Deloitte & Touche

Anvil Range Mining Complex

Waste Relocation from Northwest Dump to Low Grade Stockpile 'C'

As-Built Report
2007/08 Task 31: Early Remediation

Prepared for:

Deloitte and Touche Inc.

On behalf of

Faro Mine Closure Planning Office

Prepared by:

SRK Consulting
Engineers and Scientists

Project Reference Number
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1 Introduction

1.1 General

The Anvil Range Mining Complex is located approximately 200 km north of Whitehorse, near the town of Faro, in the Yukon. The owner, Anvil Range Mining Corporation, is currently in receivership and Deloitte & Touche Inc. (Deloitte), in its capacity as "Interim Receiver," is overseeing the management of the site. Deloitte has been working with the Faro Mine Closure Office, since its creation in 2003, to develop a Final Closure and Reclamation Plan for the Anvil Range Mining Complex. Although the Final Closure and Reclamation Plan is currently under development, technical studies completed over the past few years have brought clarity to the areas and conditions on site which are contributing to environmental degradation at the site. Based on these findings, it is reasonable and appropriate to consider implementing small but effective remediation measures, provided these measures do not interfere with any of the probable closure alternatives.

Task 31 was established by Deloitte as one of the projects which would be funded as part of the 2007/08 fiscal year. The original purpose of this project was to identify and assess projects during the 2007 operating season relating to progressive reclamation to be executed during the 2008 operating season. The assessment was to include the determination of socio/economic benefits as well as practical engineering requirements. In addition, an approximate estimate of respective project costs and whether each of these would be multiyear was to be determined. The evaluation process was to take into account all closure plan implications. The recommended project list would be required no later than October 2007 so that projects identified for potential execution in 2008 could be included in the preparation of the projects and budgets for 2008/2009 fiscal year.

Early in the identification and assessment phase of Task 31, several small but high priority remediation projects were identified as being worthy of consideration for implementation during the 2007 construction season. Following a review of candidate projects, the relocation of one or more of the piles of highly reactive rock on the Northwest Dump was selected for execution in the 2007/08 fiscal year. The selection of this project was based on the following rationale:

- First, by relocating and consolidating the waste rock, the dump area above Upper Guardhouse Creek would be at a lower risk of impact and, since Guardhouse Creek flows directly to the area downstream of the tailings impoundment, there would be a commensurate reduction in the risk of impacting the area downstream of the site.
- Second, this is a small project that can be handled by local contractors and this type of work will likely be part of the final closure and remediation, on a much larger scale. The project, therefore, provides a good opportunity to develop local skills.

Following a site specific assessment of the conditions at the Northwest Dump, the scope, budget and schedule were defined in sufficient detail to obtain an authorization to proceed with the relocation.

The project commenced in early August and, over the course of a couple of weeks, over 600 dump-truck loads of high sulphide rock were moved from the Northwest Dump to a new stockpile closer to the Faro Pit. A total of approximately 5,000 m^3 of highly reactive rock were moved from the Northwest Dump to Low Grade Stockpile ‘C’, a separate area which drains to the Faro Pit and already contains high sulphide rock.

This report provides a summary of the reclamation concepts associated with the relocation of highly reactive rock on the Northwest Dump, as well as the details of the relocation work, including related sampling and testing and the as-built condition of the source and destination areas.

1.2 Project Team and Description of Responsibilities

The preliminary evaluation of the project scope and budget was performed by SRK personnel, namely: Cam Scott, P. Eng., Daryl Hockley, P. Eng, Dylan MacGregor, G.I.T., and Jozsef Miskolczi, E.I.T. Additional input was provided by John Brodie, P.Eng., of Brodie Consulting Ltd. who is also a representative of the Faro Project Management Team. The sampling protocols for the waste material and the first-flush seepage were developed by Daryl Hockley, P. Eng., and Dylan MacGregor, G.I.T.

Overall engineering and supervision were under the control of SRK. Clifford McLeod Transport, a local contractor from Ross River, was contracted to provide the loading equipment (excavator) and hauling trucks.

Field supervision was provided by Jozsef Miskolczi and two Deloitte and Touche summer students, Chris Croy and John Minder. The solid waste sampling program was carried out by the two aforementioned students, under the supervision of Jozsef Miskolczi.

2 Design Concepts

2.1 Background

During the excavation of the Faro Pit, waste rock dumps were developed around the open pit. In general, these dumps are situated within the catchment of the Faro Pit and/or the catchment of the Rose Creek Tailings Impoundment. However, based on pre-mining topography, part of the dump designated as the Northwest Dump lies outside of these catchments and within the catchment for Guardhouse Creek. The flow from Guardhouse Creek enters Rose Creek at a point downstream of the tailings impoundment.

The Northwest Dump is comprised of three lobes, the location of which is illustrated on Figure 1 in Appendix A. The upper lobe (UNWD) is largely within the inferred boundary of the surface catchment of Upper Guardhouse Creek. Approximately one-third of the middle lobe (MNWD) lies within the Upper Guardhouse Creek catchment. The lower lobe (LNWD) is almost completely outside the boundary of the surface catchment of Upper Guardhouse Creek.

The bulk of the Northwest Dump consists of rock low in sulphides and soluble metals. However, high-sulphide waste was free-dumped over part of UNWD and, to a lesser extent, MNWD and LNWD, following construction of the main body of the Northwest Dump. Most of this high-sulphide waste is situated in three discrete piles (designated as Stockpiles 1 and 2 on UNWD, and as Stockpile 3 on MNWD). Additional high-sulphide waste is present in a series of smaller dumps elsewhere on MNWD and LNWD, as illustrated on Figure 1.

Since Guardhouse Creek discharges into Rose Creek without treatment, the existence of high sulphide-content and low acidity waste rock on the surface of the Northwest Dump raises the possibility that seepage from this dump could lead to dissolved metal levels within Guardhouse Creek that exceed the discharge water quality criteria. The removal of this source of contamination was determined as being a feasible and relatively easy solution to avoid the possible long-term problems associated with contamination of Guardhouse Creek and Rose Creek with Northwest Dump seepage.

A suitable site for the relocation of the reactive material was determined to be the easternmost Low Grade Ore Stockpile designated as LGSP 'C'. The location of LGSP 'C' is shown on Figure 2. The site was surrounded on three sides (in a semi-circle shape) by high walls, approximately 6 m high, which were formed as part of the removal of low grade ore. This area was used previously as a "bone yard" for old vehicles, trucks and old steel, and most recently was the site of a steel cutting program to prepare steel scrap for sale.

2.2 Material Characterization

Stockpile 1, located on the northwest part of UNWD, is comprised exclusively of orange, rocky material, containing some purplish-black boulders. This stockpile was dozed into a wedge shape, gently sloping towards the northeast. Stockpile 2 is situated near the south limit of UNWP. The material in Stockpile 2 takes the form of discrete "bubbles". Previous work by SRK determined that these bubbles typically consist of two distinct types of high sulphide content waste. The first type consists of fine-grained pyritic sand, which has a white-greyish colour and high moisture content. The second type identified is an orange-stained material containing purplish-black pyrite quartzite boulders. The bubbles were placed tightly together, forming several distinct areas of orange and white waste, randomly intercalated. Stockpile 3 is situated on the north edge of MNWD, at the base of the slope. It is a compact mass of orange-stained rocky material, dozed into a wedge shape. Its east face shows signs of active excavation activity.

The volume of high-sulphide material in stockpiles 1 to 3 was estimated by multiplying the approximate surface area by the average height observed in the field. Based on this method, the volume of material in each of the three piles is summarized in Table 2.1. Based on the preliminary geochemical assessment completed by SRK in June 2007 (Appendix A), the priority for removal, from highest to lowest, was Stockpile 2, Stockpile 1 and Stockpile 3.

Table 2.1: Estimated Volume and Size of Sulphide Stockpiles

Stockpile #	Location	Area (m^2)	Perimeter (m)	Est. Thickness (m)	Est. Volume (m^3)
1	UNWD	2,793	238	2.0	5,586
2	UNWD	4,381		1.5	6,572
3	MNWD	2,363	299	3.0	7,089
				Estimated Total Volume	**19,247**

Due to budgetary constraints, it was decided that the 2007 relocation project would include only about 6,000 m^3 of material. Based on the field observations and measured paste pH and conductivity, was determined to be the grey, fine grained material contained in Stockpile 2, the most reactive, and therefore it would be prudent to move it first.

In addition to the relocation of the highly reactive waste in stockpile 2, it was considered of practical importance for future relocation projects to determine the water quality of the seepage from the disturbed material at first flush. For this purpose, three experimental test pads were designed by John Brodie of the Faro Project Management Team and constructed at the dumping site (LGSP'C'). Seepage was to be sampled and sent for analysis to determine the chemistry, as well as paste pH and conductivity.

A sampling program was developed by SRK, with the aim of determining the boundaries of the high-sulphide waste piles, as well as the cut-off level for the excavation in case over-excavation is necessary for removal of highly contaminated waste rock from the contact area.

