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**LAKEFIELD RESEARCH**

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To: Godfrey McDonald

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From: S. Belatonic

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Date: August 29, 1989

Reference:

This transmission consists of 1 page(s), including this one.

Enclosed brief summary of fieldwork  
conducted on Brun-Vedigerde between 1975-1979  
This is best I can do for 3 hours search.  
However if you wish to prepare summary of  
all work conducted on these deposits I would  
need about 52 hours.

Current work on ground will follow.

Regards  
S. Belatonic

**BRIEF SUMMARY OF  
METALLURGICAL DEVELOPMENT  
ON  
GRUM AND VANQORDA**

**1. Grum****1.1. Metallurgical Testwork 1975-76**

Testwork carried out on samples B2, C2, PPA, A, B and C (Table 1).

**TABLE NO. 1 : Head Sample Assays**

Sample	Assays %						Assays oz/ton	
	Pb	Pb*	Zn	Zn*	Pb(Ox)	Zn(Ox)	Au	Ag
B-2	7.81	7.94	15.2	15.4	1.07	0.29	0.030	3.37
C-2	4.50	4.72	9.53	9.86	1.15	0.41	0.025	2.10
PPB (stockpile)	6.56	6.39	10.6	10.3	3.00	0.58	-	-
B-2 (stored 3 mos)	-	7.90	-	15.7	1.14	0.35	-	-
PPA	8.08	-	7.14	-	1.66	0.16	0.026	3.2

\*calculated from testwork

The lead flotation results ranged from satisfactory to very poor (Table 2).

**TABLE NO. 2 :**

Test No.	Sample	Grinding Time		Pb Cleaner Concentrate					
		Primary	Regrind	Weight %	Assays %		% Distribution		
					Pb	Zn	Pb	Zn	
non-representative	32	A	30	30	10.18	65.8	6.40	84.1	9.4
	22	B	40	30	6.03	55.1	14.5	51.2	8.3
	78	C	40	40	6.83	51.4	13.3	52.6	9.1
pilot plant comparative	114	B-2	30	30	8.63	56.3	14.0	62.2	7.9
	113	C-2	30	30	5.12	69.3	4.38	73.0	2.3
non-representative	72	B	60	60+30	7.12	65.3	10.3	70.2	7.1
	79	C	60	60+30	6.09	60.3	10.3	56.7	6.7
	116	B-2	60	60+30	6.39	75.0	5.28	61.2	2.2

Average

62.3 9.8 63.9 6.6

Locked cycle tests were run on Composite B2 and C2 (Tables 3 and 4).

**TABLE NO. 3 : B-2 Cycle Test Results**

Test No.	Product	Weight %	Assays %		% Distribution	
			Pb	Zn	Pb	Zn
126	Pb Cleaner Concentrate	10.73	65.1	10.80	89.2	7.4
	Zn Cleaner Concentrate	24.34	1.85	67.6	5.7	89.7
	Zn Rougher Tailing	64.93	0.61	0.69	5.1	2.9
	Head (Calc)	100.00	7.83	15.6	100.0	100.0
131	Pb Cleaner Concentrate	11.66	61.5	10.85	91.0	8.0
	Zn Cleaner Concentrate	24.16	1.10	57.6	3.4	87.5
	Zn Rougher Tailing	64.16	0.89	1.12	5.6	4.5
	Head (Calc)	100.00	7.88	15.9	100.0	100.0

**TABLE NO. 4 : C-2 Cycle Test Results**

Test No.	Product	Weight %	Assays %		% Distribution	
			Pb	Zn	Pb	Zn
127	Pb Cleaner Concentrate	6.51	63.5	4.78	89.5	3.1
	Zn Cleaner Concentrate	15.88	0.90	55.8	3.1	89.2
	Zn Rougher Tailing	77.61	0.44	0.85	7.4	6.6
	Head (Calc)	100.00	4.62	9.83	100.0	100.0
128	Pb Cleaner Concentrate	6.74	60.2	5.68	86.0	3.8
	Zn Cleaner Concentrate	16.33	1.64	55.4	5.7	90.5
	Zn Rougher Tailing	76.93	0.51	0.74	8.3	5.7
	Head (Calc)	100.00	4.72	10.0	100.0	100.0

Other samples (i.e. A,B,C) were considered as non representative.

