Appendix D

Fish Operations Plan Spill

Introduction

Each year from April through the end of August, the US Army Corps of Engineers (Corps) spills water at it's lower four Snake and lower four Columbia River dams to facilitate downstream passage of juvenile salmonids. In 2009, spring and summer Fish Operations Plans (FOPs) were prepared by the Corps and subsequently ordered by the court as guidance documents to detail spill operations for fish passage at lower Snake and Columbia River Corps-operated dams during the 2009 fish passage season. Spill operations; either a fixed spill level or percentage of total flow, as specified in the FOP are defined as hourly spill targets subject to the following constraints:

1) TDG spill caps which are reviewed daily and updated as necessary
2) Minimum generation level for station service and power system needs.

Hourly target spill levels, if defined as a percentage of total river discharge, can vary as a function of river flow and generating units available at a project. FOP spill operations for fish passage do not include involuntary spill that occurs at projects for flood control or spill due of lack of load throughout the hydropower system. These operations also do not include other "miscellaneous" discharge through a given project such as through fish ladders, sluiceways, navigation locks, etc.

This appendix provides an overview of how FOP spill amounts were calculated for compliance monitoring purposes, a description of fish testing and research operations, FOP spill levels for Corps projects on the lower Snake and Columbia rivers, and tabular and graphical summaries of the data (Figures D-1 through D-8; Tables D-1 through D-12).

Overview of Spill Calculations

Calculations of hourly FOP spill levels for juvenile fish passage are based on methods developed and used over the past several years to monitor how closely each project and BPA are implementing juvenile fish spill based on the operating instructions provided to the projects and BPA by the Corps via teletypes. Excel spreadsheets have been developed to display actual project spill level and the level of spill specified for juvenile fish passage in the FOP. Both of these metrics are then displayed graphically so that spill operations can be monitored visually to identify deviations in actual spill from FOP spill.

The mathematical functions developed to calculate FOP spill take into consideration FOP maximum spill levels, 115% forebay/120% tailrace TDG spill caps in effect, minimum generation requirements, fish research and testing during the spill season, and in some cases, ±1% efficiency turbine unit operating requirements. Each project has its own set of mathematical functions depending on the prescribed spill operation and season. Each year, several of these functions are modified to account for spill operations in effect for the current year. These changes are usually driven by fish research to evaluate fish passage and survival or modifications in target spill levels. Typically, functions for a given project are not modified for short duration spill operational changes at projects like a three-day spill test or other short-term regulation adjustments.

One item considered when determining if the projects and BPA are complying with spill operation instructions is to review individual spill gate settings or spill patterns at each project. Spill gates are opened a set number of "stops" to provide a specific discharge through each spill bay. The minimum increment for opening a spill gate is either 1/2 stop or a full stop, which is generally equivalent to spill discharges of 0.8 - 1.9 kcfs per increment, but can vary depending on project. The project's ability to operate continuously at a stop setting also varies due to the changing hydraulic conditions and the speed at which the spill gate control system can react to these changes. This limitation often results in spill levels that are slightly above or below the desired spill level for a period of time.

Project Specific Spill Operations for Fish Passage

In following paragraphs, spill refers to the target spill level provided for juvenile fish passage as described in the 2009 FOP (Appendix C). The target spill is the desired spill amount. Target spill, in some cases, can vary due to factors such as TDG spill caps, minimum generation requirements, altered spill patterns, fish research and testing, and prescribed court ordered spill levels. The target spill will often be lower than actual spill during involuntary spill events; otherwise target spill and actual spill are identical (Figures D-1 through D-8; Tables D-1 through D-8).

Bonneville

Spill for fish passage began at Bonneville Dam on April 10 at 0001 hours and continued until 0001 hours on September 1 (Figure D-1; Table D-1). The spring (April 10 – June 20) FOP spill operation was 100 kcfs 24 hours per day. The summer (June 21- August 31) FOP spill operation was 85 kcfs during daytime hours and to the 120% TDG spill cap at night from June 21 to July 20 and then 75 kcfs during daytime hours and to the 120% TDG spill cap at night from July 21 to August 31. The BII corner collector began operation on April 3, 2009 and continued until September 1st 0700 hour. On April 27 the second powerhouse tripped offline resulting in a spill level that exceeded both the 2009 Spring FOP spill level and the 120% TDG spill cap level for two hours. On July 29, elevated air and water temperatures were driving TDG levels above 115% at the Camas Washougal TDG monitoring site, and spill was reduced to 70 kcfs at the project. Because fish survival through the spillway is reduced at spill levels below 75 kcfs, an agreement was reached at TMT to set the spill cap at no lower than 75 kcfs, as long as TDG levels do not exceed 120% at the Camas Washougal monitoring site. This operational interim measure will continue through August to maintain high fish survival through the spillway.

The Dalles

Spill for fish passage began at The Dalles Dam on April 10 at 0001 hours and continued until 2400 hours on August 31 (Figure D-2; Table D-2). The FOP spill operation at The Dalles Dam for both spring and summer was 40% of total river discharge, 24 hours per day.

John Day
Spill for fish passage began at John Day Dam on April 10 at 0001 hours and continued until 2400 hours on August 31 (Figure D-3; Table D-3). The spring (April 10 – June 30) spill operation in the FOP specified 30% spill 24 hours per day prior to testing, then 30% vs. 40% of total river discharge 24 hours per day during the test. The summer (July 1 – August 31) spill operation in the FOP specified 30% or 40% spill 24 hours per day and then 30% spill 24 hours per day after the summer test was complete. The two treatment spring test to evaluate juvenile fish passage and survival began on April 27 and concluded on June 4 due to early closure of the spillway weirs. This early closure was a consequence of observed heavy gull predation in the tailrace below the spillway weirs. The Corps notified the court of the closure in a memo to the court dated June 5. The two treatment summer test (30% vs. 40%) began on June 25 and concluded on July 20. This operation was coordinated with TMT at the June 24 meeting.

McNary
Spill for fish passage began at McNary Dam on April 10 at 0001 hours and continued until 2400 hours on August 31 (Figure D-4; Table D-4). The FOP spring (April 10 – approximately June 30) spill operation in the FOP specified 40% of total river discharge 24 hours per day. The summer (July 1 – August 31) spill operation in the FOP specified 40% or 60% spill 24 hours per day, in two day blocks. A single treatment spring test to evaluate juvenile fish passage and survival under a continuous 40% spill level, with spillway weirs located in spill bays 4 and 20, began on April 18 and continued through June 19.

The single treatment summer test with continuous 50% spill that began on June 20 continued throughout the month of August. The spillway weir in spill bay 4 was moved to spill bay 19 for the summer test, next to the spillway weir in spill bay 20. The summer test concluded on August 10, while 50% spill operations continued through August 31, except during the low flow operation. Spillway weir locations and spill level for the McNary summer test were coordinated through the Studies Review Work Group and TMT, and had the unanimous support of the state, federal and tribal fishery managers. The Court was notified of this operation by letter on June 19, as the summer test was a change from the operations described in the 2009 summer FOP.

On July 22, the project began spilling to the TDG spill cap instead of the 50% target spill operation. A System Operational Request (SOR) 2009-03 was discussed and coordinated with TMT on July 22. Project operations were adjusted in response to elevated water temperatures and resulting increased mortality of juvenile salmonids passing through the juvenile bypass system. This operation was in place until July 24 at 1200 hours when the temperature ranges that fish experienced was reduced. A detailed description was provided to the Court on July 24, 2009.

On August 14-17, day average flows were low enough to require implementation of the 2009 Summer FOP "low flow" provisions, which forced the project to operate for the minimum generation requirement instead of the 50% target spill operation.

Ice Harbor
Spill for fish passage began at Ice Harbor dam on April 3rd at 0001 hours and continued until 0001 hours on September 1 (Figure D-5; Table D-5). The spring (April 3 – June 20) spill operation in the FOP specified alternate between 45 kcfs day/spill cap night and 30% /30% with the RSW operating. The summer (June 21 – August 31) spill operation in the FOP specified spill 30% 24 hours per day or 45 kcfs day / spill cap night; then 45 kcfs day / spill cap night after the end of the test, with the RSW operating. A two treatment spring test to evaluate juvenile fish passage and survival began on April 28 and continued through June 7. The same two treatment spill test (45kcfs/gas cap vs. 30% of total flow) continued from June 7 as the summer spill test described in the summer FOP, and concluded on July 11. This summer operation continued until the end of the spill season on September 1 at 0001 hours.

On August 15, as a result of the Sacajawea substation transformer coming back in service, it became unnecessary to have a unit operating at Ice Harbor during nighttime hours to maintain system stability. The project began a zero generation nighttime operation from 2200-0600 hours through August 31. During this operation, the project was able to provide 9 kcfs (approximate) spill that would otherwise have been used for minimum generation. This operation was coordinated with TMT on August 19, 2009.

On August 25 due to low flow conditions, maintaining both the minimum generation requirement for system stability and the minimum spill level (15.2 kcfs) was not possible. Consequently, the spill level was reduced as described in the 2009 FPP (Section 6, Table IHR-11). The project spilled all available water (approximately 11.9 kcfs) above the minimum generation level for 14 hours between 1800 hours on August 25 and 0700 hours on August 26. The project operated at the minimum generation requirement at all times during this low flow period, while spilling all remaining flow. This summer operation continued until the end of the spill season on September 1 at 0001 hours.

Lower Monumental
Spill for fish passage at Lower Monumental Dam began on April 3 at 0001 hours and continued until 0001 hours on September 1 (Figure D-6; Table D-6). The spring (April 3 – approximately June 20) spill operation in the FOP specified to spill to the 115/120% TDG spill cap 24 hours per day with the RSW operating. The summer (approximately June 21 – August 31) spill operation in the FOP specified spill 17 kcfs 24 hours per day (subject to 120%/115% TDG spill cap limits) with the RSW operating.

A two treatment spring spill test to evaluate juvenile fish passage and survival began on April 28 and was completed on June 3. The test included alternating the spill pattern between a bulk and uniform pattern. On July 20, a full powerhouse outage occurred as scheduled in the FPP to conduct Doble testing. As a result, the project spilled 39.4 kcfs for one hour, exceeding the 2009 Summer FOP spill level. This testing was originally scheduled to occur in June, as stated in the FPP. Through coordination with FPOM, the testing was rescheduled for July 20.

Little Goose
Spill for fish passage at Little Goose Dam began on April 3rd at 0001 hours and continued until 0001 hours on September 1 (Figure D-7; Table D-7). The spring (April 3 – June 20) and summer (June 21 – August 31) spill operation in the FOP specified 30% spill 24 hours per day. On June 10, an unplanned powerhouse outage occurred due to excessive debris that required units to be cleaned and inspected for damage. As a result, the project spilled 38.4 and 34.8 kcfs for two hours, exceeding the 2009 Spring FOP operations of 30 kcfs spill cap.

Lower Granite
Spill for fish passage at Lower Granite Dam began on April 3 at 0001 hours and continued until 0001 hours on September 1 (Figure D-8; Table D-8). The spring (April 3 – June 20) spill operation in the FOP specified spilling 20 kcfs (including approximately 6 kcfs from the RSW and 14 kcfs from training spill) 24 hours per day. The summer (June 21 – August 31) spill operation in the FOP specified spilling 18 kcfs (including approximately 6 kcfs from the RSW and 12 kcfs from training spill) 24 hours per day. On May 4, an unplanned powerhouse outage occurred due to a fault in the 500KV transmission line. As a result, the project spilled 22 to 70 kcfs for three hours, exceeding the 2009 Spring FOP operation of 20 kcfs. On June 14, the project had to increase spill to pass excessive debris through the spillway bay. As a result, the project spilled 22.3 kcfs for one hour, exceeding the 2009 Spring FOP operations of 20 kcfs spill cap.