2.3 Proposed Design

Given that the relocation was a relatively small-scale project, the principal focus of project preparation was on planning, with minimal design work being performed. This approach provided flexibility for field staff to adapt to the specific field conditions. In order to estimate the volume of material to be relocated from Stockpile 2, a rigorous sampling protocol was developed and cut-off criteria were determined. Given the volume to be relocated in 2007, the final height of the depository was predicted to be 4 m with a surface area of approximately 3,000 m^2.

A plan view and two cross sections through the test pads were produced by John Brodie and are attached in Appendix C. The proposed location of the test pads was along the northwest side of the access road to the repository on LGSP‘C’, with the provision that the test pads could be moved to the southeast side, if necessary. The sampling requirements for the waste placed on the test pads, as well as the composition of the waste to be placed on the test pads, were defined prior to the development of the test pads.

The test pads were to be 5 m wide and 15 m long and would drain to one point, where a bucket would be placed to collect the seepage for sampling and analysis. An impermeable liner was to be placed on the prepared pad, to collect as much of the seepage as possible. A volume equivalent to 4 or 5 truckloads of material was to be placed on each of the pads, with one pad receiving the grey, fine waste, the second pad receiving the orange, rocky material, while the third pad would be covered by a mixture of the previous two, or fine oxides from the mill.

3 Pile Relocation Project

3.1 Relocation Program

SRK personnel identified the areas to be removed, as well as a suitable deposition site, and estimated the total volume of material. Deloitte contracted Clifford McLeod Transport to carry out the relocation, while SRK provided supervision and quality assurance for the relocation project. The work consisted of loading the waste, hauling it from the Northwest Dump to Low Grade Ore Stockpile 'C' and free-dumping it. Subsequently, Anvil Range equipment (a dozer and an excavator) levelled the dumps and shaped the stockpile, providing a ramp for the hauling trucks.

The following section presents the equipment used for the relocation and contouring of the constructed repository, as well as a summary of activities executed as part of the relocation project. The relocation involved the following major activities:

- Determining the extent and depth of the material to be relocated.
- Loading, hauling and dumping the material marked for relocation.
- Constructing and shaping the repository.
- Preparing and constructing the experimental piles.

3.1.1 Relocation Equipment Summary

The equipment used for relocation and the operating personnel were provided by Clifford McLeod Transport and consisted of one CAT excavator and two tandem-axle dump trucks. Two additional tandem-axle dump trucks were sub-contracted by Clifford McLeod. The box of each dump truck was estimated to have a capacity of 8 m^3. The tailgate of each truck was removed to avoid the risk of rocks getting stuck while free dumping at the repository site.

For constructing and shaping the repository, one CAT D9 dozer and one CAT 345 excavator were used, provided by Deloitte & Touche.

The footprint of the relocated Stockpile 2 material was finished using a D9 dozer, a road grader and a one tonne compactor provided by Deloitte & Touche.

3.1.2 Relocation Details

The relocation project started on August 8, 2007 and was finished on August 22, 2007. During the first day, August 8, and partly on the second day, material was hauled from the edge of the bench on MNWD (marked in the original plan as potential material to be relocated at a later time). The excavator was placed on the top of the dump at the narrowest part of the dump and created a free face for ease of loading. At the middle of the second day, the excavator was moved to the UNWD and started loading from Stockpile 2. The haul distance between Stockpile 2 and the dumping site at

LGSP'C' was approximately 3 km. The hauling route is shown on Figure 2. The deposition plan was based on free dumping as "bubble dumps", followed by the flattening of the bubble dumps and construction of a ramp by dozer. The trucks would then drive on the newly created bench and dump the material on top, constructing subsequent lifts until the final height of the depository was reached.

On the third day of the program, relocation of the fine fraction commenced. The fine fraction consisted of pyritic sand, with high moisture content and low shear strength. Because of the physical characteristics of this fine material, the deposition plan had to be modified to allow for the construction of the subsequent lifts on top of the highly plastic, soft material. The decision was made to place a layer of hard, rocky material (the orange waste) thick enough to support the haul trucks.

Because the rocky waste material located within Stockpile 2 was mixed with the fine fraction in a chess pattern, the decision was made to start hauling rocky orange waste from the Southeast tip of Stockpile 3 on MNWD, where this type of material was available in bulk. The designated section of Stockpile 3 was depleted the next day, August 11, totalising about 45 truckloads of material. At the dumping site, the rocky material was free dumped at the base of the pile, and placed on top using the CAT 345 excavator. When all the material was placed, the excavator walked on top of the pile to compact the dry, rocky material. The result was that the dry material was pushed into the soft, wet pyritic sand and mixed with it, and the excavator was sinking in a few spots, failing in creating a surface trafficable by dump trucks.

On August 12, more orange waste was selectively loaded and hauled from Stockpile 2 and dumped at the base of the repository. The D9 dozer was pushing the material up, to cover the soft material previously relocated, and creating a long ramp across the entire width of the repository and a as well as a horizontal bench on the top approximately 12 m wide measured from the contact with the wall of LGSP'C'. At the same time, some more dry material was pulled down from the side slopes of LGSP'C' by the excavator, and incorporated into the soft spots to consolidate them.

The deposition plan was modified to relocate the entire volume of dry (orange) waste first, and leave the soft, wet pyritic sand for the last lift. When all the rocky material was depleted, the fine pyritic sand was loaded and relocated. It was observed by the field engineer that the bubbles of fine waste loaded at that time were not as wet as the fines hauled on the second and third day, greatly diminishing the problems associated with constructing an above grade structure from low shear strength material.

In some places, the bubble dumps on Stockpile 2 were over-excavated during loading, leaving the surface of the footprint irregular, with a few pockets of high sulphide material identified by the field engineer during visual inspection. To remove as much of the high sulphide waste as possible and create a smooth the surface, a thin layer of material was removed from the surface of the footprint using the D9 dozer, and piled up in preparation for loading and hauling to the repository site. The dozer removed more material where remaining pockets of waste were identified, but the excavator had to be used in the end to limit the excavation to contaminated material only.

The final contour of the repository was finished with the D9 dozer, at the final average height of 4.5 m, with a smaller footprint than assumed during design. The final volume of the dump was approximately 5,000 m^3, as determined by both the load count and calculations based on the level survey. During the 12 days of relocation, a total of 648 truck loads were hauled. The bench created at the top level has a width of 11 m on the northeast and north sides, and 3.5 m towards the west end. The bench is confined on its north side by the wall of LGSP'C' and on the south side by a ramp constructed of the relocated waste.

At the base of the ramp, a 0.3 m deep drainage ditch was excavated and a 0.5 m high windrow was constructed on the south side of the ditch to contain run-off from the slopes of the waste repository.

To prevent water from ponding on the finished surface of Stockpile 2 on UNWD, a drainage ditch was excavated. It breached the safety berm on the south side of the bench and will drain onto the face of the dump. To enhance run-off towards the ditch, the surface was subsequently graded using a road grader and then smoothed using the one tonne compactor, without vibration.

3.1.3 Sampling and Sample Analysis

The sampling program consisted of two distinct components:

- Sampling of the solid waste and the subgrade of the material marked for relocation; and
- Sampling the water seeping from the experimental piles to determine the quality of first flush seepage from the disturbed waste

A sampling kit was shipped from the SRK Vancouver office to Faro. The kit consisted of one portable pH meter, one portable conductivity meter, two sieves (20 mm and 2 mm), scale, and sample bags. The bulk of the bags used for sampling were provided by Deloitte.

Samples of the waste marked for relocation, as well as the subgrade, were harvested daily from the loading face (for the waste material) and from test pits (for the subgrade) starting on day 3 of the relocation program (August 10). The sample locations at Stockpile 2 are shown on Figure 3. The daily samples were stored and periodically analysed in Anvil's lab, using the equipment available in the lab. The sampling protocol also required samples from areas outside the zone of influence of the waste stockpile, to determine background levels of paste pH and conductivity.

Table 3.1 summarizes the paste pH and conductivity values for the samples collected throughout the entire period of relocation. Each individual sample was identified by its category, as follows: BG for background, SM for stockpile material, SG for subgrade, and GS for grade surface location, respectively. Note that all conductivity values are expressed in millisiemens.

