-	(ft amsl)	(ft amsl)	(ft)
682	3	1,003,538	431,257	4	3.1	3.83	-0.73
686	3	1,003,346	429,756	4	10.4	14.19	-3.79
684	3	1,003,586	429,739	4	17.0	13.30	3.70

Coordinates in South Dakota State Plane South North American Datum 1983.

Table 5-3. Calibration Statistics, Transient Simulation, 1982 Chilson Pumping Test, Dewey-Burdock Project Model

Calibration Statistic	
Residual Mean	1.21
Absolute Residual Mean	8.47
Residual Standard Deviation	9.20
Sum of Squares	860.69
Residual Mean Squared Error	9.28
Minimum Residual	-13.78
Maximum Residual	12.46
Number of Observations	10
Range in Observations	173.53
Scaled Standard Deviation	0.053
Scaled Absolute Mean	0.049
Scaled Residual Mean Squared	0.053

Target ID	Time	Easting	Northing	Layer	Observed Drawdown	Simulated Drawdown	Residual
	(days)	(ft)	(ft)		(ft)	(ft)	(ft)
622	11	991,175	454,034	2	4.05	0.66	3.39
613	11	990,523	453,776	2	11.97	0.66	11.31
436	11	990,002	454,437	2	5.54	0.69	4.85
614	11	990,584	453,770	3	23.42	26.04	-2.62
617	11	989,447	453,643	4	122.27	131.72	-9.45
616	11	990,745	453,249	4	136.47	124.01	12.46
623	11	991,051	454,252	4	136.95	126.25	10.70
657	11	989,748	454,650	4	126.98	137.45	-10.47
615	11	990,348	453,802	4	177.58	171.90	5.68
612	11	990,153	454,089	4	161.83	175.61	-13.78

Coordinates in South Dakota State Plane South North American Datum 1983.

Table 5-4. Sensitivity Analysis Results, Recharge and General Head Boundaries, Dewey-Burdock Project Model

Sensitivity Analysis Simulations for Recharge										
Multiplier	-	0.1	0.25	0.5	0.75	1	1.5	2.5	5	10
Residual Sum of Squares	-	4387	3692	2771	2160	1863	2191	6389	36133	173027
Fall River Flux	(gpm)	135.3	134.7	133.8	133.0	132.2	130.7	133.0	141.1	177.2
Chilson Flux	(gpm)	207.6	208.8	210.6	212.4	214.1	217.5	225.2	245.0	279.6

Sensitivity Analysis Simulations for Layer 2 General Head Boundary Conductance										
Multiplier	-	0.1	0.25	0.5	0.75	1	1.5	2.5	5	10
Residual Sum of Squares	-	2135	1917	1876	1867	1863	1860	1859	1858	1857
Fall River Flux	(gpm)	128.9	131.0	131.7	132.0	132.2	132.3	132.4	132.6	132.6
Chilson Flux	(gpm)	214.8	214.3	214.2	214.1	214.1	214.1	214.0	214.0	214.0

Sensitivity Analysis Simulations for Layer 4 General Head Boundary Conductance										
Multiplier	-	0.1	0.25	0.5	0.75	1	1.5	2.5	5	10
Residual Sum of Squares	-	1855	1854	1858	1861	1863	1866	1868	1871	1872
Fall River Flux	(gpm)	132.7	132.4	132.3	132.2	132.2	132.1	132.1	132.1	132.0
Chilson Flux	(gpm)	212.2	213.2	213.7	214.0	214.1	214.2	214.3	214.4	214.5

Sensitivity Analysis Simulations for Layer 2 General Head Boundary Heads										
Increment	(ft)	-50	-25	-10	-5	1	5	10	25	50
Residual Sum of Squares	-	6124	3028	2080	1929	1863	1883	1989	2830	6017
Fall River Flux	(gpm)	117.7	124.7	129.2	130.7	132.2	133.7	135.2	139.7	147.5
Chilson Flux	(gpm)	217.2	215.6	214.7	214.4	214.1	213.8	213.5	212.6	211.1

