

CHEMICAL ANALYSIS REPORT

Date: July 21, 1994
ASL File No. E1616
Report On: Water Analysis (Goose Lake)
Report To: **Homestake Canada Ltd.**
1000 - 700 West Pender Street
Vancouver, BC
V6C 1G8
Attention: **Mr. Bill Napier**
Received: June 29, 1994

ASL ANALYTICAL SERVICE LABORATORIES LTD.

per:

Brent A. Makelki, B.Sc.
Project Chemist

Joyce Chow, B.Sc.
Project Chemist

cc: Hallam Knight Piesold Ltd.

		WQ1	WQ2	WQ3	WQ4	WQ5
		94 06 27 08:00	94 06 27 08:00	94 06 27 08:00	94 06 27 08:00	94 06 27 08:00
Physical Tests						
Colour	CU	23.3	6.7	9.9	25.1	47.3
Conductivity	umhos/cm	26.4	13.4	17.4	18.9	16.7
Total Dissolved Solids		16	8	11	12	10
Hardness	CaCO ₃	6.74	3.70	3.96	6.75	6.15
pH		6.42	6.35	6.32	6.38	5.76
Total Suspended Solids		7	2	3	5	3
Turbidity	NTU	1.79	0.26	0.64	0.86	0.54
Dissolved Anions						
Alkalinity - Total	CaCO ₃	4.3	2.8	3.0	5.3	3.0
Chloride	Cl	0.9	0.8	0.7	0.9	0.8
Sulphate	SO ₄	2.6	1.0	<1.0	1.3	2.9
Nutrients						
Ammonia Nitrogen	N	0.022	<0.005	0.011	0.019	<0.005
Nitrate Nitrogen	N	0.011	<0.005	<0.005	<0.005	<0.005
Nitrite Nitrogen	N	0.001	0.001	0.001	0.002	0.002
ortho-Phosphate	P	<0.001	<0.001	<0.001	<0.001	<0.001
Total Phosphorus	P	0.008	<0.001	<0.001	0.006	0.006
Total Metals						
Mercury	T-Hg	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001

Results are expressed as milligrams per litre except for pH,
Conductivity (umhos/cm), Turbidity (NTU), and Colour (CU).
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

File No. H1616

		WQ1	WQ2	WQ3	WQ4	WQ5
		94 06 27 08:00	94 06 27 08:00	94 06 27 08:00	94 06 27 08:00	94 06 27 08:00
<u>Dissolved Metals</u>						
Aluminum	D-Al	0.024	0.009	0.012	0.017	0.130
Antimony	D-Sb	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	D-As	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Barium	D-Ba	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium	D-Be	<0.005	<0.005	<0.005	<0.005	<0.005
Bismuth	D-Bi	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	D-Cd	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Calcium	D-Ca	1.53	0.808	0.826	1.44	1.32
Chromium	D-Cr	0.002	<0.001	<0.001	<0.001	<0.001
Cobalt	D-Co	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	D-Cu	0.005	0.001	0.001	0.002	0.004
Iron	D-Fe	0.106	<0.030	<0.030	0.118	0.118
Lead	D-Pb	0.002	0.002	<0.001	<0.001	<0.001
Lithium	D-Li	<0.015	<0.015	<0.015	<0.015	<0.015
Magnesium	D-Mg	0.712	0.408	0.460	0.765	0.695
Manganese	D-Mn	<0.005	<0.005	<0.005	<0.005	<0.005
Molybdenum	D-Mo	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	D-Ni	0.003	0.002	0.003	0.003	0.006
Phosphorus	D-P	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium	D-K	<2.0	<2.0	<2.0	<2.0	<2.0
Selenium	D-Se	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Silver	D-Ag	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium	D-Na	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium	D-Sr	0.007	0.003	0.003	0.006	0.006
Thallium	D-Tl	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	D-Sn	<0.30	<0.30	<0.30	<0.30	<0.30
Titanium	D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010
Tungsten	D-W	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium	D-V	<0.030	<0.030	<0.030	<0.030	<0.030
Zinc	D-Zn	0.019	<0.005	0.007	<0.005	0.008

