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TECHNICAL ANALYSIS OF EFFECTS OF 115% AND 120% TDG WAIVER CRITERIA ON SPILL VOLUMES

Prepared by US Army Corps of Engineers Northwestern Division

Introduction:

At the request of the states of Oregon and Washington, the RCC Water Quality Unit modeled two different spill scenarios using SYSTDG: Scenario A is with 115% forebay and 120% tailwater State water quality waiver TDG criteria in effect and Scenario B is with only 120 % tailwater water quality TDG waiver criteria in effect. The purpose of this modeling effort was to see the effects of removing the 115% TDG waiver criteria.

The 2007 water year was used as the initial model run data set. The 2007 water year was chosen for this modeling effort due to the low occurrence of involuntary spill and high level of spill to the spill caps as compared to other recent years. In 2007, there were no exceedances of the State TDG waiver criteria due to involuntary spill. In 2006, there were 21 exceedances due to involuntary spill, eight in 2005, five in 2004, and 12 in 2003.

Additional water year scenarios may be modeled using a range of water years and/or spill conditions in order to understand how the change in waiver criteria could affect spill amounts and TDG levels in the river across a wider range of runoff conditions and spill scenarios. One of the future model scenarios could include the 2007 draft BiOp spill regime shown in the proposed RPA # 29, Spill Operations to Improve Juvenile Passage. This will take additional effort and biological input, since some projects start and stop spill based on daily fish numbers and species at the projects. This report compares the simulations results for both spill scenarios.

Assumptions:

The following assumptions are used in the modeling effort.

- Spill season begins April 3rd at 0001 for the Snake River projects and on April 10th at 0001 for the four lower Columbia projects and lasts until August 31.
- Scenario A is spilling within the 115% or 120% TDG criteria.
- Scenario B is spilling within only the 120% TDG criteria. The 115% state water quality standard does not apply in scenario B.
- Use 2007 actual project discharge hourly flows.
- Use 2007 actual water temperatures and wind conditions.
- Use 2007 actual pool elevations.
- Use 2007 spill patterns.
- Minimum generation: 9.5 kcfs at IHR, 11.5 kcfs at Lower Monumental; Little Goose; and Lower Granite; 50 kcfs at McNary, John Day and The Dalles; and 30 kcfs for Bonneville.
- Use the same number of TDG exceedances for the each scenario: An attempt will be made to keep the TDG exceedances at approximately the same number so that the spill volumes could be compared. During the model runs, the spill caps are changed multiple times to reduce or increase TDG levels as needed. To achieve the same number of exceedances for both scenarios, the spill cap changes may stop sooner than if this goal was not involved.
- Spill regime at the various projects is the same as that used in 2007, which included:
    1. LWG – spill 20 kcfs from 4/3 – 6/20; then 18 kcfs from 6/21 – 8/31 24 hours/day

2. LGS – spill 30% of total river flow up to spill cap for all the spill season except from April 29th through May 13th when spill was to the spill cap.
3. LMN – spill to spill cap 24 hours/day during spring; spill 17 kcfs up to spill cap during the summer beginning June 21st.
4. IHR – spill to 45 kcfs during the day and to spill cap at night; conduct a spill test from April 30th to July 16th with spill alternating between spilling 45 kcfs in the day and up to the 120% gas cap at night and spilling 30% of the total outflow 24 hours a day
5. MCN – spill 40% up to spill cap from 4/10 – 6/30 then alternating from 40% to 60% from 6/22 – 8/31
6. JDA – spill 60% up to spill cap from 4/10 to 6/30 then 30% from 7/1 to 8/31
7. TDA – spill 40% up to spill cap from 4/10 – 8/31
8. BON – spill 100 kcfs for 24 hours/day from 4/10 to 6/21; then 85 kcfs during the day and spill cap at night until July 15th, then 75 kcfs during the day and spill cap at night until 8/31st.

General Comments:
In order to see the effects of removing the 115% TDG waiver standard from spill management, it was necessary to keep all other variables constant between the two scenarios. The variables that were held constant between the two scenarios were project outflows; water temperature; wind; pool elevation; spill regimes; spill patterns and the number of TDG exceedances. Allowing a certain level of TDG exceedances more accurately reflected the level of risk currently being applied to spillway operations decisions. After many model simulations to obtain the same or similar number of TDG exceedances for both scenarios, the attached model simulation results were developed. The following comments provide an overview and summary of the SYSTDG modeling results.

Modeling Lower Monumental: The SYSTDG model results for Lower Monumental were unique in that the TDG production equation for the project was very sensitive to spill cap changes. For example, in scenario B, a spill cap of 37 kcfs resulted in no TDG exceedances at the tailwater gage; a spill cap of 39 kcfs resulted in 11 exceedances; a spill cap of 40 kcfs resulted in 26 exceedances and a spill cap of 41 kcfs resulted in 40 exceedances. A one kcfs change in the spill cap producing such a drastic change in the number of TDG exceedances shows that the Lower Monumental TDG exchange is very sensitive to spill levels and highlights the difficulty in TDG management for the project. A small change in the spill discharge can produce an extraordinarily large change in the frequency of exceeding TDG criteria. The Lower Monumental modeling results are representative of what we see in real time operations. This unique characteristic of Lower Monumental results in the Ice Harbor forebay gage having the second highest frequency of TDG exceedances over a nine year period (226 exceedances). A one kcfs change in the spill cap does not produce such a drastic change in the number of TDG exceedances at any of the other projects on the Lower Snake and Columbia Rivers.

Spill Regime is Controlling Factor: The spill regimes at Lower Granite, Ice Harbor, McNary and The Dalles were the controlling factors to such a large degree that spill caps exerted minimum influence during a water year like 2007 when the flows were low and the shape of the runoff was gradual. Because of this fact, the spill volumes of the two scenarios for these projects were very similar showing that removal of the forebay gages would not result in any significant increase or decrease in spill volumes at these projects for a water year like 2007. A comparison of the spill volumes for each project in the two scenarios is shown on Table 2.

Spill Caps is Controlling Factor: Without the 115% TDG criteria in spill management, spill caps exerted the controlling influence at John Day, Lower Monumental, and Bonneville, resulting in an increase in spill volumes. A comparison of the spill caps for each project in the two scenarios is shown on Table 1. In general Little Goose was unique in that its TDG levels were influenced by both the spill cap and spill regime. A comparison of the spill volumes for each project in the two scenarios is shown on Table 2.

Increase Spill Volumes: Removal of the 115% TDG waiver criteria resulted in an additional spill of 5,177 KAF. Scenario A had 113,185 KAF spill and scenario B had 118,362 KAF. The projects with the largest changes were Lower Monumental, John Day and Bonneville. Lower Monumental had 2,184 KAF more spill in scenario B which occurred in the spring, mainly in May. John Day had 1,421 KAF more spill which also occurred in the spring, mainly in April and May. Bonneville had 1,303 KAF more spill in scenario B which occurred throughout the spill season, mainly from June through August, with a peak in July. A comparison of the spill volumes for each project in the two scenarios is shown on Table 2.

Changes in Spill Caps: Removal of the 115% TDG waiver criteria resulted in a 16 kcfs higher spill cap at John Day and 17 kcfs higher spill caps at Lower Monumental and Bonneville as a seasonal average. The Bonneville spill cap had the largest single increase between scenario A and B where the spill cap went from 131 to 175 kcfs during July. There were five days with a spill cap of 200 kcfs. The estimate of the spillway capacity as limited by the tailwater criterion of 120 percent at Bonneville should be applied cautiously because of the known sampling bias at the Cascade Island station for spillway flows above 120 kcfs and the need to extrapolate the TDG exchange response for some of the simulated conditions. A comparison of spill caps used in scenario A and B are shown on Table 1.

% TDG Increase in Forebay Gages:
Removal of the 115% TDG waiver criteria from spill management resulted in no increase in the high 12 hour average TDG levels at five of the nine forebay gages for a water year like 2007. The gages with no increase in the high 12 hour average were Lower Granite; Little Goose; Lower Monumental; McNary; and John Day forebay gages. The three forebay gages that showed notable increases in the High 12 hour average TDG levels for the entire spill season were Ice Harbor; The Dalles; and Camas Washougal for a water year like 2007. As shown on Table 7, the Ice Harbor forebay had the largest increase in maximum TDG levels, going from 116.6 % in scenario A to 120.4 % in scenario B, an increase of 3.8 % over the entire spill season. The Ice Harbor forebay gage's high 12 hour average as a seasonal average rose from 111.9% to 113.4%, an increase of 1.5%. Ice Harbor forebay gage experienced the largest increase of TDG, which could be expected since Lower Monumental had the largest increase in spill volumes. The Dalles forebay gage had the second largest increase in maximum TDG levels, going from 114.4 % in scenario A to 116.1 % in scenario B, an increase of 1.7 %. The Dalles forebay gage's high 12 hour average as a seasonal average rose from 110.8 % to 111.2 %, an increase of 0.4 %. The Dalles forebay gage experienced the second largest increase of TDG, which could be expected since John Day had the second largest increase in spill volumes. The Camas Washougal gage had the third largest increase in the maximum TDG levels going from 116.5 % in scenario A to 117.5 % in scenario B, an increase of 1.0 % over the entire spill season. The Camas Washougal forebay gage's high 12 hour average as a seasonal average rose from 113.4 % to 114.0 %, an increase of 0.6%. The Camas Washougal forebay gage experienced the third largest increase of TDG, which could be expected since Bonneville had the second largest increase in spill volumes. The increased High 12 hour average TDG levels for Ice Harbor; The Dalles; and Camas Washougal that were modeled and described above were consistent with what has been seen in real time operations. An overall TDG comparison of the two scenarios is shown on Table 6.

Table 4 provides the high 12 hour average TDG levels at the Snake River forebay and tailwater gages. Table 5 provides the high 12 hour average TDG levels at the Columbia River forebay and tailwater gages.

% TDG Increase in Tailwater Gages: Removal of the 115% TDG waiver criteria from spill management resulted in small to small to no increase in the high 12 hour average TDG levels at five of the eight tailwater gages for a water year like 2007. The gages with small to no increase in the high 12 hour average for water years like 2007 were Lower Granite; Little Goose; Ice Harbor; McNary; and The Dalles tailwater gages. The three tailwater gages that showed notable increases in the High 12 hour average TDG levels for the entire spill season were Lower Monumental, Bonneville and John Day. The Lower Monumental tailwater had the largest increase in the maximum TDG levels going from 118.5 % in scenario A to 120.2 % in scenario B, an increase of 1.7 %. The Lower Monumental tailwater gage's high 12 hour average as a seasonal average rose from 115.0 % to 116.7 %, an increase of 1.7 %. The Lower Monumental tailwater experienced the largest increase which could be expected since Lower Monumental had the largest increase in spill volumes. The Bonneville tailwater had the second largest increase in the maximum TDG levels going from 118.8 % in scenario A to 120.6 % in scenario B, an increase of 1.8 %. The Bonneville tailwater gage's high 12 hour average as a seasonal average rose from 117.1 % to 117.7 %, an increase of 0.6 %. The Bonneville tailwater experienced the second largest increase which could be expected since Bonneville had a large increase in spill volumes. The John Day tailwater had the third largest increase in the maximum TDG levels going from 120.5 % in scenario A to 122.0 % in scenario B, an increase of 1.5 %. The John Day tailwater gage's high 12 hour average as a seasonal average rose from 117.8 % to 118.1 %, an increase of 0.3 %. The John Day tailwater experienced the third largest increase which could be expected since John Day had a large increase in spill volumes. The increased High 12 hour average TDG levels for Lower Monumental, Bonneville and John Day tailwater gages that were modeled and described above were consistent with what has been seen in real time operations. An overall TDG comparison of the two scenarios is shown on Table 6. Table 4 provides the high 12 hour average TDG levels at the Snake River forebay and tailwater gages. Table 5 provides the high 12 hour average TDG levels at the Columbia River forebay and tailwater gages.

Number of TDG Exceedances: In order to compare the two scenarios where only one variable changed (TDG standards), all other variables remained the same which included the number of TDG exceedances. Since scenario A had 49 TDG exceedances with only 11 from tailwater gages, it was necessary to increase the tailwater TDG exceedances in scenario B so that it would have approximately 49 TDG also. By keeping the number of TDG exceedances the same, then it is possible to see the effects of removing the 115% waiver criteria. Table 7 provides a TDG exceedance summary comparison. As Table 7 shows, scenario A had 49 TDG exceedances when both forebay and tailwater waiver criteria are considered. Scenario B had 54 TDG exceedances when only tailwater waiver criteria are considered. This is the basis that the two scenarios are compared. Table 7 shows what the number of TDG exceedances in the forebay and tailwater for both scenarios.

Peak Hourly Readings: There were no hourly TDG readings that exceeded the 125% TDG waiver criteria in scenario A or B. As Table 3 shows, Lower Monumental and Ice Harbor had the largest shifts in TDG of all of the gages from an hourly perspective. 9.55% of the time, the Lower Monumental tailwater gage was above 120% compared to zero percent of the time in scenario A. The Lower Monumental tailwater gage was also between 117.5 % and 120% TDG 37.9% of the time in scenario B compared to 6.8% of the time in scenario A.

Ice Harbor forebay was above 117.5% TDG levels 10.4% of the time in scenario B compared to zero percent of the time in scenario A. Ice Harbor forebay was also had 115% to 117.5% TDG levels 28.6% of the time in scenario B compared to 4.1% of the time in scenario A. Ice Harbor forebay exceeded the 115% TDG criteria 39.4 % of spill season in scenario B compared to 4.1% of the time in scenario A.

The Bonneville tailwater gage in scenario B had eight hourly readings above 124.0 % TDG in scenario B compared to two hourly readings of 121.3% in scenario A. Camas/Washougal exceeded the 115% TDG criteria 12.6 % of the time in scenario B compared to 6.5% of the time in scenario A.

SYSTDG Modeling: The existence of the Columbia and Snake River forebay gages made it possible to perform this modeling and provide the results that are contained in this report. Forebay gages are also necessary for all other SYSTDG modeling needed for spill season management and real time operations.

Conclusions:
When the 115% TDG waiver criteria was removed the following effects are seen:

- Spill regimes were the controlling factor at Lower Granite, Ice Harbor, McNary and The Dalles during water years like 2007.
- Spill caps were the controlling factor at John Day, Lower Monumental, and Bonneville during water years like 2007.
- A large increase in spill at Lower Monumental, John Day and Bonneville resulting in an overall increase of 5,177 KAF in the Lower Columbia and Snake Rivers.
- In general Little Goose was unique in that its TDG levels were influenced by both the spill cap and spill regime.
- Resulted in a 17 kcfs higher spill caps Bonneville, 15 kcfs higher spill cap at John Day and 9 kcfs higher spill cap at Lower Monumental as a seasonal average.
- The forebay gages with no increase in the high 12 hour average were Lower Granite; Little Goose; Lower Monumental; McNary; and John Day forebay gages when flows like 2007 were modeled.
- The large increase in High 12 hour average TDG levels at Ice Harbor; The Dalles; and Camas Washougal forebay gages was consistent with the fact that Lower Monumental, John Day and Bonneville projects had the largest increases in spill volumes.
- The large increase in High 12 hour average TDG levels at Lower Monumental and John Day tailwater gages was consistent with the fact that these two projects had the largest increases in spill volumes.
- Resulted in a maximum TDG increase of 3.1 % TDG at the forebay gages and 1.5 % TDG at the tailwater gages during the entire spill season.
- Ice Harbor forebay exceeded the 115% TDG criteria 39.4 % of spill season in scenario B compared to 4.1% of the time in scenario A.
- Camas/Washougal exceeded the 115% TDG criteria 12.6 % of the time in scenario B compared to 6.5% of the time in scenario A.
- The maximum TDG levels in the tailwater increased by 1.5%.
- The maximum TDG levels in the forebay increased by 3.1 %.
- There were no hourly TDG readings that exceeded the 125% TDG waiver criteria in either Scenario A or Scenario B.
- The existence of the Columbia and Snake River forebay gages made it possible to perform this modeling and provide the results contained in this report.