Sensitivity Analysis Simulations for Layer 4 General Head Boundary Heads										
Increment	(ft)	-50	-25	-10	-5	1	5	10	25	50
Residual Sum of Squares	-	5990	2818	1980	1878	1863	1937	2099	3113	6558
Fall River Flux	(gpm)	140.3	136.2	133.8	133.0	132.2	131.4	130.5	128.1	124.1
Chilson Flux	(gpm)	182.9	198.5	207.9	211.0	214.1	217.2	220.3	229.6	245.1

Table 6-1. Calculation of Wellfield Pore Volumes, Dewey-Burdock Project

Wellfield	Area	Thick	Porosity	Flare	Pore Volume	Pore Volume	6 Pore Volumes	No. Well Patterns	Restoration Time	Rate to Recover 1 PV	Rate to Recover 1 PV	Rate to Recover 6 PV	Rate to Recover 6 PV
	(ft ²)	(ft)	-	-	(ft ³)	(gallons)	(gallons)	-	(days)	(gpd)	(gpm)	(gpd)	(gpm)
Dewey 1A*	856,829	4.6	0.3	1.44	1,702,690	12,736,118	76,416,709	80	366	34,798	24.2	208,789	145
Dewey 1B*	856,829	4.6	0.3	1.44	1,702,690	12,736,118	76,416,709	80	366	34,798	24.2	208,789	145
Dewey 2	562,591	4.6	0.3	1.44	1,117,981	8,362,497	50,174,980	80	366	22,848	15.9	137,090	95
Dewey 3	120,110	4.6	0.3	1.44	238,683	1,785,346	10,712,075	15	183	9,756	6.8	58,536	41
Dewey 4	117,303	4.6	0.3	1.44	233,105	1,743,622	10,461,731	25	183	9,528	6.6	57,168	40
Burdock 1	767,821	4.6	0.3	1.44	1,525,814	11,413,088	68,478,527	120	366	31,183	21.7	187,100	130
Burdock 2	491,394	4.6	0.3	1.44	976,498	7,304,206	43,825,237	60	366	19,957	13.9	119,741	83
Burdock 3	63,972	4.6	0.3	1.44	127,125	950,896	5,705,377	20	183	5,196	3.6	31,177	22
Burdock 4	338,486	4.6	0.3	1.44	672,639	5,031,343	30,188,055	60	183	27,494	19.1	164,962	115
Burdock 5	247,377	4.6	0.3	1.44	491,588	3,677,075	22,062,450	40	366	10,047	7.0	60,280	42
Burdock 6	847,013	4.6	0.3	1.44	1,683,184	12,590,218	75,541,308	120	549	22,933	15.9	137,598	96
Burdock 7	207,537	4.6	0.3	1.44	412,418	3,084,883	18,509,299	37	183	16,857	11.7	101,144	70
Burdock 8	510,804	4.6	0.3	1.44	1,015,070	7,592,721	45,556,329	68	366	20,745	14.4	124,471	86
Burdock 9	58,240	4.6	0.3	1.44	115,735	865,694	5,194,166	11	366	2,365	1.6	14,192	10
Burdock 10	42,217	4.6	0.3	1.44	83,894	627,524	3,765,146	9	183	3,429	2.4	20,575	14

* Dewey 1A and Dewey 1B are the same wellfield but are simulated as two wellfields because of its large size

Table 6-2. Operational Rates for ISR Production and Restoration Simulations, Dewey-Burdock Project Model

