

APPENDIX 4

DESIGN FLOW REQUIREMENTS

The following tables present both the winter and summer design flow requirements for each NGTL design area. The values are derived, as discussed in Chapters 2 and 4, through application of the mainline design assumptions to the July 2004 design forecast.

Design flow requirements, described as Area Design Flow Requirements in the tables, are calculated by subtracting the Area Minimum Deliveries and area fuel (not shown) from the Area Required Receipts. In some areas, Flow Into Area is added to the Area Required Receipts and represents the flow from other design areas. Area Minimum Deliveries are determined based on the design flow assumption discussed in Section 2.6.

Area FS Productive Capability represents the sum of the FS productive capability at each Receipt Point in the design area. The Area Required Receipts is determined through application of the design flow, equal prorationing and FS productive capability assumptions.

The design flow requirements may differ from the flow schematics shown in Appendix 5. This is because the detailed flow schematic information is taken directly from the hydraulic simulations whereas design flow requirements are estimated for the entire design area.

Design Flow Requirements

Upper Peace River Design Sub Area

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	27820	26452	25033	24084	23393
Flow Into Area	0	0	0	0	0
Area Required Receipts	27820	26452	25033	24084	23393
Area Deliveries	-10	-10	-10	-10	-10
Area Design Flow Req'mts	27453	26102	24701	23765	23083

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	987	939	888	855	830
Flow Into Area	0	0	0	0	0
Area Required Receipts	987	939	888	855	830
Area Deliveries	0	0	0	0	0
Area Design Flow Req'mts	974	926	877	843	819

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	27820	26452	25033	24084	23393
Flow Into Area	0	0	0	0	0
Area Required Receipts	27820	26452	25033	24084	23393
Area Deliveries	-8	-8	-8	-8	-8
Area Design Flow Req'mts	27455	26104	24703	23767	23085

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	987	939	888	855	830
Flow Into Area	0	0	0	0	0
Area Required Receipts	987	939	888	855	830
Area Deliveries	0	0	0	0	0
Area Design Flow Req'mts	974	927	877	844	819

Design Flow Requirements

Central Peace River Design Sub Area

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	17286	16576	17851	15659	17130
Flow Into Area	27453	26102	24701	23765	23083
Area Required Receipts	17286	16576	17851	15659	17130
Area Deliveries	-429	-429	-429	-429	-429
Area Design Flow Req'mts	44088	42037	41894	38794	39564

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	614	588	634	556	608
Flow Into Area	974	926	877	843	819
Area Required Receipts	614	588	634	556	608
Area Deliveries	-15	-15	-15	-15	-15
Area Design Flow Req'mts	1565	1492	1487	1377	1404

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	17286	16576	17851	15659	17130
Flow Into Area	27455	26104	24703	23767	23085
Area Required Receipts	17286	16576	17851	15659	17130
Area Deliveries	-87	-89	-89	-90	-90
Area Design Flow Req'mts	44432	42379	42235	39135	39905

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	614	588	634	556	608
Flow Into Area	974	927	877	844	819
Area Required Receipts	614	588	634	556	608
Area Deliveries	-3	-3	-3	-3	-3
Area Design Flow Req'mts	1577	1504	1499	1389	1416

Design Flow Requirements

Lower Peace River Design Sub Area

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	51531	53221	49718	45669	42038
Flow Into Area	44088	42037	41894	38794	39564
Area Required Receipts	51531	53221	49718	45669	42038
Area Deliveries	-589	-590	-590	-591	-591
Area Design Flow Req'mts	94368	93985	90384	83286	80472

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	1829	1889	1765	1621	1492
Flow Into Area	1565	1492	1487	1377	1404
Area Required Receipts	1829	1889	1765	1621	1492
Area Deliveries	-21	-21	-21	-21	-21
Area Design Flow Req'mts	3349	3336	3208	2956	2856

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	51531	53221	49718	45669	42038
Flow Into Area	44432	42379	42235	39135	39905
Area Required Receipts	51531	53221	49718	45669	42038
Area Deliveries	-436	-436	-436	-437	-437
Area Design Flow Req'mts	94866	94481	90879	83781	80967

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	1829	1889	1765	1621	1492
Flow Into Area	1577	1504	1499	1389	1416
Area Required Receipts	1829	1889	1765	1621	1492
Area Deliveries	-15	-15	-15	-16	-16
Area Design Flow Req'mts	3367	3353	3226	2974	2874

