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MEMORANDUM

To: Erin Dowd, Yukon Department of Energy, Mines and Resources

From: Steve Januszewski, Principal
SteveJan Consultants Inc.

Date: November 13, 2014

Subject: Review of Teck Resources' Sa Dena Hes Mine Remaining Closure Tasks and Associated Costs – October 2014 Update

Executive Summary

A high level review of the outstanding closure tasks and estimates of their associated costs was completed after an Oct. 7, 2014 site visit and review of Teck's table of estimated percentage completions of the various closure tasks. These were provided to YG EMR & SJCI in October 2014 which estimated that the work they had completed to date amounted to \$17.7M of the total estimated closure cost of \$22.6M. This review finds the current closure liability to be \$4.9M.

The review finds general agreement with the individual tasks, their cost estimates and their percentage completions as of early October 2014. However, some adjustments were made including several specific estimates of % completion and the setting of a higher overall contingency allowance for the remaining work.

A follow-up teleconference on October 27, 2014 between YG EMR and representatives of Teck reviewed the draft report and arrived at consensus as to residual liability estimate.

Introduction

An updated Detailed Decommissioning and Reclamation Plan (DDRP, the Plan) was prepared by Teck Resources Limited (Teck, the Company) in March 2013 (2013a). Teck is the operator and part-owner of the site.

SJCI has previously completed reviews of the Company's earlier DDRPs for the Sa Dena Hes Mine, as submitted by Teck on behalf of the Yukon Government's Department of Energy Mines and Resources-Mineral Resources Division (YG EMR). The high level review of the most recent Plan and progress in completing the closure plan tasks is part of an ongoing Standing Offer Agreement between EMR and SJCI.

Previously submitted closure cost estimates from the Company put the total closure cost at \$7.692M in 2010, which was raised to \$15.912M in 2012 and remained the same in their 2013 DDRP Update report (Teck 2013a). The 2013 and previous Plans' cost estimates included a 20% contingency allowance. SJCI provided comments on the 2013 DDRP report and agreed in general with the overall costs but cautioned that a number of elements had not yet been detailed and that a more accurate cost review should be undertaken when the additional studies had been completed, additional contractor pricing quotes had been received and that this information was incorporated into an updated DDRP and closure cost estimate.

In June of 2013 a revised cost estimate of \$25.2M was provided to YG EMR (with a 5% contingency allowance) in a letter report by Teck as a follow-up to the previously issued DDRP report. In November 2013, the Company provided an update to YG EMR showing that after completion of their 2013 closure work program at the site the remaining closure

cost had dropped to \$22.6M (with the 5% contingency allowance). Based on that, security for the site was revised to \$22.6M by YG EMR in a letter to Teck dated December 18, 2013. The letter also included a requirement for a joint site audit to assess the need for an adjustment to the financial security. The audit was to take place prior to October 15, 2014, to incorporate any work undertaken at the site in 2014. This would enable a revision to the financial security being held by YG for the site.

In the summer of 2014 the Company undertook an aggressive closure works program. In October 2014, in preparation for the YG EMR site visit/audit, EMR prepared a more detailed costing listing that utilized the tasks outlined by Teck in the Project Cost Summary spreadsheet that was included in the November 2013 letter report (Teck 2013b). EMR's 2 page listing included all of the closure tasks and updated the estimated % completions of all the tasks as of the beginning of October 2014 (with percentage completions provided by Teck) which indicated the work undertaken in 2014 had a value of \$17.7M of the total cost of the \$22.6M estimate as of November 2013.

The author visited the SDH site on October 7, 2014 with staff from YG EMR and Teck Resources and their consultants in fulfillment of the site audit requirement. The listing was distributed to participants prior to the site visit. This was the first visit to the site by the author, and as a result he had never seen all the site components in their still standing, but shut down status prior to this site visit.

Assumptions

A number of assumptions have been in the preparation of this report. The most significant ones include:

- New Water and Quartz Mining Licences will be required for the post-closure period to ensure satisfactory performance of the Sa Dena Hes site, using monitoring and inspections to confirm physical and chemical stability of the various previously disturbed and recently restored site features. It is expected that a revised post-closure management plan and cost estimate will be prepared as part of the permitting process for those licences. As a result, costs associated with the period beyond December 31, 2015 have not been addressed in this report;
- Material extraction from the borrow areas has been completed and the areas have been reclaimed (these areas were not inspected during the October 2014 site visit and are not included in the Company's costing sheet); and
- No long term active or passive water treatment will be required to treat waters prior to exiting the site.

