Appendix E

Hourly Spill and Flow and Daily Average of High 12 Hour % TDG Data

(2007 Spill Implementation Status Monthly Reports to the US District Court)

FISH OPERATION PLAN IMPLEMENTATION REPORT
April 2007

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 April 16, 2007 court order requiring the Corps to provide monthly reports on the implementation of project spill for fish passage and fish transportation operations provided for in the 2007 Fish Operations Plan (FOP). The FOP describes the Corps project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the April – August 2007 fish migration season. Consistent with the 2004 Biological Opinion adaptive management strategy, this plan incorporates the project operations contained in the "Agreement Regarding 2007 Federal Columbia River Power System Fish Operations" (Agreement)[1]. The Corps agreed to provide 2007 fish passage operations in accordance with the Agreement as identified in Attachment 1 of the Agreement[2]. Water management operations not addressed in the Agreement will continue to be consistent with the operations considered in the 2004 Biological Opinion and in particular, the 2007 Water Management Plan and 2007 Fish Passage Plan (FPP).

The Corps' lower Columbia and Snake River project and fish passage operations for the month of April 2007 identified in the FOP 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 12-hour average total dissolved gas (TDG) for the tailwater at each project and for the next project's forebay downstream.

This report also provides information on issues presented and unanticipated or emergency situations that arose during implementation of the spill program for the month of April 2007.

Data Reporting:

[1] The Agreement signed by the Bonneville Power Administration (BPA), Confederated Tribes of the Warm Springs Reservation, Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes and Bands of the Yakama Nation, and Confederated Tribes of the Colville Indian Reservation, was submitted to the Federal District Court on January 9, 2007.
[2] Brigadier General Martin committed to implement the 2007 operations identified in Attachment 1 of the Agreement by letter dated December 15, 2006.

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

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

For the lower Snake River projects: Lower Granite, Little Goose, Lower Monumental, and Ice Harbor dams, the weekly graphs begin on April 3. For the lower Columbia River projects: McNary, John Day, The Dalles, and Bonneville dams, the weekly graphs begin on April 10.

Each figure represents one week of operation for a project. The graphs start on Monday 0100 hours through Monday 0100 hours for the following dates:

April 3 – April 8	Figures 1 - 4
April 9 – April 15	Figures 5 – 12
April 16 – April 22	Figures 13 - 20
April 23 – April 29	Figures 21 - 28

A. Upper Graph: Shows the resultant daily average percent TDG for the 12 highest hours as the result of spill from the dam. The objective is to operate each project up to the TDG limits without exceeding those limits if practicable.

- The blue line on the graph represents the TDG in the tailrace of the dam. 120% TDG is the upper operating limit.
- The green line represents the TDG in the forebay of the next dam downstream. 115% is the upper operating limit.

B. Lower Graph: Represents the 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 heavy red line represents the hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2007 FOP.
- Each graph includes a heavy black line that represents the target spill. This is the hourly maximum spill level that is subject to the following conditions:

    - Spill percentage or discharge specified in the FOP;
    - Spill caps as set daily for TDG management;
    - Test spill levels for fish passage research; and,
    - Minimum generation for power system needs.

The hourly target spill may vary as a function of quantity of river flow and generating units available at a project.

II. A monthly FOP Spill Report Table is included at the end of the report that shows the overall daily results of the average percent TDG for the 12 highest hours for all projects. The numbers in red show exceedances of the TDG gas cap - 115% (forebay) or 120% (tailwater) for each project.

General Implementation Remarks:

Please note that for all of the projects that spill for fish passage, the target spill may be limited to a lesser quantity (i.e. the spill cap), with the objective of staying within the TDG state waiver limits. When spill levels briefly deviated below or above the level described in the FOP, the heavy red line will be below or above the heavy black line in the graphs. Whenever the operation varied from the target spill during voluntary spill hours, or other anomalies occurred, these instances are described in the FOP Spill Report Table below. Occurrences which prompted more extensive regional coordination are described in greater detail in the paragraphs below.

Also note that while spill operations called for at Bonneville Dam are spill to the spill cap up to approximately 100 kcfs, the project operator sets the spill gates to the 100 kcfs spill pattern; however, actual spill levels usually range between 98 – 100 kcfs. A number of factors influence this including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The minimum generation ranges for Ice Harbor Dam were updated in the final FOP dated April 18 (p. 15). The updated ranges are from 65 – 70 MW and 9 – 10 kcfs for units 1-3, and 80 - 81 MW and 11 – 12 kcfs for units 4-6. This change results in more efficient operation of the generators at the project and was coordinated regionally through FPOM and TMT.

At McNary Dam, a spring spill test started on April 16, 2007 and will continue until June 12, 2007 to examine passage, survival rates, and behavior under two treatments of project operations. Two different spill patterns will be used using a 2 day treatment within 4-day block design.

In the FOP Spill Report Table below, the result of “load swing hours” appears as a reason for not meeting the hourly spill at The Dalles Dam. This occurs because projects on the Lower Columbia must be available to respond to within-hour load variability to satisfy North American Electric Reliability Council (NERC) reserve requirements (“on response”). During periods of rapidly changing loads, projects on response may have significant changes in turbine discharge within the hour. Under normal conditions, within-hour load changes the most on hours immediately preceding and after the peak load hours, while spill quantity remains the same within the hour. These hours may be referred to as “load swing hours.” Due to the high variability of within-hour load, these load swing hours may have a greater instance of reporting actual spill percentages that

differ more from the requirement than other hours. On every day cited in the table, the day-average spill was between 39-41%.

April Operations:

The month of April was characterized by below average flows on the lower Snake and Columbia rivers. Spill operations commenced on April 3 at the Corps' lower Snake River projects and on April 10 on the lower Columbia River. During the April reporting period, the FOP spill operations were carried out as follows:

- Lower Granite Dam - the hourly target spill was a fixed quantity of 20 kcfs through each day;
- Little Goose Dam - the target spill was 30% of the total flow;
- Lower Monumental Dam - the target spill was to the spill cap, which was estimated to be about 27 kcfs in the FOP;
- Ice Harbor (45 kcfs/spill cap night) and John Day (0 day/60% night) dams - the spill levels described in the FOP varied from daytime to nighttime, and is shown as the heavy black line on the graph;
- McNary and The Dalles dams - the target spill was 40% of total flow; and,
- Bonneville Dam - the hourly target spill was a fixed quantity of approximately 100 kcfs.

Operational Adjustments Occurring in April:

1. On April 3, a power operation occurred at John Day, The Dalles and Bonneville dams that resulted in operations outside 1% peak efficiency for a few hours. This occurrence was presented at the April 4 TMT meeting and is detailed in the Oliver Declaration filed submitted to the Court on May 1, 2007.

2. As a result of faulty equipment at Little Goose Dam on April 3, there was a reduction in spill as pools on the lower Snake River filled back to their normal operating ranges. Detailed information about what occurred at Little Goose Dam and the downstream effects is presented in the Henriksen Declaration submitted to the Court on May 1, 2007. This occurrence was presented at the April 4 TMT meeting.

3. In the FOP Spill Report Table below, "forebay elevation" appears as an explanation for spill changes at Lower Monumental and Ice Harbor dams. This results when projects reach a forebay limit and occurs most often at lower Snake projects which have a one foot operating range. On April 3 for example, Lower Monumental reached the bottom forebay limit during the early morning and spill was reduced and generation was ramped down to minimum until the forebay returned to be within the operating range. During the evening of April 3, the opposite occurred: the project reached the top of the forebay range and spill was increased. Conditions like this occur several times over the spill season and are generally caused by uncertainty in inflows. Additionally, Lower Monumental's forebay is difficult to manage even under

normal conditions due to harbor resonance, or waves that oscillate within the reservoir.

Changes in the discharge level at any reservoir can create wave run-up or recession. The run-up or recession may at times result in a persistent wave that propagates between the upstream and down stream ends of the reservoir – like water sloshing back-and-forth in a bathtub. This resonance effect can be triggered by either rapid changes at the reservoir or the reservoir immediately upstream. While this can occur at any reservoir, the physical characteristics of the Lower Monumental reservoir make it very susceptible. It is difficult to estimate the size and timing of these waves, which make it difficult to manage forebay elevation when the operating range is limited. The April 3 examples at Lower Monumental cited in the previous paragraph were instances of this resonance effect.

4. Also, Lower Monumental stopped spill for approximately 15 minutes on April 9 to ensure safe passage of a fuel barge, and for three hours on April 11 for repositioning of the RSW contractor's barge next to the navigation lock. These occurrences were discussed at the TMT forum as indicated in the meeting notes of April 4. As noted in the FOP, for pre-installation work associated with the Lower Monumental RSW, from April 3 – 13, spill was not to exceed 27 kcfs to ensure worker safety while working in the forebay. For this reason, the spill cap at Lower Monumental Dam was set at 26.4 kcfs (the stop closest to 27 kcfs on the spill pattern table) from 0001 hours on April 3 to 0700 April 14. During this time, up to April 13 an alternative spill pattern was employed using only spill bays 1-4. Subsequent to the completion of this pre-installation work, the setting of the spill cap was dependent upon the determination of the spill flows necessary to achieve 120% in the tailwater and 115% in the downstream forebay. Additionally, spill bay 8 was not usable while the crane used to remove the stoplog was being repaired. On April 4, TMT members agreed to use of the 2004 spill patterns until spill bay 8 returned to service, which included spillbay 1, 3, and 7. This pattern went into effect April 13 through April 18 and did not affect the volume of spill. Normal spill operations were restored at Lower Monumental when bay 8 was returned to service on April 18.

5. Other spill operations in the lower Snake River that varied from those described in the FOP were discussed and agreed to in Regional Forum processes prior to their commencement. Those operations coordinated with regional salmon managers were planned such that they would have the least impact to fish (also cited in the FOP Spill Report Table below). Little Goose (April 13), Lower Monumental (April 14), and Ice Harbor (April 12) dams had a total of approximately 12 hours of zero spill due to the installation or adjustments in research equipment in the spill bay area. The research was regionally coordinated through the TMT forum and was documented in the TMT notes on April 4, 11, and 13.

6. Three studies of fish transportation were regionally coordinated through either the Corps' Anadromous Fish Evaluation Program or BPA's Provincial Review Process. The Corps' studies include the early season transport study and alternative barge

release study. The BPA study is an extra mortality study of fish trucking. Evaluations of early fish transport were conducted in April, prior to the start of transport operations. Transport barges were scheduled to depart Lower Granite weekly, beginning April 12, for the studies. However, following the first barge departure, concerns about this early schedule were raised by signatory tribes to the 2007 Agreement, which calls for fish transport operations to begin between April 20 and May 1. As a result of coordination with theses Tribes, the second barge was postponed and barging of fish for studies occurred as follows:

The first transport research barge to evaluate in-river fish vs. transported fish left Lower Granite on April 12. Additional barges left Lower Granite on April 21 and April 26. A research barge left Lower Granite on April 30 for an alternative release site study. The Tribes did not agree with early fish releases for the extra mortality study, and the study was delayed until May 2. Operations to transport juvenile fish were planned to begin with fish collections at Lower Granite starting on May 1.

FOP Spill Report Table

Project	Parameter	Date	Time	Hours	Type	Reason
Little Goose	flow	4/3/2007	1200-1600	5	Forebay elevation	GDACS error reporting forebay elevation. When discovered by operator, data was manually corrected. Generation and spill were reduced due to low forebay elevation. (Cited in 5/1 Henriksen Declaration.)
Little Goose	Spill	4/11/2007	1000 - 1900	10	Excess Spill - Safety	Power outage request for breaker installation, per teletype on 11 April @ 8:40am and prior coordination at the 4 April TMT meeting. 24 hour average spill was 47.9% (FOP: 30%).
Little Goose	Spill	4/13/2007	1200-1400	3	Research - Safety	Entire spillbay outage occurred so that USGS could adjust research equipment on the spillway peirnoses. This operation was agreed to during the 13 April TMT conference call.
Lower Monumental	Spill	4/3/2007	0500 - 0600	2	Forebay elevation	Forebay elevation low at hours 0400 and 0600 (536.8 & 536.5) spill and generation reduced to restore forebay elevation to the minimum operating range between 537 - 538 ft. Minimum generation achieved during hour, but start of hour reading slightly above minimum.

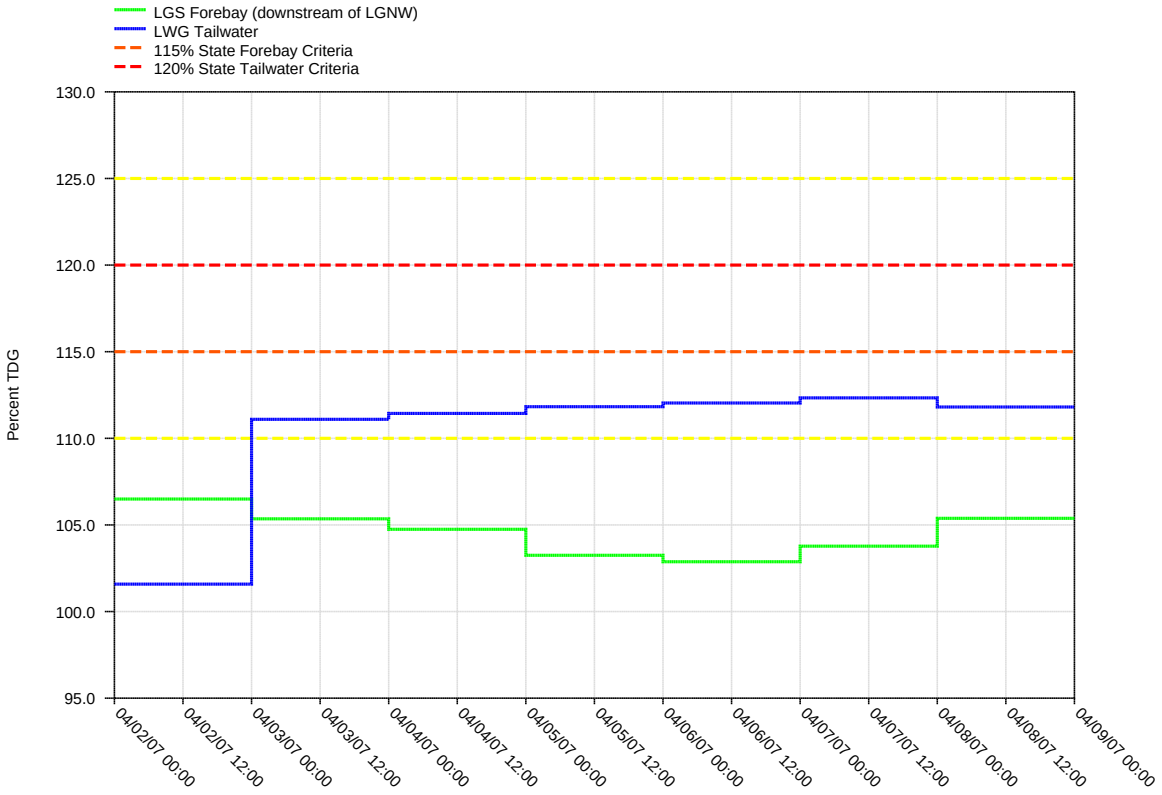
Lower Monumental	Spill	4/3/2007	1300 - 1800	6	Forebay elevation	Minimum generation achieved during hour, but start of hour reading slightly above minimum. Spill reduced because of upstream operations. (Cited in 5/1 Henriksen Declaration.)
Lower Monumental	Spill	4/3/2007	2100	1	Forebay elevation	Forebay elevation high; spill increased to 40.6 kcfs to maintain reservoir within forebay elevation of 537 to 538 ft.
Lower Monumental	Spill	4/9/2007	1600	1	Barge	Barge needed low spill for safe passage. This operation was coordinated at the 4 April TMT meeting.
Lower Monumental	Spill	4/11/2007	1400-1600	3	Safety	Zero spill was needed for the RSW contractor to reposition his barges next to the nav lock. A teletype was issued on 11 April and the operation was coordinated at the 4 April TMT meeting.
Lower Monumental	Spill	4/14/2007	0900-1300	5	Research - Safety	The spillway and unit outage was needed to install research equipment to the piernoses in the forebay. This operation was coordinated at the 4 April TMT meeting.
Lower Monumental	Spill	4/18/2007	1700 - 2000	4	Forebay elevation	Forebay elevation low; spill reduced and operated at minimum generation to restore forebay elevation to minimum operating range between 537 to 538 ft.
Lower Monumental	Spill	4/19/2007	1500 - 1700	3	Forebay elevation	Forebay elevation low; spill reduced and operated at minimum generation to restore forebay elevation to minimum operating range between 537 to 538 ft.
Lower Monumental	Spill	4/25/2007	1500	1	Safety	Spill 4 kcfs instead of spill cap of 23.4; spill bays 1-8 closed for safety purposes during repairs to the dock that is used to load fish, per teletype on 25 April.
Ice Harbor	Spill	4/3/2007	1300-2000	8	Forebay elevation	Project is on minimum generation and spill reduced because of upstream operations. (Cited in 5/1 Henriksen Declaration)

Ice Harbor	Spill	4/12/2007	1100-1500	5	Research	0 kcfs spill for about 5 hours and generation above 9.5 kcfs for an additional 3 hours in order to install hydrophones in the spill bay area. This operation was coordinated at the 11 April 2007 TMT meeting.
Ice Harbor	Spill	4/27/2007 & 4/29/07	0500-0800 & 0500-0700	7	Forebay elevation	Spill decreased in a.m. to manage forebay elevation; generation increased in afternoon to manage forebay within 437 to 438 ft elevation while spill met required 45 kcfs.
McNary	Spill pattern	4/11/2007	0900-2000	12	Research	Research equipment was removed causing spill to be bulked up at spillway 1-10 instead of 1-14, resulting in %TDG exceedance of 121.5 %TDG.
The Dalles	Spill	4/10/2007	1400-2000	7	Load swing hours	Hourly % spill below 39.0% (40% range) due to project being on response during rapidly changing load as a load swing hour as defined in the text on page 4. 24 hr avg. spill was 39.5%.
The Dalles	Spill	4/11/2007	1600-2000	5	Load swing hours	Hourly % spill below 39.0% (40% range) due to project being on response during rapidly changing load as a load swing hour as defined in the text on page 3. 24 hr avg. spill was 39.9%.
The Dalles	Spill	4/13/2007	1200-1300	2	Load swing hours	Hourly % spill above 41.0% (40% range), due to project being on response during rapidly changing load as a load swing hour as defined in the text on page 3. 24 hr avg. spill was 40.1%.
The Dalles	Spill	4/15/2007	0700 - 1900	13	Excess Spill	Hourly % spill above 41.0% (40% range) with highest value at 42.04%. Percent spill fluctuates due to physical limits of spill gate settings. 24 hr avg. spill was 41.0%
The Dalles	Spill	4/16/2007	1800, 2300	2	Excess Spill	Hourly % spill above 41.0% (40% range) with highest value at 41.71%. Percent spill fluctuates due to physical limits of spill gate settings. 24 hr avg. spill was 40.0%

The Dalles	Spill	4/17/07	0100-0500	5	Excess Spill	Hourly % spill above 41.0% (40% range) with highest value at 42.87%. Percent spill fluctuates due to physical limits of spill gate settings. 24 hr avg. spill was 40.1%
John Day	Spill	4/19/2007	2200-2300	2	Safety	The project spilled 56% and 58%, which is less than what the FOP calls for (60% night), due to the safe passage of a tow boat.
Bonneville	Spill	4/16/2007	0800-1500	8	Repair	Spilled up to 103.6 kcfs, which is more than FOP (~100kcfs). The scheduled powerhouse transmission line outage caused overspill.
Bonneville	Spill	4/18/2007	0100-2400	24	Spill Pattern	Spill only 97.7 kcfs as a daily average, less than the FOP called for. Project was using the new 100 kcfs spill pattern which resulted in 97-99 kcfs spill.

Figure 1.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

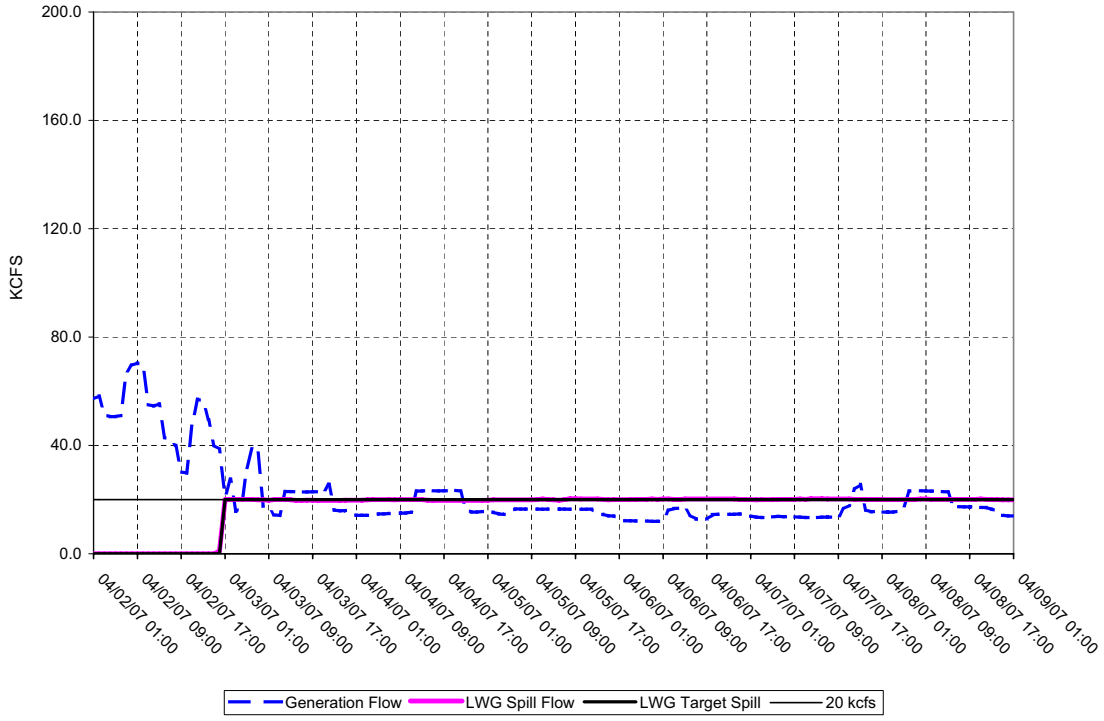
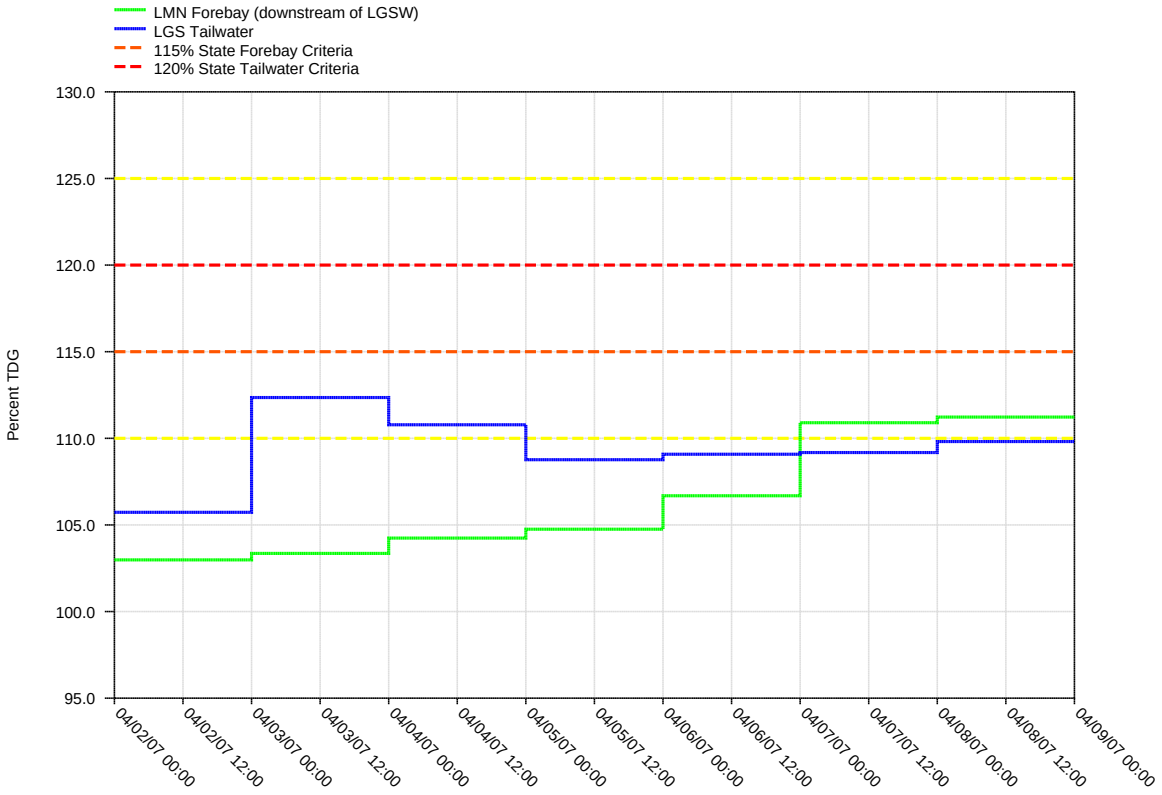


Figure 2.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

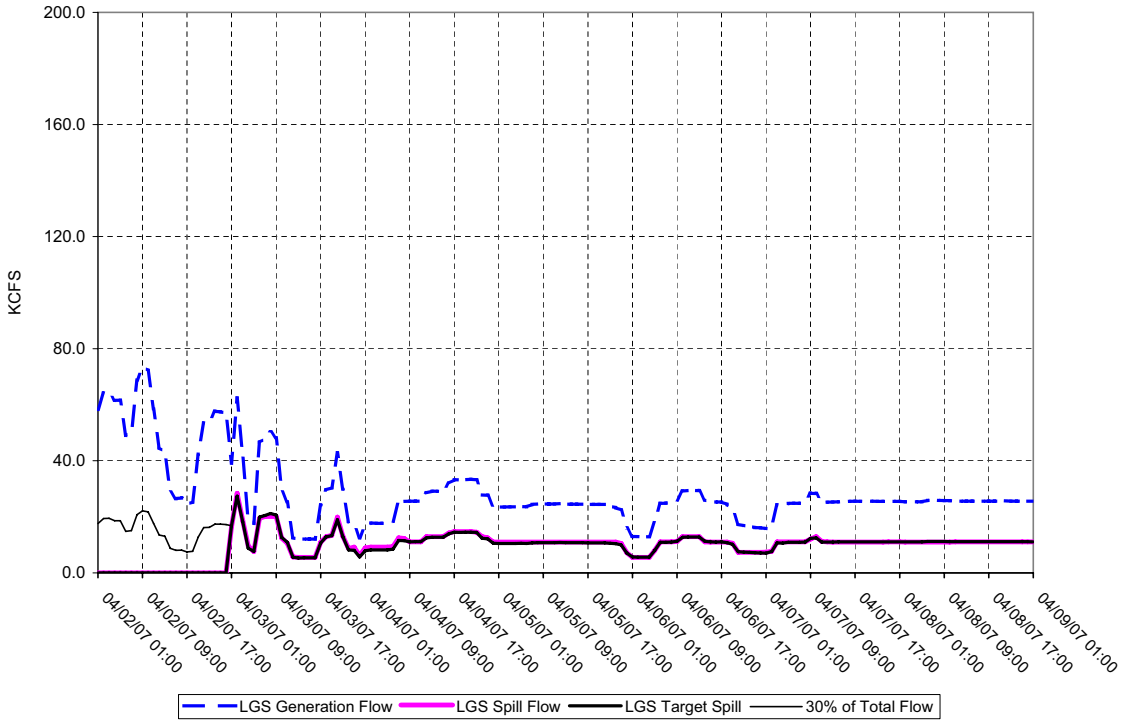
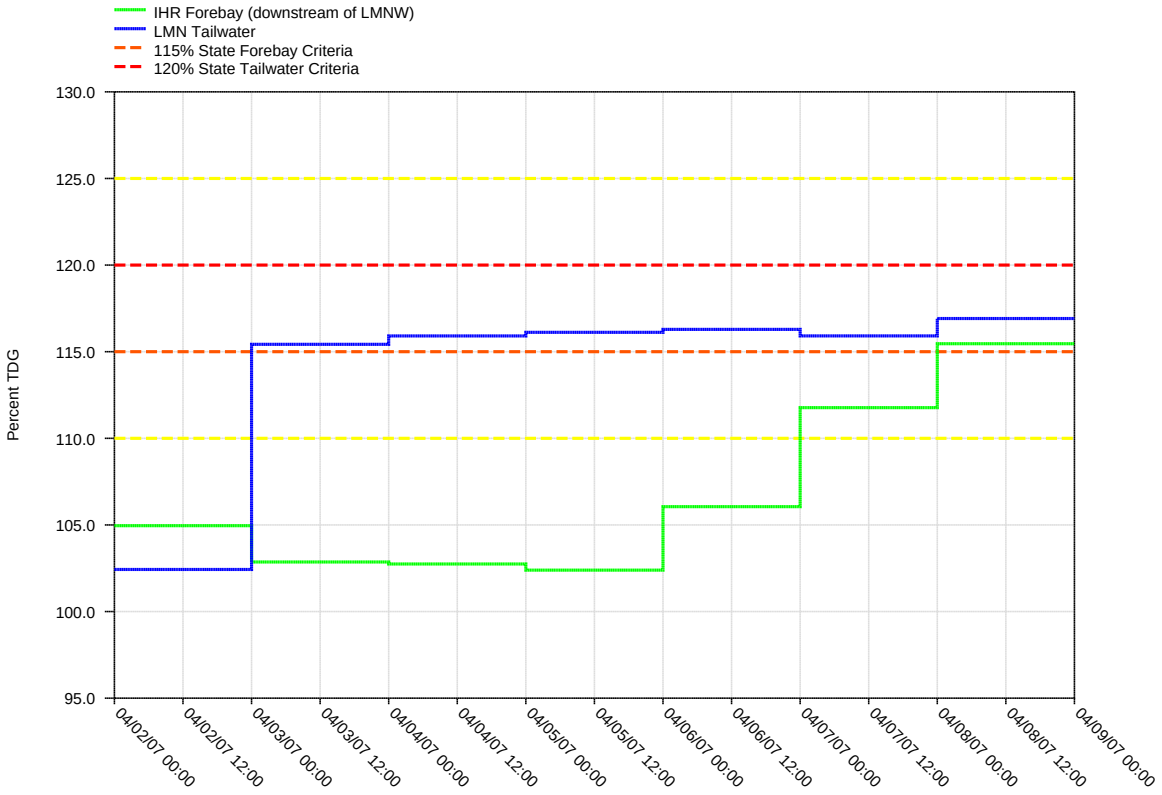


Figure 3.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

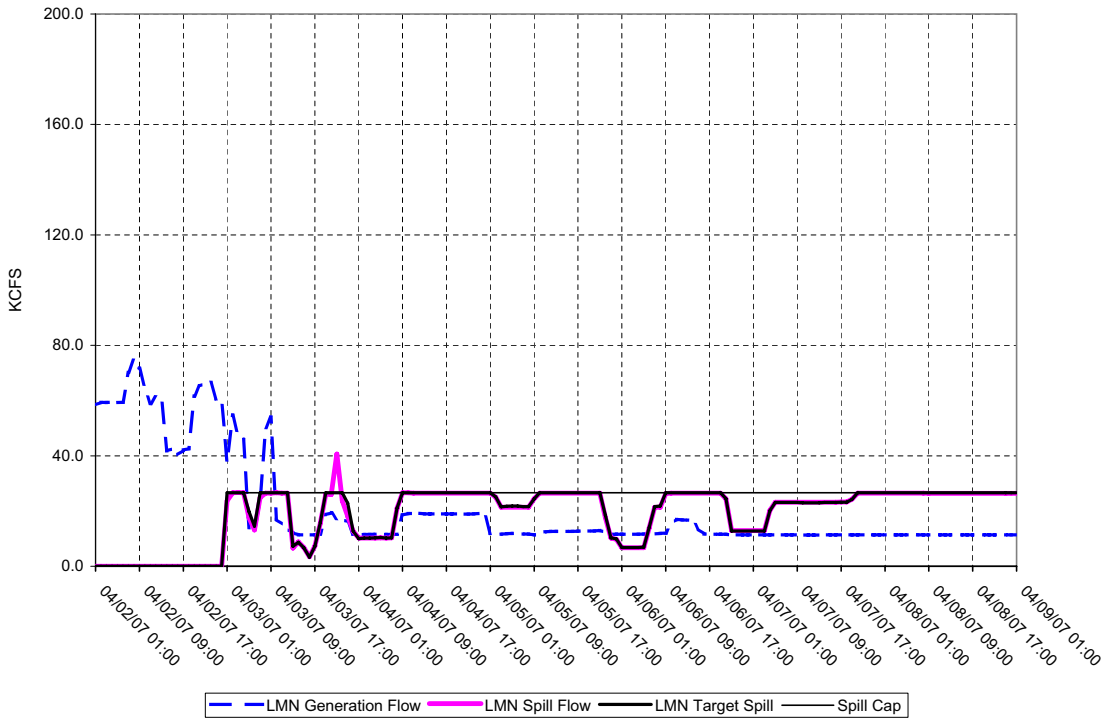
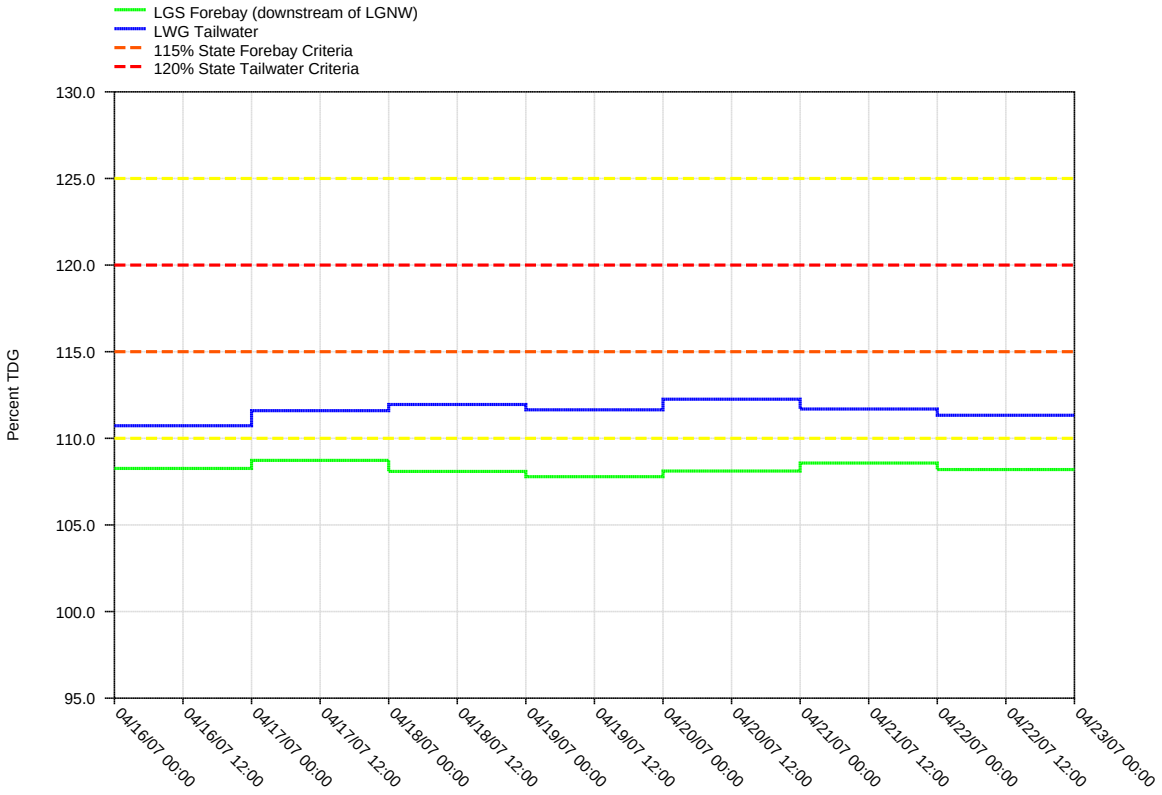


Figure 13.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

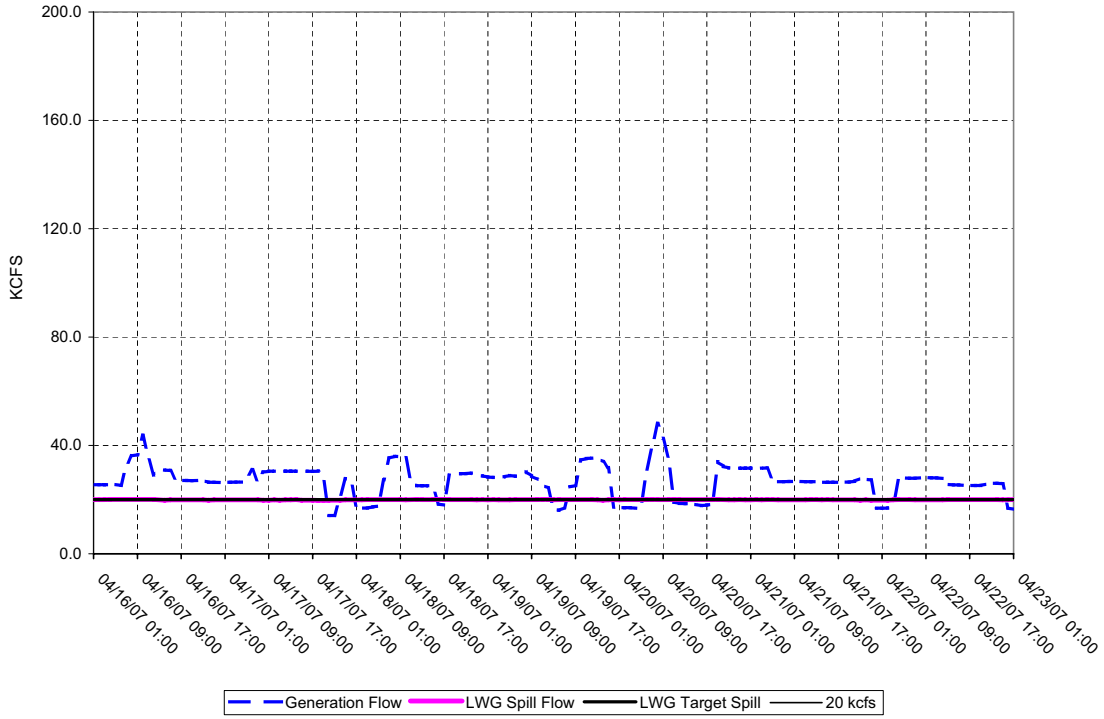
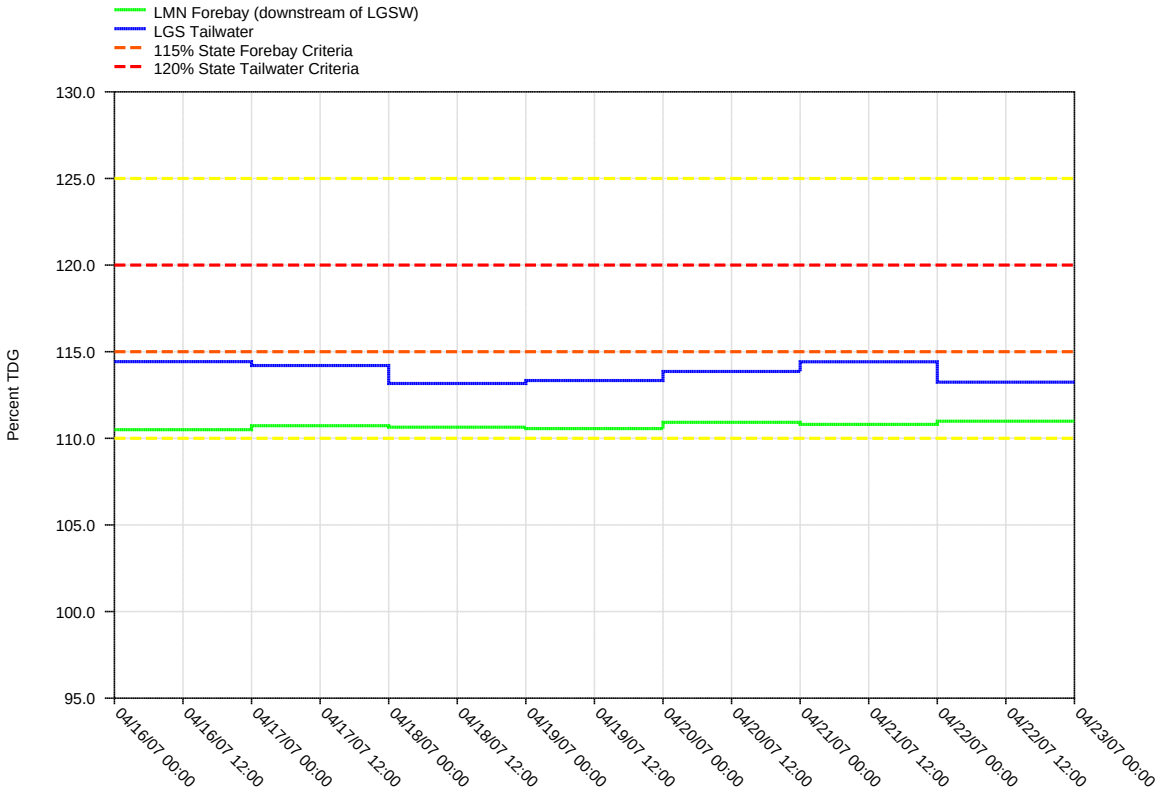


Figure 14.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

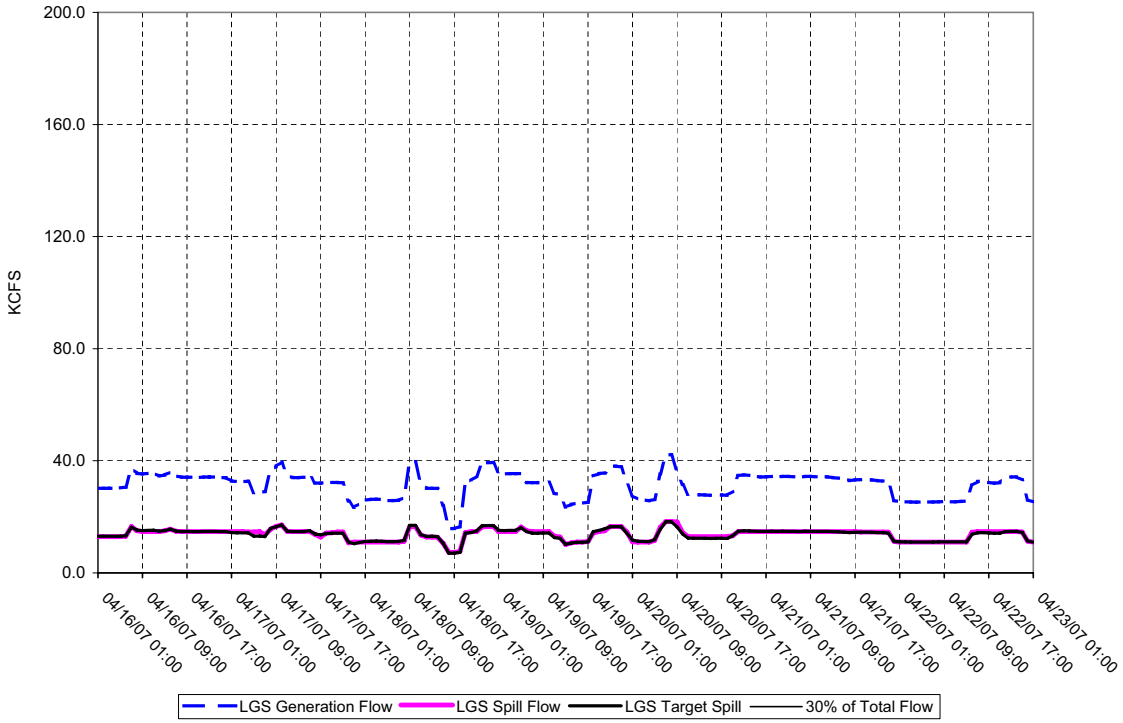
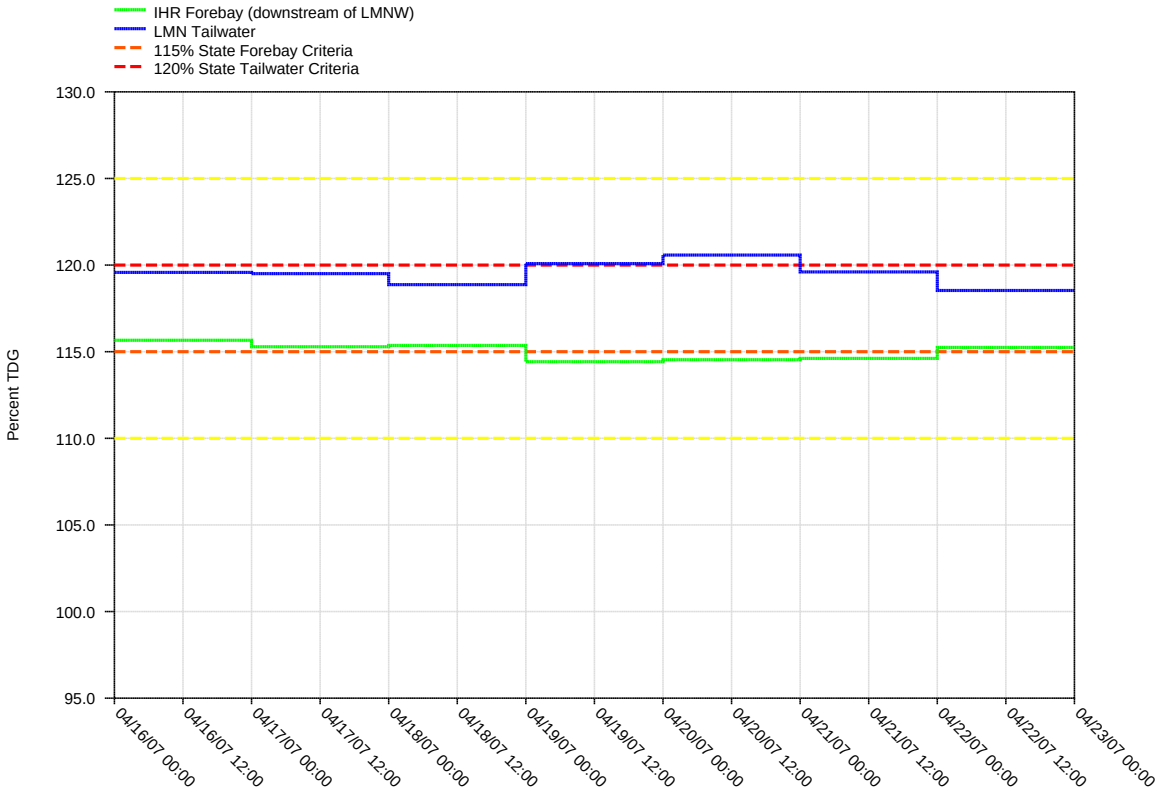


Figure 15.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

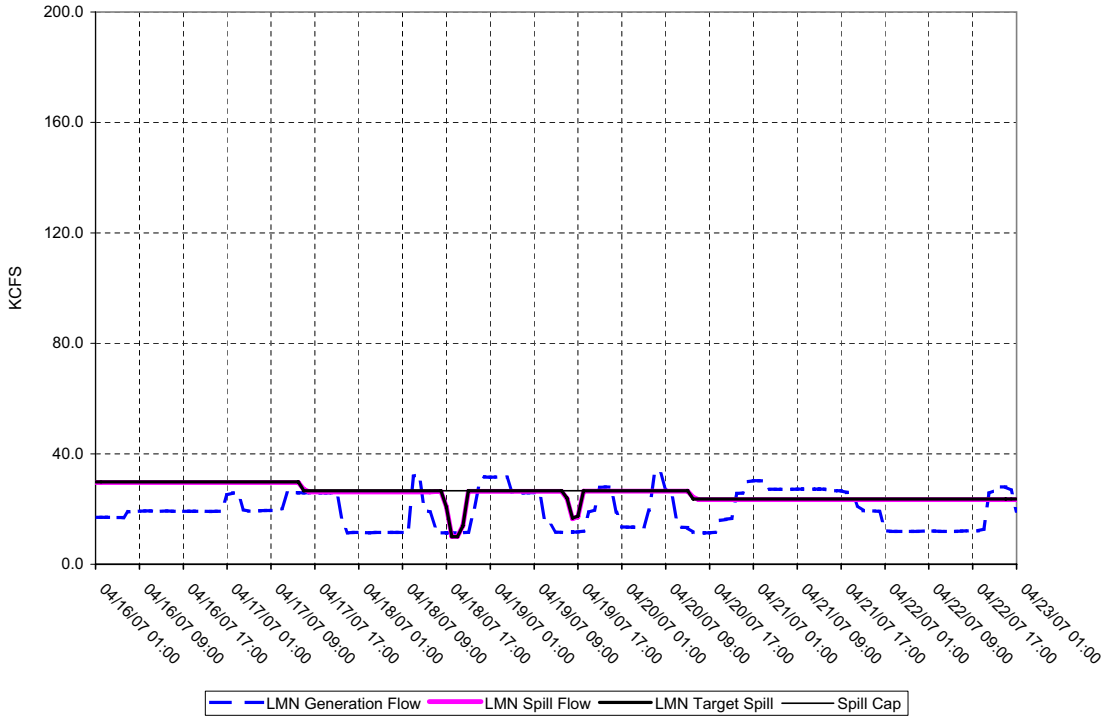
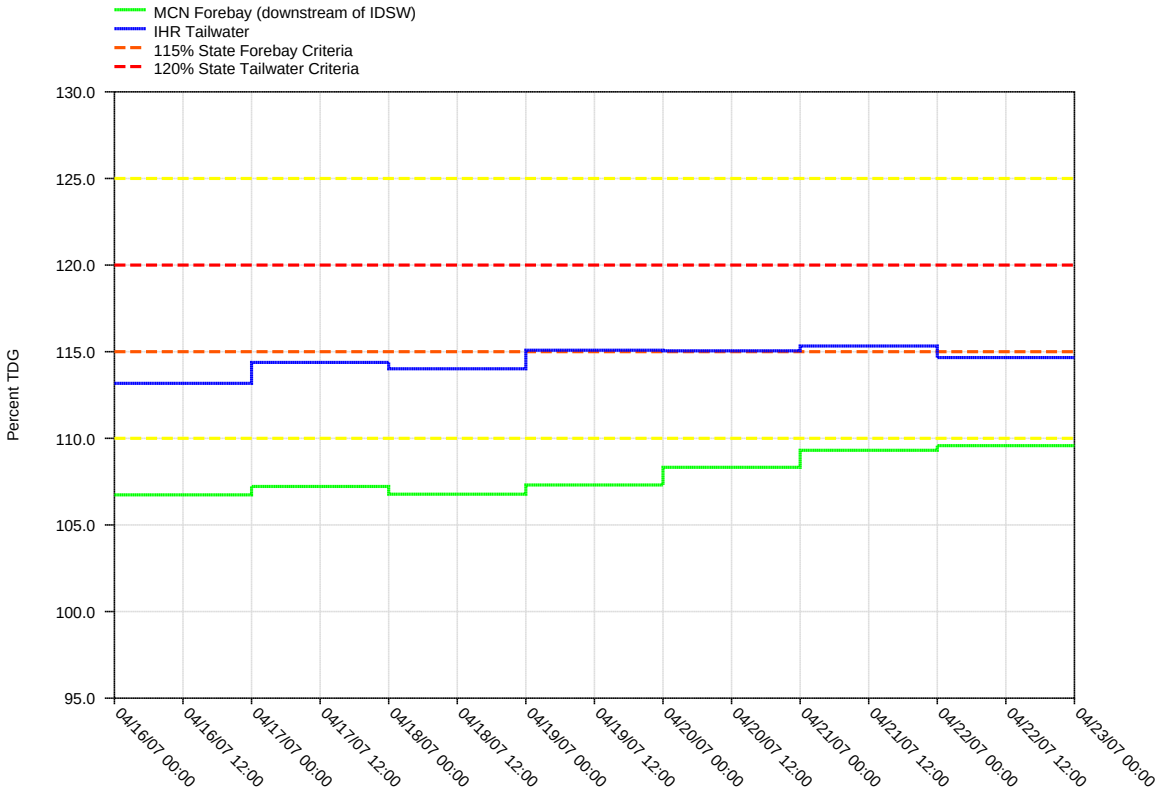


Figure 16.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

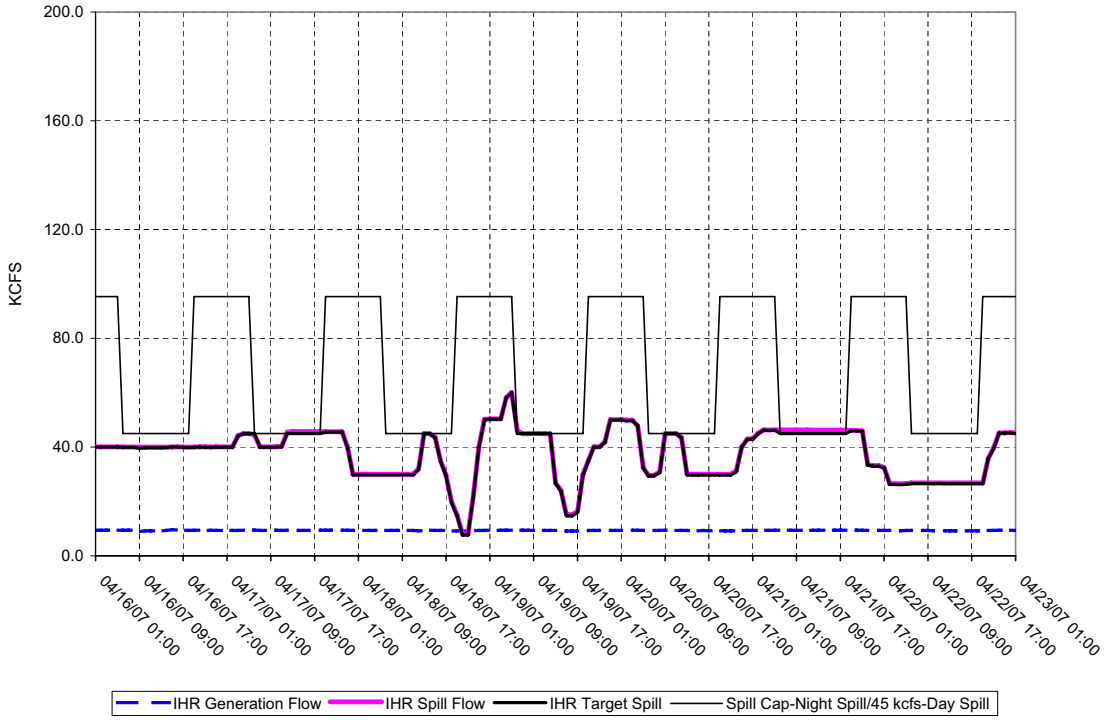
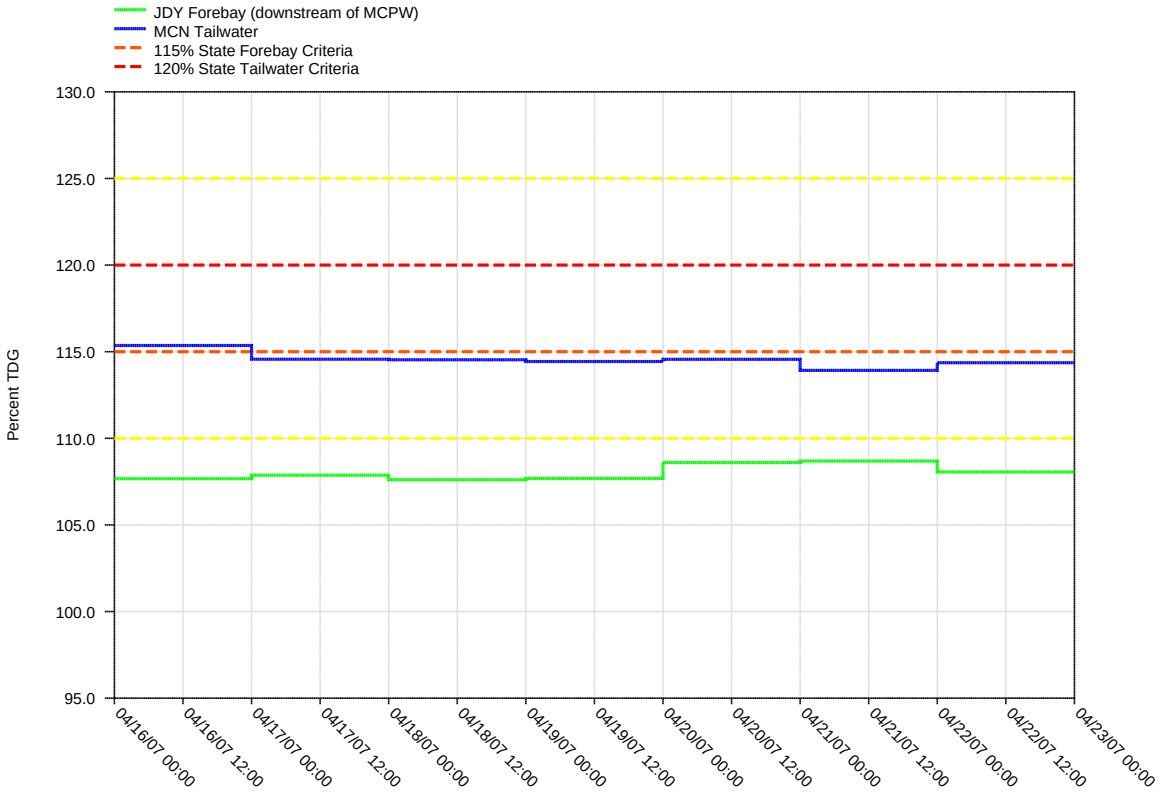


Figure 17.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

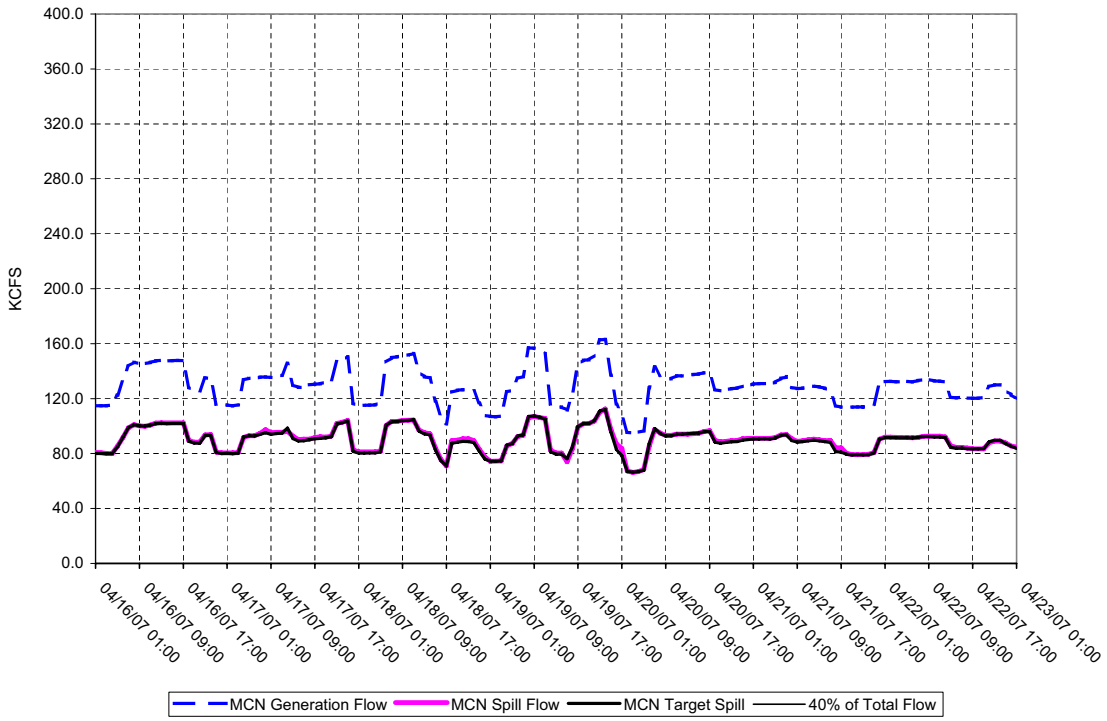
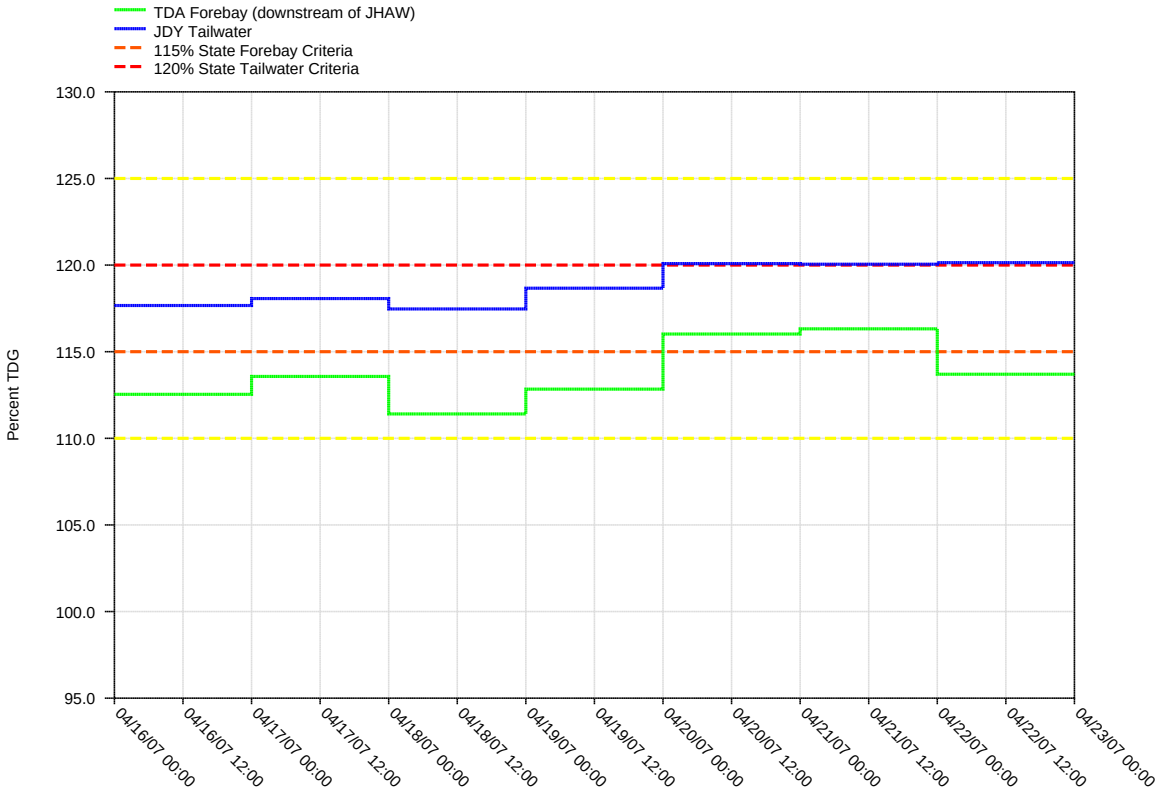


Figure 18.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

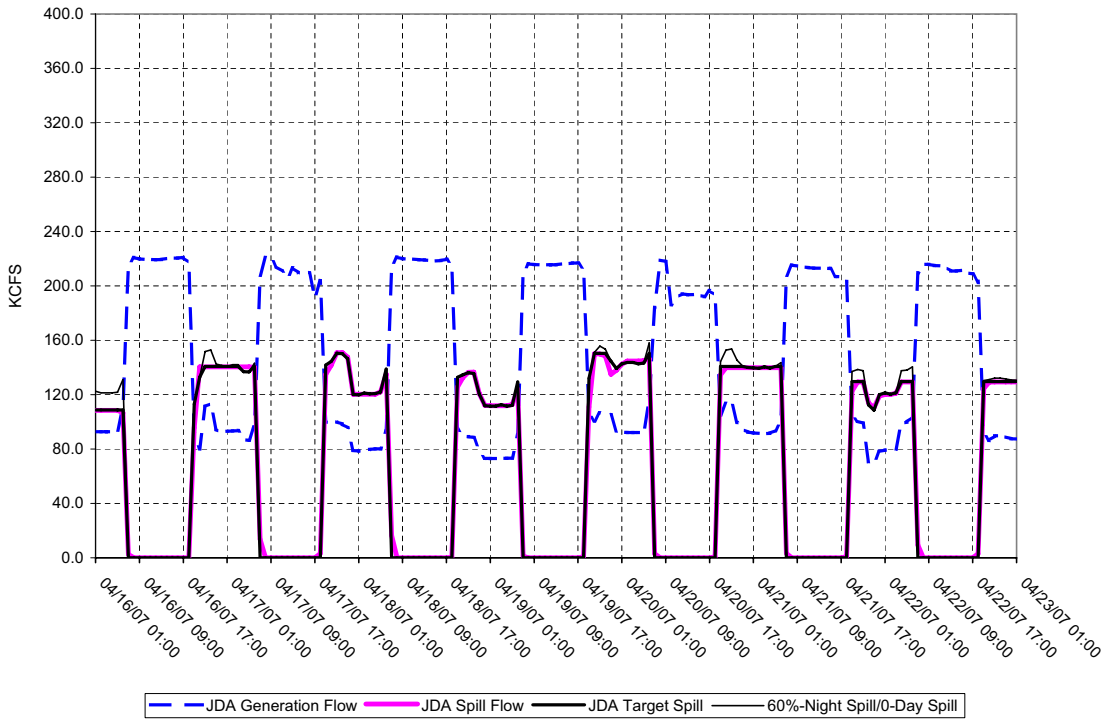
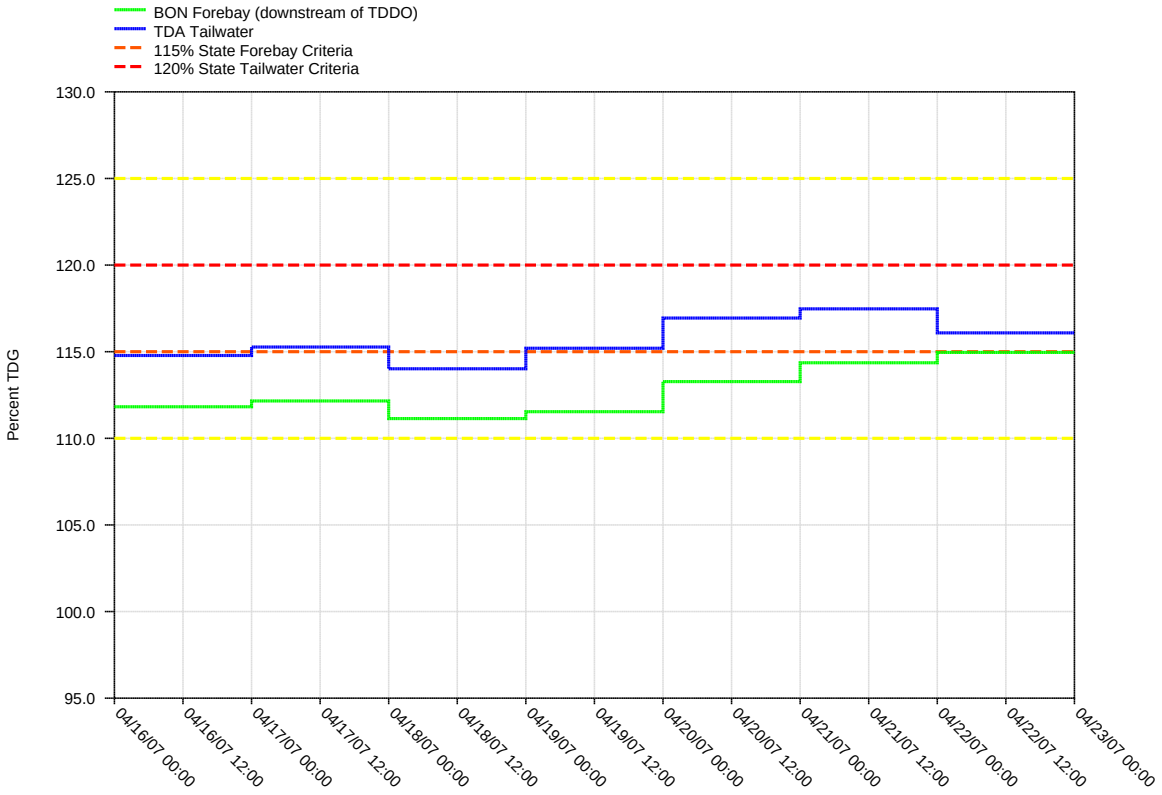


Figure 19.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

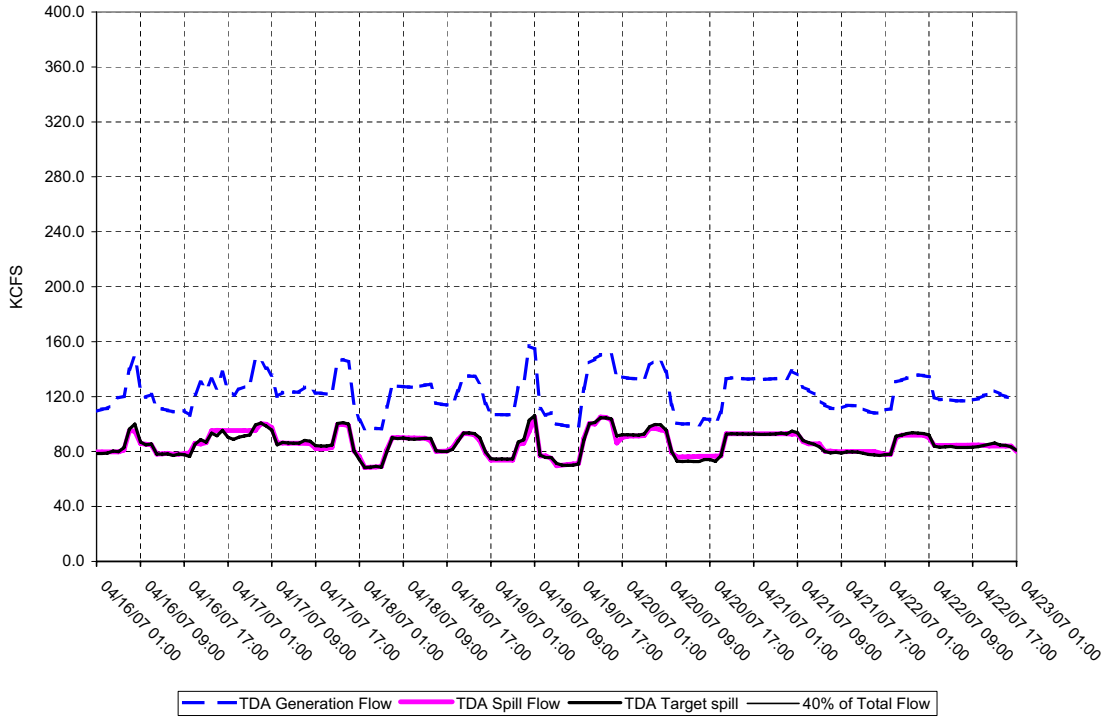
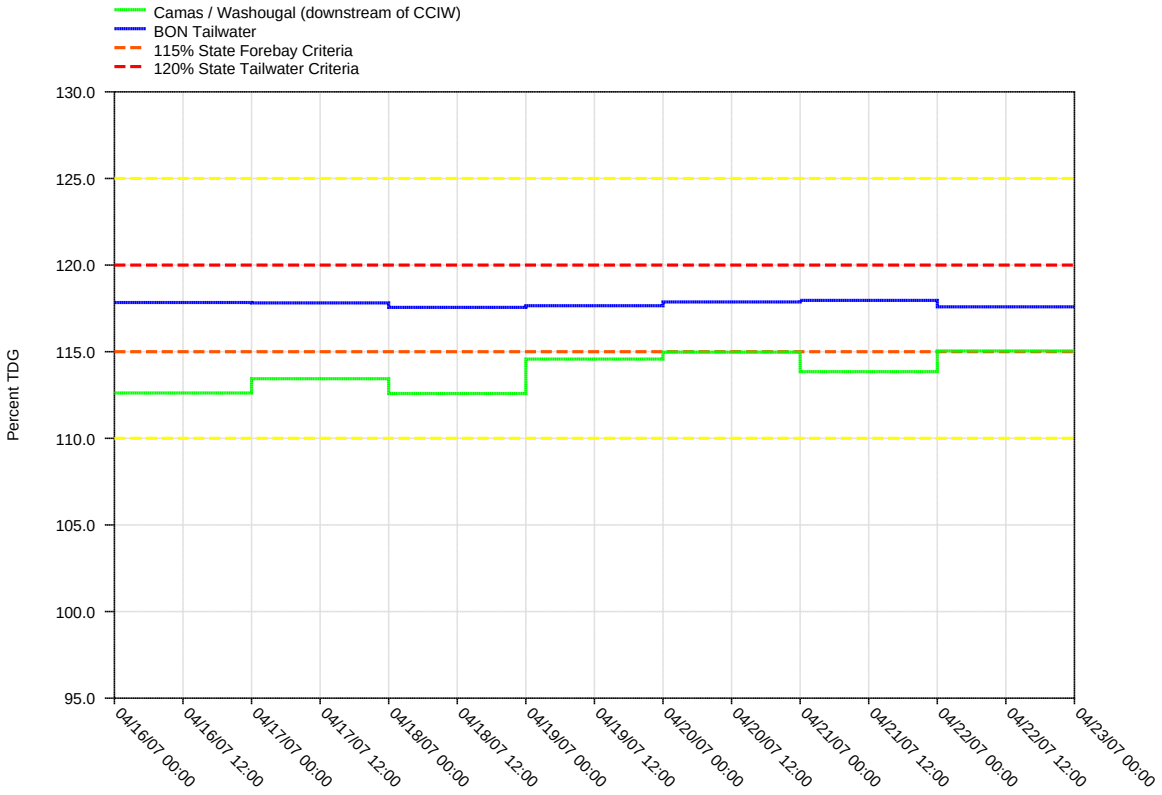


Figure 20.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

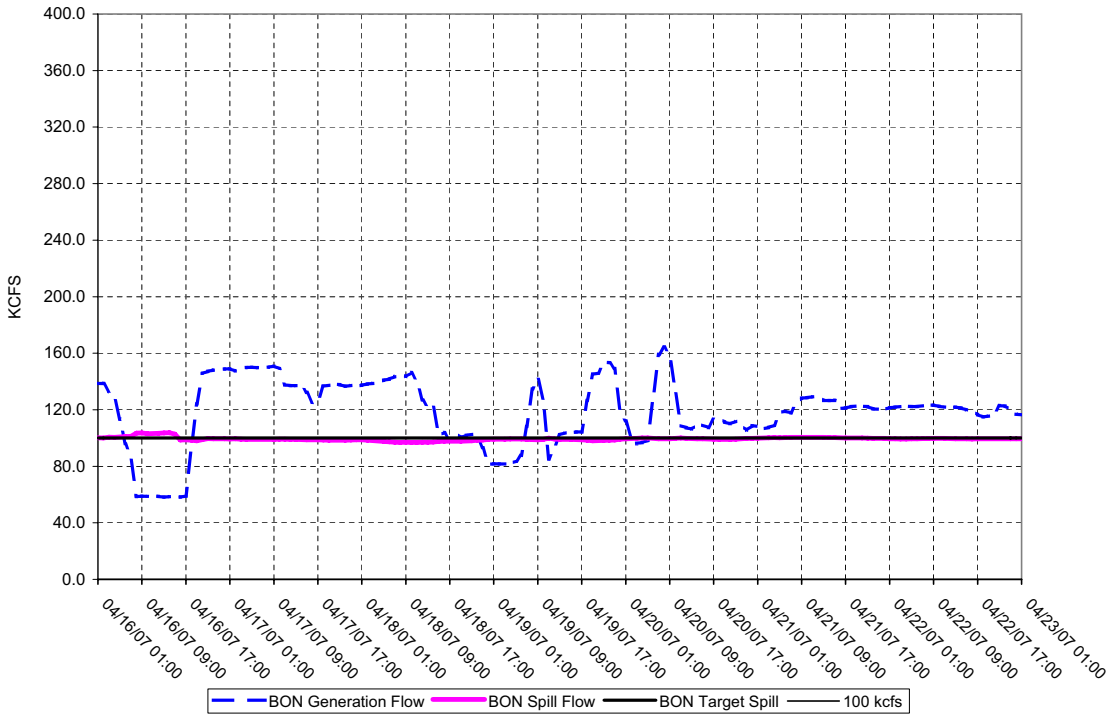
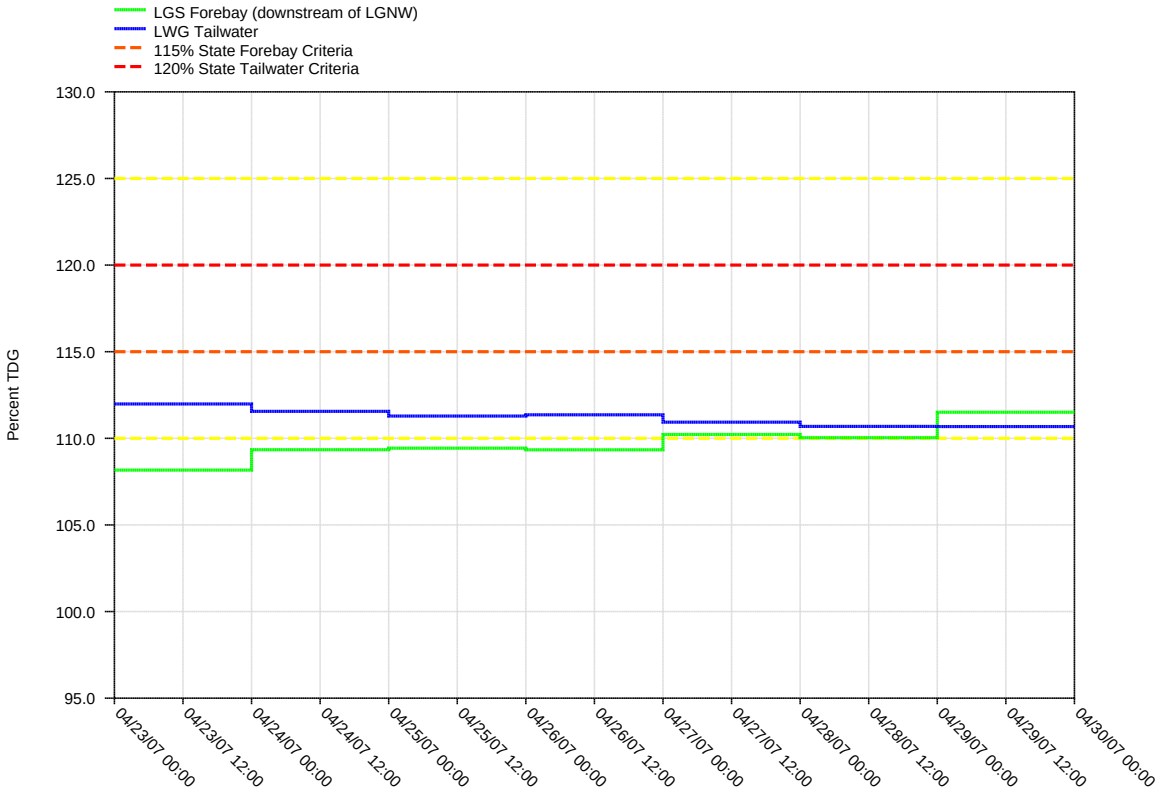


Table 21.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

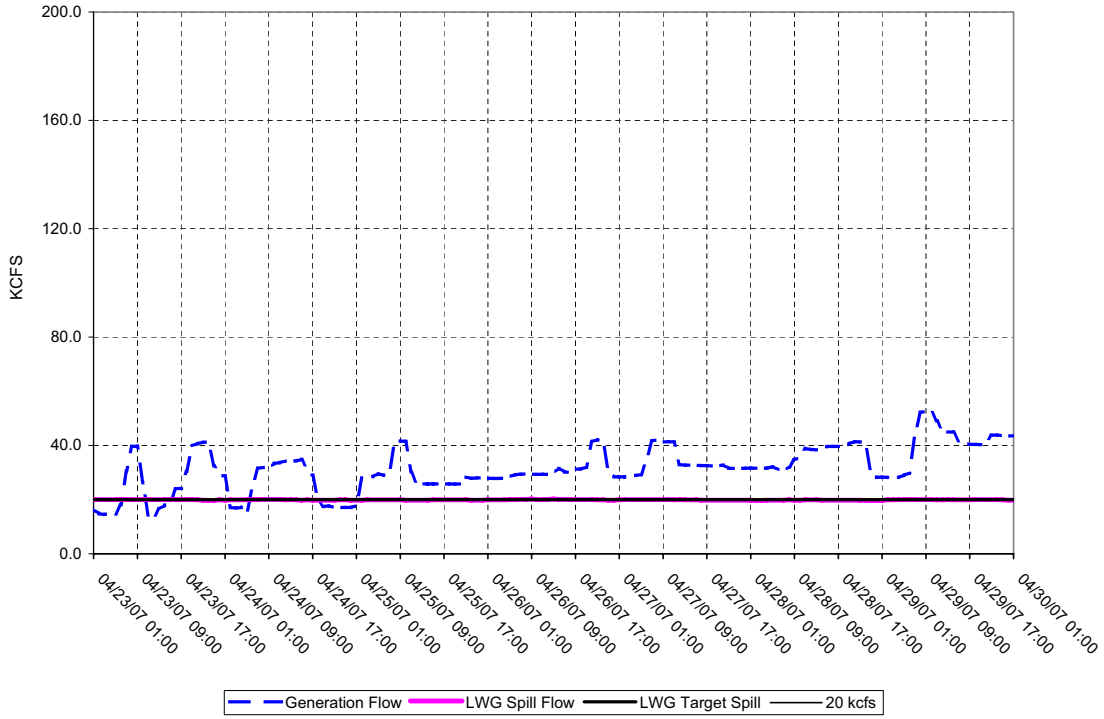
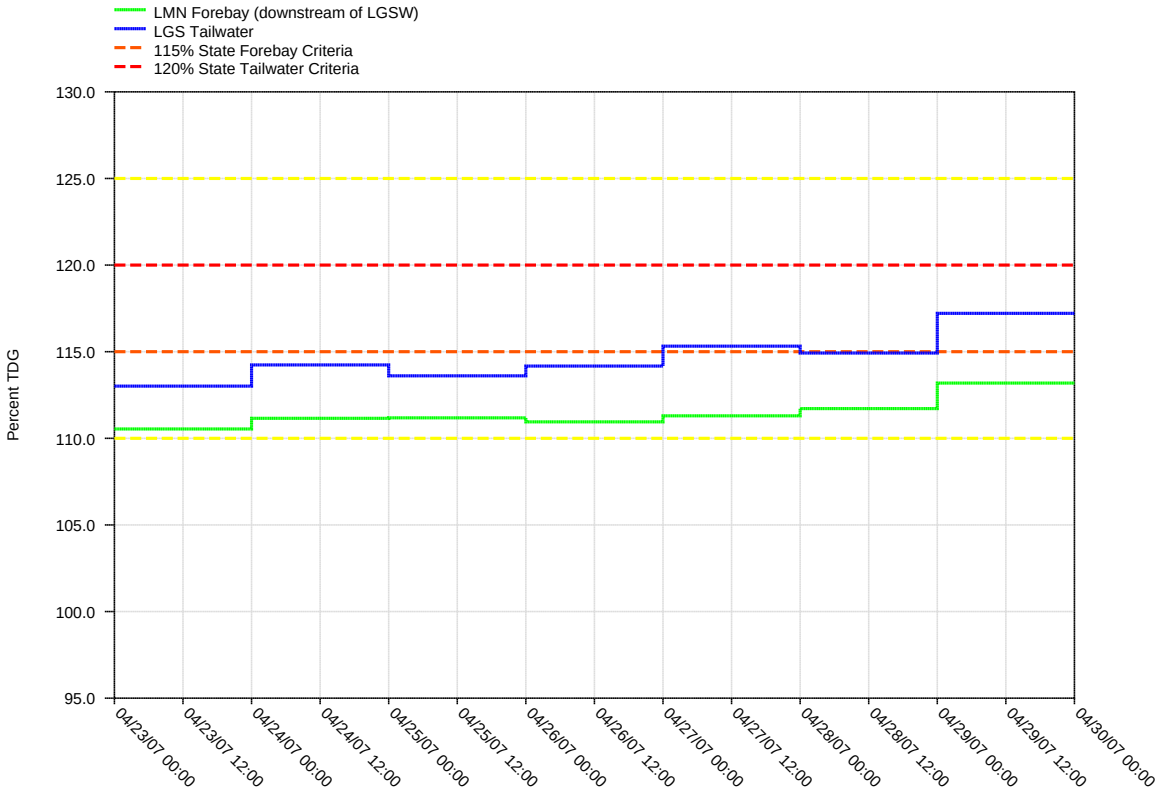


Table 22.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

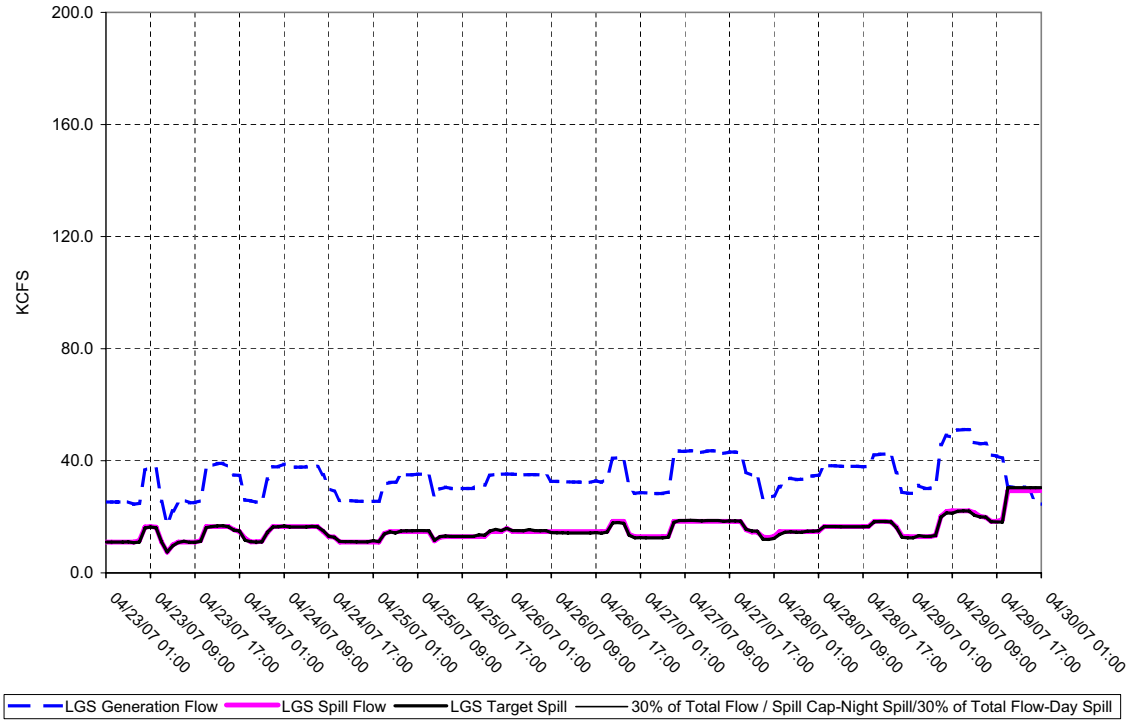
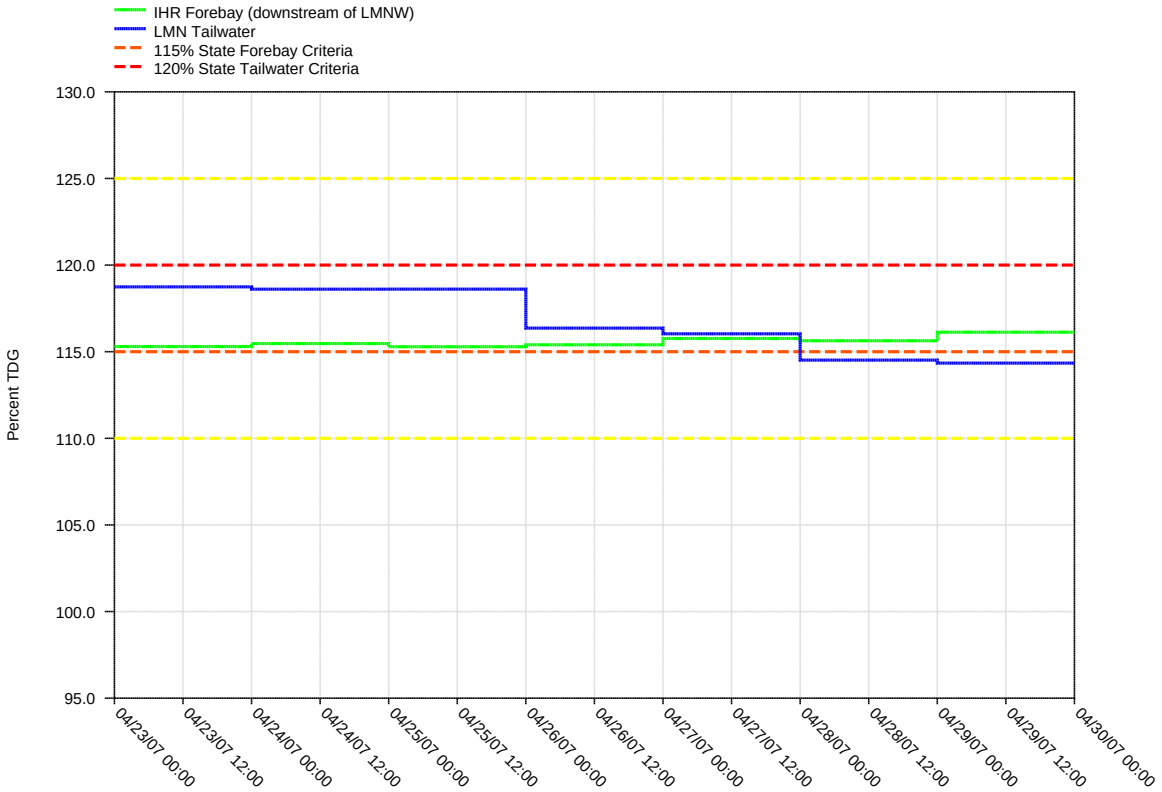


Table 23.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

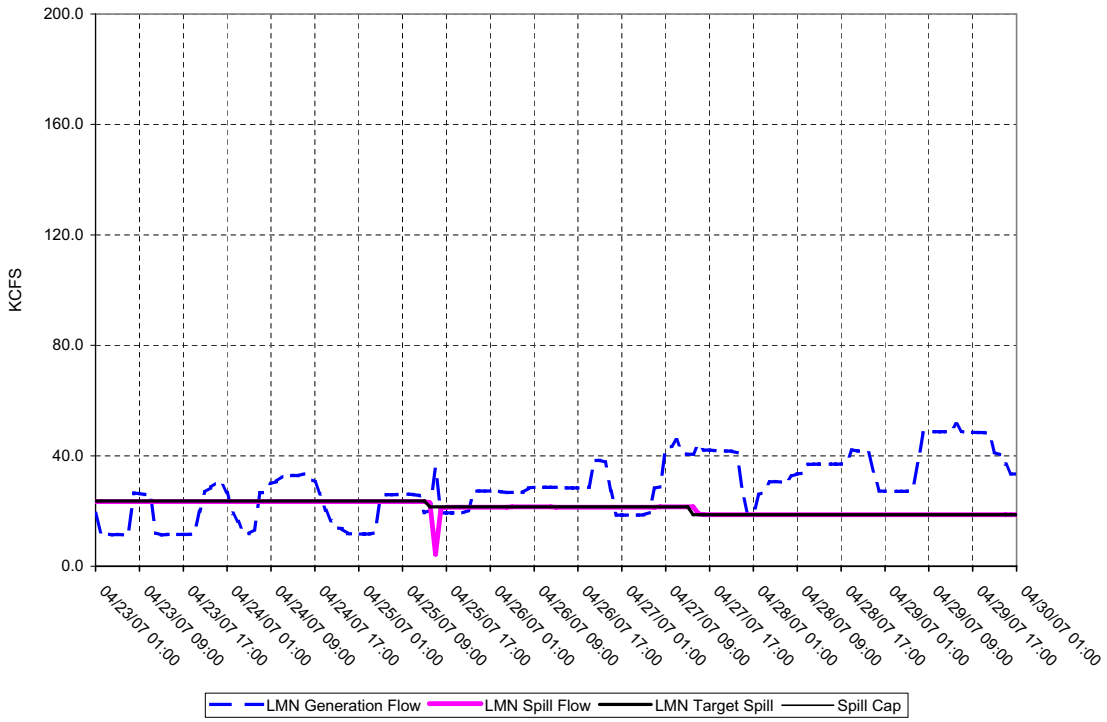
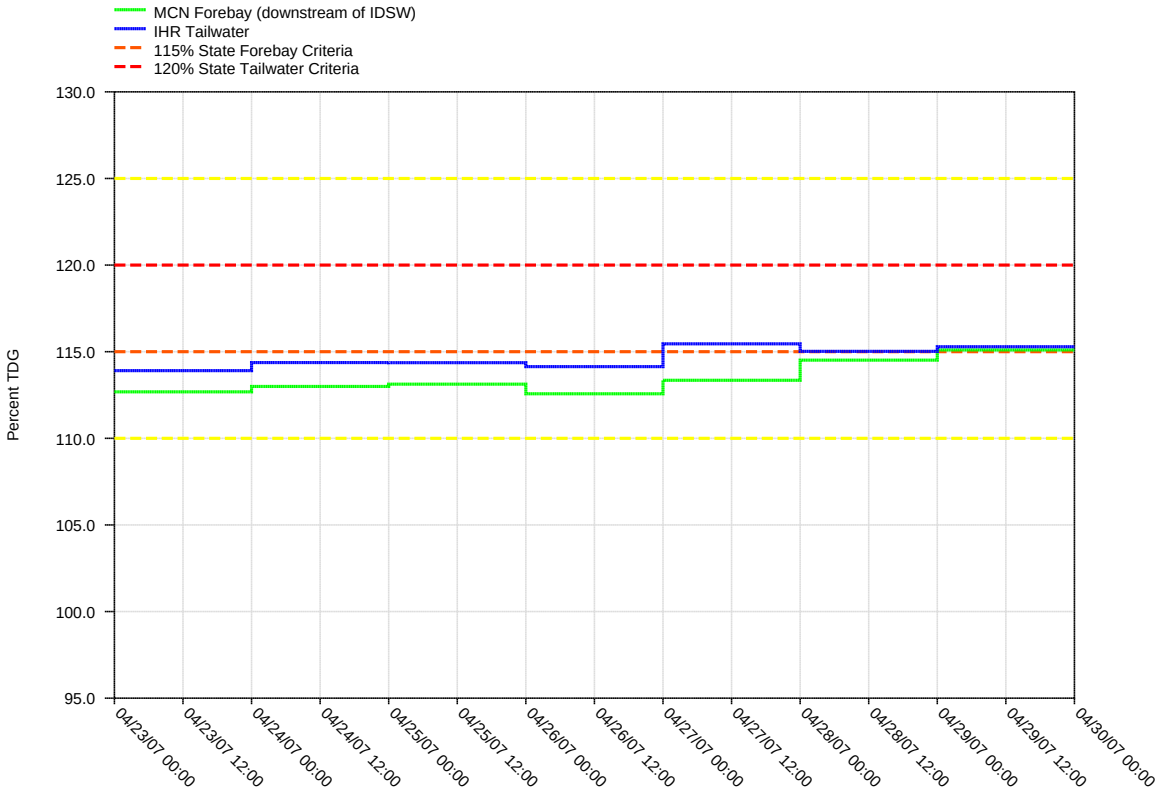


Table 24.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

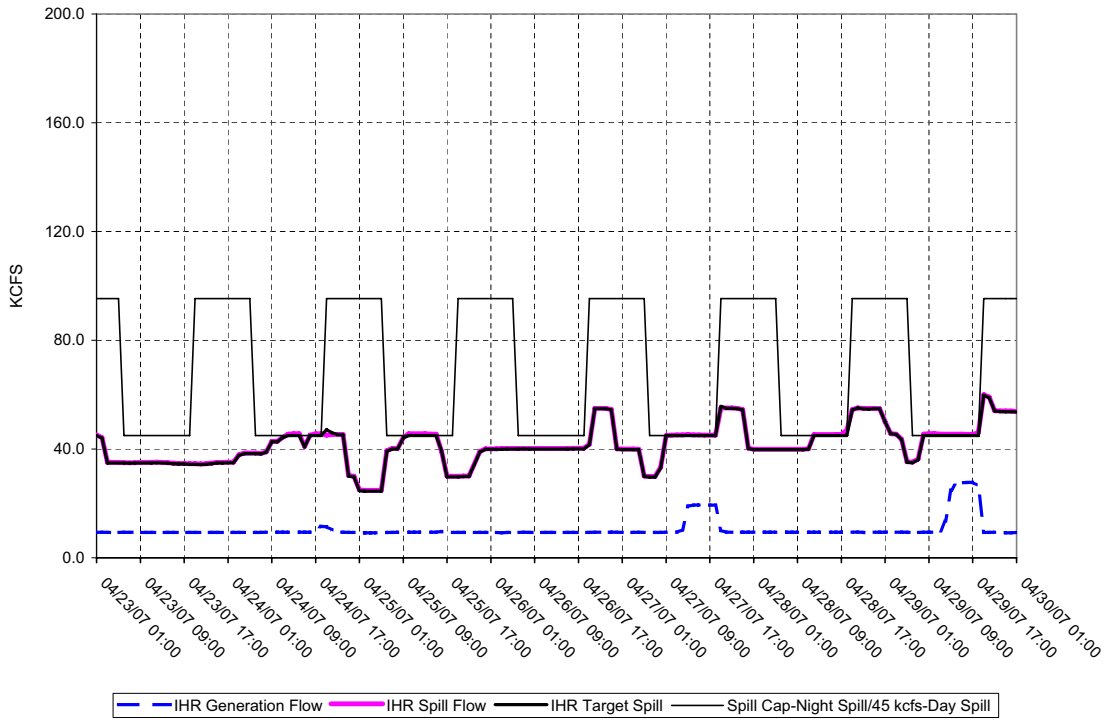
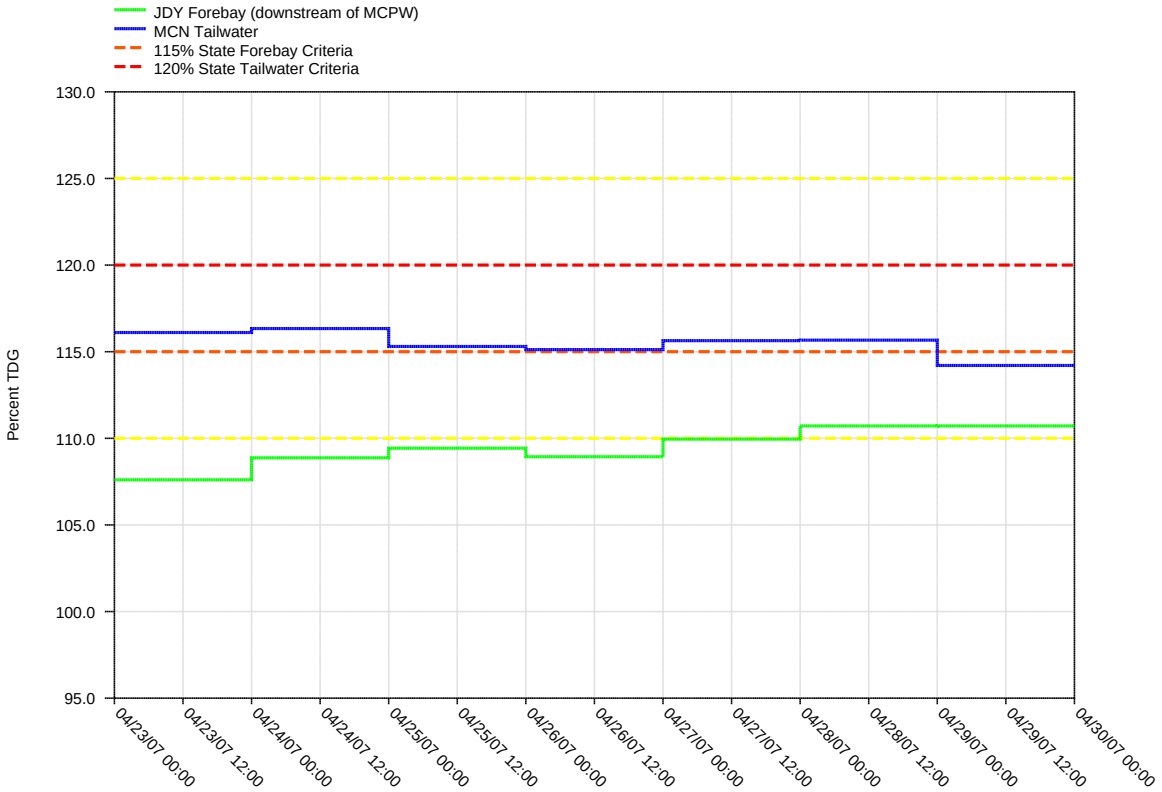


Table 25.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

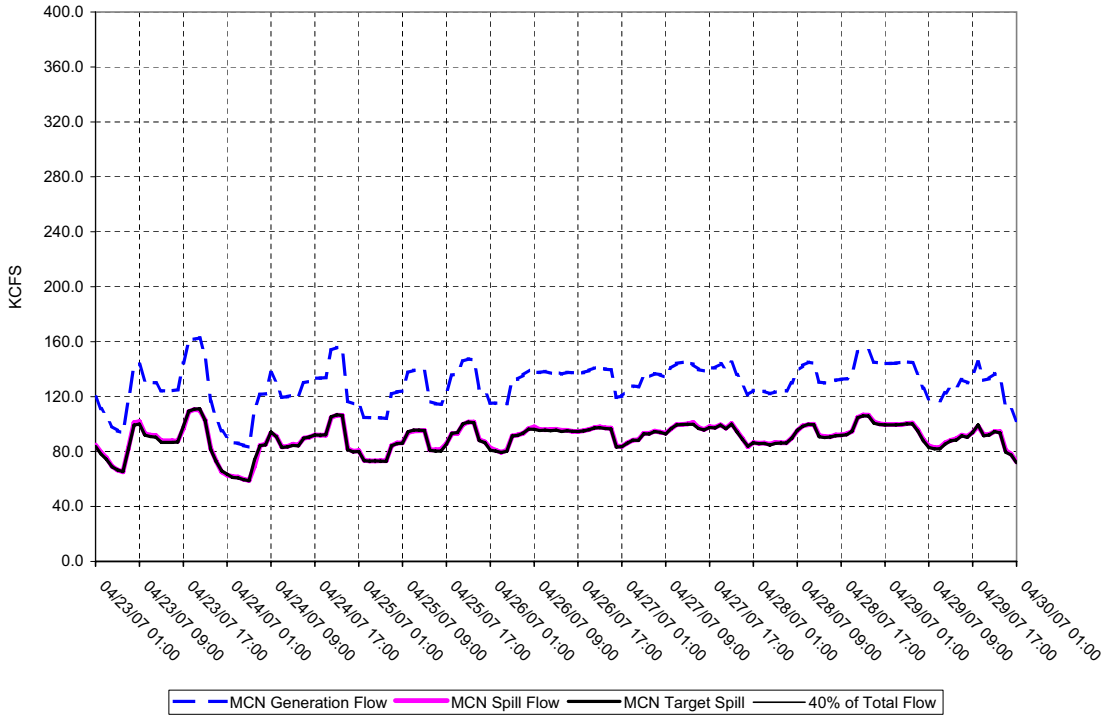
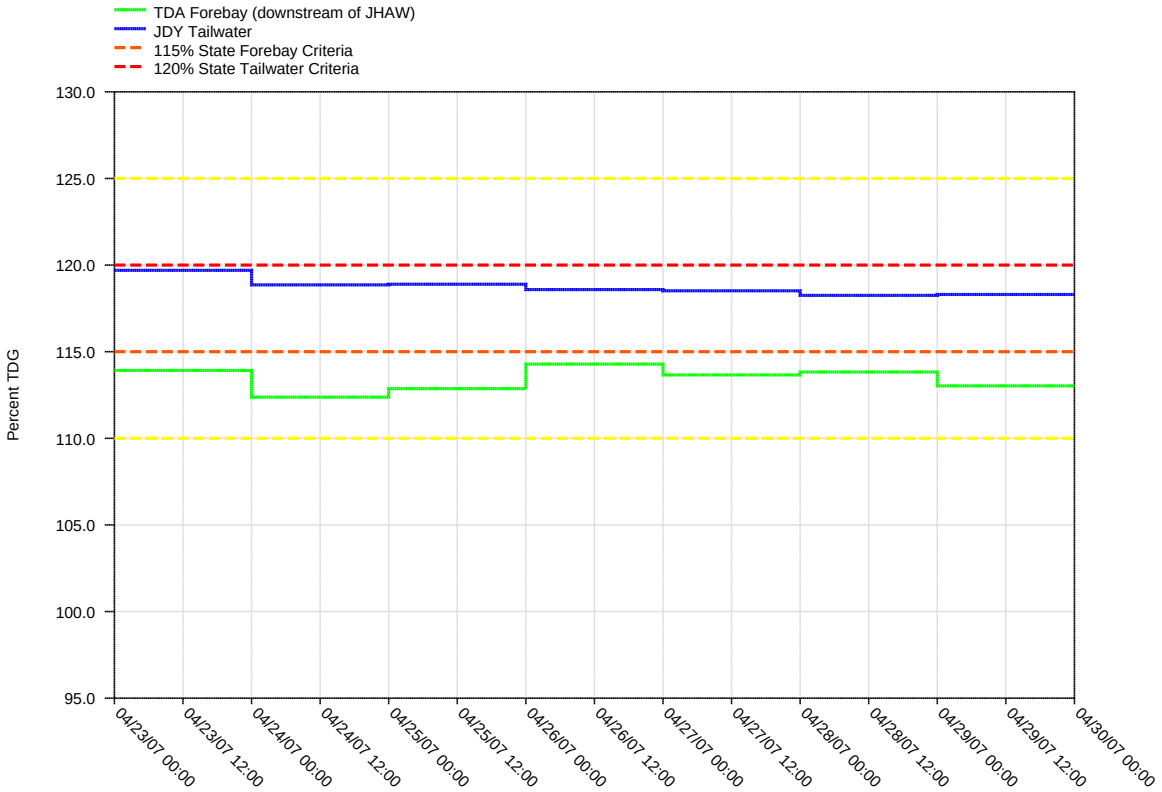


Table 26.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

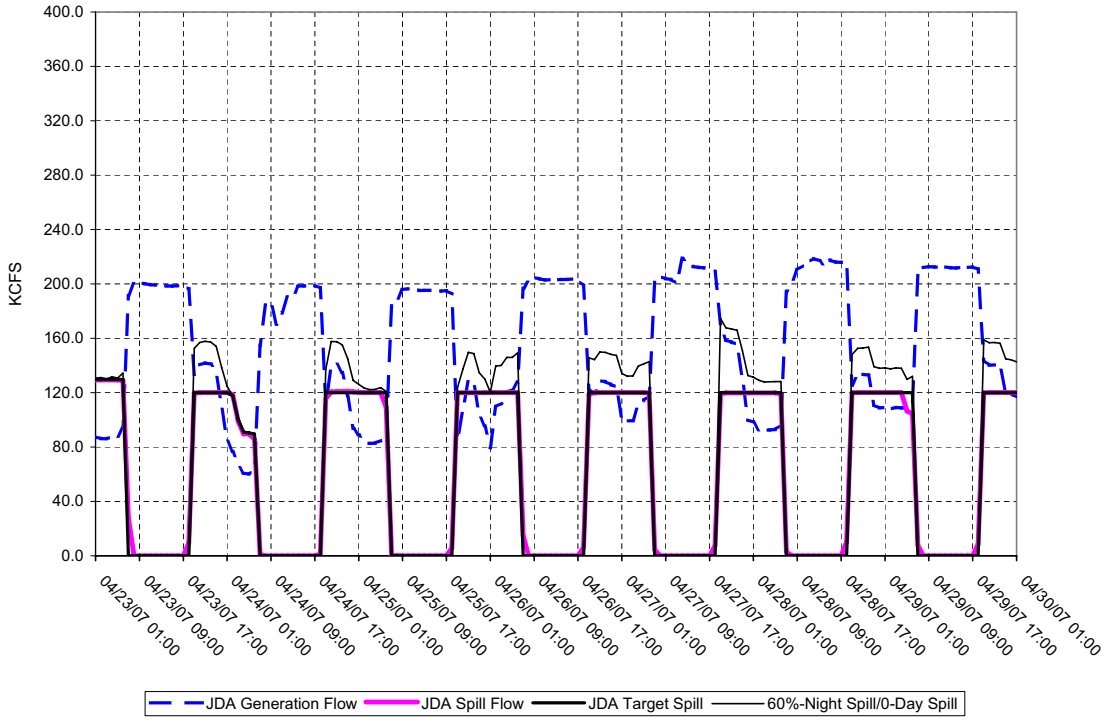
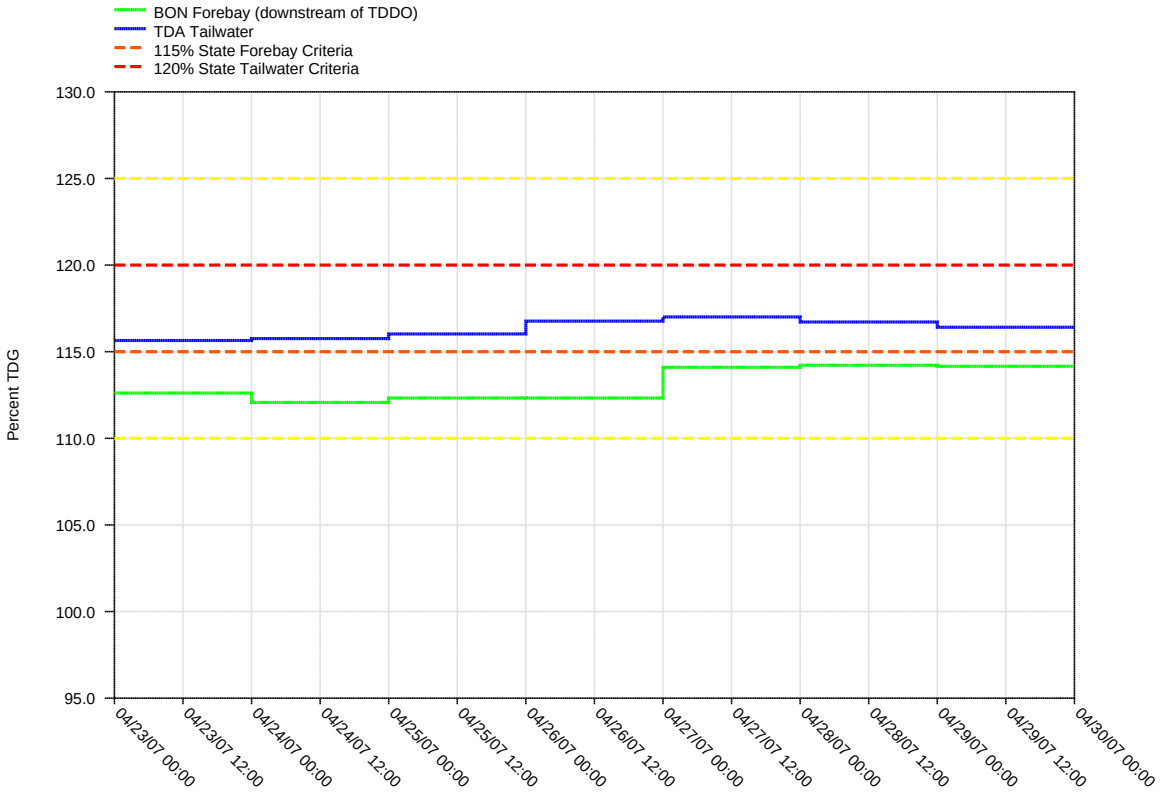


Table 27.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

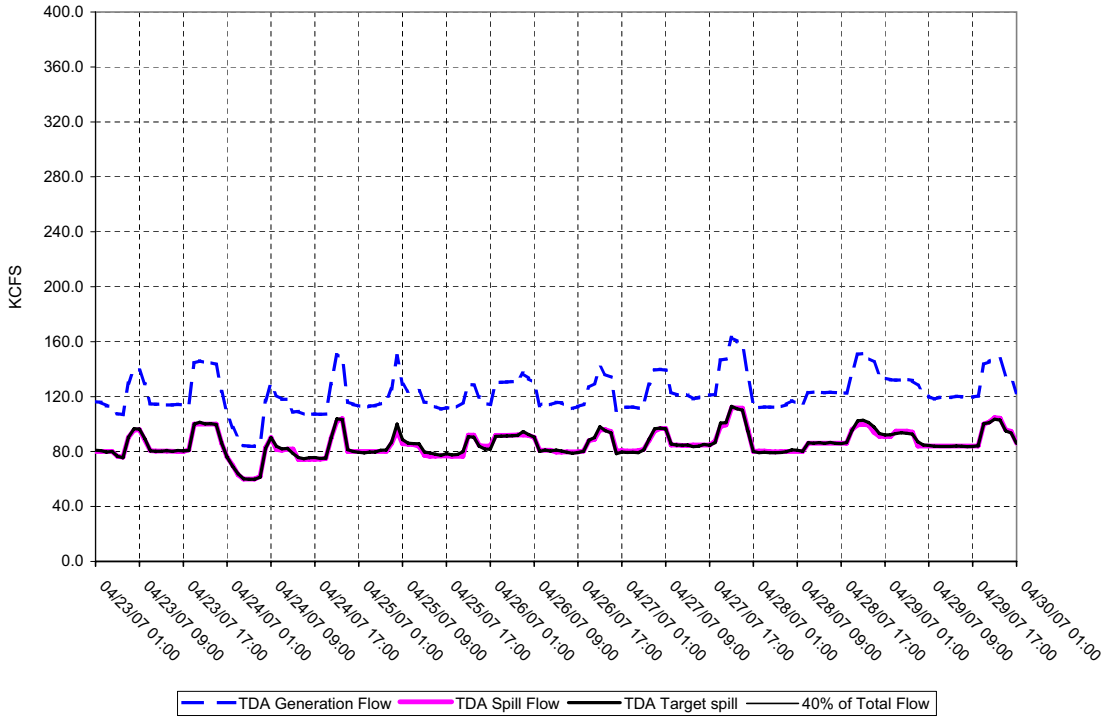
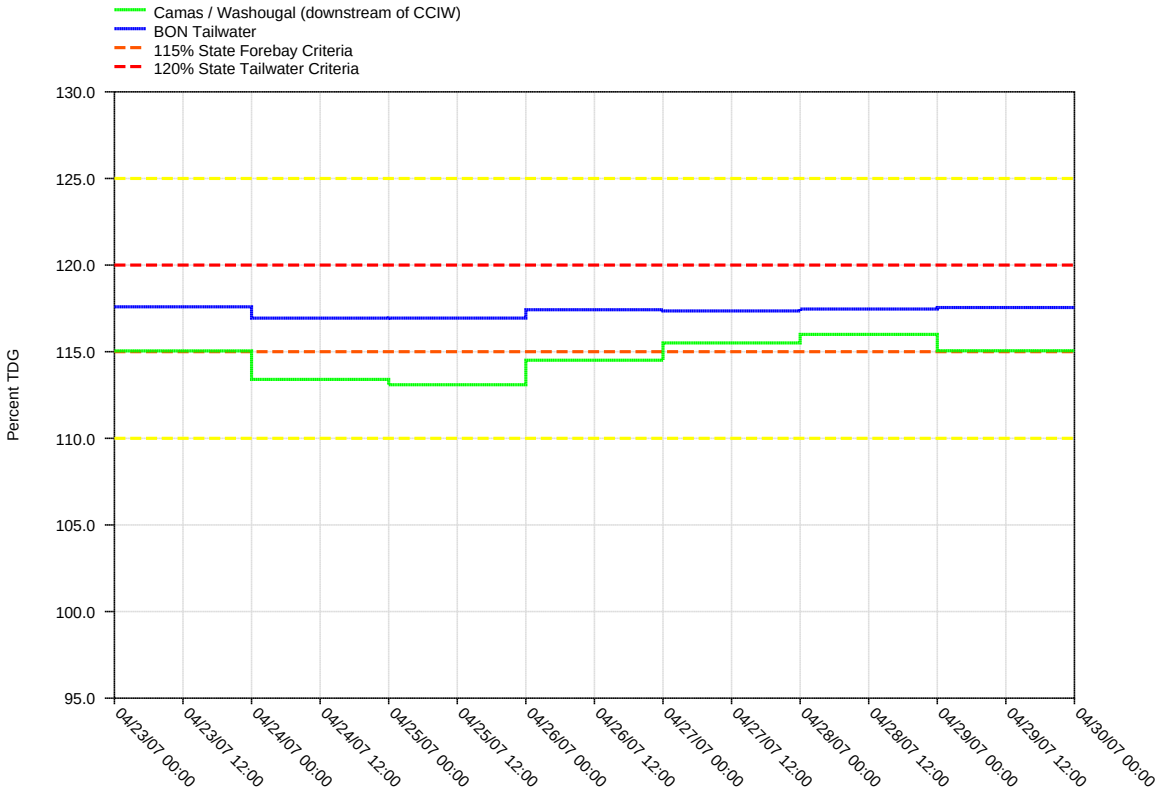


Table 28.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

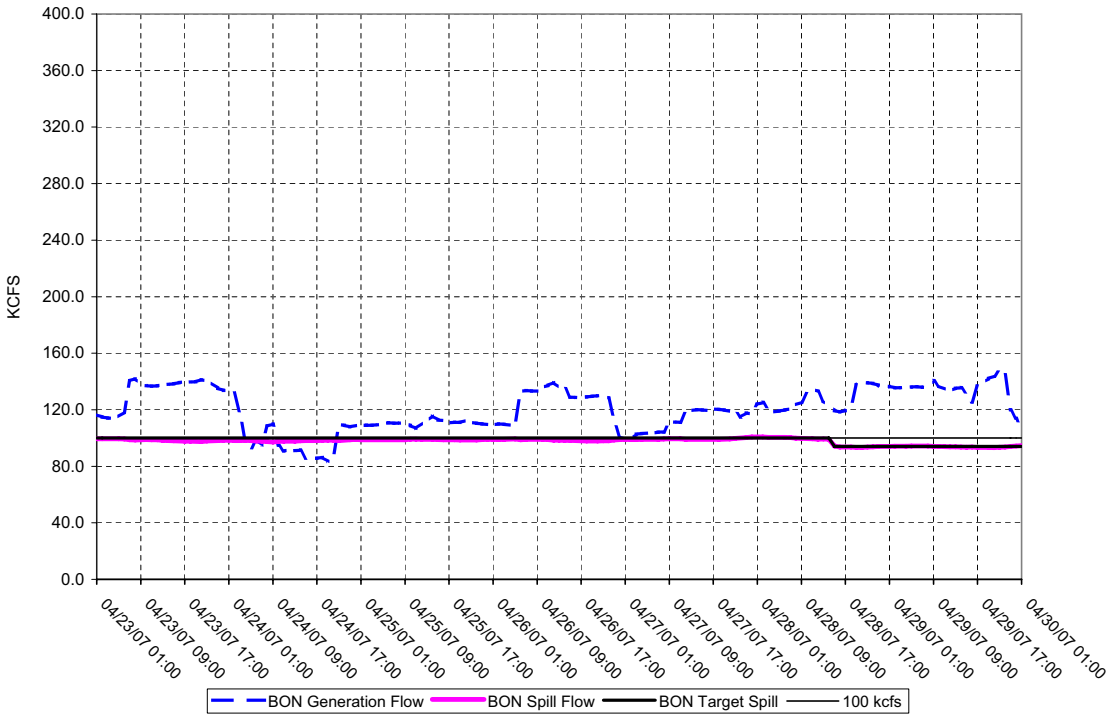


Table 1.

Average percent TDG for 12 highest hours - April 2007

Date	Monitoring Stations (full list)																	
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	120	115
04/01/2007	101.4	101.6	107.1	105.9	103.8	103.7	106.4	106.3	111.8	117.8	105.5	118.4	107.2	108.3	105.3	117.5	108.8	108.3
04/02/2007	101.6	101.6	106.5	105.7	103.0	102.4	105.0	104.8	111.6	115.1	104.8	107.6	105.9	106.7	105.9	113.3	106.7	106.9
04/03/2007	100.6	111.1	105.4	112.4	103.4	115.4	102.9	114.9	111.9	118.4	105.3	118.9	106.4	107.7	105.6	116.2	107.7	106.2
04/04/2007	100.2	111.4	104.7	110.8	104.2	115.9	102.7	113.8	111.3	117.5	105.9	115.5	108.4	109.5	105.2	112.5	106.0	106.4
04/05/2007	100.0	111.8	103.2	108.8	104.8	116.1	102.4	113.9	114.8	115.9	107.6	114.6	107.7	108.1	108.8	114.4	109.3	108.1
04/06/2007	100.8	112.0	102.9	109.1	106.7	116.3	106.1	113.4	**116.1**	115.8	109.6	112.0	109.1	109.2	107.9	113.3	108.1	108.6
04/07/2007	102.3	112.3	103.8	109.2	110.9	115.9	111.8	113.9	**116.0**	119.4	112.5	113.3	110.0	109.6	109.6	112.2	109.3	108.5
04/08/2007	103.0	111.8	105.4	109.8	111.2	116.9	**115.5**	114.6	115.0	119.1	113.6	113.4	111.8	111.3	108.8	112.1	108.8	110.1
04/09/2007	102.8	111.8	107.1	111.9	110.7	116.3	**115.1**	114.0	114.7	117.3	112.8	112.4	111.4	110.5	107.6	112.5	107.6	107.2
04/10/2007	101.8	111.3	106.9	113.1	107.3	116.5	110.8	114.9	107.9	116.5	110.3	118.8	110.2	114.0	108.0	118.0	112.3	109.9
04/11/2007	101.8	111.5	107.2	118.2	107.3	116.4	110.9	113.6	106.5	**121.5**	109.7	119.6	113.0	116.2	111.2	118.7	113.4	110.2
04/12/2007	100.9	111.0	106.7	113.3	107.2	117.9	111.4	112.6	106.2	114.6	108.7	118.6	110.6	114.2	112.8	117.6	115.6	111.9
04/13/2007	99.7	110.3	106.1	113.7	110.1	118.6	113.6	114.8	107.4	116.6	107.4	118.2	111.1	115.5	112.5	119.3	114.8	114.2
04/14/2007	100.4	110.3	108.1	113.8	112.2	119.6	114.4	114.9	107.1	115.1	106.9	118.2	110.3	114.1	114.5	118.0	116.4	114.1
04/15/2007	100.3	110.7	107.5	111.6	110.2	119.7	114.1	113.8	106.4	116.9	106.5	117.8	110.0	114.3	110.5	118.4	113.4	113.8
04/16/2007	101.1	110.7	108.3	114.4	110.5	119.6	**115.7**	113.2	106.7	115.4	107.7	117.7	112.5	114.8	111.8	117.8	114.4	112.6
04/17/2007	101.7	111.6	108.7	114.2	110.7	119.5	**115.3**	114.4	107.2	114.6	107.9	118.1	113.6	115.3	112.2	117.8	114.7	113.4
04/18/2007	101.9	112.0	108.1	113.2	110.6	118.9	**115.4**	114.0	106.8	114.5	107.6	117.5	111.4	114.0	111.1	117.6	114.4	112.6
04/19/2007	102.0	111.6	107.8	113.3	110.6	**120.1**	114.4	115.1	107.3	114.4	107.7	118.7	112.8	115.2	111.5	117.7	115.8	114.6
04/20/2007	102.6	112.3	108.1	113.9	110.9	**120.6**	114.5	115.1	108.3	114.6	108.6	**120.1**	**116.0**	116.9	113.3	117.9	116.2	115.0
04/21/2007	102.6	111.7	108.6	114.4	110.8	119.6	114.6	115.3	109.3	113.9	108.7	**120.1**	**116.3**	117.5	114.4	118.0	116.6	113.8
04/22/2007	101.8	111.3	108.2	113.2	111.0	118.5	**115.2**	114.7	109.6	114.4	108.1	**120.1**	113.7	116.1	115.0	117.6	116.6	115.0
04/23/2007	101.2	112.0	108.2	113.0	110.5	118.7	**115.3**	113.9	112.7	116.1	107.6	119.7	113.9	115.6	112.6	117.6	115.5	115.0
04/24/2007	101.3	111.6	109.3	114.2	111.2	118.6	**115.5**	114.4	113.0	116.3	108.9	118.9	112.4	115.8	112.1	116.9	115.4	113.4
04/25/2007	101.5	111.3	109.4	113.6	111.2	118.6	**115.3**	114.4	113.1	115.3	109.4	118.9	112.9	116.0	112.3	116.9	115.4	113.1
04/26/2007	101.6	111.4	109.3	114.2	110.9	116.4	**115.4**	114.1	112.6	115.1	108.9	118.6	114.3	116.8	112.3	117.4	114.9	114.5
04/27/2007	102.8	110.9	110.2	115.3	111.3	116.0	**115.8**	115.5	113.4	115.6	110.0	118.5	113.7	117.0	114.1	117.4	116.4	**115.5**
04/28/2007	102.3	110.7	110.0	114.9	111.7	114.5	**115.6**	115.0	114.5	115.7	110.7	118.3	113.8	116.7	114.2	117.5	116.3	**116.0**
04/29/2007	103.3	110.7	111.5	117.2	113.2	114.3	**116.1**	115.3	**115.1**	114.2	110.7	118.3	113.0	116.4	114.2	117.5	115.5	**115.1**
04/30/2007	103.6	110.6	112.8	118.2	114.2	114.1	**115.2**	116.0	114.5	116.7	111.3	118.7	114.1	116.5	113.5	117.9	115.6	114.9

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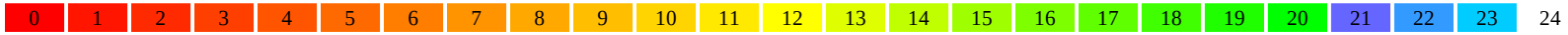
Number of hours of data reported in a given day



Big, bold, red text denotes exceedances.
--- indicates No Data
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%.