Simulation		DB 4_05 NoGWS	DB 4_08 NoGWS	DB 4_10 NoGWS	DB 4_05 GWS	DB 4_08 GWS	DB 4_10 NoGWS	DB 8_05 NoGWS	DB 8_08 NoGWS	DB 8_10 NoGWS	DB 8_05 GWS	DB 8_08 GWS	DB 8_10 GWS
Total Production Rate	(gpm)	4,000	4,000	4,000	4,000	4,000	4,000	8,000	8,000	8,000	8,000	8,000	8,000
Net Bleed	%	0.5	0.875	1.0	0.5	0.875	1.0	0.5	0.875	1.0	0.5	0.875	1.0
Restoration Method	-	RO	RO	RO	GWS	GWS	GWS	RO	RO	RO	GWS	GWS	GWS
Maximum Production Rate Dewey Area	(gpm)	1,600	1,600	1,600	1,600	1,600	1,600	3,200	3,200	3,200	3,200	3,200	3,200
Maximum Production Rate Burdock Area	(gpm)	2,400	2,400	2,400	2,400	2,400	2,400	4,800	4,800	4,800	4,800	4,800	4,800
Total Net Extraction (Production)	(gpm)	20.0	35.0	40.0	20.0	35.0	40.0	40.0	70.0	80.0	40.0	70.0	80.0
Net Extraction During Production Dewey (Maximum)	(gpm)	8.0	14.0	16.0	8.0	14.0	16.0	16.0	28.0	32.0	16.0	28.0	32.0
Net Extraction During Production Burdock (Maximum)	(gpm)	12.0	21.0	24.0	12.0	21.0	24.0	24.0	42.0	48.0	24.0	42.0	48.0
Net Extraction During Restoration Dewey (Maximum)	(gpm)	10.0	10.0	10.0	29.2	29.2	29.2	10.0	10.0	10.0	29.2	29.2	29.2
Net Extraction During Restoration Burdock (Maximum)	(gpm)	15.0	15.0	15.0	38.0	38.0	38.0	15.0	15.0	15.0	38.0	38.0	38.0
Maximum Extraction Dewey (Production + Restoration)	(gpm)	13.0	19.0	21.0	37.2	43.2	45.2	21.0	33.0	37.0	45.2	57.2	61.2
Maximum Extraction Burdock (Production + Restoration)	(gpm)	27.0	36.0	39.0	50.0	59.0	62.0	39.0	57.0	63.0	62.0	80.0	86.0
Maximum Extraction Dewey+ Burdock (Production + Restoration)	(gpm)	40.0	55.0	60.0	87.2	102.2	107.2	60.0	90.0	100.0	107.2	137.2	147.2

DB_04_05_NoGWS	-	4000 gpm Production Rate, 0.5% Net Production Bleed, 1% Restoration Bleed, No Groundwater Sweep
DB_04_08_NoGWS	-	4000 gpm Production Rate, 0.875% Net Production Bleed, 1% Restoration Bleed, No Groundwater Sweep
DB_04_10_NoGWS	-	4000 gpm Production Rate, 1.0% Net Production Bleed, 1% Restoration Bleed, No Groundwater Sweep
DB_04_05_GWS	-	4000 gpm Production Rate, 0.5% Net Production Bleed, 1% Restoration Bleed + Groundwater Sweep (1 Pore Volume)
DB_04_08_GWS	-	4000 gpm Production Rate, 0.875% Net Production Bleed, 1% Restoration Bleed + Groundwater Sweep (1 Pore Volume)
DB_04_10_GWS	-	4000 gpm Production Rate, 1.0% Net Production Bleed, 1% Restoration Bleed + Groundwater Sweep (1 Pore Volume)
DB_08_05_NoGWS	-	8000 gpm Production Rate, 0.5% Net Production Bleed, 1% Restoration Bleed, No Groundwater Sweep
DB_08_08_NoGWS	-	8000 gpm Production Rate, 0.875% Net Production Bleed, 1% Restoration Bleed, No Groundwater Sweep
DB_08_10_NoGWS	-	8000 gpm Production Rate, 1.0% Net Production Bleed, 1% Restoration Bleed, No Groundwater Sweep
DB_08_05_GWS	-	8000 gpm Production Rate, 0.5% Net Production Bleed, 1% Restoration Bleed + Groundwater Sweep (1 Pore Volume)
DB_08_08_GWS	-	8000 gpm Production Rate, 0.875% Net Production Bleed, 1% Restoration Bleed + Groundwater Sweep (1 Pore Volume)
DB_08_10_GWS	-	8000 gpm Production Rate, 1.0% Net Production Bleed, 1% Restoration Bleed + Groundwater Sweep (1 Pore Volume)

Table 6.3 Operational Rates vs Time, ISR Simulations Dewey-Burdock Project Model

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
4000 gpm Production with GWS									
Rates are in Gallons per Minute									
Burdock Production	2,400	2,400	2,380	2,400	2,400	1,600	520	1,720	0
Burdock Restoration	0	0	522	523	0	516	1,023	256	522
Burdock Total	2,400	2,400	2,902	2,923	2,400	2,116	1,543	1,976	522
Dewey Production	1,600	1,600	1,600	1,600	1,600	1,600	1,600	800	0
Dewey Restoration	0	0	0	524	0	0	524	516	513
Dewey Total	1,600	1,600	1,600	2,124	1,600	1,600	2,124	1,316	513
Project Total	4,000	4,000	4,502	5,047	4,000	3,716	3,668	3,292	1,035