Results are expressed as milligrams per litre except for pH.
 Conductivity (umhos/cm), Turbidity (NTU), and Colour (CU).
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

File No. E1616

		WQ6	WQ7	WQ8
		94 06 27 08:00	94 06 27 08:00	94 06 27 08:00
<u>Physical Tests</u>				
Colour	CU	7.5	8.0	<5.0
Conductivity	umhos/cm	15.7	12.5	1.5
Total Dissolved Solids		9	8	<1
Hardness	CaCO3	5.23	3.76	0.08
pH		6.16	6.28	5.72
Total Suspended Solids		<1	3	<1
Turbidity	NTU	0.28	0.33	<0.10
<u>Dissolved Anions</u>				
Alkalinity - Total	CaCO3	3.5	2.4	<1.0
Chloride	Cl	0.6	0.8	<0.5
Sulphate	SO4	1.9	1.5	<1.0
<u>Nutrients</u>				
Ammonia Nitrogen	N	<0.005	<0.005	<0.005
Nitrate Nitrogen	N	0.034	<0.005	<0.005
Nitrite Nitrogen	N	<0.001	<0.001	<0.001
ortho-Phosphate	P	<0.001	<0.001	<0.001
Total Phosphorus	P	0.004	0.003	<0.001
<u>Total Metals</u>				
Mercury	T-Hg	<0.00001	<0.00001	<0.00001

Results are expressed as milligrams per litre except for pH,
Conductivity (umhos/cm), Turbidity (NTU), and Colour (CU).
< = Less than the detection limit indicated.

		WQ6	WQ7	WQ8
		94 06 27 08:00	94 06 27 08:00	94 06 27 08:00
<u>Dissolved Metals</u>				
Aluminum	D-Al	0.019	0.011	<0.005
Antimony	D-Sb	<0.0001	<0.0001	<0.0001
Arsenic	D-As	<0.0001	<0.0001	<0.0001
Barium	D-Ba	<0.010	<0.010	<0.010
Beryllium	D-Be	<0.005	<0.005	<0.005
Bismuth	D-Bi	<0.10	<0.10	<0.10
Cadmium	D-Cd	<0.0002	<0.0002	<0.0002
Calcium	D-Ca	1.09	0.774	<0.050
Chromium	D-Cr	<0.001	<0.001	<0.001
Cobalt	D-Co	<0.001	<0.001	<0.001
Copper	D-Cu	0.002	0.001	<0.001
Iron	D-Fe	<0.030	<0.030	<0.030
Lead	D-Pb	<0.001	<0.001	<0.001
Lithium	D-Li	<0.015	<0.015	<0.015
Magnesium	D-Mg	0.611	0.444	0.019
Manganese	D-Mn	<0.005	<0.005	<0.005
Molybdenum	D-Mo	<0.001	<0.001	<0.001
Nickel	D-Ni	0.002	0.002	<0.001
Phosphorus	D-P	<0.30	<0.30	<0.30
Potassium	D-K	<2.0	<2.0	<2.0
Selenium	D-Se	<0.0005	<0.0005	<0.0005
Silver	D-Ag	<0.0001	<0.0001	<0.0001
Sodium	D-Na	<2.0	<2.0	<2.0
Strontium	D-Sr	0.003	0.003	<0.001
Thallium	D-Tl	<0.10	<0.10	<0.10
Tin	D-Sn	<0.30	<0.30	<0.30
Titanium	D-Ti	<0.010	<0.010	<0.010
Tungsten	D-W	<0.10	<0.10	<0.10
Vanadium	D-V	<0.030	<0.030	<0.030
Zinc	D-Zn	<0.005	<0.005	<0.005

Results are expressed as milligrams per litre except for pH,
Conductivity (umhos/cm), Turbidity (NTU), and Colour (CU).
< = Less than the detection limit indicated.

Samples were analyzed by methods acceptable to the appropriate regulatory agency. Outlines of the methodologies utilized are as follows:

Conventional Parameters in Water

These analyses are carried out in accordance with procedures described in "Standard Methods for the Examination of Water and Wastewater" 18th Ed. published by the American Public Health Association, 1992. Further details are available on request.