Following this testwork, a pilot plant was performed on Samples PPA and PPB. These samples corresponded to lab samples B2 and C2. Head assays are shown in Table No. 5.



**TABLE NO. 7 : Pilot Plant Results**

Product	Weight %	Assays %		% Distribution	
		Pb	Zn	Pb	Zn
Pb Cleaner Conc	17.75	42.5	10.8	90.2	26.6
Zn Cleaner Conc	10.07	1.80	48.7	2.2	68.0
Combined Tailings	72.18	0.88	0.54	7.6	5.4
Cyclone Overflow	100.00	8.36	7.21	100.0	100.0
Pb Rougher Conc	24.44	31.7	12.1	92.7	39.3
Pb Scavenger Tail	75.56	0.81	6.04	7.3	60.7
Cyclone O/Flow (Calc)	100.00	8.36	7.52	100.0	100.0

Note that the pilot plant was run by Noranda metallurgists.

### 1.2. Testwork 1977 to 1978 - Laboratory

Testwork was performed on 5 composites prepared from 9 different samples as shown in Table No. 8.

**TABLE NO. 8 : Head Analyses**

Element	Composite No.				
	1	2	3	4	5
Lead (Pb), %	4.0	6.12	4.69	5.63	6.19
*(Pb), %	(4.16)	(5.91)	(4.60)	(5.68)	(5.95)
Zinc (Zn), %	6.50	9.44	9.05	10.40	10.60
*(Zn), %	(6.60)	(9.25)	(9.12)	(10.65)	(10.61)
Arsenic (As), %	-	0.34	0.37	0.40	0.37
Silver (Ag), oz/t	-	2.39	2.05	2.45	2.54

\*calculated from testwork

Five composite samples were prepared for this testwork from the eight individual samples. Composite 2 contained 20 % ore sample A-77. The distributions of the individual samples in the various composites are shown on the following page:

Sample No.	Assays %		Composite, Weight %				
	Pb	Zn	1	2	3	4	5
F-3V	6.86	15.8	2.5	10.0	10.0	14.0	12.5
F-3H	6.87	11.1	4.3	15.0	15.0	14.0	12.5
C-77	4.72	11.1	-	10.0	10.0	14.0	12.5
C-3	3.82	6.52	30.1	-	10.0	-	-
H-3	3.11	6.20	10.4	15.0	10.0	14.0	12.5
G-3	1.37	2.83	31.2	20.0	20.0	14.0	12.5
D-3	3.84	7.82	10.4	10.0	20.0	10.0	12.5
A-77	13.00	7.81	8.6	20.0	5.0	10.0	12.5
B-2	7.81	15.20	2.5	-	-	10.0	12.5
Total	-	-	100.0	100.0	100.0	100.0	100.0

Basically, overall metallurgical results (Table 9) were satisfactory.

**TABLE NO. 9 :**

Test No.	Comp. No.	Product	Weight %	Assays %		% Distribution	
				Pb	Zn	Pb	Zn
222	1	Pb Cleaner Conc	5.80	60.8	5.59	85.8	4.7
		Pb 1st Cl Conc	9.46	39.5	7.76	91.1	10.7
		Zn Cleaner Conc	9.69	0.45	55.70	1.0	78.5
		Zn Rougher Conc	17.44	0.53	32.40	2.1	82.3
		Zn Flot'n Tail	73.10	0.38	0.66	8.8	7.0
226	2	Pb Cleaner Conc	8.44	61.3	7.18	88.0	6.3
		Pb 1st Cl Conc	13.49	40.9	10.00	93.8	14.1
		Zn Cleaner Conc	13.29	0.46	57.00	1.0	78.7
		Zn Rougher Conc	21.90	0.59	36.30	2.2	82.5
		Zn Flot'n Tail	64.61	0.36	0.50	4.0	3.4
225	3	Pb Cleaner Conc	5.92	63.5	6.83	83.7	4.2
		Pb 1st Cl Conc	10.49	39.7	10.20	92.7	11.1
		Zn Cleaner Conc	14.17	0.45	55.20	1.4	81.8
		Zn Rougher Conc	26.61	0.48	30.50	2.8	85.1
		Zn Flot'n Tail	62.90	0.32	0.57	4.5	3.8
235	4	Pb Cleaner Conc	8.16	61.5	8.17	87.2	5.9
		Pb 1st Cl Conc	12.95	41.2	11.80	92.9	13.5
		Zn Cleaner Conc	16.06	0.67	56.3	1.9	80.5
		Zn Rougher Conc	23.56	0.77	39.4	3.1	82.7
		Zn Flot'n Tail	63.49	0.36	0.67	4.0	3.8
236	5	Pb Cleaner Conc	8.72	60.2	8.79	87.2	7.0
		Pb 1st Cl Conc	13.93	40.3	11.90	93.2	16.2
		Zn Cleaner Conc	14.45	0.54	57.70	1.3	75.7
		Zn Rougher Conc	24.07	0.72	37.20	2.8	81.2
		Zn Flot'n Tail	62.00	0.39	0.66	4.0	3.6

