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MINISTRY OF EMPLOYMENT AND INVESTMENT

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# MOUNT POLLEY HOLDING COMPANY LIMITED **MOUNT POLLEY MINE**

95-2018 Box 18

## 1998 WATER MANAGEMENT PLAN

## PERMIT M-200

Prepared for Ministry of Energy and Mines

Prepared by Mount Polley Mine Engineering Department

MP00010

# MOUNT POLLEY HOLDING COMPANY LIMITED MOUNT POLLEY MINE

#### 1998 WATER MANAGEMENT PLAN

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#### WATER BALANCE AND MANAGEMENT

#### 1.0 GENERAL

The water management strategy for the Mount Polley project was originally presented in the "Report on Project Water Management" (Knight Piesold Ref. No. 1624/1). The current revised water management strategy differs from the concept originally presented as some catchment areas are no longer utilized as a source of surface runoff for transfer to the tailings impoundment. Instead, up to one million cubic metres of water will be extracted annually from Polley Lake during the spring freshet high flow period.

The overall project components include disturbed and undisturbed areas at the Open Pits (OP), Rock Disposal Site (RDS), Millsite (MS), Tailings Storage Facility (TSF), the undisturbed catchment area immediately upstream of the Tailings Storage Facility and the diverted areas downstream of the tailings embankment. A schematic of the water balance components is shown on Figure 1. This report fulfills the requirement for the Section of the M-200 Permit entitled "*Proctection of Lands and Watercourse*" Item 3.

#### 2.0 WATER BALANCE

#### 2.1 General

The overall project water balance was completed in the "Report on Project Water Management" by integrating the water balances for the mine site with those for the Tailings Storage Facility. The analyses included a comprehensive series of water balances to evaluate the volumes of surface runoff water available throughout the life of the mine. A probabilistic water balance analysis using the @RISK Analysis and Modelling program was developed to describe the effects of a statistical range of precipitation conditions over the entire life of the project. Over 1000 different combinations of wet and dry precipitation conditions were considered.

The staged development plans for the various components of the project are included in the water balance analyses. Specific assumptions incorporated in the analyses are consistent with those used in previous water balances for the tailings impoundment and mine site. For this report, average annual water balances is estimated until the end of the year 2000. A typical schematic is illustrated in Figure 2.

#### 2.2 Water Balance Results

When conducting the water balance, fundamental consideration was that an adequate volume of water must be available to the milling circuit during the cold winter months (when precipitation accumulates as snow and surface runoff is at a minimum) or if drier than average conditions occur. This requirement can be met by:

- Providing up to 2.5 million cubic metres of water in the tailings impoundment prior to start-up.
- Ensuring that 1.9 to 2.5 million cubic metres of water is available in the tailings impoundment following the freshet during on-going operations.
- Allowing for contingency water extraction of up to 1.0 million cubic metres annually from Polley Lake during peak flow months.

The water balance components for the next three years are shown in Table 1, the general trend indicates that water stored in the Tailings Storage Facility will be at a minimum at the end March of every year, just prior to freshet. The subsequent snowmelt will significantly increase the water storage in the tailings impoundment. However, it is unlikely that the freshet alone will provide the volume required to carry operations through the following winter. Consequently, additional make-up water from Polley Lake (up to about 1 million cubic metres) will be required to make up the difference so that sufficient process water is available for reclaim. This additional inflow requirement is tentatively scheduled at 1,000,000 cubic metres for 1998, 500,000 cubic metres for 1999 and 0 cubic metres for the year 2000.

The annual withdrawal of the maximum of 1.0 million cubic metres of water from Polley Lake will likely only be required prior to start-up and for the first year thereafter (1998). Withdrawal requirements for subsequent years will decrease progressively with time due to the increased consolidation of tailings in the pond (greater release of pore water) and the progressive development of the open pit and waste dump.

# 2.3 Water Supply at Start-Up

There were approximately 670,000 cubic metres of water pumped from Polley Lake in 1997 for at total of 2,100,000 cubic metres stored in the Tailings Storage Facility prior to mill start-up. This water volume was obtained by capturing the 1997 freshet and by optimizing the amount pumped from Polley Lake.

#### 3.0 WATER MANAGEMENT PLAN

#### 3.1 General

The objective of the project Water Management Plan in the early years is to route all project water flow from disturbed areas into the milling process or into associated mine site activities such as dust suppression. In the later years of operation the objective will be to monitor and release selected surface water inflows in order to managed the final volume of ponded water in the tailings impoundment at closure. The following activities will be incorporated in the Water Management Plan:

- Maximize the capture of surface and groundwater flow from within the project area.
- Maximize the use of the uncharacteristic water recovered from within the project area in the milling process.
- Minimize the volume of fresh water extracted from Polley Lake.
- Monitor the quality of surface runoff from disturbed areas and groundwater flows within the project site, monitoring in accordance to the term and conditions of our effluent permit 11678.
- Release only the highest quality water from within the project boundaries in accordance with permitted requirements. The volumes to be released will be as necessary to maintain an overall project water balance under actual hydrometeorological conditions.
- Manage the tailings supernatant pond to optimize the volume of water stored on the tailings surface during operations and provide the final volume of ponded water in the tailings basin at closure. The objective at closure is to provide a walk-away solution.
- Develop and maintain a detailed data base to allow water balances for site to be as accurate as possible, thereby becoming useful tools for predicting annual make-up water requirements, for scheduling associated tailings construction activities and for scheduling releases of clean surface runoff water as appropriate.