Discussion

After the site visit the author reviewed the percentage completions stated by Teck as well as the completeness of the tasks included in the listing. No changes were made to the cost estimates for the individual tasks as they had previously been agreed to by SJCI. A number of adjustments were made to the percentage completions as well as to the list of remaining tasks, including:

- Mob & Demob costs were estimated and included in the June 2013 cost estimate by Teck but the remaining items were not transferred onto the latest listing. Provision for a small percentage (10%) of the estimated 2014 mob & demob cost and the full amount of the 2015 mob & demob costs have been put back into the listing (Note: the costings for these items were added at the bottom of the worksheet, and not within the table as they were not included in the setting of the latest financial security and therefore cannot be credited against it);
- The provision for maintenance and opening and closing of the roads has been adjusted based on a similar amount of work being required in 2015 as was required in 2014;
- A number of the individual areas such as portal areas, waste rock dumps, open pit high walls, etc. have been filled and re-contoured in 2014, and although a 100% credit was taken by Teck for these components, it is recommended that provisions remain for one year (i.e., until the expiry of the current Licences) to ensure stability of the slopes, slumping, erosion issues, etc.;
- A number of new creek and runoff diversions and surface water channels have been created. Similar to the above, these require some holdback provision to consider any major restoration that may be required in 2015;
- No reclaimed areas with active vegetation in place were observed during the site visit. In addition, credit for revegetation costs is typically only granted after areas have been successfully revegetated and their ongoing survivability has been demonstrated. As a result, no credit for any vegetation work was considered appropriate.

Lastly, the contingency allowance on the remaining tasks has been increased from the 5% proposed by the Company in their November letter to 15%. This is considered appropriate recognizing the uncertainty of the success of the closure work completed in 2013 & 2014, the remaining tasks for 2015, pending results from contaminated soils surveys and any remedial work that may be required, issuance of the ERA and HHRA reports with possible remedial work recommendations, and any additional unknowns (e.g., new items that may require attention). The latest DDRPs by Teck had a 20% contingency allowance included.

The revised listing is included in the back end of this report.

Conclusions and Recommendations

Teck has undertaken a significant amount of work in 2013 & 2014 in undertaking the permanent closure of the Sa Dena Hes Mine property. The remainder of the closure tasks are due to be undertaken in 2015 leaving only longer term post-closure monitoring, maintenance and reporting for a period thereafter, which will be financially secured under new Water and Quartz Mining Licences.

Based on the results of a review of the documentation and a recent site visit it is estimated that the overall closure liability at the Sa Dena Hes Mine site has dropped from \$22.632M as of November 28, 2013 to \$4.942M as of October 7, 2014. It is recommended EMR adjust the financial security requirement to this level.

References

Teck 2014, *Teck Sa Dena Hes Tailings Management Facility Decommissioning Design Report*, prepared for Teck Resources Limited, by SRK Consulting, March 2014

Teck 2013c, *Sa Dena Hes Mine Decommissioning and Reclamation Status Report – November 2013, Yukon Water Licence QZ99-045 and Quartz Mining Licence QML-0004*, prepared by Teck Resources Limited, November 28, 2013

Teck 2013b, *Re: Sa Dena Hes Decommissioning – November 2013 Site Audit and Financial Security Requirement*, 3 page letter report including a 1 page costing table, from Bruce Donald-Manager Dormant Properties, Teck Resources Limited to Robert Holmes, Director, EMR Minerals Branch, dated November 28, 2013

Teck 2013a, *Sa Dena Hes Operating Corporation – Sa Dena Hes Mine Detailed Decommissioning & Reclamation Plan March 2013 Update*, prepared by Teck Resources Limited, March 2013