Locked cycle tests were run to examine type of flowsheet. The results were reasonably good (Table 10). In this testwork it was indicated that the recirculation of intermediate products adversely affected metallurgical results.

**TABLE NO. 10:****Effect of Type of Flowsheet on Pb-Zn Metallurgical Results - Cycle Tests**

Test No.	Flowsheet No.	Comp. No.	Product	Weight %	Assays %		% Dist'n	
					Pb	Zn	Pb	Zn
207	1	1	Pb Cleaner Conc	4.77	66.7	4.56	78.4	3.2
			Zn Cleaner Conc	9.18	0.58	57.40	1.3	78.5
			Zn Flot'n Tail	86.05	0.95	1.43	20.3	18.3
			Head (Calc)	100.00	4.06	6.71	100.0	100.0
217	2	1	Pb Cleaner Conc	6.12	62.2	5.67	91.0	5.0
			Zn Cleaner Conc	8.91	0.40	59.70	0.9	76.7
			Zn Flot'n Tail	84.97	0.40	1.49	8.1	18.3
			Head (Calc)	100.00	4.18	6.93	100.0	100.0
230	3	3*	Pb Cleaner Conc	5.82	62.5	6.16	80.6	3.9
			Zn Cleaner Conc	13.75	0.39	57.80	1.2	85.4
			Zn Flot'n Tail	80.43	1.02	1.25	18.2	10.7
			Head (Calc)	100.00	4.51	9.31	100.0	100.0
237	3	2	Pb Cleaner Conc	9.12	59.7	7.47	93.3	7.4
			Zn Cleaner Conc	14.31	0.58	55.7	1.4	86.2
			Zn Flot'n Tail	76.57	0.41	0.78	5.3	6.4
			Head (Calc)	100.00	5.84	9.25	100.0	100.0
240	3	2	Pb Cleaner Conc	9.08	59.1	7.24	91.4	6.9
			Zn Cleaner Conc	14.49	0.46	56.6	1.2	86.0
			Zn Flot'n Tail	75.87	0.44	0.57	5.7	4.5
			Head (Calc)	100.00	5.86	9.53	100.0	100.0

\*calculated by Noranda procedure

**1.3. Testwork 1977 to 1979 - Pilot Plant**

Pilot plant was performed on a composite of 12 different samples (Table No. 11).

Pilot plant was carried out using much coarser primary grind and regrinding than that used in the laboratory testwork.

Sample No.	Weight %	Assays %				Ag oz/t
		Pb	Zn	Fe	S	
K76-1	5.0	6.95	10.30	26.8	38.5	3.11
K80-1	10.0	5.18	9.38	19.3	26.1	2.34
K88-1	10.0	5.42	11.3	31.3	36.9	2.59
J76-1	15.0	6.38	8.81	28.5	35.9	2.55
B-5	10.0	6.96	15.5	22.6	34.9	4.40
C-4	10.0	4.20	8.26	15.5	21.2	1.93
FV-4	5.0	6.88	16.8	18.1	27.9	3.34
D-4	5.0	4.10	8.44	6.98	11.8	2.04
H-4	10.0	3.78	8.20	14.4	17.0	1.89
G-4	10.0	1.49	3.40	5.56	6.87	0.88
FQ-4	5.0	7.81	14.1	17.8	26.9	3.60
A-2	5.0	9.23	6.15	23.7	29.2	3.01
Total (Calc)	100.0	5.70	9.61	20.3	26.4	25.2
Assays*	-	6.06	10.1	20.5	27.0	2.85

\*direct assays

This was done on the request of Noranda metallurgists. The results obtained in the pilot plant were satisfactory, but not as good as those obtained in the laboratory. Pilot plant results are shown in Table No. 12, single shift and Table 13, continuous operation.

