

## *Appendix 12-D*

### *Harper Creek Snow Water Equivalent Data*

HARPER CREEK PROJECT

**Application for an Environmental Assessment Certificate /  
Environmental Impact Statement**

# Memorandum



Refer to File: A.1 - Harper Creek SWE Memo\_14Dec30.docx

**Date:** December 30, 2014  
**To:** Charlene Higgins, M.Sc., Ph.D., Harper Creek Mining Corporation  
**From:** Cameron McCarthy, P.Eng., P.Geo., PMP, ERM Consultants Canada Ltd.  
**Subject:** Harper Creek Snow Water Equivalent Data

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## 1. BACKGROUND AND OBJECTIVES

The Harper Creek Application Information Requirements (AIR) specifies that site-specific snow surveys be conducted and included in the Environmental Assessment (EA) application. During the EA screening review it was identified that “...site snow water equivalent data has not been provided as required in the AIR...” To address these AIR requirements ERM has acquired the 2008 and 2012 on-site Harper Creek snow course data and presented it along with the long-term regional snow course data.

The objectives of this document are to:

1. Present on-site snow course data from 2008 and 2012; and
2. Compare long-term regional snow course data to on-site Harper Creek data.

Three snow course survey sites were established on the Harper Creek Property in 2008 by Summit Environmental Consultants Ltd. and samples were collected in April and May of that year (Appendix A). In 2012 Knight Piésold Consulting undertook snow course survey sampling, collecting two samples in February, one in March, and one in May (Appendix B). On-site snow course location SC1 was not accessible in March and data from SC2 was missing for May, 2012. Regional SWE data were downloaded from the River Forecast Centre (RFC) for regional snow course survey sites (Table 1) near the proposed Harper Creek Project. The results from both regional and on-site data collection have been compiled and analysed in this document.

## 2. RESULTS AND DISCUSSION

Table 2 presents snow depth and snow water equivalent (SWE) data from the on-site Harper Creek snow course survey sites. On-site Harper Creek snow course data were collected at the following locations: (1) near the proposed open pit at the median site elevation (SC 1; 1,618 m); (2) in the proposed tailings facility representative of higher elevations in the facility (SC2; 1,840 m); and (3) in the proposed tailings facility representative of lower elevations in the facility (SC3; 1,675 m). Limited conclusions can be drawn from the relatively short period of project data due to the following:

1. SC1 was not accessible in March 2012; and
2. Site data for SC2 was missing for May 2012.

**Table 1. Snow Course Survey Site for the Harper Creek Project**

Location	ID	Name	Period of Record	Distance from Project (km)	Latitude	Longitude	Elevation (m)
On-site	B-SC1 (SC1)	Pit	2008, 2012		51° 28'	119° 51'	1,618
On-site	V-SC1 (SC2)	Tailings North	2008, 2012		51° 30'	119° 48'	1,840
On-site	V-SC2 (SC3)	Tailings South	2008, 2012		51° 28'	119° 48'	1,675
Regional	1F06P	Celista Mountain	2004-2014	58	51° 24'	118° 59'	1,553
Regional	1C20P	Boss Mountain Mine	1993-2014	100	52° 06'	120° 52'	1,477
Regional	1E02P	Mount Cook	1999-2014	82	52° 10'	119° 19'	1,574
Regional	1E08P	Azure River	1996-2014	122	52° 35'	119° 43'	1,625
Regional	1E10P	Kostal Lake	1984-2014	83	52° 12'	120° 01'	1,760

