April 20, 2011

Lorna Ellestad
Project Manager
Skagit County Public Works Department
1800 Continental Place
Mount Vernon, WA 98273

Dear Ms Ellestad,

Thank you for the opportunity to attend PSE's Aquatic Resources Group meeting (by videoconference in January, and in person in March) to hear Tetra Tech's briefing on the Article 107(c) imminent flood drawdown analysis. The following are my comments related to this analysis.

References:
1) PDF file entitled Jan2011ARG_v3.pdf
2) PDF file entitled 4Mar2011ARG_v4.pdf

General comment: The analysis performed so far by Tetra Tech assumes 5,000 cfs outflow from Upper Baker and the natural inflow to Lower Baker will always combine to produce the minimum Project outflow. This underlying assumption of continuous minimum outflow is not consistent with the purpose of drawing down the reservoirs in advance of a flood event. The purpose of drawing down the reservoirs in advance of a Skagit River flood is to reduce Project outflow from Lower Baker Dam to zero in the critical few hours prior to and following the Skagit flood peak at Concrete. For this analysis, the duration of the "critical few hours" should be defined as 10 hours before the Skagit regulated flood peak at Concrete, to 10 hours after the Skagit regulated flood peak at Concrete. As you know, in the matter of drawing down the reservoirs in advance of a Skagit flood, the concept was to achieve a result similar to the October, 2003 flood event. During that event, PSE would have achieved zero project outflow during the Skagit flood peak if not for debris blocking one of the spill gates.

The Tetra Tech analysis conducted so far assumes 1) the project is required to be operated in accordance with the current water control manual; and 2) interprets the manual as requiring continuous 5,000 cfs outflow from Upper Baker into Lower Baker and also interprets the manual as requiring all Lower Baker natural inflow to be passed through.

Below are relevant excerpts from the manual. The first excerpt, from Chapter 7, applies to Upper Baker. The second excerpt, also from Chapter 7, applies to Lower Baker:

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i. Minimum Discharge. When an OFCN is issued, instructions will be issued to immediately establish the minimum discharge at Upper Baker. The minimum discharge will be maintained until it is cancelled by the NWS-RCC or higher discharges are required by the Special Gate Regulation Schedule, reference section 7.03. A mandatory minimum discharge at Upper Baker of 141.58 m^3/s (5,000 cfs) is required to help extend the available flood control storage in Baker Lake. The minimum discharge should be set as close to the 141.58 m^3/s (5,000 cfs) value as possible. If the powerhouse is unable to release the entire minimum discharge, the remaining amount must be released through the spillways.

o. Lower Baker Operation. Lower Baker is not required to provide any part of the 9,127.90 ha-m (74,000 AF) of flood control storage for the Baker River Project. The following operations at Lower Baker are essential during official flood control events to avoid interfering with the flood control regulation at Upper Baker:

- Puget must avoid drafting Lower Baker storage during a flood event to avoid increasing flood discharges in the Skagit River unnecessarily.
- Lower Baker should be scheduled to pass inflow and any releases from Upper Baker in a timely manner to avoid interference with the Corps' Upper Baker regulation plan and to avoid unnecessary storage in Lower Baker.
- If Lower Baker threatens to overfill, Puget must coordinate with NWS-RCC prior to completing any gate operation.

The current water control manual mandatory requirement to continuously release 5,000 cfs from Upper Baker, and recommendation to pass inflow from Lower Baker, is based on flood control operations assuming no more than 74,000 acre-feet of flood storage in Upper Baker will be available. The mandatory language in the water control manual is a tacit acknowledgement that 74,000 acre-feet of flood storage is inadequate to reduce project outflow to zero during a large Skagit basin flood event. An August 2004 study completed for Skagit County by Pacific International Engineering (attached) indicated 140,000 acre-feet of storage was needed in the Baker

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system to capture its own 100-year event. This 140,000 acre-foot goal is the reason for the target reservoir elevations incorporated into the settlement agreement, paragraphs 4.1.1 and 4.1.2 (the target elevations represent flood storage of about 140,000 acre-feet). The flood control provisions in license article 107(c) were agreed to by Skagit County with the expectation that additional study would enable advance drawdown protocols to be included in the water control manual to achieve additional flood storage and then operate the reservoirs to minimize outflow during the Skagit flood peak.

By way of review, License article 107(c) states:

> Licensee shall consult with the ARG (Aquatics Resources Group), and specifically Skagit County and the Corps of Engineers, to develop means and operational methods to operate the Project reservoirs in a manner addressing imminent flood events and consistent with the requirements of the license. Appropriate means and methods may include, without limitation, additional reservoir drawdown below the maximum established flood pool. Licensee shall submit a report to the Commission within three years following license issuance describing any operational changes developed as a result of this consultation.

Because the water control manual does not envision a protocol for drawing down the Baker reservoirs below the regulatory flood pool elevations in advance of a flood event, it does not make sense to conduct this 107(c) analysis utilizing the "constraints" of the current water control manual as the "input" to the analysis. The concept is to first determine whether alternative operations could produce a beneficial peak flow reduction in the Skagit river; and, if so, modify the water control manual to incorporate the beneficial operating procedures. In other words, this analysis will drive modifications to the water control manual, not the other way around. In order for this to occur, the analysis being conducted by Tetra Tech cannot limit itself at the outset to artificial water control manual restrictions (i.e., 5,000 cfs minimum outflow from Upper Baker, and Lower Baker passing inflow).

The following comments apply to the January 11, 2011 technical briefing document:

1. Slide #4 of 55, Study Objectives: Add a second bullet to the first objective, "Maximum flood benefits = zero Project outflow 10 hours before and 10 hours after the Skagit regulated flood peak at Concrete."

2. Slide #6 of 55, Study Objectives: Add an additional bullet after the second bullet, "Can the Project be operated in a way that will help retain natural flood storage in the downstream Nookachamps basin?" (Note: this can be done if the Skagit flow is maintained below 57,000 cfs)

3. Slide # 12 of 55, Inflow Hydrographs: this is a good and useful graphic. Conveys a lot of information relevant to the analysis. As do the graphics on slides #7 and #8. It would be useful to "stretch out" the interval shown so that it is easier to estimate the timing differences of the flood peaks of the various basins. The graphic could start, for example, on 10/18 and then go until 10/24. It also might be helpful to show a vertical line representing the timing of the Skagit peak flow at Concrete.