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)
WRNO	Bonneville Tailwater (Warrendale)
CWMW	Camas / Washougal

Effective April, 2006

FISH OPERATION PLAN IMPLEMENTATION REPORT
May 2007

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 April 16, 2007 court order requiring the Corps to provide monthly reports on the implementation of project spill for fish passage and fish transportation operations provided for in the 2007 Fish Operations Plan (FOP). The FOP describes the Corps project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the April – August 2007 fish migration season. Consistent with the 2004 Biological Opinion adaptive management strategy, this plan incorporates the project operations contained in the "Agreement Regarding 2007 Federal Columbia River Power System Fish Operations" (Agreement)[1]. The Corps agreed to provide 2007 fish passage operations in accordance with the Agreement as identified in Attachment 1 of the Agreement[2]. Water management operations not addressed in the Agreement will continue to be consistent with the operations considered in the 2004 Biological Opinion and in particular, the 2007 Water Management Plan and 2007 Fish Passage Plan (FPP).

The Corps' lower Columbia and Snake River projects and fish passage operations for the month of May 2007 identified in the FOP 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 12-hour average total dissolved gas (TDG) for the tailwater at each project and for the next project's forebay downstream.

This report also provides information on issues presented and unanticipated or emergency situations that arose during implementation of the spill program for the month of May 2007.

[1] The Agreement signed by the Bonneville Power Administration (BPA), Confederated Tribes of the Warm Springs Reservation, Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes and Bands of the Yakama Nation, and Confederated Tribes of the Colville Indian Reservation, was submitted to the Federal District Court on January 9, 2007.
[2] Brigadier General Martin committed to implement the 2007 operations identified in Attachment 1 of the Agreement by letter dated December 15, 2006.

Data Reporting:

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

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

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

Each figure represents one week of operation for a project. The graphs start on Monday 0100 hours through Monday 0100 hours for the following dates:

April 30 – May 6	Figures 1 - 8
May 7 – May 13	Figures 9 – 16
May 14 – May 20	Figures 17 - 24
May 21 – May 27	Figures 25 – 32
May 28 – June 3	Figures 33 - 40

A. Upper Graph: Shows the resultant daily average percent TDG for the 12 highest hours as the result of spill from the dam. The objective is to operate each project up to the TDG limits without exceeding those limits if practicable.

- The blue line on the graph represents the TDG in the tailrace of the dam. 120% TDG is the upper operating limit.
- The green line represents the TDG in the forebay of the next dam downstream. 115% is the upper operating limit.

B. Lower Graph: Represents the 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 heavy red line represents the hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2007 FOP.
- Each graph includes a heavy black line that represents the target spill. This is the hourly maximum spill level that is subject to the following conditions:

    - Spill percentage or discharge specified in the FOP;
    - Spill caps as set daily for TDG management;
    - Test spill levels for fish passage research;
    - Minimum generation for power system needs; and,
    - Minimum spill at Ice Harbor (15.2 kcfs) and Bonneville (50 kcfs) Dams.

The hourly target spill may vary as a function of quantity of river flow and generating units available at a project.

II. A monthly FOP Spill Report Table is included at the end of the report that shows the overall daily results of the average percent TDG for the 12 highest hours for all projects. The numbers in red show exceedances of the TDG gas cap - 115% (forebay) or 120% (tailwater) for each project.

General Implementation Remarks:

Please note that for all projects that spill for fish passage, the target spill may be limited to a lesser quantity (i.e. the spill cap), with the objective of staying within the TDG state waiver limits. When spill levels briefly deviated below or above the level described in the FOP, the heavy red line will be below or above the heavy black line in the graphs. Whenever the operation varied from the target spill during voluntary spill hours, or other anomalies occurred, these instances are described in the FOP Spill Report Table below. Occurrences which prompted more extensive regional coordination are described in greater detail in the paragraphs below.

Also note that while spill operations called for at Bonneville Dam are spill to the spill cap up to approximately 100 kcfs, the project operator sets the spill gates to the 100 kcfs spill pattern; however, actual spill levels usually range between 98 – 100 kcfs. A number of factors influence this including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The minimum generation ranges for Ice Harbor Dam were updated in the final FOP dated April 18 (p. 15). The updated ranges are from 65 – 70 MW and 9 – 10 kcfs for units 1-3, and 80 - 81 MW and 11 – 12 kcfs for units 4-6. This change results in more efficient operation of the generators at the project and was coordinated regionally through FPOM and TMT.

At McNary Dam, a spring spill test started on April 16, 2007 and continues until June 12, 2007 to examine passage, survival rates, and behavior under two treatment conditions. Two different spill patterns are being tested using a 2 day treatment within 4-day block design.

In the FOP Spill Report Table below, the result of “load swing hours” appears as an explanation for not meeting the hourly spill at McNary and The Dalles dams. This occurs because projects on the Lower Columbia must be available to respond to within-hour load variability to satisfy North American Electric Reliability Council (NERC) reserve requirements (“on response”). During periods of rapidly changing loads, projects on response may have significant changes in turbine discharge within the hour. Under normal conditions, within-hour load changes mostly on hours immediately preceding and after the peak load hours, while spill quantity remains the same within the hour. These

hours are referred to as "load swing hours." Due to the high variability of within-hour load, these load swing hours may have a greater instance of reporting actual spill percentages that differ more from the requirement than other hours. On every day cited in the Table, the day-average spill was between 39-41% with 40% being the target spill.

May Operations:

The month of May was characterized by below average flows on the lower Snake River and slightly below average flows on the lower Columbia River. Below normal snow pack in Idaho resulted in lower than normal flows for the lower Snake River. Above average precipitation in the upper Columbia Basin combined with below normal snow melt into the Snake River, resulted in the slightly below average flows for the lower Columbia River. During the May reporting period, the FOP spill operations were carried out as follows:

- Lower Granite Dam - the hourly target spill was a fixed quantity of 20 kcfs through each day;
- Little Goose Dam - the target spill was 30% of the total flow
- Lower Monumental Dam - the target spill was to the spill cap, which was estimated to be about 27 kcfs in the FOP
- Ice Harbor (45 kcfs day/spill cap night/30% spill test) and John Day (0 day/60% night) dams - the spill levels described in the FOP varied from daytime to nighttime, and is shown as the heavy black line on the graph
- McNary and The Dalles dams - the target spill was 40% of total flow
- Bonneville Dam - the hourly target spill was a fixed quantity of approximately 100 kcfs.

Operational Adjustments Occurring in May.

1. Lower Monumental increased spill 18 kcfs above the spill cap from 1800-2200 on May 2 to pass juvenile fish thought to be delayed in the forebay. The spill discharge was 31.5 kcfs during this operation. The salmon managers requested this operation, which was coordinated via a conference call and later discussed at the May 9 TMT and May 10 FPOM regional meetings.

   With the fish transport barges leaving Lower Monumental on May 12, spill was reduced 20 times over the course of the month for one to three hours between the hours of 1700 and 2400 to allow safe passage of the barge.

2. Routine operations to transport juvenile fish began with collecting fish at Lower Granite starting on May 1 with the first barge departing on May 2. Fish collections at Little Goose started on May 8 with the first barge departing on May 9. Fish collections at Lower Monumental started on May 11 with the first barge departing on May 12.

3. Other spill operations in the lower Snake and Columbia rivers that varied from those described in the FOP were discussed and agreed to in Regional Forum processes prior to their commencement. Those operations coordinated with regional salmon managers were planned such that they would have the least impact to fish (also cited in the FOP Spill Report Table below).

   a. Spillbays 18 and 1 were opened for less than 15 minutes at Bonneville Dam on May 16 and May 25 respectively to pass debris accumulated in front of each bay. This operation was coordinated with the salmon managers via phone calls resulting in spill above the spill cap.

   b. During the May 30 TMT meeting, the salmon managers noted that there appeared to be fewer adult fish passing Little Goose Dam compared to the numbers passing Lower Monumental Dam. The salmon managers indicated that they may request a change in spill or the spill pattern at Little Goose to provide better conditions for adult passage. At the recommendation of regional fish managers, and agreement by the salmon managers, the spill pattern was changed to a flat pattern on May 31 at 1600. As a result of the change, there was an immediate increase in the number of adult fish observed passing the dam. The adult fish counts went from approximately 100 adults passing Little Goose per day prior to the spill pattern change, to about 2000 fish per day for two days following the change. The divergence in counts between Little Goose and Lower Monumental dams is now consistent with previous year's information.

FOP Spill Report Table

Project	Parameter	Date	Time	Hours	Type	Reason
Little Goose	Spill	5/14/2007	1200	1	Spill Cap - Change delay	Delayed Spill Cap increase: teletype sent at 1100, operator got it at 1130 and made changes at 1200. Results of change evident at 1300.
Little Goose	Spill	5/15/2007	200-300	2	Navigational safety	Passenger vessel needed reduced spill for safe passage.
Lower Monumental	Addt'l Spill	5/2/2007	1800-2200	5	Fish passage	Spill increased above 13.6 kcfs spill cap up to 31.5 kcfs. NOAA requested increase in spill to pass fish. Salmon managers approved extra spill and teletype sent on 5/2/07.
Lower Monumental	Spill	5/12/2007	2200	1	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/13/2007	1900-2000, 2200	3	Barge safety	Fish barge needed reduced spill for safe passage.*

Lower Monumental	Spill	5/14/2007	1200-1300	2	Spill Cap - Change delay	Spill Cap increase was sent to the operator 2 hours earlier than standard practice of 1330. Request sent at 1130 but operator involved in handling a nav lockage, spill did not increase until after 1300.
Lower Monumental	Spill	5/14/2007	2000 - 2400	5	Barge safety	Fish barge needed reduced spill for safe passage; new barge operator had problems with high wind making the ship approach to Navigation Lock and loading fish difficult.*
Lower Monumental	Spill	5/15/2007	2000 - 2200	3	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/16/2007	1900-2000	2	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/17/2007	1900 - 2000	2	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/18/2007	1800-1900, 2100	3	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/19/2007	1800 - 2000	3	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/20/2007	1800 - 2000	3	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/21/2007	1900 - 2000	2	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/22/2007	2000 - 2100	2	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/23/2007	1800 - 1900	2	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/24/2007	1800, 2000	2	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/25/2007	1800 - 2000	3	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/26/2007	1700 - 1900	3	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/27/2007	1800 - 2000	3	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/28/2007	1700-1900	3	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	5/30/2007	1800 - 1900	2	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	6/1/2007	1900-2000	2	Barge safety	Fish barge needed reduced spill for safe passage.*
Lower Monumental	Spill	6/3/2007	1800-1900	2	Barge safety	Fish barge needed reduced spill for safe passage.*

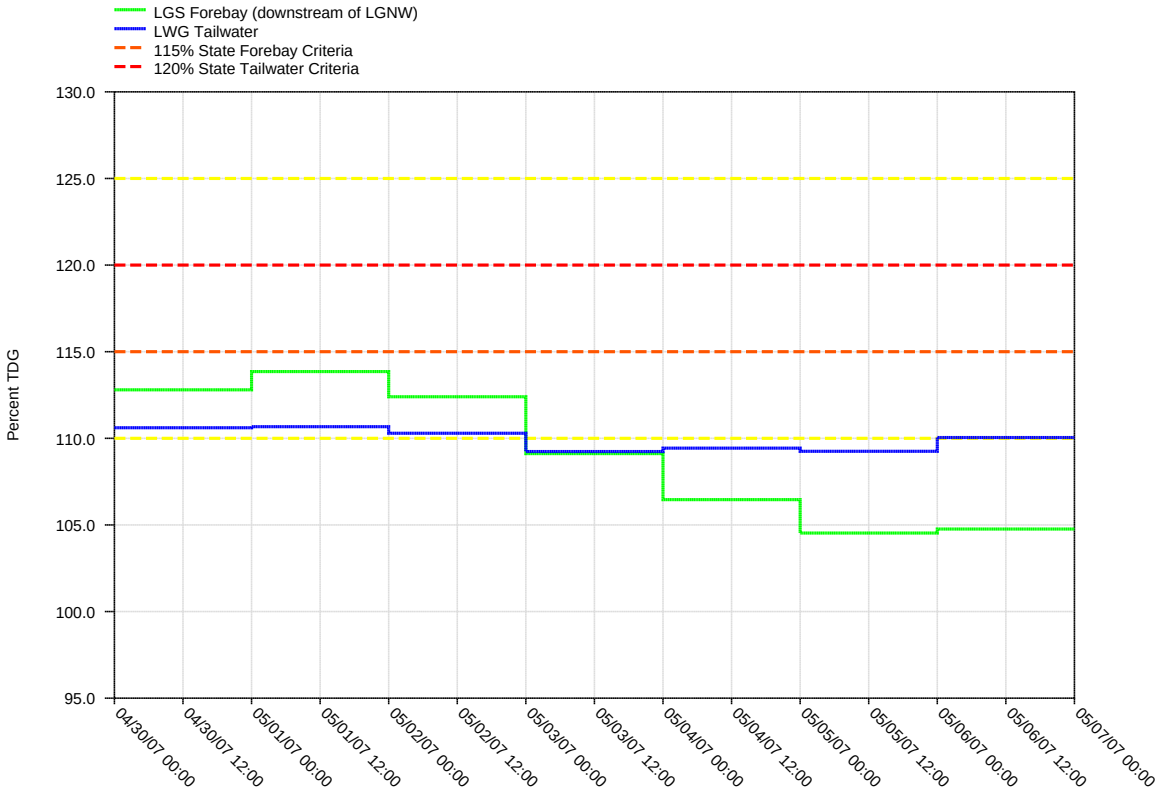
* Data collected for reporting spill reductions for safe passage of fish transport barges is reported as average hourly data. Therefore, while spill may be reduced for only a portion of an hour, the FOP Spill Report Table characterizes the reduction as a full hour.

Ice Harbor	Addt'l Spill	5/11/2007	1000-1300	4	High inflow - Involuntary spill	Hourly spill above 30.0% (spilled 35.3-40%) due to high inflows in excess of generation capacity resulting in involuntary spill.
Ice Harbor	Addt'l Spill	5/16/2007	1200-2400	13	Maintenance - Involuntary spill	Hourly spill above 30.0% requested spill test (spilled 35.6-37.2%) due to one unit out of service resulting in involuntary spill.
Ice Harbor	Addt'l Spill	5/24/2007	200	1	Navigation Lock	One operator on duty involved in handling a nav lockage and he was late in changing the spill and as a result IHR spilled 33.3% instead of 30%.
McNary	Spill	6/1/2007	0700-0800	2	Load swing hours	Hourly % spill below 39.0% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.1%.
McNary	Spill	6/3/2007	1100	1	Load swing hours	Hourly % spill below 39.0% at 37.5% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.0%.
John Day	Spill	5/12/2007 5/12/2007 5/13/2007	1900 2400 0100-0200	4	Barge safety	Delayed spill @ 1900 because high winds made approach to Navigation Lock difficult. Spilled above target of 60% (61.27-64.01%) to achieve the nighttime hr avg spill 60.4%.[1]
The Dalles	Addt'l Spill	5/1/2007	0100-0300, 0500, 1200	5	Load swing hours	Hourly % spill above 41.0% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.1%.
The Dalles	Spill	5/2/2007	2100	1	Load swing hours	Hourly % spill below 39.0% at 38.6% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 39.8%.
The Dalles	Spill	5/9/2007	0600-0700	2	Load swing hours	Hourly % spill slightly below 39.0% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 39.7%.
The Dalles	Spill	5/10/2007	0600-0800, 2400	4	Load swing hours	Hourly % spill slightly below 39.0% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 39.7%.
The Dalles	Spill	5/11/2007	0100-0200 0700-0900	5	Load swing hours	Hourly % spill slightly outside of 39.0-41.0% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.0%.

The Dalles	Addt'l Spill	5/12/2007 5/13/2007	2400 0100-0400	5	Load swing hours	Hourly % spill slightly above 41.0% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.1%.
The Dalles	Addt'l Spill	5/14/2007	2400	1	Load swing hours	Hourly % spill above 41.0% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.1%.
The Dalles	Addt'l Spill	5/18/2007	200	1	Load swing hours	Hourly % spill above 41.0% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.0%.
The Dalles	Addt'l Spill	5/23/2007	1900	1	Load swing hours	Hourly % spill above 41.0% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.3%.
The Dalles	Spill	5/30/2007	1700-1800	2	Load swing hours	Hourly % spill below 39.0% (40% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 39.7%.
Bonneville	Addt'l Spill	5/16/2007	1300-1400	2	Maintenance	One spillbay was opened to pass debris resulting in spill up to 103.4 kcfs which is above the spill cap of 100 kcfs.
Bonneville	Addt'l Spill	5/25/2007	1700	1	Maintenance	One spillbay was opened to pass debris resulting in 100.9 kcfs spill which is above the spill cap of 100 kcfs.
Bonneville	Spill	5/28/2007	0900-1000	2	Spill Cap - Change delay	Delayed Spill Cap increase: teletype sent at 0830, operator involved in handling a nav lockage and did not increase spill until after 1000.

Figure 1.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

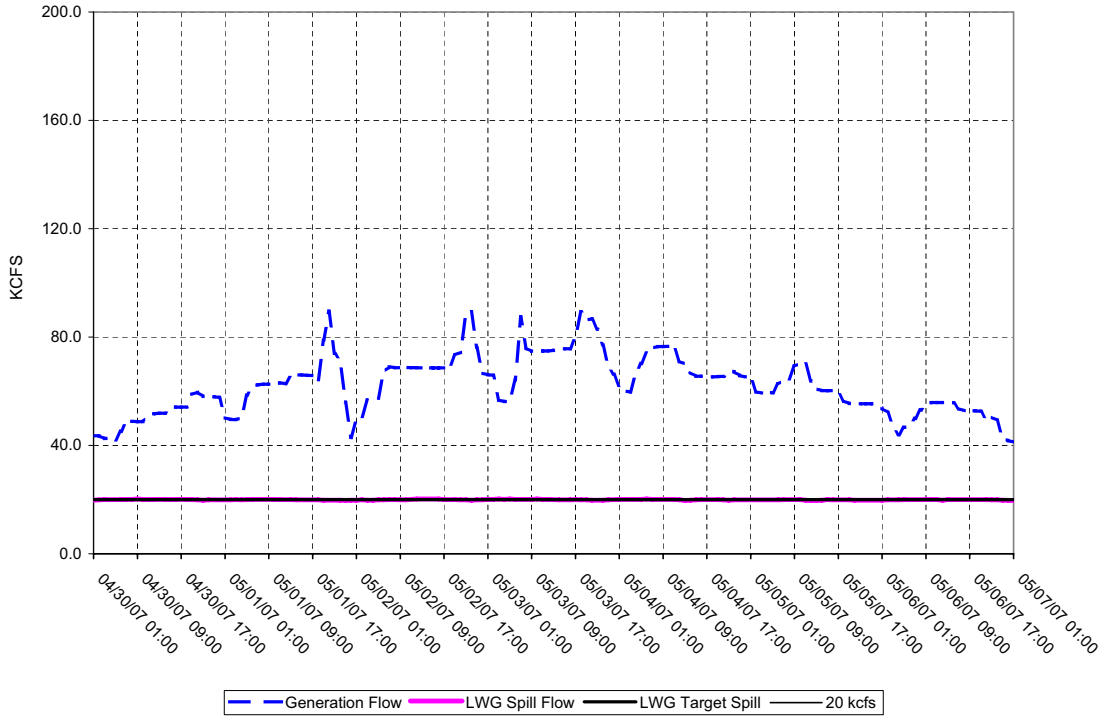
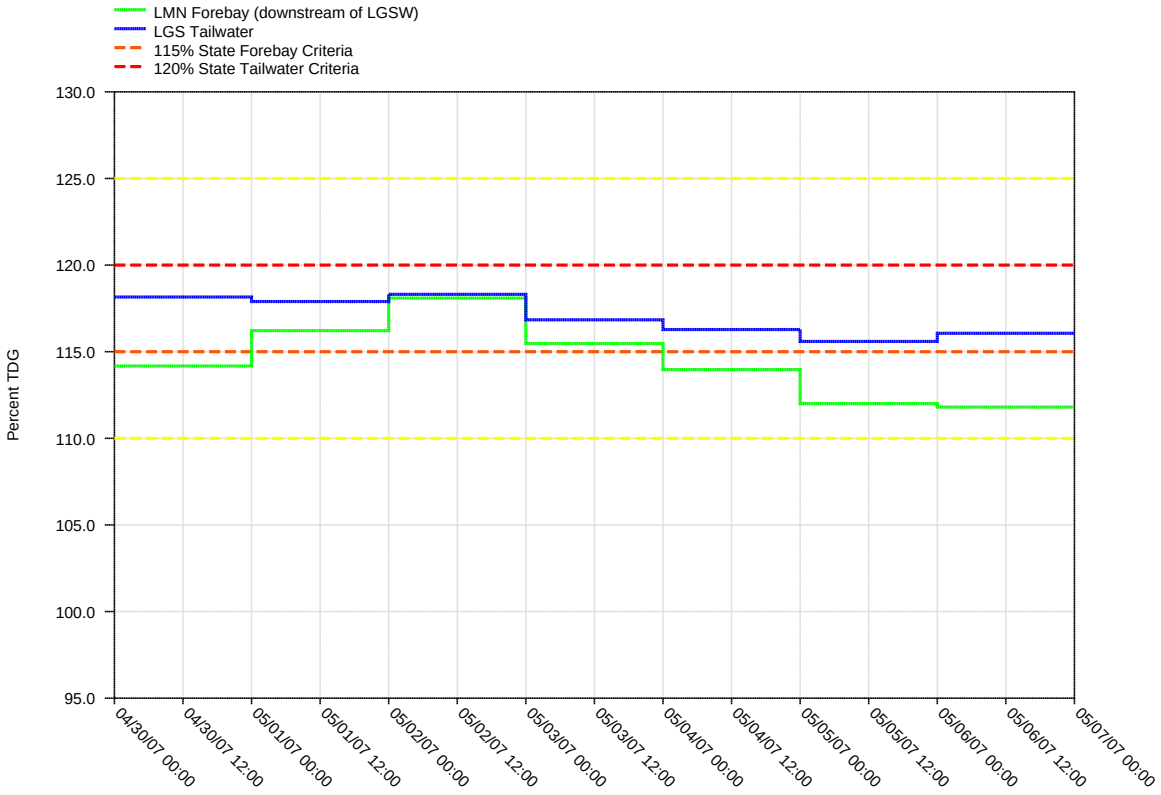


Figure 2.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

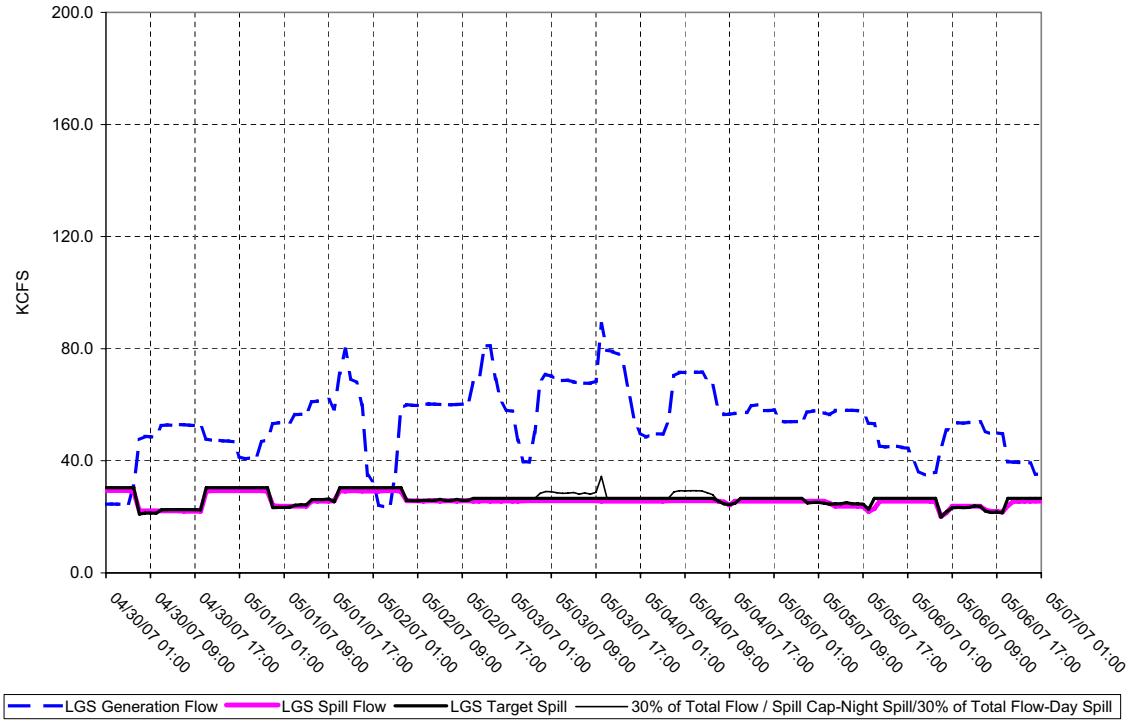
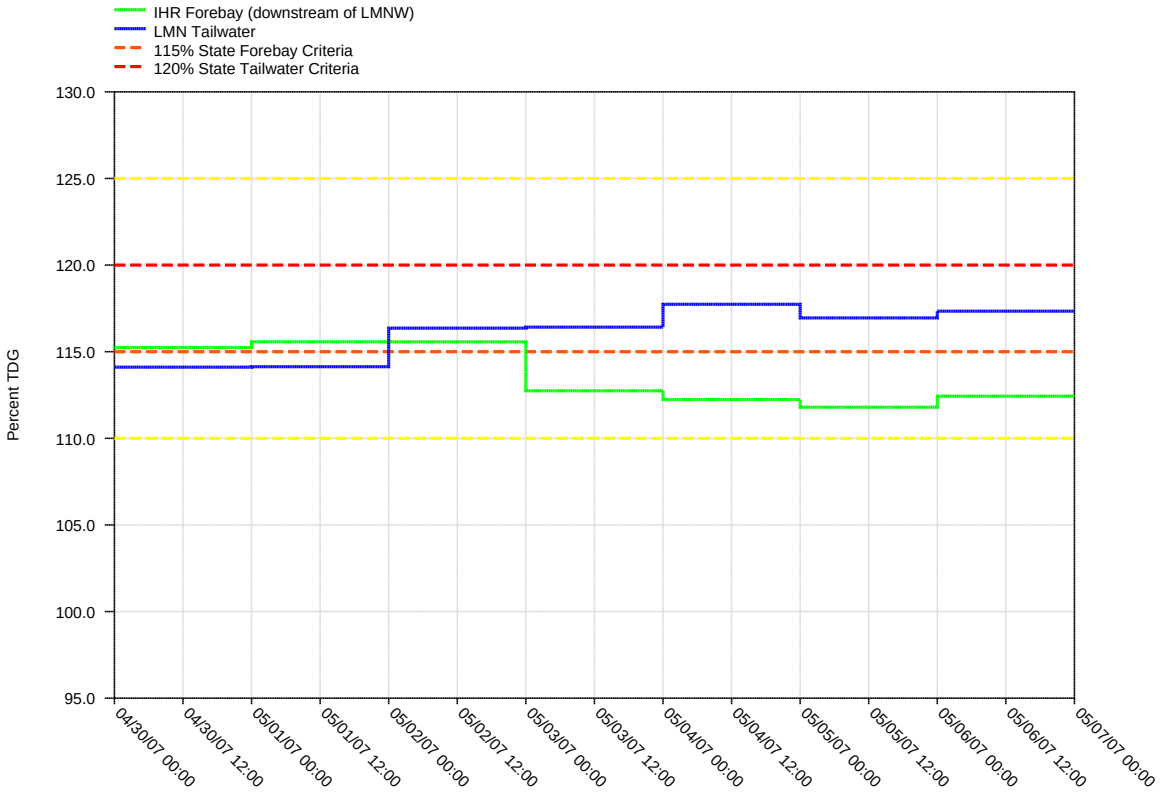


Figure 3.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

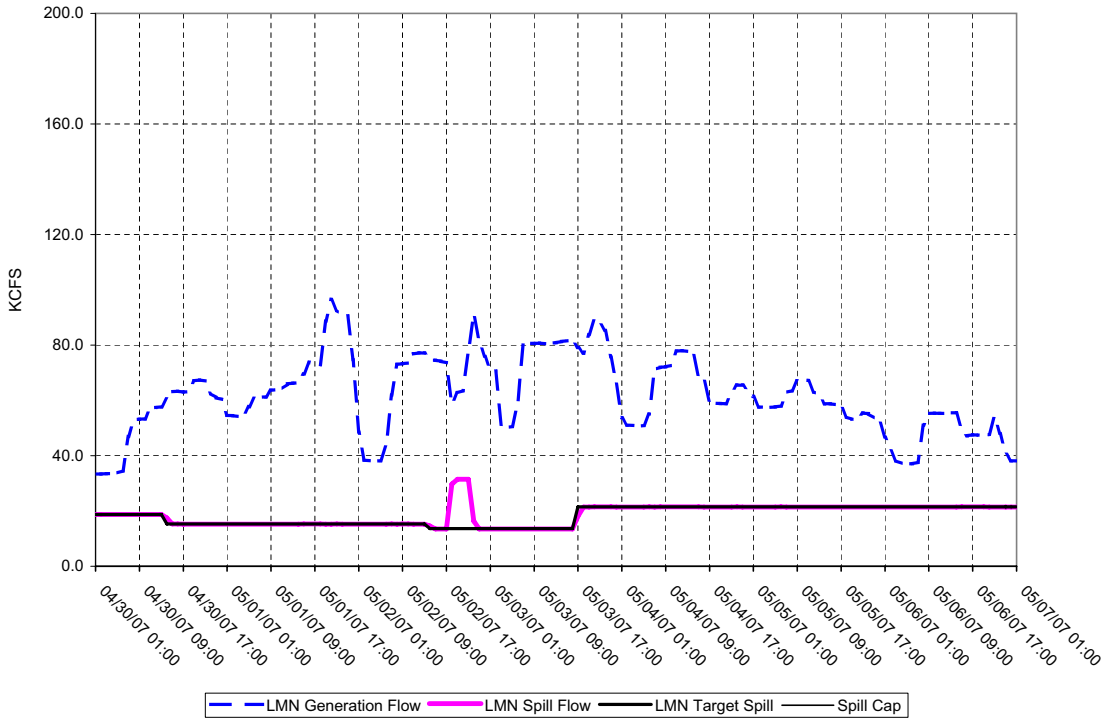
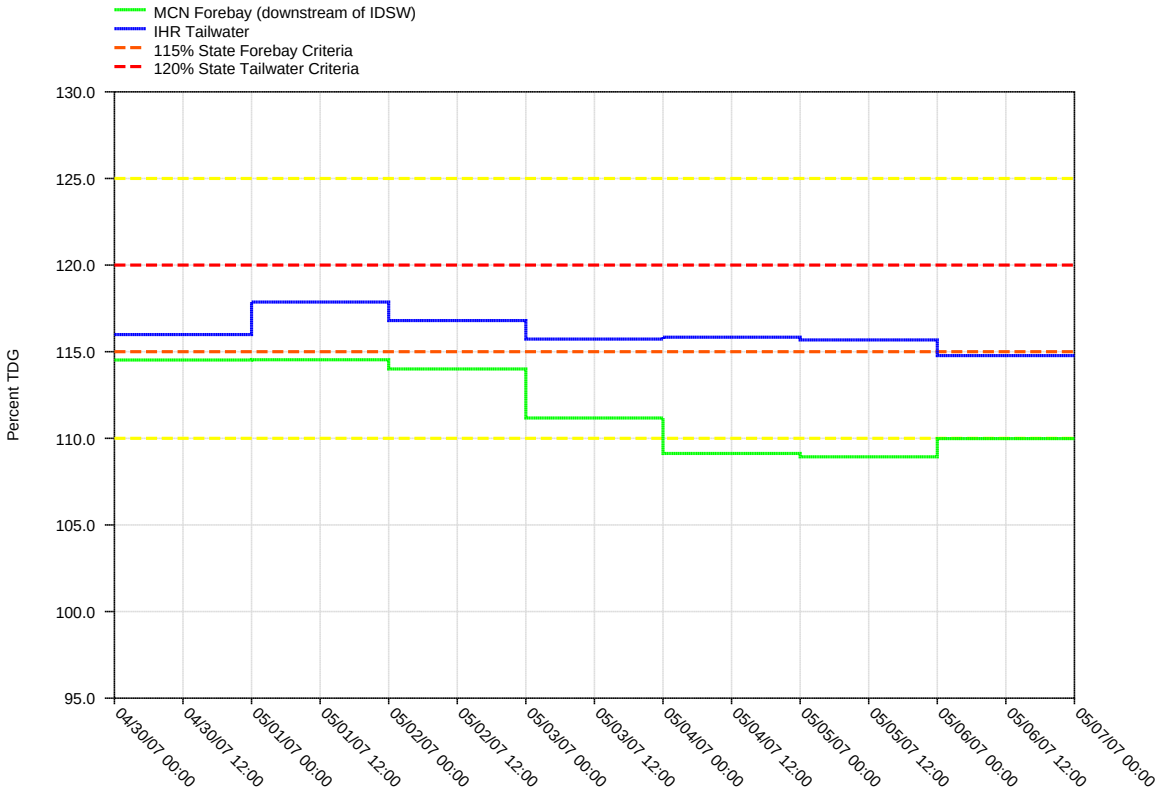


Figure 4.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

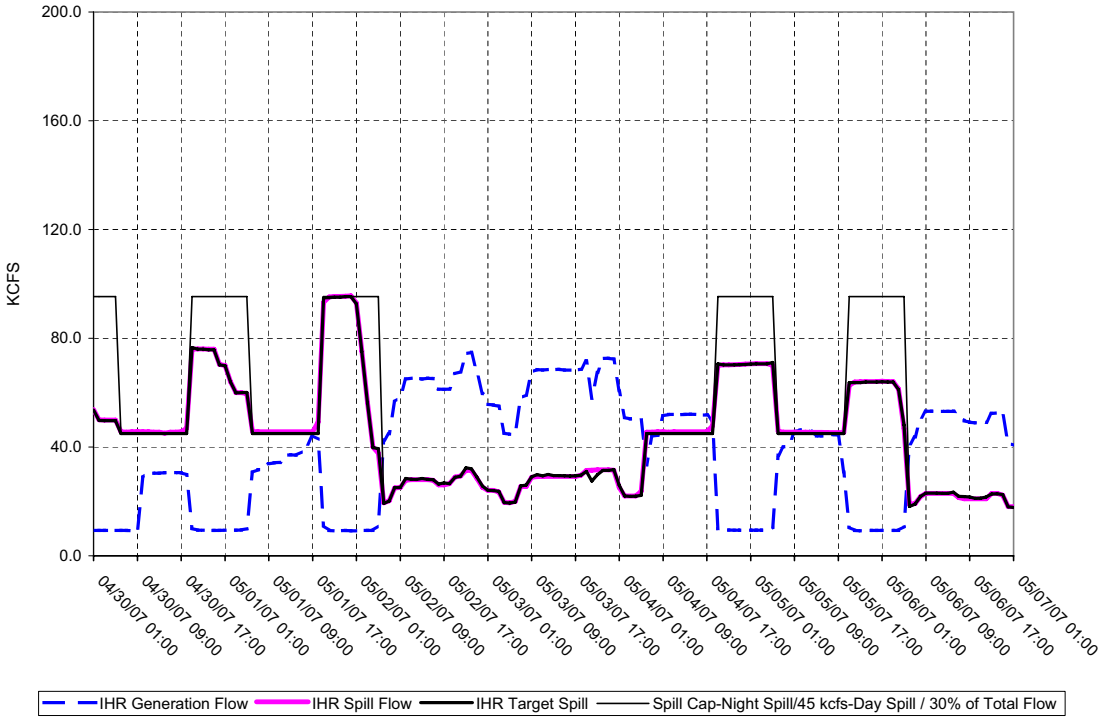
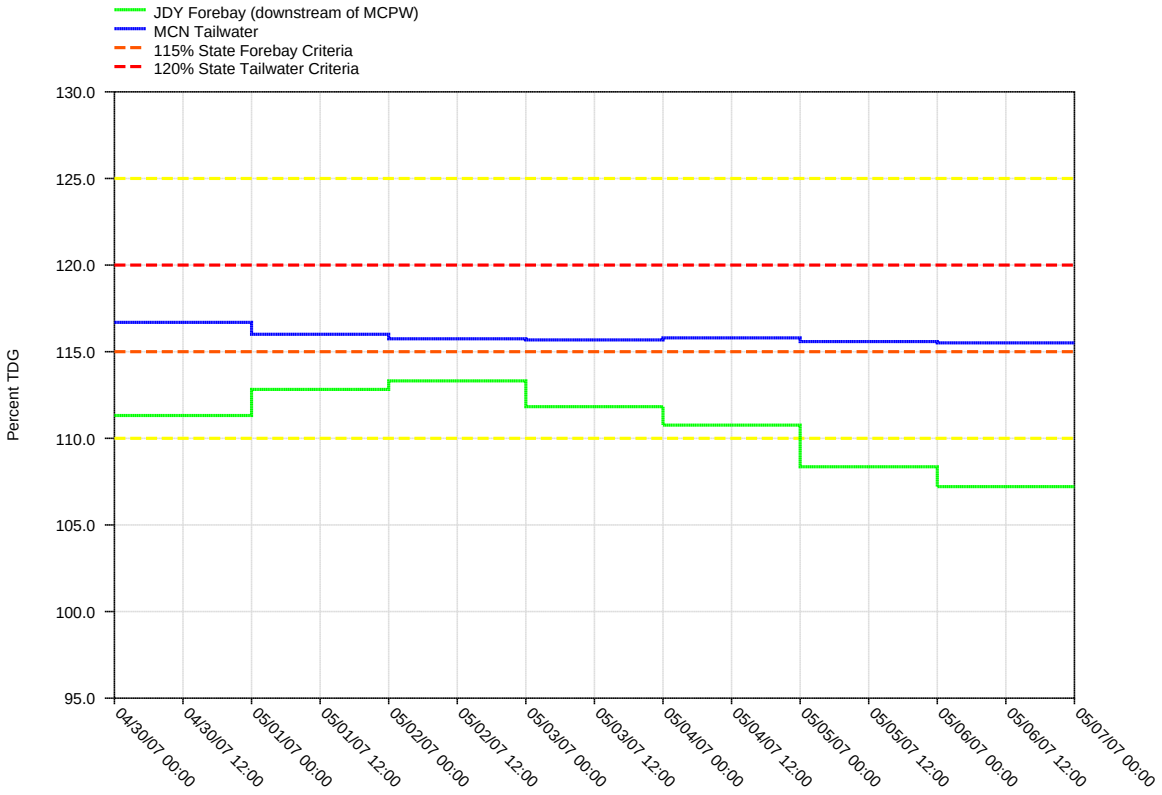


Figure 5.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

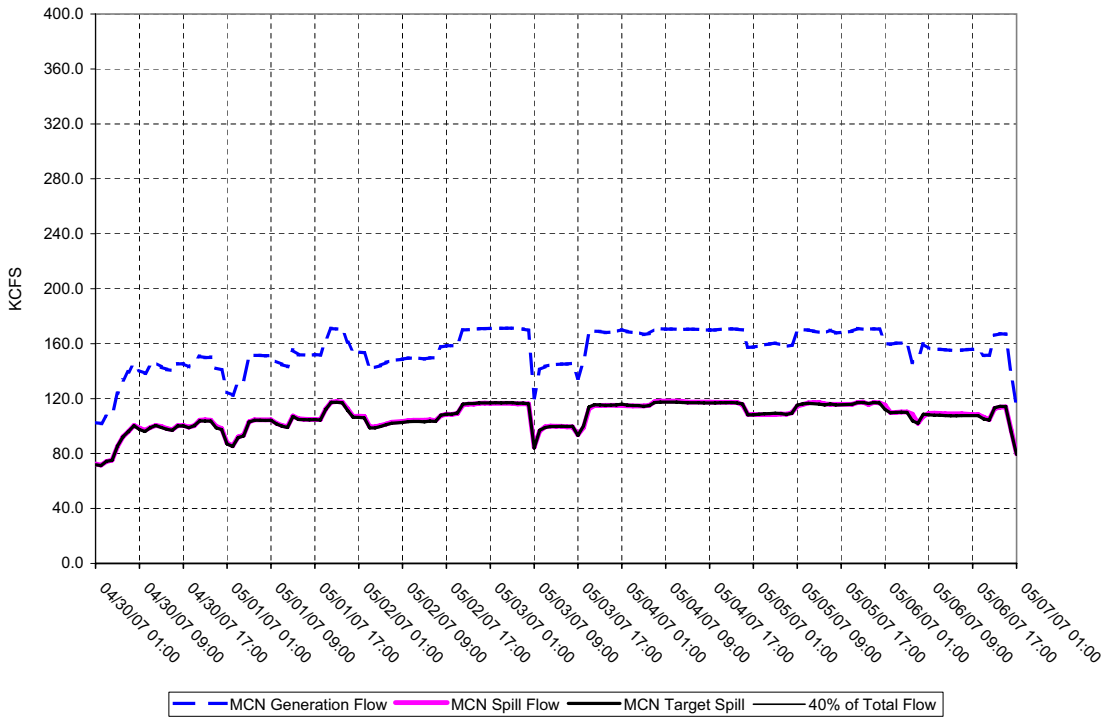
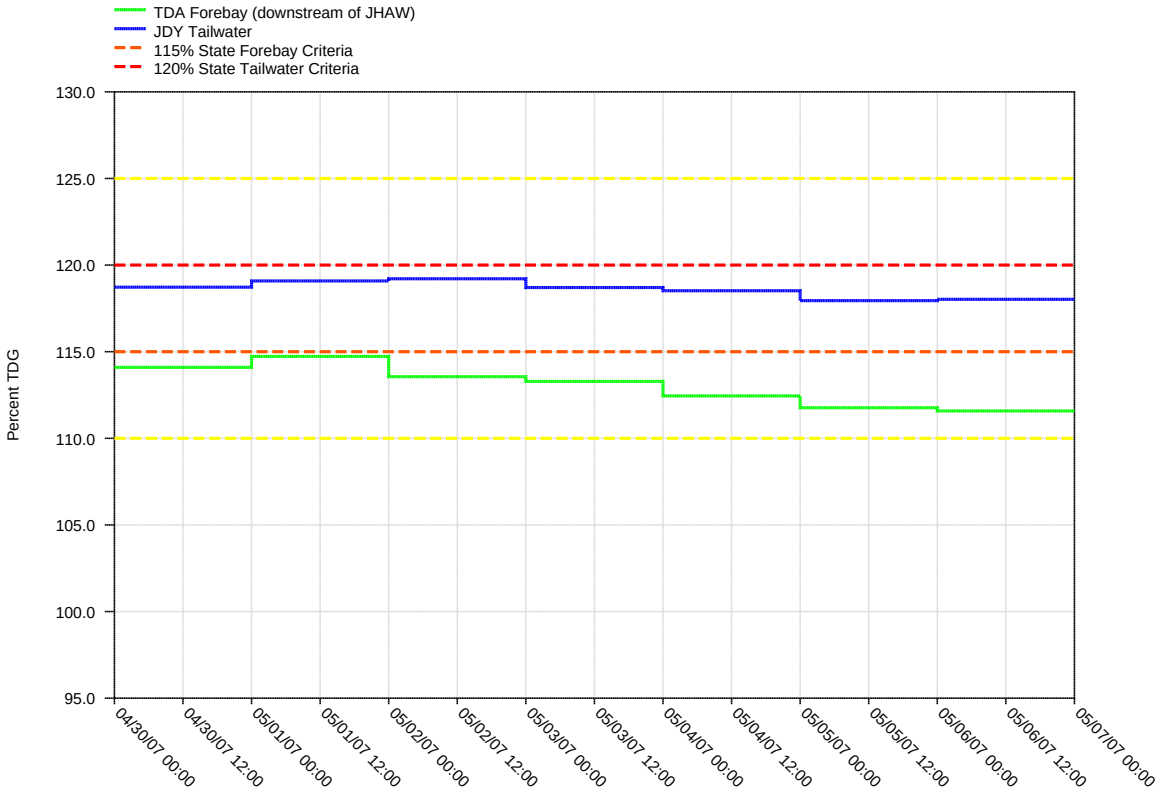


Figure 6.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

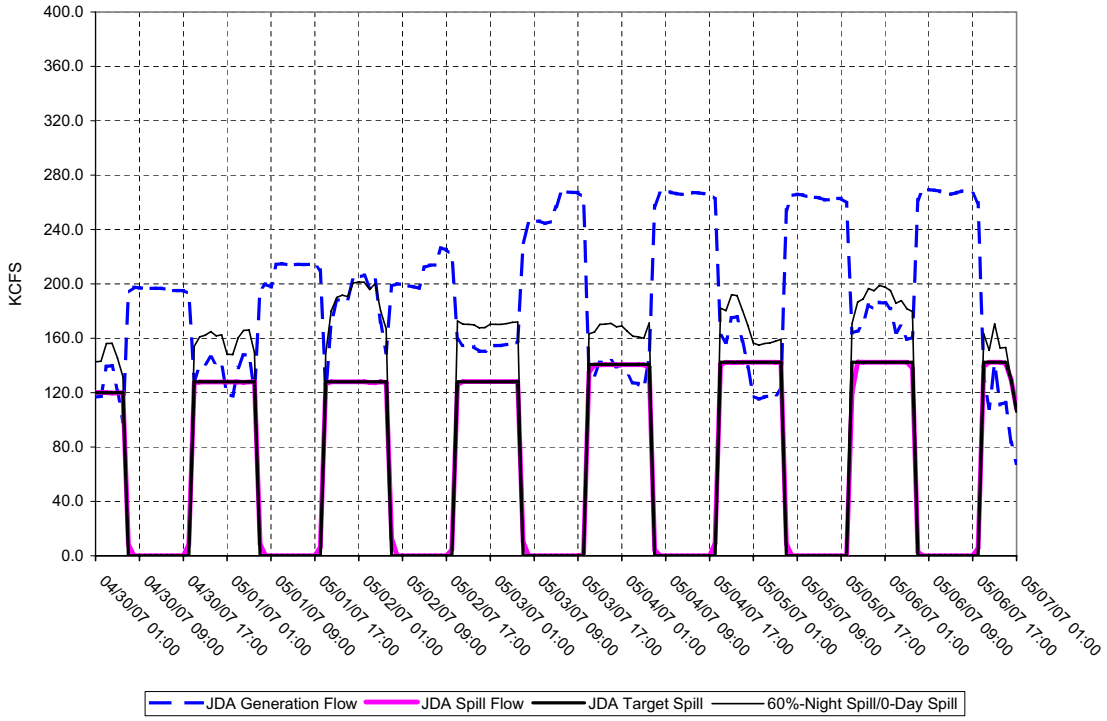
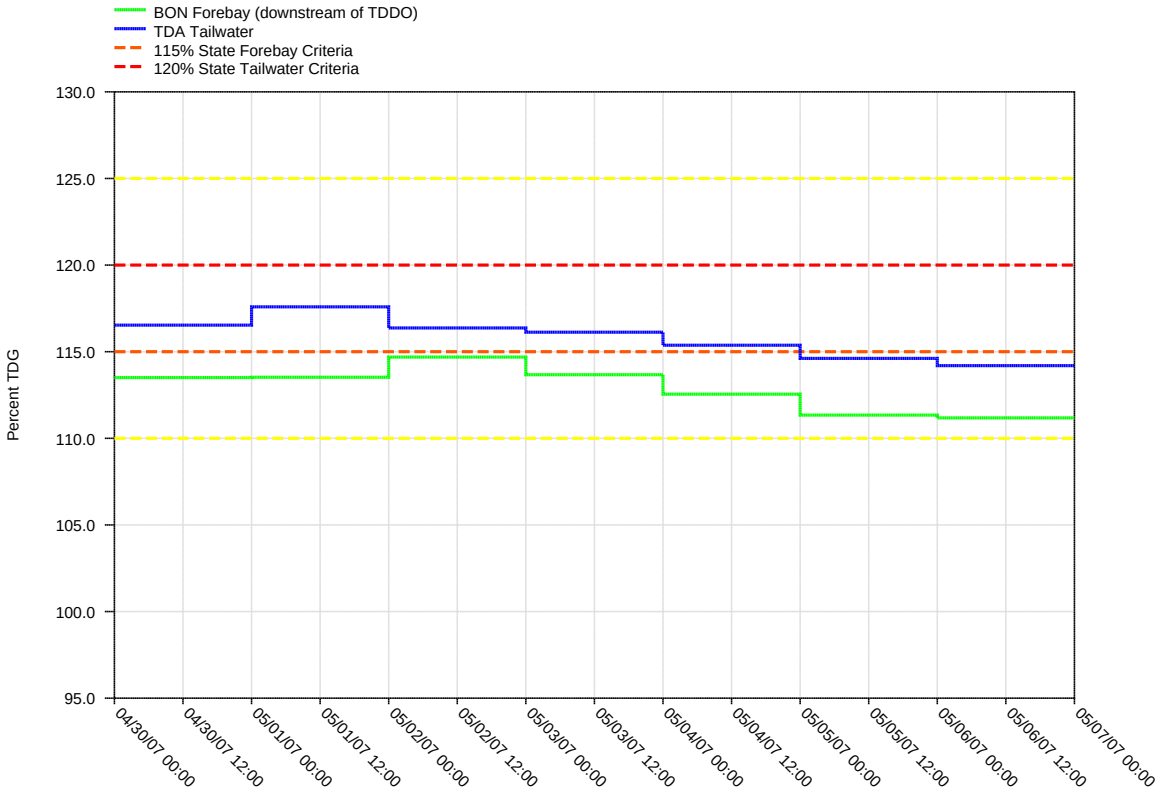


Figure 7.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

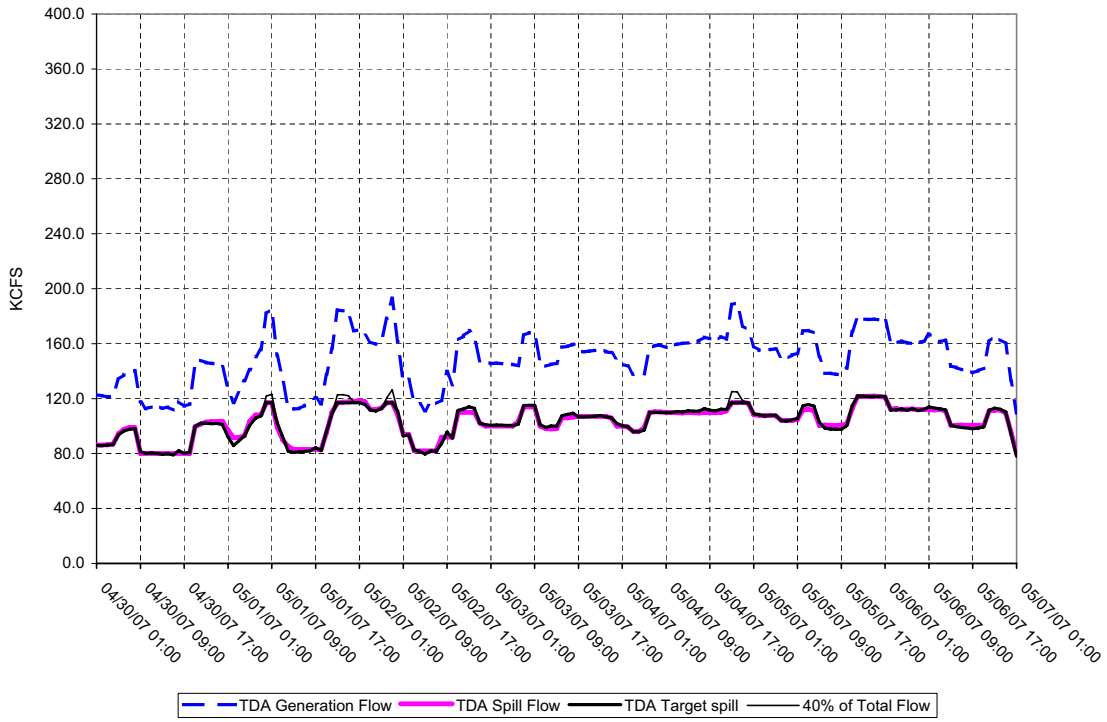
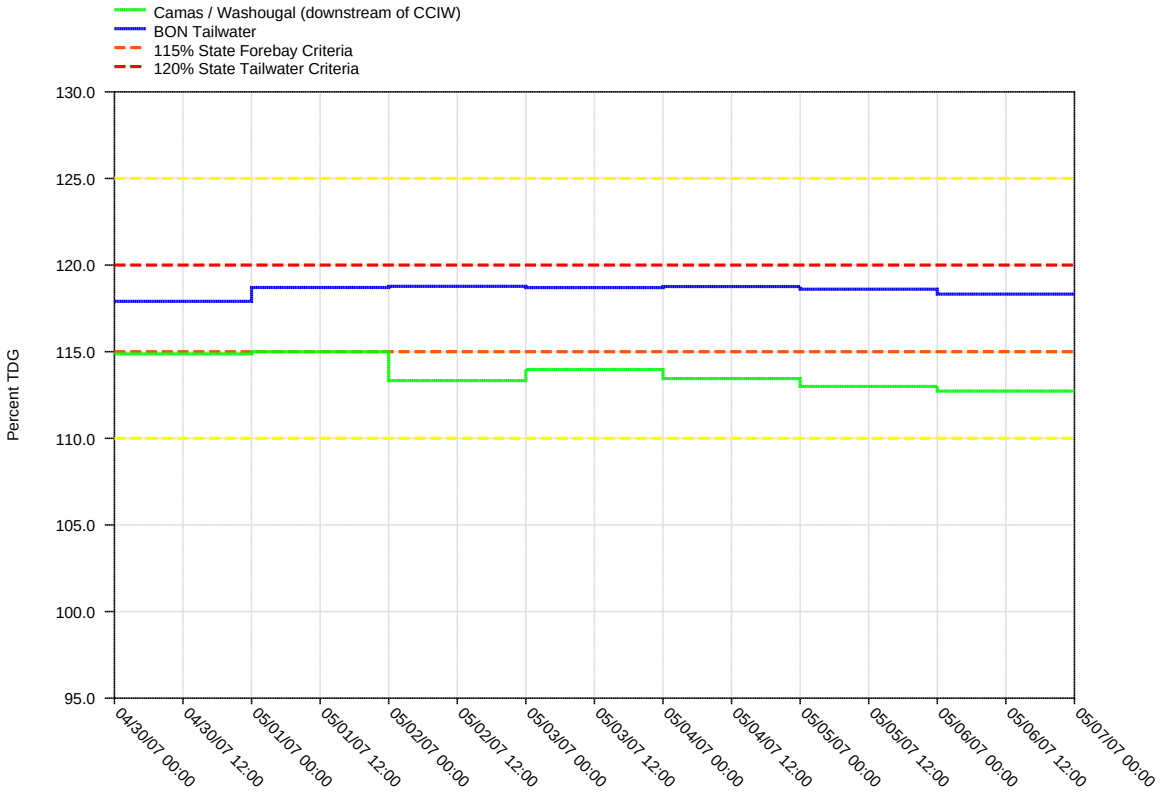


Figure 8.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

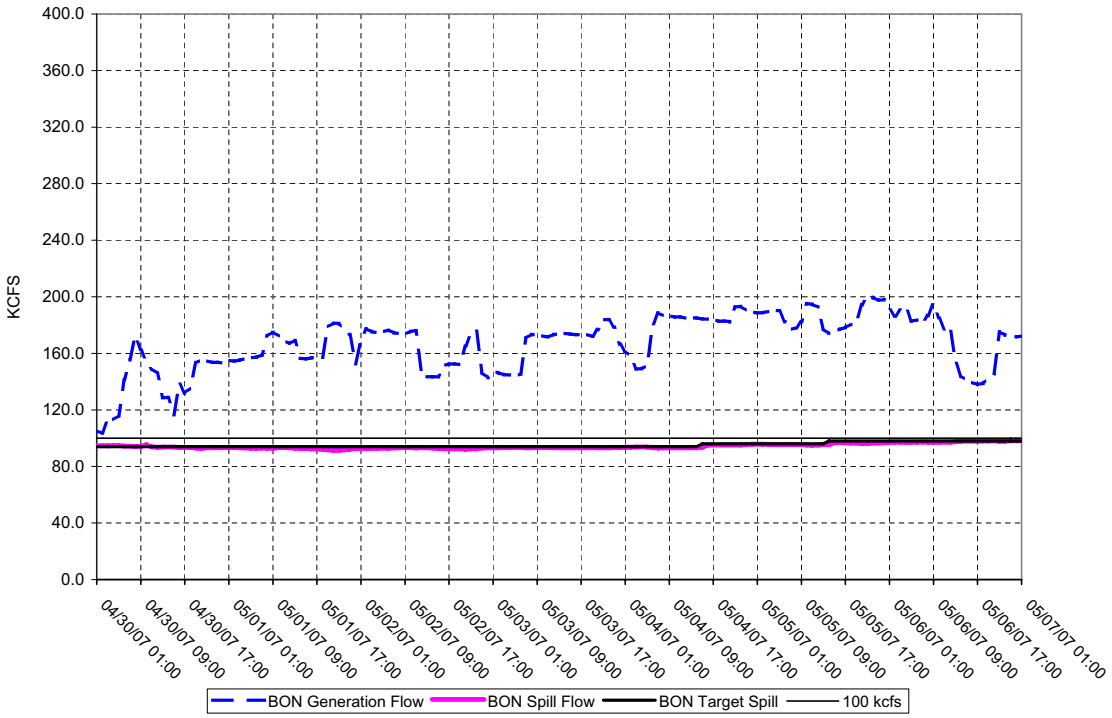
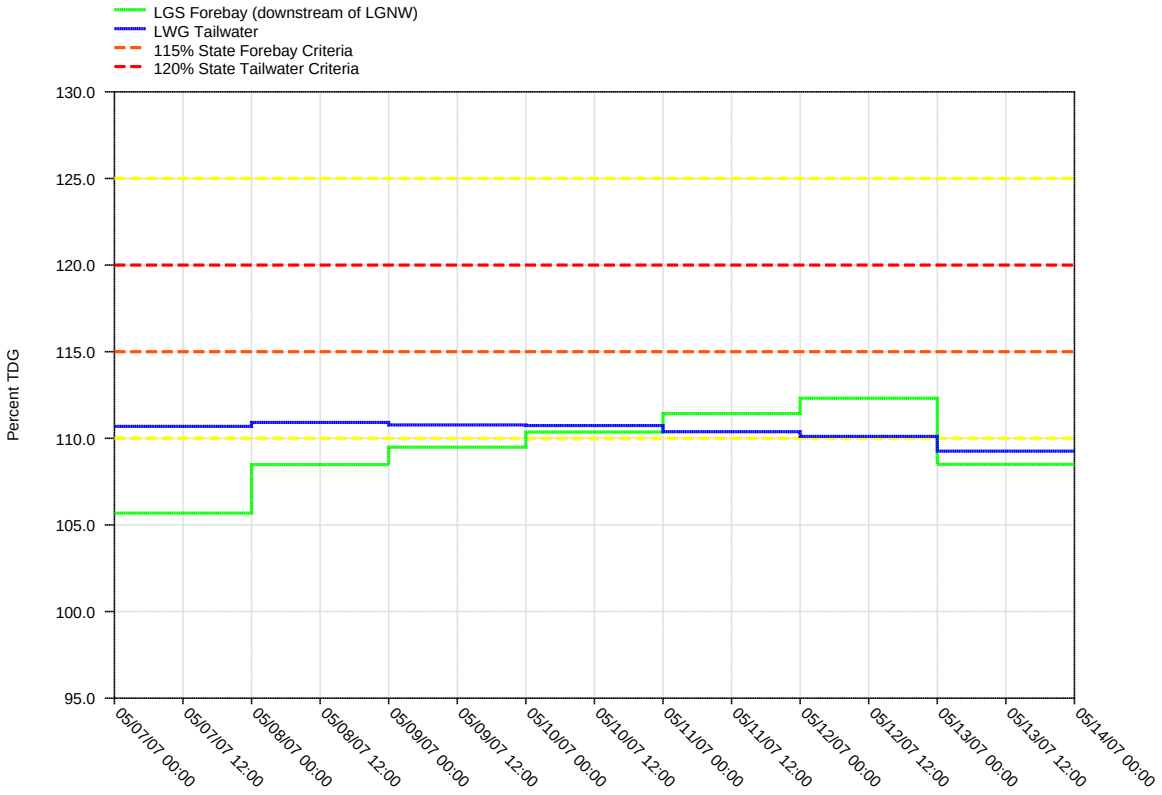


Figure 9.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

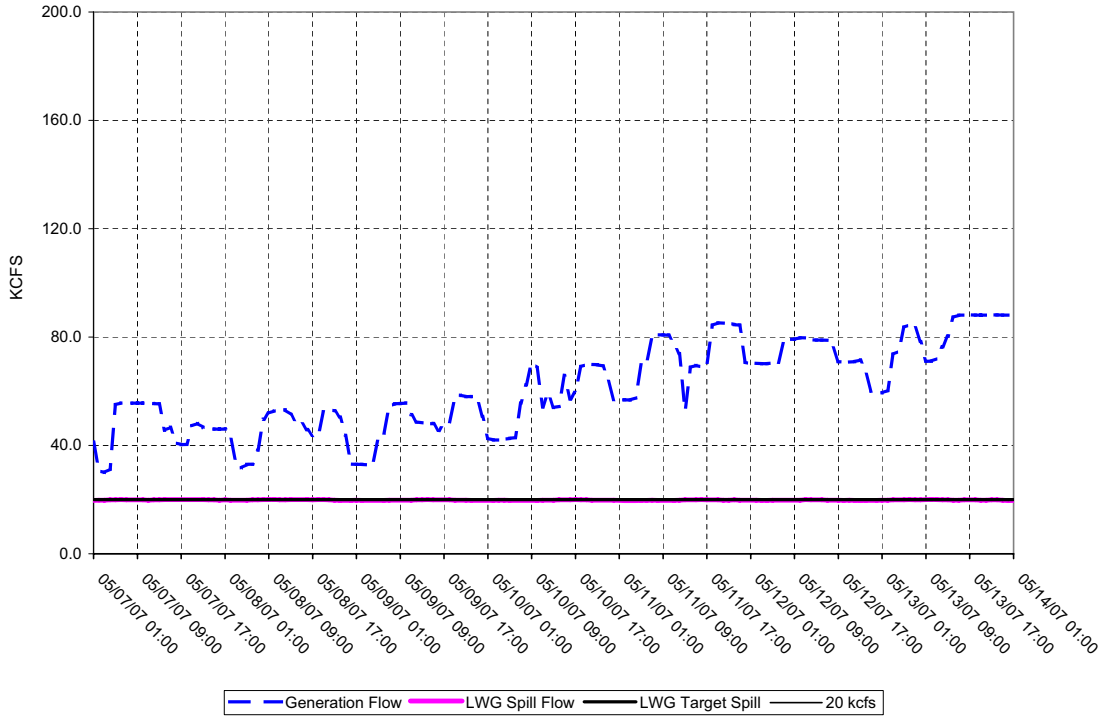
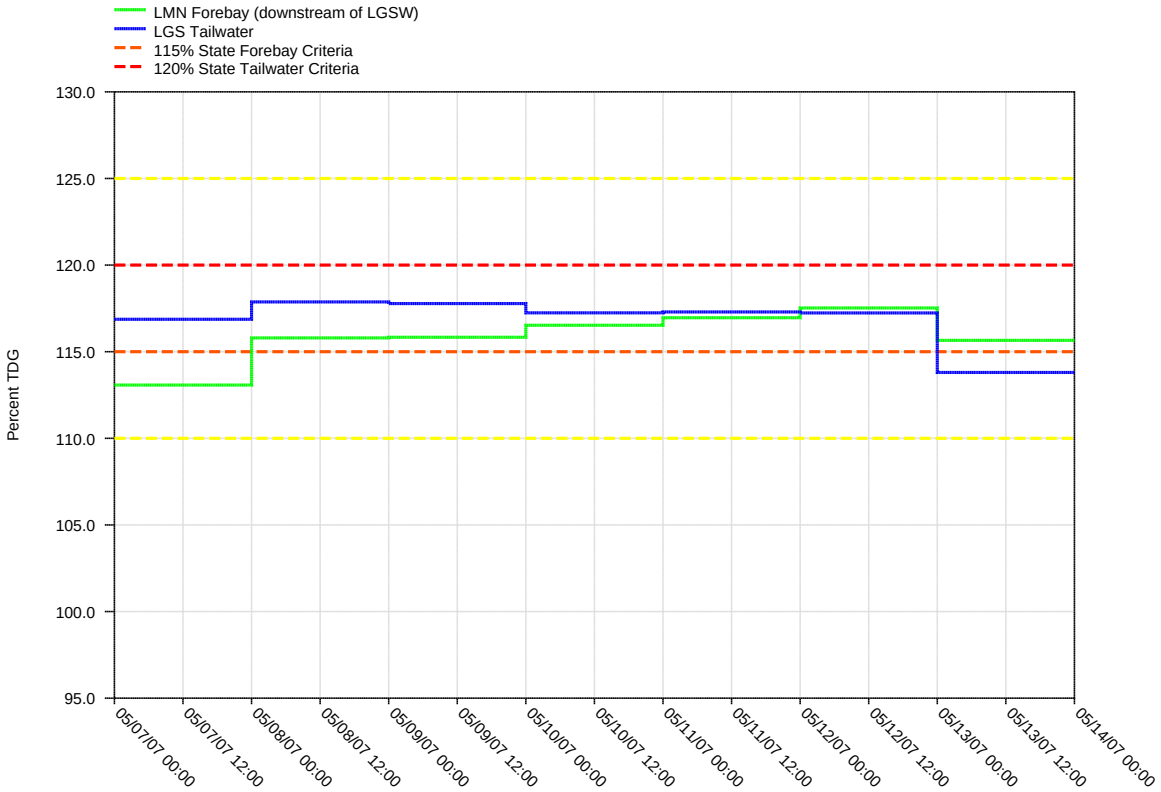


Figure 10.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

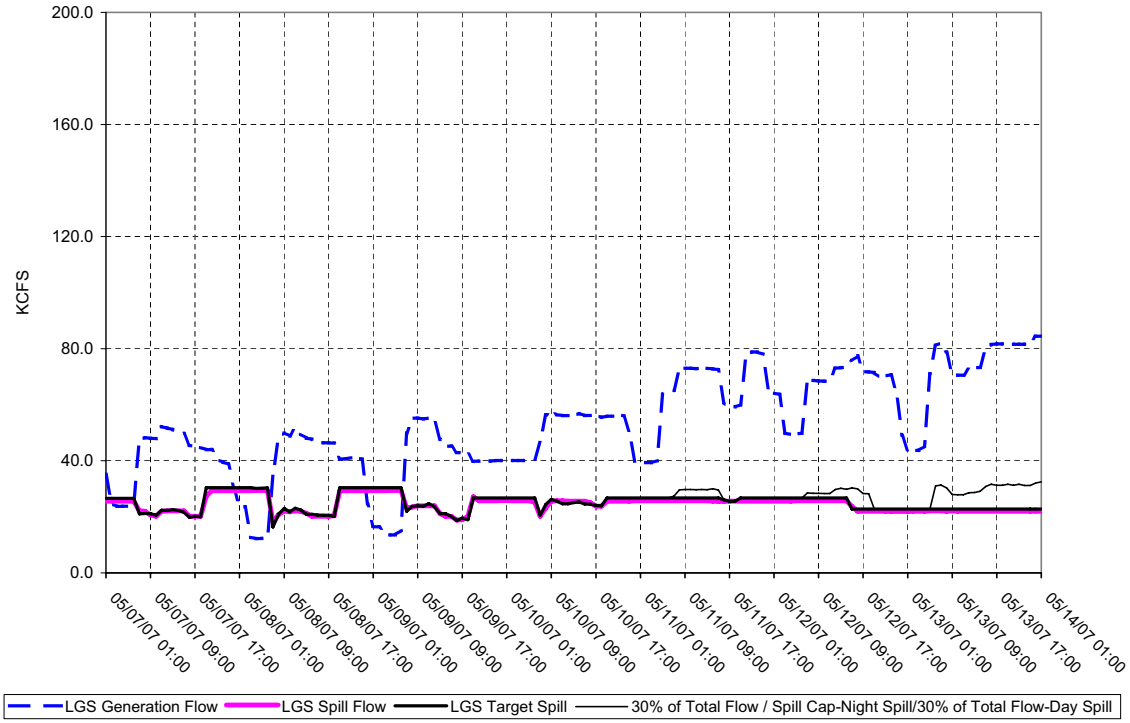
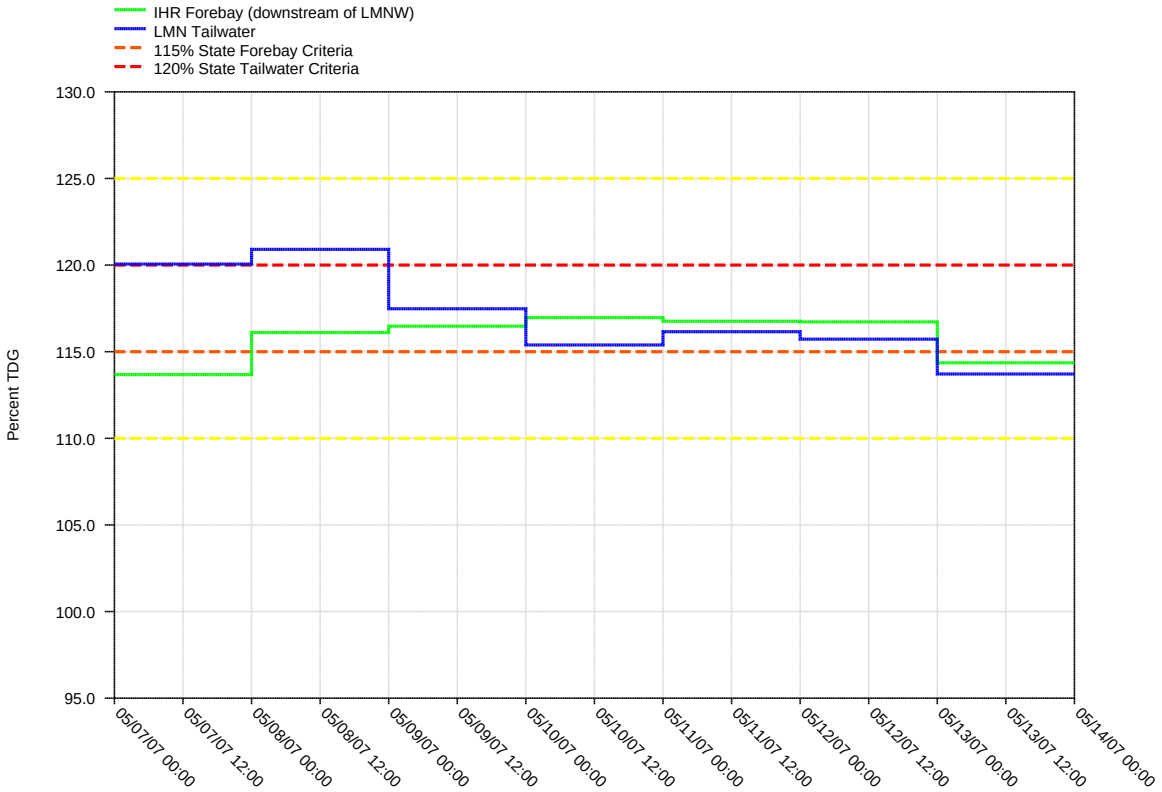


Figure 11.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

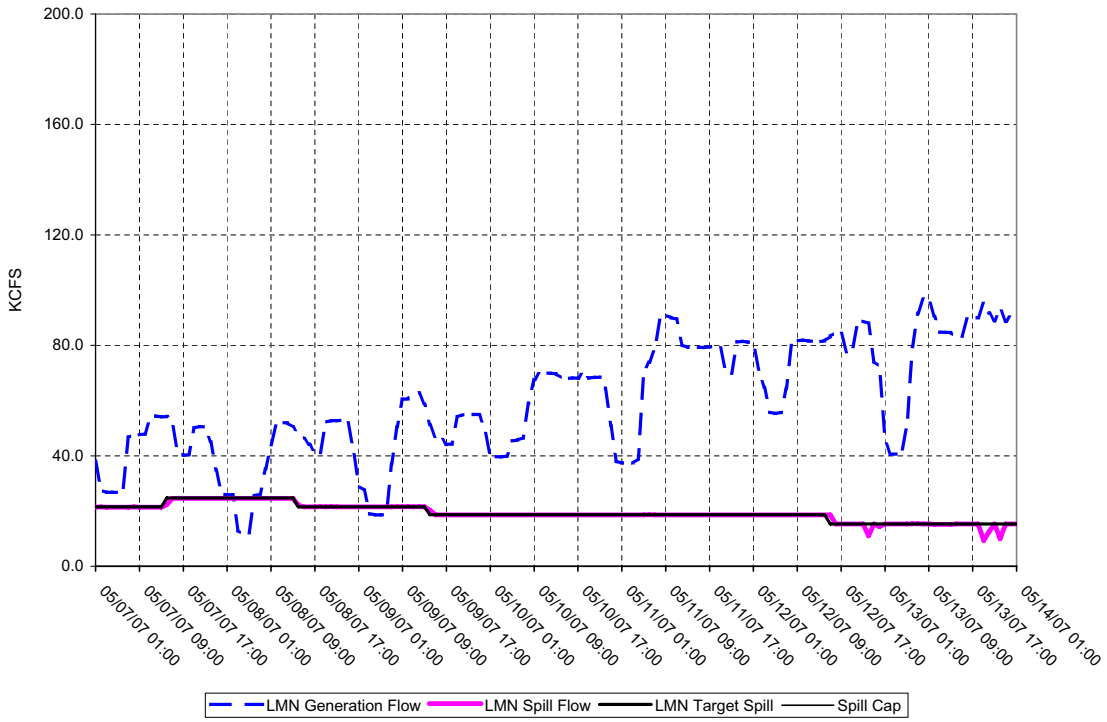
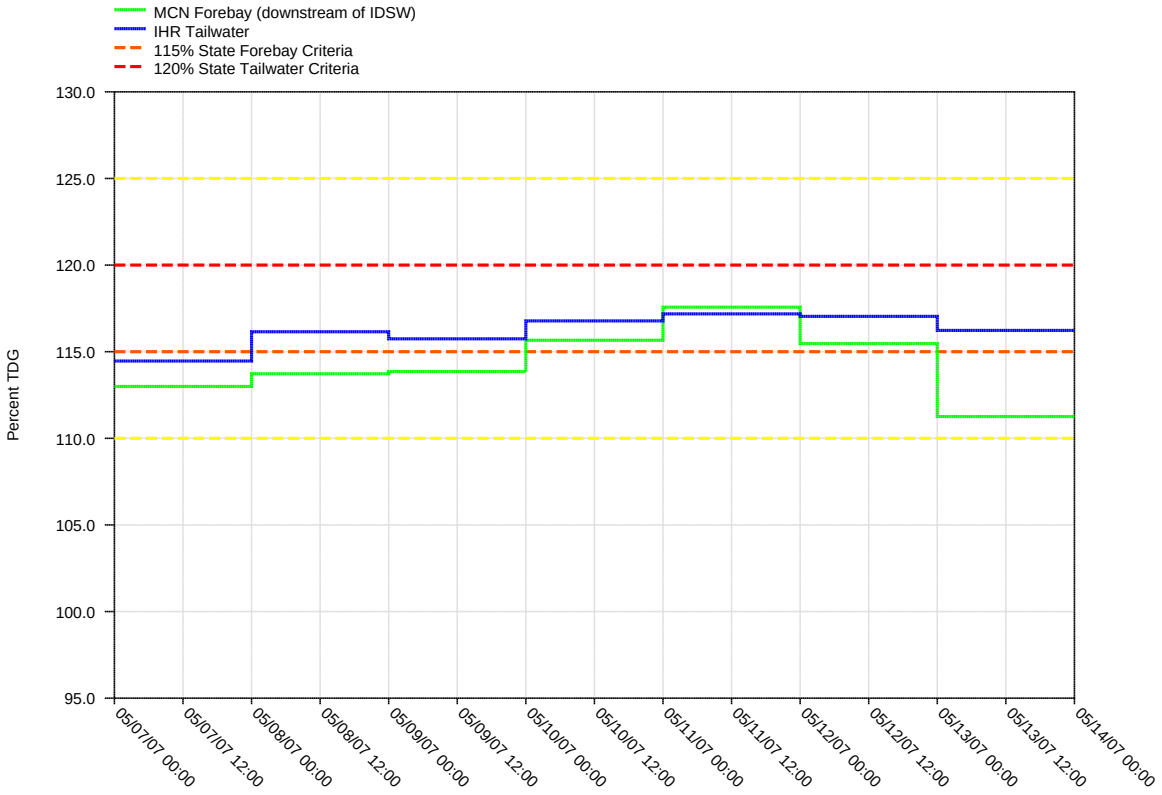


Figure 12.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

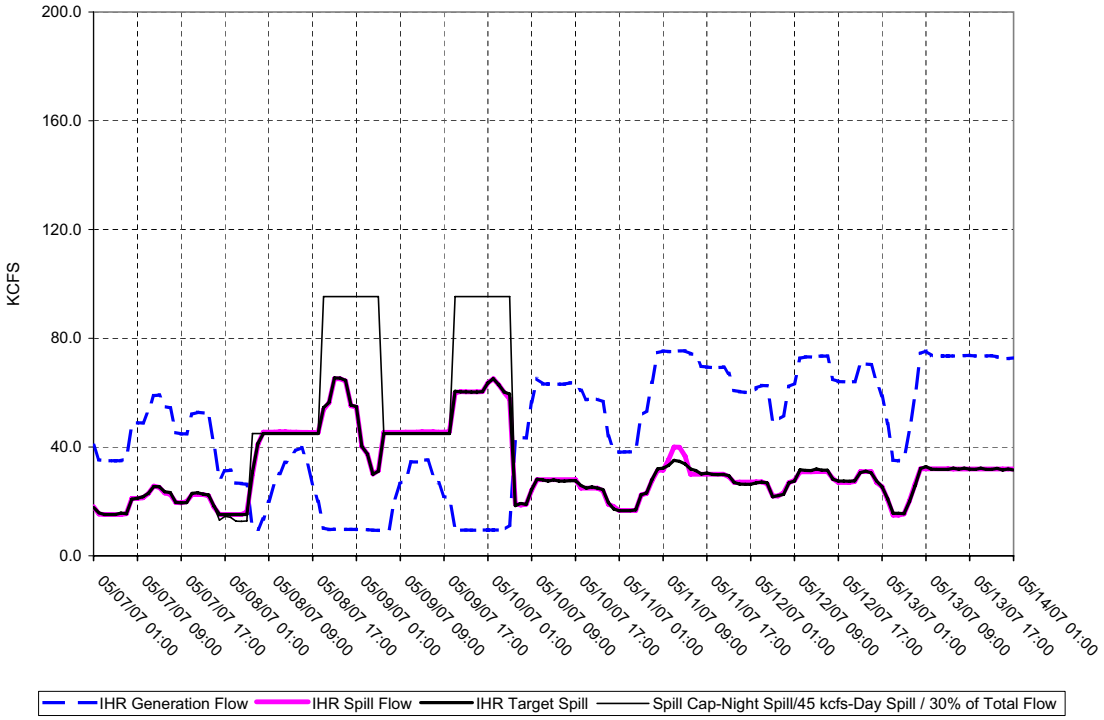
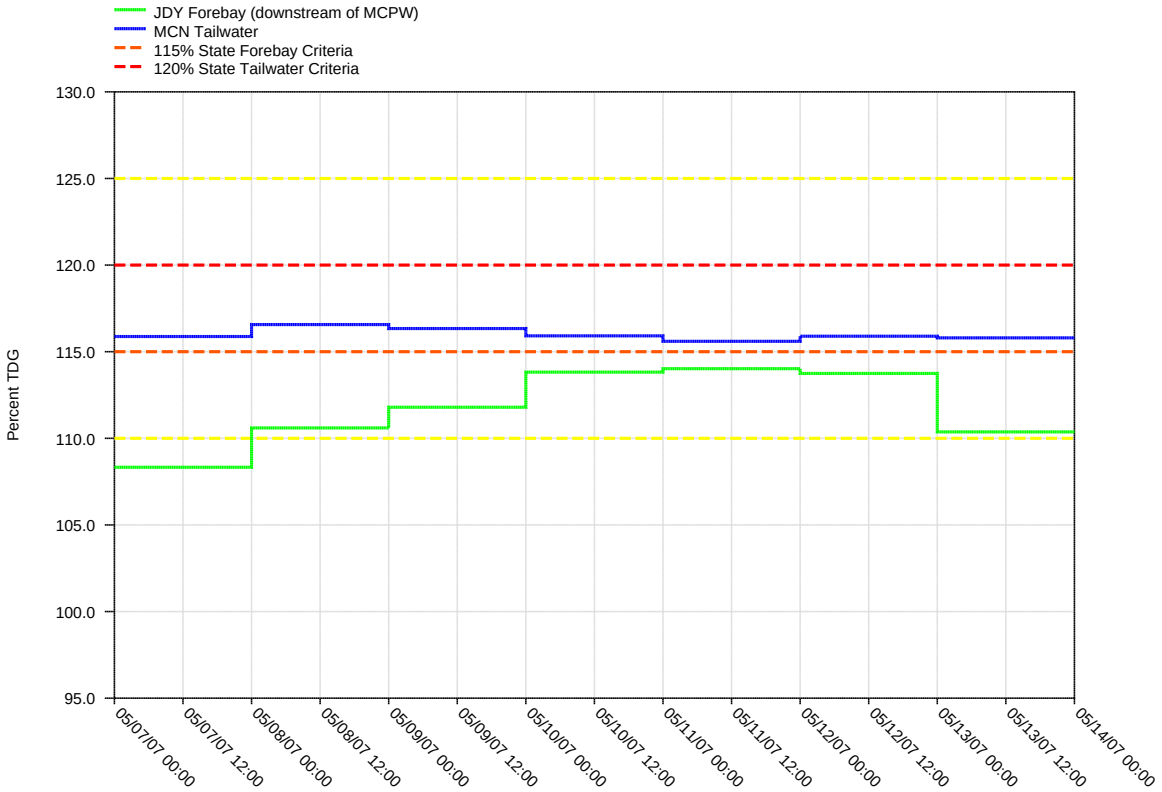


Figure 13.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

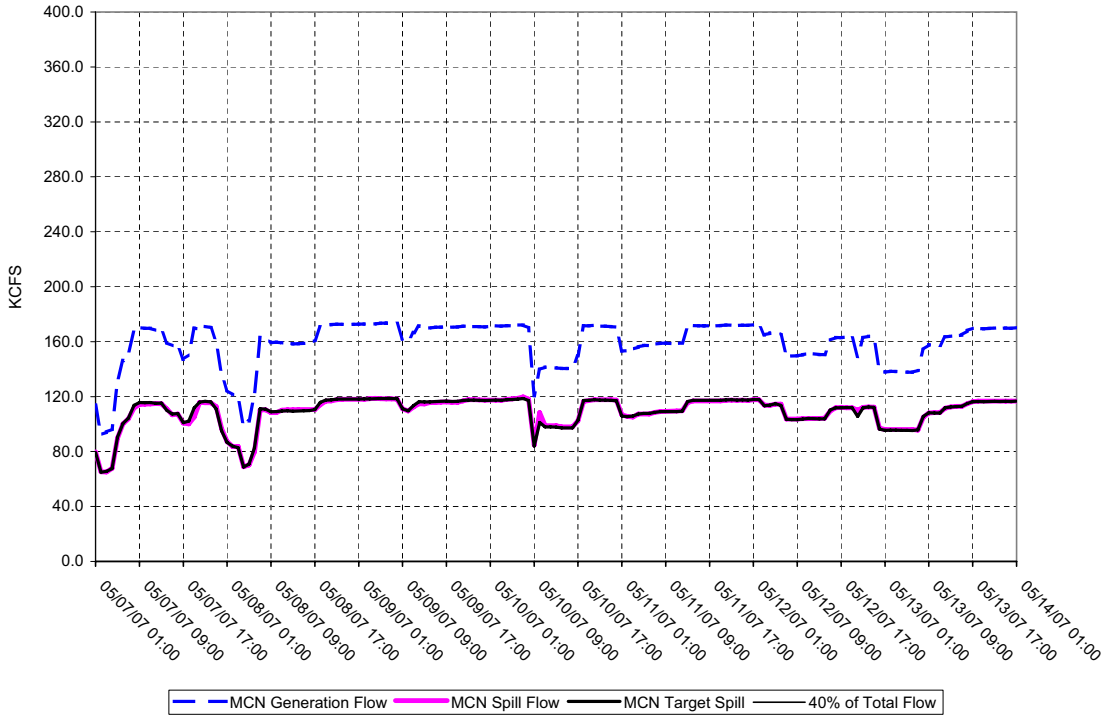
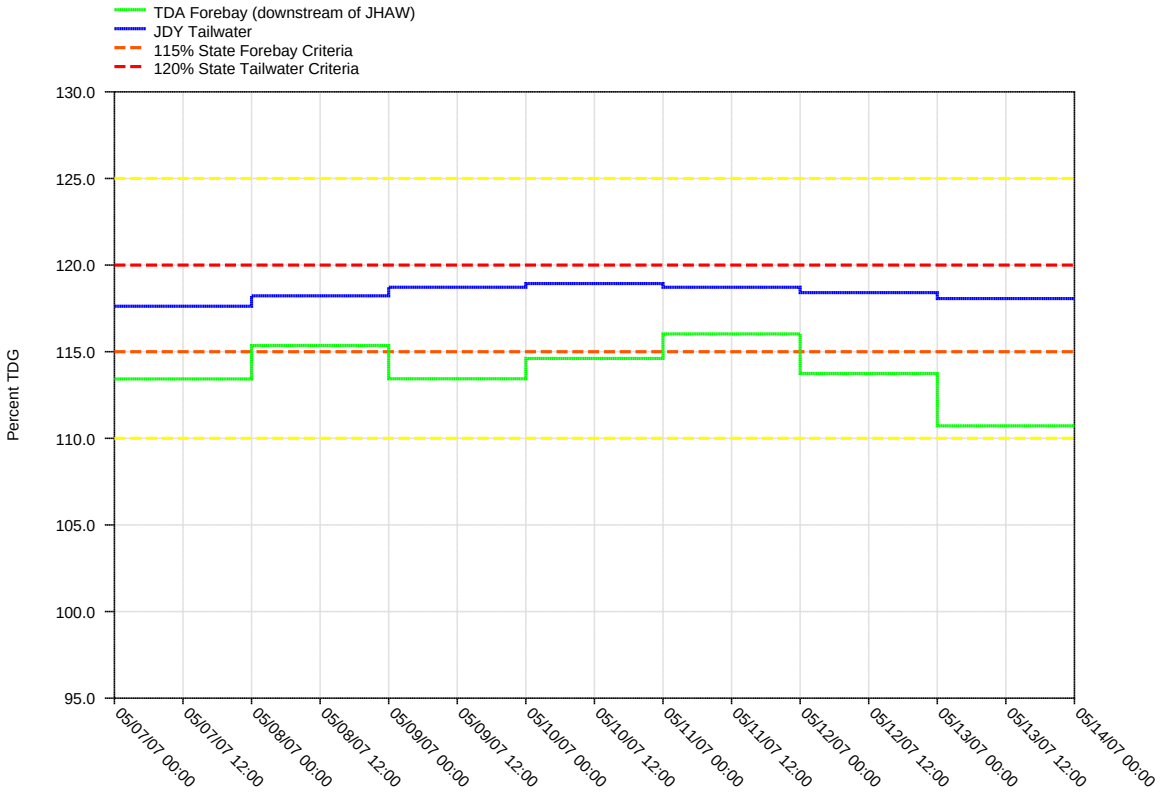


Figure 14.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

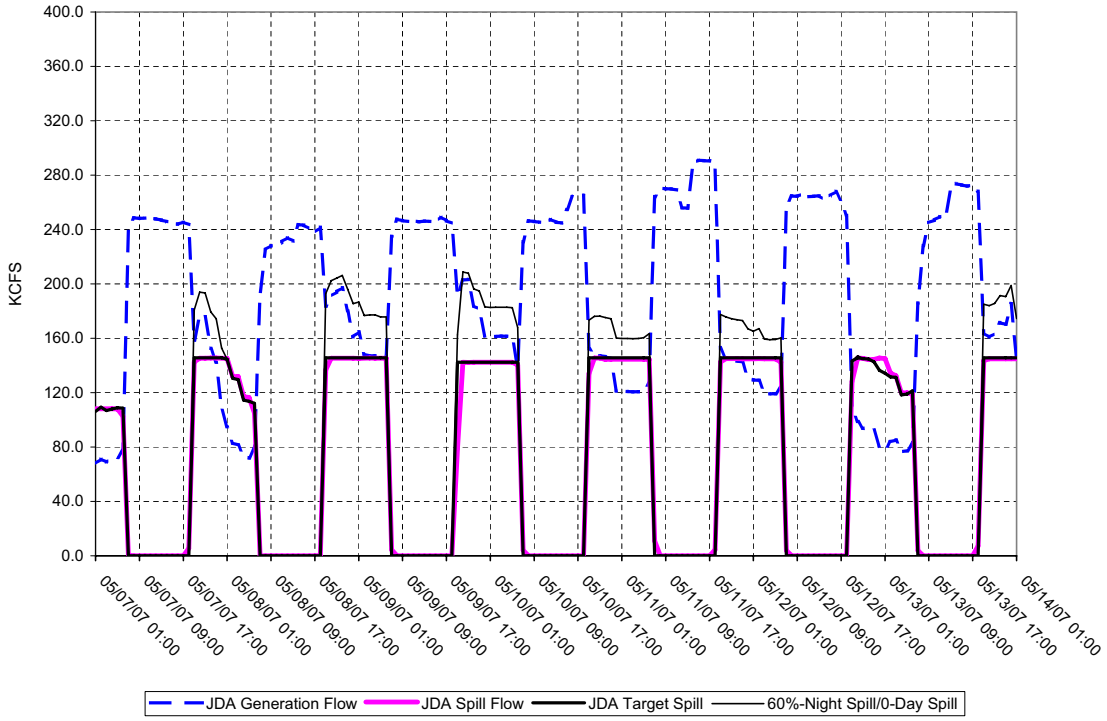
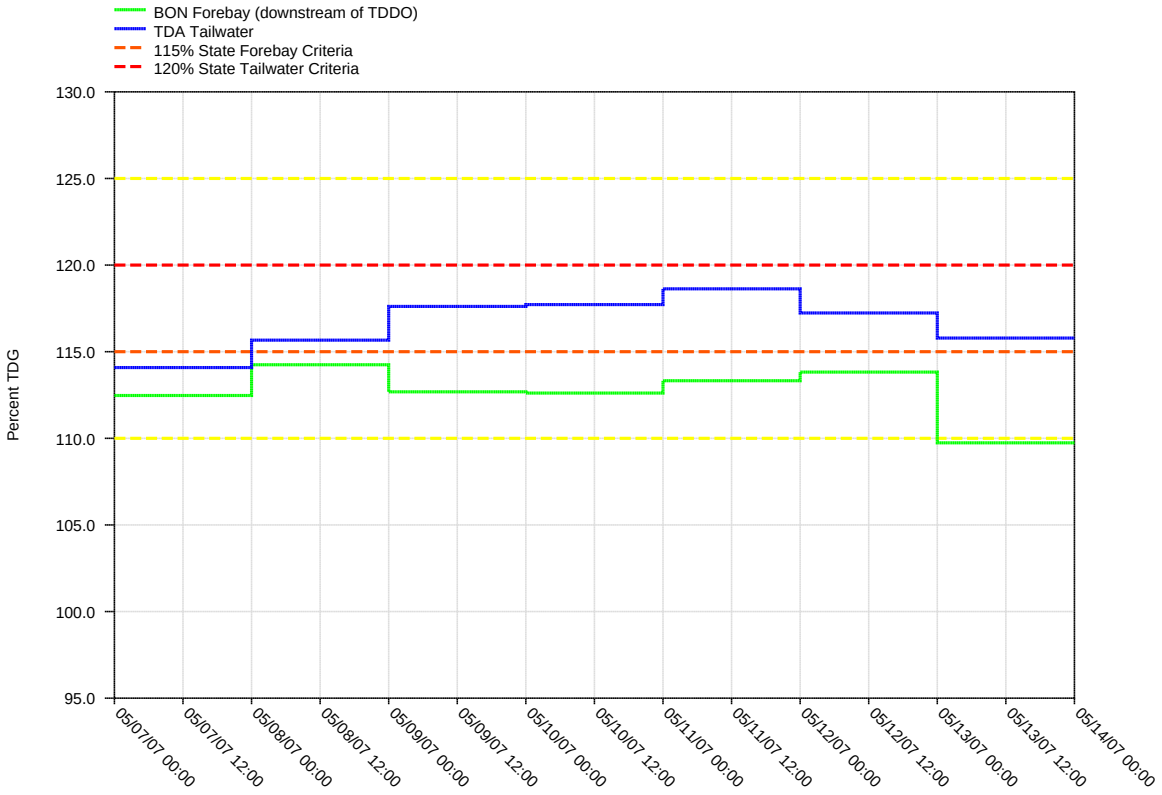


Figure 15.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

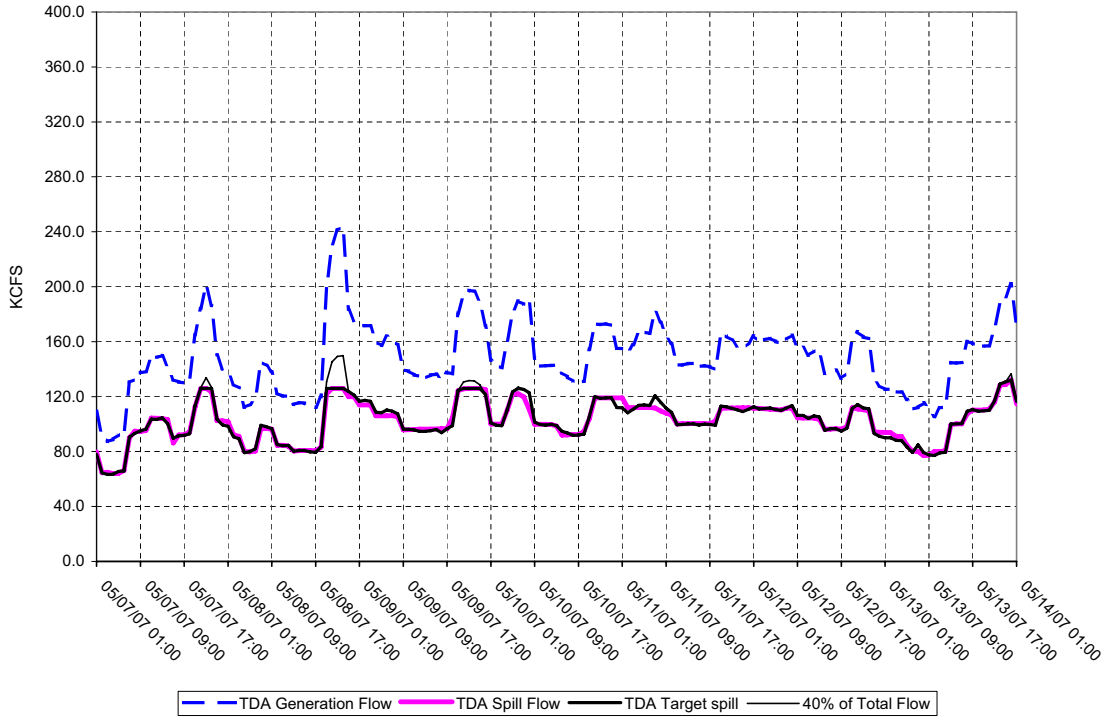
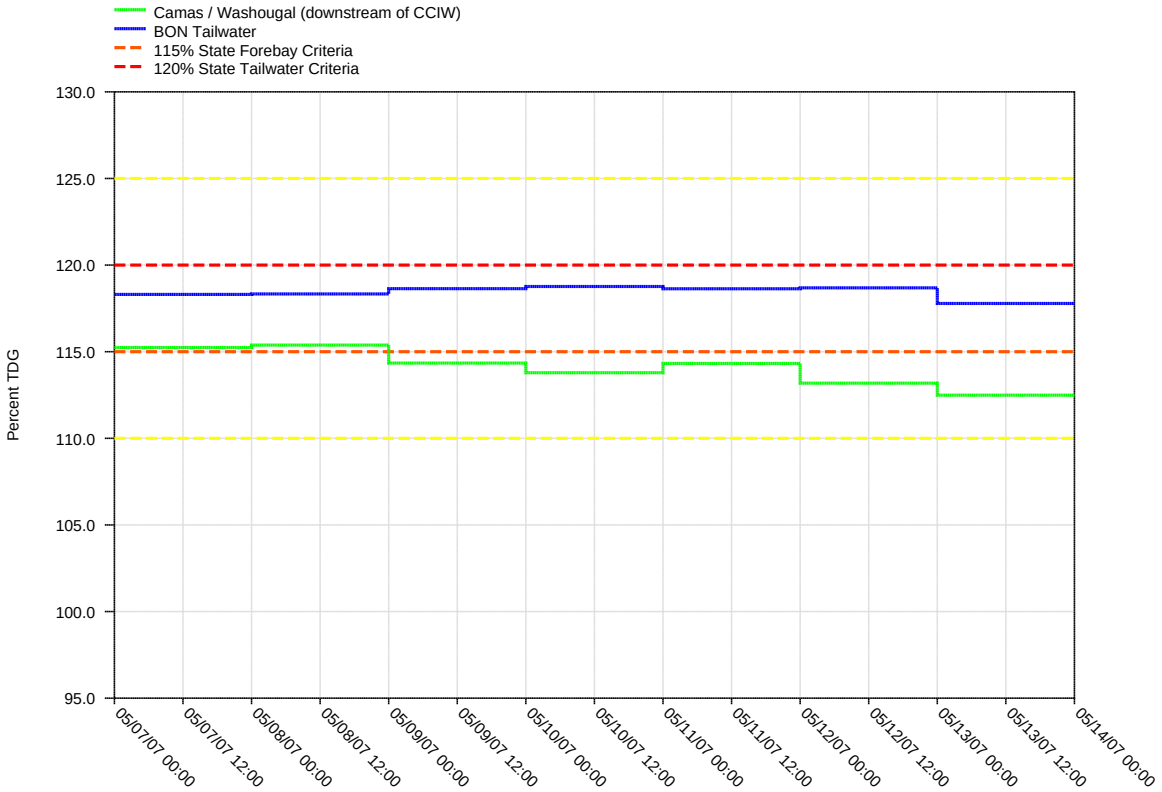


Figure 16.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

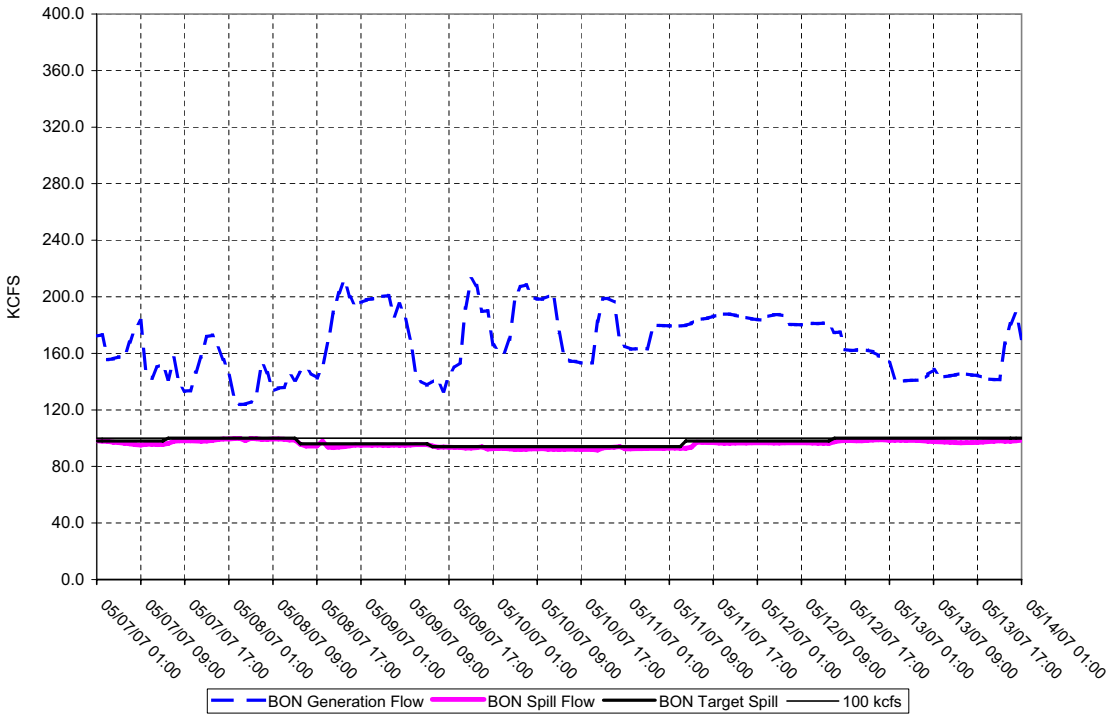
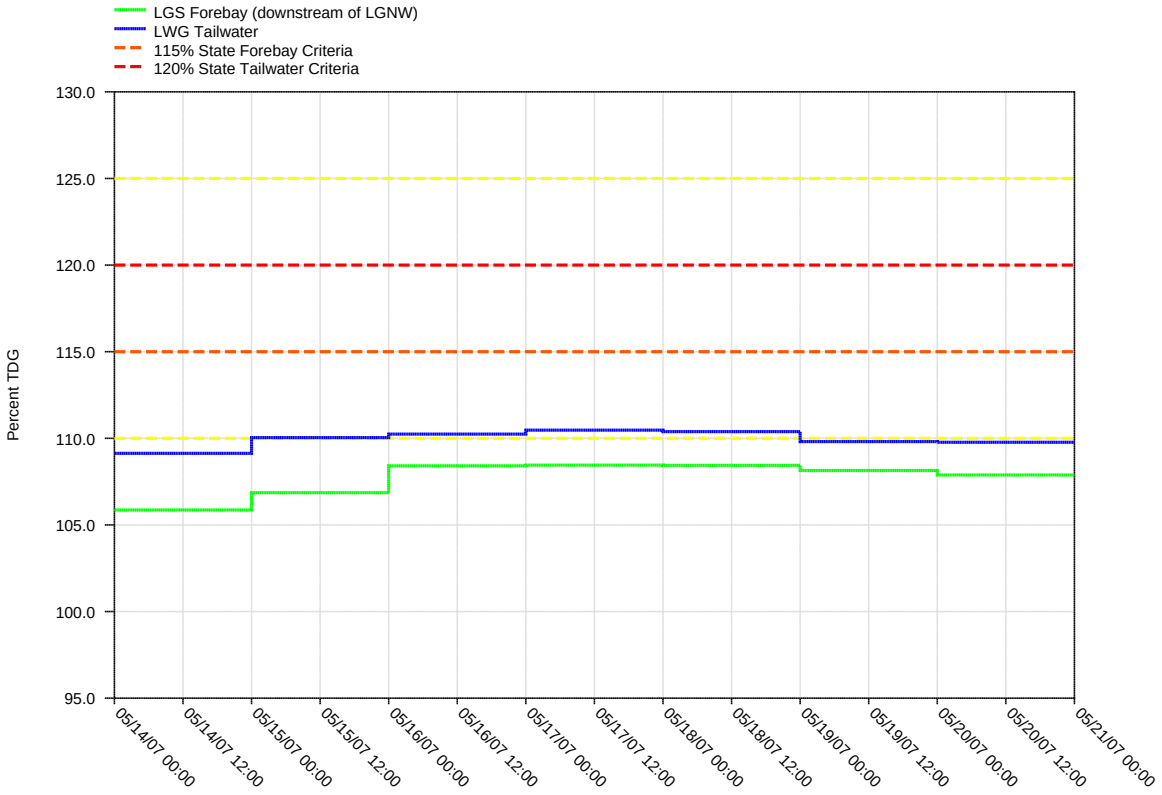


Figure 17.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

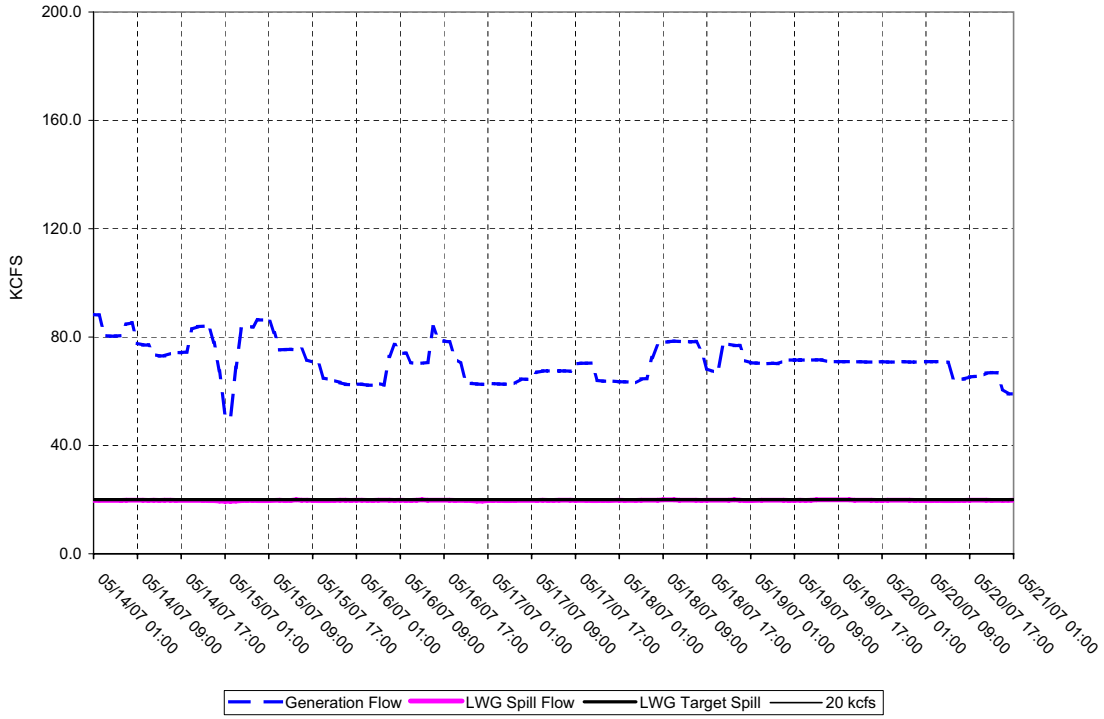
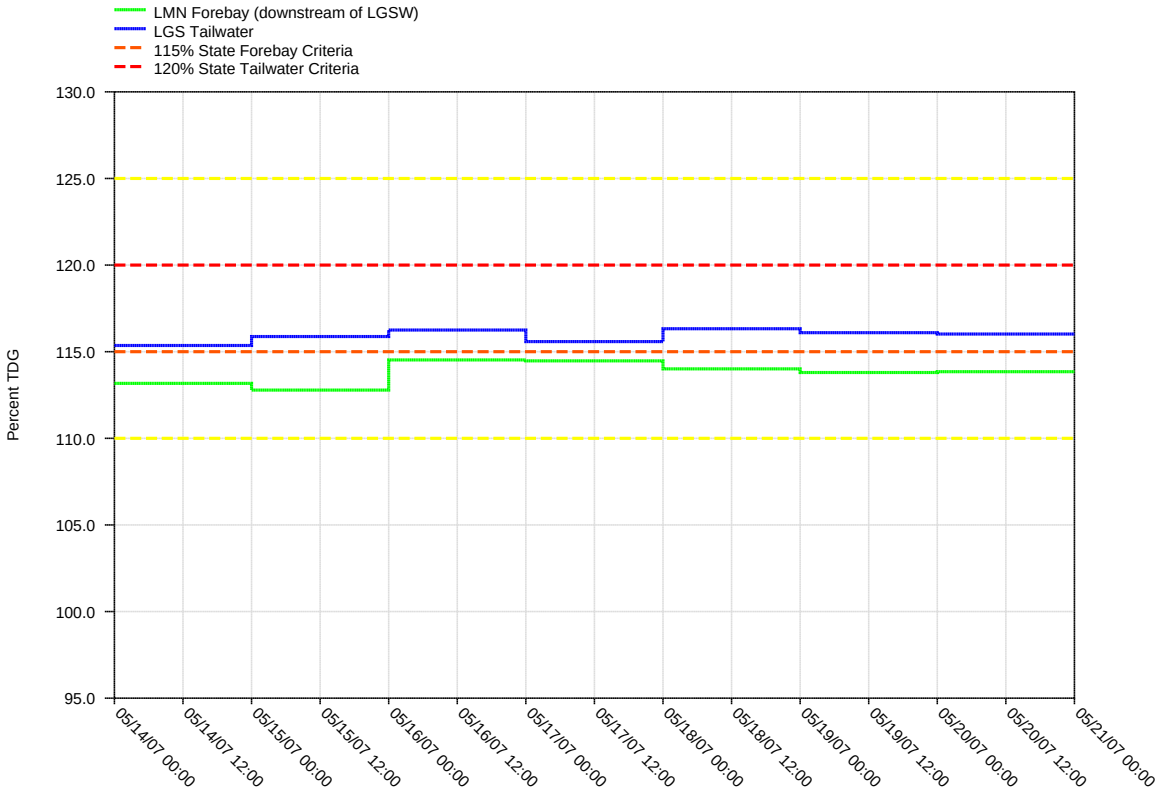


Figure 18.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

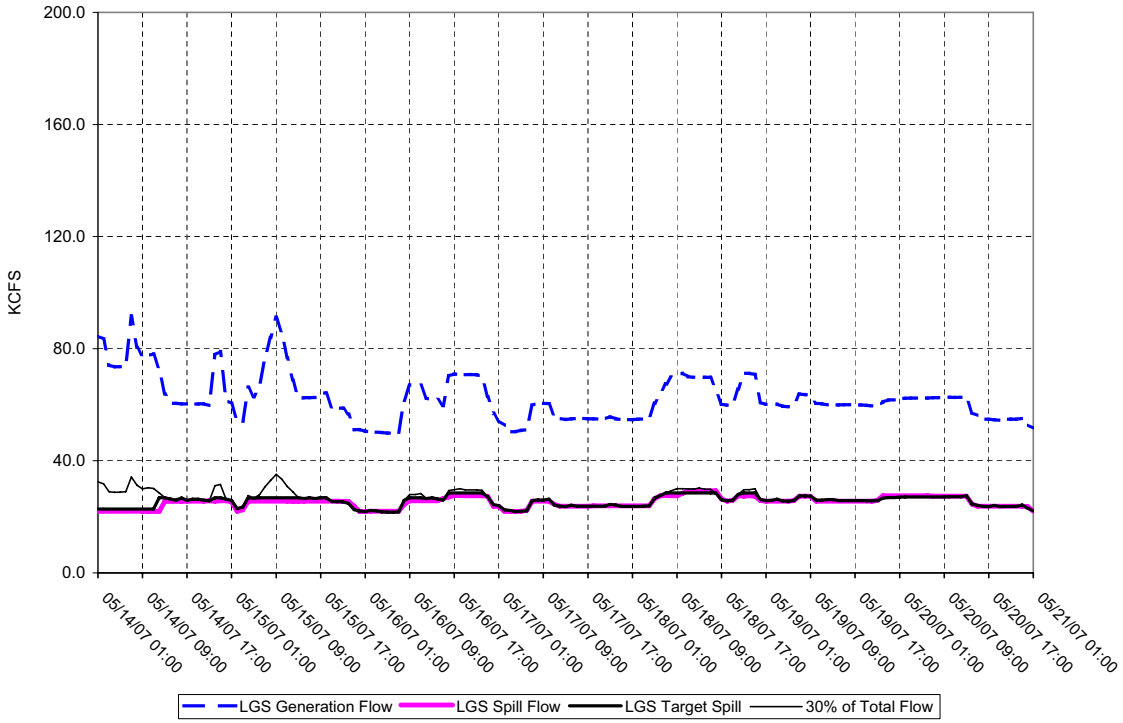
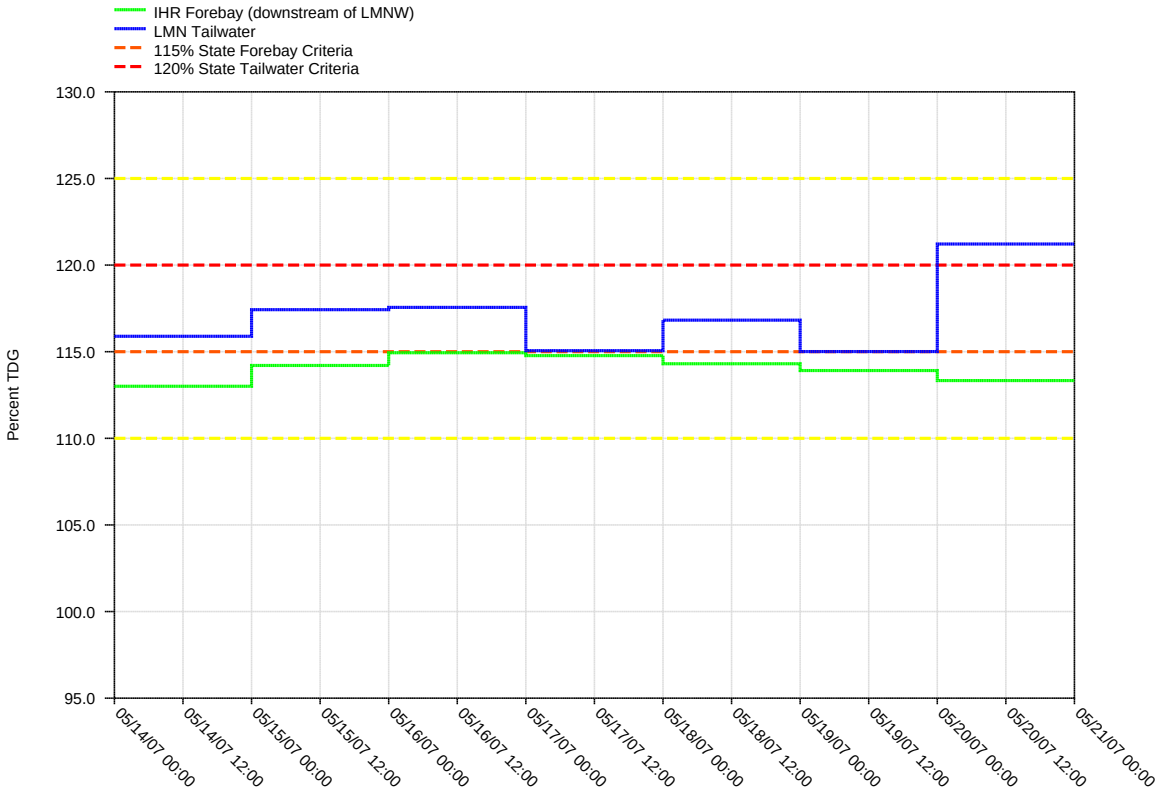


Figure 19.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

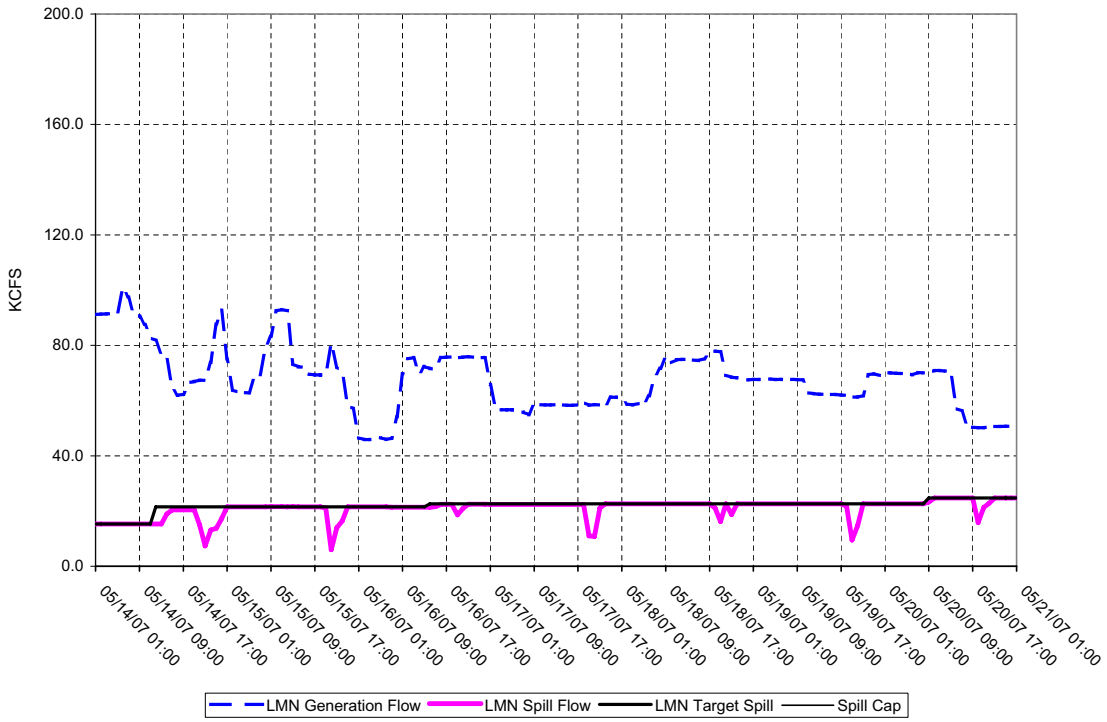
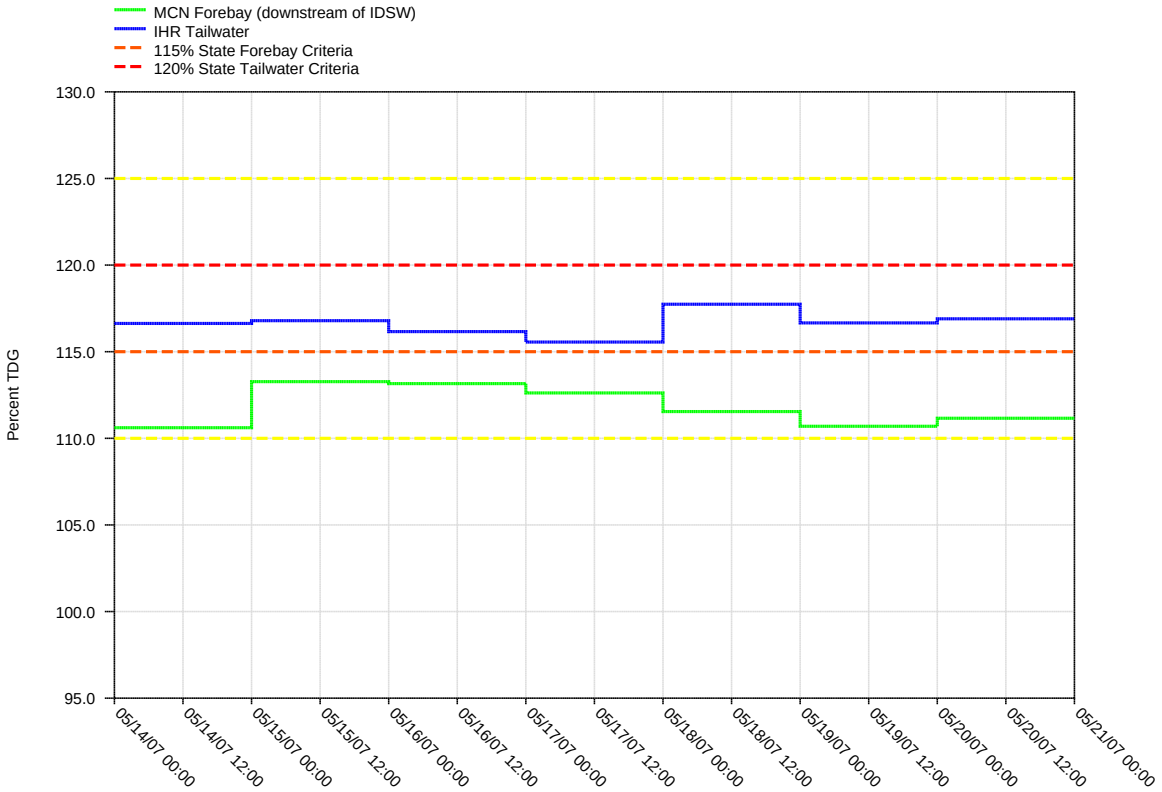


Figure 20.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

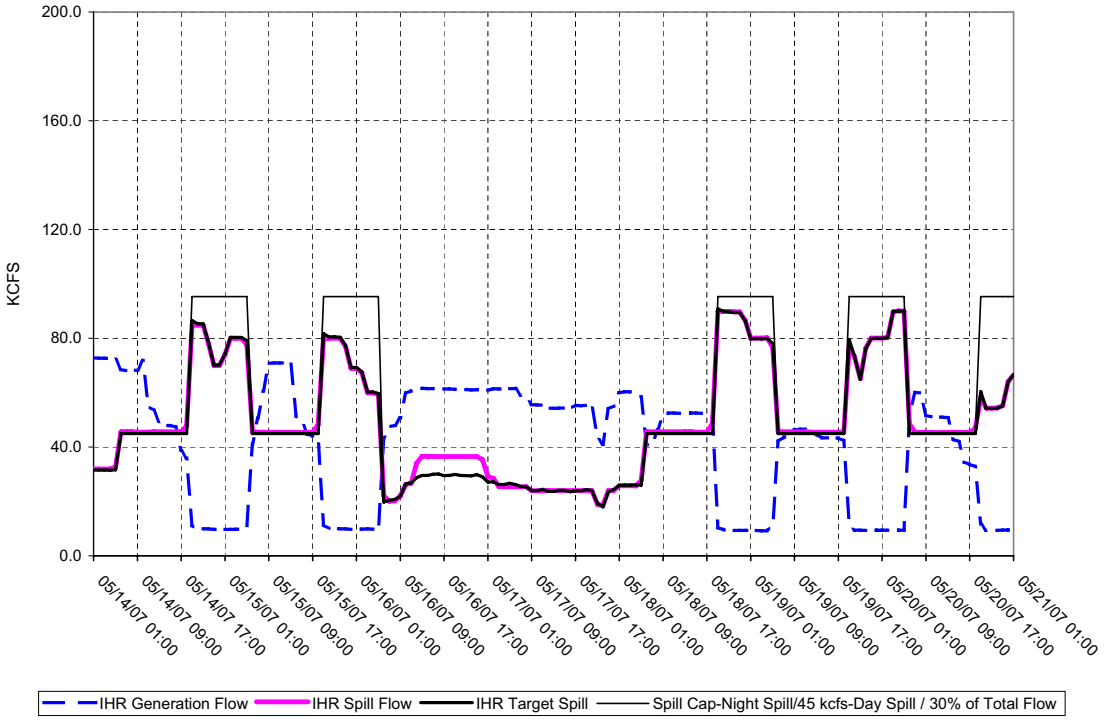
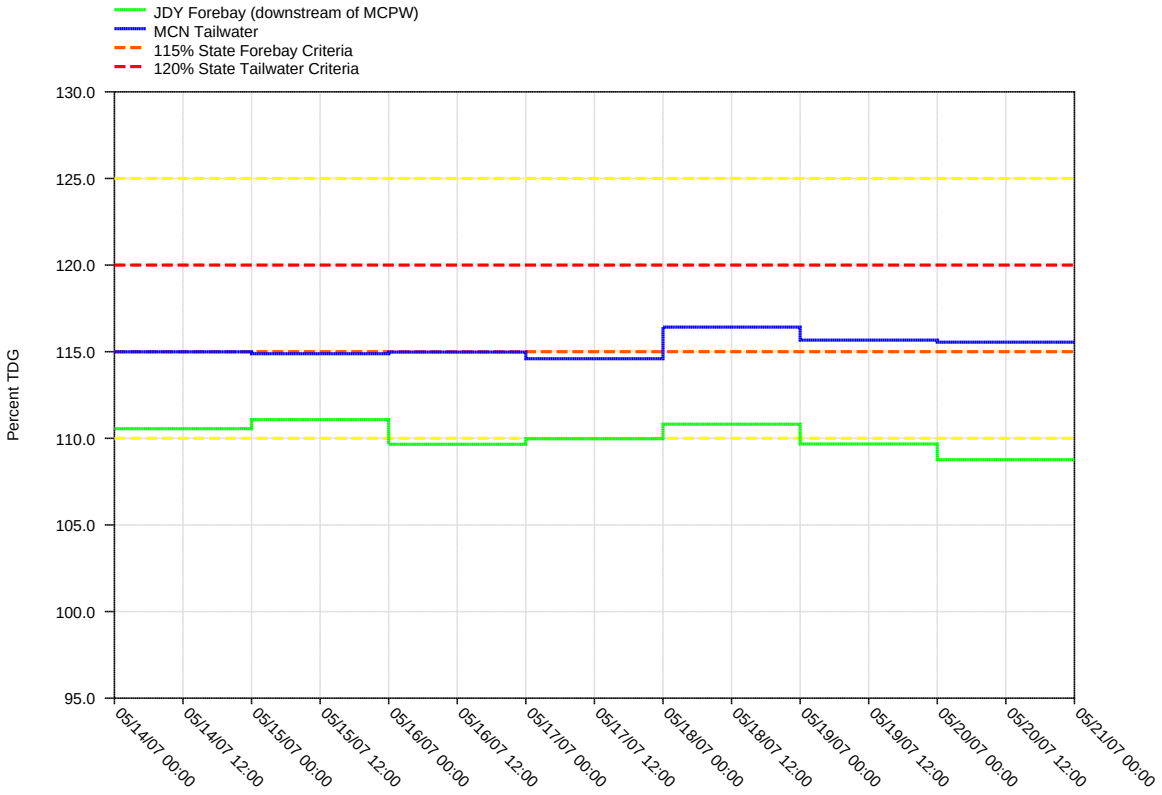