#### 3.2 Surface Runoff Diversion Ditches

Some of the surface runoff diversion ditches will be used to direct runoff to the Tailings Storage Facility from various catchments as follow:

- Catchment above the Tailings Storage Facility Runoff from the area directly above the Tailings Storage Facility will be captured during the early years of operation.
- Catchment above tailings area access road, below Bootjack Creek Runoff in the ditch for the access road will be directed to the Tailings Storage Facility. The pipelines are in a separate pipe containment channel.
- Catchment above the tailings access road, between the Millsite and Bootjack Creek Runoff will be directed to Bootjack Creek with transfer to the Tailings Storage Facility.
- Catchment areas downstream from the tailings embankments Runoff for some areas will be directed to the Seepage Collection Ponds and transferred to the Tailings Storage Facility.
- Millsite area Diversion ditches along the lower perimeter of the Millsite area will collect and direct runoff to the Millsite Sump. The water will be pumped to the mill and will flow by gravity to an inlet point (T1) on the tailings pipeline so that it can be returned to the process circuit via the tailings and reclaim systems.
- Rock Disposal Site A diversion ditch along the base of the Rock Disposal Site area will collect and direct runoff to the Southeast Sediment Pond. From here, water can be directed into the process circuit via the Reclaim Booster Pump Station or the T2 Dropbox. The design criteria for the diversion ditches are as follows:
- The ditches are sized to convey the peak flow runoff from the 1 in 10 year precipitation event. Our effluent permit PE 11678 requires the collection and conveyance of a 1 in 100 year 24 year storm for the Mill Site sump.

- Erosion protection and energy dissipation will be provided to minimize erosion under normal operation conditions. Erosion damage requiring repairs to surface water control facilities would be expected during extreme flood events.
- For design purposes, "extreme" floods are defined as those with an annual probability of occurrence of less than 2%.
- The need for sediment removal at sediment control ponds should be checked annually and after major storm events and carried out when necessary.

#### 3.3 Polley Lake Pumping System

The Polley Lake Pumping System is a contingency option that can provide additional make-up water to the milling process. The system was designed for a maximum water extraction rate of 5,500 US usgpm and will operate during the spring freshet only. It includes a submerged intake structure, suction pipeline, pumping station and a discharge pipeline into the Tailings Storage Facility.

Based on annual water balances for average precipitation conditions, the extraction of up to 1 million cubic metres may be required for the first 2 years of operations, after which the annual make-up water requirements decrease.

The amount of water that can be extracted from Polley Lake is limited by the minimum fish flow requirements for Hazeltine Creek. To minimize the negative potential impacts on Hazeltine Creek, water will only be extracted from Polley Lake during the freshet, from approximately mid March to mid May. Base on annual outflow hydrographs for Polley Lake, approximately 1.4 to 2.0 million cubic metres of water should be available for pumping and will be determined by an automated flow monitoring station in Hazeltine Creek during the pumping period. Refer to Figure 3 for an example Hydrograph for Hazeltine Creek.

### 3.4 Sediment Control Ponds and Discharge Requirements

Sediment control ponds are sized to provide storage (Southeast Sediment Pond) of the 1 in 10 year - 24-hour storm runoff flood flows from the tributary catchment above the sediment pond. The storage capacity can be increased by selectively routing flows into the tailings system. Erosion control and energy dissipation riprap will be provided as necessary in spillways and discharge channels.

#### 3.5 Water Balance Updates

The water balance is updated at the end of each month, the accuracy of the balance is dictated by an actual staff gauge reading taken in the reclaim pond and compared to a calculated value. Operating experience will further enhance the water management planning.

#### 3.6 Key Parameters and Monitoring Variables

Tailings Tonnage: Mining Variable.
Tailings Solids Density: Milling Variable.

Tailings Beach Volume: Tailings Operating Variable.

Monthly Precipitation: Handar automated weather station, snow pack,

manual measuments.

Monthly Evaporation:

Weekly South-East Pond flows:

Weekly Millsite Sump Flows:

Estimate; based on field measurements.

Estimate; based on field measurements.

Short term planning tool (Figure 4)

Local Weather Information: Short term planning tool. (Figure 4.)