Design Flow Requirements

Marten Hills Design Area

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	1879	1837	1890	2004	1995
Flow Into Area	0	0	0	0	0
Area Required Receipts	1879	1837	1890	2004	1995
Area Deliveries	-170	-170	-176	-176	-177
Area Design Flow Req'mts	1685	1643	1690	1802	1793

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	67	65	67	71	71
Flow Into Area	0	0	0	0	0
Area Required Receipts	67	65	67	71	71
Area Deliveries	-6	-6	-6	-6	-6
Area Design Flow Req'mts	60	58	60	64	64

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	1879	1837	1890	2004	1995
Flow Into Area	0	0	0	0	0
Area Required Receipts	1879	1837	1890	2004	1995
Area Deliveries	-57	-58	-58	-58	-58
Area Design Flow Req'mts	1798	1755	1808	1920	1911

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	67	65	67	71	71
Flow Into Area	0	0	0	0	0
Area Required Receipts	67	65	67	71	71
Area Deliveries	-2	-2	-2	-2	-2
Area Design Flow Req'mts	64	62	64	68	68

Design Flow Requirements

Upstream Bens Lake Design Area

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	27925	26562	23269	20952	21165
Flow Into Area	0	0	0	0	0
Area Required Receipts	27609	25740	23269	20952	21165
Area Deliveries	-13571	-16796	-19478	-20844	-23211
Area Design Flow Req'mts	13684	8614	3492	-161	-2317

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	991	943	826	744	751
Flow Into Area	0	0	0	0	0
Area Required Receipts	980	914	826	744	751
Area Deliveries	-482	-596	-691	-740	-824
Area Design Flow Req'mts	486	306	124	-6	-82

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	27925	26562	23269	20952	21165
Flow Into Area	0	0	0	0	0
Area Required Receipts	27925	26562	23269	20952	21165
Area Deliveries	-11662	-14703	-17060	-18735	-20118
Area Design Flow Req'mts	15905	11518	5911	1948	776

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	991	943	826	744	751
Flow Into Area	0	0	0	0	0
Area Required Receipts	991	943	826	744	751
Area Deliveries	-414	-522	-606	-665	-714
Area Design Flow Req'mts	565	409	210	69	28

Design Flow Requirements

Fort McMurray Area

10³m³/d

PW						
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09	
FS Productive Capability						
Flow Into Area						
Area Required Receipts						
Area Deliveries	-20264	-23119	-24691	-25655	-31649	
Area Design Flow Req'mts	-20264	-23119	-24691	-25655	-31649	

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PW						
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09	
FS Productive Capability						
Flow Into Area						
Area Required Receipts						
Area Deliveries	-719	-821	-876	-911	-1123	
Area Design Flow Req'mts	-719	-821	-876	-911	-1123	

10³m³/d

PS						
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09	
FS Productive Capability						
Flow Into Area						
Area Required Receipts						
Area Deliveries	-20759	-22433	-23980	-27453	-30836	
Area Design Flow Req'mts	-20759	-22433	-23980	-27453	-30836	

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PS						
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09	
FS Productive Capability						
Flow Into Area						
Area Required Receipts						
Area Deliveries	-737	-796	-851	-974	-1094	
Area Design Flow Req'mts	-737	-796	-851	-974	-1094	

Design Flow Requirements

Downstream Bens Lake Design Area

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	15741	15559	14210	13720	13910
Flow Into Area	13684	8614	3492	-161	-2317
Area Required Receipts	15568	15094	14210	13720	13910
Area Deliveries	-1422	-1422	-1421	-1439	-1439
Area Design Flow Req'mts	27630	22092	16099	11944	9976

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	559	552	504	487	494
Flow Into Area	486	306	124	-6	-82
Area Required Receipts	553	536	504	487	494
Area Deliveries	-50	-50	-50	-51	-51
Area Design Flow Req'mts	981	784	571	424	354

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	15741	15559	14210	13720	13910
Flow Into Area	15905	11518	5911	1948	776
Area Required Receipts	15741	15559	14210	13720	13910
Area Deliveries	-967	-967	-973	-973	-973
Area Design Flow Req'mts	30477	25911	18965	14519	13535