Metals in Water

These analyses are carried out in accordance with procedures described in "Standard Methods for the Examination of Water and Wastewater" 18th Edition published by the American Public Health Association, 1992. The procedures involve a variety of instrumental analyses including atomic emission spectrophotometry (ICP) and atomic absorption spectrophotometry (AA) to obtain the required detection limit for each element. Specific details are available on request.

End of Report

CHEMICAL ANALYSIS REPORT

Date: September 29, 1994
ASL File No. E3221
Report On: Water Analysis (Goose Lake)
Report To: **Homestake Canada Ltd.**
1000 - 700 West Pender Street
Vancouver, BC
V6C 1G8
Attention: **Mr. Bill Napier**
Received: August 25, 1994

ASL ANALYTICAL SERVICE LABORATORIES LTD.
pcr:

Brent A. Makelki, B.Sc.
Project Chemist

Tim Crowther, M.Sc.
Project Chemist

cc: Hallam Knight Piesold Ltd.

RESULTS OF ANALYSIS - Water

File No. E3221

		WQ1	WQ2	WQ3	WQ4	WQ5
		94 08 23 15:45	94 08 23 15:45	94 08 23 15:45	94 08 23 15:45	94 08 23 15:45
<u>Physical Tests</u>						
Conductivity	umhos/cm	14.6	22.0	11.9	43.2	36.5
Total Dissolved Solids		7.1	11.2	7.7	22.2	19.7
Hardness	CaCO ₃	4.35	6.84	4.01	15.1	12.3
pH		6.66	6.52	6.34	6.02	6.11
Total Suspended Solids		2	<1	<1	2	3
<u>Dissolved Anions</u>						
Alkalinity - Total	CaCO ₃	4.0	5.9	3.5	12.4	6.3
Chloride	Cl	0.9	1.7	0.8	1.0	0.9
Sulphate	SO ₄	1.6	2.1	2.8	6.1	6.9
<u>Nutrients</u>						
Ammonia Nitrogen	N	0.020	0.007	0.005	0.031	<0.005
Nitrate Nitrogen	N	0.015	0.127	<0.005	0.136	0.529
Nitrite Nitrogen	N	0.002	0.002	<0.001	0.002	0.001
Total Phosphorus	P	0.011	0.004	0.004	0.006	0.005

Results are expressed as milligrams per litre except for pH and Conductivity (umhos/cm).
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		WQ1	WQ2	WQ3	WQ4	WQ5
		94 08 23 15:45	94 08 23 15:45	94 08 23 15:45	94 08 23 15:45	94 08 23 15:45
Total Metals						
Aluminum	T-Al	<0.20	<0.20	<0.20	<0.20	<0.20
Antimony	T-Sb	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	T-As	0.0001	0.0001	0.0001	0.0001	0.0001
Barium	T-Ba	<0.010	<0.010	<0.010	0.022	<0.010
Beryllium	T-Be	<0.005	<0.005	<0.005	<0.005	<0.005
Bismuth	T-Bi	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	T-Cd	<0.010	<0.010	<0.010	<0.010	<0.010
Calcium	T-Ca	1.04	1.75	0.823	3.99	2.76
Chromium	T-Cr	<0.015	<0.015	<0.015	<0.015	<0.015
Cobalt	T-Co	<0.015	<0.015	<0.015	<0.015	<0.015
Copper	T-Cu	0.002	0.001	0.001	0.003	0.002
Iron	T-Fe	0.208	0.264	<0.030	0.047	<0.030
Lead	T-Pb	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	T-Li	<0.015	<0.015	<0.015	<0.015	<0.015
Magnesium	T-Mg	0.601	0.926	0.517	1.95	1.67
Manganese	T-Mn	<0.005	<0.005	<0.005	0.006	<0.005
Mercury	T-Hg	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Molybdenum	T-Mo	<0.030	<0.030	<0.030	<0.030	<0.030
Nickel	T-Ni	<0.020	<0.020	<0.020	<0.020	<0.020
Phosphorus	T-P	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium	T-K	<2.0	<2.0	<2.0	<2.0	<2.0
Selenium	T-Se	<0.20	<0.20	<0.20	<0.20	<0.20
Silver	T-Ag	<0.015	<0.015	<0.015	<0.015	<0.015
Sodium	T-Na	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium	T-Sr	0.004	0.007	0.004	0.015	0.008
Thallium	T-Tl	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	T-Sn	<0.30	<0.30	<0.30	<0.30	<0.30
Titanium	T-Ti	<0.010	<0.010	<0.010	<0.010	<0.010
Tungsten	T-W	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium	T-V	<0.030	<0.030	<0.030	<0.030	<0.030
Zinc	T-Zn	<0.005	<0.005	<0.005	0.007	<0.005

