2001939

Below Upper Tailrace
June 24-30 2012

Date and time	Stage (cm)	Ramp Rate (cm/min)	Average Ramping Rate (cm/15min)	Average Ramping Rate (cm/hr)	FA Ramp Rates	
2012/07/01,00:00:23	137.50	0.00			5	-5
2012/07/01,00:01:23	135.20	-2.30			5	-5
2012/07/01,00:02:23	138.20	3.00			5	-5
2012/07/01,00:03:23	136.30	-1.90			5	-5
2012/07/01,00:04:23	135.50	-0.80			5	-5
2012/07/01,00:05:23	135.40	-0.10			5	-5
2012/07/01,00:06:23	135.60	0.20			5	-5
2012/07/01,00:07:23	135.80	0.20			5	-5
2012/07/01,00:08:23	135.30	-0.50			5	-5
2012/07/01,00:09:23	134.70	-0.60			5	-5
2012/07/01,00:10:23	135.70	1.00			5	-5
2012/07/01,00:11:23	133.90	-1.80			5	-5
2012/07/01,00:12:23	136.50	2.60			5	-5
2012/07/01,00:13:23	136.30	-0.20			5	-5
2012/07/01,00:14:23	137.30	1.00			5	-5
2012/07/01,00:15:23	136.30	-1.00	-0.08	-0.32	5	-5
2012/07/01,00:16:23	133.10	-3.20			5	-5
2012/07/01,00:17:23	135.20	2.10			5	-5
2012/07/01,00:18:23	135.00	-0.20			5	-5
2012/07/01,00:19:23	136.00	1.00			5	-5
2012/07/01,00:20:23	135.80	-0.20			5	-5
2012/07/01,00:21:23	136.00	0.20			5	-5
2012/07/01,00:22:23	134.20	-1.80			5	-5
2012/07/01,00:23:23	133.50	-0.70			5	-5
2012/07/01,00:24:23	134.50	1.00			5	-5
2012/07/01,00:25:23	135.00	0.50			5	-5
2012/07/01,00:26:23	135.70	0.70			5	-5
2012/07/01,00:27:23	135.70	0.00			5	-5
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2012/07/01,00:29:23	133.90	-1.40			5	-5
2012/07/01,00:30:23	135.30	1.40	-0.07	-0.27	5	-5
2012/07/01,00:31:23	134.90	-0.40			5	-5
2012/07/01,00:32:23	136.00	1.10			5	-5
2012/07/01,00:33:23	134.80	-1.20			5	-5

2012/07/01,00:34:23	134.40	-0.40			5	-5
2012/07/01,00:35:23	135.20	0.80			5	-5
2012/07/01,00:36:23	133.80	-1.40			5	-5
2012/07/01,00:37:23	135.30	1.50			5	-5
2012/07/01,00:38:23	134.80	-0.50			5	-5
2012/07/01,00:39:23	137.20	2.40			5	-5
2012/07/01,00:40:23	135.20	-2.00			5	-5
2012/07/01,00:41:23	133.90	-1.30			5	-5
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2012/07/01,00:44:23	134.00	0.70			5	-5
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2012/07/01,00:46:23	134.30	-0.50			5	-5
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2012/07/01,00:48:23	133.10	-2.40			5	-5
2012/07/01,00:49:23	134.00	0.90			5	-5
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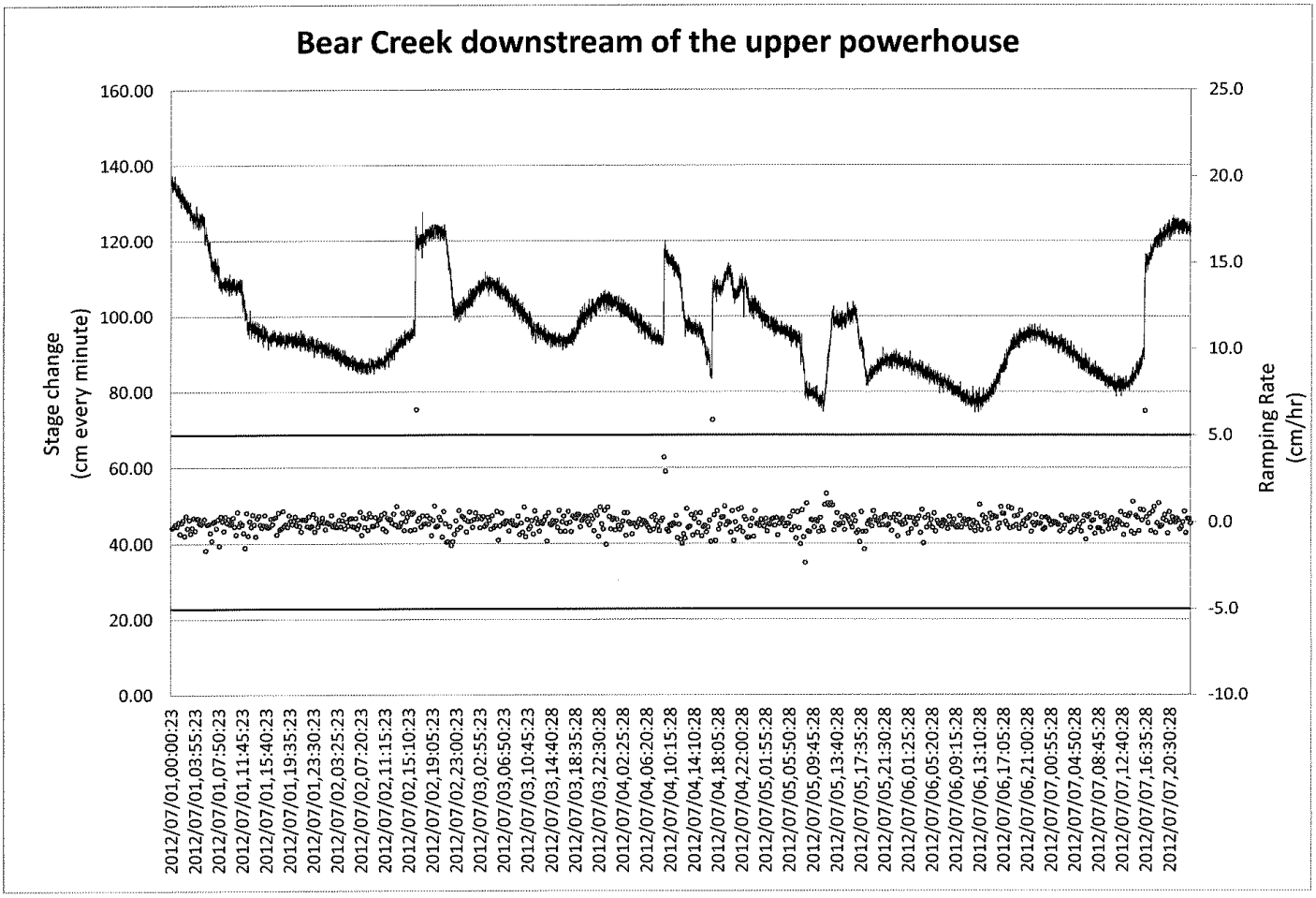
2012/07/01,00:51:23	133.10	0.70			5	-5
2012/07/01,00:52:23	134.00	0.90			5	-5
2012/07/01,00:53:23	132.90	-1.10			5	-5

10,079 DATA POINTS TOTAL.

JULY 1 TO 7, 2012


Bear Creek downstream of the upper powerhouse
Stage change (cm every minute)
Ramping Rate (cm/hr)
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
25.0
20.0
15.0
10.0
5.0
0.0
-5.0
-10.0
2012/07/01,00:00:23
2012/07/01,03:55:23
2012/07/01,07:50:23
2012/07/01,11:45:23
2012/07/01,15:40:23
2012/07/01,19:35:23
2012/07/01,23:30:23
2012/07/02,03:25:23
2012/07/02,07:20:23
2012/07/02,11:15:23
2012/07/02,15:10:23
2012/07/02,19:05:23
2012/07/02,23:00:23
2012/07/03,02:55:23
2012/07/03,06:50:23
2012/07/03,10:45:23
2012/07/03,14:40:28
2012/07/03,18:35:28
2012/07/03,22:30:28
2012/07/04,02:25:28
2012/07/04,06:20:28
2012/07/04,10:15:28
2012/07/04,14:10:28
2012/07/04,18:05:28
2012/07/04,22:00:28
2012/07/05,01:55:28
2012/07/05,05:50:28
2012/07/05,09:45:28
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2012/07/05,17:35:28
2012/07/05,21:30:28
2012/07/06,01:25:28
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2012/07/06,13:10:28
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2012/07/06,21:00:28
2012/07/07,00:55:28
2012/07/07,04:50:28
2012/07/07,08:45:28
2012/07/07,12:40:28
2012/07/07,16:35:28
2012/07/07,20:30:28

2 001939

Davies, James W FLNR:EX

2002598

From: Ullah, Aman FLNR:EX
Sent: Friday, March 30, 2012 2:34 PM
To: Davies, James W FLNR:EX
Subject: FW: Innergex - Unplanned Variance - Stokke Creek Facility
Attachments: image001.jpg

I got it with another e-mail, so don't need it any more.

Thanks,

Aman

From: Ullah, Aman FLNR:EX
Sent: Friday, March 30, 2012 2:32 PM
To: Davies, James W FLNR:EX
Subject: RE: Innergex - Unplanned Variance - Stokke Creek Facility

Hi Jim,

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From: Davies, James W FLNR:EX
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To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Unplanned Variance - Stokke Creek Facility

Aman Ullah

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Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

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Sent: Friday, March 30, 2012 12:48 PM
To: Sean Mccoy; Davies, James W FLNR:EX
Cc: Busto, Vince; Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; John Miller; Matt Kennedy
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Squamish phone: 604-892-2040
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Pacific Region 'Working Near Water' website
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Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

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2002598

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Subject: FW: Innergex - Unplanned Variance - Stokke Creek Facility
Attachments: Stokke Unplanned Variance Report (15Mar2012).pdf

Aman Ullah

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Project Information

Project:	Stokke Creek	**Water Lic#:**	122346
Owner:	Innergex Renewable Energy Inc.		
Contact Person:	Sean McCoy	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Position:	Operations Environmental Manager		
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Report Information

Prepared By:	Sean McCoy	**Date:**	30 March 2012
Position:	Operations Environmental Manager	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Was the Unplanned Variance Previously Reported?		**Yes** / No	
Name & Contact Information		**Method**	**Date**
James Davies	James.Davies@gov.bc.ca	Email	15 Mar 2012
Vince Busto	Vince.Busto@dfo-mpo.gc.ca	Email	15 Mar 2012
Francesca Knight	Francesca.Knight@dfo-mpo.gc.ca	Email	15 Mar 2012
Scott Babakaiff	scott.babakaiff@gov.bc.ca	Email	15 Mar 2012
Erin Stoddard	Erin.Stoddard@gov.bc.ca	Email	15 Mar 2012

Event Description

Date:	15 March 2012	**Time:**	12:00
Event Type:	IFR		

Background

- The IFR flow is a combination of flow through the IFR gate and Coanda screen overflow. Maintaining an overflow mitigates the risk of stranding potential downstream-moving fish on the Coanda screen.
- The facility was operating in 'flow following' mode prior to the event which enables the plant control system to automatically adjust plant flow based on the upstream creek flow.

Event

- At approximately 12:00, the upstream Stokke Creek flow dropped suddenly and unexpectedly from 1.3 cms to 0.3 cms. Refer to Figure 1.
- The Harrison Lake area experienced heavy snowfall in the weeks prior to the event. A snow slide upstream of the intake is the most probable cause of the abrupt drop in creek flow.
- The blockage cleared itself and the upstream creek flow returned to pre-event levels at 15:00 (likely as the creek worked through the slide material).

Response & Mitigation

- The plant control system identified the drop in upstream creek flow and began to down-ramp the turbine at the designated flow rate.
  - The facility is designed to down-ramp slowly (instead of an abrupt stop) to mitigate the impact of a shutdown on the creek downstream of the powerhouse.

Environmental Impact & Assessment

- The IFR decreased to ~0.12 cms from 12:00 until 15:15 and from 16:00 until 17:40 when the full IFR was restored. Refer to Figure 1.
- The impact on the creek downstream of the powerhouse due to the low flow event was dampened by the controlled down-ramp of the turbine. Refer to Figure 2.

Preventative & Corrective Measures

- Continue to monitor upstream creek flow and automatically adjust plant flow to accommodate natural events and fluctuations.
- Maintain flow through the IFR gate to approximately ¾ of the IFR to mitigate the environmental impact on the diversion reach in the event of a natural upstream event that leads to an unplanned drop in mitigation flow over the Coanda screen.

Appendix

Figure 1: Upstream Creek and IFR Flow

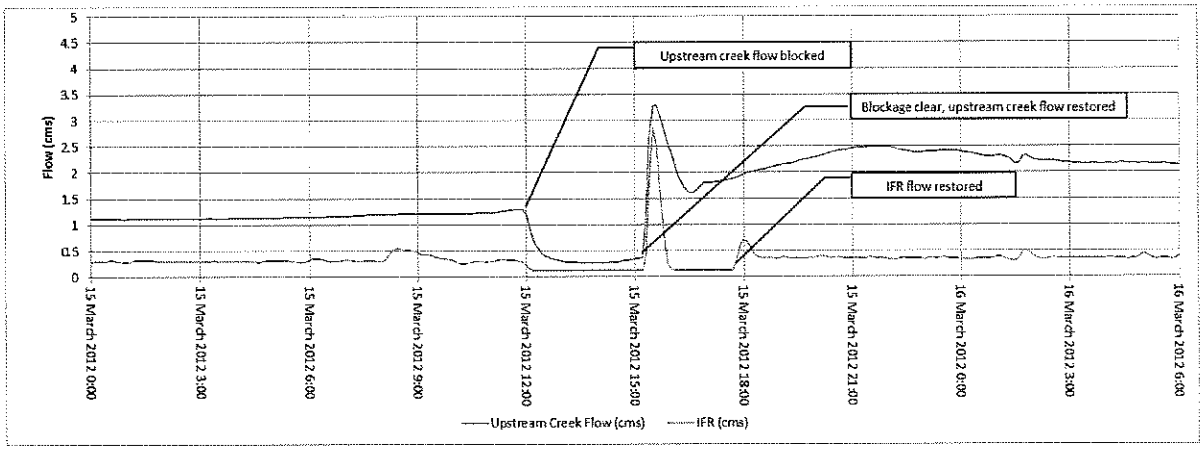
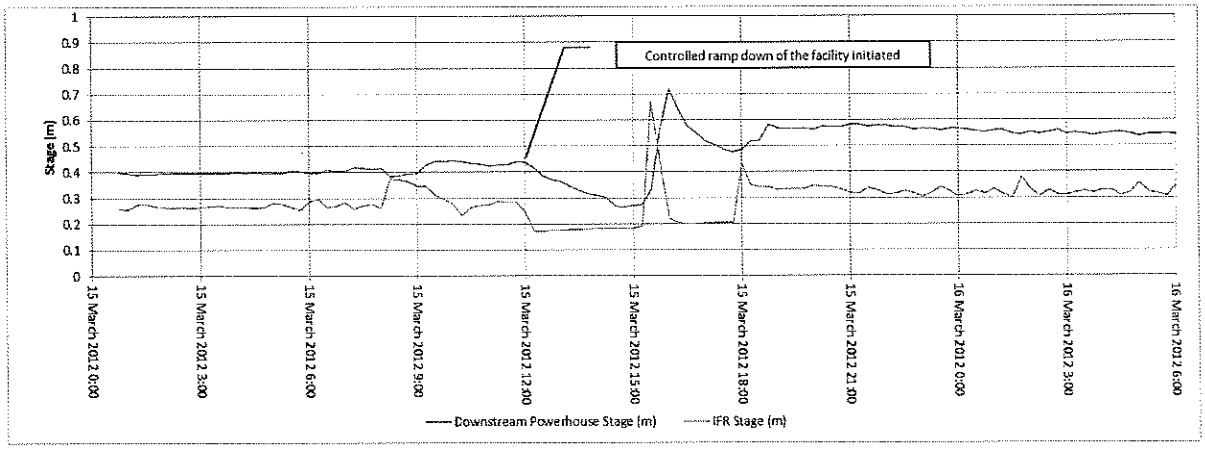


Figure 2: IFR & Downstream Powerhouse Water Level Gauge



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Cc: Busto, Vince; Francesca Knight; Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; John Miller; Matt Kennedy
Subject: RE: Innergex - Unplanned Variance - Stokke Creek Facility
Attachments: Stokke Unplanned Variance Report (15Mar2012).pdf

Mr. Davies,

The follow-up report for the low flow event at the Stokke Creek facility due to a snow slide upstream of the intake is attached for your records.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

---

From: Sean Mccoy
Sent: March-15-12 4:08 PM
To: James Davies (James.Davies@gov.bc.ca)
Cc: 'Busto, Vince'; Francesca Knight; Babakaiff, Scott; Stoddard, Erin; Matt Kennedy; John Miller
Subject: Innergex - Unplanned Variance - Stokke Creek Facility

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Please be advised that that at approximately 12:00 today (15 Mar 2012), there was an event at the Stokke Creek Hydro Facility which caused a low IFR event for approximately 3 hrs. Initial data indicates there was a slide upstream of the intake structure that caused a rapid decrease in creek flow.

A detailed report will be forwarded once all of the event data can be compiled.

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Project Information

Project:	Stokke Creek	**Water Lic#:**	122346
Owner:	Innergex Renewable Energy Inc.		
Contact Person:	Sean McCoy	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Position:	Operations Environmental Manager		
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Report Information

Prepared By:	Sean McCoy	**Date:**	30 March 2012
Position:	Operations Environmental Manager	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Was the Unplanned Variance Previously Reported?		**Yes** / No	
Name & Contact Information		**Method**	**Date**
James Davies	James.Davies@gov.bc.ca	Email	15 Mar 2012
Vince Busto	Vince.Busto@dfo-mpo.gc.ca	Email	15 Mar 2012
Francesca Knight	Francesca.Knight@dfo-mpo.gc.ca	Email	15 Mar 2012
Scott Babakaiff	scott.babakaiff@gov.bc.ca	Email	15 Mar 2012
Erin Stoddard	Erin.Stoddard@gov.bc.ca	Email	15 Mar 2012

Event Description

Date:	15 March 2012	**Time:**	12:00
Event Type:	IFR		

Background

- The IFR flow is a combination of flow through the IFR gate and Coanda screen overflow. Maintaining an overflow mitigates the risk of stranding potential downstream-moving fish on the Coanda screen.
- The facility was operating in 'flow following' mode prior to the event which enables the plant control system to automatically adjust plant flow based on the upstream creek flow.

Event

- At approximately 12:00, the upstream Stokke Creek flow dropped suddenly and unexpectedly from 1.3 cms to 0.3 cms. Refer to Figure 1.
- The Harrison Lake area experienced heavy snowfall in the weeks prior to the event. A snow slide upstream of the intake is the most probable cause of the abrupt drop in creek flow.
- The blockage cleared itself and the upstream creek flow returned to pre-event levels at 15:00 (likely as the creek worked through the slide material).

Response & Mitigation

- The plant control system identified the drop in upstream creek flow and began to down-ramp the turbine at the designated flow rate.
  - The facility is designed to down-ramp slowly (instead of an abrupt stop) to mitigate the impact of a shutdown on the creek downstream of the powerhouse.

Environmental Impact & Assessment

- The IFR decreased to ~0.12 cms from 12:00 until 15:15 and from 16:00 until 17:40 when the full IFR was restored. Refer to Figure 1.
- The impact on the creek downstream of the powerhouse due to the low flow event was dampened by the controlled down-ramp of the turbine. Refer to Figure 2.

Preventative & Corrective Measures

- Continue to monitor upstream creek flow and automatically adjust plant flow to accommodate natural events and fluctuations.
- Maintain flow through the IFR gate to approximately ¾ of the IFR to mitigate the environmental impact on the diversion reach in the event of a natural upstream event that leads to an unplanned drop in mitigation flow over the Coanda screen.

Appendix

Figure 1: Upstream Creek and IFR Flow

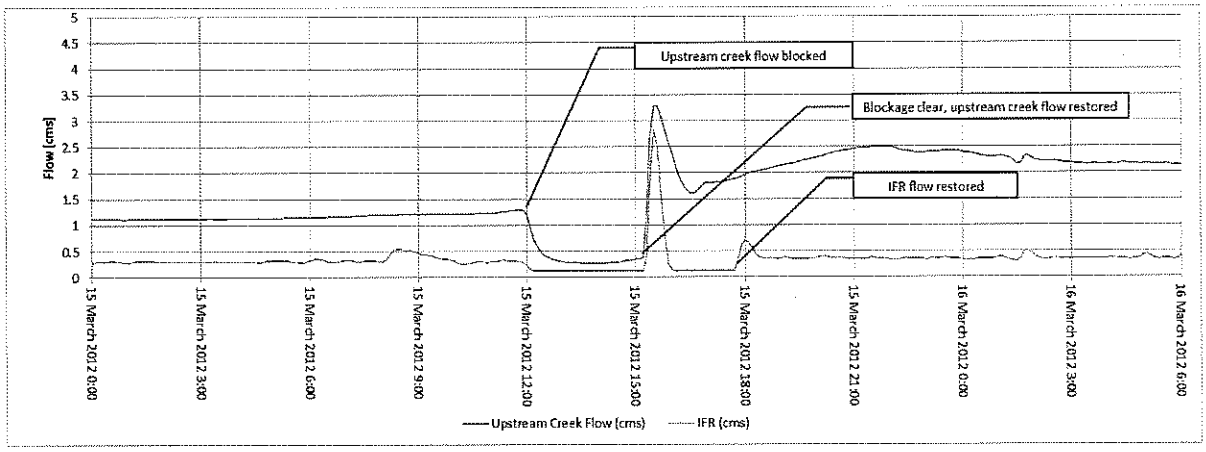
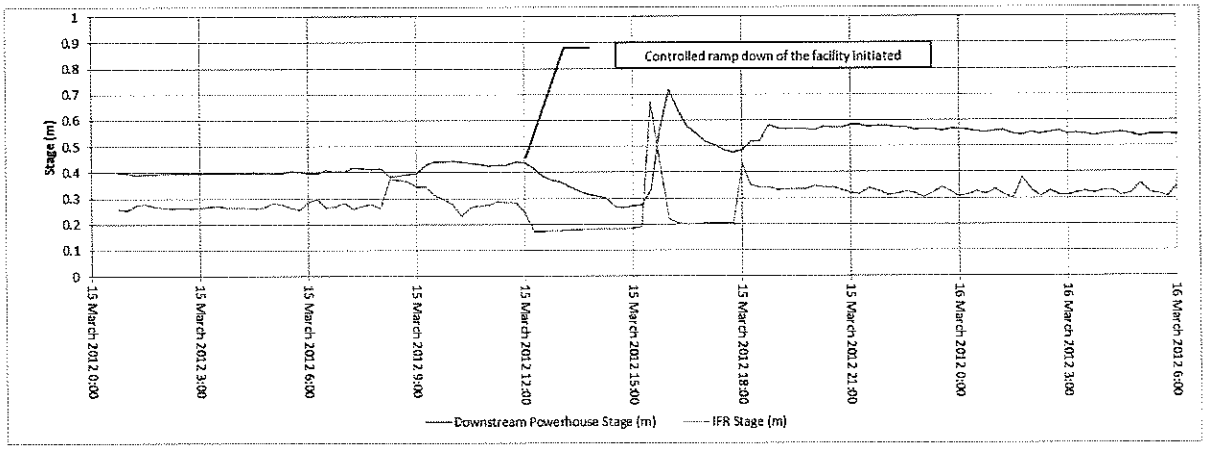


Figure 2: IFR & Downstream Powerhouse Water Level Gauge



Davies, James W FLNR:EX

2002598

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Sent: Thursday, March 15, 2012 5:12 PM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Unplanned Variance - Stokke Creek Facility
Attachments: image001.jpg

Aman Ullah

Read, print and file.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

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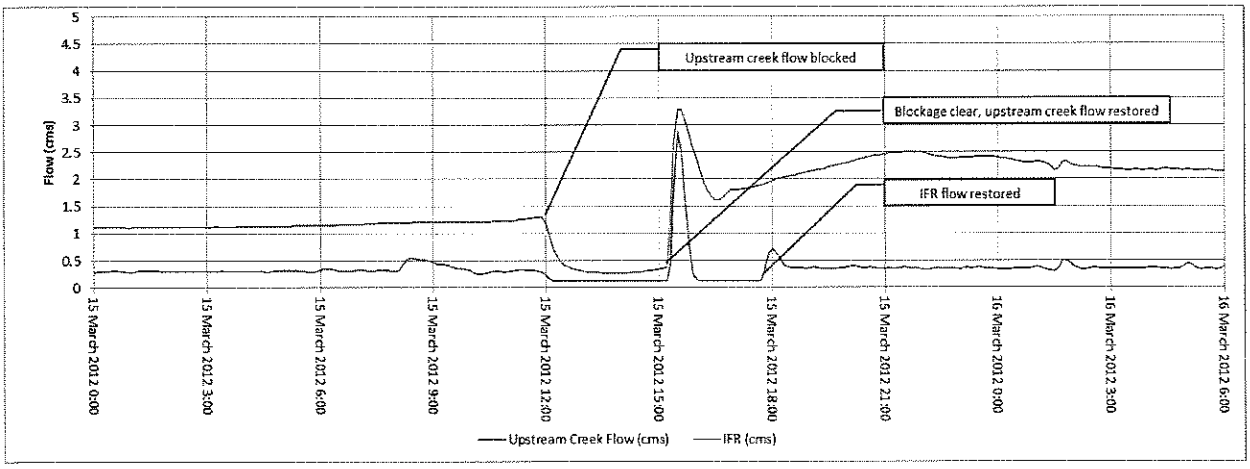

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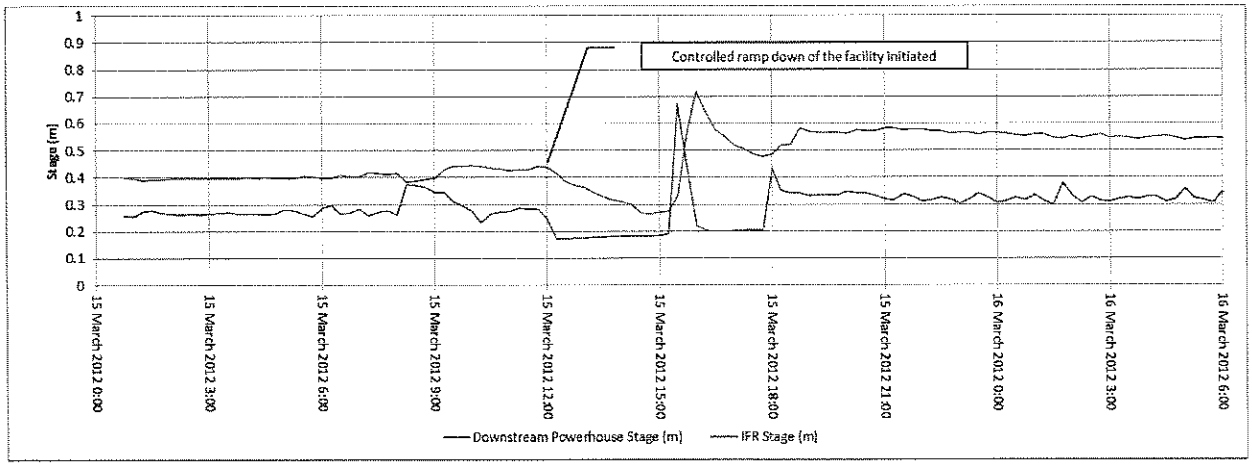

Upper Bear – 2001939

Davies, James W FLNR:EX

2002482

From: Davies, James W FLNR:EX
Sent: Sunday, March 4, 2012 3:31 PM
To: Ullah, Aman FLNR:EX
Subject: FW: Ramping Violation at Lamont
Attachments: image001.jpg

Aman Ullah

Read, print and file.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

From: Stoddard, Erin M FLNR:EX
Sent: Wednesday, February 8, 2012 12:42 PM
To: 'John Miller'
Cc: 'Vince Busto (Vince.Busto@dfo-mpo.gc.ca)'; Babakaiff, Scott C FLNR:EX; 'Knight, Francesca'; 'Sean Mccoy'; 'Matt Kennedy'; 'Evan Gillespie'; 'Jason Guenther'; 'Myles Charlie'; Davies, James W FLNR:EX
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Erin

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Sent: Tuesday, February 7, 2012 5:40 PM
To: Stoddard, Erin M FLNR:EX
Cc: 'Vince Busto (Vince.Busto@dfo-mpo.gc.ca)'; Babakaiff, Scott C FLNR:EX; 'Knight, Francesca'; Sean Mccoy; Matt Kennedy; Evan Gillespie; Jason Guenther; Myles Charlie; Davies, James W FLNR:EX
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Sincerely,

John D. Miller, P.Eng.

Vice President - Operations and Maintenance, Western Region

INNERGEX

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Ecosystems Biologist

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Hi Jim

On Saturday February 4th we had an emergency shutdown of Lamont G.S. The PLC controlling the plant became unresponsive. The Operators were able to restore the plant within an hour of the shutdown.
As you may be aware, the proximity of Lamont Powerhouse to the Stave River mitigates the impact for stranding below Lamont Powerhouse. Although a thorough stranding search was not possible due to winter access limitations, no stranding was observed.

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Cc: 'Vince Busto (Vince.Busto@dfo-mpo.gc.ca)'; Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; 'Knight, Francesca'; Sean Mccoy; Matt Kennedy; Evan Gillespie; Jason Guenther; Myles Charlie
Subject: Ramping Violation at Lamont

Hi Jim

On Saturday February 4th we had an emergency shutdown of Lamont G.S. The PLC controlling the plant became unresponsive. The Operators were able to restore the plant within an hour of the shutdown.

As you may be aware, the proximity of Lamont Powerhouse to the Stave River mitigates the impact for stranding below Lamont Powerhouse. Although a thorough stranding search was not possible due to winter access limitations, no stranding was observed.

We apologise for the delay in submitting this report. If you should have any questions, please do not hesitate to contact us.

Regards,

John D. Miller, P.Eng.

Vice President - Operations and Maintenance, Western Region

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x229 : Cell. 778 994-3180 : www.innergex.com

Ullah, Aman FLNR:EX

2002482

From: Davies, James W FLNR:EX
Sent: Sunday, March 4, 2012 3:32 PM
To: Ullah, Aman FLNR:EX
Subject: FW: Ramping Violation at Lamont

Aman Ullah

Read, print and file.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

From: John Miller [mailto:JMiller@innergex.com]
Sent: Tuesday, February 7, 2012 5:40 PM
To: Stoddard, Erin M FLNR:EX
Cc: 'Vince Busto (Vince.Busto@dfo-mpo.gc.ca)'; Babakaiff, Scott C FLNR:EX; 'Knight, Francesca'; Sean Mccoy; Matt Kennedy; Evan Gillespie; Jason Guenther; Myles Charlie; Davies, James W FLNR:EX
Subject: RE: Ramping Violation at Lamont

Hi Erin

Thanks for your question

A shutdown of the plant creates a potential stranding event downstream of the plant. The diversion reach (upstream of the plant) would experience an increase in flow from the plant shutting down which is not considered a stranding risk. Therefore, the stranding risk is only downstream of the plant.

While it is possible that a stranding did occur, we do not believe it is appropriate to assume that it likely occurred. As you may know, the short section of creek between the powerhouse and the confluence of Upper Stave is very confined. The ramping threshold tests (for shutdown)at Lamont confirmed this. Furthermore, we understand that at this time of year the fish tend to deeper pools. More to the point, the report (we hope) provides a candid assessment of what occurred and what actions were taken without speculation either way. We deliberately and honestly advised that the inspection of the downstream reach was limited to observations from the tailrace due to winter conditions and safety concerns. I'm sure you would not advocate that we report otherwise.

Sincerely,

John D. Miller, P.Eng.

Vice President - Operations and Maintenance, Western Region

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x229 | Cell. 778 994-3180 | www.innergex.com

From: Stoddard, Erin M FLNR:EX [mailto:Erin.Stoddard@gov.bc.ca]
Sent: February 7, 2012 4:10 PM
To: John Miller
Cc: 'Vince Busto (Vince.Busto@dfo-mpo.gc.ca)'; Babakaiff, Scott C FLNR:EX; 'Knight, Francesca'; Sean Mccoy; Matt Kennedy; Evan Gillespie; Jason Guenther; Myles Charlie; Davies, James W FLNR:EX
Subject: RE: Ramping Violation at Lamont

Lamont Creek has fish use for a distance upstream of the tailrace as well as downstream to its' confluence with the Upper Stave. The system supports blue listed bull trout. I don't believe that there would have been backwatering from the Upper Stave that would have mitigated the effects of a shutdown if that's what you are suggesting. Please explain within your incident report how this mitigation could have occurred as you have stated below. An hour without water would kill fish, which don't move very quickly at this time of year.

Please also indicate within the report how no stranding could have been observed if no thorough search was conducted. Please confirm the degree to which any search was conducted. It would be more appropriate to assume that fish stranding and likely kills did occur. The objective of the search and salvage is to confirm otherwise.

Sincerely,

Erin Stoddard, R.P.Bio.
Ecosystems Biologist

From: John Miller [mailto:JMiller@innergex.com]
Sent: Tuesday, February 7, 2012 3:36 PM
To: Davies, James W FLNR:EX
Cc: 'Vince Busto (Vince.Busto@dfo-mpo.gc.ca)'; Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; 'Knight, Francesca'; Sean Mccoy; Matt Kennedy; Evan Gillespie; Jason Guenther; Myles Charlie
Subject: Ramping Violation at Lamont

Hi Jim

On Saturday February 4th we had an emergency shutdown of Lamont G.S. The PLC controlling the plant became unresponsive. The Operators were able to restore the plant within an hour of the shutdown.
As you may be aware, the proximity of Lamont Powerhouse to the Stave River mitigates the impact for stranding below Lamont Powerhouse. Although a thorough stranding search was not possible due to winter access limitations, no stranding was observed.

We apologise for the delay in submitting this report. If you should have any questions, please do not hesitate to contact us.

Regards,

John D. Miller, P.Eng.

Vice President - Operations and Maintenance, Western Region

INNERGEX

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Tel. 604 633-9990 x229 | Cell. 778 994-3180 | www.innergex.com

Davies, James W FLNR:EX

2002483

From: Sean Mccoy [SMccoy@innergex.com]
Sent: Tuesday, August 7, 2012 6:20 PM
To: Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; XT:Busto, Vince DFO EAO:IN; 'Francesca.Knight@dfo-mpo.gc.ca'; John Miller; Matt Kennedy
Subject: Unplanned Variance Event - Upper Stave

Mr. Davies,

Please be advised that on 5 Aug 2012 there was a ramping event at the Upper Stave generating facility.

The follow-up report will be forwarded next week once all the data has been compiled and analyzed.

Regards,
Sean

Davies, James W FLNR:EX

2002483

From: Davies, James W FLNR:EX
Sent: Monday, May 28, 2012 4:00 PM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Unplanned Variance Event - Upper Stave
Attachments: Unplanned Variance Report (16May2012).pdf

Aman Ullah

Read, print and file.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 586-5637 FAX: (604) 586-4434
email: James.Davies@gov.bc.ca

From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Monday, May 28, 2012 2:27 PM
To: Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; Francesca Knight; Busto, Vince; Matt Kennedy; John Miller
Subject: RE: Innergex - Unplanned Variance Event - Upper Stave

Mr. Davies,

The follow-up report for the 16 May 2012 variance event at the Upper Stave generating facility is attached for your records.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

---

From: Sean Mccoy
Sent: May-17-12 4:14 PM
To: James Davies (James.Davies@gov.bc.ca)
Cc: Babakaiff, Scott; Francesca Knight; 'Busto, Vince'; Matt Kennedy; John Miller
Subject: Innergex - Unplanned Variance Event - Upper Stave

Mr. Davies,

Please be advised that on 16 May 2012 there was a ramping event at the Upper Stave generating facility.

A follow-up report will be forwarded once all the data has been compiled and analyzed.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

Project Information

Project:	Upper Stave	**Water Licence:**	124380
Owner:	Innergex Renewable Energy Inc.		
Contact Person:	Sean McCoy	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Position:	Operations Environmental Manager		
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Report Information

Prepared By:	Sean McCoy	**Date:**	25 May 2012
Position:	Operations Environmental Manager	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Was the Unplanned Variance Previously Reported?		**Yes** / No	
Name & Contact Information		**Method**	**Date**
James Davies	James.Davies@gov.bc.ca	Email	17 May 2012
Vince Busto	Vince.Busto@dfo-mpo.gc.ca	Email	17 May 2012
Francesca Knight	Francesca.Knight@dfo-mpo.gc.ca	Email	17 May 2012
Scott Babakaiff	scott.babakaiff@gov.bc.ca	Email	17 May 2012

Event Description

Date:	16 May 2012	**Time:**	16:15
Event Type:	Ramping		

- Creek flow was returning to normal after a high flow event that began two days earlier on 14 May 2012. Refer to Figure 1.
- The radial sluice gate was open during the high flow event to limit spill flow over the rubber dam.
- An operator was slowly closing the sluice gate to follow the decrease in creek flow.
- The closing rate was increased as the gate approached the fully closed position which caused a ramping event in the diversion reach.

Response & Mitigation

- Three fish stranding searchers were conducted by the Hydro Station Operators in the diversion reach.
  - Two were conducted immediately after the event; the third was conducted the next morning.

Environmental Impact & Assessment

- No stranded or distressed fish were observed during the stranding searches.
- No change in stage was observed downstream of the powerhouse. Refer to Figure 1.
- The IFR was maintained throughout the variance at greater than the 5.5 cms licence requirement. Refer to Figure 2.
- The stage change observed downstream of the intake was -0.4 m (1.2 m to 0.8 m). Refer to Figure 2.

Preventative & Corrective Measures

- Task training for the Operations Group to ensure the sluice gate closing rate is maintained throughout the closing cycle.

Appendix

Figure 1: Stage Profile During High Flow Event (14 May 2012 to 18 May 2012)

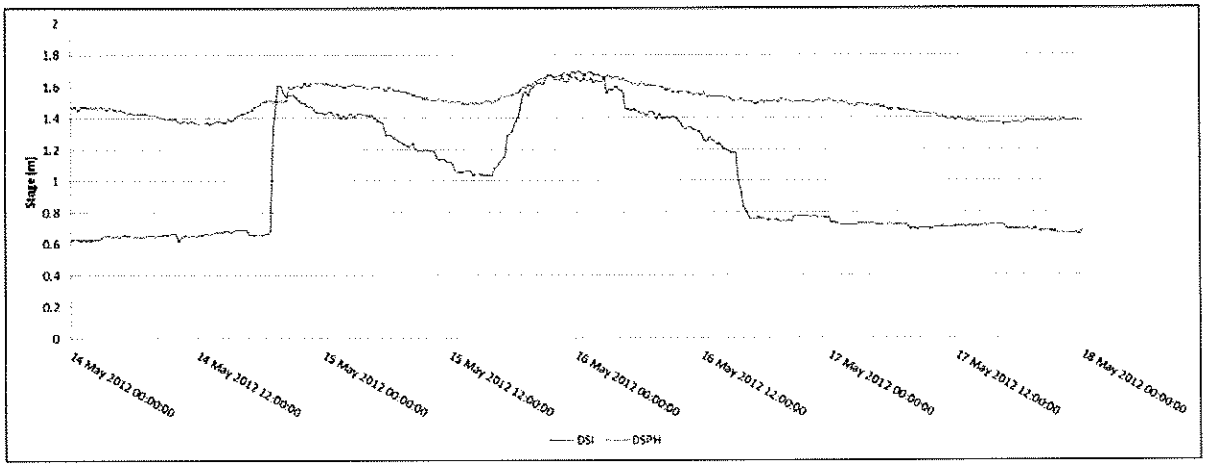
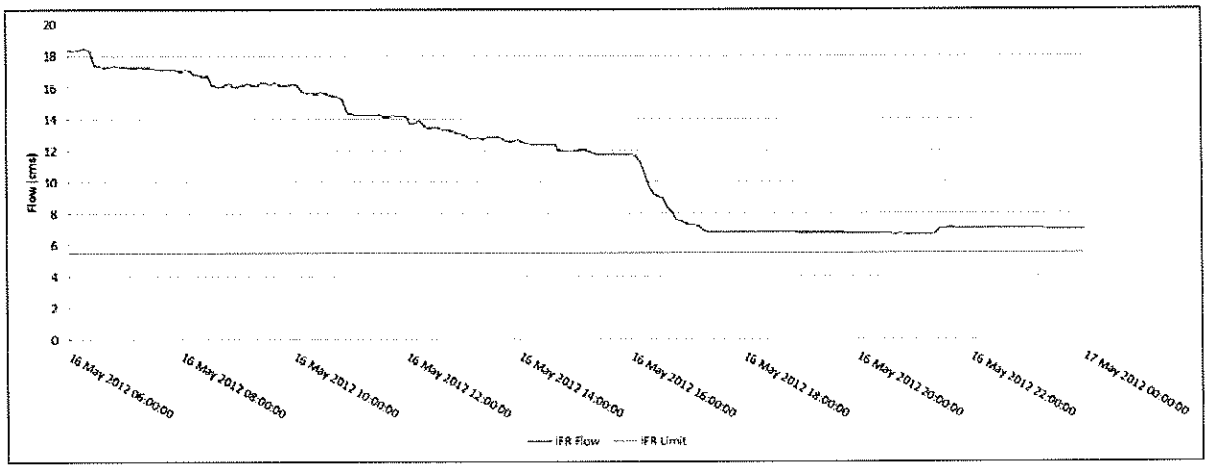


Figure 2: IFR Flow (16 May 2012)



Davies, James W FLNR:EX

2002483

From: Sean Mccoy [SMccoy@innergex.com]
Sent: Monday, May 28, 2012 2:27 PM
To: Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; Francesca Knight; Busto, Vince; Matt Kennedy; John Miller
Subject: RE: Innergex - Unplanned Variance Event - Upper Stave
Attachments: Unplanned Variance Report (16May2012).pdf

Mr. Davies,

The follow-up report for the 16 May 2012 variance event at the Upper Stave generating facility is attached for your records.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

---

From: Sean Mccoy
Sent: May-17-12 4:14 PM
To: James Davies (James.Davies@gov.bc.ca)
Cc: Babakaiff, Scott; Francesca Knight; 'Busto, Vince'; Matt Kennedy; John Miller
Subject: Innergex - Unplanned Variance Event - Upper Stave

Mr. Davies,

Please be advised that on 16 May 2012 there was a ramping event at the Upper Stave generating facility.

A follow-up report will be forwarded once all the data has been compiled and analyzed.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

Project Information

Project:	Upper Stave	**Water Licence:**	124380
Owner:	Innergex Renewable Energy Inc.		
Contact Person:	Sean McCoy	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Position:	Operations Environmental Manager		
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Report Information

Prepared By:	Sean McCoy	**Date:**	25 May 2012
Position:	Operations Environmental Manager	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Was the Unplanned Variance Previously Reported?		**Yes** / No	
Name & Contact Information		**Method**	**Date**
James Davies	James.Davies@gov.bc.ca	Email	17 May 2012
Vince Busto	Vince.Busto@dfo-mpo.gc.ca	Email	17 May 2012
Francesca Knight	Francesca.Knight@dfo-mpo.gc.ca	Email	17 May 2012
Scott Babakaiff	scott.babakaiff@gov.bc.ca	Email	17 May 2012

Event Description

Date:	16 May 2012	**Time:**	16:15
Event Type:	Ramping		

- Creek flow was returning to normal after a high flow event that began two days earlier on 14 May 2012. Refer to Figure 1.
- The radial sluice gate was open during the high flow event to limit spill flow over the rubber dam.
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- No stranded or distressed fish were observed during the stranding searches.
- No change in stage was observed downstream of the powerhouse. Refer to Figure 1.
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- The stage change observed downstream of the intake was -0.4 m (1.2 m to 0.8 m). Refer to Figure 2.

Preventative & Corrective Measures

- Task training for the Operations Group to ensure the sluice gate closing rate is maintained throughout the closing cycle.

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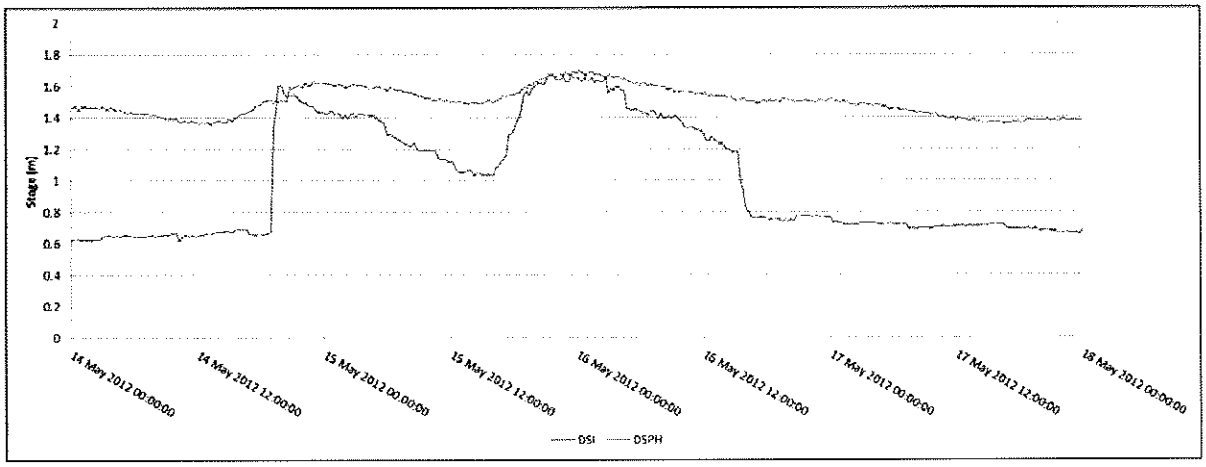
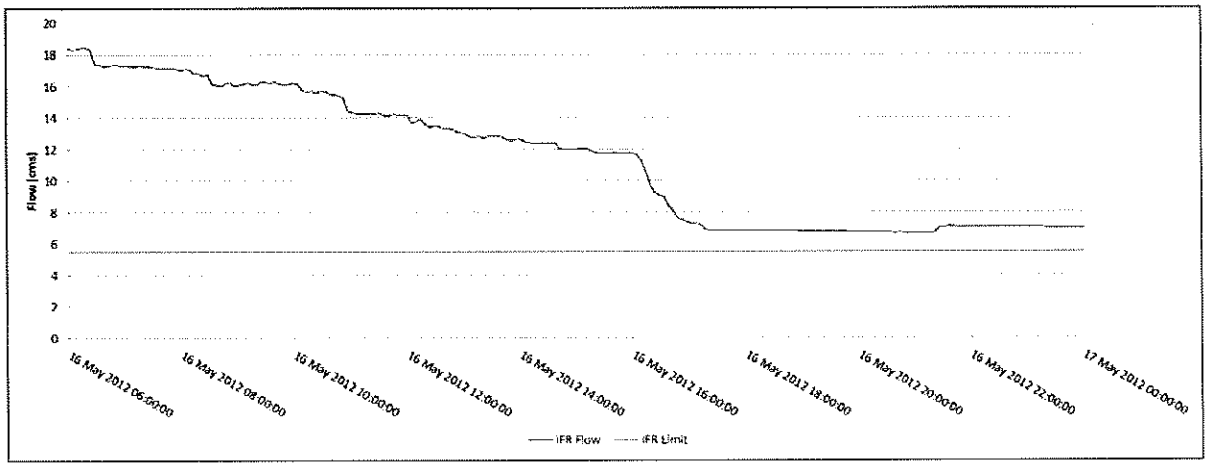


Figure 2: IFR Flow (16 May 2012)



Davies, James W FLNR:EX

2002483

From: Davies, James W FLNR:EX
Sent: Friday, May 18, 2012 1:17 PM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Unplanned Variance Event - Upper Stave
Attachments: image001.jpg

Aman Ullah

Read, print and file.

Thanks

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 586-5637 FAX: (604) 586-4434
email: James.Davies@gov.bc.ca

From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Thursday, May 17, 2012 4:14 PM
To: Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; Francesca Knight; Busto, Vince; Matt Kennedy; John Miller
Subject: Innergex - Unplanned Variance Event - Upper Stave

Mr. Davies,

Please be advised that on 16 May 2012 there was a ramping event at the Upper Stave generating facility.

A follow-up report will be forwarded once all the data has been compiled and analyzed.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

Davies, James W FLNR:EX

2002483

From: Sean Mccoy [SMccoy@innergex.com]
Sent: Thursday, May 17, 2012 4:14 PM
To: Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; Francesca Knight; Busto, Vince; Matt Kennedy; John Miller
Subject: Innergex - Unplanned Variance Event - Upper Stave
Attachments: image001.jpg

Mr. Davies,

Please be advised that on 16 May 2012 there was a ramping event at the Upper Stave generating facility.

A follow-up report will be forwarded once all the data has been compiled and analyzed.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

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Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

Davies, James W FLNR:EX

2002483

From: Sean Mccoy [SMccoy@innergex.com]
Sent: Tuesday, May 8, 2012 11:51 AM
To: Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; 'Francesca.Knight@dfo-mpo.gc.ca'; XT:Busto, Vince DFO EAO:IN; Matt Kennedy; John Miller
Subject: Innergex - Unplanned Variance Event - Upper Stave
Attachments: Unplanned Variance Report (27Apr2012).pdf

Mr. Davies,

The follow-up report for the variance event at the Upper Stave generating facility is attached for your records.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

-----Original Message-----
From: Sean Mccoy
Sent: April-28-12 1:35 PM
To: 'James.Davies@gov.bc.ca'
Cc: 'scott.babakaiff@gov.bc.ca'; 'Francesca.Knight@dfo-mpo.gc.ca'; 'BustoV@pac.dfo-mpo.gc.ca'; Matt Kennedy; John Miller
Subject: Innergex - Unplanned Variance Event - Upper Stave

Mr. Davies,

Please be advised that on 27 April 2012 there was an IFR event at the Upper Stave generating facility.

A follow-up report will be forwarded once all the data has been compiled and analyzed.