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Modeling Results:

The following products were used to evaluate the differences between Scenario A and B for the entire spill season (April 3rd through August 31st) and were the basis for the general comments provided above. The attached tables include:

- Table 1: Spill Cap Evaluation
- Table 2: Outflow, Spill and Generation Comparison
- Table 3: Hourly TDG Statistics Comparison
- Table 4: Scenario A and B TDG levels On The Snake River
- Table 5: Scenario A and B TDG levels On The Columbia River
- Table 6: Gage Specific TDG Exceedance Comparison
- Table 7: TDG Exceedance Summary Statistics
- Figure 1 – 17:Graphs of Hourly TDG Evaluations of Scenario A and B

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TABLE 1
SPILL CAP EVALUATION

	Scenario A	Scenario B	Difference between A and B
	115% and 120% TDG standards Applying	Only 120% TDG standard Applying	
LWG	**Scenario A Spill caps**	**Scenario B Spill caps**	**Difference between A and B in kcfs**
April	42	42	0
May	42	42	0
June	42	42	0
July	42	42	0
August	42	42	0
Average	42	42	0
LGS	**Scenario A Spill caps**	**Scenario B Spill caps**	**Difference between A and B in kcfs**
April	30	30	0
May	28	32	4
June	30	30	0
July	30	30	0
August	30	30	0
Average	30	31	1
LMN	**Scenario A Spill caps**	**Scenario B Spill caps**	**Difference between A and B in kcfs**
April	25	40	15
May	21	40	19
June	23	35	11
July	24	24	0
August	24	24	0
Average	23	32	9
IHR	**Scenario A Spill caps**	**Scenario B Spill caps**	**Difference between A and B in kcfs**
April	95	95	0
May	95	96	0
June	95	95	0
July	95	95	0
August	95	95	0
Average	95	95	0

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TABLE 1
SPILL CAP EVALUATION

	Scenario A	Scenario B	Difference between A and B
	115% and 120% TDG standards Applying	Only 120% TDG standard Applying	
MCN	**Scenario A Spill caps**	**Scenario B Spill caps**	**Difference between A and B in kcfs**
April	121	119	-2
May	124	124	0
June	127	130	3
July	140	141	0
August	150	150	0
Average	133	133	0
JDA	**Scenario A Spill caps**	**Scenario B Spill caps**	**Difference between A and B in kcfs**
April	113	160	47
May	151	175	24
June	157	164	6
July	160	160	0
August	160	160	0
Average	149	164	15
TDA	**Scenario A Spill caps**	**Scenario B Spill caps**	**Difference between A and B in kcfs**
April	125	127	2
May	126	137	11
June	119	128	9
July	126	126	0
August	126	126	0
Average	125	129	4
BON	**Scenario A Spill caps**	**Scenario B Spill caps**	**Difference between A and B in kcfs**
April	94	100	6
May	98	100	2
June	103	125	23
July	131	175	44
August	142	154	11
Average	114	131	17

* The Bonneville tailwater gage, Cascade Island, has a sampling bias that underestimates the average TDG above 120 kcfs spill at Bonneville. (See "Total Dissolved Gas Exchange at Bonneville Dam, 2002 Spill Season", 2002, Schneider and Carol)

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TABLE 2

OUTFLOW, SPILL AND GENERATION COMPARISON

	Scenario A				Scenario B				Difference between A and B
	115% and 120% TDG standards Applying				Only 120% TDG standard Applying				
LWG	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Difference between A and B in kcfs**
April	47	20	26	1,109	47	20	26	1,109	0
May	80	20	58	1,220	80	20	58	1,220	0
June	46	19	25	1,146	46	19	25	1,146	0
July	32	17	13	1,044	32	17	13	1,044	0
August	24	12	10	747	24	12	10	747	0
Totals in KAF	13,708	5,266	7,843		13708	5266	7843		0
LGS	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Spill Difference (kcfs)**
April	46	14.4	29	797	46	14.5	29	804	0
May	77	23	52	1,429	77	25	50	1,511	1
June	46	14	30	822	46	14	30	820	0
July	32	9	20	582	32	9	20	582	0
August	24	9	13	523	24	9	13	524	0
Totals in KAF	13,415	4,153	8,604		13,415	4,241	8,516		88
LMN	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Spill Difference (kcfs)**
April	47	24	21	1,309	47	33	12	1,830	9
May	78	21	55	1,268	78	39	36	2,428	19
June	45	21	22	1,229	45	29	14	1,733	8
July	31	16	13	970	31	16	13	970	0
August	23	11	10	682	23	11	10	682	0
Totals in KAF	13,399	5,458	7,313		13399	7641	5129		2,184

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TABLE 2

OUTFLOW, SPILL AND GENERATION COMPARISON

	Scenario A				Scenario B				Difference between A and B
	115% and 120% TDG standards Applying				Only 120% TDG standard Applying				
IHR	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Spill Difference (kcfs)**
April	49	38	9	2,092	49	38	8	2,129	1
May	79	37	40	2,271	79	37	40	2,261	0
June	46	28	16	1,638	46	28	16	1,650	0
July	31	18	10	1,135	31	19	10	1,163	0
August	23	13	8	814	23	14	8	848	1
Totals in KAF	13,613	7,950	5,064		13,613	8,052	4,962		102
MCN	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Spill Difference (kcfs)**
April	225	90	128	3,758	225	90	129	3,744	0
May	266	107	154	6,552	266	107	154	6,551	0
June	222	95	121	5,655	222	95	121	5,680	0
July	179	91	82	5,623	179	92	81	5,632	0
August	147	72	69	4,432	147	72	69	4,432	0
Totals in KAF	59,053	26,017	31,266		59,053	26,036	31,246		20
JDA	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Spill Difference (kcfs)**
April	220	59	158	2,452	220	69	148	2,861	10
May	258	66	189	4,078	258	77	178	4,713	10
June	211	53	155	3,166	211	60	149	3,543	6
July	168	50	115	3,096	168	50	115	3,096	0
August	138	41	94	2,548	138	41	94	2,546	0
Totals in KAF	56,370	15,342	40,228		56,370	16,763	38,807		1,421

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TABLE 2
OUTFLOW, SPILL AND GENERATION COMPARISON

	Scenario A				Scenario B				Difference between A and B
	115% and 120% TDG standards Applying				Only 120% TDG standard Applying				
TDA	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Spill Difference (kcfs)**
April	216	86	123	3,597	216	86	123	3,595	0
May	254	101	146	6,217	254	102	145	6,243	0
June	208	83	119	4,909	208	83	118	4,950	1
July	163	65	91	4,007	163	65	91	4,009	0
August	133	53	73	3,281	133	53	73	3,274	0
Totals in KAF	55,179	22,010	31,199		55,179	22,069	31,140		59
BON	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Outflow kcfs**	**Spill kcfs**	**Generation kcfs**	**Spill KSFD**	**Spill Difference (kcfs)**
April	233	99	122	4,118	233	100	121	4,165	1
May	270	96	161	5,932	270	100	157	6,149	4
June	219	96	111	5,704	219	101	106	6,015	5
July	174	93	68	5,721	174	101	60	6,216	8
August	145	90	42	5,517	145	93	39	5,748	4
Totals in KAF	58,932	26,990	28,343		58,932	28,293	27,040		1,303
Seasonal Totals in KAF	**283,671**	**113,185**	**159,860**		**283,671**	**118,362**	**154,684**		**5,177**

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TABLE 3
HOURLY TDG STATISTICS COMPARISON AT THE COLUMBIA AND SNAKE RIVER GAGES

Parameter	LWG FOREBAY		LWG TAILWATER		LGS FOREBAY		LGS TAILWATER		LMN FOREBAY		LMN TAILWATER		IHR FOREBAY		IHR TAILWATER	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
>125	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
120%<X≤125	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.55%	0.00%	0.36%	0.00%	0.03%
117.5%<X≤120	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.56%	5.24%	0.17%	0.22%	6.79%	37.87%	0.00%	10.41%	0.99%	0.99%
115%<X≤117.5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.77%	5.19%	4.22%	4.69%	31.08%	5.13%	4.14%	28.60%	11.43%	20.70%
112.5%<X≤115	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.56%	24.54%	20.87%	22.27%	39.99%	26.80%	32.82%	11.70%	87.30%	78.17%
110%<X≤112.5	0.00%	0.00%	44.52%	44.52%	2.15%	2.15%	48.27%	47.97%	38.26%	36.19%	16.26%	15.04%	43.22%	29.75%	0.17%	0.00%
≤110%	100.00%	100.00%	55.48%	55.48%	97.85%	97.85%	16.84%	17.06%	36.49%	36.63%	5.88%	5.60%	19.82%	19.18%	0.11%	0.11%
Max %TDG	105.4	105.4	111.1	111.1	111.2	111.2	119.3	119.6	118.3	118.5	120.0	120.3	116.9	120.7	120.0	120.1
Min %TDG	97.7	97.7	105.0	105.0	98.3	98.3	103.7	103.7	99.0	99.0	102.3	102.8	100.6	100.6	102.7	102.9
Seasonal Average	101.6	101.6	109.4	109.4	107.2	107.2	112.0	112.1	110.8	110.8	114.4	116.1	111.5	113.1	114.1	114.4
Std Deviation	1.49	1.49	1.57	1.57	2.0	2.0	2.5	2.6	2.7	2.8	2.3	3.5	2.6	3.7	0.9	1.1
April Ave %TDG	101.0	101.0	109.4	109.4	105.7	105.7	111.3	111.2	108.8	108.7	116.3	118.7	111.3	112.8	114.2	114.2
May Ave %TDG	102.8	102.8	107.2	107.2	107.1	107.1	114.5	114.9	113.7	114.1	115.0	119.2	113.2	117.0	115.1	115.9
June Ave %TDG	101.9	101.9	109.6	109.6	107.0	107.0	111.8	111.8	111.5	111.5	115.4	117.6	112.7	115.0	114.0	114.3
July Ave %TDG	101.6	101.6	110.8	110.8	108.4	108.4	111.2	111.2	110.1	110.1	114.0	114.0	111.3	111.3	113.7	113.7
Aug Ave %TDG	100.5	100.5	110.1	110.1	107.9	107.9	111.2	111.2	109.7	109.7	111.5	111.5	109.2	109.2	113.7	113.7

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TABLE 3
HOURLY TDG STATISTICS COMPARISON AT THE COLUMBIA AND SNAKE RIVER GAGES

Parameter	MCN FOREBAY		MCN TAILWATER		JDA FOREBAY		JDA TAILWATER		TDA FOREBAY		TDA TAILWATER		BON FOREBAY		BON TAILWATER		CWMW FOREBAY	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
>125	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
120%<X≤125	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.89%	10.59%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.53%	7.50%	0.00%	0.12%
117.5%<X≤120	0.17%	0.17%	0.00%	0.00%	0.00%	0.00%	19.94%	16.93%	0.00%	0.00%	5.35%	9.73%	0.00%	0.00%	24.37%	31.23%	0.23%	1.68%
115%<X≤117.5	1.45%	1.45%	33.89%	33.84%	0.00%	0.00%	45.09%	41.88%	0.46%	2.43%	35.69%	34.04%	1.01%	1.59%	47.32%	35.80%	6.31%	10.94%
112.5%<X≤115	11.58%	11.58%	66.08%	66.11%	0.00%	0.00%	2.34%	2.11%	10.22%	12.62%	52.74%	50.68%	15.60%	17.66%	24.72%	25.47%	38.47%	39.88%
110%<X≤112.5	22.55%	22.55%	0.03%	0.06%	11.64%	11.78%	0.98%	1.04%	30.88%	29.78%	6.22%	5.56%	50.97%	50.30%	0.06%	0.00%	49.99%	43.13%
≤110%	64.25%	64.25%	0.00%	0.00%	88.36%	88.22%	24.75%	27.44%	58.44%	55.17%	0.00%	0.00%	32.42%	30.45%	0.00%	0.00%	5.01%	4.25%
Max %TDG	118.1	118.1	117.3	117.4	112.1	111.9	122.4	123.0	115.9	117.3	119.4	120.0	116.6	117.5	121.3	124.6	118.1	121.1
Min %TDG	101.8	101.8	112.4	112.5	104.0	104.1	104.0	104.1	103.3	103.3	110.8	110.8	105.3	105.3	110.8	113.5	104.8	104.8
Seasonal Average	109.0	109.0	114.5	114.5	107.5	107.5	114.5	114.4	109.4	109.7	114.8	115.0	110.8	110.9	116.5	116.9	112.4	112.8
Std Deviation	2.9	2.9	1.0	1.1	1.7	1.7	4.8	5.1	2.5	2.7	1.5	1.7	1.9	2.0	1.7	2.1	1.6	1.9
April Ave %TDG	109.2	109.2	114.4	114.4	107.3	107.3	113.9	113.3	109.8	110.4	115.1	115.5	111.1	111.3	117.3	117.3	115.1	116.2
May Ave %TDG	110.9	110.9	115.6	115.6	107.6	107.6	114.0	114.0	109.6	110.2	115.3	115.7	111.7	112.0	117.6	117.9	113.5	114.0
June Ave %TDG	109.9	109.9	114.7	114.7	106.1	106.1	112.5	112.4	108.0	108.3	114.1	114.3	109.6	109.8	116.8	117.2	112.5	112.8
July Ave %TDG	109.6	109.6	114.3	114.3	107.8	107.9	116.1	116.1	109.3	109.4	114.6	114.6	110.3	110.3	115.9	116.5	111.6	111.8
Aug Ave %TDG	105.7	105.7	113.7	113.7	108.4	108.4	115.6	115.6	110.4	110.5	115.0	115.1	111.4	111.4	115.2	115.5	110.3	110.5

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TABLE 4

SCENARIO A and B TDG LEVELS ON SNAKE RIVER

HIGH 12 HOUR AVERAGES

	LWG		LWG		LGS		LGS		LMN		LMN		IHR		IHR	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
4/3/2007	100.2	100.2	110.6	110.6	99.4	99.4	110.1	110.1	100.4	100.4	116.3	119.1	102.6	102.6	114.9	114.9
4/4/2007	99.8	99.8	110.9	110.9	99.3	99.3	107.7	107.4	100.3	100.3	117.8	119.3	102.1	102.1	114.3	114.3
4/5/2007	99.6	99.6	110.8	110.8	99.5	99.5	106.4	106.1	100.2	100.2	117.7	118.2	101.8	102.0	113.7	113.7
4/6/2007	100.3	100.3	110.9	110.9	100.6	100.6	107.1	107.0	105.5	105.5	117.8	118.4	104.4	105.5	113.9	113.9
4/7/2007	101.8	101.8	111.0	111.0	101.8	101.8	107.9	107.9	108.6	108.3	117.5	117.8	107.2	108.8	114.0	114.0
4/8/2007	102.3	102.3	111.0	111.0	103.3	103.3	108.8	108.8	108.9	108.6	118.0	118.2	112.6	113.8	114.0	114.0
4/9/2007	102.6	102.6	111.0	111.0	105.5	105.5	112.2	112.1	108.3	108.0	118.0	119.7	113.6	114.5	114.6	114.7
4/10/2007	101.5	101.5	109.4	109.4	106.3	106.3	113.0	112.7	105.7	105.6	117.2	120.0	110.6	111.0	114.9	114.9
4/11/2007	101.3	101.3	110.0	110.0	108.8	108.8	117.4	117.6	106.4	106.4	117.9	119.8	111.9	112.1	114.4	114.5
4/12/2007	100.6	100.6	109.2	109.2	107.5	107.5	112.3	112.3	108.5	108.5	117.8	**120.0**	111.6	112.6	114.4	114.6
4/13/2007	99.2	99.2	109.2	109.2	105.4	105.4	111.9	111.9	110.9	110.8	117.7	**120.0**	113.4	**115.6**	114.5	114.5
4/14/2007	100.0	100.0	109.5	109.5	105.4	105.4	111.3	111.1	112.3	112.3	118.4	120.0	113.6	**116.2**	114.6	114.6
4/15/2007	99.9	99.9	109.6	109.6	103.7	103.7	109.6	109.6	110.9	110.9	118.4	119.3	112.5	114.7	114.1	114.2
4/16/2007	100.7	100.7	109.4	109.4	106.7	106.7	112.0	112.0	110.0	110.0	118.5	119.9	113.8	**115.8**	114.3	114.3
4/17/2007	101.3	101.3	109.6	109.6	107.6	107.6	112.4	112.3	109.5	109.4	118.4	**120.1**	113.8	**115.6**	114.5	114.5
4/18/2007	101.6	101.6	110.4	110.4	108.5	108.5	112.7	112.9	108.6	108.5	117.8	119.2	**115.0**	**116.1**	114.0	114.0
4/19/2007	101.6	101.6	110.0	110.0	109.0	109.0	113.2	113.3	109.7	109.7	117.6	**120.1**	**115.3**	**116.2**	114.7	114.7
4/20/2007	102.2	102.2	110.9	110.9	109.1	109.1	113.4	113.2	111.3	111.2	117.8	119.5	115.0	**116.1**	114.4	114.4
4/21/2007	102.3	102.3	109.8	109.8	108.7	108.7	113.0	113.0	112.1	112.1	116.6	**120.1**	114.3	**115.5**	114.7	114.7
4/22/2007	101.6	101.6	110.1	110.1	108.1	108.1	112.3	112.1	112.2	112.2	117.2	118.6	113.0	114.6	114.1	114.1
4/23/2007	101.0	101.0	110.7	110.7	106.9	106.9	112.1	112.0	112.0	111.9	117.0	119.3	113.1	114.7	114.1	114.1
4/24/2007	101.1	101.1	110.7	110.7	107.3	107.3	112.6	112.6	111.3	111.3	116.9	119.9	113.1	**115.2**	114.6	114.6
4/25/2007	101.1	101.1	109.6	109.6	108.1	108.1	112.2	112.5	111.0	110.9	116.5	119.7	113.5	**115.2**	114.0	114.0
4/26/2007	101.3	101.3	109.1	109.1	108.7	108.7	113.4	113.2	110.9	110.9	115.2	119.9	114.3	**115.9**	114.4	114.4
4/27/2007	102.4	102.4	109.1	109.1	108.8	108.8	114.3	114.4	111.7	111.7	115.4	120.0	114.5	**116.6**	115.0	115.0
4/28/2007	102.0	102.0	108.8	108.8	108.6	108.6	113.8	113.7	112.3	112.4	114.4	120.0	114.5	**117.3**	114.9	114.9
4/29/2007	103.0	103.0	108.7	108.7	109.5	109.5	117.3	117.4	114.0	113.9	114.9	**120.0**	114.6	**118.0**	115.2	115.2
4/30/2007	103.2	103.2	107.8	107.8	108.6	108.6	118.2	119.4	114.0	114.0	114.7	119.9	113.6	**118.0**	116.3	116.2
5/1/2007	103.3	103.3	107.4	107.4	109.8	109.8	117.3	118.8	**117.1**	**117.2**	116.3	119.8	114.0	**118.7**	118.0	118.0
5/2/2007	103.0	103.0	107.0	107.0	109.7	109.7	117.2	118.4	**116.7**	**117.3**	116.4	119.8	114.5	**119.2**	115.6	117.2