TECK SA DENA HES MINE - OUTSTANDING CLOSURE LIABILITY ESTIMATE AS OF OCTOBER 7, 2014

	AREA	DESCRIPTION	TECK JUNE 2013 FORECAST (\$)	TECK OCT2014 FORECAST (\$)	TECK (%) COMPLETED	TECK SECURITY REFUND (\$)	SJ ESTIMATED % COMPLETED	SJ SECURITY REFUND (\$)	NOTE
Mob & Demob (from June 2013 Costing by Teck)									
			244,800				100%		0
			163,200				90%		0
			81,600				0%		0
1.0 Site Services & Infrastructures									
1	Site power	Gen set & fuel/sea-can	239,940	239,940	66%	158,360	66%	158,360	Power for 2015
2	Road maintenance	Watering/grading of roads	101,482	99,320	75%	74,490	50%	49,660	Work to open road in 2015
3	General site	Misc site work not listed below	540,398	657,470	70%	460,229	70%	460,229	Misc items that are unknown
2.0 Demolition									
1	Mill area	Demo mill aux buildings, capping & resloping final mill site	4,800,183	1,980,646	85%	1,683,549	85%	1,683,549	Minor grading in 2015
2	Mill area	Demo concentrator and mill complex	included with above	2,413,407	100%	2,413,407	100%	2,413,407	
3	Jewel box zone	Demo shacks/clean site	40,788	40,788	100%	40,788	100%	40,788	
4	Burnick zone	Demo shacks/clean site/fuel tank/fan	170,979	170,979	100%	170,979	100%	170,979	
5	Tailing management facility	Salvage pumps/demo pump house	109,845	109,845	100%	109,845	100%	109,845	
6	Trappers camp	Demo shacks	32,400	32,400	100%	32,400	100%	32,400	
7	Gribbler ridge exploration camp	Demo shacks	32,400	32,400	100%	32,400	100%	32,400	
8	Upper north creek	Salvage pumps/demo pump house	24,472	24,472	100%	24,472	100%	24,472	
9	Lower north creek	Salvage pumps/demo pump house & shacks	79,464	79,464	100%	79,464	100%	79,464	
10	Camp creek diversion	Salvage pumps/demo pump house/cap wells	24,300	24,300	100%	24,300	100%	24,300	
11	Power pole/lines	Remove powerlines/poles/hardware	213,483	213,483	100%	213,483	100%	213,483	
12	HDPE pipe	Remove and stockpile HDPE pipe	included with above	164,375	95%	156,156	95%	156,156	Misc pipe piled in bone yard
13	Core rack demo and core disposal	Burn racks/place core in Jewelbox raises	Not included	82,677	100%	82,677	100%	82,677	
3.0 Earthworks									
Jewelbox Zone									
1	1408 portal	Install new portal plug	130,828	130,828	100%	130,828	100%	130,828	
2	Vent raises	Cap vent raises (concrete)	186,826	186,826	100%	186,826	100%	186,826	
3	1250 portal	Reslope & fill portal area/stabilized slopes	60,035	60,035	100%	60,035	100%	60,035	
4	Jewel box pit	Reshape pit with waste rock	112,482	112,482	100%	112,482	100%	112,482	
5	Jewel waste rock dump	Reshape waste rock dumps	188,360	188,360	100%	188,360	100%	188,360	
Main Zone Pit									
1	1380 portal	Install new portal plug/sed pond	150,585	150,585	100%	150,585	100%	150,585	
2	Main zone open pit	Reshape pit with waste rock	266,469	266,469	100%	266,469	95%	253,146	
3	Main zone waste dump	Reshape waste rock dumps	294,471	299,706	100%	299,706	95%	284,721	
	Main zone sediment ponds		5,235						
Burnick Zone									
1	1200 portal	Install new portal plug (2)	176,956	176,956	100%	176,956	100%	176,956	
2	1300 portal	Install new portal plug/sed pond	108,027	108,027	100%	108,027	100%	108,027	
3	Burnick waste dump	Reshape waste rock dumps	30,850	30,850	100%	30,850	100%	30,850	
Tailings Management Facility									
1.1	South dam & tailings	Draining of the south dam	55,322	44,272	100%	44,272	100%	44,272	
1.2	South dam & tailings	Removal of dam material/cap tailings	883,201	883,201	100%	883,201	95%	839,041	
1.3	South dam & tailings	Slope/level/contour remaining material	49,167	49,167	100%	49,167	100%	49,167	
1.4	South dam & tailings	Demo decant tower and cap	14,429	38,900	100%	38,900	100%	38,900	
2.1	Reclaim dam	Draining of reclaim dam	55,322	84,180	100%	84,180	100%	84,180	
2.2	Reclaim dam	Removal of dam material/cap tailings	973,935	973,935	100%	973,935	95%	925,238	
2.3	Reclaim dam	Slope/level/contour remaining material	21,700	21,700	100%	21,700	95%	20,615	
3	cofferdam	Remove culverts & gates/regrade	78,556	78,556	100%	78,556	100%	78,556	
4	North dam	Slope the crest of the dam to the tailings	37,427	37,427	100%	37,427	95%	35,556	
5	Interceptor ditches	Clean up ditches and surrounding areas	47,783	47,783	0%	0	0%	0	Planned work for 2015
	Tailings Pond decant tower		38,900						
7	Camp creek diversion	Channel/rip rap and breach by-pass	118,010	118,010	100%	118,010	95%	112,110	
8	Mill area	Fill/shape/grade/capping	863,250	863,250	85%	733,763	85%	733,763	Minor grading in 2015
9	Jewelbox zone	Capping	304,032	304,032	0%	0	0%	0	Pending Test Result 2015
10	Burnick zone	Capping	182,419	182,419	0%	0	0%	0	Pending Test Result 2015
	Landfarm		304,032						
	North creek dyke		11,817						
Rip Rap Quarry and Landfill									
1	Rip rap quarry km 17	Rip rap quarry	273,331	273,331	100%	273,331	100%	273,331	
2	Landfill	Prepare/manage/track material & cap	409,066	326,869	95%	310,526	95%	310,526	Close last cell in 2015
Misc Area									
1	North creek dyke	Breach, remove culverts & place rip rap	158,587	170,404	100%	170,404	95%	161,884	
2	Roads & trails	Reclamation of roads & trails	249,599	349,599	0%	0	0%	0	Planned work for 2015
4.0 Revegetation/Final Reclamation									
1		Trees & shrubs	325,000	323,895	20%	64,779	0%	0	Planting in 2015
2		Reseeding	221,392	221,392	0%	0	0%	0	Seeding in 2015
5.0 Construction Labour & Expense									
PC/CM Management									