Table 3.1: Summary of Paste pH and Conductivity Results

Date	Depth ->	0.0m		0.1m		0.5m		1.0m		1.5m		2.0m		2.5m		3.0m	
	Location	pH	Cond.	pH	Cond.	pH	Cond.	pH	Cond.	pH	Cond.	pH	Cond.	pH	Cond.	pH	Cond.
Aug10/07	BG 1			8.4	0.13	8.0	0.17	6.6	0.18								
Aug10/07	BG 2			8.4	0.09	8.1	0.12	7.4	0.07								
Aug10/07	BG 3			7.7	0.30	8.3	0.18	7.9	0.25								
Aug10/07	BG 4			6.5	0.85	6.9	1.06	7.8	0.87								
Aug10/07	SM 1			1.9	10.68	2.1	26.50	1.8	22.60								
Aug10/07	SM 2			2.0	14.72	2.2	7.94	2.0	7.44								
Aug10/07	SM 3			2.0	7.78	2.2	7.79	2.3	2.92								
Aug10/07	SM 4			1.9	18.40	1.9	10.20	1.7	22.80								
Aug10/07	SM 5			2.3	5.20	2.4	4.20	2.3	4.10								
Aug12/07	SM 6			2.1	6.08	2.1	5.93	2.1	5.18								
Aug12/07	SM 7			2.0	10.02	2.0	10.89	2.1	7.62								
Aug13/07	SM 8			2.0	7.32	2.1	5.84	2.3	3.29								
Aug13/07	SM 9			2.2	3.64	2.2	3.54	2.2	3.08								
Aug13/07	SM 10			2.2	3.74	2.1	5.04	2.0	7.35								
Aug13/07	SG 7					2.2	4.20	2.2	3.33	2.14	3.61	2.09	4.09	2.12	3.90		
Aug13/07	SG 8					2.5	7.95	4.0	7.33	4.94	6.28	5.16	6.08	4.77	6.38		
Aug13/07	GS 1	2.3	4.96														
Aug13/07	GS 2	2.3	5.87														
Aug13/07	GS 3	2.2	4.57														
Aug13/07	GS 4	2.2	5.29														
Aug15/07	SM 11			2.3	5.97	2.3	7.71	2.3	5.33								
Aug15/07	SM 12			2.3	2.75	2.5	2.14	2.2	4.15								
Aug15/07	SM 13			2.1	8.70	2.3	3.25	2.3	3.55								
Aug15/07	SM 14			2.2	4.62	2.2	4.67	2.1	6.01								
Aug15/07	SM 15			2.1	5.76	2.2	9.14	2.2	8.92								
Aug15/07	SM 16			2.2	6.61	2.3	3.70	2.2	4.37								
Aug15/07	SM 17			2.2	4.26	2.3	2.80	2.2	4.52								
Aug15/07	SM 18			2.5	3.57	2.5	3.98	2.8	1.80								
Aug15/07	SM 19			2.4	5.64	2.5	3.69	2.5	2.84								
Aug15/07	SM 20			2.3	6.87	2.2	9.94	2.3	7.97								
Aug15/07	SM 21			2.6	3.51	2.6	3.72	4.7	2.59								
Aug15/07	SG 9					2.2	4.18	2.3	3.82	2.50	2.97	2.76	2.05	3.67	1.72	3.79	1.76
Aug15/07	GS 6	2.4	6.13														
Aug15/07	GS 7	2.5	2.07														
Aug15/07	GS 8	2.7	3.59														
Aug16/07	SG 10					2.4	3.86	2.7	2.63	3.54	1.68	4.34	1.92				
Aug16/07	SG 11					2.4	8.16	2.4	6.69	3.35	6.06	2.65	5.55				
Aug16/07	SG 12					2.6	3.21	2.5	3.82	2.50	3.80	2.52	3.83	2.50	4.63		
Aug16/07	GS 9	2.4	5.14														
Aug16/07	GS 10	2.5	4.00														
Aug23/07	SM 22			6.4	0.53	6.5	0.42	5.0	2.10								
Aug23/07	SM 23			5.6	1.44	5.3	2.17	6.1	1.51								
Aug23/07	SM 24			6.0	2.27	6.9	0.69	7.1	0.90								
Aug23/07	SM 25			2.8	1.44	5.7	2.44	6.2	2.07								
Aug23/07	SM 26			6.5	0.85	7.2	0.36	7.4	0.51								
Aug23/07	SG 13					2.3	5.29	2.8	2.52	2.32	4.56	3.25	3.67				
Aug23/07	SG 14					2.4	3.68	2.5	3.61	5.50	2.32	5.87	1.81				
Aug23/07	SG 15					7.6	0.67	7.6	0.58	7.64	0.49	7.58	0.60	7.48	0.88		
Aug23/07	GS 11	2.5	3.63														
Aug23/07	GS 12	2.6	2.03														
Aug23/07	GS 13	4.6	0.94														

3.2 Experimental Test Pads

The purpose of the experimental test pads was to assess the impact on contaminant levels in the seepage from disturbed material coincident with the first flush event, i.e. as a consequence of one or more significant precipitation events. The design of the experiment required the construction of 3 pads, each of which is covered with an impermeable liner. The two types of waste material were placed on two of the pads while the third pad received a mixture of the two waste materials in a specified volumetric proportion. The seepage from the piles following the first significant rain event was to be collected and analysed.

3.2.1 Construction of the Experimental Test Pads

The pads were located within the LSGP'C' area, on the east and west sides of the access to the waste repository. On the east side there is one pad (designated as Test Pad 1), while on the west side two pads (Test Pad 2 towards the south and Test Pad 3 towards the north) were constructed, as shown in Figure 4. The pads are identical in shape and size. Each pad was constructed by excavating a 15 m long by 5 m wide shallow trench (approximately 0.5 m deep) with a 1 m deep hole or "catch point" at the end of it. The shape of the trench encourages the seepage to drain towards the middle and towards the catch point, for ease of seepage collection. In the case of Test Pads 2 and 3, a single catch point was constructed, and the two test pads drain towards each other. The construction of the pads was performed using a CAT 345 excavator on August 8. A 15 by 5 m sheet of 40 mil PVC liner was placed on each of the pads on August 13. The waste material was placed on the pads on August 16. In the case of Test Pad 2, which received the soft pyritic sand (gray waste), the placement of the material was executed by backing up the trucks to the edge of the liner and free-dumping the load. Three truckloads of material were dumped on the top of the liner, and approximately 10 % of the volume spilled over the edges of the liner. The over-spilled material was manually shovelled back on top of the piles. In the case of Test Pad 3, the trucks dumped the rocky waste material (orange waste) in front of the test pad and the CAT 345 excavator was used to gently place the material on top of the liner. Approximately 3 truckloads of waste were placed on Test Pad 3. The placement of the waste mixture on Test Pad 1 was executed using the same excavator by alternately placing single buckets of the two distinct types of waste stockpiled near the test pad. This method allowed proper control of the mixing to achieve a 1:1 volumetric proportion between the two types of waste. The excess material dumped by the trucks next to the test pads was subsequently pushed on top of the repository using the dozer.

3.2.2 Sampling of the Seepage

A few showers were observed in the period between August 16 and 31, but seepage from the piles was insufficient for collecting a full sample set. The test pads were checked daily for seepage. On August 31, the day the field engineers left the site, 20 litre pails were placed at the edge of the liner at each test pad to collect seepage. A small quantity of waste was placed on the bottom of the trench on top of the liner, and the liner was cut and folded over the placed material, to reduce the volume of run-off and rainwater that would collect on the exposed parts of the liner. A 4 m long by 3 m wide flap of liner was then placed on top of the fold and further material was placed on the edges to keep it in place. This flap of liner extended over the edge of the test pad, covering the bucket to prevent rainwater and dust accumulating in the bucket. The buckets were wiped clean and rinsed before placing them under the liner.

The sampling of the seepage was left in the care of Deloitte site personnel, who were provided with a sampling protocol developed by SRK. The protocol is attached as Appendix B.

3.2.3 Analytical Results

Two samples were collected from each of the test pads by Glen Craig of Deloitte in September 2007, to provide an indication of the potential magnitude of contaminant release that could be expected from sulphidic waste rock that has been disturbed through relocation. The results are provided in Appendix C.

The test pad leachates were strongly acidic with field pHs ranging from 1.42 to 2.09, and had high total dissolved salts concentrations with laboratory conductivities in the range of 59,000 to 157,000 μS/cm. Sulphate, iron and zinc were the dominant components, and concentrations of aluminum, arsenic, cadmium, chromium, cobalt, copper, lead, manganese and nickel were high.

Samples from Test Pad 3 (orange waste) tended to have lower arsenic, and higher cadmium, cobalt, copper, manganese, nickel and zinc concentrations in comparison to samples from Test Pad 2 (grey waste). The mixed pile (Test Pad 1) tended to have intermediate concentrations. The second sample collected from Test Pad 2 had a much lower pH and substantially higher sulphate, arsenic and iron concentrations in comparison to the other samples.

Despite the relatively small size of the test pads, metal concentrations were in the upper range of concentrations observed in the semi-annual waste rock seep surveys (SRK 2006), while pHs were lower, and sulphate and iron concentrations were higher in comparison to the most acidic seep survey samples (i.e. ponded water on the oxide fines stockpile (FD-04) and very local seepage from the Medium Grade Ore Stockpile (FD-37)).

Table 3.2: Comparison of Water Quality Indicators

Location	pH	Sulphate (mg/L)	Iron (mg/L)
Test Pads	1.42 to 2.03	39,500 to 101,000	11,200 to 34,900
FD-04	2.24 to 2.54	32,300 to 59,000	9,170 to 15,110
FD-37	2.28 to 2.44	13,200 to 40,700	1,780 to 5,190

The relatively low pH, high sulphate and iron concentrations in the test pad leachate are likely due to the initial flushing of contaminants that had accumulated in the waste rock prior to relocation and the lack of dilution by other runoff.

3.3 Site Survey

On August 23, the summer students surveyed the finished depository. In October 2007, an additional survey was performed by Yukon Engineering Services. The survey of the waste repository is included in Figure 4.

