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To: BC Forest Practices Board

We are stewards and stakeholders of Glade Creek Watershed, members of the public, invested members of the Glade Watershed Protection Society (GWPS) and members of Glade Irrigation District (GID).

The purpose of the GWPS is to protect the ecosystem of the Glade watershed, including maintaining current water quality, quantity, and timing of flow, while influencing the watershed processes to restore historical, natural levels of water quality, quantity, and timing of flow, and by consequence, to provide for the health and wellbeing of the Glade community. The value that the forest adds to the health and welfare of all life is paramount and how we care for the elements of nature that provide us with these benefits should be foremost in our actions.

The hydrogeomorphic assessment [Glade Creek Hydrogeomorphic Assessment¹ by Dr. Kim Green of Apex Geoscience Consultants Ltd., (Apex Report)] was commissioned by ATCO and KLC. One of the objectives (p1) of the Apex report was to “provide guidance for forest development” and to determine “hydrogeomorphic risk to water quality, quantity and timing of flows ... associated with existing and proposed forest development.”

FRPA, and therefore Atco and KLC, state the following as an objective in their FSP: “to prevent the cumulative hydrological effects of primary forest activities within the community watershed from resulting in a material adverse impact on the quantity of water or the timing of the flow of the water...”²

The GWPS asserts that both licencees (KLC and ATCO) are not meeting the government’s Community Watershed objectives, or the strategies of their own FSPs. This is in part because the assessment that they are accepting as having met the requirements of their strategies is incomplete, outdated, and by the author’s statements, does not meet its *own* objectives.

This complaint is not about the science in the report, but about the fact that this report does not meet the licencees’ stated objectives and strategies.

Under the management system of professional reliance, both licensees agree that the Apex report is satisfactory for their FSP strategies and is valid for a 10-year span. The community of Glade feels that there are a number of serious concerns about the report, including a limitation of water monitoring data, the fact that due to a landslide the report it is now outdated, and historical data has not been included.

KALESNIKOFF: FSP STRATEGIES

‘New Forest Development’ was not Considered in the Apex Report, or KLC’s FSP Strategy

¹ Glade Creek Hydrogeomorphic Assessment. Apex Geoscience Consultants.Ltd. Apex File HA-15-KL-02, released Feb 2016

² Kalesnikoff Lumber Company, Thrums. Forest Stewardship Plan #597 2016-2021 p16
 FPB complaint Jul 2018

When this assessment was released in Feb 2016, there was only basic information available for one single Atco cut block, and no site plans available. There are now three more KLC cut blocks proposed (Apr2017) in Glade Creek watershed. The Apex report is failing to meet its own objectives, since its premise is to ‘determine hydrogeomorphic risks’ associated with ‘*proposed* forest development’. More forest development has been proposed, and none of that development has been assessed to see what hydrological risks are associated with those new cut blocks.

As a strategy in their FSP, KLC states that hydrological assessments *will be conducted in advance of new developments*.³ This FSP strategy has not been met due to the fact that their cut blocks (i.e. new development) are not considered at all in the Apex report.

We realize that mostly, proposed cut blocks are not included in hydrology reports. However, as this report *did* assess Atco’s single available cut block R10 in terms of the impact of that block on the hydrology of GCW, it follows that any new cut blocks would be assessed in the same way, but this has not happened, and apparently will not happen, according to KLC.

Apex Report is ‘Binding’

KLC considers Dr. Kim Green’s Apex report ‘binding’, as stated by their RPF in a public meeting (Feb 2016) and repeated in a newspaper article.

When asked by *Castlegar News* if the companies considered the recommendations in the report as binding ... Tyler Hodgkinson, woodlands manager with Kalesnikoff, stated, "If I went outside Kim's report, and I was brought before my peers, I would be in trouble. What Kim's recommendations are is what I follow." (Castlegar News, Feb 24, 2016)

Since the Apex report is part of professional reliance model and was commissioned by both ATCO and KLC, it can be safely assumed that Atco also considers the Apex report binding. The RPF for Atco certainly speaks highly of her work:

Atco employs well qualified and community conscious consultants to supplement its decision making process. Kim Green PGeo., PhD is one of the most experienced and well qualified hydrologists in this area and works independently from Atco and Kalesnikoff. (Letter, Feb 4, 2016)

ATCO: FSP STRATEGY

ATCO’s FSP (FSP June 28, 2017 – June 27, 2022 Forest Licences: A20193 and A20218) states that: “If risk is low based on a QRP review of the relevant and available site specific hydrologic information, the (more detailed) commitments below are not required.” (p 21, ATCO FSP)

However, due to a lack of data and outdated information, *any* level of risk cannot be determined by this Apex report and so Atco would not be able to determine a) the level of risk or b) whether the more detailed commitment to ascertaining hydrological risk would be necessary. Atco’s FSP strategy has not been met.

