

February 16, 2011

Mr. Ron Martel
Environmental Superintendent
Mount Polley Mining Corporation
P.O. Box 12
Likely, BC V0L 1N0

Dear Ron,

Re: 2010 Flows in Hazeltine Creek**Introduction:**

Knight Piésold Ltd (KPL) was retained by Mount Polley Mining Corporation (MPMC) to undertake a review of 2010 hydrometric monitoring data from the Hazeltine Creek Gauging Station (H7). These data included continuous stage, observed gauge heights, and measured discharge. The objective was to process these data to provide MPMC with a continuous daily discharge record for the 2010 monitoring season.

Summary of Monitoring Activities

The Hazeltine Creek Hydrometric Monitoring Station (H7) was visited by MPMC technical staff 18 times throughout 2010.

The first site visits occurred from April 13 to 14, and were completed by Cameron Butt of KPL, and Colleen Hughes of MPMC. During these visits, a new site staff gauge was installed and surveyed to original Water Survey of Canada (WSC) bench marks (Photo 1), and the two pre-existing staff gauges were removed (Photo 2). An INW PT2X datalogger/pressure transducer (S/N 2717016), which had remained installed over the previous winter period (2009-2010), was removed on April 13, and a field calibration check was made to ensure that the instrument was within manufacturer specifications. The sensor was subsequently reinstalled on April 14th.

On a site visit by MPMC technicians on July 6th, it was discovered that the site had been (presumably) vandalized, with the enclosure being pushed into Hazeltine creek, as shown on Photo 3. All instrumentation, including the data logger and chart recorder, were no longer recording stage. The chart was destroyed and the sensor was submerged. Stage data were able to be salvaged, but no further continuous stage data were collected for the remainder of the year.

Periodic site visits were undertaken until September 30, and both stage and discharge were recorded on each visit, which provided a relatively continuous source of sample stage data from July to September. A total of 11 flow measurements were undertaken in 2010.

Stage Correction and Rating Development

Gauge heights are recorded during each site visit. These observed gauge heights are used to undertake corrections to recorded datalogger data so that a continuous time series is developed that reflects these observed gauge heights.



Reliable datalogger data, available from Feb 8 to June 23, 2010, were corrected according to this procedure. 11 site visits occurred after June 23, and allowed for a reliable linear interpolation of synthetic stage data in the absence of continuous data. Observed gauge heights and continuous stage data are presented in Table 1 and on Figure 1.

A rating curve was developed using the relationship between the staff gauge readings and the measured discharge. All 2010 discharge measurements were used to develop the rating curve, in addition to the surveyed point of zero flow. The rating curve is shown on Figure 2. The resulting rating curve is a composite curve comprised of three distinct sub-sections. These sub-sections are valid for different gauge heights, the characteristics of which are determined largely by the weir cross-section, but may also be affected by downstream influences that cause backwater effects during high flow conditions. The surveyed point of zero flow is at the weir invert, which lies at a gauge height of 0.093 m. It should be recalled from previous studies, most notably that of KPL Letter Report **VA08-01502**, that leaking under and through the weir blocks (and other factors), is a source of error in the rating curve that is unable to be reliably quantified.

Discharge

The 2010 rating curve equations were applied to the corrected stage record, and daily average discharge values were calculated from the resulting flow record, for the dates of February 8 to September 30. The discharges calculated between Feb 8 and July 6 are based on digital logger stage data, and the discharges calculated between July 6 and Sept 30 are based on synthetic linearly interpolated stage data. Daily average discharges are presented in Table 2.

The 2010 hydrograph shows a marked increase in discharge starting in early March, coincident with the beginning of the spring break-up and snowmelt period. The 2010 peak flow was 0.365 m³/s and occurred on March 29. Flows remained high throughout April, with an average monthly flow of 0.235 m³/s, and begin to decline in mid May. The May monthly average flow was 0.189 m³/s, while the June monthly average flow dropped to 0.051 m³/s. Yearly low flows appeared at the end of August, with the lowest flow occurring on August 26 at 0.004 m³/s.