4 Conclusions

During the period between August 8 and August 22, 2007, a small but high priority program of waste rock relocation was undertaken at the Anvil Range Mine Complex, as part of the progressive reclamation efforts at the Northwest Dump. Highly reactive waste rock from the upper lobe of the Northwest dump, identified as Stockpile 2, was removed by the contractor, Clifford McLeod, and deposited in an area within the Faro pit drainage identified as LGSP'C'. The material marked for relocation was intensively sampled, as well as the subgrade under the footprint of the stockpile, paste pH and conductivity being determined.

The total volume of waste deposited at LGSP'C' was approximately 5,000 m^3, in a pile that reached a maximum height of 6 m, with average height of 4.5 m. Over the 12 "working" days of the project, more than 600 truckloads of material were hauled from Stockpile 2 to the repository site.

For the purpose of determining the magnitude of increase in metal load at the first flush event, three experimental piles were constructed within the LGSP'C' and samples of drainage were collected at the time of the first major rainfall event. Despite the relatively small size of the test pads, metal concentrations were in the upper range of concentrations observed in recent semi-annual waste rock seep surveys, while pHs were lower, and sulphate and iron concentrations were higher in comparison to the most acidic seep survey samples. The relatively low pH, high sulphate and iron concentrations in the test pad leachate are likely due to the initial flushing of contaminants that had accumulated in the waste rock prior to relocation and the lack of dilution by other runoff.

This As-Built Report, "**Waste Relocation from Northwest Dump to Low Grade Stockpile 'C', 2007/08 Task 31: Early Remediation**", has been prepared by SRK Consulting (Canada) Inc.

Prepared by

Jozsef Miskolczi, M.A.Sc
Consultant.

Reviewed by

Cam Scott, P.Eng.
Principal

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FIGURES

J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Faro\2007 Acad Drawings\2007 FARO SITE Sulphidic Stockpiles.dwg

NOTE:
1. Contour interval 2 metres.

0 50 100 150 200 250
Scale in Metres

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Vancouver B.C.

SRK JOB NO.: 1CD003.104
FILE NAME: 2007 FARO SITE Sulphidic Stockpiles.dwg

Deloitte & Touche

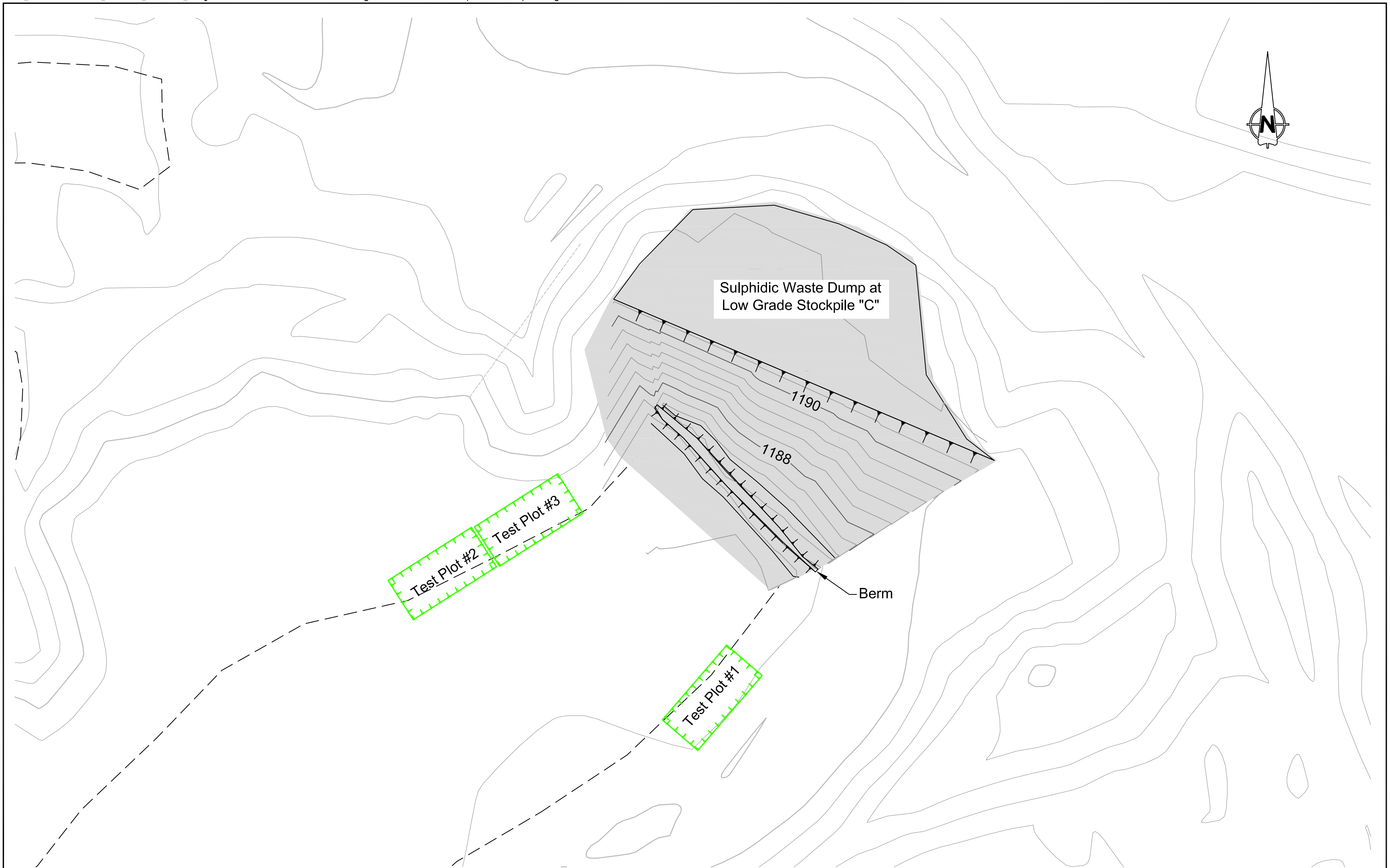
Early Remediation Activities

Faro Mine Site

Plan View of Northwest Dumps and Low Grade Stockpiles

DATE:	APPROVED:	FIGURE:
Feb 2008	JM	1

J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Faro\2007 Acad Drawings\2007 FARO SITE Sulphidic Stockpiles.dwg



NOTES:
1. Contour interval 2 metres.
2. Test pit locations are approximate.

0 5 10 15 20 25
Scale in Meters

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Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CD003.104

