FISH OPERATIONS PLAN IMPLEMENTATION REPORT
April 2014

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 2014 Spring Fish Operations Plan (2014 Spring FOP) posted to TMT on April 1, 2014. The 2014 Spring FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the spring fish migration season, generally April through early June. To the extent Corps project operations that are not specified in the 2014 Spring FOP, the FCRPS operations will be consistent with the 2014 NOAA Fisheries Supplemental Biological Opinion (2014 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2014 Water Management Plan (WMP), WMP seasonal updates, and the 2014 Fish Passage Plan (FPP).

The Corps' April 2014 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,
- % average percent Total Dissolved Gas (TDG) levels in the tailwater at each project, and in the subsequent downstream project's forebay.[1]

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2014 Spring FOP in April.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[2] in April displaying the performance of the fish passage spill program as follows:

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

[1] Averages reported consistent with the current and applicable Oregon TDG waiver (120% tailwater) and Washington TDG criteria adjustments (120% tailwater/115% forebay). The Oregon TDG waiver and the Washington TDG criteria adjustment have different methodologies for calculating TDG. When the standards vary or conflict, the Corps applies the more stringent standard.
[2] Operations are implemented from Monday through Sunday.

The weekly graphs begin on March 31 and end on April 27 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 March 31 for the lower Snake River and the lower Columbia River projects.

March 31 – April 6	Figures 1 – 4
April 7 – April 13	Figures 5 – 12
April 14 – April 20	Figures 13 – 20
April 21 – April 27	Figures 21 – 28

A. Upper Graph: Displays the average daily %TDG for the Corps' lower Snake River and lower Columbia River projects. The Corps' objective is to operate each project in accordance with the spill levels in the 2014 Spring FOP; and to the extent practicable, avoid exceeding the applicable state TDG limits.

1. The green dashed line represents the Oregon 120 %TDG waiver limit for the tailwater of the dam.
2. The blue dot-dash line represents the Washington 120 %TDG criteria adjustment for the tailwater of the dam.
3. The black solid line represents the Washington 115 %TDG criteria adjustment for the forebay of the next dam downstream.

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

- The dashed blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The heavy grey line represents the average hourly total river flow through the project in kcfs.
- The dotted 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 2014 Spring FOP.
- The heavy green 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 2014 Spring 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 % of project outflow.

II. A table is included at the end of the figures that lists the average daily %TDG for all projects. The numbers in red indicate the project exceeded the %TDG cap -- i.e.115 % (forebay of the

next downstream dam) or 120 % (tailwater) for each project. For the lower Columbia projects, tailwater TDG values are presented by displaying the highest value %TDG (controlling limit), and the lower value is displayed with a strikethrough.

General Implementation Remarks:

For all projects that spill for fish passage, the actual spill may vary from the target spill due to various conditions as described below. When spill levels briefly deviate below or above the level specified in the 2014 Spring FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual deviations from the target operation during voluntary spill hours are described below in the April 2014 Spill Variance Table.[3] The Spill Variance Table includes average hourly data; therefore, while spill may vary from target FOP spill for only a portion of an hour, the Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly FOP 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 2014 Spring 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 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 within the hour (except as otherwise noted in the 2014 Spring FOP for Bonneville and The Dalles dams,[4] which may range up to ±3 kcfs) as compared to those specified in the 2014 Spring FOP and the RCC spill priority list (defining the project %TDG spill caps). A number of factors influence actual

[3] Involuntary spill conditions are identified in the graphs but are not considered variances so are not reported in the Spill Variance Table. Involuntary spill conditions result from lack of load, high river inflows that exceed available powerhouse capacity, scheduled or unscheduled turbine unit outages or transmission outages of various durations, passing debris, or any other operational and/or maintenance activities required to manage dam facilities for safety and authorized project uses.

[4] As specified in the 2014 Spring FOP (p. 15), this applies when the spill level is below 40% of total flow at The Dalles Dam.

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 2014 Spring 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 within hour requirement (or other ranges specified in the 2014 Spring 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 slightly below average flows for the lower Columbia River. The NOAA Northwest River Forecast Center's Runoff Processor indicated that the April 2014 adjusted volume runoff on the lower Columbia was below the 30 year average (1981-2010): 13.1MAF (million acre feet) or 95 % of average as measured at The Dalles. The Runoff Processor also indicated April 2014 adjusted volume runoff on the lower Snake was below the 30 year average (1981-2010): 4.1MAF or 90 % of average as measured at Lower Granite Dam. The monthly precipitation summary for April was below average at 97 % on the Snake River above Ice Harbor Dam and below average on the Columbia River above The Dalles Dam at 97 %.

In accordance with the 2014 Spring 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 2014 Spring 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 % of total river flow 24-hours/day.

- Lower Monumental Dam - The hourly target spill level was the %TDG cap 24 hours/day, approximate gas cap range: 20 – 29 kcfs.
- Ice Harbor Dam - The hourly target spill level was 45 kcfs daytime and the %TDG cap nighttime, approximate gas cap range: 75 – 95 kcfs. Nighttime spill hours are 1800-0500.
- McNary Dam - The hourly target spill level was 40 % of total river flow for 24-hours/day.
- John Day Dam - The hourly target spill level was 30 % of total river flow for 24-hours/day until the alternating two-treatment operation begins (2014 Spring FOP p. 14) on April 27).
- The Dalles Dam - The hourly target spill level was 40 % of total river flow for 24-hours/day.
- Bonneville Dam - The hourly target spill level was 100 kcfs 24 hours/day.

Operational Adjustments

1. Little Goose Dam:

Between April 27 at 0001 hours and April 30 at 0800 hours, Little Goose Dam operated above the Minimum Operating Pool (MOP) elevation of 633-634 feet in order to properly store the navigation lock bulkhead. Due to an emergency navigation lock outage that occurred at Little Goose Dam between the dates of March 25 and April 21, the project was unable to conduct this operation as previously scheduled prior to April 3. This operation was coordinated during the April 23 TMT and there were no objections.

2. Dworshak Dam:

Dworshak Dam operations were coordinated with TMT at meetings on April 2, April 9 and April 30 to deviate from flood control requirements to the extent possible in order to minimize fish impacts. At the April 2 TMT meeting there was inquiry regarding flood control requirements that would increase Dworshak Dam outflows to 25 kcfs for 10 days and then reduce to below 5 kcfs in May. This increase in outflows was due to a significant increase in the water supply forecast. Based on concerns from TMT that the higher discharge could have near-term TDG impacts and could reduce flow augmentation available for the bulk of the juvenile outmigration in late April and early May, the Corps proposed consideration of a flood control deviation to increase outflows to 20 kcfs instead of 25 kcfs. On April 4, the deviation request was approved and the modified operation was implemented until April 18, 2014 when outflows were reduced to10 kcfs (full powerhouse) through the end of April. These operations were discussed at TMT on April 9 and April 30.

At the April 30 TMT meeting, some representatives proposed an operation to extend the full powerhouse operation for an additional day (through May 2), then reduce outflows to 5 kcfs on May 3, and then down to 2.4 kcfs on May 4 as the project transitioned to refilling of the reservoir pool. Discussion of this proposal included TMT's representatives' acknowledgment that, based on the current forecast, the operation could potentially risk reservoir refill by the end of June as required in the BiOp (i.e. Dworshak reservoir elevation could be up to 2 feet below full in June). TMT members either supported or did not object to the operation as proposed and the Action Agencies agreed to implement the request.

April 2014 Spill Variance Table

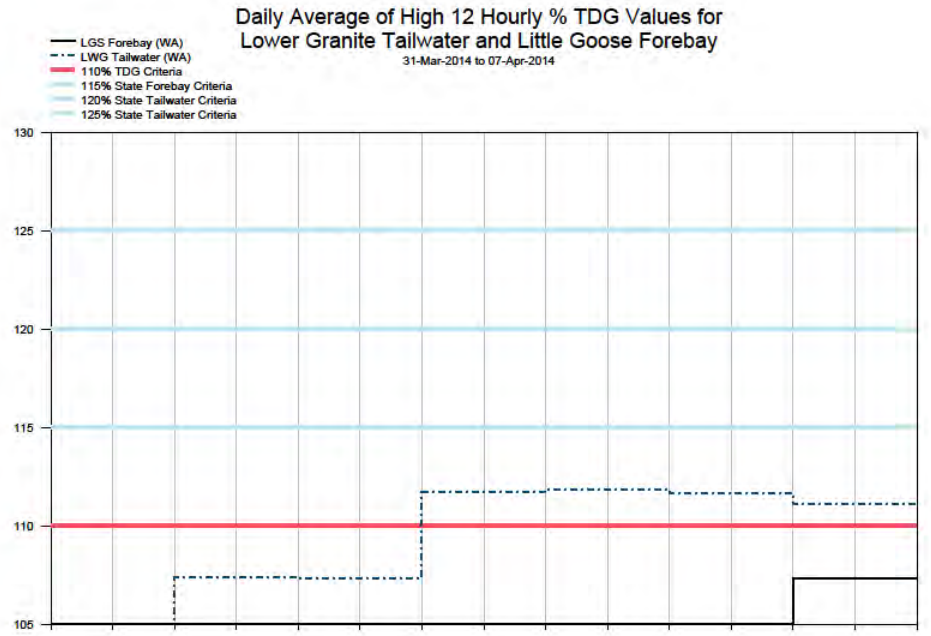
Table 1: April 2014 (4/3 – 4/27) - FOP Implementation Report Table

Project	Parameter	Date	Time[5]	Hours	Type	Reason
	Additional Spill	4/17/14	1700-1800	2	Operational Limitations	Due to an unexpected transmission line outage, multiple projects had to reduce generation which impacted hourly spill.
Lower Granite			1700-1800	2		Lower Granite: Hourly spill increased to 37.8 kcfs (above FOP spill of 20 kcfs).
Little Goose			1700-1800	2		Little Goose: Hourly spill increased to 47.3% (above 30% ± 1.0% range). 24 hr avg. spill was 40.0%.
Ice Harbor			1700-1800	2		Ice Harbor: Hourly spill increased to 65.4 kcfs (above FOP spill of 45 kcfs).
John Day			1700-1800	2		John Day: Hourly spill increased to 44.5% (above 30% ± 1.0% range). 24 hr avg. spill was 30.7%.
The Dalles			1700-1800	2		The Dalles: Hourly spill increased to 57.1% (above 40% ± 1.0% range). 24 hr avg. spill was 40.8%.
Bonneville			1700	1		Bonneville: Hourly spill increased to 109.1 kcfs (above FOP spill of 100 kcfs).
John Day	Additional Spill	4/21/14	1900	1	Transmission Stability	Hourly spill increased to 31.3% (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 32.1%.

[5] 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.

John Day	Additional Spill	4/27/14	0900	1	Transmission Stability	Hourly spill increased to 32.6% (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 34.6%.
The Dalles	Reduced Spill	4/13/14	0800	1	Operational Limitations	Hourly spill decreased to 38.5% (below 40.0% ± 1% range) due to transmission system emergency. Project increased generation for part of the hour to assure system reliability. 24 hr avg. spill was 39.9%.
The Dalles	Reduced Spill	4/21/14	2000	1	Human/Program Error	Hourly spill decreased to 38.9% (below 40.0% ± 1% range). GDACS error reporting spill rate. Spill was reduced due to program malfunction. 24 hr avg. spill was 39.9%.
The Dalles	Reduced Spill	4/22/14	0200	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 40.8%
The Dalles	Reduced Spill	4/22/14	2000	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 40.8%
The Dalles	Reduced Spill	4/27/14	0700	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 41.4%.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay
31-Mar-2014 to 07-Apr-2014
LGS Forebay (WA)
LWG Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

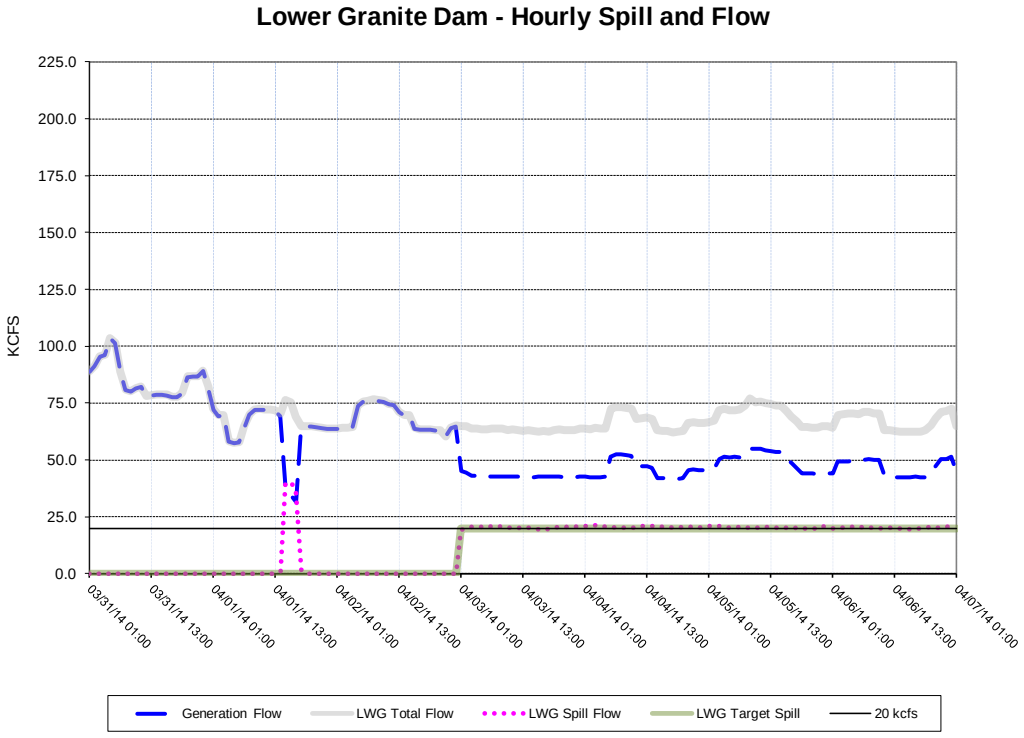
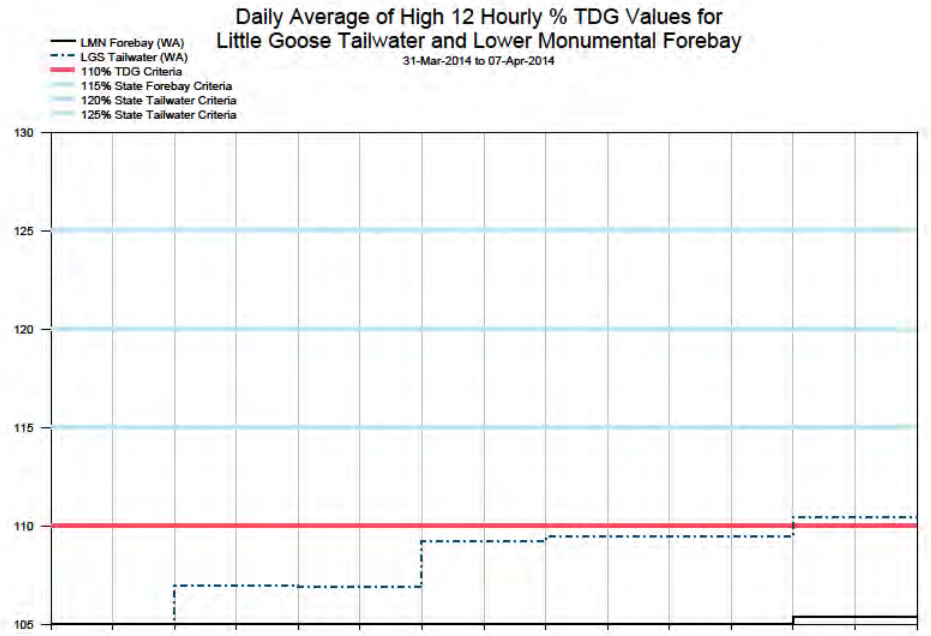

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
03/31/14 01:00
03/31/14 13:00
04/01/14 01:00
04/01/14 13:00
04/02/14 01:00
04/02/14 13:00
04/03/14 01:00
04/03/14 13:00
04/04/14 01:00
04/04/14 13:00
04/05/14 01:00
04/05/14 13:00
04/06/14 01:00
04/06/14 13:00
04/07/14 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 2