Figure 21.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

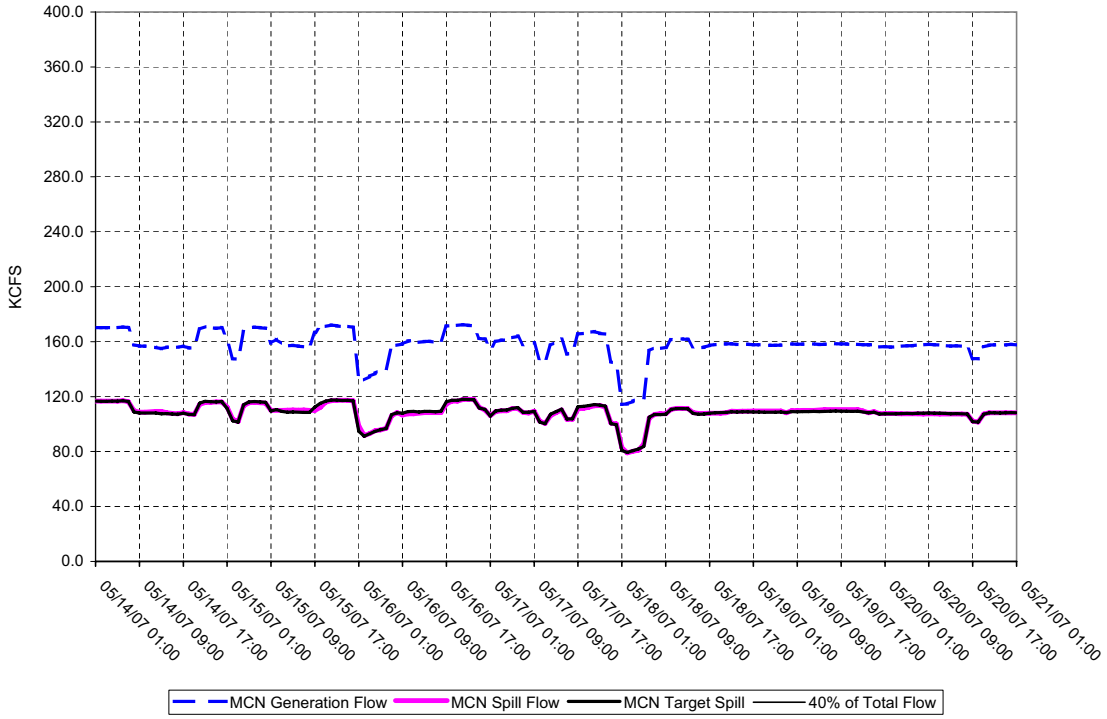
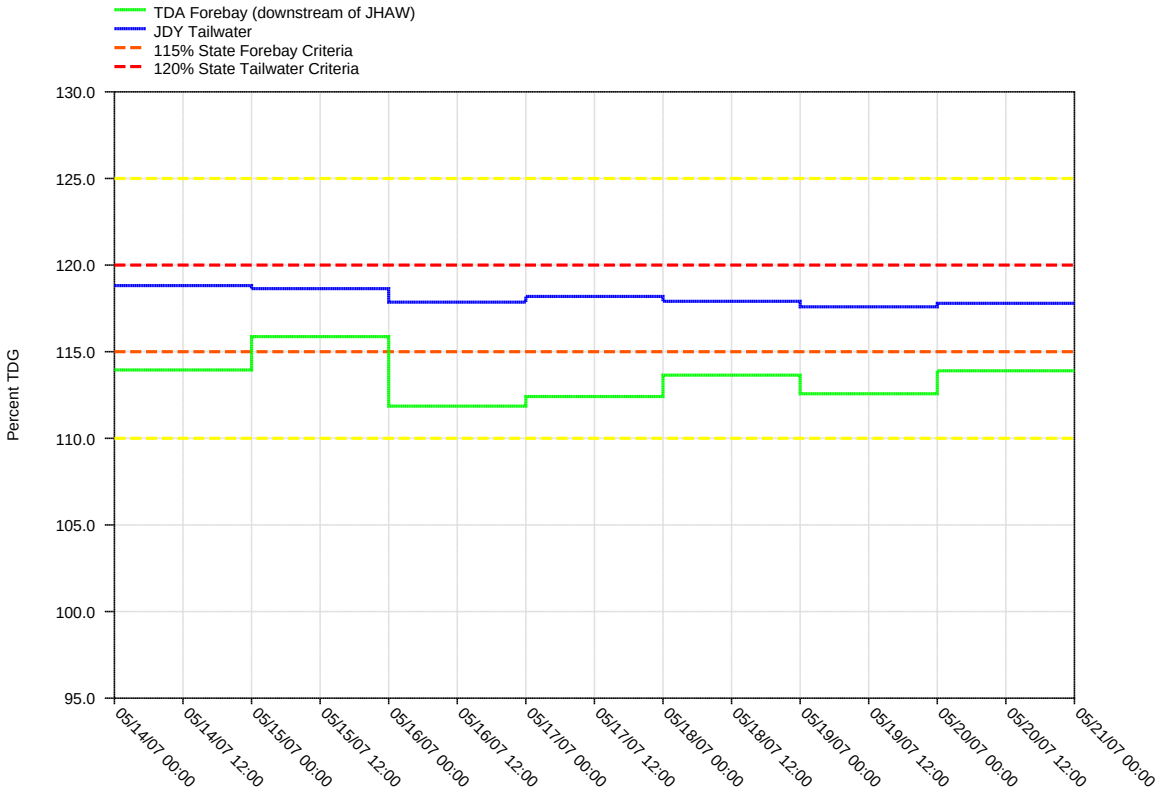


Figure 22.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

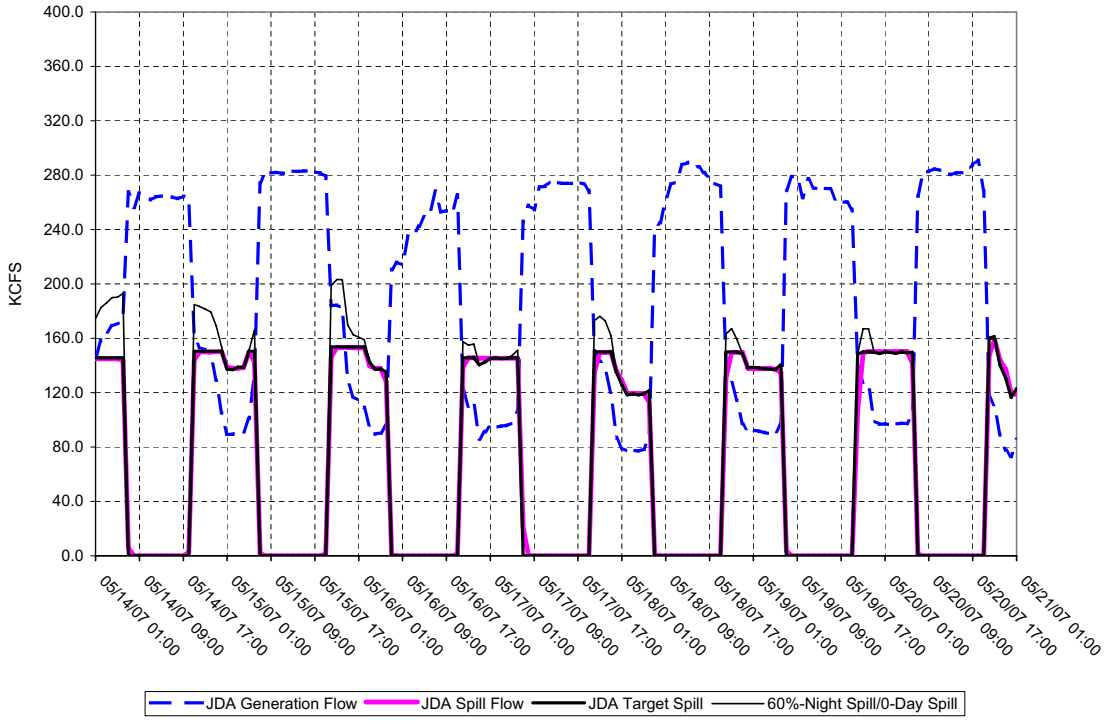
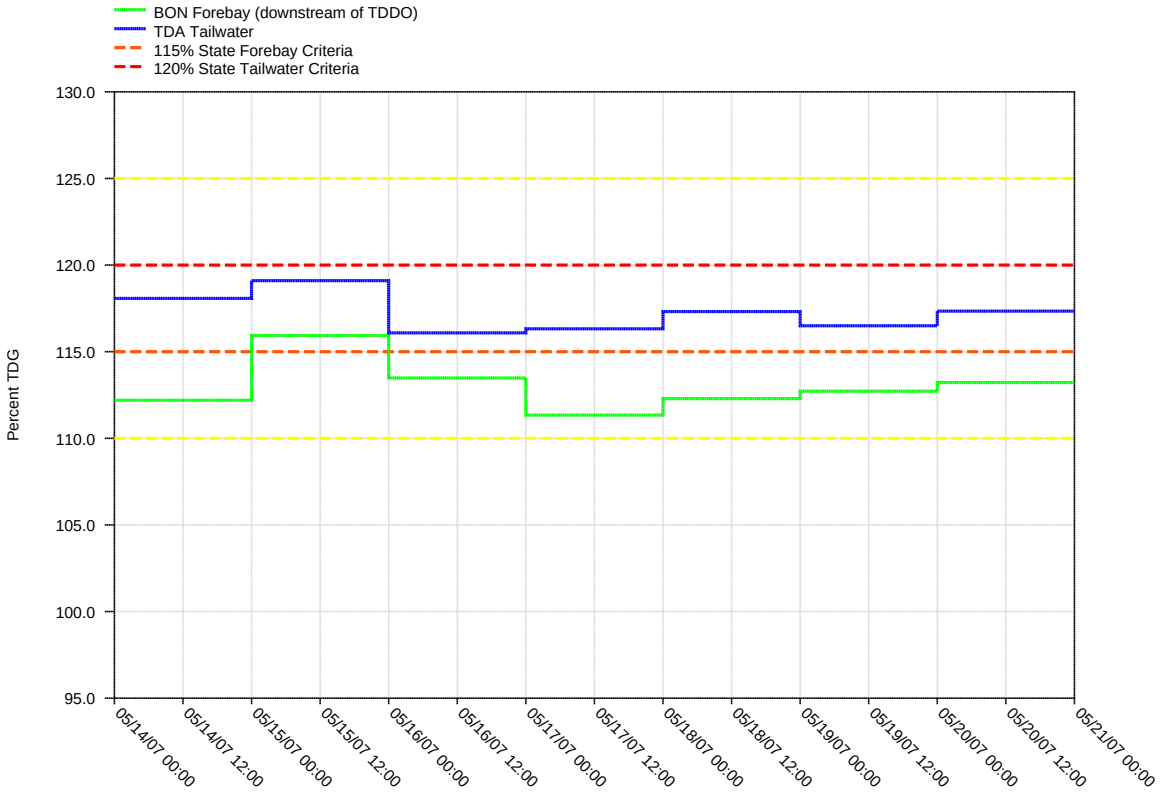


Figure 23.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

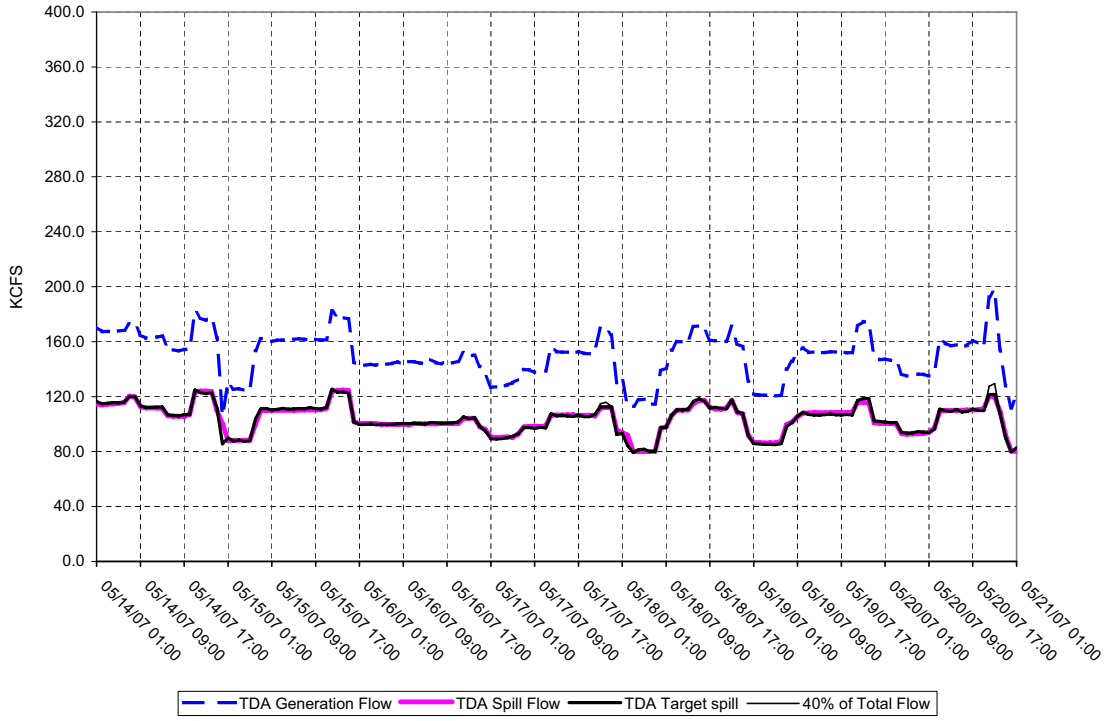
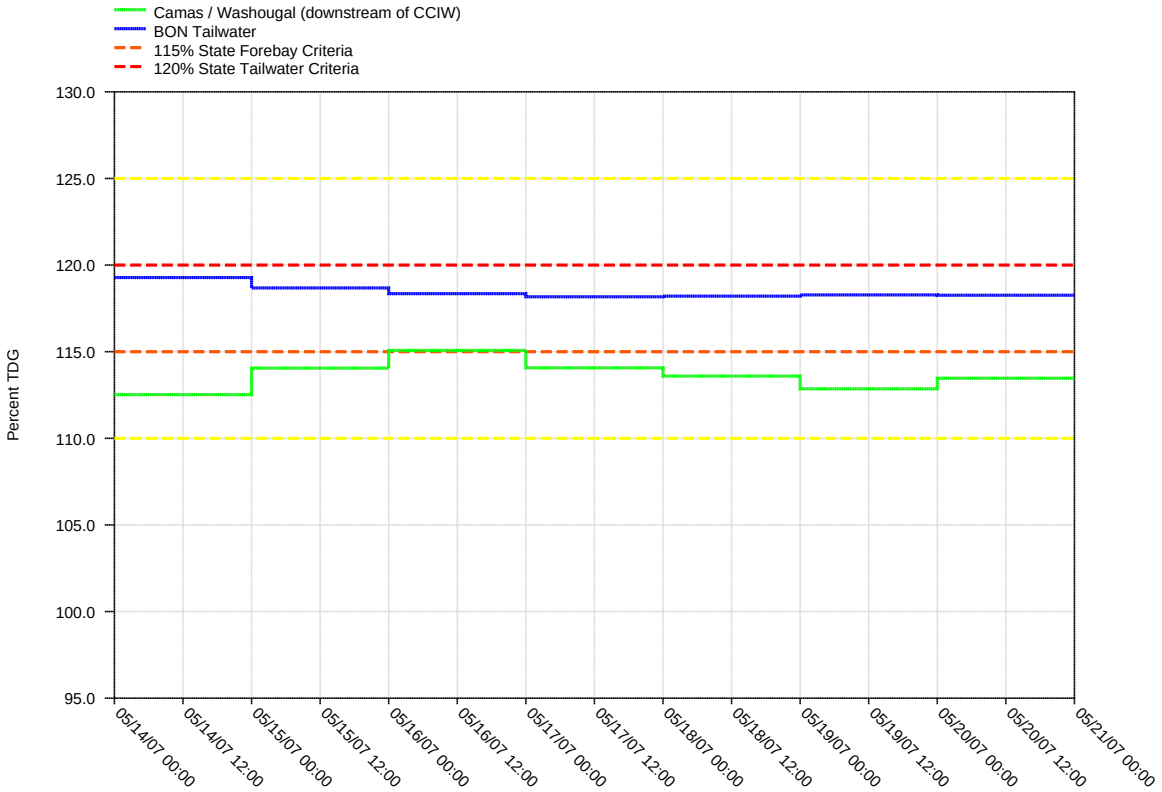


Figure 24.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

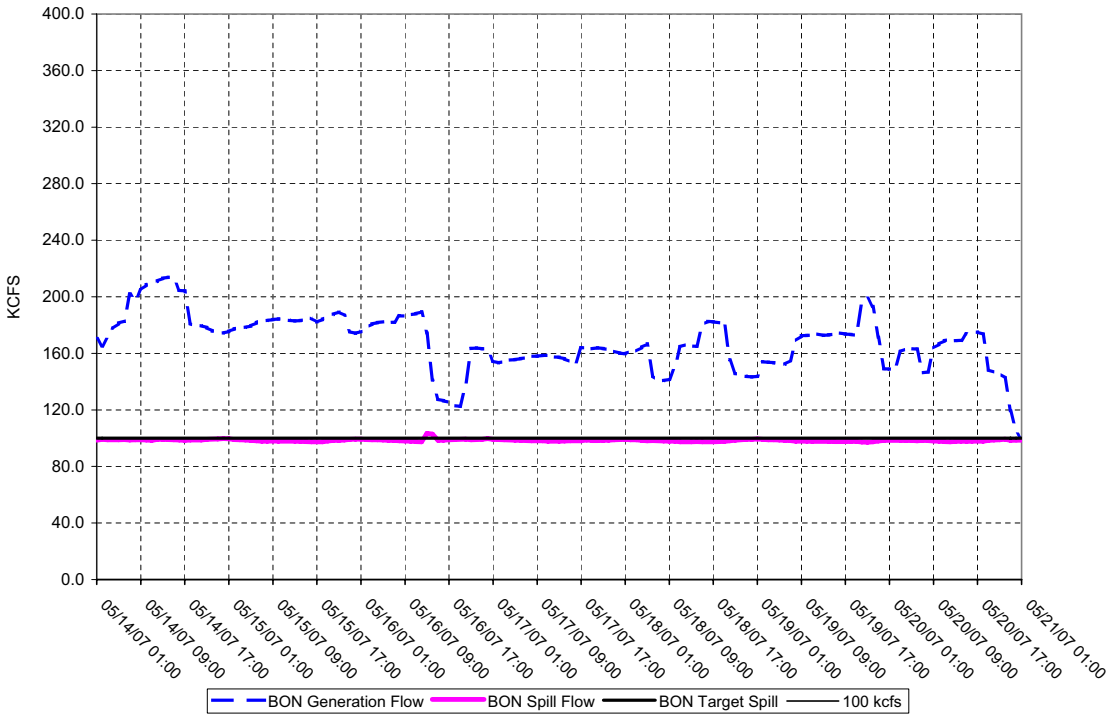
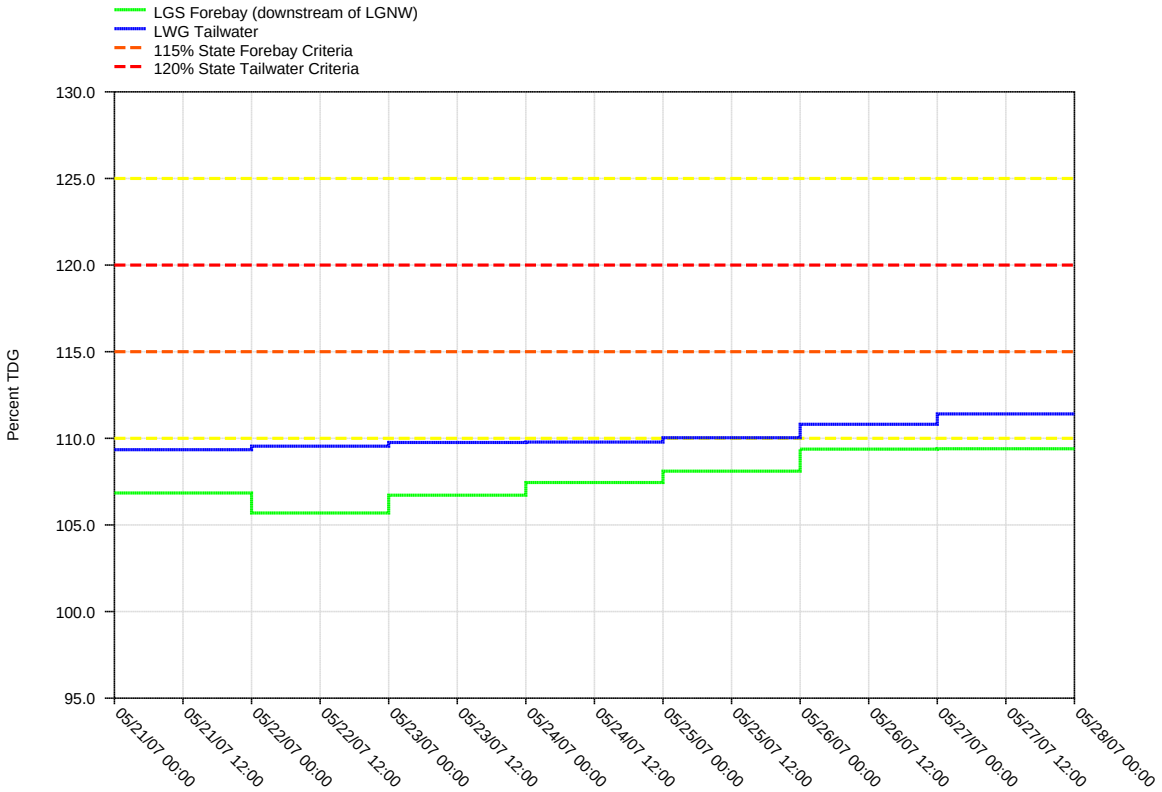


Figure 25.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

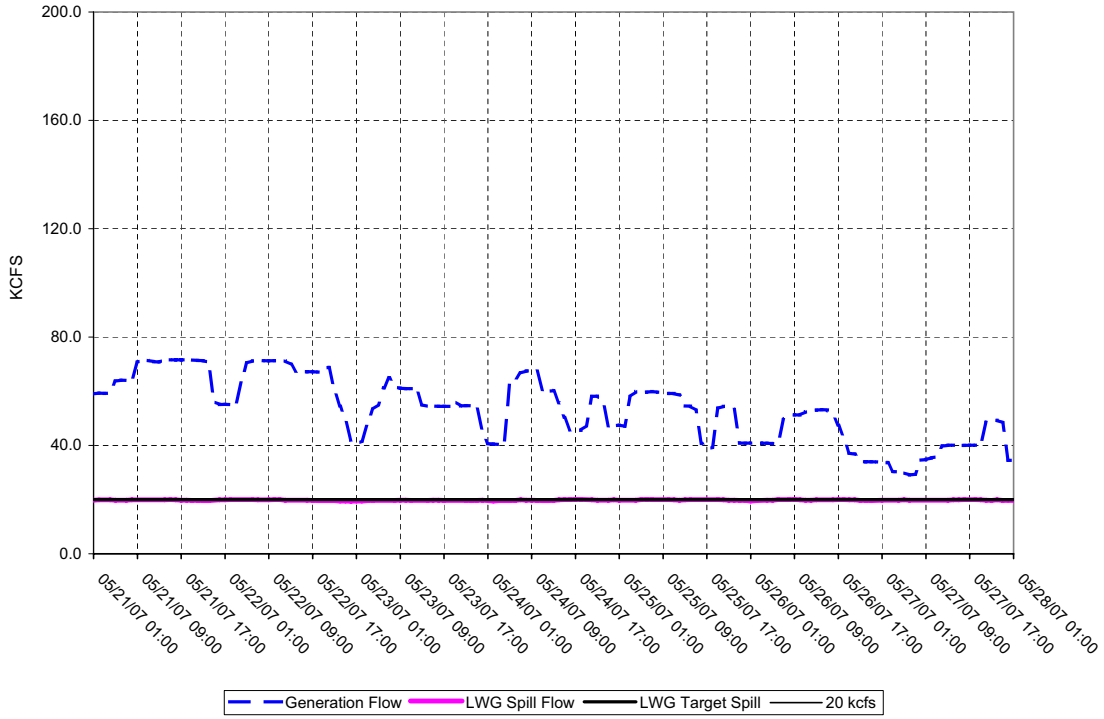
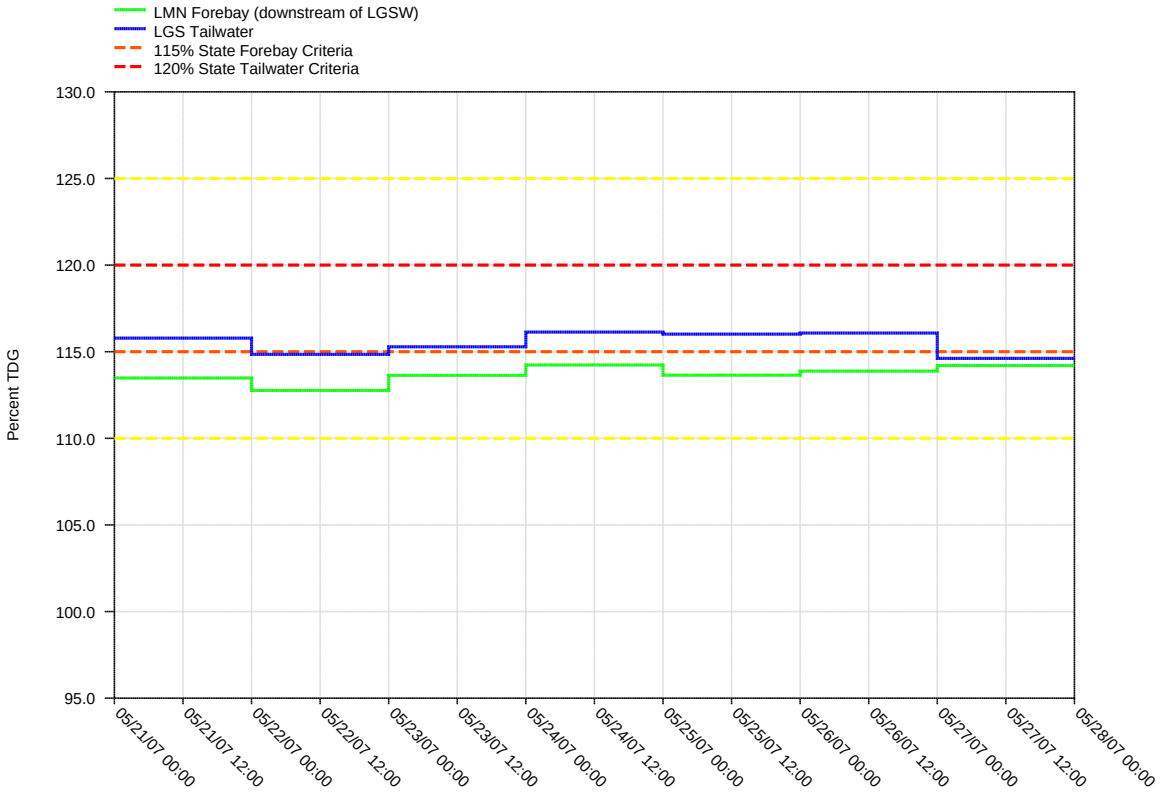


Figure 26.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

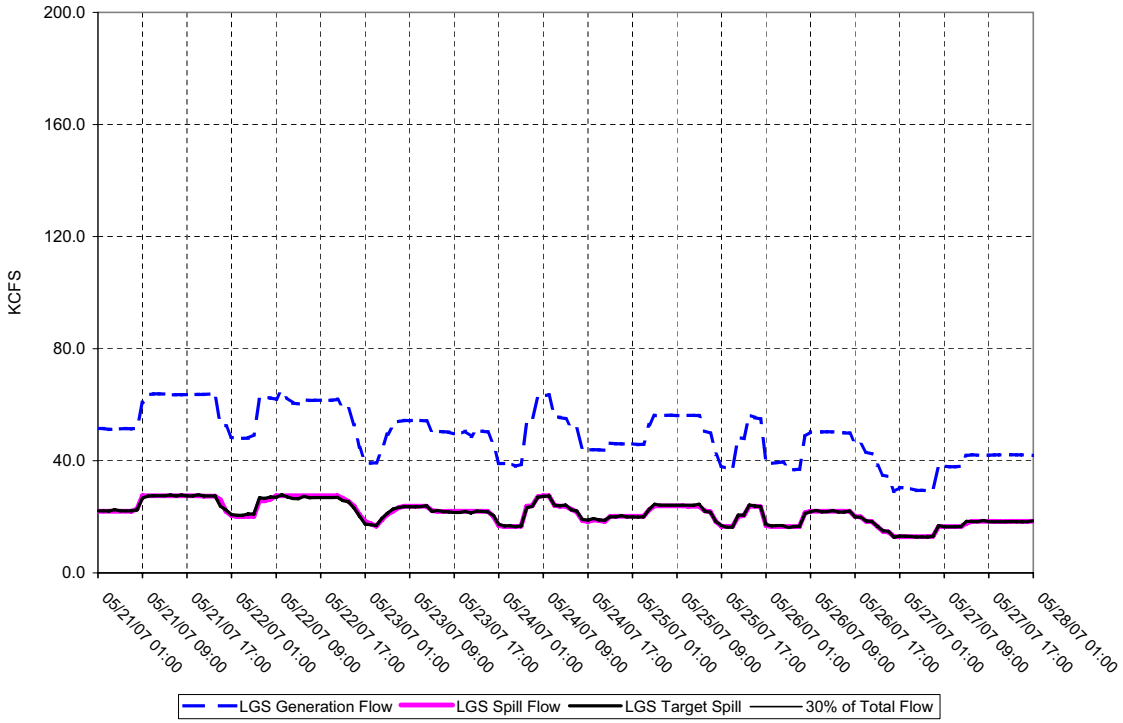
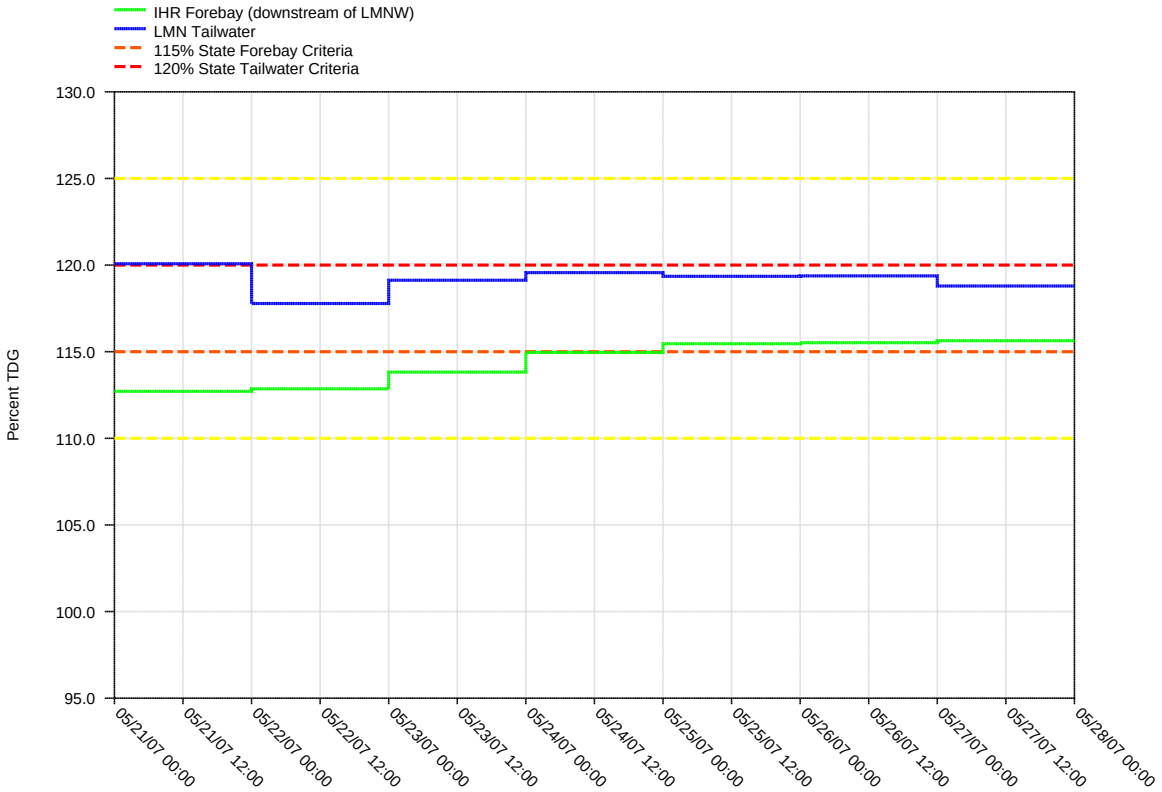


Figure 27.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

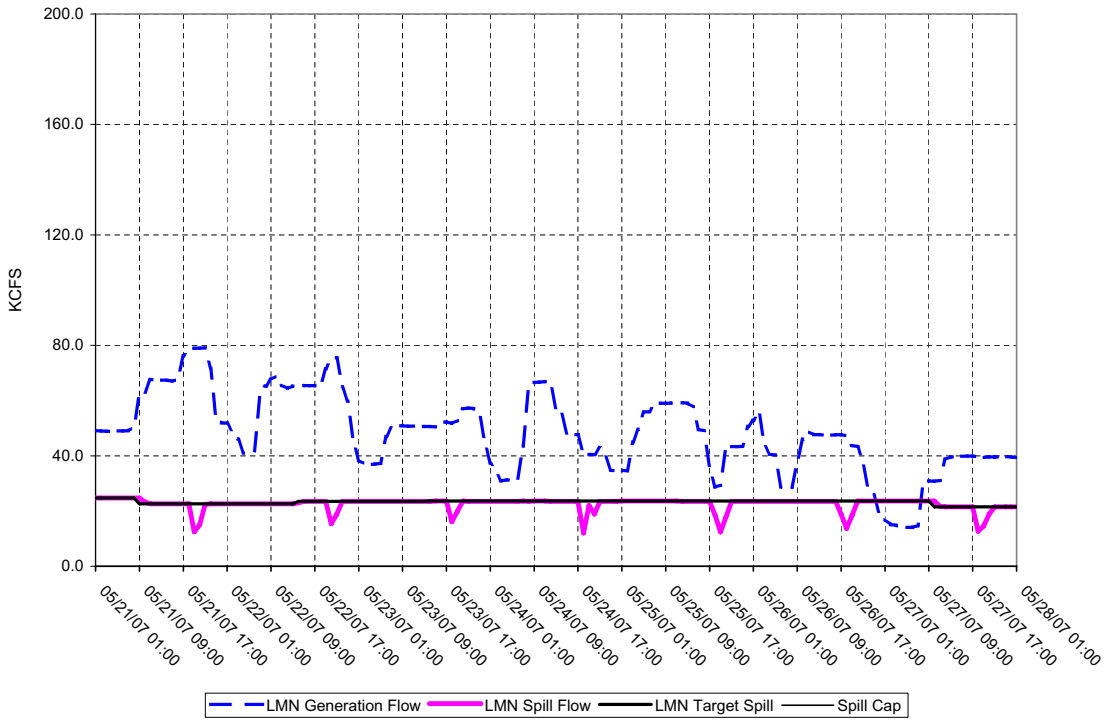
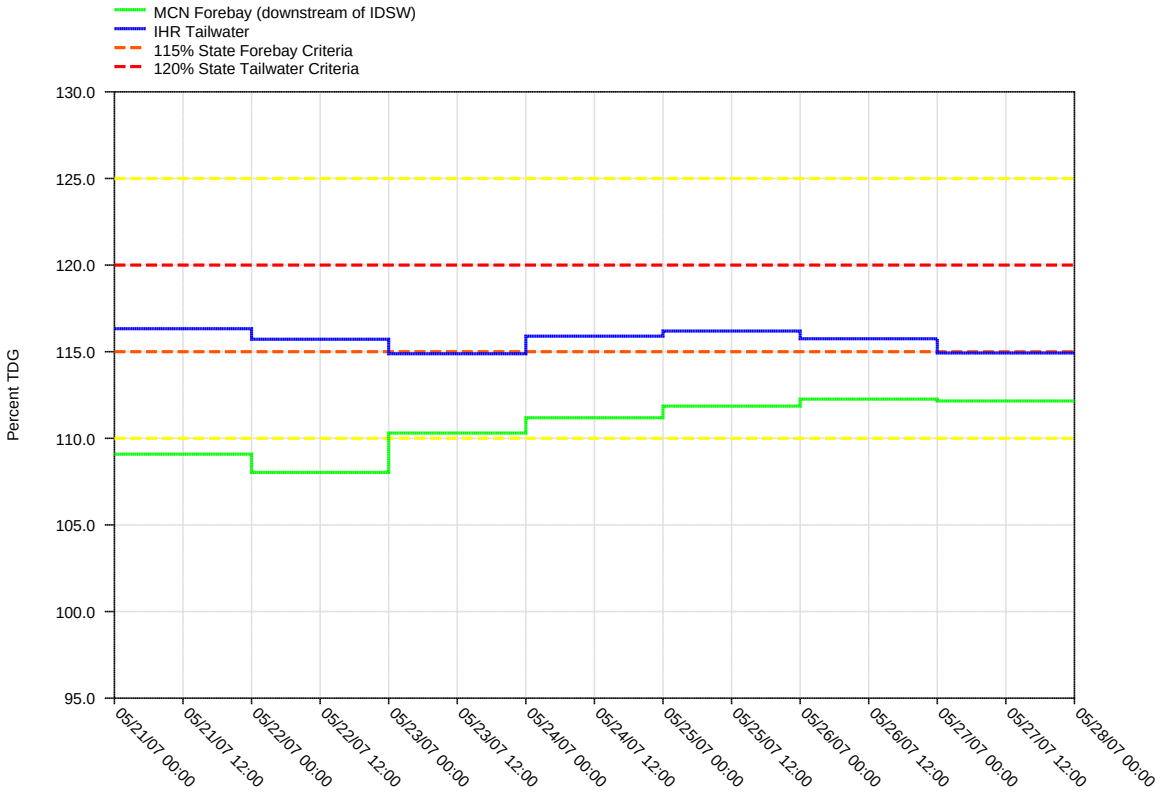


Figure 28.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

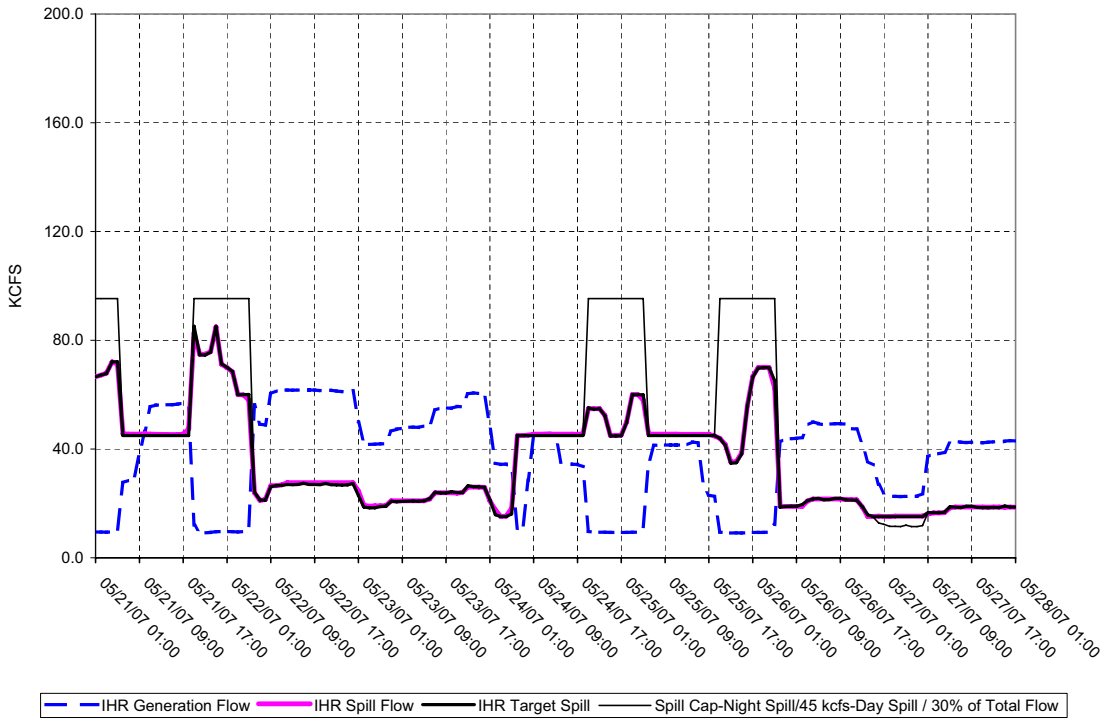
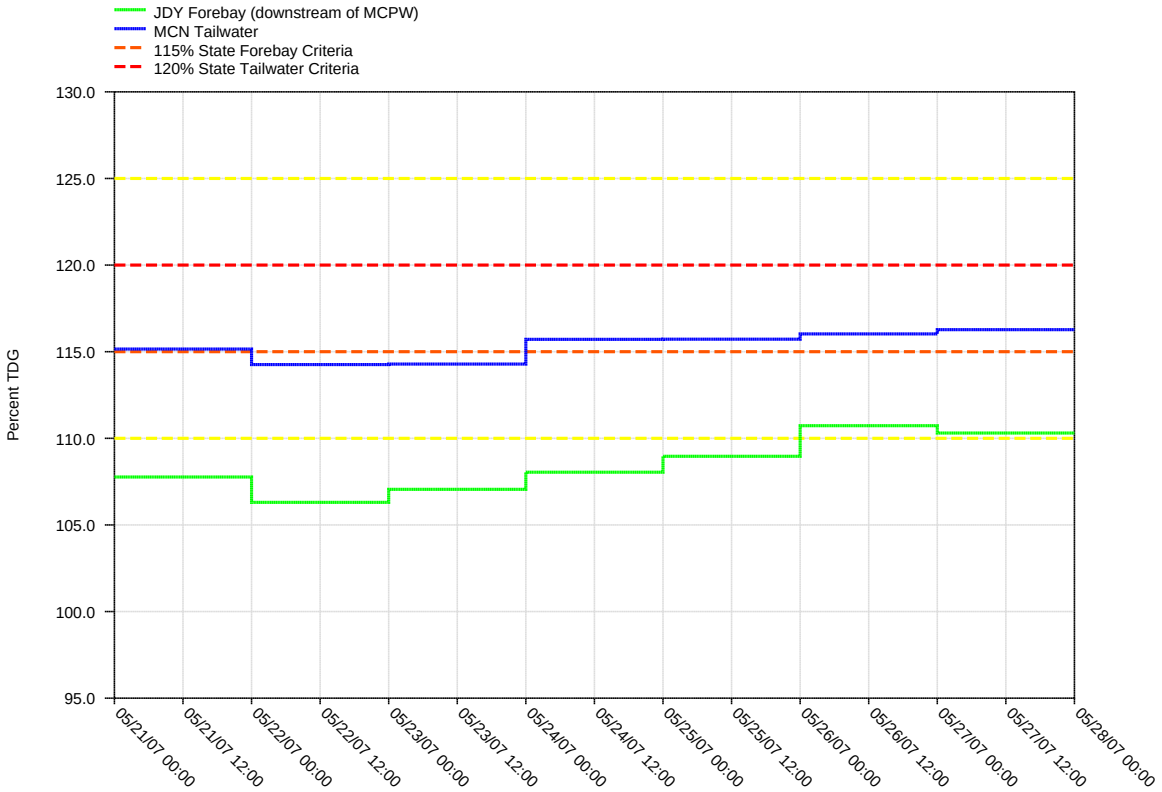


Figure 29.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

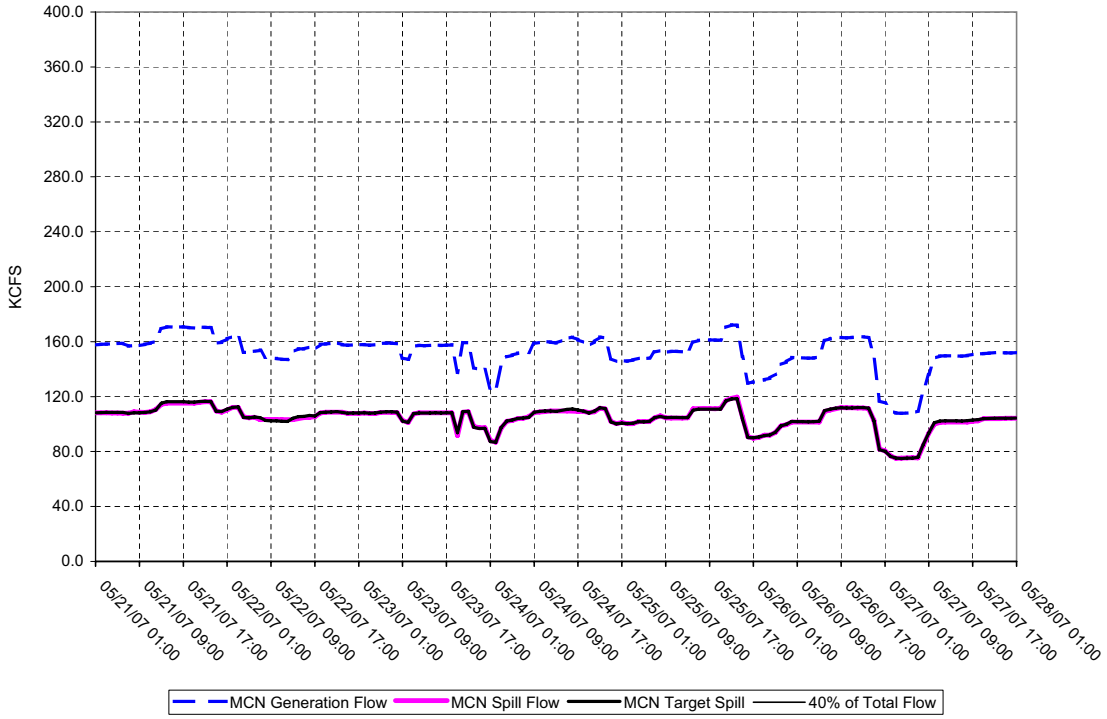
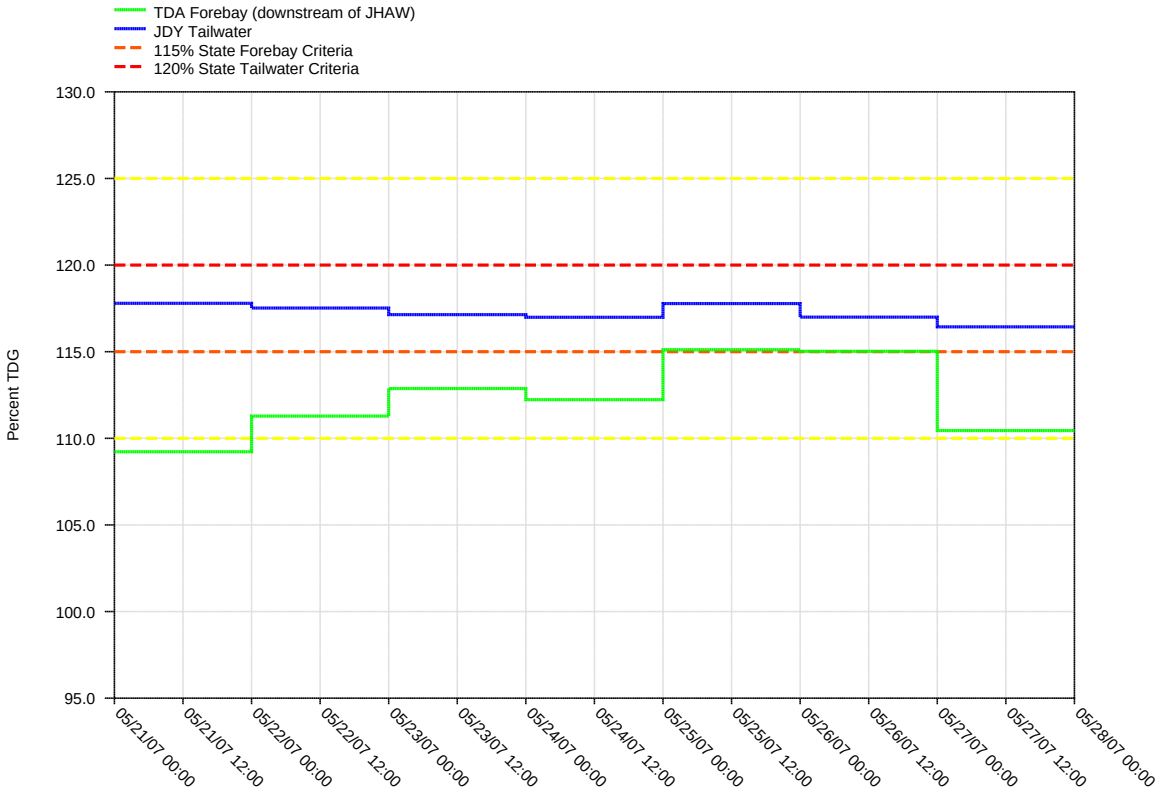


Figure 30.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

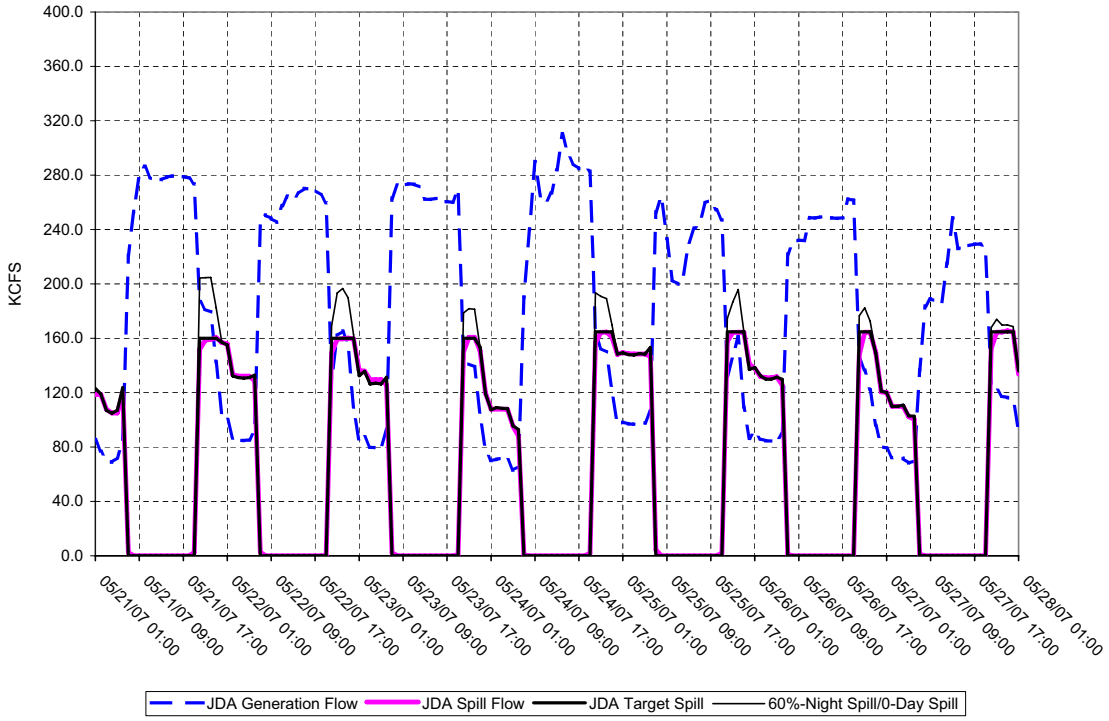
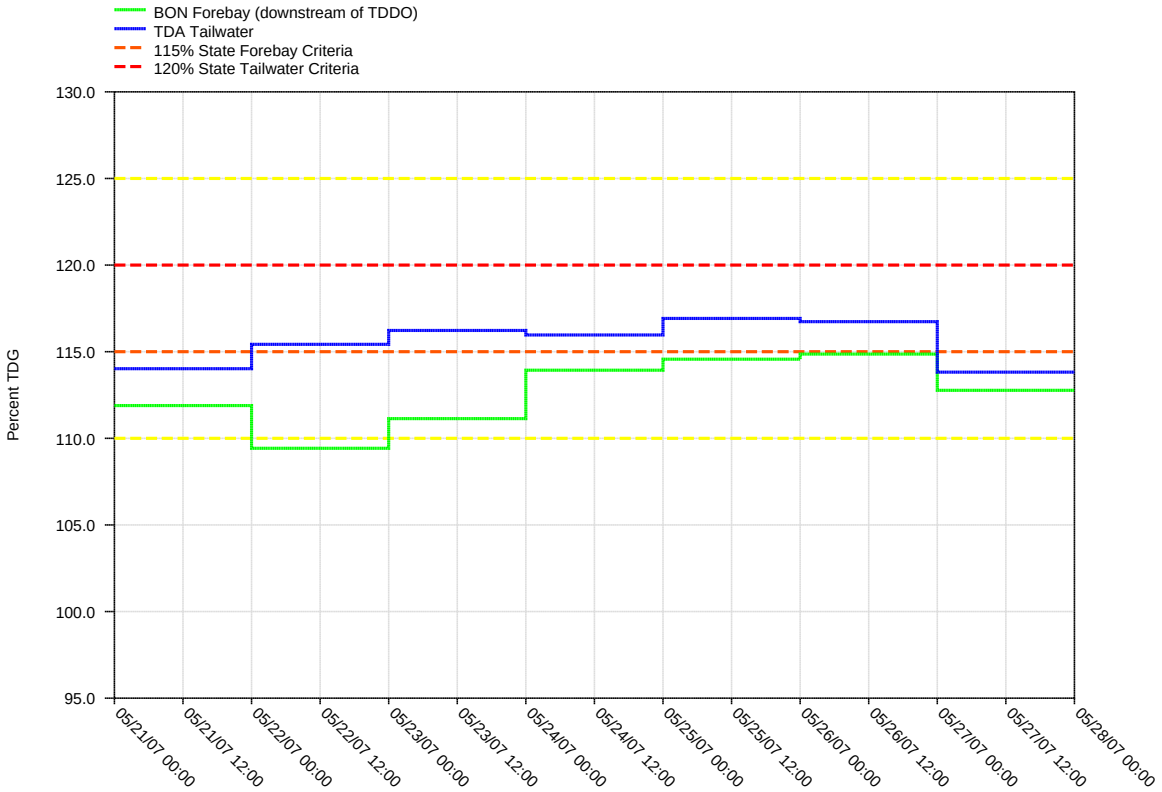


Figure 31.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

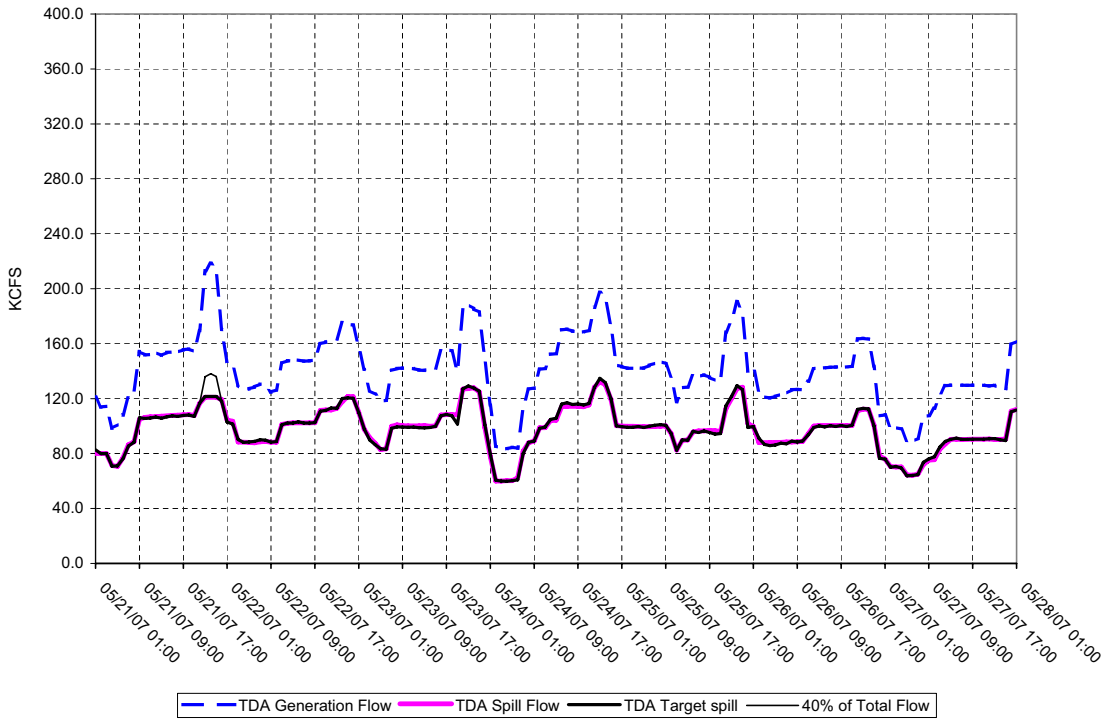
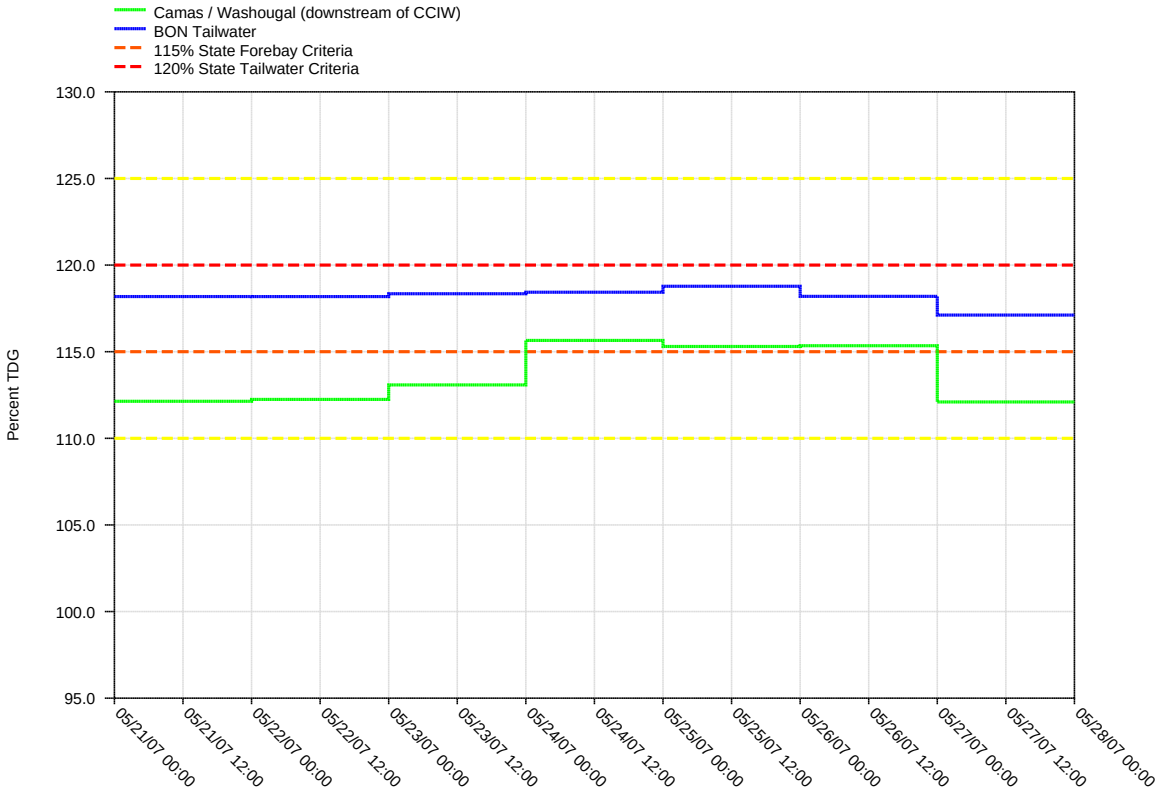


Figure 32.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

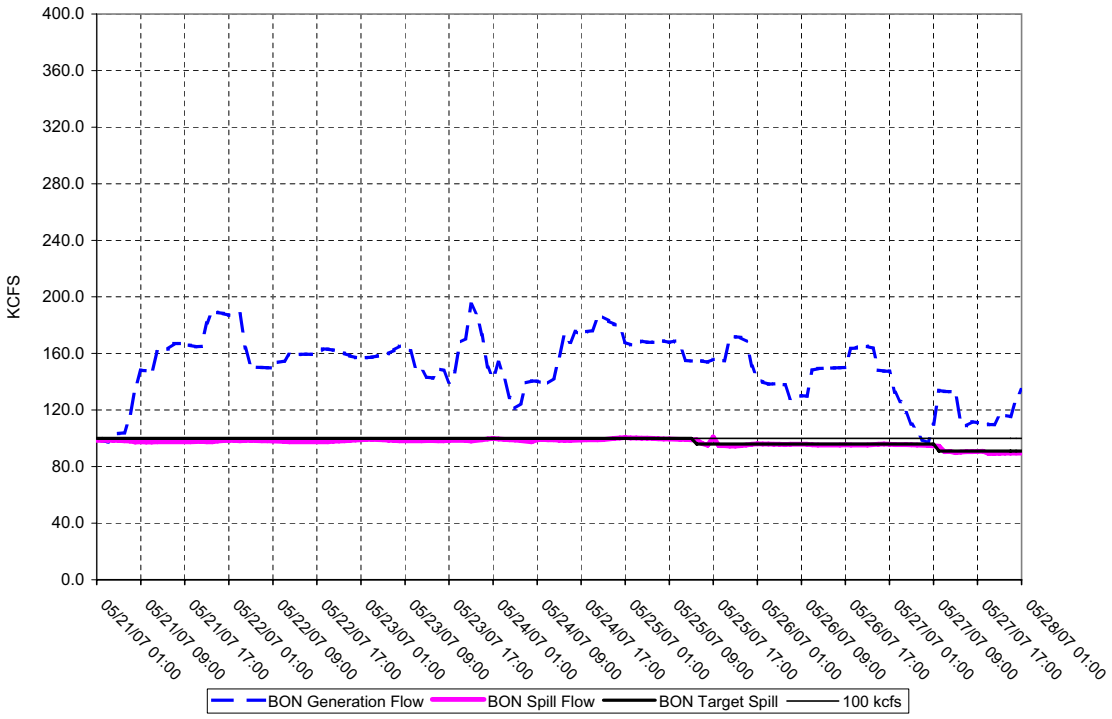
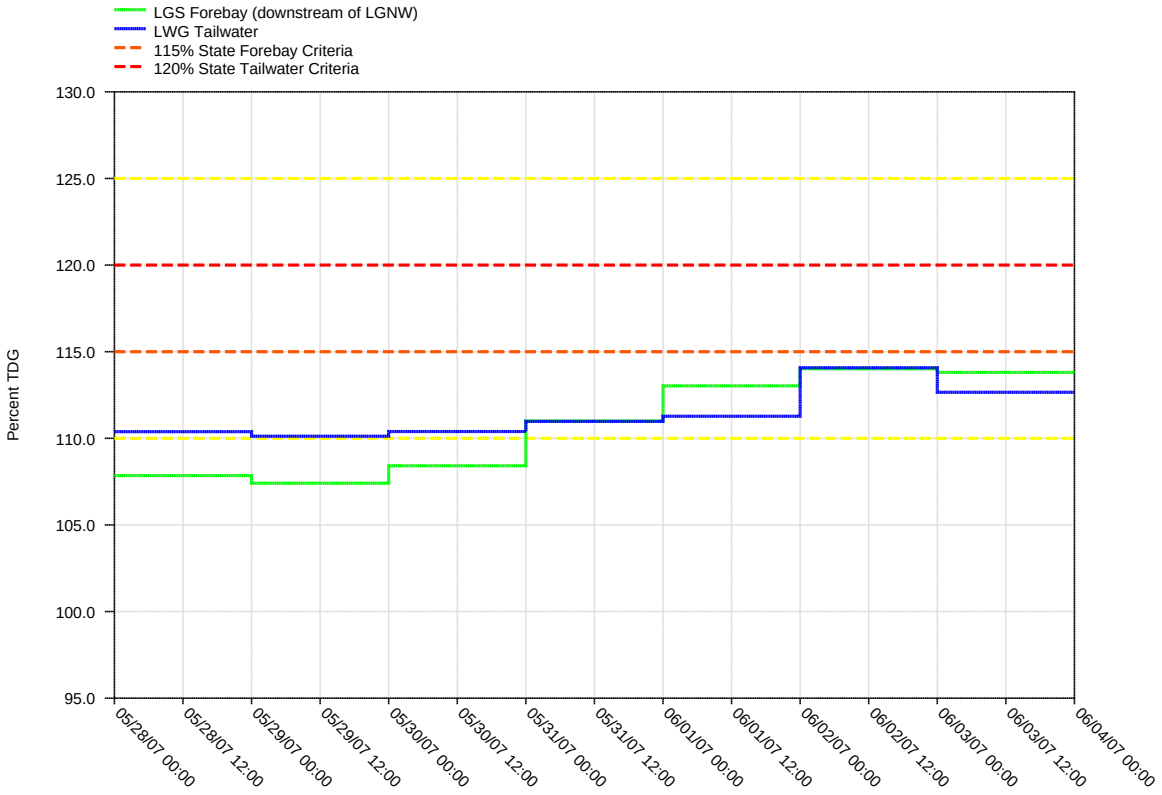


Figure 33.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

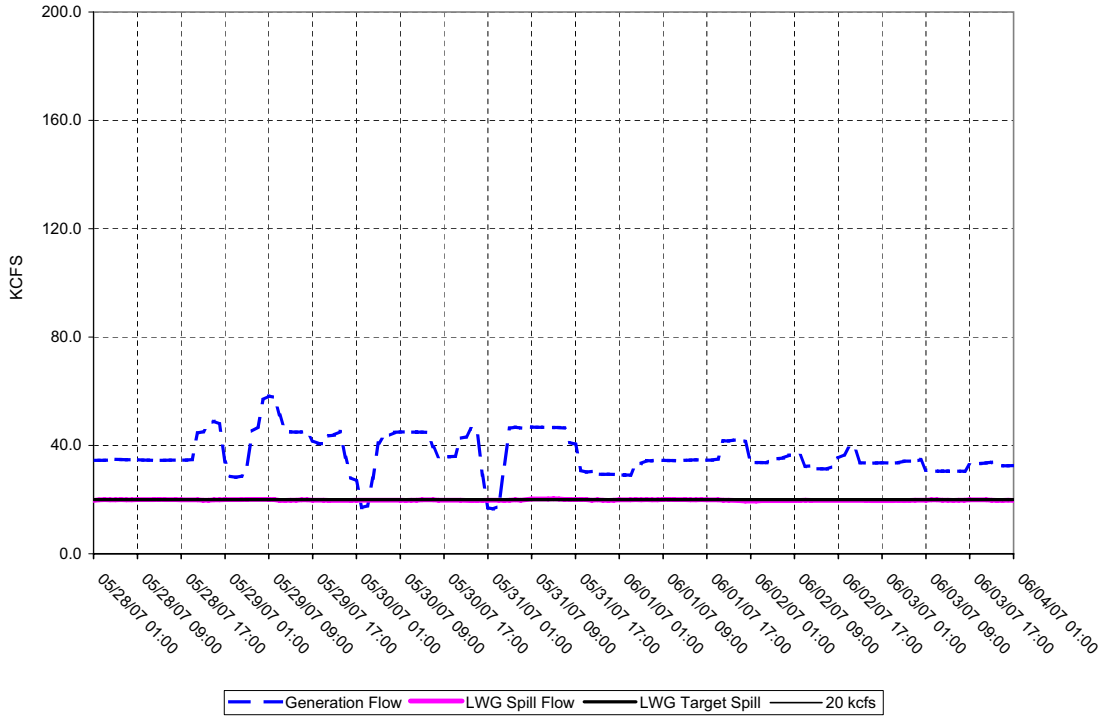
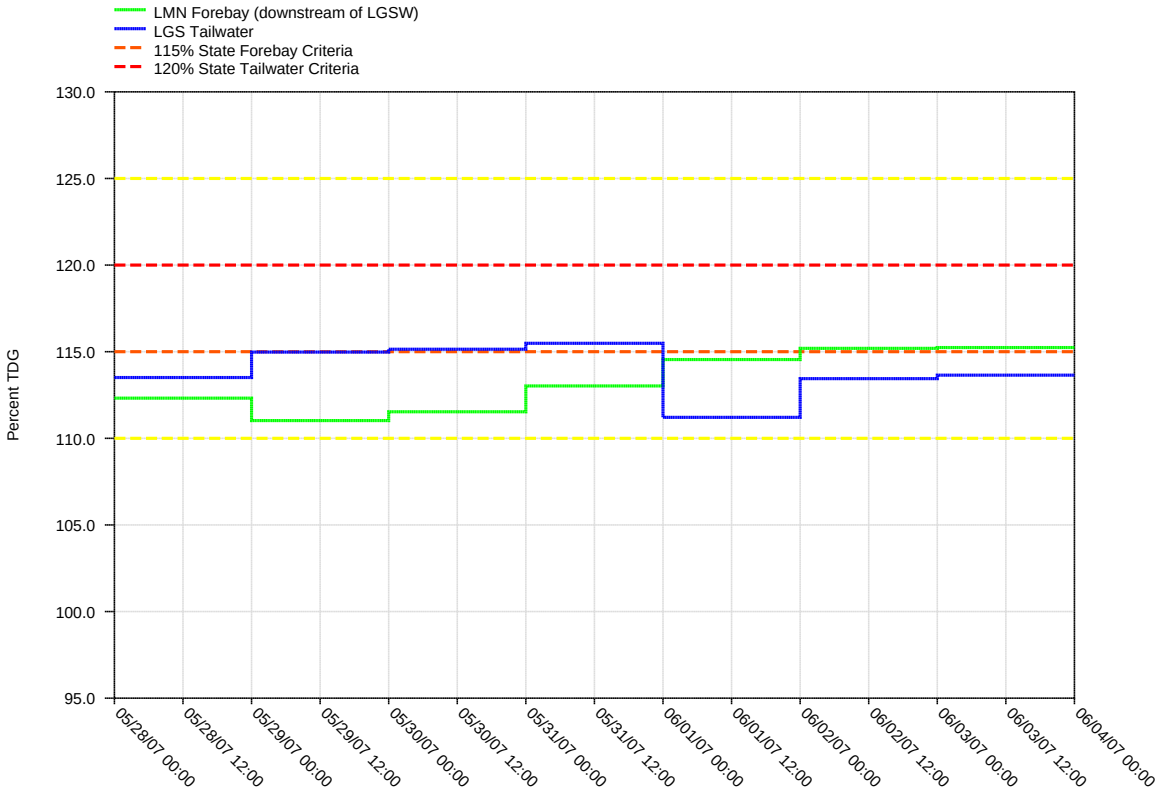


Figure 34.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

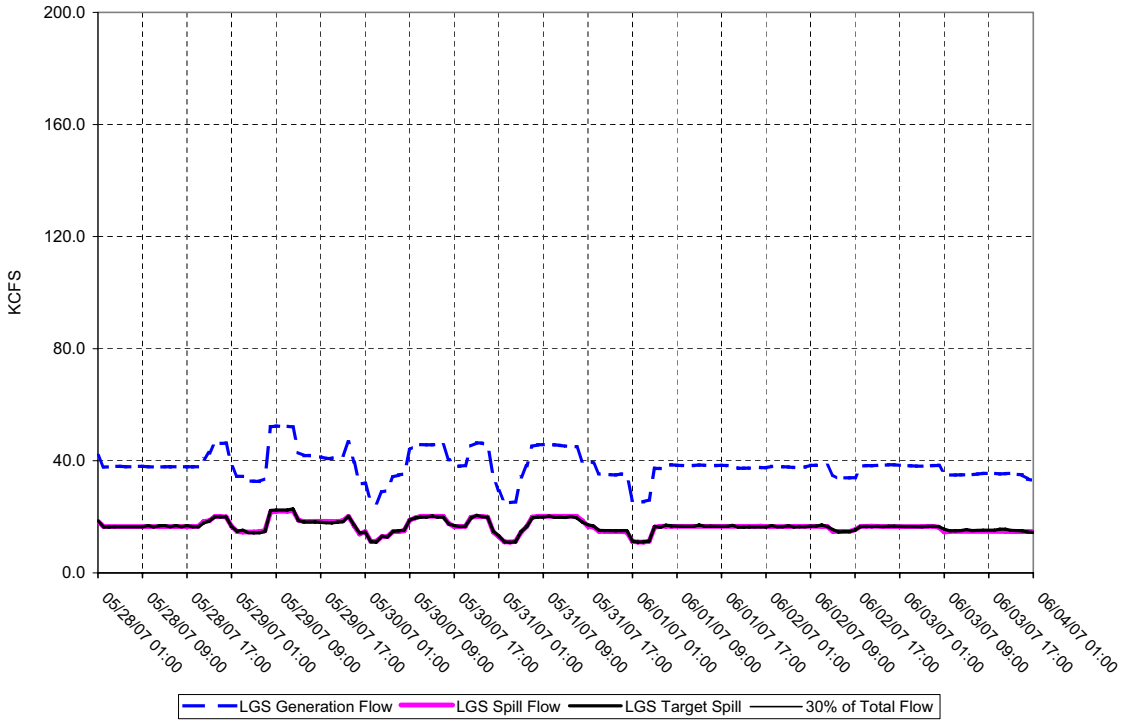
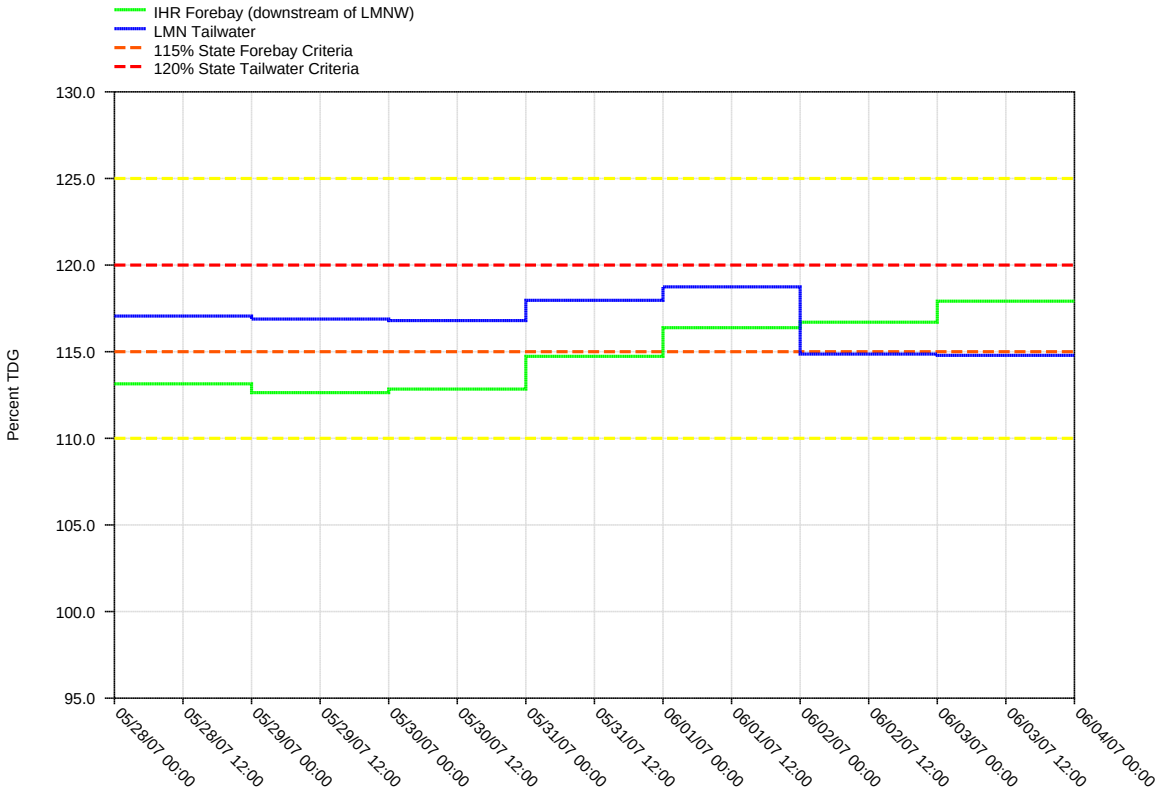


Figure 35.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

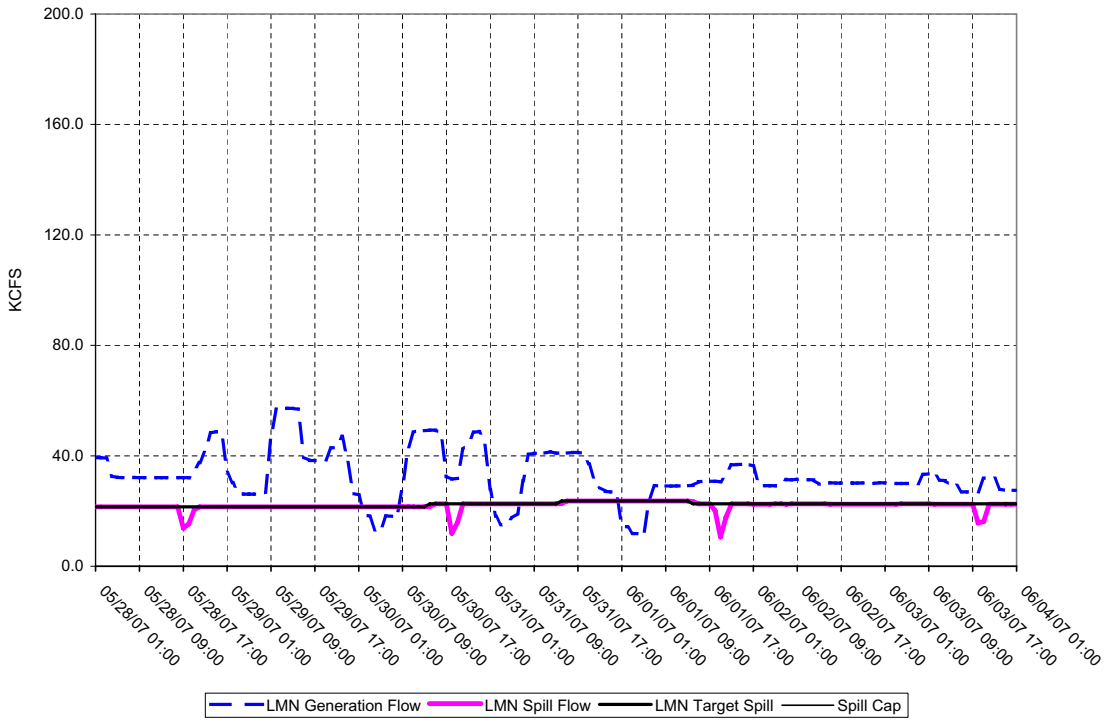
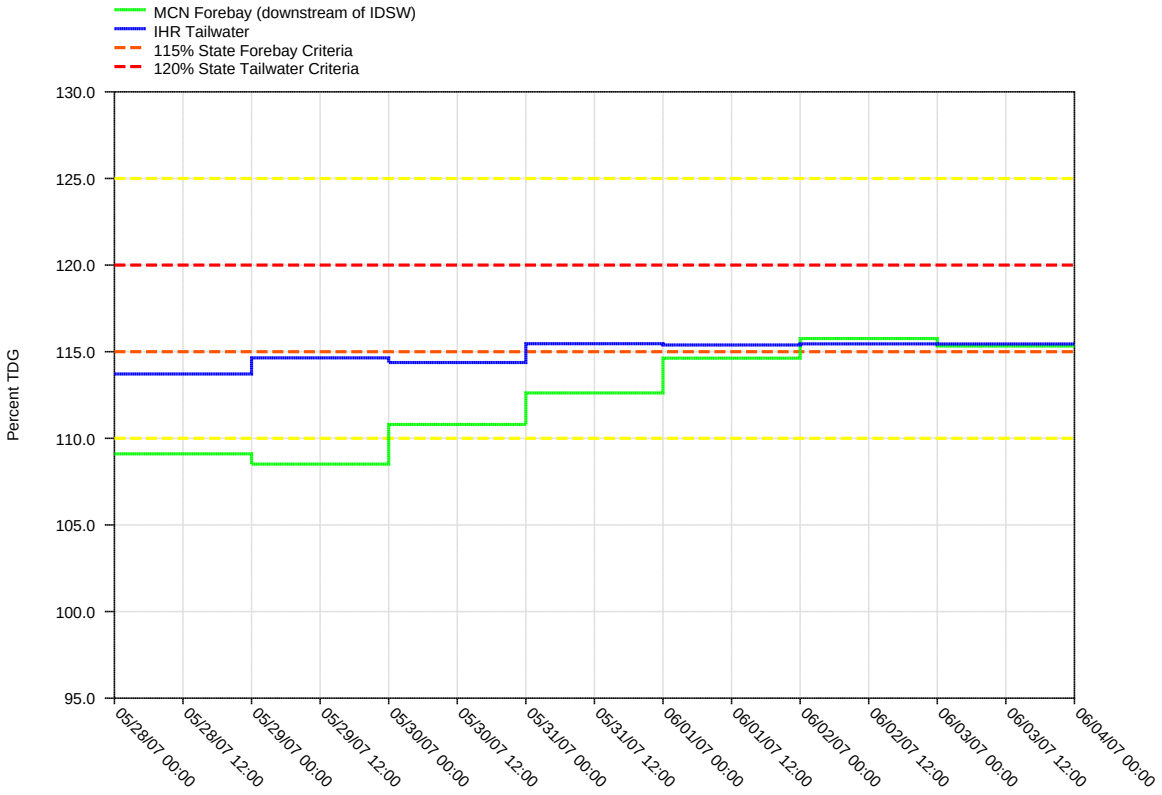


Figure 36.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

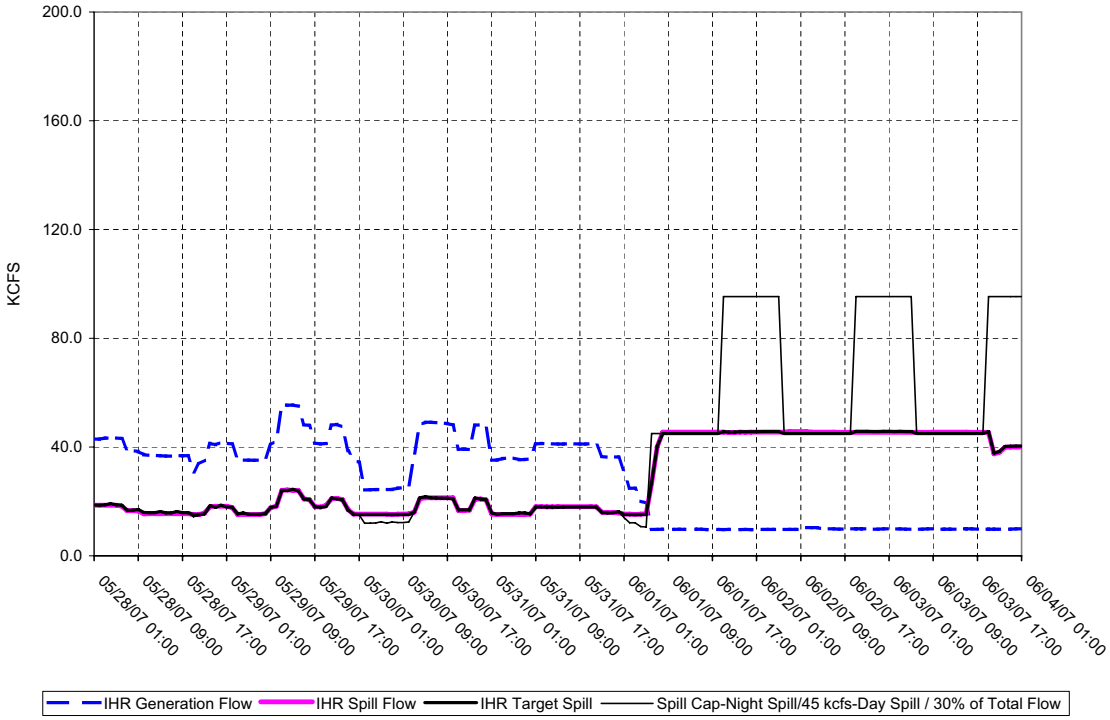
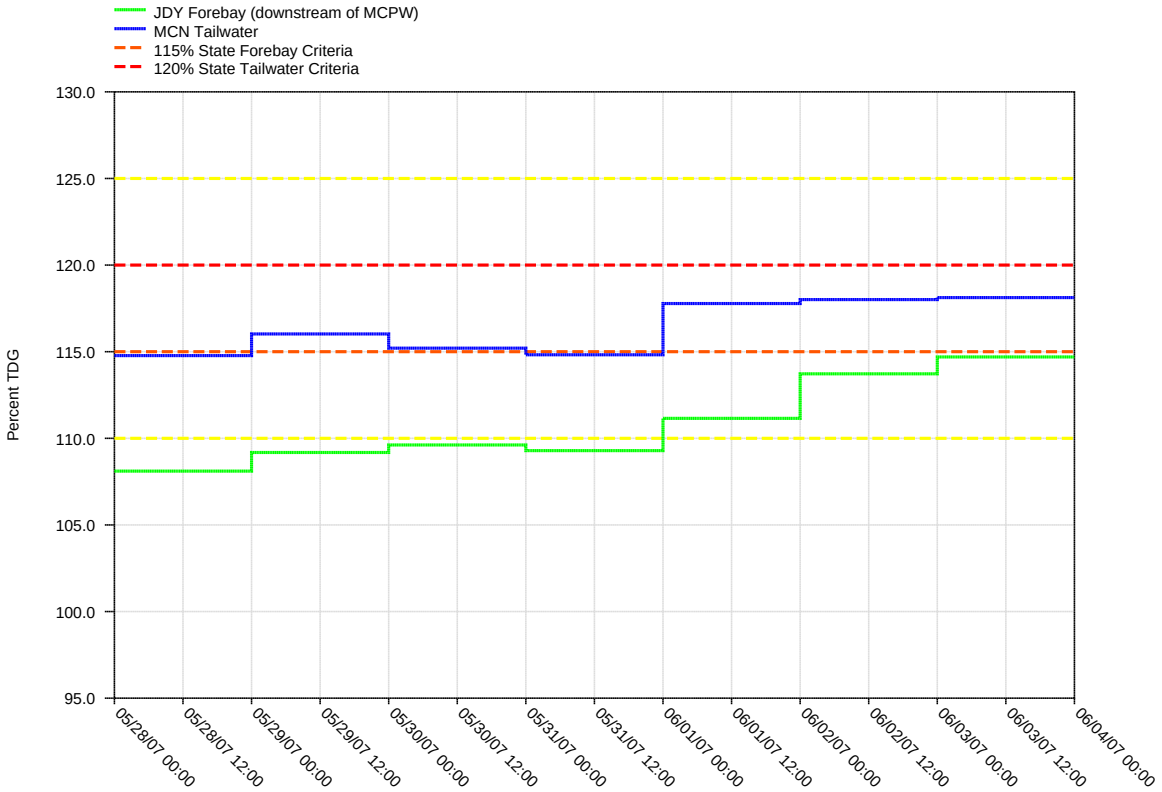


Figure 37.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

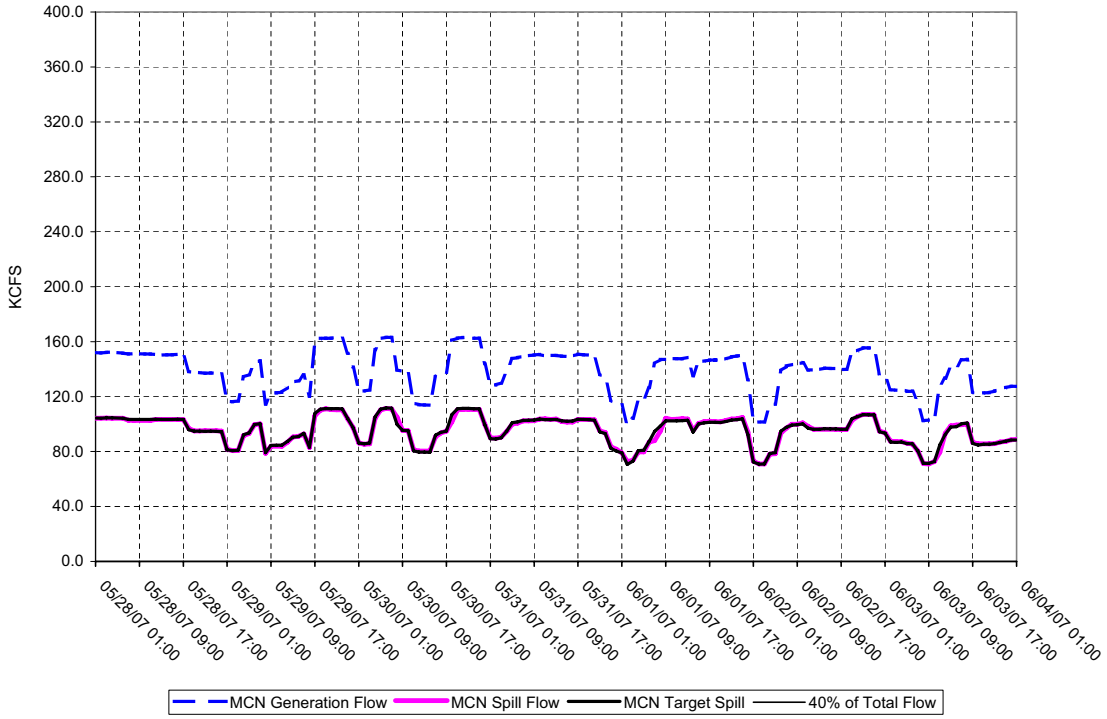
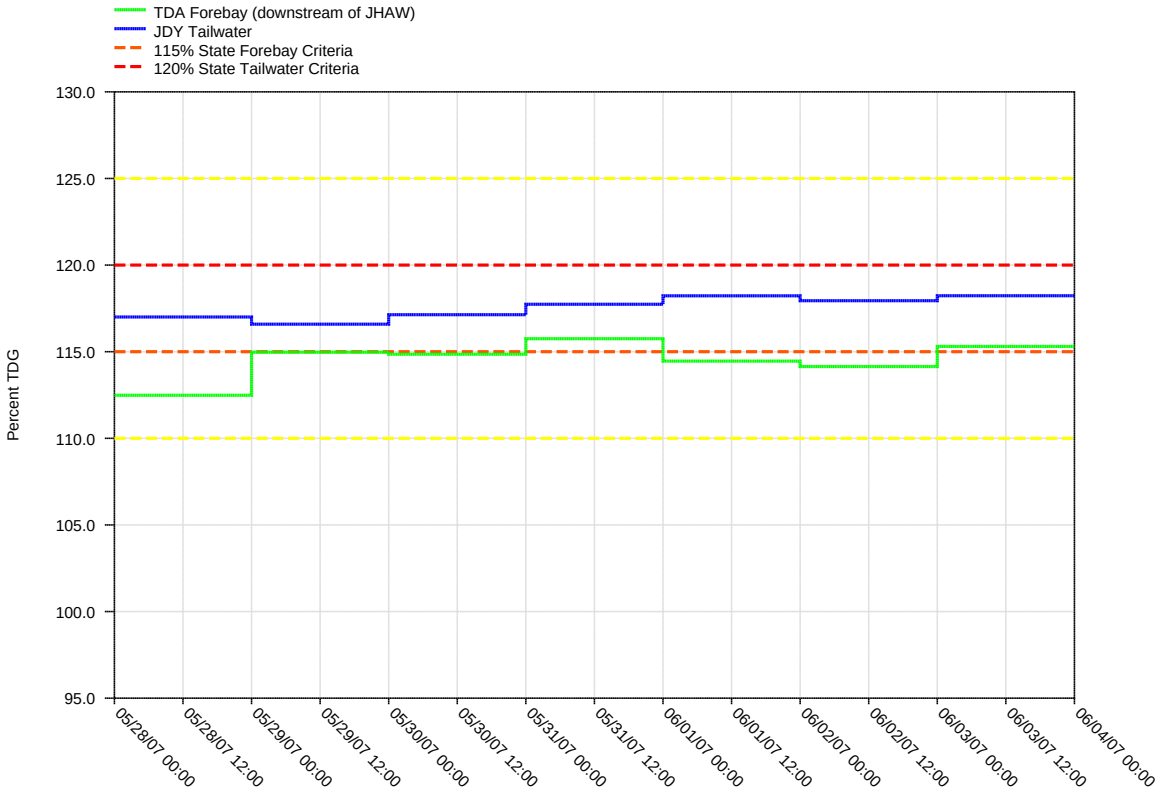


Figure 38.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

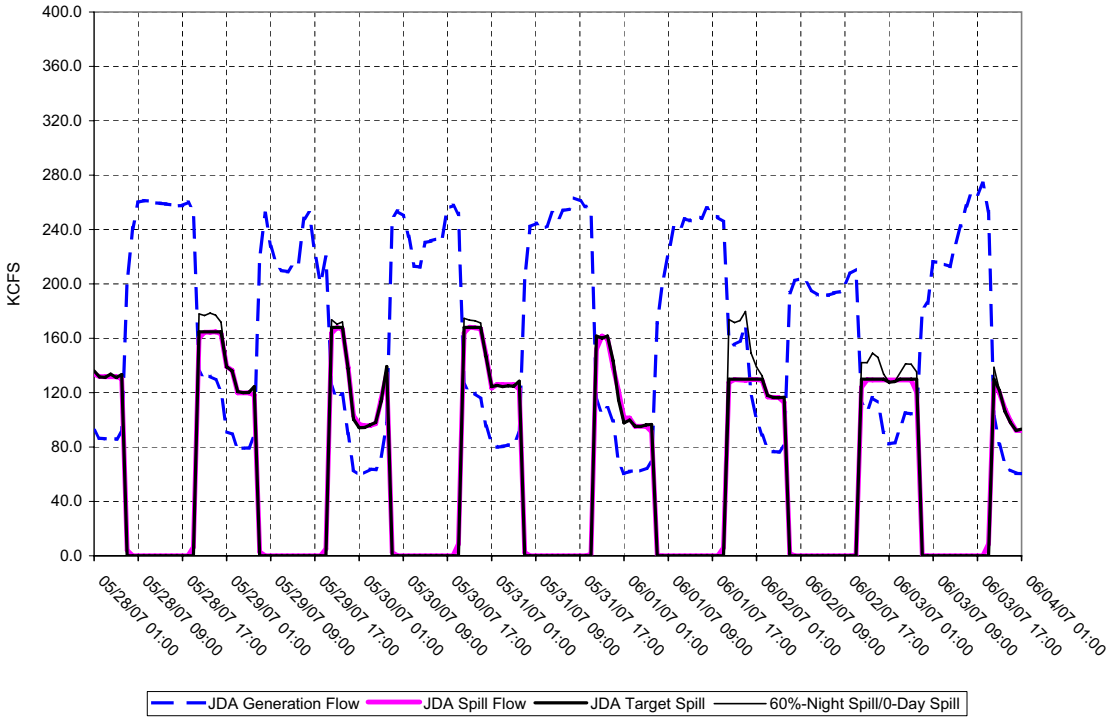
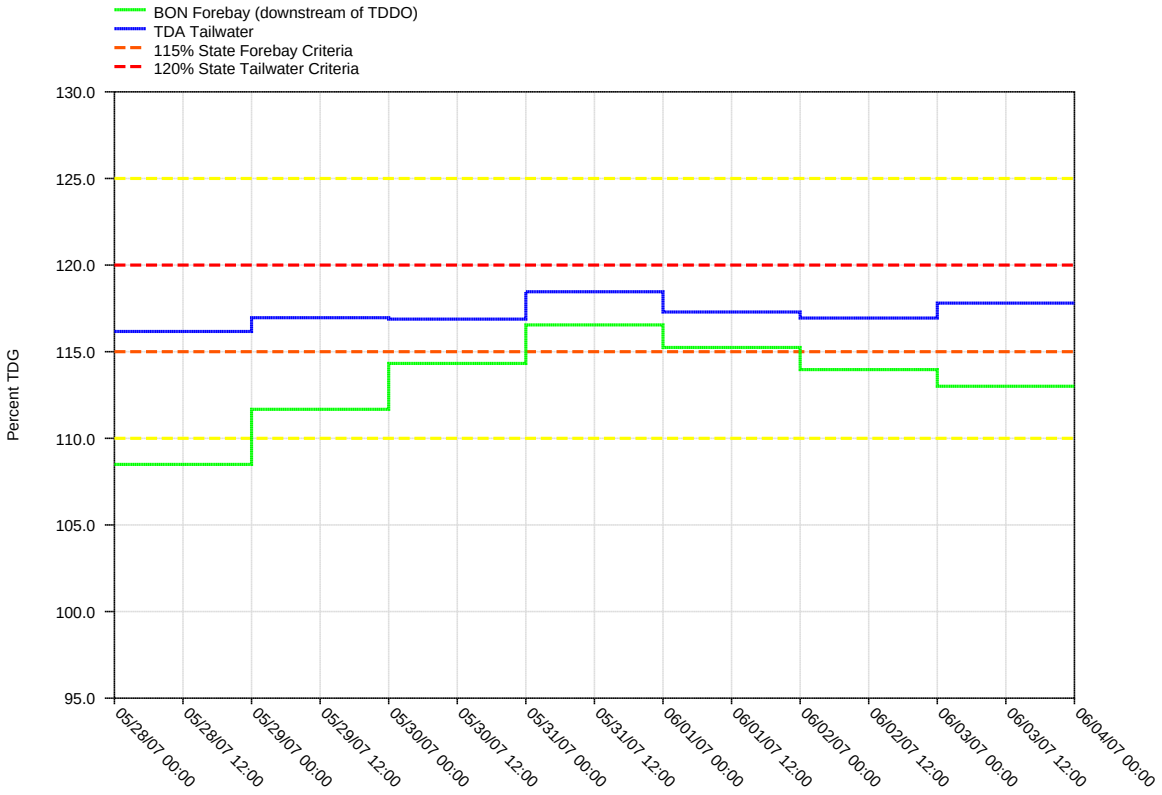


Figure 39.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

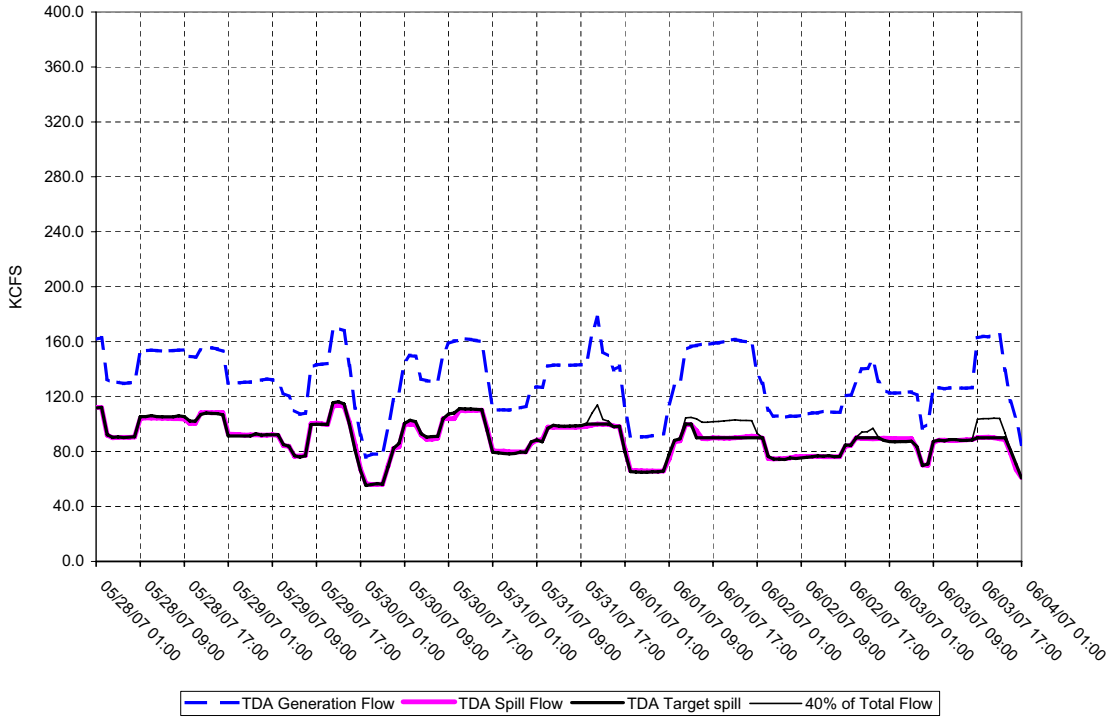
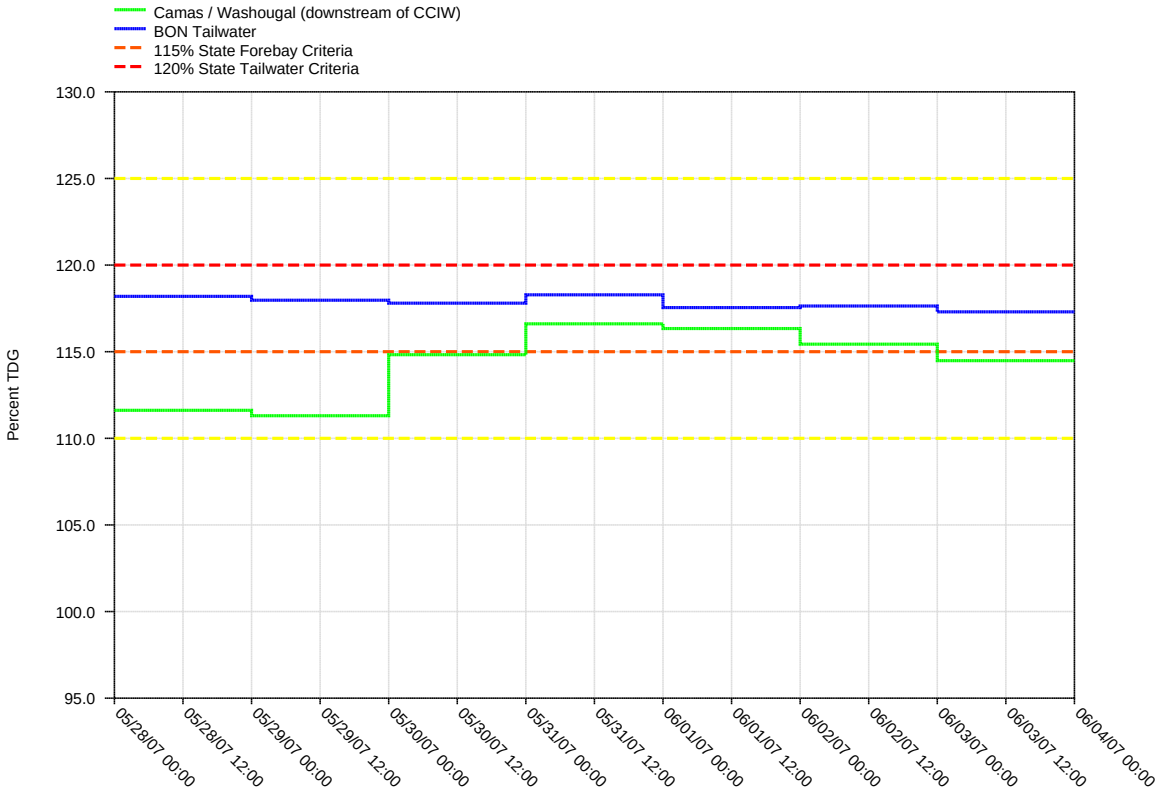


Figure 40.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

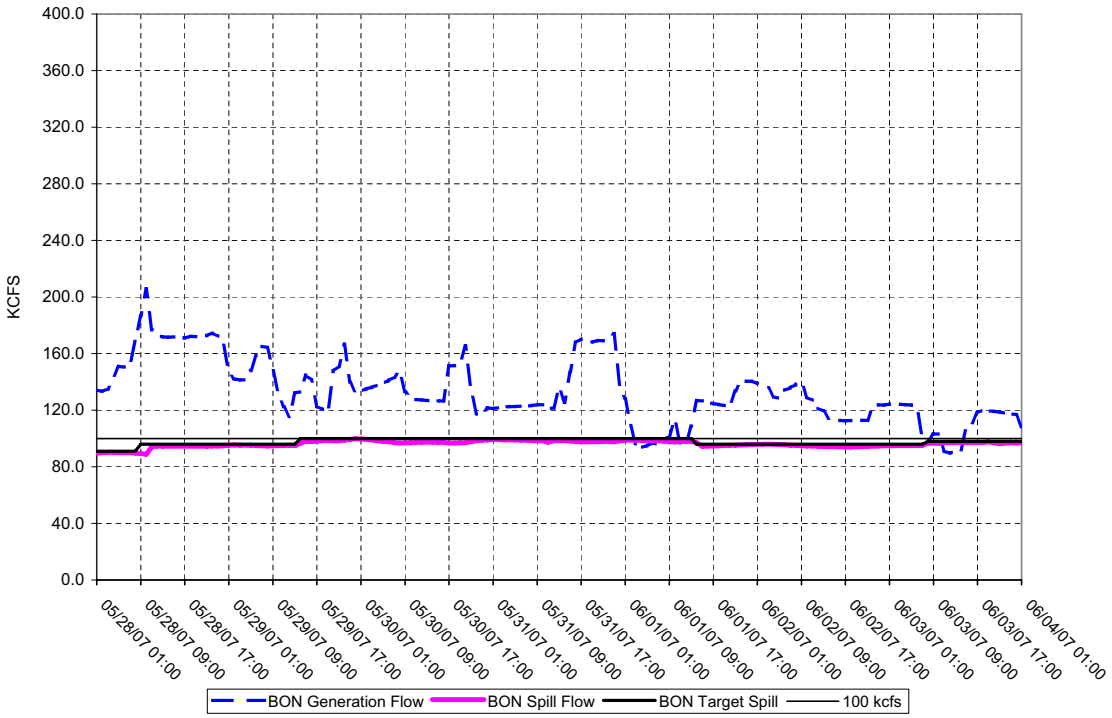
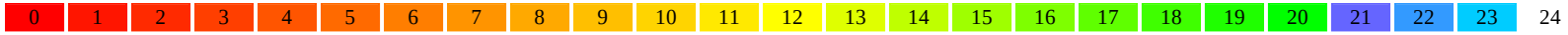


Table 1.
Average percent TDG for 12 highest hours: April 30 – June 3 2007

Date	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	120	115
04/30/2007	103.6	110.6	112.8	118.2	114.2	114.1	**115.2**	116.0	114.5	116.7	111.3	118.7	114.1	116.5	113.5	117.9	115.6	114.9
05/01/2007	103.6	110.7	113.9	117.9	**116.2**	114.1	**115.6**	117.9	114.5	116.0	112.8	119.1	114.7	117.6	113.5	118.7	114.8	115.0
05/02/2007	103.3	110.3	112.4	118.3	**118.1**	116.4	**115.6**	116.8	114.0	115.7	113.3	119.2	113.6	116.4	114.7	118.8	115.0	113.3
05/03/2007	102.3	109.2	109.1	116.8	**115.5**	116.4	112.7	115.7	111.2	115.7	111.8	118.7	113.3	116.1	113.7	118.7	114.6	114.0
05/04/2007	101.6	109.4	106.5	116.3	114.0	117.7	112.2	115.8	109.1	115.8	110.8	118.5	112.4	115.4	112.5	118.8	113.7	113.4
05/05/2007	101.5	109.3	104.5	115.6	112.0	116.9	111.8	115.7	108.9	115.6	108.4	117.9	111.8	114.6	111.3	118.6	112.7	113.0
05/06/2007	102.0	110.0	104.8	116.1	111.8	117.3	112.4	114.8	110.0	115.5	107.2	118.0	111.6	114.2	111.2	118.3	113.3	112.7
05/07/2007	102.8	110.7	105.7	116.9	113.1	**120.1**	113.7	114.5	113.0	115.9	108.3	117.6	113.4	114.1	112.5	118.3	114.3	**115.2**
05/08/2007	105.0	110.9	108.5	117.9	**115.8**	**120.9**	**116.1**	116.2	113.7	116.6	110.6	118.2	**115.4**	115.7	114.2	118.3	116.3	**115.4**
05/09/2007	104.8	110.8	109.5	117.8	**115.8**	117.5	**116.5**	115.7	113.9	116.3	111.8	118.7	113.4	117.6	112.7	118.6	114.0	114.3
05/10/2007	105.2	110.7	110.4	117.2	**116.5**	115.4	**117.0**	116.8	**115.7**	115.9	113.8	118.9	114.6	117.7	112.6	118.8	113.9	113.8
05/11/2007	104.1	110.4	111.4	117.3	**117.0**	116.2	**116.8**	117.2	**117.6**	115.6	114.0	118.7	**116.0**	118.6	113.3	118.6	114.3	114.3
05/12/2007	0.0	110.1	112.3	117.2	**117.5**	115.7	**116.7**	117.0	**115.5**	115.9	113.7	118.4	113.7	117.2	113.8	118.7	114.7	113.2
05/13/2007	0.0	109.3	108.5	113.8	**115.7**	113.7	114.4	116.2	111.3	115.8	110.4	118.1	110.7	115.8	109.7	117.8	113.2	112.5
05/14/2007	102.5	109.1	105.9	115.4	113.2	115.9	113.0	116.6	110.6	115.0	110.6	118.8	113.9	118.1	112.2	119.3	113.3	112.5
05/15/2007	103.5	110.0	106.9	115.9	112.8	117.4	114.2	116.8	113.3	114.9	111.1	118.6	**115.9**	119.1	**115.9**	118.7	115.5	114.1
05/16/2007	105.3	110.2	108.4	116.3	114.5	117.6	114.9	116.2	113.2	115.0	109.7	117.9	111.9	116.1	113.5	118.3	115.0	**115.1**
05/17/2007	105.2	110.5	108.5	115.6	114.5	115.1	114.8	115.6	112.6	114.6	110.0	118.2	112.4	116.3	111.3	118.2	113.5	114.1
05/18/2007	104.6	110.4	108.4	116.3	114.0	116.8	114.3	117.7	111.5	116.4	110.8	117.9	113.6	117.3	112.3	118.2	114.0	113.6
05/19/2007	103.8	109.8	108.1	116.1	113.8	115.0	113.9	116.7	110.7	115.7	109.7	117.6	112.6	116.5	112.7	118.3	114.3	112.9
05/20/2007	103.5	109.8	107.9	116.0	113.8	**121.2**	113.3	116.9	111.2	115.5	108.8	117.8	113.9	117.3	113.2	118.3	114.3	113.5
05/21/2007	102.8	109.3	106.8	115.8	113.5	**120.1**	112.7	116.3	109.1	115.2	107.8	117.8	109.2	114.0	111.9	118.2	115.0	112.1
05/22/2007	101.9	109.5	105.7	114.8	112.8	117.8	112.9	115.7	108.0	114.3	106.3	117.5	111.3	115.4	109.4	118.2	112.2	112.2
05/23/2007	102.1	109.8	106.7	115.3	113.6	119.1	113.8	114.9	110.3	114.3	107.1	117.1	112.9	116.2	111.1	118.3	113.6	113.1
05/24/2007	103.4	109.8	107.4	116.1	114.2	119.6	115.0	115.9	111.2	115.7	108.0	117.0	112.2	116.0	113.9	118.4	116.0	**115.7**
05/25/2007	104.4	110.0	108.1	116.0	113.6	119.4	**115.5**	116.2	111.9	115.7	109.0	117.8	**115.1**	116.9	114.6	118.8	115.3	**115.3**
05/26/2007	105.0	110.8	109.4	116.1	113.9	119.4	**115.5**	115.7	112.3	116.0	110.7	117.0	115.0	116.7	114.9	118.2	116.1	**115.3**
05/27/2007	104.6	111.4	109.4	114.6	114.2	118.8	**115.6**	114.9	112.2	116.3	110.3	116.4	110.4	113.8	112.8	117.1	114.8	112.1
05/28/2007	103.1	110.4	107.8	113.5	112.3	117.1	113.1	113.7	109.1	114.8	108.1	117.0	112.5	116.2	108.5	118.2	111.9	111.6
05/29/2007	102.2	110.1	107.4	115.0	111.0	116.9	112.6	114.6	108.5	116.0	109.2	116.6	115.0	117.0	111.7	118.0	114.6	111.3
05/30/2007	101.9	110.4	108.4	115.1	111.5	116.8	112.8	114.4	110.8	115.2	109.6	117.1	114.9	116.9	114.3	117.8	116.3	114.8
05/31/2007	102.3	111.0	111.0	115.5	113.0	118.0	114.7	115.5	112.6	114.8	109.3	117.7	**115.8**	118.5	**116.5**	118.3	117.5	**116.6**
06/01/2007	105.0	111.3	113.0	111.2	114.5	118.7	**116.4**	115.4	114.6	117.8	111.2	118.2	114.5	117.3	**115.2**	117.5	---	**116.3**
06/02/2007	105.1	114.1	114.0	113.4	**115.2**	114.9	**116.7**	115.5	**115.8**	118.0	113.7	117.9	114.1	116.9	114.0	117.6	---	**115.4**
06/03/2007	105.1	112.7	113.8	113.6	**115.2**	114.8	**117.9**	115.4	**115.3**	118.1	114.7	118.2	**115.3**	117.8	113.0	117.3	---	114.5

Generated: Tue Jun 5 14:25:00 2007

Number of hours of data reported in a given day



Big, bold, red text denotes exceedances.
--- indicates No Data
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%.

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)
WRNO	Bonneville Tailwater (Warrendale)
CWMW	Camas / Washougal

Effective April, 2006

FISH OPERATION PLAN IMPLEMENTATION REPORT
June 2007

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 April 16, 2007 court order requiring the Corps to provide monthly reports on the implementation of project spill for fish passage and fish transportation operations provided for in the 2007 Fish Operations Plan (FOP). The FOP describes the Corps project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the April – August 2007 fish migration season. Consistent with the 2004 Biological Opinion adaptive management strategy, this plan incorporates the project operations contained in the "Agreement Regarding 2007 Federal Columbia River Power System Fish Operations" (Agreement)[1]. The Corps agreed to provide 2007 fish passage operations in accordance with the Agreement as identified in Attachment 1 of the Agreement[2]. Water management operations not addressed in the Agreement will continue to be consistent with the operations considered in the 2004 Biological Opinion and in particular, the 2007 Water Management Plan and 2007 Fish Passage Plan (FPP). Judge Redden incorporated the terms of the 2007 Operations Agreement into a Court Order issued on May 23, 2007.

The Corps' lower Columbia and Snake River projects and fish passage operations for the month of June 2007 identified in the FOP 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 12-hour average Total Dissolved Gas (TDG) for the tailwater at each project and for the next project's forebay downstream.

This report also provides information on issues presented and unanticipated or emergency situations that arose during implementation of the spill program for the month of June 2007.

[1] The Agreement signed by the Bonneville Power Administration (BPA), Confederated Tribes of the Warm Springs Reservation, Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes and Bands of the Yakama Nation, and Confederated Tribes of the Colville Indian Reservation, was submitted to the Federal District Court on January 9, 2007.
[2] Brigadier General Martin committed to implement the 2007 operations identified in Attachment 1 of the Agreement by letter dated December 15, 2006.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per week in June displaying the progress 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 4 and end on July 1 for the following Lower Snake Lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville dams.

Each figure represents one week of operation for a project. The graphs start on Monday 0100 hours through Monday 0100 hours for the following dates:

June 4 – June 10	Figures 1 - 8
June 11 – June 17	Figures 9 – 16
June 18 – June 24	Figures 17 - 24
June 25 – July 1	Figures 25 – 32

A. Upper Graph: Shows the resultant daily average percent TDG for the 12 highest hours as the result of spill from the dam. The objective is to operate each project up to the TDG limits without exceeding those limits if practicable.

- The blue line on the graph represents the TDG in the tailrace of the dam. 120% TDG is the upper operating limit.
- The green line represents the TDG in the forebay of the next dam downstream. 115% is the upper operating limit.

B. Lower Graph: Represents the 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 heavy red line represents the hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2007 FOP.
- Each graph includes a heavy black line that represents the target spill. This is the hourly maximum spill level that is subject to the following conditions:

    - Spill percentage or discharge specified in the FOP;
    - Spill caps as set daily for TDG management;
    - Test spill levels for fish passage research;
    - Minimum generation for power system needs; and,
    - Minimum spill at Ice Harbor (15.2 kcfs) and Bonneville (50 kcfs) Dams.

The hourly target spill may vary as a function of quantity of river flow and generating units available at a project.

II. A monthly FOP Spill Report Table is included at the end of the report that shows the overall daily results of the average percent TDG for the 12 highest hours for all projects. The numbers in red show exceedances of the TDG gas cap - 115% (forebay) or 120% (tailwater) for each project.

General Implementation Remarks:

Please note that for all projects that spill for fish passage, the target spill may be limited to a lesser quantity (i.e. the spill cap), with the objective of staying within the TDG state waiver limits. When spill levels briefly deviated below or above the level described in the FOP, the heavy red line will be below or above the heavy black line in the graphs. Whenever the operation varied from the target spill during voluntary spill hours, or other anomalies occurred, these instances are described in the FOP Spill Report Table below. Occurrences which prompted regional coordination are described in greater detail in the section below entitled "Operational Adjustments Occurring in June."

"Low flow" operations on Lower Snake projects are triggered when inflow is not sufficient to provide for both minimum generation and the planned spill levels. In these situations, the projects operate one unit at minimum generation and spill the remainder of flow coming into the project. 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 where 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 and the target spill may not be possible on every hour.

Also note that actual spill levels at Bonneville Dam may range from 1 to 3 kcfs lower or higher than specified in the 2007 FOP. A number of factors influence this including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

In the FOP Spill Report Table below, the result of "load swing hours" appears as an explanation for not meeting the hourly spill at McNary, John Day, and The Dalles dams. This occurs because projects on the lower Columbia must be available to respond to within-hour load variability to satisfy North American Electric Reliability Council (NERC) reserve requirements ("on response"). During periods of rapidly changing loads, projects on response may have significant changes in turbine discharge within the hour. Under normal conditions, within-hour load changes occur mostly on hours immediately preceding and after the peak load hours, while spill quantity remains the same within the hour. These hours are referred to as "load swing hours." Due to the high variability of within-hour load, these load swing hours may have a greater instance of reporting actual

spill percentages that vary more than the +/- 1% requirement than other hours. On the days cited in the Table, the day or night-time average spill was within the required +/- 1% of the target spill.

June Operations:

The month of June was characterized by below average flows on the lower Snake River and slightly below average flows on the lower Columbia River. Below normal precipitation in Southeastern Washington combined with low snow pack in Idaho resulted in lower than normal flows for the lower Snake River. An average volume of precipitation in the upper Columbia Basin combined with below normal flows from the Snake River, resulted in the slightly below average flows for the lower Columbia River. During the June reporting period the FOP spill operations switched from spring to summer operations; the spill operations were carried out as follows:

- Lower Granite Dam - the hourly target spill was a fixed quantity of 20 kcfs up to June 21 at which time the target spilled changed to 18.5 kcfs
- Little Goose Dam - the target spill was 30% of the total flow
- Lower Monumental Dam - the target spill was to the spill cap, which was estimated in the FOP to be about 27 kcfs through June 20 and 17.1 kcfs starting on June 21
- Ice Harbor Dam – the target spill was 45 kcfs day/spill cap night alternating with the 30% spill test and is shown as the heavy black line on the graph
- McNary Dam – the target spill was 40% of total flow up through June 21, and starting June 22 at 0600 spill alternates between 60% and 40% of total flow in two day treatments
- John Day Dam – the target spill was 0 day/60% night through June 30, and starting July 1 spill was 30% of total flow for 24 hours
- The Dalles Dam - the target spill was 40% of total flow
- Bonneville Dam - the hourly target spill was a fixed quantity of approximately 100 kcfs through June 20, and starting on June 21 through July 15, spill was 85 kcfs day/spill cap night.

Operational Adjustments Occurring in June.

1. Routine operations to transport juvenile fish continued through the month of June. At Little Goose, spill was reduced 2 times and at Lower Monumental spill was reduced 15 times over the course of the month for one to three hours between the hours of 1700 and 2100 to allow safe passage of the fish barge.

2. Other spill operations in the lower Snake and Columbia rivers that varied from those described in the FOP were discussed and agreed to in Regional Forum processes prior to their commencement. Those operations coordinated with regional salmon managers were planned such that they would have the least impact to fish (also cited in the FOP Spill Report Table below).

    a. Bonneville Dam:

- Beginning on June 21, the project began spill at 85 kcfs to estimate the total survival of subyearling fall Chinook passing through the dam and spillway. The 85 kcfs spill pattern was developed to improve juvenile fish survival by the Fish Facility Design Review Work Group (FFDRWG) at the Corps' Engineer Research and Development Center (ERDC) during the spring. The requested date to start this evaluation was based on the numbers and run-timing of subyearling fall Chinook. In addition to the Regional Forum coordination, the representative for the signatories to the 2007 Agreement was contacted and indicated there were no objections to this change.

- Spillbays 2 through 17 were tagged out of service for approximately 4 hours on June 24 to perform a hydrosurvey to assess rate of erosion in the stilling basin. This operation was coordinated with the salmon managers at the 20 June TMT meeting, and the representative for the signatories to the 2007 Agreement was contacted and raised no objections.

- Spillbays 1 and 18 were each opened for no more than 30 minutes on June 28 to pass debris accumulated in front of each bay. This operation resulted in spill above the 85 kcfs spill cap.

b. McNary Dam:

- The spring spill test that started on April 16 ended on June 10, and the summer spill test started on June 20 (with first 2 days at 40% spill volume) and ends on August 31. This test is evaluating the performance of the two prototype surface bypass structures - temporary spillway weirs (TSWs). The objective of the biological test is to assess juvenile salmon behavior in the forebay of McNary Dam and to estimate fish passage and survival rates of subyearling fall Chinook under two treatment conditions (alternating spill volumes of 40% vs. 60%) using a two day treatment within a 4-day block design.

- In accordance with the 2004 UPA/BiOp, transport at McNary Dam begins when conditions are no longer “spring-like” - meaning favorable flow and water temperature conditions have diminished (average river flow is less than 220 kcfs and river water temperatures have reached 62º F.) On average this occurs on or about June 20, which is the date used for planning purposes. During the June 27 TMT meeting, the Corps reported that the passage conditions at McNary Dam were no longer spring-like, and transportation operations should begin per the 2004 UPA/BiOp. On behalf of the salmon managers, NOAA proposed delaying implementation of transportation at McNary until information was reviewed from the NMFS Science Center’s 2002 study results comparing transported and in-river fish at McNary. This is consistent with the UPA which provides for TMT to recommend timing for the start of transport using the best available science. At the July 5 TMT

meeting, having reviewed the science, the salmon managers stated that they did not object to beginning transportation operations at McNary. Meanwhile, the Corps identified a navigation safety issue concerning the fish transport barges. In order for the fish transport barges to safely traverse the tailrace to access the barge loading facility, spill at McNary is stopped. However, with the installation and the associated research and testing of the two TSWs, as well as logistical issues relating to the amount of time and equipment needed to stop spill at the TSWs and spillbay 14 to accommodate the navigation concerns, the Corps proposed, and TMT members agreed to a modified spill operation test on July 6. This test left spill bays 22, 20, and 14 open while a towboat operator observed the remaining spill and attempted to move his vessel to the loading facility on the south shore. Following this test, the Corps determined that it was too dangerous to operate a fish barge with the 3 spill bays open, and decided to continue bypassing fish rather than begin transport operations. TMT members indicated they would not object to this operation given the navigation safety issues under these spill conditions. The signatories to the 2007 Agreement were contacted and their representative indicated there were no objections to this change in operations.

c. Lower Monumental Dam:

- The spill operation changed to spill a higher volume (23.6 or 24.7 kcfs) for half the day starting on June 8 through June 20. This spill cap operation was an attempt to address the anomaly that was occurring in the Lower Monumental spill pattern between 22.6 kcfs and 23.6 or 24.7 kcfs that caused difficulty in managing TDG levels in the Ice Harbor forebay.

FOP Spill Report Table

Project	Parameter	Date	Time	Hours	Type	Reason
Lower Granite	Spill	6/26/2007	1500 - 2100	7	Low flow - Operational	Spill dropped below 18 kcfs to 16.6 kcfs because there was not enough water to maintain the 1% minimum generation flow and 18 kcfs spill. This situation was a result of operations during the morning when the project switched from the larger unit #6 to the smaller unit #1 at 400 hr, but generation was inadvertently not reduced to minimums from 500 to 1100, and the pool was drafted to minimum pool elevation.

Little Goose	Addt'l spill	6/7/2007	1800 - 1900	2	Mechanical problems	Hourly % spill was 33.9% & 34.3% (above 30% +/- 1% range): Project was switching transformers and encountered mechanical problems. As a result, one unit went off line, and the computers went down. The operator left the computer settings where they were until the system came back on line. 24 hr avg. spill was 30.4%.
Little Goose	Addt'l spill	6/25/2007	800 - 900; 1100 - 1200	4	Mechanical problems	Hourly % spill was above 30% +/- 1% range: Water was found in an isophase bus (13 kv conductor). To perform the repair, there was a line outage and project spilled excess outflow.
Little Goose	Spill	6/26/2007	2400	1	Barge safety	Cargo barge needed reduced spill for safe passage.
Little Goose	Spill	6/29/2007	1400	1	Barge safety	Fish barge needed reduced spill for safe passage. *
Little Goose	Spill	6/30/2007	900-1000	2	Barge safety	1 Fish barge and 2 passenger vessels needed reduced spill for safe passage. *
Little Goose	Addt'l spill	6/30/2007	1700	1	Operational	Hourly % spill was 31.6% (above 30% +/- 1% range) due spill request for 14.8 kcfs, which was the closest available spill pattern for 14.0 kcfs (30% spill). The next lower spill pattern would have produced 12.9 kcfs spill which is 27.6%. 24 hr. avg. spill was 30.2%.
Lower Monumental	Spill	6/3/2007	1800 - 1900	2	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	6/5/2007	1900 - 2100	3	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	6/7/2007	1800 - 1900	2	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	6/9/2007	1900 - 2000	2	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	6/11/2007	1900 - 2100	3	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	6/13/2007	1800 - 1900	2	Barge safety	Fish barge needed reduced spill for safe passage. *

Lower Monumental	Spill	6/15/2007	1700 - 1800	2	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	6/16/2007	1900 - 2300	5	Spill cap - Change delay	What appears as a "variance" in the attached graphs in actuality was not a variance. It appears as such because the data was not entered into computer immediately (spill data was automatically entered into GDACS as 22.6 kcfs), and operator did not update it to reflect actual spill of 23.6 kcfs until 2400 hr.
Lower Monumental	Spill	6/17/2007	1800 - 1900	2	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	6/19/2007	1800	1	Barge safety	Fish barge needed reduced spill for safe passage. Few fish, so quick loading. *
Lower Monumental	Spill	6/21/2007	1900	1	Barge safety	Fish barge needed reduced spill for safe passage. Few fish, so quick loading. *
Lower Monumental	Spill	6/23/2007	1800 - 1900	2	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	6/25/2007	1900 - 2000	2	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	6/26/2007	1300 - 2000	8	Low flow - Operational	Because the project went below MOP and had to get back to criteria, it operated at minimum generation and spilled less than 17 kcfs spill (between 11.8 - 16.0 kcfs), which occurs when there is not enough water to maintain the 1% minimum generation flow and 17 kcfs spill.
Lower Monumental	Spill	6/27/2007	1700 - 1800	2	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	6/29/2007	1800 - 2000	3	Barge safety	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	7/1/2007	1800	1	Barge safety	Fish barge needed reduced spill for safe passage. *
Ice Harbor	Spill	6/6/2007	1300	1	Minimum generation	Project generated 10.2 kcfs which is outside of minimum generation range of 9 to 10 kcfs for units 1-3. As a result 0.2 kcfs was not spilled. Operator was transitioning from unit 1 to 3 at beginning of 1300 hour and went over the min. gen. for a few minutes while unit 1 was shutting down.