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	559	552	504	487	494
Flow Into Area	565	409	210	69	28
Area Required Receipts	559	552	504	487	494
Area Deliveries	-34	-34	-35	-35	-35
Area Design Flow Req'mts	1082	920	673	515	480

Design Flow Requirements

Edson Mainline Design Sub Area

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	41110	40567	39307	37393	37761
Flow Into Area	96053	95628	92074	85088	82264
Area Required Receipts	41110	40567	39307	37393	37761
Area Deliveries	-3	-3	-3	-3	-3
Area Design Flow Req'mts	136632	135671	130873	121998	119538

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	1459	1440	1395	1327	1340
Flow Into Area	3409	3394	3268	3020	2920
Area Required Receipts	1459	1440	1395	1327	1340
Area Deliveries	0	0	0	0	0
Area Design Flow Req'mts	4850	4815	4645	4330	4243

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	41142	40622	39386	37496	37887
Flow Into Area	96664	96236	92687	85701	82878
Area Required Receipts	41142	40622	39386	37496	37887
Area Deliveries	-2	-2	-2	-2	-2
Area Design Flow Req'mts	137275	136335	131565	122713	120276

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	1460	1442	1398	1331	1345
Flow Into Area	3431	3416	3290	3042	2942
Area Required Receipts	1460	1442	1398	1331	1345
Area Deliveries	0	0	0	0	0
Area Design Flow Req'mts	4872	4839	4670	4356	4269

Design Flow Requirements

Eastern Alberta Mainline Design Sub Area (James River to Princess)

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	21557	21423	21619	21210	20357
Flow Into Area	111050	124069	115087	117132	118792
Area Required Receipts	21557	21423	21619	21210	20357
Area Deliveries	-1034	-1031	-1026	-2163	-2777
Area Design Flow Req'mts	131297	144185	135403	135907	136110

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	765	760	767	753	723
Flow Into Area	3942	4404	4085	4157	4216
Area Required Receipts	765	760	767	753	723
Area Deliveries	-37	-37	-36	-77	-99
Area Design Flow Req'mts	4660	5118	4806	4824	4831

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	21557	21423	21619	21210	20357
Flow Into Area	115514	129134	119580	122109	122720
Area Required Receipts	21557	21423	21619	21210	20357
Area Deliveries	-179	-175	-170	-170	-166
Area Design Flow Req'mts	136615	150107	140752	142877	142649

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	765	760	767	753	723
Flow Into Area	4100	4583	4244	4334	4356
Area Required Receipts	765	760	767	753	723
Area Deliveries	-6	-6	-6	-6	-6
Area Design Flow Req'mts	4849	5328	4996	5071	5063

Design Flow Requirements

Eastern Alberta Mainline Design Sub
Area (Princess to Empress/McNeill)10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	1739	1718	1685	1658	1640
Flow Into Area	156390	160012	151286	148466	146460
Area Required Receipts	1739	1718	1685	1658	1640
Area Deliveries	-8054	-8091	-7840	-8020	-7940
Area Design Flow Req'mts	150054	153617	145110	142082	140139

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	62	61	60	59	58
Flow Into Area	5551	5679	5370	5270	5198
Area Required Receipts	62	61	60	59	58
Area Deliveries	-286	-287	-278	-285	-282
Area Design Flow Req'mts	5326	5452	5150	5043	4974

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	1739	1718	1685	1658	1640
Flow Into Area	157192	160598	151588	148442	146580
Area Required Receipts	1739	1718	1685	1658	1640
Area Deliveries	-9100	-8677	-8142	-7996	-8060
Area Design Flow Req'mts	149809	153617	145110	142082	140139

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	62	61	60	59	58
Flow Into Area	5579	5700	5380	5269	5203
Area Required Receipts	62	61	60	59	58
Area Deliveries	-323	-308	-289	-284	-286
Area Design Flow Req'mts	5317	5452	5150	5043	4974

Design Flow Requirements

Western Alberta Mainline Design Sub
Area10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	14004	13593	11628	10882	10736
Flow Into Area	75102	75316	78694	79868	81023
Area Required Receipts	14004	13593	11628	10882	10736
Area Deliveries	-5193	-5555	-6992	-7486	-9064
Area Design Flow Req'mts	83733	83181	83181	83124	82558

