DE BEERS
GROUP OF COMPANIES

28 November 2014

Robert Calhoun
Mineral Exploration and Development Consultant
Ontario Ministry of Northern Development and Mines
Ontario Government Complex
PO Bag 3060
South Porcupine, Ontario P0N 1H0

Re: **Responses to Wildlands League Comments on Closure Plan Amendment #3 for the Victor Mine EBR Reference #012-2628**

Dear Mr. Calhoun,

With respect to the subject application to file the Closure Plan Amendment #3 for the Victor Mine, we are pleased to provide the attached responses to various comments from Wildlands League (November 3, 2014).

We trust that these responses and supplemental information will suffice to address the points raised. If you require anything further on this matter, please contact the undersigned at 416-645-3888 ext 5125 or by email at Stephen.monninger@debeersgroup.com.

Thank you,

Stephen Monninger,
Environmental Manager

cc: Juan Gimon, Brian Steinback, Terry Ternes - DBC

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Stakeholder: **Wildlands League**
Trevor Hesselink, Director, Policy and Research
Comments dated: **November 3, 2014**
Comments regarding: **Review Closure Plan Amendment #3, Victor Mine**
Response dated: **November 28, 2014**

#	COMMENT	DE BEERS RESPONSE
1	*Process: transparency of documentation* *We recommend that the Ministry use this case as an opportunity to proactively consider what "reasonable access" might mean in a contemporary setting, where significant geography and inconvenience to stakeholders, ministry staff, proponents and their consultants can all be easily overcome by establishing standard e-document sharing protocols.*	Question is respectfully directed to MNDM to respond.
2	*Connection to 2013 Mercury Performance Report findings Missing* *That the amendment be re-drafted to substantially remedy this identified gap, where minerock contributions to sulphate loadings and mercury methylation over time, including (a) mitigation alternatives, (b) likelihood of success and (c) further contingencies are comprehensively assessed in the context of significant additional stockpiling in this setting.*	• At this time, De Beers is evaluating and developing alternatives that could be used to better prevent sulphates from contacting adjacent muskeg environments, and is in the process of evaluating the merits of these alternatives, with the intent of developing an overall strategy for sulphate management during both operations and at closure. • Details are not yet at a sufficient level to be included in a closure plan amendment, and to provide them at this time would be premature in the context of a closure plan. Any relevant results will be provided in the next amendment. It is planned that prior to the next closure plan amendment, a Sulphate Management Plan will be developed and formalized then distributed to the communities and the MOE for review. • The revised mine rock stockpile is predominantly a relocation of material previously expected to be used for FPK dike.
3	*Values and figures generally demonstrate a lack of currency/refinement* *We would expect a more comprehensive updating of all operational realities and gained information through any amendment opportunity. We recommend a general redrafting of this amendment to accurately reflect all currently understood values and operational decisions, such that the document is maintained in as updated a state as possible over time. Any persistent gaps / large ranges of assumptions should be flagged for priority refinement, including such commitment and outline of how this would occur.*	• De Beers and AMEC have noted some typographic errors, but none at a level that would have a material effect on closure costs. • Where typographic errors result in corrected text, a replacement page is provided (see Comment #10).

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4	Expansion implications a reasonable consideration to legacy planning *We recommend that a discussion of expansion potential and implications be included in this Plan. Such discussion should characterize, to the extent possible, the likelihood and nature of ongoing use of the site as it pertains to any extended life of the processing plant, likely points of intersection between offsite developments and Victor, and then appropriately detail what the implications of such extension might present to the closure activities and timelines of this Plan.*	Discussion of the potential for expansion / development of a satellite kimberlite and implications in the current closure plan amendment document is out of scope for the current closure plan. A separate Closure Plan (and associated financial assurance) is provided for advanced exploration activities in the area, including those at the Tango-Extension kimberlite site. Any future development, when fully defined and where applicable to the Victor Mine closure plan, will be included in future closure plan amendments.
5	Current mercury monitoring inadequate as a basis for ongoing operational, closure, and expansion monitoring. *We recommend that (a) every effort be made to avoid data gaps going forward, (b) analysis acknowledge the importance of data gaps to any conclusions being made, (c) adding additional water sampling stations at strategic frequency along the creeks relative to site storages be considered, and (d) sampling be expanded to include the sampling of Sediment and Benthic compartments which can contribute additional analytical value and data quality*	Please refer to the responses to Wildlands League comments on the Permit To Take Water for Pit Perimeter Well Field Dewatering. Sediment sampling is not a monitoring requirement of the C of A. The recent (post-development) upstream Granny Creek samples include supplemental water from the Attawapiskat River, but still represent the upstream water quality condition (upstream of the mine site) to allow detection of local changes in water quality due to mine operations. Pre-development data is also available for reference. Extensive monitoring data are available. “Data gaps” referenced by the reviewer, such as the occasional filtered mercury value that is higher than its non-filtered component is partly a function of the very low mercury concentrations that are being assessed, often near the detection limits for specialized ultra-trace analysis laboratories, and also a function of the large number of samples being taken. This has been discussed in the mercury monitoring reports.
6	Assessment of legacy effects of all surfaced material *We would recommend a more thorough and critical assessment of potential for legacy issues associated with the large volumes and landscape-changing nature of the various stockpiles being left on the surface of this site.*	At this time, De Beers has only developed a conceptual level strategy and investigation regarding sulphate discharges and its postulated link to methylization of mercury (refer back to Comment 2). Details on sulphate management strategies are not yet sufficiently developed to be included in a closure plan amendment, and to provide them at this time would be premature. Any relevant results / strategies will be provided in the next amendment.