**Table 2. 2012 Harper Creek Manual Snow Course Data**

Date	Snow Course #	Number	Snow Depth (mm)		Snow Water Equivalent (mm)	
			Mean	2 Standard Deviations	Mean	2 Standard Deviations
6-Feb-2012	SC1	5	1,060	258	260	18
8-Feb-2012	SC2	5	1,560	261	480	141
8-Feb-2012	SC3	5	1,530	216	480	76
29-Feb-2012	SC1	5	490	106	110	46
28-Feb-2012	SC2	5	680	91	200	39
28-Feb-2012	SC3	5	700	37	200	9
30-Mar-2012	SC1	- <sup>a</sup>	- <sup>a</sup>	- <sup>a</sup>	- <sup>a</sup>	- <sup>a</sup>
30-Mar-2012	SC2	5	2,210	240	640	236
30-Mar-2012	SC3	5	1,980	164	610	90
4-May-2012	SC1	5	720	260	290	60
3-May-2012	SC2	- <sup>b</sup>	- <sup>b</sup>	- <sup>b</sup>	- <sup>b</sup>	- <sup>b</sup>
2-May-2012	SC3	5	1,510	204	620	46

Notes:

<sup>a</sup> not accessible.

<sup>b</sup> missing data.

Generally, analysis of the available project data does suggest that SWE increased from February to May at all locations (Table 2).

Regional snow course survey sites yielded similar monthly SWE results (Table 2). The exception was 1C20P, which demonstrated substantially lower SWE in both 2008 and 2012 (Figure 1A). The Boss Mountain (1C20P) snow survey site is located in the RFC 'Middle Fraser Snow Survey Basin,' whereas the Harper Creek Project is located in the adjacent RFC 'North and South Thompson Snow Survey Basin.' Although the Boss Mountain site was reasonably close to the project (100 km), it is suggested that localized physiographic and/or climate conditions may have

resulted in substantially different SWE results compared to the other (four) regional sites therefore, 1C20P was not included in further analysis.

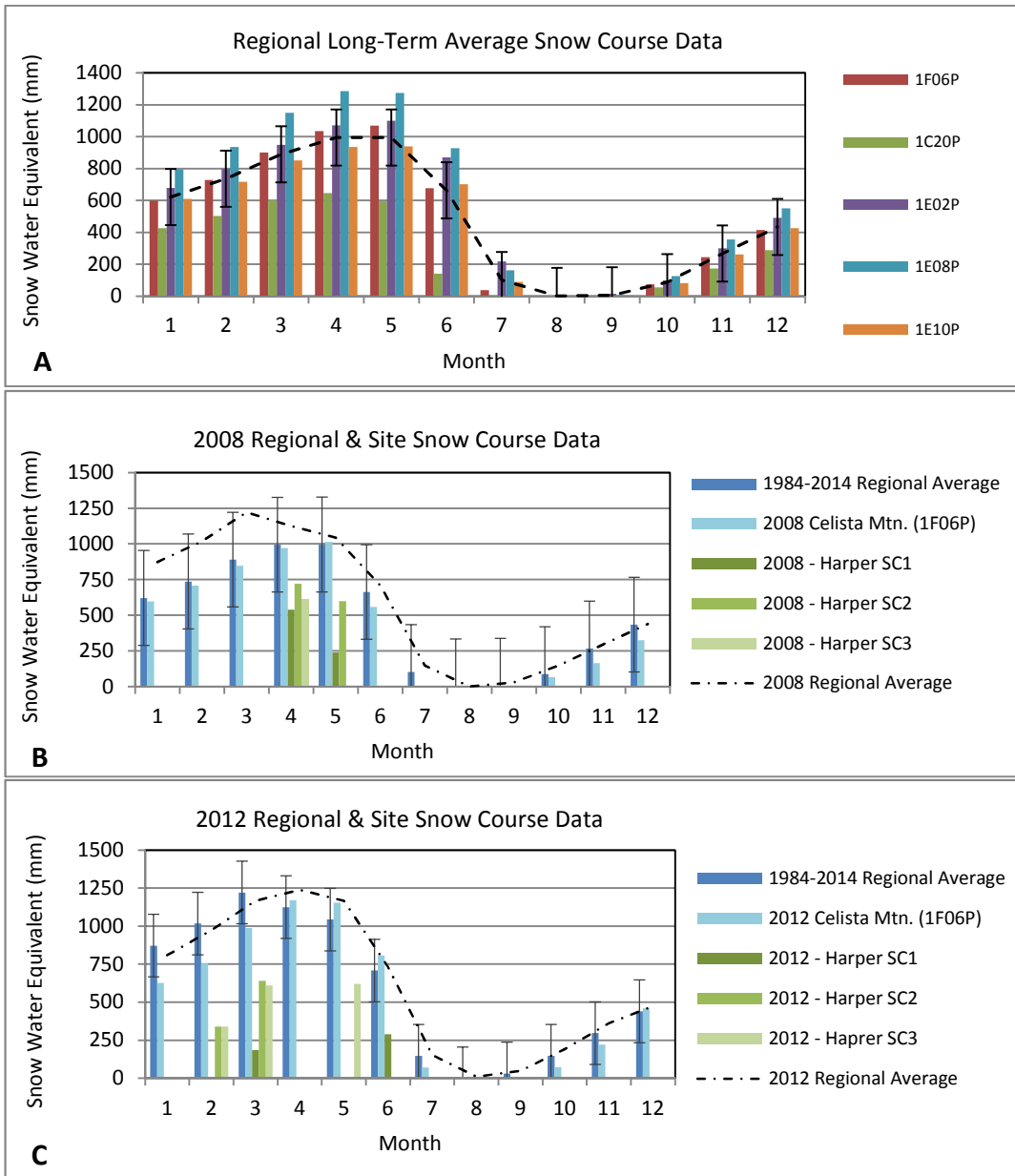
Regional SWE data were compared to concurrent SWE data from the on-site Harper Creek snow survey sites for 2008 (Figure 1B), and 2012 (Figure 1C). In each case long-term average regional data from the four regional sites are presented. The regional site closest to Harper Creek was 1F06P (Celista Mountain) at 58 km from the Project. Given this proximity, Celista Mountain snow course data has been plotted separately (but also included in the long-term and annual regional averages).

