Information Request 4

Responses to Information Request 4

IR 4 – Alternatives to Mine Waste Disposal

References:

EIS Guidelines, Section 2.4.3.1
EIS, Section 2.4
EIS, Table 2.4.3.1-1 (Pre-Screening Criteria)
EIS Appendix 2.4.3.1-A, Table 6.2 (Project Economic Indicators)
EIS Appendix 2.4.3.1-A (Assessment of Alternatives for Mine Waste Disposal)

Related Comments:

CEAR # 290 (Tsilhqot'in National Government)
CEAR # 292 (Environment Canada)

Rationale:

The Proponent argued during the 2009 review that the Mine Development Plan (MDP T2 - Fish Creek South) option was not economically feasible. Therefore the cost information on which the new project plan is based is important. Of the 15 alternatives, two options were identified for more detailed assessment, which are described as MDP T2 (Fish Creek South) and MDP T6 (Tête Angela Creek). All other options were fatally flawed based on pre-screening criterion 4F; *the cost of an alternative exceeds a reasonable threshold by >$500 Million.*

According to Environment Canada, for each of the economic indicators used in the Multiple Accounts Analysis, the Proponent has not provided information on the breakdown of the costs for MDPs T2 and T6. Environment Canada indicated that having a breakdown of costs is important to better understand the basis for the cost estimates, particularly since the estimated costs presented in Table 6.2 vary by many orders of magnitude from those presented in August 2009.

Information Requested:

The Panel requests that Taseko:

a. Provide additional information for those alternatives that were eliminated due to economic 'fatal flaw' in order to support the conclusion that it was appropriate to exclude these alternatives from further analysis. The Panel requests that current financial information be used to substantiate the Proponent's conclusions, including references to relevant sources.

b. Justify why an economic threshold of $500 Million was used compared to the $1 billion figure that was used in the 2009 EIS.

c. Provide additional information on the breakdown of estimated costs of MDPs T2 and T6, to assist the Panel to understand the basis for the cost estimates presented in Table 6.2.

d. Clarify how mitigation costs have been accounted for in the alternatives assessment.

e. Provide a rationale for why estimated fish habitat compensation costs for MDP T6 are assumed to be “equivalent or greater” than estimated fish habitat compensation costs for MDP T2.

f. Provide information to support a conclusion that MDP T6 would be more costly than MDP T2.

g. Provide information to support the conclusion that MDP T6 would require a significantly higher volume of construction material for the tailings dams compared to MDP T2.

Information Request #4 - Clarification of Stated Rationale

The Panel should note corrections to three comments provided by the Panel in the rationale for this IR.

The rationale states, Of the 15 alternatives, two options were identified for more detailed assessment, which are described as MDP T2 (Fish Creek South) and MDP T6 (Tete Angela Creek). **All other options were fatally flawed based on pre-screening alternative 4F; *the cost of an alternative exceeds a reasonable threshold by >$500 Million***." These two statements are incorrect.

Only 7 of the 15 alternatives exceeded the cost threshold. Of these, 3 demonstrated a second fatal flaw and the other 4 demonstrated an additional exclusionary criteria. (Refer to Appendix 2.4.3.1-A, Assessment of Alternatives for Mine Waste Disposal, Table 5.1).

The explanation of the criteria with respect to an economic fatal flaw as stated in Appendix 2.4.3.1-A, Assessment of Alternatives for Mine Waste Disposal, page 21, is, "……an incremental cost of $500M over the cost of the project proposed…….". Table 5.1 of the stated appendix also states that the threshold is ">$500,000,000 above the proposed project cost".

The rationale states, "Environment Canada indicated that having a breakdown of costs is important to better understand the basis of the cost estimates, particularly since **the estimated costs presented in Table 6.2 vary by many orders of magnitude from those presented in August 2009**." This statement is incorrect.

The Panel will note that the units for costs presented in Table 6.2 are millions of dollars while the units for costs presented in August 2009 are thousands of dollars. The difference in costs presented in Table 6.2 vary from those in 2009 by <3%.

Information Request #4a

Provide additional information for those alternatives that were eliminated due to economic 'fatal flaw' in order to support the conclusion that it was appropriate to exclude these alternatives from further analysis. The Panel requests that current financial information be used to substantiate the Proponent's conclusions, including references to relevant sources.

Response Summary

The cost estimation and the basis for estimate for each of the 15 alternative tailings and PAG waste storage alternatives are provided in Table 4A-1. These estimates were used to support the exclusion of some alternatives from further analysis.

These costs have not been updated to 2012 but utilize the costs presented in 2009 because the exclusion is based on differential costs or costs relative to the preferred alternative.

Taseko's operating and construction experience at the Gibraltar mine and a review by Ausenco of several projects over this time range indicate cost escalation has been on the order of 12-20% over the period. The effect has been to increase the differential cost between alternatives.

The basis for the conclusion to eliminate some alternatives on the basis of the differential cost provided in 2009 remains valid.

Table 4A-1 - Tailings and PAG Waste Storage Alternatives Costs[1]

Cost are $1000s

Type	Description	Category	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Capital costs	This includes the Life of Mine (LOM) cost of embankment construction (haul and place material and engineering), truck capital for construction and PAG haulage, seepage control allowance (common for all slurry facilities), and construction cost of drystack/paste facilities and bridges as applicable. LOM tailings and reclaim costs are captured as operating costs.	Haulage	44,576	59,751	180,629	102,429	566,951	184,525	209,340	452,492	288,676	192,342	63,330	52,581	52,581	65,393	81,151
		Haul Trucks	34,112	53,393	84,028	76,877	153,938	87,650	124,799	159,680	131,004	122,953	87,300	21,434	34,907	36,847	73,656
		Material Placement	47,603	28,335	45,336	29,469	133,742	47,603	35,136	78,205	60,070	34,002	14,734	24,935	24,935	18,815	23,348
		Engineering	7,055	6,001	11,401	10,258	16,304	8,863	10,216	15,345	11,740	9,127	10,727	5,729	5,729		
		Seepage	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		
		Taseko River Crossing											30,000				
		Non-slurry Additional Capital														224,100	451,900
		Total	**134,346**	**148,480**	**322,395**	**220,032**	**871,934**	**329,641**	**380,491**	**706,722**	**492,491**	**359,424**	**207,091**	**105,679**	**119,152**	**345,154**	**630,055**
Operational costs	These costs include initial and ongoing tailings and reclaim water line costs, tailings pumping (power) costs, PAG haulage costs, and drystack/paste operating costs as applicable	Reclaim Line	9,763	12,204	26,441	37,221	21,357	10,495	26,848	45,662	33,662	24,408	31,323	12,204	12,204	8,136	8,136
		Tailings Line	29,819	33,473	69,736	60,531	47,699	51,688	64,715	66,946	52,023	54,673	87,030	33,473	33,473		
		Pumping	6,192	10,329	31,424	29,250	17,265	16,816	21,660	38,445	22,472	27,132	13,691	10,329	10,329		
		Non-slurry operating														612,500	525,000
		PAG Haulage	180,401	292,363	373,681	404,592	448,959	393,666	613,816	601,070	575,533	618,612	512,335	88,824	88,824	88,824	404,592
		Total	**226,175**	**348,369**	**501,282**	**531,593**	**535,280**	**472,665**	**727,039**	**752,123**	**683,689**	**724,825**	**644,379**	**144,830**	**144,830**	**709,459**	**937,728**
Closure costs	These costs include topsoil haulage and placement, revegetation, and dry cover placement, (if required), water treatment capital costs (if required), environmental monitoring, and PAG rehandle to pit (if applicable)	Topsoil Haulage and Placement	13,714	13,440	20,506	20,246	22,151	12,363	15,387	18,179	15,272	23,887	11,788	12,086	12,086	45,481	45,928
		Revegetation	2,556	2,119	4,035	3,755	2,494	2,051	2,595	2,599	2,102	2,614	2,206	2,022	2,022	10,175	10,207
		5 Year Environmental Monitoring	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
		Dry Till Cover												8,300			24,018
		Rock cover															76,199
		WTP Capital												2,000			
		PAG Rehandle to Pit													112,553	112,553	
		Total	**16,520**	**15,809**	**24,791**	**24,251**	**24,894**	**14,664**	**18,232**	**21,029**	**17,625**	**26,751**	**14,244**	**24,658**	**126,911**	**168,459**	**156,601**
Post-closure costs	These costs include embankment inspections, environmental monitoring, supernatant pumpback to pit (if required), water quality monitoring and/or water treatment (if required) for a period of 25 years.	Environmental Monitoring	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250	5,000	1,250	1,250	2,000
		Pumpback to Pit		6,250			6,250	6,250						6,250	6,250	6,250	6,250
		Water Treatment operating												16,250			
		Total	**1250**	**7500**	**1250**	**1250**	**7500**	**7500**	**1250**	**1250**	**1250**	**1250**	**1250**	**27500**	**7500**	**7500**	**8250**
Fish habitat compensation and monitoring costs	These costs are reflective of the costs that would be required to compensate for the loss of fish bearing habitat.	Lake Habitat	2,000	966	19,605	8,163	1,442	2,245	136	680	150		17,959	966	966	8,163	8,163
		Stream Habitat	2,000	1,040	672	1,577	132	1,005	2,848	877	2,100	1,370	154	1,040	1,040	1,577	1,577
		Other	1,000	692	2,386	1,646	54	251	801	331	79	317	389	692	692	1,646	1,646
		Total	**5,000**	**2,698**	**22,664**	**11,386**	**1,629**	**3,502**	**3,784**	**1,888**	**2,329**	**1,687**	**18,502**	**2,698**	**2,698**	**11,386**	**11,386**
	Total		**383,291**	**522,855**	**872,382**	**788,512**	**1,441,237**	**827,971**	**1,130,797**	**1,483,013**	**1,197,384**	**1,113,936**	**885,466**	**305,364**	**401,090**	**1,241,959**	**1,744,020**
	Total Differential Cost Relative to Alternative T2		**-139,564**	**0**	**349,526**	**265,657**	**918,382**	**305,116**	**607,941**	**960,157**	**674,529**	**591,081**	**362,611**	**-217,491**	**-121,766**	**719,104**	**1,221,165**