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		Muskeg will be utilized as a component of the reclamation cover, therefore stockpiles will be depleted at closure. Discussions of 20 to 30 m edge effects related to bioherms are not relevant to muskeg stockpiles. Although during the Federal EA process it was considered that there was some potential that muskeg piles might dry out or spontaneously combust, to date the primary muskeg stockpiles are saturated with water and remain frozen year round, except for the surface layer. Therefore they are not subject to this risk.
7	Comprehensive assessment of sulphate-loading to creeks specifically Required *An integrated assessment of all sulphate loadings (and any other parameters of interest) from the site to each of the creeks is necessary, including the role of decant from the current tailings facility (and the planned future additional cell(s)), using current processing facility throughput. Closure scenarios are the obvious adjunct to these scenarios, with the removal of subsurface diversion and the onset of full precipitation effects upon the rehabilitated quarry pond as fish habitat – and all assessed over appropriate time scales. Such assessment would also logically provide for any additional monitoring design necessary.*	The reviewers present an accurate summary of sulphate concentrations in Victor Mine waters derived from various De Beers documents, as well as initial predictions of sulphate concentrations likely to derive from the various mineral stockpiles based on geochemical evaluations provided by SRK Consulting in support of original environmental assessment determination for the Victor Mine in 2003. The underlying assumption in the comment is that sulphate loadings to local creek systems are driving the mercury methylation process. As part of the review, the reviewers discuss and reference several scientific papers that provide data on mercury methylation in aquatic sediments, indicating that mercury methylation in such sediments is stimulated by sulphate addition. AMEC agrees with the results of the various studies referenced by the reviewers that sulphate addition to surface waters will increase mercury methylation rates within the sediments, and that such mechanisms can potentially lead to increased methyl mercury concentrations in the overlying water column; in this case to increased methyl mercury concentrations in Granny Creek. The critical question, however, is the likely contribution of this process to overall methyl mercury loadings to the creek. The question can be approached conceptually from a mass balance perspective. AMEC has maintained that sulphate release to area peatlands has resulted in a very localized increase in wetland methyl mercury production. The northeast fen (NEF) has been singled out as the main loading source increase area for North Granny Creek. The effect of methyl mercury release from the NEF on North Granny Creek, the principally affected creek, can be estimated from a mass balance calculation for the most recent year of available data (2013), taking into account watershed areas and methyl mercury concentrations for both systems,