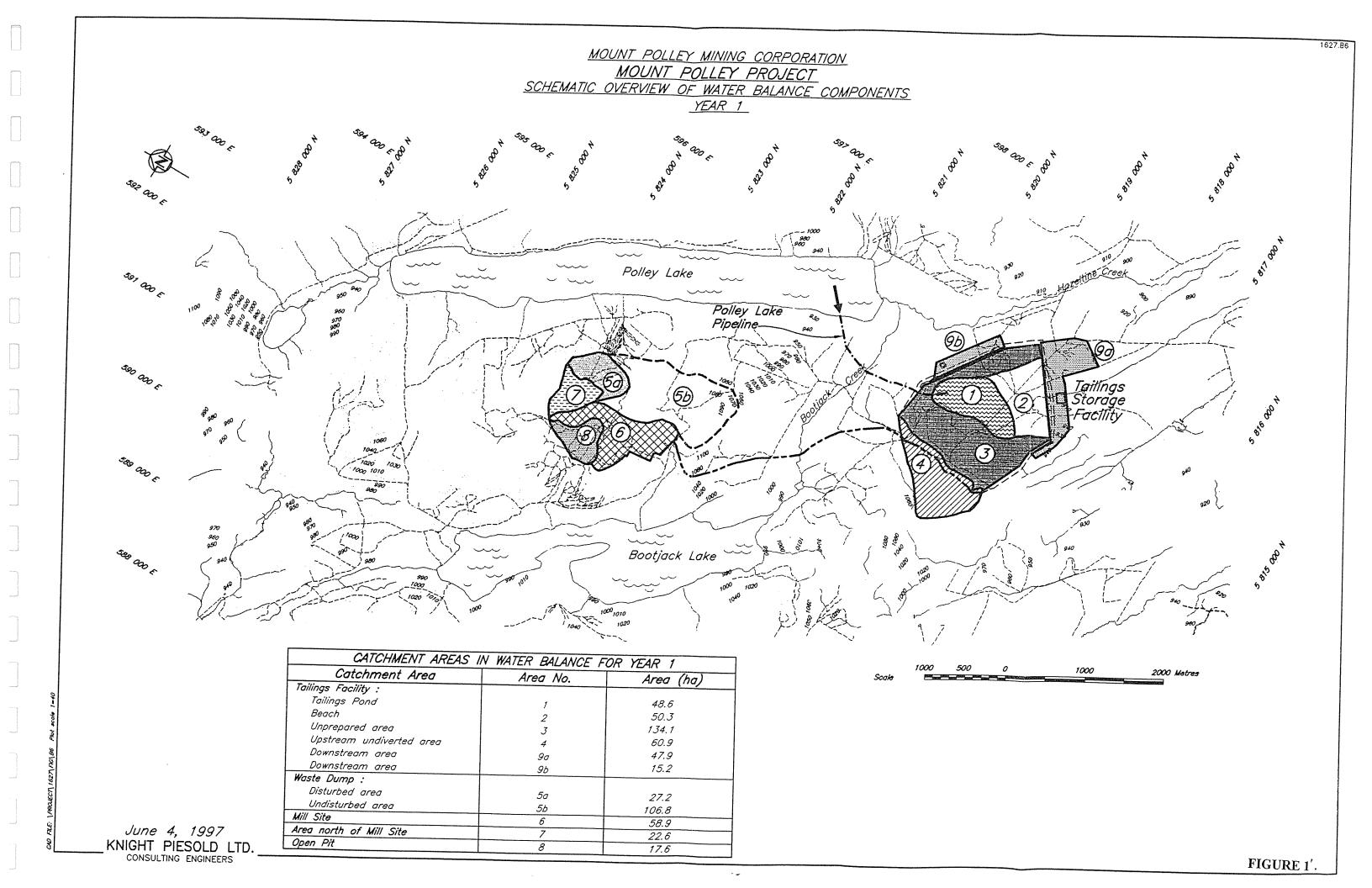
Ice Thickness: Monthly Measurement. Hazeltine Flow Measurement: Hydrometric Station.

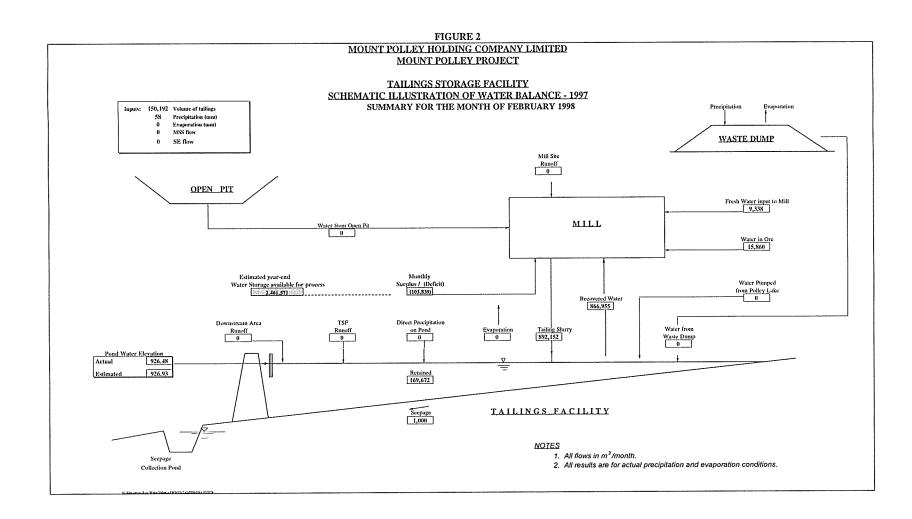
Polley Lake Instrumentation: Signet Flow monitoring device.