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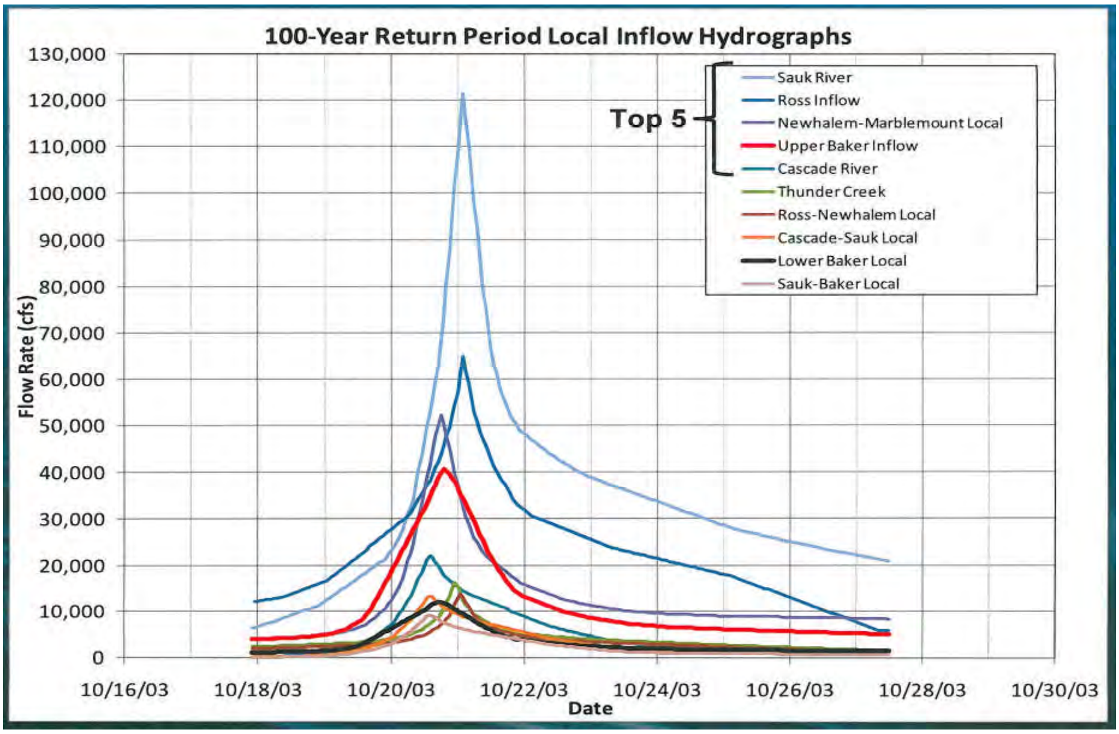
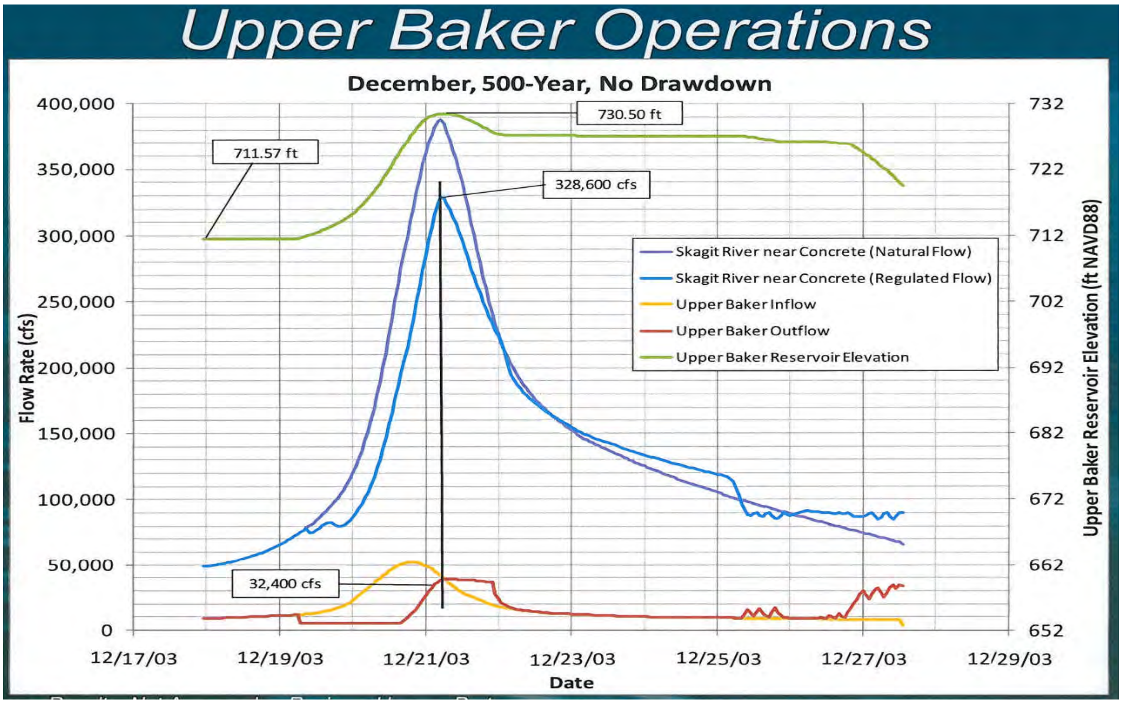


4. Slide #13 of 55, Analytical Periods: It would be nice to simplify this. One way that the analysis could be simplified would be emphasize Lower Baker, as that will focus the analysis more on the constraints that affect releases from Lower Baker. Of course the Upper Baker storage is very important, but the real issue is outflow from Lower Baker.

5. Slide #22 of 55, Upper Baker 500-year Ops: It is not clear to me what the 32,400 cfs annotation applies to. It appears to indicate the outflow of Upper Baker at the Skagit flood peak; however, it appears that outflow would be about 38,000 cfs from the graphic.