**TABLE NO. 12 : Metallurgical Results - Single Shift**

Test No.	Product	Weight %	Assays %		% Distribution	
			Pb	Zn	Pb	Zn
PP32	Pb Cleaner Conc	6.97	65.40	9.45	78.1	6.6
	Zn Cleaner Conc	14.65	2.16	54.50	5.4	79.8
	Zn Combined Tail	78.38	1.23	1.73	16.5	13.6
	Flot'n Feed (Calc)	100.00	5.80	10.00	100.0	100.0
PP41	Pb Cleaner Conc	7.07	62.70	10.40	77.2	7.3
	Zn Cleaner Conc	13.78	2.37	57.40	6.7	79.6
	Zn Combined Tail	79.15	1.24	1.65	16.8	12.4
	Flot'n Feed (Calc)	100.00	5.74	9.95	100.0	100.0

**TABLE NO. 13 : Metallurgical Results - Continuous Run**

Test No.	Test Period hours	Product	Weight %	Assays %		% Distribution	
				Pb	Zn	Pb	Zn
PP42	16	Pb Cl Conc	7.18	60.90	10.8	75.6	7.7
		Zn Cl Conc	16.66	2.65	48.4	7.6	79.9
		Zn Comb Tail	76.16	1.27	1.65	16.8	12.4
		Flot'n Feed (Calc)	100.00	5.74	9.55	100.0	100.0
PP43	24	Pb Cl Conc	7.30	60.7	10.9	75.9	8.0
		Zn Cl Conc	14.50	2.64	52.1	6.6	75.5
		Zn Comb Tail	78.20	1.30	2.11	17.5	16.5
		Flot'n Feed (Calc)	100.00	5.78	10.10	100.0	100.0

Note that the pilot plant ore assayed 0.7 % oxide lead.

#### 1.4. Testwork 1979

Pilot plant laboratory testwork was performed on individual ore samples for the purpose of metallurgical mapping. The results obtained were satisfactory.

### 2. Testwork on Vangorda Ore

#### 2.1. Laboratory Testwork

All laboratory testwork on Vangorda was done by Noranda Research and Dowo Mining, Japan. Lakefield does not have any record on hand regarding such testwork.

#### 2.2. Pilot Plant Testwork

Pilot plant testwork was done on samples C-1 and C-2. Tests were carried out by Noranda and Kerr Addison metallurgists. Only 12 pilot plant tests were performed. The pilot plant in fact was a complete failure and no reasonable metallurgy was established.

### 3. List of Reports

Table No. 14 shows a list of reports conducted on Grum and Faro ores. Each LR reference consists of 2 to 7 volumes of reports.

TABLE NO. 14:

**LIST OF REPORTS  
DONE ON  
GRUM, VANGORDA & FARO ORE DEPOSITS**

<u>COMPANY</u>	<u>TITLE</u>	<u>REPORT ISSUED</u>	<u>LR #</u>
Noranda Mines (Grum, Faro Yukon - R. Coleman)		1976	1868*
Kerr Addison (Grum, Faro Yukon - R. Roswell)		1975	1869
Kerr Addison (Grum, Faro Yukon - R. Roswell)		1975	1869
Noranda Mines (Grum Yukon - R. Coleman)		1978	1991
Cyprus Anvil (Yukon - R. Ferguson)		1977	1992
Kerr Addison (Grum, Faro Yukon - Noranda)		1978	2027
Cyprus Anvil (Yukon)		-	2082
Kerr Addison (Grum, Faro Yukon)		-	2084
Kerr Addison (Grum, Faro Yukon)		-	2084
Cyprus Anvil (Yukon)		1979	2142
Cyprus Anvil (Grum, Faro Yukon)		1979	2176
Cyprus Anvil (Grum, Faro Yukon)		1979	2176
Cyprus Anvil (Faro Yukon - W. Muir, P. Brown)		-	2202
Cyprus Anvil (Faro Yukon)		1981	2366
Curragh Resources (Vangorda - D. Scheduling, R. Colcman)		1989	3458B