Figure D-1
FOP Spill at Bonneville

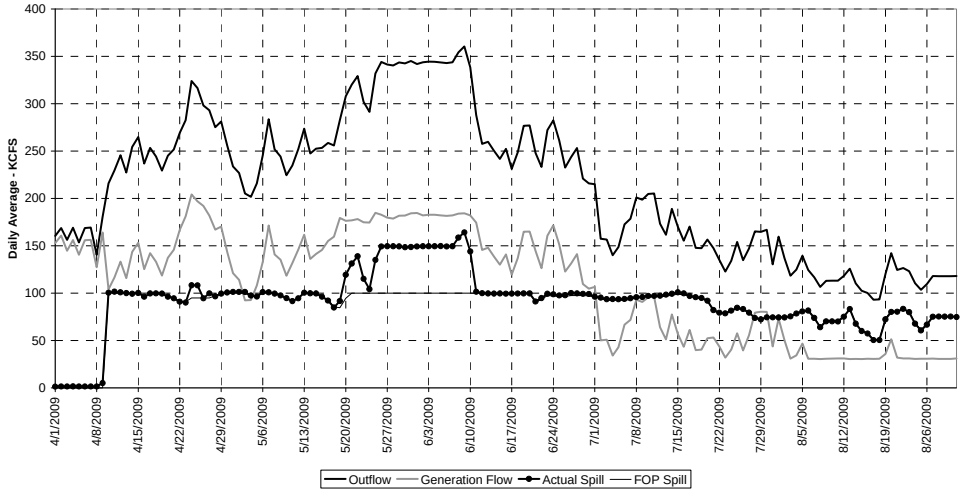

Figure D-2
FOP Spill at The Dalles

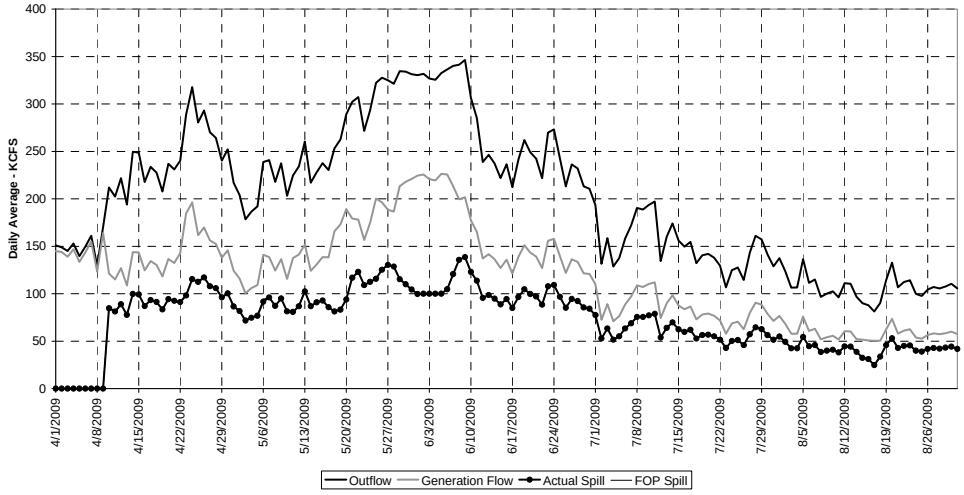

Figure D-3
FOP Spill at John Day

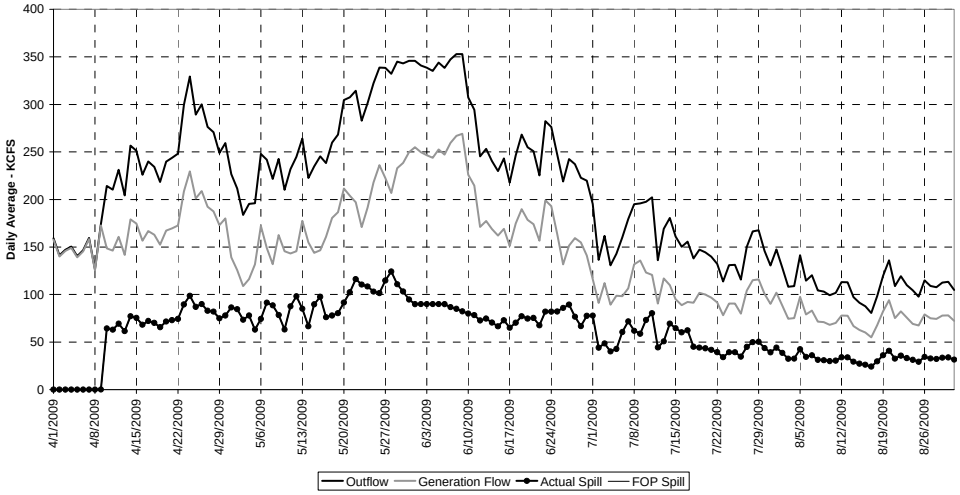

Figure D-4
FOP Spill at McNary

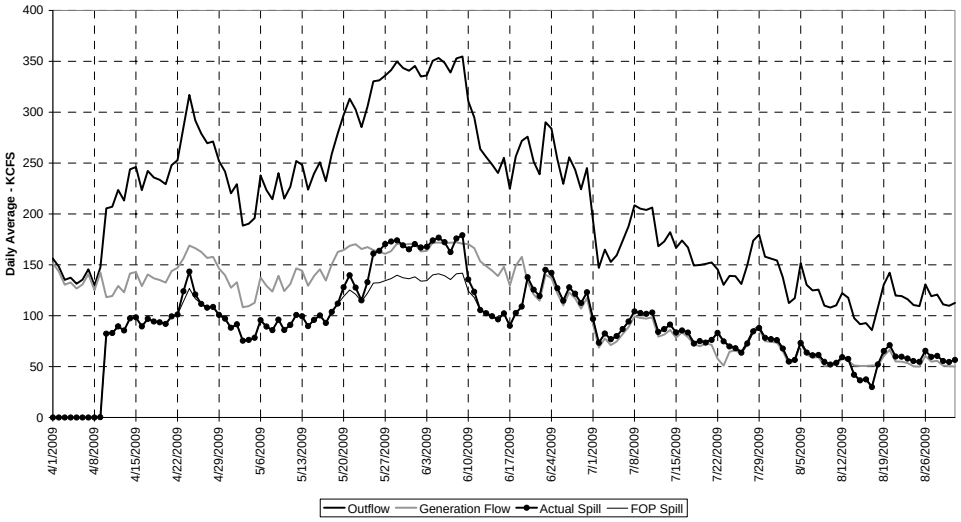

Figure D-5
FOP Spill at Ice Harbor

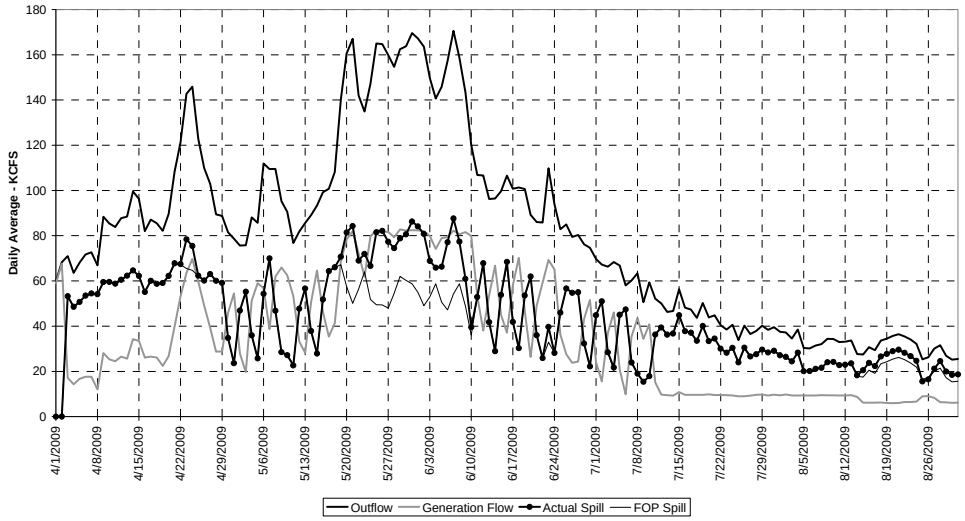

Figure D-6
FOP Spill at Lower Monumental

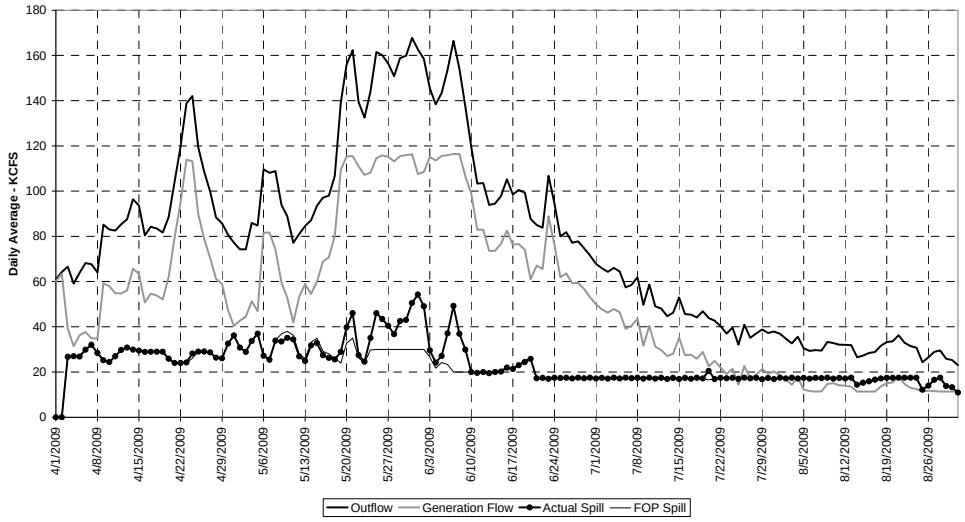

Figure D-7
FOP Spill at Little Goose

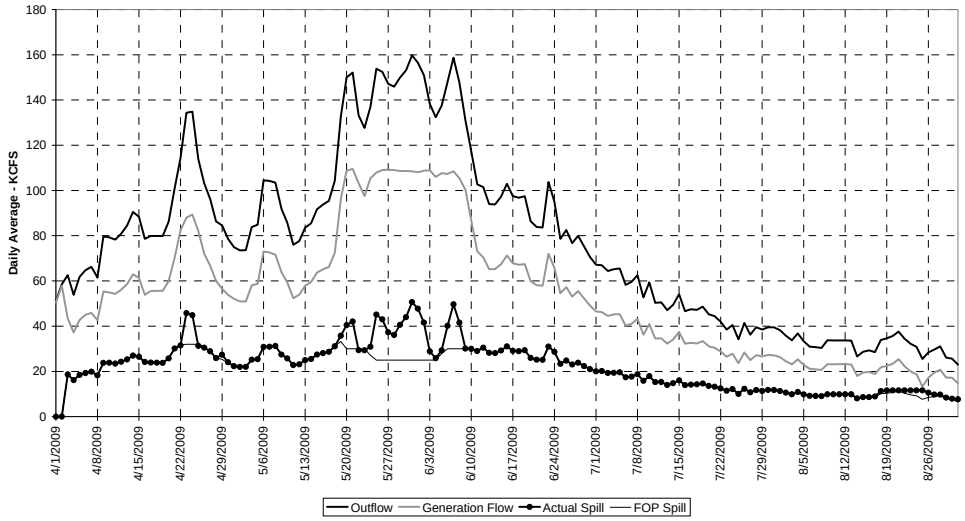

Figure D-8
FOP Spill at Lower Granite

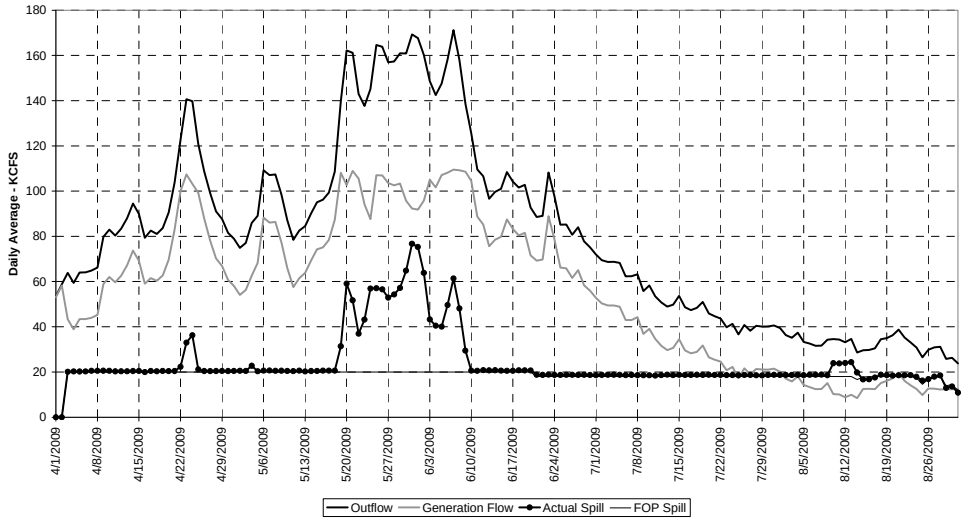

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Table D-1

FOP Spill at Bonneville

Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS
04/01/09	160.56	152.82	1.34	0.00	05/22/09	329.32	178.27	138.95	100.00	7/12/2009	173.30	63.96	97.23	96.25
04/02/09	168.68	160.74	1.53	0.00	05/23/09	302.00	174.78	115.14	100.00	7/13/2009	161.79	51.20	98.50	96.67
04/03/09	156.20	144.70	1.55	0.00	05/24/09	291.43	174.42	104.27	100.00	7/14/2009	189.05	77.51	99.44	97.92
04/04/09	169.12	156.15	1.56	0.00	05/25/09	332.00	184.77	135.13	100.00	7/15/2009	170.25	57.19	100.97	98.75
04/05/09	153.47	140.54	1.55	0.00	05/26/09	344.18	182.76	149.33	100.00	7/16/2009	155.43	43.48	99.85	98.33
04/06/09	168.77	155.85	1.53	0.00	05/27/09	341.35	179.68	149.57	100.00	7/17/2009	170.33	61.18	97.04	96.67
04/07/09	169.30	156.37	1.53	0.00	05/28/09	340.40	178.77	149.53	100.00	7/18/2009	147.72	39.85	95.76	95.00
04/08/09	140.32	127.37	1.55	0.00	05/29/09	343.54	181.85	149.37	100.00	7/19/2009	147.47	40.45	94.93	94.12
04/09/09	180.51	164.00	5.11	0.00	05/30/09	342.59	181.95	148.55	100.00	7/20/2009	156.53	52.40	92.03	91.67
04/10/09	215.90	103.98	100.51	100.00	05/31/09	345.16	184.30	148.76	100.00	7/21/2009	147.48	53.25	82.14	81.30
04/11/09	229.57	116.54	101.62	100.00	06/01/09	341.91	184.66	149.30	100.00	7/22/2009	135.02	43.55	79.37	78.76
04/12/09	245.57	133.25	100.90	100.00	06/02/09	343.81	182.20	149.50	100.00	7/23/2009	122.75	31.95	78.70	78.33
04/13/09	227.37	115.92	100.07	100.00	06/03/09	344.50	182.83	149.56	100.00	7/24/2009	134.04	40.36	81.58	81.25
04/14/09	254.52	143.67	99.44	100.00	06/04/09	344.29	182.70	149.50	100.00	7/25/2009	154.17	57.57	84.53	83.75
04/15/09	264.95	153.25	100.24	100.00	06/05/09	343.70	182.06	149.70	100.00	7/26/2009	134.88	39.50	83.26	82.50
04/16/09	236.78	125.40	96.24	99.95	06/06/09	343.03	181.62	149.33	100.00	7/27/2009	147.19	55.60	79.47	79.17
04/17/09	253.39	142.31	99.68	100.00	06/07/09	343.84	182.18	149.55	100.00	7/28/2009	165.24	79.38	73.75	73.75
04/18/09	244.34	133.16	99.79	100.00	06/08/09	354.35	183.94	158.73	100.00	7/29/2009	164.80	80.40	72.29	72.71
04/19/09	229.45	118.51	99.52	100.00	06/09/09	360.57	184.30	164.18	100.00	7/30/2009	166.92	80.30	74.52	75.00
04/20/09	245.12	137.40	96.31	96.67	06/10/09	338.38	182.15	144.14	100.00	7/31/2009	130.42	43.82	74.49	75.00
04/21/09	251.68	145.76	94.53	95.00	06/11/09	288.04	174.42	101.53	100.00	8/1/2009	159.55	73.08	74.37	75.00
04/22/09	269.14	166.73	91.00	90.83	06/12/09	257.65	145.57	99.97	100.00	8/2/2009	136.75	50.26	74.39	75.00