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TABLE 4

SCENARIO A and B TDG LEVELS ON SNAKE RIVER

HIGH 12 HOUR AVERAGES

	LWG		LWG		LGS		LGS		LMN		LMN		IHR		IHR	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
5/3/2007	102.0	102.0	106.2	106.2	107.2	107.2	115.3	118.4	114.1	114.7	114.4	119.1	112.5	**116.1**	114.6	115.8
5/4/2007	101.3	101.3	105.9	105.9	105.7	105.7	115.1	119.2	113.0	114.8	114.7	119.5	112.3	**115.3**	116.1	116.2
5/5/2007	101.1	101.1	106.2	106.2	104.7	104.7	114.9	116.9	111.6	113.7	113.9	119.3	111.4	**115.1**	116.0	116.0
5/6/2007	101.7	101.7	107.1	107.1	105.1	105.1	116.8	116.8	112.3	114.7	114.6	119.9	111.7	**115.4**	114.3	115.2
5/7/2007	102.4	102.4	108.0	108.0	106.0	106.0	118.1	118.1	113.7	114.6	116.0	119.9	112.3	**116.8**	113.8	115.6
5/8/2007	104.7	104.7	108.8	108.8	108.6	108.6	118.6	118.6	**116.0**	**116.0**	117.0	**120.1**	114.6	**119.2**	115.6	115.7
5/9/2007	104.4	104.4	108.6	108.6	109.1	109.1	118.1	118.1	**116.0**	**116.0**	116.3	**120.0**	114.8	**118.9**	115.5	115.5
5/10/2007	104.9	104.9	108.4	108.4	110.4	110.4	116.9	116.9	**116.6**	**116.6**	116.1	119.9	**115.6**	**118.7**	115.6	116.7
5/11/2007	104.0	104.0	107.4	107.4	110.4	110.4	116.3	117.3	**116.5**	**116.5**	116.2	119.3	**115.5**	**118.8**	115.8	117.0
5/12/2007	103.9	103.9	107.1	107.1	109.6	109.6	115.6	118.6	**116.5**	**116.5**	116.1	119.4	**116.0**	**119.1**	115.9	117.2
5/13/2007	102.6	102.6	106.2	106.2	106.4	106.4	113.3	115.4	113.6	114.8	113.7	118.9	114.0	**116.6**	115.1	116.1
5/14/2007	102.3	102.3	105.8	105.8	105.7	105.7	113.8	114.3	111.4	113.6	112.7	118.6	113.0	**116.7**	116.6	116.9
5/15/2007	103.2	103.2	106.9	106.9	107.2	107.2	114.6	114.8	111.6	113.5	113.6	119.0	113.3	**117.9**	117.3	117.5
5/16/2007	105.0	105.0	107.8	107.8	107.7	107.7	114.8	115.2	113.5	114.5	114.9	119.6	112.8	**117.9**	115.3	116.6
5/17/2007	104.9	104.9	107.8	107.8	107.6	107.6	114.9	114.9	114.2	114.4	115.4	119.6	112.1	**117.0**	114.0	116.0
5/18/2007	104.3	104.3	107.5	107.5	108.2	108.2	115.1	115.3	113.9	114.1	115.2	119.0	113.5	**117.2**	117.6	117.7
5/19/2007	103.6	103.6	106.9	106.9	107.7	107.7	115.0	115.0	113.5	113.5	115.0	119.1	113.4	**117.0**	117.3	117.4
5/20/2007	103.2	103.2	106.9	106.9	107.5	107.5	115.0	114.9	113.6	113.7	115.6	119.7	113.4	**116.5**	117.0	117.2
5/21/2007	102.6	102.6	106.8	106.8	106.5	106.5	114.6	114.6	113.4	113.4	115.6	119.7	113.0	**116.3**	116.8	116.9
5/22/2007	101.6	101.6	106.4	106.4	105.2	105.2	114.4	114.1	112.2	112.2	114.8	119.4	112.9	**116.3**	115.0	115.8
5/23/2007	101.7	101.7	106.9	106.9	105.7	105.7	114.1	114.0	113.1	113.1	115.4	119.9	113.4	**116.9**	114.4	115.8
5/24/2007	103.1	103.1	107.8	107.8	106.5	106.5	114.4	114.4	114.2	114.1	116.1	**120.1**	114.2	**118.0**	115.6	115.7
5/25/2007	104.0	104.0	108.2	108.2	107.4	107.4	114.5	114.6	113.8	113.8	115.8	120.0	114.0	**117.9**	115.6	115.6
5/26/2007	104.6	104.6	108.9	108.9	108.5	108.5	114.8	114.8	114.4	114.4	116.4	**120.1**	114.3	**117.8**	115.3	116.1
5/27/2007	104.4	104.4	109.4	109.4	108.2	108.2	113.8	113.8	114.6	114.7	116.9	**120.2**	114.0	**117.5**	114.3	115.7
5/28/2007	102.9	102.9	108.8	108.8	107.3	107.3	113.5	113.5	112.9	113.0	115.4	**120.0**	112.6	**115.9**	113.7	115.0
5/29/2007	101.9	101.9	108.4	108.4	107.4	107.4	114.1	114.1	113.0	113.1	115.5	120.0	113.0	**115.9**	114.1	115.3
5/30/2007	101.6	101.6	108.8	108.8	107.2	107.2	114.2	114.2	113.1	113.1	116.0	**120.0**	113.4	**116.9**	114.3	115.7
5/31/2007	102.0	102.0	109.4	109.4	108.1	108.1	114.4	114.3	115.0	115.0	116.8	**120.1**	114.9	**118.8**	114.8	116.3
6/1/2007	104.6	104.6	109.3	109.3	109.3	109.3	114.0	114.0	115.0	114.9	116.9	**120.2**	**116.6**	**120.4**	114.8	115.1

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TABLE 4

SCENARIO A and B TDG LEVELS ON SNAKE RIVER

HIGH 12 HOUR AVERAGES

	LWG		LWG		LGS		LGS		LMN		LMN		IHR		IHR	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
6/2/2007	104.8	104.8	109.4	109.4	109.7	109.7	114.0	114.1	**115.1**	**115.0**	116.5	**120.2**	**115.9**	**119.6**	114.9	114.9
6/3/2007	104.9	104.9	109.6	109.6	110.5	110.5	114.0	114.1	114.5	114.5	116.4	**120.2**	**116.0**	**119.1**	114.8	114.9
6/4/2007	104.7	104.7	109.5	109.5	109.1	109.1	114.5	114.4	113.5	113.5	116.4	**120.2**	114.8	**117.7**	115.0	115.0
6/5/2007	104.3	104.3	109.4	109.4	108.3	108.3	113.9	114.0	113.5	113.5	116.4	**120.2**	114.2	**117.2**	115.2	115.2
6/6/2007	103.7	103.7	109.6	109.6	107.2	107.2	113.2	113.2	113.3	113.4	116.6	**120.2**	113.5	**116.5**	115.4	115.4
6/7/2007	101.4	101.4	108.8	108.8	105.7	105.7	114.0	113.6	111.1	111.1	115.8	**120.0**	110.7	113.5	113.7	114.4
6/8/2007	100.2	100.2	108.8	108.8	105.8	105.8	112.4	112.2	110.2	110.2	116.0	**120.0**	112.1	**115.2**	113.6	114.8
6/9/2007	99.6	99.6	108.2	108.2	106.0	106.0	112.6	112.3	111.3	111.3	116.6	**120.1**	113.8	**117.1**	114.2	115.6
6/10/2007	100.7	100.7	108.8	108.8	106.1	106.1	112.6	112.7	112.4	112.3	117.1	**120.2**	114.1	**117.8**	114.3	115.8
6/11/2007	102.1	102.1	109.0	109.0	106.4	106.4	113.3	113.4	110.4	110.4	117.1	119.8	112.0	**115.6**	114.8	115.3
6/12/2007	102.0	102.0	108.2	108.2	108.0	108.0	114.7	114.7	109.2	109.2	114.8	120.0	111.1	114.1	115.6	115.6
6/13/2007	101.5	101.5	108.7	108.7	108.5	108.5	114.1	114.2	110.1	110.1	115.9	120.0	111.6	114.5	114.0	114.7
6/14/2007	101.7	101.7	109.5	109.5	107.9	107.9	114.2	114.0	112.8	112.8	117.0	**120.0**	111.6	**115.3**	113.4	114.9
6/15/2007	104.1	104.1	110.4	110.4	108.3	108.3	113.3	113.3	114.5	114.6	116.9	**120.1**	112.4	**116.5**	114.4	114.7
6/16/2007	102.7	102.7	110.1	110.1	107.4	107.4	112.1	112.0	114.3	114.4	117.0	119.5	112.5	**116.4**	114.2	114.2
6/17/2007	102.6	102.6	110.4	110.4	106.6	106.6	112.2	112.2	113.4	113.3	116.9	119.8	112.6	**115.6**	114.6	114.7
6/18/2007	102.7	102.7	110.8	110.8	107.2	107.2	111.7	111.7	112.8	112.8	117.0	118.7	114.1	**116.5**	114.1	114.1
6/19/2007	102.4	102.4	110.9	110.9	106.8	106.8	110.9	110.9	112.4	112.4	117.1	117.5	114.4	**116.5**	114.0	114.5
6/20/2007	101.8	101.8	110.9	110.9	107.2	107.2	112.4	112.4	111.8	111.8	117.1	119.7	114.0	**115.9**	114.1	114.7
6/21/2007	100.9	100.9	111.0	111.0	106.6	106.6	111.0	111.0	111.0	111.1	114.9	114.9	114.0	**115.8**	113.7	114.1
6/22/2007	102.0	102.0	110.5	110.5	106.7	106.7	111.9	111.8	111.1	111.1	114.1	114.1	114.6	**116.0**	114.6	114.6
6/23/2007	103.0	103.0	110.9	110.9	107.0	107.0	111.4	111.4	111.3	111.3	114.3	114.3	114.9	**115.8**	114.4	114.6
6/24/2007	103.6	103.6	110.9	110.9	107.5	107.5	111.2	111.1	111.4	111.4	114.8	114.8	114.2	**115.3**	114.1	114.3
6/25/2007	101.9	101.9	110.8	110.8	106.6	106.6	111.2	110.7	109.5	109.5	114.3	114.3	111.5	112.3	113.7	113.8
6/26/2007	102.1	102.1	110.8	110.8	107.9	107.9	111.0	110.9	110.3	110.2	114.9	114.9	110.7	111.0	113.5	113.5
6/27/2007	100.9	100.9	110.9	110.9	108.0	108.0	111.4	111.2	110.1	110.1	115.0	115.0	111.0	111.1	113.5	113.5
6/28/2007	100.2	100.2	110.9	110.9	106.9	106.9	110.7	110.7	110.1	110.0	115.0	115.0	111.3	111.4	113.7	113.7
6/29/2007	99.6	99.6	110.9	110.9	105.7	105.7	110.1	110.1	109.8	109.7	114.2	114.2	110.6	110.6	113.6	113.6
6/30/2007	101.2	101.2	110.8	110.8	105.5	105.5	110.0	109.8	109.4	109.3	114.7	114.7	111.0	111.1	113.7	113.7
7/1/2007	101.9	101.9	110.9	110.9	107.1	107.1	110.9	110.9	110.6	110.5	114.8	114.8	112.3	112.3	113.8	113.8

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TABLE 4
SCENARIO A and B TDG LEVELS ON SNAKE RIVER
HIGH 12 HOUR AVERAGES

	LWG		LWG		LGS		LGS		LMN		LMN		IHR		IHR	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
7/2/2007	101.1	101.1	110.9	110.9	106.6	106.6	110.3	110.2	109.5	109.5	114.9	114.9	111.3	111.3	113.7	113.7
7/3/2007	99.8	99.8	110.9	110.9	107.9	107.9	111.3	111.4	108.7	108.7	114.9	114.9	110.7	110.7	114.0	114.0
7/4/2007	101.4	101.4	110.8	110.8	108.6	108.6	111.8	111.8	108.8	108.7	114.9	114.9	111.1	111.1	113.7	113.6
7/5/2007	102.5	102.5	110.9	110.9	108.7	108.7	111.9	112.0	110.6	110.6	115.0	115.0	112.9	112.9	113.8	113.8
7/6/2007	102.5	102.5	110.9	110.9	108.4	108.4	112.1	112.1	110.0	110.0	114.9	114.9	112.6	112.6	113.9	113.9
7/7/2007	100.5	100.5	110.9	110.9	108.6	108.6	111.7	111.7	109.7	109.7	114.5	114.5	112.6	112.6	113.9	113.9
7/8/2007	102.8	102.8	110.9	110.9	108.0	108.0	111.9	111.9	110.2	110.2	114.4	114.4	112.2	112.2	113.9	113.9
7/9/2007	103.4	103.4	110.9	110.9	108.8	108.8	112.0	112.0	110.7	110.7	114.2	114.2	113.4	113.4	113.8	113.8
7/10/2007	103.3	103.3	110.8	110.8	108.8	108.8	112.0	112.0	111.3	111.3	114.4	114.4	112.7	112.7	113.9	113.9
7/11/2007	103.0	103.0	110.9	110.9	109.6	109.6	113.0	113.0	111.6	111.6	114.8	114.8	112.4	112.4	113.9	113.9
7/12/2007	103.0	103.0	111.0	111.0	109.6	109.6	112.8	112.8	110.8	110.8	115.0	115.0	112.0	112.0	114.0	114.0
7/13/2007	103.1	103.1	110.9	110.9	108.9	108.9	111.9	111.9	110.5	110.5	115.0	115.0	111.8	111.8	114.0	114.0
7/14/2007	102.9	102.9	110.9	110.9	109.0	109.0	112.1	112.0	110.9	110.9	115.0	115.0	111.2	111.2	113.8	113.8
7/15/2007	103.4	103.4	111.0	111.0	108.7	108.7	111.9	111.9	110.9	110.9	115.0	115.0	111.1	111.1	113.9	113.9
7/16/2007	103.2	103.2	110.9	110.9	109.2	109.2	112.1	112.0	111.7	111.7	115.0	115.0	111.8	111.8	113.6	113.6
7/17/2007	103.0	103.0	111.0	111.0	109.5	109.5	111.9	111.9	111.6	111.6	115.1	115.1	112.1	112.1	113.9	113.9
7/18/2007	102.9	102.9	111.0	111.0	109.0	109.0	111.7	111.8	110.9	110.9	115.1	115.1	111.9	111.9	113.8	113.8
7/19/2007	101.6	101.6	110.9	110.9	108.6	108.6	111.3	111.2	110.5	110.5	115.0	115.0	111.5	111.5	113.7	113.6
7/20/2007	102.1	102.1	110.9	110.9	109.8	109.8	112.1	112.1	110.7	110.7	115.0	115.0	111.4	111.4	113.8	113.8
7/21/2007	101.3	101.3	110.9	110.9	108.8	108.8	111.9	111.8	110.6	110.6	114.6	114.6	111.5	111.5	113.8	113.8
7/22/2007	100.7	100.7	110.8	110.8	108.5	108.5	111.0	111.0	110.6	110.6	113.2	113.2	111.6	111.6	113.8	113.7
7/23/2007	100.6	100.6	110.9	110.9	108.7	108.7	110.8	110.9	110.3	110.3	113.6	113.6	111.6	111.6	113.8	113.7
7/24/2007	100.1	100.1	111.0	111.0	108.2	108.2	111.2	111.1	109.8	109.8	114.4	114.4	110.8	110.8	113.7	113.7
7/25/2007	100.5	100.5	110.9	110.9	109.5	109.5	111.3	111.3	110.8	110.8	114.1	114.1	111.4	111.4	113.5	113.5
7/26/2007	100.9	100.9	111.0	111.0	109.5	109.5	111.6	111.6	110.8	110.8	112.1	112.1	111.7	111.7	113.8	113.8
7/27/2007	101.9	101.9	111.0	111.0	108.6	108.6	111.5	111.5	110.5	110.5	113.6	113.6	111.1	111.1	114.0	114.0
7/28/2007	101.9	101.9	111.0	111.0	108.8	108.8	111.5	111.5	110.2	110.2	114.4	114.4	111.3	111.3	113.9	113.9
7/29/2007	101.6	101.6	111.0	111.0	108.9	108.9	111.4	111.3	108.7	108.7	114.1	114.1	110.4	110.4	113.8	113.8
7/30/2007	101.6	101.6	110.9	110.9	108.8	108.8	111.4	111.4	109.6	109.6	115.0	115.0	110.6	110.6	113.7	113.7
7/31/2007	101.7	101.7	110.9	110.9	109.6	109.6	111.5	111.5	110.1	110.1	113.1	113.1	111.1	111.1	113.7	113.7
8/1/2007	102.4	102.4	110.9	110.9	109.7	109.7	112.2	112.3	111.0	111.0	116.2	116.2	110.6	110.6	113.8	113.8