Little Goose Dam - Hourly Spill and Flow

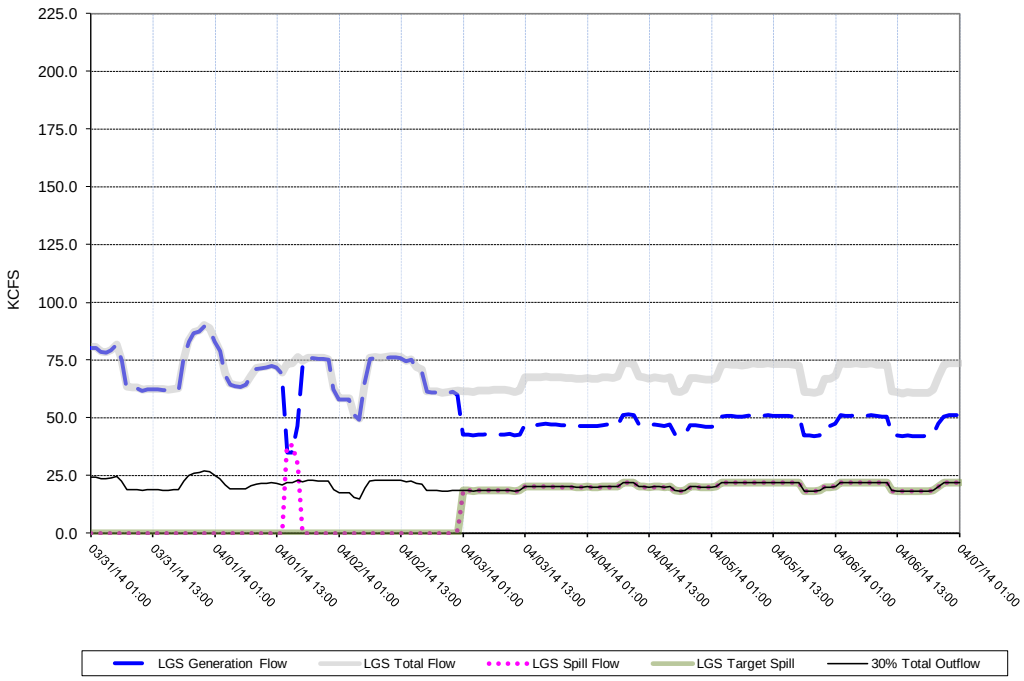
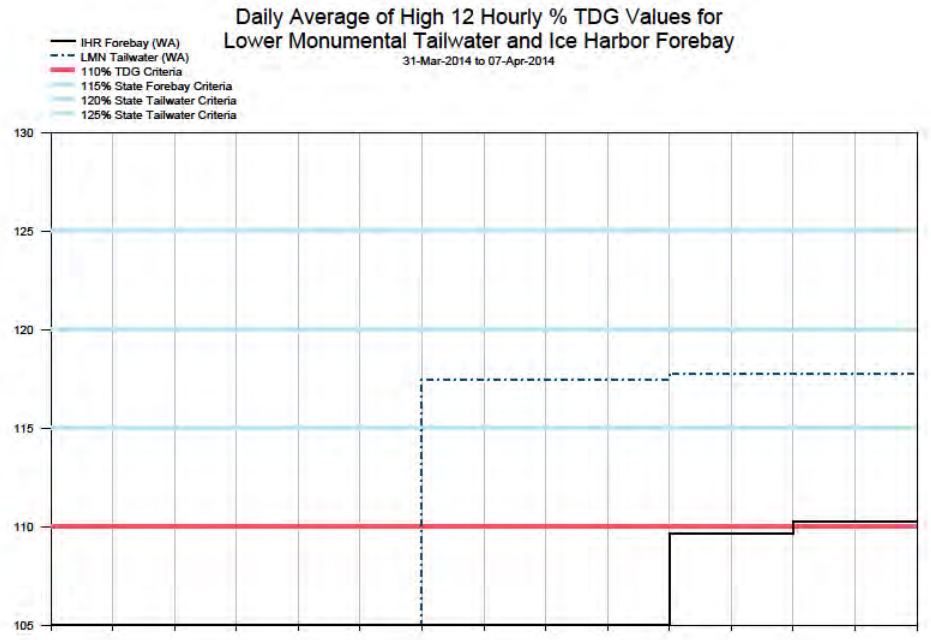
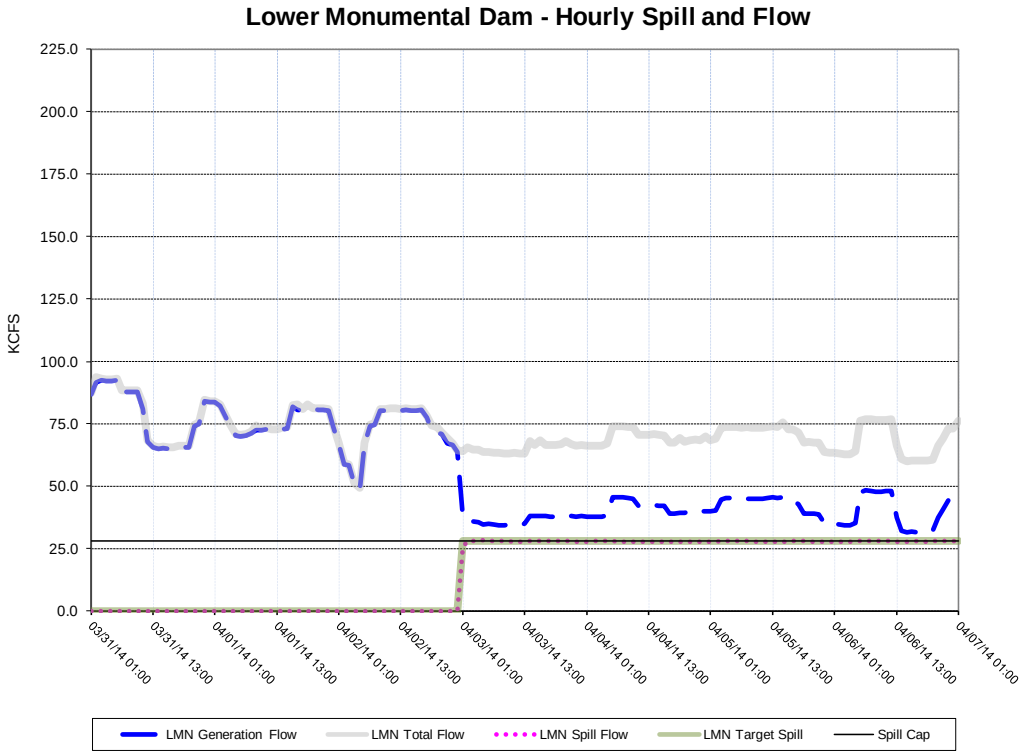


Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay
31-Mar-2014 to 07-Apr-2014
IHR Forebay (WA)
LMN Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105


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
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03/31/14 01:00
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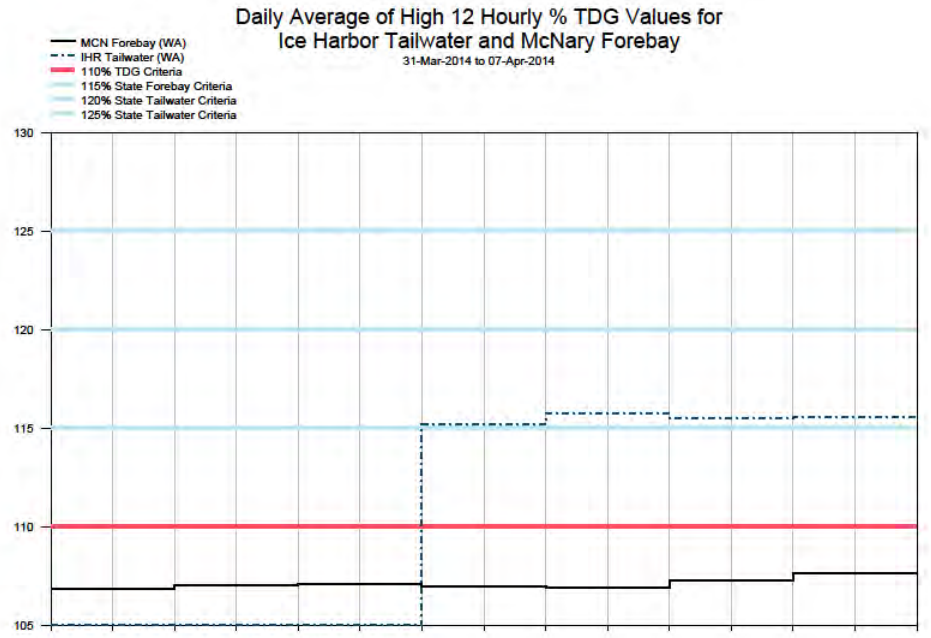
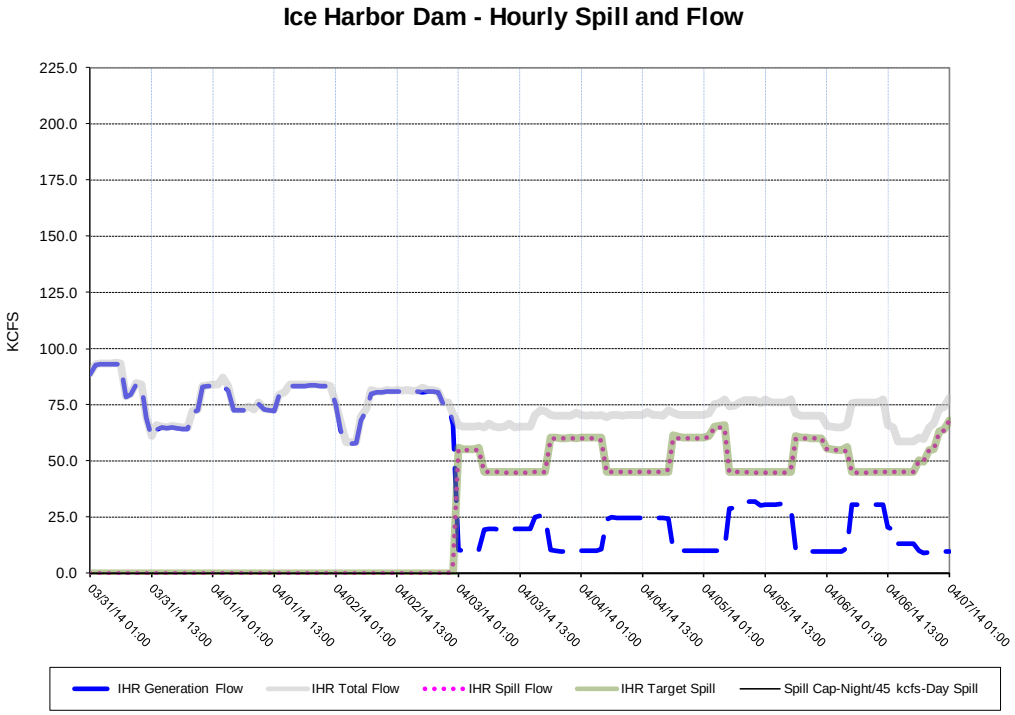
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay
31-Mar-2014 to 07-Apr-2014
MCN Forebay (WA)
IHR Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105


Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
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04/04/14 13:00
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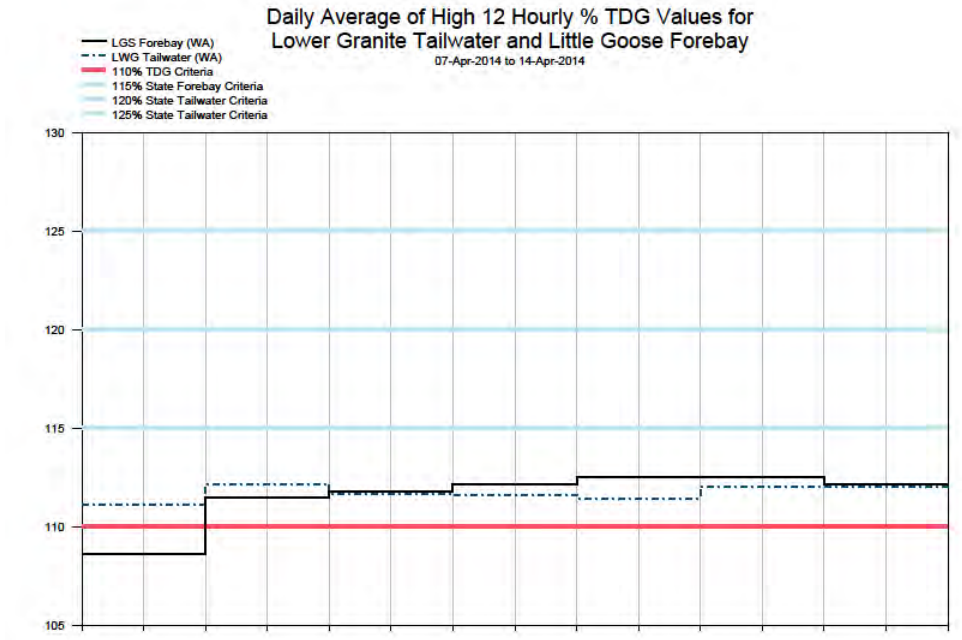
04/06/14 01:00
04/06/14 13:00
04/07/14 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 5


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay
07-Apr-2014 to 14-Apr-2014
LGS Forebay (WA)
LWG Tailwater (WA)
110% TDG Criteria
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125% State Tailwater Criteria
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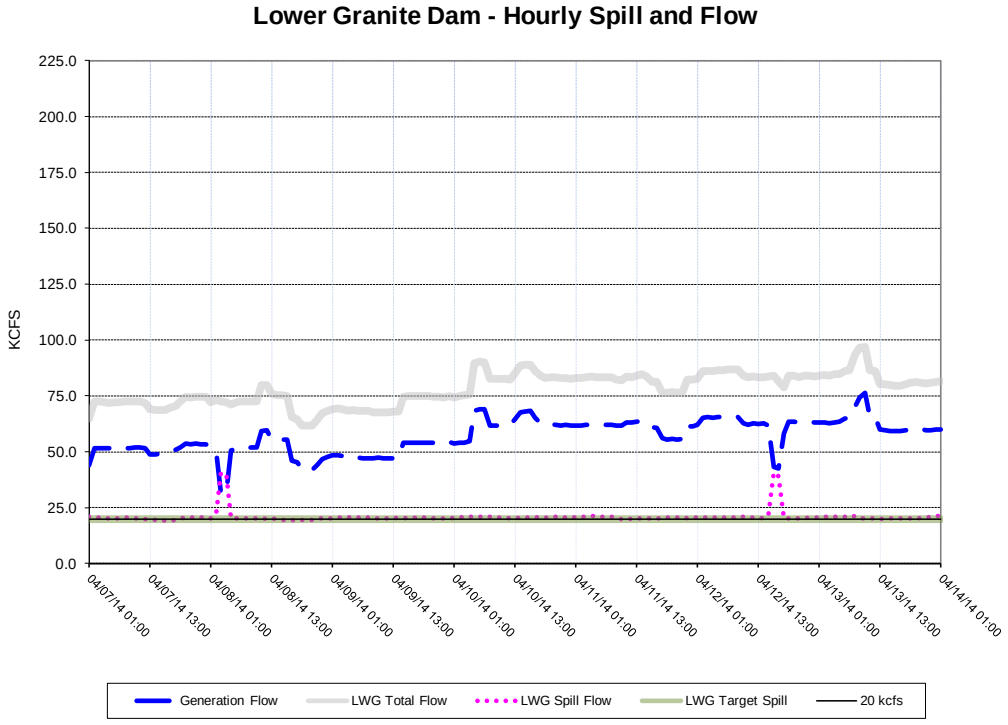
Lower Granite Dam - Hourly Spill and Flow
KCFS
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04/13/14 01:00
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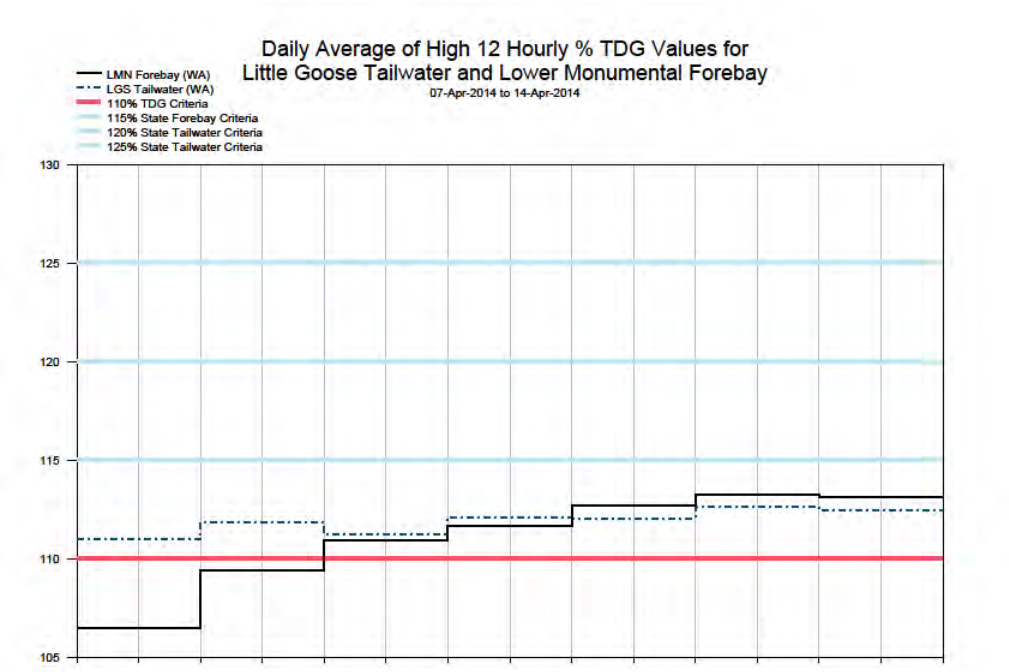
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 6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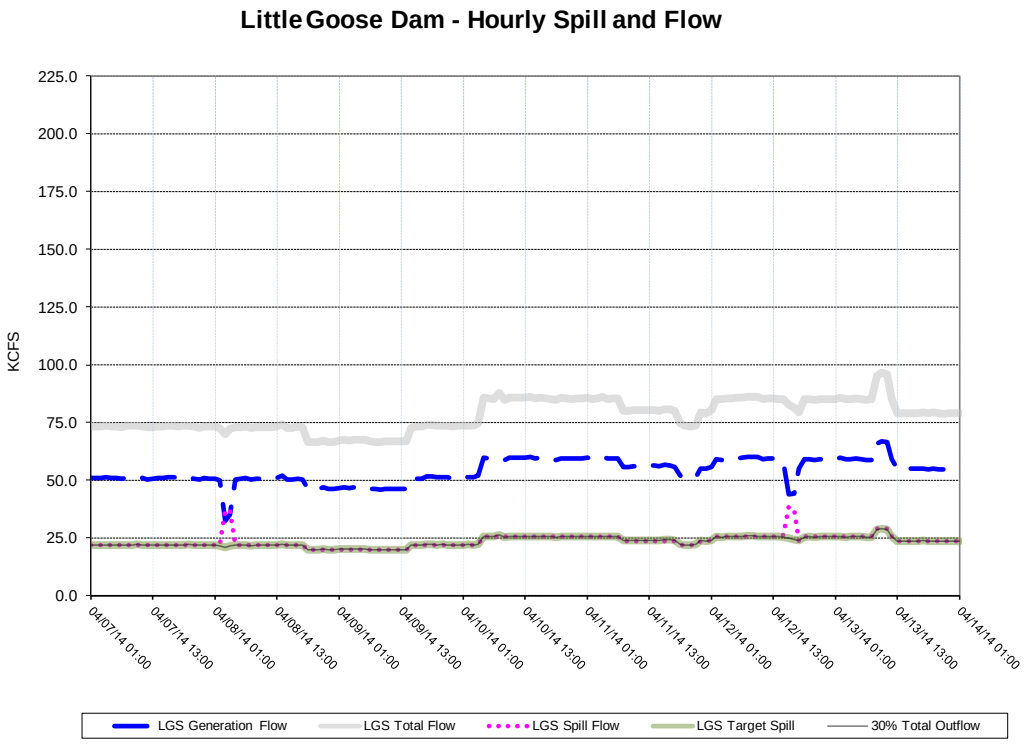
Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
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175.0
150.0
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04/13/14 01:00
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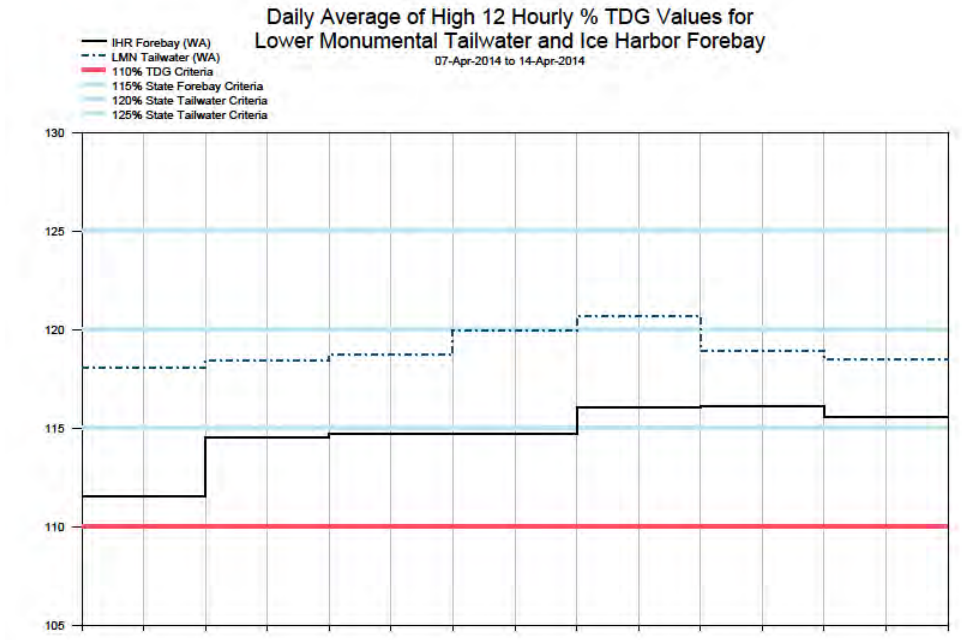
04/14/14 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% Total Outflow

