Appendix E

2013 Court Reports

With Hourly Spill, Flow And TDG Graphs

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UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

PORTLAND DIVISION

NATIONAL WILDLIFE FEDERATION, et al.,

Plaintiffs,

v.

NATIONAL MARINE FISHERIES SERVICE, et al.,

Defendants,

Case No.: 3:01-CV-00640-SI

NOTICE OF FEDERAL DEFENDANTS' FIRST 2013 SPILL IMPLEMENTATION REPORT

In accordance with the Court's August 2, 2011 Opinion and Order (ECF No. 1855) and Federal Defendants' Notice Re: 2013 Spill Operations at 7 (ECF 1905) (filed Mar. 28, 2013), Federal Defendants submit their first 2013 spill implementation status report. *See* Exhibit 1. This status report includes, among other things: the hourly flow through the powerhouse at each dam; the hourly flow over the spillway compared to the target spill for that hour; and the resultant 12-hour average total dissolved gas ("TDG") for the tailwater at each project and for the next project's forebay downstream. The report also provides written explanations of variances that occurred during the reporting period.

Dated this 17th day of May, 2013.

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CERTIFICATE OF SERVICE

I certify that on May 17, 2013, the foregoing will be electronically filed with the Court's electronic filing system, which will generate automatic service upon on all Parties enrolled to receive such notice. The following will be manually served by overnight mail:

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/s/ Michael R. Eitel

FISH OPERATIONS PLAN IMPLEMENTATION REPORT
April 2013

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

The U.S. Army Corps of Engineers (Corps) is submitting this report in accordance with the 2013 Fish Operations Plan (2013 FOP) submitted to the U.S. District Court of Oregon on March 28, 2013. The 2013 FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the fish migration season, generally April through August. To the extent Corps project operations are not specified in the 2013 FOP, the FCRPS operations will be consistent with the 2010 NOAA Fisheries Supplemental Biological Opinion (2010 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2013 Water Management Plan (WMP), WMP seasonal updates, and the 2013 Fish Passage Plan (FPP).

The Corps' April 2013 lower Snake and Columbia River project and fish passage operations are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant high 12-hour average percent Total Dissolved Gas (%TDG) levels in the tailrace at each project and in the subsequent downstream project's forebay and the Camas-Washougal gauge below Bonneville Dam.

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2013 FOP in April.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[1] in April displaying the performance of the spill program as follows:

(A) Daily Average of the High 12 Hourly %TDG Values - described in the upper graph.
(B) Hourly Spill and Generation Flows - described in the lower graph.

The weekly graphs begin on April 1 and end on April 28 for the following lower Snake River and lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.

[1] Operations are implemented from Monday through Sunday.

Each figure represents one week of a project's operation. The graphs start at 0000 hours (%TDG graphs) and 0100 hours (flow/spill graphs) on April 1 for the lower Snake River and the lower Columbia River projects.

April 1 – April 7	Figures 1 – 4
April 8 – April 14	Figures 5 – 12
April 15 – April 21	Figures 13 – 20
April 22 – April 28	Figures 21 – 28

A. Upper Graph: Shows the resultant daily average %TDG for the 12 highest hours. This is primarily a result of spill at dams. The objective is to operate each project up to the TDG limits without exceeding those limits to the extent practicable.

1. The blue line represents the %TDG in the tailrace of the dam. 120 percent TDG is the upper operating limit.
2. The green line represents the %TDG in the forebay of the next dam downstream. 115 percent TDG is the upper operating limit.

B. Lower Graph: Shows the hourly flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The medium green line represents the average hourly total river flow through the project in kcfs.
- The heavy pink line represents the average hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2013 FOP.
- The heavy black line represents the target spill. This is the hourly maximum spill level. The hourly target spill may vary as a function of total river flow, forebay elevation and generator capacity, subject to the following conditions:

    - spill percentage or flow rate specified in the 2013 FOP;
    - spill caps as set daily for TDG management;
    - test spill levels for fish passage research;
    - minimum generation for power system needs;
    - minimum spill at Bonneville (50 kcfs) dam;
    - minimum spill at John Day is 25 percent of project outflow.

II. A table is included at the end of the figures that lists the average daily %TDG for the 12 highest hours for all projects. The numbers in red indicate the project exceeded the %TDG gas cap - 115 percent (forebay of the next downstream dam) or 120 percent (tailwater) for each project.

General Implementation Remarks:

For all projects that spill for fish passage, the target spill may be reduced due to various conditions as described below. When spill levels briefly deviate below or above the level

specified in the 2013 FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual operation deviations from the target operation during voluntary spill hours are described below. The April 2013 Spill Variance Table includes average hourly data; therefore, while spill may vary from target spill for only a portion of an hour, the April 2013 Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly spill levels are not achievable due to mechanical limitations in setting spill gates to implement the regionally coordinated spill pattern. The project operator sets the spill gate stops to most closely approximate the 2013 FOP level of spill while also avoiding exceeding the %TDG spill cap to the extent practicable.

"Low flow" operations at the lower Columbia and Snake projects are triggered when inflow is insufficient to provide both minimum generation and the specified spill levels. In these situations, the projects operate at minimum generation and pass the remainder of project inflow as spill and through other miscellaneous routes, such as fish ladders, sluiceways, and navigation locks. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain.

The combination of these factors may result in instances when unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation, MOP elevation, and the target spill may not be possible throughout every hour. During low flow periods at Little Goose Dam, the overall project spill percentage appears to be reduced because the calculations do not account for the volume of water released during navigational lockages; however, the actual spill volume remains constant. When these variances occur, they are recorded in the monthly Spill Variance Table for Little Goose under the variance type "Navigation."

Actual spill levels at Corps projects with set flow targets may vary up to ±2 kcfs (Bonneville Dam may range up to ±3 kcfs, 2013 FOP p. 18) compared to those specified in the 2013 FOP and the RCC spill priority list (defines the projects' %TDG spill caps). A number of factors influence actual spill, including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (e.g. a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The 2013 FOP describes project "Operations during Rapid Load Changes" (p. 6). For reporting purposes, the notation "Transmission Stability" in the Spill Variance Report Table replaces "Rapid Load Changes," and identifies instances when hourly spill levels were not met as a result of load swing hours and other related within-hour load variability issues. "Transmission Stability" occurs because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Corporation (NERC) reserve requirements ("on response"). In addition to within-hour load variability, projects on response must be responsive to within hour changes resulting from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while spill quantity remains the same within the hour. Under normal conditions, within-hour load changes primarily occur

immediately preceding and following the peak load hours; however, within-hour changes in intermittent generation can occur at any hour of the day. Occasionally, several hours after peak load hours, the project may be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. Due to the high variability of within-hour load, reporting actual spill percentages that vary by more than the ±1 percent requirement (or other ranges specified in the 2013 FOP) may occur with greater frequency with "Transmission Stability" hours than other hours.

Occurrences requiring an adjustment in operations and/or regional coordination are described in greater detail in the "Operational Adjustments" section below.

April Operations:

The month of April was characterized by below average flows for the lower Snake River and above average flows for the lower Columbia River. The NOAA Northwest River Forecast Center's Runoff Processor indicated that the April 2013 adjusted volume runoff on the Lower Columbia was above the 30 year average (1981-2010): 13.2 MAF (million acre feet) or 114 percent of average as measured at The Dalles. The Runoff Processor also indicated April 2013 adjusted volume runoff on the Lower Snake was below the 30 year average (1981-2010): 3.3 MAF or 74 percent of average as measured at Lower Granite Dam. The monthly precipitation summary for April was significantly below average at 64 percent on the Snake River above Ice Harbor Dam and below average on the Columbia River above The Dalles Dam at 87 percent.

In accordance with the 2013 FOP, spring spill operations commenced on April 3 at 0001 hours at the Corps' lower Snake projects and on April 10 at 0001 hours at the lower Columbia projects. During the April reporting period, the planned 2013 FOP spill operations were carried out as follows:

- Lower Granite Dam - The hourly target spill level was 20 kcfs 24-hours/day.
- Little Goose Dam - The hourly target spill level was 30 percent of total river flow 24-hours/day.
- Lower Monumental Dam - The hourly target spill level was the %TDG gas cap 24 hours/day.
- Ice Harbor Dam - The hourly target spill level was 45 kcfs daytime and the %TDG gas cap nighttime. Nighttime spill hours are 1800-0500.
- McNary Dam - The hourly target spill level was 40 percent of total river flow for 24-hours/day.
- John Day Dam - The hourly target spill level was 30 percent of total river flow for 24-hours/day.
- The Dalles Dam - The hourly target spill level was 40 percent of total river flow for 24-hours/day.
- Bonneville Dam - The hourly target spill level was 100 kcfs 24 hours/day.

Operational Adjustments

1. Lower Monumental Dam:

On April 17 from 1305–1335 hours, spill at Lower Monumental was stopped to provide safe navigation conditions in the tailrace for a project crew to install equipment at the fish facility barge dock to continue repair work of the bypass system outfall flume sprinkler. As a result of the 30-minute spillway outage, the average hourly spill level was 17.9 kcfs, which was below the FOP level of 31 kcfs. The 24-hour average spill level was 30.5 kcfs. This operation was coordinated with the FPOM during the April 11 meeting and via email on April 16, 17 and 18. Participants either supported or did not object to this operation.

April 2013 Spill Variance Table

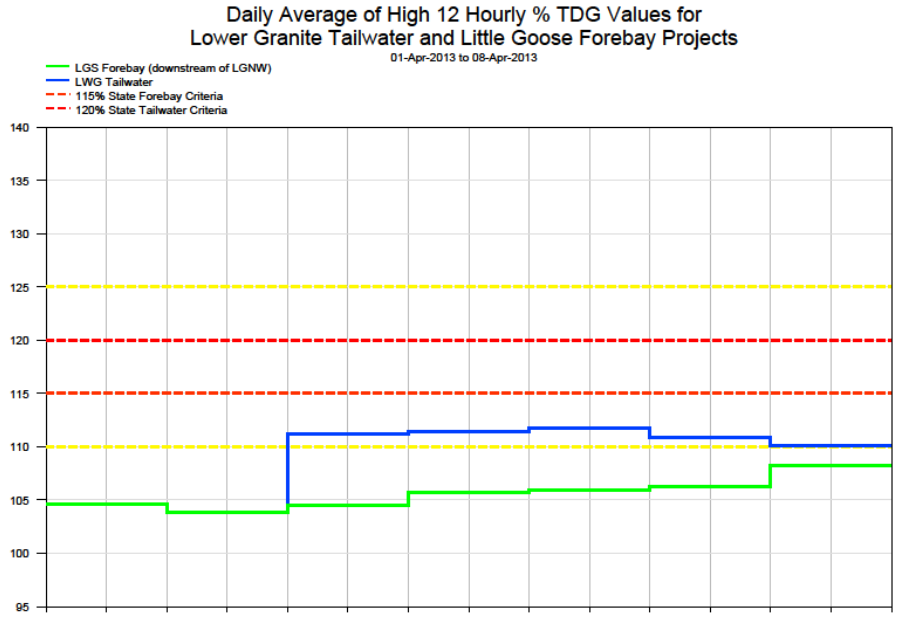
Table 1: April 2013 (4/1 – 4/28) - FOP Implementation Report Table

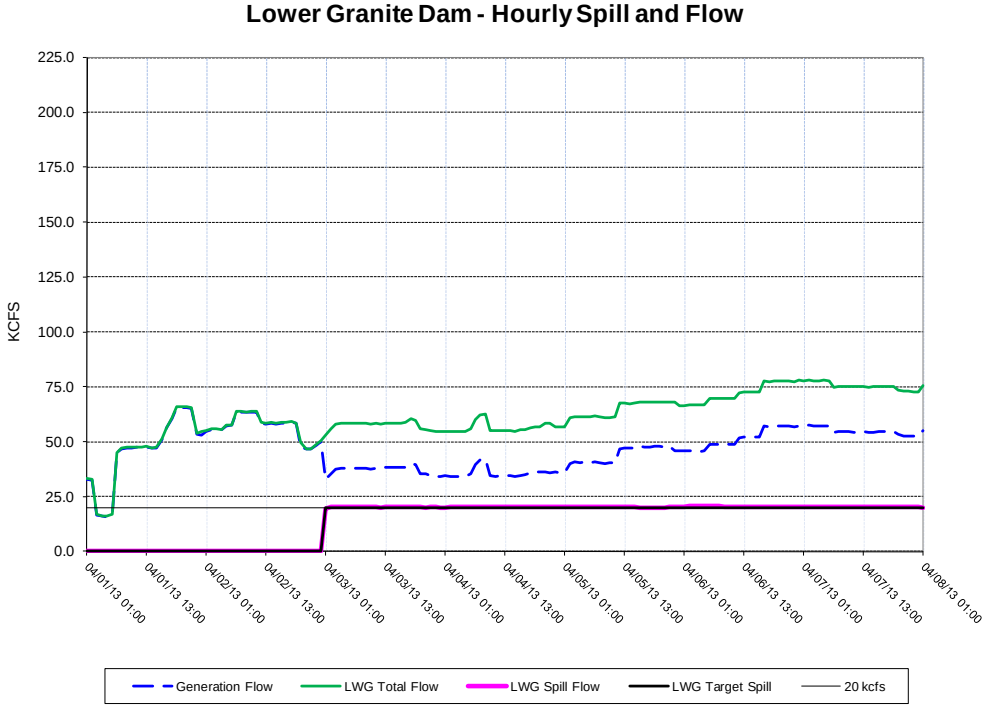
Project	Parameter	Date	Time[2]	Hours	Type	Reason
Little Goose	Reduced Spill	4/4/13	0900	1	Navigation	Hourly spill decreased to 28.9% (below 30% ± 1.0% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.8%.
Little Goose	Reduced Spill	4/12/13	1600	1	Maintenance	Hourly spill decreased to 28.3% (below 30% ± 1.0% range) due to generator testing. 24 hr avg. spill was 30.0%.
Little Goose	Reduced Spill	4/17/13	0300 & 2100	2	Navigation	Hourly spill decreased to 28.7 and 28.9% (below 30% ± 1.0% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.0%.
Little Goose	Reduced Spill	4/18/13	1600	1	Navigation	Hourly spill decreased to 28.9% (below 30% ± 1.0% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.8%.
Little Goose	Reduced Spill	4/22/13	2200	1	Navigation	Hourly spill decreased to 28.9% (below 30% ± 1.0% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.0%.
Little Goose	Reduced Spill	4/23/13	0400	1	Navigation	Hourly spill decreased to 28.8% (below 30% ± 1.0% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.1%.
Little Goose	Reduced Spill	4/24/13	2100	1	Navigation	Hourly spill decreased to 28.9% (below 30% ± 1.0% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.1%.
Lower Monumental	Reduced Spill	4/16/13	2100 - 2300	3	Operational Limitation	Hourly spill decreased to 24.8 kcfs (2000-2100 hrs), 13.3 kcfs (2100-2200 hrs), and 25.2 kcfs (2200-2300 hrs) due to reduced outflow from Little Goose and unit limitations regarding 1% efficiency requirements. Project operated at min generation with reduced spill per FOP p. 4-5. 24 hr avg. spill was 29.7

[2] Note: Data collected for reporting spill variances is reported using hourly-averaged data. Therefore, while spill may be increased or decreased for only a portion of an hour, it is represented in the Spill Variance Table as an hour.

						kcfs below the 31 kcfs spill cap.
Lower Monumental	Reduced Spill	4/17/13	1400	1	Maintenance	Hourly spill decreased to17.9 kcfs (below 31 kcfs spill cap) due to spill reduction to provide safe boat conditions during sprinkler repair. 24 hr avg. spill was 30.5%.
John Day	Reduced Spill	4/10/13	1100	1	Transmission Stability	Hourly spill decreased to 28.9 % (below 30% ± 1%) Project on response during intermittent generation complicated by start up of the TSW spill pattern and adjusting the hydro control program. 24 hr avg. spill was 32.5%.
John Day	Additional Spill	4/10/13	1200 - 1300	2	Transmission Stability	Hourly spill ranged from 32.3% to 32.5% (above 30% ± 1.0% range). Project on response during intermittent generation. 24 hr avg. spill was 32.5%.
John Day	Reduced Spill	4/10/13	1400	1	Transmission Stability	Hourly spill decreased to 28.5 % (below 30% ± 1%) Project on response during intermittent generation complicated by start up of the TSW spill pattern and adjusting the hydro control program. 24 hr avg. spill was 32.5%.
John Day	Additional Spill	4/10/13	1600	1	Human/Program Error	Hourly spill increased to 32.8% (above 30.0% ± 1% range) due to a miscalculation. 24 hr avg. spill was 32.5%.
John Day	Additional Spill	4/19/13	1300	1	Transmission Stability	Hourly spill increased to 31.1% (above 30.0% ± 1% range). Project on response during intermittent generation. 24 hr avg. spill was 30.0%.
The Dalles	Reduced Spill	4/10/13	0500	1	Transmission Stability	Hourly spill decreased to 37.9% (below 40% ± 1.0% range). Project on response during rapid load change and intermittent generation. 24 hr avg. spill was 40.4%.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
01-Apr-2013 to 08-Apr-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95


Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
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04/01/13 13:00
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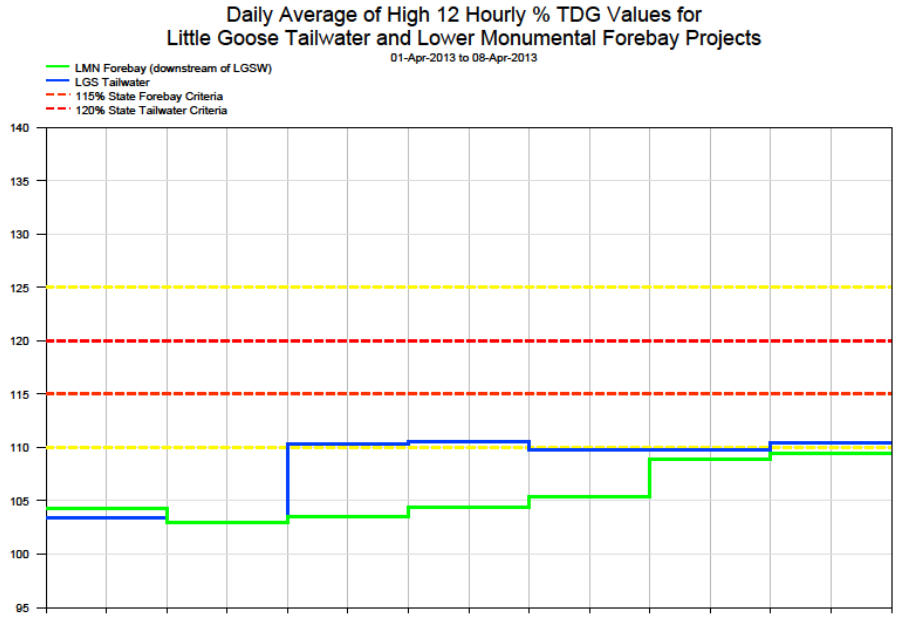
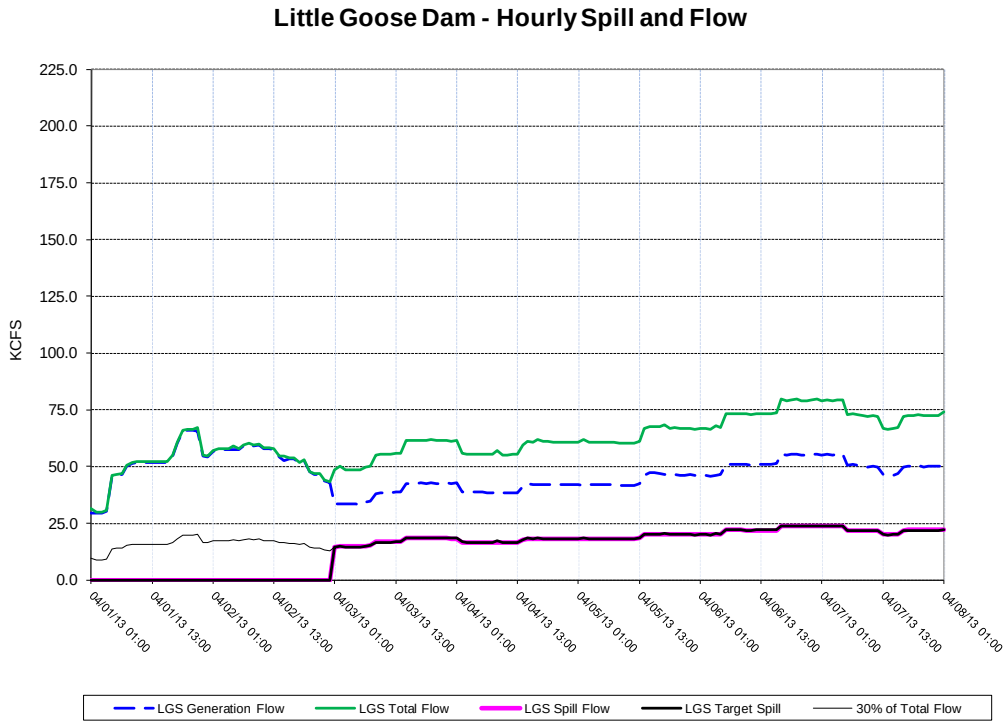
04/06/13 01:00
04/06/13 13:00
04/07/13 01:00
04/07/13 13:00
04/08/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 2


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
01-Apr-2013 to 08-Apr-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95


Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
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04/07/13 01:00
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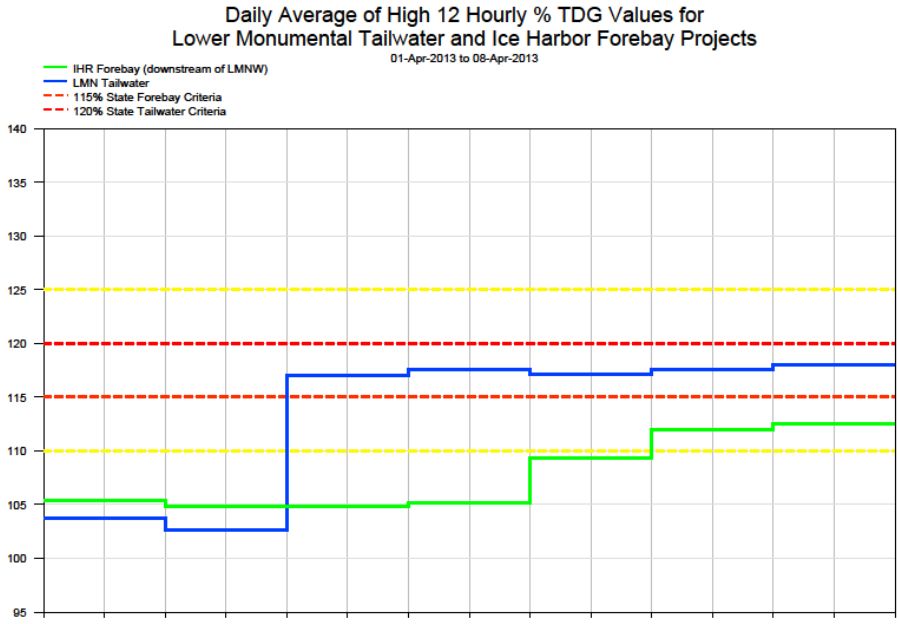
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
01-Apr-2013 to 08-Apr-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
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130
125
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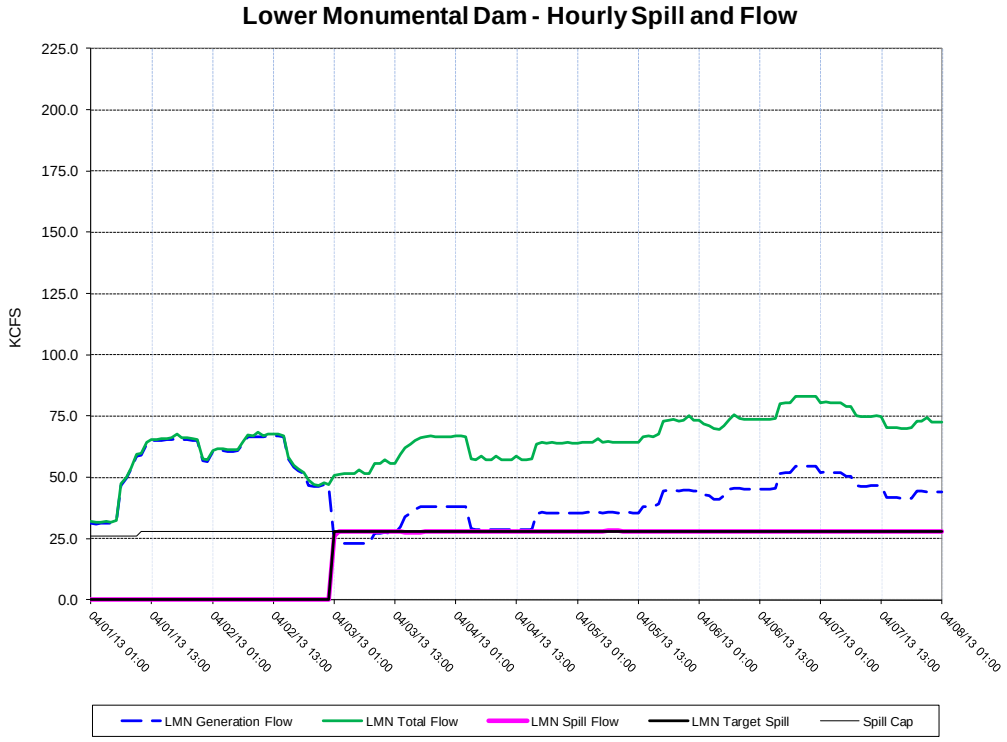
115
110
105
100
95


Lower Monumental Dam - Hourly Spill and Flow
KCFS
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175.0
150.0
125.0
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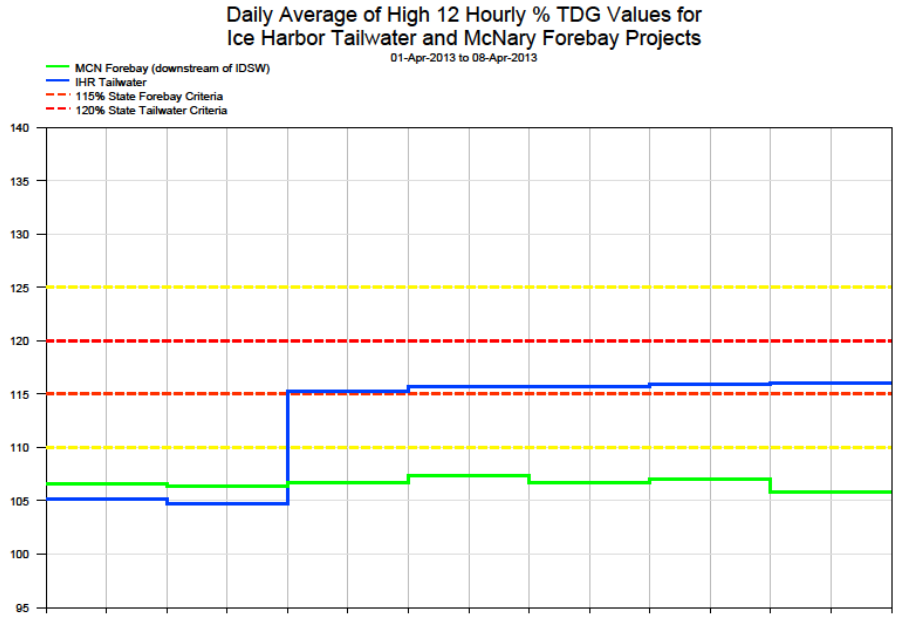
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
01-Apr-2013 to 08-Apr-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
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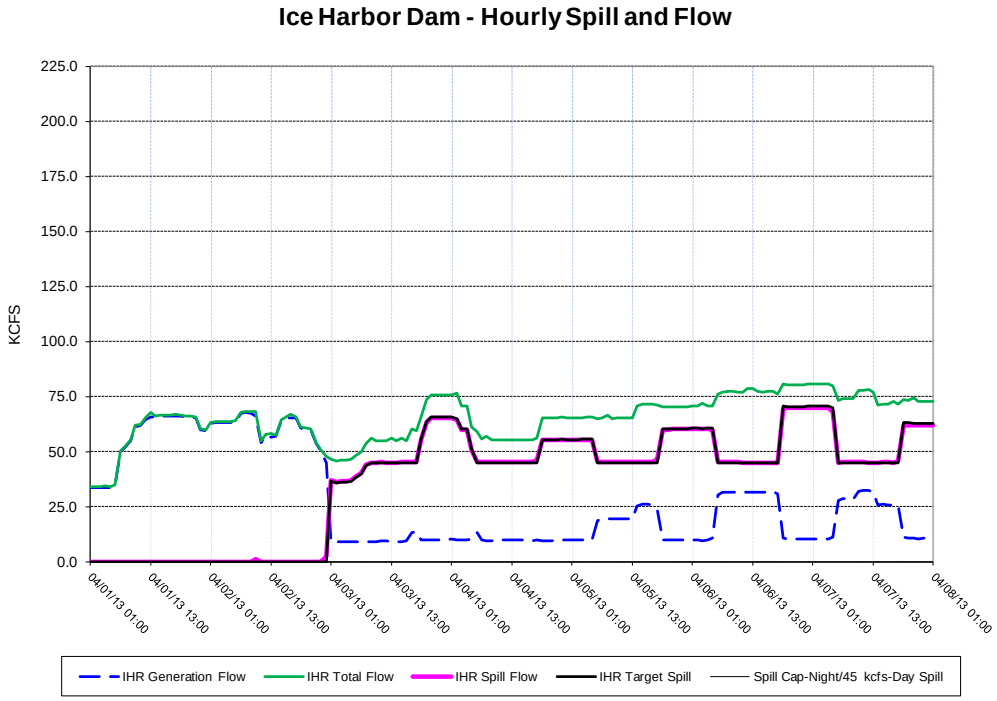
Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
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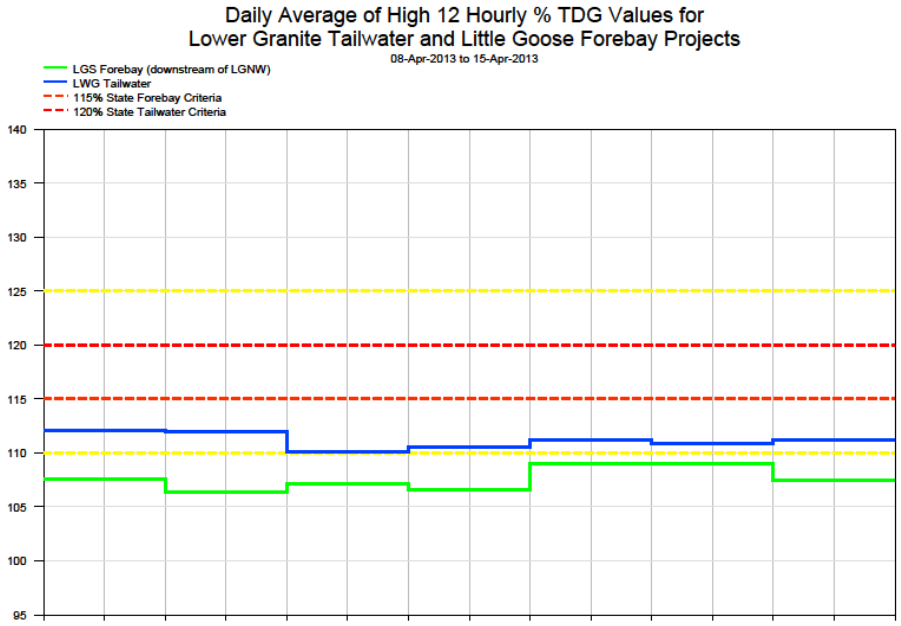
04/07/13 13:00
04/08/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 5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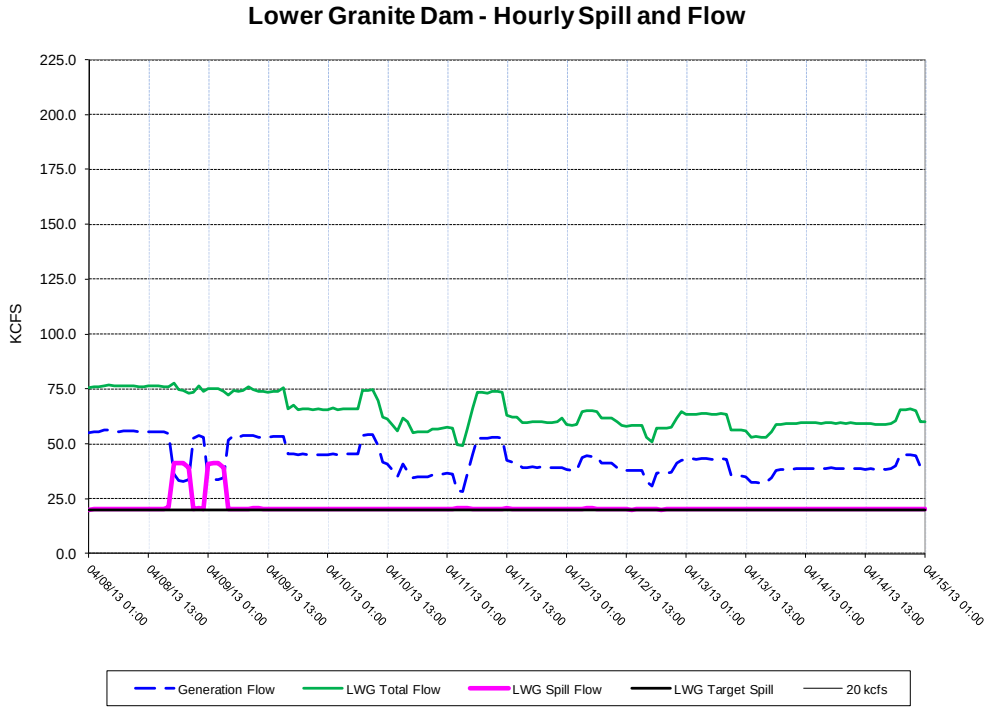
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04/14/13 01:00
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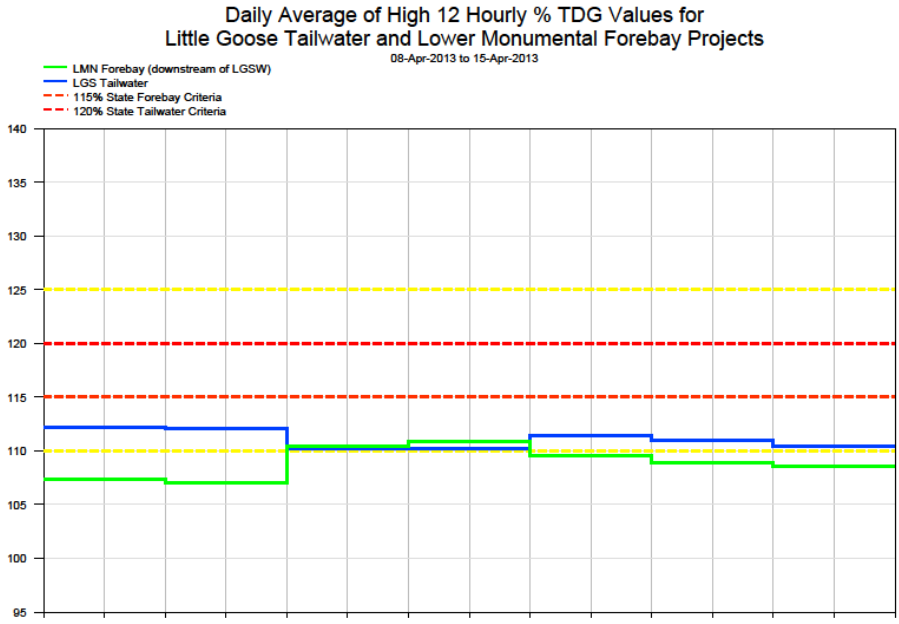
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 6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120
115
110
105
100
95

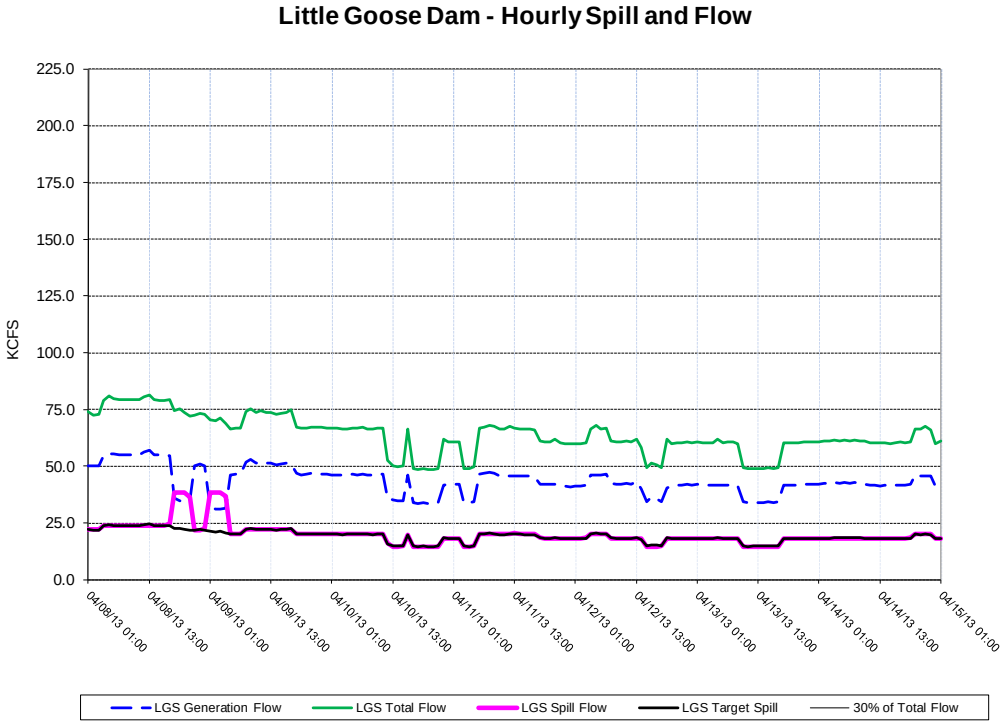
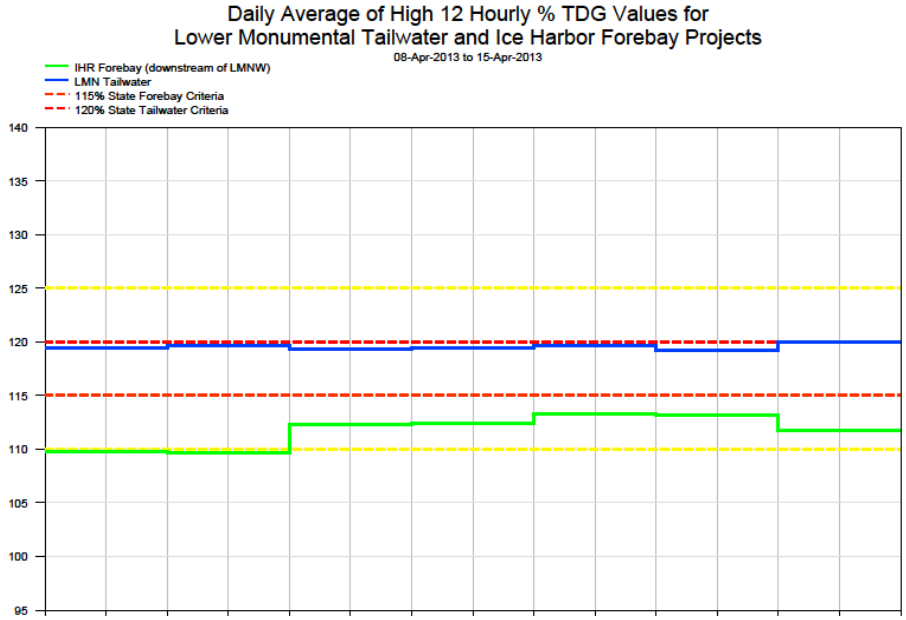

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/08/13 01:00
04/09/13 13:00
04/09/13 01:00
04/09/13 13:00
04/10/13 01:00
04/10/13 13:00
04/11/13 01:00
04/11/13 13:00
04/12/13 01:00
04/12/13 13:00
04/13/13 01:00
04/13/13 13:00
04/14/13 01:00
04/14/13 13:00
04/15/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 7


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
08-Apr-2013 to 15-Apr-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

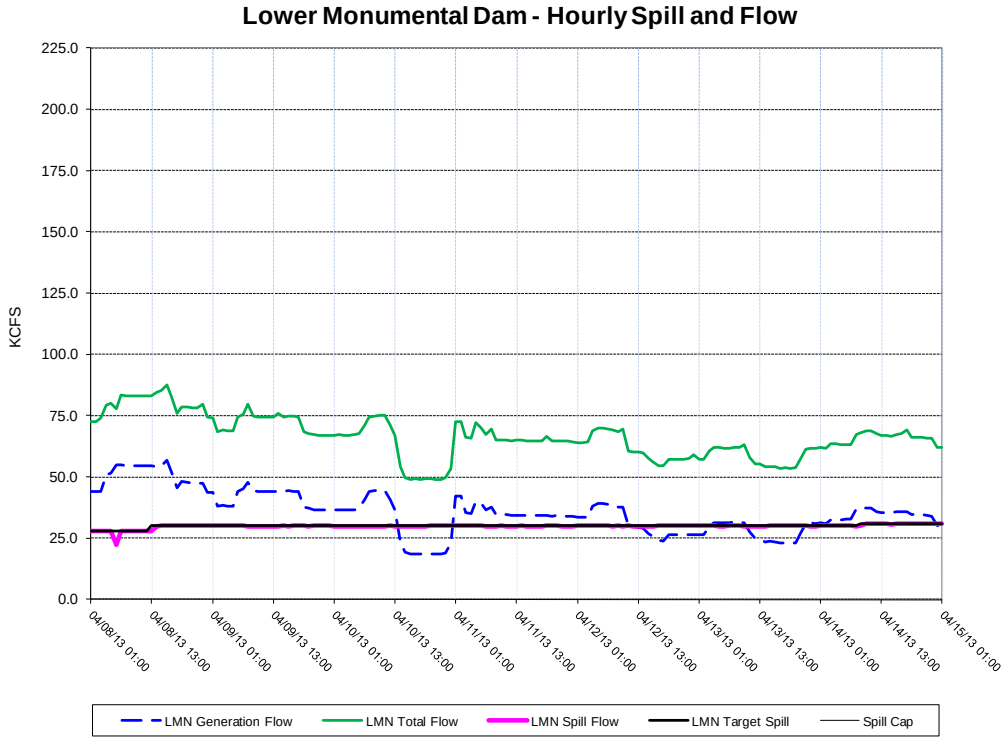
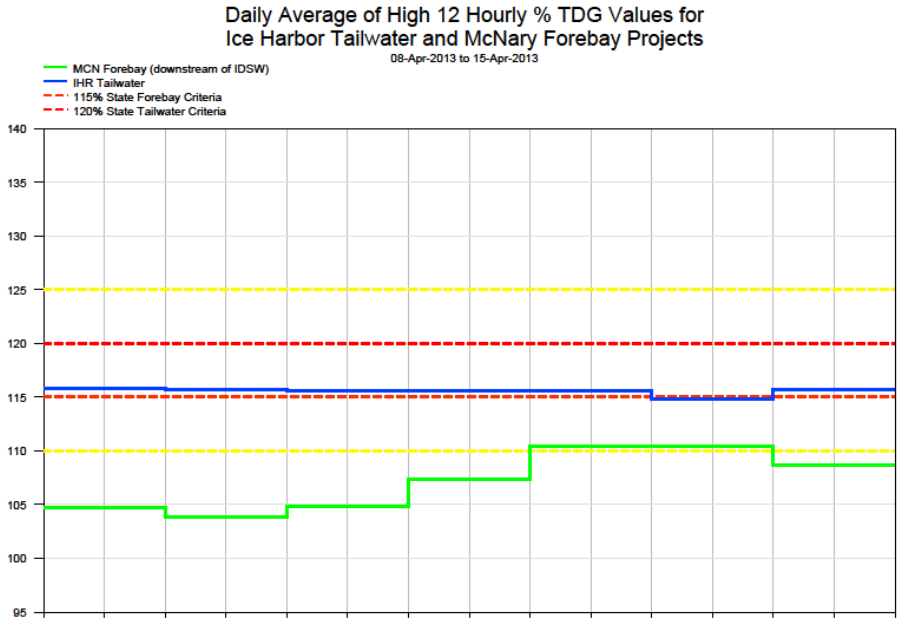

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/08/13 01:00
04/08/13 13:00
04/09/13 01:00
04/09/13 13:00
04/10/13 01:00
04/10/13 13:00
04/11/13 01:00
04/11/13 13:00
04/12/13 01:00
04/12/13 13:00
04/13/13 01:00
04/13/13 13:00
04/14/13 01:00
04/14/13 13:00
04/15/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
08-Apr-2013 to 15-Apr-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

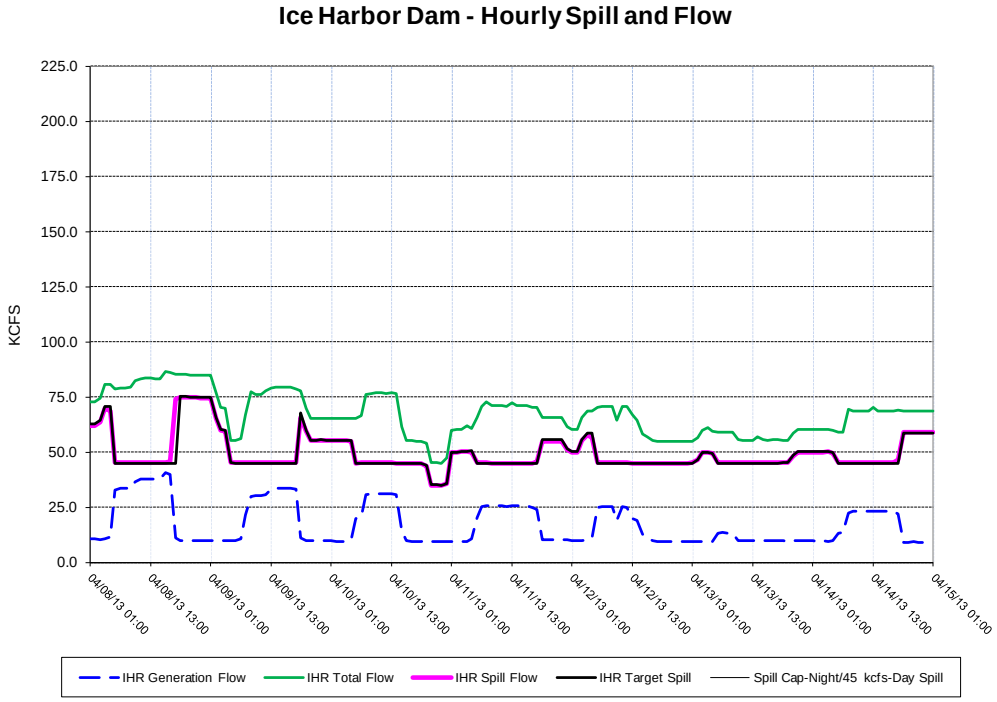
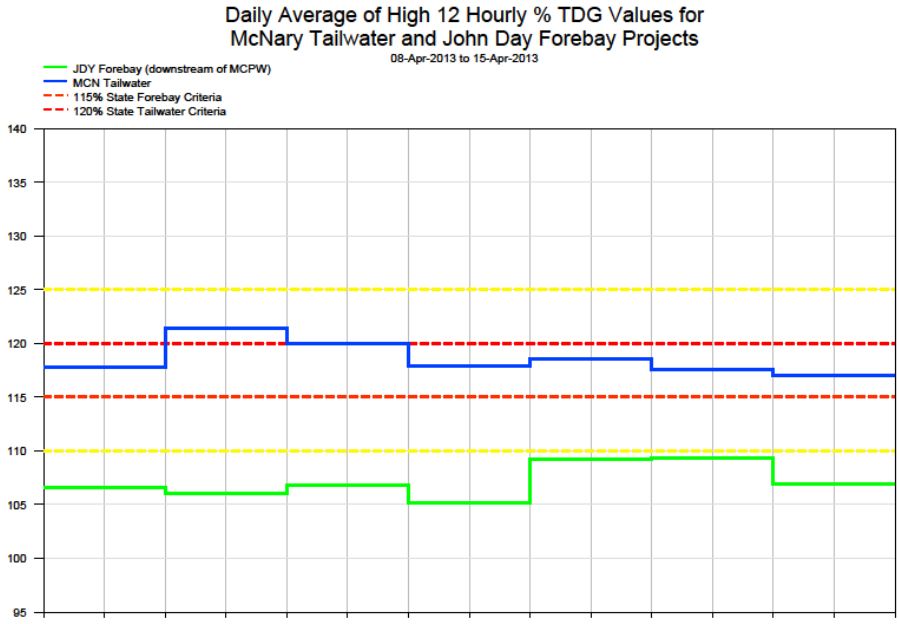

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/08/13 01:00
04/08/13 13:00
04/09/13 01:00
04/09/13 13:00
04/10/13 01:00
04/10/13 13:00
04/11/13 01:00
04/11/13 13:00
04/12/13 01:00
04/12/13 13:00
04/13/13 01:00
04/13/13 13:00
04/14/13 01:00
04/14/13 13:00
04/15/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 9


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
08-Apr-2013 to 15-Apr-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

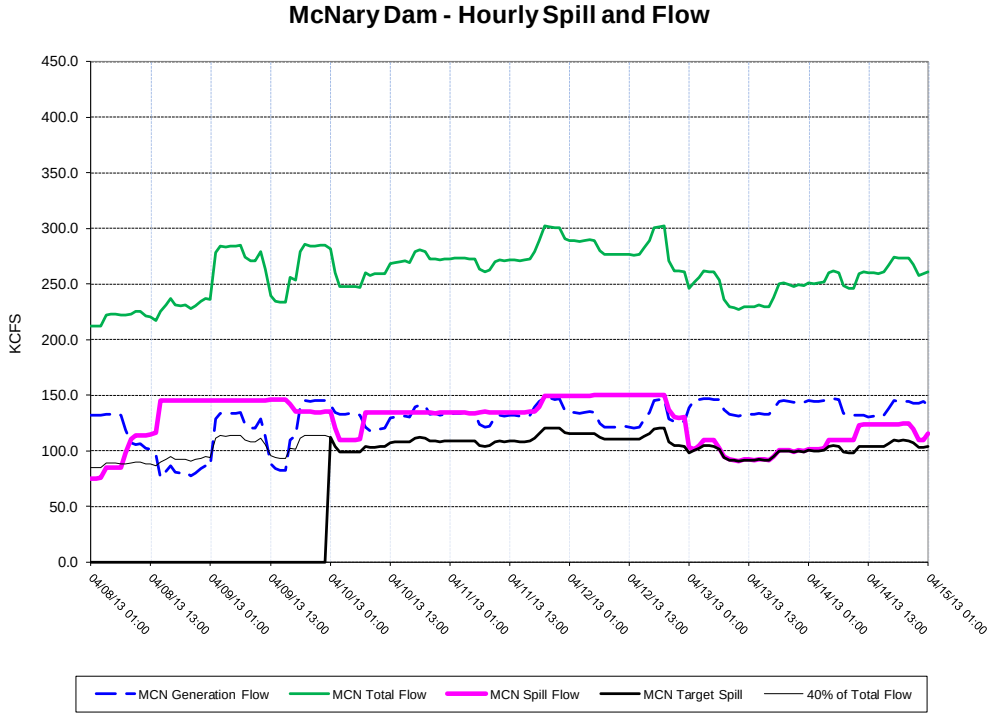
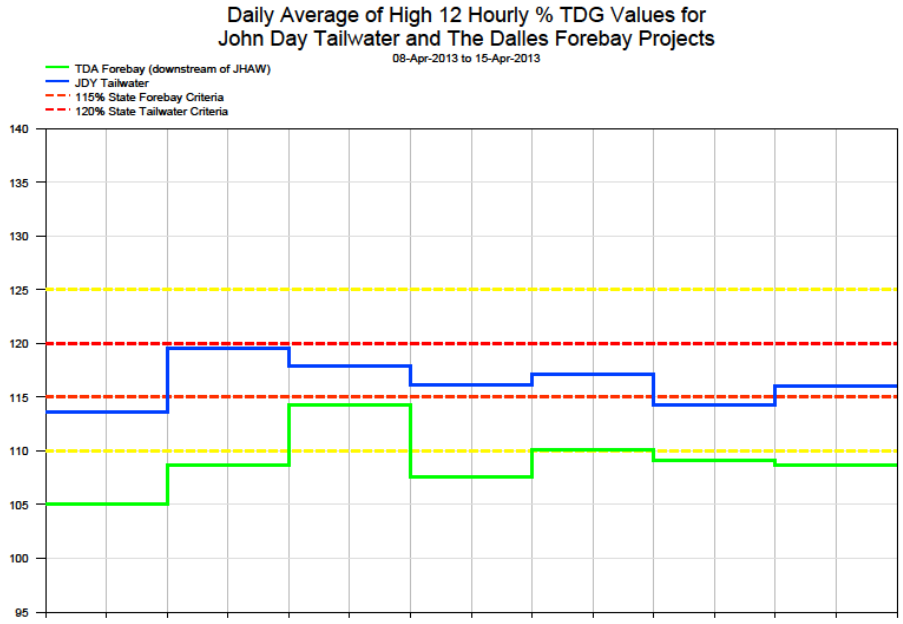

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/08/13 01:00
04/08/13 13:00
04/09/13 01:00
04/09/13 13:00
04/10/13 01:00
04/10/13 13:00
04/11/13 01:00
04/11/13 13:00
04/12/13 01:00
04/12/13 13:00
04/13/13 01:00
04/13/13 13:00
04/14/13 01:00
04/14/13 13:00
04/15/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 10


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
08-Apr-2013 to 15-Apr-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

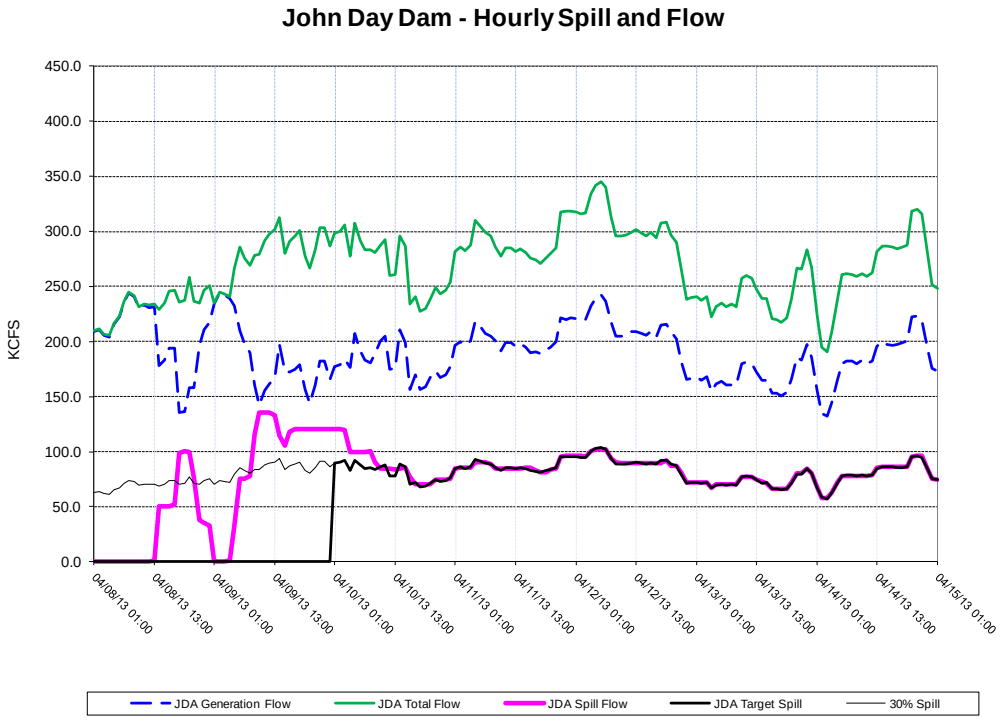
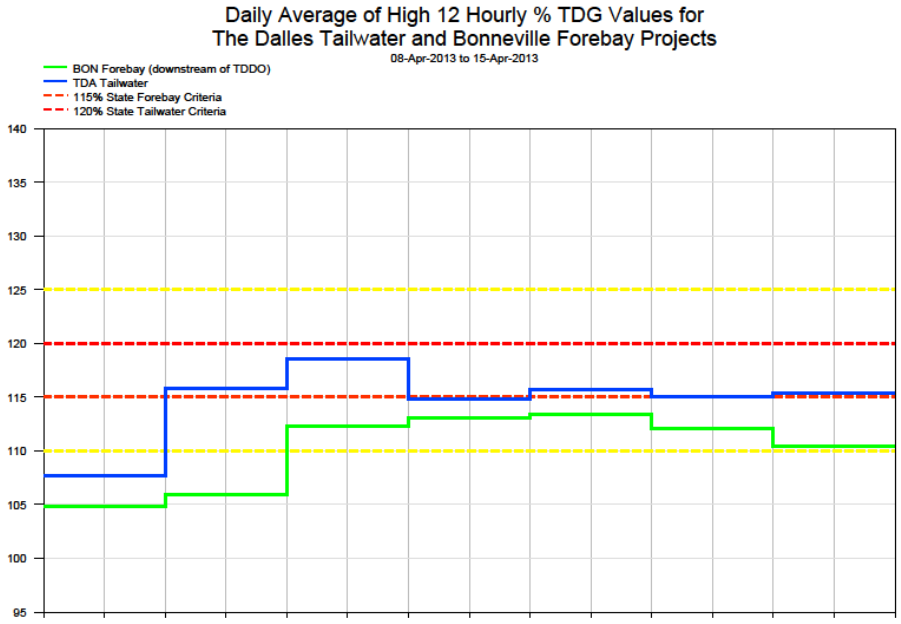

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/08/13 01:00
04/08/13 13:00
04/09/13 01:00
04/09/13 13:00
04/10/13 01:00
04/10/13 13:00
04/11/13 01:00
04/11/13 13:00
04/12/13 01:00
04/12/13 13:00
04/13/13 01:00
04/13/13 13:00
04/14/13 01:00
04/14/13 13:00
04/15/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 11


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
08-Apr-2013 to 15-Apr-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

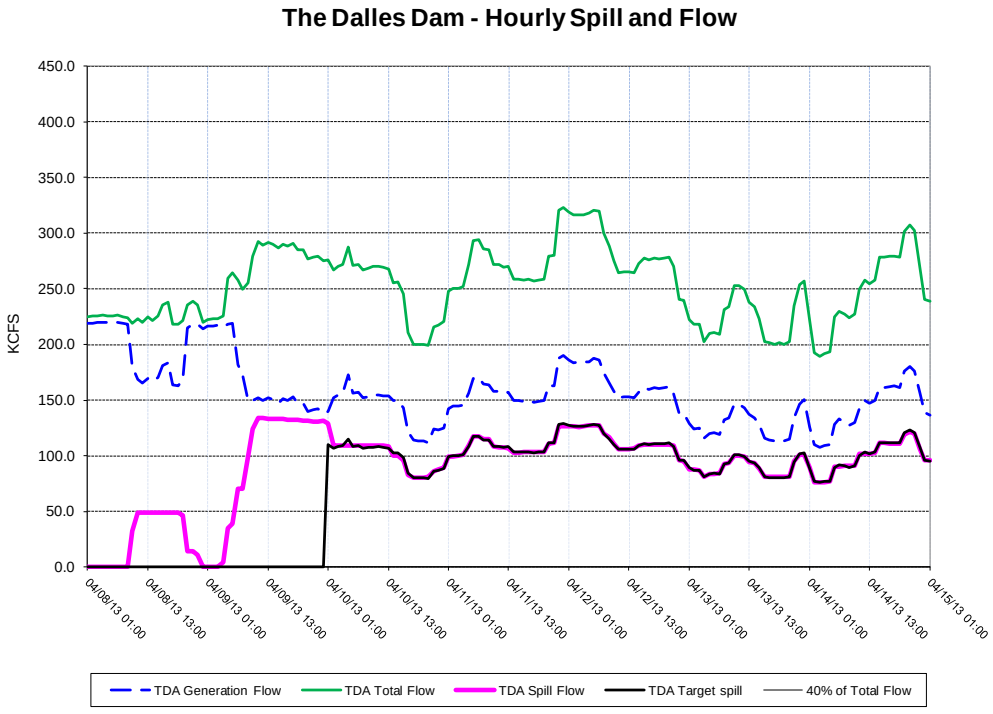
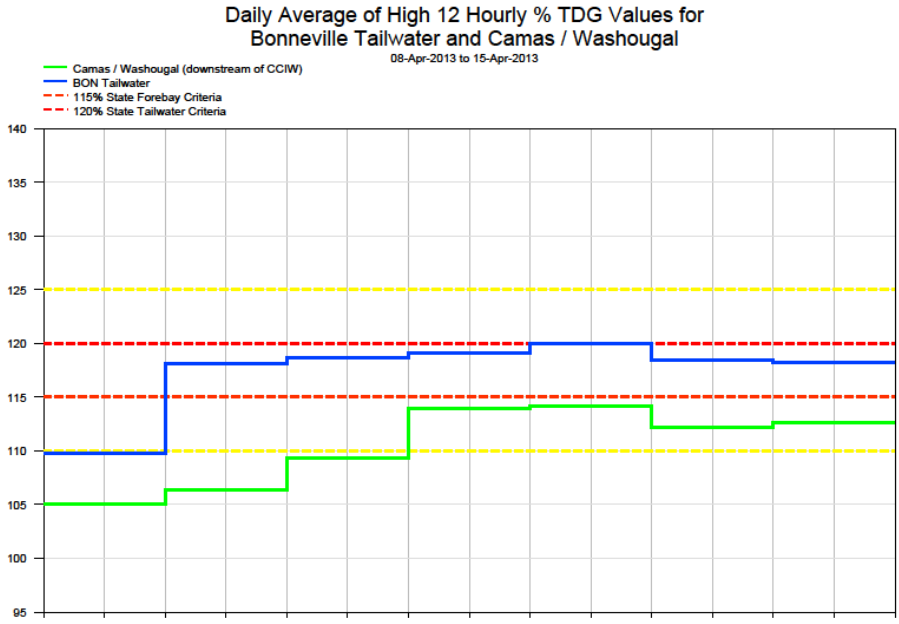

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/08/13 01:00
04/08/13 13:00
04/09/13 01:00
04/09/13 13:00
04/10/13 01:00
04/10/13 13:00
04/11/13 01:00
04/11/13 13:00
04/12/13 01:00
04/12/13 13:00
04/13/13 01:00
04/13/13 13:00
04/14/13 01:00
04/14/13 13:00
04/15/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 12


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
08-Apr-2013 to 15-Apr-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

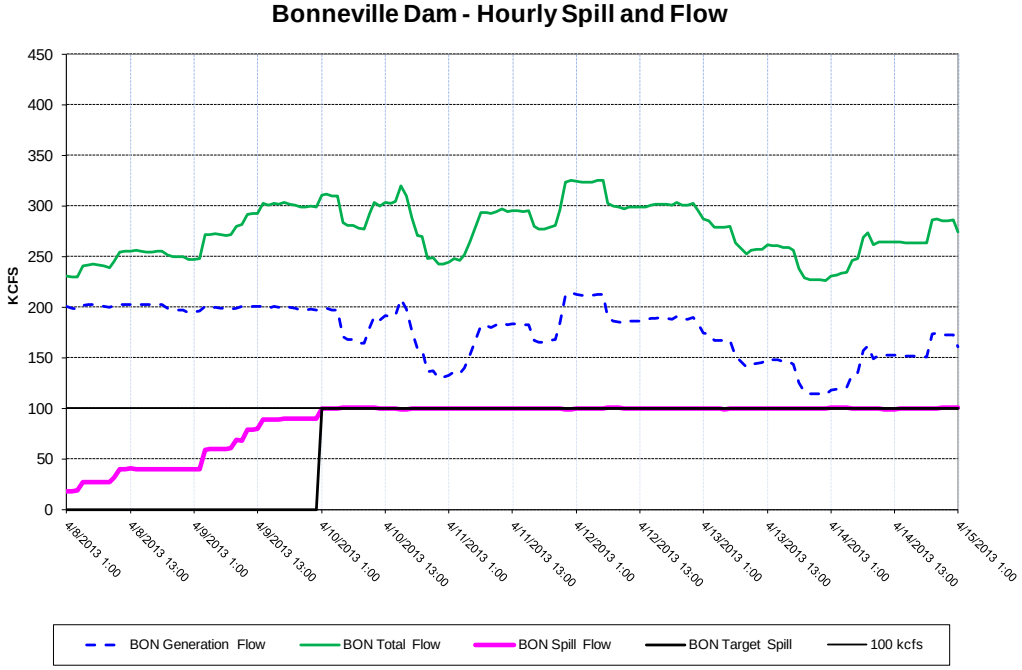
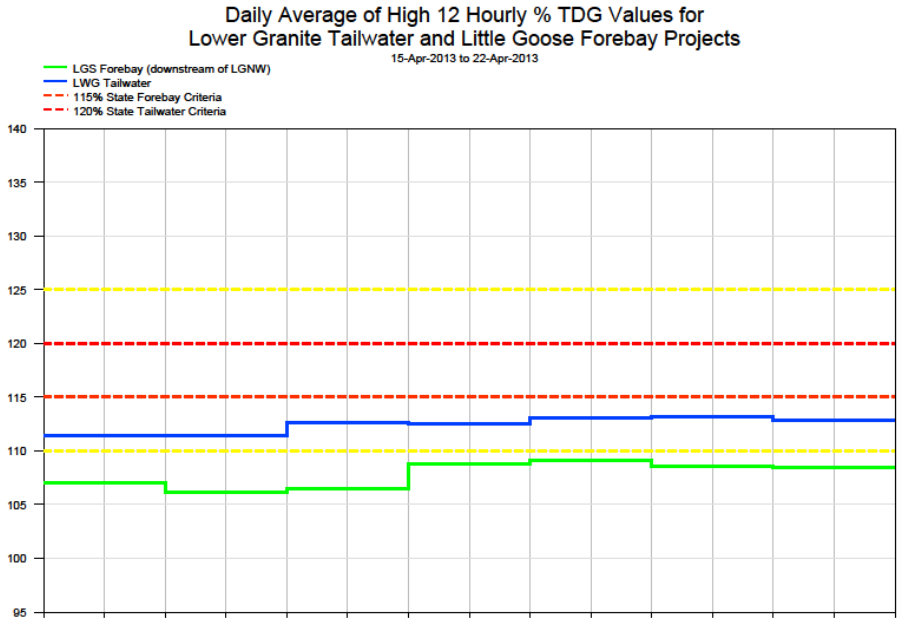

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
4/8/2013 1:00
4/8/2013 13:00
4/9/2013 1:00
4/9/2013 13:00
4/10/2013 1:00
4/10/2013 13:00
4/11/2013 1:00
4/11/2013 13:00
4/12/2013 1:00
4/12/2013 13:00
4/13/2013 1:00
4/13/2013 13:00
4/14/2013 1:00
4/14/2013 13:00
4/15/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 13


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
15-Apr-2013 to 22-Apr-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

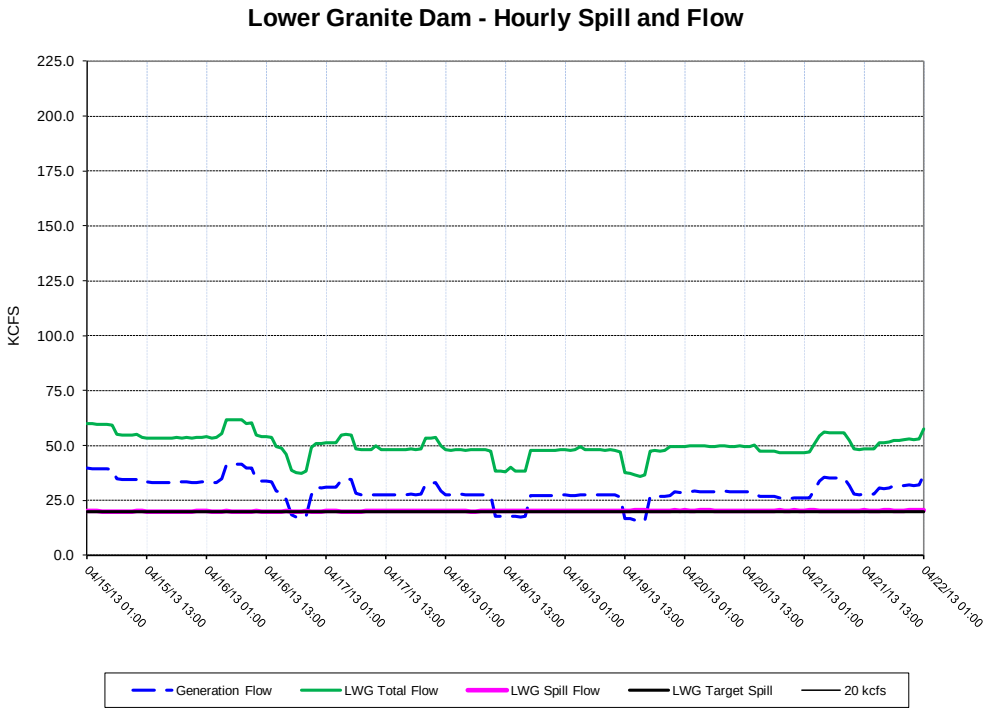
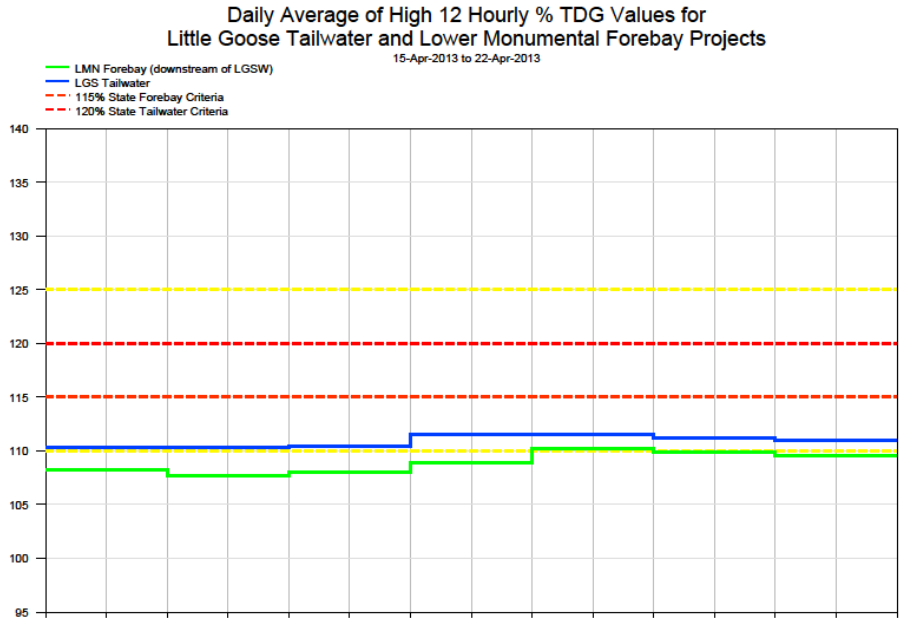

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/15/13 01:00
04/15/13 13:00
04/16/13 01:00
04/16/13 13:00
04/17/13 01:00
04/17/13 13:00
04/18/13 01:00
04/18/13 13:00
04/19/13 01:00
04/19/13 13:00
04/20/13 01:00
04/20/13 13:00
04/21/13 01:00
04/21/13 13:00
04/22/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 14


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
15-Apr-2013 to 22-Apr-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

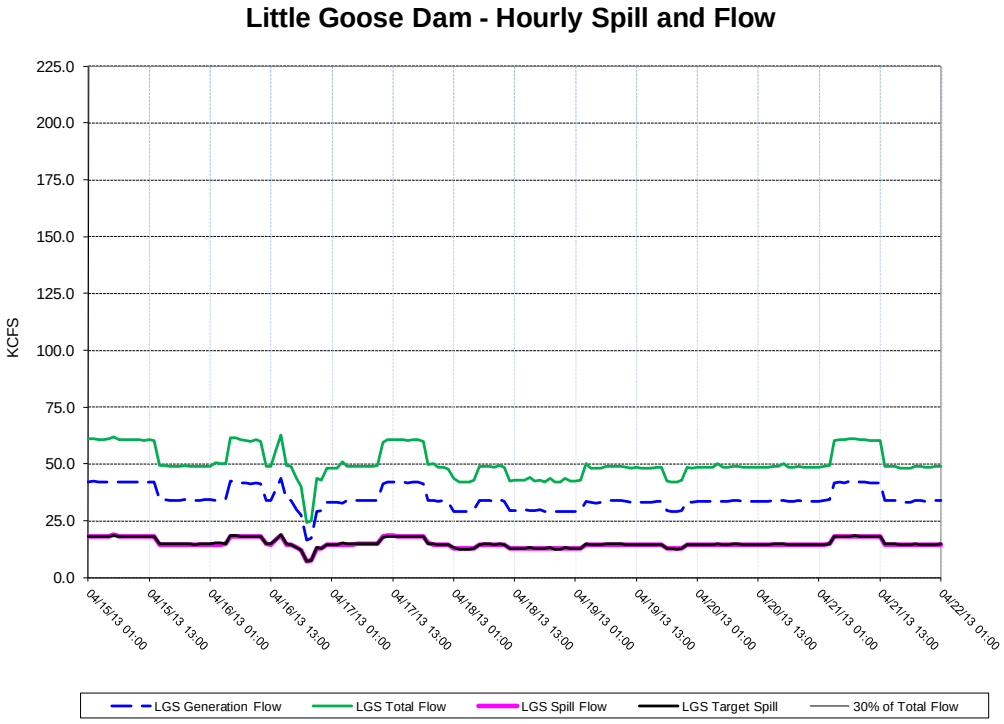
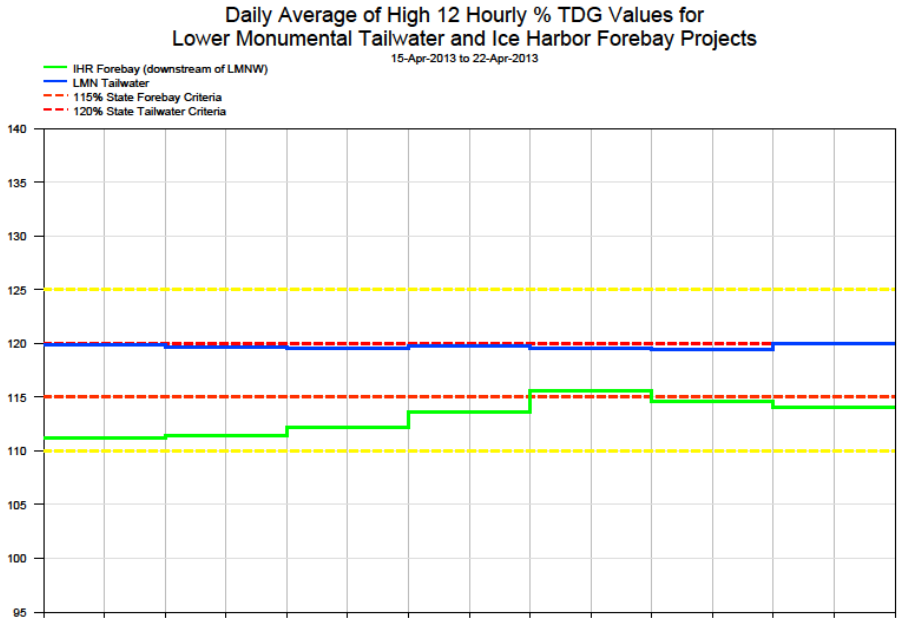

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/15/13 01:00
04/15/13 13:00
04/16/13 01:00
04/16/13 13:00
04/17/13 01:00
04/17/13 13:00
04/18/13 01:00
04/18/13 13:00
04/19/13 01:00
04/19/13 13:00
04/20/13 01:00
04/20/13 13:00
04/21/13 01:00
04/21/13 13:00
04/22/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 15


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
15-Apr-2013 to 22-Apr-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

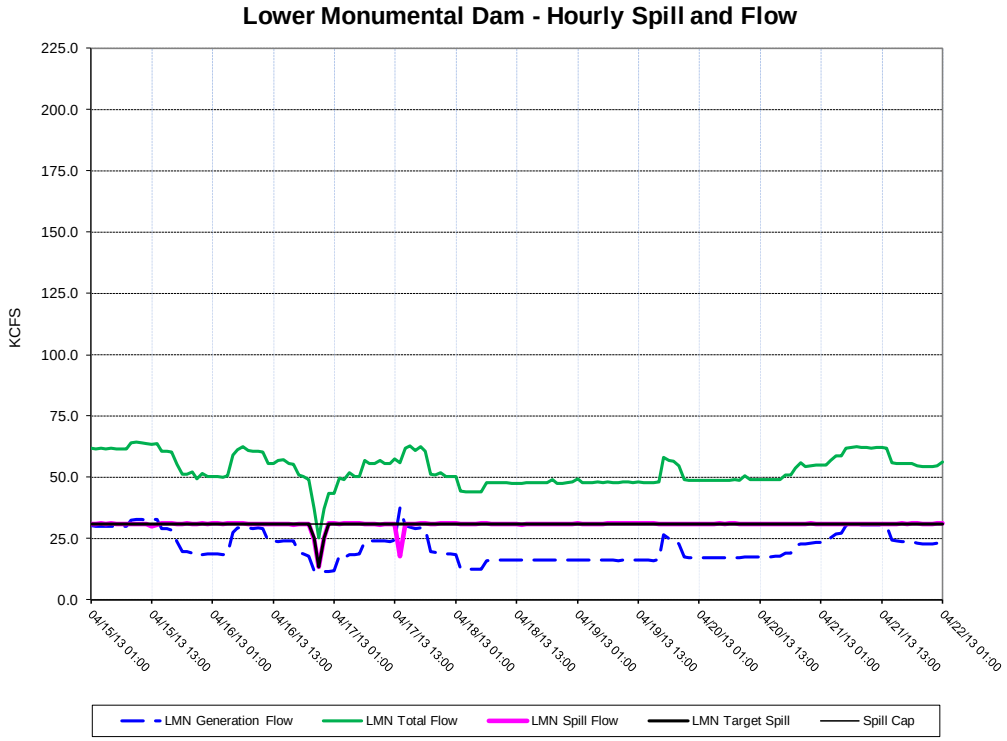
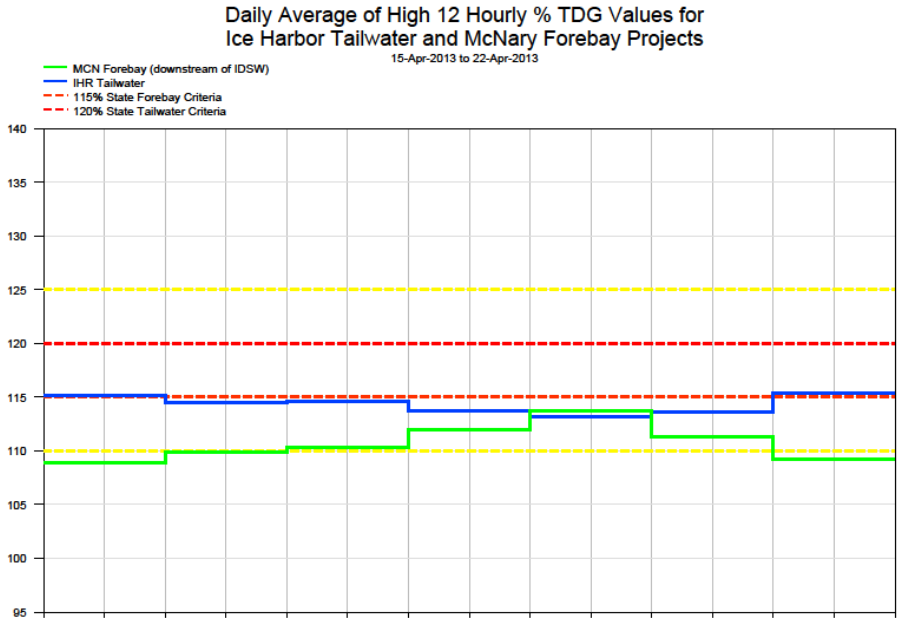

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/15/13 01:00
04/15/13 13:00
04/16/13 01:00
04/16/13 13:00
04/17/13 01:00
04/17/13 13:00
04/18/13 01:00
04/18/13 13:00
04/19/13 01:00
04/19/13 13:00
04/20/13 01:00
04/20/13 13:00
04/21/13 01:00
04/21/13 13:00
04/22/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 16


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
15-Apr-2013 to 22-Apr-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

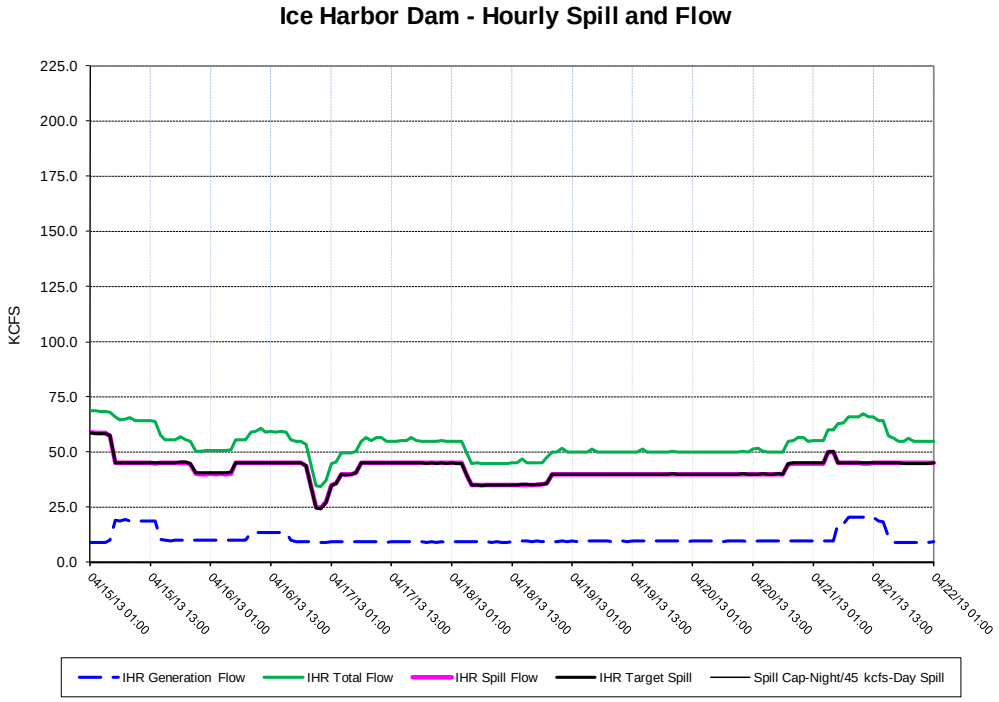
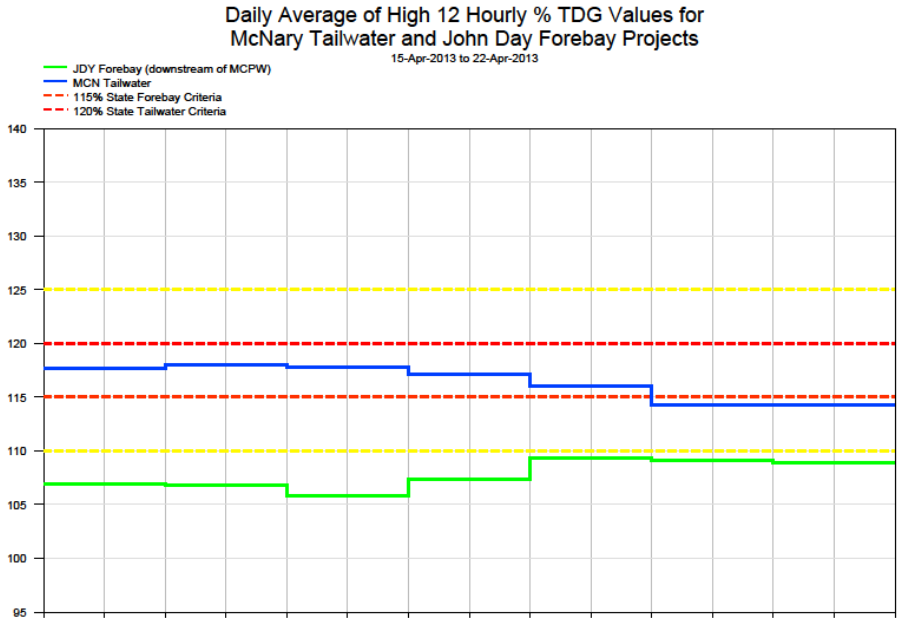

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/15/13 01:00
04/15/13 13:00
04/16/13 01:00
04/16/13 13:00
04/17/13 01:00
04/17/13 13:00
04/18/13 01:00
04/18/13 13:00
04/19/13 01:00
04/19/13 13:00
04/20/13 01:00
04/20/13 13:00
04/21/13 01:00
04/21/13 13:00
04/22/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 17


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
15-Apr-2013 to 22-Apr-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

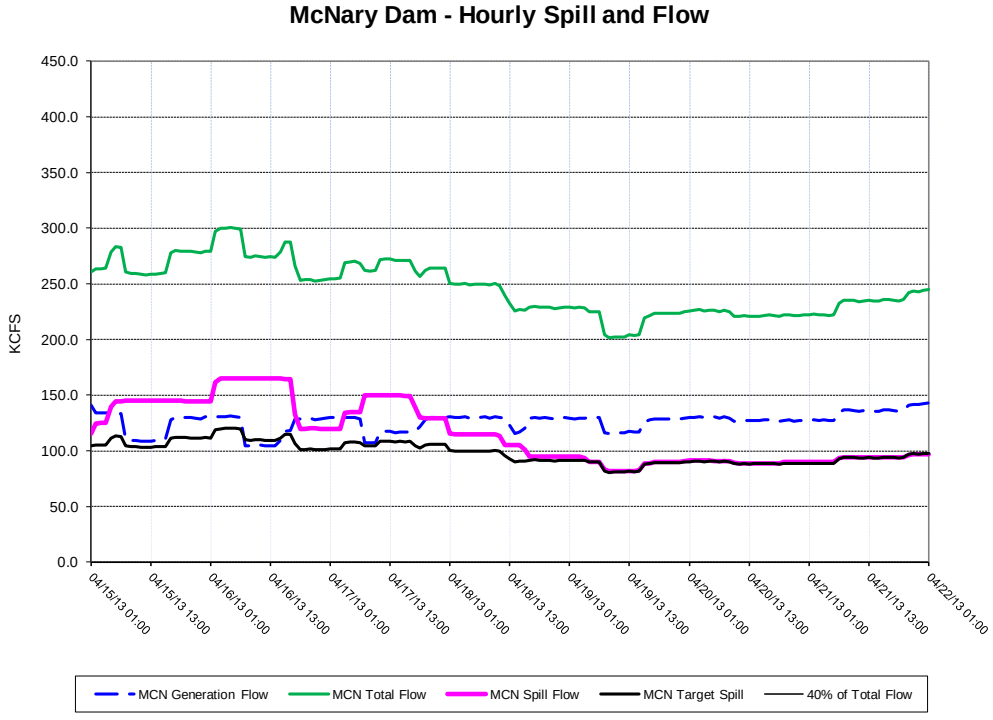
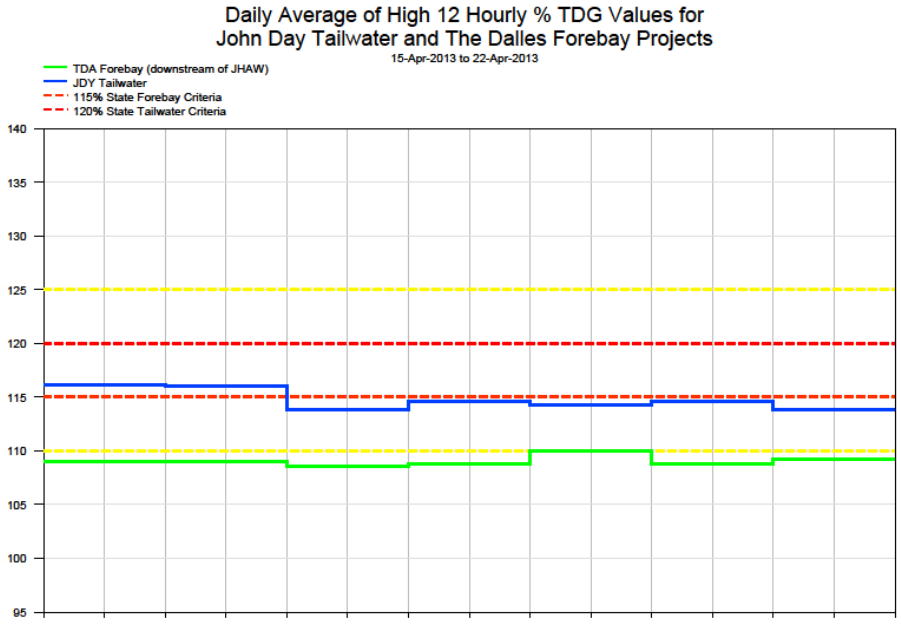

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/15/13 01:00
04/15/13 13:00
04/16/13 01:00
04/16/13 13:00
04/17/13 01:00
04/17/13 13:00
04/18/13 01:00
04/18/13 13:00
04/19/13 01:00
04/19/13 13:00
04/20/13 01:00
04/20/13 13:00
04/21/13 01:00
04/21/13 13:00
04/22/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 18


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
15-Apr-2013 to 22-Apr-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

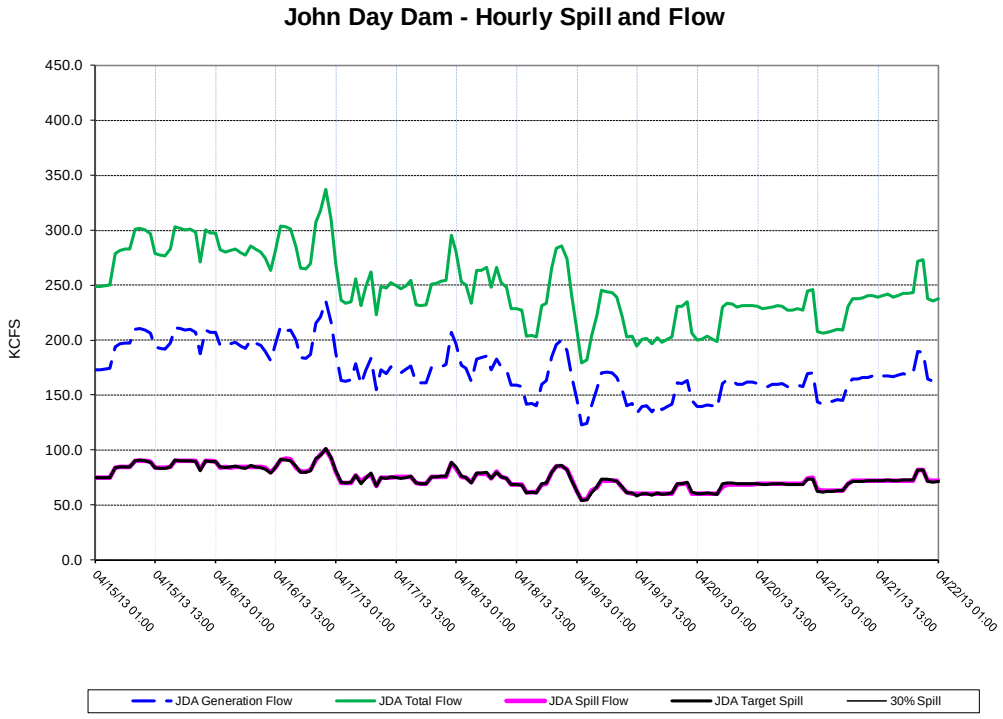
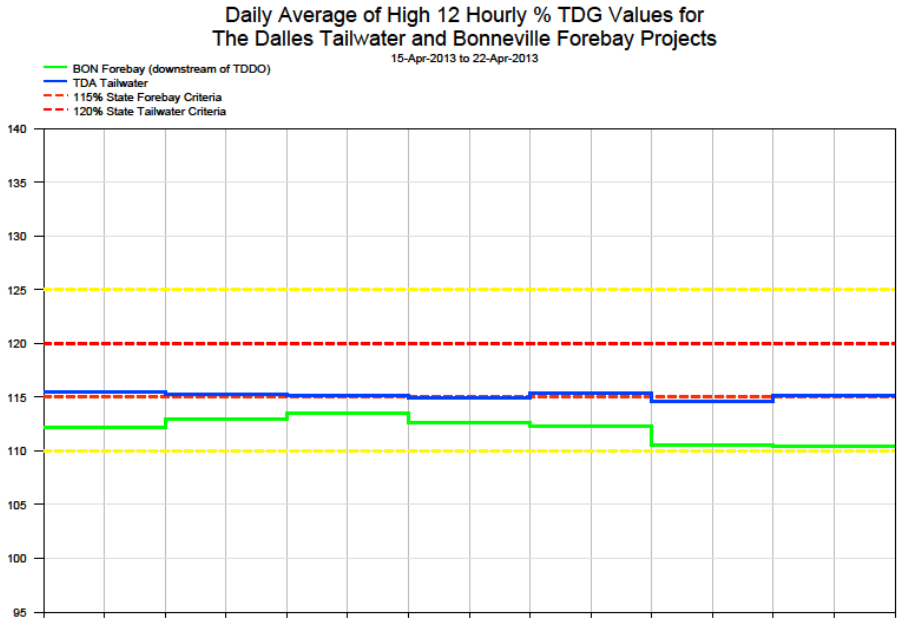

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/15/13 01:00
04/15/13 13:00
04/16/13 01:00
04/16/13 13:00
04/17/13 01:00
04/17/13 13:00
04/18/13 01:00
04/18/13 13:00
04/19/13 01:00
04/19/13 13:00
04/20/13 01:00
04/20/13 13:00
04/21/13 01:00
04/21/13 13:00
04/22/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 19


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
15-Apr-2013 to 22-Apr-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

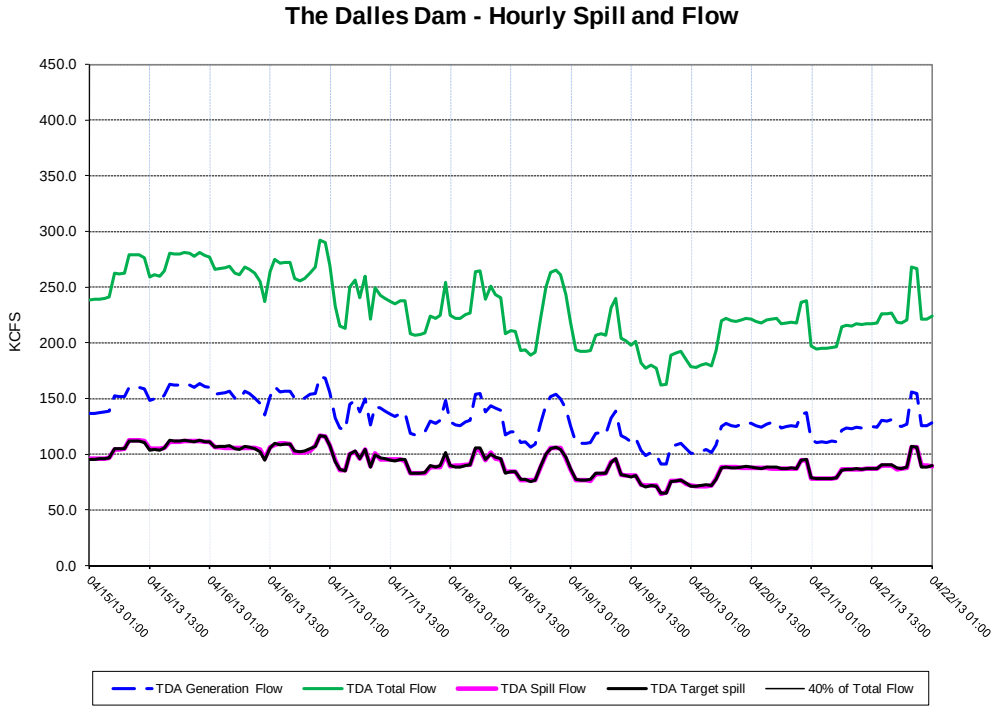
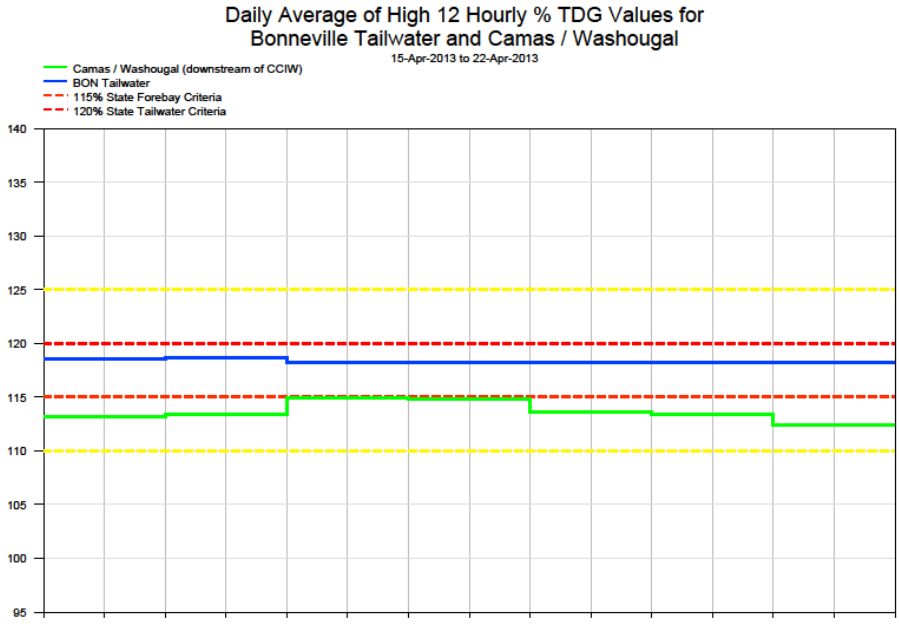

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/15/13 01:00
04/15/13 13:00
04/16/13 01:00
04/16/13 13:00
04/17/13 01:00
04/17/13 13:00
04/18/13 01:00
04/18/13 13:00
04/19/13 01:00
04/19/13 13:00
04/20/13 01:00
04/20/13 13:00
04/21/13 01:00
04/21/13 13:00
04/22/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
15-Apr-2013 to 22-Apr-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

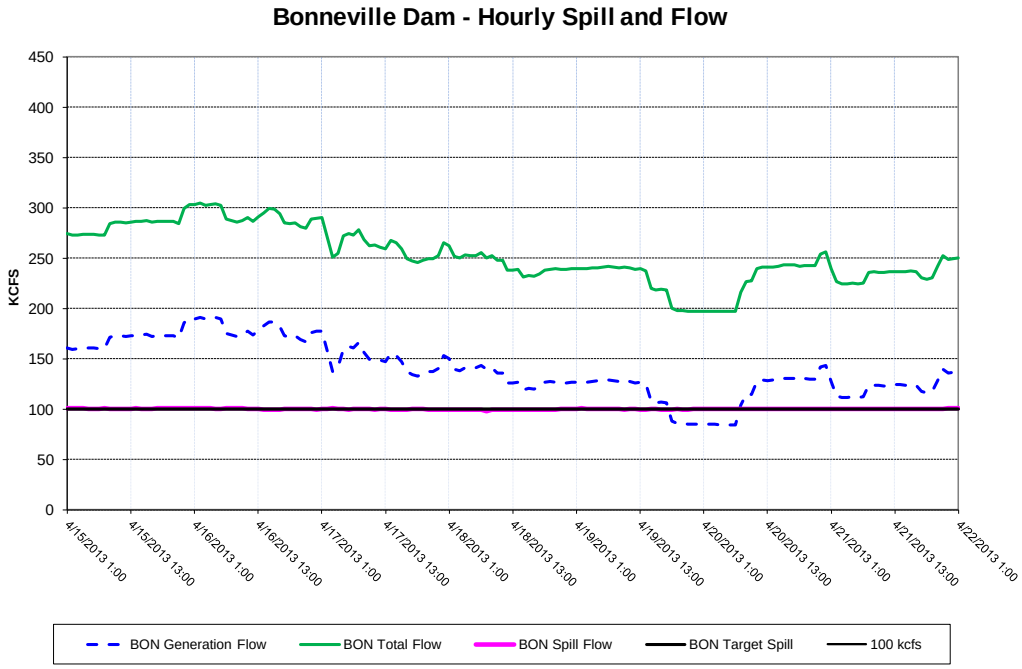
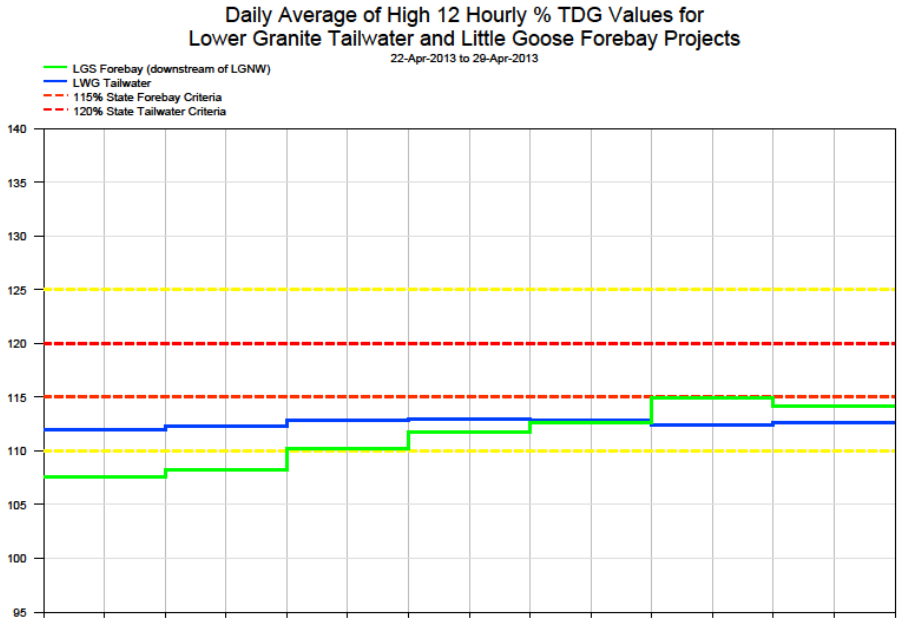

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
4/15/2013 1:00
4/15/2013 13:00
4/16/2013 1:00
4/16/2013 13:00
4/17/2013 1:00
4/17/2013 13:00
4/18/2013 1:00
4/18/2013 13:00
4/19/2013 1:00
4/19/2013 13:00
4/20/2013 1:00
4/20/2013 13:00
4/21/2013 1:00
4/21/2013 13:00
4/22/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 21


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
22-Apr-2013 to 29-Apr-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

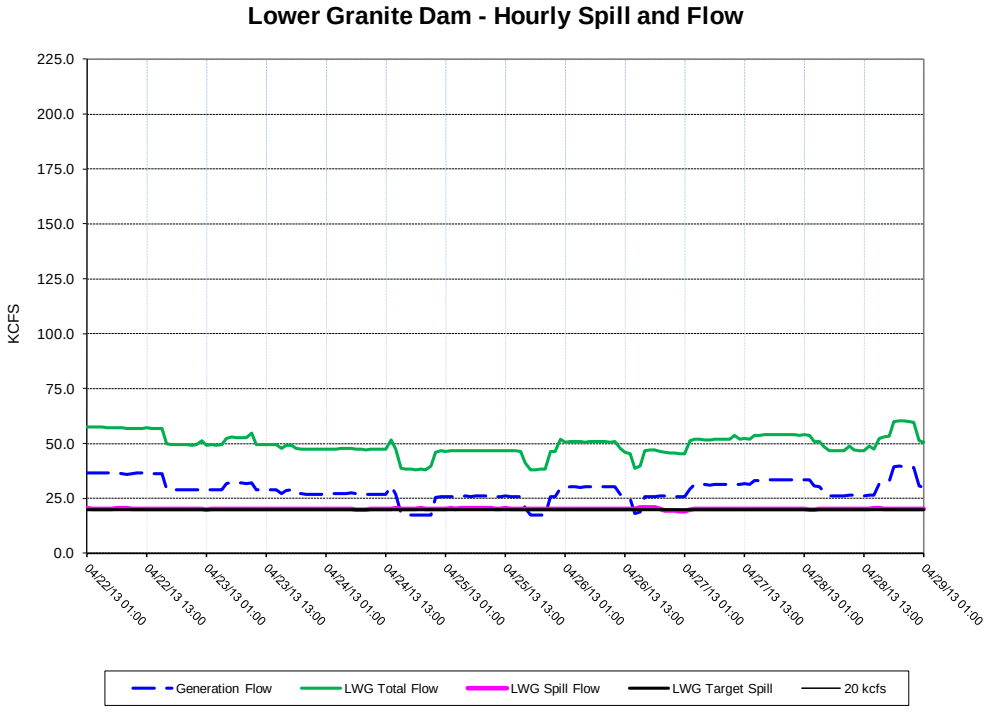
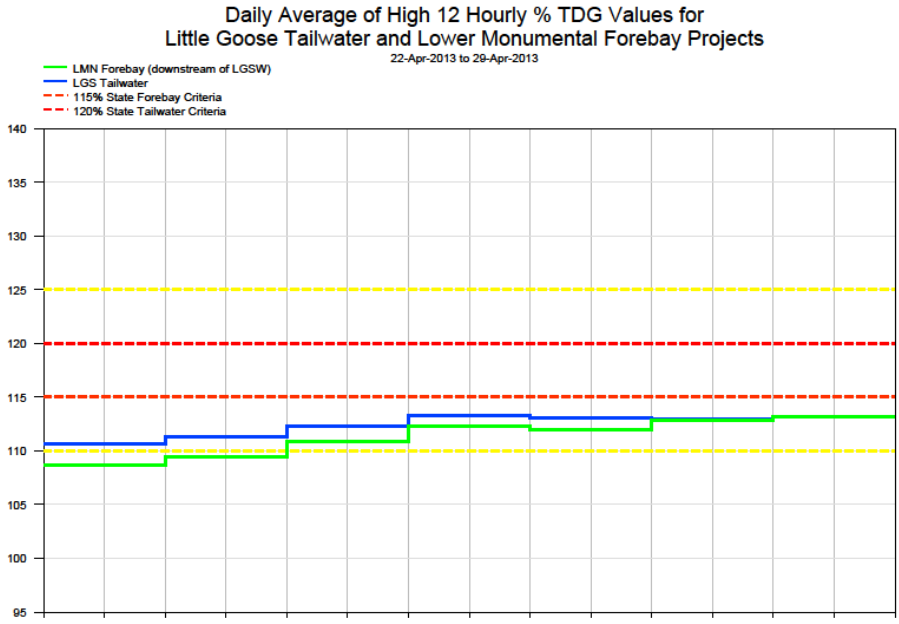

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/22/13 01:00
04/22/13 13:00
04/23/13 01:00
04/23/13 13:00
04/24/13 01:00
04/24/13 13:00
04/25/13 01:00
04/25/13 13:00
04/26/13 01:00
04/26/13 13:00
04/27/13 01:00
04/27/13 13:00
04/28/13 01:00
04/28/13 13:00
04/29/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 22


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
22-Apr-2013 to 29-Apr-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

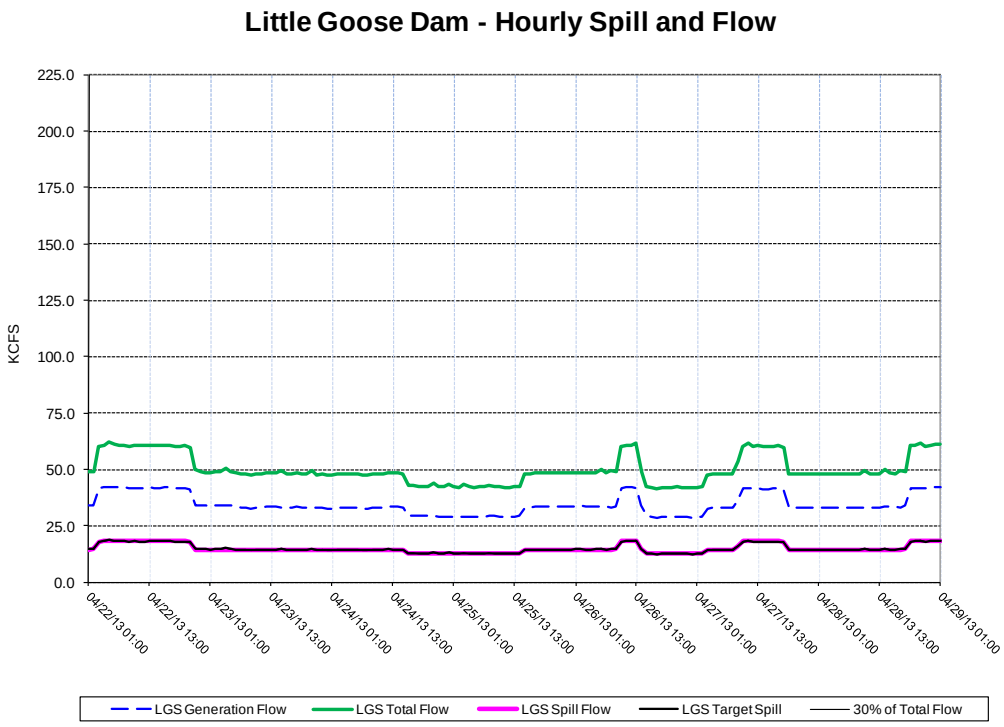
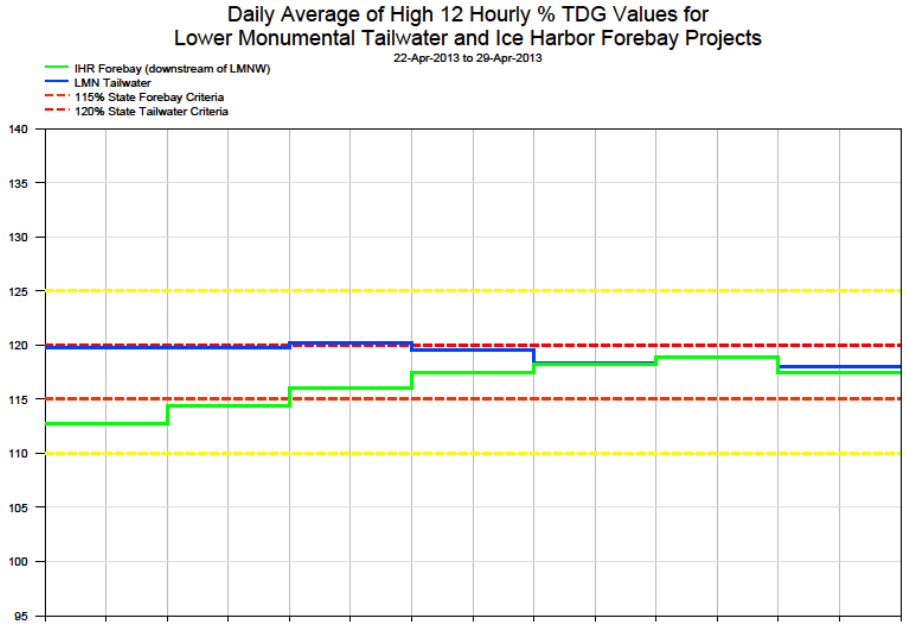

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/22/13 01:00
04/22/13 13:00
04/23/13 01:00
04/23/13 13:00
04/24/13 01:00
04/24/13 13:00
04/25/13 01:00
04/25/13 13:00
04/26/13 01:00
04/26/13 13:00
04/27/13 01:00
04/27/13 13:00
04/28/13 01:00
04/28/13 13:00
04/29/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 23


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
22-Apr-2013 to 29-Apr-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