Recommendations

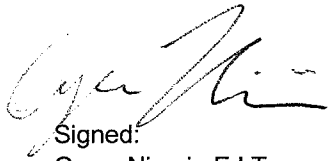
MPMC undertook a successful period of data collection through 2010, despite encountering some situations that often cause complications with data acquisition and analyses. Apart from key recommendations outlined in the previous KPL letter report **VA08-01502**, KPL would like to provide several recommendations for ongoing data collection to ensure that data quality remains as high as possible at this station. These recommendations are itemized below:

- The Swoffer current meter should be returned to the manufacturer for recalibration, to ensure that measured velocities continue to be as accurate as possible.
- The PT2X datalogger should be returned to the manufacturer for recalibration. In the interim, KPL may be able to provide MPMC with a spare PT2X datalogger for the 2011 monitoring season.
- FULCRUM should continue to be used by MPMC to track instrumentation movements and for general hydrology data management.
- Site photographs, especially of measuring sections, gauge heights and weirs, should be taken during **all** site visits. These photographs greatly assist in validating measured discharge and subsequent rating curve development.
- Field sheets should be clear and legible, and scanned copies should be uploaded to FULCRUM as soon as possible after each site visit.

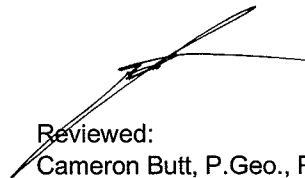
Knightsold CONSULTING

We would like to gratefully acknowledge the efforts of MPMC technicians throughout the 2010 wet season. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

Yours truly,
KNIGHT PIESOLD LTD.



Signed:
Cyrus Niamir, E.I.T.
Staff Engineer



Reviewed:
Cameron Butt, P.Geo., PMP
Project Scientist



Reviewed:
Jaime Cathcart, PhD, P.Eng.
Specialist Hydrotechnical Engineer



Approved
FOR Ken Brouwer, P.Eng.
Managing Director

Attachments:

- | | |
|----------------|--|
| Table 1 Rev 0 | 2010 H7 Stage-Discharge Measurements |
| Table 2 Rev 0 | 2010 H7 Daily Flow Averages |
| Figure 1 Rev 0 | 2010 H7 Daily Averaged Discharge Hydrograph |
| Figure 2 Rev 0 | 2010 H7 Rating Curve |
| Photo 1 | New Staff Gauge Installation, May 12, 2010 |
| Photo 2 | Pre 2010 Staff Gauges, removed April 13, 2010 |
| Photo 3 | Water Survey of Canada chart recorded hut after pushed into Hazeltine Creek.
Photo taken July 6, 2010 |

/cbn

TABLE 1

**MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY PROJECT**

2010 H7 DISCHARGE MEASUREMENTS

Print: 2/16/2011 9:00

Date/Time	Number	Method	Discharge (m ³ /s)	Discharge Error (%)	Stage (m)	Stage Error (m)	Comment
4/13/10 10:25 AM	Q1	Current Meter	0.1926	10%	0.324	0.001	
4/13/10 11:27 AM	Q2	Current Meter	0.2177	10%	0.324	0.001	
4/19/10 2:20 PM	Q1	Current Meter	0.284258	10%	0.36	0.001	
5/26/10 11:25 AM	Q1	Current Meter	0.1389	10%	0.31	0.002	
6/21/10 12:55 PM	Q1	Current Meter	0.01395	10%	0.211	0.002	water was flowing very slowly, hard to get a reading from the swoffer.
7/28/10 11:20 AM	Q1	Current Meter	0.013341	30%	0.214	0.001	
8/10/10 7:55 AM	Q1	Current Meter	0.015137	30%	0.208	0.001	
8/18/10 9:40 AM	Q1	Current Meter	0.009264	30%	0.19	0.001	
8/26/10 10:12 AM	Q1	Current Meter	0.005187	30%	0.169	0.002	There was a sediment trap just upstream of where the gauging took place
9/7/10 10:00 AM	Q1	Current Meter	0.01013	30%	0.199	0.002	
9/7/10 10:25 AM	Q2	Current Meter	0.010095	30%	0.199	0.002	
9/30/10 8:30 AM	Q1	Current Meter	0.01298	30%	0.19	0.001	

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0	16FEB'11	ISSUED WITH LETTER VA11-00288	CBN	CMB	JGC
REV	DATE	DESCRIPTION	PREP'D	CHKD	APP'D