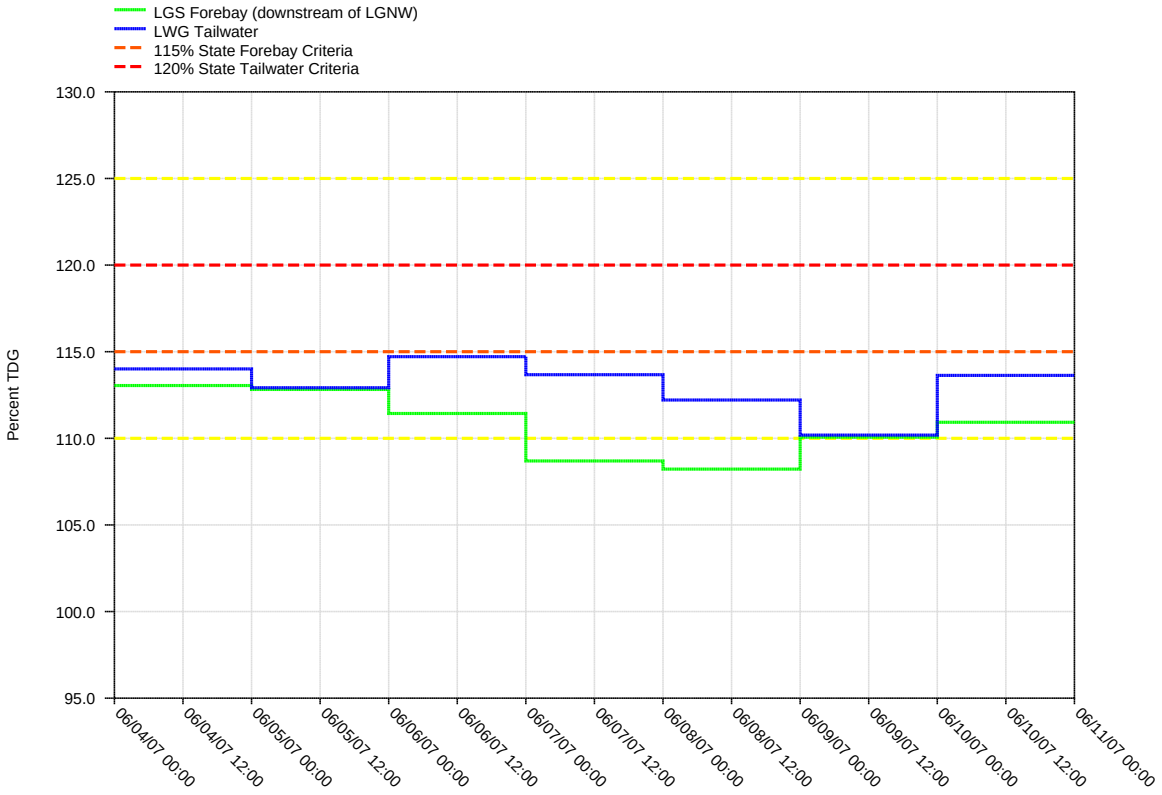
McNary	Spill	6/4/2007	1300 - 1400	2	Load swing hours	Hourly % spill was 38.3% & 38.6% (below 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.0%.
McNary	Addt'l spill	6/8/2007	1100 - 1600	6	Mechanical problems	Hourly % spill was up to 48.9% (above 40% +/- 1% range) due to fish screen repair that required four units and a line to be taken off line. 24 hr avg. spill was 41.0%.
McNary	Spill	6/25/2007	1100, 1900 - 2000, 2200	4	Load swing hours	Hourly % spill was 35.8-41.4% (outside of 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 39.9%.
McNary	Addt'l spill	6/28/2007	1000	1	Load swing hours	Hourly % spill was 42.5% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 3.
John Day	Addt'l spill	6/26/2007	2200	1	Load swing hours	Hourly % spill was 63.2% (above 60% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 3. Night-time avg. spill was 59.7%.
John Day	Addt'l spill	6/27/2007	0000	1	Operational/human error	Hourly % spill was 61.6% (above 60% +/- 1% range) due to operator being late in implementing BPA's request to lower spill to 99 kcfs. Night-time avg. spill was 59.7%.
John Day	Addt'l spill	6/27/2007	0200	1	Operational/human error	Hourly % spill was 61.5% (above 60% +/- 1% range): There was a delay in lowering spill to requested 90 kcfs, Night-time avg. spill was 59.7%.
John Day	Addt'l spill	6/27/2007	2300	1	Load swing hours	Hourly % spill was 62.1% (above 60% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 3. Night-time avg. spill was 59.7%.
John Day	Spill	6/29/2007	400-500	2	Operational/human error	Hourly % spill was 58.4% & 58.0% (below 60% +/- 1% range). Project inadvertently remained at 54 kcfs although there was a request to increase to 58 kcfs at 0500. Night-time avg. spill was 59.0%.

The Dalles	Addt'l spill	6/4/2007	2000	1	Spill Cap/human Error	Hourly avg. spill was 106.4 kcfs (above 103.5 kcfs spill cap) due to BPA's request at 1923 hr to increase spill to 119 kcfs to achieve 40%. The error was corrected within 10 minutes
The Dalles	Spill	6/21/2007	1100 - 1200	2	Mechanical problems	Hourly % spill was 38.8% & 36.5% (below 40% +/- 1% range) due to an electrical fault on transformer 9 which caused transformer line 6 to go off line. Five units had to go off line during repair. 24 hr avg. spill was 39.7%.
The Dalles	Spill	6/28/2007	1500	1	Human Error	Hourly % spill was 38.7% (below 40% +/- 1% range) due to delay in operator increasing spill to 72 kcfs. 24 hr avg. was 40.1%.
The Dalles	Addt'l Spill	6/29/2007	0600	1	Load swing hours	Hourly % spill was 41.7% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. was 40.1%.
Bonneville	Addt'l Spill	6/20/2007	1500-2300	9	Human Error	Hourly avg. spill above 100 kcfs target spill. Two teletypes sent: spill priority teletype saying 110 kcfs spill with no start time and summer spill teletype started the 110 kcfs spill on June 21 at 0001. BPA requested that project spill at the 110 kcfs at 1500.
Bonneville	Spill	6/24/2007	1300-1600	4	Perform survey	Hourly spill below 85 kcfs spill cap; spillbay was closed to perform a hydrosurvey in the stilling basin
Bonneville	Addt'l Spill	6/28/2007	1400-1500	2	Maintenance	Spilled above 85 kcfs daytime spill level in order to remove debris from spill bay 1 and 18.

* Data collected for reporting spill reductions for safe passage of fish transport barges is reported as average hourly data. Therefore, while spill may be reduced for only a portion of an hour, the FOP Spill Report Table characterizes the reduction as a full hour.

Figure 1.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

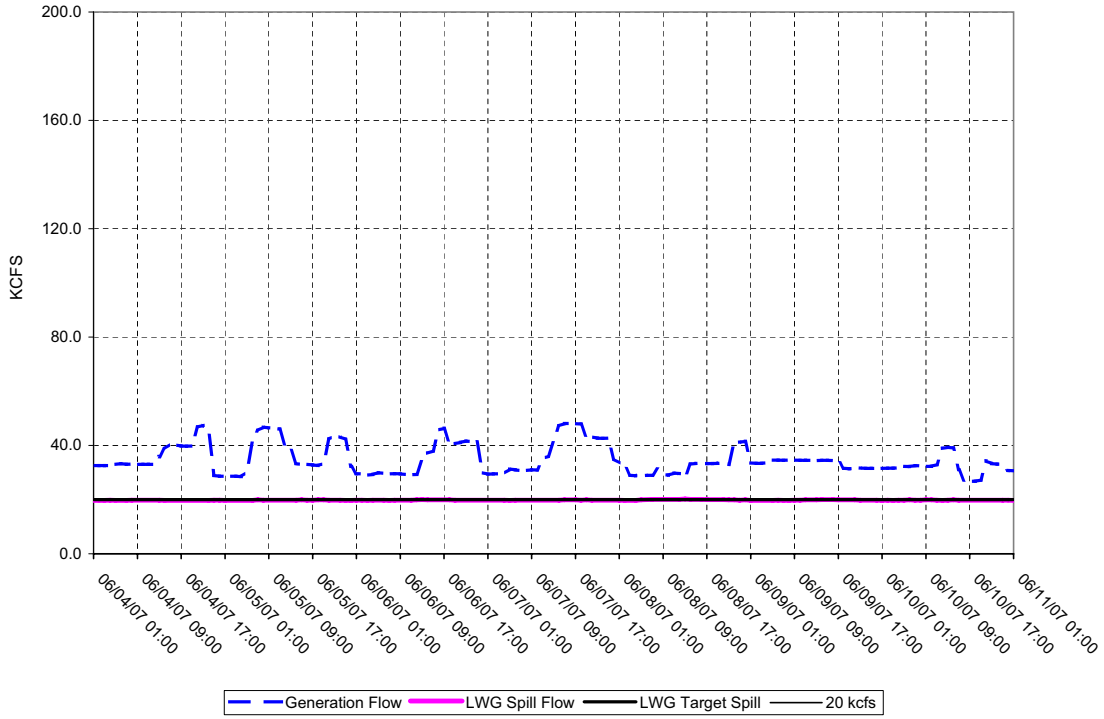
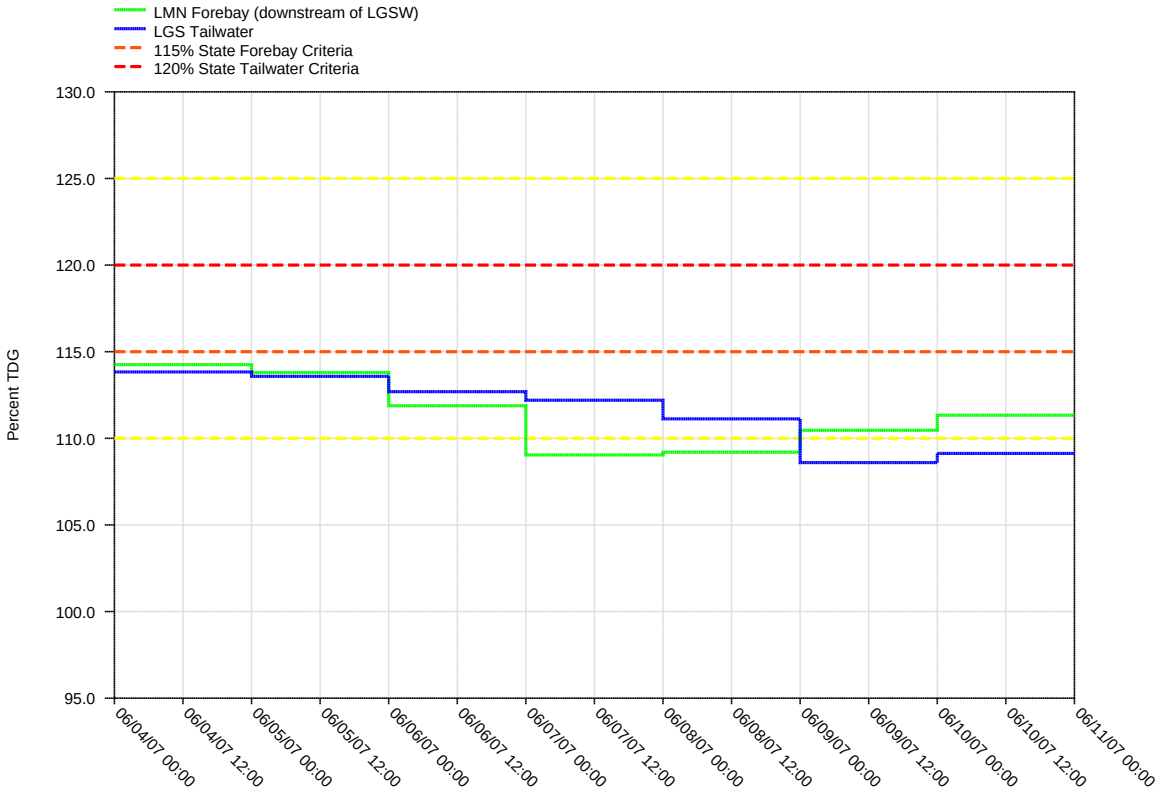


Figure 2.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

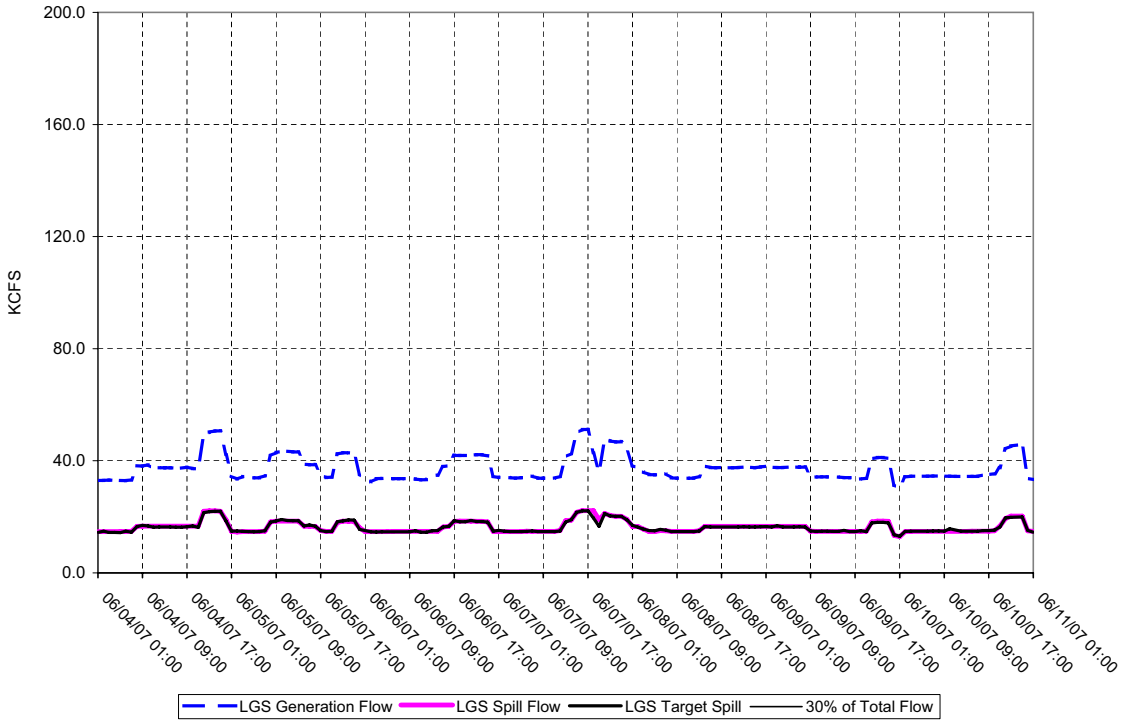
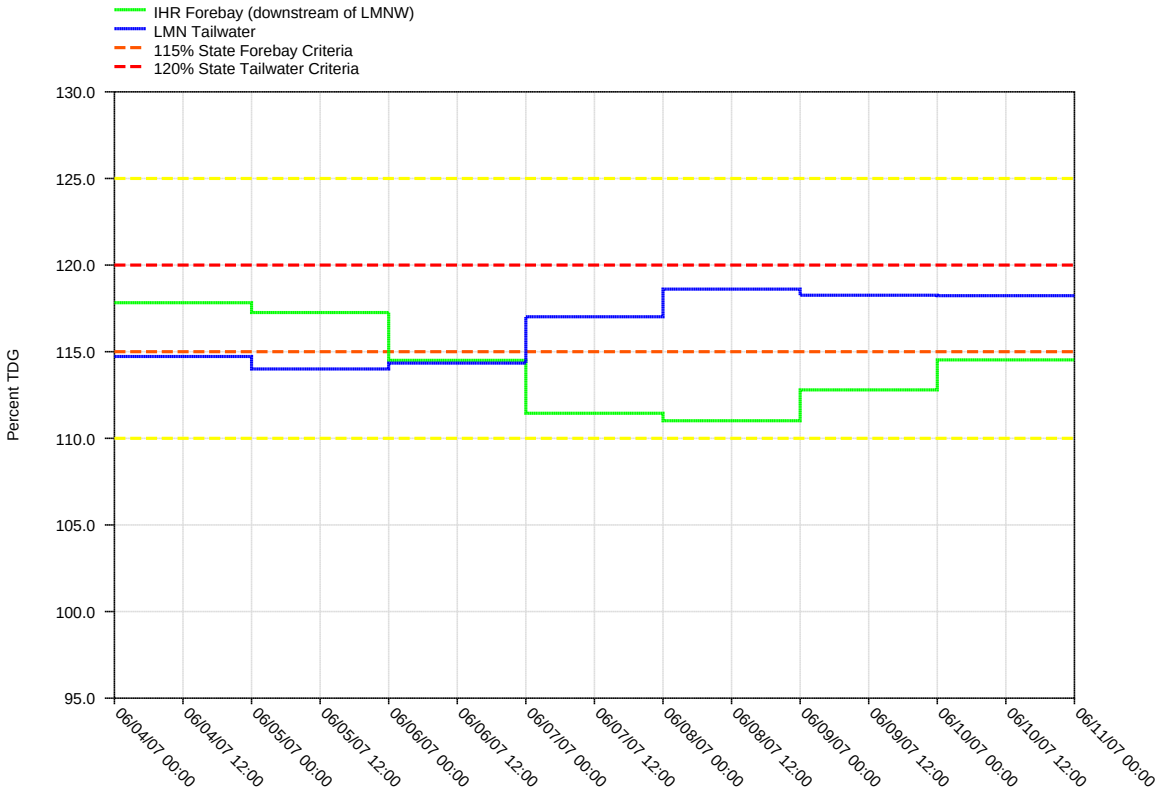


Figure 3.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

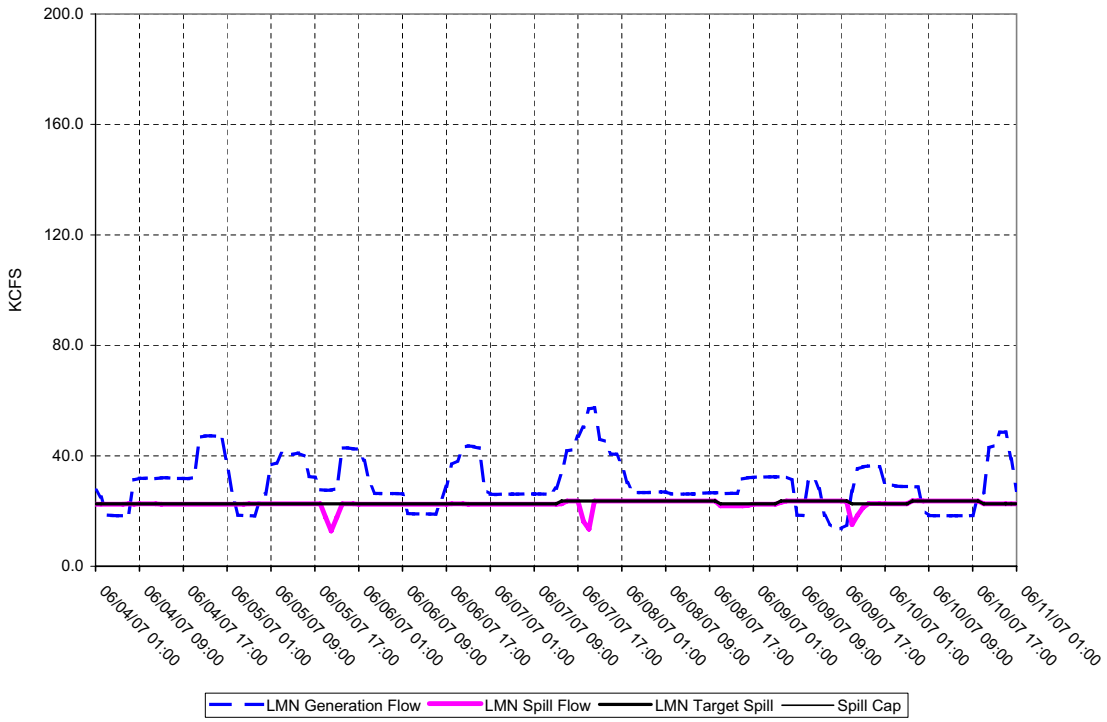
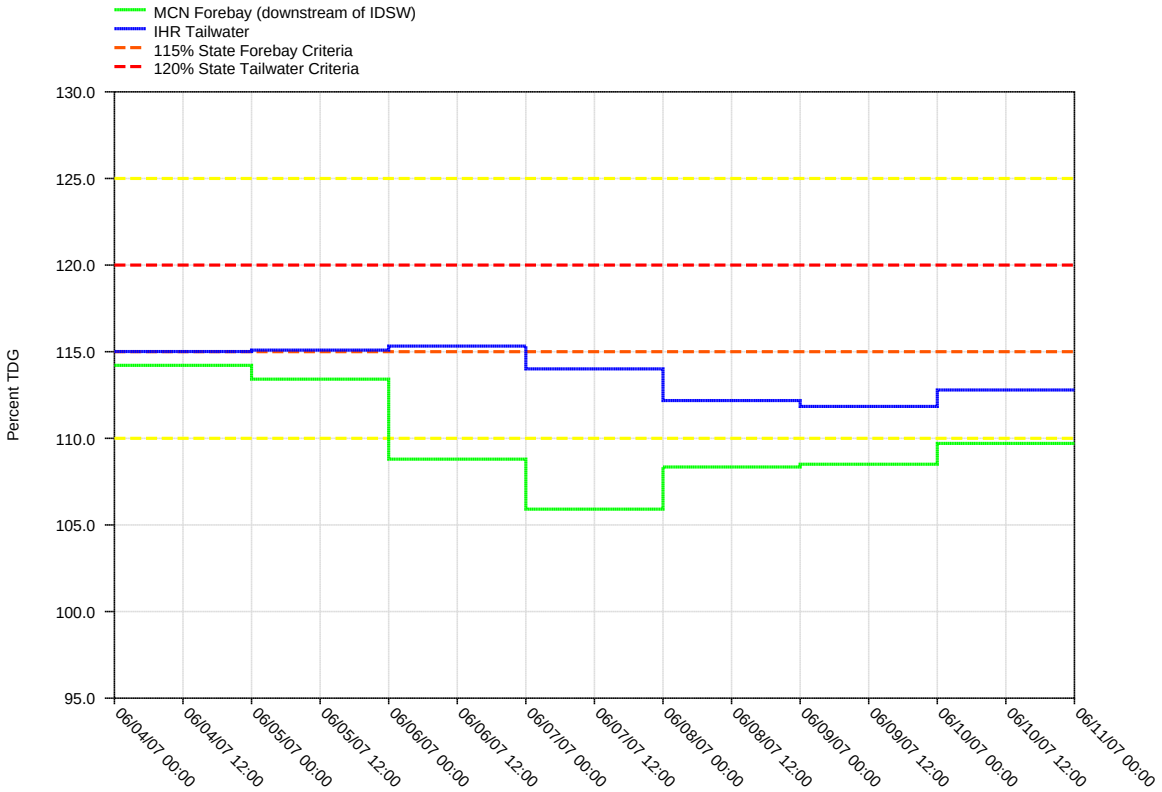


Figure 4.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

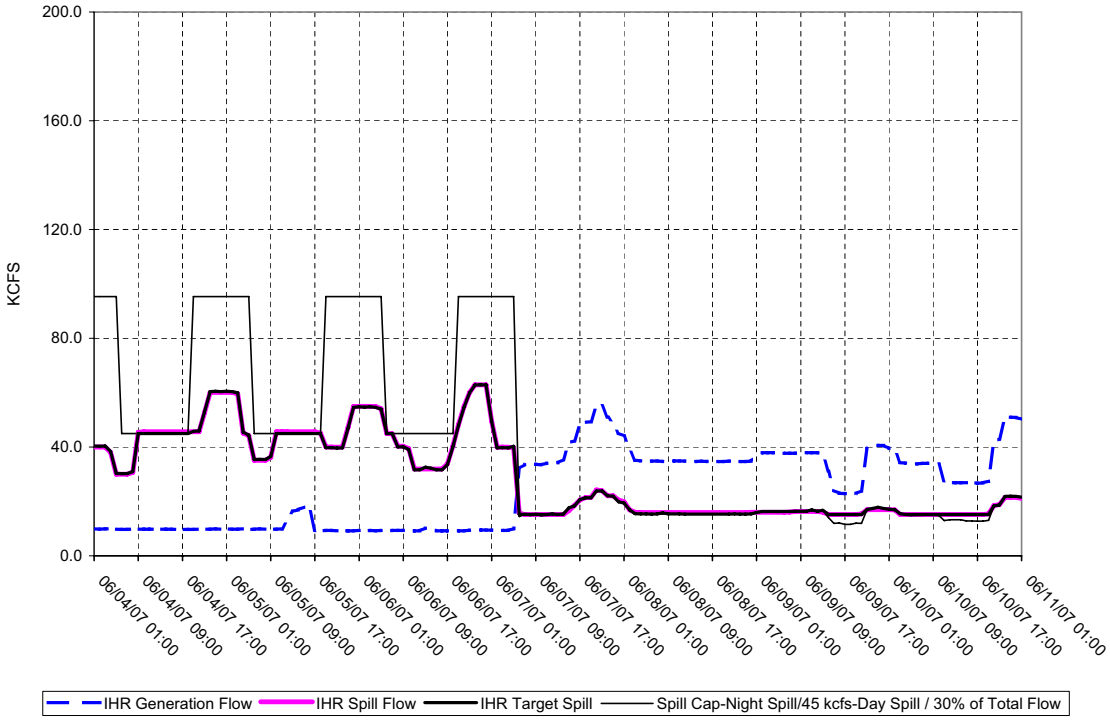
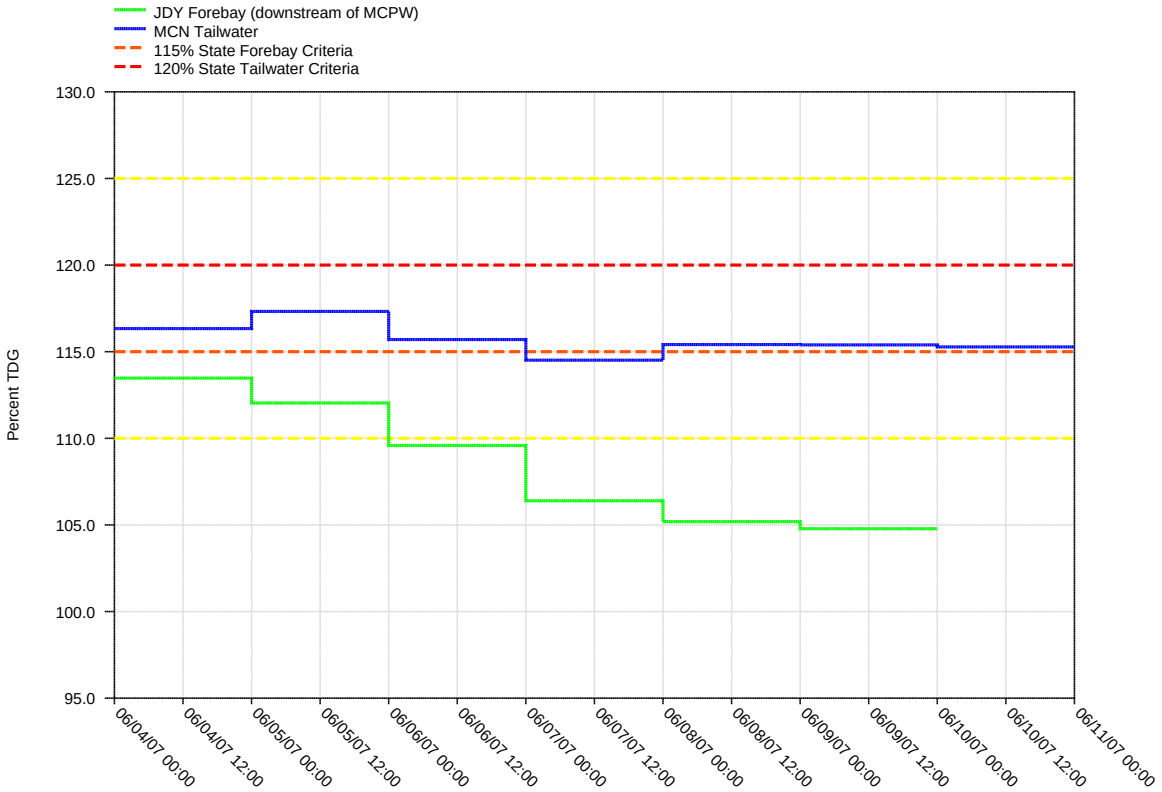


Figure 5.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

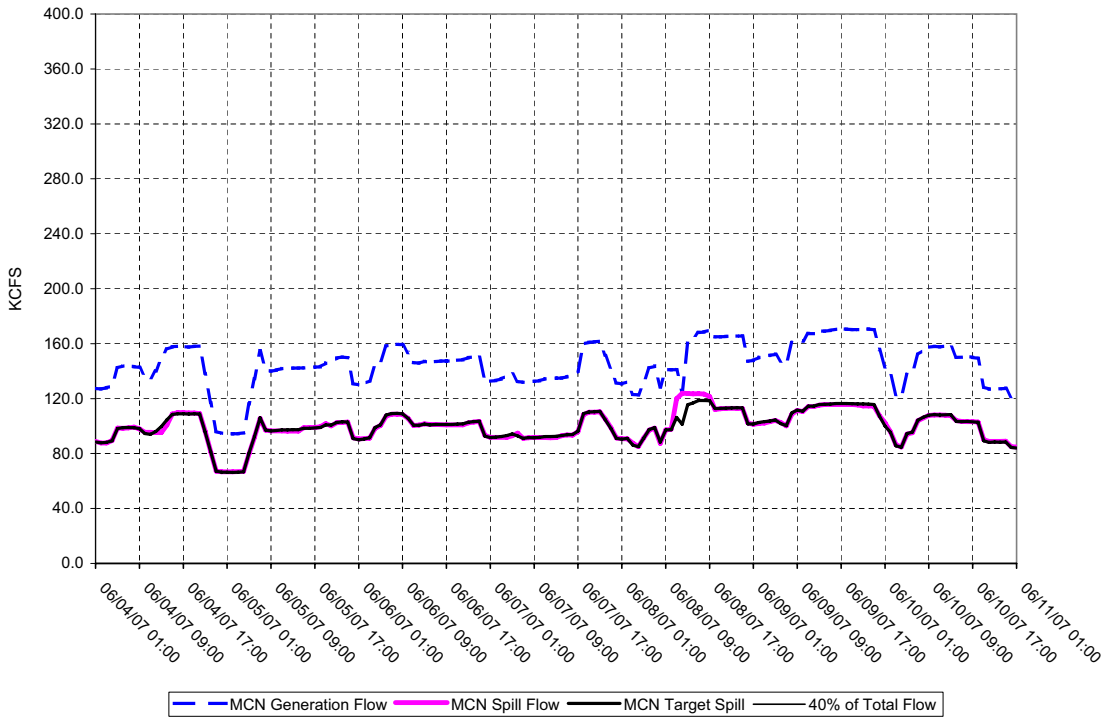
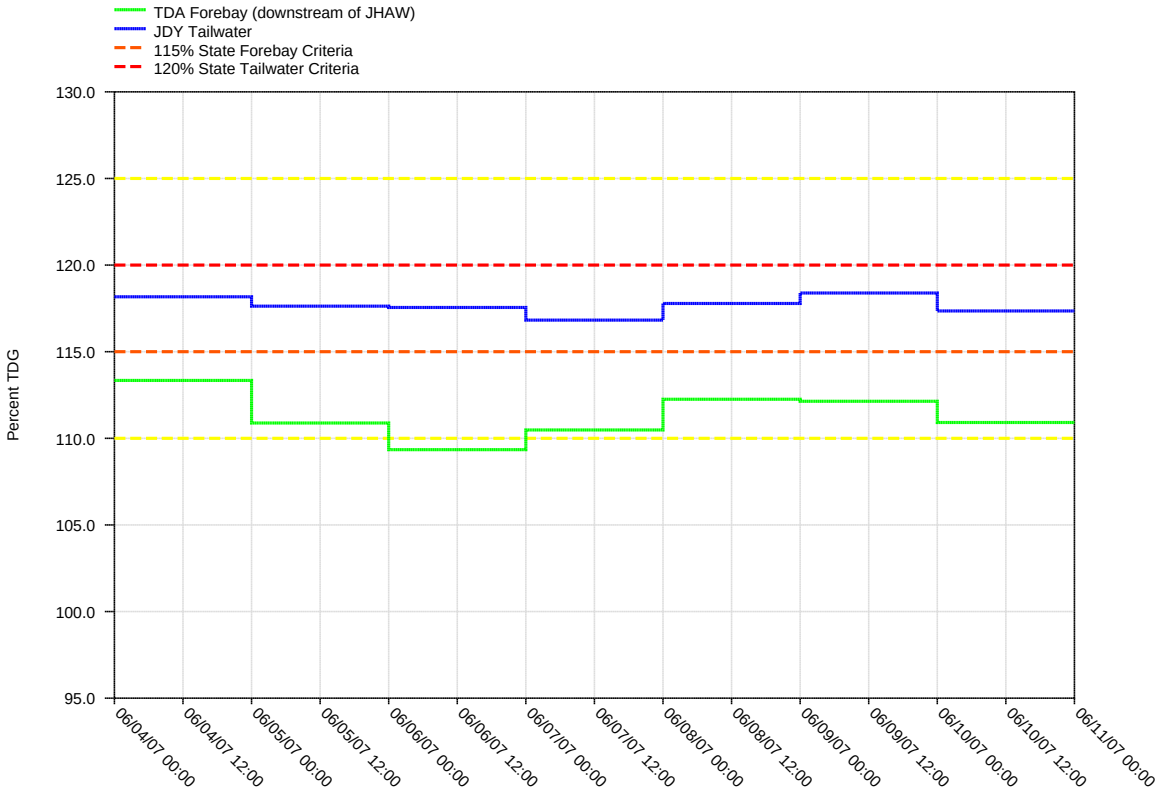


Figure 6.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

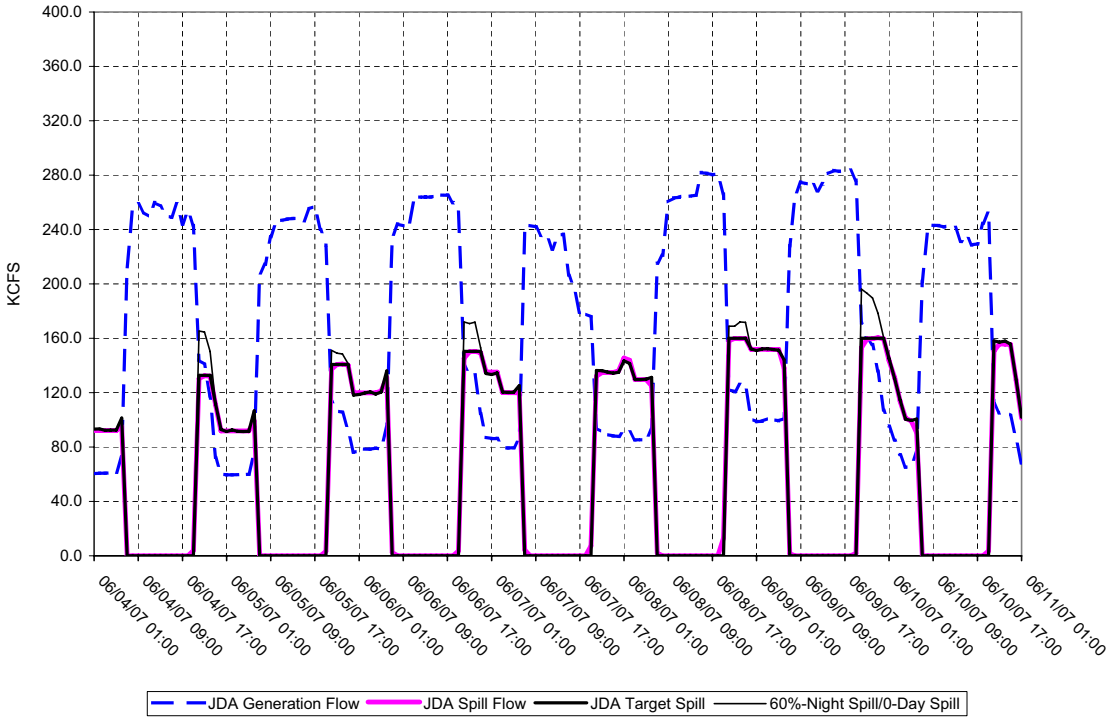
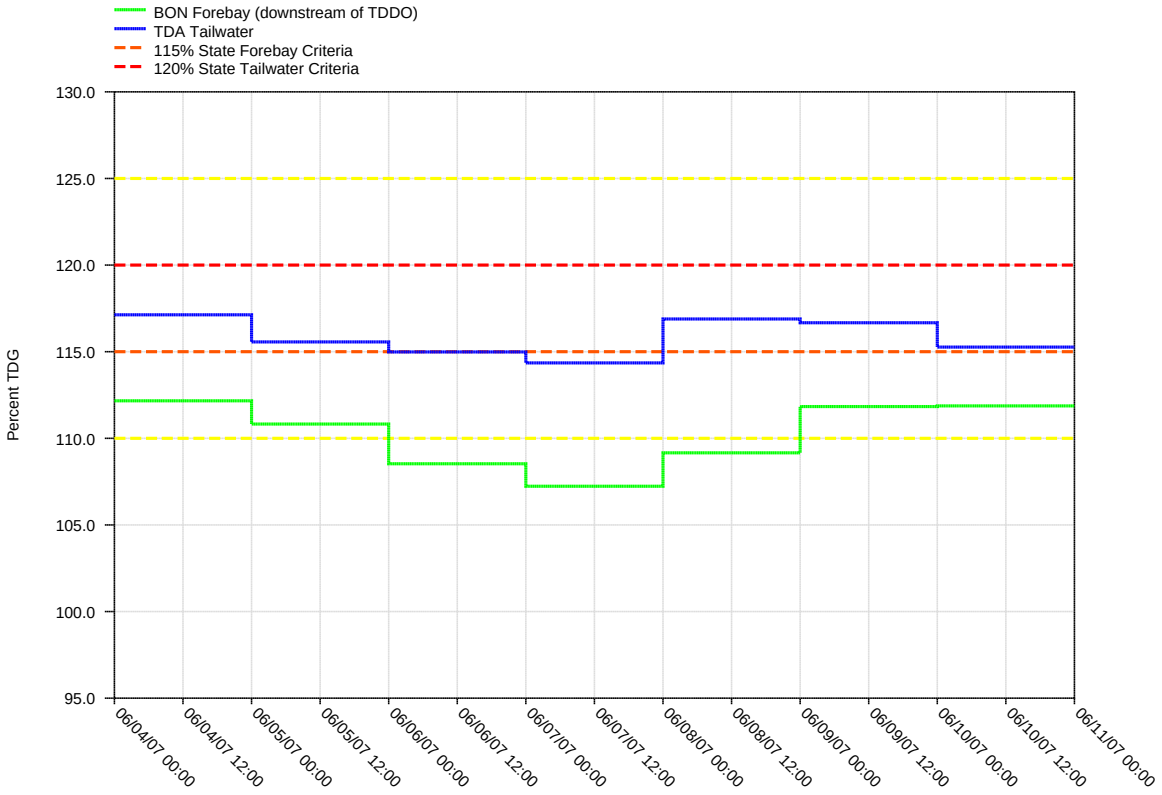


Figure 7.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

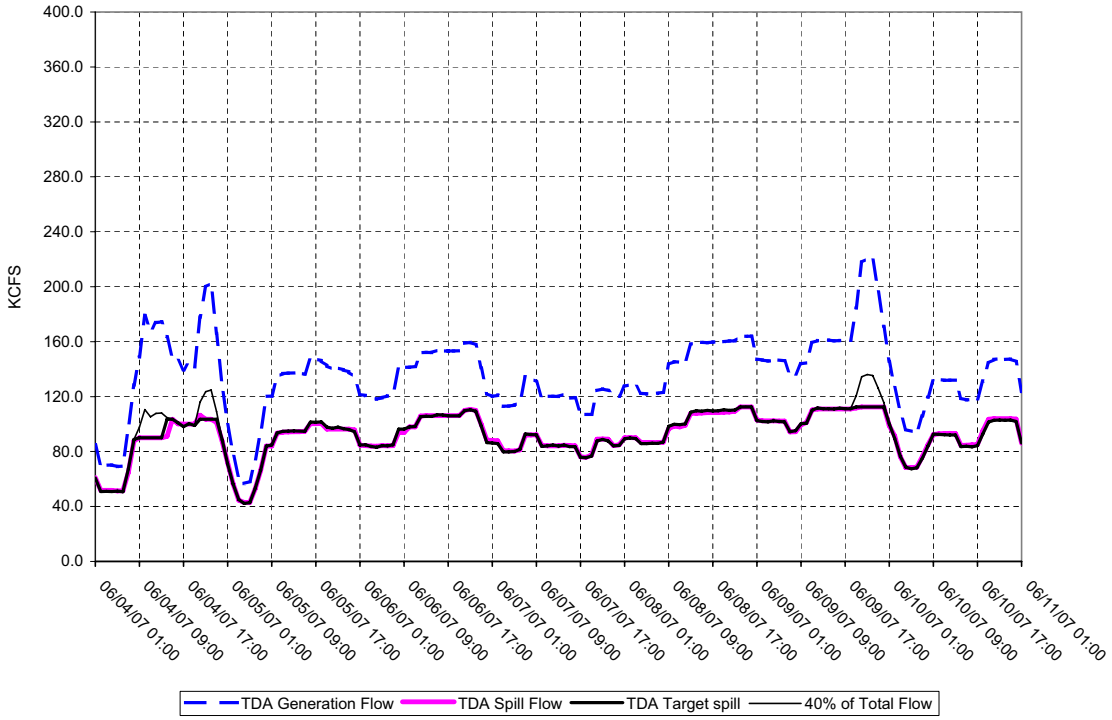
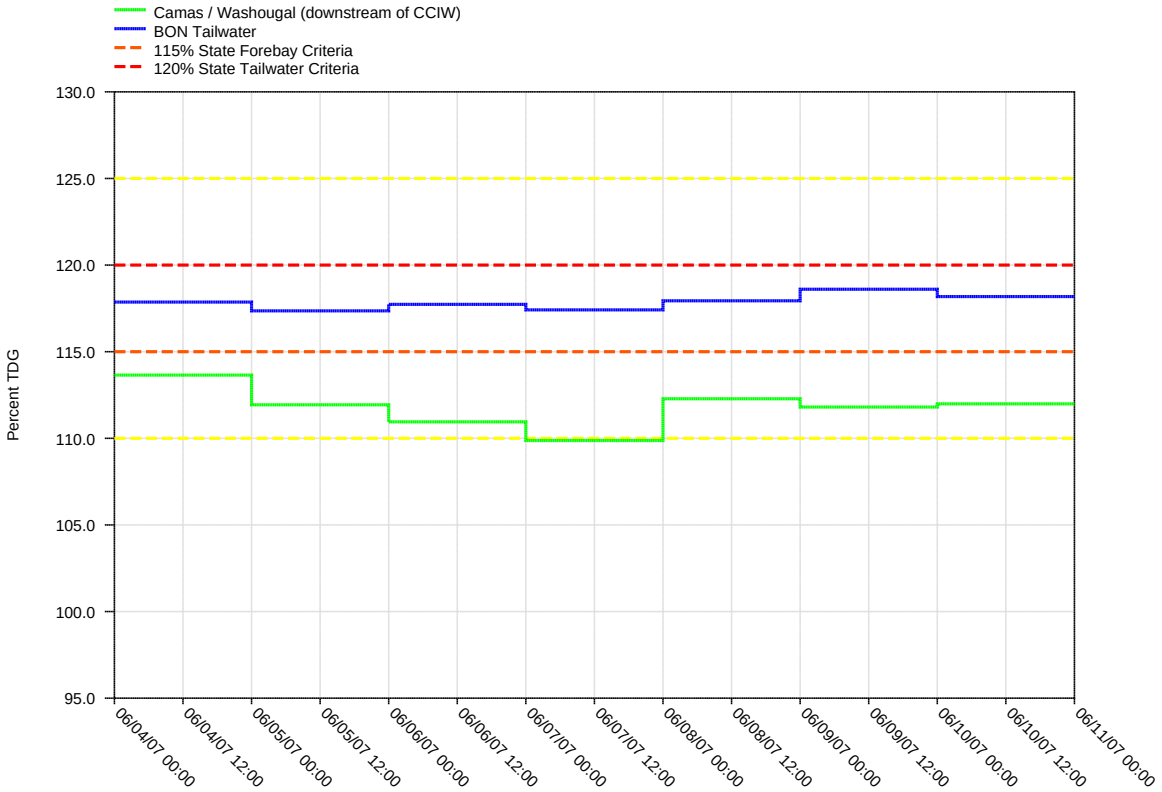


Figure 8.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

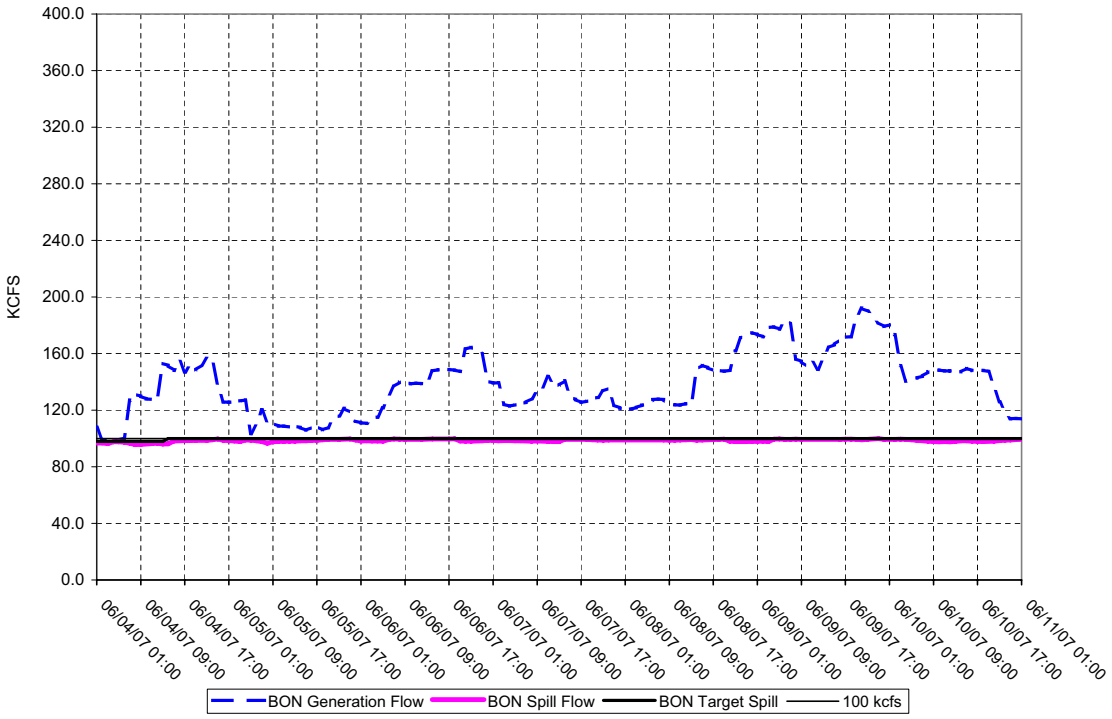
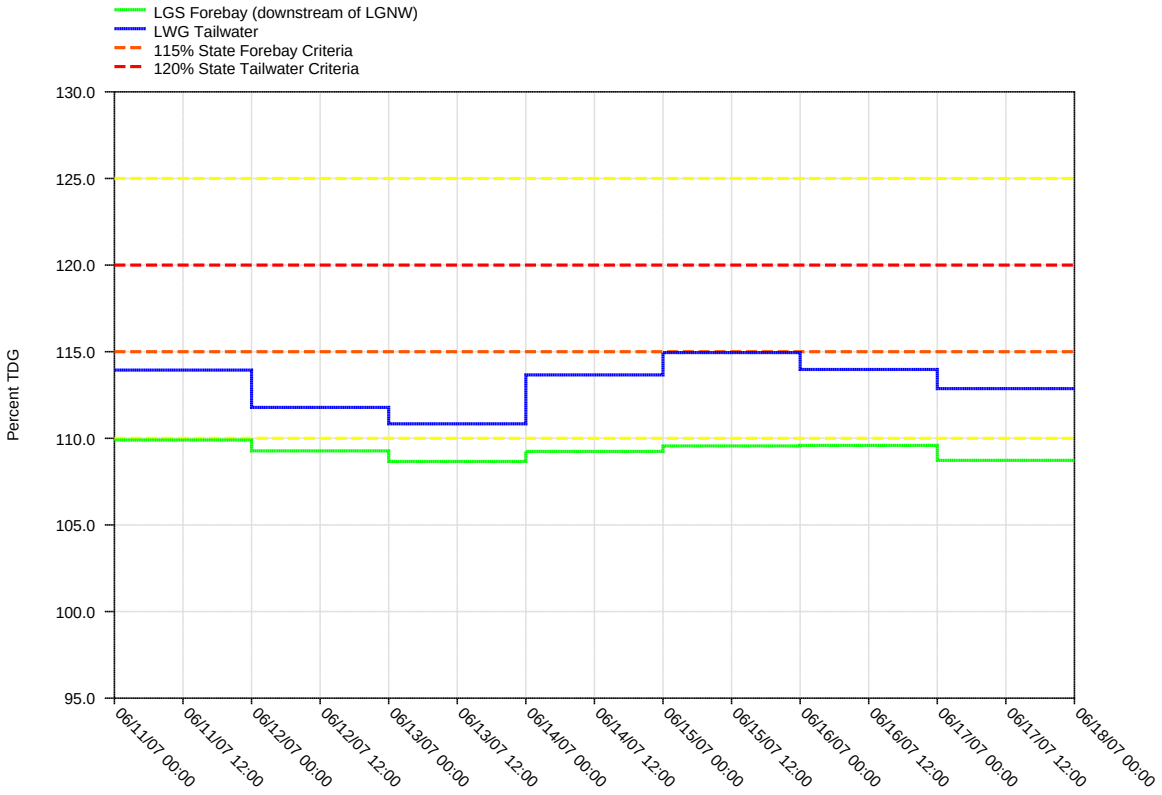


Figure 9.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

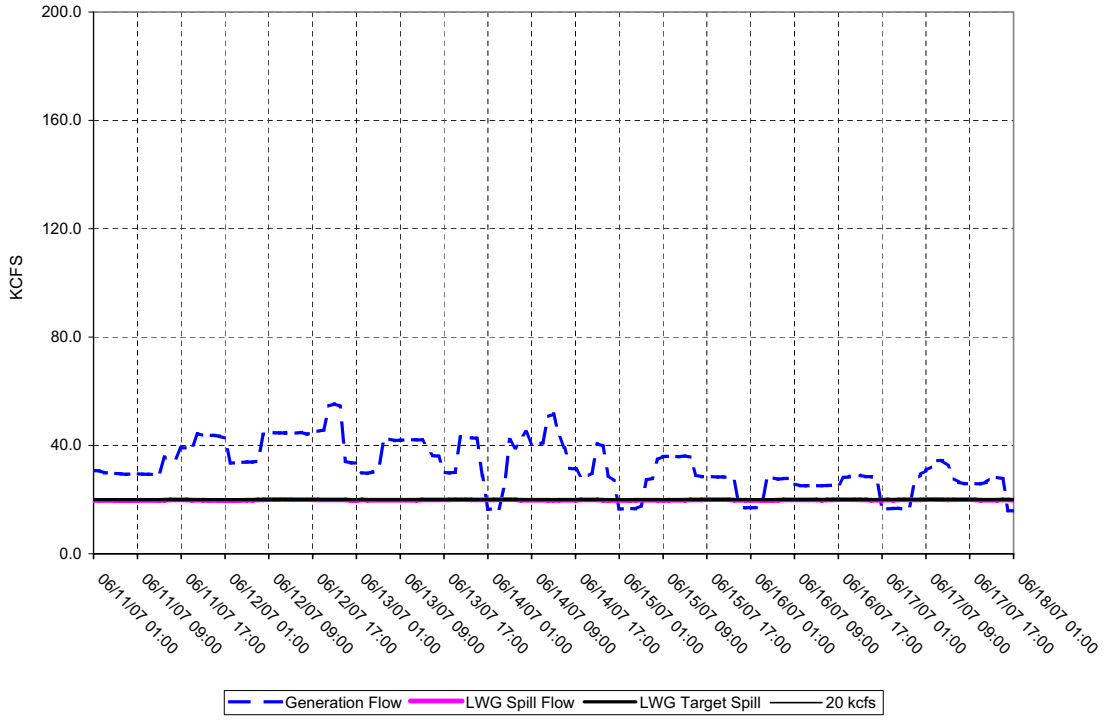
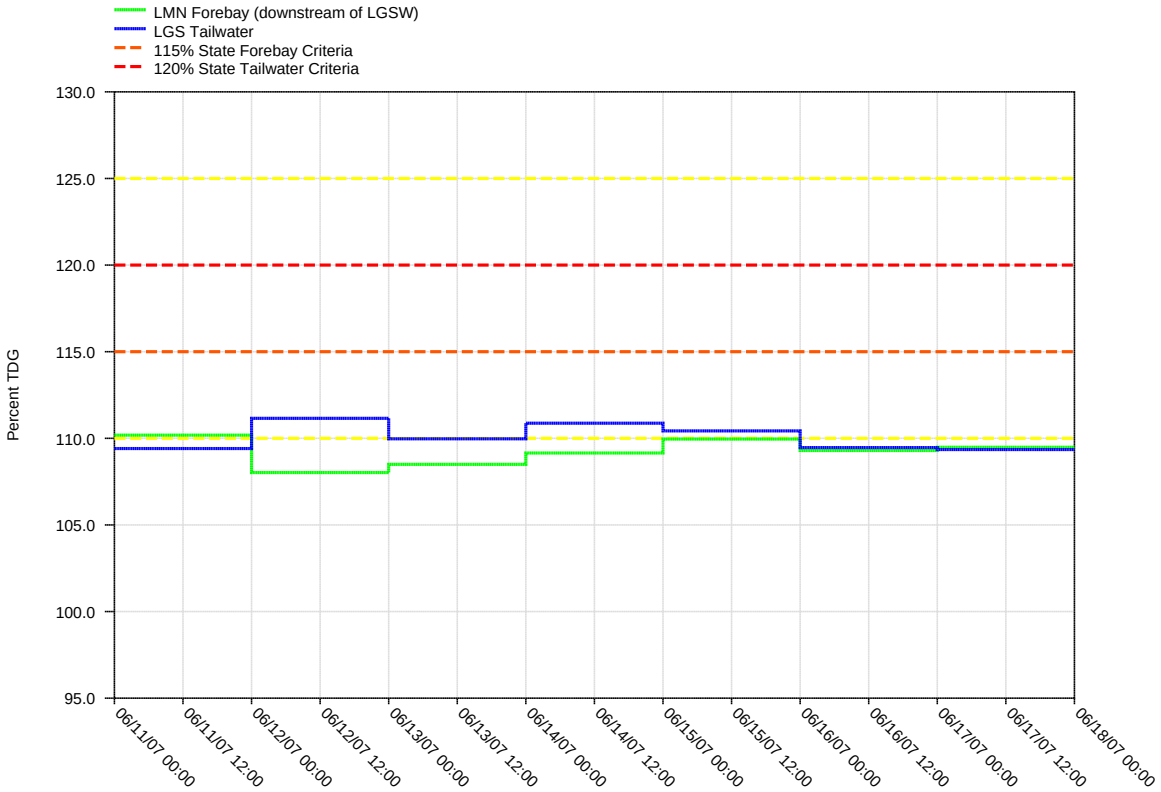


Figure 10.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

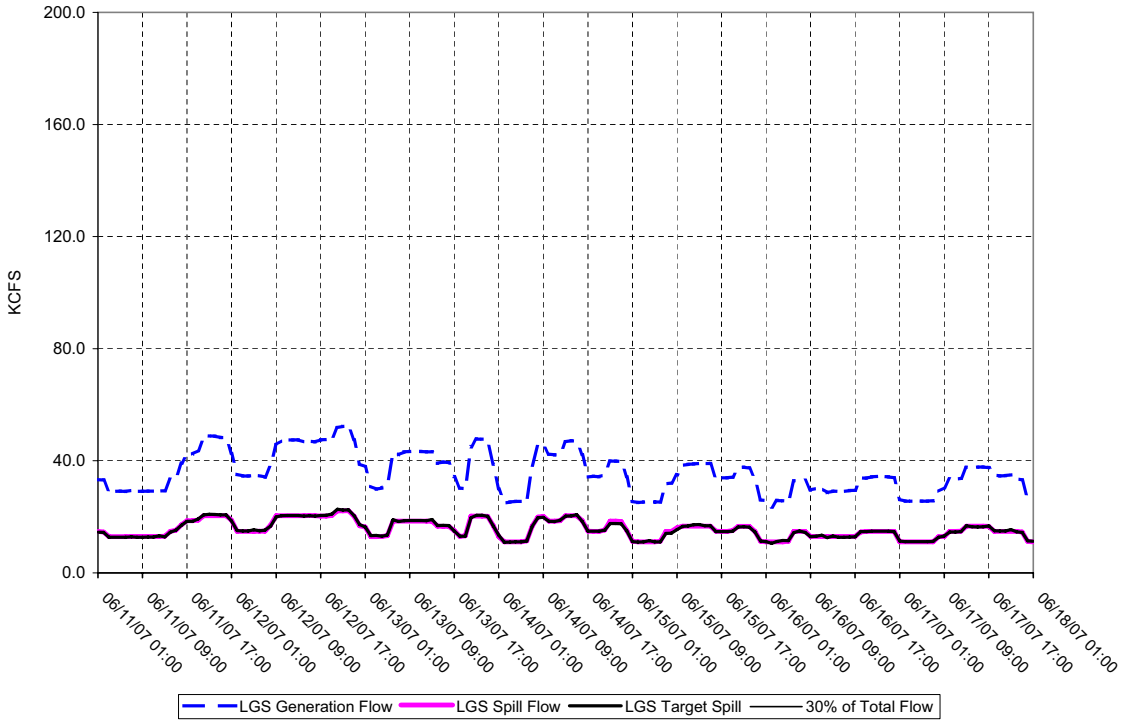
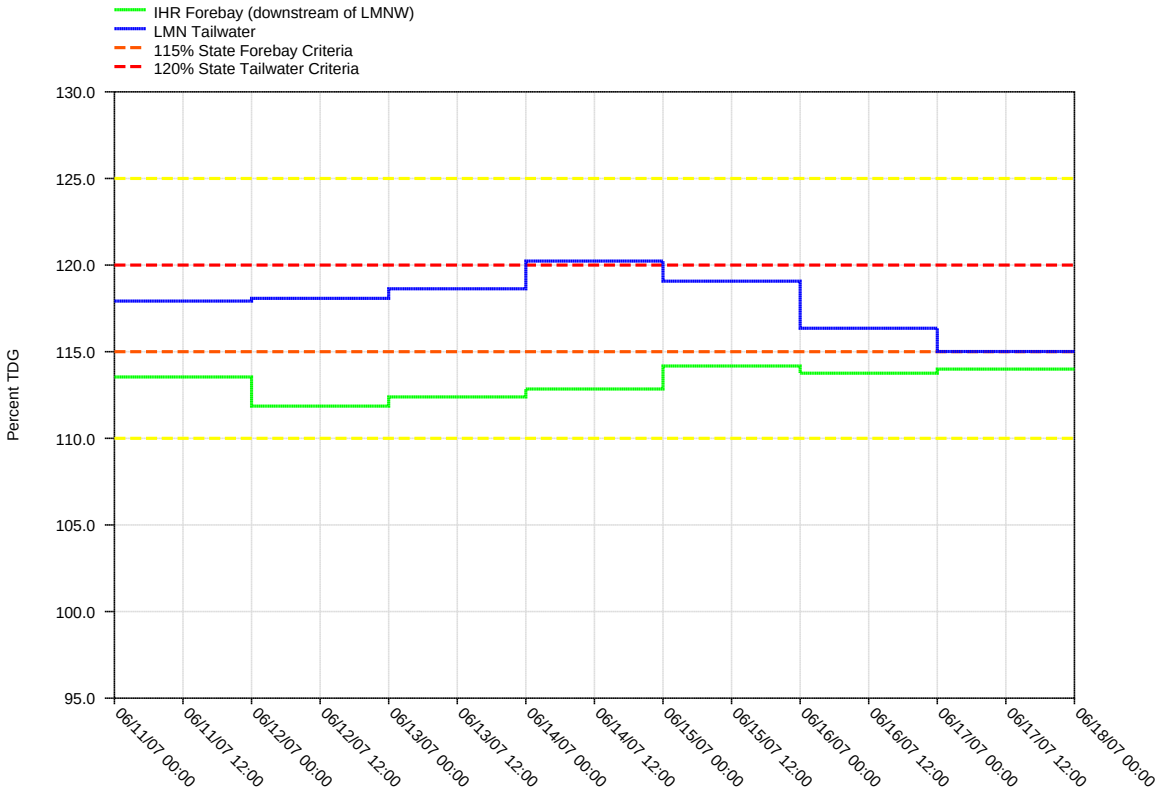


Figure 11.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

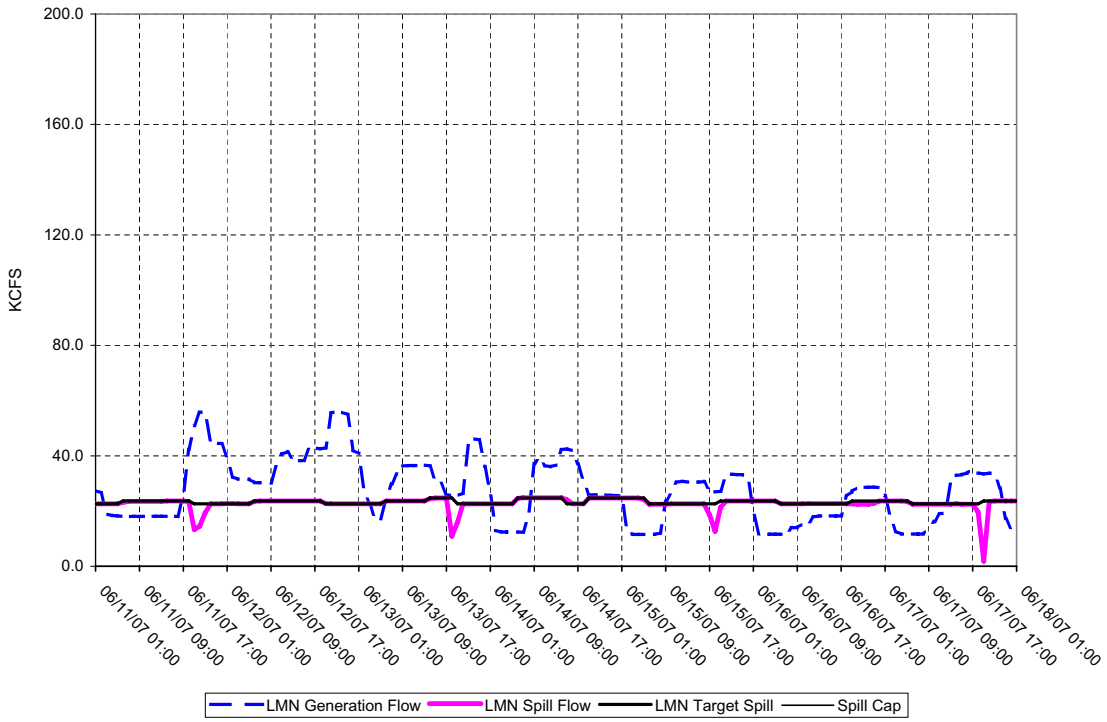
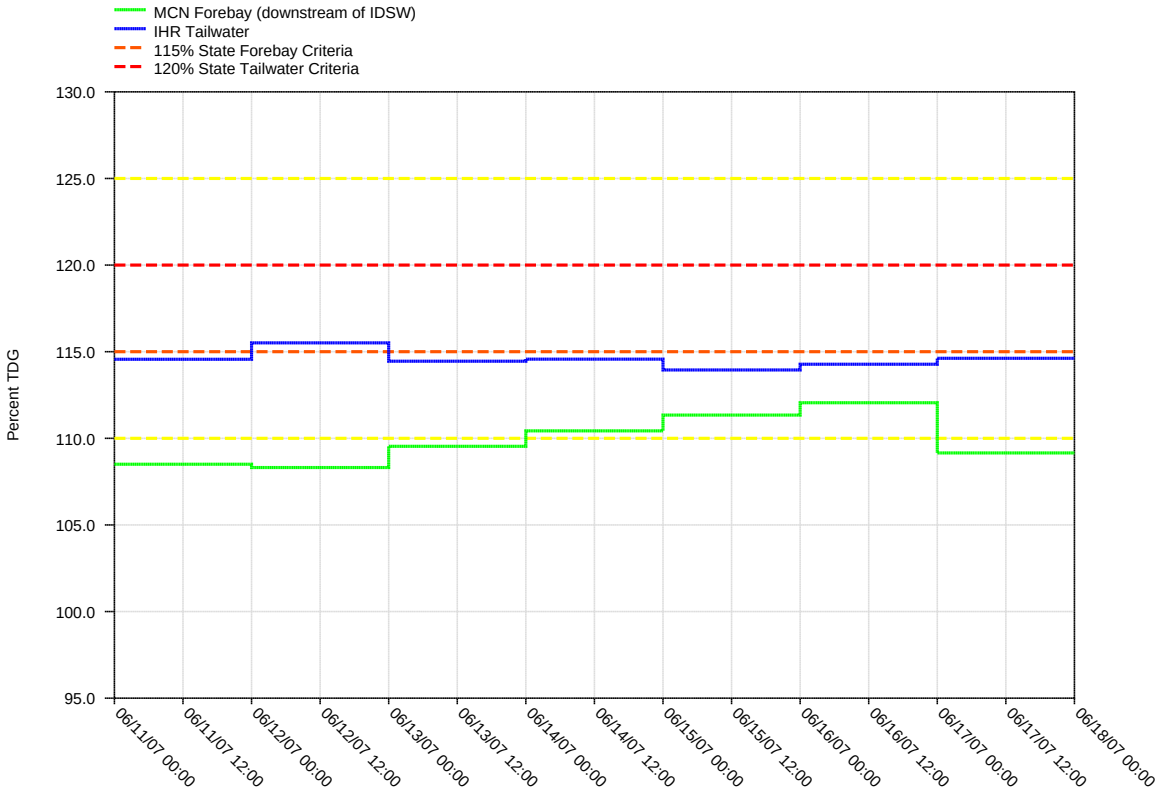


Figure 12.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

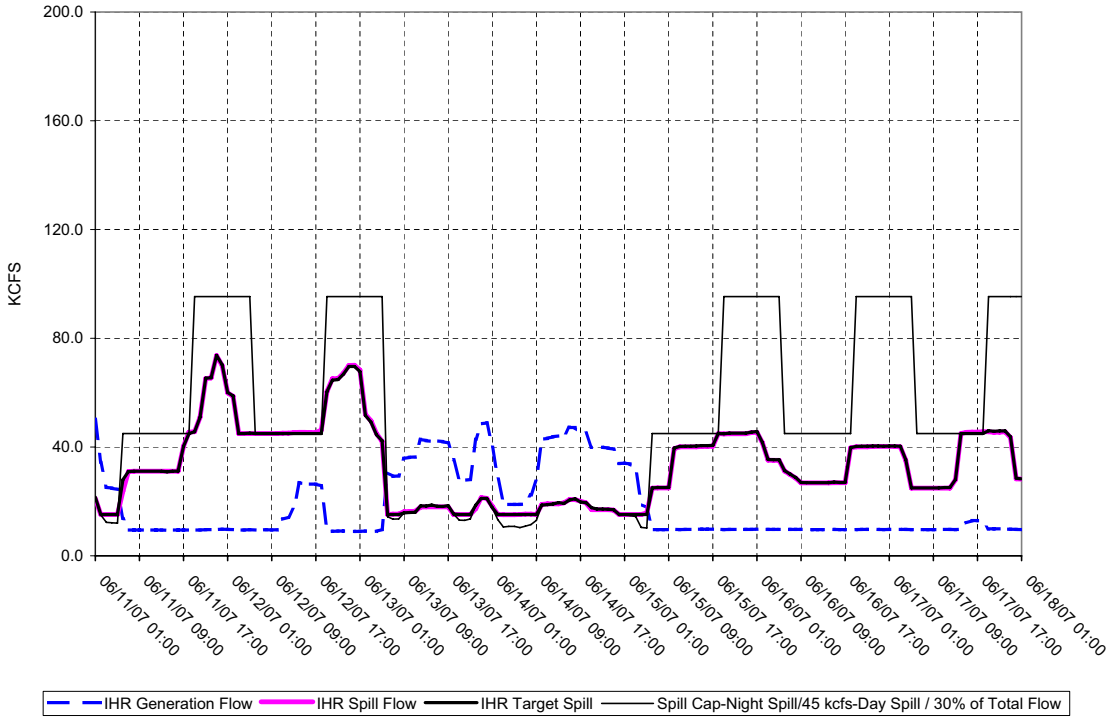
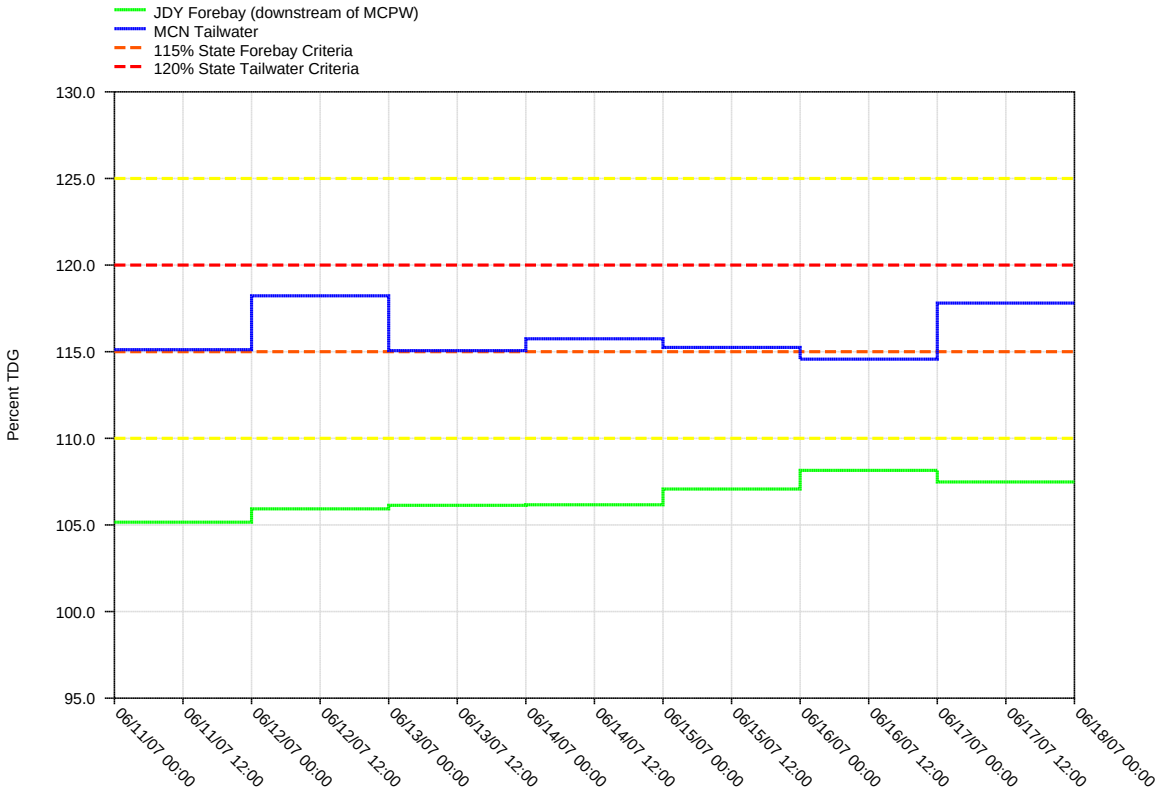


Figure 13.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

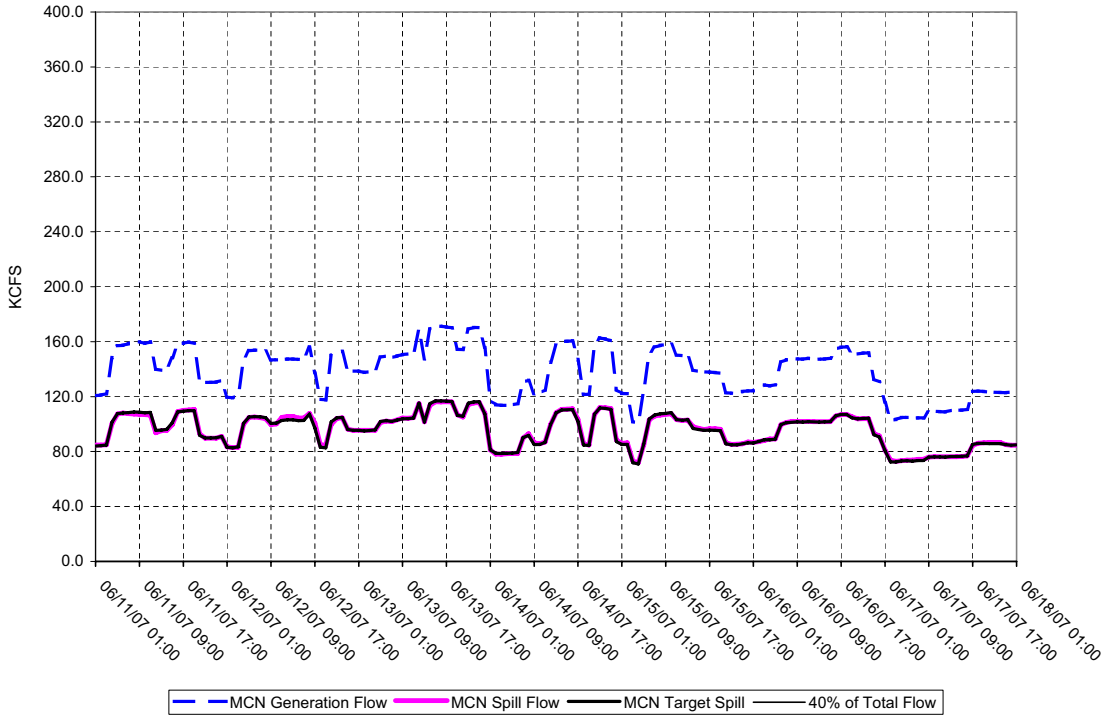
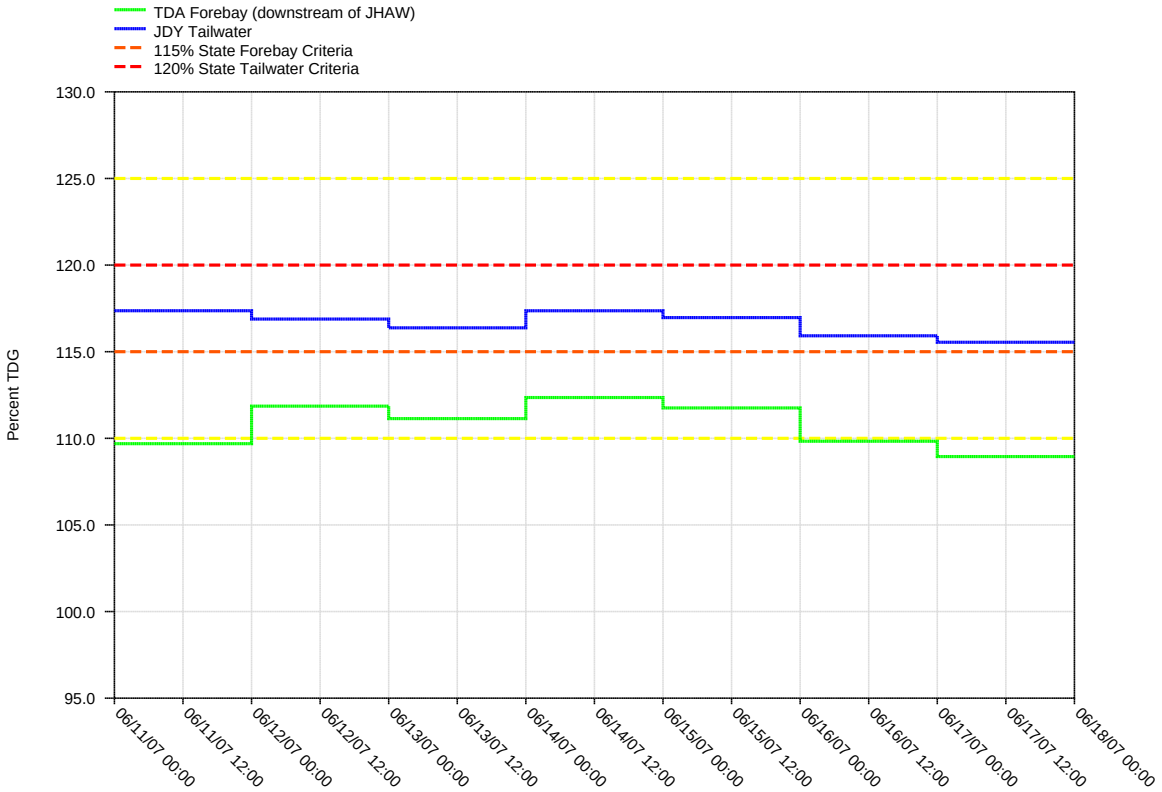


Figure 14.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

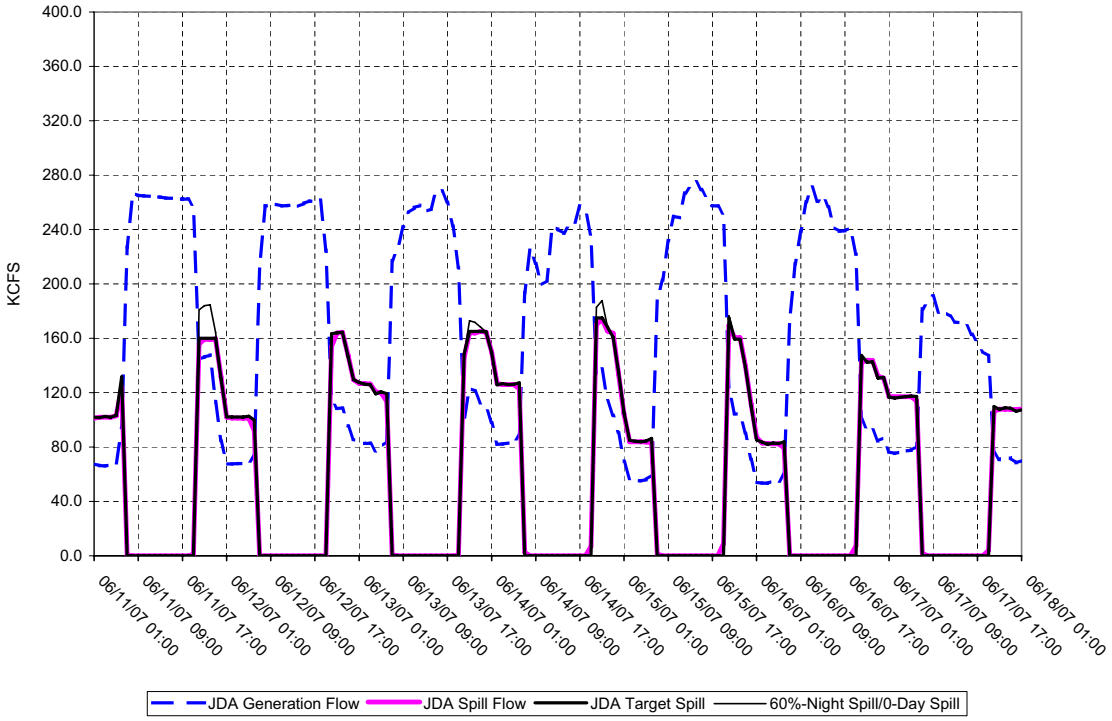
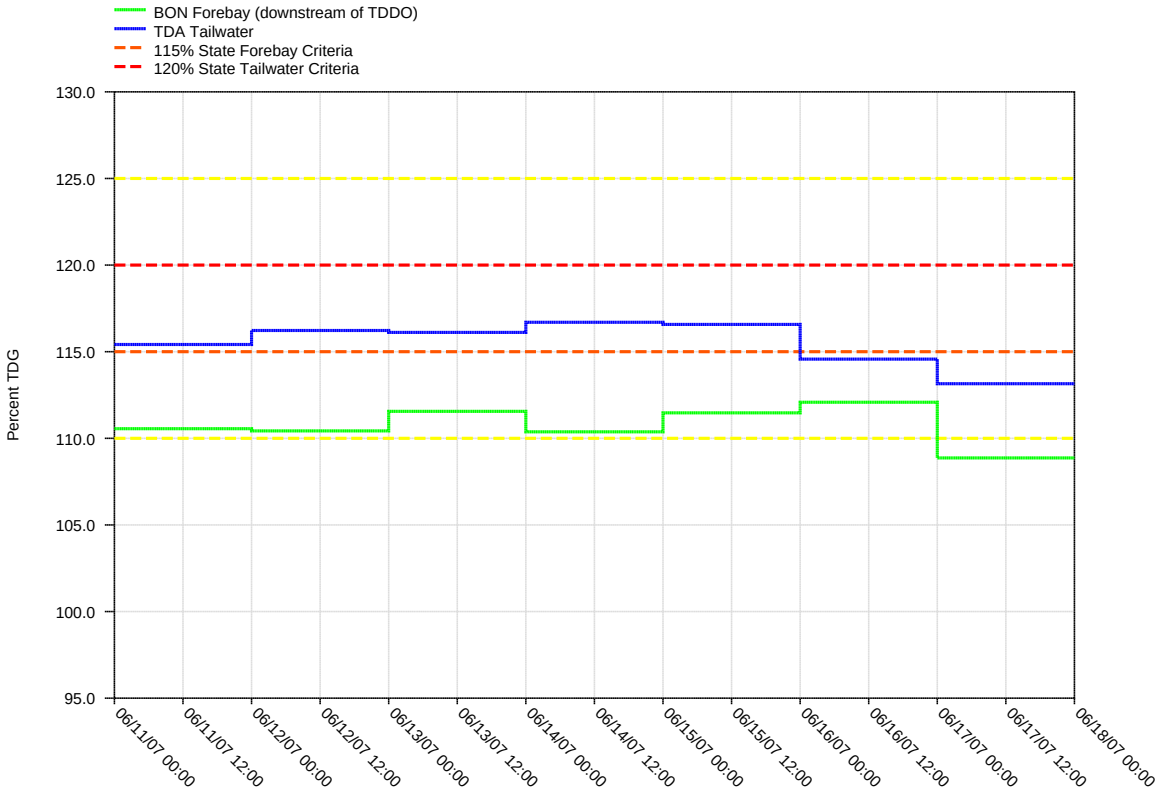


Figure 15.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

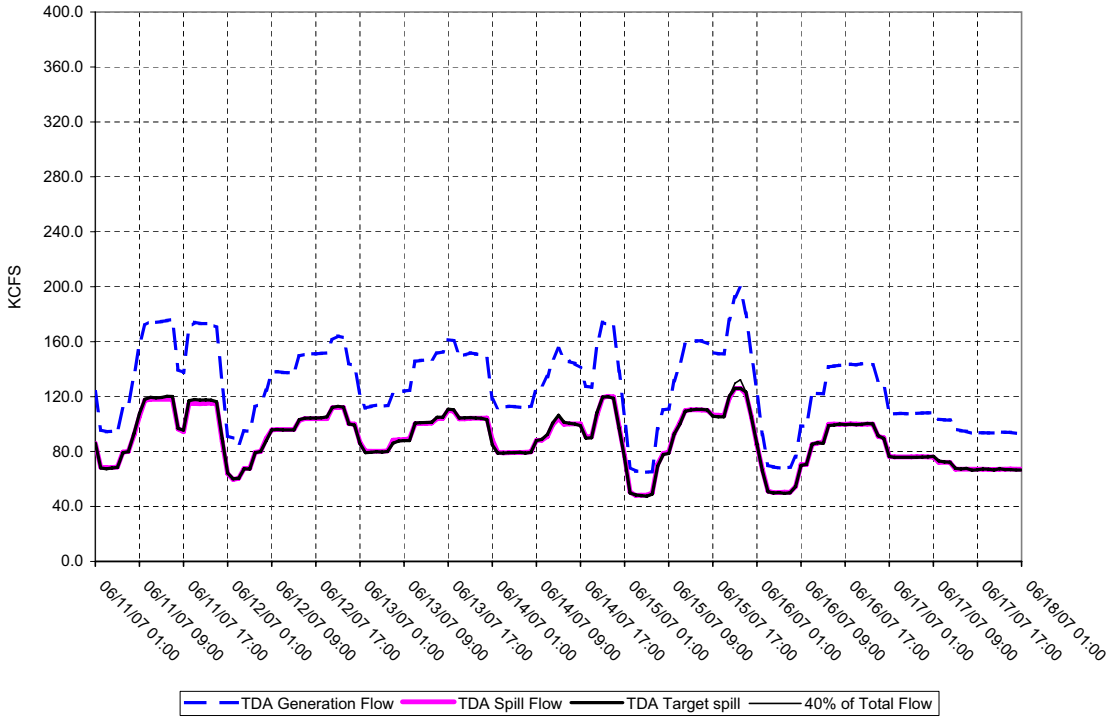
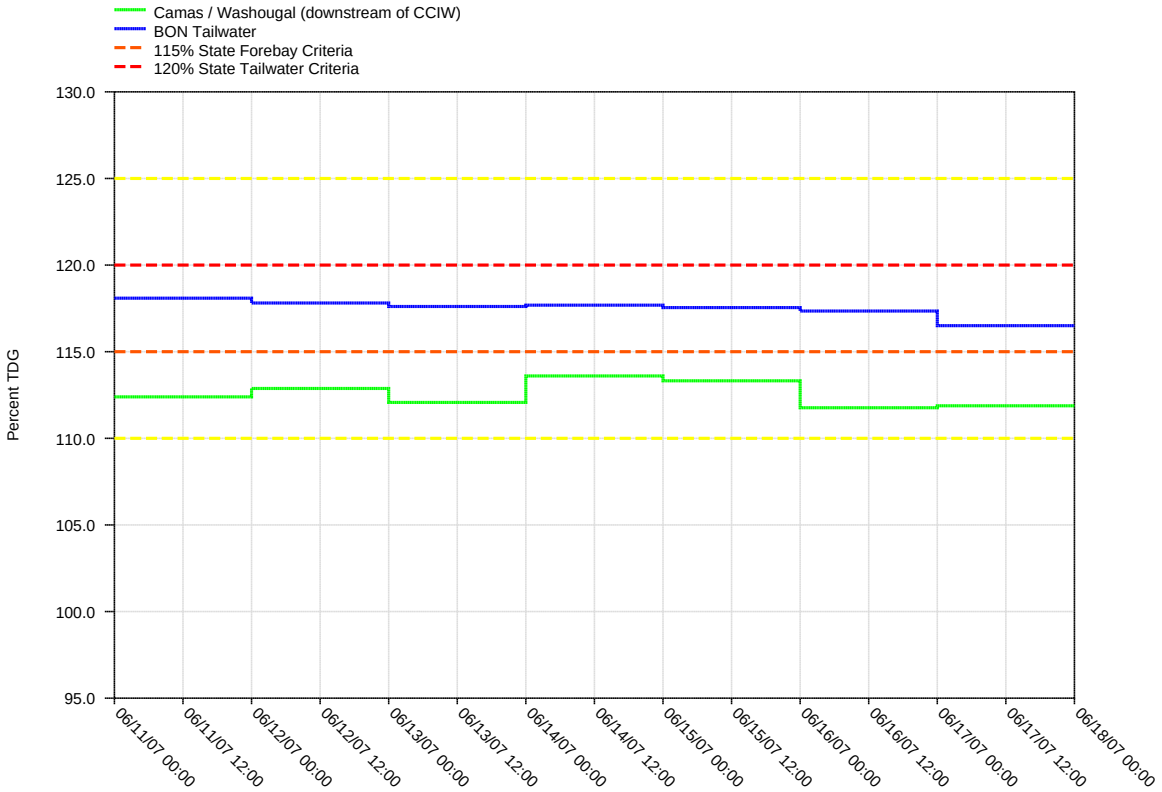


Figure 16.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

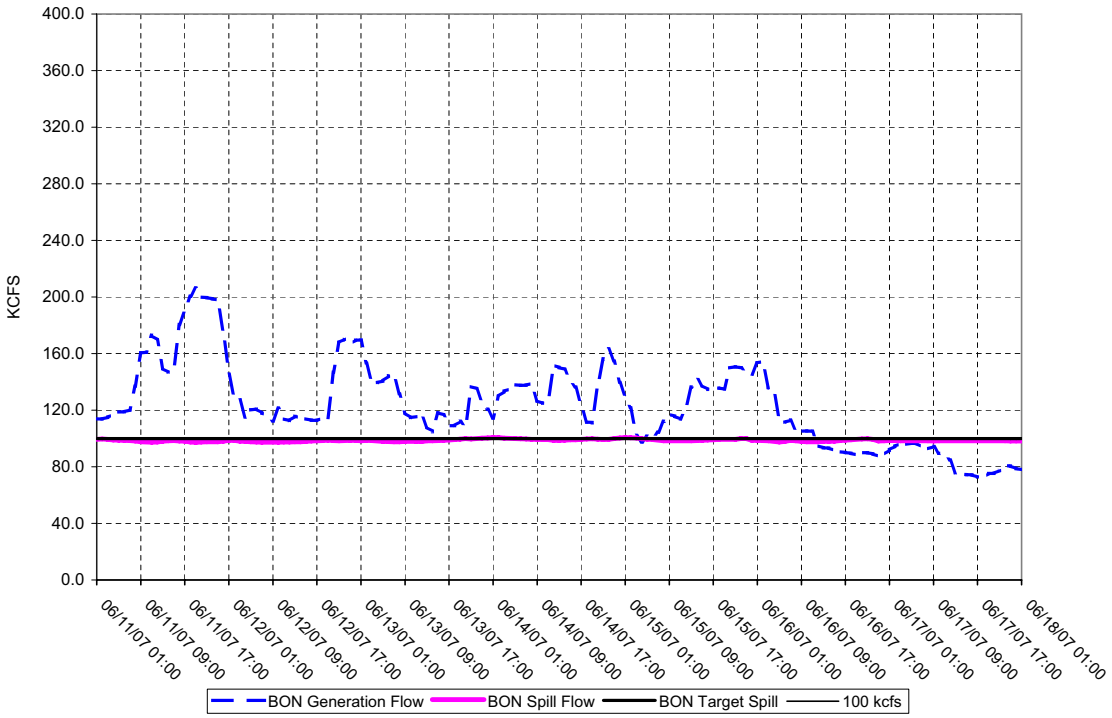
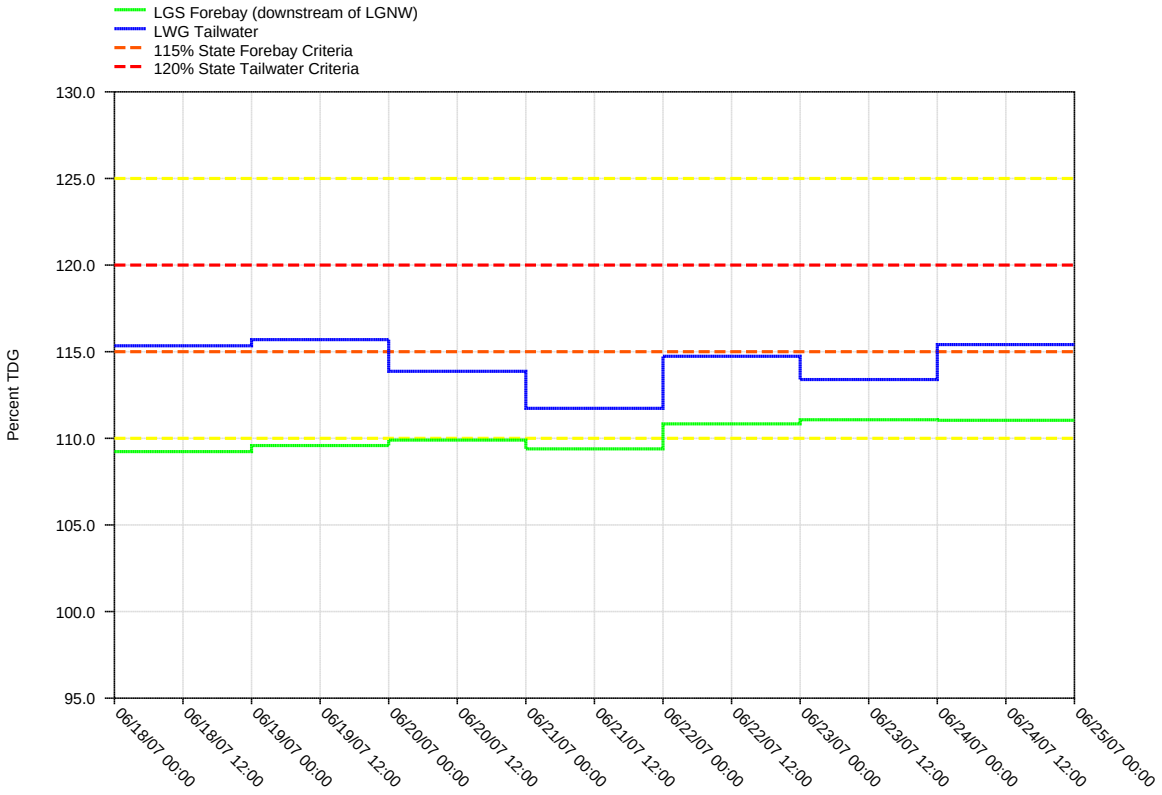


Figure 17.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

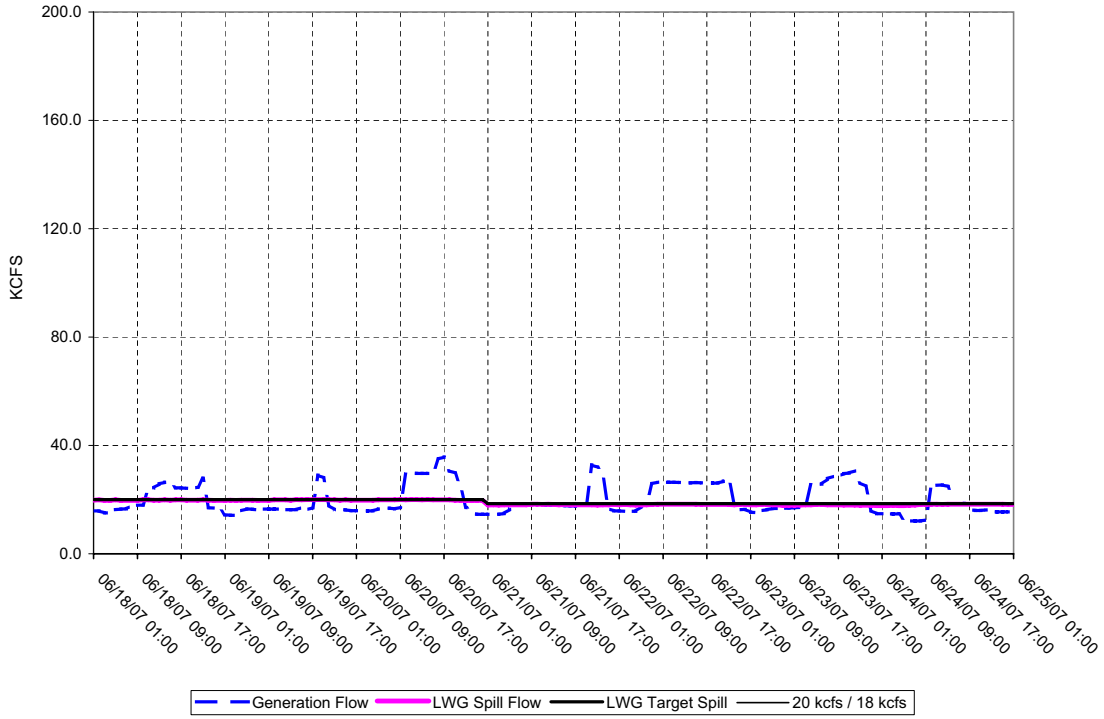
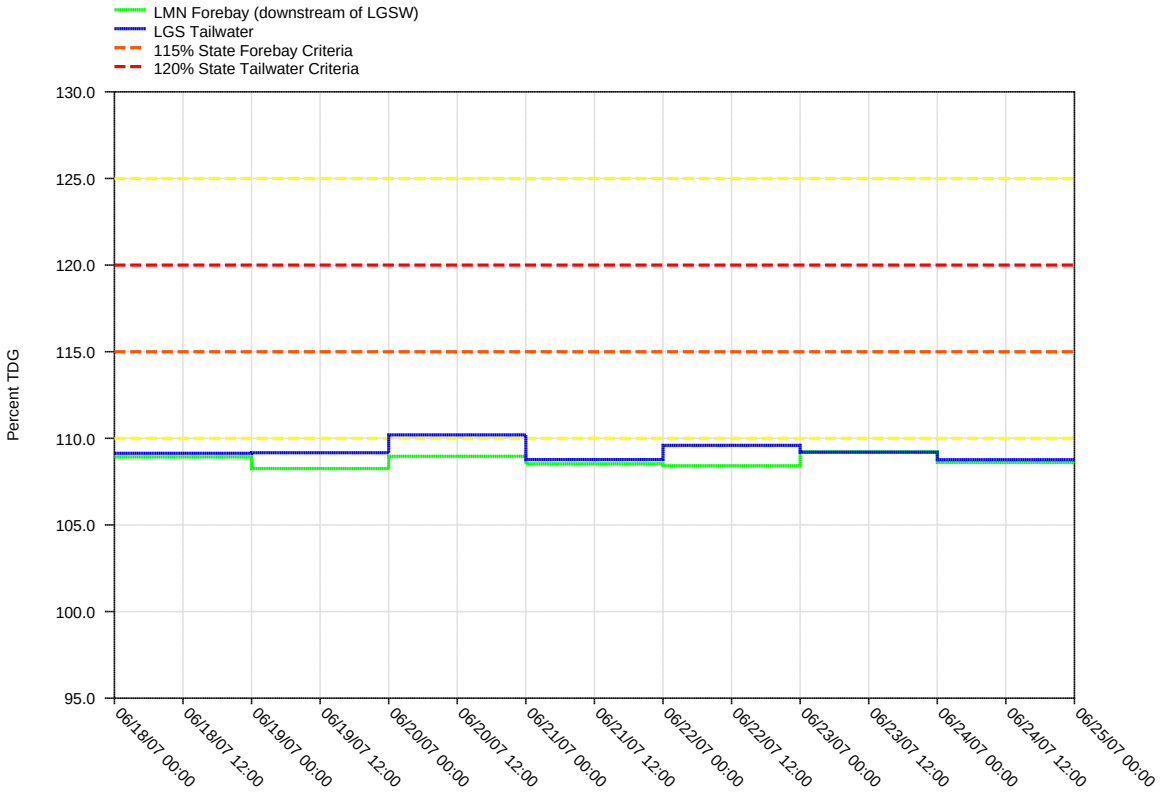


Figure 18.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

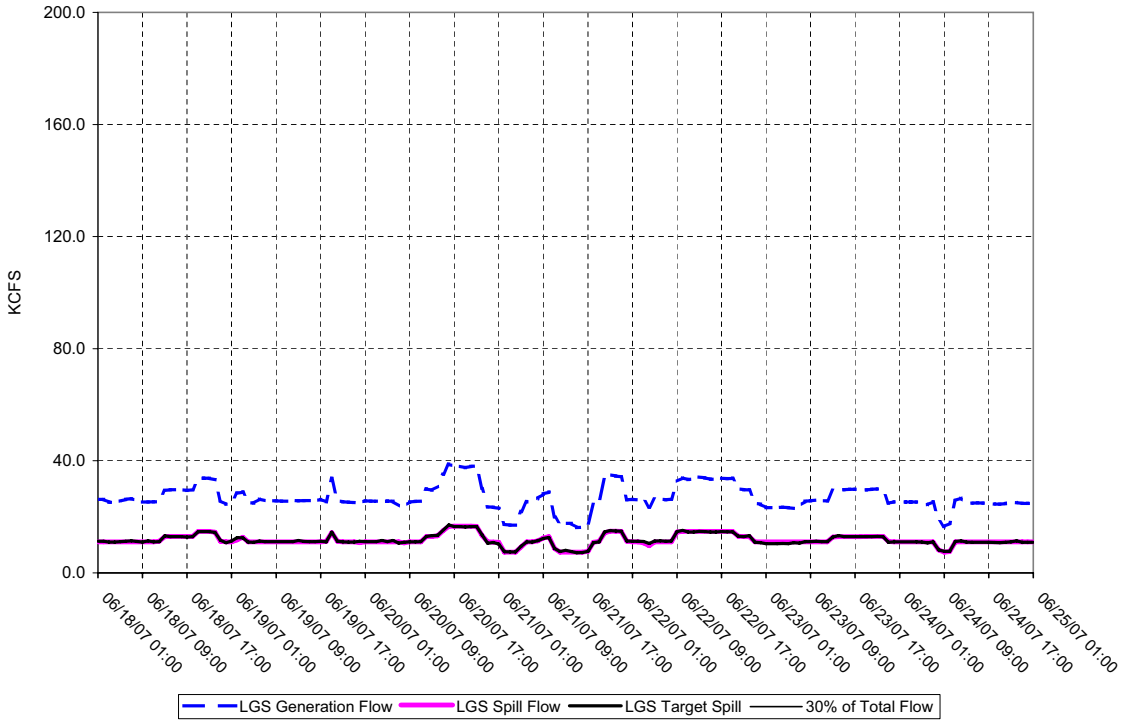
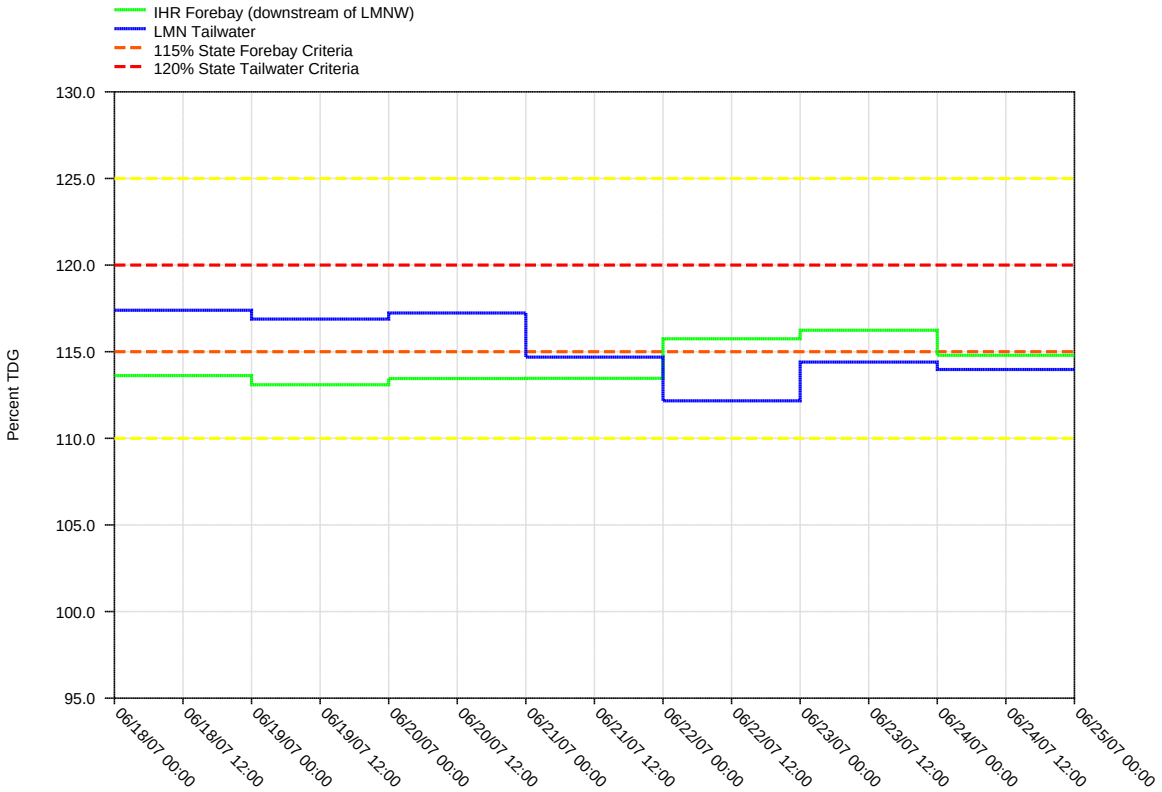


Figure 19.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

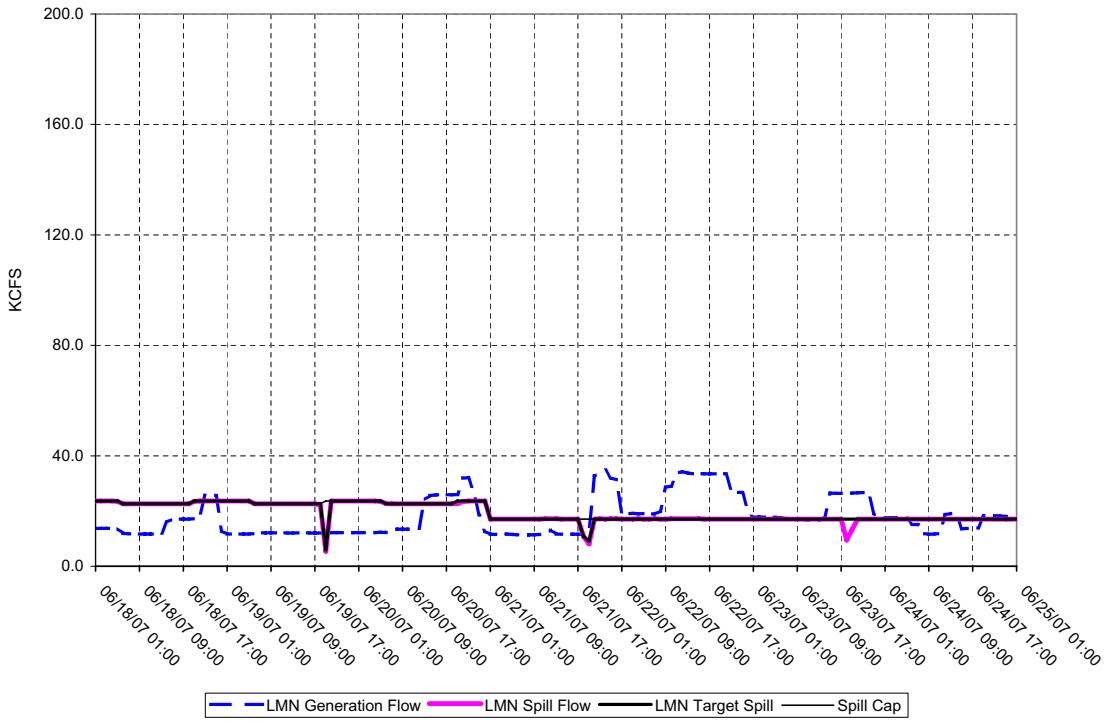
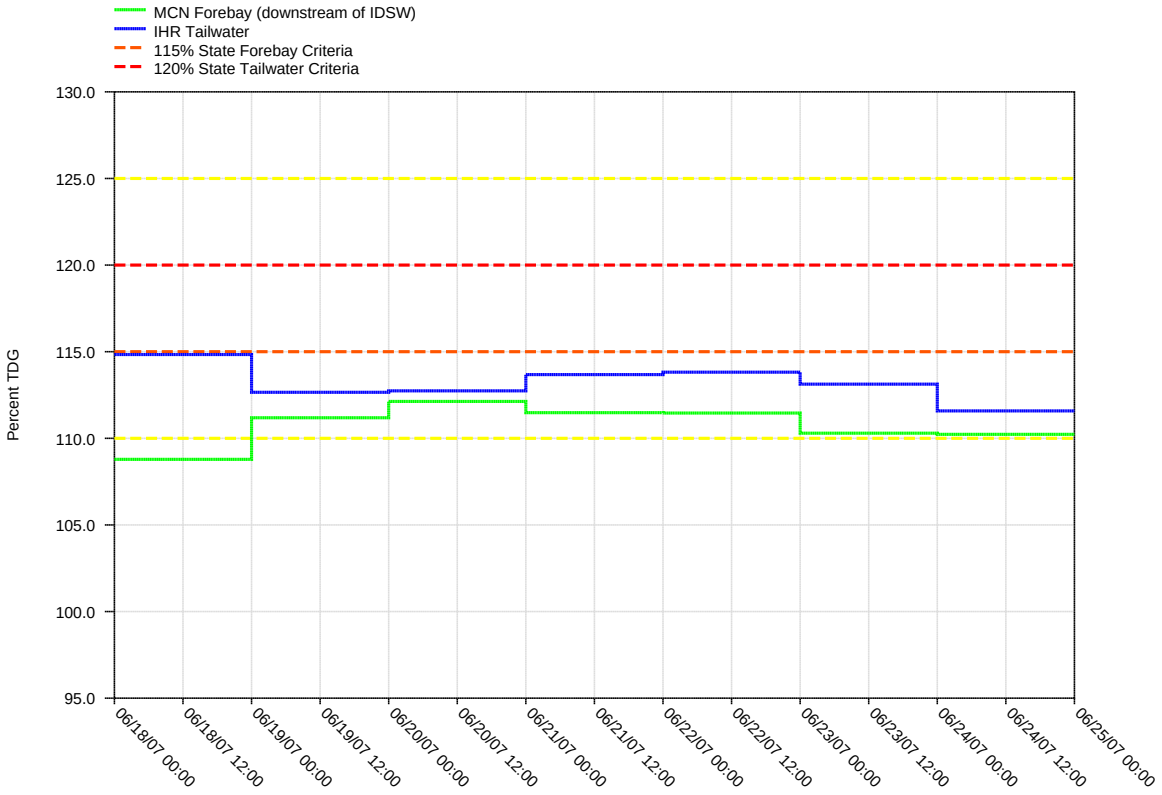


Figure 20.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

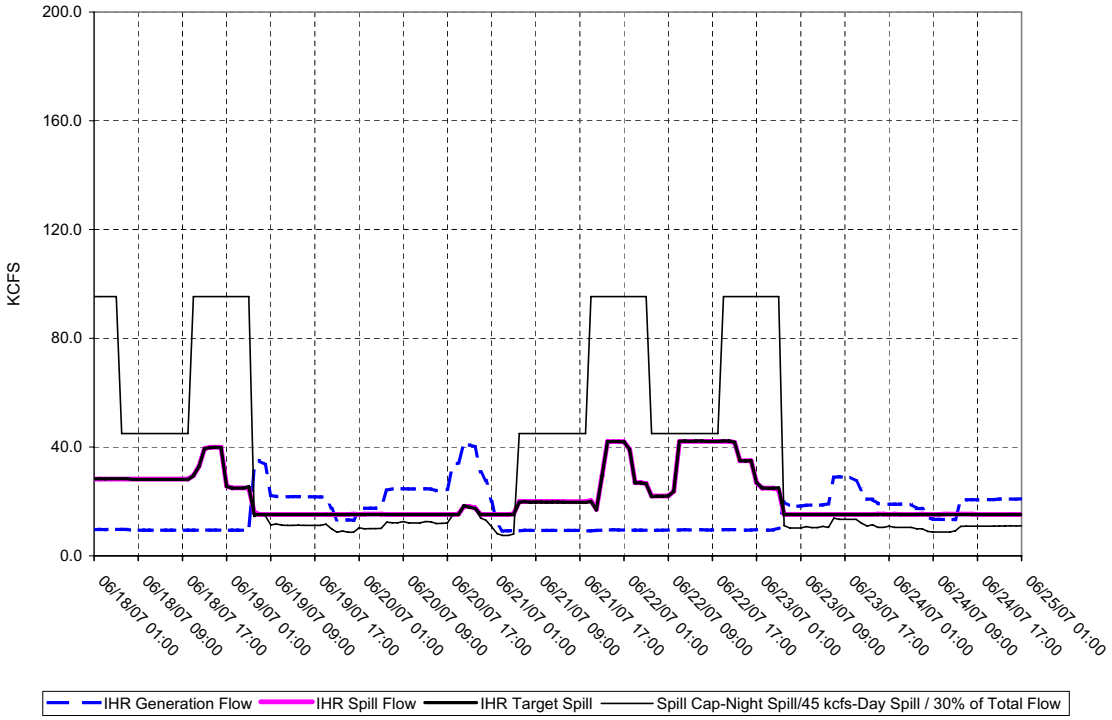
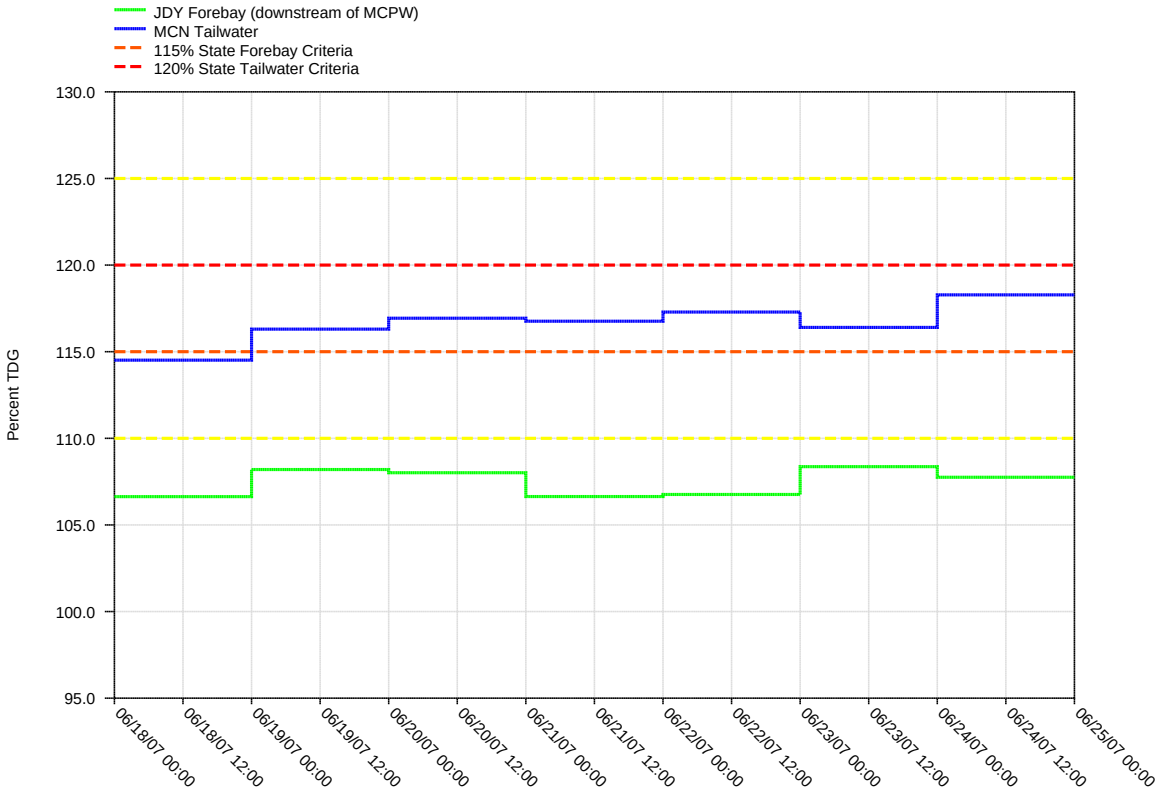


Figure 21.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

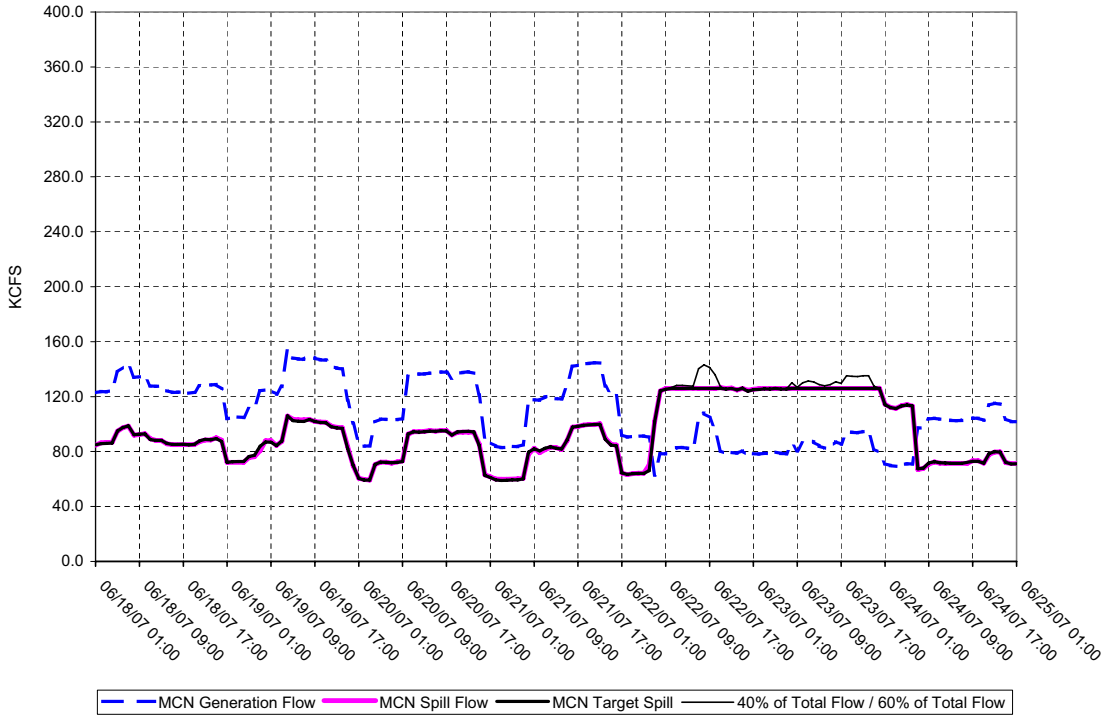
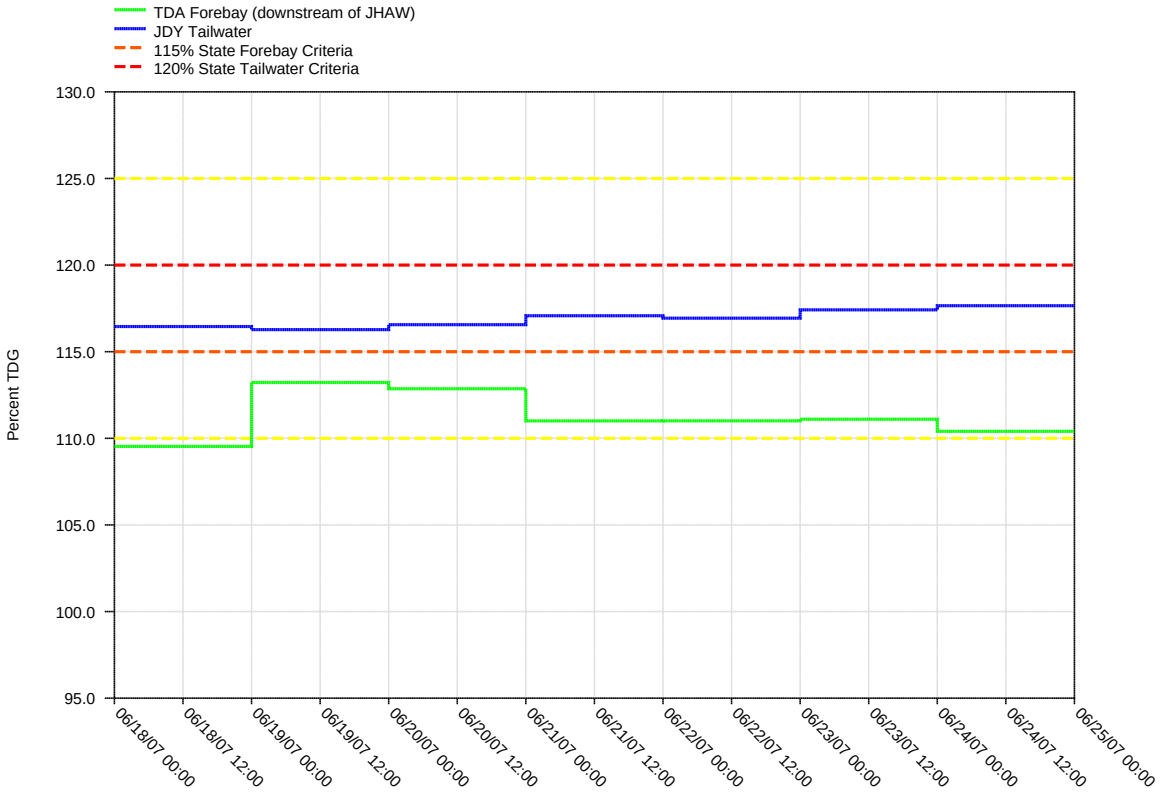


Figure 22.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

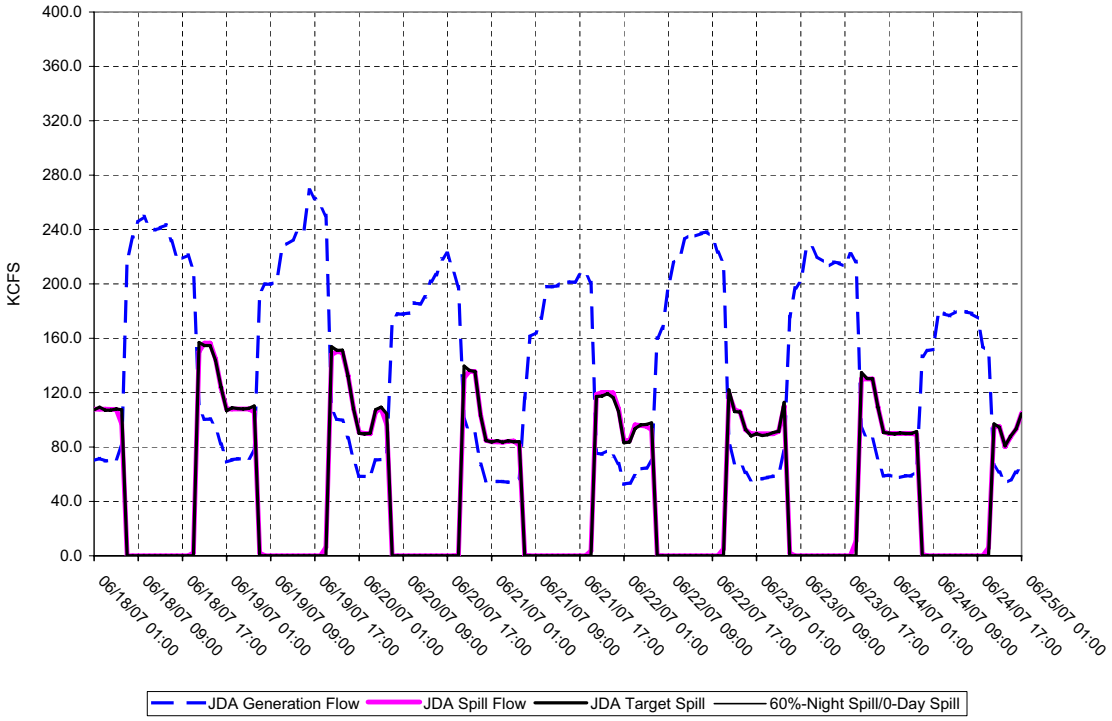
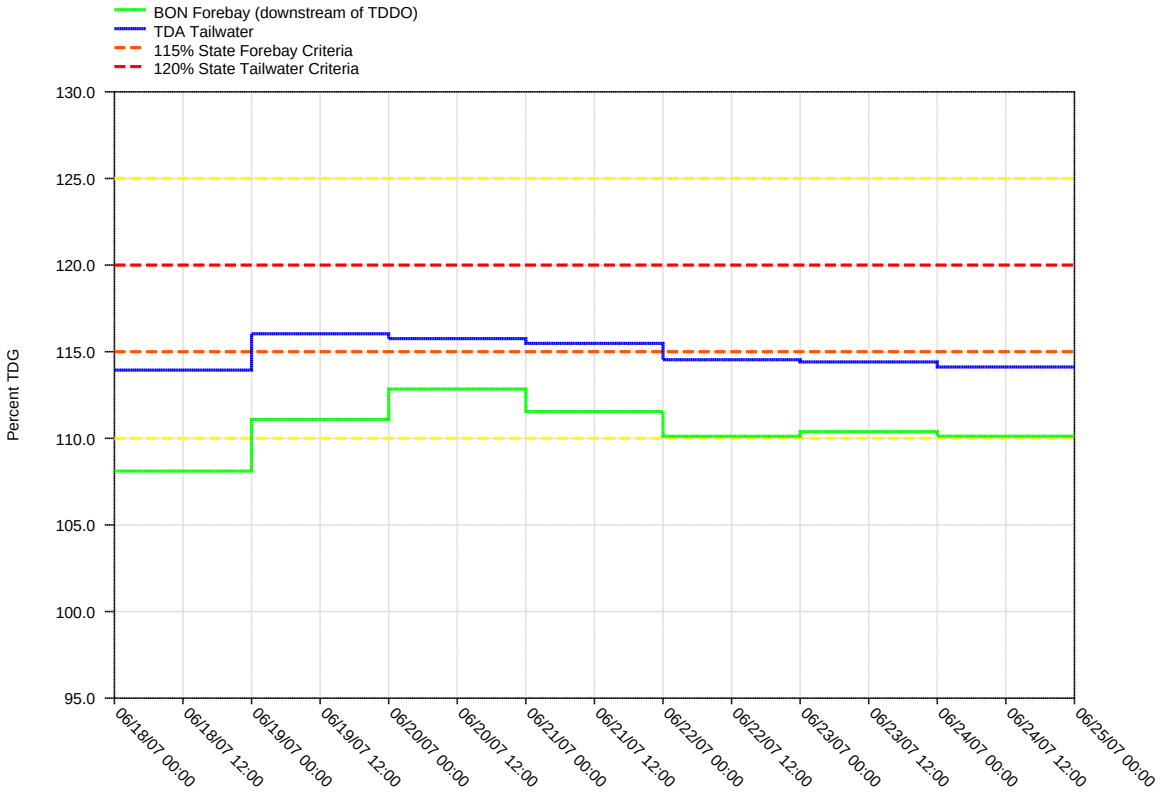