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TABLE 4

SCENARIO A and B TDG LEVELS ON SNAKE RIVER

HIGH 12 HOUR AVERAGES

	LWG		LWG		LGS		LGS		LMN		LMN		IHR		IHR	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
8/2/2007	102.6	102.6	110.9	110.9	110.3	110.3	112.3	112.3	111.1	111.1	115.2	115.2	111.3	111.3	113.7	113.7
8/3/2007	101.9	101.9	111.0	111.0	108.7	108.7	110.8	110.8	109.6	109.6	112.4	112.4	110.5	110.5	113.7	113.6
8/4/2007	102.1	102.1	110.9	110.9	109.7	109.7	111.6	111.6	109.2	109.2	113.7	113.7	110.7	110.7	113.7	113.7
8/5/2007	102.4	102.4	110.9	110.9	110.8	110.8	112.3	112.3	110.5	110.5	113.5	113.5	111.3	111.3	113.9	113.9
8/6/2007	103.0	103.0	110.9	110.9	109.7	109.7	111.5	111.5	110.7	110.8	112.7	112.7	111.4	111.4	113.8	113.8
8/7/2007	102.7	102.7	110.9	110.9	108.3	108.3	110.5	110.5	110.5	110.5	112.1	112.1	111.4	111.4	113.7	113.7
8/8/2007	101.8	101.8	110.9	110.9	108.2	108.2	110.4	110.4	109.3	109.3	111.9	111.9	111.1	111.1	113.6	113.5
8/9/2007	101.3	101.3	110.9	110.9	110.4	110.4	112.3	112.3	109.3	109.3	114.1	114.1	110.6	110.6	113.7	113.7
8/10/2007	101.1	101.1	110.8	110.8	108.7	108.7	110.8	110.8	109.1	109.1	114.4	114.4	109.4	109.4	113.6	113.6
8/11/2007	101.9	101.9	110.8	110.8	109.6	109.6	111.4	111.4	111.0	111.0	114.1	114.1	110.6	110.6	113.9	113.8
8/12/2007	100.9	100.9	110.8	110.8	108.6	108.6	110.7	110.7	109.0	109.0	112.0	112.0	109.3	109.3	113.9	113.8
8/13/2007	100.2	100.2	110.3	110.3	108.9	108.9	117.6	117.6	108.5	108.5	113.0	113.0	107.9	107.9	113.7	113.7
8/14/2007	100.1	100.1	110.1	110.1	109.0	109.0	117.9	117.9	109.6	109.6	112.4	112.4	108.9	108.9	113.8	113.9
8/15/2007	100.4	100.4	110.5	110.5	109.5	109.5	118.1	118.1	110.1	110.1	111.2	111.2	110.1	110.1	113.9	113.9
8/16/2007	100.8	100.8	110.3	110.3	109.8	109.8	118.2	118.2	110.2	110.2	113.2	113.2	110.2	110.2	114.1	114.1
8/17/2007	100.5	100.5	109.7	109.7	107.2	107.2	117.6	117.6	109.7	109.7	110.8	110.8	110.3	110.3	114.1	114.0
8/18/2007	100.3	100.3	109.6	109.6	108.6	108.6	110.3	110.3	111.2	111.2	111.0	111.0	110.6	110.6	114.2	114.1
8/19/2007	100.5	100.5	108.9	108.9	108.8	108.8	110.3	110.3	111.7	111.7	109.7	109.7	109.5	109.5	113.9	114.2
8/20/2007	100.5	100.5	111.0	111.0	107.9	107.9	110.4	110.4	112.8	112.8	112.0	112.0	108.4	108.4	113.3	113.5
8/21/2007	99.5	99.5	110.9	110.9	107.5	107.5	110.0	110.0	113.6	113.6	112.4	112.4	108.6	108.6	113.5	113.5
8/22/2007	99.4	99.4	110.9	110.9	107.3	107.3	109.5	109.5	113.0	113.0	111.5	111.5	108.5	108.5	113.7	113.8
8/23/2007	99.4	99.4	111.0	111.0	107.9	107.9	109.7	109.7	112.1	112.1	109.3	109.3	108.1	108.1	113.9	114.1
8/24/2007	99.0	99.0	109.6	109.6	108.1	108.1	110.4	110.4	110.8	110.8	112.1	112.1	108.4	108.4	113.9	113.9
8/25/2007	98.9	98.9	109.6	109.6	107.4	107.4	109.6	109.6	109.4	109.4	111.0	111.0	108.4	108.4	114.0	114.0
8/26/2007	98.7	98.7	109.6	109.6	106.5	106.5	109.3	109.3	108.0	108.0	111.8	111.8	107.5	107.5	113.9	114.0
8/27/2007	99.5	99.5	109.6	109.6	105.2	105.2	108.5	108.5	108.2	108.2	111.8	111.8	107.7	107.7	113.8	113.9
8/28/2007	100.6	100.6	109.6	109.6	105.6	105.6	108.4	108.4	108.1	108.1	111.7	111.7	108.8	108.8	113.7	113.7
8/29/2007	100.9	100.9	109.6	109.6	106.4	106.4	108.7	108.7	108.5	108.5	110.2	110.2	108.7	108.7	113.9	113.9
8/30/2007	100.9	100.9	108.9	108.9	107.6	107.6	109.5	109.5	108.9	108.9	108.9	108.9	108.8	108.8	113.7	113.8
8/31/2007	100.1	100.1	108.7	108.7	107.4	107.4	109.8	109.8	108.2	108.2	111.2	111.2	108.4	108.4	113.8	113.8
TDG exceedances	0	0	0	0	0	0	0	0	8	8	0	26	8	67	0	0

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TABLE 5
SCENARIO A and B TDG LEVELS ON COLUMBIA RIVER
HIGH 12 HOUR AVERAGES

	MCN		MCN		JDA		JDA		TDA		TDA		BON		BON		CWMW	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
4/10/2007	107.7	107.7	116.7	116.6	108.3	108.3	119.2	118.9	110.1	110.2	115.1	115.1	106.4	106.4	117.5	117.6	109.2	109.3
4/11/2007	106.3	106.3	116.1	116.0	111.1	111.1	119.7	120.0	113.9	**116.1**	117.6	119.0	111.5	111.5	117.9	117.8	109.9	110.0
4/12/2007	105.9	105.9	114.7	114.7	110.0	110.0	119.3	119.5	111.6	112.8	115.9	116.6	111.9	112.0	117.1	117.1	111.2	111.2
4/13/2007	107.1	107.1	115.3	115.4	108.4	108.4	**120.5**	**120.5**	113.2	**116.1**	117.2	118.9	113.0	113.9	117.9	117.9	113.9	113.9
4/14/2007	106.9	106.9	115.3	115.3	108.2	108.2	119.7	119.5	111.5	112.7	116.1	116.8	114.1	114.5	117.4	117.3	113.9	114.3
4/15/2007	106.1	106.1	114.2	114.2	106.9	106.9	**120.4**	119.3	111.2	112.6	116.0	116.7	111.2	112.2	117.7	117.6	113.7	113.9
4/16/2007	106.5	106.5	115.0	115.0	107.8	107.7	119.7	118.5	112.8	113.4	117.0	117.3	112.0	112.2	117.5	117.5	113.0	113.5
4/17/2007	106.9	106.9	114.7	114.7	106.8	106.8	119.3	119.3	112.5	112.6	116.9	116.9	112.4	112.9	117.6	117.7	113.1	113.1
4/18/2007	106.6	106.6	114.9	114.8	106.2	106.2	118.3	118.3	110.0	110.0	115.1	115.1	110.9	111.0	117.4	117.6	112.6	112.9
4/19/2007	106.9	106.9	115.4	115.4	105.9	105.9	118.3	118.6	111.6	111.6	116.2	116.3	110.9	110.9	117.5	117.6	114.0	114.1
4/20/2007	108.0	108.0	114.5	114.5	106.7	106.7	119.6	119.8	113.2	113.5	117.3	117.4	113.0	113.0	117.5	117.6	114.0	114.0
4/21/2007	109.0	109.0	114.2	114.2	107.4	107.4	118.9	119.3	113.8	114.0	117.7	117.8	113.8	113.9	117.6	117.6	113.6	113.7
4/22/2007	109.3	109.3	114.3	114.3	107.0	107.0	118.5	118.7	112.1	112.4	116.6	116.8	113.1	113.2	117.4	117.5	113.9	114.0
4/23/2007	112.2	112.2	114.7	114.7	106.4	106.3	118.4	119.4	111.0	111.2	115.8	115.9	111.5	111.6	117.4	117.5	114.0	114.1
4/24/2007	112.8	112.8	114.4	114.4	106.8	106.8	118.1	119.0	110.1	111.1	115.0	115.6	110.9	111.0	117.0	117.1	112.9	113.0
4/25/2007	112.8	112.8	114.1	114.1	106.8	106.8	117.8	118.5	110.6	111.6	115.3	116.0	110.8	110.8	116.9	117.0	112.7	112.8
4/26/2007	112.3	112.3	114.3	114.3	106.4	106.4	117.9	119.4	111.5	112.6	116.0	116.5	111.4	111.8	116.9	117.0	113.7	113.8
4/27/2007	113.0	113.0	114.8	114.8	107.0	107.0	118.3	119.8	111.6	113.1	116.4	117.3	112.8	113.2	117.2	117.2	114.5	114.6
4/28/2007	114.1	114.1	114.9	114.9	107.9	107.9	118.0	119.1	111.1	112.6	116.2	117.1	112.8	113.2	117.3	117.4	114.7	114.8
4/29/2007	114.9	114.9	114.8	114.7	108.4	108.4	118.5	119.6	110.9	112.0	116.1	116.8	112.2	112.8	117.1	117.5	114.0	114.3
4/30/2007	114.3	114.3	115.0	115.0	109.0	109.0	118.7	**120.3**	112.2	114.0	116.9	118.0	111.9	112.3	117.3	117.7	113.4	113.8
5/1/2007	114.3	114.3	116.0	116.0	109.3	109.3	119.4	**121.3**	113.2	115.0	117.5	118.5	113.0	113.3	117.5	118.1	113.6	114.0
5/2/2007	113.9	113.9	116.1	116.1	109.5	109.5	119.5	**121.9**	111.7	113.9	116.6	117.8	114.3	115.0	117.7	118.2	113.5	113.9
5/3/2007	110.9	110.9	116.5	116.5	108.1	108.1	119.6	**121.5**	111.5	114.0	116.6	118.1	112.2	112.9	117.6	118.1	112.9	113.5
5/4/2007	109.0	109.0	116.6	116.5	107.7	107.7	**120.3**	**121.7**	110.8	112.2	116.3	117.2	111.2	112.0	117.9	118.2	112.7	113.4
5/5/2007	108.6	108.6	116.4	116.4	106.2	106.2	119.7	**120.9**	110.3	111.7	116.0	116.8	110.0	110.8	117.9	118.2	112.0	112.7
5/6/2007	109.6	109.6	115.7	115.7	105.5	105.5	119.9	**121.0**	110.3	112.2	116.0	117.1	110.4	111.0	117.9	118.1	112.3	112.8
5/7/2007	112.5	112.5	116.0	116.1	106.7	106.7	**120.2**	**120.5**	111.5	112.0	116.5	116.7	112.1	112.6	117.7	117.9	114.6	**115.0**
5/8/2007	113.5	113.5	116.4	116.4	108.1	108.1	119.8	**120.2**	112.6	113.6	117.1	117.9	114.5	**115.2**	117.8	118.0	**115.3**	**115.7**
5/9/2007	113.5	113.5	116.6	116.6	108.5	108.5	**120.5**	**122.0**	112.6	114.3	117.4	118.4	112.2	112.5	117.9	118.3	113.7	114.0
5/10/2007	**115.2**	**115.2**	116.6	116.6	108.9	108.9	**120.5**	**121.9**	112.2	113.9	117.1	118.2	112.5	113.1	117.8	118.3	113.8	114.4

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TABLE 5
SCENARIO A and B TDG LEVELS ON COLUMBIA RIVER
HIGH 12 HOUR AVERAGES

	MCN		MCN		JDA		JDA		TDA		TDA		BON		BON		CWMW	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
5/11/2007	117.3	117.3	116.4	116.5	110.0	110.0	120.3	121.3	114.4	115.7	118.6	119.3	113.1	113.8	118.0	118.3	114.4	115.0
5/12/2007	115.4	115.4	116.3	116.3	110.0	110.1	119.7	120.2	112.2	113.3	117.1	117.8	113.7	114.2	118.0	118.3	113.3	113.9
5/13/2007	111.2	111.2	116.3	116.3	107.1	107.1	119.4	120.0	109.5	109.5	115.4	115.4	110.3	110.6	117.5	117.7	112.7	113.0
5/14/2007	110.3	110.3	116.3	116.3	107.7	107.7	120.5	121.7	113.0	114.9	117.6	118.8	111.8	111.8	118.3	118.4	113.4	113.6
5/15/2007	112.8	112.8	116.3	116.3	109.9	109.9	119.9	120.8	114.2	114.9	118.3	118.7	115.6	116.2	118.2	118.3	113.5	113.5
5/16/2007	112.9	112.9	116.1	116.2	108.8	108.8	119.3	119.9	111.1	111.9	116.1	116.6	113.5	114.1	118.2	118.3	114.9	115.3
5/17/2007	112.5	112.5	116.0	116.1	107.7	107.7	119.6	120.4	111.1	111.7	116.2	116.6	110.9	111.1	117.9	118.0	113.7	113.9
5/18/2007	111.3	111.3	115.8	115.8	108.6	108.6	118.6	119.2	112.2	113.2	116.9	117.5	111.3	111.6	118.0	118.1	113.0	113.2
5/19/2007	110.5	110.5	115.8	115.8	107.5	107.5	119.5	119.8	110.6	111.3	115.8	116.3	112.0	112.2	118.0	118.1	112.4	112.5
5/20/2007	110.9	110.9	115.6	115.7	107.4	107.4	119.4	119.7	112.9	113.6	117.3	117.8	111.8	112.2	118.0	118.1	112.9	113.2
5/21/2007	109.0	109.0	116.4	116.4	107.3	107.3	119.8	120.5	108.9	109.4	114.9	115.4	112.1	112.3	117.8	117.9	112.2	112.4
5/22/2007	107.8	107.8	115.6	115.7	106.3	106.3	119.8	120.4	110.4	111.2	116.0	116.4	110.1	110.3	117.8	117.9	112.7	112.9
5/23/2007	109.9	109.9	115.6	115.6	106.1	106.1	119.1	119.7	111.9	112.9	117.0	117.5	111.0	111.3	117.8	117.9	113.4	113.6
5/24/2007	110.8	110.8	115.8	115.9	107.3	107.3	119.9	120.3	111.0	111.8	116.4	117.0	113.2	113.5	118.1	118.1	115.2	115.4
5/25/2007	111.6	111.6	115.9	115.8	107.4	107.4	120.0	120.4	113.6	114.3	117.7	118.1	113.7	114.1	118.0	118.1	115.2	115.4
5/26/2007	111.9	111.9	115.8	115.8	108.9	108.9	118.9	119.5	113.0	113.6	117.4	117.8	114.3	114.6	117.5	117.8	115.2	115.5
5/27/2007	112.0	112.0	115.5	115.6	108.5	108.5	119.4	119.7	108.8	109.3	114.6	114.9	113.3	113.6	117.0	117.4	112.9	113.1
5/28/2007	108.9	108.9	115.4	115.4	107.0	107.0	119.5	120.1	112.0	112.5	116.9	117.2	108.3	108.4	117.5	118.0	111.8	112.4
5/29/2007	108.3	108.3	115.1	115.2	107.9	107.9	118.6	118.9	112.7	113.7	117.0	117.6	112.5	112.7	117.5	117.7	112.4	112.8
5/30/2007	110.3	110.3	115.7	115.7	108.5	108.4	119.0	119.4	113.2	113.6	117.2	117.6	114.3	114.5	117.5	117.7	114.7	114.9
5/31/2007	112.2	112.2	115.2	115.2	108.6	108.6	118.7	119.0	113.9	114.4	117.7	118.2	115.5	115.8	117.7	117.9	115.9	116.1
6/1/2007	114.2	114.2	115.3	115.2	110.2	110.0	118.8	120.0	113.2	113.7	117.1	117.8	115.5	115.7	117.2	117.5	116.0	116.2
6/2/2007	115.5	115.5	115.1	115.1	111.4	111.3	118.2	118.8	112.0	113.5	116.4	117.4	114.2	114.5	117.2	117.5	115.8	116.0
6/3/2007	115.1	115.1	114.4	114.3	111.0	111.0	118.6	119.2	113.7	114.2	117.5	118.1	113.3	113.7	117.1	117.3	114.9	115.2
6/4/2007	114.0	114.0	115.5	115.5	109.6	109.6	118.4	119.1	111.7	112.1	116.4	116.8	111.6	112.0	117.6	117.8	114.1	114.4
6/5/2007	113.2	113.2	115.3	115.3	108.4	108.4	118.5	118.9	110.0	110.7	115.5	115.9	110.4	110.8	117.3	117.4	112.4	112.7
6/6/2007	108.7	108.7	115.7	115.7	107.2	107.3	118.5	119.0	108.6	108.9	114.9	115.1	108.0	108.4	117.7	117.7	111.3	111.5
6/7/2007	105.7	105.7	115.0	115.0	104.9	105.1	118.3	118.4	108.5	109.2	114.5	114.8	106.5	106.7	117.4	117.5	110.0	110.2
6/8/2007	108.0	108.0	116.5	116.3	104.7	104.5	120.1	120.1	111.2	111.5	116.5	116.7	109.5	109.5	117.7	117.8	112.2	112.3
6/9/2007	108.2	108.2	116.4	116.4	104.9	104.8	120.4	121.0	111.9	111.9	116.8	117.2	111.8	111.9	118.2	118.2	112.4	112.6
6/10/2007	109.4	109.4	115.6	115.6	105.0	105.1	119.2	119.7	109.2	110.4	115.0	115.7	112.3	112.5	117.8	117.9	112.7	112.8
6/11/2007	108.3	108.3	115.8	115.8	104.6	104.6	119.5	120.0	108.6	109.0	114.7	115.0	110.0	110.3	118.0	118.1	112.6	112.7