04/23/09	282.62	181.13	90.10	90.83	06/13/09	259.84	148.05	99.69	100.00	8/3/2009	118.43	30.86	75.47	75.78
04/24/09	324.05	204.28	108.36	95.00	06/14/09	250.37	138.69	99.57	100.00	8/4/2009	124.90	34.25	78.54	78.75
04/25/09	316.56	196.96	108.20	95.00	06/15/09	241.77	130.01	99.66	100.00	8/5/2009	139.59	46.82	80.69	80.83
04/26/09	298.14	192.14	94.59	95.00	06/16/09	252.48	140.90	99.48	100.00	8/6/2009	124.55	30.82	81.63	81.59
04/27/09	293.12	181.91	99.82	95.00	06/17/09	231.33	119.68	99.54	100.00	8/7/2009	116.76	30.73	73.92	74.25
04/28/09	275.16	167.10	96.67	97.29	06/18/09	248.88	137.15	99.61	100.00	8/8/2009	106.60	30.47	64.03	64.50
04/29/09	281.22	170.26	99.56	100.00	06/19/09	276.80	164.94	99.77	100.00	8/9/2009	113.03	30.65	70.28	70.93
04/30/09	255.70	143.53	100.78	100.00	06/20/09	276.95	165.08	99.76	100.00	8/10/2009	113.13	30.86	70.18	71.04
05/01/09	233.89	121.17	101.33	100.00	06/21/09	247.94	144.60	91.23	90.42	8/11/2009	113.23	31.06	70.05	71.12
05/02/09	226.81	114.05	101.35	100.00	06/22/09	233.32	126.42	94.80	93.33	8/12/2009	118.30	31.04	75.18	75.53
05/03/09	205.21	92.51	101.30	100.00	06/23/09	272.14	160.70	99.35	97.50	8/13/2009	125.78	30.45	83.23	83.25
05/04/09	201.68	92.76	97.53	96.67	06/24/09	282.47	171.58	98.79	97.08	8/14/2009	110.42	30.57	67.79	68.36
05/05/09	215.94	108.08	96.46	96.33	06/25/09	261.13	151.40	97.65	96.25	8/15/2009	102.60	30.46	60.04	60.50
05/06/09	245.49	132.92	101.17	100.00	06/26/09	232.67	122.74	97.84	96.67	8/16/2009	100.24	30.67	57.47	58.14
05/07/09	283.69	171.39	100.90	100.00	06/27/09	243.60	131.34	100.15	97.50	8/17/2009	93.12	30.52	50.49	51.01
05/08/09	251.89	140.95	99.53	100.00	06/28/09	253.15	141.22	99.79	97.50	8/18/2009	93.31	30.66	50.53	51.20
05/09/09	244.32	135.28	97.63	97.71	06/29/09	221.00	109.64	99.26	97.50	8/19/2009	120.30	35.89	72.29	73.38
05/10/09	224.48	118.37	94.71	95.00	06/30/09	215.93	104.77	99.06	97.08	8/20/2009	142.32	51.29	80.18	80.83
05/11/09	234.80	131.82	91.60	92.08	07/01/09	215.05	106.63	96.31	95.83	8/21/2009	124.46	31.98	80.39	80.66
05/12/09	252.00	146.01	94.59	95.00	07/02/09	157.53	50.12	95.30	94.17	8/22/2009	126.52	30.98	83.43	83.84
05/13/09	273.61	161.70	100.50	100.00	07/03/09	156.58	50.81	93.65	92.50	8/23/2009	123.18	31.15	79.92	80.31
05/14/09	247.44	136.11	99.91	100.00	07/04/09	140.01	34.09	93.82	92.50	8/24/2009	110.48	30.57	67.79	68.33
05/15/09	252.50	141.42	99.70	100.00	07/05/09	148.68	42.97	93.62	92.50	8/25/2009	103.61	30.83	60.68	61.50
05/16/09	253.37	145.69	96.27	96.67	07/06/09	172.73	66.67	93.96	92.50	8/26/2009	109.60	30.73	66.77	67.42
05/17/09	258.67	155.08	92.19	92.92	07/07/09	178.61	71.87	94.65	93.33	8/27/2009	118.12	30.87	75.14	75.46
05/18/09	255.87	159.60	84.87	85.42	07/08/09	201.00	93.14	95.76	95.00	8/28/2009	118.02	30.62	75.32	75.45
05/19/09	282.87	179.36	91.67	84.58	07/09/09	198.73	90.72	95.93	95.42	8/29/2009	117.89	30.60	75.20	75.39
05/20/09	307.92	176.45	119.37	94.58	07/10/09	204.77	95.56	97.12	96.25	8/30/2009	117.99	30.58	75.30	75.43
05/21/09	320.22	176.81	131.31	100.00	07/11/09	205.33	96.08	97.13	96.25	8/31/2009	118.09	30.99	74.81	75.43