TABLE 2

**MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY PROJECT**

2010 H7 DAILY FLOW AVERAGES

Print: 2/16/2011 10:30

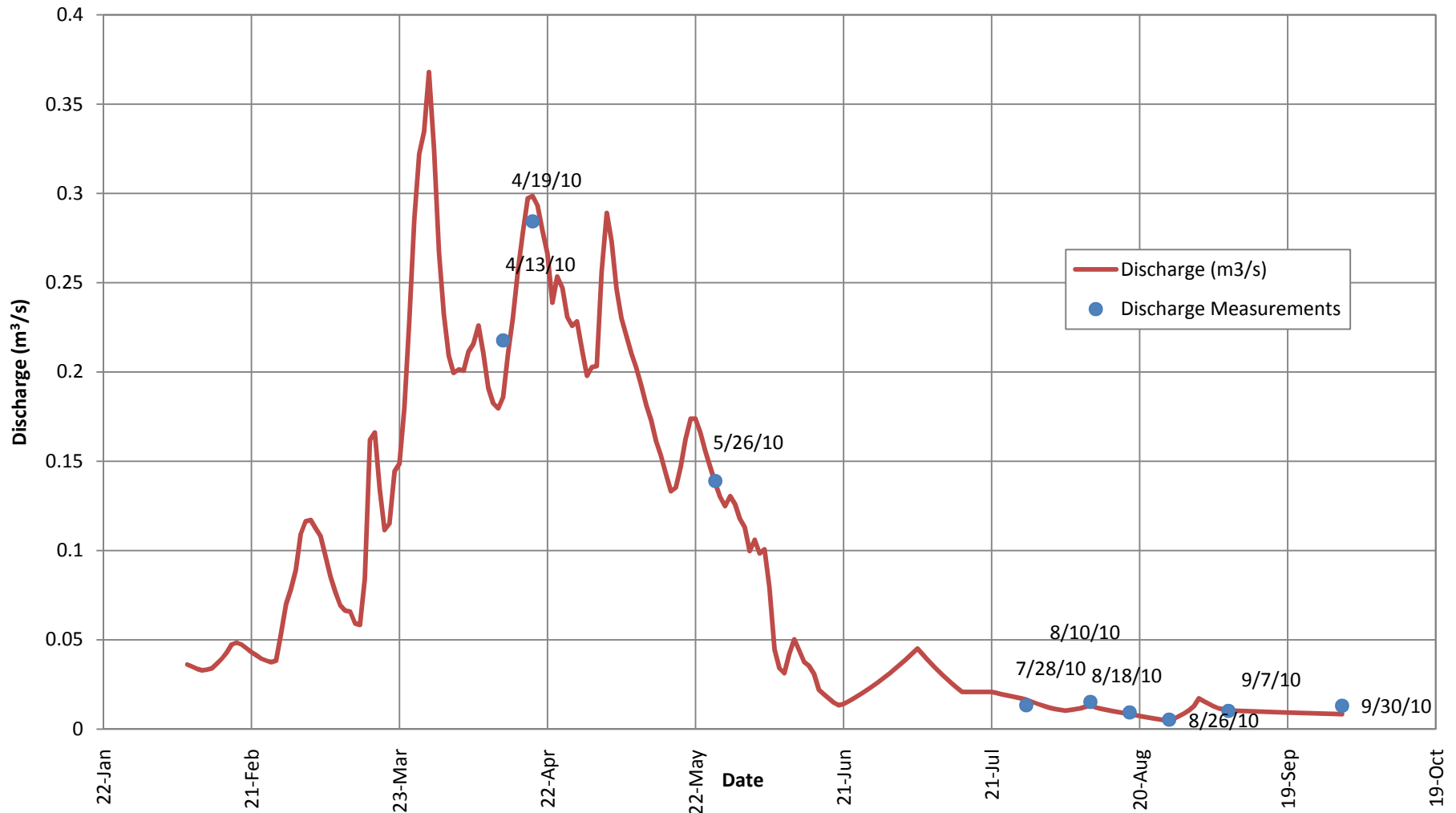
Day	Discharge (m ³ /s)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1			0.078	0.232	0.203	0.113	0.033	0.013	0.017			
2			0.089	0.209	0.203	0.100	0.035	0.012	0.016			
3			0.109	0.199	0.256	0.106	0.037	0.011	0.014			
4			0.116	0.201	0.289	0.098	0.040	0.011	0.013			
5			0.117	0.201	0.273	0.101	0.042	0.010	0.012			
6			0.112	0.211	0.247	0.079	0.045	0.011	0.011			
7			0.108	0.216	0.230	0.044	0.042	0.011	0.010			
8		0.036	0.097	0.226	0.220	0.034	0.039	0.012	0.010			
9		0.035	0.086	0.211	0.210	0.031	0.036	0.012	0.010			
10		0.034	0.077	0.191	0.202	0.042	0.033	0.013	0.010			
11		0.033	0.069	0.183	0.193	0.050	0.030	0.012	0.010			
12		0.033	0.066	0.180	0.181	0.044	0.028	0.011	0.010			
13		0.034	0.066	0.186	0.173	0.038	0.025	0.011	0.010			
14		0.037	0.059	0.210	0.161	0.035	0.023	0.010	0.010			
15		0.039	0.058	0.230	0.153	0.031	0.021	0.010	0.010			