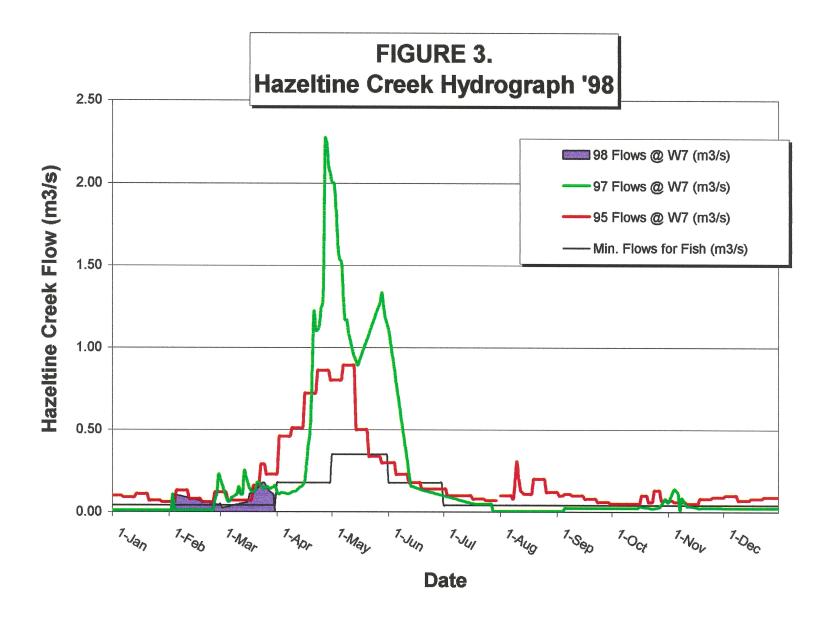
# TABLE 1 Mount Polley Mining Corporation Mount Polley Mine