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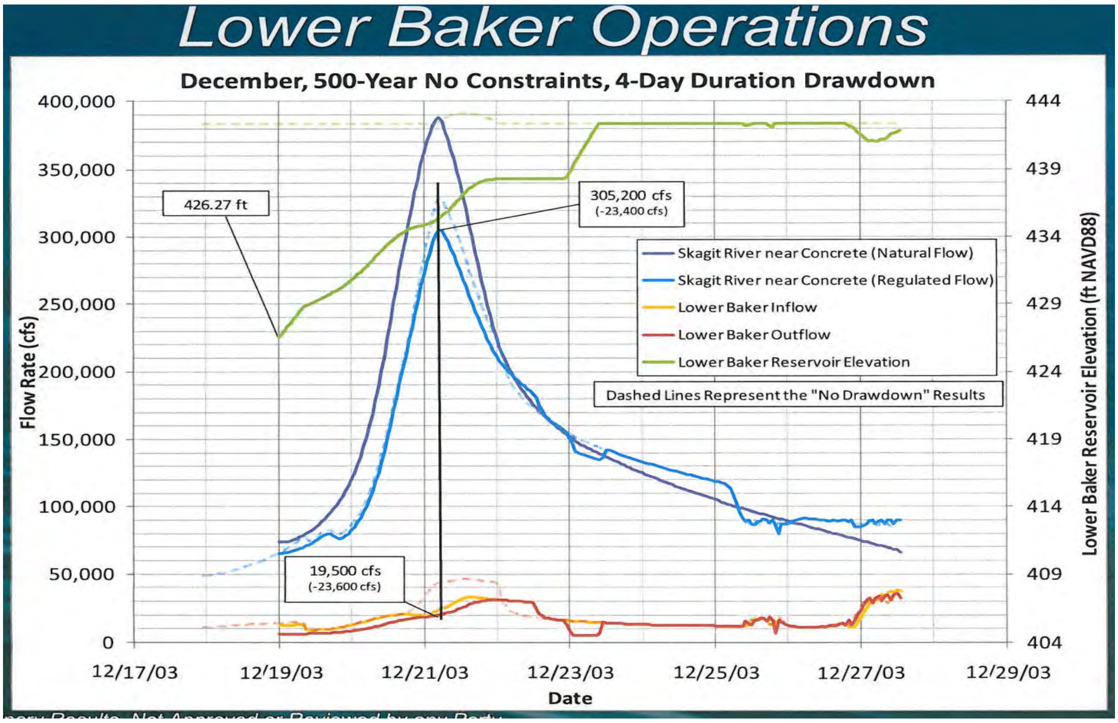
6. Slide #23 of 55, Lower Baker 500-year Ops: is this right? If the 500-year inflow to Lower Baker from Upper Baker, at the time of the Skagit flood peak, is about 38,000 cfs, it seems like the inflow from Lower Baker's basin would be 12,000 cfs or more at the same time, for a total closer to 50,000 cfs.

7. Slide #25 of 55, Lower Baker 500-year Ops: although it would not make much downstream difference in a flood of this magnitude, I would note that Lower Baker could still be used to reduce the Skagit peak by another 10,000 cfs or so, because the reservoir would still have some small amount of storage available prior to the Skagit flood peak and Concrete. This could be done by monitoring the flood peak on the Sauk above Whitechuck gage, as well as the Sauk gage, and then reducing outflow from Lower Baker shortly after the Sauk above Whitechuck gage crests, if it looks like the Sauk gage is rate of increase is slowing. There is an art to this but it can be done.



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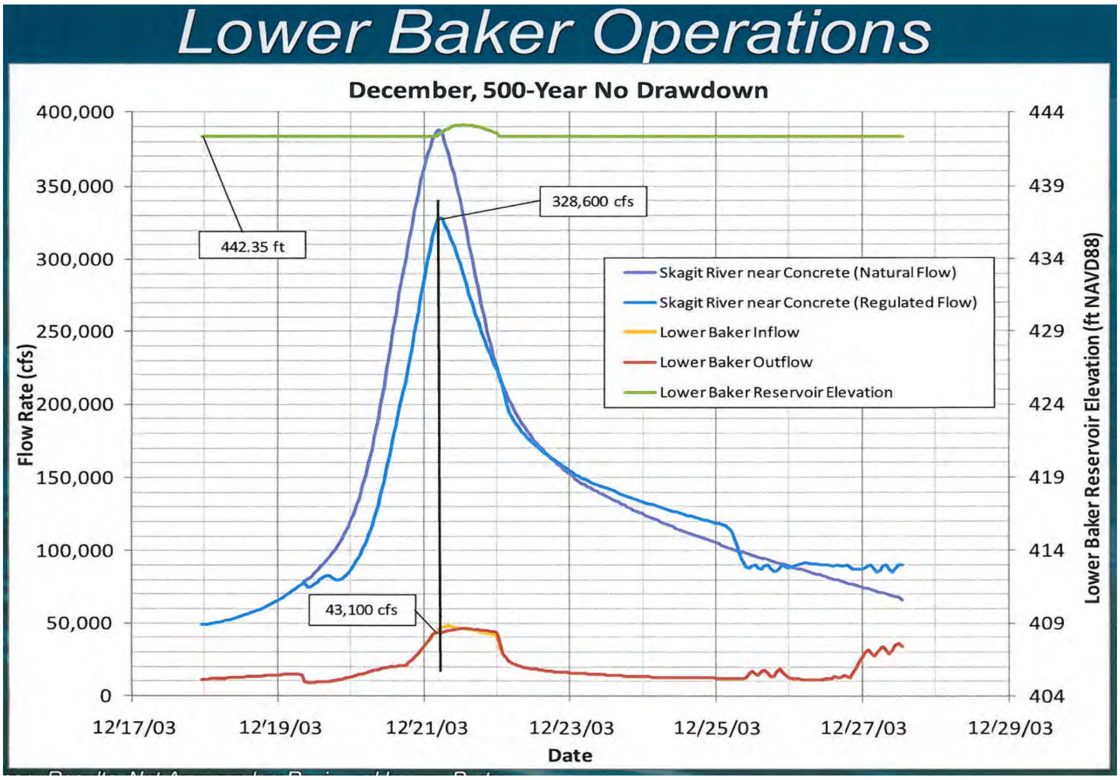

8. Slides #26-33, Antecedent Conditions: concur with this approach.

9. Slide #40 of 55: This slide is difficult to understand. I think I understand that under dry antecedent conditions, it would be possible to achieve about 93,000 acre-feet of flood storage in Upper Baker, subject to license constraints as you have defined them (and lower amounts for wetter precedent conditions)?

10. Slide #41 of 55: This slide is also difficult to understand. But I think it points out the difficulty of drawing down Lower Baker below the spillway?

11. Slide #42 of 55: under the last bullet, include a sub-bullet stating: “i.e., continuous Upper Baker generation of 5,000 cfs”

12. Slide #43 of 55: This slide is deceptive and should be changed. The change is: add a center sub-column in each of the main columns for 4-day drawdown and 4-day alternative drawdown, entitled “Project Outflow” and include those numbers in the center column for each drawdown scenario.