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TABLE 5
SCENARIO A and B TDG LEVELS ON COLUMBIA RIVER
HIGH 12 HOUR AVERAGES

	MCN		MCN		JDA		JDA		TDA		TDA		BON		BON		CWMW	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
6/12/2007	108.0	108.0	115.2	115.2	105.6	105.4	118.3	119.5	110.6	111.6	115.8	116.5	109.2	109.4	117.5	117.6	112.2	112.5
6/13/2007	109.3	109.3	116.1	116.1	105.7	105.7	118.7	118.9	109.7	110.1	115.4	115.7	111.0	111.3	117.4	117.5	112.1	112.3
6/14/2007	110.1	110.1	115.3	115.3	105.6	105.3	119.2	119.5	111.1	111.5	116.3	116.6	109.8	110.1	117.6	117.6	113.1	113.3
6/15/2007	111.0	111.0	115.2	115.2	106.2	106.1	118.6	118.9	110.6	111.1	116.1	116.5	111.5	111.6	117.6	117.6	113.2	113.4
6/16/2007	111.8	111.8	115.5	115.5	106.5	106.6	117.6	118.0	108.7	109.3	114.8	115.1	111.3	111.5	117.2	117.4	112.3	112.4
6/17/2007	109.0	109.0	113.9	113.9	106.0	106.1	118.5	118.5	107.2	107.7	113.6	113.9	108.2	108.4	116.7	116.8	111.6	111.8
6/18/2007	108.5	108.5	114.3	114.3	105.3	105.2	119.6	119.5	109.9	110.0	115.5	115.5	107.3	107.4	117.3	117.4	112.5	112.7
6/19/2007	110.8	110.8	114.9	114.9	106.7	106.4	119.2	119.3	111.8	112.2	116.8	117.1	110.7	110.8	117.4	117.5	112.9	113.0
6/20/2007	111.9	111.9	114.3	114.3	106.5	106.5	118.2	118.2	110.7	111.2	115.9	116.2	112.6	112.7	117.6	117.1	113.7	113.8
6/21/2007	111.3	111.3	114.3	114.3	105.6	105.7	117.5	117.7	109.2	109.3	114.6	114.7	110.7	110.8	116.7	116.8	114.8	114.4
6/22/2007	111.2	111.2	116.1	116.3	105.2	105.3	118.2	118.5	108.7	108.7	114.1	114.2	108.5	108.6	116.8	118.2	112.9	113.1
6/23/2007	110.0	110.0	116.2	116.4	105.8	105.6	117.9	118.2	109.1	109.4	114.2	114.5	108.5	108.6	116.9	**120.6**	112.4	**117.5**
6/24/2007	110.0	110.0	114.6	114.6	105.9	106.0	118.0	118.4	108.2	108.6	113.5	113.7	108.6	108.7	116.3	118.4	111.1	114.1
6/25/2007	108.1	108.1	113.9	113.9	105.0	105.3	118.0	118.3	109.3	109.6	114.4	114.5	108.2	108.3	116.1	117.1	112.5	113.9
6/26/2007	110.2	110.2	115.7	116.0	105.7	105.3	118.1	118.4	110.9	111.3	115.8	116.0	109.5	109.7	116.6	117.5	113.7	114.9
6/27/2007	109.3	109.3	114.9	114.9	105.5	105.4	117.9	118.2	109.5	110.0	115.0	115.2	110.3	110.5	116.4	117.8	113.2	114.3
6/28/2007	111.4	111.4	114.1	114.7	105.8	105.8	117.5	117.6	109.3	109.5	114.7	114.8	110.3	110.4	116.4	116.9	113.9	**115.1**
6/29/2007	110.4	110.4	113.9	113.9	105.7	105.9	116.7	117.0	109.1	109.3	114.4	114.5	109.0	109.2	116.3	117.0	112.8	113.8
6/30/2007	109.0	109.0	115.7	115.8	106.3	106.1	116.5	117.5	109.1	109.5	114.5	114.6	108.7	108.8	116.4	119.9	112.8	**115.8**
7/1/2007	109.9	109.9	114.0	114.0	106.7	106.7	115.9	116.0	109.8	110.1	114.7	114.8	110.0	110.1	116.0	118.2	112.4	114.5
7/2/2007	108.8	108.8	114.9	115.0	106.1	106.2	115.9	115.9	108.3	108.9	113.4	113.8	109.5	109.6	115.3	115.6	112.8	114.1
7/3/2007	109.5	109.5	115.1	115.1	106.1	106.0	116.1	116.1	108.4	108.4	114.2	114.2	109.4	109.5	115.7	116.1	114.2	114.2
7/4/2007	109.5	109.5	113.6	113.6	107.3	107.0	115.7	115.6	109.3	109.4	114.7	114.8	110.4	110.6	115.3	116.9	113.5	114.3
7/5/2007	112.1	112.1	113.9	113.9	107.3	107.1	116.2	116.1	109.3	109.4	115.1	115.1	111.1	111.1	115.5	116.7	113.8	**115.2**
7/6/2007	113.5	113.5	114.1	114.0	107.3	107.2	116.4	116.4	108.4	108.5	114.5	114.5	110.1	110.1	115.7	117.9	113.0	114.7
7/7/2007	112.5	112.5	113.7	113.7	107.3	107.3	116.0	116.0	107.6	107.6	113.8	113.8	108.3	108.3	115.6	116.6	111.6	113.0
7/8/2007	111.5	111.5	115.1	115.1	106.9	106.9	116.2	116.2	107.1	107.1	113.2	113.3	107.1	107.1	115.7	117.3	112.3	113.6
7/9/2007	111.2	111.2	115.9	116.0	107.7	107.5	117.0	117.0	108.5	108.6	114.3	114.3	108.2	108.2	116.2	118.0	113.0	**115.0**
7/10/2007	110.0	110.0	113.8	113.8	108.5	108.3	116.9	116.9	110.4	110.5	115.4	115.4	110.8	110.8	116.6	118.9	113.5	**115.8**
7/11/2007	109.9	109.9	114.0	114.0	108.4	108.4	117.4	117.3	111.3	111.4	116.1	116.2	112.5	112.5	116.6	118.2	113.9	**115.8**
7/12/2007	111.0	111.0	116.4	116.4	107.2	107.2	117.4	117.5	109.4	109.4	114.7	114.7	111.1	111.1	117.1	118.9	114.3	**116.0**

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TABLE 5
SCENARIO A and B TDG LEVELS ON COLUMBIA RIVER
HIGH 12 HOUR AVERAGES

	MCN		MCN		JDA		JDA		TDA		TDA		BON		BON		CWMW	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
7/13/2007	111.0	111.0	116.7	116.8	106.6	106.7	117.8	117.8	107.1	107.1	113.5	113.5	108.7	108.7	117.2	119.3	113.5	**116.0**
7/14/2007	110.3	110.3	114.7	114.7	107.2	107.0	118.2	118.1	108.3	108.3	114.5	114.5	108.5	108.5	117.4	118.9	113.2	**115.3**
7/15/2007	109.7	109.7	114.0	114.0	107.3	107.3	116.6	116.6	107.9	108.0	114.1	114.1	108.7	108.8	117.6	118.7	112.9	114.4
7/16/2007	110.3	110.3	115.7	115.7	106.7	106.8	117.4	117.4	108.5	108.5	114.7	114.7	109.1	109.1	117.7	**120.0**	113.4	**115.8**
7/17/2007	110.6	110.6	115.6	115.6	105.7	105.7	116.1	116.1	108.2	108.3	113.9	114.1	109.4	109.3	117.7	119.3	112.4	**115.1**
7/18/2007	110.2	110.2	116.0	116.0	105.4	105.4	116.1	116.1	108.1	108.0	113.6	113.6	110.0	110.1	117.4	118.1	112.0	113.0
7/19/2007	108.7	108.7	114.8	114.8	106.6	106.4	115.9	115.9	107.9	107.9	113.7	113.7	110.4	110.5	117.9	118.6	113.8	114.5
7/20/2007	108.4	108.4	114.0	114.0	107.5	107.5	115.5	115.5	109.2	109.2	114.5	114.6	110.7	110.8	118.2	118.8	113.9	114.8
7/21/2007	107.0	107.0	113.7	113.7	106.9	107.0	115.8	115.8	109.4	109.4	114.7	114.6	110.4	110.4	118.1	118.7	113.6	114.4
7/22/2007	108.0	108.0	115.4	115.4	107.7	107.6	116.6	116.6	109.7	109.7	115.1	115.1	111.0	111.0	118.1	118.7	**115.2**	**116.1**
7/23/2007	109.0	109.0	115.8	115.8	109.0	108.9	116.5	116.4	110.9	111.0	115.6	115.6	112.3	112.3	117.9	118.7	**115.4**	**116.3**
7/24/2007	109.4	109.4	113.9	113.9	110.2	109.9	116.2	116.2	111.2	111.2	115.7	115.8	112.3	112.3	117.3	118.0	114.2	114.9
7/25/2007	110.2	110.2	113.9	113.8	111.4	111.1	116.0	116.0	111.9	112.0	116.2	116.3	112.4	112.4	117.5	118.1	115.0	**115.7**
7/26/2007	110.6	110.6	116.3	116.3	111.8	111.8	116.9	116.8	112.7	112.7	116.9	116.9	112.1	112.2	117.6	118.3	114.3	**115.0**
7/27/2007	110.2	110.2	116.3	116.4	111.5	111.4	117.1	117.0	112.9	112.9	117.2	117.2	112.5	112.6	117.9	118.8	**115.1**	**115.9**
7/28/2007	110.0	110.0	114.1	114.1	110.9	110.8	116.5	116.5	113.1	113.1	117.2	117.3	113.2	113.2	117.8	118.6	114.5	**115.5**
7/29/2007	109.2	109.2	113.8	113.8	110.8	110.8	115.9	115.9	112.4	112.4	116.5	116.5	113.2	113.2	117.5	118.2	113.6	114.3
7/30/2007	108.9	108.9	115.2	115.2	111.5	111.4	117.5	117.6	111.4	111.4	116.3	116.2	112.8	112.8	117.6	118.3	114.8	**115.6**
7/31/2007	108.8	108.8	115.3	115.3	111.1	111.2	117.2	117.2	113.0	113.1	116.9	117.0	112.6	112.6	117.9	118.6	**115.3**	**116.0**
8/1/2007	108.5	108.5	114.6	114.6	110.4	110.4	117.1	117.1	113.5	113.9	117.3	117.6	113.5	113.6	118.4	119.0	**116.0**	**116.8**
8/2/2007	109.6	109.6	113.9	113.9	111.3	111.2	116.8	116.8	112.9	113.5	117.1	117.5	114.5	114.6	118.8	119.3	**116.5**	**117.3**
8/3/2007	108.8	108.8	114.9	114.9	111.1	111.1	116.0	116.0	112.2	112.3	116.1	116.2	113.8	113.9	117.8	118.4	114.5	**115.1**
8/4/2007	108.5	108.5	113.7	113.7	110.8	110.7	115.6	115.6	112.2	112.2	116.2	116.3	112.8	113.1	116.2	116.7	113.5	114.0
8/5/2007	109.1	109.1	113.7	113.7	110.7	110.5	115.8	115.8	112.7	112.8	116.6	116.6	112.3	112.5	116.9	117.5	113.3	113.9
8/6/2007	108.8	108.8	113.8	113.8	110.3	110.4	115.9	115.9	112.0	112.1	116.1	116.1	111.7	111.8	117.0	117.6	112.8	113.4
8/7/2007	106.8	106.8	114.4	114.4	110.1	110.2	116.1	116.1	111.2	111.2	115.4	115.3	111.3	111.3	116.7	117.3	112.2	112.8
8/8/2007	105.0	105.0	114.4	114.4	109.7	109.7	116.1	116.1	111.0	111.0	115.6	115.6	110.9	110.9	117.1	117.7	113.0	113.6

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TABLE 5
SCENARIO A and B TDG LEVELS ON COLUMBIA RIVER
HIGH 12 HOUR AVERAGES

	MCN		MCN		JDA		JDA		TDA		TDA		BON		BON		CWMW	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
8/9/2007	103.6	103.6	113.8	113.8	109.0	109.1	116.0	116.0	111.2	111.2	115.7	115.7	110.9	110.9	117.9	118.3	113.3	113.9
8/10/2007	102.9	102.9	113.8	113.8	107.5	107.5	116.5	116.4	110.2	110.2	115.0	115.1	110.9	110.9	117.8	118.3	114.0	114.7
8/11/2007	104.5	104.5	113.7	113.7	108.9	108.6	115.7	115.7	110.5	110.5	115.1	115.2	111.9	111.9	118.1	118.6	114.8	**115.4**
8/12/2007	104.5	104.5	113.2	113.2	108.6	108.8	115.5	115.5	110.1	110.1	114.5	114.5	111.5	111.5	117.6	118.6	113.3	113.9
8/13/2007	105.2	105.2	113.7	113.7	107.7	107.6	116.3	116.3	110.3	110.3	115.2	115.2	111.2	111.2	115.8	116.3	113.0	113.8
8/14/2007	106.7	106.7	113.8	113.8	108.0	107.7	116.7	116.6	110.9	111.0	115.8	115.9	111.9	111.9	117.4	117.9	114.8	**115.4**
8/15/2007	107.2	107.2	115.5	115.4	109.4	109.1	116.2	116.1	111.4	111.4	116.0	116.0	112.9	112.9	118.1	118.9	**115.3**	**115.8**
8/16/2007	107.7	107.7	115.0	115.0	109.0	109.2	116.0	116.1	111.0	111.0	115.6	115.6	112.5	112.5	118.6	119.5	114.0	114.9
8/17/2007	106.6	106.6	113.5	113.5	107.8	107.9	115.6	115.6	110.6	110.6	115.0	115.0	111.9	111.9	117.8	118.3	114.2	114.9
8/18/2007	106.1	106.1	113.6	113.6	107.5	107.4	115.4	115.4	110.6	110.5	114.8	114.7	111.8	111.8	115.5	116.1	113.6	114.2
8/19/2007	105.8	105.8	113.7	113.7	107.4	107.5	115.5	115.5	109.9	109.9	114.3	114.4	111.5	111.6	113.7	114.3	112.0	112.6
8/20/2007	104.1	104.1	113.6	113.6	107.9	108.0	115.7	115.7	108.6	108.6	113.9	113.9	110.2	110.2	113.7	114.2	110.6	111.0
8/21/2007	103.9	103.9	113.6	113.6	108.0	107.9	115.4	115.4	109.4	109.4	114.5	114.5	109.7	109.7	114.8	115.3	111.9	112.0
8/22/2007	104.1	104.1	113.6	113.6	107.7	107.6	115.5	115.4	110.6	110.7	115.5	115.5	110.4	110.4	117.1	117.5	113.4	113.9
8/23/2007	104.9	104.9	113.6	113.6	107.3	107.2	115.9	115.8	110.5	111.0	115.4	115.7	111.2	111.2	116.8	117.2	114.2	114.7
8/24/2007	107.2	107.2	113.5	113.5	107.8	107.6	115.8	115.7	110.4	111.0	115.5	115.7	112.0	112.0	115.9	116.5	113.9	114.5
8/25/2007	107.3	107.3	113.8	113.8	107.7	107.7	115.8	115.8	110.0	110.2	114.8	114.8	112.0	112.0	115.2	115.8	112.9	113.4
8/26/2007	106.7	106.7	113.8	113.8	107.5	107.6	115.9	115.9	109.1	109.1	114.2	114.1	111.1	111.2	113.7	114.3	112.2	112.7
8/27/2007	105.4	105.4	113.7	113.7	106.9	106.9	115.3	115.3	108.8	108.7	114.1	114.1	109.9	110.1	113.8	114.3	111.5	111.8
8/28/2007	105.4	105.4	113.6	113.6	107.1	107.0	115.6	115.6	109.4	109.3	114.7	114.7	109.9	110.0	114.7	115.0	112.3	112.6
8/29/2007	105.4	105.4	113.7	113.7	108.6	108.2	115.8	115.8	109.4	109.3	114.7	114.6	111.1	111.1	115.5	116.0	113.1	113.6
8/30/2007	103.8	103.8	114.0	114.0	108.8	108.7	116.4	116.3	110.9	110.9	115.8	115.8	112.0	112.0	116.1	116.7	113.8	114.3
8/31/2007	104.3	104.3	115.8	115.9	108.1	108.2	115.9	115.9	111.0	111.0	115.7	115.7	112.0	112.0	115.5	116.0	112.9	113.3
TDG exceedances	5	5	0	0	0	0	11	26	0	3	0	0	3	4	0	2	14	37