Regards,
Sean McCoy

Project Information

Project:	Upper Stave	**Water Licence:**	124380
Owner:	Innergex Renewable Energy Inc.		
Contact Person:	Sean McCoy	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Position:	Operations Environmental Manager		
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Report Information

Prepared By:	Sean McCoy	**Date:**	8 May 2012
Position:	Operations Environmental Manager	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Was the Unplanned Variance Previously Reported?		**Yes** / No	
Name & Contact Information		**Method**	**Date**
James Davies	James.Davies@gov.bc.ca	Email	28 Apr 2012
Vince Busto	Vince.Busto@dfo-mpo.gc.ca	Email	28 Apr 2012
Francesca Knight	Francesca.Knight@dfo-mpo.gc.ca	Email	28 Apr 2012
Scott Babakaiff	scott.babakaiff@gov.bc.ca	Email	28 Apr 2012

Event Description

Date:	27 April 2012	**Time:**	23:00
Event Type:	IFR		

- The Upper Stave River was experiencing abnormally high flow prior to the variance event due to precipitation and warmer weather.
  - The peak instream flow was approximately 135 cms on 26 Apr 2012 @ 08:00. Refer to Figure 1.
  - The river began to naturally ramp down after the peak flow.
- During the high flow event, the IFR gate became partially obstructed due to the high volume of submerged debris which led to the IFR event when the river flow returned to normal.

Response & Mitigation

- The operator remotely opened the sluice gate to restore the IFR flow.
- The IFR gate was manually opened to dislodge the material that was causing the obstruction.

Environmental Impact & Assessment

- The instream flow release was 1.72 cms for approximately six hours, slightly less than the licenced release of 1.85 cms.
- The high flow event caused the stage to change drastically prior to the event.
  - The stage ranged from 0.2 m (prior to high flow event) to 2.9 m (peak flow) and then down to 0.17 m over a period of four days.

Preventative & Corrective Measures

- The plant control system has been modified to maintain the IFR by opening the sluice gate in the event that the IFR gate becomes partially obstructed.

Appendix

Figure 1: IFR Flow (23 Apr 2012 0:00 to 29 Apr 2012 0:00)

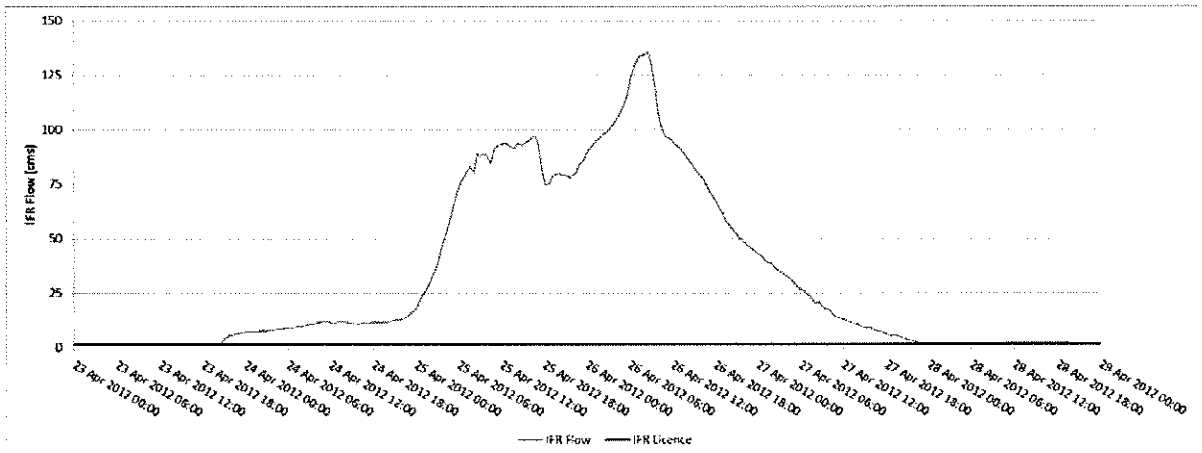
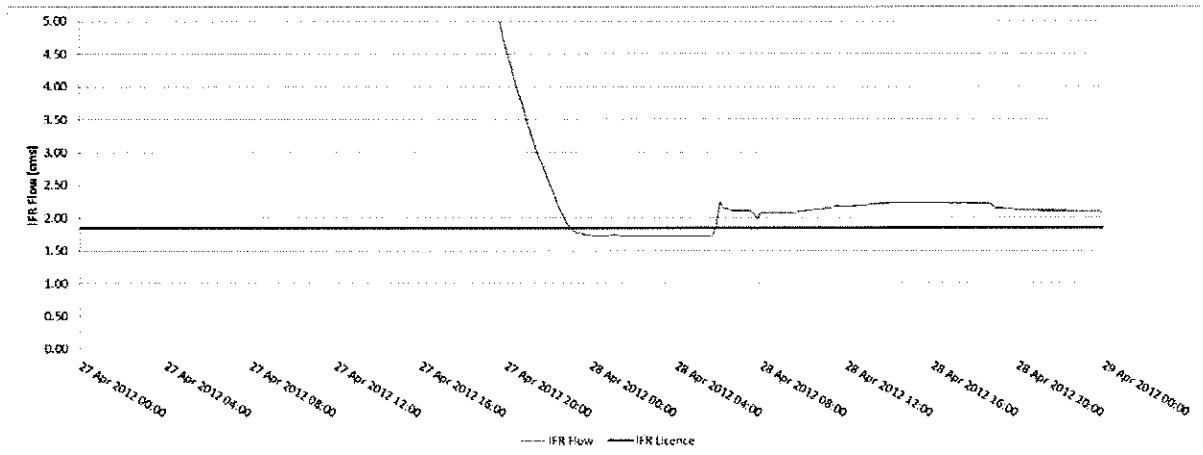


Figure 2: IFR Flow with Licence Limit (27 Apr 2012 0:00 to 29 Apr 2012 0:00)



Davies, James W FLNR:EX

2002483

From: Sean Mccoy [SMccoy@innergex.com]
Sent: Saturday, April 28, 2012 1:35 PM
To: Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; 'Francesca.Knight@dfo-mpo.gc.ca'; XT:Busto, Vince DFO EAO:IN; Matt Kennedy; John Miller
Subject: Innergex - Unplanned Variance Event - Upper Stave

Mr. Davies,

Please be advised that on 27 April 2012 there was an IFR event at the Upper Stave generating facility.

A follow-up report will be forwarded once all the data has been compiled and analyzed.

Regards,
Sean McCoy

Davies, James W FLNR:EX

2002483

From: Sean Mccoy [SMccoy@innergex.com]
Sent: Thursday, April 19, 2012 5:21 PM
To: Davies, James W FLNR:EX; XT:Busto, Vince DFO EAO:IN; 'Francesca.Knight@dfo-mpo.gc.ca'; Babakaiff, Scott C FLNR:EX
Cc: John Miller; Matt Kennedy
Subject: RE: Innergex - Unplanned Variance Event - Upper Stave
Attachments: Unplanned Variance Report (30Mar2012).pdf

Mr. Davies,

The follow-up report for the variance event at the Upper Stave facility is attached for your records.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

-----Original Message-----
From: Sean Mccoy
Sent: March-31-12 3:28 PM
To: 'James.Davies@gov.bc.ca'; 'BustoV@pac.dfo-mpo.gc.ca'; 'Francesca.Knight@dfo-mpo.gc.ca'; 'scott.babakaiff@gov.bc.ca'; 'Erin.Stoddard@gov.bc.ca'
Cc: John Miller; Matt Kennedy
Subject: Innergex - Unplanned Variance Event - Upper Stave

Mr. Davies,

Please be advised that at approximately 23:30 on 30 March 2012 there was an unplanned shutdown of the Upper Stave facility.

A detailed report will be forwarded once all of the data has been compiled and analyzed.

Regards,
Sean McCoy

Project Information

Project:	Upper Stave	**Water Lic#:**	124380
Owner:	Innergex Renewable Energy Inc.		
Contact Person:	Sean McCoy	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Position:	Operations Environmental Manager		
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Report Information

Prepared By:	Sean McCoy	**Date:**	17 April 2012
Position:	Operations Environmental Manager	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Was the Unplanned Variance Previously Reported?		**Yes** / No	
Name & Contact Information		**Method**	**Date**
James Davies	James.Davies@gov.bc.ca	Email	31 Mar 2012
Vince Busto	Vince.Busto@dfo-mpo.gc.ca	Email	31 Mar 2012
Francesca Knight	Francesca.Knight@dfo-mpo.gc.ca	Email	31 Mar 2012
Scott Babakaiff	scott.babakaiff@gov.bc.ca	Email	31 Mar 2012
Erin Stoddard	Erin.Stoddard@gov.bc.ca	Email	31 Mar 2012

Event Description

Date:	30 March 2012	**Time:**	21:45
Event Type:	Ramping		

- A communication fault between the generator and the plant control system caused an unplanned shutdown of the Upper Stave generating facility.
- Communication was restored shortly after the event allowing the operator to restart the generating facility.

Response & Mitigation

- The operators inspected the equipment prior to restarting the generating facility; nothing abnormal was noted.

Environmental Impact & Assessment

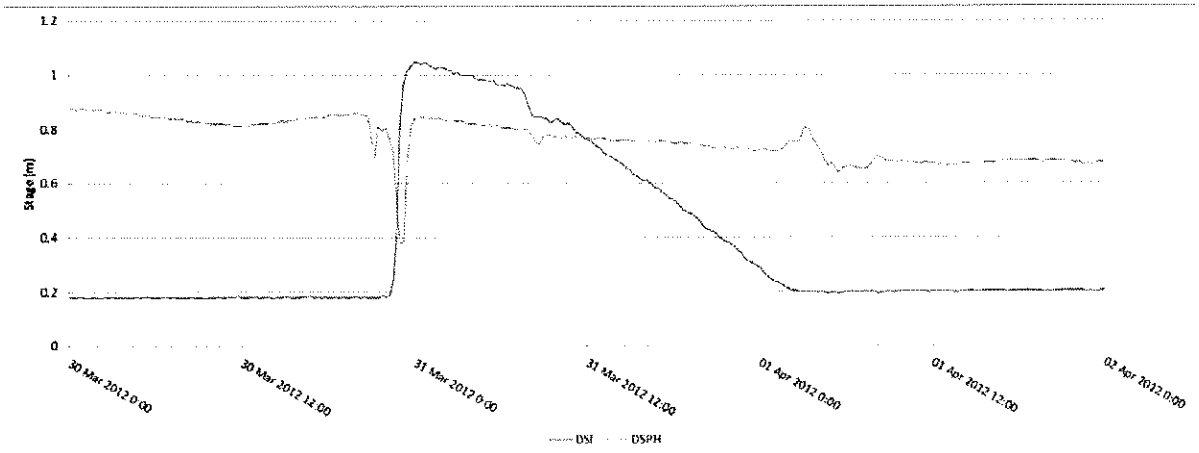
- The stage change observed downstream of the intake was +0.8 m. Refer to Figure 1.
- The stage change observed downstream of the powerhouse was -0.4 m for approximately two hours. Refer to Figure 1.

Preventative & Corrective Measures

- The equipment was inspected by the operators after the event; nothing abnormal was noted during the inspection.
  - The operators will continue to monitor the equipment for abnormal operation and repair as required.

Appendix

Figure 1: Downstream Intake (DSI) & Powerhouse (DSPH) Water Level Gauge



Davies, James W FLNR:EX

2002483

From: Davies, James W FLNR:EX
Sent: Tuesday, April 3, 2012 3:08 PM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Unplanned Variance Event - Upper Stave

Aman Ullah

Read, print and file.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

-----Original Message-----
From: Knight, Francesca [mailto:Francesca.Knight@dfo-mpo.gc.ca]
Sent: Monday, April 2, 2012 1:33 PM
To: Sean Mccoy; Davies, James W FLNR:EX; Busto, Vince; Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX
Cc: John Miller; Matt Kennedy
Subject: RE: Innergex - Unplanned Variance Event - Upper Stave

Was a search initiated for stranded fish? Bull trout fry will be emerging now.
Francesca

Francesca Knight, M.Sc., R.P.Bio.
Habitat Biologist
Fisheries and Oceans Canada / Pêches et Océans Canada Ecosystems Management Branch Lower Fraser River - Le Bas Fraser Unit 3 - 100 Annacis Parkway Delta, BC V3M 6A2
Francesca.Knight@dfo-mpo.gc.ca

Ph: (604) 666-3191 / Fax: (604) 666-6627 Squamish phone: 604-892-2040 Government of Canada - Gouvernement du Canada

Pacific Region 'Working Near Water' website http://www.pac.dfo-mpo.gc.ca/habitat/index-eng.htm

-----Original Message-----
From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: March 31, 2012 3:28 PM
To: 'James.Davies@gov.bc.ca'; Busto, Vince; Knight, Francesca; 'scott.babakaiff@gov.bc.ca'; 'Erin.Stoddard@gov.bc.ca'
Cc: John Miller; Matt Kennedy
Subject: Innergex - Unplanned Variance Event - Upper Stave

Mr. Davies,

Please be advised that at approximately 23:30 on 30 March 2012 there was an unplanned shutdown of the Upper Stave facility.

A detailed report will be forwarded once all of the data has been compiled and analyzed.

Regards,
Sean McCoy

Davies, James W FLNR:EX

2002483

From: Davies, James W FLNR:EX
Sent: Tuesday, April 3, 2012 3:08 PM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Unplanned Variance Event - Upper Stave

Aman Ullah

Read, print and file.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

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From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Saturday, March 31, 2012 3:28 PM
To: Davies, James W FLNR:EX; XT:Busto, Vince DFO EAO:IN; 'Francesca.Knight@dfo-mpo.gc.ca'; Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX
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Ullah, Aman FLNR:EX

2002483

From: Davies, James W FLNR:EX
Sent: Monday, May 28, 2012 4:00 PM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Unplanned Variance Event - Upper Stave (May 16, 2012)
Attachments: Unplanned Variance Report (16May2012).pdf

Aman Ullah

Read, print and file.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 586-5637 FAX: (604) 586-4434
email: James.Davies@gov.bc.ca

From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Monday, May 28, 2012 2:27 PM
To: Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; Francesca Knight; Busto, Vince; Matt Kennedy; John Miller
Subject: RE: Innergex - Unplanned Variance Event - Upper Stave

Mr. Davies,

The follow-up report for the 16 May 2012 variance event at the Upper Stave generating facility is attached for your records.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

From: Sean Mccoy
Sent: May-17-12 4:14 PM
To: James Davies (James.Davies@gov.bc.ca)
Cc: Babakaiff, Scott; Francesca Knight; 'Busto, Vince'; Matt Kennedy; John Miller
Subject: Innergex - Unplanned Variance Event - Upper Stave

Mr. Davies,

Please be advised that on 16 May 2012 there was a ramping event at the Upper Stave generating facility.

A follow-up report will be forwarded once all the data has been compiled and analyzed.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

Project Information

Project:	Upper Stave	**Water Licence:**	124380
Owner:	Innergex Renewable Energy Inc.		
Contact Person:	Sean McCoy	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Position:	Operations Environmental Manager		
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Report Information

Prepared By:	Sean McCoy	**Date:**	25 May 2012
Position:	Operations Environmental Manager	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Was the Unplanned Variance Previously Reported?		**Yes** / No	
Name & Contact Information		**Method**	**Date**
James Davies	James.Davies@gov.bc.ca	Email	17 May 2012
Vince Busto	Vince.Busto@dfo-mpo.gc.ca	Email	17 May 2012
Francesca Knight	Francesca.Knight@dfo-mpo.gc.ca	Email	17 May 2012
Scott Babakaiff	scott.babakaiff@gov.bc.ca	Email	17 May 2012

Event Description

Date:	16 May 2012	**Time:**	16:15
Event Type:	Ramping		

- Creek flow was returning to normal after a high flow event that began two days earlier on 14 May 2012. Refer to Figure 1.
- The radial sluice gate was open during the high flow event to limit spill flow over the rubber dam.
- An operator was slowly closing the sluice gate to follow the decrease in creek flow.
- The closing rate was increased as the gate approached the fully closed position which caused a ramping event in the diversion reach.

Response & Mitigation

- Three fish stranding searchers were conducted by the Hydro Station Operators in the diversion reach.
  - Two were conducted immediately after the event; the third was conducted the next morning.

Environmental Impact & Assessment

- No stranded or distressed fish were observed during the stranding searches.
- No change in stage was observed downstream of the powerhouse. Refer to Figure 1.
- The IFR was maintained throughout the variance at greater than the 5.5 cms licence requirement. Refer to Figure 2.
- The stage change observed downstream of the intake was -0.4 m (1.2 m to 0.8 m). Refer to Figure 2.

Preventative & Corrective Measures

- Task training for the Operations Group to ensure the sluice gate closing rate is maintained throughout the closing cycle.

Appendix

Figure 1: Stage Profile During High Flow Event (14 May 2012 to 18 May 2012)

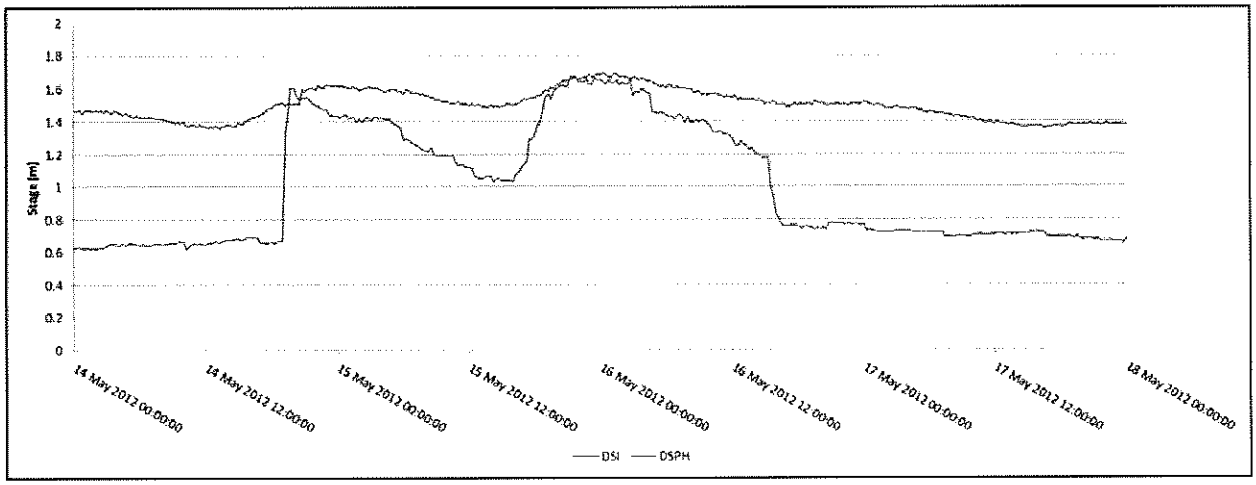
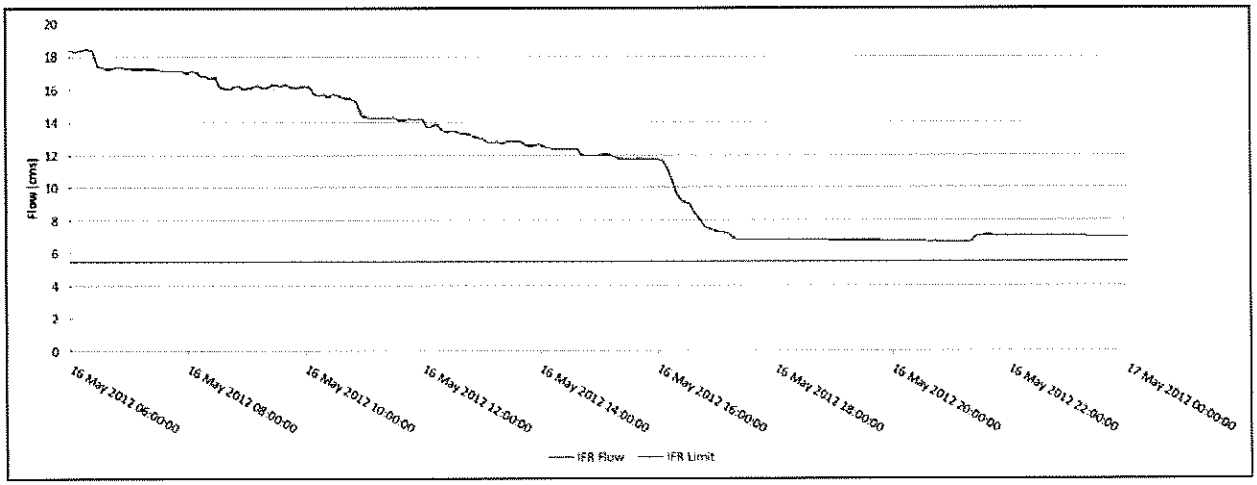


Figure 2: IFR Flow (16 May 2012)



Davies, James W FLNR:EX

2002483

From: Davies, James W FLNR:EX
Sent: Sunday, March 4, 2012 2:21 PM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - IFR Violation at Upper Stave
Attachments: image001.jpg

Aman Ullah

Read, print and file.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Tuesday, February 21, 2012 2:37 PM
To: Busto, Vince; Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; Francesca Knight; Matt Kennedy; John Miller
Subject: RE: Innergex - IFR Violation at Upper Stave

Vince,

Thank you for your reply. Additional information is detailed below in response to your follow-up questions.

1. Section 3.3.3 of the OPPR addresses 'Sediment & Woody Debris Transport' but there is no specific section that addresses clearing debris from the sluice gate. The intake structure is designed to promote the movement of floating debris towards the overflow spillway. The penstock intake has a trash rack to collect floating and submerged debris to prevent damage to the turbine. The sluice gates do not have trash racks installed so that the natural bed load can be transferred downstream of the structure during periods of high flow.
2. It's difficult to say whether the debris was floating on top of the headpond or transported within the water column. I was at the intake structure approximately one hour prior to the event and can definitively say that I did not observe any debris floating on top of the headpond. It is possible that the debris that impeded flow through the sluice gate was part of the bed load and not woody.
3. The opinion by the consultant on the likely impact on fish habitat was expressed during a phone conversation with the consultant. A follow-up report is being prepared and will be forwarded when complete.
4. We are continuing to look for ways to better manage our facilities, including the passage of woody debris and improving the reliability of all systems including those designed to ensure regulatory compliance.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

From: Busto, Vince [mailto:Vince.Busto@dfo-mpo.gc.ca]
Sent: February-14-12 10:05 AM
To: Sean Mccoy; James.Davies@gov.bc.ca
Cc: Babakaiff, Scott; Knight, Francesca; Matt Kennedy; John Miller
Subject: RE: Innergex - IFR Violation at Upper Stave

Sean

Thank-you for your response.

I certainly have concerns and do have more questions and a request. Debris management is in fact part of the OPPR for the facility. It is concerning from a fish habitat point of view if you believe this type of blockage of the small sluice gate is beyond Innergex's control.

I have the following questions and request:
1) Does the "Upper Stave River Parameters and Procedures Mar 2011 rev2" contain any comments and guidance with respect to clearing debris from the small sluice gate?
2) Was the debris that caused the blockage initially transported floating on top of the headpond, or was it transported within the water column?
3) Please provide the expert's analysis that you state shows that no impact to fish habitat occurred, and ask the expert to also comment on the expected impact to fish as a result of the flow reduction.

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Pacific Region 'Working Near Water' website

http://www.pac.dfo-mpo.gc.ca/habitat/index-eng.htm

From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: February 14, 2012 7:56 AM
To: Busto, Vince; James.Davies@gov.bc.ca
Cc: Babakaiff, Scott; Knight, Francesca; Matt Kennedy; John Miller
Subject: RE: Innergex - IFR Violation at Upper Stave

Vince,
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As a follow-up to our initial report on 10 Feb 2012, please consider the following:

- The human machine interfaces (HMI) for the Stave Lake and Harrison Lake operations were designed to be interconnected to allow the operators at each site to assist each other if required. One of the operators at the

Harrison facilities selected the 'acknowledge all' button on the HMI and accidently acknowledged the Upper Stave IFR alarm. This function has since been disabled.

- An instream assessment was not conducted; the IFR decrease was detected and restored after dark which prevented the onsite personnel from safely accessing the diversion reach.
- We view any variation from our Fisheries Authorisation as a serious matter and have taken immediate steps to reduce the response time to these variations. It must be emphasised that the reduction in IFR was caused by a debris blockage outside of our control. It is the response times we continue to try and improve upon.
- Due to your concern for potential habitat destruction, Innergex consulted an expert who confirmed that this temporary reduction in flow (from 1.85 cms to 1.55 cms for 6 hrs.) would not lead to a measurable habitat destruction in the diversion reach. We acknowledge our responsibility to maintain the IFR under the Authorization but we feel that, while serious, the incident did not result in a reduction in fish habitat.

Please let me know if you have any further questions or concerns.
Regards,
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INNERGEX

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From: Busto, Vince [mailto:Vince.Busto@dfo-mpo.gc.ca]
Sent: February-10-12 4:50 PM
To: Sean Mccoy; James.Davies@gov.bc.ca
Cc: Babakaiff, Scott; Knight, Francesca; Matt Kennedy; John Miller
Subject: RE: Innergex - IFR Violation at Upper Stave
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Lower Fraser Area	La bas Fraser
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Operations Environmental Manager

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Ullah, Aman FLNR:EX

2002483

From: Davies, James W FLNR:EX
Sent: Tuesday, February 14, 2012 11:47 AM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - IFR Violation at Upper Stave

Aman Ullah

Read, print and file.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
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From: Busto, Vince [mailto:Vince.Busto@dfo-mpo.gc.ca]
Sent: Tuesday, February 14, 2012 10:05 AM
To: Sean Mccoy; Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; Knight, Francesca; Matt Kennedy; John Miller
Subject: RE: Innergex - IFR Violation at Upper Stave

Sean

Thank-you for your response.

I certainly have concerns and do have more questions and a request. Debris management is in fact part of the OPPR for the facility. It is concerning from a fish habitat point of view if you believe this type of blockage of the small sluice gate is beyond Innergex's control.

I have the following questions and request:
1) Does the "Upper Stave River Parameters and Procedures Mar 2011 rev2" contain any comments and guidance with respect to clearing debris from the small sluice gate?
2) Was the debris that caused the blockage initially transported floating on top of the headpond, or was it transported within the water column?
3) Please provide the expert's analysis that you state shows that no impact to fish habitat occurred, and ask the expert to also comment on the expected impact to fish as a result of the flow reduction.

Vince Busto, B.A.Sc., P.Eng.
Habitat and Hydrotechnical Engineer | Ingénieur de l'habitat et de l'hydrotechnique
Lower Fraser Area | La bas Fraser
Ecosystem Management Branch | Gestion des écosystèmes
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Pacific Region 'Working Near Water' website

http://www.pac.dfo-mpo.gc.ca/habitat/index-eng.htm

From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: February 14, 2012 7:56 AM
To: Busto, Vince; James.Davies@gov.bc.ca
Cc: Babakaiff, Scott; Knight, Francesca; Matt Kennedy; John Miller
Subject: RE: Innergex - IFR Violation at Upper Stave

Vince,
Thank you for your reply.
As a follow-up to our initial report on 10 Feb 2012, please consider the following:

- The human machine interfaces (HMI) for the Stave Lake and Harrison Lake operations were designed to be interconnected to allow the operators at each site to assist each other if required. One of the operators at the Harrison facilities selected the 'acknowledge all' button on the HMI and accidently acknowledged the Upper Stave IFR alarm. This function has since been disabled.
- An instream assessment was not conducted; the IFR decrease was detected and restored after dark which prevented the onsite personnel from safely accessing the diversion reach.
- We view any variation from our Fisheries Authorisation as a serious matter and have taken immediate steps to reduce the response time to these variations. It must be emphasised that the reduction in IFR was caused by a debris blockage outside of our control. It is the response times we continue to try and improve upon.
- Due to your concern for potential habitat destruction, Innergex consulted an expert who confirmed that this temporary reduction in flow (from 1.85 cms to 1.55 cms for 6 hrs.) would not lead to a measurable habitat destruction in the diversion reach. We acknowledge our responsibility to maintain the IFR under the Authorization but we feel that, while serious, the incident did not result in a reduction in fish habitat.

Please let me know if you have any further questions or concerns.
Regards,
Sean McCoy, P.Eng.

Operations Environmental Manager
INNERGEX

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---

From: Busto, Vince [mailto:Vince.Busto@dfo-mpo.gc.ca]
Sent: February-10-12 4:50 PM
To: Sean Mccoy; James.Davies@gov.bc.ca
Cc: Babakaiff, Scott; Knight, Francesca; Matt Kennedy; John Miller
Subject: RE: Innergex - IFR Violation at Upper Stave
Sean
Thank-you for the incident report. Please consider the following.
Attached is a copy of the Fisheries Act Authorization for the Upper Stave operation. As you will see in the Authorization the minimum IFR for the months of December to April inclusive is 1.85 cubic metres per second. Within the
DFO recognizes that that the flow reduction within the diversion reach is a HADD; however, the Authorization accepts some level of impact. The drop in flow that has been reported is outside of what was authorized by DFO, and is therefore an unauthorized HADD. Even within the rating system included in your report this event should be rated as a "Medium-High (Extreme)" event. Therefore my immediate concerns are twofold:
1) The unauthorized HADD that resulted in reduced flows in the diversion reach and lasted for over 6 hours
2) Innergex's reporting of the event as a "Category: Minor"
Was there any instream assessment conducted to determine what the impacts to fish were as a result of the flow reduction?

Vince Busto, B.A.Sc., P.Eng.
Habitat and Hydrotechnical Engineer | Ingénieur de l'habitat et de l'hydrotechnique
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From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: February 9, 2012 4:17 PM
To: James Davies (James.Davies@gov.bc.ca)
Cc: Busto, Vince; Babakaiff, Scott; Knight, Francesca; Matt Kennedy; John Miller
Subject: Innergex - IFR Violation at Upper Stave

Mr. Davies,
On 8 Feb 2012, there was an IFR violation at the Upper Stave facility. The IFR dropped unexpectedly at 15:33; likely due to debris partially plugging the sluice gate. The sluice gate was adjusted and the IFR was restored at 21:45.
The incident report is attached for your reference.
Regards,
Sean McCoy, P.Eng.

Operations Environmental Manager
INNERGEX

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Davies, James W FLNR:EX

From: Davies, James W FLNR:EX
Sent: Thursday, February 2, 2012 8:18 AM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Incident Report - Ashlu Ramping

Aman Ullah

Update on Ashlu ramping.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

From: Matt Kennedy [mailto:MKennedy@innergex.com]
Sent: Wednesday, February 1, 2012 6:19 PM
To: Knight, Francesca; Sean Mccoy; Busto, Vince; Davies, James W FLNR:EX
Cc: John Miller; Stoddard, Erin M FLNR:EX; Babakaiff, Scott C FLNR:EX
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Hi Francesca

Thank you for your comments. We take our commitments seriously and mobilize field crews from Squamish as soon as possible when a ramping incident occurs. We will continue to work to improve response times and to best coordinate maintenance activities.

Regarding terminology, clearly ramping is an evolving subject and so goes for descriptive terms in use. We are open to alternate terminology that is more agreeable to DFO.

Matt

Matt Kennedy, M.Sc., R.P.Bio.

Vice President, Environment - Western Region

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From: Knight, Francesca [mailto:Francesca.Knight@dfo-mpo.gc.ca]
Sent: January 30, 2012 8:15 AM
To: Sean Mccoy; Busto, Vince; James.Davies@gov.bc.ca
Cc: Matt Kennedy; John Miller; Stoddard, Erin; Babakaiff, Scott
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Hi folks, I took a look at the Ecofish and Innergex reports for the two events, and have some comments:

1. Ecofish crews were not on site until well after flows had come back up, making language such as "no stranded fish were found at either of the two downstream monitoring sites" misleading. Having Ecofish on site and commencing stranding searches within 24 hours is not an effective strategy for managing these events. Given the time delay

between the two events and commencement of the stranding search (as well as the presence of fry at the monitoring sites) we can only assume that fry very likely were stranded, but any evidence of such was gone by the time Ecofish personnel arrived. We have discussed this as a group many times, and Innergex is aware of DFO's concerns around the absence of stranded fish when searches are commenced so late after an event (given that report conclusions typically indicate that in fact the event was not harmful to fish). In this cases, the reports should include a statement like, "Although no stranded or dead fish were found during the searches at the established stranding-sensitive sites, search results are equivocal, as crews were not on site until XX hours after river flows had come back to pre-incident levels". We have talked about this issue many times, which leads me to my next point:

2. Timing of maintenance work - Even the Innergex incident report acknowledges that the work on the generators should have been postponed until the river was at higher flows. As a group, we have discussed numerous possible measures to mitigate the effects of ramp rate non-compliance events, including timing works to coincide with higher ambient flows. Searching stranding sites many hours following an incident is not an effective strategy for managing such incidents.

3. Finally, I don't think this group has agreed to the terminology of a "ramping excursion". Somewhere between the development of the Ecofish / CEBC ramping guidelines document (which is currently under review by DFO and MFLNRO) and the two recent ramping events at Ashlu, the "ramping excursion" term has worked its way into the Ashlu Ecofish incident report. The term is not accurate, and a more appropriate term has to be used to define and describe what is really a ramp rate non-compliance event.

Francesca

Francesca Knight, M.Sc., R.P.Bio.
Habitat Biologist
Fisheries and Oceans Canada / Pêches et Océans Canada
Ecosystems Management Branch
Lower Fraser River - Le Bas Fraser
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From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: January 26, 2012 4:32 PM
To: Busto, Vince; James Davies (James.Davies@gov.bc.ca)
Cc: Matt Kennedy; John Miller; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Subject: RE: Innergex - Incident Report - Ashlu Ramping

All,

Attached are both the Innergex and Ecofish reports for the 19 Jan 2012 ramping events at the Ashlu Hydro facility for your reference.

Please let me know if you require any additional information or have any questions.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

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From: Busto, Vince [mailto:Vince.Busto@dfo-mpo.gc.ca]
Sent: January-20-12 5:06 PM
To: Sean Mccoy; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Sean

Please provide a little more information, like:
- maximum ramping rate
- total stage change downstream
- duration of the rapid ramping event

Vince Busto, B.A.Sc., P.Eng.
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-----Original Message-----
From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Fri 1/20/2012 4:38 PM
To: Busto, Vince; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: Innergex - Incident Report - Ashlu Ramping

All,

Please be notified that at approximately 18:00 yesterday (19 January 2012), the Ashlu Hydro Facility exceeded the allowable ramping rate as measured at the downstream gauging site.

A field crew (Ecofish Research Ltd.) has been dispatched to evaluate the on-site conditions.

A more detailed report will be provided within the next two weeks as per our incident protocol.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

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Davies, James W FLNR:EX

From: Davies, James W FLNR:EX
Sent: Wednesday, February 1, 2012 8:35 AM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Incident Report - Ashlu Ramping

Aman Ullah

FW: Innergex - Incident Report - Ashlu Ramping

As discussed Jan 31, this is the email from DFO on the Ashlu ramping incident.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

From: Knight, Francesca [mailto:Francesca.Knight@dfo-mpo.gc.ca]
Sent: Monday, January 30, 2012 8:15 AM
To: Sean Mccoy; Busto, Vince; Davies, James W FLNR:EX
Cc: Matt Kennedy; John Miller; Stoddard, Erin M FLNR:EX; Babakaiff, Scott C FLNR:EX
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Hi folks, I took a look at the Ecofish and Innergex reports for the two events, and have some comments:

1. Ecofish crews were not on site until well after flows had come back up, making language such as "no stranded fish were found at either of the two downstream monitoring sites" misleading. Having Ecofish on site and commencing stranding searches within 24 hours is not an effective strategy for managing these events. Given the time delay between the two events and commencement of the stranding search (as well as the presence of fry at the monitoring sites) we can only assume that fry very likely were stranded, but any evidence of such was gone by the time Ecofish personnel arrived. We have discussed this as a group many times, and Innergex is aware of DFO's concerns around the absence of stranded fish when searches are commenced so late after an event (given that report conclusions typically indicate that in fact the event was not harmful to fish). In this cases, the reports should include a statement like, "Although no stranded or dead fish were found during the searches at the established stranding-sensitive sites, search results are equivocal, as crews were not on site until XX hours after river flows had come back to pre-incident levels". We have talked about this issue many times, which leads me to my next point:

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3. Finally, I don't think this group has agreed to the terminology of a "ramping excursion". Somewhere between the development of the Ecofish / CEBC ramping guidelines document (which is currently under review by DFO and MFLNRO) and the two recent ramping events at Ashlu, the "ramping excursion" term has worked its way into the Ashlu Ecofish incident report. The term is not accurate, and a more appropriate term has to be used to define and describe what is really a ramp rate non-compliance event.

Francesca

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Ecosystems Management Branch

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From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: January 26, 2012 4:32 PM
To: Busto, Vince; James Davies (James.Davies@gov.bc.ca)
Cc: Matt Kennedy; John Miller; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Subject: RE: Innergex - Incident Report - Ashlu Ramping

All,

Attached are both the Innergex and Ecofish reports for the 19 Jan 2012 ramping events at the Ashlu Hydro facility for your reference.

Please let me know if you require any additional information or have any questions.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

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From: Busto, Vince [mailto:Vince.Busto@dfo-mpo.gc.ca]
Sent: January-20-12 5:06 PM
To: Sean Mccoy; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Sean

Please provide a little more information, like:
- maximum ramping rate
- total stage change downstream
- duration of the rapid ramping event

Vince Busto, B.A.Sc., P.Eng.
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Sent: Fri 1/20/2012 4:38 PM
To: Busto, Vince; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: Innergex - Incident Report - Ashlu Ramping

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Davies, James W FLNR:EX

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Sent: Monday, January 30, 2012 8:15 AM
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Cc: Matt Kennedy; John Miller; Stoddard, Erin M FLNR:EX; Babakaiff, Scott C FLNR:EX
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Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

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Please provide a little more information, like:
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A more detailed report will be provided within the next two weeks as per our incident protocol.

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Davies, James W FLNR:EX

From: Davies, James W FLNR:EX
Sent: Friday, January 27, 2012 8:41 AM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Incident Report - Ashlu Ramping
Attachments: Ramping Event Compliance Report (19 Jan 2012).pdf; Ecofish - ASU Ramping Event (19 Jan 2012).pdf

Aman Ullah

For your attention.

James Davies, P.Eng.
Acting Section Head – Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
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To: XT:Busto, Vince DFO EAO:IN; Davies, James W FLNR:EX
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INNERGEX

Renewable Energy.
Sustainable Development.

26 January 2012

James Davies
Acting Section Head, Water Allocation
Ministry of Forest, Lands and Natural Resource Operations
10470-152rd St.
Surrey, BC V3R 0Y3

Vince Busto
Habitat and Hydrotechnical Engineer
Fisheries and Oceans Canada
Unit 3 - 100 Annacis Parkway
Delta, BC V3M 6A2

Reference: Ashlu Creek Hydroelectric Project

Subject: Ramping Event Compliance Report – 19 January 2012

Mr. Davies / Mr. Busto,

In accordance with Section 5.5 of the Ashlu Creek Operating Parameters and Procedures Report, the compliance report for the 19 January 2012 ramping event at the Ashlu facility is detailed below.

Description

- The generator supplier (Andritz) was onsite to repair a deficiency with the speed pickup probes on all three generators.
- The deficiency repair required the generators to be stopped and restarted which resulted in a ramping event that exceeded the approved rate in the OPPR.
- After further review of the data, a minor ramping event was observed between 13:32 and 14:02 in addition to the reported event between 17:18 and 18:28.
- There is some uncertainty regarding the accuracy of the downstream monitoring site (ASU-DSLG01) after the landslide event in November 2011. Please refer to John Miller's letter dated 20 December 2011.

Mitigation & Response

- The PLC generated ramping alarm was confirmed by an alarm generated at the downstream hydrometric gauge (ASU-DSLG01).
- Ecofish was dispatched to the site to conduct a stranding search of the downstream stranding sensitive sites (ASU-DSSD04 and ASU-DSSD05) on 20 January 2012.
- The total plant flow returned to normal at the completion of the maintenance. (Figure 1)

Environmental Impact

- No stranded or isolated fish were found in either of the two established downstream monitoring sites by Ecofish during their search.
- The stage change during the first event was -7.3 cm with a maximum stage change rate of -4.1 cm/hr.
- The stage change during the second event was -6.1 cm with a maximum stage change rate of -5.5 cm/hr.
- The complete Ecofish report is attached for your reference.

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Preventative Measures

- Replacement of the speed pickups is not routine maintenance and should not need to be performed again in the near future.
- The operators have been advised that similar work that may have an impact on plant flow should be conducted during periods of higher flow when the river is less sensitive to changes.

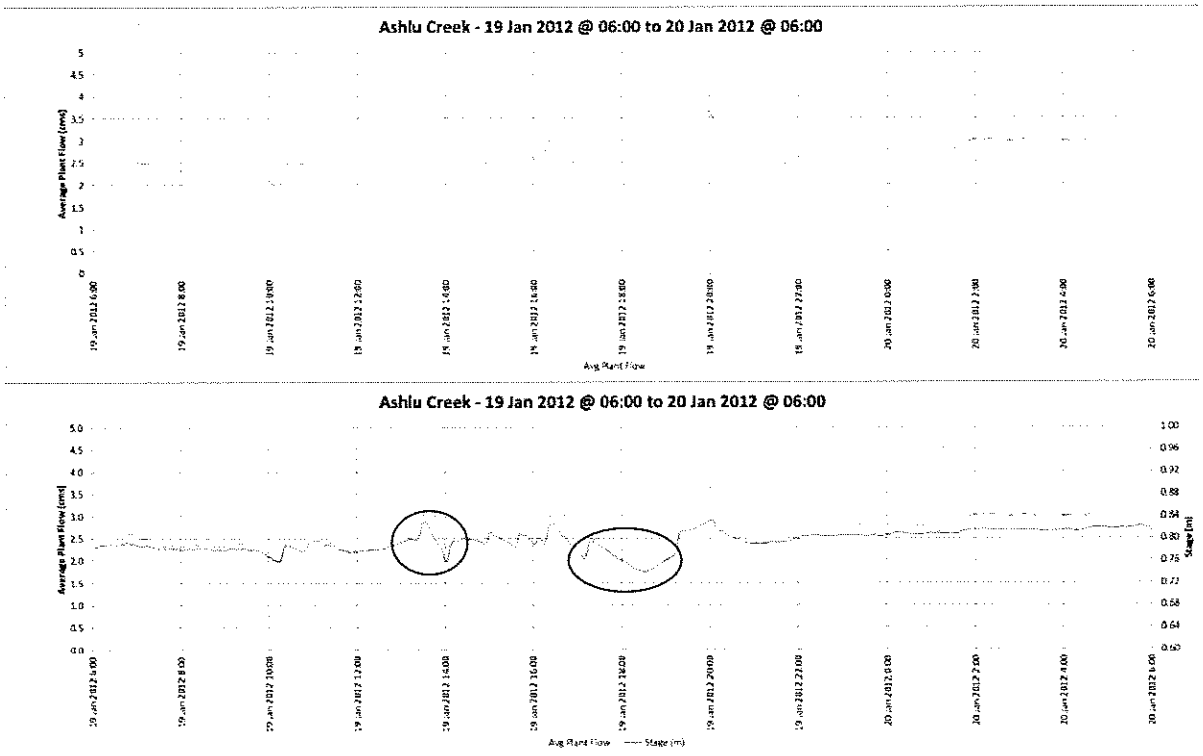
Please let me know if you require any additional information or have any questions.

Sincerely,

Sean McCoy
Operations Environmental Manager

Encl: Ecofish Memorandum – 26 Jan 2012
Cc: MFLNRO: Erin Stoddard, Scott Babakaiff
DFO: Francesca Knight
Innergex: Richard Blanchet, Francois Hebert, John Miller, Michel Malette, Brian Patjas, Colin Murrell

Figure 1: Plant data for the period of 19 January 2012 @ 06:00 to 20 January 2012 @ 06:00



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ECOFISH RESEARCH

MEMORANDUM

TO: Sean McCoy
FROM: Elyse MacDonald
DATE: January 26, 2012
FILE: 1112-04
RE: Ashlu Creek - Ramping Incident Response Monitoring

This memo describes observations made during ramping incident response monitoring conducted for Innergex on the Ashlu Creek River run-of-river hydroelectric project (the Project) on January 20, 2012. Two ramping excursions occurred on January 19 at 13:32 hrs and 17:18 hrs. Ecofish staff received two automated email alarm notifications at 15:10 hrs and 19:00 hrs (all times are Pacific Standard Time PST - local time) on January 19, alerting them of the the two events respectively.

Stage change criteria are measured at the downstream permanent hydrometric gauge, ASU-DSLG01 and ramping rates were calculated following the standard protocol which has been used previously on the Ashlu and Fitzsimmons projects (Appendix A).

The first event on January 19 was a -7.3 cm stage reduction from 13:32 hrs to 14:02 hrs in the downstream reach that resulted in a maximum hourly stage change rate (maximum ramping rate) of -4.1 cm/hr (Figure 1 and Table 1). The stage decrease exceeded the stage change criteria of -4.0 cm/hr, and also met the other conditions necessary to be flagged as an excursion based on the standard protocol (stage remained outside of compliance criteria for more than ten minutes, and the 24hr wetted history stage was higher than during the event). Innergex staff confirmed that the operational ramping rate of 1.5 cms/hr was exceeded during these events. This was required because the ASU-DSLG01 rating curve was affected by a landslide in November 2011, and Innergex has proposed to agencies that the operational rate be used to confirm compliance until the rating curve is re-established. It should be noted that a larger stage change at ASU-DSLG01 might be recorded now for a similar change in flow than before the landslide, as the slide constricted the banks near the gauge.

During the second event, stage declined by -6.1 cm between 17:18 and 18:28. The maximum hourly stage change rate was -5.5 cm/hr (Figure 1 and Table 1).

Time series of discharge, stage, and ramping rates at ASU-DSLG01 for both events are shown in Figure 1.

Crews were on site from 15:55 to 16:52 hrs on January 20 and searched the two established downstream monitoring sites (ASU-DSSD04-05). Broad-based searches lasted a total of 20 minutes and covered an area of 250 m^2. Hotspot searches were also conducted at each of the two established monitoring sites and covered a total area of 180 m^2. The total time spent searching at hotpots was 57 minutes. Since the water levels were low and little stranding habitat was exposed, the total area

searched with hotspots was slightly less than the standard protocol of 100 m^2 of hotspot searches per site, and searches focused on the margin habitat to a depth of approximately 0.01 m, where fry were most likely to have been stranded during an excursion. The maximum total stage change at ASU-DSLG01 was 7.3 cm and stage change at ASU-DSSD04 and ASU-DSSD05 is less than that observed at ASU-DSLG01[1]. Therefore, searches to a depth of 10 cm would include the potentially dried marginal habitat during the excursion (Figure 2).

A live fry was observed hiding under cobble in approximately 10 cm of water at 16:08 hrs at ASU-DSSD04, and four live fry were observed in approximately 15 cm of water at 16:48 hrs at ASU-DSSD05. No stranded or isolated fish were found in either site.

In summary, two ramping events exceeding the -4.0 cm/hr stage change criteria for ASU-DSLG01 and 1.5 cms/hr operational rate for shutdowns were recorded downstream of the Project powerhouse on January 20, 2012. Ecofish crews were onsite within 24 hours of receiving notification of the first event, and no stranded or isolated fish were found.

Please contact me if you have any questions or need further information.

Yours truly,
Ecofish Research Ltd.

signed

Elyse MacDonald, B.Sc., R.P.Bio., CPESC
Environmental Biologist, Project Manager

[1] Lewis, A., E. MacDonald, K. Lyle, K. Sheldon. 2011. Ashlu Creek Hydropower Project Flow Ramping Study. Consultant's report prepared by Ecofish Research Ltd for Innergex Renewable Energy.

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Table 1. Summary of stage change, incident duration, and rate of change at ASU-DSLG01 during the ramping excursions on January 19, 2012.

Compliance Point	Start Time (PST)	End Time (PST)	Duration (hh:mm)	Stage Start (cm)[4]	Stage End (cm)[4]	Total Stage Change (cm)[1]	Maximum Hourly Stage Change Rate (cm/hr)[1,3]	Estimated Discharge Start (cms)[2]	Estimated Discharge End (cms)[2]
ASU-DSLG01	19-Jan-12 13:32	19-Jan-12 14:02	00:30	83.1	75.8	-7.3	-4.1	5.5	3.8
ASU-DSLG01	19-Jan-12 17:18	19-Jan-12 18:28	01:10	80.1	74.0	-6.1	-5.5	4.7	3.4

[1] Negative number indicates stage decrease

[2] ASU- DSLG01 discharge estimated from Rating Curve 14 (RC14); Discharge = 23.024 * (Stage - 0.212) ^ 2.989. Discharge values are estimates and based on an uncertain rating curve since the November slide

[3] This is the maximum stage change recorded within one hour at the hydrometric gauge.

[4] Start and End Times denote stage decrease induced by ramping.

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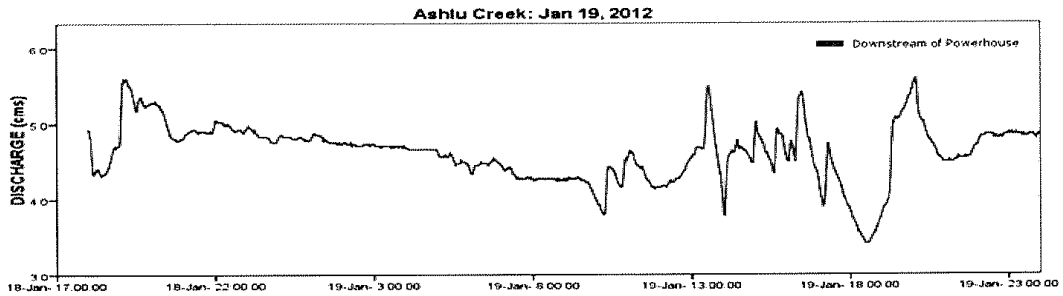
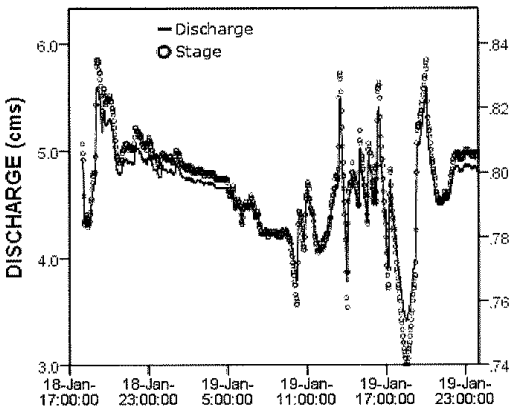
Figure 1. **Discharges from January 18 to January 20, 2011; a) at the downstream permanent gauges over time, b) in relation to stage at the downstream permanent gauge (ASU-DSLG01) on January 19, and c) in relation to ramping rates at downstream permanent gauge (ASU-DSLG01) on January 19 – the ramping criteria of -4.0 cm/hr is shown by the yellow reference line. Discharge values are estimates based on the uncertain rating curve since the November 2010 landslide.**

a)



b)



c)

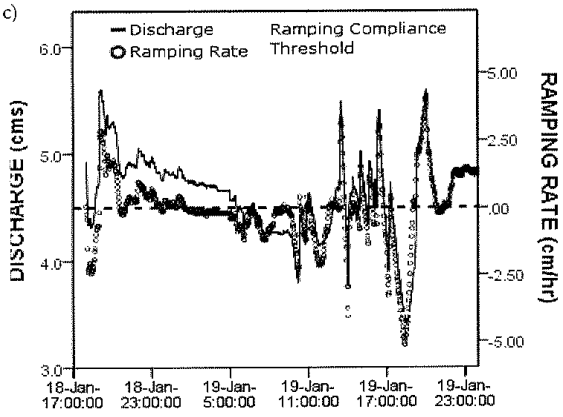


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Figure 2. Potential stranding habitat at ASU-DSSD05 on January 20, 2012.