Regional and on-site SWE results from 2008 (Figure 1B) and 2012 (Figure 1C) each indicate that regional snow course survey sites yielded greater SWE than those snow course survey sites from the Harper Creek Project. Long-term regional snowmelt was calculated from regional SWE data and presented in Table 3. The average long-term regional snowmelt suggests that a small amount of melt occurs in May but overall snowmelt begins in June (35%) and peaks in July (58%). The small amount of snowmelt indicated for May (4%) is likely attributed to years with unusually warm or wet conditions in May, rather than a small amount of snowmelt occurring every May.

Overall a comparison between on-site snow course data from Harper Creek and those results from regional snow course sites suggests these data sets are substantially different, and that the regional snow course survey sites represent a higher overall snowfall with a different snowmelt pattern than that observed on site. Snowmelt data inferred from on-site Harper Creek runoff indicate substantially more runoff occurs in May (28%) with a peak in June (56%) and the remainder melting in July (16%). Given the substantial difference between regional and on-site snow depths, and also between regional and on-site snowmelt patterns, snow course data were not deemed useful for water balance modelling.

### 3. CONCLUSIONS

An overall comparison between the regional and on-site snow course survey data suggest that the spatial distribution of snow depth and temporal distribution of snowmelt was substantially different between regional and on-site locations. In summary, data collected from regional snow course sites produced substantially higher SWE than on-site snow course survey sites. And snowmelt calculated from regional snow course survey sites suggest snowmelt initiate later in the year than indicated from on-site Harper Creek runoff data. Given these results, regional and on-site SWE data were not used in the water balance model as they may have overestimated monthly SWE and underestimated monthly snowmelt for May and June.



Note: Error bars represent one standard deviation from the mean. Standard deviation was averaged over the first six months of the year (January to June) to generate one representative value to plot.