APEX REPORT and ASSESSMENT OBJECTIVES

Report Limitations

In the Glade Apex Assessment, page one, it states: “The assessment in Glade Creek is intended to determine hydrogeomorphic risk to water quality, quantity and timing of flows at the intake in Reach 1

³ Kalesnikoff Lumber Company, Thrums. Forest Stewardship Plan #597 2016-2021 p17
FPB complaint Jul 2018

associated with existing and proposed forest development”⁴ and to “provide guidance for forest development to limit the risk of ... impacts occurring”.

However, the APEX report *itself states that it does not address* the following:

- Landslides: “Although a large landslide capable of causing long-term impacts to water quality at the intake is identified as a hazardous event a rigorous assessment of the likelihood of such event is beyond the scope of this assessment.”⁵
- Impacts of proposed roads on our watershed: The scope of the Apex assessment did not include information on road building and its effect on our watershed. When questioned, Dr. Green agreed that those impacts were not part of the assessment, and that “would require a much more detailed assessment”.⁶

Another objective was to consider four hazardous events as listed in *Assessment of Hazardous Events in Glade Creek* (p26). The assessment states that *three* of these four hazardous events cannot be considered. Again, this is an obvious example where the stated objectives of the Apex assessment have not been met.

- A flood capable of substantially increasing sedimentation at the intakes (i.e. above the normal range of variability): This hazardous event was not considered: “Due to the lack of discharge gauging on Glade Creek it is not possible to relate variability in water quality to the flow regime. For this reason the hazard of flood related impacts to water quality at the intake cannot be quantified.”⁷
- A change in the timing of runoff that could create water supply problems during low flow months: This hazardous event was not considered: “The lack of discharge gauging on Glade Creek makes it impossible to quantify the hazard of runoff timing changes.”⁸
- A landslide that could impact the water intake and/or cause long term impacts to water quality on Glade Creek: This hazardous event was not considered: “Although a large landslide capable of causing long-term impacts to water quality at the intake is identified as a hazardous event a rigorous assessment of the likelihood of such event is beyond the scope of this assessment.”⁹

Future Forest development:

When this assessment was released in Feb 2016 KLC stated that they had no site plans available for any proposed cut blocks, so the QRP would have been completely unaware of any ‘future forest development’ and would not have been able to meet the requirements of KLC’s FSP strategy by providing a ‘qualitative risk analysis...given past development and disturbance and *future* forest development’. As stated earlier, the single Atco block (R10) *was* assessed in this report.

⁴ *Glade Creek Hydrogeomorphic Assessment. Dr. Kim Green of Apex Geoscience Consultants Ltd., Apex File HA-15-KL-02, Feb/16 p1*

⁵ *Ibid. p27*

⁶ *Transcript Audio Recording, Power Point presentation of Glade Hydrogeomorphic Report. Feb17,2016 p26*

⁷ *Glade Creek Hydrogeomorphic Assessment. Dr. Kim Green of Apex Geoscience Consultants Ltd., Apex File HA-15-KL-02, Feb/16 p26*

⁸ *Ibid. p26*

⁹ *Ibid p27*

GOVERNMENT OBJECTIVES: CUMULATIVE SHORTCOMINGS

Atco and KLC's FRPA and FSP strategy is "to prevent the cumulative hydrological effects of primary forest activities within the community watershed from resulting in a material adverse impact on the quantity of water or the timing of the flow of the water..."

When the Apex report is word-searched, the word 'cumulative' appears only three times in the 15,000-plus word document:

- once when it repeats the 'objective' quote above
- once when it states that "This investigation is intended to assess the likelihood of adverse cumulative impacts to water quantity..."¹⁰
- and once when it references a study in *Literature Cited*.¹¹

That would suggest that the government's objectives and FSP strategy objectives are not being discussed in this assessment, and so do not meet the measurable requirements of that FSP strategy.

