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Yukon Environmental and Socioeconomic Assessment Board
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Environment Yukon
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Attention: Simon Mason-Wood (YESAB)
Matt Clark (YG)

**Re: Response to Request for Information for Grizzly Bear Denning
Adequacy Report: Project No. 2008-0304 – Mactung Mine Project**

This letter includes a summary of information gathered to date regarding grizzly bear denning in the proposed Mactung project area and provides information relevant to that requested by YESAB in the Adequacy Report: Project No. 2008-0304 for the Mactung project proposal “the Adequacy Report”. This letter is submitted as a formal response to Section 7.2 of that Adequacy Report.

PRIOR COMMUNICATIONS WITH YESAB AND ENVIRONMENT YUKON

Following the release of the Adequacy Report, biologists with EBA Engineering Consultants Ltd. (EBA) met with Government of Yukon, Department of Environment (YG) officials on April 24, 2009, on behalf of North American Tungsten Corporation (NATC) to discuss Sections 7.2 (Grizzly Bears) and 7.3 (Mineral Lick) of the Adequacy Review Report: Project No. 2008-0304 – Mactung Mine Project. At that time, the validity of completing a denning survey program in the spring of 2009 was discussed, as was the potential for using desktop-based methods to estimate potential denning habitat density in the region (based on habitat modelling). At this meeting it was agreed between YG and EBA that denning surveys were not appropriate for the 2009 season due to timing and relevance to the project. Comments related to Section 7.3 Mineral Lick, have been addressed in a separate submittal.

Following the meeting with YG, EBA drafted a letter to YESAB dated April 29, 2009, outlining the details of the April 24 meeting and detailing EBAs intended plan to develop an expert opinion model of grizzly bear denning habitat in the region along with an adaptive mitigation strategy for the construction and operations phases of the mine. This plan was accepted by YESAB.

On May 11, 2009, EBA attended another meeting with YG, this time with Ramona Maraj (Territorial Carnivore Biologist), who had previously been unavailable. The intent of the meeting was to discuss the response plan submitted to YESAB and to develop a cooperative effort for developing a denning habitat model. However, it was the opinion of YG that this approach may not be technically feasible, would not give an accurate representation, and would need to be ground-truthed at a regional level to refine the model provide proper model validation.

ISSUES WITH PREVIOUSLY CONSIDERED SOLUTIONS

Following EBA's meeting with YG on May 11, several of EBA's senior biologists conducted further research regarding the value of completing grizzly bear denning surveys and a denning habitat modelling exercise. After reviewing the existing information and internal technical discussions, senior biologists feel that the survey and den habitat modelling will not provide additional information of value to the baseline assessment.

Habitat Modelling of Denning Sites

Following further internal review of the information obtained from YG's carnivore biologist (Ramona Maraj) and other pertinent information reviewed by EBA's senior biologists, it was EBA's professional opinion that developing a habitat-based model of denning habitat for the study region would not provide the level of detail of information that is being requested and insufficient existing information and data is available for model input. In essence, the information readily available to develop a model includes elevation, land slope, aspect, as well as some information on vegetation cover from EBA's baseline vegetation habitat mapping. However, since grizzly bears select den sites based on a multitude of factors, including individual bear tradition, soil conditions, and micro-habitat conditions, habitat modelling without those criteria would overestimate available denning habitat in both the proposed project area and region as a whole. Also, it was suggested that any such regional model should be ground truthed to be considered technically defensible. If the model were to be developed at this stage in the project, proper ground truthing could not be conducted until the spring of 2010, much too late to be available for the projected assessment timeline for this project. More importantly, considering the size of a regional study area that is applicable in this case (of several home range areas), the cost and effort of developing and verifying such a model is restrictive to NATC, and is on the scale of a government or institutional research project.

In essence, neither EBA nor NATC feel that it is in the best interest of the project to input the time or cost to develop a product that we feel will not provide useful information to the assessment process.

Denning Surveys

Denning surveys were considered in response to comments in the adequacy review. Although additional surveys along the proposed road corridors in the area of the mine infrastructure and elsewhere in the region could be used to supplement existing information on den site characteristics

and potentially new den locations, information provided from such surveys would not be expected to provide data critical to the project assessment. In order to document dens that were used over the previous winter, rigorous regional surveys would be required throughout the period of den emergence (a minimum of five to six weeks in April/May). Furthermore, it is EBA's opinion that a regional-level survey that would provide quantitative information on the availability of denning habitat in the region is beyond the scope of a proponent's responsibility at the baseline or assessment level. Since the appropriate survey timing window has passed, a survey at this time would simply document use of a den site during 2008/2009; however, denning specifics, such as the age class and sex of the denning bear would remain unknown.