16		0.043	0.084	0.257	0.143	0.022	0.021	0.009	0.009			
17		0.047	0.162	0.278	0.133	0.019	0.021	0.009	0.009			
18		0.048	0.166	0.297	0.135	0.017	0.021	0.008	0.009			
19		0.047	0.134	0.299	0.147	0.015	0.021	0.008	0.009			
20		0.045	0.111	0.293	0.162	0.013	0.021	0.007	0.009			
21		0.043	0.115	0.279	0.174	0.014	0.021	0.007	0.009			
22		0.041	0.144	0.266	0.174	0.015	0.020	0.006	0.009			
23		0.039	0.149	0.239	0.166	0.017	0.020	0.006	0.009			
24		0.038	0.180	0.253	0.156	0.019	0.019	0.005	0.009			
25		0.038	0.228	0.247	0.146	0.020	0.018	0.005	0.009			
26		0.038	0.286	0.231	0.138	0.022	0.018	0.005	0.009			
27		0.053	0.322	0.226	0.130	0.024	0.017	0.006	0.009			
28		0.070	0.335	0.228	0.125	0.026	0.017	0.007	0.008			
29			0.368	0.212	0.130	0.028	0.015	0.009	0.008			
30			0.324	0.198	0.126	0.030	0.014	0.010	0.008			
31			0.267		0.118		0.013	0.013				
Average:		0.042	0.151	0.230	0.177	0.042	0.026	0.009	0.010			
Max:		0.070	0.368	0.299	0.289	0.113	0.045	0.013	0.017			
Min:		0.033	0.058	0.180	0.118	0.013	0.013	0.005	0.008			