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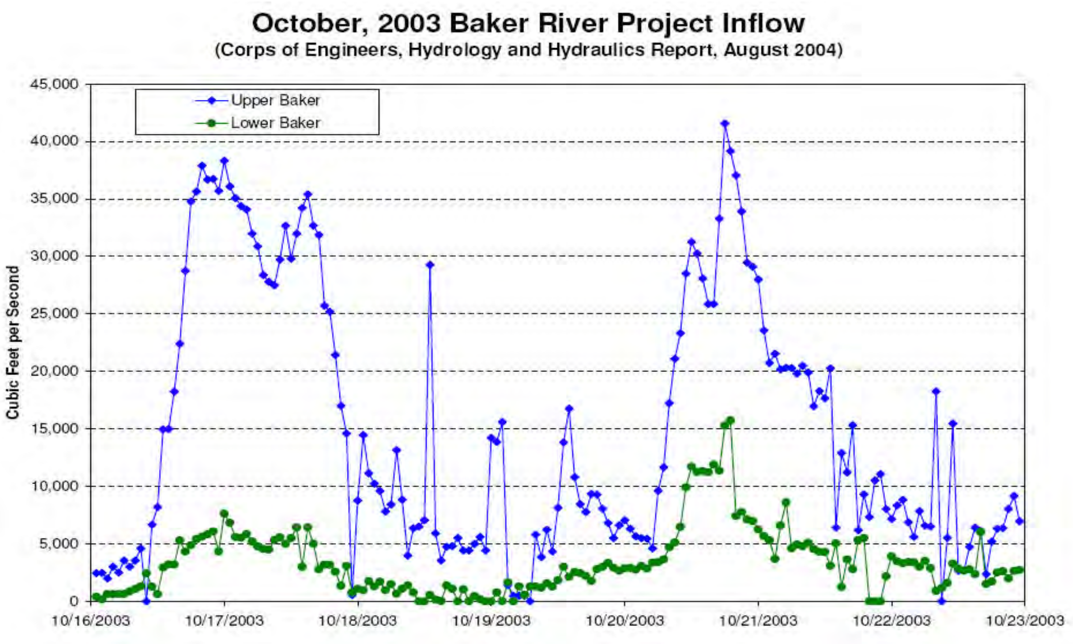
Results – Flood Analysis Post-IPP

Comparison of Skagit River near Concrete Regulated Peak Flow R
No Drawdown vs. Drawdown
December Dry Antecedent

Flood Event Return Period	No Drawdown	4-Day Duration License Permitted Drawdown		4-Day Duration Alternative Operation Drawdown	
(yrs)	Peak Flow (cfs)	Peak Flow (cfs)	Delta (cfs)	Peak Flow (cfs)	Additional Delta (cfs)
5	103,500	103,500	-	103,100	400
10	128,400	128,400	-	128,300	100
25	167,200	167,200	-	166,900	300
50	186,800	186,800	-	186,800	-
75	210,800	210,600	200	210,600	-
100	223,000	222,700	300	222,700	-
250	279,400	270,900	8,500	270,800	100
500	328,600	311,100	17,500	305,200	5,900

13. Slides #48 and 49: These two slides are very important and key to the analysis. Of note is the fact that Lower Baker releases approximately 14,000 cfs into the Skagit flood peak, while significant storage is still available in Lower Baker reservoir. Side note: I assume 14,000 cfs represents 5,000 cfs inflow from Upper Baker and 9,000 cfs natural inflow into Lower Baker. This seems low for a 100-year flood event. Below is the graphic showing inflow during the double pump October 2003 flood, generally considered to be about a 30 year event for the Skagit:



Note Lower Baker inflow for this flood was about 5,000 cfs or a little more at the time of the Skagit flood peak, with Upper Baker inflow at about 20,000 cfs or higher.

My rough calculations indicate that approximately 10 hours of storage would be available at the Lower Baker inflow rates for the “post IPP constraints” scenario if the project outflow was reduced to