Waterbalance Through End of 2000

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							7 mm		Budgeted Monthly l Budgeted Monthly		,		400822 1924		48000 202			552190 4201	552568 2361	534804 553 2118 3	185 534980 015 3789																						
Typical parameters * for actual refer to footnotes	Catchment Areas				Runoff Coeff.												R	tunoff Coeff.		Dump (Disturbed) Dump (un-Disturbed)	1999 1999	93 ha 88.8 ha		60% 24%	Weather Statists	May	to December 1997		Precipitation:		35% of Ave. Annua	1											
Throughput = 17,808 tonnes/day = 4,0%	Area North of Mill Site Total Tailings Catchmer Regional / Upstream Ca	t Area =	233	0 ha 0 ha	24%		Min. Fresh Makeup Total Annual Precip		100	Ousgpm	16,414 m³/n 487.3 mm									Dump (Disturbed) Dump (un-Disturbed)	2000 2000	110 ha 88.8 ha		60% 24%			to December Ave. A to December 1997	nnual	Precipitation: Evaporation:	533.8mm 347.2mm or 8	32% of Ave. Annua	1											
	Active / Cleared Tailings Initial Water Pond Area	Basin Area =	160 60.	0 ha 00 ha	24% 100%		rout Antual Pour	фи <b>зи</b> он –			407.5 Hall	•		ater Pond Area	1998-1999	81.5		100%	Waste	Dump (Disturbed)	2001	ha		60%			to December Ave. A	nnual	Evaporation:	423.0mm													
= 31.0% Density 1997 = 1.24 t/m³ Density 1998 = 1.24 t/m³	Beach Area Downstream Area			10 ha .1 ha	70%									Oump (Disturbed) Oump (un-Disturbed)	1998 1998	45 88.8		60% 24%	Waste	Dump (un-Disturbed)	2001	па		24%																			
7 Density 1999 = 1.3 t/m <sup>2</sup> ate Production = 3,000 tonnes														Oump (Disturbed)		75 58.8		60% 24%																									
ate = 9.0% • Water Pond Depth = 0.0 m • = 2119125 m <sup>3</sup>	Total pit Area			7.6 ha	50%	i							waste	Dump (un-Disturbed)	1996	36.6	iid.	2476																									
Lastin-C'	Mill Site - (Disturbed / v Waste Dump (Disturbe Waste Dump (un-Distu	d)		3.9 ha 27 ha 3.8 ha	50% 60% 24%	•	134		G:\c	data\envirodocs\Wat	31-Mar-98 ter Balance\[WB99v	v2.xls]MINELIFE2		,	138 42.809	6							1999	181.8 42	%																		
NE UNLESS OTHERWISE NOTED	Waste Dairip (air Disc					1997											1998										19	99										20	00				
i n/month)	JAN I	EB MA	R APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN 1	FEB M	AR RUNOF	F APR	MAY	JUN	JUL	AUG S	EP OCT	NOV	DEC	JAN FI	B MAR	RUNOFF	APR	MAY J	IN JUL	AUG	SEP	OCT 60.4	NOV DE	JAN	FEB 59.1	MAR	RUNOFF	APR	MAY J	N JUL	AUG	SEP 60.4	OCT 60.4	NOV 57.3
n/month) (nmn/month) ea (ha)	0.0 0.0 60.00	0.0 0.0 60.00	0.0 0.0 60.00 60	0 45.3 0 47.0 00 60.00	51.8 71.0 0 60.00	65.7	94.2	31.0	81.0 14.9 69.10	35.2 2.8 71.40	49.6 0.0 75.20	28.9 0.0 80.00	0.0 80.12	0.0 80.24	45. 0. 80.3	50.6 47.0 6 80.48	81.3 112.0 80.60	107.0 80.72	92.0 80.84	30.0	5.0 0.0 1.08 81.20	0.0 81.32	0.0 81.48	0.0 0. 81.60 81.	. <mark>0</mark> 72	0.0 81.84	81.96	112.0 107 82.08 82	20 82.32	30.0	15.0 82.60	0.0 82.72	0.0	0.0 0.0 82.98 83.10			83.34	83.46	83.58		2 83.94	84.06	
a (un) a) E STORAGE IN TSF AT END OF MONTH> (m²)		233.00 2								233.00			233.00	233.00		0 233.00		233.00	233.00	233.00 23	3.00 233.00	233.00	233.00	233.00 233.	00	233.00	233.00	233.00 233	.00 233.00	233.00	233.00	233.00	233.00	33.00 233.00	233.00		233.00	233.00	233.00 2	33.00 233	0 233.00	233.00	233.00
of Deposited Tailings Solids added to Beach hume of Deposited Tailings Solids added to Beach	0	0	0	0 0	0	50000 50000				37,500 97,500		65400 165,400	34600 200,000	165.400	5000	50000	SOOO			29	047 58096	87143	116190	145237 17428	35						203332	232379 2	51426 29	0473 319520	348571							377589	406636
e of Deposited Tailings Solids	0	0	0	0 0	3,270	61,303	158,142	163,412	160,375	180,241	180,784			190,038	183,90	200,937	194,455	211,567		204,906 211,	948 204,973	211,776	206,264 2	206,264 206,26	54	206,264	206,264	206,264 206,26	64 206,264	206,264	206,264	206,264 20	6,264 20	,264 206,264	206,264		206,264			,264 206,20		206,264	
dume of Deposited Tailings Solids	0	0	0	0 2,119,125	3,270 <b>2,148,038</b>				546,502 <b>1,972,059</b>	726,743 <b>1,857,572</b>				369,758 3 <b>22,780</b>	1,553,66 <b>2,250,01</b>	1,754,603 2,734,493	1,949,058 <b>2,673,371</b>	2,160,625 <b>2,578,175</b>	2,372,337 2, 2,529,569 2,	,577,243 2,789, 178,209 2,454,5				3,824,73 31,602 2,116,65			4,237,263 4, <b>2,967,755 2,</b> 9	4,649,7: 58,703 2,907,50						,377 6,093,642 ,693 <b>2,784,674</b>	6,299,906 <b>2,669,724</b>			6,712,435 6, 3,078,297 3,	18,699 7,124 92,637 3,059	,964 7,331,2: , <b>756 3,075,8</b> 6		7,743,757 <b>3,128,857</b>	
under ice conditions  0.75m of ice. under ice conditions  1.00m of ice.				2,119,125 2,119,125	2,148,038 2,148,038	2,238,784	2,084,767	1,993,297 1,993,297	1,972,059 1,972,059	1,857,572 1,857,572				348,118 348,118	2,250,01 2,250,01					,478,209 2,454, ,478,209 2,454,				564,522 1,448,59 564,522 1,225,90				958,703 2,907,5 958,703 2,907,5						,452 2,105,331 ,452 2,105,331					92,637 3,059 92,637 3,059				
Quality (Total Suspended Solids in parts per million) Quality (pH) Quality (Total Copper in parts per million)					0.07	162 0.358		8.1	160 8.3 0.199	61 8.3	8.3																																
natant trapped in Voids	0	0	0	0 0	18,312	67,729	173,569	180,544	177,188	199,137	176,877	134,792		209,962	203,18			233,747		226,388 234,				207,851 207,85				207,851 207,8					7,851 20 0.679 6.23	,851 207,851	207,851 6,654,232				07,851 207 77,785 7,485	,851 207,8 ,636 7,693,4		207,851 8,109,189	