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TABLE 6
GAGE SPECIFIC TDG EXCEEDANCE COMPARISON
HIGH 12 HOUR AVERAGES

	LWG		LWG		LGS		LGS		LMN		LMN	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER	
	A	B	A	B	A	B	A	B	A	B	A	B
TDG exceedances	0	0	0	0	0	0	0	0	8	5	0	26
Maximum TDG level	105.0	105.0	111.0	111.0	110.8	110.8	118.6	119.4	117.1	117.3	118.5	120.2
Minimum TDG level	98.7	98.7	105.0	105.8	99.3	99.3	106.4	106.1	100.2	100.2	108.9	108.9
Average TDG level	101.9	101.9	109.7	109.7	107.6	107.6	112.6	112.8	111.1	111.2	115.0	116.7
	IHR		IHR		MCN		MCN		JDA		JDA	
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY		TAILWATER	
	A	B	A	B	A	B	A	B	A	B	A	B
TDG exceedances	8	67	0	0	5	5	0	0	0	1	11	26
Maximum TDG level	116.6	120.4	118.0	118.0	117.3	117.3	116.7	116.8	111.8	111.8	120.5	122.0
Minimum TDG level	101.8	102.0	113.3	113.5	102.9	102.9	113.2	113.2	104.6	104.5	115.3	115.3
Average TDG level	111.9	113.4	114.4	114.6	109.5	109.5	115.0	115.0	107.7	107.8	117.8	118.1
	TDA		TDA		BON		BON		CWMW			
	FOREBAY		TAILWATER		FOREBAY		TAILWATER		FOREBAY			
	A	B	A	B	A	B	A	B	A	B		
TDG exceedances	0	3	0	0	3	4	0	2	14	37		
Maximum TDG level	114.4	116.1	118.6	119.3	115.6	116.2	118.8	120.6	116.5	117.5		
Minimum TDG level	107.0	107.1	113.3	113.3	106.4	106.4	113.7	114.3	109.2	109.3		
Average TDG level	110.8	111.2	115.7	116.0	111.3	111.2	117.1	117.7	113.4	114.0		

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TABLE 7
TDG EXCEEDANCE SUMMARY STATISTICS
HIGH 12 HOUR AVERAGES

Parameter	Scenario A	Scenario B	Difference
Forebay TDG exceedance on Snake River	16	75	59
Forebay TDG exceedance on Columbia River	22	49	27
Tailwater TDG exceedance Snake River	0	26	26
Tailwater TDG exceedance Columbia River	11	28	17
Total Forebay exceedance	38	124	86
Total Tailwater exceedance	11	54	43
Grand total # of TDG exceedances	49	178	129
Maximum forebay % TDG	117.3	120.4	3.1
Minimum forebay % TDG	98.7	98.7	0.0
Average forebay % TDG	109.5	109.6	0.1
Maximum tailwater % TDG	120.5	122.0	1.5
Minimum tailwater % TDG	105.0	105.8	0.8
Average tailwater % TDG	114.7	115.1	0.4