Basis of Estimate:

Haulage costs and haul truck capital are based on detailed cost estimates of three different mine development plans utilizing haulage profiles, calculated cycle times and fuel consumption, using OEM maintenance schedules and consumables, Gibraltar labour rates and consumable costs and operating experience to derive costs/tonne.km and trucks/tonne.km. Derived costs/tonne.km and trucks/tonne.km are then applied to all alternatives based on haulage distances and material quantities for each.
Material placement costs are based on cost estimates for three different embankments to derive cost/m3 placed. Cost/m3 placed is then applied to all alternatives based on embankment volumes for each.
Engineering is based on a percentage of placement, seepage, reclaim and tailings lines, and non-slurry capital
Seepage is an allowance common to all slurry methods
Taseko River crossing is a +/-50% estimate for a bridge capable of handling haul trucks, and tailings and reclaim lines
Non-slurry additional capital is based on recent similar sized paste and dry-stack infrastructure estimates factored appropriately for Prosperity (Knight Piesold)
Reclaim and Tailings costs are based on cost estimates for three different TSF facilities to derive cost/m line. Cost/m is then applied to all alternatives based on line lengths specific to each alternative.
Pumping is based on average LOM annual power consumption calculated for each alternative (Knight Piesold).
Non-slurry operating costs are based on recent similar sized paste and dry-stack estimates factored appropriately for Prosperity (Knight Piesold)
PAG haulage is based on detailed cost estimates of three different mine development plans utilizing haulage profiles, calculated cycle times and fuel consumption, using OEM maintenance schedules and consumables, Gibraltar labour rates and consumable costs and operating experience to derive costs/tonne.km. Derived costs/tonne.km are then applied to all alternatives based on haulage distances and material quantities for each.
Topsoil haulage and placement costs are based on cost estimates for three different embankments to derive cost/Ha for beaches and embankments. Cost/Ha is then applied to all alternatives based on areas of beaches and embankments for each
Revetation costs are based on cost estimates for three different embankments to derive cost/Ha for beaches and embankments. Cost/Ha is then applied to all alternatives based on areas of beaches and embankments for each
5 Year Env monitoring is an equal allowance for each alternative
Dry till and rock cover costs have the same basis as PAG haulage applied to tonnes required to cover the appropriate surfaces.
Water treatment plant (WTP) capital costs are based on an HDS treatment plant to treat 87,000 m3/ year, based on previous estimates for plants of similar scale for other projects developed within the past 5 to 7 years. A cost escalation factor of 50% was used to account for general increases in costs (SRK)
PAG rehandle to pit is based on detailed cost estimates of three different mine development plans utilizing haulage profiles, calculated cycle times and fuel consumption, using OEM maintenance schedules consumables, Gibraltar labour rates and consumable costs and operating experience to derive costs/tonne.km. Derived costs/tonne.km are then applied to all alternatives based on haulage distances and material quantities for each
Environmental monitoring is based on an annual allowance for 25 years after closure for all alternatives except T12 which is 100 years because of the nature of the PAG storage proposed
Pumpback to pit is based on an equal annual allowance for 25 years for applicable alternatives
Water treatment operating costs are based on an HDS treatment plant to treat 87,000 m3/ year, based on previous estimates for plants of similar scale for other projects developed within the past 5 to 7 years. A cost escalation factor of 50% was used to account for general increases in costs (SRK)
Lake, stream, and other compensation costs are derived from assumed base case costs for T1 for areas of open water and wetland, and lengths of wetted and ephemeral streams. Costs are then factored for all other alternatives based on area of open water and wetland, and length of wetted and ephemeral streams.

1 Table and basis of estimate reproduced from Table 1 of Appendix C of the Supplemental Report on the Assessment of Alternatives For Tailings and Waste Rock Storage provided as part of the 2009 EIS submission for Prosperity. Total Differential Cost Relative to AlternativeT2 added for purposes of this submission

Discussion

The cost estimation and the basis for estimate for each of the 15 alternative tailings and PAG waste storage alternatives is documented in Table 1 of Appendix C of the Supplemental Report on the Assessment of Alternatives For Tailings and Waste Rock Storage provided as part of the 2009 EIS submission for Prosperity. This table has been reproduced and attached as Table 4A-1 for the convenience of the Panel.

To provide additional clarity the calculated differential cost relative to the proposed project has been added to the bottom of the table.

The elimination of alternatives due to an economic fatal flaw is based on the differential cost of each alternative relative to the currently proposed alternative, as opposed to the absolute cost, as estimated in 2008. The estimates for purposes of evaluating the 15 alternative tailings and PAG waste storage alternatives have not been updated to 2012 costs. The justification for this is that since 2008 the capital and operating costs of mining projects have increased.

Taseko's Gibraltar mine has experienced increases in capital and operating costs on the order of 15-20% over this period. For example the increases in haulage truck tires, fuel and labour have resulted in hourly truck operating cost increases of approximately 22% over the last 4 years. Taseko has been consistently upgrading and replacing most of the fundamental capital infrastructure at Gibraltar over the last 6 years, including plant site infrastructure and mine production equipment, and has experienced average annual capital cost increases of 3-5% dependant on the expenditure type. This same 12-15% overall escalation over the last 4 years is consistent with a review of several projects costs that fall within a 2007 to 2013 time frame by Ausenco (Van Doorn, Ausenco, pers. Comm., 2013). As a result the differential cost of the alternatives has only increased in 2012 relative to 2008 and the basis for the conclusion to eliminate some alternatives on the basis of the differential cost provided in 2009 remains valid.

Information Request #4b

Justify why an economic threshold of $500 Million was used compared to the $1 billion figure that was used in the 2009 EIS.

Response Summary

In 2009 a total LOM cost of $1 Billion for tailings and PAG waste storage was used as a filter in the analysis, not the differential cost relative to the preferred alternative. In 2009 if the total LOM cost of tailings and PAG waste storage exceeded $1 Billion the alternative was filtered out. In 2012 if the LOM cost of tailings and PAG waste storage for an alternative exceeds that of the proposed 2012 alternative (T2) by $500M, the alternative is filtered out. The cost of tailings and PAG waste storage for the proposed 2012 alternative is about $500 Million.

Discussion

The feasibility of any mining project is sensitive to the effect of cost. With increasing cost comes greater the risk that the project will not proceed, or that the project will not be sustainable.

While higher costs may be warranted to eliminate significant adverse effects there is no reason to investigate alternatives requiring significant additional cost unless there is a reasonable assumption of environmental gains.

Taseko determined that in the absence of the identification of significant potential environmental improvements at the pre-screening stage, an incremental cost of $500M over the cost of the project proposed is a conservative threshold. $500M was selected as a large enough differential cost to compensate for any estimation errors at this level of analysis.

In 2009 a total LOM cost of $1B for tailings and PAG waste storage was used in the analysis, not the differential cost relative to the preferred alternative. The LOM cost of tailings and PAG waste storage for the proposed 2012 alternative (T2) is about $500M. Therefore using a differential cost of $500M as a threshold is equivalent to using a total cost of $1B. This is evidenced by the fact that in the 2009 analysis alternatives T5, T7, T8, T9, T10, T14, and T15 exceeded $1B in total LOM cost of tailings and PAG waste storage. The same 7 alternatives exceed the differential cost threshold used in the 2012 analysis.