e Volume Trapped in Voids 'SF	0	0	0	0 2,119,125	18,312 2,169,620					816,479 3,400,794				507,782 400.320	1,710,97 5,514,65		2,147,815 6,770,244	2,381,562 7,120,362	7,517,375 7	,841,857 3,076, ,897,310 8,319,		_,,	-,,	952,169 4,160,02 802,240 10,101,40		10.838.107	11.780.740 12.	783,573 4,991,4 185,803 12,548,7	75 12.959.678	13.358.316	13.796.640	14.244.592 14.72	6.435 15.02	.601 15.324.697	15.623.862		16,405,725	6,860,666 17	89,122 17,670	,356 18,100,5	3 18,527,486	18,981,803	19,445,236
ISF Underwater which affects pond elev.	0	ō	0	0 2,119,125 926.31	2,169,620	2,339,398	2,467,092	2,699,578	3,075,903	3,303,294	3,622,700		3,900,282 4,	234,920	5,464,65	4 6,372,070	6,720,244	7,120,362	7,517,375 7.	897,310 8,290,	673 8,685,593	9,116,836 933.94	9,386,954 9,6	9,927,12			11,780,740 12, 935.78	185,803 12,548,7	75 12,959,678	13,358,316	13,593,308	14,012,213 14,40	5,009 14,73	5,128 15,005,177	15,275,291		16,405,725	16,860,666 17	89,122 17,670	18,100,5	18,527,486	18,604,214	19,038,600
levation (Estimated) levation (Actual)				926.31 0.00	926.40	926.67	7 926.89	9 927.23	927.77	928 09	928.39	928.36 -0.27	928.65	929.20	930.0	931.36			2.00																								
TER TO PROCESS> (m²) esh Makeup Water	0	0	0	0 0	3713	3 5981	1 10170	0 10902	11638	11051	11621	7295	9338	9339	171:	1 18213	13411 <b>20146</b>	14191 21710	14542 21890	13720 14 21202 21	4189 13759 1856 21058	14435 21903	12583 21264	12582 125 21264 212		13849 21264	18954 21264	14542 146 21264 212	086 14439 264 21264	13976 21264	14084 21264	14056 <b>21264</b>	14392 21264	2583 12582 21264 21264	12583 21264		14020 <b>21264</b>	14126 <b>21264</b>		14282 146 21264 212		14244 <b>21264</b>	
Water from Ore minus water in conc. al Fresh Water to process	0	0	0	0 0	0 4216	5 12246	5 16375 5 26545		16608 28246	18592 29643	18649 30270	12558 19853	15860 25198	19667 29005	190 361:			35900	36432	34921 30	6045 34818	36337	33847	33846 338	47	35113	40218	35806 353		35240	35348			33847 33846			35284	35390		35546 359			
TS TO TSF> (m²) h Shurry d Precipitation	0	0	0	0 0 0 27,180	61,905 31,080				1,024,794 55,971	1,047,084 25,133	1,050,236 37,269	708,748 23-3-20	892,152	892,152 35,787 <b>105</b> ,0	1,068,38 377 36,24			1,229,068 53,033	67,178	,190,370 1,231, 48,900 48,	972 46,528	60,827	1,198,263 1,1	98,263 1,198,26	145,292	1,198,263 36,910	41,472	1,198,2 66,895 54,0	05 68,408		1,198,263 49,890	47,399	1,979	1,198,263 45,281	37,093	147,964	37,586	42,231		,991 69,6	4 50,700		48,235
ared Basin Runoff gional Catchment Runoff	0	0	0	0 10,872 0 6,632	12,432 7,584	29,184 8,184	,,020	17,171	17,671 9,677	7,485 5,153	10,086 7,256	5.50 5.731	(1.108 8.506	9:45 <b>19</b> ;	206 8,62 252 6,60 693 1.01	7,408	15,531 11,932 1,834	12,501 (6,046)	15,788 (1,303)		440 10,837 647 8,389 789 1,498	10,951	11,613	10,432 8,34 2,506 8,51	33,520 26,074 11,235	8,460 6,603	9,477 7,408	15,241 12,2 11,932 (6,0	68 15,492 46) (1,303)	11,237 1,523	11,220 6,647		3,848 0,951	0256 10.133 025 82505 0251	8,280 5,215 5,000	32,879 26,074 25,303	8,298 6,603		11,932 (6	,031 15,1 ,046) (1,3 ,913 7,4	3) 1,523	11,008 6,647 5,436	10,427 8,389 5,157
ach Runoff noff from Downstream Area aste Dump Area ( Disturbed and Un-Disturbed)	0 0	0	0	0 20,009 0 8,284	22,880 8,284	53,711 10,996	1,872 18,375 1,204	3,308 27,054 1,642	2,187 35,778 10.195	1,544 15,548 864	2,230 21,891 8,782	2375 12765 3177	25,063 25,063 10,295	(9.6%) <b>58,</b>	692 1,01 084 19,92 301 7,99	22,350		29,020 11,642	36,705 14,725	20,077	679 25,309 567 3,384	33,039	3 \ 3 78 4 3 759	23,563 19,65 3,433 2.60	78,667	19,921 10,429	22,350 11,701	35,999 29,0 18,847 15,1		26,679 4,656	26,679 4,656	25,309 : 4,417	3,039 5,766	188 25,643 1230 2439	10,076 3,4%	78,667 13,729	19,921 10,429		35,999 29 18,847 11	,020 36,7 ,642 14,7	5 10,702		25,309 3,384
Il Site Sump ater available from Polley Lake	0	0	0 0 300,0	0 3,669 00 371,000	3,669 0	8,174 0	3,382 0	7,841 0	6,818 0	1,598 0	3,635 0	0	0	0	646 3,30 8 500,00	500,000		4,819 0	6,095 0 59,350	4,430 4, 0 59,350 59,	430 4,203 0 0 350 59,350	1,829 0 59,350	0 59,350	0 59.350 59.35	4,355 0 θ	3,308 0 59,350	3,712 500,000 59,350	5,978 4,8 0	19 6,095 0 0	4,430 0	4,430 0 59,350	4,203 0 59,350	5,487 0 9,350 5	0 0 2350 59,350	3.7% 0 59.350	13,064	3,308 0 59.350	3,712 0 59.350	0	1,819 6,0 0 0.350 59.3	5 4,430 0 0 0 59,350	4,430 0 59,350	4,203 0 59,350
oundwater wells ( see note 14) pen Pit (see note 4) pmestic Waste Water (4USgpm)	704	0 635	704 6	0 0 0 0 81 704	0 0 681	0 0 704	0 0 704	0 0	0 0 704	0 0 681	20,000 0 704	20,000 <b>0</b> 704	41,000 <b>0</b> 635	41,000 <b>0</b> 704	59,35	59,350 0 0 1 681	59,350 0 681	<b>59,350</b> 25,000 <b>704</b>	25,000 <b>704</b>	25,000 25,	350 59,350 000 25,000 704 681	25,000	59,330 0 704	0 635 70	0 Ö 04	41,000 681	41,000 <b>681</b>	59,350 59,3 41,000 41,0 681 7			41,000 <b>704</b>		11,000 <b>704</b>	0 0 704 635	99,390 0 704		57,560 <b>681</b>			7,560 57,5 704 7			
SES FROM TSF > (m²)	704	635	704 300,6	31 448,350	148,515	598,078	1,017,004	1,090,245	1,163,795	1,105,090	1,162,089	729,452	933,787	933,856 251,	556 1,712,11	3 1,821,298	1,341,093	1,419,090	1,454,151 1	371,958 1,418,	862 1,375,941	1,443,459	1,258,317 1,2	258,248 1,258,31	17 309,662	1,384,925	1,895,413 1,	454,185 1,408,5	75 1,443,932	1,397,637	1,408,365	1,405,630 1,43	9,186 1,25	1,258,248	1,258,317	337,579	1,401,233	1,712,000	1,420	1,464,4	5 1,426,349	2,10,1,10	1,120,730