Table D-2

FOP Spill at The Dalles

Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS
04/01/09	150.95	144.85	0.00	0.00	05/22/09	307.28	178.02	123.05	122.91	7/12/2009	134.30	74.33	53.85	53.72
04/02/09	148.90	144.05	0.00	0.00	05/23/09	271.79	156.61	109.09	108.72	7/13/2009	160.18	90.05	64.02	64.07
04/03/09	145.06	138.96	0.00	0.00	05/24/09	293.46	174.87	112.49	112.83	7/14/2009	173.98	98.22	69.71	69.59
04/04/09	153.06	146.96	0.00	0.00	05/25/09	322.35	200.34	115.72	116.02	7/15/2009	156.09	87.52	62.47	62.44
04/05/09	139.65	133.55	0.00	0.00	05/26/09	327.68	196.30	125.28	126.19	7/16/2009	149.51	83.67	59.73	59.80
04/06/09	149.69	143.59	0.00	0.00	05/27/09	325.01	188.60	130.30	130.00	7/17/2009	154.63	86.52	61.96	61.85
04/07/09	161.07	154.97	0.00	0.00	05/28/09	321.28	186.56	128.63	128.44	7/18/2009	132.12	73.06	52.73	52.85
04/08/09	129.36	123.26	0.00	0.00	05/29/09	334.68	213.32	115.25	115.65	7/19/2009	140.53	78.00	56.43	56.21
04/09/09	170.25	164.15	0.00	0.00	05/30/09	334.00	217.92	109.98	110.00	7/20/2009	142.03	79.15	56.78	56.81
04/10/09	212.01	121.24	84.67	84.80	05/31/09	331.41	220.87	104.44	104.58	7/21/2009	137.92	76.71	55.11	55.17
04/11/09	202.34	115.02	81.23	80.94	06/01/09	330.36	224.48	99.78	100.00	7/22/2009	129.55	71.89	51.54	51.82
04/12/09	221.75	126.97	88.92	88.70	06/02/09	331.73	225.63	100.00	100.00	7/23/2009	106.81	57.91	42.80	42.73
04/13/09	193.90	108.80	77.76	77.56	06/03/09	326.87	220.77	100.00	100.00	7/24/2009	124.88	68.57	50.21	49.95
04/14/09	249.66	143.80	99.76	99.87	06/04/09	325.53	219.43	100.00	100.00	7/25/2009	127.72	70.49	51.13	51.09
04/15/09	248.75	143.43	99.20	99.50	06/05/09	332.50	226.41	100.00	100.00	7/26/2009	114.44	62.57	45.78	45.78
04/16/09	217.75	124.65	86.99	87.10	06/06/09	336.55	225.66	104.79	105.00	7/27/2009	143.20	79.78	57.20	57.28
04/17/09	233.76	134.33	93.33	93.51	06/07/09	340.16	213.40	120.67	120.67	7/28/2009	161.09	90.48	64.50	64.44
04/18/09	227.72	130.34	91.29	91.09	06/08/09	341.42	199.59	135.74	135.59	7/29/2009	157.19	88.36	62.70	62.88
04/19/09	207.72	118.13	83.48	83.09	06/09/09	346.40	201.72	138.59	138.56	7/30/2009	141.26	78.77	56.37	56.50
04/20/09	236.98	136.56	94.32	94.04	06/10/09	306.40	177.28	123.02	122.48	7/31/2009	128.83	71.26	51.49	51.53
04/21/09	230.98	132.35	92.54	92.39	06/11/09	285.10	165.27	113.71	113.60	8/1/2009	137.48	76.51	54.86	54.99
04/22/09	240.07	142.83	91.14	90.28	06/12/09	238.85	137.07	95.68	95.54	8/2/2009	123.54	68.10	49.33	49.42
04/23/09	288.92	184.65	98.16	99.08	06/13/09	246.36	141.63	98.63	98.54	8/3/2009	106.39	57.83	42.47	42.56
04/24/09	317.68	196.26	115.32	115.55	06/14/09	237.24	136.33	94.81	94.90	8/4/2009	106.49	57.80	42.57	42.60
04/25/09	280.42	161.78	112.54	112.17	06/15/09	222.01	127.14	88.80	88.80	8/5/2009	136.45	75.90	54.40	54.58
04/26/09	293.14	169.88	117.16	117.23	06/16/09	236.48	135.98	94.40	94.59	8/6/2009	111.49	60.77	44.61	44.60
04/27/09	270.15	156.19	107.86	108.06	06/17/09	212.24	121.17	84.97	84.90	8/7/2009	114.97	62.98	45.89	45.99
04/28/09	264.34	152.44	105.80	105.74	06/18/09	241.57	138.95	96.51	96.63	8/8/2009	96.63	51.92	38.62	38.65
04/29/09	240.33	138.03	96.20	96.13	06/19/09	261.82	151.03	104.70	104.73	8/9/2009	100.20	54.09	40.02	40.08
04/30/09	252.16	145.73	100.33	100.86	06/20/09	249.05	143.29	99.70	99.59	8/10/2009	102.56	55.56	40.90	41.03
05/01/09	216.90	124.18	86.60	86.76	06/21/09	242.33	139.12	97.11	96.93	8/11/2009	96.02	51.76	38.15	38.41
05/02/09	204.01	116.11	81.79	81.60	06/22/09	221.70	127.07	88.52	88.68	8/12/2009	111.07	60.51	44.48	44.43
05/03/09	178.32	100.51	71.71	71.33	06/23/09	269.77	155.88	107.79	107.91	8/13/2009	110.45	60.13	44.22	44.18
05/04/09	186.56	105.81	74.65	74.62	06/24/09	273.14	157.81	109.24	109.26	8/14/2009	96.86	52.05	38.74	38.74
05/05/09	192.04	109.13	76.84	76.82	06/25/09	242.80	139.91	96.80	97.12	8/15/2009	90.02	51.53	32.38	32.41
05/06/09	238.78	141.02	91.65	94.17	06/26/09	213.20	121.90	85.22	85.28	8/16/2009	87.92	50.68	31.12	31.12
05/07/09	240.75	138.52	96.12	96.30	06/27/09	236.19	136.18	94.50	94.48	8/17/2009	81.31	50.44	24.74	24.74
05/08/09	217.87	124.50	87.27	87.15	06/28/09	232.00	133.62	92.28	92.80	8/18/2009	90.23	50.42	33.70	33.49
05/09/09	237.55	136.46	94.99	95.02	06/29/09	213.19	121.37	85.53	85.28	8/19/2009	114.26	62.36	45.83	45.70
05/10/09	203.22	115.65	81.47	81.29	06/30/09	210.65	120.88	84.17	84.26	8/20/2009	132.69	73.57	53.03	53.08
05/11/09	224.56	137.60	80.87	80.49	07/01/09	193.40	109.85	77.45	77.36	8/21/2009	106.84	57.98	42.75	42.74
05/12/09	234.24	141.35	86.79	87.57	07/02/09	131.53	72.59	52.85	52.61	8/22/2009	112.22	61.08	45.02	44.89
05/13/09	260.48	151.86	102.49	102.75	07/03/09	158.58	89.06	63.41	63.43	8/23/2009	114.08	62.51	45.48	45.63
05/14/09	217.03	124.12	86.83	86.81	07/04/09	128.65	70.98	51.59	51.46	8/24/2009	99.85	53.77	39.98	39.94
05/15/09	227.90	130.83	90.96	91.16	07/05/09	137.56	76.33	55.13	55.02	8/25/2009	97.70	52.61	39.00	39.08
05/16/09	237.56	138.63	92.83	92.66	07/06/09	158.26	88.78	63.39	63.31	8/26/2009	104.41	56.51	41.80	41.76
05/17/09	230.32	138.39	85.82	85.73	07/07/09	171.79	96.91	68.78	68.72	8/27/2009	107.06	58.22	42.75	42.82
05/18/09	253.12	165.69	81.28	80.99	07/08/09	190.40	108.80	75.51	76.16	8/28/2009	105.47	57.28	42.10	42.19
05/19/09	262.85	173.29	83.25	83.86	07/09/09	188.69	107.12	75.49	75.48	8/29/2009	107.62	58.33	43.19	43.05
05/20/09	289.15	189.11	93.94	94.58	07/10/09	193.62	110.28	77.23	77.45	8/30/2009	110.37	60.02	44.25	44.15
05/21/09	302.29	179.35	116.85	117.60	07/11/09	197.15	111.99	78.81	78.86	8/31/2009	105.51	57.54	41.86	42.21

Table D-3

FOP Spill at John Day

Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS
04/01/09	159.11	157.69	0.00	0.00	05/22/09	314.43	197.03	116.20	116.58	7/12/2009	136.05	90.60	44.34	44.29
04/02/09	141.14	139.94	0.00	0.00	05/23/09	282.85	170.98	110.51	109.88	7/13/2009	169.16	116.97	50.77	50.75
04/03/09	147.00	145.87	0.00	0.00	05/24/09	301.40	191.57	108.48	108.44	7/14/2009	180.54	109.87	69.40	69.56
04/04/09	150.47	149.16	0.00	0.00	05/25/09	322.32	218.03	103.10	103.35	7/15/2009	161.03	95.09	64.52	64.41
04/05/09	140.39	139.15	0.00	0.00	05/26/09	338.78	236.17	101.53	101.63	7/16/2009	150.27	88.78	60.23	60.11
04/06/09	146.50	145.37	0.00	0.00	05/27/09	338.52	222.44	114.74	114.70	7/17/2009	155.61	92.23	62.34	62.24
04/07/09	159.49	158.29	0.00	0.00	05/28/09	332.19	206.78	124.23	124.58	7/18/2009	137.88	91.42	45.11	44.93
04/08/09	126.58	125.53	0.00	0.00	05/29/09	345.07	232.97	110.84	110.88	7/19/2009	147.20	101.81	44.14	44.16
04/09/09	174.05	172.67	0.10	0.00	05/30/09	343.20	238.45	103.16	102.96	7/20/2009	144.47	99.86	43.41	43.34
04/10/09	214.16	148.61	64.35	64.25	05/31/09	345.77	249.76	94.80	94.66	7/21/2009	139.86	96.72	41.86	41.96
04/11/09	210.39	146.17	63.03	63.12	06/01/09	345.96	254.93	89.91	90.00	7/22/2009	132.20	91.60	39.32	39.66
04/12/09	231.22	160.68	69.35	69.37	06/02/09	340.87	249.73	89.95	89.96	7/23/2009	113.69	78.23	34.03	34.11
04/13/09	204.30	141.73	61.51	61.29	06/03/09	338.59	246.52	89.97	90.00	7/24/2009	130.96	90.45	39.28	39.29
04/14/09	256.65	179.05	77.15	77.00	06/04/09	335.31	243.93	89.95	90.00	7/25/2009	131.24	90.56	39.25	39.37
04/15/09	251.27	174.60	75.46	75.38	06/05/09	343.98	252.66	89.94	90.00	7/26/2009	115.82	79.88	34.70	34.75
04/16/09	225.96	156.65	68.20	67.79	06/06/09	338.38	247.14	89.93	89.64	7/27/2009	150.25	104.14	44.86	45.07
04/17/09	240.00	166.75	72.19	72.00	06/07/09	347.36	259.45	86.70	86.67	7/28/2009	166.42	115.04	49.94	49.93
04/18/09	234.22	162.83	70.18	70.27	06/08/09	352.97	266.95	84.93	85.00	7/29/2009	167.55	115.95	50.31	50.27
04/19/09	218.50	152.50	65.63	65.55	06/09/09	352.93	269.20	82.30	82.08	7/30/2009	145.89	100.64	43.71	43.77
04/20/09	239.75	167.18	71.58	71.92	06/10/09	307.23	225.96	80.00	80.00	7/31/2009	130.48	90.11	39.23	39.15
04/21/09	243.85	169.68	73.04	73.16	06/11/09	294.27	214.61	78.30	78.02	8/1/2009	147.41	101.90	44.08	44.22
04/22/09	248.25	172.68	74.37	74.48	06/12/09	245.35	171.22	72.70	72.90	8/2/2009	128.26	88.33	38.59	38.48
04/23/09	299.51	208.58	89.59	89.85	06/13/09	253.30	177.31	74.72	74.80	8/3/2009	108.15	74.43	32.44	32.45
04/24/09	329.31	229.50	98.72	98.79	06/14/09	240.53	168.89	70.45	70.65	8/4/2009	108.86	75.13	32.53	32.66
04/25/09	289.32	201.08	87.08	86.80	06/15/09	229.93	162.06	66.58	66.45	8/5/2009	141.31	97.63	42.41	42.39
04/26/09	300.09	208.92	89.97	90.03	06/16/09	243.22	169.05	72.92	72.77	8/6/2009	114.66	79.02	34.35	34.40
04/27/09	276.37	192.35	82.99	82.91	06/17/09	217.77	151.02	65.13	65.33	8/7/2009	120.40	83.15	36.12	36.12
04/28/09	270.77	187.51	82.05	81.23	06/18/09	246.59	174.87	70.31	70.33	8/8/2009	104.32	71.40	31.35	31.30
04/29/09	248.97	173.08	74.95	74.69	06/19/09	268.17	189.80	77.15	77.14	8/9/2009	103.14	70.99	30.86	30.94
04/30/09	259.29	180.09	77.93	77.79	06/20/09	254.87	178.59	74.72	74.78	8/10/2009	99.21	68.13	29.96	29.76
05/01/09	226.75	139.21	86.42	86.50	06/21/09	250.72	173.93	75.37	75.22	8/11/2009	101.82	70.08	30.50	30.55
05/02/09	211.44	125.70	84.52	84.58	06/22/09	225.27	156.58	67.55	67.58	8/12/2009	113.00	77.89	33.97	33.90
05/03/09	183.75	108.85	73.47	73.50	06/23/09	282.42	199.10	82.02	82.17	8/13/2009	112.88	77.73	33.88	33.86
05/04/09	195.40	116.23	77.97	78.16	06/24/09	276.39	193.12	81.99	82.40	8/14/2009	97.23	66.74	29.37	29.17
05/05/09	196.00	131.70	63.11	62.68	06/25/09	247.34	163.73	82.18	82.35	8/15/2009	91.32	62.70	27.33	27.40
05/06/09	247.83	172.20	74.35	74.35	06/26/09	218.86	131.82	85.93	86.01	8/16/2009	87.56	60.11	26.20	26.27
05/07/09	241.78	148.90	91.52	91.45	06/27/09	242.50	151.53	89.39	89.31	8/17/2009	80.64	55.00	24.17	24.19
05/08/09	221.64	131.95	88.57	88.66	06/28/09	237.10	159.29	76.68	76.64	8/18/2009	98.39	67.70	29.70	29.52
05/09/09	242.61	162.62	78.46	78.58	06/29/09	222.83	154.84	66.80	66.85	8/19/2009	119.72	82.38	36.06	35.92
05/10/09	210.19	145.54	63.22	63.06	06/30/09	219.80	141.04	77.63	77.62	8/20/2009	135.96	93.99	40.76	40.79
05/11/09	231.97	143.26	87.60	87.63	07/01/09	195.33	116.24	77.81	77.95	8/21/2009	108.87	75.16	32.57	32.66
05/12/09	244.91	145.53	98.14	97.96	07/02/09	136.50	91.23	44.07	44.09	8/22/2009	119.33	82.21	35.70	35.80
05/13/09	264.03	177.55	85.05	84.93	07/03/09	161.75	112.01	48.53	48.53	8/23/2009	109.91	75.73	33.11	32.97
05/14/09	222.72	154.85	66.60	66.82	07/04/09	130.77	89.30	40.12	39.23	8/24/2009	104.52	69.13	31.33	31.36
05/15/09	234.73	143.76	89.70	89.93	07/05/09	142.95	98.81	42.78	42.88	8/25/2009	97.78	67.41	29.25	29.34
05/16/09	245.41	146.50	97.55	97.70	07/06/09	160.09	98.32	60.58	60.46	8/26/2009	114.81	79.11	34.42	34.44
05/17/09	238.27	160.76	76.13	76.14	07/07/09	179.44	106.43	71.80	71.78	8/27/2009	108.94	75.06	32.74	32.68
05/18/09	259.80	180.50	77.95	77.94	07/08/09	195.06	131.82	61.88	62.07	8/28/2009	107.65	74.32	32.21	32.30
05/19/09	268.20	186.54	80.39	80.46	07/09/09	195.86	135.76	58.76	58.76	8/29/2009	112.59	77.81	33.59	33.78
05/20/09	304.57	211.45	91.61	91.37	07/10/09	197.57	123.06	73.24	73.55	8/30/2009	113.41	78.06	33.86	34.02
05/21/09	307.54	203.98	102.36	102.35	07/11/09	202.33	120.55	80.39	80.54	8/31/2009	104.83	72.27	31.50	31.45

