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### *MEMORANDUM*

To: David Peerla By: email  
Subject: **Victor Diamond Project Comprehensive Study**  
Date: 5 July 2005

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I have conducted a limited review of the Comprehensive Study Report (CSR) for the above project in order to see how the issues we raised in our September 2004 submission were incorporated. The format used below is to identify each issue from our earlier report (small font), followed by a comment as to whether it has been satisfactorily addressed in the CSR.

As a general observation, the CSR fails for one very important reason. The RAs do not provide any independent analysis to state why they reach the conclusions they do. For most issues identified in the CSEA, the RAs simply state that they agree with the proponent's analysis, which uniformly concludes that there will be no significant residual effects. There is no discussion, and no evidence of any independent analysis of the issues. While there may not be a legal requirement to provide justification, there certainly is a transparency and accountability issue with this approach. Interested parties should be able to determine that independent scrutiny of the proponent's environmental assessment has been conducted by regulatory reviewers, and not just a 'rubber stamping' of the proponent's conclusions. In my view, this is sufficient reason to reject the CSR on its face.

To turn now to the specific issues we identified last year:

1. Monitoring of the waters emerging downstream of the muskeg filters will be required, and possible contingency measures should be identified at licensing in case monitoring data reveal that receiving water quality is not at desirable levels.

The issue has been partially addressed. The CSR states that follow-up monitoring programs will require this to be done. However, no details of the program are provided. The CSR indicates that "adaptive management strategies" for each of Granny Creek, Nayshkootayaow, North, and Lawashi rivers have been prepared (have not seen these) and that these specify criteria for determining when the proponent must implement a specified mitigation measure. Such adaptive management plans are coming into increasing use in new mining projects as a way of handling contingency situations that emerge during monitoring programs. Their actual performance in preventing environmental harm is not generally

known, but it is reasonable to assume that they add an element of certainty for coping with an upset condition that arises during operation of a project.

2. DeBeers should lay down a limestone pad prior to placing any kimberlite on the muskeg.

Discussion of this issue is apparently not provided in the CSR. There is no indication that the RAs conducted any independent assessment of the potential for kimberlite to produce environmentally significant drainage. This is a potentially serious issue for closure, and on principle it merits an independent assessment by the RAs of the predictive work done by the proponent. The proponent's own consultant recommended this measure.

3. Monitoring of metals, sulphates and ammonia in the receiving waters will clearly be required.

Although no details are provided, the follow-up programs identified in the CSR should cover this need.

4. It would be prudent to have a contingency plan for dealing with ammonia presented as a requirement of licensing.

No contingency plan has been provided. The proponent and the RAs contend that ammonia will be effectively controlled by discharge of site drainage through the fen system.

5. The Closure Plan is a key document for licensing and should form part of the application documents so that it is reviewable ahead of the provincial authorization to proceed with the project.

A very general description of how mine components will be reclaimed is provided, but no proper Closure Plan is provided. The CSR indicates that this will be left for development when required by the *Ontario Mining Act*.

6. DeBeers should be required to investigate an alternative approach of re-locating processed kimberlite tailings into the pit, so as to bring the bottom of the pit up to a sufficiently high level where only aerobic conditions in a shallow pit lake would prevail.

This alternative has not been properly evaluated. The CSR notes that the option of backfilling the open pit with 'mineral material' was examined by the proponent, but that this would cost an additional \$100 million and, consequently, the proponent has opted not to do it. No analysis is provided to back up this discussion. The RAs do not question the conclusion. It is hard to believe that pumping processed kimberlite back into the pit, for example, would cost anything like this amount.

This issue needs re-examination, since re-establishing an ecologically viable lake, or terrestrial ecosystem if filled completely, would obviously be desirable, and would significantly reduce the volume of 'mineral material' left as a reclaimed surface at closure. A responsible RA would have undertaken an independent assessment of this issue.

7. The assessment of dewatering impacts was confined to the Nayshkootayaow mainstem and did not examine potential effects that could occur over the entire surface-water ecosystem in the tributary systems of the river.

The CSR indicates that a revised groundwater hydrology model was constructed last year, and discusses the drawdown on a regional basis. I have not reviewed the new report, but the brief discussion provided in the CSR indicates that conceptual level assessment of this impact was performed.

8. The potential impacts of draining perched groundwater and drying out the muskeg over a large area around the mine have not been assessed.

The CSR notes that the proponent has provided an expert's assessment that the peatlands are not likely to be susceptible to draw-down drainage effects related to the mine. The CSR also notes that muskeg is apparently exceedingly difficult to drain, even with closely-spaced networks of ditches. If this is the case, it is reasonable to assume that even with a draw-down of the water table in muskeg areas, these are unlikely to dry out.