ter Retained in Tailings Voids	0	0	0	0 0	18,312		2.0,000			199,137	176,878	134,792	169,672	169,672	203,18	,	214,842	233,747		226,388 234,	,	233,979	207,851	207,851 207,85	51	207,851	207,851	207,851 207,8			207,851	207,851 20	7,851 20	7,851 207,851	207,851		207,851	207,851		7,851 207,8 9,559 77,1		-	207,851
oration from Water Pond age	1,000	-,	0	-,	1,000	1,000	1,000	1,000	1,000	1,999 1,000	1,000	1,000	1,000	0 1,000	1,00	1,000	-,	86,370 1,000 321.118	74,373 1,000 309,280		162 0 000 1,000 331 227,462	-,-	0 1,000 208.851	1,000 1,00	00	1,000 208.851	1,000 208.851	91,930 87,9 1,000 1,0 300.781 296.8	00 1,000		12,390 1,000	,	-,	0 0 ,000 1,000			1,000 208.851	1,000	1,000	,000 1,0		1,000	1,000 <b>208,851</b>
Water Lost  TS FROM TSF> (m²)   Reclaimed for Process	1,000	1,000	0 1,0	0 29,200	61,912 57,689	108,149 399,183	25 13 100		700,101	202,136 1,017,441		135,792 688,895		170,672 863,147	1.032.24	9 208,498 8 1,128,324				155,449 1,195,				208,831 208,83 164,416 1,164,41	16	1,163,150		162,457 1,162,9	10,000		1,162,915	200,001			1,164,416		200,001	200,001		1,716 1,162,3			
al Water Out	0	0	0	0 0					996,548				,	,	1,032,24	8 1,128,324	1,096,102	1,193,168	1,193,478 1	,155,449 1,195,	238 1,155,944	1,193,946	1,164,416 1,1	1,164,416	16	1,163,150	1,158,045 1	162,457 1,162,9	13 1,162,560	1,163,023	1,162,915	1,162,943 1,16	2,607 1,16	l,416 1,164,416	1,164,416		1,162,979	1,162,873 1	62,209 1,162	2,716 1,162,3	5 1,162,735	1,162,755	1,162,789
Deficit) at End of Month	(296)	(365)	(296) 299,6	11 419,150										***************************************	556 475,68	2 484,476	(61,123)	(95,196)	(48,606)	(51,359) (23,	707) (7,466)	14,535	(114,950) (1	15,020) (114,95	50) 309,662	12,924	528,518	(9,052) (51,1-	(3,213)	(15,477)	24,2 <del>09</del>	33,836 6	7,728 (11	,950) (115,020)	(114,950)	337,579	30,169	40,826	14,340 (32	,881) 16,1	5 12,793	40,202	49,318
ainfall data from MOF Gavin and Likely sites (average), evaporation data taken u	using manual measuments f	rom weather station.						SE-POND FLO	ws										MILL	SITE SUMP FLOWS	3													ree major areas visiual									
Runoff Coefficients are estimates from MTC Drainage Manual - Design Flood Estim Sand and Clay areas are outside the tailings facilities, and are estimate based on the	imation for small Watershed ne regional surficial geology.	s (MTO 1984)						Period	Precip.		M3/Month	Variance	Period	Precip.	A A	M3/Month	Variance		Period May 19		omm Ave. Annual	M3/Month 12.372	Variance	Period Sep 1998	Precip.		Month 14,768	'ariance						ngs slurry density = 31° a calculation error prev		Tonnage 318,423)							
Pit water estimates: 150 usgpm, 250 usgpm and 350 usgpm in 1998, 1999 and 2000, No allowances will be made for beach runoff until perhaps latter in 1998. 1997 water availability under ice conditions is based on a 60 ha supernatant p		of Nov;0%-Dec;25	%-Jan;50%,Feb:78	%-Mer;100%. SG 0.	0.92			May 1998 May 1997 Estimate	50.6mm Ave 45.3mm Act @45.3mm		26,638 29,886 26,755	31%	Sep 199 Sep 199 <u>Estima</u> i	7 61.3	Imm Ave. Annual Imm Actual Imm	35,675 1,642 <u>36,206</u>	5%		May 19 Estima	97 45.3	Smm Actual	3,669 11,076	33%	Sep 1998 Sep 1997 <u>Estimate</u>	61.3mm / @61.3mm	Actual	7,841 14,988	<u>52%</u>															
7. Mill tonnage for the month of July 160,000 tonnes. Tailings shurry density = 2 3. Mill tonnage for the month of Aug 412,751 tonnes. Tailings shurry density = 3	= 28% solids. = 30% solids. ( Tailings Tor	mage 410,028)						Estimate June 1998 June 1997	81.5mm Ave 51.8mm Act		48,137 8,284		Oct 199 Oct 199	8 60.4 7 81.0	mm Ave. Annual	35,675 10,195			June 19 June 19	998 81.5 997 51.8	Smm Ave. Annual Smm Actual	19,927 3,669		Oct 1998 Oct 1997	60.4mm & 81.0mm &	Ave. Annual Actual	14,768 6,818	240/															
<ol> <li>Mill tormage for the month of Sept 429,118 tonnes. Tailings slurry density = 10.</li> <li>Mill tormage for the month of Oct. 420,866 tonnes. Tailings slurry density = 11.</li> <li>Mill tormage for the month of Nov. 472,669 tonnes. Tailings slurry density = 11.</li> </ol>	29% solids. (Tailings Tor	mage 418,578)						Estimate July 1998 July 1997	@51.8mm 65.7mm Ave 121.6mm Act		30,418 38805 10996	27%	Estimal Nov 19 Nov 19	98 57.3	Omm Omm Ave. Annual Omm Actual	47,842 33844	21%		<u>Estima</u> July 19 July 19		Smm 7mm Ave. Annual 5mm Actual	<u>12,743</u> 16064 8174	29%	Estimate Nov 1998 Nov 1997	<u>@81.0mm</u> 57.3mm A 35.2mm A	Ave. Annual	19,805 14010 1598	34%															
<ol> <li>Mill tonnage for the month of Nov. 472,069 tonnes. I attings sturry density =.</li> <li>Dec 97; made change to WB including adding transpiration (plant uptake) to</li> <li>Mill tonnage for the month of Dec. 474,414 tonnes. Tailings sturry density =.</li> </ol>	to D61 and D64 for JULY	through November.						Estimate Aug 1998 Aug 1997	@121.6mm Act @121.6mm 83.1mm Ave		71822 49082	15%	Estima	@35.2	<u>2mm</u>	20791 to the flows that ar	4%		Estima Aug 19	te @121.6 98 83.1		29732 20318	27%	Estimate	@35.2mm		8606	18%															
Will continge for the mount of 1900. 474,414 to the continue start 4 definity																			Aug 19		omm Actual	3382			ction factor will be a																		