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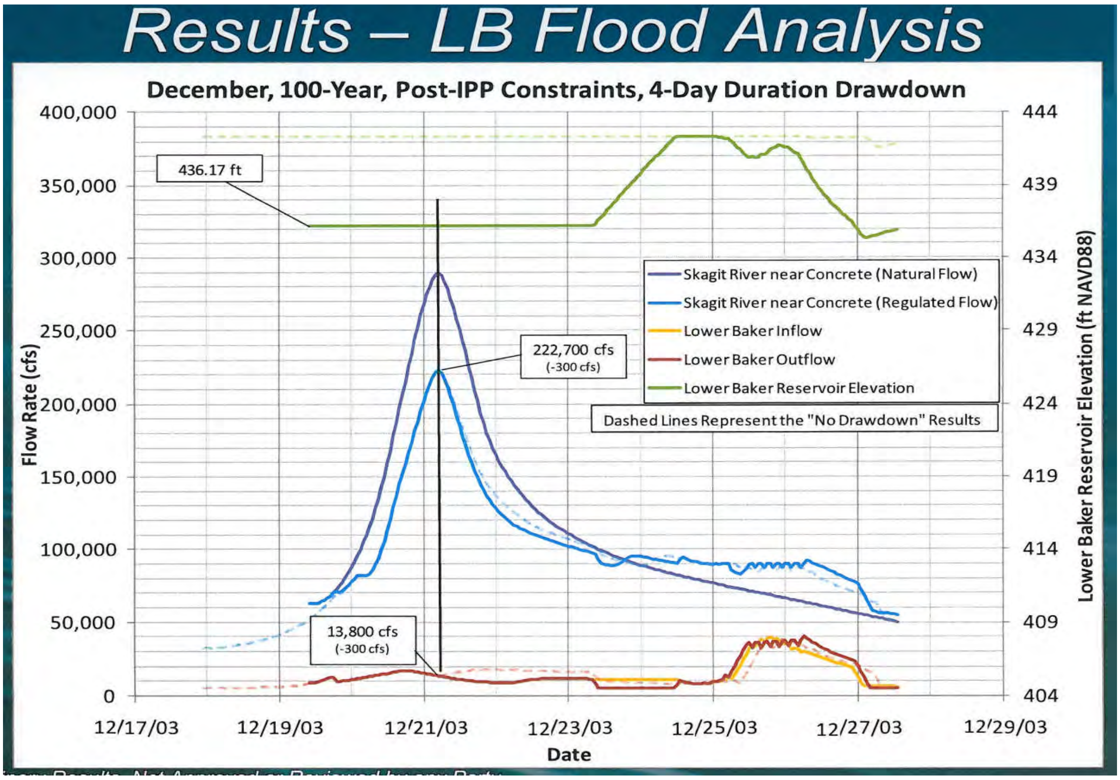
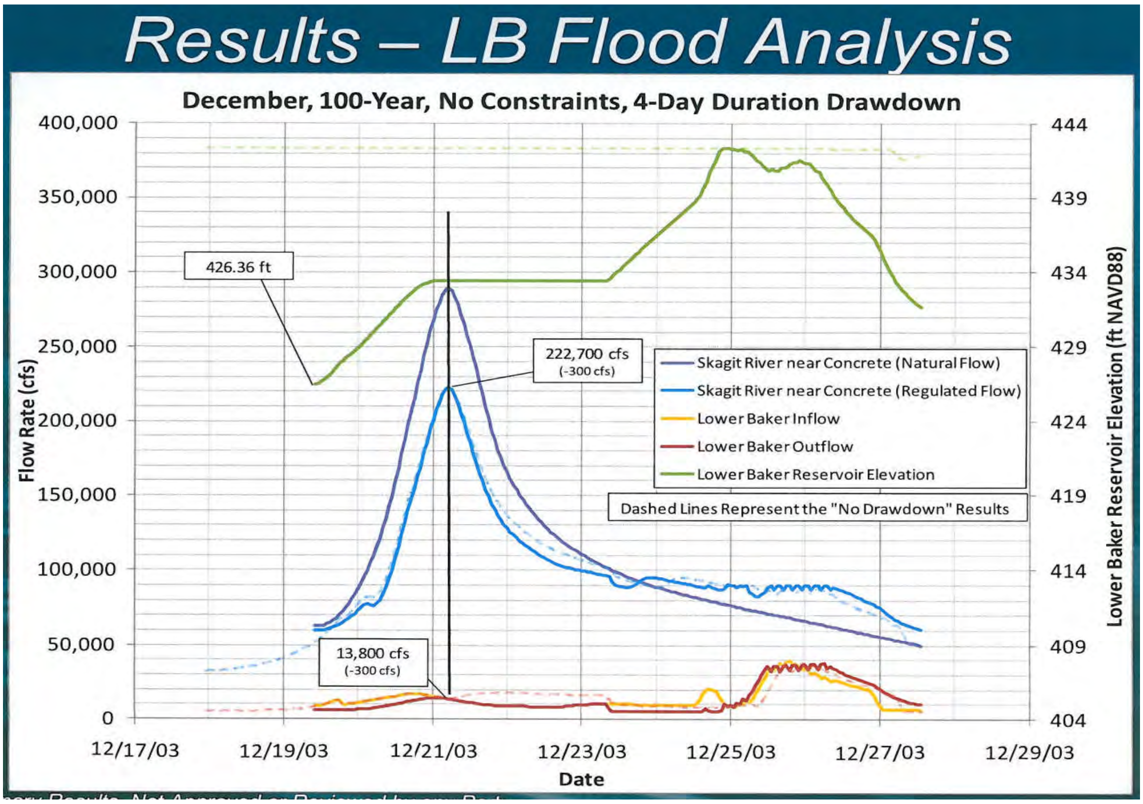
zero starting 5 hours prior to the Skagit flood peak at Concrete. I assume that the Tetra Tech analysis uses the Corps Water Control Manual suggestion to pass Lower Baker inflow as a constraint. This is not the point of the imminent flood reservoir drawdown concept; in fact, the assumption here is that if an alternative operation can be found that reduces Skagit flood peaks, the water control manual would be modified to accommodate the alternative operation. So the water control manual should not be used as a constraint in the analysis. For the "no constraints" analysis, a couple more hours of storage would be available to absorb a complete shutdown of all project outflow. Several years ago, Puget Sound Energy indicated to Skagit County that it was willing to completely shut down Project electrical generation, with no compensation, for these limited few hours prior to and following a Skagit River flood peak.

14. Slides 48 and 49: add another slide to this group showing the impact of reducing project outflow to zero for a 20-hour period beginning 10 hours prior to the flood peak at Concrete. This analysis may extend upstream to the Upper Baker reservoir, to the extent additional flood storage may be available in that reservoir that could be used to retain storage in Lower Baker.





15. Slides #50-52: These three slides need to be modified to include the analysis showing the peak flow impact on the Skagit of reducing project outflow to zero during a window of time beginning 10 hours prior to the Skagit flood peak and extending 10 hours beyond the Skagit flood peak.

The following comments apply to the March 4, 2011 technical briefing document:

1. Slide #3 of 54: with regard to the bullet that states, "Drawdown consistent with Articles 106 and 107:" It is clear that the Tetra Tech analysis uses as constraints, the provisions of license article 106, Aquatics Table 1 (including footnote 1); presumably the study also takes note of Article 106(L), Conflicts; and, also uses as "constraints," a 5,000 cfs minimum outflow from Upper Baker for the purpose of electrical generation, as well as the "constraint" of Lower Baker not being a federally authorized flood control facility, and therefore operated to pass its own basin's inflow at all times. The last two constraints, in particular, do not represent the best way to operate the facility to maximize its beneficial effect on a Skagit River flood peak.

However, the Tetra Tech study does not speak to other license provisions which could be argued to enable unrestricted operation of the Project during flood emergencies. For example, Article 106(I), Temporary Modification to Flows and Ramping Rates – Emergencies. This article allows temporary modification to flows and ramping rates if the condition meets the requirements of 18 CFR 12.3(b)(4), which states:

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(4) Condition affecting the safety of a project or project works
means any condition, event, or action at the project
which might compromise the safety, stability, or integrity of any
project work or the ability of any project work to function safely for
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its intended purposes, including navigation, water power development, or other beneficial public uses; or which might otherwise adversely affect life, health, or property. Conditions affecting the safety of a project or project works include, but are not limited to:

(i) Unscheduled rapid draw-down of impounded water;

(ii) Failure of any facility that controls the release or storage of impounded water, such as a gate or a valve;

(iii) Failure or unusual movement, subsidence, or settlement of any part of a project work;

(iv) Unusual concrete deterioration or cracking, including development of new cracks or the lengthening or widening of existing cracks;

(v) Piping, slides, or settlements of materials in any dam, abutment, dike, or embankment;

(vi) Significant slides or settlements of materials in areas adjacent to reservoirs;

(vii) Significant damage to slope protection;

(viii) Unusual instrumentation readings;

(ix) New seepage or leakage or significant gradual increase in pre-existing seepage or leakage;

(x) Sinkholes;

(xi) Significant instances of vandalism or sabotage;

(xii) Natural disasters, such as floods, earthquakes, or volcanic activity;

(xiii) Any other signs of instability of any project work.

Further, FERC added Articles 305 and 306 regarding flood control. Article 305 requires Puget Sound Energy to "incorporate into the imminent flood event report required by Settlement Agreement article 107 in Appendix A of this license, the following measures:

(1) an analysis of how any specific procedures used to address imminent flood events would affect the safety and adequacy of project structures;

(2) a provision to allow the licensee to temporarily modify storage requirements if required by an emergency and if the U.S. Army Corps of Engineers mutually agrees to the temporary modification; and

(3) a provision to notify the Commission as soon as possible, but not later than 10 days after each such temporary modification.