9. There is a possibility that subsidence of these rocks through depressurization caused by the dewatering could make the aquifer less functional and ultimately reduce its recharge capacity back to the Nayshkootayaow River. The potential for this has not been evaluated by DeBeers.

This may be covered in the revised groundwater hydrology report which I have not seen. The CSR does not appear to discuss the issue.

10. An insufficient number of boreholes were drilled over the area to properly understand the variability of groundwater flows in the rocks. Further, the assumptions used to construct the model for predicting dewatering effects over the greater than 8000 square km area cannot be relied upon due to lack of adequate data and testing deficiencies. The model also assumed radial flow, but there is evidence of linear pathways (fractures, etc.) that could produce a cone of depression with much different shape and dimensions than that currently depicted. The model could 'highly over- or under-estimate impacts'. For these reasons the model should be rerun with the deficiencies corrected.

The proponent apparently updated its groundwater model in September 2004, and concluded that there is little potential for the bioherms to act as drain nodes in a way that could dewater significant portion of the shallow overburden aquifer and associated muskeg, or have an adverse effect on local creeks. This report was not

made available to us, so we cannot comment on its findings, or whether the issues we raised have been adequately addressed.

11. The proposed flow supplementation using Attawapiskat River water is too generally described to be properly evaluated.

No further details are provided on this proposed system.

12. The basis for the 15% reduction in flows as a trigger for flow supplementation is not provided.

See item #20 below.

13. Potential impacts from water quality changes due to the flow supplementation have not been assessed.

The CSR notes that during low flow of the Naysh river, when flow supplementation is being implemented, the major salinity ions of chloride, sodium and sulphate would be diminished, with resulting water quality more similar to the Attawapiskat River. If this is the case, it would be reasonable to assume that adverse effects to water quality in the Naysh river would not occur.

14. The contingency mitigation plan proposes a hatchery for whitefish, but does not address impacts to other fish species or the aquatic ecosystem generally.

The CSR notes that the primary species affected by the drawdown is whitefish, and that other species such as brook trout, walleye, pike, sturgeon and sucker have life history requirements that would not meaningfully be influenced by the operation, or else are well distributed in the water courses above the drawdown zone of influence. The CSR contends that drawdown impacts to fish will be mitigated by the flow supplementation scheme. If this is true, then impacts to other species should be minimal, if not non-existent.

15. Water quality, sediment, and benthic invertebrate data collected to date are all insufficient to properly describe the baseline conditions at the site. In particular, water quality for critical periods of low flow (when mining impacts will be greatest) are not adequately characterized. Further baseline collection and analysis will be required to fully characterize baseline conditions in the watershed.

The CSR notes that additional baseline surveys will be conducted before mining begins. No additional information is provided on what the surveys are intended to achieve or how they will be conducted. Furthermore, it is not clear that the surveys will be completed prior to site disturbance. Without these details, the issue has not been satisfactorily addressed.

16. Data are also inadequate for determining the distribution, abundance, migration patterns, or seasonal habitat use by fish species.

The follow-up programs in the CSR identify that 'fish habitat assessments, including spawning surveys and benthos investigations' are to be carried out for each of the potentially affected waterways. However, there is no specification for when this is to be done, or that it should be done to complement the deficient aquatic baseline database.

17. Baseline levels of metals in fish tissues are also not properly defined.

The CSR notes that follow-up monitoring is to be conducted for COPCs such as mercury in fish, and that further studies need to be conducted to determine if lead, cadmium, and dioxins/furans also need to be monitored. The CSR does not note that the baseline information needs to be upgraded prior to site disturbance.

18. TEK could have been more properly used as a scoping approach for the design of fish surveys.

The CSR notes that TEK and heritage resource studies were used to identify the presence of a 'substantial' fall whitefish spawning run on the Nayshkootayaow River. Field work in 2004 indicated that this was not the case as there was no evidence of spawning whitefish in either the spring or fall surveys. Sampling by the proponent has not resulted in any whitefish captures in the river during spring or summer, and only low numbers of non-spawners in the fall. The proponent has committed to installing a counting weir on the Naysh river in 2005. Low numbers of brook trout spawn in the river, but the predicted flow reductions do not constitute a significant portion of the natural flows during the fall according to the proponent, and no foreseeable impacts to fish migration or movements are likely.

19. The risk assessment for human consumption of fish did not provide for the generally higher levels of consumption by aboriginal users so that levels of mercury, for example, may be approaching or exceeding levels of concern.

Issue apparently not addressed in CSR.

20. It is not clear why flow alterations of greater than 15% in the Lawashi River were not considered significant. This value may not be sufficiently conservative to identify problematic environmental changes to aquatic organisms.