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NOTES:

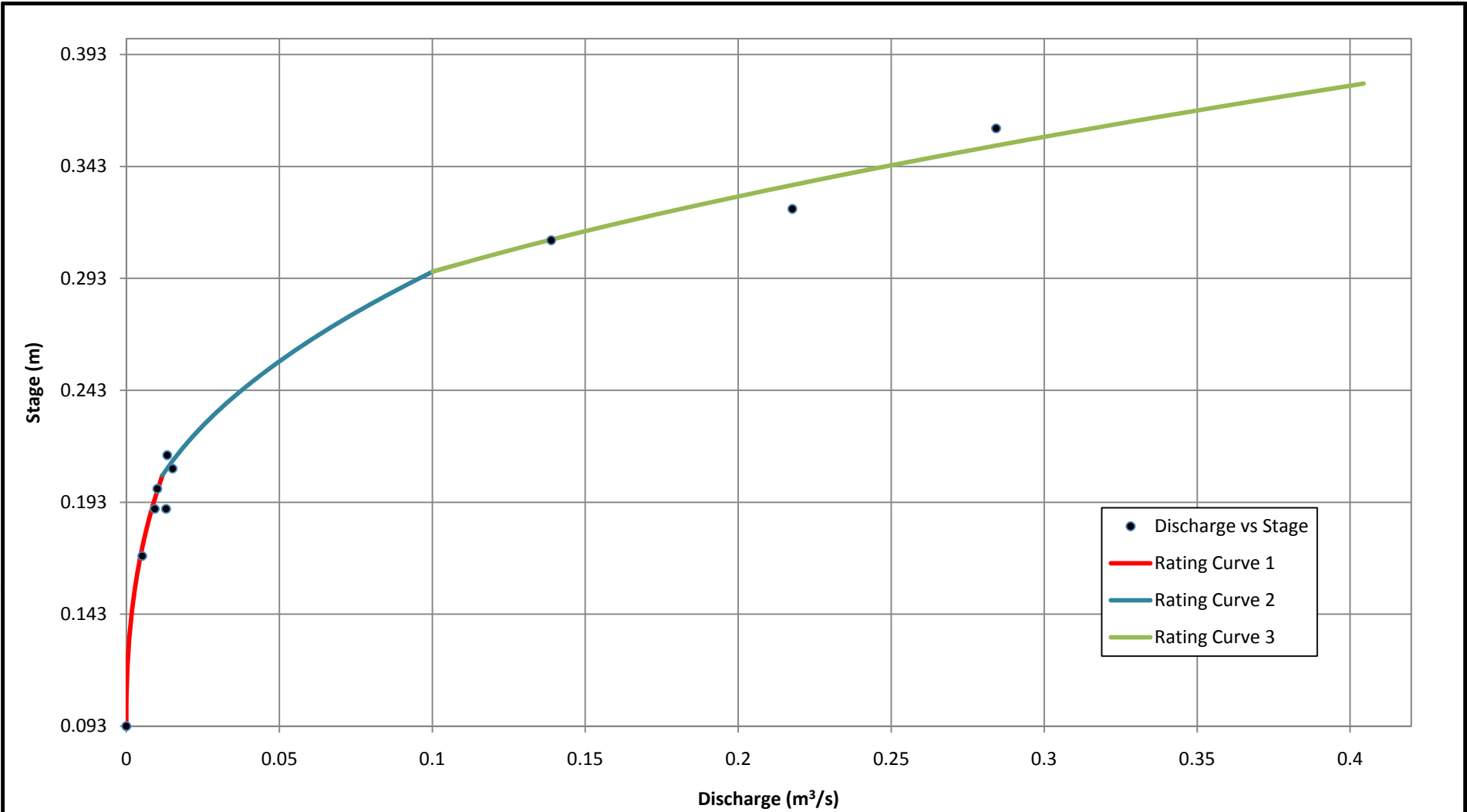
1. LIGHT SHADED CELLS INDICATE NO DATA AVAILABLE, GENERALLY FROM STATION BEING INACTIVE DUE TO FREEZE CONDITIONS
2. DARKER SHADED CELLS INDICATE LINEARLY INFILLING OF STAGE DATA DATA BETWEEN OBSERVED GAUGE HEIGHTS

0	16FEB'11	ISSUED WITH LETTER VA11-00288	CBN	CMB	JGC
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MOUNT POLLEY MINING CORPORATION	
MOUNT POLLEY PROJECT	
2010 H7 DAILY AVERAGED DISCHARGE HYDROGRAPH	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-1/30
	REF: VA11-00288
FIGURE 1	
REV 0	

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	16FEB'11	ISSUED WITH LETTER	CBN	CMB	JGC



NOTES:

1. POINT OF ZERO FLOW DETERMINED TO BE 0.093 FROM CROSS SECTION SURVEY
2. RATING CURVE 1 EQUATION: $Q=2.25*(h-0.093)^{2.4}$
3. RATING CURVE 2 EQUATION: $Q=6*(h-0.1536)^{2.1}$
4. RATING CURVE 3 EQUATION: $Q=11.5*(h-0.2243)^{1.8}$

MOUNT POLLEY MINING CORPORATION	
MOUNT POLLEY PROJECT	
2010 H7 RATING CURVE	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-1/30 REF: VA11-00288
FIGURE 2	REV 0

0	16FEB'11	ISSUED WITH LETTER	CBN	CMB	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D



Photo 1: New Staff Gauge Installation,
May 12, 2010.



Photo 2: Pre 2010 Staff Gauges,
removed April 13, 2010.

**MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY HYDROLOGY**



Photo 3: Water Survey of Canada chart recorded hut after pushed into Hazeltine Creek. Photo taken July 6, 2010.

**MOUNT POLLEY MINING CORPORATION
MOUNT POLLEY HYDROLOGY**