For example, in 2009 alternative T7 was eliminated from further consideration because the estimated absolute cost of $1,323,000,000 exceeded the fatal flaw threshold of $1,000,000,000. In 2012 this alternative was eliminated from further consideration because the cost relative to T2 exceeded the fatal flaw threshold of $500,000,000. i.e (Cost of T7 – Cost of T2) = (1,323,000,000 – 522,855,000) = 607,941,000 which is greater than 500,000,000.

Information Request #4c

Provide additional information on the breakdown of estimated costs of MDPs T2 and T6, to assist the Panel to understand the basis for the cost estimates presented in Table 6.2.

Response Summary

The breakdown of estimated life of mine (LOM) costs of MDP T2 and T6 as presented in Table 6.2 of Appendix 2.4.3.1-A of the 2012 New Prosperity EIS are provided here in Table 4C-1.

Table 4C-1. Breakdown of Mine Development Plan Costs

Cost Component	Mine Development Plan	
	MDP T2 Fish Creek South LOM Costs ($1000s)	MDP T6 Tete Angela LOM Costs ($1000s)
Capital Cost		
Haulage Truck Capital	134,880	148,368
Tailings Dam Construction	33,853	58,689
Water Management	6,000	7,700
Tailings Pipework	28,976	61,660
Water Reclaim Pipework	10,972	12,633
Tailings Dam Engineering and Construction Management	6,532	11,339
Seepage Control	1,845	1,054
Haulage Road Construction	3,700	3,700
Mitigation	20,000	20,000
Subtotal Capital	**246,757**	**325,143**
Operating Cost		
Haulage Operating	838,749	914,200
Road Maintenance	30,660	30,660
General and Administration (G&A)	257,960	260,099
Water Management	1,206	2,700
Tailings Pumping	14,329	20,816
Subtotal Operating	**1,142,904**	**1,228,475**
Closure and Reclamation Costs		
Re-sloping	4,800	1,400
Soil haulage and Placement	18,465	16,265
Revegetation	2,800	2,200
Pumping to Pit	3,600	3,600
Environmental Monitoring	2,100	2,100
Subtotal Closure and Reclamation	**31,765**	**25,565**
Fish Compensation Cost		
Capital	8,555	8,555
Operating	12,700	12,700
Subtotal Fish Compensation	**21,255**	**21,255**
Total Cost	**1,442,681**	**1,600,438**

The cost estimates provided for MDPs T2 and T6 are based on those provided in the 2009 submission with revisions with respect to mitigation and fish compensation.

Costs are dominated by haulage, and all other components are relatively equal in terms of their contribution to the total cost for each alternative. Changes in costs since 2009 would then affect both alternatives equally. Costs have escalated since the previous estimate, as evidenced by Taseko's operating and construction experience at the Gibraltar mine and a review of other projects over this timeframe by Ausenco (van Doorn, Ausenco, pers comm., 2013). The effect of that escalation is that the differential cost between the 2 alternatives has increased.

Costs are based on pre-feasibility level costing and actual Taseko operating costs and capital expenditures at the Gibraltar mine and are considered detailed estimates for the purposes of this analysis.

Discussion

The breakdown of estimated costs of MDP T2 and T6 by project year are provided in Table 4C-2 and Table 4C-3. These costs have been allocated to capital, operating, closure and reclamation, and fish compensation categories for the purpose of inclusion in Table 6-2 of Appendix 2.4.3.1-A of the 2012 New Prosperity EIS submission. The allocation is provided by the colour coding shown in the column labeled "Cost Category" in the two tables and the key included below the tables.

The cost estimates provided for MDPs T2 and T6 are based on those provided in the 2009 submission with updates to mitigation and fish compensation. The basis of estimate for the component costs of the two MDPs is detailed in the response to IR4 f.

Taseko notes that world economics have driven changes in capital and operating costs of projects since the estimates were prepared for the 2009 submission but the costs presented here are relative costs for purposes of differentiating between the two alternative MDPs. Costs have escalated since the previous estimate, as evidenced by Taseko's operating and construction experience at the Gibraltar mine and a review of other projects over this timeframe by Ausenco (van Doorn, Ausenco, pers. comm., 2013). The effect of that escalation is that the differential cost between the 2 alternatives has increased.

TABLE 4C-2 - 2012 TETE ANGELA (MDP T6) CAPITAL AND OPERATING COST COMPONENTS FOR ALTERNATIVES ASSESSMENT ($1000's)

Component	Cost Category	LOM Total	Year	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		40
Haulage Total		**1,353,327**		**0**	**42,644**	**70,940**	**69,955**	**71,726**	**99,482**	**80,159**	**86,493**	**77,060**	**109,796**	**95,918**	**97,330**	**95,282**	**73,373**	**57,609**	**55,905**	**52,351**	**58,996**	**20,741**	**17,041**	**14,890**	**5,638**		
Truck Capital		148,368		0	20,232	33,720	20,232	13,488	26,976	3,372	6,744	3,372	16,860	3,372													
Op Cost		914,200		0	8,123	21,897	34,110	42,073	56,319	60,503	63,599	56,947	76,342	75,942	81,084	80,174	59,018	43,628	42,415	38,787	47,126	9,434	6,347	6,155	4,178		
Road Maintenance		30,660		0	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460		
G&A		260,099		0	12,829	13,864	14,153	14,705	14,727	14,824	14,690	15,280	15,134	15,144	14,785	13,648	12,895	12,521	12,030	12,104	10,410	9,847	9,234	7,275			
Reclamation Total		**19,865**		**0**	**19,865**																						
Re-sloping		1,400		0	1,400																						
Soil haulage and Placement		16,265		0	16,265																						
Revegetation		2,200		0	2,200																						
Tailings Dam Construction Method and Timing		**58,689**		**4,462**	**4,462**	**6,181**	**4,239**		**6,652**		**7,237**		**7,019**		**5,138**		**3,810**		**4,764**		**4,725**						
Water Management Total		**10,400**		**4,000**	**4,000**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**						
Capital		7,700		3,850	3,850																						
Operating		2,700		150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150						
Tailings Pipework		**61,660**		**11,003**	**11,003**	**4,925**	**3,378**		**5,301**		**5,767**		**5,593**		**4,094**		**3,036**		**3,796**		**3,765**						
Water Reclaim Pipework		**12,633**		**6,183**	**6,183**	**33**	**23**		**36**		**39**		**38**		**27**		**20**		**25**		**25**						
Tailings Dam Engineering and Construction Management		**11,339**		**2,082**	**2,082**	**891**	**611**		**959**		**1,043**		**1,012**		**741**		**549**		**687**		**681**						
Seepage Control		**1,054**		**527**	**527**																						
Haulage Road Construction		**3,700**		**2,590**	**185**	**185**	**185**	**185**	**185**	**185**																	
Long Term Monitoring and Treatment Total		**5,700**		**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**200**	**200**	**200**	**200**	**200/yr**	**200**
Pumping to Pit		3,600																				150	150	150	150	150/yr	150
Environmental Monitoring		2,100		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50/yr	50
Tailings Pumping (capital and operating)		**20,816**			**4,000**	**787**	**793**	**798**	**804**	**810**	**815**	**821**	**827**	**832**	**838**	**844**	**849**	**855**	**861**	**866**	**872**	**877**	**883**	**889**	**894**		
Mitigation		**20,000**		**10,000**	**10,000**																						
Fish Compensation		**21,255**		**4,278**	**4,278**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**		
Capital		8,555		**4,278**	**4,278**																						
Operating		12,700				**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**		
TOTAL		**1,600,438**		**45,174**	**109,278**	**84,778**	**80,019**	**73,544**	**114,254**	**81,989**	**102,229**	**78,716**	**125,119**	**97,585**	**109,003**	**96,960**	**82,473**	**59,299**	**66,873**	**54,052**	**69,899**	**22,453**	**18,759**	**16,613**	**7,367**	**200/yr**	**200**

Capital Cost	**325,143**
Operating Cost	**1,228,475**
Closure and Reclamation Costs	**25,565**
Fish Compensation	**21,255**

TABLE 4C-3 - 2012 FISH CREEK SOUTH (MDP T2) CAPITAL AND OPERATING COST COMPONENTS FOR ALTERNATIVES ASSESSMENT ($1000's)