Article 306 states: "The Commission reserves the authority to order, upon its own motion or upon the recommendation of the U.S. Army Corps of Engineers, alterations of project structures and operations for flood control purposes, after notice and opportunity for a hearing."

Taken together, it is clear FERC is interested in how the project is operated to provide flood control. The heart of the matter is to develop means and operational methods to increase the Project's ability to reduce Skagit flood peaks; however, it is clear that the conflicting language must be resolved. Are the License Article 106 constraints absolutely hard constraints, or could a process be set up to consult with the ARG to enable a ramp-up of project outflows, say for example to 8,000 cfs 4 days in advance of a flood, to provide some additional reservoir drawdown if it looked like the incoming flood was going to be a large flood. Then, 3 days out, this decision could be looked at again. Has the weather pattern altered? Does it now appear more certain a big flood is headed toward the Skagit basin? If so, then it might be appropriate to continue the drawdown. If not, then it might be more appropriate to revert back to the reduced outflows in accordance with Aquatics Table 1. It seems like this is the type of process that could be implemented in accordance with 107(c).

2. Slide #4 of 54: I do not think the intent of 107(c) is to constrain imminent flood drawdown possibilities by interpreting the existing outdated water control manual as requiring 5,000 cfs outflow from Upper Baker, nor passing natural inflow from Lower Baker. The point of the consultation and study is to consider "appropriate means and methods" which "may include, without limitation, additional reservoir drawdown below the maximum established flood pool." A necessary requirement will ultimately be to change the water control manual consistent with whatever means and operational methods come out or the consultation process outlined in 107(c). I think I have heard the Corps put forward a position that it will not change the water control manual. Certainly I it would be a goal of this process to convince the Corps to ultimately change the manual. But that is an issue for later.

3. Slide #6 of 54: with regard to the threshold events: if the goal is to reduce Project outflow to zero for a 20-hour period prior to and following a Skagit peak flow at Concrete, then the threshold may be much different than if the goal is to only reduce Lower Baker outflow to 14,000 cfs (5,000 cfs from Upper Baker's generation plus the natural inflow to Lower Baker).

4. Slide 19 of 54: since it is the outflow from Lower Baker that impacts the Skagit peak flow, the study needs to focus on operation of Lower Baker for flood control, whether it "is typically operated for flood control" or not. In October 2003, the operation of Lower Baker for flood control had a substantial positive effect on water surface elevation reductions downstream.

5. Slide #20 of 54: I am not sure of the "32,400 cfs" annotation on this slide. Is that supposed to be the outflow from Upper Baker? From the graph it looks as though this figure should be closer to 38,000 cfs at the time of the Skagit flood peak.

6. Slide #21 of 54, Lower Baker 500-year Ops: is this right? If the 500-year inflow Lower Baker from Upper Baker, at the time of the Skagit flood peak, is about 38,000 cfs, it seems like the inflow from Lower Baker's basin would be 12,000 cfs or more at the same time, for a total closer to 50,000 cfs. Compare this to the information on slide 47 of 54 (both shown below). Slide 47 indicates a 500-year Lower Baker discharge of 62,600 cfs. I am not sure how that can happen without damaging the gates, but that is a separate issue). Which figures are correct?

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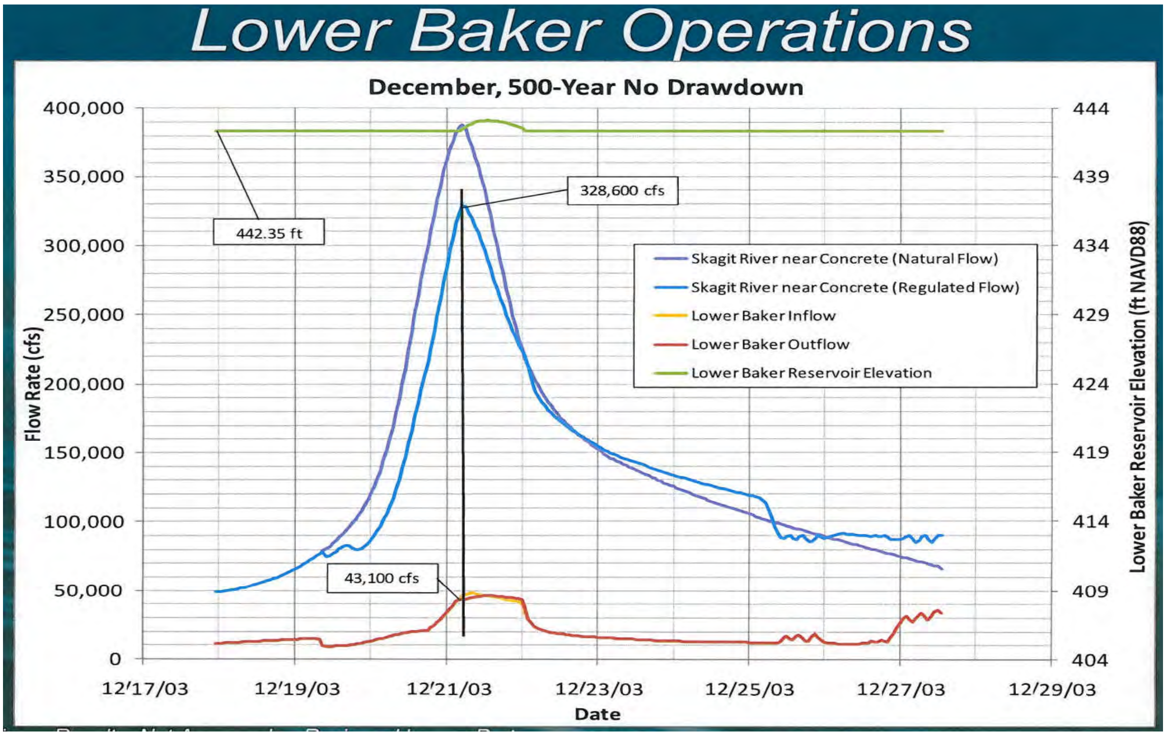

Results – Flood Analysis Post-IPP

No Drawdown Results
Oct1 – Oct20 Post IPP Analytical Period

Return Period (yrs)	Skagit River Regulated Peak Flow (cfs)	Upper Baker Contribution to Skagit River Regulated Peak Flow (cfs)	Total Baker Project Contribution to Skagit River Regulated Peak Flow (cfs)
5	108,000	9,000	13,400
10	143,700	16,500	21,000
25	199,500	29,800	36,900
50	228,500	34,000	41,700
75	257,900	37,400	45,300*
100	273,500	39,300	47,400*
250	330,700	46,100	54,600*
500	371,300	51,900	62,600*

Special Gate Regulation Flow Rates

* Spillway Capacity

…inary Results. Not Approved or Reviewed by any Party

7. Slide #23 of 54, Lower Baker Ops: The additional flood storage in Lower Baker could conceivably be used to reduce total Project outflows. This capability, if it exists, should be shown in an alternative graphic.