Results are expressed as milligrams per litre except for pH and
 Conductivity (umhos/cm).
 < - Less than the detection limit indicated.

		WQ1	WQ2	WQ3	WQ4	WQ5
		94 08 23 15:45	94 08 23 15:45	94 08 23 15:45	94 08 23 15:45	94 08 23 15:45
<u>Dissolved Metals</u>						
Aluminum	D-Al	<0.20	<0.20	<0.20	<0.20	<0.20
Antimony	D-Sb	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	D-As	0.0001	0.0001	<0.0001	0.0001	0.0001
Barium	D-Ba	<0.010	<0.010	<0.010	0.015	<0.010
Beryllium	D-Be	<0.005	<0.005	<0.005	<0.005	<0.005
Bismuth	D-Bi	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	D-Cd	<0.010	<0.010	<0.010	<0.010	<0.010
Calcium	D-Ca	0.903	1.46	0.807	3.24	2.45
Chromium	D-Cr	<0.015	<0.015	<0.015	<0.015	<0.015
Cobalt	D-Co	<0.015	<0.015	<0.015	<0.015	<0.015
Copper	D-Cu	<0.001	<0.001	<0.001	0.003	0.001
Iron	D-Fe	0.066	0.094	<0.030	<0.030	<0.030
Lead	D-Pb	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	D-Li	<0.015	<0.015	<0.015	<0.015	<0.015
Magnesium	D-Mg	0.508	0.778	0.484	1.70	1.51
Manganese	D-Mn	<0.005	<0.005	<0.005	0.005	<0.005
Molybdenum	D-Mo	<0.030	<0.030	<0.030	<0.030	<0.030
Nickel	D-Ni	<0.020	<0.020	<0.020	<0.020	<0.020
Phosphorus	D-P	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium	D-K	<2.0	<2.0	<2.0	<2.0	<2.0
Selenium	D-Se	<0.20	<0.20	<0.20	<0.20	<0.20
Silver	D-Ag	<0.015	<0.015	<0.015	<0.015	<0.015
Sodium	D-Na	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium	D-Sr	0.004	0.007	0.004	0.010	0.008
Thallium	D-Tl	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	D-Sn	<0.30	<0.30	<0.30	<0.30	<0.30
Titanium	D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010
Tungsten	D-W	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium	D-V	<0.030	<0.030	<0.030	<0.030	<0.030
Zinc	D-Zn	<0.005	<0.005	<0.005	<0.005	<0.005

Results are expressed as milligrams per litre except for pH and Conductivity (umhos/cm).

< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

File No. E3221

		WQ7	WQ8
		94 08 23	94 08 23
<u>Physical Tests</u>			
Conductivity	umhos/cm	11.7	3.0
Total Dissolved Solids		7.8	2.1
Hardness	CaCO ₃	3.75	0.25
pH		6.16	5.12
Total Suspended Solids		3	2
<u>Dissolved Anions</u>			
Alkalinity - Total	CaCO ₃	3.6	<1.0
Chloride	Cl	0.7	<0.5
Sulphate	SO ₄	3.0	<1.0
<u>Nutrients</u>			
Ammonia Nitrogen	N	0.012	0.010
Nitrate Nitrogen	N	0.009	0.122
Nitrite Nitrogen	N	0.001	0.001
Total Phosphorus	P	0.006	0.003

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Conductivity (umhos/cm).
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RESULTS OF ANALYSIS - Water