Historical data incomplete, discrepancy: Flood data, Fire Data

Incomplete Flood Data: Since risk assessment is based on how often an event occurs, then the Apex report is inaccurate as a significant flood event that occurred in 2006 is not recorded. During the 2006 flood event, the water went over the bank of the creek and the road: the community was without water for a few days. (See photo below). Since the Apex assessment extrapolates conclusions from historical events, all events need to be recorded and considered, something that has not occurred.



Discrepancy in ECA /Fire Data:

In addition, there appears to be a discrepancy between Dr. Green's data in the 2016 report and the same data from 1995 when Ms. Green was employed by the Ministry of Forests, Arrow District. In 1934 Glade Creek Watershed suffered a fire, and that is of consequence to the current ECA and planned development.

¹⁰ Glade Creek Hydrogeomorphic Assessment Dr. Kim Green of Apex Geoscience Consultants Ltd., Apex File HA-15-KL-02, Feb/16 p26. p1

¹¹ Ibid. p29

Table 3. Equivalent Clearcut Area (ECA) estimation for Glade Creek.

Opening description	Area (ha)	Applied Recovery (%)	Unrecovered area (ha)		
			total (2977 ha)	South Fork (1286 ha)	North Fork (1561 ha)
Recent Blocks and powerline (2000/2011 harvest year)	65.4	0	65.4	46	3.9
1934 burn still unrecovered (deciduous leading)	201	0	201	0	180.5
Recovered early 1900s disturbed forest	868	100%	0	0	0
Disturbed forest 90% recovered	740	90%	74	28.1	44.6
Disturbed forest 70% recovered	102	70%	30.6	6.1	24.5
Disturbed forest 60% recovered	64	60%	25.6	5.2	19.6
Disturbed forest 40% recovered	37.8	40%	22.7	0	22.7
Total current ECA			419.3 (14.1%)	85.4 (6.6%)	295.8 ha (19%)
Proposed ECA with Atco block (Figure 10)	29.7		29.7 (15.1%)	na	325.7 ha (20%)

Based on the assumptions of hydrological recovery the current ECA of Glade Creek is estimated at 419.3 ha or 14% of the 2977 ha watershed area. 296 hectares (19%) of ECA are in the north fork tributary and 85.4 hectares (6.6%) of ECA are in the south fork tributary.

In the 2016 Apex report excerpt it states "201ha still unrecovered from the 1934 burn".

ATCO LUMBER LTD. GLADE WATERSHED ASSESSMENT.

NOTES TO TABLES

- S.L. 8, owned by Atco Lumber was included in all calculations as per Kim Green, MOF Arrow, May 3, 1995.
- All areas burned in 1934 are considered fully recovered as per Kim Green May 8, 1995.
- Ministry of Forests' forest cover map shows only one road in the drainage, whereas the TRIM map shows a few more. The TRIM roads were used in this analysis.
- For erodible soils, the Sediment Yield mapping done by Integrated Hyrdopedology Ltd. in August, 1991 was used. All those areas defined as M, H, or E Hazard Class were considered erodible soils. Since that mapping only covered a portion of the watershed, the areas with slope > 30% but not bedrock were used for the rest of the watershed. (As per Kim Green, May 8, 1995)
- Total stream length includes the perimeter of lakes. Since all lakes are different shapes, the calculation for length of a lake cannot be easily automated. Also, when logging has occurred next to a lake, the length of the lakeshore would be desired, not the length parallel to the creek, especially if the lake is more round than oblong in line with the creek.

For example:

Not that these would ever happen in reality, but...
- Glade Creek is a fish-bearing creek up to the falls, which is within the Residual sub-basin approximately 600 metres up Glade Creek from the point of interest (POI).
- For unstable terrain, the Mass Wasting mapping done by Integrated Hyrdopedology Ltd. in August, 1991 was used. All those areas defined as M, H, or E Hazard Class were considered unstable terrain. Since that mapping only covered a portion of the watershed, the areas defined as Es1 and Es2 by MoF forest cover mapping were used for the rest of the watershed. (All as per Kim Green, May 8, 1995)
- Operability In the upper part of the watershed was modified to match Atco Lumber's operability line on their Siwash Mountain Five Year Development Plan map.
- Hydromyological zone was not filled in as per Kim Green.