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FIGURE 1

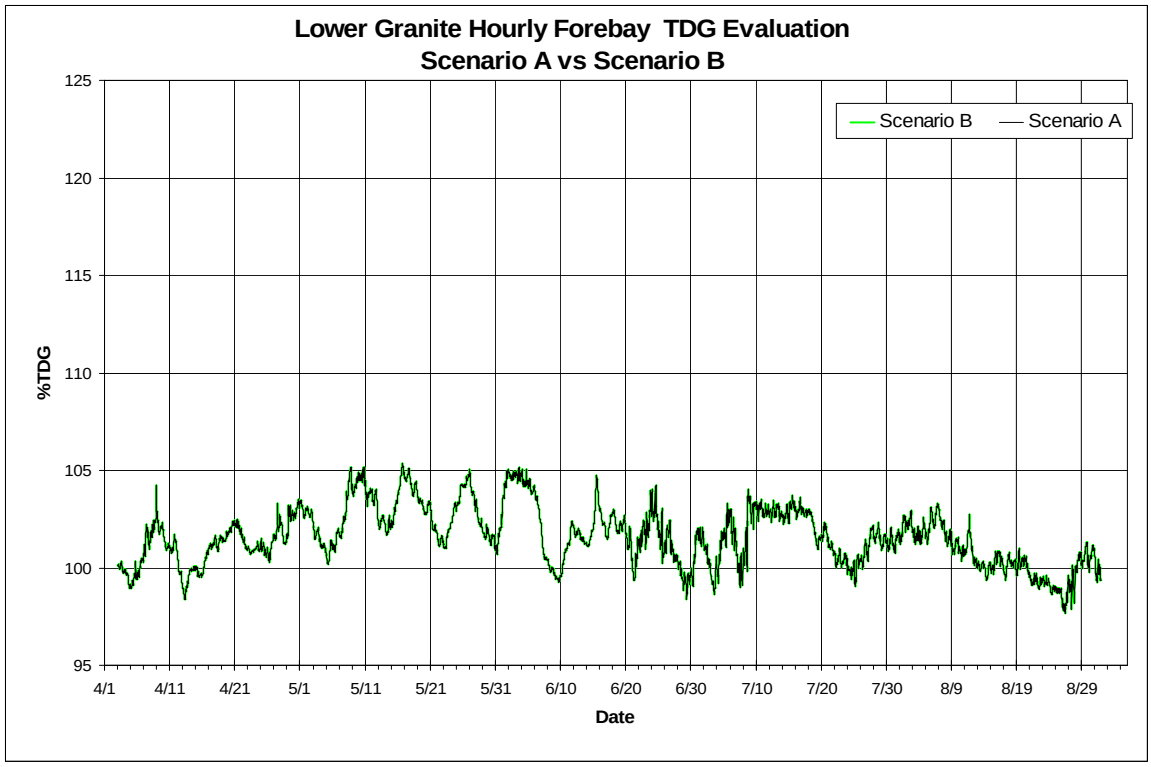

FIGURE 2

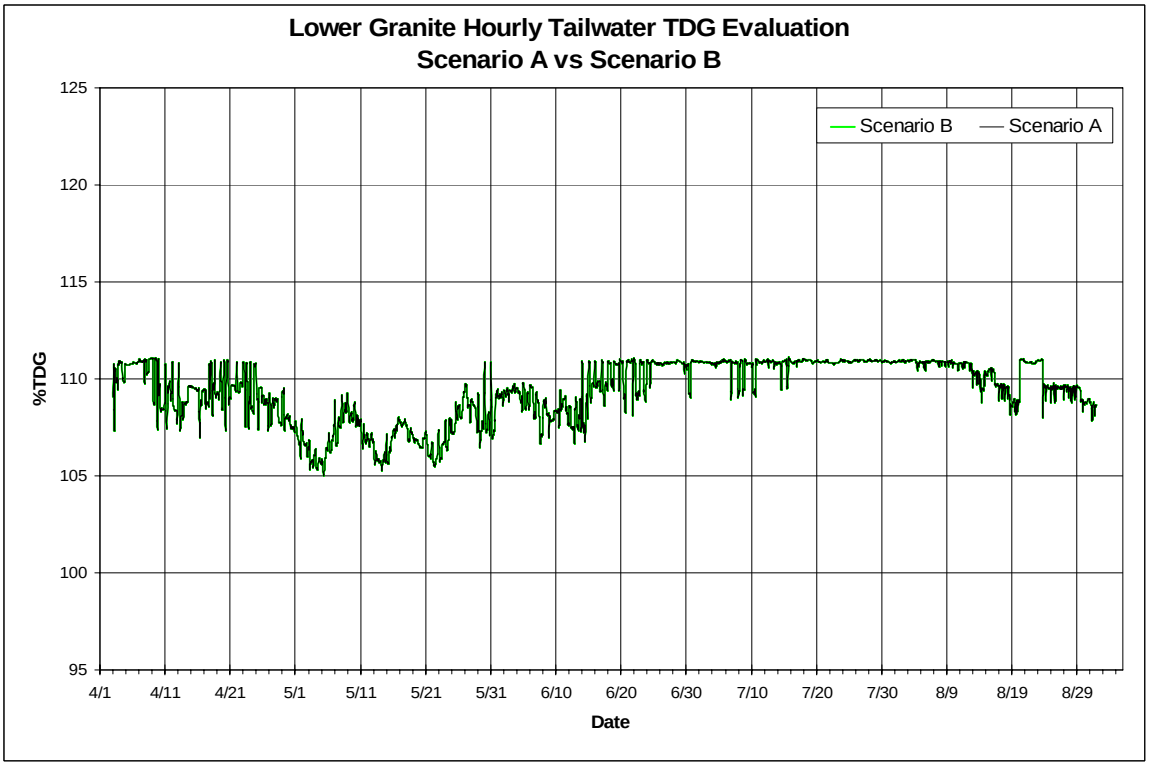

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FIGURE 3

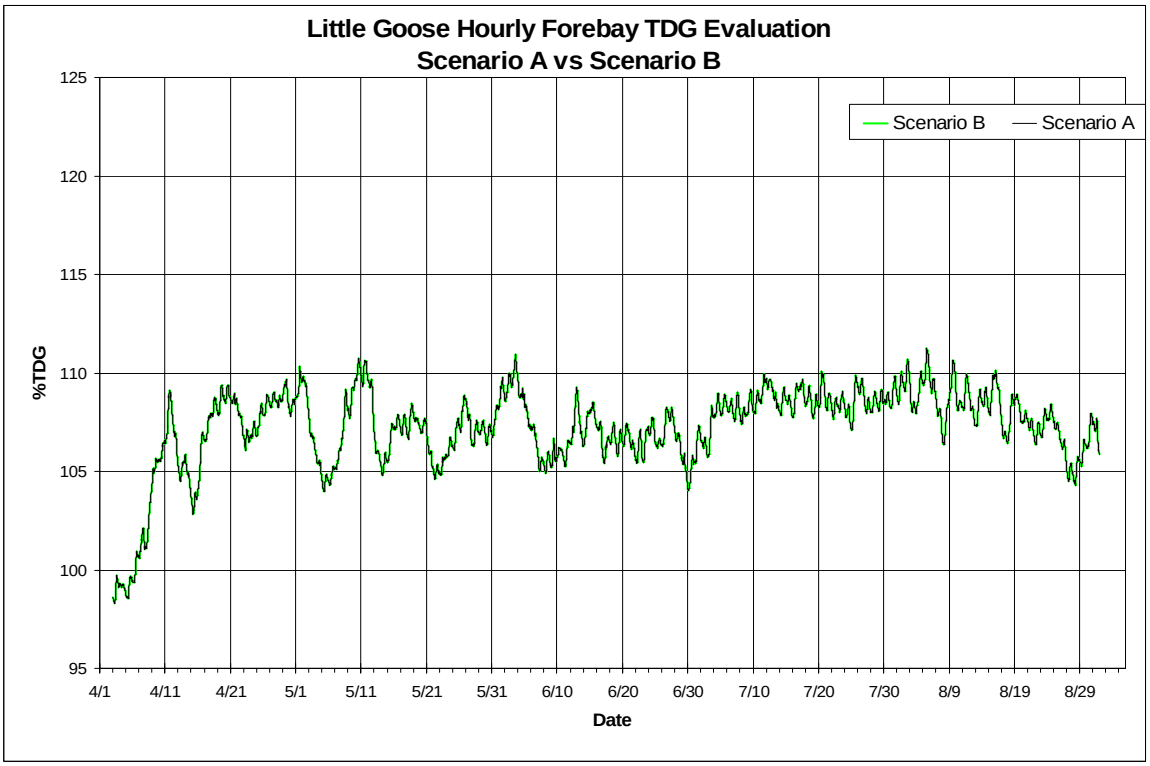

FIGURE 4

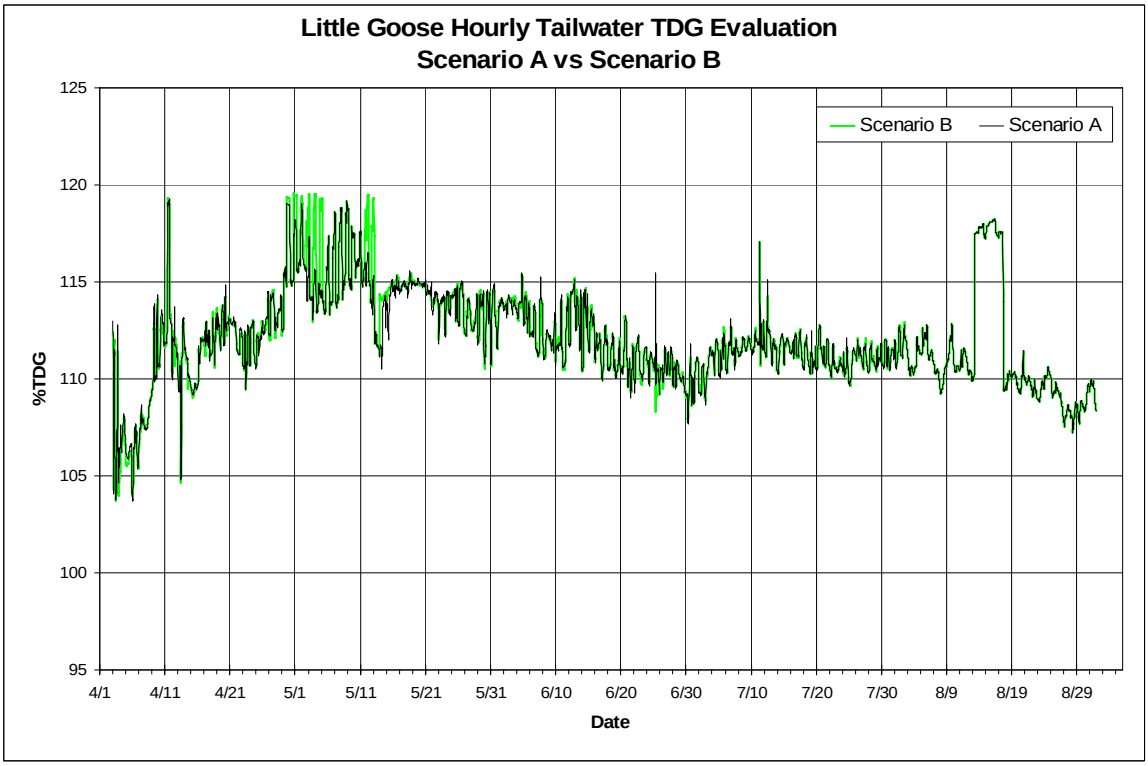

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FIGURE 5

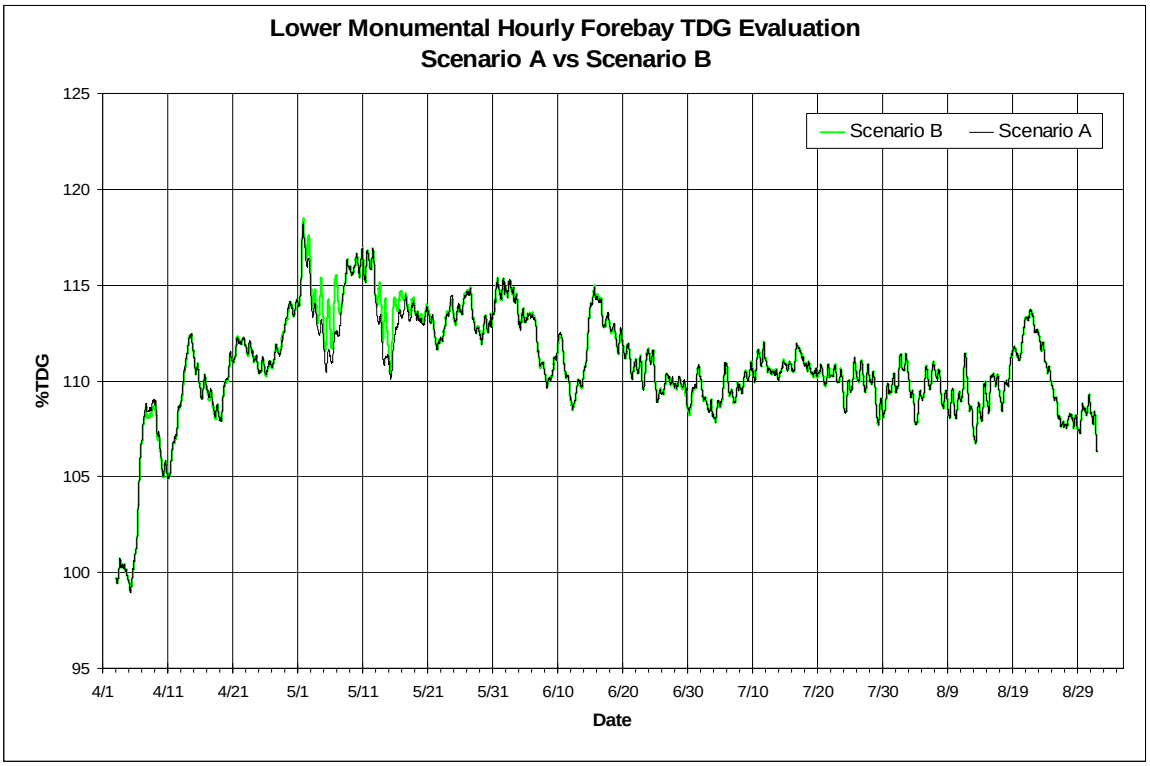

FIGURE 6

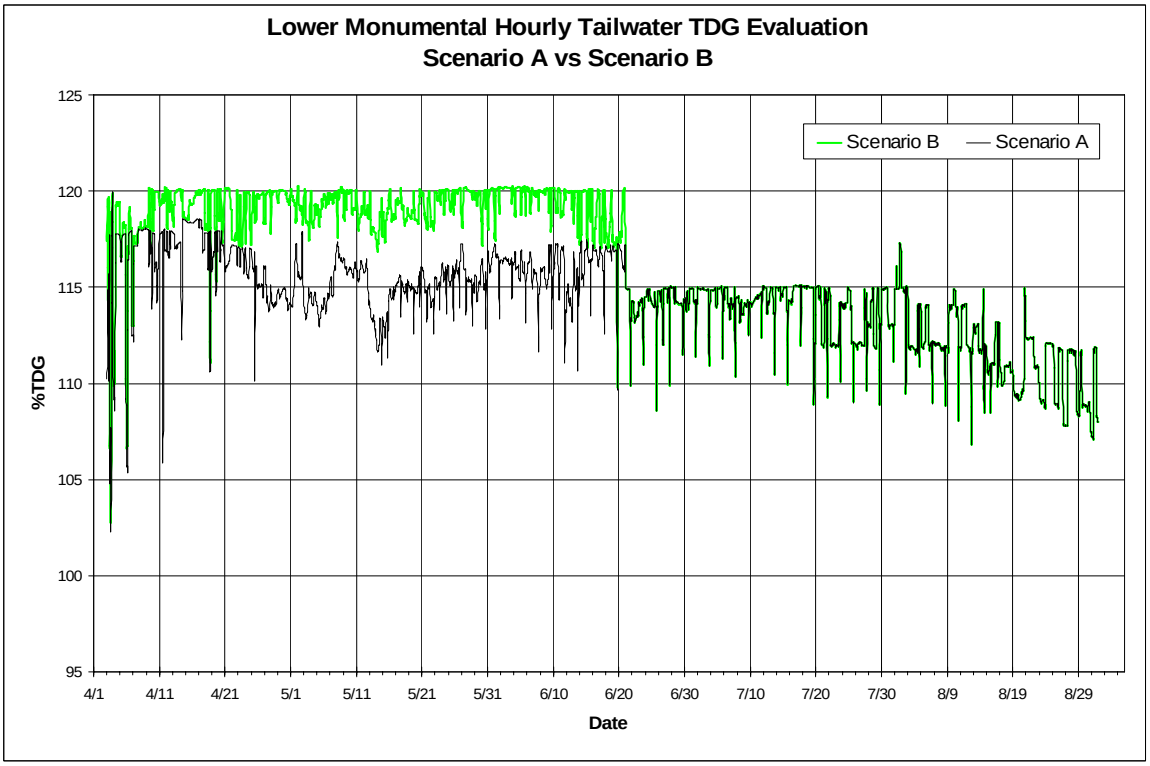

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FIGURE 7

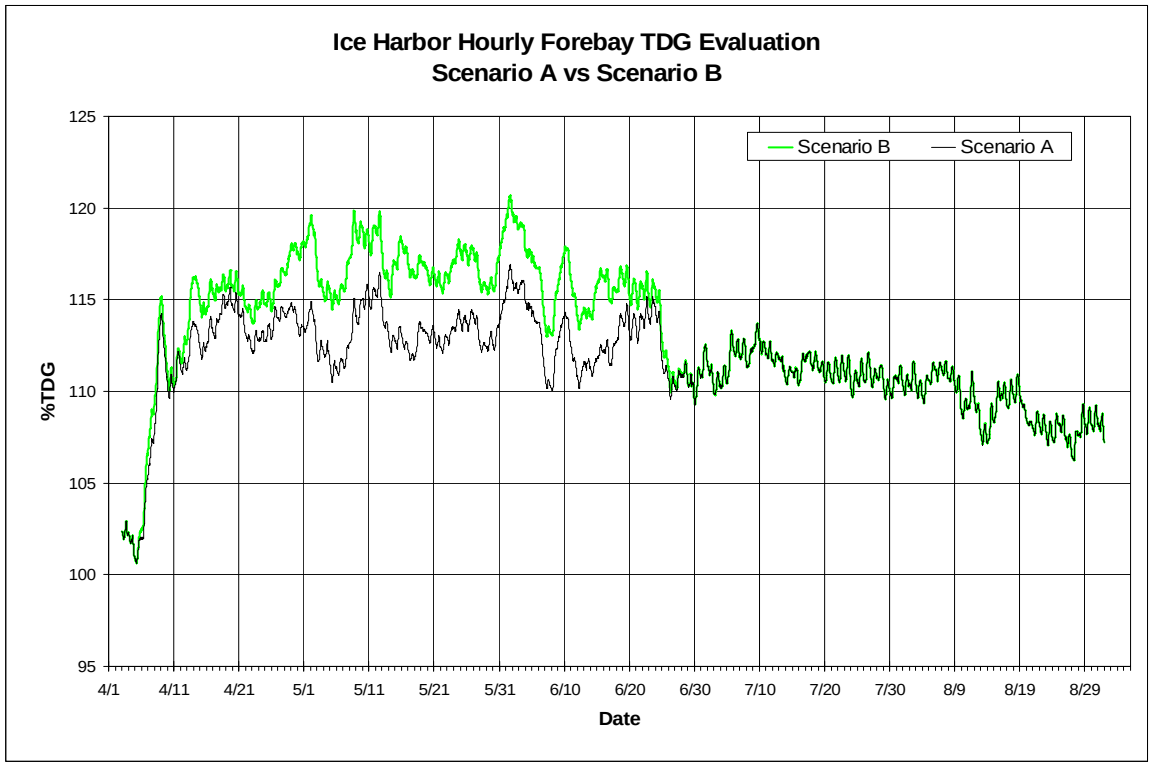

FIGURE 8

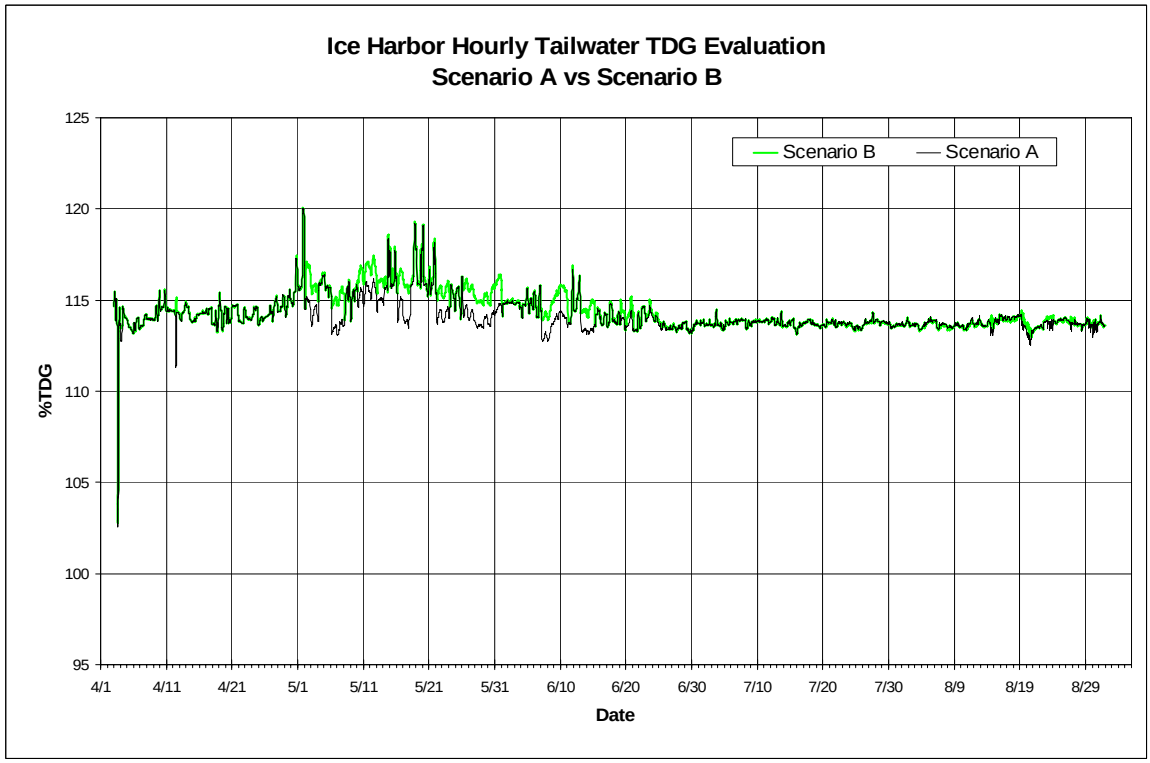

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FIGURE 9