4000 gpm Production with No GWS

Burdock Production	2,400	2,400	2,380	2,400	2,400	1,600	520	1,720	0
Burdock Restoration	0	0	500	500	0	500	500	250	500
Burdock Total	2,400	2,400	2,880	2,900	2,400	2,100	1,020	1,970	500
Dewey Production	1,600	1,600	1,600	1,600	1,600	1,600	1,600	800	0
Dewey Restoration	0	0	0	500	0	0	500	500	500
Dewey Total	1,600	1,600	1,600	2,100	1,600	1,600	2,100	1,300	500
Project Total	4,000	4,000	4,480	5,000	4,000	3,700	3,120	3,270	1,000

8000 gpm Production with GWS

Burdock Production	4,800	4,800	4,760	4,800	4,800	3,200	1,040	3,440	0
Burdock Restoration	0	0	522	523	0	516	1,023	256	522
Burdock Total	4,800	4,800	5,282	5,323	4,800	3,716	2,594	3,696	522
Dewey Production	3,200	3,200	3,200	3,200	3,200	3,200	3,200	1,600	0
Dewey Restoration	0	0	0	524	0	0	524	516	513
Dewey Total	3,200	3,200	3,200	3,724	3,200	3,200	3,724	2,116	513
Project Total	8,000	8,000	8,482	9,047	8,000	6,916	6,318	5,812	1,035

8000 gpm Production with No GWS

Burdock Production	4,800	4,800	4,760	4,800	4,800	3,200	1,040	3,440	0
Burdock Restoration	0	0	500	500	0	500	500	250	500
Burdock Total	4,800	4,800	5,260	5,300	4,800	3,700	2,594	3,690	500
Dewey Production	3,200	3,200	3,200	3,200	3,200	3,200	3,200	1,600	0
Dewey Restoration	0	0	0	500	0	0	500	500	500
Dewey Total	3,200	3,200	3,200	3,700	3,200	3,200	3,700	2,100	500
Project Total	8,000	8,000	8,460	9,000	8,000	6,900	6,294	5,790	1,000

GWS - Groundwater Sweep

No GWS - Restoration Bleed of 5 gpm per Wellfield

Table 6-4. Net Extraction Rates vs Time, ISR Simulations, Dewey-Burdock Project Model