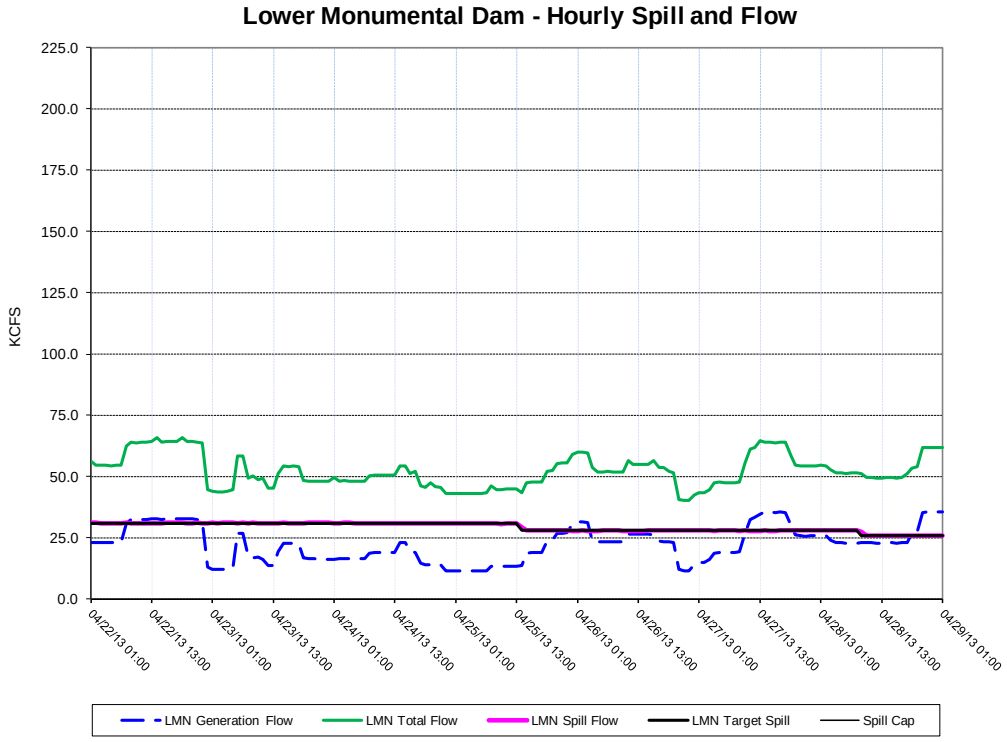
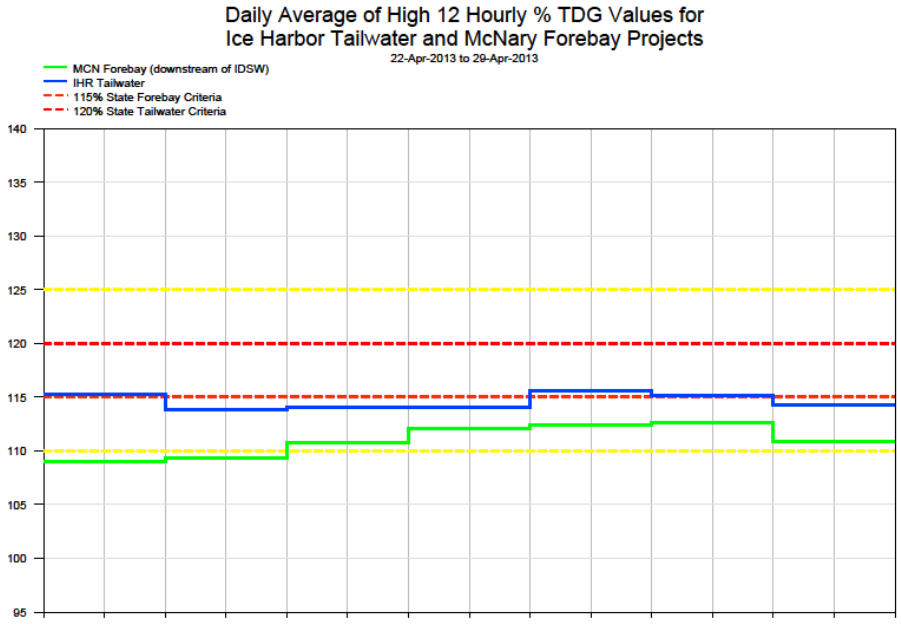

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/22/13 01:00
04/22/13 13:00
04/23/13 01:00
04/23/13 13:00
04/24/13 01:00
04/24/13 13:00
04/25/13 01:00
04/25/13 13:00
04/26/13 01:00
04/26/13 13:00
04/27/13 01:00
04/27/13 13:00
04/28/13 01:00
04/28/13 13:00
04/29/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 24


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
22-Apr-2013 to 29-Apr-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

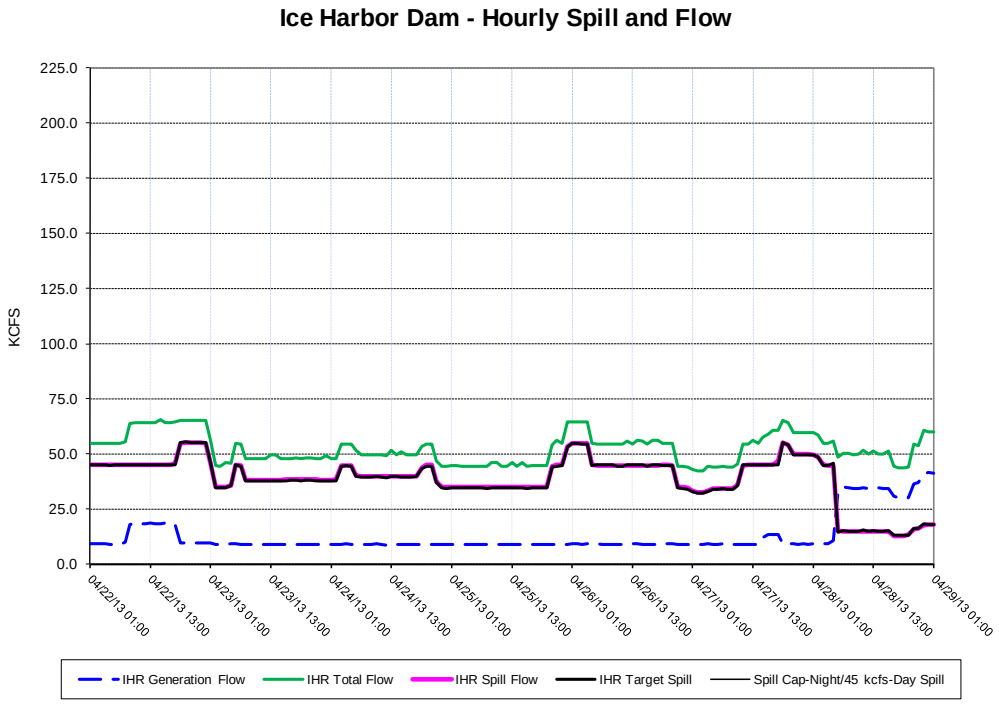
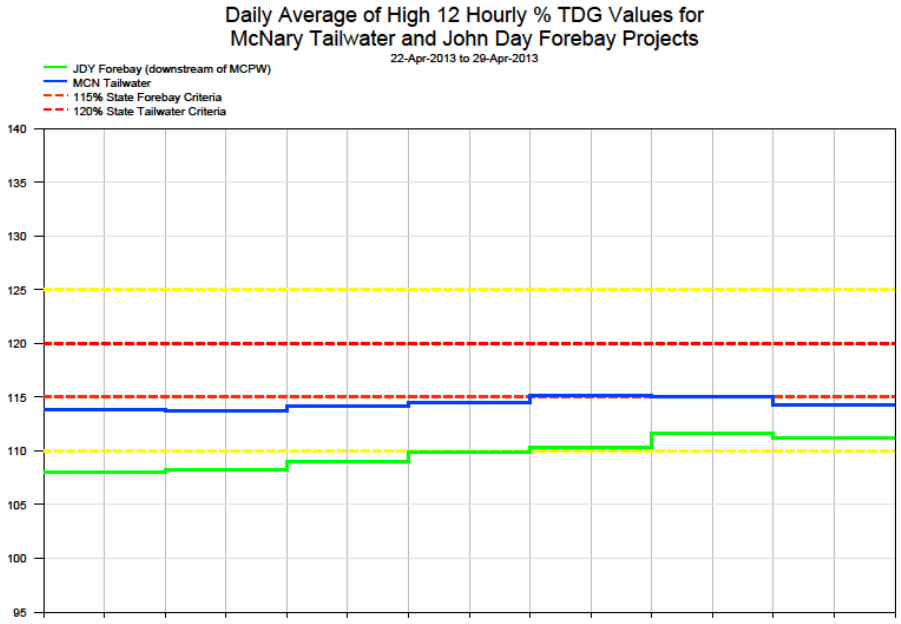

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/22/13 01:00
04/22/13 13:00
04/23/13 01:00
04/23/13 13:00
04/24/13 01:00
04/24/13 13:00
04/25/13 01:00
04/25/13 13:00
04/26/13 01:00
04/26/13 13:00
04/27/13 01:00
04/27/13 13:00
04/28/13 01:00
04/28/13 13:00
04/29/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 25


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
22-Apr-2013 to 29-Apr-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

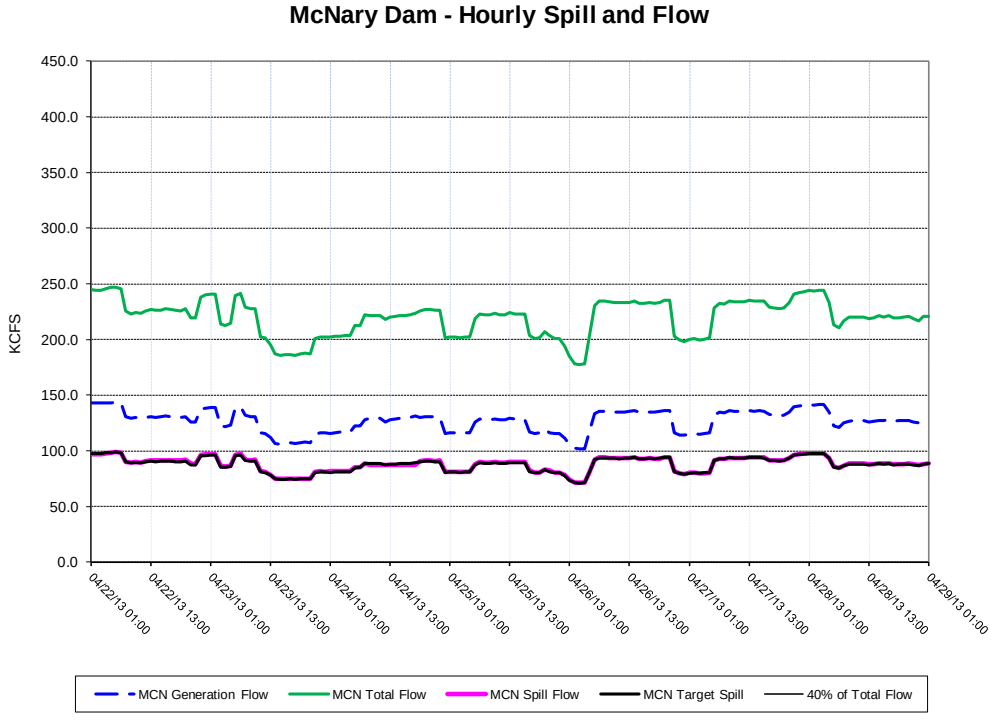
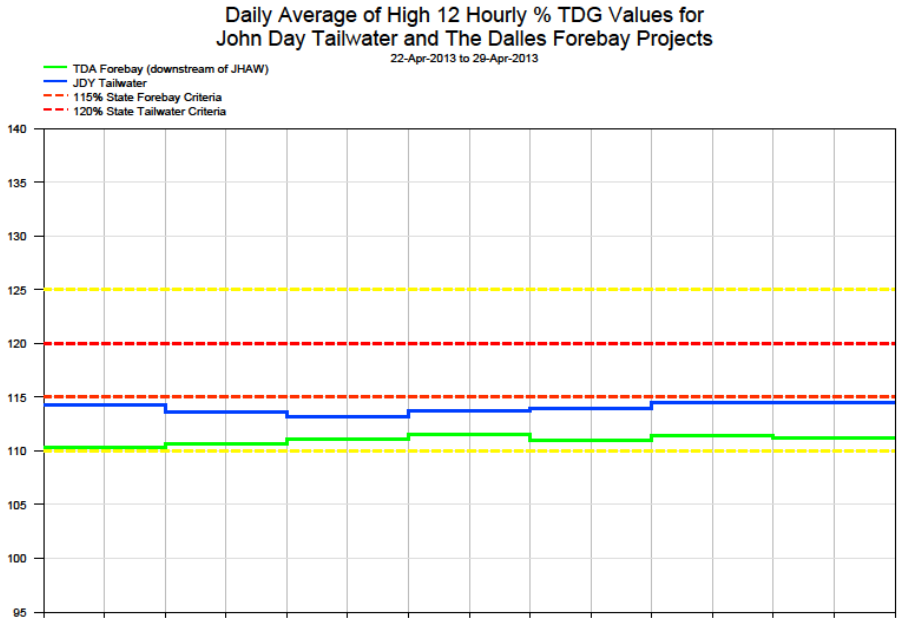

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/22/13 01:00
04/22/13 13:00
04/23/13 01:00
04/23/13 13:00
04/24/13 01:00
04/24/13 13:00
04/25/13 01:00
04/25/13 13:00
04/26/13 01:00
04/26/13 13:00
04/27/13 01:00
04/27/13 13:00
04/28/13 01:00
04/28/13 13:00
04/29/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 26


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
22-Apr-2013 to 29-Apr-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

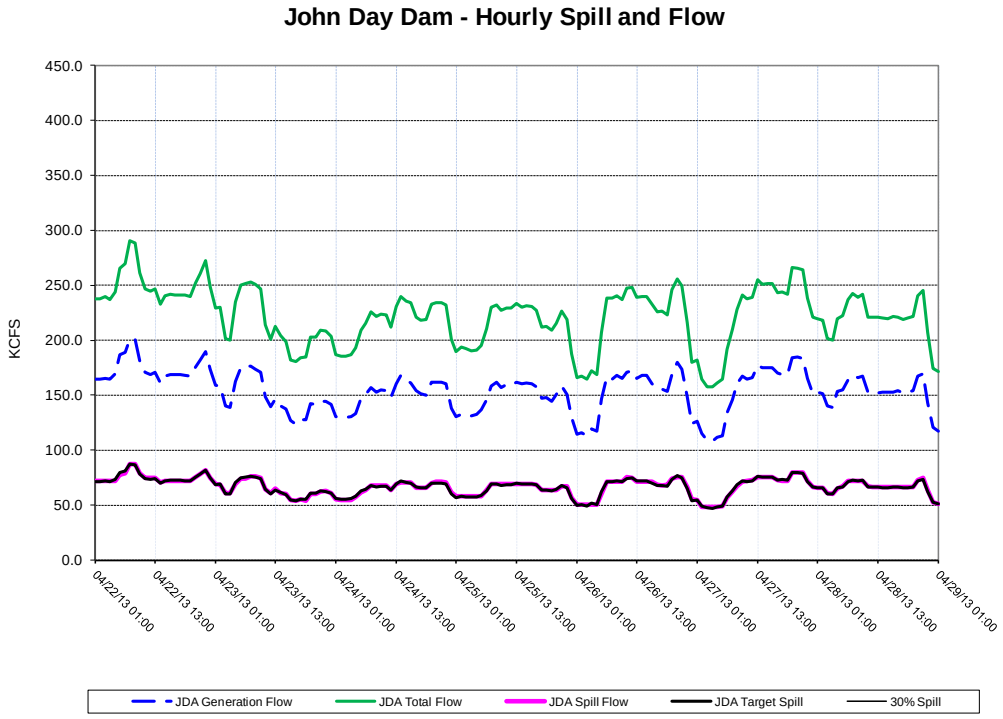
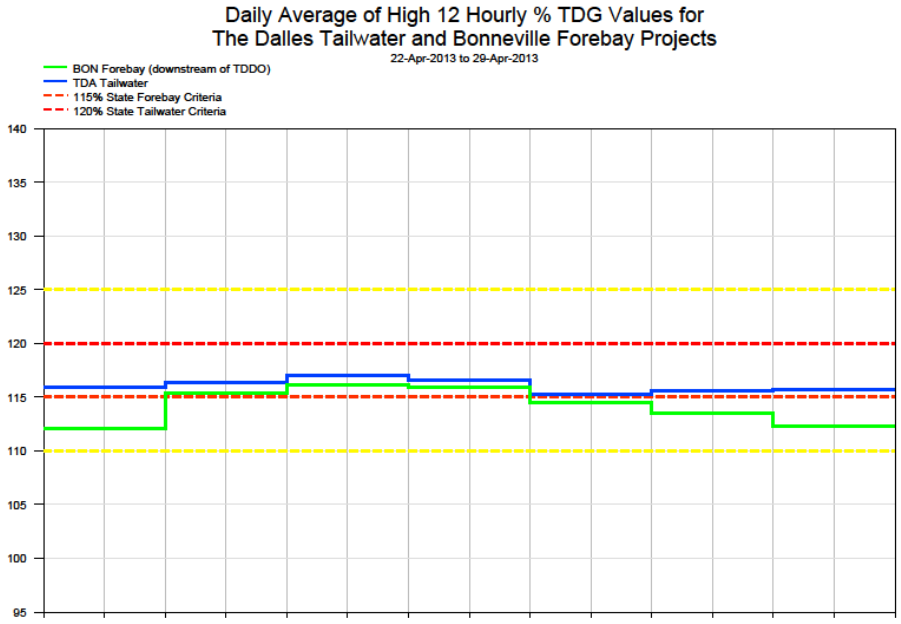

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/22/13 01:00
04/22/13 13:00
04/23/13 01:00
04/23/13 13:00
04/24/13 01:00
04/24/13 13:00
04/25/13 01:00
04/25/13 13:00
04/26/13 01:00
04/26/13 13:00
04/27/13 01:00
04/27/13 13:00
04/28/13 01:00
04/28/13 13:00
04/29/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 27


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
22-Apr-2013 to 29-Apr-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

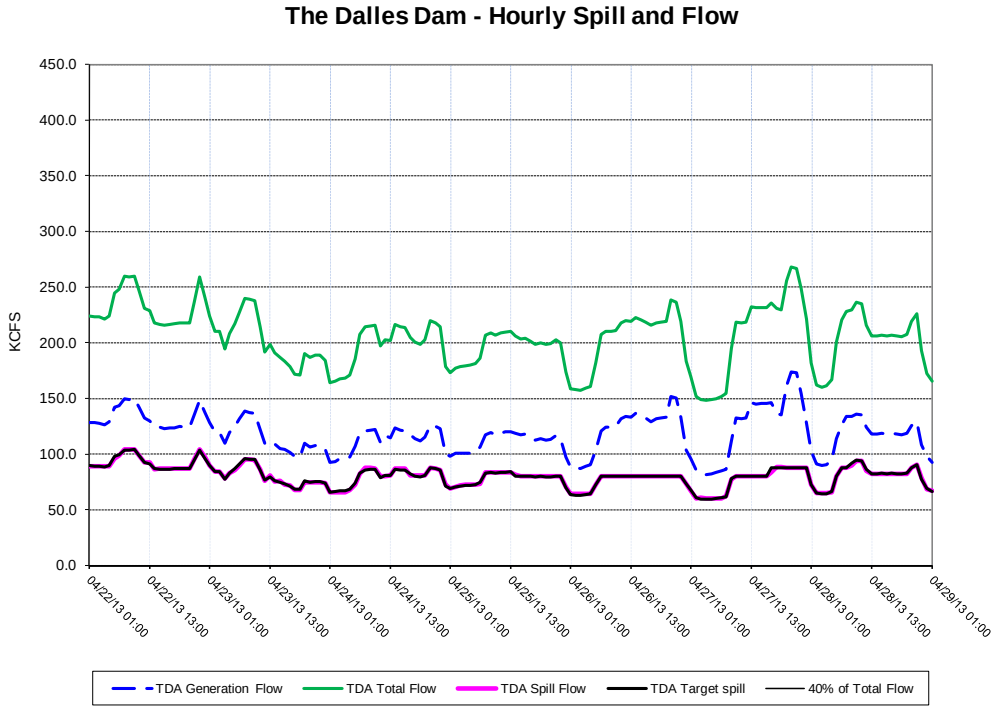
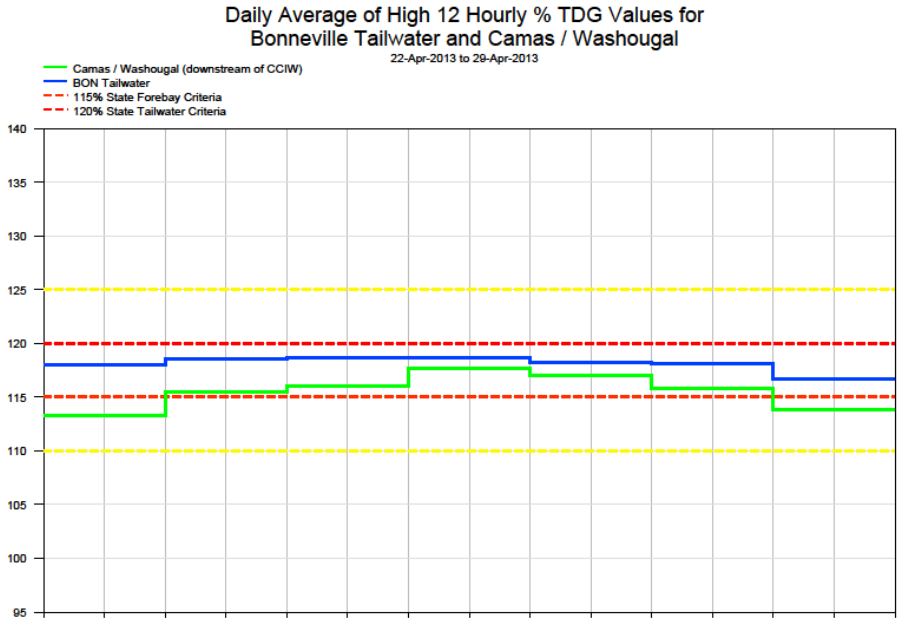

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/22/13 01:00
04/22/13 13:00
04/23/13 01:00
04/23/13 13:00
04/24/13 01:00
04/24/13 13:00
04/25/13 01:00
04/25/13 13:00
04/26/13 01:00
04/26/13 13:00
04/27/13 01:00
04/27/13 13:00
04/28/13 01:00
04/28/13 13:00
04/29/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 28


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
22-Apr-2013 to 29-Apr-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

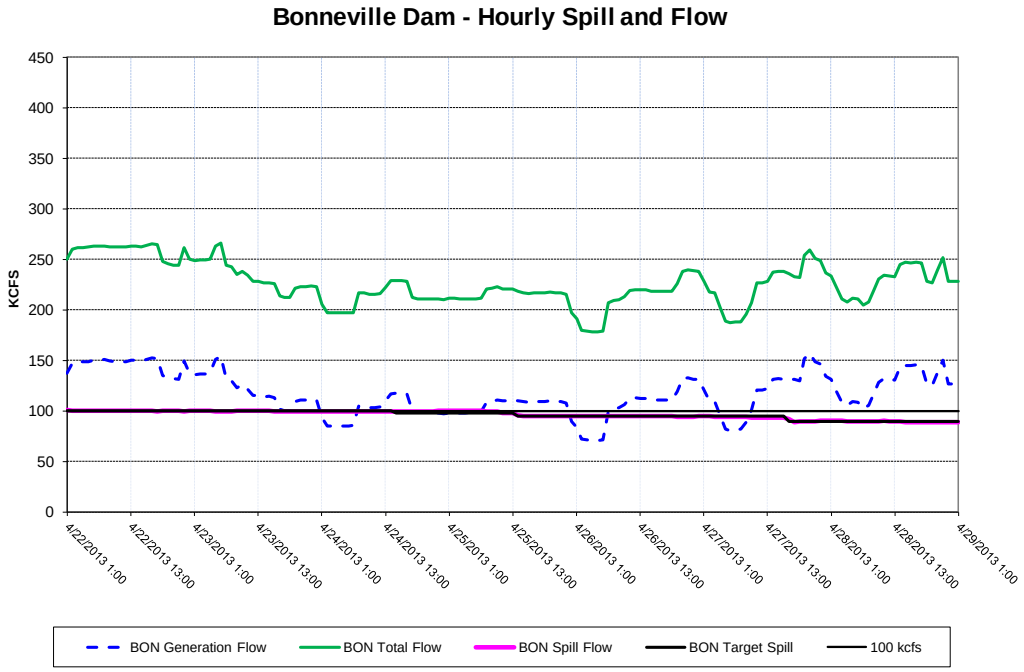

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
4/22/2013 1:00
4/22/2013 13:00
4/23/2013 1:00
4/23/2013 13:00
4/24/2013 1:00
4/24/2013 13:00
4/25/2013 1:00
4/25/2013 13:00
4/26/2013 1:00
4/26/2013 13:00
4/27/2013 1:00
4/27/2013 13:00
4/28/2013 1:00
4/28/2013 13:00
4/29/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 29

Table 1

Average Percent TDG for Highest 12-Hours: April 1 – April 28, 2013

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115
4/1/2013	105.2	104.6	104.6	103.4	104.2	103.7	105.3	105.1	106.5	107.5	108.3	107	106.4	106.5	106	111.4	107.3
4/2/2013	104.4	103.8	103.9	102.9	103	102.6	104.8	104.8	106.3	111.3	106.8	106.2	105.9	105.8	105.5	112.3	108.2
4/3/2013	104.5	111.2	104.4	110.3	103.5	117	104.8	115.2	106.7	111.4	107.4	106.5	107	106.9	106.8	112.8	108.7
4/4/2013	104.9	111.4	105.7	110.5	104.4	117.5	105.2	115.6	107.3	111.2	108.7	107.6	108	107.7	107.4	113.6	107.8
4/5/2013	103.4	111.8	105.9	109.7	105.4	117.1	109.3	115.7	106.7	118.2	108.3	107.2	107.3	107	107	111.5	106.8
4/6/2013	102.8	110.8	106.3	109.8	108.9	117.6	112	115.9	107.1	116.9	107.8	106.5	107.2	106.8	107.1	111.3	106.5
4/7/2013	102.5	110.1	108.2	110.4	109.4	118	112.5	116.1	105.8	116.3	107.9	107	107.1	106.9	107.1	110.8	105.9
4/8/2013	101.2	112.1	107.5	112.1	107.3	119.5	109.8	115.8	104.7	117.8	106.5	113.7	105.1	107.7	104.8	109.9	105.1
4/9/2013	100	111.9	106.4	112.1	107.1	119.6	109.7	115.7	103.9	**121.4**	106	119.5	108.7	115.8	105.9	118.3	106.4
4/10/2013	100.9	110.1	107.1	110.2	110.4	119.4	112.3	115.5	104.8	120	106.8	117.9	114.3	118.6	112.3	118.9	109.3
4/11/2013	100.6	110.6	106.6	110.2	110.8	119.4	112.4	115.6	107.4	117.8	105.2	116.1	107.6	114.8	113	119.3	113.9
4/12/2013	102.8	111.2	109	111.4	109.5	119.6	113.3	115.5	110.5	118.5	109.2	117.2	110.1	115.7	113.4	**120.2**	114.2
4/13/2013	103	110.9	109	110.9	108.9	119.2	113.2	114.8	110.5	117.6	109.3	114.2	109.1	115.1	112.1	118.7	112.1
4/14/2013	101.7	111.2	107.4	110.5	108.6	119.9	111.8	115.7	108.7	117	106.9	116	108.6	115.3	110.4	118.4	112.7
4/15/2013	101.4	111.4	107	110.3	108.3	119.9	111.2	115.2	108.9	117.7	107	116.1	109	115.5	112.1	118.8	113.2
4/16/2013	100.1	111.4	106.1	110.3	107.7	119.6	111.4	114.5	109.9	118	106.8	116.1	109	115.2	113	118.8	113.4
4/17/2013	99.4	112.6	106.4	110.4	108	119.5	112.2	114.6	110.3	117.8	105.8	113.8	108.6	115.1	113.5	118.4	114.9
4/18/2013	100.4	112.5	108.8	111.5	108.9	119.8	113.6	113.7	111.9	117.1	107.3	114.6	108.8	114.9	112.7	118.5	114.8
4/19/2013	101.5	113	109.1	111.5	110.2	119.5	**115.6**	113.2	113.7	116	109.3	114.3	110	115.4	112.2	118.5	113.6
4/20/2013	102	113.1	108.5	111.1	109.9	119.5	114.6	113.7	111.3	114.2	109.1	114.5	108.8	114.6	110.6	118.4	113.4
4/21/2013	102.5	112.9	108.4	111	109.6	119.9	114	115.4	109.2	114.3	108.8	113.9	109.3	115.1	110.4	118.4	112.4
4/22/2013	101.7	111.9	107.6	110.6	108.7	119.8	112.7	115.2	109	113.8	108	114.2	110.3	115.9	112.1	118.2	113.3
4/23/2013	102	112.3	108.2	111.3	109.4	119.8	114.4	113.8	109.3	113.8	108.2	113.6	110.7	116.4	**115.4**	118.8	**115.5**
4/24/2013	102.6	112.9	110.1	112.3	110.9	**120.2**	**116.1**	114	110.8	114.1	109	113.2	111	117	**116.1**	118.9	**116**
4/25/2013	103.4	112.9	111.7	113.3	112.2	119.5	**117.4**	114.1	112.1	114.5	109.9	113.7	111.5	116.6	**115.9**	118.9	**117.6**
4/26/2013	103.3	112.8	112.6	113	111.9	118.3	**118.2**	115.5	112.4	115.2	110.4	113.9	111	115.3	114.5	118.4	**117**
4/27/2013	103.3	112.4	114.9	113	112.8	118.8	**118.9**	115.2	112.7	115	111.6	114.5	111.4	115.6	113.5	118.3	**115.8**
4/28/2013	103.8	112.6	114.2	113.2	113.2	118	**117.4**	114.3	110.9	114.3	111.2	114.5	111.1	115.7	112.2	117	113.8

Generated: Mon Apr 29 11:25:00 2013

Number of hours of data used:

OR: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Red text denotes exceedances.

• indicates no data due to malfunctioning gauge

- indicates gauge is out of service for winter

Dates run from hour 1 to 24 (not 0 to 23).

The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st. At all other times, the gas cap is 110%.

Figure 30

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal

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Attorneys for Federal Defendants

UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

PORTLAND DIVISION

NATIONAL WILDLIFE FEDERATION, et al.,

Plaintiffs,

v.

NATIONAL MARINE FISHERIES SERVICE, et al.,

Defendants,

Case No.: 3:01-CV-00640-SI

NOTICE OF FEDERAL DEFENDANTS' SECOND 2013 SPILL IMPLEMENTATION REPORT

In accordance with the Court's August 2, 2011 Opinion and Order (ECF No. 1855) and Federal Defendants' Notice Re: 2013 Spill Operations at 7 (ECF No. 1905) (filed Mar. 28, 2013), Federal Defendants submit their second 2013 spill implementation status report. *See* Exhibit 1. This status report includes, among other things: the hourly flow through the powerhouse at each dam; the hourly flow over the spillway compared to the target spill for that hour; and the resultant 12-hour average total dissolved gas ("TDG") for the tailwater at each project and for the next project's forebay downstream. The report also provides written explanations of variances that occurred during the reporting period.

Dated this 17th day of June, 2013.

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Attorneys for Federal Defendants

CERTIFICATE OF SERVICE

I certify that on June 17, 2013, the foregoing will be electronically filed with the Court's electronic filing system, which will generate automatic service upon on all Parties enrolled to receive such notice. The following will be manually served by overnight mail:

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FISH OPERATIONS PLAN IMPLEMENTATION REPORT
May 2013

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

The U.S. Army Corps of Engineers (Corps) is submitting this report in accordance with the 2013 Fish Operations Plan (2013 FOP) submitted to the U.S. District Court of Oregon on March 28, 2013. The 2013 FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the fish migration season, generally April through August. To the extent Corps project operations are not specified in the 2013 FOP, the FCRPS operations will be consistent with the 2010 NOAA Fisheries Supplemental Biological Opinion (2010 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2013 Water Management Plan (WMP), WMP seasonal updates, and the 2013 Fish Passage Plan (FPP).

The Corps' May 2013 lower Snake and Columbia River project and fish passage operations are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant high 12-hour average percent Total Dissolved Gas (%TDG) levels in the tailrace at each project and in the subsequent downstream project's forebay and the Camas-Washougal gauge below Bonneville Dam.

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2013 FOP in May.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[1] in May displaying the performance of the spill program as follows:

(A) Daily Average of the High 12 Hourly %TDG Values - described in the upper graph.
(B) Hourly Spill and Generation Flows - described in the lower graph.

[1] Operations are implemented from Monday through Sunday.

The weekly graphs begin on April 29 and end on June 2 for the following lower Snake River and lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.
Each figure represents one week of a project's operation. The graphs start at 0000 hours (%TDG graphs) and 0100 hours (flow/spill graphs) on April 29 for the lower Snake River and the lower Columbia River projects.

April 29 – May 5	Figures 1 – 8
May 6 – May 12	Figures 9 – 16
May 13 – May 19	Figures 17 – 24
May 20 – May 26	Figures 25 – 32
May 27 – June 2	Figures 33 – 40

A. Upper Graph: Shows the resultant daily average %TDG for the 12 highest hours. This is primarily a result of spill at dams. The objective is to operate each project up to the TDG limits without exceeding those limits to the extent practicable.

1. The blue line represents the %TDG in the tailrace of the dam. 120 percent TDG is the upper operating limit.
2. The green line represents the %TDG in the forebay of the next dam downstream. 115 percent TDG is the upper operating limit.

B. Lower Graph: Shows the hourly flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The medium green line represents the average hourly total river flow through the project in kcfs.
- The heavy pink line represents the average hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2013 FOP.
- The heavy black line represents the target spill. This is the hourly maximum spill level. The hourly target spill may vary as a function of total river flow, forebay elevation and generator capacity, subject to the following conditions:

    - spill percentage or flow rate specified in the 2013 FOP;
    - spill caps as set daily for TDG management;
    - test spill levels for fish passage research;
    - minimum generation for power system needs;
    - minimum spill at Bonneville (50 kcfs) dam;
    - minimum spill at John Day is 25 percent of project outflow.

II. A table is included at the end of the figures that lists the average daily %TDG for the 12 highest hours for all projects. The numbers in red indicate the project exceeded the %TDG gas cap - 115 percent (forebay of the next downstream dam) or 120 percent (tailwater) for each project.

General Implementation Remarks:

For all projects that spill for fish passage, the target spill may be reduced due to various conditions as described below. When spill levels briefly deviate below or above the level specified in the 2013 FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual operation deviations from the target operation during voluntary spill hours are described below. The May 2013 Spill Variance Table includes average hourly data; therefore, while spill may vary from target spill for only a portion of an hour, the May 2013 Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly spill levels are not achievable due to mechanical limitations in setting spill gates to implement the regionally coordinated spill pattern. The project operator sets the spill gate stops to most closely approximate the 2013 FOP level of spill while also avoiding exceeding the %TDG spill cap to the extent practicable.

"Low flow" operations at the lower Columbia and Snake projects are triggered when inflow is insufficient to provide both minimum generation and the specified spill levels. In these situations, the projects operate at minimum generation and pass the remainder of project inflow as spill and through other miscellaneous routes, such as fish ladders, sluiceways, and navigation locks. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain.

The combination of these factors may result in instances when unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation, MOP elevation, and the target spill may not be possible throughout every hour. During low flow periods at Little Goose Dam, the overall project spill percentage appears to be reduced because the calculations do not account for the volume of water released during navigational lockages; however, the actual spill volume remains constant. When these variances occur, they are recorded in the monthly Spill Variance Table for Little Goose under the variance type "Navigation."

Actual spill levels at Corps projects with set flow targets may vary up to ±2 kcfs (Bonneville Dam may range up to ±3 kcfs, 2013 FOP p. 18) compared to those specified in the 2013 FOP and the RCC spill priority list (defines the projects' %TDG spill caps). A number of factors influence actual spill, including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (e.g. a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The 2013 FOP describes project "Operations during Rapid Load Changes" (p. 6). For reporting purposes, the notation "Transmission Stability" in the Spill Variance Report Table replaces "Rapid Load Changes," and identifies instances when hourly spill levels were not met as a result of load swing hours and other related within-hour load variability issues. "Transmission Stability" occurs because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Corporation (NERC) reserve requirements ("on response"). In addition to within-hour load variability, projects on response must be responsive

to within hour changes resulting from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while spill quantity remains the same within the hour. Under normal conditions, within-hour load changes primarily occur immediately preceding and following the peak load hours; however, within-hour changes in intermittent generation can occur at any hour of the day. Occasionally, several hours after peak load hours, the project may be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. Due to the high variability of within-hour load, reporting actual spill percentages that vary by more than the ±1 percent requirement (or other ranges specified in the 2013 FOP) may occur with greater frequency with "Transmission Stability" hours than other hours.

Occurrences requiring an adjustment in operations and/or regional coordination are described in greater detail in the "Operational Adjustments" section below.

May Operations:

The month of May was characterized by below average flows for the lower Snake River and above average flows for the lower Columbia River. The NOAA Northwest River Forecast Center's Runoff Processor indicated that the May adjusted volume runoff on the Lower Snake was below the 30 year average (1981-2010): 5.8 MAF or 85 percent of average as measured at Lower Granite Dam. The Runoff Processor also indicated that the May 2013 adjusted volume runoff on the Lower Columbia was above the 30 year average (1981-2010): 28.1 MAF (million acre feet) or 111 percent of average as measured at The Dalles. The monthly precipitation summary for May was significantly below average at 55 percent on the Snake River above Ice Harbor Dam and below average on the Columbia River above The Dalles Dam at 82 percent.

I. During the May reporting period, the planned 2013 FOP spill operations were carried out as follows:

- Lower Granite Dam - The hourly target spill level was 20 kcfs 24-hours/day.
- Little Goose Dam - The hourly target spill level was 30 percent of total river flow 24-hours/day.
- Lower Monumental Dam - The hourly target spill level was the %TDG gas cap 24 hours/day.
- Ice Harbor Dam - The hourly target spill level alternated every two days between 30 percent of total river flow rate for 24-hours/day vs. 45 kcfs daytime and the %TDG gas cap nighttime. Nighttime spill hours are 1800-0500.
- McNary Dam - The hourly target spill level was 40 percent of total river flow for 24-hours/day.
- John Day Dam - The hourly target spill level alternated between 40 percent and 30 percent of total river flow for 24-hours/day due to the two-day treatment spring spill test. Spill level changes occurred at 2000 hours.
- The Dalles Dam - The hourly target spill level was 40 percent of total river flow for 24-hours/day.
- Bonneville Dam - The hourly target spill level was 100 kcfs 24 hours/day.

Operational Adjustments

Lower Monumental Dam:

On June 1, Battelle staff (contractors for performance standard studies) collected 118 subyearling Chinook salmon with the help of Corps personnel and Smolt Monitoring Program staff (Washington Department of Fish and Wildlife) in the juvenile fish collection facility at Lower Monumental Dam. This was the first day of fish collection for use in the 2013 summer performance standard evaluations being performed at Little Goose and Lower Monumental dams. Later that day, a Corps technician noticed there was not a screen on the holding tank drain and fish were passing from the circular tank into a storm drain. Battelle personnel were notified of the issue and immediately returned to the dam and placed a screen over the drain pipe. A total of five confirmed fish mortalities were collected at the site around the storm drain grate. Other fish were observed in the end of the tank drain hose near the grate. In addition to the five confirmed mortalities, sixty fish were unaccounted for. The drain from the grate area passes under an access road and the drain outfall discharges a substantial amount of water (it is the common drain for four circular tanks and four 20-foot long troughs) at the edge of the river near the transport fish barge loading area. The storm drain outfall is within a few feet of the water's edge. Some of the fish may have survived passing through the drain and into the river, but all unaccounted fish were assumed to have died because the crew was unable to determine the fate of these fish. A total of 65 (43 adipose fin clipped and 22 unclipped) subyearling Chinook salmon were missing from the tank following the incident. After the incident occurred, holding tank drains were screened to prevent similar fish mortalities from occurring in the future. In addition, Battelle's fish collection protocol has been modified to include a check to ensure that tank screens are in place prior to fish collection. All Battelle staff involved in fish collection and operation of the tanks were briefed on the incident and the remedial actions. Notification and coordination with FPOM occurred via email on June 3.

May 2013 Spill Variance Table

Table 1: May 2013 (4/29 - 6/2) - FOP Implementation Report Table

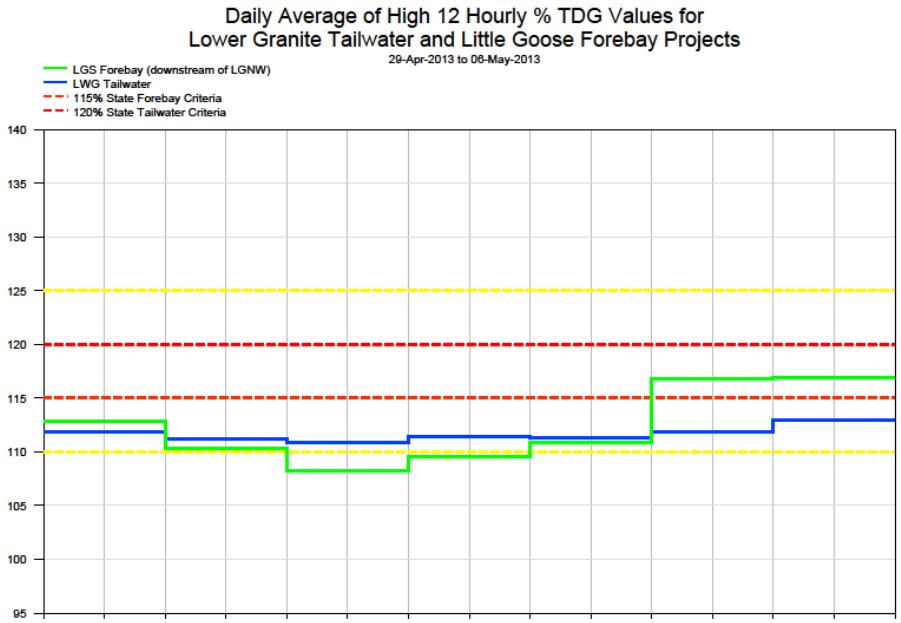
Project	Parameter	Date	Time[2]	Hours	Type	Reason
Little Goose	Additional Spill	5/6/13	1500	1	Transmission Stability	Hourly spill increased to 36.3% (above 30.0% ± 1% range) due to a unexpected powerhouse outage. 24 hr avg. spill was 30.3%.
Little Goose	Additional Spill	5/9/13	0800	1	Transmission Stability	Hourly spill increased to 37.2% (above 30.0% ± 1% range) due to unexpected unit outage, spilled excess outflow. 24 hr avg. spill was 30.3%.
Lower Monumental	Reduced Spill	5/8/13	1800 - 2000	3	Navigation	Hourly spill decreased to17.7 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/9/13	1900	1	Navigation	Hourly spill decreased to 14.5 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/10/13	1900 - 2000	2	Navigation	Hourly spill decreased to 16.4 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/11/13– 5/12/13	2300-0100	3	Navigation	Hourly spill decreased to 18.3-20.0 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/13/13	0400-0500	2	Navigation	Hourly spill decreased to 9.7 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/14/13	1800-1900	2	Navigation	Hourly spill decreased to 13.9 kcfs (below 22 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/16/13	1800 - 2000	3	Navigation	Hourly spill decreased to 8.7 kcfs (below 22 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/17/13	1800	1	Navigation	Hourly spill decreased to 11.0 kcfs (below 22 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/18/13	1800	1	Navigation	Hourly spill decreased to 12.9 kcfs (below 22 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/19/13	1800-1900	2	Navigation	Hourly spill decreased to 15.9 kcfs (below 23 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/20/13	1700-1800	2	Navigation	Hourly spill decreased to 12.7 kcfs (below 23 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/21/13	1800	1	Navigation	Hourly spill decreased to 14.6 kcfs (below 23 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/22/13	2000-2100	2	Navigation	Hourly spill decreased to 17.1 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/23/13	1700-1800	2	Navigation	Hourly spill decreased to 22.1 kcfs (below 29 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower	Reduced	5/24/13	1800-1900	2	Navigation	Hourly spill decreased to 15.3 kcfs (below 29

[2] Note: Data collected for reporting spill variances is reported using hourly-averaged data. Therefore, while spill may be increased or decreased for only a portion of an hour, it is represented in the Spill Variance Table as an hour.

Monumental	Spill					kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/25/13	1700-1800	2	Navigation	Hourly spill decreased to 16.7 kcfs (below 29 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/26/13	1800-1900	2	Navigation	Hourly spill decreased to 19.9 kcfs (below 29 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/27/13	1700-1800	2	Navigation	Hourly spill decreased to 25.7 kcfs (below 30 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/28/13	1700-1800	2	Navigation	Hourly spill decreased to 18.8 kcfs (below 29 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/29/13	1800-1900	2	Navigation	Hourly spill decreased to 21.3 kcfs (below 29 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/30/13	1900-2000	2	Navigation	Hourly spill decreased to 18.2 kcfs (below 29 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/31/13	1900	1	Navigation	Hourly spill decreased to 26.4 kcfs (below 29 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/1/13	1800-1900	2	Navigation	Hourly spill decreased to 17.3 kcfs (below 29 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/2/13	1800	1	Navigation	Hourly spill decreased to 14.8 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Ice Harbor	Additional Spill	5/21/13	1600	1	Human/Program Error	Hourly spill increased to 35.6% (above 30.0% ± 1% range). Project operator entered erroneous data into GDAC program. 24 hr avg. spill was 30.3%.
McNary	Additional Spill	5/30/13	1700	1	Transmission Stability	Hourly spill increased to 46.2% (above 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 40.4%.
John Day	Additional Spill	5/12/13	0200	1	Transmission Stability	Hourly spill increased to 42.8% (above 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 39.9%.
John Day	Reduced Spill	5/12/13	0800	1	Transmission Stability	Hourly spill decreased to 38.2% (below 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 39.9%.
John Day	Reduced Spill	5/13/13	0700	1	Transmission Stability	Hourly spill decreased to 38.7% (below 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 41.7%.
John Day	Reduced Spill	5/13/13	1200	1	Transmission Stability	Hourly spill decreased to 38.8% (below 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 41.7%.
John Day	Reduced	5/13/13	1400	1	Transmission	Hourly spill decreased to 38.9% (below

	Spill				Stability	40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 41.7%.
John Day	Reduced Spill	5/22/13	1500	1	Transmission Stability	Hourly spill decreased to 28.5% (below 30.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 33.1%.
John Day	Additional Spill	5/22/13	1600	1	Transmission Stability	Hourly spill increased to 31.4% (above 30.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 33.1%.
John Day	Reduced Spill	5/22/13	1800	1	Transmission Stability	Hourly spill decreased to 28.9% (below 30.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 33.1%.
John Day	Reduced Spill	5/30/13	1700	1	Transmission Stability	Hourly spill decreased to 27.5% (below 30.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. . 24 hr avg. spill was 29.9%.
The Dalles	Reduced Spill	5/10/13	0800; 0900; 1100; and 1200	4	Operational Limitations	Hourly spill decreased to 102.7 and 102.9 kcfs (below 105 kcfs spill cap). Spill volume fluctuated due to physical limits of spill gate settings. See p. 3 of FOP.
The Dalles	Additional Spill	5/20/13	0700	1	Maintenance	Hourly spill increased to 42.8% (above 40.0% ± 1% range) due to project switching units off and on for maintenance. 24 hr avg. spill on May 10 was 39.8%.
The Dalles	Reduced Spill	5/22/13	1800	1	Transmission Stability	Hourly spill decreased to 38.2% (below 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 39.8%.
The Dalles	Reduced Spill	5/23/13	1800	1	Transmission Stability	Hourly spill decreased to 38.8% (below 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 40.0%.
The Dalles	Additional Spill	5/30/13	1700	1	Transmission Stability	Hourly spill increased to 43.7% (below 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 40.0%.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
29-Apr-2013 to 06-May-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

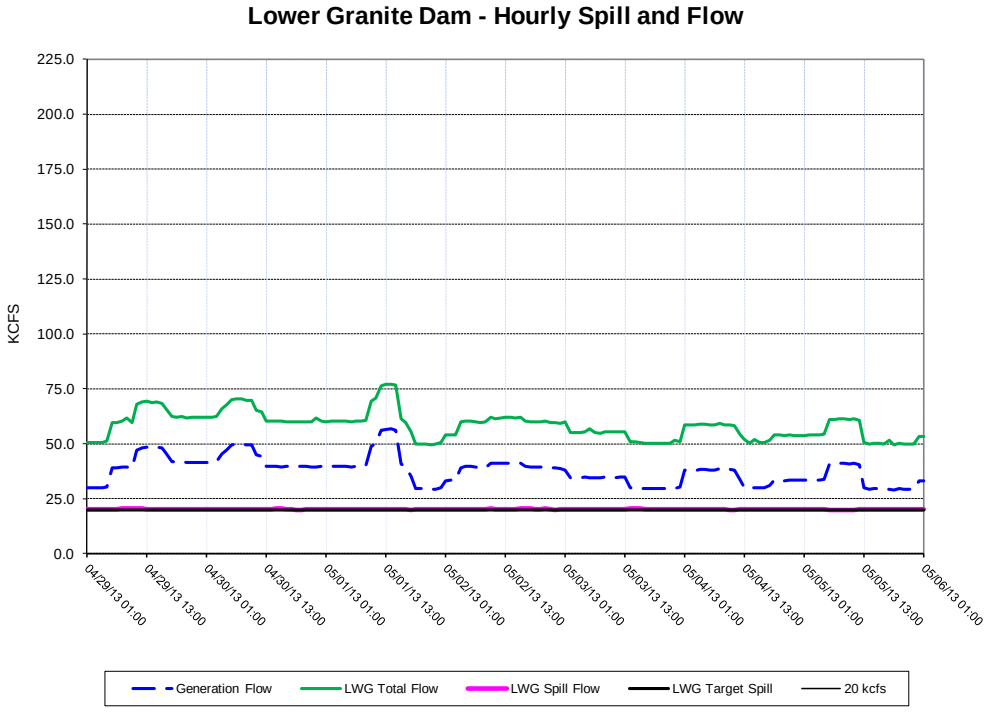
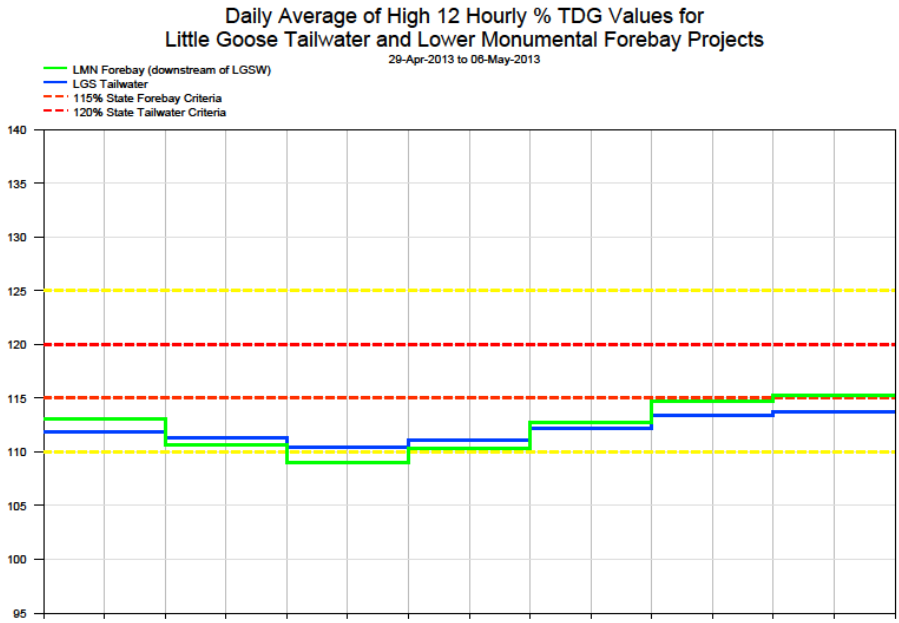

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/29/13 01:00
04/29/13 13:00
04/30/13 01:00
04/30/13 13:00
05/01/13 01:00
05/01/13 13:00
05/02/13 01:00
05/02/13 13:00
05/03/13 01:00
05/03/13 13:00
05/04/13 01:00
05/04/13 13:00
05/05/13 01:00
05/05/13 13:00
05/06/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 2


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
29-Apr-2013 to 06-May-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

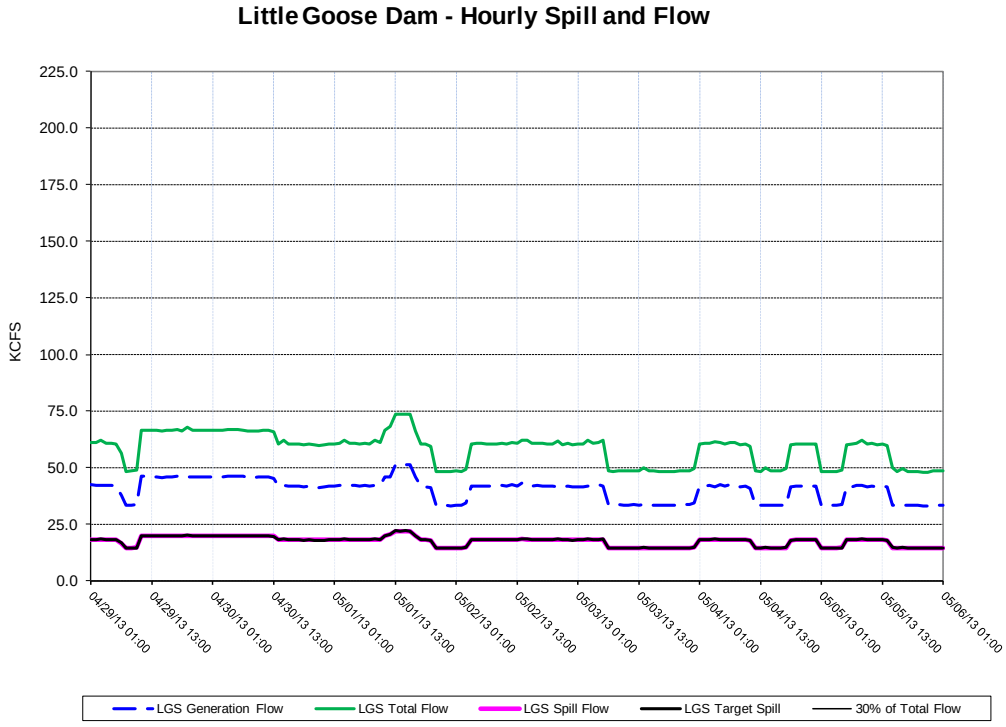
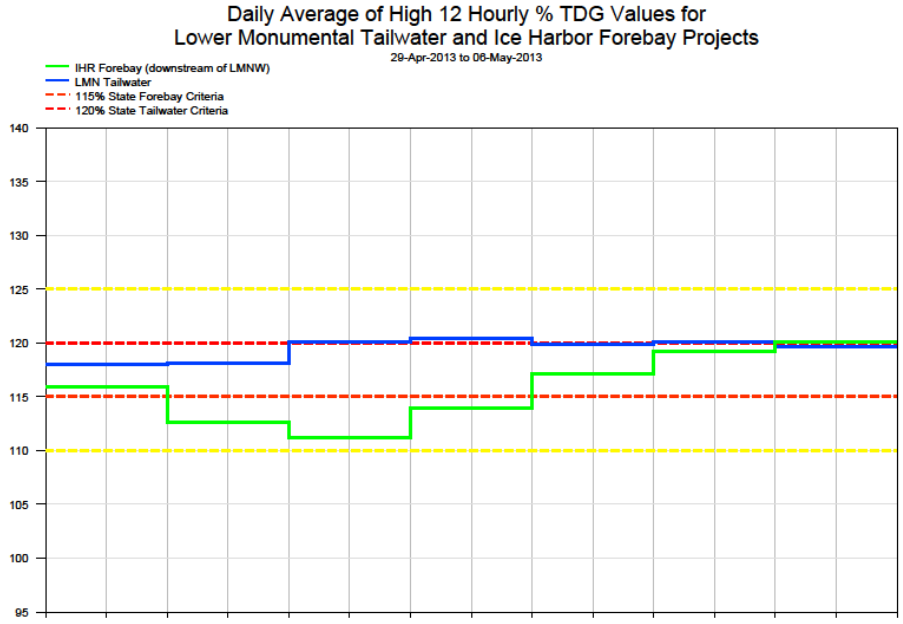

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/29/13 01:00
04/29/13 13:00
04/30/13 01:00
04/30/13 13:00
05/01/13 01:00
05/01/13 13:00
05/02/13 01:00
05/02/13 13:00
05/03/13 01:00
05/03/13 13:00
05/04/13 01:00
05/04/13 13:00
05/05/13 01:00
05/05/13 13:00
05/06/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
29-Apr-2013 to 06-May-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

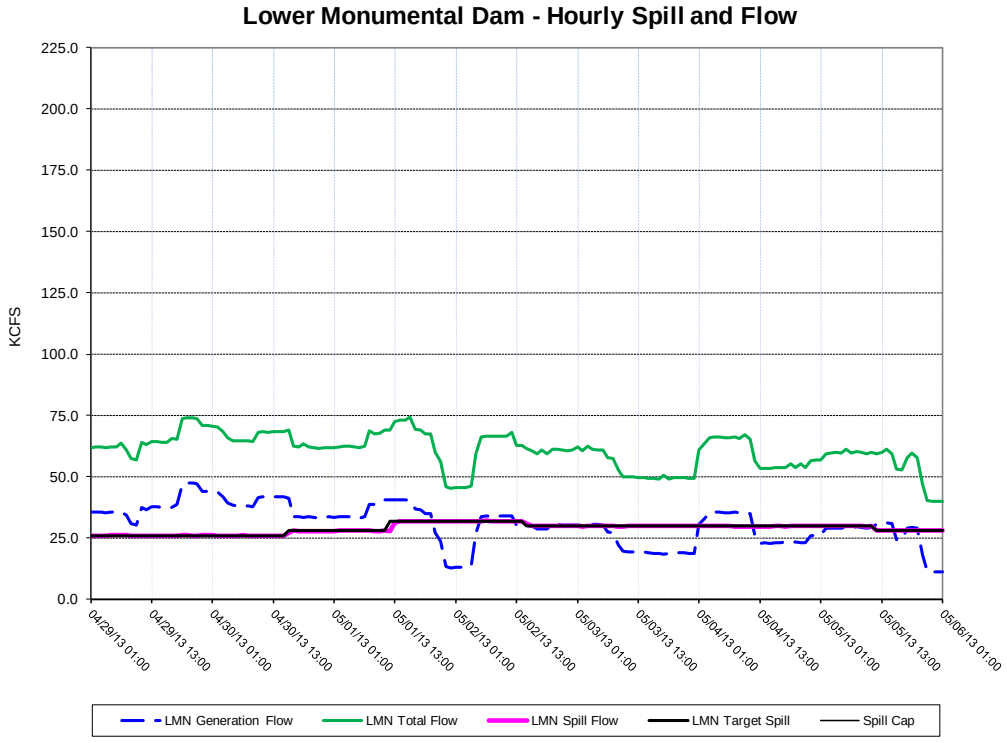
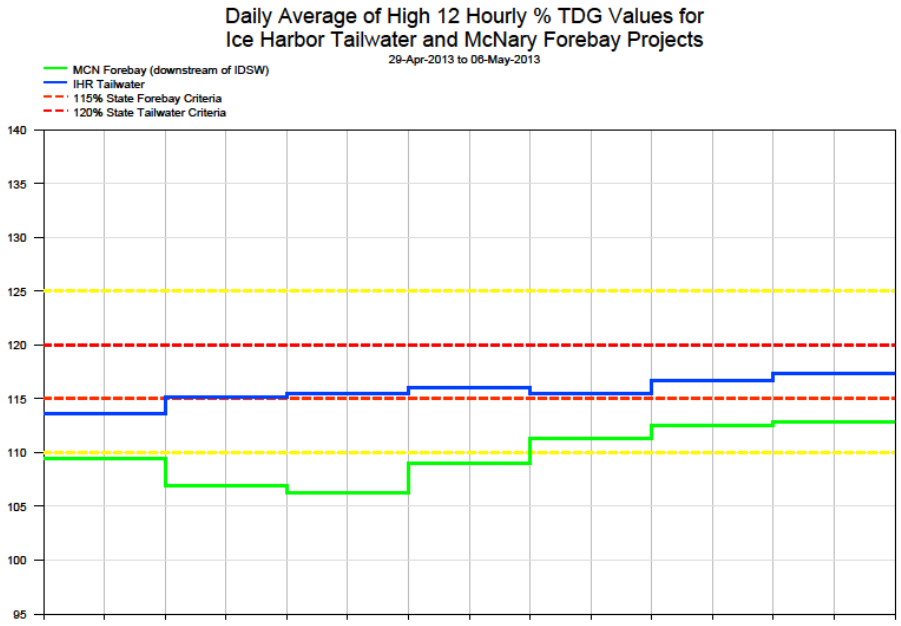

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/29/13 01:00
04/29/13 13:00
04/30/13 01:00
04/30/13 13:00
05/01/13 01:00
05/01/13 13:00
05/02/13 01:00
05/02/13 13:00
05/03/13 01:00
05/03/13 13:00
05/04/13 01:00
05/04/13 13:00
05/05/13 01:00
05/05/13 13:00
05/06/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
29-Apr-2013 to 06-May-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

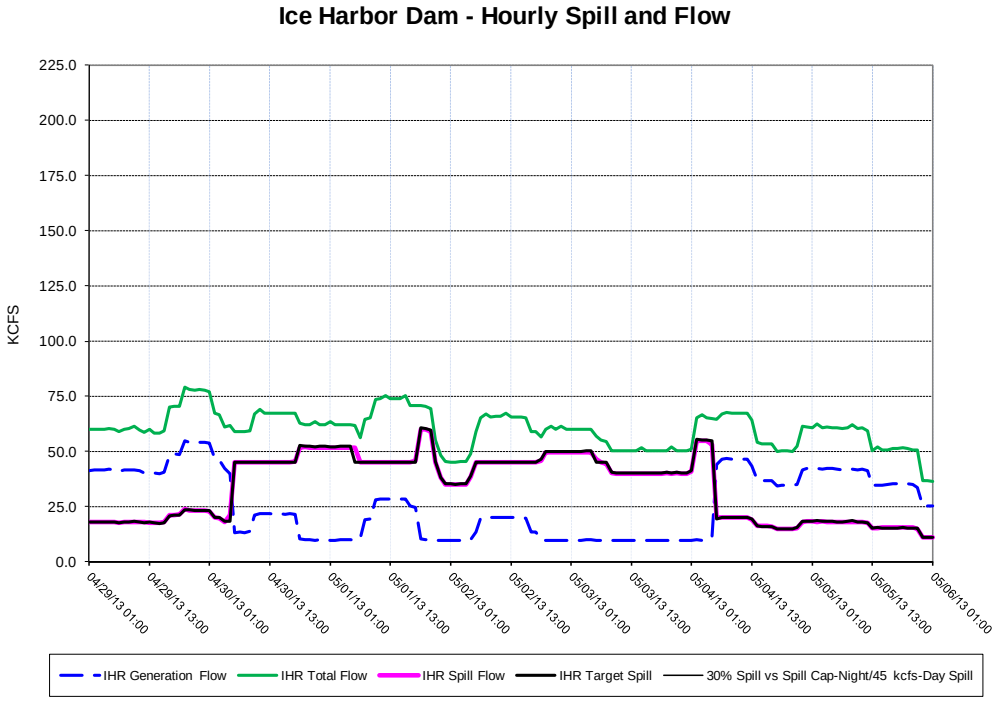
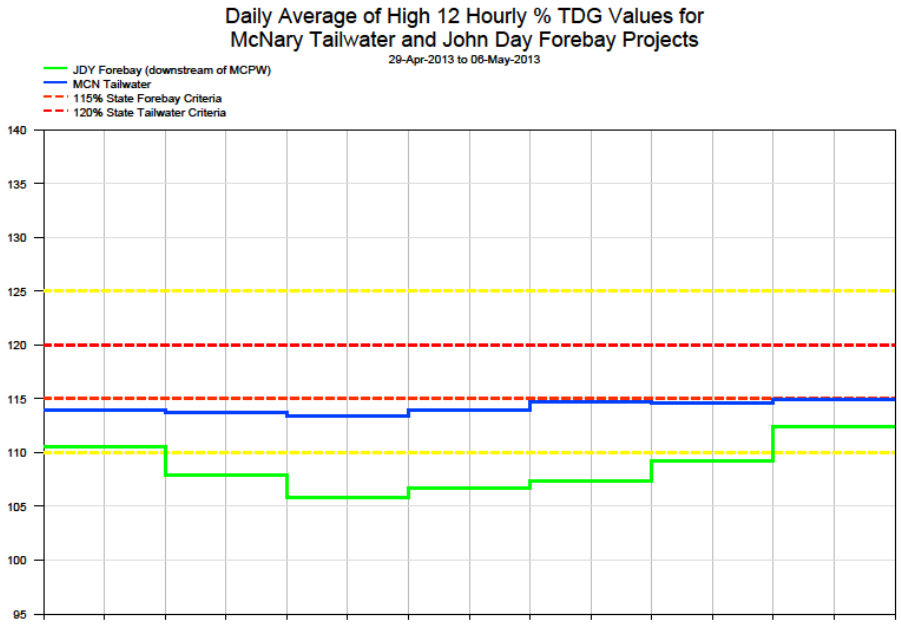

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/29/13 01:00
04/29/13 13:00
04/30/13 01:00
04/30/13 13:00
05/01/13 01:00
05/01/13 13:00
05/02/13 01:00
05/02/13 13:00
05/03/13 01:00
05/03/13 13:00
05/04/13 01:00
05/04/13 13:00
05/05/13 01:00
05/05/13 13:00
05/06/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 5


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
29-Apr-2013 to 06-May-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

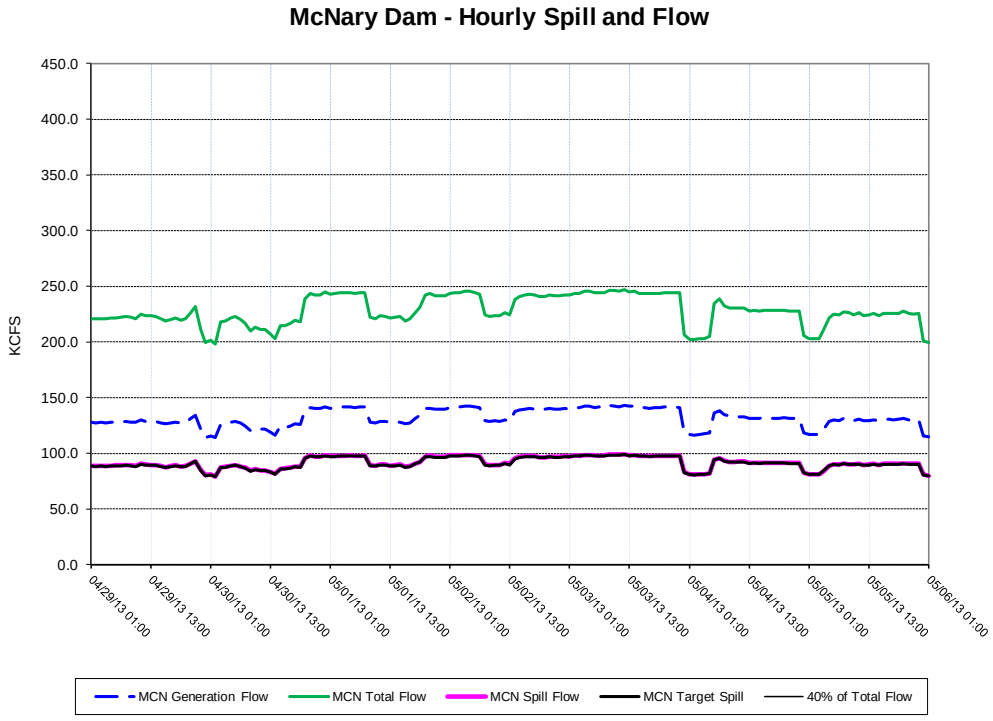
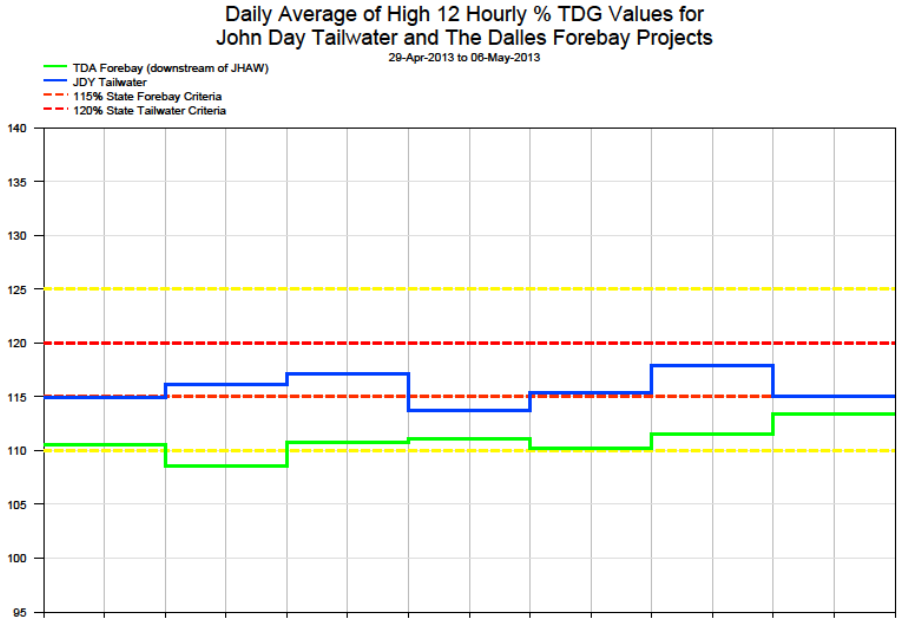

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/29/13 01:00
04/29/13 13:00
04/30/13 01:00
04/30/13 13:00
05/01/13 01:00
05/01/13 13:00
05/02/13 01:00
05/02/13 13:00
05/03/13 01:00
05/03/13 13:00
05/04/13 01:00
05/04/13 13:00
05/05/13 01:00
05/05/13 13:00
05/06/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 6


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
29-Apr-2013 to 06-May-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

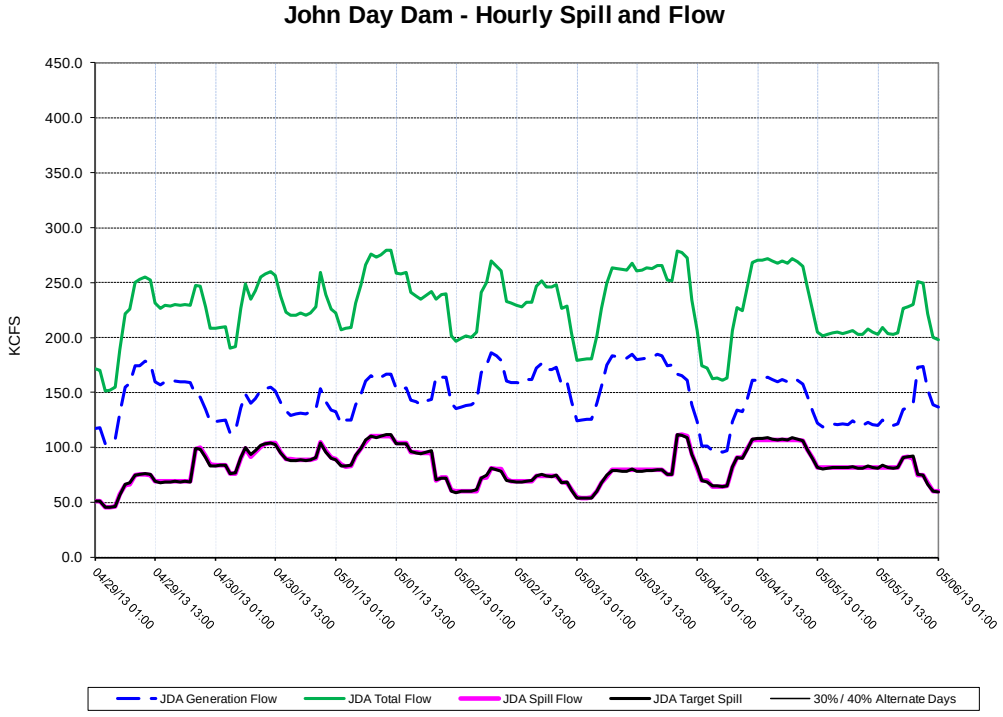
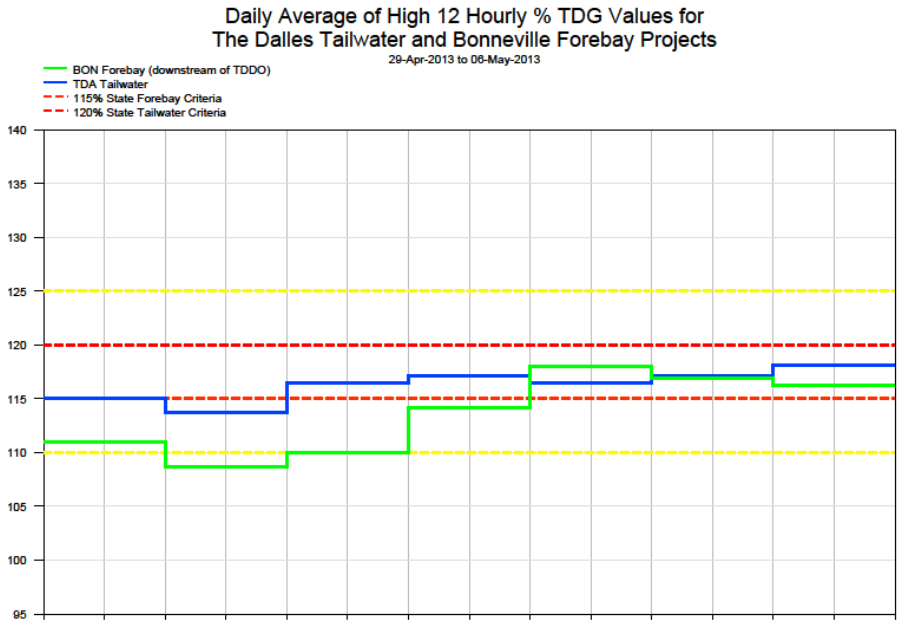

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/29/13 01:00
04/29/13 13:00
04/30/13 01:00
04/30/13 13:00
05/01/13 01:00
05/01/13 13:00
05/02/13 01:00
05/02/13 13:00
05/03/13 01:00
05/03/13 13:00
05/04/13 01:00
05/04/13 13:00
05/05/13 01:00
05/05/13 13:00
05/06/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 7


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
29-Apr-2013 to 06-May-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

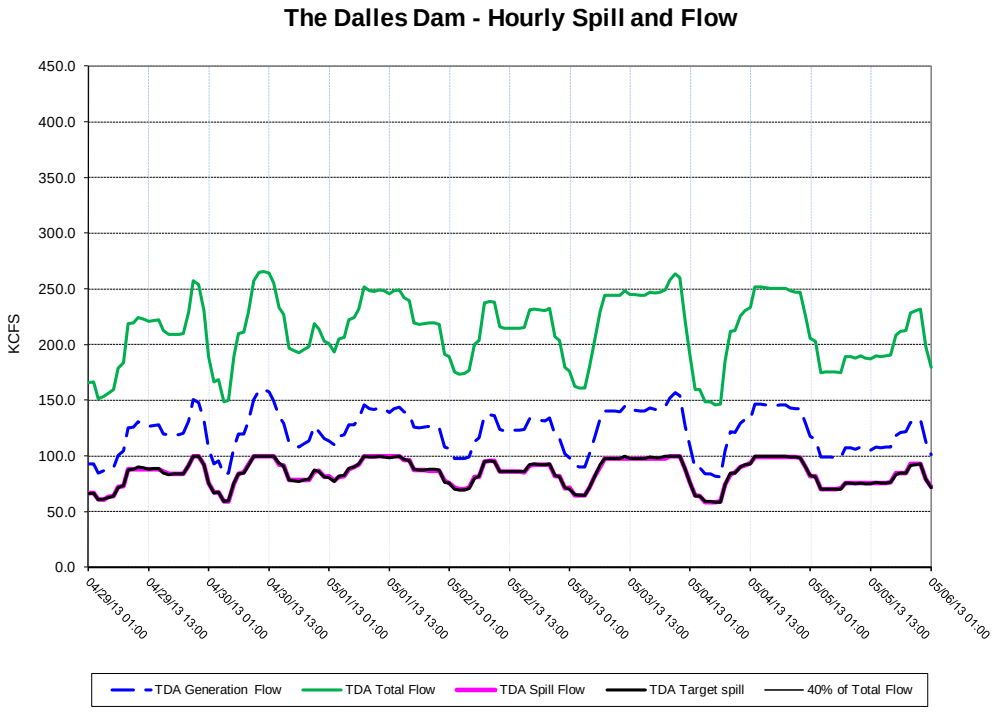
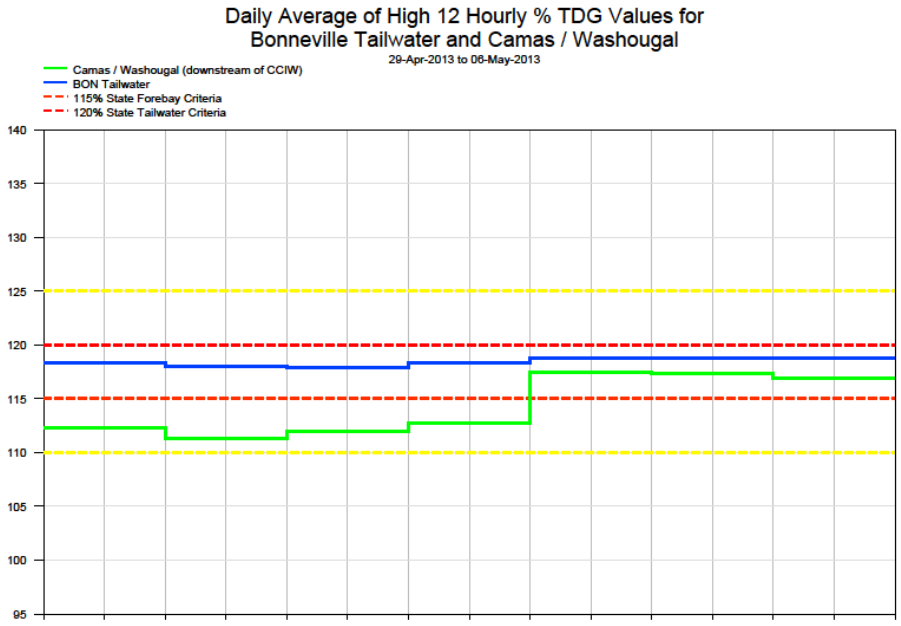

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/29/13 01:00
04/29/13 13:00
04/30/13 01:00
04/30/13 13:00
05/01/13 01:00
05/01/13 13:00
05/02/13 01:00
05/02/13 13:00
05/03/13 01:00
05/03/13 13:00
05/04/13 01:00
05/04/13 13:00
05/05/13 01:00
05/05/13 13:00
05/06/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
29-Apr-2013 to 06-May-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

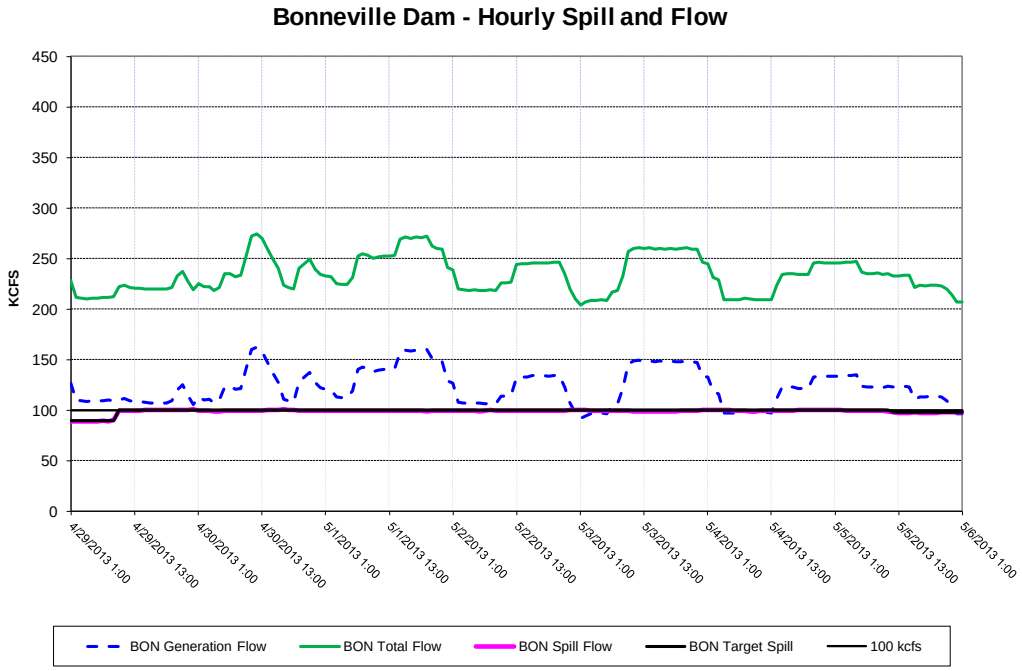
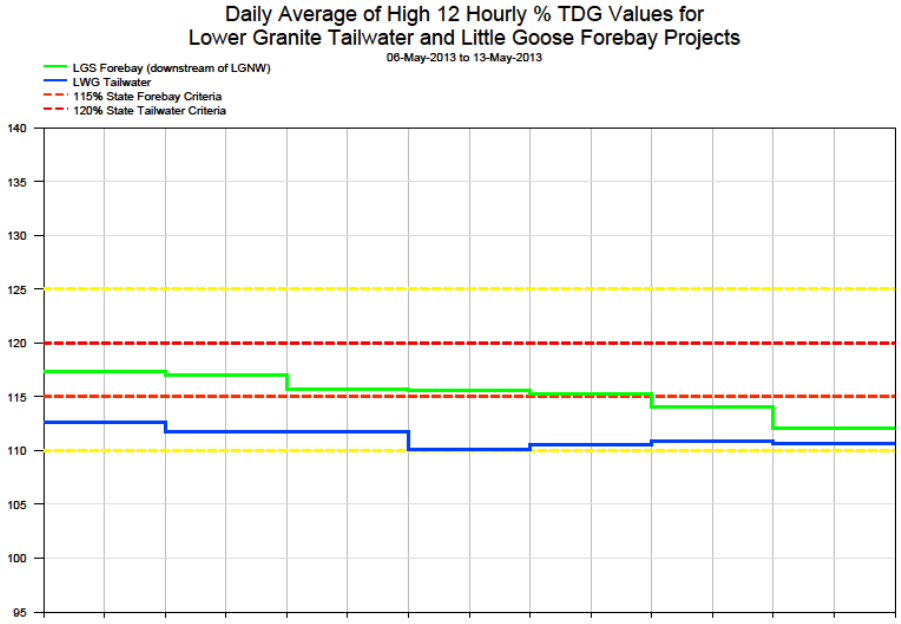

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
4/29/2013 1:00
4/29/2013 13:00
4/30/2013 1:00
4/30/2013 13:00
5/1/2013 1:00
5/1/2013 13:00
5/2/2013 1:00
5/2/2013 13:00
5/3/2013 1:00
5/3/2013 13:00
5/4/2013 1:00
5/4/2013 13:00
5/5/2013 1:00
5/5/2013 13:00
5/6/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 9


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
06-May-2013 to 13-May-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

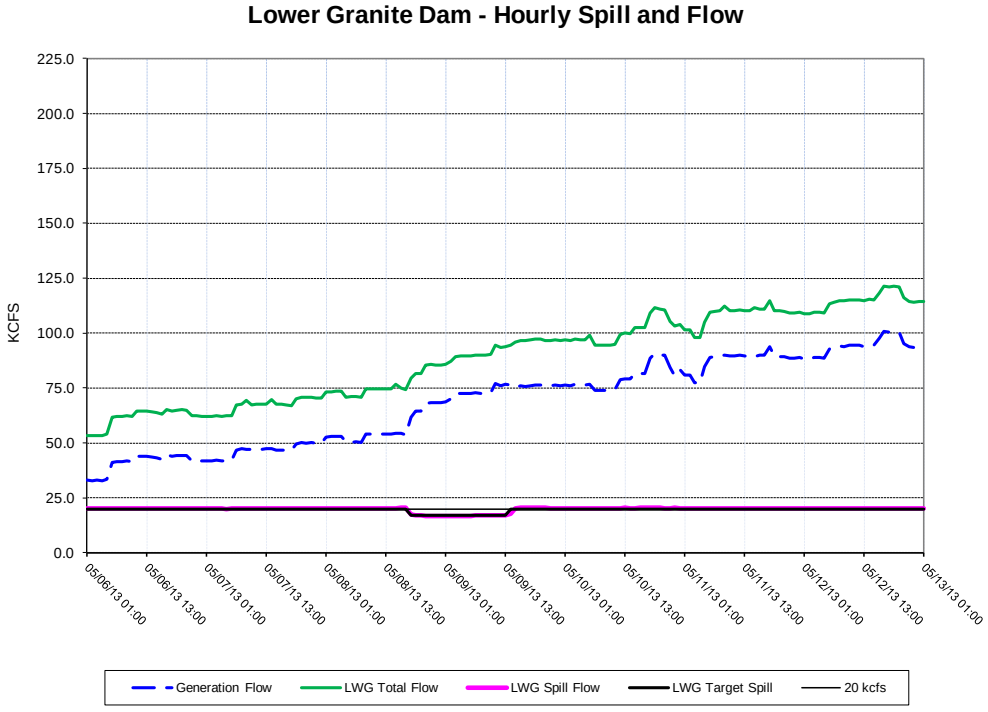
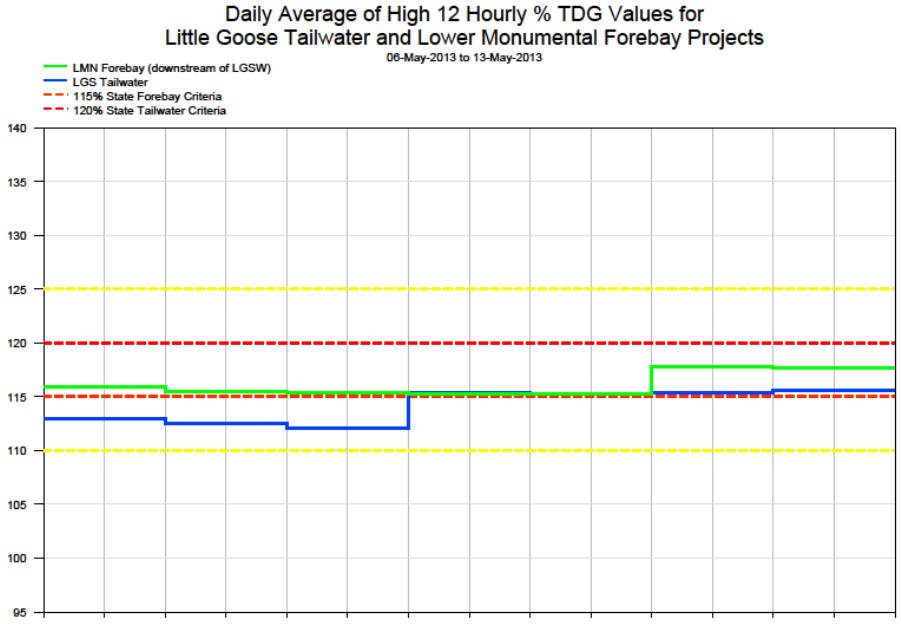

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/06/13 01:00
05/06/13 13:00
05/07/13 01:00
05/07/13 13:00
05/08/13 01:00
05/08/13 13:00
05/09/13 01:00
05/09/13 13:00
05/10/13 01:00
05/10/13 13:00
05/11/13 01:00
05/11/13 13:00
05/12/13 01:00
05/12/13 13:00
05/13/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 10


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
06-May-2013 to 13-May-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

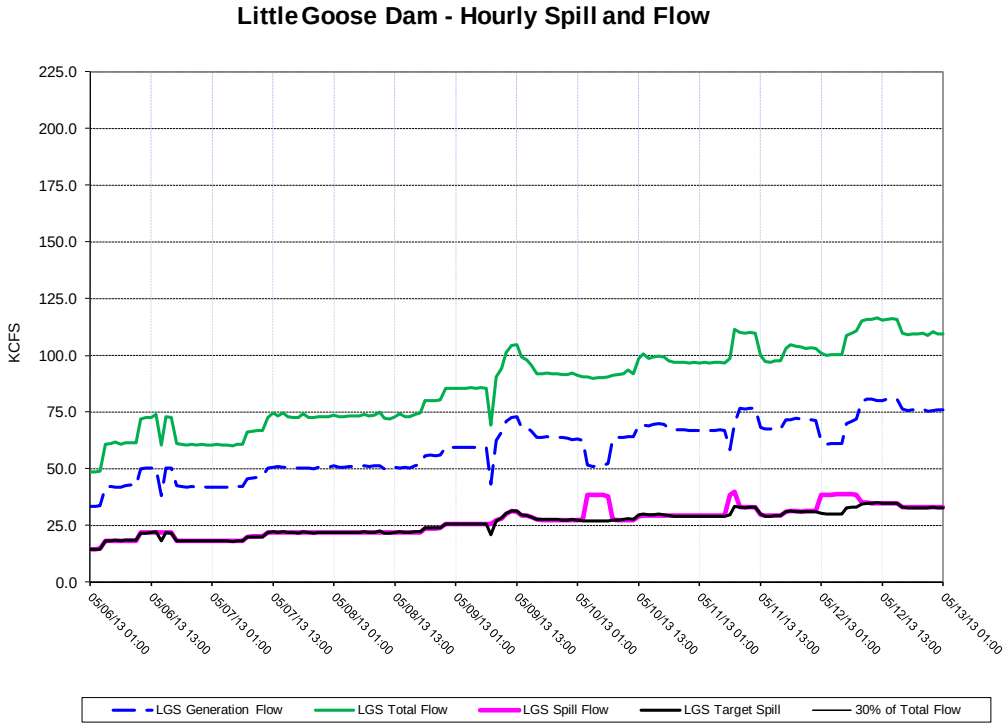
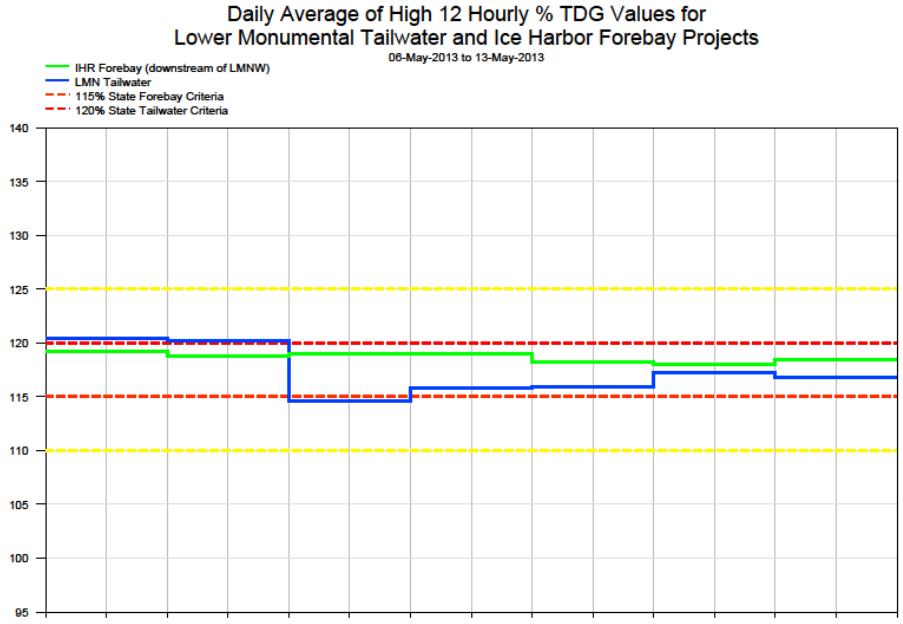

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/06/13 01:00
05/06/13 13:00
05/07/13 01:00
05/07/13 13:00
05/08/13 01:00
05/08/13 13:00
05/09/13 01:00
05/09/13 13:00
05/10/13 01:00
05/10/13 13:00
05/11/13 01:00
05/11/13 13:00
05/12/13 01:00
05/12/13 13:00
05/13/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 11


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
06-May-2013 to 13-May-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

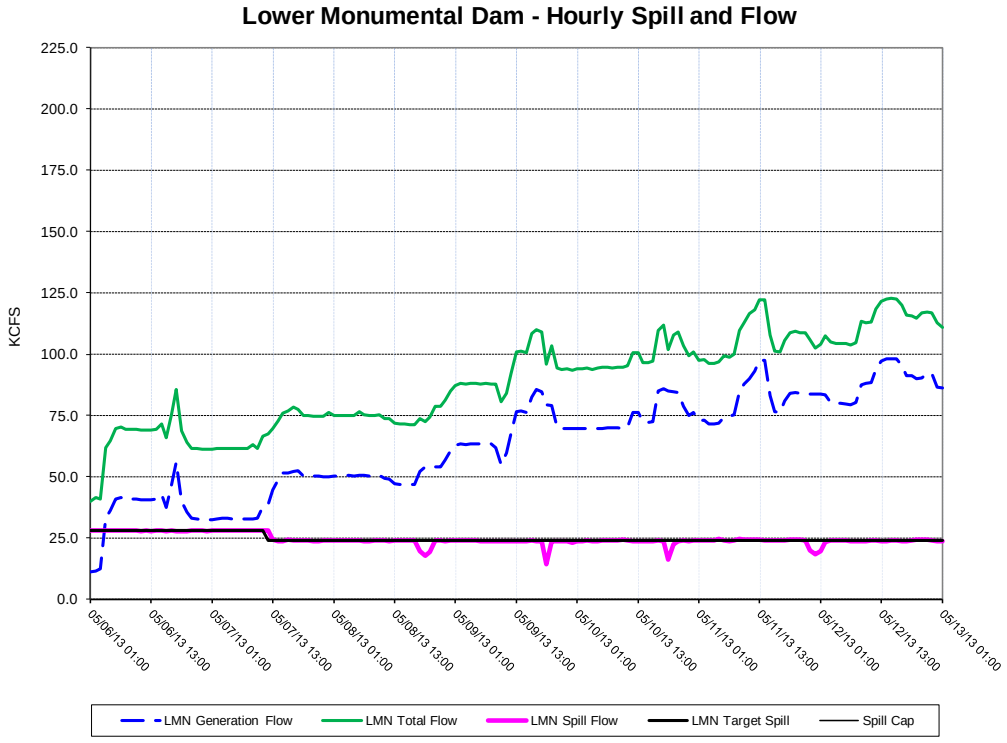
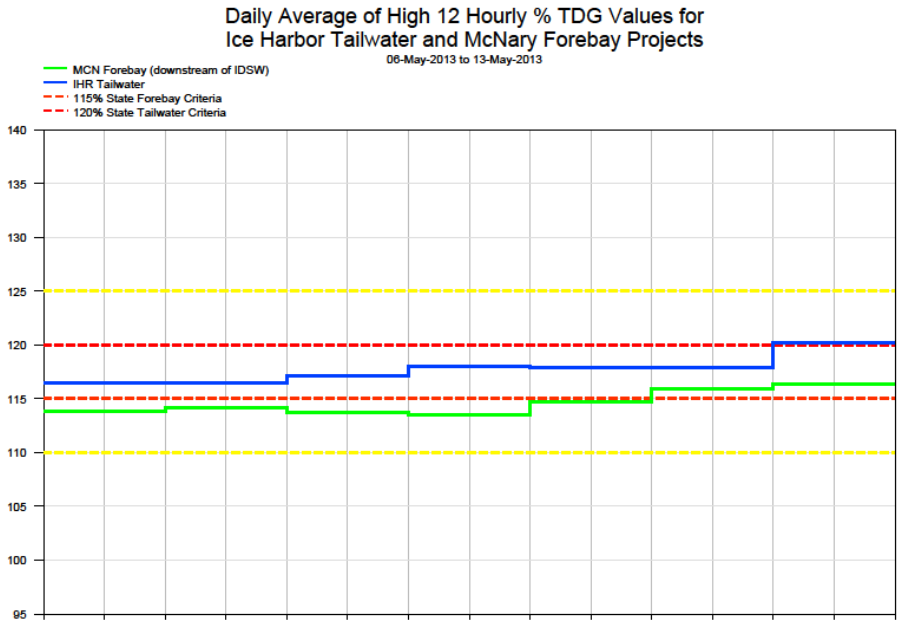

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/06/13 01:00
05/06/13 13:00
05/07/13 01:00
05/07/13 13:00
05/08/13 01:00
05/08/13 13:00
05/09/13 01:00
05/09/13 13:00
05/10/13 01:00
05/10/13 13:00
05/11/13 01:00
05/11/13 13:00
05/12/13 01:00
05/12/13 13:00
05/13/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 12


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
06-May-2013 to 13-May-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

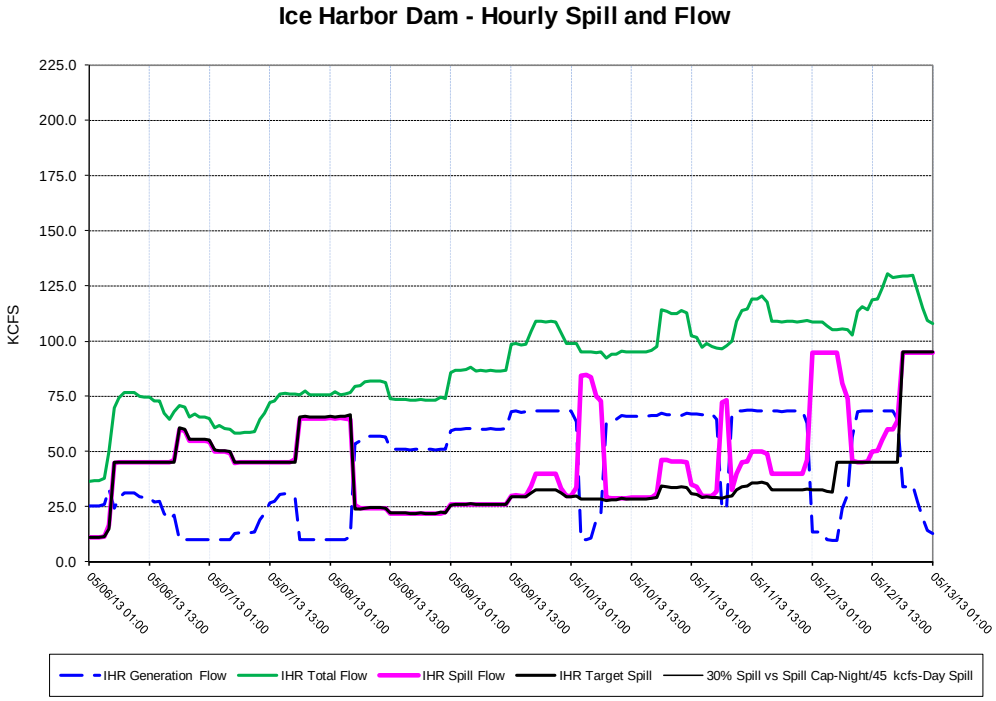
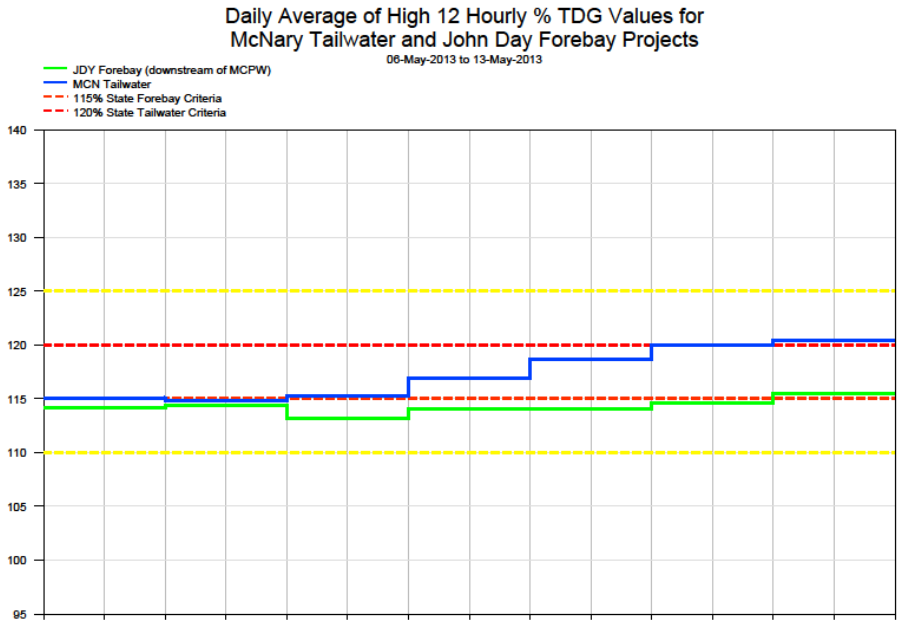

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/06/13 01:00
05/06/13 13:00
05/07/13 01:00
05/07/13 13:00
05/08/13 01:00
05/08/13 13:00
05/09/13 01:00
05/09/13 13:00
05/10/13 01:00
05/10/13 13:00
05/11/13 01:00
05/11/13 13:00
05/12/13 01:00
05/12/13 13:00
05/13/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 13


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
06-May-2013 to 13-May-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

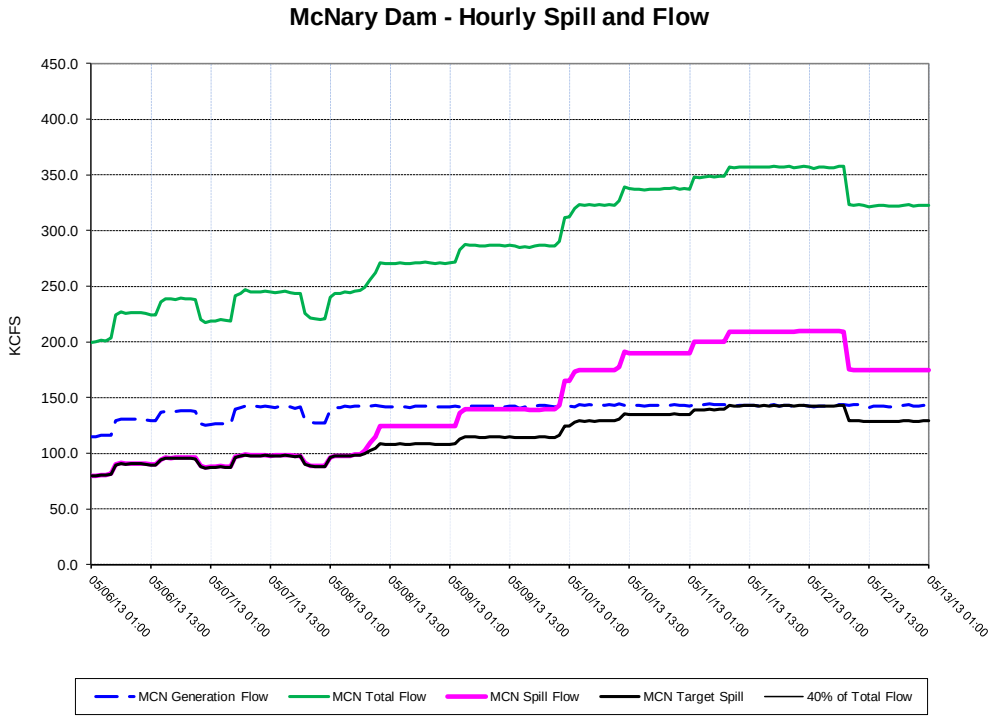
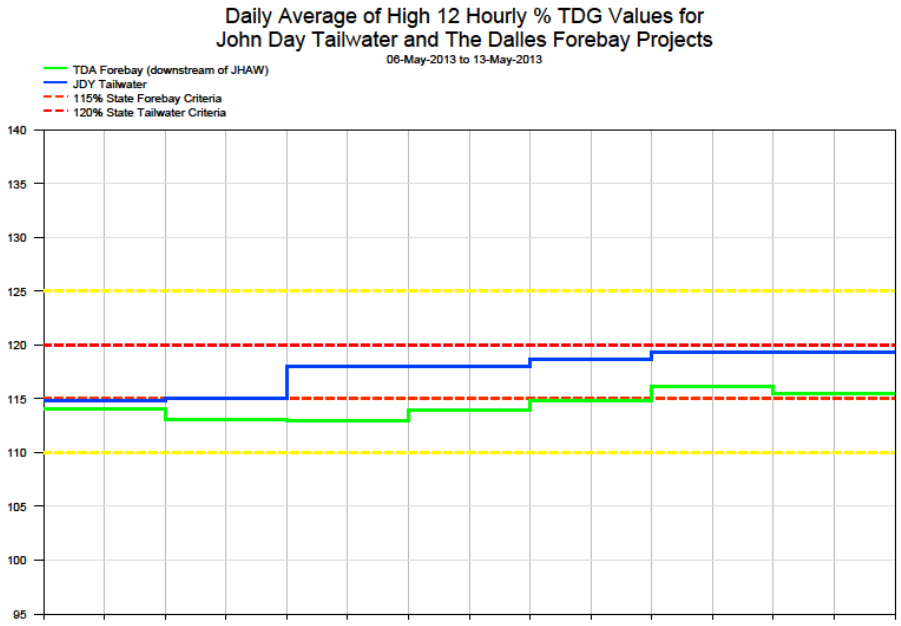

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/06/13 01:00
05/06/13 13:00
05/07/13 01:00
05/07/13 13:00
05/08/13 01:00
05/08/13 13:00
05/09/13 01:00
05/09/13 13:00
05/10/13 01:00
05/10/13 13:00
05/11/13 01:00
05/11/13 13:00
05/12/13 01:00
05/12/13 13:00
05/13/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 14


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
06-May-2013 to 13-May-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

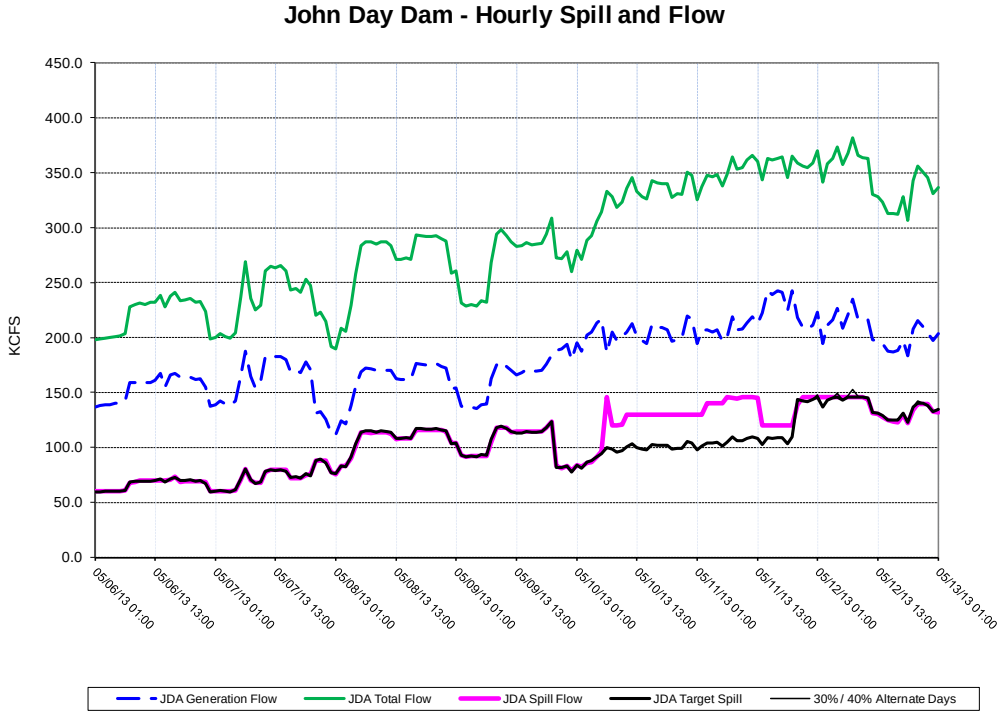
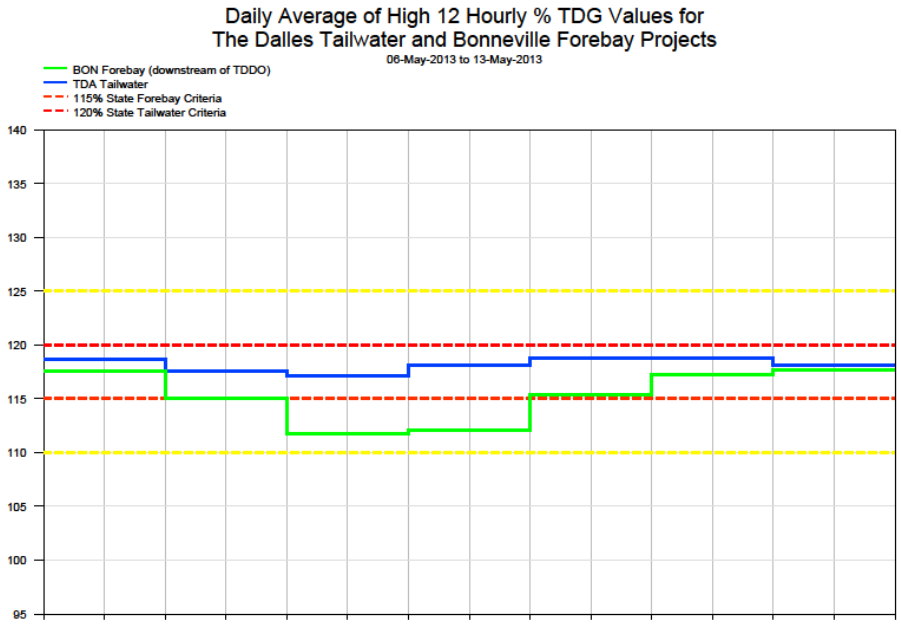

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/06/13 01:00
05/06/13 13:00
05/07/13 01:00
05/07/13 13:00
05/08/13 01:00
05/08/13 13:00
05/09/13 01:00
05/09/13 13:00
05/10/13 01:00
05/10/13 13:00
05/11/13 01:00
05/11/13 13:00
05/12/13 01:00
05/12/13 13:00
05/13/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 15


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
06-May-2013 to 13-May-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