It should also be emphasized that since 2005, EBA biologists have spent well over 400 hours conducting aerial surveys in the regional study area including the proposed road route for wildlife and wildlife sign, and have identified numerous bear denning areas in that region. While the surveys that have been emphasized in baseline literature are transect-based, it should be noted that several contour-based surveys including raptor nesting surveys were conducted on the road corridor in 2008, specifically focussing on much of the area potentially used by grizzly bears as well. These surveys were performed by the same wildlife biologist that performed many of the transect surveys, and who is well experienced in recognizing den sites. Additional scientific staff, such as fisheries, vegetation, and hydrology crews have also flown the regional area and recorded all grizzly bear observations made during these studies, including sign or dens.

Although EBA has not conducted specific den emergence surveys or targeted den site surveys during the baseline study program on behalf of NATC, it is our professional opinion that we have an accurate representation of denning habitat use within the project area.

ADDITIONAL INFORMATION RELEVANT TO LOCAL DENNING HABITAT AVAILABILITY

Current den site information exists for the regional area and along the proposed road route. Studies show grizzly bears in the Mackenzie Mountains likely do not re-use dens (Miller et al. 1982¹). Although females generally exhibit greater fidelity to denning areas than males (Schwartz et al. 2003), dens used in consecutive years can be many kilometres apart. Therefore, any bears denning in the area of Mactung likely have alternate sites available to them well outside the influence of the proposed mine and road. Based on female collaring data collected by Miller et al. (1982), multiple den sites were found within each female's home territory ranging in distance from approximately less than 1 km to 7 km apart (estimate). These dens included those constructed the same year, multiple years, and collapsed dens (Miller *et al.* 1982). Likewise, in an area where denning habitat was not a limiting factor, Ciarniello et al. (2005)² reported the mean distance between dens used in subsequent years was 2.4 km apart (ranging from 0 to 9 km). This is similar to the baseline data

¹ Miller, S.J., N. Barichello, and D. Tait. 1982. The Grizzly Bears of the MacKenzie Mountains, Northwest Territories. Completion Report No. 3. N.W.T. Wildlife Service. 188pp.

² Ciarniello, L.M., M.S. Boyce, D.C. Heard, and D.R. Seip. 2005. Denning behaviour and den site selection of grizzly bears along the Parsnip River, British Columbia, Canada. *Ursus* 16(1):47-58.

collected for the project area from 2005 – 2008 (summarized in the project proposal and in Figure 1, attached).

Based on previously estimated minimum home range sizes of female grizzly bears (Miller et al. 1982), EBA estimated at least four female and one male bear territories could be present within the entire regional study area (or intersected by the 1 km buffer surrounding the proposed mine and roads). When mapped, EBA's baseline grizzly bear observations from 2005 – 2008 seem to correspond to the presence of four to five potential home territories, one in particular near the proposed mine infrastructure area. Using this female territory size near the proposed mine site as an example, observed den sites were approximately 2 km apart.

Grizzly bears are flexible when choosing den sites and will construct dens in multiple habitat types with various micro-habitat characteristics (i.e. slope, aspect, and soil types) depending on many factors including tradition of individual bears and den site security (Schwartz et al. 2003) (including human activity, but females with cubs will also choose den sites furthest distance from an adult male). Grizzly bears select den sites within a variety of plant associations leading Stevens and Gibeau (2005³) to conclude that slope and micro-terrain are greater indicators of den site selection. According to Schwartz et al. (2003), suitable den sites are likely not limiting in most grizzly bear populations across North America, although local exceptions may occur.

Miller et al. (1982) described 22 winter dens within a 3,000 km² study area in the Mackenzie Mountains. These 22 dens were located on 31 to 38 degree slopes ranging from 1,402 m to 1,829 m (mean elevation was 1,619 m), and greater than 75% of the dens observed by Miller *et al.* (1982) were within alpine habitats. Dens observed from the Mactung 2005-2008 baseline data indicate similar results, including the presence of dens in subalpine willow-slope habitat. Denning habitat described by Miller *et al.* (1982) included willow, fescue, bluebells, anemone, death camas, buffalo-berry, white spruce, birch, and bearberry. Similar habitats that best correlate with EBA's baseline study ELC vegetation units include, fescue-willow, fescue-sedge, birch-moss, sedge-bluebell, willow-bluebell, willow-slope, and spruce moss (EBA 2007, 2008⁴). The distribution of those vegetation habitats that may be used for denning as mapped during EBA's baseline studies are present in Figure 2. An analysis of slope and elevation conditions in the regional study area suggests that only 4.8% of area with potentially suitable conditions occur within the disturbance footprint of 1 km (Figure 2).