Component	Cost Category	LOM Total	Year	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		40
Haulage Total		**1,262,248**			**40,416**	**46,954**	**71,465**	**69,374**	**84,990**	**77,642**	**69,642**	**67,099**	**101,288**	**81,985**	**94,328**	**89,760**	**67,742**	**54,526**	**57,360**	**49,961**	**60,552**	**25,073**	**23,125**	**20,070**	**8,897**		
Truck Capital		134,880			20,232	16,860	26,976	16,860	20,232	6,744			20,232		6,744												
Op Cost		838,749			6,241	14,900	29,049	36,595	48,717	54,889	53,679	50,605	64,823	65,642	71,512	74,797	53,460	40,545	43,914	36,439	48,550	13,564	12,215	11,177	7,437		
Road Maintenance		30,660			1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460		
G&A		257,960			12,483	13,734	13,980	14,459	14,581	14,548	14,502	15,034	14,774	14,883	14,612	13,502	12,822	12,521	11,986	12,062	10,542	10,049	9,450	7,433			
Reclamation Total		**26,065**			**26,065**																						
Re-sloping		4,800			4,800																						
Soil haulage and Placement		18,465			18,465																						
Revegetation		2,800			2,800																						
Tailings Dam Construction Method and Timing		**33,853**		**3,040**	**3,040**	**2,237**	**3,106**		**3,333**		**2,859**		**3,312**		**2,585**		**2,308**		**3,473**		**4,561**						
Water Management Total		**7,206**		**3,067**	**3,067**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**						
Capital		6,000		3,000	3,000																						
Operating		1,206		67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67						
Tailings Pipework		**28,976**		**4,370**	**4,370**	**1,630**	**2,263**		**2,429**		**2,083**		**2,413**		**1,883**		**1,682**		**2,530**		**3,323**						
Water Reclaim Pipework		**10,972**		**4,488**	**4,488**	**161**	**223**		**240**		**206**		**238**		**186**		**166**		**250**		**328**						
Tailings Dam Engineering and Construction Management		**6,532**		**1,234**	**1,234**	**327**	**454**		**488**		**418**		**485**		**378**		**338**		**508**		**667**						
Seepage Control		**1,845**		**527**	**527**	**64**	**88**		**95**		**81**		**94**		**74**		**66**		**99**		**130**						
Haulage Road Construction		**3,700**		**2,590**	**185**	**185**	**185**	**185**	**185**	**185**																	
Long Term Monitoring and Treatment Total		**5,700**		**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**200**	**200**	**200**	**200**	**200/yr**	**200**
Pumping to Pit		3,600																				150	150	150	150	150/yr	150
Environmental Monitoring		2,100		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50/yr	50
Tailings Pumping (capital and operating)		**14,329**			**4,000**	**399**	**411**	**424**	**436**	**449**	**461**	**473**	**486**	**498**	**510**	**523**	**535**	**547**	**560**	**572**	**584**	**597**	**609**	**621**	**634**		
Mitigation		**20,000**		**10,000**	**10,000**																						
Fish Compensation		**21,255**		**4,278**	**4,278**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**		
Capital		8,555		4,278	4,278																						
Operating		12,700				635	635	635	635	635	635	635	635	635	635	635	635	635	635	635	635	635	635	635	635		
TOTAL		**1,442,681**		**33,643**	**101,719**	**52,709**	**78,948**	**70,735**	**92,947**	**79,027**	**76,502**	**68,324**	**109,067**	**83,235**	**100,696**	**91,034**	**73,588**	**55,825**	**65,531**	**51,285**	**70,897**	**26,505**	**24,569**	**21,526**	**10,366**	**200/yr**	**200**

Capital Cost	**246,757**
Operating Cost	**1,142,904**
Closure and Reclamation Costs	**31,765**
Fish Compensation	**21,255**

Information Request #4d

Clarify how mitigation costs have been accounted for in the alternatives assessment.

Response Summary

Mitigation measures specific to seepage control, long term monitoring and treatment, and fish compensation elements have been included in those estimates for those elements.

While the detailed design of mitigation measures related to the TSF locations will obviously be site/case specific, the measures related to other aspects of the MDPs will be similar and the contribution to total project cost is not material to a relative cost comparison. For purposes of this estimate costs have been estimated to be $20M for both alternatives and incurred in the preproduction period.

Discussion

The mitigation costs itemized in the alternatives assessment are over and above those related to and included in the seepage control, long term monitoring and treatment, and fish compensation elements of the cost estimates. They have been assumed to be equivalent for both alternatives. While the detailed design of mitigation measures related to the TSF locations will obviously be site/case specific, the measures related to other aspects of the MDPs will be similar and the contribution to total project cost is not material to a relative cost comparison.

Both MDPs require design elements to mitigate:

- The effects of TSF seepage on the downstream receiving environment; primarily Fish Lake in the case of T2 but potentially the Beece Creek and Big Onion catchments, and Tete Angela Creek West and the Vick Lake catchment in the case of T6
- The potential effects of seepage and run-off from the ore stockpile on Fish Lake
- The potential effects of surface run-off from the plant site on Fish Lake.

For purposes of this estimate costs have been estimated to be $20M for both alternatives and incurred in the preproduction period.

The Panel will note that mitigation costs identified for MDP T2 in 2009 included significant mitigation costs associated with the protection of Upper Fish Creek and Fish Lake, including a foundation grout curtain, and embankment face liner. Additional detailed engineering since then has determined that less extensive measures are required.

Information Request #4e

Provide a rationale for why estimated fish habitat compensation costs for MDP T6 are assumed to be "equivalent or greater" than estimated fish habitat compensation costs for MDP T2.

Response Summary

Fish habitat compensation is typically based on area of fish habitat lost. The total area of fish habitat requiring compensation for MDP T6 will be at least that required for MDP T2 and likely higher. The same suite of compensation elements would be available to both MDPs. It is therefore reasonable to assume that the costs associated with fish compensation for MDP T6 will be at least that required for MDP T2 and likely somewhat higher based on area of fish habitat directly affected.

Discussion

The initial basis for determining the scope of fish habitat compensation elements is the effect of a project on fish and fish habitat; generally on a per m^2 basis. Both MDPs would have a similar direct effect on fish and fish habitat on a per m^2 basis.

With respect to lake habitat, MDP T2 would require the loss of Little Fish Lake with an area of 6.6 ha. MDP T6 would require the loss of the headwater lake in upper Tete Angela Creek West with an area of 7-8 ha. Both Lakes are rainbow trout bearing and have similar physical dimensions although the maximum depth of the head water lake is 2.6m deeper.

With respect to stream habitat the direct effects on both permanent and ephemeral stream area is higher for MDP T6 than for T2. The permanent stream areas directly impacted by the TSFs are 20,400 m2 and 6,800 m2 for MDP T6 and MDP T2 respectively. The permanent stream area affected by the pit is the same for both MDPs and there are no permanent streams directly impacted by the plant site or stockpiles for either option. The ephemeral stream areas directly impacted by the TSFs are 25,600 m2 and 13,500 m2 for MDP T6 and MDP T2 respectively. The density of ephemeral streams in the area of ore and waste stockpiles and plant site are equivalent for both MDPs. Any difference between the two will be immaterial with respect to habitat requiring compensation. The streams in both drainages are of similar width, depth, and gradient and are rainbow trout bearing.

It is therefore reasonable to assume that the total area of fish habitat requiring compensation for MDP T6 will be at least that required for MDP T2 and likely higher.

Both MDPs are in the same local area and the same suite of compensation elements would be available to both.

It is therefore reasonable to assume that the costs associated with fish compensation for MDP T6 will be at least that required for MDP T2 and likely somewhat higher based on area of fish habitat directly affected.

Information Request #4f

Provide information to support a conclusion that MDP T6 would be more costly than MDP T2.

Response Summary

The breakdown of estimated life of mine (LOM) costs of MDP T2 and T6 are provided here in Table 4F-1.

Table 4F-1. Breakdown of Mine Development Plan Costs

Cost Component	Mine Development Plan	
	MDP T2 Fish Creek South LOM Costs ($1000s)	MDP T6 Tete Angela LOM Costs ($1000s)
Capital Cost		
Haulage Truck Capital	134,880	148,368
Tailings Dam Construction	33,853	58,689
Water Management	6,000	7,700
Tailings Pipework	28,976	61,660
Water Reclaim Pipework	10,972	12,633
Tailings Dam Engineering and Construction Management	6,532	11,339
Seepage Control	1,845	1,054
Haulage Road Construction	3,700	3,700
Mitigation	20,000	20,000
Subtotal Capital	**246,757**	**325,143**
Operating Cost		
Haulage Operating	838,749	914,200
Road Maintenance	30,660	30,660
General and Administration (G&A)	257,960	260,099
Water Management	1,206	2,700
Tailings Pumping	14,329	20,816
Subtotal Operating	**1,142,904**	**1,228,475**
Closure and Reclamation Costs		
Re-sloping	4,800	1,400
Soil haulage and Placement	18,465	16,265
Revegetation	2,800	2,200
Pumping to Pit	3,600	3,600
Environmental Monitoring	2,100	2,100
Subtotal Closure and Reclamation	**31,765**	**25,565**
Fish Compensation Cost		
Capital	8,555	8,555
Operating	12,700	12,700
Subtotal Fish Compensation	**21,255**	**21,255**
Total Cost	**1,442,681**	**1,600,438**

The cost estimates provided for MDPs T2 and T6 are based on those provided in the 2009 submission with revisions with respect to mitigation and fish compensation.