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Appendix A. Ramping Rate Violation Measurement

The procedure is as follows:

1. The maximum stage observed over the past hour at time t_i, $hmax(t_i)$, should be determined for each data point according to the following equation:

$$hmax(t_i) = \max\left(h(t_{i-k}), \ldots, h(t_{i-1})\right)$$

where h is stage, k is the number of data points recorded per hour, and t is time,
The maximum stage decrease over the past hour relative to time t_i is then defined by the equation:

$$\Delta hmax(t_i) = h(t_i) - hmax(t_i)$$

2. If the maximum stage change $\Delta hmax(t_i)$ exceeds the ramping criterion (e.g. -4.0 cm for ASU-DSLG01), the data are flagged as a potential ramping event. That is the exceedance rule (Rule 1).

3. A mortality event is assumed to occur if the stage remains below $hmax(t_i)$ for a critical period, which is the dewatering time. The time to asphyxiation is assumed to be 10 minutes considering both air exposure and the time needed for the substrate to drain. This is the dewatering rule (Rule 2).

4. The average stage over some time prior to a ramping event may be used to determine the likelihood of habituation of the affected habitat (we have selected 24 hours). If the maximum level associated with the ramping exceeds the average stage from the past 24 hours, the stage change is recomputed using the 24hr average (as hmax), and violation of Rule 1 is reassessed. If the stage change based on the 24hr average does not exceed the ramping criteria, the event is not flagged as a ramping excursion.

Davies, James W FLNR:EX

From: John Miller [JMiller@innergex.com]
Sent: Monday, April 2, 2012 6:55 AM
To: Davies, James W FLNR:EX
Subject: FW: 2011 Harrison Operating Reports - DGL,FRE,LMN
Attachments: 2011 DGL Operations Summary.pdf; 2011 FRE Operations Summary.pdf; 2011 LMN Operations Summary.pdf

Email below bounced back so I'll send a few at a time

John D. Miller, P.Eng.

Vice President - Operations and Maintenance, Western Region

INNERGEX

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Tel. 604 633-9990 x229 | Cell. 778 994-3180 | www.innergex.com

From: John Miller
Sent: April 2, 2012 6:48 AM
To: 'Davies, James W ENV:EX'
Subject: 2011 Harrison Operating Reports

Hi Jim

Sorry – these should have gone out Friday. I trust the short delay is not an inconvenience. The reports are to include an electronic copy of data – these were too large to email so will be copied onto CD and couriered today.

Should you have any questions, please call or email. Ashlu and Fitz to follow.

Regards

John D. Miller, P.Eng.

Vice President - Operations and Maintenance, Western Region

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Tel. 604 633-9990 x229 | Cell. 778 994-3180 | www.innergex.com

From: Nicholas Daniel
Sent: March 30, 2012 4:55 PM
To: John Miller
Subject: 2011 Harrison Operating Reports

Hi John

Attached are the 2011 Annual Operating Reports for the Harrison facilities.

Regards,

Nicholas Daniel, M.Eng, EIT

Project Engineer

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
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INNERGEX

2011 Harrison Hydro Operations Summary

Fire Creek Generating Station

2012.

Revision History

Revision	Date of Revision	Summary of Revision
Rev 1	Mar 30. 2011	Initial Issue

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1.0 Introduction

The Fire Creek Hydroelectric Generating Station is located near Tipella, B.C. approximately 100 km northeast of Vancouver, B.C. The facility consists of a head pond, static coanda screen, a 3.1 km penstock and two six-jet vertical pelton turbines with a total power capacity of 25 MW. Construction of the Generating Station was completed in the Fall of 2009 for the owner Harrision Hydro Limited Partnership (HHLP). The plant is operated by Innergex Renewable Energy Inc (Innergex). The plant is being operated in compliance with Conditional Water Licence No. 121116 (File No.2002403) that was issued August 23, 2005.

As required by the Water Licence, HHLP submitted an Operating Parameter and Procedures Report (OPPR) to the Ministry of Forests, Lands and Natural Resources Operations (MFLNRO) in June 2010 that outlines the parameters and procedures that the Fire Creek Generating Station uses to comply with the Water Licence. In addition, the report outlines the monitoring and reporting requirements required by the MFLNRO to demonstrate compliance. As part of the monitoring and reporting requirements, Innergex is to provide the MFLNRO with an annual report summarizing the operations of the Fire Creek Generating Station. Under the Conditional Water Licence, Innergex is also required to participate in an annual Long Term Monitoring Program (LTMP) for the first five years of operation. This program requires annual reports to be submitted to MFLNRO to ensure that the risks, environmental impacts and performance of the constructed facilities were consistent with the expectations outlined during the licensing and permitting phase of the project.

The purpose of this report is to provide the MFLNRO with a summary of annual operations at the Fire Creek Generating Station to verify compliance with the Conditional Water Licence and the OPPR. The information contained within this report will also be included in HHLP's 2011 LTMP submission. This report includes:

- A summary table of all incidents within the year 2011;
- A summary of any in-stream maintenance activities undertaken either in accordance with specified procedures in the OPPR or unspecified procedures (e.g., pertaining to headpond flushing, sediment monitoring and transport, etc.);
- A summary of annual flow data in graphical format, to confirm compliance with maximum authorized diversion rates, and in-stream flow requirements;
- A summary of ramping monitoring;
- Electronic version of flow data;
- A summary of plant shutdowns, tailrace inspection and fish stranding monitoring and salvage activities; and
- Water Licence returns detailing energy production.

2.0 Incidents and In-Stream Maintenance Activities

2.1 Reported Incidents

An incident is defined as any environmental infringement, non-compliance with Water Licence, or OPPR conditions such as IFR or ramping violations. During 2011, there were no incidents at the Fire Creek Generating Station.

2.2 Unreported Incidents

There were no unreported incidents at the Fire Creek Generation Station in 2011.

2.3 In-stream Maintenance Activities

During 2011, Knight Piesold's (KP) hydrometrics group made IFR verification measurements downstream of the intake. The results of the IFR verification measurements are summarized in the table below

Table 1-IFR Verification Measurements

Date	Time	Measured Flow (cms)	Plant Data (cms)	Difference (cms)
18/10/2011	10:20 AM	0.75	0.75	0.00
17/03/2011	4:29 PM	0.59	0.55	-0.04

3.0 In-stream Flow Release (IFR) and Plant Flow Compliance

3.1 Licensed Operating Limits

The Conditional Water Licence allows for a diversion of a maximum 10.5 m^3/s from Fire Creek. The Conditional Water Licence also specifies the minimum amount of water that must remain in the diversion reach at all times throughout the year (IFR). The table below contains a schedule of Licensed IFR at the Fire Creek Generating Station.

Table 2-Licensed IFR

Month	IFR(m^3/s)
January	0.5
February	0.5
March	0.5
April	0.5
May	0.5
June	2.0
July	0.9
August	0.9
September (1-15)	0.9
September (16 – 30)	1.1
October (1 – 15)	1.1
October (16 – 31)	0.7
November	0.7
December	0.7

3.2 Flow Compliance

Flow compliance data is summarized in Figure 1 and Figure 2 below. The plant flow and IFR were measured and recorded using the methodology described in the OPPR. An electronic copy of the data in the graphs below is appended to this document.

Flow compliance was assessed using hourly average flow data. During 2011, there were no instances where the maximum authorized diversion flow or IFR License limit were violated. There was, however, a discrepancies in the data set that is discussed below in detail.

- On December 28th, there was an intake sensor fault that caused the IFR gauge to record erroneous values for 5 hours. As a result, this data was excluded from the data set.

Figure 1 - Graphical Summary of 2011 IFR

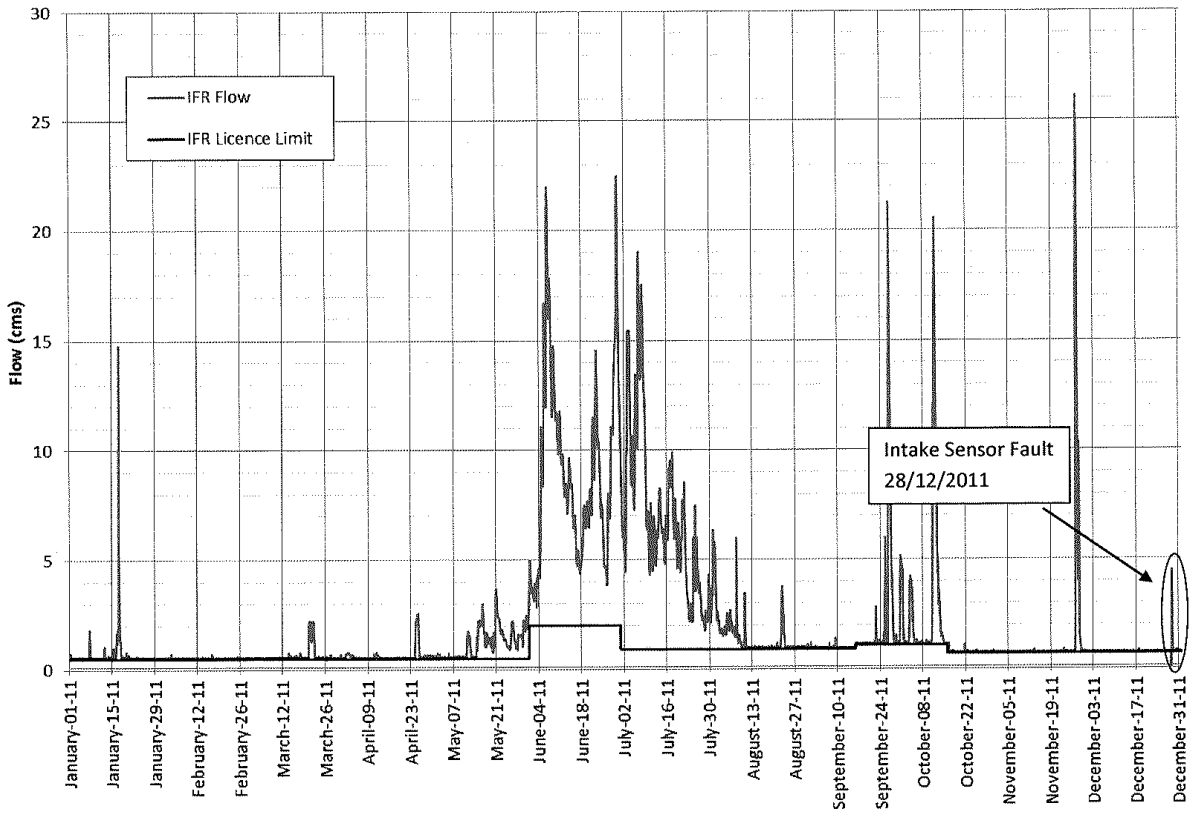
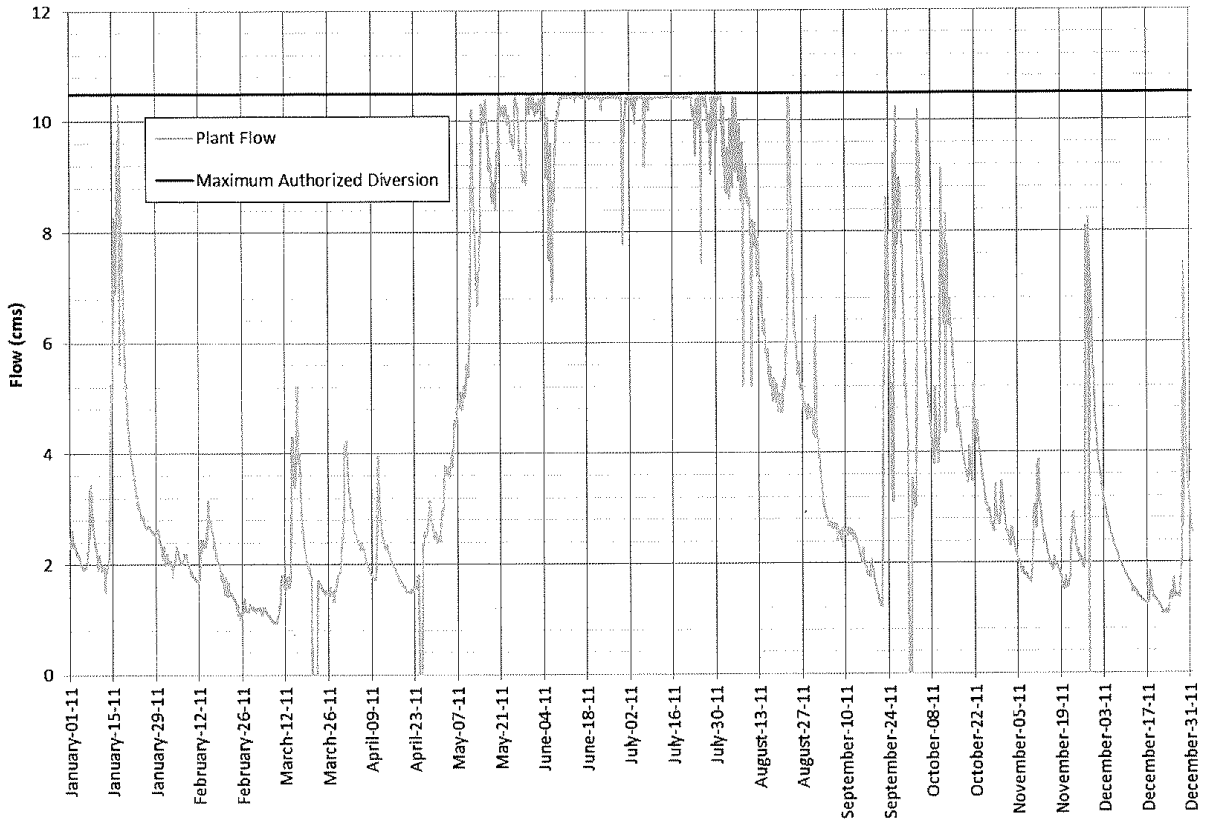


Figure 2-Graphical Summary of 2011 Plant Flows



4.0 Ramping

The *Fisheries Act Authorization* for the Fire Creek Generating Station regulates the rate at which the plant can increase and decrease flows during start-ups and shutdowns to minimize the risk of fish stranding. The Authorization stipulates interim ramping rates until site specific ramping studies can be completed. These interim rates where expressed as changes in stage of 2.5 cm/hr when fry are present and 5.0 cm/hr at other times, below a threshold of 60% mean annual discharge (MAD). Prior to commissioning, this interim protocol was revised to 5.0 cm/hr from the threshold to the high IFR and 2.5 cm/hr from the high IFR to the low IFR.

Ramping studies were submitted to MFLNRO in May 2011 and feedback was received in September. Based on the feedback from the agencies Innergex was required to make several changes to the interim ramping protocol at Fire Creek. The resulting ramp rates that are programmed into the flow controller at Fire Creek are summarized in the table below.

Table 3 - Ramping Rates

	Threshold Flow		Ramping Rate at Compliance Point (cm/h)	
	m^3/s	% MAD	To High IFR	To Low IFR
Start Up	3.5	65%	8.6	2.5
Shutdown	4.3	80%	5	2.5

The ramp rates in the table above are measured at a compliance point downstream of the intake (DSI) during start up and downstream of the powerhouse (DSPH) during shutdowns. The plant does not directly measure stage at either if the compliance points. Stage is calculated using the stage discharge curve for the compliance point and the flow either DSI or DSPH. The formula below is used to describe the relationship between stage and discharge.

$$Flow = a(Stage + h_0)^b$$

At Fire Creek, the compliance point DSI and DSPH uses the same stage discharge curve to monitor the plants ramping rate. Below is the most recent stage discharge curve used to describe the compliance point.

Table 4 - Compliance Point Stage Discharge Curve

a=	10.957
ho=	0.079
b=	2.924

The plant calculates the stage at the compliance point DSI using the IFR and the stage DSPH is calculated using the flow DSPH. The flow DSPH is calculated by adding the IFR from the previous hour to the plant flow. This stage data is fed into the plant's flow control to ensure the plant ramps at that authorized rates. The stage data recorded by the plant is referred to as the recorded stage.

4.1 Ramping Compliance

While Innergex believes a reasonable compliance model would examine significant samples of the data to demonstrate ramping, the MFLNRO has requested that all plant flow data be analysed. For 2011, a model was developed to analyze all plant data for ramping noncompliance.

The first aspect of the model was to determine the fish stage. This is the highest stage that the fish will occupy. It is assumed that it will take 24 hours for fish to migrate into newly watered habitats. To calculate the fish stage, the wetted stage is calculated; a filter is applied to eliminate temporary dips in the data set that would artificially lower the fish stage. The wetted stage is able to increase at the same rate as the recorded stage. However, in order to filter out any potential dips in the data the wetted stage is only allowed to decrease at the authorized ramp rates calculated from the previous period's wetted stage. The fish stage is then calculated as the minimum of the wetted stage over the previous 24 hours. By calculating the fish stage using this methodology, the peaks and troughs in the recorded stage data are filtered out and an accurate estimate of the maximum stage at which fish could reside is developed

The fish stage is the point from which ramping compliance is enforced. Therefore, as soon as the recorded stage drops below the fish stage a ramping event is occurring. The model analyzes the ramping events by forecasting forward a minimum allowable fish stage for the next period. If the recorded stage in the next period is then greater than the forecasted fish stage and less than previous period fish stage the record stage become the fish stage. However, if the recorded stage in the next period is less than the forecasted fish stage for that period the fish stage becomes the forecasted fish stage. This enables the fish stage to decrease at the authorized ramping rates and adapt to any corrective actions taken by the plant to avoid a potential ramping violation. By comparing the fish stage with the recorded stage it becomes possible to identify a ramping event. This is because if the recorded stage is less than the fish stage then the plant must have exceeded the authorized ramping rates. This methodology allows you to quantify each ramping violation by calculating the amount the recorded stage dropped below the fish stage. This is done by subtracting the recorded stage from the fish stage.

Ramping events were assumed to occur when the recorded stage dropped below the fish stage by 2 cm for 10 minutes. The model analysed the entire data set for the year and flagged these events so they could be further investigated whether or not an actual ramping violation occurred. Each of the events is analyzed graphically by superimposing the fish stage over the recorded stage. The next section will discuss the model results.

4.2 Compliance Monitoring Results

After analysing data for the entire year, the following potential events were identified for further analysis. To verify ramping compliance each of the ramping events identified by the model are summarized in the figures below. To further demonstrate the accuracy of the model each start-up and shutdown was also included to verify that the model is accurate and the plants are capable of adhering to the authorized ramp rates. Each ramping event, start-up and shutdown is analyzed in the figures below.

In each of the figures the threshold flow, High IFR and Low IFR have been converted from flow into stage to clearly depict where the ramping rate changes. These flows were converted to stage based on the stage discharge relationship in Table 4 above.

4.2.1 Shutdowns

Figure 3 - Shutdown March 20th

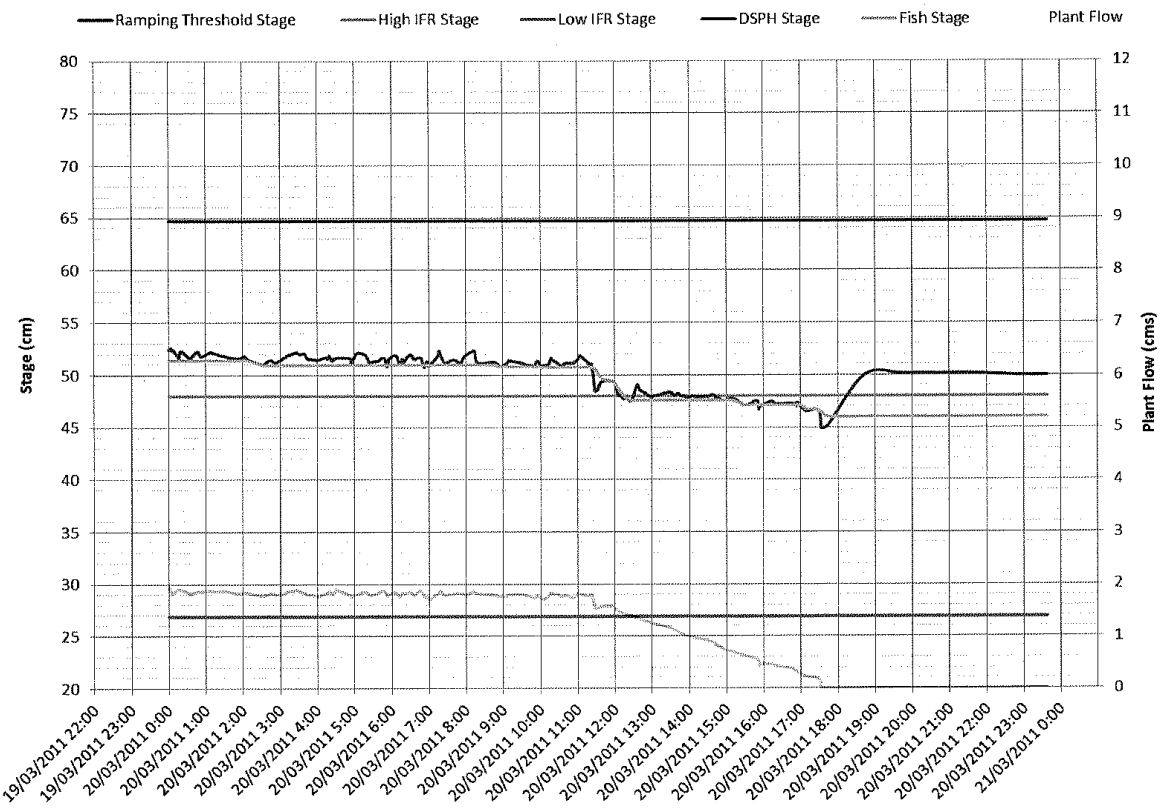


Figure 4 - Shutdown April 24th

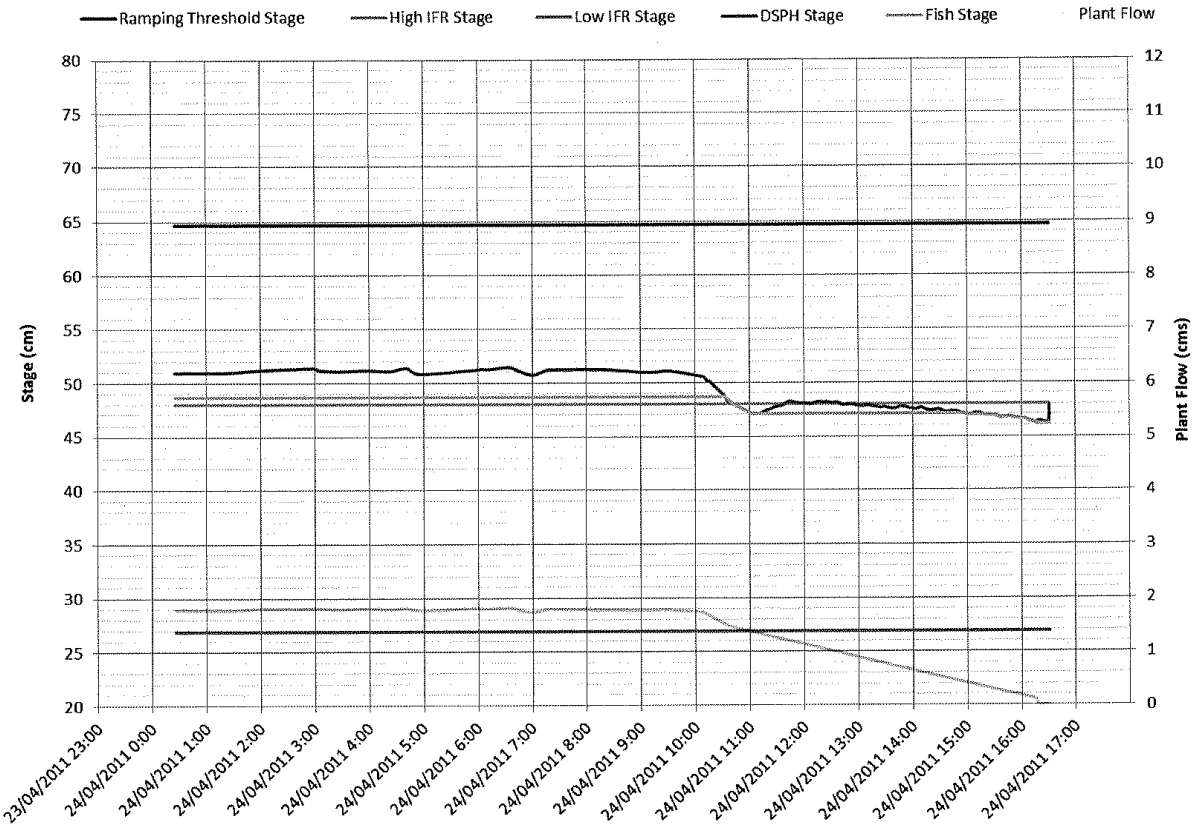


Figure 5 - Shutdown September 30th

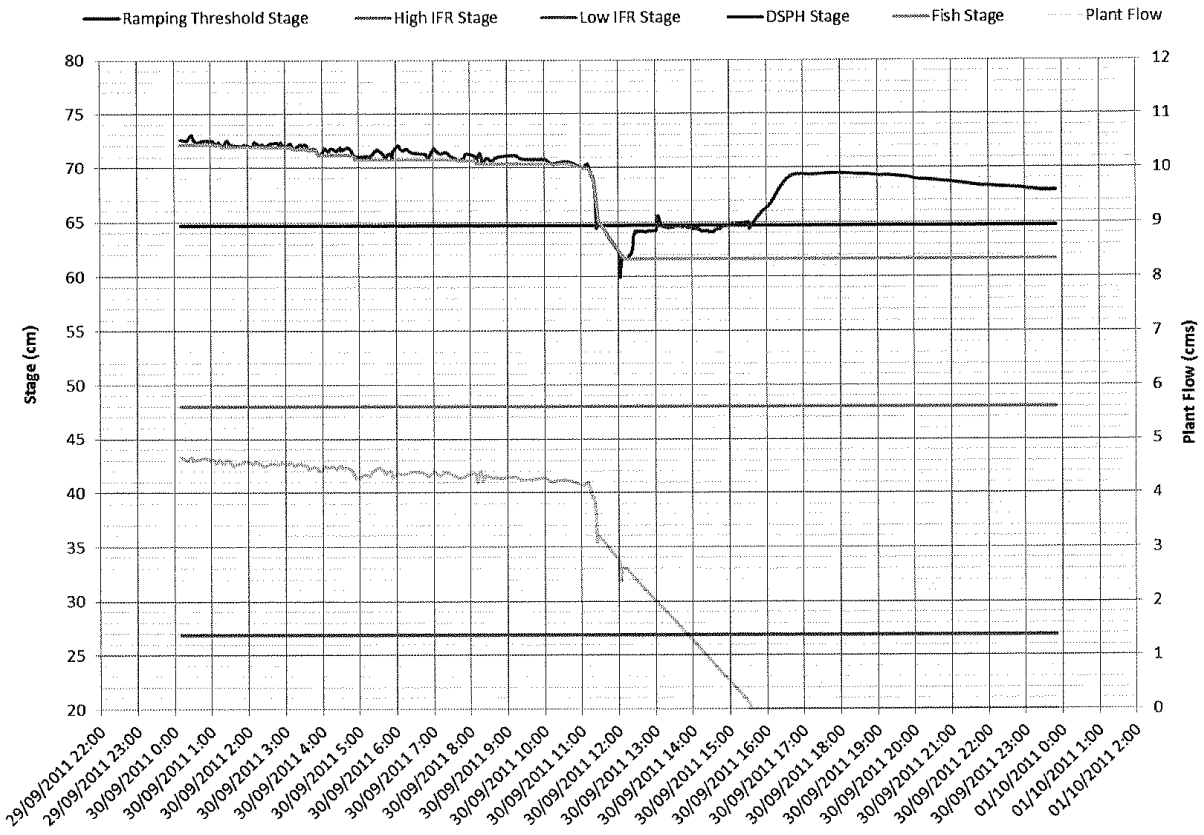
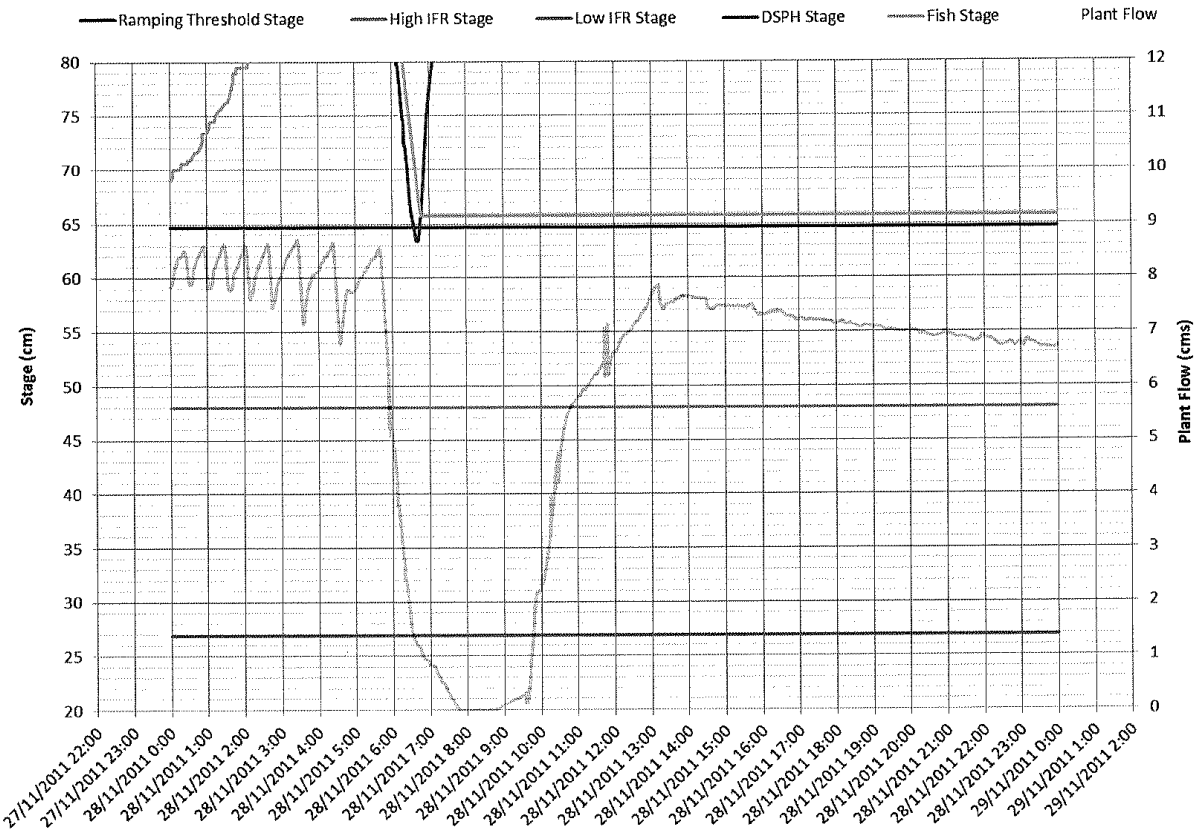


Figure 6 - Shutdown November 28th



4.2.2 Start-Ups

Figure 7 - Start-Up March 22nd

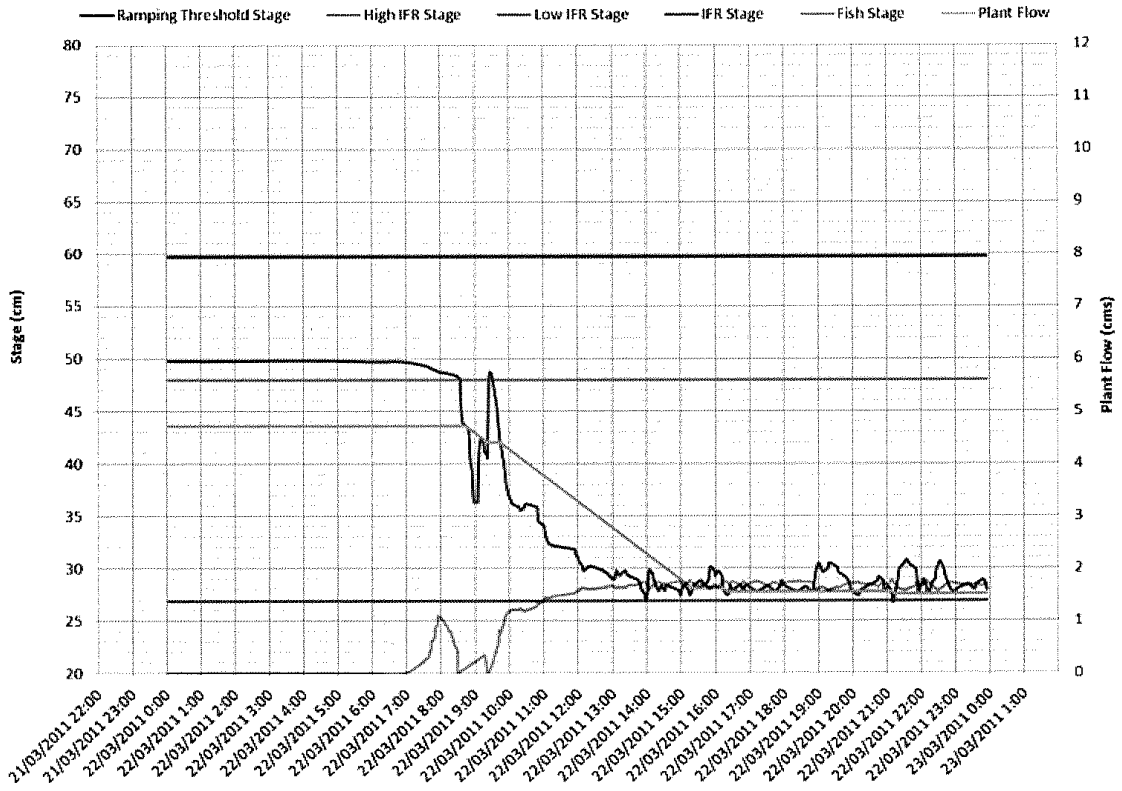


Figure 8 – Start-Up April 25th

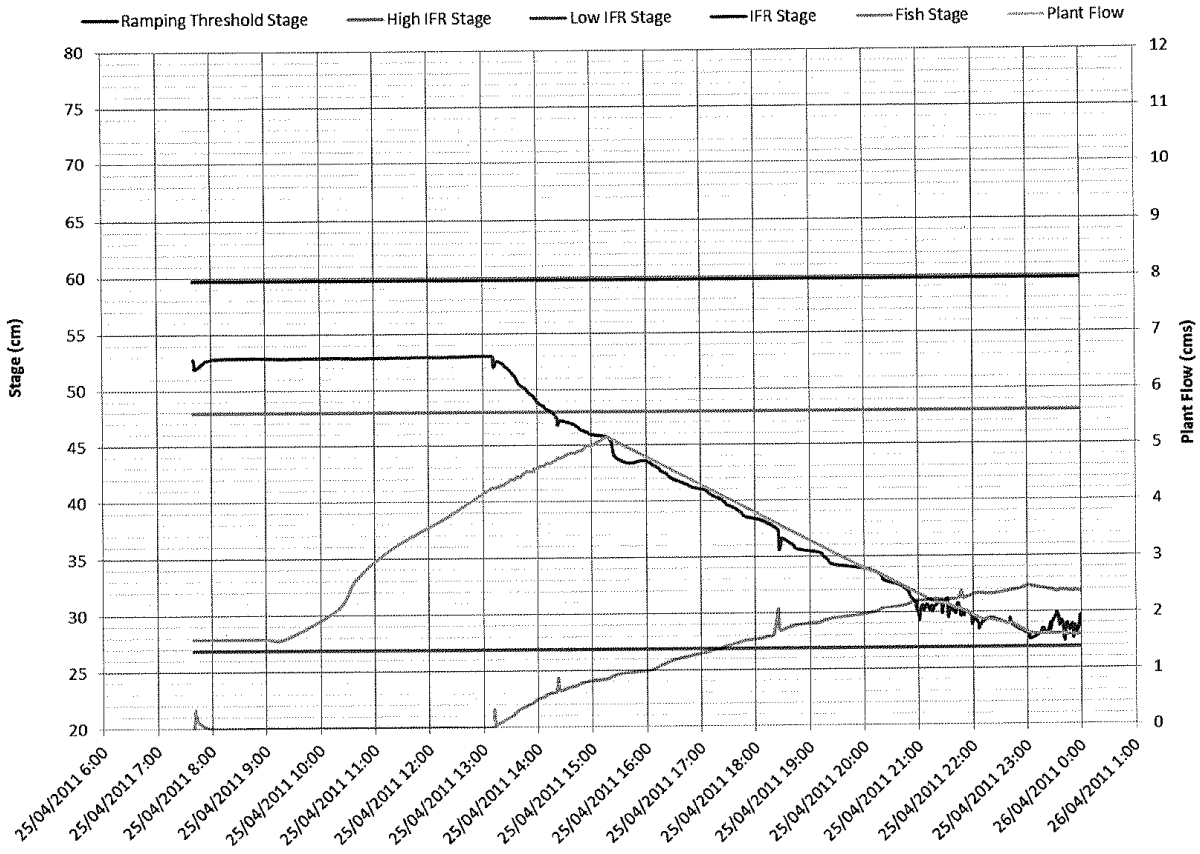


Figure 9 - Start-Up October 1st

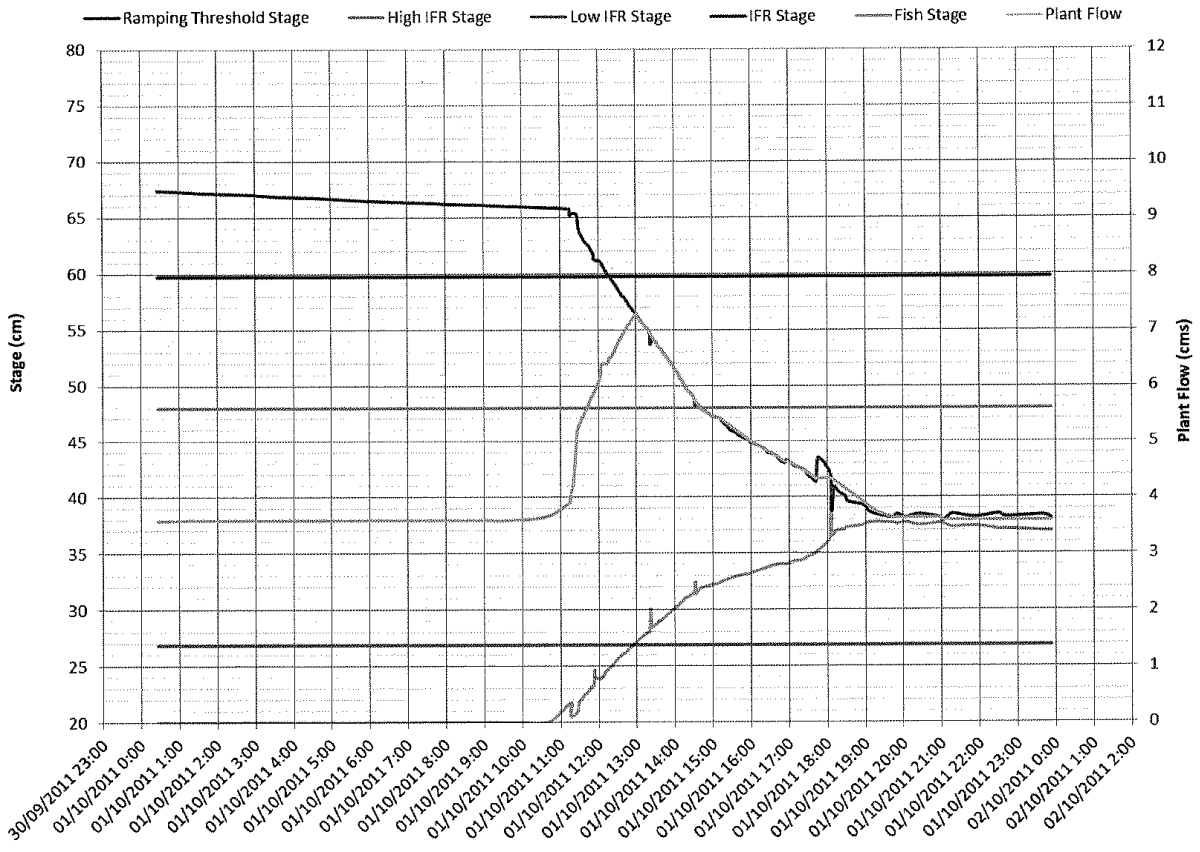
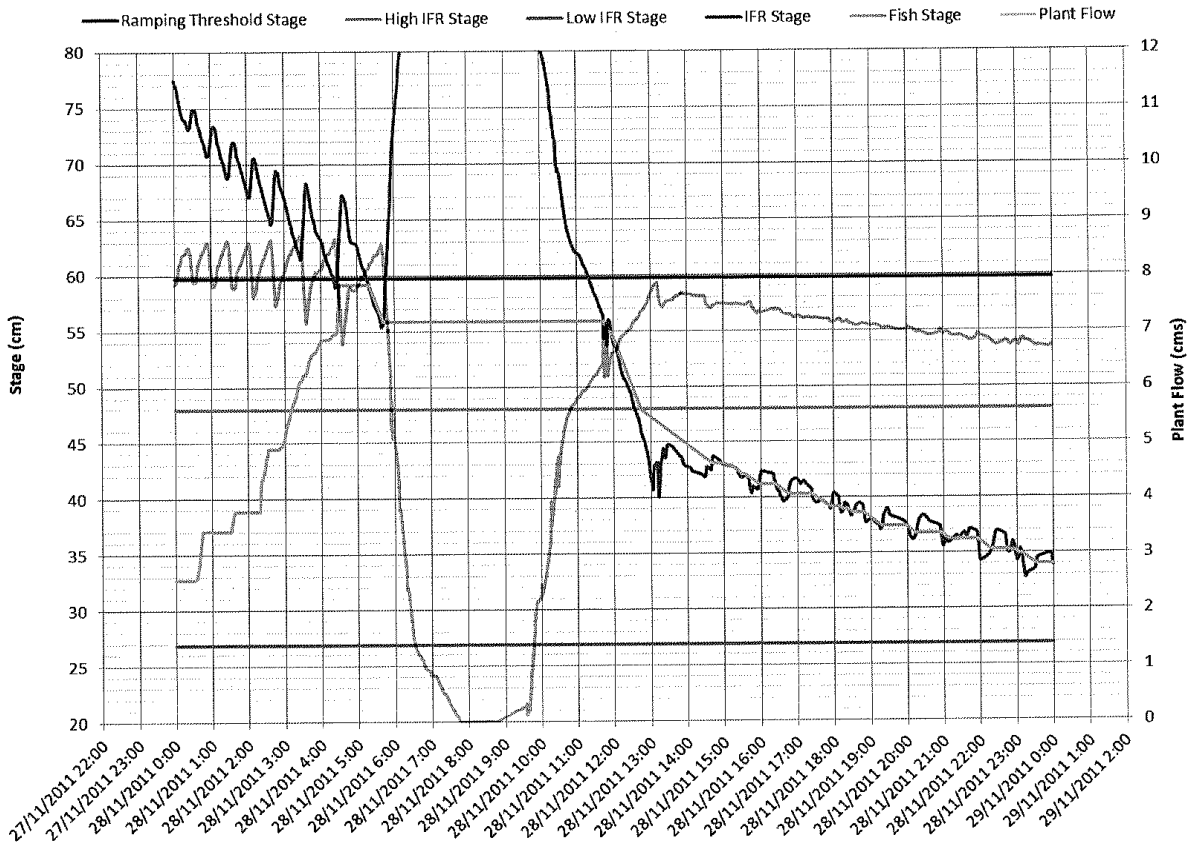
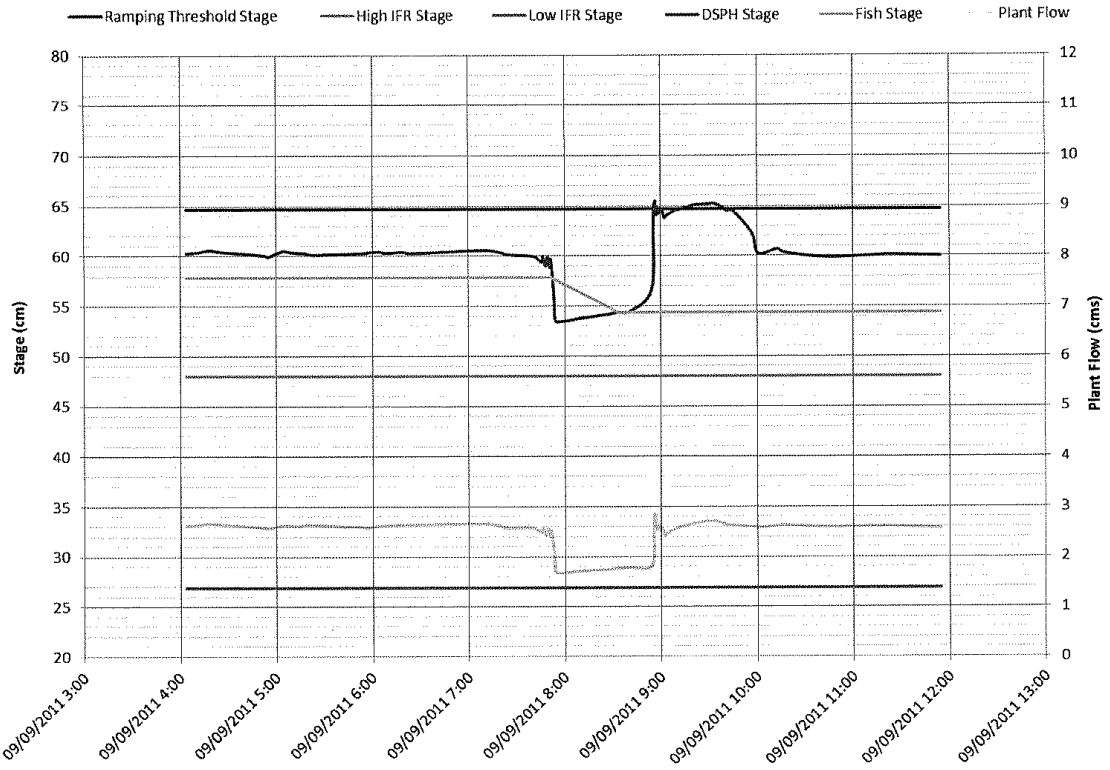


Figure 10 - Start-Up November 28th



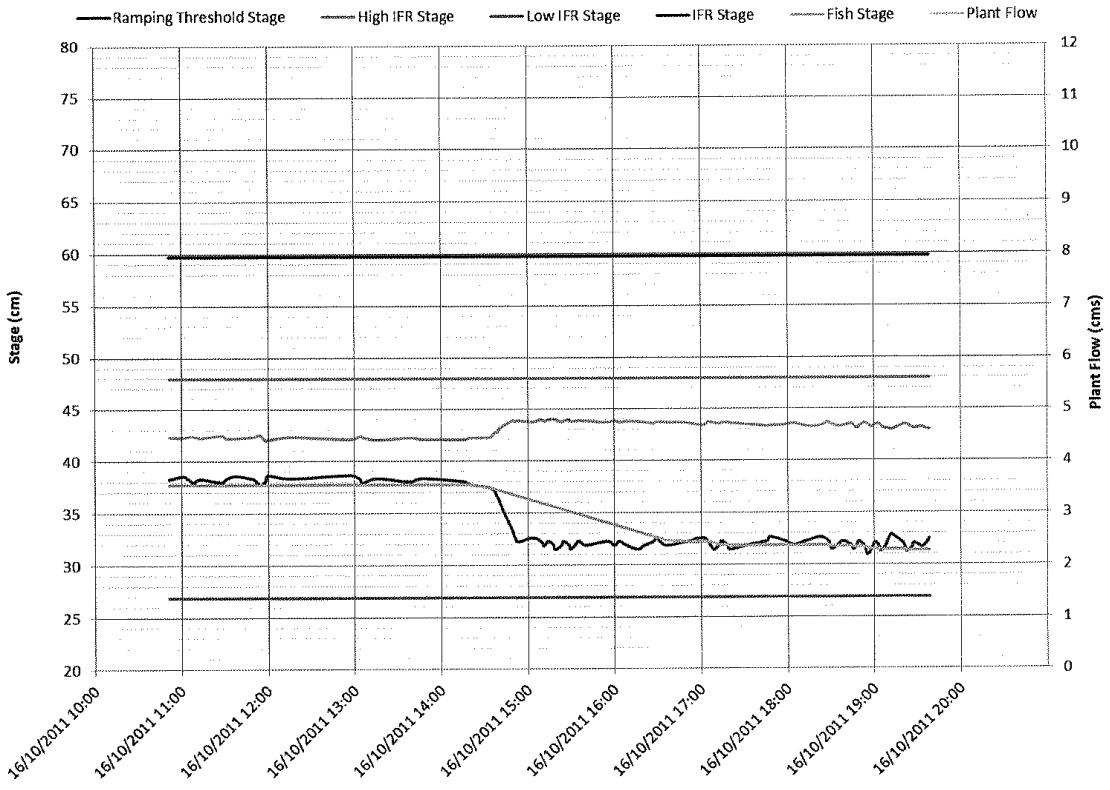
4.2.3 Flow Following Ramp Down Events

Figure 11- Ramp Down Event September 9th



4.2.4 Flow Following Ramp-Up Events

Figure 12 – Ramp-Up Event October 16th



4.3 Discussion of Ramping Compliance Model Results

A summary of the events identified by the ramping compliance model are outline in the table below.

