Indian and Northern Affairs Canada | Affaires indiennes et du Nord Canada

Indian and Northern Affairs Canada
Nunavut Field Operations
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November 17, 2004

NWB1LUP0008

C. Michael Tansey
Reclamation Project Manager
Lupin, Nunavut
9818 International Airport
Edmonton Alberta
T5J 2T2

Re: Lupin Mine Water Licence Inspection July 7, 2004 and July 13, 2004

Dear Mr Tansey;

The following document is a summary of the Water Licence Inspection conducted on July 7, 2004 and the follow up site visit on July 13, 2004. In the course of the July 7, 2004 inspection concerns were identified with respect to; leaking drums located at the Bulk Fuel Storage Facility, a low containment berm at the Bulk Fuel Storage Facility and fuel leaking from day tanks used to supply the camp generators. It was also noted on July 13, 2004 that water was being drawn from End Lake for the purpose of dust suppression on site. Lab results for samples taken from the drinking water source, landfill leachate, coffer dam and sewage lagoon effluent are attached to this document.

The leaking drums located at the Bulk Fuel Storage Facility were cleaned up so they are no longer a concern. According to Mr Tansey, the day tanks are leaking very slowly and have been contained by placing spill pads beneath the leaky valves. However, it appears that a fairly large amount of fuel oil has been released into the containment berm for the day tanks. Care should be taken to ensure that water levels do not build up in the containment berm as an overflow of the berm could result in the discharge of hydrocarbon contaminated water. It should also be noted that the contaminated soil will need to be properly disposed of when the site is decommissioned. The low spot in the containment berm of the Bulk Fuel Storage Facility has been built up but this did not include raising the liner in the Berm. As the raising of the liner may not be practical at this time it will simply be noted that any release of fuel in the event of a spill will be a violation of both the Licence and the Act.

Water Supply

The pump house (figure 1) located on Contwoyto Lake and the Water Treatment Plant (figure 2) located in camp appear to be well maintained.

Drinking water quality is maintained using Ultra Violet radiation in combination with a 10 um filtration system. The filters are changed every two days and water use is recorded weekly and used to calculate annual water consumption. According to the pumping report provided for 2003, 681 584 cubic metres of water was pumped out of Contwoyto Lake and used either as potable or process water. The amount reported was well below the annual limit of 1 700 000 cubic metres per year set by the Nunavut Water Board. Discussion with Mike Tansey suggested that the use of End Lake as a water source for dust suppression was cleared by the NWB however, this water use should be included in the annual report. All parameters tested were within the Canadian Council of Ministers of the Environment Summary of Guidelines for Canadian Drinking Water Quality 2003.

Solid Waste Disposal

Burnable waste is open burned (figure 3) and landfilled while metal waste is compacted and landfilled. The Landfill site appears to be efficiently operated with the waste covered regularly. A seep on the south east side of the landfill had a film of oil and grease on it's surface (figure 4). The sample was taken at N 65°45'42.1" W 111°13'23.6". A number of the parameters measured exceeded the Canadian Water Quality Guidelines for the Protection of Aquatic Life 2002. Arsenic 223 ug/L>> 5.0 ug/L, Oil and Grease 26 mg/L > no visible sheen, Cadmium 0.6 ug/L > 0.017 ug/L (hardness not incorporated into Water Quality Guideline) Chromium 7.6 ug/L > 1.0 ug/L, Iron 17 300 ug/L >> 300 ug/L, Selenium 2 ug/L > 1.0 ug/L and Zinc 1360 ug/L >> 30 ug/L. Given the high levels of contaminants in this seep and it's potential toxicity, measures need to be taken to contain and treat this seepage to prevent it's entry into water which would be a violation of the Nunavut Waters and Nunavut Surface Rights Tribunal Act 2002.

No leachate was observed at the Tailings Containment Area however; water samples taken at the Coffer Dam at Cell 4 (Figure 5) exceeded Canadian Guidelines for Aluminum (3110 ug/L > 5-100 ug/L), Arsenic (163 ug/L > 5ug/L), Copper (39.9 ug/L > 2-4 ug/L), Iron (10300 ug/L > 300 ug/L) and Zinc (155 ug/L > 30 ug/L). The parameters measured do not exceed the discharge guidelines for the tailings effluent but the high levels at the coffer dam could indicate a seep or runoff problem..