Figure 23.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

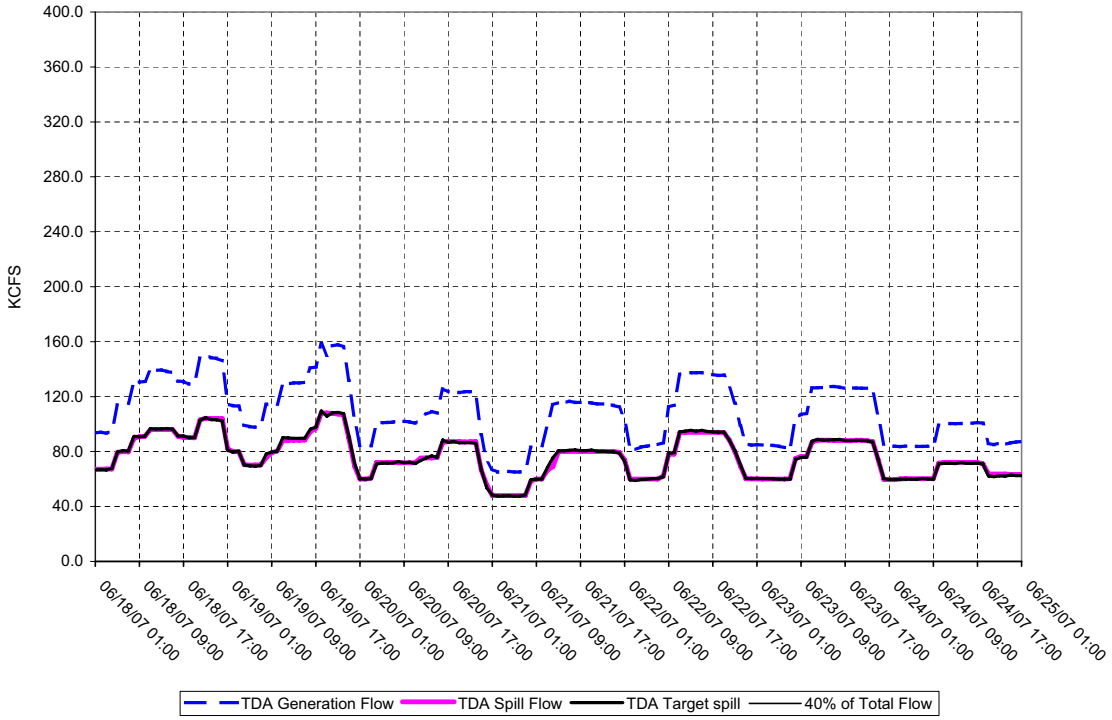
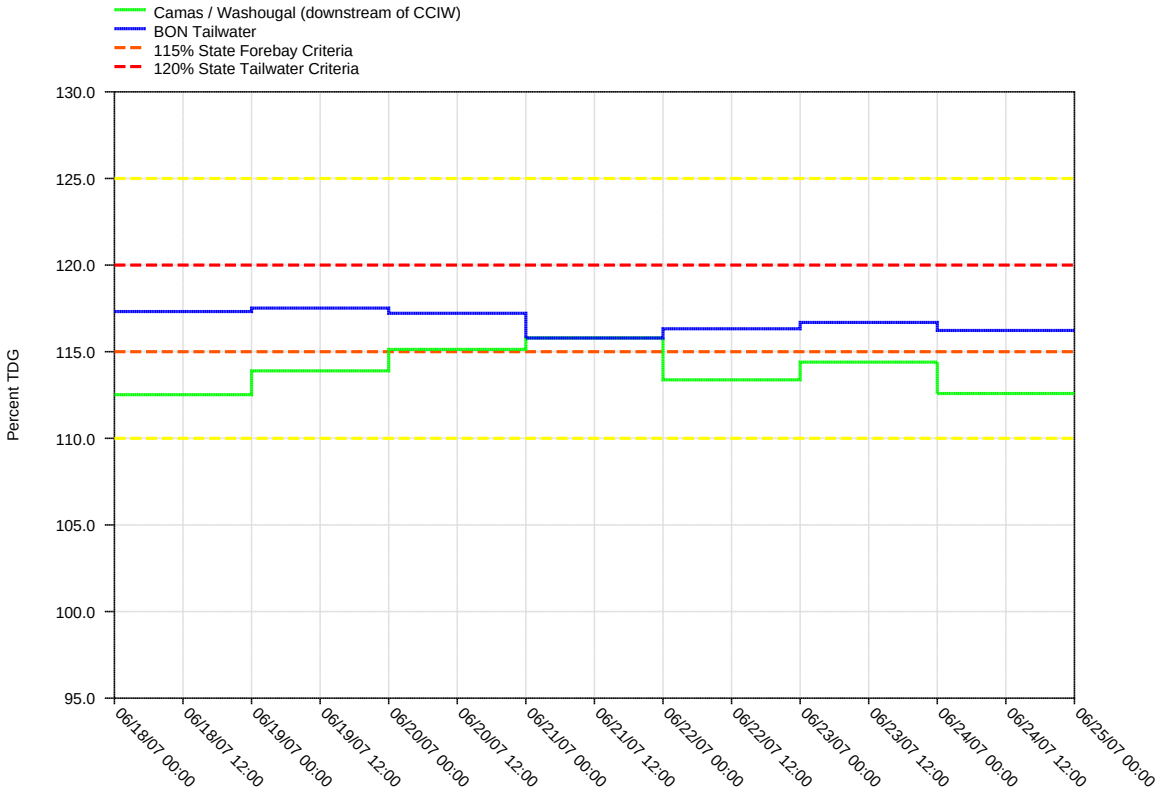


Figure 24.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

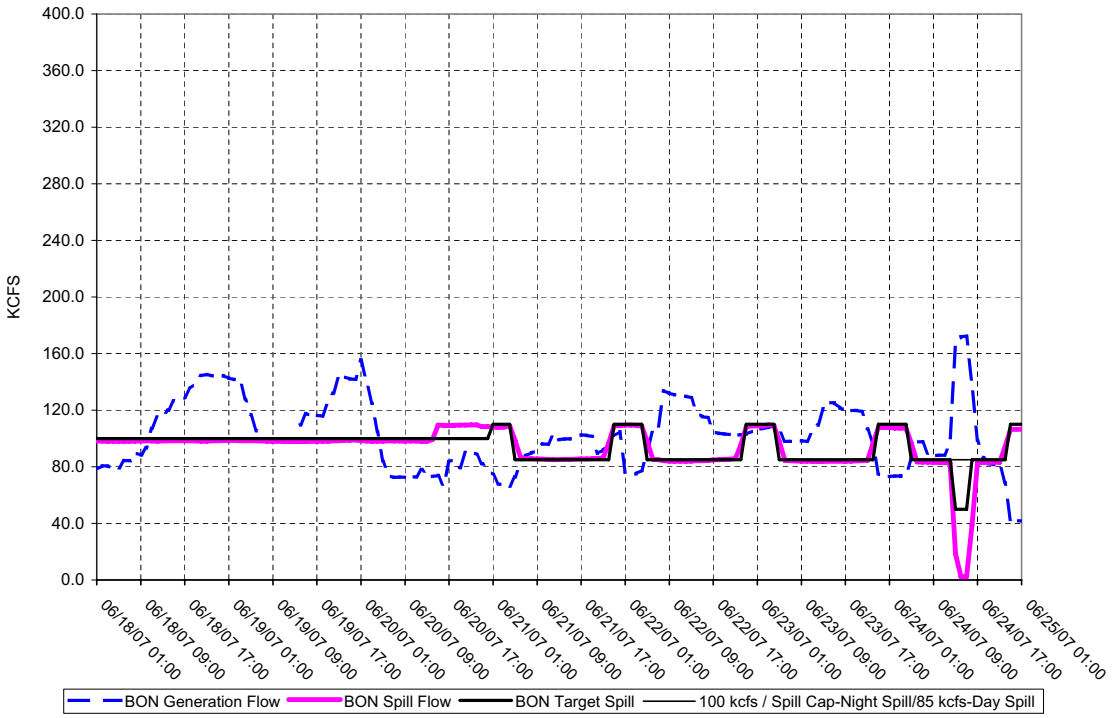
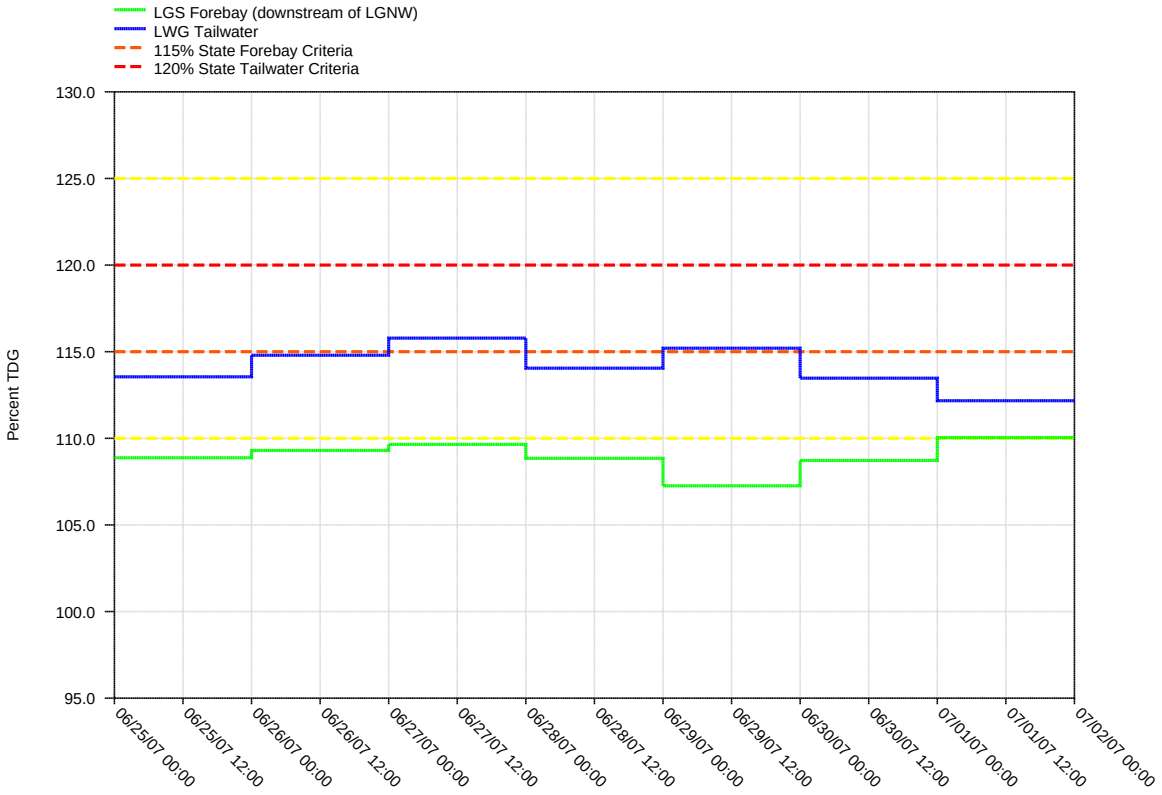


Figure 25.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

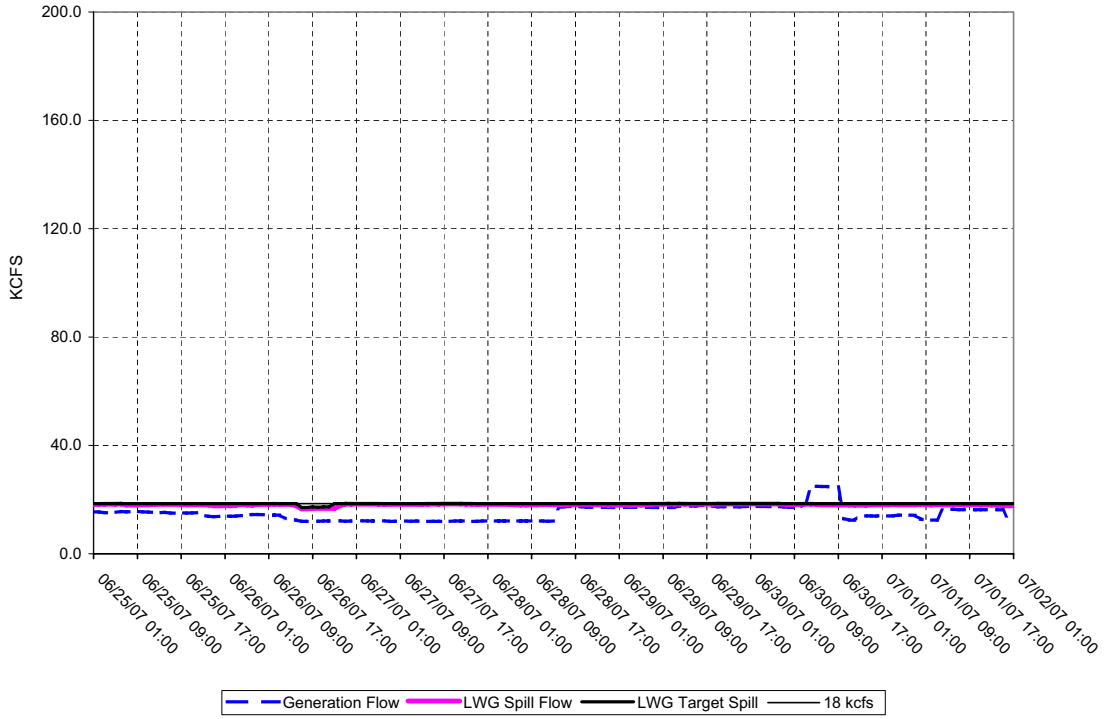
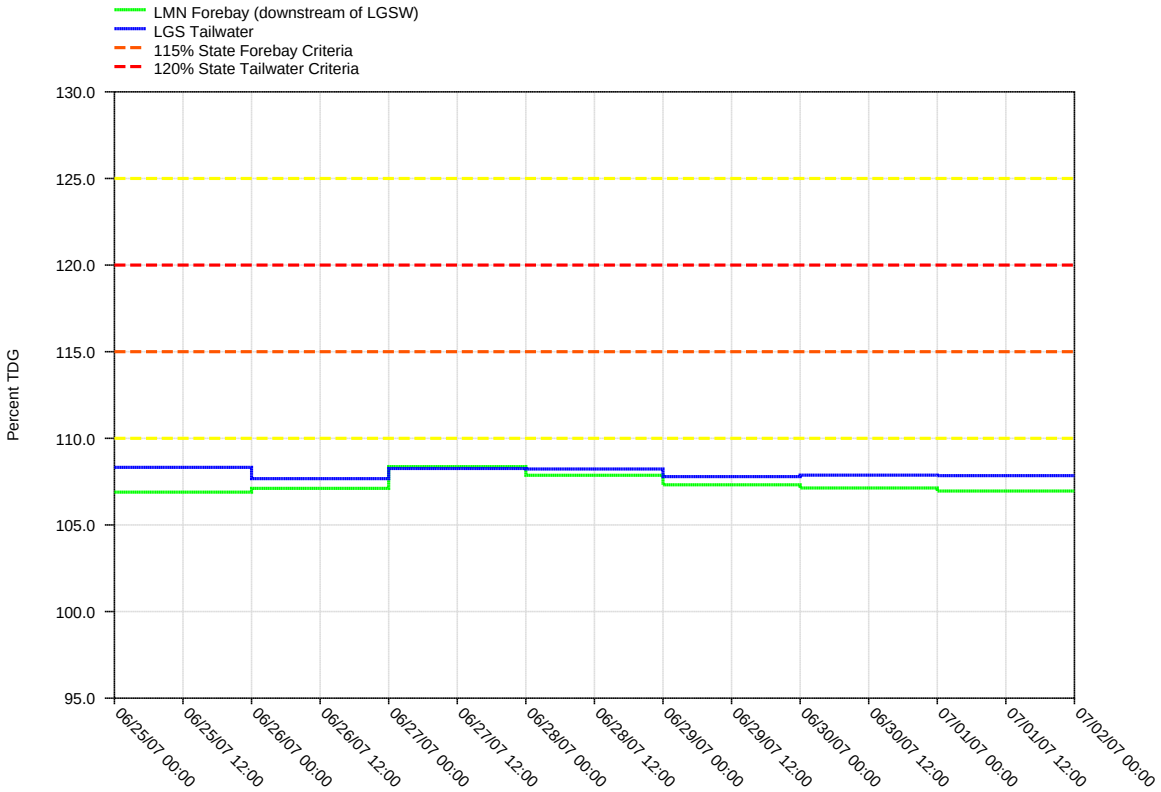


Figure 26.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

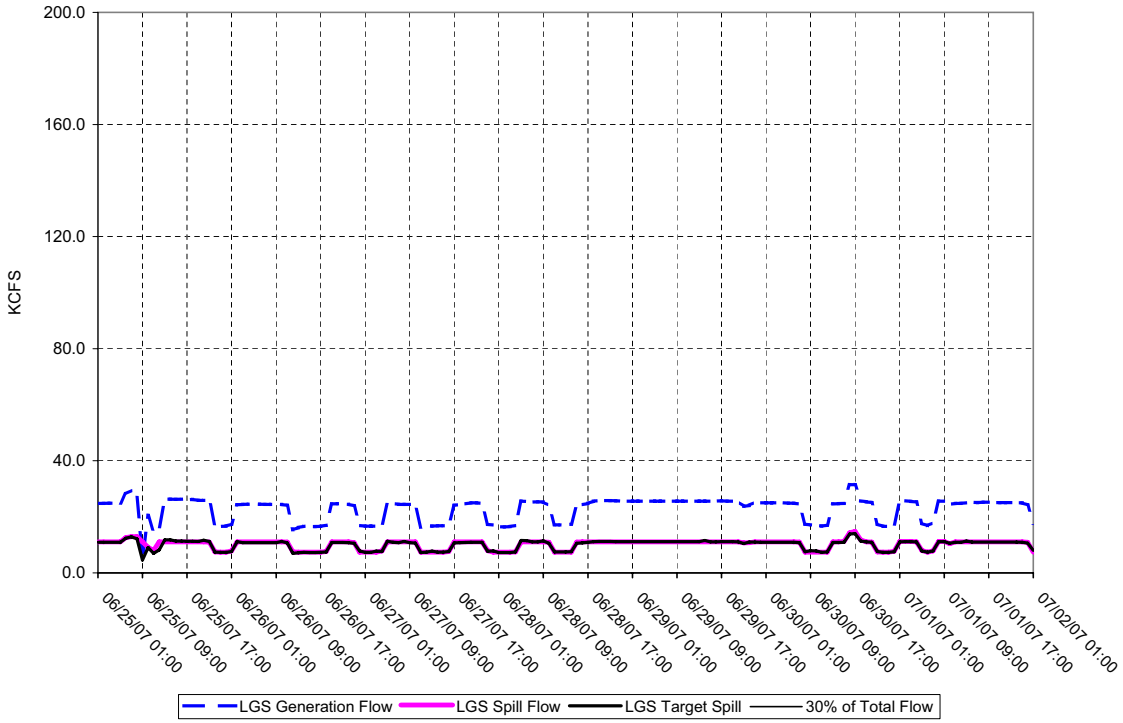
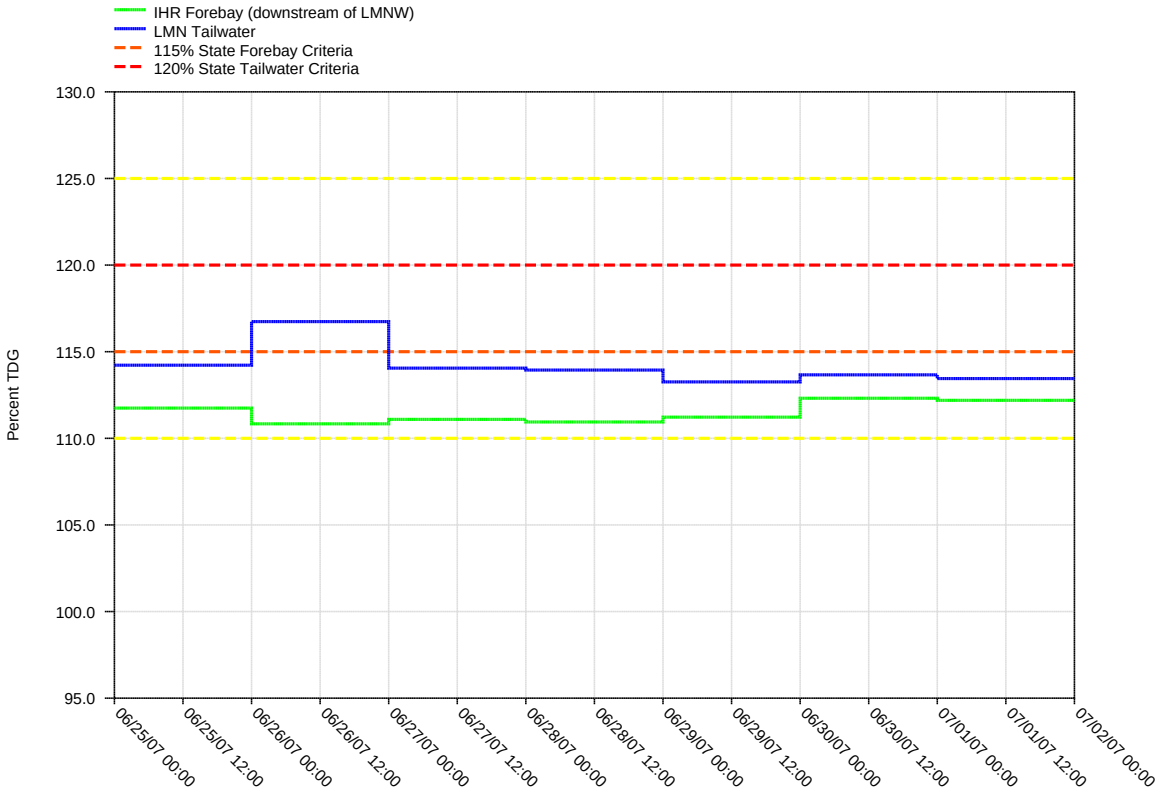


Figure 27.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

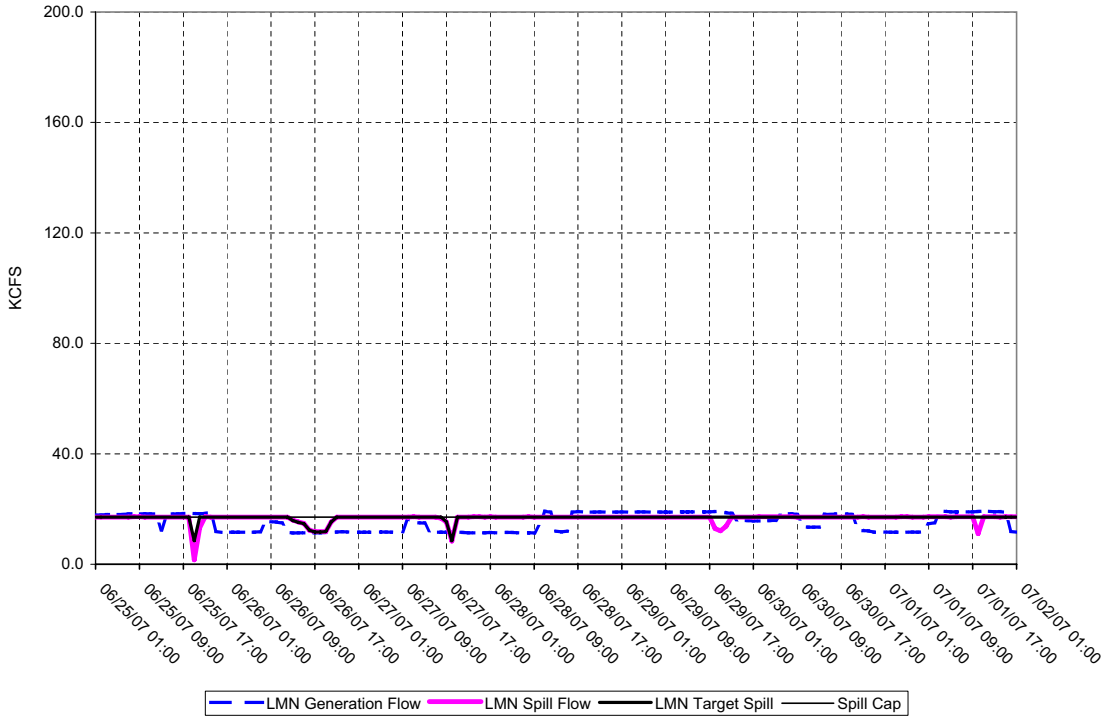
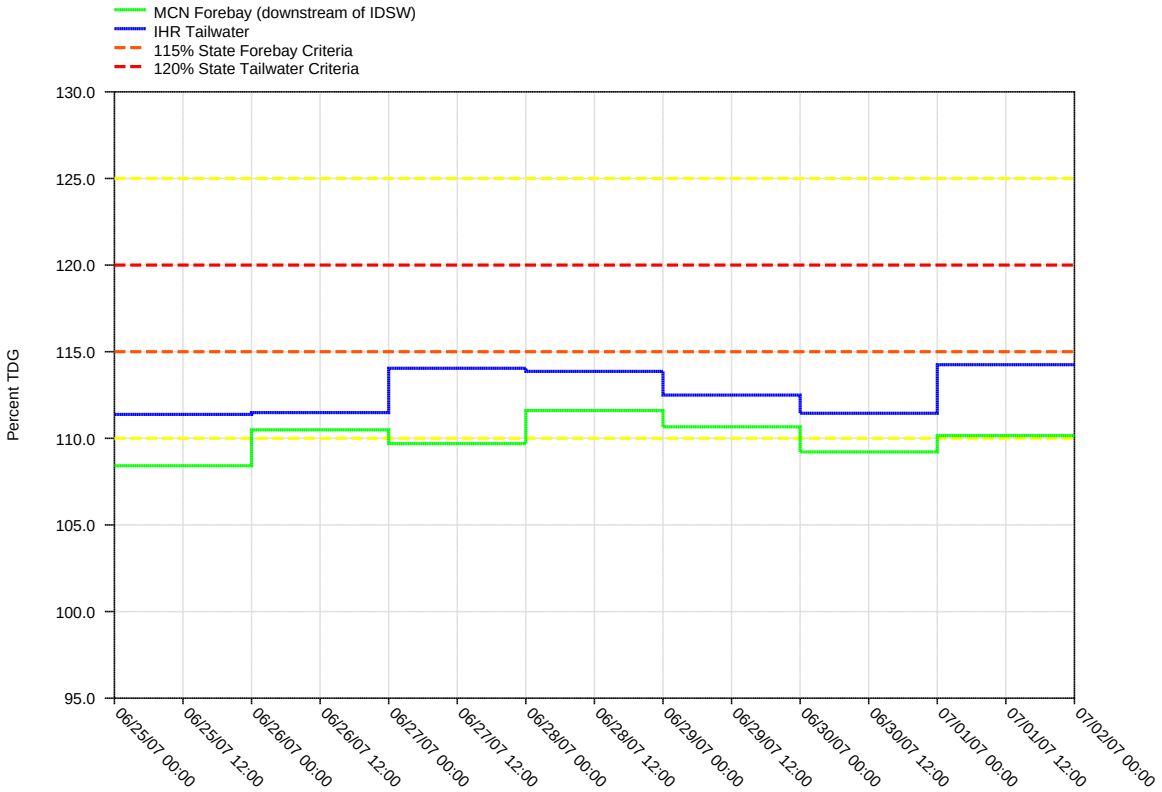


Figure 28.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

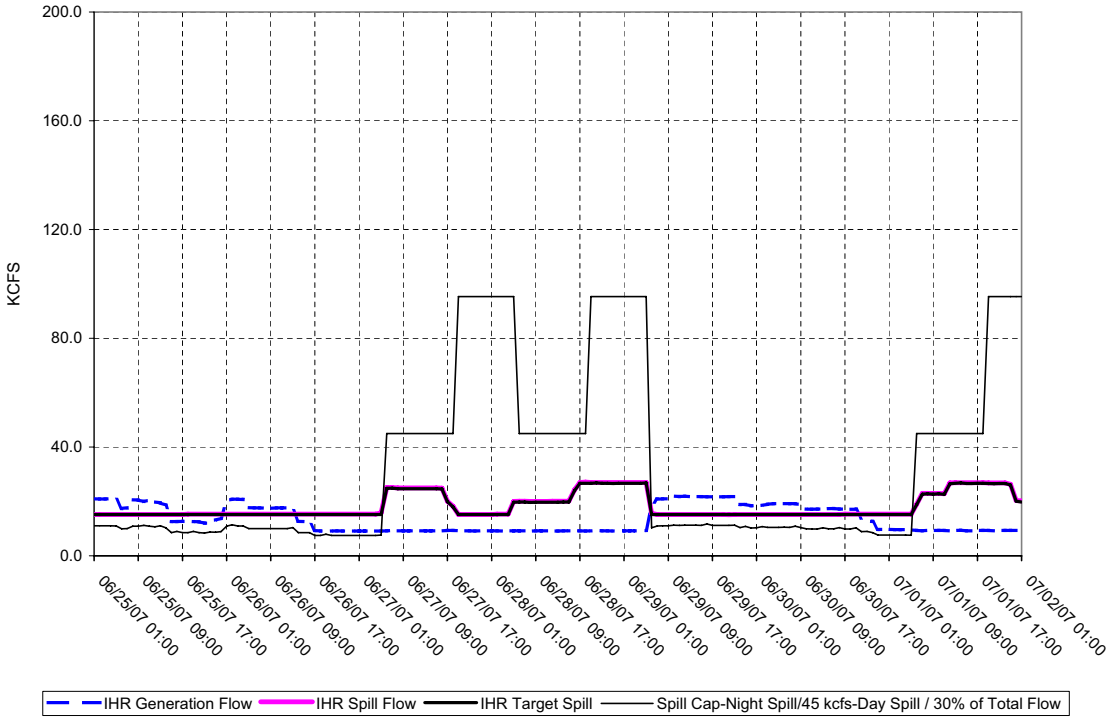
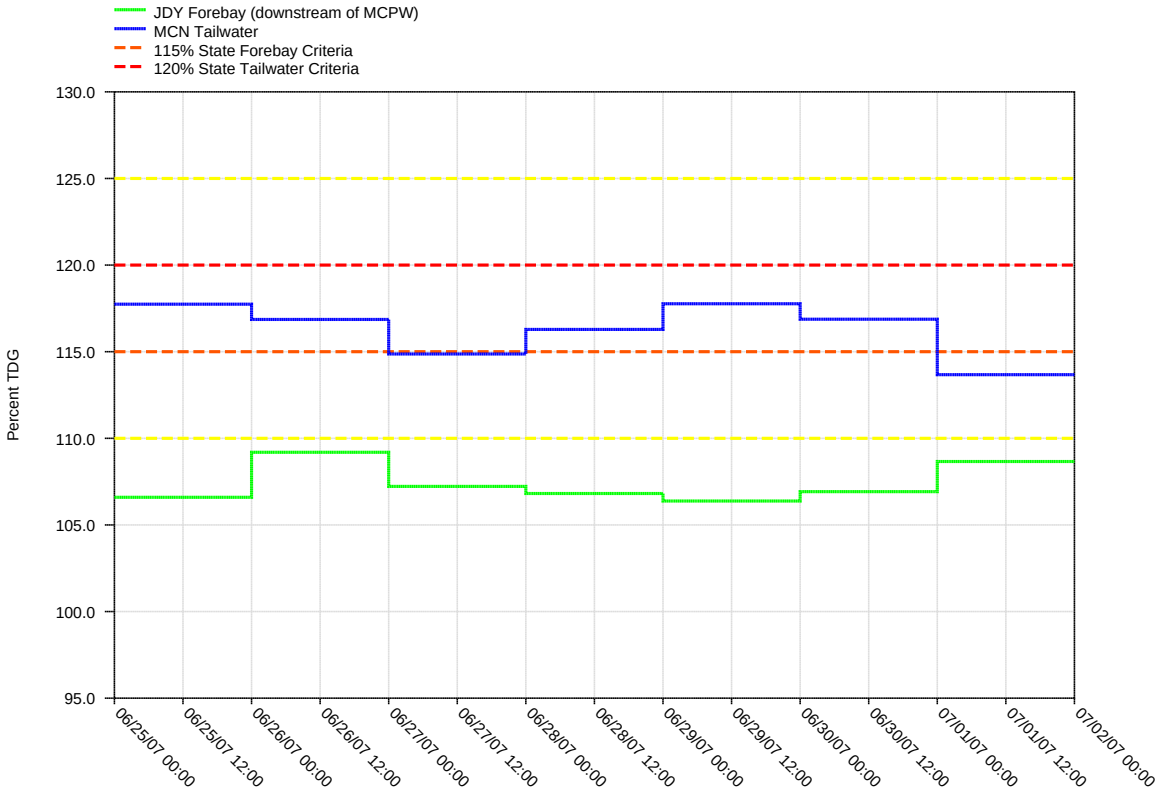


Figure 29.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

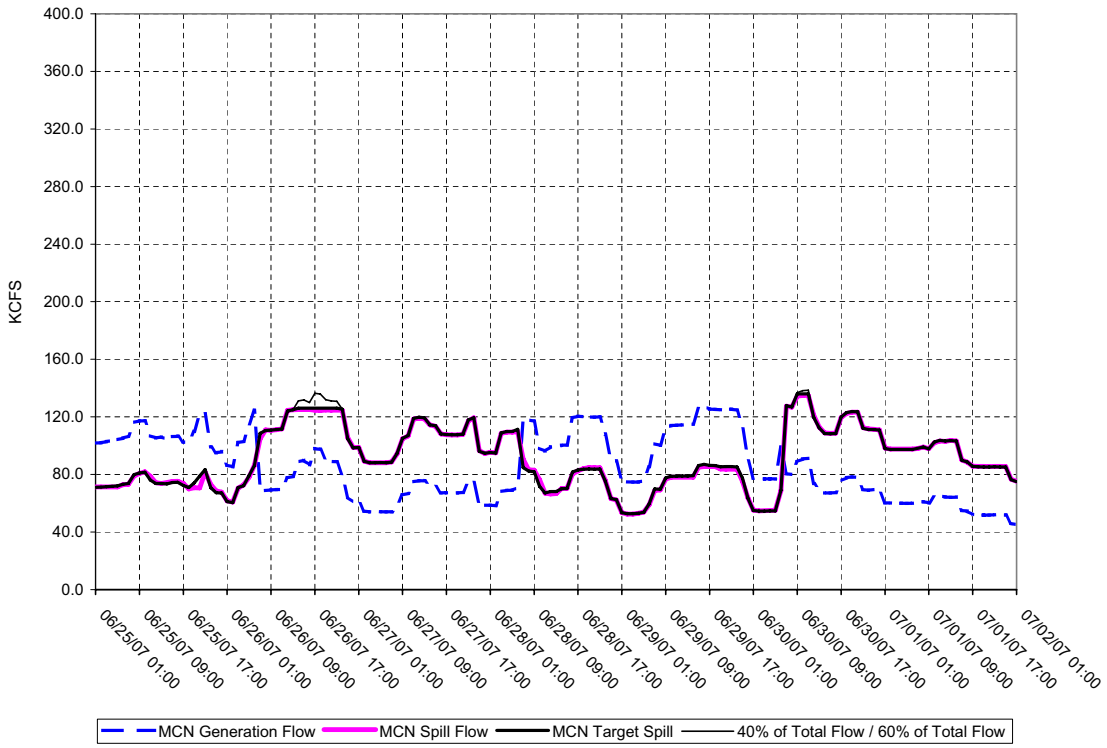
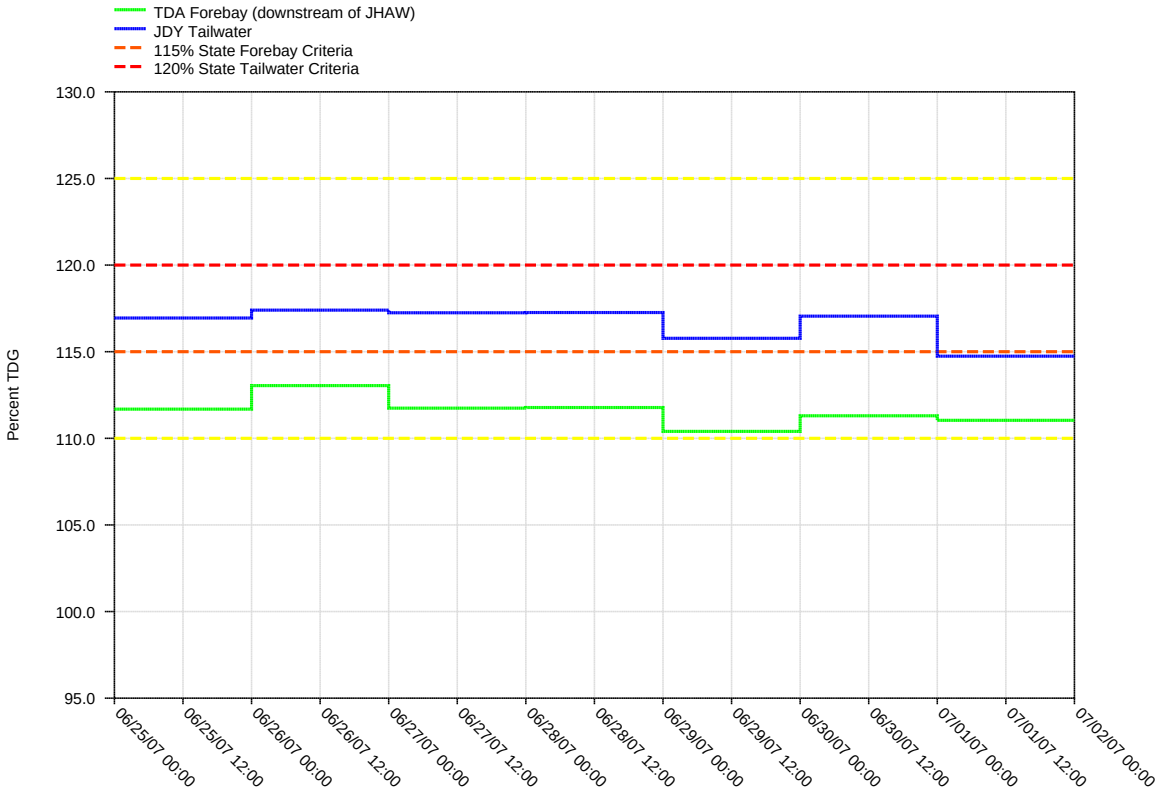


Figure 30.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

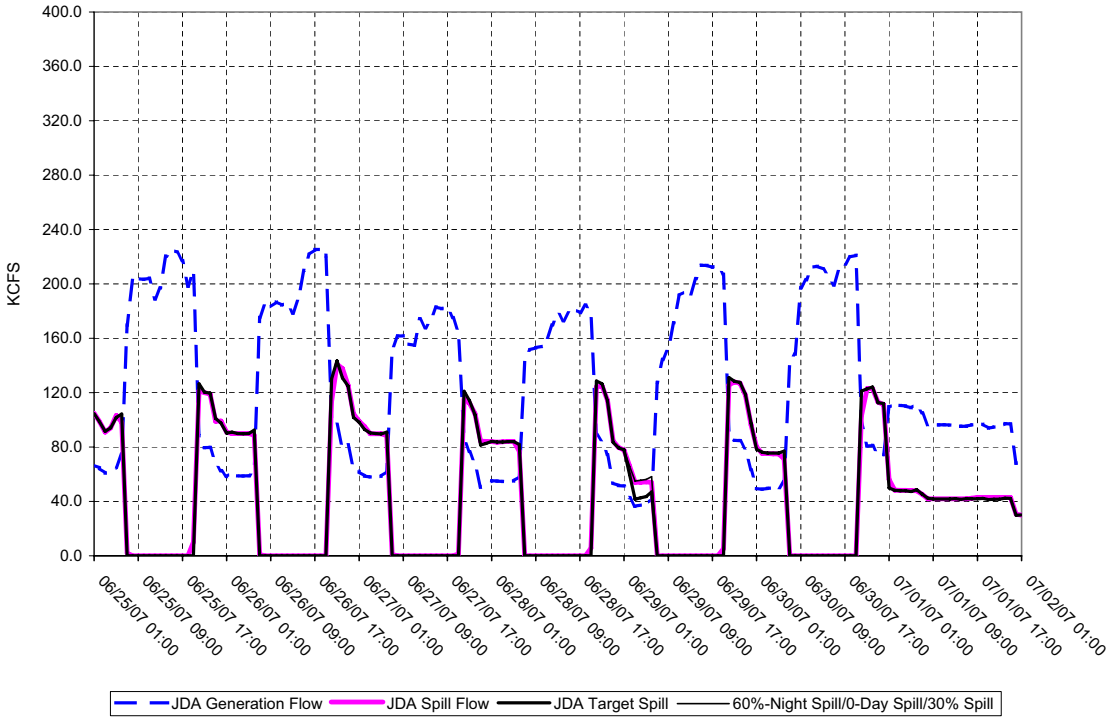
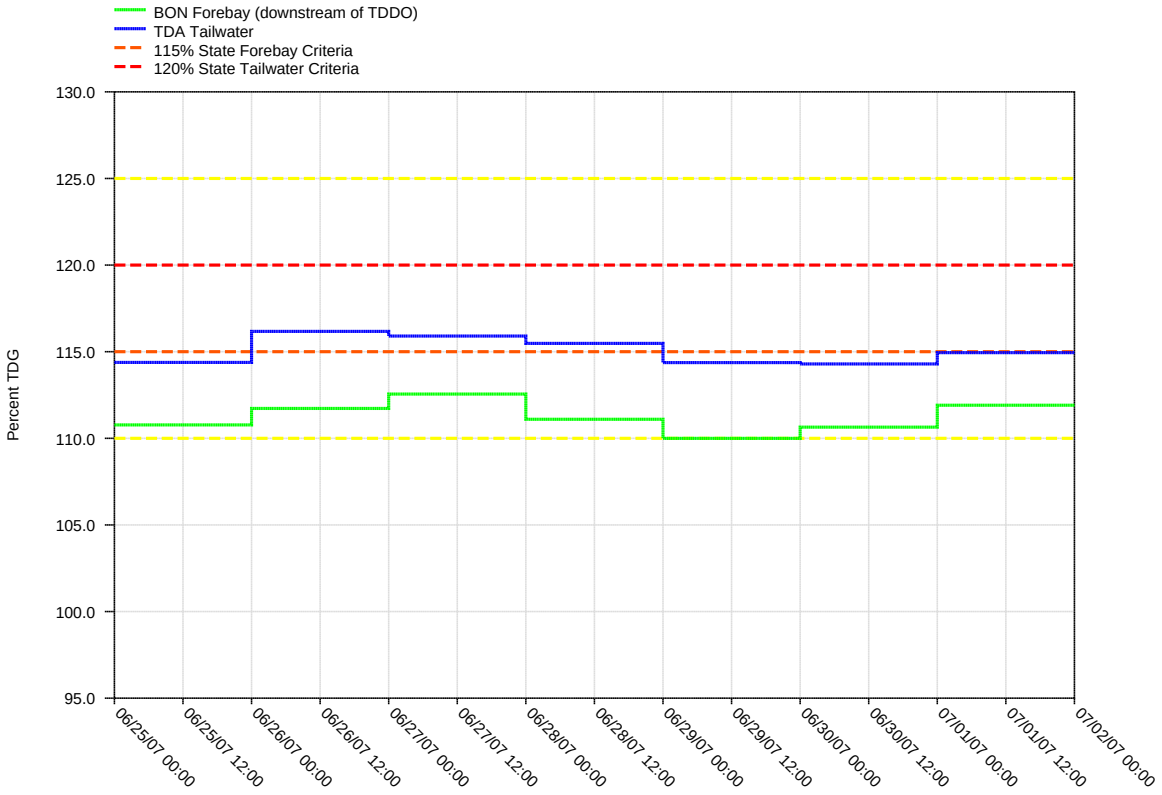


Figure 31.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

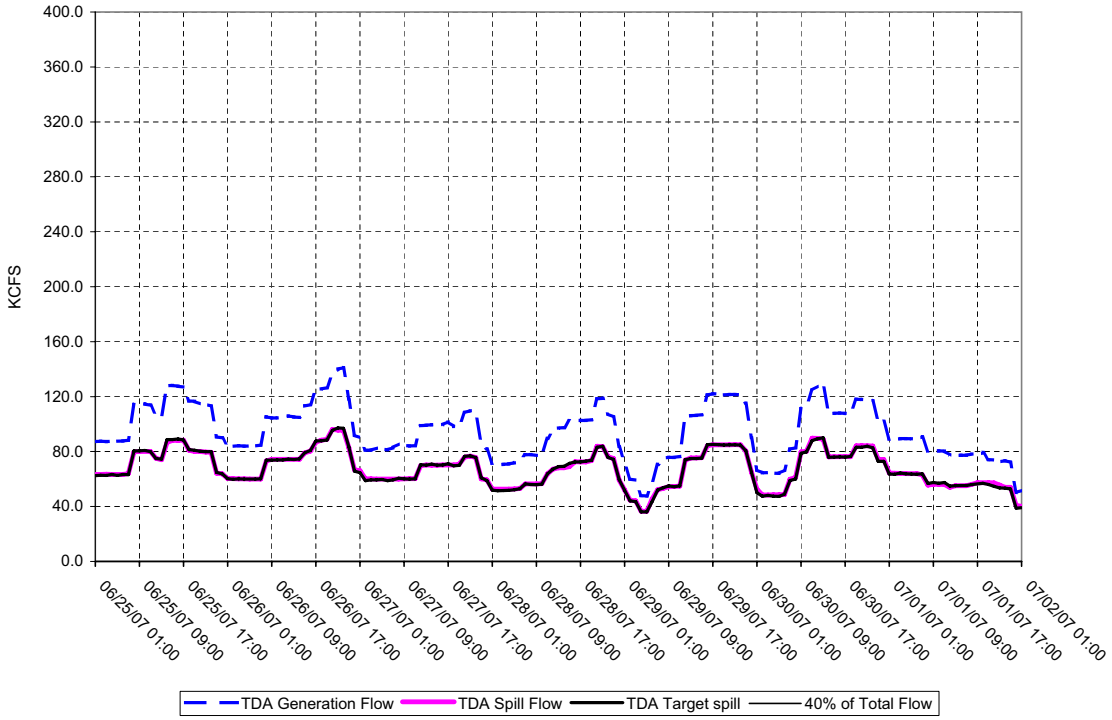
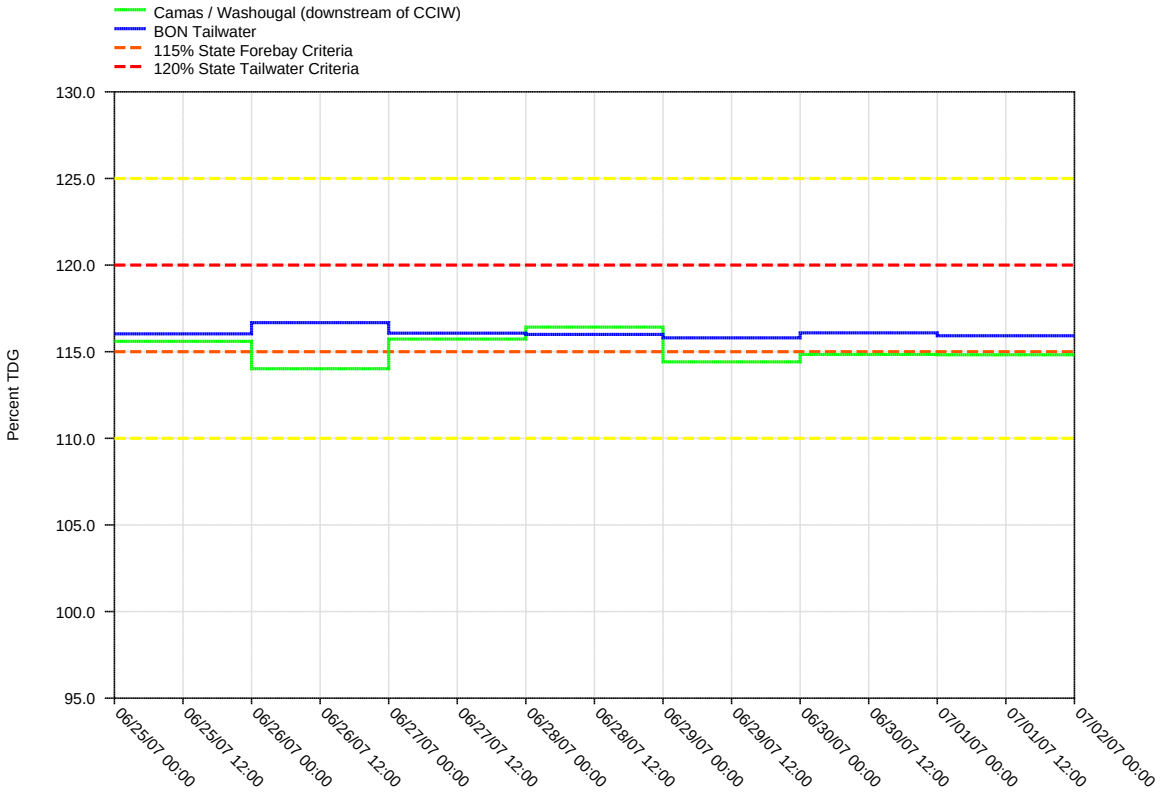


Figure 32.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

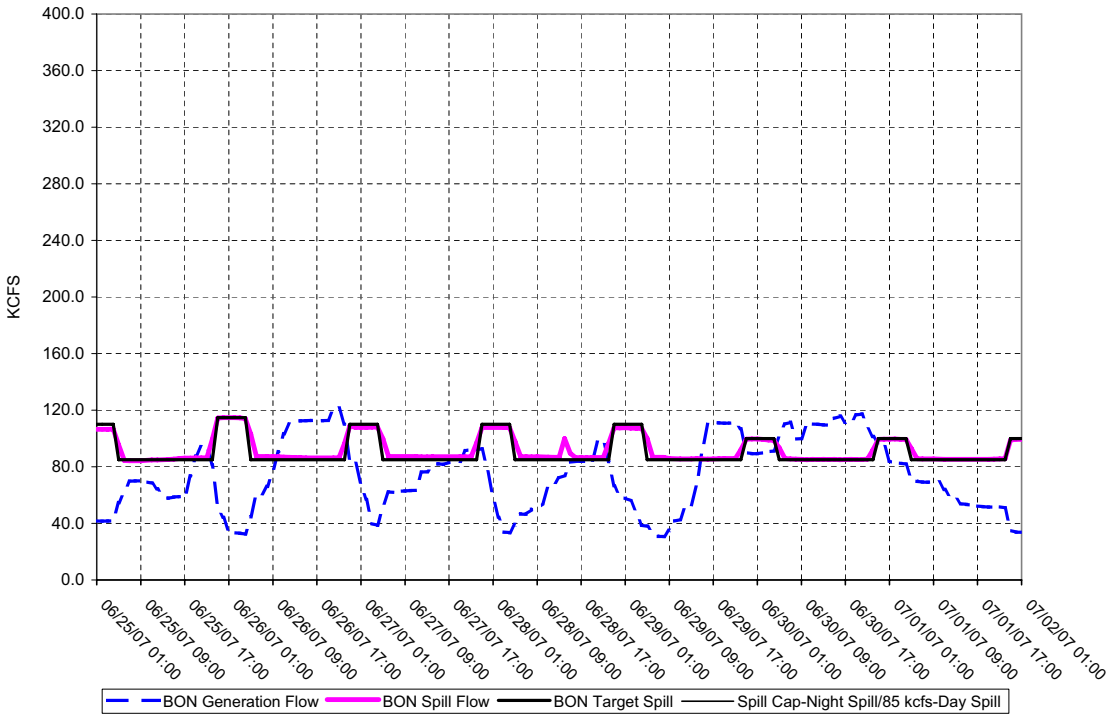


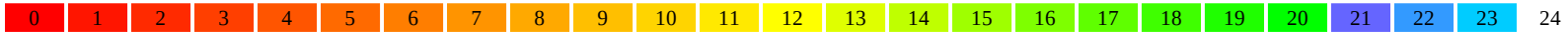
Table 1.

Average percent TDG for 12 highest hours - June 2007

Date	Monitoring Stations (full list)																	
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	120	115
06/04/2007	105.0	114.0	113.0	113.8	114.3	114.7	**117.8**	115.0	114.2	116.3	113.5	118.2	113.3	117.1	112.2	117.9	---	113.6
06/05/2007	104.6	112.9	112.8	113.6	113.8	114.0	**117.3**	115.1	113.4	117.3	112.0	117.6	110.9	115.6	110.8	117.4	---	111.9
06/06/2007	103.9	114.7	111.4	112.7	111.9	114.3	114.5	115.3	108.8	115.7	109.6	117.6	109.3	115.0	108.5	117.7	---	111.0
06/07/2007	101.5	113.7	108.7	112.2	109.0	117.0	111.4	114.0	105.9	114.5	106.4	116.8	110.5	114.4	107.2	117.4	---	109.9
06/08/2007	100.4	112.2	108.2	111.1	109.2	118.6	111.0	112.2	108.3	115.4	105.2	117.8	112.3	116.9	109.2	117.9	---	112.3
06/09/2007	99.9	110.2	110.1	108.6	110.5	118.3	112.8	111.8	108.5	115.4	104.8	118.4	112.1	116.7	111.8	118.6	---	111.8
06/10/2007	101.1	113.6	110.9	109.1	111.3	118.2	114.5	112.8	109.7	115.3	---	117.4	110.9	115.3	111.9	118.2	---	112.0
06/11/2007	102.5	113.9	109.9	109.4	110.2	117.9	113.5	114.6	108.5	115.1	105.2	117.4	109.7	115.4	110.6	118.1	---	112.4
06/12/2007	102.2	111.8	109.3	111.2	108.0	118.1	111.9	115.5	108.3	118.2	105.9	116.9	111.9	116.2	110.4	117.8	---	112.9
06/13/2007	101.8	110.8	108.7	110.0	108.5	118.6	112.4	114.5	109.5	115.1	106.1	116.4	111.1	116.1	111.6	117.6	---	112.1
06/14/2007	102.0	113.7	109.2	110.9	109.2	**120.2**	112.8	114.6	110.4	115.7	106.2	117.4	112.4	116.7	110.4	117.7	---	113.6
06/15/2007	104.4	114.9	109.6	110.4	110.0	119.1	114.2	113.9	111.3	115.2	107.1	117.0	111.8	116.6	111.5	117.5	---	113.3
06/16/2007	102.9	114.0	109.6	109.5	109.3	116.4	113.8	114.3	112.1	114.6	108.1	115.9	109.8	114.6	112.1	117.3	---	111.8
06/17/2007	102.9	112.9	108.7	109.4	109.5	115.0	114.0	114.6	109.2	117.8	107.5	115.5	108.9	113.2	108.9	116.5	---	111.9
06/18/2007	103.0	115.3	109.2	109.1	108.9	117.4	113.6	114.8	108.8	114.5	106.6	116.5	109.5	113.9	108.1	117.3	---	112.5
06/19/2007	102.7	115.7	109.6	109.2	108.3	116.9	113.1	112.7	111.2	116.3	108.2	116.3	113.2	116.0	111.1	117.5	---	113.9
06/20/2007	102.0	113.9	109.9	110.2	109.0	117.2	113.5	112.7	112.1	116.9	108.0	116.6	112.9	115.8	112.8	117.2	---	**115.1**
06/21/2007	101.2	111.7	109.4	108.8	108.5	114.7	113.5	113.7	111.5	116.8	106.6	117.1	111.0	115.5	111.5	115.8	---	**115.8**
06/22/2007	102.3	114.7	110.8	109.6	108.4	112.2	**115.7**	113.8	111.5	117.3	106.8	116.9	111.0	114.5	110.1	116.3	---	113.4
06/23/2007	103.5	113.4	111.1	109.2	109.2	114.4	**116.2**	113.1	110.3	116.4	108.4	117.4	111.1	114.4	110.4	116.7	---	114.4
06/24/2007	103.8	115.4	111.0	108.8	108.6	114.0	114.8	111.6	110.2	118.3	107.8	117.7	110.4	114.1	110.1	116.2	---	112.6
06/25/2007	102.1	113.5	108.9	108.3	106.9	114.2	111.7	111.4	108.4	117.7	106.6	116.9	111.7	114.4	110.8	116.0	---	**115.6**
06/26/2007	102.3	114.8	109.3	107.7	107.1	116.7	110.8	111.5	110.5	116.9	109.2	117.4	113.0	116.2	111.7	116.7	---	114.0
06/27/2007	101.2	115.8	109.6	108.3	108.4	114.1	111.1	114.0	109.7	114.9	107.2	117.2	111.7	115.9	112.6	116.1	---	**115.7**
06/28/2007	100.4	114.0	108.8	108.2	107.9	113.9	110.9	113.9	111.6	116.3	106.8	117.3	111.8	115.5	111.1	116.0	---	**116.4**
06/29/2007	99.9	115.2	107.3	107.8	107.3	113.3	111.2	112.5	110.7	117.8	106.4	115.8	110.4	114.4	110.0	115.8	---	114.4
06/30/2007	101.6	113.5	108.7	107.9	107.1	113.7	112.3	111.4	109.2	116.9	106.9	117.1	111.3	114.3	110.6	116.1	---	114.8
07/01/2007	102.1	112.2	110.0	107.8	107.0	113.4	112.2	114.2	110.2	113.7	108.7	114.7	111.0	114.9	111.9	115.9	---	114.8

Generated: Sun Jul 1 23:25:09 2007

Number of hours of data reported in a given day



Big, bold, red text denotes exceedances.
--- indicates No Data
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%.

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)
WRNO	Bonneville Tailwater (Warrendale)
CWMW	Camas / Washougal

Effective April, 2006

FISH OPERATION PLAN IMPLEMENTATION REPORT
July 2007

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 April 16, 2007 court order requiring the Corps to provide monthly reports on the implementation of project spill for fish passage and fish transportation operations provided for in the 2007 Fish Operations Plan (FOP). The FOP describes the Corps project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the April – August 2007 fish migration season. Consistent with the 2004 Biological Opinion adaptive management strategy, this plan incorporates the project operations contained in the "Agreement Regarding 2007 Federal Columbia River Power System Fish Operations" (Agreement)[1]. The Corps agreed to provide 2007 fish passage operations in accordance with the Agreement as identified in Attachment 1 of the Agreement[2]. Water management operations not addressed in the Agreement will continue to be consistent with the operations considered in the 2004 Biological Opinion and in particular, the 2007 Water Management Plan and 2007 Fish Passage Plan (FPP). Judge Redden incorporated the terms of the 2007 Operations Agreement into a Court Order issued on May 23, 2007.

The Corps' lower Columbia and Snake River projects and fish passage operations for the month of July 2007 identified in the FOP 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 12-hour average Total Dissolved Gas (TDG) for the tailwater at each project and for the next project's forebay downstream.

This report also provides information on issues presented and unanticipated or emergency situations that arose during implementation of the spill program for the month of July 2007.

[1] The Agreement signed by the Bonneville Power Administration (BPA), Confederated Tribes of the Warm Springs Reservation, Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes and Bands of the Yakama Nation, and Confederated Tribes of the Colville Indian Reservation, was submitted to the Federal District Court on January 9, 2007.
[2] Brigadier General Martin committed to implement the 2007 operations identified in Attachment 1 of the Agreement by letter dated December 15, 2006.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per week in July displaying the progress 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 2 and end on July 29 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 dams.

Each figure represents one week of operation for a project. The graphs start on Monday 0100 hours through Monday 0100 hours for the following dates:

July 2 – July 8	Figures 1 - 8
July 9 – July 15	Figures 9 – 16
July 16 – July 22	Figures 17 - 24
July 23 – July 29	Figures 25 – 32

A. Upper Graph: Shows the resultant daily average percent TDG for the 12 highest hours as the result of spill from the dam. The objective is to operate each project up to the TDG limits without exceeding those limits if practicable.

- The blue line on the graph represents the TDG in the tailrace of the dam. 120% TDG is the upper operating limit.
- The green line represents the TDG in the forebay of the next dam downstream. 115% is the upper operating limit.

B. Lower Graph: Represents the 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 heavy red line represents the hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2007 FOP.
- Each graph includes a heavy black line that represents the target spill. This is the hourly maximum spill level that is subject to the following conditions:

    - Spill percentage or discharge specified in the FOP;
    - Spill caps as set daily for TDG management;
    - Test spill levels for fish passage research;
    - Minimum generation for power system needs; and,
    - Minimum spill at Ice Harbor (15.2 kcfs) and Bonneville (50 kcfs) dams.

The hourly target spill may vary as a function of quantity of river flow and generating units available at a project.

II. A monthly FOP Spill Report Table is included at the end of the report that shows the overall daily results of the average percent TDG for the 12 highest hours for all projects. The numbers in red show exceedances of the TDG gas cap - 115% (forebay) or 120% (tailwater) for each project.

General Implementation Remarks:

Please note that for all projects that spill for fish passage, the target spill may be limited to a lesser quantity (i.e. the spill cap), with the objective of staying within the TDG state waiver limits. When spill levels briefly deviated below or above the level described in the FOP, the heavy red line will be below or above the heavy black line in the graphs. Whenever the operation varied from the target spill during voluntary spill hours, or other anomalies occurred, these instances are described in the FOP Spill Report Table below. Occurrences which prompted regional coordination are described in greater detail in the section below entitled "Operational Adjustments Occurring in July."

"Low flow" operations on Lower Snake projects are triggered when inflow is not sufficient to provide for both minimum generation and the planned spill levels. In these situations, the projects operate one unit at minimum generation and spill the remainder of flow coming into the project. 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 where 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 and the target spill may not be possible on every hour.

Also note that actual spill levels at Bonneville Dam may range from 1 to 3 kcfs lower or higher than specified in the 2007 FOP. A number of factors influence this including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

In the FOP Spill Report Table below, the result of "load swing hours" appears as an explanation for not meeting the hourly spill at The Dalles Dam. This occurs because projects on the lower Columbia must be available to respond to within-hour load variability to satisfy North American Electric Reliability Council (NERC) reserve requirements ("on response"). During periods of rapidly changing loads, projects on response may have significant changes in turbine discharge within the hour. Under normal conditions, within-hour load changes occur mostly on hours immediately preceding and after the peak load hours, while spill quantity remains the same within the hour. These hours are referred to as "load swing hours." Due to the high variability of within-hour load, these load swing hours may have a greater instance of reporting actual

spill percentages that vary more than the +/- 1% requirement than other hours. On the days cited in the Table, the day or night-time average spill was within the FOP level of +/- 1% of the target spill.

July Operations:

The month of July was characterized by below average flows on the lower Snake River and on the lower Columbia River. Below normal precipitation in Southeastern Washington combined with low snow pack in Idaho resulted in lower than normal flows for the lower Snake River. A below average volume of precipitation in the upper Columbia Basin combined with below normal flows from the Snake River, resulted in the below average flows for the lower Columbia River. During the July reporting period, the daily FOP spill operations were carried out as follows:

- Lower Granite Dam - the hourly target spill was a fixed quantity of 18 kcfs for 24 hours
- Little Goose Dam - the target spill was 30% of the total flow for 24 hours
- Lower Monumental Dam - the hourly target spill was a fixed quantity of 17 kcfs
- Ice Harbor Dam – the target spill was 45 kcfs day/spill cap night alternating with the 30% spill test (the 30% spill test ended July 17th) and is shown as the heavy black line on the graph
- McNary Dam – the target spill was alternating between 60% and 40% of total flow in two day treatments
- John Day Dam – the target spill was 30% of total flow for 24 hours
- The Dalles Dam - the target spill was 40% of total flow for 24 hours
- Bonneville Dam - the hourly target spill was 85 kcfs day/spill cap night through July 15, and starting on July 16, target spill changed to 75 kcfs day/spill cap night.

Operational Adjustments Occurring in July.

1. Routine operations to transport juvenile fish at the three lower Snake River collector dams continued through the month of July. At Lower Monumental Dam, spill was reduced 9 times over the course of the month for one to two hours between the hours of 1800 and 2000 to allow safe passage of the fish barge.

2. On July 18, 2007, there was a lightning strike that caused breaker failures at Grand Coulee Dam. The result of the breaker failures was that 1446 MW of generation was lost to the Northwest power grid. The rest of the hydro-system responded to this loss by automatically increasing generation to maintain power in the Northwest. Because Grand Coulee and Chief Joseph projects had not been cleared for full usage in time for the upcoming hours' load request for each dam, this caused the slight variation that occurred for the hour ending 9:00 a.m. on July 18 as shown in the Spill Report Table.

3. Other spill operations in the lower Snake and Columbia rivers that varied from those described in the FOP were discussed and agreed to in Regional Forum processes prior

to their commencement. Those operations coordinated with regional salmon managers were planned such that they would have the least impact to fish (also cited in the FOP Spill Report Table below).

a. Bonneville Dam:

- Beginning on July 16, the project resumed 75 kcfs spill during the daytime hours following the end of the spillway test. The test at 85 kcfs during the daytime was conducted to estimate the survival of subyearling fall Chinook passing through the spillway with an emphasis on evaluating survival through spillway bays with different flow deflector elevations. The 85 kcfs spill pattern was developed to improve juvenile fish survival by the Fish Facility Design Review Work Group (FFDRWG) at the Corps' Engineer Research and Development Center (ERDC) during the spring. The requested date to start this evaluation with 85 kcfs spill was based on the numbers and run-timing of subyearling fall Chinook. In addition to the Regional Forum coordination, the representatives for the signatories to the 2007 Agreement indicated there were no objections to this change.

- The Corps' project operators discussed with TMT representatives model validation testing on the turbines during the period between August 11 and 17. Each unit will be started and ramped up to normal operating range within 1% peak efficiency. During the start up period, the unit will temporarily hold at a generation output level below the 1% peak efficiency range for a period less than 15 minutes, then complete the ramping. Each unit at the Bonneville second powerhouse will be tested, including the fish units. One unit will be tested in the morning, and one in the afternoon everyday August 11, and August 13 – 17. The units will not be tested at an operating range above 1% peak efficiency. This activity was also coordinated with signatory Tribes and no objections were raised.

b. McNary Dam:

- The modified spill operation test on July 6 did not result in improved conditions such that the fish transport barges could safely traverse the tailrace to access the barge loading facility. Consequently, the Corps determined that conditions were too dangerous to operate the fish barges, and decided to continue bypassing fish back to the river. TMT members did not object to this operation given the navigation safety issues under these spill conditions. The signatories to the 2007 Agreement were contacted and their representatives indicated there were no objections to this change in operations. Transport operations addressed in the FOP are slated to begin on August 16 and were discussed at the August 1 TMT meeting.

c. Ice Harbor Dam:

- On July 17 the summer research operations were completed at Ice Harbor and the project resumed operations as described in the 2007 Fish Operations Plan, spilling 45 kcfs during the day and spill to the spill cap at night with the Removable Spillway Weir (RSW) operating.

d. Lower Monumental Dam:

- On July 26 as part of the planned maintenance and testing as noted in the annual Fish Passage Plan Appendix C, the project increased generation above minimum generation for three hours in order to test generation of Unit 3 after an annual overhaul was completed. During this maintenance operation, spill continued at 11.8 kcfs - below the FOP level of 17 kcfs.

- A maximum 4 hour spillway outage is planned for August 14 to install equipment for research in the LMN forebay boat restricted zone (BRZ). This research was prioritized and coordinated with Regional Forum teams prior to the start of spill. Also, this operation was coordinated with the salmon managers at the July 25 and August 8 TMT meetings, and with the signatory Tribes of the 2007 Operations Agreement with no objections raised. In addition to the spill outage, the powerhouse will be out for approximately one-hour to ensure safe conditions while installing this equipment by boats in front of the powerhouse. The project will maintain minimum discharge of 11.5 kcfs during this operation.

e. Little Goose Dam:

- Planned research began on July 29 that includes collection of listed fish at Little Goose Dam and rather than transporting these fish, they are routed back to the river. Fewer fish are transported from this project than described in the FOP as a result. This activity was coordinated through SRWG, FDRWG, TMT, and the signatory Tribes; no objections were raised.

FOP Spill Report Table

Project	Parameter	Date	Time	Hours	Type	Reason
Lower Granite	Spill	7/29/2007	100 - 2400	24	Minimum generation	Project generated between 12.1-12.6 kcfs which is outside of minimum generation range of 11 to 12 kcfs for units 1-3. Project spill gate set at the 15.2 kcfs stop resulting in spilling 14.5 kcfs. Review of the data suggests that the generation levels had drifted above true minimums, eventually leading to operation outside of the bounds considered to be minimum.

Little Goose	Add'l Spill	7/11/2007	800-900	2	Maintenance	Hourly % spill was 37.2% and 68.2% (above 30.0% +/- 1% range): Project had to stop generation and spill excess outflow in order to take the line out of service.
Little Goose	Add'l Spill	7/12/2007	1400	1	Maintenance	Hourly % spill was 48.5 % (above 30.0% +/- 1% range): Project had to stop generation and spill excess outflow in order to take the line out of service.
Little Goose	Add'l Spill	7/19/2007	900	1	Load change hour	Hourly % spill was 41.5 % instead of FOP level of 30.0%. During a transition hour while the project was decreasing total outflow after peak morning load, generation was decreased such that the resulting hourly spill percentage exceeded 30%. 24 hr avg. spill was 30.2%.
Lower Monumental	Spill	7/3/2007	1900	1	Barge	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	7/5/2007	1900-2000	2	Barge	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	7/7/2007	1600-1700	2	Operational - Lower Flows	Spill dropped below FOP level of 17 kcfs to 13.1 kcfs and 15.8 kcfs, and generation quantity dropped to 12.2 and 12.3 kcfs, which was slightly above minimum range. The LMN pool elevation was near minimum and total outflow was significantly reduced including spill and generation outflow.
Lower Monumental	Spill	7/7/2007	1800-1900	2	Barge	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	7/9/2007	1900-2000	2	Barge	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	7/11/2007	1900-2000	2	Barge	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	7/13/2007	1800-1900	2	Barge	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	7/15/2007	1800-1900	2	Barge	Fish barge needed reduced spill for safe passage. *
Lower Monumental	Spill	7/19/2007	1600-1700, 2000-2300	6	Operational - lower Flows	Hourly spill dropped below FOP level of 17 kcfs to 11 kcfs. Insufficient flows to maintain generation and spill.
Lower Monumental	Spill	7/21/2007	1800-1900	2	Barge	Fish barge needed reduced spill for safe passage. *

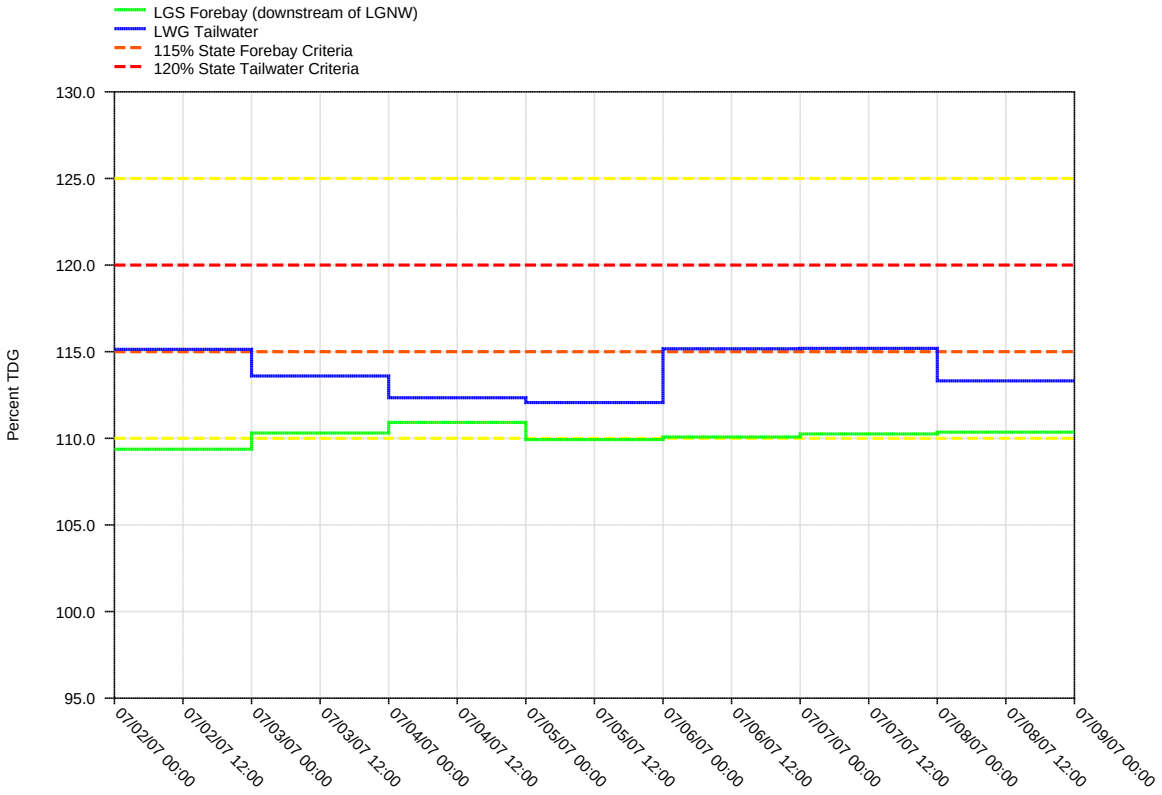
Lower Monumental	Spill	7/26/2007	800-1000	2	Maintenance	Hourly spill remained at 11.8 kcfs, while generation increased above minimum generation levels due to the project putting an additional unit on line for testing after annual maintenance. Unit was operated at various levels for 2.5 hours to check operation of the turbine, breaker and other equipment.
Lower Monumental	Spill	7/27/2007	1800-1900	2	Barge	Fish barge needed reduced spill for safe passage. *
McNary	Spill	7/6/2007	0800-1000	3	Barge	Hourly % spill dropped to 16.0% (below 40% +/- 1% range) due to a navigation test to see if the fish barge could safely pass the spillway while there was 26 kcfs spill. The test failed; for further explanation refer to page 5 of the text. 24 hr avg. spill was 38.8%.
McNary	Add'l Spill	7/18/2007	1000-1100	2	Human error	Hourly % spill increased to 61.3% and 62.4% (above 60% +/- 1% range) due to project passing inflow since pool was near full; when generation was reduced, spill should have been decreased as well. 24 hr avg. spill was 60.1%
John Day	Add'l Spill	7/14/2007	2100	1	Human error	Hourly spill was 31.9%, 70.1 kcfs (above 30% +/- 1% range). Log book shows the project was requested to change to 64 kcfs at 2000, but change did not occur until later in the hour. 24 hr avg. spill was 30.0%
John Day	Spill	7/18/2007	900	1	System recovering from earlier lightning strike	Hourly % spill dropped to 27.6%, 48.0 kcfs, (below 30% +/- 1% range) due to reduced generation capability at Grand Coulee at the start of the hour. John Day and The Dalles were allocated more load for part of the hour to assure system reliability. 24 hr avg. spill was 29.6%
John Day	Add'l Spill	7/26/2007	1200	1	Human error	Hourly % spill was up to 32.1%, 67.9 kcfs, (above 30% +/- 1% range). At 1145 hr the project was requested to spill 84 kcfs, then at 1230 hr BPA realized the project was spilling too much and changed spill to 67 kcfs. 24 hr avg. spill was 30.2%
The Dalles	Add'l Spill	7/3/2007	0100	1	Load swing hour	Hourly % spill was up to 41.9% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.0%.
The Dalles	Add'l Spill	7/5/2007	1200	1	Load swing hour	Hourly % spill was up to 43.8% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 40.2%.

The Dalles	Spill	7/10/2007	800	1	Load swing hour.	Hourly % spill dropped to 37.8 % (below 40.0% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 39.8%.
The Dalles	Spill	7/11/2007	900-1000	2	Load swing hours	Hourly % spill dropped to 37.9% & 38.3% (below 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 3. 24 hr avg. spill was 39.8%
The Dalles	Spill	7/18/2007	900	1	System recovering from earlier lightning strike	Hourly % spill was 37.2 %, 61.1 kcfs, (below 40% +/- 1% range) due to reduced generation capability at Grand Coulee at the start of the hour. John Day and The Dalles were allocated more load for part of the hour to assure system reliability. 24 hr avg. spill was 39.7%.

* Data collected for reporting spill reductions for safe passage of fish transport barges is reported as average hourly data. Therefore, while spill may be reduced for only a portion of an hour, the FOP Spill Report Table characterizes the reduction as a full hour.

Figure 1.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

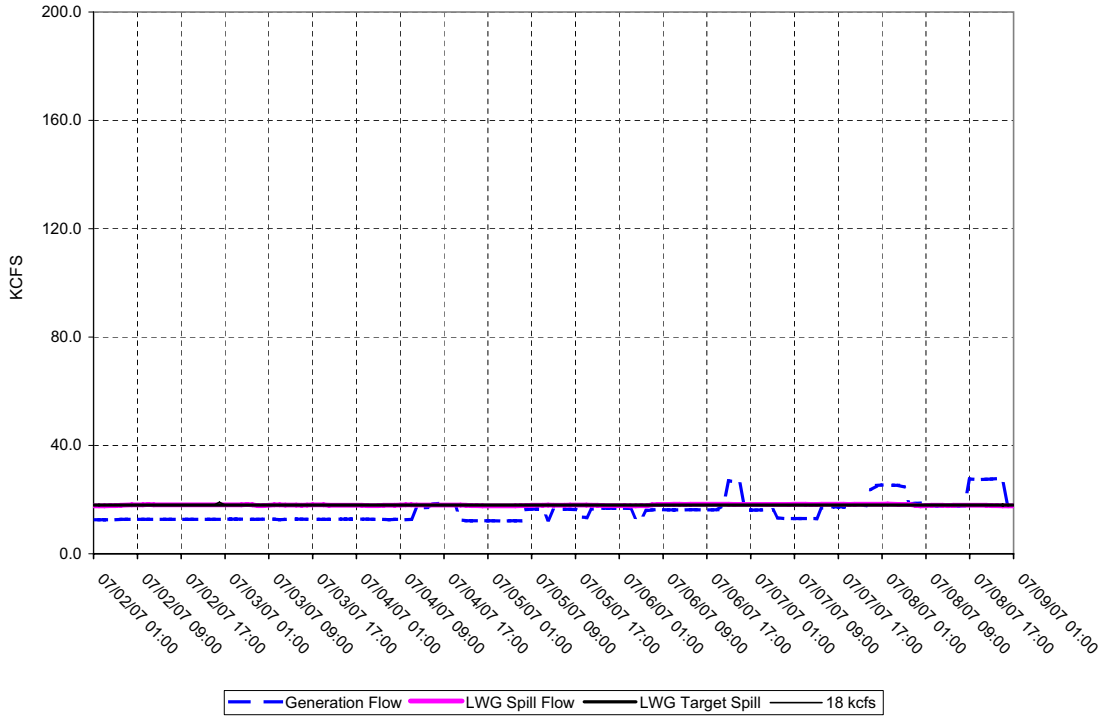
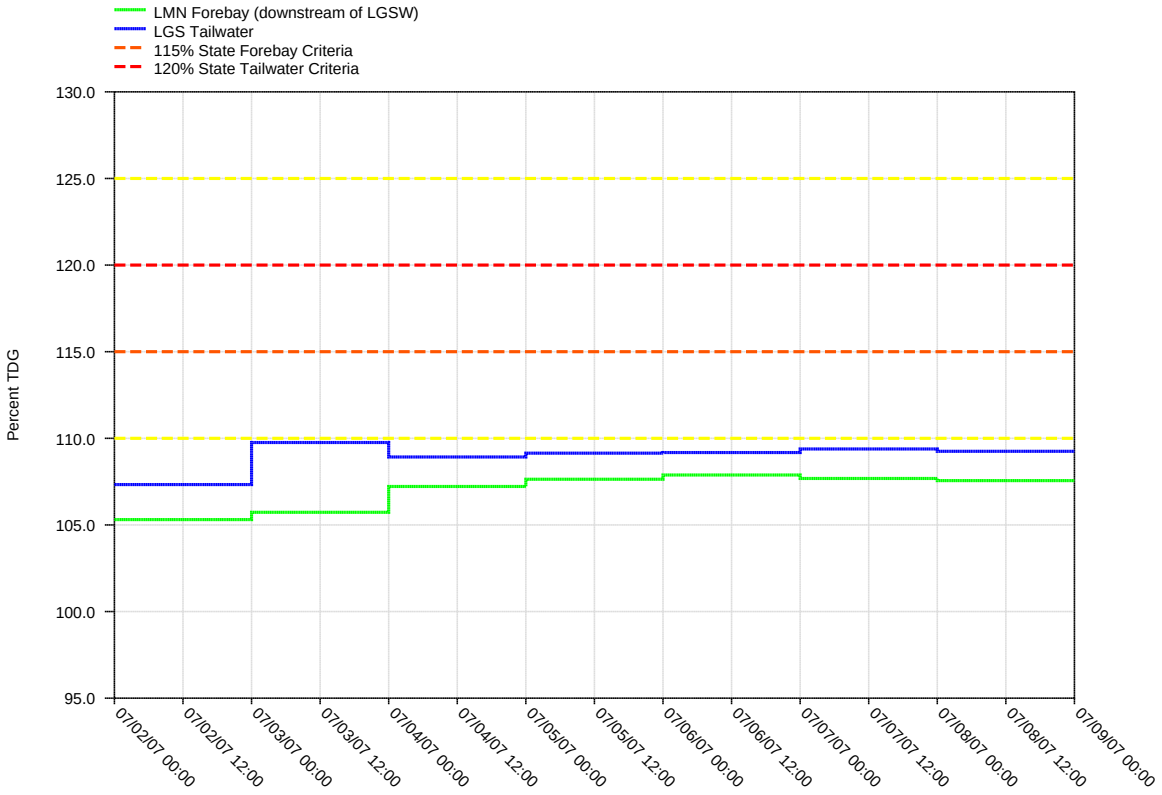


Figure 2.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

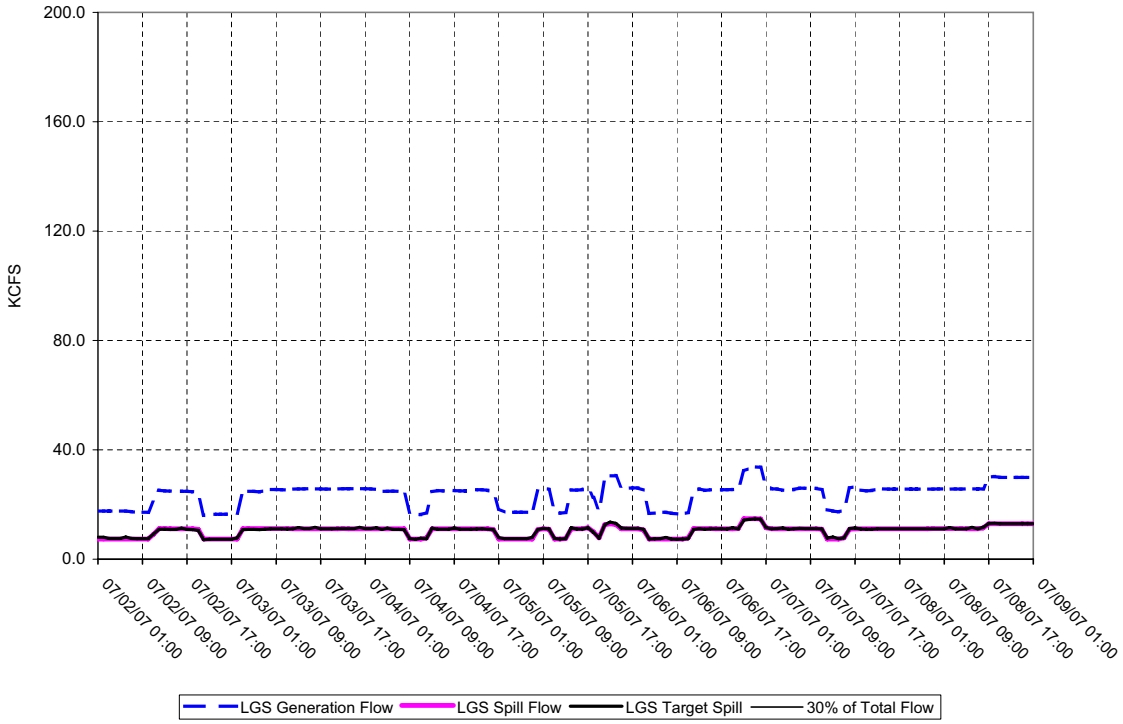
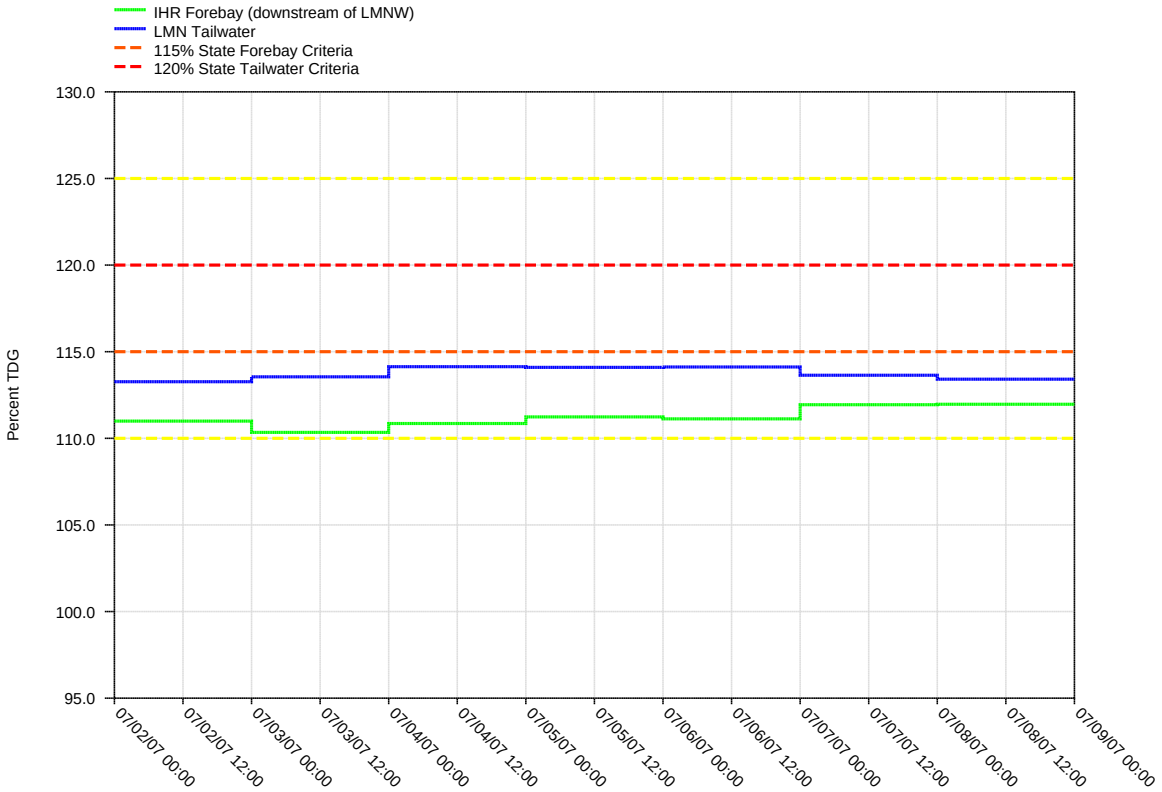


Figure 3.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

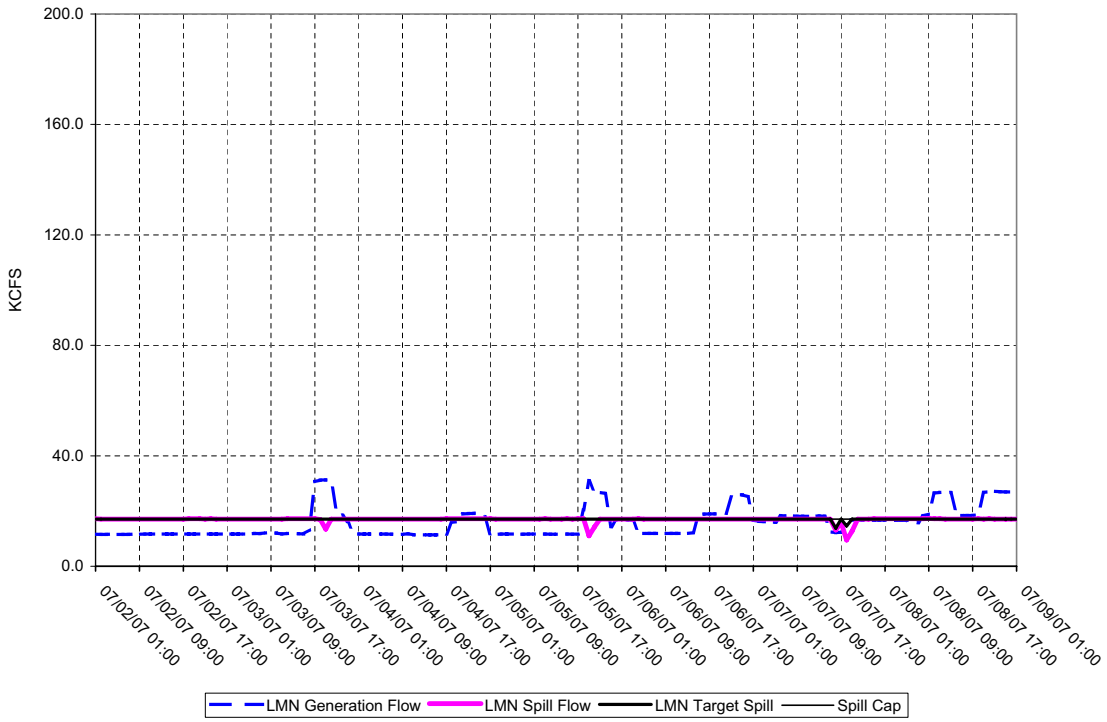
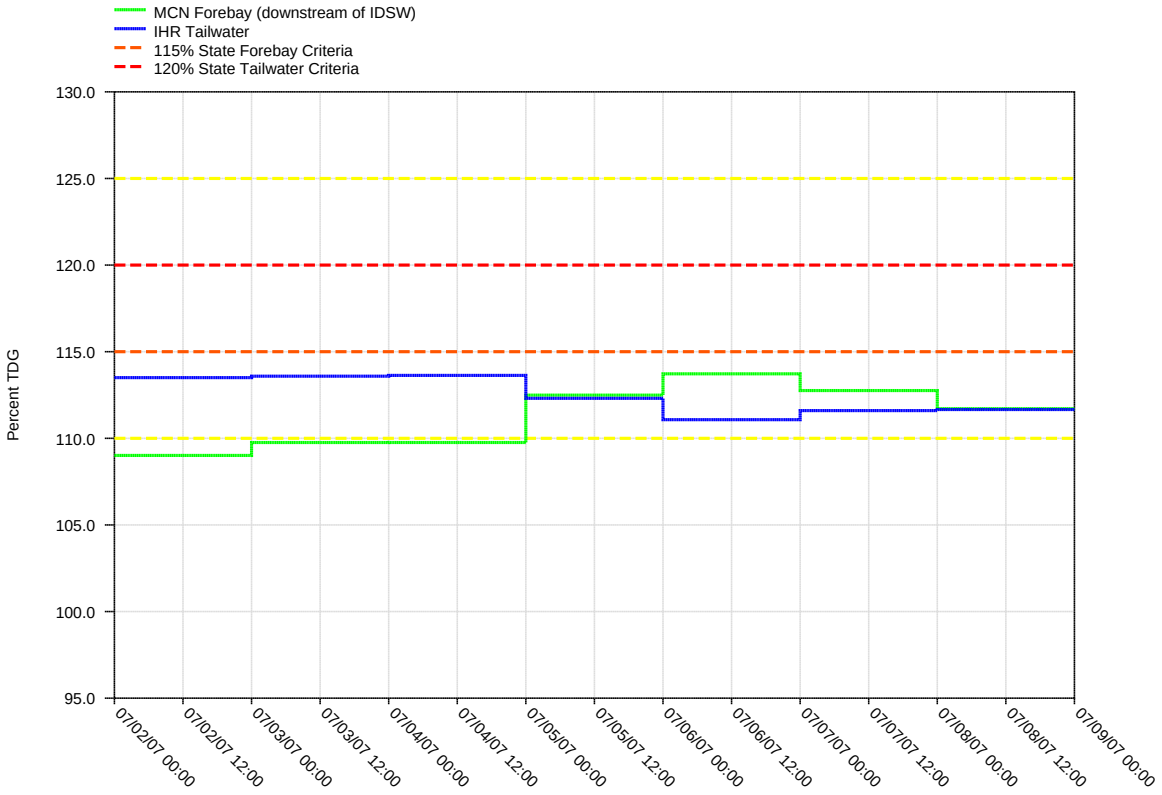


Figure 4.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

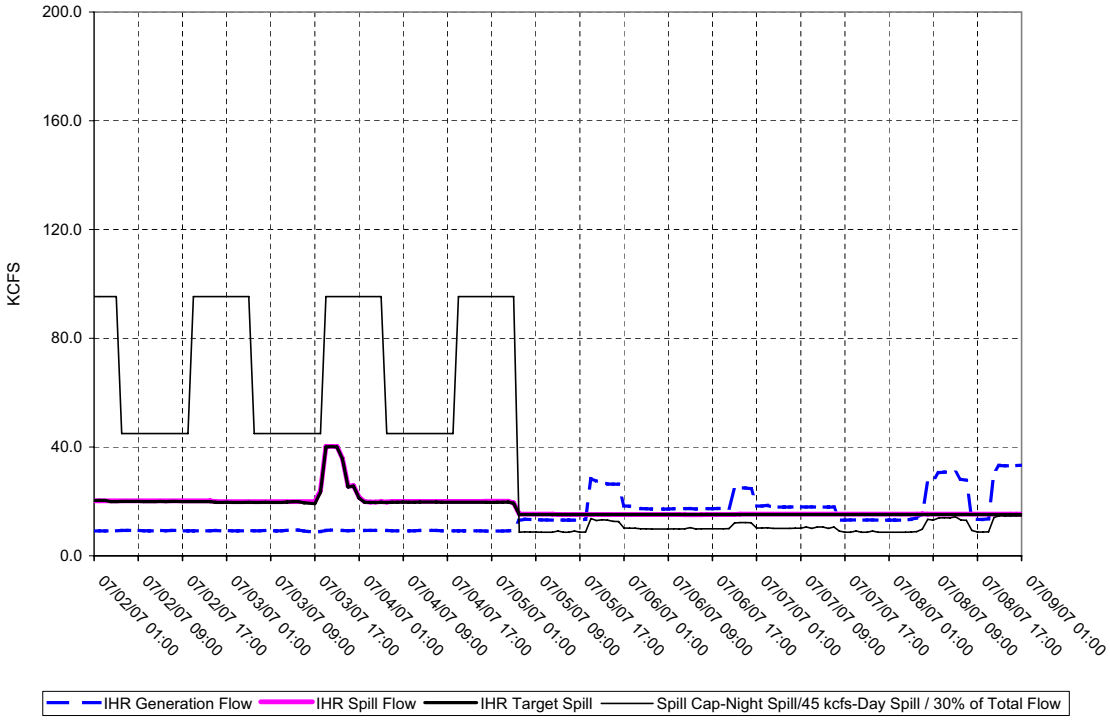
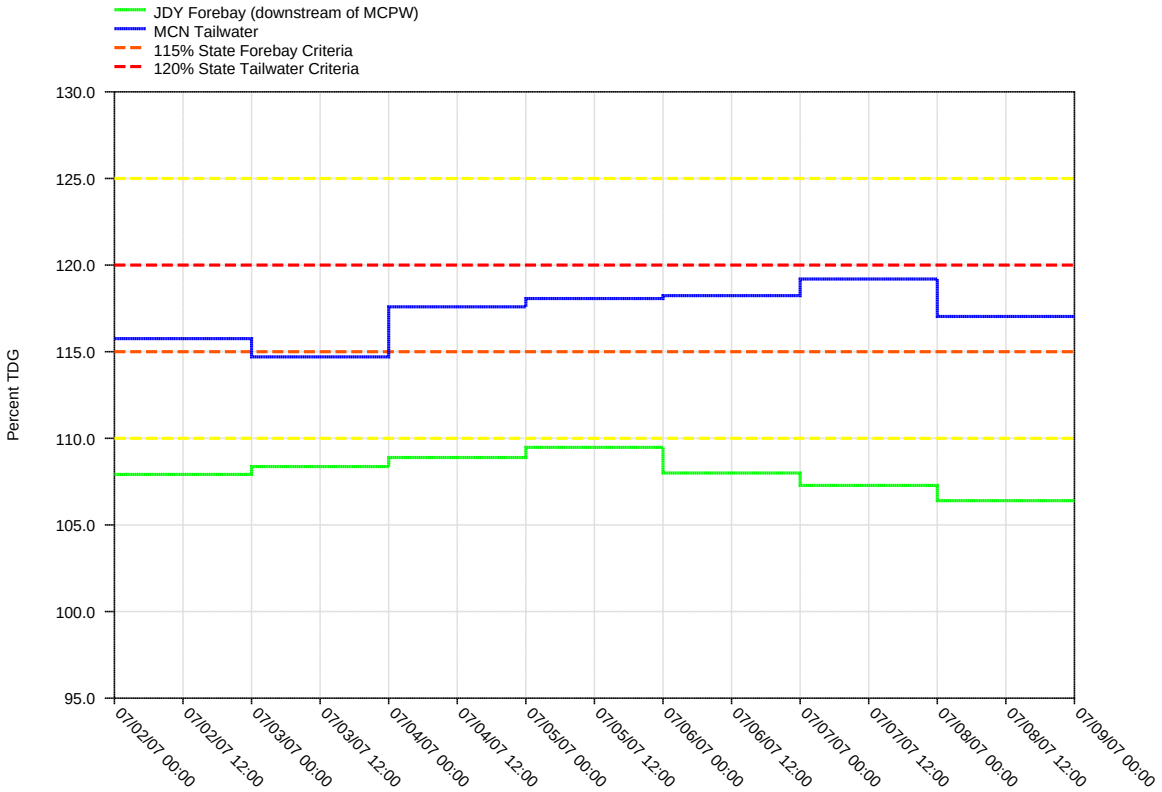


Figure 5.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

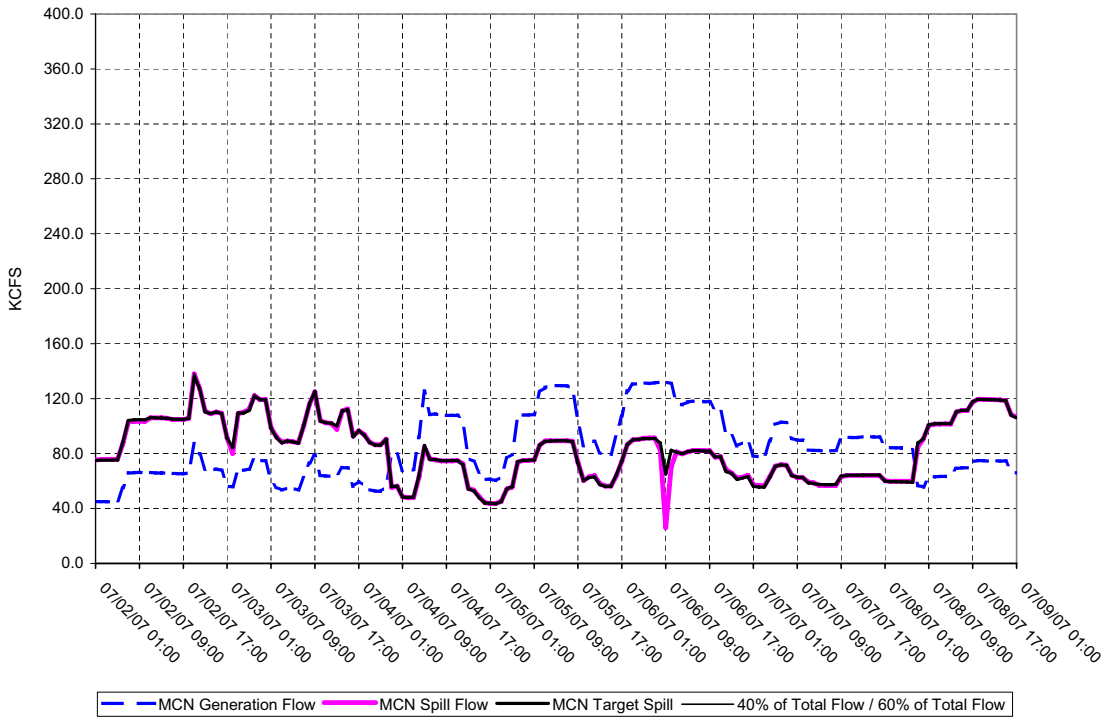
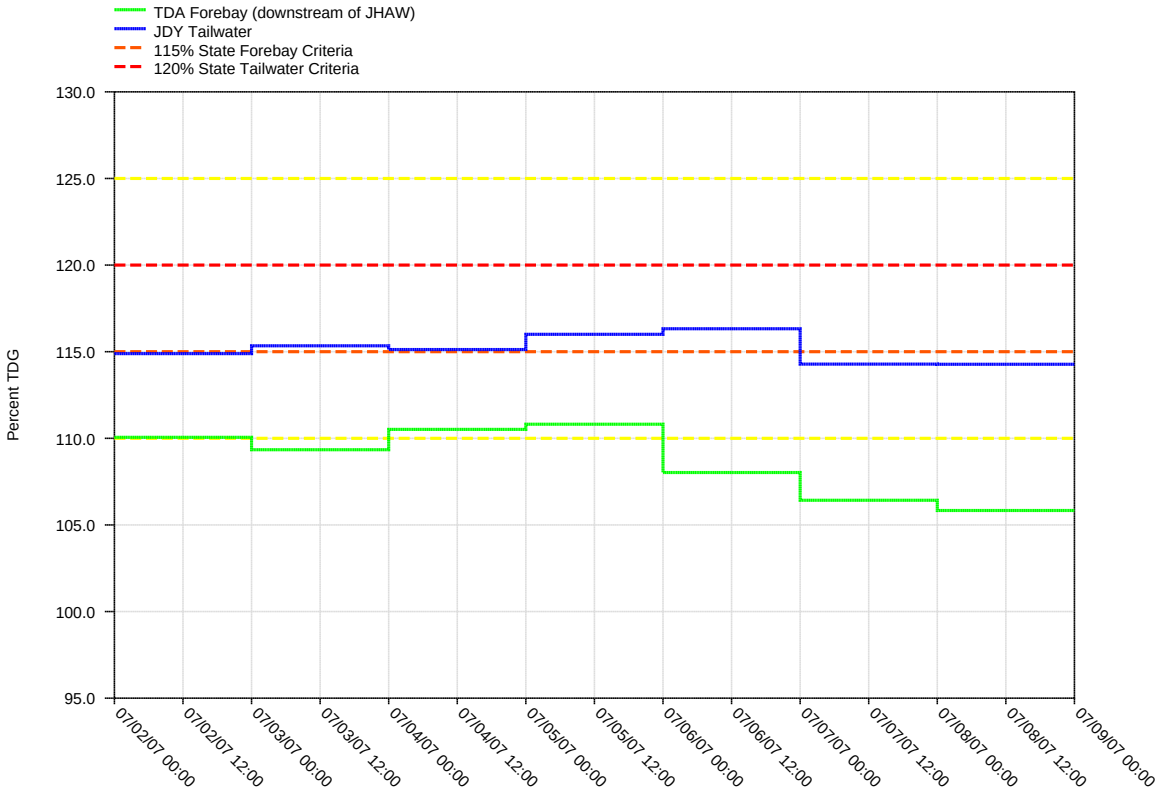


Figure 6.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

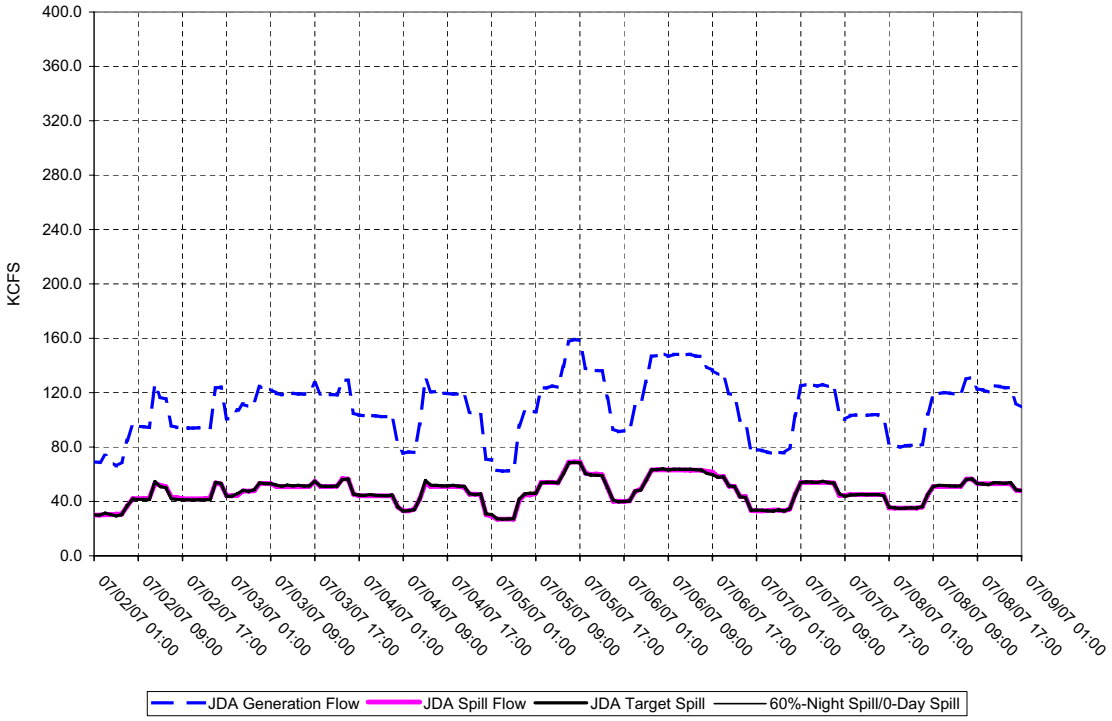
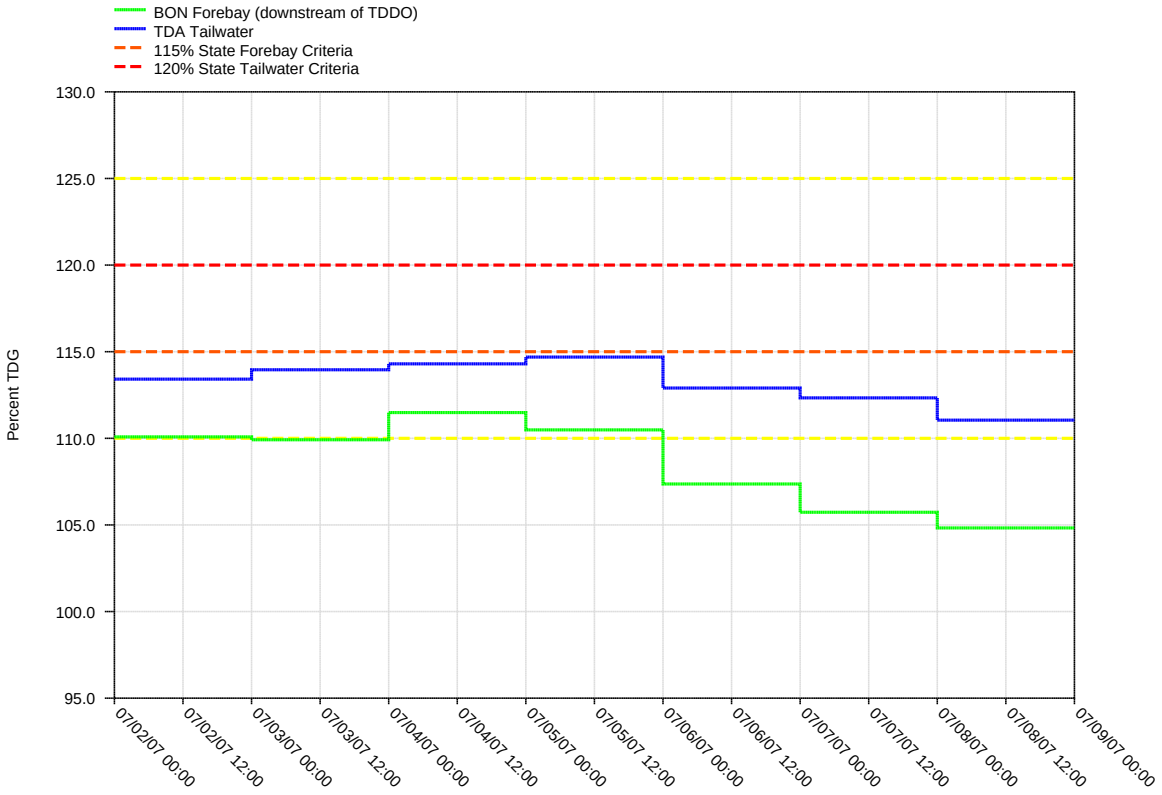


Figure 7.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

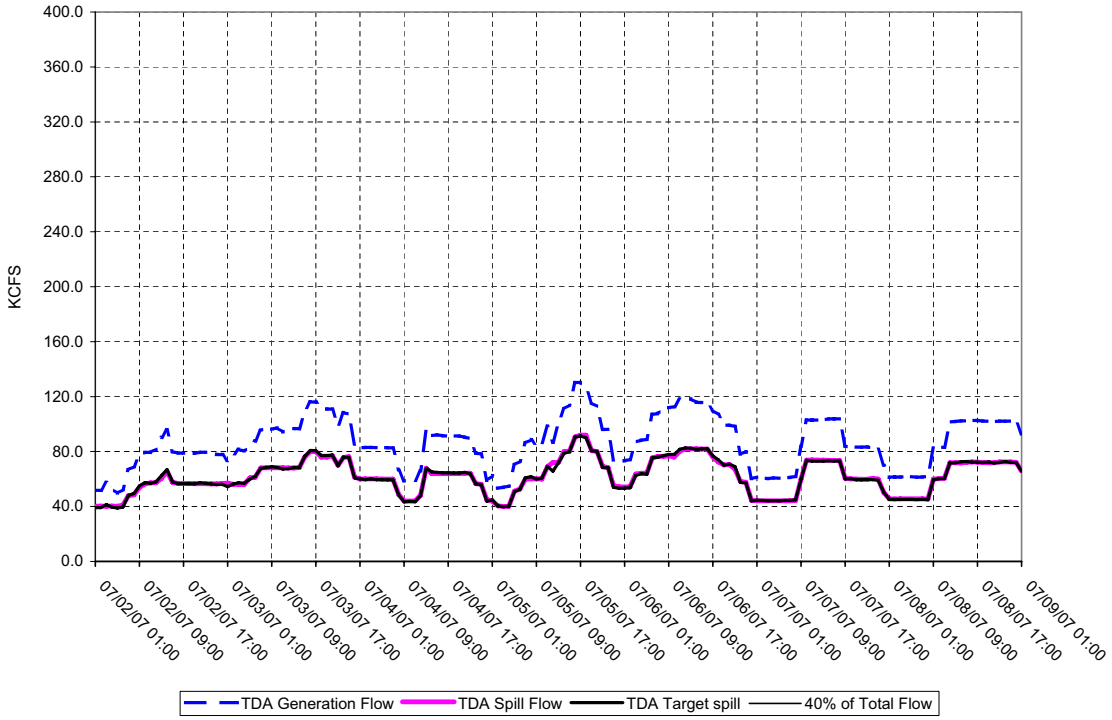
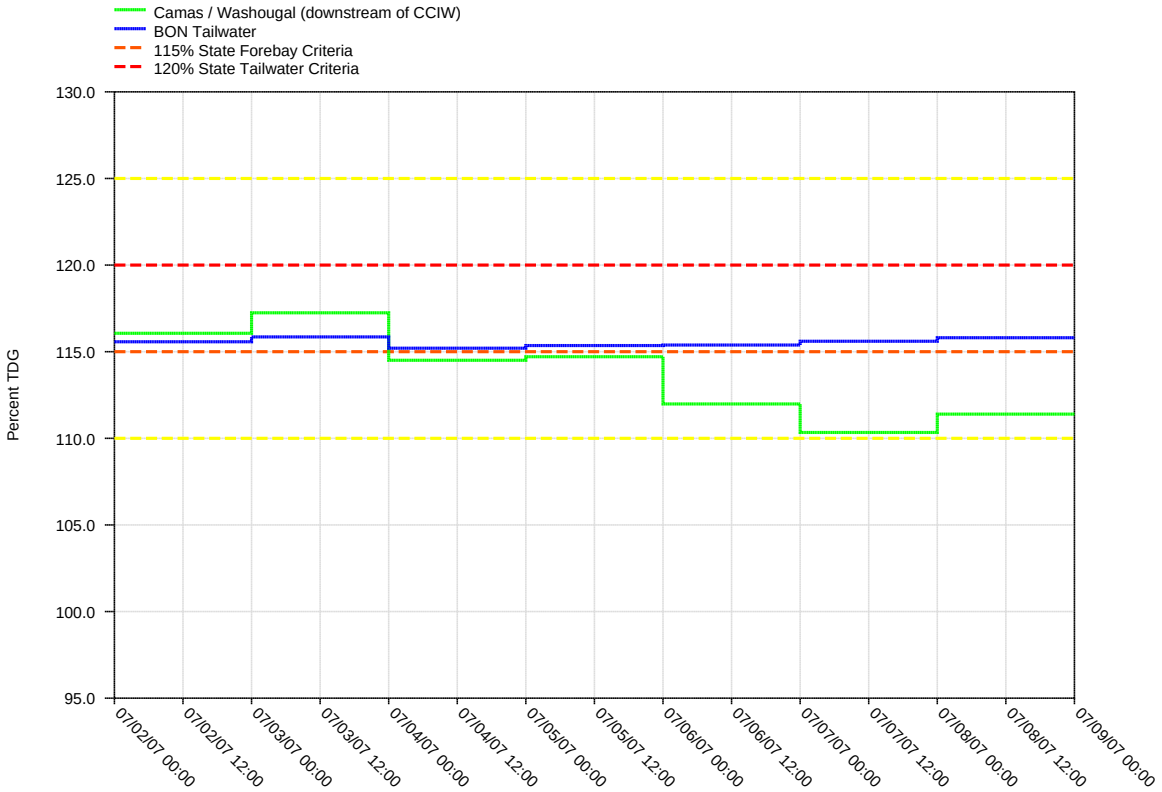


Figure 8.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

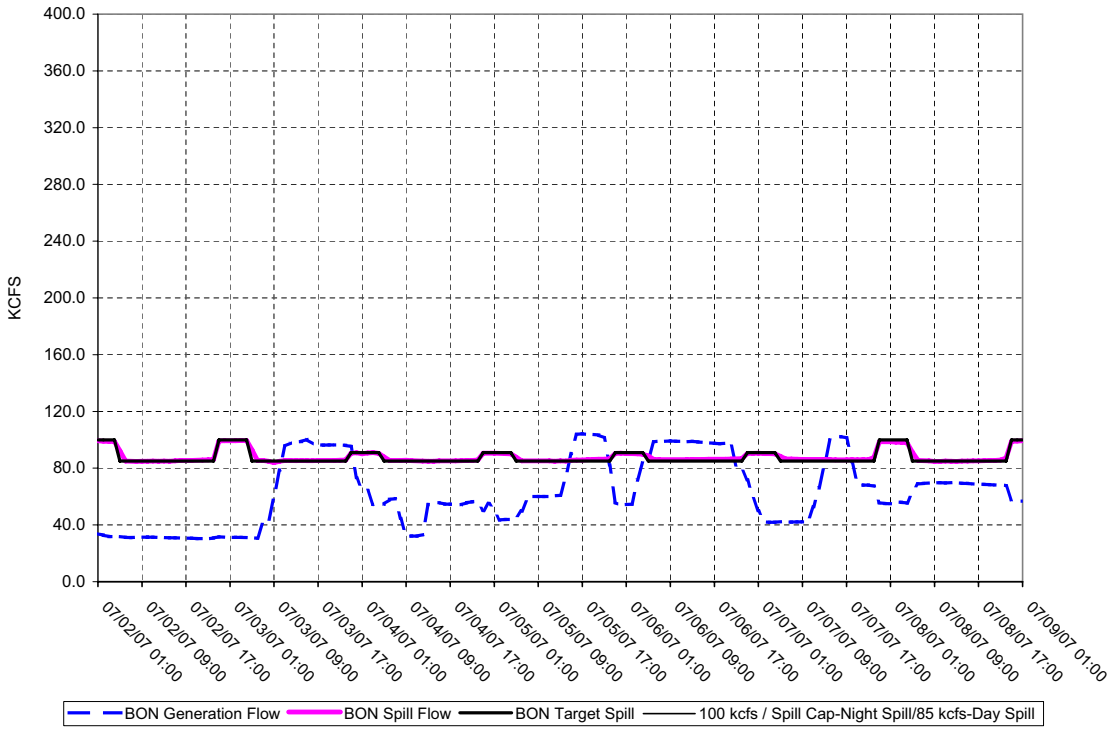
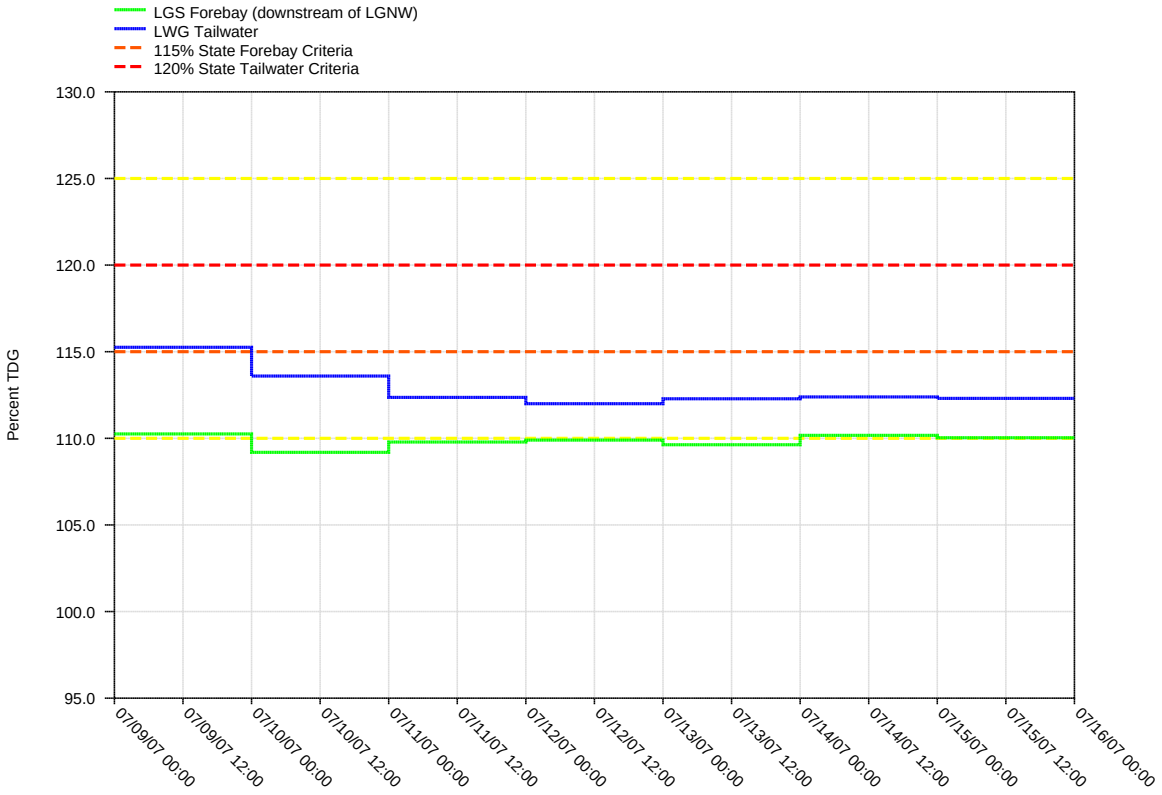


Figure 9.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

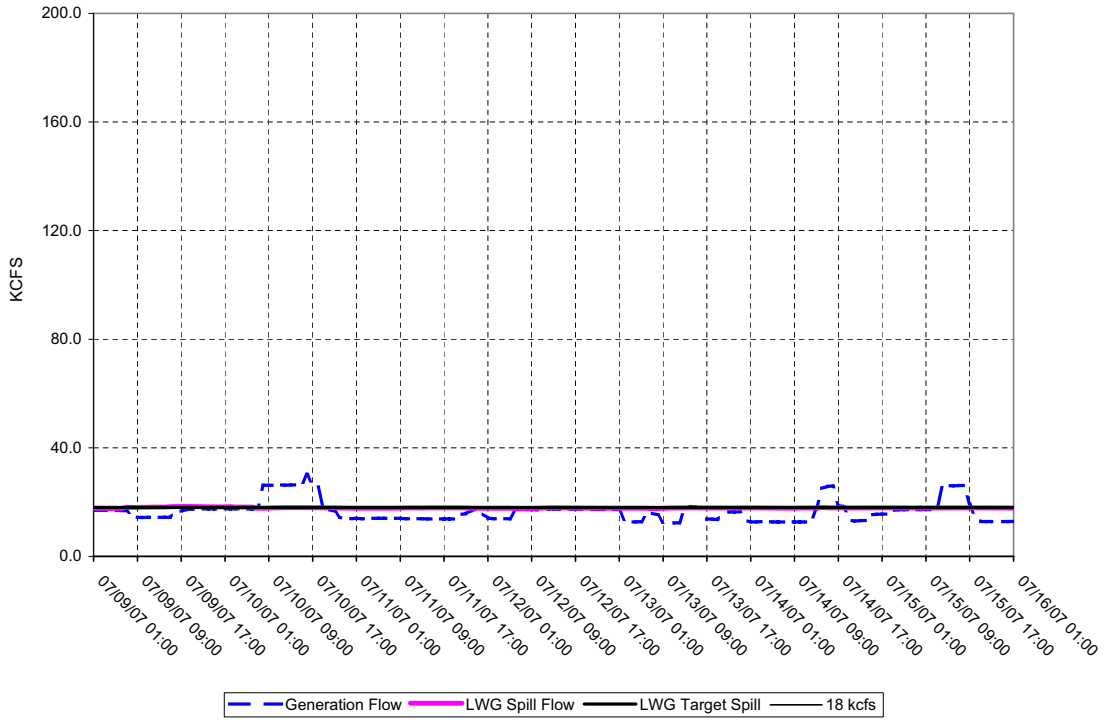
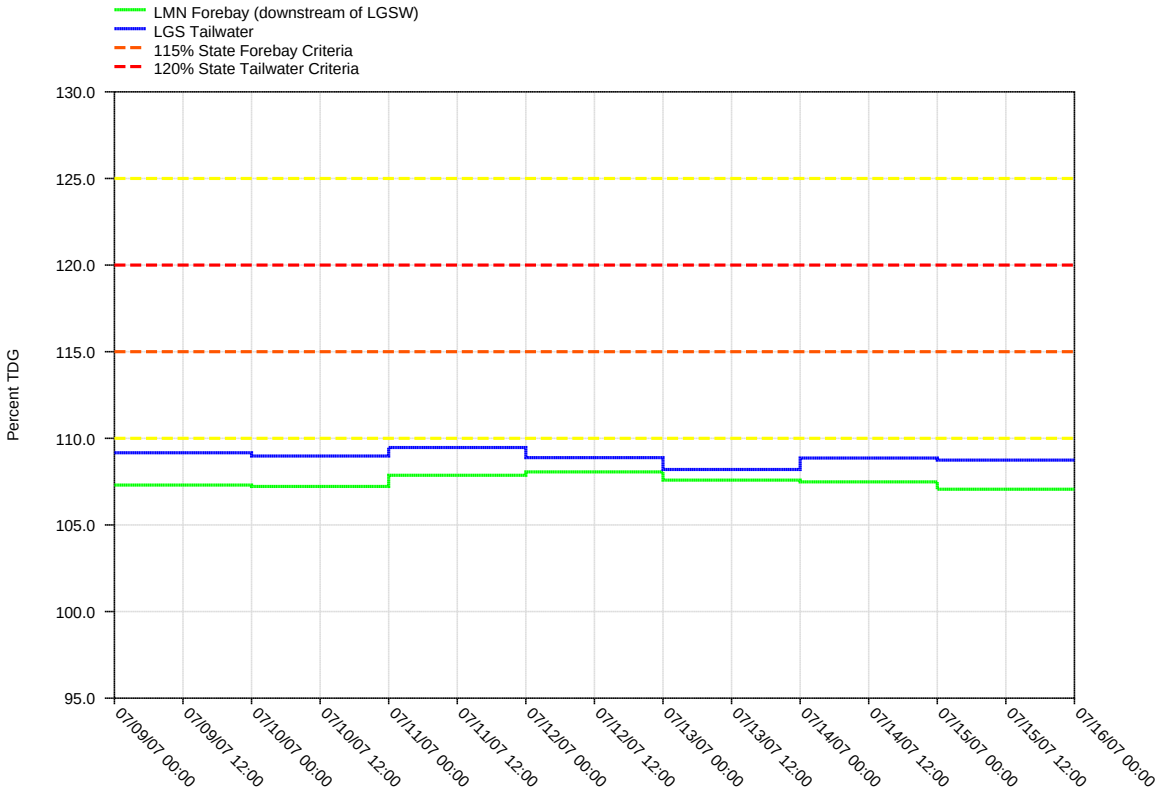