Figure 7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125% State Tailwater Criteria
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125
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115
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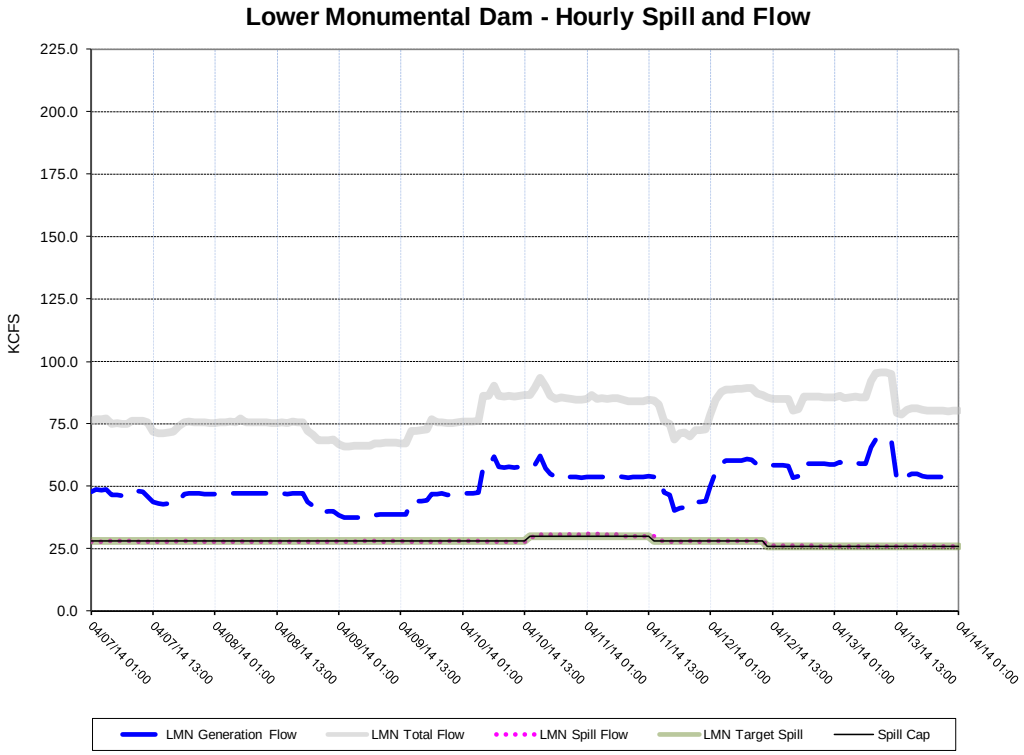
105


Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
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75.0
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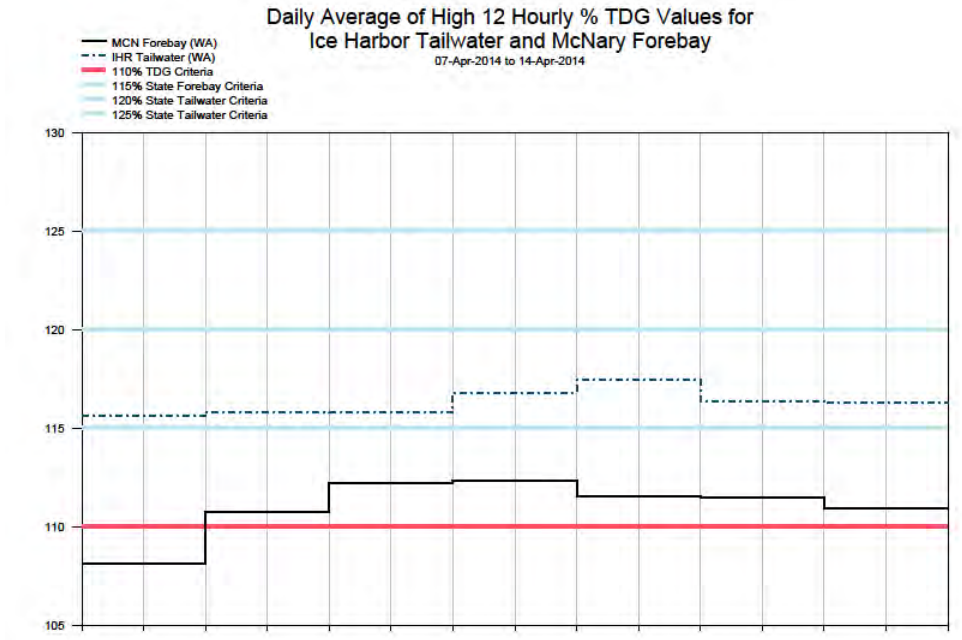
04/10/14 01:00
04/10/14 13:00
04/11/14 01:00
04/11/14 13:00
04/12/14 01:00
04/12/14 13:00
04/13/14 01:00
04/13/14 13:00
04/14/14 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay
07-Apr-2014 to 14-Apr-2014
MCN Forebay (WA)
IHR Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

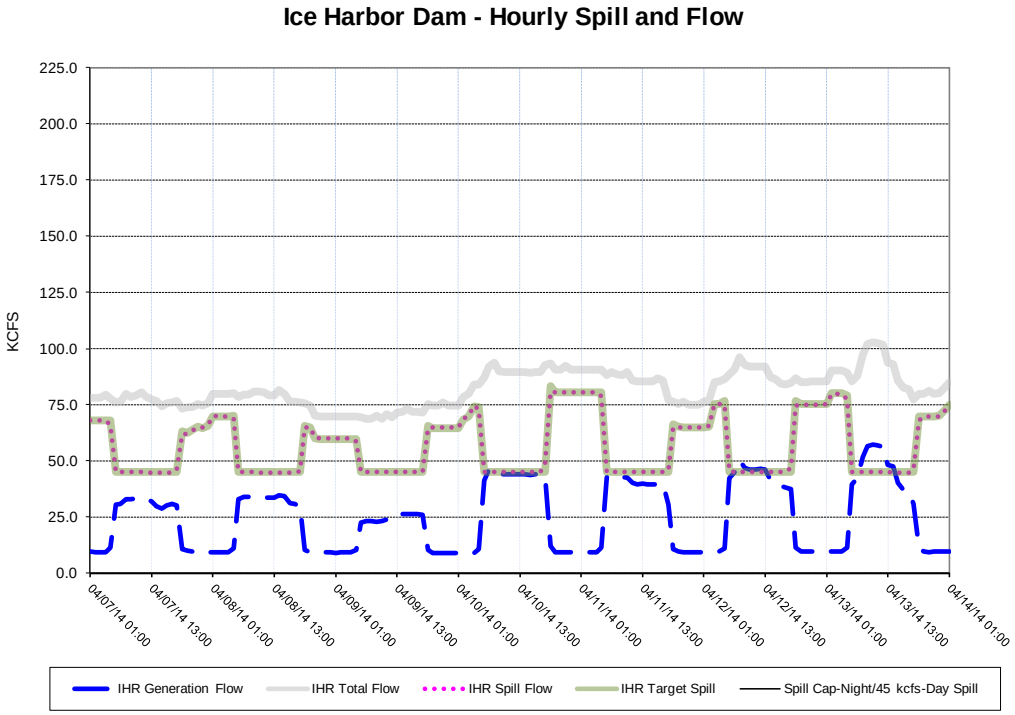
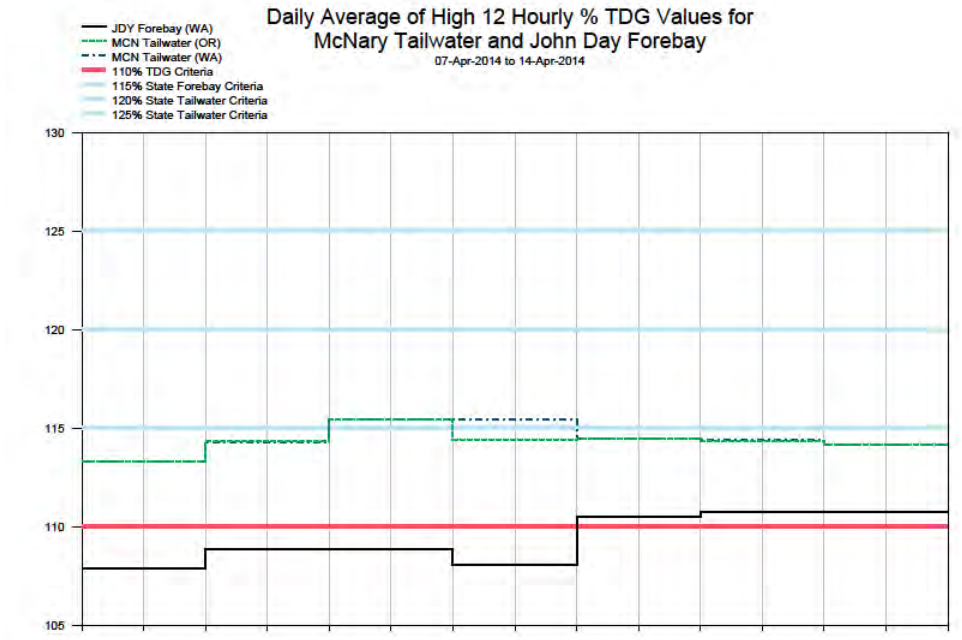

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/07/14 01:00
04/07/14 13:00
04/08/14 01:00
04/08/14 13:00
04/09/14 01:00
04/09/14 13:00
04/10/14 01:00
04/10/14 13:00
04/11/14 01:00
04/11/14 13:00
04/12/14 01:00
04/12/14 13:00
04/13/14 01:00
04/13/14 13:00
04/14/14 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
07-Apr-2014 to 14-Apr-2014
JDY Forebay (WA)
MCN Tailwater (OR)
MCN Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

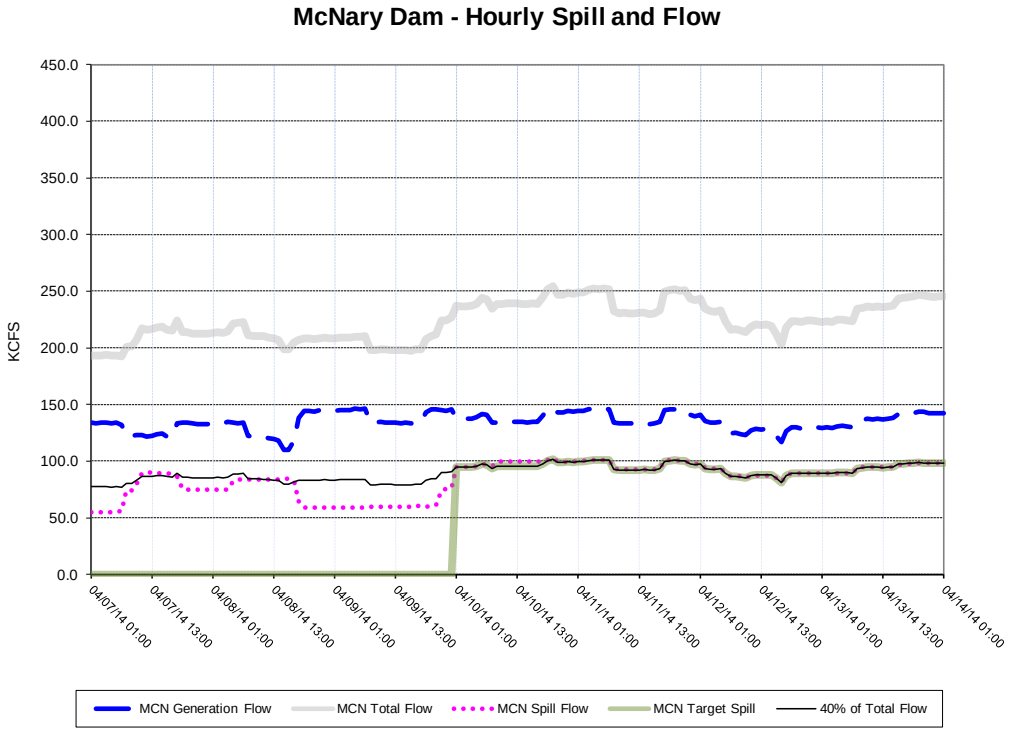
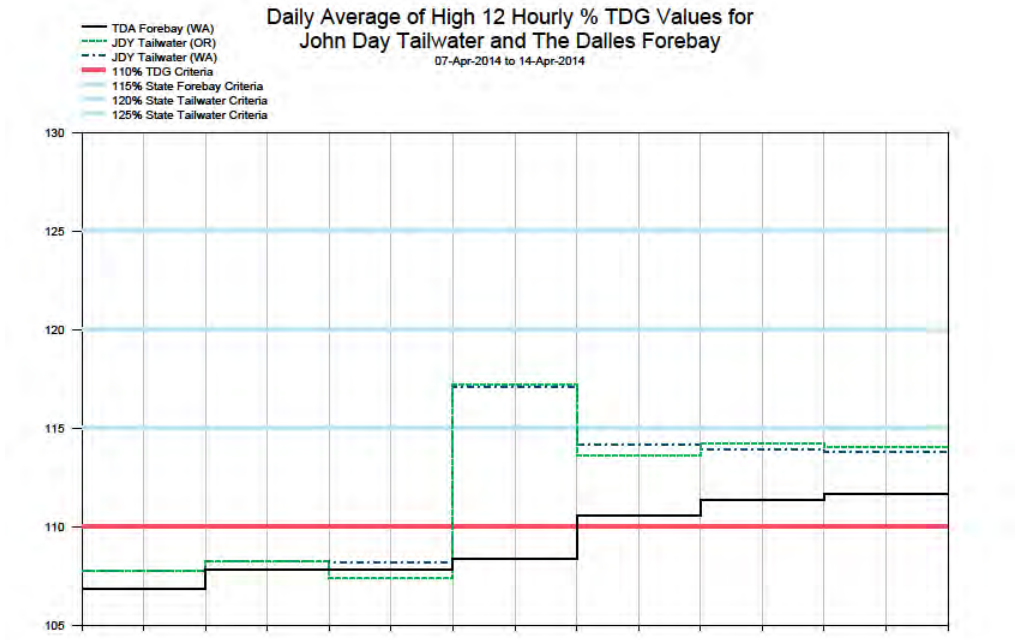

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/07/14 01:00
04/07/14 13:00
04/08/14 01:00
04/08/14 13:00
04/09/14 01:00
04/09/14 13:00
04/10/14 01:00
04/10/14 13:00
04/11/14 01:00
04/11/14 13:00
04/12/14 01:00
04/12/14 13:00
04/13/14 01:00
04/13/14 13:00
04/14/14 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
07-Apr-2014 to 14-Apr-2014
TDA Forebay (WA)
JDY Tailwater (OR)
JDY Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

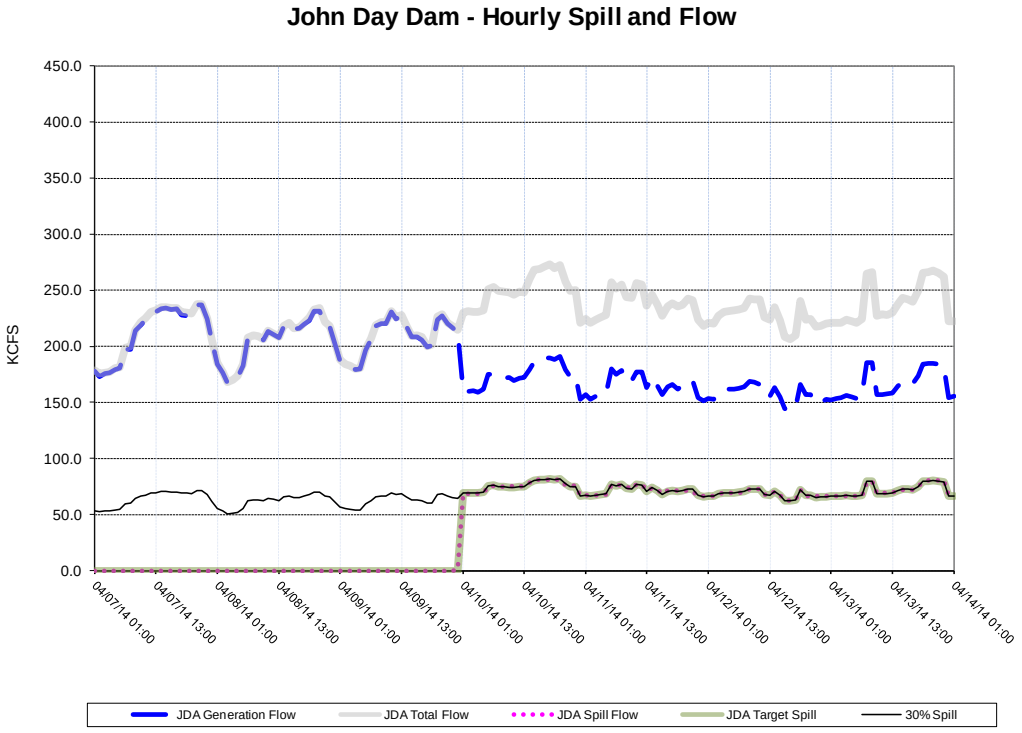
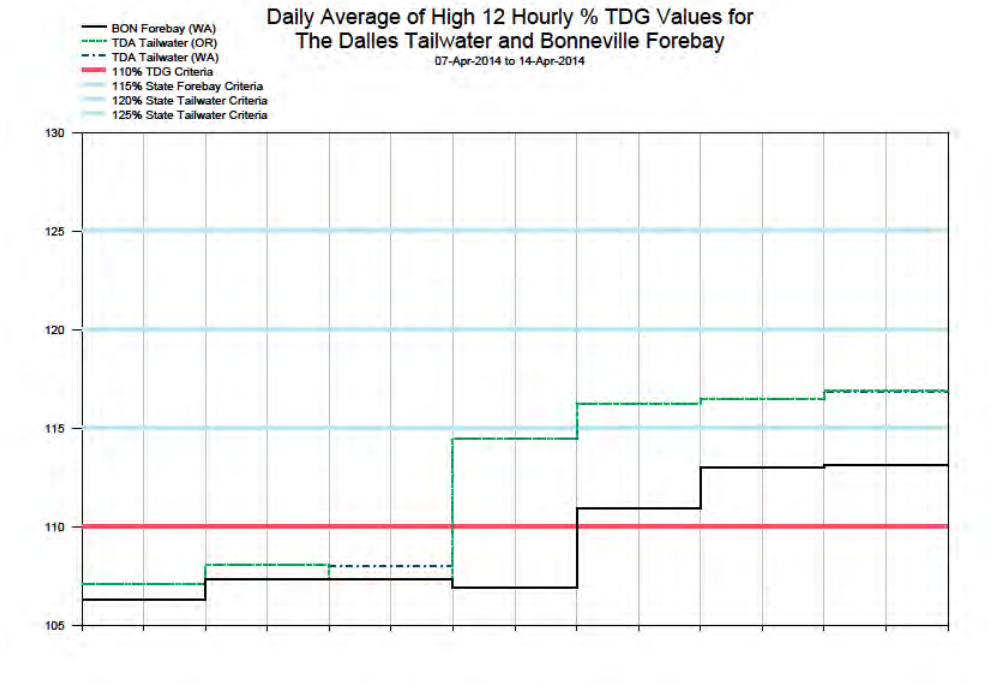