Table 5 - Summary of Ramping Events

Date	Event	Comments
19/03/2011	Shutdown	Plant ramped down as planned.
24/04/2011	Shutdown	Plant ramped down as planned.
29/09/2011	Shutdown	Plant ramped down as planned.
28/11/2011	Shutdown	Plant ramped down as planned.
21/03/2011	Start-Up	During start-up the plant deviated from normal operating conditions. Following a penstock inspection, the plant had been started without opening the main head gate. Upon realising their error, the head gate was quickly opened, diverting additional flow from the intake.
25/04/2011	Start-Up	Plant ramped up as planned.
01/10/2011	Start-Up	Plant ramped up as planned.
28/11/2011	Start-Up	Plant ramped up as planned.
09/09/2011	Ramp Down Event	Plant deviated from programmed flow due to a slow moving nozzle.
16/10/2011	Ramp-Up Event	Plant deviated from normal operating conditions when the IFR licence limit was changed from 1.1 cms to 0.7 cms.

The Fire Creek Generating Station has operated as programmed with very few exceptions. Further work will be undertaken to improve alarm annunciation, ramping analysis and follow-up.

5.0 Plant Shutdowns

The following table details the plant shutdowns that occurred in 2011.

Table 6-Plant Shutdowns

Date	Shutdown Type	Immediate Re-Start	Tailrace Inspection Completed	Stranded Fish Found	Fish Salvage
Mar-20	Planned-Penstock Inspection	No	Yes	No	No
Apr-24	Unplanned-Transmission Line Fault	No	Yes	No	No
Sep-30	Planned-1L2 Double Nutting	No	Yes	No	No
Nov-28	Unplanned-Intake Probe Fault	Yes	N/A	N/A	N/A

6.0 Flow Returns and Energy Production

The following table summarizes the Water Licence returns detailing energy production and peak monthly power production.

Table 7-Energy production and peak monthly power production

Month	Peak Power Production (MW)	Energy Production (MWh)
January	23.3	6,235
February	8.0	3,126
March	13.1	3,247
April	10.6	3,894
May	24.6	13,915
June	25.3	17,388
July	25.2	18,184
August	24.3	12,714
September	24.4	6,254
October	24.2	8,541
November	20.4	4,829
December	18.5	3,802

Davies, James W FLNR:EX

2002403

From: Davies, James W FLNR:EX
Sent: Tuesday, March 6, 2012 8:28 AM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex Incident Report - Fire Creek
Attachments: Innergex Fire Creek - Unplanned Variance Report (16Feb2012).pdf

Aman Ullah

Read, print and file.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Monday, March 5, 2012 3:28 PM
To: Davies, James W FLNR:EX
Cc: Busto, Vince; Stoddard, Erin M FLNR:EX; Francesca Knight; Matt Kennedy; John Miller
Subject: RE: Innergex Incident Report - Fire Creek

Mr. Davies,

The detailed report for the event at the Fire Creek facility on 16 Feb 2012 is attached for your review.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

Davies, James W FLNR:EX

2002403

From: Sean Mccoy [SMccoy@innergex.com]
Sent: Monday, March 5, 2012 3:28 PM
To: Davies, James W FLNR:EX
Cc: Busto, Vince; Stoddard, Erin M FLNR:EX; Francesca Knight; Matt Kennedy; John Miller
Subject: RE: Innergex Incident Report - Fire Creek
Attachments: Innergex Fire Creek - Unplanned Variance Report (16Feb2012).pdf

Mr. Davies,

The detailed report for the event at the Fire Creek facility on 16 Feb 2012 is attached for your review.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x224 | Cell. 778 229-5996 | www.innergex.com

Project Information

Project:	Fire Creek	**Water Lic#:**	121116
Owner:	Innergex Renewable Energy Inc.		
Contact Person:	Sean McCoy	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Position:	Operations Environmental Manager		
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Report Information

Prepared By:	Sean McCoy	**Date:**	27 Feb 2012
Position:	Operations Environmental Manager	**Address:**	403 – 1168 Hamilton St Vancouver, BC V6B 2S2
Phone:	604 633 9990		
Email:	smccoy@innergex.com		

Was the Unplanned Variance Previously Reported?		**Yes** / No	
Name & Contact Information		**Method**	**Date**
James Davies	James.Davies@gov.bc.ca	Email	17 Feb 2012
Vince Busto	Vince.Busto@dfo-mpo.gc.ca	Email	17 Feb 2012
Francesca Knight	Francesca.Knight@dfo-mpo.gc.ca	Email	17 Feb 2012
Erin Stoddard	Erin.Stoddard@gov.bc.ca	Email	17 Feb 2012

Event Description

Date:	16 Feb 2012	**Time:**	20:30
Event Type:	IFR and Ramping		

Background

- IFR flow is calculated using one of two different methods depending on the stage reading downstream of the intake. The stage is determined using an Ohmart level indicator.
  - During low flow, the IFR is calculated using the downstream level indicator and the stage discharge relationship.
  - During high flow, the IFR is calculated using the upstream level indicator. The IFR is calculated as the difference between the creek flow and the plant flow.

Event

- At approximately 17:00, the PLC began unexpectedly switching between the two calculation methods.
- The PLC generated a Low IFR warning alarm. The Operator acknowledged the alarm and checked the IFR; it was above the licence requirement.
- The PLC generated a Ramping warning alarm. The Operator acknowledged the alarm and adjusted the plant flow to increase flow in the diversion reach.
- At approximately 20:15, the PLC became unstable and increased plant flow.
- The Operator activated the emergency stop at 20:20 to shut down the generators.
- The rapid increase in plant flow caused a temporary IFR flow reduction in the diversion reach. (Figure 1)
- The emergency shutdown caused a ramping incident downstream of the plant. (Figure 2)

Response & Mitigation

- The Operator immediately contacted the VP – Operations and Maintenance (VP) to assist with troubleshooting the event.
- The Operator rebooted the PLC and the HMI computer was also rebooted.
- The VP was able to remotely log into the HMI and discovered, and corrected, an error in the PLC.
- The PLC was forced to use the upstream creek flow calculation and the IFR setpoint was set conservatively high and the plant re-started
- The water level indicator (Ohmart Vegapulse) downstream of the intake was inspected after observing that the output was flat lined at 20 mA.
    - The operators discovered a loose connection and water in the junction box. Both of these conditions caused erroneous values to be transmitted to the PLC.
    - The erroneous stage inputs to the PLC produced an error that was propagated through the PLC, causing the instability and forcing the unplanned shutdown of the facility.

Environmental Impact & Assessment

- The stage change observed downstream of the intake was -0.07 m (0.24 m to 0.17 m) for approximately two hours. Refer to Figure 1.
- The stage change observed downstream of the powerhouse was -0.16 m (0.56 m to 0.4 m) for approximately 3 hours. Refer to Figure 2.
- An instream assessment was not conducted; the variance was detected and restored after dark which prevented onsite personnel from safely accessing the diversion reach.

Preventative & Corrective Measures

- The downstream level indicator was cleaned, connections inspected, sealed and put back into service.
- Similar level indicators are installed at the Douglas, Tipella and Stokke facilities.
    - The Douglas and Tipella level indicators were inspected; no issues were found.
    - The Stokke indicator will be inspected in the near future.
- Review the PLC program for instances where a similar erroneous number could be created and determine what precautions can be implemented to prevent a recurrence.

Appendix

Figure 1: Downstream Intake Water Level Gauge

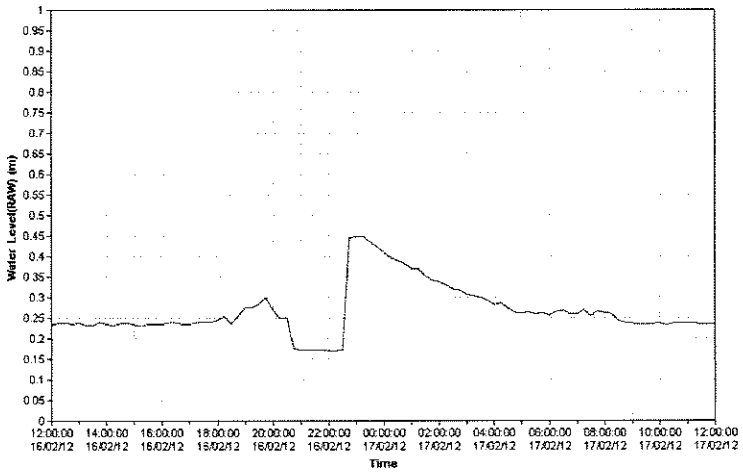
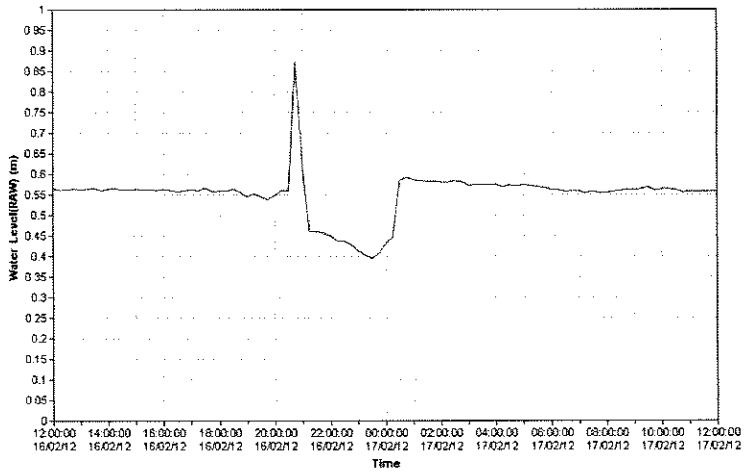


Figure 2: Downstream Powerhouse Water Level Gauge



Davies, James W FLNR:EX

From: John Miller [JMiller@innergex.com]
Sent: Monday, April 2, 2012 6:55 AM
To: Davies, James W FLNR:EX
Subject: FW: 2011 Harrison Operating Reports - DGL,FRE,LMN
Attachments: 2011 DGL Operations Summary.pdf; 2011 FRE Operations Summary.pdf; 2011 LMN Operations Summary.pdf

Email below bounced back so I'll send a few at a time

John D. Miller, P.Eng.

Vice President - Operations and Maintenance, Western Region

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x229 | Cell. 778 994-3180 | www.innergex.com

From: John Miller
Sent: April 2, 2012 6:48 AM
To: 'Davies, James W ENV:EX'
Subject: 2011 Harrison Operating Reports

Hi Jim

Sorry – these should have gone out Friday. I trust the short delay is not an inconvenience. The reports are to include an electronic copy of data – these were too large to email so will be copied onto CD and couriered today.

Should you have any questions, please call or email. Ashlu and Fitz to follow.

Regards

John D. Miller, P.Eng.

Vice President - Operations and Maintenance, Western Region

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x229 | Cell. 778 994-3180 | www.innergex.com

From: Nicholas Daniel
Sent: March 30, 2012 4:55 PM
To: John Miller
Subject: 2011 Harrison Operating Reports

Hi John

Attached are the 2011 Annual Operating Reports for the Harrison facilities.

Regards,

Nicholas Daniel, M.Eng, EIT

Project Engineer

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
Tel. 604 633-9990 x238 | Cell. 604 345-3681 | www.innergex.com

INNERGEX

2011 Harrison Hydro Operations Summary

Douglas Creek Generating Station

Revision History

Revision	Date of Revision	Summary of Revision
Rev 1	Mar 29. 2011	Initial Issue

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1.0 Introduction

The Douglas Creek Hydroelectric Generating Station is located near Tipella, B.C. approximately 100 km northeast of Vancouver, B.C. The facility consists of a head pond, static coanda screen, a 3 km penstock and two six-jet vertical pelton turbines with a total power capacity of 27 MW. Construction of the Generating Station was completed in the Fall of 2009 for the owner Harrision Hydro Limited Partnership (HHLP). The plant is operated by Innergex Renewable Energy Inc (Innergex). The plant is being operated in compliance with Conditional Water Licence No. 122374 (File No.2002402) that was issued November 9, 2006 and ammened on June 8, 2007.

As required by the Water Licence, HHLP submitted an Operating Parameter and Procedures Report (OPPR) to the Ministry of Forests, Lands and Natural Resources Operations (MFLNRO) in June 2009 that outlines the parameters and procedures that the Douglas Creek Generating Station uses to comply with the Water Licence. In addition, the report outlines the monitoring and reporting requirements required by the MFLNRO to demonstrate compliance. As part of the monitoring and reporting requirements, Innergex is to provide the MFLNRO with an annual report summarizing the operations of the Douglas Creek Generating Station. Under the Conditional Water Licence, Innergex is also required to participate in an annual Long Term Monitoring Program (LTMP) for the first five years of operation. This program requires annual reports to be submitted to MFLNRO to ensure that the risks, environmental impacts and performance of the constructed facilities were consistent with the expectations outlined during the licensing and permitting phase of the project.

The purpose of this report is to provide the MFLNRO with a summary of annual operations at the Douglas Creek Generating Station to verify compliance with the Conditional Water Licence and the OPPR. The information contained within this report will also be included in HHLP's 2011 LTMP submission. This report includes:

- A summary table of all incidents within the year 2011;
- A summary of any in-stream maintenance activities undertaken either in accordance with specified procedures in the OPPR or unspecified procedures (e.g., pertaining to headpond flushing, sediment monitoring and transport, etc.);
- A summary of annual flow data in graphical format, to confirm compliance with maximum authorized diversion rates, and in-stream flow requirements;
- A summary of ramping monitoring;
- Electronic version of flow and stage data.
- A summary of plant shutdowns, tailrace inspection and fish stranding monitoring and salvage activities; and
- Water Licence returns detailing energy production.

2.0 Incidents and In-Stream Maintenance Activities

2.1 Reported Incidents

An incident is defined as any environmental infringement, non-compliance with Water Licence, or OPPR conditions such as IFR or ramping violations. During 2011, there were no incidents at the Douglas Creek Generating Station.

2.2 Unreported Incidents

There were no unreported incidents at the Douglas Creek Generating Station in 2011.

2.3 In-stream Maintenance Activities

During 2011, Knight Piesold's (KP) hydrometrics group made IFR verification measurements downstream of the intake. The results of the IFR verification measurements are summarized in the table below.

Table 1-IFR Verification Measurements

Date	Time	Measured Flow (cms)	Plant Data (cms)	Difference (cms)
21/10/2011	2:08 PM	0.91	1.02	0.11
10/08/2011	2:36 PM	1.23	1.22	-0.01
10/08/2011	2:06 PM	1.27	1.18	-0.09
07/07/2011	12:05 PM	17.85	14.9	-2.95
07/07/2011	11:20 AM	17.63	14.9	-2.73

3.0 In-stream Flow Release (IFR) and Plant Flow Compliance

3.1 Licensed Operating Limits

The Conditional Water Licence allows for a diversion of a maximum 11.1 m^3/s from Douglas Creek. The Conditional Water Licence also specifies the minimum amount of water that must remain in the diversion reach at all times throughout the year (IFR). The table below contains a schedule of Licensed IFR at the Douglas Creek Generating Station.

Table 2-Licensed IFR

Month	IFR
January	0.45
February	0.45
March	0.45
April	0.45
May	0.45
June	1.8
July	0.9
August	0.9
September	0.9
October	0.9
November	0.45
December	0.45

3.2 Flow Compliance

Flow compliance data is summarized in Figure 1 and Figure 2 below. The plant flow and IFR were measured and recorded using the methodology described in the OPPR. An electronic copy of the data in the graphs below is appended to this document.

Flow compliance was assessed using hourly average flow data. During 2011, there were no instances where the maximum authorized diversion flow or IFR License limit were violated.

Figure 1 - Graphical Summary of 2011 IFR

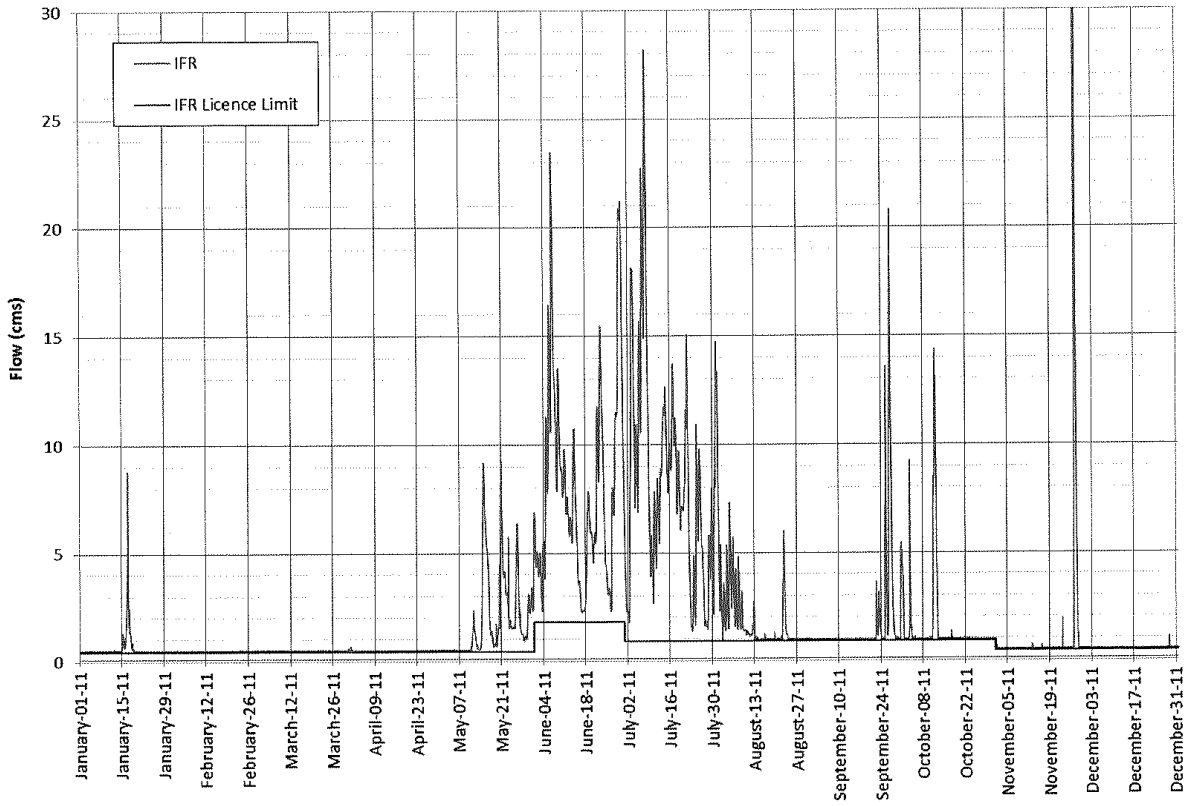
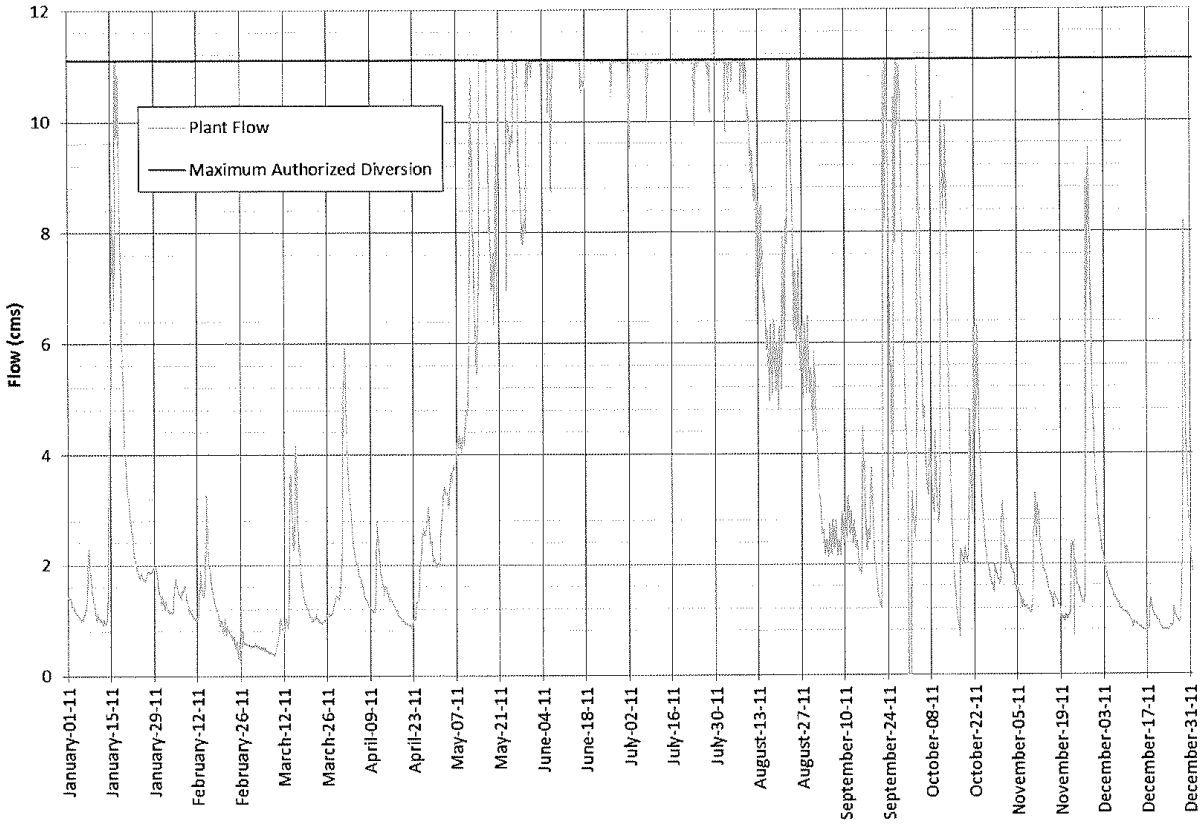


Figure 2-Graphical Summary of 2011 Plant Flows



4.0 Ramping

The *Fisheries Act Authorization* for the Douglas Creek Generating Station regulates the rate at which the plant can increase and decrease flows during start-ups and shutdowns to minimize the risk of fish stranding. The Authorization stipulates interim ramping rates until site specific ramping studies can be completed. These interim rates where expressed as changes in stage of 2.5 cm/hr when fry are present and 5.0 cm/hr at other times, below a threshold of 60% mean annual discharge (MAD). Prior to commissioning, this interim protocol was revised to 5.0 cm/hr from the threshold to the high IFR and 2.5 cm/hr from the high IFR to the low IFR.

Ramping studies were submitted to MFLNRO in May 2011 and feedback was received in September. Based on the feedback from the agencies Innergex was required to make several changes to the interim ramping protocol at Douglas Creek. The resulting ramp rates that are programmed into the flow controller at Douglas Creek are summarized in the table below.

Table 3 - Ramping Rates

	Threshold Flow		Ramping Rate at Compliance Point (cm/h)	
	m^3/s	% MAD	To High IFR	To Low IFR
Start Up	4.8	65%	5	2.5
Shutdown	5.9	80%	5	2.5

The ramp rates in the table above are measured at a compliance point downstream of the intake (DSI) during start up and downstream of the powerhouse (DSPH) during shutdowns. The plant does not directly measure stage at either if the compliance points. Stage is calculated using the stage discharge curve for the compliance point and the flow either DSI or DSPH. The formula below is used to describe the relationship between stage and discharge.

$$Flow = a(Stage + h_0)^b$$

At Douglas Creek, the compliance point DSI and DSPH uses the same stage discharge curve to monitor the plants ramping rate. Below is the most recent stage discharge curve used to describe the compliance point.

Table 4 - Compliance Point Stage Discharge Curve

a=	19.196
ho=	-0.222
b=	2.649

The plant calculates the stage at the compliance point DSI using the IFR and the stage DSPH is calculated using the flow DSPH. The flow DSPH is calculated by adding the IFR from the previous hour to the plant flow. This stage data is fed into the plant's flow control to ensure the plant ramps at that authorized rates. The stage data recorded by the plant is referred to as the recorded stage.

4.1 Ramping Compliance

While Innergex believes a reasonable compliance model would examine significant samples of the data to demonstrate ramping, the MFLNRO has requested that all plant flow data be analysed. For 2011, a model was developed to analyze all plant data for ramping non-compliance.

The first aspect of the model was to determine the fish stage. This is the highest stage that the fish will occupy. It is assumed that it will take 24 hours for fish to migrate into newly watered habitats. To calculate the fish stage, the wetted stage is calculated; a filter is applied to eliminate temporary dips in the data set that would artificially lower the fish stage. The wetted stage is able to increase at the same rate as the recorded stage. However, in order to filter out any potential dips in the data the wetted stage is only allowed to decrease at the authorized ramp rates calculated from the previous period's wetted stage. The fish stage is then calculated as the minimum of the wetted stage over the previous 24 hours. By calculating the fish stage using this methodology, the peaks and troughs in the recorded stage data are filtered out and an accurate estimate of the maximum stage at which fish could reside is developed.

The fish stage is the point from which ramping compliance is enforced. Therefore, as soon as the recorded stage drops below the fish stage a ramping event is occurring. The model analyzes the ramping events by forecasting forward a minimum allowable fish stage for the next period. If the recorded stage in the next period is then greater than the forecasted fish stage and less than previous period fish stage the record stage become the fish stage. However, if the recorded stage in the next period is less than the forecasted fish stage for that period the fish stage becomes the forecasted fish stage. This enables the fish stage to decrease at the authorized ramping rates and adapt to any corrective actions taken by the plant to avoid a potential ramping violation. By comparing the fish stage with the recorded stage, it becomes possible to identify ramping events. This is because if the recorded stage is less than the fish stage then the plant must have exceeded the authorized ramping rates. This methodology allows you to quantify each ramping violation by calculating the amount the recorded stage dropped below the fish stage. This is done by subtracting the recorded stage from the fish stage.

Ramping events were assumed to occur when the recorded stage dropped below the fish stage by 2 cm for 10 minutes. The model was programmed to flag these events so they could be further investigated whether or not an actual ramping violation occurred. Each of the events is analyzed graphically by superimposing the fish stage over the recorded stage. The next section will discuss the model results.

4.2 Compliance Monitoring Results

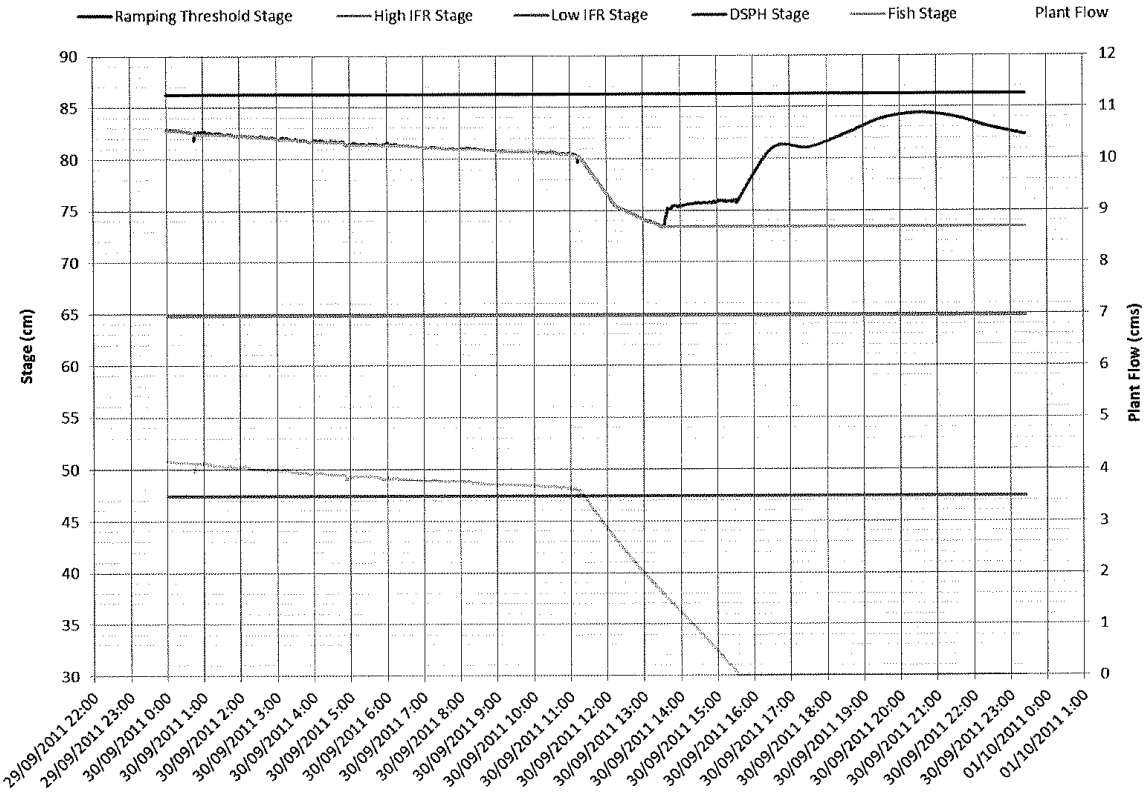
To verify ramping compliance each of the ramping events identified by the model are summarized in the figures below. To further demonstrate the accuracy of the model each start-up and shutdown was also

included to verify that the model is accurate and the plants are capable of adhering to the authorized ramp rates. Each ramping event, start-up and shutdown is analyzed in the figures below.

In each of the figures the threshold flow, High IFR and Low IFR have been converted from flow into stage to clearly depict where the ramping rate changes These flows were converted to stage based on the stage discharge relationship in Table 4 above.

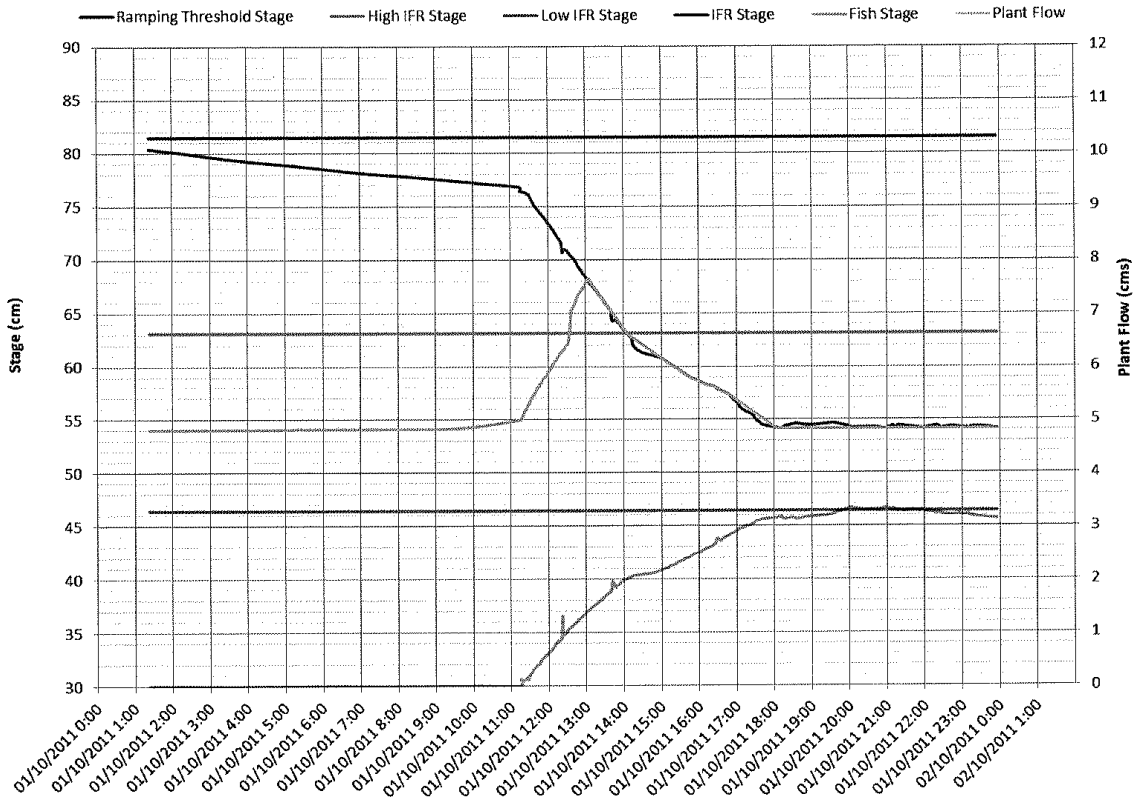
4.2.1 Shutdowns

Figure 3 – Shutdown September 30th



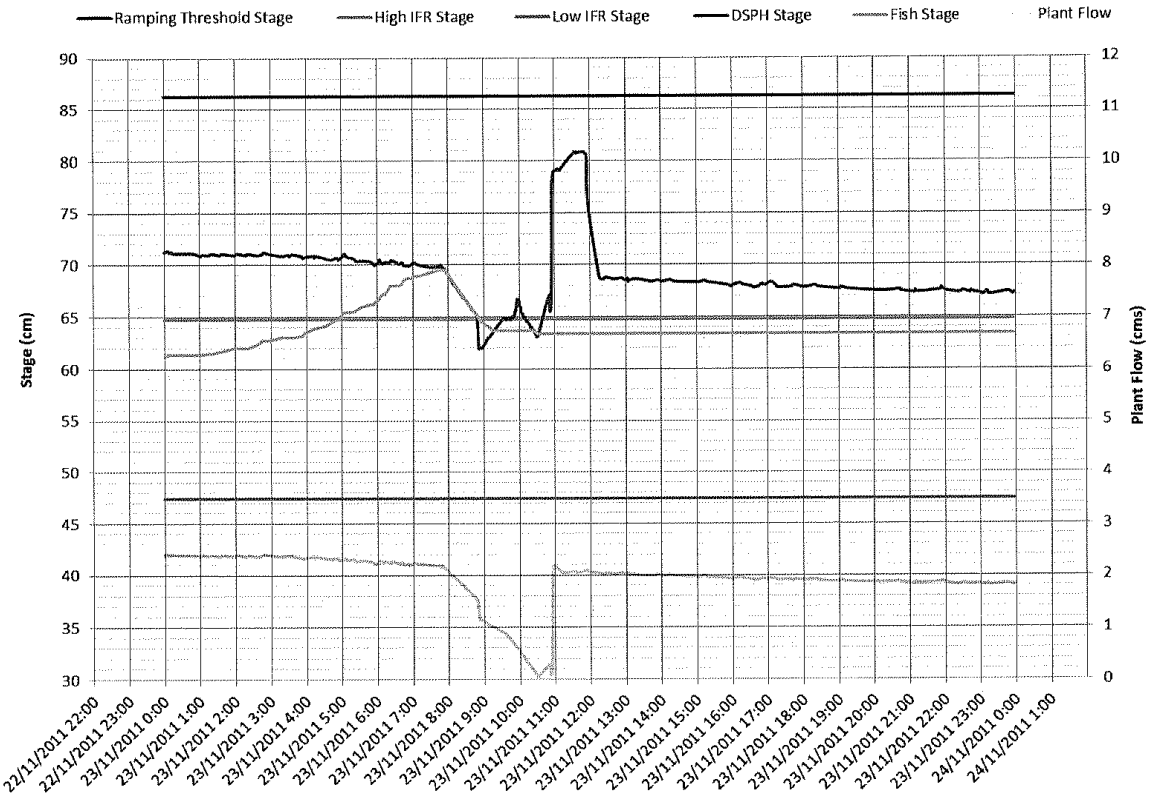
4.2.2 Start-Ups

Figure 4 – Start-Up October 1st



4.2.3 Flow Following Ramp Down Events

Figure 5 - Ramp Down Event November 23rd



4.2.4 Flow Following Ramp-Up Events

Figure 6 - Ramp-Up Event August 19th

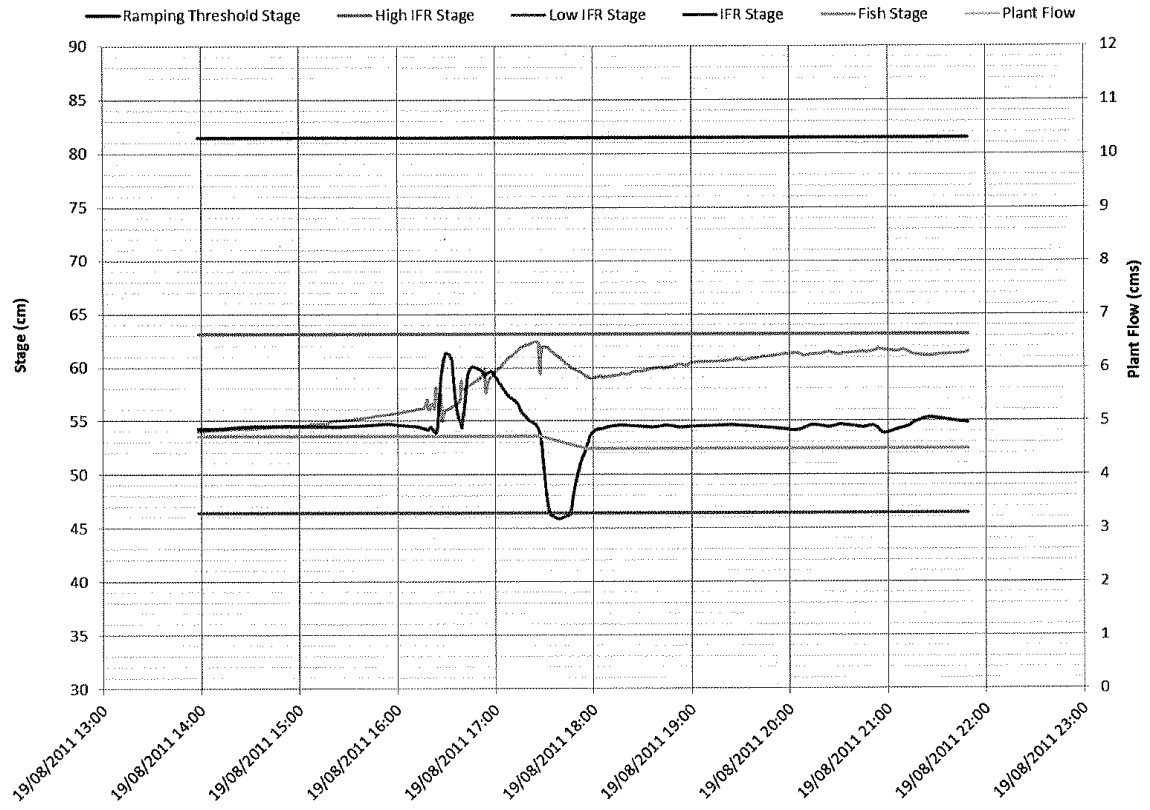
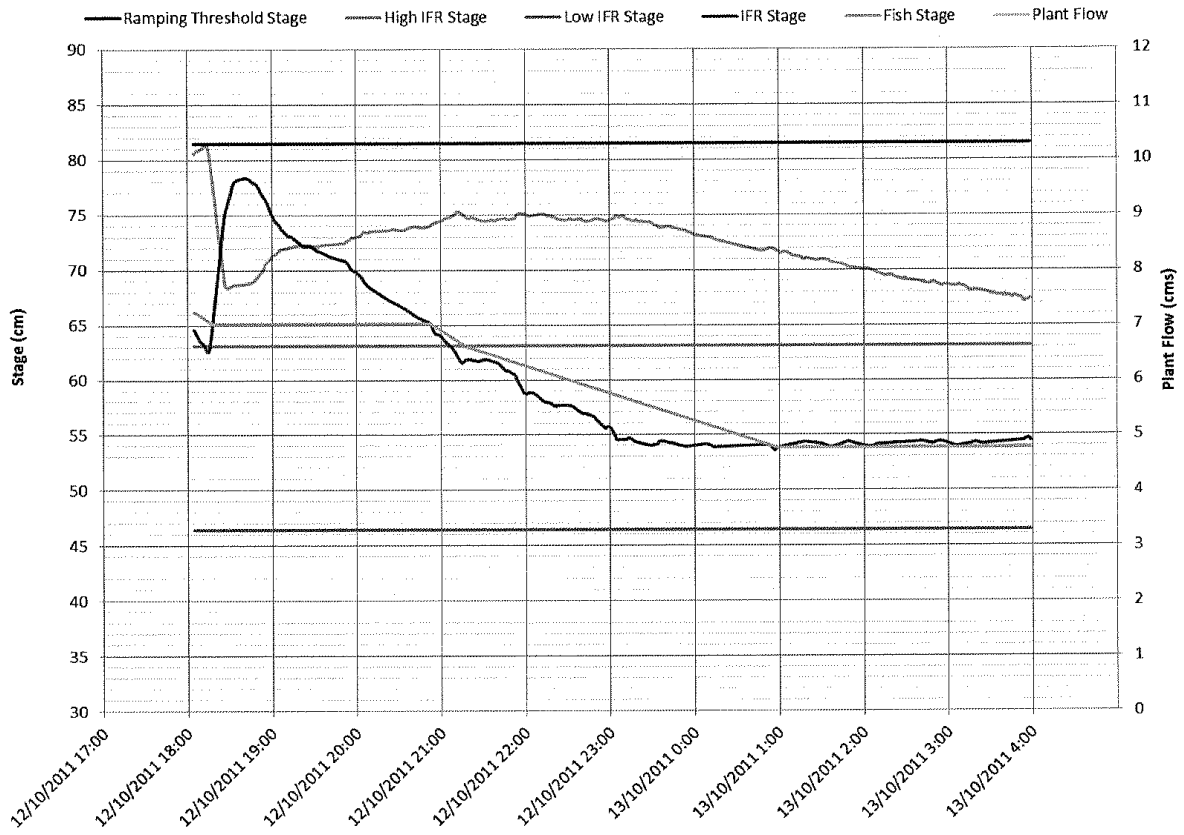


Figure 7 – Natural Flow Decline October 12th



4.3 Discussion of Ramping Compliance Model Results

A summary of the events identified by the ramping compliance model are outlined in the table below.

Table 5 - Summary of Ramping Events

Date	Event	Comments
30/09/2011	Shutdown	Plant ramped down as planned.
01/10/2011	Start-Up	Plant ramped up as planned.
23/11/2011	Ramp Down Event	Plant deviated from normal operating conditions due to a stuck nozzle.
19/08/2011	Ramp-Up Event	Short-term deviation from flow order as plant switched from 1 to 2 units.
12/10/2011	Natural Flow Decline	Natural decrease in creek flow with stable or declining plant flow.

The Douglas Creek Generating Station has operated as programmed with very few exceptions. Further work will be undertaken to improve alarm annunciation, ramping analysis and follow-up.

5.0 Plant Shutdowns

The following table details any plant shutdowns that occurred in 2011.

Table 6-Plant Shutdowns

Date	Shutdown Type	Immediate Re-Start	Tailrace Inspection Completed	Stranded Fish Found	Fish Salvage
Sep-30	Planned-1L2 Double Nutting	No	N/A	N/A	N/A

6.0 Flow Returns and Energy Production

The following table summarizes the Water Licence returns detailing energy production and peak monthly power production.

Table 7-Energy production and peak monthly power production

Month	Peak Power Production (MW)	Energy Production (MWh)
January	27.6	5,082
February	8.7	2,016
March	15.6	2,418
April	14.9	3,366
May	27.9	14,513
June	27.9	19,923
July	28.0	20,573
August	27.9	15,357
September	27.7	7,384
October	27.5	7,156
November	24.9	4,162
December	21.4	2,878

Davies, James W FLNR:EX

From: Bennett, Timothy A FLNR:EX
Sent: Friday, September 30, 2011 6:11 PM
To: Berardinucci, Julia F FLNR:EX; Davies, James W FLNR:EX
Cc: Lachance, Nikki FLNR:EX; Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; Blacquiere, Kelly FLNR:EX; Anderson, Keith FLNR:EX; Ullah, Aman FLNR:EX
Subject: Retrospective review of post-licensing IPP issues - NRO workload

Importance: High

Hi all,

One thing I have been trying to pull together, off the side of my desk and between other priorities, is a retrospective overview of the issues we are seeing on active IPPs [post construction].

I've attached a table (below) which is a start to this, and summarizes some issues that have come to light on 20 of our active IPP's. Note that these are IPPs which are either under some scrutiny (e.g., within the construction phase, or operational-monitoring phase) or have had proponent driven requests or 'recent' incidents. This list and stats only considers 20 of the 30+ active IPP's in our region, that have come to my attention in the last 3 years.

Some of the key take home messages I would pass on (right off the bat) are:

1) **The frequency of 'Incidents' and [minor or otherwise] 'non-compliance' is high**
   a. 70% of those projects have had 'incidents' occur during construction
   b. At least 35% have had 'incidents' during commissioning and operations
   c. 45% have had permit or legislative non-compliances
   d. Overall, 90% of the projects have had incidents or non-compliances
2) **There are a number of typical/consistent incident types we are seeing**, including:
   a. Sediment release
   b. Excessive ramping (diverting water too fast, dewatering stream peripheries and potentially stranding fish): * DFO currently has 'ramping rate' requirements in their authorizations, we have only instituted ramping requirements on one licence and retroactively required/imposed ramping requirements (in Operating manuals) on several IPPs [i.e., all IPPs constructed in the last 2 years]
   c. non-release of instream flow requirements, IFR (not leaving behind enough water in the stream, as required by their water licences)
   d. release of other substances: typically hydrocarbon spills, but have included Arsenic discharge from tunnels

   b. and c. can and have resulted in documented fish strandings and kills. The cause of b. and c. has included equipment malfunction, pipe blockages, poor design of some infrastructure and software/programming glitches during commissioning/early operations.
3) **We have not had sufficient staff resources to monitor permit condition compliance.** Notably, we have not:
   a. Been reviewing weekly Environmental Monitoring reports during construction [we had required EM's to act on our behalf, they have authority to do so, and have required self-reporting of incidents within 24 hours]
   b. Been reviewing Annual environmental monitoring reports submitted by proponents or their consultants [due to staffing limitations, our review has recently been limited to the final 5 year rollup/summary report – wherein we have consistently noted deviations from the previously approved monitoring programs]
4) **There are a number of typical/consistent permit/licence non-compliances we are seeing**, including:
   a. Non-submission of a monitoring plan, as required by our standard water licence conditions
   b. Non-adherence and non-completion of approved monitoring plans, over the course of our standard 5 year monitoring program
   c. issues with the adequacy of the monitoring programs, as the baseline data has been noted to be problematic (due to natural variability, and the limited number of years of baseline monitoring, or incomplete baseline data collection prior to construction/operations, or approval of professionally

provided plans which are later deemed to be inadequate to scientifically-defensibly and quantifiably determine project impacts)

5) **80% of the projects have required SIGNIFICANT additional staff time**, over and above what might be expected from standard operations and monitoring conditions. Staff time has been spent on:
    a. Technical review of environmental impacts/assessments following incidents
    b. Technical review of proposed plant / operational modifications to prevent incident re-occurrence
    c. Technical review of required revisions of monitoring plans, when they have been noted to deviate from previously approved plans or incomplete
    d. Technical review of operational conditions
    e. Technical support for ORDERS and INVESTIGATIONS
    f. Decision maker support/involvement in all of the above, and especially for proponent interaction and stat decisions (ORDERS, ADVISORIES, directives)

Recommendations:

I would suggest the following:

1) Put emphasis on developing explicit protocols/policy on RAMPING RATES
2) Provide explicit direction on info required pre-licencing to inform/determine appropriate RAMPING RATES
3) Require better interaction between IE-EM, and IE-EM consideration of environmental practices/potential impacts (e.g., including 'erosion and sediment control') prior to all Leaves issued by IE
4) Require complete baseline data collection, OEMP confirmation, and power analyses PRIOR to licensing
5) Complete the project tracking tool (access database), to allow more efficiently tracking of project and incident response deliverables, task assignment and deadlines [underway for last 6 months – see GIS]
6) Engage the RIO/RCEPT/Land staff to assist in project and deliverable tracking and workload, e.g., perhaps
    a. Ensure submission of annual monitoring reports, OPPR, baseline data collection
    b. Scan weekly EM reports during construction, and providing initial response/support to EM-identified issues
7) Flag IPP post-licensing workload as a critical issue, and consider its relative priority to gov. and possible reassignment of other technical staff to assist water technical staff
8) Consider strategies to further engage external professionals post-licensing (e.g., 3rd party professionals) and/or reduce permitting requirements [if identified as a lower priority]

IPP overview.xlsx

Timothy Bennett, M.Sc., P.Eng.
Section Head, Water Allocation (South Coast Region)
Ministry of Forests, Lands and Natural Resource Operations
10470 - 152 Street, Surrey, BC V3R 0Y3
Ph. (604) 582-5227 *Fx.* (604) 582-5235

						ISSUE									FOLLOWUP REQUIRED BY NRO					
#	Facility	File	NRO Lead	Alternate contact(s)	Status	Potential Env Impact?	Incidents during/post construction (a)						Incidents post-construction	Other (e.g., permit non-compliance)	Supplemental monitoring / OEMP revision required	Impact assessment required	Operational revision required	Advisory / Order &/or Investigation	Licence amendment	NRO Followup (b)
							Ramping	IFR non-compliance	Sediment release	Spill/Release	Fish strand/kill	Other								
1	Upper Bear	2001939	JD		Under Construction														x	yes
2	Lower Bear	2001940	JD		Under Construction															
3	NW Stave	2002792	JD		Under Construction					1										
4	Ashlu	2001264	TB	SB/ES	Operating (5 yr monitoring pha	yes	1	1	1	5	1	1	multiple ramping events + fish kill	IFR, OEMP submission	x	x	x	x		yes
5	Stave	2002483	TB	SB/ES	Operating (5 yr monitoring pha	yes	3		3	7		1				x	x	x		yes
6	Stokke	2002598	TB	SB/ES	Operating (5 yr monitoring pha	yes	2		1								x			yes
7	Upper Clowhom	2002496	AU	SB	Operating (5 yr monitoring phase)				4	2				operating without Leave			x			yes
7	Lower Clowhom	2002497	AU	SB	Operating (5 yr monitoring phase)				4	2				operating without Leave			x			yes
8	Fire	2002403	TB	SB/ES	Operating (5 yr monitoring pha	yes	3		4		1									
9	Douglas	2002402	TB	SB/ES	Operating (5 yr monitoring pha	yes	1	1	1			1				x		x		yes
10	Tipella	2002697	TB	SB/ES	Operating (5 yr monitoring pha	yes			1	1	1									
11	Lamont	2002482	TB	SB/ES	Operating (5 yr monitoring pha	yes	5	3	4	1										
12	Lower Mamquam	2000966		SB/ES	Operating (5 yr monitoring pha	yes	n/a (project licenced/constructed prior to electronic EM report submission)						Ramping issues identified + Fish Kill			x	x	x	x	yes
13	Upper Mamquam	2001914	JD	SB/ES	Operating (5 yr monitoring pha	yes	n/a (project licenced/constructed prior to electronic							operating without Leave, deviation from	x					yes
14	Furry Creek	2002494	AU	SB	Operating	yes	n/a (project licenced/constructed prior to electronic EM report submission)						IFR pipe blockage (3 months)	deviation from approved monitoring plan	x	x	x	x		yes
15	Tyson Creek	2002773	TB		Operating (5 yr monitoring pha	yes				2			Slope failure + sediment release to ocean			x	x	x		yes
16	Miller Creek	2001917	TB	SB/ES	Operating (5 yr monitoring pha	yes	n/a (project licenced/constructed prior to electronic EM report submission)						non-release of IFR + fish kill		x	x		x		yes
17	Brandywine Creek	2002306	TB	SB/ES	Operating (5 yr monitoring phase)		n/a (project licenced/constructed prior to electronic EM report submission)							deviation from approved monitoring plan	x					yes
18	Fitzsimmons	2002777	TB	SB/ES	Operating (5 yr monitoring pha	yes	2	1	1	1			coanda malfunction - ramping, IFR non-	EA inaccurate - required monitoring	x	x	x		x	yes
19	Rutherford	2001923	ES	SB	Operating		n/a (project licenced/constructed prior to electronic EM report submission)							deviation from approved monitoring plan	x					yes
20	McNair	2002093	AU	SB/ES	Operating	yes	n/a (project licenced/constructed prior to electronic EM report submission)							monitoring plan never submitted or implemented,	x	x	x	x		yes
						70%							30%	45%						80%

NOTES

(a) based on a preliminary review of EM reports during construction

(b) followup work / FTE time over and above standard permitting conditions and project monitoring

Upper & Lower Clowhom CEPs

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@veresenInc.com]
Sent: Thursday, October 13, 2011 10:31 AM
To: Davies, James W FLNR:EX
Cc: Ullah, Aman FLNR:EX; Jim Hinrichs; Doug Bryson; Amit Bhargava; Linda Vaughan
Subject: Clowhom Power - Monthly Compliance Reports - September 2011
Attachments: Upper Clowhom - Monthly Compliance Report Letter - September 2011.pdf; Upper Clowhom - Monthly Compliance Report Data - September 2011.xlsx; Lower Clowhom - Montly Compliance Report Letter - September 2011.pdf; Lower Clowhom - Monthly Compliance Report Data - September 2011.xlsx

Mr. Davies,

Please accept the attached August 2011 Monthly Compliance Reports for the Upper and Lower Clowhom hydroelectric sites, submitted in accordance with the conditions of the Interim Leaves to Commence Operations, dated August 4, 2011.