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		as per Table 1 (attached). The results of this analysis show that concentrations of filtered and unfiltered methyl mercury in downstream North Granny Creek water can be largely accounted for by direct loadings from the NEF, and that any contribution of methyl mercury from North Granny Creek sediments is likely to be minor. The above analysis is consistent with the comparatively low sulphate concentrations measured for North Granny Creek, which in 2013 averaged 4.5 mg/L. This value is higher than the pre-development background Granny Creek sulphate concentration of <1.0 mg/L; but is still quite low, and is in fact lower than the background, pre-development upstream Nayshkootayaow River sulphate concentration which averaged 6.16 mg/L. The Nayshkootayaow River shows very low methyl mercury concentrations averaging 0.07 ng/L for unfiltered samples and 0.03 ng/L for filtered samples, for 2013, suggesting that sulphate concentrations in the order of 5 mg/L are not likely to generate appreciable levels of methyl mercury from riverine sediments (AMEC 2014). The primary concern with methyl mercury production at the Victor Diamond Mine is therefore believed to be sulphate release to the local muskeg environment, and not with sulphate release to area creeks and rivers. De Beers is continuing to review options to improve sulphate management at the Victor Diamond Mine and any applicable results will be incorporated into a future closure plan amendment if appropriate.
8	FPK Facility water balance a key module in the needed drainage assessment *Recognizing that runoff from this facility involves the exposure of slurry transport water, pore water, and gained precipitation to a relatively high sulphate-producing material spread thinly across a very large area of exposure, we recommend that a careful water balance for any decommissioning and/or extended use of the FPK facility is necessary, that can feed directly into the creek loading assessments identified above, including:* *(a) the precipitation addition gained from the construction of the second cell,* *(b) any possibility of continued usage beyond the cessation of Victor underdraining, which currently is apparently responsible for an poorly defined, but likely significant volume of decant diversion,* *(c) the effects and phasing of the planned cell closure-draining of any stored decant to the quarry and NGC receivers, and*	This comment is an extension of Comment 7, and the same response applies. The major portion of increased methyl mercury loading to North Granny Creek derives from the NEF, and not from sulphate induced mercury methylation within the creek sediments. This aspect notwithstanding, De Beers is currently evaluating potential strategies for managing sulphate releases to adjacent muskeg environments and is in the process of evaluating the applicability of these strategies at a conceptual level. Further details on strategy evaluation and implementation will be developed over the next few months, and any applicable results will be incorporated into a future closure plan amendment if appropriate. This will include a consideration of sulphate loadings to area creeks, as applicable.

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	(d) the legacy effects over time of precipitation-driven drainage from these facilities into the central quarry, once it has been transformed into a fish habitat asset, connected with NGC as proposed in this Plan.	
9	Ongoing reliance on Attawapiskat assimilative capacity. *This Closure Plan should provide clear description of how the transition from any temporary mechanical diversion to the Attawapiskat River will occur, and detail risks and contingencies for the site absent such modalities, including any necessary assessments and monitoring. Notably, this includes the removal of subsurface diversions currently provided by pit dewatering and currently influencing the FPK Facility runoff.*	The reviewer raises three main concerns, namely: • Pre-dilution of the well field discharge if it exceeds the MOECC permit threshold for chloride of 1,500 mg/L; • Release of sulphates to the Attawapiskat River that could stimulate methyl mercury production from river sediments; and • Collection and re-distribution of mine rock stockpile runoff directly to the Attawapiskat River, as a contingency, compared with the current condition where runoff and seepage from the mine rock stockpile drains to the Northeast Fen. The first point is an operational consideration, and not one that relates to closure. Nevertheless, all measured chloride levels in the Attawapiskat River near to the well field discharge point have been well below the Canadian Environmental Quality Guideline of 120 mg/L set for the protection of aquatic life. In accordance with MOECC approval conditions, chloride concentrations are measured monthly at transects positioned 100, 500, 1,000, 1,500, 2,000 and 3,000 m downstream of the well field discharge, with sampling stations positioned at 0, 10, 20, 40, 80 and 120 m from shore along each transect. The second concern is similar to the concern raised in Comment 7 where the reviewer believes that sulphates released to watercourses have the potential to generate problematic concentrations of methyl mercury from river sediments; in this case from Attawapiskat River sediments. As per our response to Comment 7, there is no question that increased sulphate levels can result in an increased rate of mercury methylation within sediments; but in the case of the Victor Diamond Mine, this increase is considered to be minor, and not likely measureable. With specific reference to the Attawapiskat River, downstream sulphate concentrations for the Attawapiskat River, upstream of the Nayshkootayaow River inflow, averaged 4.48 mg/L for 2013. This value compares with an upstream Attawapiskat River sulphate concentration of 1.71 mg/L for 2013. There is however, no change in Attawapiskat filtered methyl mercury concentrations