Table D-4

FOP Spill at McNary

Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS
04/01/09	156.22	151.68	0.01	0.00	05/22/09	302.70	170.33	127.67	121.08	7/12/2009	168.22	79.36	84.17	84.11
04/02/09	148.37	143.62	0.05	0.00	05/23/09	285.41	165.65	115.07	114.16	7/13/2009	173.04	81.43	86.90	86.52
04/03/09	135.27	130.57	0.00	0.00	05/24/09	305.24	167.47	133.06	122.09	7/14/2009	182.14	86.08	91.36	91.07
04/04/09	137.35	132.65	0.00	0.00	05/25/09	330.34	164.53	161.10	132.14	7/15/2009	166.75	78.44	83.60	83.38
04/05/09	131.40	126.70	0.00	0.00	05/26/09	331.32	162.80	163.82	132.53	7/16/2009	173.97	83.69	85.58	86.99
04/06/09	135.35	130.65	0.00	0.00	05/27/09	336.03	160.86	170.49	134.41	7/17/2009	167.19	78.96	83.52	83.59
04/07/09	145.58	140.88	0.00	0.00	05/28/09	341.27	163.57	173.00	136.51	7/18/2009	149.40	72.10	72.59	74.70
04/08/09	129.82	125.12	0.00	0.00	05/29/09	349.75	171.00	174.05	139.90	7/19/2009	149.88	70.06	75.10	74.94
04/09/09	147.60	142.52	0.38	0.00	05/30/09	343.38	169.56	169.10	137.35	7/20/2009	151.00	72.65	73.66	75.29
04/10/09	205.45	118.36	82.38	82.18	05/31/09	340.66	170.68	165.30	136.27	7/21/2009	152.35	71.40	76.26	76.18
04/11/09	207.03	119.31	83.03	82.81	06/01/09	345.48	170.31	170.48	138.19	7/22/2009	145.49	57.61	83.18	84.75
04/12/09	223.53	129.28	89.55	89.41	06/02/09	334.98	163.20	167.08	133.99	7/23/2009	130.43	50.90	74.83	75.43
04/13/09	213.18	122.90	85.59	85.27	06/03/09	336.07	163.64	167.72	134.43	7/24/2009	139.12	64.58	69.86	70.67
04/14/09	243.80	141.59	97.52	97.52	06/04/09	350.41	171.72	173.97	140.16	7/25/2009	138.83	65.97	68.15	69.42
04/15/09	246.00	142.90	98.43	98.40	06/05/09	353.29	171.83	176.73	141.32	7/26/2009	131.08	62.72	63.66	64.97
04/16/09	223.41	129.12	89.60	89.36	06/06/09	348.51	171.53	172.26	139.40	7/27/2009	149.73	72.28	72.74	74.87
04/17/09	242.23	140.55	96.98	96.89	06/07/09	338.96	171.73	162.51	135.58	7/28/2009	173.72	84.40	84.60	86.86
04/18/09	235.89	136.87	94.32	94.36	06/08/09	352.86	172.19	175.94	141.15	7/29/2009	179.71	87.06	87.96	89.86
04/19/09	233.41	135.10	93.61	93.36	06/09/09	354.61	170.83	179.09	141.84	7/30/2009	157.99	75.02	78.27	79.00
04/20/09	229.30	132.55	92.05	91.72	06/10/09	310.95	170.56	135.68	124.38	7/31/2009	156.12	74.43	77.00	78.06
04/21/09	247.92	143.84	99.38	99.17	06/11/09	294.62	166.37	123.55	117.85	8/1/2009	154.30	73.58	75.99	77.15
04/22/09	252.83	146.95	101.19	101.13	06/12/09	263.79	153.50	105.56	105.52	8/2/2009	137.78	65.26	67.79	68.89
04/23/09	285.05	156.32	124.02	114.02	06/13/09	255.97	148.76	102.51	102.39	8/3/2009	112.49	52.73	55.07	55.70
04/24/09	317.04	168.98	143.35	126.82	06/14/09	248.57	144.32	99.55	99.43	8/4/2009	117.37	56.02	56.65	57.78
04/25/09	291.95	166.35	120.89	116.78	06/15/09	240.22	139.07	96.45	96.09	8/5/2009	151.69	73.72	73.27	75.85
04/26/09	279.11	162.77	111.63	111.64	06/16/09	255.16	148.16	102.30	102.06	8/6/2009	130.43	61.90	63.84	64.72
04/27/09	269.48	156.81	107.97	107.79	06/17/09	224.63	129.75	90.19	89.85	8/7/2009	124.79	58.97	61.14	62.01
04/28/09	271.20	157.92	108.60	108.48	06/18/09	256.45	149.05	102.70	102.58	8/8/2009	125.63	59.36	61.57	62.81
04/29/09	251.75	146.15	100.90	100.70	06/19/09	271.75	157.98	109.05	108.70	8/9/2009	109.96	50.63	54.64	54.76
04/30/09	241.68	139.83	97.15	96.67	06/20/09	275.85	133.29	137.84	137.88	8/10/2009	108.09	51.37	52.03	52.30
05/01/09	220.39	127.54	88.16	88.16	06/21/09	251.38	121.03	125.65	125.69	8/11/2009	110.22	51.75	53.76	53.97
05/02/09	229.24	132.92	91.62	91.70	06/22/09	239.02	114.85	119.46	119.51	8/12/2009	122.24	58.20	59.34	59.67
05/03/09	188.53	108.36	75.46	75.41	06/23/09	290.01	140.27	145.05	145.01	8/13/2009	117.69	55.52	57.49	58.56
05/04/09	190.47	109.47	76.29	76.19	06/24/09	283.99	137.12	142.18	142.00	8/14/2009	97.77	51.15	41.93	42.88
05/05/09	195.91	112.81	78.38	78.36	06/25/09	253.71	122.03	126.98	126.86	8/15/2009	91.76	50.62	36.45	37.07
05/06/09	237.92	137.60	95.60	95.17	06/26/09	229.64	110.16	114.78	114.82	8/16/2009	92.82	50.70	37.40	38.10
05/07/09	223.50	129.41	89.40	89.40	06/27/09	255.65	123.04	127.91	127.83	8/17/2009	85.82	51.15	29.95	31.11
05/08/09	214.41	123.80	85.92	85.77	06/28/09	243.50	117.18	121.64	121.75	8/18/2009	107.85	51.00	52.17	51.85
05/09/09	240.05	139.20	96.15	96.02	06/29/09	224.19	106.91	112.56	112.09	8/19/2009	130.49	60.44	65.35	65.24
05/10/09	215.05	124.32	86.05	86.02	06/30/09	245.09	117.31	123.07	122.55	8/20/2009	142.37	66.58	71.09	71.18
05/11/09	226.75	131.07	90.97	90.70	07/01/09	193.40	91.83	96.87	96.70	8/21/2009	119.81	55.16	59.94	59.90
05/12/09	252.05	146.57	100.78	100.82	07/02/09	147.00	68.80	73.51	73.50	8/22/2009	119.32	54.87	59.73	59.66
05/13/09	248.36	144.13	99.53	99.34	07/03/09	164.91	77.65	82.55	82.46	8/23/2009	116.21	53.58	57.92	58.10
05/14/09	223.90	129.47	89.74	89.56	07/04/09	152.85	71.16	76.97	76.42	8/24/2009	110.57	50.34	55.52	55.29
05/15/09	239.66	139.00	95.94	95.86	07/05/09	159.45	74.79	79.97	79.73	8/25/2009	109.50	50.04	54.77	54.75
05/16/09	250.78	145.66	100.41	100.31	07/06/09	173.55	81.95	86.90	86.78	8/26/2009	130.85	60.56	65.59	65.43
05/17/09	232.28	134.62	92.95	92.91	07/07/09	187.90	88.89	94.31	93.95	8/27/2009	119.25	54.94	59.62	59.62
05/18/09	258.91	150.50	103.72	103.56	07/08/09	208.45	99.49	104.27	104.23	8/28/2009	120.86	55.66	60.50	60.43
05/19/09	279.41	162.73	111.99	111.76	07/09/09	205.21	97.85	102.67	102.61	8/29/2009	111.17	50.96	55.51	55.59
05/20/09	297.27	164.55	128.05	118.91	07/10/09	203.90	97.28	101.93	101.95	8/30/2009	109.71	50.52	54.50	54.86
05/21/09	313.25	168.77	139.80	125.30	07/11/09	206.34	98.51	103.13	103.17	8/31/2009	112.67	50.13	56.60	56.34