Simulation	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Yr 9
4000 gpm Production-0.5%Bleed-GWS																	
	Net Extraction Rates in Gallons per Minute																
Burdock Production	12.0	12.0	12.0	12.0	11.9	11.9	12.0	12.0	12.0	12.0	8.0	8.0	0.0	5.2	12.1	6.9	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	26.7	26.7	38.0	38.0	0.0	0.0	20.9	20.9	48.4	18.9	0.0	16.7	31.5
Burdock Total	12.0	12.0	12.0	12.0	38.6	38.6	50.0	50.0	12.0	12.0	28.9	28.9	48.4	24.1	12.1	23.6	31.5
Dewey Production	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	4.0	4.0	0.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	29.2	29.2	0.0	0.0	0.0	0.0	29.2	29.2	20.9	20.9	10.0
Dewey Total	8.0	8.0	8.0	8.0	8.0	8.0	37.2	37.2	8.0	8.0	8.0	8.0	37.2	37.2	24.9	24.9	10.0
Total Extraction	20.0	20.0	20.0	20.0	46.6	46.6	87.2	87.2	20.0	20.0	36.9	36.9	85.6	61.3	37.0	48.5	41.5
4000 gpm Production-0.5%Bleed-No GWS																	
Burdock Production	12.0	12.0	12.0	12.0	11.9	11.9	12.0	12.0	12.0	12.0	8.0	8.0	0.0	5.2	12.1	6.9	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	5.0	5.0	15.0	15.0	0.0	0.0	5.0	5.0	15.0	5.0	0.0	5.0	10.0
Burdock Total	12.0	12.0	12.0	12.0	16.9	16.9	27.0	27.0	12.0	12.0	13.0	13.0	15.0	10.2	12.1	11.9	10.0
Dewey Production	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	4.0	4.0	0.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	0.0	0.0	0.0	0.0	5.0	5.0	5.0	5.0	10.0
Dewey Total	8.0	8.0	8.0	8.0	8.0	8.0	13.0	13.0	8.0	8.0	8.0	8.0	13.0	13.0	9.0	9.0	10.0
Total Extraction	20.0	20.0	20.0	20.0	24.9	24.9	40.0	40.0	20.0	20.0	21.0	21.0	28.0	23.2	21.1	20.9	20.0
4000 gpm Production-0.875%Bleed-GWS																	
Burdock Production	21.0	21.0	21.0	21.0	20.8	20.8	21.0	21.0	21.0	21.0	14.0	14.0	0.0	9.1	21.2	12.1	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	26.7	26.7	38.0	38.0	0.0	0.0	20.9	20.9	48.4	18.9	0.0	16.7	31.5
Burdock Total	21.0	21.0	21.0	21.0	47.5	47.5	59.0	59.0	21.0	21.0	34.9	34.9	48.4	28.0	21.2	28.8	31.5
Dewey Production	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	7.0	7.0	0.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	29.2	29.2	0.0	0.0	0.0	0.0	29.2	29.2	20.9	20.9	10.0
Dewey Total	14.0	14.0	14.0	14.0	14.0	14.0	43.2	43.2	14.0	14.0	14.0	14.0	43.2	43.2	27.9	27.9	10.0
Total Extraction	35.0	35.0	35.0	35.0	61.5	61.5	102.2	102.2	35.0	35.0	48.9	48.9	91.6	71.2	49.1	56.7	41.5
4000 gpm Production-0.875%Bleed-No GWS																	
Burdock Production	21.0	21.0	21.0	21.0	20.8	20.8	21.0	21.0	21.0	21.0	14.0	14.0	0.0	9.1	21.2	12.1	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	5.0	5.0	15.0	15.0	0.0	0.0	5.0	5.0	15.0	5.0	0.0	5.0	10.0
Burdock Total	21.0	21.0	21.0	21.0	25.8	25.8	36.0	36.0	21.0	21.0	19.0	19.0	15.0	14.1	21.2	17.1	10.0
Dewey Production	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	7.0	7.0	0.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	0.0	0.0	0.0	0.0	5.0	5.0	5.0	5.0	10.0
Dewey Total	14.0	14.0	14.0	14.0	14.0	14.0	19.0	19.0	14.0	14.0	14.0	14.0	19.0	19.0	12.0	12.0	10.0
Total Extraction	35.0	35.0	35.0	35.0	39.8	39.8	55.0	55.0	35.0	35.0	33.0	33.0	34.0	33.1	33.2	29.1	20.0
4000 gpm Production-1.0%Bleed-GWS																	
Burdock Production	24.0	24.0	24.0	24.0	23.8	23.8	24.0	24.0	24.0	24.0	16.0	16.0	0.0	10.4	24.2	13.8	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	26.7	26.7	38.0	38.0	0.0	0.0	20.9	20.9	48.4	18.9	0.0	16.7	31.5
Burdock Total	24.0	24.0	24.0	24.0	50.5	50.5	62.0	62.0	24.0	24.0	36.9	36.9	48.4	29.3	24.2	30.5	31.5
Dewey Production	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	8.0	8.0	0.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	29.2	29.2	0.0	0.0	0.0	0.0	29.2	29.2	20.9	20.9	10.0
Dewey Total	16.0	16.0	16.0	16.0	16.0	16.0	45.2	45.2	16.0	16.0	16.0	16.0	45.2	45.2	28.9	28.9	10.0
Total Extraction	40.0	40.0	40.0	40.0	66.5	66.5	107.2	107.2	40.0	40.0	52.9	52.9	93.6	74.5	53.1	59.4	41.5
4000 gpm Production-1.0%Bleed-No GWS																	
Burdock Production	24.0	24.0	24.0	24.0	23.8	23.8	24.0	24.0	24.0	24.0	16.0	16.0	0.0	10.4	24.2	13.8	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	5.0	5.0	15.0	15.0	0.0	0.0	5.0	5.0	15.0	5.0	0.0	5.0	10.0
Burdock Total	24.0	24.0	24.0	24.0	28.8	28.8	39.0	39.0	24.0	24.0	21.0	21.0	15.0	15.4	24.2	18.8	10.0
Dewey Production	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	8.0	8.0	0.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	0.0	0.0	0.0	0.0	5.0	5.0	5.0	5.0	10.0
Dewey Total	16.0	16.0	16.0	16.0	16.0	16.0	21.0	21.0	16.0	16.0	16.0	16.0	21.0	21.0	13.0	13.0	10.0
Total Extraction	40.0	40.0	40.0	40.0	44.8	44.8	60.0	60.0	40.0	40.0	37.0	37.0	36.0	36.4	37.2	31.8	20.0