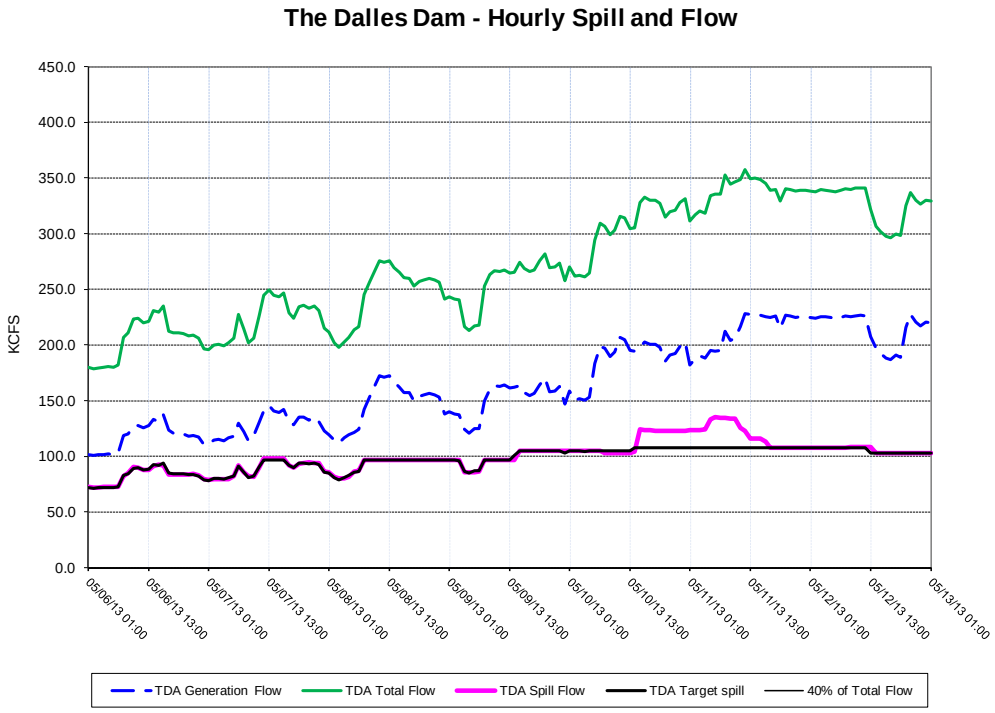
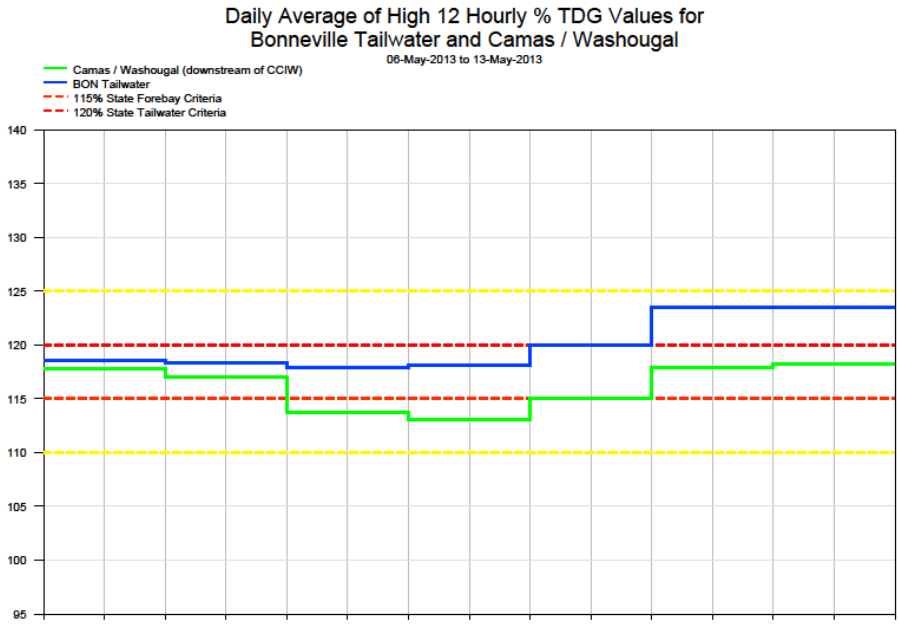

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/06/13 01:00
05/06/13 13:00
05/07/13 01:00
05/07/13 13:00
05/08/13 01:00
05/08/13 13:00
05/09/13 01:00
05/09/13 13:00
05/10/13 01:00
05/10/13 13:00
05/11/13 01:00
05/11/13 13:00
05/12/13 01:00
05/12/13 13:00
05/13/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 16


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
06-May-2013 to 13-May-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

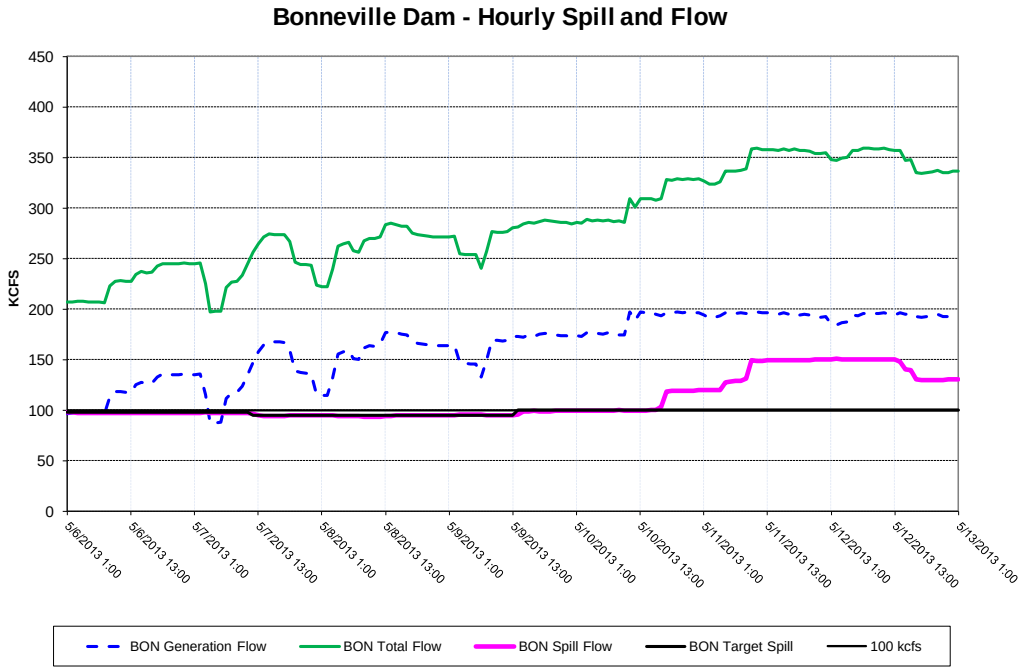
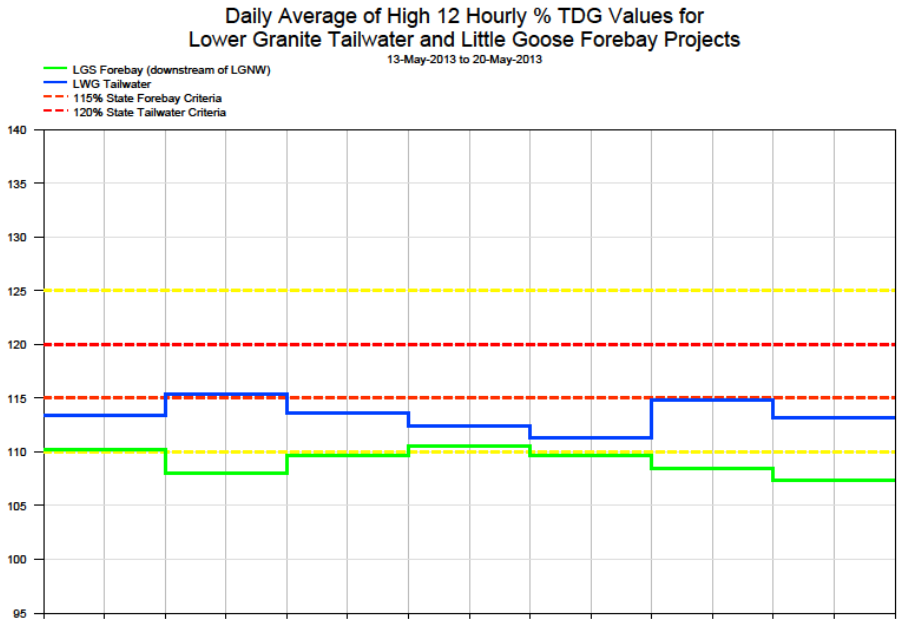

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
5/6/2013 1:00
5/6/2013 13:00
5/7/2013 1:00
5/7/2013 13:00
5/8/2013 1:00
5/8/2013 13:00
5/9/2013 1:00
5/9/2013 13:00
5/10/2013 1:00
5/10/2013 13:00
5/11/2013 1:00
5/11/2013 13:00
5/12/2013 1:00
5/12/2013 13:00
5/13/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 17


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
13-May-2013 to 20-May-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

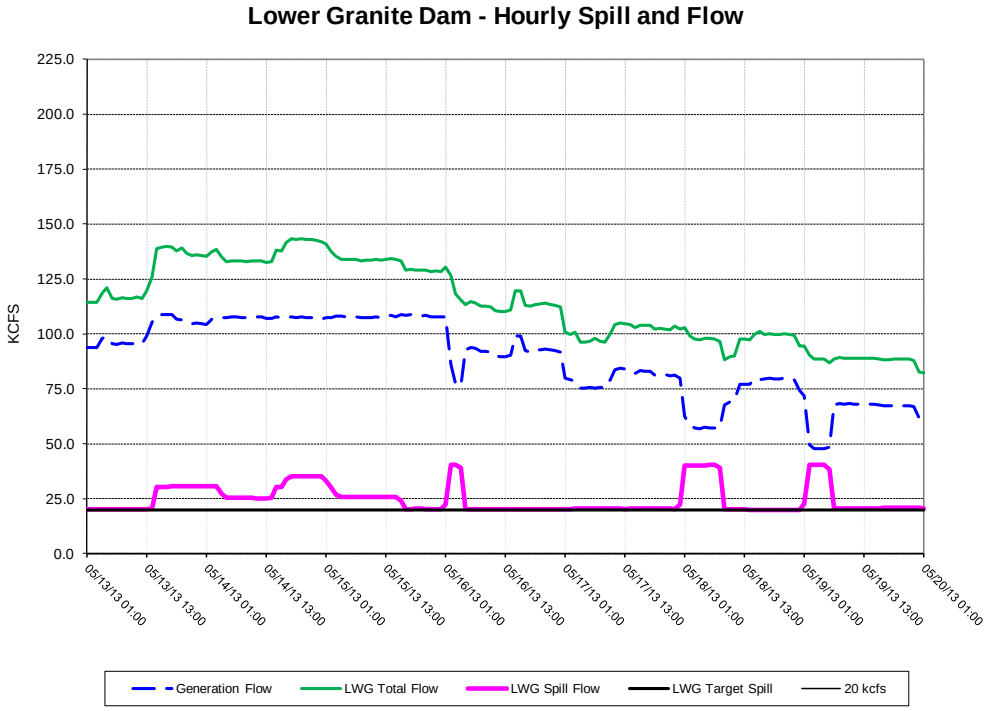
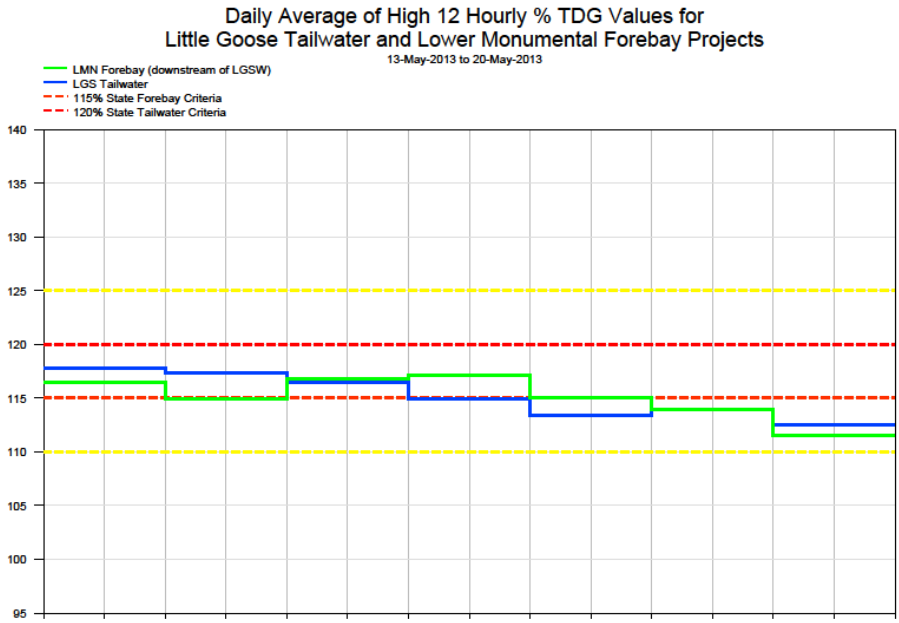

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/13/13 01:00
05/13/13 13:00
05/14/13 01:00
05/14/13 13:00
05/15/13 01:00
05/15/13 13:00
05/16/13 01:00
05/16/13 13:00
05/17/13 01:00
05/17/13 13:00
05/18/13 01:00
05/18/13 13:00
05/19/13 01:00
05/19/13 13:00
05/20/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 18


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
13-May-2013 to 20-May-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

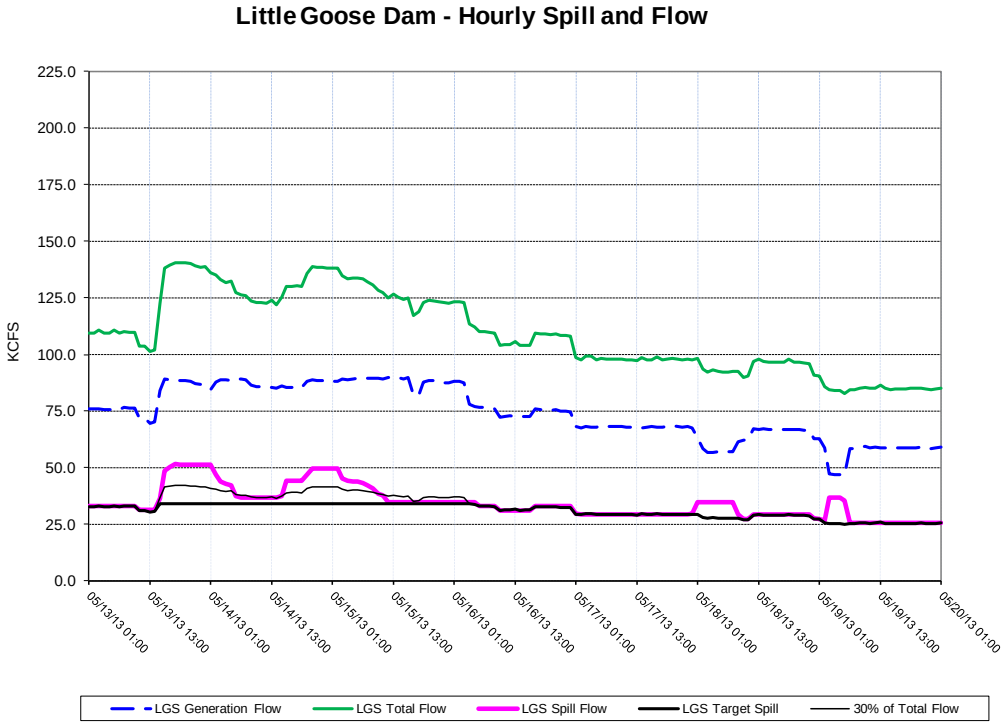
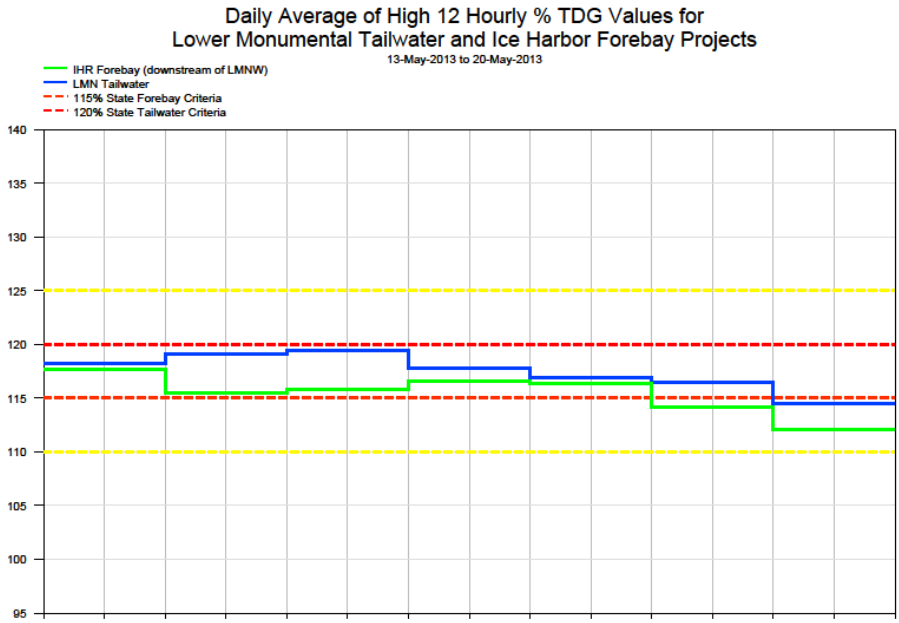

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/13/13 01:00
05/13/13 13:00
05/14/13 01:00
05/14/13 13:00
05/15/13 01:00
05/15/13 13:00
05/16/13 01:00
05/16/13 13:00
05/17/13 01:00
05/17/13 13:00
05/18/13 01:00
05/18/13 13:00
05/19/13 01:00
05/19/13 13:00
05/20/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 19


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
13-May-2013 to 20-May-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

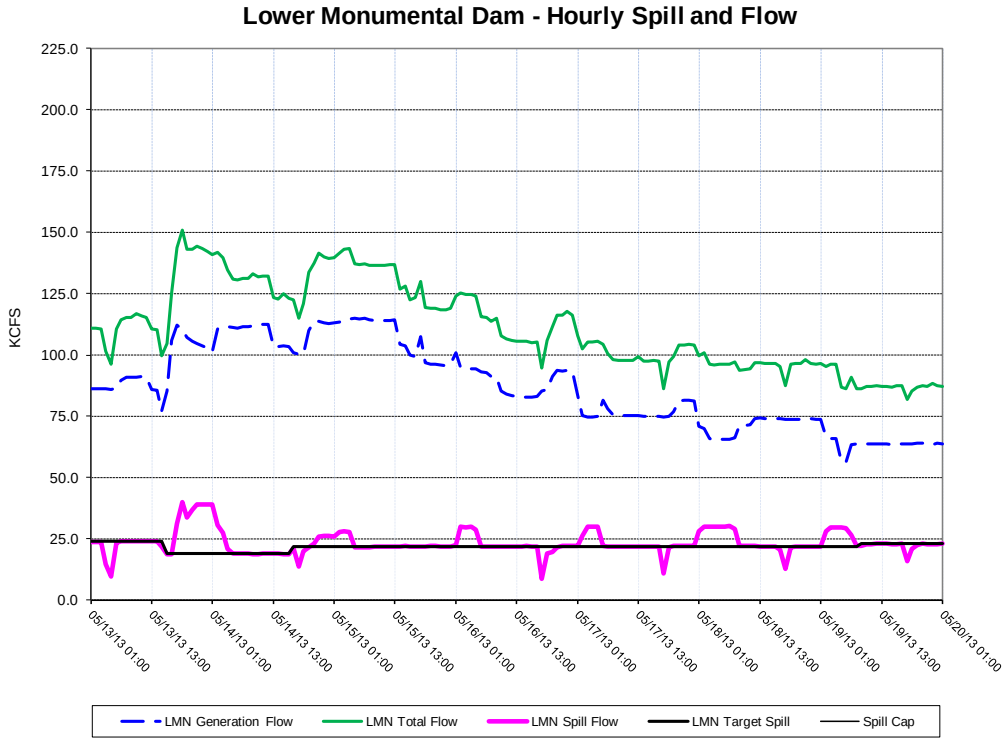
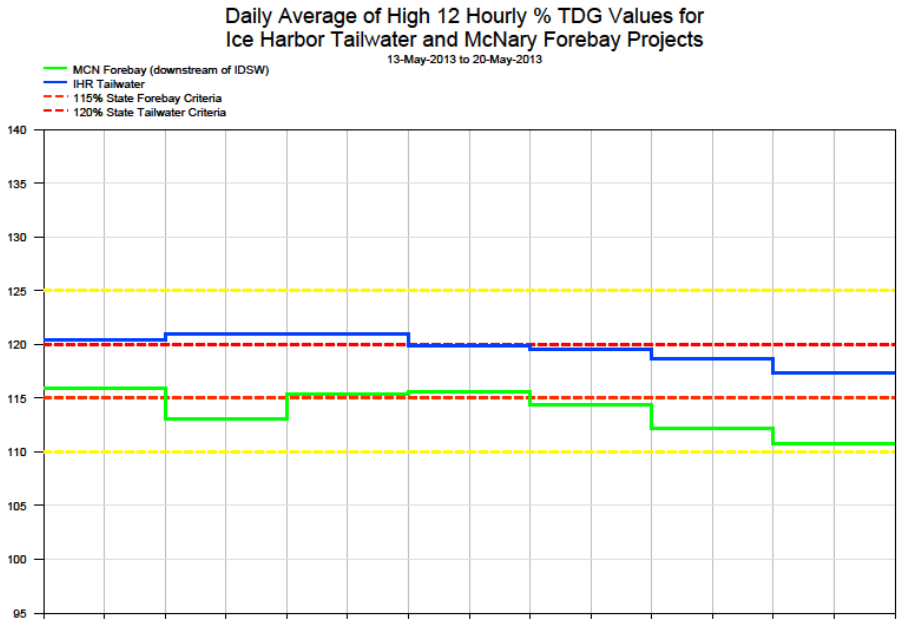

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/13/13 01:00
05/13/13 13:00
05/14/13 01:00
05/14/13 13:00
05/15/13 01:00
05/15/13 13:00
05/16/13 01:00
05/16/13 13:00
05/17/13 01:00
05/17/13 13:00
05/18/13 01:00
05/18/13 13:00
05/19/13 01:00
05/19/13 13:00
05/20/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
13-May-2013 to 20-May-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

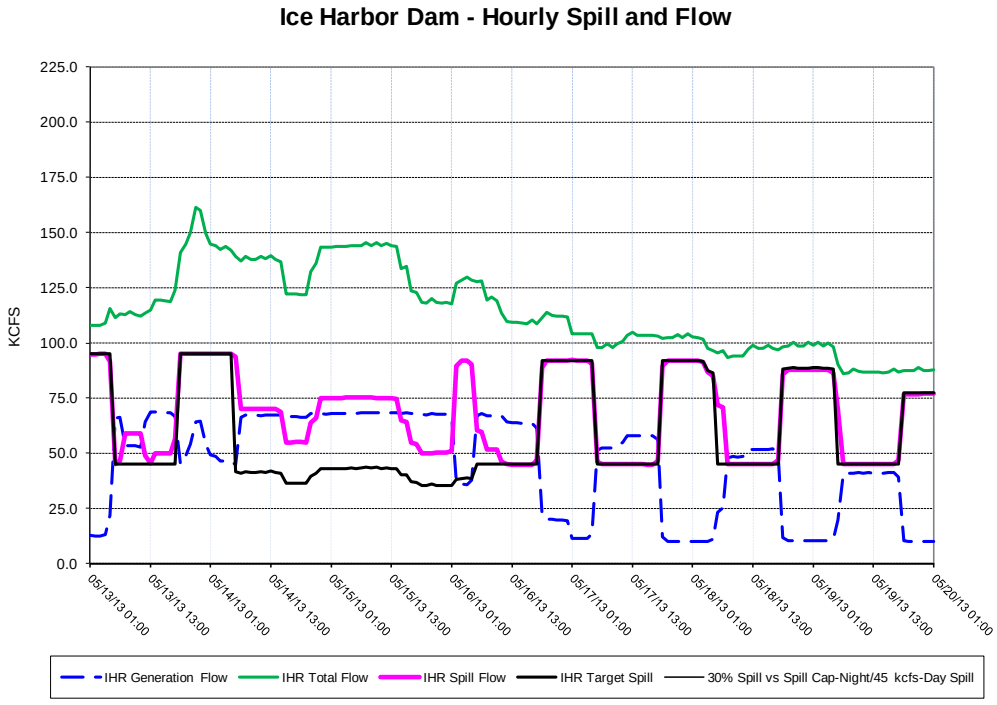
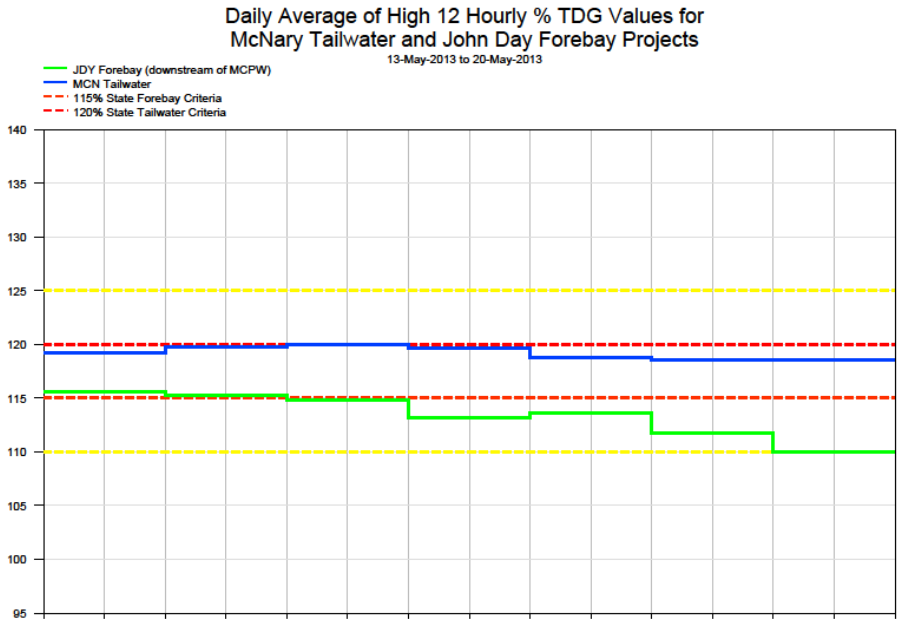

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/13/13 01:00
05/13/13 13:00
05/14/13 01:00
05/14/13 13:00
05/15/13 01:00
05/15/13 13:00
05/16/13 01:00
05/16/13 13:00
05/17/13 01:00
05/17/13 13:00
05/18/13 01:00
05/18/13 13:00
05/19/13 01:00
05/19/13 13:00
05/20/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 21


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
13-May-2013 to 20-May-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

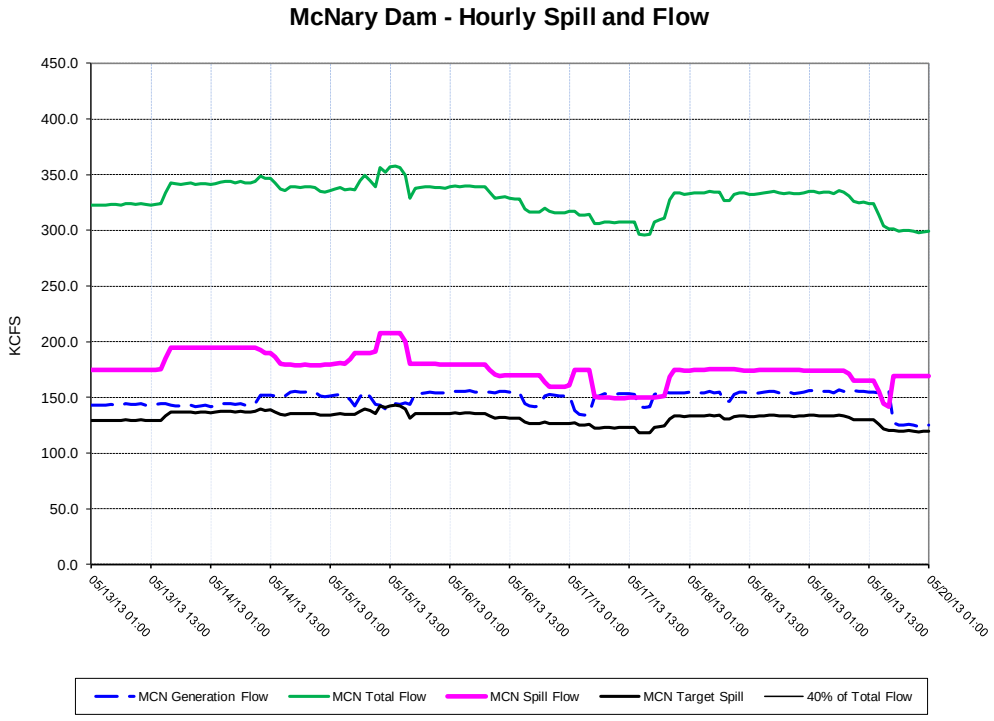
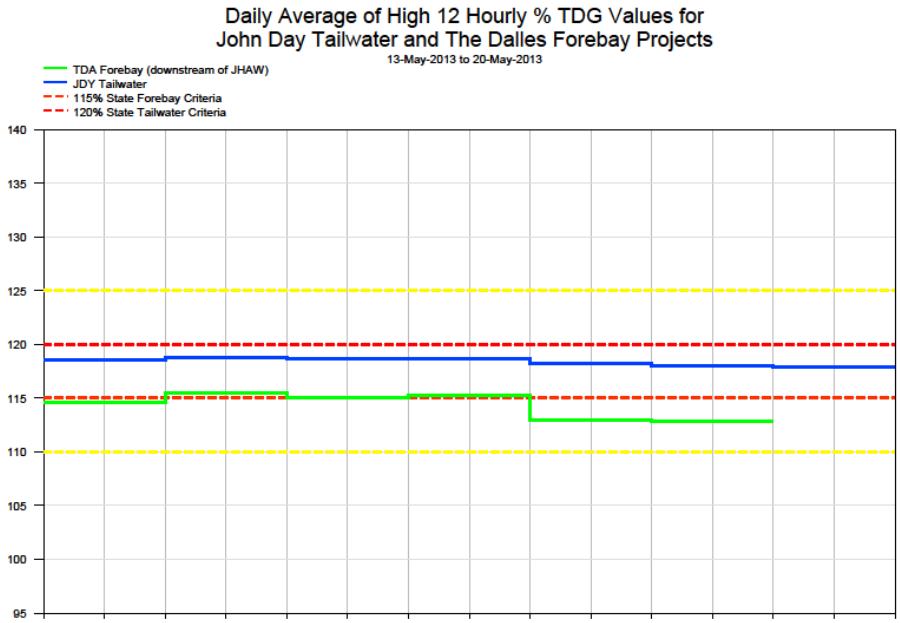

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/13/13 01:00
05/13/13 13:00
05/14/13 01:00
05/14/13 13:00
05/15/13 01:00
05/15/13 13:00
05/16/13 01:00
05/16/13 13:00
05/17/13 01:00
05/17/13 13:00
05/18/13 01:00
05/18/13 13:00
05/19/13 01:00
05/19/13 13:00
05/20/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 22


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
13-May-2013 to 20-May-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

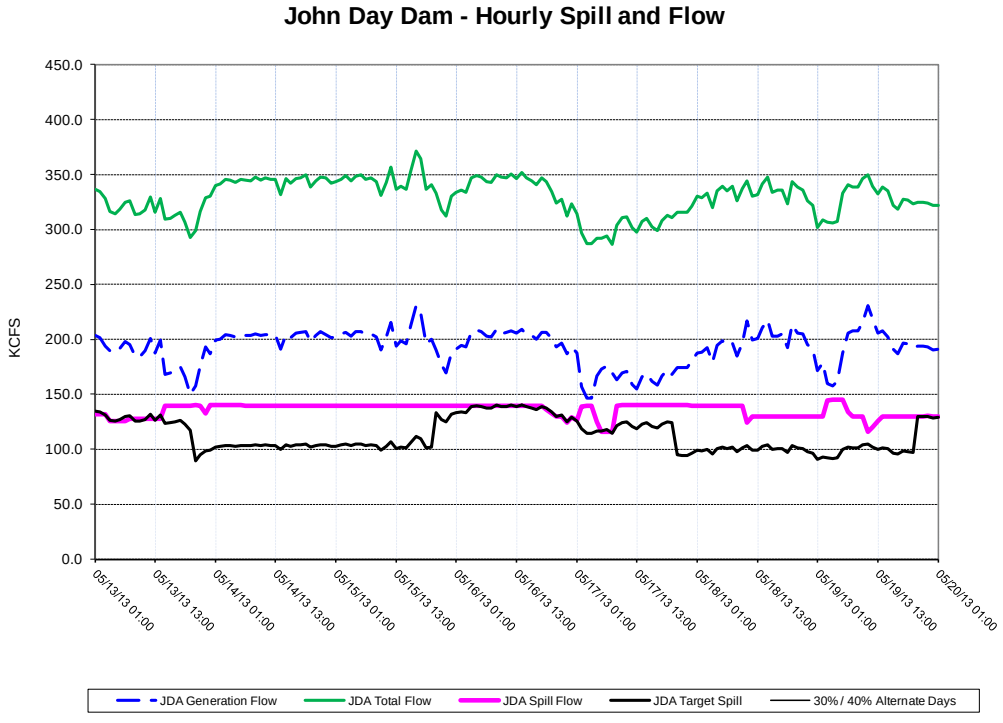
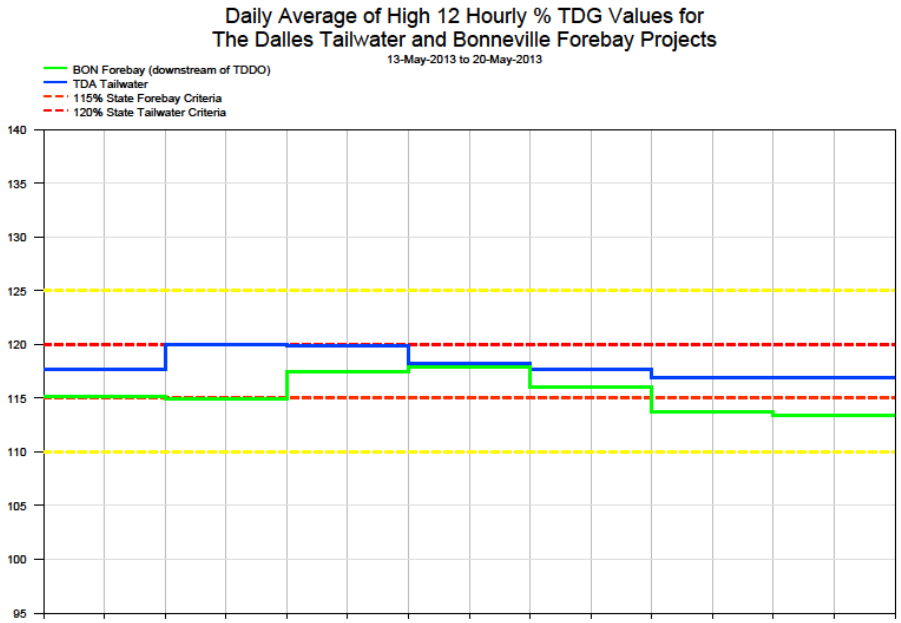

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/13/13 01:00
05/13/13 13:00
05/14/13 01:00
05/14/13 13:00
05/15/13 01:00
05/15/13 13:00
05/16/13 01:00
05/16/13 13:00
05/17/13 01:00
05/17/13 13:00
05/18/13 01:00
05/18/13 13:00
05/19/13 01:00
05/19/13 13:00
05/20/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 23


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
13-May-2013 to 20-May-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

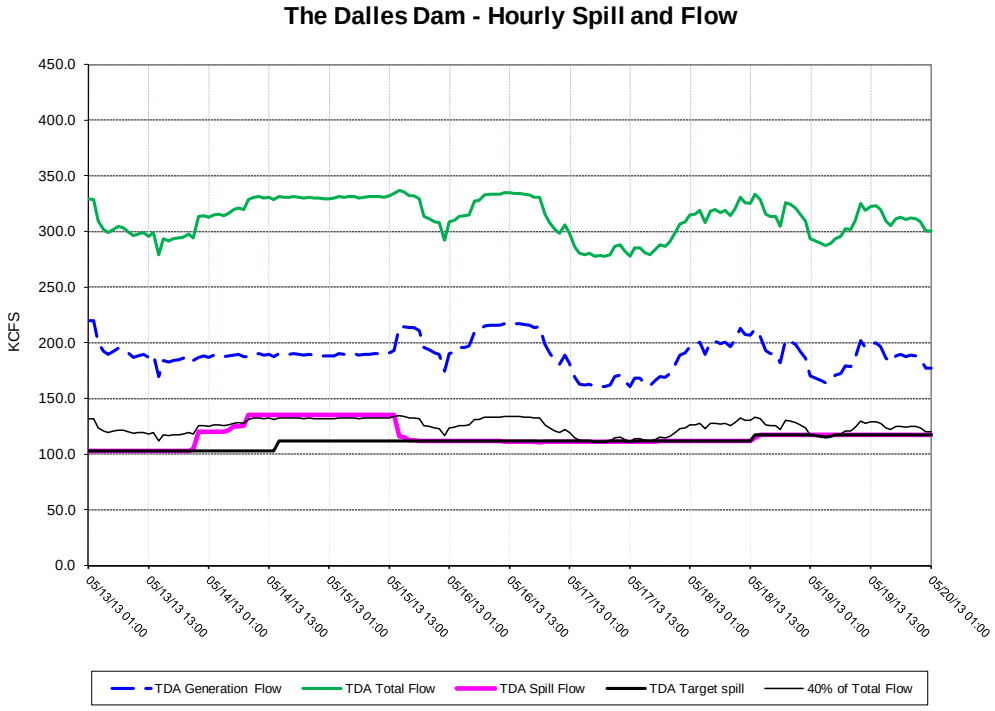
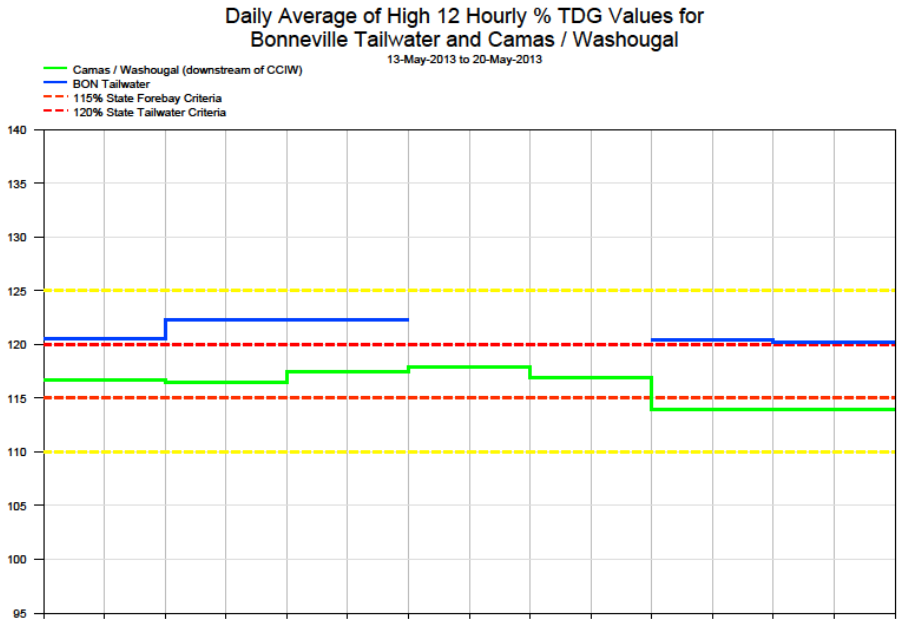

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/13/13 01:00
05/13/13 13:00
05/14/13 01:00
05/14/13 13:00
05/15/13 01:00
05/15/13 13:00
05/16/13 01:00
05/16/13 13:00
05/17/13 01:00
05/17/13 13:00
05/18/13 01:00
05/18/13 13:00
05/19/13 01:00
05/19/13 13:00
05/20/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 24


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
13-May-2013 to 20-May-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

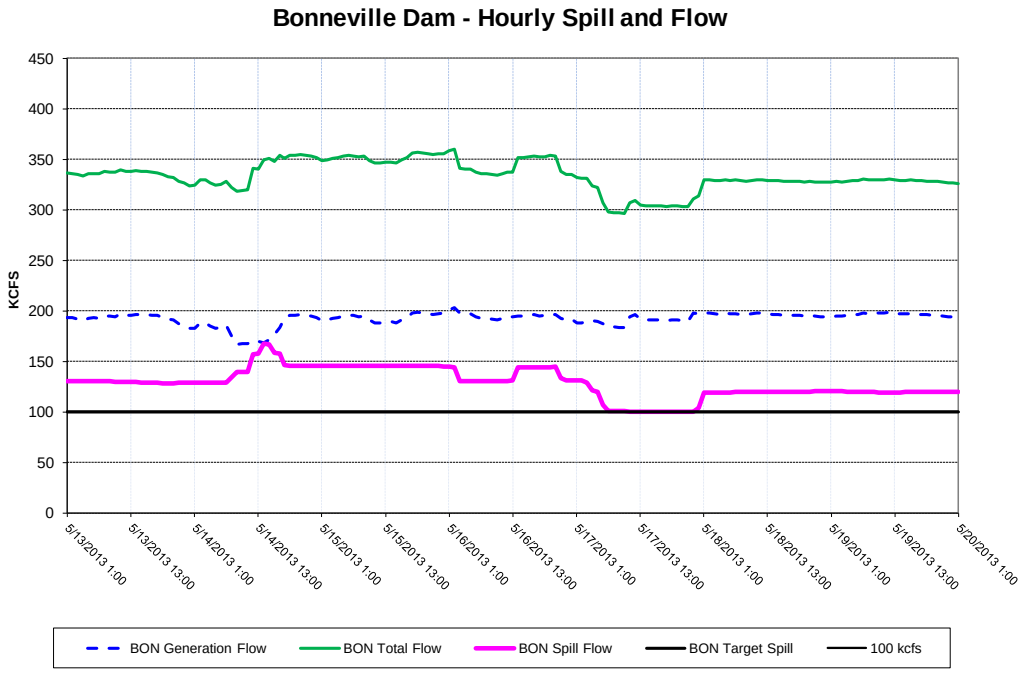
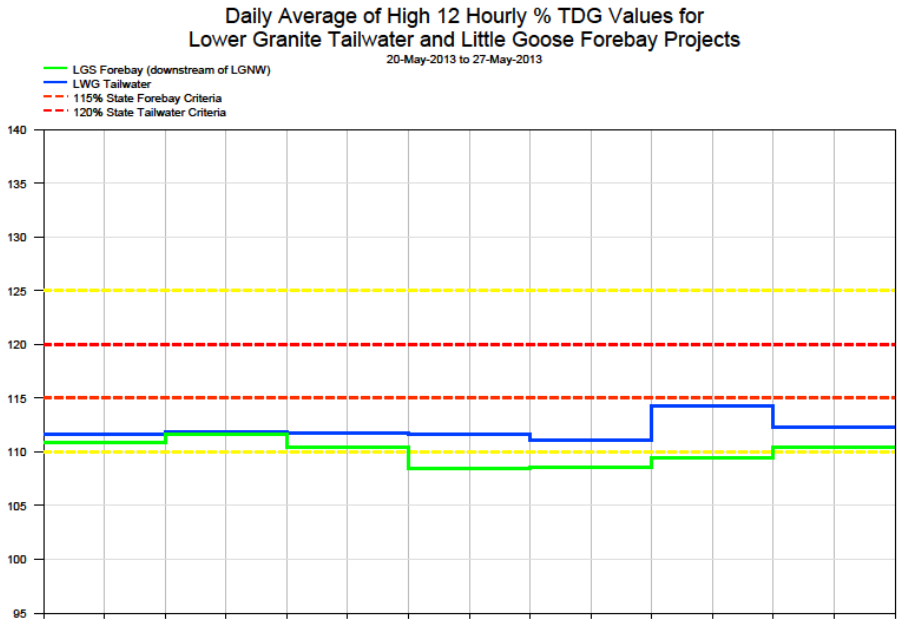

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
5/13/2013 1:00
5/13/2013 13:00
5/14/2013 1:00
5/14/2013 13:00
5/15/2013 1:00
5/15/2013 13:00
5/16/2013 1:00
5/16/2013 13:00
5/17/2013 1:00
5/17/2013 13:00
5/18/2013 1:00
5/18/2013 13:00
5/19/2013 1:00
5/19/2013 13:00
5/20/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 25


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
20-May-2013 to 27-May-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

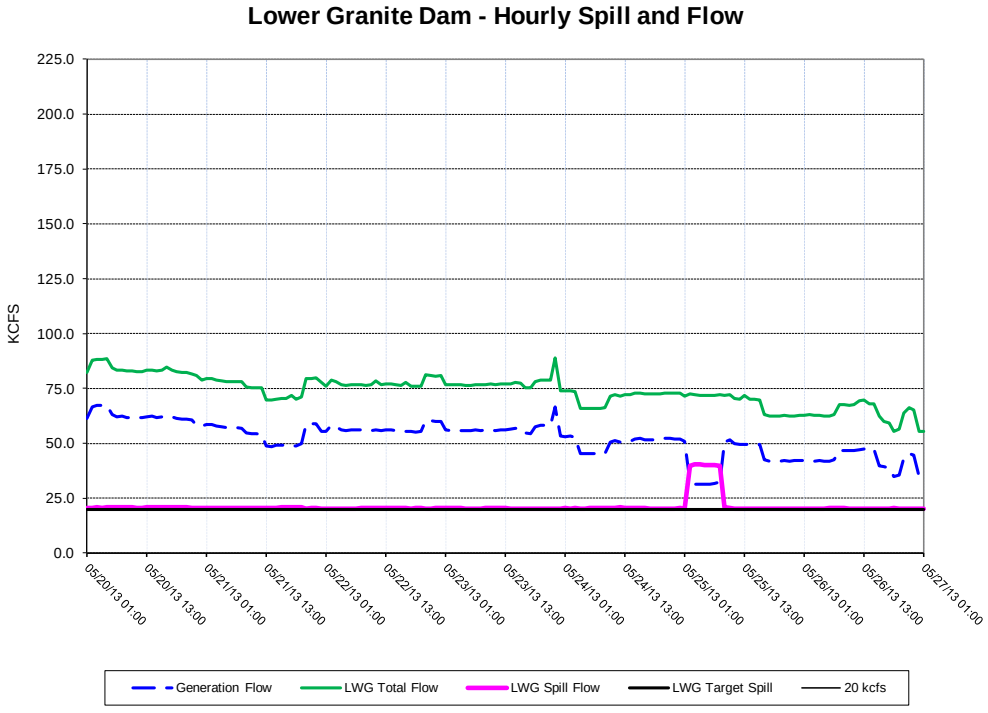
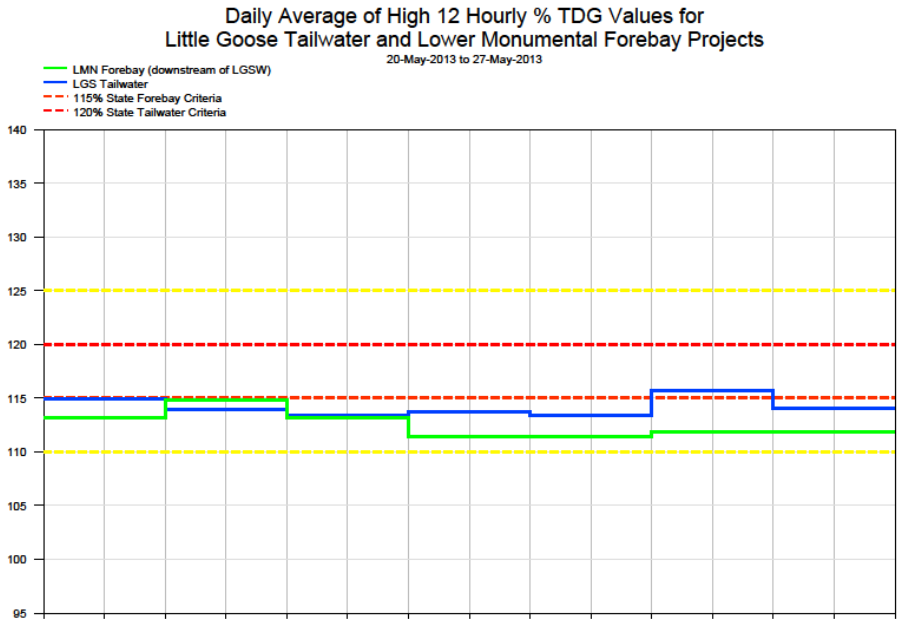

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/20/13 01:00
05/20/13 13:00
05/21/13 01:00
05/21/13 13:00
05/22/13 01:00
05/22/13 13:00
05/23/13 01:00
05/23/13 13:00
05/24/13 01:00
05/24/13 13:00
05/25/13 01:00
05/25/13 13:00
05/26/13 01:00
05/26/13 13:00
05/27/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 26



Little Goose Dam - Hourly Spill and Flow

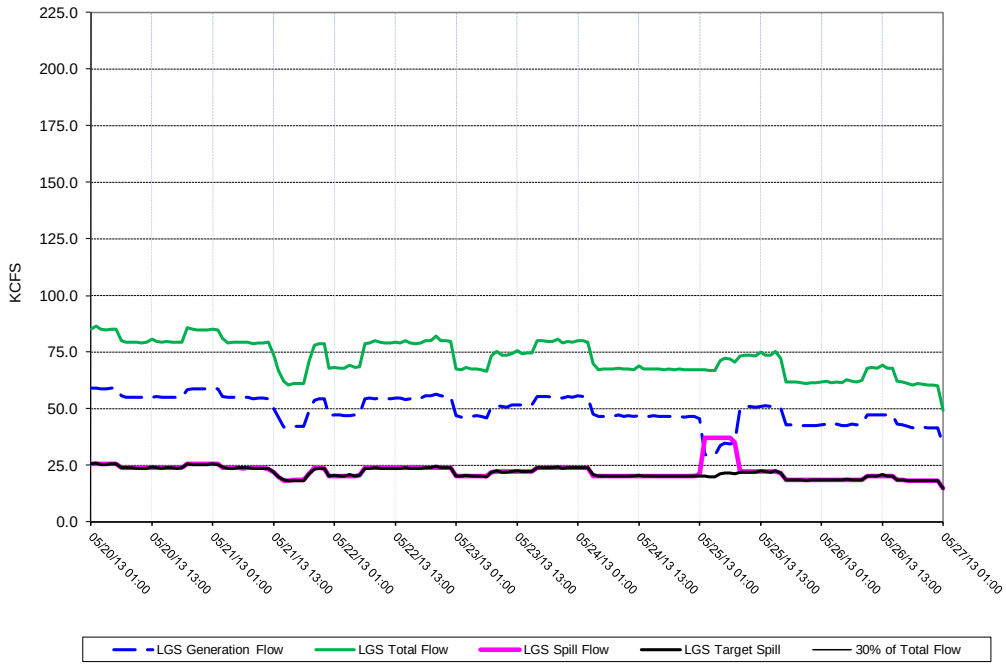
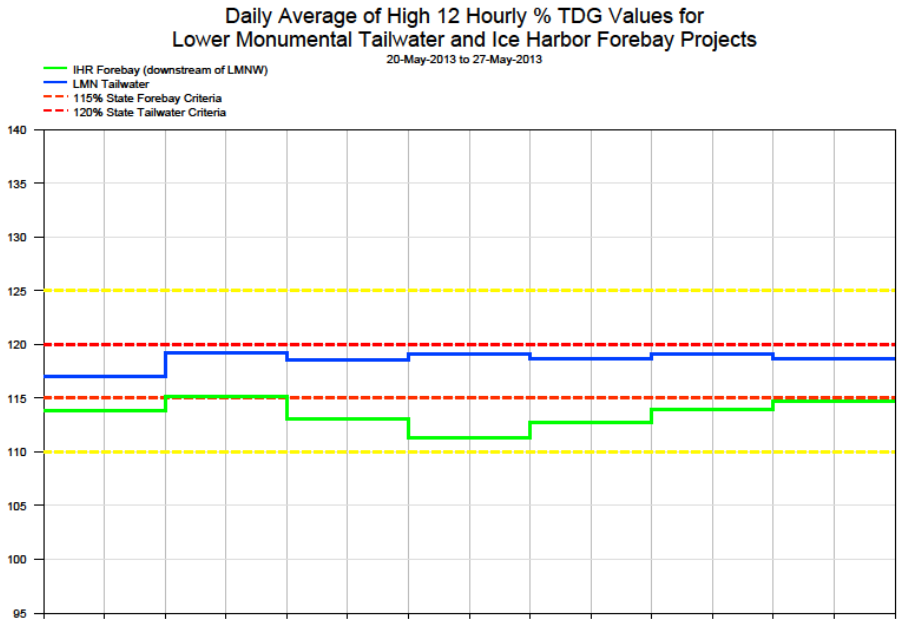


Figure 27


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
20-May-2013 to 27-May-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

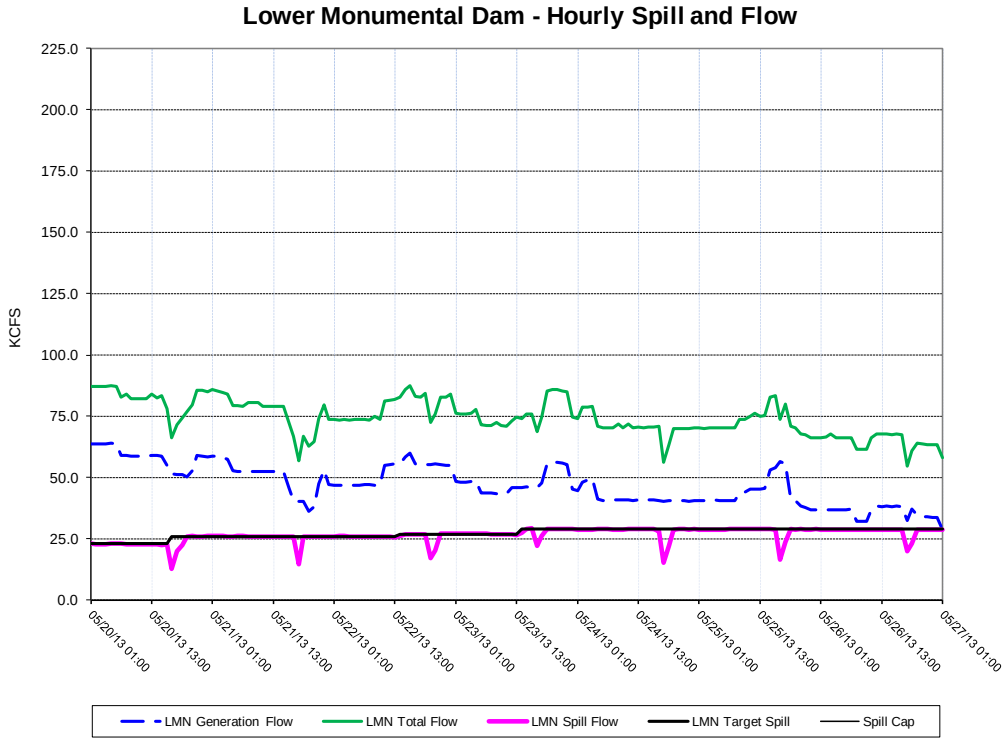
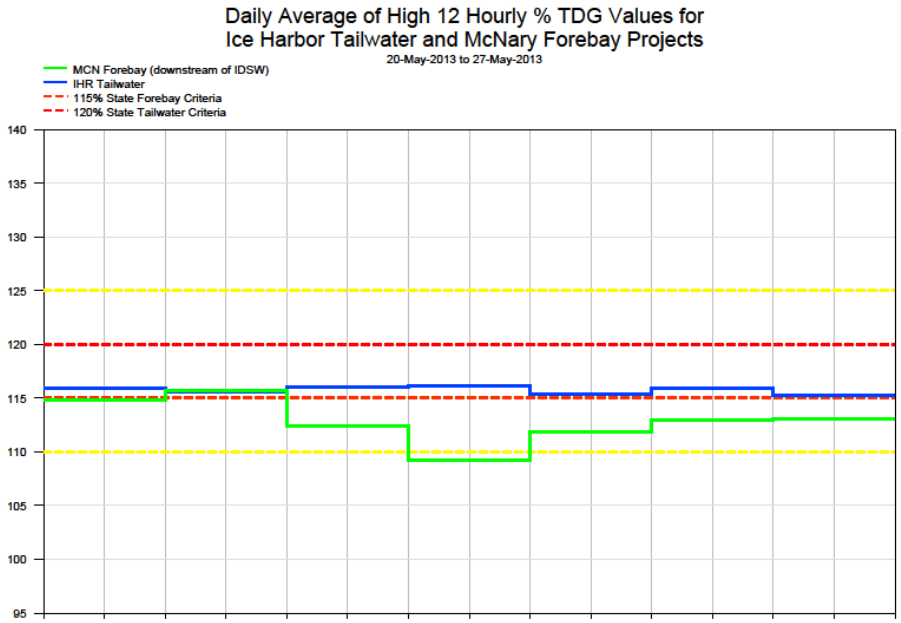

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/20/13 01:00
05/20/13 13:00
05/21/13 01:00
05/21/13 13:00
05/22/13 01:00
05/22/13 13:00
05/23/13 01:00
05/23/13 13:00
05/24/13 01:00
05/24/13 13:00
05/25/13 01:00
05/25/13 13:00
05/26/13 01:00
05/26/13 13:00
05/27/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 28


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
20-May-2013 to 27-May-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

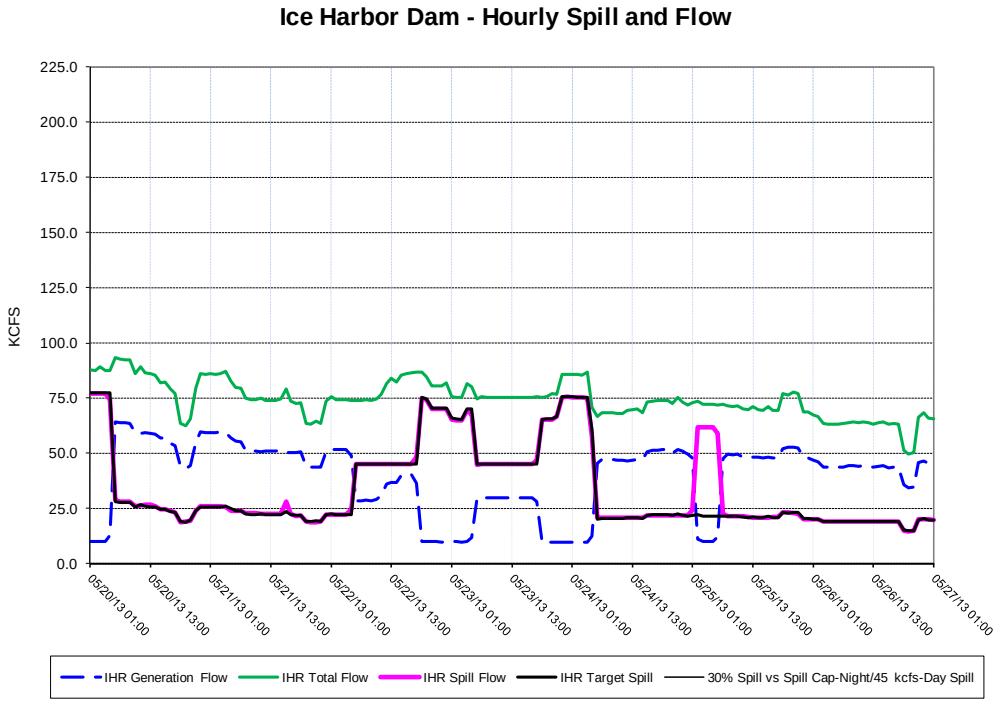
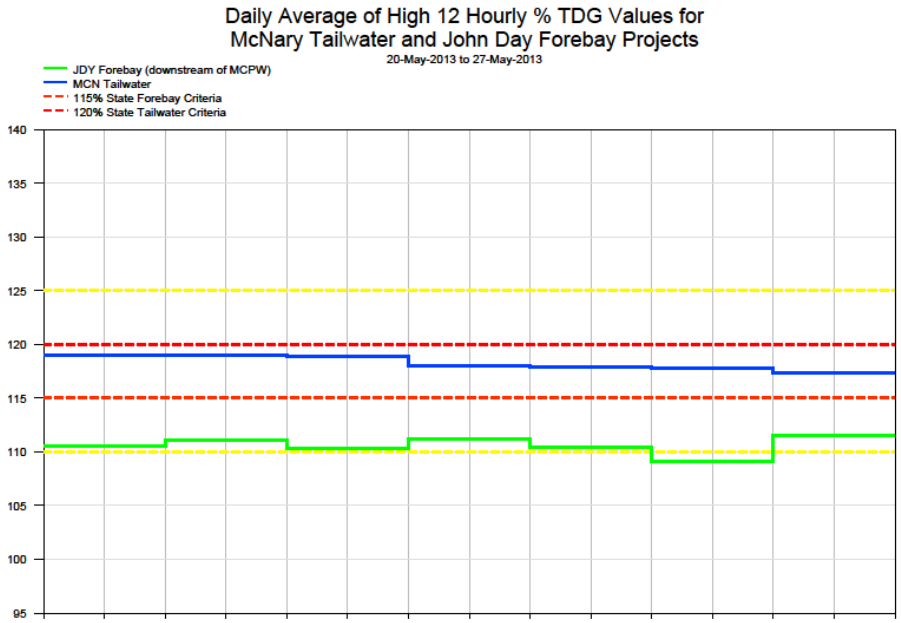

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/20/13 01:00
05/20/13 13:00
05/21/13 01:00
05/21/13 13:00
05/22/13 01:00
05/22/13 13:00
05/23/13 01:00
05/23/13 13:00
05/24/13 01:00
05/24/13 13:00
05/25/13 01:00
05/25/13 13:00
05/26/13 01:00
05/26/13 13:00
05/27/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 29


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
20-May-2013 to 27-May-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

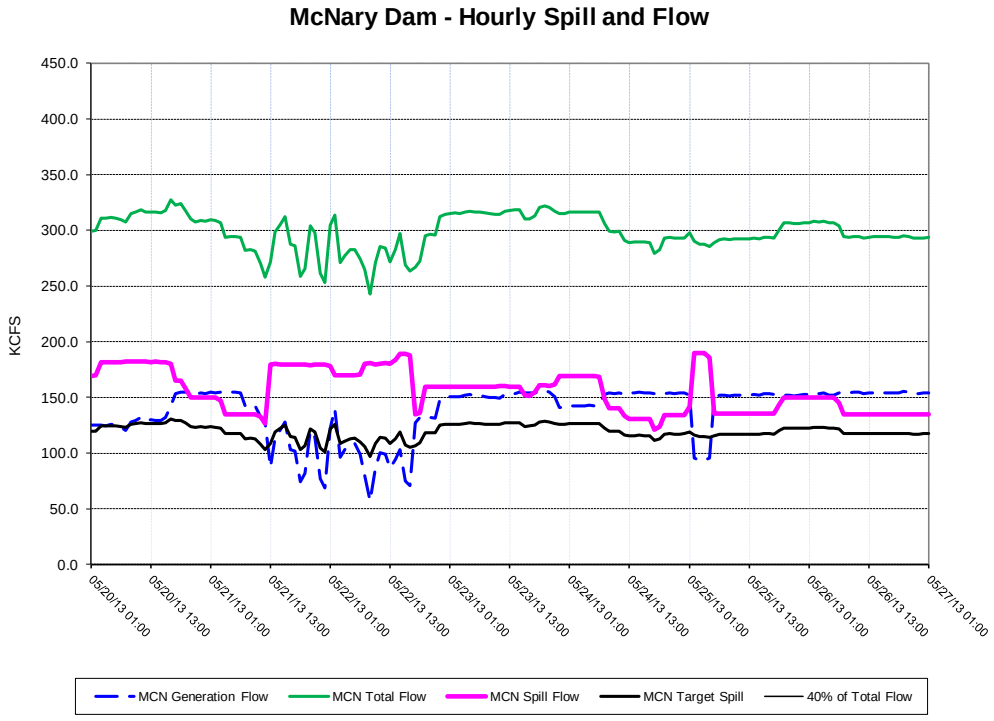
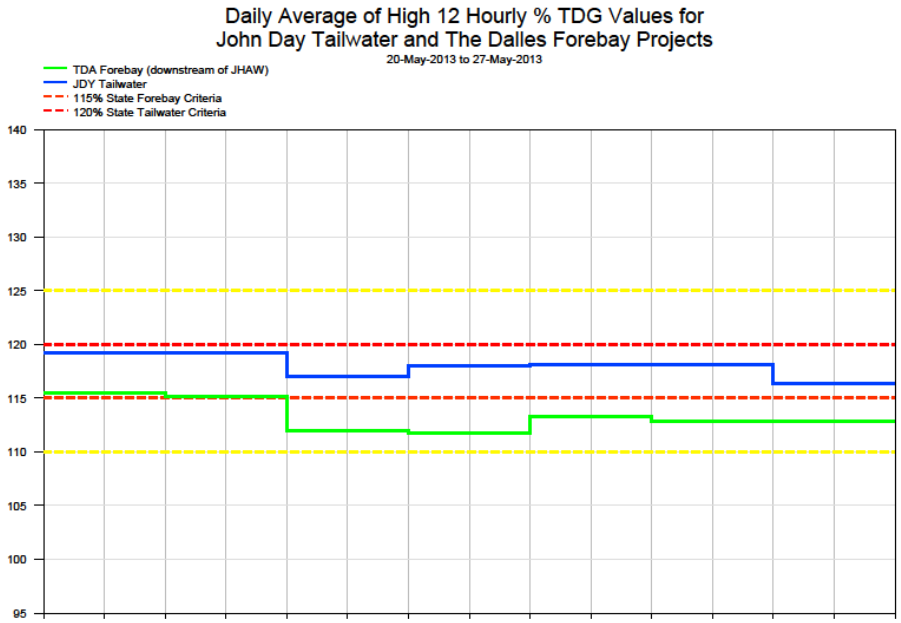

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/20/13 01:00
05/20/13 13:00
05/21/13 01:00
05/21/13 13:00
05/22/13 01:00
05/22/13 13:00
05/23/13 01:00
05/23/13 13:00
05/24/13 01:00
05/24/13 13:00
05/25/13 01:00
05/25/13 13:00
05/26/13 01:00
05/26/13 13:00
05/27/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 30


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
20-May-2013 to 27-May-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

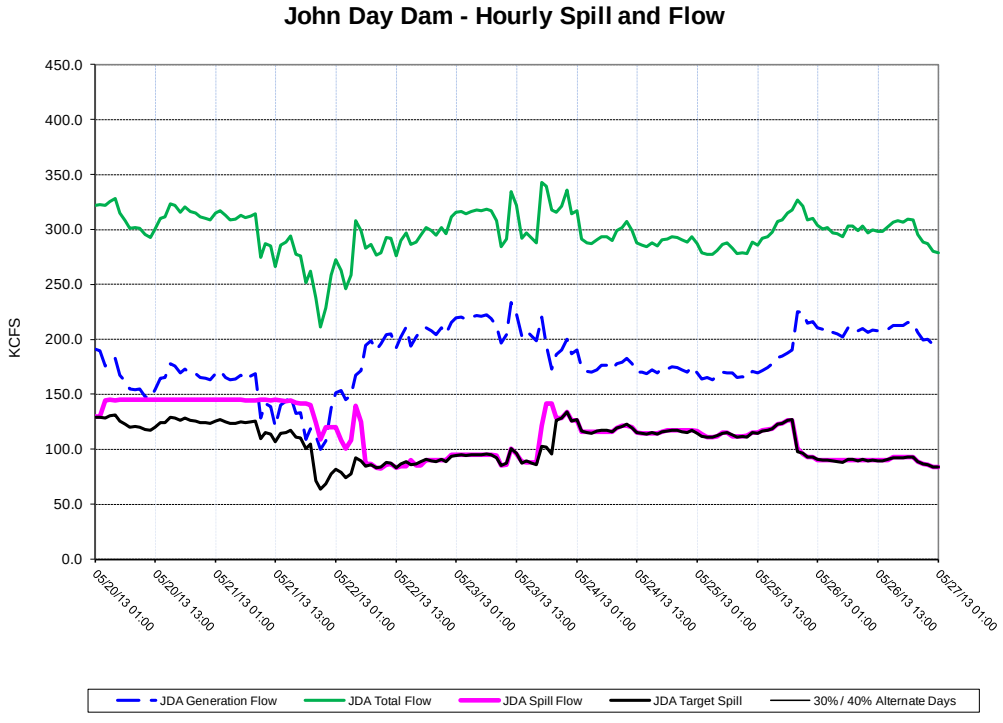
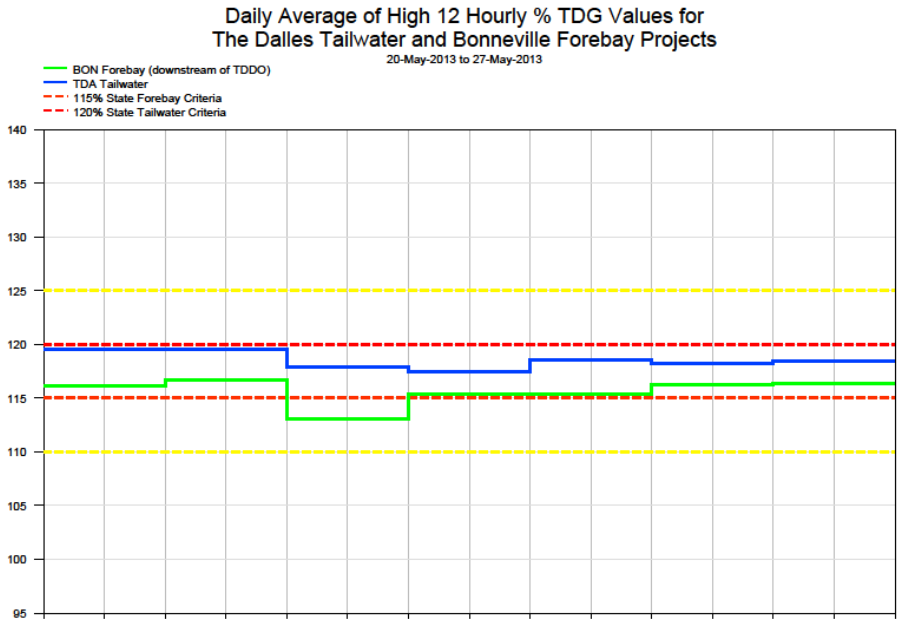

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/20/13 01:00
05/20/13 13:00
05/21/13 01:00
05/21/13 13:00
05/22/13 01:00
05/22/13 13:00
05/23/13 01:00
05/23/13 13:00
05/24/13 01:00
05/24/13 13:00
05/25/13 01:00
05/25/13 13:00
05/26/13 01:00
05/26/13 13:00
05/27/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 31


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
20-May-2013 to 27-May-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

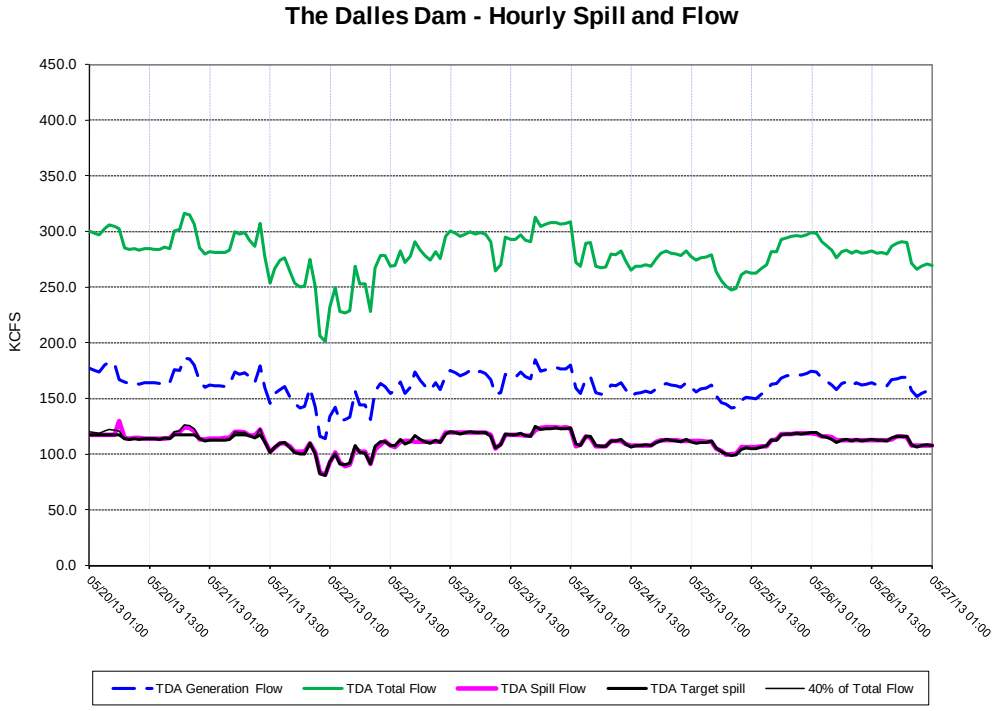
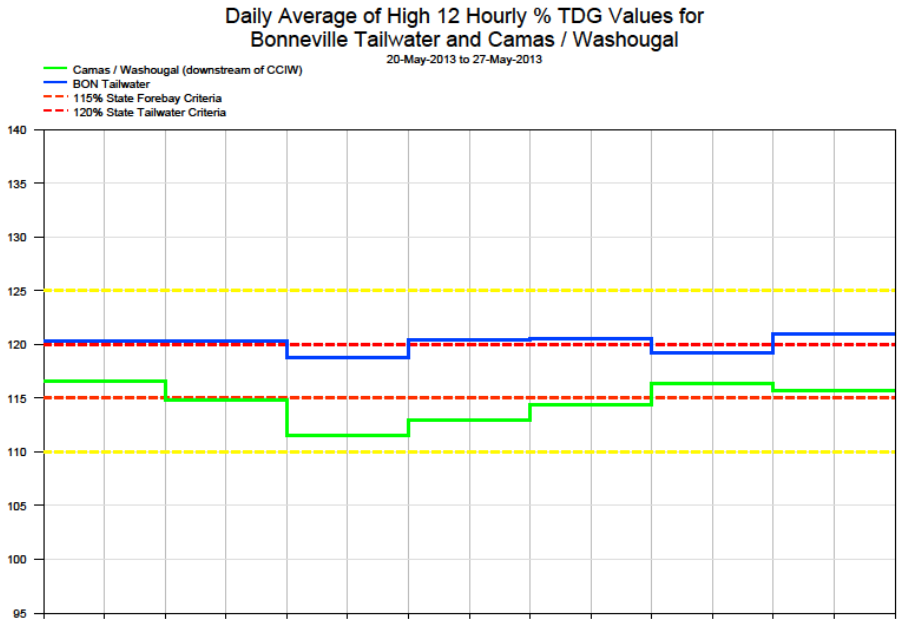

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/20/13 01:00
05/20/13 13:00
05/21/13 01:00
05/21/13 13:00
05/22/13 01:00
05/22/13 13:00
05/23/13 01:00
05/23/13 13:00
05/24/13 01:00
05/24/13 13:00
05/25/13 01:00
05/25/13 13:00
05/26/13 01:00
05/26/13 13:00
05/27/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 32


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
20-May-2013 to 27-May-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

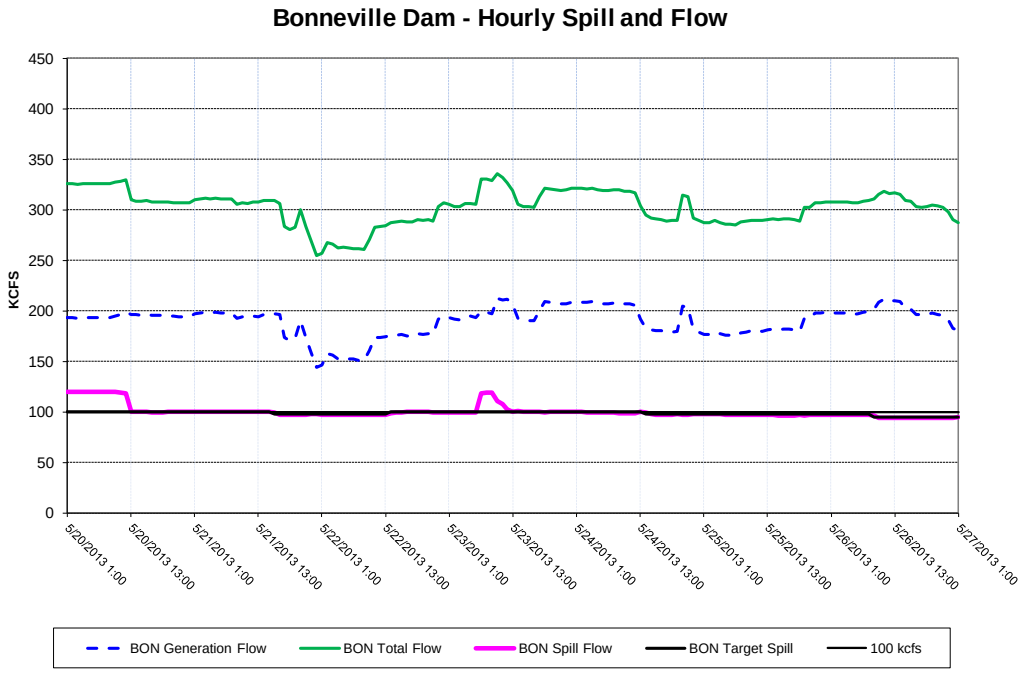
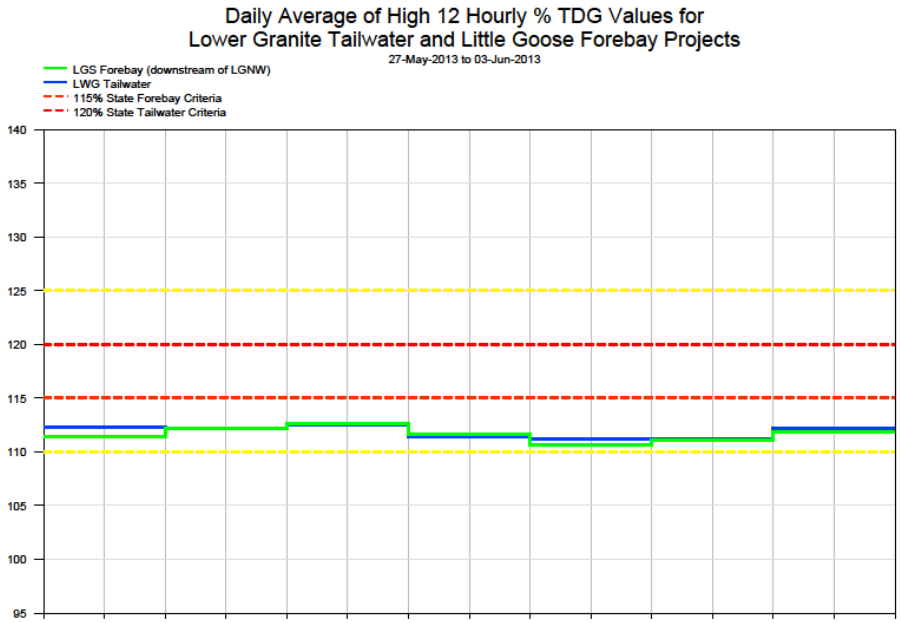

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
5/20/2013 1:00
5/20/2013 13:00
5/21/2013 1:00
5/21/2013 13:00
5/22/2013 1:00
5/22/2013 13:00
5/23/2013 1:00
5/23/2013 13:00
5/24/2013 1:00
5/24/2013 13:00
5/25/2013 1:00
5/25/2013 13:00
5/26/2013 1:00
5/26/2013 13:00
5/27/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 33


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
27-May-2013 to 03-Jun-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

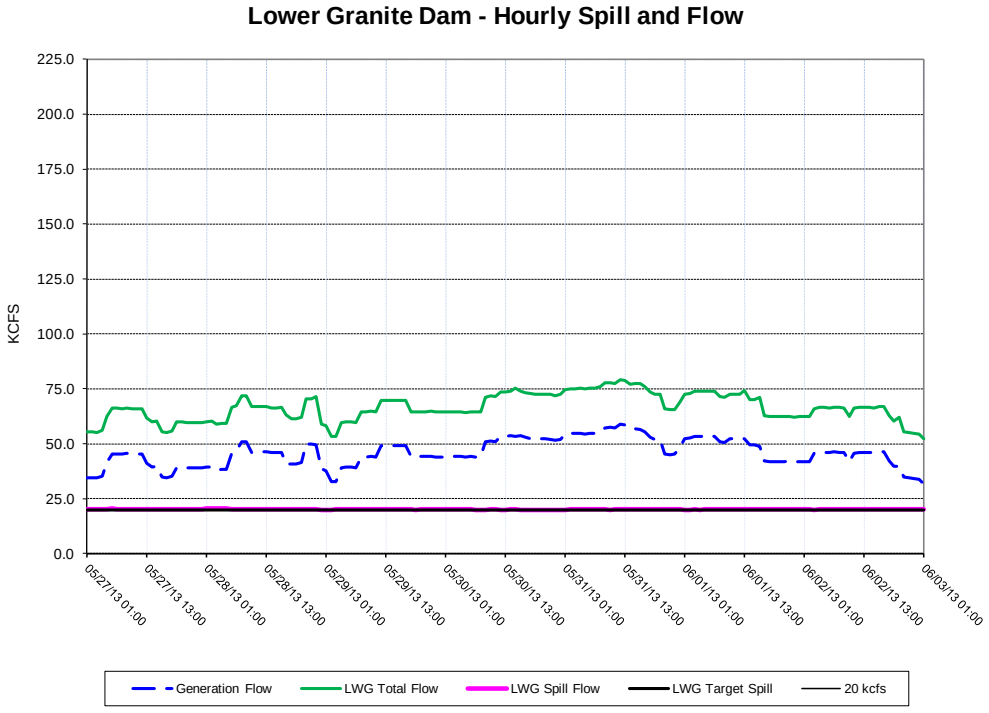
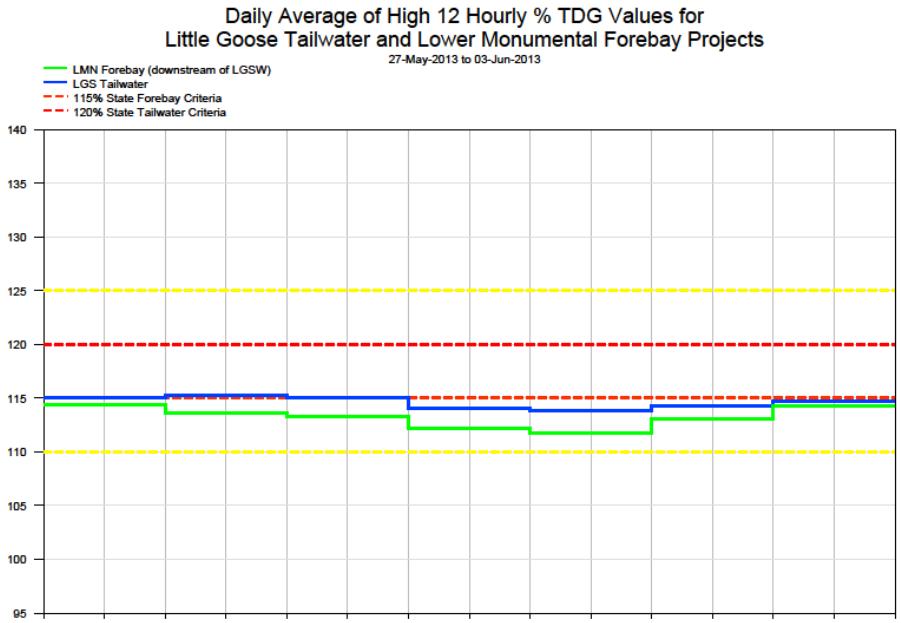

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/27/13 01:00
05/27/13 13:00
05/28/13 01:00
05/28/13 13:00
05/29/13 01:00
05/29/13 13:00
05/30/13 01:00
05/30/13 13:00
05/31/13 01:00
05/31/13 13:00
06/01/13 01:00
06/01/13 13:00
06/02/13 01:00
06/02/13 13:00
06/03/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 34


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
27-May-2013 to 03-Jun-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

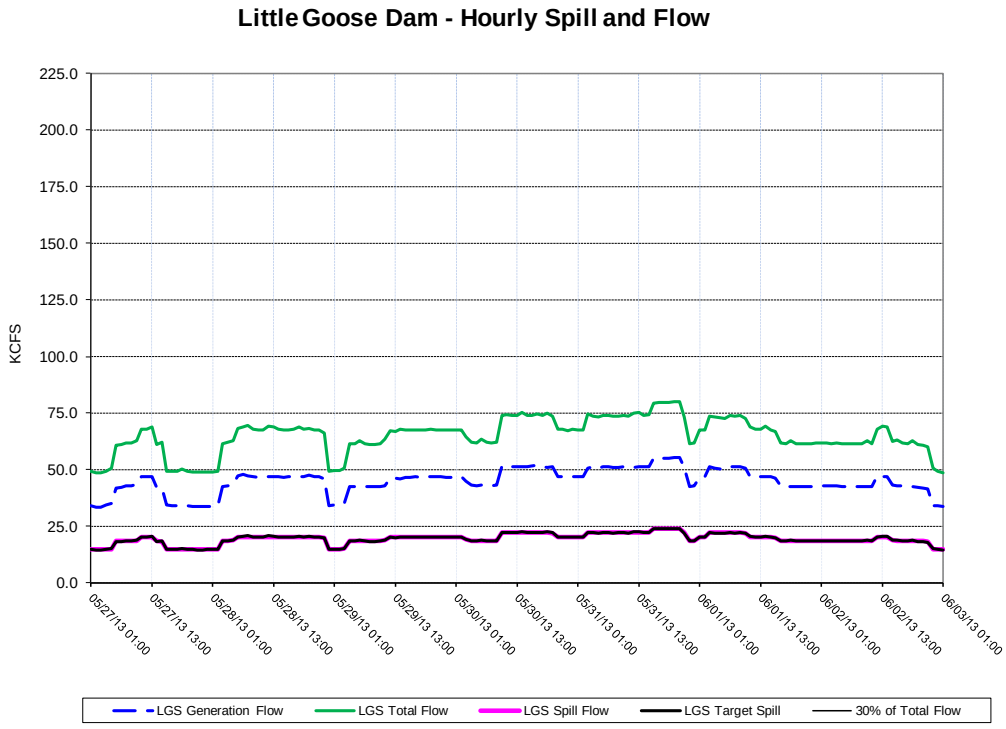
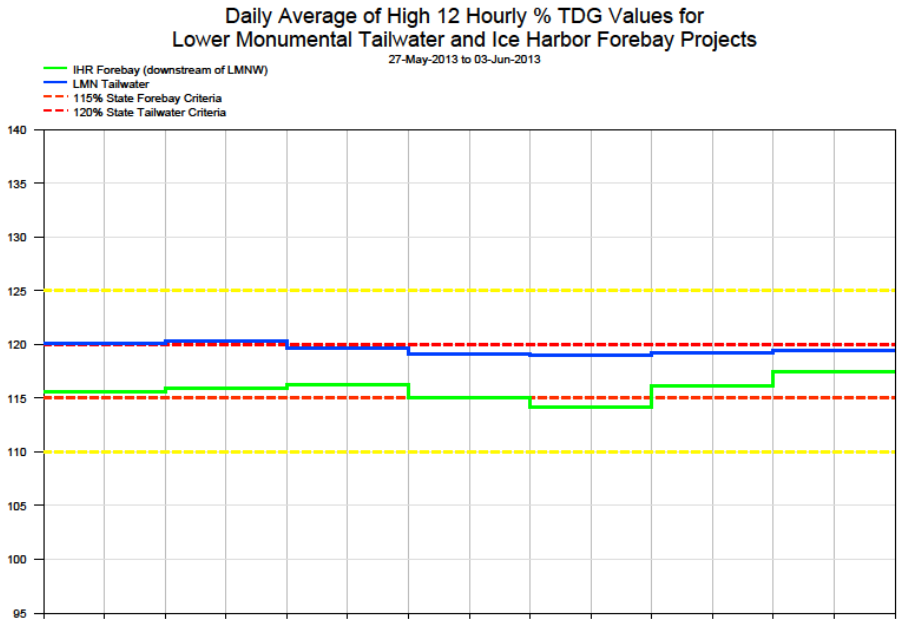

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/27/13 01:00
05/27/13 13:00
05/28/13 01:00
05/28/13 13:00
05/29/13 01:00
05/29/13 13:00
05/30/13 01:00
05/30/13 13:00
05/31/13 01:00
05/31/13 13:00
06/01/13 01:00
06/01/13 13:00
06/02/13 01:00
06/02/13 13:00
06/03/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 35


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
27-May-2013 to 03-Jun-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

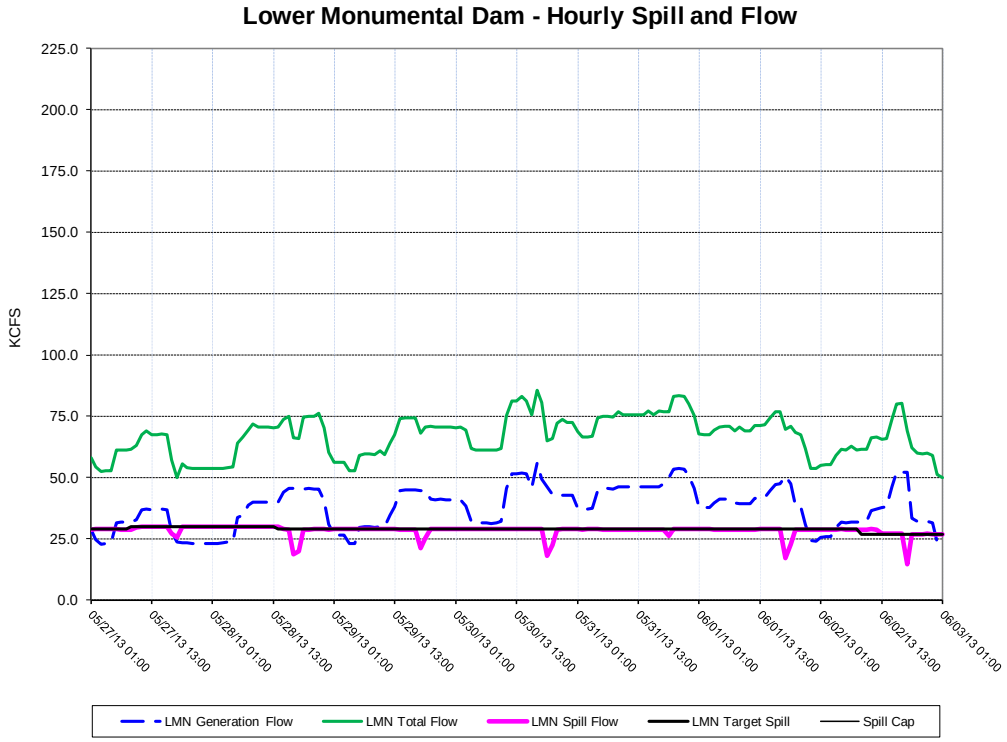
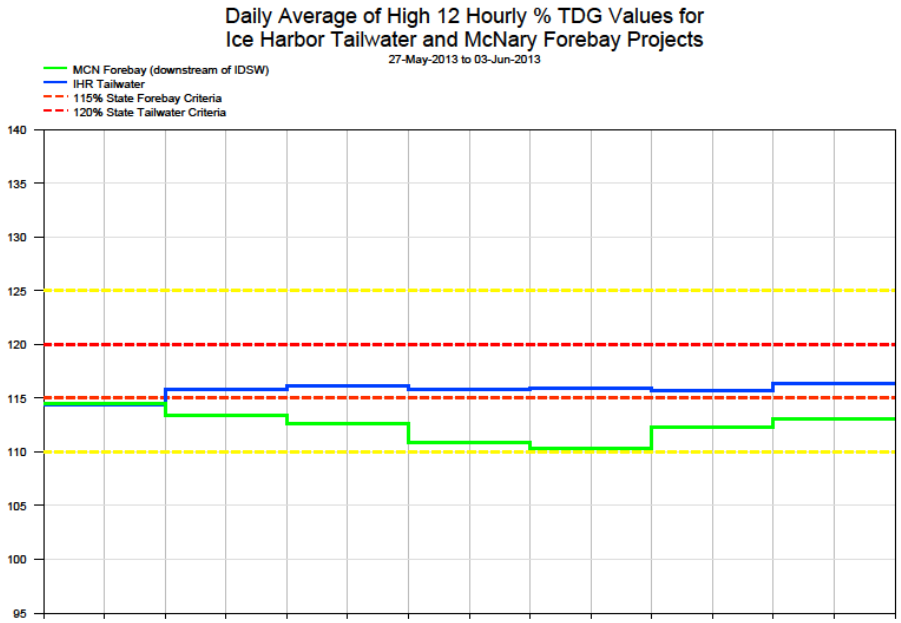

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/27/13 01:00
05/27/13 13:00
05/28/13 01:00
05/28/13 13:00
05/29/13 01:00
05/29/13 13:00
05/30/13 01:00
05/30/13 13:00
05/31/13 01:00
05/31/13 13:00
06/01/13 01:00
06/01/13 13:00
06/02/13 01:00
06/02/13 13:00
06/03/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 36


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
27-May-2013 to 03-Jun-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

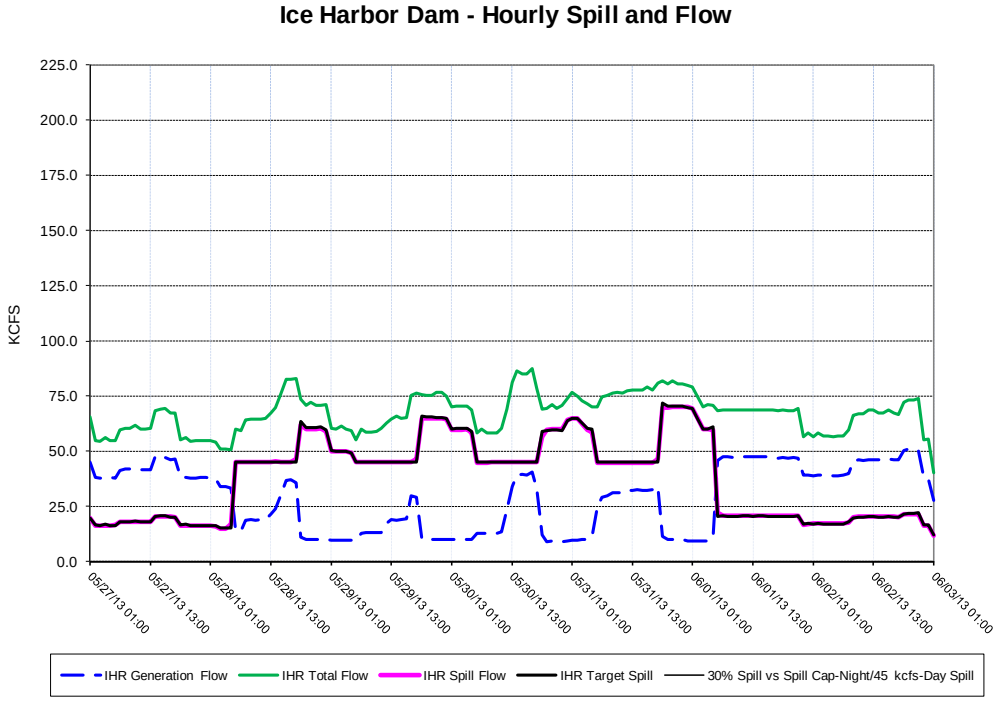
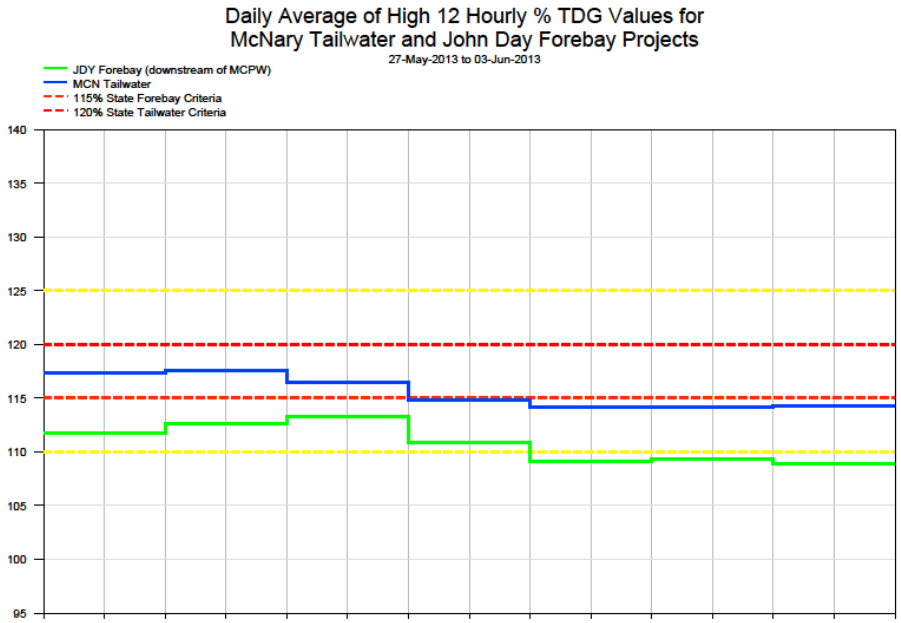

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/27/13 01:00
05/27/13 13:00
05/28/13 01:00
05/28/13 13:00
05/29/13 01:00
05/29/13 13:00
05/30/13 01:00
05/30/13 13:00
05/31/13 01:00
05/31/13 13:00
06/01/13 01:00
06/01/13 13:00
06/02/13 01:00
06/02/13 13:00
06/03/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 37


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
27-May-2013 to 03-Jun-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

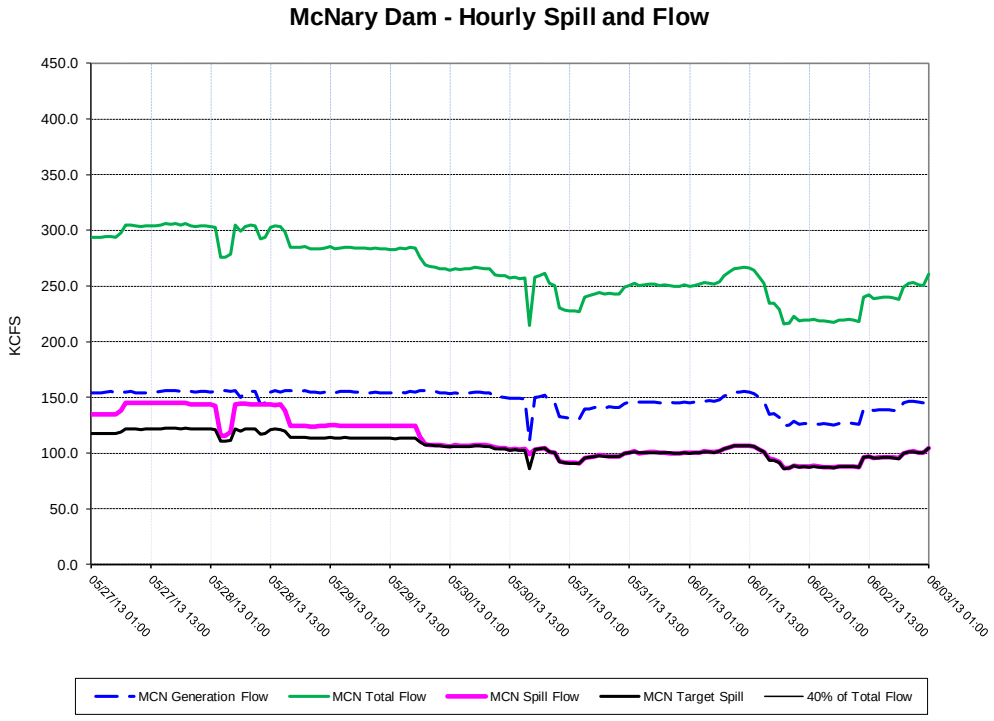
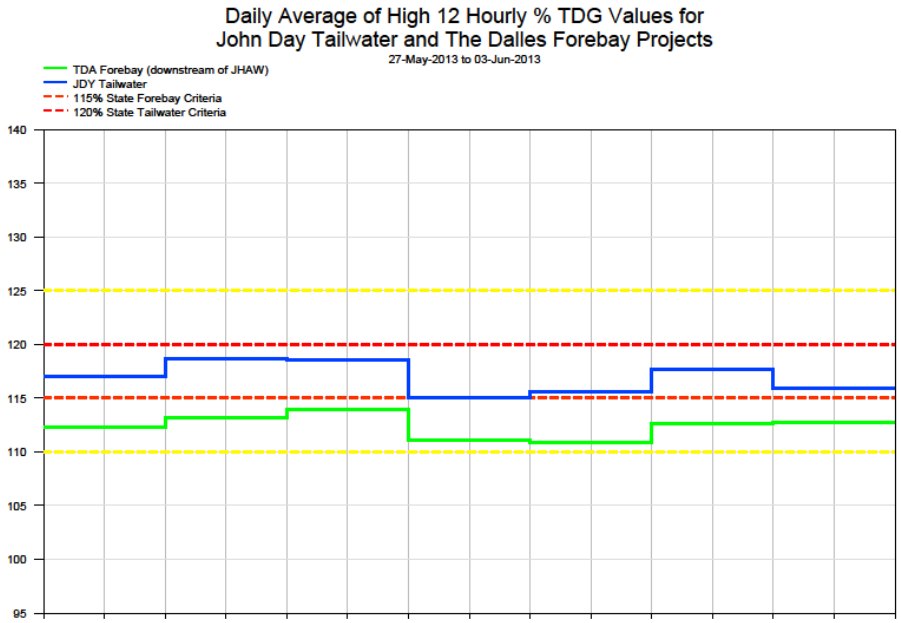

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/27/13 01:00
05/27/13 13:00
05/28/13 01:00
05/28/13 13:00
05/29/13 01:00
05/29/13 13:00
05/30/13 01:00
05/30/13 13:00
05/31/13 01:00
05/31/13 13:00
06/01/13 01:00
06/01/13 13:00
06/02/13 01:00
06/02/13 13:00
06/03/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 38


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
27-May-2013 to 03-Jun-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

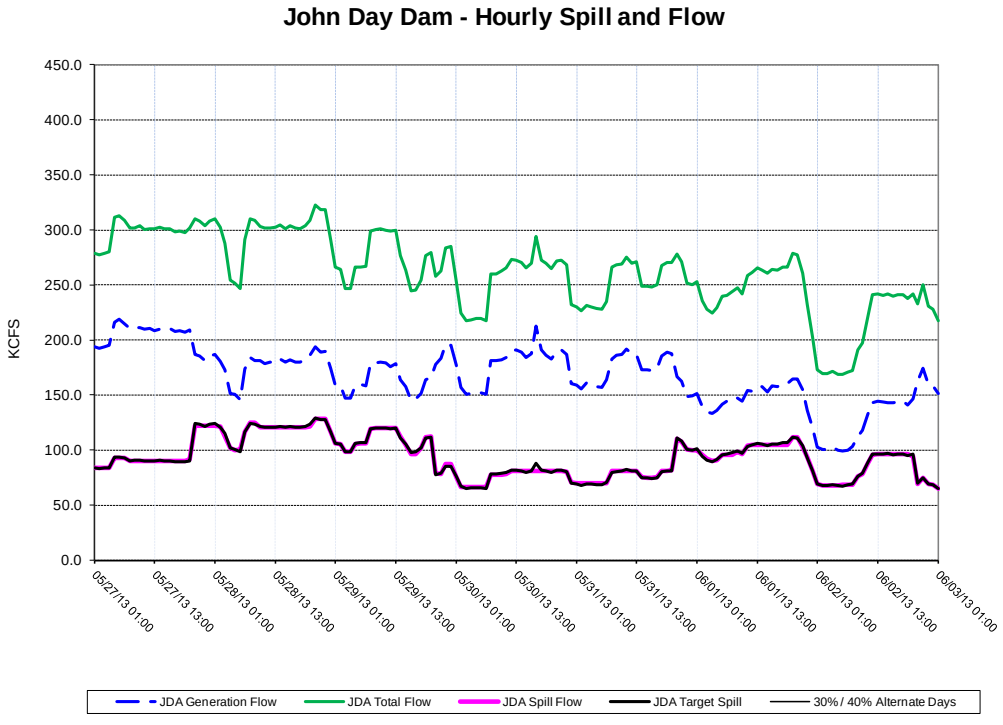
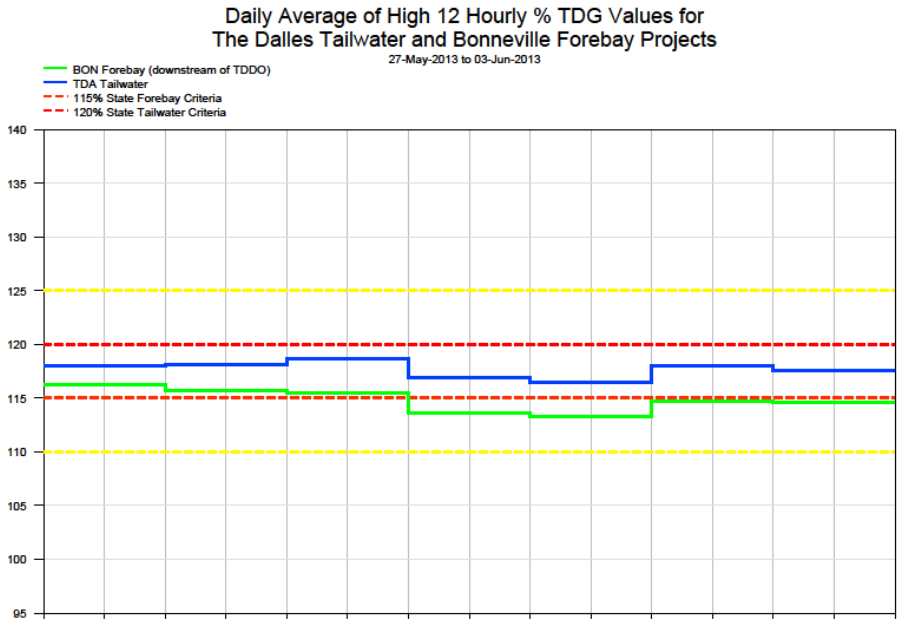

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/27/13 01:00
05/27/13 13:00
05/28/13 01:00
05/28/13 13:00
05/29/13 01:00
05/29/13 13:00
05/30/13 01:00
05/30/13 13:00
05/31/13 01:00
05/31/13 13:00
06/01/13 01:00
06/01/13 13:00
06/02/13 01:00
06/02/13 13:00
06/03/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 39


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
27-May-2013 to 03-Jun-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

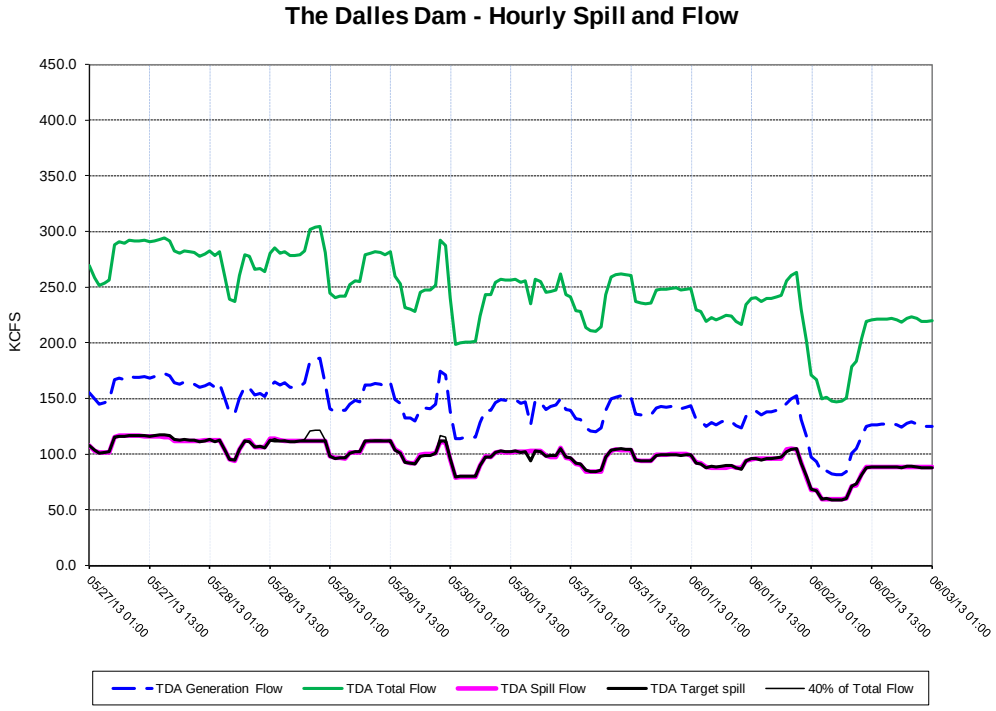
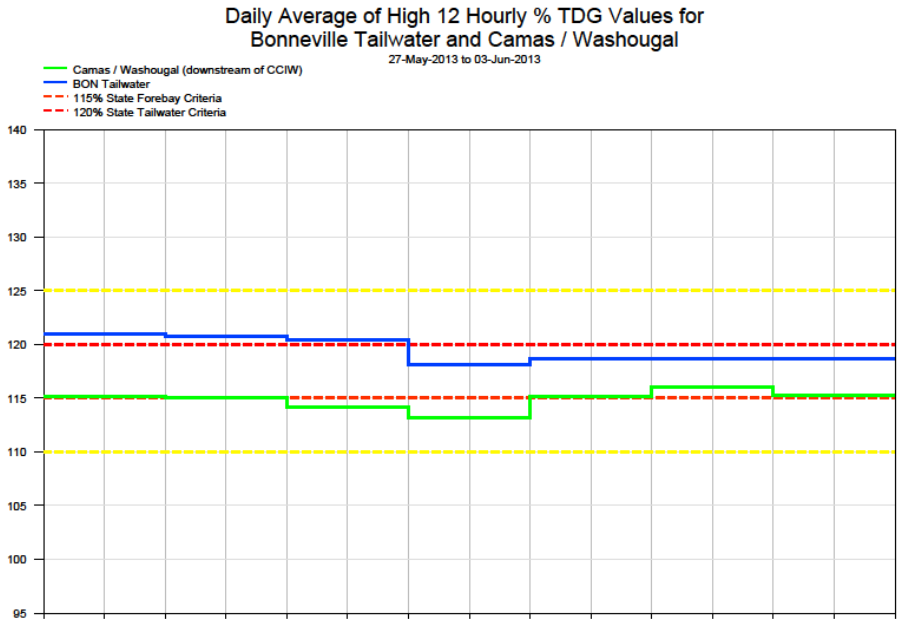
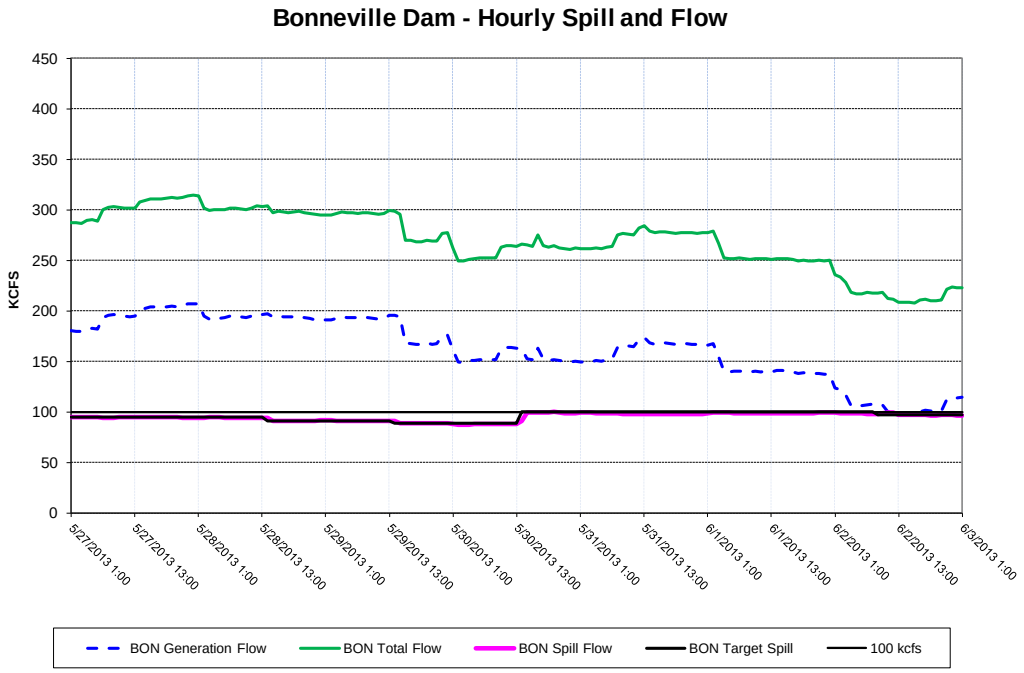

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/27/13 01:00
05/27/13 13:00
05/28/13 01:00
05/28/13 13:00
05/29/13 01:00
05/29/13 13:00
05/30/13 01:00
05/30/13 13:00
05/31/13 01:00
05/31/13 13:00
06/01/13 01:00
06/01/13 13:00
06/02/13 01:00
06/02/13 13:00
06/03/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 40


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
27-May-2013 to 03-Jun-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95


Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
5/27/2013 1:00
5/27/2013 13:00
5/28/2013 1:00
5/28/2013 13:00
5/29/2013 1:00
5/29/2013 13:00
5/30/2013 1:00
5/30/2013 13:00
5/31/2013 1:00
5/31/2013 13:00
6/1/2013 1:00
6/1/2013 13:00
6/2/2013 1:00
6/2/2013 13:00
6/3/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115
4/29/2013	104.4	111.9	112.9	111.8	113.1	118	**115.9**	113.6	109.4	113.9	110.5	115	110.5	115	110.9	118.5	112.3
4/30/2013	102.9	111.2	110.3	111.3	110.6	118.1	112.6	115.1	106.9	113.7	107.9	116.1	108.6	113.7	108.6	118.2	111.3
5/1/2013	100.9	110.8	108.2	110.4	109	**120.1**	111.2	115.5	106.3	113.4	105.8	117.1	110.7	116.5	110	118.1	112
5/2/2013	101.4	111.4	109.5	111.1	110.3	**120.4**	114	116	108.9	114	106.7	113.7	111.1	117.1	114.2	118.6	112.7
5/3/2013	101.5	111.3	110.8	112.2	112.7	119.9	**117.2**	115.5	111.3	114.6	107.3	115.3	110.2	116.4	**118**	119	**117.5**
5/4/2013	104.3	111.9	**116.8**	113.3	114.7	**120.1**	**119.2**	116.7	112.5	114.6	109.2	117.8	111.5	117.1	**116.9**	118.9	**117.3**
5/5/2013	106.4	112.9	**116.9**	113.7	**115.2**	119.7	**120.1**	117.3	112.9	114.9	112.4	115	113.3	118.1	**116.3**	118.9	**116.9**
5/6/2013	106.3	112.6	**117.3**	113	**115.9**	**120.4**	**119.2**	116.4	113.8	115.1	114.2	114.8	114.1	118.6	**117.5**	118.8	**117.8**
5/7/2013	105.7	111.7	**117**	112.5	**115.5**	**120.2**	**118.8**	116.4	114.1	114.8	114.3	115.1	113.1	117.6	115	118.5	**117**
5/8/2013	104.7	111.7	**115.6**	112	**115.3**	114.6	**119**	117.2	113.7	115.3	113.2	118	113	117.1	111.7	118.1	113.7
5/9/2013	104	110.1	**115.5**	115.3	**115.2**	115.8	**119**	117.9	113.5	116.9	114	118	113.9	118.1	112	118.3	113.1
5/10/2013	104	110.5	**115.2**	115.2	**115.3**	115.9	**118.2**	117.9	114.7	118.6	114.1	118.6	114.8	118.7	**115.3**	**120.2**	**115.1**
5/11/2013	104.6	110.8	114.1	115.3	**117.8**	117.2	**118**	117.9	**115.9**	120	114.5	119.3	**116.1**	118.8	**117.3**	**123.7**	**117.9**
5/12/2013	105.4	110.6	112.1	115.6	**117.7**	116.8	**118.4**	**120.2**	**116.3**	**120.4**	**115.5**	119.3	**115.4**	118.1	**117.7**	**123.7**	**118.2**
5/13/2013	105.5	113.4	110.2	117.8	**116.5**	118.2	**117.6**	**120.4**	**115.9**	119.2	**115.6**	118.6	114.6	117.6	**115.1**	**120.7**	**116.6**
5/14/2013	104.7	115.4	108	117.4	114.9	119.1	**115.4**	**121**	113.1	119.8	**115.2**	118.7	**115.5**	120	115	**122.5**	**116.4**
5/15/2013	105.4	113.6	109.7	116.5	**116.8**	119.4	**115.8**	**121**	**115.4**	120	114.8	118.7	115	119.9	**117.4**	**122.4**	**117.4**
5/16/2013	106.2	112.4	110.5	114.9	**117.1**	117.8	**116.5**	119.9	**115.6**	119.6	113.1	118.7	**115.2**	118.2	**117.8**	---	**117.9**
5/17/2013	106.1	111.3	109.7	113.3	115	116.9	**116.3**	119.6	114.4	118.8	113.6	118.2	112.9	117.7	**116**	---	**116.9**
5/18/2013	105.2	114.8	108.4	113.9	114	116.5	114.2	118.7	112.2	118.5	111.7	118	112.9	117	113.7	**120.6**	113.9
5/19/2013	103.9	113.1	107.3	112.5	111.6	114.5	112.1	117.3	110.8	118.5	110	117.9	---	116.9	113.3	**120.3**	114
5/20/2013	104.9	111.6	110.9	114.9	113.1	117	113.9	115.9	114.8	119	110.5	119.2	**115.5**	119.5	**116.1**	**120.5**	**116.6**
5/21/2013	106.2	111.9	111.7	114	114.9	119.2	**115.2**	115.5	**115.7**	119	111.1	119.2	**115.1**	119.6	**116.7**	**120.5**	114.8
5/22/2013	105.4	111.8	110.4	113.4	113.2	118.6	113.1	116	112.4	118.9	110.3	117	112	117.9	113.1	118.8	111.5
5/23/2013	104.5	111.6	108.5	113.7	111.4	119.1	111.3	116.2	109.2	118	111.1	117.9	111.7	117.4	**115.3**	**120.5**	113
5/24/2013	102.4	111.1	108.5	113.4	111.4	118.7	112.7	115.3	111.9	117.9	110.4	118.1	113.3	118.5	**115.4**	**120.5**	114.3
5/25/2013	103	114.2	109.4	115.7	111.9	119.1	113.9	115.9	112.9	117.7	109.1	118.1	112.8	118.2	**116.3**	119.4	**116.3**
5/26/2013	103.7	112.2	110.4	114	111.9	118.6	114.6	115.2	113.1	117.4	111.5	116.3	112.9	118.4	**116.4**	**121**	**115.7**
5/27/2013	103.7	112.3	111.4	115.1	114.3	**120.1**	**115.6**	114.4	114.5	117.4	111.8	117	112.3	118	**116.2**	**121.1**	**115.1**
5/28/2013	104.1	112.2	112.2	115.2	113.6	**120.3**	**115.9**	115.8	113.4	117.5	112.6	118.6	113.1	118.1	**115.7**	**120.9**	115
5/29/2013	104.2	112.5	112.7	115.1	113.2	119.6	**116.2**	116.2	112.7	116.4	113.3	118.5	113.9	118.7	**115.5**	**120.5**	114.2
5/30/2013	102.8	111.4	111.6	114	112.2	119	**115.1**	115.8	110.9	114.9	110.9	115	111	116.9	113.6	118.2	113.2
5/31/2013	101.4	111.2	110.6	113.9	111.8	119	114.1	115.9	110.3	114.1	109.1	115.6	110.9	116.4	113.3	118.8	**115.1**
6/1/2013	102.1	111.2	111.1	114.2	113.1	119.2	**116.1**	115.7	112.3	114.2	109.3	117.6	112.6	118	114.7	118.8	**116**
6/2/2013	103.3	112.2	111.8	114.7	114.2	119.5	**117.5**	116.4	113.1	114.2	108.9	115.9	112.8	117.6	114.6	118.8	**115.2**

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal

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UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

PORTLAND DIVISION

NATIONAL WILDLIFE FEDERATION, et al.,

Plaintiffs,

v.