1		PC (home office)	1,245,100	740,742	80%	592,594	80%	592,594	2015 support
2		PMT (site services)	2,490,000	2,409,530	80%	1,927,624	80%	1,927,624	2015 construction season
3		Site infrastructure (LS)	2,552,000	2,516,584	85%	2,139,096	80%	2,013,267	2015 construction season
Engineering Services									
1		Portal & ventilation seals	39,217	39,217	100%	39,217	100%	39,217	
2		Portal drainage systems	15,687	15,687	100%	15,687	100%	15,687	
3		Tailings management facility	197,827	189,982	100%	189,982	100%	189,982	
4		Camp creek diversion	29,674	29,674	100%	29,674	100%	29,674	
5		Refuse area	15,000	15,000	100%	15,000	100%	15,000	
6		Hydrocarbons	12,500	12,500	100%	12,500	100%	12,500	
Owner's Cost									
1		Salaries	500,000	410,146	60%	246,088	60%	246,088	Teck 2015 Construction Season
2		Expenses	200,000	146,709	60%	88,025	60%	88,025	Teck 2015 Construction Season
Containment of Hazardous Materials									
1		Chemical disposal	43,085	43,085	100%	43,085	100%	43,085	
2		Fuel & lubricants	57,590	57,590	100%	57,590	100%	57,590	
3		Hydrocarbon soils remediation	976,530	53,978	100%	53,978	100%	53,978	
		Lead/Zinc Disposal	101,601						
		Hydrogeological Assessment	239,400						
Environmental Assessment & Consultants									
1		Human health & ecological risk assessment	500,771	350,000	60%	210,000	60%	210,000	Complete in 2015
2		CSR investigation & reporting	0	454,105	65%	295,168	65%	295,168	Complete in 2015
3		LFN environmental monitor	0	101,601	90%	91,441	90%	91,441	
5		Regulatory support	66,400	61,907	15%	9,286	15%	9,286	Post 2015 water licence application etc.
		Hazard Classification	12,537						
		Yukon Environmental Review	50,000						
8		SRK DRP support, water balance & permitting	185,000	97,635	85%	82,990	85%	82,990	Ongoing support
Monitoring & Site Inspections									
1		Geotechnical inspections	35,185	89,409	50%	44,705	50%	44,705	2015 inspection
2		Surface & ground water monitoring	149,870	149,739	50%	74,870	50%	74,870	2015 monitoring
3		Dam decommissioning monitoring	0	100,000	100%	100,000	100%	100,000	
Sub-Total									
			24,002,119	21,554,232		17,708,873		17,354,892	Credit owing based on above tasks

Contingency Allowance (5%)	1,200,106	1,077,712
	25,202,225	22,631,944

SUMMARY CALCULATIONS

Nov'13 Liability Estimate (pre-contingency, from above)	21,554,232
Credit due for work undertaken in 2014 minus NEW ITEMS	17,256,972
Remaining Liability (sub-total, pre-contingency)	4,297,260
15% Contingency Allowance	644,589
Remaining Total Closure & P-C Liability	4,941,849
Credit to be Issued Against Current \$22.6M Financial Security	\$17,658,151

	16,320	NEW ITEMS (that reduce credit value)
	81,600	Remaining 2014 Demob Cost (10%) as per Jun'13
	N/A	2015 Mob & Demob Cost (100%) as per Jun'13
	N/A	New QML & WL permitting for P-C Phase
	N/A	New 2016-2025 P-C Management
	97,920	Sub-Total of Additional Items
	17,256,972	Revised credit amount against fndl scrtcy