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OPERATOR: kde

SENDER: Ken Embrec

APPROVED:

TO: Mount Polley Mining Corporation

FAX: 250-790-2268

ATTN: Don Parsons

Cc: George Headley, MEM Victoria (250 952-0481)

Ed Beswick, MEM Prince George (250 565-6015)

Brian Kynoch / Peter Campbell, Imperial Metals (687-4030)

Eric LeNeve, Mount Polley Site

SUBJECT: Meeting Minutes - January 26 Meeting

Don,

The minutes from the January 26 meeting on Stage 3 Cycloned Sand construction are attached. Two other items were identified as deliverables, including the following:

- The construction schedule. A draft has been completed and is currently being reviewed. It will be forwarded as soon as it is finalized.
- The letter addressing stability during localized cycloned sand deposition is being prepared. It will be forwarded as soon as it is finalized.

Regards,

Ken Embree

Attachments:

January 26, 200 Meeting Minutes

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TABLE 1

MOUNT POLLEY MINING CORPORATION MOUNT POLLEY MINE

TAILINGS STORAGE FACILITY

MEETING MINUTES - STAGE 3 CYCLONE SAND CONSTRUCTION

A DESC	RIPTION		uary 31, 20
		ACTION BY	DAT
.0 Introd			
,	Meeting at KPL offices, January 26, 2000, 8:30 am to 11:00 am		
• F	Present at Meeting:		
۷ ا	Parian Kynoch (BK), Don Parsons (DP), Peter Campbell (PC), MPMC		
>			
>	Ken Brouwer (KJB), Ken Embree (KDE), Jeremy Kinch (JRK), KPL		1
• N	fleeting called to discuss KPL report "Report on Cycloned Sand Construction of Stage 3 and On-going Stages of		
th	he Tailings Storage Facility Vol I and II" (Ref. No. 11162/12-2).		
	SH provided items for discussion in a letter dated January 24, 2000 (copy attached).		
	Primary concern is downstream embankment stability and construction/operation methodology.		
	(JB commented that schedule for hydraulic placement presented in the report might be too optimistic. The		
te	avised method will see cycloned sand placed hydraulically at the Main Embankment only, and only for the first 2		
10	o 4 lifts. The remaining fill will be placed mechanically from drained cycloned sand stockpiles.		1
	the revised plan offers increased flexibility and allows additional hydraulic placement if conditions are favourable.		
. T	the Mount Polley tailings embankments have a low permeability core zone that precludes the development of a		
8	teady state phreatic surface within the cycloned sand fill.		
		ł	ł
tr	Vater is introduced to the cycloned sand during hydraulic placement of overlying lifts, which results in localized,		
T	ansient wetting fronts for short periods of time but does not affect the long term stability of the embankment, his was observed in the trial berm constructed during 1999.		
Opera			
1	perations Manual Content:		
>			
	the division of the course of		
1	odated to reflect the shift to cycloned sand construction. The report will be issued pending the completion of clone system and pumpback system design (MPMC).		
>			}
i	- manage management of the management	MPMC/KPL	26-Jan-
×	ersonnel Training/Supervision & Experience/Management:		1
1	Operator error has occurred at Gibraltar, particularly during line flushing, which results in erosion of cycloned and.		
>]
į.	Stockpiles will be created before and during construction, which will provide an opportunity to optimize the		
- Sy	stem, observe drainage characteristics and train the operators. Revised plan makes greater use of		
) N	echanically placed sand, which decreases the possibility of operator error.		
1	Most of the tailings operators on staff, some of whom have been with the Gibraltar Mine tailings crew, have		,
l .	perience with cyclone systems.		
>	Operators will monitor underflow density and line pressure during cyclone operations. The Marcy density		
	uge and visual observation are used to monitor underflow properties.		
۶ (۵	The QA/QC program will continue as per the trial program. Composite samples are collected frequently		
	ach shift) for PSA with results typically within semi-weekly.		
× ×	Piezometers will be installed and monitored. Trigger levels will be established.		
>	The trial berm had a complete underdrainage blanket. Most of Stage 3 will be completely drained by the		
77.4	ne T haul road.		
	College was a second of the se		26-Jan-
>	Subsequent longitudinal drains will be placed at 20 m intervals.	KPL	20-0211-1
>	A detailed construction schedule is being developed to identify goals and key dates.	KPL	20-021-1
> > >		KPL	20-0211-1