NATIONAL MARINE FISHERIES SERVICE, et al.,

Defendants,

Case No.: 3:01-CV-00640-SI

NOTICE OF FEDERAL DEFENDANTS' THIRD 2013 SPILL IMPLEMENTATION REPORT

In accordance with the Court's August 2, 2011 Opinion and Order (ECF No. 1855) and Federal Defendants' Notice Re: 2013 Spill Operations at 7 (ECF No. 1905) (filed Mar. 28, 2013), Federal Defendants submit their third 2013 spill implementation status report. *See* Exhibit 1. This status report includes, among other things: the hourly flow through the powerhouse at each dam; the hourly flow over the spillway compared to the target spill for that hour; and the resultant 12-hour average total dissolved gas ("TDG") for the tailwater at each project and for the next project's forebay downstream. The report also provides written explanations of variances that occurred during the reporting period.

Dated this 17th day of July, 2013.

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CERTIFICATE OF SERVICE

I certify that on July 17, 2013, the foregoing will be electronically filed with the Court's electronic filing system, which will generate automatic service upon on all Parties enrolled to receive such notice. The following will be manually served by overnight mail:

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FISH OPERATIONS PLAN IMPLEMENTATION REPORT
June 2013

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

The U.S. Army Corps of Engineers (Corps) is submitting this report in accordance with the 2013 Fish Operations Plan (2013 FOP) submitted to the U.S. District Court of Oregon on March 28, 2013. The 2013 FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the fish migration season, generally April through August. To the extent Corps project operations are not specified in the 2013 FOP, the FCRPS operations will be consistent with the 2010 NOAA Fisheries Supplemental Biological Opinion (2010 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2013 Water Management Plan (WMP), WMP seasonal updates, and the 2013 Fish Passage Plan (FPP).

The Corps' June 2013 lower Snake and Columbia River project and fish passage operations are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant high 12-hour average percent Total Dissolved Gas (%TDG) levels in the tailrace at each project and in the subsequent downstream project's forebay and the Camas-Washougal gauge below Bonneville Dam.

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2013 FOP in June.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[1] in June displaying the performance of the spill program as follows:

(A) Daily Average of the High 12 Hourly %TDG Values - described in the upper graph.
(B) Hourly Spill and Generation Flows - described in the lower graph.

The weekly graphs begin on June 3 and end on June 30 for the following lower Snake River and lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.

[1] Operations are implemented from Monday through Sunday.

Each figure represents one week of a project's operation. The graphs start at 0000 hours (%TDG graphs) and 0100 hours (flow/spill graphs) on June 3 for the lower Snake River and the lower Columbia River projects.

June 3 – June 9	Figures 1 – 8
June 10 – June 16	Figures 9 – 16
June 17 – June 23	Figures 17 – 24
June 24 – June 30	Figures 25 – 32

A. Upper Graph: Shows the resultant daily average %TDG for the 12 highest hours. This is primarily a result of spill at dams. The objective is to operate each project up to the TDG limits without exceeding those limits to the extent practicable.

1. The blue line represents the %TDG in the tailrace of the dam. 120 percent TDG is the upper operating limit.
2. The green line represents the %TDG in the forebay of the next dam downstream. 115 percent TDG is the upper operating limit.

B. Lower Graph: Shows the hourly flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The medium green line represents the average hourly total river flow through the project in kcfs.
- The heavy pink line represents the average hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2013 FOP.
- The heavy black line represents the target spill. This is the hourly maximum spill level. The hourly target spill may vary as a function of total river flow, forebay elevation and generator capacity, subject to the following conditions:

    - spill percentage or flow rate specified in the 2013 FOP;
    - spill caps as set daily for TDG management;
    - test spill levels for fish passage research;
    - minimum generation for power system needs;
    - minimum spill at Bonneville (50 kcfs) dam;
    - minimum spill at John Day is 25 percent of project outflow.

II. A table is included at the end of the figures that lists the average daily %TDG for the 12 highest hours for all projects. The numbers in red indicate the project exceeded the %TDG gas cap - 115 percent (forebay of the next downstream dam) or 120 percent (tailwater) for each project.

General Implementation Remarks:

For all projects that spill for fish passage, the target spill may be reduced due to various conditions as described below. When spill levels briefly deviate below or above the level specified in the 2013 FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual operation deviations from the target operation during voluntary spill hours are described below. The June 2013 Spill Variance Table includes average hourly data; therefore, while spill may vary from target spill for only a portion of an hour, the June 2013 Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly spill levels are not achievable due to mechanical limitations in setting spill gates to implement the regionally coordinated spill pattern. The project operator sets the spill gate stops to most closely approximate the 2013 FOP level of spill while also avoiding exceeding the %TDG spill cap to the extent practicable.

"Low flow" operations at the lower Columbia and Snake projects are triggered when inflow is insufficient to provide both minimum generation and the specified spill levels. In these situations, the projects operate at minimum generation and pass the remainder of project inflow as spill and through other miscellaneous routes, such as fish ladders, sluiceways, and navigation locks. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain.

The combination of these factors may result in instances when unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation, MOP elevation, and the target spill may not be possible throughout every hour. During low flow periods at Little Goose Dam, the overall project spill percentage appears to be reduced because the calculations do not account for the volume of water released during navigational lockages; however, the actual spill volume remains constant. When these variances occur, they are recorded in the monthly Spill Variance Table for Little Goose under the variance type "Navigation."

Actual spill levels at Corps projects with set flow targets may vary up to ±2 kcfs (Bonneville Dam may range up to ±3 kcfs, 2013 FOP p. 18) compared to those specified in the 2013 FOP and the RCC spill priority list (defines the projects' %TDG spill caps). A number of factors influence actual spill, including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (e.g. a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The 2013 FOP describes project "Operations during Rapid Load Changes" (p. 6). For reporting purposes, the notation "Transmission Stability" in the Spill Variance Report Table replaces "Rapid Load Changes," and identifies instances when hourly spill levels were not met as a result of load swing hours and other related within-hour load variability issues. "Transmission Stability" occurs because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Corporation (NERC) reserve requirements ("on response"). In addition to within-hour load variability, projects on response must be responsive

to within hour changes resulting from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while spill quantity remains the same within the hour. Under normal conditions, within-hour load changes primarily occur immediately preceding and following the peak load hours; however, within-hour changes in intermittent generation can occur at any hour of the day. Occasionally, several hours after peak load hours, the project may be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. Due to the high variability of within-hour load, reporting actual spill percentages that vary by more than the ±1 percent requirement (or other ranges specified in the 2013 FOP) may occur with greater frequency with "Transmission Stability" hours than other hours.

Occurrences requiring an adjustment in operations and/or regional coordination are described in greater detail in the "Operational Adjustments" section below.

June Operations:

The month of June was characterized by below average flows for the lower Snake River and slightly below average flows for the lower Columbia River. The NOAA Northwest River Forecast Center's Runoff Processor indicated that the June adjusted volume runoff on the Lower Snake was below the 30 year average (1981-2010): 3.4 MAF (million acre feet) or 55 percent of average as measured at Lower Granite Dam. The Runoff Processor also indicated that the June 2013 adjusted volume runoff on the Lower Columbia was below the 30 year average (1981-2010): 24.3 MAF or 93 percent of average as measured at The Dalles. The monthly precipitation summary for June was significantly below average at 61 percent on the Snake River above Ice Harbor Dam and near average on the Columbia River above The Dalles Dam at 98 percent.

During the June reporting period, the planned 2013 FOP spill operations were carried out as follows:

- Lower Granite Dam - The hourly target spill level was 20 kcfs 24-hours/day through June 20 when the operation transitioned to the summer level of 18 kcfs 24-hours/day.
- Little Goose Dam - The hourly target spill level was 30 percent of total river flow 24-hours/day.
- Lower Monumental Dam - The hourly target spill level was the %TDG gas cap 24-hours/day through June 20 when the operation transitioned to the summer level of 17 kcfs 24 hours/day.
- Ice Harbor Dam - The hourly target spill level alternated every two days between 30 percent of total river flow 24-hours/day vs. 45 kcfs daytime and the %TDG gas cap nighttime. Nighttime spill hours are 1800-0500.
- McNary Dam - The hourly target spill level was 40 percent of total river flow 24-hours/day through June 19 when the operation transitioned the summer level of 50 percent of total river flow 24-hours/day.
- John Day Dam - The hourly target spill level alternated every two days between 40 percent vs. 30 percent of total river flow for 24-hours/day. Spill level changes occurred at 2000 hours.

- The Dalles Dam - The hourly target spill level was 40 percent of total river flow 24-hours/day.
- Bonneville Dam - The hourly target spill flow rate was 100 kcfs 24-hours/day until June 16 when the operation transitioned to the summer operation of alternating every two days between 95 kcfs 24-hours/day vs. 85 kcfs daytime/121 kcfs nighttime.

Operational Adjustments

1. Lower Granite Dam:

• On June 11, a total of 98 subyearling Chinook mortalities (97 adipose fin clipped, 1 unclipped) occurred at the Lower Granite Dam Juvenile Fish Facility (JFF). The fish were being held in a recovery tank as part of a Corps study to evaluate prototype fish passage structures in the juvenile fish bypass system. At 1545 hours, contract research personnel from Blue Leaf Environmental (sub-contractor to University of California, Davis) inadvertently left a recovery tank lid open, allowing 98 of the 282 fish in the tank to jump out. The mortalities were discovered at 1730 hours by a Corps technician who secured the tank lid to prevent the loss of more fish. The Corps took corrective action and worked with the lead contractor to develop additional QA/QC protocols and modify staffing schedules to include on-site senior staff throughout all shifts to ensure protocols and standard operating procedures are implemented correctly. The total number of mortalities throughout the study was within the authorized incidental take provided in the Section 10 Permit (NMFS 23-13-COE92). The Corps notified FPOM of this incident at the meeting on June 13.

• On June 20 from 1340-1530 hours, all spillbays were closed at Lower Granite Dam during the attempted retrieval of a navigation lock pump that was accidentally dropped into the forebay. As a result, hourly average spill was below the Lower Granite FOP spring spill level of 20 kcfs for a total of 3 hours: 1400 hours - 9.9 kcfs, 1500 hours - 0.0 kcfs, 1600 hours -10.1 kcfs. Average spill over the 24-hour period was 18.6 kcfs. This incident occurred during maintenance activities when a halter failed and a pump was dropped from a crane into the forebay upstream of the locks. The Corps operated the halter and crane in accordance with manufacturer specifications for the pump and is investigating the incident to identify all corrective actions necessary to prevent another halter failure. Due to the highly specialized nature of the pump in the navigation lock and the risk of flushing the pump downstream when the locks re-opened, the Corps deployed a Remotely Operated Vehicle (ROV) to locate and attempt retrieval of the pump. To address turbulent conditions that were impairing recovery of the pump the spill pattern was changed to shift spill away from bays 5-8 nearest the locks and distribute all spill through bays 1-4 (including the spillway weir in bay 1) from 1200-1330 hours. The 2013 FOP spring spill level of 20 kcfs was maintained during this time. Conditions at the site remained turbulent so all spillbays were closed at 1340 hours to attempt retrieval of the pump. During the spill outage, the pump was located with the ROV, but attempts to retrieve it were unsuccessful. At 1530 hours, the project resumed the FOP spill level of 20 kcfs using the pattern defined in the 2013 Fish Passage Plan. The Corps is reviewing information to determine action to successfully retrieve the pump. The navigation lock was out of service from 1200-1530 hours during this incident. The Corps provided regional notification of this incident to FPOM via email on June 21.

June 2013 Spill Variance Table

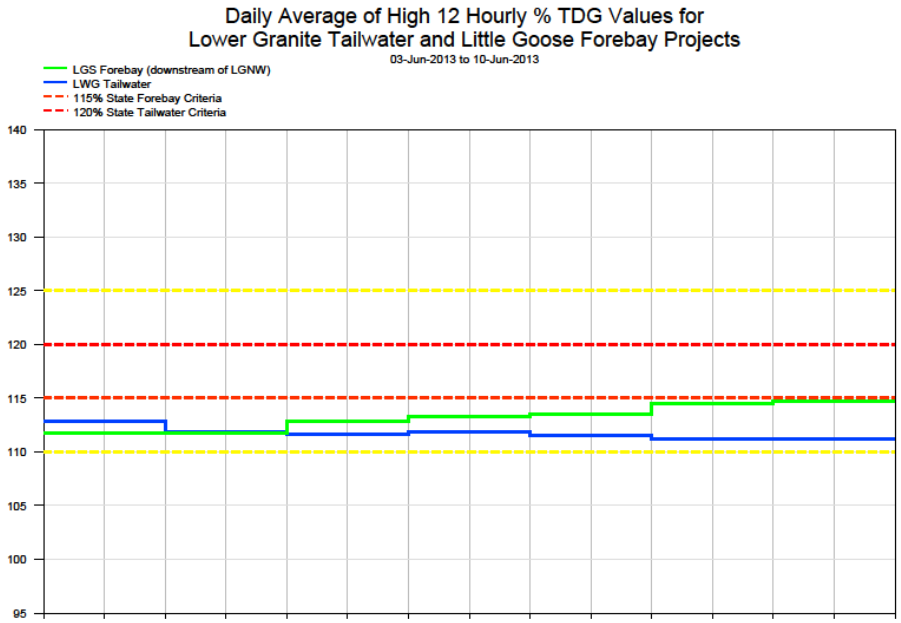
Table 1: June 2013 (6/3 - 6/30) - FOP Implementation Report Table

Project	Parameter	Date	Time[2]	Hours	Type	Reason
Lower Granite	Reduced Spill	6/20/13	1400-1600	3	Special Operation	Hourly spill decreased to 0.0 kcfs (below 20 kcfs FOP spill.) Emergency recovery attempt of navigation lock pump from the forebay.
Little Goose	Reduced Spill	6/13/13	1300	1	Navigation	Hourly spill decreased to 28.8 % (below 30.0% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.8%.
Little Goose	Reduced Spill	6/19/13	2400	1	Navigation	Hourly spill decreased to 28.9 % (below 30.0% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.9%.
Little Goose	Reduced Spill	6/22/13	0300	1	Human/Program Error	Hourly spill decreased to 28.8 % (below 30.0% ± 1% range). Delay in changing spill to requested 12 kcfs. 24 hr avg. spill was 29.8%.
Little Goose	Reduced Spill	6/22/13	0500	1	Navigation	Hourly spill decreased to 28.7 % (below 30.0% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.8%.
Little Goose	Reduced Spill	6/30/13	0700	1	Navigation	Hourly spill increased to 28.8/ % (below 30.0% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.1%.
Lower Monumental	Reduced Spill	6/3/13	1800	1	Navigation	Hourly spill decreased to 19.1 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/5/13	1800-1900	2	Navigation	Hourly spill decreased to 15.1 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/7/13	1800	1	Navigation	Hourly spill decreased to 16.2 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/9/13	1800-1900	2	Navigation	Hourly spill decreased to 14.9 kcfs (below 21 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/13/13	1800-1900	2	Navigation	Hourly spill decreased to 14.6 kcfs (below 22 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/15/13	1900	1	Navigation	Hourly spill decreased to 19.5 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/17/13	1800-1900	2	Navigation	Hourly spill decreased to 17.0 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/19/13	1700-1800	2	Navigation	Hourly spill decreased to 18.2 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/21/13	1700-1800	2	Navigation	Hourly spill decreased to 10.5kcfs (below17 kcfs FOP spill). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/23/13	1700	1	Navigation	Hourly spill decreased to13.4 kcfs (below 17 kcfs FOP spill). Reduced spill for safe passage of fish barge.

[2] Data collected for reporting spill variances is reported using hourly-averaged data. Therefore, while spill may be increased or decreased for only a portion of an hour, it is represented in the Spill Variance Table as an hour.

Lower Monumental	Reduced Spill	6/25/13	1700-1800	2	Navigation	Hourly spill decreased to11.5 kcfs (below 17 kcfs FOP spill). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/27/13	1800-1900	2	Navigation	Hourly spill decreased to 9.3 kcfs (below 17 kcfs FOP spill). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/29/13	1700-1800	2	Navigation	Hourly spill decreased to 12.5 kcfs (below 17 kcfs FOP spill). Reduced spill for safe passage of fish barge.
Ice Harbor	Additional Spill	6/6/13	0200	1	Human/Program Error	Hourly spill increased to 31.5 % (above 30.0% ± 1% range). Delay in changing spill to requested 18 kcfs. 24 hr avg. spill was 30.0%.
Ice Harbor	Reduced Spill	6/13/13	1300	1	Navigation	Hourly spill decreased to 28.9 % (below 30.0% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 40.5%.
Ice Harbor	Reduced Spill	6/25/13	1800	1	Navigation	Hourly spill decreased to 28.9 % (below 30.0% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 39.9%.
Ice Harbor	Reduced Spill	6/26/13	1400	1	Navigation	Hourly spill decreased to 28.8 % (below 30.0% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.1%.
John Day	Reduced Spill	6/18/13	1700	1	Human/Program Error	Hourly spill decreased to 38.9 % (below 40.0% ± 1% range) due to spill control program losing contact with the spillway. 24 hr avg. spill was 38.0%.
John Day	Reduced Spill	6/26/13	1000	1	Transmission Stability	Hourly spill decreased to 38.9 % (below 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 38.2%.
John Day	Reduced Spill	6/29/13	1100	1	Transmission Stability	Hourly spill decreased to 38.6 % (below 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 40.5%
The Dalles	Additional Spill	6/6/13	0200	1	Human/Program Error	Hourly spill increased to 41.1 % (above 40.0% ± 1% range) due to a miscalculation. 24 hr avg. spill was 38.7%.
The Dalles	Additional Spill	6/12/13	1200	1	Transmission Stability	Hourly spill increased to 41.1 % (above 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. 24 hr avg. spill was 40.0%.
Bonneville	Additional Spill	6/30/13	1200-1700	6	Operational Limitation	Hourly spill increased to 162.2 kcfs (above 85 kcfs FOP spill) due to an unexpected outage of transmission lines from Powerhouse 2. Spilled excess outflow until Powerhouse 2 returned to service.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
03-Jun-2013 to 10-Jun-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

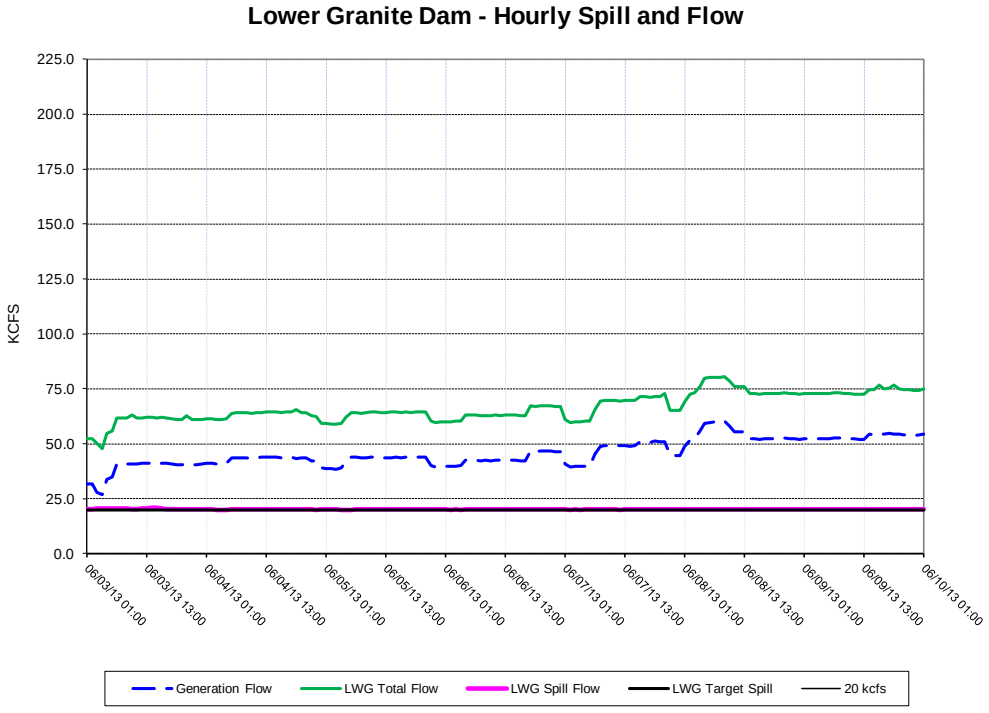
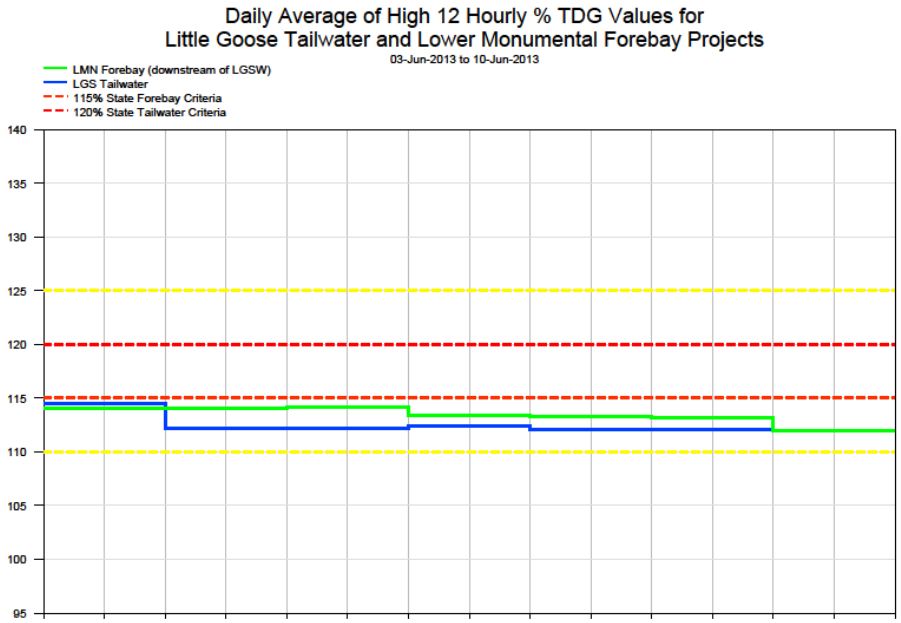

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/03/13 01:00
06/03/13 13:00
06/04/13 01:00
06/04/13 13:00
06/05/13 01:00
06/05/13 13:00
06/06/13 01:00
06/06/13 13:00
06/07/13 01:00
06/07/13 13:00
06/08/13 01:00
06/08/13 13:00
06/09/13 01:00
06/09/13 13:00
06/10/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 2



Little Goose Dam - Hourly Spill and Flow

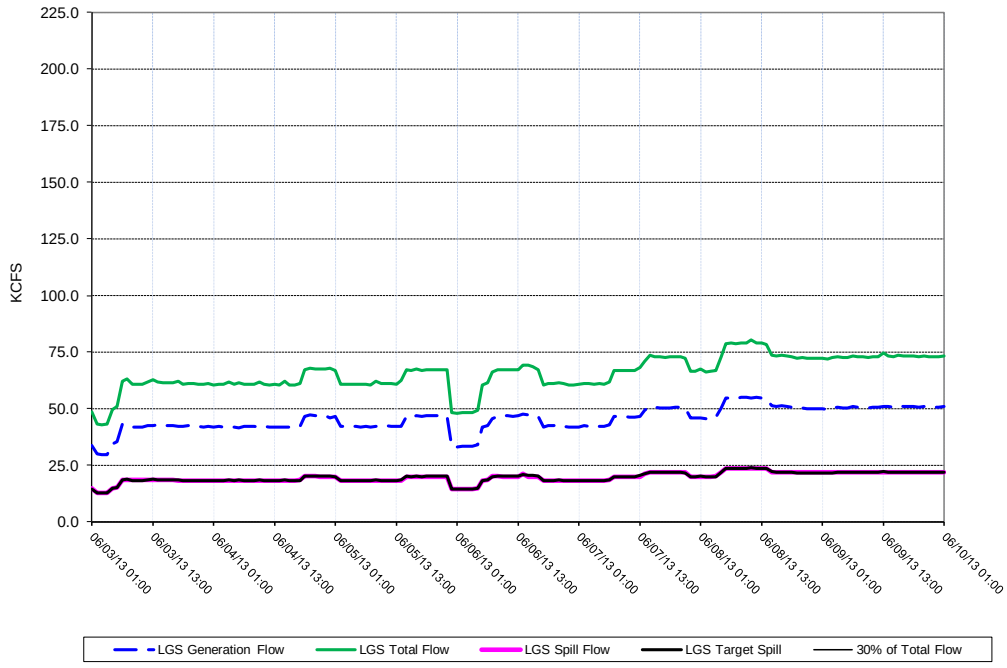
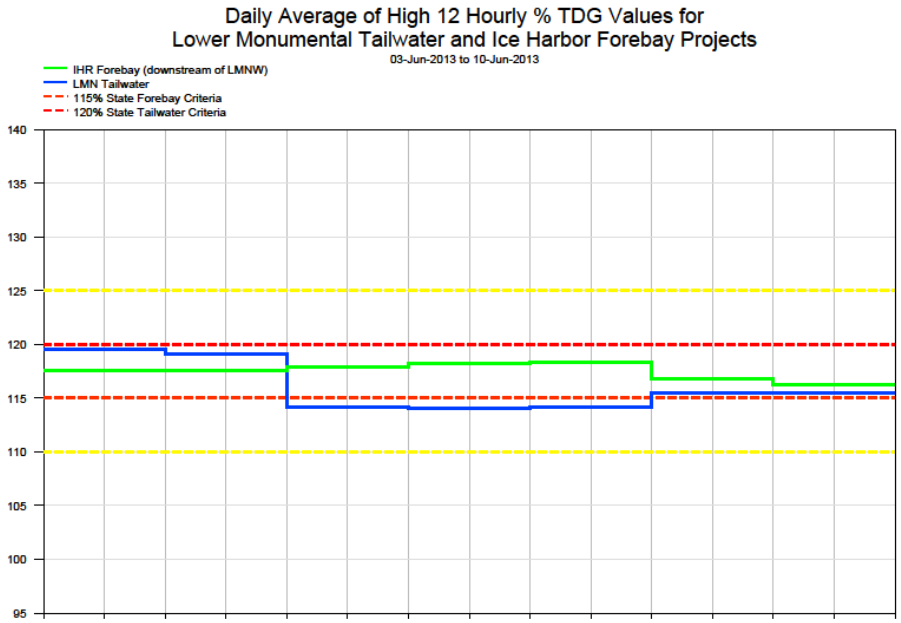


Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
03-Jun-2013 to 10-Jun-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

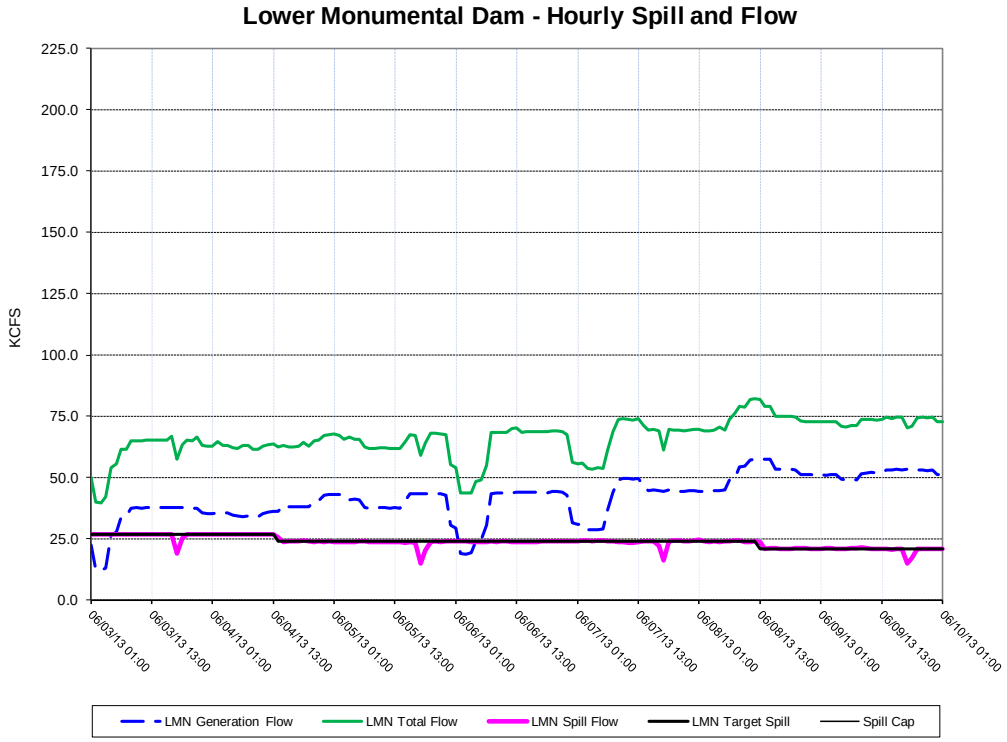
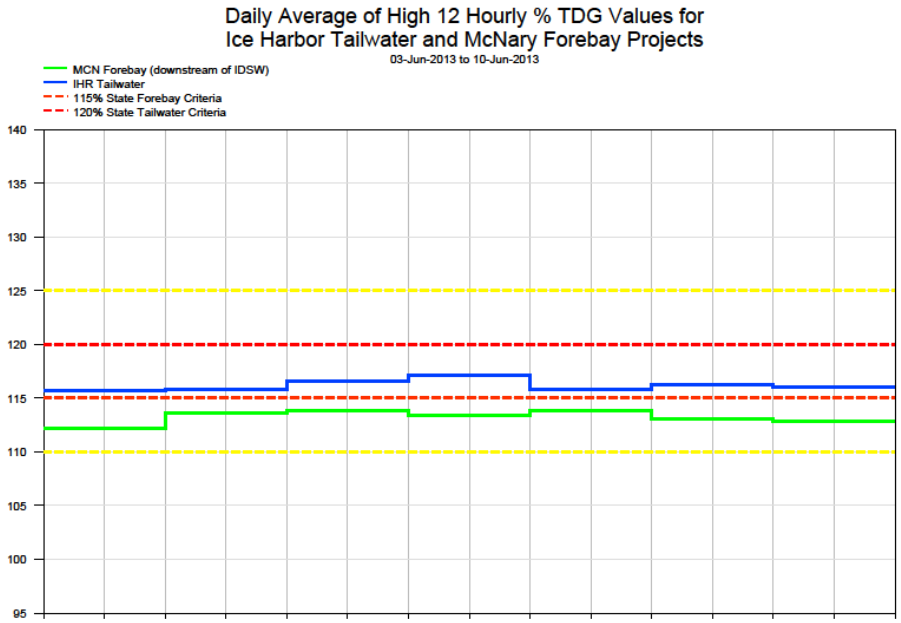

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/03/13 01:00
06/03/13 13:00
06/04/13 01:00
06/04/13 13:00
06/05/13 01:00
06/05/13 13:00
06/06/13 01:00
06/06/13 13:00
06/07/13 01:00
06/07/13 13:00
06/08/13 01:00
06/08/13 13:00
06/09/13 01:00
06/09/13 13:00
06/10/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
03-Jun-2013 to 10-Jun-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

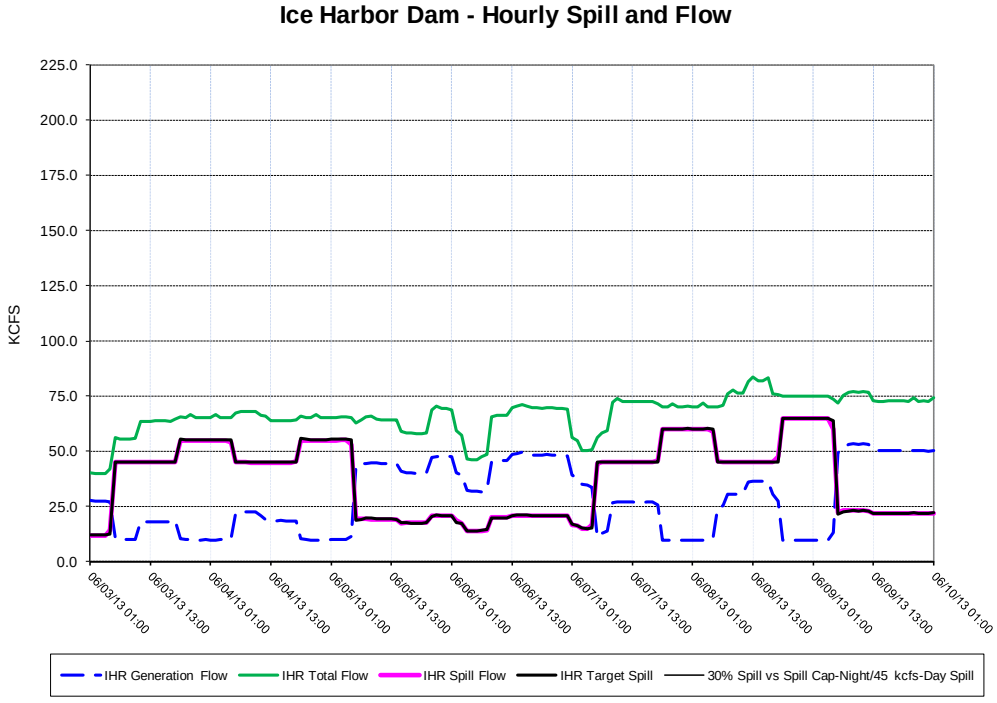
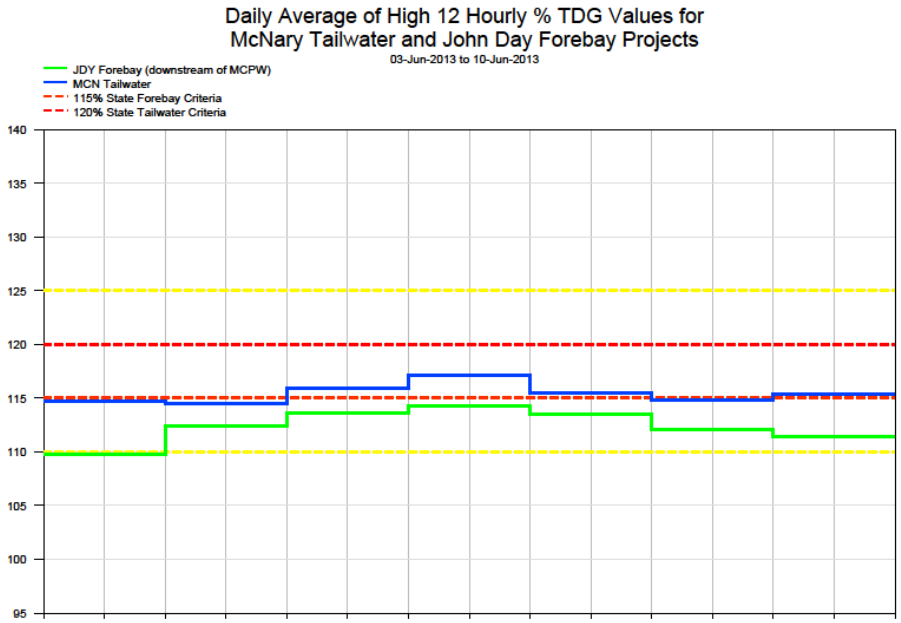

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/03/13 01:00
06/03/13 13:00
06/04/13 01:00
06/04/13 13:00
06/05/13 01:00
06/05/13 13:00
06/06/13 01:00
06/06/13 13:00
06/07/13 01:00
06/07/13 13:00
06/08/13 01:00
06/08/13 13:00
06/09/13 01:00
06/09/13 13:00
06/10/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 5


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
03-Jun-2013 to 10-Jun-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

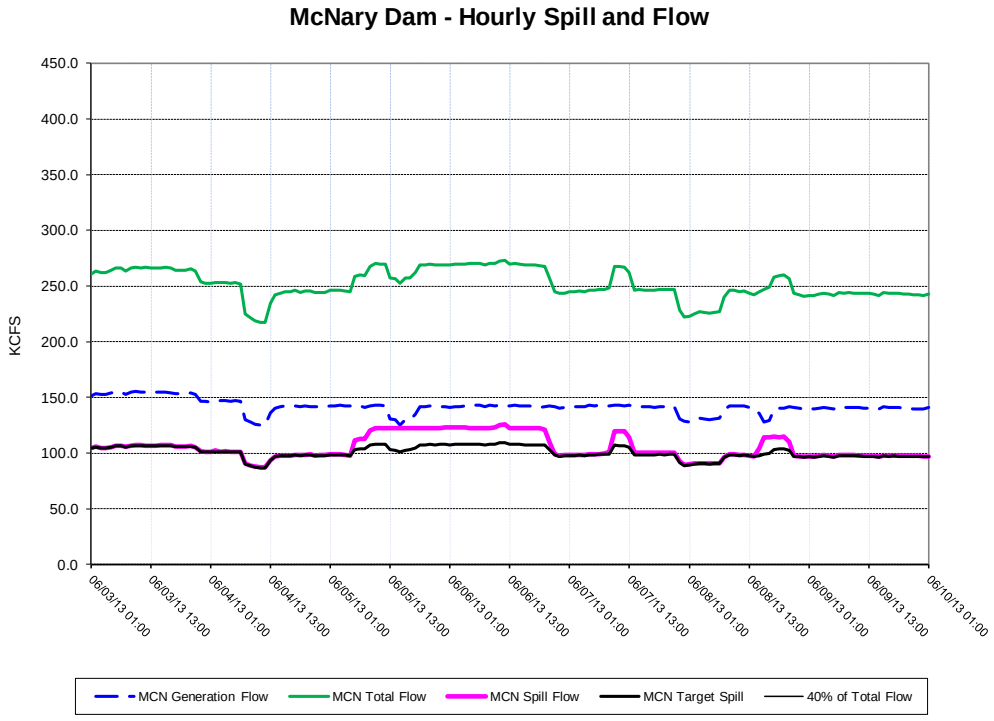
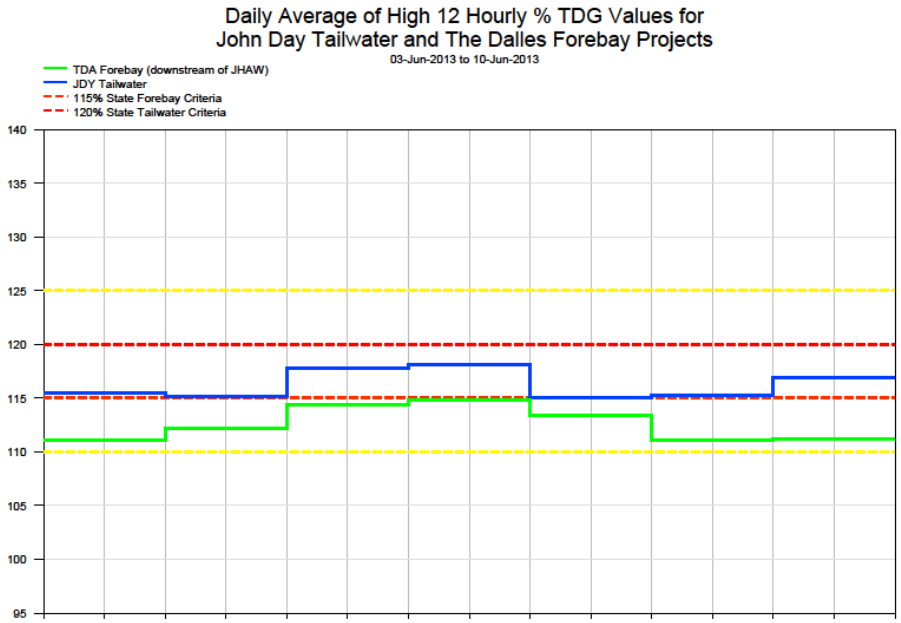

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/03/13 01:00
06/03/13 13:00
06/04/13 01:00
06/04/13 13:00
06/05/13 01:00
06/05/13 13:00
06/06/13 01:00
06/06/13 13:00
06/07/13 01:00
06/07/13 13:00
06/08/13 01:00
06/08/13 13:00
06/09/13 01:00
06/09/13 13:00
06/10/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 6


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
03-Jun-2013 to 10-Jun-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

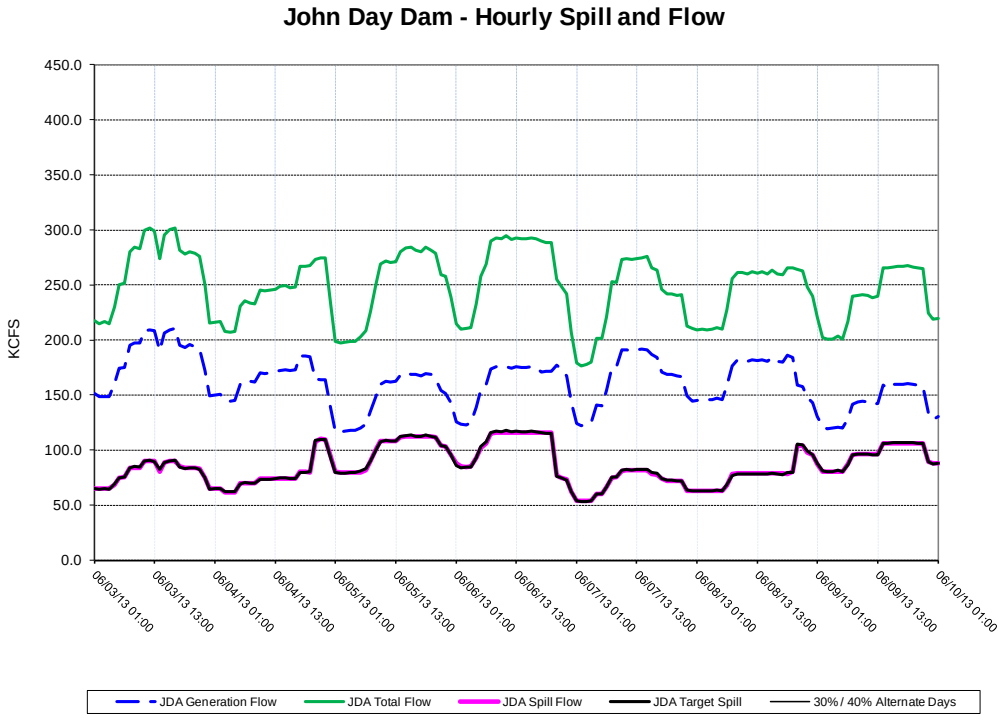
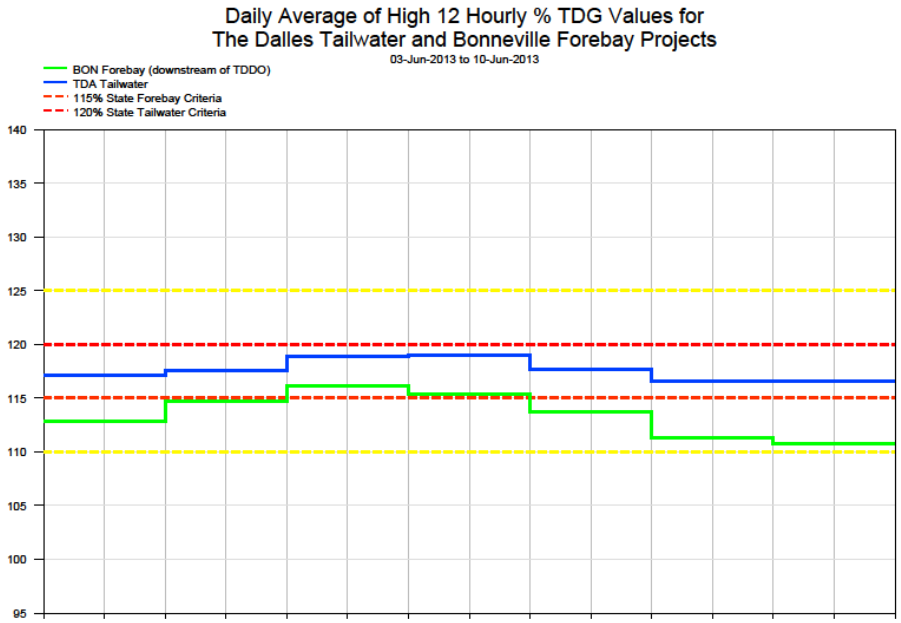

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/03/13 01:00
06/03/13 13:00
06/04/13 01:00
06/04/13 13:00
06/05/13 01:00
06/05/13 13:00
06/06/13 01:00
06/06/13 13:00
06/07/13 01:00
06/07/13 13:00
06/08/13 01:00
06/08/13 13:00
06/09/13 01:00
06/09/13 13:00
06/10/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 7


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
03-Jun-2013 to 10-Jun-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

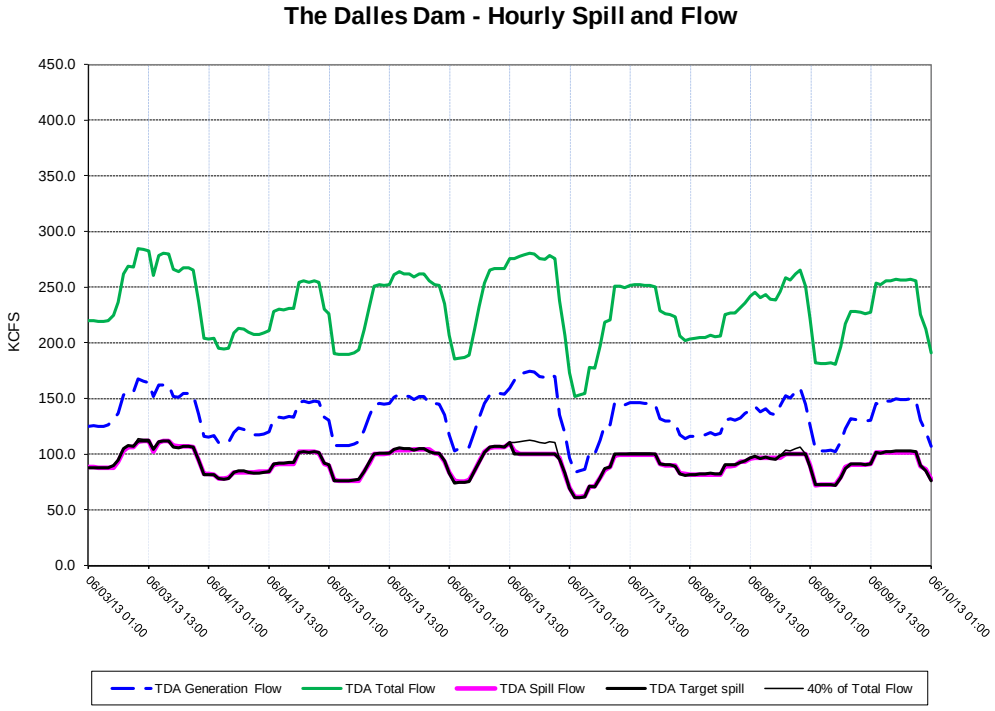
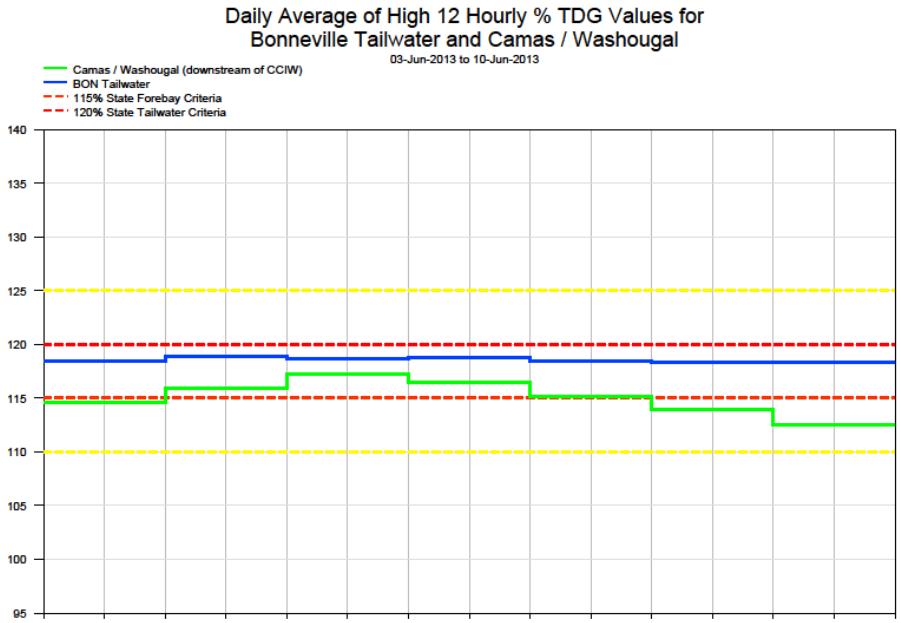

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/03/13 01:00
06/03/13 13:00
06/04/13 01:00
06/04/13 13:00
06/05/13 01:00
06/05/13 13:00
06/06/13 01:00
06/06/13 13:00
06/07/13 01:00
06/07/13 13:00
06/08/13 01:00
06/08/13 13:00
06/09/13 01:00
06/09/13 13:00
06/10/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
03-Jun-2013 to 10-Jun-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

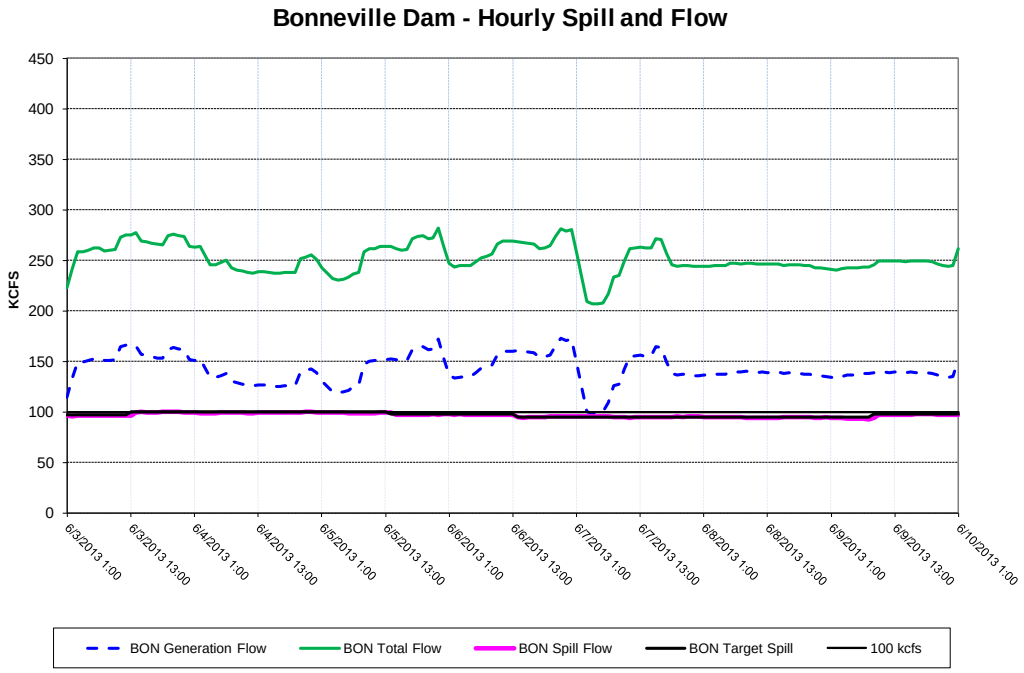
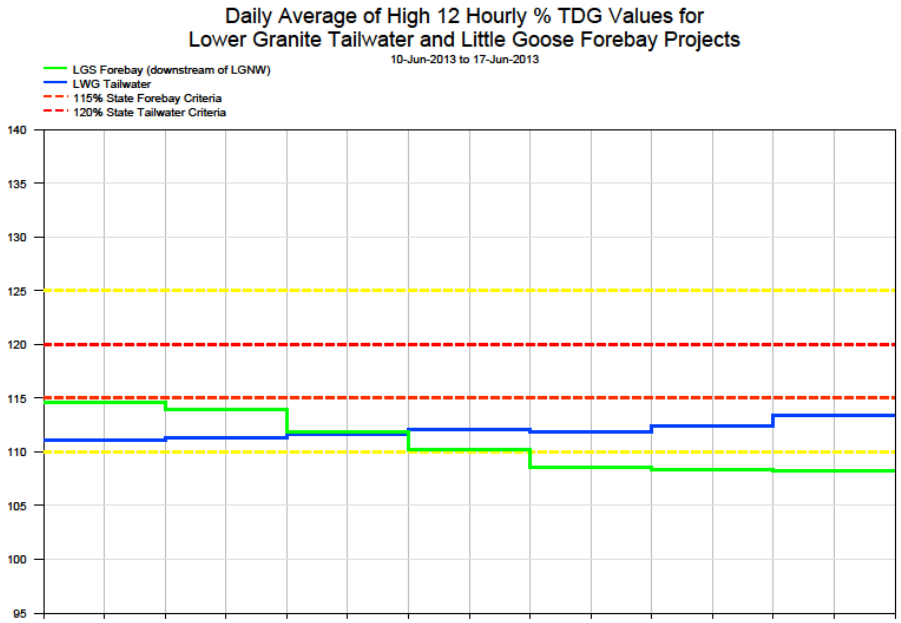

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
6/3/2013 1:00
6/3/2013 13:00
6/4/2013 1:00
6/4/2013 13:00
6/5/2013 1:00
6/5/2013 13:00
6/6/2013 1:00
6/6/2013 13:00
6/7/2013 1:00
6/7/2013 13:00
6/8/2013 1:00
6/8/2013 13:00
6/9/2013 1:00
6/9/2013 13:00
6/10/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 9


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
10-Jun-2013 to 17-Jun-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

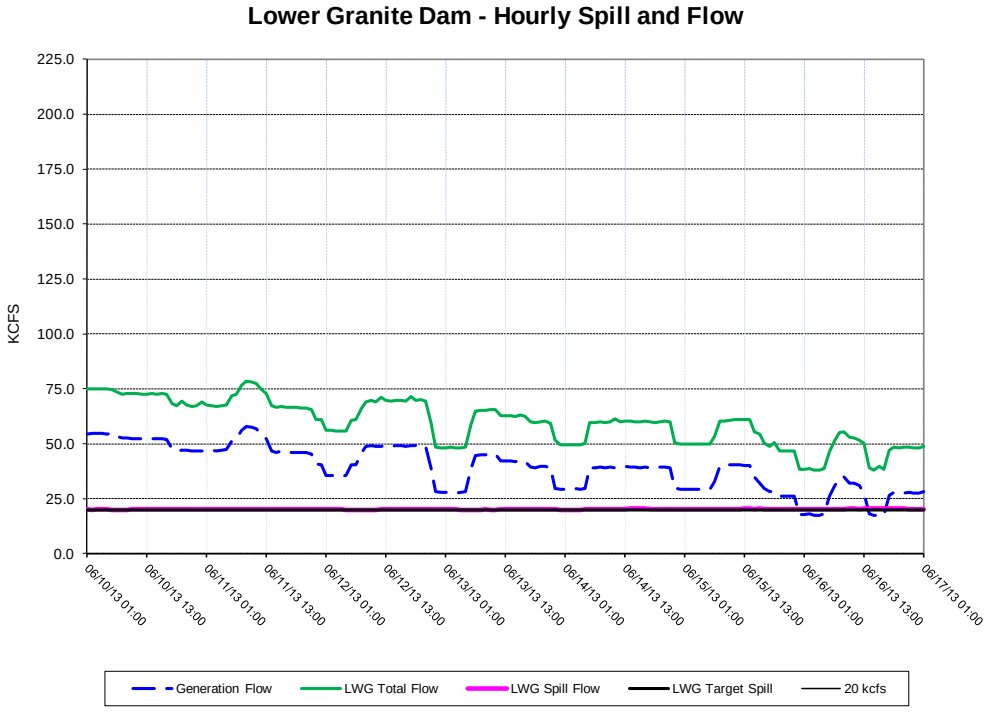
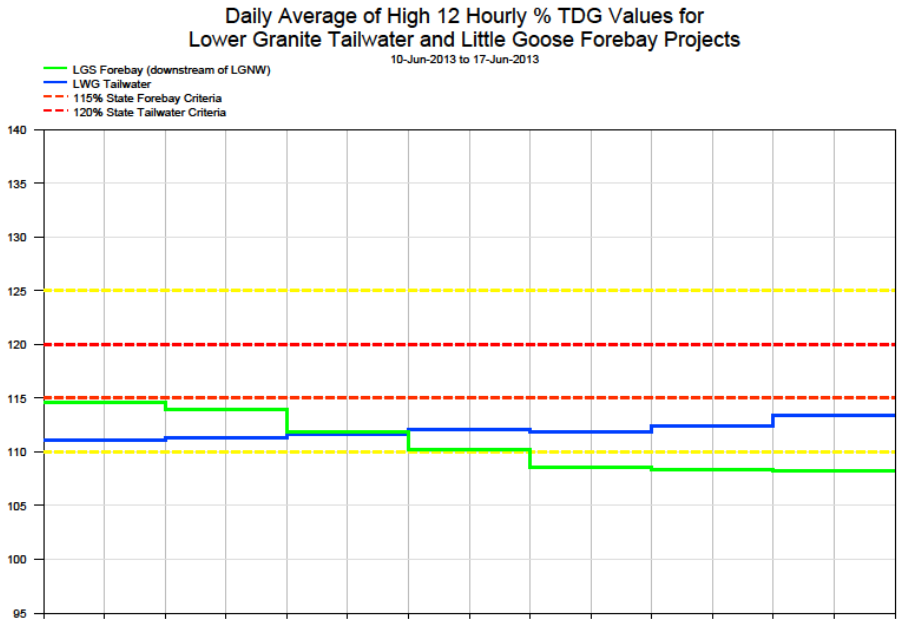

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/10/13 01:00
06/10/13 13:00
06/11/13 01:00
06/11/13 13:00
06/12/13 01:00
06/12/13 13:00
06/13/13 01:00
06/13/13 13:00
06/14/13 01:00
06/14/13 13:00
06/15/13 01:00
06/15/13 13:00
06/16/13 01:00
06/16/13 13:00
06/17/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 10


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
10-Jun-2013 to 17-Jun-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

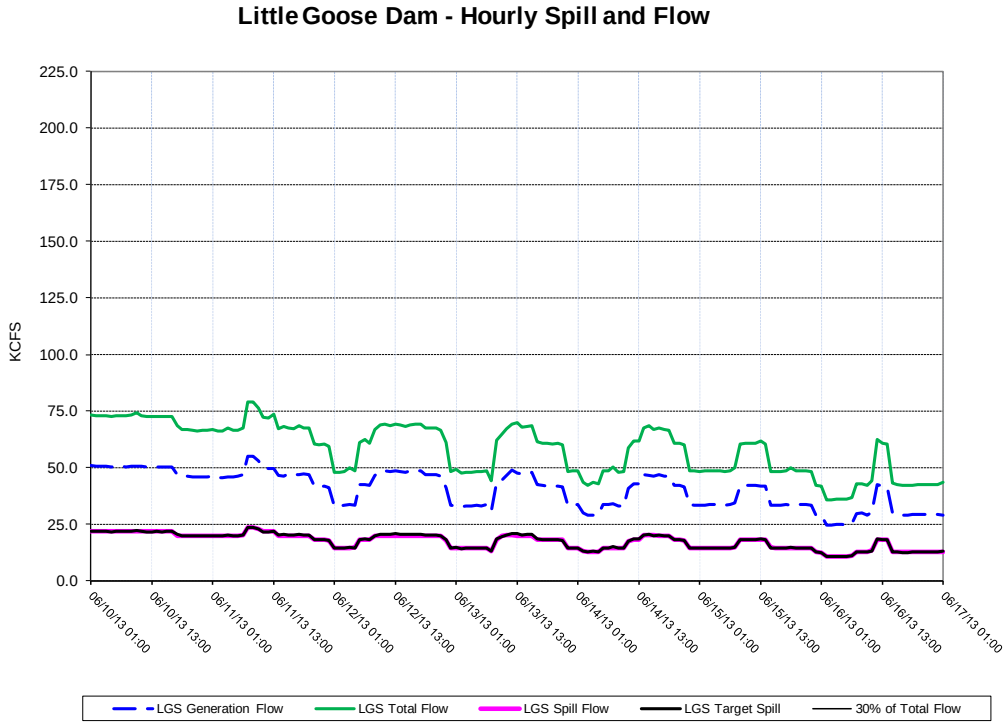
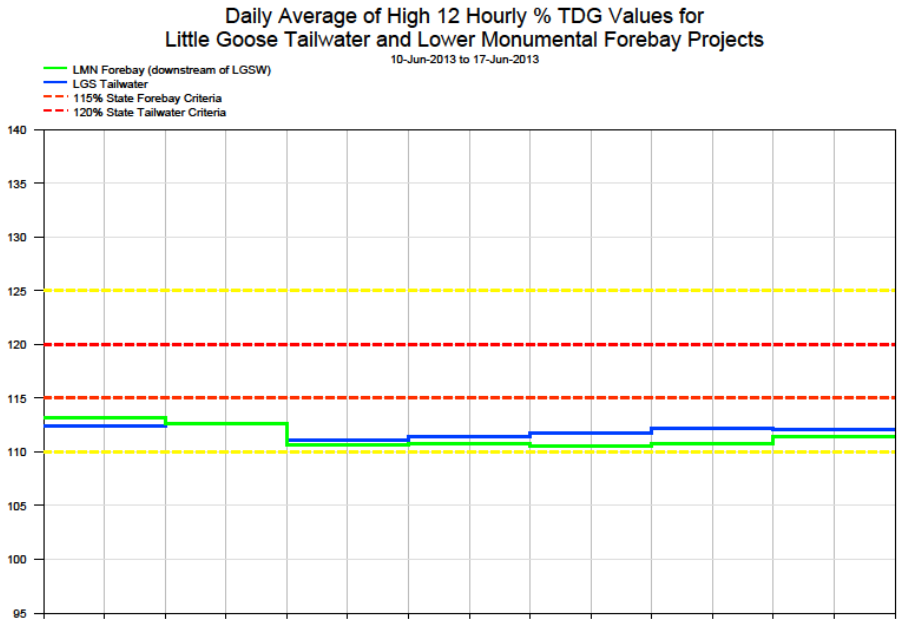

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/10/13 01:00
06/10/13 13:00
06/11/13 01:00
06/11/13 13:00
06/12/13 01:00
06/12/13 13:00
06/13/13 01:00
06/13/13 13:00
06/14/13 01:00
06/14/13 13:00
06/15/13 01:00
06/15/13 13:00
06/16/13 01:00
06/16/13 13:00
06/17/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 11


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
10-Jun-2013 to 17-Jun-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

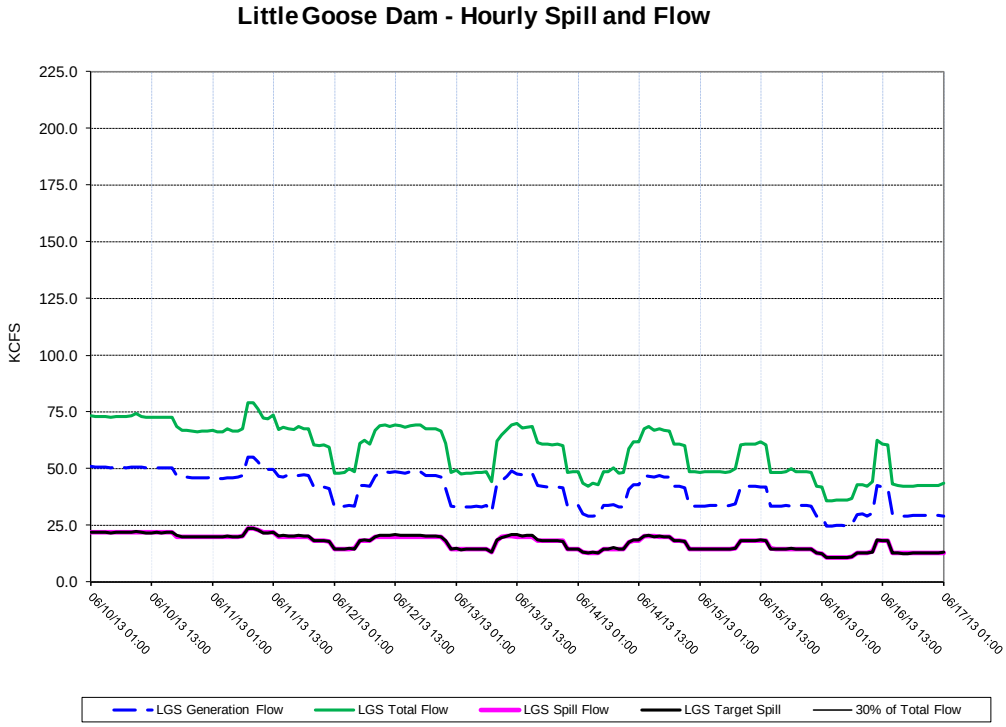
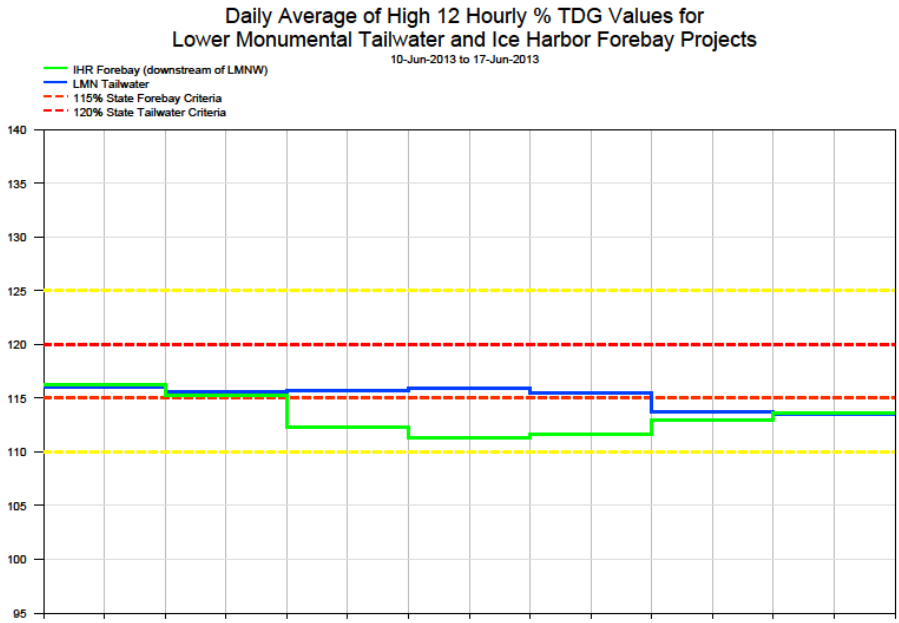

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/10/13 01:00
06/10/13 13:00
06/11/13 01:00
06/11/13 13:00
06/12/13 01:00
06/12/13 13:00
06/13/13 01:00
06/13/13 13:00
06/14/13 01:00
06/14/13 13:00
06/15/13 01:00
06/15/13 13:00
06/16/13 01:00
06/16/13 13:00
06/17/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 12


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
10-Jun-2013 to 17-Jun-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

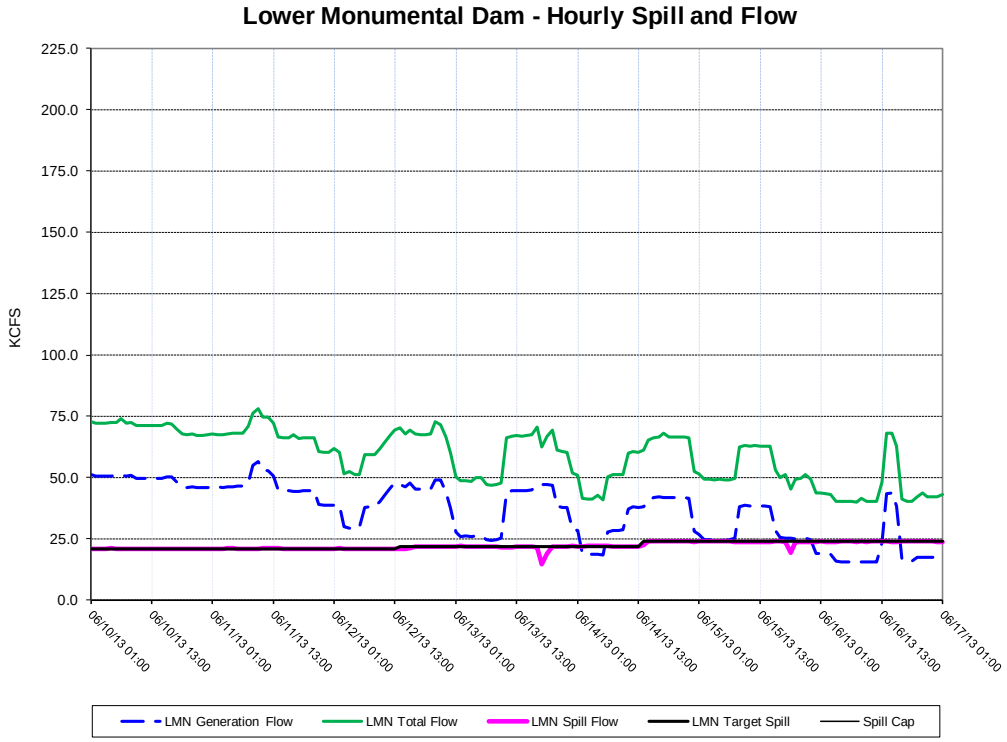
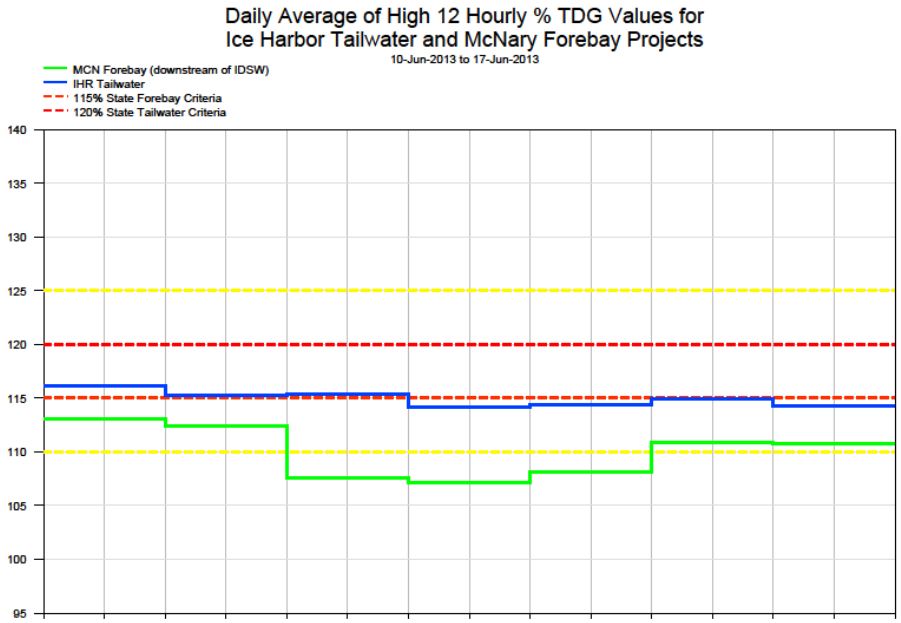

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/10/13 01:00
06/10/13 13:00
06/11/13 01:00
06/11/13 13:00
06/12/13 01:00
06/12/13 13:00
06/13/13 01:00
06/13/13 13:00
06/14/13 01:00
06/14/13 13:00
06/15/13 01:00
06/15/13 13:00
06/16/13 01:00
06/16/13 13:00
06/17/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 13


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
10-Jun-2013 to 17-Jun-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

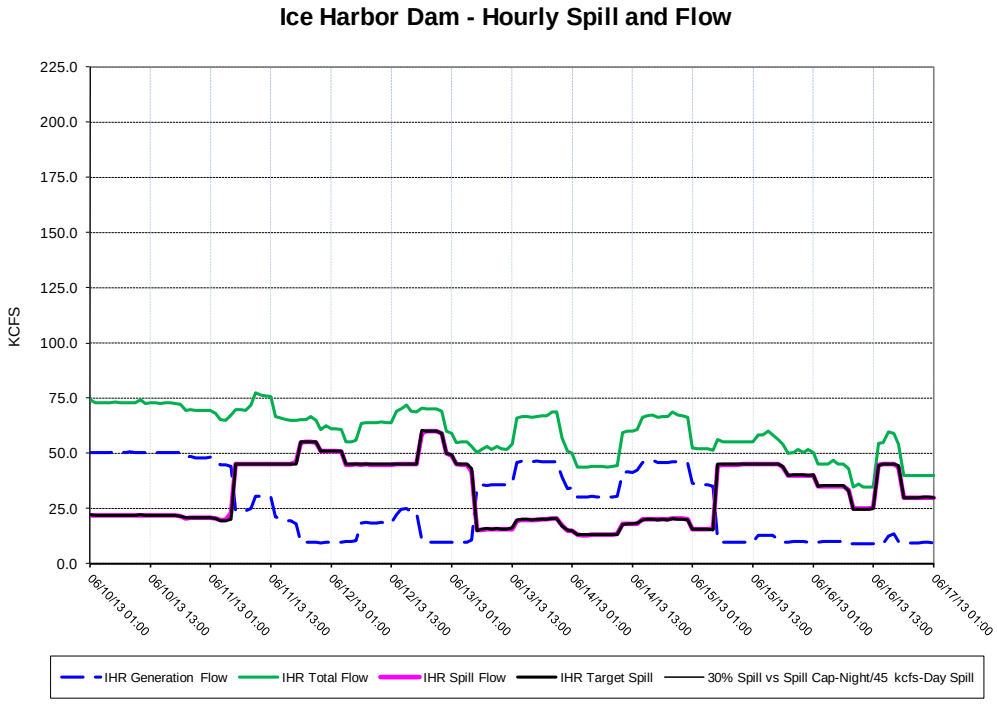
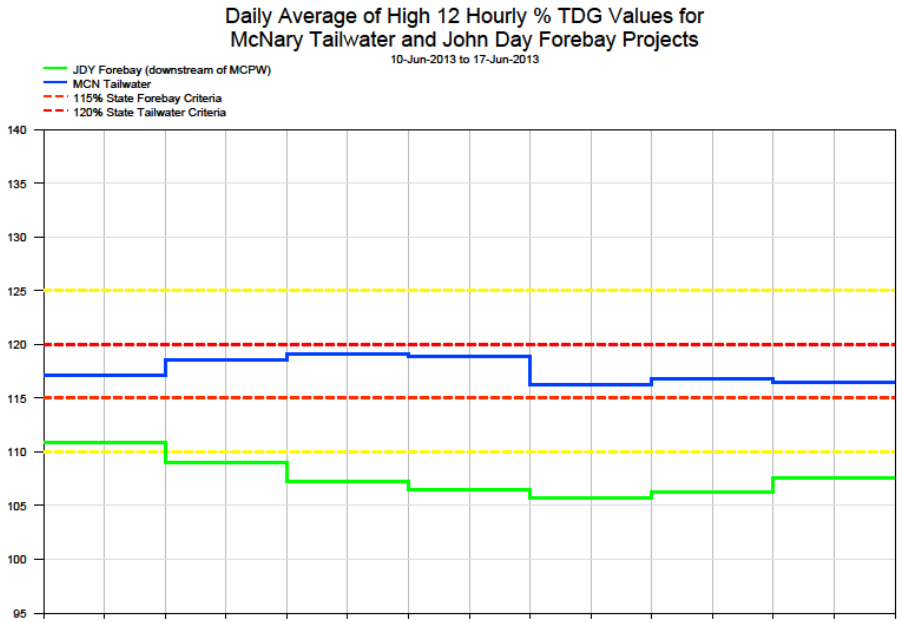

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/10/13 01:00
06/10/13 13:00
06/11/13 01:00
06/11/13 13:00
06/12/13 01:00
06/12/13 13:00
06/13/13 01:00
06/13/13 13:00
06/14/13 01:00
06/14/13 13:00
06/15/13 01:00
06/15/13 13:00
06/16/13 01:00
06/16/13 13:00
06/17/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 14


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
10-Jun-2013 to 17-Jun-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

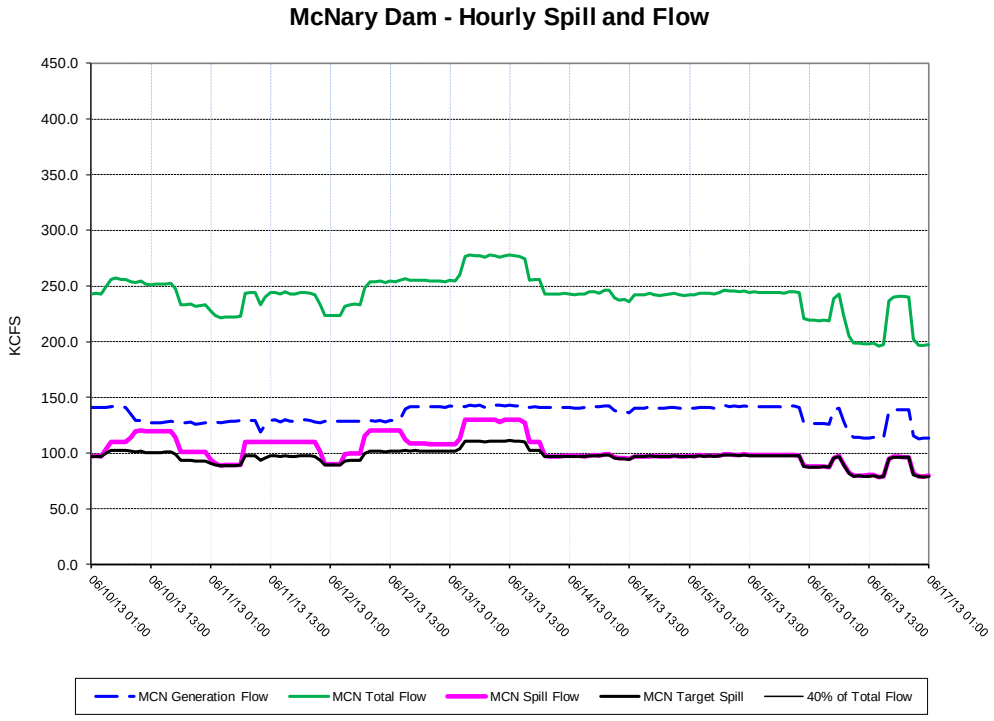
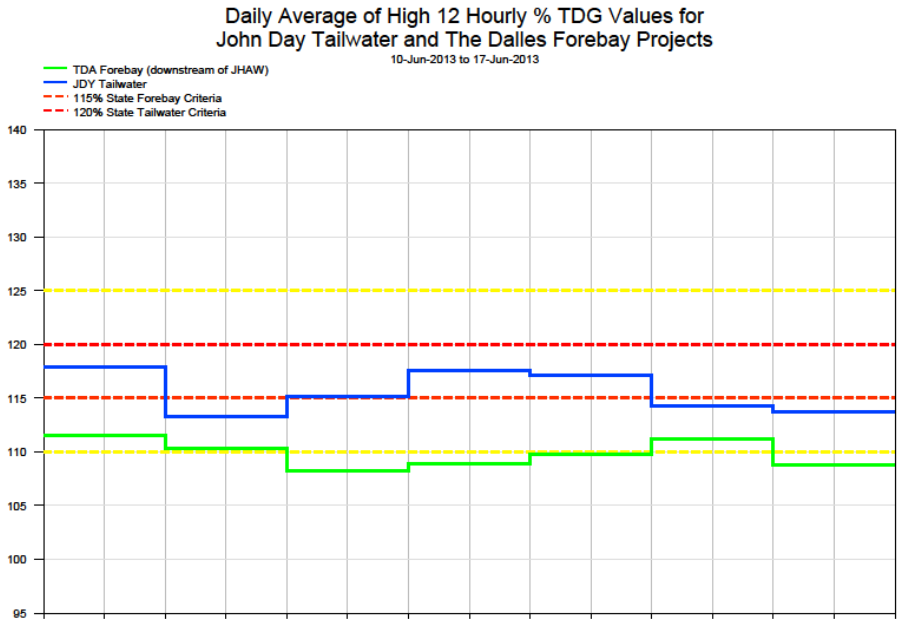

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/10/13 01:00
06/10/13 13:00
06/11/13 01:00
06/11/13 13:00
06/12/13 01:00
06/12/13 13:00
06/13/13 01:00
06/13/13 13:00
06/14/13 01:00
06/14/13 13:00
06/15/13 01:00
06/15/13 13:00
06/16/13 01:00
06/16/13 13:00
06/17/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 15


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
10-Jun-2013 to 17-Jun-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

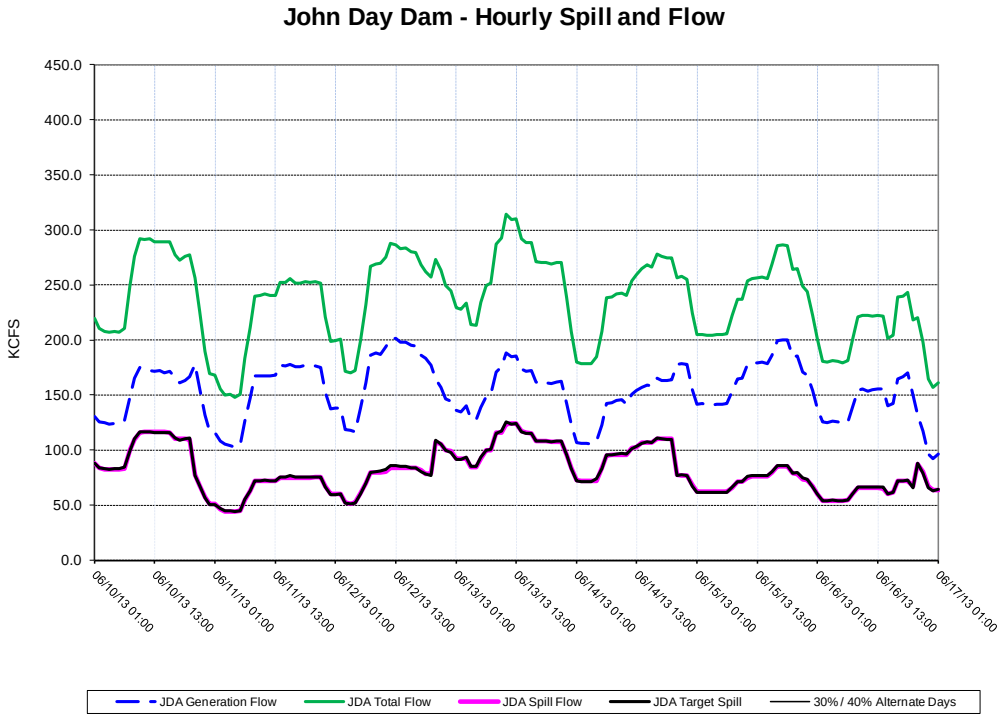
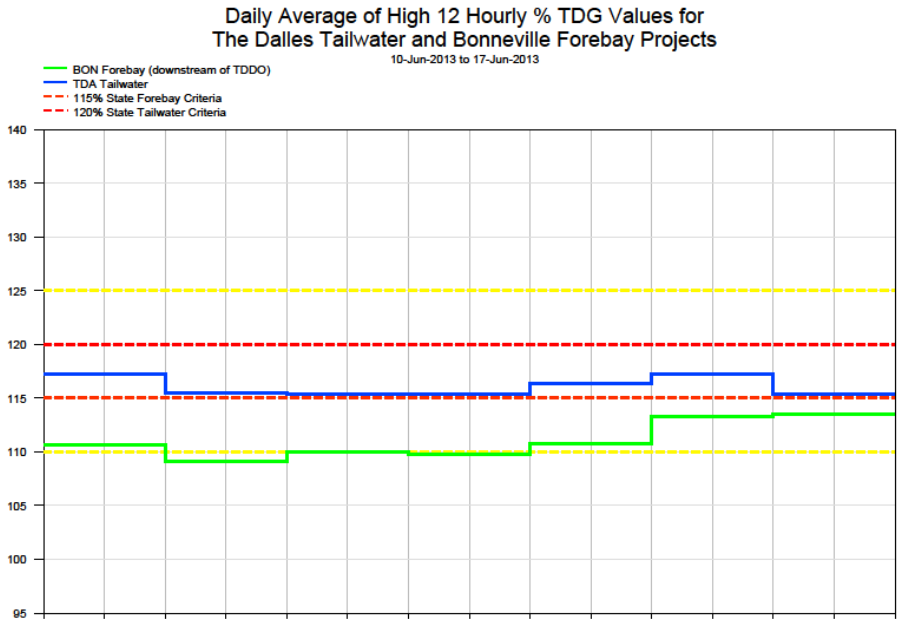

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/10/13 01:00
06/10/13 13:00
06/11/13 01:00
06/11/13 13:00
06/12/13 01:00
06/12/13 13:00
06/13/13 01:00
06/13/13 13:00
06/14/13 01:00
06/14/13 13:00
06/15/13 01:00
06/15/13 13:00
06/16/13 01:00
06/16/13 13:00
06/17/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 16


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
10-Jun-2013 to 17-Jun-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

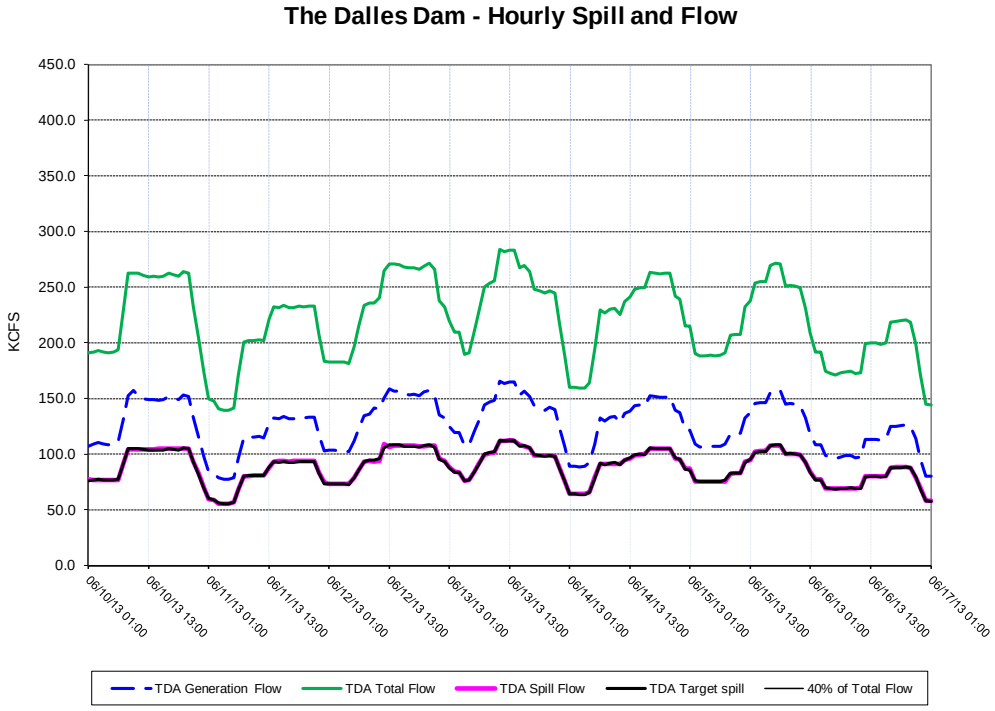
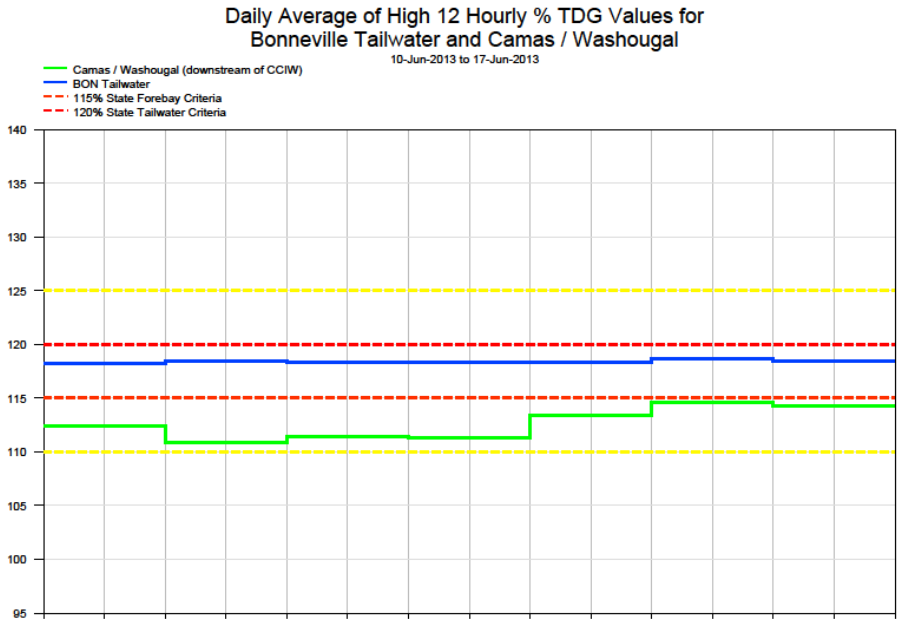

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/10/13 01:00
06/10/13 13:00
06/11/13 01:00
06/11/13 13:00
06/12/13 01:00
06/12/13 13:00
06/13/13 01:00
06/13/13 13:00
06/14/13 01:00
06/14/13 13:00
06/15/13 01:00
06/15/13 13:00
06/16/13 01:00
06/16/13 13:00
06/17/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 17


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
10-Jun-2013 to 17-Jun-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

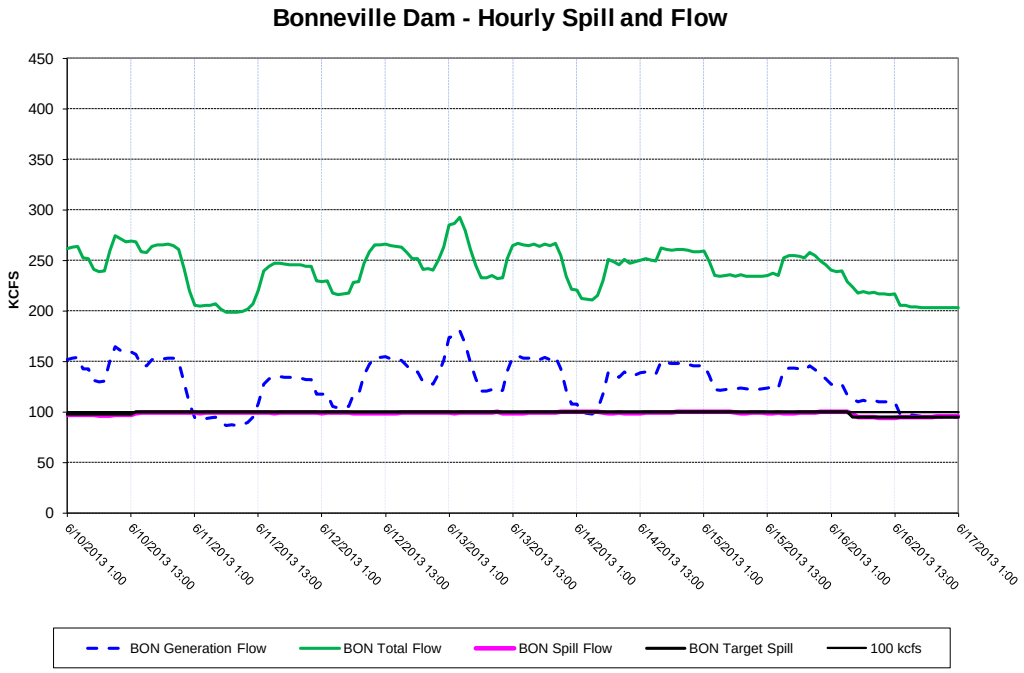
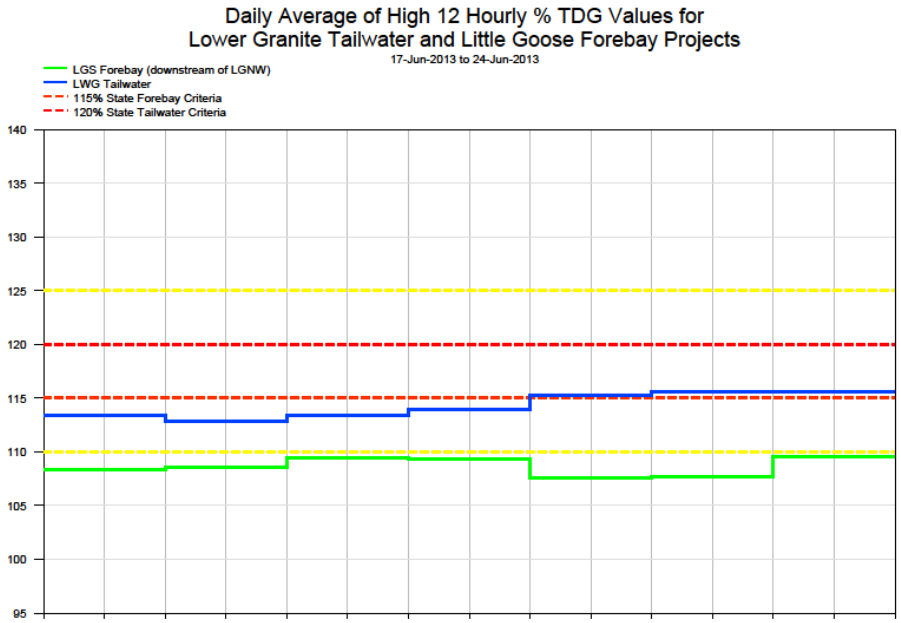

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
6/10/2013 1:00
6/10/2013 13:00
6/11/2013 1:00
6/11/2013 13:00
6/12/2013 1:00
6/12/2013 13:00
6/13/2013 1:00
6/13/2013 13:00
6/14/2013 1:00
6/14/2013 13:00
6/15/2013 1:00
6/15/2013 13:00
6/16/2013 1:00
6/16/2013 13:00
6/17/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 17


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
17-Jun-2013 to 24-Jun-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

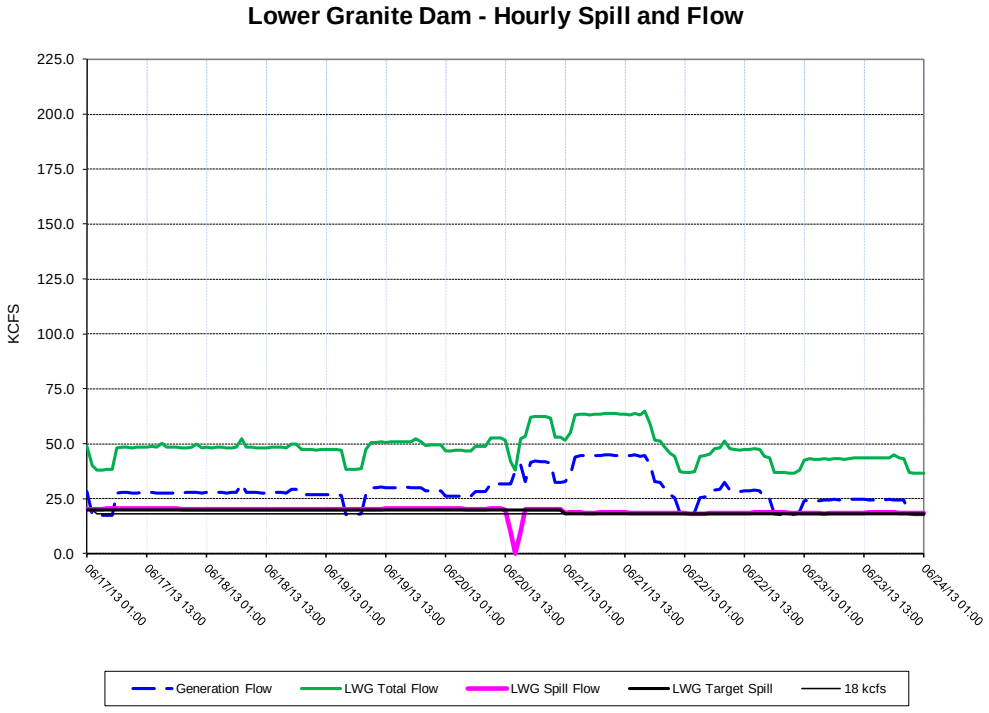
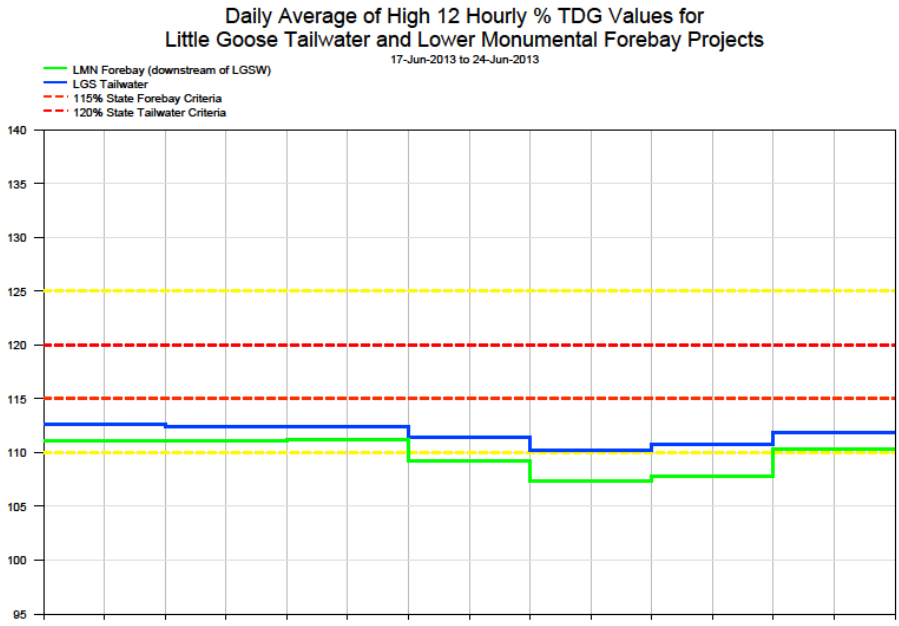

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/17/13 01:00
06/17/13 13:00
06/18/13 01:00
06/18/13 13:00
06/19/13 01:00
06/19/13 13:00
06/20/13 01:00
06/20/13 13:00
06/21/13 01:00
06/21/13 13:00
06/22/13 01:00
06/22/13 13:00
06/23/13 01:00
06/23/13 13:00
06/24/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 18


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
17-Jun-2013 to 24-Jun-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

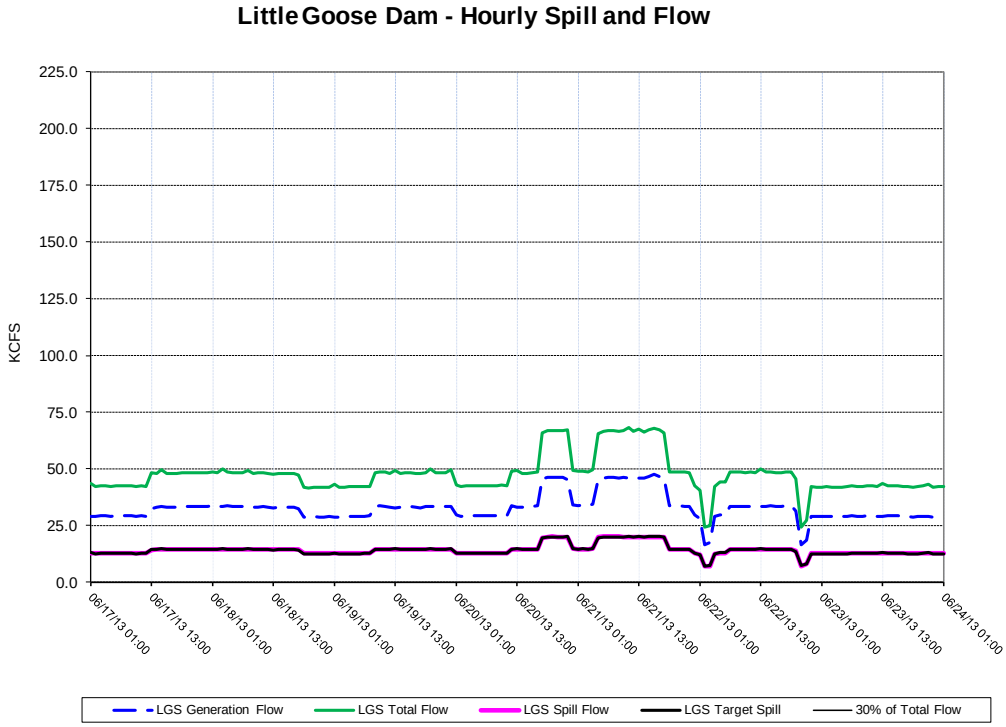
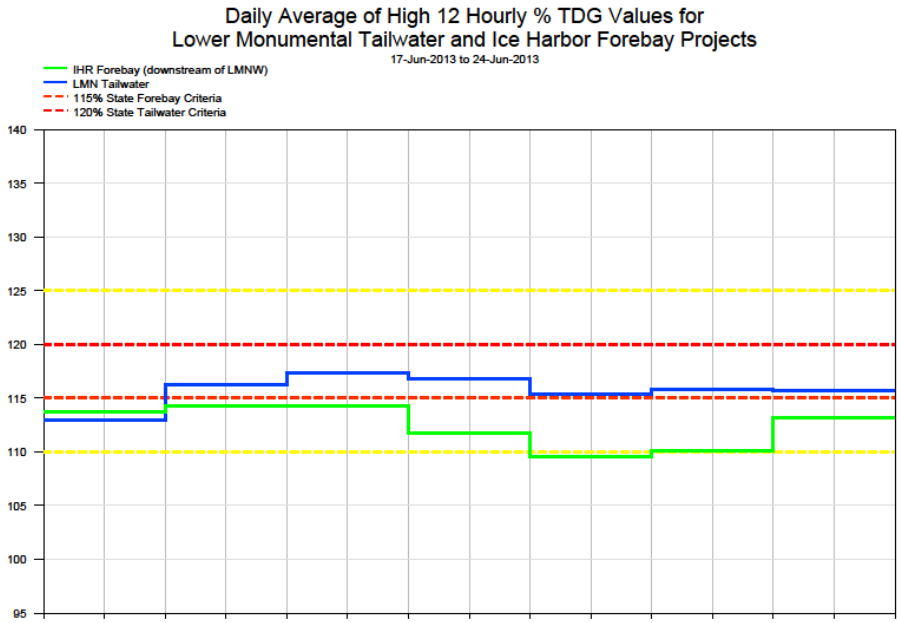

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/17/13 01:00
06/17/13 13:00
06/18/13 01:00
06/18/13 13:00
06/19/13 01:00
06/19/13 13:00
06/20/13 01:00
06/20/13 13:00
06/21/13 01:00
06/21/13 13:00
06/22/13 01:00
06/22/13 13:00
06/23/13 01:00
06/23/13 13:00
06/24/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 19


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
17-Jun-2013 to 24-Jun-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