Table D-5

FOP Spill at Ice Harbor

Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS
04/01/09	59.82	58.88	0.00	0.00	05/22/09	141.96	72.09	69.00	56.42	7/12/2009	50.05	9.76	39.41	39.68
04/02/09	68.27	67.58	0.07	0.00	05/23/09	134.90	61.92	71.93	64.04	7/13/2009	46.30	9.53	36.27	36.30
04/03/09	70.97	17.16	53.25	53.37	05/24/09	147.14	79.64	66.65	51.79	7/14/2009	46.73	9.32	36.77	36.59
04/04/09	63.56	14.29	48.58	48.50	05/25/09	164.96	82.56	81.53	49.49	7/15/2009	56.36	10.89	44.84	44.83
04/05/09	68.07	16.73	50.72	50.62	05/26/09	164.68	81.80	82.14	49.41	7/16/2009	48.18	9.64	37.80	37.94
04/06/09	71.68	17.66	53.51	53.32	05/27/09	159.87	81.66	77.33	47.96	7/17/2009	47.33	9.65	37.11	37.15
04/07/09	72.70	17.62	54.46	54.27	05/28/09	154.64	79.32	74.50	54.48	7/18/2009	43.68	9.61	33.52	33.63
04/08/09	66.86	12.07	54.15	54.07	05/29/09	162.47	82.78	78.81	61.96	7/19/2009	50.25	9.68	40.08	40.09
04/09/09	88.36	28.12	59.48	59.35	05/30/09	163.79	82.30	80.61	60.21	7/20/2009	43.88	9.85	33.42	33.66
04/10/09	85.39	25.32	59.59	59.64	05/31/09	169.60	82.47	86.27	58.75	7/21/2009	44.79	9.55	34.53	34.58
04/11/09	83.90	24.54	58.79	58.73	06/01/09	167.18	82.38	84.11	54.91	7/22/2009	40.44	9.55	30.09	30.14
04/12/09	87.75	26.54	60.52	60.25	06/02/09	163.55	81.90	80.81	49.07	7/23/2009	38.50	9.47	28.27	28.24
04/13/09	88.45	25.64	62.32	62.15	06/03/09	149.77	79.95	68.89	52.94	7/24/2009	40.61	9.34	30.43	30.27
04/14/09	99.57	34.24	64.65	64.24	06/04/09	140.66	74.15	65.90	58.75	7/25/2009	33.83	9.02	24.00	23.52
04/15/09	96.34	33.50	62.22	62.25	06/05/09	145.83	78.92	66.28	50.58	7/26/2009	40.26	9.02	30.50	30.02
04/16/09	82.00	26.16	55.15	55.43	06/06/09	157.28	79.37	77.10	47.18	7/27/2009	36.53	9.32	26.60	26.42
04/17/09	87.10	26.55	60.05	60.16	06/07/09	170.61	82.23	87.63	54.27	7/28/2009	37.87	9.67	27.58	27.75
04/18/09	85.50	26.16	58.75	58.98	06/08/09	158.67	80.65	77.40	58.75	7/29/2009	40.20	9.78	29.67	29.95
04/19/09	82.13	22.43	59.06	58.96	06/09/09	143.30	81.61	60.95	48.78	7/30/2009	38.38	9.35	28.35	28.20
04/20/09	89.65	26.80	62.23	62.13	06/10/09	120.16	79.86	39.54	36.05	7/31/2009	39.57	9.70	29.13	29.34
04/21/09	108.30	39.93	67.82	67.37	06/11/09	106.85	53.20	52.89	53.06	8/1/2009	37.51	9.44	27.14	27.08
04/22/09	121.28	53.13	67.45	67.17	06/12/09	106.67	38.12	67.85	67.83	8/2/2009	37.19	9.81	26.43	26.74
04/23/09	142.68	63.57	78.42	65.54	06/13/09	96.21	53.63	41.79	42.01	8/3/2009	34.55	9.35	24.45	24.30
04/24/09	145.86	69.68	75.44	64.71	06/14/09	96.48	66.70	28.95	28.95	8/4/2009	38.53	9.39	28.32	28.22
04/25/09	122.83	59.74	62.32	62.21	06/15/09	99.62	45.12	53.82	53.74	8/5/2009	30.37	9.37	20.13	20.00
04/26/09	109.86	49.05	60.19	60.13	06/16/09	106.55	37.10	68.45	66.67	8/6/2009	30.19	9.34	20.18	20.02
04/27/09	102.78	39.16	63.07	63.13	06/17/09	100.77	58.09	41.86	42.05	8/7/2009	31.40	9.37	21.18	21.05
04/28/09	89.42	28.73	60.06	60.16	06/18/09	101.33	70.23	30.28	30.40	8/8/2009	32.07	9.53	21.62	21.65
04/29/09	88.72	28.86	59.16	59.20	06/19/09	100.59	46.42	53.55	53.20	8/9/2009	34.44	9.44	24.06	24.00
04/30/09	81.50	45.94	34.80	34.90	06/20/09	89.25	26.40	61.98	62.00	8/10/2009	34.33	9.45	24.25	24.20
05/01/09	78.65	54.51	23.65	23.60	06/21/09	86.05	49.15	36.02	36.11	8/11/2009	33.00	9.40	22.77	22.67
05/02/09	75.61	27.95	46.90	46.56	06/22/09	85.86	59.24	25.89	25.76	8/12/2009	33.13	9.40	22.98	22.88
05/03/09	75.78	19.74	55.23	55.13	06/23/09	109.79	69.27	39.72	32.94	8/13/2009	33.70	9.47	23.56	23.53
05/04/09	88.06	51.31	35.98	36.11	06/24/09	93.99	65.12	28.16	28.20	8/14/2009	27.67	8.74	18.31	17.89
05/05/09	85.67	59.05	25.73	25.70	06/25/09	82.90	36.32	45.97	45.70	8/15/2009	27.48	6.20	20.53	17.50
05/06/09	111.95	56.86	54.33	54.24	06/26/09	85.00	27.65	56.67	56.43	8/16/2009	30.74	6.16	23.76	20.55
05/07/09	109.45	38.75	69.95	69.23	06/27/09	79.50	23.80	54.76	54.80	8/17/2009	29.38	6.18	22.40	19.11
05/08/09	109.50	61.90	46.83	47.02	06/28/09	80.31	24.36	55.01	55.04	8/18/2009	33.62	6.25	26.62	23.37
05/09/09	95.24	65.97	28.51	28.57	06/29/09	76.19	43.20	32.36	32.51	8/19/2009	34.46	6.01	27.76	24.27
05/10/09	90.55	62.51	27.21	27.17	06/30/09	74.67	51.59	22.20	22.40	8/20/2009	35.68	6.00	28.94	25.44
05/11/09	76.78	53.30	22.66	23.03	07/01/09	69.68	24.16	44.84	44.77	8/21/2009	36.44	6.07	29.63	26.19
05/12/09	81.82	33.28	47.73	47.49	07/02/09	67.25	15.57	50.99	51.02	8/22/2009	35.50	6.48	28.21	25.19
05/13/09	85.59	28.16	56.69	56.66	07/03/09	66.31	37.00	28.44	28.52	8/23/2009	34.16	6.48	26.74	23.72
05/14/09	89.11	50.64	37.84	37.81	07/04/09	68.34	46.05	21.72	20.50	8/24/2009	32.16	6.66	24.73	21.90
05/15/09	93.36	64.62	27.91	28.01	07/05/09	66.83	20.80	45.03	45.04	8/25/2009	25.38	9.01	15.54	16.49
05/16/09	99.22	46.38	51.82	51.63	07/06/09	58.01	9.85	47.42	47.29	8/26/2009	26.24	9.06	16.50	17.28
05/17/09	100.76	35.43	64.34	64.30	07/07/09	60.26	35.49	23.89	24.26	8/27/2009	30.10	8.29	21.21	20.04
05/18/09	108.10	41.23	66.06	66.00	07/08/09	63.42	43.55	19.05	19.03	8/28/2009	31.60	6.38	24.56	21.44
05/19/09	140.13	68.60	70.66	67.17	07/09/09	50.63	34.44	15.45	15.39	8/29/2009	26.91	6.33	19.97	17.20
05/20/09	160.54	78.33	81.40	57.57	07/10/09	59.42	40.85	17.90	17.89	8/30/2009	25.21	6.11	18.45	15.42
05/21/09	167.07	81.96	84.23	50.12	07/11/09	52.17	15.13	36.29	36.47	8/31/2009	25.48	6.17	18.69	15.67

Table D-6

FOP Spill at Lower Monumental

Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS
04/01/09	60.90	60.17	0.00	0.00	05/22/09	139.33	110.91	27.50	26.29	7/12/2009	48.00	29.69	17.47	17.00
04/02/09	64.17	63.39	0.00	0.00	05/23/09	132.51	107.13	24.59	24.00	7/13/2009	44.71	27.04	16.96	17.00
04/03/09	66.60	39.20	26.75	27.00	05/24/09	144.02	108.13	35.08	29.79	7/14/2009	46.27	28.14	17.40	17.00
04/04/09	59.14	31.43	26.99	27.00	05/25/09	161.48	114.60	46.03	30.00	7/15/2009	52.98	35.22	16.96	17.00
04/05/09	63.82	36.30	26.80	27.00	05/26/09	160.09	115.79	43.43	30.00	7/16/2009	45.58	27.40	17.38	17.00
04/06/09	68.16	37.68	29.90	30.13	05/27/09	156.42	115.16	40.43	30.00	7/17/2009	45.38	27.63	17.02	17.00
04/07/09	67.69	34.94	32.03	32.00	05/28/09	150.83	113.16	36.75	30.00	7/18/2009	44.10	25.85	17.47	17.00
04/08/09	64.04	34.86	28.45	28.46	05/29/09	158.83	115.42	42.53	30.00	7/19/2009	46.84	28.94	17.18	17.00
04/09/09	85.15	59.23	25.18	25.17	05/30/09	159.85	115.94	43.05	30.00	7/20/2009	43.84	22.56	20.50	16.50
04/10/09	83.01	57.90	24.47	24.67	05/31/09	167.75	116.31	50.53	30.00	7/21/2009	42.74	24.97	16.89	17.00
04/11/09	82.52	54.91	26.95	27.00	06/01/09	162.67	107.56	54.26	30.00	7/22/2009	40.21	21.99	17.42	17.00
04/12/09	85.31	54.76	29.77	29.92	06/02/09	158.47	108.54	49.10	30.00	7/23/2009	37.02	19.10	17.20	17.00
04/13/09	87.59	56.09	30.83	30.83	06/03/09	145.52	115.10	29.59	26.67	7/24/2009	39.65	21.46	17.44	17.00
04/14/09	96.38	65.73	29.92	30.00	06/04/09	138.34	113.53	24.15	21.67	7/25/2009	32.10	14.37	17.00	16.82
04/15/09	93.67	63.41	29.47	29.54	06/05/09	143.36	115.58	27.13	24.17	7/26/2009	40.93	22.58	17.50	17.00
04/16/09	80.39	50.78	28.89	29.00	06/06/09	153.64	115.87	37.10	23.33	7/27/2009	35.15	17.17	17.19	17.00
04/17/09	84.24	54.64	29.00	29.00	06/07/09	166.42	116.46	49.25	20.00	7/28/2009	37.03	18.77	17.46	17.00
04/18/09	83.45	53.83	28.96	29.00	06/08/09	154.12	116.40	36.88	20.00	7/29/2009	38.81	21.28	16.81	16.93
04/19/09	81.73	52.10	28.96	29.00	06/09/09	137.06	106.43	29.91	20.00	7/30/2009	37.28	19.25	17.36	17.00
04/20/09	88.59	62.06	25.87	25.67	06/10/09	119.60	98.87	19.97	20.00	7/31/2009	37.87	20.27	16.88	17.00
04/21/09	104.12	79.40	23.98	24.00	06/11/09	103.32	82.88	19.66	20.00	8/1/2009	36.93	18.57	17.52	17.00
04/22/09	119.60	94.93	24.00	24.00	06/12/09	103.58	82.96	19.96	20.00	8/2/2009	34.79	16.80	17.14	17.00
04/23/09	138.78	113.88	24.24	24.00	06/13/09	93.83	73.53	19.50	20.00	8/3/2009	32.68	14.31	17.47	17.00
04/24/09	142.05	113.21	28.16	26.08	06/14/09	94.50	73.61	19.96	20.00	8/4/2009	35.66	17.74	17.13	17.00
04/25/09	119.37	89.76	29.02	29.00	06/15/09	97.83	76.78	20.20	20.92	8/5/2009	30.43	12.22	17.43	17.00
04/26/09	108.63	78.84	29.06	29.00	06/16/09	105.27	82.50	21.92	22.00	8/6/2009	29.33	11.54	17.07	16.66
04/27/09	99.58	70.24	28.67	28.58	06/17/09	98.53	76.33	21.34	22.00	8/7/2009	29.71	11.37	17.44	17.00
04/28/09	88.34	61.27	26.33	26.33	06/18/09	100.50	76.61	23.02	23.17	8/8/2009	29.47	11.44	17.30	16.87
04/29/09	85.71	58.92	26.06	26.08	06/19/09	99.29	74.07	24.41	25.17	8/9/2009	33.32	14.77	17.50	17.00
04/30/09	80.70	47.32	32.59	32.75	06/20/09	87.73	61.06	25.81	26.00	8/10/2009	32.83	15.04	17.08	17.00
05/01/09	77.18	40.37	36.16	36.25	06/21/09	84.98	67.07	17.19	17.00	8/11/2009	32.13	14.14	17.40	17.00
05/02/09	74.29	42.71	30.84	30.88	06/22/09	83.80	65.54	17.46	17.00	8/12/2009	32.01	13.97	17.16	17.00
05/03/09	74.26	44.50	28.91	29.00	06/23/09	106.76	88.94	17.03	17.00	8/13/2009	31.89	13.54	17.49	17.00
05/04/09	85.91	51.29	33.69	33.88	06/24/09	94.60	76.34	17.48	17.00	8/14/2009	26.48	11.32	14.38	14.06
05/05/09	84.80	46.93	36.97	37.00	06/25/09	79.99	61.94	17.32	17.00	8/15/2009	27.29	11.35	15.27	14.93
05/06/09	109.65	81.62	27.18	27.29	06/26/09	81.84	63.61	17.48	17.00	8/16/2009	28.37	11.36	15.92	15.60
05/07/09	108.07	81.69	25.46	25.54	06/27/09	77.15	59.26	17.16	17.00	8/17/2009	28.83	11.37	16.63	16.20
05/08/09	108.82	74.24	33.88	33.92	06/28/09	77.80	59.39	17.50	17.00	8/18/2009	31.62	13.59	17.18	16.80
05/09/09	93.88	59.59	33.50	36.92	06/29/09	74.73	56.77	17.24	17.00	8/19/2009	33.22	15.05	17.44	17.00
05/10/09	88.88	52.89	35.14	38.00	06/30/09	71.60	53.09	17.53	17.00	8/20/2009	33.54	15.40	17.42	17.00
05/11/09	77.18	41.92	34.42	36.25	07/01/09	67.82	49.90	17.18	17.00	8/21/2009	36.25	18.04	17.50	17.00
05/12/09	81.03	53.33	26.92	27.88	07/02/09	65.88	47.70	17.45	17.00	8/22/2009	32.93	14.71	17.50	17.00
05/13/09	84.58	58.96	24.90	26.00	07/03/09	64.29	46.22	17.08	17.00	8/23/2009	31.44	13.03	17.50	17.00
05/14/09	87.12	54.50	31.82	33.13	07/04/09	66.07	47.84	17.52	17.00	8/24/2009	30.77	12.51	17.47	17.00
05/15/09	93.51	59.96	32.77	34.90	07/05/09	64.45	46.43	17.17	17.00	8/25/2009	24.34	11.35	12.19	12.04
05/16/09	97.12	68.86	27.46	29.21	07/06/09	57.40	39.10	17.50	17.00	8/26/2009	26.48	11.71	13.98	13.79
05/17/09	97.95	70.76	26.27	28.00	07/07/09	58.51	40.43	17.24	17.00	8/27/2009	28.88	11.58	16.58	16.26
05/18/09	106.66	80.17	25.57	26.17	07/08/09	61.94	43.55	17.48	17.00	8/28/2009	29.57	11.38	17.49	17.00
05/19/09	139.19	109.51	28.88	24.00	07/09/09	49.69	31.65	17.10	17.00	8/29/2009	25.85	11.38	13.83	13.59
05/20/09	155.95	115.30	39.75	32.71	07/10/09	58.72	40.37	17.49	17.00	8/30/2009	25.34	11.36	13.28	13.22
05/21/09	162.36	115.53	46.05	35.00	07/11/09	49.05	31.27	17.10	17.00	8/31/2009	23.02	11.37	10.93	10.80