Please contact Jim Hinrichs, Doug Bryson, or me with any questions or concerns.

Sincerely,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

CLOWHOM POWER

Clowhom Power LP
901 – 33 Water Street
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October 11, 2011

Water Allocation, South Coast Region
Ministry of Forests, Lands & Natural Resource Operations
2nd Floor - 10470 - 152nd Street, Surrey BC V3R 0Y3

Attn: Jim Davies
Acting Assistant Regional Water Manager
604-582-5203

Upper Clowhom - Monthly Compliance Report – September 2011

Dear Mr. Davies,

Please accept the following letter report, submitted in accordance with the conditions of the Interim Leave to Commence Operations for the Upper Clowhom power plant, dated August 4, 2011.

Summary of operational information:

<table>
<tr><td>Non-compliances</td><td>Ramping non-compliances are listed below. All other occurrences of ramping rates in the diversion reach or downstream of the powerhouse greater/less than 0.05/-0.05 are considered to be natural, or occurred at flows greater than the mean annual discharge and are therefore not considered ramping non-compliances.
<table>
<tr><th>Date/Time</th><th>Duration (h:m)</th><th>Maximum Ramping Rate* (m/h)</th><th>Cause</th></tr>
<tr><td>09/13/11 15:00</td><td>1:45</td><td>-0.074</td><td>Plant startup after BC Hydro shutdown</td></tr>
<tr><td>09/19/11 11:35</td><td>1:00 over 2:10</td><td>-0.058</td><td>Plant startup after exciter problem</td></tr>
<tr><td colspan="4">*The Maximum Ramping Rate column above represents the single greatest ramping rate achieved and is not a rate sustained for the duration of the event.</td></tr>
</table></td></tr>
<tr><td>Shutdowns/startups</td><td>The plant was started on September 13th, after the BC Hydro forced outage. The plant was then stopped on the 16th for an exciter problem and restarted on the 19th. The plant was also shut down and restarted on the 23rd, 25th, and 28th, due to various plant problems.</td></tr>
<tr><td>Maintenance of IFR</td><td>The minimum flow at the IFR gauge was 0.31 m^3/s compared to the September IFR of 0.33 m^3/s.

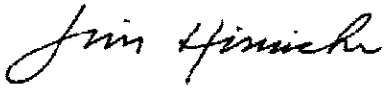
From the 16th to the 17th and from the 20th to the 21st, the flow at the IFR gauge intermittently fell below 0.33 m3/s. The minimum flow was only 0.02 m3/s less than the IFR and is considered to be within the error of the rating curve. Improvement of the rating curve at low flows is a priority and further work is currently planned. The slightly low flow was not detectible at the time because it was too intermittent to show up on the hourly data provided remotely by Rom Communications.

Stage and flow data at the IFR gauge for the period from 0:00 until 10:35 on September 1st was not available due to damage caused to the gauge in a flood event on August 22nd. A second flood event on September 22nd moved the IFR gauge up in its housing, causing false low flow readings. The problem is</td></tr>
</table>

	in the process of being fixed by Via Sat. See attached Discharge chart.
Stage	See attached Water Level and Ramping Rate chart for hourly data in the diversion reach.
Diverted Flows	The maximum diverted flow was 8.48 m^3/s compared to the water license allowable diversion of 8.40 m^3/s. This overage occurred for a short period on September 22nd, and can be attributed to very short term spikes in penstock flow that were related to pressure fluctuations in the penstock caused by flood conditions and a partially blocked trash rack. The plant was subsequently shut down on a low penstock pressure trip. Data is missing for most of the day on the 12th because the hard drive became full and data could not be recorded. The plant was not operational during this time and there was no penstock flow. See attached Flow and Stage Data.
Operational Changes	The flow ramping program was updated on September 13th with the most recent rating curve. Between September 21st and 23rd, changes were made to the head level control program to in an attempt to reduce variations in volume of water flowing through the plant. At the same time changes were also made to the ramping program to reduce the rate at which the plant ramps down output, to make it consistent with the up-ramping program.

The ramping data attached has stage readings collected at 5 minute intervals, obtained from Via Sat, up until their last visit to the site (September 21 – 22). Data for the period from September 22-30 was obtained remotely through Rom Communications and was only available for the IFR gauge, and at one hour intervals.

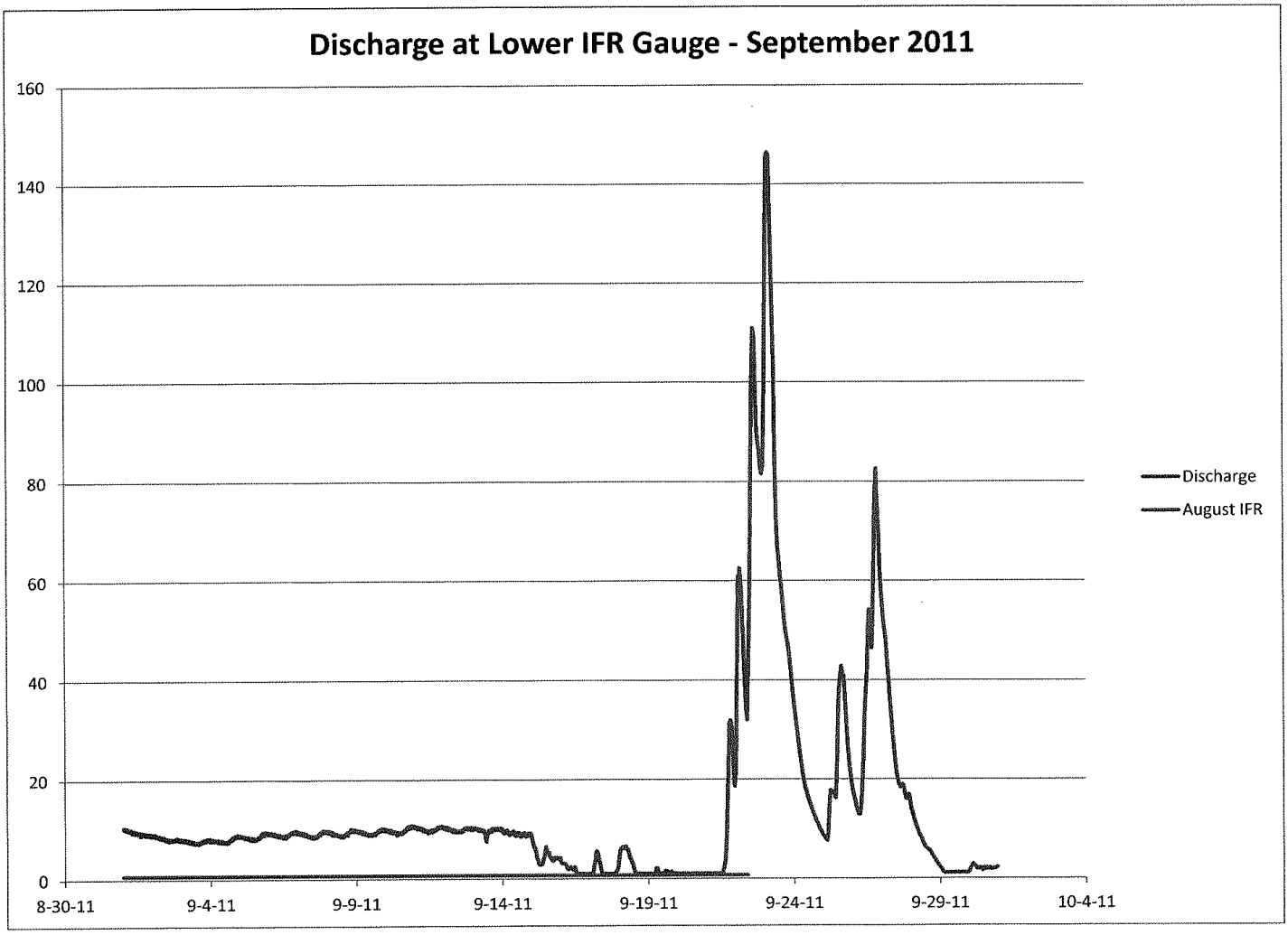
Sincerely,

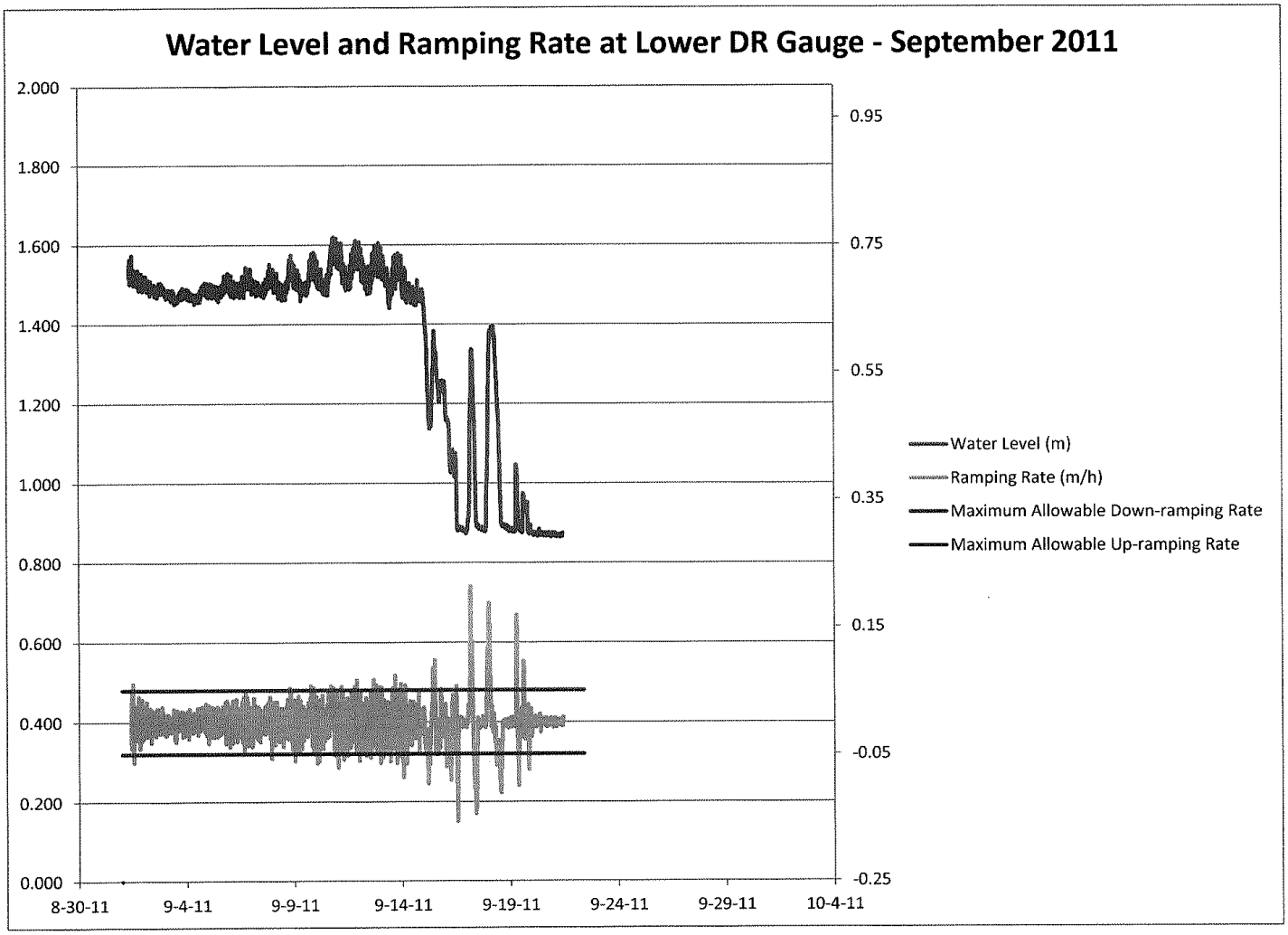


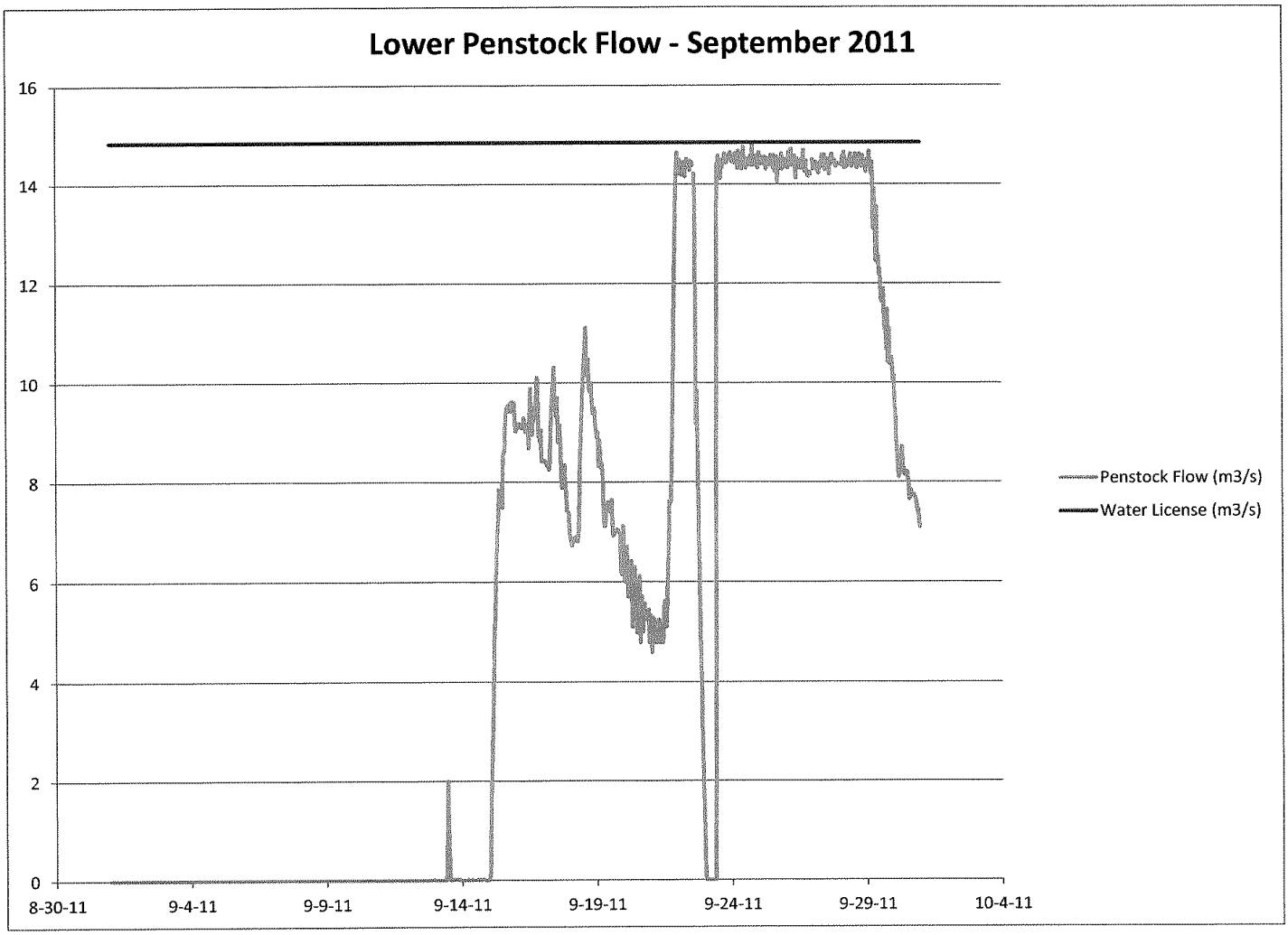
Jim Hinrichs
Vice President Western Operations
T: 760-798-8503 | H: 619-224-4747 | C: 619-252-4747

Encls.

Flow & Stage Data – September 2011
Chart – Ramp and Level – September 2011
Chart – Discharge – September 2011
Chart – Penstock Flow – September 2011


Discharge at Lower IFR Gauge - September 2011
160
140
120
100
80
60
40
20
0
8-30-11
9-4-11
9-9-11
9-14-11
9-19-11
9-24-11
9-29-11
10-4-11
Discharge
August IFR


Water Level and Ramping Rate at Lower DR Gauge - September 2011
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
0.95
0.75
0.55
0.35
0.15
-0.05
-0.25
8-30-11
9-4-11
9-9-11
9-14-11
9-19-11
9-24-11
9-29-11
10-4-11
Water Level (m)
Ramping Rate (m/h)
Maximum Allowable Down-ramping Rate
Maximum Allowable Up-ramping Rate


Lower Penstock Flow - September 2011
16
14
12
10
8
6
4
2
0
8-30-11
9-4-11
9-9-11
9-14-11
9-19-11
9-24-11
9-29-11
10-4-11
Penstock Flow (m3/s)
Water License (m3/s)

CLOWHOM POWER

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October 11, 2011

Water Allocation, South Coast Region
Ministry of Forests, Lands & Natural Resource Operations
2nd Floor - 10470 - 152nd Street, Surrey BC V3R 0Y3

Attn: Jim Davies
Acting Assistant Regional Water Manager
604-582-5203

Lower Clowhom - Monthly Compliance Report – September 2011

Dear Mr. Davies,

Please accept the following letter report, submitted in accordance with the conditions of the Interim Leave to Commence Operations for the Lower Clowhom power plant, dated August 4, 2011.

Summary of operational information:

Non-compliances

There were no plant induced violations of IFR, or any other water license conditions, other than the ramping events listed below. All other occurrences of ramping rates in the diversion reach or downstream of the powerhouse greater/less than 0.05/-0.05 are considered to be natural, or occurred at flows greater than the mean annual discharge and are therefore not considered ramping non-compliances.

Date/Time	Duration (h:m)	Maximum Ramping Rate* (m/h)	Cause
Gauge Location in Diversion Reach			
9/16/11 11:45	0:10	0.057	400kW drop in output
9/16/11 12:40	1:15	-0.156	1.2 MW increase in output
9/17/11 6:55	4:05	-0.144	2.3 MW increase over 4 hours
9/18/11 7:55	6:00 over 6:35	-0.111	4 MW increase over 6+ hours
9/19/11 6:20	1:00	0.169	1 MW decrease over 1+ hour
Gauge Location Downstream of Powerhouse			
9/17/11 3:35	0:15 over 0:25	0.064	1.4 MW output reduction and water delayed before overflowing weir
9/17/11 10:20	0:35	-0.083	1.4 MW output reduction
9/18/11 14:25	0:20 over 0:25	-0.056	1 MW step decrease in output
9/18/11 23:35	0:20 over 0:25	-0.057	1 MW step decrease in output
9/20/11 6:35	0:25	-0.070	Output cycling – flow following
9/20/11 13:35	0:25	-0.070	Output cycling – flow following

*The Maximum Ramping Rate column above represents the single greatest ramping rate achieved and is not a rate sustained for the duration of the event. The above events were not related to start-up or shut-down of the plant. We are currently reviewing why these operational adjustments caused ramping events.

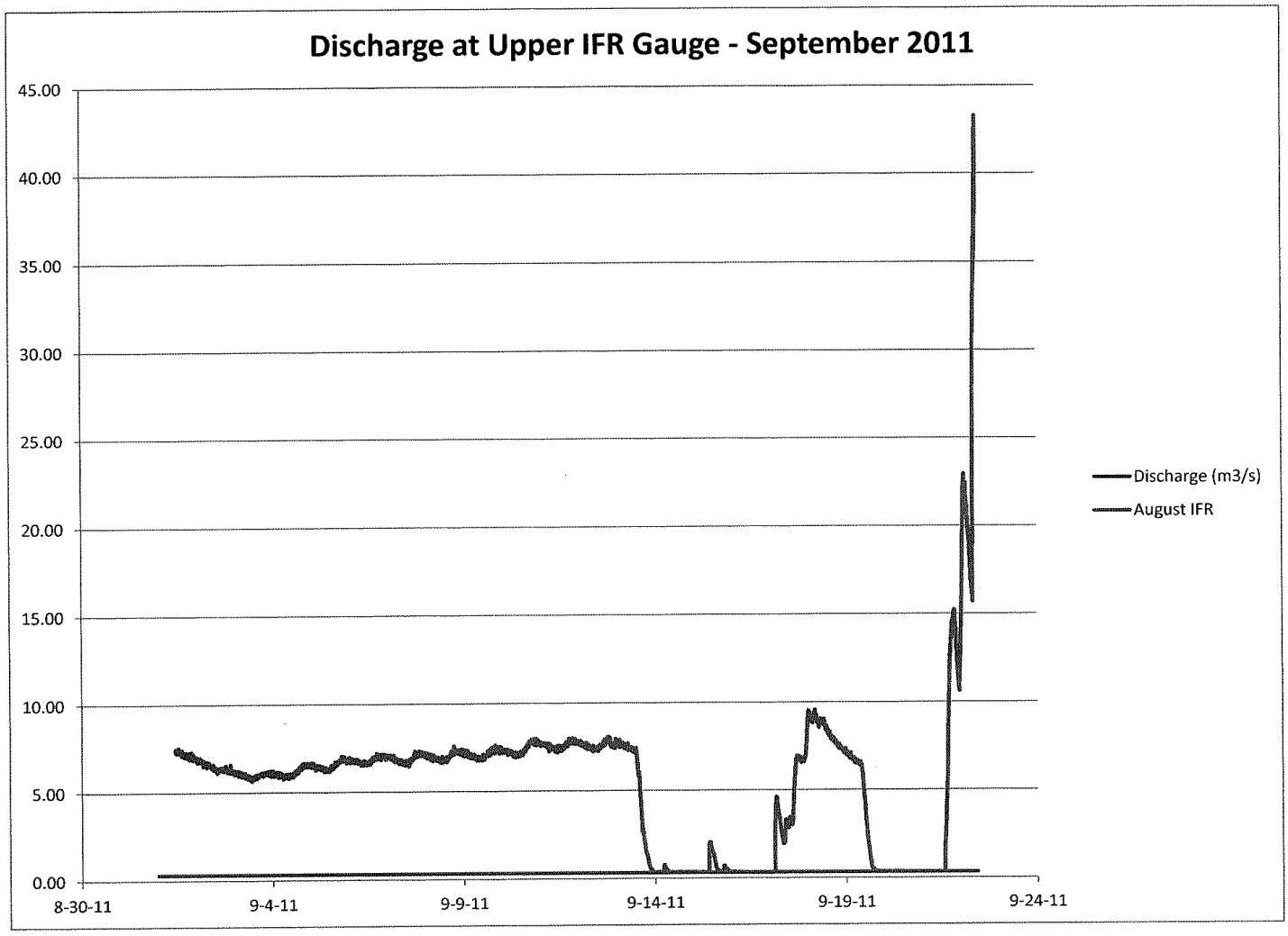
Shutdowns/startups	The plant was started on September 15th after the BC Hydro forced shutdown, shut down and restarted on September 18th after a low headpond level trip, and shut down on the 22nd and restarted on the 23rd after an emergency shutdown caused by low seal water pressure.
Maintenance of IFR	IFR was maintained al all times. The minimum flow in the diversion reach was 0.99 m^3/s compared to the IFR of 0.72 m^3/s. See attached Discharge chart.
Stage	See attached Water Level and Ramping Rate chart for hourly stage data at the diversion reach gauge.
Diverted Flows	The maximum diverted flow was 14.78 m^3/s compared to the water license allowable diversion of 14.84 m^3/s. See attached Flow and Stage Data.
Operational Changes	The flow ramping program was updated on September 13th with the most recent rating curve. Between September 21st and 23rd, changes were made to the head level control program to in an attempt to reduce variations in volume of water flowing through the plant. At the same time, changes were also made to the ramping program to reduce the rate at which the plant ramps down output, to make it consistent with the up-ramping program.

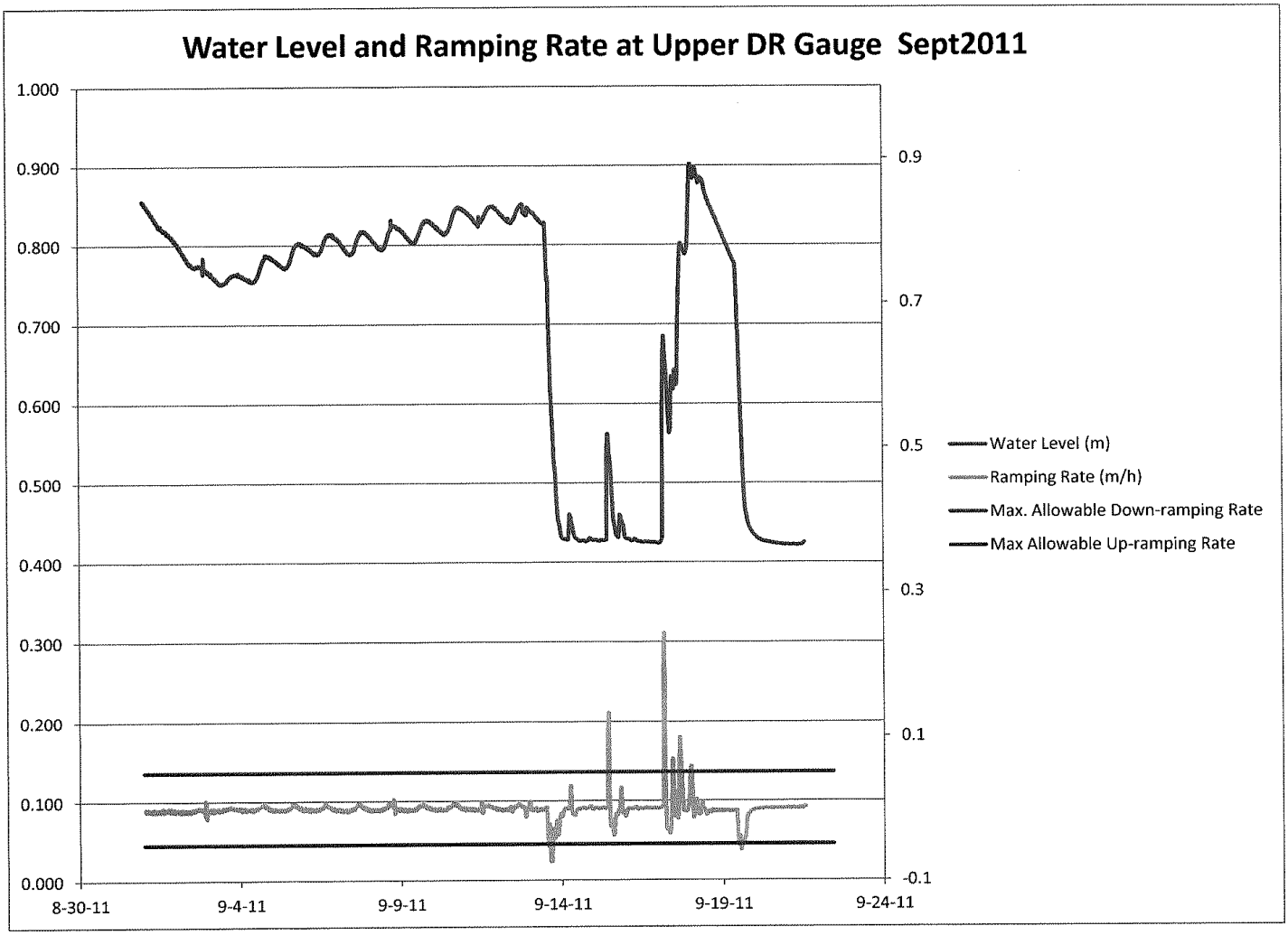
The ramping data attached has stage readings collected at 5 minute intervals, obtained from Via Sat, up until their last visit to the site (September 21 – 22). Data for the period from September 22-30 was obtained remotely through Rom Communications and was only available for the IFR gauge, and at one hour intervals. Data for the gauge downstream of the powerhouse was not available until 8:50 on September 1st when a faulty sensor was replaced. The plant was not running during the time of the missing data.

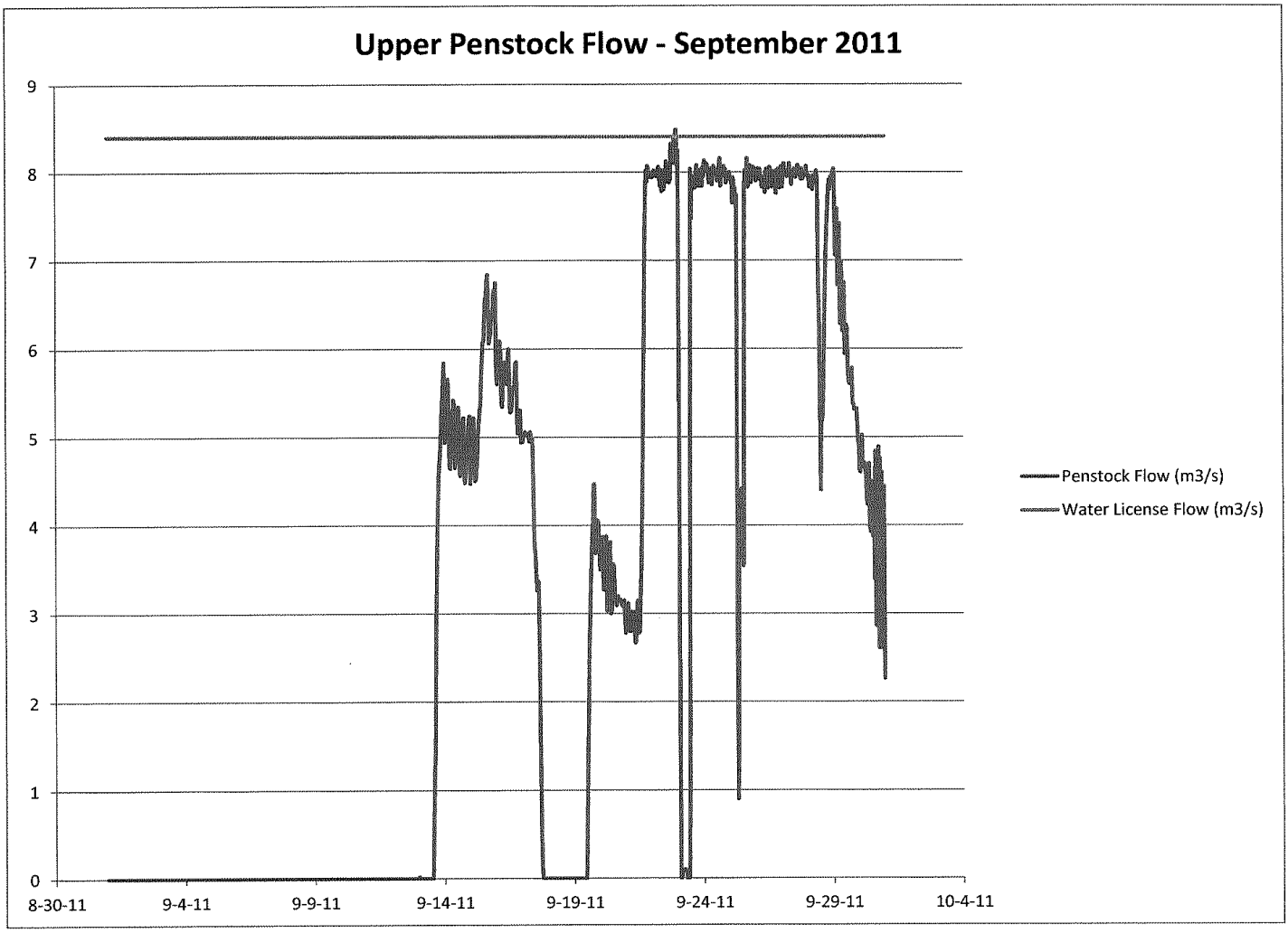
Sincerely,

Jim Hinrichs
Vice President Western Operations
T: 760-798-8503 | H: 619-224-4747 | C: 619-252-4747

Encls.
Flow & Stage Data – September 2011
Chart – Ramp and Level – September 2011
Chart – Discharge – September 2011
Chart – Penstock Flow – September 2011


Discharge at Upper IFR Gauge - September 2011
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
8-30-11
9-4-11
9-9-11
9-14-11
9-19-11
9-24-11
Discharge (m3/s)
August IFR


Water Level and Ramping Rate at Upper DR Gauge Sept2011
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0.9
0.7
0.5
0.3
0.1
-0.1
8-30-11
9-4-11
9-9-11
9-14-11
9-19-11
9-24-11
Water Level (m)
Ramping Rate (m/h)
Max. Allowable Down-ramping Rate
Max Allowable Up-ramping Rate


Upper Penstock Flow - September 2011
9
8
7
6
5
4
3
2
1
0
8-30-11
9-4-11
9-9-11
9-14-11
9-19-11
9-24-11
9-29-11
10-4-11
Penstock Flow (m3/s)
Water License Flow (m3/s)

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Friday, October 21, 2011 4:17 PM
To: Ullah, Aman FLNR:EX
Cc: Jim Hinrichs; Doug Bryson; Davies, James W FLNR:EX; Amit Bhargava; Julia Ciccaglione; Andy Robinson
Subject: Lower Clowhom start and stop - ramping

Aman, this is to report a potential ramping event at Lower Clowhom yesterday morning when the unit was shut down and subsequently restarted. (maximum ramping rates of 0.266m/hr on shutdown and -0.104m/hr on startup versus the 0.075m/hr rate limit at the IFR gauge). This was only for two one hour intervals on shutdown and three one hour intervals on startup. This is based on the hourly ROMCOMM data from the IFR gauge, so details are minimal.

Again this is a potential event, because of the poor correlation between the IFR gauge data and the Diversion reach data identified earlier in PGL's Supplementary Ramping report, June 2011. In looking at past gauge data for the Lower plant, it is clear that even using a 0.075m/hr standard at the IFR gauge, often overstates the stage change in the Lower diversion reach.

The potential incident will be re-evaluated once the 5 minute data for this time period is retrieved from the data loggers. On a side note, the new IFR gauges for tie-in to the plant PLC are in place in the river and should be connected next week. This will allow real time access to data at 5 minute intervals.

CPLP is providing this report in line with the 24 hour reporting requirement as per the Interim Leave to Commence Operations.

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Babakaiff, Scott C FLNR:EX
Sent: Wednesday, October 26, 2011 4:48 PM
To: Ullah, Aman FLNR:EX; Stoddard, Erin M FLNR:EX; 'Busto, Vince'; 'Knight, Francesca'
Cc: Davies, James W FLNR:EX; Barrett, Scott FLNR:EX
Subject: RE: Furry Creek Power - Ramping Report

Aman,

Thank you forwarding the information for these ramping non-compliance events at Furry (and the ones in recent months at Clowhom).

s.13, s.15

In short, please provide some clarity for me: will Water Staff (and more generally the Resource Approvals & Authorizations Division) simply be serving as messengers on this issue, or is there any appetite to share in enforcement responsibilities?

Scott

From: Ullah, Aman FLNR:EX
Sent: October 26, 2011 4:25 PM
To: Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; 'Busto, Vince'; 'Knight, Francesca'
Subject: FW: Furry Creek Power - Ramping Report

Hello Folks,

Some ramping events at Furry Creek hydroelectric facility for your information.

Aman

From: Kyle Edwards [mailto:kedwards@vereseninc.com]
Sent: Wednesday, October 26, 2011 9:25 AM
To: Ullah, Aman FLNR:EX
Cc: Linda Vaughan; Amit Bhargava; Julia Ciccaglione; Jim Hinrichs; Doug Bryson; Robert Kulka
Subject: Furry Creek Power - Ramping Report

Aman,

On behalf of Furry Creek Power, I wanted to inform you of ramping events that occurred between October 20 and 22, 2011.

The first event occurred on Oct 20th, and began at 9:00 AM PST. The plant was re-started beginning at 8:25 AM PST, after a shutdown the previous day caused by a BC Hydro line fault. At the beginning of ramping, the flow in the diversion reach was 2.178 m3/s. The minimum plant flow is 0.2 m3/s, which accounts for about half of the flow change in the first hour

(from 8-9 AM) which resulted in the -0.072 ramping rate. This is an operational constraint of the plant and cannot be avoided. The plant ramped at it's programmed rate, and took approximately 4 hours to reach an output of about 6400 kW. The current ramping protocol does not take into account the flow in the river and is simply a linear rate based on the time to reach full output. This ramping protocol will be replaced in the near future by a program that will consider the flow in the river and adjust the ramping rate accordingly, which should eliminate low-flow ramping exceedances such as this one.

Date/Time PST

Stage (m)

Flow (m3/s)

Ramping (m/h)

10/20/2011 9:01

0.859

1.732

-0.072

10/20/2011 10:01

0.777

1.299

-0.082

10/20/2011 11:01

0.622

0.684

-0.155

10/20/2011 12:01

0.506

0.371

-0.116

A second, very short duration, event occurred on October 21st at 18:00 PST. Prior to the event, flows in the river were ramping up at a rate of 0.454 m/h naturally, due to rainfall. This caused debris to be released from above the headpond and impinge on the intake trashrack. The event occurred when operations staff removed the accumulated debris from the trashrack, which caused a sudden increase in penstock flow and an associated decrease in diversion reach flow. The trashrack cleaning procedure is currently being reviewed, and changes to plant programming and/or manual cleaning procedures are being considered in an effort to avoid this type of event in the future.

10/21/2011 18:01

0.922

2.118

-0.195

The third event was also short in duration and occurred on October 22nd at 9:00 AM PST. The event was again related to the removal of debris blocking the trash rack, but occurred at a lower flow, where ramping rates are more easily affected by small changes in flow.

10/22/2011 9:01

0.631

0.714

-0.196

10/22/2011 10:01

0.509

0.379

-0.122

Furry Creek Power will do a more in-depth internal review once more detailed data is retrieved from the loggers on site. A new flow ramping protocol that takes into account the existing flow in the river is in the works and is expected to be implemented very soon. New trashrack cleaning procedures are being developed, that will avoid causing ramping events when blockages are removed.

Please let us know if you have any further questions.

Sincerely,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Thursday, November 10, 2011 3:50 PM
To: Davies, James W FLNR:EX
Cc: Ullah, Aman FLNR:EX; Jim Hinrichs; Robert Kulka; Doug Bryson; Amit Bhargava; Linda Vaughan
Subject: Clowhom Power - October Monthly Complaince Report
Attachments: Upper Clowhom - Monthly Compliance Report Letter -October 2011.pdf; Lower Clowhom - Montly Compliance Report Letter - October 2011.pdf; Upper Clowhom - Monthly Compliance Report Data - October 2011.xlsx; Lower Clowhom - Monthly Compliance Report Data - October 2011.xlsx

Mr. Davies,

Please accept the attached October 2011 Monthly Compliance Reports for the Upper and Lower Clowhom hydroelectric sites, submitted in accordance with the conditions of the Interim Leaves to Commence Operations, dated August 4, 2011.

Please contact Jim Hinrichs, Robert Kulka, or me with any questions or concerns.

Sincerely,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

CLOWHOM POWER

Clowhom Power LP
901 – 33 Water Street
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November 10, 2011

Water Allocation, South Coast Region
Ministry of Forests, Lands & Natural Resource Operations
2nd Floor - 10470 - 152nd Street, Surrey BC V3R 0Y3

Attn: Jim Davies
Acting Assistant Regional Water Manager
604-582-5203

Upper Clowhom - Monthly Compliance Report – October 2011

Dear Mr. Davies,

Please accept the following letter report, submitted in accordance with the conditions of the Interim Leave to Commence Operations for the Upper Clowhom power plant, dated August 4, 2011.

Summary of operational information:

Non-compliances	There were no non-compliances with ramping rate restrictions during startup or shutdown of the plant at flows below mean annual discharge (MAD) and there were no non-compliances with any other requirements of the water license or interim leave to commence operations during the month of October. There were many natural events during which ramping rates were above 0.05 m/h, but could not be attributed to plant operations. There were also a few minor exceedances of ramping rates at the gauge downstream of the powerhouse during normal plant operations that can be attributed to variations in head level control during flow following. This problem is being investigated and changes to the program are planned for the near future. Upon review of the data from the September monthly compliance report, it was noted that an exceedance of allowable ramping rates was overlooked. On September 17th there was an event starting at 10:05 and lasting 35 minutes with a maximum ramping rate of 0.068 m/h at the gauge in the diversion reach. This event was related to a plant shutdown.
Shutdowns/startups	The plant shut down and restarted on October 7, because of a line fault caused by a tree on the transmission line.
Maintenance of IFR	The minimum flow at the IFR gauge was reported in the September Monthly Compliance Report to have fallen to 0.31 m^3/s compared to the September IFR of 0.33 m^3/s. Further work on the rating curve in October by Via-Sat revealed that the rating curve used in September was inaccurate at the low end, and estimating much lower flows than actually existed. The corrected data shows that the flow in the diversion reach flow did not in fact fall below 0.508, well above the IFR. The IFR was maintained at all times in October, with a minimum flow of 0.53 m^3/s compared to the October IFR of 0.48.
Stage	See attached Water Level and Ramping Rate chart for hourly data in the diversion reach.
Diverted Flows	The maximum diverted flow was 8.16 m^3/s compared to the water license allowable diversion of 8.40 m^3/s.

Operational Changes	Flow measurements were taken at flows near the IFR as part of the ongoing improvement of the rating curve at low flows. IFR gauges were wired into the plant HMI to allow better IFR and ramping alarms, and access to data.

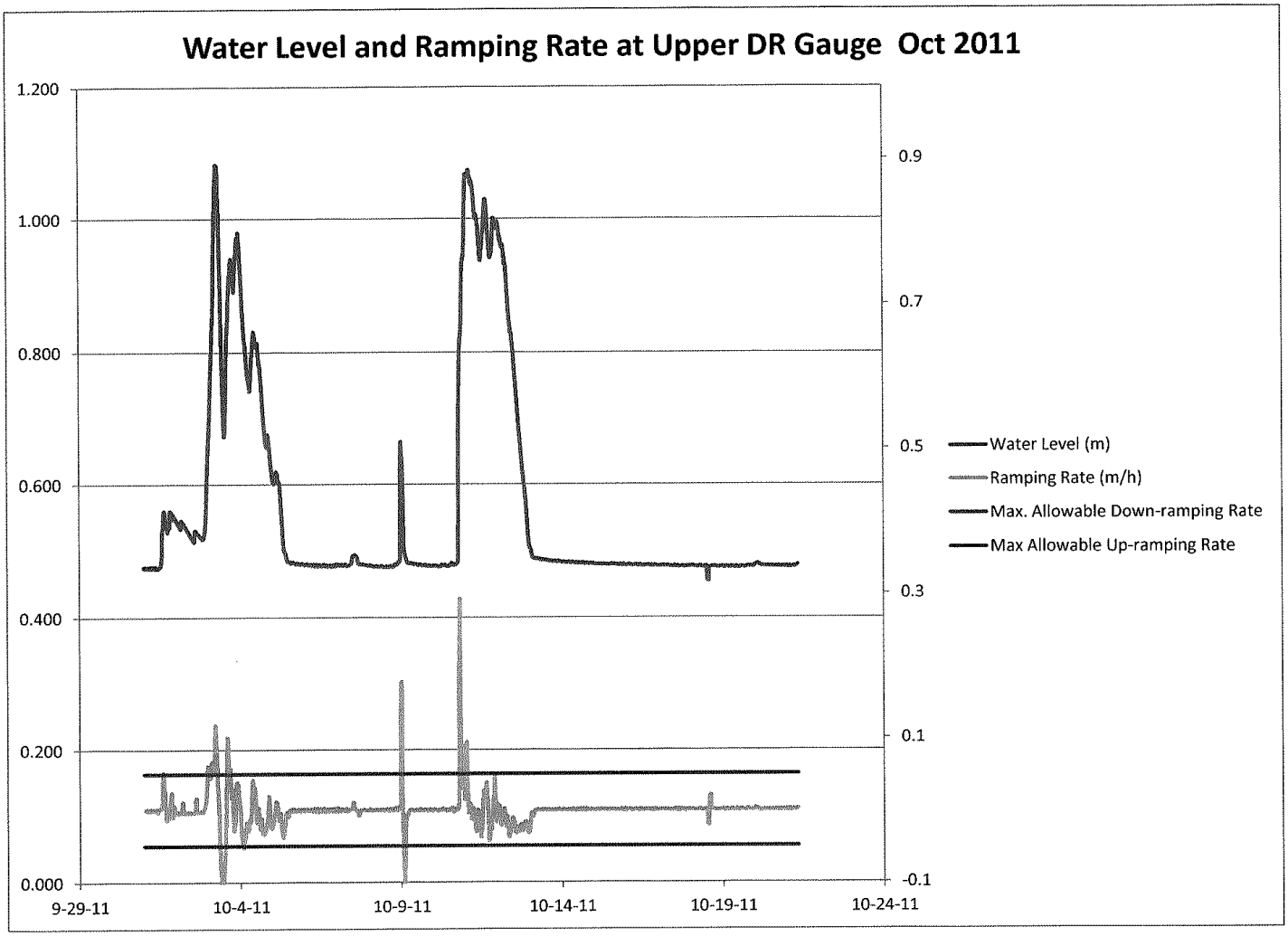
The ramping data attached consists of stage readings collected at 5 minute intervals, obtained from Via-Sat, up until their last visit to the site (October 18-21). IFR Gauge data for the period from October 18-31 was obtained remotely through Rom Communications and was only available at one hour intervals. Water levels on October 18 at 12:01 and 12:07, are considered unrepresentative of actual river conditions due to Via-sat cleaning the gauge housing.

Sincerely,

Jim Hinrichs
Vice President Western Operations
T: 760-798-8503 | H: 619-224-4747 | C: 619-252-4747

Encls.

Flow & Stage Data – October 2011
Chart – Ramp and Level – October 2011
Chart – Discharge – October 2011
Chart – Penstock Flow – October 2011


Water Level and Ramping Rate at Upper DR Gauge Oct 2011
1.200
1.000
0.800
0.600
0.400
0.200
0.000
0.9
0.7
0.5
0.3
0.1
-0.1
9-29-11
10-4-11
10-9-11
10-14-11
10-19-11
10-24-11
Water Level (m)
Ramping Rate (m/h)
Max. Allowable Down-ramping Rate
Max Allowable Up-ramping Rate

CLOWHOM POWER

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November 10, 2011

Water Allocation, South Coast Region
Ministry of Forests, Lands & Natural Resource Operations
2nd Floor - 10470 - 152nd Street, Surrey BC V3R 0Y3

Attn: Jim Davies
Acting Assistant Regional Water Manager
604-582-5203

Lower Clowhom - Monthly Compliance Report – October 2011

Dear Mr. Davies,

Please accept the following letter report, submitted in accordance with the conditions of the Interim Leave to Commence Operations for the Lower Clowhom power plant, dated August 4, 2011.

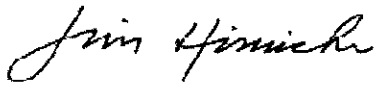
Summary of operational information:

Non-compliances	There were no exceedances of allowable ramping rates during shutdown or startup of the plant at river flows below the mean annual discharge (MAD). There were numerous natural exceedances of allowable ramping rates that were not attributable to plant operations. Due to variations in the head level control system, there were occasions during the month of October when stage change occurred during, flow following, at rates higher than 0.075 m/h. The current head level control scheme is being refined, and changes will be made in the near future to avoid the continuation of these types of events. IFR was maintained at all times and all terms of the Interim Leave to Operate were complied with. There were some minor, short deviations of other water license criteria (see diverted flows below).
Shutdowns/startups	The plant was shut down and restarted on October 7th due to a tree on the transmission line, on the 11th (twice), and on the 20th for a turbine vibration trip.
Maintenance of IFR	IFR was maintained at all times. The minimum flow in the diversion reach was 1.26 m^3/s compared to the IFR of 1.05 m^3/s. See attached Discharge chart.
Stage	See attached Water Level and Ramping Rate chart for hourly stage data at the IFR gauge.
Diverted Flows	The maximum diverted flow was 14.95 m^3/s on October 4 at 7:55, compared to the water license allowable diversion of 14.84 m^3/s. This deviation of 0.11 m^3/s greater than the water license limit occurred for less than 5 minutes and is considered to be an amount within the accuracy of the flow meter, which is documented as +/-2.5%. This also occurred on October 3 at 14:55 and 16:25 at flows of 14.88 and 14.90 respectively. These penstock flow readings are considered transient in nature and are unlikely to reflect actual diversion rates. CPLP is considering switching to a turbine output relationship for determining flows to avoid these inconsistencies. See attached Flow and Stage Data.
Operational Changes	Flow measurements were taken at flows near IFR for further development of the low end of the rating curve. The IFR gauge was wired in to the plant PLC for better alarming capability for ramping and IFR as well as better access to data.