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		between upstream and downstream Attawapiskat River stations (AMEC 2014). Also, as per the response to Comment 7, the background sulphate concentration measured for the Nayshkootayaow River in the pre-development condition, averaged 6.16 mg/L. Despite this naturally higher sulphate concentration in the Nayshkootayaow River, because of stronger groundwater inputs compared with the Attawapiskat River, filtered methyl mercury concentrations in the two rivers are virtually identical (Table 14a; AMEC 2014). There is consequently no reason to believe that the slight increase in sulphate levels experienced in the Attawapiskat River is contributing, or is likely to contribute to, a measurable increase in Attawapiskat River methyl mercury concentrations. With regard to the third point, this contingency is an appropriate consideration (though not part of this Closure Plan amendment) because the concern with sulphates and methyl mercury generation is primarily related to sulphate addition to peatlands, and not to area watercourses, as per the response to Comment 7.
10	Additional detailed-specific comments: 4.3.2 Surface Water Quality. It is not clear when these water quality characterizations provided occurred, or if they include current data. • Table 4-1: Which North Granny Creek station is being used? What vintage is this data? This important information is not present on this table. • Table 4-3: Why are notations for mercury (and other parameters) at the top of a range being indicated with a "<" when the bottom of the range is not? This would not logically appear to be a detection range indication. • Pg 61 – indicates a maximum pit depth of 280m. We have not encountered this figure elsewhere in the documentation to date. Is this an error, or a previous plan, or is this being maintained as some kind of operational contingency? • Pg 82 – it is indicated here that Cell#2 of the FPK Facility will be constructed of coarse PK, as mine waste rock is limited. This seems to contradict the very purpose of this amendment – to find homes for additional mine waste rock… Further explanation would be useful, particularly given the further statement of a 2009 design decision also factoring in (without further information) on Pg 85. • Pg. 83 – mention of a third cell of the FPK facility, as well as a South drainage ditch to SGC. Perhaps these artifacts of earlier plans? Or are these operational elements still being proposed? As presented in this document, we find such references confusing. • Pg 83 – Figure 5-15 referenced here does not seem to contain the described detail?	Section 4.3.2: This refers to baseline data. A replacement page with adjusted text is attached. Table 4-1: A date will be added and a replacement page is attached. For station locations please see Figure 4-7. Table 4-3: Different labs have different method detection limits at times. More than one lab was used to analyze the data. In some cases, concentrations were present at low levels, which were lower than the method detection limits for other labs. Page 61: This is a typographical error. The pit depth should be stated as "approximately 254 m". Page 82: The reference to limited mine rock is an inadvertent error. It has been removed and a replacement page is attached. Page 83: A replacement page is attached. A third cell PK cell is not proposed.

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	• Pg 137 – 6.2 Progressive rehabilitation schedule – notes closure of cell #1 of the FPK facility, but does not list Cell #2 in the schedule?	Page 83: Please refer to Figure 5-1 for additional detail. Page 137: In Section 6.2, Cell #2 is not listed as it will not undergo progressive rehabilitation. Cell #2 will be used until the end of mine life. Reclamation of Cell #2 is a post-closure activity.

Table 1: Methyl Mercury Mass Balance Determinations for North Granny Creek

Watershed / Condition	Watershed Area (km^2)	2013 Methyl Mercury Concentration (ng/L)	
		Unfiltered	Filtered
N. Granny Cr. US (measured)		0.07	0.04
N. Granny Cr. DS (measured)		0.22	0.12
North East Fen (measured)		2.10	1.11
Watershed NGC	43		
Watershed NEF	2		
Predicted Methyl Mercury in DS Granny Cr. from mass balance		0.16	0.09

References:

AMEC Environment and Infrastructure. June 2014. De Beers Canada Inc. Victor Mine. Mercury Performance Monitoring 2013 Annual Report as per Conditions 7(5) and 8(6) of Certificate of Approval 33960-7Q4K2G. Submitted to the Ministry of the Environment.

Kimberlites: Kimberlite pipes intrude upward through the bedrock formations. The Victor kimberlite was emplaced at the intersection of northeast and north/south-trending fracture zones in the basement rocks and adjacent to a large northwest-trending dyke. The Victor Project is focused on two adjacent, diamond-bearing kimberlite pipes known as Victor Main and Victor Southwest. The geology and mineralogy of the Victor site, as it relates to the kimberlite deposit, is discussed in Section 5.2.

Geochemical analysis of the Victor kimberlites and sedimentary host rock (limestone/dolostone/mudstone) formations shows that the neutralizing (acid consuming) potential of both the kimberlite and host rock formations is very high, and that the acid generating potential is very low, such that there is effectively no potential for the development of acid mine drainage at the Victor site. Associated heavy metal levels are also generally low in both the kimberlite and the surrounding sedimentary country rock.