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/07/14 01:00
04/07/14 13:00
04/08/14 01:00
04/08/14 13:00
04/09/14 01:00
04/09/14 13:00
04/10/14 01:00
04/10/14 13:00
04/11/14 01:00
04/11/14 13:00
04/12/14 01:00
04/12/14 13:00
04/13/14 01:00
04/13/14 13:00
04/14/14 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
07-Apr-2014 to 14-Apr-2014
BON Forebay (WA)
TDA Tailwater (OR)
TDA Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

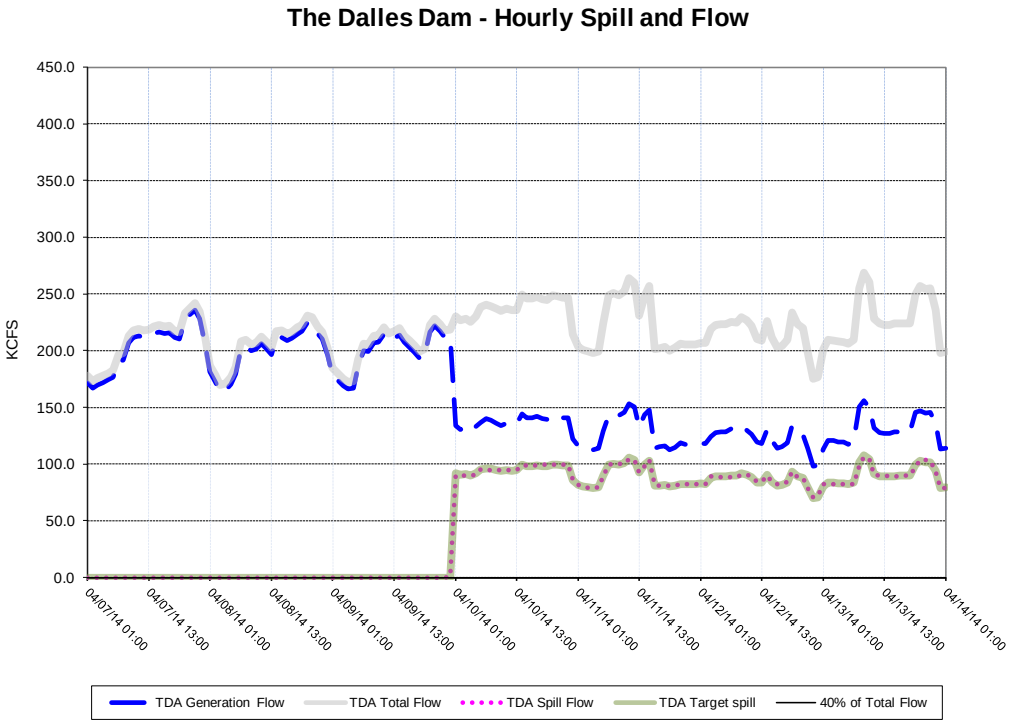
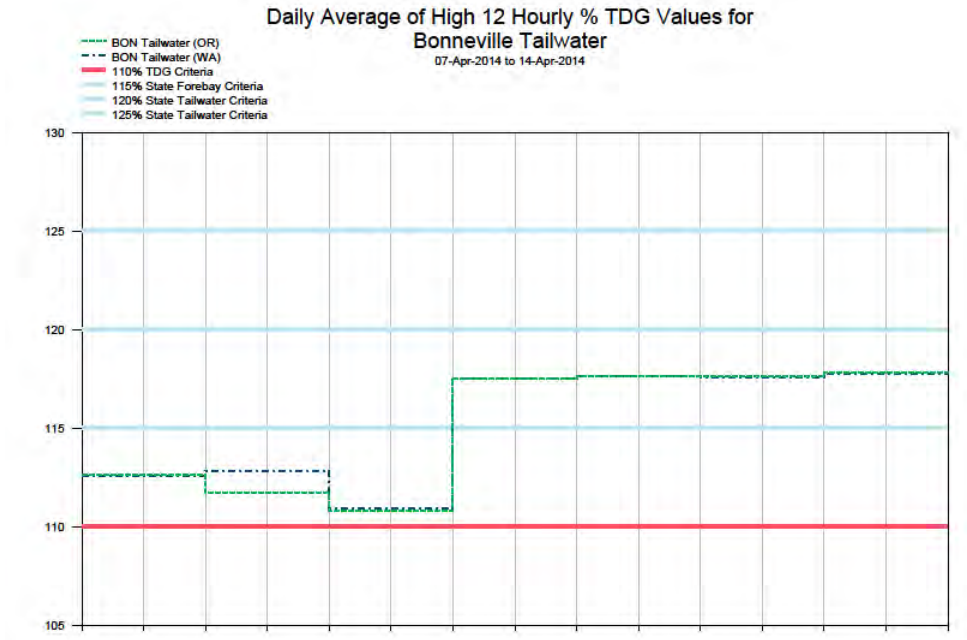

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/07/14 01:00
04/07/14 13:00
04/08/14 01:00
04/08/14 13:00
04/09/14 01:00
04/09/14 13:00
04/10/14 01:00
04/10/14 13:00
04/11/14 01:00
04/11/14 13:00
04/12/14 01:00
04/12/14 13:00
04/13/14 01:00
04/13/14 13:00
04/14/14 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
07-Apr-2014 to 14-Apr-2014
BON Tailwater (OR)
BON Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

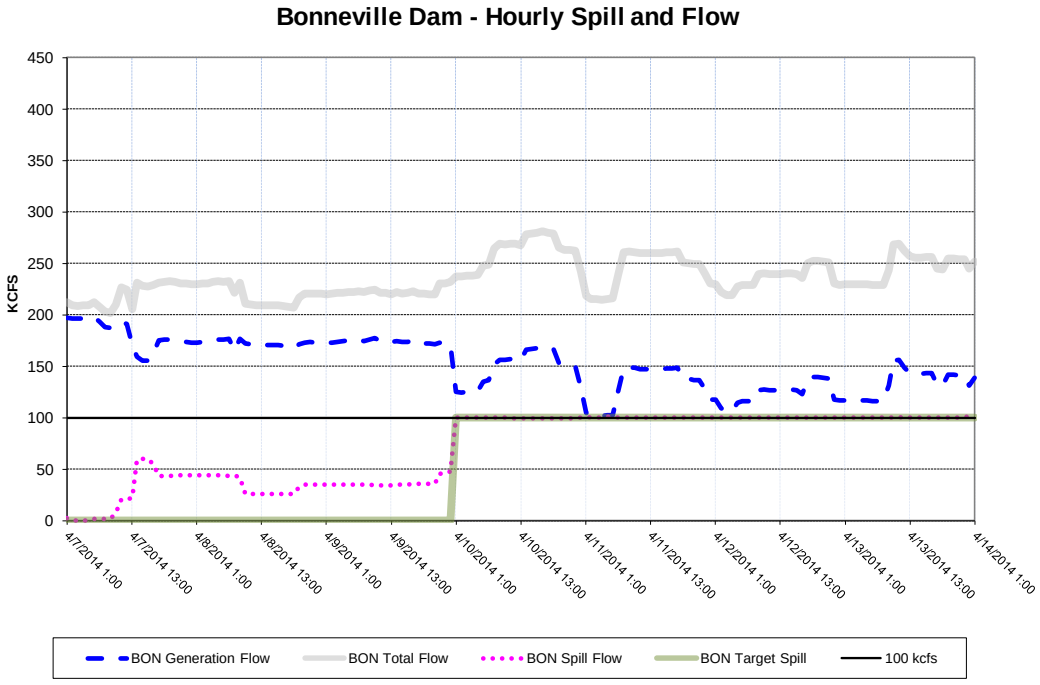
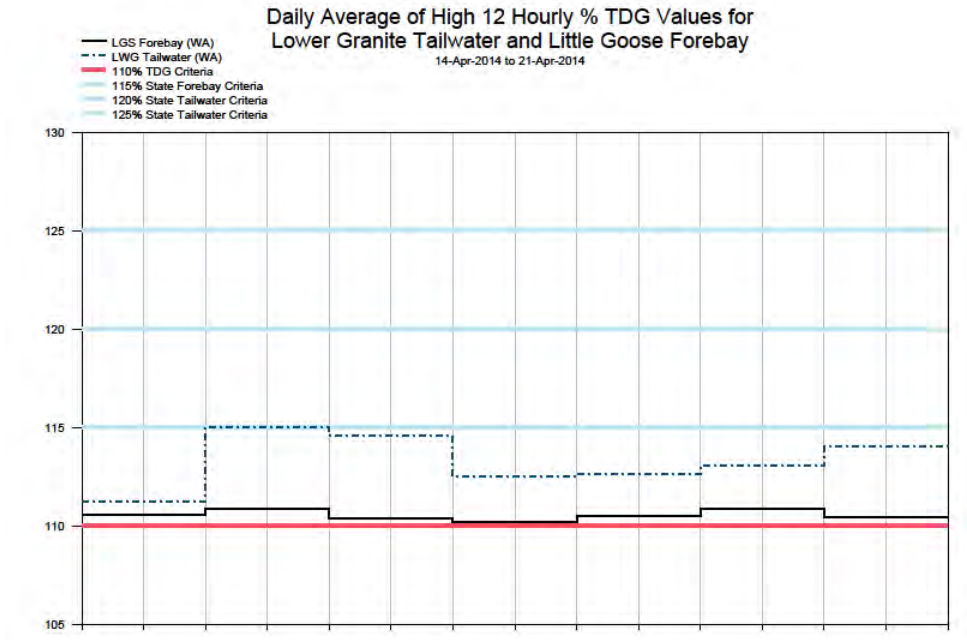

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
4/7/2014 1:00
4/7/2014 13:00
4/8/2014 1:00
4/8/2014 13:00
4/9/2014 1:00
4/9/2014 13:00
4/10/2014 1:00
4/10/2014 13:00
4/11/2014 1:00
4/11/2014 13:00
4/12/2014 1:00
4/12/2014 13:00
4/13/2014 1:00
4/13/2014 13:00
4/14/2014 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
14-Apr-2014 to 21-Apr-2014
LGS Forebay (WA)
LWG Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

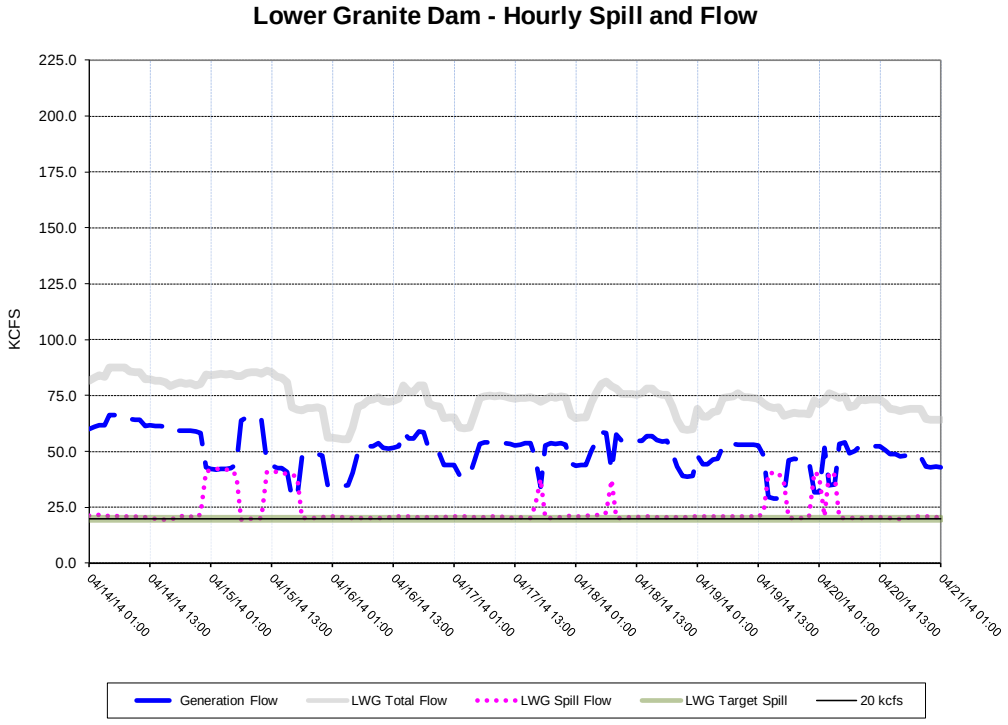
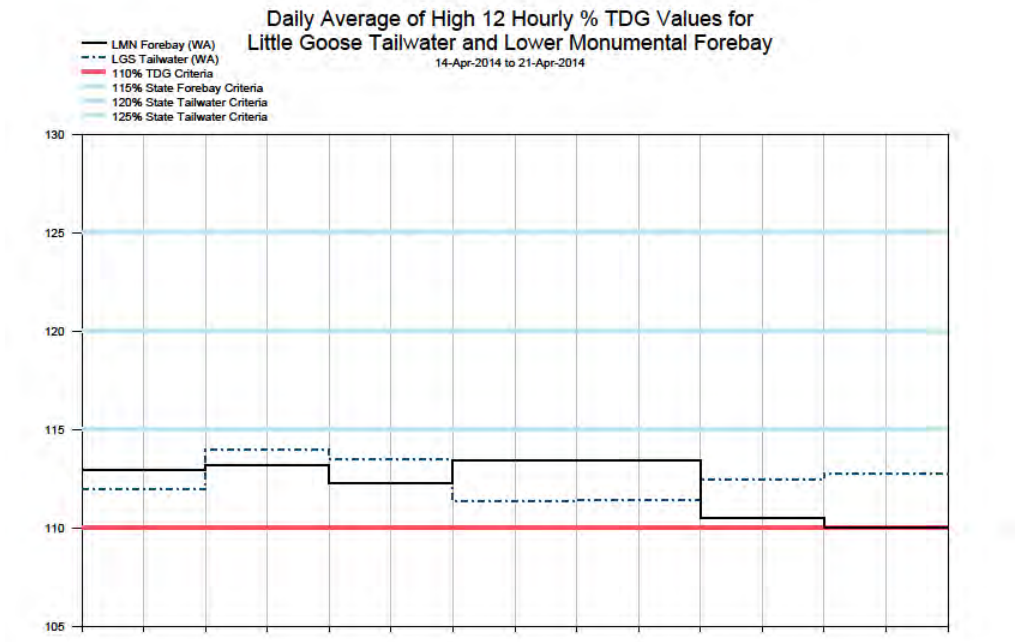

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/14/14 01:00
04/14/14 13:00
04/15/14 01:00
04/15/14 13:00
04/16/14 01:00
04/16/14 13:00
04/17/14 01:00
04/17/14 13:00
04/18/14 01:00
04/18/14 13:00
04/19/14 01:00
04/19/14 13:00
04/20/14 01:00
04/20/14 13:00
04/21/14 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
14-Apr-2014 to 21-Apr-2014
LMN Forebay (WA)
LGS Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

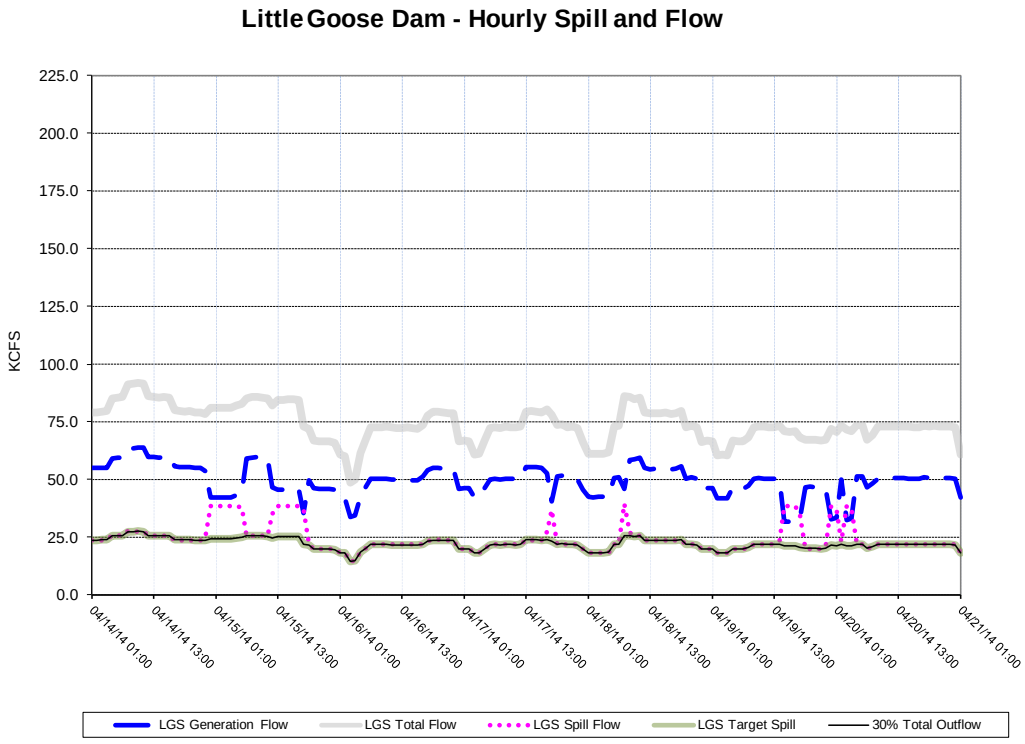
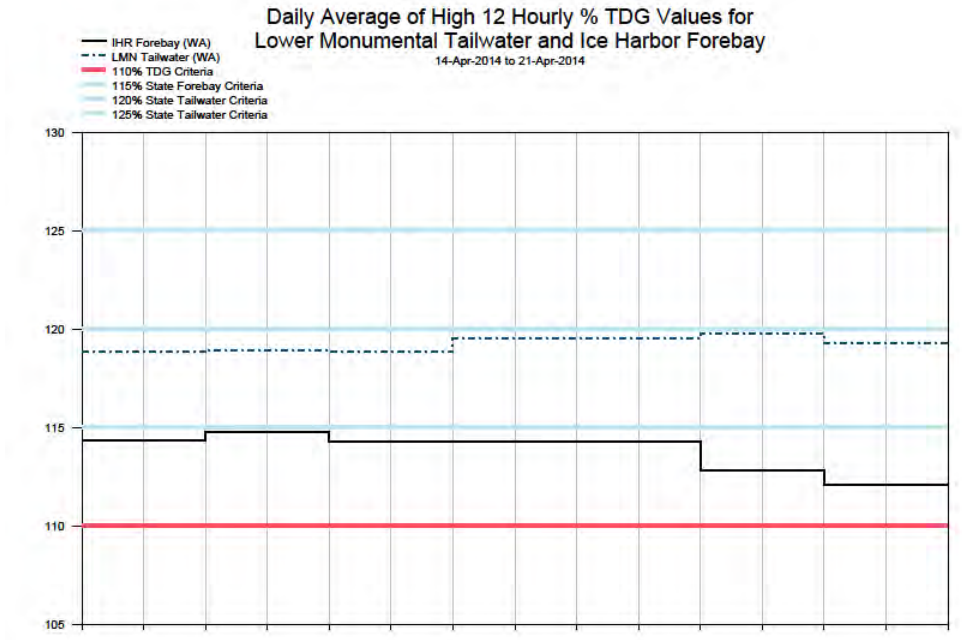