The ramping data attached has stage readings collected at 5 minute intervals, obtained from Via Sat, up until their last visit to the site (October 18-19). Data for the period from October 19-31 was obtained

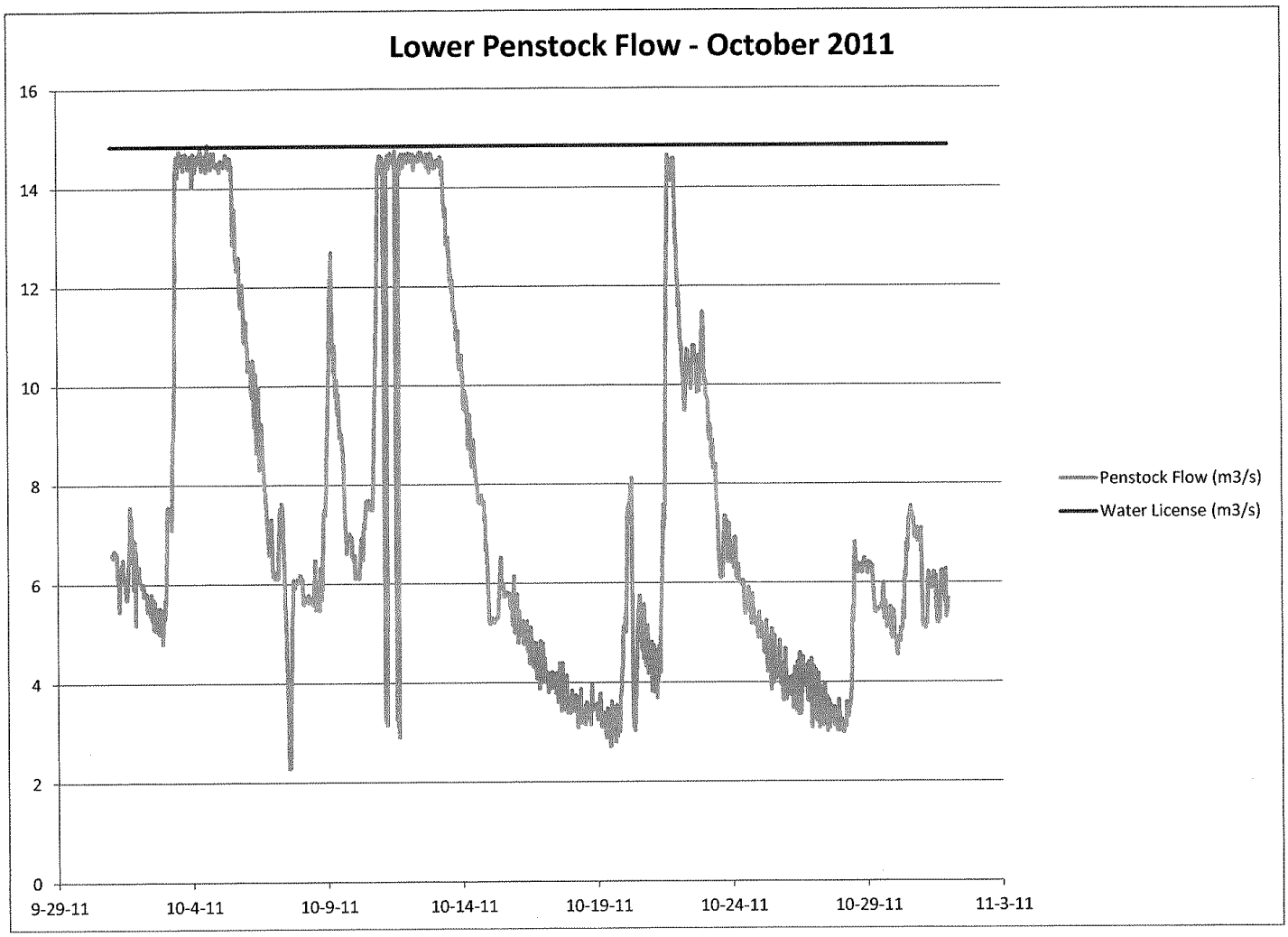
remotely through Rom Communications and was only available for the IFR gauge, and at one hour intervals. Data for the gauge in the diversion reach was not available for the month of October due to a problem with the data logger. As such, ramping compliance was determined using stage data from the IFR gauge. The data should be available as soon as it can be retrieved from the faulty logger.

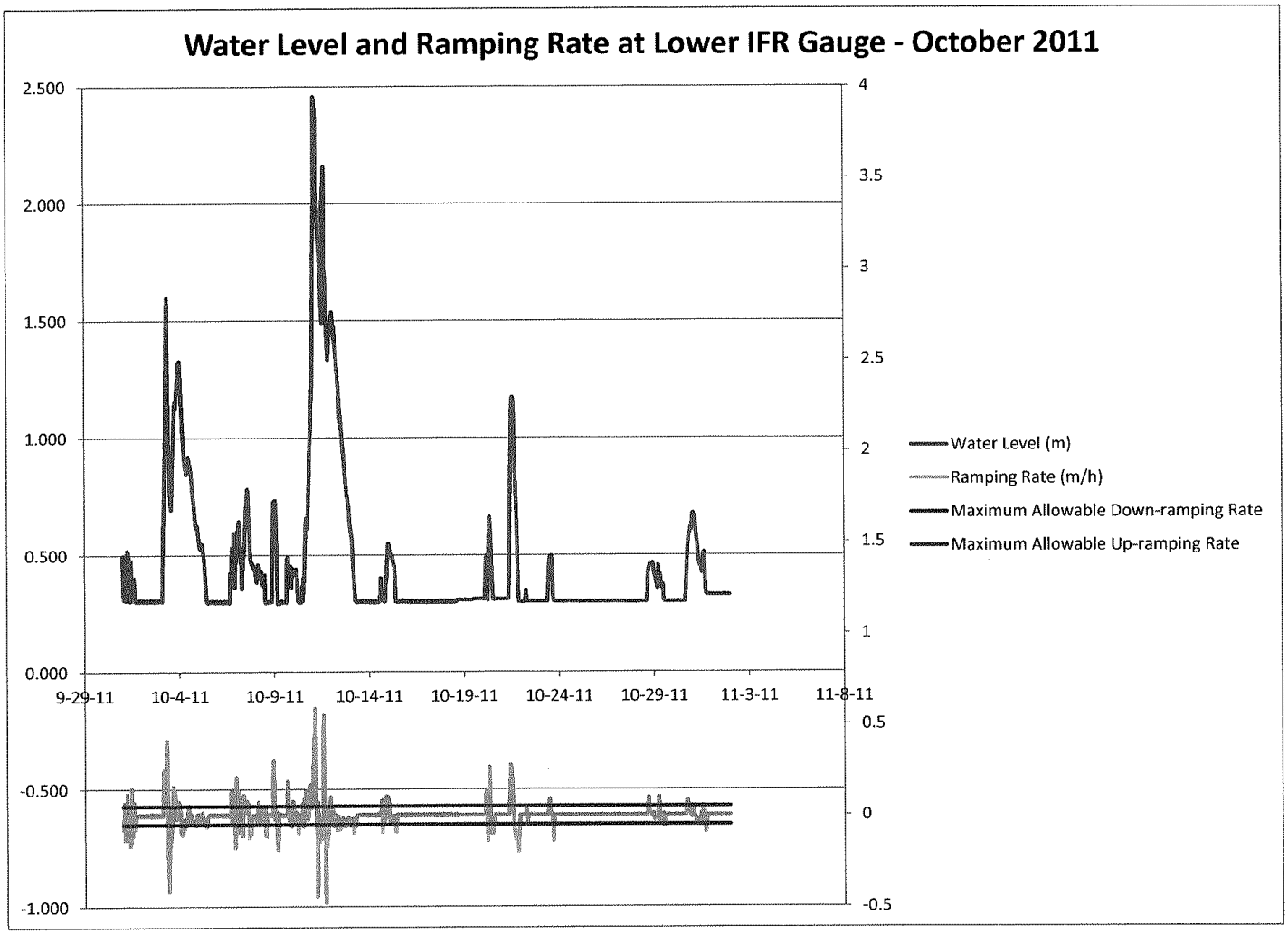
Sincerely,



Jim Hinrichs
Vice President Western Operations
T: 760-798-8503 | H: 619-224-4747 | C: 619-252-4747

Encls.
Flow & Stage Data – September 2011
Chart – Ramp and Level – September 2011
Chart – Discharge – September 2011
Chart – Penstock Flow – September 2011


Lower Penstock Flow - October 2011
16
14
12
10
8
6
4
2
0
9-29-11
10-4-11
10-9-11
10-14-11
10-19-11
10-24-11
10-29-11
11-3-11
Penstock Flow (m3/s)
Water License (m3/s)


Water Level and Ramping Rate at Lower IFR Gauge - October 2011
2.500
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
9-29-11
10-4-11
10-9-11
10-14-11
10-19-11
10-24-11
10-29-11
11-3-11
11-8-11
Water Level (m)
Ramping Rate (m/h)
Maximum Allowable Down-ramping Rate
Maximum Allowable Up-ramping Rate

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Thursday, November 10, 2011 5:15 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Jim Hinrichs; Amit Bhargava; Linda Vaughan; Doug Bryson; Robert Kulka
Subject: Clowhom Power - Early November Ramping Events

Aman,

On behalf of Clowhom Power LP, I wanted to inform you of potential ramping events that occurred between November 4th and 10th at the Upper and Lower Clowhom power plants.

The first event occurred at the Upper plant on November 4th and was caused by the plant shutting down due to low water. This shutdown revealed issues with programming that allowed the headpond to be drawn down slightly. When flow resumed over the weir, there was a short flushing event in the diversion reach. A similar event occurred at the lower plant on November 5th, with a similar result. This occurrence has been investigated and a temporary solution has been implemented, until programming work to fix the root cause can be completed.

The lower plant was re-started last night with no issues.

At the Lower plant at 04:00 this morning we had a flushing event when the unit shut down due to blockage on the trashrack caused by high river flows. This was caused by a programming issue which allowed one wicket gate to close too quickly. This issue is being investigated and will be addressed as soon as possible.

Both the Upper and Lower plant were re-started today. An intermittant ramping event occurred at the lower plant during the restart beginning at 10:00. The Upper plant may have caused a ramping event on startup, beginning at 14:01. This event appears to be of low magnitude (maximum ramping rate of 0.072). We are making every effort to effect operational changes that will prevent these events going forward. We had a meeting this morning with our engineering firm to work on the issues discussed above, and should have solutions in the very near future.

Again these are possible ramping events, as we have not yet had time to fully investigate the circumstances surrounding them.

Thanks,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Ullah, Aman FLNR:EX
Sent: Monday, November 14, 2011 4:55 PM
To: 'Kyle Edwards'; 'Doug Bryson'
Cc: Davies, James W FLNR:EX; 'Jim Hinrichs'; 'Amit Bhargava'; 'Linda Vaughan'; 'Robert Kulka'; 'Magnan, Alain'
Subject: RE: Clowhom Power - Early November Ramping Events
Attachments: Incident Report Form.docx

Hello Kyle,

Thank you for providing the information on recent (occurred in early November 2011) ramping events at the Upper and Lower Clowhom hydroelectric projects!

Please complete the attached "Incident Report Form (IRF)" for these ramping events and also for the all other non-compliance events (ie. IFR, Ramping etc) that occurred since the issuance of Interim Leave to Commence Operation (ILCO) at these facilities separately and submit to the undersigned and Alan Magnan with DFO at: Alain.Magnan@dfo-mpo.gc.ca at the earliest possible, no later than December 7, 2011.

Please let me know if you have any questions in this regard.

Regards,

Aman

From: Kyle Edwards [mailto:kedwards@vereseninc.com]
Sent: Thursday, November 10, 2011 5:15 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Jim Hinrichs; Amit Bhargava; Linda Vaughan; Doug Bryson; Robert Kulka
Subject: Clowhom Power - Early November Ramping Events

Aman,

On behalf of Clowhom Power LP, I wanted to inform you of potential ramping events that occurred between November 4th and 10th at the Upper and Lower Clowhom power plants.

The first event occurred at the Upper plant on November 4th and was caused by the plant shutting down due to low water. This shutdown revealed issues with programming that allowed the headpond to be drawn down slightly. When flow resumed over the weir, there was a short flushing event in the diversion reach. A similar event occurred at the lower plant on November 5th, with a similar result. This occurrence has been investigated and a temporary solution has been implemented, until programming work to fix the root cause can be completed.

The lower plant was re-started last night with no issues.

At the Lower plant at 04:00 this morning we had a flushing event when the unit shut down due to blockage on the trashrack caused by high river flows. This was caused by a programming issue which allowed one wicket gate to close too quickly. This issue is being investigated and will be addressed as soon as possible.

Both the Upper and Lower plant were re-started today. An intermittant ramping event occurred at the lower plant during the restart beginning at 10:00. The Upper plant may have caused a ramping event on startup, beginning at

14:01. This event appears to be of low magnitude (maximum ramping rate of 0.072). We are making every effort to effect operational changes that will prevent these events going forward. We had a meeting this morning with our engineering firm to work on the issues discussed above, and should have solutions in the very near future.

Again these are possible ramping events, as we have not yet had time to fully investigate the circumstances surrounding them.

Thanks,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@veresenInc.com]
Sent: Wednesday, November 16, 2011 5:22 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Amit Bhargava; Linda Vaughan; Jim Hinrichs; Doug Bryson; Robert Kulka
Subject: Clowhom Power - Low Water Shutdown Ramping

Aman,

On behalf of Clowhom Power LP, I wanted to inform you of a potential ramping event that occurred November 15th at the Upper and Lower Clowhom power plants.

Low flow in the river caused both plants to shut down when they fell below minimum production levels. We have not yet been able to secure detailed data showing the plant and flow conditions surrounding the event, but a preliminary assessment shows reduced severity from a similar event that occurred earlier in the month.

Following the November 5th low water shut down event, changes were made to the water level set points and dead bands at both plants to reduce the effect of the delay in weir spill. The wicket gates at the lower plant were repaired, which allowed them to close more quickly, thus eliminating a jump in penstock flow that occurred when the by pass valve was initiated. These changes have reduced the severity of the ramping caused by low water shutdowns.

We have dispatched an engineer to site for detailed data analysis. We will continue to improve operations based on the positive experience gained with the recent changes and analysis of the collected data.

Thanks,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Wednesday, November 23, 2011 6:00 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Jim Hinrichs; Robert Kulka; Doug Bryson; Linda Vaughan; Amit Bhargava
Subject: Clowhom Power - Lower Plant Startup Ramping

Aman,

Please excuse the format of this report as we are still developing a reporting template based on the draft Incident Report Form (IRF) that you provided. We would like to consult with both MFLNRO and DFO to better understand what is required of us, in order to provide information that will fulfill regulatory needs while staying relevant to our project.

On behalf of Clowhom Power LP, I wanted to inform you of a potential ramping event that occurred November 22nd at the Lower Clowhom power plant. Upon plant startup after a low water outage, the IFR gauge data provided by Romcomm at hourly intervals showed the following ramping rates:

Date/Time	Stage (m)	Flow (m3/s)	Ramping Rate (m/h)
11/22/2011 9:01	0.794	6.331	**-0.079**
11/22/2011 10:01	0.719	5.293	**-0.075**
11/22/2011 11:01	0.64	4.302	**-0.079**
11/22/2011 12:01	0.554	3.363	**-0.086**
11/22/2011 14:01	0.414	2.094	**-0.08**
11/22/2011 15:01	0.315	1.396	**-0.099**

The ramping rates observed are only slightly higher than the estimated allowable rate at the IFR gauge of 0.075 m/h, but they are reportable as a possible violation. The cause of the improper ramping is being investigated, and steps will be taken this week to ensure that this doesn't happen again. Data will be downloaded from the gauges at the sensitive locations in the diversion reach and downstream of the powerhouse, to determine if this was in fact a violation of ramping rates, within the next two weeks. It is also our intention to install Romcomm units on the gauges in the diversion reach, so that we will have remote access to hourly gauge data at the sensitive locations at both the upper and lower plants. This will allow better and more timely identification of ramping violations.

Thanks,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Friday, November 25, 2011 4:53 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Robert Kulka; Doug Bryson; Amit Bhargava; Linda Vaughan
Subject: Clowhom Power - Ramping Report

Aman,

On behalf of Clowhom Power L.P., I wanted to inform you of an event that occurred on November 24th at approximately 12:20 p.m. at the Lower Clowhom power plant. This event was the result of a mechanical shutdown due to high vibration. Despite implementing a more conservative ramping program since our last shutdown, stage change at the IFR gauge indicated a possible exceedance of maximum ramping rates. The high ramping rate was noticed almost immediately, and steps were taken to interrupt the shutdown and restart the plant, thus avoiding a prolonged event. Ramping rates were monitored very closely while ramping up the unit, and when the level in the river seemed to be dropping too quickly, ramping was paused for a period of time, and then allowed to ramp to a steady state output.

In response to this event, programming changes were made last night to restrict all ramping (both up and down) to our minimum ramping values of 0.5 m3/s/h at the lower plant and 0.4 m3/s/h at the upper plant. In the middle of the implementation of this very conservative ramping program, another shutdown was triggered due to vibrations, and the plant was forced to shutdown without the benefit of a ramping program. This caused a rapid decrease in diverted water flows, and a second short duration potential ramping event.

The new program has now been fully implemented and was performance tested last night for the remainder of the shutdown, and seems to be working as expected. We are currently in the process of ramping the unit up and are monitoring it very closely to ensure it continues to behave properly. The implementation of minimum ramping rates at all times, regardless of river flow, is considered a drastic and temporary measure and will be re-evaluated after a thorough review of the control system, and modifications to ramping rate input and output values

Thanks,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Ullah, Aman FLNR:EX
Sent: Wednesday, November 30, 2011 10:37 AM
To: 'Kyle Edwards'
Cc: Davies, James W FLNR:EX; 'Amit Bhargava'; 'Linda Vaughan'; 'Jim Hinrichs'; 'Doug Bryson'; 'Robert Kulka'
Subject: RE: Clowhom Power - Low Water Shutdown Ramping
Attachments: Incident Report Form.docx

Hi Kyle,

Thanks for informing the ramping event that occurred on November 15th at both, Upper and Lower Clowhom power plants!

Per our standard request, please complete the attached Incident Report Form (IRF) and be provided to our office within a week time of this e-mail correspondence. Please note that there is a little change in the IRF with regard to the IFR and/or ramping non-compliance events flow and gauge data provision that would be only for a week duration (three days prior and three days after the event occurrence day).

For reporting the non-compliance events in future, please be advised that whenever such an event occurs/reported, this IRF be completed and submitted to our office within a week time of the occurrence of the event automatically.

Please let me know if you have any questions in this regard.

Regards,

Aman

From: Kyle Edwards [mailto:kedwards@vereseninc.com]
Sent: Wednesday, November 16, 2011 5:22 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Amit Bhargava; Linda Vaughan; Jim Hinrichs; Doug Bryson; Robert Kulka
Subject: Clowhom Power - Low Water Shutdown Ramping

Aman,

On behalf of Clowhom Power LP, I wanted to inform you of a potential ramping event that occurred November 15th at the Upper and Lower Clowhom power plants.

Low flow in the river caused both plants to shut down when they fell below minimum production levels. We have not yet been able to secure detailed data showing the plant and flow conditions surrounding the event, but a preliminary assessment shows reduced severity from a similar event that occurred earlier in the month.

Following the November 5th low water shut down event, changes were made to the water level set points and dead bands at both plants to reduce the effect of the delay in weir spill. The wicket gates at the lower plant were repaired, which allowed them to close more quickly, thus eliminating a jump in penstock flow that occurred when the by pass valve was initiated. These changes have reduced the severity of the ramping caused by low water shutdowns.

We have dispatched an engineer to site for detailed data analysis. We will continue to improve operations based on the positive experience gained with the recent changes and analysis of the collected data.

Thanks,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Thursday, December 15, 2011 2:30 PM
To: Davies, James W FLNR:EX
Cc: Ullah, Aman FLNR:EX; Jim Hinrichs; Amit Bhargava; Linda Vaughan; Robert Kulka; Linda Vaughan; Babakaiff, Scott C FLNR:EX
Subject: Clowhom Power - November Monthly Compliance Reports
Attachments: Lower Clowhom - Montly Compliance Report Letter - November 2011.pdf; Lower Clowhom - Monthly Compliance Report Data - November 2011.xlsx; Upper Clowhom - Monthly Compliance Report Letter - November 2011.pdf; Upper Clowhom - Monthly Compliance Report Data - November 2011.xlsx

Mr. Davies,

Please accept the attached November 2011 Monthly Compliance Reports for the Upper and Lower Clowhom hydroelectric sites, submitted in accordance with the conditions of the Interim Leaves to Commence Operations, dated August 4, 2011.

Please contact Jim Hinrichs, Robert Kulka, or me with any questions or concerns.

Sincerely,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

CLOWHOM POWER

Clowhom Power LP
901 – 33 Water Street
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December 15, 2011

Water Allocation, South Coast Region
Ministry of Forests, Lands & Natural Resource Operations
2nd Floor - 10470 - 152nd Street, Surrey BC V3R 0Y3

Attn: Jim Davies
Acting Assistant Regional Water Manager
604-582-5203

Lower Clowhom - Monthly Compliance Report – November 2011

Dear Mr. Davies,

Please accept the following letter report, submitted in accordance with the conditions of the Interim Leave to Commence Operations for the Lower Clowhom power plant, dated August 4, 2011.

Summary of operational information:

<table>
<tr><td>Non-compliances</td><td>There were no plant induced violations of IFR, or any other water license conditions, other than the ramping events listed below. All other occurrences of ramping rates in the diversion reach or downstream of the powerhouse greater/less than 0.05/-0.05 are considered to be natural, or occurred when plant was in normal head level control or at flows greater than the mean annual discharge and are therefore not considered ramping non-compliances.

As part of the 24 hour compliance reporting required by the Interim Leave to Commence operation, possible ramping events were reported for a shutdown on November 15 and a start up on November 22. Further investigation has revealed that ramping rates were <u>not</u> exceeded on these days, either in the diversion reach or downstream of the powerhouse.</td></tr>
<tr><td></td><td>Gauge Location in Diversion Reach</td></tr>
<tr><td></td><td>
<table>
<tr><th>Date/Time</th><th>Duration (h:m)</th><th>Maximum Ramping Rate* (m/h)</th><th>Cause</th></tr>
<tr><td>11/5/2011 2:05</td><td>0:50</td><td>0.083</td><td>Plant shutdown – weir spill starting[1]</td></tr>
<tr><td>11/10/2011 4:50</td><td>1:00</td><td>0.152</td><td>Plant shutdown – programming issue</td></tr>
<tr><td>11/10/2011 20:05</td><td>0:20</td><td>-0.059</td><td>Plant startup – ramping up output</td></tr>
<tr><td>11/24/2011 20:15</td><td>0:55</td><td>0.107</td><td>Plant shutdown[1]</td></tr>
<tr><td colspan="4">Gauge Location Downstream of Powerhouse</td></tr>
<tr><td>11/5/11 1:35</td><td>0:25</td><td>-0.057</td><td>Plant shutdown</td></tr>
<tr><td>11/9/11 14:30</td><td>3:15 over 6:20</td><td>0.083</td><td>Plant startup – ramping up bypass/output</td></tr>
<tr><td>11/24/11 13:55</td><td>0:30</td><td>0.067</td><td>Intervention to stop false shutdown.</td></tr>
<tr><td>11/24/11 20:35</td><td>0:50</td><td>0.270</td><td>Bypass opening to recover flow after wicket gate shut due to programming error.</td></tr>
</table>
</td></tr>
<tr><td></td><td>*The Maximum Ramping Rate column above represents the single greatest ramping rate achieved and is not a rate sustained for the duration of the event.
[1]Ramping event also observed downstream of the powerhouse.</td></tr>
<tr><td>Shutdowns/startups</td><td>The plant shut down on November 5th due insufficient water for diversion. It was</td></tr>
</table>

	restarted on November 9th, but shut down on the 10th due to a trashrack differential trip caused by high flows and debris. The plant was re-started on the 10th and shut down on low water again on the 15th. The plant was re-started on the 22nd and shutdown on the 25th due to low water. The plant was then restarted on the 26th but shut down again on the 27th on a trashrack differential trip caused by high flows. The plant was restarted again on the 30th.
Maintenance of IFR	IFR was maintained at all times. The minimum flow in the diversion reach was 1.24 m^3/s compared to the November IFR of 1.03 m^3/s. See attached Discharge chart.
Stage	See attached Water Level and Ramping Rate chart for hourly stage data at the diversion reach gauge.
Diverted Flows	The maximum diverted flow was 14.65 m^3/s, compared to the water license allowable diversion of 14.84 m^3/s. See attached Flow and Stage Data.
Operational Changes	Plant flow ramping rates were reduced to the minimum practical hourly rate (0.5 $m^3/s/h$) for all startups and shutdowns at any flow below MAD. Ramping for low water shutdowns was modified to avoid flushing due to sudden start of weir flow.

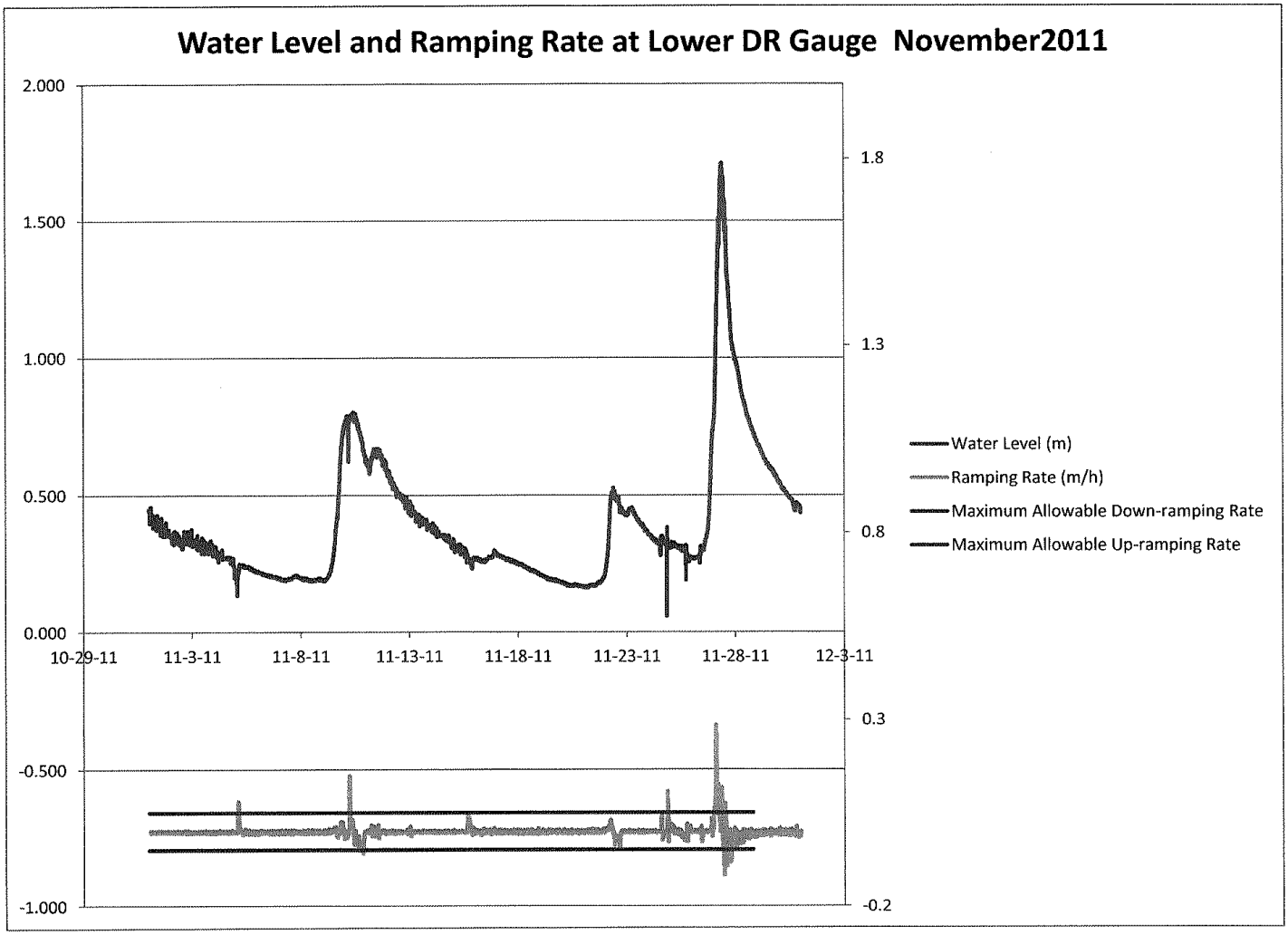
The ramping data attached has stage readings collected at 5 minute intervals obtained from Via Sat data systems. During the month of November we gained valuable insight into our low flow operations that will help us avoid future ramping violations.

Sincerely,

Jim Hinrichs

Jim Hinrichs
Vice President Western Operations
T: 760-798-8503 | H: 619-224-4747 | C: 619-252-4747

Encls.
Flow & Stage Data – November 2011
Chart – Ramp and Level – November 2011
Chart – Discharge – November 2011
Chart – Penstock Flow – November 2011


Water Level and Ramping Rate at Lower DR Gauge November2011
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
1.8
1.3
0.8
0.3
-0.2
10-29-11
11-3-11
11-8-11
11-13-11
11-18-11
11-23-11
11-28-11
12-3-11
Water Level (m)
Ramping Rate (m/h)
Maximum Allowable Down-ramping Rate
Maximum Allowable Up-ramping Rate

CLOWHOM POWER

Clowhom Power LP
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V6B 1R4

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Fax (604) 688-4457
www.veresenic.com

December 15, 2011

Water Allocation, South Coast Region
Ministry of Forests, Lands & Natural Resource Operations
2nd Floor - 10470 - 152nd Street, Surrey BC V3R 0Y3

Attn: Jim Davies
Acting Assistant Regional Water Manager
604-582-5203

Upper Clowhom - Monthly Compliance Report – November 2011

Dear Mr. Davies,

Please accept the following letter report, submitted in accordance with the conditions of the Interim Leave to Commence Operations for the Upper Clowhom power plant, dated August 4, 2011.

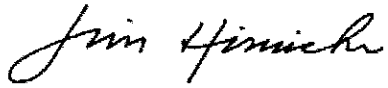
Summary of operational information:

<table>
<tr><td>Non-compliances</td><td>There were no plant induced violations of IFR, or any other water license conditions, other than the ramping events listed below. All other occurrences of ramping rates at the IFR gauge or downstream of the powerhouse greater/less than 0.05/-0.05 are considered to be natural, or occurred when plant was in normal head level control or at flows greater than the mean annual discharge and are therefore not considered ramping non-compliances.
<table>
<tr><td colspan="4">IFR Gauge Location</td></tr>
<tr><td>Date/Time</td><td>Duration (h:m)</td><td>Maximum Ramping Rate* (m/h)</td><td>Cause</td></tr>
<tr><td>11/4/11 22:10</td><td>0:55</td><td>0.111</td><td>Plant shutdown – weir spill starting[1]</td></tr>
<tr><td>11/10/11 13:25</td><td>3:35</td><td>-0.084</td><td>Plant startup – ramping up output</td></tr>
<tr><td>11/15/11 18:50</td><td>0:55</td><td>0.110</td><td>Plant shutdown – weir spill starting[1]</td></tr>
<tr><td>11/22/11 14:30</td><td>0:15</td><td>0.069</td><td>Attempted startup – ramping down bypass[1]</td></tr>
<tr><td colspan="4">Gauge Location Downstream of Powerhouse</td></tr>
<tr><td>11/4/11 20:15</td><td>1:05</td><td>-0.078</td><td>Plant shutdown</td></tr>
<tr><td>11/15/11 17:45</td><td>0:45</td><td>-0.065</td><td>Plant shutdown</td></tr>
</table>
*The Maximum Ramping Rate column above represents the single greatest ramping rate achieved and is not a rate sustained for the duration of the event. Data from the Upper Diversion Reach gauge could not be obtained for November due to access issues. The above IFR data represents possible ramping exceedances that will be further investigated when the diversion reach data is available.
[1]Ramping event also observed downstream of the powerhouse.</td></tr>
<tr><td>Shutdowns/startups</td><td>The plant shut down on November 4th due to insufficient water for diversion. It was re-started on November 10th. The plant shut down again on the 15th due to low water, and was restarted on the 27th. The plant shut down briefly due to trashrack differential on the 27th and was re-started later that day.</td></tr>
<tr><td>Maintenance of IFR</td><td>The IFR was maintained at all times in November, with a minimum flow of 0.63m^3/s compared to the November IFR of 0.47.</td></tr>
</table>

Stage	See attached Water Level and Ramping Rate chart for hourly data at the IFR gauge.
Diverted Flows	The maximum diverted flow was 8.08 m^3/s compared to the water license allowable diversion of 8.40 m^3/s.
Operational Changes	Plant flow ramping rates were reduced to the minimum practical hourly rate (0.4 $m^3/s/h$) for all startups and shutdowns at any flow below MAD. Ramping for low water shutdowns was modified to avoid flushing due to sudden start of weir flow.

The ramping data attached consists of stage readings collected at 5 minute intervals, obtained from Via-Sat. IFR Gauge data is presented in lieu of diversion reach gauge data as the logger was inaccessible due to weather conditions. During the month of November we gained valuable insight into our low flow operations that will help us to avoid future ramping violations.

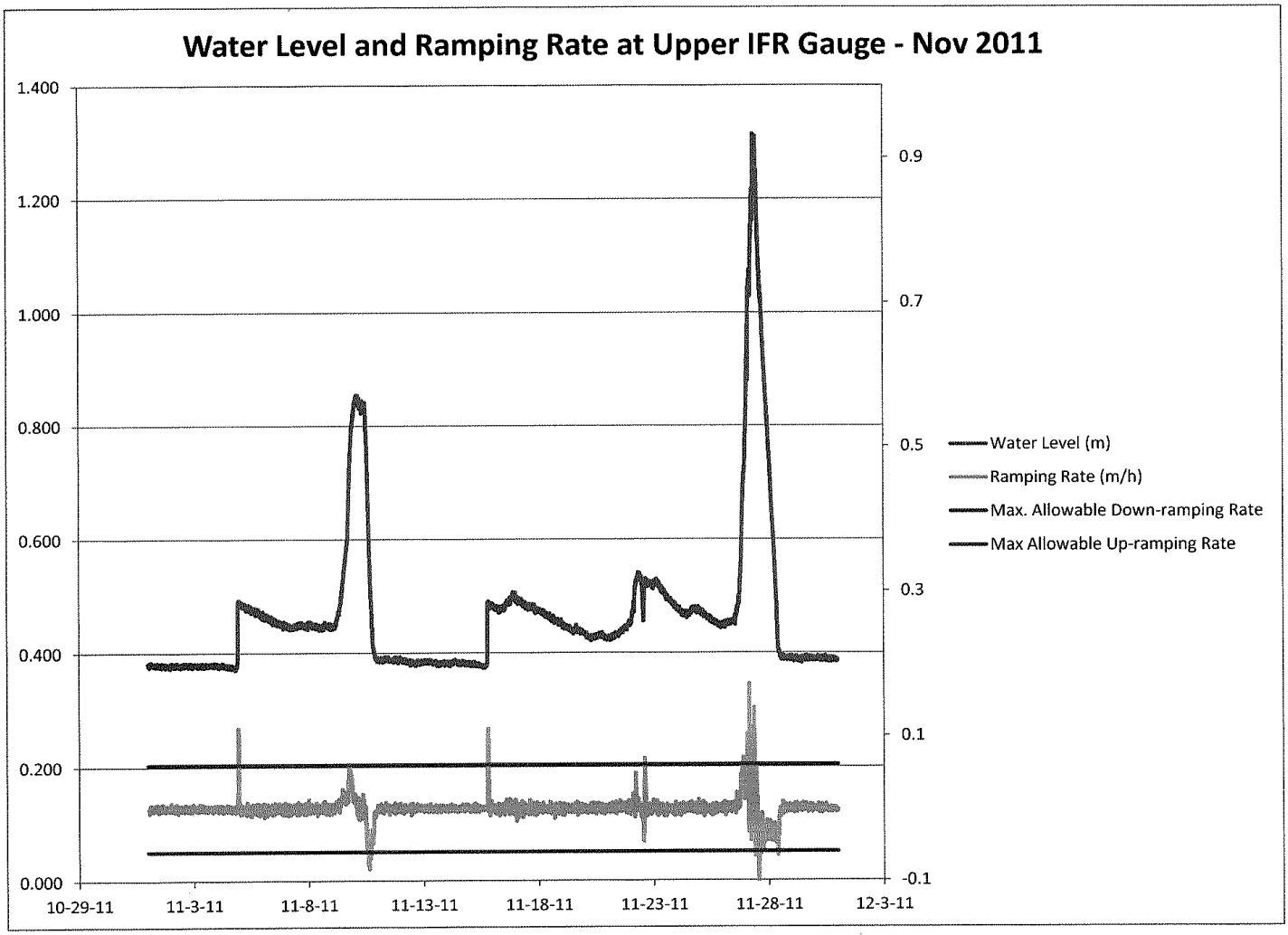
Sincerely,



Jim Hinrichs
Vice President Western Operations
T: 760-798-8503 | H: 619-224-4747 | C: 619-252-4747

Encls.

Flow & Stage Data – November 2011
Chart – Ramp and Level – November 2011
Chart – Discharge – November 2011
Chart – Penstock Flow – November 2011


Water Level and Ramping Rate at Upper IFR Gauge - Nov 2011
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
0.9
0.7
0.5
0.3
0.1
-0.1
10-29-11
11-3-11
11-8-11
11-13-11
11-18-11
11-23-11
11-28-11
12-3-11
Water Level (m)
Ramping Rate (m/h)
Max. Allowable Down-ramping Rate
Max Allowable Up-ramping Rate

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@veresenInc.com]
Sent: Friday, January 6, 2012 12:06 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Robert Kulka; Jim Hinrichs; Doug Bryson; Amit Bhargava; Linda Vaughan
Subject: Clowhom Power - Ramping Report

Aman,

On behalf of Clowhom Power LP, I wanted to inform you of a potential ramping event that occurred at the Upper power plant over the holidays.

The plant had a potential event when it shut down on December 31st due to low flows. The potential event occurred at around 01:20 on January 1st when spill over the weir resumed after the shutdown. A special ramping program to avoid this issue was implemented in November and successfully tested at the lower plant. However an error prevented it from being executed properly in this case at the upper plant. Programming upgrades are planned for later this month, as soon as key personnel become available.

Thanks,

Kyle Edwards, BASc, EIT
Operations Engineer
P: 604-637-6393 x112 | Cell: 604-362-5953
VERESEN | www.veresenInc.com
Veresen Inc.
Suite 440, Livingston Place | South Tower
222 – 3rd Avenue SW | Calgary, Alberta | T2P 0B4

Ullah, Aman FLNR:EX

From: Ullah, Aman FLNR:EX
Sent: Tuesday, January 10, 2012 4:57 PM
To: 'Kyle Edwards'
Cc: Davies, James W FLNR:EX; 'Robert Kulka'; 'Jim Hinrichs'; 'Doug Bryson'; 'Amit Bhargava'; 'Linda Vaughan'
Subject: RE: Clowhom Power - Ramping Report
Attachments: RE: Clowhom Power - Low Water Shutdown Ramping

Hi Kyle,

Thanks for reporting the ramping event on January 6th that occurred on January 1st .....

As advised earlier (see the attachment), IRF be completed and provided to our office for this non compliance event and the ramping events previously occurred/reported at this facility at the earliest, no later than January 17, 2012.

Regards,

Aman

From: Kyle Edwards [mailto:kedwards@veresenInc.com]
Sent: Friday, January 6, 2012 12:06 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Robert Kulka; Jim Hinrichs; Doug Bryson; Amit Bhargava; Linda Vaughan
Subject: Clowhom Power - Ramping Report

Aman,

On behalf of Clowhom Power LP, I wanted to inform you of a potential ramping event that occurred at the Upper power plant over the holidays.

The plant had a potential event when it shut down on December 31st due to low flows. The potential event occurred at around 01:20 on January 1st when spill over the weir resumed after the shutdown. A special ramping program to avoid this issue was implemented in November and successfully tested at the lower plant. However an error prevented it from being executed properly in this case at the upper plant. Programming upgrades are planned for later this month, as soon as key personnel become available.

Thanks,

Kyle Edwards, BASc, EIT
Operations Engineer
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Veresen Inc.
Suite 440, Livingston Place | South Tower
222 – 3rd Avenue SW | Calgary, Alberta | T2P 0B4

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@veresenInc.com]
Sent: Wednesday, January 11, 2012 3:47 PM
To: Ullah, Aman FLNR:EX
Subject: FW: Clowhom Power - Monthly Complinace Reports - December 2011
Attachments: Lower Clowhom - Monthly Compliance Report Data - December 2011.xlsx; Lower Clowhom - Monthly Compliance Report Letter - December 2011.pdf; Upper Clowhom - Monthly Compliance Report Data - December 2011.xlsx; Upper Clowhom - Monthly Compliance Report Letter - December 2011.pdf

Missed you on the first try.

From: Kyle Edwards
Sent: Wednesday, January 11, 2012 3:42 PM
To: 'james.davies@gov.bc.ca'
Cc: Amit Bhargava; Babakaiff, Scott C FLNR:EX; Robert Kulka; Jim Hinrichs; Amit Bhargava; Linda Vaughan
Subject: Clowhom Power - Monthly Complinace Reports - December 2011

Mr. Davies,

Please accept the attached December 2011 Monthly Compliance Reports for the Upper and Lower Clowhom hydroelectric sites, submitted in accordance with the conditions of the Interim Leaves to Commence Operations, dated August 4, 2011.

Please contact Robert Kulka or me with any questions or concerns.

Sincerely,

Kyle Edwards, BASc, EIT
Operations Engineer
P: 604-637-6393 x112 | Cell: 604-362-5953

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January 11, 2012

Water Allocation, South Coast Region
Ministry of Forests, Lands & Natural Resource Operations
2nd Floor - 10470 - 152nd Street, Surrey BC V3R 0Y3

Attn: Jim Davies
Acting Assistant Regional Water Manager
604-582-5203

Upper Clowhom - Monthly Compliance Report – December 2011

Dear Mr. Davies,

Please accept the following letter report, submitted in accordance with the conditions of the Interim Leave to Commence Operations for the Upper Clowhom power plant, dated August 4, 2011.

Summary of operational information:

<table>
<tr><td>Non-compliances</td><td colspan="4">There were no plant induced violations of IFR, or any other water license conditions, other than the potential ramping event shown below. All other occurrences of ramping rates at the IFR greater/less than 0.06/-0.06 are considered to be natural, or occurred at flows greater than the mean annual discharge and are therefore not considered possible ramping non-compliances.</td></tr>
<tr><td></td><td colspan="4">IFR Gauge</td></tr>
<tr><td></td><td>Date/Time</td><td>Duration (h:m)</td><td>Maximum Ramping Rate* (m/h)</td><td>Cause</td></tr>
<tr><td></td><td>12/5/11 10:30</td><td>0:55</td><td>0.123</td><td>Weir spill commencing after low water shut down.</td></tr>
<tr><td></td><td colspan="4">*The Maximum Ramping Rate column above represents the single greatest ramping rate achieved and is not a rate sustained for the duration of the event. Data from the Upper diversion reach and downstream of the powerhouse gauges were not obtained for December as Via-sat did not visit the site. The above IFR data represents possible ramping exceedances that will be further investigated when the sensitive cross section data is available.</td></tr>
<tr><td>Shutdowns/startups</td><td colspan="4">The plant shut down on December 5th due to insufficient water for diversion. It was re-started on December 28th, and shut down again on the 31st.</td></tr>
<tr><td>Maintenance of IFR</td><td colspan="4">The IFR was maintained at all times in December, with a minimum flow of 0.35 m^3/s compared to the December IFR of 0.28.</td></tr>
<tr><td>Stage</td><td colspan="4">See attached Water Level and Ramping Rate chart for hourly data at the IFR gauge.</td></tr>
<tr><td>Diverted Flows</td><td colspan="4">The maximum diverted flow was 2.74 m^3/s compared to the water license allowable diversion of 8.40 m^3/s.</td></tr>
<tr><td>Operational Changes</td><td colspan="4">None (plant offline for the majority of the month).</td></tr>
</table>

The modification of ramping for low water shutdowns to avoid flushing events, as indicated in the November Monthly Compliance Report, Operational Changes section, did not initiate as planned. The system programmer is scheduled to return to site in late January 2012 to troubleshoot and test this feature.

The ramping data attached consists of stage readings collected at 5 minute intervals, obtained from Via-Sat Data Systems. IFR Gauge data is presented in lieu of diversion reach and downstream of the power house gauge data as the loggers were not accessed for the month of December. Via-sat is scheduled to access the gauges in the week of January 16th.

Sincerely,

Robert Kulka
Operations Manager
P: 604-637-6393 | C: 604-619-9402 | F: 604-688-4457

Encls.

Flow & Stage Data – December 2011
Chart – Ramp and Level – December 2011
Chart – Discharge – December 2011
Chart – Penstock Flow – December 2011

CLOWHOM POWER

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www.veresenic.com

January 11, 2012

Water Allocation, South Coast Region
Ministry of Forests, Lands & Natural Resource Operations
2nd Floor - 10470 - 152nd Street, Surrey BC V3R 0Y3

Attn: Jim Davies
Acting Assistant Regional Water Manager
604-582-5203

Upper Clowhom - Monthly Compliance Report – December 2011

Dear Mr. Davies,

Please accept the following letter report, submitted in accordance with the conditions of the Interim Leave to Commence Operations for the Upper Clowhom power plant, dated August 4, 2011.

Summary of operational information:

<table>
<tr><td>Non-compliances</td><td colspan="4">There were no plant induced violations of IFR, or any other water license conditions, other than the potential ramping event shown below. All other occurrences of ramping rates at the IFR greater/less than 0.06/-0.06 are considered to be natural, or occurred at flows greater than the mean annual discharge and are therefore not considered possible ramping non-compliances.</td></tr>
<tr><td></td><td colspan="4">IFR Gauge</td></tr>
<tr><td></td><td>Date/Time</td><td>Duration (h:m)</td><td>Maximum Ramping Rate* (m/h)</td><td>Cause</td></tr>
<tr><td></td><td>12/5/11 10:30</td><td>0:55</td><td>0.123</td><td>Weir spill commencing after low water shut down.</td></tr>
<tr><td></td><td colspan="4">*The Maximum Ramping Rate column above represents the single greatest ramping rate achieved and is not a rate sustained for the duration of the event. Data from the Upper diversion reach and downstream of the powerhouse gauges were not obtained for December as Via-sat did not visit the site. The above IFR data represents possible ramping exceedances that will be further investigated when the sensitive cross section data is available.</td></tr>
<tr><td>Shutdowns/startups</td><td colspan="4">The plant shut down on December 5th due to insufficient water for diversion. It was re-started on December 28th, and shut down again on the 31st.</td></tr>
<tr><td>Maintenance of IFR</td><td colspan="4">The IFR was maintained at all times in December, with a minimum flow of 0.35 m^3/s compared to the December IFR of 0.28.</td></tr>
<tr><td>Stage</td><td colspan="4">See attached Water Level and Ramping Rate chart for hourly data at the IFR gauge.</td></tr>
<tr><td>Diverted Flows</td><td colspan="4">The maximum diverted flow was 2.74 m^3/s compared to the water license allowable diversion of 8.40 m^3/s.</td></tr>
<tr><td>Operational Changes</td><td colspan="4">None (plant offline for the majority of the month).</td></tr>
</table>

The modification of ramping for low water shutdowns to avoid flushing events, as indicated in the November Monthly Compliance Report, Operational Changes section, did not initiate as planned. The system programmer is scheduled to return to site in late January 2012 to troubleshoot and test this feature.

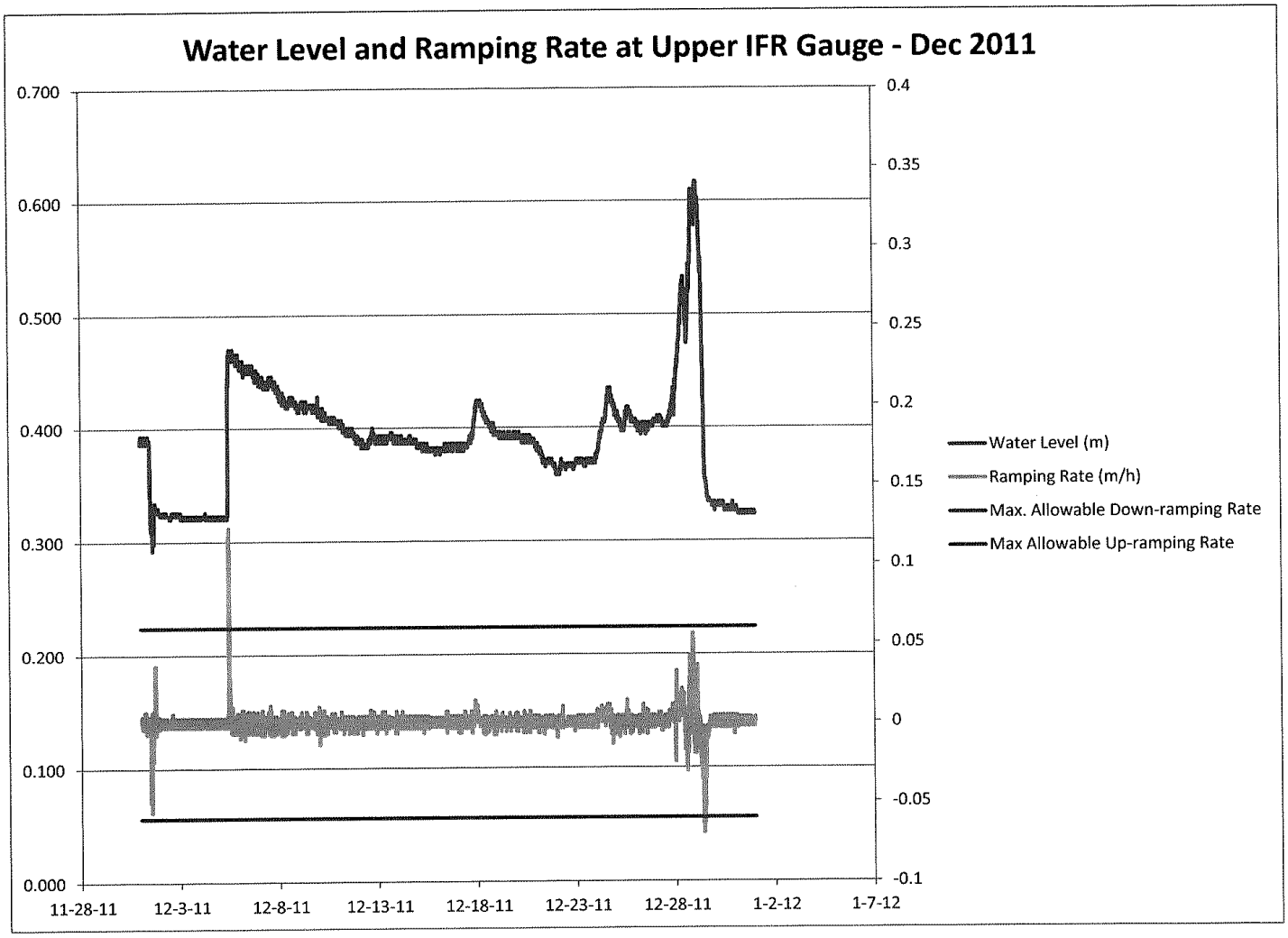
The ramping data attached consists of stage readings collected at 5 minute intervals, obtained from Via-Sat Data Systems. IFR Gauge data is presented in lieu of diversion reach and downstream of the power house gauge data as the loggers were not accessed for the month of December. Via-sat is scheduled to access the gauges in the week of January 16th.