4.3 Surface Water

4.3.1 Regional Surface Water Hydrology

Surface water systems consist of saturated muskeg and muskeg ponds, which drain through creeks and rivers to the Attawapiskat River. The Victor site area is drained by two small creeks, North Granny Creek and South Granny Creek, which converge east of the Victor site and flow into the Nayshkootayaow River. The Nayshkootayaow River drains to the Attawapiskat River (Figure 4-7).

The Granny Creek system is quite small, with a combined watershed area of approximately 90 km^2, split more or less equally between the north and south branches. The Nayshkootayaow River has a watershed area of about 1,840 km^2 opposite the Victor site (a total watershed area of 2,180 km^2), and the much larger Attawapiskat River has a watershed area of approximately 49,000 km^2 opposite the Victor site (Figure 4-4). The Attawapiskat River has a high assimilative capacity compared to other area watersheds because of its large size. Annual runoff yields for the region are in the order of 260 to 300 mm for local systems, and 300 mm for the Attawapiskat River system. There is a pronounced seasonal flow regime, with the highest flows occurring during the spring melt, and lowest flows during the mid to late winter, with a less pronounced low flow period in the late summer.

4.3.2 Surface Water Quality

Creeks and rivers of the Victor site area represent background conditions and generally good water quality with no industrial influence (baseline data, 1999 - 2003). Granny Creek water quality (mean and 75th percentile values) generally meets Provincial Water Quality Objectives (PWQO) for drinking water and for the protection of aquatic life, for all parameters except for pH, total phosphorous, iron, and manganese (Table 4-1). Deviations from PWQO values are relatively minor and are due entirely