Table D-7

FOP Spill at Little Goose

Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS
04/01/09	51.02	50.45	0.00	0.00	05/22/09	133.20	103.22	29.39	30.00	7/12/2009	50.53	34.63	15.33	15.16
04/02/09	58.51	57.87	0.07	0.00	05/23/09	127.63	97.58	29.35	30.00	7/13/2009	47.05	32.27	14.02	14.12
04/03/09	62.58	43.46	18.65	18.78	05/24/09	136.96	105.42	30.91	27.08	7/14/2009	49.49	34.16	14.81	14.85
04/04/09	53.86	37.25	16.17	16.16	05/25/09	153.81	107.94	45.18	25.00	7/15/2009	54.15	37.48	16.04	16.25
04/05/09	61.79	42.74	18.50	18.54	05/26/09	152.47	109.03	43.00	25.00	7/16/2009	46.66	32.25	13.97	14.00
04/06/09	64.75	45.01	19.29	19.43	05/27/09	147.15	109.20	37.30	25.00	7/17/2009	47.47	32.65	14.18	14.24
04/07/09	66.23	45.88	19.89	19.87	05/28/09	145.86	109.03	36.13	25.00	7/18/2009	47.18	32.37	14.31	14.15
04/08/09	61.49	42.68	18.24	18.45	05/29/09	149.88	108.62	40.62	25.00	7/19/2009	48.63	33.42	14.67	14.59
04/09/09	79.67	55.33	23.80	23.90	05/30/09	153.20	108.63	44.01	25.00	7/20/2009	45.24	31.08	13.60	13.57
04/10/09	79.25	54.91	23.87	23.77	05/31/09	159.75	108.45	50.65	25.00	7/21/2009	44.48	30.45	13.25	13.34
04/11/09	78.29	54.30	23.47	23.49	06/01/09	156.44	108.01	47.75	25.00	7/22/2009	42.00	28.83	12.51	12.60
04/12/09	80.90	56.10	24.30	24.27	06/02/09	151.02	108.78	41.62	25.00	7/23/2009	38.50	26.51	11.49	11.55
04/13/09	84.45	58.58	25.30	25.34	06/03/09	138.33	108.90	28.85	25.00	7/24/2009	40.51	27.83	12.17	12.15
04/14/09	90.48	62.95	27.01	27.15	06/04/09	132.40	106.00	25.84	25.00	7/25/2009	34.21	23.66	10.07	10.26
04/15/09	88.35	61.32	26.51	26.51	06/05/09	137.43	107.59	29.32	27.92	7/26/2009	41.40	28.38	12.34	12.42
04/16/09	78.65	53.87	24.19	23.59	06/06/09	148.03	107.34	40.17	30.00	7/27/2009	36.25	24.97	10.76	10.87
04/17/09	79.87	55.56	23.90	23.96	06/07/09	158.68	108.49	49.68	30.00	7/28/2009	39.56	27.20	11.76	11.87
04/18/09	79.90	55.60	23.86	23.97	06/08/09	147.71	105.45	41.57	30.00	7/29/2009	38.51	26.59	11.39	11.55
04/19/09	79.89	55.61	23.81	23.97	06/09/09	130.93	100.29	30.12	30.00	7/30/2009	39.48	27.23	11.80	11.84
04/20/09	86.25	59.96	25.78	25.87	06/10/09	117.40	86.78	29.97	30.00	7/31/2009	39.50	27.13	11.80	11.85
04/21/09	100.83	70.17	30.16	30.25	06/11/09	102.66	73.05	29.02	29.41	8/1/2009	38.20	26.38	11.32	11.46
04/22/09	114.37	82.42	31.50	31.76	06/12/09	101.57	70.51	30.53	30.47	8/2/2009	35.85	24.53	10.63	10.76
04/23/09	134.37	87.99	45.81	32.00	06/13/09	93.97	65.19	28.21	28.19	8/3/2009	33.73	23.18	9.90	10.12
04/24/09	134.84	89.38	44.88	32.00	06/14/09	93.86	65.22	28.08	28.16	8/4/2009	36.85	25.35	10.92	11.05
04/25/09	113.91	82.13	31.32	32.00	06/15/09	97.24	67.38	29.22	29.17	8/5/2009	33.32	22.89	9.86	10.00
04/26/09	103.16	72.06	30.51	30.86	06/16/09	102.94	71.26	31.05	30.88	8/6/2009	30.93	21.15	9.22	9.28
04/27/09	96.08	66.63	28.90	28.83	06/17/09	97.48	67.79	29.11	29.24	8/7/2009	30.71	20.90	9.17	9.21
04/28/09	86.35	59.98	25.90	25.91	06/18/09	96.82	67.18	28.96	29.05	8/8/2009	30.35	20.70	9.07	9.11
04/29/09	84.54	56.52	27.40	25.36	06/19/09	97.44	67.42	29.38	29.23	8/9/2009	33.78	23.16	9.90	10.13
04/30/09	78.58	53.86	24.05	23.58	06/20/09	86.41	59.88	25.96	25.92	8/10/2009	33.69	23.19	9.90	10.11
05/01/09	74.93	52.08	22.33	22.48	06/21/09	83.85	58.08	25.20	25.16	8/11/2009	33.70	23.26	9.90	10.11
05/02/09	73.52	50.98	22.03	22.06	06/22/09	83.65	57.88	25.10	25.10	8/12/2009	33.73	23.22	9.90	10.12
05/03/09	73.60	50.89	22.00	22.08	06/23/09	103.69	72.00	31.00	31.11	8/13/2009	33.65	23.11	9.90	10.09
05/04/09	83.86	58.05	25.23	25.16	06/24/09	94.95	65.74	28.69	28.48	8/14/2009	26.60	17.96	8.11	7.98
05/05/09	84.83	58.73	25.41	25.45	06/25/09	78.61	54.58	23.35	23.58	8/15/2009	28.65	19.48	8.65	8.59
05/06/09	104.52	73.06	30.83	31.16	06/26/09	82.55	57.29	24.80	24.76	8/16/2009	29.31	19.85	8.64	8.79
05/07/09	104.21	72.60	30.93	31.12	06/27/09	76.70	53.09	23.09	23.01	8/17/2009	28.53	18.88	8.93	8.56
05/08/09	103.44	71.62	31.23	31.03	06/28/09	79.98	55.51	23.85	23.99	8/18/2009	33.87	21.83	11.33	10.16
05/09/09	91.89	63.88	27.44	27.57	06/29/09	75.29	52.28	22.38	22.59	8/19/2009	34.60	22.47	11.60	10.38
05/10/09	85.78	59.37	25.74	25.73	06/30/09	70.60	49.12	20.98	21.18	8/20/2009	35.68	23.39	11.60	10.70
05/11/09	76.00	52.37	22.82	22.80	07/01/09	67.15	46.52	20.05	20.15	8/21/2009	37.59	25.42	11.60	11.28
05/12/09	77.66	53.94	23.14	23.30	07/02/09	66.93	46.22	20.19	20.08	8/22/2009	34.47	22.33	11.60	10.34
05/13/09	83.55	57.93	25.01	25.06	07/03/09	64.37	44.54	19.31	19.31	8/23/2009	32.22	20.00	11.60	9.67
05/14/09	85.52	59.54	25.47	25.66	07/04/09	65.15	45.20	19.38	19.55	8/24/2009	30.88	18.67	11.60	9.27
05/15/09	91.71	63.69	27.44	27.51	07/05/09	65.55	45.30	19.60	19.67	8/25/2009	25.52	13.30	11.60	7.65
05/16/09	93.77	65.12	28.07	28.13	07/06/09	58.27	40.19	17.38	17.48	8/26/2009	28.40	17.19	10.63	8.52
05/17/09	95.40	66.14	28.70	28.62	07/07/09	59.56	41.08	17.72	17.87	8/27/2009	29.70	19.45	9.75	8.91
05/18/09	104.18	72.32	31.10	31.19	07/08/09	62.60	43.25	18.74	18.78	8/28/2009	31.05	20.77	9.75	9.31
05/19/09	132.65	96.22	35.78	33.23	07/09/09	52.71	36.27	15.86	15.81	8/29/2009	26.16	17.29	8.42	7.85
05/20/09	150.02	108.77	40.51	30.00	07/10/09	59.40	40.90	17.88	17.82	8/30/2009	25.63	17.19	7.90	7.69
05/21/09	152.15	109.55	42.07	30.00	07/11/09	50.34	34.56	15.27	15.10	8/31/2009	23.01	14.73	7.69	6.63