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/14/14 01:00
04/14/14 13:00
04/15/14 01:00
04/15/14 13:00
04/16/14 01:00
04/16/14 13:00
04/17/14 01:00
04/17/14 13:00
04/18/14 01:00
04/18/14 13:00
04/19/14 01:00
04/19/14 13:00
04/20/14 01:00
04/20/14 13:00
04/21/14 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% Total Outflow

Figure 15


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay
14-Apr-2014 to 21-Apr-2014
IHR Forebay (WA)
LMN Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

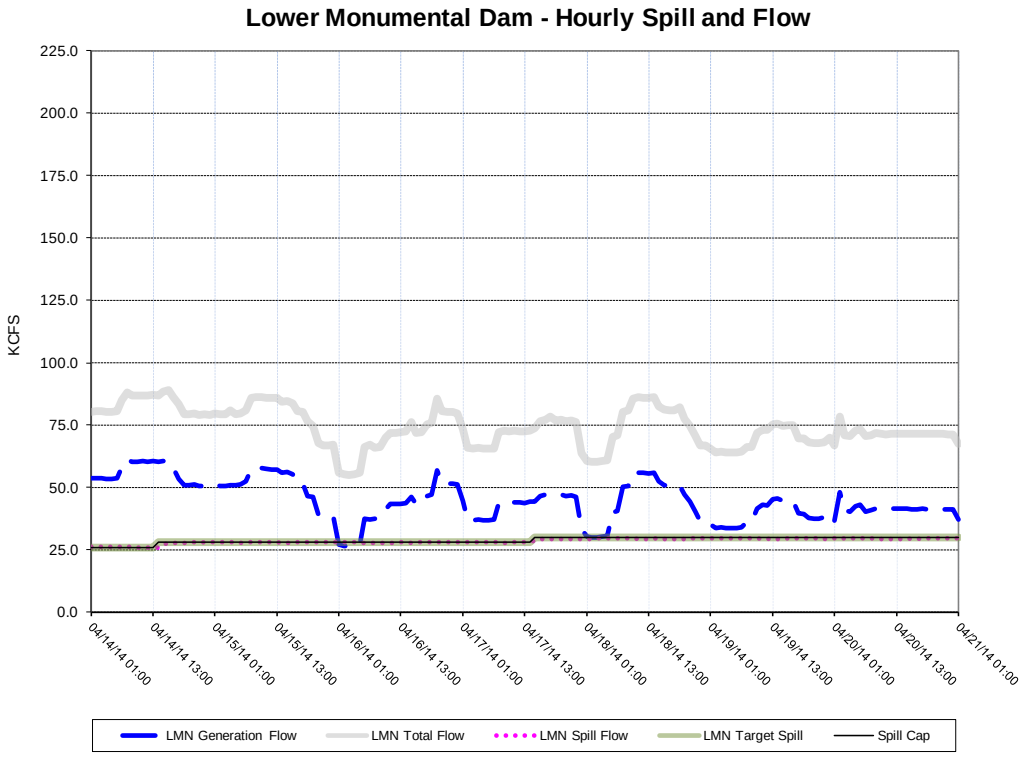
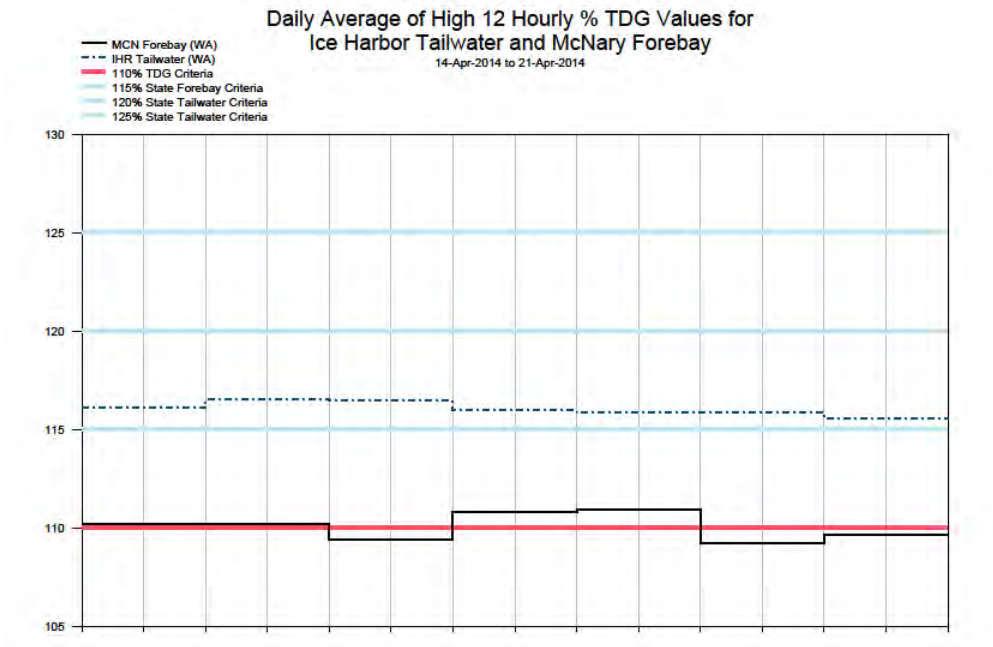

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/14/14 01:00
04/14/14 13:00
04/15/14 01:00
04/15/14 13:00
04/16/14 01:00
04/16/14 13:00
04/17/14 01:00
04/17/14 13:00
04/18/14 01:00
04/18/14 13:00
04/19/14 01:00
04/19/14 13:00
04/20/14 01:00
04/20/14 13:00
04/21/14 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
14-Apr-2014 to 21-Apr-2014
MCN Forebay (WA)
IHR Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

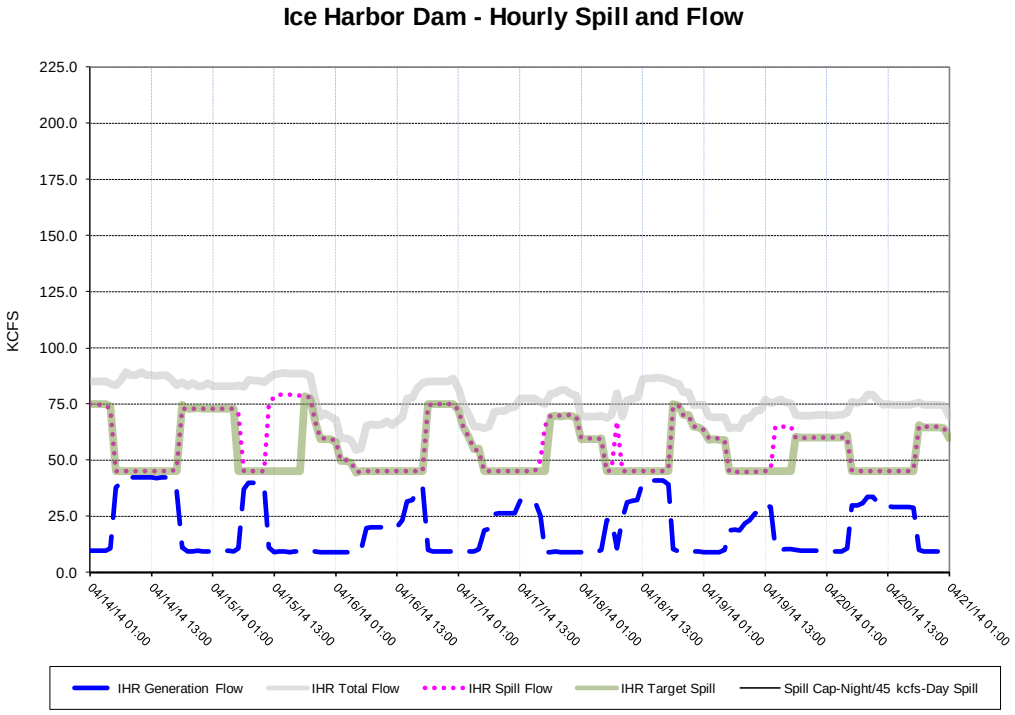
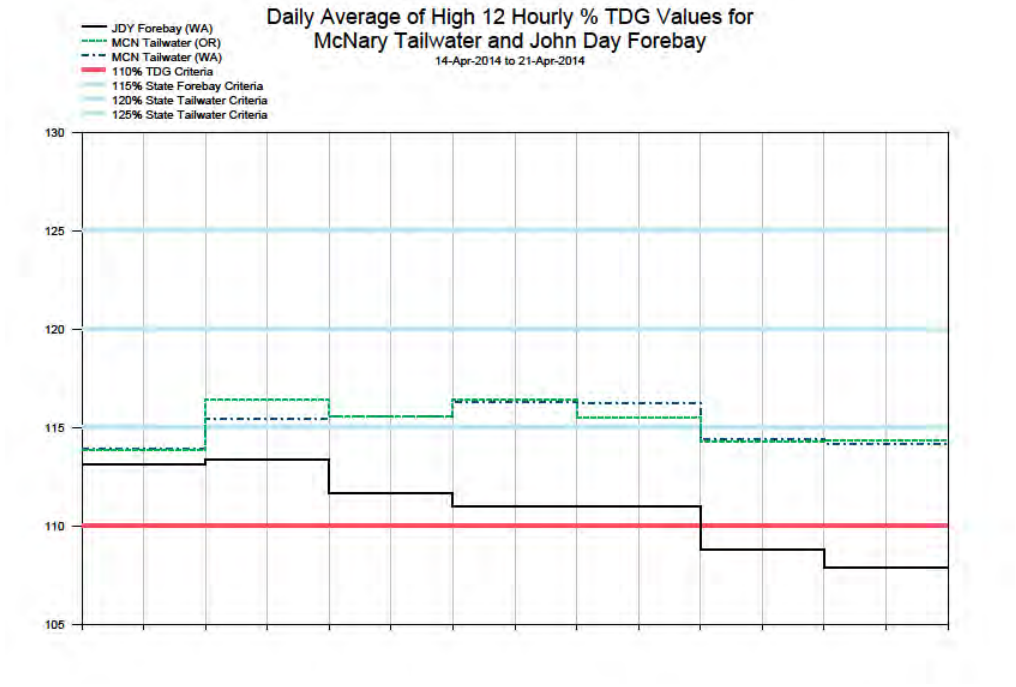

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/14/14 01:00
04/14/14 13:00
04/15/14 01:00
04/15/14 13:00
04/16/14 01:00
04/16/14 13:00
04/17/14 01:00
04/17/14 13:00
04/18/14 01:00
04/18/14 13:00
04/19/14 01:00
04/19/14 13:00
04/20/14 01:00
04/20/14 13:00
04/21/14 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
14-Apr-2014 to 21-Apr-2014
JDY Forebay (WA)
MCN Tailwater (OR)
MCN Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

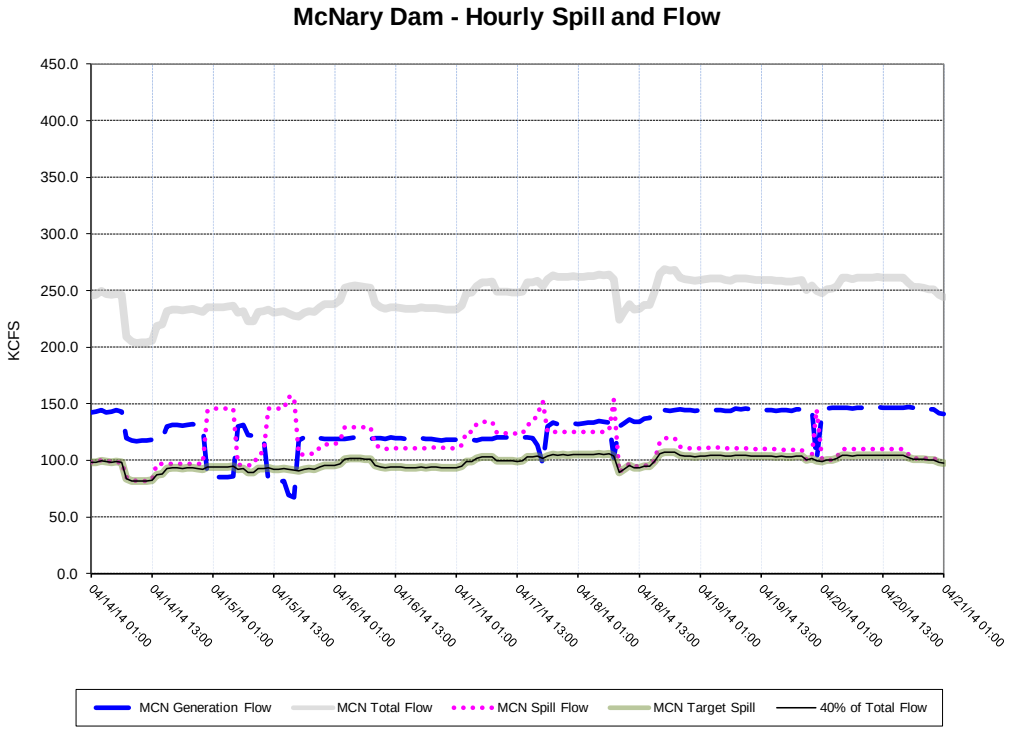
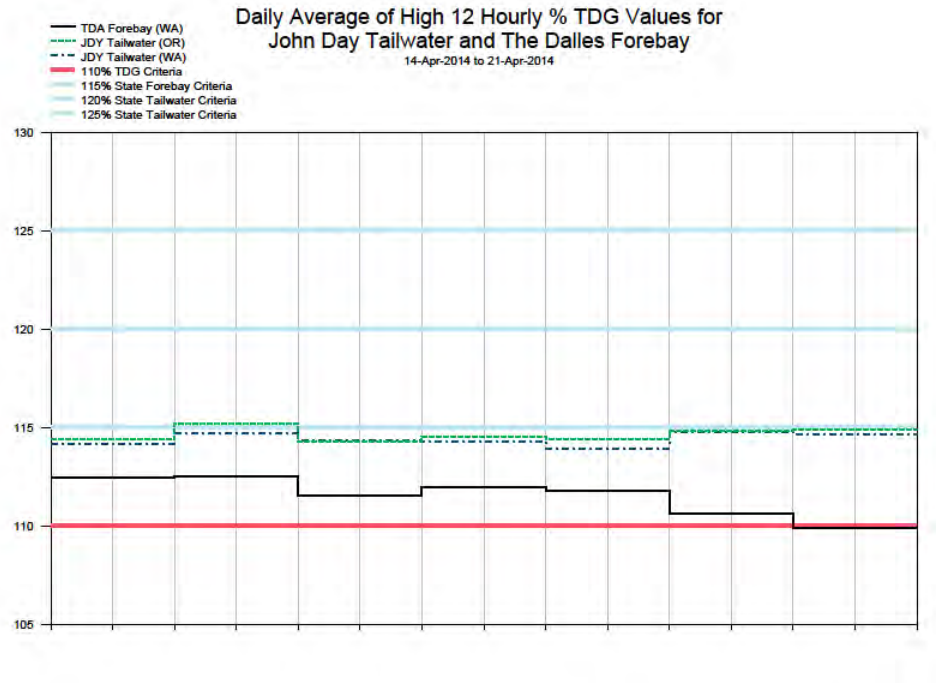

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/14/14 01:00
04/14/14 13:00
04/15/14 01:00
04/15/14 13:00
04/16/14 01:00
04/16/14 13:00
04/17/14 01:00
04/17/14 13:00
04/18/14 01:00
04/18/14 13:00
04/19/14 01:00
04/19/14 13:00
04/20/14 01:00
04/20/14 13:00
04/21/14 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
14-Apr-2014 to 21-Apr-2014
TDA Forebay (WA)
JDY Tailwater (OR)
JDY Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

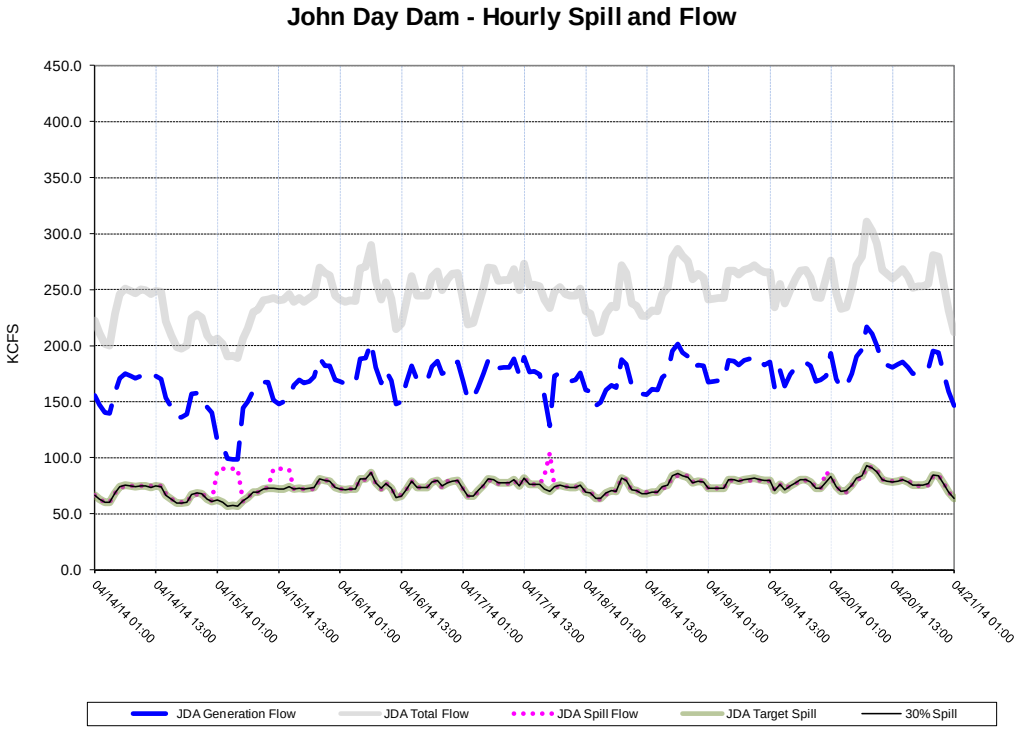
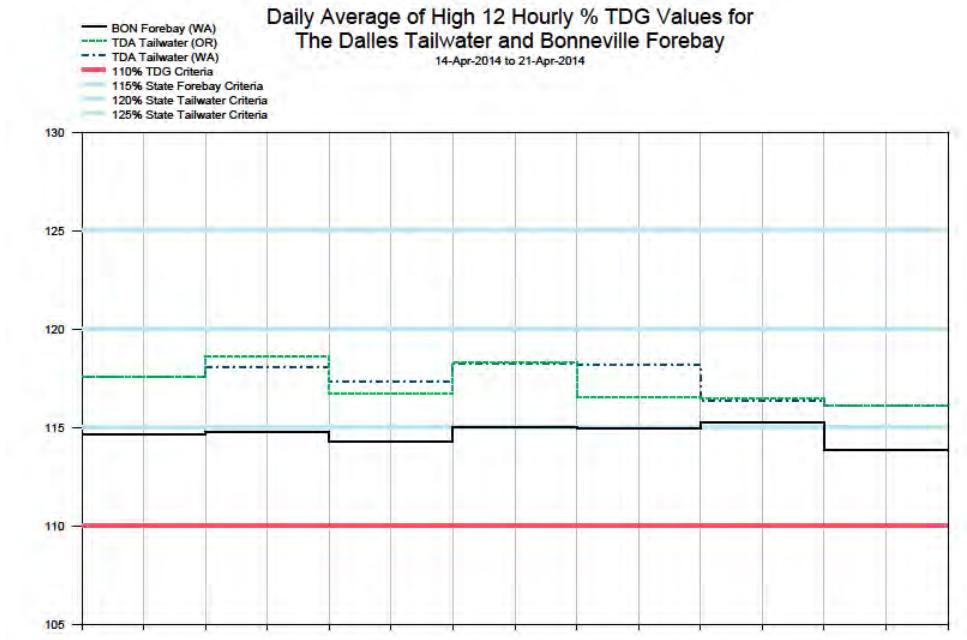