TABLE 4-1
GRANNY CREEK SURFACE WATER QUALITY

Parameters	Units	MDL	PWQO Criteria	ODWS Criteria	NORTH GRANNY CREEK (41 samples)			SOUTH GRANNY CREEK UPSTREAM (43 samples)			SOUTH GRANNY CREEK DOWNSTREAM (42 samples)			CONFLUENCE (41 samples)		
					Observed Range	Mean	75th Percentile	Observed Range	Mean	75th Percentile	Observed Range	Mean	75th Percentile	Observed Range	Mean	75th Percentile
pH			6.5-8.5	6.5-8.5	**6.00** - 6.96	**6.420**	6.59	**4.81** - 6.77	**6.265**	6.52	**5.18** - 6.89	**6.319**	**6.46**	**6.38** - 7.70	6.956	7.28
Conductivity	(µs/cm)	1			1 - 229	77.7	94	17 - 182	62.1	69	18 - 184	63.5	77	27 - 870	136.8	114
Total Alkalinity (CaCO3)	(mg/L)	1		30-500 (OG)	9 - 106	35.5	46	2 - 94	28.1	37	5 - 93	27.5	38	12 - 236	53.6	65
Hardness (CaCO3)	(mg/L)	0.3		80-100 (OG)	3 - 93	32.2	38.1	3 - 82	27.5	37	3 - 82	27.4	38	11 - 257	56.6	65.2
Total Suspended Solids	(mg/L)	1			1 - 40	7.1	9	1 - 53	<5.9	6	1 - 23	<4.8	6	1 - 444	28.4	21
Total Dissolved Solids	(mg/L)	10		500 (AO)	11 - 210	93.2	135	19 - 183	80.9	105	19 - 167	77.8	92	20 - 540	121.4	127
Chloride	(mg/L)	0.1		250 (AO)	0.8 - 13.2	4.52	6.5	0.5 - 12.4	3.44	3.9	0.6 - 28.2	4.34	3.8	1.0 - 129.0	11.24	4.3
Nitrate as N	(mg/L)	0.1		10 $^{+}$	<0.01 - <0.1	<0.10	<0.1	<0.1 - <0.1	<0.10	<0.1	<0.10 - 0.7	<0.11	<0.10	<0.01 - 0.4	<0.10	<0.1
Nitrite as N	(mg/L)	0.1		1	<0.01 - <0.1	<0.10	<0.1	<0.1 - <0.1	<0.10	<0.1	<0.10 - 0.6	<0.11	<0.10	<0.01 - 0.5	<0.11	<0.1
Sulphate	(mg/L)	0.1		500 (AO)$^{++}$	<0.01 - 1.6	<0.20	0.2	<0.01 - 1.5	<0.16	0.1	<0.10 - 11.4	<0.56	0.1	<0.01 - 25.9	<2.75	0.2
Total Phosphorus	(mg/L)	0.01	0.03		<0.01 - 0.51	<0.047	0.04	<0.01 - 0.07	<0.026	0.04	<0.01 - 0.14	<0.033	0.04	<0.01 - 0.11	<0.035	0.05
Ammonia as N	(mg/L)	0.025			<0.010 - 1.490	<0.2701	0.285	<0.010 - 0.891	<0.1312	0.098	<0.010 - 0.840	<0.1337	0.175	<0.010 - 0.560	<0.0850	0.089
Aluminum	(mg/L)	0.005	0.075'	0.10 (OG)	<0.005 - **0.11**	<0.0530	0.067	<0.005 - **0.17**	<0.0384	0.048	<0.005 - **0.09**	<0.0367	0.049	<0.005 - **0.17**	<0.0702	**0.095**
Antimony	(mg/L)	0.001	0.02		<0.001 - <0.007	<0.0011	<0.001	<0.001 - 0.001	<0.0010	<0.001	<0.001 - 0.002	<0.0010	<0.001	<0.001 - <0.001	<0.0010	<0.001
Arsenic	(mg/L)	0.001	0.1	0.025^{I}	<0.001 - <0.002	<0.0011	<0.001	<0.001 - <0.001	<0.0010	<0.001	<0.001 - <0.002	<0.0010	<0.001	<0.001 - <0.01	<0.0012	<0.001
Cadmium	(mg/L)	0.0001	0.0002	0.005	<0.0001 - **0.0003**	<0.00011	<0.0001	<0.0001 - **0.0003**	<0.00010	<0.0001	<0.0001 - <0.0002	<0.00010	<0.0001	<0.0001 - 0.0009	<0.00013	<0.0001
Calcium	(mg/L)	0.05			<0.05 - 30	10.111	13.30	<0.05 - 23	8.243	10.13	<0.05 - 23	8.173	11.90	1.3 - 73	18.230	21.10
Chromium	(mg/L)	0.001	0.0089	0.05	<0.001 - 0.050	<0.0028	<0.001	<0.001 - 0.002	<0.0010	<0.001	<0.001 - 0.002	<0.0010	<0.001	<0.001 - 0.004	<0.0011	<0.001
Cobalt	(mg/L)	0.0005	0.0009		<0.0003 - <0.005	<0.00084	<0.0005	<0.0005 - <0.005	<0.00063	<0.0005	<0.0005 - <0.005	<0.00062	<0.0005	<0.0005 - <0.005	<0.00063	<0.0005
Copper	(mg/L)	0.001	0.005	1.0 (AO)	<0.001 - 0.004	<0.0013	<0.001	<0.001 - 0.004	<0.0011	<0.001	<0.001 - 0.002	<0.0010	<0.001	<0.001 - **0.007**	<0.0012	<0.001
Iron	(mg/L)	0.01	0.3	0.30 (AO)	<0.01 - **6.57**	**1.444**	**1.62**	<0.01 - **5.15**	**<1.077**	**1.55**	<0.01 - **5.13**	**<1.029**	**1.50**	0.01 - **2.10**	**<0.878**	**1.11**
Lead	(mg/L)	0.001	0.010	0.01	<0.001 - 0.003	<0.0011	<0.001	<0.001 - 0.003	<0.0011	<0.001	<0.001 - 0.003	<0.0010	<0.001	<0.001 - 0.003	<0.0011	<0.001
Magnesium	(mg/L)	0.05			0.36 - 5.96	1.701	2.44	0.29 - 6.08	1.734	2.66	0.37 - 5.96	1.743	2.48	0.63 - 18.30	3.272	3.21
Manganese	(mg/L)	0.005			<0.005 - 2.260	<0.2647	0.345	<0.005 - 0.50	<0.0850	0.090	<0.005 - 0.50	<0.0737	0.083	<0.005 - 0.125	<0.0276	0.033
Mercury	(mg/L)	0.0001	0.0002	0.001	<0.0001 - **0.0004**	<0.00012	<0.0001	<0.0001 - **0.0004**	<0.00012	<0.0001	<0.0001 - **0.0004**	<0.00012	<0.0001	<0.0001 - 0.0010	<0.00014	<0.0001
Molybdenum	(mg/L)	0.005	0.04^{I}		<0.005 - <0.005	<0.0050	<0.005	<0.005 - <0.005	<0.0050	<0.005	<0.005 - <0.005	<0.0050	<0.005	<0.005 - <0.005	<0.0050	<0.005
Nickel	(mg/L)	0.005	0.025		<0.001 - <0.01	<0.0049	<0.005	<0.001 - <0.01	<0.0049	<0.005	<0.005 - <0.01	<0.0050	<0.005	<0.001 - <0.01	<0.0050	<0.005
Potassium	(mg/L)	0.050			<0.05 - 2.06	<0.337	0.37	<0.05 - 2.38	<0.548	0.64	<0.05 - 2.37	<0.551	0.71	<0.01 - 7.08	<0.748	0.54
Sodium	(mg/L)	0.05		200 (AO)$^{+++}$	2.03 - 14.50	5.441	6.65	0.89 - 13.30	3.689	4.78	0.97 - 24.00	4.284	4.70	1.40 - 77.90	9.943	5.19
Zinc	(mg/L)	0.005	0.03	5.0 (AO)	0.003 - **0.073**	<0.0087	0.007	0.003 - **0.107**	<0.0093	0.006	<0.005 - **0.104**	<0.0104	0.005	<0.001 - **0.051**	<0.0073	<0.005