Sewage Treatment Lagoons

The two sewage treatment lagoons at Lupin Mine (figure 6) appear to be working effectively however, during the first site visit the pH of the sewage effluent exceeded the Licenced Guideline (9.84 > 7.0 to 9.0). As a result, sewage effluent could not be discharged from the second lagoon. Discharge was delayed until the pH was within Licenced Guidelines. Samples of the sewage effluent being discharged on July 13, 2004 revealed that the effluent exceeded the Canadian Water Quality Guidelines for the Protection of Aquatic Life 2003 for a number of parameters. These parameters include Arsenic (11 ug/L > 5.0 ug/L), Aluminum (112 ug/L > 100ug/L), Copper (8.1 ug/L > 4.0 ug/L) and Selenium (3.0 ug/L > 1.0 ug/L), however none of the parameters measured exceeded the Licenced Guidelines. The free board in the lagoon was not a concern.

Non-Compliance of the Act or Licence

The Licencee is out of compliance with respect to leachate being discharged in the area of the Landfill. Water at the coffer dam at cell four of the TCA exceeds CCME Water Quality Guidelines for the Protection of Aquatic Life 2003. Accordingly, the water collected in the coffer dam at cell 4 should be pumped into the tailings pond and discharged as part of the tailings effluent. Aside from the problems noted with the sewage effluent and landfill leachate the licencee appears to be in compliance and committed to operating within the parameters of their licence.

If you have any questions or concerns please contact me.

Sincerely,

Scott Stewart

Scott Stewart
Water Resource Officer
Nunavut Field Operations
Indian and Northern Affairs Canada
Ph: (867) 975-4289
stewarts@inac.gc.ca

c.c.
Nunavut Water Board - Gjoa Haven (Dionne Filiatrault, Jim Wall)
Environment Canada - Iqaluit (Sid Bruinsma)
Environment Canada - Yellowknife (Anne Wilson)

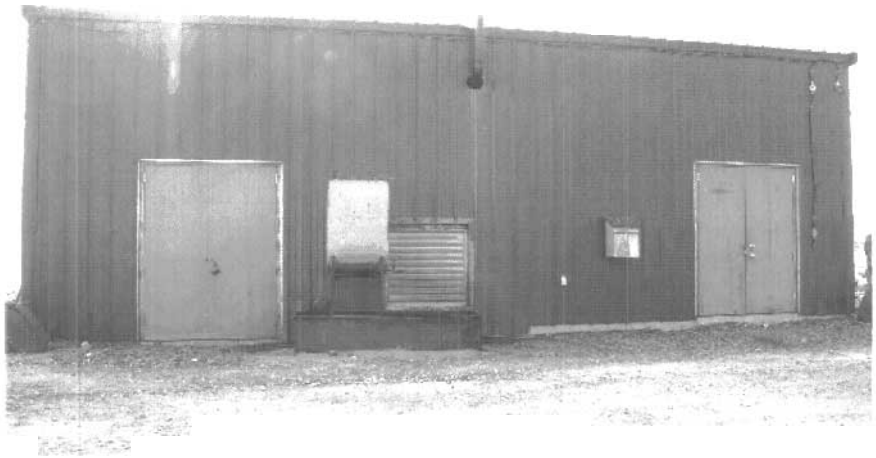

Figure 1. Pump house on Contwoyto Lake at Lupin Mine.

