

Chuck Hubert

From: David Harpley <david@canadianzinc.com>
Sent: June 15, 2016 10:42 PM
To: Mark Cliffe-Phillips
Cc: Chuck Hubert; Sachi De Souza; Alan B.. Taylor; Allison.Stoddart@pc.gc.ca
Subject: Avalanche Assessment

Regarding avalanche issues along the all season road, I've reviewed the 2012 Alpine Solutions report again in light of the comments provided this afternoon. Here are my findings:

- Twenty seven avalanche paths (or hazard areas) were identified distributed from approximately 4 km to 35 km from the mine site
- Three Drawings indicating road layout and topography completed by SNC Lavalin were referred to: Prairie Creek Mine Proposed Access Road – Plan and Profile Sta. 0+000 to Sta. 72+000; Prairie Creek Mine Proposed Access Road – Plan and Profile Sta. 72+000 to Sta. 136+000; and, Prairie Creek Mine Proposed Access Road – Plan and Profile Sta. 136+000 to Sta. 180+000. In other words, the entire alignment was considered
- Avalanche hazard affecting the road was only identified along the first segment from the mine site to Cat Camp (in fact only to Km 35). Avalanche terrain was noted on the east side of the Grainger River at Grainger Gap (123 km from the mine site), but avalanches were not estimated to affect the current road alignment. The Grainger Gap location is not exactly clear from the km marker. However, it must be the slopes on the south side of the Gap since these are steep and match the km marker. The all season alignment is now more distant from these slopes than the winter alignment.
- The preferred all season alignment from the Gap to Wolverine pass traverses the lower slopes of the west side of the Front Range. These slopes are not especially steep, but more importantly, the imagery provided in Appendix G to Allnorth's recent Response to IR's report shows that the lower slopes are densely treed and display no signs of disturbance by avalanches.
- The avalanche hazard maps for Sundog show the winter road alignment at a scale that would make it very difficult to discern a significant difference between that alignment and the all season road alignment, except for the realignment between Km 24-29. Therefore, we can assume that the all season road and winter road are one and the same in terms of risk of avalanches, and the winter road was previously assessed.
- A recommendation is that "If structures such as bridges are to be installed at creek and river crossings near avalanche paths along the mountain segment of the road, an assessment of potential avalanche impact should be undertaken". The bridge at Km 6.1 is not proximal to a path. The bridges at Km 23.4 and 25.3 are approx. 0.5 km from, and upslope of, a path. The bridge at Km 28.3 is approx. 50 m from, and upslope of, the edge of a path.
- The risks to vehicles and occupants are less on an all season road compared to a winter road because the volume of traffic in winter will be much less. The projected end of the winter haul season is March 31. Traffic resumes on June 15.

Conclusion – There is no justification for additional avalanche assessment at this time. Any additional assessment will not alter the recommendations for risk management and mitigation provided. CZN has committed to adopt and implement these before road operations. Avalanche Solutions (AS),

or other suitable consultant, will be provided with the final road design and operation details and tasked to implement the AS recommendations. Avalanche risks were assessed during the winter road EA and were not flagged as a significant concern in the Board's Report of EA.

David Harpley
VP, Environment and Permitting Affairs
Canadian Zinc
Home Office 604 594 3855, Office 604 688 2001