Table D-8

FOP Spill at Lower Granite

Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS	Date	Outflow KCFS	Generation Flow KCFS	Actual Spill KCFS	FOP Spill KCFS
04/01/09	53.47	53.10	0.00	0.00	05/22/09	142.97	105.50	36.95	20.00	7/12/2009	50.76	31.58	18.66	18.00
04/02/09	58.75	58.31	0.00	0.00	05/23/09	137.69	94.15	43.17	20.00	7/13/2009	48.96	29.68	18.84	18.00
04/03/09	63.85	43.37	20.12	20.00	05/24/09	145.20	87.64	56.89	20.00	7/14/2009	49.78	30.70	18.63	18.00
04/04/09	59.38	38.84	20.24	20.00	05/25/09	164.59	107.06	57.08	20.00	7/15/2009	53.70	34.52	18.78	18.00
04/05/09	64.00	43.41	20.21	20.00	05/26/09	163.87	106.97	56.54	20.00	7/16/2009	48.67	29.57	18.73	18.00
04/06/09	64.09	43.45	20.26	20.00	05/27/09	156.95	103.57	52.92	20.00	7/17/2009	47.37	28.25	18.69	18.00
04/07/09	64.86	43.98	20.52	20.00	05/28/09	157.30	102.54	54.30	20.00	7/18/2009	48.36	28.90	18.81	18.00
04/08/09	66.15	45.28	20.56	20.00	05/29/09	160.93	103.34	57.22	20.00	7/19/2009	50.96	31.77	18.74	18.00
04/09/09	79.80	58.91	20.58	20.00	05/30/09	160.86	95.68	64.81	20.00	7/20/2009	45.86	26.53	18.81	18.00
04/10/09	82.96	62.03	20.56	20.00	05/31/09	169.32	92.29	76.73	20.00	7/21/2009	44.69	25.40	18.72	18.00
04/11/09	80.37	59.68	20.31	20.00	06/01/09	167.63	91.81	75.30	20.00	7/22/2009	43.62	24.58	18.73	18.00
04/12/09	83.41	62.62	20.35	20.00	06/02/09	160.14	95.80	63.83	20.00	7/23/2009	39.85	20.75	18.65	18.00
04/13/09	88.00	67.16	20.33	20.00	06/03/09	148.65	105.03	43.25	20.00	7/24/2009	41.33	22.29	18.66	18.00
04/14/09	94.49	73.70	20.43	20.00	06/04/09	142.50	101.63	40.48	20.00	7/25/2009	36.60	17.35	18.59	18.00
04/15/09	89.93	69.18	20.46	20.00	06/05/09	147.57	107.11	40.09	20.00	7/26/2009	40.77	21.65	18.69	18.00
04/16/09	79.39	59.06	19.97	19.62	06/06/09	158.20	108.16	49.65	20.00	7/27/2009	38.24	19.01	18.72	18.00
04/17/09	82.51	61.50	20.50	20.00	06/07/09	171.21	109.53	61.38	20.00	7/28/2009	40.43	21.33	18.58	18.00
04/18/09	81.07	60.33	20.37	20.00	06/08/09	158.01	109.20	48.14	20.00	7/29/2009	40.12	21.15	18.51	18.00
04/19/09	83.63	62.70	20.49	20.00	06/09/09	138.50	108.57	29.49	20.00	7/30/2009	40.14	21.06	18.70	18.00
04/20/09	90.54	69.67	20.42	20.00	06/10/09	125.63	104.55	20.63	20.00	7/31/2009	40.61	21.46	18.76	18.00
04/21/09	103.79	83.03	20.45	20.00	06/11/09	109.54	88.65	20.52	20.00	8/1/2009	39.48	20.17	18.72	18.00
04/22/09	122.70	100.01	22.32	20.00	06/12/09	106.61	85.22	20.82	20.00	8/2/2009	36.33	17.11	18.73	18.00
04/23/09	140.65	107.34	33.03	20.00	06/13/09	96.64	75.64	20.72	20.00	8/3/2009	35.15	15.86	18.70	18.00
04/24/09	139.80	103.17	36.26	20.00	06/14/09	99.69	78.52	20.79	20.00	8/4/2009	37.39	18.07	18.79	18.00
04/25/09	120.78	99.27	21.15	20.00	06/15/09	100.97	79.78	20.60	20.00	8/5/2009	33.26	14.30	18.61	18.00
04/26/09	108.76	87.95	20.44	20.00	06/16/09	108.41	87.50	20.55	20.00	8/6/2009	32.62	13.36	18.76	18.00
04/27/09	98.93	77.93	20.42	20.00	06/17/09	104.17	83.34	20.53	20.00	8/7/2009	31.56	12.42	18.82	18.00
04/28/09	91.07	70.24	20.45	20.00	06/18/09	101.55	80.42	20.75	20.00	8/8/2009	31.65	12.47	18.88	18.00
04/29/09	87.65	66.86	20.47	20.00	06/19/09	102.77	81.54	20.71	20.00	8/9/2009	34.30	15.11	18.61	18.00
04/30/09	81.55	60.72	20.45	20.00	06/20/09	92.77	71.58	20.70	20.00	8/10/2009	34.59	10.23	23.91	18.00
05/01/09	78.93	58.02	20.49	20.00	06/21/09	88.52	69.27	18.81	18.00	8/11/2009	34.35	10.10	23.78	18.00
05/02/09	74.88	54.07	20.52	20.00	06/22/09	89.03	69.77	18.73	18.00	8/12/2009	33.17	8.83	23.98	18.00
05/03/09	77.07	56.29	20.50	20.00	06/23/09	108.25	88.95	18.85	18.00	8/13/2009	34.63	9.97	24.36	18.00
05/04/09	85.95	62.58	22.77	20.00	06/24/09	97.78	78.65	18.75	18.00	8/14/2009	28.67	8.49	19.81	16.66
05/05/09	89.02	68.27	20.37	20.00	06/25/09	85.16	66.20	18.68	18.00	8/15/2009	29.64	12.47	16.73	17.79
05/06/09	109.24	88.26	20.61	20.00	06/26/09	85.19	65.83	18.77	18.00	8/16/2009	29.77	12.57	16.83	17.98
05/07/09	107.12	86.10	20.65	20.00	06/27/09	80.70	61.58	18.75	18.00	8/17/2009	30.51	12.43	17.57	18.00
05/08/09	107.34	86.34	20.55	20.00	06/28/09	84.06	65.02	18.73	18.00	8/18/2009	34.51	15.12	18.83	18.00
05/09/09	98.37	77.27	20.58	20.00	06/29/09	77.80	58.35	18.80	18.00	8/19/2009	35.02	16.07	18.64	18.00
05/10/09	87.25	66.05	20.46	20.00	06/30/09	75.15	56.03	18.67	18.00	8/20/2009	36.30	17.19	18.45	18.00
05/11/09	78.48	57.57	20.39	20.00	07/01/09	71.90	52.76	18.62	18.00	8/21/2009	38.75	19.80	18.58	18.00
05/12/09	82.52	61.47	20.63	20.00	07/02/09	69.47	50.36	18.74	18.00	8/22/2009	35.27	16.13	18.57	18.00
05/13/09	84.51	63.85	20.28	20.00	07/03/09	68.69	49.42	18.83	18.00	8/23/2009	33.12	14.10	18.65	18.00
05/14/09	90.13	69.31	20.45	20.00	07/04/09	68.78	49.45	18.81	18.00	8/24/2009	30.80	12.48	17.89	17.38
05/15/09	95.05	74.28	20.47	20.00	07/05/09	68.21	48.89	18.80	18.00	8/25/2009	26.49	9.84	16.20	14.55
05/16/09	96.16	75.09	20.63	20.00	07/06/09	62.29	43.00	18.63	18.00	8/26/2009	29.82	12.69	16.85	16.92
05/17/09	99.32	78.40	20.62	20.00	07/07/09	62.41	43.01	18.75	18.00	8/27/2009	30.93	12.60	17.96	17.39
05/18/09	108.58	87.27	20.64	20.00	07/08/09	63.24	44.25	18.61	18.00	8/28/2009	31.16	12.25	18.53	18.00
05/19/09	139.84	108.06	31.40	20.00	07/09/09	55.81	36.81	18.55	18.00	8/29/2009	25.77	12.40	12.99	13.89
05/20/09	162.21	102.75	59.11	20.00	07/10/09	58.27	39.14	18.54	18.00	8/30/2009	26.31	12.41	13.60	14.51
05/21/09	161.12	108.91	51.70	20.00	07/11/09	53.46	34.65	18.44	18.00	8/31/2009	23.84	12.44	10.89	11.83

TABLE D-9

Year	Lower Granite	Little Goose	Lower Monumenta	Ice Harbor	McNary	John Day	The Dalles	Bonneville	Yearly Totals
2009	5,662	6,157	6,705	12,383	26,671	18,682	22,322	25,868	124,450
2008	5,703	6,624	6,326	11,920	29,115	21,671	25,645	25,967	132,971
2007	5,283	4,071	5,513	7,915	26,001	15,350	22,007	27,084	113,224
2006	5,612	5,684	6,003	11,493	26,359	15,007	24,671	24,042	118,871
2005	2,806	2,306	2,868	8,932	25,079	14,445	18,496	24,195	99,127
2004	715	631	948	11,188	10,488	13,943	19,440	25,216	82,569
2003	3,098	2,820	4,424	9,945	9,094	13,279	20,451	31,732	94,843
2002	3,100	3,770	0	13,408	10,497	17,863	24,122	30,803	103,562
2001	2,992	2,356	3,786	9,153	325	803	4,821	5,527	29,762
2000	3,605	3,039	4,856	14,022	9,297	18,500	21,647	25,417	100,383
Project Average	3,857	3,746	4,143	11,036	17,293	14,954	20,362	24,585	

TABLE D-10

Average Project Flow and FOP Spill in kcfs - April through August, 2009									
Average Flow, kcfs	**Lower Granite**	**Little Goose**	**Lower Monumental**	**Ice Harbor**	**McNary**	**John Day**	**The Dalles**	**Bonneville**	**Total**
Outflow	81	77	79	81	214	209	203	217	**1,161**
Generation Flow	56	54	54	35	111	142	119	108	**679**
Actual Spill	24	22	24	45	98	65	78	98	**454**
FOP Spill	19	21	22	41	93	65	78	91	**430**

TABLE D-11

Total Project Flow and FOP Spill Volumes in KAF - April through August, 2009									
Volume Flow, KAF	**Lower Granite**	**Little Goose**	**Lower Monumental**	**Ice Harbor**	**McNary**	**John Day**	**The Dalles**	**Bonneville**	**Total**
Outflow	24,155	23,065	23,544	24,159	61,042	59,699	58,002	62,082	**335,748**
Generation Flow	16,706	16,182	16,112	10,457	31,846	40,651	33,948	30,789	**196,691**
Actual Spill	7,320	6,708	7,199	13,480	27,851	18,683	22,309	27,894	**131,444**
FOP Spill	5,662	6,157	6,705	12,383	26,671	18,682	22,322	25,868	**124,450**
Involuntary spill	1,658	551	494	1,097	1,180	1	-13	2,026	**6,994**

TABLE D-12

Total Project Flow and BiOp Spill Volumes in KAF April through August				
Year	**Total Project Outflow**	**Generation Outflow**	**Actual Spill**	**FOP Spill**
2009	335,784	196,691	131,444	124,450
2008	363,125	200,728	154,901	132,989
2007	283,680	162,927	113,174	113,224
2006	406,601	238,580	160,146	118,878
2005	274,635	167,402	99,333	99,127
2004	280,692	190,388	82,551	82,569
2003	311,458	206,927	98,001	94,843
2002	357,155	225,072	125,688	103,522
2001	182,996	164,738	11,460	29,762
2000	327,334	209,851	96,931	100,383
Average	312,346	196,330	107,363	99,975