FILE NAME: 2007 FARO SITE Sulphidic Stockpiles.dwg

Deloitte & Touche

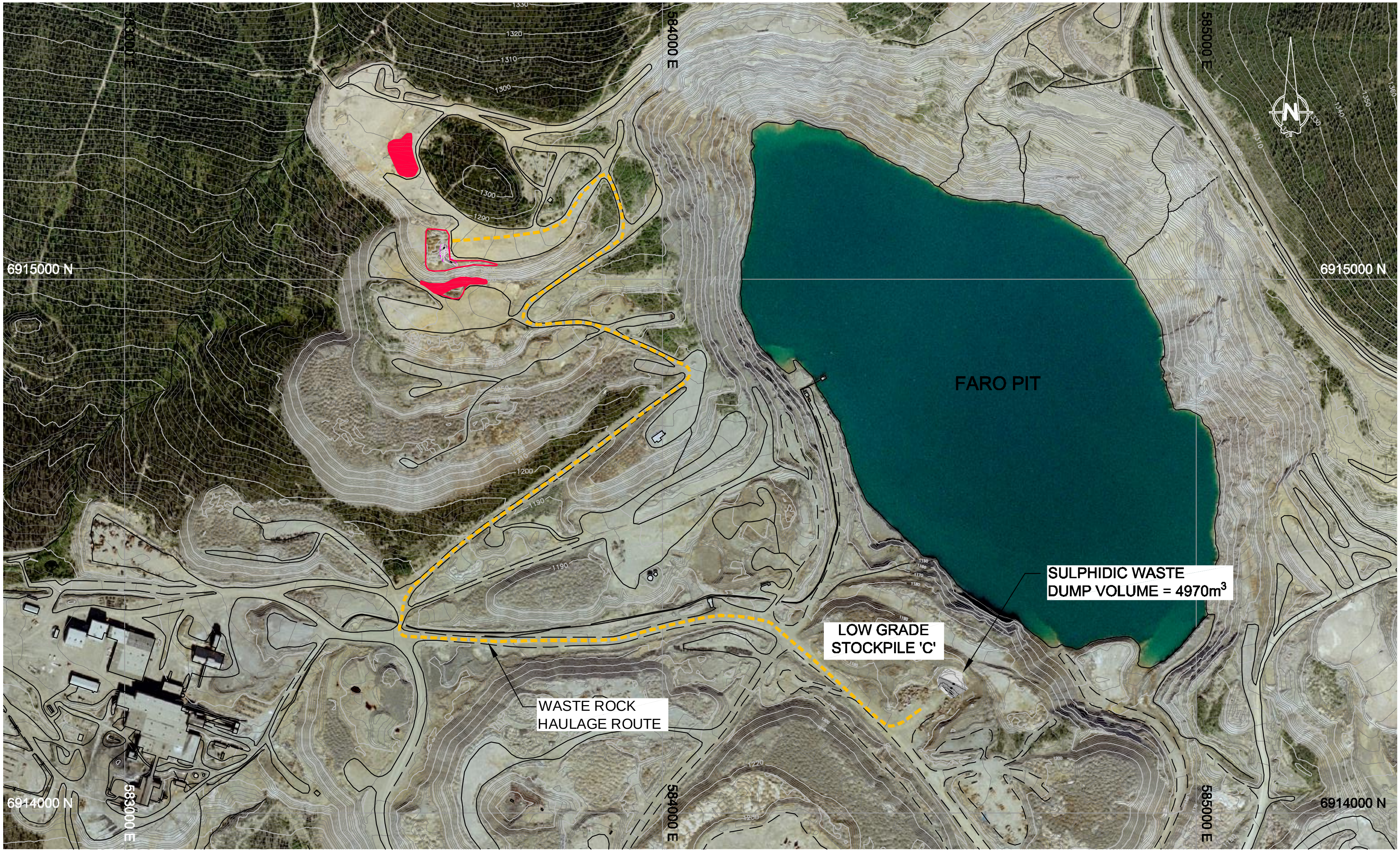
Early Remediation Activities

Faro Mine Site

Sulphide Waste Dump Asbuilt and Test Plot Locations

DATE:	APPROVED:	FIGURE:
Feb 2008	JM	4

J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Faro\2007 Acad Drawings\2007 FARO SITE Sulphidic Stockpiles.dwg

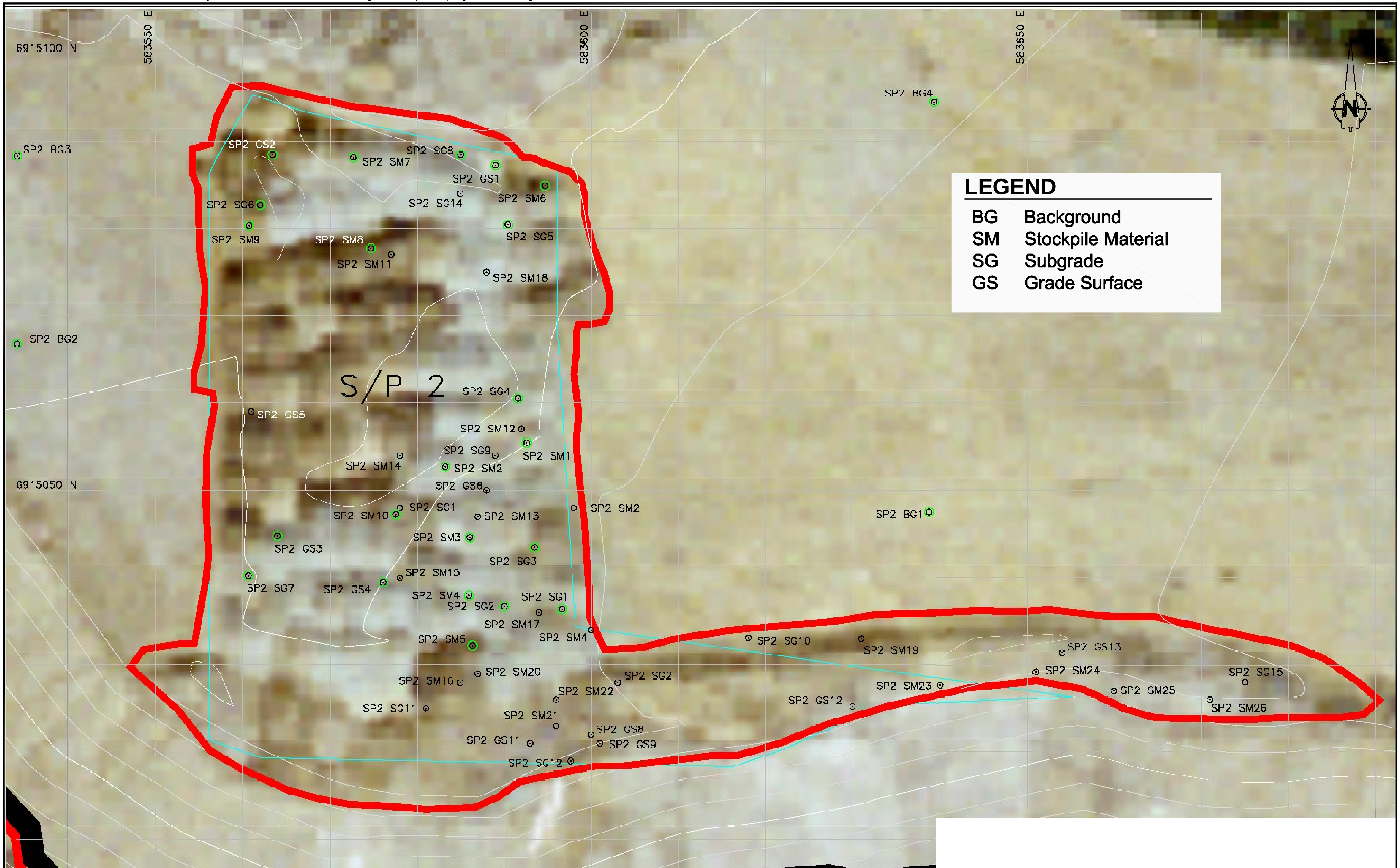


NOTE:
1. Contour interval 2 metres.

0 100 200 300 400 500
Scale in Metres

SRK Consulting Engineers and Scientists Vancouver B.C.	Deloitte & Touche	Faro Mine Site
		Sulphide Wastes on Northwest Dumps
SRK JOB NO.: 1CD003.104	Early Remediation Activities	DATE: Feb 2008
FILE NAME: 2007 FARO SITE Sulphidic Stockpiles.dwg		APPROVED: JM
		FIGURE: 2

J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Faro\2007 Acad Drawings\NW Dumps-Sampling Locations.dwg



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Faro Mine Site

Northwest Dump Stockpile 2
Sampling Locations

SRK JOB NO.: 1CD003.104

FILE NAME: NW Dumps–Sampling Locations.dwg

Early Remediation Activities

DATE:	APPROVED:	FIGURE:
Feb. 2008	JM	3

APPENDICES

APPENDIX A

Memo: ARMC 2207/08 Task 28 –

Supplement Geochemical Studies: NW Dumps Investigation

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Memo

To:	File	**Date:**	July 21, 2007
cc:		**From:**	Dylan MacGregor
Subject:	ARMC 2007/08 Task 28-Supplemental Geochemical Studies: NW Dumps Investigation	**Project #:**	1CD003.092

A site visit was carried out by a SRK geochemist (Dylan MacGregor) on July 3, 2007, to delineate high-sulphide material stored in the Northwest Dumps, and in particular that material located within the Upper Guardhouse Creek catchment (as defined by pre-mining topography). This material is under consideration for relocation as part of early reclamation. Two ARMC summer students (John Minder and Chris Croy) accompanied the SRK geochemist for briefing purposes in anticipation of the students supervising the relocation activities.

In addition to material delineation, two water quality samples were collected from Upper Guardhouse Creek, as this stream receives seepage from the Northwest Dumps but has not been monitored as part of the routine monitoring program defined by the water licence. A station in the Northwest Interceptor Ditch was monitored several times during the 1990s, with zinc concentrations ranging from 0.006 to 0.52 mg/L.

1 Observations

- The upper lobe of the Northwest Dump (UNWD) is largely within the boundary of the surface catchment of Upper Guardhouse Creek, as defined by the pre-mining topography (Figure 1). There are two discrete piles of high sulphide material sitting on top of the dump surface (Stockpiles 1 and 2 in Figure 1); the bulk of the dump itself appears to be clean hornblende quartz diorite.

  – The northwest pile (Stockpile 1) consists of a prism of rusty orange-stained material (probably Unit 1D4) containing about 10% purplish-black stained pyritic quartzite boulders. This material has been dozed such that it forms a wedge sloping gently to the northeast; the shape of the steep face of the wedge does not suggest that material has been excavated from this pile. The entire volume of Stockpile 1 could be re-handled using a loader- an excavator would not be required.

    There are two significant surface run-off pathways (one active, one relict) that are heavily stained with orange precipitate; these pathways lead directly from the toe of the sulphide pile (as is visible on the aerial photograph) and report over the crest of the dump to the southwest. Both flowpaths were dry at the time of the July 2007 inspection. Ditching along the current flowpath indicates that the flow was diverted approximately 50 m to the east (away from Upper Guardhouse Creek) from its original point of discharge over the dump crest. Willow growth in a portion of the ditch along the relict flowpath indicates that these runoff management measures were taken some time ago, probably during active mining operations.

    There is a large zone of dead vegetation directly downgradient of the dump toe below Stockpile 1, as indicated by the grey zone in the aerial photograph shown in Figure 1.