In the CSR the proponent states that there are two reasons for adopting the 15% value. First, this is the practical limit for flow measurement accuracy for natural systems, at least without constructing a weir to take more accurate measurements. Second, the proponent determined that any reduction of flows below this value would have only a limited effect on fish habitat. MOE regulations for mine

effluent discharge specify a flow accuracy requirement of  $\pm 15\%$ . This explanation is reasonable.

21. Estimates of ammonia concentration (blasting residue) and suspended solids in the Nayshkootayaow River could be underestimated. Chloride concentrations in groundwater could also be underestimated, and insufficient use of existing toxicology data for chloride was made.

Issue not addressed in CSR. The RAs apparently did not conduct an independent assessment of the ammonia issue. No further comment is provided about the adequacy of use of toxicological database for chloride. The proponent and the RAs contend that the proposed fen treatment system for mine drainage will be effective, and that an adaptive management strategy will be in place to handle any unexpected water quality concerns.

22. The extent to which differences in water quality might affect aquatic organisms, including the survival of fish eggs and fry, when using Attawapiskat River water to supplement low flows in the Nayshkootayaow River has not been properly addressed.

The CSR is silent on this issue.

23. The proposed compensatory measures of constructing a whitefish culture facility and using abandoned quarries to recreate fish habitat are undemonstrated and have significant uncertainty attached to their success.

This proposal has since been rejected by DFO, and mitigation plans relying on flow supplementation and adaptive management strategies will be adopted instead.

24. Restoring flows in the Nayshkootayaow River to maintain only 85% of the flows is bizarre—affected flows should be restored to normal.

Issue not directly addressed in the CSR, but it presumably relies on the ability to measure to within only 15% accuracy, as described in item #20 above.

25. No mitigation has been proposed for impacts to the Lawashi River.

The CSR notes that flows within this river system are expected to remain within the 15% criterion and that, therefore, no mitigation is necessary.

26. We recommended that lost flows in Nayshkootayaow River be supplemented to 100% of natural levels, not 85%. Upgrade the assessment of potential impacts from flow alterations in the river.

This is likely accommodated by the proponent's explanation of adopting the 15% change in natural flows as a response criterion (see item #20). The updated

hydrogeological study likely resulted in a more refined assessment of impacts from flow alteration.

27. We recommended that the proponent ensure that suitable substrate material for benthic invertebrates is available for reclamation of the quarries.

This issue is not addressed in the CSR.

28. We recommended that a contingency plan be developed for dealing with higher than expected stream flows in the South Granny Creek diversion.

The CSR concludes that any changes in average annual flows in this system will be less than 15% and, therefore, not significant. No contingency plan for higher than expected flows has been proposed.

29. We recommended that a contingency plan be developed for managing groundwater quality if the effluent is acutely toxic to fish or invertebrates. Further toxicity testing should be conducted to inform the plan.

The CSR agrees with the proponent that mine site effluent will not be harmful to fish or invertebrates. The CSR also notes that the proponent has committed to 'make reasonable and best efforts to follow federal Environmental Effects (EEM) protocols for aquatic system monitoring during operations.' This implies that toxicity testing will occur during operations, but says nothing about a contingency plan.

30. We recommended that more work needs to be carried out to better describe how water quality within the Attawapiskat basin changes over distance and seasonally. Additional water quality sampling may be required.

The RAs agree with the proponent that the predicted water quality changes are reasonably accurate and that such changes will not be significant. Follow-up monitoring programs coupled with adaptive management strategies for each main watercourse should be able to detect changes and, possibly, provide effective mitigation for upset conditions.

31. We recommended that additional sampling be conducted to upgrade and fully describe baseline conditions for:

- whole-sediment chemistry;
- intragravel fish habitats, including spawning and incubation areas, in Nayshkootayaow River;
- benthic invertebrate community; and,
- fish community.

The CSR does not provide any analysis of the adequacy of existing baseline data, and so proposes no additional sampling to complement any data deficiencies.

As a closing comment, it is worth noting that there are several aspects of this project which make it experimental. Experience with mining kimberlite pipes in northern ecosystems is not rich, and proponents are implementing activities which may sound reasonable from an engineering perspective but which in reality have significant uncertainty associated with them. Placement of kimberlite on the surface and long-term geochemical behaviour is unknown, as is successful closure of these rock wastes. The scale of water table drawdown proposed for this project is likely unprecedented, and given the uncertainties associated with subsurface geology and structure, the impacts cannot be accurately predicted.

The project will require well developed and robustly designed monitoring programs, as well as demonstrably workable adaptive management plans. These have not been provided at this stage, but it is imperative they be available for review during the regulatory permitting stage which follows.

A handwritten signature in black ink, appearing to read "T. D. Hanson". The signature is stylized with a large, looping initial "T" and a long horizontal stroke at the end.