

Table 1 – Metal content of the process residue components (Golder, 2009).

Process		Pressure Acid Leach Oxidation; Cyanidation		Chloride Leach Electro-Recovery
Percent of Feed		53	45	2
% Solids (Filter Cake)		75	60	60
Parameter	Units	Acid Leach Recovery of Co and Au Cyanidation Residue	Copper Re-Leach Fe/Gypsum Residue	Iron Precipitates from the Bi CLER Process
Ag	µg g ⁻¹	2.2	0.06	0.16
Al	µg g ⁻¹	8,100	6,100	1,600
As	µg g ⁻¹	150,000	13,000	36
B	g t ⁻¹	1,500	240	120
Ba	g t ⁻¹	40	4.3	5.9
Be	g t ⁻¹	0.78	0.11	0.09
Bi	µg g ⁻¹	4,100	2,200	17,000
Ca	µg g ⁻¹	20,000	190,000	120,000
Cd	µg g ⁻¹	0.08	0.05	0.06
Co	µg g ⁻¹	2,700	140	35
Cr	µg g ⁻¹	98	18	71
Cu	µg g ⁻¹	2,100	905	330
Fe	µg g ⁻¹	230,000	58,000	210,000
K	µg g ⁻¹	7,400	320	160
Li	g t ⁻¹	13	4	< 2
Mg	µg g ⁻¹	13,000	130	47
Mn	g t ⁻¹	430	9.2	770
Mo	µg g ⁻¹	27	19	17
Na	µg g ⁻¹	2,900	600	980
Ni	µg g ⁻¹	39	26	75
Pb	µg g ⁻¹	49	4.3	120
Sb	g t ⁻¹	200	14	100
Se	µg g ⁻¹	26	7.2	1
Sn	µg g ⁻¹	2.9	1.3	3.5
Sr	g t ⁻¹	8.29	150	32
Ti	µg g ⁻¹	740	90	380
Tl	µg g ⁻¹	0.27	0.09	< 0.02
U	µg g ⁻¹	1.1	7.5	2.9
V	g t ⁻¹	9	9	6
W	g t ⁻¹	36	3.2	3.2
Y	µg g ⁻¹	4.9	4	1.7
Zn	µg g ⁻¹	24	4.9	120
Hg	µg g ⁻¹	0.2	< 0.1	< 0.1

Table 2 – Acid base accounting of the SMPP process residue components (Golder, 2009).

Process		Pressure Acid Leach Oxidation; Cyanidation		Chloride Leach Electro-Recovery
Percent of Feed		53	45	2
% Solids (Filter Cake)		75	60	60
Parameter	Units	Acid Leach Recovery of Co and Au Cyanidation Residue	Copper Re-Leach Fe/Gypsum Residue	Iron Precipitates from the Bi CLER Process
Paste pH		6.27	3.83	5.45
Sulphur	% S	5.24	14.6	10.7
Sulphide	% S	4.74	0.47	0.31
Sulphate	% S	0.5	14.2	10.4
Carbon	% C	0.14	0.08	0.07
Carbonate	% C	0.05	0.04	0.03
NP		0.5	-15.8	-1.7
AP		148	14.6	9.83
CaNP		0.81	0.58	0.56
NAG-pH		1.93	3.77	4.51

Table 3 – Whole rock analysis of the SMPP process residue components (Golder, 2009).

Process		Pressure Acid Leach Oxidation; Cyanidation		Chloride Leach Electro-Recovery
Percent of Feed		53	45	2
% Solids (Filter Cake)		75	60	60
Parameter	Units	Acid Leach Recovery of Co and Au Cyanidation Residue	Copper Re-Leach Fe/Gypsum Residue	Iron Precipitates from the Bi CLER Process
SiO ₂	%	42.4	1.39	0.76
Al ₂ O ₃	%	6.9	1.11	0.29
Fe ₂ O ₃	%	30.4	7.96	30.7
MgO	%	5.55	0.49	0.09
CaO	%	8.97	26.8	17.6
Na ₂ O	%	0.68	0.13	0.17
K ₂ O	%	2.96	0.03	0.01
TiO ₂	%	0.34	0.01	0.05
P ₂ O ₅	%	0.07	0.03	0.04
MnO	%	0.23	< 0.01	0.09
Cr ₂ O ₃	%	< 0.01	0.06	0.37
V ₂ O ₅	%	< 0.01	< 0.01	< 0.01
LOI	%	0.35	25.3	23.2
Sum	%	98.8	63.3	73.3

Literature Cited

Golder Associates, 2009. Geochemical Characterization of Tailings, Cobalt and Bismuth Leach Residues and Iron-Arsenic Precipitates, NICO Project. Golder Report Number 08 1118 0043 (5005).