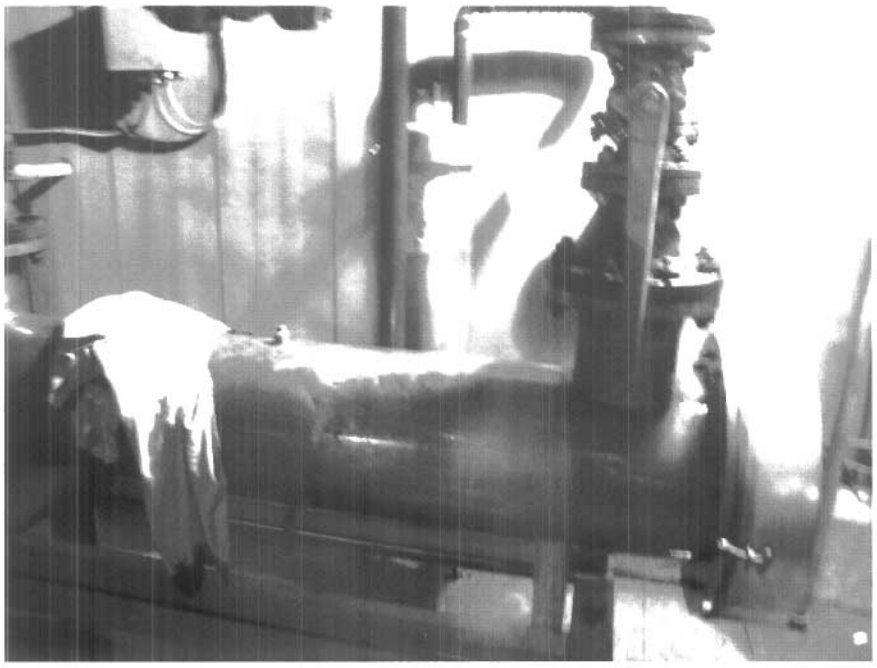

Figure 2. Ultraviolet Radiation Unit in the Water Treatment Plant at Lupin Mine.

Figure 3. Burnable waste combustion site at Lupin Mine.

Figure 4.A seep adjacent to the Lupin Landfill taken at N 65°45'42.1" W 111°13'23.6".

Figure 5.Sample taken at N 65° 43' 02.7" W 111° 16' 13.1" at Coffer Dam at cell four of Lupin Tailings Containment Area.

Figure 6. The first lagoon of the two lagoon sewage treatment system at Lupin Mine.

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INDUSTRIAL WATER USE INSPECTION REPORT

Date: July 7, 2004 **Company Rep.** (Name/Title)**:** Mike Tansey

Licensee: Kinross Gold (Echo Bay Mine) **Licence No.:**NWB1LUP0008

WATER SUPPLY

Source(s): Contwoyto Lake **Quantity used:** 651 584 cubic metres **Meter Reading:**

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Intake Facilities: A	**Storage Structure:** A	**Treatment Systems:** A	**Recycling:** NA
Flow Meas. Device: A	**Conveyance Lines:** A	**Pumping Stations:** A	**Modifications:**NA

Comments: The UV water treatment system, combined with a 10um filter unit appeared to be well maintained. appeared to be well maintained. The filters are changed every two days and water use is recorded weekly with annual water use calculated from that.

WASTE DISPOSAL

Tailings: **Tailings Pond:** x **Natural Lake:** x **Underground:**x

Sewage: **Sewage Treatment System:** **Tailings Pond:** x **Natural Water Body:** x
Continuous Discharge: **Intermittent Discharge:**

Solid Waste: **Open Dump:** **Landfill:** x **Burn & Bury:** x **Underground:**

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Discharge Quality: sampled	**Decant Structure:** A	**Dyke Inspections:** NI
Conveyance Lines: NI	**Pond Treatment:** A	**Runoff Diversion:** NI
Discharge Meas. Device: NI	**Dams, Dykes:** A	**Erosion:** A
Freeboard: A	**Seepages:** sampled	**Spills:** NA
Effluent Discharge Rate: A	**Samples Collected:**	

Comments: The 2nd lagoon was being decanted before my arrival but the pH readings exceeded licenced guidelines so the decant was stopped. The lagoon has >1m of freeboard. The pH reading on July 7th, 2004 was 9.84. The lagoon will be decanted when the pH is acceptable.

GENERAL CONDITIONS

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Ore & Waste Rock Stockpiles:NI	**Records & Reporting:** A	**SNP:** A
Geotechnical Inspection:NI	**Posting/Signage:** U	**Contingency Plan:** A
Restoration Activities: A	**New Construction:** NA	**Fuel Storage:** U
Mine Water Discharge: A	**Chemical Storage:** NI	**Annual Report:** A

Comments: Mine water is now discharged to the tailings. The TCA appears to be well monitored and maintained with the next decant from pond 2 scheduled to occur in 2005. Freeboard is not an issue. Covering of tailings with esker material has started.