NOTE: Anomalous values not included in Observed Range, Mean, and 75th Percentile calculations.
Baseline Data (1999-2003)

PWQO: Provincial Water Quality Objectives
ODWS: Ontario Drinking Water Standards
(OG): Operational Guideline
(AO): Aesthetic Objective
$^{+}$: Where nitrate and nitrite are both present, the total of the two should not exceed 10 mg/L (as nitrogen)
$^{++}$: When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.
^{I}: Interim Maximum Acceptable concentration. All other ODWS are Maximum Acceptable concentrations.
+++: Local Medical Officer of health should be notified when sodium concentration exceeds 20 mg/L, so that physicians caring for patients on sodium restricted diets may be informed.

1 Exceeds PWQO
▨ Exceeds ODWS
1 Exceeds both PWQO and ODWS
0.04^{I}: Interim PWQO

The Victor resource comprises two potentially economic zones, Victor Main and Victor Southwest [*text deleted*] The mine plan is based on the Indicated and Inferred mineral resource of the Victor Main and Victor Southwest kimberlite bodies. Analyses and whittle modelling were completed to determine the optimum pit plan and design. A mine life of 13 years was selected (Project life of 16 years excluding closure) in the interests of sustainability, although analyses indicated that a shorter mine life provided the best economic return. The mine life will span from the last quarter in 2008 to 2021 and utilize a production rate of *approximately* 2.7 Mt/a. The maximum projected depth of the pit is *approximately 254* m below ground surface.

5.2.2 Geochemistry Programs

Three analytical programs were completed to define the geochemical characteristics of the rock that may be extracted either as ore, low grade ore, or mine rock at the Victor site. Initial testing of materials from the Victor site was completed in 1999 by Lakefield Research Limited (Lakefield). This was followed by a second phase of testing in 2001/2002 by Canadian Environmental and Metallurgical Inc. (CEMI) and Lakefield under the direction of SRK Consulting (SRK). A third phase of testing was completed in 2002/2003 at Lakefield also under the direction of SRK. The results and interpretation of the geochemical work undertaken for the Project is documented by SRK (2003a) and included as Appendix C. The list below summarizes the activities completed during each phase:

- Phase 1: Acid base accounting, whole rock analyses, US EPA 1312 extraction tests, process water analyses, mineralogical examinations and saturated column tests were completed on nine, kimberlite, PK (coarse and fine) and limestone samples (PK from the Grand Prairie pilot test plant);

- Phase 2: Acid base accounting, whole rock analyses, de-ionized water leach extraction tests and mineralogical examinations on mine rock (Attawapiskat and Ekwan River/ Severn River formations), kimberlite and PK residue (coarse PK, fine PK, recovery plant rejects) from the sample treatment plant at the Victor site; and,

- Phase 3: Acid base accounting, whole rock analyses, leach extraction tests, reductive extractive tests, mineralogical examinations on kimberlite samples, and kinetic tests on two kimberlite samples and one coarse PK sample from the Victor NW zone. Note: the analytical results associated with the coarse PK sample are not considered representative of the coarse PK to be produced during operations.