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/14/14 01:00
04/14/14 13:00
04/15/14 01:00
04/15/14 13:00
04/16/14 01:00
04/16/14 13:00
04/17/14 01:00
04/17/14 13:00
04/18/14 01:00
04/18/14 13:00
04/19/14 01:00
04/19/14 13:00
04/20/14 01:00
04/20/14 13:00
04/21/14 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
14-Apr-2014 to 21-Apr-2014
BON Forebay (WA)
TDA Tailwater (OR)
TDA Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

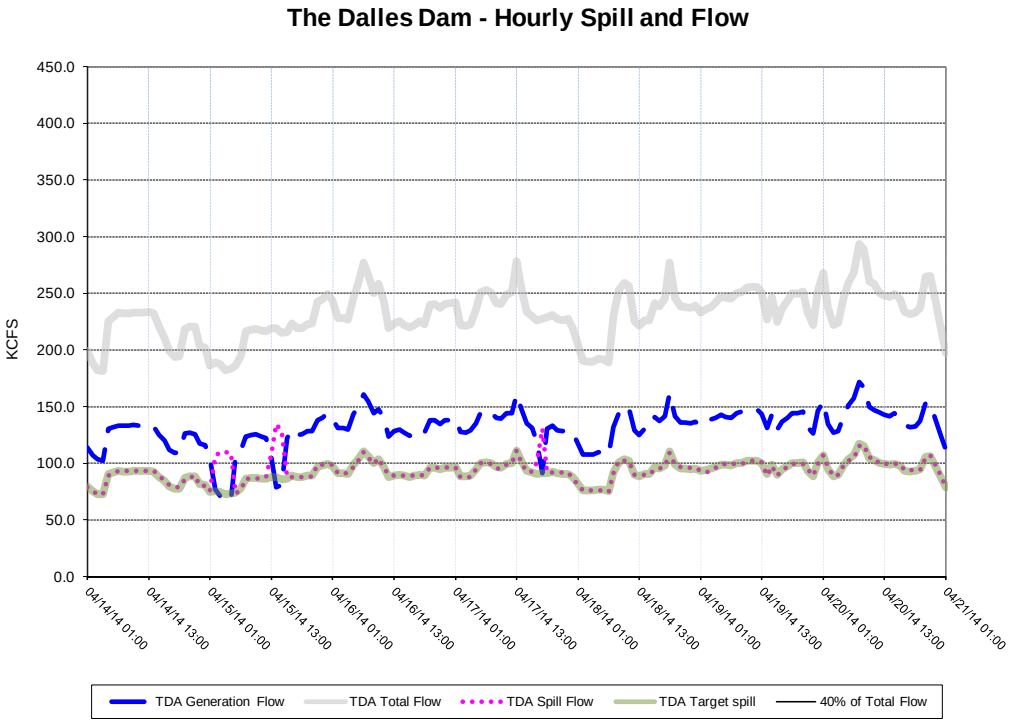
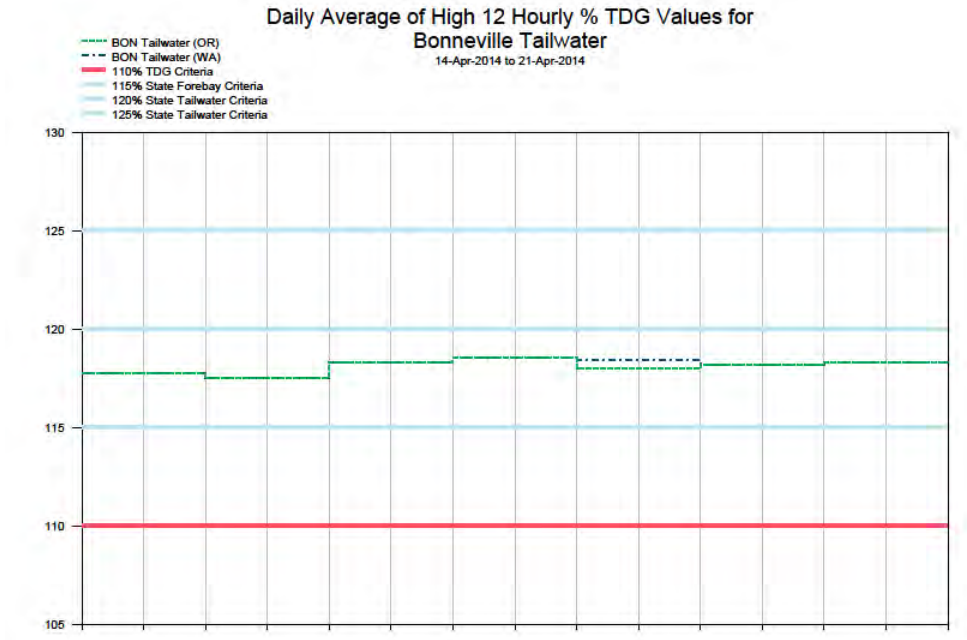

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/14/14 01:00
04/14/14 13:00
04/15/14 01:00
04/15/14 13:00
04/16/14 01:00
04/16/14 13:00
04/17/14 01:00
04/17/14 13:00
04/18/14 01:00
04/18/14 13:00
04/19/14 01:00
04/19/14 13:00
04/20/14 01:00
04/20/14 13:00
04/21/14 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
14-Apr-2014 to 21-Apr-2014
BON Tailwater (OR)
BON Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

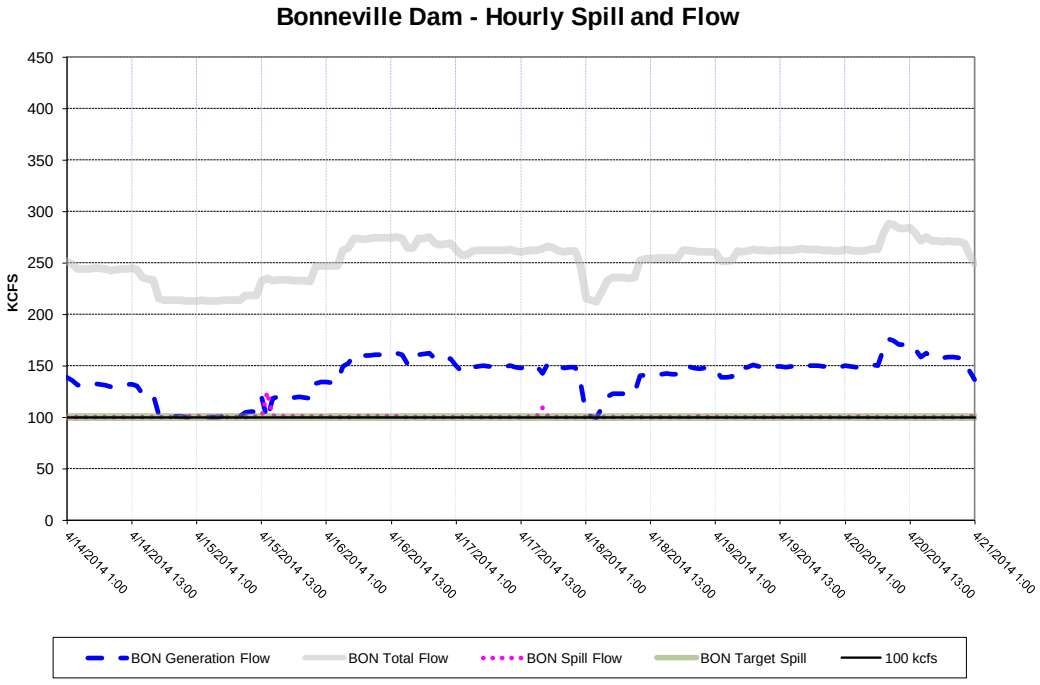
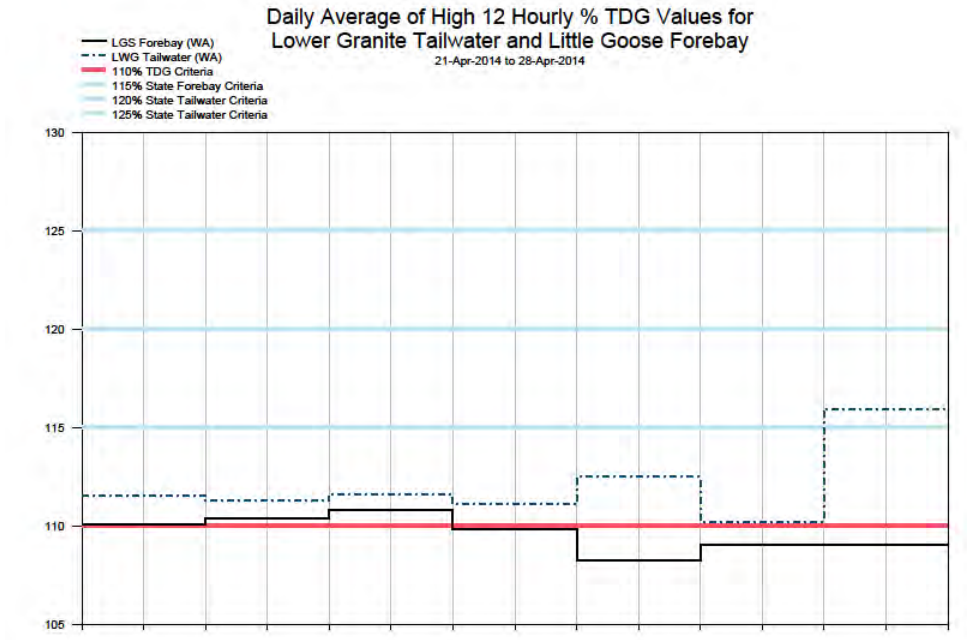

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
4/14/2014 1:00
4/14/2014 13:00
4/15/2014 1:00
4/15/2014 13:00
4/16/2014 1:00
4/16/2014 13:00
4/17/2014 1:00
4/17/2014 13:00
4/18/2014 1:00
4/18/2014 13:00
4/19/2014 1:00
4/19/2014 13:00
4/20/2014 1:00
4/20/2014 13:00
4/21/2014 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
21-Apr-2014 to 28-Apr-2014
LGS Forebay (WA)
LWG Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

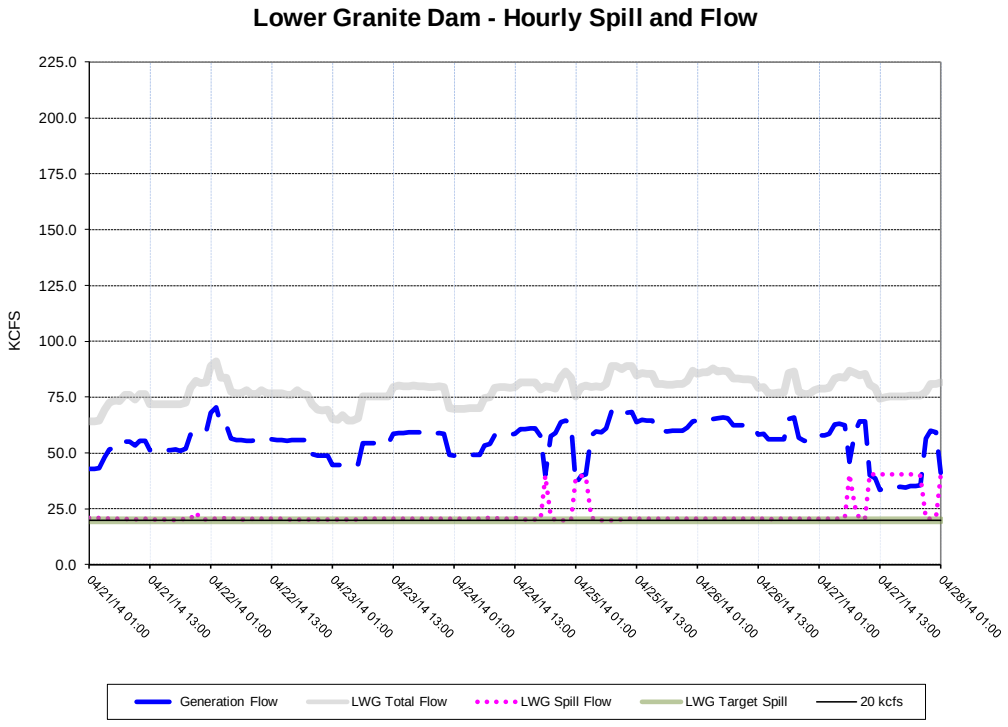
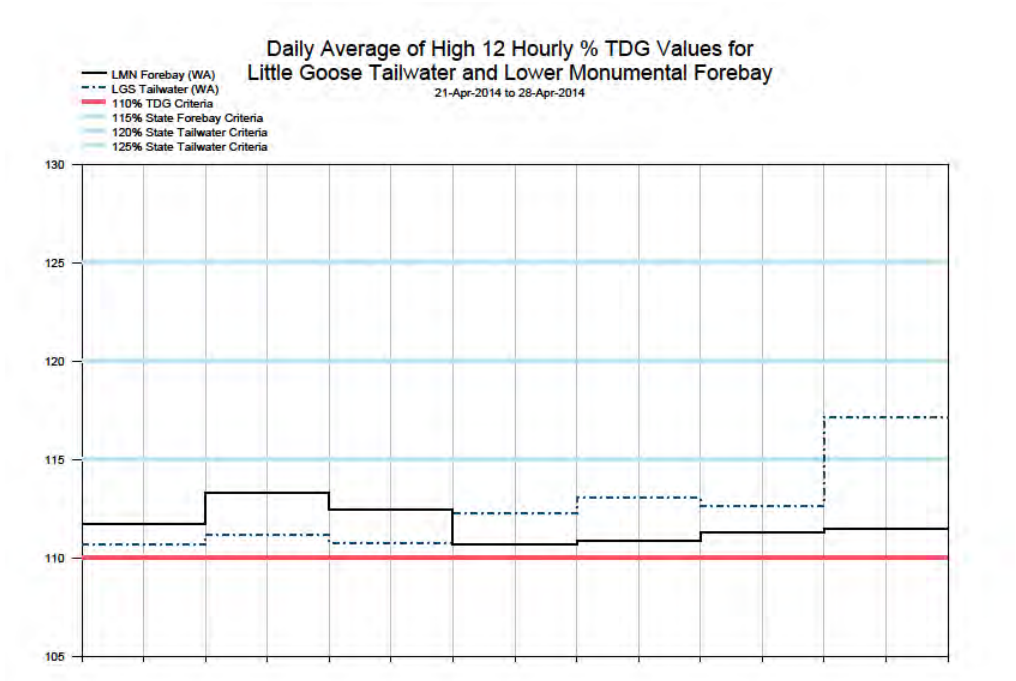

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/21/14 01:00
04/21/14 13:00
04/22/14 01:00
04/22/14 13:00
04/23/14 01:00
04/23/14 13:00
04/24/14 01:00
04/24/14 13:00
04/25/14 01:00
04/25/14 13:00
04/26/14 01:00
04/26/14 13:00
04/27/14 01:00
04/27/14 13:00
04/28/14 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
21-Apr-2014 to 28-Apr-2014
LMN Forebay (WA)
LGS Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