Costs are dominated by haulage, and all other components are relatively equal in terms of their contribution to the total cost for each alternative. Changes in costs since 2009 would then affect both alternatives equally. Costs have escalated since the previous estimate, as evidenced by Taseko's operating and construction experience at the Gibraltar mine and a review by Ausenco

of several projects over this time range (van Doorn, Ausenco, pers. comm., 2013). The effect of that escalation is that the differential cost between the 2 alternatives has increased.

Costs are based on pre-feasibility level costing and actual Taseko operating costs and capital expenditures at the Gibraltar mine and are considered detailed estimates for the purposes of this analysis.

The estimate indicates that MDP T6 would be approximately $160 Million more costly than MDP T2.

Discussion

The estimated costs provided in support of the alternatives assessment are for those elements that are different for the two MDPs. They do not include costs for those elements which would be identical for both alternatives. For example the transmission line, road, concentrator, plantsite facilities, and non-haulage aspects of the open pit are not included.

The breakdown of estimated costs of MDP T2 and T6 by project year are provided in Table 4F-2 and Table 4F-3.

TABLE 4F-2 - 2012 TETE ANGELA (MDP T6) CAPITAL AND OPERATING COST COMPONENTS FOR ALTERNATIVES ASSESSMENT ($1000's)

Component	LOM Total	Year	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		40
Haulage Total	**1,353,327**		**0**	**42,644**	**70,940**	**69,955**	**71,726**	**99,482**	**80,159**	**86,493**	**77,060**	**109,796**	**95,918**	**97,330**	**95,282**	**73,373**	**57,609**	**55,905**	**52,351**	**58,996**	**20,741**	**17,041**	**14,890**	**5,638**		
Truck Capital	148,368		**0**	20,232	33,720	20,232	13,488	26,976	3,372	6,744	3,372	16,860	3,372													
Op Cost	914,200		**0**	8,123	21,897	34,110	42,073	56,319	60,503	63,599	56,947	76,342	75,942	81,084	80,174	59,018	43,628	42,415	38,787	47,126	9,434	6,347	6,155	4,178		
Road Maintenance	30,660		**0**	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460		
G&A	260,099		**0**	12,829	13,864	14,153	14,705	14,727	14,824	14,690	15,280	15,134	15,144	14,785	13,648	12,895	12,521	12,030	12,104	10,410	9,847	9,234	7,275			
Reclamation Total	**19,865**		**0**	**19,865**																						
Re-sloping	1,400		**0**	1,400																						
Soil haulage and Placement	16,265		**0**	16,265																						
Revegetation	2,200		**0**	2,200																						
Tailings Dam Construction Method and Timing	**58,689**		**4,462**	**4,462**	**6,181**	**4,239**		**6,652**		**7,237**		**7,019**		**5,138**		**3,810**		**4,764**		**4,725**						
Water Management Total	**10,400**		**4,000**	**4,000**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**						
Capital	7,700		3,850	3,850																						
Operating	2,700		150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150						
Tailings Pipework	**61,660**		**11,003**	**11,003**	**4,925**	**3,378**		**5,301**		**5,767**		**5,593**		**4,094**		**3,036**		**3,796**		**3,765**						
Water Reclaim Pipework	**12,633**		**6,183**	**6,183**	**33**	**23**		**36**		**39**		**38**		**27**		**20**		**25**		**25**						
Tailings Dam Engineering and Construction Management	**11,339**		**2,082**	**2,082**	**891**	**611**		**959**		**1,043**		**1,012**		**741**		**549**		**687**		**681**						
Seepage Control	**1,054**		**527**	**527**																						
Haulage Road Construction	**3,700**		**2,590**	**185**	**185**	**185**	**185**	**185**	**185**																	
Long Term Monitoring and Treatment Total	**5,700**		**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**200**	**200**	**200**	**200**	**200/yr**	**200**
Pumping to Pit	3,600																				150	150	150	150	150/yr	150
Environmental Monitoring	2,100		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50/yr	50
Tailings Pumping (capital and operating)	**20,816**			**4,000**	**787**	**793**	**798**	**804**	**810**	**815**	**821**	**827**	**832**	**838**	**844**	**849**	**855**	**861**	**866**	**872**	**877**	**883**	**889**	**894**		
Mitigation	**20,000**		**10,000**	**10,000**																						
Fish Compensation	**21,255**		**4,278**	**4,278**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**		
Capital	8,555		**4,278**	**4,278**																						
Operating	12,700				**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**		
TOTAL	**1,600,438**		**45,174**	**109,278**	**84,778**	**80,019**	**73,544**	**114,254**	**81,989**	**102,229**	**78,716**	**125,119**	**97,585**	**109,003**	**96,960**	**82,473**	**59,299**	**66,873**	**54,052**	**69,899**	**22,453**	**18,759**	**16,613**	**7,367**	**200/yr**	**200**

TABLE 4F-3 - 2012 FISH CREEK SOUTH (MDP T2) CAPITAL AND OPERATING COST COMPONENTS FOR ALTERNATIVES ASSESSMENT ($1000's)

Component		LOM Total	Year	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		40
Haulage Total		**1,262,248**			**40,416**	**46,954**	**71,465**	**69,374**	**84,990**	**77,642**	**69,642**	**67,099**	**101,288**	**81,985**	**94,328**	**89,760**	**67,742**	**54,526**	**57,360**	**49,961**	**60,552**	**25,073**	**23,125**	**20,070**	**8,897**		
	Truck Capital	134,880			20,232	16,860	26,976	16,860	20,232	6,744			20,232		6,744												
	Op Cost	838,749			6,241	14,900	29,049	36,595	48,717	54,889	53,679	50,605	64,823	65,642	71,512	74,797	53,460	40,545	43,914	36,439	48,550	13,564	12,215	11,177	7,437		
	Road Maintenance	30,660			1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460	1,460		
	G&A	257,960			12,483	13,734	13,980	14,459	14,581	14,548	14,502	15,034	14,774	14,883	14,612	13,502	12,822	12,521	11,986	12,062	10,542	10,049	9,450	7,433			
Reclamation Total		**26,065**			**26,065**																						
	Re-sloping	4,800			4,800																						
	Soil haulage and Placement	18,465			18,465																						
	Revegetation	2,800			2,800																						
Tailings Dam Construction Method and Timing		**33,853**		**3,040**	**3,040**	**2,237**	**3,106**		**3,333**		**2,859**		**3,312**		**2,585**		**2,308**		**3,473**		**4,561**						
Water Management Total		**7,206**		**3,067**	**3,067**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**						
	Capital	6,000		3,000	3,000																						
	Operating	1,206		67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67						
Tailings Pipework		**28,976**		**4,370**	**4,370**	**1,630**	**2,263**		**2,429**		**2,083**		**2,413**		**1,883**		**1,682**		**2,530**		**3,323**						
Water Reclaim Pipework		**10,972**		**4,488**	**4,488**	**161**	**223**		**240**		**206**		**238**		**186**		**166**		**250**		**328**						
Tailings Dam Engineering and Construction Management		**6,532**		**1,234**	**1,234**	**327**	**454**		**488**		**418**		**485**		**378**		**338**		**508**		**667**						
Seepage Control		**1,845**		**527**	**527**	**64**	**88**		**95**		**81**		**94**		**74**		**66**		**99**		**130**						
Haulage Road Construction		**3,700**		**2,590**	**185**	**185**	**185**	**185**	**185**	**185**																	
Long Term Monitoring and Treatment Total		**5,700**		**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**200**	**200**	**200**	**200**	**200/yr**	**200**
	Pumping to Pit	3,600																				150	150	150	150	150/yr	150
	Environmental Monitoring	2,100		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50/yr	50
Tailings Pumping (capital and operating)		**14,329**			**4,000**	**399**	**411**	**424**	**436**	**449**	**461**	**473**	**486**	**498**	**510**	**523**	**535**	**547**	**560**	**572**	**584**	**597**	**609**	**621**	**634**		
Mitigation		**20,000**		**10,000**	**10,000**																						
Fish Compensation		**21,255**		**4,278**	**4,278**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**	**635**		
	Capital	8,555		4,278	4,278																						
	Operating	12,700				635	635	635	635	635	635	635	635	635	635	635	635	635	635	635	635	635	635	635	635		
	TOTAL	**1,442,681**		**33,643**	**101,719**	**52,709**	**78,948**	**70,735**	**92,947**	**79,027**	**76,502**	**68,324**	**109,067**	**83,235**	**100,696**	**91,034**	**73,588**	**55,825**	**65,531**	**51,285**	**70,897**	**26,505**	**24,569**	**21,526**	**10,366**	**200/yr**	**200**

The cost estimates provided for MDPs T2 and T6 are based on those provided in the 2009 submission with updates to mitigation and fish compensation.