- The southeast pile (Stockpile 2) consists of approximately 50 truckloads of free-dumped material of two distinct compositions (as is visible on the aerial photograph). One material type is orange-stained sulphide waste (Unit 1D4) with purplish-black pyritic quartzite boulders, as described for the northwest pile above. The other material type is a very pale yellow pyritic sand (unit unknown)- this material has rapidly slaked from it's original structure and is highly acidic (based on visual observations of highly-corroded rocks where schist and other lithologies contact this material, on the bright untarnished appearance of the pyrite at the individual dump scale, and on observations of haloes of unstained rock surrounding orange-stained surfaces where clasts protrude out of the pyritic sand). This material should be a high priority candidate for relocation.

  A portion of the safety berm adjacent to the southeast pile appears to be composed of similar material, is included within the perimeter of Stockpile 2 in Figure 1, and should be relocated at the same time as the main pile. Re-handling the safety berm material will require an excavator, as a loader will not safely be able to pick up the safety berm without working close to the crest, and without pushing high-sulphide material over the dump crest.

  Surface runoff from this area flows along the dump surface parallel to the crest, and reports to the east outside of the Guardhouse Creek catchment. The dump surface is stained orange over a wide area, as shown on the aerial photograph, with no clear surface runoff channel evident.

- The western half of the middle lobe of the Northwest Dump (MNWD) is within the boundary of the surface catchment of Upper Guardhouse Creek, as defined by the pre-mining topography. This dump is mainly hornblende quartz diorite and calc-silicate schist, but appears to have more sulphide material mixed in than the UNWD.

  - There is a single large pile of high-sulphide material within the inferred Upper Guardhouse Creek catchment. This material is orange-stained and contains purplish-black pyrite quartzite boulders (likely Unit 1D4). The material has been dozed into a wedge-shaped prism, and the eastern face of the pile is near-vertical and appears to have been an active digging face. Where overhangs occur on this eastern face, secondary salts were observed- these are indicative of the reactive nature of the material.

  - There are isolated other berms and single dumps of similar material; these are volumetrically small, but should be relocated if the larger relocation program is undertaken. These locales are identified in Figure 1 by dashed green lines. The material at these locations is visually distinct and relocation can be undertaken on a visual basis alone.
  - Current dump surface runoff drains towards the Faro Pit over most of the MNWD, as the highest point on the MNWD is the western crest of the dump and the traffic surface is sloped towards the pit from the dump crest.

- The lower lobe of the Northwest Dump (LNWD) is almost completely outside the boundary of the surface catchment of Upper Guardhouse Creek, as defined by the pre-mining topography- only a small region of the northwest portion of the LNWD is within the catchment. This dump is largely calc-silicate schist, and the western portion of the LNWD appears to be uniformly calc-silicate schist, as observed from the free dumps on the pile surface and the material exposed in the dump face. The eastern portion of the LNWD contains some proportion of mixed sulphide material, based on observations of material currently exposed. This dump was observed from the crest of the MNWD only and was not inspected on foot during July 2007. The remote observations agree with previous observations by the principal investigator from toe seep surveys in this area in previous years.

2 Volume Estimates

Volume estimates for Stockpiles 1, 2, and 3 are shown in Table 1. Volumes above the plane of the dump surface were estimated, and a separate estimate was prepared for volumes including over-excavation by 0.5m to ensure the majority of residual sulphide material is removed. Volumes of sulphide material outside of the Upper Guardhouse Creek catchment were not estimated, but could be estimated using the areas defined in Figure 1 and an average thickness of 1.5 m.

Table 1: Estimates of sulphide stockpile volumes within Upper Guardhouse Creek catchment, Northwest Dumps

Sulphide Stockpile	Area	Perimeter	Est. Average Thickness	Volume Above Plane	Volume of 0.5m Over-excavation Within Footprint	Total Estimated Volume to be Relocated
	[m^2]	[m]	[m]	[m^3]	[m^3]	[m^3]
1 (UNWD)	2,793	238	2.0	5,586	1,397	6,983
2 (UNWD)	4,381	420	1.5	6,572	2,191	8,762
3 (MNWD)	2,363	299	3.0	7,089	1,182	8,271
Total Volume				**19,247**	**4,769**	**24,015**

3 Candidate Disposal Locations

The western-most of the Faro low-grade ore stockpiles (LGSP A) is a candidate repository for the high-sulphide material in the Upper Guardhouse Creek catchment. The upper surface of this pile is fairly flat and there is ample capacity to increase the height of this stockpile without increasing the footprint.

The eastern Faro low-grade stockpile (LGSP C) currently has an irregular surface, and would require a minor amount of dozer work to prepare a candidate repository for the sulphide material form the Northwest Dump. A candidate location previously identified as location for receiving oxide fines and low grade ore is presently used as a scrap yard, and is presently the site of a steel-cutting program to prepare scrap steel for sale.

Several alternate repositories are available within the Upper Northwest Dump. These candidate sites provide opportunities for shorter haul distances while maintaining the objective of removing high sulphide material from the Upper Guardhouse Creek catchment. The candidate locations are currently the sites of similar high-sulphide material as observed and noted elsewhere. Re-location of high sulphide material to these locations requires consideration of the ultimate site closure measures adopted for the Northwest Dumps and the low grade ore stockpiles.

APPENDIX B

Memo: Northwest Dump Sulphide Relocation:

Geochemical Monitoring Protocols

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Memo

To:	File	**Date:**	August 4, 2007
cc:	Cam Scott, Joseph Miskolczi, SRK	**From:**	Dylan MacGregor
Subject:	Northwest Dump Sulphide Relocation: Geochemical Monitoring Protocols	**Project #:**	1CD003.092

The relocation of sulphide material from Stockpile 2 on the Upper Northwest Dump to Low-grade Stockpile C will be carried out in August and September 2007. The primary objective of the sulphide relocation is to remove a localized and concentrated source of metals and acidity from the Northwest Dumps, which have relatively low sulphide content overall. A secondary objective of the program is to assess the 'first-flush' runoff and seepage water quality that is generated by the relocated sulphide material. The following points outline a geochemical monitoring program to evaluate the relocation program and to provide a comparison between standard shake flask test results and 'first-flush' seepage and run-off quality.

1 Objectives

Determining the appropriate depth of excavation is the first objective of the monitoring. There is some uncertainty about the depth to which contaminants may have been washed into the waste rock material underlying Stockpile 2. In similar projects elsewhere, it has been necessary to excavate a metre or more of subgrade in order to capture all of the contaminants. In the current project, time and budget constraints will limit the depth to which the excavation can be continued. Should it prove necessary to excavate much deeper than expected, there may be a need to completely re-design the program, to either reduce the plan area of excavation or import un-contaminated cover material.

A second objective will be to ensure that contaminants are not picked up by truck tires and distributed along the haul route. Stockpile 2 will be relocated by an excavator sitting on top of the stockpile, loading trucks that sit adjacent to the stockpile on clean waste rock. As relocation proceeds, it will be important to ensure that the loading area is sufficiently uncontaminated that sulphide material and related oxidation products are not dispersed along the haul route. This will require testing of the cleared area at the end of each day, with removal of any additional contaminated material (and confirmatory testing) the following morning prior to commencing relocation for that day.

A third objective will be to collect information that can be used to assess the flushing of contaminants from relocated material. In project elsewhere, excavation of oxidized waste rock has been shown to expose new surfaces that release soluble contaminants in the first precipitation. Although this effect is not expected to be significant at the scale of Stockpile 2, it may constrain the scale of future waste rock relocation projects. Collecting and testing samples in this program will help to define the expected severity of the "first flush" problem in larger projects.

2 All Programs

1. Devise a sample numbering scheme that is intuitive, and which will allow a detailed review of monitoring data. Include “SRK” and the sample dates in the numbering system.
2. Keep records of all monitoring records, including a large scale map of locations where test samples were collect.
3. Keep a photographic record of each day’s excavation.

3 Depth of Excavation

Contact tests (rinse pH and rinse conductivity) will be used as screening tools to evaluate the degree of contamination in the waste rock under Stockpile 2. The method for performing the contact tests is provided as Attachment 1.