Acid Base Accounting

The most important considerations relating to ore and mine rock geology, from an environmental perspective, is whether these materials will generate acid in the presence of oxygen and water (termed acid generating potential). The potential to generate acid is *fine PK beach. Cell two will be constructed primarily from coarse PK.*

Stage 1 will require an estimated 1,036,606 m^3 of coarse PK. The initial lift will be placed directly over native muskeg to a maximum thickness of 1.5 m above the original ground surface. The initial lift will be proof rolled to ensure that it provides a stable base for the dykes. Subsequent lifts up to 0.5 m thick will be placed until the Stage 1 crest elevation of 91.0 m is reached. Winter construction of the coarse PK lifts may occur as long as the coarse PK is levelled and compacted prior to freezing.

Upon completion, the Cell 2 dykes are expected to reach 94.0 m, although the northern half of the west dyke will extend up to 97.5 m to accommodate the fine PK deposition plan. The minimum crest width for all dykes will be 15 m.

During the first year of deposition in Cell 2, the fine PK will be deposited from a single discharge pint from the South Dyke of Cell 1. The fine Pk will form a fan shaped deposition cone with the top of the beach reaching an elevation of 94.5 m. After approximately 1 year of depositing from a single discharge point, deposition will begin to occur from different discharge points along the west side of Cell 2 with the goal of raising the fine PK beach in the west end to promote drainage to the northeast corner of the cell, where the decant pipe and emergency spillway are located.

Dyke Classification

The hazard potential classification of dams outlined in the Ontario Dam Safety Guidelines (ODSG Guidelines, September 1999, Draft) is based on incremental consequences of a hypothetical dam failure, which are assessed from considerations of loss of life, economic and social losses, and environmental losses.

The following observations are made regarding the potential impacts of a PKC dam failure:

- In consideration of the relatively remote location of the Victor Project and absence of any communities downstream of the PKC facility, the potential for incremental loss of life due to dam failure is considered to be nil. Similarly, the potential for third-party economic losses is considered to be nil. The hazard potential classification from loss of life and economic loss perspective is thus assessed as “Very Low."

- The topography of the Victor project site, size of the PKC facility, characteristics of the PK materials, and the presence of a thick muskeg deposit in the area surrounding the PKC facility all suggest that most of the solids released during a potential dam breach will be entrapped in the muskeg, and that the water released towards the nearest waterways (North or South Granny Creeks) will not have a detrimental effect on biological life or habitat. This is due to the fact that the PK deposit and/or process water will not result in any significant contamination of the site waters. The potential environmental losses to the wetlands and creeks will be minimal in the short-term and nil in the long-term. The hazard potential classification with respect to potential environmental losses is thus assessed as "Very Low."

The overall hazard potential classification of the PKC dams is therefore "Very Low." Based on this classification, the following design criteria are considered appropriate (consistent with the ODSG recommendations):

1. The Inflow Design Flood (IDF) for the PKC facility during the production phase is a 100-year flood. Shortly after mine closure, the PKC confinement structures will effectively cease to function as dams requiring flood routing considerations. However, from the perspective of the risk to the mine operation (rather than the dam classification), this level of protection is not considered sufficient, and the 1:1000 year flood has been selected as the design criterion.
2. The ODSG do not define a Maximum Design Earthquake (MDE) for Very Low or Low category dams. A MDE corresponding to a 1 in 100 year earthquake event is considered appropriate for the PKC dams during the production phase. A 1 in 1000 year (5% probability of exceedance in 50 years) seismic event was actually used to check the potential for dam deformation under earthquake load.

Fine PK Slurry Pipelines: PK slurry pipelines are required to transport the fine PK slurry from the thickener underflow (about 50% solids content by weight) in the process plant to the PKC basin. The effluent from the sewage treatment plant (during operation only) will be combined with the fine PK slurry and will be discharged using the same pipeline to the PKC facility (Section 5.5.8). The length of pipeline from the process plant to the central quarry will be about 1.5 km, and to the far west end of Cell 1 of the PKC facility about 3.6 km.

Two PK slurry pipelines with individual pumps will be installed, but only one will be in operation at any given time. The PK slurry pipelines will be 200 mm carbon steel pipe with heat tracing and insulation between the process plant and the individual cells. Within the quarry containment area and along the dam crest the pipeline will be 200 mm high density polyethylene (HDPE) pipe. The pipeline will be located adjacent to the haul road between the process plant and the PKC basin to facilitate inspection and maintenance.

Ditching: Diversion ditches will be constructed to the north of Cell 1 to direct the runoff to the North Granny Creek (north diversion ditch) and west of Cell 2 (south diversion ditch) to direct the runoff to South Granny Creek, and reduce the amount of surface runoff from the perimeter watershed from reporting to the polishing pond during operations (Figure 5-1).