Taseko notes that world economics have driven changes in capital and operating costs of projects since the estimates were prepared for the 2009 submission but the costs presented here are relative costs for purposes of differentiating between the two alternative MDPs.

The distribution of the estimated costs provided in Tables 4F-2 and 4F-3 by component for both alternatives are shown in Figures 4F-1 and 4F-2. It is clear that costs are dominated by haulage and all other components are relatively equal in terms of their contribution to cost for each alternative. Changes in costs since the previous estimate would then affect both alternatives in an equivalent manner. Costs have escalated since the previous estimate, as evidenced by Taseko's operating and construction experience at the Gibraltar mine and a review by Ausenco of several projects over this time range (van Doorn, Ausenco, pers. comm., 2013), increasing the differential between the 2 alternatives.

Figure 4F-1. Cost Distribution by Component for MDP T6 - Tete Angela

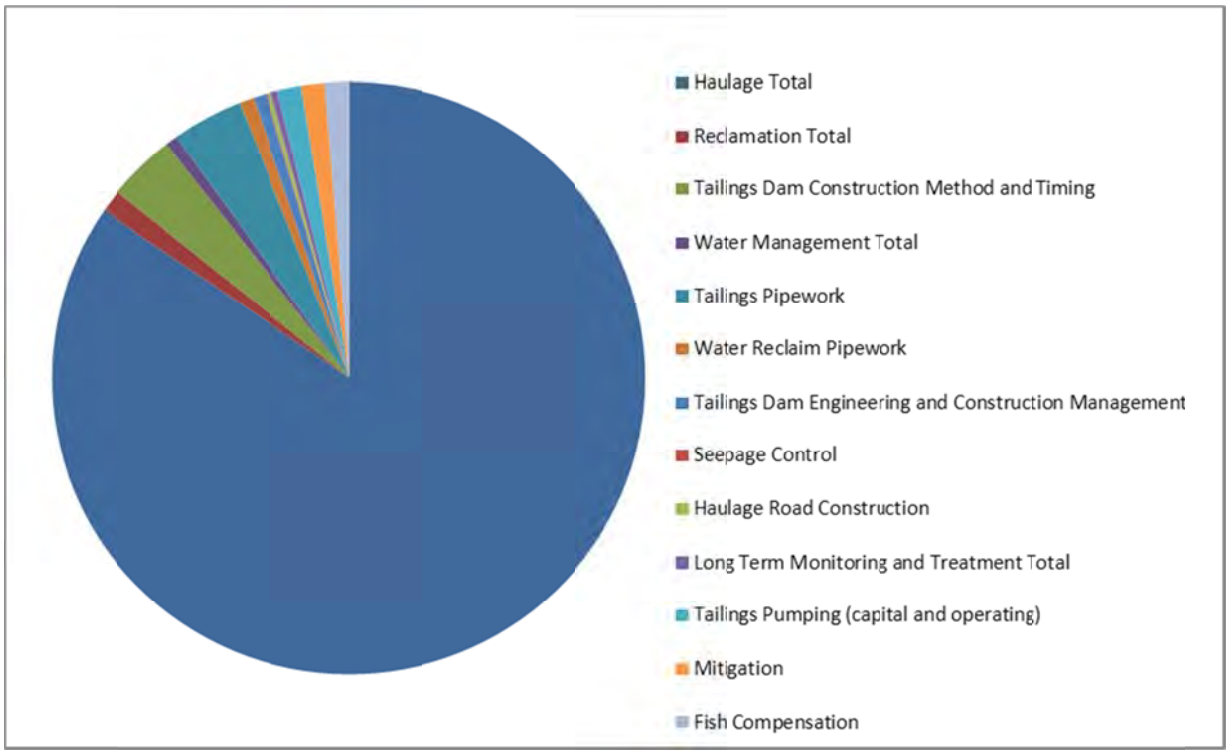
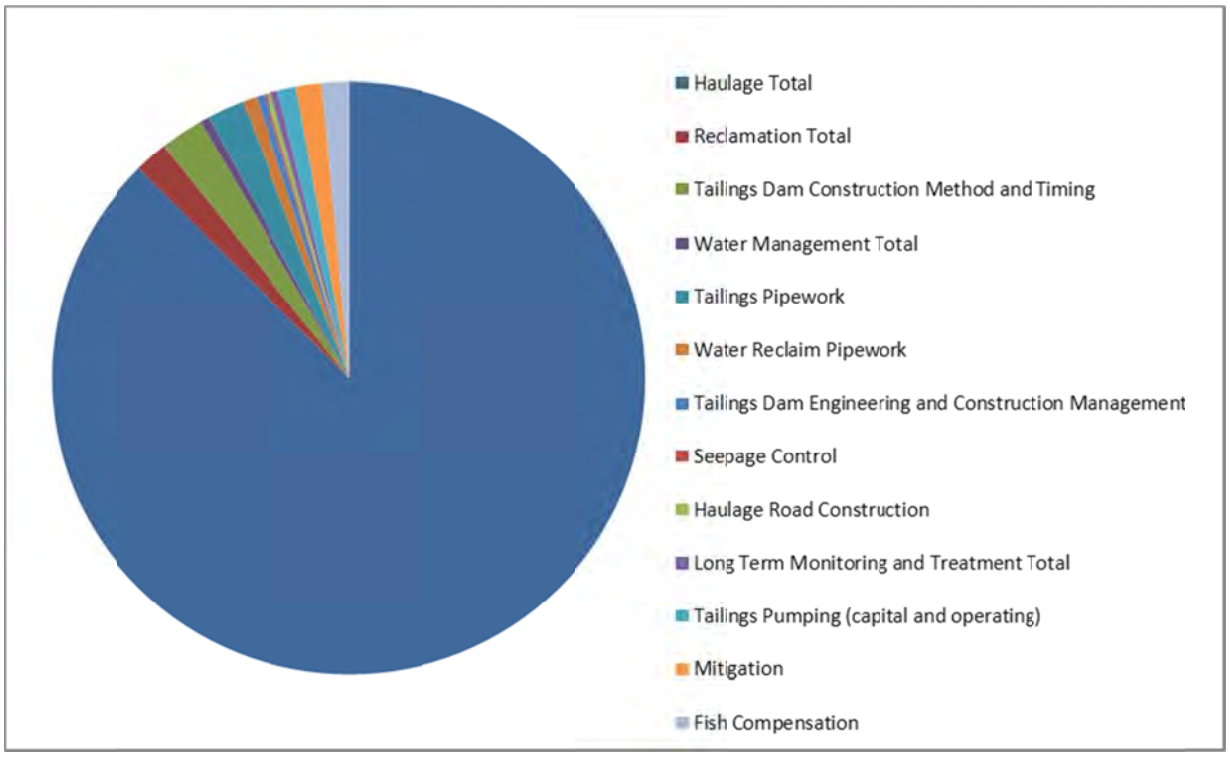


Figure 4F-2. Cost Distribution by Component for MDP T2 - Fish Creek South



The basis of estimate for the component costs of the two MDPs is outlined below.

Haulage Total

Taseko derived the number of trucks required for haulage in each year of the mine plan from the quantity of material that must be moved to differing destinations in each year (PAG storage, non-PAG storage, dam construction, primary crusher, ore stockpile, etc.), the vendor performance specifications for the trucks (speed loaded and empty for given road grades, time required to load, time required to dump), mechanical availability of the haulage trucks, utilization of the haulage trucks (number of hours operator shift changes and breaks allow operation in a 24- hour period based on industry standard) and the specific haulage profiles (road length and grade) for each material destination in each year. Truck costs were based on budgetary quotes from vendors.

Taseko derived the operating costs for haulage from the total number of truck operating hours required each year based on the same inputs for number of trucks required outlined above, labour rates from the Gibraltar Mine to operate and maintain the trucks, and the operating and maintenance supplies (fuel, lubricants, tires, major component overhauls, routine maintenance materials, etc.) required. Unit costs for operating and maintenance supplies were based on Gibraltar costs.

Increased road maintenance operating costs including grading, snow removal, dust suppression, and surface dressing required for haulage roads are estimated on the basis of an hourly requirement per day, an all-in hourly equipment cost, and apply for the first 15 years of operation. They are based on Gibraltar experience.