8. Slide #35 of 54, Upper Baker Drawdown: the term “license permitted drawdown” is not the best description. I would argue that, for example, Article 106(I), Temporary Modification to Flows and Ramping Rates – Emergencies, allows the Baker reservoirs to be drawn down in advance of a large

Skagit flood. Additionally, the FERC-added articles 305 and 306 could also support flood control, including article 305's mandate to incorporate into the imminent flood event report, "a provision to allow the licensee to temporarily modify storage requirements if required by an emergency and if the U.S. Army Corps of Engineers mutually agrees to the temporary modification."

9. Slide #36 of 54: It is contrary to the purpose of this technical evaluation to constrain the reservoir operation to the perceived requirements of the outdated Water Control Manual. Same comment for Slide #37.

10. Slides #38-40: These slides infer there is no benefit to drawing down the Baker reservoirs in advance of a 100-year or smaller Skagit flood event. But the underlying premise of the analysis which arrived at the conclusions shown (i.e., 5,000 cfs minimum continuous outflow from Upper Baker, and outflow=inflow for Lower Baker, is not consistent with the purpose of the study. The study must look at how to achieve zero outflow from Lower Baker during the critical hours before and after the Skagit flood peak at Concrete.

11: Slide #45: See comments for slide #35.

12. Slide #47 (see below)

Results – Flood Analysis Post-IPP

No Drawdown Results

Oct1 – Oct20 Post IPP Analytical Period

Return Period (yrs)	Skagit River Regulated Peak Flow (cfs)	Upper Baker Contribution to Skagit River Regulated Peak Flow (cfs)	Total Baker Project Contribution to Skagit River Regulated Peak Flow (cfs)
5	108,000	9,000	13,400
10	143,700	16,500	21,000
25	199,500	29,800	36,900
50	228,500	34,000	41,700
75	257,900	37,400	45,300*
100	273,500	39,300	47,400*
250	330,700	46,100	54,600*
500	371,300	51,900	62,600*

Special Gate Regulation Flow Rates

* Spillway Capacity

inary Results. Not Approved or Reviewed by any Party

The peak flow figures in the second column appear to be unregulated, not regulated peaks. Also, it is not clear to me how more than about 50,000 cfs of water can be let through or over Lower Baker without damage to the spill gate structure. Does the asterisk following the last 4 entries indicate "exceeds spillway capacity?"

13. Slides #48-50 (slide #49 for average antecedent flow conditions is shown below):

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Results – Flood Analysis Post-IPP

Skagit River near Concrete Regulated Peak Flow Rate and Stage
No Drawdown vs. Drawdown
Oct1 – Oct20 Average Antecedent

Flood Event Return Period (yrs)	No Drawdown *	4-Day Duration License Permitted Drawdown			4-Day Duration Alternative Operation Drawdown		
	Peak Flow (cfs)	Peak Flow (cfs)	Delta (cfs)	Delta (ft)	Peak Flow (cfs)	Additional Delta (cfs)	Additional Delta (ft)
5	108,000	104,000	4,000	0.6	104,000	-	-
10	143,700	132,300	11,400	1.4	131,800	500	0.1
25	199,500	176,800	22,700	2.5	174,400	2,400	0.3
50	228,500	208,700	19,800	2.1	199,100	9,600	1.0
75	257,900	243,000	14,900	1.5	225,100	17,900	1.8
100	273,500	263,600	9,900	1.0	239,500	24,100	2.4
250	330,700	322,800	7,900	0.7	290,800	32,000	2.9
500	371,300	366,900	4,400	0.3	327,700	39,200	3.3

* 10,700 ac-ft of flood control volume available at Upper Baker prior to drawdown

minary Results. Not Approved or Reviewed by any Party

Another sub-column should be added in each of the scenarios showing the outflow from Lower Baker at the time of the Skagit flood peak. This would provide a fuller picture of what was happening.

14. Slide #51, Apparent Threshold Flood Event:

Preliminary Results

Apparent Threshold Flood Event by Analytical Period *					
Hydrologic Conditions During Drawdown	Analytical Period				
	Oct1 - Oct20	Oct21 - Oct31	Nov1 - Nov15	Nov16 - Nov 30	Dec 1 - Dec 31
Wet	10-yr	50-yr	100-yr	250-yr	250-yr
Average	10-yr	75-yr	250-yr	250-yr	250-yr
Dry	10-yr	75-yr	250-yr	250-yr	250-yr

* Apparent Threshold Flood Event: Lowest magnitude flood event for which there are additional flood reduction benefits attributed to alternative operation drawdown

Comparing slides 49 and 51 with slide 39 (shown below) is confusing. I think I understand that for the smaller flood events occurring early in the flood season, prior to any substantial availability of flood storage, that the beneficial effect of drawing down the reservoirs is more pronounced. But in slide #39 below, the underlying assumption, which I pointed out I do not agree with, is that the peak

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flow reduction is based on the “constraints” of minimum 5,000 cfs generation from Upper Baker, and also passing all of the natural inflow from Lower Baker.