Violations of Act or Licence:

Leaky oil drums need to be removed and the spills cleaned up at the tank farm. Sewage effluent should not be discharged until it is within licenced guidelines. Otherwise no violations of the Act or Licence were observed.

General Comments:

The containment berm of the main tank farm needs to be built up on the runway side as a low spot would likely result in the release of spilled fuel out of the berm. Two of the day tanks were leaking fuel and fuel had collected inside the berm. The leaks need to be fixed and the contaminated soil removed.

Scott Stewart
Inspector's Name

Scott Stewart
Inspector's Signature

Taiga Environmental Laboratory
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- FINAL REPORT -

Prepared For: Nunavut District Office

Address: Box 100
Iqaluit, nu
X0A 0H0

Attn: Scott Stewart **Facimile:** (867) 975-6445

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Final report has been reviewed and approved by:

Helene Harper

Helene Harper
Client Services Officer

Nunavut Water Board
NOV 2 6 2004
Public Registry

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Standards Council of Canada (SCC) as a testing laboratory for specific tests registered with the Council.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: Lupin Landfill Leachate **Taiga Sample ID:** 241488

Client Project:
Sample Type:
Received Date: 09-Jul-04
Sampling Date: 07-Jul-04
Location: Lupin Mine Nunavut

Approved By Helene Harper
Client Services Officer

Report Status: **FINAL**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Physicals						
Alkalinity	124	0.3	mg/L	10-Jul-04	SM2320:B	
Conductivity, Specific	1600	0.3	µS/cm	10-Jul-04	SM2510:B	
pH	7.14	0.05	pH units	10-Jul-04	SM4500-H:B	
Solids, Total Suspended	171	3	mg/L	13-Jul-04	SM2540:D	
Turbidity	162	0.05	NTU	12-Jul-04	SM2130:B	
Nutrients						
Ammonia as N	0.650	0.005	mg/L	15-Jul-04	SM4500-NH3:G	
Phosphorous, Total	0.28	0.01	mg/L	09-Jul-04	SM4500-P:D	
Subcontracted Nutrients						
Nitrate as N	3.6	0.1	mg/L	13-Jul-04	SM4110:B	
Nitrite as N	0.10	0.05	mg/L	13-Jul-04	SM4110:B	
Major Ions						

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: Lupin Landill Leachate **Taiga Sample ID:** 241488

Calcium	271	0.1	mg/L	13-Jul-04	SM4110:B
Magnesium	27.0	0.1	mg/L	13-Jul-04	SM4110:B
Potassium	18.1	0.1	mg/L	13-Jul-04	SM4110:B
Sodium	50.2	0.1	mg/L	13-Jul-04	SM4110:B
Subcontracted Major Ions					
Chloride	89	1	mg/L	16-Jul-04	SM4500-Cl-:E
Sulphate	640	0.2	mg/L	22-Jul-04	SM4110:B
Subcontracted Organics					
Oil and Grease	26	5	mg/L	20-Jul-04	SM5520:B
Metals, Total					
Aluminum	1670	30	µg/L	14-Jul-04	EPA200.8
Antimony	5.1	0.1	µg/L	14-Jul-04	EPA200.8
Arsenic	223	1	µg/L	15-Jul-04	SM3113:B
Barium	83.4	0.1	µg/L	14-Jul-04	EPA200.8
Beryllium	< 0.1	0.1	µg/L	14-Jul-04	EPA200.8
Cadmium	0.6	0.1	µg/L	14-Jul-04	EPA200.8
Cesium	2.0	0.1	µg/L	14-Jul-04	EPA200.8
Chromium	7.6	0.3	µg/L	14-Jul-04	EPA200.8
Cobalt	20.8	0.1	µg/L	14-Jul-04	EPA200.8
Copper	31.6	0.3	µg/L	14-Jul-04	EPA200.8
Iron	17300	50	µg/L	14-Jul-04	SM3111:B

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: Lupin Landill Leachate **Taiga Sample ID:** 241488