Timberland GIS Dept. Page 4 of 4 09/05/95

But from the *Glade Watershed Assessment* in the Glade Creek Technical Committee minutes (Jun 29, 1995) when ATCO was proposing to log in the upper Glade Creek watershed, we read: "#2. All areas burned in 1934 are considered fully recovered as per Kim Green, MOF Arrow, May 3, 1995."

Which version is correct - are those areas recovered or not? And what impact is that having on the ECA and the recommendations for development?

Discrepancies lead to further doubt about the strategies in both KLC and Atco's FSP.

Apex Report out of date: Landslide occurred after Apex Report completed

The limitations of the Hydrogeomorphic Apex report are exemplified in the following current event: a substantial slide was discovered by community members April 29, 2017 and this information was relayed to KLC and Atco.

This slide, considerable in size, is located on an inactive haul road and approximately 30' across at the mouth, took out 50' trees and runs right down to Glade Creek.



It is a new event that happened after the report was released and so has not been considered as an impact or in the history of impacts in Glade Creek – so any guidance delivered by this report would be incomplete and should not be used as a basis for forest development, and does not meet FSP strategies. In addition, part of KLC's FSP strategy is that hydrological assessments *will be conducted in advance of new developments*.¹² This slide is a new development, something that would alter determinations made by Dr. Green and yet the licencees maintain that this Apex report is 'good for 10 years'. Being aware that an important document is out of date and doing nothing to correct that clearly shows that those FSP strategies are not being met, and that they are not trying to be met.

The Limitations of the Assessment

The Apex Assessment cannot determine the following:

- offer guidance on potential landslide activity
- offer guidance on any cumulative impacts of cut blocks
- offer information on the impacts of roads on hydrological function
- quantify the hazard of runoff timing changes
- quantify flood related impacts to water quality at the intake
- or correlate turbidity with characteristics of the flow regime in Glade Creek

¹² Kalesnikoff Lumber Company, Thrums. Forest Stewardship Plan #597 2016-2021 p17
FPB complaint Jul 2018

Since it cannot determine all of those impacts, the Apex report objectives: ...to determine hydrogeomorphic risk to water quality, quantity and timing of flows at the intake... associated with existing and proposed forest development¹³ has not been met. Since the licencees are using this Apex report as a tool to meet their FSP strategies, their FSP and FRPA strategies and objectives have not been met either.

Conclusion

Both Atco and KLC maintain they will continue using the Apex assessment document to guide their development practices in Glade Creek Watershed, regardless of these issues. When apprised of the situation, the KLC RPF stated in an email (July 7, 2016):

When Kalesnikoff hires a Hydrologist to complete a hydrologic assessment we generally do not have specific blocks planned. As per our FSP we have committed to conducting hydrologic assessments ahead of new developments. The assessments provide guidance for future: forest planning, harvesting, road construction or permanent deactivation. The assessments are considered relevant and current up to 10 years or until appreciable change has occurred beyond the limits of recommendations or thresholds established in the original assessment. Please refer to section 6.1.2.5 FSP 597.

The Apex report and the FSPs provide

- No guidance for Glade Watershed future forest development
- No determinations related to hydrogeomorphic risk to water quality, quantity and timing of flows associated with proposed forest development.
- No information provided to prevent the cumulative hydrological effects of primary forest activities within the community watershed from resulting in a material adverse impact on the quantity of water or the timing of the flow of the water.

The GWPS has informed Tyler Hodgkinson (KLC), Ron Ozanne (Atco), District Manager Tara DeCourcy, and the respective owners of Atco Wood Products and Kalesnikoff Lumber Company about our concerns in regards to the Apex report, namely that it is out of date, has not considered cumulative development, and cannot consider hydrological impacts due to a lack of water monitoring data.

The proposed development has not been evaluated in the Apex hydrological assessment and the report is not sufficient to determine whether proposed logging by KLC and Atco will protect water quality, quantity, and timing of flow, so it is therefore not in line with strategies and objectives of the respective FSPs.

Thank you,

Glade Watershed Protection Society

¹³Glade Creek Hydrogeomorphic Assessment. Apex Geoscience Consultants. Ltd. ApexFile HA-15-KL-02, released Feb 2016 p1
FPB complaint Jul 2018