In addition to mine equipment capital and operating costs, the number of operating and maintenance personnel required drive 45% of G&A costs, predominantly camp related costs which were based on current daily rates per man. The balance of G&A costs are approximately constant between options and were based on Gibraltar costs.

Reclamation

Only those costs incurred for areas with differing amounts of reclamation were estimated, not the total costs of reclamation for each option. i.e. reclamation costs for the access road, plant site etc. are common to all options and were not included.

Re-sloping costs were estimated by Knight Piésold Ltd (KPL) using average dump heights, dozer productivity based on this height and an all found hourly dozer rate.

KPL estimated soil haulage and placement costs based on areas to be reclaimed, dozer and scraper productivities, and all found hourly dozer and scraper rates assuming scrapers move the soil and a dozer does the spreading.

KPL based revegetation costs on a constant cost per hectare.

Reclamation costs were assumed to occur in Year -1 only because it is anticipated that MEMNG will expect financial assurance for reclamation and closure at that time.

Tailings Dam Construction Method and Timing

Tailings dam construction costs were based on option-specific units and unit costs (e.g., $/m3 or$/ha) provided by KPL for the following activities and materials for each scenario:

- strip and grub
- prepare foundation
- place and compact—Zone S—low permeability till
- place and compact—Zone T & F—filter and transition zones
- place and compact—Zone C—(NR) overburden
- place and compact—Zone C—(NR) rock
- place and compact—wearing coarse on till core

The unit costs are the same for both options while the quantities and timing of each material differ.

Costs include pre-production capital and sustaining capital for subsequent embankment raises.

Distribution of pre-production capital was assumed to be 50% in Year -2 and 50% in Year -1. Total sustaining capital costs have been distributed over the life of the mine based on the percentage of total construction material placed in a given year.

Note that the haulage costs of dam construction material are included in total haulage.

Water Management

There are two primary components to the cost of water management for MDP T2 and MDP T6:

- diversion/collection ditches and sedimentation ponds
- managing Fish Lake water outflow to allow open pit operations.

The pre-production capital costs for the sedimentation ponds were estimated by KPL on the basis of volume and unit costs.

KPL based capital and operating costs to manage the outflow of Fish Lake water based on pipeline length, and the 1:20 year peak flow for appropriate watershed areas using typical costs for equivalent sized equipment operating at the stated flows and head pressures.

It is reasonable to expect that capital and operating costs for the MDP T6 would be higher than that for MDP T2 because the volume of water flowing out of Fish Lake for MDPT6 is double that for MDP T2 due to the MDP T2 TSF collecting half the Fish Lake watershed upstream of the pit.

Pre-production capital costs were distributed on the basis of 50% in Year -1 and 50% in Year -2.

Annual operating costs were applied to Years -2 through 16 when pit operations cease.

Tailings Pipework

KPL based the cost of purchasing and installing tailings pipe on the basis of typical costs for equivalent pipe materials, thickness, diameter, and length for each option.

Pre-production capital costs were distributed on the basis of 50% in Year -1 and 50% in Year -2 while sustaining capital costs are incurred through Year 16.

Annual operating costs were applied to Years -2 through 16 when dam construction is complete.

Water Reclaim Pipework

KPL based the cost of purchasing and installing reclaim pipe on typical costs for equivalent pipe materials, thickness, diameter and length for each option.

Pre-production capital costs were distributed on the basis of 50% in Year -1 and 50% in Year -2 while sustaining capital costs are incurred through Year 16.

Annual operating costs were applied to Years -2 through 16 when dam construction is complete.

Tailings Dam Engineering and Construction Management

Cost estimates for dam engineering and construction management were estimated by KPL based on 8% of the total cost of pumping and piping, placement and compaction of construction materials, reclaim water systems, and seepage control. This is industry standard methodology for estimation at this level of detail.

Seepage Control

KPL estimated the cost of seepage control on basis of the unit costs of seepage pump back systems applied against the number of pump back systems required for each option. The costs do not include downstream groundwater pump-back wells which are assumed to be equivalent for both alternatives.

Haulage Road Construction

Taseko has estimated haul road construction based on a unit construction cost for a 35 m wide running surface, constructed and surfaced with material available within 1 km.

The cost has been assumed to be incurred uniformly over Years -2 and -1.

Long Term Monitoring and Treatment

Taseko has assumed both options would incur a constant annual cost for environmental monitoring. For purposes of this estimate that has been assumed to be 40 years, primarily related to water quality. This is in addition to environmental costs already captured within G&A estimates for the construction and operations periods and monitoring of fish compensation elements.

Monitoring requirements will be driven primarily by TSF supernatant pond water quality and this will be equivalent for both MDPs. Both options will require equivalent periods requiring transfer of TSF supernatant pond water to the pit until water quality is such that water can be discharged to the downstream environment.

Both options have an equivalent likelihood of water treatment being required as a contingency measure.

Both options will require monitoring of downstream receiving environments.

For purposes of this estimate the cost of pumping TSF supernatant to the pit (the most cost effective mitigation measure) has been estimated on the basis of a %age of the annual reclaim water pumping cost during operations. The average annual TSF water surplus in closure for both MDPs is 15% of the total annual reclaim volume during operations. This cost has been assumed for years 20 through 40.

Tailings Pumping

The capital cost for tailings pumps has been estimated by Taseko. The cost has been incurred in the year required in each option.

The power cost to pump tailings has been estimated on the basis of power requirements in initial and final years of pumping (by KPL), assuming straight line annual increases in between these two values. A constant annual power rate based on current industrial power costs has been used.

Mitigation Measures

For purposes of this estimate mitigation costs are over and above those related to seepage control, long term monitoring and treatment, and fish compensation. They have been assumed to be equivalent for both alternatives. While the detailed design of mitigation measures related to the TSF locations will obviously be site/case specific, the measures related to other aspects of the MDPs will be similar and the contribution to total project cost is not material to a relative cost comparison.

Both MDPs require design elements to mitigate:

- The effects of TSF seepage on the downstream receiving environment; primarily Fish Lake in the case of T2 but potentially the Beece Creek and Big Onion catchments, and Tete Angela Creek West and the Vick Lake catchment in the case of T6
- The potential effects of seepage and run-off from the ore stockpile on Fish Lake
- The potential effects of surface run-off from the plant site on Fish Lake.

For purposes of this estimate costs have been estimated to be $20M for both alternatives and incurred in the preproduction period.

Fish Compensation

A cost estimate for fish compensation for MDP T2 is provided in Appendices 2.7.2.5-A, Fish and Fish Habitat Compensation Plan, and 2.7.2.5-B, MMER Schedule 2 Compensation Plan, in the 2012 EIS submission. The estimate was developed after the compilation of costing for purposes of the alternatives assessment. Because the critical aspect of the alternatives assessment

is differential cost and the MDPs are not expected to differ materially with respect to fish compensation costs, the estimate was not revised to be consistent with those provided in Appendices 7.2.5-A and 2.7.2.5-B. The rationale for applying equivalent costs to both MDPs is provided in the response to IR 4e.

The estimate used in the 2012 alternatives assessment for the project as proposed includes capital and operating costs for a suite of potential compensation elements from which Taseko believes the requirements of legislation and policy can be established.

Capital costs have been assumed to occur during the construction period. Operating costs include monitoring, follow-up and adaptive management.

The cost estimate for purposes of the alternatives assessment is provided in Table 4F-4.

Table 4F-4. Alternatives Assessment Fish Compensation Cost Estimate for MDP T2 (Fish Creek

Element	Description	Capital Costs ($M)	Annual Operating Costs ($K)
Compensation			
Taseko Lake Off-Channel	5km groundwater fed off-channel project	4.0	150,000
Fish Lake Tributary Enhancement	1.5km channel excavation & habitat features	0.3	25,000
Fish Passage Enhancement	culverts, barrier removal, enhancement (15 sites $50-100k/site)	1.5	50,000
Haines Creek	diversion/berm upgrades, channel improvements	0.5	25,000
Elkin Creek	diversion/berm upgrades, channel improvements	0.5	25,000
Compensation Subtotal		**6.8**	**275,000**
Mitigation			
Hatchery Strategy	safe-guarding genetics, reduce risk, outplant stock	0.5	300,000
Ouplant Lakes	2 - 4 recipient lakes		50,000
Fish Lake Tributary Enhancement	maintaining flows, pumps, etc.	0.25	in mine ops
Mitigation Subtotal		**0.75**	**350,000**
MFLNRO/Transport Canada			
Access Roads/Campsites	Construction of 5-7 sites ($100k/site)	0.5	10,000
Others, as yet identified	FN, community input	0.5	
MFLNRO/TCSubtotal		**1.0**	**10,000**
TOTAL		**8.55 M**	**635,000**

Information Request #4g

Provide information to support the conclusion that MDP T6 would require a significantly higher volume of construction material for the tailings dams compared to MDP T2.