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02/11/00

TABLE 1

MOUNT POLLEY MINING CORPORATION MOUNT POLLEY MINE TAIL DIGG STOP A CIP PA CYL YMY

TAILINGS STORAGE FACILITY

MEETING MINUTES - STAGE 3 CYCLONE SAND CONSTRUCTION 3.0 Construction Methodology Underflow will be piped from the crest to the bottom to avoid eroding the existing downstream face. Stockpiles will be established at the Main Embankment abutments to start. The current schedule assumes that these will be allowed to drain for 6 weeks, if necessary. Cells will be developed and, if required, will be allowed to drain for at least three weeks before placing the next lift. Perimeter Embankment construction will start at the end of June with either local borrow or mechanically placed sand. (to be confirmed) DP noted that it would be best to start construction at the Perimeter Embankment early. 5.000 m³/day (double shift) has been used in the schedule. Coarse cycloned material would be beneficial near the end of construction as it would drain more quickly and allow the 6 week waiting period for stockpiles to be reduced. GH asked if fine material placed in initial lifts would adversely affect vertical drainage in future raises. KJB commented that cycloned sand would be placed for periods of short duration, possibly resulting in a short saturation "pulse" migrating through the underlying partially saturated cycloned sand. The underlying material is partially saturated, so elevated pore water pressure would not be sustained. Stratification and segregation of cycloned sand will occur to some extent, with coarse material deposited near the discharge point and fine material collecting at the toe of each cell. The maximum lift height is 10 m at the Main Embankment (for the first lift). The maximum lift height in the trial berm was 5 m. Segregation will be controlled through the use of a discharge pipe and more efficient operations. The revised plan does not require the cyclones to be moved as often as the original plan. Expedient construction: Engineering concerns will not be overlooked because of production requirements. KPL will be involved in on-going review of progress and scheduling. 4.0 Design The underdrain consists of select shot rock, but does not have a perfect filter relationship with the cycloned sand. The redundancy of the drains will allow drainage to continue if a section is blinded off by sand. Outflows from the trial berm were monitored and fines migration was not observed. The only source of water is from hydraulically placed sand. There is no sustained phreatic surface due to the low permeability core zone and higher permeability sands. GH noted that sinkholes formed near one drain at Gibraltar. These were caused by cyclone drainage water only. Zone T was scarified before sand placement in the trial berm. Filter fabric was used in the rockfill toe berm. Slimes blinded of the filter fabric, resulting in ponding on the upstream side of the toe berm. Ponded water will have to be pumped or piped out. GH suggested using transition material in the rock too berms. KDE noted that Zone T material is probably acceptable but segregation can occur during fill placement. Transition will be included if filter criteria are not satisfied. Longitudinal drain flow capacity is excellent and drains are greatly oversized due to the size of the equipment KPL 26-Jan-00 involved. The total drainage flows are expected to be less than 20 l/s. KPL to confirm data and verify capacity. Additional toe berms will be added for further expansions. No contingency measures are required to provide vertical drainage. Cells are allowed 3 weeks to drain before the next lift is placed. There will not be enough water draining from the active cells to cause a large scale piping failure. Also, the longitudinal drains are placed at 20 m spacing and facilitate efficient drainage of the entire length of the downstream toe. This precludes the development of a phreatic surface in the sand. The finger drains provide an additional drainage capacity and help to route flows into the sediment control ponds. The upstream toe drain is already installed at the Main Embankment. It includes concrete encased pipe and seepage collars at the core zone penetrations. This provides operational contingency.

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02/11/00

TABLE 1

MOUNT POLLEY MINING CORPORATION MOUNT POLLEY MINE TAILINGS STOP A CIF FA CITY VIEW

TAILINGS STORAGE FACILITY

MEETING MINUTES - STAGE 3 CYCLONE SAND CONSTRUCTION

	e GH thought SEEPAW model shows shippour drain extending in the said.		
	 GH thought SEEP/W model shows chimney drain extending into sand. This is not the case in reality but has no effect on the model, as both the chimney drain and cycloned sand have permeability orders of magnitude higher than the till core. 		
	 Drainage water will be directed to ponds via ditches. Hydraulically placed sand can "spill" into adjacent cells due 		
	to the slope of the ground. The lowest cell can overflow into the pond. Ditching and the road provide ultimate		
	containment at the Main Embankment.		
1 1			
5.0	Stability Assessment		
-	 Stability analysis assumed all downstream sand was drained. GH asked if analysis had been done for locally 		
	saturated sand during cycloning operations. These results will be updated and provided by KPL.	KPL	26-Jan-00
ŀ	Piping prevented by close spacing of longitudinal drains.	1	120 000,00
•	 Liquefaction can only occur if sand is saturated, therefore it can only occur during operations. Even if it could 		
	occur, it would be localized. It is also difficult to re-saturate material with surface recharge.	1	
ŀ	Equipment traffic will be beneficial, as saturated material will be densified.		
-	Loss of freeboard stability is not an issue, as sand will be placed mechanically adjacent to the core zone. This		
	material must be unsaturated in order to be placed and is therefore non-liquefiable.		
6.0 F	Risk Assessment	 	
•	GH concerned with phreatic surface and piping failure.	j	
•	To minimize risk, skilled and experienced operators are required to monitor the operation 24 hours a day.		1
	Supervision of operators is also required.		
•	GH concerned that uncontrolled erosion could expose an undrained area and subsequent sloughing could occur in		
- 1	saturated sands are exposed in the area of active deposition.		
•	sales sales allest sales sales and the sales appear layers to drain taster.		
•	The mill will have to notify the tailings operators in the event of a shutdown and flushing of the line. It takes		
	approximately 15 minutes for tailings/water to reach the tailings facility.	}	
•	Trigger levels will be set for piezometers. A monitoring schedule will be determined, with a higher frequency of	ļ	
1	readings than for embankment piezometers during initial operations.		ĺ
	Standpipe piezometers may be used in addition to vibrating wire piezometers. KP to evaluate	KPL	26-Jan-00
7.0 M	lonitoring and Operational Controls:	 	
<u> •</u>	OM&S Manual discussed.		
•	QA/QC Testing discussed.		
•	MPMC to construct drainage system and toe berms. KPL would inspect after work is completed and confirm		
	suitability to Ministry of Mines.		
8.0 R	equirements:		
•	Meeting minutes, comments on stability, schedule (28-Jan-00)	KPL	26-Jan-00
•	OM&S Manual. Preferred before starting stockpile. Focus on water management. (1-Apr-00)	KPL/MPMC	26-Jan-00
•	Excavate test pits in existing toe berm for particle size analysis and filter relationship calculations.	KPL	26-Jan-00
•	GH requested discussion of cell drainage for future raises/lifts. Review possible methods and provide letter		
	report. Not required immediately.	KPL	26-Jan-00
1	top to the total and the total) \/ (

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