At the end of the first day of excavation, an assessment of depth of secondary contamination should be carried out as follows:

1. Measure rinse pH and conductivity of Stockpile 2 material from three depths at five locations along the face of the day’s excavation. Photograph the face and take approximate measurements so the sample location can be displayed on the photograph. This will establish the range of rinse pH and conductivity within the excavated material.
2. Measure rinse pH and conductivity of waste rock from a depth of 0.1, 0,5, and 1.0 m at three locations adjacent to Stockpile 2, at a distance of at least 20 m from the base of the stockpile and away from the influence of dust or drainage from the stockpile. This will establish a range of background rinse pH and conductivity values for comparison with results from the foundation of Stockpile 2.
3. From the foundation area cleared on the first day of relocation, select three representative locations and measure rinse pH and conductivity on samples from these locations.
4. Excavate test pits to depths of 2.5 m at each location. Take representative samples of material excavated from depths of 0.5, 1.0, 1.5, 2 and 2.5 m. Carry out rinse pH and conductivity tests on the samples.
5. Prepare a table and plots summarizing the results of the Stockpile 2 sampling, background ssmpling, and subgrade sampling. Forward to Dylan, Cam and Daryl for immediate review. The results will be reviewed and discussed to determine appropriate “cutoffs” for identification of contaminated material in subsequent daily testing

4 Daily Testing of Subgrade

1. From the foundation area cleared on each subsequent day of relocation, select three representative locations and measure rinse pH and conductivity on samples from these locations.
2. Compare results from stockpile foundation with the cut-off limits defined after Day 1. of rinse conductivity in surface foundation material is above the cut-off, have the excavator remove another 0.5 m from a small area and measure rinse pH and conductivity.
3. If necessary, repeat step 2 in 0.5 m depth increments until an elevation is reached where rinse conductivity is less than 3x maximum background rinse conductivity. If a depth of 2.5 m is reached and rinse conductivity remains >3x maximum background levels, terminate testing program and report results (including values) to SRK immediately to inform decisions on how to proceed with relocation.
4. Inform SRK site staff of depth below grade where acceptable rinse conductivities were encountered, to allow revised estimates of contaminated materials to be relocated.
5. Repeat step 2 daily to verify that the contaminated material has been removed; instruct the excavator to clear additional material as required to achieve a clean working surface for the trucks on the following day.
6. Advise the contractor not to re-surface the final excavation. Leave the area exposed as excavated to allow follow-up inspection.

5 Sampling of relocated sulphide wastes

To correlate standard laboratory characterization tests with actual ‘first-flush’ seepage and run-off water chemistry, several samples of each material type should be collected from the constructed pile. The following points summarize the sampling requirements.

1. Three samples should be collected from each of the pyritic sand, mixed sulphide waste, and sulphide boulders areas of the constructed pile. Sample locations should be selected to be evenly spaced and provide coverage of the entire constructed pile.
2. Screen a 1 kg sample from the surface material at each station, using the 1 cm screen.
3. Take GPS coordinates (UTM NAD27) of each station, and draw a sketch of the constructed pile, the approximate boundaries of the different material types, and the sample stations.
4. Give the samples to SRK staff on site, or ship to SRK’s Vancouver office attn: Dylan MacGregor.

6 SRK Contacts

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APPENDIX C

Results of Water Quality Analyses

Client:	Anvil Range Mining Corporation
Download Date:	9/14/2007
Project Name:	Sulphide Leach
Project Number:	
Chain of Custody:	2088372
Samples received:	9/6/2007

TABLE: Results of WATER Analyses

Sample ID		Leach Red Pile	Leach Mixed Pile
CANTEST ID		709060368	709060390
Date Sampled		9/4/2007	9/4/2007
Parameter	Units		
Conventional Parameters			
pH, Laboratory	pH units	1.96	1.96
Conductivity	uS/cm	98300	84000
Total Alkalinity CaCO3	mg/L	< 0.5	< 0.5
Bicarbonate Alkalinity HCO3	mg/L	< 0.5	< 0.5
Carbonate Alkalinity CO3	mg/L	< 0.5	< 0.5
Hydroxide Alkalinity OH	mg/L	< 0.5	< 0.5
Total Acidity	mg/L	52000	45300
Dissolved Chloride Cl	mg/L	< 20	< 20
Dissolved Sulphate SO4	mg/L	68700	63400
Metals Analysis			
Dissolved Aluminum Al	mg/L	493	369
Dissolved Antimony Sb	mg/L	< 0.5	0.6
Dissolved Arsenic As	mg/L	1.2	3.5
Dissolved Barium Ba	mg/L	< 0.01	< 0.01
Dissolved Beryllium Be	mg/L	0.26	0.17
Dissolved Boron B	mg/L	0.2	< 0.1
Dissolved Cadmium Cd	mg/L	14.3	8.8
Dissolved Calcium Ca	mg/L	474	439
Dissolved Chromium Cr	mg/L	0.8	0.9
Dissolved Cobalt Co	mg/L	29.2	19.9
Dissolved Copper Cu	mg/L	838	473
Dissolved Iron Fe	mg/L	14800	15000
Dissolved Lead Pb	mg/L	2.2	3.5
Dissolved Magnesium Mg	mg/L	706	394
Dissolved Manganese Mn	mg/L	354	189
Dissolved Molybdenum Mo	mg/L	< 0.2	< 0.2
Dissolved Nickel Ni	mg/L	7.3	4.7
Dissolved Phosphorus P	mg/L	22	30
Dissolved Potassium K	mg/L	3	3
Dissolved Silicon Si	mg/L	71.8	39.3
Dissolved Silver Ag	mg/L	< 0.1	< 0.1
Dissolved Sodium Na	mg/L	< 1	< 1
Dissolved Strontium Sr	mg/L	0.52	0.42
Dissolved Tin Sn	mg/L	< 0.3	< 0.3
Dissolved Titanium Ti	mg/L	0.15	0.17
Dissolved Vanadium V	mg/L	0.4	0.9
Dissolved Zinc Zn	mg/L	7920	4570
Dissolved Zirconium Zr	mg/L	0.4	0.5

Client:	Anvil Range Mining Corporation
Download Date:	9/17/2007
Project Name:	Sulphide Leach
Project Number:	
Chain of Custody:	2086072
Samples received:	9/10/2007

TABLE: Results of WATER Analyses

Sample ID		Mixed Pile Leachate
CANTEST ID		709100293
Date Sampled		9/6/2007
Parameter	Units	
Conventional Parameters		
pH, Laboratory	pH units	1.95
Conductivity	uS/cm	63600
Total Alkalinity CaCO3	mg/L	< 0.5
Bicarbonate Alkalinity HCO3	mg/L	< 0.5
Carbonate Alkalinity CO3	mg/L	< 0.5
Hydroxide Alkalinity OH	mg/L	< 0.5
Total Acidity	mg/L	42000
Dissolved Chloride Cl	mg/L	< 20
Dissolved Sulphate SO4	mg/L	42000
Metals Analysis		
Dissolved Aluminum Al	mg/L	286
Dissolved Antimony Sb	mg/L	0.7
Dissolved Arsenic As	mg/L	2.9
Dissolved Barium Ba	mg/L	< 0.01
Dissolved Beryllium Be	mg/L	0.12
Dissolved Boron B	mg/L	< 0.1
Dissolved Cadmium Cd	mg/L	5.3
Dissolved Calcium Ca	mg/L	387
Dissolved Chromium Cr	mg/L	0.8
Dissolved Cobalt Co	mg/L	11.5
Dissolved Copper Cu	mg/L	334
Dissolved Iron Fe	mg/L	11900
Dissolved Lead Pb	mg/L	3.4
Dissolved Magnesium Mg	mg/L	258
Dissolved Manganese Mn	mg/L	107
Dissolved Molybdenum Mo	mg/L	< 0.2
Dissolved Nickel Ni	mg/L	3.4
Dissolved Phosphorus P	mg/L	18
Dissolved Potassium K	mg/L	4
Dissolved Silicon Si	mg/L	41.4
Dissolved Silver Ag	mg/L	< 0.1
Dissolved Sodium Na	mg/L	< 1
Dissolved Strontium Sr	mg/L	0.15
Dissolved Tin Sn	mg/L	< 0.3
Dissolved Titanium Ti	mg/L	0.19
Dissolved Vanadium V	mg/L	1.2
Dissolved Zinc Zn	mg/L	3140
Dissolved Zirconium Zr	mg/L	0.4

Client:	Anvil Range Mining Corporation
Download Date:	9/20/2007
Project Name:	Sulphide Leach
Project Number:	
Chain of Custody:	175411
Samples received:	9/13/2007

TABLE: Results of WATER Analyses

Sample ID		Leach Grey Pile
CANTEST ID		709130545
Date Sampled		9/10/2007
Parameter	Units	
Conventional Parameters		
pH, Laboratory	pH units	1.88
Conductivity	uS/cm	82600
Total Alkalinity CaCO3	mg/L	< 0.5
Bicarbonate Alkalinity HCO3	mg/L	< 0.5
Carbonate Alkalinity CO3	mg/L	< 0.5
Hydroxide Alkalinity OH	mg/L	< 0.5
Total Acidity	mg/L	38000
Dissolved Chloride Cl	mg/L	60.4
Dissolved Sulphate SO4	mg/L	39500
Metals Analysis		
Dissolved Aluminum Al	mg/L	130
Dissolved Antimony Sb	mg/L	< 0.5
Dissolved Arsenic As	mg/L	7.7
Dissolved Barium Ba	mg/L	0.03
Dissolved Beryllium Be	mg/L	0.04
Dissolved Boron B	mg/L	< 0.1
Dissolved Cadmium Cd	mg/L	1.7
Dissolved Calcium Ca	mg/L	94.8
Dissolved Chromium Cr	mg/L	0.8
Dissolved Cobalt Co	mg/L	4.9
Dissolved Copper Cu	mg/L	209
Dissolved Iron Fe	mg/L	13100
Dissolved Lead Pb	mg/L	3.5
Dissolved Magnesium Mg	mg/L	77.6
Dissolved Manganese Mn	mg/L	27.3
Dissolved Molybdenum Mo	mg/L	< 0.2
Dissolved Nickel Ni	mg/L	1.6
Dissolved Phosphorus P	mg/L	17
Dissolved Potassium K	mg/L	7
Dissolved Silicon Si	mg/L	10.5
Dissolved Silver Ag	mg/L	< 0.1
Dissolved Sodium Na	mg/L	< 1
Dissolved Strontium Sr	mg/L	< 0.01
Dissolved Tin Sn	mg/L	< 0.3
Dissolved Titanium Ti	mg/L	0.12
Dissolved Vanadium V	mg/L	1.5
Dissolved Zinc Zn	mg/L	1380
Dissolved Zirconium Zr	mg/L	0.5