Figure 10.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

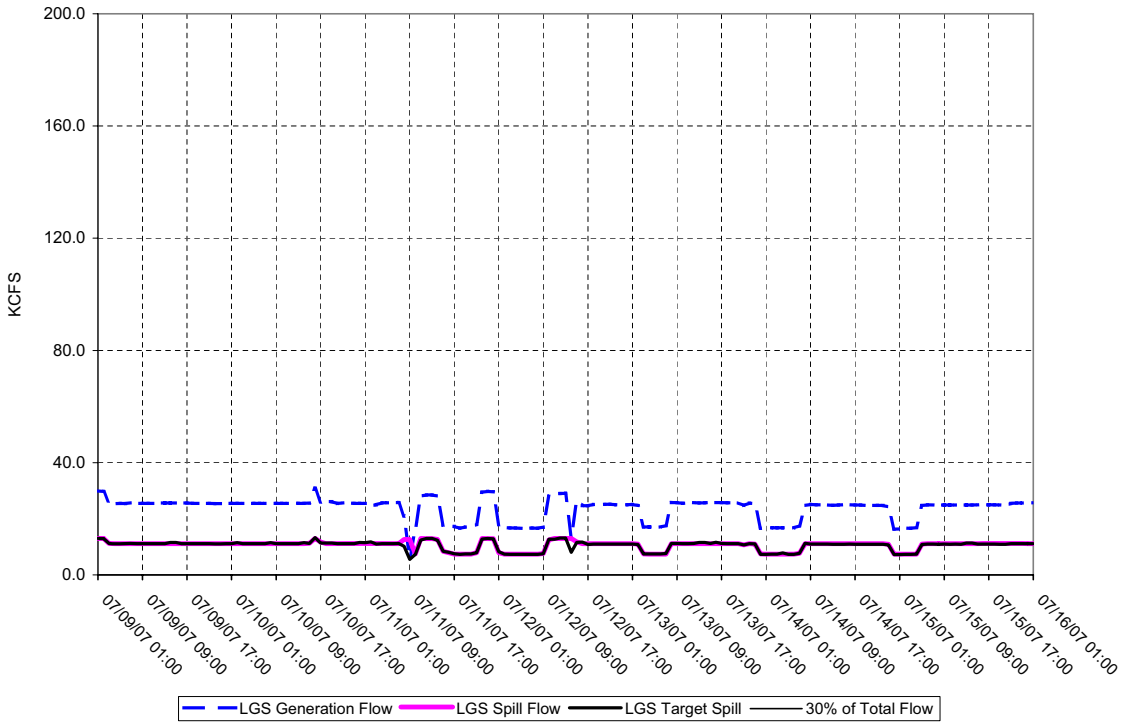
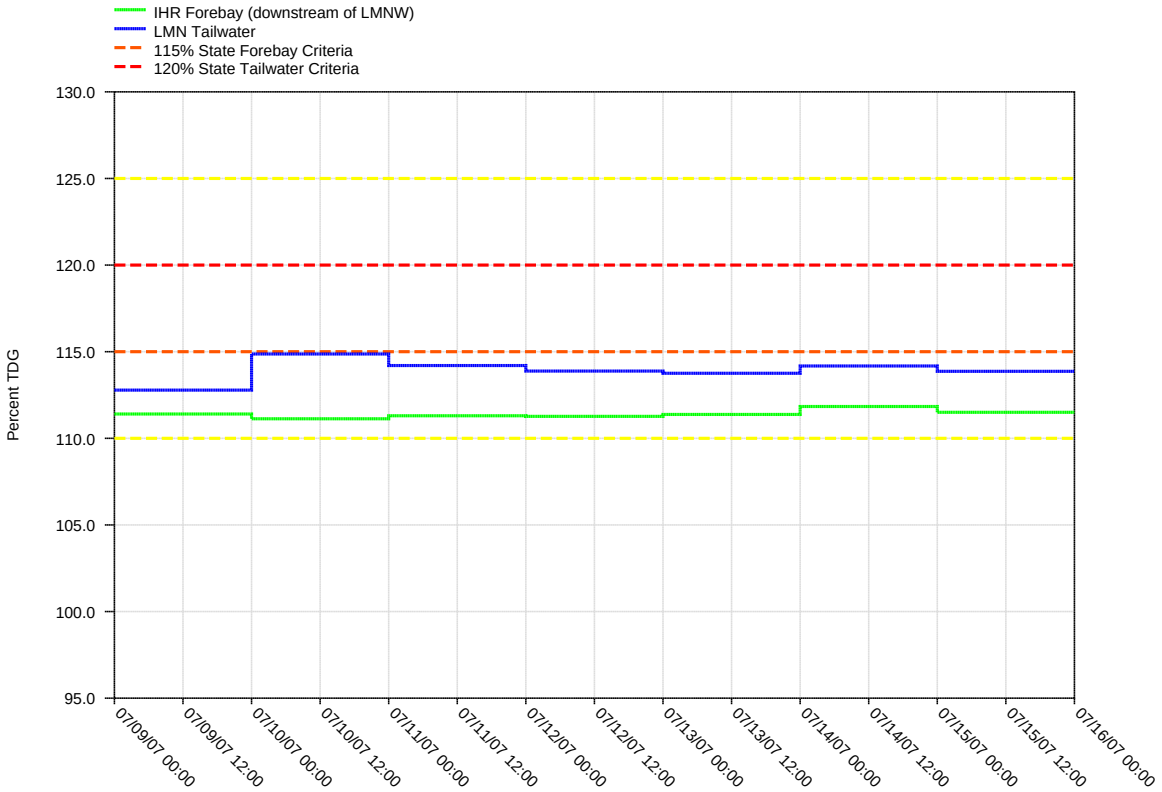


Figure 11.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

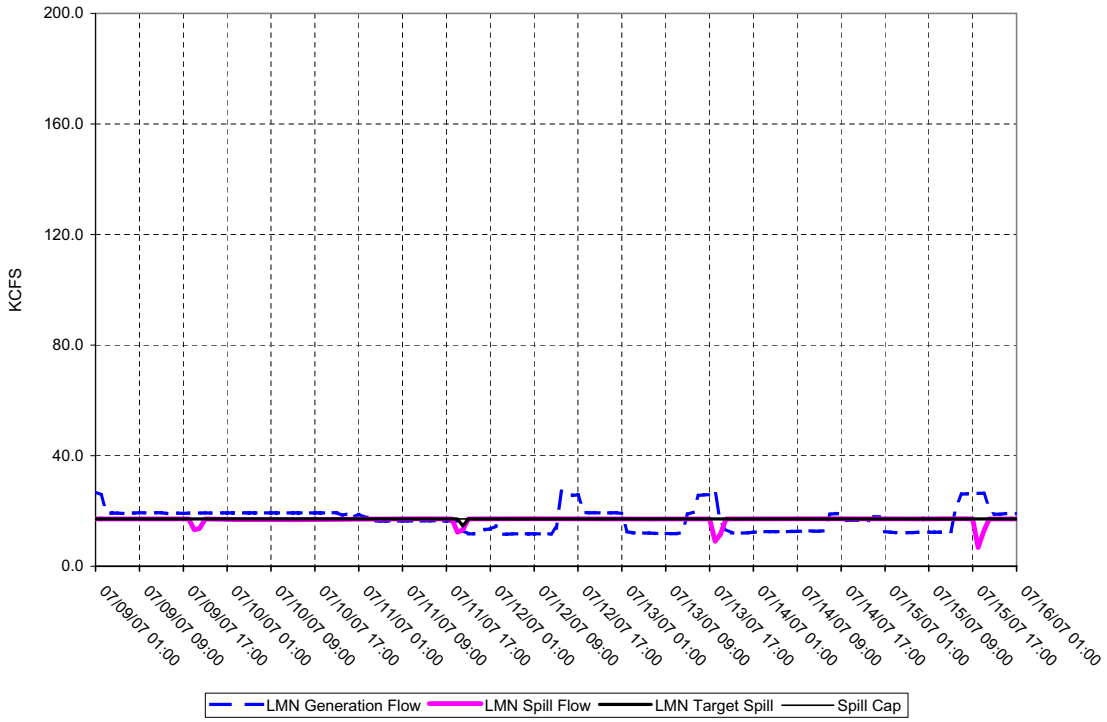
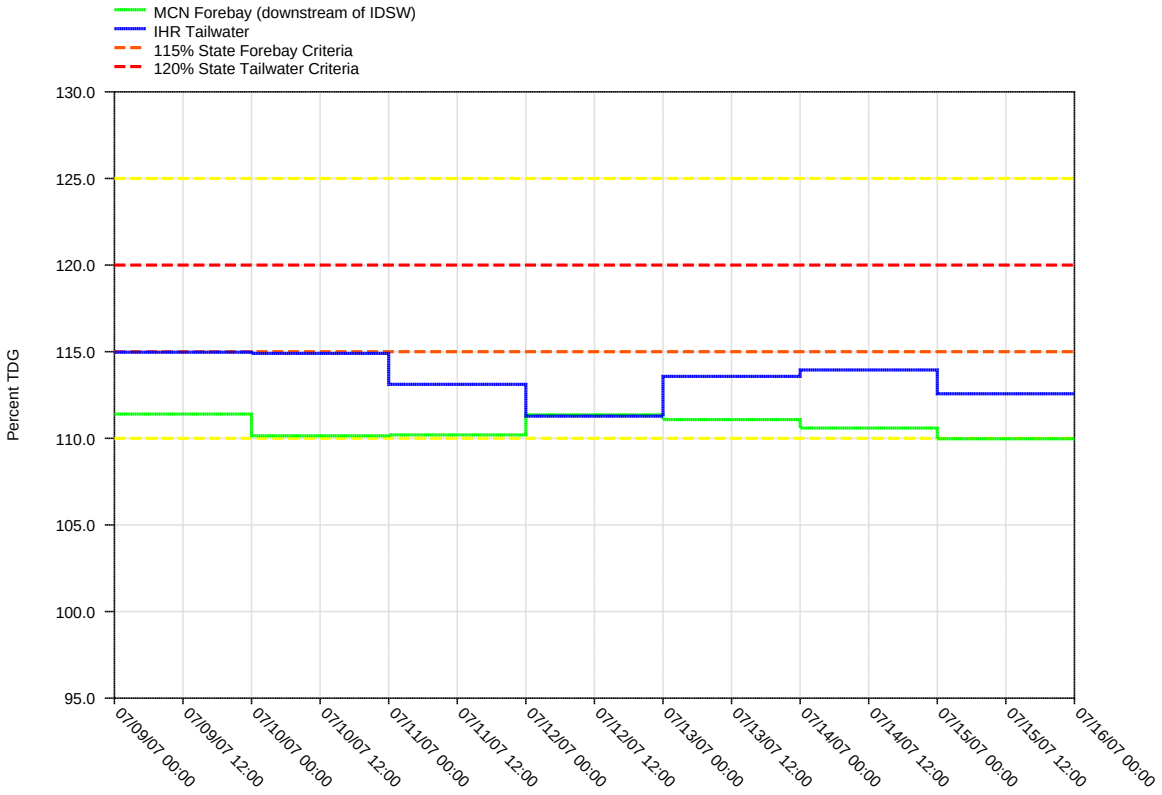


Figure 12.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

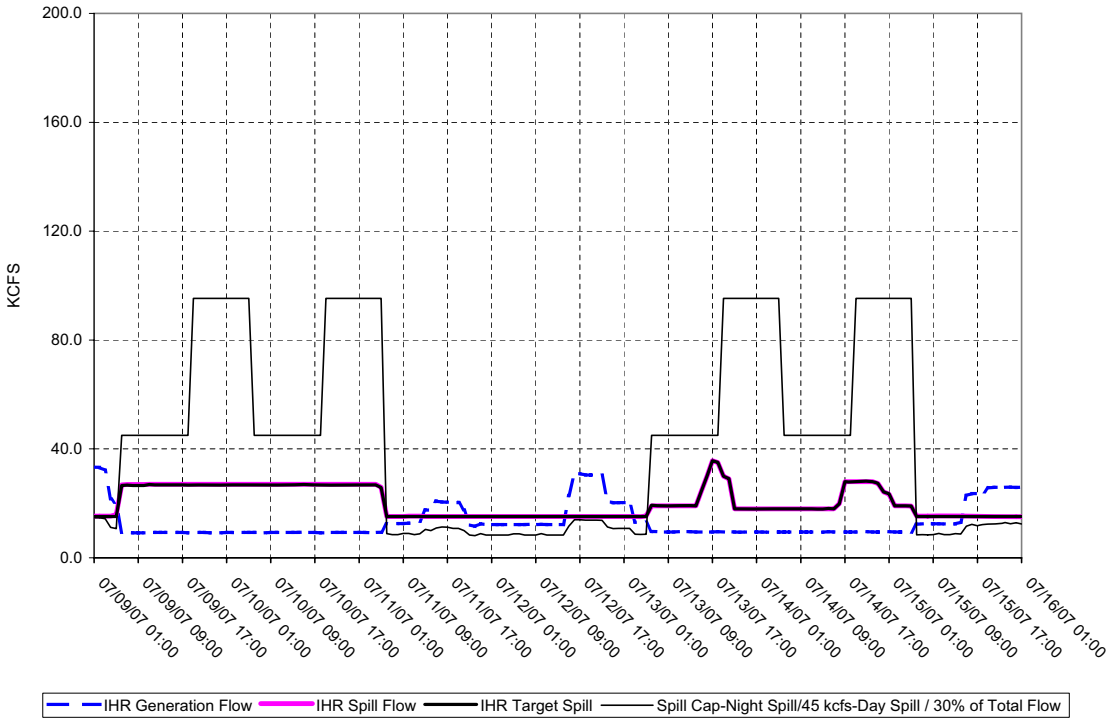
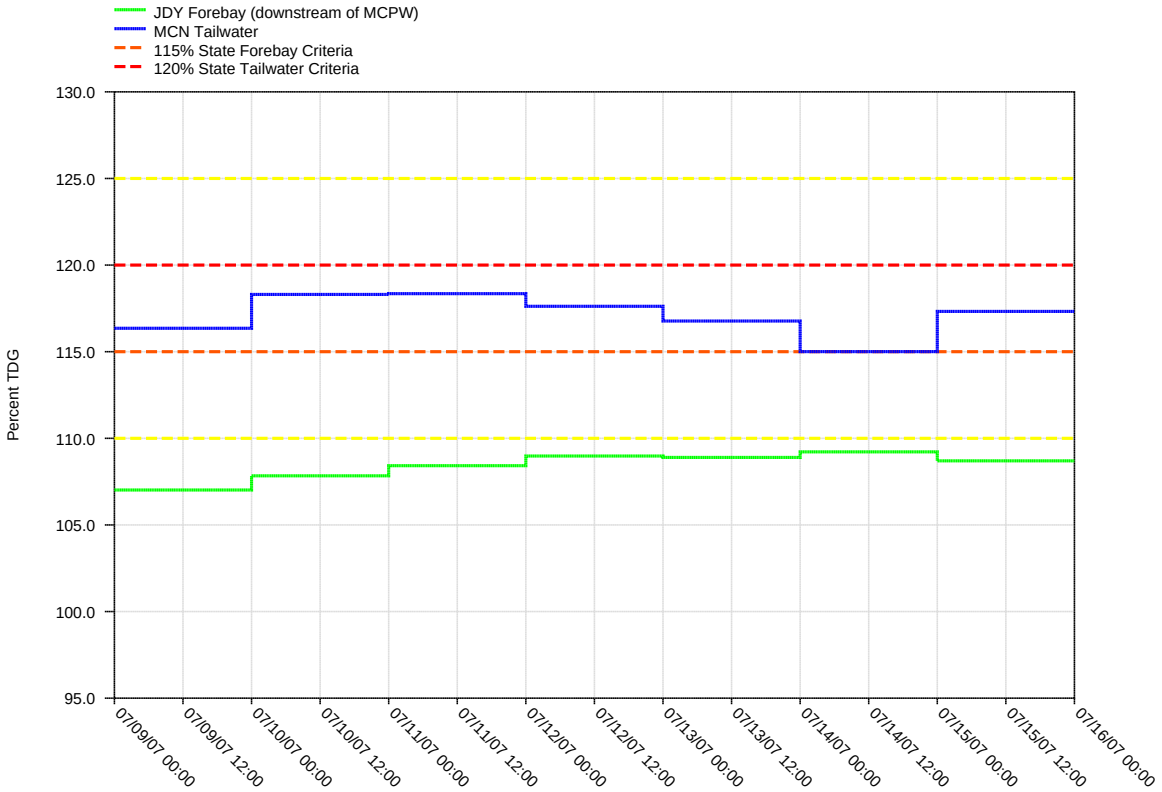


Figure 13.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

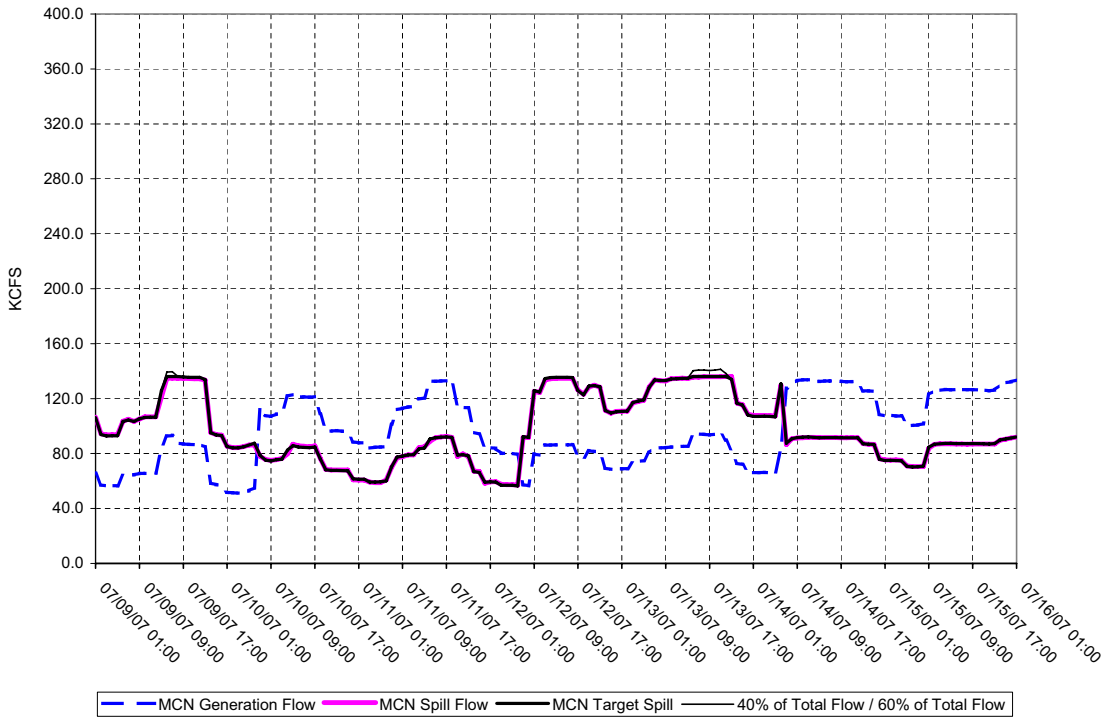
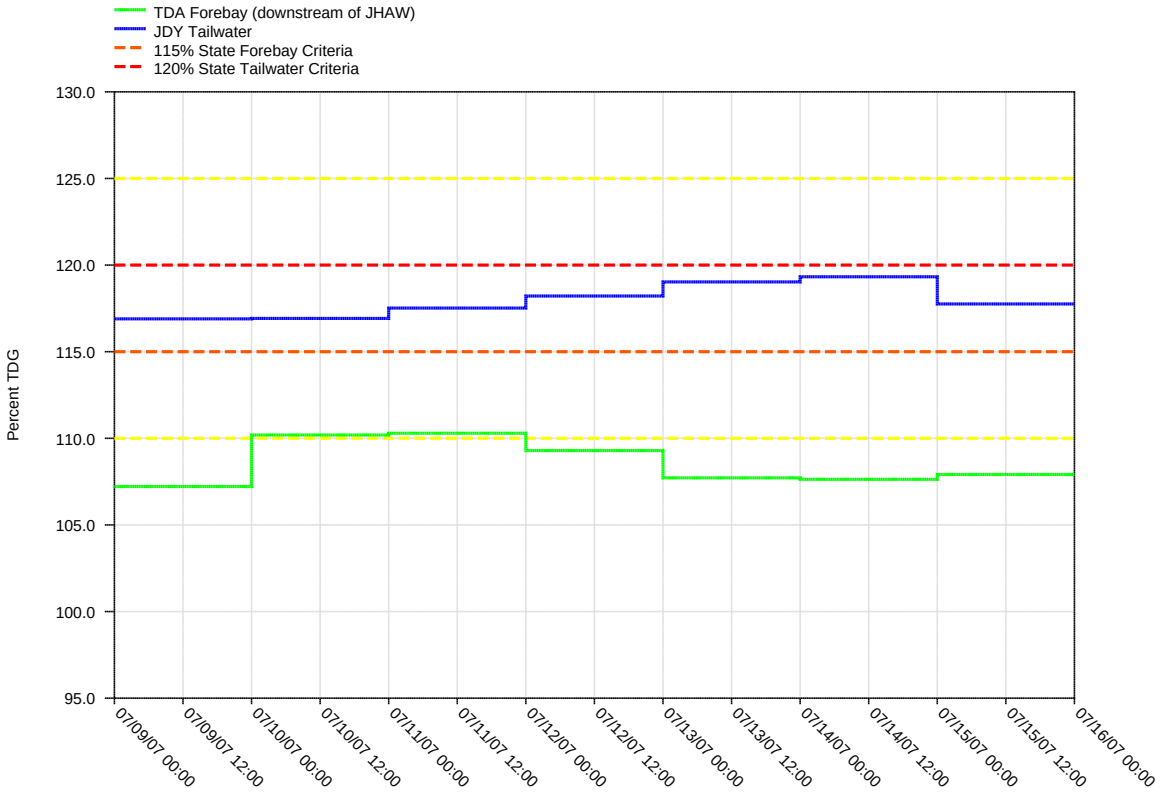


Figure 14.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

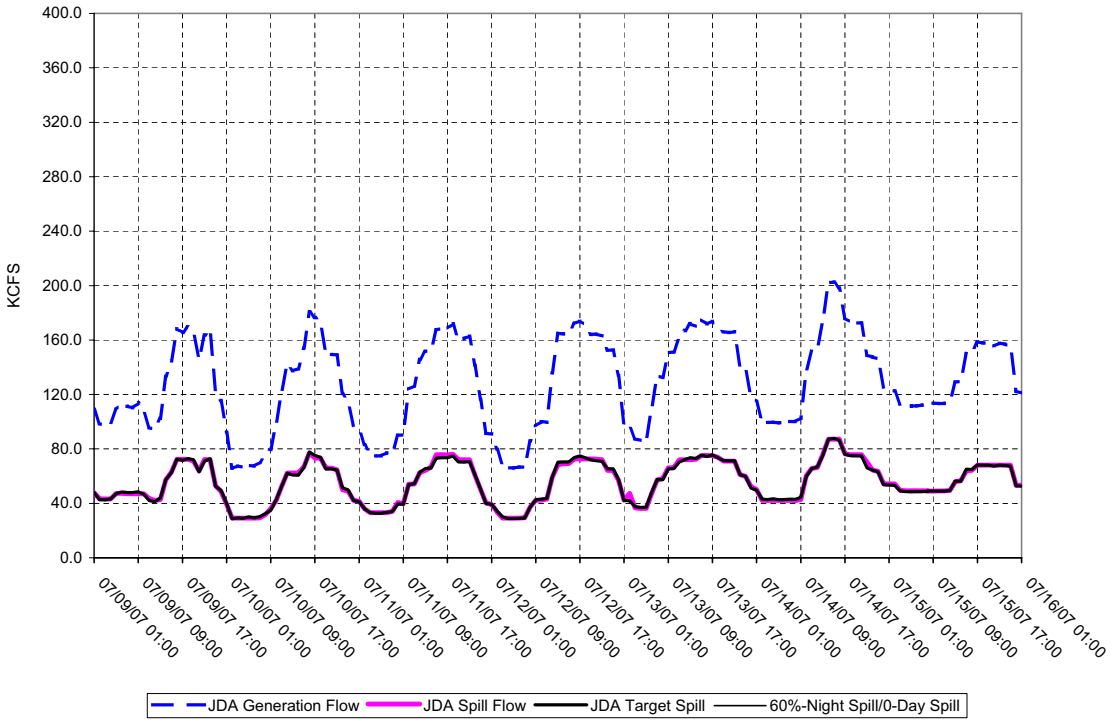
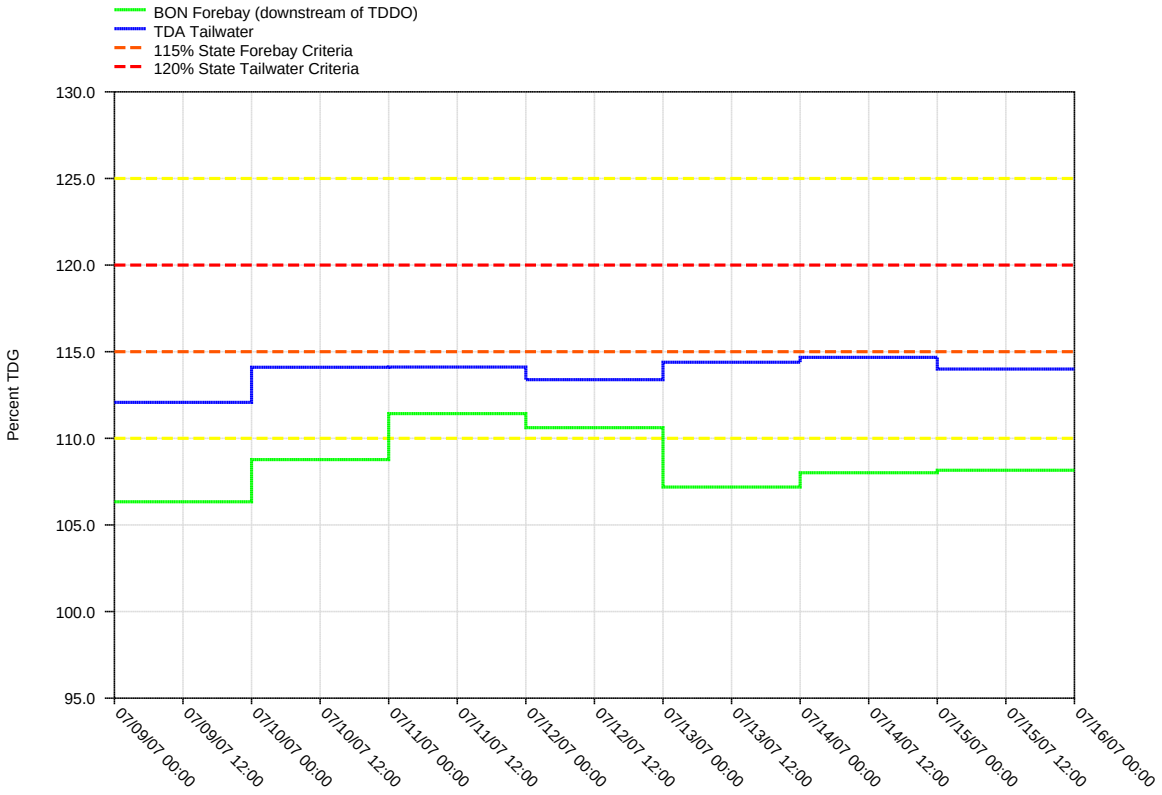


Figure 15.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

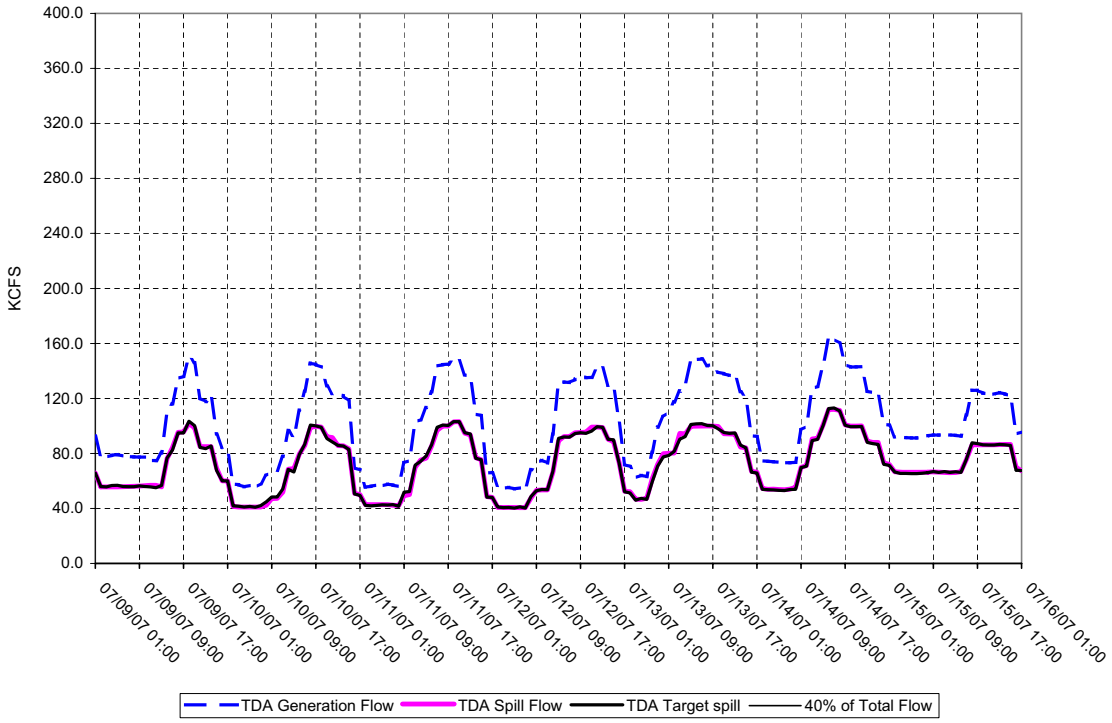
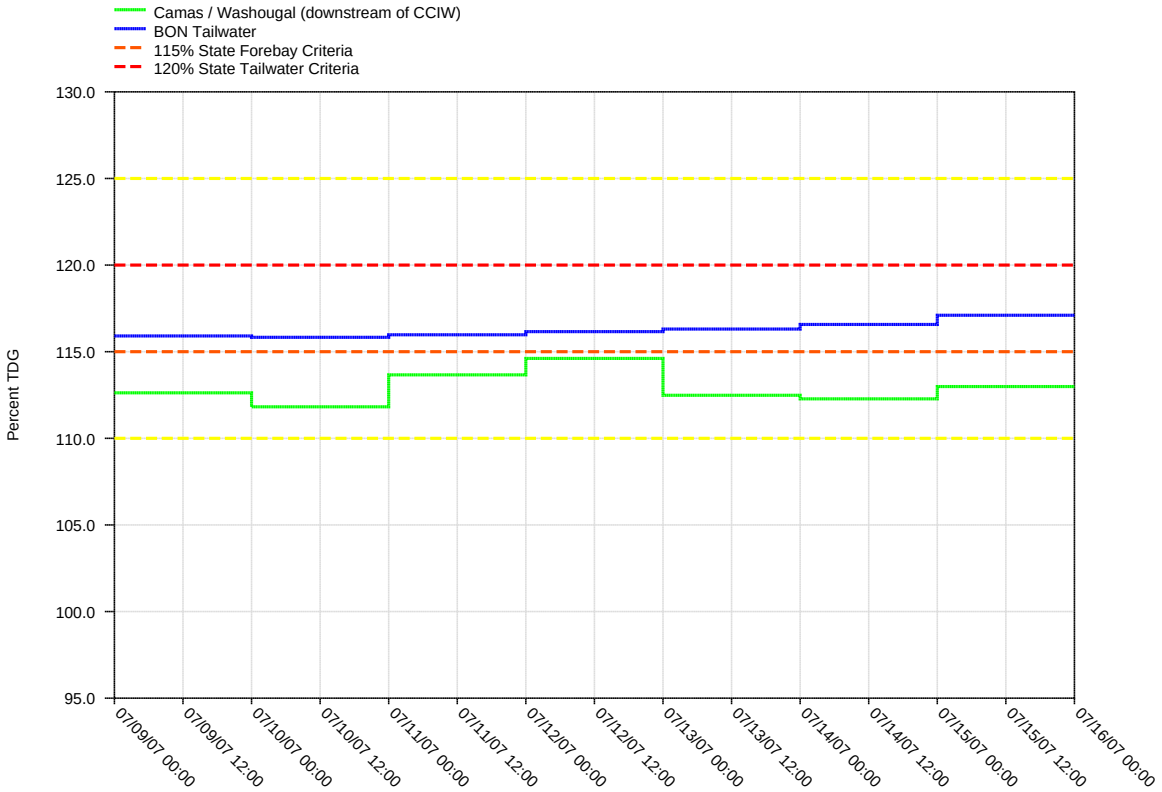


Figure 16.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

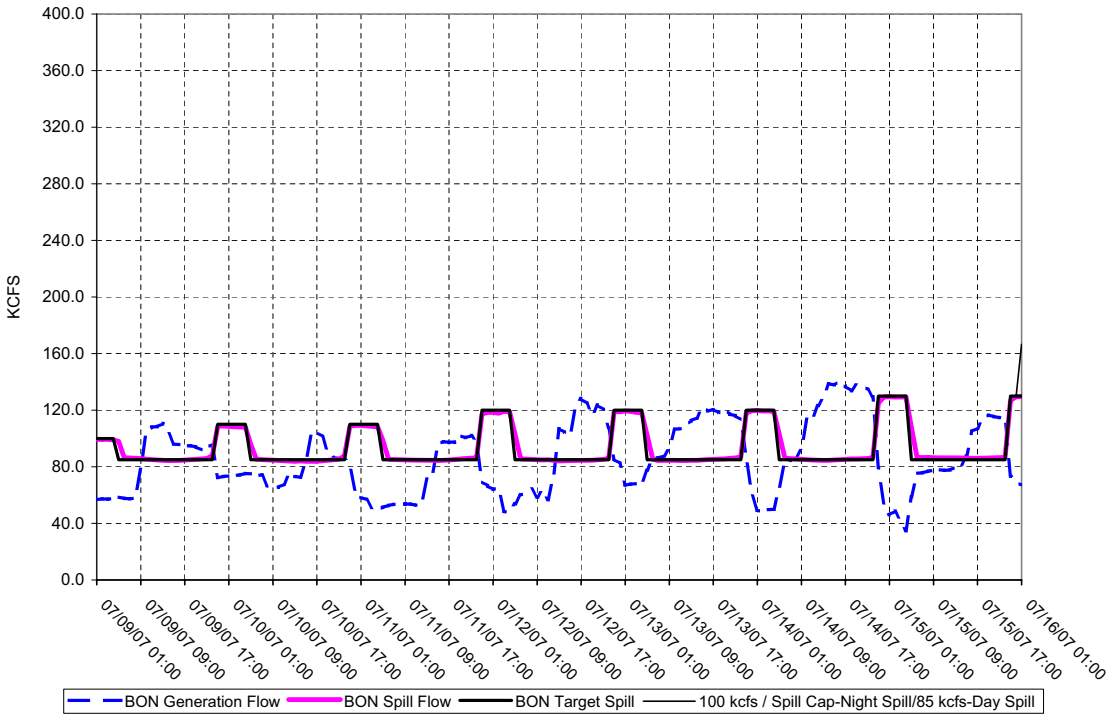
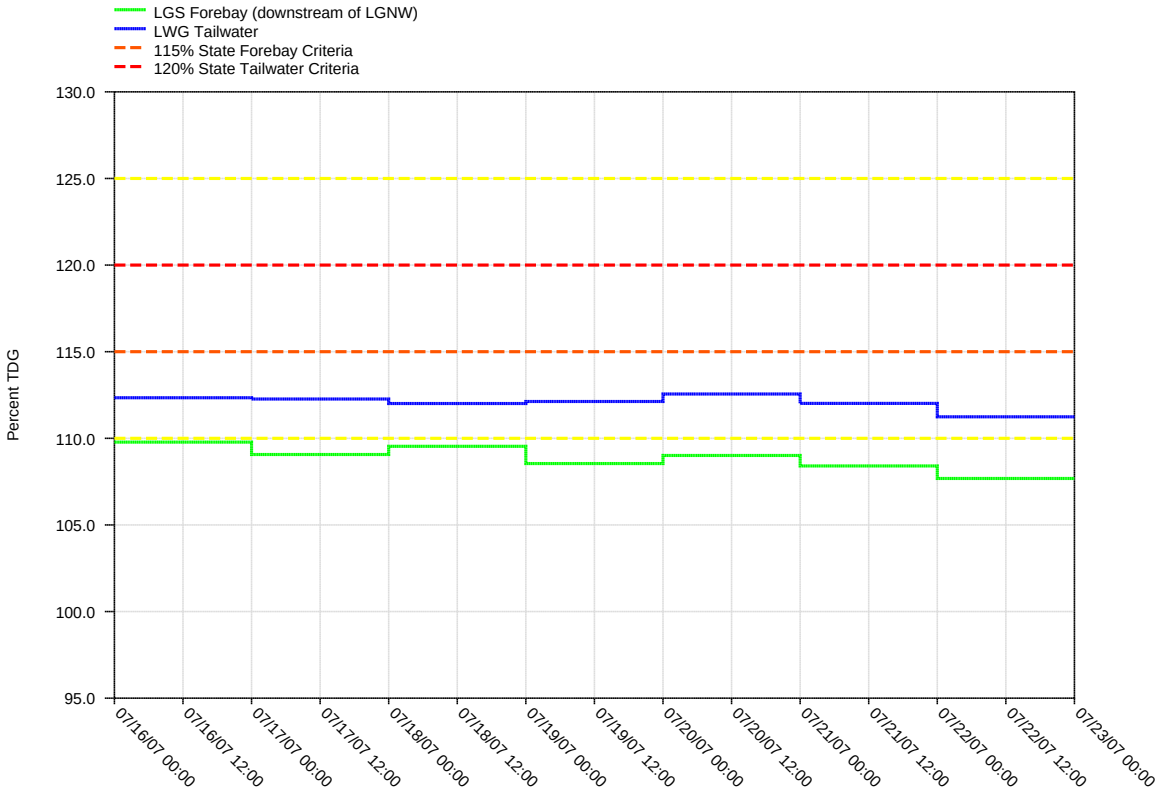


Figure 17.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

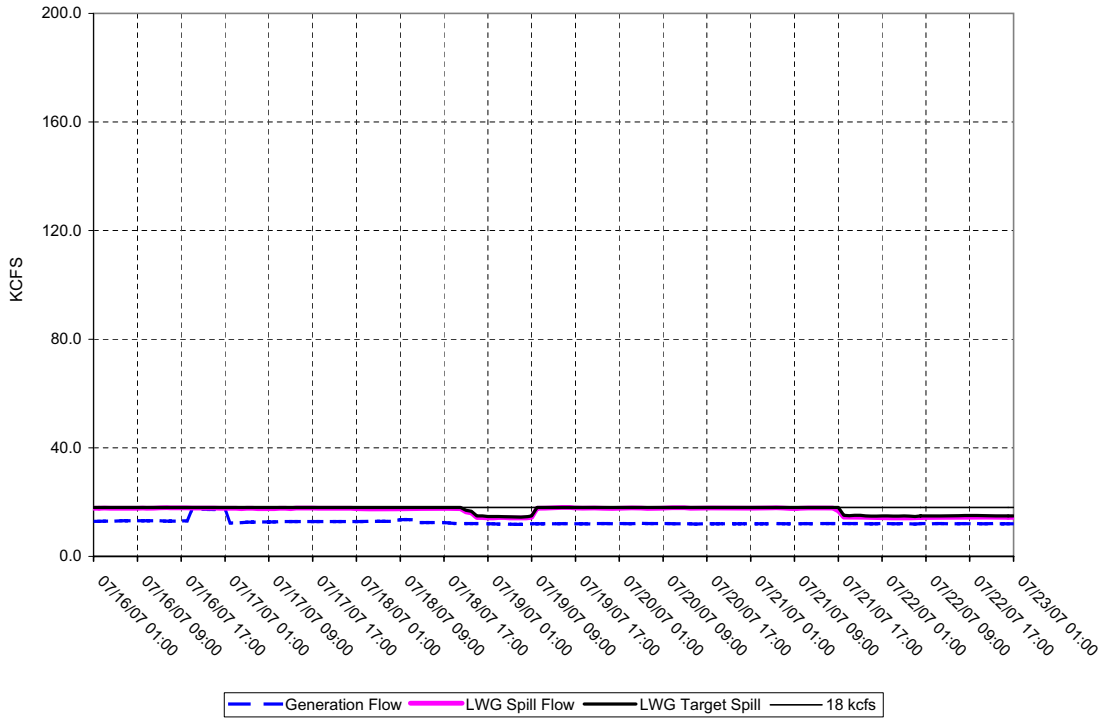
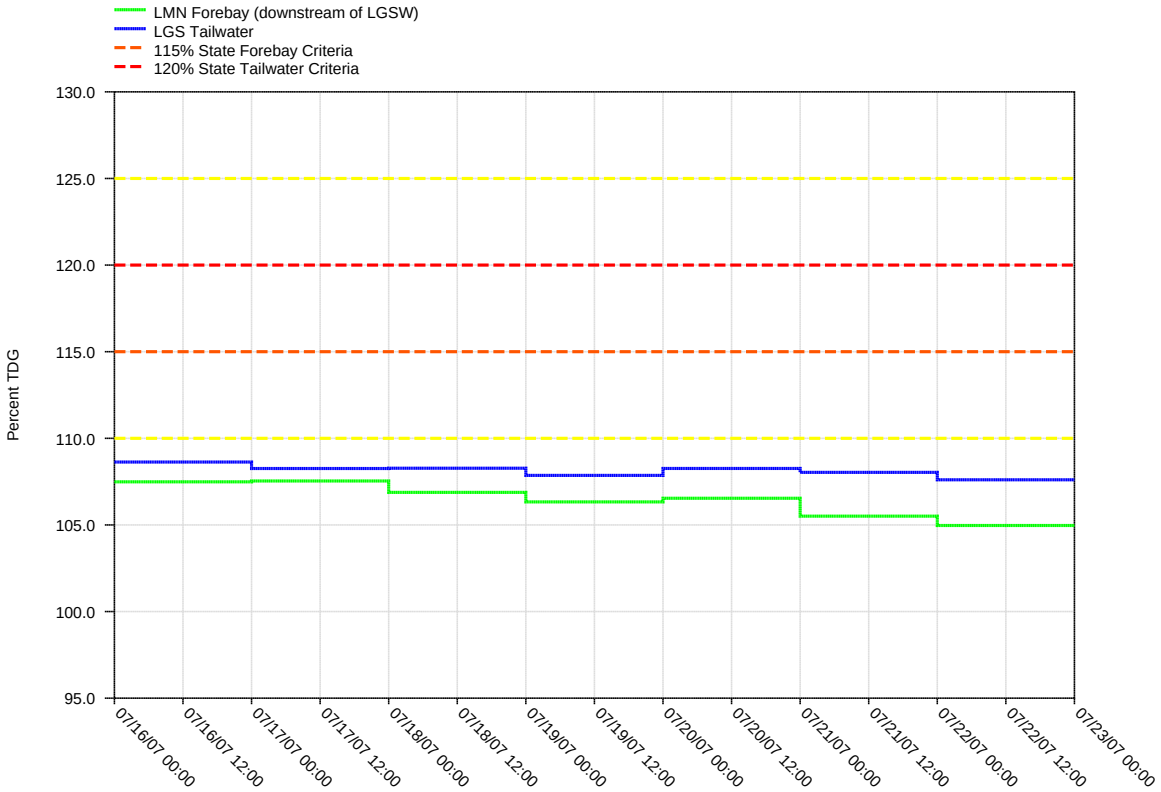


Figure 18.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

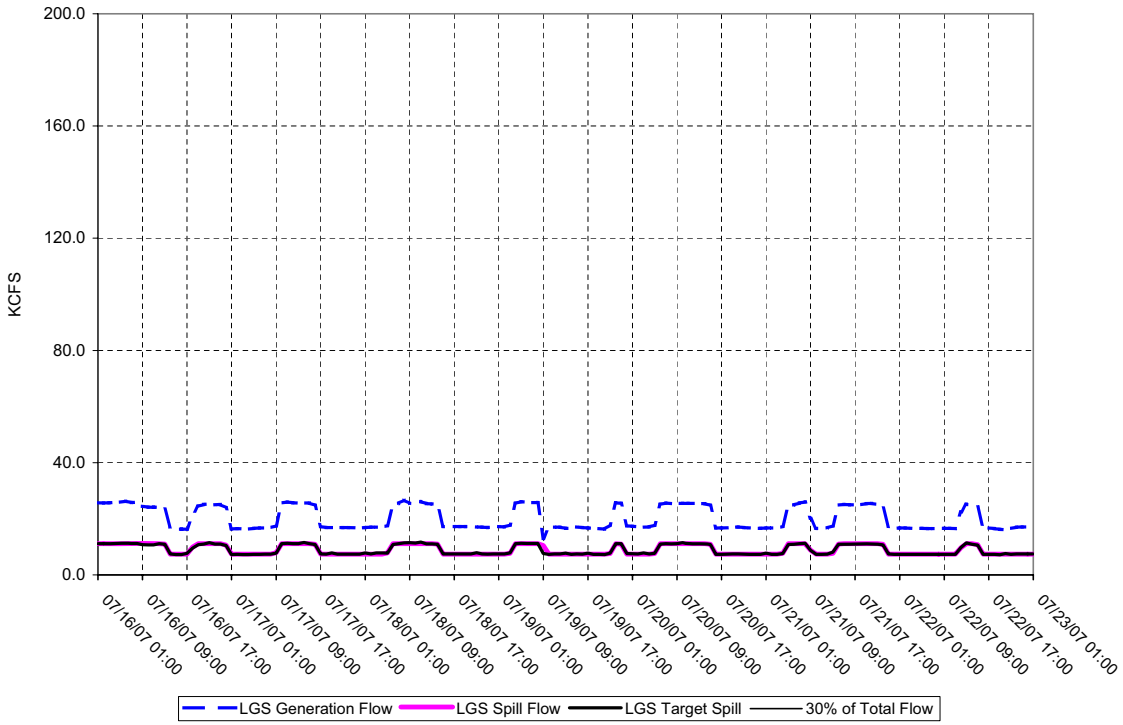
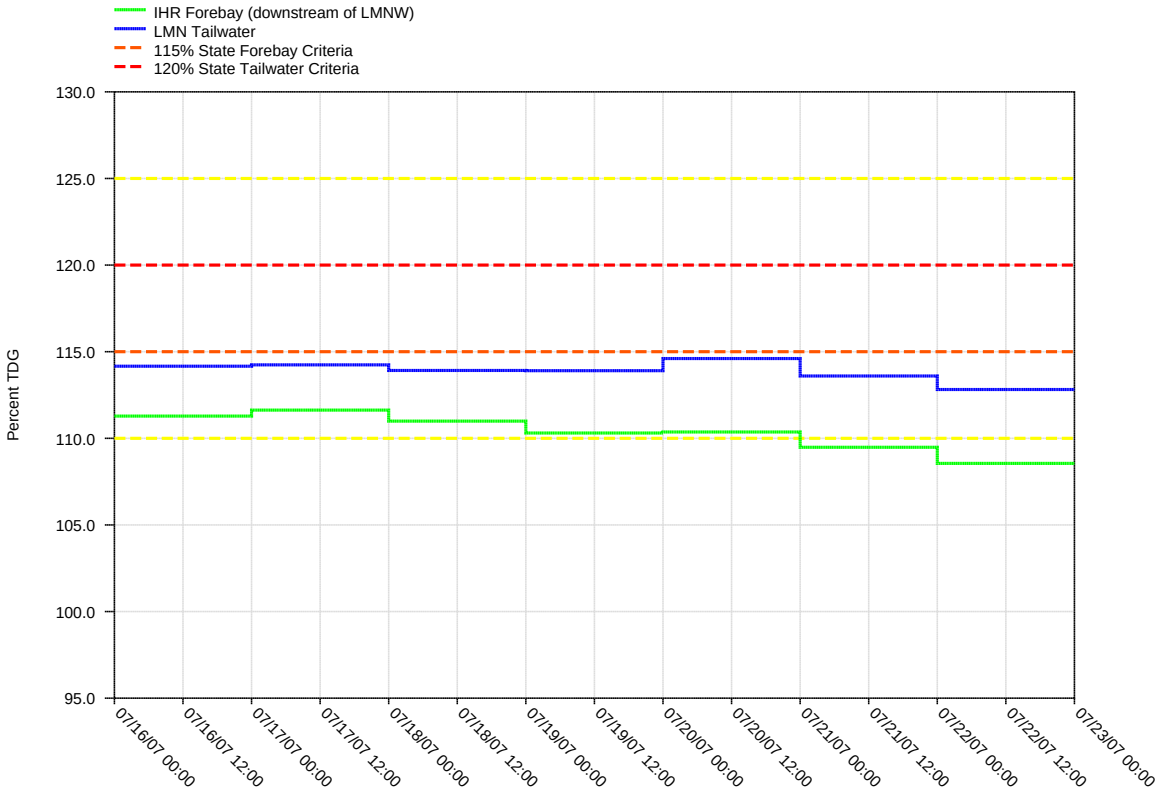


Figure 19.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

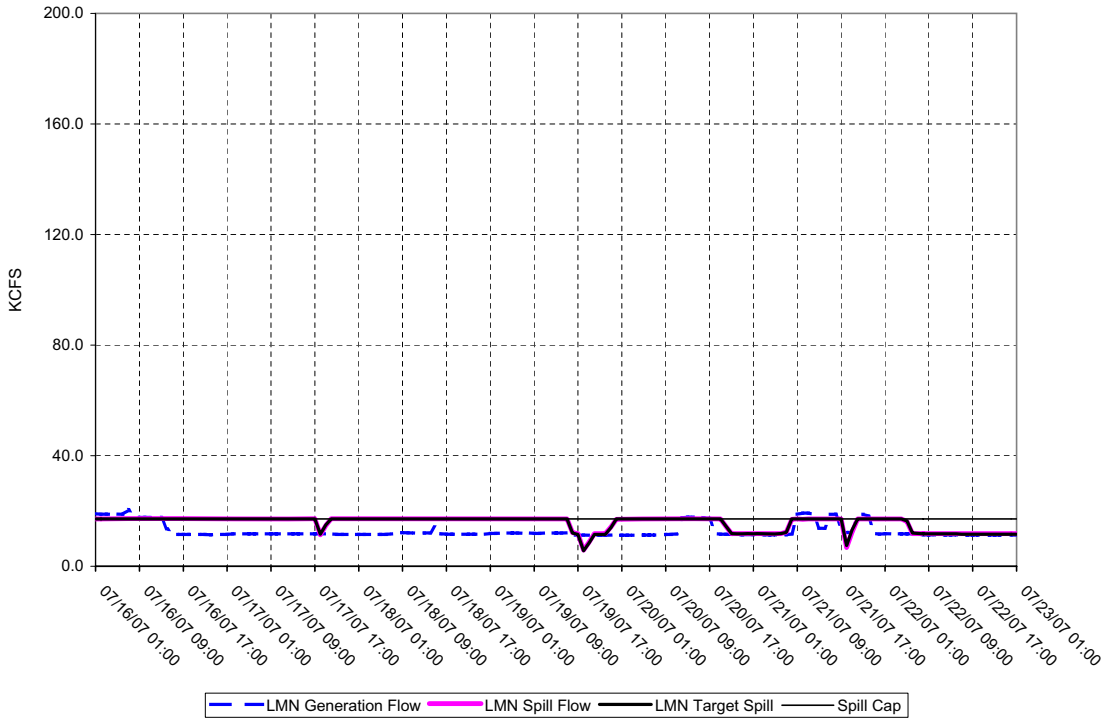
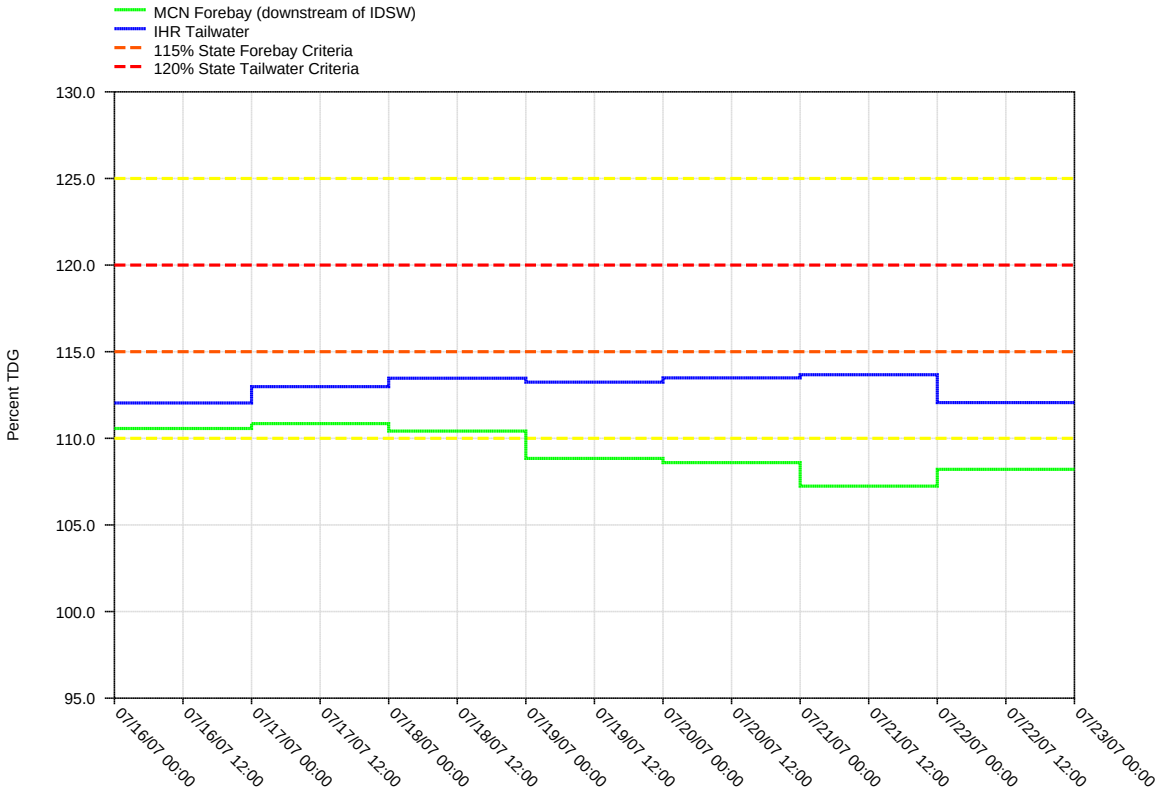


Figure 20.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

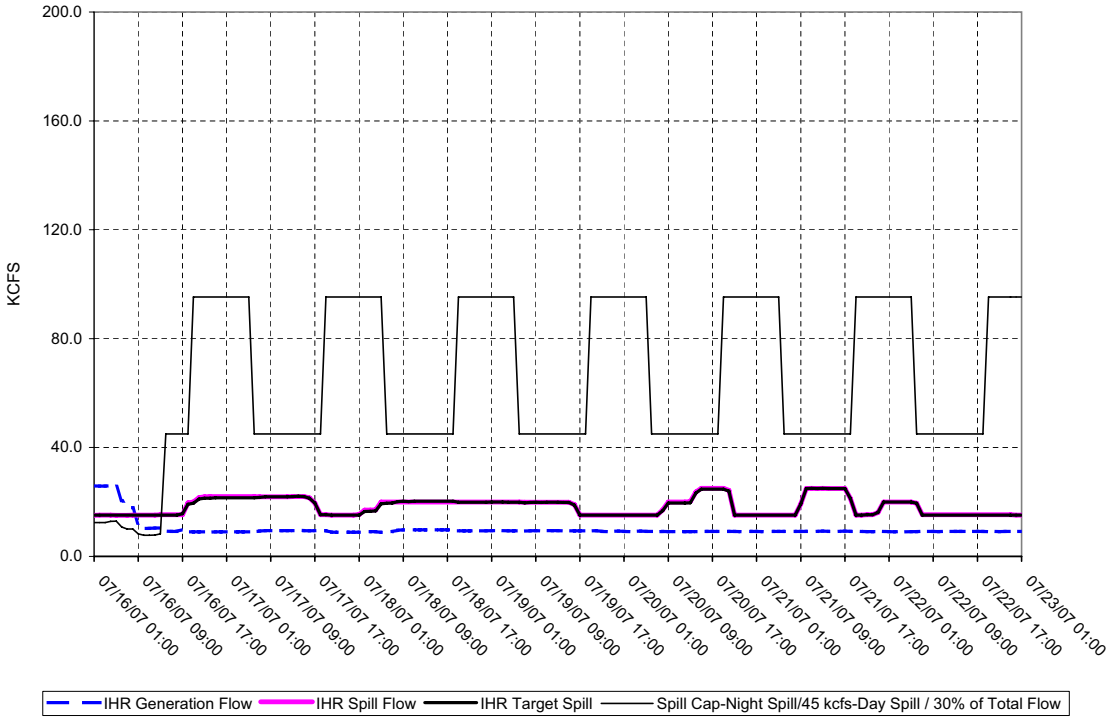
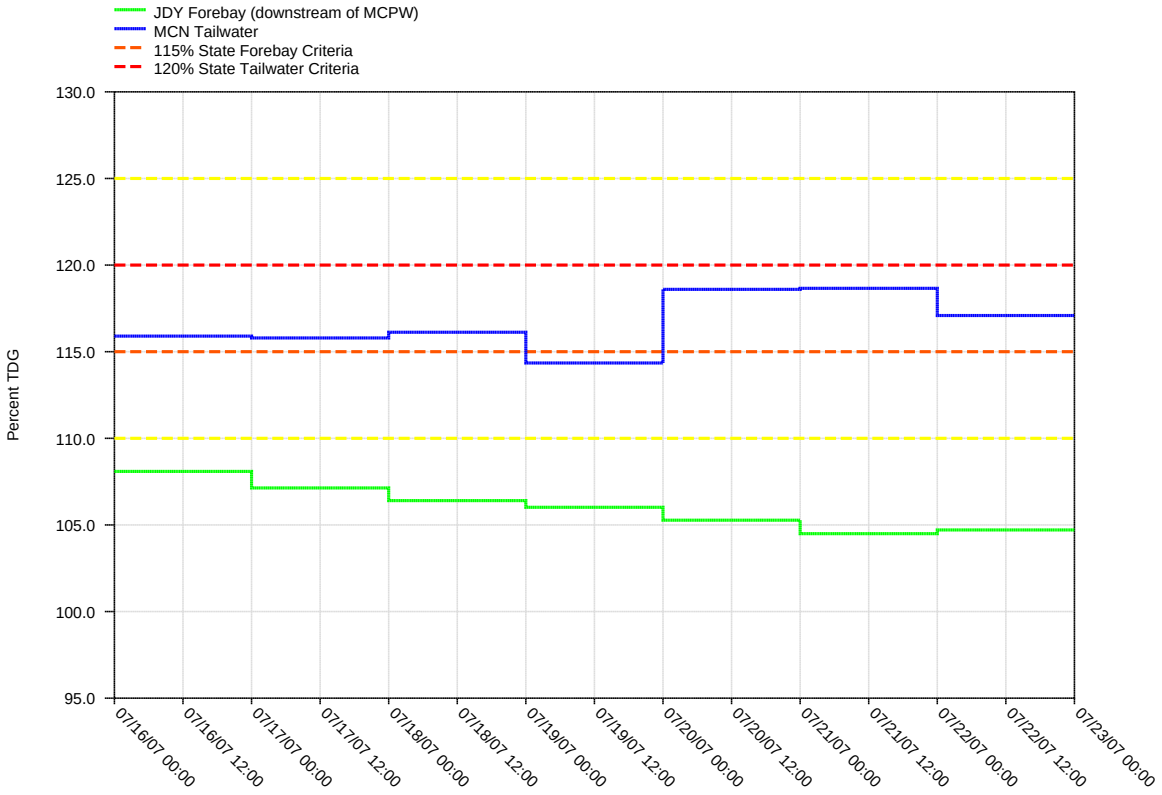


Figure 21.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

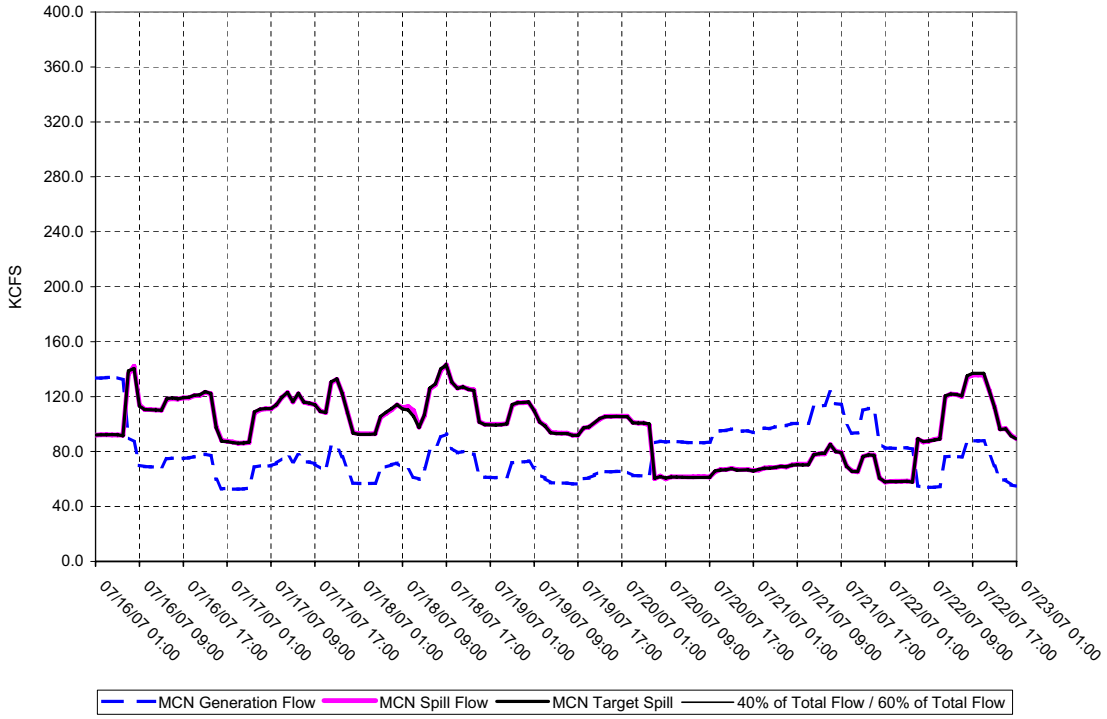
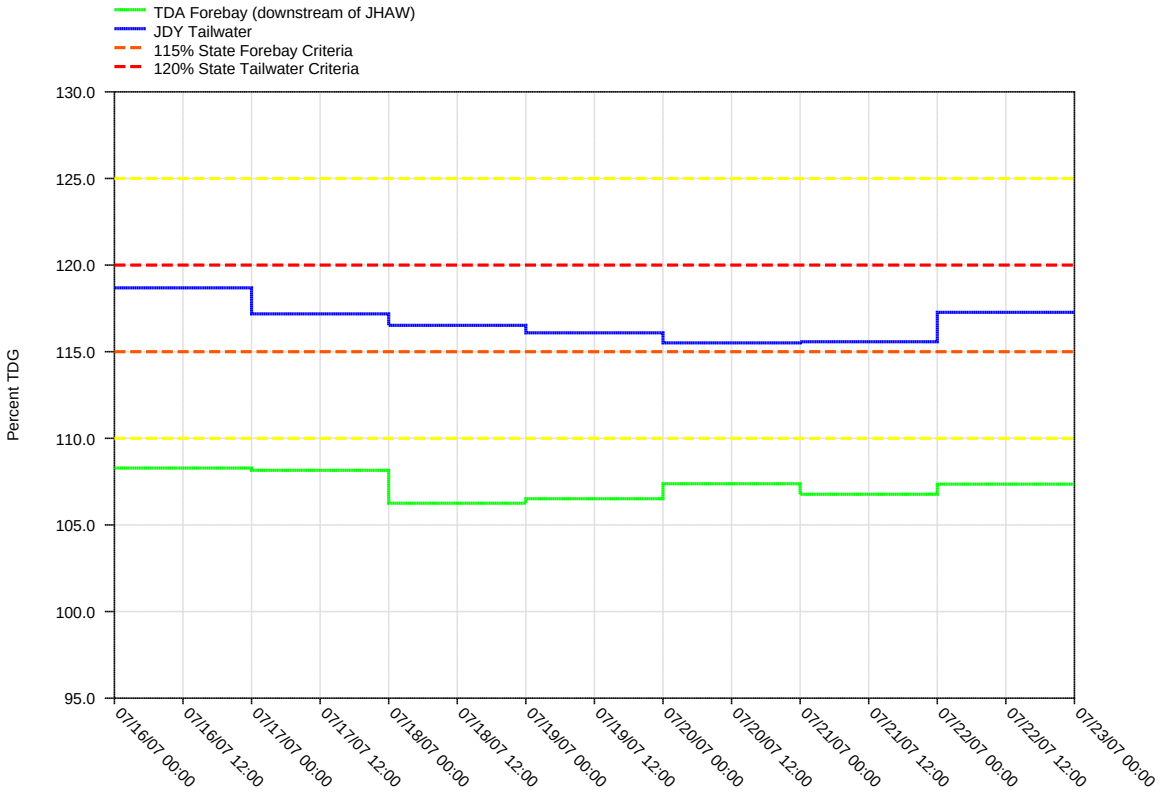


Figure 22.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

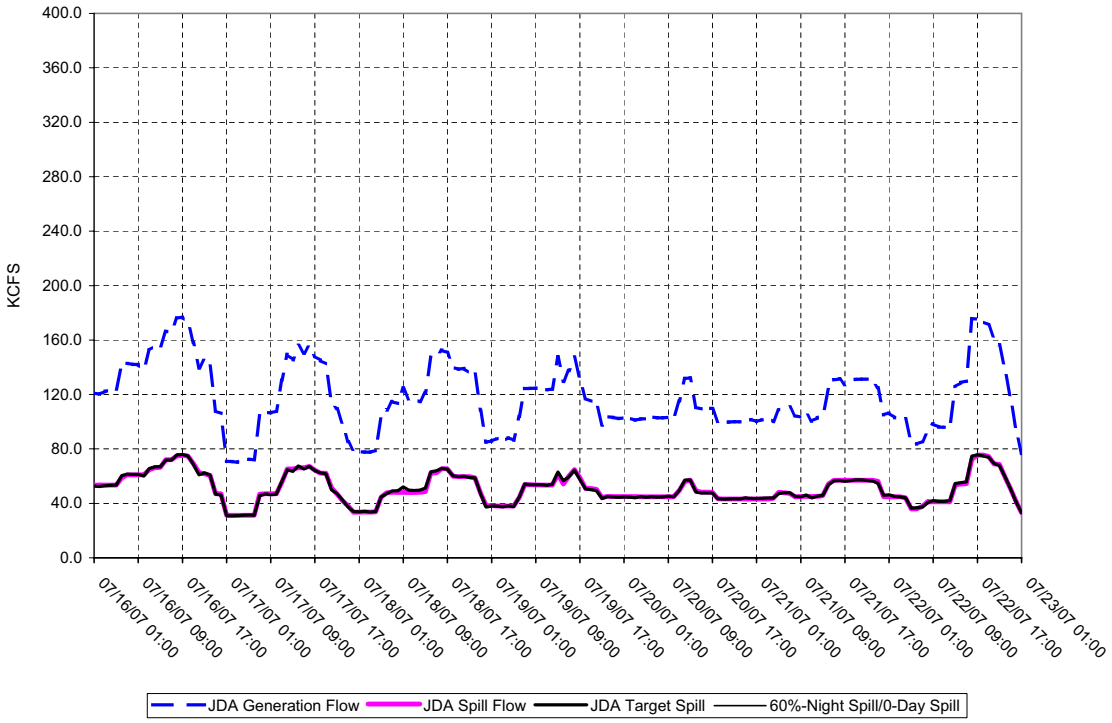
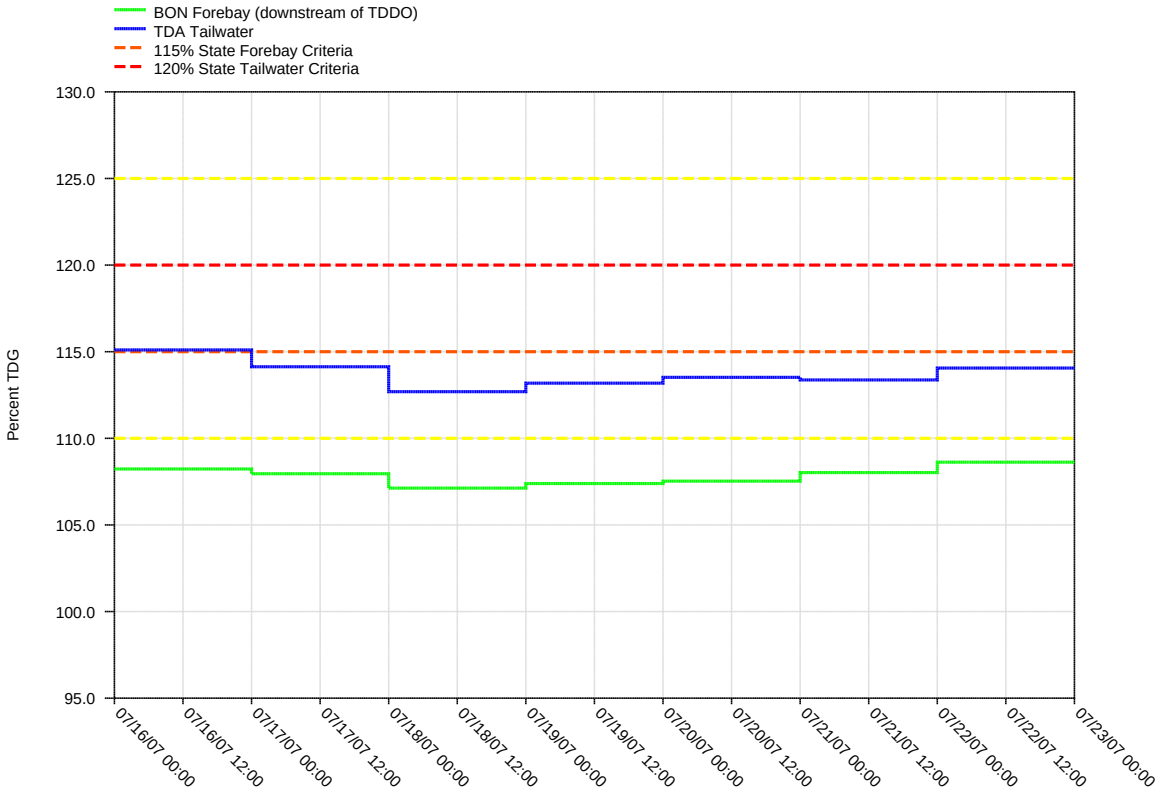


Figure 23.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

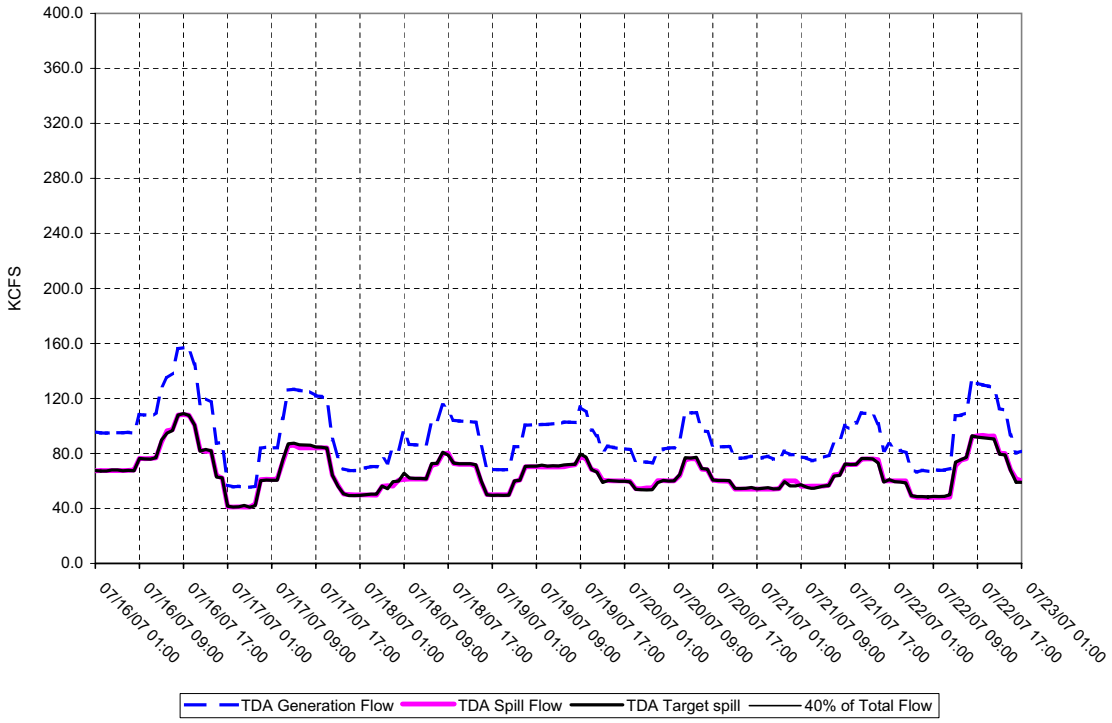
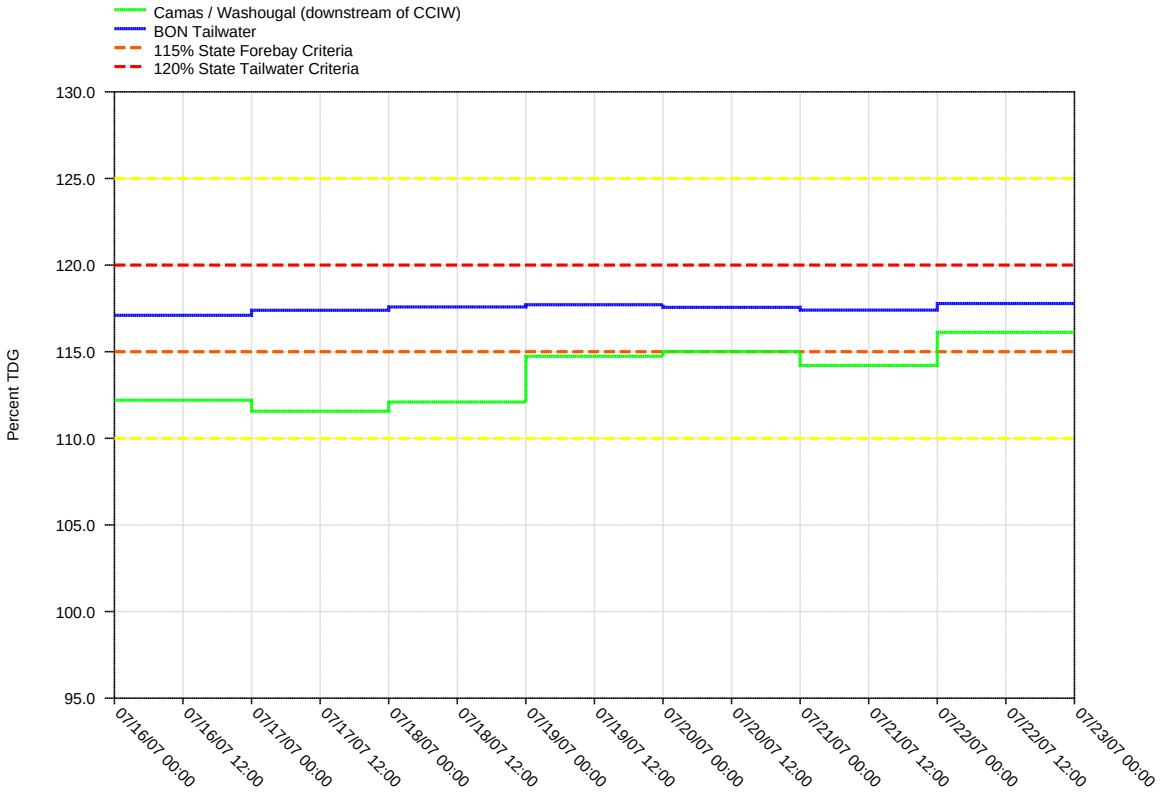


Figure 24.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

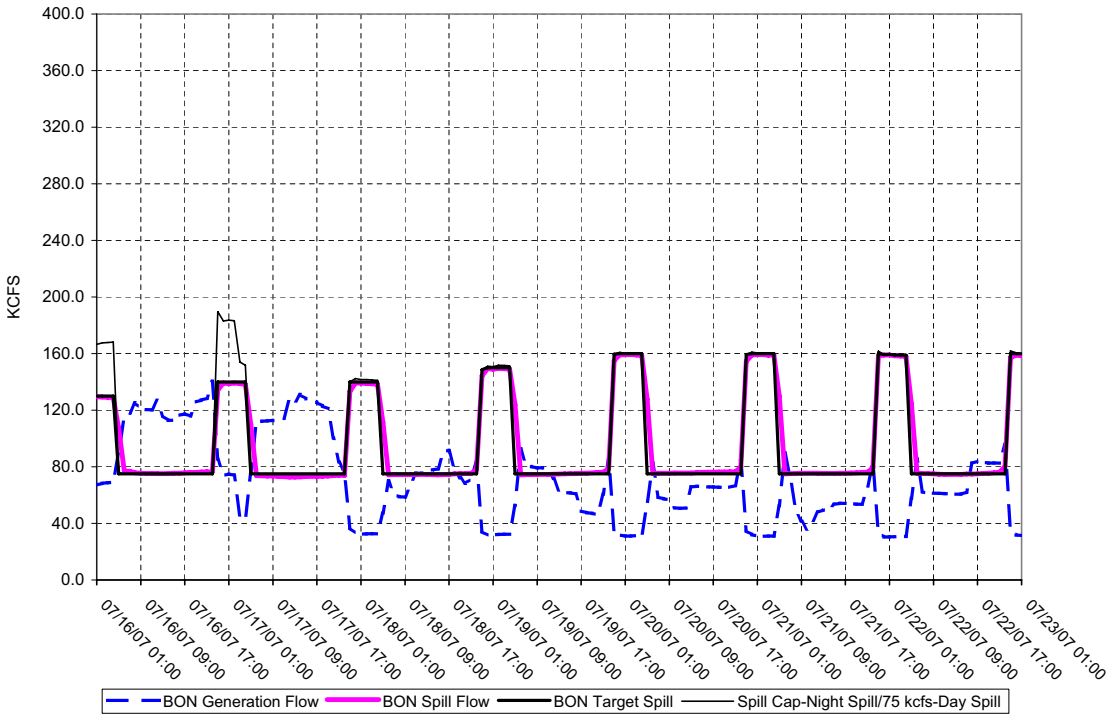
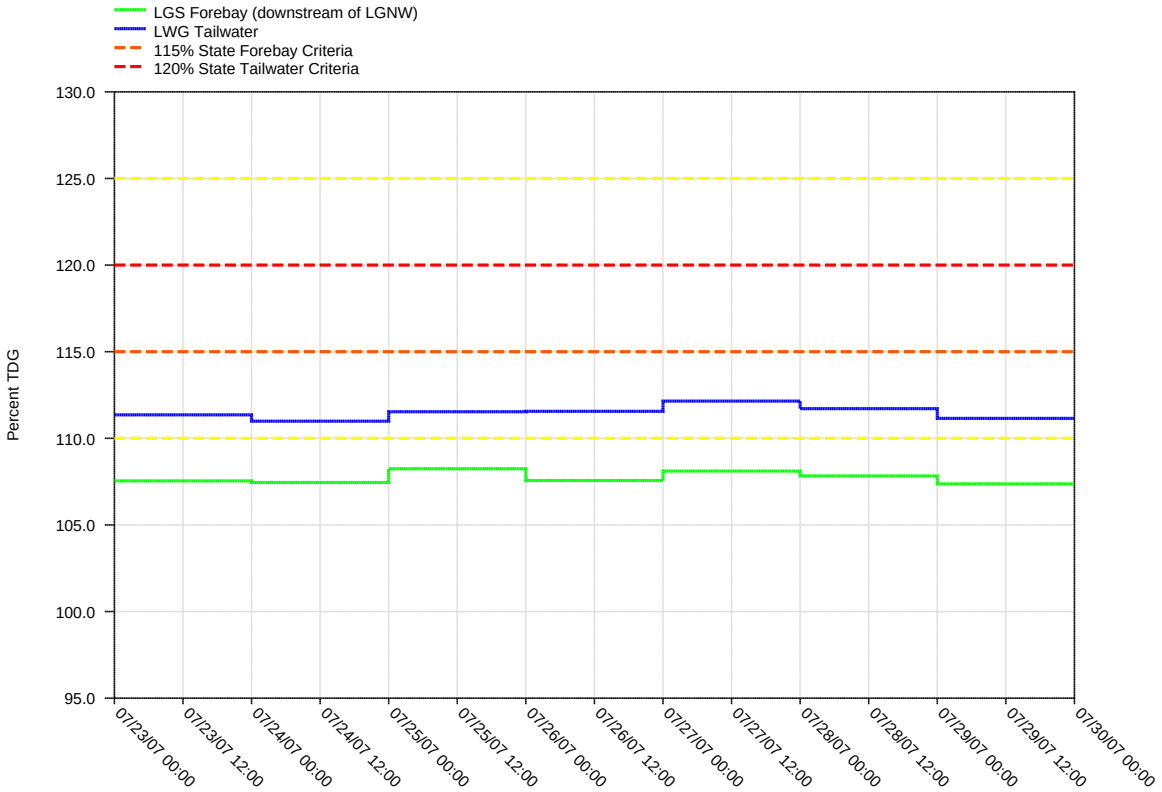


Figure 25.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

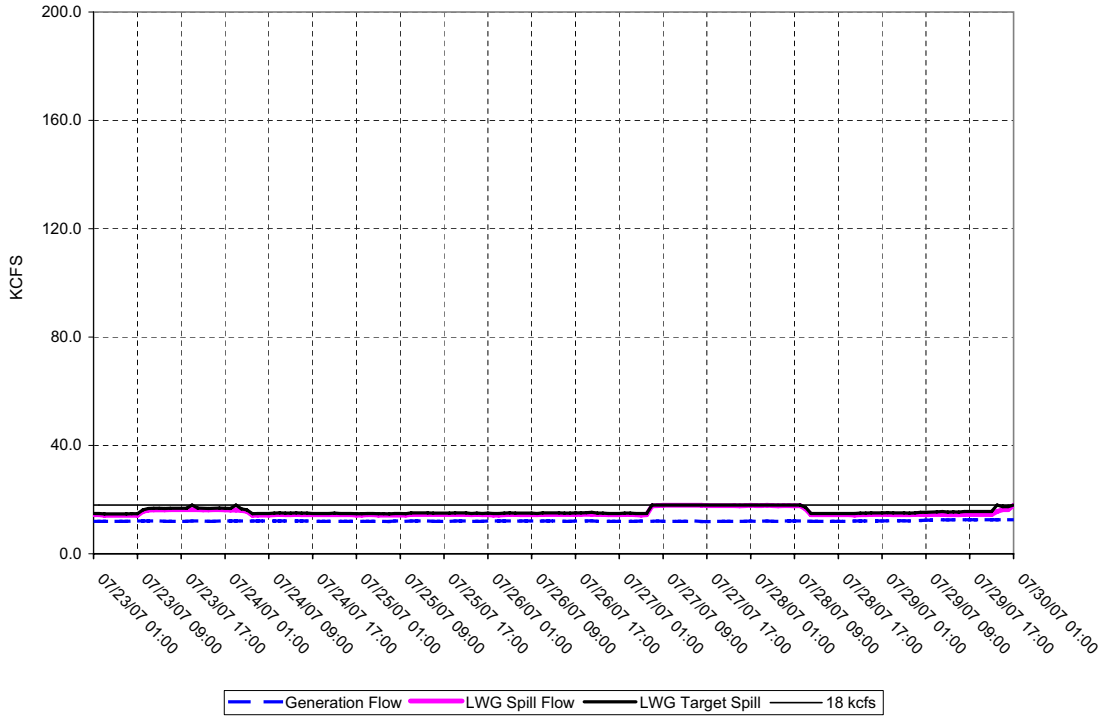
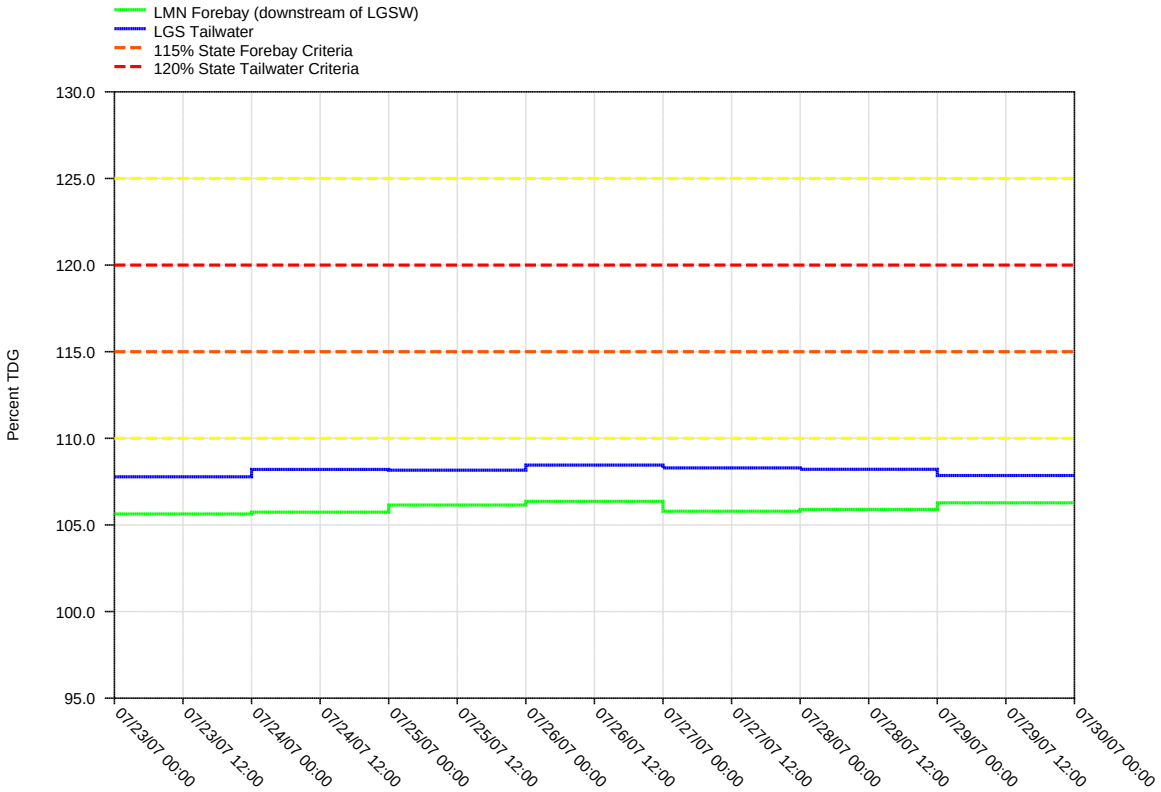


Figure 26.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

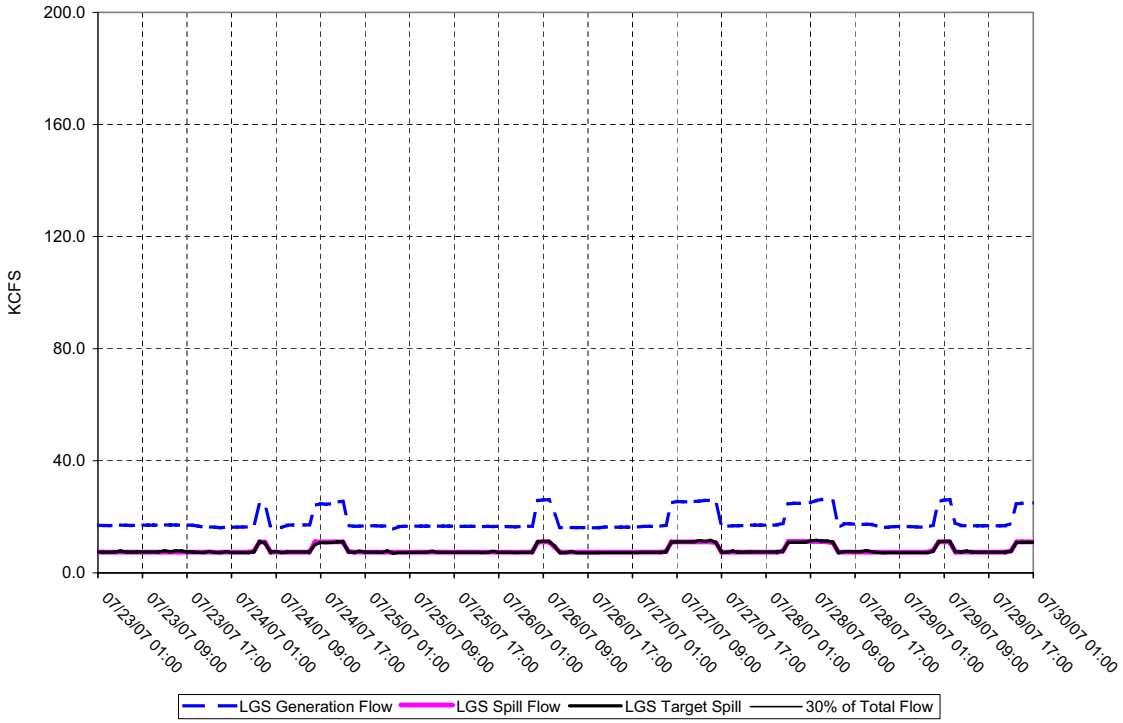
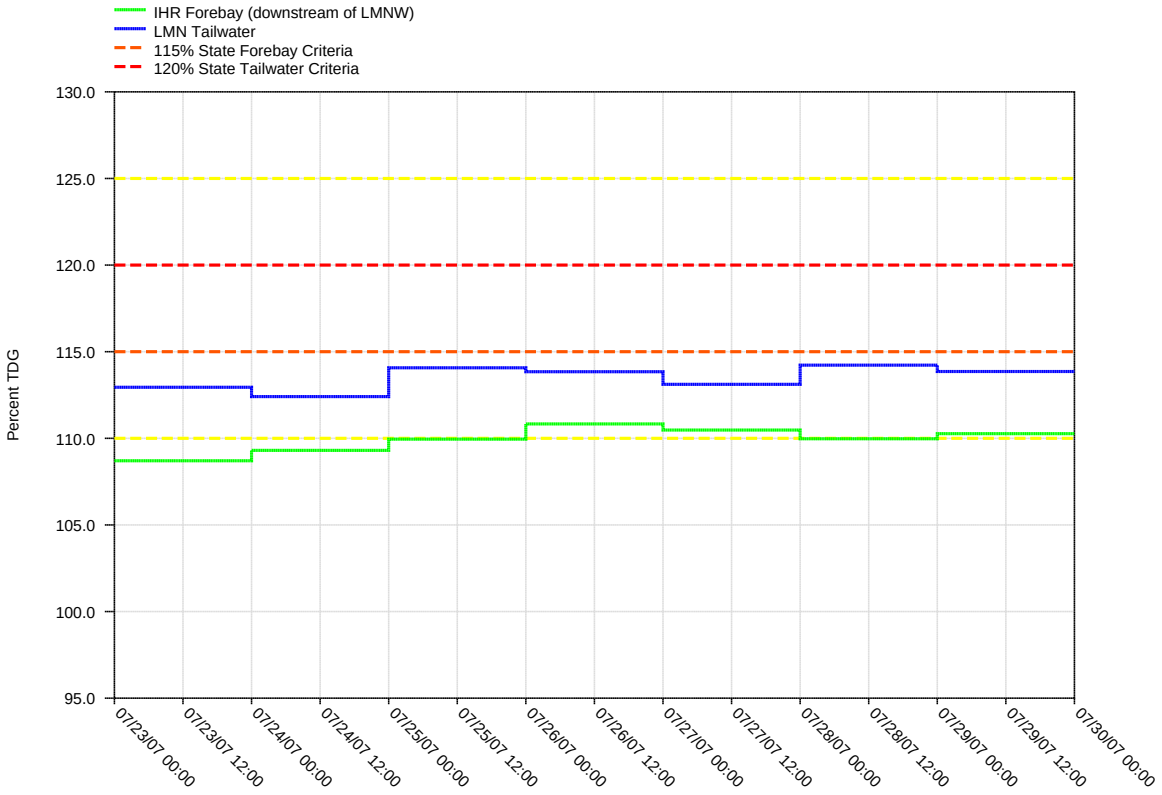


Figure 27.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

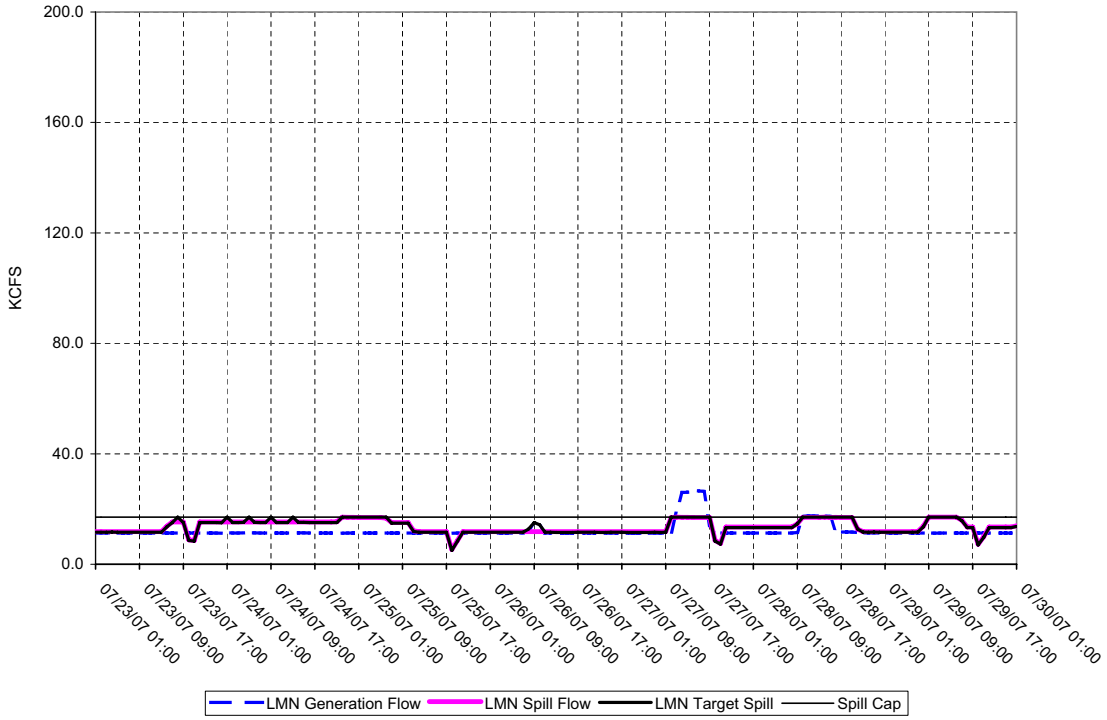
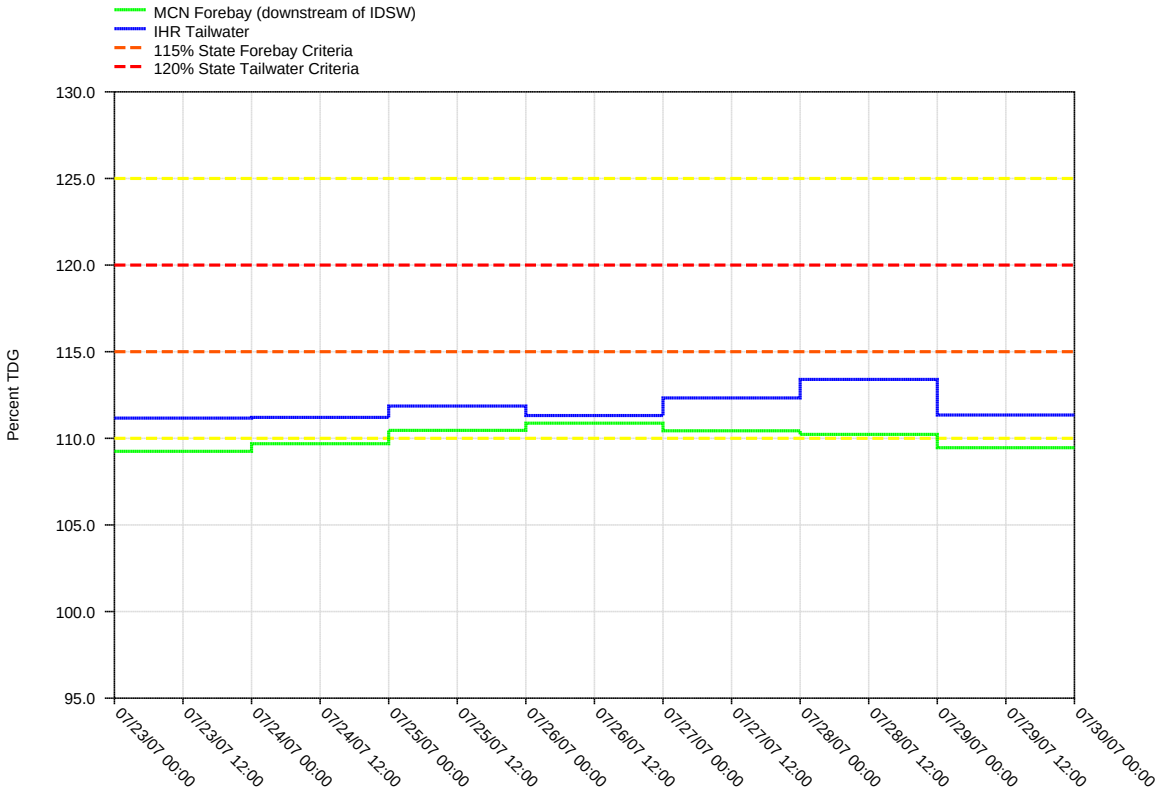


Figure 28.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

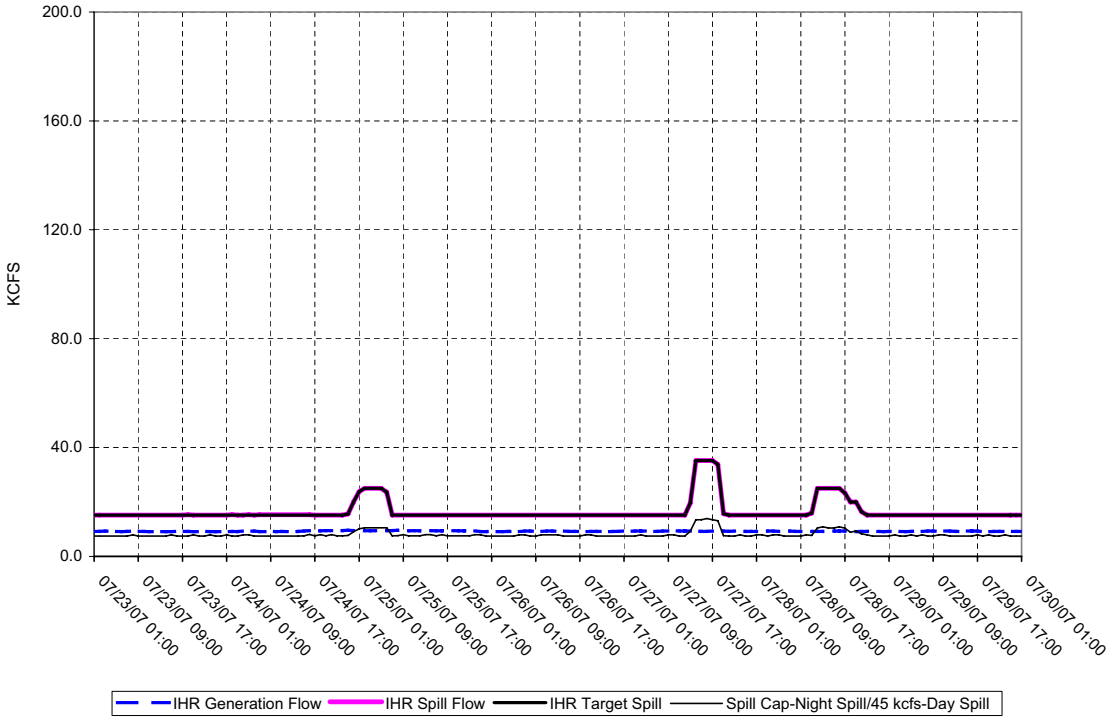
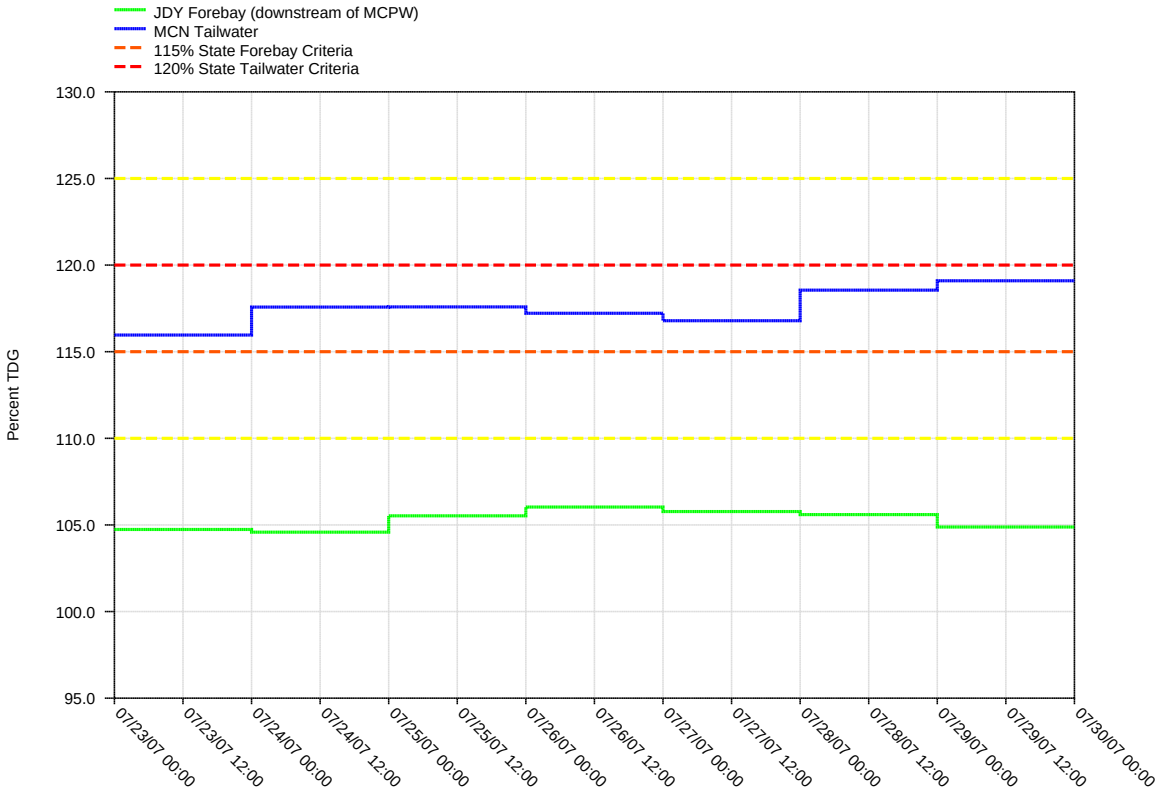


Figure 29.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

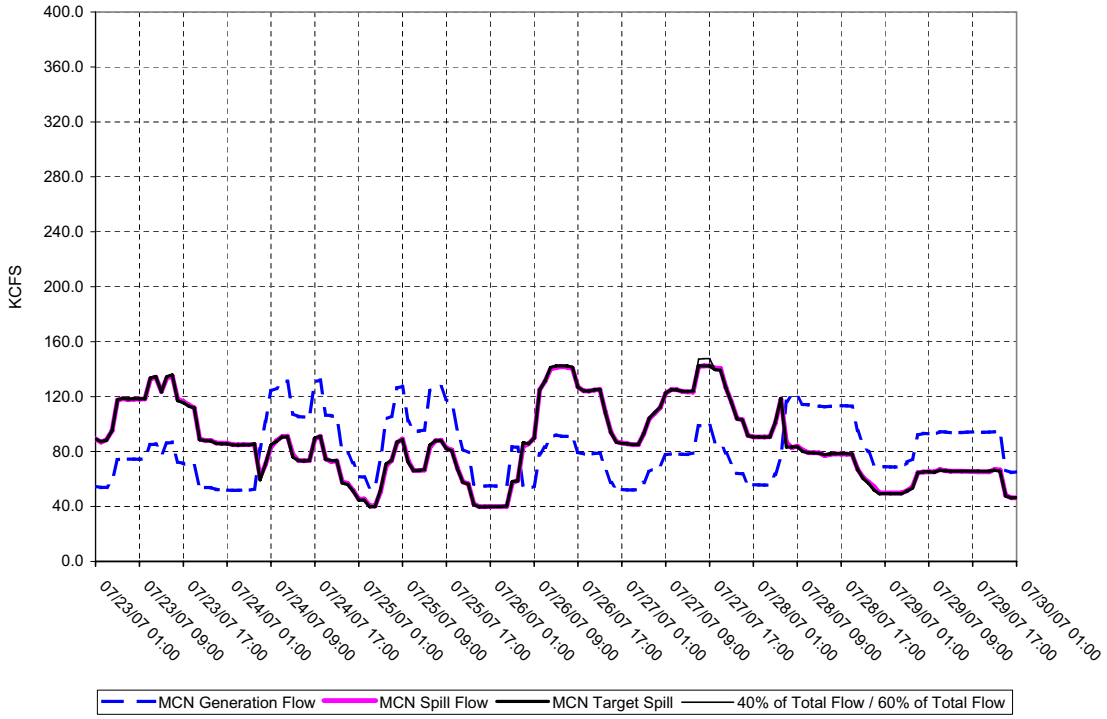
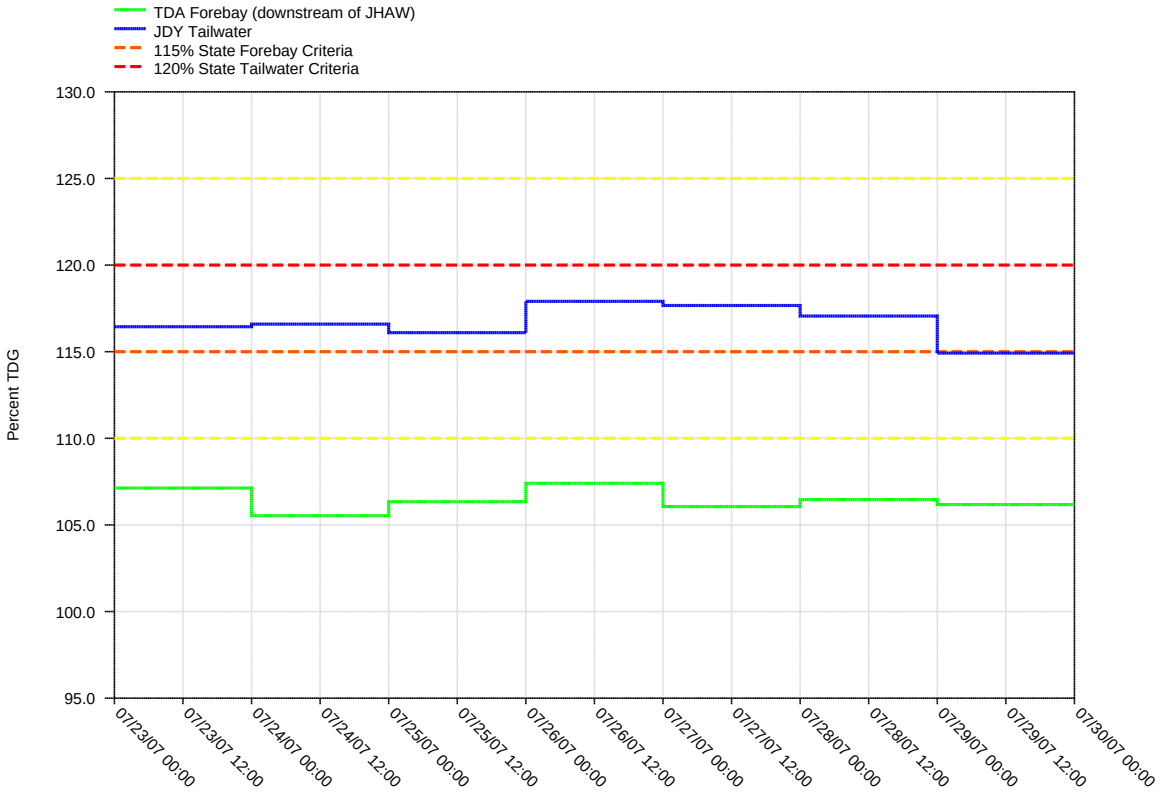


Figure 30.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

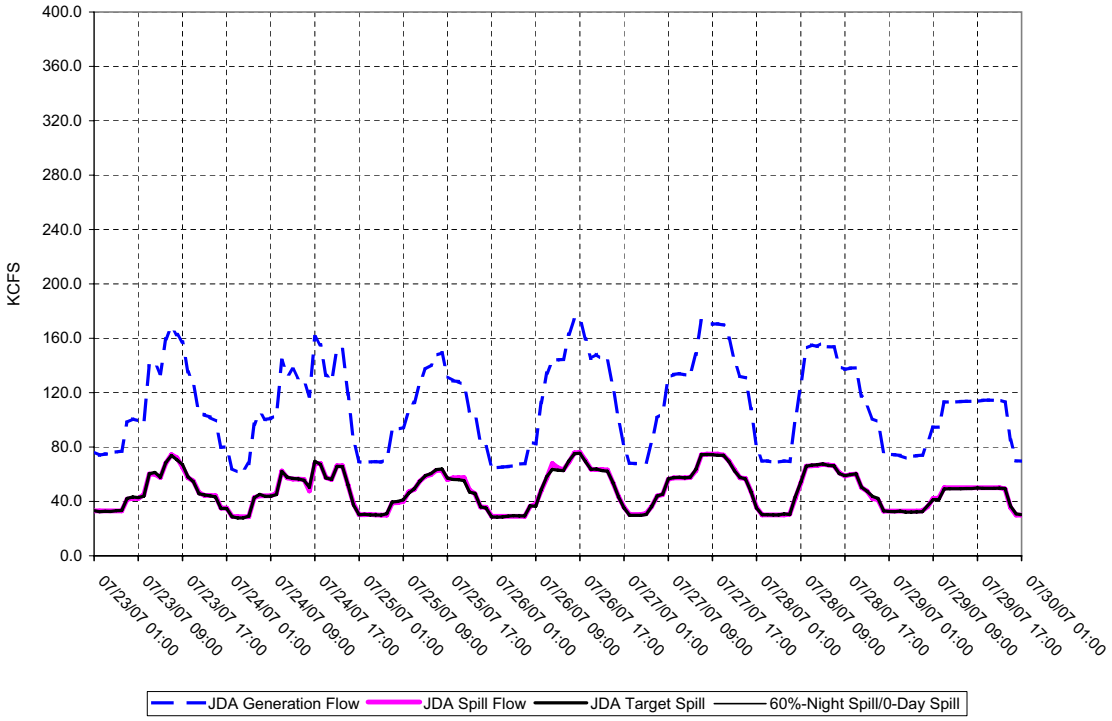
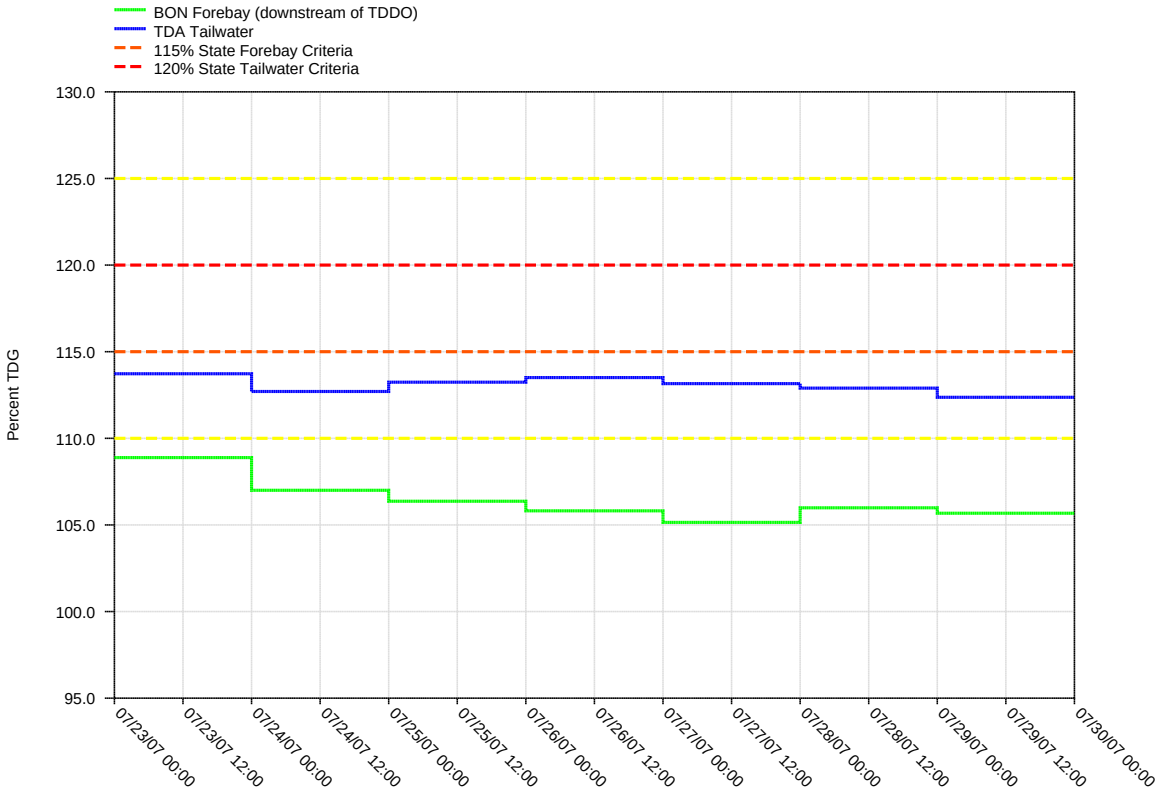


Figure 31.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

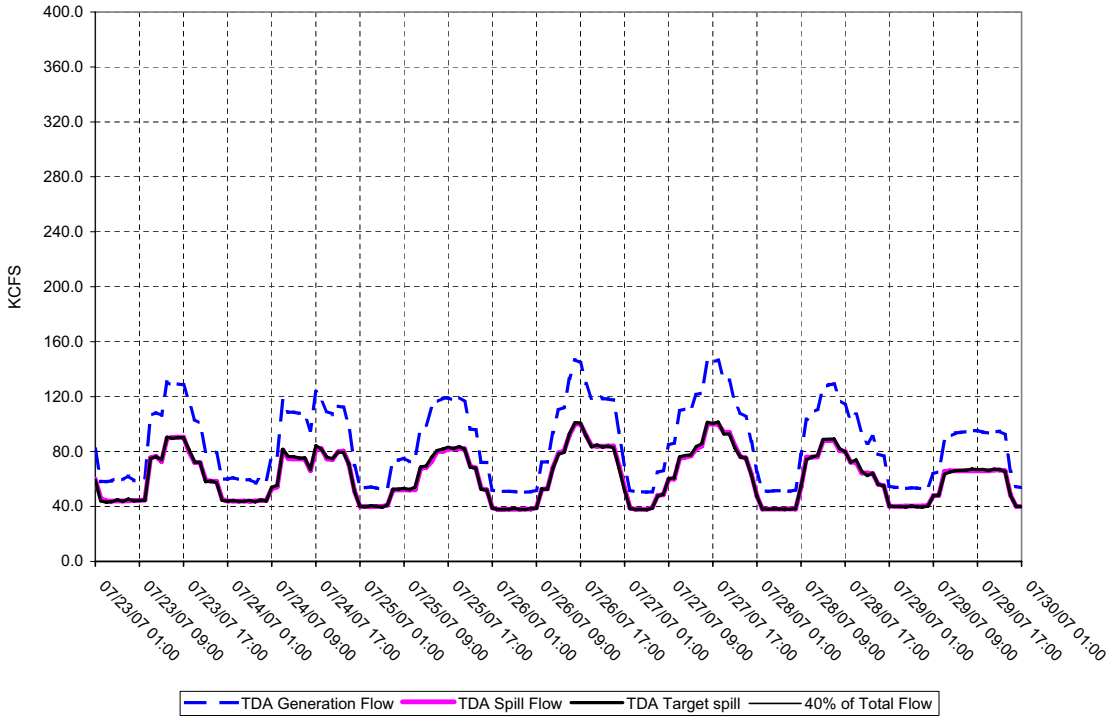
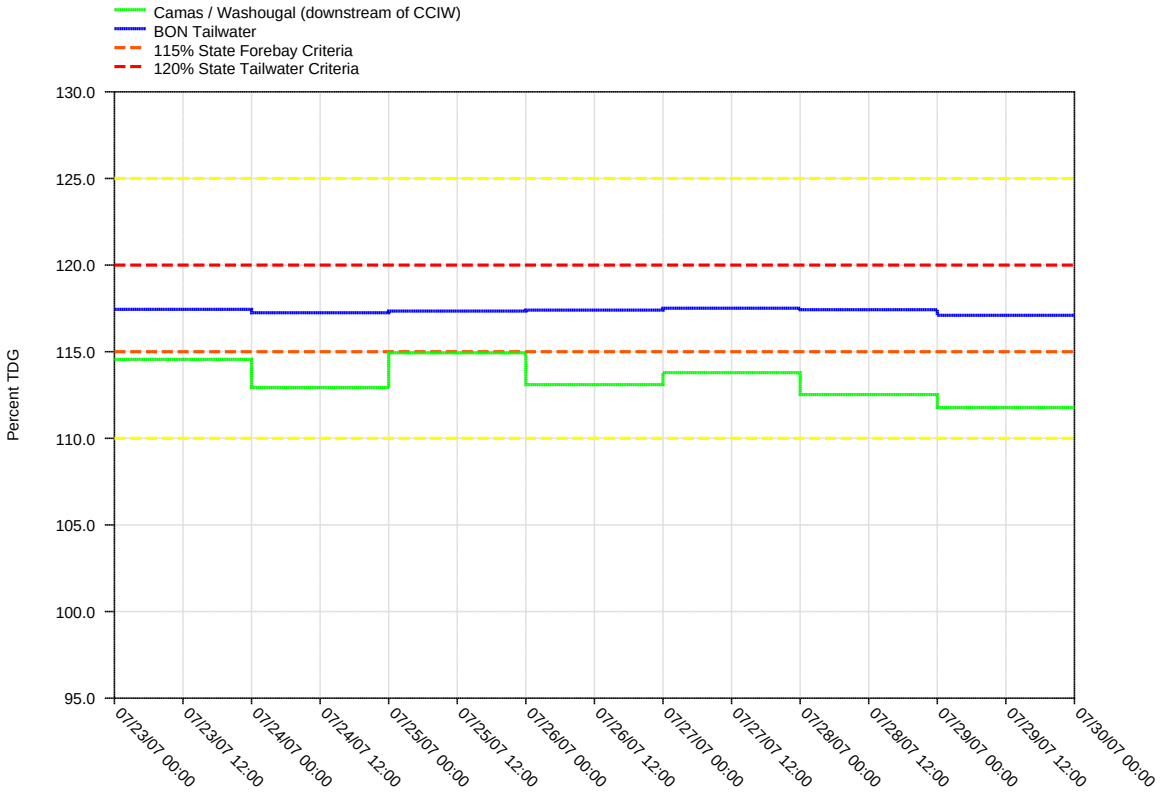


Figure 32.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

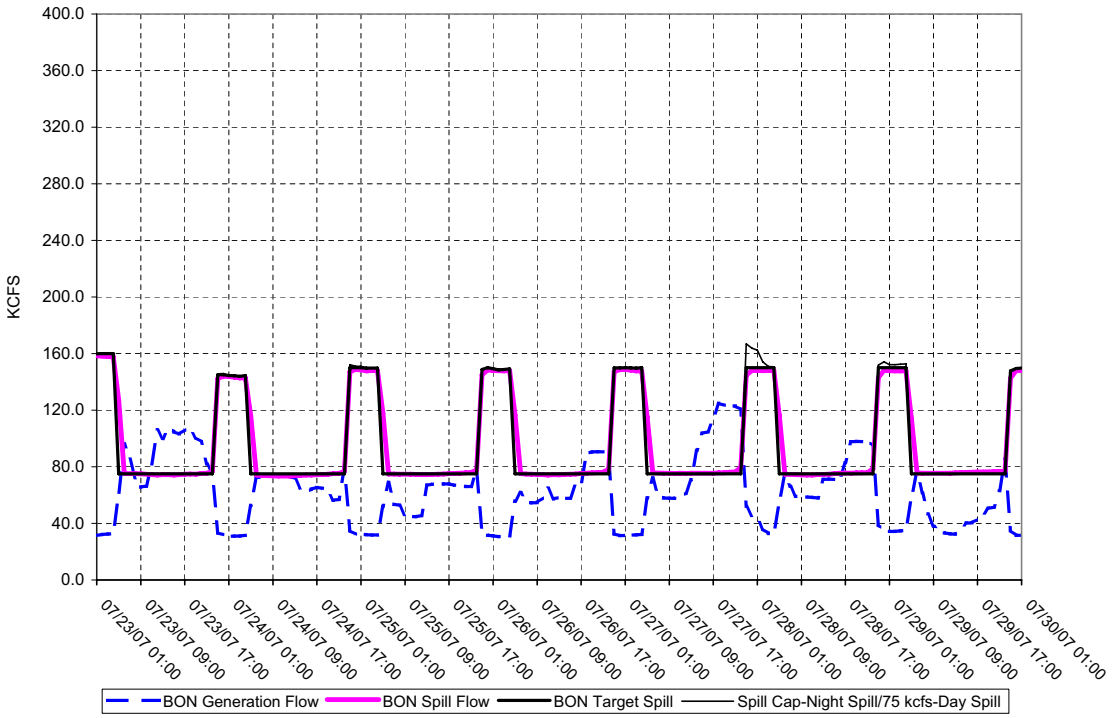


Table 1.

Average percent TDG for 12 highest hours: July 2 - 29, 2007

Date	Monitoring Stations (full list)																	
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	120	115
07/02/2007	101.3	115.1	109.4	107.3	105.3	113.3	111.0	113.5	109.0	115.8	107.9	114.9	110.1	113.4	110.1	115.6	---	116.1
07/03/2007	100.0	113.6	110.3	108.1	105.7	113.5	110.3	113.6	109.8	114.7	108.4	115.3	109.3	114.0	109.9	115.9	---	117.2
07/04/2007	101.8	112.3	110.9	108.9	107.2	114.1	110.9	113.6	109.8	117.6	108.9	115.1	110.5	114.3	111.5	115.2	---	114.5
07/05/2007	102.9	112.1	109.9	109.1	107.6	114.1	111.2	112.3	112.5	118.1	109.5	116.0	110.8	114.7	110.5	115.4	---	114.7
07/06/2007	102.6	115.2	110.1	109.2	107.9	114.1	111.1	111.1	113.7	118.2	108.0	116.3	108.0	112.9	107.4	115.4	---	112.0
07/07/2007	100.7	115.2	110.3	109.4	107.7	113.6	111.9	111.6	112.8	119.2	107.3	114.3	106.4	112.3	105.7	115.6	---	110.3
07/08/2007	103.3	113.3	110.4	109.3	107.6	113.4	112.0	111.7	111.7	117.0	106.4	114.3	105.8	111.0	104.8	115.8	---	111.4
07/09/2007	103.6	115.3	110.3	109.2	107.3	112.8	111.4	115.0	111.4	116.4	107.0	116.9	107.2	112.1	106.3	115.9	---	112.6
07/10/2007	103.5	113.6	109.2	109.0	107.2	114.9	111.1	114.9	110.1	118.3	107.8	116.9	110.2	114.1	108.8	115.8	---	111.8
07/11/2007	103.3	112.4	109.8	109.5	107.9	114.2	111.3	113.1	110.2	118.3	108.4	117.5	110.3	114.1	111.4	116.0	---	113.7
07/12/2007	103.3	112.0	109.9	108.9	108.1	113.9	111.3	111.3	111.4	117.6	109.0	118.2	109.3	113.4	110.6	116.2	---	114.6
07/13/2007	103.4	112.3	109.6	108.2	107.6	113.8	111.4	113.6	111.1	116.8	108.9	119.0	107.7	114.4	107.2	116.3	---	112.5
07/14/2007	103.2	112.4	110.2	108.9	107.5	114.2	111.8	113.9	110.6	115.0	109.2	119.3	107.6	114.7	108.0	116.6	---	112.3
07/15/2007	103.7	112.3	110.0	108.7	107.1	113.9	111.5	112.6	110.0	117.3	108.7	117.8	107.9	114.0	108.2	117.1	---	113.0
07/16/2007	103.5	112.3	109.8	108.6	107.5	114.2	111.3	112.0	110.6	115.9	108.1	118.7	108.3	115.1	108.2	117.1	---	112.2
07/17/2007	103.3	112.3	109.1	108.3	107.5	114.2	111.6	113.0	110.8	115.8	107.1	117.2	108.2	114.1	108.0	117.4	---	111.6
07/18/2007	103.1	112.0	109.5	108.3	106.9	113.9	111.0	113.5	110.4	116.1	106.4	116.5	106.3	112.7	107.1	117.6	---	112.1
07/19/2007	101.9	112.1	108.5	107.9	106.3	113.9	110.3	113.2	108.8	114.3	106.0	116.1	106.5	113.2	107.4	117.7	---	114.7
07/20/2007	102.4	112.6	109.0	108.3	106.5	114.6	110.4	113.5	108.6	118.6	105.3	115.5	107.4	113.5	107.5	117.6	---	115.0
07/21/2007	101.5	112.0	108.4	108.0	105.5	113.6	109.5	113.7	107.2	118.7	104.5	115.6	106.8	113.4	108.0	117.4	---	114.2
07/22/2007	101.0	111.2	107.7	107.6	105.0	112.8	108.6	112.1	108.2	117.1	104.7	117.3	107.4	114.1	108.6	117.8	---	116.1
07/23/2007	100.9	111.4	107.5	107.8	105.6	112.9	108.7	111.2	109.2	116.0	104.7	116.4	107.1	113.7	108.9	117.4	---	114.6
07/24/2007	100.3	111.0	107.5	108.2	105.7	112.4	109.3	111.2	109.7	117.6	104.6	116.6	105.5	112.7	107.0	117.2	---	112.9
07/25/2007	100.8	111.5	108.2	108.2	106.1	114.1	110.0	111.9	110.5	117.6	105.5	116.1	106.3	113.2	106.4	117.3	---	114.9
07/26/2007	101.2	111.6	107.6	108.5	106.4	113.8	110.8	111.3	110.9	117.2	106.0	117.9	107.4	113.5	105.8	117.4	---	113.1
07/27/2007	102.3	112.1	108.1	108.3	105.8	113.1	110.5	112.3	110.4	116.8	105.8	117.7	106.1	113.2	105.1	117.5	---	113.8
07/28/2007	102.2	111.7	107.8	108.2	105.9	114.2	110.0	113.4	110.2	118.6	105.6	117.1	106.5	112.9	106.0	117.4	---	112.5
07/29/2007	101.8	111.2	107.4	107.9	106.3	113.9	110.3	111.3	109.5	119.1	104.9	114.9	106.2	112.4	105.7	117.1	---	111.8

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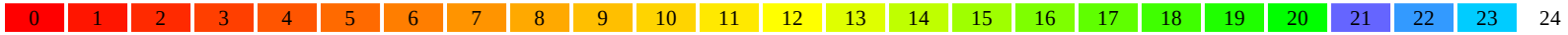
Number of hours of data reported in a given day



Big, bold, red text denotes exceedances.
--- indicates No Data
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%.