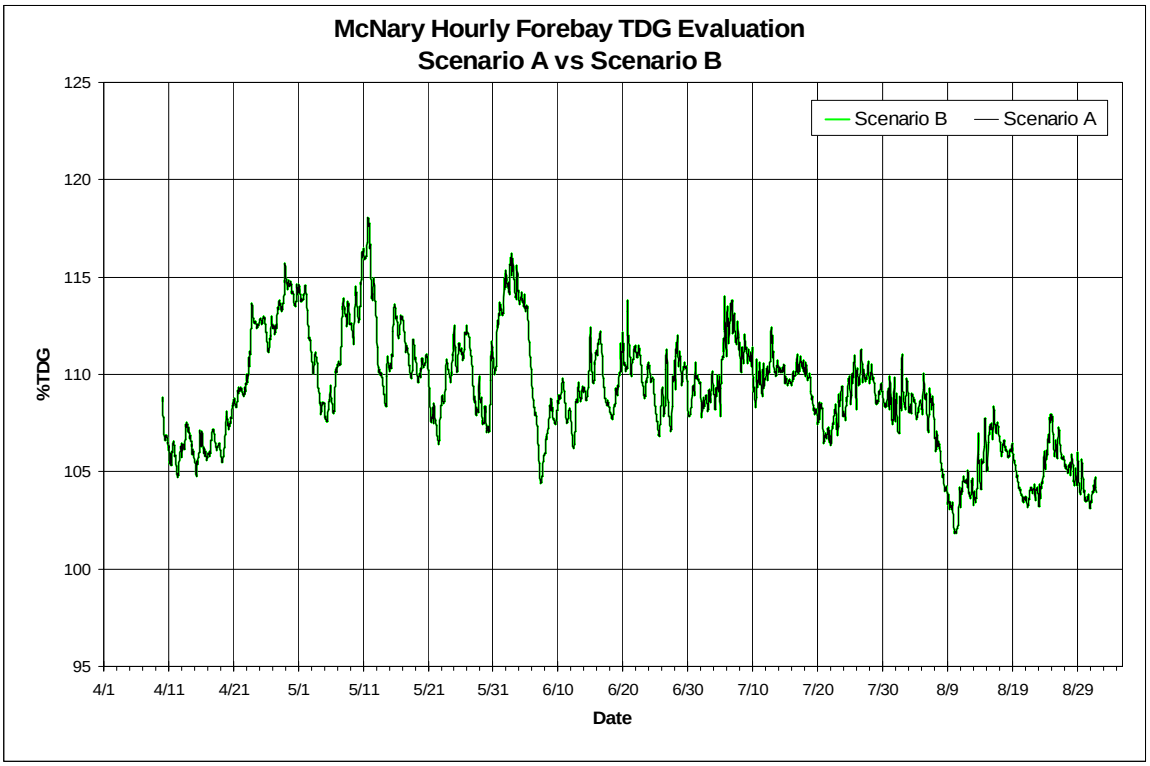

FIGURE 10

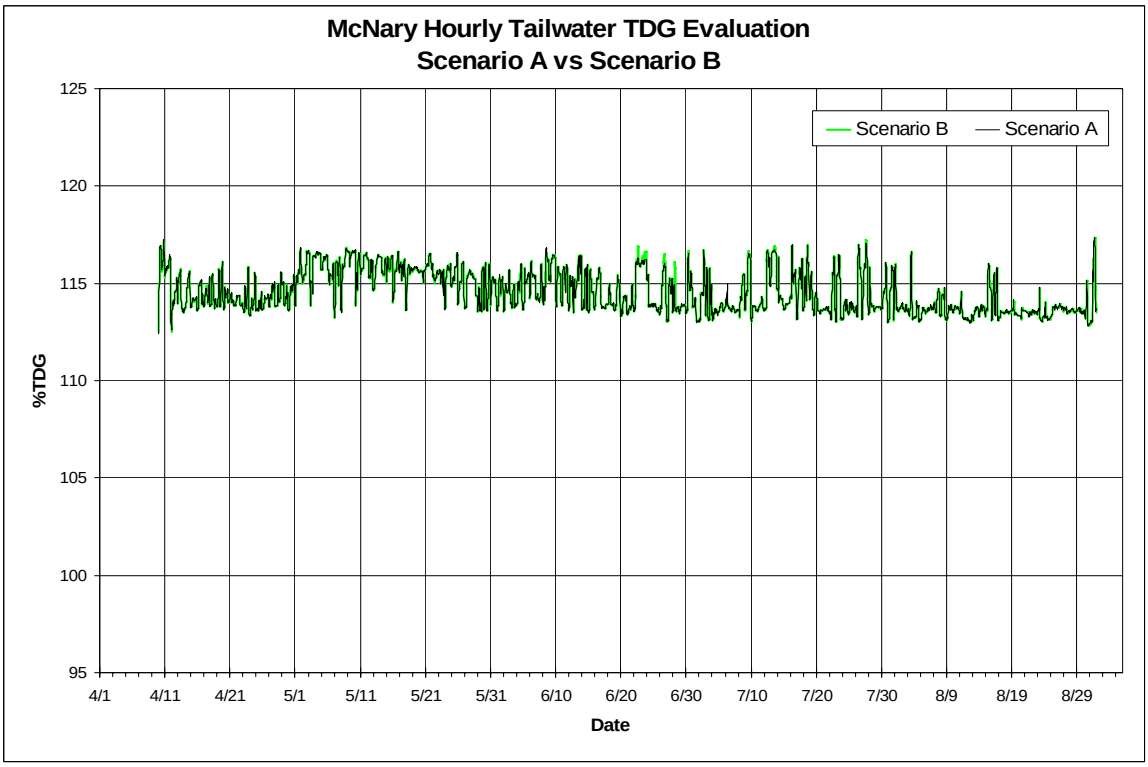

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FIGURE 11

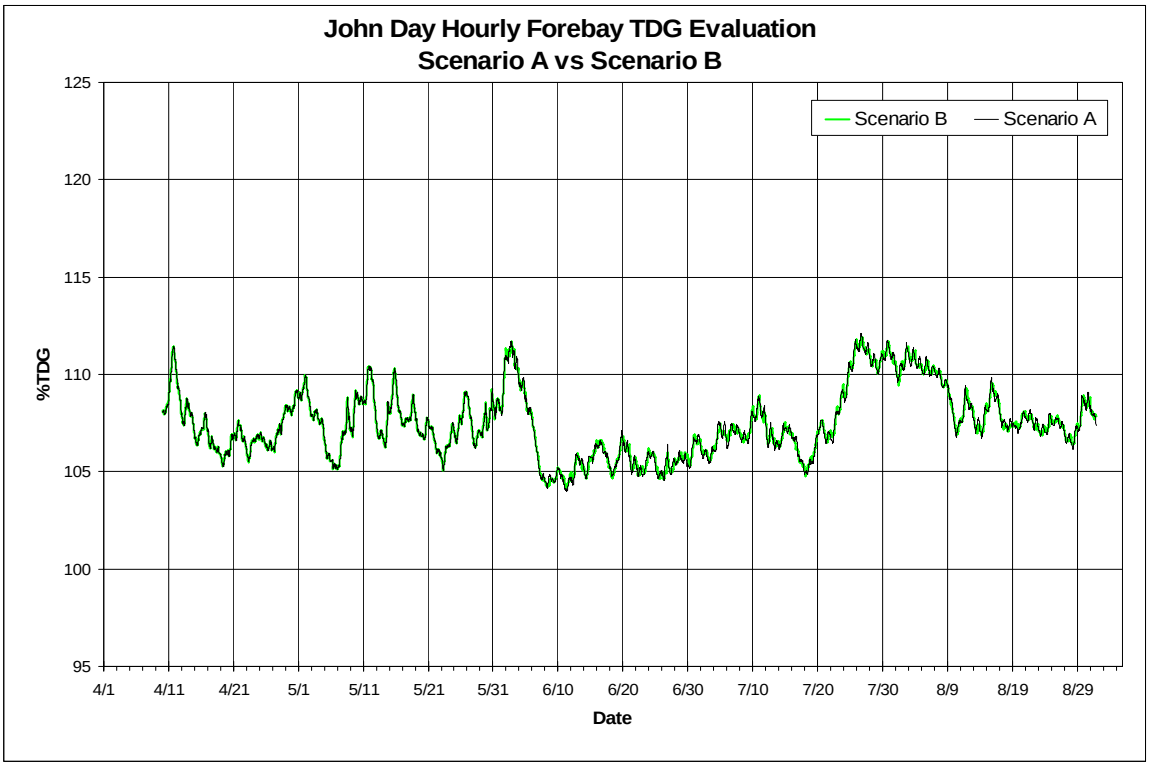

FIGURE 12

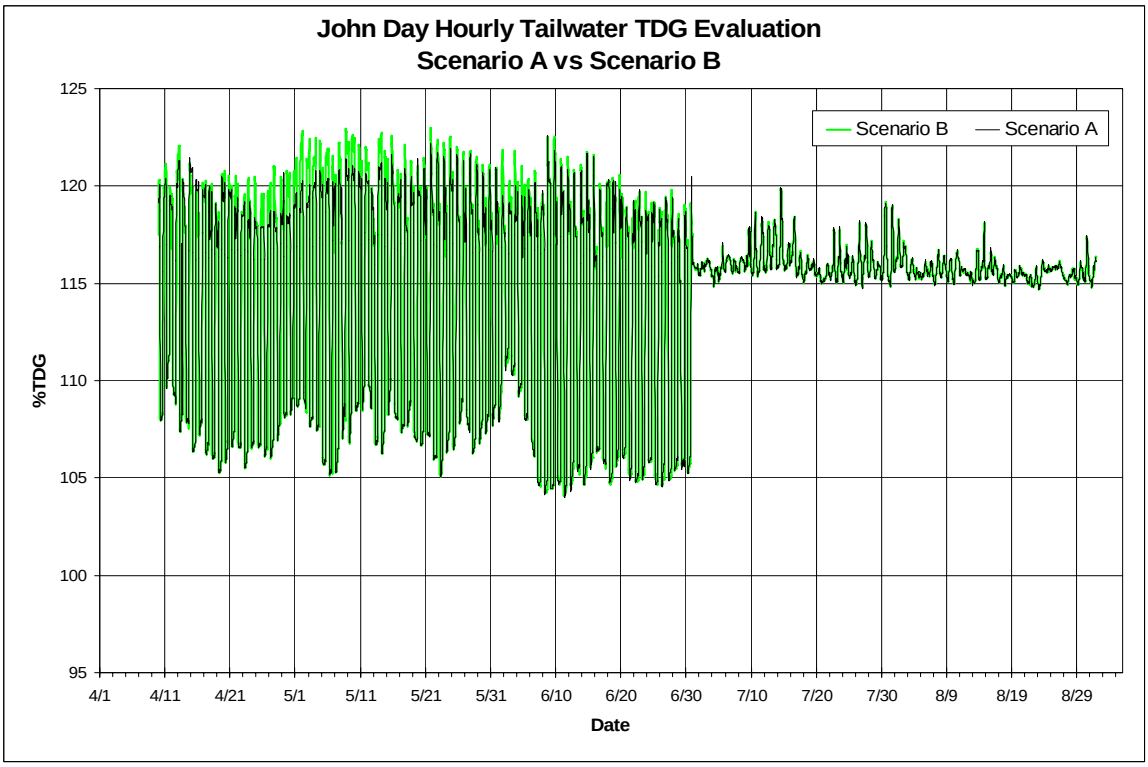

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FIGURE 13

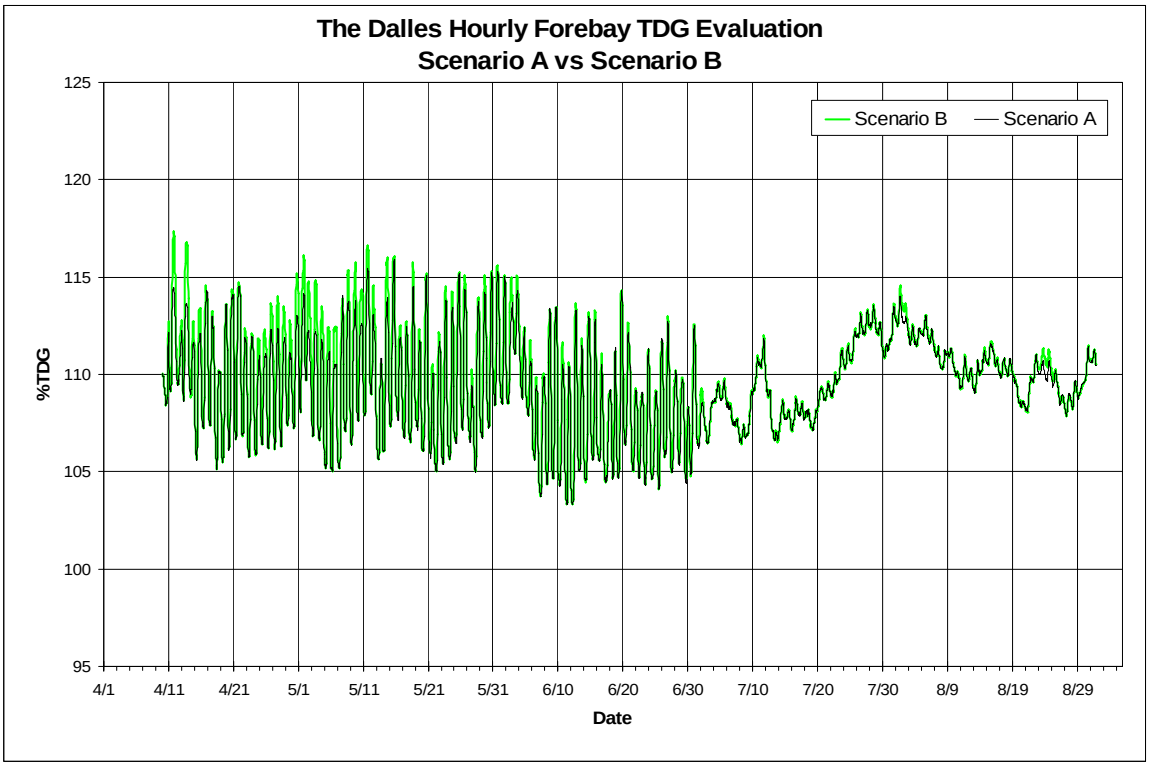

FIGURE 14

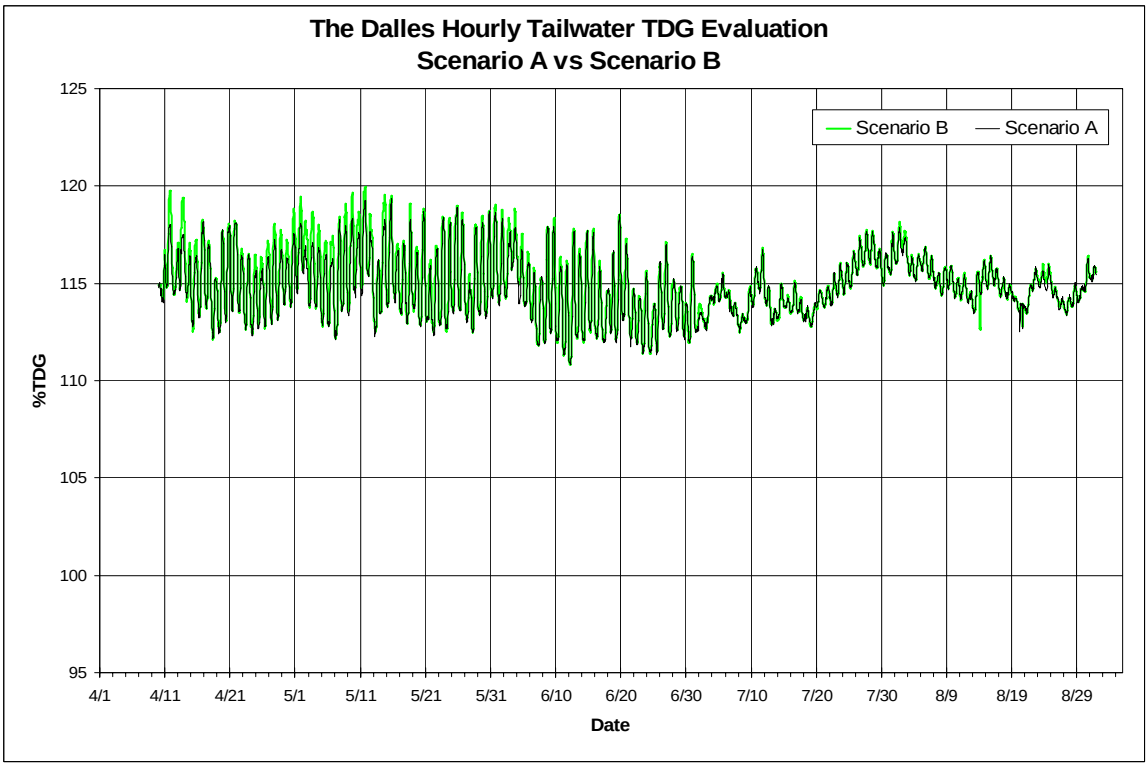

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FIGURE 15

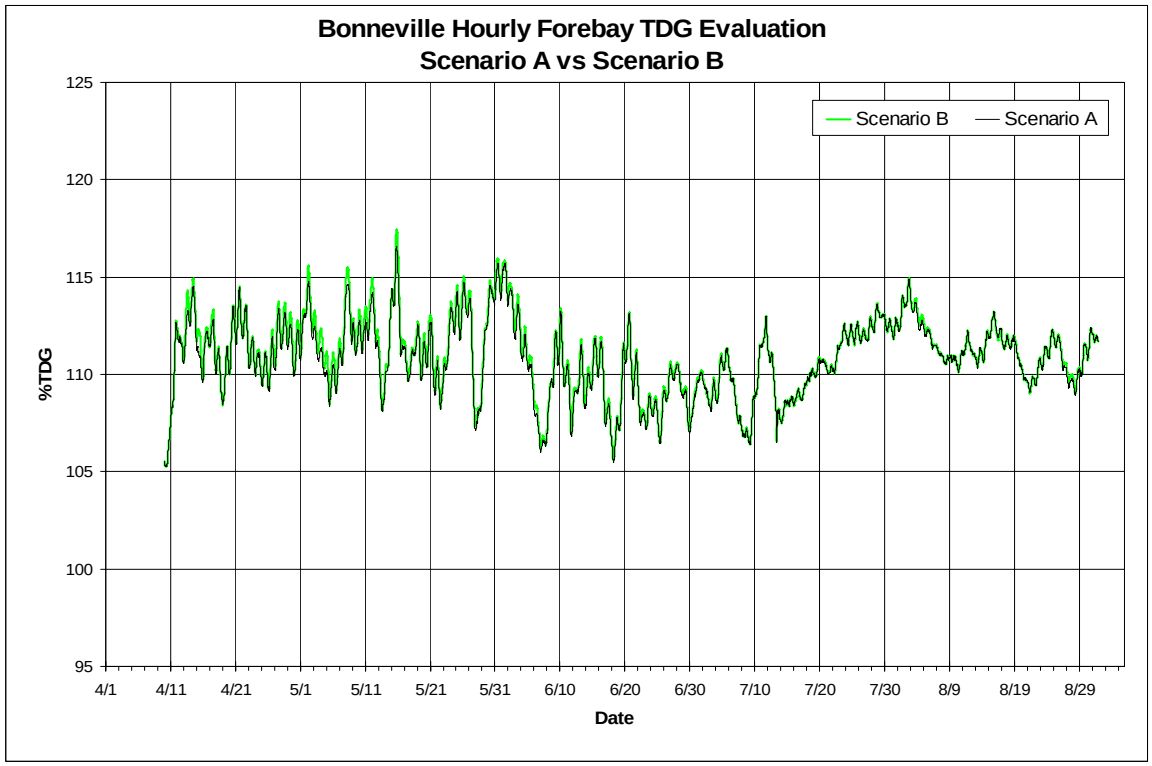
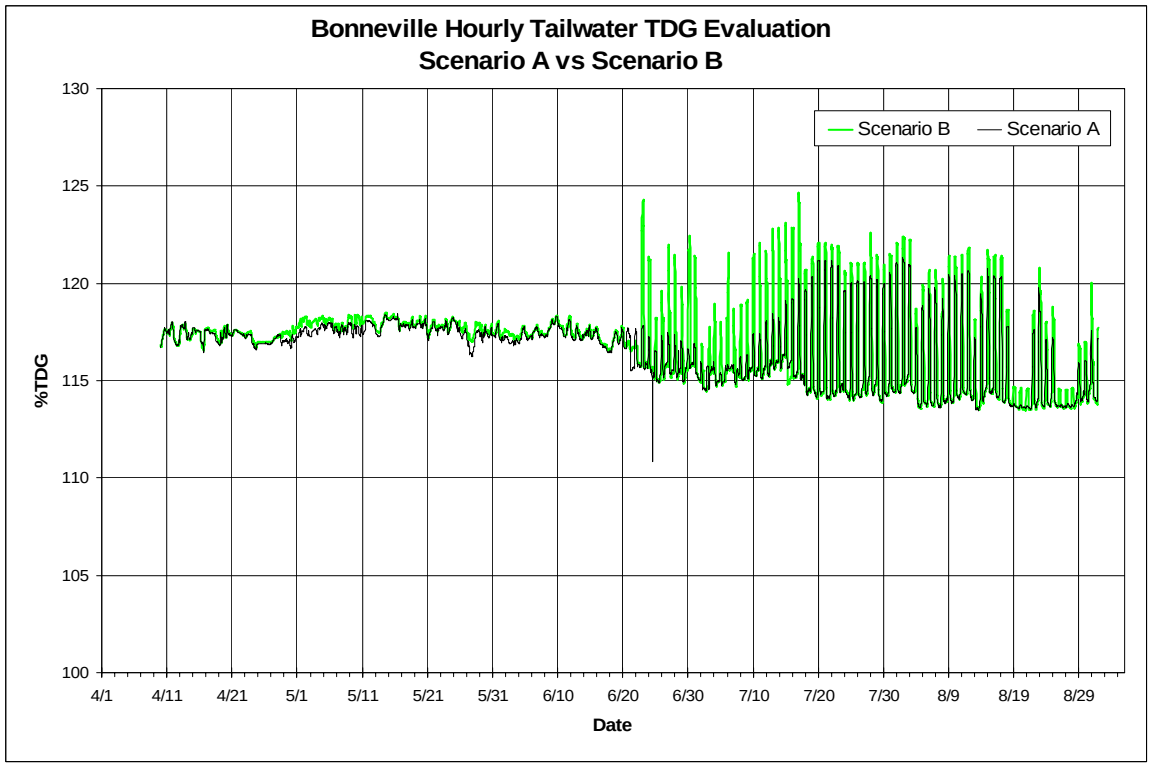


FIGURE 16



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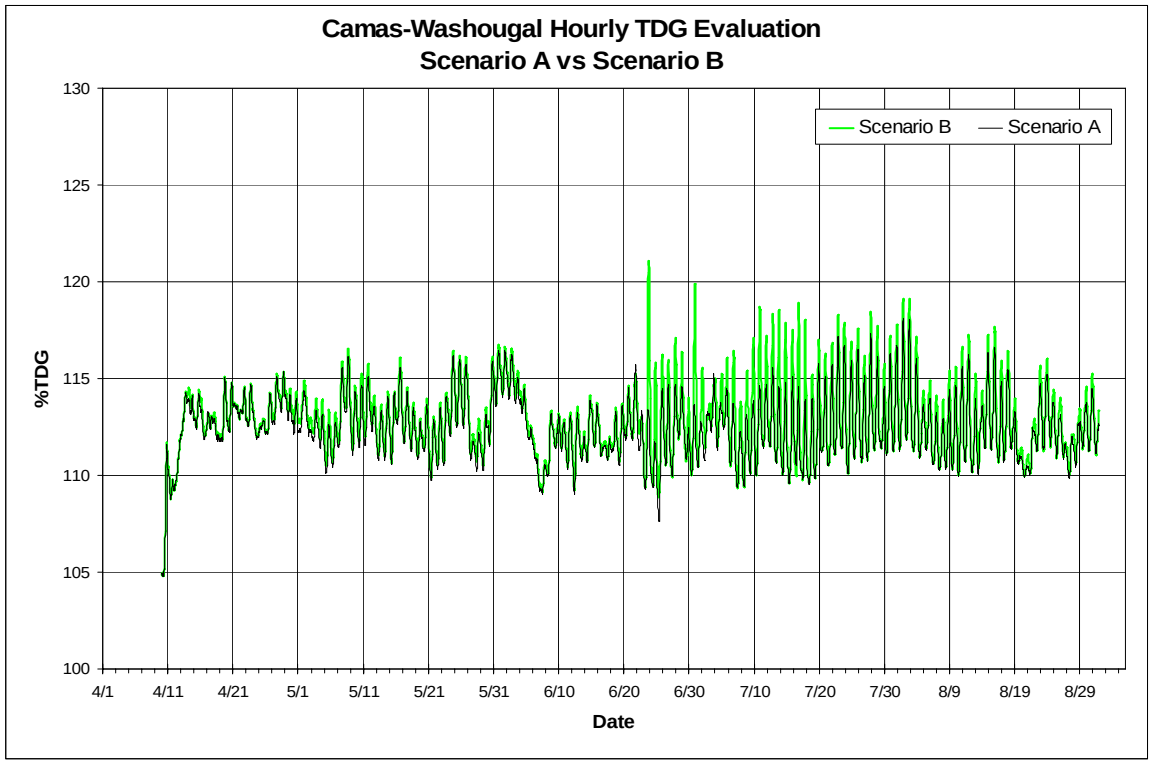
FIGURE 17