Table 6-4. Net Extraction Rates vs Time, ISR Simulations, Dewey-Burdock Project Model

Simulation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Yr 9
Net Extraction Rates in Gallons per Minute									
8000 gpm Production-0.5%Bleed-GWS									
Burdock Production	24.0	24.0	24.0	24.0	23.8	23.8	24.0	24.0	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	26.7	26.7	38.0	38.0	0.0
Burdock Total	24.0	24.0	24.0	24.0	50.5	50.5	62.0	62.0	0.0
Dewey Production	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	29.2	29.2	20.9
Dewey Total	16.0	16.0	16.0	16.0	16.0	16.0	45.2	45.2	28.9
Total Extraction	40.0	40.0	40.0	40.0	66.5	66.5	107.2	107.2	41.5
8000 gpm Production-0.5%Bleed-No GWS									
Burdock Production	24.0	24.0	24.0	24.0	23.8	23.8	24.0	24.0	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	5.0	5.0	15.0	15.0	0.0
Burdock Total	24.0	24.0	24.0	24.0	28.8	28.8	39.0	39.0	0.0
Dewey Production	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	5.0
Dewey Total	16.0	16.0	16.0	16.0	16.0	16.0	21.0	21.0	13.0
Total Extraction	40.0	40.0	40.0	40.0	44.8	44.8	60.0	60.0	20.0
8000 gpm Production-0.875%Bleed-GWS									
Burdock Production	42.0	42.0	42.0	42.0	41.6	41.6	42.0	42.0	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	26.7	26.7	38.0	38.0	0.0
Burdock Total	42.0	42.0	42.0	42.0	68.3	68.3	80.0	80.0	0.0
Dewey Production	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	29.2	29.2	20.9
Dewey Total	28.0	28.0	28.0	28.0	28.0	28.0	57.2	57.2	34.9
Total Extraction	70.0	70.0	70.0	70.0	96.3	96.3	137.2	137.2	41.5
8000 gpm Production-0.875%Bleed-No GWS									
Burdock Production	42.0	42.0	42.0	42.0	41.6	41.6	42.0	42.0	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	5.0	5.0	15.0	15.0	0.0
Burdock Total	42.0	42.0	42.0	42.0	46.6	46.6	57.0	57.0	0.0
Dewey Production	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	5.0
Dewey Total	28.0	28.0	28.0	28.0	28.0	28.0	33.0	33.0	19.0
Total Extraction	70.0	70.0	70.0	70.0	74.6	74.6	90.0	90.0	20.0
8000 gpm Production-1.0%Bleed-GWS									
Burdock Production	48.0	48.0	48.0	48.0	47.6	47.6	48.0	48.0	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	26.7	26.7	38.0	38.0	0.0
Burdock Total	48.0	48.0	48.0	48.0	74.3	74.3	86.0	86.0	0.0
Dewey Production	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	29.2	29.2	20.9
Dewey Total	32.0	32.0	32.0	32.0	32.0	32.0	61.2	61.2	36.9
Total Extraction	80.0	80.0	80.0	80.0	106.3	106.3	147.2	147.2	41.5
8000 gpm Production-1.0%Bleed-No GWS									
Burdock Production	48.0	48.0	48.0	48.0	47.6	47.6	48.0	48.0	0.0
Burdock Restoration	0.0	0.0	0.0	0.0	5.0	5.0	15.0	15.0	0.0
Burdock Total	48.0	48.0	48.0	48.0	52.6	52.6	63.0	63.0	0.0
Dewey Production	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Dewey Restoration	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	5.0
Dewey Total	32.0	32.0	32.0	32.0	32.0	32.0	37.0	37.0	21.0
Total Extraction	80.0	80.0	80.0	80.0	84.6	84.6	100.0	100.0	20.0