Lead	16.1	0.1	µg/L	14-Jul-04	EPA200.8
Lithium	43.9	0.3	µg/L	14-Jul-04	EPA200.8
Manganese	1030	0.1	µg/L	14-Jul-04	EPA200.8
Mercury	< 0.02	0.02	µg/L	28-Jul-04	EPA200.8
Molybdenum	4.2	0.1	µg/L	14-Jul-04	EPA200.8
Nickel	31.7	0.1	µg/L	14-Jul-04	EPA200.8
Rubidium	33.4	0.1	µg/L	14-Jul-04	EPA200.8
Selenium	2	1	µg/L	14-Jul-04	EPA200.8
Silver	< 0.1	0.1	µg/L	14-Jul-04	EPA200.8
Strontium	1020	0.1	µg/L	14-Jul-04	EPA200.8
Thallium	< 0.1	0.1	µg/L	14-Jul-04	EPA200.8
Titanium	102	0.1	µg/L	14-Jul-04	EPA200.8
Uranium	3.3	0.1	µg/L	14-Jul-04	EPA200.8
Vanadium	4.6	0.1	µg/L	14-Jul-04	EPA200.8
Zinc	1360	10	µg/L	14-Jul-04	EPA200.8

- DATA QUALIFERS -

Data Qualifier Descriptions:

50 *An emulsion formed during extraction and required centrifugati*

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: Lupin Potable **Taiga Sample ID:** 241489

Client Project:
Sample Type:
Received Date: 09-Jul-04
Sampling Date: 07-Jul-04
Location: Lupin Mine Nunavut

Report Status: **FINAL**

Approved By Helene Harper
Client Services Officer

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Physicals						
Alkalinity	3.9	0.3	mg/L	10-Jul-04	SM2320:B	
Colour	< 5	5		10-Jul-04	SM2120:B	
Conductivity, Specific	12.2	0.3	µS/cm	10-Jul-04	SM2510:B	
pH	6.45	0.05	pH units	10-Jul-04	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	13-Jul-04	SM2540:D	
Turbidity	0.42	0.05	NTU	12-Jul-04	SM2130:B	
Nutrients						
Ammonia as N	< 0.005	0.005	mg/L	15-Jul-04	SM4500-NH3:G	
Phosphorous, Total	< 0.01	0.01	mg/L	09-Jul-04	SM4500-P:D	
Subcontracted Nutrients						
Nitrate as N	< 0.1	0.1	mg/L	13-Jul-04	SM4110:B	
Nitrite as N	< 0.05	0.05	mg/L	13-Jul-04	SM4110:B	
Major Ions						

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: Lupin Potable **Taiga Sample ID:** 241489

Calcium	1.1	0.1	mg/L	13-Jul-04	SM4110:B
Magnesium	0.5	0.1	mg/L	13-Jul-04	SM4110:B
Potassium	0.3	0.1	mg/L	13-Jul-04	SM4110:B
Sodium	0.5	0.1	mg/L	13-Jul-04	SM4110:B
Subcontracted Major Ions					
Chloride	0.4	0.1	mg/L	16-Jul-04	SM4500-Cl-:E
Sulphate	1.6	0.2	mg/L	22-Jul-04	SM4110:B
Metals, Total					
Aluminum	< 30	30	µg/L	12-Jul-04	EPA200.8
Antimony	0.3	0.1	µg/L	12-Jul-04	EPA200.8
Arsenic	< 1	1	µg/L	15-Jul-04	SM3113:B
Barium	1.9	0.1	µg/L	12-Jul-04	EPA200.8
Beryllium	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Cadmium	0.3	0.1	µg/L	12-Jul-04	EPA200.8
Cesium	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Chromium	0.3	0.3	µg/L	12-Jul-04	EPA200.8
Cobalt	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Copper	27.4	0.3	µg/L	12-Jul-04	EPA200.8
Iron	69	50	µg/L	14-Jul-04	SM3111:B
Lead	1.7	0.1	µg/L	12-Jul-04	EPA200.8
Lithium	0.7	0.3	µg/L	12-Jul-04	EPA200.8

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: Lupin Potable **Taiga Sample ID:** 241489