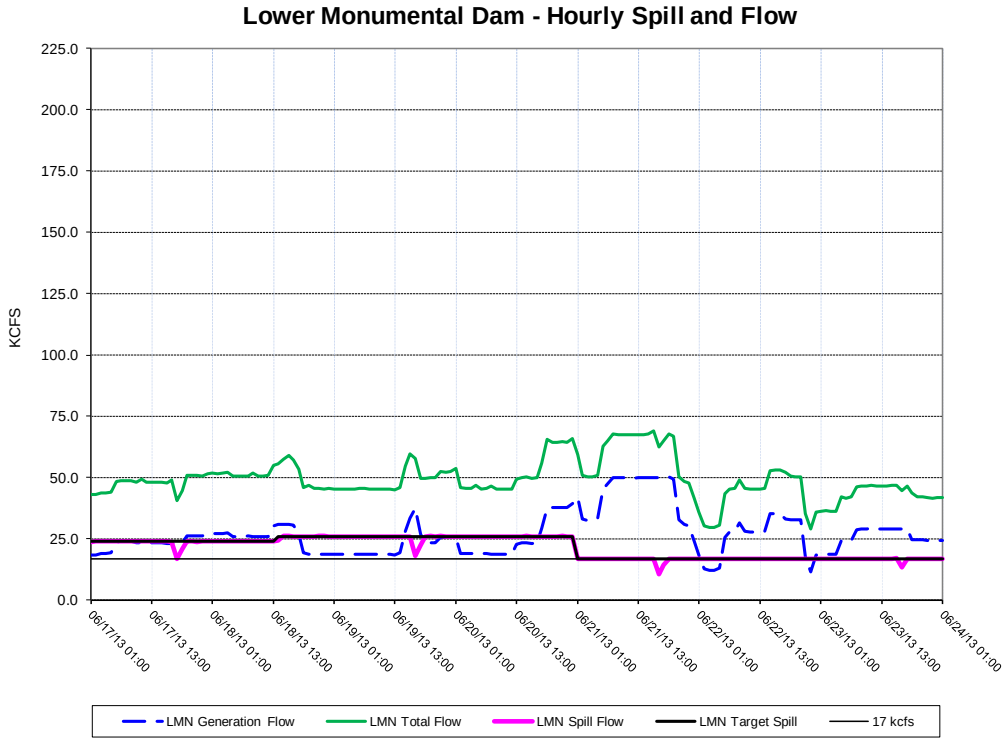
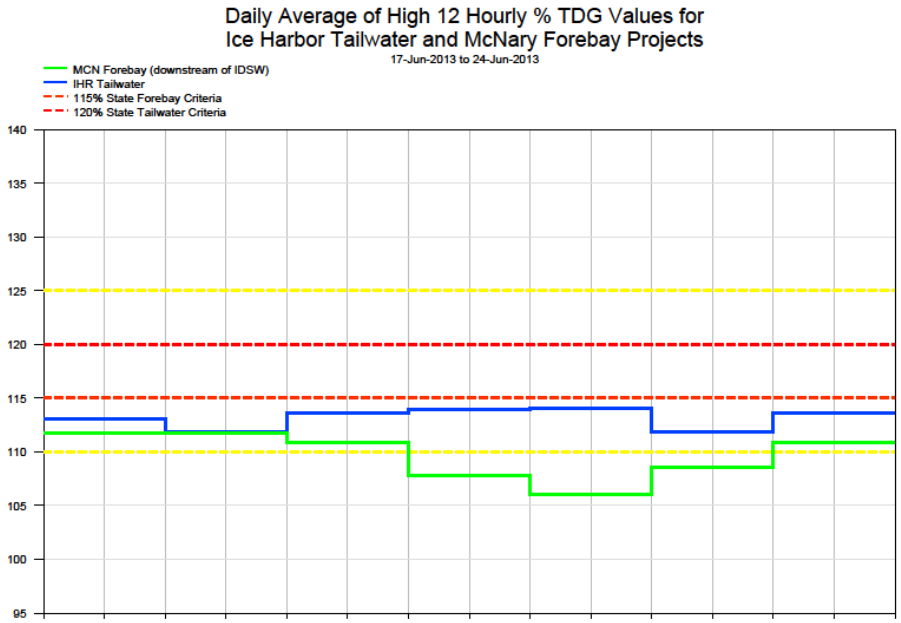

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/17/13 01:00
06/17/13 13:00
06/18/13 01:00
06/18/13 13:00
06/19/13 01:00
06/19/13 13:00
06/20/13 01:00
06/20/13 13:00
06/21/13 01:00
06/21/13 13:00
06/22/13 01:00
06/22/13 13:00
06/23/13 01:00
06/23/13 13:00
06/24/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
17-Jun-2013 to 24-Jun-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

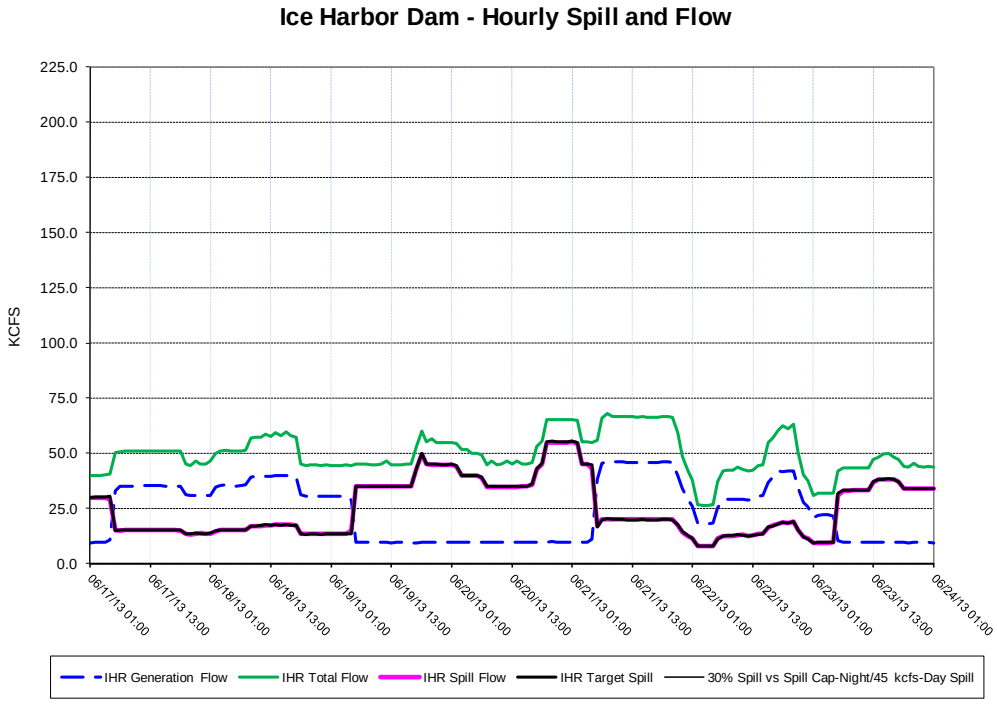
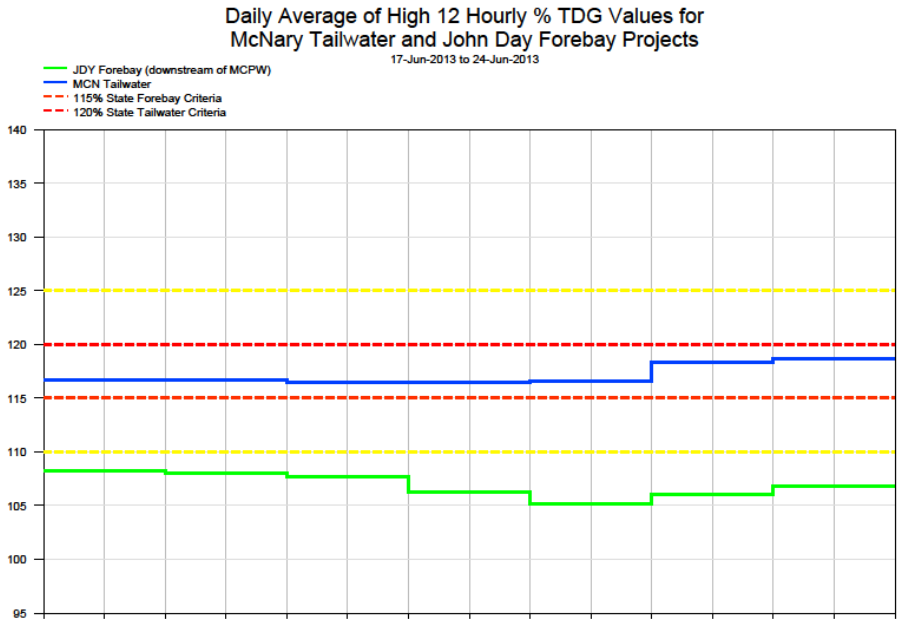

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/17/13 01:00
06/17/13 13:00
06/18/13 01:00
06/18/13 13:00
06/19/13 01:00
06/19/13 13:00
06/20/13 01:00
06/20/13 13:00
06/21/13 01:00
06/21/13 13:00
06/22/13 01:00
06/22/13 13:00
06/23/13 01:00
06/23/13 13:00
06/24/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 21


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
17-Jun-2013 to 24-Jun-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

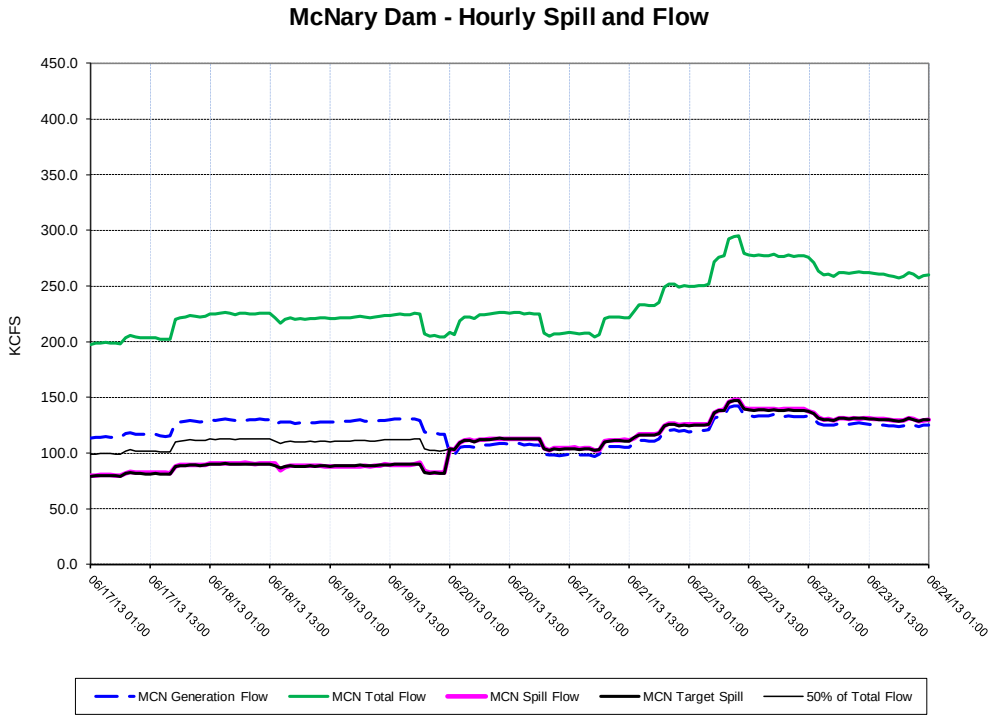
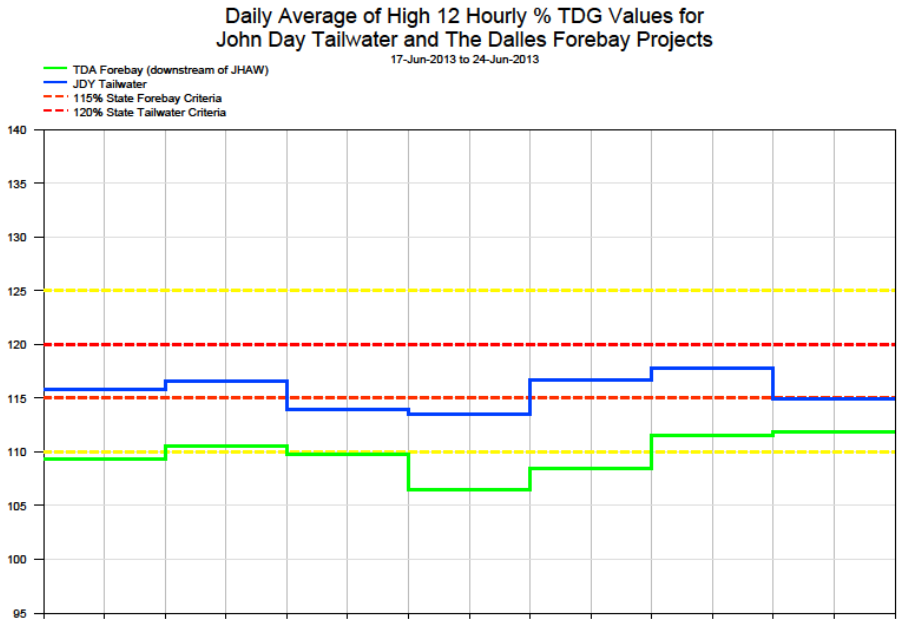

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/17/13 01:00
06/17/13 13:00
06/18/13 01:00
06/18/13 13:00
06/19/13 01:00
06/19/13 13:00
06/20/13 01:00
06/20/13 13:00
06/21/13 01:00
06/21/13 13:00
06/22/13 01:00
06/22/13 13:00
06/23/13 01:00
06/23/13 13:00
06/24/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 22


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
17-Jun-2013 to 24-Jun-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

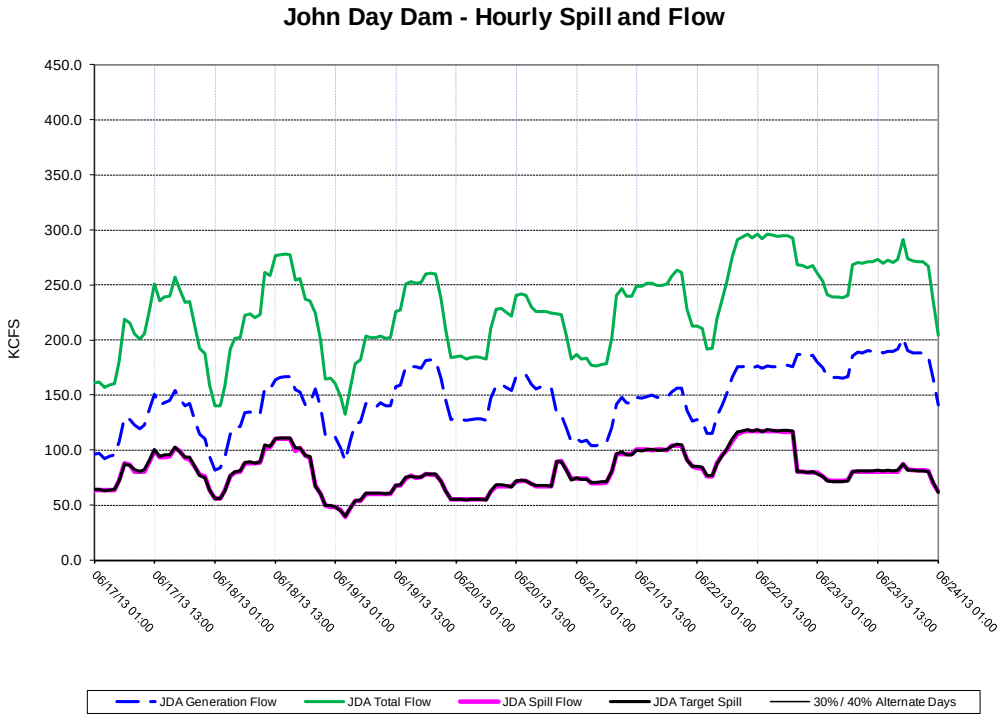
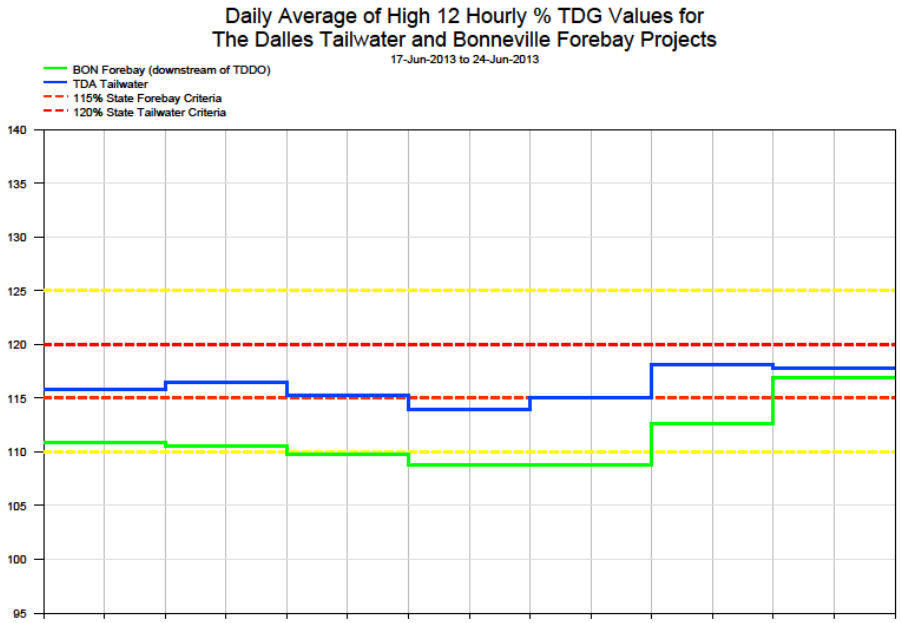

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/17/13 01:00
06/17/13 13:00
06/18/13 01:00
06/18/13 13:00
06/19/13 01:00
06/19/13 13:00
06/20/13 01:00
06/20/13 13:00
06/21/13 01:00
06/21/13 13:00
06/22/13 01:00
06/22/13 13:00
06/23/13 01:00
06/23/13 13:00
06/24/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 23


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
17-Jun-2013 to 24-Jun-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

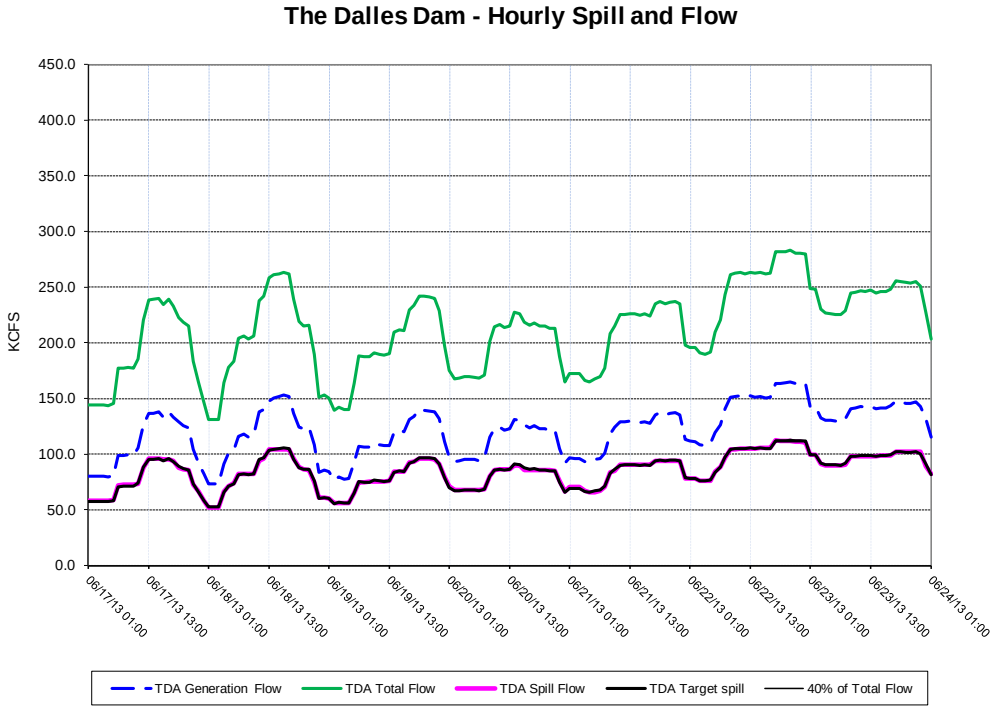
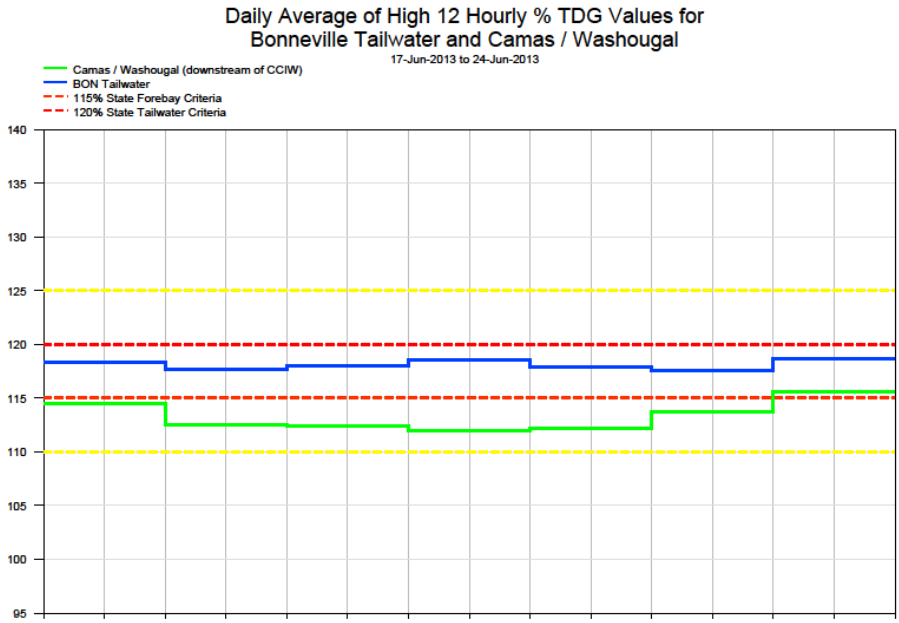

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/17/13 01:00
06/17/13 13:00
06/18/13 01:00
06/18/13 13:00
06/19/13 01:00
06/19/13 13:00
06/20/13 01:00
06/20/13 13:00
06/21/13 01:00
06/21/13 13:00
06/22/13 01:00
06/22/13 13:00
06/23/13 01:00
06/23/13 13:00
06/24/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 24


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
17-Jun-2013 to 24-Jun-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

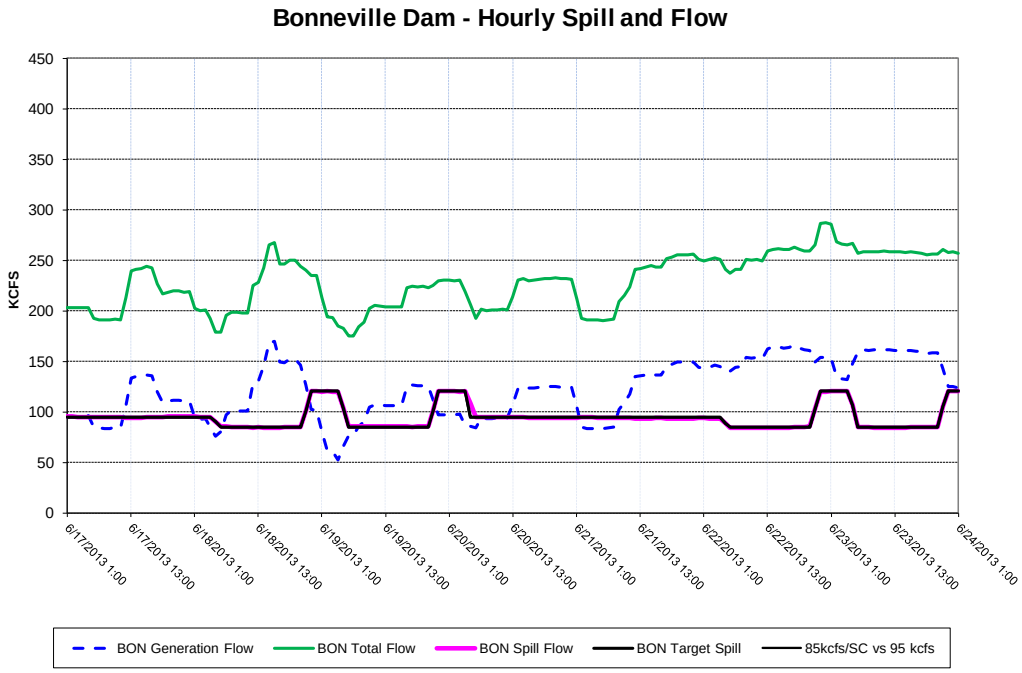
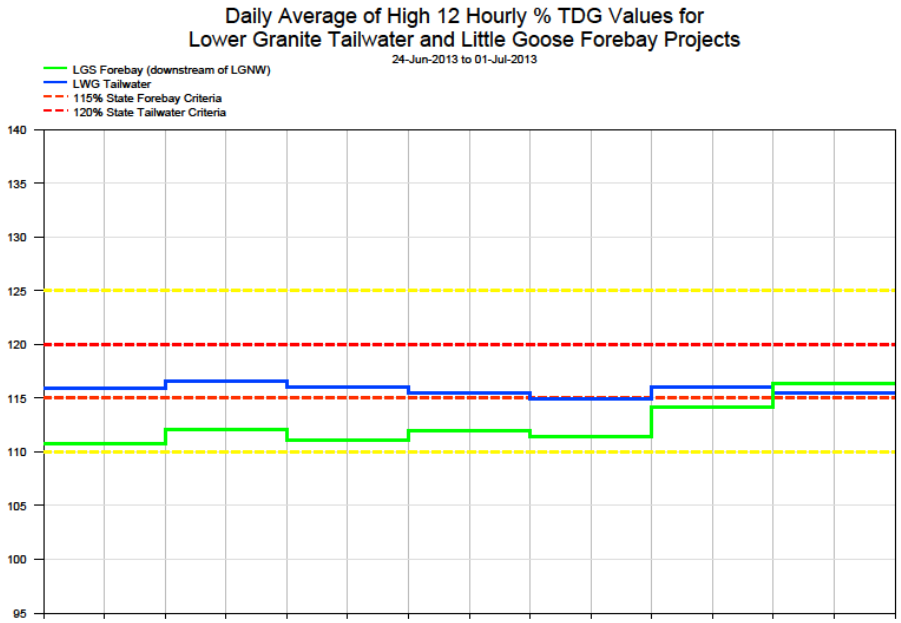

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
6/17/2013 1:00
6/17/2013 13:00
6/18/2013 1:00
6/18/2013 13:00
6/19/2013 1:00
6/19/2013 13:00
6/20/2013 1:00
6/20/2013 13:00
6/21/2013 1:00
6/21/2013 13:00
6/22/2013 1:00
6/22/2013 13:00
6/23/2013 1:00
6/23/2013 13:00
6/24/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
85kcfs/SC vs 95 kcfs

Figure 25


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
24-Jun-2013 to 01-Jul-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

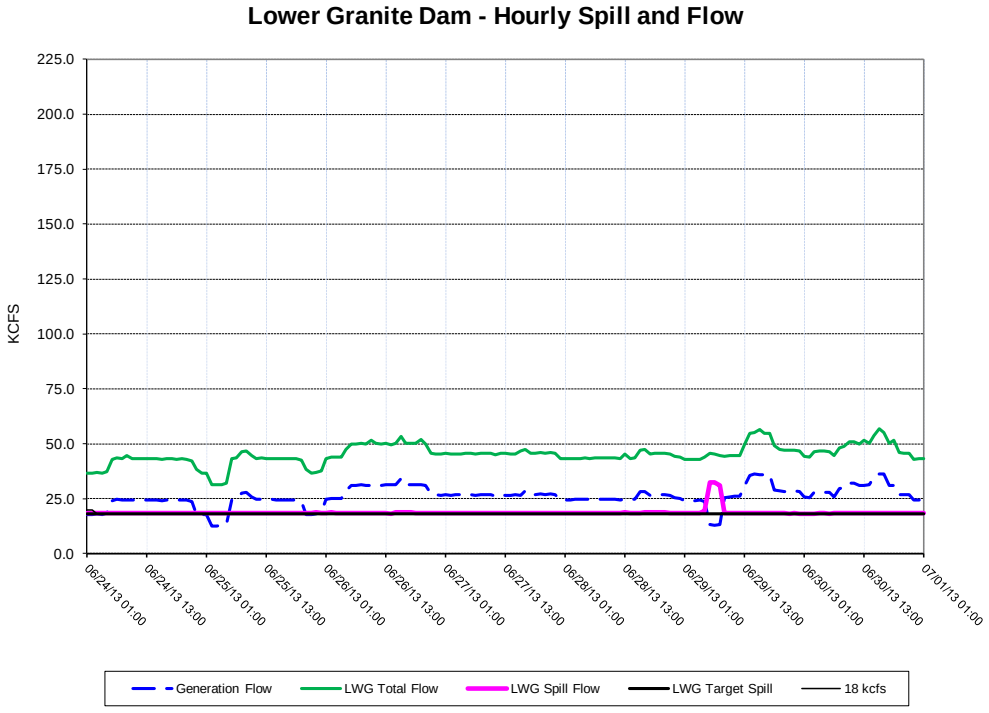
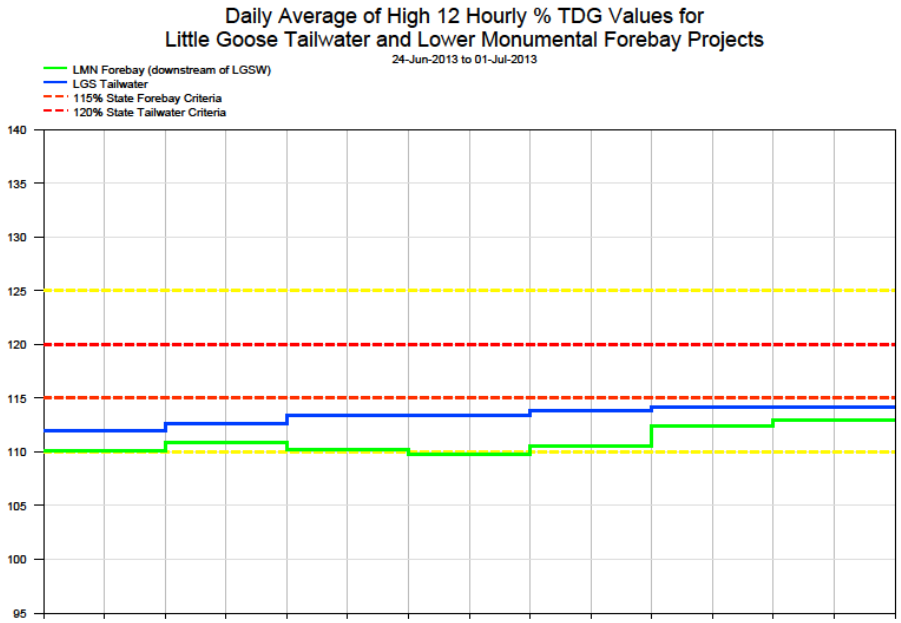

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/24/13 01:00
06/24/13 13:00
06/25/13 01:00
06/25/13 13:00
06/26/13 01:00
06/26/13 13:00
06/27/13 01:00
06/27/13 13:00
06/28/13 01:00
06/28/13 13:00
06/29/13 01:00
06/29/13 13:00
06/30/13 01:00
06/30/13 13:00
07/01/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 26


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
24-Jun-2013 to 01-Jul-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

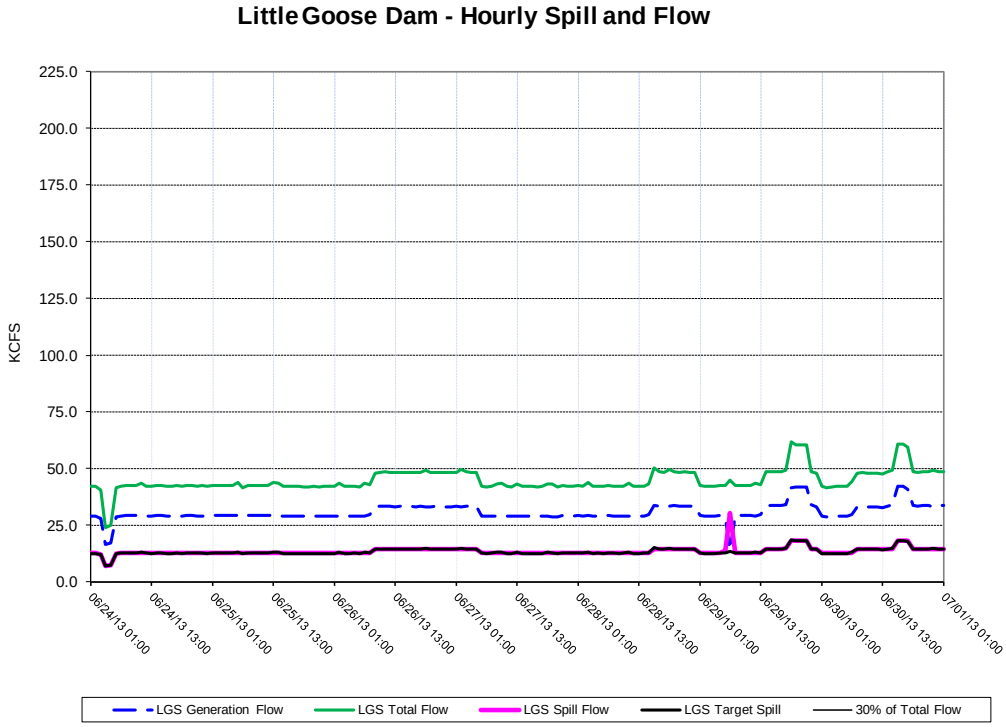
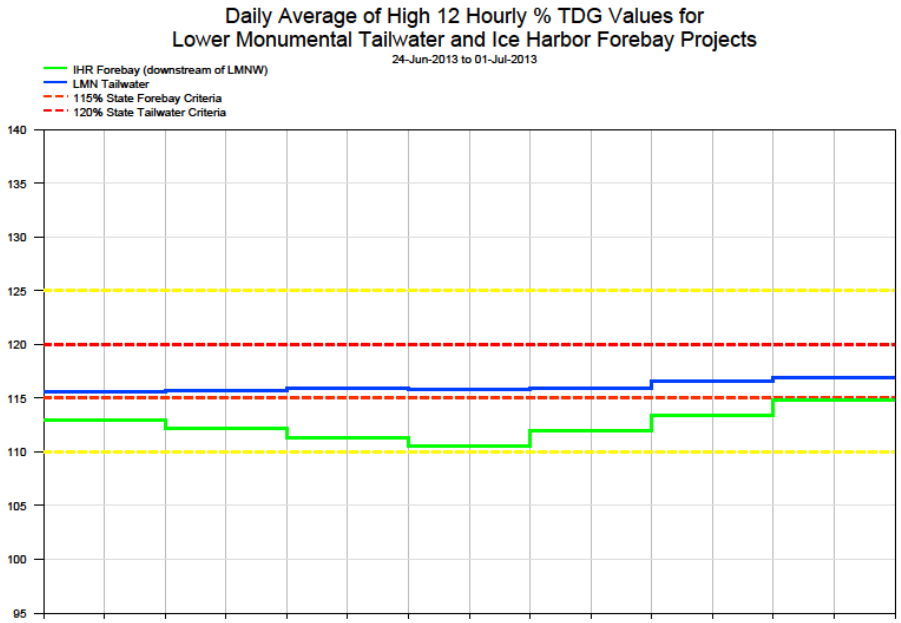

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/24/13 01:00
06/24/13 13:00
06/25/13 01:00
06/25/13 13:00
06/26/13 01:00
06/26/13 13:00
06/27/13 01:00
06/27/13 13:00
06/28/13 01:00
06/28/13 13:00
06/29/13 01:00
06/29/13 13:00
06/30/13 01:00
06/30/13 13:00
07/01/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 27


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
24-Jun-2013 to 01-Jul-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

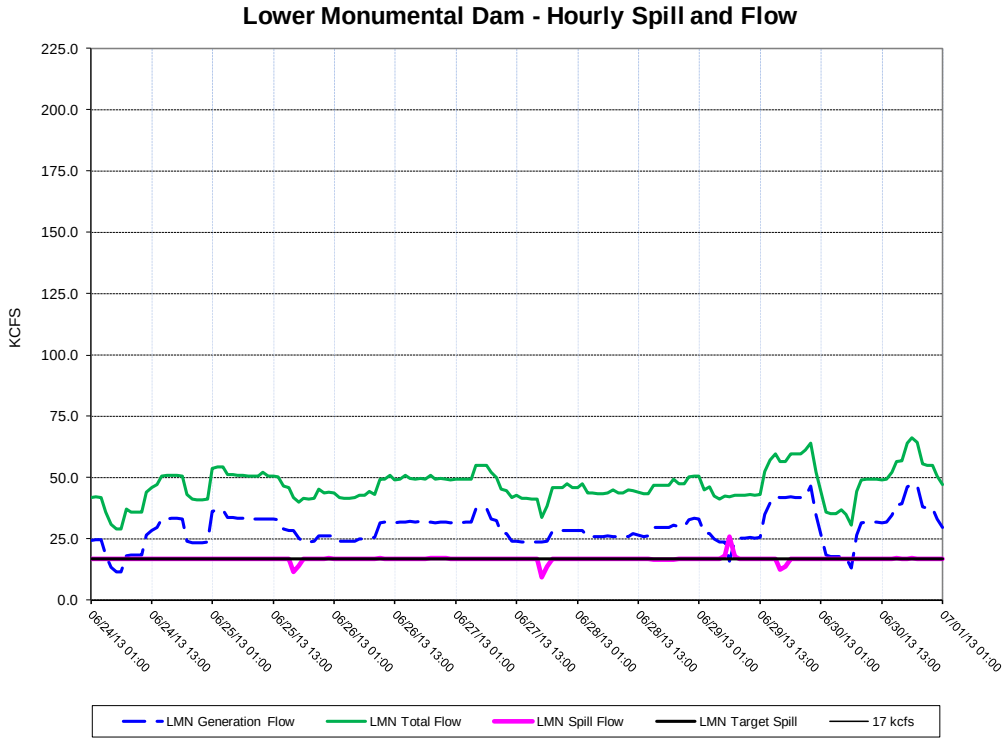
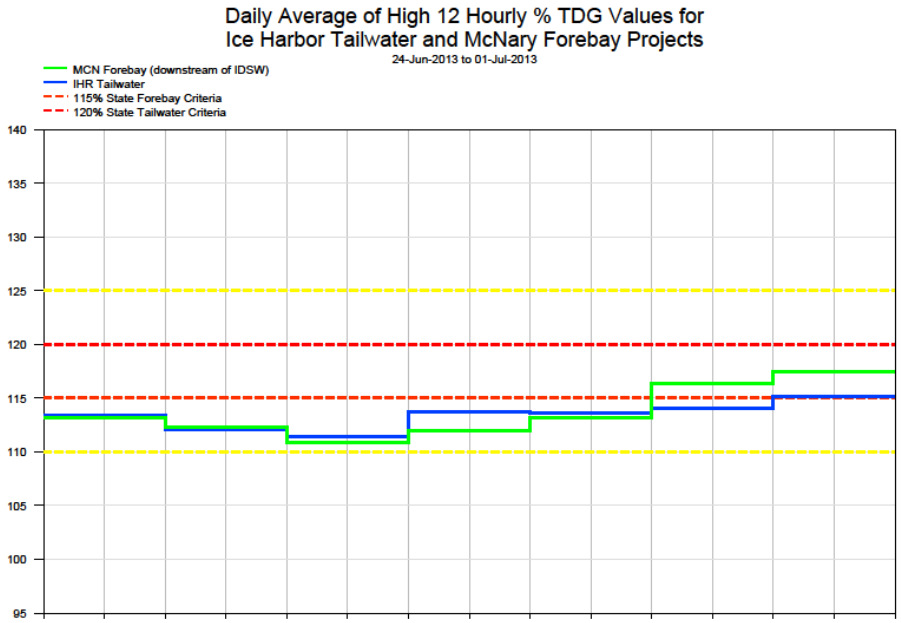

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/24/13 01:00
06/24/13 13:00
06/25/13 01:00
06/25/13 13:00
06/26/13 01:00
06/26/13 13:00
06/27/13 01:00
06/27/13 13:00
06/28/13 01:00
06/28/13 13:00
06/29/13 01:00
06/29/13 13:00
06/30/13 01:00
06/30/13 13:00
07/01/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 28


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
24-Jun-2013 to 01-Jul-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

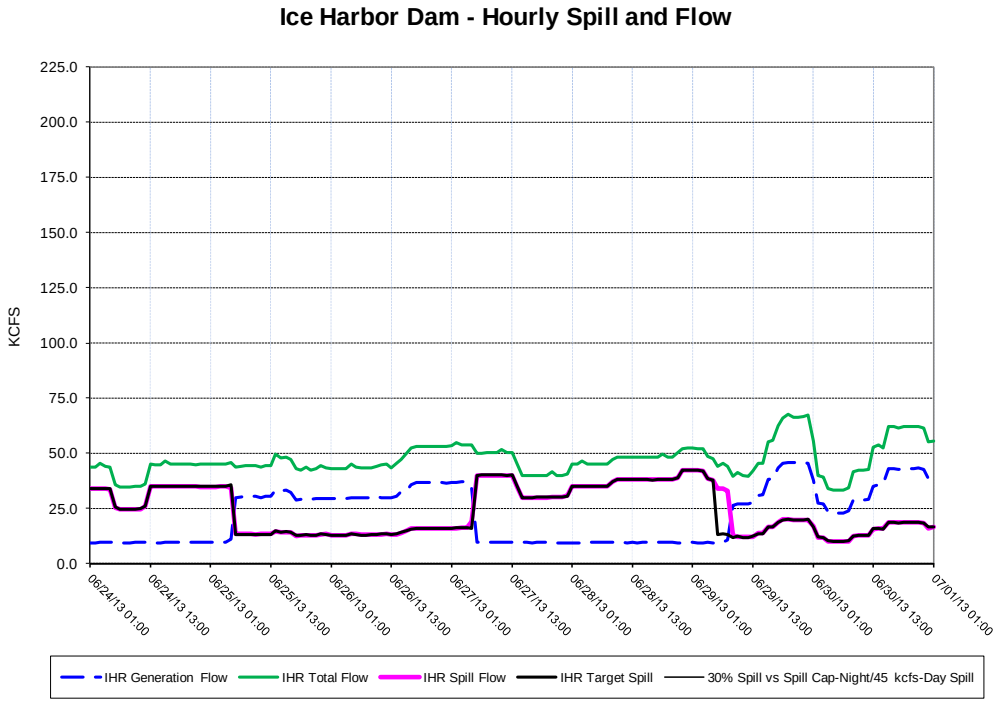
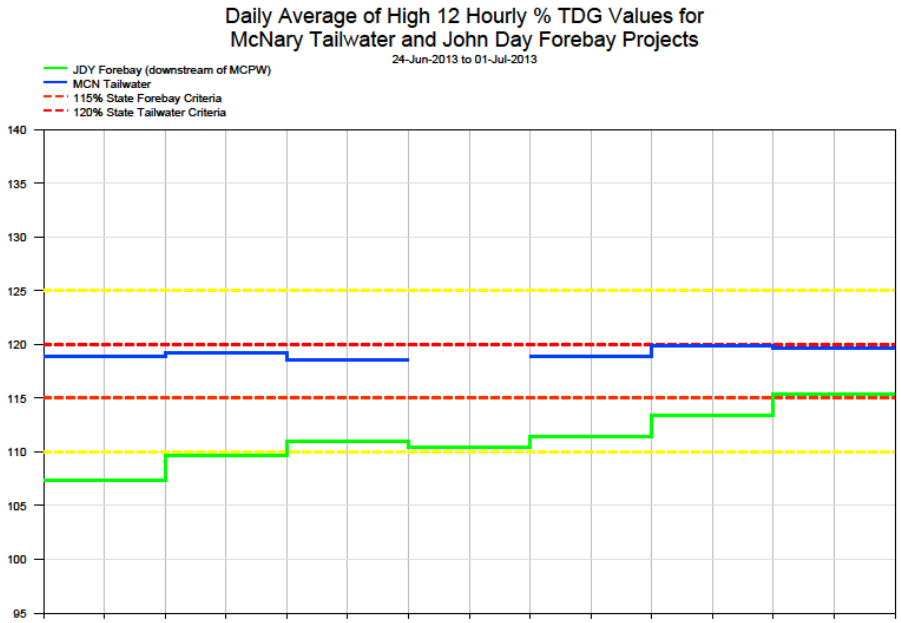

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/24/13 01:00
06/24/13 13:00
06/25/13 01:00
06/25/13 13:00
06/26/13 01:00
06/26/13 13:00
06/27/13 01:00
06/27/13 13:00
06/28/13 01:00
06/28/13 13:00
06/29/13 01:00
06/29/13 13:00
06/30/13 01:00
06/30/13 13:00
07/01/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 29


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
24-Jun-2013 to 01-Jul-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

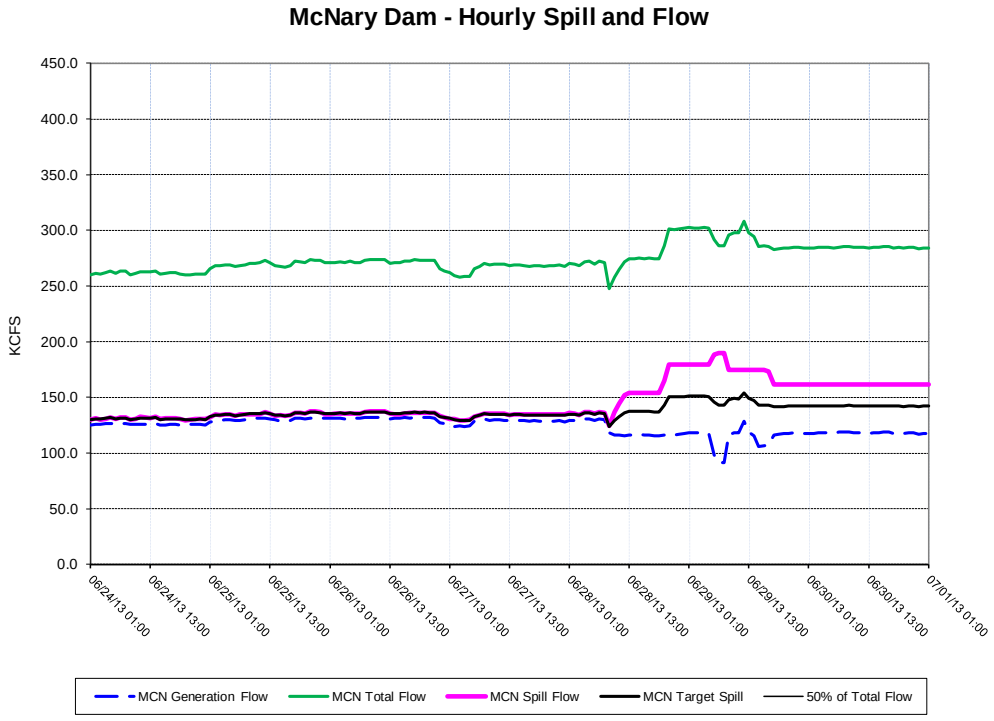
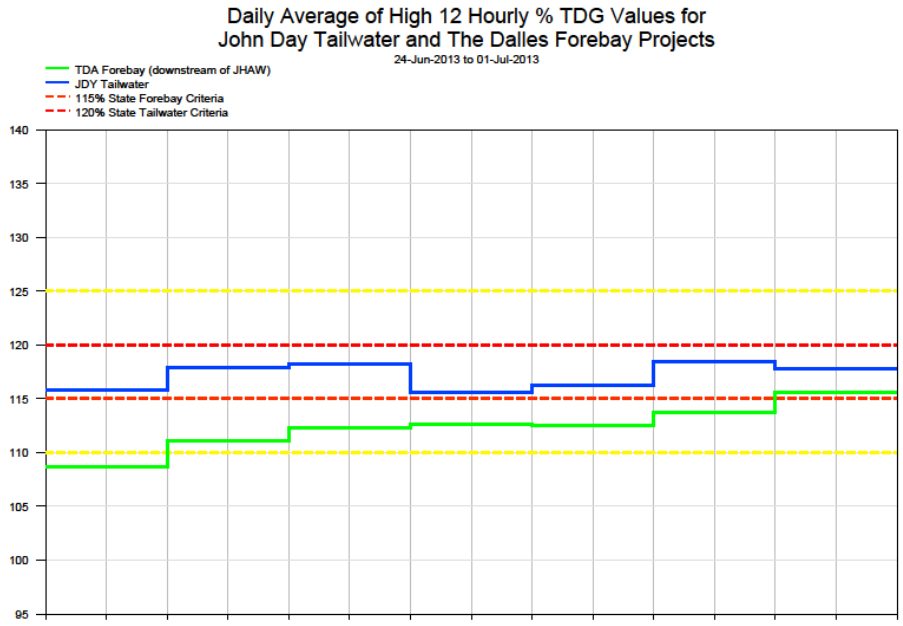

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/24/13 01:00
06/24/13 13:00
06/25/13 01:00
06/25/13 13:00
06/26/13 01:00
06/26/13 13:00
06/27/13 01:00
06/27/13 13:00
06/28/13 01:00
06/28/13 13:00
06/29/13 01:00
06/29/13 13:00
06/30/13 01:00
06/30/13 13:00
07/01/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 30


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
24-Jun-2013 to 01-Jul-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

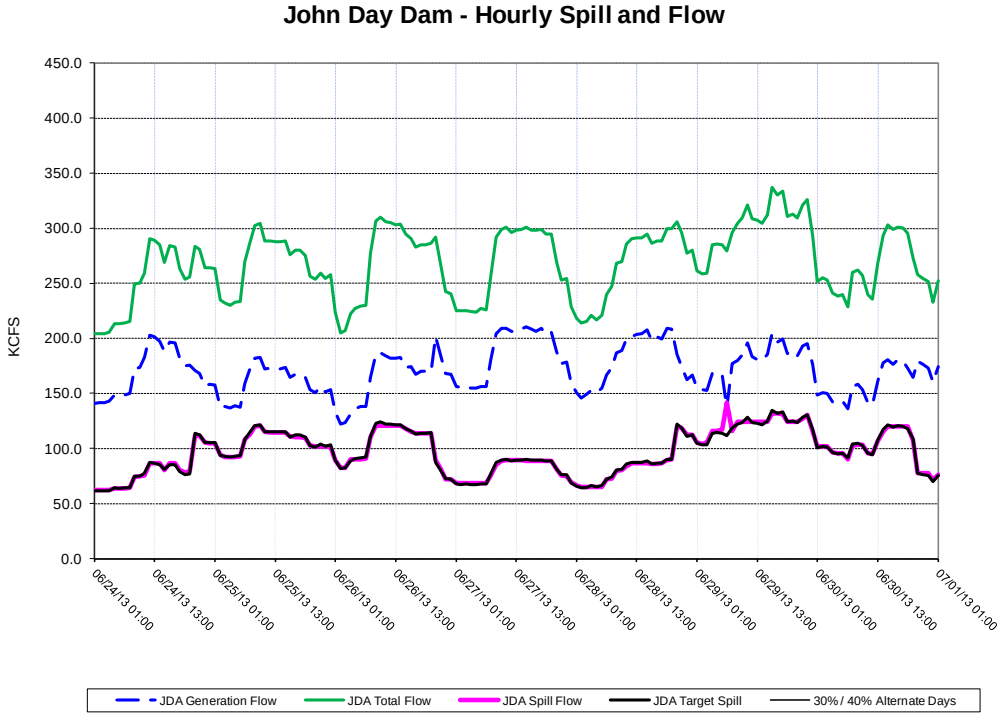
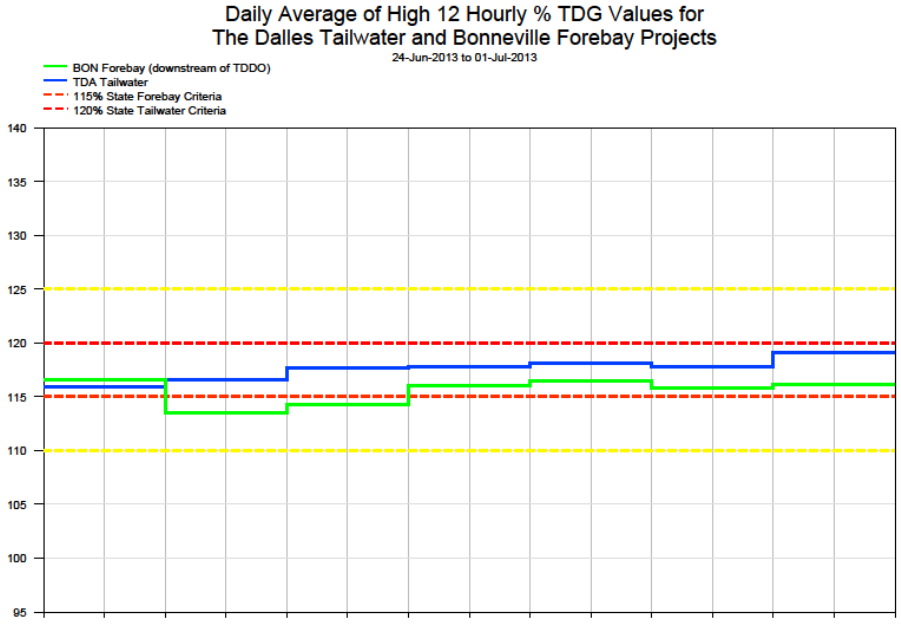

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/24/13 01:00
06/24/13 13:00
06/25/13 01:00
06/25/13 13:00
06/26/13 01:00
06/26/13 13:00
06/27/13 01:00
06/27/13 13:00
06/28/13 01:00
06/28/13 13:00
06/29/13 01:00
06/29/13 13:00
06/30/13 01:00
06/30/13 13:00
07/01/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 31


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
24-Jun-2013 to 01-Jul-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

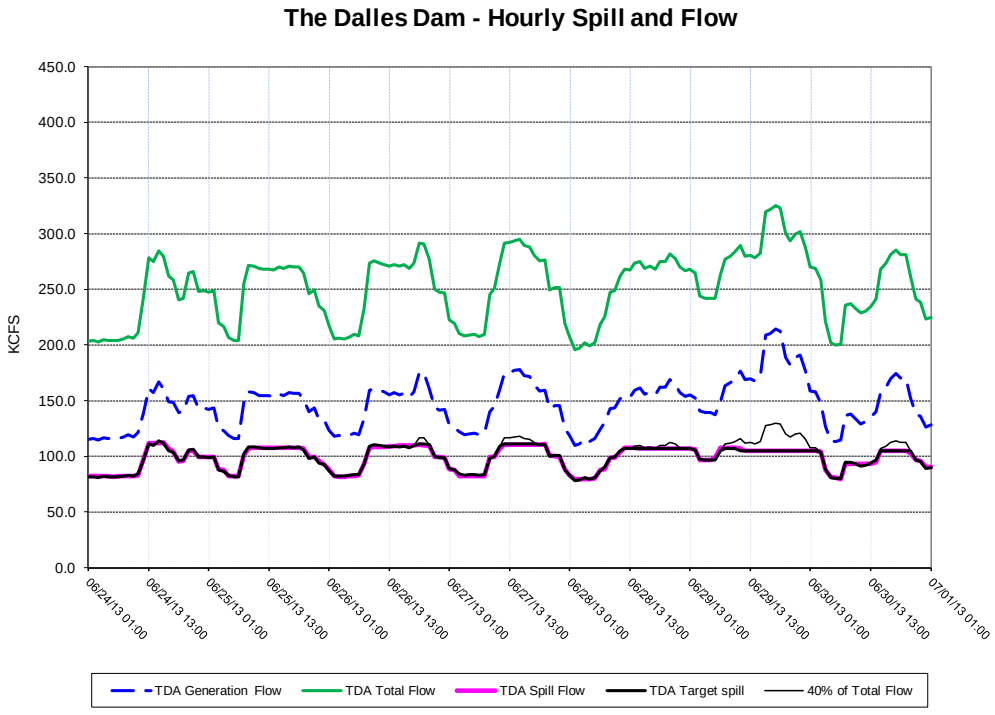
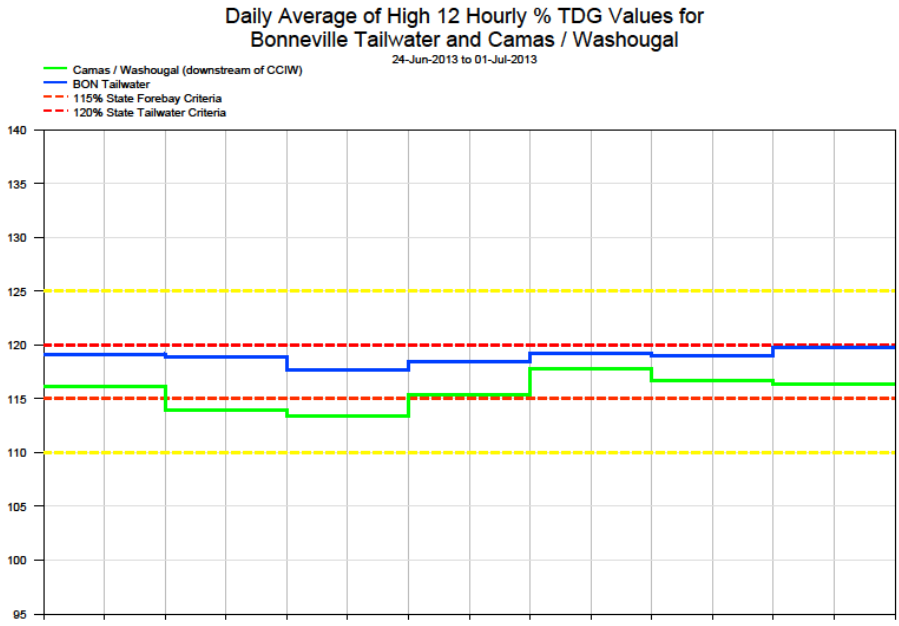

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/24/13 01:00
06/24/13 13:00
06/25/13 01:00
06/25/13 13:00
06/26/13 01:00
06/26/13 13:00
06/27/13 01:00
06/27/13 13:00
06/28/13 01:00
06/28/13 13:00
06/29/13 01:00
06/29/13 13:00
06/30/13 01:00
06/30/13 13:00
07/01/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 32


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
24-Jun-2013 to 01-Jul-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

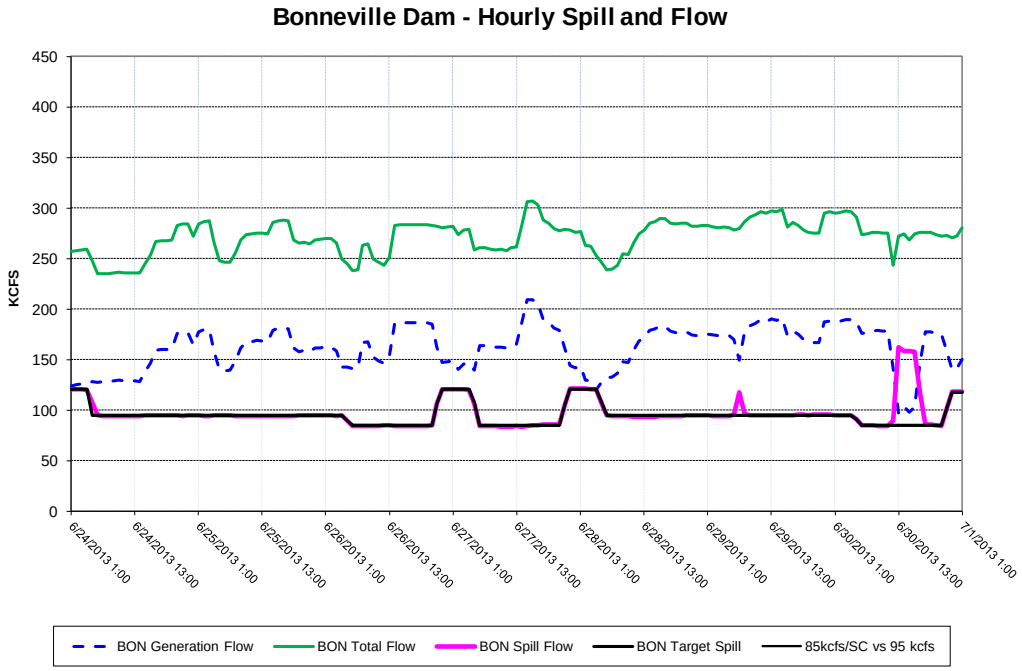

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
6/24/2013 1:00
6/24/2013 13:00
6/25/2013 1:00
6/25/2013 13:00
6/26/2013 1:00
6/26/2013 13:00
6/27/2013 1:00
6/27/2013 13:00
6/28/2013 1:00
6/28/2013 13:00
6/29/2013 1:00
6/29/2013 13:00
6/30/2013 1:00
6/30/2013 13:00
7/1/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
85kcfs/SC vs 95 kcfs

Figure 33

Table 1
Average Percent TDG for Highest 12-Hours: June 3 – June 30, 2013

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115
6/3/2013	103.8	112.8	111.7	114.4	114.1	119.6	**117.6**	115.7	112.2	114.7	109.8	115.5	111.1	117.2	112.8	118.6	114.6
6/4/2013	103.4	111.9	111.8	112.2	114	119.1	**117.6**	115.8	113.6	114.5	112.4	115.2	112.2	117.6	114.7	119	**115.9**
6/5/2013	103.4	111.6	112.8	112.2	114.1	114.2	**117.9**	116.5	113.9	115.9	113.6	117.7	114.4	118.9	**116.1**	118.9	**117.2**
6/6/2013	103.9	111.8	113.2	112.4	113.4	114.1	**118.2**	117.2	113.4	117.1	114.2	118.1	114.8	119	**115.3**	118.9	**116.4**
6/7/2013	104	111.5	113.4	112.1	113.3	114.1	**118.3**	115.8	113.8	115.5	113.4	115	113.3	117.7	113.7	118.6	**115.1**
6/8/2013	103.9	111.1	114.4	112.1	113.2	115.4	**116.8**	116.2	113.1	114.8	112.1	115.3	111.1	116.5	111.3	118.5	113.9
6/9/2013	103.7	111.2	114.7	111.9	112	115.5	**116.2**	116	112.9	115.3	111.4	116.8	111.2	116.6	110.7	118.5	112.5
6/10/2013	103.4	111.1	114.6	112.4	113.2	116.1	**116.3**	116.1	113.1	117.1	110.9	117.9	111.6	117.2	110.6	118.4	112.4
6/11/2013	103.1	111.2	113.9	112.7	112.6	115.6	**115.3**	115.3	112.4	118.6	109	113.3	110.3	115.5	109.1	118.6	110.9
6/12/2013	102.2	111.6	111.8	111.1	110.7	115.7	112.3	115.4	107.5	119.1	107.2	115.2	108.2	115.4	110	118.5	111.4
6/13/2013	101.7	112.1	110.2	111.4	110.7	115.9	111.3	114.2	107.1	118.9	106.5	117.5	108.9	115.4	109.7	118.3	111.3
6/14/2013	101	111.8	108.6	111.7	110.6	115.5	111.6	114.4	108.1	116.3	105.7	117.1	109.7	116.3	110.7	118.4	113.4
6/15/2013	102.1	112.4	108.3	112.2	110.7	113.8	113	115	110.9	116.8	106.3	114.2	111.2	117.2	113.2	118.7	114.6
6/16/2013	102.3	113.4	108.3	112.1	111.4	113.5	113.6	114.2	110.7	116.5	107.6	113.8	108.8	115.3	113.5	118.6	114.3
6/17/2013	102.3	113.4	108.4	112.6	111.1	113	113.7	113	111.7	116.7	108.3	115.8	109.4	115.8	110.9	118.4	114.5
6/18/2013	102.5	112.8	108.6	112.4	111	116.2	114.3	111.9	111.8	116.7	108	116.6	110.5	116.5	110.6	117.8	112.5
6/19/2013	103	113.4	109.4	112.3	111.2	117.4	114.3	113.6	110.9	116.4	107.7	113.9	109.8	115.2	109.7	118.2	112.4
6/20/2013	102.7	113.9	109.3	111.4	109.3	116.8	111.8	113.9	107.8	116.5	106.3	113.5	106.4	113.9	108.8	118.6	112
6/21/2013	101.8	115.2	107.5	110.2	107.4	115.3	109.5	114.1	106.1	116.6	105.1	116.7	108.5	115	108.8	118	112.2
6/22/2013	100.2	115.6	107.7	110.7	107.8	115.8	110.1	111.8	108.6	118.3	106	117.8	111.6	118.1	112.6	117.7	113.8
6/23/2013	101	115.6	109.5	111.8	110.3	115.6	113.1	113.6	110.9	118.7	106.8	114.9	111.9	117.8	**116.9**	118.8	**115.5**
6/24/2013	102.6	115.9	110.7	112	110.1	115.6	113	113.4	113.1	118.8	107.3	115.8	108.7	115.9	**116.5**	119.2	**116.1**
6/25/2013	103.1	116.6	112	112.6	110.8	115.7	112.2	112.1	112.3	119.2	109.7	117.8	111.1	116.6	113.5	118.9	113.9
6/26/2013	102.9	116.1	111.1	113.4	110.3	115.9	111.3	111.4	110.9	**127.1**	111	118.2	112.3	117.7	114.2	117.9	113.4
6/27/2013	102.1	115.5	111.9	113.3	109.7	115.8	110.5	113.7	112	**154.8**	110.4	115.5	112.6	117.7	**116**	118.5	**115.4**
6/28/2013	100.9	114.9	111.4	113.8	110.6	115.9	111.9	113.6	113.2	**133.3**	111.4	116.2	112.5	118.1	**116.5**	119.3	**117.8**
6/29/2013	100.8	116	114.1	114.1	112.4	116.6	113.4	114	**116.3**	119.9	113.3	118.4	113.7	117.8	**115.8**	119.2	**116.7**
6/30/2013	102.7	115.5	**116.4**	114.2	113	116.9	114.8	115.1	**117.5**	119.6	**115.4**	117.8	**115.6**	119.1	**116.1**	119.9	**116.3**

Figure 34

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal

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UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

PORTLAND DIVISION

NATIONAL WILDLIFE FEDERATION, et al.,

Plaintiffs,

v.

NATIONAL MARINE FISHERIES SERVICE, et al.,

Defendants,

Case No.: 3:01-CV-00640-SI

NOTICE OF FEDERAL DEFENDANTS' FOURTH 2013 SPILL IMPLEMENTATION REPORT

In accordance with the Court's August 2, 2011 Opinion and Order (ECF No. 1855) and Federal Defendants' Notice Re: 2013 Spill Operations at 7 (ECF No. 1905) (filed Mar. 28, 2013), Federal Defendants submit their fourth 2013 spill implementation status report. *See* Exhibit 1. This status report includes, among other things: the hourly flow through the powerhouse at each dam; the hourly flow over the spillway compared to the target spill for that hour; and the resultant 12-hour average total dissolved gas ("TDG") for the tailwater at each project and for the next project's forebay downstream. The report also provides written explanations of variances that occurred during the reporting period.

Dated this 16th day of August, 2013.

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Attorneys for Federal Defendants

CERTIFICATE OF SERVICE

I certify that on August 16, 2013, the foregoing will be electronically filed with the Court's electronic filing system, which will generate automatic service upon on all Parties enrolled to receive such notice. The following will be manually served by overnight mail:

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/s/ Michael R. Eitel

FISH OPERATIONS PLAN IMPLEMENTATION REPORT
July 2013

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

The U.S. Army Corps of Engineers (Corps) is submitting this report in accordance with the 2013 Fish Operations Plan (2013 FOP) submitted to the U.S. District Court of Oregon on March 28, 2013. The 2013 FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the fish migration season, generally April through August. To the extent Corps project operations are not specified in the 2013 FOP, the FCRPS operations will be consistent with the 2010 NOAA Fisheries Supplemental Biological Opinion (2010 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2013 Water Management Plan (WMP), WMP seasonal updates, and the 2013 Fish Passage Plan (FPP).

The Corps' July 2013 lower Snake and Columbia River project and fish passage operations are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant high 12-hour average percent Total Dissolved Gas (%TDG) levels in the tailrace at each project and in the subsequent downstream project's forebay and the Camas-Washougal gauge below Bonneville Dam.

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2013 FOP in July.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[1] in July displaying the performance of the spill program as follows:

(A) Daily Average of the High 12 Hourly %TDG Values - described in the upper graph.
(B) Hourly Spill and Generation Flows - described in the lower graph.

[1] Operations are implemented from Monday through Sunday.

The weekly graphs begin on July 1 and end on July 28 for the following lower Snake River and lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.
Each figure represents one week of a project's operation. The graphs start at 0000 hours (%TDG graphs) and 0100 hours (flow/spill graphs) on July 1 for the lower Snake River and the lower Columbia River projects.

July 1 – July 7	Figures 1 – 8
July 8 – July 14	Figures 9 – 16
July 15 – July 21	Figures 17 – 24
July 22 – July 28	Figures 25 – 32

A. Upper Graph: Shows the resultant daily average %TDG for the 12 highest hours. This is primarily a result of spill at dams. The objective is to operate each project up to the TDG limits without exceeding those limits to the extent practicable.

1. The blue line represents the %TDG in the tailrace of the dam. 120 percent TDG is the upper operating limit.
2. The green line represents the %TDG in the forebay of the next dam downstream. 115 percent TDG is the upper operating limit.

B. Lower Graph: Shows the hourly flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The medium green line represents the average hourly total river flow through the project in kcfs.
- The heavy pink line represents the average hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2013 FOP.
- The heavy black line represents the target spill. This is the hourly maximum spill level. The hourly target spill may vary as a function of total river flow, forebay elevation and generator capacity, subject to the following conditions:

    - spill percentage or flow rate specified in the 2013 FOP;
    - spill caps as set daily for TDG management;
    - test spill levels for fish passage research;
    - minimum generation for power system needs;
    - minimum spill at Bonneville (50 kcfs) dam;
    - minimum spill at John Day is 25 percent of project outflow.

II. A table is included at the end of the figures that lists the average daily %TDG for the 12 highest hours for all projects. The numbers in red indicate the project exceeded the %TDG gas cap - 115 percent (forebay of the next downstream dam) or 120 percent (tailwater) for each project.

General Implementation Remarks:

For all projects that spill for fish passage, the target spill may be reduced due to various conditions as described below. When spill levels briefly deviate below or above the level specified in the 2013 FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual operation deviations from the target operation during voluntary spill hours are described below. The July 2013 Spill Variance Table includes average hourly data; therefore, while spill may vary from target spill for only a portion of an hour, the July 2013 Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly spill levels are not achievable due to mechanical limitations in setting spill gates to implement the regionally coordinated spill pattern. The project operator sets the spill gate stops to most closely approximate the 2013 FOP level of spill while also avoiding exceeding the %TDG spill cap to the extent practicable.

"Low flow" operations at the lower Columbia and Snake projects are triggered when inflow is insufficient to provide both minimum generation and the specified spill levels. In these situations, the projects operate at minimum generation and pass the remainder of project inflow as spill and through other miscellaneous routes, such as fish ladders, sluiceways, and navigation locks. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain.

The combination of these factors may result in instances when unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation, MOP elevation, and the target spill may not be possible throughout every hour. During low flow periods at Little Goose Dam, the overall project spill percentage appears to be reduced because the calculations do not account for the volume of water released during navigational lockages; however, the actual spill volume remains constant. When these variances occur, they are recorded in the monthly Spill Variance Table for Little Goose under the variance type "Navigation."

Actual spill levels at Corps projects with set flow targets may vary up to ±2 kcfs (Bonneville Dam may range up to ±3 kcfs, 2013 FOP p. 18) compared to those specified in the 2013 FOP and the RCC spill priority list (defines the projects' %TDG spill caps). A number of factors influence actual spill, including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (e.g. a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The 2013 FOP describes project "Operations during Rapid Load Changes" (p. 6). For reporting purposes, the notation "Transmission Stability" in the Spill Variance Report Table replaces "Rapid Load Changes," and identifies instances when hourly spill levels were not met as a result of load swing hours and other related within-hour load variability issues. "Transmission Stability" occurs because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Corporation (NERC) reserve requirements ("on response"). In addition to within-hour load variability, projects on response must be responsive

to within hour changes resulting from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while spill quantity remains the same within the hour. Under normal conditions, within-hour load changes primarily occur immediately preceding and following the peak load hours; however, within-hour changes in intermittent generation can occur at any hour of the day. Occasionally, several hours after peak load hours, the project may be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. Due to the high variability of within-hour load, reporting actual spill percentages that vary by more than the ±1 percent requirement (or other ranges specified in the 2013 FOP) may occur with greater frequency with "Transmission Stability" hours than other hours.

Occurrences requiring an adjustment in operations and/or regional coordination are described in greater detail in the "Operational Adjustments" section below.

July Operations:

The month of July was characterized by below average flows for the lower Snake River and slightly below average flows for the lower Columbia River. The NOAA Northwest River Forecast Center's Runoff Processor indicated that the July adjusted volume runoff on the lower Snake was below the 30 year average (1981-2010): 1.2 MAF (million acre feet) or 55 percent of average as measured at Lower Granite Dam. The Runoff Processor also indicated that the July 2013 adjusted volume runoff on the lower Columbia was below the 30 year average (1981-2010): 13.7 MAF or 94 percent of average as measured at The Dalles. The monthly precipitation summary for July was significantly below average at 31 percent on the Snake River above Ice Harbor Dam and significantly below average on the Columbia River above The Dalles Dam at 21 percent.

During the July reporting period, the planned 2013 FOP spill operations were carried out as follows:

- Lower Granite Dam - The hourly target spill level was 18 kcfs 24-hours/day.
- Little Goose Dam - The hourly target spill level was 30 percent of total river flow 24-hours/day.
- Lower Monumental Dam - The hourly target spill level was 17 kcfs 24 hours/day.
- Ice Harbor Dam - The hourly target spill level alternated every two days between 30 percent of total river flow for 24-hours/day vs. 45 kcfs daytime/%TDG cap nighttime until July 13 when the operation transitioned to 45 kcfs daytime/%TDG cap nighttime. Nighttime spill hours are 1800-0500.
- McNary Dam - The hourly target spill level was 50 percent of total river flow for 24-hours/day.
- John Day Dam - The hourly target spill level alternated every two days between 40 percent vs. 30 percent of total river flow for 24-hours/day until July 20 when the operation transitioned to 30 percent of total river flow for 24-hours/day.
- The Dalles Dam - The hourly target spill level was 40 percent of total river flow for 24-hours/day.

- Bonneville Dam - The hourly target spill level alternated every two days between 95 kcfs 24-hours/day vs. 85 kcfs daytime/121 kcfs nighttime until July 21 when the operation transitioned to 75 kcfs daytime/%TDG cap nighttime.

Operational Adjustments

1. Lower Granite Dam:

To address adult sockeye passage delays due to warm water temperatures in the adult fish ladder, special operations were implemented with spill levels that were intermittently either higher or lower than levels identified in the 2013 FOP.[2] On July 22, the TMT convened at the request of Idaho to discuss the situation and the consensus was to immediately modify unit priority and operate Unit 1 to improve attraction flow to the adult ladder and break up thermal stratification in the forebay. The Corps implemented this action from July 22 at 1700 hours through July 23 at 0800 hours. On July 23, the Fish Passage Advisory Committee (FPAC) submitted a System Operations Request (SOR) 2013-04 with several suggested operational and structural modifications to improve adult sockeye passage conditions. A recommendation was to alternate between a daytime operation to maximize powerhouse flow through Unit 1, which is closer to the adult ladder entrance and provides improved ladder attraction flow, with a night operation to maximize spill up to the %TDG spill cap to provide improved juvenile salmonid passage through the spillway at a time when fewer adults pass the project. The Corps began this special operation on July 23.

The Corps also proposed installing emergency auxiliary water supply pumps to bring cooler water into the ladder. The Corps installed the pumps on July 25 at 0715 hours and the ladder temperature decreased by 5°F within 24 hours. Adult fish passage numbers increased significantly after the pumps were installed when operating to Unit 1 priority, likely in response to the combination of improved ladder attraction flow and cooler ladder temperatures.

Throughout the operation, the Corps monitored the real-time data and modified the operation as necessary through further coordination with TMT during meetings on July 22, 23, 24, and 26. TMT members either supported or did not object to these operations.

[2] At river flows observed during this period, the 2013 FOP operation is to operate Unit 2 at minimum generation (11-13 kcfs) and spill the remainder of river flow. Spill levels with Unit 2 are approximately 4-6 kcfs greater than Unit 1 spill levels because this unit requires more powerhouse flow (due to the unit's fixed blades) to operate at near the upper ±1% efficiency range (approximately 17 kcfs). During nighttime spill to the %TDG spill cap, Unit 5 was operated for station service (5 kcfs), and the resulting spill levels were approximately 6-8 kcfs higher than Unit 2 minimum generation.

July 2013 Spill Variance Table
Table 1: July 2013 (7/1 – 7/28) - FOP Implementation Report Table

Project	Parameter	Date	Time[3]	Hours	Type	Reason
Lower Granite	Additional Spill	7/15/13	1000-2100	12	Maintenance	Hourly spill increased to 27.2 kcfs (above 18 kcfs FOP spill). Powerhouse was closed for worker safety during a moisture survey of the roof. Operation was coordinated at the May 9, 2013 FPOM meeting. 24 hr avg spill was 23 kcfs.
Lower Granite	Additional Spill	7/16/13	1000-2100	12	Maintenance	Hourly spill increased to 27.2 kcfs (above 18 kcfs FOP spill). Powerhouse was closed for worker safety during a moisture survey of the roof. Operation was coordinated at the May 9, 2013 FPOM meeting. 24 hr avg spill was 18.3 kcfs.
Lower Granite	Reduced Spill	7/22/13–7/23/13	1700-0800	15	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 6.9 kcfs (below 18 kcfs FOP spill). Modified FPP unit priority from Unit 2 (min. gen. range 11.3-13.1 kcfs) to Unit 1 (min. gen. range 16.4-17.3 kcfs), resulting in less spill. FPAC requested Unit 1 priority as part of adaptive management actions to improve adult passage conditions. 24 hr avg. spill was 13 kcfs on 7/22 and 15.1 kcfs on 7/23
Lower Granite	Additional Spill	7/23/13-7/24/13	2000-0600	11	Special Operations (Adaptive Management for Fish Passage)	Hourly spill increased to 25.3 kcfs (above 18 kcfs FOP spill). FPAC requested nighttime spill up to %TDG cap as part of adaptive management actions to improve adult passage conditions. 24 hr avg. spill was 15.1 kcfs on 7/23 and 16.5 kcfs on 7/24
Lower Granite	Reduced Spill	– 7/24/13	0700-1800	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 9.6 kcfs (below 18 kcfs FOP spill). Modified FPP unit priority from Unit 2 (min. gen. range 11.3-13.1 kcfs) to Unit 1 (min. gen. range 16.4-17.3 kcfs), resulting in less spill. FPAC requested Unit 1 priority as part of adaptive management actions to improve adult passage conditions. 24 hr avg. spill was 16.5 kcfs on 7/24
Lower Granite	Additional Spill	7/24/13-7/25/13	1900-0600	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill increased to 25.3 kcfs (above 18 kcfs FOP spill). FPAC requested nighttime spill up to %TDG cap as part of adaptive management actions to improve adult passage conditions. 24 hr avg. spill was 16.5 kcfs on 7/24 and 13.3 kcfs on 7/25
Lower Granite	Reduced Spill	7/25/13	0700-1800	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 9.9 kcfs (below 18 kcfs FOP spill). Modified FPP unit priority from Unit 2 (min. gen. range 11.3-13.1 kcfs) to Unit 1 (min. gen. range 16.4-17.3 kcfs), resulting in less spill. FPAC requested Unit 1 priority as part of adaptive management actions to improve adult passage conditions. 24 hr avg. spill was 13.3 kcfs on 7/25
Lower Granite	Reduced Spill	7/27/13–7/28/13	1000-2300	46	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 6.8 kcfs (below 18 kcfs FOP spill). Modified FPP unit priority from Unit 2 (min. gen. range 11.3-13.1 kcfs) to Unit 1 (min. gen. range 16.4-17.3 kcfs), resulting in less spill. FPAC requested unit 1 priority as part of adaptive management actions to improve adult passage conditions. 24 hr avg. spill was 9.5 kcfs on 7/27 and 8.1 kcfs on 7/28.
Little Goose	Reduced Spill	7/4/13	0800	1	Navigation	Hourly spill decreased to 28.9 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.9%.
Little Goose	Reduced Spill	7/7/13	1200	1	Navigation	Hourly spill decreased to 28.9 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.8%.

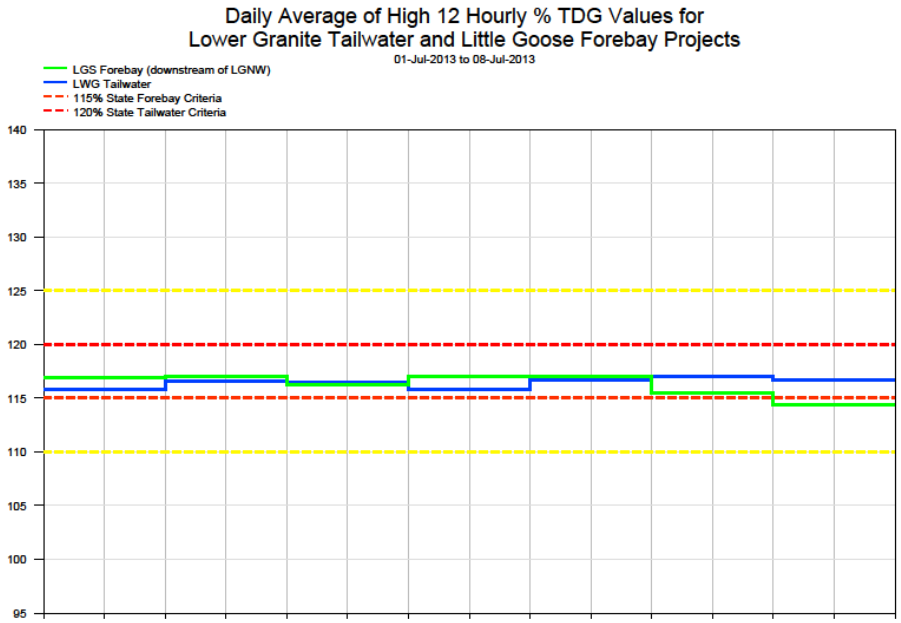
[3] Data collected for reporting spill variances is reported using hourly-averaged data. Therefore, while spill may be increased or decreased for only a portion of an hour, it is represented in the Spill Variance Table as an hour.

Project	Parameter	Date	Time[3]	Hours	Type	Reason
Little Goose	Reduced Spill	7/7/13	2100	1	Navigation	Hourly spill decreased to 28.2 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.8%.
Little Goose	Reduced Spill	7/8/13	0600	1	Navigation	Hourly spill decreased to 28.5 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.8%.
Little Goose	Reduced Spill	7/8/13	1600	1	Navigation	Hourly spill decreased to 28.9 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.8%.
Little Goose	Reduced Spill	7/9/13	1300	1	Navigation	Hourly spill decreased to 28.9 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.0%.
Little Goose	Reduced Spill	7/10/13	1600	1	Maintenance	Hourly spill decreased to 27.7 % (below 30% ± 1% range) due to water volume needed to empty the navigation lock in order to perform repairs. Volume of spill through the spillway remained the same. 24 hr avg. spill was 29.8%.
Little Goose	Reduced Spill	7/12/13	0500	1	Navigation	Hourly spill decreased to 28.4 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.0%.
Little Goose	Reduced Spill	7/13/13	0500	1	Navigation	Hourly spill decreased to 28.8 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.9%.
Little Goose	Reduced Spill	7/15/13	0900	1	Navigation	Hourly spill decreased to 28.9 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.9%.
Little Goose	Reduced Spill	7/17/13	1400	1	Navigation	Hourly spill decreased to 28.2 % (below 30% ± 1% range). Reduced spill for safe passage of fish barge. 24 hr avg. spill was 30.2%.
Little Goose	Reduced Spill	7/18/13	0800	1	Maintenance	Hourly spill decreased to 28.3 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. Operators were having problems with the lock so it was cycled for maintenance. 24 hr avg. spill was 29.2%.
Lower Monumental	Reduced Spill	7/1/13	1700-1900	3	Navigation	Hourly spill decreased to 12.7 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/3/13	1700-1800	2	Navigation	Hourly spill decreased to 12.1 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/7/13	1700-1800	2	Navigation	Hourly spill decreased to 12.2 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/9/13	1800-1900	2	Navigation	Hourly spill decreased to 13.6 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/11/13	1700-1800	2	Navigation	Hourly spill decreased to 12.0 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/13/13	1800-1900	2	Navigation	Hourly spill decreased to 10.3 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/15/13	1700-1800	2	Navigation	Hourly spill decreased to 9.4 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/19/13	1800	1	Navigation	Hourly spill decreased to 13.9 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/21/13	1800	1	Navigation	Hourly spill decreased to 13.6 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/23/13	1700-1800	2	Navigation	Hourly spill decreased to 9.8 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/25/13	1800-1900	2	Navigation	Hourly spill decreased to 12.0 kcfs (below 17 kcfs spill cap). Reduced spill for safe passage of fish barge.
Ice Harbor	Reduced Spill	7/8/13	0600	1	Navigation	Hourly spill decreased to 28.8 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.0%.

Project	Parameter	Date	Time[3]	Hours	Type	Reason
Ice Harbor	Additional Spill	7/8/13	0700	1	Transmission Stability	Hourly spill increased to 31.1% (above 30% ± 1% range) due to an unexpected unit outage, spilled excess outflow. 24 hr avg. spill was 30.0%.
Ice Harbor	Reduced Spill	7/12/13	1600	1	Navigation	Hourly spill decreased to 28.4 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.0%.
Ice Harbor	Reduced Spill	7/12/13	1800	1	Navigation	Hourly spill decreased to 28.4 % (below 30% ± 1% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 30.0%.
Ice Harbor	Reduced Spill	7/23/13	1100-1800	8	Human/Program Error	Hourly spill was 1.3 kcfs below FOP min gen spill (16.8 kcfs) due to miscalculation above min gen range (8.5-10.3 kcfs). BPA duty schedulers instructed to review and reset every basepoint whenever Automatic Generation Control (AGC) is changed to prevent future occurrences. 24 hr avg. spill was 18 kcfs.
Ice Harbor	Reduced Spill	7/25/13	1000	1	Maintenance	In accordance with the 2013 FPP, routine inspections of the fish screens are required. Hourly spill of 18.1 kcfs was 0.7 kcfs below FOP min gen spill due additional generation from switching between units during the hour to inspect screens. Hourly average generation was 11 kcfs (above the min gen range of 8.5-10.3 kcfs). 24 hr avg. spill was 18.5 kcfs.
Ice Harbor	Reduced Spill	7/25/13	1300	1	Maintenance	In accordance with the 2013 FPP, routine inspections of the fish screens are required. Hourly spill of 18.1 kcfs was 0.1 kcfs below FOP min gen spill due additional generation from switching between units during the hour to inspect screens. Hourly average generation was 10.4 kcfs (above the min gen range of 8.5-10.3 kcfs). 24 hr avg. spill was 18.5 kcfs.
Ice Harbor	Reduced Spill	7/26/13	1400	1	Maintenance	Hourly spill of 21.0 kcfs was 2.5 kcfs below FOP min. gen. spill due to generation above min. gen. range (8.5-10.3 kcfs) to 12.5 kcfs during routine unit testing after annual maintenance, per the 2013 FPP. 24 hr avg. spill was 19.4 kcfs.
Ice Harbor	Reduced Spill	7/27/13	0800	1	Maintenance	Hourly spill of 10.1 kcfs was 3.8 kcfs below FOP min. gen. spill due to generation above min. gen. range (8.5-10.3 kcfs) to 14.1 kcfs during routine unit testing after annual maintenance, per the 2013 FPP. 24 hr avg. spill was 11.3 kcfs.
McNary	Additional Spill	7/8/13-7/9/13	0700 - 1600	34	Maintenance	Hourly spill increased to 59.3 % (above 50% ± 1% range) due to testing a transmission system program that trips units to ensure system stability. This testing was coordinated with FPOM on June 25, July 2, and July 9, 2013.
McNary	Additional Spill	7/11/13	1000	1	Program Error	Hourly spill increased to 51.5 % (above 50% ± 1% range) due to a malfunction of the program that manages spill during ongoing testing of the transmission stability program. 24 hr avg. spill was 50.1%.
John Day	Reduced Spill	7/10/13	1200	1	Transmission Stability	Hourly spill decreased to 28.7 % (below 30% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 31.6%.
John Day	Additional Spill	7/11/13	0300	1	Transmission Stability	Hourly spill increased to 41.1 % (above 40% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 40.1%.
John Day	Reduced Spill	7/15/13	0200	1	Transmission Stability	Hourly spill decreased to 38.9 % (below 40% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 39.7%.

Project	Parameter	Date	Time[3]	Hours	Type	Reason
John Day	Reduced Spill	7/25/13	1100	1	Transmission Stability	Hourly spill decreased to 28.6 % (below 30% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 29.9%.
The Dalles	Additional Spill	7/4/13	0200	1	Transmission Stability	Hourly spill increased to 41.1% (above 40% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 38.4%.
The Dalles	Additional Spill	7/10/13	0100	1	Transmission Stability	Hourly spill increased to 41.1% (above 40% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 39.9%.
The Dalles	Reduced Spill	7/10/13	1200	1	Transmission Stability	Hourly spill decreased to 38.6 % (below 30% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 39.9%.
The Dalles	Reduced Spill	7/10/13	1400	1	Transmission Stability	Hourly spill decreased to 38.9 % (below 30% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 39.9%.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
01-Jul-2013 to 08-Jul-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

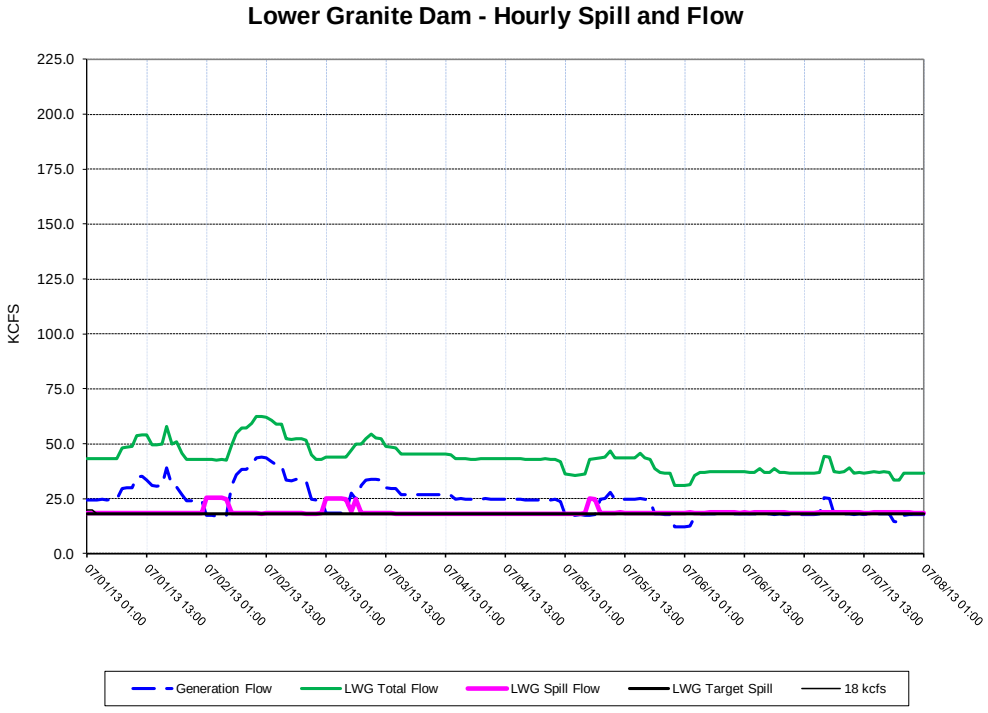
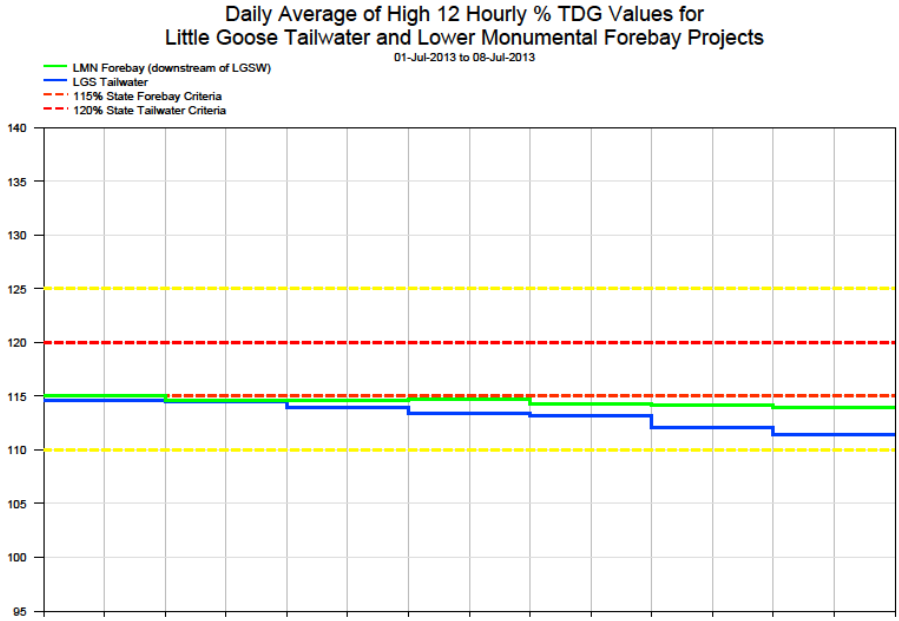

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/01/13 01:00
07/01/13 13:00
07/02/13 01:00
07/02/13 13:00
07/03/13 01:00
07/03/13 13:00
07/04/13 01:00
07/04/13 13:00
07/05/13 01:00
07/05/13 13:00
07/06/13 01:00
07/06/13 13:00
07/07/13 01:00
07/07/13 13:00
07/08/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 2


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
01-Jul-2013 to 08-Jul-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

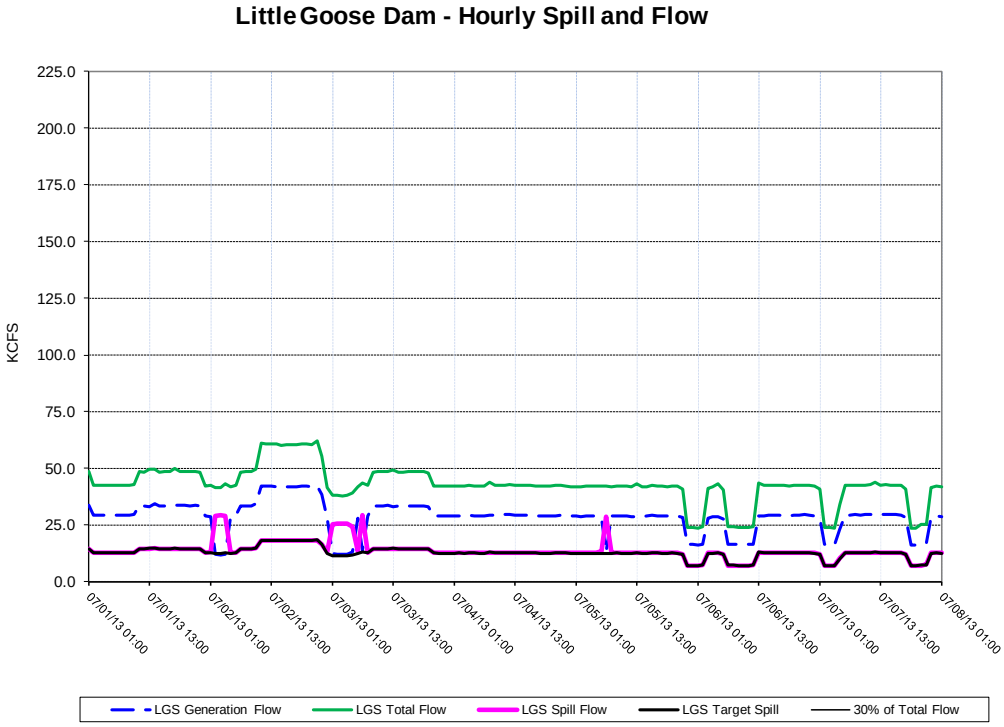
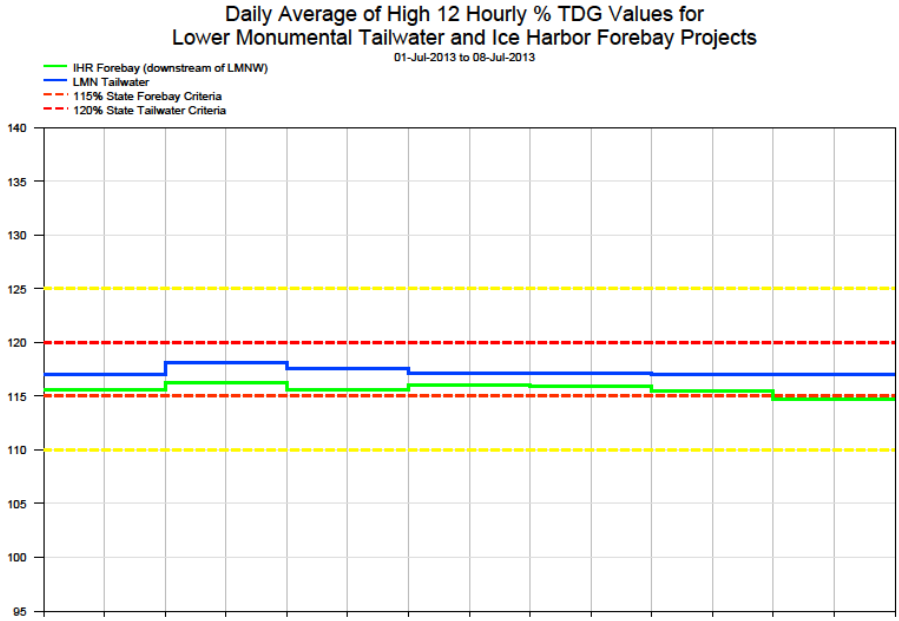

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/01/13 01:00
07/01/13 13:00
07/02/13 01:00
07/02/13 13:00
07/03/13 01:00
07/03/13 13:00
07/04/13 01:00
07/04/13 13:00
07/05/13 01:00
07/05/13 13:00
07/06/13 01:00
07/06/13 13:00
07/07/13 01:00
07/07/13 13:00
07/08/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
01-Jul-2013 to 08-Jul-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

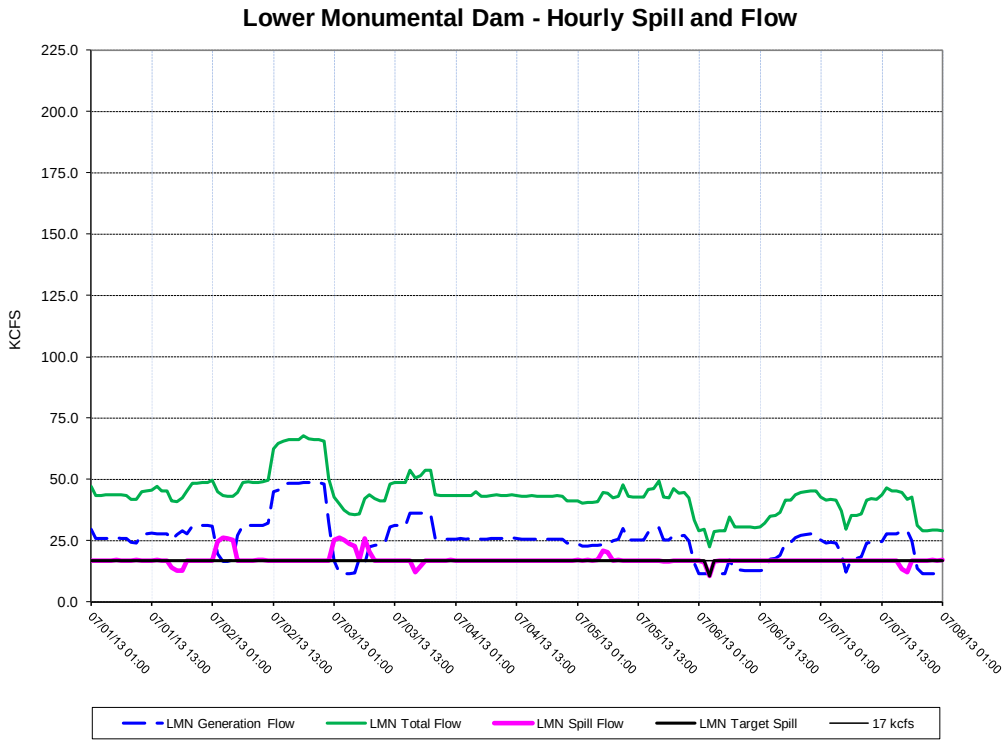
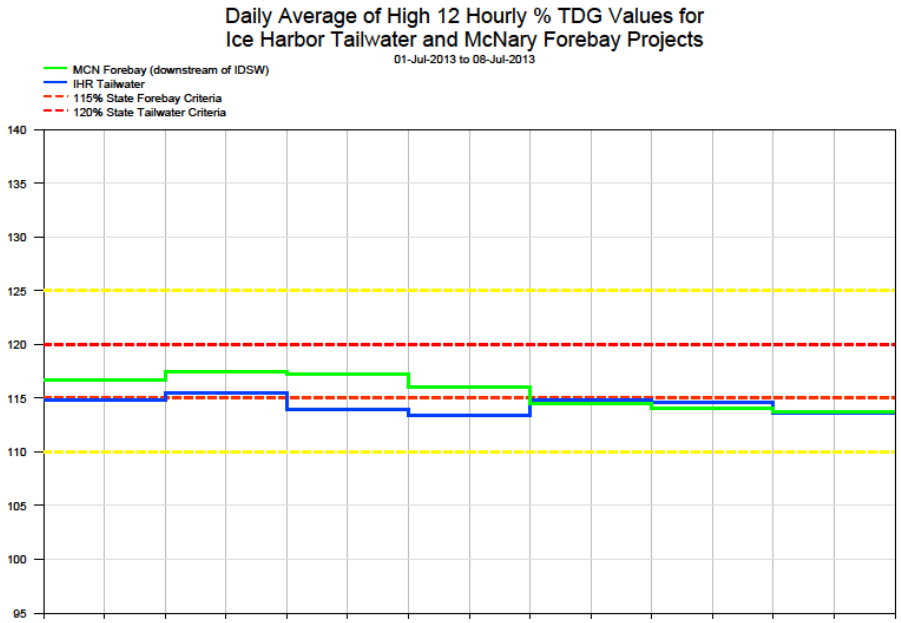

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/01/13 01:00
07/01/13 13:00
07/02/13 01:00
07/02/13 13:00
07/03/13 01:00
07/03/13 13:00
07/04/13 01:00
07/04/13 13:00
07/05/13 01:00
07/05/13 13:00
07/06/13 01:00
07/06/13 13:00
07/07/13 01:00
07/07/13 13:00
07/08/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
01-Jul-2013 to 08-Jul-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

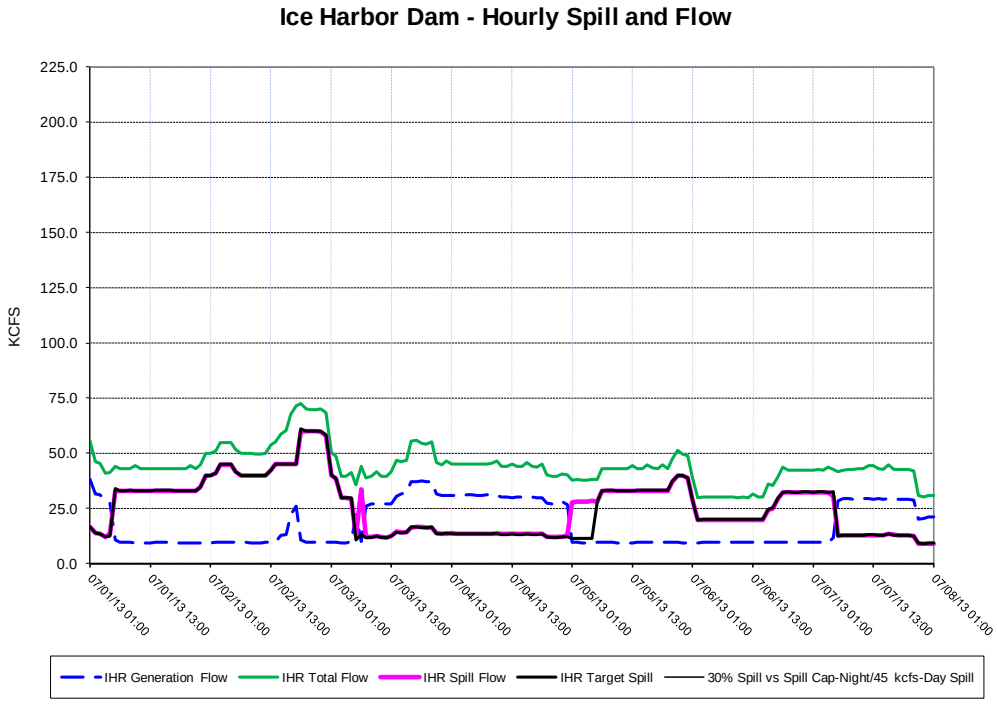
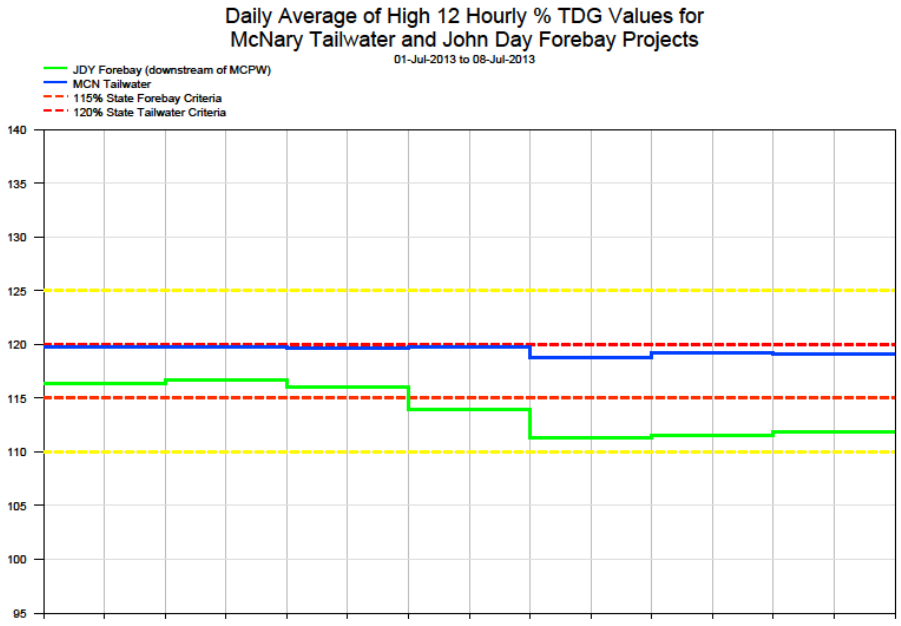

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/01/13 01:00
07/01/13 13:00
07/02/13 01:00
07/02/13 13:00
07/03/13 01:00
07/03/13 13:00
07/04/13 01:00
07/04/13 13:00
07/05/13 01:00
07/05/13 13:00
07/06/13 01:00
07/06/13 13:00
07/07/13 01:00
07/07/13 13:00
07/08/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 5


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
01-Jul-2013 to 08-Jul-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

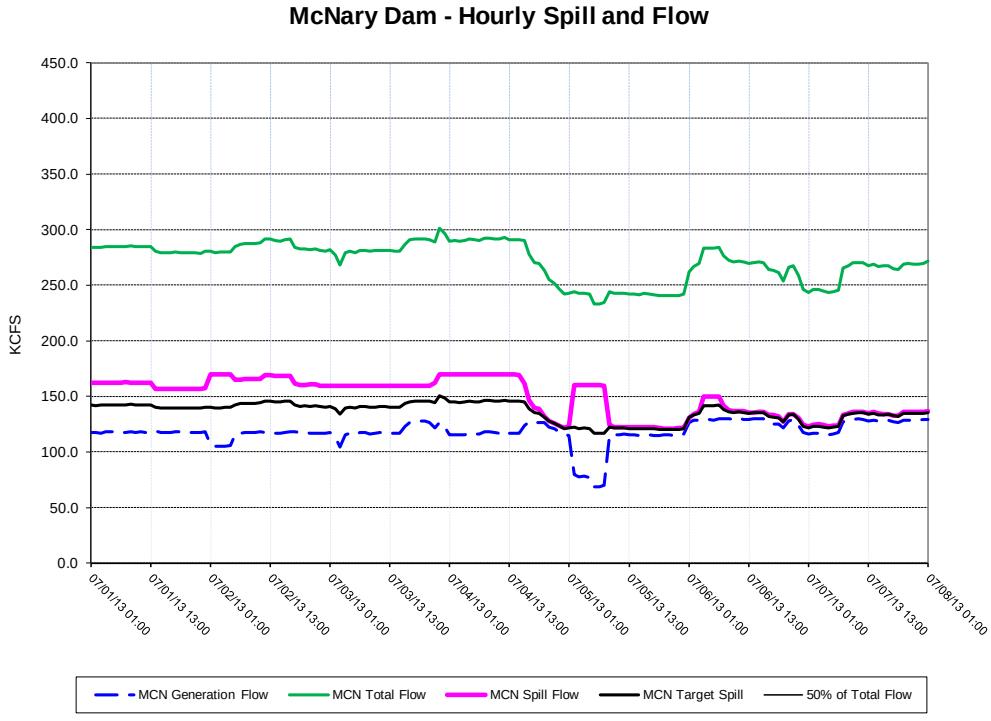
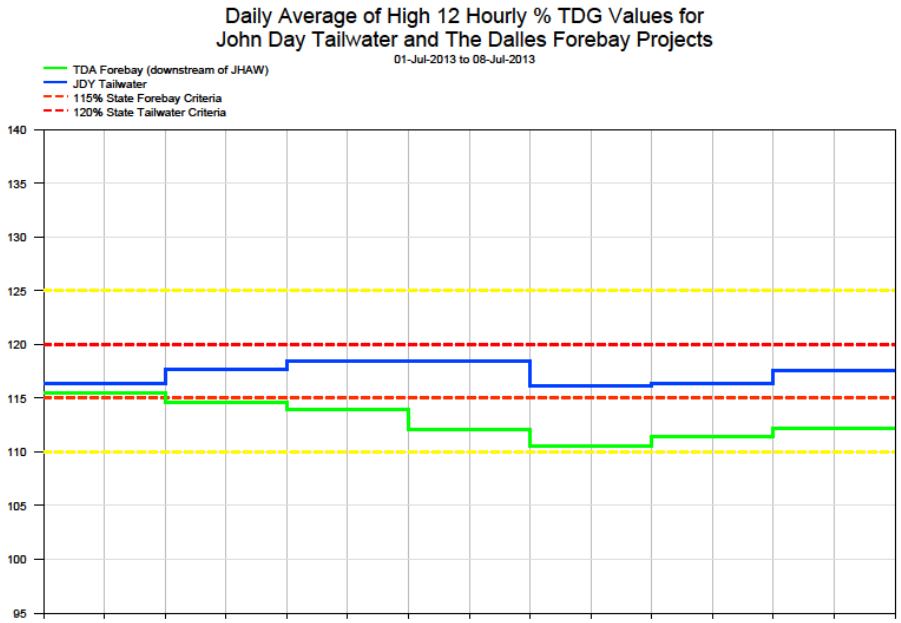

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/01/13 01:00
07/01/13 13:00
07/02/13 01:00
07/02/13 13:00
07/03/13 01:00
07/03/13 13:00
07/04/13 01:00
07/04/13 13:00
07/05/13 01:00
07/05/13 13:00
07/06/13 01:00
07/06/13 13:00
07/07/13 01:00
07/07/13 13:00
07/08/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 6


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
01-Jul-2013 to 08-Jul-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