# FIGURE 4. Williams Lake Weather

from www.weatheroffice.com





# 5-Day Forecast from Environment Canada

Monday	Monday Night		Wednesday	Thursday	Friday		
Timere	Trung	יניוניניני	Simple State of the State of th	Company of the Compan			
Showers High 8	Light rain Low 2	Showers High 10 Low 2	Chance of showers High 10 Low 0	Chance of showers High 9 Low -1	Chance of showers High 8 Low -1		

Mon, 23 Mar 1998 22:19:13 23 Mar 1998 14:19:1 UTC Time: Your Time:

#### **Current Conditions** Observed on Monday, March 23, 1998 at 21:00 UTC

from Environment Canada

		Cloudy			Wind:
Temperature: 6°C	Pressure: 100.3kPa	Visibility: 29km	Humidity: 78%	DewPoint: 3°C	ENE 10km/h

# Yesterday's Conditions Observed on Sunday, March 22, 1998 at 22:00 UTC from Environment Canada

	popularies no 1900 de la propiete de la transfer Millionne de la actionistica de la companya de la actionistica de la companya del companya de la companya de la companya del companya de la companya del companya del companya de la companya de la companya del comp		ight Rain	anneliseste postelli Renovalle et part settinosi colorenes andis	at techniques de Sistembré de S	Wind:
רויויויוי	Temperature: 6°C	Pressure: 100.5kPa	Visibility: <b>16km</b>	Humidity: 92%	DewPoint: 5°C	SE 6km/h

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