Response Summary

The volume of construction material required for the embankments associated with the two MDPs were calculated by Knight Piésold Limited (KPL) using industry standard methods to produce comparative quantities.

The estimates demonstrate that the TSF for MDP T6 would require approximately 20 Million cubic metres more construction material than that for MDP T2.

Discussion

Centreline construction of the embankments was assumed for TSF embankments at each MDP. The starter embankment is a full-section dam, where the slopes are assumed to have 2 horizontal to 1 vertical (2:1) on both the upstream and downstream shell zones. A crest width of 30 metres is assumed for the core zones. Ongoing raises are centreline, with a small upstream zone located between the tailings mass and the core zone. The raises will also have a downstream shell zone with a slope of 2:1.

Embankment quantities are calculated for each staged raise, based on the final crest elevation for each stage and using the common embankment section described. Quantities are calculated using AutoCAD with 5 metre contours.

MDP T2 has more favorable topography that MDP T6 for the purpose of constructing embankments and managing tailings/waste rock. The areas, embankment lengths and maximum embankment heights are similar between these two options. However, the topography along the length of each embankment differs between each MPD. For instance, the natural topography along the western arm of the embankment at MDP T6 is decreasing in elevation from south to north. Contrarily, the topography along the southern embankment of MDP2 is not decreasing in elevation in the same manner. Therefore, more favorable topography leads to less embankment volumes. Put another way, there are longer sections of embankment at MDP T6 compared with MDP T2 with an equivalent embankment height, thereby requiring larger volumes of fill material.

The calculated staged embankment fill volumes for both MDPs, quantifying volumes of each required construction material type by project year, are provided in Tables 4G-1 and 4G-2.

TABLE 4G-1

STAGED EMBANKMENT FILL VOLUMES
FISH CREEK SOUTH OPTION (MDP T2)

MAIN EMBANKMENT

Stage	Year	Min. Crest Elevation	Maximum Height	Zone B	Zone C (NR)	Zone S	Zone F	Zone G	Zone T	Wearing Coarse	Zone RF Downstream	Total Volume
		(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
I	-1	1,519	45	93,000	1,000,000	486,000	93,000	0	1,635,000	0	0	3,307,000
II	1	1,541	67	121,500	385,000	434,000	121,500	0	1,113,000	0	0	2,175,000
III	2	1,552	78	85,000	1,732,000	276,000	85,000	0	761,000	0	0	2,939,000
	3											
IV	4	1,560	86	75,000	1,882,000	244,000	75,000	0	655,000	0	0	2,931,000
	5											
V	6	1,567	93	48,000	1,883,000	155,000	48,000	0	379,000	0	0	2,513,000
	7											
VI	8	1,573	99	60,500	1,867,000	197,000	60,500	0	486,000	0	0	2,671,000
	9											
VII	10	1,577	103	50,500	1,395,000	166,000	50,500	0	358,000	0	0	2,020,000
	11											
VIII	12	1,580	106	83,500	1,105,000	276,000	83,500	0	203,000	0	0	1,751,000
	13											
IX	14	1,583	109	117,500	1,240,000	390,000	117,500	0	407,000	0	0	2,272,000
	15											
X	16	1,588	114	65,000	2,143,000	213,000	65,000	0	492,000	0	0	2,978,000
SUB-TOTAL (Sustaining Capital Quantites)				706,500	13,632,000	2,351,000	706,500	0	4,854,000	0	0	22,250,000
TOTAL (Initial & Sustaining Capital Quantities)				799,500	14,632,000	2,837,000	799,500	0	6,489,000	0	0	25,557,000

SOUTH EMBANKMENT

Stage	Year	Min. Crest Elevation	Maximum Height	Zone B	Zone C (NR)	Zone S	Zone F	Zone G	Zone T	Wearing Coarse	Zone RF Downstream	Total Volume
		(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
	-1 1											
III	2	1552	2	10,000	36,000	25,000	10,000	0	0	0	0	81,000
	3											
IV	4	1,560	10	40,000	140,000	90,000	40,000	0	0	0	0	310,000
	5											
V	6	1,567	17	34,000	119,000	80,000	34,000	0	0	0	0	267,000
	7											
VI	8	1,573	23	40,000	300,000	113,000	40,000	0	0	0	0	493,000
	9											
VII	10	1,577	27	32,250	290,500	100,000	32,250	0	0	0	0	455,000
	11											
VIII	12	1,580	30	32,250	290,500	100,000	32,250	0	0	0	0	455,000
	13											
IX	14	1,583	33	75,000	565,600	309,000	75,000	0	0	0	0	1,024,600
	15											
X	16	1,588	38	67,000	848,400	400,000	67,000	0	0	0	0	1,382,400
TOTAL (Sustaining Capital Quantities)				330,500	2,590,000	1,217,000	330,500	0	0	0	0	4,468,000

WEST EMBANKMENT

Stage	Year	Min. Crest Elevation	Maximum Height	Zone B	Zone C (NR)	Zone S	Zone F	Zone G	Zone T	Wearing Coarse	Zone RF Downstream	Total Volume
		(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
	-1 1 2 3 4 5 6 7											
VI	8	1,573	5	9,000	20,000	18,000	9,000	0	0	0	0	56,000
	9											
VII	10	1,577	9	6,000	14,000	12,000	6,000	0	0	0	0	38,000
	11											
VIII	12	1,580	12	6,000	14,000	12,000	6,000	0	0	0	0	38,000
	13											
IX	14	1,583	15	4,500	50,000	21,000	4,500	0	0	0	0	80,000
	15											
X	16	1,588	20	4,000	46,000	20,000	4,000	0	0	0	0	74,000
TOTAL (Sustaining Capital Quantities)				29,500	144,000	83,000	29,500	0	0	0	0	286,000

Notes:

1) Volumes are based on compacted embankment fill bulk densities of 2.1 t/m³ for overburden and 2.4 t/m³ for waste rock.
2) Ground level considered 1474 m at the Main Embankment, 1550 m at the South Embankment and 1568 m at the West Embankment.

TABLE 4G-2

STAGED EMBANKMENT FILL VOLUMES
TETE ANGELA OPTION (MDP T6)

MAIN EMBANKMENT

Stage	Year	Min. Crest Elevation	Maximum Height	Zone B	Zone C (NR)	Zone S	Zone F	Zone G	Zone T	Wearing Coarse	Zone RF Downstream	Total Volume
		(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
I	-1	1,510	35	96,500	282,000	914,000	96,500	0	2,605,000	0	0	3,994,000
II	1	1,518	43	147,500	2,908,000	783,000	147,500	0	1,680,000	0	0	5,666,000
III	2	1,530	55	190,500	1,164,000	882,000	190,500	0	1,459,000	0	0	3,886,000
IV	4	1,540	65	213,000	3,070,000	1,028,000	213,000	0	1,574,000	0	0	6,098,000
V	6	1,549	74	213,000	3,671,000	1,028,000	213,000	0	1,509,000	0	0	6,634,000
VI	8	1,557	82	192,500	3,894,000	931,000	192,500	0	1,224,000	0	0	6,434,000
VII	10	1,563	88	136,000	3,276,000	655,000	136,000	0	507,000	0	0	4,710,000
VIII	12	1,566	91	183,000	1,773,000	903,000	183,000	0	437,000	0	0	3,479,000
IX	14	1,569	94	233,000	1,855,000	1,152,000	233,000	0	871,000	0	0	4,344,000
X	16	1,574	99	156,000	2,775,000	763,000	156,000	0	430,000	0	0	4,280,000
SUB-TOTAL (Sustaining Capital Quantites)				1,664,500	24,386,000	8,125,000	1,664,500	0	9,691,000	0	0	45,531,000
TOTAL (Initial & Sustaining Capital Quantities)				1,761,000	24,668,000	9,039,000	1,761,000	0	12,296,000	0	0	49,525,000

WEST EMBANKMENT

Stage	Year	Min. Crest Elevation	Maximum Height	Zone B	Zone C (NR)	Zone S	Zone F	Zone G	Zone T	Wearing Coarse	Zone RF Downstream	Total Volume
		(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
	-1											
	1											
	2											
	3											
	4											
	5											
	6											
	7											
	8											
	9											
	10											
	11											
VIII	12	1,566	2	1,000	3,000	4,000	1,000	0	5,000	0	0	14,000
	13											
IX	14	1,569	5	1,500	5,000	6,000	1,500	0	9,000	0	0	23,000
	15											
X	16	1,574	10	3,000	12,000	14,000	3,000	0	19,000	0	0	51,000
TOTAL (Sustaining Capital Quantities)				5,500	20,000	24,000	5,500	0	33,000	0	0	88,000