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	497	482	413	386	381
Flow Into Area	2666	2673	2793	2835	2876
Area Required Receipts	497	482	413	386	381
Area Deliveries	-184	-197	-248	-266	-322
Area Design Flow Req'mts	2972	2952	2952	2950	2930

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	14028	13626	11669	10932	10786
Flow Into Area	75243	75807	78018	78568	78102
Area Required Receipts	14028	13626	11669	10932	10786
Area Deliveries	-5939	-6078	-6357	-6236	-6191
Area Design Flow Req'mts	83152	83181	83181	83124	82558

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	498	484	414	388	383
Flow Into Area	2671	2691	2769	2789	2772
Area Required Receipts	498	484	414	388	383
Area Deliveries	-211	-216	-226	-221	-220
Area Design Flow Req'mts	2951	2952	2952	2950	2930

Design Flow Requirements

Rimbey-Nevis Design Area

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	20536	21368	18704	18703	18478
Flow Into Area	0	0	0	0	0
Area Required Receipts	20536	21368	18704	18703	18478
Area Deliveries	-3110	-3111	-3119	-3122	-3123
Area Design Flow Req'mts	17163	17983	15345	15342	15118

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	729	758	664	664	656
Flow Into Area	0	0	0	0	0
Area Required Receipts	729	758	664	664	656
Area Deliveries	-110	-110	-111	-111	-111
Area Design Flow Req'mts	609	638	545	545	537

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	20536	21368	18704	18703	18478
Flow Into Area	0	0	0	0	0
Area Required Receipts	20536	21368	18704	18703	18478
Area Deliveries	-2276	-2277	-2278	-2279	-2280
Area Design Flow Req'mts	17997	18817	16186	16184	15961

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	729	758	664	664	656
Flow Into Area	0	0	0	0	0
Area Required Receipts	729	758	664	664	656
Area Deliveries	-81	-81	-81	-81	-81
Area Design Flow Req'mts	639	668	575	574	567

Design Flow Requirements

South and Alderson Design Area

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	10989	11485	11309	11028	10748
Flow Into Area	0	0	0	0	0
Area Required Receipts	10989	11485	11309	11028	10748
Area Deliveries	-30	-30	-30	-30	-30
Area Design Flow Req'mts	10818	11308	11134	10857	10580

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	390	408	401	391	381
Flow Into Area	0	0	0	0	0
Area Required Receipts	390	408	401	391	381
Area Deliveries	-1	-1	-1	-1	-1
Area Design Flow Req'mts	384	401	395	385	376

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	10989	11485	11309	11028	10748
Flow Into Area	0	0	0	0	0
Area Required Receipts	10989	11485	11309	11028	10748
Area Deliveries	-22	-22	-22	-22	-22
Area Design Flow Req'mts	10826	11316	11142	10865	10588

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	390	408	401	391	381
Flow Into Area	0	0	0	0	0
Area Required Receipts	390	408	401	391	381
Area Deliveries	-1	-1	-1	-1	-1
Area Design Flow Req'mts	384	402	395	386	376

Design Flow Requirements

Medicine Hat Design Area

10³m³/d

PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	8036	7939	7567	7317	7324
Flow Into Area	0	0	0	0	0
Area Required Receipts	8036	7939	7567	7317	7324
Area Deliveries	-4649	-4880	-5058	-5114	-5218
Area Design Flow Req'mts	3283	2958	2412	2109	2013

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PW					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	285	282	269	260	260
Flow Into Area	0	0	0	0	0
Area Required Receipts	285	282	269	260	260
Area Deliveries	-165	-173	-180	-182	-185
Area Design Flow Req'mts	117	105	86	75	71

10³m³/d

PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	8036	7939	7567	7317	7324
Flow Into Area	0	0	0	0	0
Area Required Receipts	8036	7939	7567	7317	7324
Area Deliveries	-3943	-4003	-4038	-4050	-4085
Area Design Flow Req'mts	3990	3835	3432	3173	3145

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PS					
Gas Year	2004/05	2005/06	2006/07	2007/08	2008/09
FS Productive Capability	285	282	269	260	260
Flow Into Area	0	0	0	0	0
Area Required Receipts	285	282	269	260	260
Area Deliveries	-140	-142	-143	-144	-145
Area Design Flow Req'mts	142	136	122	113	112