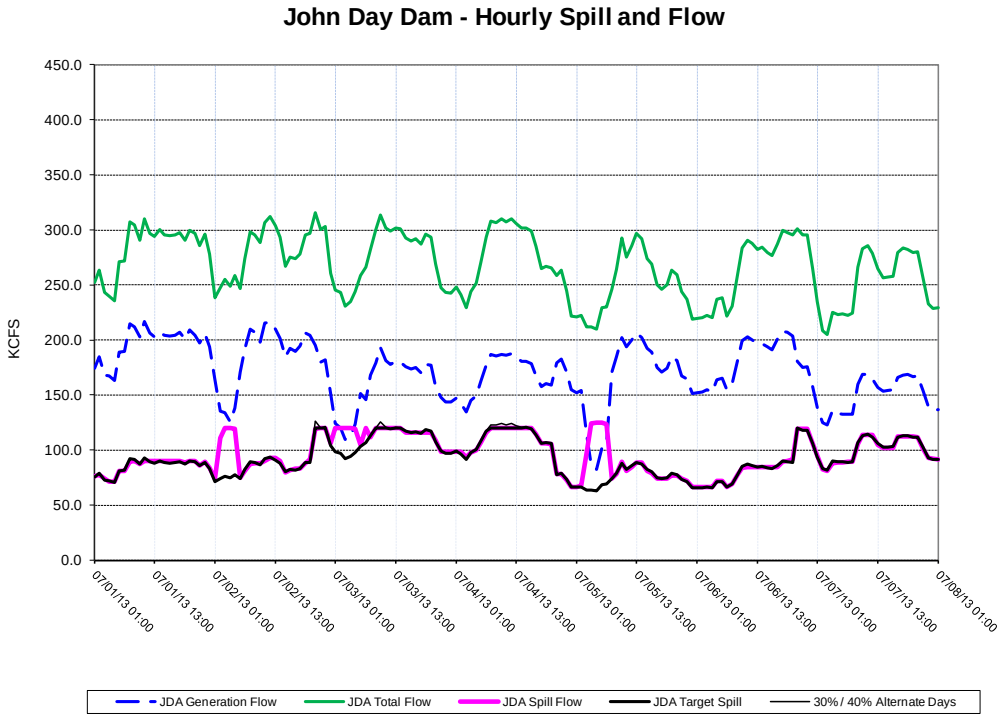
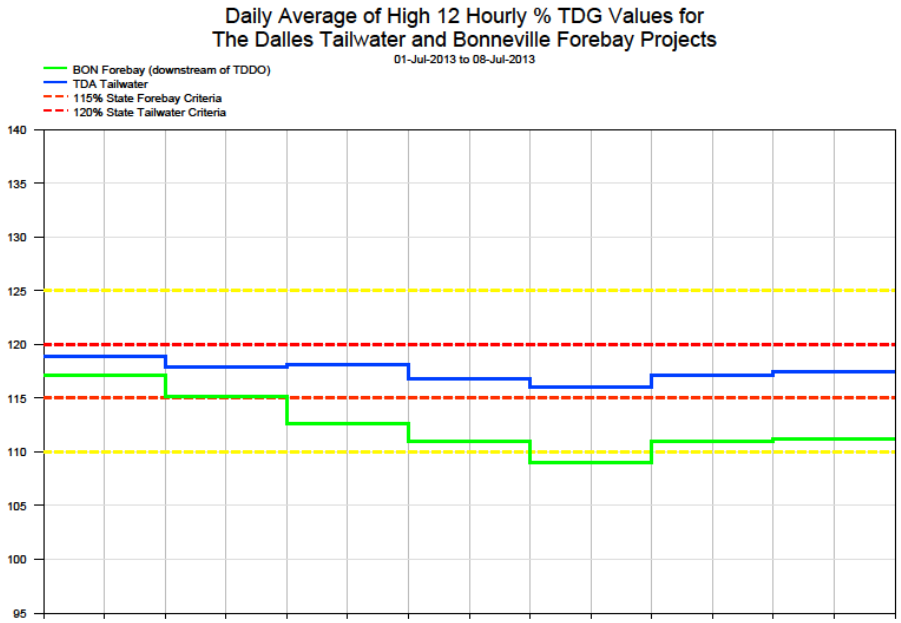

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/01/13 01:00
07/01/13 13:00
07/02/13 01:00
07/02/13 13:00
07/03/13 01:00
07/03/13 13:00
07/04/13 01:00
07/04/13 13:00
07/05/13 01:00
07/05/13 13:00
07/06/13 01:00
07/06/13 13:00
07/07/13 01:00
07/07/13 13:00
07/09/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 7


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
01-Jul-2013 to 08-Jul-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

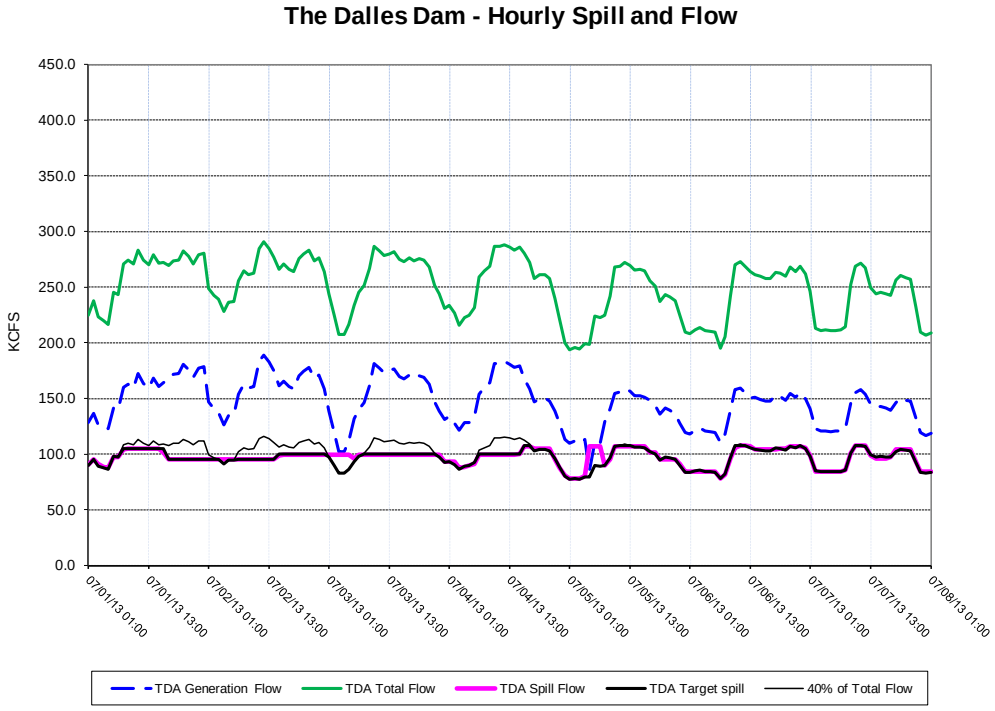
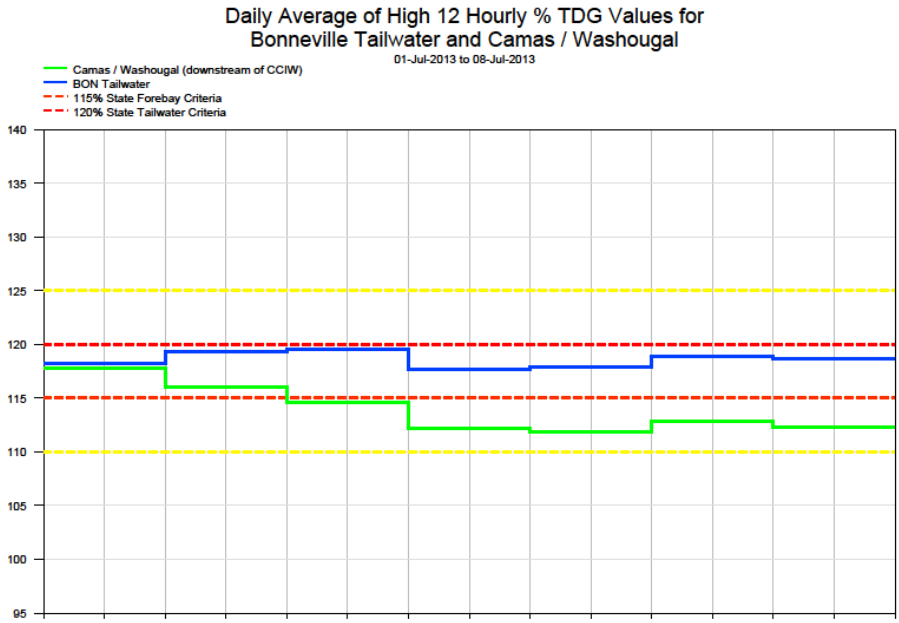

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/01/13 01:00
07/01/13 13:00
07/02/13 01:00
07/02/13 13:00
07/03/13 01:00
07/03/13 13:00
07/04/13 01:00
07/04/13 13:00
07/05/13 01:00
07/05/13 13:00
07/06/13 01:00
07/06/13 13:00
07/07/13 01:00
07/07/13 13:00
07/08/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
01-Jul-2013 to 08-Jul-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

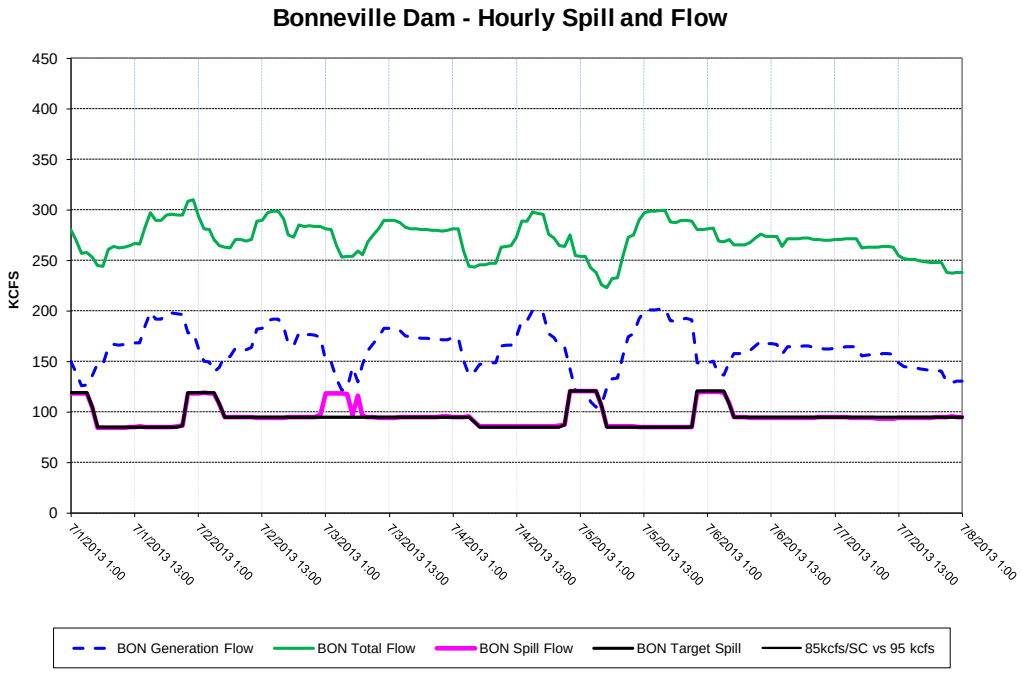
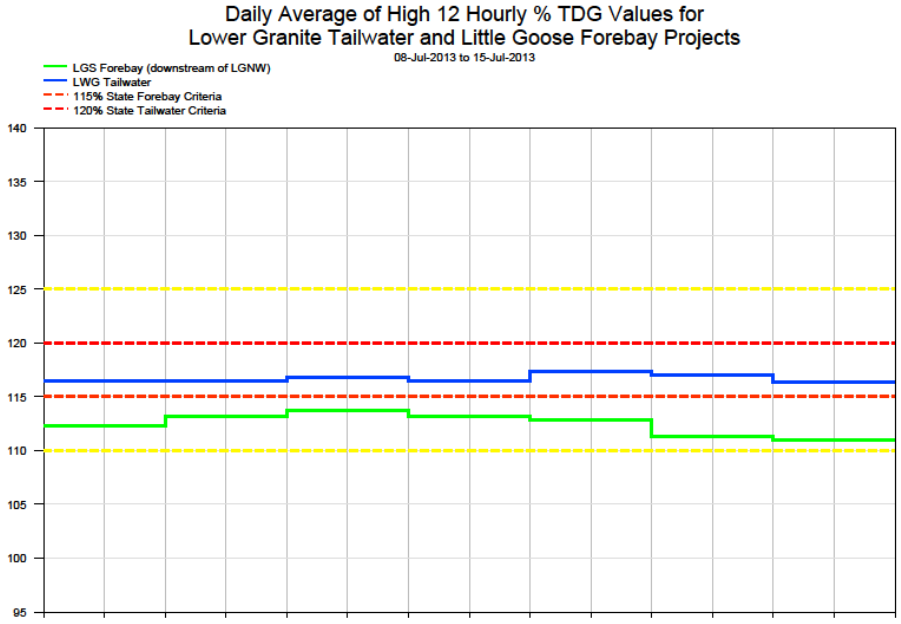

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/1/2013 1:00
7/1/2013 13:00
7/2/2013 1:00
7/2/2013 13:00
7/3/2013 1:00
7/3/2013 13:00
7/4/2013 1:00
7/4/2013 13:00
7/5/2013 1:00
7/5/2013 13:00
7/6/2013 1:00
7/6/2013 13:00
7/7/2013 1:00
7/7/2013 13:00
7/8/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
85kcfs/SC vs 95 kcfs

Figure 9


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
08-Jul-2013 to 15-Jul-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

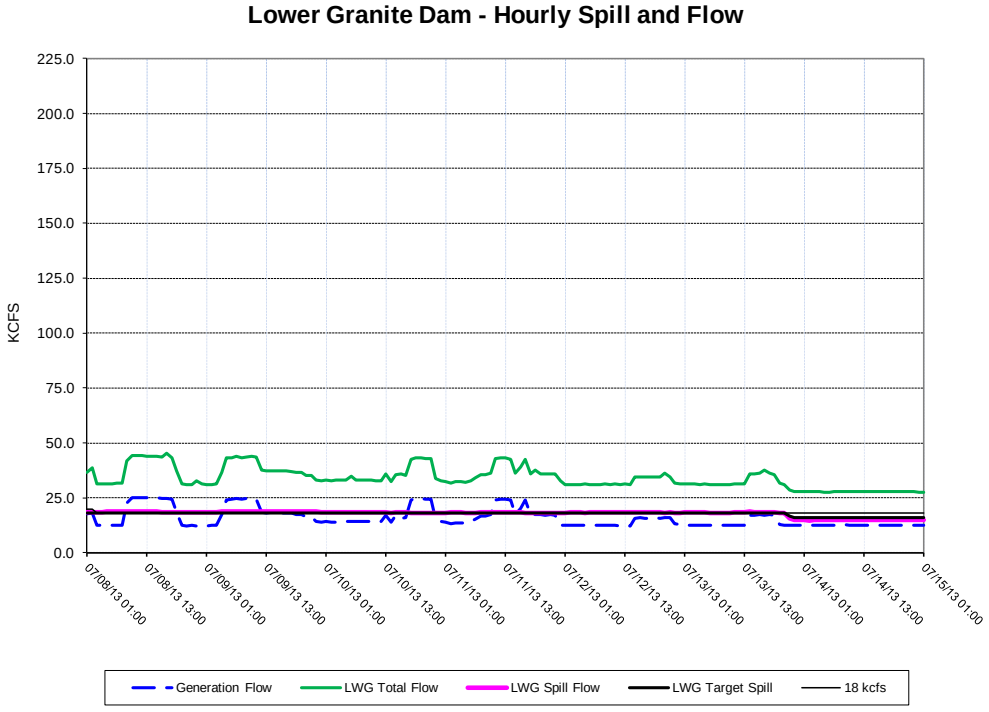
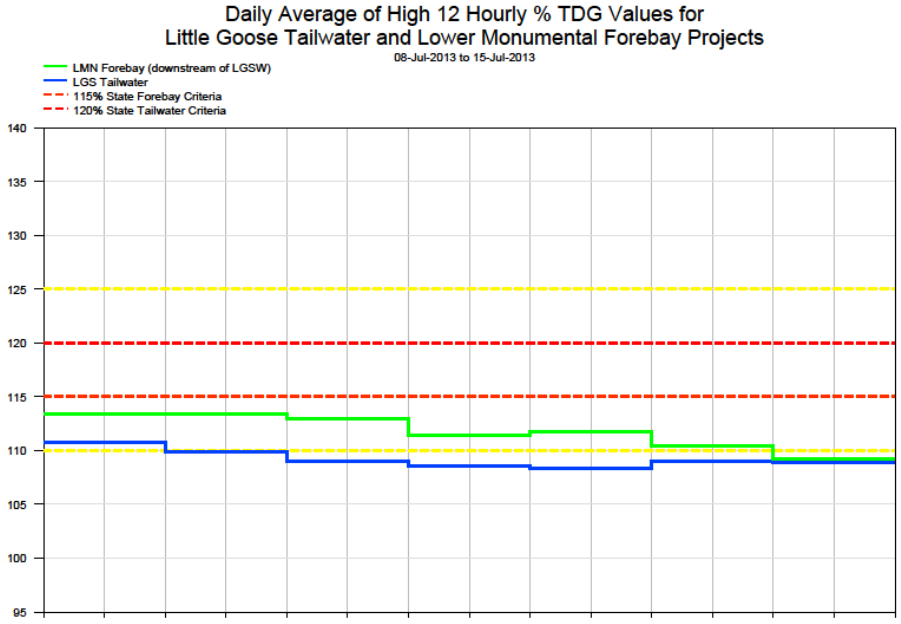

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/08/13 01:00
07/08/13 13:00
07/09/13 01:00
07/09/13 13:00
07/10/13 01:00
07/10/13 13:00
07/11/13 01:00
07/11/13 13:00
07/12/13 01:00
07/12/13 13:00
07/13/13 01:00
07/13/13 13:00
07/14/13 01:00
07/14/13 13:00
07/15/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 10


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
08-Jul-2013 to 15-Jul-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

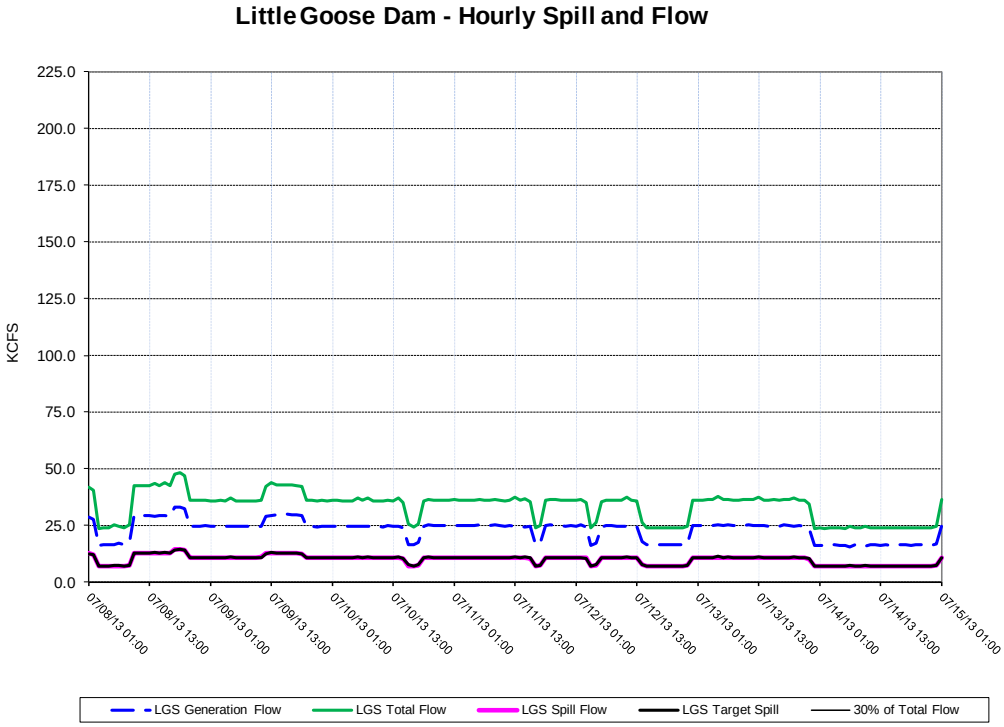
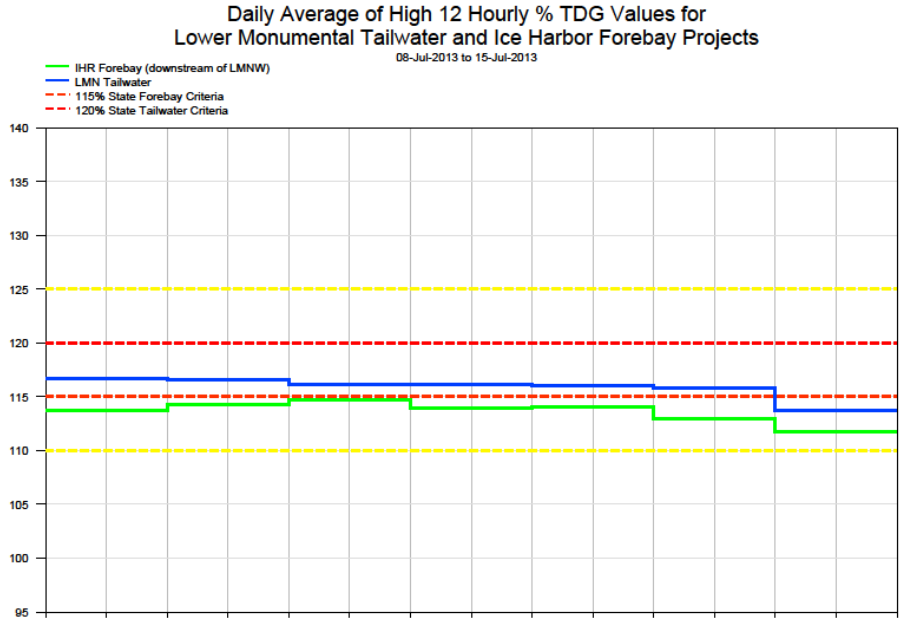

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/08/13 01:00
07/08/13 13:00
07/09/13 01:00
07/09/13 13:00
07/10/13 01:00
07/10/13 13:00
07/11/13 01:00
07/11/13 13:00
07/12/13 01:00
07/12/13 13:00
07/13/13 01:00
07/13/13 13:00
07/14/13 01:00
07/14/13 13:00
07/15/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 11


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
08-Jul-2013 to 15-Jul-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

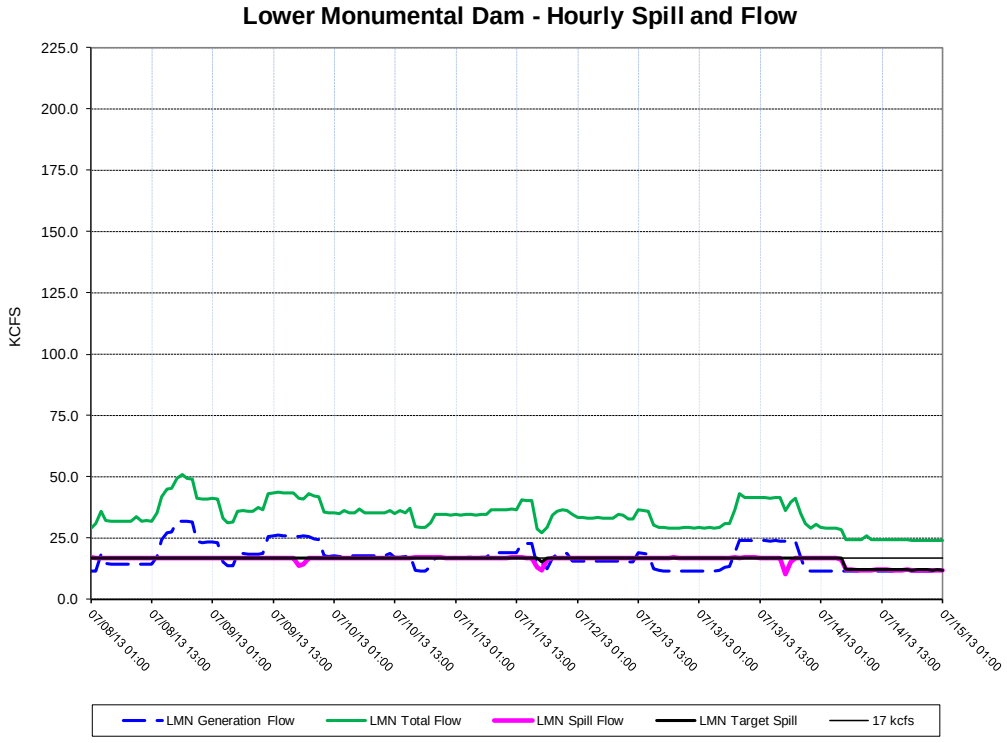
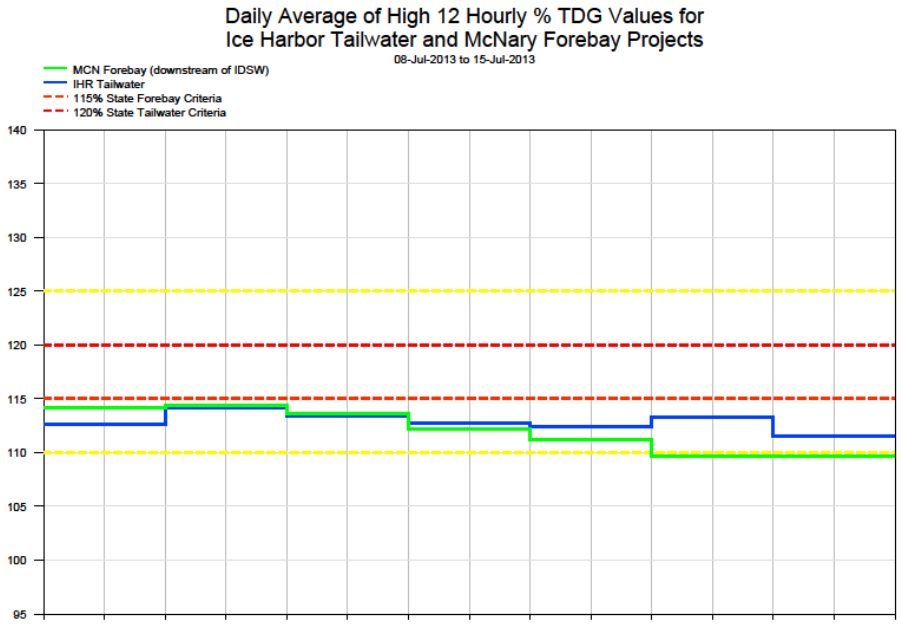

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/08/13 01:00
07/08/13 13:00
07/09/13 01:00
07/09/13 13:00
07/10/13 01:00
07/10/13 13:00
07/11/13 01:00
07/11/13 13:00
07/12/13 01:00
07/12/13 13:00
07/13/13 01:00
07/13/13 13:00
07/14/13 01:00
07/14/13 13:00
07/15/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 12


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
08-Jul-2013 to 15-Jul-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

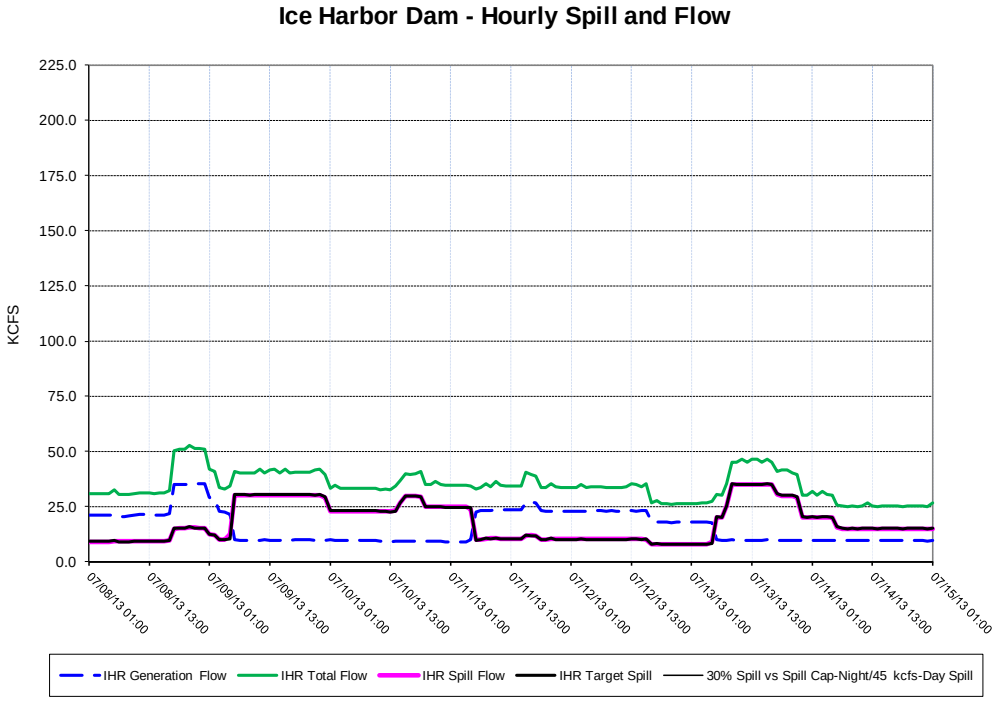
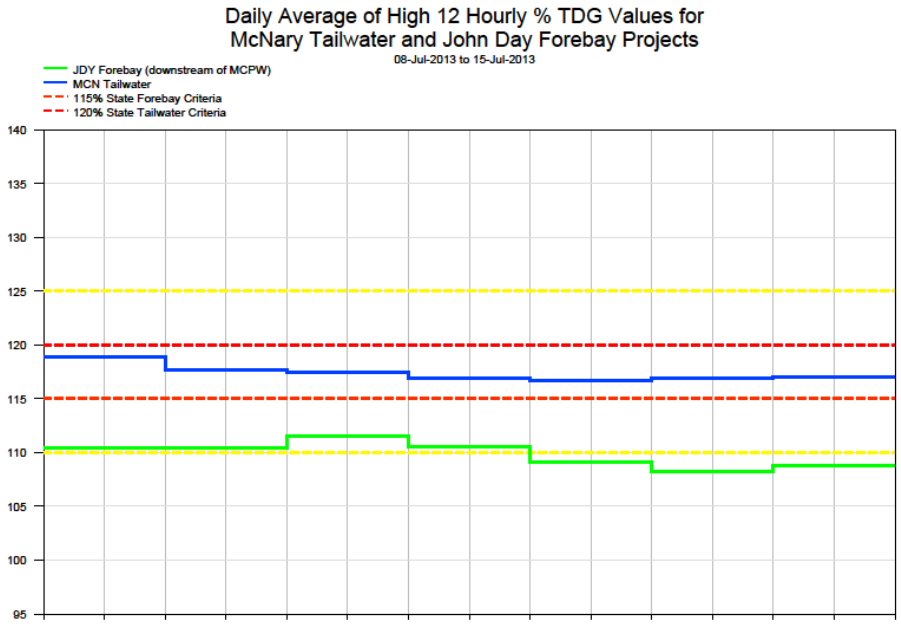

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/08/13 01:00
07/08/13 13:00
07/09/13 01:00
07/09/13 13:00
07/10/13 01:00
07/10/13 13:00
07/11/13 01:00
07/11/13 13:00
07/12/13 01:00
07/12/13 13:00
07/13/13 01:00
07/13/13 13:00
07/14/13 01:00
07/14/13 13:00
07/15/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 13


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
08-Jul-2013 to 15-Jul-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

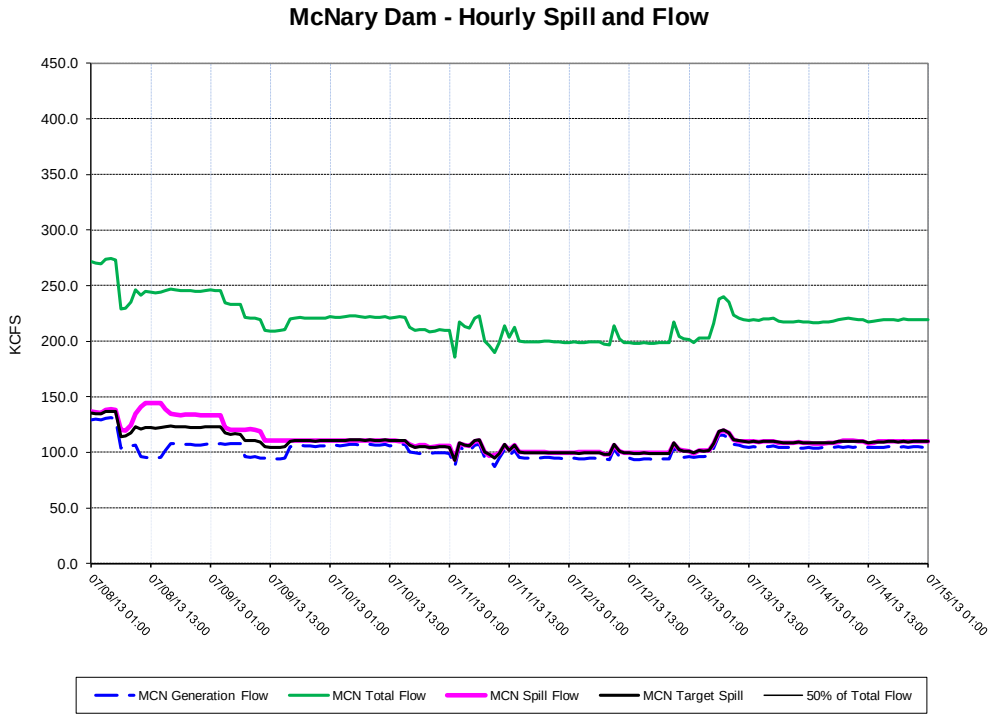
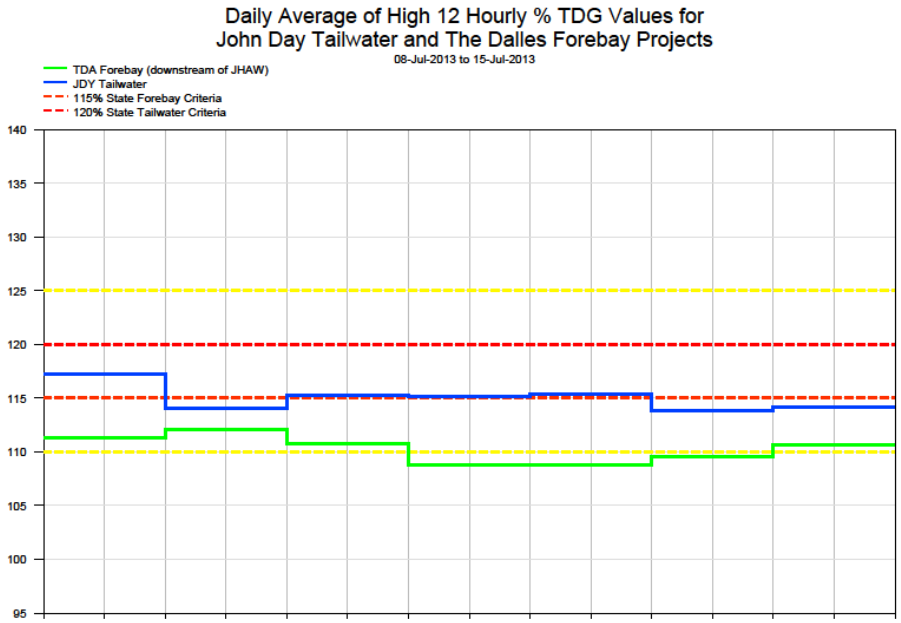

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/08/13 01:00
07/08/13 13:00
07/09/13 01:00
07/09/13 13:00
07/10/13 01:00
07/10/13 13:00
07/11/13 01:00
07/11/13 13:00
07/12/13 01:00
07/12/13 13:00
07/13/13 01:00
07/13/13 13:00
07/14/13 01:00
07/14/13 13:00
07/15/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 14


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
08-Jul-2013 to 15-Jul-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

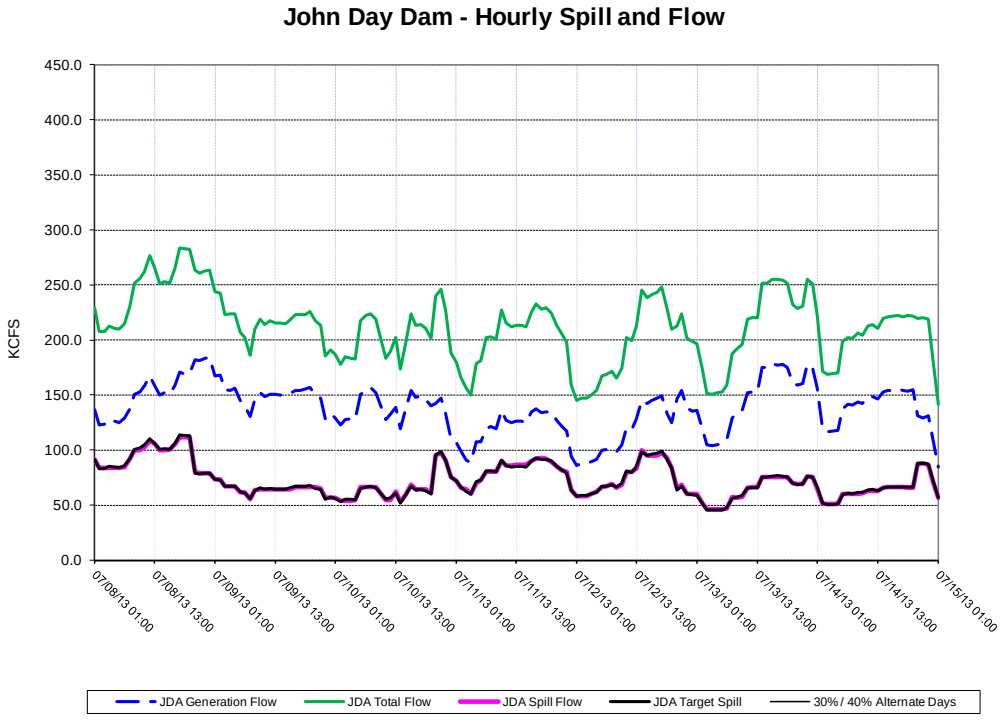
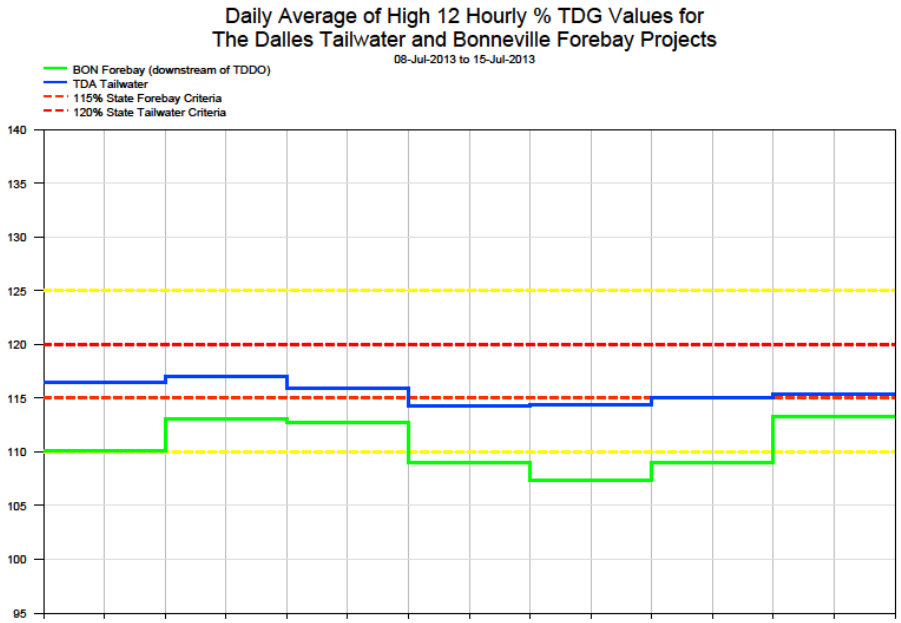

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/08/13 01:00
07/08/13 13:00
07/09/13 01:00
07/09/13 13:00
07/10/13 01:00
07/10/13 13:00
07/11/13 01:00
07/11/13 13:00
07/12/13 01:00
07/12/13 13:00
07/13/13 01:00
07/13/13 13:00
07/14/13 01:00
07/14/13 13:00
07/15/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 15


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
08-Jul-2013 to 15-Jul-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

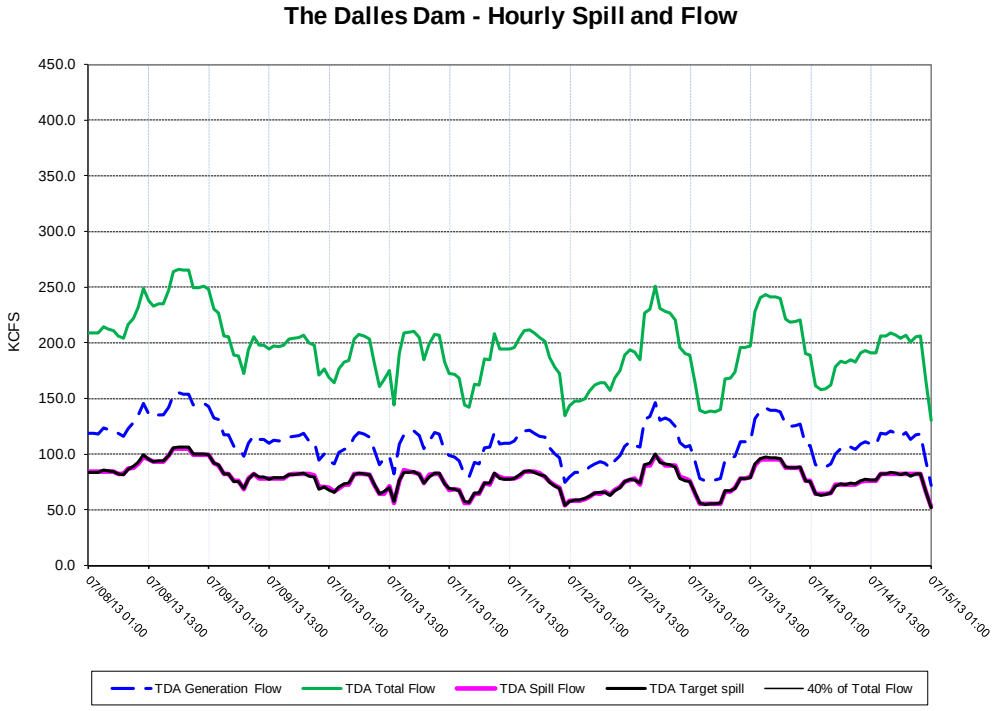
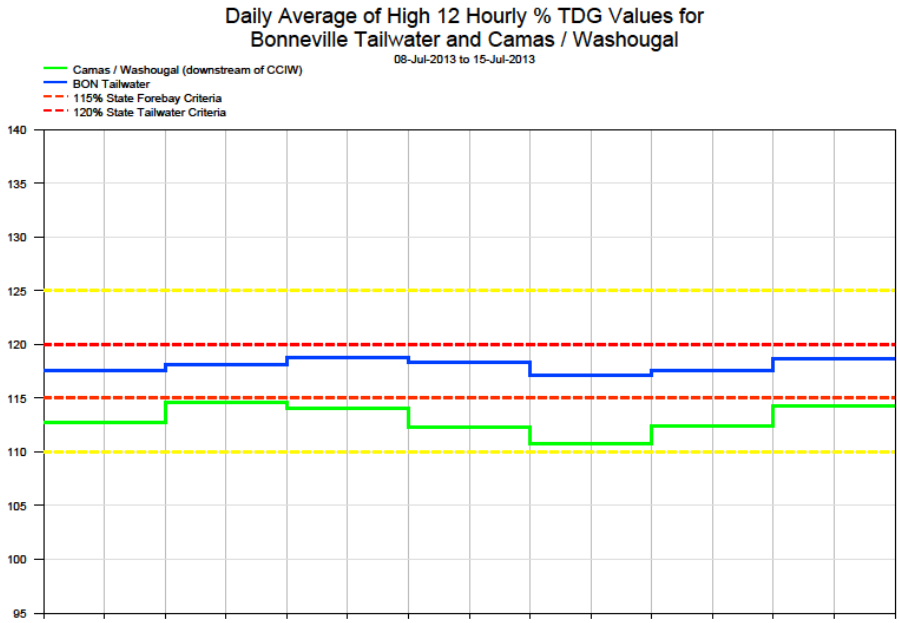

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/08/13 01:00
07/08/13 13:00
07/09/13 01:00
07/09/13 13:00
07/10/13 01:00
07/10/13 13:00
07/11/13 01:00
07/11/13 13:00
07/12/13 01:00
07/12/13 13:00
07/13/13 01:00
07/13/13 13:00
07/14/13 01:00
07/14/13 13:00
07/15/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 16


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
08-Jul-2013 to 15-Jul-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

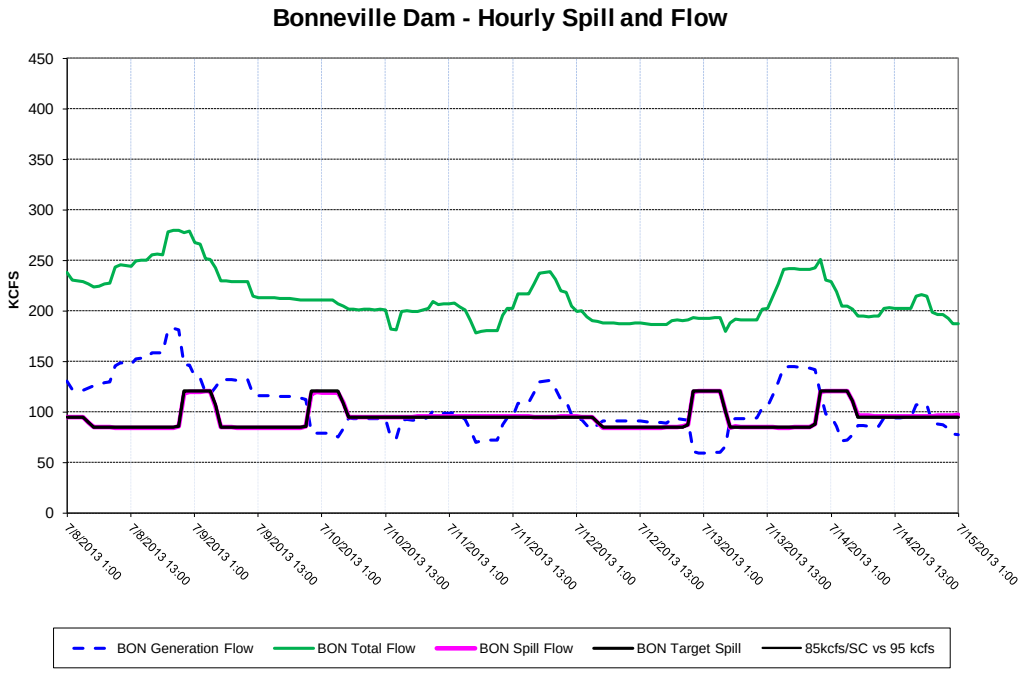
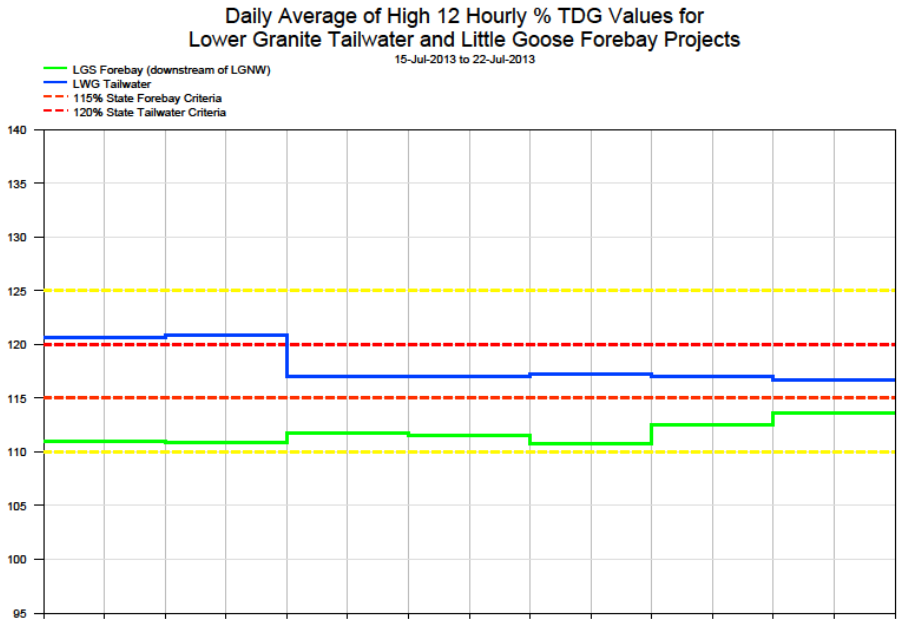

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/8/2013 1:00
7/8/2013 13:00
7/9/2013 1:00
7/9/2013 13:00
7/10/2013 1:00
7/10/2013 13:00
7/11/2013 1:00
7/11/2013 13:00
7/12/2013 1:00
7/12/2013 13:00
7/13/2013 1:00
7/13/2013 13:00
7/14/2013 1:00
7/14/2013 13:00
7/15/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
85kcfs/SC vs 95 kcfs

Figure 17


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
15-Jul-2013 to 22-Jul-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

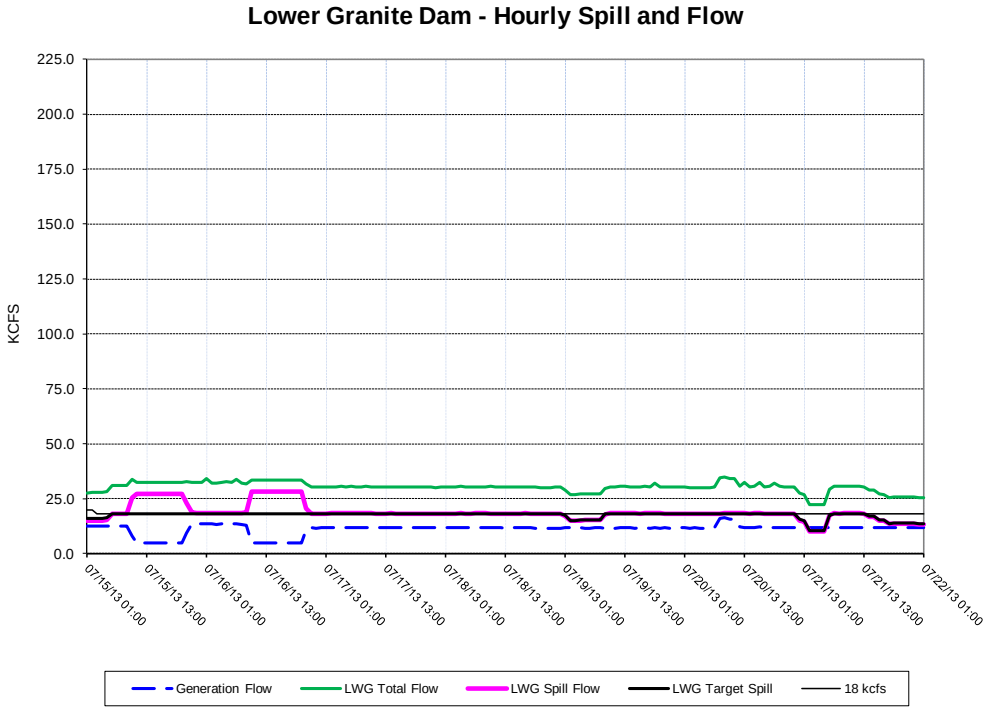
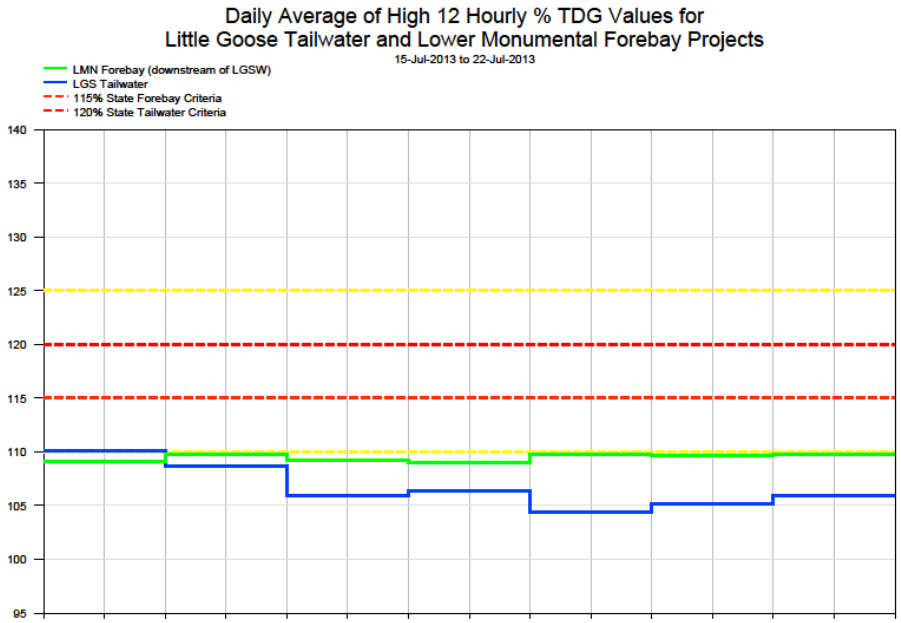

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/15/13 01:00
07/15/13 13:00
07/16/13 01:00
07/16/13 13:00
07/17/13 01:00
07/17/13 13:00
07/18/13 01:00
07/18/13 13:00
07/19/13 01:00
07/19/13 13:00
07/20/13 01:00
07/20/13 13:00
07/21/13 01:00
07/21/13 13:00
07/22/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 18


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
15-Jul-2013 to 22-Jul-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

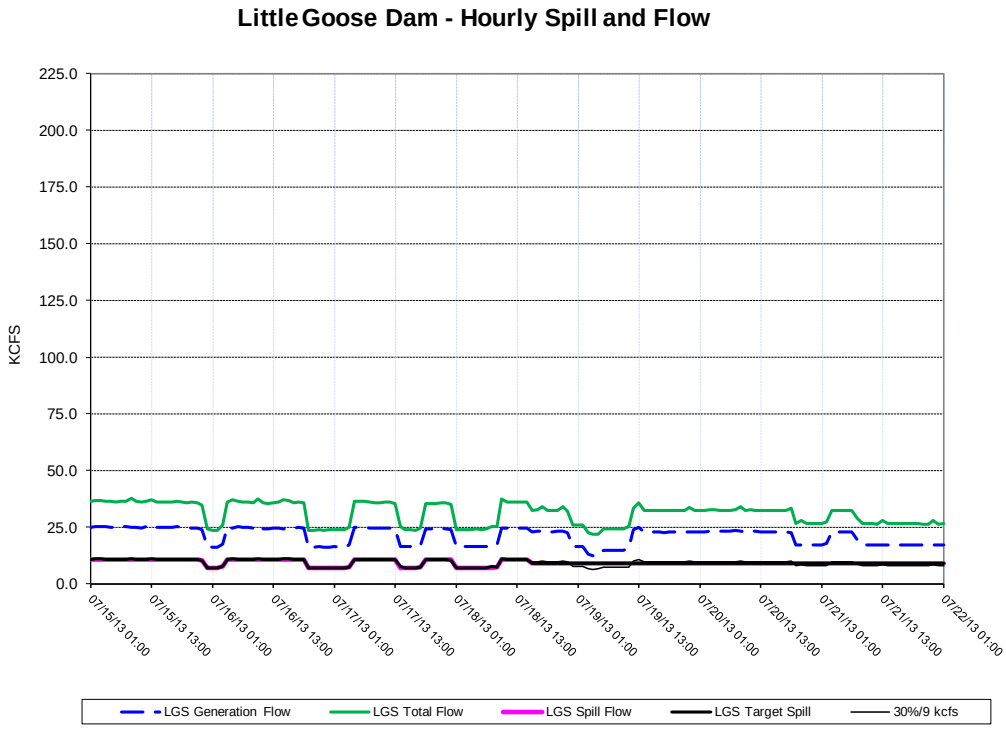
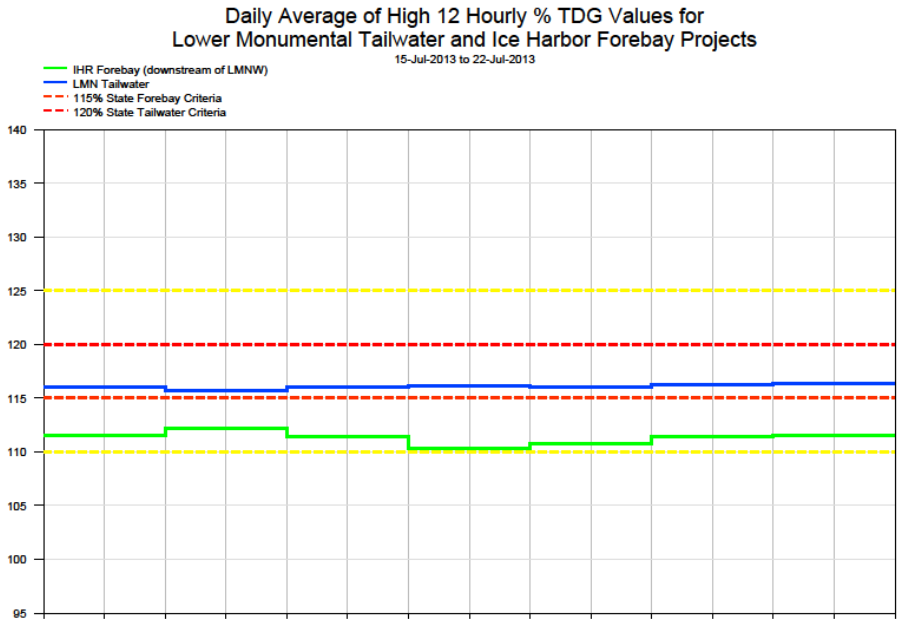

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/15/13 01:00
07/15/13 13:00
07/16/13 01:00
07/16/13 13:00
07/17/13 01:00
07/17/13 13:00
07/18/13 01:00
07/18/13 13:00
07/19/13 01:00
07/19/13 13:00
07/20/13 01:00
07/20/13 13:00
07/21/13 01:00
07/21/13 13:00
07/22/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30%/9 kcfs

Figure 19


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
15-Jul-2013 to 22-Jul-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

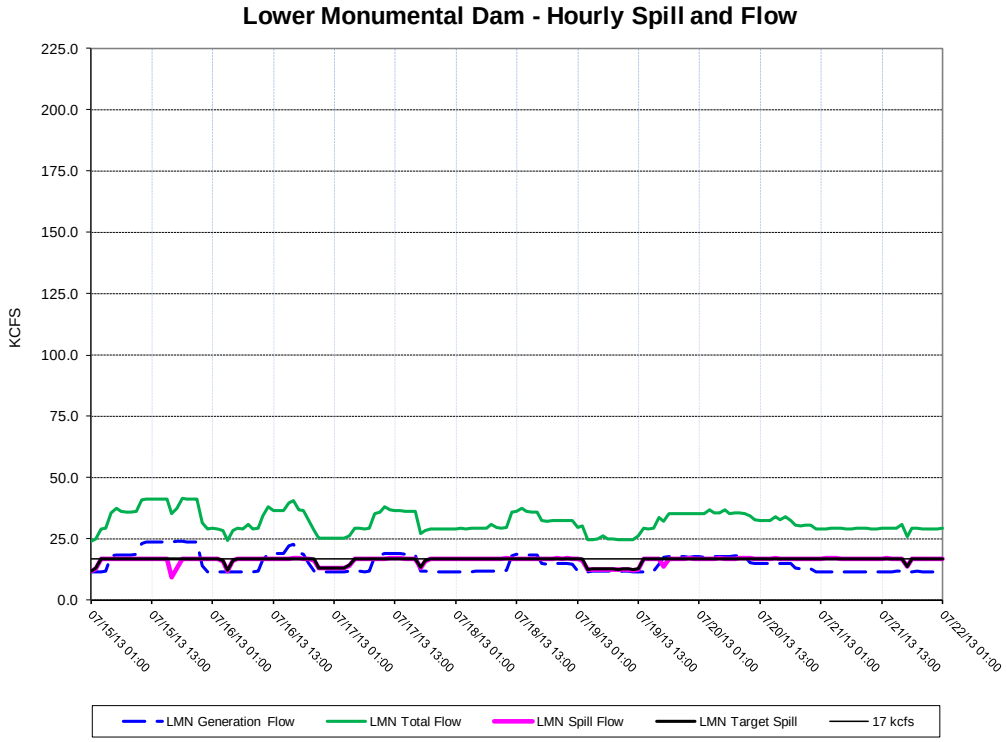
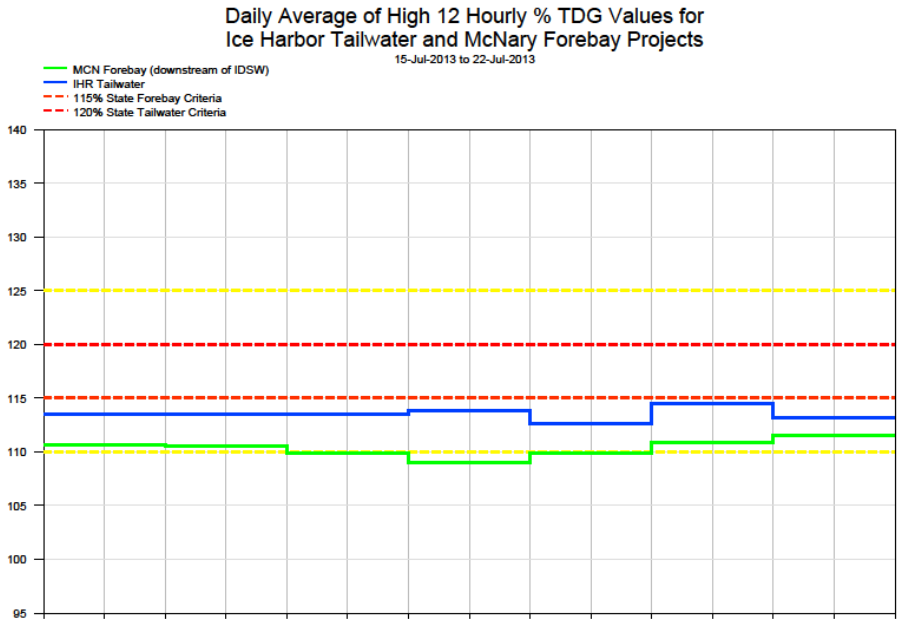

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/15/13 01:00
07/15/13 13:00
07/16/13 01:00
07/16/13 13:00
07/17/13 01:00
07/17/13 13:00
07/18/13 01:00
07/18/13 13:00
07/19/13 01:00
07/19/13 13:00
07/20/13 01:00
07/20/13 13:00
07/21/13 01:00
07/21/13 13:00
07/22/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
15-Jul-2013 to 22-Jul-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

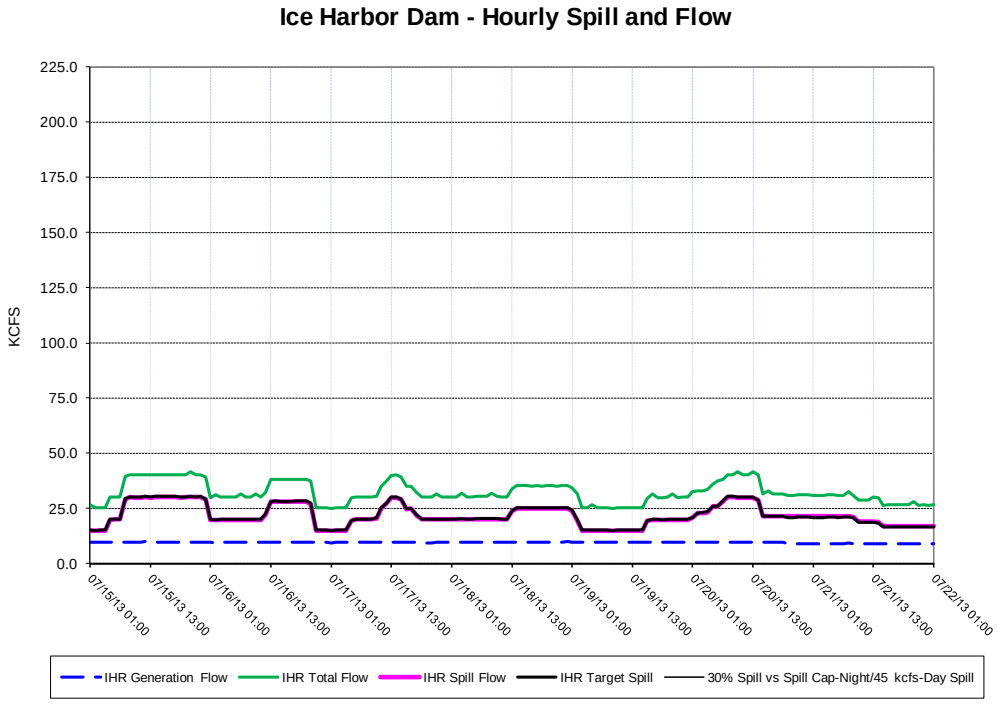
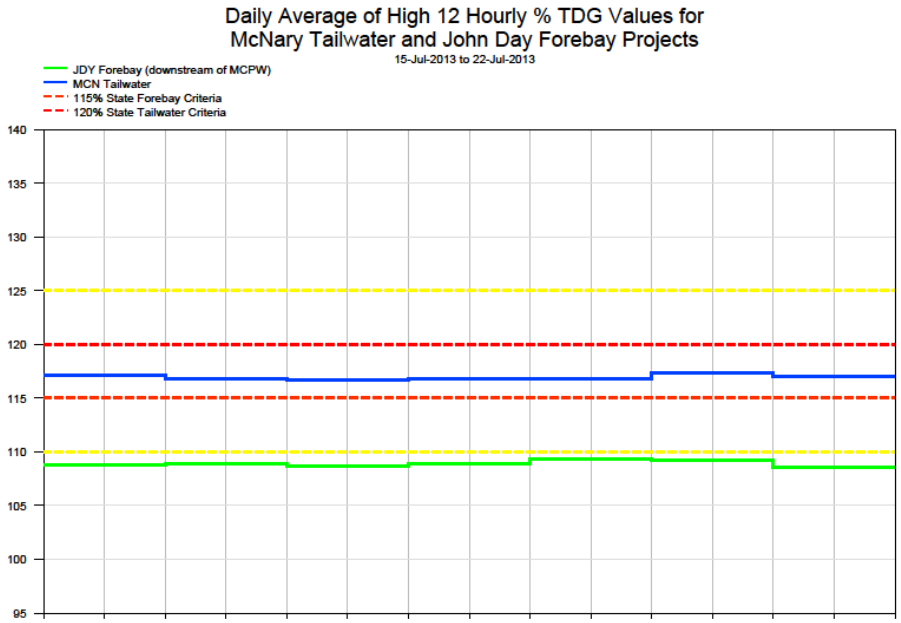

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/15/13 01:00
07/15/13 13:00
07/16/13 01:00
07/16/13 13:00
07/17/13 01:00
07/17/13 13:00
07/18/13 01:00
07/18/13 13:00
07/19/13 01:00
07/19/13 13:00
07/20/13 01:00
07/20/13 13:00
07/21/13 01:00
07/21/13 13:00
07/22/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 21


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
15-Jul-2013 to 22-Jul-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

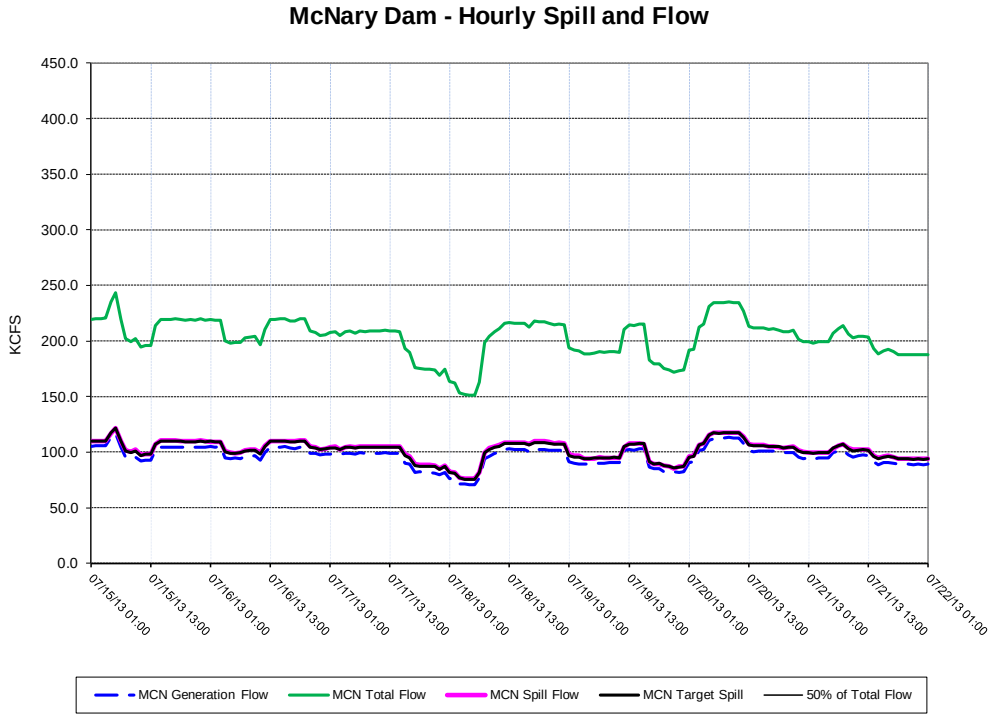
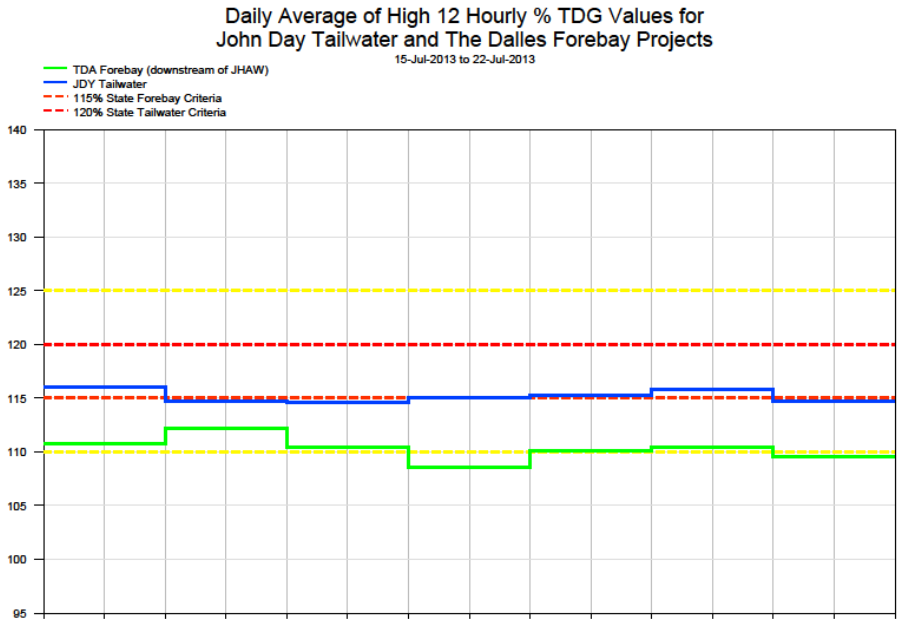

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/15/13 01:00
07/15/13 13:00
07/16/13 01:00
07/16/13 13:00
07/17/13 01:00
07/17/13 13:00
07/18/13 01:00
07/18/13 13:00
07/19/13 01:00
07/19/13 13:00
07/20/13 01:00
07/20/13 13:00
07/21/13 01:00
07/21/13 13:00
07/22/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 22


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
15-Jul-2013 to 22-Jul-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

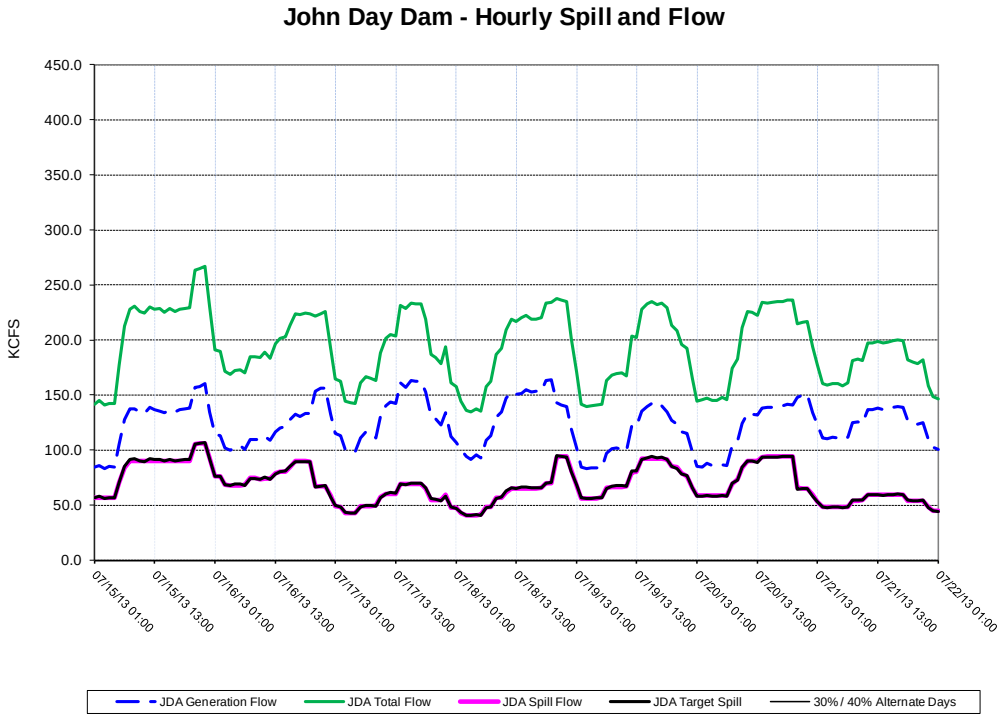
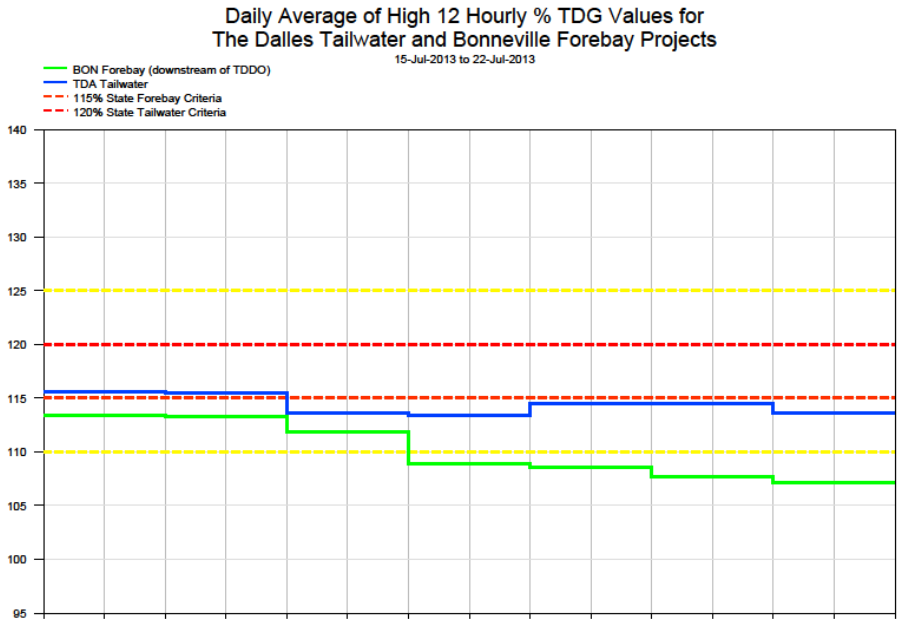

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/15/13 01:00
07/15/13 13:00
07/16/13 01:00
07/16/13 13:00
07/17/13 01:00
07/17/13 13:00
07/18/13 01:00
07/18/13 13:00
07/19/13 01:00
07/19/13 13:00
07/20/13 01:00
07/20/13 13:00
07/21/13 01:00
07/21/13 13:00
07/22/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 23


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
15-Jul-2013 to 22-Jul-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

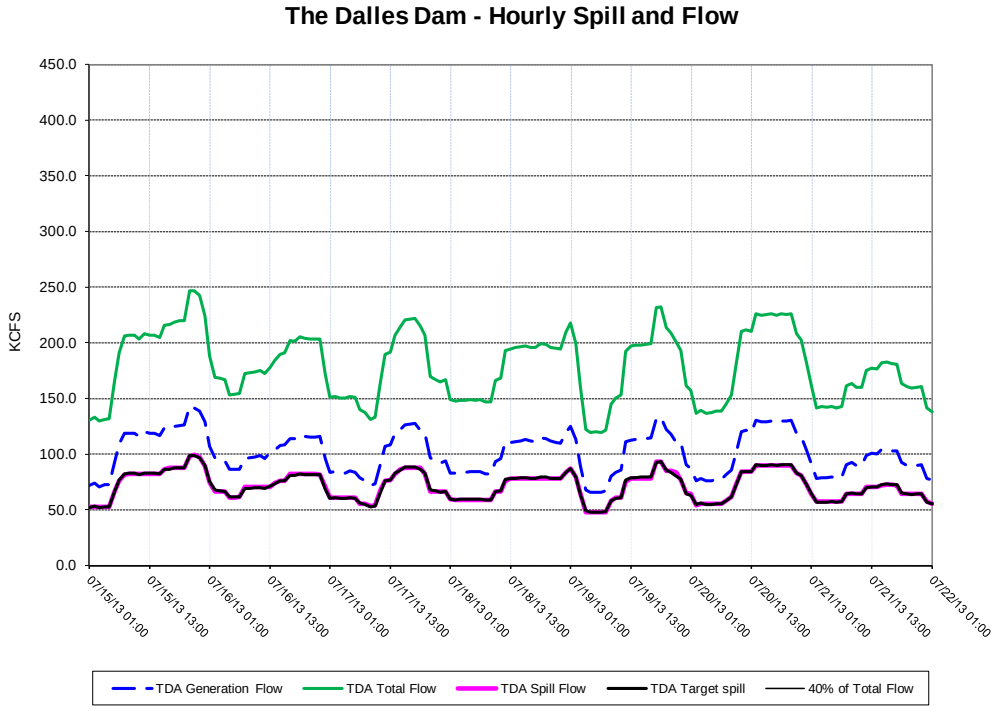
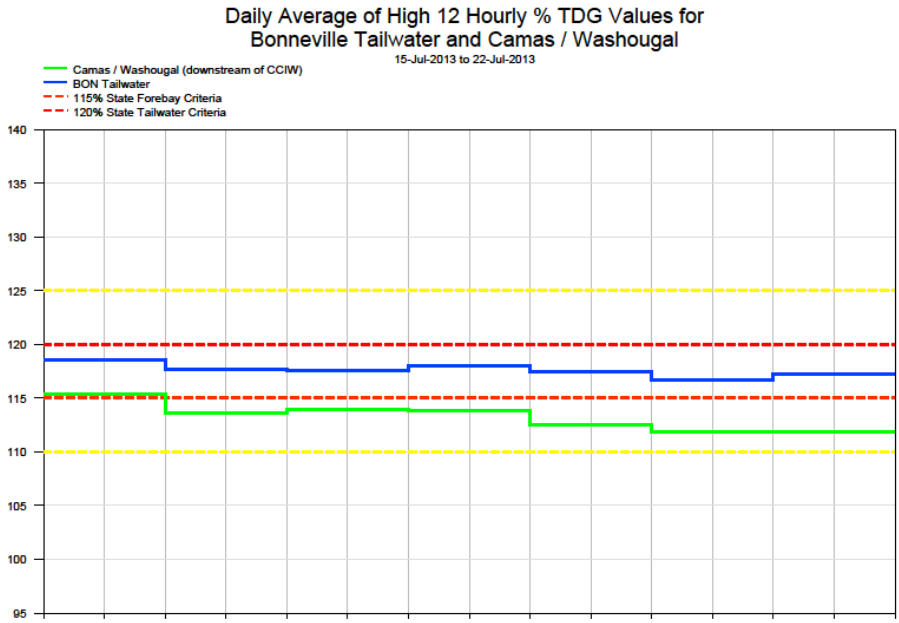

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/15/13 01:00
07/15/13 13:00
07/16/13 01:00
07/16/13 13:00
07/17/13 01:00
07/17/13 13:00
07/18/13 01:00
07/18/13 13:00
07/19/13 01:00
07/19/13 13:00
07/20/13 01:00
07/20/13 13:00
07/21/13 01:00
07/21/13 13:00
07/22/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 24


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
15-Jul-2013 to 22-Jul-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

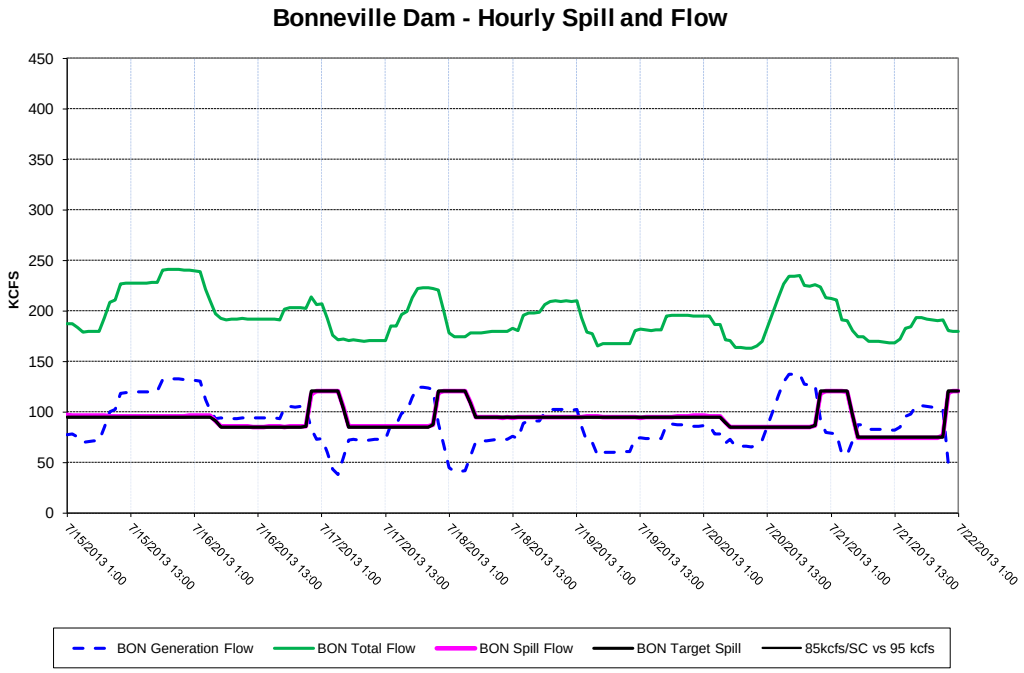
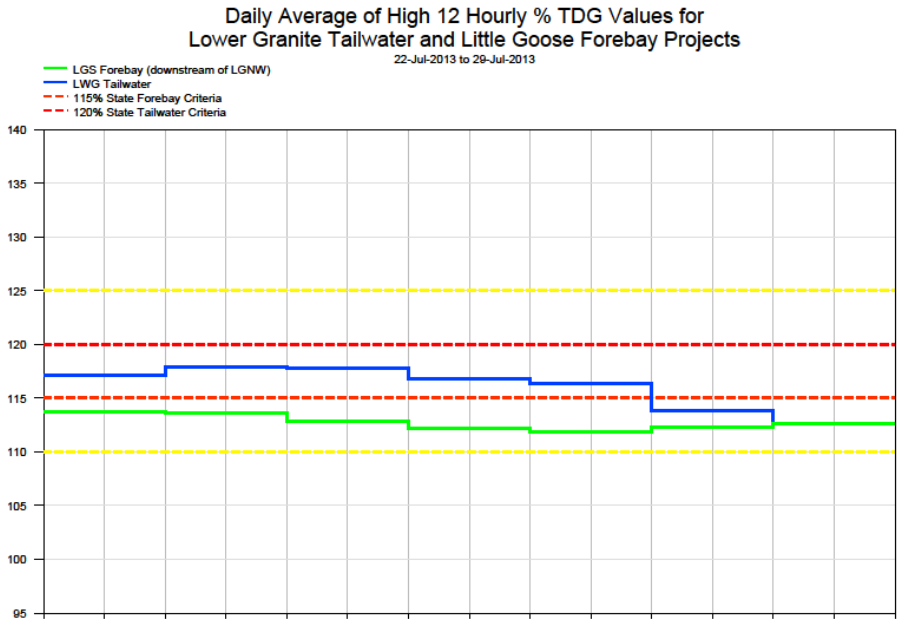

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/15/2013 1:00
7/15/2013 13:00
7/16/2013 1:00
7/16/2013 13:00
7/17/2013 1:00
7/17/2013 13:00
7/18/2013 1:00
7/18/2013 13:00
7/19/2013 1:00
7/19/2013 13:00
7/20/2013 1:00
7/20/2013 13:00
7/21/2013 1:00
7/21/2013 13:00
7/22/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
85kcfs/SC vs 95 kcfs

Figure 25


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
22-Jul-2013 to 29-Jul-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

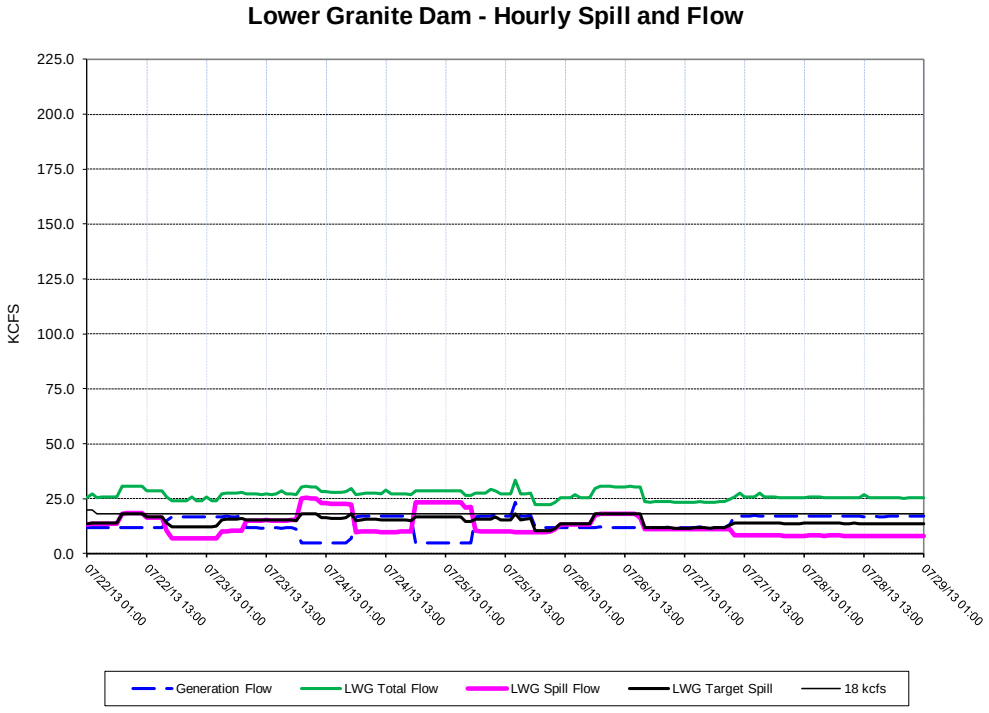
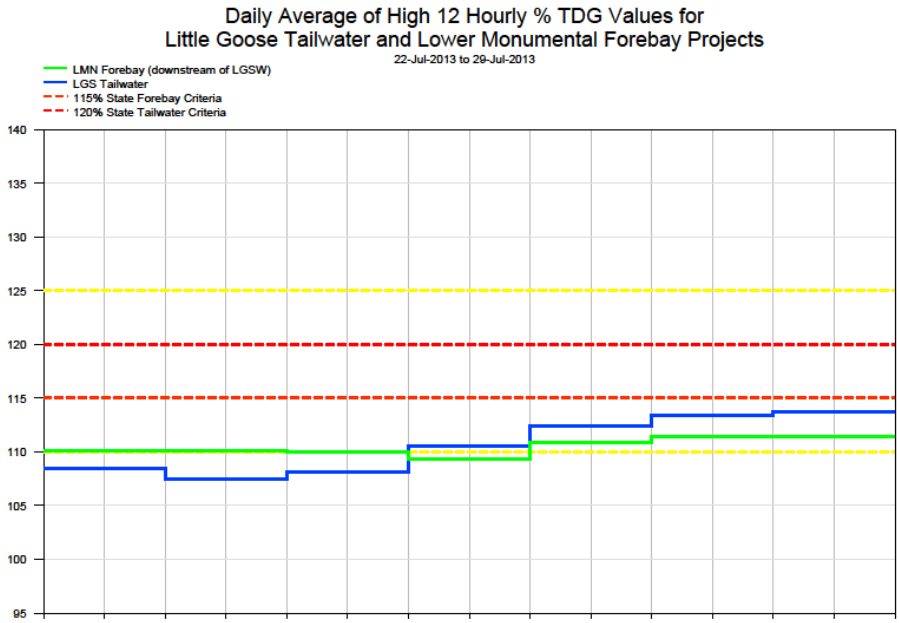

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/22/13 01:00
07/22/13 13:00
07/23/13 01:00
07/23/13 13:00
07/24/13 01:00
07/24/13 13:00
07/25/13 01:00
07/25/13 13:00
07/26/13 01:00
07/26/13 13:00
07/27/13 01:00
07/27/13 13:00
07/28/13 01:00
07/28/13 13:00
07/29/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 26


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
22-Jul-2013 to 29-Jul-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

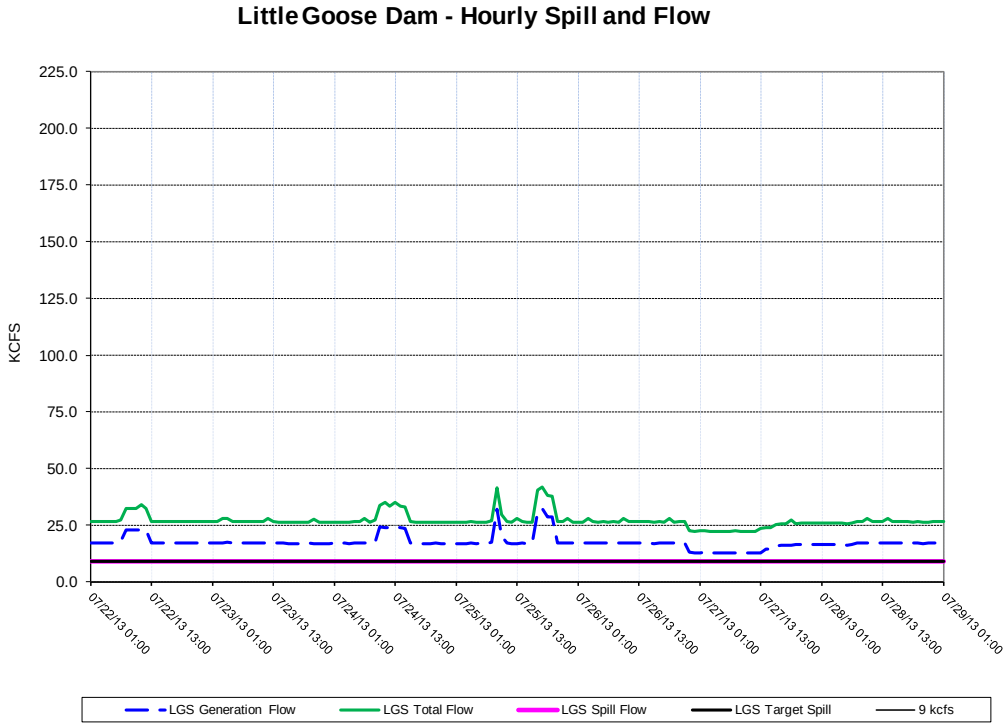
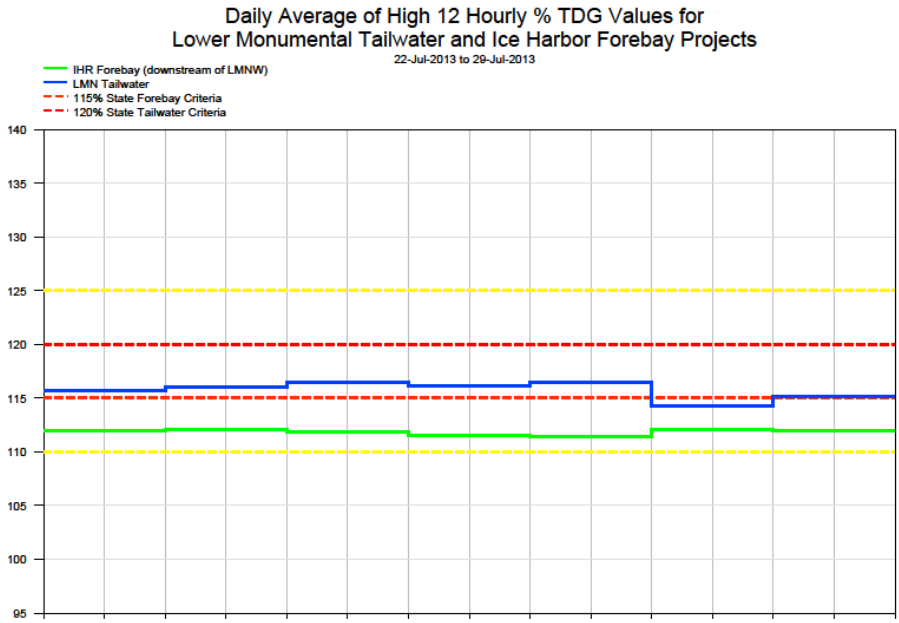

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/22/13 01:00
07/22/13 13:00
07/23/13 01:00
07/23/13 13:00
07/24/13 01:00
07/24/13 13:00
07/25/13 01:00
07/25/13 13:00
07/26/13 01:00
07/26/13 13:00
07/27/13 01:00
07/27/13 13:00
07/28/13 01:00
07/28/13 13:00
07/29/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
9 kcfs

Figure 27


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
22-Jul-2013 to 29-Jul-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

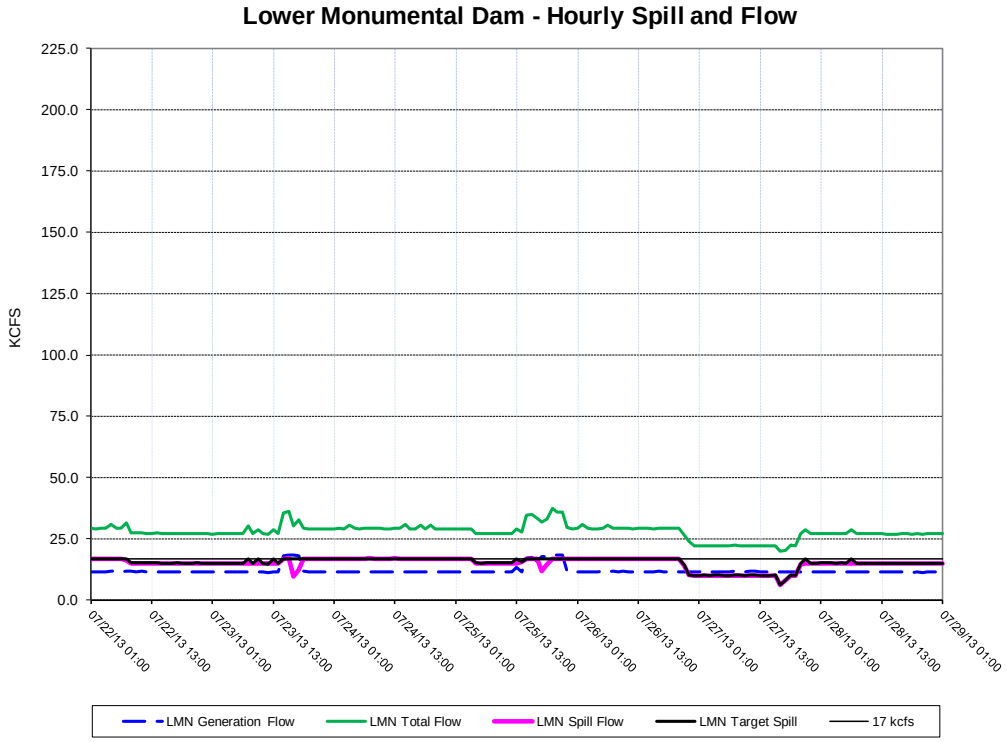
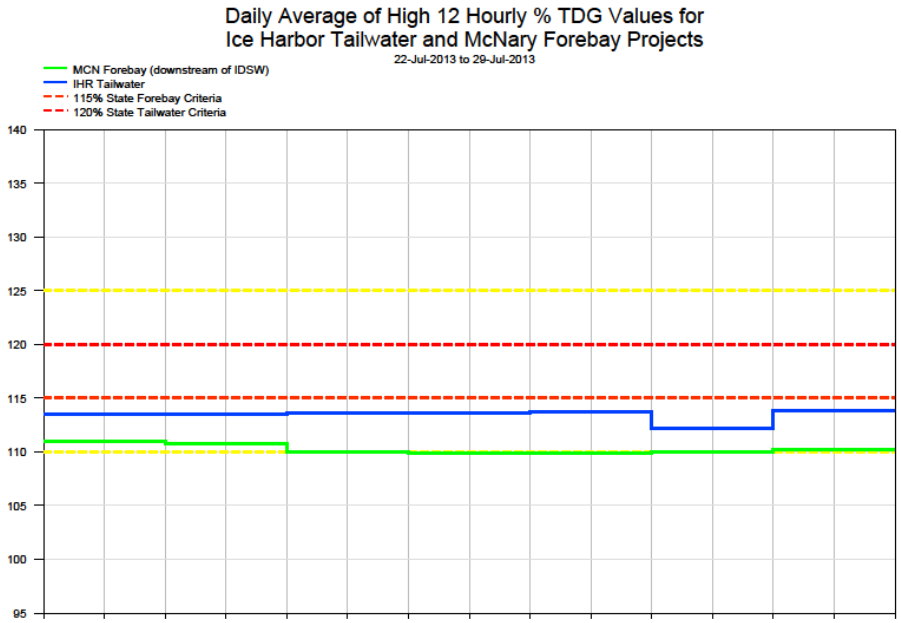

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/22/13 01:00
07/22/13 13:00
07/23/13 01:00
07/23/13 13:00
07/24/13 01:00
07/24/13 13:00
07/25/13 01:00
07/25/13 13:00
07/26/13 01:00
07/26/13 13:00
07/27/13 01:00
07/27/13 13:00
07/28/13 01:00
07/28/13 13:00
07/29/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 28


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
22-Jul-2013 to 29-Jul-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

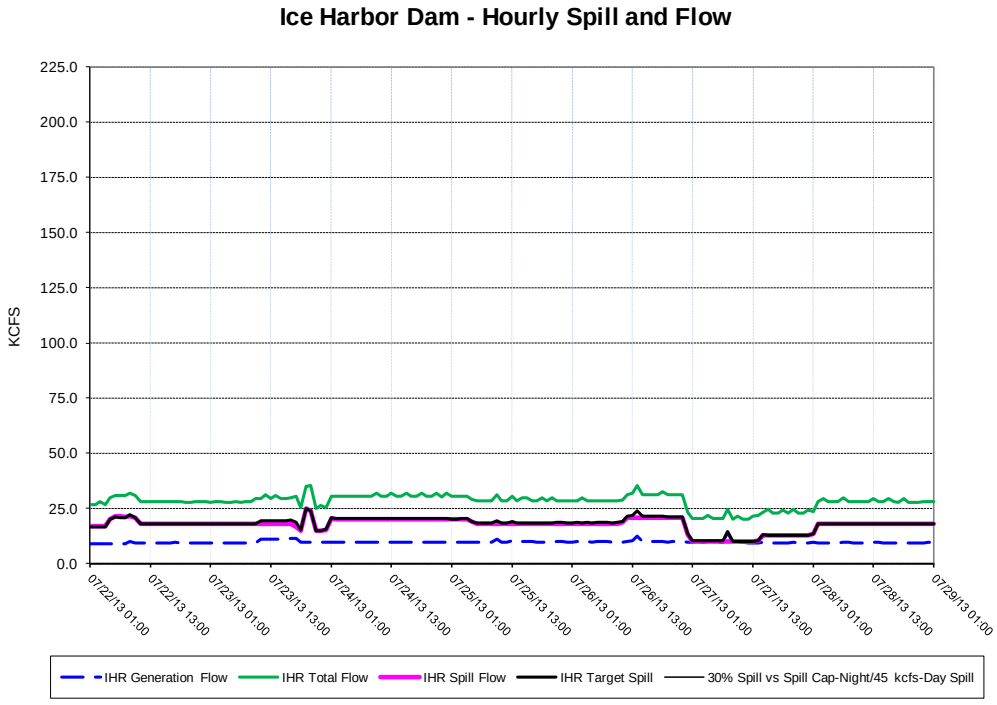
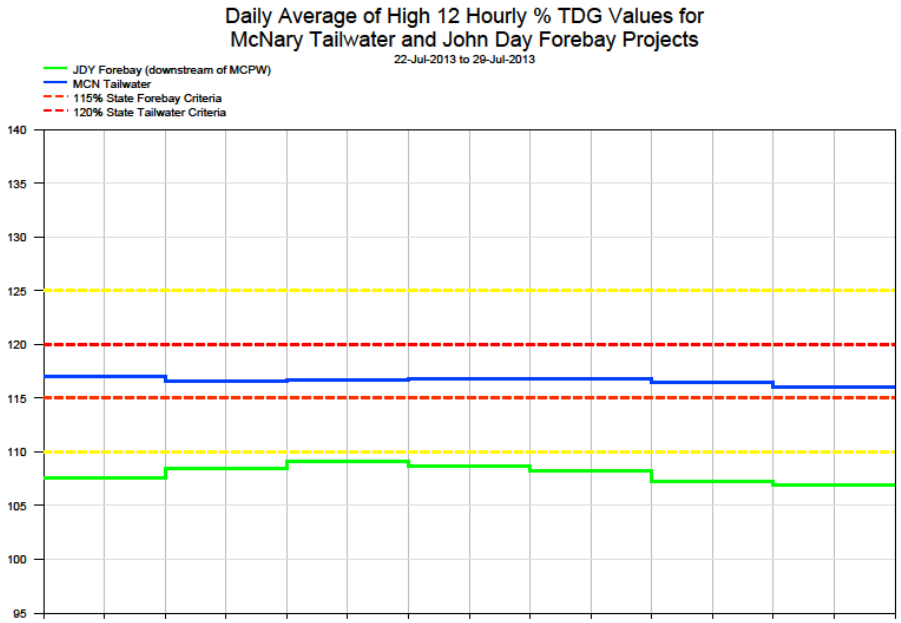

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/22/13 01:00
07/22/13 13:00
07/23/13 01:00
07/23/13 13:00
07/24/13 01:00
07/24/13 13:00
07/25/13 01:00
07/25/13 13:00
07/26/13 01:00
07/26/13 13:00
07/27/13 01:00
07/27/13 13:00
07/28/13 01:00
07/28/13 13:00
07/29/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% Spill vs Spill Cap-Night/45 kcfs-Day Spill

Figure 29


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
22-Jul-2013 to 29-Jul-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

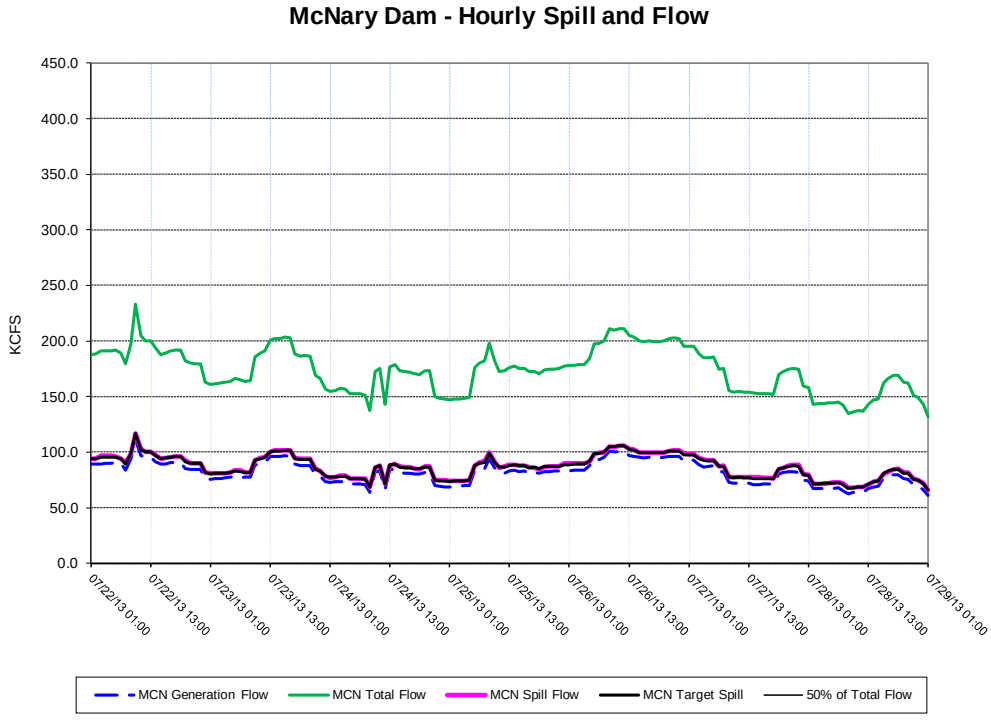
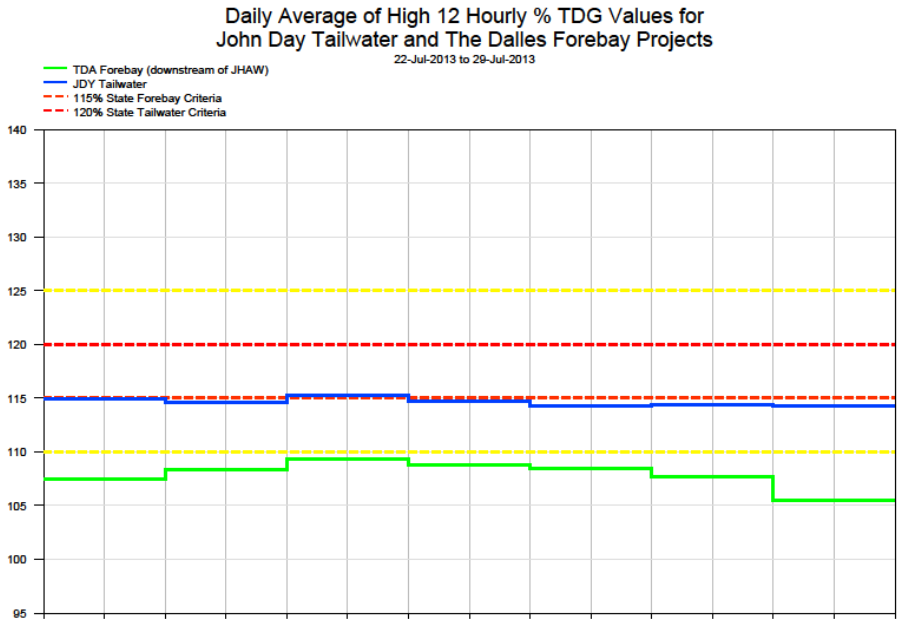

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/22/13 01:00
07/22/13 13:00
07/23/13 01:00
07/23/13 13:00
07/24/13 01:00
07/24/13 13:00
07/25/13 01:00
07/25/13 13:00
07/26/13 01:00
07/26/13 13:00
07/27/13 01:00
07/27/13 13:00
07/28/13 01:00
07/28/13 13:00
07/29/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 30


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
22-Jul-2013 to 29-Jul-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

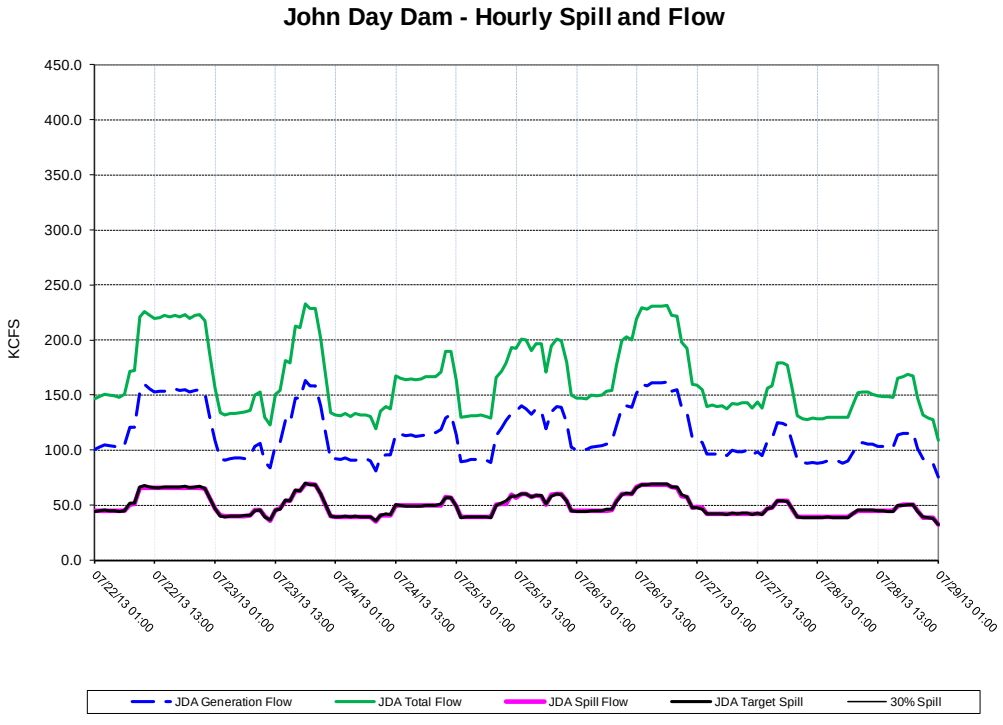
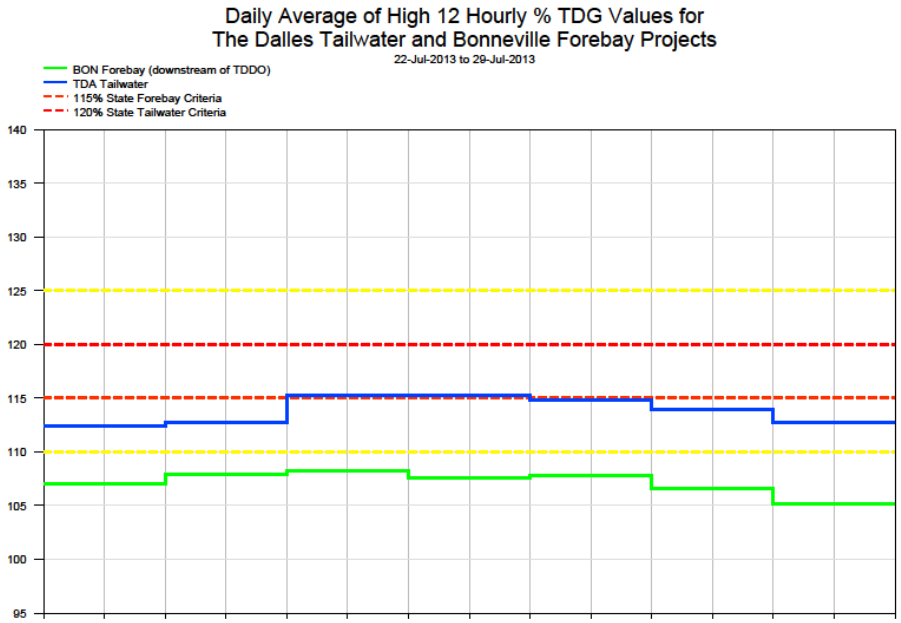

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/22/13 01:00
07/22/13 13:00
07/23/13 01:00
07/23/13 13:00
07/24/13 01:00
07/24/13 13:00
07/25/13 01:00
07/25/13 13:00
07/26/13 01:00
07/26/13 13:00
07/27/13 01:00
07/27/13 13:00
07/28/13 01:00
07/28/13 13:00
07/29/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 31


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
22-Jul-2013 to 29-Jul-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

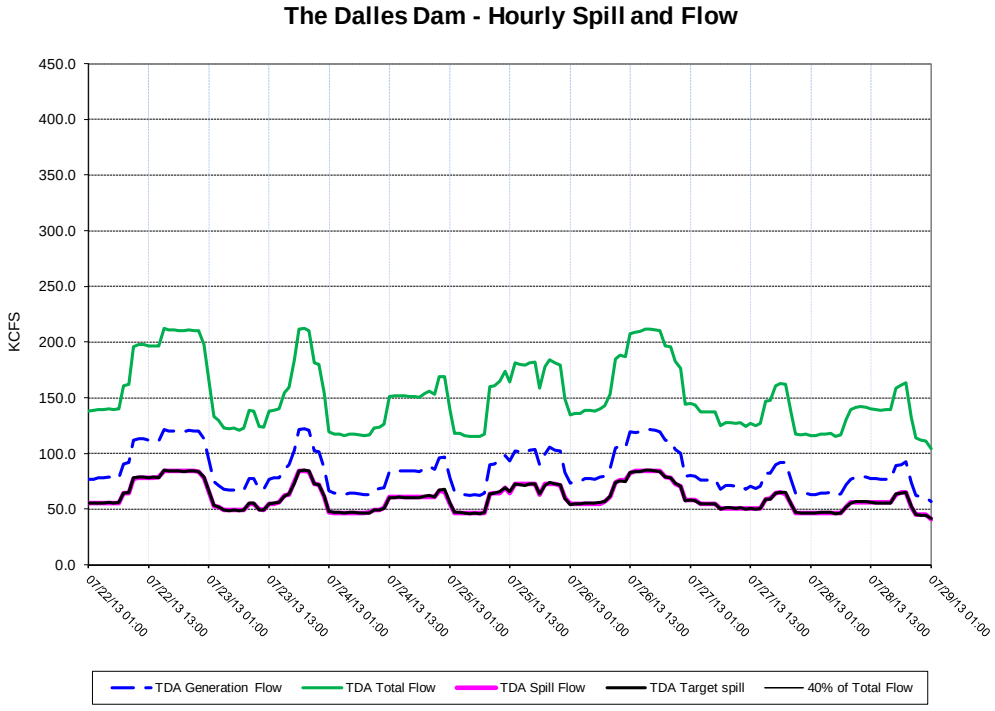
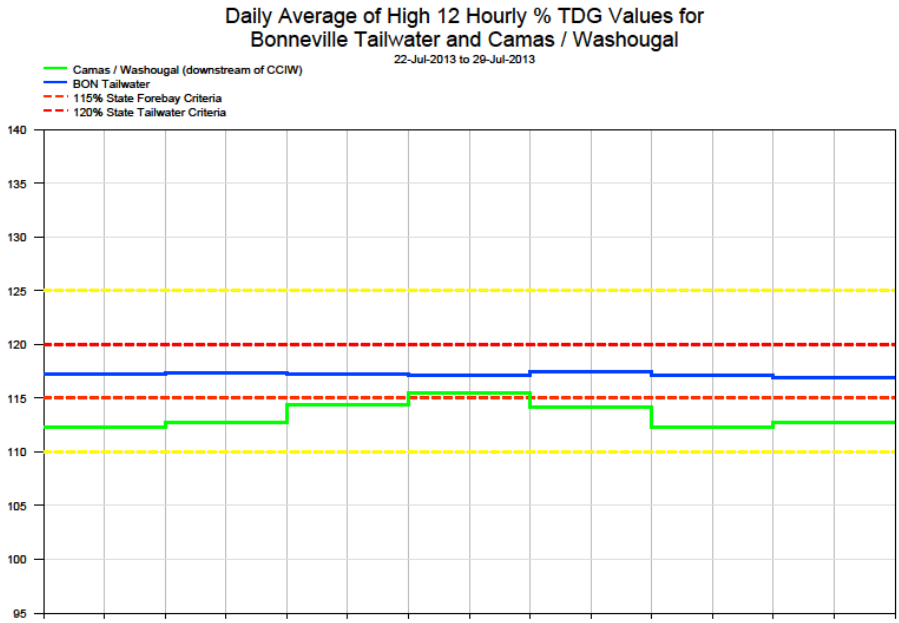

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/22/13 01:00
07/22/13 13:00
07/23/13 01:00
07/23/13 13:00
07/24/13 01:00
07/24/13 13:00
07/25/13 01:00
07/25/13 13:00
07/26/13 01:00
07/26/13 13:00
07/27/13 01:00
07/27/13 13:00
07/28/13 01:00
07/28/13 13:00
07/29/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 32


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
22-Jul-2013 to 29-Jul-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

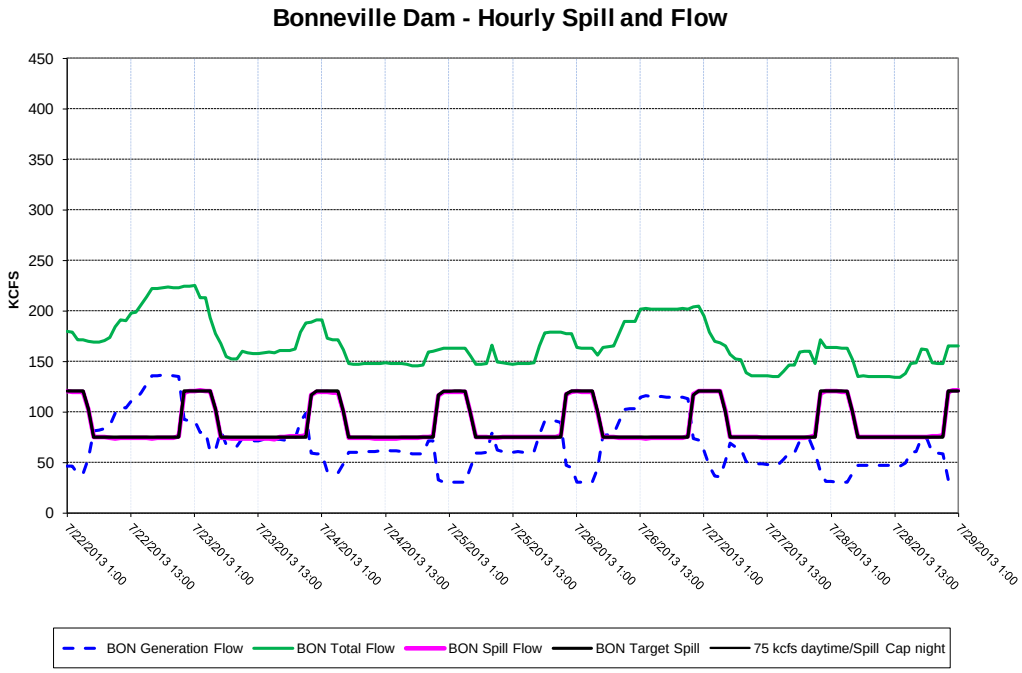

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/22/2013 1:00
7/22/2013 13:00
7/23/2013 1:00
7/23/2013 13:00
7/24/2013 1:00
7/24/2013 13:00
7/25/2013 1:00
7/25/2013 13:00
7/26/2013 1:00
7/26/2013 13:00
7/27/2013 1:00
7/27/2013 13:00
7/28/2013 1:00
7/28/2013 13:00
7/29/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75 kcfs daytime/Spill Cap night

Figure 33

Table 1
Average Percent TDG for Highest 12-Hours: July 1 – July 28, 2013

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115
7/1/2013	104.8	115.8	**116.9**	114.5	115	117	**115.6**	114.8	**116.6**	119.7	**116.4**	116.4	**115.5**	118.9	**117.1**	118.3	**117.8**
7/2/2013	104.7	116.6	**117**	114.4	114.6	118.1	**116.2**	115.5	**117.5**	119.7	**116.7**	117.7	114.6	117.9	**115.2**	119.4	**116.1**
7/3/2013	103.5	116.4	**116.3**	114	114.6	117.6	**115.6**	113.9	**117.2**	119.6	**116**	118.4	114	118.1	112.6	119.2	114.6
7/4/2013	103	115.8	**117**	113.4	114.8	117.1	**116**	113.4	**116.1**	119.7	114	118.4	112	116.8	111	117.7	112.2
7/5/2013	103.7	116.6	**117**	113.1	114.3	117.1	**115.9**	114.8	114.5	118.7	111.3	116.1	110.5	116	109	118	111.9
7/6/2013	103.7	117	**115.4**	112	114.1	117	**115.4**	114.6	114	119.1	111.5	116.4	111.4	117.1	110.9	119	112.8
7/7/2013	103.3	116.7	114.4	111.4	113.9	117	114.7	113.6	113.7	119.1	111.9	117.6	112.2	117.5	111.2	118.7	112.3
7/8/2013	102	116.5	112.3	110.7	113.4	116.7	113.8	112.6	114.2	118.9	110.4	117.2	111.3	116.5	110.1	117.6	112.8
7/9/2013	101.7	116.5	113.2	109.8	113.4	116.6	114.3	114.1	114.4	117.6	110.4	114.1	112	117	113	118.2	114.6
7/10/2013	102.5	116.8	113.7	109	113	116.1	114.7	113.4	113.6	117.5	111.6	115.3	110.8	115.9	112.7	118.8	114
7/11/2013	102.2	116.5	113.1	108.5	111.4	116.1	113.9	112.7	112.2	116.9	110.5	115.2	108.8	114.3	109	118.4	112.3
7/12/2013	101.5	117.3	112.8	108.3	111.8	116	114	112.4	111.1	116.7	109.1	115.4	108.8	114.4	107.3	117.2	110.7
7/13/2013	101.3	117	111.3	109	110.4	115.8	113	113.3	109.6	116.9	108.2	113.8	109.5	115	109	117.6	112.4
7/14/2013	101.5	116.4	111	108.9	109.2	113.7	111.8	111.6	109.6	117	108.8	114.1	110.7	115.4	113.3	118.8	114.3
7/15/2013	101.5	**120.6**	111	110.1	109.2	116	111.6	113.5	110.6	117.1	108.8	116	110.7	115.6	113.3	118.6	**115.4**
7/16/2013	102.6	**120.9**	110.9	108.7	109.8	115.7	112.1	113.5	110.5	116.8	108.9	114.7	112.2	115.5	113.3	117.6	113.7
7/17/2013	102.3	117	111.7	105.9	109.2	116	111.4	113.5	109.9	116.7	108.7	114.6	110.5	113.6	111.8	117.7	113.9
7/18/2013	102.7	117	111.6	106.4	109	116.2	110.3	113.8	109	116.8	108.9	115.1	108.5	113.3	108.8	118.1	113.8
7/19/2013	102.6	117.3	110.7	104.4	109.7	116	110.7	112.7	109.9	116.7	109.4	115.3	110.1	114.5	108.5	117.4	112.5
7/20/2013	103.1	117.1	112.5	105.1	109.6	116.2	111.4	114.4	110.9	117.3	109.2	115.8	110.4	114.5	107.7	116.8	111.9
7/21/2013	103.1	116.7	113.6	106	109.8	116.4	111.6	113.2	111.5	117	108.6	114.7	109.6	113.7	107.2	117.4	111.8
7/22/2013	102.3	117.1	113.7	108.4	110.1	115.7	112	113.5	111	117	107.6	115	107.5	112.4	107	117.4	112.3
7/23/2013	101.9	117.9	113.7	107.4	110.1	116	112.1	113.5	110.8	116.6	108.4	114.6	108.3	112.7	107.9	117.4	112.7
7/24/2013	101.7	117.8	112.9	108.2	110	116.4	111.9	113.6	109.9	116.7	109	115.3	109.4	115.3	108.2	117.3	114.4
7/25/2013	101.6	116.8	112.2	110.5	109.3	116.1	111.5	113.6	109.9	116.8	108.6	114.7	108.8	115.2	107.6	117.2	**115.4**
7/26/2013	101.7	116.4	111.9	112.4	110.9	116.5	111.5	113.7	109.8	116.8	108.2	114.3	108.4	114.8	107.8	117.5	114.2
7/27/2013	102	113.9	112.3	113.4	111.4	114.3	112	112.2	110	116.5	107.2	114.3	107.6	113.9	106.6	117.2	112.2
7/28/2013	102.5	112.6	112.6	113.7	111.4	115.1	112	113.8	110.2	116	106.9	114.3	105.5	112.8	105.2	116.9	112.7

Figure 34

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal

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UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

PORTLAND DIVISION

NATIONAL WILDLIFE FEDERATION, et al.,

Plaintiffs,

v.