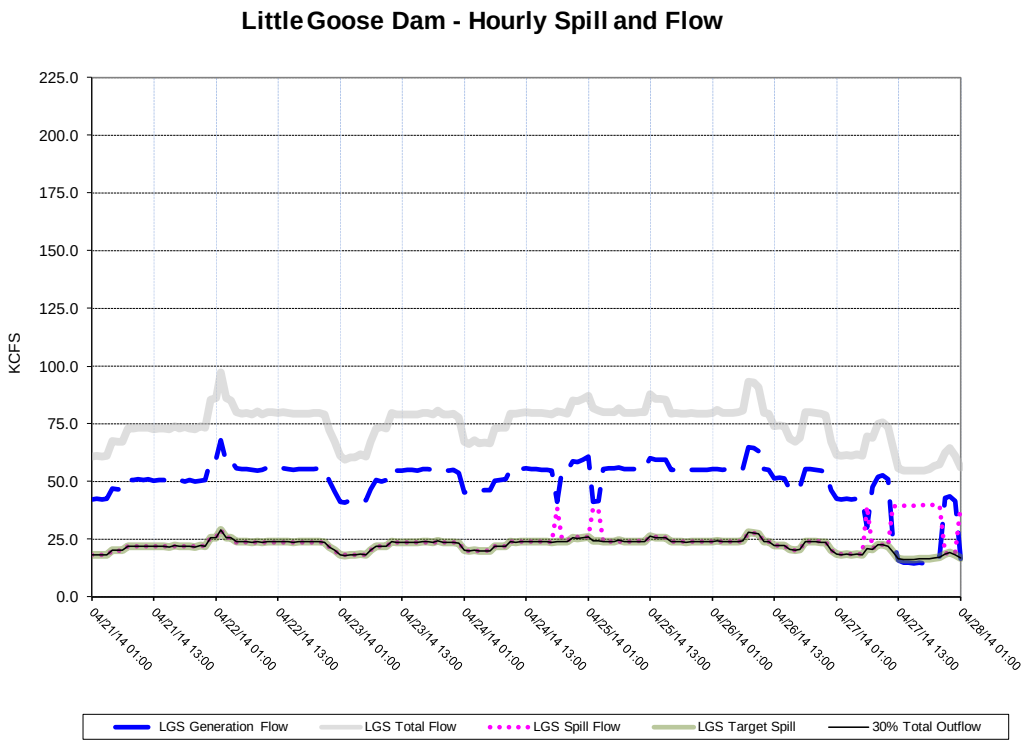
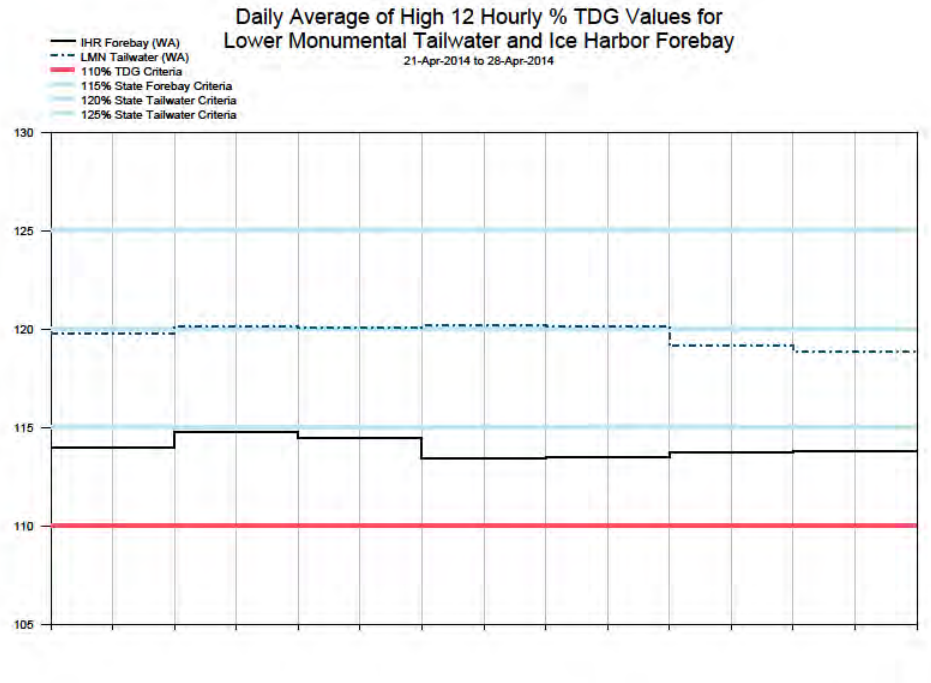

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/21/14 01:00
04/21/14 13:00
04/22/14 01:00
04/22/14 13:00
04/23/14 01:00
04/23/14 13:00
04/24/14 01:00
04/24/14 13:00
04/25/14 01:00
04/25/14 13:00
04/26/14 01:00
04/26/14 13:00
04/27/14 01:00
04/27/14 13:00
04/28/14 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% Total Outflow

Figure 23


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay
21-Apr-2014 to 28-Apr-2014
IHR Forebay (WA)
LMN Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

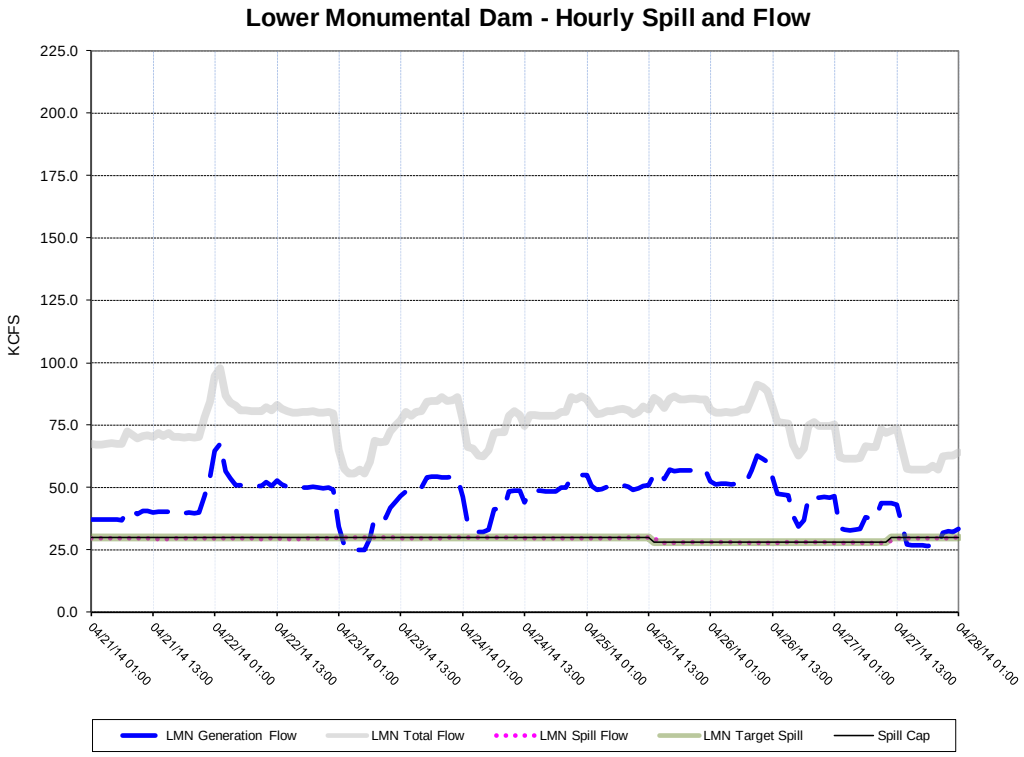
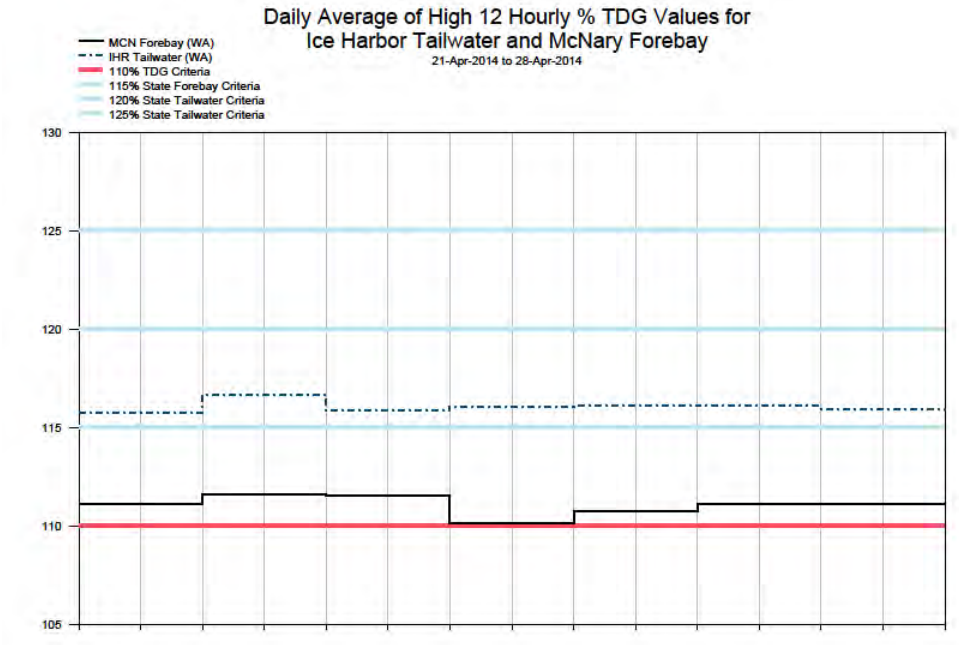

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/21/14 01:00
04/21/14 13:00
04/22/14 01:00
04/22/14 13:00
04/23/14 01:00
04/23/14 13:00
04/24/14 01:00
04/24/14 13:00
04/25/14 01:00
04/25/14 13:00
04/26/14 01:00
04/26/14 13:00
04/27/14 01:00
04/27/14 13:00
04/28/14 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
21-Apr-2014 to 28-Apr-2014
MCN Forebay (WA)
IHR Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

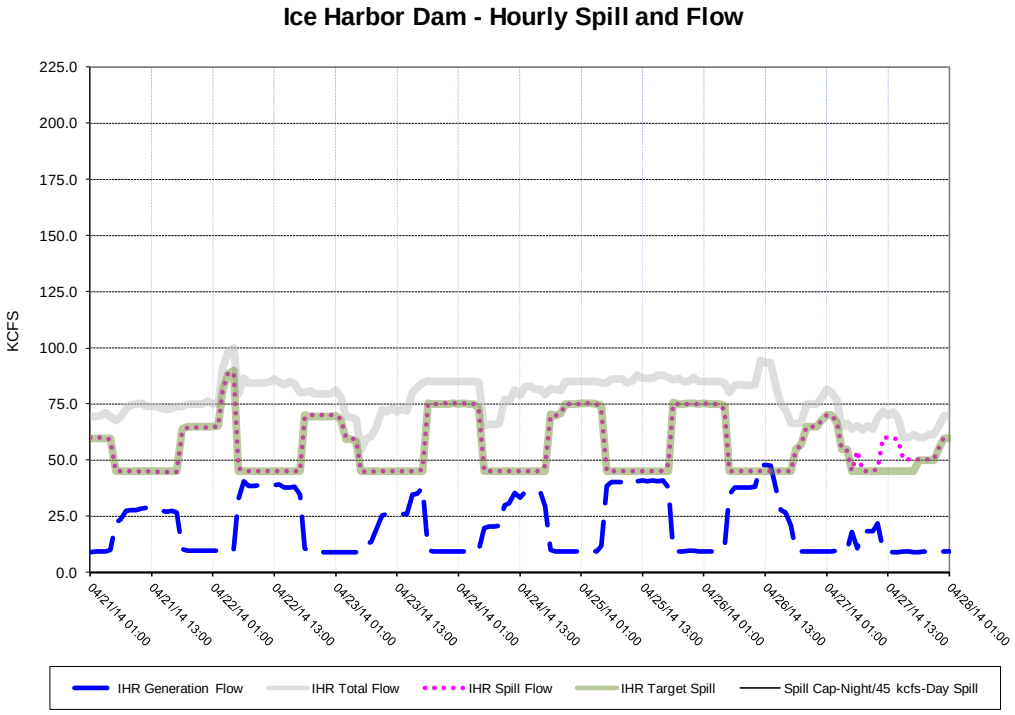
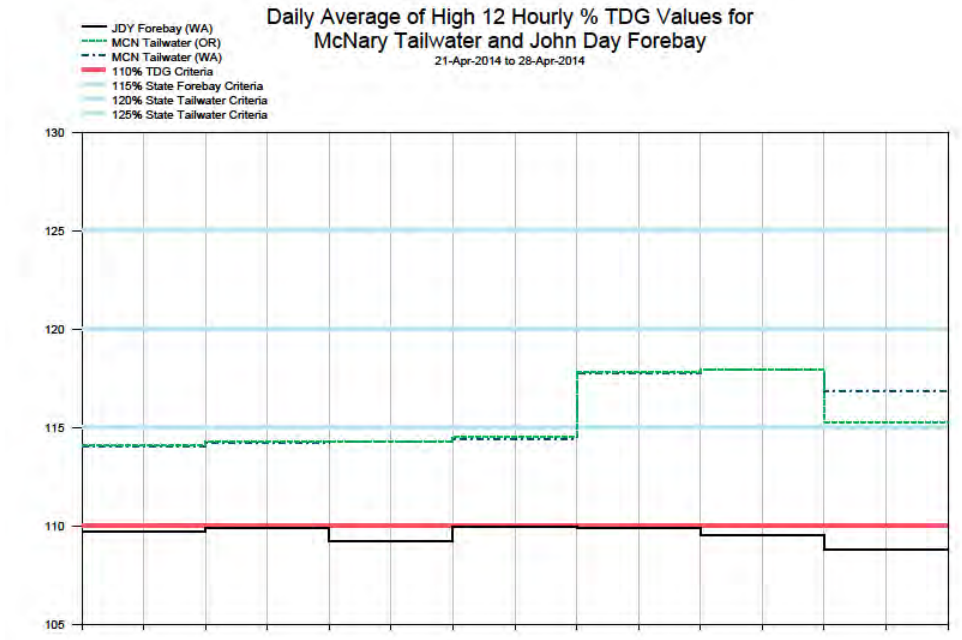

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/21/14 01:00
04/21/14 13:00
04/22/14 01:00
04/22/14 13:00
04/23/14 01:00
04/23/14 13:00
04/24/14 01:00
04/24/14 13:00
04/25/14 01:00
04/25/14 13:00
04/26/14 01:00
04/26/14 13:00
04/27/14 01:00
04/27/14 13:00
04/28/14 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
21-Apr-2014 to 28-Apr-2014
JDY Forebay (WA)
MCN Tailwater (OR)
MCN Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

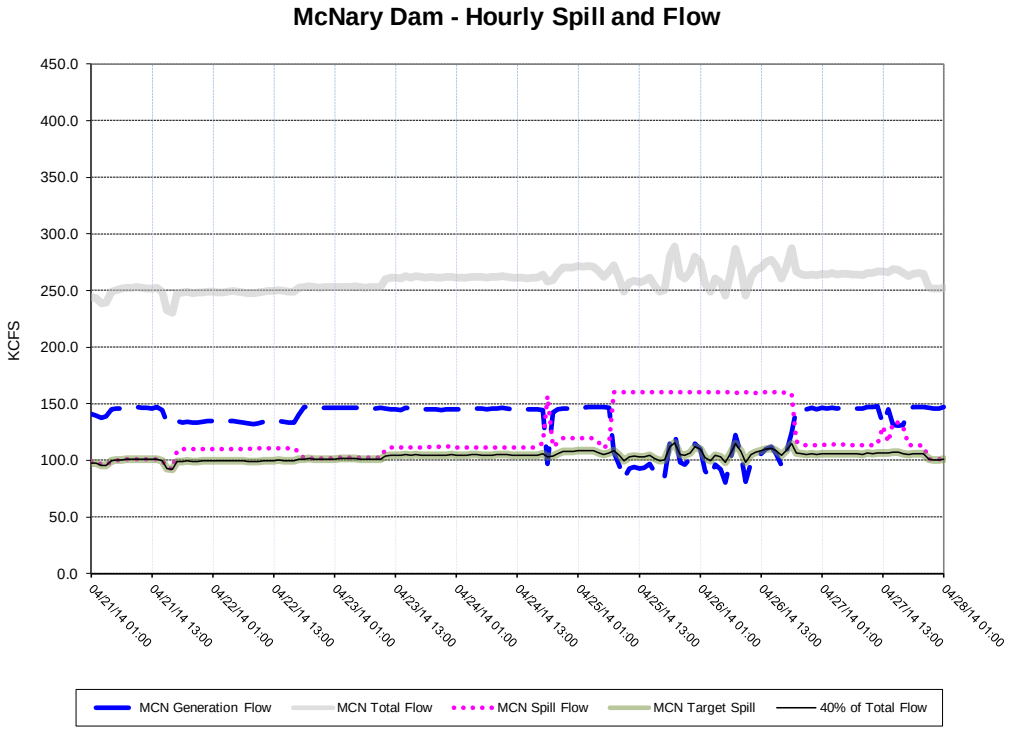
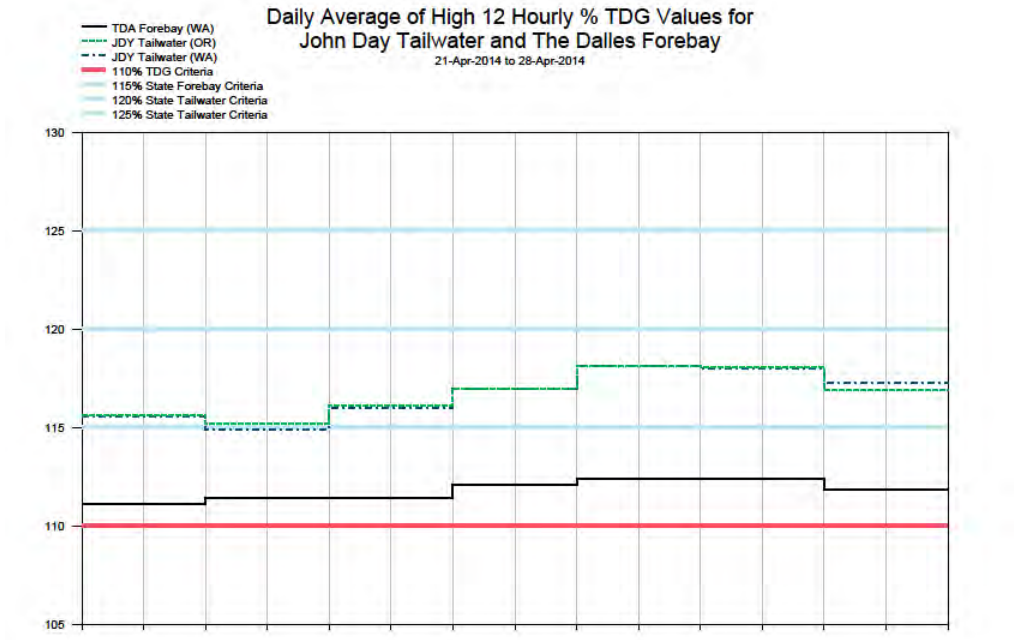

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/21/14 01:00
04/21/14 13:00
04/22/14 01:00
04/22/14 13:00
04/23/14 01:00
04/23/14 13:00
04/24/14 01:00
04/24/14 13:00
04/25/14 01:00
04/25/14 13:00
04/26/14 01:00
04/26/14 13:00
04/27/14 01:00
04/27/14 13:00
04/28/14 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
21-Apr-2014 to 28-Apr-2014
TDA Forebay (WA)
JDY Tailwater (OR)
JDY Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