Client:	Anvil Range Mining Corporation
Download Date:	10/5/2007
Project Name:	Sulphide Leach
Project Number:	
Chain of Custody:	2089119
Samples received:	9/28/2007

TABLE: Results of WATER Analyses

Sample ID		Red Leach Pile	Grey Leach Pile
CANTEST ID		709280179	709280182
Date Sampled		9/26/2007	9/26/2007
Parameter	Units		
Conventional Parameters			
pH, Laboratory	pH units	2.11	1.59
Conductivity	uS/cm	59200	157000
Total Alkalinity CaCO3	mg/L	< 0.5	< 0.5
Bicarbonate Alkalinity HCO3	mg/L	< 0.5	< 0.5
Carbonate Alkalinity CO3	mg/L	< 0.5	< 0.5
Hydroxide Alkalinity OH	mg/L	< 0.5	< 0.5
Total Acidity	mg/L	42300	102000
Dissolved Chloride Cl	mg/L	< 100	< 200
Dissolved Sulphate SO4	mg/L	46400	101000
Metals Analysis			
Dissolved Aluminum Al	mg/L	427	355
Dissolved Antimony Sb	mg/L	< 0.5	2.4
Dissolved Arsenic As	mg/L	1.2	15.1
Dissolved Barium Ba	mg/L	< 0.01	< 0.01
Dissolved Beryllium Be	mg/L	0.21	0.13
Dissolved Boron B	mg/L	< 0.1	< 0.1
Dissolved Cadmium Cd	mg/L	12.3	6.4
Dissolved Calcium Ca	mg/L	398	245
Dissolved Chromium Cr	mg/L	0.6	2
Dissolved Cobalt Co	mg/L	24.2	15.5
Dissolved Copper Cu	mg/L	676	675
Dissolved Iron Fe	mg/L	11200	34900
Dissolved Lead Pb	mg/L	1.8	6.2
Dissolved Magnesium Mg	mg/L	580	217
Dissolved Manganese Mn	mg/L	299	72.4
Dissolved Molybdenum Mo	mg/L	< 0.2	< 0.2
Dissolved Nickel Ni	mg/L	6.1	4.7
Dissolved Phosphorus P	mg/L	20	42
Dissolved Potassium K	mg/L	< 2.5	< 2.5
Dissolved Silicon Si	mg/L	42.3	29.2
Dissolved Silver Ag	mg/L	< 0.1	< 0.1
Dissolved Sodium Na	mg/L	< 1	< 1
Dissolved Strontium Sr	mg/L	0.33	< 0.01
Dissolved Tin Sn	mg/L	< 0.3	< 0.3
Dissolved Titanium Ti	mg/L	< 0.05	0.14
Dissolved Vanadium V	mg/L	< 0.1	5.9
Dissolved Zinc Zn	mg/L	6570	4830
Dissolved Zirconium Zr	mg/L	0.3	1.1

APPENDIX D

Photos

Photo1: The white colour band on the right side of the photo indicates the presence of precipitated acid salts at the waste-subgrade interface; 0.5 meter overexcavation evident. Students sampling the subgrade in the left side of the photo.

Photo 2: Waste repository at LGSP 'C' – the soft fines from S/P2 on the far side of the photo (grey colour) placed against the original topography of LGSP 'C' and the dry, rocky material from S/P3 placed downstream (orange colour) at the end of day 3 of the program.

Photo 3: Relocated waste rock from S/P2 “bubble dumped” at the repository site on day 5. Material hauled on previous days pushed up and levelled in a bench against the original slope of LGSP‘C’.

Photo 4: Dozer pushing up and levelling the hauled waste at LGSP‘C’ on day 6.

Photo 5: Finished waste repository at LGSP'C'. Drainage ditch and test pad 3visible at the left side of the photo.

Photo 6: Detail of drainage ditch and drainage retention windrow. The repository is located on the left side of the photo.

Photo 7: The waste from S/P2 was loaded selectively to segregate the wet fines (grey colour) and the dry material (orange).

Photo 8: Footprint of S/P2 after leveling with the dozer, after all the above grade material was removed. The pile visible in the photo contains contaminated subgrade material waiting to be hauled away.

Photo 9: Footprint of S/P2 after grading and compaction. Drainage ditch noticeable in the upper left corner of picture.

Photo 10: Regions of high sulphide content waste (whitish-grey) remaining at from the fringes of S/P2.

Photo 11: Small pockets of contaminated (grey material) subgrade left on the footprint of S/P2 after levelling with the dozer.

Photo 12: Test Pad 1 with the collection point in the foreground.

Photo 13: PVC liner placed on Test Pad 1. The drainage point is located in the right side of the photo.

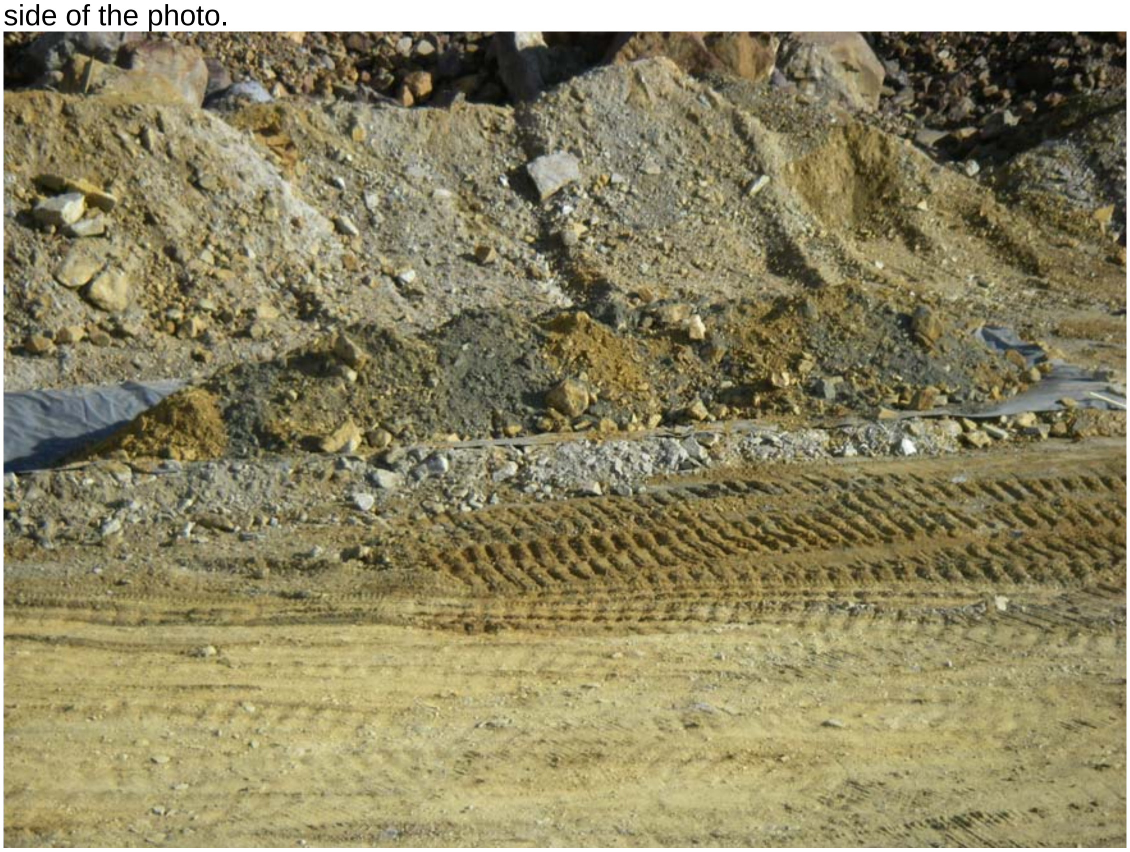

Photo 14: Mixed waste (gray and orange) placed on the liner of Test Pad 1.

Photo 15: Test Pad 2 (in background) and 3 in foreground after excavation, prepared for the placing of the PVC liner. Collection point between the two test pads.

Photo 16: PVC liner placed on Test Pads 2 (right side) and 3 (left side).

Photo 17: Grey waste placed on the liner of Test Pad 2.

Photo 18: Orange waste placed on the liner of Test Pad 3.

Photo 19: Flap of the PVC liner extended over the collection point of Test Pad 2. Each test pad had a 20 litre bucket installed at the collection point, and was covered with flaps of PVC liner to eliminate contamination of the drainage sample with dust or dilution with rain water.