Sincerely,

Robert Kulka
Operations Manager
P: 604-637-6393 | C: 604-619-9402 | F: 604-688-4457

Encls.

Flow & Stage Data – December 2011
Chart – Ramp and Level – December 2011
Chart – Discharge – December 2011
Chart – Penstock Flow – December 2011


Water Level and Ramping Rate at Upper IFR Gauge - Dec 2011
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
11-28-11
12-3-11
12-8-11
12-13-11
12-18-11
12-23-11
12-28-11
1-2-12
1-7-12
Water Level (m)
Ramping Rate (m/h)
Max. Allowable Down-ramping Rate
Max Allowable Up-ramping Rate

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@veresenInc.com]
Sent: Wednesday, January 11, 2012 4:47 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Jim Hinrichs; Robert Kulka; Amit Bhargava; Linda Vaughan
Subject: Clowhom Power - Ramping Report

Aman,

On behalf of Clowhom Power LP, I wanted to inform you of a potential ramping event that occurred at the Upper and Lower power plants.

A potential event occurred at the Upper plant when the unit was ramped down for some maintenance work. The special ramping program designed to avoid flushing events caused by the commencement of flow over the weir was not implemented properly, and was not initiated on this shutdown. The plant started to ramp down with no flow over the weir, and when the water did finally hit the IFR gauge there was a potential event that lasted approximately an hour with a ramping rate of approximately 0.11 m/h. Programming changes to fix this oversight are scheduled for late January.

At the Lower plant, a shutdown was initiated last night to allow work to be done today. Near the middle of the down ramping, there was a two hour period where slight flushing flows were seen at the IFR gauge. Ramping rates were a maximum of 0.092 m/h but the average for the time period was only 0.083 (compared to 0.075 target). It is unlikely that this ramping will be an event at the sensitive locations.

These are potential ramping rate violations and will be further investigated when gauge data from the sensitive reaches becomes available after Via-sat's site visit next week.

Thanks,

Kyle Edwards, BASc, EIT
Operations Engineer
P: 604-637-6393 x112 | Cell: 604-362-5953

VERESEN | www.veresenInc.com

Veresen Inc.
Suite 901
33 Water Street | Vancouver, BC | V6B 1R4

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Monday, January 16, 2012 1:41 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Jim Hinrichs; Robert Kulka; Amit Bhargava; Linda Vaughan
Subject: Clowhom - Ramping Report

Aman,

On behalf of Clowhom Power L.P., I would like to report potential ramping exceedances for the Upper and Lower Clowhom power plants.

On January 14th at 02:00, the IFR gauge at the Lower Plant registered a change in stage of greater than 0.075 m/h. This potential flushing event lasted for 45 minutes and had a maximum ramping rate of 0.1 m/h at the IFR gauge and was caused by the plant ramping down for a vibration trip at the minimum ramping rate. The ramping scheme for trips due to vibration and other comparable events will be changed to use the bypass valve for water level control in the head pond rather than ramping down flows which causes weir spill.

On January 15th at 16:10, a potential ramping event occurred at the Lower Plant when the bypass was ramping down after a shutdown due to low water. This minor potential flushing event lasted 30 minutes and the maximum ramping rate was only 0.095 m/h at the IFR gauge. The unit ramped near its programmed ramping rate and it's likely that natural flow changes during the ramping caused the detected non-compliance. However the incremental readings of the head pond level probes currently do not allow the precisely calculation of the actual head pond inflow over a short period of time, and therefore don't allow us to clearly attribute the non-compliance to natural flow changes for such short term events. Hardware to increase the reading increments has been ordered in late 2011 and is scheduled for installation in late January.

On January 15th at 10:15, a potential ramping event occurred at the Upper Plant when weir spill re-occurred after the plant shut down due to low water. This minor potential flushing event lasted 45 minutes and the maximum ramping rate was 0.104 m/h at the IFR gauge. This type of potential event will be addressed as early as next week, when our programmer becomes available.

The above potential events are based on data from the IFR gauges and do not necessarily indicate an exceedance of allowable ramping rates at the sensitive locations in the river. This will be confirmed as soon as data is obtained from Via-sat's scheduled site visit this week, and documented in the next monthly compliance report.

Thanks,

Kyle Edwards, BASc, EIT
Operations Engineer
P: 604-637-6393 x112 | Cell: 604-362-5953

VERESEN | www.veresenInc.com

Veresen Inc.
Suite 901
33 Water Street | Vancouver, BC | V6B 1R4

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Thursday, February 2, 2012 1:36 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Jim Hinrichs; Amit Bhargava; Robert Kulka; Linda Vaughan
Subject: Clowhom Power - Ramping Report

Aman,

On behalf of Clowhom Power LP, I wanted to inform you of a potential ramping non-compliance that occurred at the Upper power plant after it shut down due to low flow at 12:30 the morning of February 2.

The potential event started at 3:40 AM and lasted for approximately 40 minutes, with a maximum ramping rate of 0.95 m/h as measured immediately downstream of the intake and compared to the currently targeted rate of 0.06 m/h. Although plant flow was ramped down properly, the increase of flow to the diversion reach occurred when water started to spill over the weir. Because flow ramping rates were not exceeded, there are no stranding effects downstream of the powerhouse expected.

A special ramping program to avoid this weir spill issue was implemented in November and successfully tested at the lower plant. However an error prevented it from being executed properly in this case at the upper plant. Programming upgrades to fix this error are planned for next week.

Thanks,

Kyle Edwards, BASc, EIT
Operations Engineer
P: 604-637-6393 ext 112| C: 604-313-3559 | F: 604-688-4457

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Veresen Inc.
Suite 650
669 Howe Street | Vancouver, BC | V6C 0B4

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Wednesday, February 15, 2012 1:51 PM
To: Davies, James W FLNR:EX
Cc: Ullah, Aman FLNR:EX; Babakaiff, Scott C FLNR:EX; Robert Kulka; Jim Hinrichs; Linda Vaughan; Amit Bhargava
Subject: Clowhom Power - Monthly Complinace Reports - January 2012
Attachments: Lower Clowhom - Monthly Compliance Report Data - January 2012.xlsx; Lower Clowhom - Monthly Compliance Report Letter - January 2012.pdf; Upper Clowhom - Monthly Compliance Report Data - January 2012.xlsx; Upper Clowhom - Monthly Compliance Report Letter - January 2012.pdf

Mr. Davies,

Please accept the attached January 2012 Monthly Compliance Reports for the Upper and Lower Clowhom hydroelectric sites, submitted in accordance with the conditions of the Interim Leaves to Commence Operations, dated August 4, 2011 and their respective extensions dated December 23, 2011.

Please contact Robert Kulka or me with any questions or concerns.

Sincerely,

Kyle Edwards, BASc, EIT
Operations Engineer
P: 604-637-6393 ext 112| C: 604-313-3559 | F: 604-688-4457

VERESEN | www.veresenинc.com

Veresen Inc.
Suite 650
669 Howe Street | Vancouver, BC | V6C 0B4

Effective February 10, 2012, The Vancouver Office Address will be changed to:

Suite 650
669 Howe Street
Vancouver, BC
V6C 0B4

CLOWHOM POWER

Clowhom Power LP
901 – 33 Water Street
Vancouver, BC
V6B 1R4

Tel (604) 637-6393
Fax (604) 688-4457
www.veresenic.com

February 14, 2012

Water Allocation, South Coast Region
Ministry of Forests, Lands & Natural Resource Operations
2nd Floor - 10470 - 152nd Street, Surrey BC V3R 0Y3

Attn: Jim Davies
Acting Assistant Regional Water Manager
604-582-5203

Lower Clowhom - Monthly Compliance Report – January 2012

Dear Mr. Davies,

Please accept the following letter report, submitted in accordance with the conditions of the Interim Leave to Commence Operations dated August 4, 2011, and the subsequent extension dated December 23, 2012 for the Lower Clowhom power plant.

Non-compliances:

IFR

None

Ramping

Event Date/ Time	Date First Reported	Duration (h:m)	Maximum Ramping Rate* (m/h)			Cause	Conclusion
			LIFR	LDR	LDS		
1/10/12 22:40	1/11/12	2:00	0.092	0.034	-0.026	Planned shutdown	Not a ramping violation
1/14/12 2:00	1/16/12	0:45	0.101	0.043	-0.042	Ramping down for vibration trip	Not a ramping violation
1/15/12 10:20	na	0:10	0.003	0.002	-0.064	Plant shutdown due to low water	Slight non-compliance at LDR gauge (not detected at IFR gauge)
1/15/12 16:10	1/16/12	0:30	0.095	0.040	-0.035	Bypass ramping after low water shut down	Not a ramping violation

* The Maximum Ramping Rate column above represents the single greatest ramping rate achieved and is not a rate sustained for the duration of the event.

Data from the LDR and LDS gauges were only obtained up to Jan 16, 2012, but potential events were evaluated from LIFR gauge data.

Summary of operational information:

Shutdowns/startups	Shutdown Date	Cause	Startup Date
	January 1, 2012	Low water	January 2, 2012
	January 11, 2012	Planned breaker work	January 11, 2012
	January 14, 2012	Vibration trip	January 14, 2012

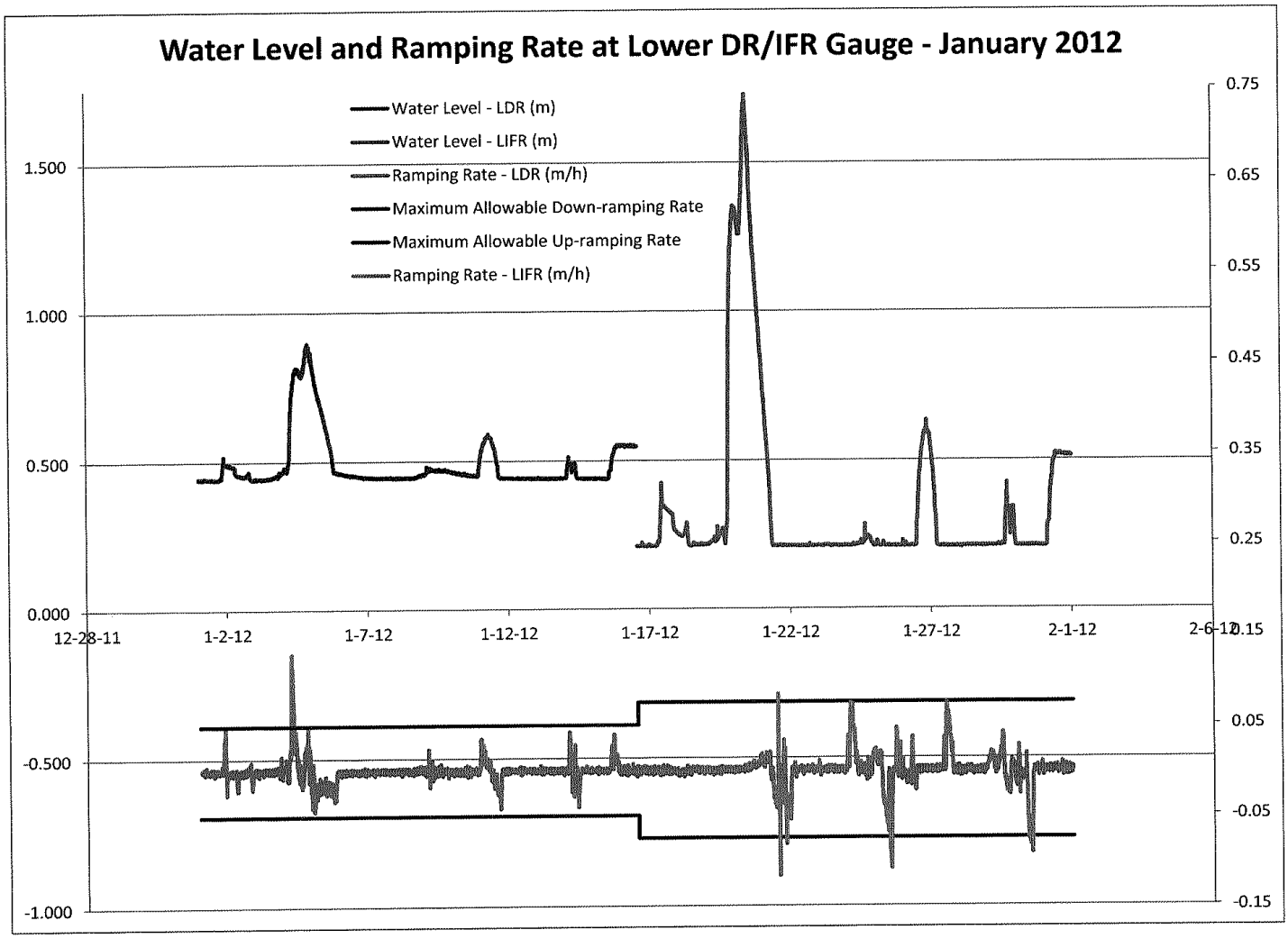
	January 15, 2012	Low water	January 21, 2012
	January 23, 2012	Low water	January 25, 2012
	January 26, 2012	Low water	January 30, 2012
Maintenance of IFR	IFR was maintained at all times. The minimum flow in the diversion reach was 0.87 m^3/s compared to the January IFR of 0.72 m^3/s. See attached Discharge chart.		
Stage	See attached Water Level and Ramping Rate chart for hourly stage data at the diversion reach and IFR gauges.		
Diverted Flows	The maximum diverted flow was 14.80 m^3/s, compared to the water license allowable diversion of 14.84 m^3/s. See attached Flow and Stage Data.		
Operational Changes	None		

The ramping data attached consists of stage readings collected at 5 minute intervals, obtained from Via-Sat Data Systems. IFR Gauge data obtained from the plant HMI is presented in lieu of diversion reach and downstream of the power house gauge data after January 16th, as Via-sat has not yet provided this data.

Sincerely,

Robert Kulka
Operations Manager
P: 604-637-6393 | C: 604-619-9402 | F: 604-688-4457

Encls.
Ramping Analysis
Flow & Stage Data – January 2012
Chart – Ramp and Level – January 2012
Chart – Discharge – January 2012
Chart – Penstock Flow – January 2012


Water Level and Ramping Rate at Lower DR/IFR Gauge - January 2012
Water Level - LDR (m)
Water Level - LIFR (m)
Ramping Rate - LDR (m/h)
Maximum Allowable Down-ramping Rate
Maximum Allowable Up-ramping Rate
Ramping Rate - LIFR (m/h)
1.500
1.000
0.500
0.000
-0.500
-1.000
0.75
0.65
0.55
0.45
0.35
0.25
0.15
0.05
-0.05
-0.15
12-28-11
1-2-12
1-7-12
1-12-12
1-17-12
1-22-12
1-27-12
2-1-12
2-6-12

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February 14, 2012

Water Allocation, South Coast Region
Ministry of Forests, Lands & Natural Resource Operations
2nd Floor - 10470 - 152nd Street, Surrey BC V3R 0Y3

Attn: Jim Davies
Acting Assistant Regional Water Manager
604-582-5203

Upper Clowhom - Monthly Compliance Report – January 2012

Dear Mr. Davies,

Please accept the following letter report, submitted in accordance with the conditions of the Interim Leave to Commence Operations dated August 4, 2011, and the subsequent extension dated December 23, 2012 for the Upper Clowhom power plant.

Non-compliances:

IFR

None

Ramping

Event Date/ Time	Date First Reported	Duration (h:m)	Maximum Ramping Rate* (m/h)			Cause	Conclusion**
			UIFR	UDR	UDS		
1/1/12 1:15	1/6/12	0:55	0.117	na	-0.068	Weir spill commencing after low water shut down.	Ramping non-compliance at UDS.
1/10/12 7:50	1/11/12	1:00	0.135	na	-0.032	Weir spill commencing after planned shutdown.	Not a ramping violation at UDS.
1/15/12 10:10	1/16/12	0:50	0.098	na	-0.049	Weir spill commencing after low water shut down.	Not a ramping violation at UDS.

*The Maximum Ramping Rate column above represents the single greatest ramping rate achieved and is not a rate sustained for the duration of the event.

**Data from the Upper diversion reach gauge were not obtained for January as Via-sat could not access the site. The above data represents possible ramping exceedances that will be further investigated when data from the LDR gauge is available in spring of 2012. Data was also not available for the UDS gauge after January 16, 2012.

Summary of operational information:

Shutdowns/startups	Shutdown Date	Cause	Startup Date
	December 31, 2011	Low water	January 4, 2012

	January 10, 2012	Planned breaker work	January 10, 2012
	January 15, 2012	Low water	January 30, 2012
Maintenance of IFR	The IFR was maintained at all times in January, with a minimum flow of 0.42 m^3/s compared to the January IFR of 0.29.		
Stage	See attached Water Level and Ramping Rate chart for hourly data at the IFR gauge.		
Diverted Flows	The maximum diverted flow was 7.48 m^3/s compared to the water license allowable diversion of 8.40 m^3/s.		
Operational Changes	None		

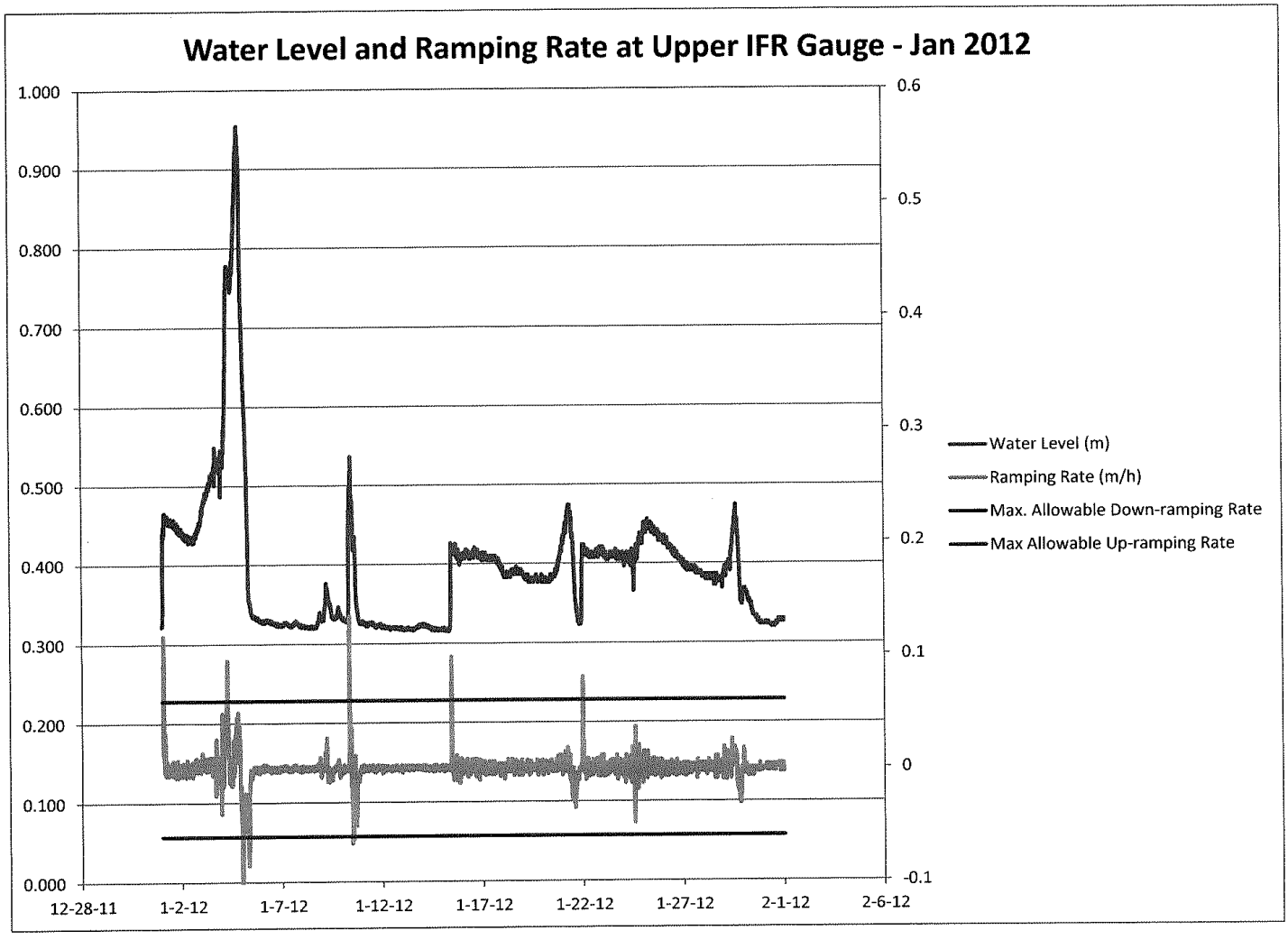
The ramping data attached consists of stage readings collected at 5 minute intervals, obtained from Via-Sat Data Systems. IFR Gauge data is presented in lieu of diversion reach gauge data as the logger was not accessed for the month of January. IFR data after January 16th were obtained from the plant HMI as Via-sat has not yet provided these data.

Sincerely,

Robert Kulka
Operations Manager
P: 604-637-6393 | C: 604-619-9402 | F: 604-688-4457

Encls.

Ramping Analysis
Flow & Stage Data – January 2012
Chart – Ramp and Level – January 2012
Chart – Discharge – January 2012
Chart – Penstock Flow – January 2012


Water Level and Ramping Rate at Upper IFR Gauge - Jan 2012
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
12-28-11
1-2-12
1-7-12
1-12-12
1-17-12
1-22-12
1-27-12
2-1-12
2-6-12
Water Level (m)
Ramping Rate (m/h)
Max. Allowable Down-ramping Rate
Max Allowable Up-ramping Rate

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Monday, February 20, 2012 4:00 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Robert Kulka; Jim Hinrichs; Amit Bhargava; Linda Vaughan
Subject: Clowhom Power - Ramping Report

Aman,

On behalf of Clowhom Power LP, I wanted to inform you of potential ramping events that occurred at the Upper and Lower power plants.

The first occurred at the Lower plant on February 15th at approximately 5 AM. The event lasted for only 10 minutes, with a maximum ramping rate of 0.096 m/h as compared to the allowable rate of 0.075m/h. The event occurred during a shutdown when the penstock flow was transferred to the bypass and there was a temporary (20 minute) drop in penstock flow. Control system programming was occurring at the time, and remote access to the IFR gauge data was only possible through our Romcomm system. The hourly data did not show the exceedance, which is why the event was not immediately reported.

The second potential event occurred at the Upper plant on February 20th at approximately 8:45 AM. The event lasted for 45 minutes, with a maximum ramping rate of 0.082 m/h as compared to the allowable rate of 0.060 m/h. The potential event occurred after a low water shutdown when water started flowing over the weir. We had planned on implementing a ramping control scheme to prevent this type of event last week, but time ran short and now the change will be implemented as soon as programming personnel becomes available (tentatively next week).

Thanks,

Kyle Edwards, BASc, EIT
Operations Engineer
P: 604-637-6393 ext 112| C: 604-313-3559 | F: 604-688-4457

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Veresen Inc.
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669 Howe Street | Vancouver, BC | V6C 0B4

Effective February 10, 2012, The Vancouver Office Address will be changed to:

Suite 650
669 Howe Street
Vancouver, BC
V6C 0B4

Furry Creek CEP

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@veresenInc.com]
Sent: Wednesday, October 26, 2011 9:25 AM
To: Ullah, Aman FLNR:EX
Cc: Linda Vaughan; Amit Bhargava; Julia Ciccaglione; Jim Hinrichs; Doug Bryson; Robert Kulka
Subject: Furry Creek Power - Ramping Report

Aman,

On behalf of Furry Creek Power, I wanted to inform you of ramping events that occurred between October 20 and 22, 2011.

The first event occurred on Oct 20th, and began at 9:00 AM PST. The plant was re-started beginning at 8:25 AM PST, after a shutdown the previous day caused by a BC Hydro line fault. At the beginning of ramping, the flow in the diversion reach was 2.178 m^3/s. The minimum plant flow is 0.2 m^3/s, which accounts for about half of the flow change in the first hour (from 8-9 AM) which resulted in the -0.072 ramping rate. This is an operational constraint of the plant and cannot be avoided. The plant ramped at it's programmed rate, and took approximately 4 hours to reach an output of about 6400 kW. The current ramping protocol does not take into account the flow in the river and is simply a linear rate based on the time to reach full output. This ramping protocol will be replaced in the near future by a program that will consider the flow in the river and adjust the ramping rate accordingly, which should eliminate low-flow ramping exceedances such as this one.

Date/Time PST	Stage (m)	Flow (m^3/s)	Ramping (m/h)
10/20/2011 9:01	0.859	1.732	**-0.072**
10/20/2011 10:01	0.777	1.299	**-0.082**
10/20/2011 11:01	0.622	0.684	**-0.155**
10/20/2011 12:01	0.506	0.371	**-0.116**

A second, very short duration, event occurred on October 21st at 18:00 PST. Prior to the event, flows in the river were ramping up at a rate of 0.454 m/h naturally, due to rainfall. This caused debris to be released from above the headpond and impinge on the intake trashrack. The event occurred when operations staff removed the accumulated debris from the trashrack, which caused a sudden increase in penstock flow and an associated decrease in diversion reach flow. The trashrack cleaning procedure is currently being reviewed, and changes to plant programming and/or manual cleaning procedures are being considered in an effort to avoid this type of event in the future.

10/21/2011 18:01	0.922	2.118	**-0.195**

The third event was also short in duration and occurred on October 22nd at 9:00 AM PST. The event was again related to the removal of debris blocking the trash rack, but occurred at a lower flow, where ramping rates are more easily affected by small changes in flow.

10/22/2011 9:01	0.631	0.714	**-0.196**
10/22/2011 10:01	0.509	0.379	**-0.122**

Furry Creek Power will do a more in-depth internal review once more detailed data is retrieved from the loggers on site. A new flow ramping protocol that takes into account the existing flow in the river is in the works and is expected to

be implemented very soon. New trashrack cleaning procedures are being developed, that will avoid causing ramping events when blockages are removed.

Please let us know if you have any further questions.

Sincerely,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Babakaiff, Scott C FLNR:EX
Sent: Wednesday, October 26, 2011 4:48 PM
To: Ullah, Aman FLNR:EX; Stoddard, Erin M FLNR:EX; 'Busto, Vince'; 'Knight, Francesca'
Cc: Davies, James W FLNR:EX; Barrett, Scott FLNR:EX
Subject: RE: Furry Creek Power - Ramping Report

Aman,

Thank you forwarding the information for these ramping non-compliance events at Furry (and the ones in recent months at Clowhom).

s.13, s.15

In short, please provide some clarity for me: will Water Staff (and more generally the Resource Approvals & Authorizations Division) simply be serving as messengers on this issue, or is there any appetite to share in enforcement responsibilities?

Scott

From: Ullah, Aman FLNR:EX
Sent: October 26, 2011 4:25 PM
To: Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; 'Busto, Vince'; 'Knight, Francesca'
Subject: FW: Furry Creek Power - Ramping Report

Hello Folks,

Some ramping events at Furry Creek hydroelectric facility for your information.

Aman

From: Kyle Edwards [mailto:kedwards@vereseninc.com]
Sent: Wednesday, October 26, 2011 9:25 AM
To: Ullah, Aman FLNR:EX
Cc: Linda Vaughan; Amit Bhargava; Julia Ciccaglione; Jim Hinrichs; Doug Bryson; Robert Kulka
Subject: Furry Creek Power - Ramping Report

Aman,

On behalf of Furry Creek Power, I wanted to inform you of ramping events that occurred between October 20 and 22, 2011.

The first event occurred on Oct 20th, and began at 9:00 AM PST. The plant was re-started beginning at 8:25 AM PST, after a shutdown the previous day caused by a BC Hydro line fault. At the beginning of ramping, the flow in the diversion reach was 2.178 m3/s. The minimum plant flow is 0.2 m3/s, which accounts for about half of the flow change in the first hour

(from 8-9 AM) which resulted in the -0.072 ramping rate. This is an operational constraint of the plant and cannot be avoided. The plant ramped at it's programmed rate, and took approximately 4 hours to reach an output of about 6400 kW. The current ramping protocol does not take into account the flow in the river and is simply a linear rate based on the time to reach full output. This ramping protocol will be replaced in the near future by a program that will consider the flow in the river and adjust the ramping rate accordingly, which should eliminate low-flow ramping exceedances such as this one.

Date/Time PST

Stage (m)

Flow (m3/s)

Ramping (m/h)

10/20/2011 9:01

0.859

1.732

-0.072

10/20/2011 10:01

0.777

1.299

-0.082

10/20/2011 11:01

0.622

0.684

-0.155

10/20/2011 12:01

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-0.116

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2.118

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Furry Creek Power will do a more in-depth internal review once more detailed data is retrieved from the loggers on site. A new flow ramping protocol that takes into account the existing flow in the river is in the works and is expected to be implemented very soon. New trashrack cleaning procedures are being developed, that will avoid causing ramping events when blockages are removed.

Please let us know if you have any further questions.

Sincerely,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@vereseninc.com]
Sent: Tuesday, November 15, 2011 2:41 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Jim Hinrichs; Robert Kulka; Amit Bhargava; Linda Vaughan; Doug Bryson
Subject: Furry Creek Power - Ramping Report

Aman,

On behalf of Furry Creek Power, I wanted to inform you of a ramping event that occurred on November 11, 2011.

A short duration event occurred on Friday, beginning at 19:00 PST. Debris was released from above the headpond by rainfall, which partially blocked the intake trashrack causing a water level differential of up to 24 cm. The event occurred when operations staff removed the accumulated debris from the trashrack, which caused a sudden increase in penstock flow and an associated decrease in diversion reach flow. In response to this event, other options for maintaining a low trashrack differential are being considered and the current trashrack cleaning procedure is being changed to include more precautions against this type of event.

See the table below for the details of the event, based on hourly stage data from Rom-comm.

Date/Time PST	Stage (m)	Flow (m^3/s)	Ramping (m/h)
11/11/2011 19:01	0.74	1.13	**-0.17**
11/11/2011 20:01	0.61	0.646	**-0.13**

Furry Creek Power will do a more in-depth internal review once more detailed data is retrieved from the loggers on site.

Please let us know if you have any further questions.

Sincerely,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@veresenInc.com]
Sent: Thursday, January 12, 2012 12:59 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Amit Bhargava; Robert Kulka; Linda Vaughan; Jim Hinrichs
Subject: Furry Creek Power - Ramping Report

Aman,

On behalf of Furry Creek Power Ltd., I wanted to inform you of a potential ramping event that occurred yesterday (January 11).

Contractors were working in the intake building to install a camera system for head pond gravel retainment monitoring and IFR pipe outlet monitoring. Inadvertently they caused the signal from the headpond level probe to be lost for approximately 15 seconds. This resulted in a very quick decrease in plant output, which caused a potential flushing event in the diversion reach. Output was slowly ramped back up as soon as the effect was noticed. The hourly Romcomm data shows a stage change of 0.275 m between 9 and 10 AM on January 11th.

While ramping the unit back up, the IFR gauge saw a change in stage of -0.131 between 11:00 and 12:00 and -0.109 between 12:00 and 13:00.

We have scheduled a programmer for later this month to investigate the possibility of implementing a timer to avoid inappropriate action when the headpond level signal is temporarily lost, and to implement a new staged ramping program that should prevent further events while ramping the unit.

Thanks,

Kyle Edwards, BASc, EIT
Operations Engineer
P: 604-637-6393 x112 | Cell: 604-362-5953

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Veresen Inc.
Suite 901
33 Water Street | Vancouver, BC | V6B 1R4

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@veresenInc.com]
Sent: Monday, January 23, 2012 5:25 PM
To: Ullah, Aman FLNR:EX
Cc: Robert Kulka; Jim Hinrichs; Davies, James W FLNR:EX; Amit Bhargava; Linda Vaughan
Subject: Furry Creek Power - Ramping Report

Aman,

On behalf of Furry Creek Power Ltd., I wanted to inform you of a potential ramping event that occurred over the weekend on January 21.

At approximately 10:13 PM the plant was forced to do an emergency shutdown when a BC Hydro line fault occurred. This caused penstock flow to decrease rapidly, causing a stage increase of approximately 0.462 m at the IFR gauge over a one hour period.

During the subsequent restarting of the plant, there was a one hour period at around 12:00 PM when the stage change at the IFR gauge was -0.119 m.

We have arranged for a programmer to be on site tomorrow to modify the plant ramping program for normal startups and shutdowns, and to investigate the possibility of avoiding quick changes in penstock flow on emergency shutdowns. This work should be completed by the end of the week.

Thanks,

Kyle Edwards, BASc, EIT
Operations Engineer
P: 604-637-6393 x112 | Cell: 604-362-5953

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Suite 901
33 Water Street | Vancouver, BC | V6B 1R4

Ullah, Aman FLNR:EX

From: Kyle Edwards [kedwards@veresenInc.com]
Sent: Tuesday, March 13, 2012 4:29 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Robert Kulka; Jim Hinrichs; Amit Bhargava; Linda Vaughan
Subject: Furry Creek Power - Ramping Report

Aman,

On behalf of Furry Creek Power, I wanted to inform you of a ramping non-compliance that occurred on March 12, at approximately 9:30 AM. The event was caused by a line fault that initiated an emergency plant shutdown. It is likely that the high winds observed yesterday were a factor. The table below shows the event with hourly data provided by Romcomm, and compares ramping rates observed to the target ramping rates at the IFR gauge based on the ramping table in the Furry Creek OPPR.

Date/Time	Stage(m)	Flow(m3/s)	Ramping Rate (m/h)	Target Ramping Rate (m/h)
12/03/2012 10:01	0.627	0.540126	0.109	0.100
12/03/2012 11:01	0.774	1.199571	0.147	0.110
12/03/2012 12:01	0.671	0.636744	-0.103	-0.100

The negative ramping rate observed between 11 am and 12 pm was a result of the plant being restarted. Operational flow ramping rates during startup will be investigated to determine if changes are necessary to maintain target stage ramping rates in the creek. Please let us know if you have further questions.

Sincerely,

Kyle Edwards, BASc, EIT
Operations Engineer
P: 604-637-6393 ext 112| C: 604-313-3559 | F: 604-688-4457

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Effective February 10, 2012, The Vancouver Office Address will be changed to:

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Vancouver, BC
V6C 0B4

Ullah, Aman FLNR:EX

From: Ullah, Aman FLNR:EX
Sent: Thursday, November 17, 2011 9:32 AM
To: 'Kyle Edwards'
Cc: Davies, James W FLNR:EX; 'Jim Hinrichs'; 'Robert Kulka'; 'Amit Bhargava'; 'Linda Vaughan'; 'Doug Bryson'; 'Busto, Vince'
Subject: RE: Furry Creek Power - Ramping Report

Hello Kyle,

Thank you for informing the ramping event at Furry Creek power facility on November 15, 2011 that occurred on November 11, 2011!

Firstly, please be advised that the event(s) are required to be reported within 24 hours of its occurrence per OPPR (still under preparation). FCPL is requested to complete the attached Incident Report Form (IRF) and provide to the undersigned and Vince Busto with DFO at: Vince.Busto@dfo-mpo.ca no later than the 2nd week of December, 2011 (ie. December 9, 2011).

Vince: not sure if the IRF provides sufficient information for the DFO's interests in such events (ie. IFR and ramping), please advise of any addition to this form and also, if DFO be kept in loop on such events. Thanks

Regards,

Aman

From: Kyle Edwards [mailto:kedwards@vereseninc.com]
Sent: Tuesday, November 15, 2011 2:41 PM
To: Ullah, Aman FLNR:EX
Cc: Davies, James W FLNR:EX; Jim Hinrichs; Robert Kulka; Amit Bhargava; Linda Vaughan; Doug Bryson
Subject: Furry Creek Power - Ramping Report

Aman,

On behalf of Furry Creek Power, I wanted to inform you of a ramping event that occurred on November 11, 2011.

A short duration event occurred on Friday, beginning at 19:00 PST. Debris was released from above the headpond by rainfall, which partially blocked the intake trashrack causing a water level differential of up to 24 cm. The event occurred when operations staff removed the accumulated debris from the trashrack, which caused a sudden increase in penstock flow and an associated decrease in diversion reach flow. In response to this event, other options for maintaining a low trashrack differential are being considered and the current trashrack cleaning procedure is being changed to include more precautions against this type of event.

See the table below for the details of the event, based on hourly stage data from Rom-comm.

Date/Time PST	Stage (m)	Flow (m^3/s)	Ramping (m/h)
11/11/2011 19:01	0.74	1.13	**-0.17**
11/11/2011 20:01	0.61	0.646	**-0.13**

Furry Creek Power will do a more in-depth internal review once more detailed data is retrieved from the loggers on site.

Please let us know if you have any further questions.

Sincerely,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

Ashlu Creek CEP

Ullah, Aman FLNR:EX

700264

From: Davies, James W FLNR:EX
Sent: Friday, January 27, 2012 8:41 AM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Incident Report - Ashlu Ramping
Attachments: Ramping Event Compliance Report (19 Jan 2012).pdf; Ecofish - ASU Ramping Event (19 Jan 2012).pdf

Aman Ullah

For your attention.

James Davies, P.Eng.
Acting Section Head – Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Thursday, January 26, 2012 4:32 PM
To: XT:Busto, Vince DFO EAO:IN; Davies, James W FLNR:EX
Cc: Matt Kennedy; John Miller; Stoddard, Erin M FLNR:EX; Babakaiff, Scott C FLNR:EX; Francesca Knight
Subject: RE: Innergex - Incident Report - Ashlu Ramping

All,

Attached are both the Innergex and Ecofish reports for the 19 Jan 2012 ramping events at the Ashlu Hydro facility for your reference.

Please let me know if you require any additional information or have any questions.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

1168 Hamilton St., Suite 403, Vancouver, British Columbia V6B 2S2
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From: Busto, Vince [mailto:Vince.Busto@dfo-mpo.gc.ca]
Sent: January-20-12 5:06 PM
To: Sean Mccoy; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Sean

Please provide a little more information, like:
- maximum ramping rate
- total stage change downstream
- duration of the rapid ramping event

Vince Busto, B.A.Sc., P.Eng.
Habitat and Hydrotechnical Engineer | Ingénieur de l'habitat et de l'hydrotechnique
Habitat and Enhancement Branch | Protection et mise en valeur des habitats
Lower Fraser River | Le bas Fraser
Fisheries and Oceans Canada | Pêches et Océans Canada
100 Annacis Parkway, Unit 3 | 100 Annacis Parkway, Unit 3
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Government of Canada | Gouvernement du Canada

Telephone/Téléphone 604-666-8281
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-----Original Message-----
From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Fri 1/20/2012 4:38 PM
To: Busto, Vince; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: Innergex - Incident Report - Ashlu Ramping

All,

Please be notified that at approximately 18:00 yesterday (19 January 2012), the Ashlu Hydro Facility exceeded the allowable ramping rate as measured at the downstream gauging site.

A field crew (Ecofish Research Ltd.) has been dispatched to evaluate the on-site conditions.

A more detailed report will be provided within the next two weeks as per our incident protocol.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

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Renewable Energy.
Sustainable Development.

26 January 2012

James Davies
Acting Section Head, Water Allocation
Ministry of Forest, Lands and Natural Resource Operations
10470-152rd St.
Surrey, BC V3R 0Y3

Vince Busto
Habitat and Hydrotechnical Engineer
Fisheries and Oceans Canada
Unit 3 - 100 Annacis Parkway
Delta, BC V3M 6A2

Reference: Ashlu Creek Hydroelectric Project

Subject: Ramping Event Compliance Report – 19 January 2012

Mr. Davies / Mr. Busto,

In accordance with Section 5.5 of the Ashlu Creek Operating Parameters and Procedures Report, the compliance report for the 19 January 2012 ramping event at the Ashlu facility is detailed below.

Description

- The generator supplier (Andritz) was onsite to repair a deficiency with the speed pickup probes on all three generators.
- The deficiency repair required the generators to be stopped and restarted which resulted in a ramping event that exceeded the approved rate in the OPPR.
- After further review of the data, a minor ramping event was observed between 13:32 and 14:02 in addition to the reported event between 17:18 and 18:28.
- There is some uncertainty regarding the accuracy of the downstream monitoring site (ASU-DSLG01) after the landslide event in November 2011. Please refer to John Miller's letter dated 20 December 2011.

Mitigation & Response

- The PLC generated ramping alarm was confirmed by an alarm generated at the downstream hydrometric gauge (ASU-DSLG01).
- Ecofish was dispatched to the site to conduct a stranding search of the downstream stranding sensitive sites (ASU-DSSD04 and ASU-DSSD05) on 20 January 2012.
- The total plant flow returned to normal at the completion of the maintenance. (Figure 1)

Environmental Impact

- No stranded or isolated fish were found in either of the two established downstream monitoring sites by Ecofish during their search.
- The stage change during the first event was -7.3 cm with a maximum stage change rate of -4.1 cm/hr.
- The stage change during the second event was -6.1 cm with a maximum stage change rate of -5.5 cm/hr.
- The complete Ecofish report is attached for your reference.

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Preventative Measures

- Replacement of the speed pickups is not routine maintenance and should not need to be performed again in the near future.
- The operators have been advised that similar work that may have an impact on plant flow should be conducted during periods of higher flow when the river is less sensitive to changes.

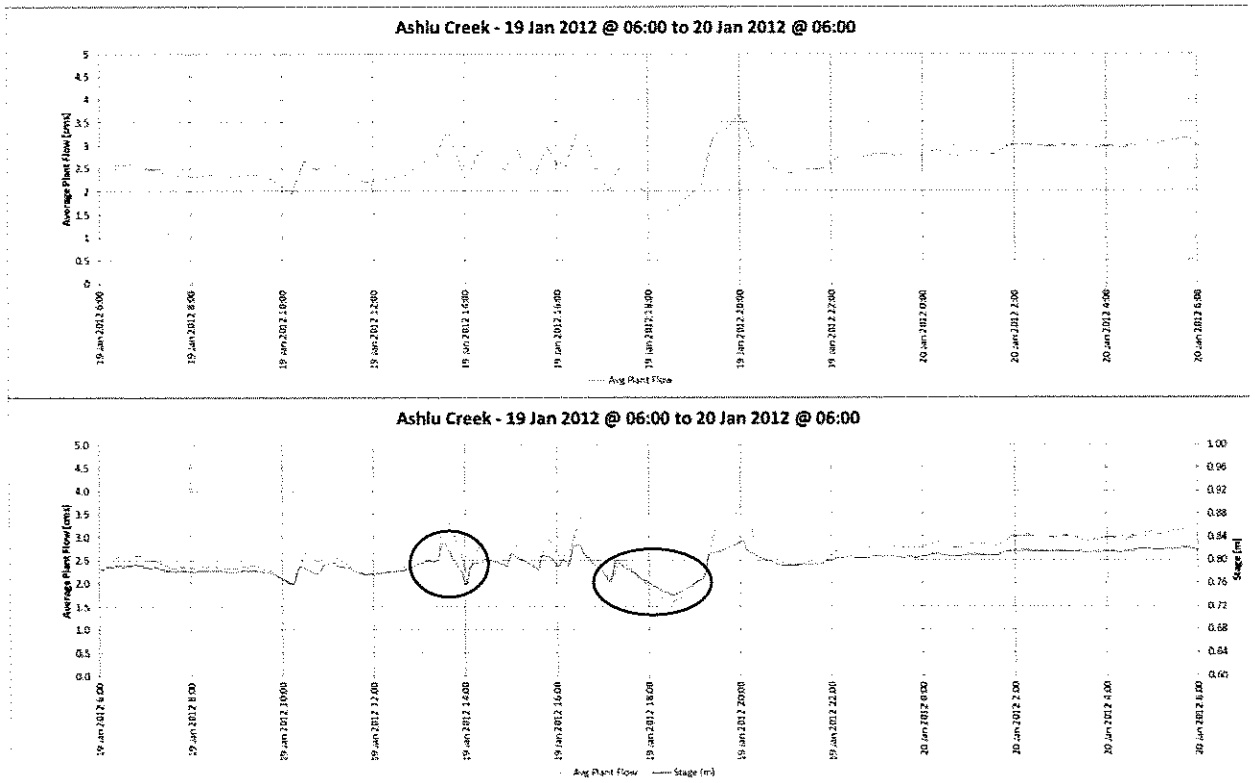
Please let me know if you require any additional information or have any questions.

Sincerely,

Sean McCoy
Operations Environmental Manager

Encl: Ecofish Memorandum – 26 Jan 2012
Cc: MFLNRO: Erin Stoddard, Scott Babakaiff
DFO: Francesca Knight
Innergex: Richard Blanchet, Francois Hebert, John Miller, Michel Malette, Brian Patjas, Colin Murrell

Figure 1: Plant data for the period of 19 January 2012 @ 06:00 to 20 January 2012 @ 06:00



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ECOFISH RESEARCH

MEMORANDUM

TO: Sean McCoy
FROM: Elyse MacDonald
DATE: January 26, 2012
FILE: 1112-04
RE: Ashlu Creek - Ramping Incident Response Monitoring

This memo describes observations made during ramping incident response monitoring conducted for Innergex on the Ashlu Creek River run-of-river hydroelectric project (the Project) on January 20, 2012. Two ramping excursions occurred on January 19 at 13:32 hrs and 17:18 hrs. Ecofish staff received two automated email alarm notifications at 15:10 hrs and 19:00 hrs (all times are Pacific Standard Time PST - local time) on January 19, alerting them of the the two events respectively.

Stage change criteria are measured at the downstream permanent hydrometric gauge, ASU-DSLG01 and ramping rates were calculated following the standard protocol which has been used previously on the Ashlu and Fitzsimmons projects (Appendix A).

The first event on January 19 was a -7.3 cm stage reduction from 13:32 hrs to 14:02 hrs in the downstream reach that resulted in a maximum hourly stage change rate (maximum ramping rate) of -4.1 cm/hr (Figure 1 and Table 1). The stage decrease exceeded the stage change criteria of -4.0 cm/hr, and also met the other conditions necessary to be flagged as an excursion based on the standard protocol (stage remained outside of compliance criteria for more than ten minutes, and the 24hr wetted history stage was higher than during the event). Innergex staff confirmed that the operational ramping rate of 1.5 cms/hr was exceeded during these events. This was required because the ASU-DSLG01 rating curve was affected by a landslide in November 2011, and Innergex has proposed to agencies that the operational rate be used to confirm compliance until the rating curve is re-established. It should be noted that a larger stage change at ASU-DSLG01 might be recorded now for a similar change in flow than before the landslide, as the slide constricted the banks near the gauge.

During the second event, stage declined by -6.1 cm between 17:18 and 18:28. The maximum hourly stage change rate was -5.5 cm/hr (Figure 1 and Table 1).

Time series of discharge, stage, and ramping rates at ASU-DSLG01 for both events are shown in Figure 1.

Crews were on site from 15:55 to 16:52 hrs on January 20 and searched the two established downstream monitoring sites (ASU-DSSD04-05). Broad-based searches lasted a total of 20 minutes and covered an area of 250 m^2. Hotspot searches were also conducted at each of the two established monitoring sites and covered a total area of 180 m^2. The total time spent searching at hotpots was 57 minutes. Since the water levels were low and little stranding habitat was exposed, the total area

searched with hotspots was slightly less than the standard protocol of 100 m^2 of hotspot searches per site, and searches focused on the margin habitat to a depth of approximately 0.01 m, where fry were most likely to have been stranded during an excursion. The maximum total stage change at ASU-DSLG01 was 7.3 cm and stage change at ASU-DSSD04 and ASU-DSSD05 is less than that observed at ASU-DSLG01[1]. Therefore, searches to a depth of 10 cm would include the potentially dried marginal habitat during the excursion (Figure 2).

A live fry was observed hiding under cobble in approximately 10 cm of water at 16:08 hrs at ASU-DSSD04, and four live fry were observed in approximately 15 cm of water at 16:48 hrs at ASU-DSSD05. No stranded or isolated fish were found in either site.

In summary, two ramping events exceeding the -4.0 cm/hr stage change criteria for ASU-DSLG01 and 1.5 cms/hr operational rate for shutdowns were recorded downstream of the Project powerhouse on January 20, 2012. Ecofish crews were onsite within 24 hours of receiving notification of the first event, and no stranded or isolated fish were found.

Please contact me if you have any questions or need further information.

Yours truly,
Ecofish Research Ltd.

signed

Elyse MacDonald, B.Sc., R.P.Bio., CPESC
Environmental Biologist, Project Manager

[1] Lewis, A., E. MacDonald, K. Lyle, K. Sheldon. 2011. Ashlu Creek Hydropower Project Flow Ramping Study. Consultant's report prepared by Ecofish Research Ltd for Innergex Renewable Energy.

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Table 1. Summary of stage change, incident duration, and rate of change at ASU-DSLG01 during the ramping excursions on January 19, 2012.