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)
WRNO	Bonneville Tailwater (Warrendale)
CWMW	Camas / Washougal

Effective April, 2006

FISH OPERATION PLAN IMPLEMENTATION REPORT
August 2007

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 April 16, 2007 court order requiring the Corps to provide monthly reports on the implementation of project spill for fish passage and fish transportation operations provided for in the 2007 Fish Operations Plan (FOP). The FOP describes the Corps project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the April – August 2007 fish migration season. Consistent with the 2004 Biological Opinion adaptive management strategy, this plan incorporates the project operations contained in the "Agreement Regarding 2007 Federal Columbia River Power System Fish Operations" (Agreement)[1]. The Corps agreed to provide 2007 fish passage operations in accordance with the Agreement as identified in Attachment 1 of the Agreement[2]. Water management operations not addressed in the Agreement will continue to be consistent with the operations considered in the 2004 Biological Opinion and in particular, the 2007 Water Management Plan and 2007 Fish Passage Plan (FPP). Judge Redden incorporated the terms of the 2007 Operations Agreement into a Court Order issued on May 23, 2007.

The Corps' lower Columbia and Snake River projects and fish passage operations for the month of August 2007 identified in the FOP 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 12-hour average Total Dissolved Gas (TDG) for the tailwater at each project and for the next project's forebay downstream.

This report also provides information on issues presented and unanticipated or emergency situations that arose during implementation of the spill program for the month of August 2007.

[1] The Agreement signed by the Bonneville Power Administration (BPA), Confederated Tribes of the Warm Springs Reservation, Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes and Bands of the Yakama Nation, and Confederated Tribes of the Colville Indian Reservation, was submitted to the Federal District Court on January 9, 2007.
[2] Brigadier General Martin committed to implement the 2007 operations identified in Attachment 1 of the Agreement by letter dated December 15, 2006.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per week in August displaying the progress 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 30 and end on August 31 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 dams.

Each figure represents one week of operation for a project. The graphs start on Monday 0100 hours through Monday 0100 hours for the following dates:

July 30 – August 5	Figures 1 - 8
August 6 – August 12	Figures 9 – 16
August 13 – August 19	Figures 17 - 24
August 20 – August 26	Figures 25 – 32
August 27 – August 31	Figures 33 – 40

A. Upper Graph: Shows the resultant daily average percent TDG for the 12 highest hours as the result of spill from the dam. The objective is to operate each project up to the TDG limits without exceeding those limits if practicable.

- The blue line on the graph represents the TDG in the tailrace of the dam. 120% TDG is the upper operating limit.
- The green line represents the TDG in the forebay of the next dam downstream. 115% is the upper operating limit.

B. Lower Graph: Represents the 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 heavy red line represents the hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2007 FOP.
- Each graph includes a heavy black line that represents the target spill. This is the hourly maximum spill level that is subject to the following conditions:

    - Spill percentage or discharge specified in the FOP;
    - Spill caps as set daily for TDG management;
    - Test spill levels for fish passage research;
    - Minimum generation for power system needs; and,
    - Minimum spill at Ice Harbor (15.2 kcfs) and Bonneville (50 kcfs) dams.

The hourly target spill may vary as a function of quantity of river flow and generating units available at a project.

II. A monthly FOP Spill Report Table is included at the end of the report that shows the overall daily results of the average percent TDG for the 12 highest hours for all projects. The numbers in red show exceedances of the TDG gas cap - 115% (forebay) or 120% (tailwater) for each project.

General Implementation Remarks:

Please note that for all projects that spill for fish passage, the target spill may be limited to a lesser quantity (i.e. the spill cap), with the objective of staying within the TDG state waiver limits. When spill levels briefly deviated below or above the level described in the FOP, the heavy red line will be below or above the heavy black line in the graphs. Whenever the operation varied from the target spill during voluntary spill hours, or other anomalies occurred, these instances are described in the FOP Spill Report Table below. Occurrences which prompted regional coordination are described in greater detail in the section below entitled "Operational Adjustments Occurring in August."

"Low flow" operations on Lower Snake projects are triggered when inflow is not sufficient to provide for both minimum generation and the planned spill levels. In these situations, the projects operate one unit at minimum generation and spill the remainder of flow coming into the project. 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 where 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 and the target spill may not be possible on every hour. During these low flow operations, additional flow that is passed through a dam as the result of navigational lockages becomes more apparent. This is because the volume of water needed to empty the navigation lock during periods of low flow is a greater percent of the total flow than it had been earlier in the season. As a result, even though the spill volume remained the same, the official recorded spill percent through the spillway appears to be reduced since it does not include this volume of water needed to empty the navigation lock. These variances are recorded in the Spill Table below for Little Goose under the variance type "Lockages".

Also note that actual spill levels at Bonneville Dam may range from 1 to 3 kcfs lower or higher than specified in the 2007 FOP. A number of factors influence this including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

In the FOP Spill Report Table below, the result of "load swing hours" appears as an explanation for not meeting the hourly spill at McNary, John Day, and The Dalles dams.

This occurs because projects on the lower Columbia must be available to respond to within-hour load variability to satisfy North American Electric Reliability Council (NERC) reserve requirements ("on response"). During periods of rapidly changing loads, projects on response may have significant changes in turbine discharge within the hour. Under normal conditions, within-hour load changes occur mostly on hours immediately preceding and after the peak load hours, while spill quantity remains the same within the hour, however, sometimes several hours after peak load hours the project may still be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. These hours are referred to as "load swing hours." Due to the high variability of within-hour load, these load swing hours may have a greater instance of reporting actual spill percentages that vary more than the +/- 1% requirement than other hours. On the days cited in the Table, the day or night-time average spill was within the FOP level of +/- 1% of the target spill.

August Operations:

The month of August was characterized by below average flows on the lower Snake River and on the lower Columbia River. A below average volume of precipitation in the upper Columbia Basin combined with below normal flows from the Snake River, resulted in the below average flows for the lower Columbia River. At all the projects, the summer spill season ended on September 1 at 0001 hours in accordance with the FOP. During the August reporting period, the daily FOP spill operations were carried out as follows:

- Lower Granite Dam - the hourly target spill was a fixed quantity of 18 kcfs for 24 hours
- Little Goose Dam - the target spill was 30% of the total flow for 24 hours
- Lower Monumental Dam - the hourly target spill was a fixed quantity of 17 kcfs
- Ice Harbor Dam – the hourly target spill was to 45 kcfs day/spill cap night and is shown as the heavy black line on the graph
- McNary Dam – the target spill was alternating between 60% and 40% of total flow in two day treatments
- John Day Dam – the target spill was 30% of total flow for 24 hours
- The Dalles Dam - the target spill was 40% of total flow for 24 hours
- Bonneville Dam - the hourly target spill was to 75 kcfs day/spill cap night.

Operational Adjustments Report

1. Routine operations to transport juvenile fish at the three lower Snake River collector dams continued through the month of August. The last fish barge left Lower Granite on 16 August and truck transport started on 18 August at Lower Granite and alternated every other day. In accordance with coordination with salmon managers at the August 1 TMT meeting, juveniles were not transported from McNary Dam with barges, but truck transportation started on 18 August. The truck operations will continue through 30 September.

2. Other operations in the lower Snake and Columbia rivers that varied from those described in the FOP are discussed below. Those operations coordinated with regional salmon managers were planned such that they would have the least impact to fish (also cited in the FOP Spill Report Table below).

a. Bonneville Dam:

- In July, the Corps' project operators discussed with TMT representatives model validation testing on the turbines during the period between August 11 and 17. This activity was also coordinated with signatory Tribes and no objections were raised. The actual work took place from August 11 to14. Each unit was started and ramped up to normal operating range within 1% peak efficiency. During the start up period, the unit operates outside of the 1% efficiency while ramping up. Nine units at the Bonneville second powerhouse were tested, including the two fish units. The units were not tested at an operating range above 1% peak efficiency. No reportable 1% excursions occurred as a result of these tests. .

b. McNary Dam:

- Due to low flow conditions there was insufficient water to hold the spill at 60% on August 20; the spill schedule was changed to spill 40% for the remainder of that 60% spill block through August 21 at 0600. In addition, starting at 0600 hrs on August 27 the last two 60% blocks of the spill schedule were changed so the project spilled 40% for three days from August 27 through 29 rather than August 30 and 31 as originally scheduled, and 60% for the last two days of spill on August 30 and 31. There was no net loss in spill volume overall in late August as a result of the change in spill schedule. This change in spill volume was coordinated with the salmon managers at the August 22 TMT meeting.

c. Ice Harbor Dam:

- On August 28 the entire powerhouse was placed out of service during non-peak hours from 1100 to 1300 hour to safely remove research equipment in the forebay. This operation was coordinated with the salmon managers at the August 22 TMT meeting. Due to the power outage, the spill increased above the target spill levels.

d. Lower Monumental Dam:

- A three hour spillway outage occurred on August 14 to install equipment for research in the LMN forebay boat restricted zone (BRZ). This research was prioritized and coordinated with Regional Forum teams prior to the start of spill. Also, this operation was coordinated with the salmon managers at the July 25 and August 8 TMT meetings, and with the signatory Tribes of the

2007 Operations Agreement with no objections raised. Prior to the spill outage, the powerhouse was out for approximately two hours to ensure safe conditions while installing this equipment by boats in front of the powerhouse. The resulting spill increased for two hours and then dropped near zero for the remaining three hours while the projects generation went above minimum.

- On September 4 a transformer maintenance test was scheduled to begin at Lower Monumental Dam at approximately 0700 hours. Normal operations during this type of testing are to pass 5 kcfs through a single turbine (Unit #5 operating at speed-no-load) and to spill approximately 6.5 kcfs in order to maintain the minimum required project flows of 11.5 kcfs. To prepare for this maintenance, the Lower Monumental pool was planned to be drafted to minimum pool elevation, MOP, (537 feet) to accommodate inflow from Little Goose while Lower Monumental outflows are reduced to 11.5 kcfs. Flows from Little Goose were 25 kcfs at 0100 hours and were reduced to 16.4 kcfs by 0600 hours. Flows at Lower Monumental were maintained at about 33.5 kcfs during these same hours. Inadvertently, the Lower Monumental discharges were not sufficiently tapered off to slow down the drafting of the pool. Consequently, the pool drafted below MOP and stayed below MOP for 3 hours until the reservoir filled to the appropriate elevation of 537 ft or above. At 0600 the project discharge was reduced to 5 kcfs for the transformer testing, but the need to discharge an additional 6.5 kcfs spill was inadvertently overlooked by both the BPA scheduler and the project operator; as a result, the project did not meet minimum flow for the duration of the transformer test. Flows were below 11.5 kcfs for 12 hours. When the transformer maintenance was completed, operations resumed so that project discharge increased to above the 11.5 kcfs minimum flow.

e. Little Goose Dam:

- Planned research which was prioritized and coordinated with Regional Forum teams prior to the start of spill, began on July 29 and went through August. This research included collection and tagging listed fish at Little Goose Dam and rather than transporting these fish, they are routed back to the river. As a result of this research, fewer fish were transported than described in the FOP. This activity was coordinated through SRWG, FDRWG, TMT, and the signatory Tribes; no objections were raised.

- From August 13 to 17 a planned outage for testing Little Goose's transformers occurred as noted in the Fish Passage Plan in table LGS-1. The scheduled maintenance was presented to TMT before the start of spill season. During this operation, the spill increased from 30% up to a range between 69% and 78% since the flow through a generation unit dropped to 5 kcfs. This is called a speed no load operation because the 5 kcfs going through the unit did not generate megawatts.

e. Lower Granite:

- From August 20 to 23 an outage for testing Lower Granite's transformers was originally scheduled for September 10 in the Fish Passage Plan in table LWG-1, however, the test occurred in August due to the projects request to reschedule so it would not occur during scheduled work on the Unit 5 and 6 breaker retrofit in September. The transformer test is not possible while the Unit 5 breaker is out of service. During this operation the spill increased from about 8 kcfs up to15.2 to 18.0 kcfs since the flow through the powerhouse dropped to 5 kcfs while the project operated at speed no load. The Snake River outage schedules including transformer tests, breaker replacements, and fire suppression contracts were presented to TMT before the start of spill season.

FOP Spill Report Table

Project	Parameter	Date	Time	Hours	Type	Reason
Lower Granite	Add'l Spill	8/20/07 - 8/23/07	700 - 1600	83	Maintenance	Project generated 5.0 kcfs and spilled the rest, 15.2 - 18.0 kcfs, instead of generating minimum of 11.5 kcfs and spilling the remainder (~ 8kcfs). There was a planned line outage for transformer testing so one unit ran speed no load and the project spilled the rest. This outage was originally scheduled in the 2007 Fish Passage Plan for Sept. 10, Table LWG-1; the new August schedule was discussed at a March TMT meeting.
Little Goose	Spill	7/30/2007	1000-1100	2	Maintenance	Hourly spill was 28.0 and 28.2% (below 30.0 % +/- 1% range): due to the volume of water needed to empty the navigation lock while the upstream tainter gate could be repaired (on-going repairs related to the March tainter gate #2 failure). Volume of spill through the spillway remained the same, but the percent spill of total outflow dropped since outflow increased while the additional flow went to empty the navigation lock which is not part of the spill quantity. 24 hr avg. spill was 29.8%.
Little Goose	Spill	7/31/2007	800-900, 1300-1400, 2300	5	Maintenance	Hourly spill was 27.9 to 28.0% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock while the upstream tainter gate could be repaired (on-going repairs related to the March tainter gate #2 failure). Volume of spill through the

						spillway remained the same. See explanation on page 3 under "Low flows". 24 hr avg. spill was 29.4%.
Little Goose	Spill	8/1/2007	100, 700, 1100, 1400, 1600, 2200, & 2400	7	Maintenance	Hourly spill was 28.1 to 28.6% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock while the upstream tainter gate could be repaired (on-going repairs related to the March tainter gate #2 failure). Volume of spill through the spillway remained the same. See page 3. 24 hr avg. spill was 29.5%.
Little Goose	Spill	8/2/2007	1600	1	Lockages	Hourly spill dropped to 28.5% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3 under "Low flows". 24 hr avg. spill was 29.9%.
Little Goose	Spill	8/3/2007	500-600, 1100 & 1600	4	Lockages	Hourly spill was 27.3 to 28.7% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 30.0%.
Little Goose	Spill	8/4/2007	100, 700, 1000 & 1700	4	Lockages	Hourly spill was 28.7% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock, See page 3. 24 hr avg. spill was 30.1.
Little Goose	Spill	8/5/2007	1100, 1400, 1600 - 1700, 1900	5	Lockages	Hourly spill was 28.6 to 28.8% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 29.9.
Little Goose	Spill	8/6/2007	200, 1300 - 1400, 1600	4	Maintenance	Hourly spill was 28.4 to 26.7% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock while the upstream tainter gate could be repaired (on-going repairs related to the March tainter gate #2 failure). Volume of spill through the spillway remained the same. See page 3. 24 hr avg. spill was 29.7%.
Little Goose	Spill	8/7/2007	500-600, 1800, 2100	4	Lockages	Hourly spill was 28.5 to 28.8% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 29.8%.

Little Goose	Spill	8/8/2007	100, 300, 1300, 1600-1700	5	Maintenance	Hourly spill was 28.1 to 28.6% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock while the upstream tainter gate could be repaired (on-going repairs related to the March tainter gate #2 failure). Volume of spill through the spillway remained the same. See page 3. 24 hr avg. spill was 29.6%.
Little Goose	Spill	8/9/2007	100, 200, 800, 1100, 1500	5	Maintenance	Hourly spill was 28.1 to 28.4% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock while the upstream tainter gate could be repaired (on-going repairs related to the March tainter gate #2 failure). Volume of spill through the spillway remained the same. See page 3. 24 hr avg. spill was 29.5%.
Little Goose	Spill	8/10/2007	1300, 2300-2400	3	Maintenance	Hourly spill was 27.9 to 28.7% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock while the upstream tainter gate could be repaired (on-going repairs related to the March tainter gate #2 failure). Volume of spill through the spillway remained the same; refer to explanation on page 3 under "Low flows". 24 hr avg. spill was 29.5%.
Little Goose	Spill	8/11/2007	1100, 1900	2	Maintenance	Hourly spill was 27.7 and 27.8% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock while the upstream tainter gate could be repaired (on-going repairs related to the March tainter gate #2 failure). Volume of spill through the spillway remained the same. See page 3. 24 hr avg. spill was 29.4%.
Little Goose	Spill	8/12/2007	700, 1000, 1300, 2000-2100	5	Maintenance	Hourly spill was 27.6 to 27.7% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock while the upstream tainter gate could be repaired (on-going repairs related to the March tainter gate #2 failure). Volume of spill through the spillway remained the same. See page 3. 24 hr avg. spill was 29.0%.
Little Goose	Add'l Spill	8/13/2007 - 8/17/07	700 - 1700	107	Maintenance	Project spilled 69 to 78% of total flow instead of the required 30%. There was a planned line outage for transformer testing so one unit ran speed no load and generated 5 kcfs, which is below minimum generation, and spilled the rest (15.2 - 18.7 kcfs). This outage is scheduled in the 2007 Fish Passage Plan, Table LGS-1.

Little Goose	Spill	8/17/2007	1900	1	Lockages	Hourly spill was 28.8% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock, refer to explanation on page 3 under “Low flows”.
Little Goose	Spill	8/18/2007	500; 1900	2	Lockages	Hourly spill was 28.2 to 28.8% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 30.4%.
Little Goose	Spill	8/18/2007	700	1	Operational - Lower Flows	Hourly spill was 28.8% (below 30.0% +/- 1% range): Because of low water flow and low forebay elevation, BPA requested less spill while maintaining generation. The project agreed to reduce spill and flow, and then realized that they couldn't because of testing, which required min gen for unit 5 which is a larger unit requiring slightly higher flow to operate within 1% peak efficiency.
Little Goose	Spill	8/18/2007	1100	1	Maintenance	Hourly spill was 28.3% (below 30.0% +/- 1% range): Project was switching from unit 5 to unit 3 and running test on line relays.
Little Goose	Add'l Spill	8/18/2007	1400; 1700; 2200 - 2400	5	Operational - Low Flows	Hourly spill was 31.1 to 31.3% (above 30.0% +/- 1% range): Project spilled 5.5 kcfs while trying to increase the forebay elevation from minimum pool of 633 ft.
Little Goose	Spill	8/19/2007	1500, 2000, 2100	3	Lockages	Hourly spill was 28.6% (below 30.0% +/- 1% range): due to misc. spill to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 30.2%.
Little Goose	Spill	8/20/2007	400; 800; 1100	3	Lockages	Hourly spill was 26.8 to 28.8% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 30.0%.
Little Goose	Spill	8/20/2007	1500	1	Maintenance	Hourly spill dropped to 28.8% (below 30.0% +/- 1% range) due to the volume of water needed to empty the navigation lock while the upstream tainter gate trunion pin could be repaired. Volume of spill through the spillway remained the same. See page 3.

Little Goose	Spill	8/21/2007	0100; 0700	2	Lockages	Hourly spill was 28.8% (below 30.0% +/- 1% range): due to misc. spill the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 30.3%.
Little Goose	Spill	8/22/2007	0600; 0900	2	Lockages	Hourly spill was 28.1 to 28.8% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 30.0%.
Little Goose	Spill	8/23/2007	1400; 1900	2	Lockages	Hourly spill was 28.0 and 28.1% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 29.8%.
Little Goose	Spill	8/24/2007	0200; 0400; 1900	3	Lockages	Hourly spill was 28.7 to 28.8% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 29.6%.
Little Goose	Spill	8/25/2007	0700; 2300	2	Lockages	Hourly spill was 27.3 and 28.5% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 29.7%.
Little Goose	Spill	8/26/2007	2200; 2400	2	Lockages	Hourly spill was 28.1 and 27.7% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 29.9%.
Little Goose	Spill	8/27/2007	1900-2000	2	Lockages	Hourly spill was 28.5 and 28.4% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 29.8%.
Little Goose	Spill	8/28/2007	100-200	2	Lockages	Hourly spill was 28.5 and 28.4% (below 30.0% +/- 1% range): due to the volume of water needed to empty the navigation lock. See page 3. 24 hr avg. spill was 29.5%.
Lower Monumental	Add'l Spill	8/1/2007	800	1	Maintenance	Project spilled above required level of 17 kcfs in order to set up the system for the scheduled powerhouse line outage. Line outage is scheduled in the FOP.
Lower Monumental	Add'l Spill	8/1/2007 - 8/2/07	1800 - 0100	8	Maintenance	Project spilled to spill cap of 23.5 kcfs instead if FOP level of 17 kcfs due to a scheduled powerhouse line outage. Line outage is scheduled in the FOP.

Lower Monumental	Spill	8/6/2007	800-1000	3	Maintenance	Project generated 13.1 to 15.1 kcfs instead of minimum generation of 11.5 kcfs while spilling 11.8 kcfs. It was necessary to take off line a small unit (#3) and bring on a large unit (#5) in order to perform the fish screen inspection. The large units generate more than a small unit. The fish screen inspections are documented in the 2007 Fish Passage Plan.
Lower Monumental	Spill	8/14/2007	1200-1600	5	Research	Spill jumped up to 17 kcfs, while generation dropped below minimum value of 11 kcfs; at 1400hr spill dropped to 0.0 and 2.6 kcfs and the remaining flow was used for generation. The powerhouse and spillway were out of service so that research equipment could be installed. This operation was coordinated with the salmon managers at the July 25 and August 8 TMT meeting.
Ice Harbor	Add'l Spill	8/28/2007	1100 - 1300	3	Research	Spill increased to 23.8 kcfs from 14 kcfs and generation went to 0. The powerhouse was out of service so that research equipment could be removed. Outage was coordinated with salmon managers at the August 22 TMT meeting.
McNary	Add'l Spill	8/27/2007	1000-1100	2	Maintenance - Safety	Hourly % spill dropped to 35.3 and 38.1% (below 40% +/- 1% range) due to reduced outflow and spill while switching generation units to ensure the safety of construction workers. Work for an on-going roofing contract was taking place, and they didn't want any electrical interference. 24 hr avg. spill was 39.6%
McNary	Add'l Spill	8/30/2007	0000	1	Load swing hour	Hourly % spill was up to 42.3% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4.
John Day	Spill	8/6/2007	2200	1	Load swing hour	Hourly % spill dropped to 28.3% (below 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4.
John Day	Spill	8/7/2007	1800	1	Load swing hour	Hourly % spill dropped to 28.8% (below 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.0%

John Day	Add'l Spill	8/10/2007	700	1	Load swing hour	Hourly % spill was up to 32.0% (above 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 29.9%
John Day	Spill	8/15/2007	700 - 800	2	Load swing hours	Hourly % spill dropped to 27.7 and 28.6% (below 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 29.9%
John Day	Spill	8/16/2007	700	1	Load swing hour	Hourly % spill dropped to 28.7% (below 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 29.9%
John Day	Spill	8/17/2007	700	1	Load swing hours	Hourly % spill dropped to 28.9% (below 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.0%
John Day	Add'l Spill	8/18/2007	2400	1	Load swing hours	Hourly % spill was up to 32.1% (above 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.3%
John Day	Add'l Spill	8/22/2007	200; 1200	2	Load swing hours	Hourly % spill was up to 31.2 and 31.3% (above 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.1%
John Day	Spill	8/24/2007	1400	1	Load swing hours	Hourly % spill dropped to 28.8% (below 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.2%
John Day	Add'l Spill	8/24/2007	2300 - 2400	2	Load swing hours	Hourly % spill was up to 31.5 and 31.3% (above 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.2%
John Day	Add'l Spill	8/26/2007	200 - 400	3	Load swing hours	Hourly % spill was up to 31.1 and 31.2% (above 30% +/- 1% range). due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.2%
John Day	Add'l Spill	8/28/2007	1400; 2300	2	Load swing hours	Hourly % spill was up to 32.0% (above 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.6%.
John Day	Add'l Spill	8/28/2007	1700	1	Human Error	Project spilled 33.7% (44 kcfs) instead of 30%. BPA requested 37 kcfs at 1600 hr and it was not implemented until 1700 hr.

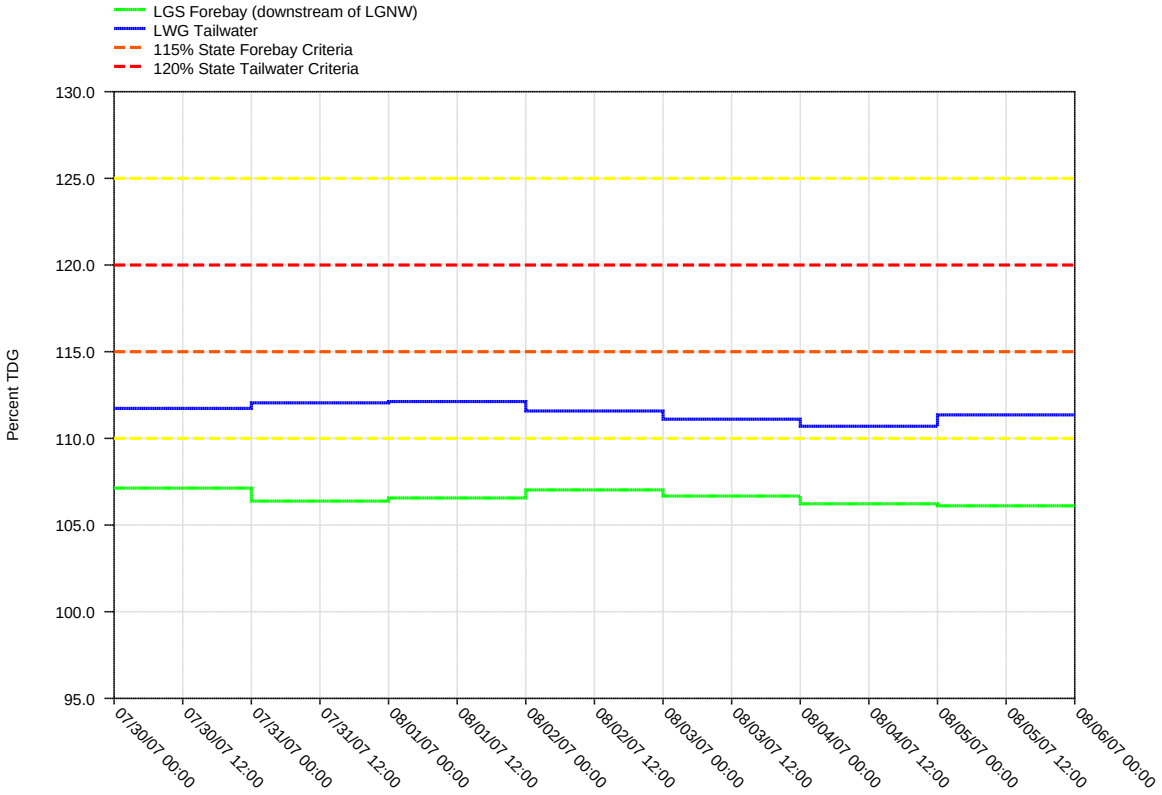
John Day	Add'l Spill	8/29/2007	300	1	Human Error	Project spilled 31.7% (34.5 kcfs) instead of 30%. Log note indicates the hydro scheduler was late calling in the spill change to 28 kcfs.
John Day	Spill	8/29/2007	600; 800; 1600	3	Load swing hours	Hourly % spill was down to 27.9% (below 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.0%.
John Day	Spill	8/30/2007	700; 900	2	Load swing hours	Hourly % spill was down to 28.5% (below 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.0%.
John Day	Add'l Spill	8/30/2007	1000; 2300	2	Load swing hours	Hourly % spill was up to 31.6% (above 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.0%.
John Day	Add'l Spill	8/31/2007	1400 - 1500	2	Load swing hours	Hourly % spill was up to 31.3% (above 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.1%. Grand Coulee and Chief Joseph were off of generation response on Aug. 31 because they were running full turbine to draft Grand Coulee pool down to 1278 ft (which they reached at 1800 hr).
John Day	Add'l Spill	8/31/2007	2300	1	Load swing hours	Hourly % spill was up to 31.2% (above 30% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 30.1%.
The Dalles	Add'l Spill	8/6/2007	1100	1	Load swing hour	Hourly % spill was up to 42.0% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.3%
The Dalles	Add'l Spill	8/7/2007	1000	1	Load swing hour	Hourly % spill was up to 41.5% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.3%
The Dalles	Add'l Spill	8/11/2007	700	1	Load swing hour	Hourly % spill was up to 41.7% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.1%
The Dalles	Spill	8/12/2007	1800	1	Load swing hour	Hourly % spill dropped to 36.8% (below 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 39.9%

The Dalles	Add'l Spill	8/13/2007 - 8/14/07	2300 - 300	5	Load swing hours	Hourly % spill was up to 41.1, 41.5, 41.3, 41.8% (above 40% +/- 1% range) due to project being on response during rapidly changing load (load drop hours) as defined in the text on page 4. 24 hr avg. spill was 40.1%
The Dalles	Spill	8/14/2007	0700, 1200	2	Load swing hours	Hourly % spill dropped to 38.8 and 38.5% (below 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.1%
The Dalles	Add'l Spill	8/16/2007	2300	1	Load swing hour	Hourly % spill was up to 41.2% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.1%
The Dalles	Add'l Spill	8/17/2007	600, 1800	2	Load swing hours	Hourly % spill was up to 41.7 and 41.2% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.4%
The Dalles	Add'l Spill	8/18/2007	400	1	Load swing hour	Hourly % spill was up to 41.3% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.1%
The Dalles	Spill	8/20/2007	700 - 800; 1800	3	Human Error	Project spilled 40.3 kcfs (30.9%), 55.1 kcfs (37.5%) and 42.0 kcfs (38.5%) instead of 40%. The project was requested to spill 40 kcfs at 001 hr which continued until 711 hr when spill was increased to 58 kcfs. The powerhouse line # 2 outage that began at 700 hr and ended at 1613 hr distracted BPA real time scheduler so that changes were not requested at 600 hr or 1700 hr; bringing the unit back on-line effected the hour ending 1800.
The Dalles	Add'l Spill	8/24/2007	1800 - 2100; 2300 - 2400	6	Load swing hours	Hourly % spill was up to 42.7% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill for 8/24/07 was 40.5%
The Dalles	Add'l Spill	8/25/07	0100; 0300 - 0600	5	Load swing hours	Hourly % spill was up to 42.5% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill for 8/25/07 it was 40.3%.
The Dalles	Add'l Spill	8/26/07	0400; 2000	2	Load swing hours	Hourly % spill was up to 41.4% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill for 8/26/07 it was 40.0%.

The Dalles	Add'l Spill	8/27/07	0100; 2300	2	Load swing hours	Hourly % spill was up to 41.1% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.1%.
The Dalles	Add'l Spill	8/28/07	0100; 800; 1800 - 2100	6	Load swing hours	Hourly % spill was up to 41.5% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.2%.
The Dalles	Add'l Spill	8/29/07	0300	1	Load swing hour	Hourly % spill was up to 41.2% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.1%.
The Dalles	Spill	8/29/07	1600	1	Load swing hour	Hourly % spill was down to 38.1% (below 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.1%.
The Dalles	Add'l Spill	8/30/07	500; 2300	2	Load swing hours	Hourly % spill was up to 42.8% (above 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.2%.
The Dalles	Spill	8/30/07	1100; 1300	2	Load swing hours	Hourly % spill was down to 38.5% (below 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.2%.
The Dalles	Spill	8/31/07	1300	1	Load swing hour	Hourly % spill was down to 38.1% (below 40% +/- 1% range) due to project being on response during rapidly changing load as defined in the text on page 4. 24 hr avg. spill was 40.1%.

Figure 1.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

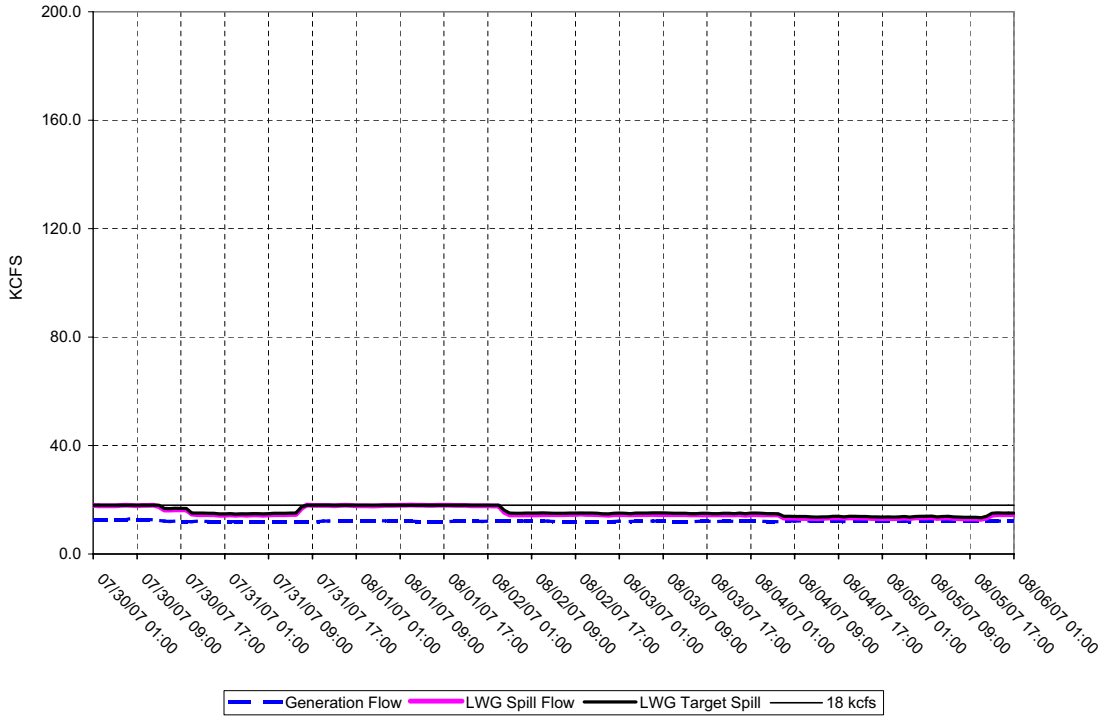
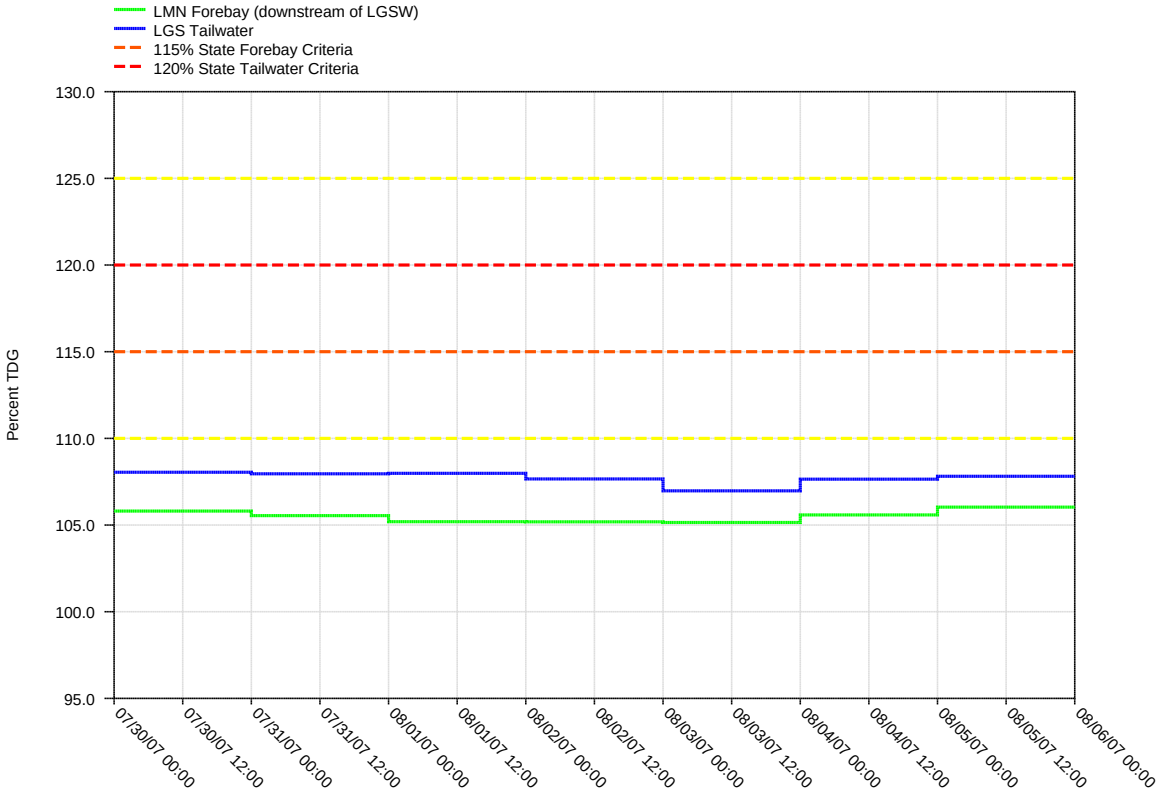


Figure 2.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

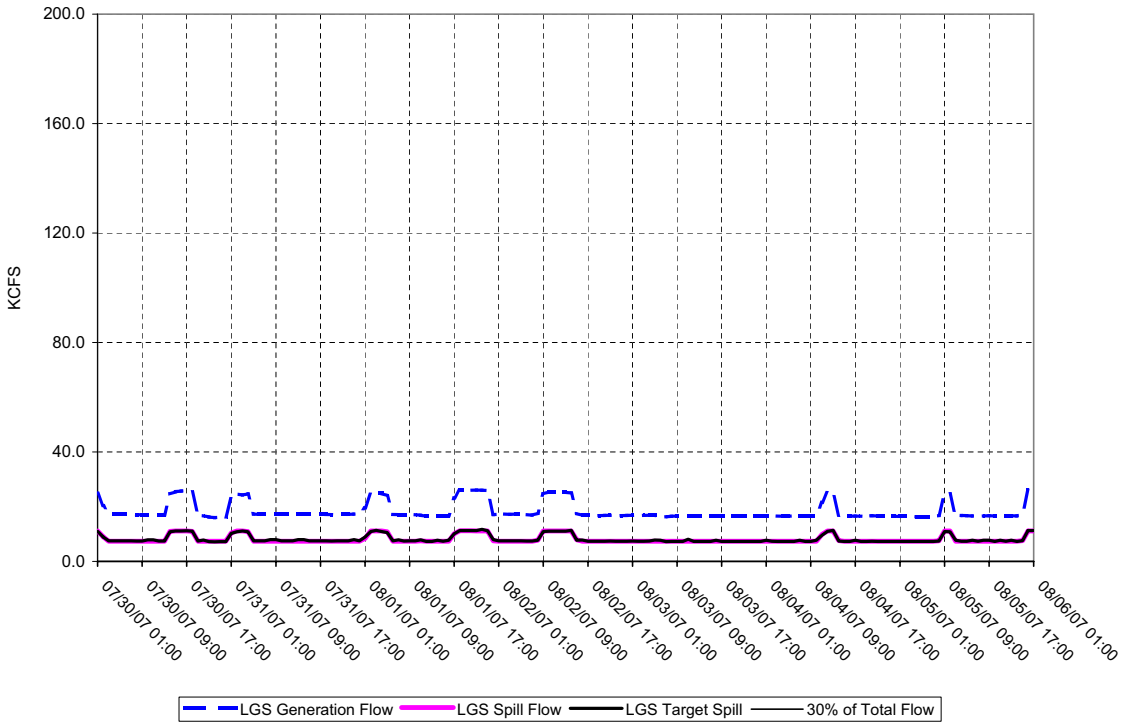
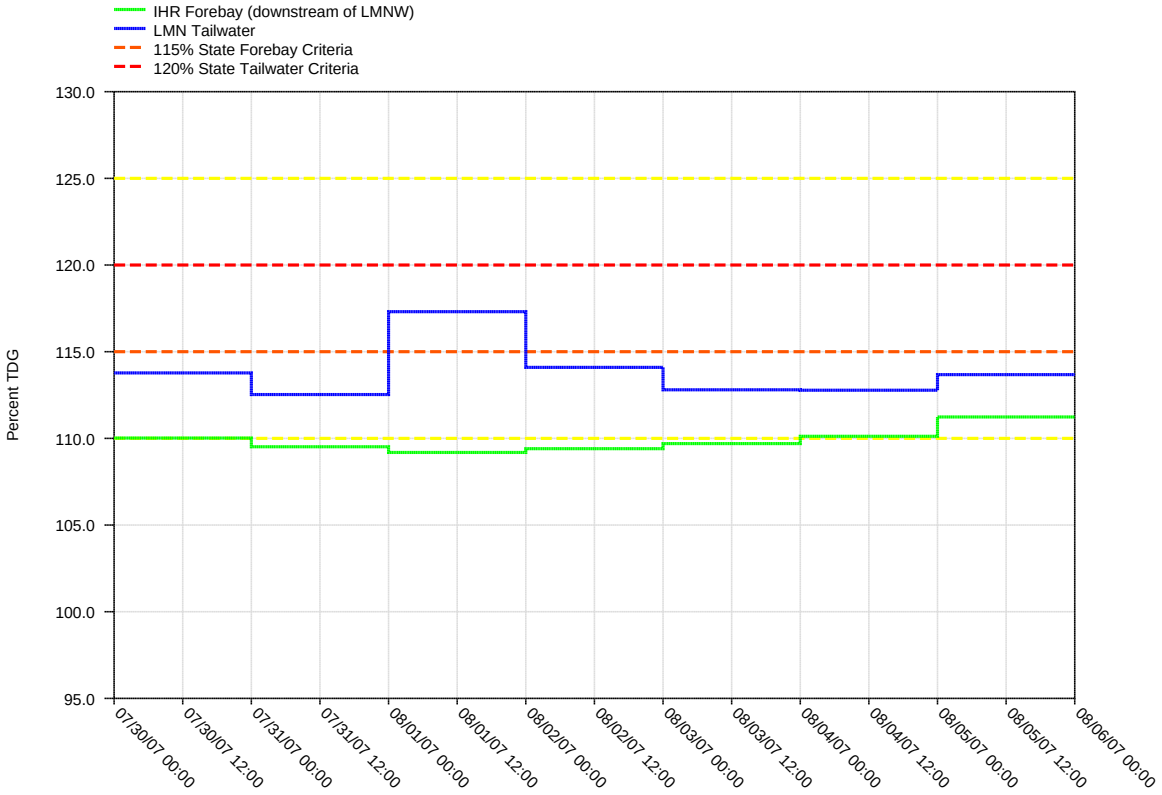


Figure 3.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

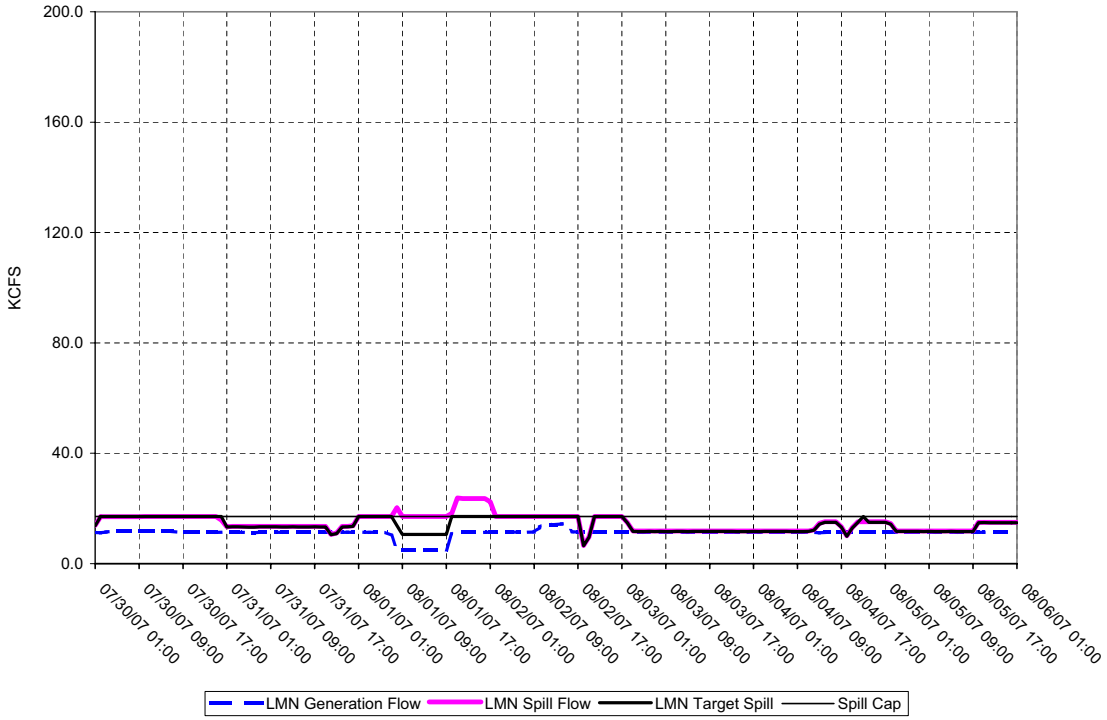
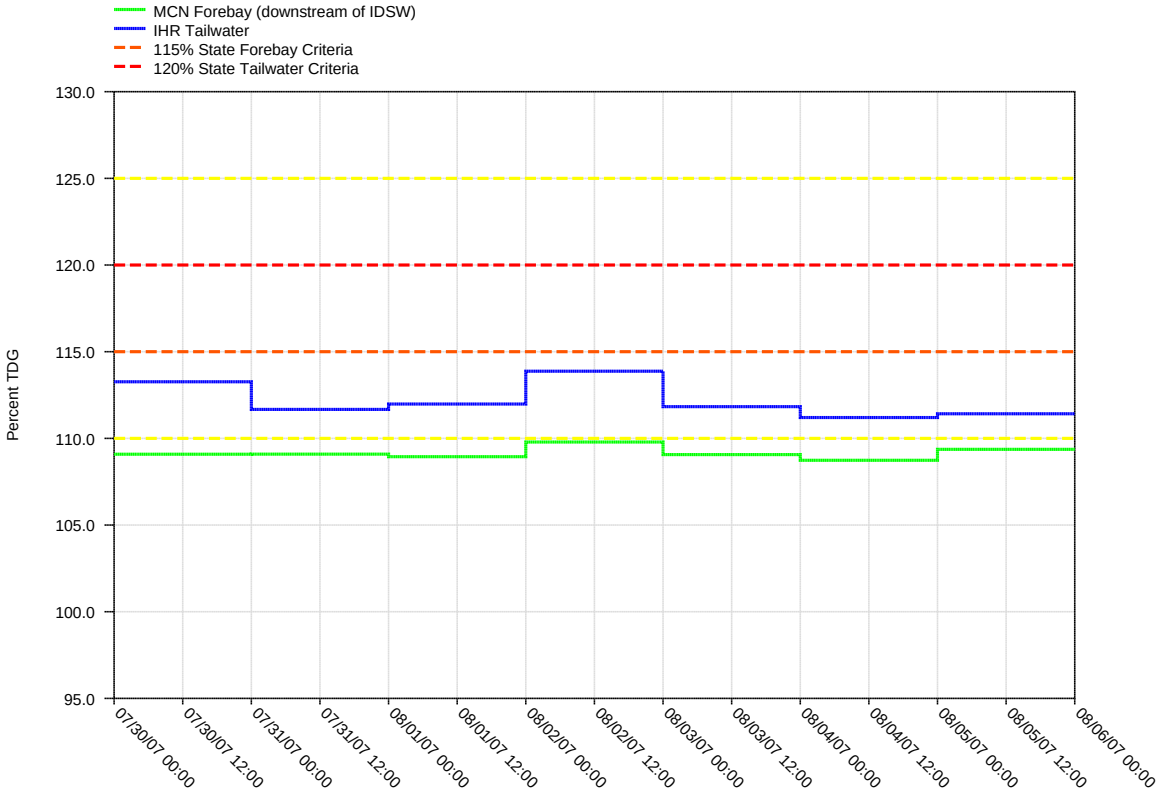


Figure 4.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

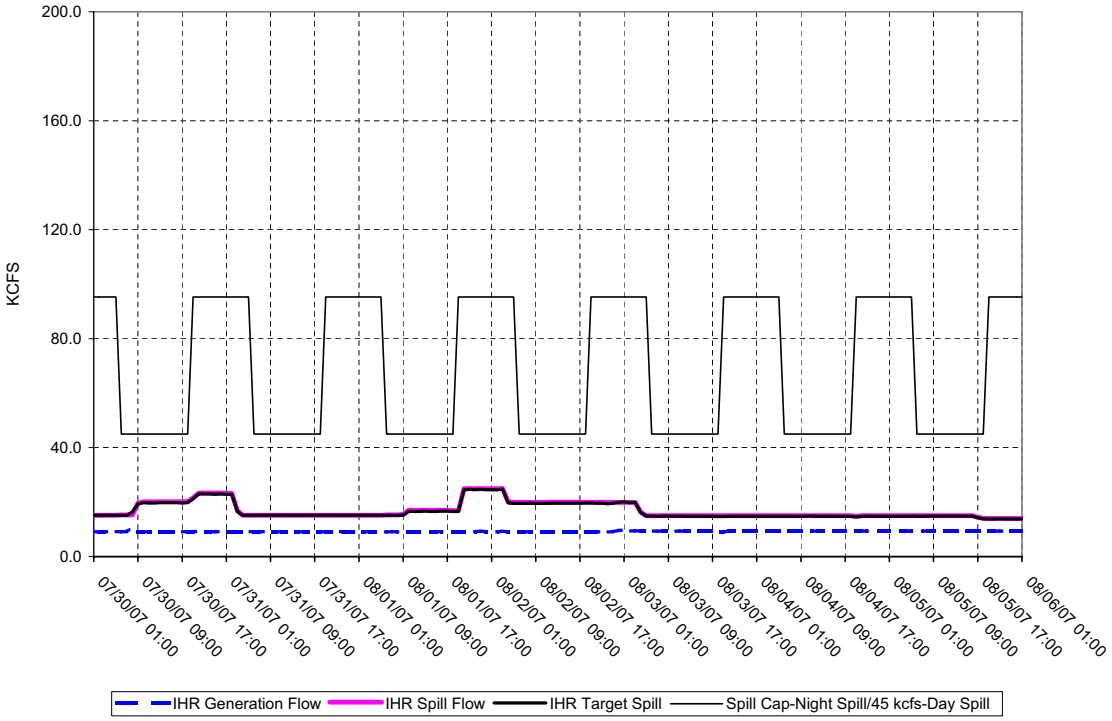
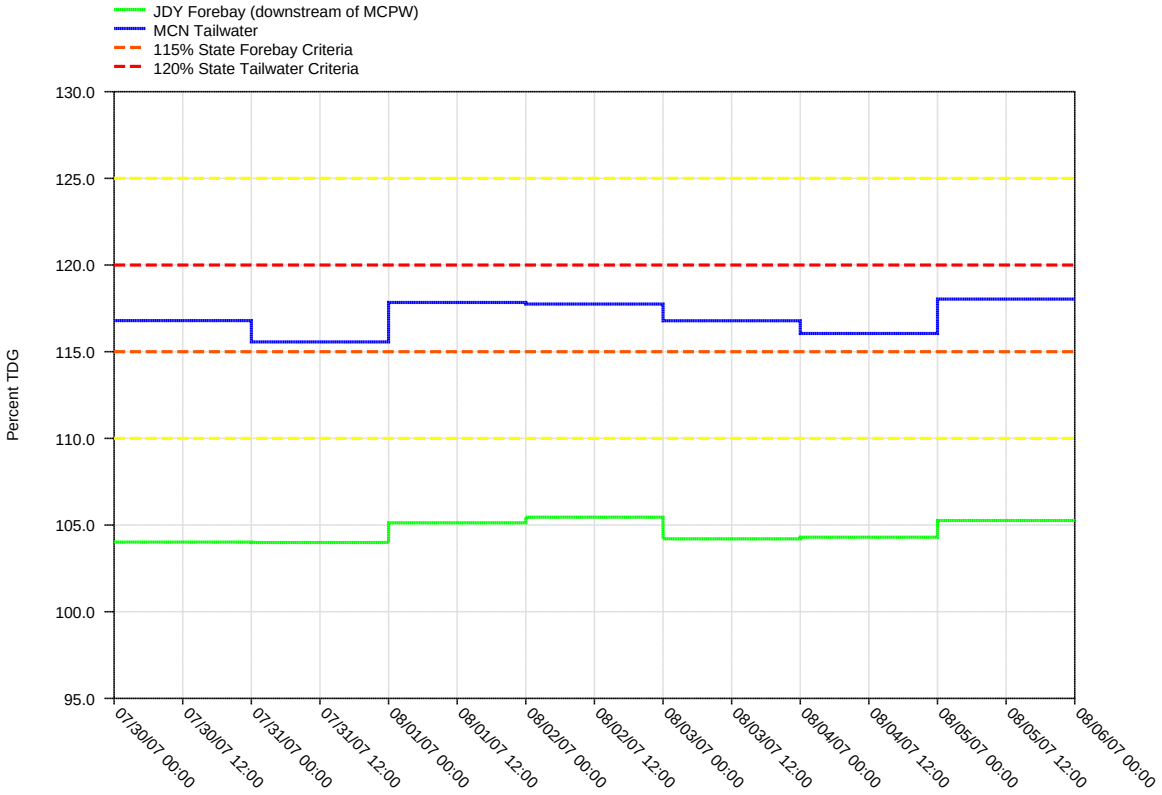


Figure 5.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

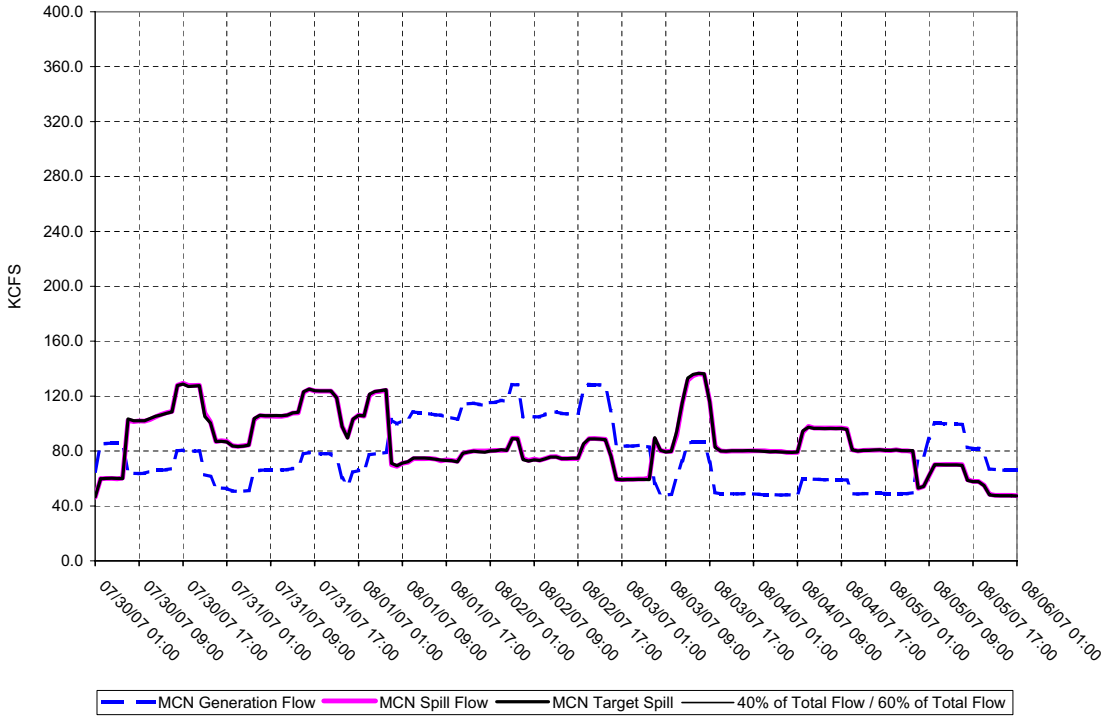
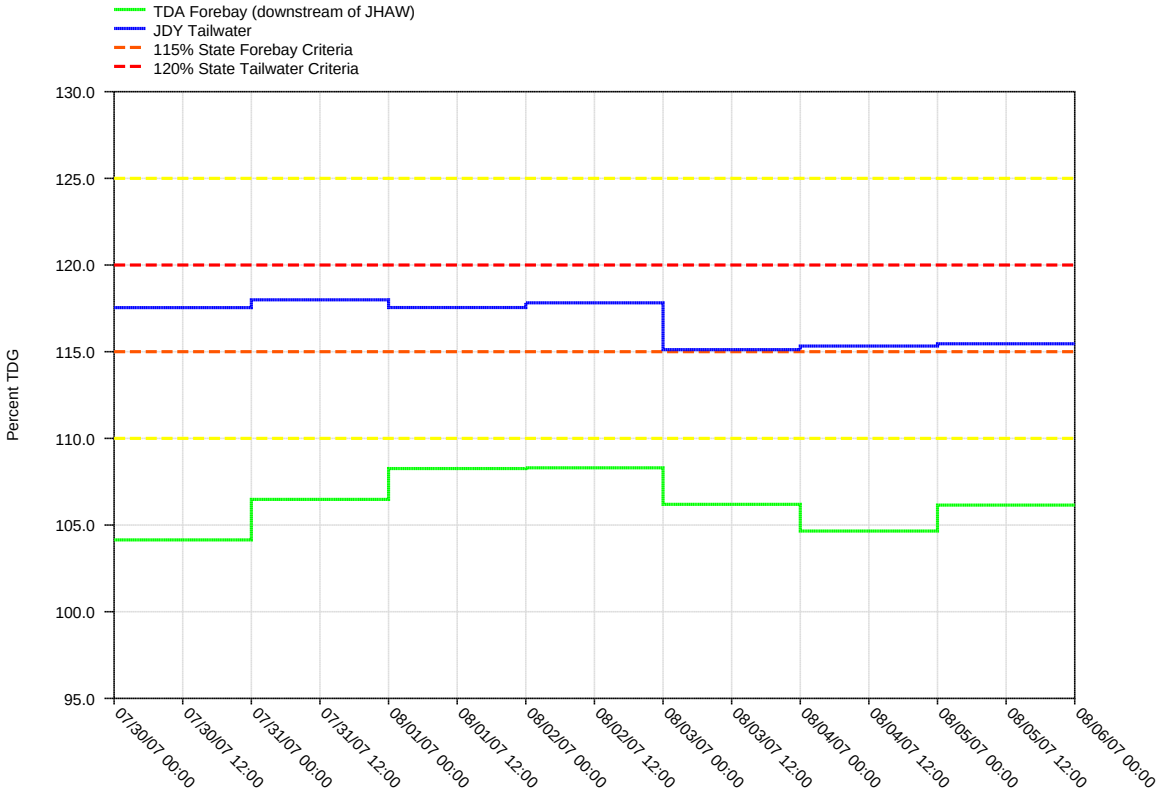


Figure 6.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

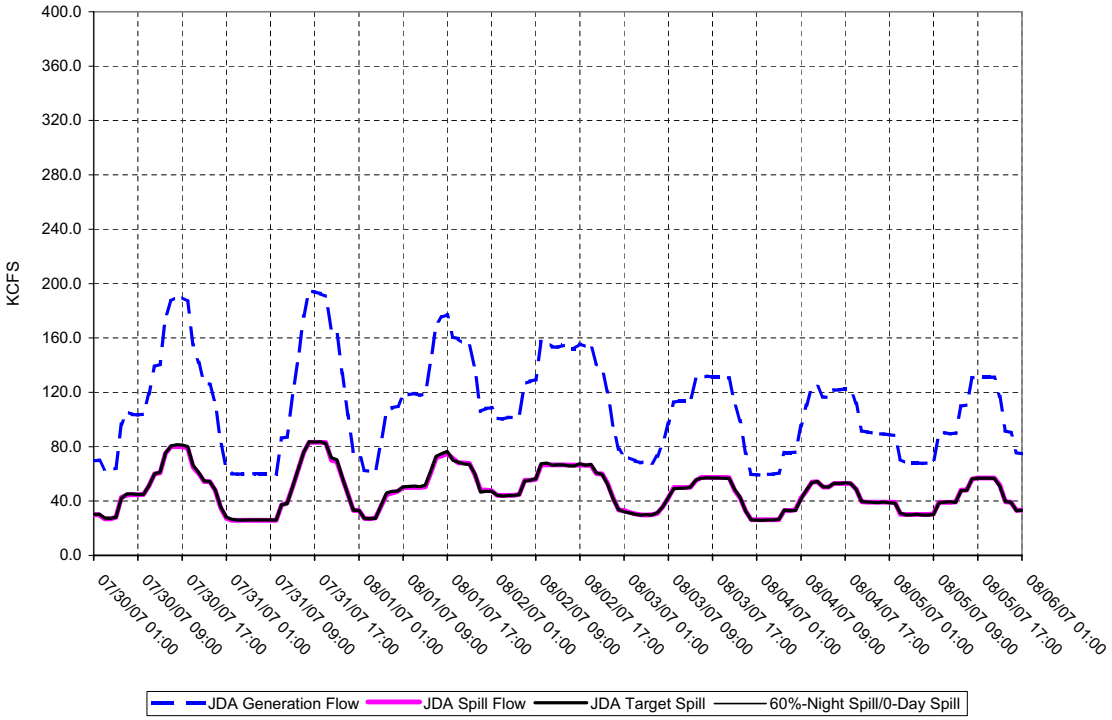
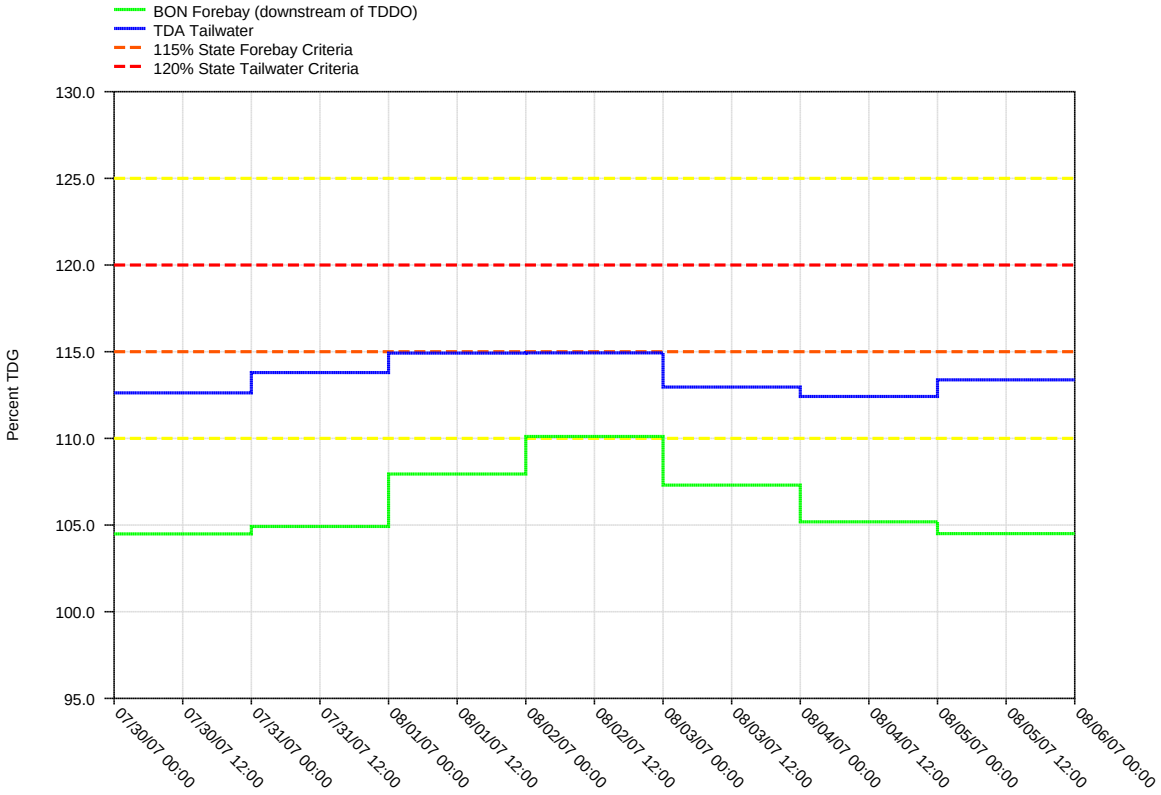


Figure 7.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

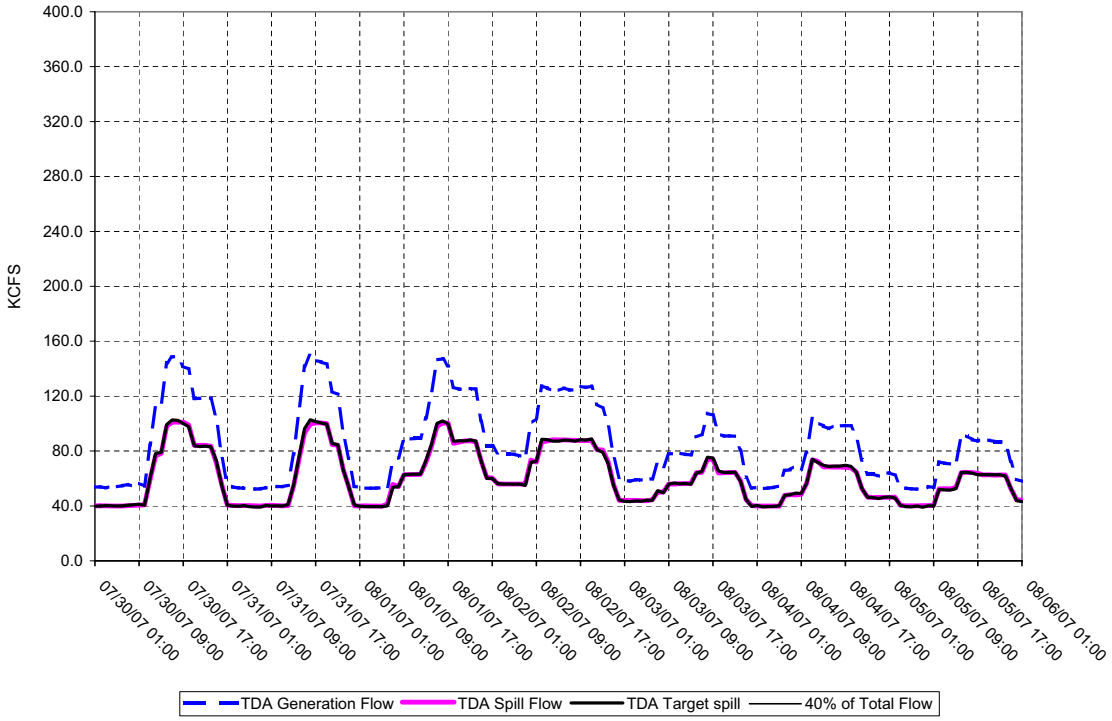
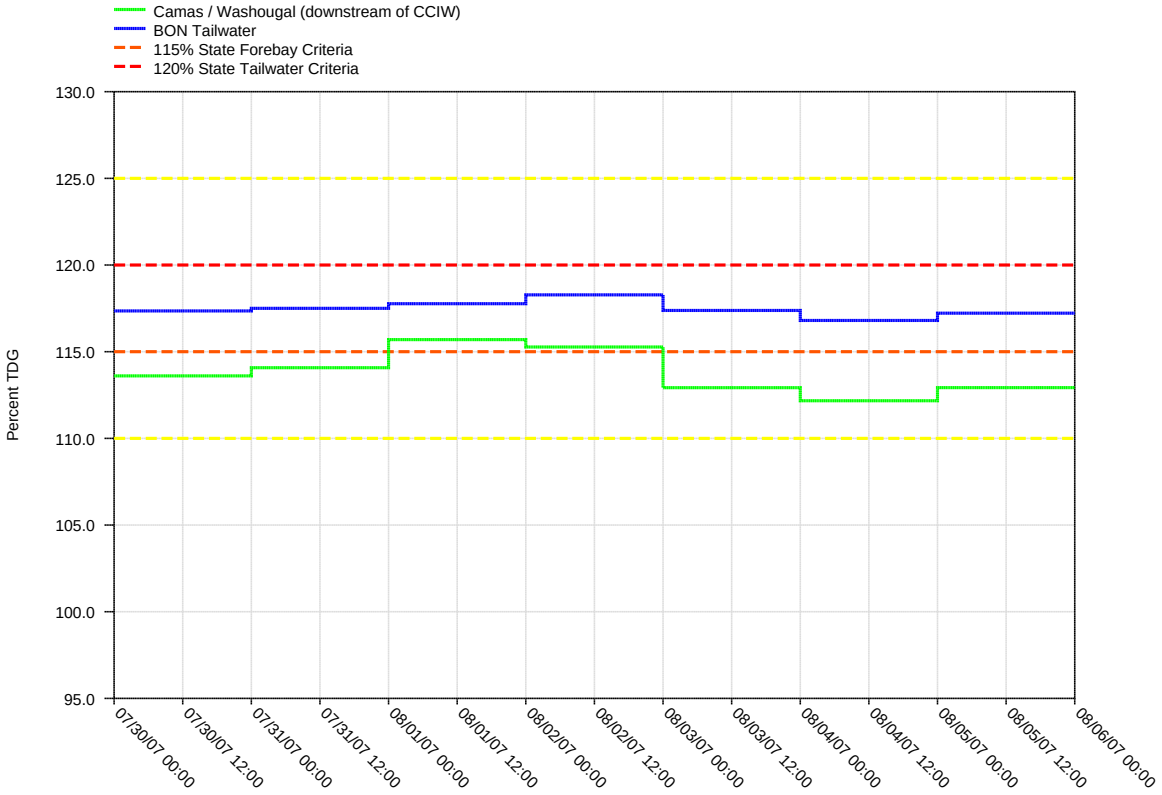


Figure 8.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

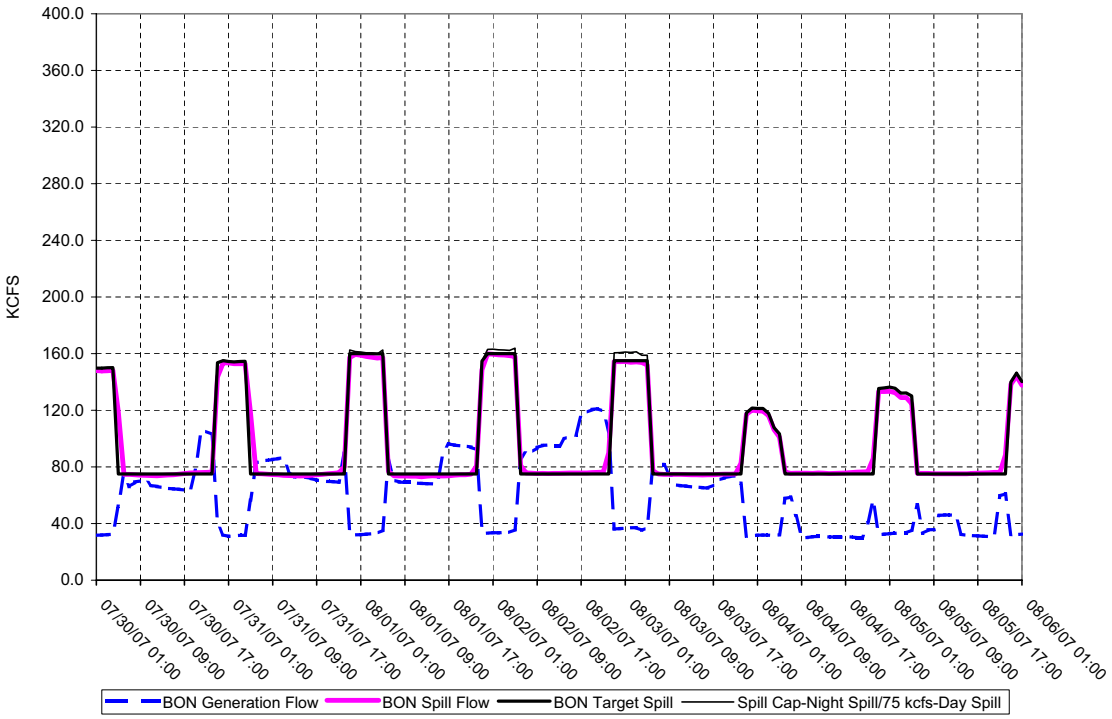
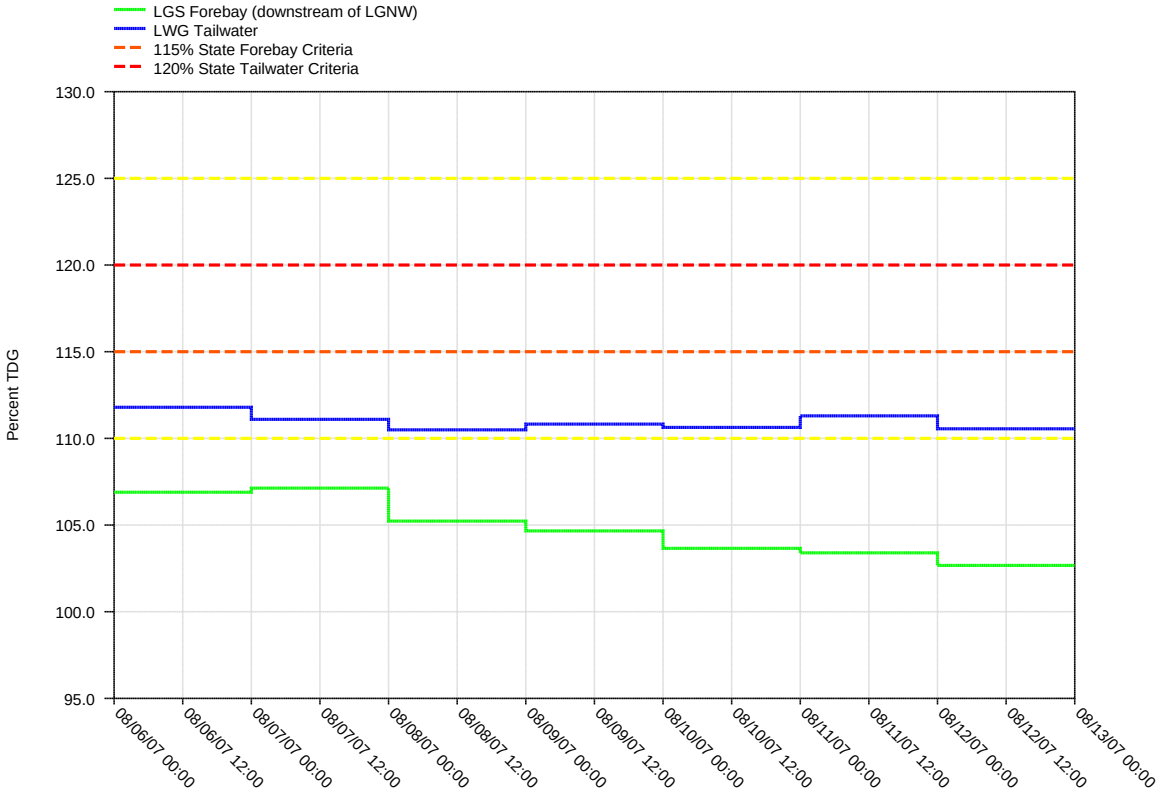


Figure 9.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

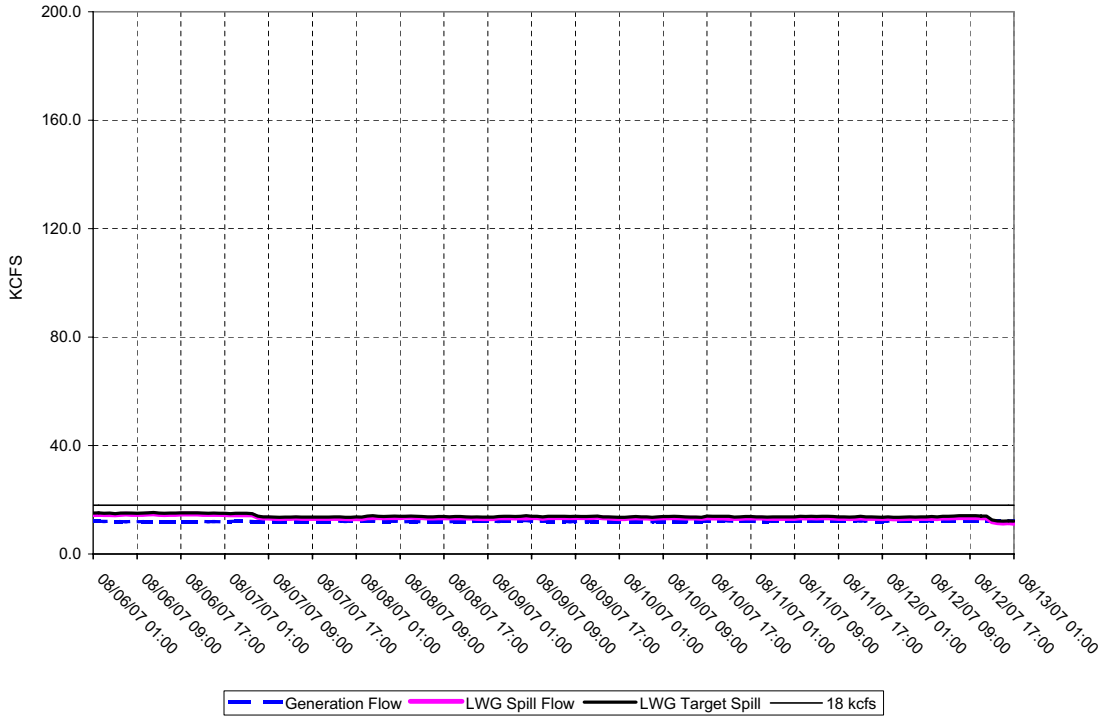
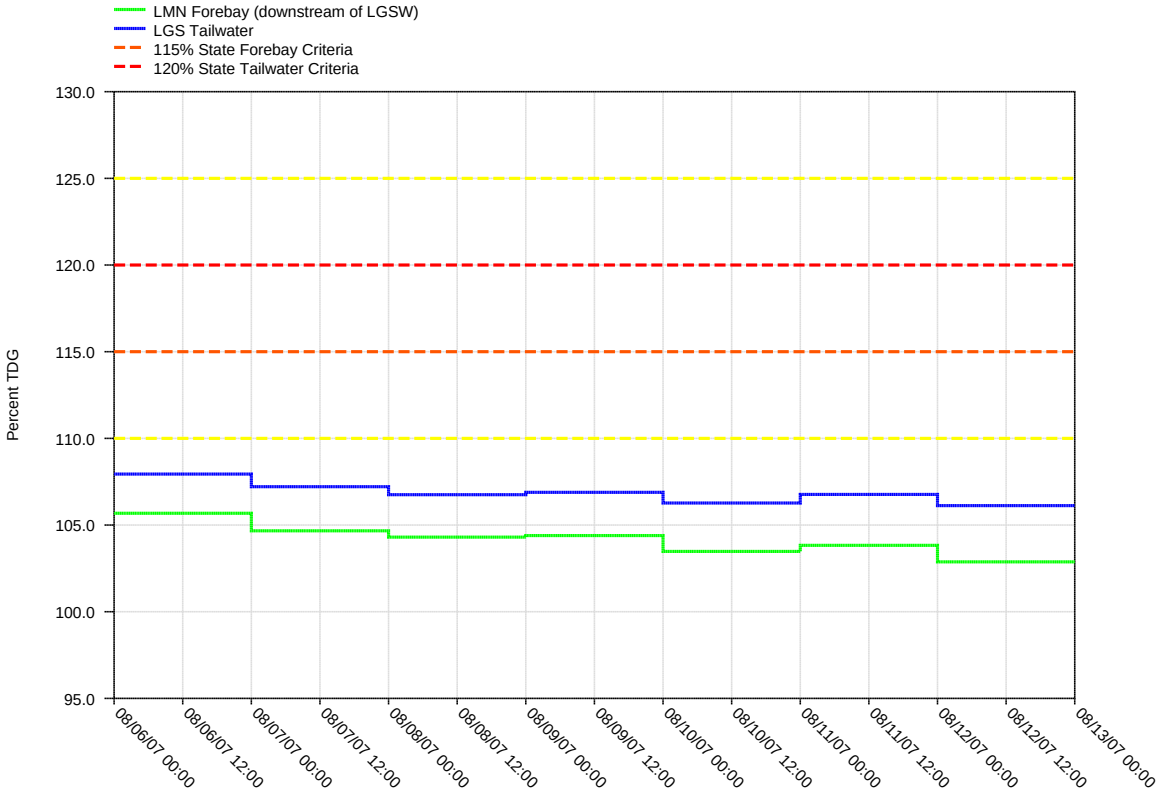


Figure 10.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

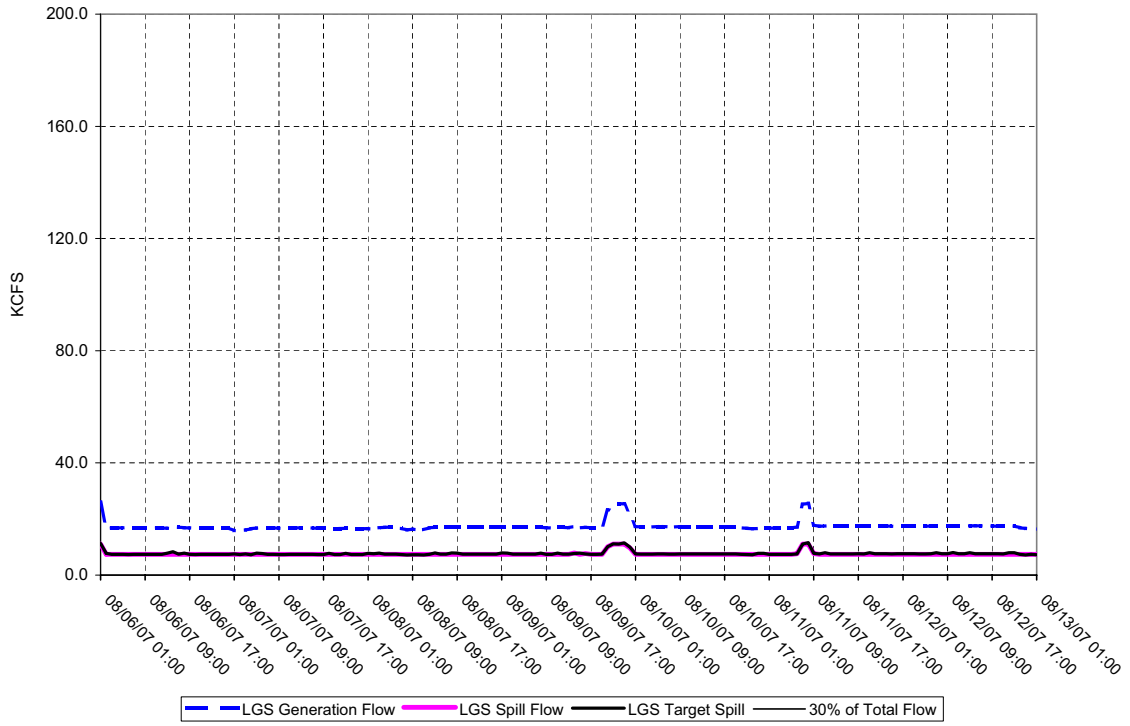
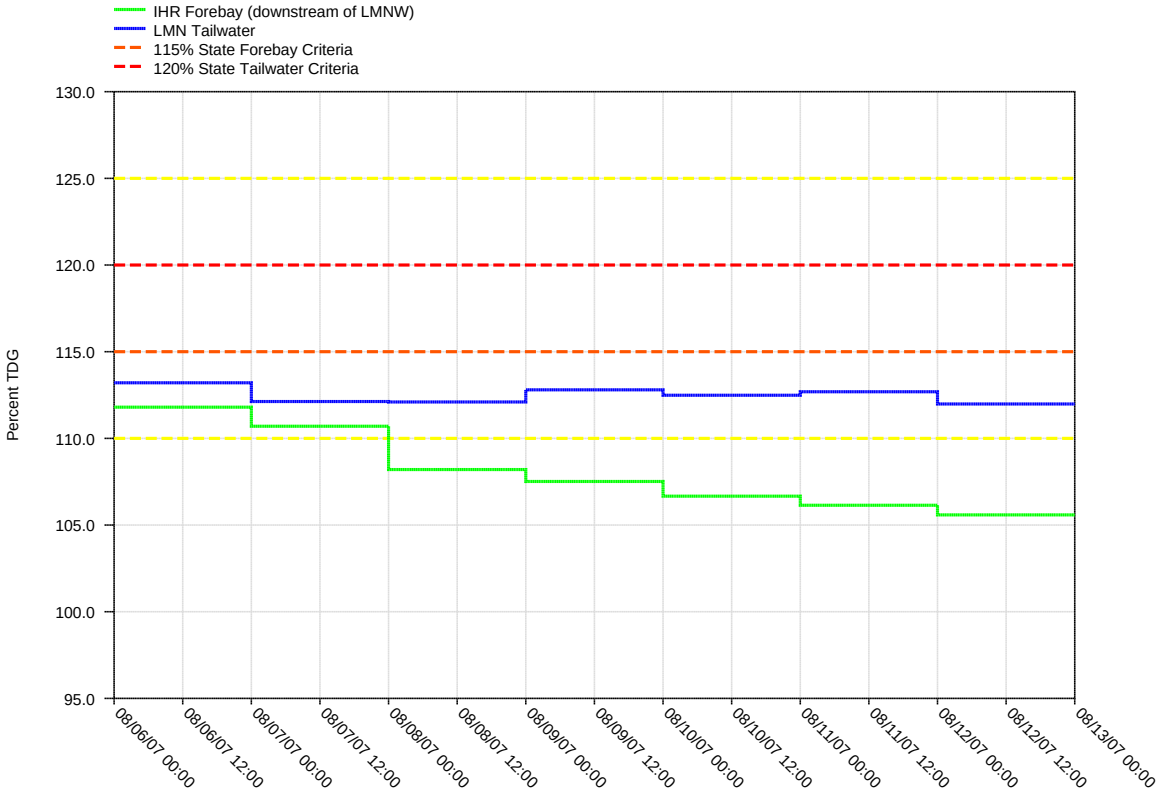


Figure 11.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

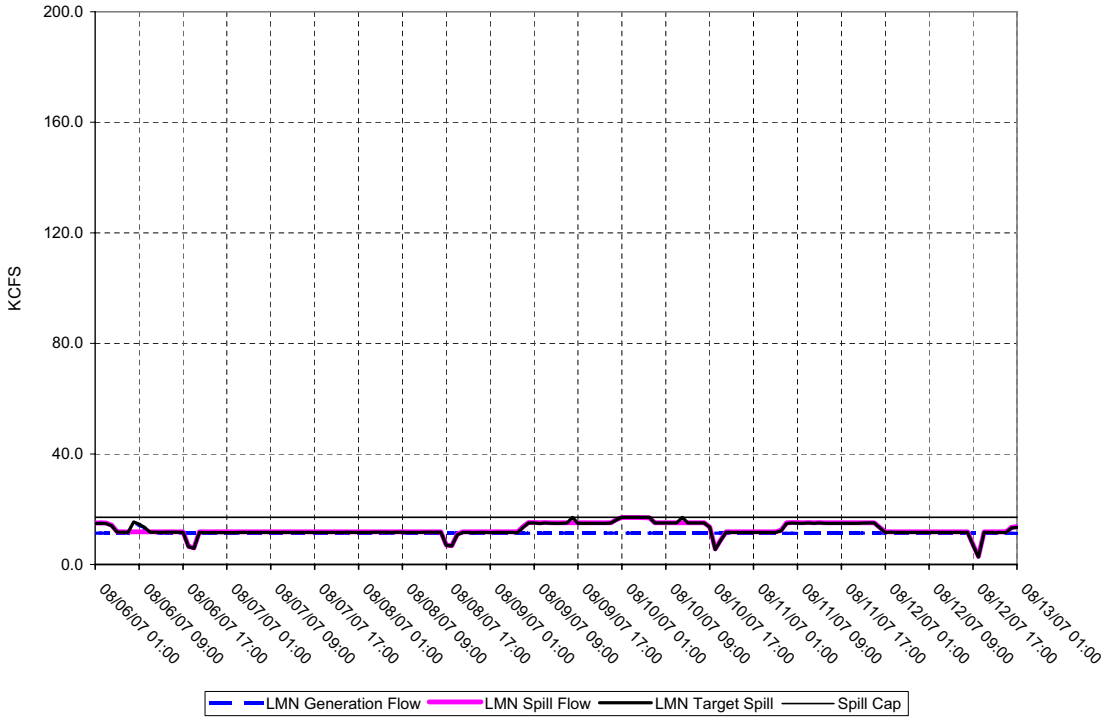
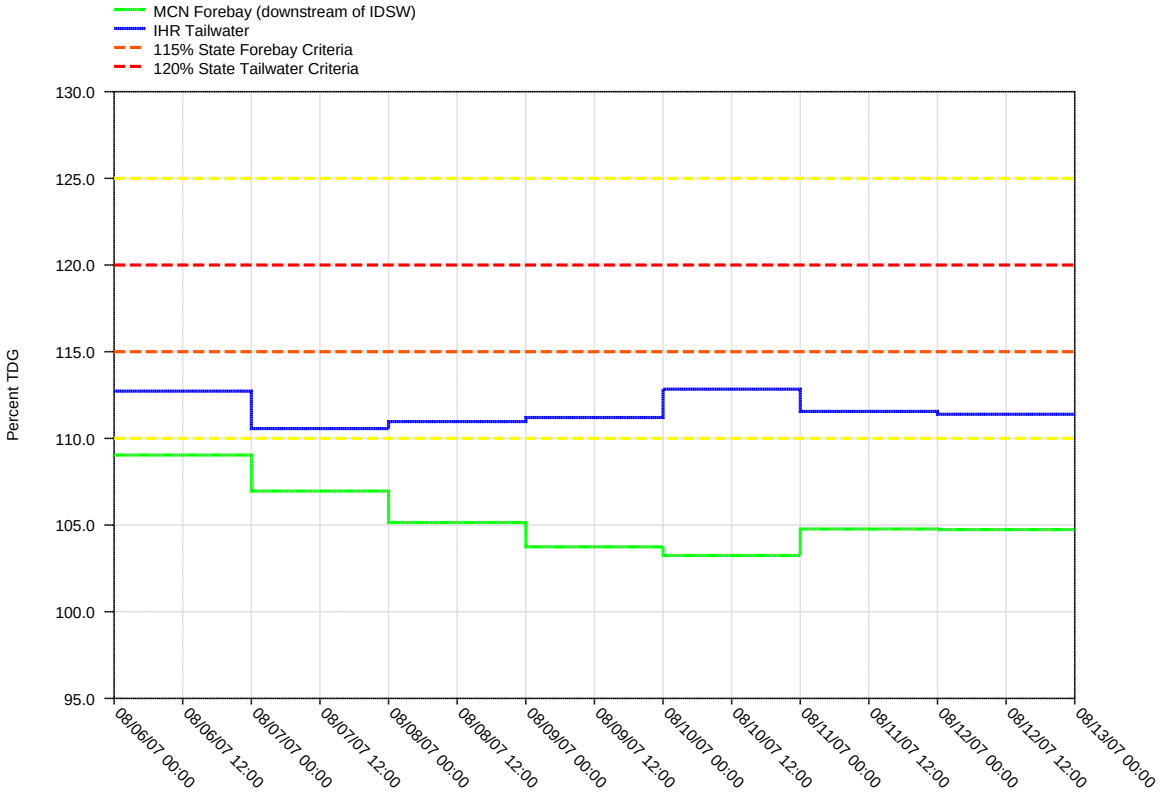


Figure 12.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

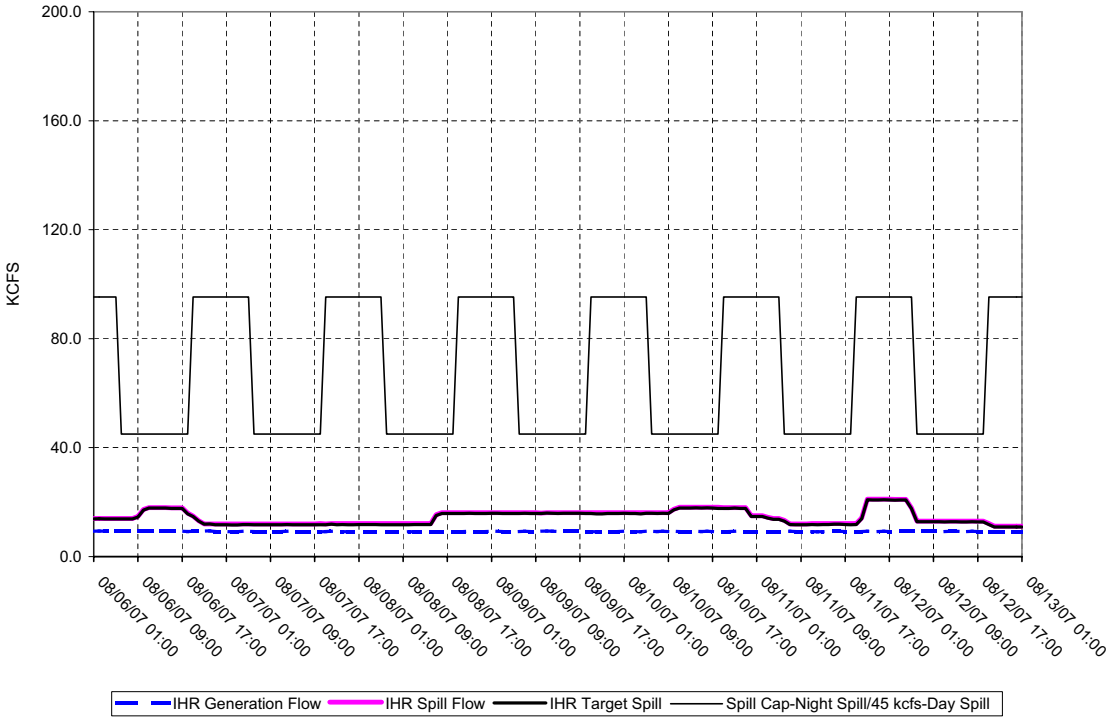
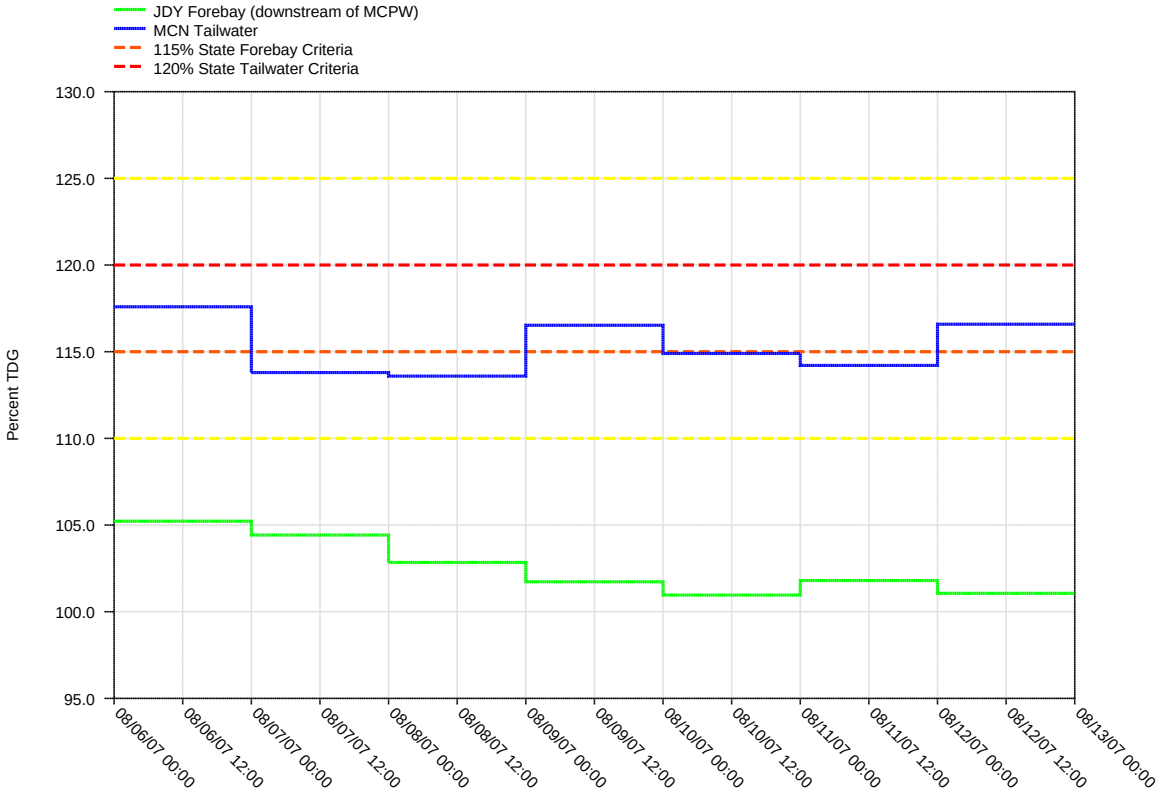


Figure 13.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

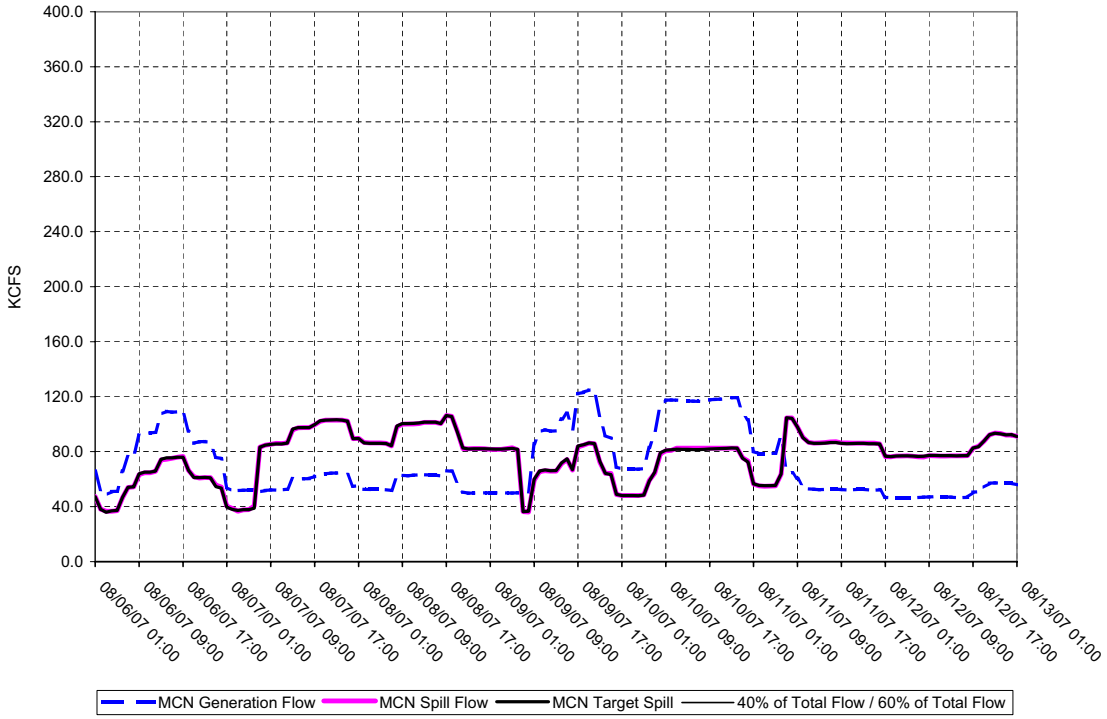
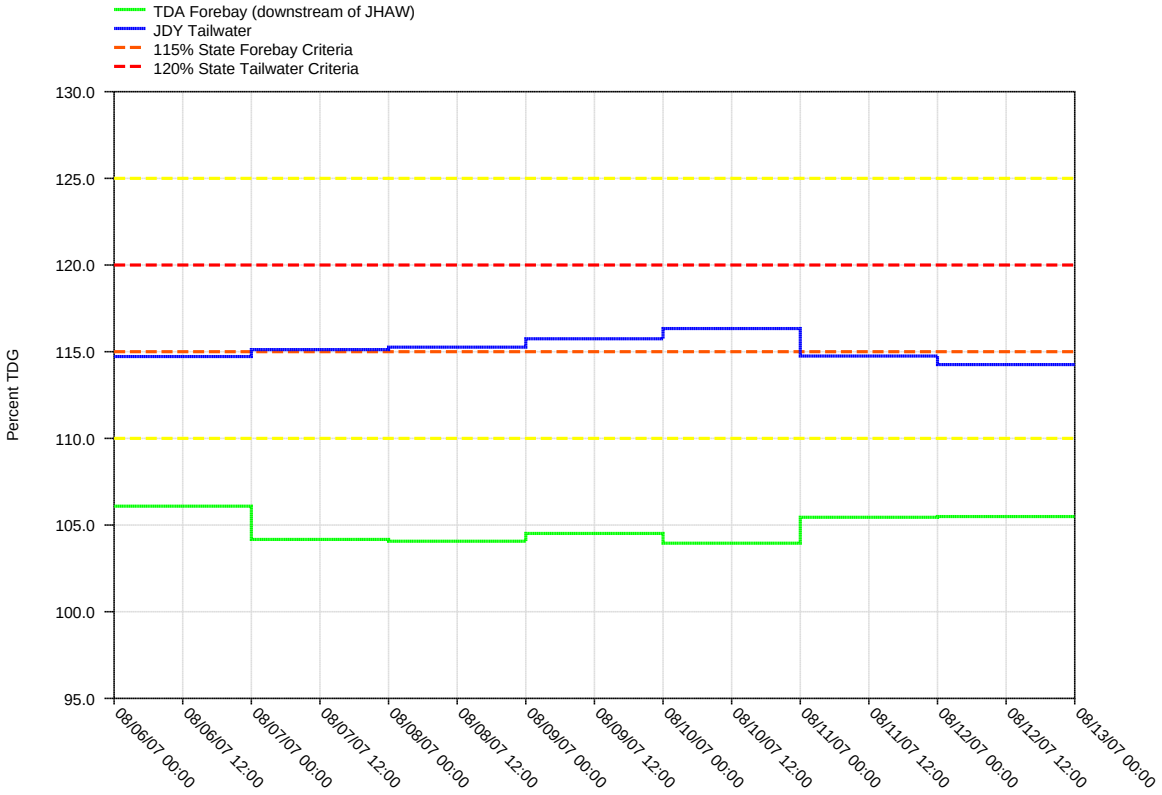


Figure 14.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

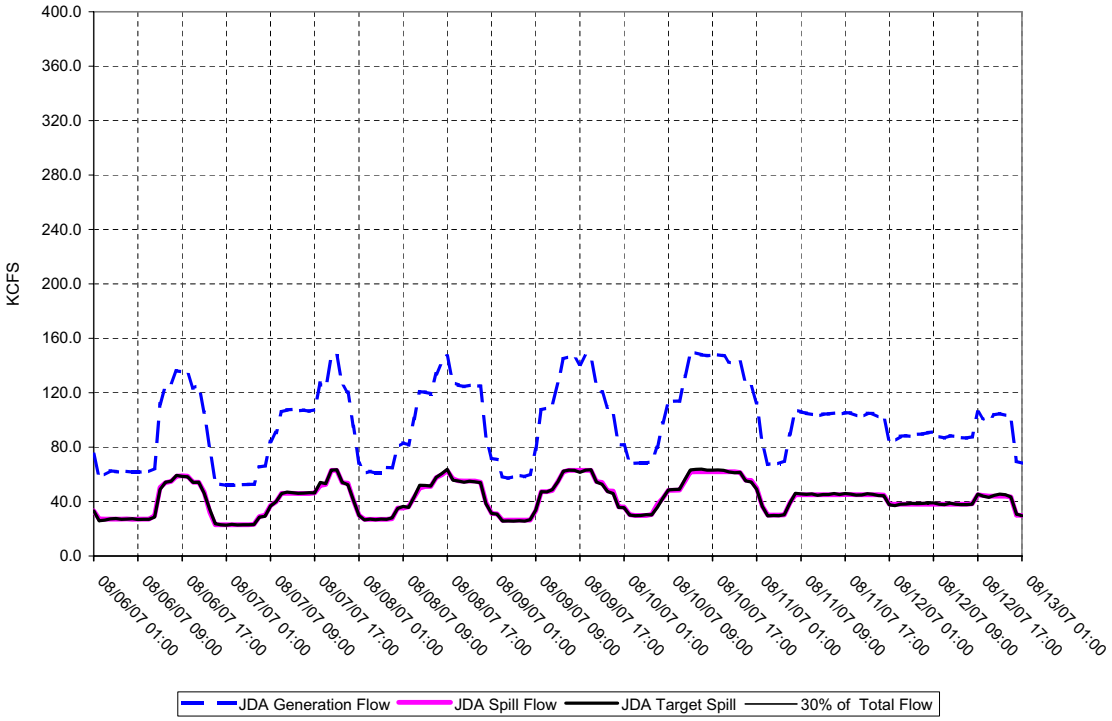
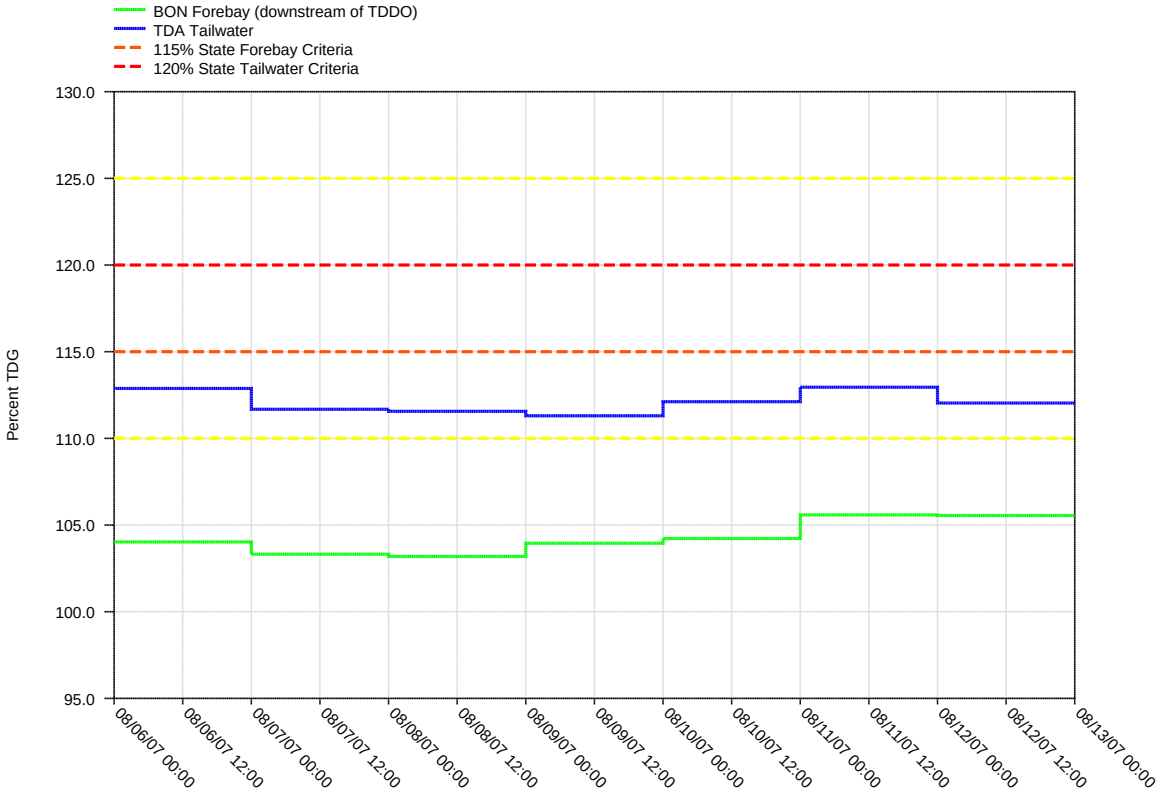


Figure 15.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

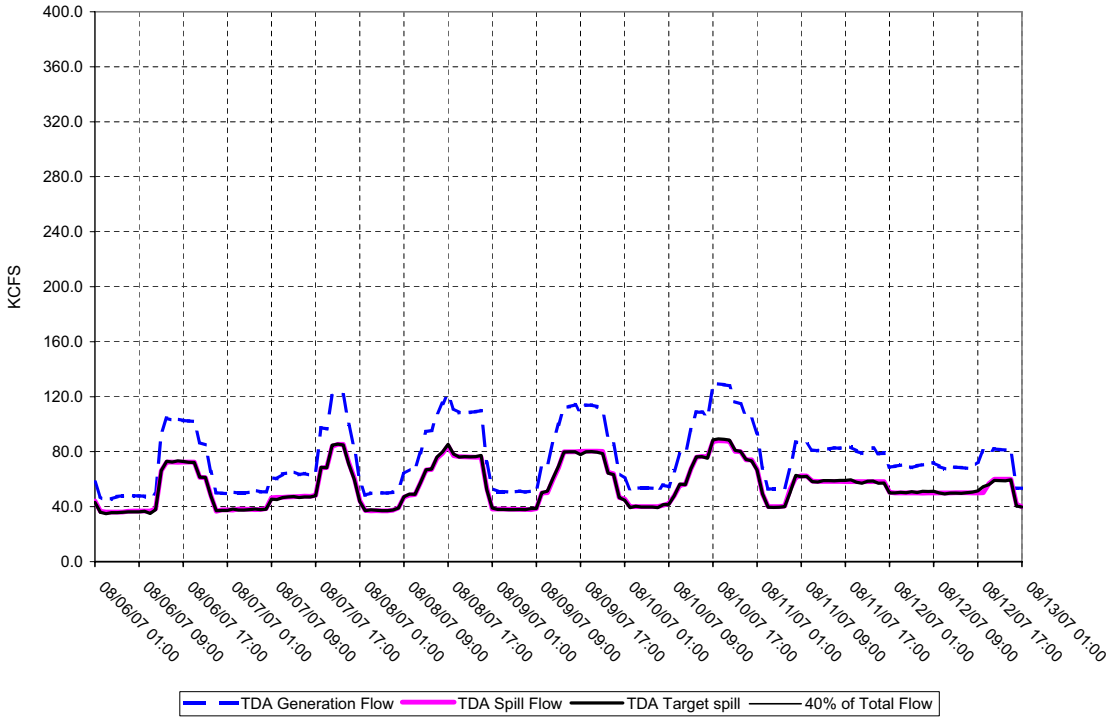
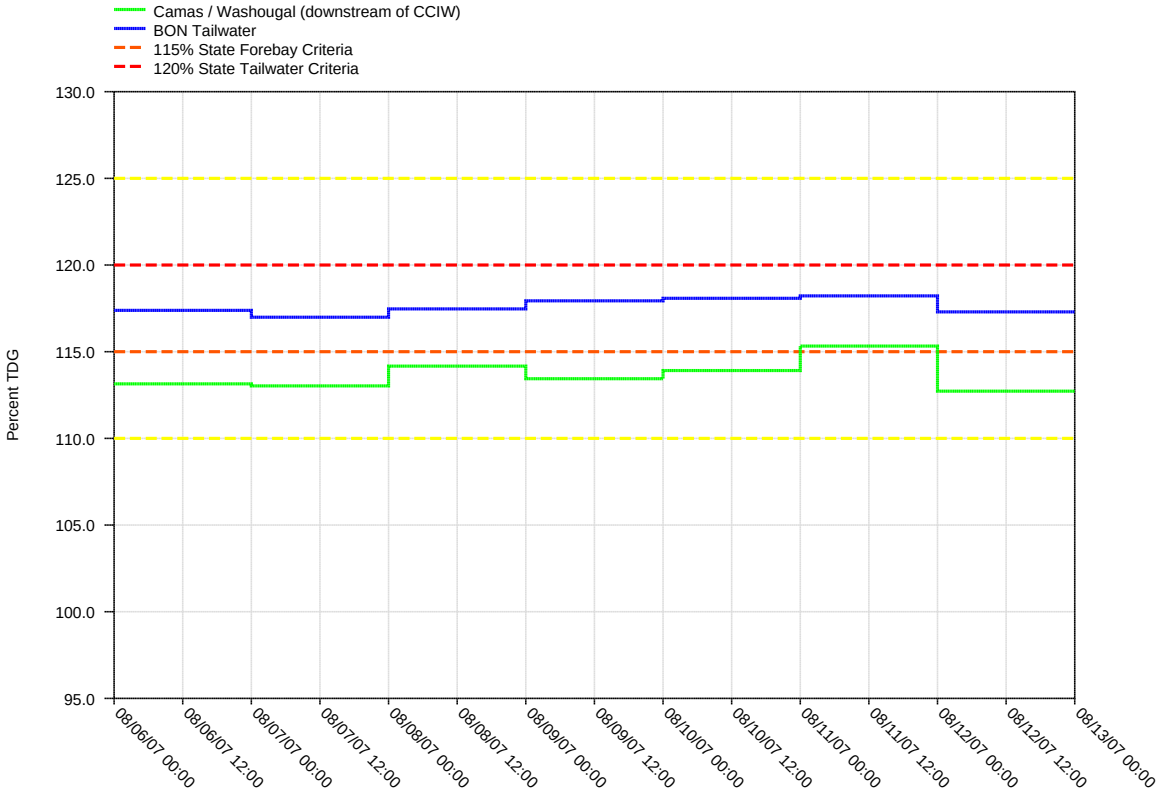


Figure 16.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

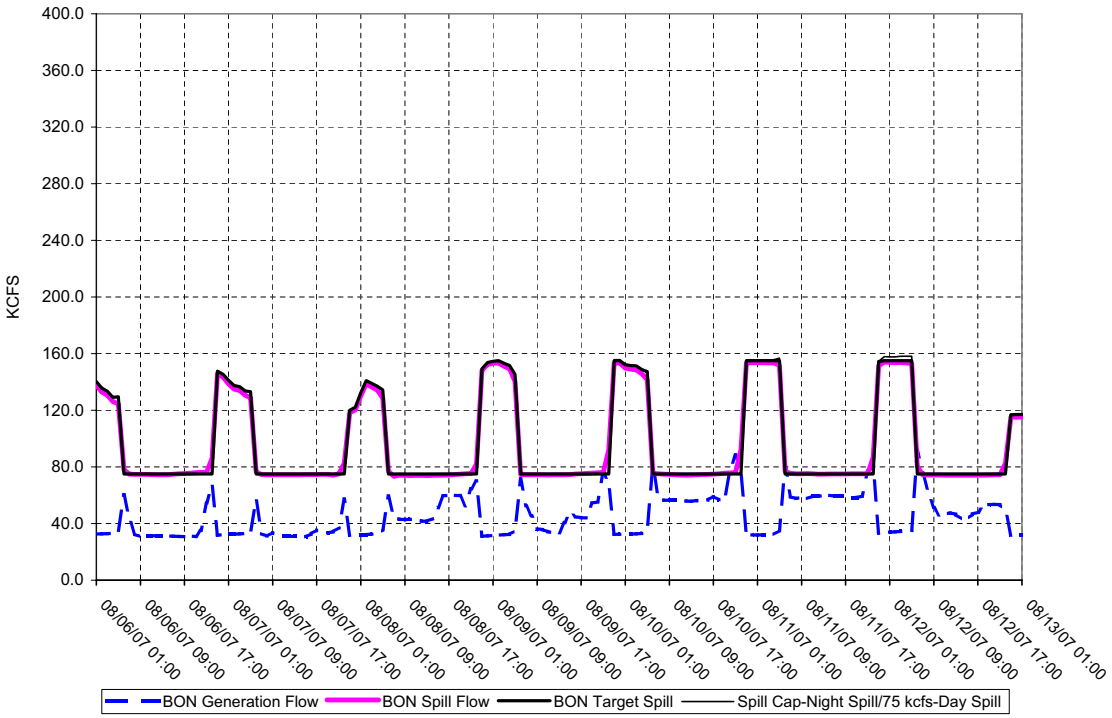
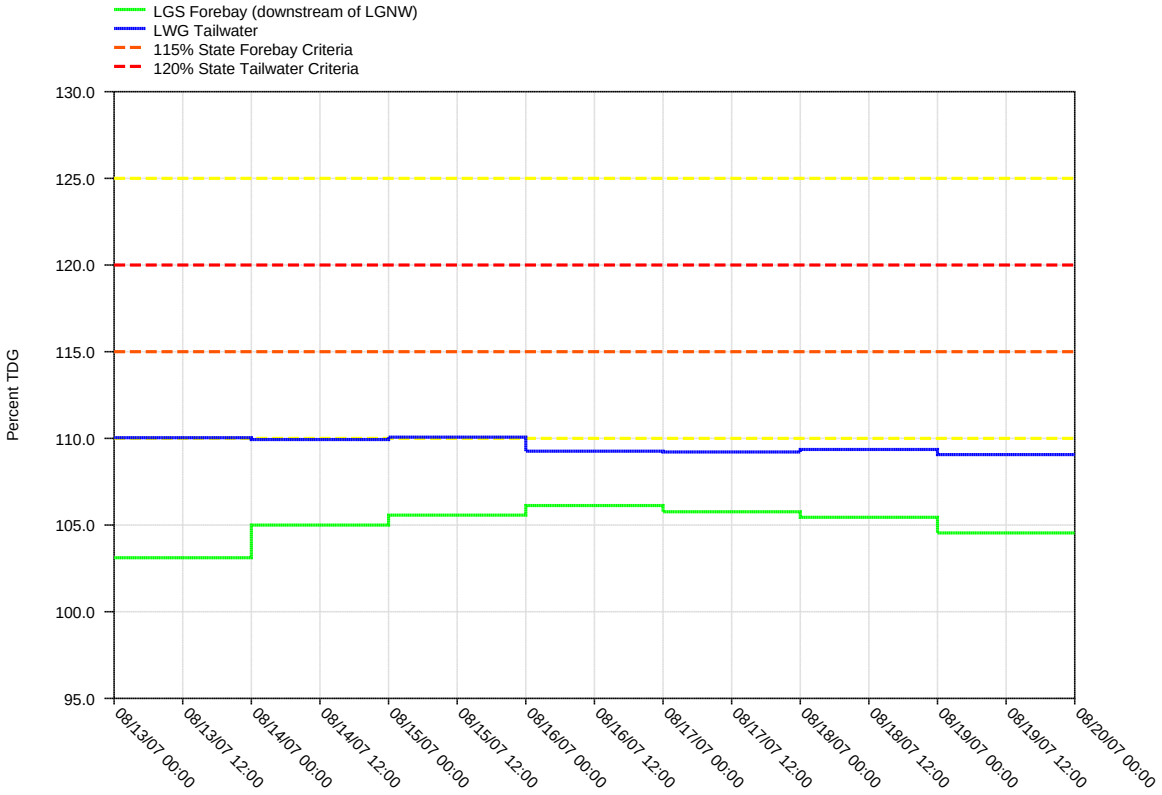


Figure 17.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

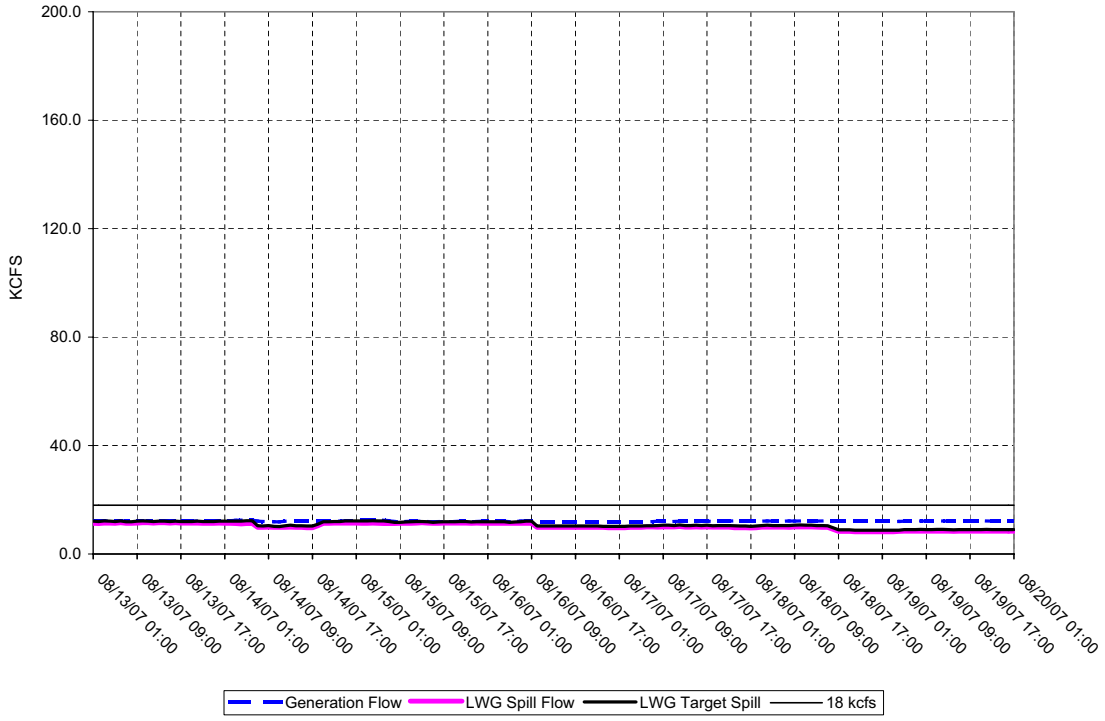
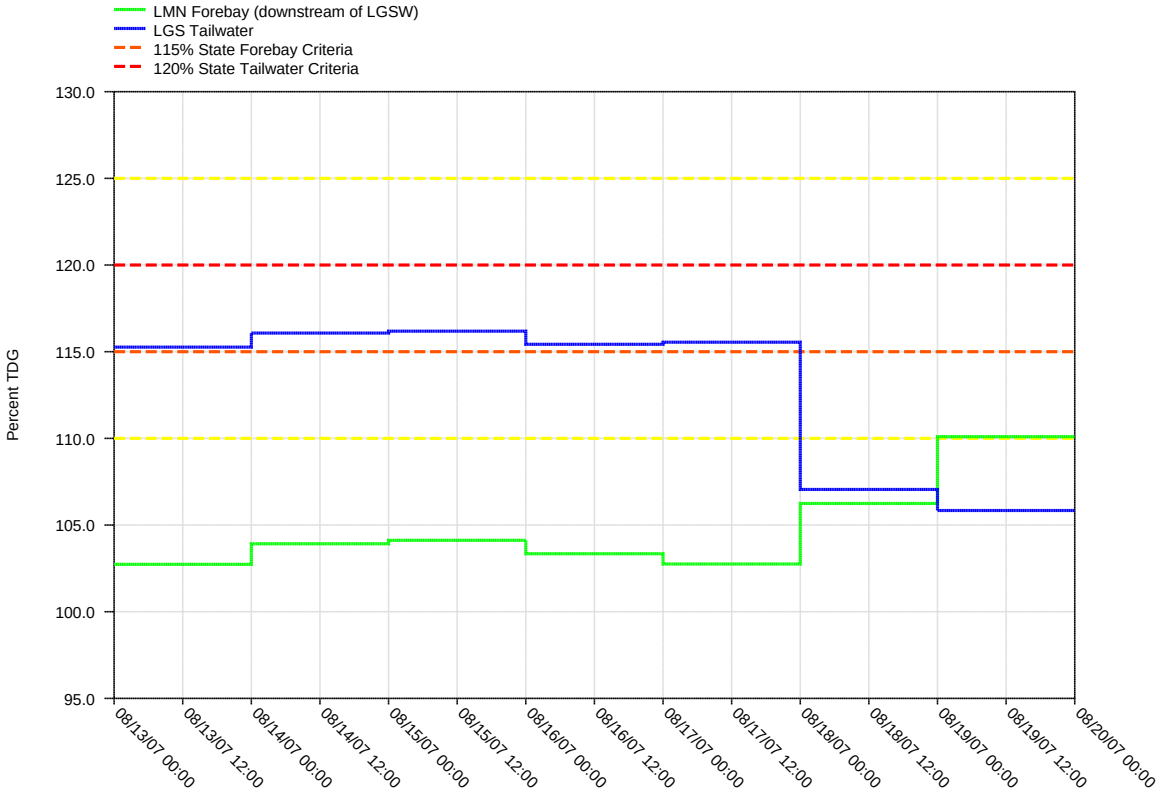


Figure 18.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

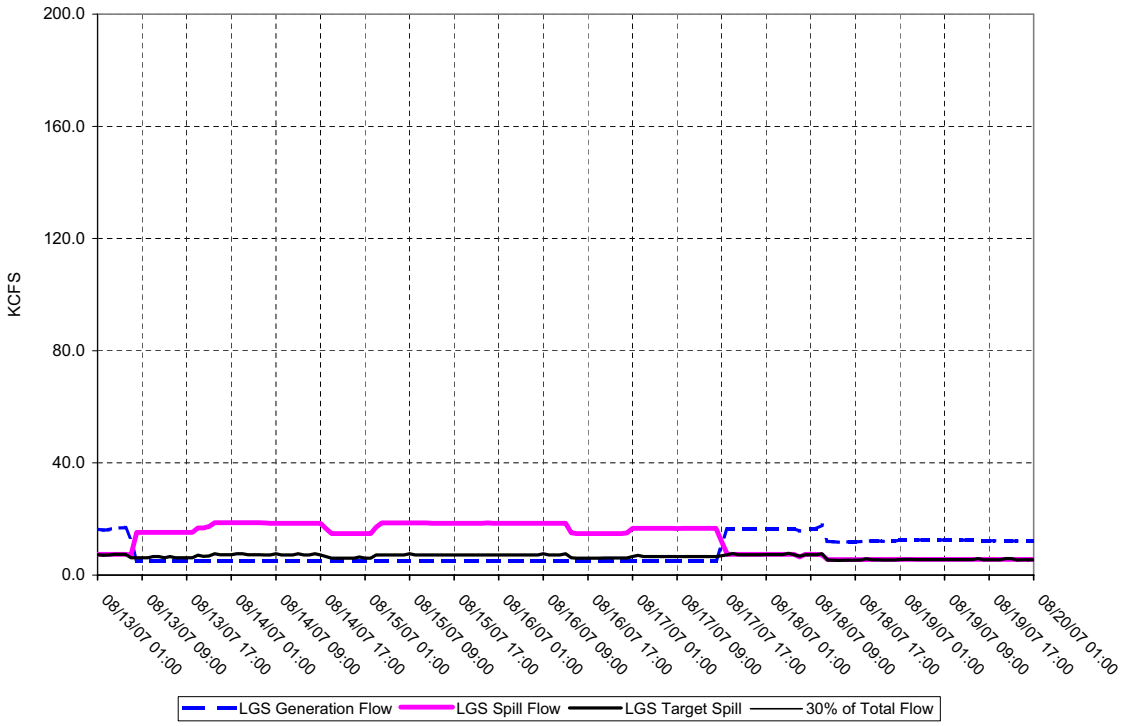
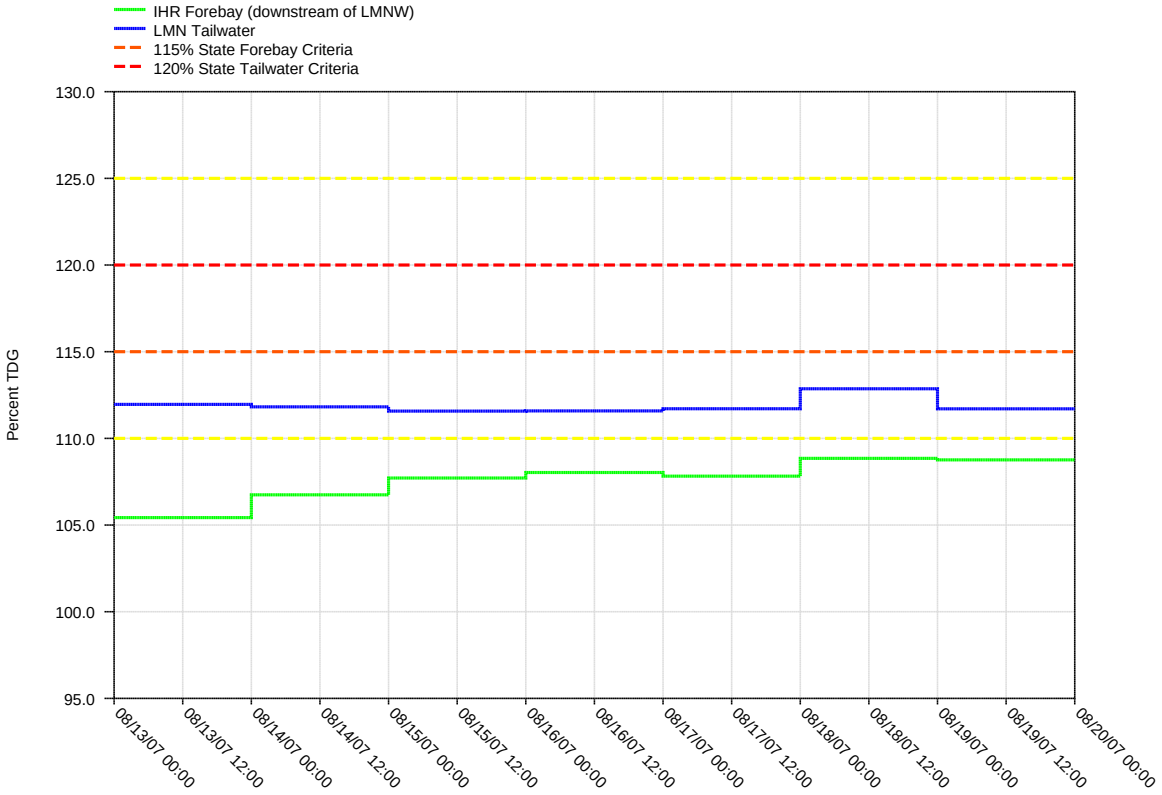