NATIONAL MARINE FISHERIES SERVICE, et al.,

Defendants,

Case No.: 3:01-CV-00640-SI

NOTICE OF FEDERAL DEFENDANTS' FIFTH 2013 SPILL IMPLEMENTATION REPORT

In accordance with the Court's August 2, 2011 Opinion and Order (ECF No. 1855) and Federal Defendants' Notice Re: 2013 Spill Operations at 7 (ECF No. 1905) (filed Mar. 28, 2013), Federal Defendants submit their fifth 2013 spill implementation status report. *See* Exhibit 1. This status report includes, among other things: the hourly flow through the powerhouse at each dam; the hourly flow over the spillway compared to the target spill for that hour; and the resultant 12-hour average total dissolved gas ("TDG") for the tailwater at each project and for the next project's forebay downstream. The report also provides written explanations of variances that occurred during the reporting period.

Dated this 17th day of September, 2013.

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CERTIFICATE OF SERVICE

I certify that on September 17, 2013, the foregoing will be electronically filed with the Court's electronic filing system, which will generate automatic service upon on all Parties enrolled to receive such notice. The following will be manually served by overnight mail:

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FISH OPERATIONS PLAN IMPLEMENTATION REPORT
August 2013

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

The U.S. Army Corps of Engineers (Corps) is submitting this report in accordance with the 2013 Fish Operations Plan (2013 FOP) submitted to the U.S. District Court of Oregon on March 28, 2013. The 2013 FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the fish migration season, generally April through August. To the extent Corps project operations are not specified in the 2013 FOP, the FCRPS operations will be consistent with the 2010 NOAA Fisheries Supplemental Biological Opinion (2010 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2013 Water Management Plan (WMP), WMP seasonal updates, and the 2013 Fish Passage Plan (FPP).

The Corps' August 2013 lower Snake and Columbia River project and fish passage operations are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant high 12-hour average percent Total Dissolved Gas (%TDG) levels in the tailrace at each project and in the subsequent downstream project's forebay and the Camas-Washougal gauge below Bonneville Dam.

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2013 FOP in August.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[1] in August displaying the performance of the spill program as follows:

(A) Daily Average of the High 12 Hourly %TDG Values - described in the upper graph.
(B) Hourly Spill and Generation Flows - described in the lower graph.

The weekly graphs begin on July 29 and end on September 1 for the following lower Snake River and lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.

[1] Operations are implemented from Monday through Sunday.

Each figure represents one week of a project's operation. The graphs start at 0000 hours (%TDG graphs) and 0100 hours (flow/spill graphs) on July 29 for the lower Snake River and the lower Columbia River projects.

July 29 – August 4	Figures 1 – 8
August 5 – August 11	Figures 9 – 16
August 12 – August 18	Figures 17 – 24
August 19 – August 25	Figures 25 – 32
August 26 – September 1	Figures 33 – 40

A. Upper Graph: Shows the resultant daily average %TDG for the 12 highest hours. This is primarily a result of spill at dams. The objective is to operate each project up to the TDG limits without exceeding those limits to the extent practicable.

1. The blue line represents the %TDG in the tailrace of the dam. 120 percent TDG is the upper operating limit.
2. The green line represents the %TDG in the forebay of the next dam downstream. 115 percent TDG is the upper operating limit.

B. Lower Graph: Shows the hourly flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The medium green line represents the average hourly total river flow through the project in kcfs.
- The heavy pink line represents the average hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2013 FOP.
- The heavy black line represents the target spill. This is the hourly maximum spill level. The hourly target spill may vary as a function of total river flow, forebay elevation and generator capacity, subject to the following conditions:

    - spill percentage or flow rate specified in the 2013 FOP;
    - spill caps as set daily for TDG management;
    - test spill levels for fish passage research;
    - minimum generation for power system needs;
    - minimum spill at Bonneville (50 kcfs) dam;
    - minimum spill at John Day is 25 percent of project outflow.

II. A table is included at the end of the figures that lists the average daily %TDG for the 12 highest hours for all projects. The numbers in red indicate the project exceeded the %TDG gas cap - 115 percent (forebay of the next downstream dam) or 120 percent (tailwater) for each project.

General Implementation Remarks:

For all projects that spill for fish passage, the target spill may be reduced due to various conditions as described below. When spill levels briefly deviate below or above the level specified in the 2013 FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual operation deviations from the target operation during voluntary spill hours are described below. The August 2013 Spill Variance Table includes average hourly data; therefore, while spill may vary from target spill for only a portion of an hour, the August 2013 Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly spill levels are not achievable due to mechanical limitations in setting spill gates to implement the regionally coordinated spill pattern. The project operator sets the spill gate stops to most closely approximate the 2013 FOP level of spill while also avoiding exceeding the %TDG spill cap to the extent practicable.

"Low flow" operations at the lower Columbia and Snake projects are triggered when inflow is insufficient to provide both minimum generation and the specified spill levels. In these situations, the projects operate at minimum generation and pass the remainder of project inflow as spill and through other miscellaneous routes, such as fish ladders, sluiceways, and navigation locks. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain.

The combination of these factors may result in instances when unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation, MOP elevation, and the target spill may not be possible throughout every hour. During low flow periods at Little Goose Dam, the overall project spill percentage appears to be reduced because the calculations do not account for the volume of water released during navigational lockages; however, the actual spill volume remains constant. When these variances occur, they are recorded in the monthly Spill Variance Table for Little Goose under the variance type "Navigation."

Actual spill levels at Corps projects with set flow targets may vary up to ±2 kcfs (Bonneville Dam may range up to ±3 kcfs, 2013 FOP p. 18) compared to those specified in the 2013 FOP and the RCC spill priority list (defines the projects' %TDG spill caps). A number of factors influence actual spill, including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (e.g. a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The 2013 FOP describes project "Operations during Rapid Load Changes" (p. 6). For reporting purposes, the notation "Transmission Stability" in the Spill Variance Report Table replaces "Rapid Load Changes," and identifies instances when hourly spill levels were not met as a result of load swing hours and other related within-hour load variability issues. "Transmission Stability" occurs because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Corporation (NERC) reserve requirements ("on response"). In addition to within-hour load variability, projects on response must be responsive

to within hour changes resulting from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while spill quantity remains the same within the hour. Under normal conditions, within-hour load changes primarily occur immediately preceding and following the peak load hours; however, within-hour changes in intermittent generation can occur at any hour of the day. Occasionally, several hours after peak load hours, the project may be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. Due to the high variability of within-hour load, reporting actual spill percentages that vary by more than the ±1 percent requirement (or other ranges specified in the 2013 FOP) may occur with greater frequency with "Transmission Stability" hours than other hours.

Occurrences requiring an adjustment in operations and/or regional coordination are described in greater detail in the "Operational Adjustments" section below.

August Operations:

The month of August was characterized by below average flows for the lower Snake River and slightly below average flows for the lower Columbia River. The NOAA Northwest River Forecast Center's Runoff Processor indicated that the August adjusted volume runoff on the lower Snake was below the 30 year average (1981-2010): 0.8 MAF (million acre feet) or 67 percent of average as measured at Lower Granite Dam. The Runoff Processor also indicated that the August 2013 adjusted volume runoff on the lower Columbia was below the 30 year average (1981-2010): 7.3 MAF or 96 percent of average as measured at The Dalles. The monthly precipitation summary for August was significantly below average at 51 percent on the Snake River above Ice Harbor Dam and significantly below average on the Columbia River above The Dalles Dam at 75 percent.

During the August reporting period, the planned 2013 FOP spill operations were carried out as follows:

- Lower Granite Dam - The hourly target spill level was 18 kcfs 24-hours/day.
- Little Goose Dam - The hourly target spill level was 30 percent of total river flow 24-hours/day.
- Lower Monumental Dam - The hourly target spill level was 17 kcfs 24 hours/day.
- Ice Harbor Dam - The hourly target spill level was 45 kcfs daytime/%TDG cap nighttime. Nighttime spill hours are 1800-0500.
- McNary Dam - The hourly target spill level was 50 percent of total river flow for 24-hours/day.
- John Day Dam - The hourly target spill level was 30 percent of total river flow for 24-hours/day.
- The Dalles Dam - The hourly target spill level was 40 percent of total river flow for 24-hours/day.
- Bonneville Dam - The hourly target spill level was 75 kcfs daytime/%TDG cap nighttime.

Operational Adjustments

1. Lower Granite Dam

- The Corps continued implementation of the regionally coordinated special operations that were initiated in July to address adult passage delays due to warm river temperatures. These operations continued until August 10 and resulted in intermittent spill levels that were either higher or lower than levels identified in the 2013 FOP.[2] Specifically, on July 29 from 0000 to 1100 hours and from July 31 at 1100 hours through August 5 at 1700 hours, Unit 1 was operated outside of the 2013 FPP unit operating priority in order to provide attraction flow near the fish ladder, while spilling the remainder of outflow. Based on additional recommendations coordinated with the TMT, from August 5 at 1700 hours through August 10 at 0900 hours, the Corps implemented a modified operation that alternated between a nighttime (1700-0500) operation of Unit 5 at 5 kcfs (minimum amount of generation needed for station service), while spilling up to %TDG cap and a daytime (0500-1700) operation of Unit 1 at 17 kcfs while spilling the remainder of outflow. Operating Unit 5 at 5 kcfs is outside of the 1% of peak efficiency range called for in the BiOp and the FOP, and is outside of the unit operating priority specified in the 2013 FPP. Throughout the special operations, the Corps continued operation of emergency auxiliary water supply pumps installed on July 25 to pump cooler water into the ladder. Adult fish passage counts were consistently higher during the special operations than during periods of Unit 2 operation. Throughout the operation, the Corps monitored real-time data and modified the operation as necessary through further coordination with TMT during meetings on July 29, 31, August 2, 5, 14, and 21. TMT members either supported or did not object to these operations.

- On August 10 at 1000 hours, the special operations described above ended and the Corps began previously scheduled daily powerhouse outages for powerhouse roof repair work and other project maintenance. Because the transmission lines were taken out of service to conduct the roof repair, this operation involved using only Unit 5 at 5 kcfs to provide station service while spilling the remainder of outflow during daylight hours. The timing for the roof repair was coordinated with the FPOM during meetings that occurred on April 11, May 9, and August 8. FPOM members either supported or did not object to this operation.

2. Lower Monumental Dam

On August 19 at 0700 hours, the Corps began previously scheduled daily powerhouse outages for testing of the transformers and other project maintenance. This maintenance and testing requirement was coordinated with FPOM and included in the FPP Appendix A. The maintenance and testing required operating Unit 5, rather than Unit 2[3] (the priority unit specified

[2] At river flows observed during this period, the 2013 FOP operation is to operate Unit 2 at minimum generation (11-13 kcfs) and spill the remainder of river flow. Spill levels with Unit 2 are approximately 4-6 kcfs greater than Unit 1 spill levels because this unit requires more powerhouse flow (due to the unit's fixed blades) to operate at near the upper ±1% efficiency range (approximately 17 kcfs). During nighttime spill to the %TDG spill cap, Unit 5 was operated for station service (5 kcfs), and the resulting spill levels were approximately 6-8 kcfs higher than Unit 2 minimum generation.

[3] At river flows observed during this period, the 2013 FOP operation is to operate Unit 2 at minimum generation (11.3-13.1 kcfs) and spill the remainder of river flow. Spill levels with Unit 2 are approximately 1-2 kcfs greater

in the 2013 FPP) and taking transmission lines out of service. This operation also required using only Unit 5 operating at 5 kcfs to provide station service, while spilling the remainder of outflow during daylight hours. Operating Unit 5 at 5 kcfs is outside of the ±1% of peak efficiency range specified in the BiOp and the FOP. This work was scheduled for completion on August 23, but on the afternoon of August 22 significant equipment problems were identified, including the discovery of a corroded insulator, causing the transformer to fail one of its main return-to-service tests. In addition, roof repair was required in the area that was temporarily accessible while the powerhouse transmission line was de-energized. As a result, the outage was extended through the weekend. However, by 1800 hours on August 23, two phases of the work had been completed allowing the project to return transformer T-2 (units 5 and 6) to service, while the last phase of work continued through the weekend. Maintenance staff completed all they could do by Saturday evening (August 24), but lacked the personnel to complete the restoration of transformer T-1 to the 500 kV transmission line on August 25. The final transformer testing was completed on August 26 at 1400 hours and remaining units were returned to service shortly after 1600 hours.

than Unit 5 spill levels. Unit 5 is a larger unit (minimum generation range is 13.5-14.5 kcfs) and requires more powerhouse flow to operate at near the lower ±1% efficiency range (approximately 14.3 kcfs). During the daytime, Unit 5 was operated for station service (5 kcfs), and the resulting spill levels were approximately 6-8 kcfs higher than Unit 2 minimum generation.

August 2013 Spill Variance Table
Table 1: July 2013 (7/29 – 8/31) - FOP Implementation Report Table

Project	Parameter	Date	Time[4]	Hours	Type	Reason
Lower Granite	Reduced Spill	7/29/13	0100-1100	11	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 6.8 kcfs (below 11 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 1 (min gen range 16.4-17.3 kcfs).
Lower Granite	Reduced Spill	7/31/13	1200-1500	4	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 9.8 kcfs (below 14 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 1 (min gen range 16.4-17.3 kcfs).
Lower Granite	Reduced Spill	7/31/13	1600	1	Maintenance	Hourly spill decreased to 8.7 kcfs (below 15.5 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 1 (min gen range 16.4-17.3 kcfs) along with test of Unit 5 for exciter repairs resulted in 19.6 kcfs generation flow.
Lower Granite	Reduced Spill	7/31/13-8/5/13	1700 - 1700	121	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 6.9 kcfs (below 9.8 – 14.3 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 1 (min gen range 16.4-17.3 kcfs).
Lower Granite	Additional Spill	8/5/13-8/6/13	1800-0500	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill increased to 18.6 kcfs (above 9.7 – 10.5 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP.
Lower Granite	Reduced Spill	8/6/13	0600-1700	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 6.9 kcfs (below 18 kcfs FOP spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 1 (min gen range 16.4-17.3 kcfs), resulting in less spill. 24 hr avg. spill was 12.9 kcfs.
Lower Granite	Additional Spill	8/6/13-8/7/13	1800-0500	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill increased ranging from 17 to 20.3 kcfs (above 9.7 – 10.5 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP
Lower Granite	Reduced Spill	8/7/13	0600-1700	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 6.9 kcfs (below 10.8-11 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 1 (min gen range 16.4-17.3 kcfs).
Lower Granite	Additional Spill	8/7/13-8/8/13	1800-0500	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill increased to 18.3 kcfs (above 9.9-11 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP.
Lower Granite	Reduced Spill	8/8/13	0600-1700	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 6.9 kcfs (below 10.1-10.8 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 1 (min gen range 16.4-17.3 kcfs).
Lower Granite	Additional Spill	8/8/13-8/9/13	1800-0500	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill increased to 19.2 kcfs (above 10.6-11 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP.

[4] Note: Data collected for reporting spill variances is reported using hourly-averaged data. Therefore, while spill and generation may be increased or decreased for only a portion of an hour, it is represented in Table 1 as an hour.

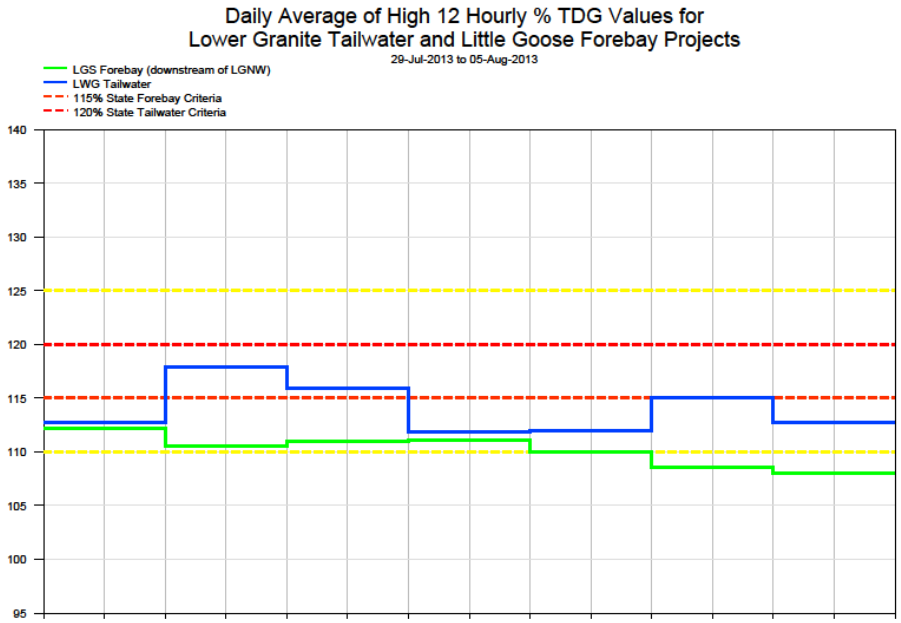
Lower Granite	Reduced Spill	8/9/13	0600-1700	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 6.9 kcfs (below 10.7-11 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 1 (min gen range 16.4-17.3 kcfs).
Lower Granite	Additional Spill	8/9/13-8/10/13	1800-0500	12	Special Operations (Adaptive Management for Fish Passage)	Hourly spill increased to 18.5 kcfs (above 8.9-10.7 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP.
Lower Granite	Reduced Spill	8/10/13	0600-0900	4	Special Operations (Adaptive Management for Fish Passage)	Hourly spill decreased to 6.9 kcfs (below 9.9-10.8 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 1 (min gen range 16.4-17.3 kcfs).
Lower Granite	Additional Spill	8/10/13	1000-2300	14	Maintenance	Hourly spill increased to 18.6 kcfs (above 8.9-10.5 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP.
Lower Granite	Additional Spill	8/11/13	1000-2000	11	Maintenance	Hourly spill increased to 15.4 kcfs (above 6.8-8.7 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/12/13-8/16/13	0700-2300	113	Maintenance	Hourly spill increased to 18.3 kcfs (above 7.7-10.2 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/17/13	0900-2300	15	Maintenance	Hourly spill increased to 18.1 kcfs (above 6-10 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/19/13	1000-2000	11	Maintenance	Hourly spill increased to 14.5 kcfs (above 4.9-7.2 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/20/13	1000-2100	12	Maintenance	Hourly spill increased to 15.3 kcfs (above 16.1 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/21/13	1000-2100	12	Maintenance	Hourly spill increased to 16.3 kcfs (above 3.6-8.2 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.

Lower Granite	Additional Spill	8/22/13	1000-2200	13	Maintenance	Hourly spill increased to 13.3 kcfs (above 2.4-5.2 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/23/13	1000-2100	12	Maintenance	Hourly spill increased to 12.2 kcfs (above 0-4.1 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/24/13	1000	1	Maintenance	Hourly spill increased to 9.7 kcfs (above 7.1 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/26/13	1000-2300	14	Maintenance	Hourly spill increased to 15.3 kcfs (above 6.9-7.2 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Reduced Spill	8/27/13	0900	1	Maintenance	Hourly spill continued at 8.3 kcfs (below 14.8 kcfs FOP min gen spill) while min gen increased to 19.6 kcfs. Project was switching units from Unit 1 to Unit 5 while transitioning to line outage/speed no load. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/27/13	1100-2100	11	Maintenance	Hourly spill increased to 16.5 kcfs (above 7.9-9.5 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Reduced Spill	8/28/13	0800	1	Maintenance	Hourly spill continued at 9.3 kcfs (below 10.7 kcfs FOP min gen spill) while min gen increased to 14.5 kcfs. Project was transitioning to line outage/speed no load. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/28/13	1000-2100	12	Maintenance	Hourly spill increased to 16.7 kcfs (above 8-8.6 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/29/13	1100-1900	9	Maintenance	Hourly spill increased to 16.7 kcfs (above 6-9 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Granite	Additional Spill	8/30/13	1000-2100	12	Maintenance	Hourly spill increased to 16.5 kcfs (above 8.1-8.4 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.

Lower Granite	Additional Spill	8/31/13	1000-2000	11	Maintenance	Hourly spill increased to 16.2 kcfs (above 7.98.1 kcfs FOP min gen spill). Modified FPP unit priority from Unit 2 (min gen range 11.3-13.1 kcfs) to Unit 5 (13.5-14.5 kcfs) and decreased Unit 5 flow to 5 kcfs which is outside of the min gen range specified in the FOP. Powerhouse was closed for worker safety during roof repair.
Lower Monumental	Reduced Spill	8/19/13	0700	1	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 7.3 kcfs compared to target FOP mean min gen spill of 9.1 kcfs.
Lower Monumental	Additional Spill	8/19/13	0800-1800	11	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 12.7 kcfs compared to target FOP mean min gen spill of 6.0 kcfs.
Lower Monumental	Reduced Spill	8/19/13-8/20/13	1900-0700	13	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 7.3 kcfs compared to target FOP mean min gen spill of 9.1 kcfs.
Lower Monumental	Additional Spill	8/20/13	0800-1800	11	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 15.1 compared to target FOP mean min gen spill of 8.2 kcfs.
Lower Monumental	Reduced Spill	8/20/13-8/21/13	1900-0700	13	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 7.3 kcfs compared to target FOP mean min gen spill of 9.1 kcfs.
Lower Monumental	Additional Spill	8/21/13	0800-1800	11	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 12.2 kcfs compared to target FOP mean min gen spill of 5.4 kcfs.
Lower Monumental	Reduced Spill	8/21/13-8/22/13	1900-0700	13	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 1.9 kcfs compared to target FOP mean min gen spill of 3.7 kcfs.
Lower Monumental	Additional Spill	8/22/13	0800-1900	12	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 14.1 kcfs compared to target FOP mean min gen spill of 6.9 kcfs.
Lower Monumental	Reduced Spill	8/22/13-8/23/13	2000-0700	12	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 6.2 kcfs compared to target FOP mean min gen spill of 8.1 kcfs.
Lower Monumental	Additional Spill	8/23/13	0800-1900	12	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 13.6 kcfs compared to target FOP mean min gen spill of 6.4 kcfs.
Lower Monumental	Reduced Spill	8/23/13-8/26/13	2000-1400	67	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 6.7 kcfs compared to target FOP mean min gen spill of 8.7 kcfs.
Lower Monumental	Additional Spill	8/26/13	1500 - 1700	3	Maintenance	Modified FPP min gen flow from priority unit 2 to unit 5 while powerhouse was performing testing after annual maintenance. Actual mean spill during this period was 17.6 kcfs compared to target FOP mean min gen spill of 12.4 kcfs.

John Day	Additional Spill	8/5/13	2300	1	Transmission Stability	Hourly spill increased to 31.1 % (above 30.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 29.9%.
John Day	Reduced Spill	8/18/13	1600	1	Transmission Stability	Hourly spill decreased to 28.8 % (below 30.0% ± 1% range) due to an unexpected transmission line outage. 24 hr avg. spill was 30.0%.
John Day	Reduced Spill	8/25/13	0200	1	Transmission Stability	Hourly spill decreased to 28.9 % (below 30.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 29.9%.
John Day	Reduced Spill	8/26/13	1000	1	Human/Program Error	Hourly spill decreased to 28.6 % (below 30.0% ± 1% range). Delay in changing spill due to IT data problems. 24 hr avg. spill was 29.9%.
John Day	Reduced Spill	8/30/13	0800	1	Transmission Stability	Hourly spill decreased to 28.9 % (below 30.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 29.9%.
The Dalles	Additional Spill	8/5/13	2300	1	Transmission Stability	Hourly spill increased to 41.1 % (above 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 39.9%.
The Dalles	Reduced Spill	8/7/13	0200	1	Transmission Stability	Hourly spill decreased to 38.7% (below 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 39.8%.
The Dalles	Additional Spill	8/16/13	0800	1	Transmission Stability	Hourly spill increased to 41.4 % (above 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 40.1%.
The Dalles	Additional Spill	8/17/13	1100	1	Transmission Stability	Hourly spill increased to 41.2 % (above 40.0% ± 1% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 40.1%.
The Dalles	Additional Spill	8/18/13	1700	1	Transmission Stability	Hourly spill increased to 41.5 % (above 40.0% ± 1% range) due to an unexpected transmission line outage. See pgs. 3-4. 24 hr avg. spill was 39.8%.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
29-Jul-2013 to 05-Aug-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

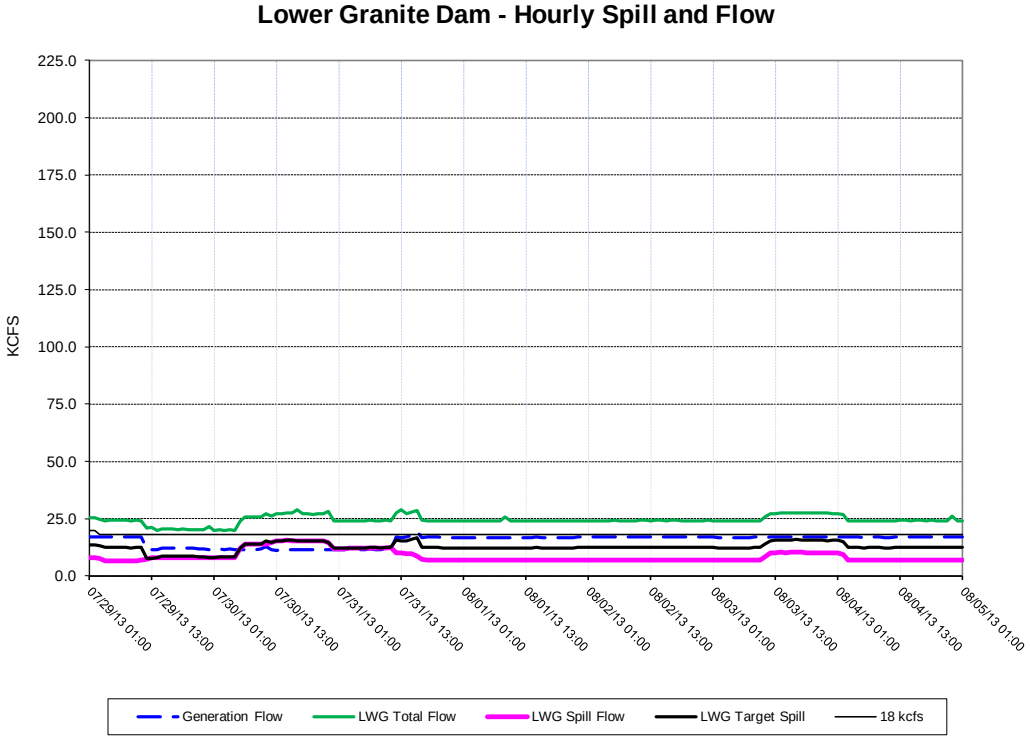
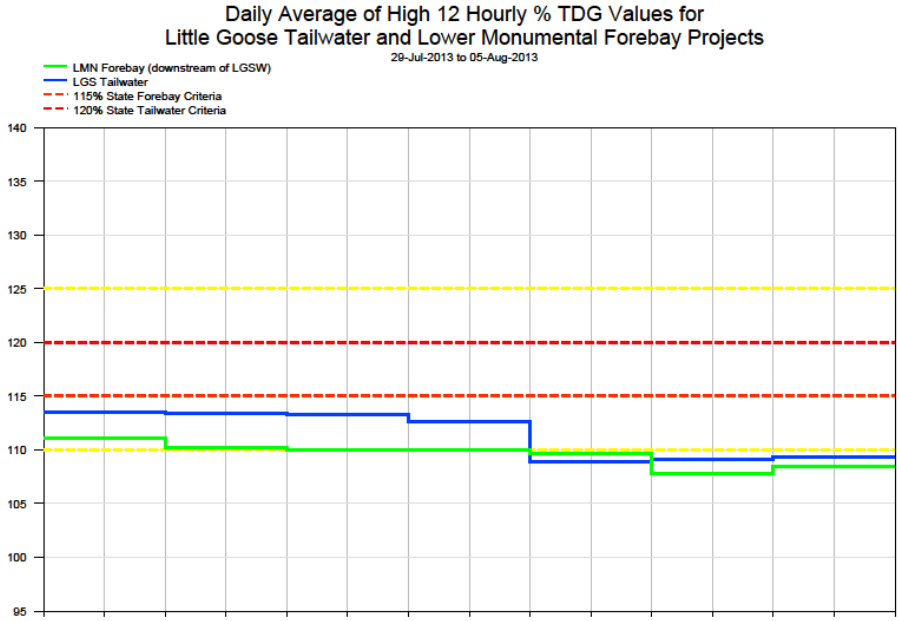

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/29/13 01:00
07/29/13 13:00
07/30/13 01:00
07/30/13 13:00
07/31/13 01:00
07/31/13 13:00
08/01/13 01:00
08/01/13 13:00
08/02/13 01:00
08/02/13 13:00
08/03/13 01:00
08/03/13 13:00
08/04/13 01:00
08/04/13 13:00
08/05/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 2


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
29-Jul-2013 to 05-Aug-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

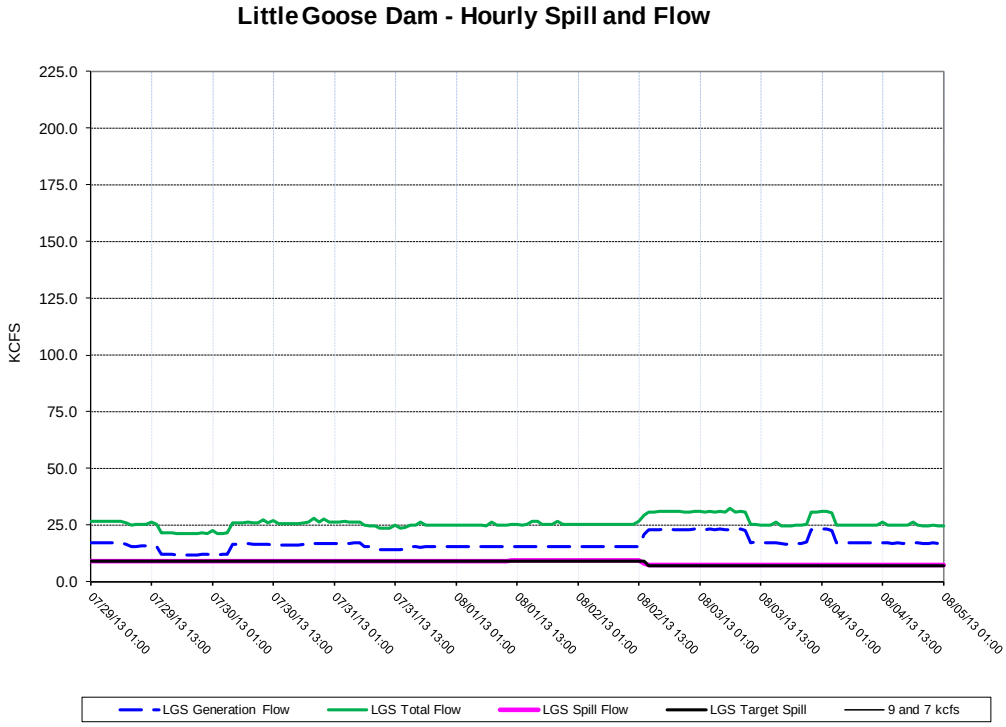
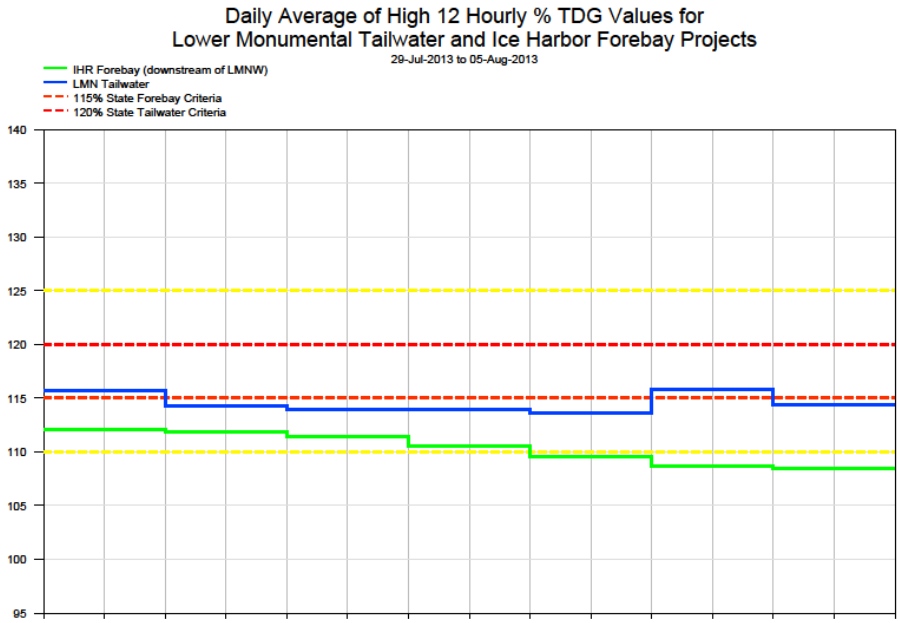

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/29/13 01:00
07/29/13 13:00
07/30/13 01:00
07/30/13 13:00
07/31/13 01:00
07/31/13 13:00
08/01/13 01:00
08/01/13 13:00
08/02/13 01:00
08/02/13 13:00
08/03/13 01:00
08/03/13 13:00
08/04/13 01:00
08/04/13 13:00
08/05/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
9 and 7 kcfs

Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
29-Jul-2013 to 05-Aug-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

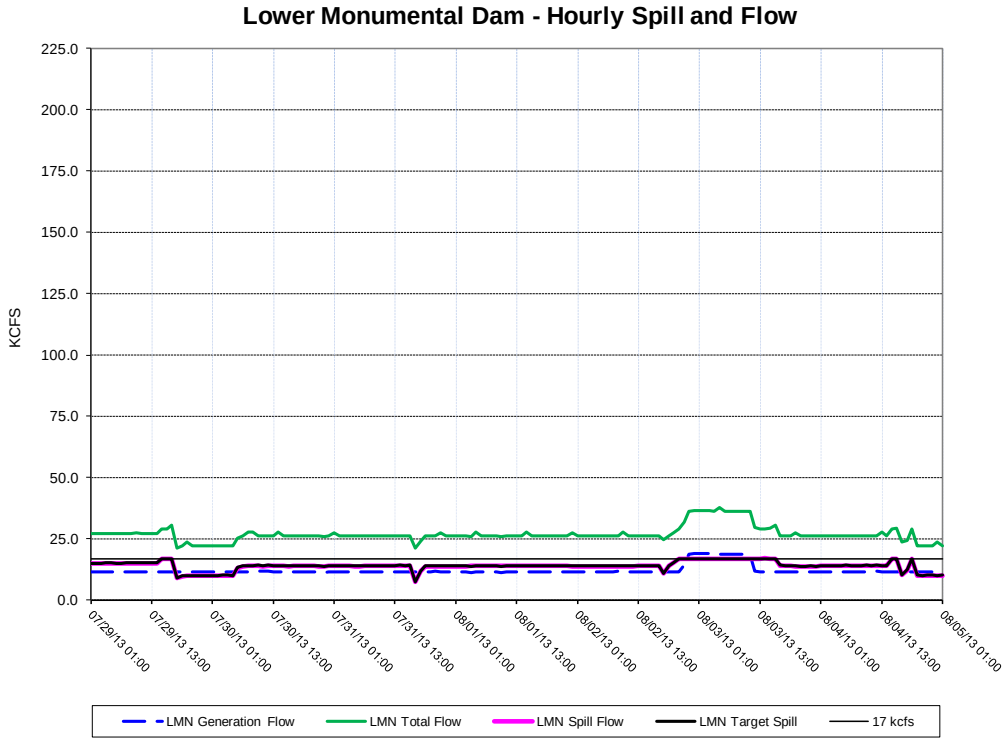
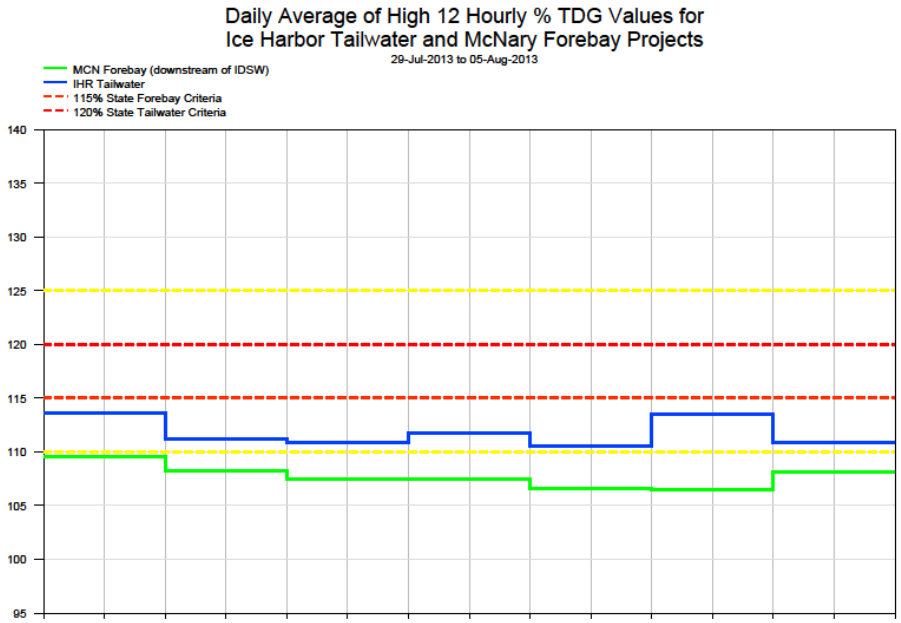

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/29/13 01:00
07/29/13 13:00
07/30/13 01:00
07/30/13 13:00
07/31/13 01:00
07/31/13 13:00
08/01/13 01:00
08/01/13 13:00
08/02/13 01:00
08/02/13 13:00
08/03/13 01:00
08/03/13 13:00
08/04/13 01:00
08/04/13 13:00
08/05/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
29-Jul-2013 to 05-Aug-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

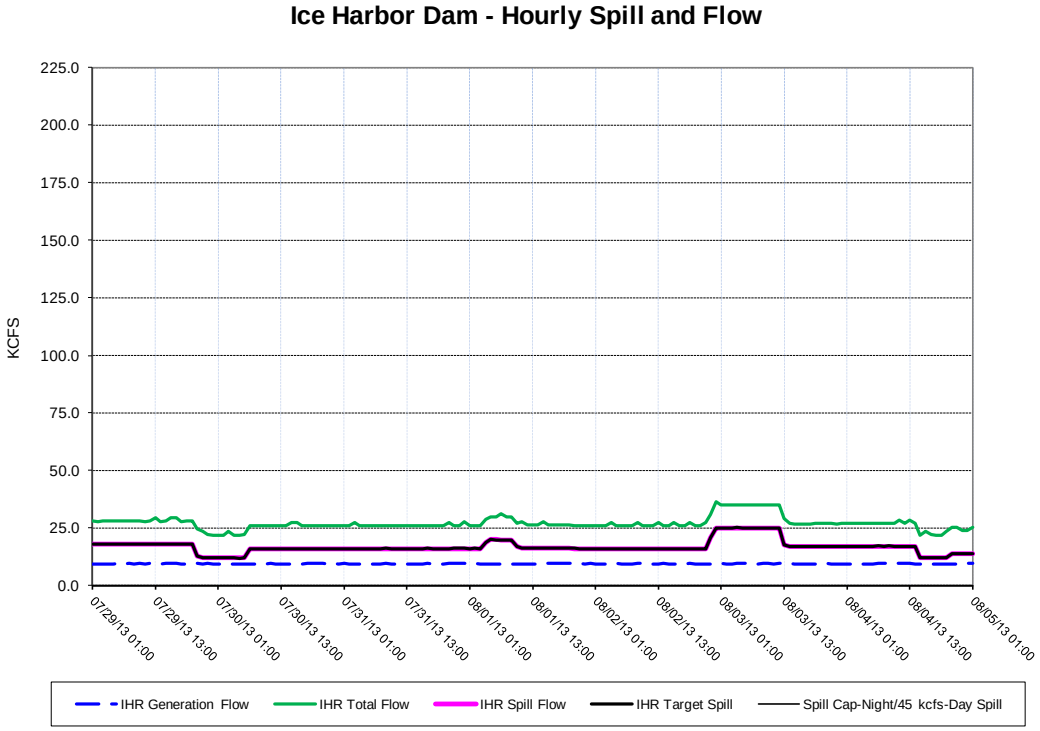
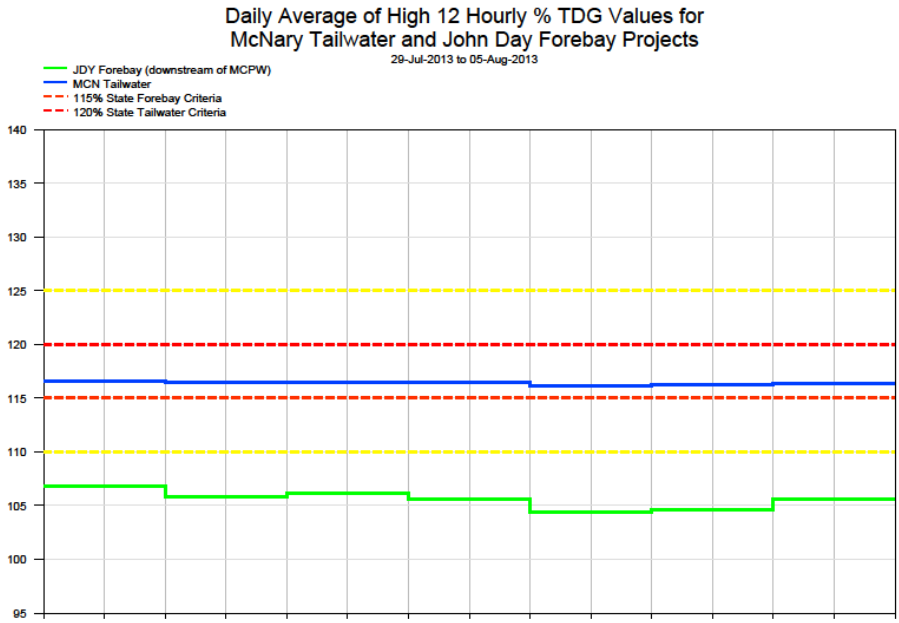

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/29/13 01:00
07/29/13 13:00
07/30/13 01:00
07/30/13 13:00
07/31/13 01:00
07/31/13 13:00
08/01/13 01:00
08/01/13 13:00
08/02/13 01:00
08/02/13 13:00
08/03/13 01:00
08/03/13 13:00
08/04/13 01:00
08/04/13 13:00
08/05/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 5


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
29-Jul-2013 to 05-Aug-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

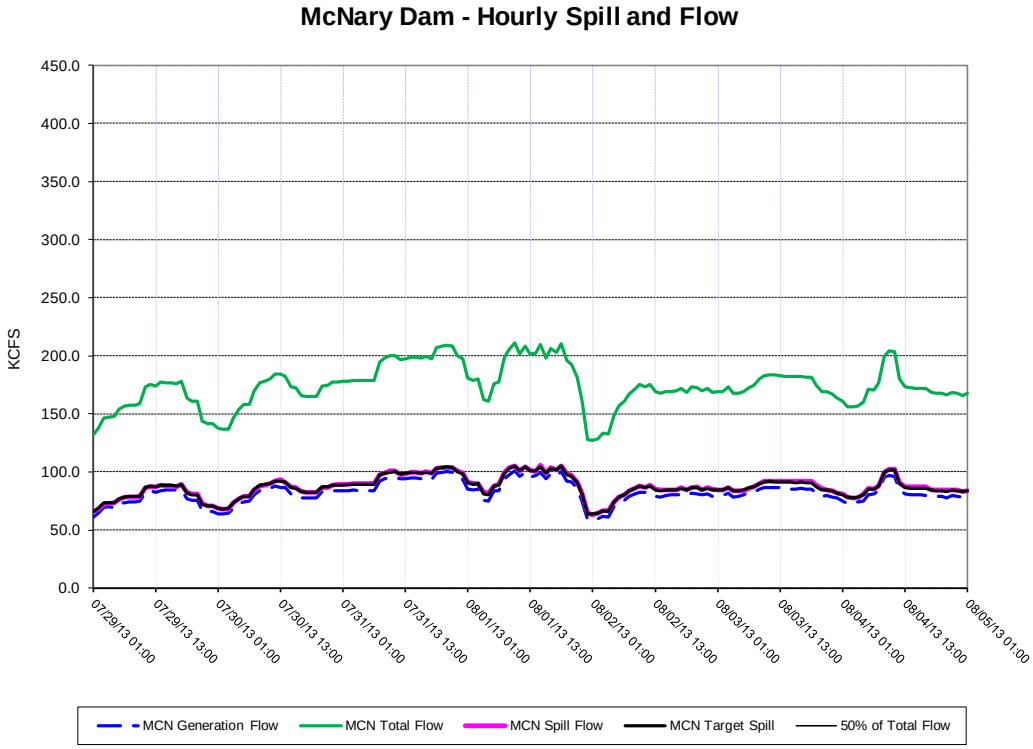
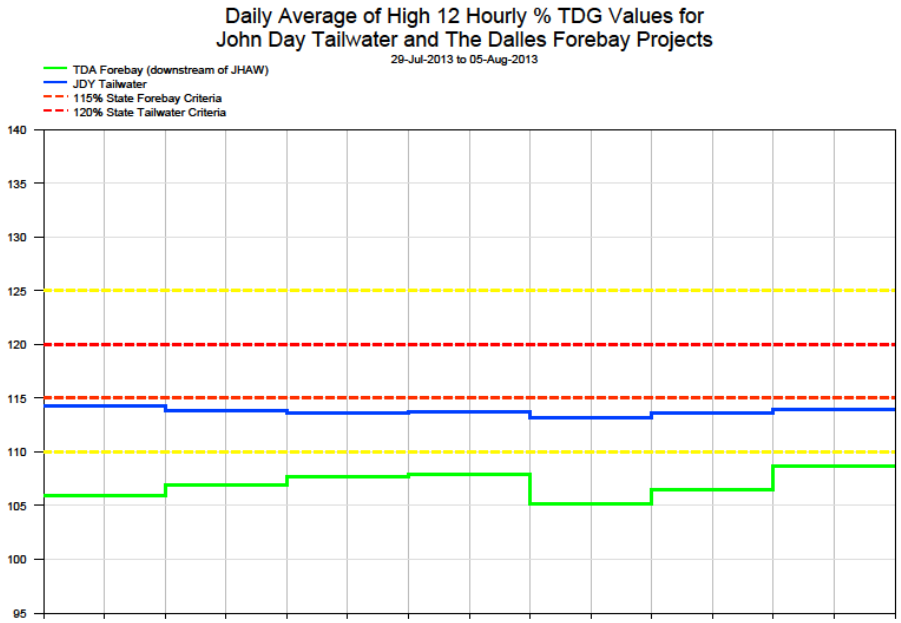

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/29/13 01:00
07/29/13 13:00
07/30/13 01:00
07/30/13 13:00
07/31/13 01:00
07/31/13 13:00
08/01/13 01:00
08/01/13 13:00
08/02/13 01:00
08/02/13 13:00
08/03/13 01:00
08/03/13 13:00
08/04/13 01:00
08/04/13 13:00
08/05/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 6


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
29-Jul-2013 to 05-Aug-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

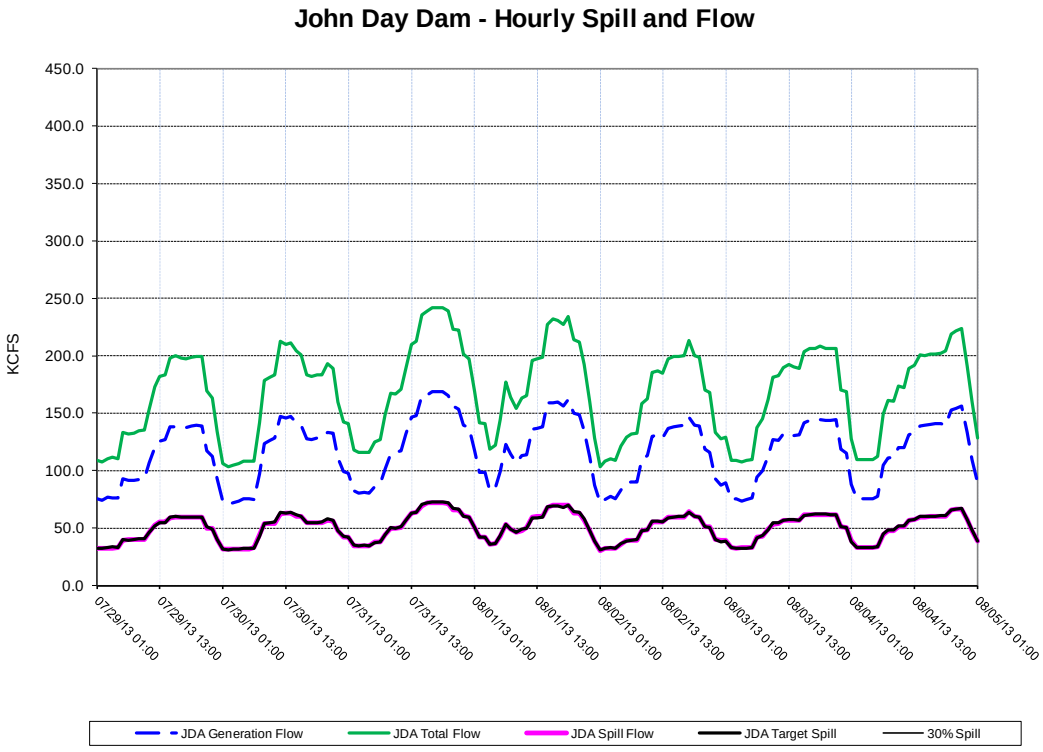
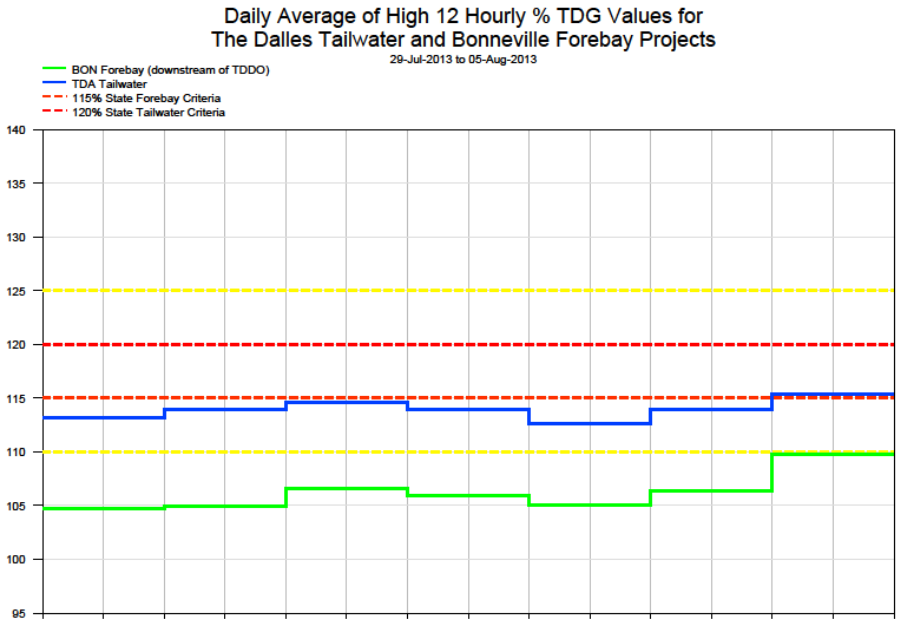

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/29/13 01:00
07/29/13 13:00
07/30/13 01:00
07/30/13 13:00
07/31/13 01:00
07/31/13 13:00
08/01/13 01:00
08/01/13 13:00
08/02/13 01:00
08/02/13 13:00
08/03/13 01:00
08/03/13 13:00
08/04/13 01:00
08/04/13 13:00
08/05/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 7


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
29-Jul-2013 to 05-Aug-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

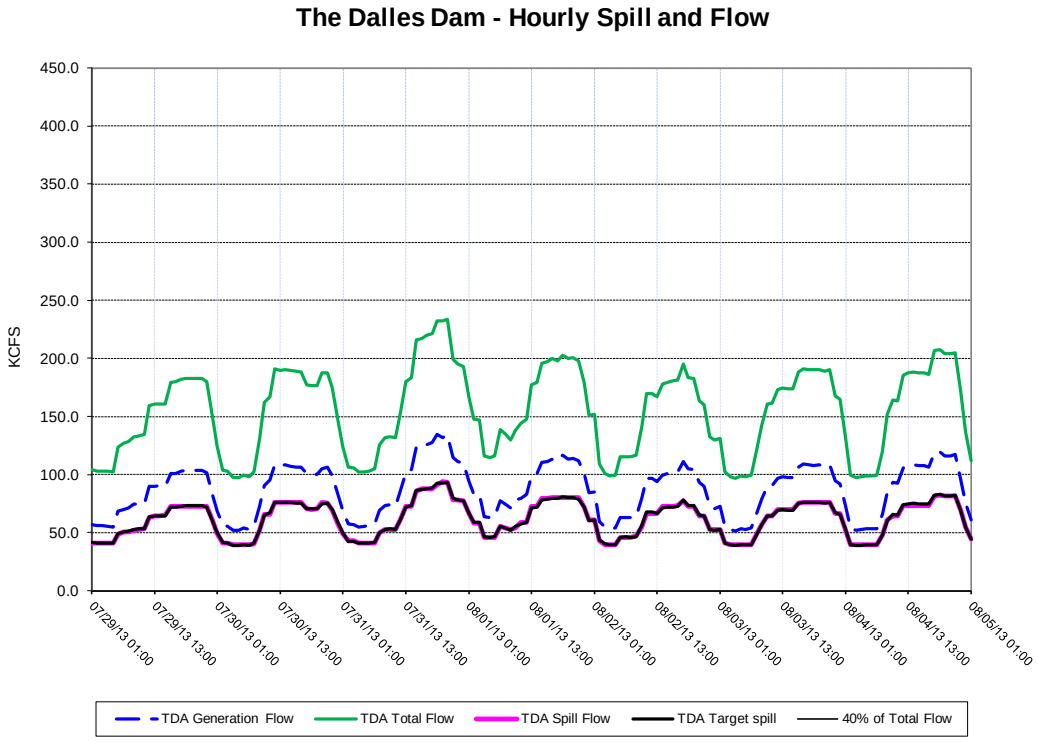
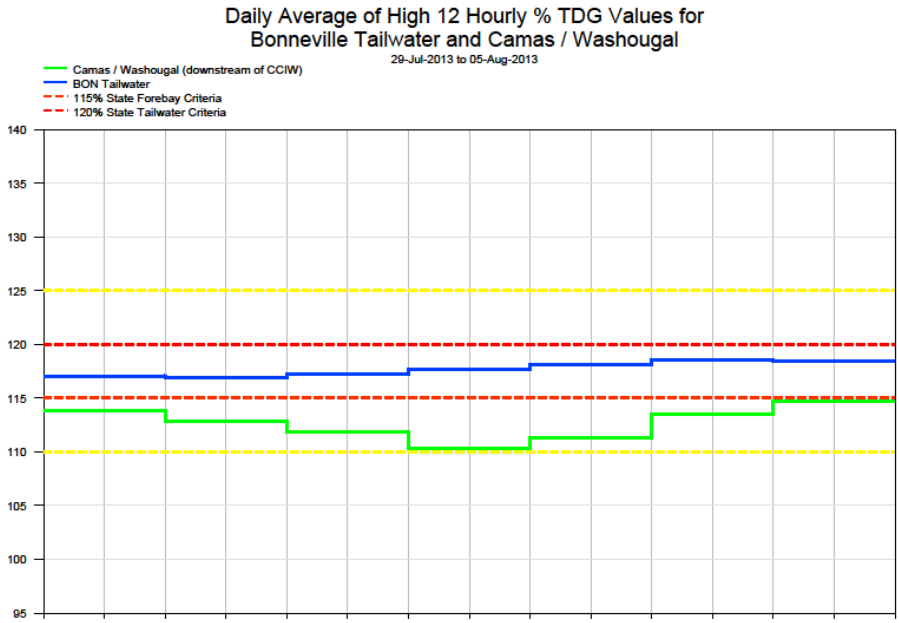

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/29/13 01:00
07/29/13 13:00
07/30/13 01:00
07/30/13 13:00
07/31/13 01:00
07/31/13 13:00
08/01/13 01:00
08/01/13 13:00
08/02/13 01:00
08/02/13 13:00
08/03/13 01:00
08/03/13 13:00
08/04/13 01:00
08/04/13 13:00
08/05/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
29-Jul-2013 to 05-Aug-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

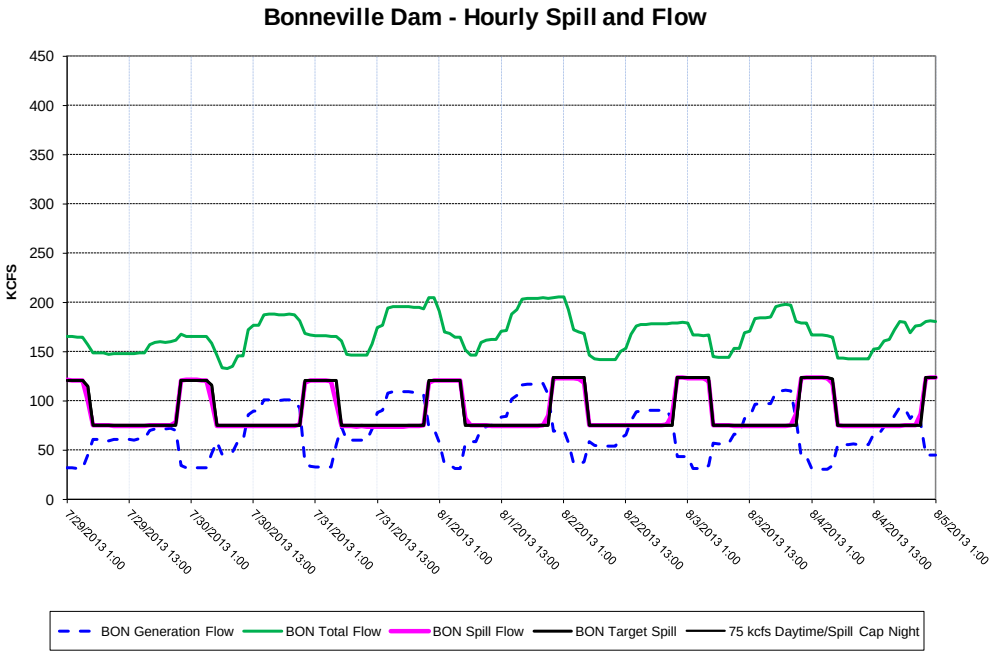
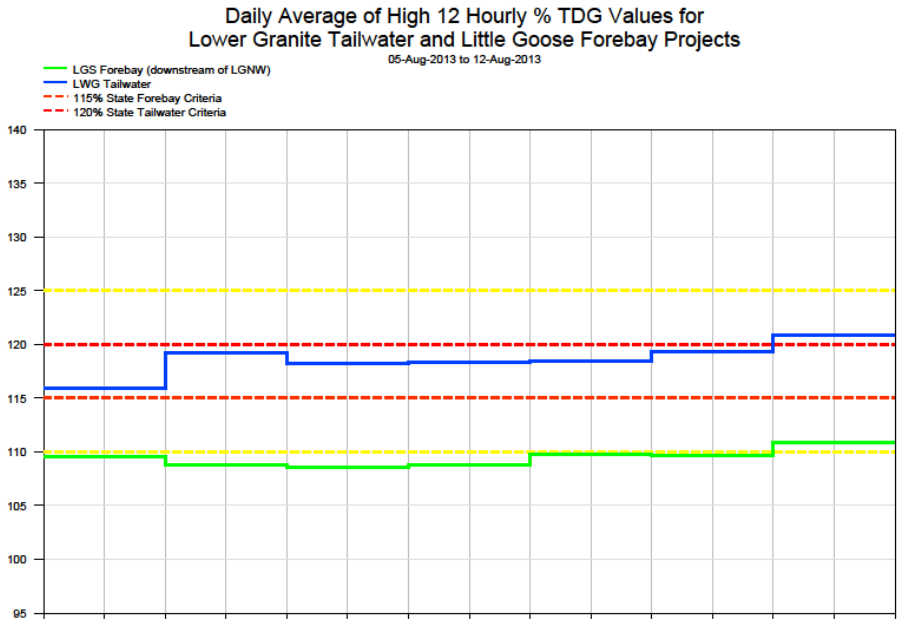

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/29/2013 1:00
7/29/2013 13:00
7/30/2013 1:00
7/30/2013 13:00
7/31/2013 1:00
7/31/2013 13:00
8/1/2013 1:00
8/1/2013 13:00
8/2/2013 1:00
8/2/2013 13:00
8/3/2013 1:00
8/3/2013 13:00
8/4/2013 1:00
8/4/2013 13:00
8/5/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75 kcfs Daytime/Spill Cap Night

Figure 9


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
05-Aug-2013 to 12-Aug-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

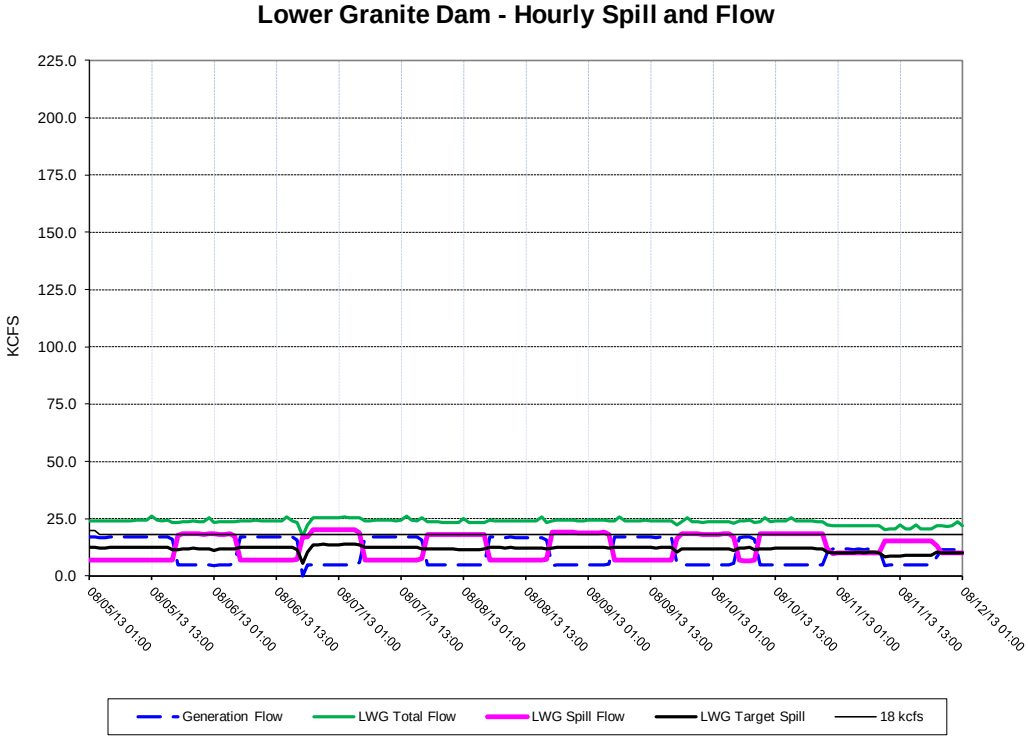
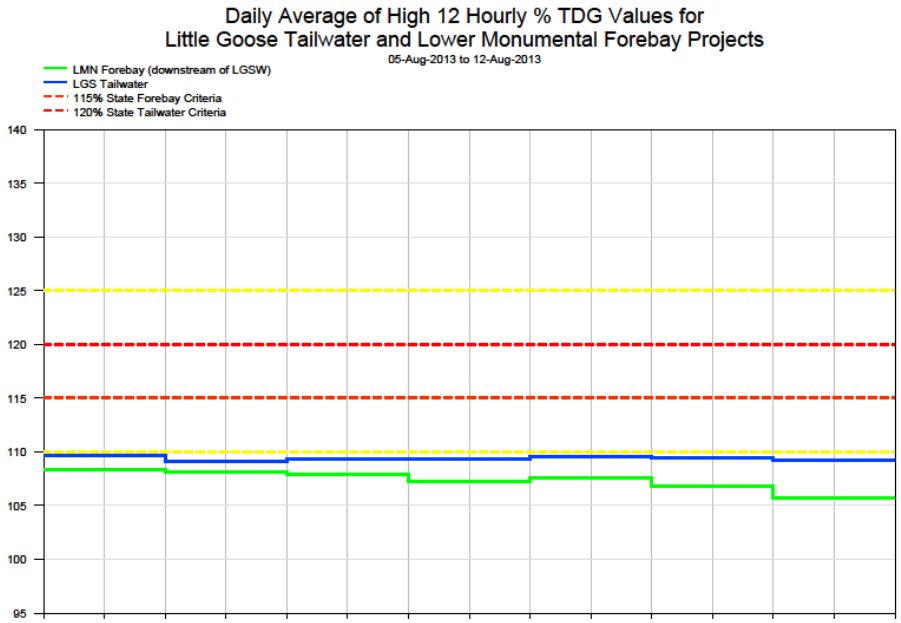

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/05/13 01:00
08/05/13 13:00
08/06/13 01:00
08/06/13 13:00
08/07/13 01:00
08/07/13 13:00
08/08/13 01:00
08/08/13 13:00
08/09/13 01:00
08/09/13 13:00
08/10/13 01:00
08/10/13 13:00
08/11/13 01:00
08/11/13 13:00
08/12/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 10


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
05-Aug-2013 to 12-Aug-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

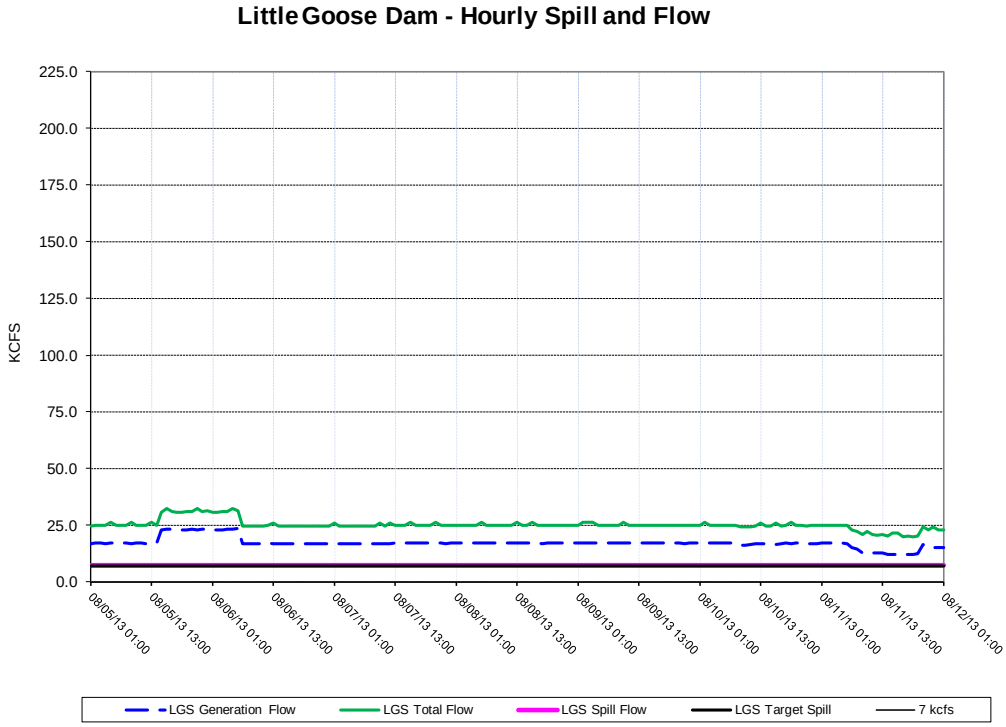
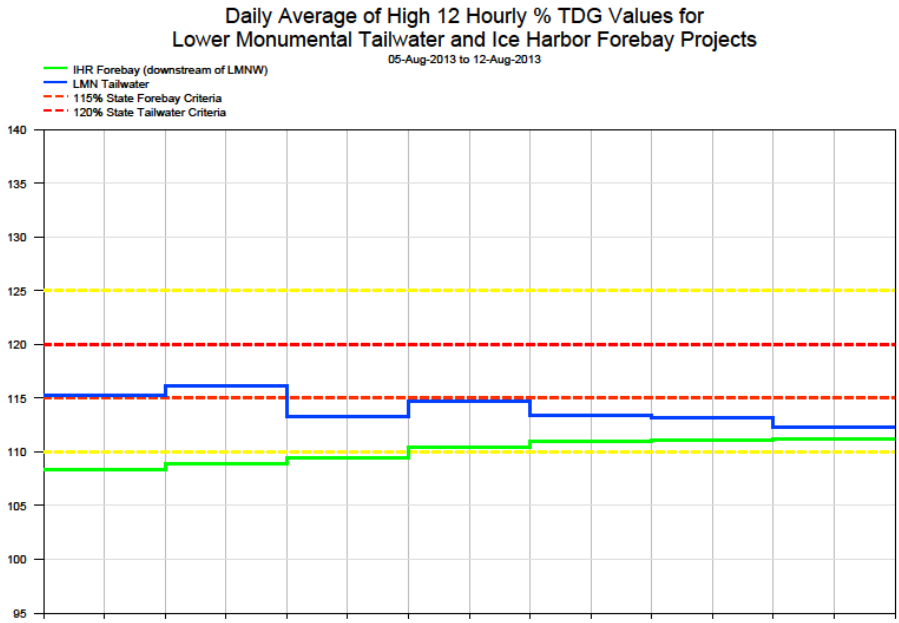

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/05/13 01:00
08/05/13 13:00
08/06/13 01:00
08/06/13 13:00
08/07/13 01:00
08/07/13 13:00
08/08/13 01:00
08/08/13 13:00
08/09/13 01:00
08/09/13 13:00
08/10/13 01:00
08/10/13 13:00
08/11/13 01:00
08/11/13 13:00
08/12/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
7 kcfs

Figure 11


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
05-Aug-2013 to 12-Aug-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

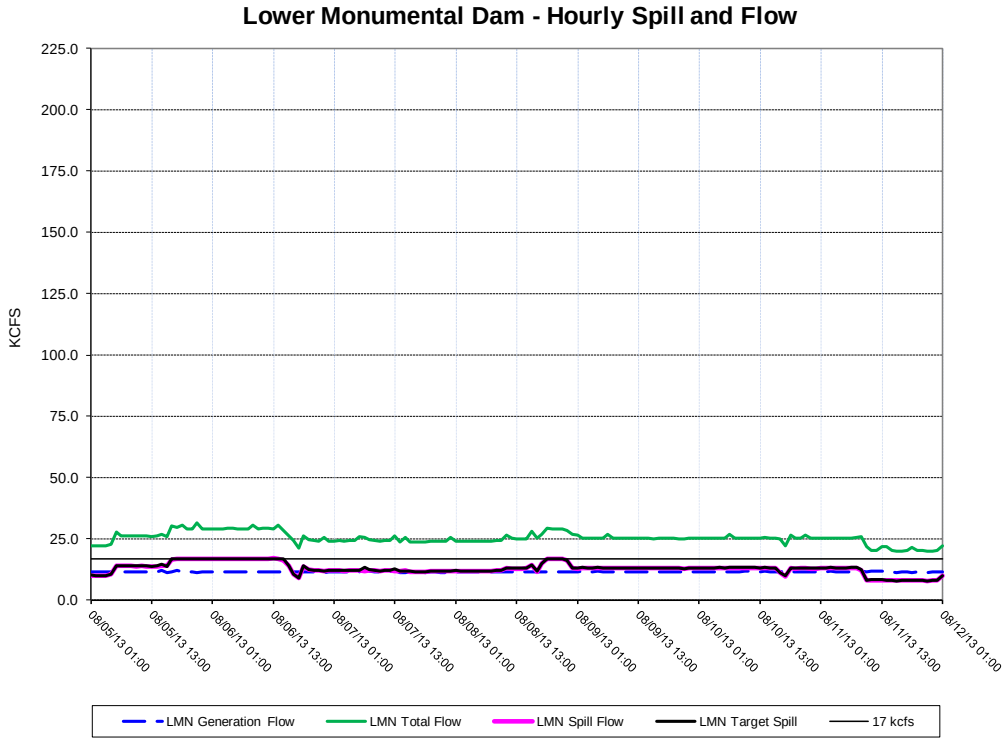
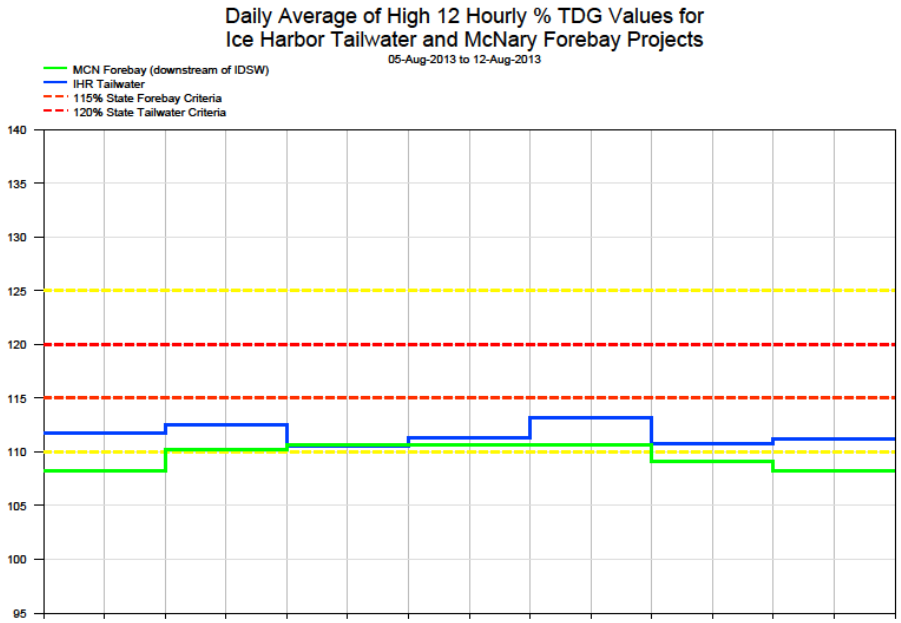

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/05/13 01:00
08/05/13 13:00
08/06/13 01:00
08/06/13 13:00
08/07/13 01:00
08/07/13 13:00
08/08/13 01:00
08/08/13 13:00
08/09/13 01:00
08/09/13 13:00
08/10/13 01:00
08/10/13 13:00
08/11/13 01:00
08/11/13 13:00
08/12/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 12


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
05-Aug-2013 to 12-Aug-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

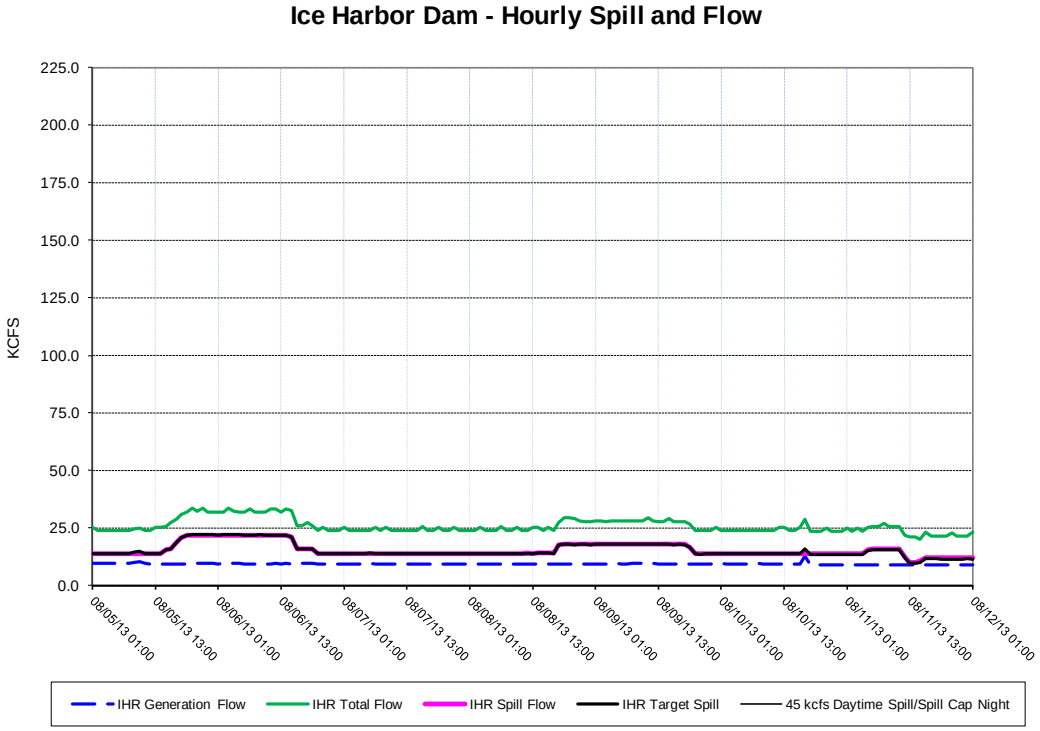
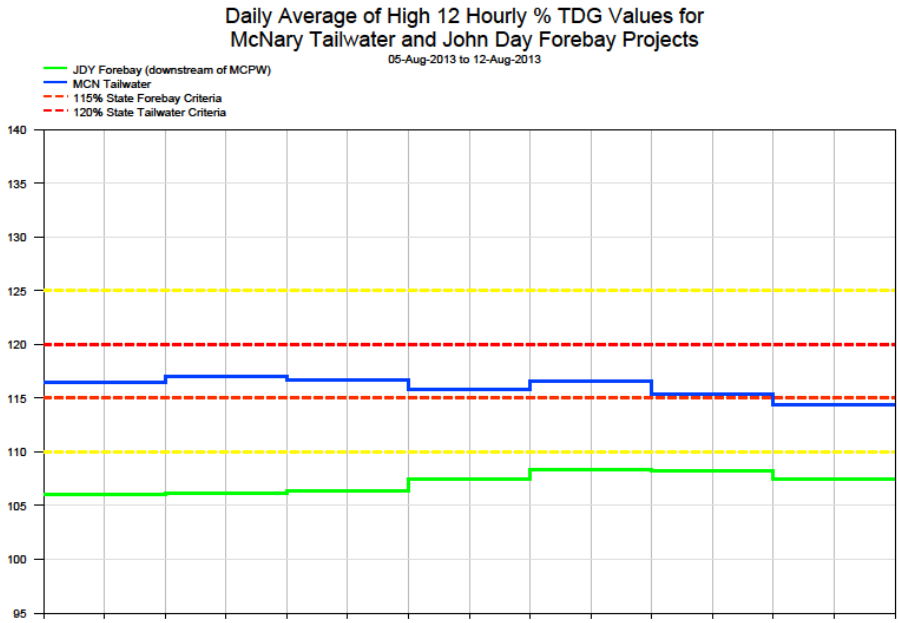

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/05/13 01:00
08/05/13 13:00
08/06/13 01:00
08/06/13 13:00
08/07/13 01:00
08/07/13 13:00
08/08/13 01:00
08/08/13 13:00
08/09/13 01:00
08/09/13 13:00
08/10/13 01:00
08/10/13 13:00
08/11/13 01:00
08/11/13 13:00
08/12/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
45 kcfs Daytime Spill/Spill Cap Night

Figure 13


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
05-Aug-2013 to 12-Aug-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

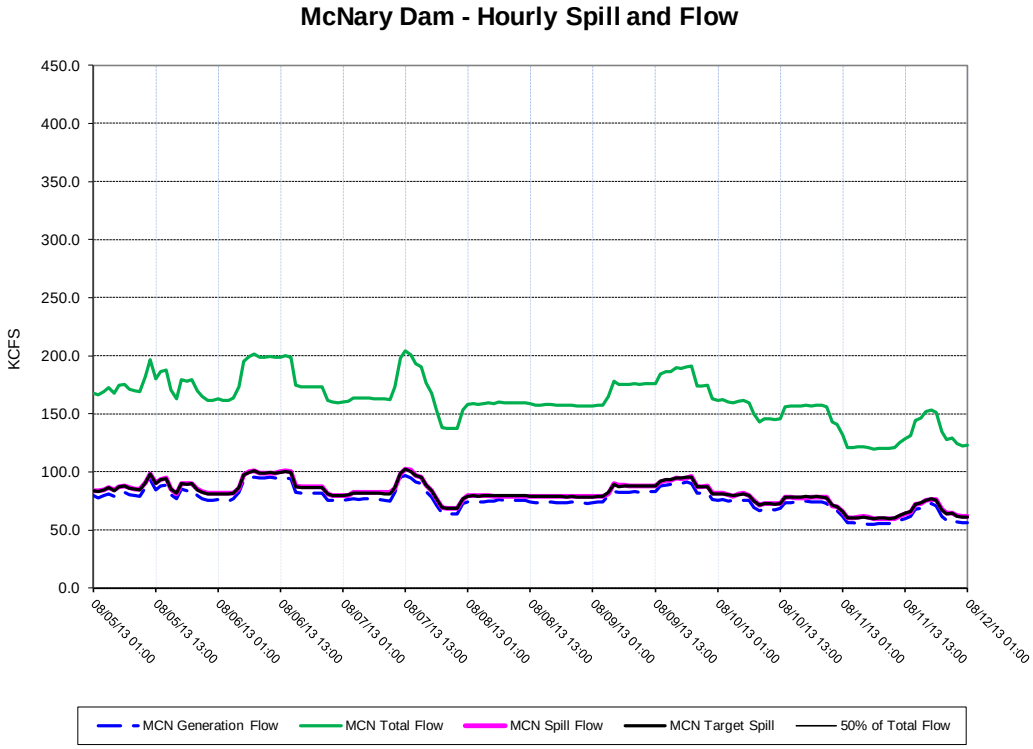
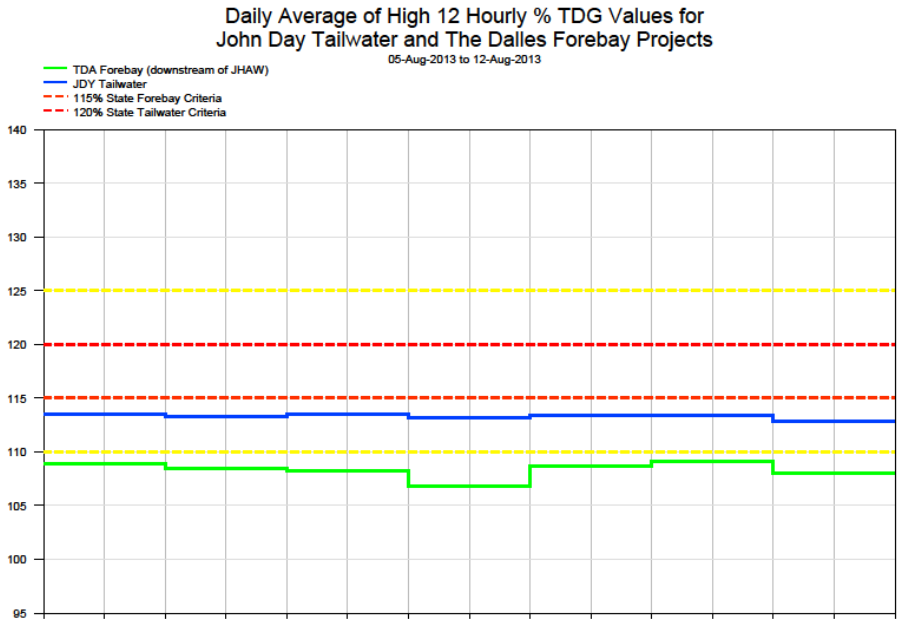

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/05/13 01:00
08/05/13 13:00
08/06/13 01:00
08/06/13 13:00
08/07/13 01:00
08/07/13 13:00
08/08/13 01:00
08/08/13 13:00
08/09/13 01:00
08/09/13 13:00
08/10/13 01:00
08/10/13 13:00
08/11/13 01:00
08/11/13 13:00
08/12/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 14


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
05-Aug-2013 to 12-Aug-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

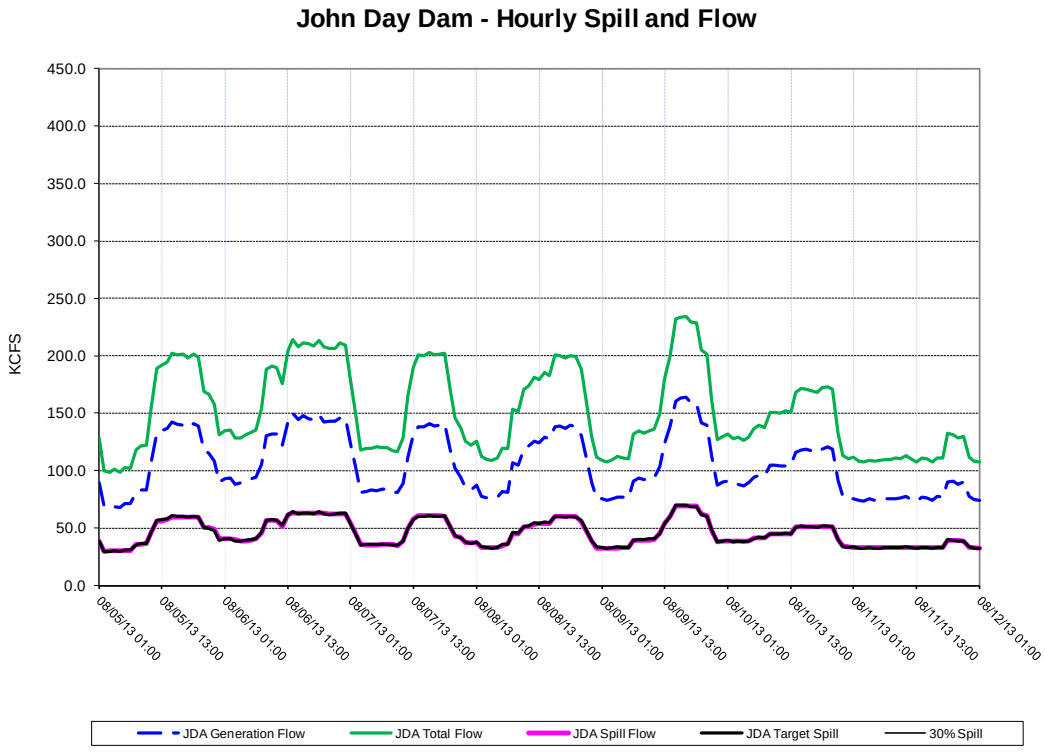
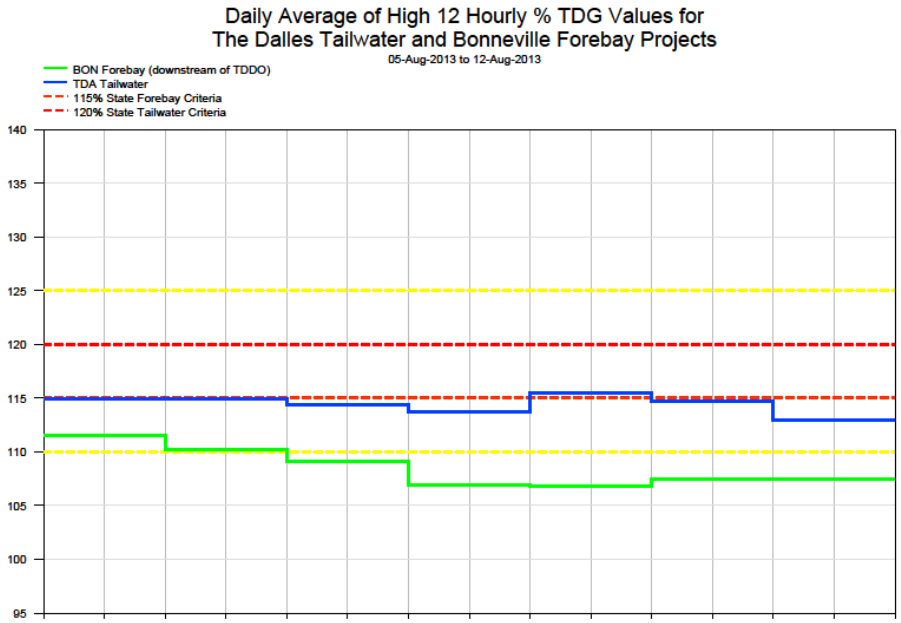

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/05/13 01:00
08/05/13 13:00
08/06/13 01:00
08/06/13 13:00
08/07/13 01:00
08/07/13 13:00
08/08/13 01:00
08/08/13 13:00
08/09/13 01:00
08/09/13 13:00
08/10/13 01:00
08/10/13 13:00
08/11/13 01:00
08/11/13 13:00
08/12/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 15


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
05-Aug-2013 to 12-Aug-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

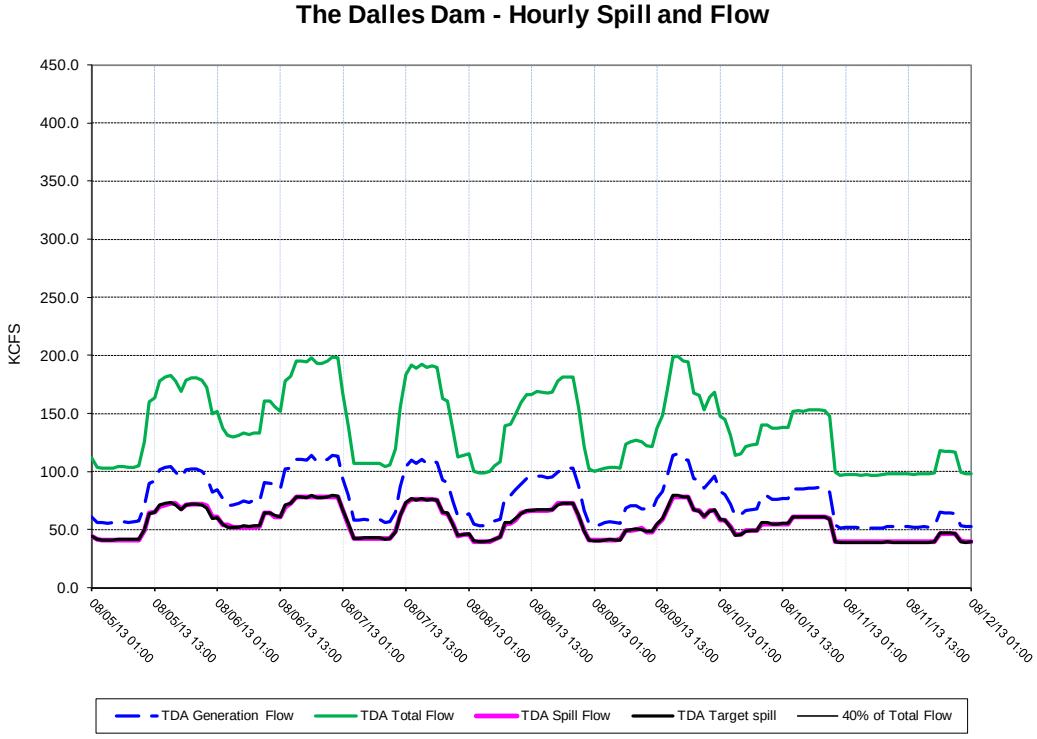
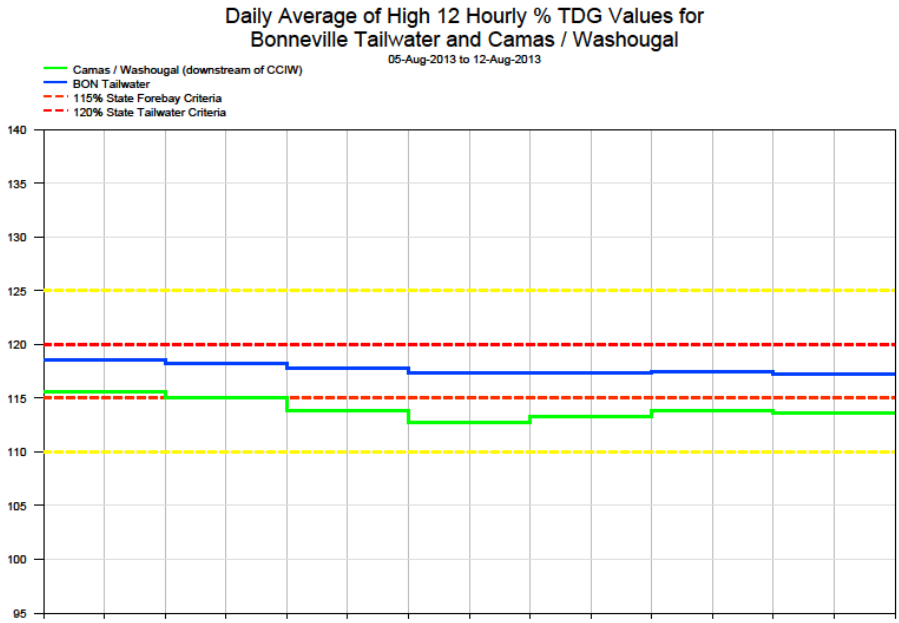

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/05/13 01:00
08/05/13 13:00
08/06/13 01:00
08/06/13 13:00
08/07/13 01:00
08/07/13 13:00
08/08/13 01:00
08/08/13 13:00
08/09/13 01:00
08/09/13 13:00
08/10/13 01:00
08/10/13 13:00
08/11/13 01:00
08/11/13 13:00
08/12/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 16


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
05-Aug-2013 to 12-Aug-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

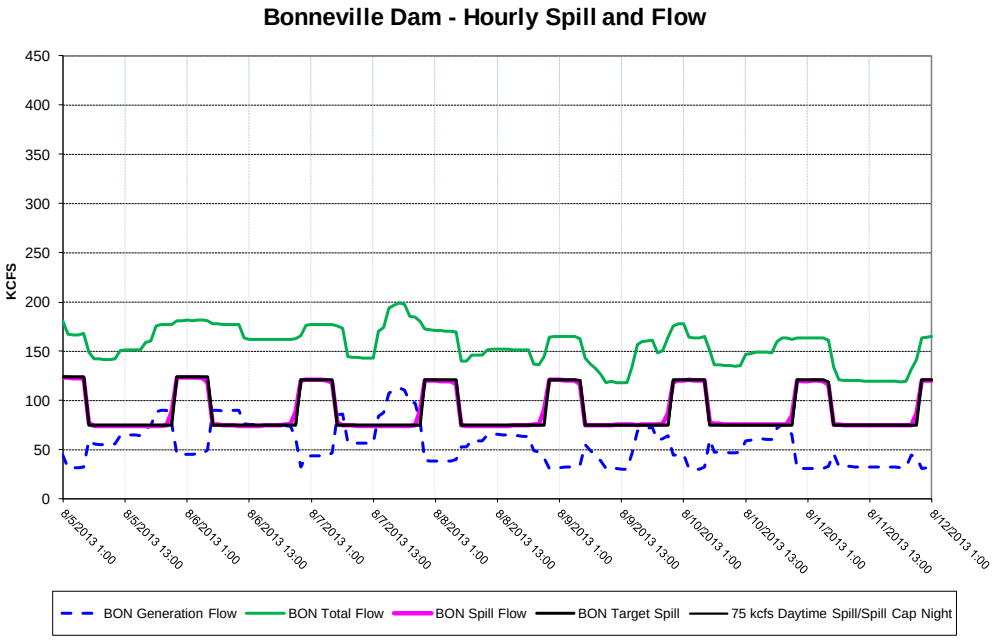
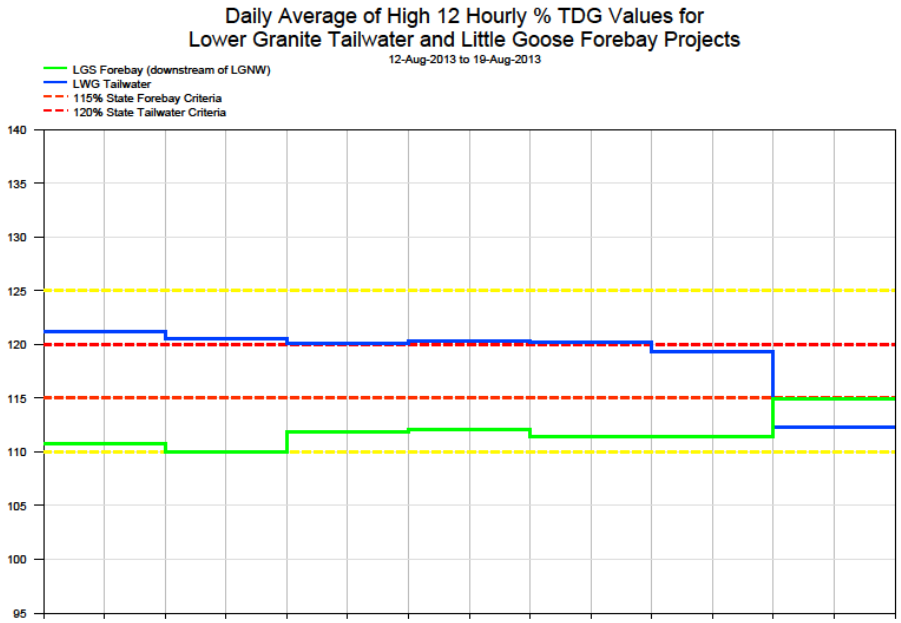

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
8/5/2013 1:00
8/5/2013 13:00
8/6/2013 1:00
8/6/2013 13:00
8/7/2013 1:00
8/7/2013 13:00
8/8/2013 1:00
8/8/2013 13:00
8/9/2013 1:00
8/9/2013 13:00
8/10/2013 1:00
8/10/2013 13:00
8/11/2013 1:00
8/11/2013 13:00
8/12/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75 kcfs Daytime Spill/Spill Cap Night

Figure 17


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
12-Aug-2013 to 19-Aug-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

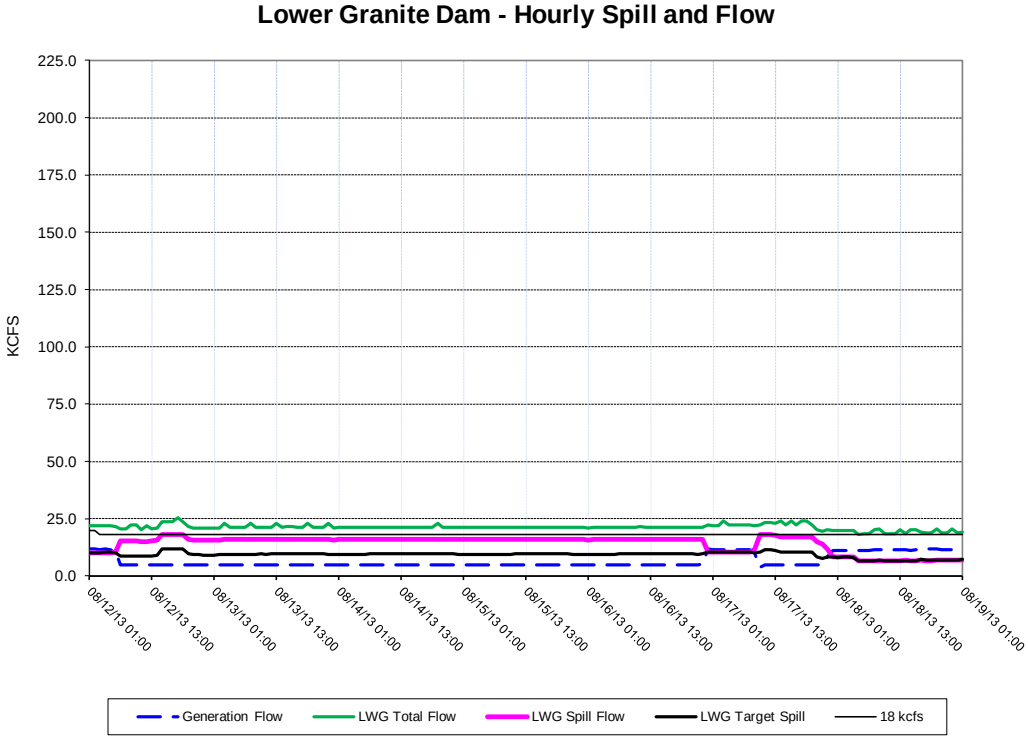
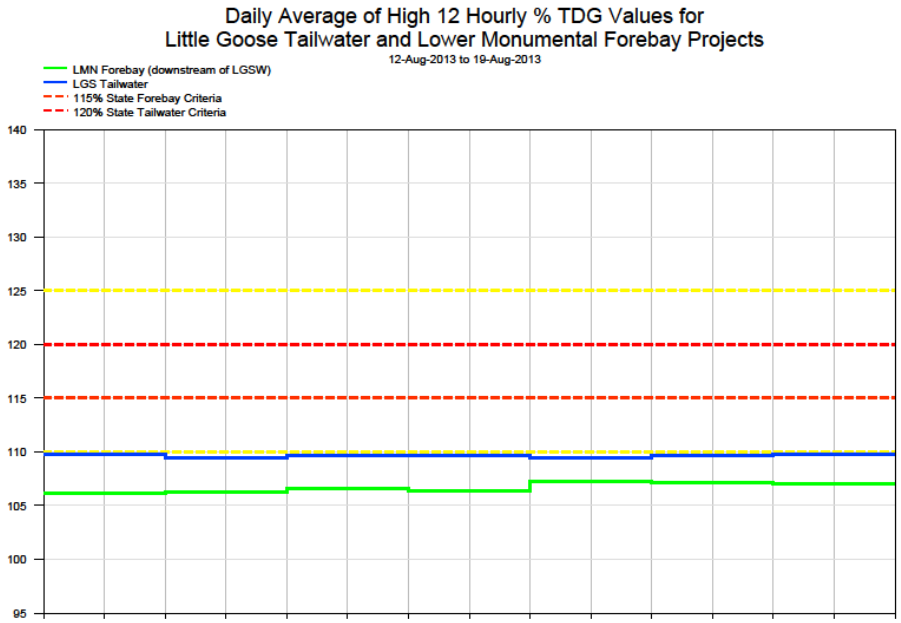