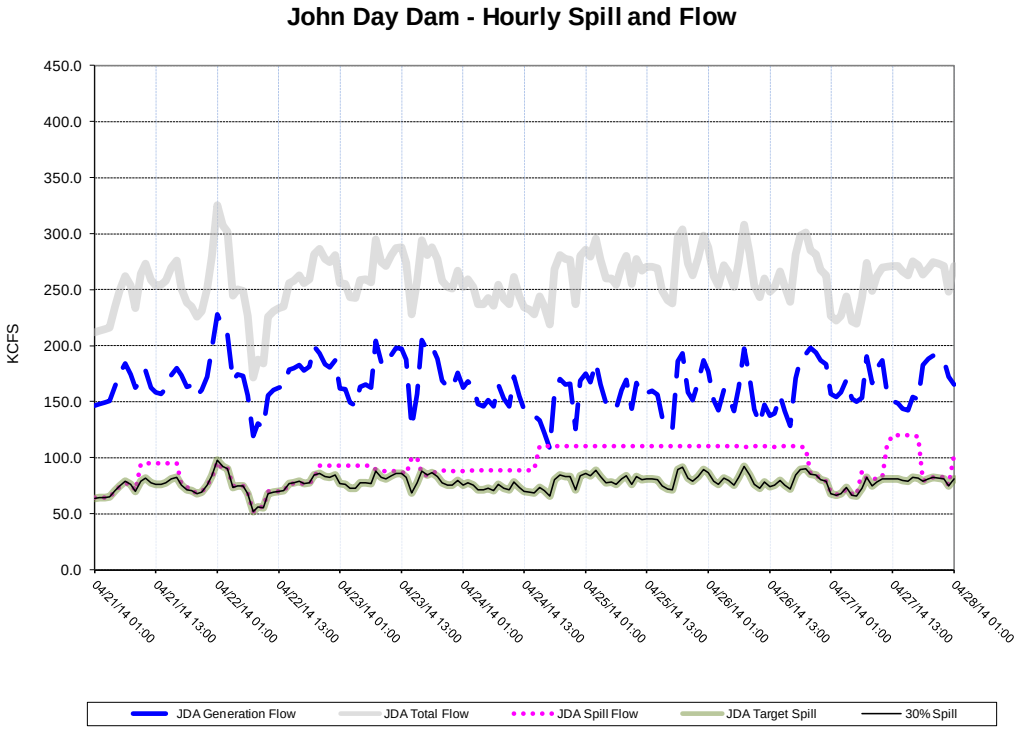
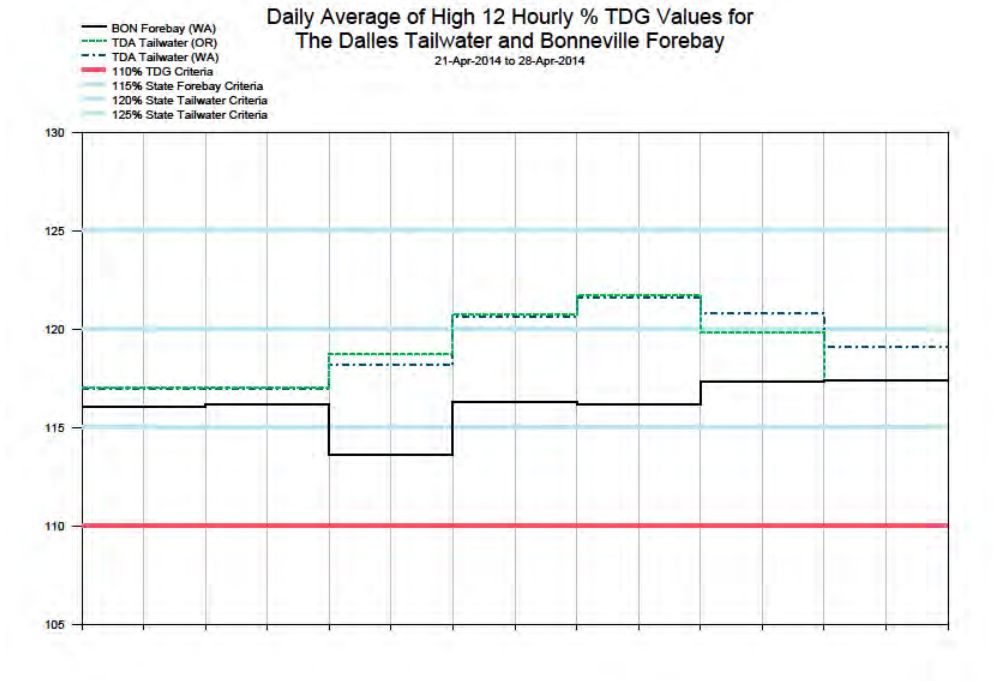

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/21/14 01:00
04/21/14 13:00
04/22/14 01:00
04/22/14 13:00
04/23/14 01:00
04/23/14 13:00
04/24/14 01:00
04/24/14 13:00
04/25/14 01:00
04/25/14 13:00
04/26/14 01:00
04/26/14 13:00
04/27/14 01:00
04/27/14 13:00
04/28/14 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
21-Apr-2014 to 28-Apr-2014
BON Forebay (WA)
TDA Tailwater (OR)
TDA Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

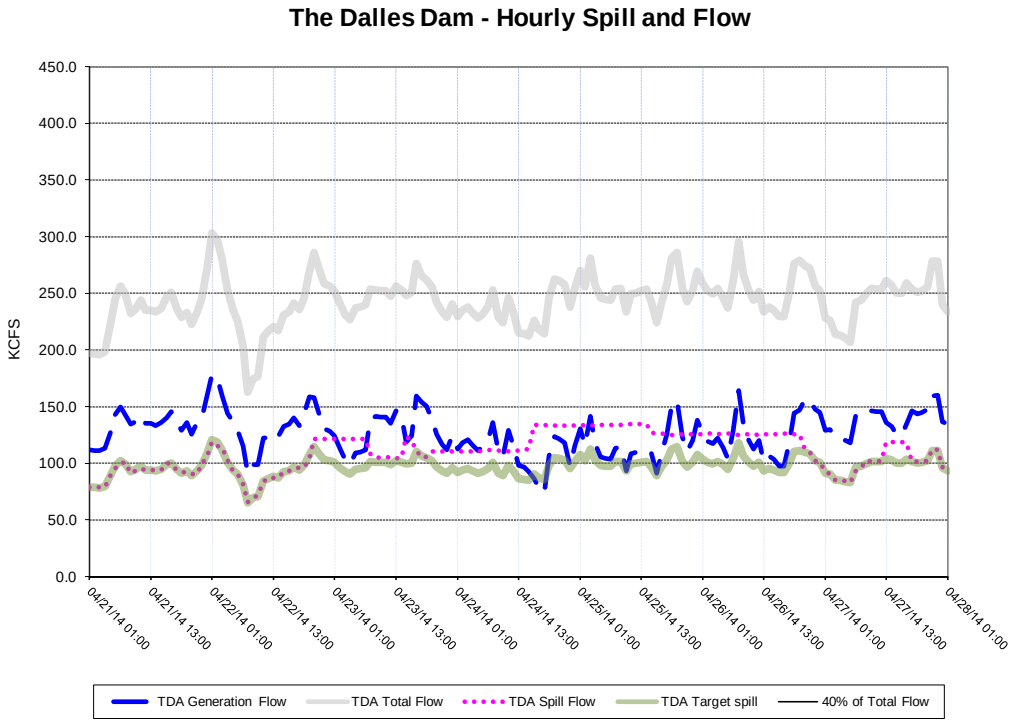
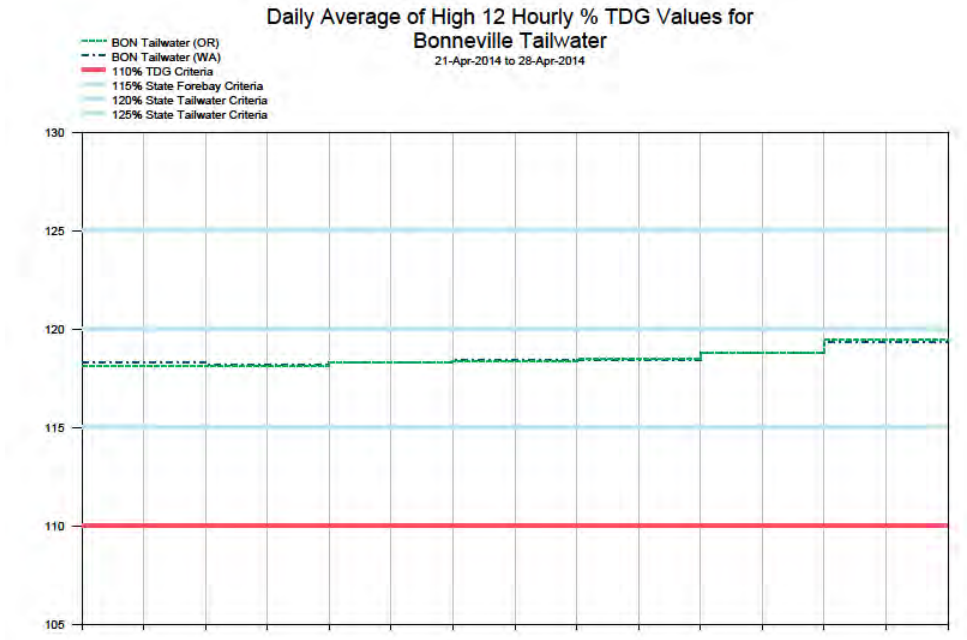

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/21/14 01:00
04/21/14 13:00
04/22/14 01:00
04/22/14 13:00
04/23/14 01:00
04/23/14 13:00
04/24/14 01:00
04/24/14 13:00
04/25/14 01:00
04/25/14 13:00
04/26/14 01:00
04/26/14 13:00
04/27/14 01:00
04/27/14 13:00
04/28/14 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
21-Apr-2014 to 28-Apr-2014
BON Tailwater (OR)
BON Tailwater (WA)
110% TDG Criteria
115% State Forebay Criteria
120% State Tailwater Criteria
125% State Tailwater Criteria
130
125
120
115
110
105

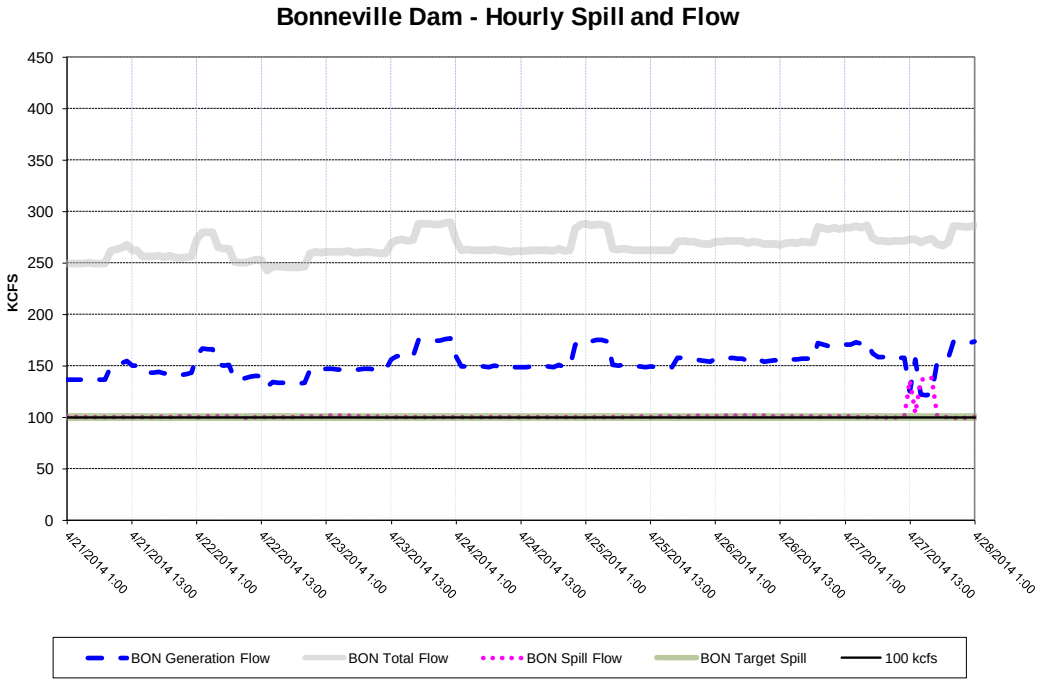

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
4/21/2014 1:00
4/21/2014 13:00
4/22/2014 1:00
4/22/2014 13:00
4/23/2014 1:00
4/23/2014 13:00
4/24/2014 1:00
4/24/2014 13:00
4/25/2014 1:00
4/25/2014 13:00
4/26/2014 1:00
4/26/2014 13:00
4/27/2014 1:00
4/27/2014 13:00
4/28/2014 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Table 1
Average Percent TDG Values For April 1 – April 27

Date	FIXED MONITORING STATIONS																			
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW		JDY	JHAW		TDA	TDDO		BON	CCIW	
Method:	WA	WA	WA	WA	WA	WA	WA	WA	WA	OR	WA	WA	OR	WA	WA	OR	WA	WA	OR	WA
Gas Cap %	115	120	115	120	115	120	115	120	115	120	120	115	120	120	115	120	120	115	120	120
4/1/2014	104.4	107.4	104.5	106.9	103.0	104.1	103.6	103.3	107.0	116.6	~~116.6~~	108.9	~~108.1~~	108.5	108.4	~~107.8~~	108.4	107.9	~~113.4~~	113.8
4/2/2014	103.8	107.3	104.0	106.8	103.0	103.9	103.7	103.3	107.0	~~115.7~~	116.2	108.2	~~107.3~~	107.8	106.6	~~106.3~~	106.8	106.9	112.1	~~112.1~~
4/3/2014	103.5	111.8	103.8	109.2	103.7	117.4	103.8	115.3	106.9	115.7	~~115.7~~	107.3	~~106.7~~	106.8	106.1	106.4	~~106.4~~	106.0	112.2	~~112.2~~
4/4/2014	103.8	111.8	104.6	109.4	104.0	117.5	104.3	115.7	106.8	~~114.0~~	114.2	107.2	107.0	~~107.0~~	106.1	106.4	~~106.4~~	106.2	~~110.8~~	111.1
4/5/2014	103.7	111.6	104.7	109.4	104.7	117.8	109.8	115.5	107.3	~~112.8~~	113.3	107.2	~~106.8~~	107.0	106.1	~~106.3~~	106.4	106.2	112.5	~~112.5~~
4/6/2014	103.5	111.1	107.4	110.4	105.4	117.7	110.3	115.6	107.6	113.7	~~113.7~~	107.1	~~106.7~~	106.7	106.1	~~105.8~~	106.3	105.5	~~111.3~~	111.9
4/7/2014	103.3	111.2	108.6	111.0	106.5	118.1	111.7	115.6	108.3	113.3	~~113.3~~	108.0	107.8	~~107.8~~	106.9	107.1	~~107.1~~	106.3	112.8	~~112.8~~
4/8/2014	104.3	112.1	111.6	111.8	109.5	118.4	114.6	115.8	110.8	114.4	~~114.3~~	108.9	108.2	~~108.2~~	107.8	108.1	~~108.1~~	107.3	~~111.8~~	112.9
4/9/2014	104.4	111.7	111.7	111.2	111.0	118.8	114.7	115.7	112.3	115.4	~~115.4~~	108.8	~~107.3~~	108.1	107.8	~~107.3~~	108.0	107.3	~~111.0~~	111.0
4/10/2014	105.0	111.5	112.2	112.1	111.6	120.1	114.8	116.9	112.3	~~114.3~~	115.4	108.2	117.2	~~117.1~~	108.7	114.7	~~114.6~~	106.9	117.7	~~117.7~~
4/11/2014	105.2	111.4	112.5	112.0	112.8	**120.7**	**116.1**	117.4	111.5	114.5	~~114.5~~	110.5	~~113.7~~	114.1	110.6	116.2	~~116.2~~	111.0	117.8	~~117.8~~
4/12/2014	105.2	112.0	112.5	112.6	113.3	118.9	**116.1**	116.4	111.4	~~114.3~~	114.3	110.8	114.1	~~113.9~~	111.4	116.5	~~116.5~~	113.0	117.8	~~117.7~~
4/13/2014	104.7	112.0	112.0	112.4	113.1	118.5	**115.5**	116.3	110.9	114.2	~~114.2~~	110.7	114.1	~~113.8~~	111.6	116.9	~~116.8~~	113.2	117.9	~~117.8~~
4/14/2014	104.3	111.7	110.6	111.9	113.0	118.8	114.4	116.1	110.2	113.9	~~113.8~~	113.2	114.4	~~114.2~~	112.5	117.5	~~117.5~~	114.7	~~117.8~~	117.8
4/15/2014	104.7	115.0	110.8	113.9	113.2	118.9	114.7	116.5	110.2	116.4	~~115.4~~	113.4	115.2	~~114.7~~	112.5	118.6	~~118.1~~	114.7	117.6	~~117.6~~
4/16/2014	104.8	114.2	110.3	113.1	112.2	118.8	114.3	116.4	109.3	115.5	~~115.5~~	111.6	114.3	~~114.1~~	111.6	~~116.7~~	117.3	114.5	118.5	~~118.5~~
4/17/2014	105.2	112.5	110.3	111.4	113.4	119.5	114.3	116.0	110.9	116.4	~~116.3~~	111.0	114.5	~~114.3~~	112.0	118.3	~~118.2~~	115.0	118.6	~~118.6~~
4/18/2014	104.8	112.6	110.5	111.4	113.4	119.5	114.3	115.9	110.9	~~115.4~~	116.2	110.9	114.4	~~113.9~~	111.7	~~116.4~~	118.1	114.8	~~118.1~~	118.5
4/19/2014	104.5	113.4	110.9	112.4	110.5	119.7	112.8	115.9	109.2	~~114.3~~	114.4	108.8	114.8	~~114.7~~	110.6	116.5	~~116.4~~	115.2	118.3	~~118.2~~
4/20/2014	103.9	114.0	110.2	112.8	109.9	119.3	111.9	115.6	109.9	114.3	~~114.1~~	108.0	114.8	~~114.7~~	110.1	116.2	~~116.2~~	113.8	118.4	~~118.4~~
4/21/2014	103.7	111.5	110.1	110.7	111.9	119.8	114.1	115.8	111.1	114.1	~~114.1~~	109.8	115.7	~~115.6~~	111.1	117.0	~~117.0~~	**116.1**	~~118.2~~	118.4
4/22/2014	103.5	111.3	110.4	111.2	113.3	120.1	114.8	116.6	111.6	114.2	~~114.2~~	109.8	115.3	~~114.9~~	111.4	117.1	~~116.9~~	**116.1**	~~118.2~~	118.3
4/23/2014	103.1	111.6	110.8	110.8	112.3	120.0	114.4	115.8	111.5	114.3	~~114.3~~	109.3	116.1	~~116.0~~	111.6	118.8	~~118.2~~	113.7	~~118.5~~	118.5
4/24/2014	102.8	111.1	109.8	112.3	110.7	120.2	113.4	116.0	110.1	114.5	~~114.5~~	109.9	117.1	~~117.1~~	112.1	**120.9**	~~120.8~~	**116.3**	~~118.6~~	118.6
4/25/2014	102.1	112.5	108.1	113.0	110.9	120.1	113.6	116.1	110.9	117.9	~~117.8~~	109.9	118.1	~~118.1~~	112.4	**121.7**	~~121.6~~	**116.2**	118.7	~~118.6~~
4/26/2014	102.5	110.2	109.0	112.7	111.3	119.0	113.7	116.1	111.1	117.9	~~117.9~~	109.5	118.1	~~118.0~~	112.3	~~119.8~~	**120.6**	**117.4**	119.0	~~119.0~~
4/27/2014	102.5	115.9	109.0	117.1	111.5	118.8	113.8	115.9	111.1	~~115.2~~	116.5	108.8	~~116.9~~	116.9	111.9	~~117.4~~	118.9	**117.4**	119.6	~~119.5~~

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