Figure 19.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

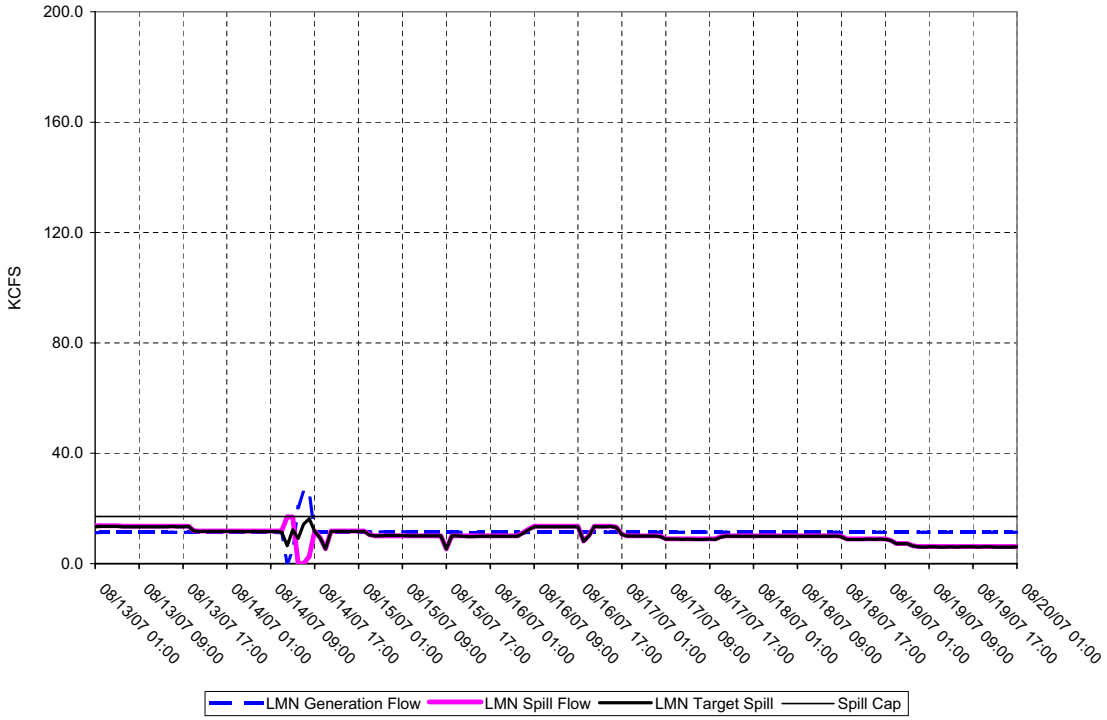
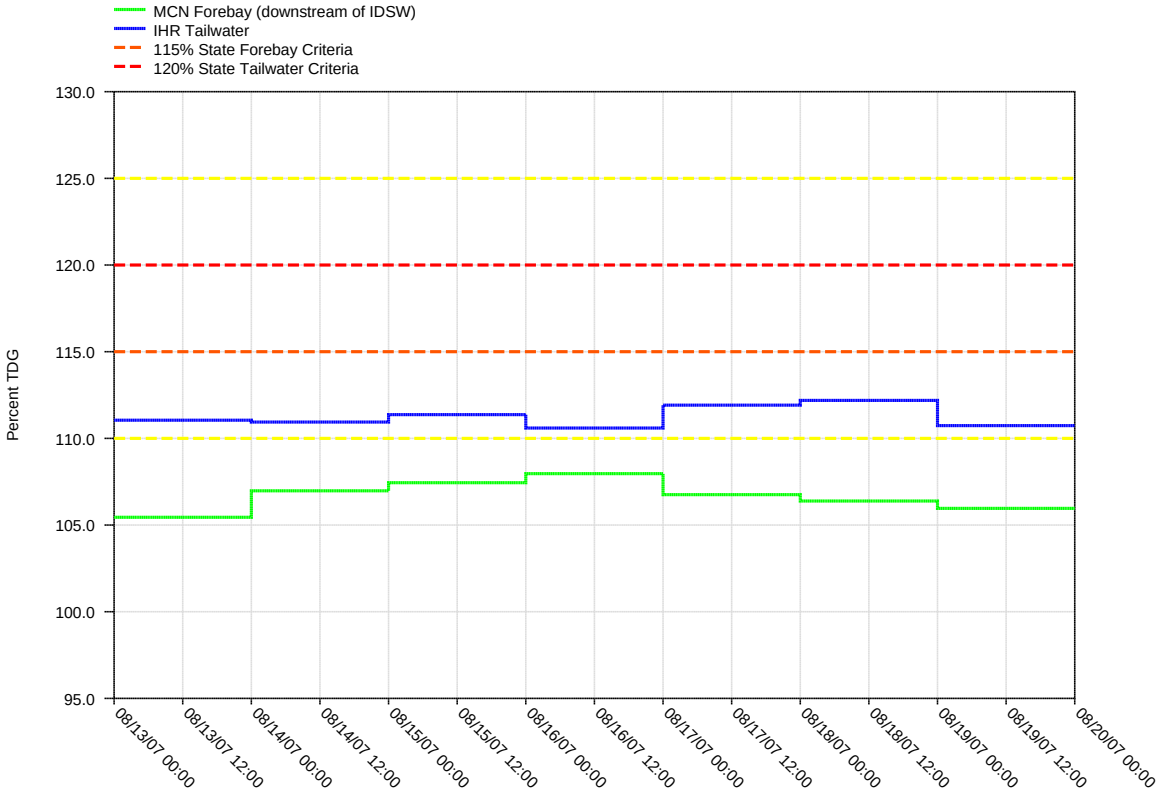


Figure 20.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

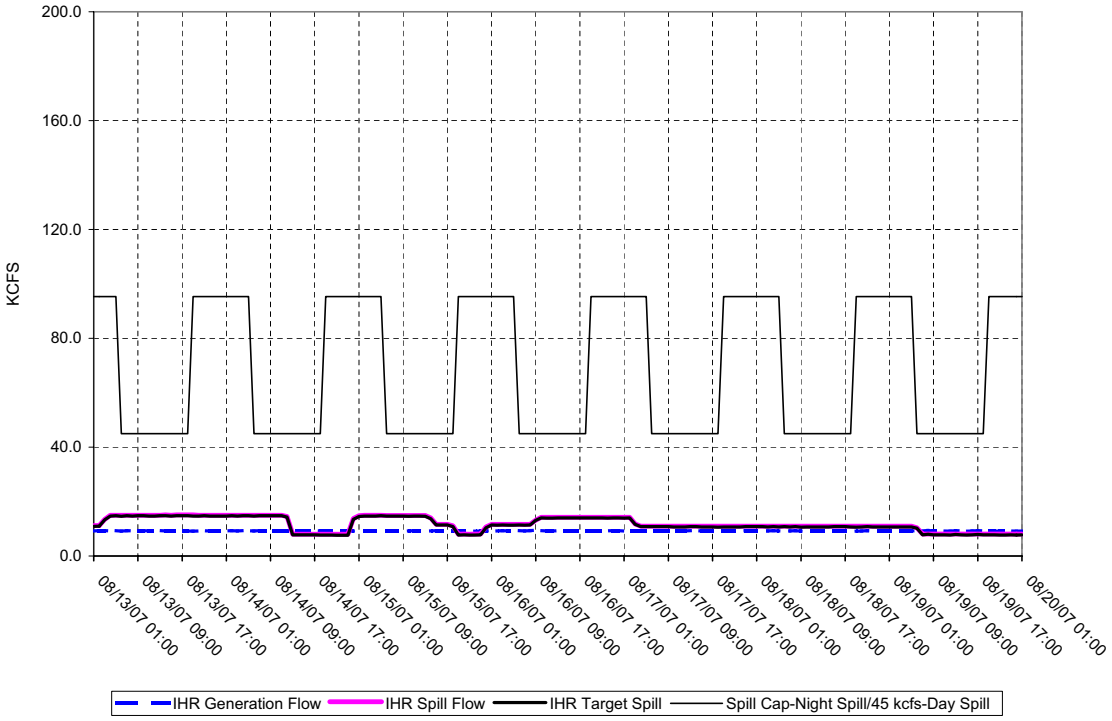
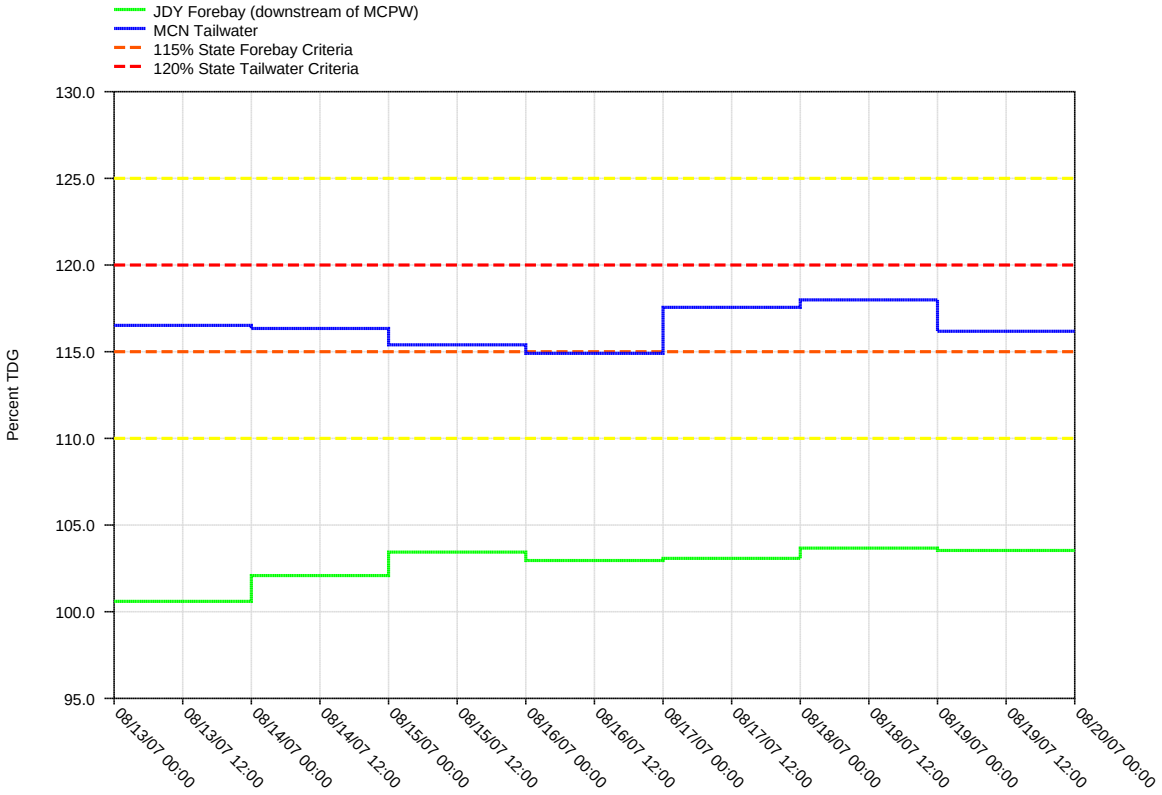


Figure 21.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

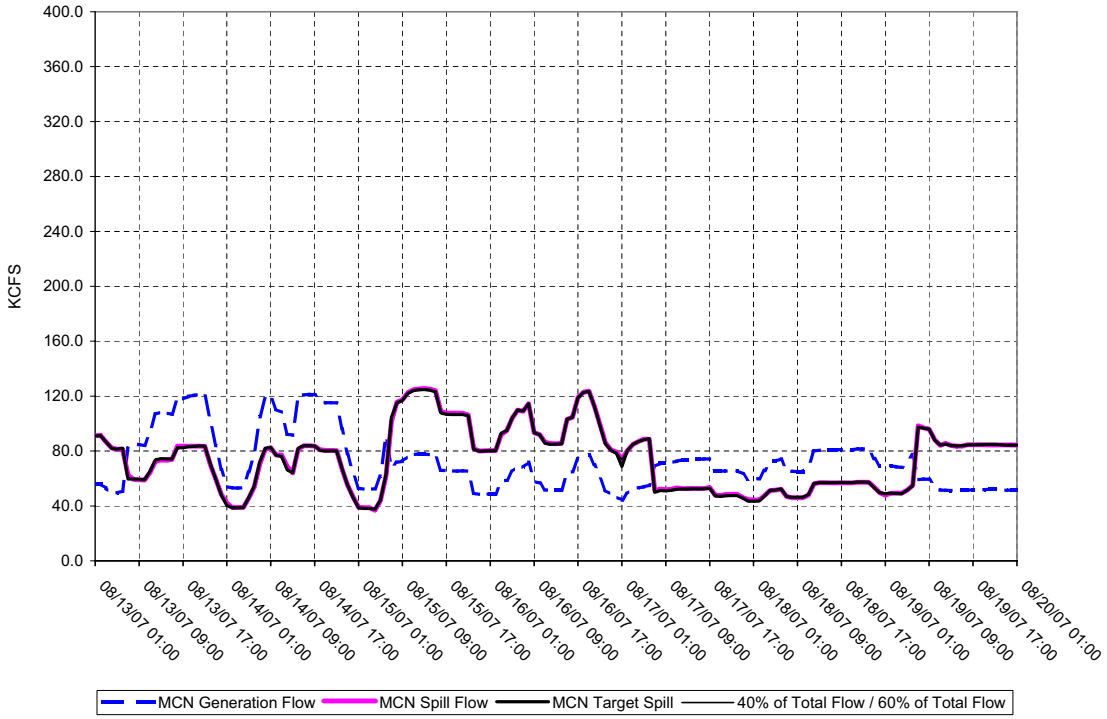
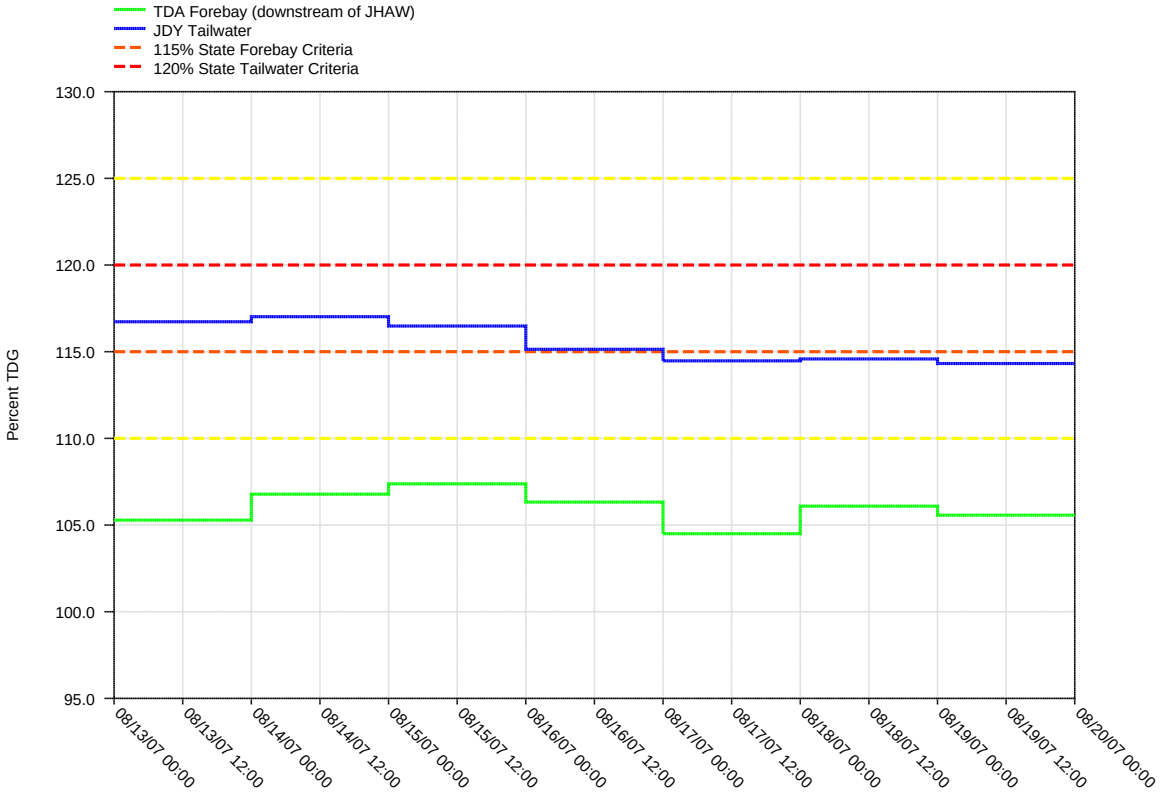


Figure 22.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

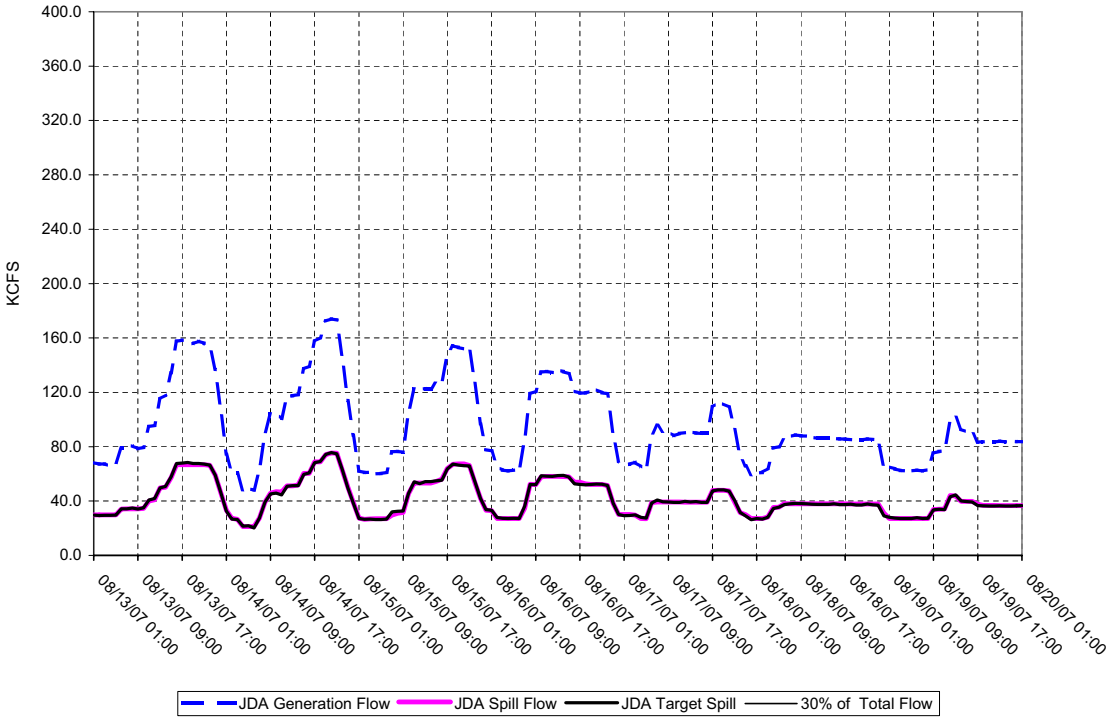
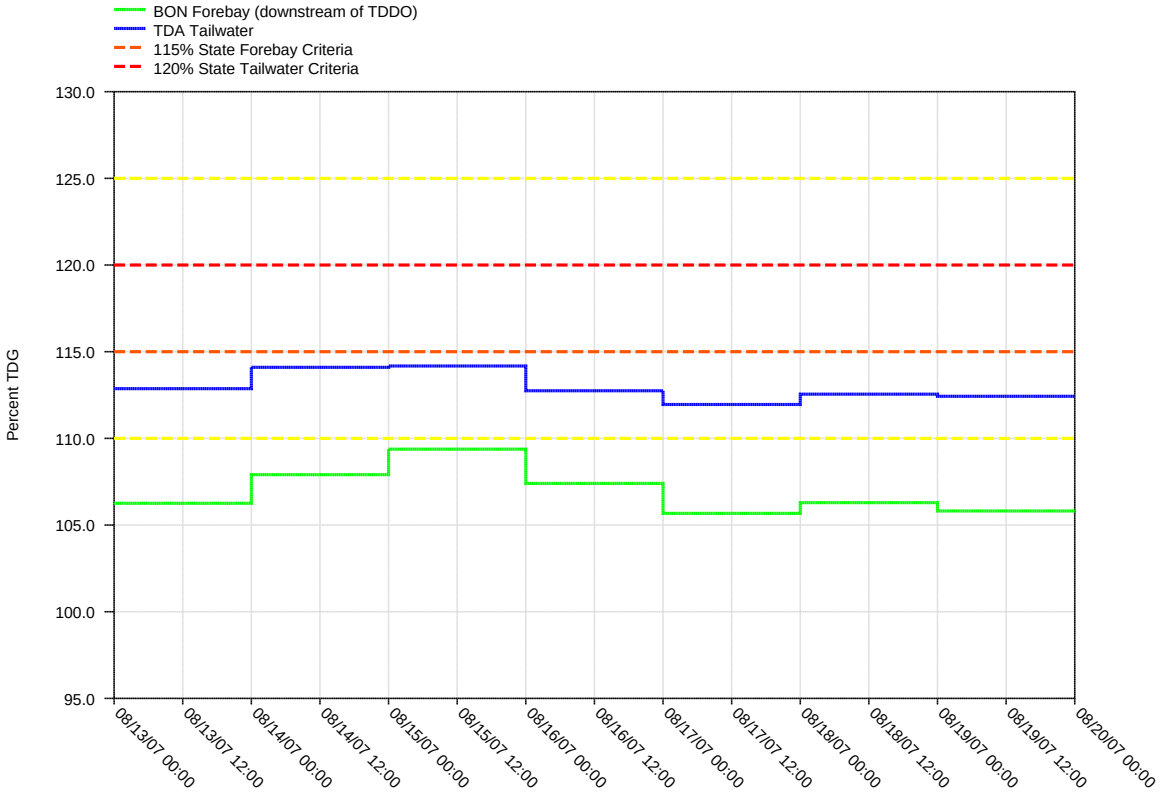


Figure 23.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

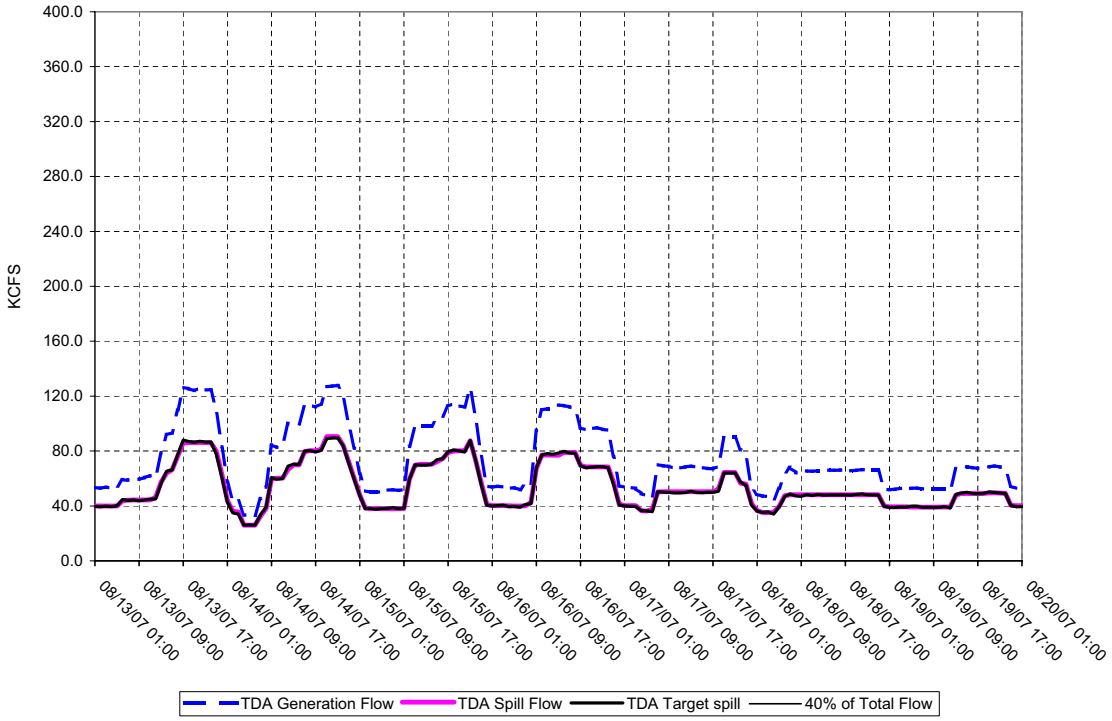
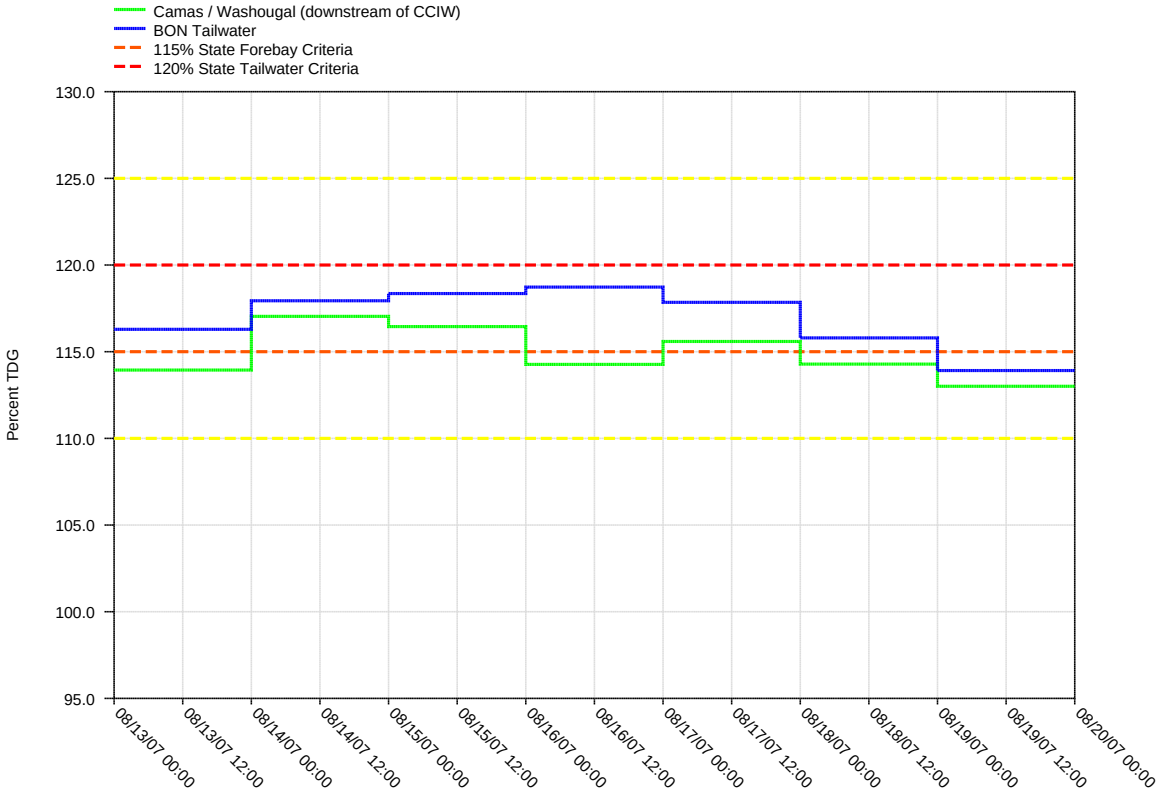


Figure 24.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

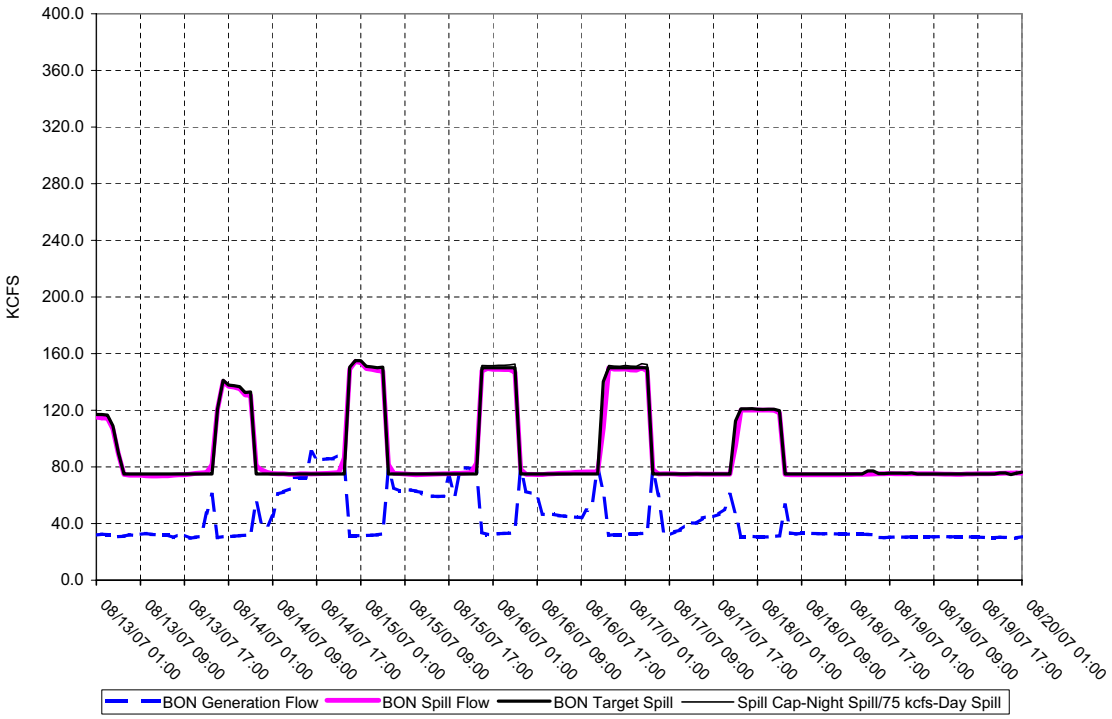
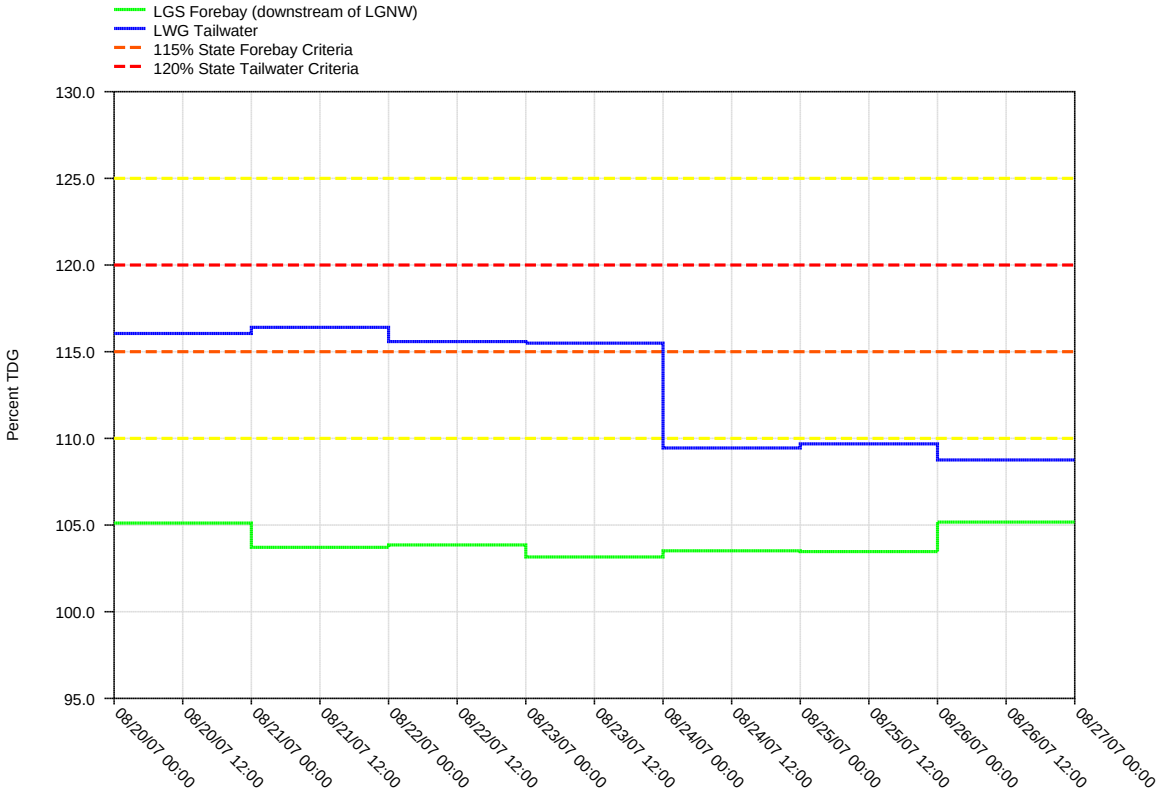


Figure 25.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

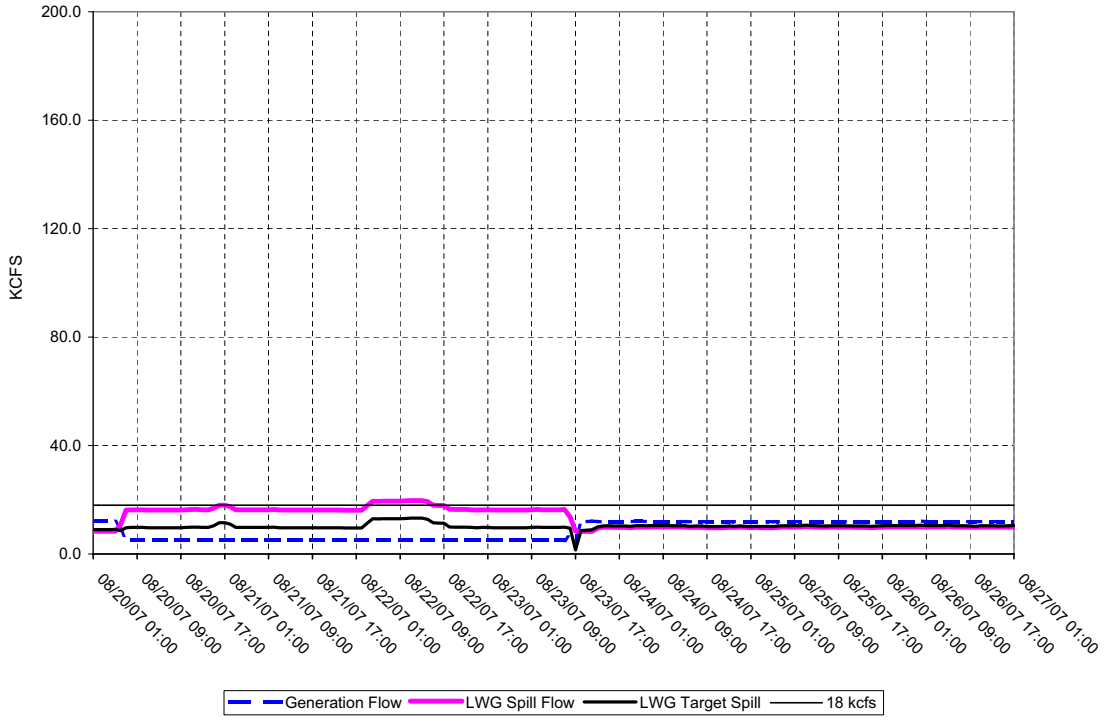
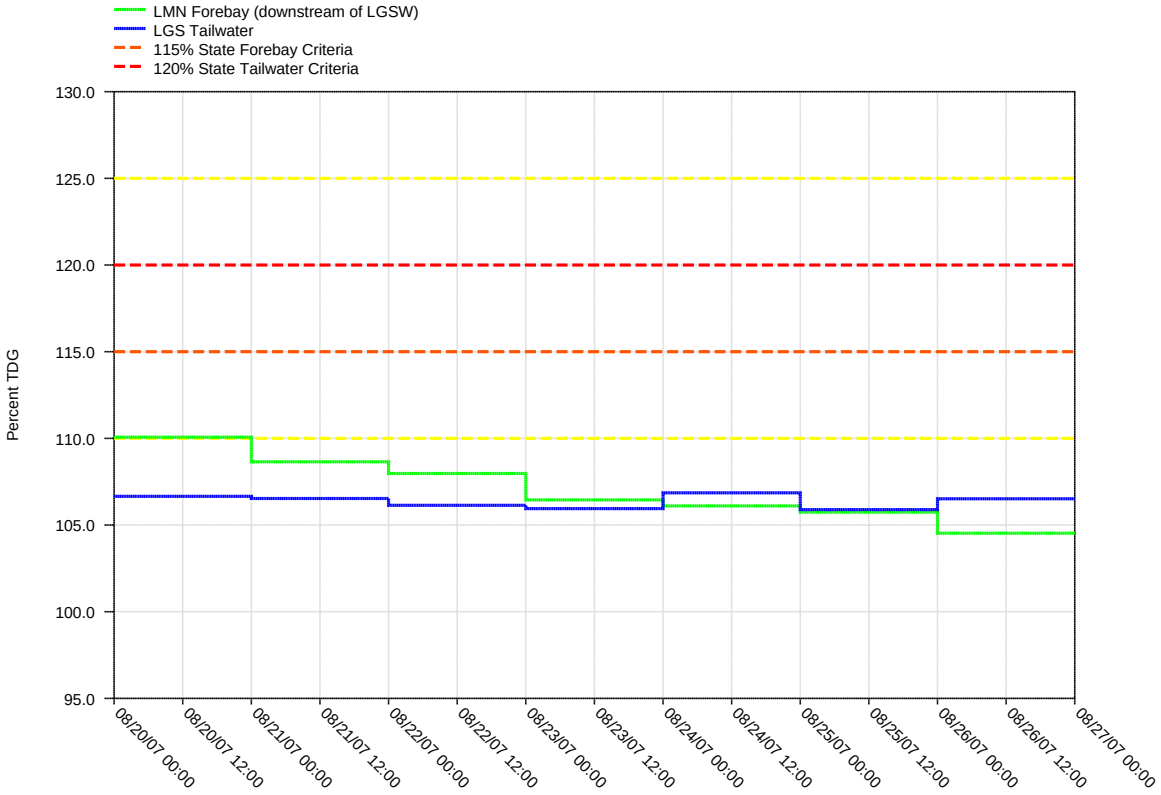


Figure 26.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

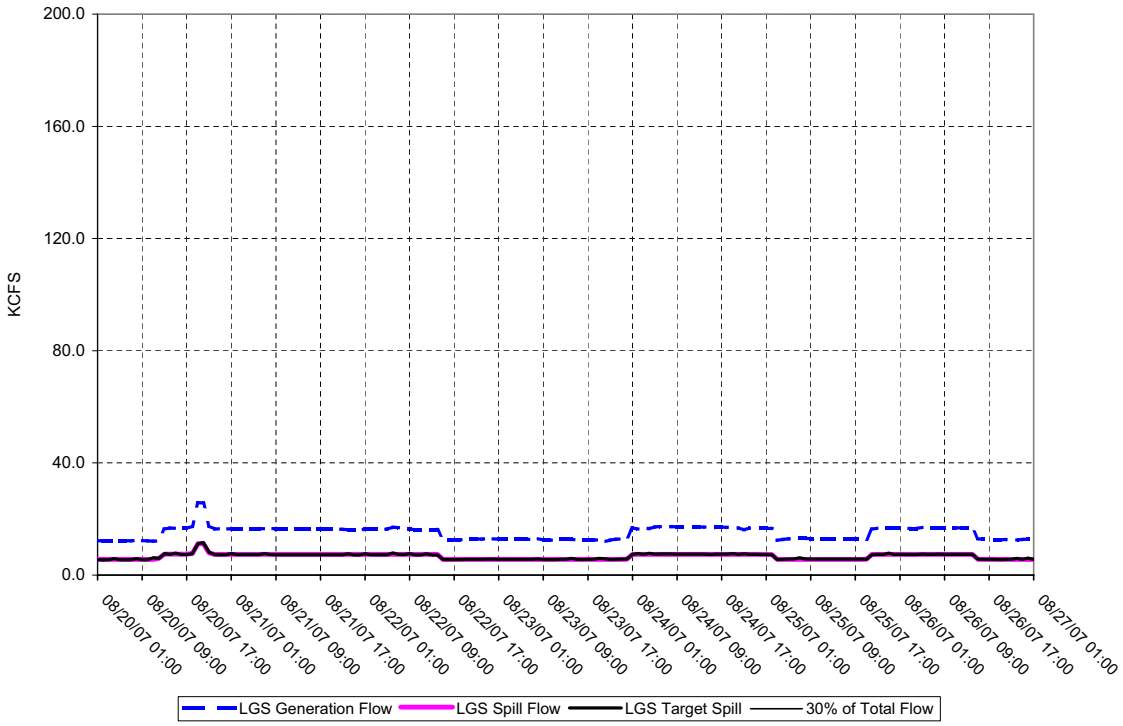
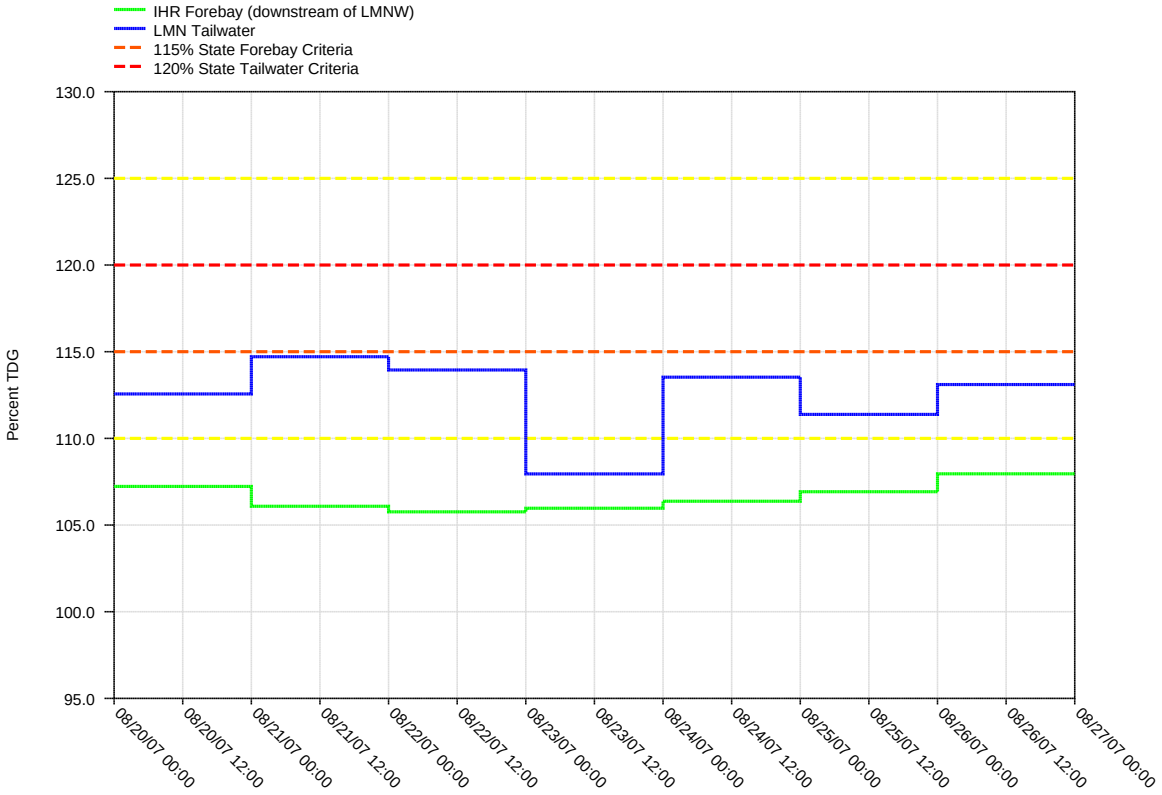


Figure 27.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

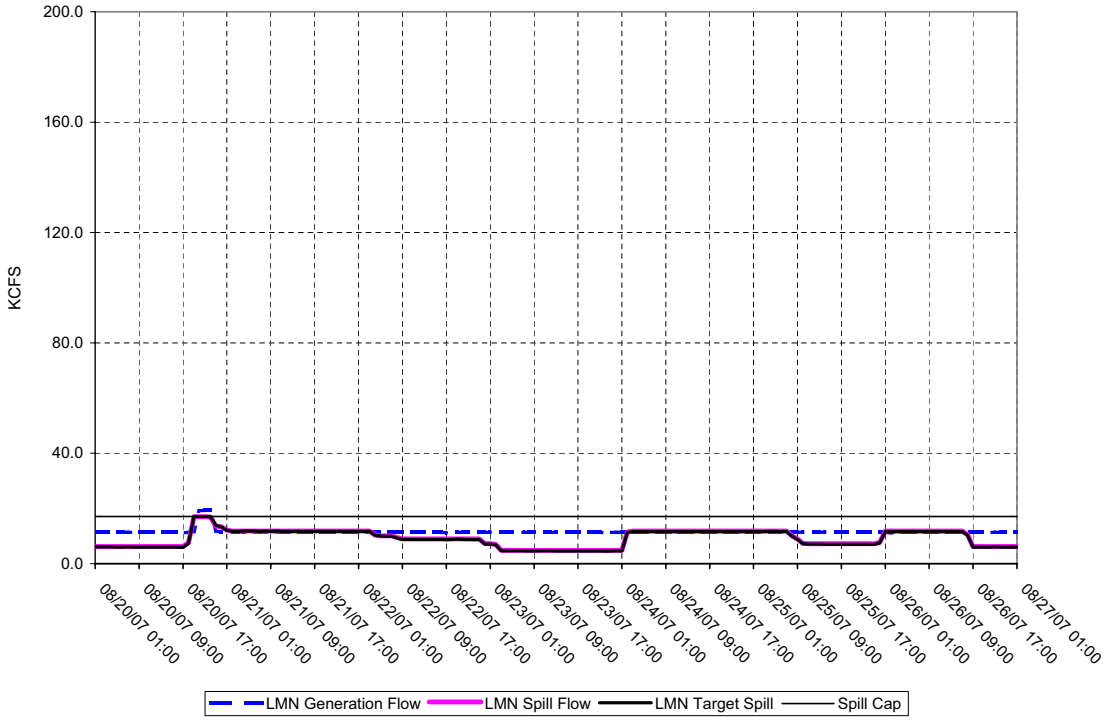
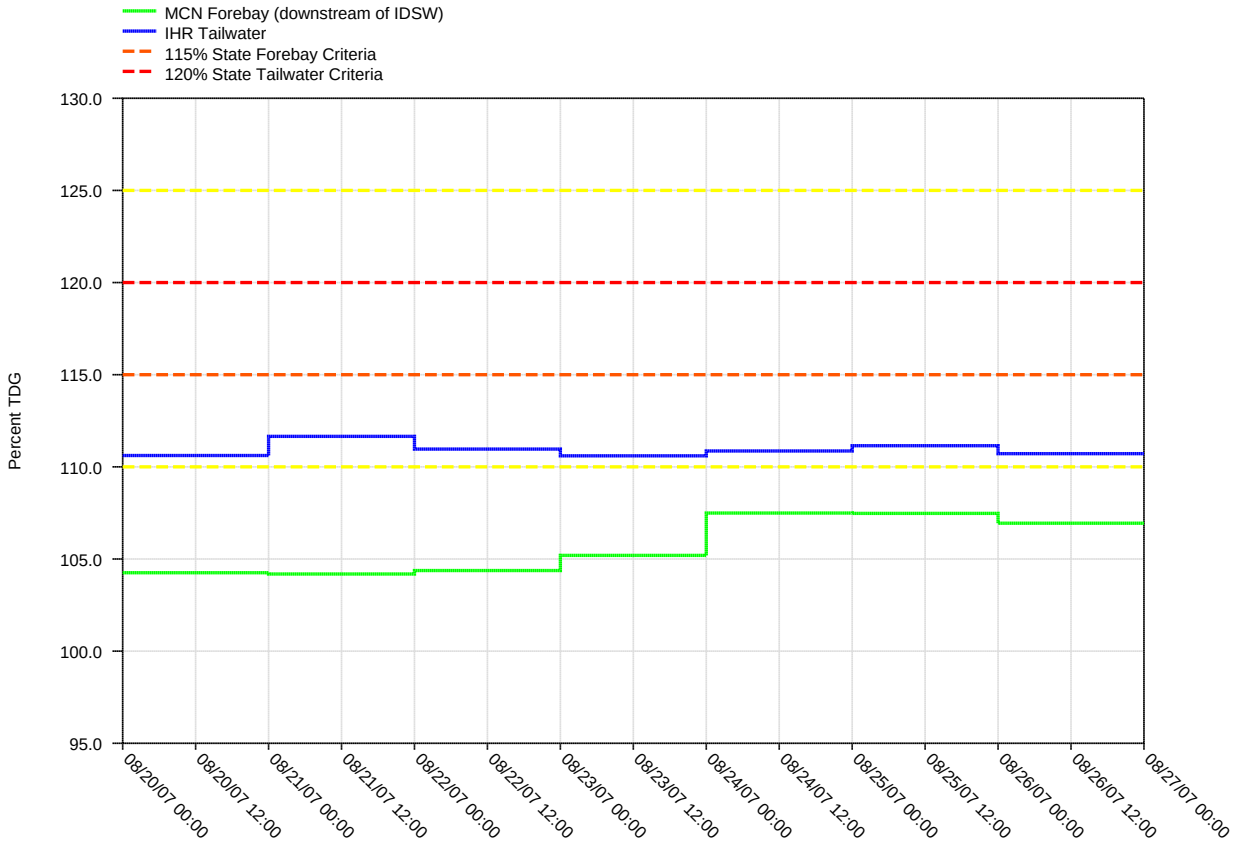


Figure 28.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

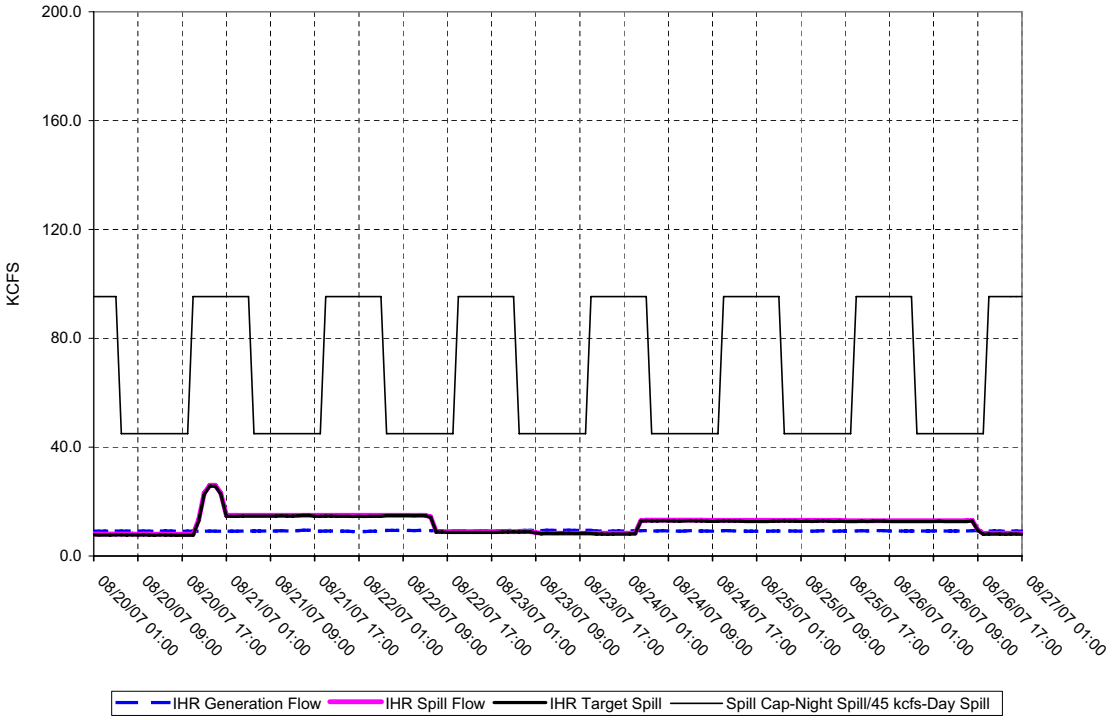
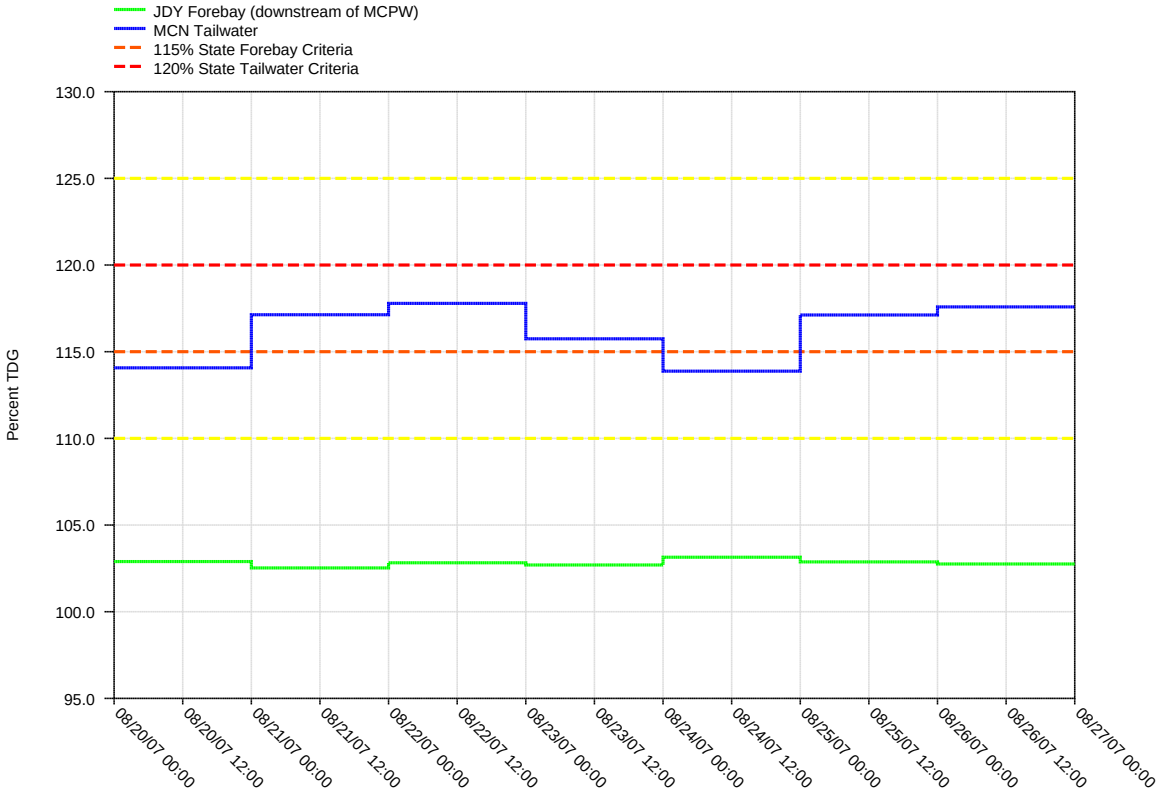


Figure 29.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

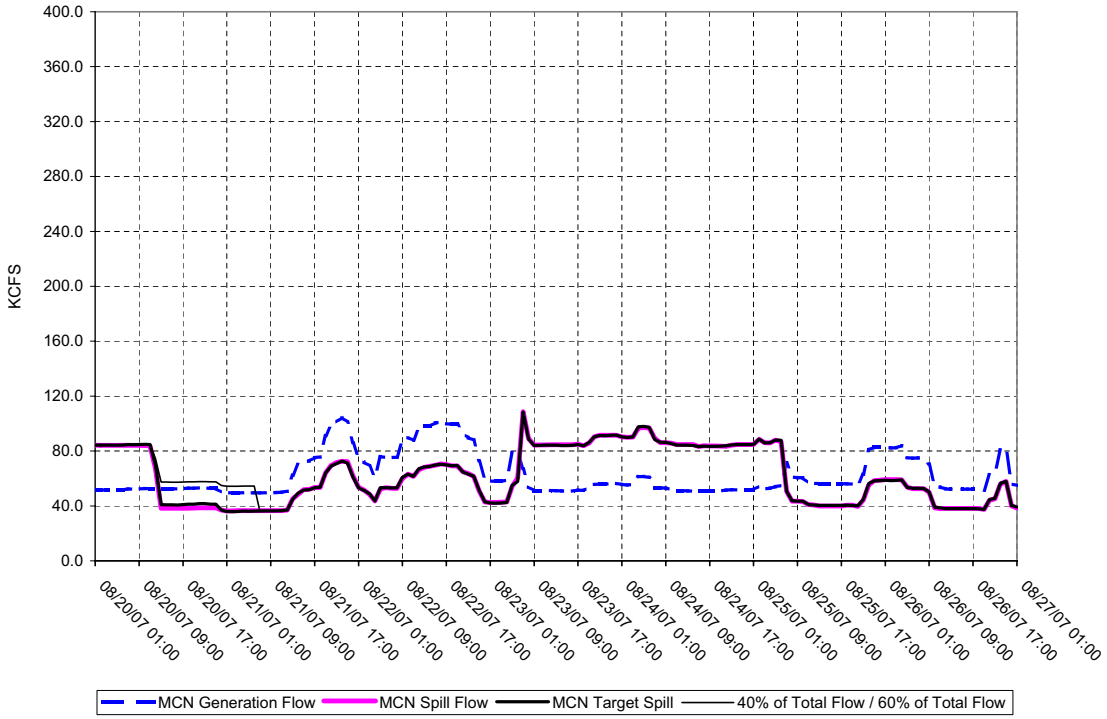
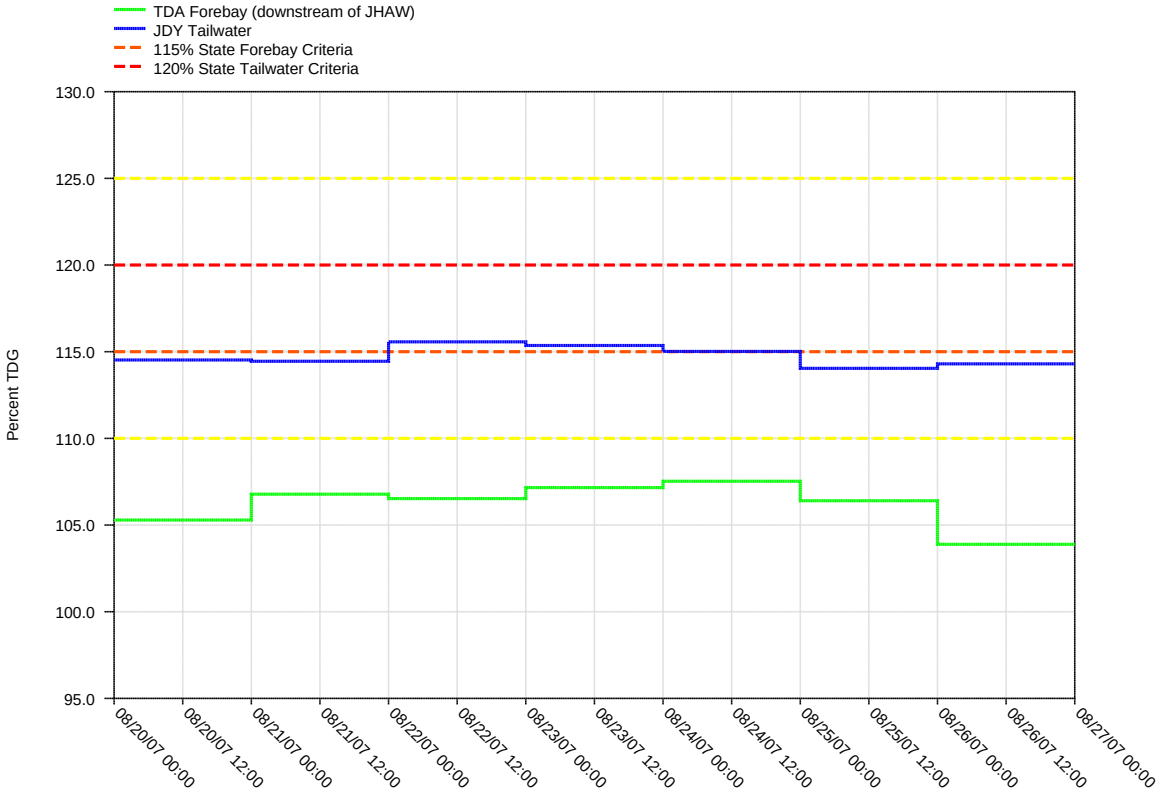


Figure 30.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

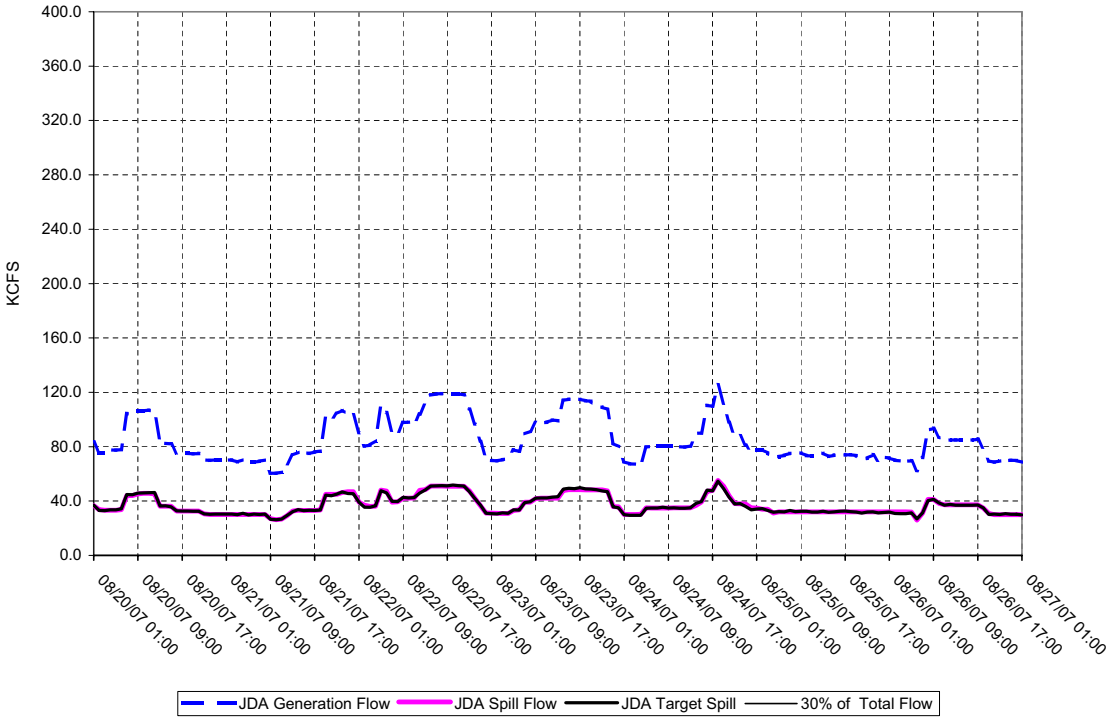
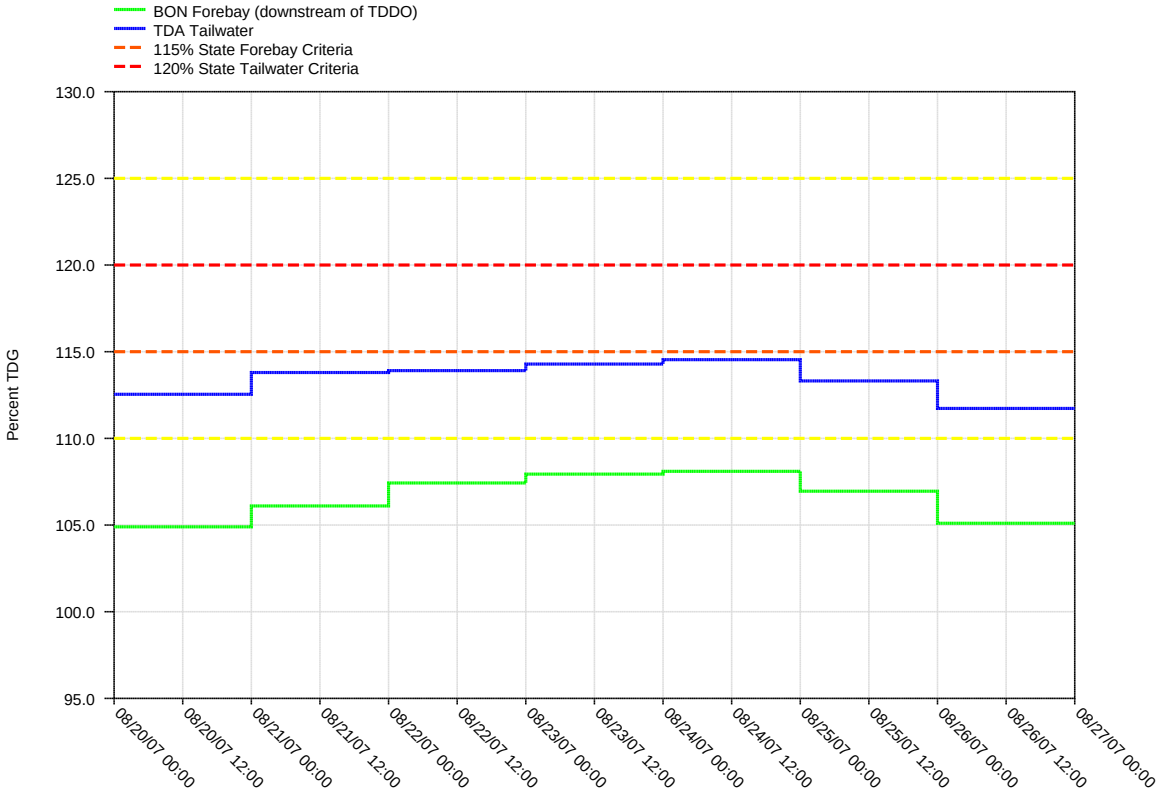


Figure 31.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

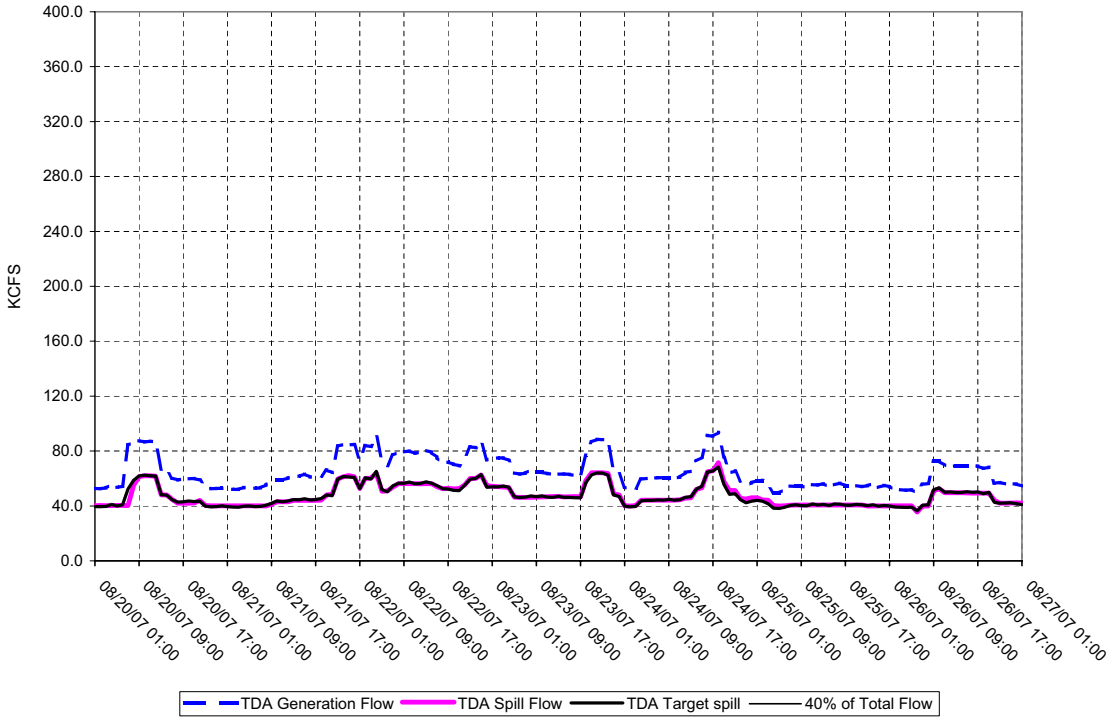
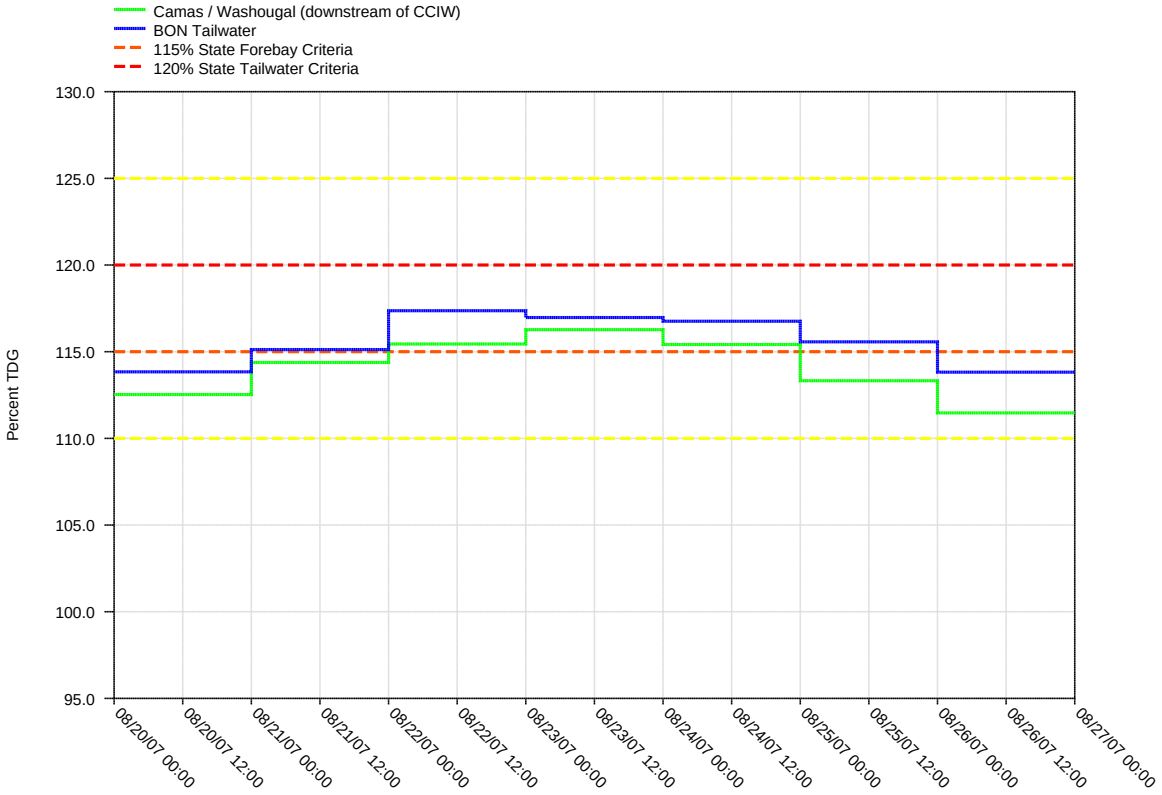


Figure 32.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

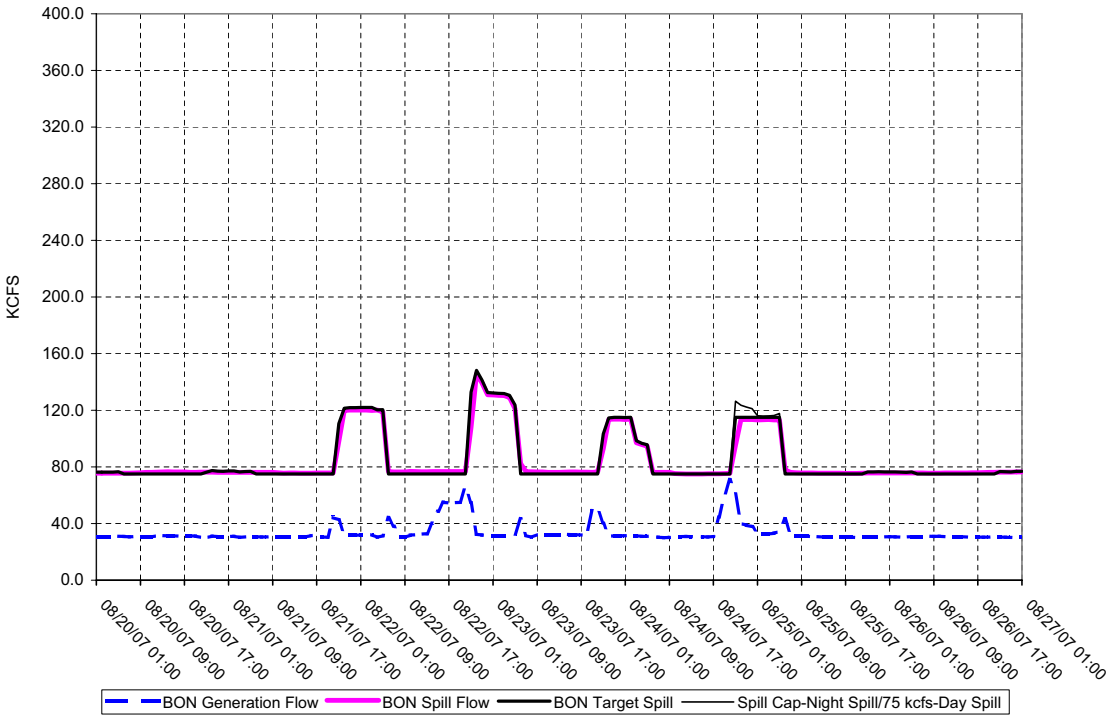
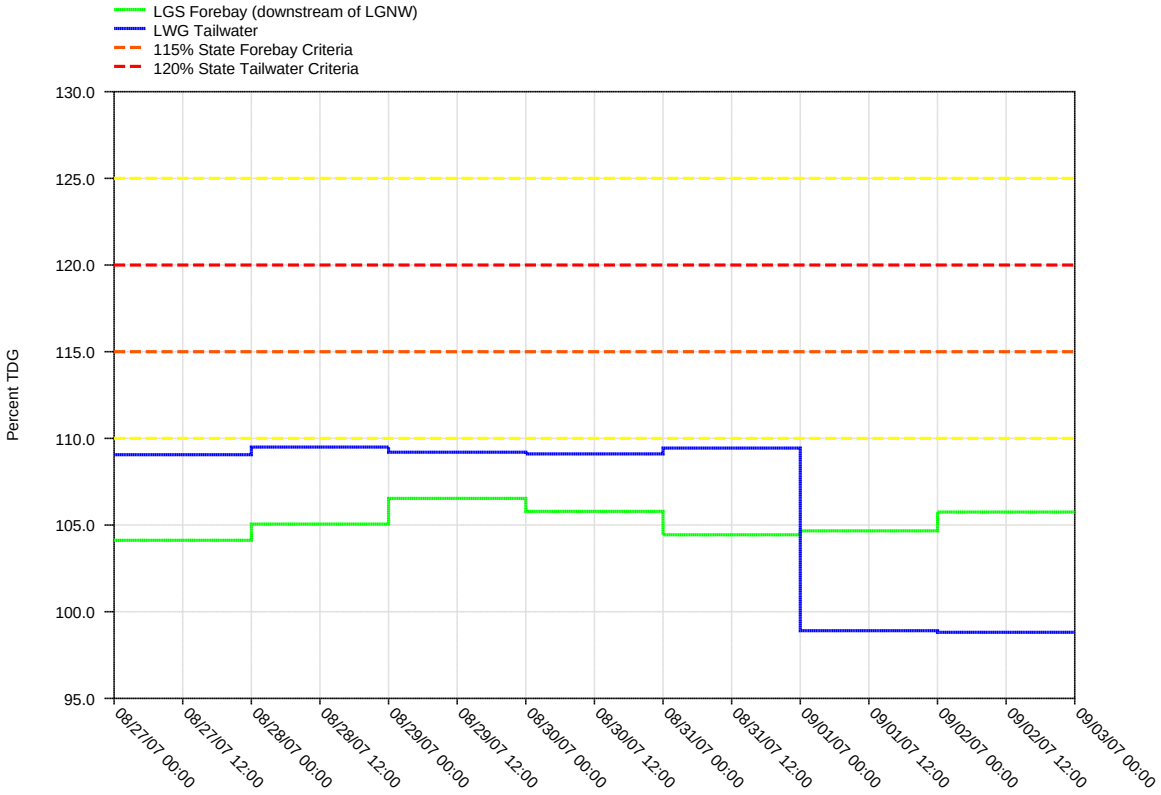


Figure 33.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

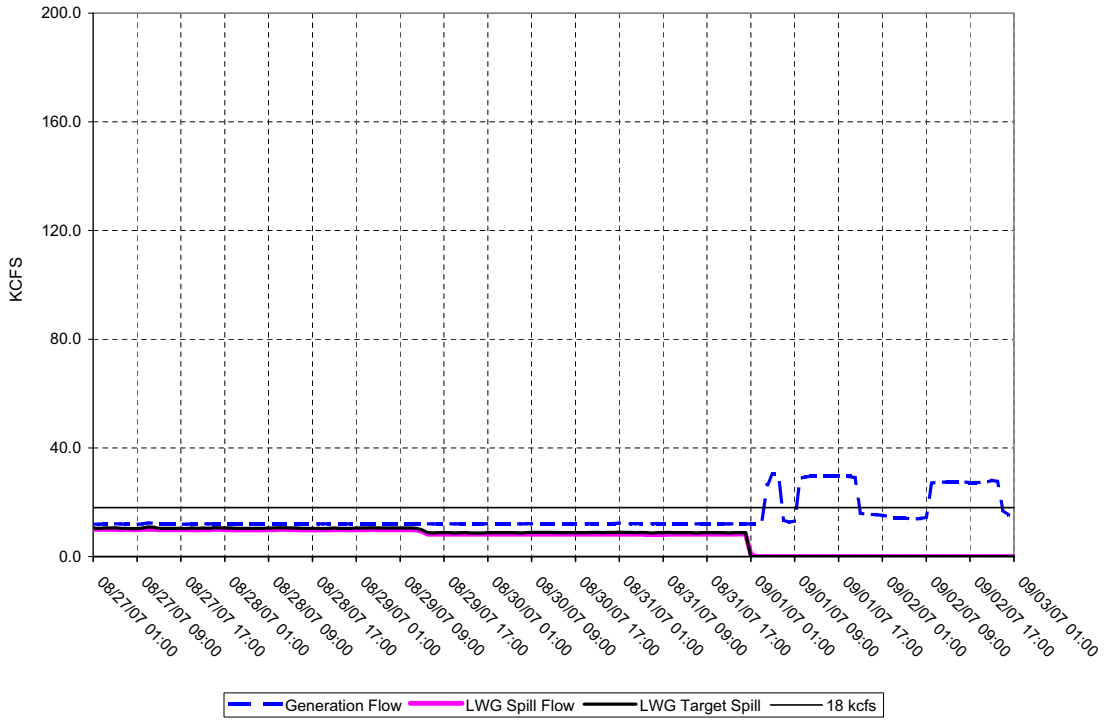
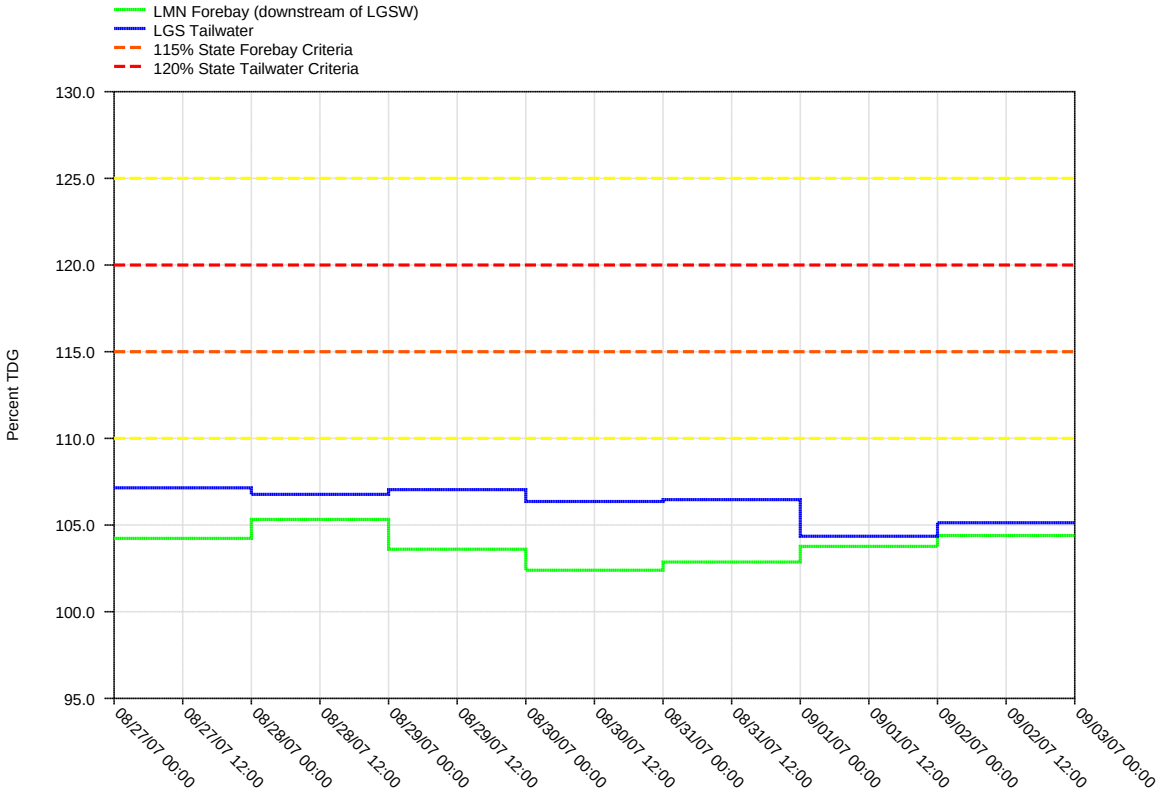


Figure 34.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

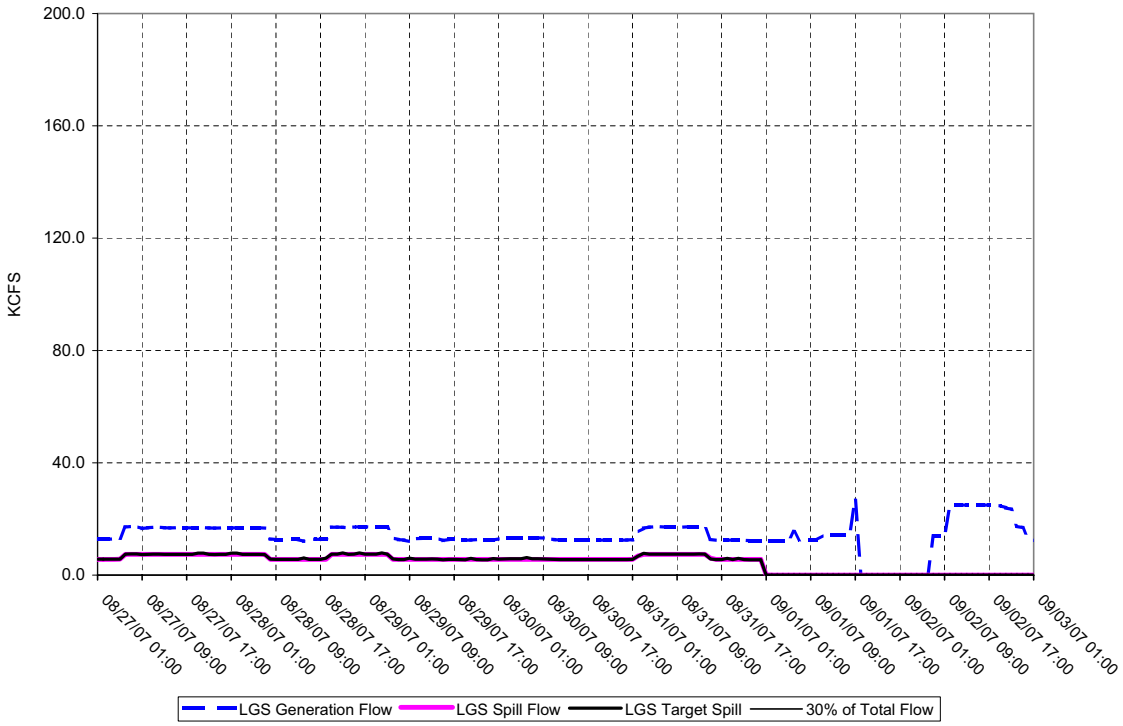
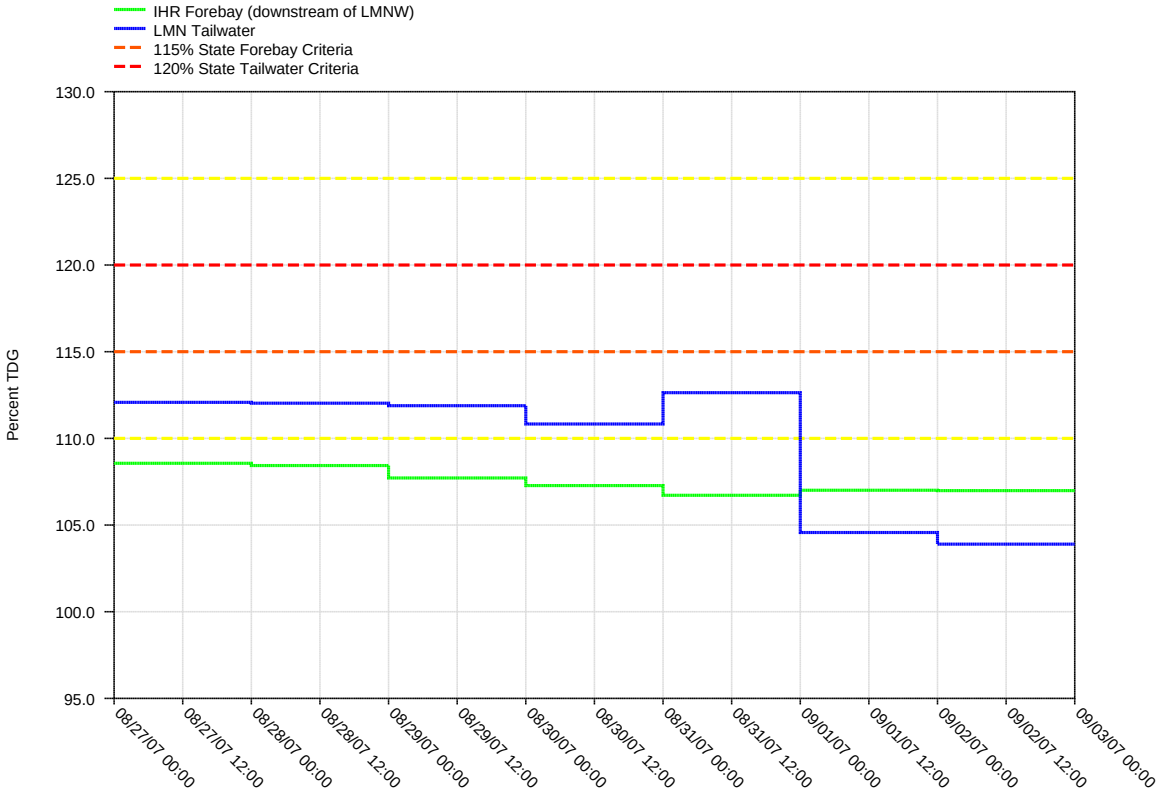


Figure 35.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

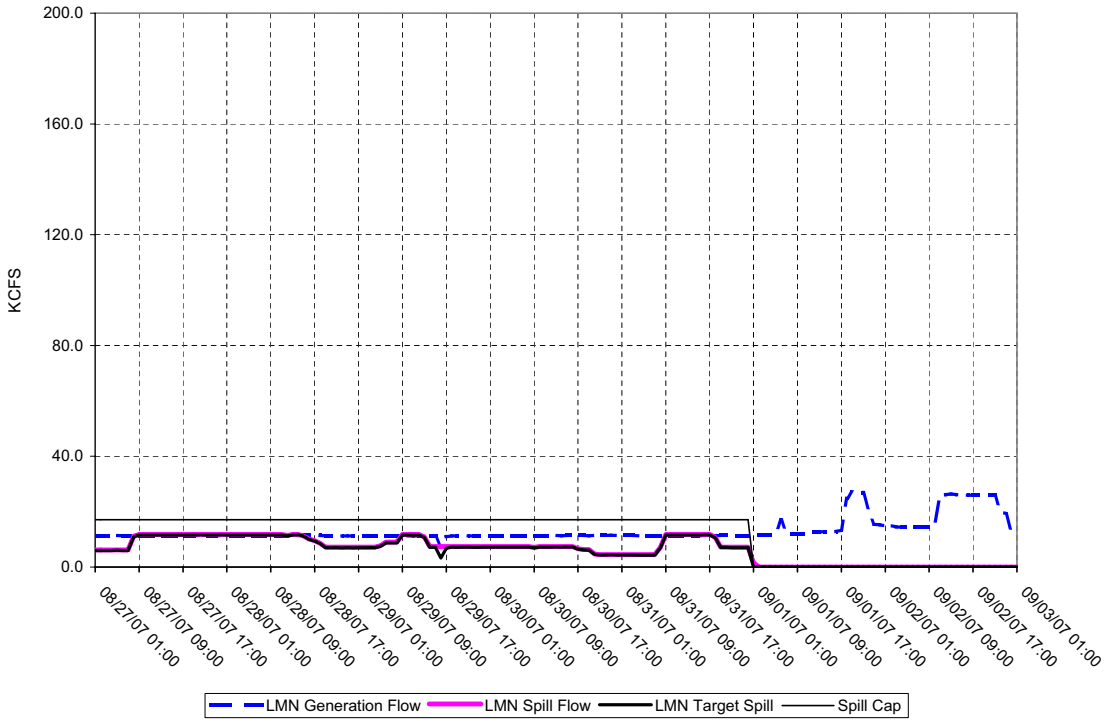
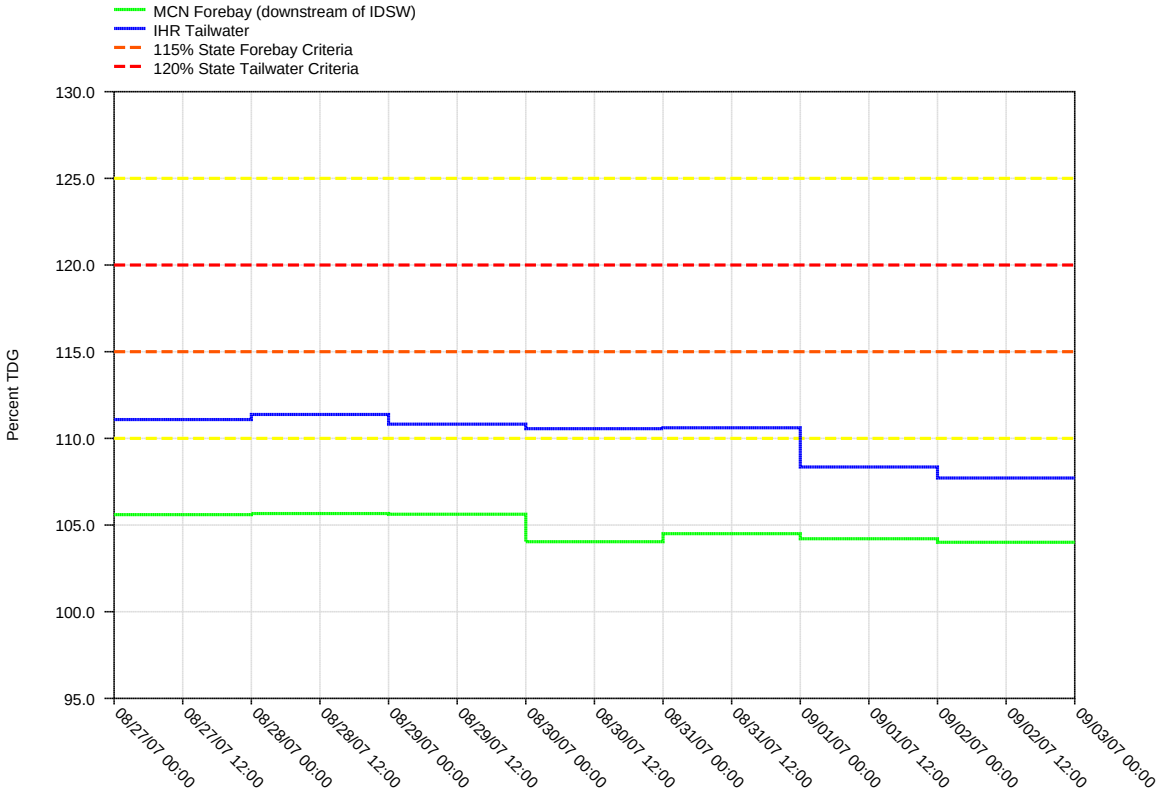


Figure 36.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

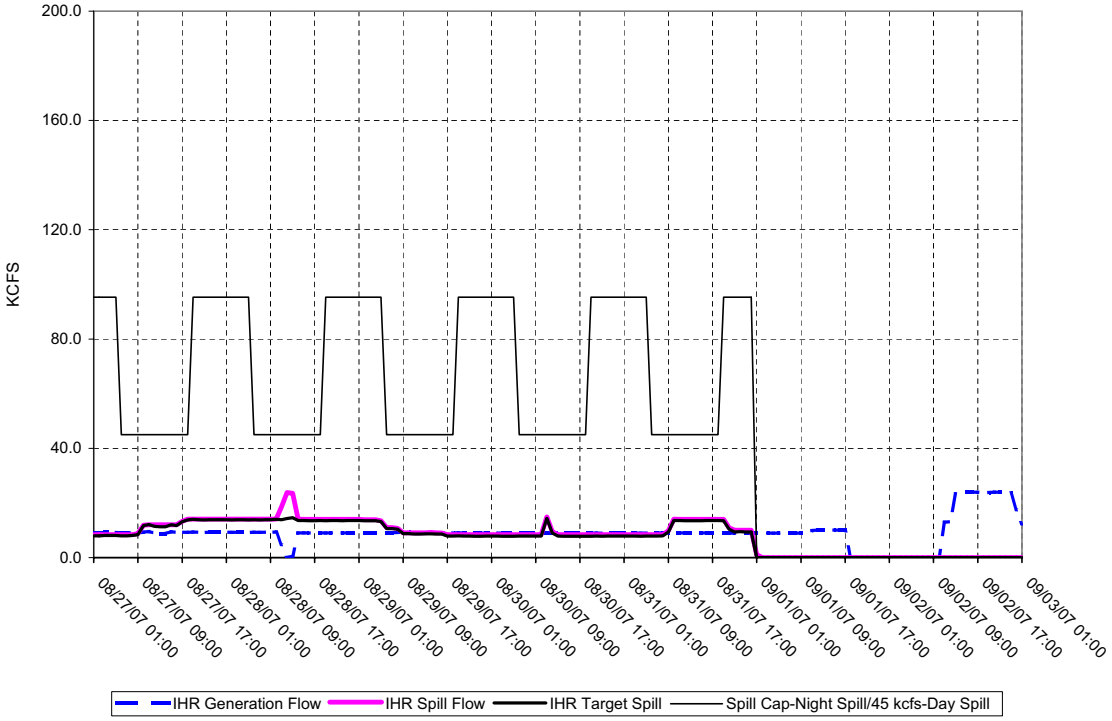
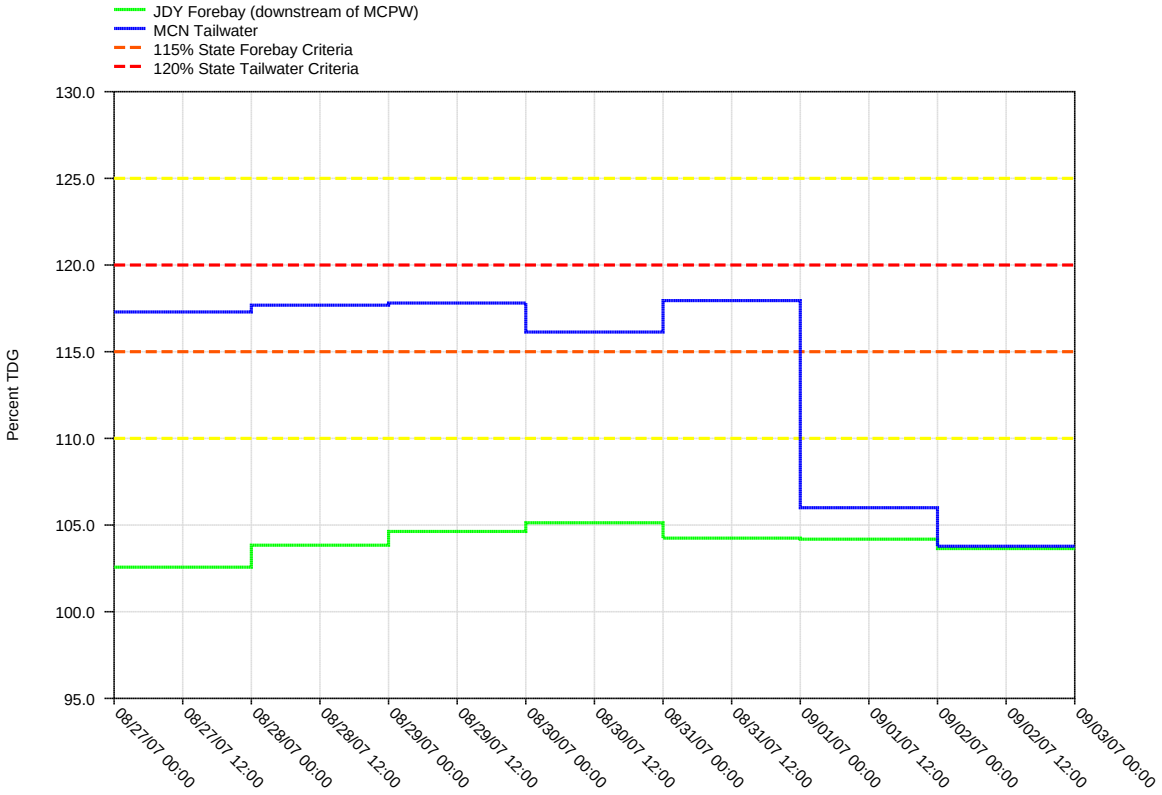


Figure 37.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

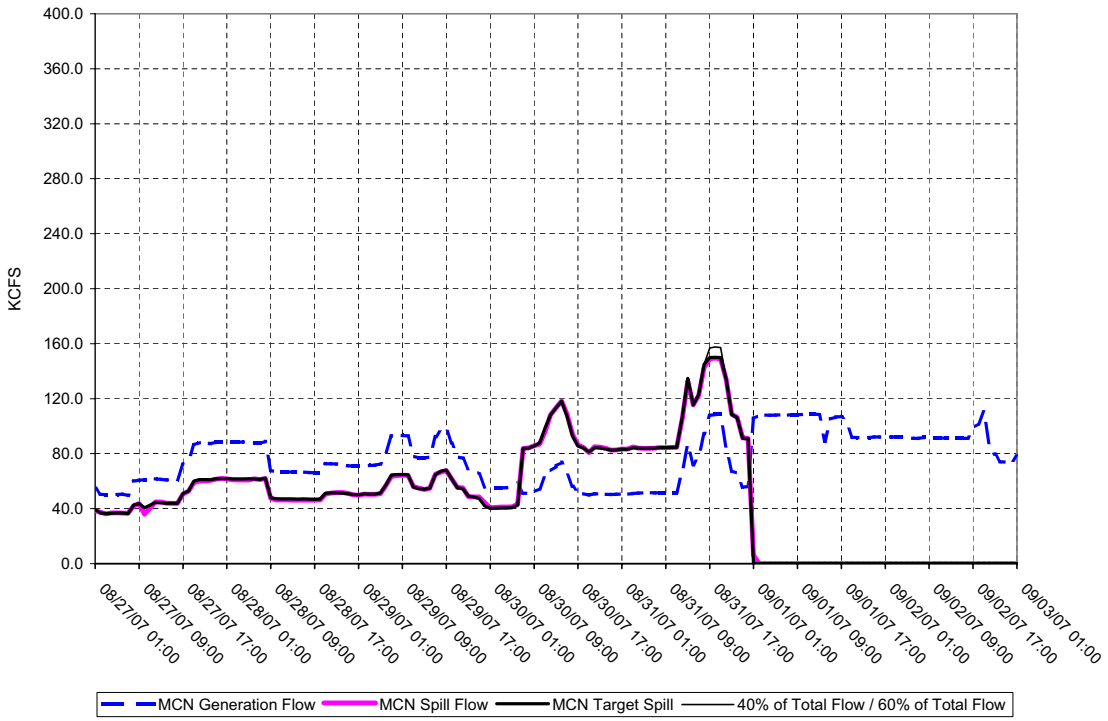
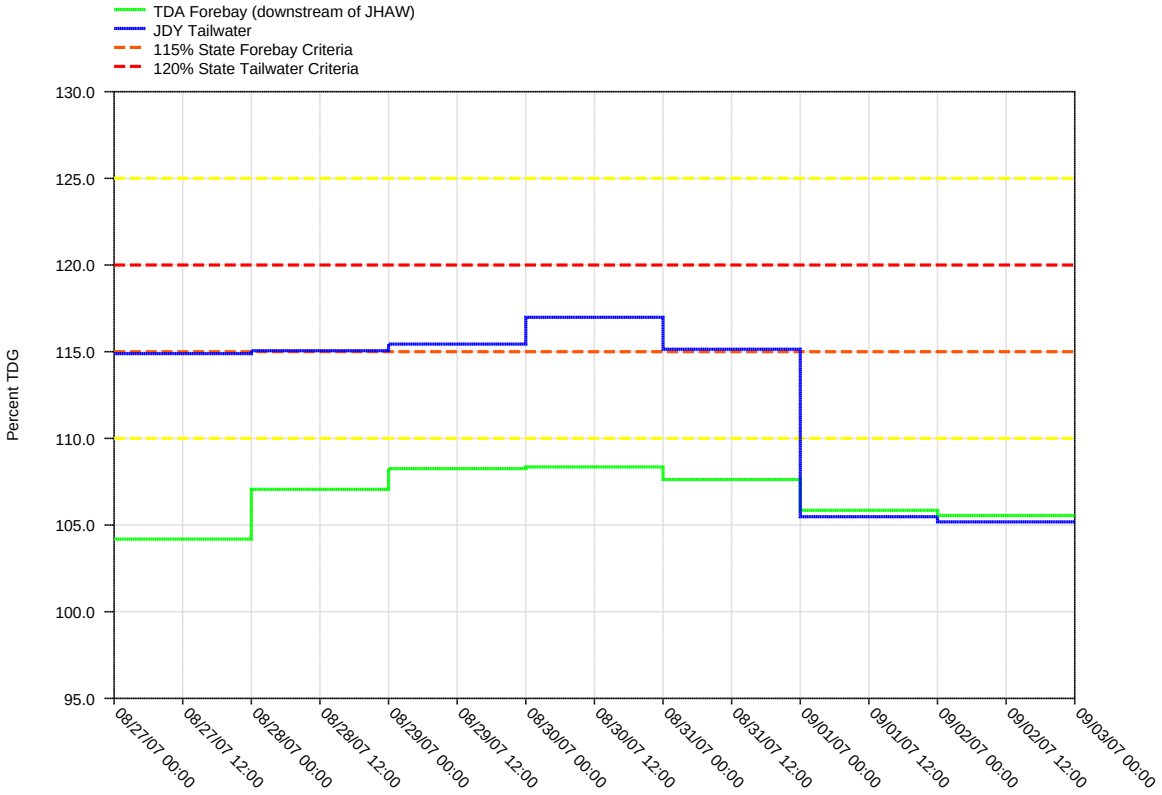


Figure 38.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

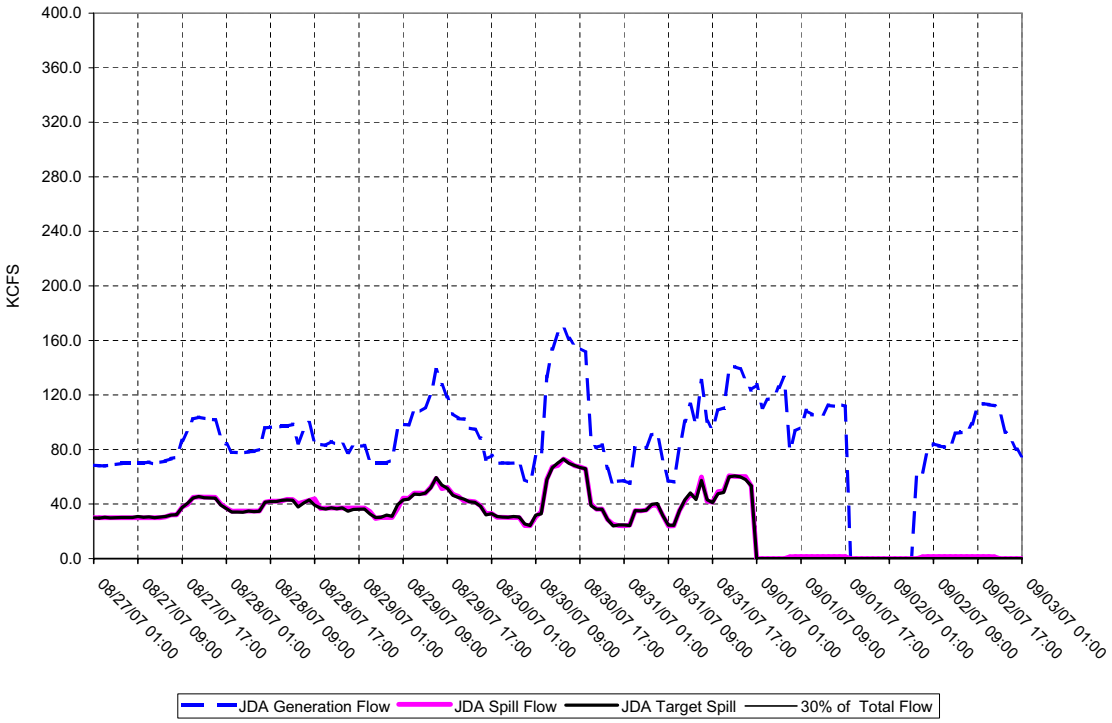
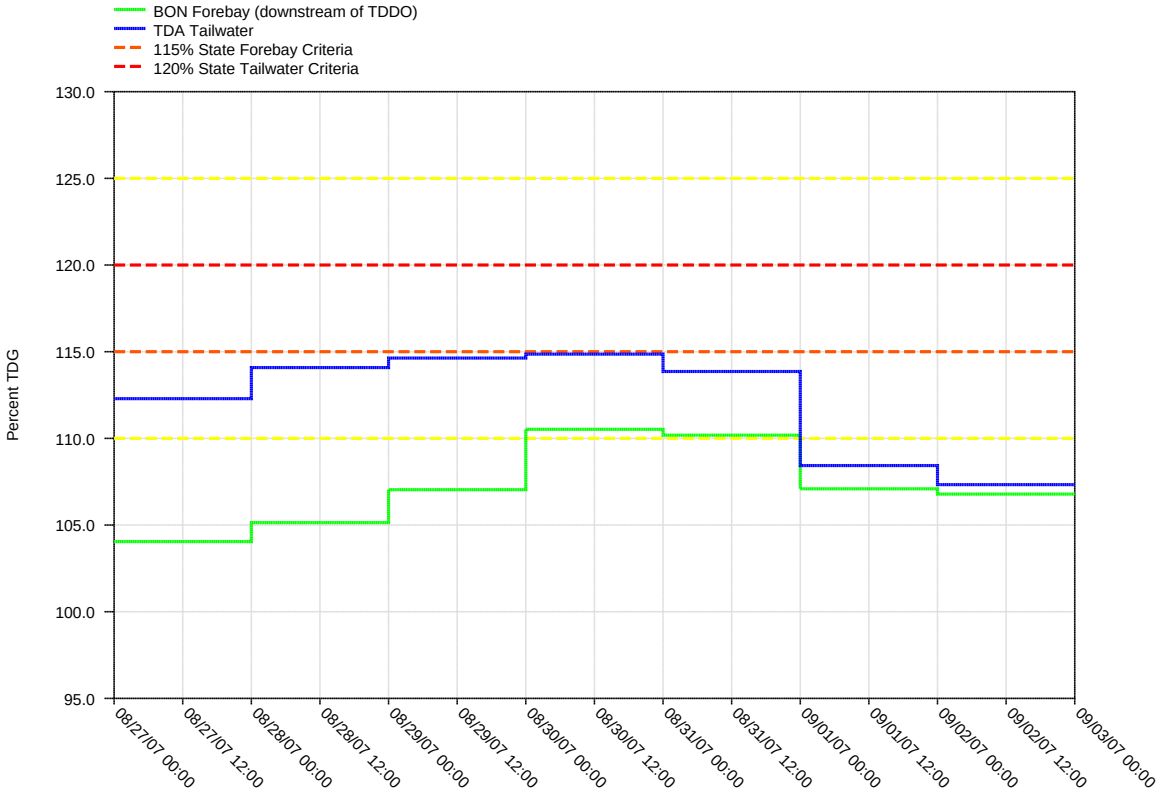


Figure 39.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

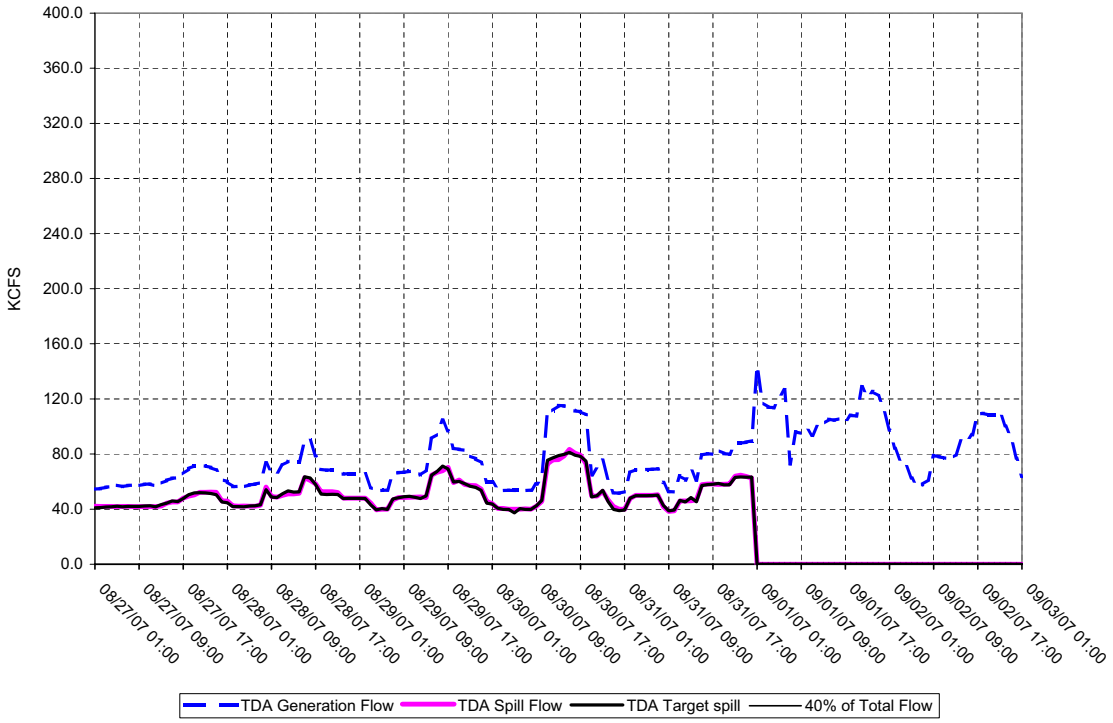
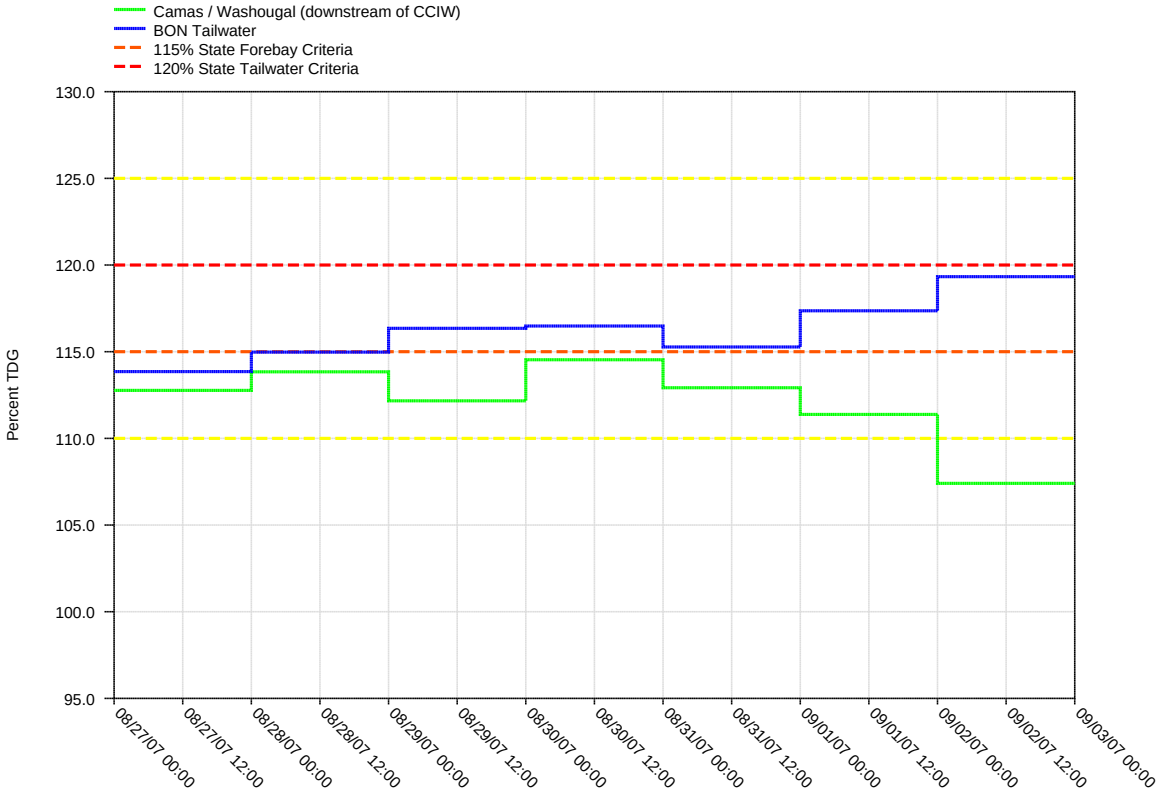


Figure 40.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

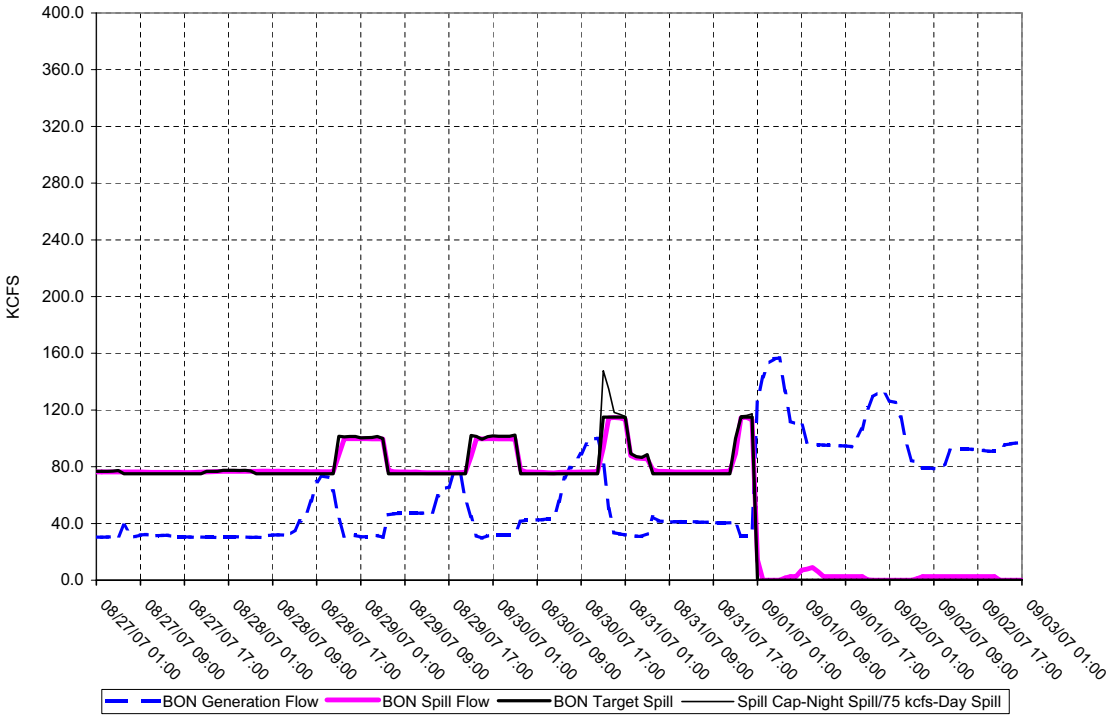
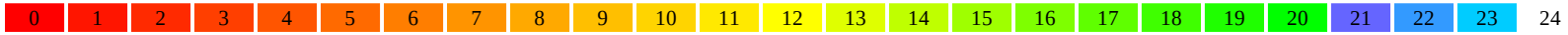


Table 1.
Average percent TDG for 12 highest hours: July 30 – August 31, 2007

Date	Monitoring Stations (full list)																
	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
07/30/2007	101.9	111.7	107.1	108.0	105.8	113.8	110.0	113.3	109.1	116.8	104.0	117.5	104.1	112.6	104.5	117.4	113.6
07/31/2007	102.0	112.1	106.4	108.0	105.5	112.5	109.5	111.7	109.1	115.6	104.0	118.0	106.5	113.8	104.9	117.5	114.1
08/01/2007	102.7	112.1	106.6	108.0	105.2	117.3	109.2	112.0	108.9	117.8	105.1	117.5	108.3	114.9	107.9	117.8	**115.7**
08/02/2007	102.9	111.6	107.0	107.7	105.2	114.1	109.4	113.9	109.8	117.7	105.5	117.8	108.3	114.9	110.1	118.3	**115.3**
08/03/2007	102.2	111.1	106.7	107.0	105.1	112.8	109.7	111.8	109.1	116.8	104.2	115.2	106.2	113.0	107.3	117.4	112.9
08/04/2007	102.4	110.7	106.2	107.6	105.6	112.8	110.1	111.2	108.7	116.1	104.3	115.3	104.7	112.4	105.2	116.8	112.2
08/05/2007	102.8	111.4	106.1	107.8	106.0	113.7	111.2	111.4	109.4	118.0	105.3	115.5	106.2	113.4	104.5	117.2	112.9
08/06/2007	103.3	111.8	106.9	107.9	105.7	113.2	111.8	112.7	109.0	117.6	105.2	114.7	106.1	112.9	104.0	117.4	112.8
08/07/2007	102.9	111.1	107.1	107.2	104.7	112.1	110.7	110.6	107.0	113.8	104.4	115.1	104.2	111.7	103.3	117.0	113.0
08/08/2007	102.1	110.5	105.2	106.8	104.3	112.1	108.2	111.0	105.1	113.6	102.8	115.3	104.1	111.6	103.2	117.5	114.2
08/09/2007	101.6	110.8	104.7	106.9	104.4	112.8	107.5	111.2	103.7	116.5	101.7	115.7	104.5	111.3	104.0	117.9	113.4
08/10/2007	101.4	110.6	103.7	106.3	103.5	112.5	106.7	112.8	103.2	114.9	101.0	116.3	104.0	112.1	104.2	118.1	113.9
08/11/2007	102.2	111.3	103.4	106.8	103.8	112.7	106.1	111.6	104.8	114.2	101.8	114.7	105.4	113.0	105.6	118.2	**115.3**
08/12/2007	101.1	110.6	102.7	106.1	102.9	112.0	105.6	111.4	104.7	116.6	101.1	114.3	105.5	112.0	105.5	117.3	112.7
08/13/2007	100.5	110.0	103.1	115.3	102.7	112.0	105.4	111.0	105.4	116.5	100.8	116.7	105.3	112.9	106.3	116.3	113.9
08/14/2007	100.4	109.9	105.0	116.1	103.9	111.8	106.7	110.9	107.0	116.3	102.1	117.0	106.8	114.1	107.9	117.9	**117.0**
08/15/2007	100.7	110.1	105.6	116.2	104.1	111.6	107.7	111.4	107.4	115.4	103.4	116.5	107.4	114.2	109.4	118.4	**116.4**
08/16/2007	101.0	109.3	106.1	115.4	103.3	111.6	108.0	110.6	108.0	114.9	103.0	115.1	106.3	112.7	107.4	118.7	114.3
08/17/2007	100.8	109.2	105.8	115.5	102.8	111.7	107.8	111.9	106.8	117.6	103.1	114.5	104.5	112.0	105.7	117.8	**115.6**
08/18/2007	100.6	109.4	105.4	107.1	106.2	112.9	108.8	112.2	106.4	118.0	103.7	114.6	106.1	112.5	106.3	115.8	114.3
08/19/2007	100.8	109.1	104.5	105.8	110.1	111.7	108.8	110.7	106.0	116.2	103.5	114.3	105.6	112.4	105.8	113.9	113.0
08/20/2007	100.7	116.1	105.1	106.7	110.1	112.6	107.2	110.6	104.3	114.1	102.9	114.5	105.3	112.5	104.9	113.8	112.5
08/21/2007	99.8	116.4	103.7	106.5	108.6	114.7	106.1	111.7	104.2	117.1	102.5	114.4	106.8	113.8	106.1	115.1	114.4
08/22/2007	99.7	115.6	103.9	106.1	108.0	113.9	105.8	111.0	104.4	117.8	102.8	115.6	106.5	113.9	107.4	117.4	**115.4**
08/23/2007	99.7	115.5	103.2	105.9	106.5	108.0	106.0	110.6	105.2	115.7	102.7	115.4	107.2	114.3	107.9	117.0	**116.3**
08/24/2007	99.3	109.4	103.5	106.9	106.1	113.5	106.4	110.9	107.5	113.9	103.1	115.0	107.5	114.5	108.1	116.8	**115.4**
08/25/2007	99.2	109.7	103.5	105.9	105.7	111.4	106.9	111.1	107.5	117.1	102.9	114.0	106.4	113.3	107.0	115.6	113.3
08/26/2007	99.0	108.8	105.2	106.5	104.5	113.1	108.0	110.7	106.9	117.6	102.8	114.3	103.9	111.7	105.1	113.8	111.5
08/27/2007	99.9	109.1	104.1	107.1	104.2	112.1	108.6	111.1	105.6	117.3	102.6	114.9	104.2	112.3	104.0	113.9	112.8
08/28/2007	100.9	109.5	105.1	106.8	105.3	112.0	108.4	111.4	105.7	117.7	103.8	115.1	107.1	114.1	105.1	115.0	113.8
08/29/2007	101.2	109.2	106.5	107.0	103.6	111.9	107.7	110.8	105.6	117.8	104.6	115.4	106.8	114.6	107.0	116.3	112.2
08/30/2007	101.2	109.1	105.8	106.4	102.4	110.8	107.3	110.6	104.0	116.1	105.1	117.0	108.3	114.9	110.5	116.5	114.5
08/31/2007	100.3	109.4	104.4	106.5	102.9	112.6	106.7	110.6	104.5	117.9	104.2	115.1	107.6	113.9	110.2	115.3	112.9

Generated: Sat Sep 1 23:25:15 2007

Number of hours of data reported in a given day



Big, bold, red text denotes exceedances.
--- indicates No Data
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%.

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)
WRNO	Bonneville Tailwater (Warrendale)
CWMW	Camas / Washougal

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