Based on this historical and recent data from the study area, as well as the professional opinion of EBA's biologists who have surveyed the regional study area from 2005 to 2008, evidence of denning

³ Stevens, S. and M. Gibeau. 2005. Chapter 14 – Denning. In S. Herrero, editor. Biology, demography, ecology and management of grizzly bears in and around Banff National Park and Kananaskis Country: The final report of the Eastern Slopes Grizzly Bear Project. Faculty of Environmental Design, University of Calgary, Alberta, Canada.

⁴ EBA Engineering Consultants Ltd. 2007. Mactung Project, 2006 Environmental Baseline Studies. Vegetation and Ecosystem Land Classification. Prepared for North American Tungsten Corporation Ltd.

EBA Engineering Consultants Ltd. 2008. Mactung Project, 2008 Environmental Baseline Studies. Vegetation and Ecosystem Land Classification for Proposed Access Road and MacMillan Pass Aerodrome Expansion. Prepared for North American Tungsten Corporation Ltd.

activity is observed throughout the regional area, and suitable denning habitat does not appear to be a limiting factor in the study area. As evidence of this, one or more dens have been observed in at least seven distinct locations across the regional study area, only one of which is located within the zone of effect of the proposed access road (i.e. within a 1 km sound- or viewshed of the road; Figure 1).

Although grizzly bear dens tend to be aggregated within a single home range area for a particular bear, these aggregations of den sites are commonly separated by several kilometres. It is clear from baseline studies that grizzly bears have denned adjacent to the proposed project area; however, since denning habitat is not considered limited within the study area, nor are den sites restricted to a small distinct area, it is the opinion of EBA that additional studies or observations of previously used dens simply do not provide added value to the Mactung baseline assessment.

EBA'S RECOMMENDATIONS

Based on the information collected by EBA between 2005 and 2008, plus evidence from existing literature, it is EBA's opinion that denning habitat is not limiting within the local area, and that denning aggregations in the region are not simply small distinct areas. Local grizzly bears commonly construct new dens many kilometres away from existing dens. Consequently, it is EBA's opinion that there is sufficient flexibility in den site availability at the large and small scale that while grizzly bears may be displaced from some available habitat by the project, this potential displacement, if managed properly, is not a factor in the overall health of the regional grizzly bear population. The proposed access road and mine facilities will not affect the one known denning aggregation as a whole. Additionally, since denning chronology is predictable and den site selection is flexible depending on various factors, human effects on grizzly bears may be best mitigated by considering the timing of human activities (Schwartz et al. 2003). As stated, denning habitat is not considered limiting in the local study area; therefore, EBA does not recommend focusing mitigation on existing den sites or denning areas. Rather, mitigations to reduce effects on denning bears should concentrate on limiting effects during the established denning season.

The following mitigation measures are recommended to limit the effect of the Mactung project on denning grizzly bears:

- The majority of construction activities, including those for the access road and mine infrastructure, are expected to occur during the summer construction season. This will help to ensure that grizzly bears within active dens are not affected by project activities, and that bears have the opportunity to find suitable alternative habitat.
- Non-mine related traffic and non-essential traffic will be limited from the access road and mine site in order to reduce the overall sensory effects on wildlife adjacent to the road corridor, including grizzly bears.
- A record of confirmed denning sites along the road corridor and adjacent to the mine site will be kept during construction and operations phases (either from pre-denning



observations or emergence observations). The data can be used by NATC and wildlife managers to adjust the timing operations, if necessary, and plan for future similar projects.

CLOSURE

We hope that the background information and suggested course of action is acceptable to YESAB during this adequacy phase of the project proposal. As requested earlier by YESAB, this letter has been drafted in order to describe changes from the plan submitted earlier (April 29, 2009 letter), in order to request that YESAB re-visit the adequacy issue and consider our suggested course of action. We would be pleased to meet with YESAB and or YG representatives to discuss this letter, and to discuss any concerns that may persist.

Sincerely,
EBA Engineering Consultants Ltd.



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