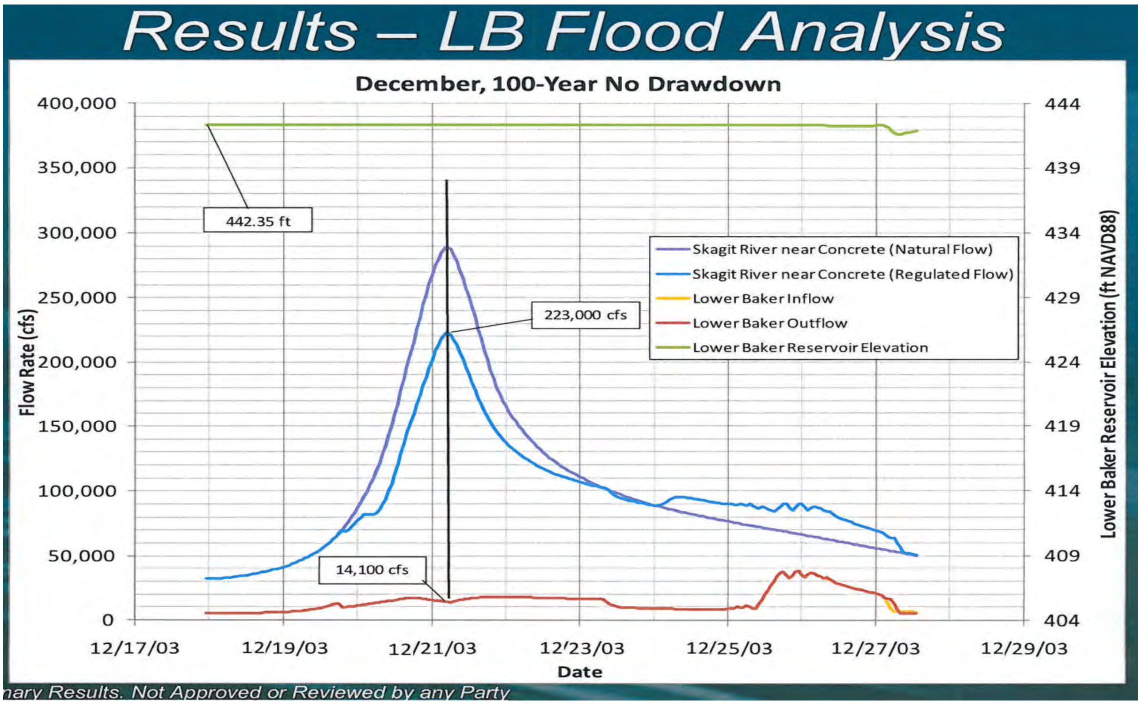
Results – Flood Analysis Post-IPP

Skagit River near Concrete Regulated Peak Flow Rate and Stage
No Drawdown vs. Drawdown
Dec1 – Dec31 Average Antecedent

Flood Event Return Period (yrs)	No Drawdown *	4-Day Duration License Permitted Drawdown			4-Day Duration Alternative Operation Drawdown		
	Peak Flow (cfs)	Peak Flow (cfs)	Delta (cfs)	Delta (ft)	Peak Flow (cfs)	Additional Delta (cfs)	Additional Delta (ft)
5	103,500	103,500	-	-	103,200	300	0.0
10	128,400	128,400	-	-	128,300	100	0.0
25	167,200	167,200	-	-	166,900	300	0.0
50	186,800	186,800	-	-	186,800	-	-
75	210,800	210,600	200	0.0	210,600	-	-
100	223,000	222,700	300	0.0	222,700	-	-
250	279,400	271,000	8,400	0.8	270,800	200	0.0
500	328,600	312,800	15,800	1.4	305,200	7,600	0.7

* 74,000 ac-ft of flood control volume available at Upper Baker prior to drawdown

Therefore, the “delta” or difference shown on the slide above, based on the assumption of 5,000 cfs outflow from Upper Baker to Lower Baker, as well as passing Lower Baker’s own basin’s inflow, results in a difference of 14,100 cfs compared to 13,800 cfs as shown in the graphics below (from the January presentation:



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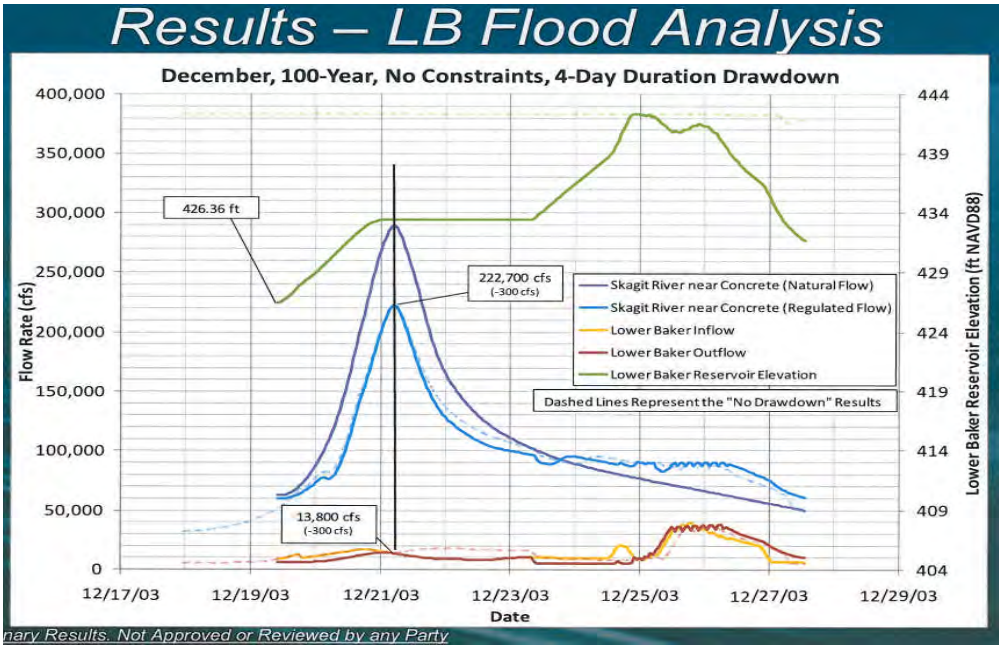

First, the graphics above indicate that the synthetic hydrograph of the Lower Baker inflow (because the assumption is: inflow = outflow) is about 9,000 cfs for a 100-year Skagit flood event at the timing of the Skagit's peak at Concrete. Is this correct? It seems a little low for a 100-year event.

Then, comparing slide 49 with 39, and after correcting the peak flows to regulated numbers, is there also an assumption for slide 49 (Oct 1-20) of 5,000 cfs generation into Lower Baker, plus passing inflow into Lower Baker? I am trying to estimate the numbers: assuming the 22,700 cfs delta for a 25-year event should be reduced to about, say, 17,000 cfs to account for regulation, and then adding 5,000 cfs for generation from Upper Baker and, say, 5,000 cfs from Lower Baker's natural inflow, this would mean that without the drawdown, the Baker project would be spilling 27,000 cfs into the flood peak. Is that correct?

Slides #51-52, threshold events and final considerations: I disagree that the threshold event graphic is correct, because the analysis defines no additional flood benefit based on the project spilling 14,000 cfs into the peak of a 100-year flood event. The concept of whether imminent flood drawdown meets a threshold must be re-defined to mean zero project outflow 10 hours prior and 10 hours following a Skagit River peak flow at Concrete.

Thanks for the opportunity to provide these comments. If possible, I would like to meet with Tetra Tech staff to discuss these issues.

Sincerely,

Chal A. Martin, P.E.
Public Works Director / City Engineer

Atch: PI Engineering Tech Memo, "Analysis of Flood Control Storage at Baker River Project," 27 Aug 2004