**Figure 1. Regional and Site Snow Water Equivalent Data, Harper Creek Project**

**Table 3. Harper Creek Long-term Regional Snowmelt Data**

Station	Elevation (m)	Distance from Site (km)	Average Monthly Snowmelt												
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Celista Mountain: ID 1F06P	1,533	58	0%	0%	0%	0%	0%	33%	63%	4%	0%	0%	0%	0%	100%
Boss Mountain Mine: ID 1C20P	1,477	100	0%	0%	0%	0%	10%	70%	20%	0%	0%	0%	0%	0%	100%
Mount Cook: ID 1E02P	1,574	82	0%	0%	0%	0%	0%	21%	60%	18%	0%	1%	0%	0%	100%
Azure River: ID 1E08P	1,625	122	0%	0%	0%	0%	4%	27%	59%	11%	0%	0%	0%	0%	100%
Kostal Lake: ID 1E10P	1,760	83	0%	0%	0%	0%	4%	25%	63%	8%	0%	0%	0%	0%	100%
Regional Average	1,552	N/A	0%	0%	0%	0%	4%	38%	50%	8%	0%	0%	0%	0%	100%
Inferred On-site Snowmelt Pattern Based on Observed Runoff		N/A	0%	0%	0%	0%	28%	56%	16%	0%	0%	0%	0%	0%	100%

*Notes:*

*Regional data were downloaded from the BC River Forecast Centre.*

*Inferred on-site snowmelt pattern based on Table 2.10 from Knight Piesold Hydrometeorology Report (March 26, 2013).*

**4. CERTIFICATION**

Prepared by:



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Jeffrey Anderson, M.Sc.  
Consultant  
ERM Consultants Canada Ltd.

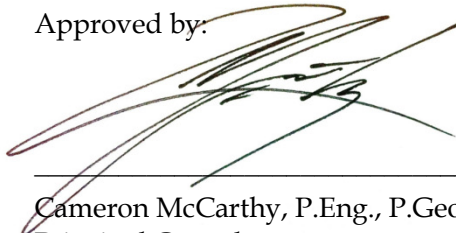
Reviewed by:



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Ali Naghibi, Ph.D., P.Eng.  
Senior Consultant  
ERM Consultants Canada Ltd.

Approved by:



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Cameron McCarthy, P.Eng., P.Geo., PMP  
Principal Consultant  
ERM Consultants Canada Ltd.

– Appendix A –

**2008 Harper Creek Snow Course Data**



Date: 

9	April	2008
Day	Month	Year

<b>Snow Course No.</b>	<b>1</b>				
<b>Snow Course Name:</b>	<i>Pit</i>				
<b>Observer's Name(s):</b>	<i>Lars Uunila, P.Geo. &amp; Brent Lennox, G.I.T.</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	163	160	-	-	-	-	-
2	144	138	123	170	122	48	0
3	150	145	114	173	122	51	35
4	151	137	107	165	122	43	31
5	182	177	141	183	122	61	34
6	154	151	145	180	122	58	38
7	189	187	152	188	122	66	35
8	175	167	152	183	122	61	37
9	166	157	114	170	122	48	31
10	154	150	150	175	122	53	35
<b>Total</b>		1569				489	
<b>Ave</b>		157				54	

**Data verified by:**

Lars Uunila, P.Geo.
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**Date:**

15	April	2008
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**Note:**

Six (6) attempts to collect a satisfactory sample at Station 1.1 failed due to ground and snow conditions

Date: 

9	April	2008
Day	Month	Year

<b>Snow Course No.</b>	2				
<b>Snow Course Name:</b>	Tailings North				
<b>Observer's Name(s):</b>	Lars Uunila, P.Geo. & Brent Lennox, G.I.T.				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	201	191	175	188	122	66	35
2	226	221	208	208	122	86	39
3	207	198	161	191	122	69	35
4	202	198	130	191	122	69	35
5	226	223	131	178	122	56	25
6	216	212	208	206	122	84	40
7	216	216	152	188	122	66	31
8	226	218	213	208	122	86	39
9	213	210	160	191	122	69	33
10	203	199	152	188	122	66	33
Total		2086				717	
Ave		209				72	

Data verified by: 

Lars Uunila, P.Geo.
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Date: 

15	April	2008
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Date: 

9	April	2008
Day	Month	Year

<b>Snow Course No.</b>	3				
<b>Snow Course Name:</b>	Tailings South				
<b>Observer's Name(s):</b>	Lars Uunila, P.Ge. & Brent Lennox, G.I.T.				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	184	182	159	188	122	66	36
2	170	161	152	180	122	58	36
3	177	169	163	188	122	66	39
4	170	166	157	188	122	66	40
5	163	159	144	183	122	61	38
6	174	174	164	188	122	66	38
7	152	151	92	167	122	45	30
8	192	176	164	183	122	61	35
9	188	171	152	183	122	61	36
10	174	166	161	183	122	61	37
<b>Total</b>		1675				611	
<b>Ave</b>		168				61	

Data verified by: 

Lars Uunila, P.Ge.
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Date: 

15	April	2008
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Date: 

21	May	2008
Day	Month	Year

<b>Snow Course No.</b>	<b>1</b>
<b>Snow Course Name:</b>	<i>Pit</i>
<b>Observer's Name(s):</b>	<i>Brent Lennox, G.I.T., Peter Rotheliser, P.Ag.</i>
<b>No. of Tube Sections Used:</b>	1 <u>2</u> 3      4      other:
<b>Driving Wrench Used?</b>	<u>yes</u>

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	84	84	61	102	78	24	29
2	48	47	36	98	78	20	42
3	86	81	48	105	78	27	33
4	58	58	53	102	78	24	42
5	99	94	89	102	78	24	26
6	58	53	50	105	78	27	50
7	107	105	79	112	78	34	32
8	86	86	37	90	78	12	14
9	69	66	43	105	78	27	41
10	56	53	30	102	78	24	46
<b>Total</b>		729				244	
<b>Ave</b>		73				24	

*Data verified by:* Brent Lennox, G.I.T.

Date: 

22	May	2008
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Date: 

21	May	2008
Day	Month	Year

<b>Snow Course No.</b>	<b>2</b>
<b>Snow Course Name:</b>	<i>North Tailings</i>
<b>Observer's Name(s):</b>	<i>Brent Lennox, G.I.T., Peter Rotheliser, P.Ag.</i>
<b>No. of Tube Sections Used:</b>	1 <u>2</u> <u>3</u> 4      other:
<b>Driving Wrench Used?</b>	<u>yes</u> no

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	127	124	91	166	122	43	34
2	151	147	140	185	122	63	43
3	140	132	124	178	122	55	42
4	126	124	119	176	122	54	43
5	127	127	119	181	122	59	46
6	145	140	127	181	122	59	42
7	166	161	145	188	122	66	41
8	136	135	123	146	78	68	51
9	133	132	117	139	78	61	46
10	122	114	97	151	78	72	63
Total		1337				600	
Ave		134				60	

*Data verified by:* Brent Lennox, G.I.T.

Date: 

22	May	2008
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Date: 

21	May	2008
Day	Month	Year

<b>Snow Course No.</b>	<b>3</b>
<b>Snow Course Name:</b>	<i>Tailings South</i>
<b>Observer's Name(s):</b>	<i>Brent Lennox, G.I.T., Peter Rotheliser, P.Ag.</i>
<b>No. of Tube Sections Used:</b>	1      2      3      4      other:
<b>Driving Wrench Used?</b>	yes      no

Station	Snow Depth (cm)	Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Water Equivalent (cm)	Density (%)
Site not accessible.						

**Data verified by:**



**Date:**

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– Appendix B –

**2012 Harper Creek Snow Course Data**

Date: 

6	Feb	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>B SC 1</b>				
<b>Snow Course Name:</b>	<i>Pit</i>				
<b>Observer's Name(s):</b>	<i>PL/LD (Knight Piesold)</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	105	105	87	184	158	26	25
2	105	100	83	184	158	26	26
3	100	99	84	184	158	26	26
4	101	99	84	184	158	26	26
5	130	129	108	186	158	28	22
<b>Std.Dev</b>		<b>12.88</b>				<b>0.89</b>	
Total		532				132	
Ave		106				26	

**Data verified by:**



**Date:**

Note: Data entered by ERM from KP pdf of data



Date: 

29	Feb	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>B SC 1</b>				
<b>Snow Course Name:</b>	<i>Pit</i>				
<b>Observer's Name(s):</b>	<i>MS (Knight Piesold)</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	53	52	39	67	55	12	23
2	47	46	25	65	55	10	22
3	43	43	39	64	55	9	21
4	48	46	42	66	55	11	24
5	56	56	51	70	55	15	27
<b>Std.Dev</b>		<b>5.27</b>				<b>2.30</b>	
<b>Total</b>		<b>243</b>				<b>57</b>	
<b>Ave</b>		<b>49</b>				<b>11</b>	

*Data verified by:*



*Date:*

Note: Data entered by ERM from KP pdf of data

Date: 

30	Mar	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>B SC 1</b>				
<b>Snow Course Name:</b>	<i>Pit</i>				
<b>Observer's Name(s):</b>	<i>CJ,SJ,LD (Knight Piesold)</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes	no			

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1							
2							
3							
4							
5							
<b>Std.Dev</b>							
Total							
Ave							

*Data verified by:*

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*Date:*

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Note: Data entered by ERM from KP pdf of data

Date: 

4	May	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>B SC 1</b>				
<b>Snow Course Name:</b>	<i>Pit</i>				
<b>Observer's Name(s):</b>	<i>LD/SJ (Knight Piesold)</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	78	78	68	190	160	30	38
2	64	55	50	132	160		0
3	70	64	68	188	160	28	44
4	75	71	61	184	160	24	34
5	100	94	81	192	160	32	34
<b>Std.Dev</b>		<b>14.77</b>				<b>3.42</b>	
<b>Total</b>		362				114	
<b>Ave</b>		72				29	

**Data verified by:**

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**Date:**

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Note: Data entered by ERM from KP pdf of data

Date: 

8	Feb	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>V SC 1</b>				
<b>Snow Course Name:</b>	<i>Harper Climate Station</i>				
<b>Observer's Name(s):</b>	<i>LD/PD (Knight Piesold)</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	163	161	155	200	159	41	25
2	137	134	134	202	159	43	32
3	154	154	106	204	159	45	29
4	163	163	158	213	159	54	33
5	167	167	159	216	159	57	34
<b>Std.Dev</b>		<b>13.07</b>				<b>7.07</b>	
Total		779				240	
Ave		156				48	

*Data verified by:*



*Date:*

Note: Data entered by ERM from KP pdf of data

Date: 

28	Feb	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>V SC 1</b>				
<b>Snow Course Name:</b>	<i>Harper Climate Station</i>				
<b>Observer's Name(s):</b>	<i>MS (Knight Piesold)</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	70	69	65	76	55	21	30
2	63	62	45	72	55	17	27
3	66	65	58	76	55	21	32
4	71	69	67	76	55	21	30
5	75	74	70	77	55	22	30
<b>Std.Dev</b>		<b>4.55</b>				<b>1.95</b>	
<b>Total</b>		339				102	
<b>Ave</b>		68				20	

**Data verified by:**



**Date:**



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Note: Data entered by ERM from KP pdf of data

Date: 

30	Mar	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>V SC 1</b>				
<b>Snow Course Name:</b>	<i>Harper Climate Station</i>				
<b>Observer's Name(s):</b>	<i>CJ, SJ, LD (Knight Piesold)</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	228	226	224	266	202	64	28
2	203	196	195	244	202	42	21
3	222	217	205	270	202	68	31
4	240	236	226	268	202	66	28
5	235	231	216	280	202	78	34
<b>Std.Dev</b>		<b>15.74</b>				<b>13.22</b>	
Total		1106				318	
Ave		221				64	

*Data verified by:*



*Date:*

Note: Data entered by ERM from KP pdf of data

Date: 

3	May	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>V SC 1</b>				
<b>Snow Course Name:</b>	<i>Harper Climate Station</i>				
<b>Observer's Name(s):</b>	<i>SJ,LD (Knight Piesold)</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes	no			

Station	Snow Depth (cm)	Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
Data Missing						
Total						
Ave						

*Data verified by:*

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*Date:*

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Note:      Data entered by ERM from KP pdf of data

Date: 

8	Feb	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>V SC 2</b>				
<b>Snow Course Name:</b>					
<b>Observer's Name(s):</b>	LD/PL (Knight Piesold)				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	137	136	118	201	158	43	32
2	154	154	152	209	158	51	33
3	174	165	158	210	158	52	32
4	159	158	132	208	158	50	32
5	152	150	127	204	158	46	31
<b>Std.Dev</b>		<b>10.81</b>				<b>3.78</b>	
<b>Total</b>		763				242	
<b>Ave</b>		153				48	

**Data verified by:**



**Date:**



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Note: Data entered by ERM from KP pdf of data



Date: 

28	Feb	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>V SC 2</b>				
<b>Snow Course Name:</b>					
<b>Observer's Name(s):</b>	MACS (Knight Piesold)				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	76	72	60	76	55	21	29
2	71	69	63	75	55	20	29
3	73	68	64	75	55	20	29
4	71	69	65	75	55	20	29
5	78	72	61	75	55	20	28
<b>Std.Dev</b>		<b>1.87</b>				<b>0.45</b>	
<b>Total</b>		<b>350</b>				<b>101</b>	
<b>Ave</b>		<b>70</b>				<b>20</b>	

**Data verified by:**



**Date:**



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Note: Data entered by ERM from KP pdf of data

Date: 

30	Mar	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>V SC 2</b>				
<b>Snow Course Name:</b>					
<b>Observer's Name(s):</b>	<i>CJ,SJ,LD (Knight Piesold)</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	185	182	173	254	202	52	29
2	210	205	190	264	202	62	30
3	208	201	197	266	202	64	32
4	207	203	202	266	202	64	32
5	204	198	197	264	202	62	31
<b>Std.Dev</b>		<b>9.20</b>				<b>5.02</b>	
<b>Total</b>		989				304	
<b>Ave</b>		198				61	

*Data verified by:*

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*Date:*

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Note: Data entered by ERM from KP pdf of data

Date: 

2	May	2012
Day	Month	Year

<b>Snow Course No.</b>	<b>V SC 2</b>				
<b>Snow Course Name:</b>					
<b>Observer's Name(s):</b>	<i>SJ,LD (Knight Piesold)</i>				
<b>No. of Tube Sections Used:</b>	1	2	3	4	other:
<b>Driving Wrench Used?</b>	yes		no		

Station	Snow Depth (cm)		Core Length (cm)	Weight Tube & Core	Weight Tube Only before sampling	Snow Water Equivalent (cm)	Density (%)
	with dirt plug	without dirt plug					
1	168	167	120	224	160	64	38
2	153	151	135	222	160	62	41
3	138	135	123	224	160	64	47
4	150	149	123	218	160	58	39
5	153	153	121	224	160	64	42
<b>Std.Dev</b>		<b>11.40</b>				<b>2.61</b>	
Total		755				312	
Ave		151				62	

*Data verified by:*

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*Date:*

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Note: Data entered by ERM from KP pdf of data