Manganese	2.8	0.1	µg/L	12-Jul-04	EPA200.8
Mercury	< 0.02	0.02	µg/L	28-Jul-04	EPA200.8
Molybdenum	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Nickel	0.5	0.1	µg/L	12-Jul-04	EPA200.8
Rubidium	0.9	0.1	µg/L	12-Jul-04	EPA200.8
Selenium	< 1	1	µg/L	12-Jul-04	EPA200.8
Silver	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Strontium	4.2	0.1	µg/L	12-Jul-04	EPA200.8
Thallium	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Titanium	0.5	0.1	µg/L	12-Jul-04	EPA200.8
Uranium	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Vanadium	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Zinc	46	10	µg/L	12-Jul-04	EPA200.8

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: Lupin SNP 925-10 **Taiga Sample ID:** 241490

Client Project:
Sample Type:
Received Date: 09-Jul-04
Sampling Date: 07-Jul-04
Location: Lupin Mine Nunavut

Approved By Helene Harper
Client Services Officer

Report Status: **FINAL**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Physicals						
Alkalinity	1.8	0.3	mg/L	10-Jul-04	SM2320:B	
Conductivity, Specific	182	0.3	µS/cm	10-Jul-04	SM2510:B	
pH	5.30	0.05	pH units	10-Jul-04	SM4500-H:B	
Solids, Total Suspended	4	3	mg/L	13-Jul-04	SM2540:D	
Turbidity	1.22	0.05	NTU	12-Jul-04	SM2130:B	
Nutrients						
Ammonia as N	0.087	0.005	mg/L	15-Jul-04	SM4500-NH3:G	
Subcontracted Nutrients						
Nitrate as N	0.2	0.1	mg/L	13-Jul-04	SM4110:B	
Nitrite as N	< 0.05	0.05	mg/L	13-Jul-04	SM4110:B	
Major Ions						
Calcium	12.6	0.1	mg/L	13-Jul-04	SM4110:B	
Magnesium	5.0	0.1	mg/L	13-Jul-04	SM4110:B	

Report Date: Friday, July 30, 2004

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: Lupin SNP 925-10 **Taiga Sample ID:** 241490

Potassium	2.2	0.1	mg/L	13-Jul-04	SM4110:B
Sodium	8.1	0.1	mg/L	13-Jul-04	SM4110:B
Subcontracted Major Ions					
Chloride	13	1	mg/L	16-Jul-04	SM4500-Cl-:E
Sulphate	57	0.2	mg/L	22-Jul-04	SM4110:B
Subcontracted Organics					
Cyanide, Total	0.022	0.001	mg/L	15-Jul-04	SM4500-CN-:E
Metals, Total					
Aluminum	323	30	µg/L	12-Jul-04	EPA200.8
Antimony	0.3	0.1	µg/L	12-Jul-04	EPA200.8
Arsenic	5	1	µg/L	15-Jul-04	SM3113:B
Barium	18.9	0.1	µg/L	12-Jul-04	EPA200.8
Beryllium	0.2	0.1	µg/L	12-Jul-04	EPA200.8
Cadmium	0.2	0.1	µg/L	12-Jul-04	EPA200.8
Cesium	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Chromium	< 0.3	0.3	µg/L	12-Jul-04	EPA200.8
Cobalt	35.8	0.1	µg/L	12-Jul-04	EPA200.8
Copper	11.2	0.3	µg/L	12-Jul-04	EPA200.8
Iron	727	50	µg/L	14-Jul-04	SM3111:B
Lead	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Lithium	8.7	0.3	µg/L	12-Jul-04	EPA200.8

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Client Sample ID: Lupin SNP 925-10 **Taiga Sample ID:** 241490

Manganese	455	0.1	µg/L	12-Jul-04	EPA200.8
Mercury	< 0.02	0.02	µg/L	28-Jul-04	EPA200.8
Molybdenum	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Nickel	79.6	0.1	µg/L	12-Jul-04	EPA200.8
Rubidium	4.8	0.1	µg/L	12-Jul-04	EPA200.8
Selenium	< 1	1	µg/L	12-Jul-04	EPA200.8
Silver	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Strontium	51.8	0.1	µg/L	12-Jul-04	EPA200.8
Thallium	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Titanium	0.3	0.1	µg/L	12-Jul-04	EPA200.8
Uranium	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Vanadium	< 0.1	0.1	µg/L	12-Jul-04	EPA200.8
Zinc	281	10	µg/L	12-Jul-04	EPA200.8

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: Lupin SNP 925-10 **Taiga Sample ID:** 241490

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency