Boston Gold Project
Acid Rock Drainage Sampling

Prepared for

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1. EXECUTIVE SUMMARY

Ferguson Simek Clark was retained by Jack Kaniak of the Kitikmeot Inuit Association to perform a limited sampling program of acid rock drainage from the waste rock area at the Boston Gold Project Site. Initially, FSC was to perform sampling of both rock and water at the site to analyze whether or not the rock contained in the ore piles is acid producing. FSC in turn retained an expert in ARD, Mr. Bruce Matson, M.Sc., P.Geo. of Lorax Environmental Services Ltd. (Lorax) to assist in the review of data.

The Kitikmeot Inuit Association was concerned about the results of sampling, literature and site visits that occurred on the site of Boston Mine. It appeared that many results or conclusions from different sources contradicted each other or did not identify all issues of concern. KIA is trying to ensure that the information they receive is unlikely to produce confusion.

Rock, Ore Pile Samples

Acid base accounting data indicated that the three (3) "rock, ore pile" samples collected on surface contained somewhat lower neutralization potential (NP) values than the material sampled by BHP geologists and Rescan.

The samples also contained a higher total sulphur content than the materials sampled by BHP and Rescan. These samples appear to be diluted with the quartz vein material associated with the ore, which has lower NP than the majority of the material discussed in the Rescan Report.

Although one (1) FSC sample is within the "uncertain" range of the DIAND criteria for non-acid generating material, all of the ore pile rock samples had paste pH > 7.5 which suggests the material is not currently "acid generating".

Soil Samples

Soil samples from the area down slope of the waste rock/ore storage had low net neitralization ratios and low sulphur contents. All but one (1) of these samples had a paste pH < 6.0, which suggests this area has slightly acidic soils, however, this also may be a result of the test procedure.

Water Samples

Ponded water near the stock piles and camp contained elevated levels of arsenic and nickel that exceeded the CCME Water Quality Guidelines for the Protection of Aquatic Life. These results were despite neutral pH, confirming the potential for pH neutral metal release from this material.

Arsenic concentrations in water samples collected on the slope directly below the ore pile and core racks at the northern end of the camp also exceeded CCME Water Quality Guidelines for the Protection of Aquatic Life..

However, arsenic concentrations were not elevated in the water sample collected on the southern portion of the slope. This suggests that the material on the southern portion of the waste pad is not releasing high concentrations of arsenic or that there is sufficient assimilative capacity in this drainage system to lower the concentrations of these two metals within the CCME Water Quality Guidelines for the Protection of Aquatic Life prior to discharge into Spyder Lake.

Recommendations

Paste pH values should be compared with other samples taken during baseline monitoring or samples from adjacent undisturbed slopes to establish if the slightly acidic soil pH values are the direct result of exploration activities.

Given the potential of the development rock to leach metals, the accumulation of additional development rock in the area may increase metal loads to the system

The geochemical leaching characteristics of the any new waste rock and also of mine tailings should be determined to facilitate the design of management facilities.

Determining the presence, distribution and form of the arsenic in the critical geologic units that will be mined should be the primary focus of future characterization and monitoring programs.

An on-going determination of ARD and metals leaching should be undertaken for new areas of the mine as they are developed.

An inventory should be maintained of which materials are placed in which location.

Monitoring stations should be established to assess the quality of water discharged from stockpiles, tailings and other altered surfaces including the roads and camp site(s) in addition to any sampling at Spyder Lake.

2. INTRODUCTION

Ferguson Simek Clark was retained by Jack Kaniak of the Kitikmeot Inuit Association to perform sampling for an acid rock drainage survey at the Boston Gold Project Site. Initially, FSC was to perform sampling of both rock and water at the site to analyze whether or not the rock contained in the ore piles is acid producing. FSC in turn retained an expert in ARD, Mr. Bruce Matson, M.Sc., P.Geo. of Lorax Environmental Services Ltd. (Lorax) to assist in the review of data.

The Kitikmeot Inuit Association was concerned about the results of sampling, literature and site visits that occurred on the site of Boston Mine. It appeared that many results or conclusions from different sources contradicted each other or did not identify all issues of concern. KIA is trying to ensure that the information they receive is unlikely to produce confusion.

The formal sampling program was to involve collecting three (3) ARD samples directly in the ore pile and another ten (10) in the run-off area to the east of the ore pile. Three (3) water samples were also to be taken and analyzed for basic water chemistry and trace metals.

FSC was then asked to review a document prepared by Rescan titled, Acid rock drainage characterization, Boston Property Waste Rock; Rescan Feb. 1999. Lorax Environmental Services Ltd undertook the review of the technical merits for FSC.

The initial review submitted to KIA on June 6, 2001 suggested that the report by Rescan appeared to misinterpret the data produced from their extensive sampling program. It appeared that the acid generating potential of the property had been over estimated. However, there existed a concern for pH neutral leaching of arsenic, nickel and possibly antimony.

The results of the review caused a change in scope of the sampling program so that the extent of all environmental issues with regards to the waste rock at Boston could be considered.

3. SAMPLING PROGRAM

Kelly Henderson, B. Tech. (Env.) visited Boston Mine from Tuesday, June 12 to Thursday, June 14, 2001.

On June 12, Kelly arrived at Windy Camp and discussed the issues of concern with Ted Mahoney, Project Manager for Boston Camp. It was confirmed that there was still some snow cover in the area. This is in the midst of melting and is the only time of the year that water flow is an issue. Boston is in an area that is considered to be a dessert and the only precipitation in the area is that of snow.

The map of the property that had been provided to FSC by KIA was shown to the Mr. Mahoney. He commented that he did not believe the run-off area to be sampled to be a plume. This area that is considered to be the plume had been used for diamond drilling in the past.

Later in the day Kelly had a tour of the Boston site. The ponds that are labeled on the site map are not being used. Generally, the only water that they contain is that of melting snow. There is little to no noticeable flow from any water on site.

The location that was considered to be the plume was marked with areas of dead vegetation. Around those areas regrowth was emerging in the form of long hay-like grass. Past the areas of grass, the tundra appeared to be in good condition. The long grass was growing in other areas on the site. Generally, in the very center of the dead vegetation there were drill casings sticking out of the ground.

On June 13, 2001 rock samples were collected from the rock pile. A second set of samples was taken for Ted Mahoney. Ten (10) samples were taken from ten different locations within the ore piles. Some locations were relatively close to each other, but sampling was done of separate piles that appeared to differ in composition. Only three (3) of these samples were analyzed. The remainder are archived for future reference.

On June 14, 2001, ten (10) soil samples were taken. Nine (9) of these were taken based on the grid pattern that was originally provided and one was taken in the area of a drill casing.

Water samples were also collected on that day. Five samples were collected within the runoff area and two were collected as background samples from standing water in the camp.

Table 3.1 shows the sample locations.

Table 3.2 shows the results of the soil samples.

Table 3.3 shows the result of the water samples, comparing them to CCME values for the protection of aquatic life.

Table 3.1 Sample Locations

Sample ID	Wpt. No.	N	E	Description/Location
ARD 01	040	0441327	7505381	Rock, ore pile
ARD 02	041	0441281	7505447	Rock, ore pile
ARD 03	042	0441239	7505480	Rock, ore pile
ARD 04	043	0441221	7505464	Rock, ore pile
ARD 05	033	0441227	7505505	Rock, ore pile
ARD 06	045	0441212	7505433	Rock, ore pile
ARD 07	046	0441208	7505493	Rock, ore pile
ARD 08	047	0441283	7505411	Rock, ore pile
ARD 09	048	0441274	7505418	Rock, ore pile
ARD 10	049	0441249	7505404	Rock, ore pile
ARD 11	050	0441347	7505431	Soil, plume area
ARD 12	051	0441368	7505447	Soil, plume area
ARD 13	052	0441400	7505463	Soil, plume area
ARD 14	053	0441362	7505530	Soil, plume area
ARD 15	054	0441342	7505502	Soil, plume area
ARD 16	055	0441324	7505479	Soil, plume area
ARD 17	056	0441257	7505543	Soil, plume area
ARD 18	057	0441285	7505566	Soil, plume area
ARD 19	058	0441298	7505578	Soil, plume area
ARD 20	059	0441267	7505559	Soil, plume area
ARD 21	060	0441263	7505558	Water, plume area
ARD 22	061	0441296	7505538	Water, plume area
ARD 23	062	0441308	7505511	Water, plume area
ARD 24	063	0441356	7505468	Water, plume area
ARD 25	064	0441473	7505493	Water, edge of Syder Lake
ARD 26	065	0441196	7505493	Water, at camp
ARD 27	066	0441184	7505496	Water, at camp

Table 3.2

Boston Mine Site Acid Rock Drainage Sample Test Results

Date of Samples June 14, 2001

Sample Number	Laboratory Result							
	%sulphur	%Sulphate	%Sulphide	AP	NP	Paste pH	NPR	NNP
ARD-02	0.55	0.08	0.52	16	174	7.9	10.64	158
ARD-03	2.72	0.03	2.71	85	120	8.6	1.42	35
ARD-09	1.75	0.22	1.68	52	208	7.6	3.98	156
ARD-11	0.02	0.00	0.02	1	1	5.6	1.95	1
ARD-12	0.02	0.01	0.02	1	1	5.1	2.86	1
ARD-13	0.02	0.01	0.02	1	2	5.2	4.15	2
ARD-14	0.17	0.01	0.17	5	13	5.4	2.45	8
ARD-15	0.16	0.02	0.15	5	18	4.4	3.76	13
ARD-16	0.02	0.01	0.02	1	2	4.5	4.39	2
ARD-17	0.06	0.02	0.55	2	5	6	2.71	3
ARD-18	0.13	0.05	0.11	4	21	5.55	5.92	18
ARD-19	0.02	0.01	0.02	1	7	5.1	12.86	6
ARD-20	0.03	0.01	0.03	1	30	8.1	35.95	29
Median	0.06	0.01	0.11	2	13	5.6	3.98	8

Table 3.3

Boston Mine Site Water Sample Test Results

Date of Samples June 14, 2001

Lab Section	Test Parameter	Units	CCME - Protection of Aquatic Life	ARD#21	ARD#22	ARD#23	ARD#24	ARD#25	ARD#26	ARD#27
Dissolved Metals	Arsenic	ug/l	5	**11.00**	**40.10**	**65.30**	2.70	1.20	**759.00**	**389.00**
Physicals	Alkalinity	mg/l		52.20	20.50	25.60	45.70	2.40	105.00	65.50
	Specific Conductivity	us/cm		1,450.00	196.00	539.00	251.00	616.00	1,670.00	941.00
	pH		6.5 - 9	6.98	7.03	7.21	7.39	6.00	7.65	7.87
Total Metals	Antimony	ug/l		1.50	1.70	5.10	1.10	1.10	32.40	16.30
	Mercury	ug/l	0.1	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Nickel	ug/l	25 @ CaCO3 <60 65 @ CaCO3 60-120 110 @ CaCO3 120-180 150 @ CaCO3 >180	30.00	19.00	23.00	3.00	5.00	**774.00**	**261.00**

4. DISCUSSION OF RESULTS

4.1 Rock, Ore Pile Samples

Acid base accounting data indicated that the three (3) "rock, ore pile" samples collected on surface by FSC contained somewhat lower neutralization potential (NP) values than the material sampled by BHP geologists and Rescan. Specifically, the three (3) FSC rock samples contained NP ranging from 120 to 208 kg$CaCO_3$/t.

In contrast, the samples collected by BHP 1996, BHP 1997 and Rescan 1999 contained median NP values of 301, 337 and 304 kg$CaCO_3$/t, respectively. Similarly, the FSC samples contained total sulphur content ranging from 0.55 to 2.72 %S compared to the median values from previous sample groups of 0.84, 0.21 and 0.21 %S.

The lower NP and higher sulphur content in the FSC samples suggest that these rock samples are diluted with the quartz vein material associated with the ore, which has lower NP than the majority of the material discussed in the Rescan Report.

The manifestation of the lower NP and higher sulphur is that one (1) FSC sample had a net potential ratio (NPR) = 1.4, which is within the "uncertain" range of the DIAND criteria for non-acid generating material.

However, all of the ore pile rock samples had paste pH > 7.5 which suggests the material is not currently "acid generating". Graph 4.1 shows NP vs. Paste pH.

4.2 Soil, Samples

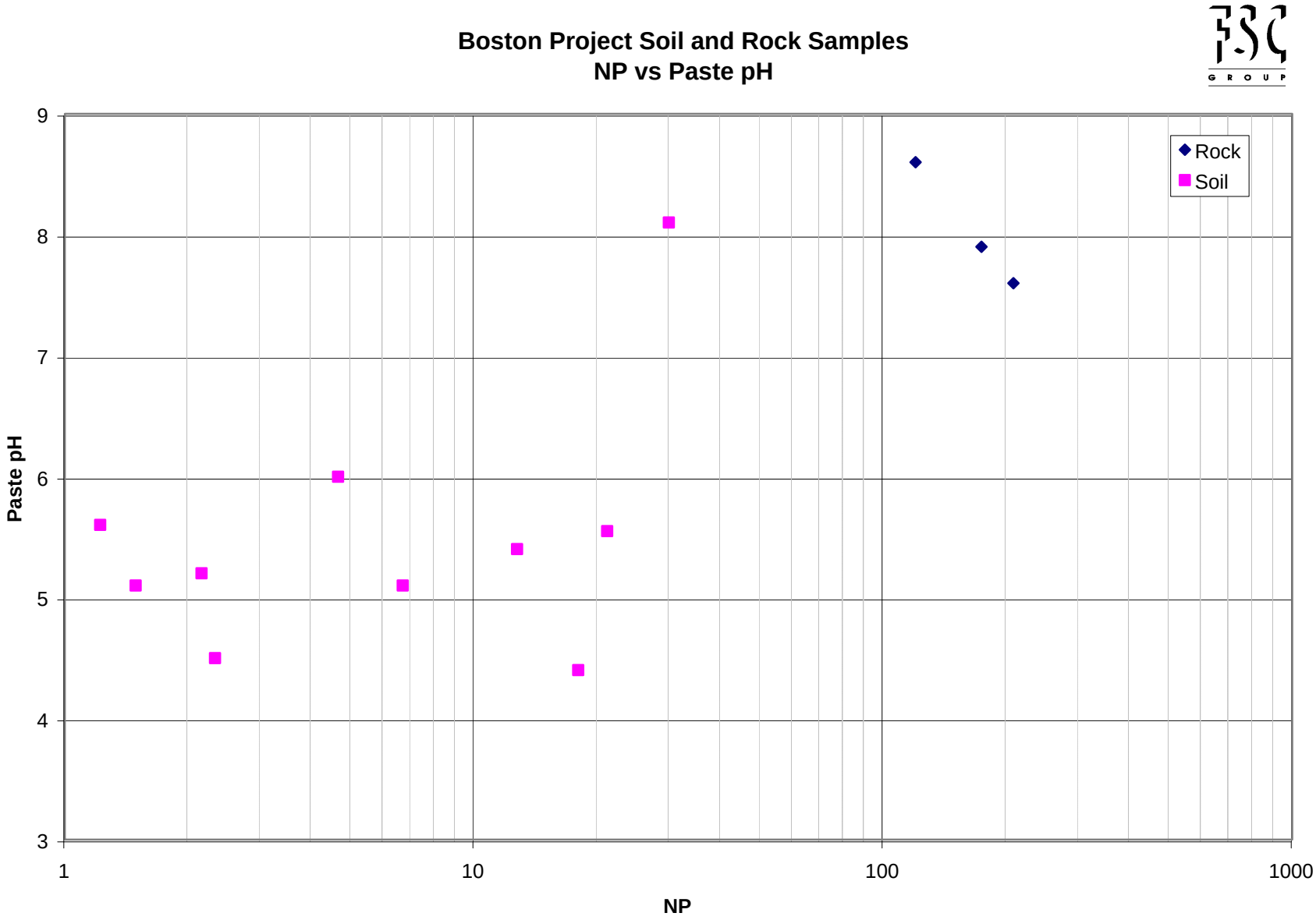
The ten (10) soil samples had NPR values > 1.0 and low sulphur contents < 0.2%. Graph 4.2 sulphur vs. NPR.

However, all except one (1) of these samples had paste pH < 6.0, which suggests this area has slightly acidic soils.

It should be noted that the paste pH test is conducted with deionized water that has an initial pH of 5.1 to 5.5. Thus, inert samples that release no dissolved constituents may have paste pH values <6.0.

Therefore, the Boston paste pH values should be compared with other samples taken during baseline monitoring or samples from adjacent undisturbed slopes to establish if the slightly acidic soil pH values are the direct result of exploration activities.

Graph 4.1



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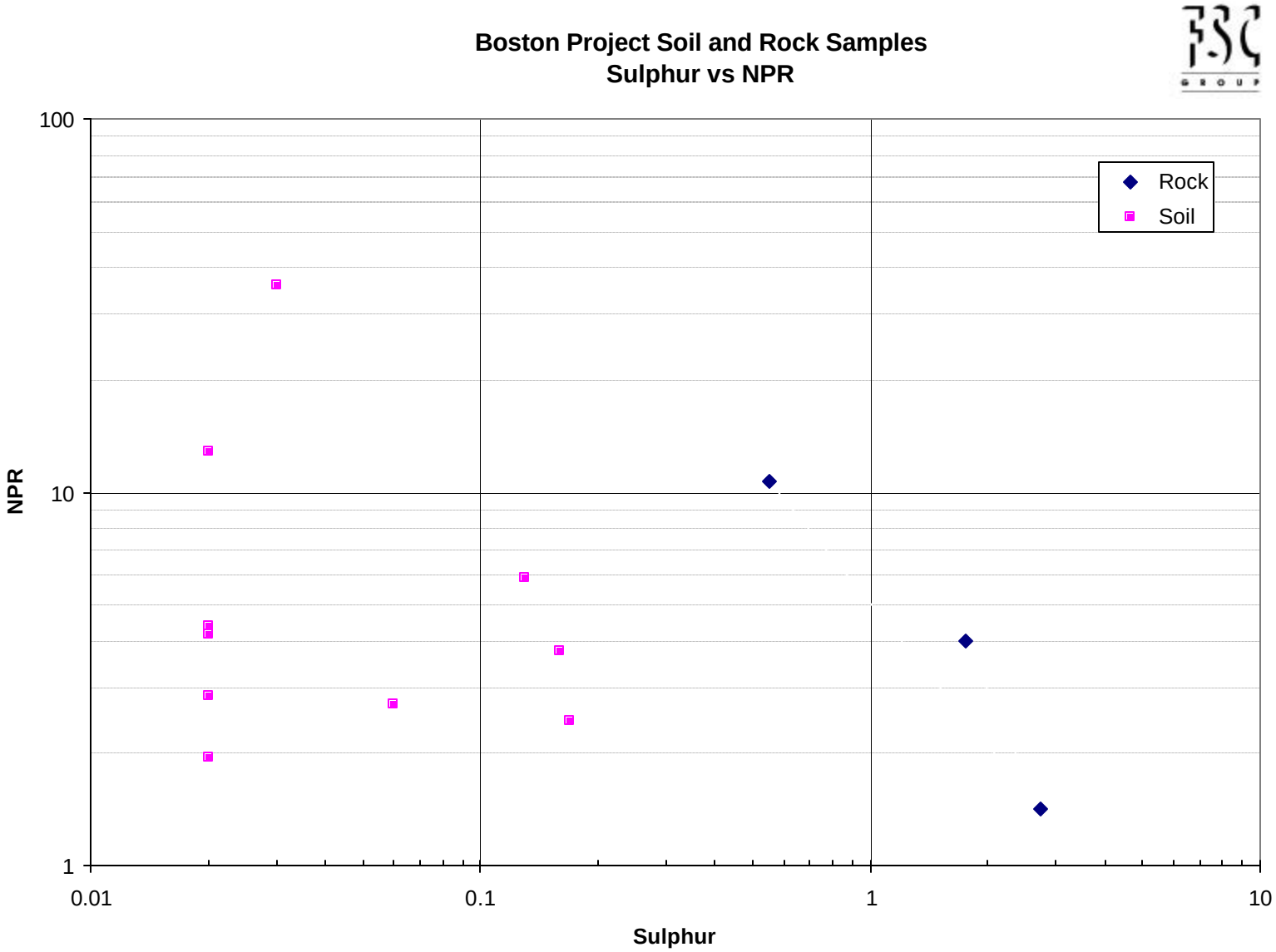
Graph 4.2



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4.3 Water Samples

Ponded water near the stock piles and camp contained elevated levels of arsenic and nickel concentrations despite neutral pH, confirming the potential for pH neutral metal release from this material.

Arsenic concentrations in water samples collected on the slope below the ore pile and core racks at the northern end of the camp were an order of magnitude lower than those collected from the ponded water in the ore pads.

However, arsenic concentrations in these waters exceeded the CCME Water Quality Guidelines for the Protection of Aquatic Life. Arsenic concentrations were not elevated in the water sample collected on the southern portion of the slope.

This suggests that the material on the southern portion of the waste pad is not releasing high concentrations of arsenic or that there is sufficient assimilative capacity in this drainage system to lower the concentrations of these two metals within the CCME Water Quality Guidelines for the Protection of Aquatic Life prior to discharge into Spyder Lake.

Given the potential of the development rock to leach metals, the accumulation of addition development rock in the area may increase metal loads to the system

5. CONCLUSIONS AND RECOMMENDATIONS

1. Arsenic leaching is a concern from the waste rock sampled as shown by the results of the water samples. Standing water appears to exacerbate the leaching of arsenic, and also the leaching of nickel.

2. Given the potential of the development rock to leach metals, the accumulation of addition development rock in the area may increase metal loads to the system

3. Paste pH values should be compared with other samples taken during baseline monitoring or samples from adjacent undisturbed slopes to establish if the slightly acidic soil pH values are the direct result of exploration activities.

4. The geochemical leaching characteristics of the any new waste rock and also of mine tailings should be determined to facilitate the design of management facilities.

5. Determining the presence, distribution and form of the arsenic in the critical geologic units that will be mined should be the primary focus of future characterization and monitoring programs.

6. An on-going determination of ARD and metals leaching should be undertaken for new areas of the mine as they are developed.

7. An inventory should be maintained of which materials are placed in which location.

8. Monitoring stations should be established to assess the quality of water discharged from stockpiles, tailings and other altered surfaces including the roads and camp site(s) in addition to any sampling at Spyder Lake.

Appendix A

Site Photographs

	
Photo 1 Area of run-off below the two ponds.	**Photo 2** ARD 24 taken below drill casings in run-off area.
	
Photo 3 Sample ARD 02	**Photo 4** Sample ARD 02 – middle pile.
	
Photo 5 Sample ARD 03.	**Photo 6** Sample ARD 03.

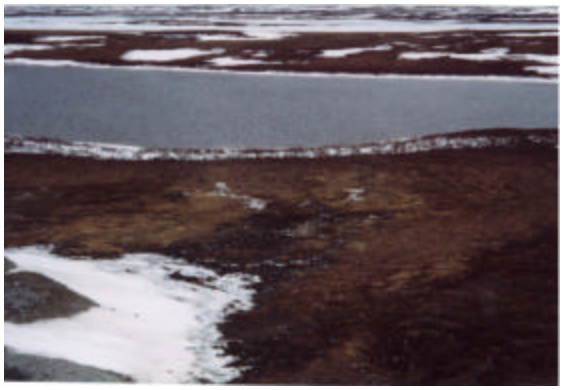
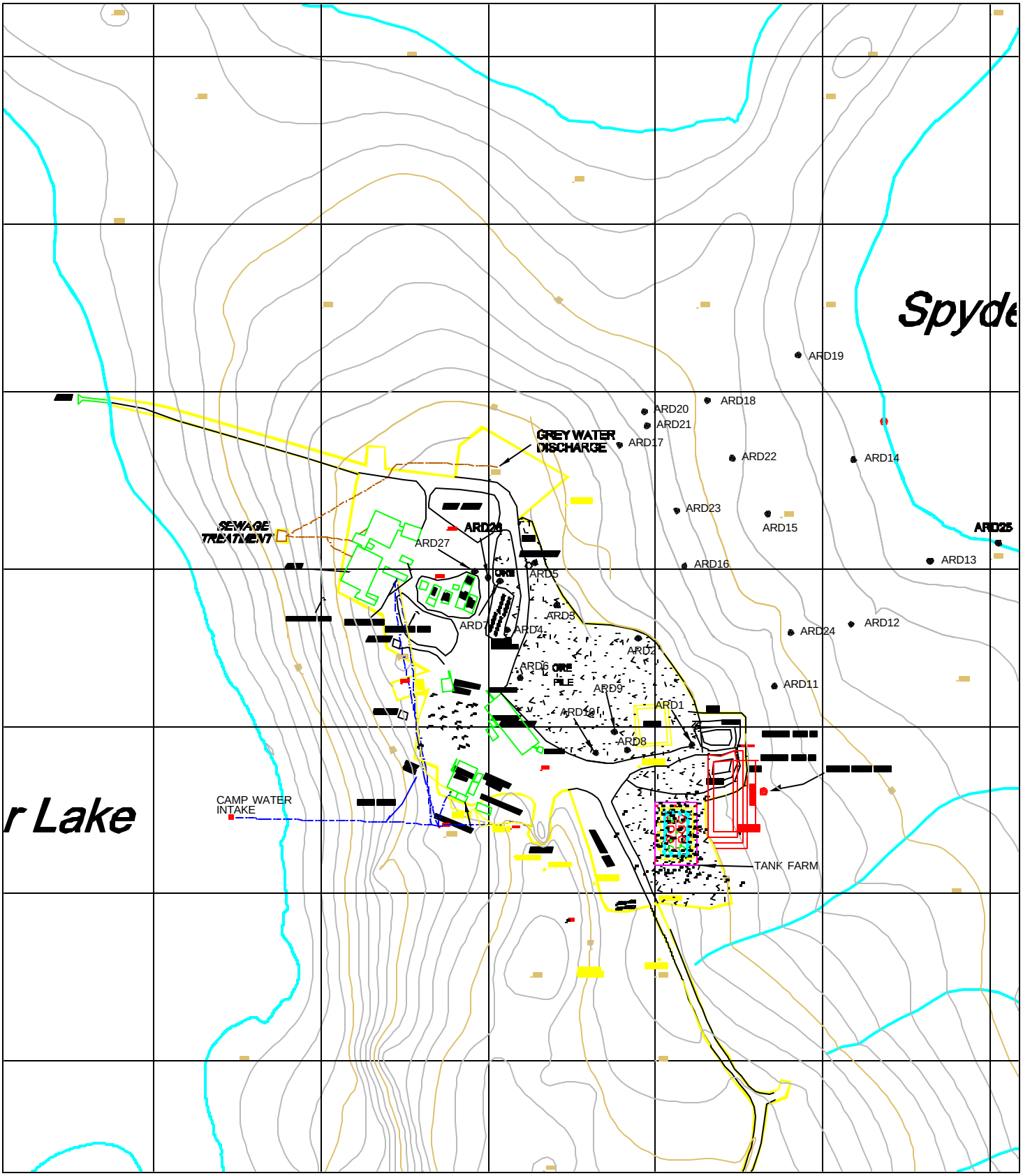
	
Photo 7 **Ore Storage Pad.**	**Photo 8** **Arial Photo of run-off area.**
	
Photo 9 **Sample ARD 09.**	**Photo 10** **Sample ARD 09-rust coloured pile of rock.**
	
Photo 11 **ARD 20**	**Photo 12** **ARD 27**

Photo 13 Caribou grazing in the run-off area.

Appendix B

Site Map



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JOB TITLE

ACID ROCK DRAINAGE CHARACTERIZATION STUDY AT THE BOSTON PROPERTY

DRAWING TITLE

BOSTON MINE SITE SAMPLE LOCATIONS

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SHEET 1 OF 1	DRAWING NO 1