File No. B3221

		WQ7	WQ8
		94 08 23	94 08 23
<u>Total Metals</u>			
Aluminum	T-Al	<0.20	<0.20
Antimony	T-Sb	<0.0001	<0.0001
Arsenic	T-As	<0.0001	0.0001
Barium	T-Ba	<0.010	<0.010
Beryllium	T-Be	<0.005	<0.005
Bismuth	T-Bi	<0.10	<0.10
Cadmium	T-Cd	<0.010	<0.010
Calcium	T-Ca	0.788	0.079
Chromium	T-Cr	<0.015	<0.015
Cobalt	T-Co	<0.015	<0.015
Copper	T-Cu	0.001	0.003
Iron	T-Fe	0.051	<0.030
Lead	T-Pb	<0.001	0.001
Lithium	T-Li	<0.015	<0.015
Magnesium	T-Mg	0.509	0.017
Manganese	T-Mn	<0.005	<0.005
Mercury	T-Hg	<0.00005	<0.00005
Molybdenum	T-Mo	<0.030	<0.030
Nickel	T-Ni	<0.020	<0.020
Phosphorus	T-P	<0.30	<0.30
Potassium	T-K	<2.0	<2.0
Selenium	T-Se	<0.20	<0.20
Silver	T-Ag	<0.015	<0.015
Sodium	T-Na	<2.0	<2.0
Strontium	T-Sr	0.004	0.001
Thallium	T-Tl	<0.10	<0.10
Tin	T-Sn	<0.30	<0.30
Titanium	T-Ti	<0.010	<0.010
Tungsten	T-W	<0.10	<0.10
Vanadium	T-V	<0.030	<0.030
Zinc	T-Zn	<0.005	<0.005

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		WQ7	WQ8
		94 08 23	94 08 23
Dissolved Metals			
Aluminum	D-Al	<0.20	<0.20
Antimony	D-Sb	<0.0001	<0.0001
Arsenic	D-As	<0.0001	<0.0001
Barium	D-Ba	<0.010	<0.010
Beryllium	D-Be	<0.005	<0.005
Bismuth	D-Bi	<0.10	<0.10
Cadmium	D-Cd	<0.010	<0.010
Calcium	D-Ca	0.739	0.079
Chromium	D-Cr	<0.015	<0.015
Cobalt	D-Co	<0.015	<0.015
Copper	D-Cu	0.001	<0.001
Iron	D-Fe	<0.030	<0.030
Lead	D-Pb	<0.001	0.001
Lithium	D-Li	<0.015	<0.015
Magnesium	D-Mg	0.463	0.013
Manganese	D-Mn	<0.005	<0.005
Molybdenum	D-Mo	<0.030	<0.030
Nickel	D-Ni	<0.020	<0.020
Phosphorus	D-P	<0.30	<0.30
Potassium	D-K	<2.0	<2.0
Selenium	D-Se	<0.20	<0.20
Silver	D-Ag	<0.015	<0.015
Sodium	D-Na	<2.0	<2.0
Strontium	D-Sr	0.004	0.001
Thallium	D-Tl	<0.10	<0.10
Tin	D-Sn	<0.30	<0.30
Titanium	D-Ti	<0.010	<0.010
Tungsten	D-W	<0.10	<0.10
Vanadium	D-V	<0.030	<0.030
Zinc	D-Zn	<0.005	<0.005

Results are expressed as milligrams per litre except for pH and Conductivity (umhos/cm).
 < = less than the detection limit indicated.

Samples were analyzed by methods acceptable to the appropriate regulatory agency. Outlines of the methodologies utilized are as follows:

Conventional Parameters in Water

These analyses are carried out in accordance with procedures described in "Standard Methods for the Examination of Water and Wastewater" 18th Ed. published by the American Public Health Association, 1992. Further details are available on request.

Metals in Water

These analyses are carried out in accordance with procedures described in "Standard Methods for the Examination of Water and Wastewater" 18th Edition published by the American Public Health Association, 1992. The procedures involve a variety of instrumental analyses including atomic emission spectrophotometry (ICP) and atomic absorption spectrophotometry (AA) to obtain the required detection limit for each element. Specific details are available on request.

End of Report