Compliance Point	Start Time (PST)	End Time (PST)	Duration (hh:mm)	Stage Start (cm)[4]	Stage End (cm)[4]	Total Stage Change (cm)[1]	Maximum Hourly Stage Change Rate (cm/hr)[1,3]	Estimated Discharge Start (cms)[2]	Estimated Discharge End (cms)[2]
ASU-DSLG01	19-Jan-12 13:32	19-Jan-12 14:02	00:30	83.1	75.8	-7.3	-4.1	5.5	3.8
ASU-DSLG01	19-Jan-12 17:18	19-Jan-12 18:28	01:10	80.1	74.0	-6.1	-5.5	4.7	3.4

[1] Negative number indicates stage decrease

[2] ASU- DSLG01 discharge estimated from Rating Curve 14 (RC14); Discharge = 23.024 * (Stage - 0.212) ^ 2.989. Discharge values are estimates and based on an uncertain rating curve since the November slide

[3] This is the maximum stage change recorded within one hour at the hydrometric gauge.

[4] Start and End Times denote stage decrease induced by ramping.

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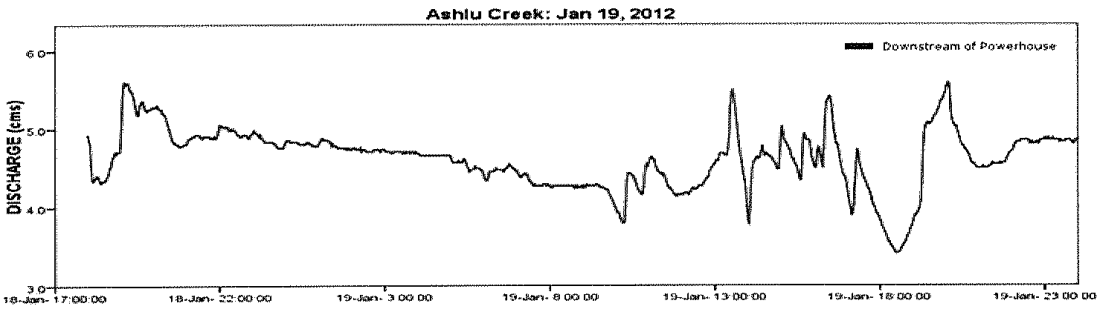
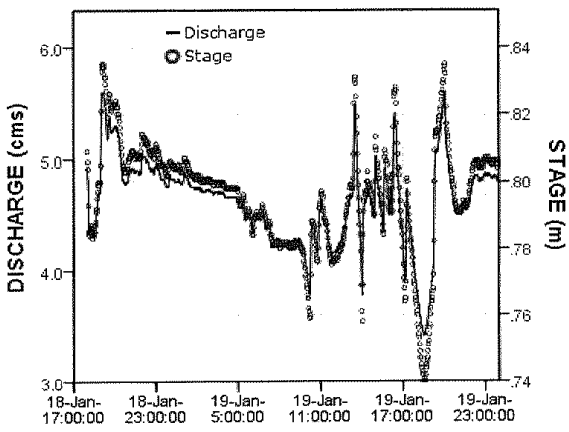
Figure 1. **Discharges from January 18 to January 20, 2011; a) at the downstream permanent gauges over time, b) in relation to stage at the downstream permanent gauge (ASU-DSLG01) on January 19, and c) in relation to ramping rates at downstream permanent gauge (ASU-DSLG01) on January 19 – the ramping criteria of -4.0 cm/hr is shown by the yellow reference line. Discharge values are estimates based on the uncertain rating curve since the November 2010 landslide.**

a)



b)



c)

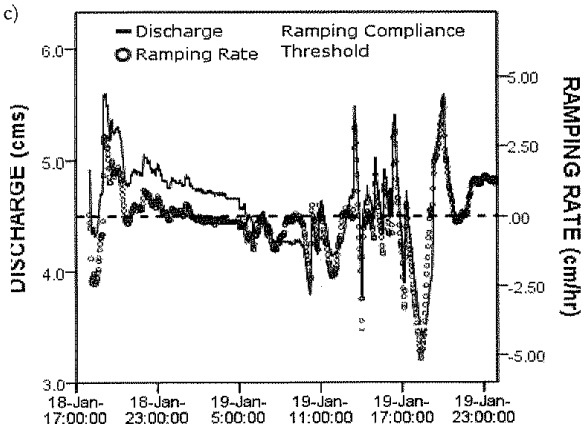


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Figure 2. Potential stranding habitat at ASU-DSSD05 on January 20, 2012.

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Appendix A. Ramping Rate Violation Measurement

The procedure is as follows:

1. The maximum stage observed over the past hour at time t_i, $hmax(t_i)$, should be determined for each data point according to the following equation:

$$hmax(t_i) = \max\left(h(t_{i-k}), \ldots, h(t_{i-1})\right)$$

where h is stage, k is the number of data points recorded per hour, and t is time,
The maximum stage decrease over the past hour relative to time t_i is then defined by the equation:

$$\Delta hmax(t_i) = h(t_i) - hmax(t_i)$$

2. If the maximum stage change $\Delta hmax(t_i)$ exceeds the ramping criterion (e.g. -4.0 cm for ASU-DSLG01), the data are flagged as a potential ramping event. That is the exceedance rule (Rule 1).

3. A mortality event is assumed to occur if the stage remains below $hmax(t_i)$ for a critical period, which is the dewatering time. The time to asphyxiation is assumed to be 10 minutes considering both air exposure and the time needed for the substrate to drain. This is the dewatering rule (Rule 2).

4. The average stage over some time prior to a ramping event may be used to determine the likelihood of habituation of the affected habitat (we have selected 24 hours). If the maximum level associated with the ramping exceeds the average stage from the past 24 hours, the stage change is recomputed using the 24hr average (as hmax), and violation of Rule 1 is reassessed. If the stage change based on the 24hr average does not exceed the ramping criteria, the event is not flagged as a ramping excursion.

Ullah, Aman FLNR:EX

From: Davies, James W FLNR:EX
Sent: Wednesday, February 1, 2012 8:35 AM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Incident Report - Ashlu Ramping

Aman Ullah

FW: Innergex - Incident Report - Ashlu Ramping

As discussed Jan 31, this is the email from DFO on the Ashlu ramping incident.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

From: Knight, Francesca [mailto:Francesca.Knight@dfo-mpo.gc.ca]
Sent: Monday, January 30, 2012 8:15 AM
To: Sean Mccoy; Busto, Vince; Davies, James W FLNR:EX
Cc: Matt Kennedy; John Miller; Stoddard, Erin M FLNR:EX; Babakaiff, Scott C FLNR:EX
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Hi folks, I took a look at the Ecofish and Innergex reports for the two events, and have some comments:

1. Ecofish crews were not on site until well after flows had come back up, making language such as "no stranded fish were found at either of the two downstream monitoring sites" misleading. Having Ecofish on site and commencing stranding searches within 24 hours is not an effective strategy for managing these events. Given the time delay between the two events and commencement of the stranding search (as well as the presence of fry at the monitoring sites) we can only assume that fry very likely were stranded, but any evidence of such was gone by the time Ecofish personnel arrived. We have discussed this as a group many times, and Innergex is aware of DFO's concerns around the absence of stranded fish when searches are commenced so late after an event (given that report conclusions typically indicate that in fact the event was not harmful to fish). In this cases, the reports should include a statement like, "Although no stranded or dead fish were found during the searches at the established stranding-sensitive sites, search results are equivocal, as crews were not on site until XX hours after river flows had come back to pre-incident levels". We have talked about this issue many times, which leads me to my next point:

2. Timing of maintenance work - Even the Innergex incident report acknowledges that the work on the generators should have been postponed until the river was at higher flows. As a group, we have discussed numerous possible measures to mitigate the effects of ramp rate non-compliance events, including timing works to coincide with higher ambient flows. Searching stranding sites many hours following an incident is not an effective strategy for managing such incidents.

3. Finally, I don't think this group has agreed to the terminology of a "ramping excursion". Somewhere between the development of the Ecofish / CEBC ramping guidelines document (which is currently under review by DFO and MFLNRO) and the two recent ramping events at Ashlu, the "ramping excursion" term has worked its way into the Ashlu Ecofish incident report. The term is not accurate, and a more appropriate term has to be used to define and describe what is really a ramp rate non-compliance event.

Francesca

Francesca Knight, M.Sc., R.P.Bio.
Habitat Biologist
Fisheries and Oceans Canada / Pêches et Océans Canada
Ecosystems Management Branch
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Pacific Region 'Working Near Water' website
http://www.pac.dfo-mpo.gc.ca/habitat/index-eng.htm

From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: January 26, 2012 4:32 PM
To: Busto, Vince; James Davies (James.Davies@gov.bc.ca)
Cc: Matt Kennedy; John Miller; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Subject: RE: Innergex - Incident Report - Ashlu Ramping

All,

Attached are both the Innergex and Ecofish reports for the 19 Jan 2012 ramping events at the Ashlu Hydro facility for your reference.

Please let me know if you require any additional information or have any questions.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

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Ullah, Aman FLNR:EX

From: Davies, James W FLNR:EX
Sent: Thursday, February 2, 2012 8:18 AM
To: Ullah, Aman FLNR:EX
Subject: FW: Innergex - Incident Report - Ashlu Ramping

Aman Ullah

Update on Ashlu ramping.

James Davies, P.Eng.
Acting Section Head - Water Allocation
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
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From: Matt Kennedy [mailto:MKennedy@innergex.com]
Sent: Wednesday, February 1, 2012 6:19 PM
To: Knight, Francesca; Sean Mccoy; Busto, Vince; Davies, James W FLNR:EX
Cc: John Miller; Stoddard, Erin M FLNR:EX; Babakaiff, Scott C FLNR:EX
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Hi Francesca

Thank you for your comments. We take our commitments seriously and mobilize field crews from Squamish as soon as possible when a ramping incident occurs. We will continue to work to improve response times and to best coordinate maintenance activities.

Regarding terminology, clearly ramping is an evolving subject and so goes for descriptive terms in use. We are open to alternate terminology that is more agreeable to DFO.

Matt

Matt Kennedy, M.Sc., R.P.Bio.

Vice President, Environment - Western Region

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From:	Isabelle Deguise
To:	Davies, James W FLNR:EX; Busto, Vince
Cc:	Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; Francesca Knight; Matt Kennedy; John Miller
Subject:	Ashlu Creek Hydro Project
Date:	Tuesday, December 20, 2011 9:41:16 AM
Attachments:	image001.jpg Letter to Agencies re Ashlu DS Gauge_20Dec2011.pdf

Good morning,

Please see the attached letter from John Miller, VP Operations – Western Region, regarding the downstream hydrometric gauge at our Ashlu Creek Hydroelectric Project.

Regards,

Isabelle

Isabelle Deguise, M.Sc., R.P.Bio.

Environmental Manager

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Sustainable Development.

December 20, 2011

James Davies
Acting Section Head, Water Allocation
Ministry of Forest, Lands and Natural
Resource Operations
10470-152rd St.
Surrey, B.C. V3R 0Y3

Vince Busto
Habitat and Hydrotechnical Engineer
Fisheries and Oceans Canada
Unit 3 - 100 Annacis Parkway
Delta, B.C. V3M 6A2

Mr. Davies and Mr. Busto:

Reference: Ashlu Creek Hydroelectric Project
Subject: Downstream Hydrometric Gauge

In the early morning hours of November 27, 2011, a significant rain-on-snow event occurred in the Ashlu River valley. A debris flow caused by this storm washed-out the Ashlu River Forest Service road at approximately 2.7km (49.913057, -123.324350; 68m elevation) where a lower spur road breaks off from the mainline downhill 130 meters to the Ashlu powerhouse. The majority of the material resulting from the debris flow was deposited below the road on the right bank of the Ashlu River; some material was deposited into the main stem of Ashlu Creek, constricting the existing channel (Photo 1).

Unfortunately, the location of the slide occurred in close proximity to our downstream hydrometric gauge ASU-DSLG01, the compliance point for shutdown ramping for the Ashlu Creek Hydroelectric Project. In accordance with the response protocol, Ecofish Research Ltd (ERL) mobilized a hydrometric crew to site as soon as the area was safe and accessible on December 8, 2011. Although the gauging equipment was not damaged by the debris flow, ERL determined that the debris that entered the channel has potentially altered the established stage-discharge relationship at that gauge location (Photo 2).

We believe that the debris has altered the bed profile, likely affecting the established rating curve at ASU-DSLG01 and therefore has increased the uncertainty of measuring the compliance criterion for shutdown ramping of 4.0 cm/hr. There remains a significant amount of debris in the channel which will likely be mobilized in future large storm events. This will create a period of uncertainty until sufficient discharge measurements can be collected to either establish a new stage-discharge relationship or verify the established relationship has remained materially unaffected.

During this period of uncertainty, Innergex proposes to use plant flow data to mobilize ERL in accordance with the response procedures in section 2.2.2 of the Operational Parameters and Procedures instead of the stage data from the affected ASU-DSLG01 station that has been used for this purpose before the debris flow event.

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During flow ramping studies conducted in March 2011 (Lewis *et al.* 2011), and approved by agencies shortly thereafter, ERL concluded that:

"*An operational ramping rate of 1.5 m^3/s/hr during plant shutdown meets the standard criteria of 2.5 cm/hr in the downstream reach and will be adequate to protect fish downstream of the project during sensitive periods*"

Innergex will continue to ramp during shutdowns using the approved operational ramp rate of 1.5 m^3/s/hr that was already in place prior to the debris flow. The plant flow data will be used to enact the response protocol until the stage-discharge relationship at the ASU-DSLG01 gauge can be confirmed or re-established. We will continue to abide by the commitments made in the Operational Parameters and Procedures (specifically Section 2.2.2). Response procedures already in place will remain unchanged: ERL will be notified immediately of an operational ramping alarm; ERL will mobilize to site if a stranding search is required per Flowchart 1 in the OPPR; and Innergex will notify agencies within 24 hours, followed by a detailed report within 2 weeks.

Please do not hesitate to contact the undersigned should you have any questions.

Regards,

John Miller, P.Eng.
Vice President – Operations, Western Region
Innergex Renewable Inc.
jmiller@innergex.com

CC: Scott Babakaiff, Erin Stoddard (MFLNRO)
Francesca Knight (DFO)

References:

Lewis, A., E. MacDonald, K. Lyle, K. Sheldon. 2011. Ashlu Creek Hydropower Project Flow Ramping Study. Consultant's report prepared by Ecofish Research Ltd. for Innergex Renewable Energy.

Photo 1: Debris flow just south (left) of the Ashlu River powerhouse at 2.7km. Photo taken November 28, 2011.

Photo 2: Looking downstream from above slide path. Location of hydrometric gauge is shown. Photo taken December 7, 2011.

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From:	Isabelle Deguise
To:	Davies, James W FLNR:EX
Cc:	Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; "Francesca Knight"; Matt Kennedy; John Miller; "Busto, Vince"; Ullah, Aman FLNR:EX; Richard Blanchet; Michel Malette
Subject:	RE: Ashlu Creek Hydro Project - ASU-DSLG01 rating curve
Date:	Friday, January 6, 2012 9:27:11 AM

Hi James,

Please see below the answers to your questions.

1) Does Innergex have measurements to assess the shift in the rating curve?

   On December 8th, Ecofish crews were onsite to collect a discharge measurement. The discharge measured at that time was 5.93 m^3/s and the stage was 0.847m. Using the current rating curve, the estimated discharge at that stage is 7.83 m^3/s. This variance between measured and estimated discharge is more than was previously observed at similar flows in the season of 2011.

1) Is the intention to re-establish the rating curve at ASU-DSLG01, or find a new site for the hydrometric gauge?

   Yes, our intention is to re-establish the rating curve.

2) The period of uncertainty to re-establish the rating curve is expected to be how long?

   Unknown. There is a significant amount of charged slide material in the channel just upstream of the gauge. We assume this material will move over time but will need several flood events. We will continue to monitoring the existing gauge location for stabilization of the hydraulic control.

3) What is the response time for ERL to mobilize and reach the site upon receiving a operational ramping alarm?

   ERL response time has not changed.

4) Is this hydrometric station on the Ashlu River used in regulating the recreational kayaking?

   No, data from this station is not used for regulating recreational kayaking.

Innergex is committed to abiding by the terms and conditions outlined in the Ashlu Creek Operational Parameters and Procedures Report.

If you have any further questions, please do not hesitate to contact myself or John Miller.

Regards,

Isabelle

Isabelle Deguise, M.Sc., R.P.Bio.

Environmental Manager

INNERGEX

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From: Davies, James W FLNR:EX [mailto:James.Davies@gov.bc.ca]
Sent: December-23-11 4:35 PM
To: Isabelle Deguise
Cc: Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; 'Francesca Knight'; Matt Kennedy; John Miller; 'Busto, Vince'; Ullah, Aman FLNR:EX
Subject: RE: Ashlu Creek Hydro Project - ASU-DSLG01 rating curve

Isabelle Deguise
Innergex

RE: Ashlu Creek Hydro Project - ASU-DSLG01 rating curve

Preliminary review of December 20, 2011 letter, Ashlu Creek Hydroelectric Project, Downstream Hydrometric Gauge

Does Innergex have measurements to assess the shift in the rating curve?

Is the intention to re-establish the rating curve at ASU-DSLG01, or find a new site for the hydrometric gauge?

The period of uncertainty to re-establish the rating curve is expected to be how long?

What is the response time for ERL to mobilize and reach the site upon receiving a operational ramping alarm?

Is this hydrometric station on the Ashlu River used in regulating the recreational kayaking?

Thanks

James Davies, P.Eng. Regional Hydrologist
Assitant Regional Water Manager
Ministry of Forests, Lands and Natural Resource Operations
South Coast Region - Authorizations - Water Allocation
2nd Floor - 10470 - 152 Street, Surrey, BC, V3R 0Y3

Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca
Our Vision: Economic prosperity and environmental sustainability

---

From: Isabelle Deguise [mailto:IDeguise@innergex.com]
Sent: Tuesday, December 20, 2011 9:41 AM
To: Davies, James W FLNR:EX; Busto, Vince
Cc: Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; Francesca Knight; Matt Kennedy; John Miller
Subject: Ashlu Creek Hydro Project

Good morning,

Please see the attached letter from John Miller, VP Operations – Western Region, regarding the downstream hydrometric gauge at our Ashlu Creek Hydroelectric Project.

Regards,

Isabelle

Isabelle Deguise, M.Sc., R.P.Bio.

Environmental Manager

INNERGEX

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From:	Sean Mccoy
To:	XT:Busto, Vince DFO EAO:IN; Davies, James W FLNR:EX
Cc:	Matt Kennedy; John Miller; Stoddard, Erin M FLNR:EX; Babakaiff, Scott C FLNR:EX; Francesca Knight
Subject:	RE: Innergex - Incident Report - Ashlu Ramping
Date:	Thursday, January 26, 2012 4:31:56 PM
Attachments:	Ramping Event Compliance Report (19 Jan 2012).pdf Ecofish - ASU Ramping Event (19 Jan 2012).pdf

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All,

Attached are both the Innergex and Ecofish reports for the 19 Jan 2012 ramping events at the Ashlu Hydro facility for your reference.

Please let me know if you require any additional information or have any questions.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

INNERGEX

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From: Busto, Vince [mailto:Vince.Busto@dfo-mpo.gc.ca]
Sent: January-20-12 5:06 PM
To: Sean Mccoy; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Sean

Please provide a little more information, like:
- maximum ramping rate
- total stage change downstream
- duration of the rapid ramping event

Vince Busto, B.A.Sc., P.Eng.
Habitat and Hydrotechnical Engineer | Ingénieur de l'habitat et de l'hydrotechnique
Habitat and Enhancement Branch | Protection et mise en valeur des habitats
Lower Fraser River | Le bas Fraser
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100 Annacis Parkway, Unit 3 | 100 Annacis Parkway, Unit 3
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Government of Canada | Gouvernement du Canada

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Facsimile / Télécopieur 604-666-6627

-----Original Message-----
From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Fri 1/20/2012 4:38 PM
To: Busto, Vince; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: Innergex - Incident Report - Ashlu Ramping

All,

Please be notified that at approximately 18:00 yesterday (19 January 2012), the Ashlu Hydro Facility exceeded the allowable ramping rate as measured at the downstream gauging site.

A field crew (Ecofish Research Ltd.) has been dispatched to evaluate the on-site conditions.

A more detailed report will be provided within the next two weeks as per our incident protocol.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

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From:	Matt Kennedy
To:	Knight, Francesca; Sean Mccoy; Busto, Vince; Davies, James W FLNR:EX
Cc:	John Miller; Stoddard, Erin M FLNR:EX; Babakaiff, Scott C FLNR:EX
Subject:	RE: Innergex - Incident Report - Ashlu Ramping
Date:	Wednesday, February 1, 2012 6:18:57 PM

Hi Francesca

Thank you for your comments. We take our commitments seriously and mobilize field crews from Squamish as soon as possible when a ramping incident occurs. We will continue to work to improve response times and to best coordinate maintenance activities.

Regarding terminology, clearly ramping is an evolving subject and so goes for descriptive terms in use. We are open to alternate terminology that is more agreeable to DFO.

Matt

Matt Kennedy, M.Sc., R.P.Bio.

Vice President, Environment - Western Region

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From: Knight, Francesca [mailto:Francesca.Knight@dfo-mpo.gc.ca]
Sent: January 30, 2012 8:15 AM
To: Sean Mccoy; Busto, Vince; James.Davies@gov.bc.ca
Cc: Matt Kennedy; John Miller; Stoddard, Erin; Babakaiff, Scott
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Hi folks, I took a look at the Ecofish and Innergex reports for the two events, and have some comments:

1. Ecofish crews were not on site until well after flows had come back up, making language such as "no stranded fish were found at either of the two downstream monitoring sites" misleading. Having Ecofish on site and commencing stranding searches within 24 hours is not an effective strategy for managing these events. Given the time delay between the two events and commencement of the stranding search (as well as the presence of fry at the monitoring sites) we can only assume that fry very likely were stranded, but any evidence of such was gone by the time Ecofish personnel arrived. We have discussed this as a group many times, and Innergex is aware of DFO's concerns around the absence of stranded fish when searches are commenced so late after an event (given that report conclusions typically indicate that in fact the event was not harmful to fish). In this cases, the reports should include a statement like, "Although no stranded or dead fish were found during the searches at the established stranding-sensitive sites, search results are equivocal, as crews were not on site until XX hours after river flows had come back to pre-incident levels". We have talked about this issue many times, which leads me to my next point:

2. Timing of maintenance work - Even the Innergex incident report acknowledges that the work on the generators should have been postponed until the river was at higher flows. As a group, we have

discussed numerous possible measures to mitigate the effects of ramp rate non-compliance events, including timing works to coincide with higher ambient flows. Searching stranding sites many hours following an incident is not an effective strategy for managing such incidents.

3. Finally, I don't think this group has agreed to the terminology of a "ramping excursion". Somewhere between the development of the Ecofish / CEBC ramping guidelines document (which is currently under review by DFO and MFLNRO) and the two recent ramping events at Ashlu, the "ramping excursion" term has worked its way into the Ashlu Ecofish incident report. The term is not accurate, and a more appropriate term has to be used to define and describe what is really a ramp rate non-compliance event.

Francesca

Francesca Knight, M.Sc., R.P.Bio.
Habitat Biologist
Fisheries and Oceans Canada / Pêches et Océans Canada
Ecosystems Management Branch
Lower Fraser River - Le Bas Fraser
Unit 3 - 100 Annacis Parkway
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Francesca.Knight@dfo-mpo.gc.ca

Ph: (604) 666-3191 / Fax: (604) 666-6627
Squamish phone: 604-892-2040
Government of Canada - Gouvernement du Canada

Pacific Region 'Working Near Water' website
http://www.pac.dfo-mpo.gc.ca/habitat/index-eng.htm

From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: January 26, 2012 4:32 PM
To: Busto, Vince; James Davies (James.Davies@gov.bc.ca)
Cc: Matt Kennedy; John Miller; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Subject: RE: Innergex - Incident Report - Ashlu Ramping

All,

Attached are both the Innergex and Ecofish reports for the 19 Jan 2012 ramping events at the Ashlu Hydro facility for your reference.

Please let me know if you require any additional information or have any questions.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

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From: Busto, Vince [mailto:Vince.Busto@dfo-mpo.gc.ca]
Sent: January-20-12 5:06 PM
To: Sean Mccoy; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Sean

Please provide a little more information, like:
- maximum ramping rate
- total stage change downstream
- duration of the rapid ramping event

Vince Busto, B.A.Sc., P.Eng.
Habitat and Hydrotechnical Engineer | Ingénieur de l'habitat et de l'hydrotechnique
Habitat and Enhancement Branch | Protection et mise en valeur des habitats
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-----Original Message-----
From: Sean Mccoy [mailto:SMccoy@innergex.com]
Sent: Fri 1/20/2012 4:38 PM
To: Busto, Vince; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: Innergex - Incident Report - Ashlu Ramping

All,

Please be notified that at approximately 18:00 yesterday (19 January 2012), the Ashlu Hydro Facility exceeded the allowable ramping rate as measured at the downstream gauging site.

A field crew (Ecofish Research Ltd.) has been dispatched to evaluate the on-site conditions.

A more detailed report will be provided within the next two weeks as per our incident protocol.

Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

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From:	Matt Kennedy
To:	Busto, Vince; Stoddard, Erin M FLNR:EX; Babakaiff, Scott C FLNR:EX; Knight, Francesca
Cc:	John Miller; Sean Mccoy; Isabelle Deguise; Kirsten Lyle
Subject:	RE: Innergex - Incident Report - Ashlu Ramping
Date:	Tuesday, January 24, 2012 6:15:10 PM

Hi Vince

Apologies for the confusion. As per our OPPR document we are required to notify agencies within 24 hours of an incident, then follow up with a detailed report as specific data come available (Ashlu OPPR page 44). The detailed report will contain the information in your message below. I can advise that a fisheries consultant (Ecofish) was dispatched to the site for the Jan 19 incident and no stranded fish were found. The detailed report is in prep and will be submitted to agencies later this week.

Also, I'd like to introduce Sean McCoy, P.Eng. who recently joined our team as Operations Environmental Manager. Sean will be working within John Miller's Operational Group and will be supporting our activities and commitments for all of our operating hydro facilities in BC. S22

S22

S22 Sean is quickly getting up to speed and adding additional strength to our team.

Regards,
Matt

Matt Kennedy, M.Sc., R.P.Bio.

Vice President, Environment - Western Region

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Sent: January 20, 2012 5:06 PM
To: Sean Mccoy; Stoddard, Erin; Babakaiff, Scott; Knight, Francesca
Cc: John Miller; Matt Kennedy
Subject: RE: Innergex - Incident Report - Ashlu Ramping

Sean

Please provide a little more information, like:
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- duration of the rapid ramping event

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Regards,

Sean McCoy, P.Eng.

Operations Environmental Manager

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From:	Babakaiff, Scott C FLNR:EX
To:	Ullah, Aman FLNR:EX; Stoddard, Erin M FLNR:EX; "Busto, Vince"; "Knight, Francesca"
Cc:	Davies, James W FLNR:EX; Barrett, Scott FLNR:EX
Subject:	RE: Furry Creek Power - Ramping Report
Date:	Wednesday, October 26, 2011 4:32:23 PM

Aman,

Thank you forwarding the information for these ramping non-compliance events at Furry (and the ones in recent months at Clowhom).

s.13, s.15

In short, please provide some clarity for me: will Water Staff (and more generally the Resource Approvals & Authorizations Division) simply be serving as messengers on this issue, or is there any appetite to share in enforcement responsibilities?

Scott

From: Ullah, Aman FLNR:EX
Sent: October 26, 2011 4:25 PM
To: Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX; 'Busto, Vince'; 'Knight, Francesca'
Subject: FW: Furry Creek Power - Ramping Report

Hello Folks,

Some ramping events at Furry Creek hydroelectric facility for your information.

Aman

From: Kyle Edwards [mailto:kedwards@vereseninc.com]
Sent: Wednesday, October 26, 2011 9:25 AM
To: Ullah, Aman FLNR:EX
Cc: Linda Vaughan; Amit Bhargava; Julia Ciccaglione; Jim Hinrichs; Doug Bryson; Robert Kulka
Subject: Furry Creek Power - Ramping Report

Aman,

On behalf of Furry Creek Power, I wanted to inform you of ramping events that occurred between October 20 and 22, 2011.

The first event occurred on Oct 20th, and began at 9:00 AM PST. The plant was re-started beginning at 8:25 AM PST, after a shutdown the previous day caused by a BC Hydro line fault. At the beginning of ramping, the flow in the diversion reach was 2.178 m3/s. The minimum plant flow is 0.2 m3/s, which accounts for about half of the flow change in the first hour (from 8-9 AM) which resulted in the -0.072 ramping rate. This is an operational constraint of the plant and cannot be avoided. The plant ramped at it's programmed rate, and took approximately 4 hours to reach an output of about 6400 kW. The current ramping protocol does not take into account the flow in the river and is simply a linear rate based on the time to reach full output. This ramping protocol will be replaced in the near future by a program that will consider the flow in the river and adjust the ramping rate accordingly, which should

eliminate low-flow ramping exceedances such as this one.
Date/Time PST

Stage (m)

Flow (m3/s)

Ramping (m/h)

10/20/2011 9:01

0.859

1.732

-0.072

10/20/2011 10:01

0.777

1.299

-0.082

10/20/2011 11:01

0.622

0.684

-0.155

10/20/2011 12:01

0.506

0.371

-0.116

A second, very short duration, event occurred on October 21st at 18:00 PST. Prior to the event, flows in the river were ramping up at a rate of 0.454 m/h naturally, due to rainfall. This caused debris to be released from above the headpond and impinge on the intake trashrack. The event occurred when operations staff removed the accumulated debris from the trashrack, which caused a sudden increase in penstock flow and an associated decrease in diversion reach flow. The trashrack cleaning procedure is currently being reviewed, and changes to plant programming and/or manual cleaning procedures are being considered in an effort to avoid this type of event in the future.

10/21/2011 18:01

0.922

2.118

-0.195

The third event was also short in duration and occurred on October 22nd at 9:00 AM PST. The event

was again related to the removal of debris blocking the trash rack, but occurred at a lower flow, where ramping rates are more easily affected by small changes in flow.

10/22/2011 9:01

0.631

0.714

-0.196

10/22/2011 10:01

0.509

0.379

-0.122

Furry Creek Power will do a more in-depth internal review once more detailed data is retrieved from the loggers on site. A new flow ramping protocol that takes into account the existing flow in the river is in the works and is expected to be implemented very soon. New trashrack cleaning procedures are being developed, that will avoid causing ramping events when blockages are removed.

Please let us know if you have any further questions.

Sincerely,

Kyle Edwards, BASc, EIT
Jr. Engineer - Dee Bee Services
P: 604-637-6393 x112 | Cell: 604-362-5953

From:	Babakaiff, Scott C FLNR:EX
To:	"Busto, Vince (Vince.Busto@dfo-mpo.gc.ca)"; "Knight, Francesca"
Subject:	FW: Miller Creek Plant trip
Date:	Tuesday, October 25, 2011 2:27:00 PM

fyi

-----Original Message-----
From: Bennett, Timothy A FLNR:EX
Sent: Monday, October 24, 2011 7:07 PM
To: Davies, James W FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX
Subject: FW: Miller Creek Plant trip

Hi Marc,

Thank you for providing this e-mail regarding the plant trip.

s.22

Please forward all future correspondence to James Davies, at James.Davies@gov.bc.ca, as he is the Acting Section Head.

Regards,

Tim Bennett

From: Marc Nering [mnering@capitalpower.com]
Sent: Monday, October 24, 2011 10:54 AM
To: Bennett, Timothy A FLNR:EX
Cc: Michael Smith; Rudy Barrett; Gary Bouwman
Subject: Miller Creek Plant trip

Hello Tim,

The Miller Creek plant tripped offline due to low penstock pressure at approx. 21:00 PST Saturday (Oct 22) night. The penstock isolation gate closed for an undetermined reason and as the penstock drained the low penstock pressure alarm tripped unit 1. The creek level dropped 20cm and the total duration of the incident was around 2 hours as shown in the graph below.

[cid:6356BA9AA1C4B24E9B861D1EE4FF9A8B@capitalpower.com]

The IFR from both North Miller Intake and South Miller Intake was not interrupted.

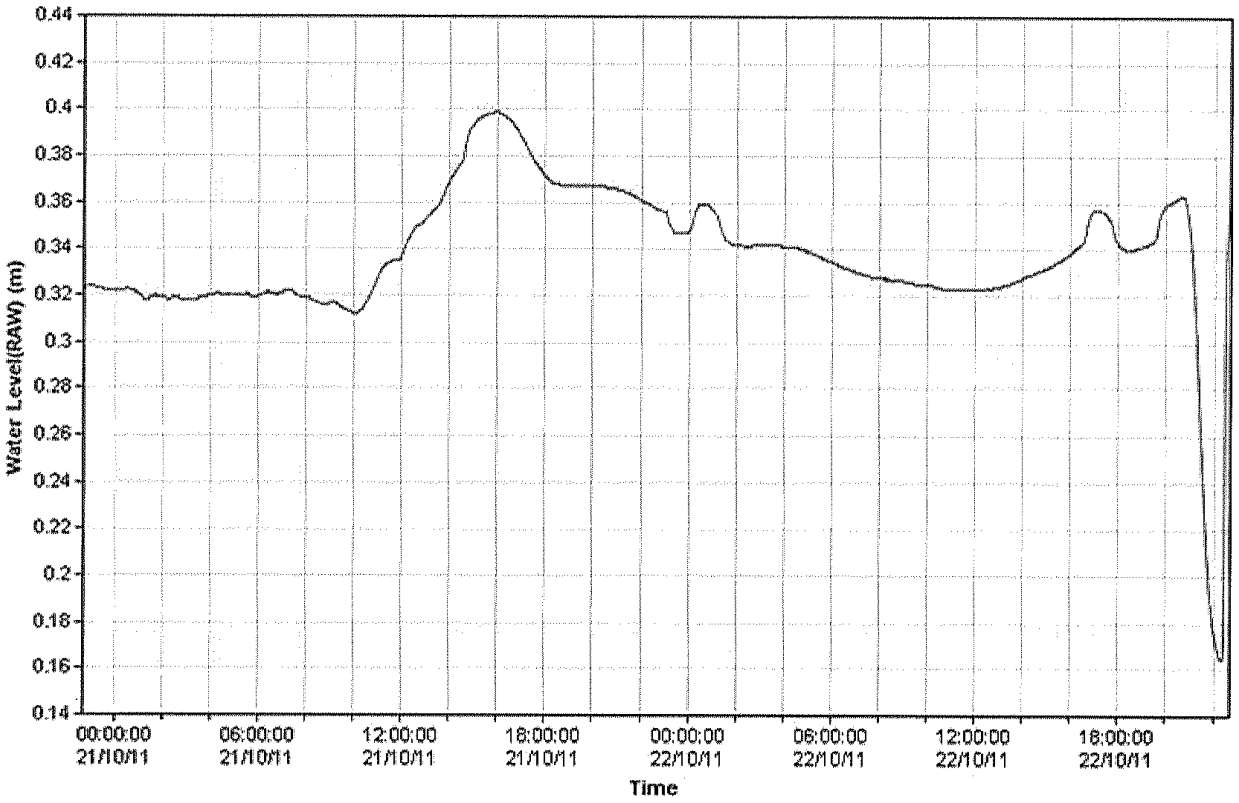
Our environmental monitors Ecofish were called as the situation developed. Due to safety concerns (working alone and in the dark of night) they conducted a fish stranding search at first light Sunday morning. No stranded or dead fish were found

The penstock isolation gate was recently installed (final commissioning was completed Tuesday Oct 18) during the plant outage under the direction and monitoring of CPC engineering, replacing the original penstock isolation gate which could not be relied on to close properly. Earlier this week (Thursday Oct. 20) the hydraulic power unit for the new gate experienced a leak and the OEM came to site and repaired the leak.

At this time the reason for the gate closure is not known, but it is expected to be a problem with the new hydraulic power unit. I have instructed the plant operator to investigate the problem at the penstock isolation gate, and to leave the plant offline until the cause of the problem is identified and

corrected. This will likely require the OEM (Hyseco) and the installation crew (SKTechnical) to determine why the gate closed.

Marc Nering


Water Level(RAW) (m)
0.44
0.42
0.4
0.38
0.36
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
00:00:00 21/10/11
06:00:00 21/10/11
12:00:00 21/10/11
18:00:00 21/10/11
00:00:00 22/10/11
06:00:00 22/10/11
12:00:00 22/10/11
18:00:00 22/10/11
Time

From:	Babakaiff, Scott C FLNR:EX
To:	Davies, James W FLNR:EX
Cc:	Alain.Magnan@dfo-mpo.gc.ca; Stoddard, Erin M FLNR:EX
Subject:	Tyson Ramping
Date:	Thursday, November 3, 2011 2:38:32 PM

Jim,

It is my understanding that there may have been ongoing (and recent) non-compliances of the allowable ramping rates at the Tyson IPP. Specifically, I've been informed that these non-compliances are apparent in data collected on the Tzoonie mainstem, downstream of the Tyson tailrace (ie. at 'Site T2').

It is also my understanding that the proponent is obligated to provide this data to the Water Allocation Section head (yes, you) and inform of you of any non-compliances within 24 hours.

Can you please:
1. confirm if my understanding on these two points is correct, and,
2. Provide copies of all data & ramping reports submitted by the Tyson proponent in the past year.

Thanks,

Scott

From:	Babakaiff, Scott C FLNR:EX
To:	Berardinucci, Julia F FLNR:EX
Cc:	Malt, Joshua FLNR:EX; Stoddard, Erin M FLNR:EX; Davies, James W FLNR:EX; Rochetta, Steve J FLNR:EX; Robbins, Kristina FLNR:EX
Subject:	FW: Tyson Creek 'experiment' ought not to be repeated - The Globe and Mail
Date:	Monday, November 28, 2011 8:41:00 AM

FYI

From: scott babakaiff S22
Sent: Monday, November 28, 2011 7:08 AM
To: Barrett, Scott FLNR:EX
Cc: Babakaiff, Scott C FLNR:EX
Subject: Tyson Creek 'experiment' ought not to be repeated - The Globe and Mail

Heads up,

We might be getting some phone calls today: I'm mentioned a few times in an article re: Tyson Creek in today's Globe & Mail...

From The Globe and Mail:
Tyson Creek 'experiment' ought not to be repeated

Via The Globe and Mail's iPhone app

Sent from my iPhone

From:	Babakaiff, Scott C FLNR:EX
To:	Berardinucci, Julia F FLNR:EX; Barrett, Scott FLNR:EX; Davies, James W FLNR:EX
Cc:	Drysdale, Alec M FLNR:EX
Subject:	RE: PAB Information to Tyson Creek 'experiment' ought not to be repeated - The Globe and Mail
Date:	Monday, November 28, 2011 9:36:00 AM

Folks,

I've been out of the information loop on Tyson in recent months, and I assume Scott Barrett is in a similar position.

Tim Bennett provided the Tyson proponent with a series of information requirements in October 2010, but I was not cc'd on any the subsequent reports, so I am unaware if these commitments were met by the proponent.

The proponent sought approval to resume full drawdown in July 2011, and provided a series of reports regarding sediment data, but I'd indicated to Tim that the sediment data was only part of the issue: the change in stage (ie. ramping) within the lake and in downstream reaches (ie. on Tyson & on Tzoonie mainstem) were of equal concern...I have a strong suspicion that the proponent has been out of compliance in recent months. Despite requests for this info, I have not received any subsequent data or reports from the proponent or regulators.

Scott

From: Berardinucci, Julia F FLNR:EX
Sent: Monday, November 28, 2011 9:27 AM
To: Babakaiff, Scott C FLNR:EX; Barrett, Scott FLNR:EX; Davies, James W FLNR:EX
Cc: Drysdale, Alec M FLNR:EX
Subject: PAB Information to Tyson Creek 'experiment' ought not to be repeated - The Globe and Mail
Importance: High

Good Morning,

Happy Monday. Scott thank you for passing this on, much appreciate the heads up.

Not Responsive

Cheers,

Julia

From: Babakaiff, Scott C FLNR:EX
Sent: Monday, November 28, 2011 8:42 AM
To: Berardinucci, Julia F FLNR:EX
Cc: Malt, Joshua FLNR:EX; Stoddard, Erin M FLNR:EX; Davies, James W FLNR:EX; Rochetta, Steve J FLNR:EX; Robbins, Kristina FLNR:EX
Subject: FW: Tyson Creek 'experiment' ought not to be repeated - The Globe and Mail

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Tyson Creek 'experiment' ought not to be repeated

Via The Globe and Mail's iPhone app

Sent from my iPhone

From:	Babakaiff, Scott C FLNR:EX
To:	"Busto, Vince"
Subject:	RE: Who needs instream flow? ..and this, unrelated, story re drawing down lakes
Date:	Monday, November 28, 2011 11:15:00 AM

Yeah, there's been a bit of buzz around the office this morning regarding that article...thanks for ensuring I'd seen it!

S

-----Original Message-----
From: Busto, Vince [mailto:Vince.Busto@dfo-mpo.gc.ca]
Sent: Monday, November 28, 2011 11:14 AM
To: Babakaiff, Scott C FLNR:EX; Stoddard, Erin M FLNR:EX
Subject: FW: Who needs instream flow? ..and this, unrelated, story re drawing down lakes

Scott, you're famous!

-----Original Message-----
From: Clark, John
Sent: November 28, 2011 9:26 AM
To: Busto, Vince; Watts, Dean; Beattie, Alasdair; Summers, John; Jerred, Stephanie E; Andrews, Trevor; Andres, Brenda; Thorpe, Suzanne; Desrochers, Dale; Ferguson, Brian (PAC); Knight, Francesca; Hillier, Joy; Magnan, Alain; Nishimura, Derek; Smith, Rob
Subject: RE: Who needs instream flow? ..and this, unrelated, story re drawing down lakes

From: DeBow, Shawn
To: Lovett, Lynn; Sheedy, Helene; Massicotte, Claude; Champagne, Émilie; Olszynski, Martin; Ikejiani, Alexander; Braden, Rose Marie
Sent: Mon Nov 28 07:16:32 2011
Subject: FYI- ENVIRONMENT Muddy waters a clear danger of private power

PUBLICATION: GLOBE AND MAIL
IDN: 113320104
DATE: 2011.11.28
PAGE: S1
BYLINE: MARK HUME
SECTION: British Columbia N
EDITION: Metro
DATELINE: Vancouver BC
WORDS: 605
WORD COUNT: 620
CIRCULATION: 321109

ENVIRONMENT Muddy waters a clear danger of private power

MARK HUME VANCOUVER mhume@globeandmail.com There have been growing concerns in British Columbia about the impact of private power projects on streams and rivers.

But we should worry about our lakes, too, according to a file of internal government documents related to the Tyson Creek hydroelectric project.

The documents, obtained by Gwen Barlee of the Wilderness Committee, track the licensing, development and subsequent but temporary closing of the project when it caused the usually clear Tzoonie River to turn the colour of mud.

Ms. Barlee says there are currently "over 30 alpine lakes staked [claims made for power generation] by

private power companies in B.C.," and she wanted to take a close look at how the Tyson Creek project was handled, because it is the first run-of-river project in the province that also generates power by drawing down water from a lake. In effect, they're using lakes as hydro reservoirs, so-called lake storage, to generate power when river water levels are low.

She says that what she saw in the records disturbed her.
"After reviewing the documents, we were surprised by the lack of checks and balances when it came to alpine lake-storage power developments. . . . I don't think the government's got a handle on this at all," she said.

The documents show the project, owned and managed by Renewable Power, was proposed in 2005 and moved fairly rapidly through the licensing and approval stages. A timeline prepared by Scott Babakaiff, regional fish hydrologist with the provincial Ministry of Environment, notes that "lake storage was not clearly (or consistently) described" in the company's initial development plan.In December, 2007, the MOE's water stewardship division issued a water licence, giving the company the green light to proceed - although the MOE's environmental stewardship division didn't learn about that until February, 2008, two months later.

That wasn't the only communication problem. Mr. Babakaiff notes that he learned in July "that construction had been proceeding for several months." In March, 2009, the company amended its original run-of-river plan, and the government file notes the new proposal was to generate electricity by drawing down Tyson Lake by 30 metres or more.

In January, 2010, the company got leave to begin operations and started drawing water out of Tyson Lake because the flow rates were so low in the river. But one month after the Tyson Creek hydroelectric project booted up, the government was flooded with phone calls from people reporting the Tzoonie River, downstream of the power plant, was pouring muck into the ocean.

According to a government report, the problem was caused when Tyson Lake was drawn down 10 metres below natural levels, creating "a sediment incident related to erosion of a delta." Silt flowed out of the lake, through the power plant, and into the river downstream.

The project was halted temporarily. Now the project is back up, not drawing down the lake as much, and apparently avoiding any more siltation problems.

One Ministry of Environment memo ends with this telling comment: "We have viewed Tyson as a large experiment in many ways. Right or wrong, we have a poor understanding of the effects of negative storage [or drawing down a lake] that begs some tough questions." Another document advises staff they "will see many more" such projects proposed in the future and then it adds: "MOE still has no guidelines . . . to allow agency assessment of ecological impacts associated with such proposals." Judging by how the first experiment went, those guidelines need to be in place before the next power company starts drawing down a lake.

ADDED SEARCH TERMS:
GEOGRAPHIC NAME: British Columbia
SUBJECT TERM:electric power stations; environment; lakes; water pollution
PERSONAL NAME: Gwen Barlee
ORGANIZATION NAME: Renewable Power; Wilderness Committee

Shawn DeBow
Paralegal
Legal Services / Services juridiques
Fisheries and Oceans / Pêches et Océans
Government of Canada | Gouvernement du Canada
800-200 Kent Street, Ottawa, Ontario
K1A 0E6
Tel: 613-990-8326
Fax: 613-990-9385

From:	Babakaiff, Scott C FLNR:EX
To:	Berardinucci, Julia F FLNR:EX; Davies, James W FLNR:EX
Cc:	Drysdale, Alec M FLNR:EX; Barrett, Scott FLNR:EX
Subject:	RE: PAB Information to Tyson Creek 'experiment' ought not to be repeated - The Globe and Mail
Date:	Tuesday, November 29, 2011 3:27:00 PM

Julia: your recollection is correct: there was a lack of evidence of fish kill from the Feb 2010 event. This is not to say that there wasn't a fish kill, but there wasn't any documented evidence that one occurred. I don't believe a formal investigation with the COS was ever initiated (although the COS were at the first meeting Tim & I had with the proponent). Per Tim's direction, the proponent subsequently submitted a series of consulting reports in 2010, which included biological opinion that the likelihood of adverse impacts to fish & fish habitat from the Feb 2010 event were small.

Per Tim's direction, the proponent was obligated to submit regular monitoring reports in 2010 including turbidity & other hydrological data. In addition to turbidity related issues, I'd indicated to Tim that I was concerned about ramping effects downstream of the tailrace, both on Tyson mainstem and on the Tzoonie...preliminary data indicated that plant operations could significantly affect river levels on Tzoonie (when Tzoonie flows were low and/or relatively constant). As such, the first item on Tim's recommencement plan (provided to the proponent on April 30 2010) states: "*At all times, the operations of the plant and diversion of water* ***must not result in ramping rates that exceed 2.5 cm/hour****, as measured at a station downstream of the tailrace and upstream of any fish-bearing reaches of Tyson Creek*".

I haven't seen the Sept 2011 OPPR (which Jim references), or any monitoring reports in 2011, so I don't know if there were further findings of adverse impacts to fish (from turbidity or ramping events in 2011). I don't even know if the proponent is still obligated to measure these components. However, I do know that the proponent did not strictly follow Tim's operational guidance in 2011 (e.g. they exceeded their allowable stage fluctuations in Tyson Lake before Tim gave them direction to do so).

Jim (again): please forward digital copies of the Tyson reports submitted in 2011 (ie. the OPPR & any turbidity & ramping data).

Scott

From: Berardinucci, Julia F FLNR:EX
Sent: Tuesday, November 29, 2011 9:00 AM
To: Davies, James W FLNR:EX; Babakaiff, Scott C FLNR:EX
Cc: Drysdale, Alec M FLNR:EX; Barrett, Scott FLNR:EX
Subject: RE: PAB Information to Tyson Creek 'experiment' ought not to be repeated - The Globe and Mail
Importance: High

Hello Gentlemen,

Could Jim or Scott please confirm the outcome of the Tyson investigation regarding the possibility of impacts to fish?

My recollection was that the turbidity event was serious, but that luckily, there were no findings of adverse impacts to fish (i.e. lack of evidence of fish kill). However, I do not want to go on memory and there may have been further findings that I did not receive.

Thank you.
Julia

From: Davies, James W FLNR:EX
Sent: Monday, November 28, 2011 4:24 PM
To: Berardinucci, Julia F FLNR:EX; Babakaiff, Scott C FLNR:EX; Barrett, Scott FLNR:EX
Cc: Drysdale, Alec M FLNR:EX
Subject: RE: PAB Information to Tyson Creek 'experiment' ought not to be repeated - The Globe and Mail

As per request.

Tyson Lake

The 2008 water licence application review covered instream flows, access road to the works, grizzly bears, First Nations.

The 2008 water technical report does not discuss the effects of the drawdown on the stability of the lakeshore.

The winter turbidity event occurred in 2009/2010. The eastern lake shore of Tyson Lake by visited by MFLNRO staff (Scott Babakaiff and Tim Bennett) on November 5, 2010.

The Ministry does not have a policy on lake drawdown (negative storage) by the use of lake tunnel taps. Such applications are adjudicate on a case by case basis by the Regional Water Manager. The RWM may specify additional information to review this issue, if the issue has not been sufficiently assessed by the applicant.

Since the 2009/2010 winter turbidity event:

The water licence is regulated to a 5-metre drawdown (the full drawdown is 10-metres).

The water licencee is required to measure turbidity. He is required to take actions to raise the lake level if turbidity parameters are exceeded, or have the potential to be exceeded, as per his operational parameter and procedures report (OPPR). The OPPR was approved by Tim Bennett on September 16, 2011.

The water licencee is required to monitor rainfall watch or advisory, and take actions to raise the lake level if turbidity parameters are exceeded.

The water licencee is required to survey the eastern lake shore, and confirm the rate of lake

shore erosion.

The water licencee is required to notify MFLNRO within 24 hours of data measurements outside operational parameters, or of a significant lake shore erosion event, or of a significant turbidity release.

James Davies, P.Eng.
MFLNRO - South Coast Region - Authorizations - Water Allocation
Tel: (604) 582-5203 FAX: (604) 582-5235
email: James.Davies@gov.bc.ca

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