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FAX COVER SHEET

DATE: June 5, 1997 **JOB #:** E97102
TO: Mr. D. Don Hindy **FAX:** ~~604/524-2837~~ 403-633-3216
COMPANY: Anvil Range Mining Corp. **PHONE:** 604/521-2481
CITY/STATE: Faro, Yukon, Canada
FROM: Naseem Mian NM/mw **PHONE:** 801/584-1487
CC: _____ **FAX:** 801/584-1440
RE: Flotation Test Work **FILE #** 97102.110.a.001

Number of pages including cover sheet: 6

Message:

Further to our discussion, attached is the information on proposed flotation test work.

*TIME SENT: <u>4:09PM</u>	DATE SENT:	SENT BY:
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**DAWSON
METALLURGICAL
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June 4, 1997

CEntry
375 Chipeta Way
Salt Lake City, Utah 84108

Attention: Mr. Naseem Mian
Director, Process Metallurgy

Subject: Budget Cost Estimate for Selective Lead - Zinc Flotation Testing of a Sample of Grum Ore from Anvil Range Mining Corporation.

Dear Naseem:

In accordance with our discussions at your office on May 27, 1997, we are pleased to offer a budget cost estimate for selective lead - zinc flotation testing of a Grum ore sample from Anvil Range Mining Corporation. It is our understanding that these tests will be performed under your direct supervision at our laboratory. We have reviewed selected reports describing previous test work which has been performed on Grum ore by other laboratories (Lakefield Research reports L.R. 4237 dated February 19, 1992 and L.R. 4922 dated April 30, 1997). This previous work has been used as a basis for generating budget cost estimates for the proposed flotation testing at our laboratory.

The Anvil Range mill processes approximately 600 tonnes per hour of extremely fine grained silver bearing lead - zinc ore by differential flotation. Ore is ground to approximately 80 percent minus 200 mesh in the presence of lime, sodium cyanide, Hart SD200™ and Cytec 3418A aerophine promoter. Galena is floated with SIPX collector during rougher and scavenger flotation at a lime pH of 9-10. The combined concentrates are reground to approximately minus 15 microns and subjected to three stages of cleaning using additional depressants and collector. Sphalerite is floated with copper sulfate and SIPX at a high lime pH of 10.5 to 11.5. Combined rougher and scavenger concentrates are reground to approximately 20 microns and subjected to one stage of mechanical cleaning and two stages of column cleaning.

The best laboratory results on Grum ore were obtained in batch Test No. 6 which was reported in Lakefield Research report L.R. 4922 of April 30, 1997. We suggest using this test procedure as the basis of comparison for the flotation test work planned. We have used this test as a cost basis in preparing this proposal and budget cost estimate.

Mr. Naseem Mian

CEntry

June 4, 1997

Page -2-

A copy of results and procedures for this test is attached to this proposal. It is our understanding that you wish to investigate the following on a sample of Grum ore.

- Repeat Test 6 to provide a baseline for possible reagent scheme modifications.
- Compare the use of ZnSO₄/NaCN mixture with the SD200™/NaCN mixture currently used in lead flotation.
- Compare the use of ZnSO₄ and NaHSO₃ with the SD200™/NaCN mixture currently used in lead flotation.
- Compare the use of Na₂CO₃ with the Ca(OH)₂ currently used in lead flotation (pH 9-10).
- Compare lead flotation at pH 7 and pH 9 using either Na₂CO₃ or Ca(OH)₂.
- Determine the effectiveness of a carbon prefloat prior to lead flotation to improve lead and zinc flotation metallurgy and perhaps reduce collector consumption.

Each test would be performed in duplicate to determine the reproducibility of results and determine the significance of the results obtained under different test conditions. The exact details of each test will be discussed prior to testing, and will depend upon the results which are generated as test work progresses. All products would be assayed for Ag (fire assay), Pb (AA), and Zn (AA). We estimate that 12 products would be generated in each batch test, although some products, such as various cleaner stage tailings, may be combined depending upon their weight. Two (2) kilogram flotation tests will be performed. The test products generated are the same as those generated in Lakefield Test No. 6, namely:

- Pb 4th Cleaner Concentrate
- Pb 4th Cleaner Tailing
- Pb 3rd Cleaner Tailing
- Pb 2nd Cleaner Tailing
- Pb 1st Cleaner Tailing
- Pb 1st Cleaner Scavenger Concentrate
- Zn 4th Cleaner Concentrate
- Zn 4th Cleaner Tailing
- Zn 3rd Cleaner Tailing
- Zn 2nd Cleaner Tailing

Mr. Nassem Mian
 CEntry
 June 4, 1997
 Page -3-

- Zn 1st Cleaner Tailing
- Zn 1st Cleaner Scavenger Concentrate
- Zn 1st Cleaner Scavenger Tailing
- Zn Rougher Tailing


We estimate that this project should not exceed \$20,500, including all analyses and a final report. Approximately 75 kilograms of representative sample will be required for this work. These costs are itemized for your reference in the following table.

Cost Estimate Itemization for Selective Lead - Zinc Flotation of Anydl Range Ore.			
Activity	# of Tests	Cost/Test	Total Cost
Sample Preparation and Head Analyses. Prepare one (1) each 75 kg sample into 2 kg batches for testing. Assay head sample for Ag, Pb, Zn, Fe, S total.	1	\$ 575	\$ 575
Calibration of Lab ball mills for P80 74 micron primary grind.	3	\$ 75	\$ 225
Calibration of lab regrind mills for 15 micron (lead) and 20 micron (zinc) concentrate regrinds. U of U comminution center "Microtrac" particle size analyzer will be used.	4	\$ 500	\$2,000
Batch Flotation Testing to Determine the Following: Duplicate LR 4922 Test 6 as baseline.	2	\$ 850	\$15,300
Compare ZnSO ₄ /NaCN with SD200 SM /NaCN mixture.	2		
Compare ZnSO ₄ /NaHSO ₃ with SD200 SM /NaCN mixture.	2		
Compare Na ₂ CO ₃ with Ca(OH) ₂ in Pb flotation.	2		
Compare Pb flotation at pH 7 and 9.	2		
Investigate effectiveness of carbon prefloat.	4		
Contingency for additional flotation tests.	4		
Report	1	\$2,400	\$ 2,400
Total			\$20,500

If you have any questions concerning this proposal, or wish to discuss the project further, please call. We look forward to working on this project with you, and welcome your visits to our laboratory to participate in the test work.

Sincerely,

DAWSON METALLURGICAL LABORATORIES, INC.


 Philip Thompson
 President

TEST NO. 6

Purpose: To repeat Test 5 but increase the CuSO_4 addition in condition stage 2 to 600 g/t.

Procedure: As shown below.

Feed: 2000 grams of minus 10 mesh MF-1 ore.

Grind: 30 minutes at 65% solids in a laboratory rod mill.

Conditions:

	Reagents Added, grams per tonne					Time, minutes			pH
	$\text{Ca}(\text{OH})_2$	SD200 NaCN (1:2)	3418A	SIPX	MIBC	Grind	Cond.	Froth	
Grind	500	200	10	-	-	30	-	-	-
Pb Rougher	-	-	-	30	6	-	1	2	9.1
	-	-	-	-	2	-	1	1	-
Pb Conc Regr	-	100	-	5	-	20	-	-	-
Pb 1st Cleaner	-	-	-	-	4	-	1	2	8.7
Pb 1st Cl Scav	-	-	-	5	2	-	1	1	-
Pb 2nd Cleaner	-	20	-	-	2	-	1	2	8.9
Pb 3rd Cleaner	-	10	-	-	2	-	1	1.5	8.8
Pb 4th Cleaner	-	10	-	-	2	-	1	1.5	8.7
Zn Circuit:		CuSO_4			DF250				
Condition 1	800	-	-	-	-	-	5	-	11.4
2	-	600	-	-	-	-	5	-	10.5
Zn Rougher	-	-	-	20	4	-	3	2.5	10.5
	-	-	-	10	2	-	1	1	-
Zn Conc Regr	200	100	-	-	-	15	-	-	-
HIC	-	-	-	5	2	-	15	-	9.0
Zn 1st Cleaner	X	-	-	-	2	-	1	2.5	10.6
Zn 1st Cl Scav	-	-	-	5	2	-	1	1	-
Zn 2nd Cleaner	X	-	-	-	-	-	1	3	11.0
Zn 3rd Cleaner	X	-	-	-	-	-	1	2	11.5
Zn 4th Cleaner	X	-	-	-	-	-	1	2.5	11.5

Test No. 6

Product	Weight		Assays, %		% Distribution		
	g	%	Pb	Zn	Pb	Zn	Zn Circuit Rec'y
1 Pb Cleaner Conc	54.3	2.71	67.4	7.09	61.8	4.0	
2 Pb 4th Cleaner Tail	14.4	0.72	37.1	15.5	9.0	2.3	
3 Pb 3rd Cleaner Tail	12.9	0.64	22.00	17.8	4.8	2.4	
4 Pb 2nd Cleaner Tail	31.7	1.58	10.00	19.3	5.4	6.3	
5 Pb 1st Cl Scav Conc	11.1	0.55	7.61	18.6	1.4	2.1	
6 Zn Cleaner Conc	104.0	5.19	1.3	54.4	2.3	58.3	70.3
7 Zn 4th Cl Tail	5.9	0.29	3.39	35	0.3	2.1	2.6
8 Zn 3rd Cl Tail	6.9	0.34	3.88	27.5	0.5	2.0	2.4
9 Zn 2nd Cl Tail	16.1	0.80	3.14	18.1	0.9	3.0	3.6
10 Zn 1st Cl Scav Conc	14.5	0.72	2.88	16.8	0.7	2.5	3.0
11 Zn 1st Cl Scav Tail	171.5	8.56	1.01	2.57	2.9	4.5	5.5
12 Zn Rougher Tail	1559.1	77.86	0.38	0.65	10.0	10.4	12.6
Head (calc)	2002.4	100.0	2.96	4.84	100.0	100.0	

Combined Products

1-2 Pb 3rd Cleaner Conc	3.43	61.0	8.85	70.9	6.3	
1-3 Pb 2nd Cleaner Conc	4.08	54.9	10.27	75.6	8.6	
1-4 Pb 1st Cleaner Conc	5.66	42.3	12.79	81.0	14.9	
1-5 Pb 1st Cl Conc+ Cl scav Conc	6.21	39.2	13.31	82.4	17.1	
6-7 Zn 3rd Cl Conc	5.49	1.4	53.36	2.6	60.5	72.9
6-8 Zn 2nd Cl Conc	5.83	1.6	51.83	3.1	62.4	75.3
6-10 Zn 1st Cl Conc	6.64	1.7	47.74	3.9	65.4	78.9
6-11 Zn Zn 1st Cl Conc +Sc Conc	7.36	1.86	44.70	4.6	67.9	81.9
6-12 Zn Ro Conc	15.93	1.0	22.04	7.6	72.5	87.4
6-13 Zn Feed	93.79	0.55	4.28	17.6	82.9	100.0
11-12 Zn Comb Tail	86.43	0.44	0.84	12.9	15.0	18.1