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/12/13 01:00
08/12/13 13:00
08/13/13 01:00
08/13/13 13:00
08/14/13 01:00
08/14/13 13:00
08/15/13 01:00
08/15/13 13:00
08/16/13 01:00
08/16/13 13:00
08/17/13 01:00
08/17/13 13:00
08/18/13 01:00
08/18/13 13:00
08/19/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 18


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
12-Aug-2013 to 19-Aug-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

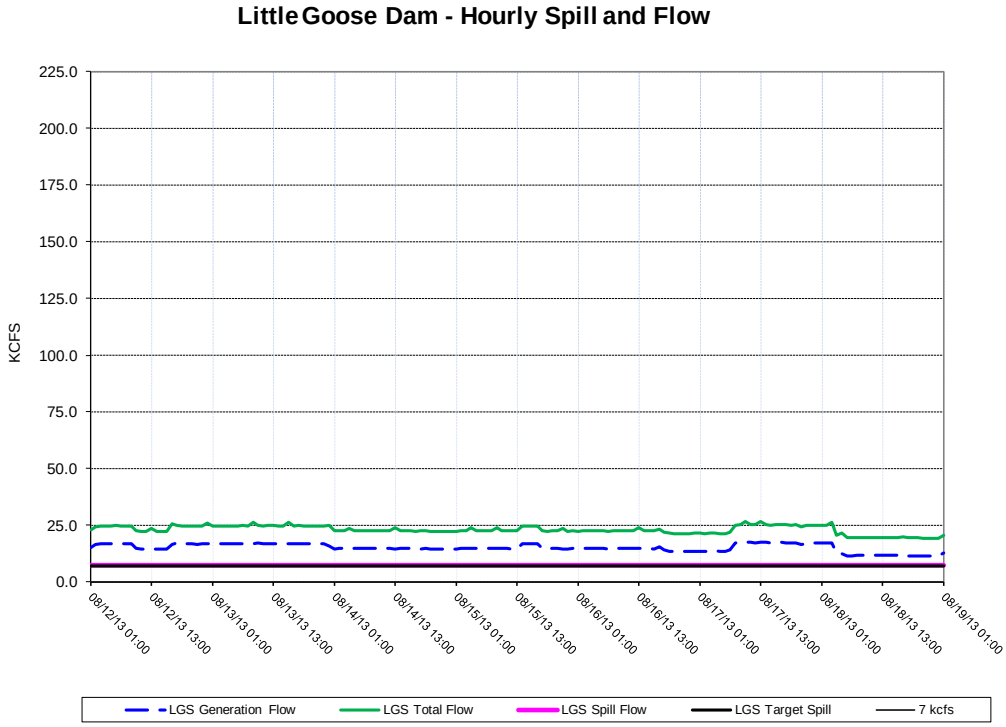

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/12/13 01:00
08/12/13 13:00
08/13/13 01:00
08/13/13 13:00
08/14/13 01:00
08/14/13 13:00
08/15/13 01:00
08/15/13 13:00
08/16/13 01:00
08/16/13 13:00
08/17/13 01:00
08/17/13 13:00
08/18/13 01:00
08/18/13 13:00
08/19/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
7 kcfs

Figure 19

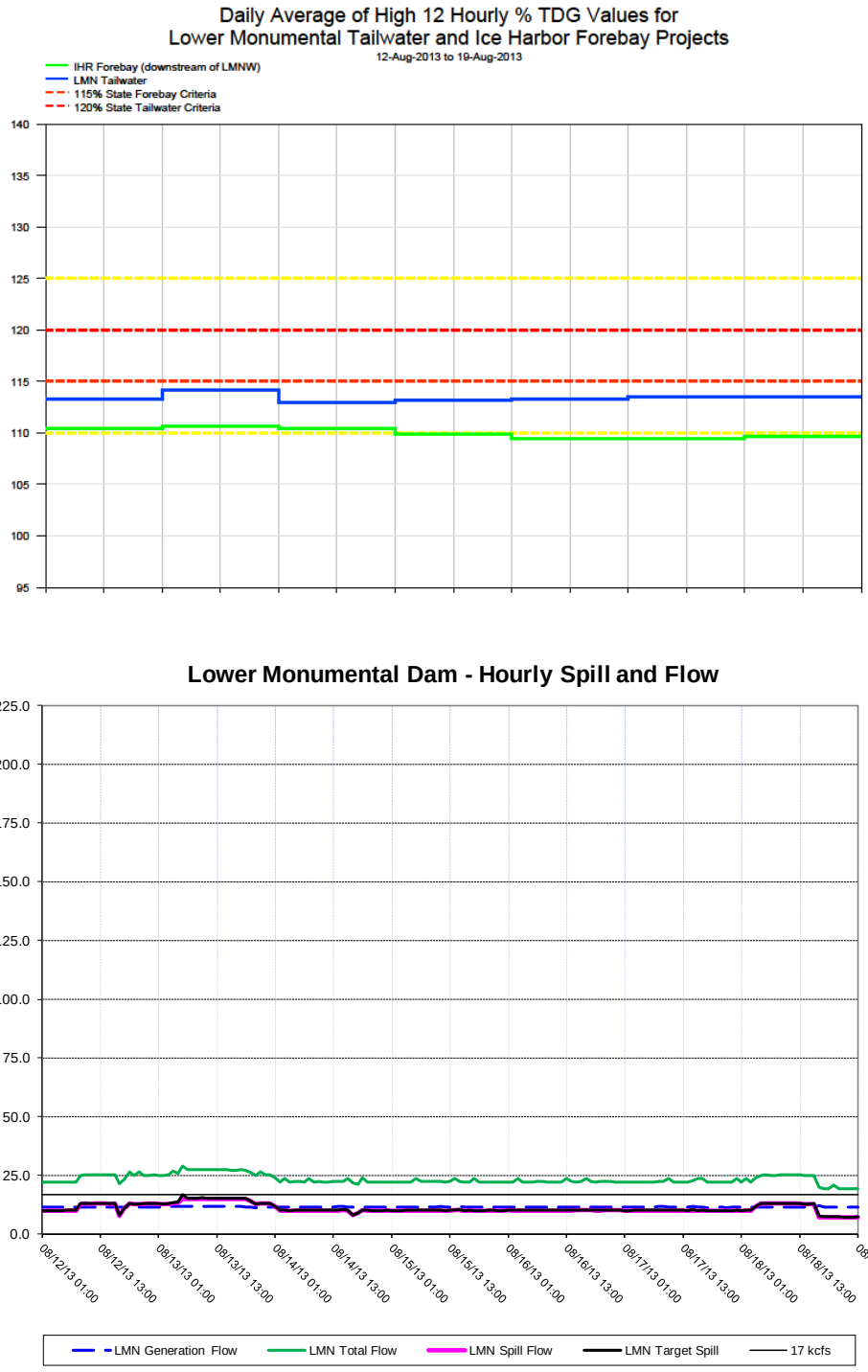
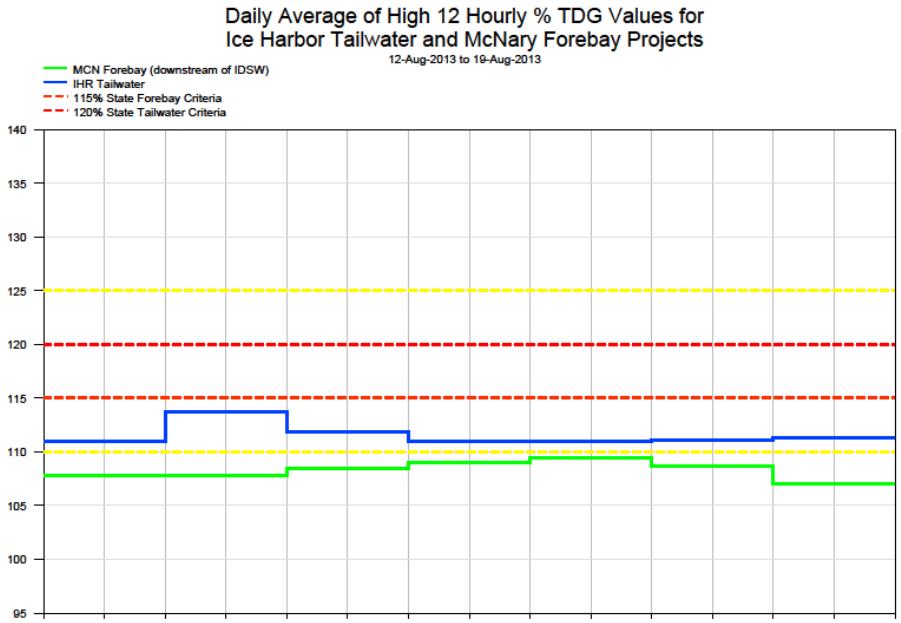

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
12-Aug-2013 to 19-Aug-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95
Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/12/13 01:00
08/12/13 13:00
08/13/13 01:00
08/13/13 13:00
08/14/13 01:00
08/14/13 13:00
08/15/13 01:00
08/15/13 13:00
08/16/13 01:00
08/16/13 13:00
08/17/13 01:00
08/17/13 13:00
08/18/13 01:00
08/18/13 13:00
08/19/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
12-Aug-2013 to 19-Aug-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

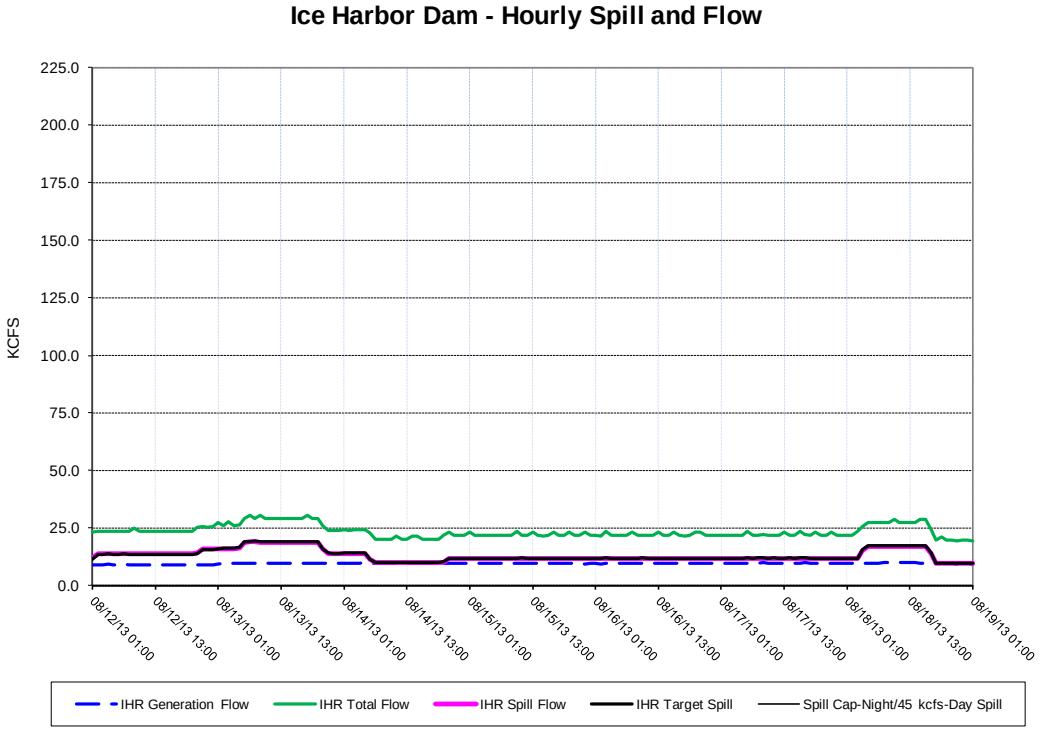
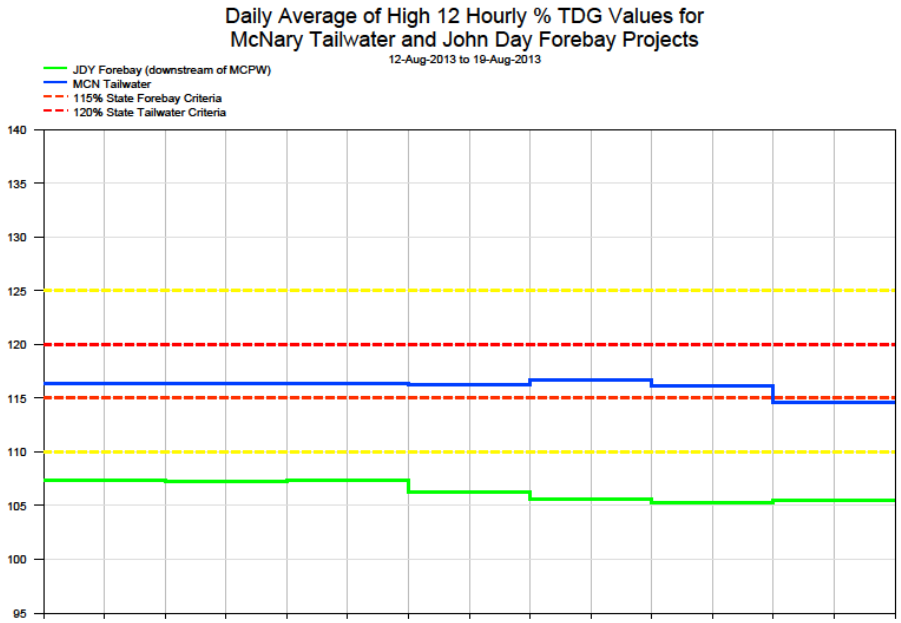

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/12/13 01:00
08/12/13 13:00
08/13/13 01:00
08/13/13 13:00
08/14/13 01:00
08/14/13 13:00
08/15/13 01:00
08/15/13 13:00
08/16/13 01:00
08/16/13 13:00
08/17/13 01:00
08/17/13 13:00
08/18/13 01:00
08/18/13 13:00
08/19/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 21


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
12-Aug-2013 to 19-Aug-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

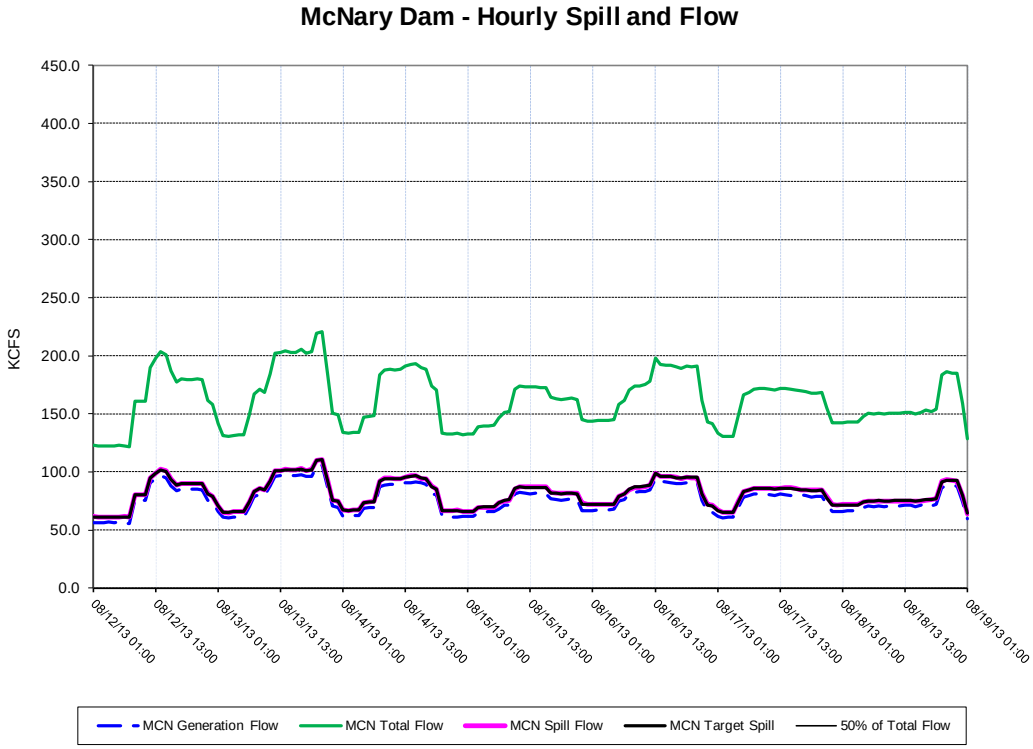
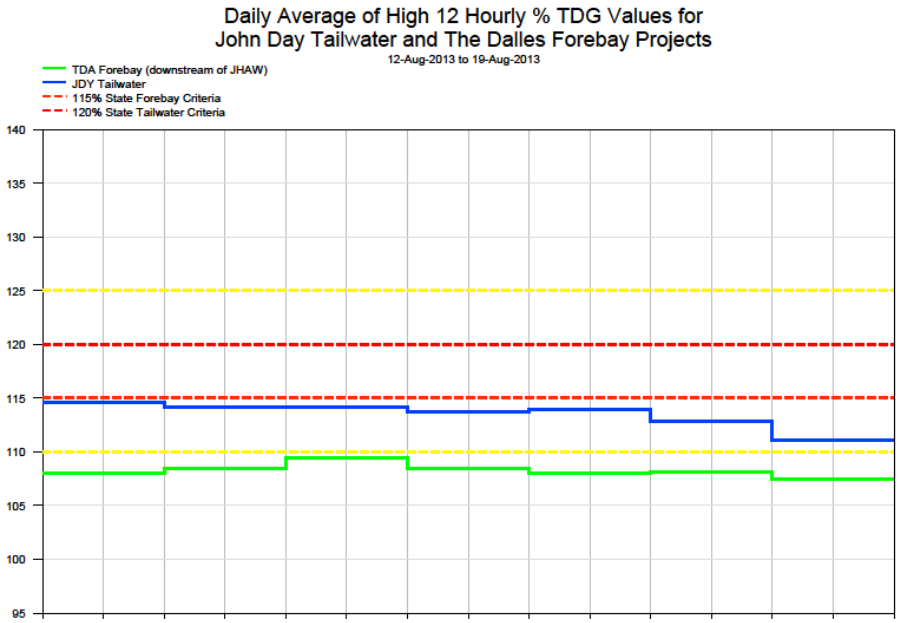

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/12/13 01:00
08/12/13 13:00
08/13/13 01:00
08/13/13 13:00
08/14/13 01:00
08/14/13 13:00
08/15/13 01:00
08/15/13 13:00
08/16/13 01:00
08/16/13 13:00
08/17/13 01:00
08/17/13 13:00
08/18/13 01:00
08/18/13 13:00
08/19/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 22


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
12-Aug-2013 to 19-Aug-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

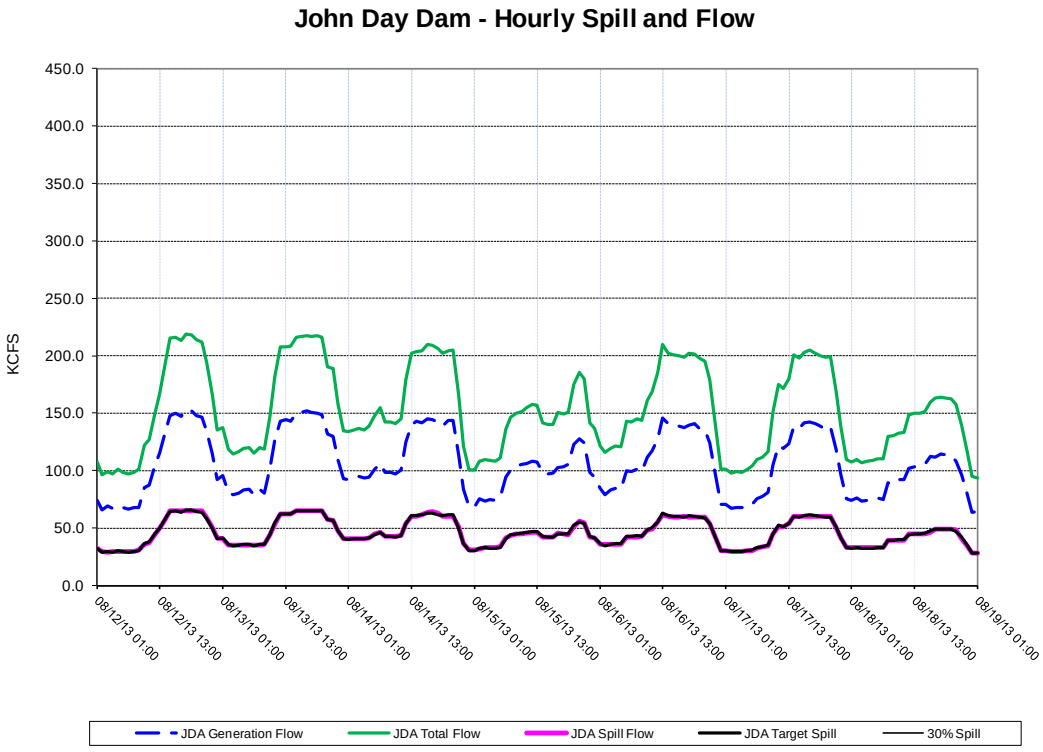
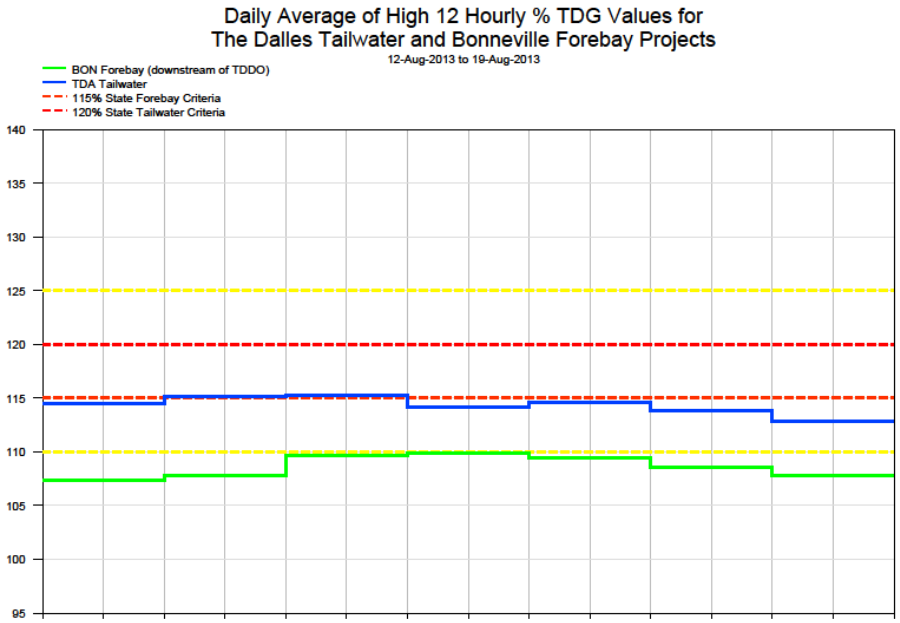

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/12/13 01:00
08/12/13 13:00
08/13/13 01:00
08/13/13 13:00
08/14/13 01:00
08/14/13 13:00
08/15/13 01:00
08/15/13 13:00
08/16/13 01:00
08/16/13 13:00
08/17/13 01:00
08/17/13 13:00
08/18/13 01:00
08/18/13 13:00
08/19/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 23


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
12-Aug-2013 to 19-Aug-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

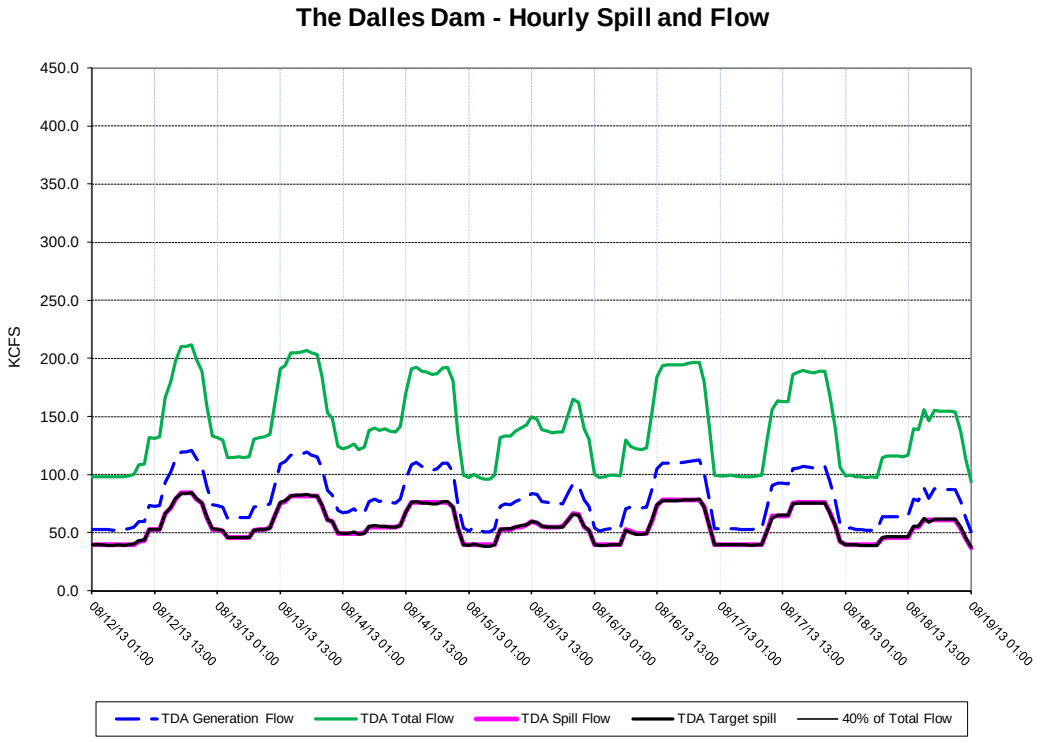
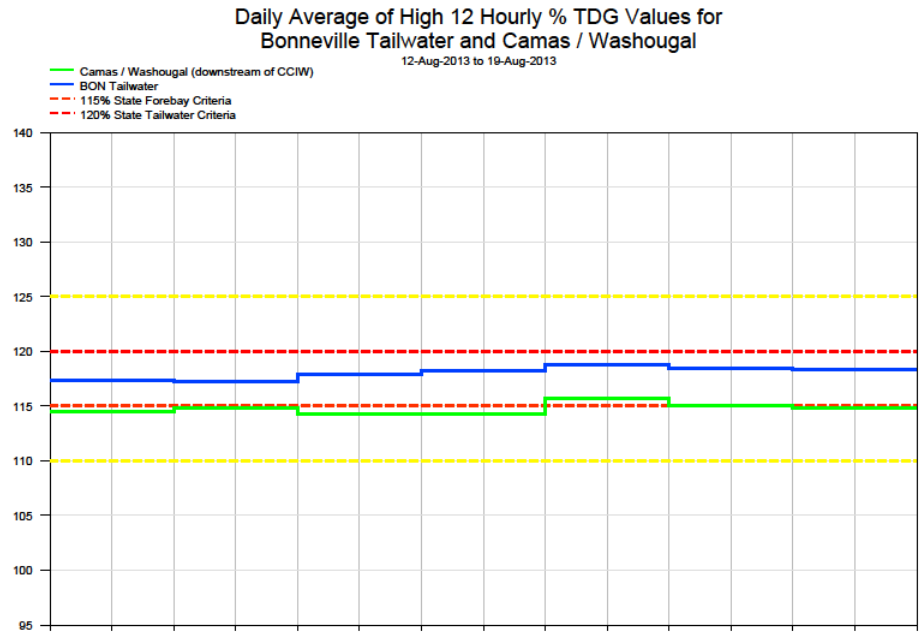

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/12/13 01:00
08/12/13 13:00
08/13/13 01:00
08/13/13 13:00
08/14/13 01:00
08/14/13 13:00
08/15/13 01:00
08/15/13 13:00
08/16/13 01:00
08/16/13 13:00
08/17/13 01:00
08/17/13 13:00
08/18/13 01:00
08/18/13 13:00
08/19/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 24


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
12-Aug-2013 to 19-Aug-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

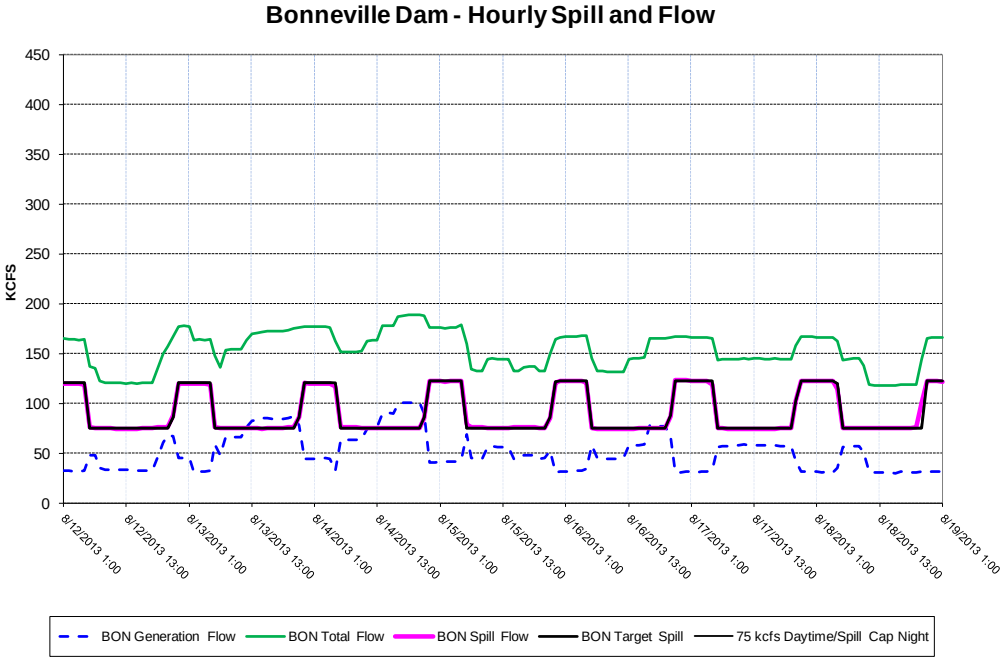
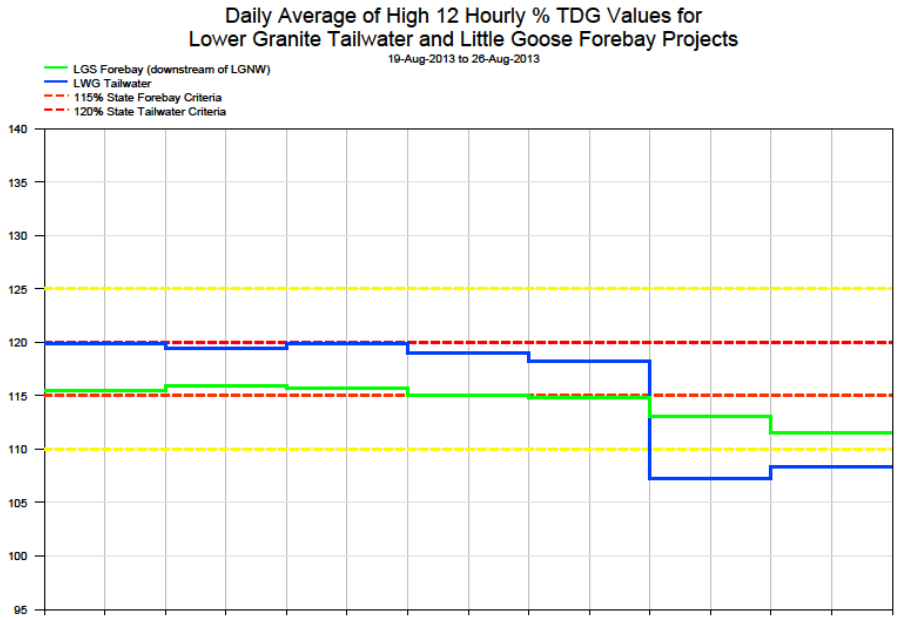

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
8/12/2013 1:00
8/12/2013 13:00
8/13/2013 1:00
8/13/2013 13:00
8/14/2013 1:00
8/14/2013 13:00
8/15/2013 1:00
8/15/2013 13:00
8/16/2013 1:00
8/16/2013 13:00
8/17/2013 1:00
8/17/2013 13:00
8/18/2013 1:00
8/18/2013 13:00
8/19/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75 kcfs Daytime/Spill Cap Night

Figure 25


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
19-Aug-2013 to 26-Aug-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

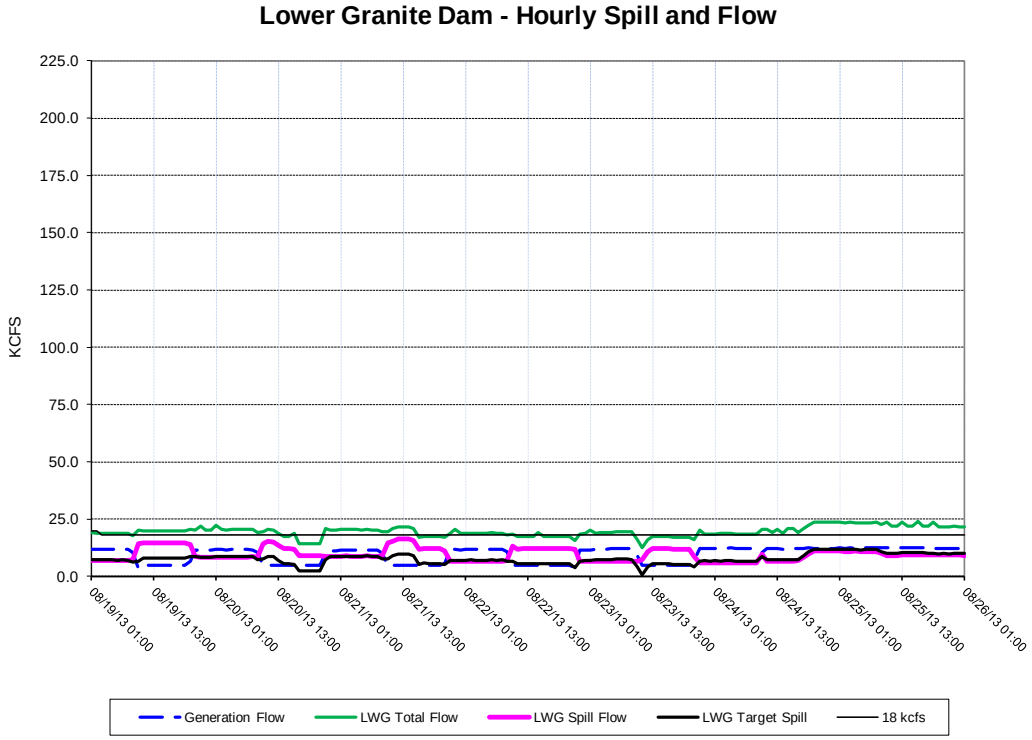
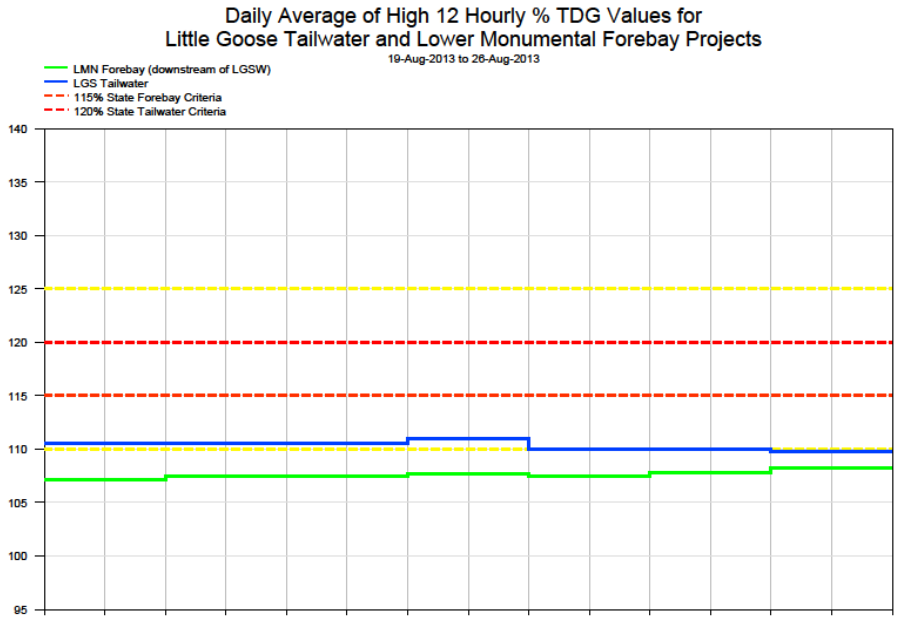

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/19/13 01:00
08/19/13 13:00
08/20/13 01:00
08/20/13 13:00
08/21/13 01:00
08/21/13 13:00
08/22/13 01:00
08/22/13 13:00
08/23/13 01:00
08/23/13 13:00
08/24/13 01:00
08/24/13 13:00
08/25/13 01:00
08/25/13 13:00
08/26/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 26


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
19-Aug-2013 to 26-Aug-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

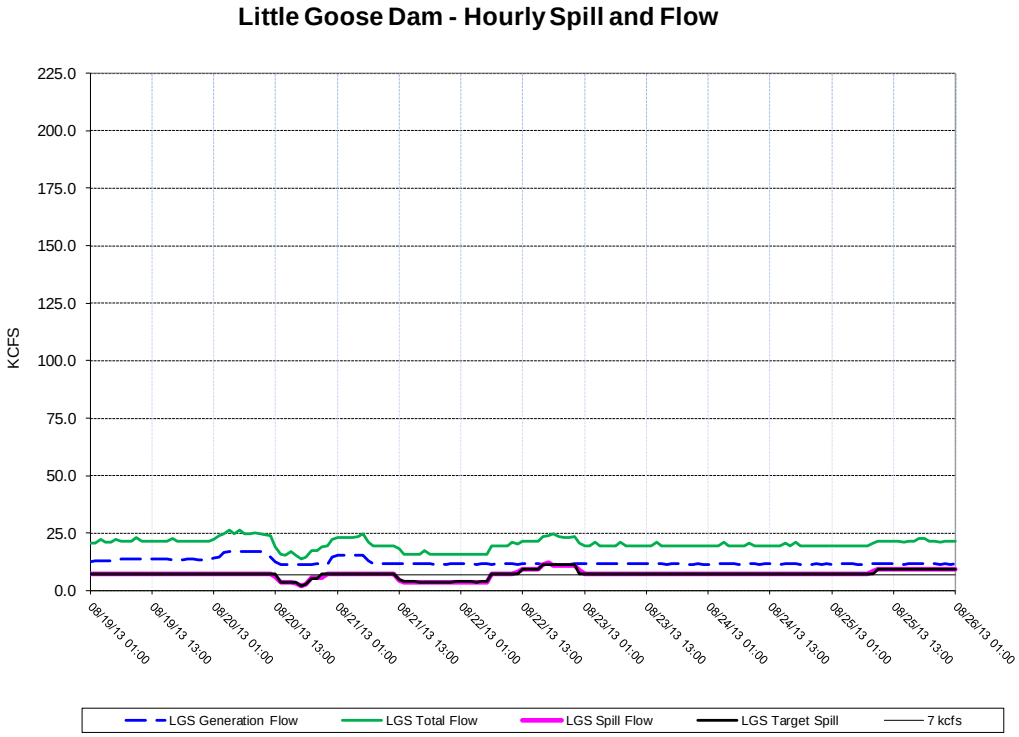
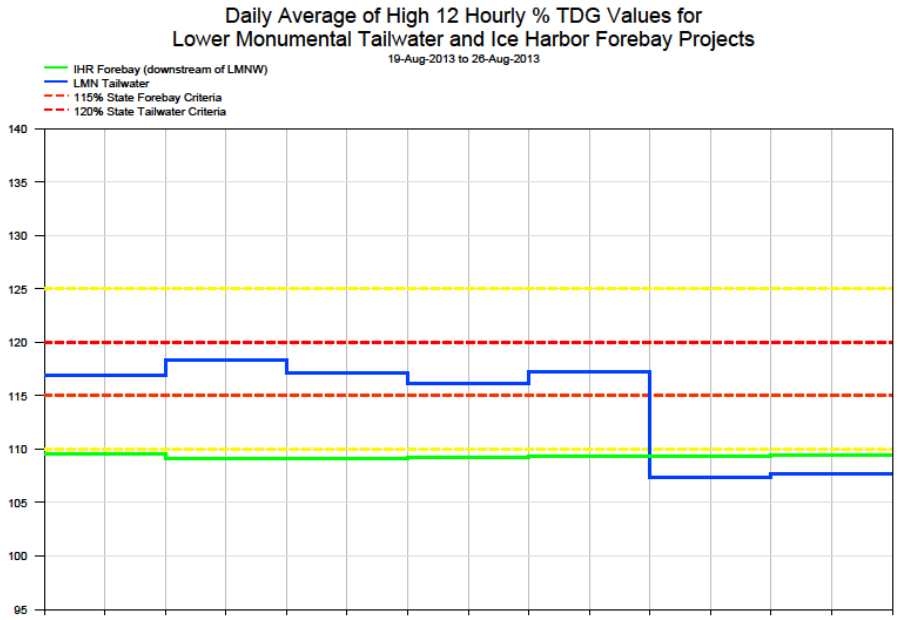

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/19/13 01:00
08/19/13 13:00
08/20/13 01:00
08/20/13 13:00
08/21/13 01:00
08/21/13 13:00
08/22/13 01:00
08/22/13 13:00
08/23/13 01:00
08/23/13 13:00
08/24/13 01:00
08/24/13 13:00
08/25/13 01:00
08/25/13 13:00
08/26/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
7 kcfs

Figure 27


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
19-Aug-2013 to 26-Aug-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

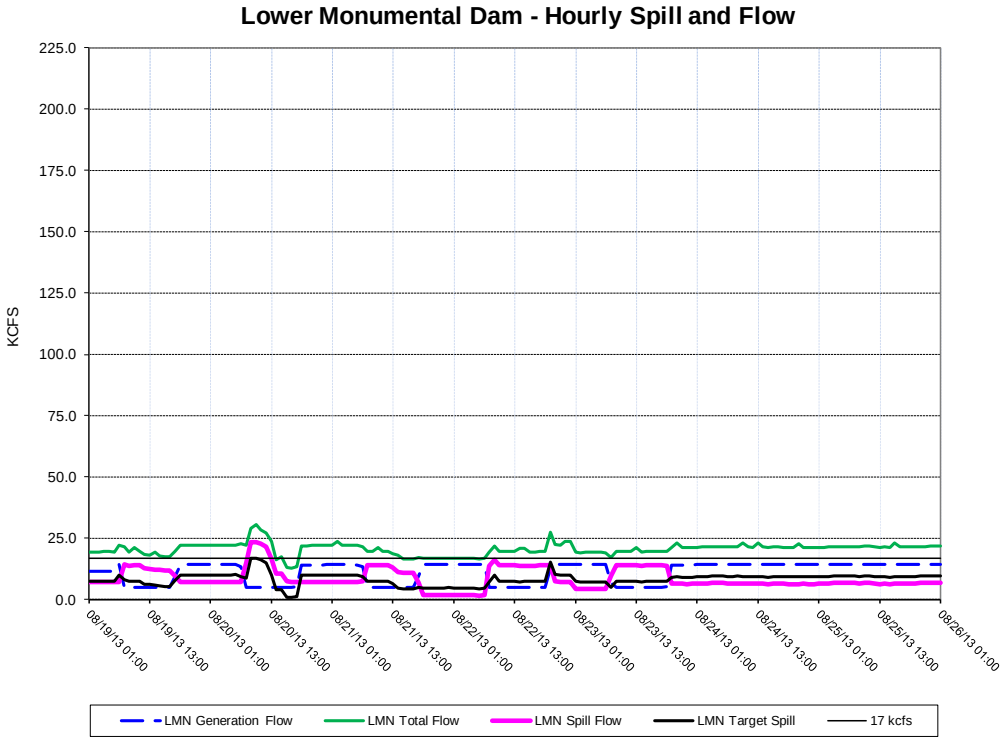
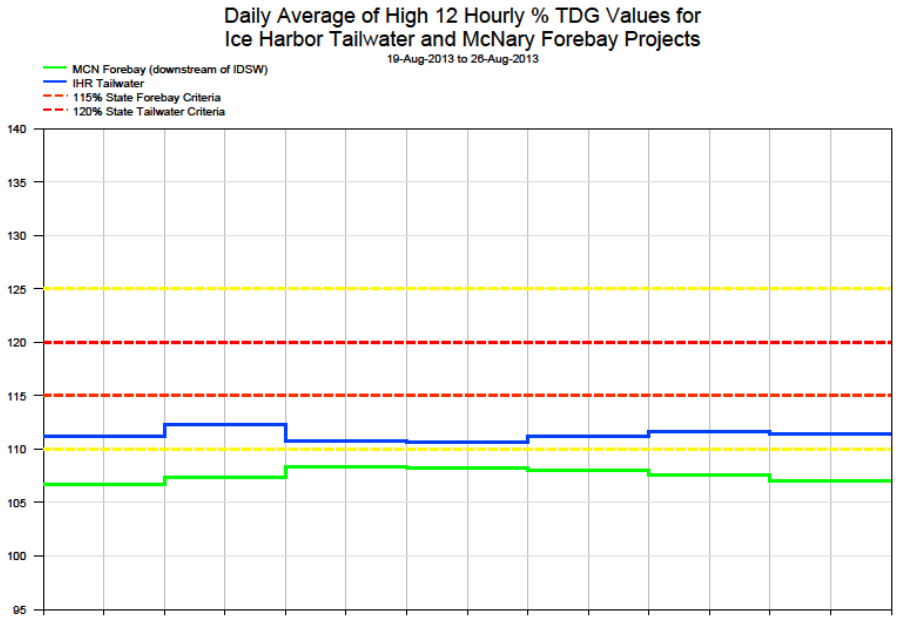

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/19/13 01:00
08/19/13 13:00
08/20/13 01:00
08/20/13 13:00
08/21/13 01:00
08/21/13 13:00
08/22/13 01:00
08/22/13 13:00
08/23/13 01:00
08/23/13 13:00
08/24/13 01:00
08/24/13 13:00
08/25/13 01:00
08/25/13 13:00
08/26/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 28


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
19-Aug-2013 to 26-Aug-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

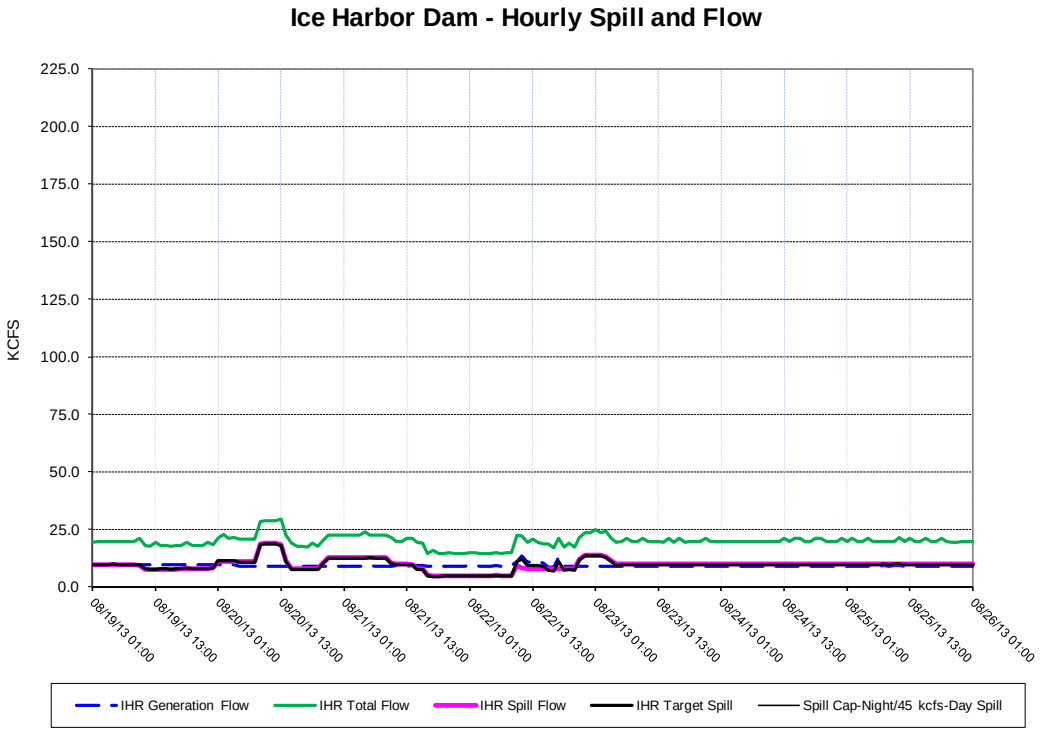
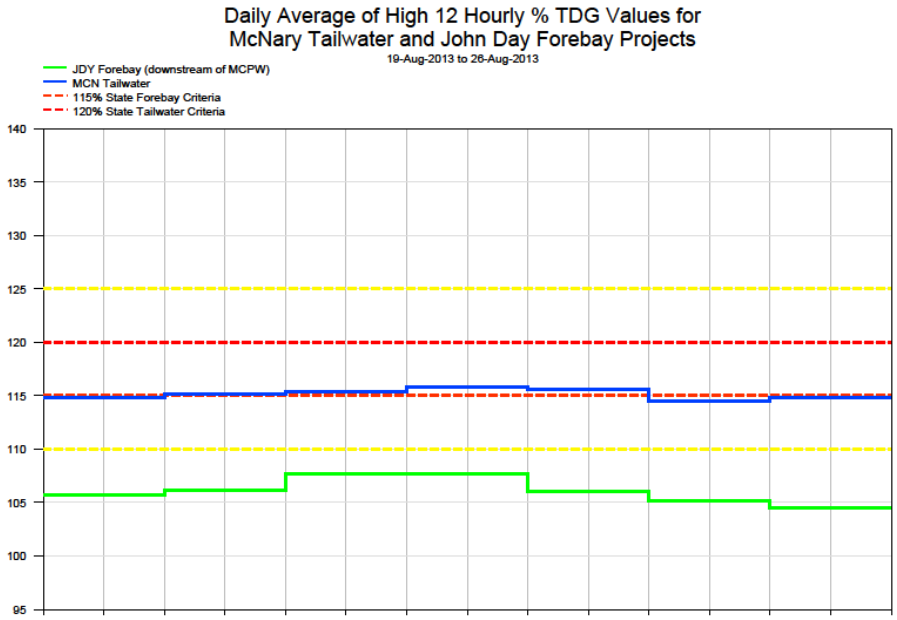

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/19/13 01:00
08/19/13 13:00
08/20/13 01:00
08/20/13 13:00
08/21/13 01:00
08/21/13 13:00
08/22/13 01:00
08/22/13 13:00
08/23/13 01:00
08/23/13 13:00
08/24/13 01:00
08/24/13 13:00
08/25/13 01:00
08/25/13 13:00
08/26/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 29


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
19-Aug-2013 to 26-Aug-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

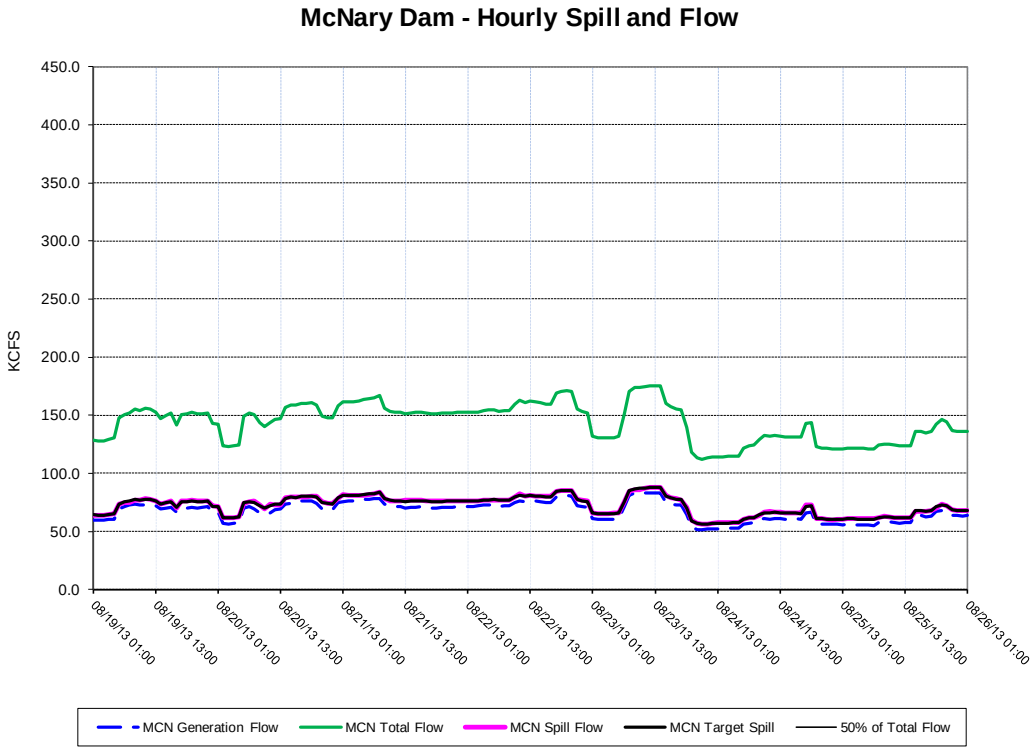
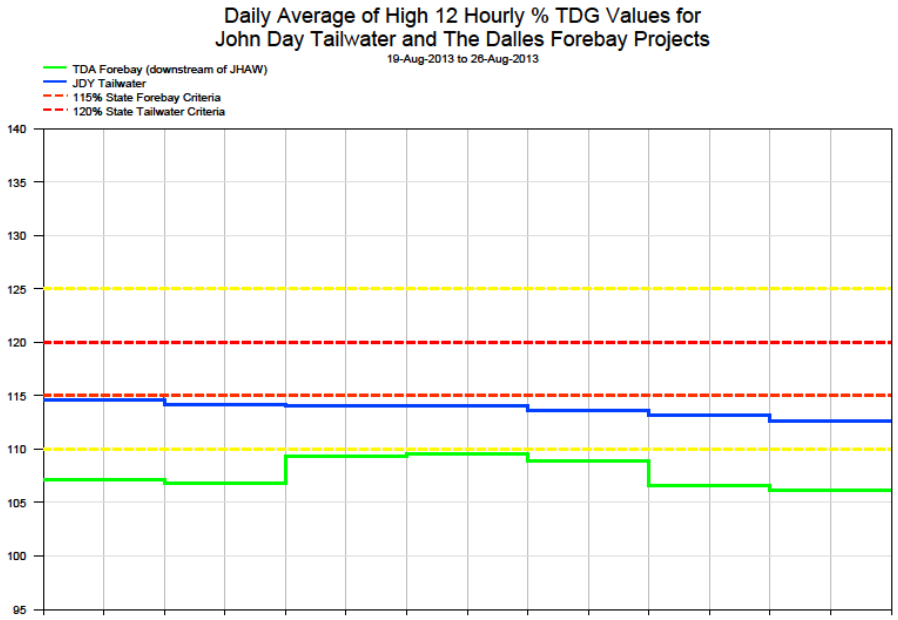

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/19/13 01:00
08/19/13 13:00
08/20/13 01:00
08/20/13 13:00
08/21/13 01:00
08/21/13 13:00
08/22/13 01:00
08/22/13 13:00
08/23/13 01:00
08/23/13 13:00
08/24/13 01:00
08/24/13 13:00
08/25/13 01:00
08/25/13 13:00
08/26/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 30


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
19-Aug-2013 to 26-Aug-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

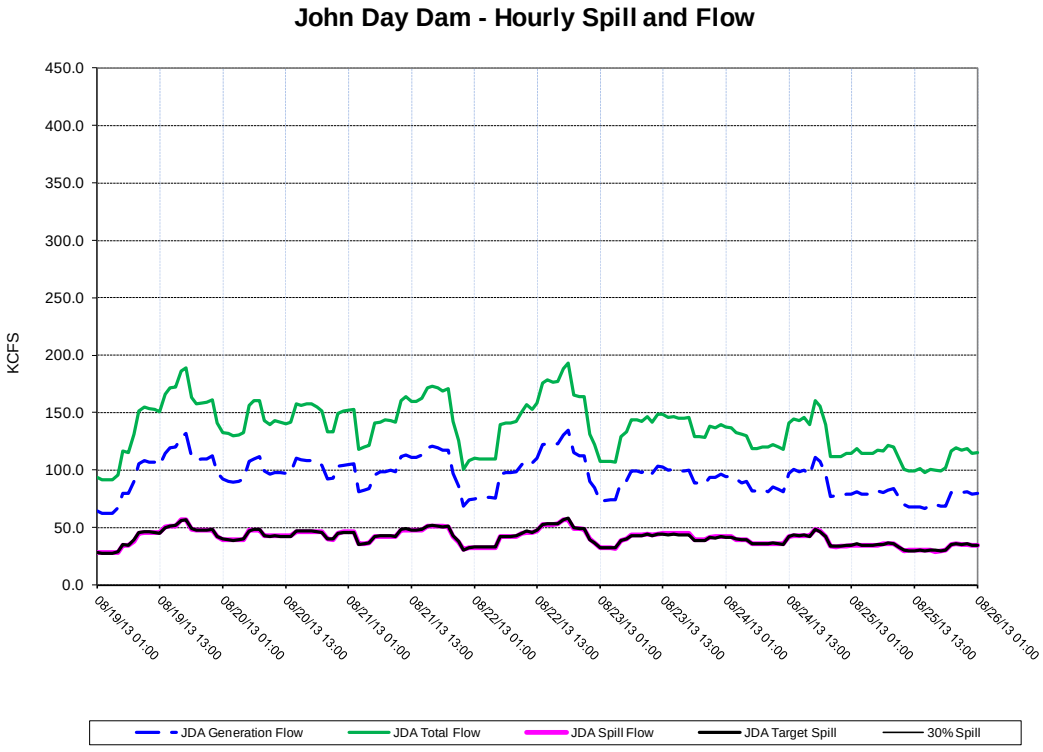
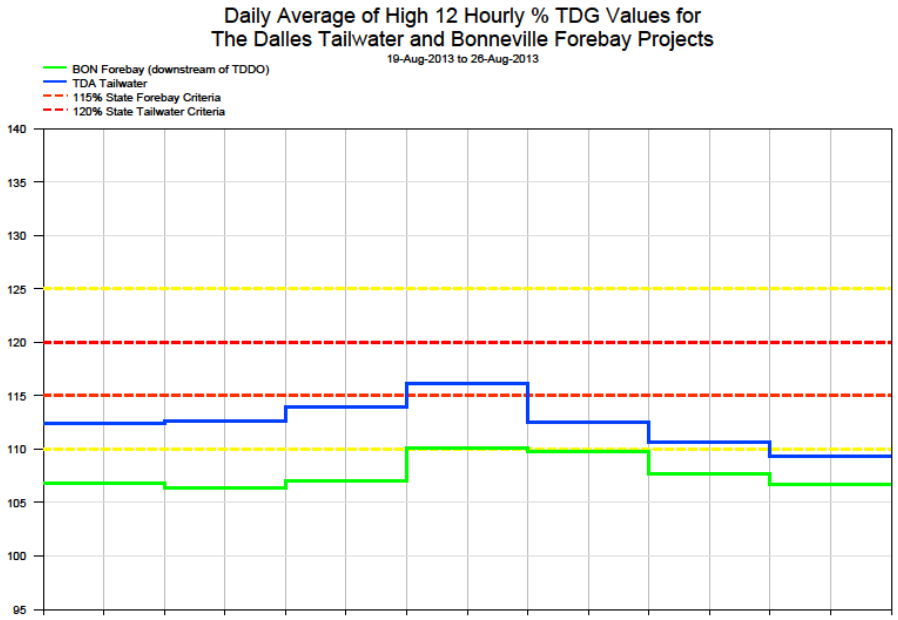

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/19/13 01:00
08/19/13 13:00
08/20/13 01:00
08/20/13 13:00
08/21/13 01:00
08/21/13 13:00
08/22/13 01:00
08/22/13 13:00
08/23/13 01:00
08/23/13 13:00
08/24/13 01:00
08/24/13 13:00
08/25/13 01:00
08/25/13 13:00
08/26/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 31


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
19-Aug-2013 to 26-Aug-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

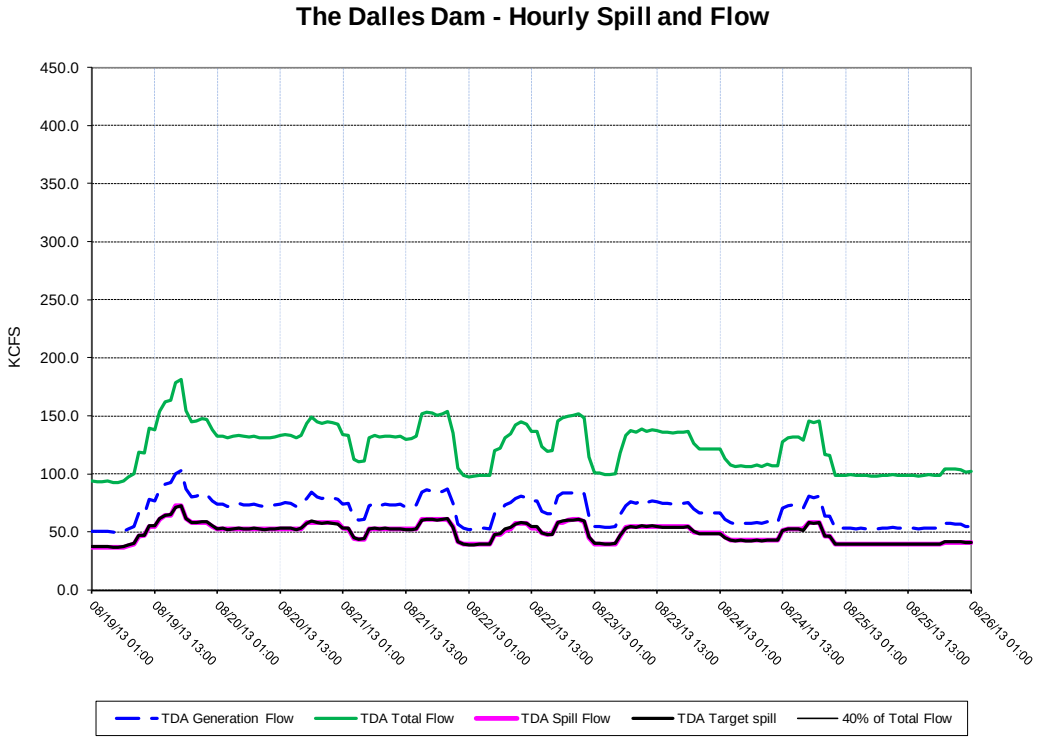
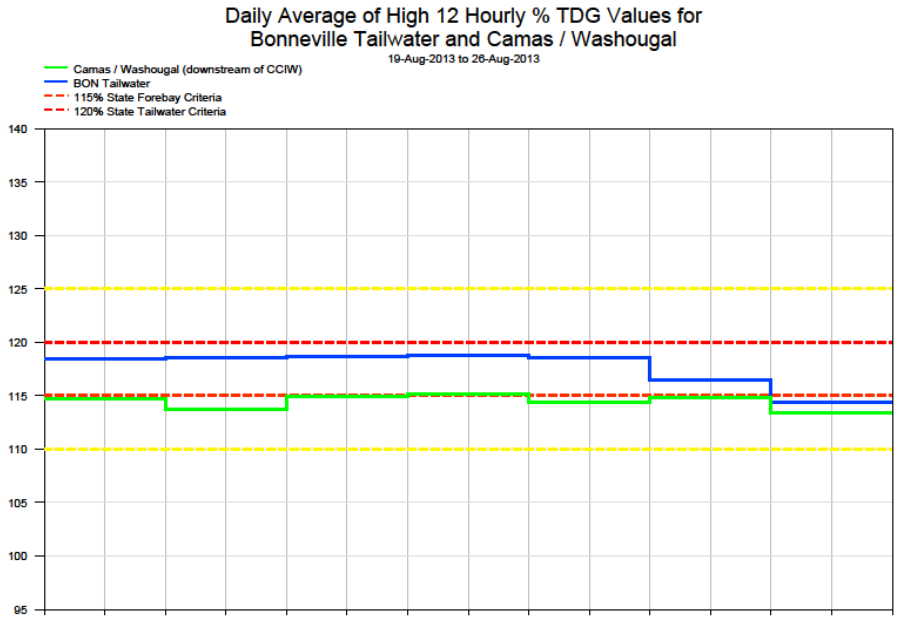

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/19/13 01:00
08/19/13 13:00
08/20/13 01:00
08/20/13 13:00
08/21/13 01:00
08/21/13 13:00
08/22/13 01:00
08/22/13 13:00
08/23/13 01:00
08/23/13 13:00
08/24/13 01:00
08/24/13 13:00
08/25/13 01:00
08/25/13 13:00
08/26/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 32


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
19-Aug-2013 to 26-Aug-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

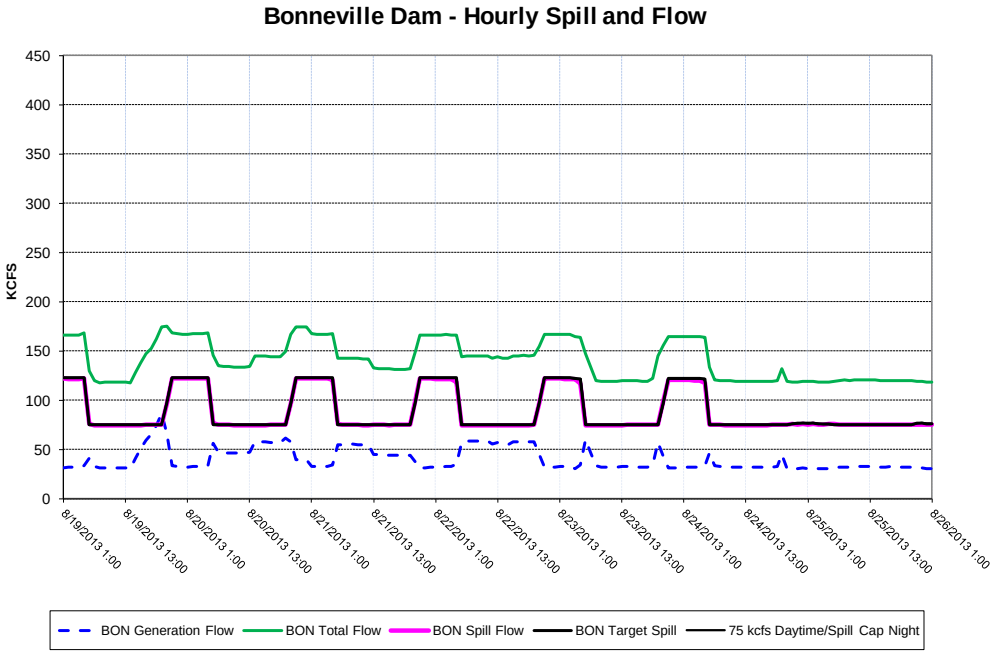
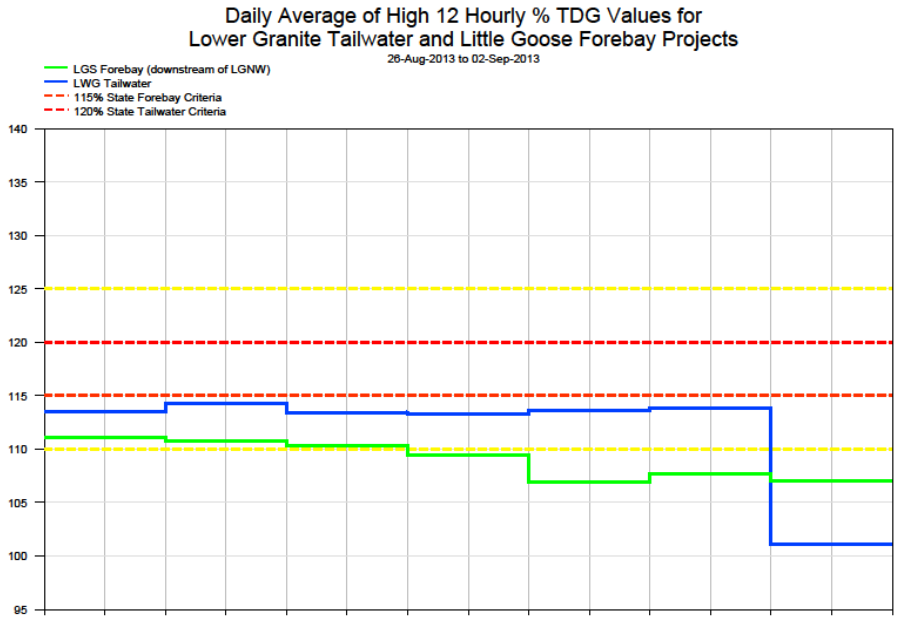

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
8/19/2013 1:00
8/19/2013 13:00
8/20/2013 1:00
8/20/2013 13:00
8/21/2013 1:00
8/21/2013 13:00
8/22/2013 1:00
8/22/2013 13:00
8/23/2013 1:00
8/23/2013 13:00
8/24/2013 1:00
8/24/2013 13:00
8/25/2013 1:00
8/25/2013 13:00
8/26/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75 kcfs Daytime/Spill Cap Night

Figure 33


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
26-Aug-2013 to 02-Sep-2013
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

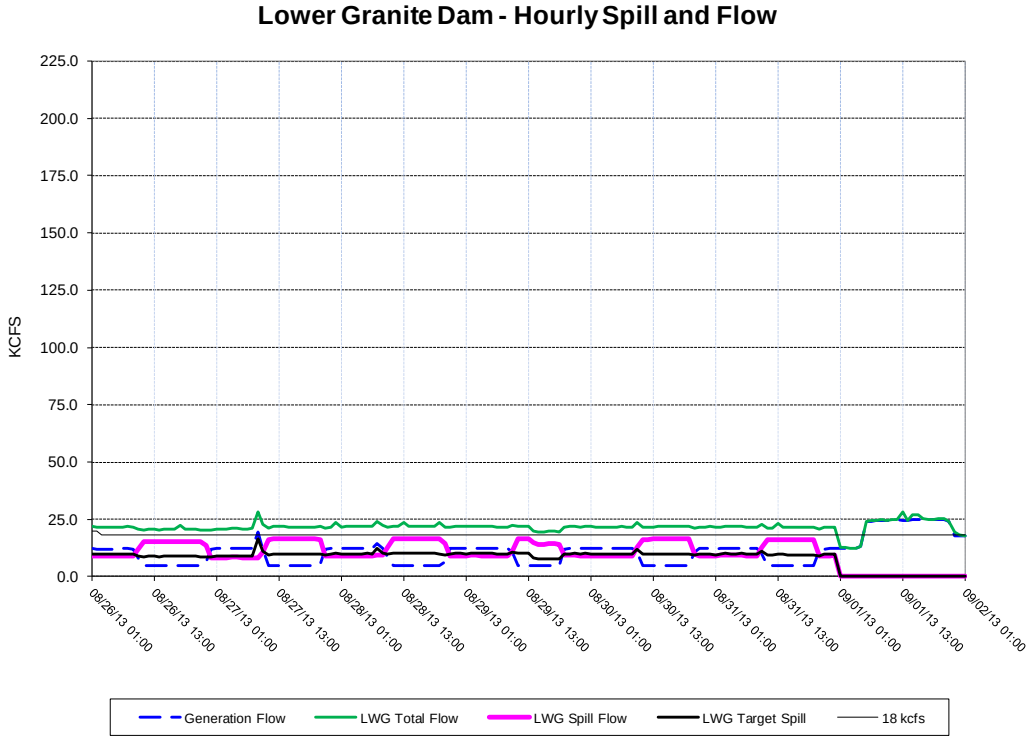
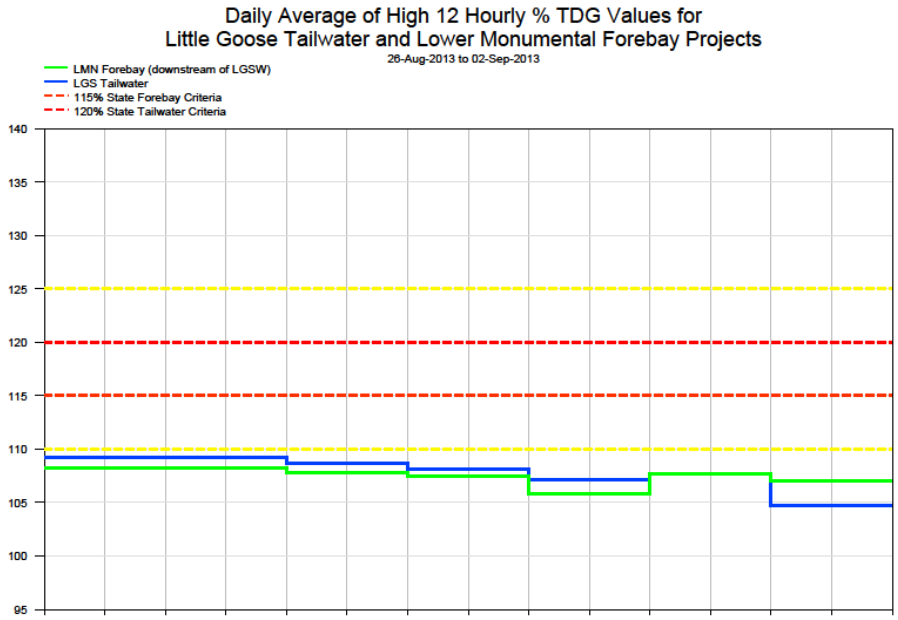

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/26/13 01:00
08/26/13 13:00
08/27/13 01:00
08/27/13 13:00
08/28/13 01:00
08/28/13 13:00
08/29/13 01:00
08/29/13 13:00
08/30/13 01:00
08/30/13 13:00
08/31/13 01:00
08/31/13 13:00
09/01/13 01:00
09/01/13 13:00
09/02/13 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 34


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
26-Aug-2013 to 02-Sep-2013
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

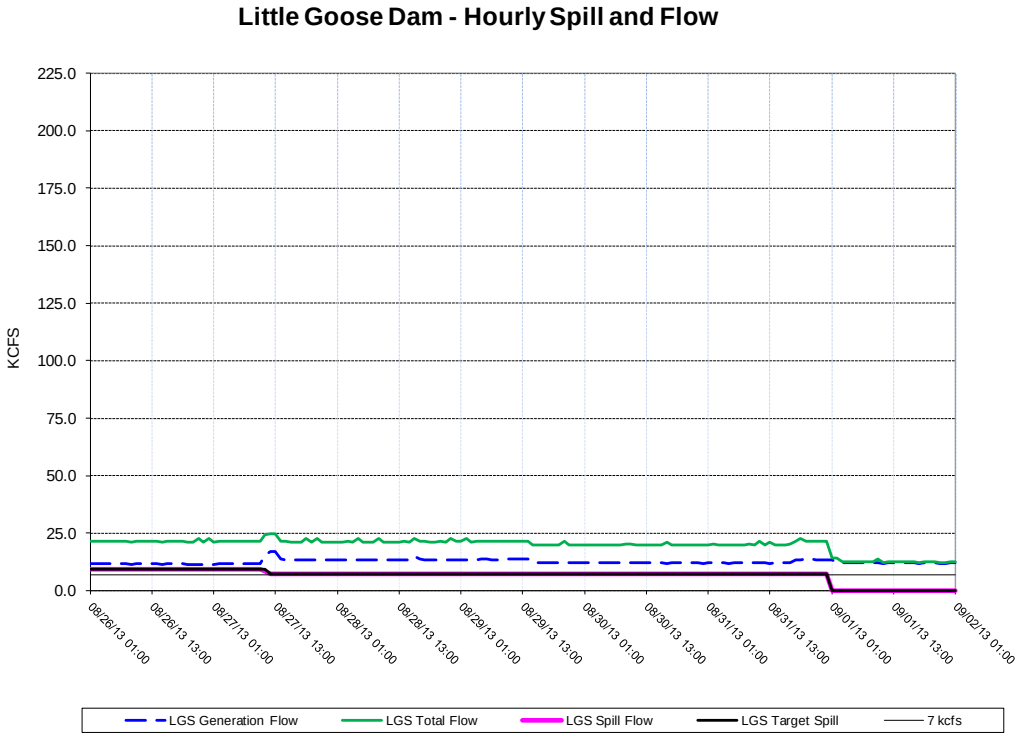
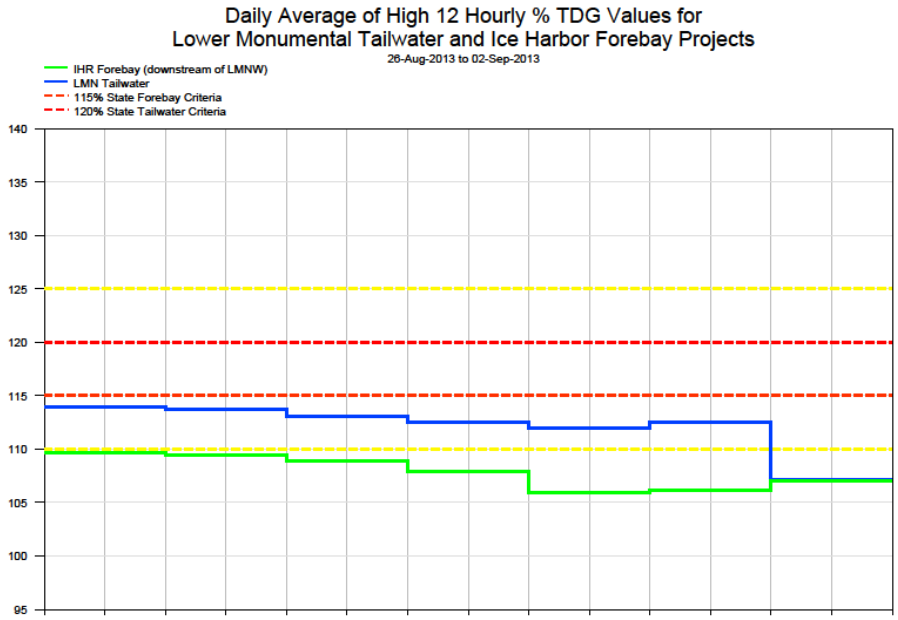

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/26/13 01:00
08/26/13 13:00
08/27/13 01:00
08/27/13 13:00
08/28/13 01:00
08/28/13 13:00
08/29/13 01:00
08/29/13 13:00
08/30/13 01:00
08/30/13 13:00
08/31/13 01:00
08/31/13 13:00
09/01/13 01:00
09/01/13 13:00
09/02/13 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
7 kcfs

Figure 35


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
26-Aug-2013 to 02-Sep-2013
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

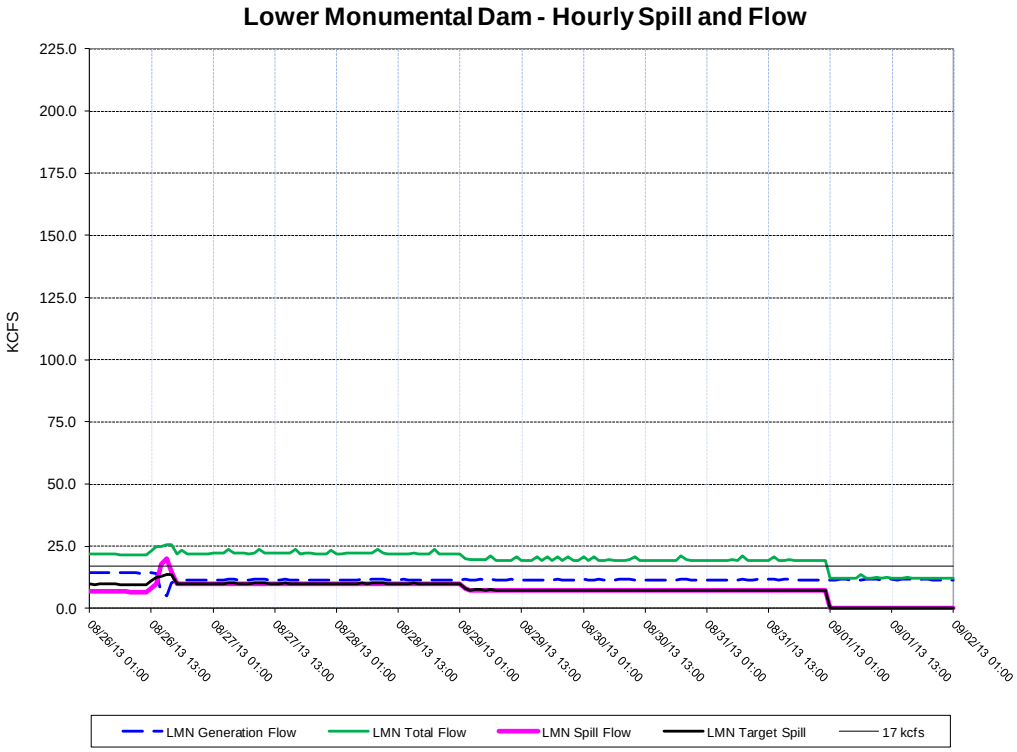
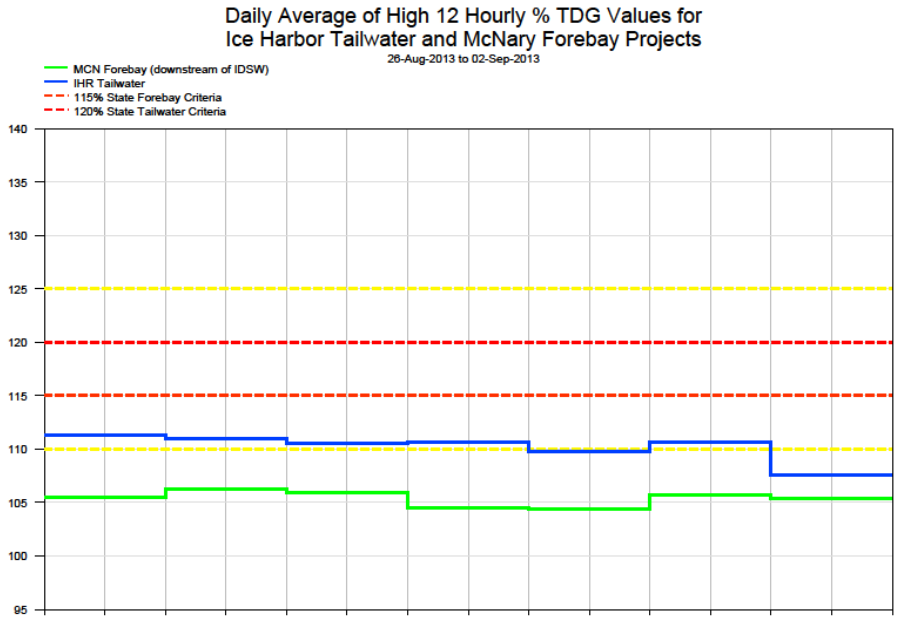

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/26/13 01:00
08/26/13 13:00
08/27/13 01:00
08/27/13 13:00
08/28/13 01:00
08/28/13 13:00
08/29/13 01:00
08/29/13 13:00
08/30/13 01:00
08/30/13 13:00
08/31/13 01:00
08/31/13 13:00
09/01/13 01:00
09/01/13 13:00
09/02/13 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 36


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
26-Aug-2013 to 02-Sep-2013
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

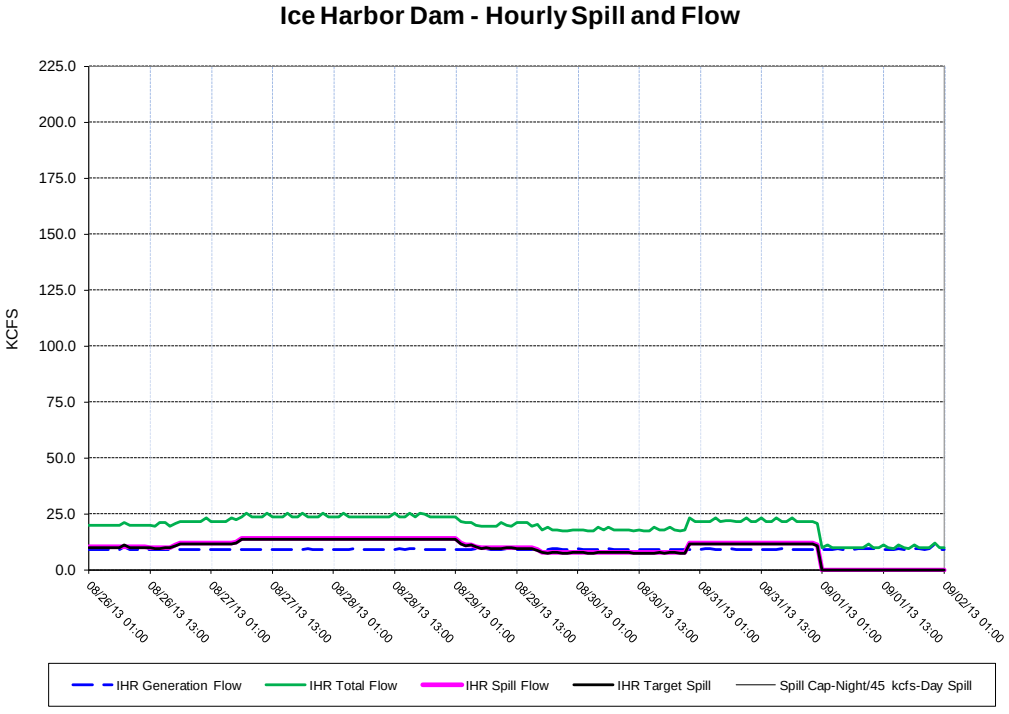
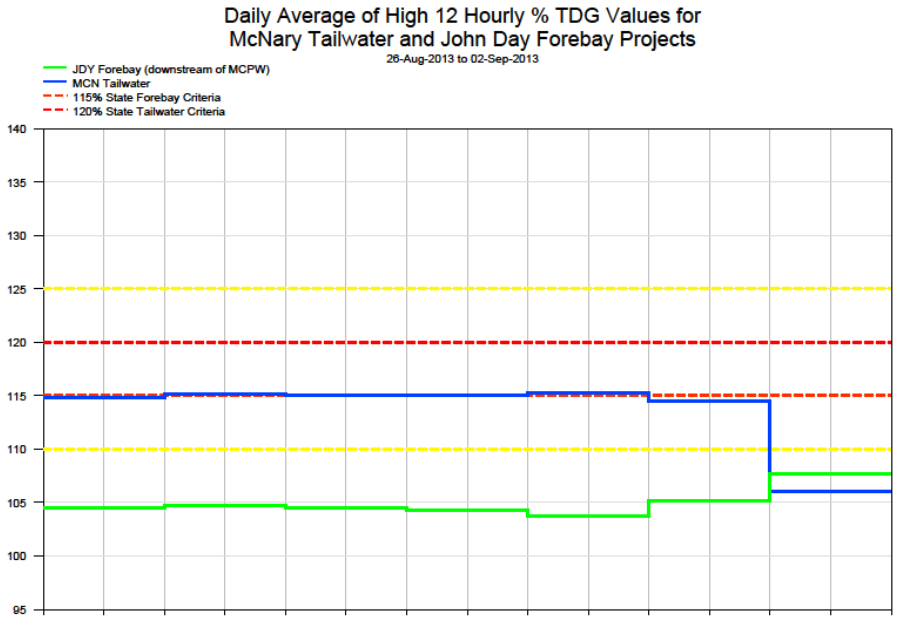

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/26/13 01:00
08/26/13 13:00
08/27/13 01:00
08/27/13 13:00
08/28/13 01:00
08/28/13 13:00
08/29/13 01:00
08/29/13 13:00
08/30/13 01:00
08/30/13 13:00
08/31/13 01:00
08/31/13 13:00
09/01/13 01:00
09/01/13 13:00
09/02/13 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 37


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
26-Aug-2013 to 02-Sep-2013
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

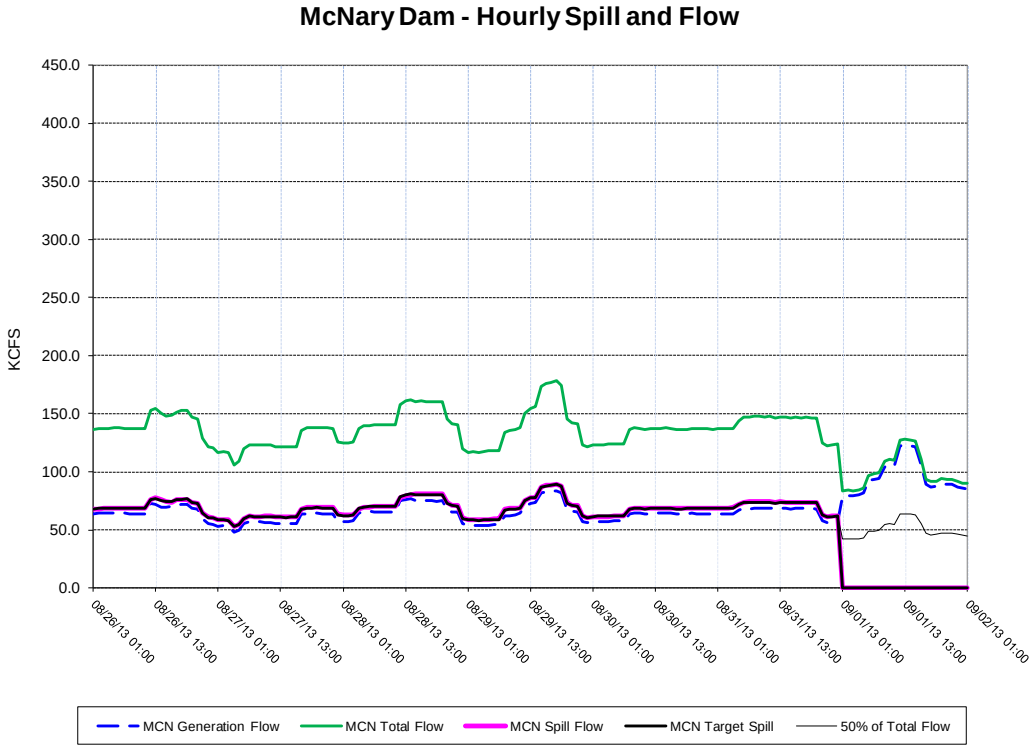
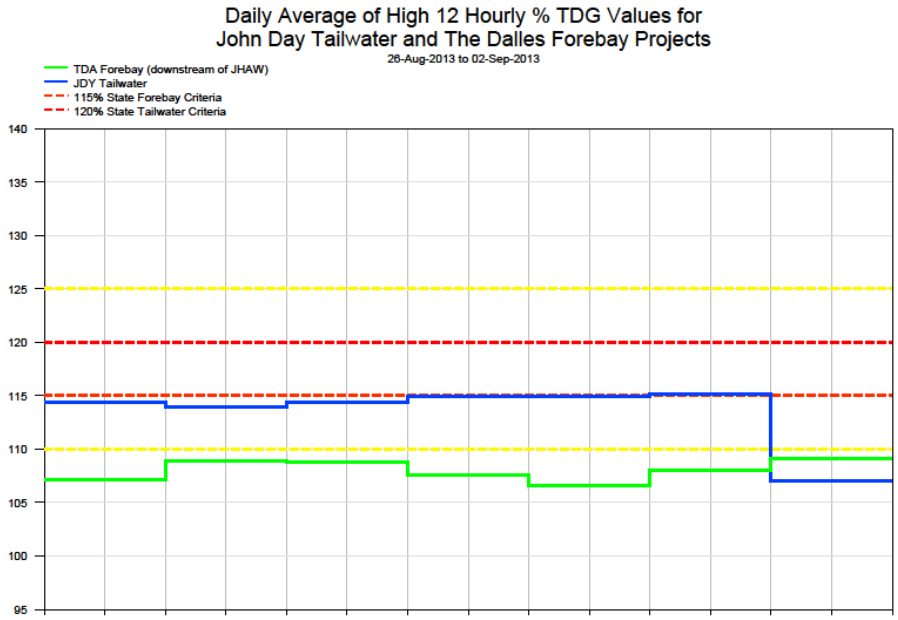

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/26/13 01:00
08/26/13 13:00
08/27/13 01:00
08/27/13 13:00
08/28/13 01:00
08/28/13 13:00
08/29/13 01:00
08/29/13 13:00
08/30/13 01:00
08/30/13 13:00
08/31/13 01:00
08/31/13 13:00
09/01/13 01:00
09/01/13 13:00
09/02/13 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 38


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
26-Aug-2013 to 02-Sep-2013
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

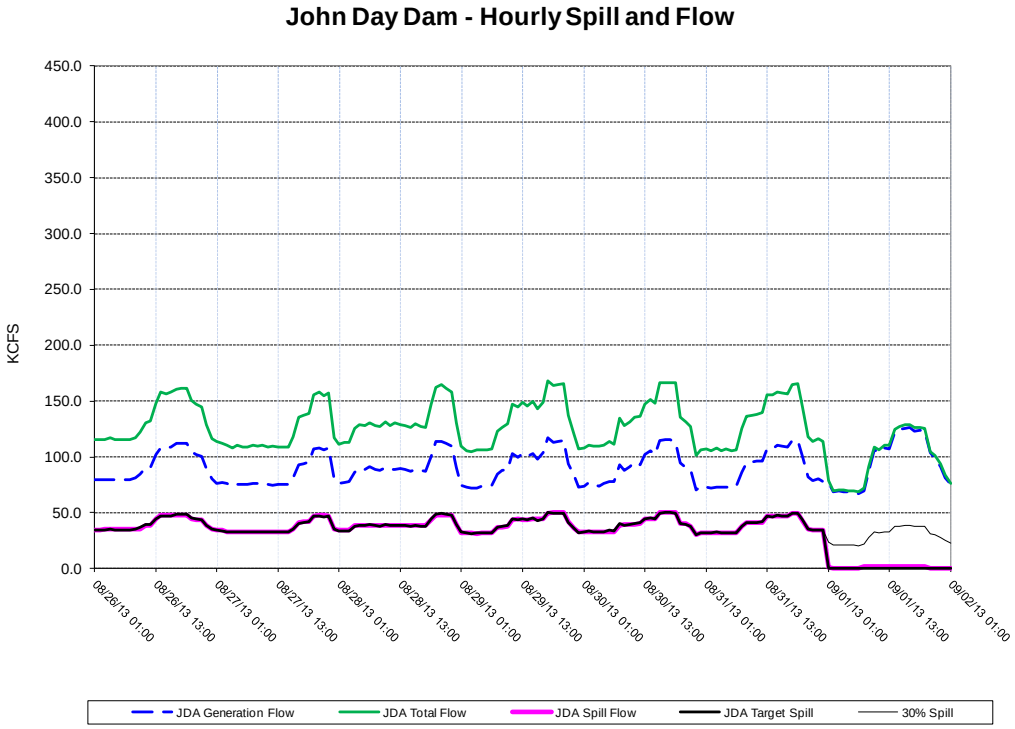
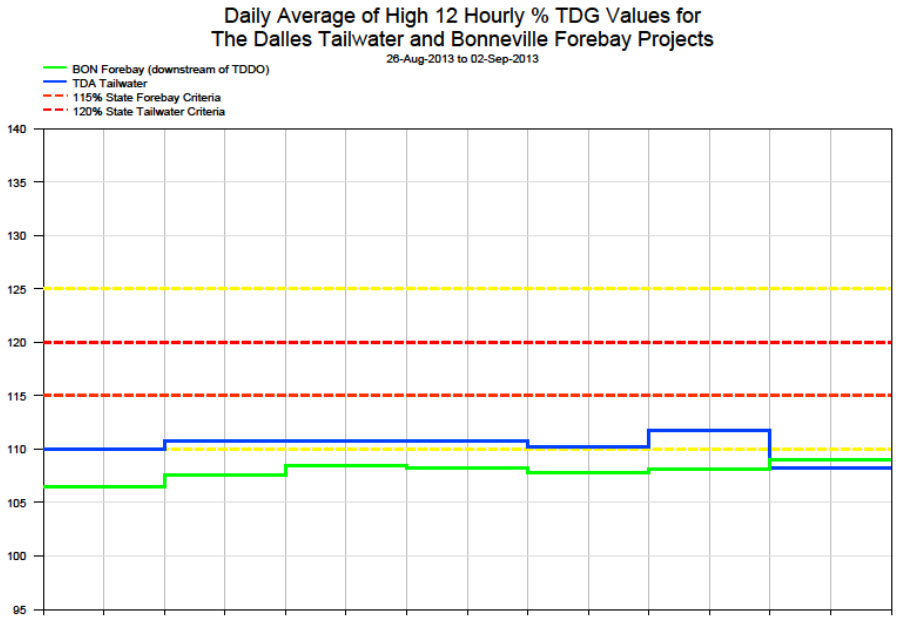

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/26/13 01:00
08/26/13 13:00
08/27/13 01:00
08/27/13 13:00
08/28/13 01:00
08/28/13 13:00
08/29/13 01:00
08/29/13 13:00
08/30/13 01:00
08/30/13 13:00
08/31/13 01:00
08/31/13 13:00
09/01/13 01:00
09/01/13 13:00
09/02/13 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 39


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
26-Aug-2013 to 02-Sep-2013
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

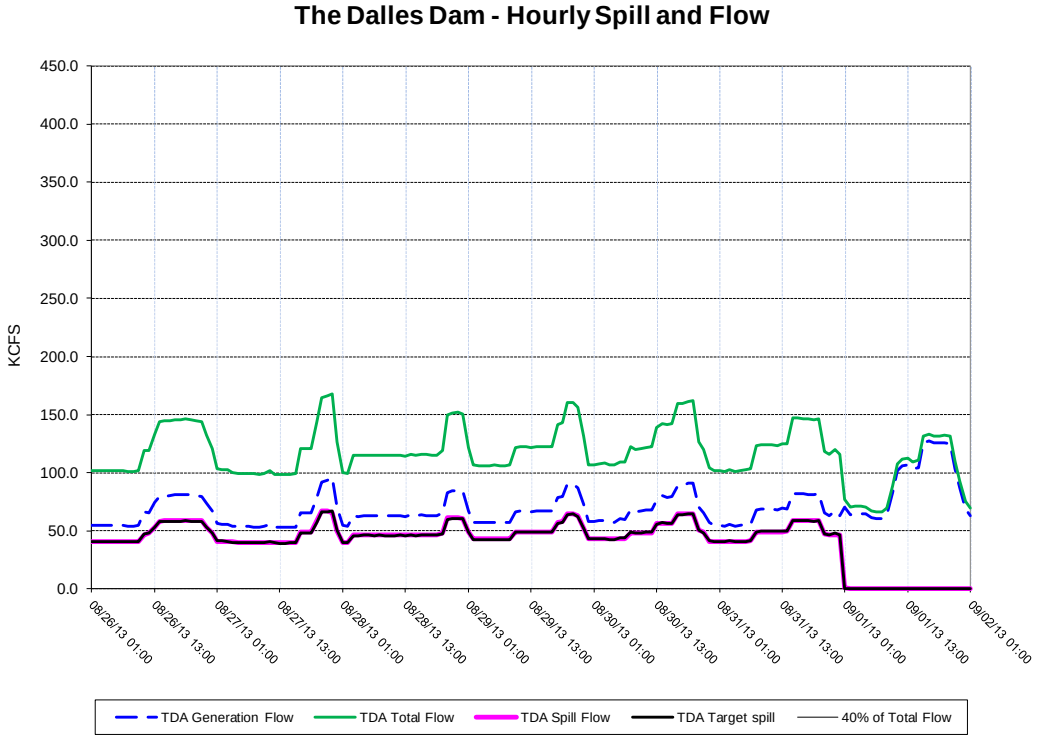
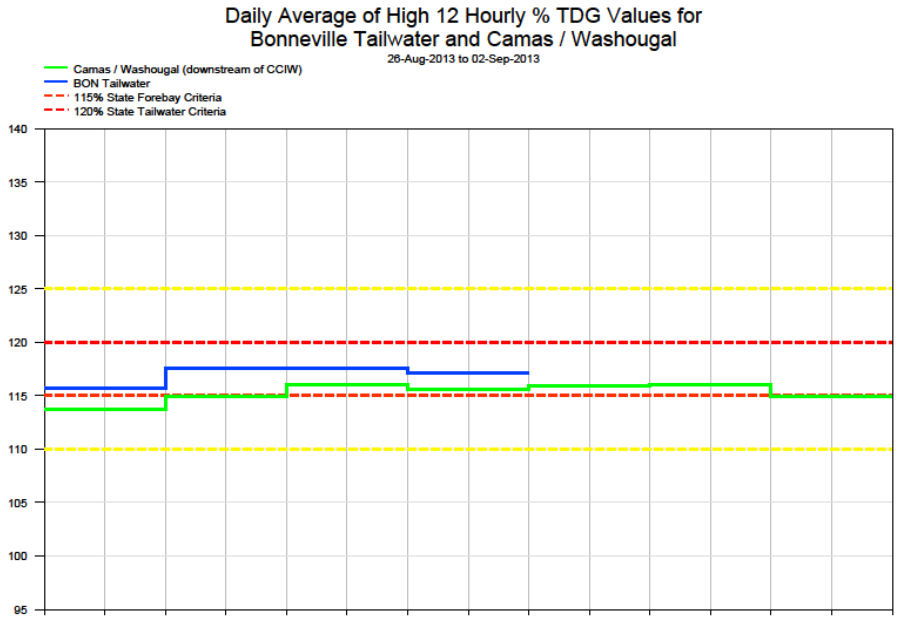

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/26/13 01:00
08/26/13 13:00
08/27/13 01:00
08/27/13 13:00
08/28/13 01:00
08/28/13 13:00
08/29/13 01:00
08/29/13 13:00
08/30/13 01:00
08/30/13 13:00
08/31/13 01:00
08/31/13 13:00
09/01/13 01:00
09/01/13 13:00
09/02/13 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 40


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
26-Aug-2013 to 02-Sep-2013
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

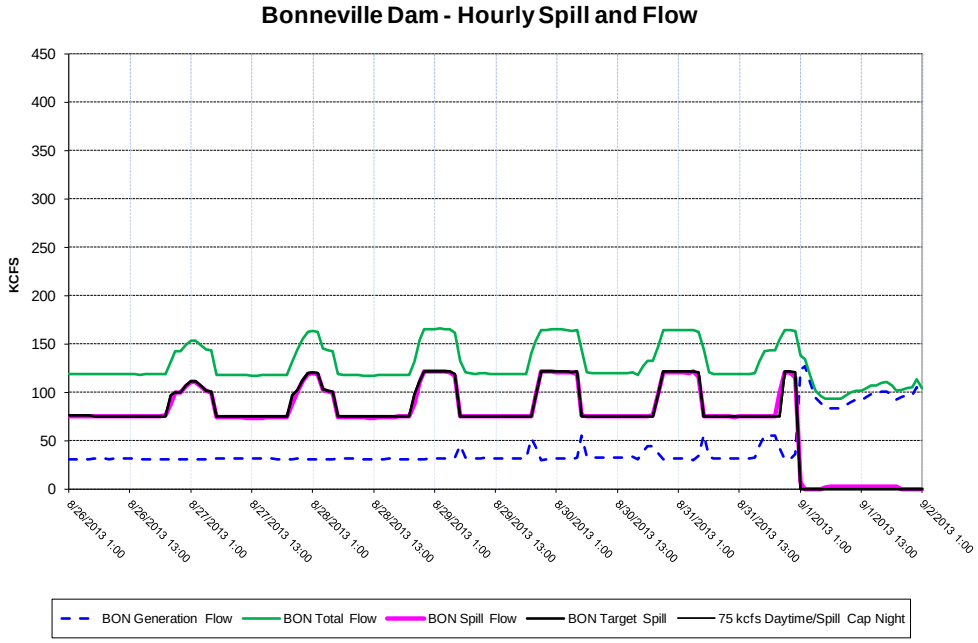

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
8/26/2013 1:00
8/26/2013 13:00
8/27/2013 1:00
8/27/2013 13:00
8/28/2013 1:00
8/28/2013 13:00
8/29/2013 1:00
8/29/2013 13:00
8/30/2013 1:00
8/30/2013 13:00
8/31/2013 1:00
8/31/2013 13:00
9/1/2013 1:00
9/1/2013 13:00
9/2/2013 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75 kcfs Daytime/Spill Cap Night

Figure 41

Table 1

Average Percent TDG for Highest 12-Hours: July 29 – August 31, 2013

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115
7/29/2013	102.2	112.7	112.2	113.5	111.1	115.7	112.1	113.6	109.5	116.6	106.8	114.3	105.9	113.2	104.7	117.1	113.8
7/30/2013	102.1	117.8	110.5	113.3	110.2	114.3	111.9	111.2	108.2	116.4	105.8	113.8	106.9	113.9	105	116.9	112.9
7/31/2013	102.2	115.9	111	113.2	110	114	111.4	110.8	107.5	116.4	106.1	113.6	107.6	114.6	106.6	117.2	111.9
8/1/2013	101.9	111.9	111.1	112.6	109.9	114	110.6	111.8	107.4	116.4	105.6	113.7	107.9	114	105.9	117.7	110.4
8/2/2013	101.5	112	110	108.9	109.6	113.6	109.5	110.6	106.6	116.2	104.4	113.2	105.2	112.6	105.1	118.1	111.3
8/3/2013	101.5	115	108.5	109.1	107.8	115.8	108.7	113.5	106.4	116.3	104.6	113.6	106.5	114	106.3	118.5	113.5
8/4/2013	101.6	112.7	108	109.4	108.4	114.3	108.5	110.9	108.1	116.3	105.6	114	108.7	115.4	109.8	118.5	114.7
8/5/2013	101.3	115.9	109.5	109.6	108.3	115.2	108.4	111.7	108.2	116.5	106	113.5	108.9	115	111.5	118.7	**115.6**
8/6/2013	100.7	119.2	108.8	109.1	108.1	116.1	108.9	112.5	110.2	117	106.2	113.3	108.5	114.9	110.1	118.3	**115.1**
8/7/2013	100.6	118.2	108.6	109.3	107.9	113.3	109.4	110.5	110.7	116.7	106.3	113.5	108.3	114.4	109.1	117.8	113.8
8/8/2013	101.2	118.3	108.8	109.3	107.3	114.7	110.4	111.3	110.6	115.8	107.5	113.2	106.8	113.8	107	117.5	112.8
8/9/2013	101.4	118.4	109.8	109.5	107.5	113.3	110.9	113.1	110.6	116.5	108.4	113.4	108.7	115.5	106.8	117.4	113.3
8/10/2013	101.3	119.3	109.6	109.5	106.8	113.1	111.1	110.8	109.1	115.3	108.2	113.4	109.1	114.7	107.5	117.5	113.8
8/11/2013	101.1	**120.9**	110.8	109.3	105.7	112.3	111.2	111.2	108.2	114.4	107.5	112.8	108	112.9	107.4	117.3	113.6
8/12/2013	101.1	**121.2**	110.7	109.8	106.1	113.2	110.5	111	107.8	116.3	107.4	114.6	108	114.5	107.3	117.4	114.5
8/13/2013	101	**120.5**	110	109.4	106.3	114.2	110.6	113.7	107.8	116.4	107.3	114.2	108.5	115.2	107.8	117.4	114.8
8/14/2013	101.4	**120.1**	111.8	109.7	106.6	112.9	110.4	111.9	108.4	116.3	107.4	114.1	109.4	115.2	109.6	117.8	114.3
8/15/2013	101	**120.3**	112.1	109.7	106.4	113.2	109.9	111	109	116.3	106.2	113.7	108.5	114.2	109.9	118.4	114.3
8/16/2013	100.7	**120.2**	111.4	109.5	107.2	113.3	109.5	110.9	109.4	116.7	105.5	113.9	108	114.6	109.5	118.9	**115.7**
8/17/2013	100.3	119.3	111.5	109.6	107.1	113.5	109.5	111.1	108.7	116.1	105.3	114.2	108.1	113.8	108.5	118.6	115
8/18/2013	99.9	112.3	114.9	109.8	107	113.5	109.7	111.3	107	114.6	105.5	114.3	107.5	112.8	107.7	118.5	114.8
8/19/2013	100.3	119.8	**115.5**	110.5	107.1	116.9	109.5	111.2	106.7	114.8	105.7	114.6	107.1	112.4	106.8	118.6	114.7
8/20/2013	100.4	119.4	**116**	110.5	107.4	118.3	109.1	112.3	107.3	115.1	106.1	114.1	106.8	112.6	106.3	118.7	113.7
8/21/2013	100.1	119.8	**115.7**	110.5	107.4	117.1	109.1	110.7	108.4	115.4	107.7	114.1	109.3	114	107.1	118.8	114.9
8/22/2013	100.2	119	115	111	107.7	116.2	109.2	110.7	108.2	115.8	107.7	114.1	109.6	116.1	110.1	118.9	**115.2**
8/23/2013	100.9	118.2	114.8	110	107.5	117.2	109.3	111.2	108	115.6	106	113.6	108.9	112.5	109.8	118.6	114.4
8/24/2013	100.9	107.2	113	110	107.8	107.4	109.3	111.6	107.6	114.5	105.1	113.1	106.5	110.6	107.7	116.6	114.8
8/25/2013	100.5	108.3	111.5	109.7	108.3	107.7	109.4	111.4	107.1	114.8	104.5	112.7	106.1	109.3	106.7	114.5	113.4
8/26/2013	99.8	113.5	111	109.2	108.3	113.9	109.7	111.3	105.5	114.8	104.5	114.4	107.1	110	106.5	115.8	113.7
8/27/2013	100.3	114.2	110.7	109.3	108.2	113.7	109.5	110.9	106.3	115.2	104.7	113.9	108.9	110.7	107.6	117.7	114.9
8/28/2013	100.3	113.4	110.3	108.7	107.7	113.1	108.9	110.5	105.9	115.1	104.5	114.3	108.8	110.8	108.5	117.7	**116**
8/29/2013	99.8	113.3	109.4	108.2	107.5	112.5	107.9	110.7	104.5	115	104.3	114.9	107.6	110.8	108.3	117.2	**115.6**
8/30/2013	99.5	113.6	106.9	107.2	105.9	111.9	105.9	109.8	104.4	115.2	103.8	114.9	106.6	110.2	107.8	•	**116**
8/31/2013	99.5	113.8	107.7	107.7	107.7	112.6	106.1	110.7	105.8	114.5	105.2	115.2	108.1	111.7	108.1	•	**116**

Figure 42

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal