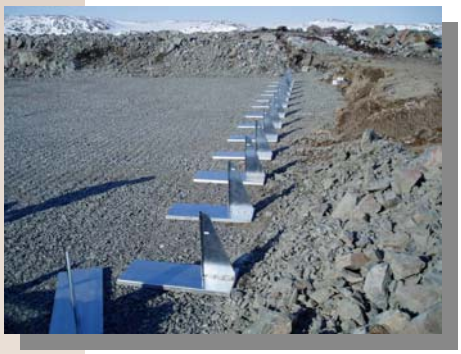
Patch Lake Tank Farm Secondary Containment Facility, As-Built Report Hope Bay, Nunavut, Canada



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SRK Project No. 1CM014.010

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Patch Lake Tank Farm Secondary Containment Facility, As-Built Report, Hope Bay, Nunavut, Canada

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1 Introduction

1.1 General

Miramar Hope Bay Limited (MHBL) contracted SRK Consulting (Canada) Inc. (SRK) to design and oversee quality control (QC) for the construction of a secondary containment facility for their fuel tank farm west of Patch Lake, Hope Bay, Nunavut (Dwg. PL-01 Rev. B in Appendix A). This facility replaces one constructed in 2005, and is used to store the annual exploration fuel requirements for the central section of the Hope Bay Belt. Construction started April 14, 2007 and was substantially completed on June 6, 2007.

1.2 Scope of Work

The SRK scope of work was as follows:

- Provide a detailed design for a secondary containment facility for the Patch Lake tank farm. The design package was to include detailed engineering drawings, material specifications and material quantities.
- Design a blast-pattern for creating a level foundation upon which to construct the secondary containment facility, and in the process generate suitable materials to use in construction of the facility.
- Full-time quality control of the construction, as well as full-time engineering support to allow SRK to sign-off as Engineer-of-Record for the facility.
- Document the design and construction information in a detailed as-built report.

The SRK scope of work includes only the physical construction of the secondary containment facility. The design of the tanks, piping and any other mechanical or electrical components directly associated with fuel containment and/or fuel transfer is being managed under the direction of MHBL. A more detailed description of specific design exclusions are listed in the design memorandum in Appendix A.

1.3 Background

MHBL constructed a secondary containment facility in 2005 designed by others. This facility, which was located about 100 m south-west of the Major drill shop, directly on the tundra. During the summer of 2006 some of the tanks in this facility started to heel over, likely as a result of foundation failure initiated by permafrost thaw. MHBL subsequently contracted SRK to evaluate remediation options and/or implement a new secondary containment facility design to replace the compromised facility.

SRK concluded that the 2005 facility was substantially compromised that remediation would not be a viable alternative and thus proceeded to design a completely new facility. Given the poor foundation conditions on the tundra, compounded by the presence of permafrost, SRK recommended that MHBL construct the new secondary containment facility on bedrock.

Construction equipment and materials had to be mobilized to site and as result MHBL had no choice but to defer the construction of the new secondary containment facility to the winter of 2007, when supplies could be air freighted to site, or brought in via winter road from Cambridge Bay.

1.4 Report Layout

This report is intended to serve as the official record of how the Patch Lake tank farm secondary containment facility was constructed. However, to ensure that all relevant information pertaining to the design and construction of this facility are kept together, this as-built report includes design documentation as well.

Chapter 2 describes design changes and/or modifications that were implemented during construction. Actual construction sequence and procedures are documented in Chapter 3, whilst Chapter 4 discusses post-construction inspections and closing observations.

Supporting documentation is presented as Appendices.

2 Design

2.1 Original Design

Details of the secondary containment facility design assumptions, exclusions and calculations are presented in Appendix A, together with the issue for construction (IFC) drawings. At the time the design package was prepared there was an understanding that the secondary containment facility would be constructed on a nominal crushed and compacted rock fill pad on top of an area of exposed bedrock. After issuance of the IFC drawings it became clear that this design had to be modified as the source of crush with which to construct the pad would not be available. Therefore MHBL requested that SRK modify the design such that a shelf be blasted in the bedrock in order to provide a level foundation and at the same time create construction material (this modification was in fact one of the options evaluated during the original design, and is documented in Appendix A).

SRK subsequently designed a blast pattern to create this shelf (Appendix B). The complete design drawings were however not revised to reflect the sunken foundation, and a new set of IFC drawings was not issued. Since this change had no material impact on the design, other than lowering the foundation of the secondary containment facility, SRK was confident that this approach was acceptable. Furthermore, SRK had a full-time engineer on site to ensure that the required modifications would be carried out in accordance with the Engineer-of-Record's requests.

2.2 Design Changes and/or Modifications

2.2.1 Rationale

Between the time MHBL contracted SRK to carry out the design and when construction started, it was not practically possible (due to unavailability of suitable equipment) to undertake a detailed geotechnical investigation of the proposed area selected for the new facility. Therefore design and construction proceeded with the understanding that design changes and/or modifications may be required.

In addition to changes and/or modifications necessitated by the foundation conditions, other factors also required adjustment of the design. These factors include equipment, material and manpower availability, as well as site logistics and construction scheduling. All changes are documented in the following sections, and the reader is also referred to Chapter 3 and Appendix D for more detail pertaining to construction procedures which relates in some instances to these changes.

All changes and/or modifications was communicated to, and approved by MHBL or their appointed construction manager and owners representative SNC Lavalin Engineers and Contractors (SLEC).

2.2.2 Facility Layout

The secondary containment facility was designed to have internal dimensions of 26.6 m x 48.0 m, and the design layout of the individual fuel tanks within this facility is presented in Dwg. PL-02 Rev. B in Appendix A. The as-built internal dimensions of the facility is 24.6 m x 46.0 m. This change and the challenges of getting the tanks into the secondary containment facility without an adequate liner protection layer required modification of the tank layout in the facility. This new layout is presented in Dwg. AB-01 Rev. A of Appendix C.

The actual dimensions of the Envirotanks that were moved into the containment are: three 70,000 litre tanks measuring 13.3 m x 3.5 m (including inspection ladder), two 70,000 litre tanks measuring 10.5 m x 5.0 m, and one 50,000 litre tank measuring 10.8 m x 3.2 m. In the front (east) there is a distance of 1.6 m between the discharge valve and the access ramp to allow for snow clearing. The tanks are at least 1 m away from the back wall (west). Tank interspacing varies from 2.7 m at the side walls (north and south) to at least 2.6 m between tanks. This interspacing was selected as it accommodated the dimensions of the tanks while maintaining a distance that exceeds the 1 m minimum according to the appropriate guideline documents (see Appendix A for details).

In the centre of the facility there is a clear space 5.5 m wide in which to place the Tidy Tanks. Tidy Tanks measure 1.5 m x 0.75 m each. As the Tidy Tanks used on site are usually placed right next to each other and are easily moved, it was determined that there is sufficient room for Tidy Tank storage on the east side of the sump. The original design called for interspacing between the Tidy Tanks to allow for safe helicopter transport. There are no regulations governing this interspacing distance, and therefore the final Tidy Tank layout is a MHBL operational choice.

2.2.3 Foundation

The original design called for constructing the secondary containment facility on a compacted crushed rock fill pad over the undulating bedrock surface. This crush was to be imported from a construction quarry developed for the Doris North Project. Shortly before construction commenced MHBL informed SRK that this fill would no longer be available, and SRK was instructed to modify the secondary containment facility foundation to reflect a blast cut into the bedrock that would create a level surface as well as provide sufficient construction material for constructing the secondary containment facility. This blast design is presented in Appendix B.

Initially the design called for blasting of a rock outcrop to the south to create a level pad on grade with the bedrock (which was subsequently found to be permafrost soil) at the north end at elevation of approximately 40 m. On April 22, 2007, a 1.7 m deep test pit was excavated on the north side of the containment which confirmed the presence of silty sand with 10-15% ice content. This material is highly susceptible to thaw settlement and SRK recommended lowering the entire blasted foundation to elevation 38 m, as this would ensure the entire secondary containment facility would be founded on bedrock. A foundation fill pad would be constructed on this blast foundation to create a suitably graded subgrade upon which to construct the secondary containment facility.

A review of the foundation conditions exposed by blasting confirmed that blasting and excavation could be minimized by moving the footprint of the tank farm 4 m to the north along its major axis.

Due to construction scheduling constraints, SLEC and MHBL determined that it is not feasible to remove all the blasted material to expose the blast face at elevation 38 m. This meant that an as-built survey of the blast surface could not be carried out. Loose material within the foundation footprint was spread to create a compacted fill pad up to elevation 38.8 m.

2.2.4 Secondary Containment

One part of the secondary containment system comprises of a pre-manufactured steel berm which is delivered in panels assembled on site (these berms support the second part of the secondary containment system which consist of a synthetic liner). Details of the steel berms are presented in Dwg. PL-04 Rev. B and Dwg. PL-05 Rev. B in Appendix A. These panels were procured by MHBL and supplied by Layfield Environmental Systems Ltd. (Layfield) from Edmonton. A shipping error resulted in the corner panels being right-angles as opposed to curved (72" radius) as per the design.

As a result of inadequate survey control the foundation blasted for the secondary containment facility was not big enough. This resulted in the revised internal dimensions of the secondary containment facility of 24.6 m x 46.0 m.

2.2.5 Secondary Containment Capacity

The original design was based on required secondary containment capacity of 114,150 litres. However, this was based on there being two 75,000 litre tanks in the facility, and four 70,000 litre tanks. In actual fact there are five 70,000 litre and one 50,000 litre tank, which only require a secondary containment capacity of 105,650 litre (details of this calculation are presented in Appendix A).

Based on the as-built internal dimensions of the secondary containment facility, the facility is still more than adequate to fully contain the required volumes.

2.2.6 Geosynthetics

The geomembrane (liner) used was Enviro Liner 6030, a 30 mil (0.75 mm) thick liner. The liner was procured by MHBL and supplied and installed by Layfield. The liner was attached using a mechanical top mount system, continuing all the way to the top of the wall so no sealant was required.

SRK had specified that the liner be installed between two layers (one layer below and one on top) of a heavy duty (supplied and installed by Layfield and procured by MHBL). Instead, the liner was installed between three layers of heavy duty 542 g/m^2 (16oz), 86' x 162' LP16 Flat Seam, non-woven geotextile, two layers below the liner, on top of the pre-approved subgrade of crushed,

compacted rock, and one layer on top of the liner. In critical locations, such as under the fuel tanks a fourth layer of geotextile was placed.

2.2.7 Liner Protective Cover Material

Sand imported from a quarry in Cambridge Bay (procured by MHBL) was used as the liner protection material. No material testing was carried out on this sand prior to starting construction. Visual inspection revealed that the sand contained a small portion of large angular rocks and stones which may puncture the liner. A screen was subsequently constructed on site and these large rocks were removed. However, to further ensure that no damage to the liner occurs, geotextile was placed as discussed in the previous section.

There was insufficient sand to provide an overall liner protective layer of 30 cm. The final placed sand thickness is about 10 cm over the entire secondary containment facility, with a local increase in thickness of 7.5 cm beneath four of the fuel tanks.

2.2.8 Sump

The dimensions of the sump were altered to accommodate the liner installation. The sump is a semi-circular bowl shape with a flat bottom 1.6 m by 1.6 m. The sump crest is 5.2 m wide at the back wall (west), 4.5 m long from the back wall to the crest, sloping towards the flat bottom.

This sump was modified after completion of construction of the secondary containment facility. The reader is referred to Appendix H and I for more details.

2.2.9 Access Ramps

The access ramp dimensions are consistent with the original design; however the approach ramps were steepened 15H:1V to 12H:1V, and the ramp side slopes are 1.2H:1V. The ramp has been offset from the eastern wall by 0.8m.

The ramps have only 15 cm of fill over the height of the steel containment berm, as opposed to the design criteria of 30 cm. This shortfall is due to there not being any more crush available on site.

2.2.10 Drainage Ditch

Due to the fact that the secondary containment facility had to be cut to below natural ground level a drainage ditch had to be cut to allow precipitation to freely drain from the facility. This drainage ditch is placed in the south west corner where the bedrock naturally daylights. The drainage invert level is at elevation 38.3 m. To allow complete drainage the invert should however be lower than elevation 38.1 m, which is the lowest surveyed blast foundation.

3 Construction Details and Procedures

3.1 Construction Responsibilities

Construction of the Patch Lake tank farm secondary containment facility was carried out by the responsible parties as listed in Table 1.

Table 1: Responsible Parties

Company	Responsibility
Miramar Hope Bay Limited (MHBL)	Owner, Tender, Procurement, Survey, (supporting role only), Permitting, Accommodation
SRK Consulting (Canada) Inc. (SRK)	Design Engineer, Quality Control, Engineer-of-Record
SNC Lavalin Engineers and Contractors (SLEC)	Construction Manager, Owners Representative
NWT Rock Services Ltd. (NWT Rock)	Drilling and Blasting Contractor
Nuna Logistics Ltd. (Nuna)	General Contractor (earthworks)
Kitnuna Construction Ltd. (Kitnuna)	Sub-Contractor (earthworks)
Sub-Arctic Surveys Ltd. (SAS)	Surveying
Layfield Environmental Systems Ltd. (Layfield)	Steel Containment Berm and Geosynthetics Installation
Golder Associates Ltd.	Environmental Monitor

Construction started on April 14, 2007 and was substantially completed on June 6, 2007. Work was carried out in 12-hour day shifts. Between April 29, 2007 and May 15, 2007 a night shift was implemented to speed up the schedule. Night shift however consisted on a skeleton crew mucking out and hauling blasted material such that daytime drilling and blasting could continue unhindered.

Construction took significantly longer than originally anticipated. There were many reasons for the construction delays, which are documented in the daily construction reports presented in Appendix E.

3.2 Construction Equipment

Construction equipment consisted of a mix of MHBL, Kitnuna and NWT Rock owned equipment. The MHBL equipment was already on site, but the Kitnuna equipment was mobilized from Cambridge Bay via a winter road. NWT Rock equipment was mobilized from Yellowknife using Hercules aircraft. A summary of the equipment used during the construction is listed in Table 2.

Table 2: Construction Equipment Used

Equipment	Owner	Period Used
Hitachi EX300LC excavator	Kitnuna	April 16 to May 17
Cat 916 Loader	Kitnuna	April 16 to May 3
Cat 966 Loader	Kitnuna	May 14 to June 5
Cat D6 Dozer	Kitnuna	April 28 to June 5
Cat D5A Dozer	Major Drilling Group International Inc.	April 16
Atlas Copco ECM590 airtrack drill	NWT Rock	April 17 to May 13
Cubex RC drill	NWT Rock	April 15
Terex Reedrill R20C airtrack drill	NWT Rock	April 20 to April 27
Cat 250 Rock Truck	Kitnuna	April 29 to May 15
Hitachi UM122 Excavator	Kitnuna	May 10 to June 5
Cat Skid Steer	Kitnuna	May 23 to May 29
Cat 563C Compactor	Kitnuna	May 15 to May 21
Crusher	Kitnuna	April 29 to May 3

In addition to the equipment listed in Table 1, MHBL supplied ski-doos, pick-up trucks and helicopter support throughout construction.

3.3 Daily Construction Reports

A standard operating procedure for SRK construction projects is compiling and submitting daily construction reports (dailies) by the field engineers to head office. These dailies fulfill a dual role; firstly, they facilitate communication with the field engineers such that rapid response to technical issues can be formulated and fed back to the field with minimal associated construction delays, and secondly, they serve as a record of field decisions and construction activities necessary to compile detailed as-built records.

For the Patch Lake tank farm secondary containment facility construction SRK distributed these dailies as a courtesy to MHBL and all other involved parties. A complete set of these daily reports are included as Appendix E and the reader is referred to these reports for more detail on any aspect discussed in this report. These dailies also contain select photos as construction progressed.

3.4 Quality Control (QC) Procedures

SRK engineers were on-site full-time and inspected all construction. Work that was not carried out in accordance with the design intent and specifications was pointed out to MHBL and SLEC who implemented the necessary corrective action. Acceptance certificates as outlined by the SRK construction specifications were issued to the contractor and are provided in Appendix F.

3.5 Construction Components

3.5.1 Drilling and Blasting

Drill holes were set out by the surveyor on a pre-determined grid spacing. The holes were a combination of 89 mm and 70 mm diameter holes, using two rock drills supplied and operated by NWT Rock. All holes were drilled to elevation 37 m, which included 1 m of sub-drilling to facilitate clean rock breaking up to the desired cut elevation of 38 m. The close drill spacing did require that after each blast some re-drilling had to be done.

Due to the close proximity of the Major drill shop and the fuel tanks, blasting had to be done in small 10 m wide sections and blast matting had to cover the entire blast zone. To facilitate blasting a west to east slot was first opened roughly along the center of the foundation base. The blasting then continued south along this slot after which the northern section was blasted. This northern section contained predominantly frozen soil as opposed to bedrock.

SRK inspected the blasted areas and where high spots above elevation 39 m were observed these were marked for re-drilling and blasting.

The access ramp to the south end was drilled and blasted to an approximate elevation of 40.5 m to decrease the difference between the finished grade and the ramp apex. The alignment was also slightly adjusted to further minimize the blast and fill requirements.

3.5.2 Blasted Foundation

The blast material was mucked out with excavators, and loaded on a Cat 250 haul truck for disposal. Excavated materials were stockpiled in a designated approved stockpile area to the south of the containment facility, as well as an unapproved area to the west. The objective was to expose the hard rock blast foundation at about elevation 38 m. Due to the slow progress with drilling and blasting as well as the inability of the equipment to efficiently muck out all the material, MHBL and SLEC made a decision to not continue mucking out the remaining blast material, but rather to start spreading it within the foundation area to create the required fill pad (all overburden was however still removed and only competent rock was left). This decision was against the advice from SRK due to the following reasons:

- An as-built survey of the blast foundation could not be carried out.
- The fill pad would contain localized areas where there is a thick layer of blast material which is not likely to be adequately compacted.

The consequence of not mucking out all the material is that there may be localized low spots or uncompacted fill which could fill with water, and if this water cannot drain from the facility foundation, ice build-up could result in foundation heave. Even though SRK did not support this decision, SRK are of the opinion that the risk of frost related heave is small.

Survey of the blast floor in areas where the blast material was mucked out confirmed that the floor was uneven, with high nodes at about 38.8 m and low spots at about 38.1 m.

3.5.3 Foundation Fill Pad

The target finished elevation for the foundation fill pad was set at elevation 39 m, with a constant grade of -1% towards the sump.

The first step was to use general bulk fill to an elevation of about 38.8 m to create a level working surface across the blast foundation (the original design called for using only processed crush as bulk fill; however, not enough crush was produced and therefore general bulk fill had to be used). This general bulk fill consisted of well graded competent blast rock with the largest fragments approximately 0.4 m in diameter, mixed with about 15% fines (< 2 cm). This fill was spread into loose layers 0.5 m thick and compacted using the Cat 563 compactor with a minimum of six overlapping passes.

A capping layer of crushed rock was placed on the compacted bulk fill to allow shaping of the finished grade and elevation of the foundation fill pad. This crush was produced on site using a portable crushing plant. Competent clean blast rock was fed into the crusher and a minus 3 cm crush was produced. This crush was placed as a single loose layer of about 0.2 m and compacted.

A survey of the finished grade of the foundation fill pad confirmed that the north-west corner was too high. This area was subsequently reworked; however, MHBL gave instructions to deploy the secondary containment berm and liner before SRK could inspect and approve this area. Subsequent inspection suggests that the new fill placed was not adequately compacted (see Appendix H for more details).

3.5.4 Steel Containment Berm

The steel containment berm was erected by a Layfield representative. Labour support for this individual was provided by MHBL. Prior to starting the installation he approved the subgrade (Appendix G). The actual secondary containment dimensions had to be modified due to construction constraints, which required cutting of the pre-fabricated panels. This custom fitting was carried out by the Layfield representative.

The steel berm consists of three primary modular parts; a base plate, a steel wall, and a fin linking the base plate and the steel wall (corrugated sheets). Assembly of these components are done entirely on site. The fin is bolted to a base plate and these bases are placed at pre-determined locations to form a perimeter around the containment area. Next the corrugated steel sheets are bolted to each fin and each sheet is bolted to its overlapping sheet, creating a continuous wall.

The steel sheets are designed to sit flush with the base of the fin and the top of the base plate is designed to sit flush with the surface of the foundation. In the case of the Patch Lake secondary containment facility, the base plates sat on top of the foundation since it was crushed rock and not

sand or soil. As a result, the steel wall did not extend to the foundation, leaving a gap of approximately 2.5 cm between the foundation and the wall. Furthermore due to the uneven foundation floor, the gap was up to 15 cm in some locations. Although this does not compromise the containment system there is a risk that as the steel and the overlying liner expand and contract, the liner may get damaged. Therefore, in all areas where this gap was more than 5 cm, sand bags were placed to provide added support for the liner. The Layfield representative was satisfied that deformation of the steel berm as a result of the uneven fill pad would not affect the structural integrity or function of the steel berm and issued a completion certificate (Appendix G).

Three of the base plates along the west wall of the berm had to be reversed in order to allow for the sump to be placed closer to the wall.

3.5.5 Geosynthetics

After completion of the steel containment berm, the secondary containment fill pad foundation was covered with two layers of 542 g/m^2 (16oz), 86' x 162' LP16 Flat Seam, non-woven geotextile. The overlap sections were not fusion welded or stitched; however, the overlaps of the second layer were staggered so as not to be in the same location at the first layer. Both geotextile layers extended about 30 cm up the wall, completely covering the base plates.

The pre-manufactured (continuous liner with no seams or welds) Enviro Liner 6030 was draped over the geotextile, extended over the top of the steel berm and permanently fixed to the top rim of the steel wall using a metal backing plate and bolts.

Due to the fact that the final secondary containment internal dimensions are smaller than designed, the Layfield representative opted to complete the installation with a permanent fold in the liner as opposed to cutting and re-seaming it. This fold runs east-west from the sump to the far wall. This was necessary to ensure that the liner fits snug and remains in contact with the ground at all points, including the sump depression. Upon completion of the liner installation SRK and Layfield representatives walked the entire surface noting possible weak points in the liner. Appropriate repairs were made and Layfield issued a warranty for the liner (Appendix G).

On top of the liner, prior to placing the liner protection layer (sand) another layer of the same 542 g/m^2 (16oz), 86' x 162' LP16 Flat Seam, non-woven geotextile was placed. It would have been desirable to place two layers; however, there was only enough geotextile to place a double layer in critical areas, i.e. beneath the fuel tanks.

3.5.6 Sump

The original design of the sump included a timber box to be placed at the low point of the sump. MHBL and SLEC opted not to construct this sump and simply contoured the foundation fill pad crush towards a low spot where the sump was located. SRK did not approve of this concept since although it would function effectively as a local collection spot, it does not provide for safe operational deployment of a pump.

Modifications were made to the sump after completion of construction covered in this report, and the details of those modifications are presented in Appendix H and I.

3.5.7 Liner Protection Layer

MHBL ordered sand from a quarry in Cambridge Bay for us as liner protection material. Due to logistical problems about half of the ordered quantity was not delivered. Furthermore, visual inspection of this sand showed that about 5% by volume consisted of sharp angular stones and rocks ranging between 2.5 and 7.5 cm. Another portion (up to another 5%) of the sand was frozen lumps and as such was unsuitable for use as liner protection material.

A screen was constructed on site to remove all the undesirable material, with the resultant effect that there was not enough sand to cover the liner to the desired thickness of 30 cm.

During foundation blasting a natural deposit of silty sand was exposed along the northern edge of the secondary containment facility. This sand was excavated and processed using the sand screen until there was sufficient material to cover the entire liner within the secondary containment facility with a layer about 10 cm thick, plus under four of the six fuel tanks the sand layer could be increased to about 17.5 cm.

The liner protection layer (sand) was placed using a Skid Steer, which ran along the crushed rock ramp, turned 90 degrees on the ramp and then dropped loads of sand ahead of itself so that it did not run on the geotextile directly. The sand was also spread by hand using rakes and was kept to a minimum lift of about 10 cm. The material was compacted using a smooth plate walk-behind tamper.

3.5.8 Access Ramps

At the point where each ramp extends over the steel berm wall, sand was placed using the excavator to suspend the bags of sand over the containment floor and then manually empty the bags and spread the sand using rakes. This sand was compacted using a hand tamper in 30 cm lifts one meter out from north wall within the footprint of ramp, inside the containment. Crushed rock was placed outside the containment on the other side of the wall to counter the pressure from the sand to prevent buckling of the wall. A 10 to 15 cm thick sand layer was placed over the crest of the steel berm, followed by a 15 cm thick layer of crush. However, after the fuel tanks were dragged into the secondary containment facility, this cover was reduced to only 15 cm, which is not sufficient. More details are provided in Appendix H.

The roadway between the ramps was covered with a layer of sand as per the rest of the containment facility. A layer of geotextile was placed on top of this sand before placing a 15 cm thick layer of crushed rock to act as a traffic layer.

The slightly steeper ramp approach angle of 12H:1V as opposed to the design angle of 15H:1V was decided on by MHBL, as the site supervisor was confident that the bowsers would not be hung up.

3.5.9 Drainage Ditch

For logistical reasons the drills had to be demobilized from site before all blast material could be mucked out, and before a detailed as-built survey of the blasted foundation could be carried out. A subsequent survey confirmed that the outlet drain on the south-west corner of the facility is at an elevation of about 38.3 m, as opposed to less than 38.1 which is the lowest surveyed spot in the blast foundation. The contractor used a portable drill in an attempt to remedy this situation; however, without success.

3.5.10 Tank Placement

Due to the configuration of the containment, it was necessary to bring the tanks down the ramp and then turn them 90 degrees into position within the containment area. The available equipment for the moves consisted of a Hitachi UM122 excavator, a Cat D6 Dozer and a Cat 966 Loader.

SRK and SLEC were concerned that the liner would be damaged as the tanks turned from the ramp into the containment floor due to the lack of crushed rock and sand. As a result, the larger (i.e. longer) 70,000 litre tanks were placed on the outer edges (farthest away from the sump), to allow more room to turn the tanks and lower the risk of tearing the liner.

Approximately 7.5 cm of additional sand was placed in the location of the first tank, and about 30 cm of sand was placed next to the first tank for use as a working platform from which to move the first tank. The excavator moved on this raised platform while lifting one end of the tank onto the sand bed and pulling it over 8” x 8” timbers. After the first tank was in place, the excess sand was moved from the excavator pad and used to build the sand bed for the second tank and the next excavator pad. This process was repeated until all tanks were in place.

The dozer pulled the tanks from the north end of the site to the ramp. Then, the excavator pulled the tank down the ramp while the loader pushed. The excavator then positioned itself on the sand work pad and lifted one end of the tank while the loader pushed from the other end, swinging the tank into position. The tanks were slid across 8” x 8” timbers which were repositioned by hand as the tank was moved into place.

4 Post Construction Observations

A final inspection of the Patch Lake tank farm secondary containment facility was carried out by SRK on June 6, 2007. The Final Handover Deficiency List prepared following this inspection is included in Appendix H.

SRK concluded that provided MHBL put in place an operational plan for management of the Patch Lake tank farm, as well as address the primary safety concerns on the deficiency list, the tank farm could be commissioned. Furthermore, SRK recommended that MHBL carry out the work to rectify the issues highlighted on the deficiency list as soon as possible.

MHBL subsequently immediately proceeded to start filling the tanks putting the facility in operation.

Whilst on site for other purposes, SRK was asked by MHBL site staff to carry out a follow-up inspection of the secondary containment facility on July 16, 2007. The findings of this inspection are documented in Appendix I.

This report, "**Patch Lake Tank Farm Secondary Containment Facility, As-Built Report**", has been prepared by SRK Consulting (Canada) Inc.

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Reviewed by

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Appendix A

SRK Memorandum: Patch Lake Tank Farm Secondary Containment Facility Design – Final, April 10, 2007

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Design Memorandum

To:	Jim Currie, John Wakeford, Larry Connell, Terry Maloof	**Date:**	April 10, 2007
cc:	Project File	**From:**	Maritz Rykaart
Subject:	Patch Lake Tank Farm Secondary Containment Facility Design - FINAL	**Project #:**	1CM014.010

1 Introduction

Miramar Hope Bay Limited (MHBL) contracted SRK Consulting (Canada) Inc. (SRK) to design a secondary containment facility for their tank farm west of Patch Lake, Hope Bay, Nunavut (see Dwg. PL-01). This facility will replace one that was constructed in 2005, and will be used to store the annual exploration fuel requirements for the central section of the Hope Bay Belt.

The SRK scope of work was as follows:

- Consider a number of alternative locations and options for constructing a secondary containment facility for the Patch Lake tank farm.
- Provide a final detailed design of the preferred option including detailed engineering drawings and specifications, such that MHBL can issue a tender document to have the works completed in time for refuelling early in 2007.

The following is excluded from the SRK scope of work:

- SRK will not specify the fuel containment requirements of the facility (i.e. tank needs), and SRK will not be responsible for the design or specification of any of the tanks that will be installed in the facility.
- SRK will not obtain local, territorial and/or federal permits or approvals for the facility. SRK will however attempt to design the facility such that all necessary guideline and regulatory standards are adhered to. Overall responsibility of ensuring that the facility is compliant remains with MHBL.
- SRK will not prepare an Operation and Management Manual (OMM) for the facility.
- Decommissioning of the existing secondary containment facility at Patch Lake is excluded.

2 Regulatory Requirements

SRK is not aware of specific guidelines, standards or regulations pertaining to the design of secondary containment for fuel storage tanks in the Nunavut Territory. We have therefore used the Canadian Council of Minister's of the Environment (CCME) "*Environmental Code of Practice for Aboveground and Underground Storage Tanks Containing Petroleum and Allied Petroleum*

Products", as the primary document to base the design on. This document references other guideline documents, which SRK has also consulted in preparing the design.

Notwithstanding what the CCME guidelines may say, SRK understands that MHBL has made a commitment to the landowner that all fuel storage, and fuel transfer on the Hope Bay Belt, will be done within a purpose designed secondary containment area which will be lined and dyked.

3 Primary Design Constraints

The secondary containment facility will be designed taking into consideration the following primary design constraints:

- The facility should have a design life of at least 10 years.
- The Hope Bay Belt is not located in a seismically active area, and therefore the design does not include any special seismic considerations.
- The facility must have room for the following tanks:
  - Two 75,000 litre Envirotanks
  - Four 70,000 litre Envirotanks
- In addition, MHBL would like to be able to do all fuel transfer to and from these tanks within the confines of the secondary containment facility. To that effect the following fuel transfer procedures apply:
  - Annual bulk fuel re-supply is done with Challenger Tractors pulling 16,000 litre Bowsers on skids.
  - Local fuel transfer between the tank farm, Windy camp and exploration drills are done with a Nodwell (or Alltrack 120) track mounted vehicle equipped with a bulk fuel tank. The bulk fuel tank capacity is not known so SRK have assumed a 13,000 litre volume for design, based on the maximum payload of 14,550 kg of the largest Nodwell 240 vehicle.
  - Local fuel transfer between exploration drills and the tank farm is also done using 750 litre Tidy Tanks transported by helicopter. At any one time there are ten of these tanks on site.
- The landowner would like to minimize any land disturbance, and therefore development of local quarries for construction material is considered a last resort. If quarries was to be developed, the landowner would prefer that those quarries are at one of the four designated quarry sites for the proposed Doris North Project, about 7 km to the north of the tank farm site. These quarries have been geochemically characterized and are confirmed to be suitable for use as a construction material (SRK 2006).
- The construction materials needed would be processed from the blasted material within the footprint of the containment facility as no quarries will be developed at the time of construction.
- The Envirotanks are skid mounted, and since there is no on-site crane with sufficient lifting capacity, the secondary containment design must allow for dragging of the tanks into place without compromising the liner integrity.

- On site construction equipment is limited to an excavator (unknown size) and a small dozer (D6). Although it is anticipated that a general contractor would be brought in to complete the works, which would also imply importing all necessary construction equipment, there is a possibility that construction would have to be completed with the limited equipment on site.

- SRK understands that MHBL intends to have the works completed by a General Contractor with experience in such works in this environment. Liner installation and quarry development will be done by Specialist Contractors, most likely sub-contracted under the Main Contractor. The main contract will be managed by MHBL (or an elected representative), whilst Quality Assurance and Quality Control (QA/QC) will be done by a full time Engineer's representative. If MHBL wishes to retain SRK as the Engineer of Record for the design, then the Engineer's representative will be a suitably qualified SRK Employee or Sub-contractor.

4 Alternatives Considered

SRK evaluated a number of alternative secondary containment designs, which was communicated to MHBL in a series of e-mails. The details of these options will not be repeated here; however, for completeness a brief summary is presented.

4.1 Option A: Reconstructing the existing secondary containment facility

Details pertaining to the design and ultimate decision to decommission the existing Patch Lake secondary containment facility are documented in Biogenie (2005) and MHBL (2006). SRK has no opinion relating to the design and decommissioning of this facility; however, some observations pertaining to the geotechnical conditions of the site must be stated to evaluate the option of reconstructing the secondary containment facility at this location. The following observations are based on a personal inspection of the site by SRK (Mr. Maritz Rykaart, P.Eng., Ph.D.) and communication with MHBL staff.

- The facility was founded on permafrost soil. No details of the soil profile are known; however, based on regional data is likely to be ice-rich marine silt and clay. This appears to be substantiated by inspecting three exploration trenches excavated about 1 km south of the facility.

- Differential tank settlement started in July 2006 and the most likely cause would be an increased active layer thickness underneath the secondary containment facility as a result of the construction method employed. This has lead to differential thaw settlement, possibly coupled with foundation bearing capacity failure.

Reconstructing the tank farm on this facility would require complete removal of the tanks, and liner, after which the foundation would have to be allowed to refreeze. This newly frozen layer would then have to be thermally insulated to prevent any further settlement. The construction techniques suitable to achieve this goal would be similar to what would be required to construct a secondary containment facility on undisturbed permafrost soil (see Option B below), with the added complication of working on a compromised foundation. This, together with the high construction material demand has led to the decision not to consider this as a viable option.

4.2 Option B: Constructing a secondary containment facility on undisturbed permafrost

A secondary containment facility can be constructed on the undisturbed permafrost soil, even if it is ice rich marine silt and clay, provided the facility is constructed on a pad that is thick enough that the active layer would be within the constructed pad as opposed to in the original ground. This can be achieved by constructing a pad from local soil (clay or sand) or local quarry rock. It is also possible to use artificial means of ensuring the foundation remain frozen, such as thermally insulating the ground with Styrofoam or installing thermosyphons. The integrity of the secondary containment

facility depends of the fact that the foundation must remain completely frozen for the life of the structure.

Given the high construction material demand that this alternative pose, and the limited availability of construction materials this option is not particularly desirable. The use of Styrofoam or thermosyphons does allow some reduction in the material demands; however, these products are expensive. This option was therefore not given further consideration.

4.3 Option C: Constructing a secondary containment facility in exposed bedrock

Constructing the secondary containment facility in exposed bedrock effectively eliminates any settlement risk, and provided the bedrock surface is reasonably level, would also require substantially less construction materials. A shelf will be cut with blasting to specified grade and the material removed will be processed and used as construction fill. This option was therefore selected as the preferred alternative upon which to base the detailed secondary containment facility design.

5 Design

5.1 Secondary Containment Facility Layout

Dwg. PL-02 presents the final tank layout of the secondary containment facility, which measures about 26.6 m x 48.0 m (internal dimensions). The primary design criterion in selecting this layout was to minimize the footprint size of the facility such that construction material quantities could be minimized.

Exact individual tank or fuel transfer equipment dimensions were not available, so the following design assumptions was used:

- MHBL provided an overall Envirotank dimension for their largest tank of 12 ft x 40 ft (3.66 m x 12.19 m). SRK confirmed with a supplier that this dimension was reasonable and proceeded to use this as the base dimension for all six the Envirotanks.

- Physical dimensions for the Tidy Tanks were not available, so SRK contacted a supplier and used the dimensions of their largest tank for the layout design. This is a 750 litre tank measuring 29” x 58” (0.75 m x 1.47 m).

- MHBL could not supply the exact model and dimensions for their Nodwell (or Alltrack 120), so SRK contacted a supplier and based the design dimensions on the larger Nodwell 240 vehicle. These dimensions are 3.05 m x 7.11 m.

- Design dimensions for the Challenger Tractor were obtained from a supplier, using their largest tractor which is a MT800B Series. Its dimensions are 3.58 m x 6.75 m.

- The design dimensions for the 16,000 litre skid mounted Bowsers were supplied by MHBL as 8 ft x 34 ft (2.44 m x 10.36 m). SRK could not verify these dimensions as we could not locate a supplier with an equivalent Bowser.

Tank interspacing, irrespective of their size or type was kept at a constant 3 m, which is three times the recommended inter-tank spacing of 1 m according to the CCME guideline document. This interspacing was selected to allow MBHL more flexibility to carry out maintenance and inspections between the tanks. The distance between tanks and the secondary containment barrier is also set at about 3 m for this reason.

5.2 Secondary Containment Capacity

The volumetric storage requirement for a lined and dyked secondary containment facility for an aboveground storage tank system containing more than one tank, according to the CCME guidelines are:

- The capacity of the largest storage tank; plus
- 10% of the greater of:
  - The capacity of the largest storage tank; or
  - The aggregate capacity of all other storage tanks located in the containment space.

Table 1 summarizes the tank farm capacity for which the secondary containment facility design is to be carried out.

Table 1. Patch Lake tank farm fuel storage requirements.

Tank Detail	Capacity (litre)	Quantity	Total Storage Volume (litre)
Envirotanks	75,000	2	150,000
Envirotanks	70,000	4	280,000
Tidy Tanks	750	10	7,500
Bowser	16,000	1[a]	16,000
Nodwell bulk fuel tank	13,000	1	13,000
Total volume of fuel stored in facility at any given time			466,500

a. There will be more than one Bowser, but only one can be in the facility at any given time.

The required secondary storage requirement is thus 75,000 litres (the largest storage tank), plus 10% of the aggregate capacity of all other storage tanks located in the containment space (0.1 x (466,500 litre -75,000 litre) = 39,150 litre), for a total secondary containment storage volume requirement of 114,150 litre.

Based on the overall containment facility footprint dimension, and subtracting the surface area (Dwg. PL-04) occupied by the tanks themselves, that relates to a berm height requirement of 0.12 m, assuming a horizontal (struck) surface.

Since the facility is a closed system, allowance for storage of precipitation water (i.e. rainfall and snowfall) must also be made. Given the remote location of the site, and the difficulties in continuously managing climatic events, the design criteria has been set at 100% containment of the annual average snowfall of 65 mm plus a 24-hour duration rainfall event with recurrence interval of 1:500 years. This value also happens to be 65 mm. Therefore, the combined containment berm height requirement based on secondary fuel containment and precipitation is 0.25 m.

The secondary containment facility liner must be covered with a suitable liner protection material to allow installation of the fuel tanks, as well as trafficking by the design fuel transfer vehicles. To that effect a minimum protective cover thickness of 0.3 m has been selected. This protective cover material must be sloped at a minimum grade of 1% over the extent of the secondary containment towards a single collection sump. Given the intended sump location (midway along the long axis of the facility, immediately adjacent the west steel containment berm) and the containment area footprint dimensions, the maximum height of fill against the steel containment berm would be about 0.57 m.

Therefore, the minimum overall required berm height is 0.82 m. This is a simplistic and conservative estimate, since the storage volume created by the sloped surface of the protective fill has been excluded from the calculation. Therefore the minimum design height can be seen as having a built in freeboard allowance.

5.3 Fuel Transfer

The secondary containment facility has been designed with two low profile access ramps, such that all fuel transfer can be done within the confines of the facility. The design allows for either the Challenger Tractor pulling one Bowser, or the Nodwell to park in the facility at any given time (although the secondary containment storage calculation allows for the possibility of a fully loaded Nodwell and a Bowser to be in the facility at any given time). To minimize the footprint of the secondary containment facility, there is no turnaround for the vehicles, but rather the ramps are designed to allow the vehicles to drive thru the facility.

The ramps have been designed with an overall width of 5.7 m, approach and depart slopes of 15H:1V (6.7 %) and a crown length of 5 m (Dwg. PL-03). This will allow safe passage of all the design vehicles, and also allow the Envirotanks to be dragged into place with relative ease. The ramp design will require at least 0.3 m fill over the height of the steel containment berm, which is 0.85 m high.

The Tidy Tanks will be dropped off and picked up by helicopter, and the 3 m tank interspacing has been deemed adequate from a safe helicopter lifting perspective by MHBL. SRK is not qualified to judge whether this requirement is adequate, and therefore assumes no responsibility in this matter.

SRK understands that MHBL will prepare a detailed OMM for the tank farm, which will take into account the design intent specified in this memo. Detailed fuel transfer procedures should form part of that manual.

5.4 Secondary Containment Type

Secondary containment will be achieved by means of a steel containment berm integrated with a geosynthetic liner sandwiched between two non-woven geotextiles. The 14 gauge galvanized Zero Ground Disturbance Steel Containment System consist of prefabricated steel panels bolted together on site. Each panel is completely free-standing and therefore does not require embedment into the foundation pad. Prefabricated corner units are used to complete the required rectangular design. The containment berm comes in different heights; however, to accommodate the secondary containment volume design height of 0.82 m, a 33” (0.85 m) high berm was selected.

The foot of the steel containment berm is about 53 ¼” long, with 14 ¾” extending towards the outside and the remainder towards the inside. Therefore, the foundation fill pad (see Section 5.5) has crown dimensions of 50.2 m x 28.4 m which allows for a 0.5 m shoulder beyond the 0.3 m outside edge of the steel containment berm foot (Dwg. PL-04 and PL-05).

The geomembrane will be Enviro Liner 6030. This is a 30 mil (0.75 mm) thick geomembrane specifically designed for use in this kind of application. The entire liner will be pre-fabricated in the factory, such that no field seaming is required. The liner will be attached to the steel containment berm using a specially designed mechanical attachment system and a sealant.

The geomembrane is chemically resistant against diesel fuel; however, it is not chemically resistant against gasoline fuels. SRK understands that the Patch Lake secondary containment facility would only be used to store diesel fuel. If, for any reason gasoline fuel storage is required then any fuel spill would have to be completely pumped from the secondary containment facility within 24 hours to ensure the liner integrity. Should MHBL choose to designate one tank to possibly contain gasoline fuel in future, SRK recommends that that tank be underlain by a tertiary containment liner manufactured from HDPE liner, which is resistant to gasoline fuels.

Since exact details of the protective liner material is not available, and given the difficult construction conditions that will be present during the construction of this facility, SRK has specified that the geomembrane be installed between two layers of a heavy duty 16 oz (542 g/m^2) non-woven

geotextile (LP16). This geotextile should be placed on a pre-approved surface with stitched seams with overlap widths of at least 0.3 m. Should stitching not be possible, a minimum overlap of 1 m is required.

The steel containment berm, geomembrane and geotextile should be supplied and installed by Layfield Environmental Systems Ltd, in Edmonton, Alberta. Should the contractor wish to use an alternative supplier, complete details of an equivalent series of products will have to be presented to the Engineer for approval.

5.5 Base Topography

The secondary containment facility will be constructed on an exposed bedrock outcrop immediately west of the Major Drilling Company workshop facility. Based on survey data received from MHBL, the minimum distance between the fuel tank farm and the workshop facility will be 12 m (Dwg. PL-02).

Survey information for this area is limited to 2 m contour interval mapping generated from aerial photography supplied by MHBL. The northernmost portion of the area where the secondary containment facility will be constructed has been surveyed more recently by the MHBL exploration survey team. Both these survey sources have been used in developing the design documented in this memo, and is considered to be sufficiently accurate for the purpose of design. Prior to construction start a detailed manual survey of the area will have to be carried out to allow on site confirmation of the foundation fill pad design elevation of 41.1 m. This survey should be accurate to a value of ±50 mm.

SRK is not aware of survey control points in the construction area that can be used for construction survey control. Therefore, prior to construction start-up adequate survey control would have to be established in the area. All information provided on the drawings are based on the UTM Zone 13 co-ordinate system.

5.6 Foundation and Levelling Fill

The secondary containment facility will be founded in competent bedrock. Ideally the rock foundation could be prepared by means of precision blast since that would create a level surface upon which to construct the secondary containment facility and the blast rock could be used as a construction material. In reality, given the nature of the rock, the blast will require extremely narrow drill spacing, and the resultant surface would be highly irregular. The depth of the shelf that will be cut from will be determined by the volume lowest point for the outcrop as to accommodate the sloping floor of the facility. An onsite survey will be done on the required footprint and identify the lowest point of the cut.

A levelling material layer will be deployed on the undulating blasted surface to provide a smooth graded surface. The levelling material layer will vary in thickness between 0.1 m and 0.7 m depending on the bedrock undulations. The final pad will be completely level and will have crown dimensions of 28.4 m x 50.2 m. The pad shall be within the developed containment footprint.

The levelling fill must be constructed from competent, well graded blasted rock, with a maximum size of 19 mm. Should only larger material be available, that can be used; however, some selective placement may be required to minimize the amount of fill that will be placed. The fill material should ideally be compacted using a smooth drum roller; however, if one is not available, multiple passes using the construction equipment should suffice.

5.7 Liner Bedding and Liner Protective Cover Material

The Enviro Liner will be installed on the graded surface of liner bedding material. This material will be placed directly on top of the levelling fill pad, and will slope towards a central sump as illustrated on Dwg. PL-05.

After the liner has been placed (including the two protective geotextiles), 0.3 m of protective cover material will be placed over the entire liner surface area, mimicking the liner bedding grade. Appropriate care must be taken when placing this material to ensure that the liner is not damaged.

The liner bedding and protective cover material should be a clean well graded sand of quarry crush, with a maximum particle size of less than 19 mm. This material should be compacted using a smooth drum vibratory roller. A walk behind roller would suffice; however, individual lift thickness must be limited to 0.15 m in that case.

5.8 Foundation and Fill Bearing Capacity

Strength testing has not been carried out on the foundation rock, the foundation pad fill, the liner bedding, or the liner protection materials. Based on general guidelines provided in the Canadian Foundation Engineering Manual (CFEM 1985) it is reasonable to assume that the allowable bearing capacity of the foundation rock would be in excess of 600 kPa, and all the fill material bearing capacity would be between 200 and 600 kPa.

Table 2 summarises the total surface ground pressures that will be exerted by each of the largest fuel storage tanks, and fuel transfer vehicles that will be contained in, or access the secondary containment facility. Based on a bearing capacity of 200 kPa, which is the lower limit of the fill foundation material, the factor of safety against bearing capacity failure for the most critical item, which is the 75,000 Envirotank is 1.5. The fill material will not undergo settlement, and as such bearing capacity failure due to shear failure would be the critical design concern. Typically, the minimum factor of safety for permanent structures against shear failure would be 2, which means that to satisfy this criterion, the fill under the 75,000 litre Envirotanks should have a bearing capacity of at least 270.2 kPa, which is entirely conceivable given the nature of the proposed fill.

Table 2. Maximum design surface ground pressures

Component	Ground Pressure (kPa)	Assumptions
Challenger Tractor MT800B	65.5	Fully loaded weight = 22,679 kg; Track surface area = 0.46 m wide x 3.7 m long each (assume smallest track width and 55% of vehicle length for track length).
Nodwell 240	32.1	Fully loaded weight = 26,350 kg; Track surface area = 1.02 m wide x 3.9 m long each (assume 55% of vehicle length for track length).
75,000 litre Envirotank	135.1	Fully loaded weight = 85,312 kg; Skid surface area = 10” (0.2 m) wide x 40 ft (12.2 m) long each.
16,000 litre Bowser	80.1	Fully loaded weight = 20,200 kg (assumed); Skid surface area = 8” (0.2 m) x 10 ft (3.1 m) long each (two sets of two).

5.9 Drainage/Collection Sump

A single drainage/collection sump will be constructed midway along the western edge of the secondary containment facility, 1 m away from the steel containment berm as illustrated on Dwg. PL-06. The sump will collect surface water and fuel spills within the confines of the secondary

containment area from where it can be pumped and managed in accordance with an OMM to be developed by MHBL.

The sump itself will be a timber cage with overall inside dimensions of about 1.2 m x 1.2 m, and 0.5 m deep. The timber cage will be constructed on site using treated 2" x 10" and 4" x 4" dimensional lumber.

5.10 Leak Detection System

The secondary containment facility will not have a dedicated leak detection system installed. Should a leak occur, flow will pass through the foundation pad fill and onto the bedrock foundation. This flow will then continue along the bedrock and emerge as a surface flow that will be observed along the toe of the foundation pad fill.

The most likely areas where these flows will first be observed will be identified after completion of the detailed topographical bedrock survey. MHBL should include visual inspection of these points in the OMM.

5.11 Construction Quantities

Construction material quantities for the Patch Lake secondary containment facility are listed on Dwgs. PL-03, PL-04 and PL-06. Fill volumes are in-place net values according to the lines and grades shown on the drawings, and does not account for bulking, shrinkage or compaction. Similarly surface areas are in-place net surface areas, and where these areas relate to geomembrane (liner) or geotextile installation there is no allowance for material overlap, seaming, etc.

The final earthworks quantities will change depending on the final topographical survey of the bedrock surface and also the maximum material size used for bulk fill. The Contractor should however verify these quantities at the tender stage.

6 Construction

6.1 Quarry Development and/or Fill Material Sourcing

A decision on suitable construction material for the bulk fill, liner bedding and liner protection material will have to be made prior to execution of the contract, preferably at the tender stage. SRK is not responsible for the design of any quarry; however, the contractor will have to demonstrate that the material from a quarry meets the required specifications. Administrative and technical approval for any such quarry development is the responsibility of MHBL.

6.2 Execution

Construction of the secondary containment facility will be carried out in accordance with the lines, grades and specifications indicated on the drawings. The following provides a brief summary of the execution schedule. This schedule assumes that suitable construction fill material has been identified and is available on site.

6.2.1 Site Preparation

1. Prior to construction the site must be completely cleared of snow. Snow must be completely removed from depressions, such that the bedrock surface can be visually inspected.
2. A detailed survey of the bedrock surface must be carried out to an accuracy of ± 50 mm.

6.2.2 Foundation and Levelling Fill Construction

1. Verify the required cut dimension from the existing topography to accommodate the grade and space needed inside the containment footprint.
2. Blast the shelf in the exposed bedrock to specified grade and process the blasted material to specifications. Exact details on levelling fill placement, lift thickness and compaction will be established once details of the material specifications and construction fleet are available.
3. Carry out a detailed survey of the final foundation fill pad surface to an accuracy of ± 25 mm.

6.2.3 Steel Containment Berm Installation

1. Assemble the individual steel containment berm sections.
2. Join all the individual sections leaving out an opening along the centre of the west section where the sump will be constructed. This will allow access for placing the liner bedding material.
3. The steel berm installation can be completed as soon as the access ramps (see later) have been constructed.

6.2.4 Liner Bedding Layer

1. Import the liner bedding material, taking care to create a final grade in accordance with the drawings.
2. Exact details on material placement, lift thickness and compaction will be established once details of the material specifications and construction fleet are available.
3. Carry out a detailed survey of the liner bedding layer to an accuracy of ± 10 mm.

6.2.5 Drainage/Collection Sump Construction

1. Construct the outer and the inner sump cages.
2. Excavate the sump into the foundation base pad.
3. Install the outer sump cage and backfill carefully around the outside edge of the sump cage using hand techniques.
4. Following geomembrane installation (see next section), install the inner sump cage.
5. Carefully backfill around the outside edge of the sump cage using hand techniques.

6.2.6 Geomembrane Installation

1. Lay the bottom geotextile over the liner bedding layer, including the sump.
2. Lay the Enviro Liner over the bottom geotextile layer.
3. Lay the top geotextile over the Enviro Liner.
4. Attach the geotextiles and Enviro Liner to the steel containment berm inside wall.

6.2.7 Protective Liner Cover Layer

1. Import the liner bedding material, taking care to create a final grade in accordance with the drawings.
2. Exact details on material placement, lift thickness and compaction will be established once details of the material specifications and construction fleet are available.
3. Carry out a detailed survey of the liner bedding layer to an accuracy of ± 10 mm.

6.2.8 Access Ramps

1. Construct the foundation fill pad. Exact details on material placement, lift thickness and compaction will be established once details of the material specifications and construction fleet are available.
2. Carry out a detailed survey of the final access ramps to an accuracy of ± 10 mm.

6.3 Quality Assurance and Quality Control

The Contractors responsibilities will be stipulated in the General Conditions of Contract which will be supplied by MHBL. Irrespective of what these Conditions may stipulate, the ultimate QA/QC responsibility will be that of the Design Engineer. This task will be carried out by a designated full-time Engineers representative reporting directly to the Design Engineer. In broad terms the Engineer will be responsible for sign-off and approval of all stages of the construction as indicated on the drawings.

The Contractor will be responsible to supply the Engineer with complete certification documents for all material used in construction, in accordance with Manufacturers specifications.

The Design Memorandum, "**Patch Lake Tank Farm Secondary Containment Facility Design**", has been prepared by SRK Consulting (Canada) Inc.

Maritz Rykaart, P.Eng., Ph.D.
Principal Geotechnical Engineer

7 References

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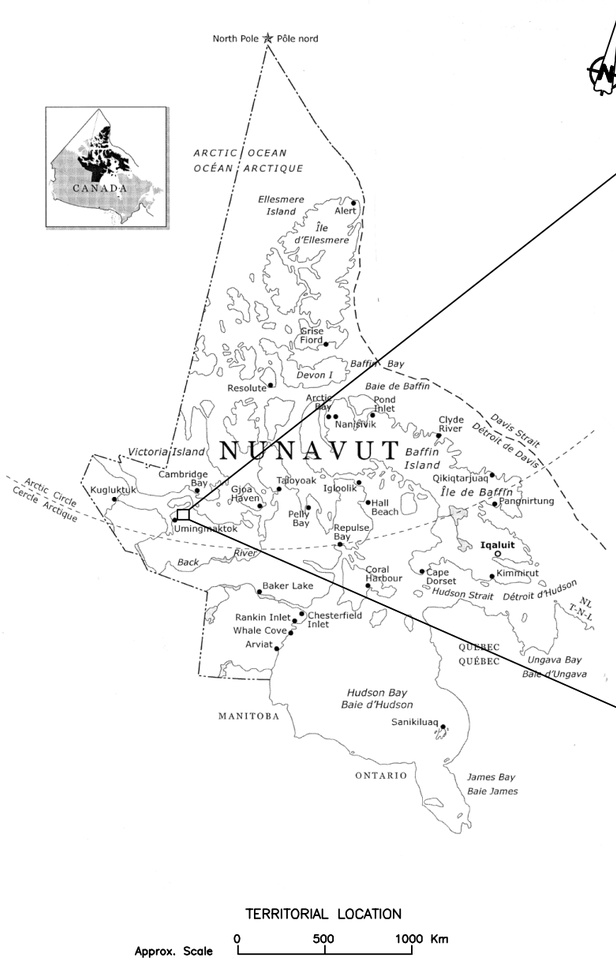

TERRITORIAL LOCATION

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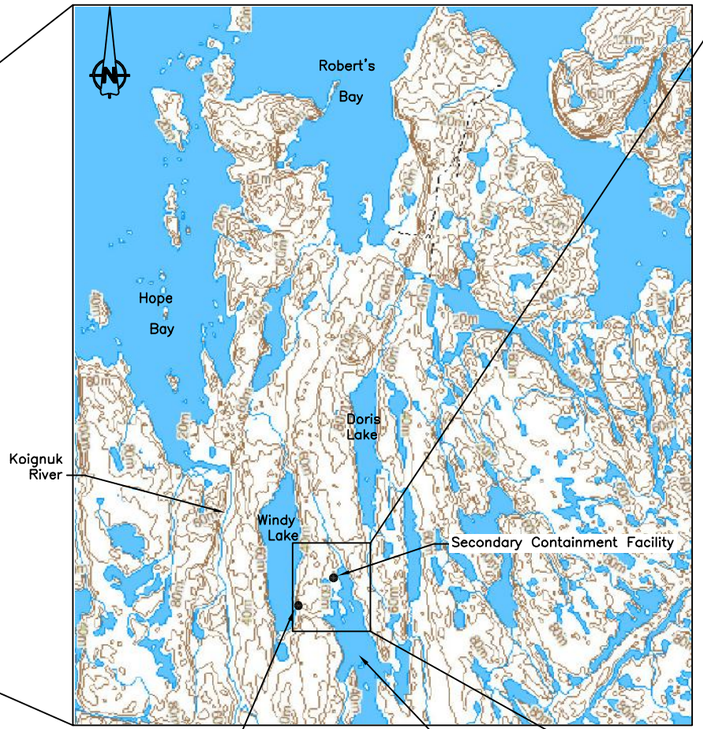

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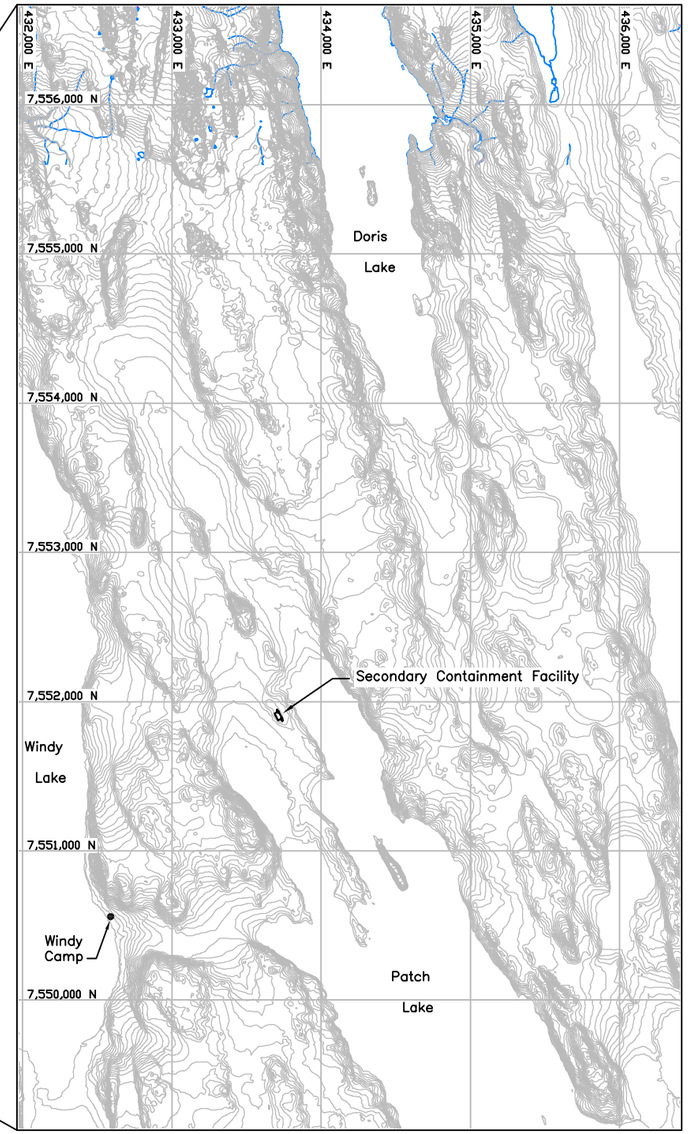


SITE LOCATION

1:20000 0 500 1000 1500 2000 Meters

Drawing Index

Note:

Drawings are scaled appropriately for D–Size construction drawings. Scales may not be correct if these drawings are reproduced and presented in any other size format.

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
B	CONSTRUCTION	AT	EMR	Apr. 2/07
A	TENDER			

REVISIONS

PROFESSIONAL ENGINEERS STAMP

SRK Consulting Engineers and Scientists Vancouver

DESIGN:	DRAWN:	REVIEWED:
EMR	VY	EMR
CHECKED:	APPROVED:	DATE:
EMR	EMR	Apr. 2007

FILE NAME: project_location.dwg

MIRAMAR HOPE BAY LTD.

PATCH LAKE SECONDARY CONTAINMENT FACILITY

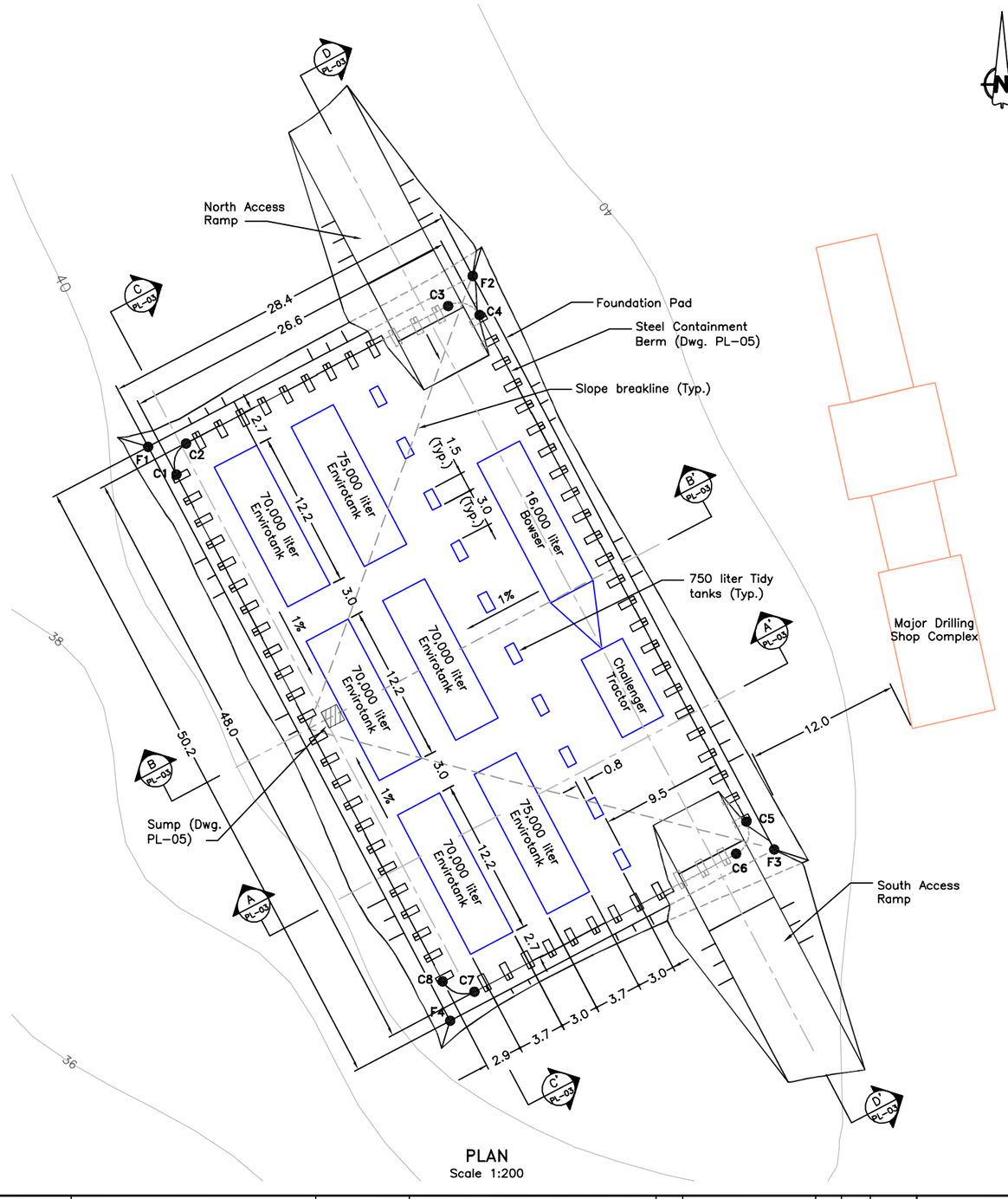
SRK JOB NO.: 1CM014.010

Patch Lake Tank Farm

DRAWING TITLE: Location and Drawing Index

DRAWING NO. PL-01 | SHEET 1 of 6 | REVISION NO. B

Dwg Ref: J:\01_SITES\Doris North\1CM014.010_Patch Lake Tank Farm\Acad\project_location.dwg



PLAN
Scale 1:200

STAKE OUT TABLE			
Foundation Pad			
Points	Easting	Northing	Elevation
F1	433689.0	7551919.4	41.10
F2	433714.1	7551932.6	41.10
F3	433737.4	7551888.2	41.10
F4	433712.4	7551874.9	41.10
Containment Berm			
C-1	433691.2	7551917.2	41.10
C-2	433691.9	7551919.6	41.10
C-3	433712.2	7551930.3	41.10
C-4	433714.6	7551929.6	41.10
C-5	433735.3	7551890.4	41.10
C-6	433734.5	7551887.9	41.10
C-7	433714.2	7551877.2	41.10
C-8	433711.8	7551878.0	41.10

Notes:

1. Drawings are scaled appropriately for D-Size construction drawings. Scales may not be correct if these drawings are reproduced and presented in any other size format.
2. Topographic data for the terrain model was provided by Miramar Hope Bay Limited, and is based on 2001 Aerial Photography and a manual survey along the northern edge of the works. Contour intervals are 2 m.
3. The co-ordinate system is UTM NAD 83, Zone 13.
4. All dimensions are in metric units, unless specifically mentioned.
5. These drawings show the secondary containment facility being constructed on top of the bedrock. In reality a 3m deep shelf will be drilled and blasted beneath the indicated footprint, and the secondary containment facility will be constructed on that blasted surface, in accordance with the presented design. The appropraite stake-out table corrections will be made in the field after the blasting has been completed.
6. All works are to be set out prior to the start of any construction, according to the Stakeout table provided. Should there be any difference between the co-ordinates provided and the field location, the Engineer is to be informed immediately.
7. The design is based on the contour information shown on this drawing. It is however the Contractors responsibility to confirm that the contours are a fair reflection of the ground levels in the vicinity of the works, and to advise the Engineer of any differences.
8. Subsurface soil conditions, including bedrock coverage has been based solely on visual interpretation. The contractor must clear the construction area of all snow and ice prior to start of construction, to allow the Engineer to conduct a final inspection.
9. The Contractor shall notify the Engineer at least 24 hrs in advance if an inspection is required for acceptance of the works at any stage.
10. The Contractor shall inform the Engineer in advance of any specialist contractors and/or technicians that will be sub-contracted to carry out specialized works. The Engineer will approve all such sub-contractors.

1:200 0 5 10 15 20 Meters

DRAWING NO.	DRAWING TITLE
PL-03	Sections, Details and Material Specifications
PL-05	Sump Layout and Details

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
B	CONSTRUCTION	AT	EMR	Apr. 2/07
A	TENDER	–	–	–

REVISIONS

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DESIGN:	DRAWN:	REVIEWED:
EMR	VY	EMR
CHECKED:	APPROVED:	DATE:
EMR	EMR	Apr. 2007

FILE NAME: TankfarmPlanV2.dwg

MIRAMAR HOPE BAY LTD.

PATCH LAKE SECONDARY CONTAINMENT FACILITY

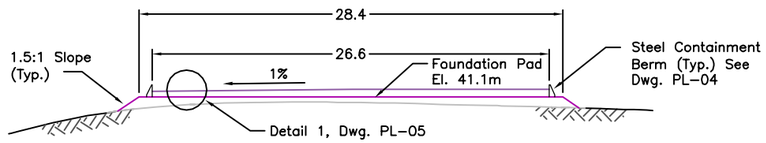
SRK JOB NO.: 1CM014.010

Patch Lake Tank Farm

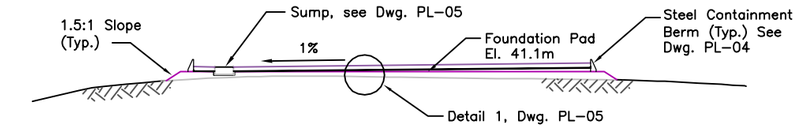
DRAWING TITLE: General Arrangement

DRAWING NO.	SHEET	REVISION NO.
PL-02	2 of 6	B

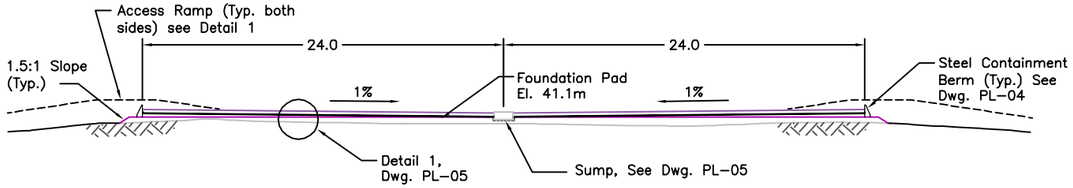
Dwg Ref: J:\01_SITES\Doris North\1CM014.010_Patch Lake Tank Farm\Acad\TankfarmPlanV2.DWG



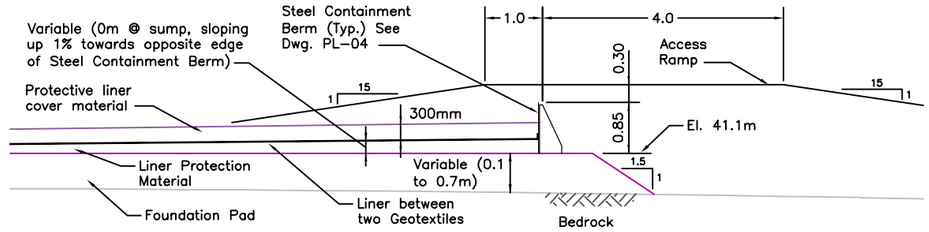
SECTION A–A' (Dwg. PL-02)
Scale 1:200



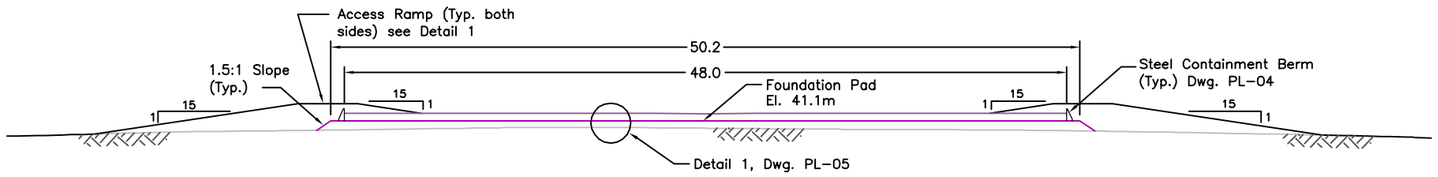
SECTION B–B' (Dwg. PL-02)
Scale 1:200



SECTION C–C' (Dwg. PL-02)
Scale 1:200



DETAIL 1
Scale 1:50



SECTION D–D' (Dwg. PL-02)
Scale 1:200

EARTHWORKS AND LINER QUANTITIES AND SPECIFICATIONS

Description	Material Specification	Unit	Quantity
Foundation Pad	Competant, well graded quarry rock, with a maximum size of 100 mm. Should only larger material be available, that can be used; however, some selective placement may be required to minimze the amount of fill that will be placed. Fill should be compacted using a smooth drum roller; however, if one is not available, multiple passes using the construction equipment should suffice.	Cum. Meter	725
Access Ramps	Competant, well graded quarry rock, with a maximum size of 100 mm. Should only larger material be available, that can be used; however, some selective placement may be required to minimze the amount of fill that will be placed. Fill should be compacted using a smooth drum roller; however, if one is not available, multiple passes using the construction equipment should suffice.	Cum. Meter	600
Liner Bedding Material	Clean well graded sand or quarry crush, with a maximum particle size of less than 19 mm. Compacted using a smooth drum vibratory roller. A walk behind roller would suffice; however, individual lift thickness must be limited to 0.15 m in that case.	Cum. Meter	200
Protective Liner Cover Material	Clean well graded sand or quarry crush, with a maximum particle size of less than 19 mm. Compacted using a smooth drum vibratory roller. A walk behind roller would suffice; however, individual lift thickness must be limited to 0.15 m in that case.	Cum. Meter	412
Geomembrane	Prefabricated Enviro Liner 6030	Sq. Meter	1425
Geotextile	16 oz Non-Woven Geotextile	Sq. Meter	2850

Notes:

1. Drawings are scaled appropriately for D–Size construction drawings. Scales may not be correct if these drawings are reproduced and presented in any other size format.
2. Soil classification for these works are based on the Unified Soil Classification System (USCS).
3. The blasted floor should carry a 1% grade to the location of the sump. The Liner Protecting Material should be a constant thickness as directed by the Engineer.
4. Construction quantities are preliminary and will be revised once the blasting has been competed.
5. Prior to placement of any construction material, the receiving surface must be free of snow and ice.
6. The Engineer must approve all surfaces prior to placement of any construction material.
7. Snow and ice on stockpiled construction material must be removed prior to loading for construction use.
8. In areas where staged construction is required, each subsequent lift must be adequately keyed in to the preceding lift. The Engineer will approve such staged construction.
9. Compaction will be a field specification, based on trial compaction tests to be carried out by the Contractor to the satisfaction of the Engineer.
10. The Contractor will be responsible to keep the secondary containment area dry and free of snow and ice during the entire construction period.
11. The Contractor is to take due care so as not to damage the liner during construction. Special temporary liner protection measures must be taken in the event that construction equipment must pass over a liner before the final protective cover has been placed. The Engineer is to be notified of these occurrences.

1:200 0 5 10 15 20 Meters

1:50 0 1 2 3 4 5 Meters

DRAWING NO.	DRAWING TITLE
PL–02	General Arrangement
PL–04	Steel Containment Berm – Layout, Details and Material List
PL–05	Sump Layout and Details

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
B	CONSTRUCTION	AT	EMR	Apr. 2/07
A	TENDER	–	–	–

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DESIGN:	DRAWN:	REVIEWED:
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CHECKED:	APPROVED:	DATE:
EMR	EMR	Apr. 2007

FILE NAME: TankfarmPlanV2.dwg

MIRAMAR HOPE BAY LTD.

PATCH LAKE SECONDARY CONTAINMENT FACILITY

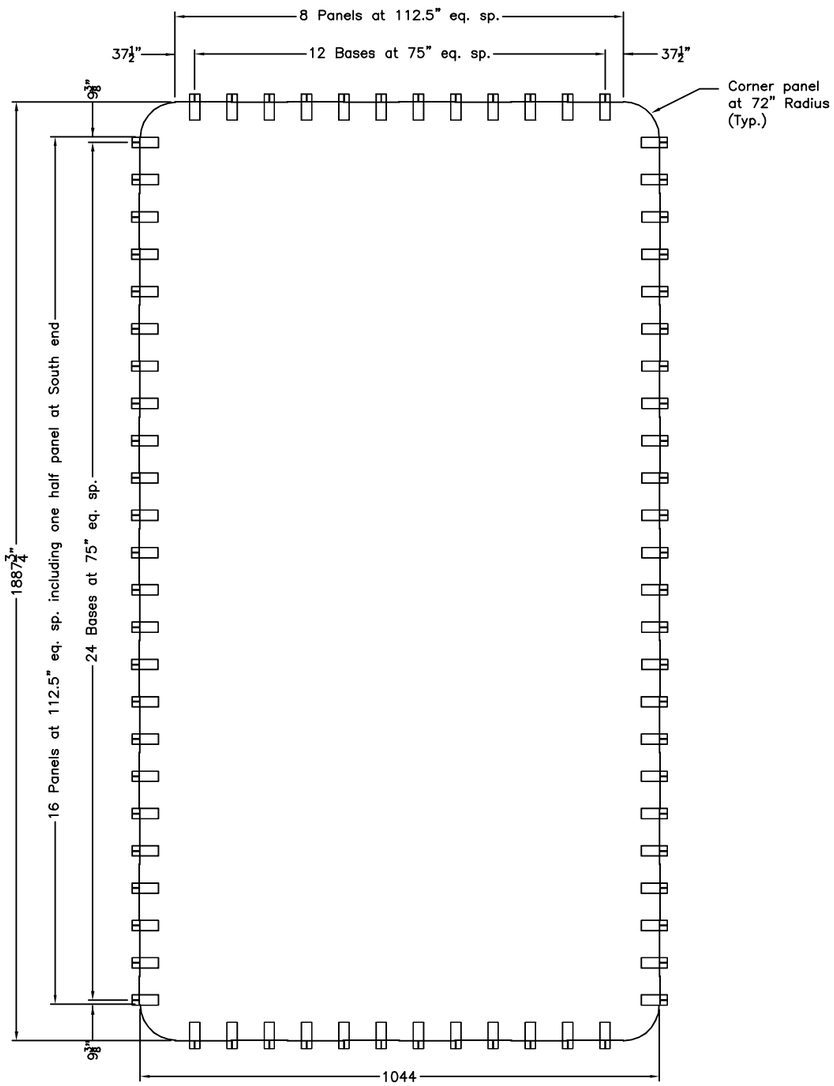
SRK JOB NO.: 1CM014.010

Patch Lake Tank Farm

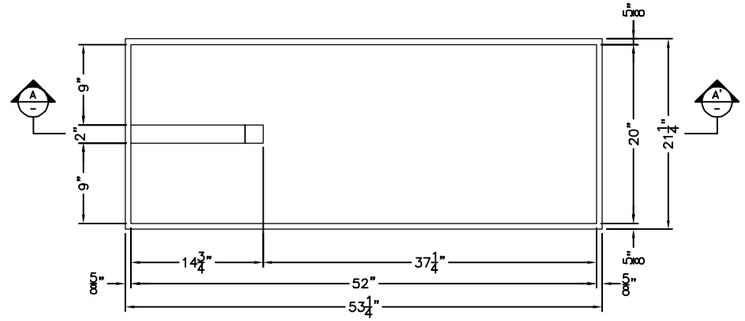
DRAWING TITLE:

Sections, Details and Material Specifications

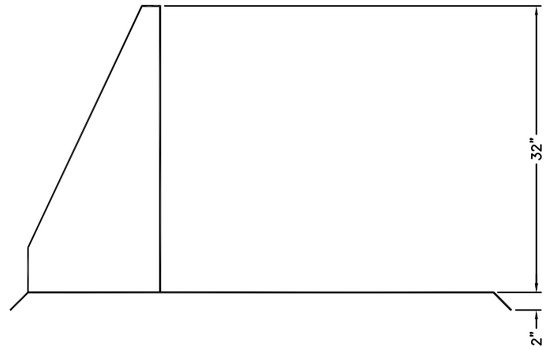
DRAWING NO.	SHEET	REVISION NO.
PL-03	3 of 6	B



STEEL CONTAINMENT BERM AND BASE PLATE LAYOUT
Scale 2"=1'-0"



BASE PLATE – PLAN
Scale 36"=1'-0"



BASE PLATE – SECTION A-A'
Scale 36"=1'-0"

Part Number	Description	Quantity
CBRACE2233	C-Ring Brace for 22" & 33" Panels	72
CPAD3344	C-Ring Pad for 33" & 44" Panels	72
CW3315F	33" C-Ring Sheet, 15 Gauge Full Panel	48
CW3315H, C10511	33" C-Ring Sheet, 15 Gauge Half Panel	2
CC3315	33" C-Ring 15 Gauge Corner Panel	4
C10230	Liner Clamp, 10' Base Mount	64
C10304	1/4" x 1-1/2" Teks Screw c/w Boot (Pkg of 100)	15
235680	3/8" x 1.0" Bolts Package (Pkg 100)	13
235686	3/8" Nuts (Pkg 100)	13
170810	Butyl Tape (30' Roll)	26

Notes:

1. Drawings are scaled appropriately for D–Size construction drawings. Scales may not be correct if these drawings are reproduced and presented in any other size format.
2. This drawing is in imperial units.
3. The Steel Containment berm is a prefabricated modular system manufactured by WESTEEL Limited, Winnipeg, Manitoba, Canada. The product is a 33" high rectangular Zero Ground Disturbance C–Ring system.
4. This drawing is intended to illustrate the Steel Containment berm layout to assist the Contractor in understanding the facility layout. Complete details of the system can be found in the suppliers Installation and Assembly Manual, which must be consulted for actual installation information pertaining to the system.
5. The Steel Containment berm must be installed by a qualified and approved WESTEEL Contractor.
6. The Contractor must confirm with the manufacturer that the Steel Containment berm materials list are in fact appropriate to execute the intended design.

DRAWING NO.	DRAWING TITLE	NO.	ISSUE PURPOSE	AUTH. BY	DATE	REV.	DESCRIPTION	CHK'D	APP'D	DATE
						B	CONSTRUCTION	AT	EMR	Apr. 2/07
						A	TENDER	–	–	–

REFERENCE DRAWINGS | ISSUE AUTHORIZATION | REVISIONS

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DESIGN:	DRAWN:	REVIEWED:
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EMR	EMR	Apr. 2007

FILE NAME: Baseplate details.dwg

MIRAMAR HOPE BAY LTD.

PATCH LAKE SECONDARY CONTAINMENT FACILITY

SRK JOB NO.: 1CM014.010

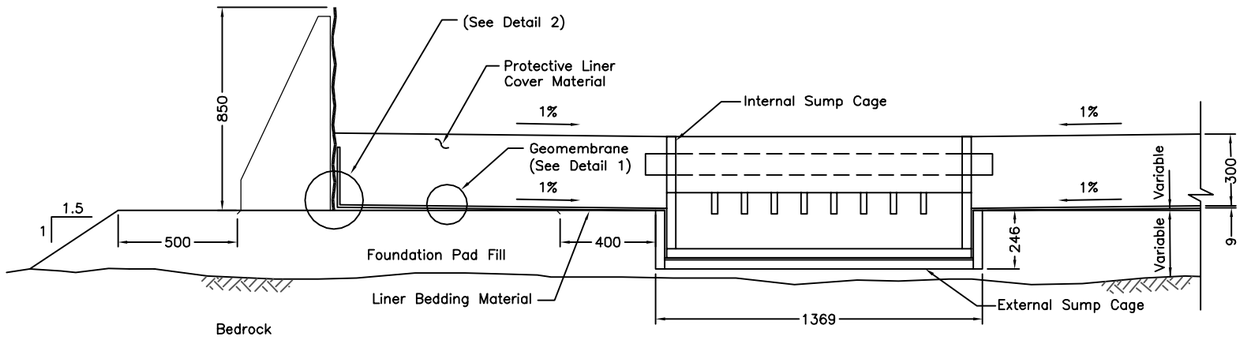
Patch Lake Tank Farm

DRAWING TITLE:
Steel Containment Berm Layout, Details and Material List

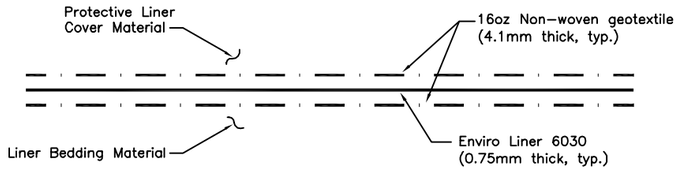
DRAWING NO.	SHEET	REVISION NO.
PL-04	4 of 6	B

Drg Ref: J:\01_SITES\Doris North\1CM014.010_Patch Lake Tank Farm\Acad\Baseplate details.dwg

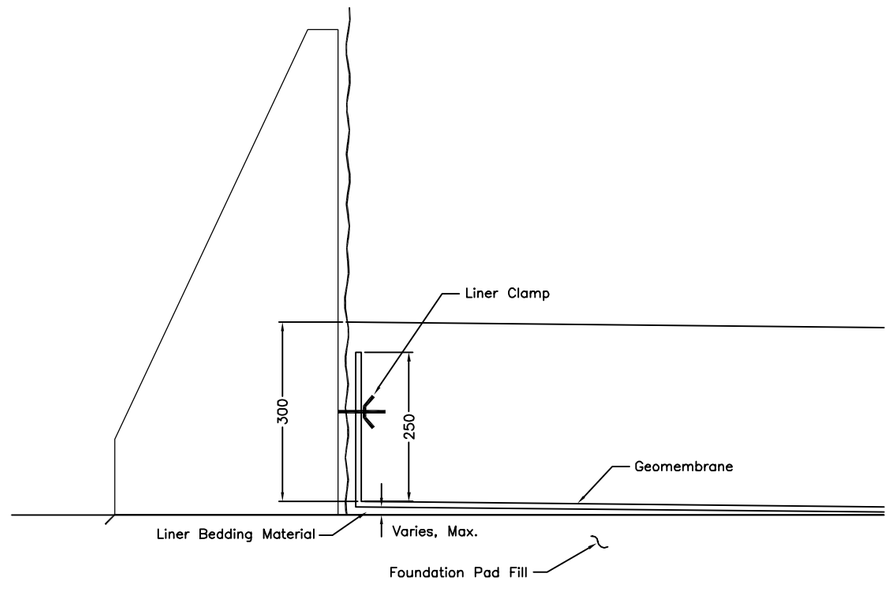
TYPICAL SUMP INSTALLATION – DETAIL PLAN
Scale 1:12500



TYPICAL SUMP INSTALLATION – DETAIL SECTION A–A'
Scale 1:12500



DETAIL 1
NTS



DETAIL 2
Scale 1:5000

Notes:

1. Drawings are scaled appropriately for D–Size construction drawings. Scales may not be correct if these drawings are reproduced and presented in any other size format.
2. The sump shall be blasted to specified depth as shown below the sloping grade of 1% floor.
3. The Contractor is to take due care so as not to damage the liner during construction. Special temporary liner protection measures must be taken in the event that construction equipment must pass over a liner before the final protective cover has been placed. The Engineer is to be notified of these occurrences.

1:12500 0 250 500 750 1000 Millimeters

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE
–	–		

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
B	CONSTRUCTION	AT	EMR	Apr. 2/07
A	TENDER			

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CHECKED:	APPROVED:	DATE:
EMR	EMR	Apr. 2007

FILE NAME: sections and details.dwg

MIRAMAR HOPE BAY LTD.

PATCH LAKE SECONDARY CONTAIMENT FACILITY

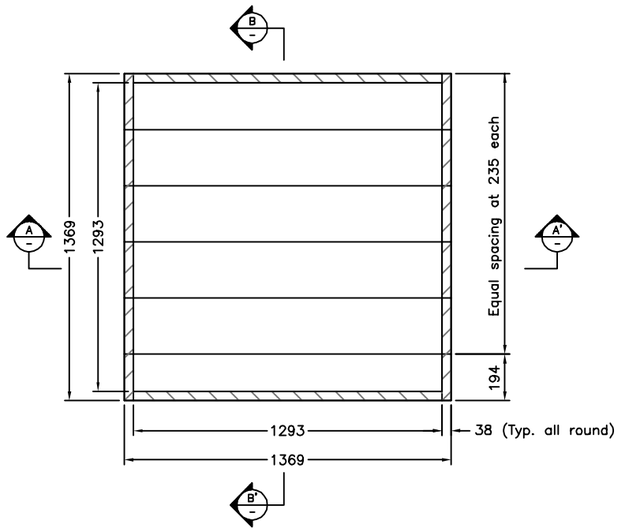
SRK JOB NO.: 1CM014.010

Patch Lake Tank Farm

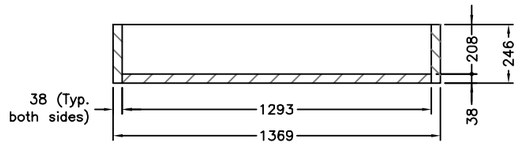
DRAWING TITLE:
Sump Layout and Details

DRAWING NO.	SHEET	REVISION NO.
PL-05	5 of 6	B

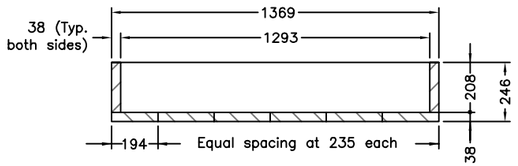
Dwg Ref: J:\GL_SITES\Doris North\1CM014.010_Patch Lake Tank Farm\Acad\sections and details.dwg



EXTERNAL SUMP CAGE – PLAN LAYOUT
Scale 1:12500

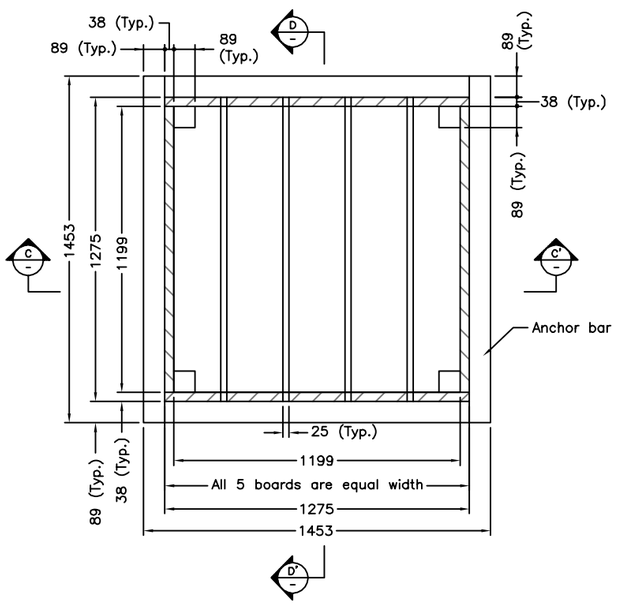


EXTERNAL SUMP CAGE – SECTION A–A'
Scale 1:12500

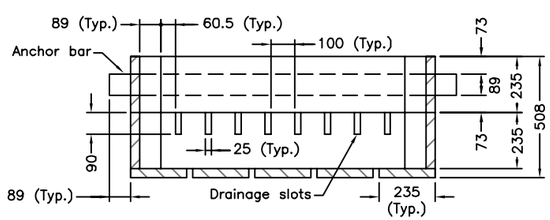


EXTERNAL SUMP CAGE – SECTION B–B'
Scale 1:12500

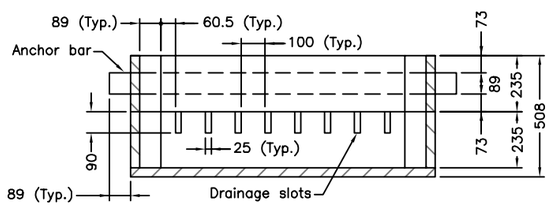
Description	Lumber Type	Lumber Dimensions	Length (mm)	Width (mm)	Quantity
External sump floor boards	2 × 10	1½" × 9¼" (38×235 mm)	1369	235	5
External sump floor boards	2 × 10	1½" × 9¼" (38×235 mm)	1369	194	1
External sump side walls	2 × 10	1½" × 9¼" (38×235 mm)	1369	208	2
External sump side walls	2 × 10	1½" × 9¼" (38×235 mm)	1293	208	2
External sump wood screws	3"	#8 gauge, 3" ACQ compliant coated			46
Internal sump floor boards	2 × 10	1½" × 9¼" (38×235 mm)	1275	235	5
Internal sump side walls	2 × 10	1½" × 9¼" (38×235 mm)	1199	235	4
Internal sump side walls	2 × 10	1½" × 9¼" (38×235 mm)	1275	235	4
Internal sump corner braces	4 × 4	3½" × 3½" (89×89 mm)	470		4
Internal sump anchor bar	4 × 4	3½" × 3½" (89×89 mm)	1453		2
Internal sump anchor bar	4 × 4	3½" × 3½" (89×89 mm)	1275		2
Internal sump wood screws	3"	#8 gauge, 3" ACQ compliant coated			128



INTERNAL SUMP CAGE – PLAN LAYOUT
Scale 1:12500



INTERNAL SUMP – SECTION C–C'
Scale 1:12500



INTERNAL SUMP – SECTION D–D'
Scale 1:12500

Notes:

1. Drawings are scaled appropriately for D–Size construction drawings. Scales may not be correct if these drawings are reproduced and presented in any other size format.
2. Sump cage lumber must be standard pressure treated dimensional lumber.
3. The sump cage dimensions used in the Drawings are based on the actual standard dimensions of dimensional lumber, as indicated in the table of quantities. Should the lumber dimensions deviate from these values, the Engineer is to be informed immediately.
4. The sump cages must be assembled using wood screws compatible with the wood treatment method. All screws shall have flat heads and must be completely countersunk. To prevent wood splitting all screws must have a pilot hole drilled.
5. The Contractor is free to determine his own screw spacing; however, the Engineer will confirm suitability.
6. The Contractor must satisfy himself that the materials list is adequate to execute the intended design.

1:12500 0 250 500 750 1000 Millimeters

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE
–	–		

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
B	CONSTRUCTION	AT	EMR	Apr. 2/07
A	TENDER			

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EMR	EMR	Apr. 2007

FILE NAME: sections and details.dwg

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PATCH LAKE SECONDARY CONTAIMENT FACILITY

SRK JOB NO.: 1CM014.010

Patch Lake Tank Farm

DRAWING TITLE:

Sump Details

DRAWING NO.	SHEET	REVISION NO.
PL-06	6 of 6	B

Appendix B
Blast Design – Internal SRK Memos and Drawings

TO: Maritz Rykaart

FROM: Dan Hewitt

DATE: Mar. 20/07

RE: Hope Bay blast

The attached design is to shave 2.5 m off a granite outcrop over a 30 m × 80 m area. Equal hole length was assumed throughout where in practice hole length would depend on topography. The first pass design called for a 33 mm hole which has some disadvantages. A 51 mm (2") hole was assumed to carry through with the design. The results are summarized below:

- drilling: 1027 holes, 3.05 m each w/sub-grade
  3142 m total drilling (1.3 m × 1.8 m pattern)
- rock generated: 6000 m^3 (7850 yd^3)
- amount of explosive: 4460 kg.
  (assumes ANFO only)

Other considerations are:

- access and removal
- survey control
- scheduling
- cost

This preliminary design is intended for use in comparing logistical and cost considerations. Further design would look at fragmentation control, sequencing, hole layout and the possibility of mixing explosives to reduce cost and/or improve fragmentation. Hole diameter would be increased to 64 mm (2½") as ANFO generally does not perform well in smaller diameter, gravity loaded holes.

Blasting accessories - detonators, delays, trunk lines etc., - should be included in the cost estimate.

Mar. 20/09.

Hi Marity,

re: Hope Bay blast

We were talking about smaller diameter holes to achieve a more even finished elevation. There is also a limit of 2 m to 3 m for the depth of blast. The guideline for minimum length of hole for a specific hole diameter determines (~~sets~~) the maximum hole diameter that should be used.

$$L = 25.4 D_H, \text{ or } D_H = \frac{L}{25.4}$$

where L = length of hole in mm

D_H = max. hole diameter in mm

L	D_H (max.)
1.5 m	59 mm (2 1/4")
2.0 m	79 mm (3")
2.5 m	98 mm (3 3/4")
3.0 m.	118 mm (4 1/2")

The hole diameter is used to determine the burden, the distance from a row of holes to the nearest free face.

$$B = 3.15 D_e \sqrt[3]{\frac{SG_e}{SG_r}} \quad \text{(Konya formula)}$$

where B = burden in feet
D_e = diameter of explosive in inches
SG_e = specific gravity of explosive
SG_r = specific gravity of rock

(imperial formula used as metric is suspect.)

Assume the holes will be gravity filled with ANFO, then $D_e = D_H$ as the explosive will completely fill the hole. SG_e of ANFO for gravity loading (as opposed to pneumatic) is ~0.84. SG_r for granite can be assumed to be 2.7 until a truer value is available. Then the table of burdens for the maximum hole diameters is:

D_H (max.)	burden (metre)	
59 mm	1.5	(very close to hole length)
79 mm	2.0	
98 mm	2.5	
118 mm	3.0	

The ideal L : B ratio is 3, where the ratio with the information so far is 1.

So, the reverse calculations can be performed to determine a smaller diameter hole that will yield the ~~(device)~~ desired ratio of 3.

The results are summarized in the following table:

hole length meter	burden B = L/3 meter	calculated optimum D_H, hole diameter mm	inch
1.5	0.5	20	3/4"
2.0	0.7	26	1"
2.5	0.8	33	1 1/4"
3.0	1.0	39	1 1/2"

These hole sizes are too small to be practical. Inefficiencies would result from too many drill setups, more likelihood of the blast going wrong and complications with timing or sequencing.

As a first pass at a more practical design a 50 mm (2") hole will be assumed.

The ideal L:3 of 3 will not be achieved but other advantages will be gained.

The calculated burden for a 51 mm hole is 1.30 m; the corresponding L:B (length to burden) ratio is 1.9 for a 2.5 m deep hole. $\left(\frac{L}{B} = \frac{2.5\text{ m}}{1.3\text{ m}} = 1.9\right)$
This is about 2/3 the optimum.

The remaining calculations are for hole spacing, depth of sub-drilling and length of stemming.

- Hole spacing: $S = \sqrt{BL}$

$= \sqrt{1.30 \times 2.5} = \underline{1.80\text{ m}}$

- Sub-drilling is generally 0.3 x B to 0.5 x B depending on the type of rock. For granite, the higher end of the range is appropriate:

use 0.4 x B as a minimum (rounded up to nearest .05 m)

$= 0.4 \times 1.30\text{ m} = \underline{0.55\text{m}}$.

- Stemming is generally $0.7 \times B = 0.7 \times 1.30 = \underline{0.9\text{ m}}$

The total length per hole is 2.5 m + 0.55 sub-drilled

$= \underline{3.05\text{ m}}$

and the loaded length is 3.05 - 0.9 stemmed

$= \underline{2.15\text{ m}}$

Total number of holes for a 30m × 80m area would be $\frac{30 \times 80}{\text{spacing} \times \text{burden}} = \frac{30 \times 80}{1.80 \times 1.30} = \frac{2400}{2.34}$

= 1024 blast holes.

Extra holes would be required for the cut, so estimate 1030 holes.

Total drilling would be

1030 (length + sub-drilling)

= 1030 (2.5 m + 0.55m) = 3142 m.

If only ANFO were used, the amount of explosive required would be total loaded length of hole × loading density.

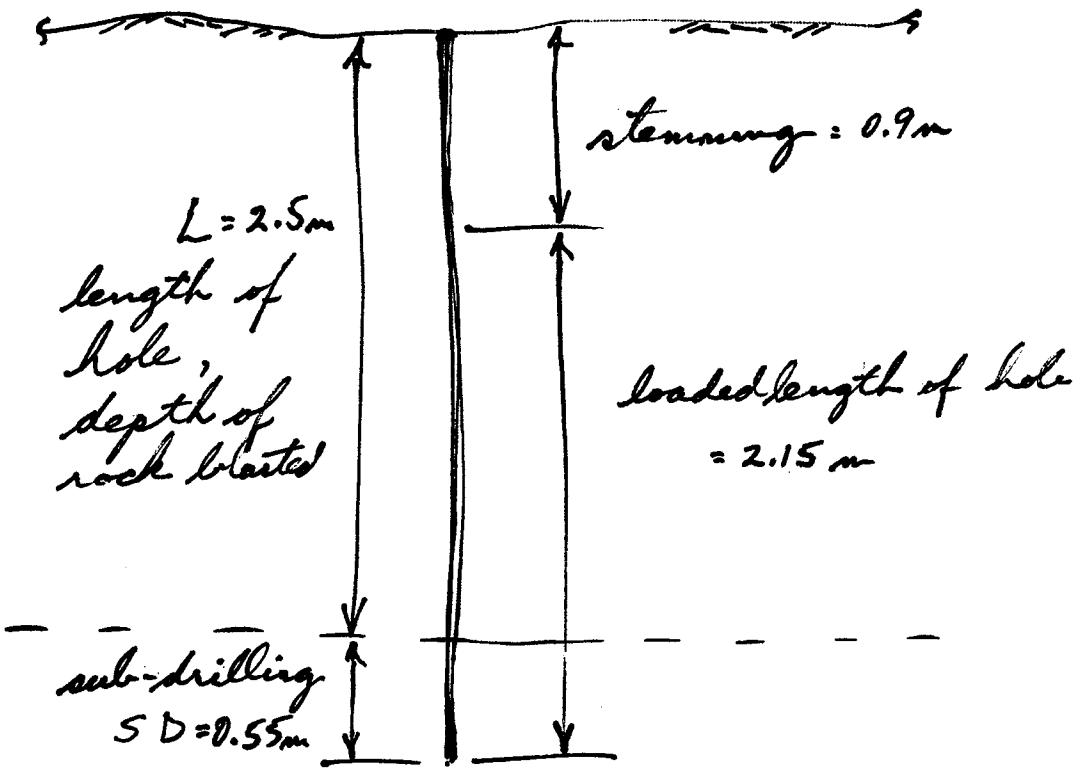
> Hole length = (1030 holes - 3 unloaded) (3.05m - 0.9m stemming)

= 1027 × 2.15m = 2208m loaded.

> loading density for gravity loaded ANFO in a (2") 51 mm hole is 2.02 kg/m.

Total explosive = 2208m × 2.02 kg/m = 4460 kg.

Allowances would be required for re-drilling and wastage of explosive or extra explosive used. Measurements are indicated on the next page.



drilled length = 3.05m

SECTION THROUGH HOLE

The sequencing of the blast would determine where the broken rock would be piled.

Options are: - along the centre of the area
- along one side
- towards one end.

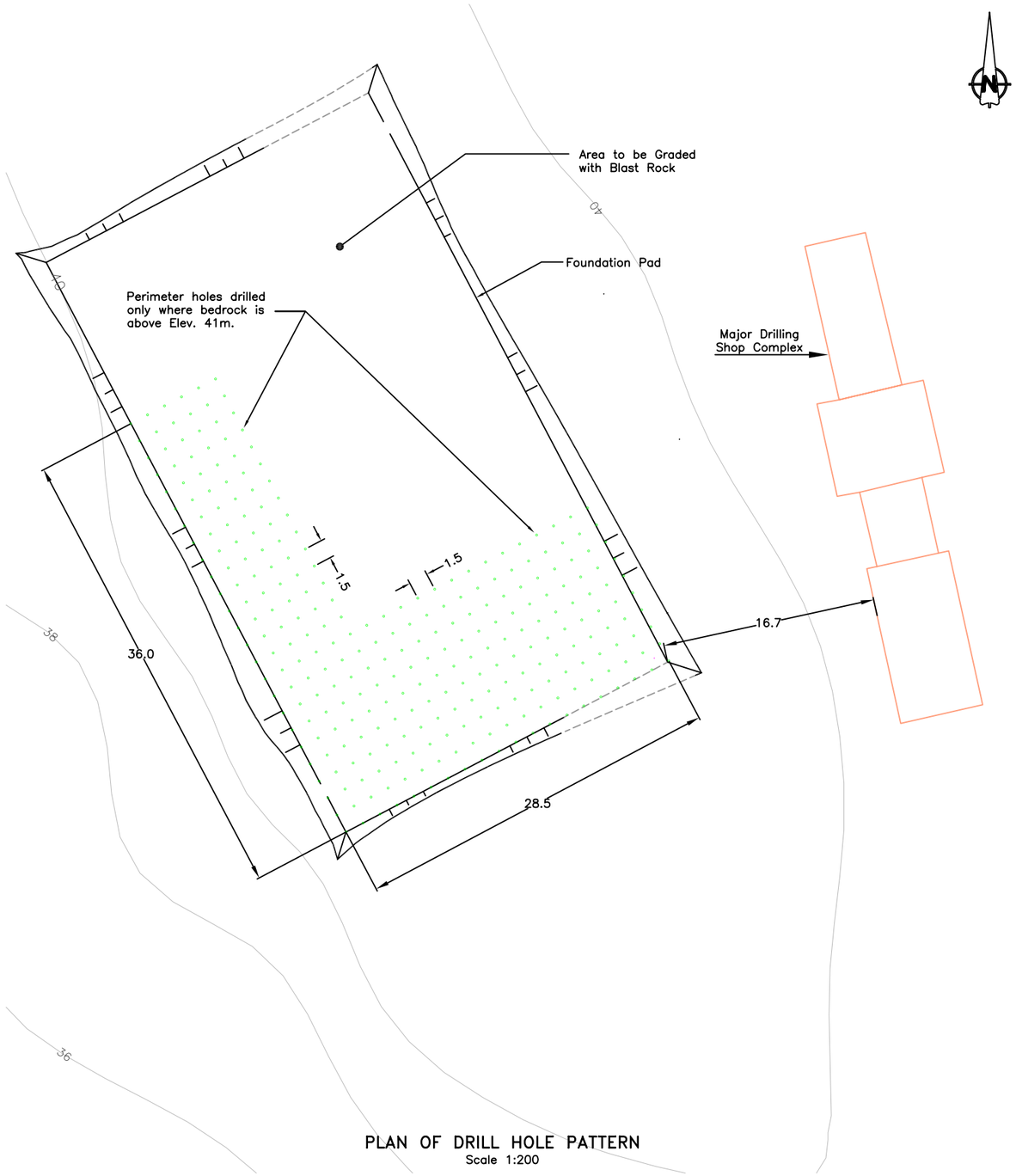
Once the access location for removal is decided, the best place for the broken rock will be apparent.

Schedule would depend on drilling rate. The blasting can start once enough holes have been drilled for a decent sized blast. It should be (if) ensured that enough rock can be provided by subsequent blasts to avoid delays in removal.

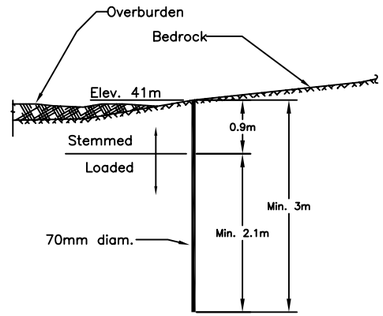
Starting with a smaller blast would also allow for assessment and revision of the blast design.

The calculated volume of rock is

$2.5m \times 30m \times 80m = 6000 m^3$ ($7850 yd^3$).



PLAN OF DRILL HOLE PATTERN
Scale 1:200



TYPICAL DRILL HOLE SECTION
N.T.S.

Notes:

1. Drawings are scaled appropriately for D–Size construction drawings. Scales may not be correct if these drawings are reproduced and presented in any other size format.
2. Topographic data for the terrain model was provided by Miramar Hope Bay Limited, and is based on 2001 Aerial Photography and a manual survey along the northern edge of the works. Contour intervals are 2 m.
3. The co–ordinate system is UTM NAD 83, Zone 13.
4. All dimensions are in metric units, unless specifically mentioned.
5. All drill holes are to be laid out prior to the start of any drilling, according to the Stakeout table in Plan 2.
6. The design is based on the contour information shown on this drawing. It is however the Contractors responsibility to confirm that the contours are a fair reflection of the ground levels in the vicinity of the works, and to advise the Engineer of any differences.
7. Subsurface soil conditions, including bedrock coverage has been based solely on visual interpretation. The contractor must clear the construction area of all snow, ice and stored materials prior to start of drilling to allow the Engineer to conduct a final inspection.
8. The contractor shall provide blasting procedures specific to the site. The procedures shall conform with Mine Health and Safety Regulations and be approved by the Engineer prior to handling any explosives.
9. The contractor shall provide all signage and warning devices as required for blasting.
10. Anyone working in the area shall be notified that blasting activity will be taking place and be made aware of the applicable precautions and procedures.
11. The Contractor shall notify the Engineer at least 24 hrs in advance if an inspection is required for acceptance of the works at any stage.
12. The Contractor shall inform the Engineer in advance of any specialist contractors and/or technicians that will be sub–contracted to carry out specialized works. The Engineer will approve all such sub–contractors.
13. No drilling is required in bedrock below Elevation 41m. Inside perimeter holes are to confirm bedrock is above Elevation 41m before continuing drilling.
14. All holes are to be drilled 70mm diameter on a 1.5m x 1.5m square grid to a depth of Elevation 39m. Length of hole will vary according to surface rock topography with the shortest hole being 3 metres.
15. Holes are to be gravity loaded with ANFO. Handidets or equivalent short period caps are to be used.
16. Holes are not to be loaded closer than 0.9m to the collar and stemmed with drill cuttings or similar available material.
17. Individual blasts are to be limited to 10 to 12 holes. No more than 3 holes shall be on the same delay.

1:200 0 5 10 15 20 Meters

PL–03	Sections, Details and Material Specifications							
DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
				A	TENDER	–	–	–
REFERENCE DRAWINGS				REVISIONS				

PROFESSIONAL ENGINEERS STAMP

SRK Consulting Engineers and Scientists Vancouver

DESIGN:	DRAWN:	REVIEWED:
DH	DH	___
CHECKED:	APPROVED:	DATE:
___	___	Jan. 2007

FILE NAME: blast.dwg

J:\01_SITES\Doris North\Shared\01_ACAD_Drawings\ARO-logo.jpg

PATCH LAKE SECONDARY CONTAINMENT FACILITY

SRK JOB NO.: 1CM014.010

Patch Lake Tank Farm

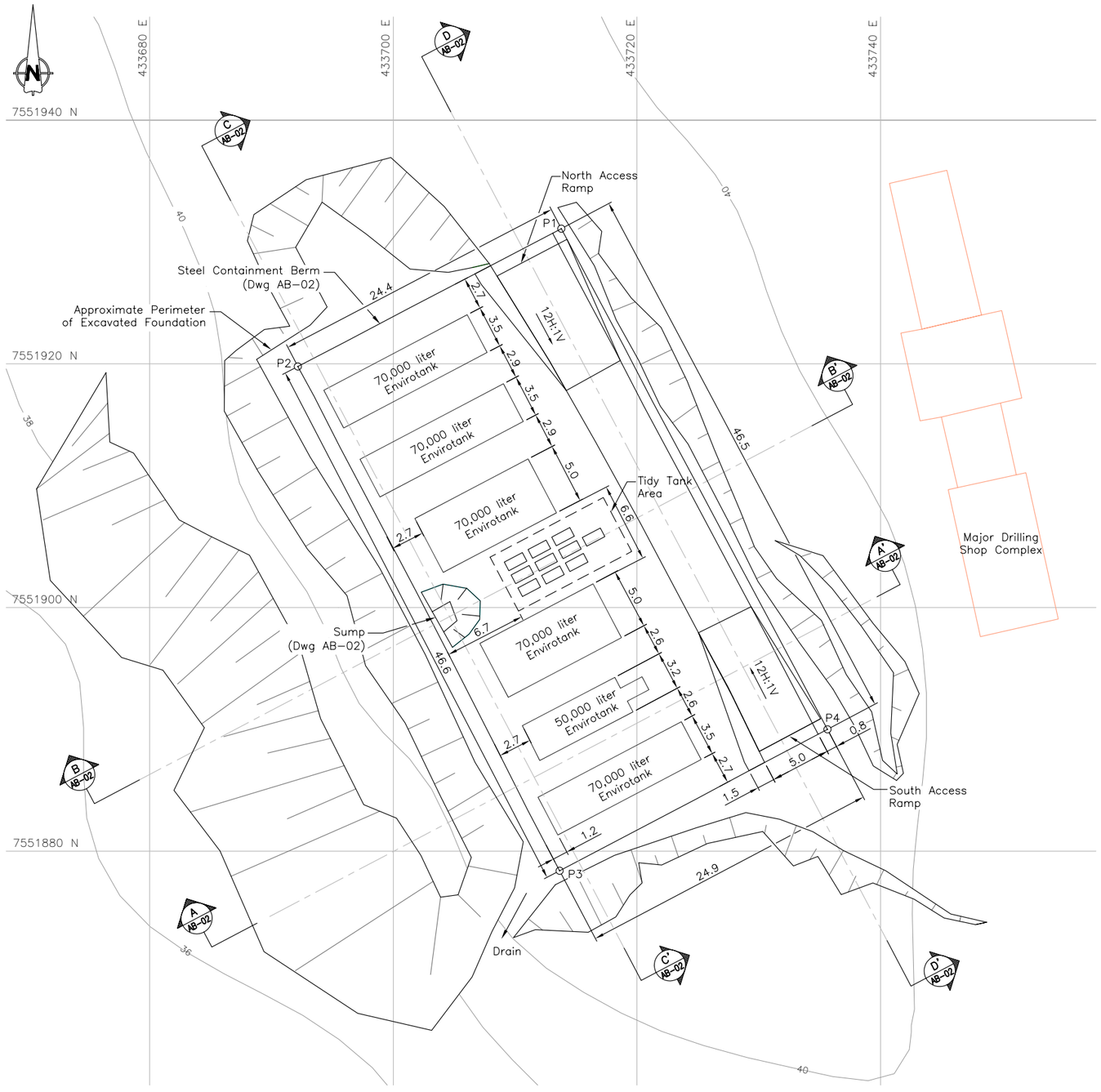
DRAWING TITLE:

DRILL AND BLAST PLAN

DRAWING NO.	SHEET	REVISION NO.
PL-07	7	A

Dwg Ref: J:\01_SITES\Doris North\1CM014.010_Patch Lake Tank Farm\Acad\TankFarmPlan\V2.DWG

Appendix C
As-Built Drawings



PLAN
Scale 1:200

Steel Berm Corner Coordinates			
Points	Easting	Northing	Elevation
P1	433713.79	7551931.10	39.89
P2	433692.17	7551919.79	39.93
P3	433713.65	7551878.39	39.97
P4	433735.64	7551890.00	40.02

Notes:

1. Drawings are scaled to appropriately for D–Size Drawings. Scales may not be correct if these drawings are reproduced and presented in any other size format
2. Topographic data for the terrain model was provided by Miramar Hope Bay Limited, and is based on 2001 Aerial Photography and a manual survey along the northern edge of the works. Contour intervals are 2m.
3. The coordinates system is UTM NAD 83, Zone 13.
4. All dimensions are in metric units, unless specifically mentioned otherwise.
5. As–built survey was done by Sub–Arctic Surveys under direction by MHBL.
6. Detailed survey data was not obtained for all stages of construction. Data gaps have been addressed through appropriate interpretation by the Engineer.

1:200 0 5 10 15 20 Meters

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
A	AS–BUILT	AT	EMR	Oct. 15/07

REVISIONS

PROFESSIONAL ENGINEER'S STAMP

SRK Consulting Engineers and Scientists Vancouver

DESIGN:	DRAWN:	REVIEWED:
EMR	VY	EMR
CHECKED:	APPROVED:	DATE:
EMR	EMR	Oct. 2007

FILE NAME: Tankfarm–Asbuilt_Points1.dwg

MIRAMAR HOPE BAY LTD.

PATCH LAKE SECONDARY CONTAINMENT FACILITY AS-BUILT

SRK JOB NO.: 1CM014.010

Patch Lake Tank Farm

DRAWING TITLE:

General Arrangement

DRAWING NO.	SHEET	REVISION NO.
AB-01	1 of 3	A

J:\01_SITES\Doris North\1CM014.010_Patch Lake Tank Farm & Trenches\Acad\Tankfarm–Asbuilt_Points1.dwg

Appendix D
Construction Notes Pertaining to Design Changes

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

Z:\01_SITES\Doris North\1CM014.010_Patch Lake Tank Farm & Trenches\Patch Lake Tank Farm Site Folder\Design Notes\[Patch Lake Tank Farm.xls]INDEX Last Updated 15/10/2007

Design Note No.	Title
DN-01	Tank Farm Realignment
DN-02	Drilling/Blasting
DN-03	Liner Details
DN-04	Sub-Grade Levelling
DN-05	Drainage Channel
DN-06	Farm Dimensions
DN-07	Sump
DN-08	Tank Layout
DN-09	Access Ramps
DN-10	Steel Containment Berm

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

Z:\01_SITES\Doris North\1CM014.010_Patch Lake Tank Farm & Trenches\Patch Lake Tank Farm Site Folder\Design Notes\[Patch Lake Tank Farm.xls]DN1 Last Updated 15/10/2007

Design Notes Ref #:	DN-01
Date Drafted:	20-May-07
By:	PM
Title:	**Tank Farm Realignment**

Notes from Daily Reports:

-**April 14th**: (Dan Hewitt) discussed realignment options with site personnel (Fred Penner, David Shaw) to adapt to field conditions

-**April 15th:** (Dan Hewitt) Drilled 6 RC holes to determine depth to bedrock in possible pad re-alignment to flat-lying area to the northwest of the proposed alignment.
  -Three RC holes on east side of possible re-alignment area found bedrock at 2.31m, 1.14m and 1.17m,
  -Three RC holes on west side of possible re-alignment area found bedrock at 0.71m, 0.81m and 0.69m,

-April 16th: (Dan Hewitt) Farm outline stakes marked out 16m north of design alignment in flatter area but avoiding the deeper areas of overburden uncovered from the drillholes from the 15th.

-**April 21**: (Dan Hewitt): Re-alignment of the farm was reviewed with respect to possible settling of ice rich overburden in the north portion of the pad.

-**April 22**: (Dan Hewitt) One test pit dug at the north side of the tank farm to identify depth to bedrock and overburden classification. Visual inspection indicates a silty sand material with 10-15% ice content between matrix and thin ice viens.

-April 23: (Dan Hewitt) Ice rich overburden at north end of original alignment found to be deeper than acceptable as a substrate for the pad and must be removed.
  - Tank farm pad relocated SE back to original alignment due to presence of ice rich overburden to the north.

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

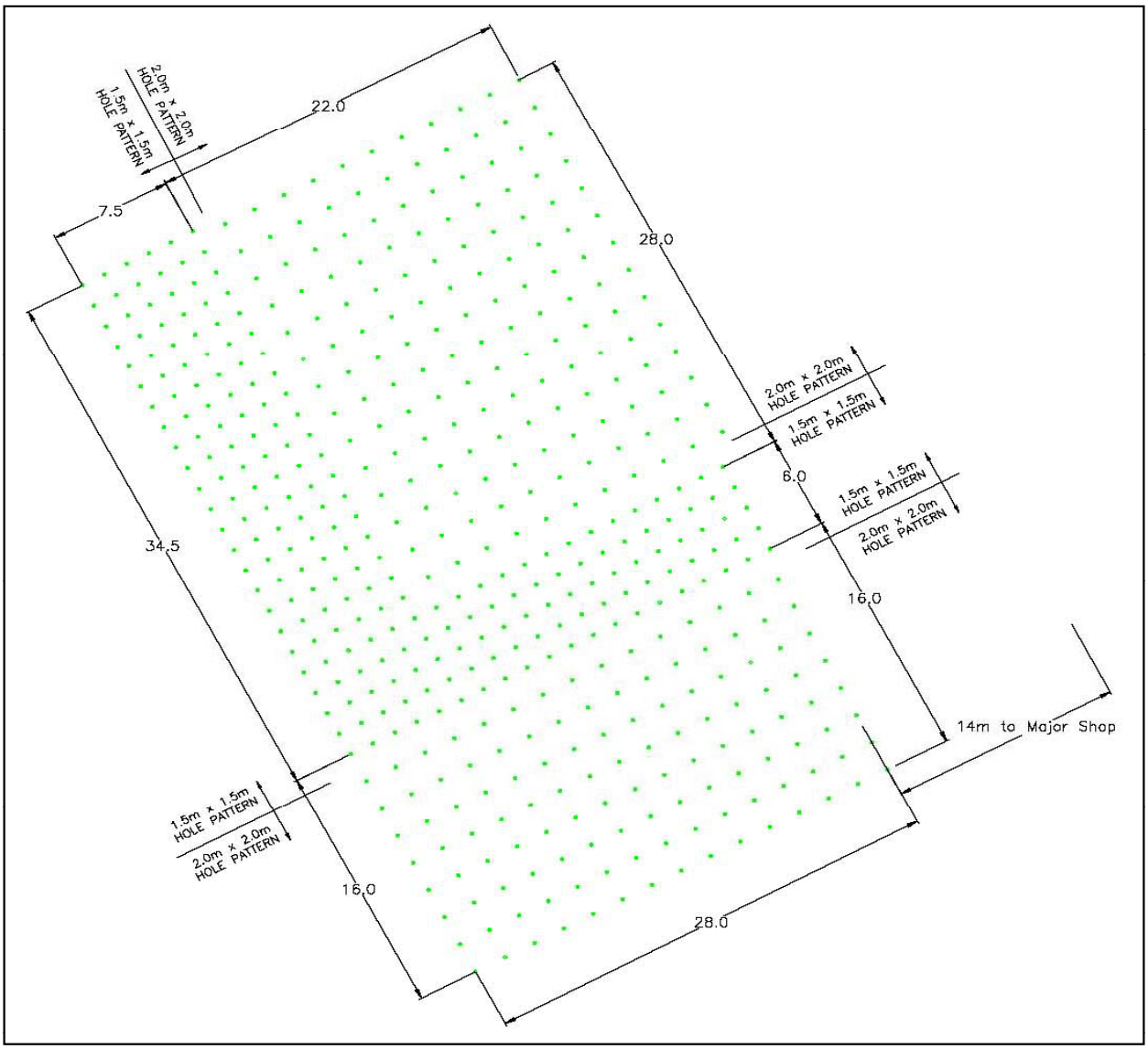
Z:\01_SITES\Doris North\1CM014.010_Patch Lake Tank Farm & Trenches\Patch Lake Tank Farm Site Folder\Design Notes\[Patch Lake Tank Farm.xls]DN2a Last Updated 15/10/2007

Design Notes Ref #:	DN-02
Date Drafted:	20-May-07
By:	PM
Title:	**Drilling/Blasting**

Notes from Daily Reports:

-**April 16:** (Dan Hewitt) Elevation 41m is chosen in field appeared to be an initial balance between cut and fill over the area; the elevation is to be verified once overburden has been stripped to expose bedrock above 41m elevation.
-Drillhole layed out in a 1.5m by 1.5m drillhole pattern.

-**April 19**: (Dan Hewitt) sent out the following drill hole plan as shown below:



-**April 21:** (Dan Hewitt) Based on a April 20th survey, • Elevation 41m confirmed as average rock fill elevation for pad and the drill holes in areas below Elev.41m not required

-April 26: (Alvin Tong) The 3 blasts today produced oversizes up to 2m in diameter. Approximately 70% of the blast material is less than 0.5m

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

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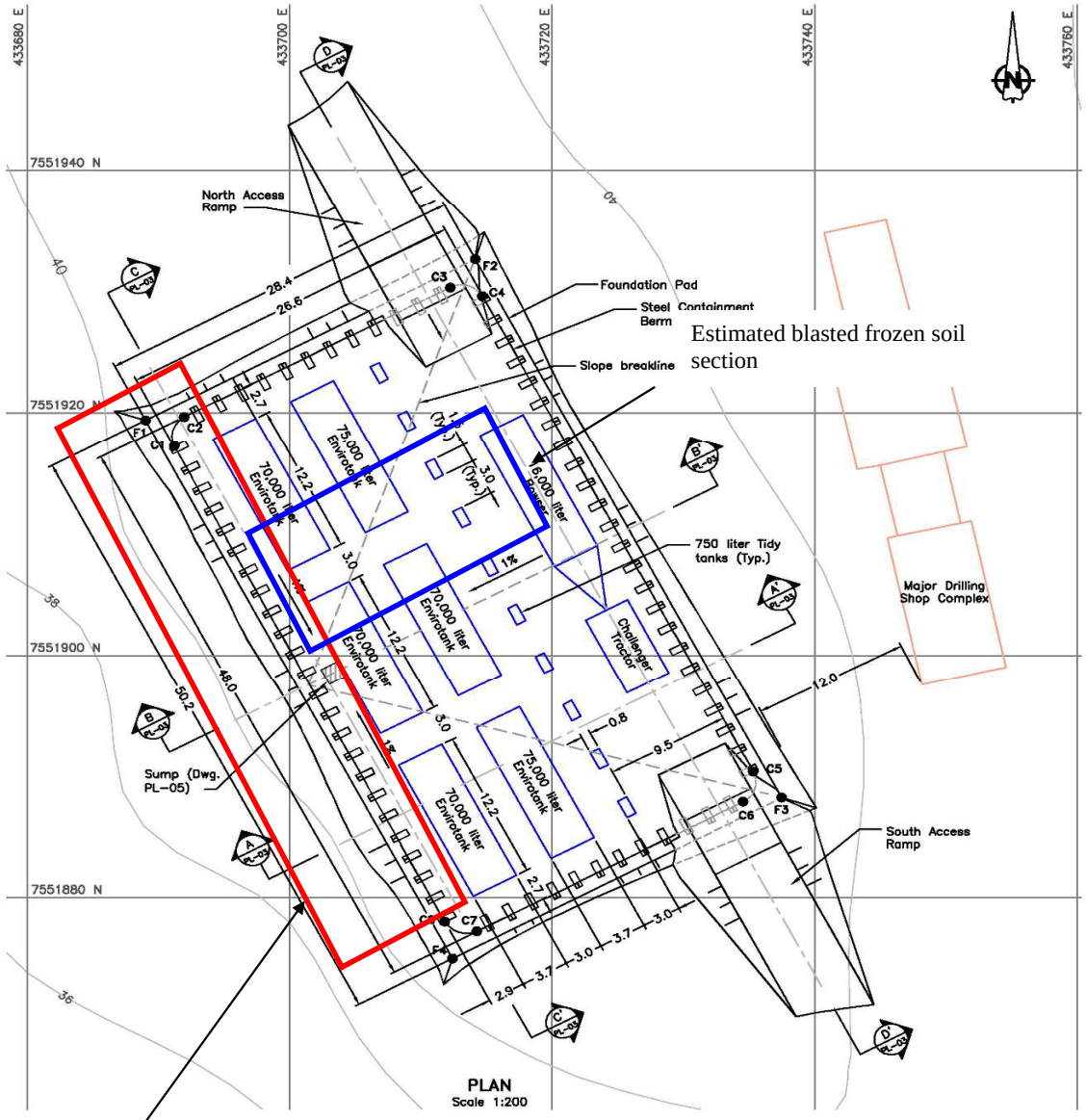
Design Notes Ref #:	DN-02
Date Drafted:	20-May-07
By:	PM
Title:	**Drilling/Blasting**

Notes from Daily Reports:
-May 1: (Alvin Tong)



Estimated blasted rock section

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

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Design Notes Ref #:	DN-03
Date Drafted:	20-May-07
By:	PM
Title:	**Liner Details**

Notes from Daily Reports:

-**April 25**: (Alvin Tong) SRK was informed that another layer of geotextile is being shipped in for the tank farm. It proposed to be used as extra bedding for liner. This may reduce initial sand bedding requirement but a final decision will be made after seeing what the blasting and crushing produces.

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

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Design Notes Ref #:	DN-04
Date Drafted:	21-May-07
By:	PM
Title:	**Sub-Grade Levelling**

Notes from Daily Reports:

-**May 7:** (Alvin Tong) A new construction method was suggested on site. To shorten the construction schedule, site personnel suggested that only the frozen soil and large oversize are removed. The rest of the material will be spread over the in place to reduce haul and muck time. This will increase the fill thickness over the blasted floor and reduce the need to blast the ramp accesses. SRK has significant concerns about this method of construction for the following reasons:

- By simply spreading the material place, the floor elevation cannot be surveyed and the fill thickness cannot be established. This is undesirable and inappropriate from an engineering standpoint, and not knowing the fill thickness compromises judgement with respect to compaction efficiency.
- By not completing an as-built survey on the blasted floor, there is not confirmation of if the floor will not have ponding water. Ponding water on the blasted floor will be subject the full freeze/thaw cycle which will compromise the structural integrity of the tank farm and the liner integrity. Both consequences which are completely unacceptable.
- By not controlling appropriate fill material appropriate compaction cannot be done. Compaction using the on-site truck and excavator bucket may be experimented with but that is highly unlikely to be satisfactorily to prevent large voids from being present, especially if the material is not appropriately graded.
- As a whole whilst SRK recognizes the importance of moving the project to conclusion, this revised work methodology is not acceptable and SRK does not approve it.

-May 8: (Alvin Tong) SLEC and SRK have worked out a construction plan. All the frozen till material at the northern section of the farm will be blasted and excavated. A survey will be done on the floor to confirm bedrock and elevations. Then the blasted material that being stock in the middle of the farm will be placed in the northern section in lifts to ensure compaction. The lift thickness will be determined after field tests. The process will continue to expose and identify the blasted floor for survey then place with material from southern sections to minimize double handling of material. Anomaly rock nodes will be blasted or hammered to grade. Drainage dykes or natural grade to the west will be made on the blasted floor to ensure water drainage. This will be site fitted with survey results. The north and south ramps may require blasting but it will be determined on a later date.

-**May 10:** (Alvin Tong) The frozen soil at the northern area of the farm is excavated and blasted floor is surveyed and inspected, approximately 28m x 15m from the northern most limited of the farm. The blasted floor is uneven with the highest node at approximately 38.8 m and lowest spot at approximately 38.1 m. A preliminary finish grade is set at El. 39m at the edges with -1% slope toward the sump. General fill from the blast has been spread in place over the approved floor. The general fill consist of blasted material with largest fragments approximately 0.4 m in diameter and approximately 15% fines (<2cm). A 0.2 m thick of the crushed material will be spread over the general fill to provide more fines for the compaction and smooth finish grade. Compaction has not been done to any placed fill. Preliminary decision is made to blast drainage dykes through the west rock wall to provide drainage. Locations of these dykes will be site fitted when the floor survey is completed

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

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Design Notes Ref #:	DN-05
Date Drafted:	21-May-07
By:	PM
Title:	**Drainage Channel**

Notes from Daily Reports:

-**May 12**: (Alvin Tong) A break at the south western corner of the farm is spotted. Hence, there is no need to blast drainage dykes through the west rock wall. The plan is to blast a finger drain when cutting the high rock nodes on the floor. The finger drain will start at the middle of the farm and draining toward the break at the south western corner. This will provide fill drainage during thaw.

-**May 15** (Alvin Tong) SRK site inspection found bedrock in the daylight corner. It needs to be blasted to El. 38 to provide drainage. The blasting will be done by a handheld drill and small amounts of stick powder.

-**May 16** (Alvin Tong) The total depth to be drilled and blasted is approximately 1.5 m. As longest drill rod is 0.9 m long; drilling will have to be done in two stages. First blast was done late afternoon and secondary blasts will be done tomorrow to finalize the drainage dyke.

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

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Design Notes Ref #:	DN-06
Date Drafted:	21-May-07
By:	PM
Title:	**Tank Farm Dimensions**

-**May 21**: (Peter Mikes) Tank farm dimensions (along steel containment berm) provided by surveyor as 46.04m x 24.5m. The length measured in the field today was 46.6m, so the surveyor's dimensions need confirmation.

Notes from Daily Reports:

-**May 15**: (Alvin Tong) The dimensions of the farm were changed to site fit the south western corner. Blasting didn't remove all the bedrock as designed and there are rock outcrops 4m inside of the designed footprint. The site decision is to move the south western corner inward 4m north and east to accommodate site conditions. Calculations show that the net loss to the area from the reduction is about 10%.

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

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Design Notes Ref #:	DN-07
Date Drafted:	21-May-07
By:	PM
Title:	**Sump**

Notes from Daily Reports:

-**May 17**: (Alvin Tong) Sump was dug out not to specifications as a rectangular hole was dug with near vertical cut and large loose material on the side. SRK specified that a 0.28 m sump with 1% sloping grades from the perimeter of the containment.

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

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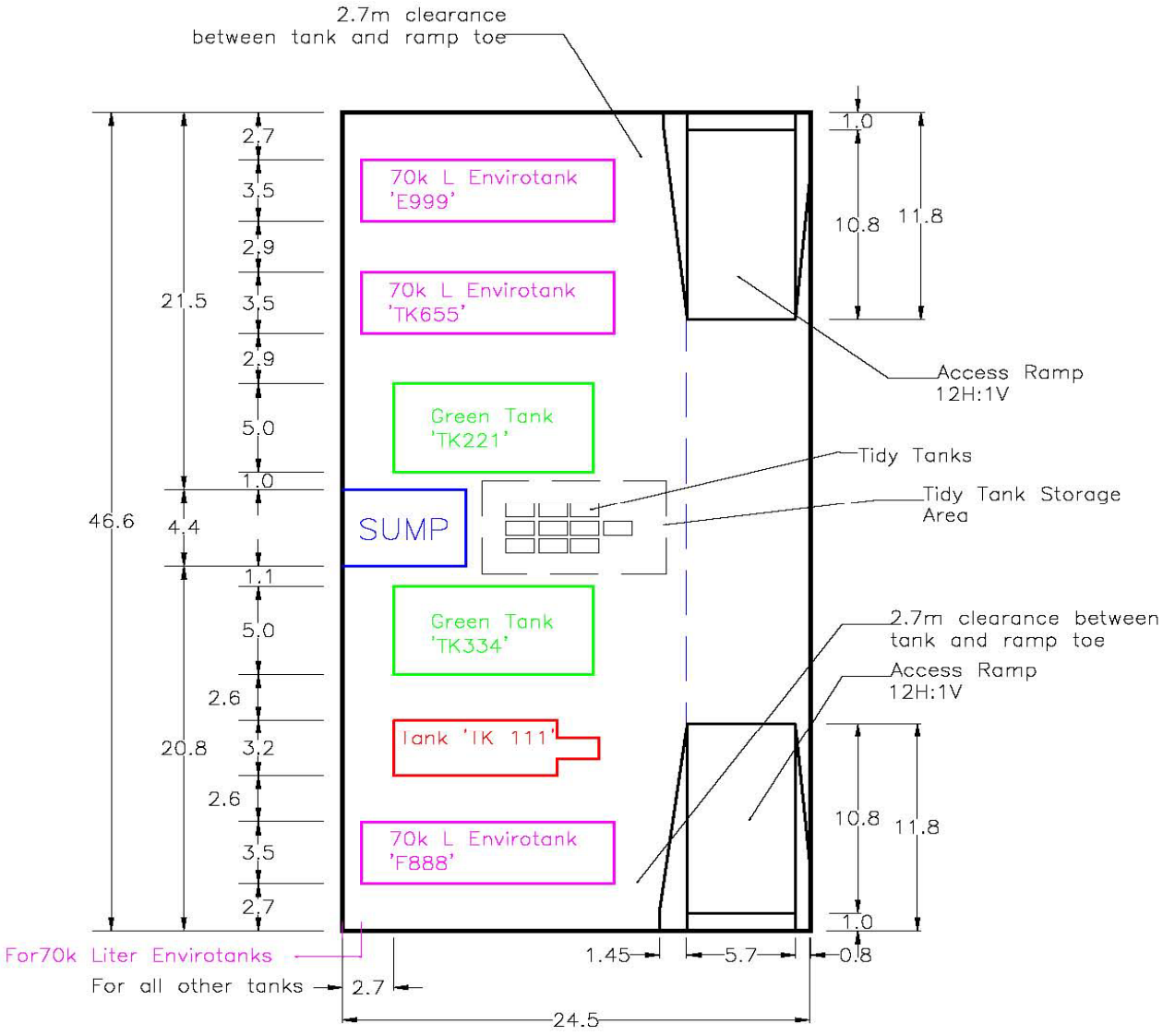
Design Notes Ref #:	DN-08
Date Drafted:	21-May-07
By:	PM
Title:	**Tank Layout**

Notes from Daily Reports:

-**May 18**: (Alvin Tong) Tanks will be turned so taps are facing east and space between them can be reduced to accommodate new design sizing.

Not from Dailies:

-**May 22**: (Peter Mikes) With the new tank dimensions known, the following layout was drafted up and approved by Cyril Turpin and Mike Cripps.



Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

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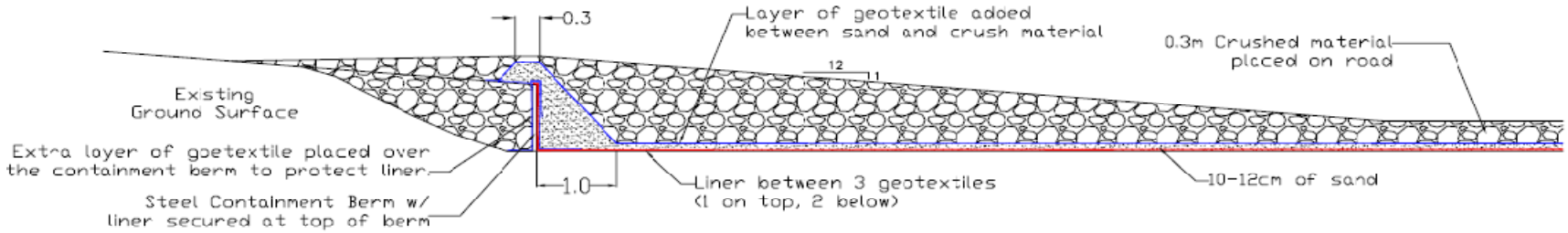
Design Notes Ref #:	DN-09
Date Drafted:	22-May-07
By:	PM
Title:	**Access Ramps**

1. (Alvin Tong) The grade of the access road ramp has been changed to 12H:1V from 15H:1V.
2. (Peter Mikes) Construction of the north access ramp started this afternoon. The following design changes have occurred:
   - Sand was added on the inside of the containment berm as well as 30cm above the top, to protect the liner which is secured at the top of the berm.
   -An extra layer of geotextile (consisting of left over scrap material) was added directly over the berm.
   -Another layer of geotextile was added between the sand and crushed material layers as the sand thickness has been reduced to 4 to 5 inches.
   -30cm of crushed material will be placed over the road area between the two ramps.



Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

Design Notes Ref #:	DN-10
Date Drafted:	21-May-07
By:	PM
Title:	**Steel Containment Berm**

-**May 21**: (Peter Mikes) Overall dimensions of the secondary steel berm containment were change to 46.0m by 24.6m from 48.0m by 26.6m. The excavation of foundation did not take into account of a spacing requirement between the toe of excavation and the steel base plate of the containment. Calculations of the reduced containment shows that with a vertical column of 100mm of fuel (from the required 114,150 L), plus vertical average snow pack of 65mm and proposed sand cover of 300mm, the 810 mm height of the berm is sufficient for containment, at a factor of safety of 1.7. The volume of the ramps and voids in the sand are not included in this calculation but expected to have minimum impact. SRK worked with Layfield and Sub-Arctic Surveyor to reduce the containment size.

Appendix E
Daily Reports

SRK Consulting
Engineers and Scientists

SRK Consulting (Canada) Inc.
Suite 2200 – 1066 West Hastings Street
Vancouver, B.C. V6E 3X2, Canada
Tel: 604.681.4196
Fax: 604.687.5532

DAILY REPORT #1 – Patch Lake Tank Farm

Prepared by:	Dan Hewitt	**Date:**	2007.04.14
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -22	Minimum: -29	Maximum: -16
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear and sunny		

ACTIVITY

Location	Description
Tank Farm	• Inspected proposed tank farm site. • Located corner stakes previously placed by Sub-arctic Surveys. • Assessed alignment in light of proposed location and field conditions.
Survey	• No activity.
Materials	• Two NWT Rock sea cans previously shipped were at the site.
Other Activity	• Discussed possible re-alignment options with site personnel to adapt to field conditions.

EQUIPMENT

Equipment	Operating Hours	Notes
• None	•	

PERSONNEL

SRK	• Dan Hewitt
Miramar	• Fred Penner, Superintendent
Kitnuna	• Dave Shaw, Supervisor

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- Site orientation and training on Land Cruiser for D.Hewitt

COMMENTS, CONCERNS AND CORRESPONDENCE

- Email to NWT Rock to follow up on March 23 request to supply Handidet blasting caps.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- None

PHOTOS

1. Looking northward over proposed pad area from hill at SW corner.

2. Looking northward over possible re-alignment area; NWT Rock's sea cans on the right.

SRK Consulting
Engineers and Scientists

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Suite 2200 – 1066 West Hastings Street
Vancouver, B.C. V6E 3X2, Canada
Tel: 604.681.4196
Fax: 604.687.5532

DAILY REPORT #2 – Patch Lake Tank Farm

Prepared by:	Dan Hewitt	**Date:**	2007.04.15
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -26	Minimum: -33	Maximum: -19
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Fog in early morning, then clear and sunny		

ACTIVITY

Location	Description
Tank Farm	• Drilled 6 RC holes to determine depth to bedrock in possible pad re-alignment to flat-lying area to the northwest of the proposed alignment. • Drill 6 RC holes through overburden to the north to determine depth to bedrock (photos 1 & 2).
Survey	• Installed missing SW and NE corner stakes for proposed pad alignment. • Installed corner stakes for pad on a 25m NE offset from proposed alignment to assess possible re-alignment.
Materials	• Awaiting blasting caps from NWT Rock. • ANFO in explosives magazines was found to be in very good condition.
Other Activity	• Field assessment of re-aligning the tank farm pad in a northwestern direction to: 1. Reduce the amount of rock excavation required; 2. Take advantage of an existing flat-lying area; and 3. Facilitate construction of the south access ramp at the specified grade where the natural slope is steep.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 0	Arrived on site.
• Cubex RC (reverse circulation) drill	• 4	6 holes through overburden at north end of pad; see photos 1 & 2 for depths to bedrock.

PERSONNEL

SRK	• Dan Hewitt
NWT Rock	• Drilling: Paul Hubbard arrived on site with the airtrack drill (1 hour to unload drill from Hercules)
Miramar	• Surveying: Jay Hallman, Joel Black (2hr) • RC drill crew (4 hr)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

• None

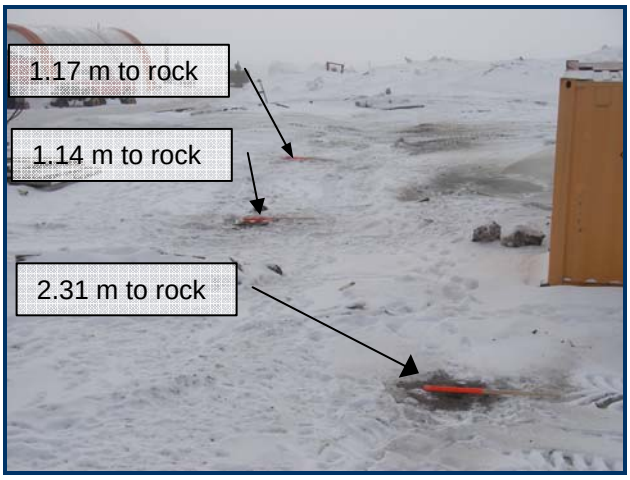
COMMENTS, CONCERNS AND CORRESPONDENCE

• None

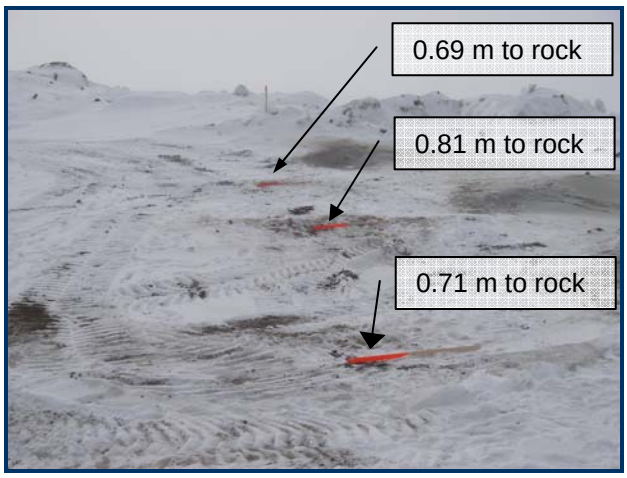
OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Awaiting blasting caps from NWT Rock.

PHOTOS



1. Three RC holes on east side of possible re-alignment area found bedrock at 2.31m, 1.14m and 1.17m, from nearest hole to farthest. (Looking south)



2. Three RC holes on west side of possible re-alignment area found bedrock at 0.71m, 0.81m and 0.69m, from nearest hole to farthest. (Looking south)

3. and 4. Typical materials from RC holes.

SRK Consulting
Engineers and Scientists

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DAILY REPORT #3 – Patch Lake Tank Farm

Prepared by:	Dan Hewitt	**Date:**	2007.04.16
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -25	Minimum: -30	Maximum: -19
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Fog all morning, then clear and sunny		

ACTIVITY

Location	Description
Tank Farm	• Set up and check airtrack drill for proper operation. • Begin laying out the drill holes on a 1.5m x 1.5m square grid.
Survey	• Install corner stakes 16m north of proposed alignment; the 25m offset was in a deeper area of overburden to be avoided. • Survey spot elevations in order to calculate drill hole depth. • Mark Elev.41 on rock outcrop as the initial reference for limit of drilling.
Materials	• 13 tote bags of sand brought to site.
Other Activity	• Adjust pad re-alignment to remain clear of deep overburden in NE corner; re-alignment is now 16m northwest rather than 25m. • Elevation 41m is chosen in field appeared to be an initial balance between cut and fill over the area; the elevation is to be verified once overburden has been stripped to expose bedrock above 41m elevation.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 0	Walk drill from airstrip to site.
• Hitachi EX300LC excavator	• 8	Clear material and equipment stored in area of tank farm.
• CAT 916 loader	• 6	
• CAT D5A dozer	• 2	

PERSONNEL

SRK	• Dan Hewitt
NWT Rock	• Drilling: Paul Hubbard (12hr)
Kitnuna	• Dave Shaw (loader 6hr), Cedric (excavator 10hr), dozer operator (2hr)
Miramar	• Surveying: Jay Hallman (4hr), Joel Black (4hr)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- Email regarding suitability of overburden as substrate for tank farm pad.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Awaiting blasting caps from NWT Rock.

PHOTOS

1. Looking east over the tank farm area; Major Drilling's shop facility in the background will be exposed to blasting.

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DAILY REPORT #4 – Patch Lake Tank Farm

Prepared by:	Dan Hewitt	**Date:**	2007.04.17
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -22	Minimum: -30	Maximum: -15
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear and sunny		

ACTIVITY

Location	Description
Tank Farm	• Finished laying out drill holes. • Started drilling late afternoon; drilled 12 holes.
Survey	• Staked corners for re-alignment #2. • Surveyed spot elevations in area to be drilled. • Surveyed spot elevations in low flat area to be filled.
Materials	• 13 tote bags of sand on site.
Other Activity	• None.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack	• 4	Airtrack drill hard starting from cold weather; started after tarping and heating engine compartment; drill left running at end of shift to ensure operation next morning.
• Herman Nelson heater	• 0.5	Heat airtrack to start
• Hitachi EX300LC	• 0	

PERSONNEL

SRK	• Dan Hewitt
Miramar	• Surveying: Jay Hallman, Joel Black (4hr each)
NWT Rock	• Drilling: Paul Hubbard (12hr) • Blasting: Jamie Cameron (blaster's helper) arrived on site.

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- None

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Awaiting blasting caps from NWT Rock.

PHOTOS

1. First day of drilling.

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DAILY REPORT #5 – Patch Lake Tank Farm

Prepared by:	Dan Hewitt	**Date:**	2007.04.18
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -18	Minimum: -20	Maximum: -15
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear and sunny		

ACTIVITY

Location	Description
Tank Farm	• Drilled 26 holes - 42 holes total.
Survey	• No activity.
Materials	• 24 totes sand brought to site – 37 total
Other Activity	• None.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 7	Drill shank broke mid-day.

PERSONNEL

SRK	• Dan Hewitt
Miramar	• Surveying: No activity.
NWT Rock	• Drilling: Paul Hubbard (12hr) • Blasting: Jamie Cameron (blaster helper) (12hr)
Kitnuna	• No activity.

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None.

COMMENTS, CONCERNS AND CORRESPONDENCE

- Called NWT Rock for spare shanks for ECM590 drill and hole plugs.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Awaiting blasting caps from NWT Rock.

PHOTOS

1. Drilling rock on west side; excavator stripping overburden from rock outcrop to be drilled.

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DAILY REPORT #6 – Patch Lake Tank Farm

Prepared by:	Dan Hewitt	**Date:**	2007.04.19
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -21	Minimum: -26	Maximum: -16
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear and sunny		

ACTIVITY

Location	Description
Tank Farm	• Drilled 40 holes - 82 holes total to date.
Survey	• No activity.
Materials	• 30 totes sand brought to site - 67 total • 2 rolls geotextile brought to site (86’ x 162’ LP16 Flat Seam)
Other Activity	• Prepared drill/blast layout drawing; sent for review.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 12	Spare shanks arrived; replace broken part.
• Terex Reedrill R20C airtrack drill	• 12	Arrived on site; attached cab and boom; walked to site.

PERSONNEL

SRK	• Dan Hewitt
Miramar	• Surveying: No avtivity.
NWT Rock	• Drilling: Paul Hubbard (12hr) • Blasting: Jamie Cameron (blaster helper) (12hr) • Mechanic: Gord Mosher (Terex) (12hr)
Kitnuna	• No activity.

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None.

COMMENTS, CONCERNS AND CORRESPONDENCE

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Awaiting blasting caps from NWT Rock.

PHOTOS

1. & 2. Terex mechanic attaching boom to R20C airtrack drill.

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DAILY REPORT #7 – Patch Lake Tank Farm

Prepared by:	Dan Hewitt	**Date:**	2007.04.20
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -16	Minimum: -24	Maximum: -9
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Light snow in early morning, overcast		

ACTIVITY

Location	Description
Tank Farm	• Drilled 90 holes with two drills - 172 holes total to date
Survey	• Survey high areas in locations where overburden was stripped from rock to check grade elevation for pad.
Materials	• 30 more totes on site - 97 total. • 2 rolls geotextile on site (86’ x 162’ LP16 Flat Seam)
Other Activity	• Send drill/blast layout drawing to S.Stringer and F.Penner

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 12	Leave drill running overnight.
• Terex Reedrill R20C airtrack drill	• 12	

PERSONNEL

SRK	• Dan Hewitt
Miramar	• Surveying: No activity.
NWT Rock	• Drilling: Paul Hubbard (12hr) • Blasting: Jamie Cameron (blaster helper) (12hr) • Mechanic: Gord Mosher (from Terex) (12hr)
Kitnuna	• No activity.

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None.

COMMENTS, CONCERNS AND CORRESPONDENCE

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Awaiting blasting caps from NWT Rock.

PHOTOS

1. Morning drilling; pile of snowy overburden (centre) to be removed.

2. Afternoon drilling with Terex R20C on site to supplement ECM590 drilling.

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DAILY REPORT #8 – Patch Lake Tank Farm

Prepared by:	Dan Hewitt	**Date:**	2007.04.21
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -18	Minimum: -21	Maximum: -14
Precipitation (mm)	Rain: None	Snow: trace	
Conditions	Light snow in morning, overcast rest of day		

ACTIVITY

Location	Description
Tank Farm	• Drill 89 holes with two drills - 221 holes total to date; drilling completed. • Lay out revised drill hole pattern based on yesterday's survey.
Survey	• No activity.
Materials	• 97 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam).
Other Activity	• Review re-alignment with respect to possible settling of ice rich overburden in the north portion of the pad. • Elevation 41m confirmed as average rock fill elevation for pad based on yesterday's survey. • Revise drilling based on yesterday's survey; holes in areas below Elev.41m not required.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 12	
• Terex Reedrill R20C airtrack drill	• 12	

PERSONNEL

SRK	• Alvin Tong, Dan Hewitt
Miramar:	• Surveying: No activity.
NWT Rock	• Drilling: Paul Hubbard (12hr) • Blasting: Jamie Cameron (blaster's helper) (12hr) • Mechanic: Gord Mosher (from Terex) (12hr)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- Site orientation and snowmobile training for A.Tong who arrived on site.

COMMENTS, CONCERNS AND CORRESPONDENCE

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Awaiting blasting caps from NWT Rock.

PHOTOS

1. Drillers completing the last of the drilling at the south end of the pad.

2. Completed drill holes in foreground; outline indicates high area of rock to be trimmed.

3. Geotextile, liner and sand totes.

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DAILY REPORT #9 – Patch Lake Tank Farm

Prepared by:	Dan Hewitt, Alvin Tong	**Date:**	2007.04.22
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -17	Minimum: -22	Maximum: -13
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear and windy.		

ACTIVITY

Location	Description
Tank Farm	• Drill 89 holes with two drills - 221 holes total to date; drilling completed. • Lay out revised drill hole pattern based on yesterday's survey. • Dug one test pit at the north side of the tank farm to identify depth to bedrock and overburden classification
Survey	• No activity.
Materials	• 97 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam).
Other Activity	• Assess material in test pit; visual inspection indicates a silty sand material with 10-15% ice content between matrix and thin ice viens.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 0	
• Terex Reedrill R20C airtrack drill	• 0	Commissioning repairs to drill
• Hitachi EX300LC excavator	• 8	Test pit in frozen overburden

PERSONNEL

SRK	• Alvin Tong, Dan Hewitt
Miramar	• Surveying: No activity.
Kitnuna	• Cedric (excavator operator) (8hr)
NWT Rock	• Drilling: Paul Hubbard (12hr) (no drilling - drill maintenance & organize sea cans) • Blasting: Jamie Cameron (blaster's helper) (12hr) (no drilling - drill maintenance & organize sea cans) • Mechanic: Gord Mosher (from Terex) (12hr)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None.

COMMENTS, CONCERNS AND CORRESPONDENCE

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Awaiting blasting caps from NWT Rock.

PHOTOS

1. View into 1.7 m deep test pit in area sandy silt with 10-15% ice. Extremely tough digging as it took 8 hrs to excavate.

2. Test pit being excavated in ice rich overburden at north end of pad.

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DAILY REPORT #10 – Patch Lake Tank Farm

Prepared by:	Alvin Tong, Dan Hewitt	**Date:**	2007.04.23
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell, Darren Lindsay, John Wakeford Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -17	Minimum: -22	Maximum: -11
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear and windy.		

ACTIVITY

Location	Description
Tank Farm	• Drilled 46 - 3.5” holes with two drills; 221 - 2.75” holes total to date. • Drilled 9 holes on 4 m spacing to test overburden depth in north end of pad area. • Stripped overburden from additional area to be drilled. • Marked up additional drill holes for original pad alignment.
Survey	• Pick up overburden test holes in flat lying area to the north.
Materials	• 97 totes of sand on site. • 2 rolls geotextile on site (86’ x 162’ LP16 Flat Seam).
Other Activity	• Ice rich overburden at north end of original alignment found to be deeper than acceptable as a substrate for the pad and must be removed. • Relocate tank farm pad SE back to original alignment due to presence of ice rich overburden to the north. • Ice rich overburden in northern portion of the pad to be removed by blasting as machine excavation is not feasible in the frozen ground. • Prepared drilling layouts to cover: 1. South section of original pad alignment (200 holes); and 2. Ice rich overburden to be removed in north end (154 holes).

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 12	Switched to 3.5” bits as there were no more 2.75” bits on hand; ECM590 drilled overburden test holes
• Terex Reedrill R20C airtrack drill	• 12	
• Hitachi EX300LC excavator	• 12	Strip overburden from outcrop

PERSONNEL

SRK	• Alvin Tong, Dan Hewitt
Miramar	• Surveying: Jay Hallman (1hr).
Kitnuna	• Cedric (excavator operator) (12hr)
NWT Rock	• Drilling: Paul Hubbard (12hr) • Blasting: Jamie Cameron (blaster’s helper) (12hr) • Mechanic: Gord Mosher (from Terex) (12hr)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None.

COMMENTS, CONCERNS AND CORRESPONDENCE

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Awaiting blasting caps from NWT Rock.

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DAILY REPORT #11 – Patch Lake Tank Farm

Prepared by:	Alvin Tong, Dan Hewitt	**Date:**	2007.04.24
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell, Darren Lindsay Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -15	Minimum: -22	Maximum: -7
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear and windy.		

ACTIVITY

Location	Description
Tank Farm	• Drilled 121 - 3.5” holes with two drills; 221 - 2.75” holes total to date. • Stripped overburden from additional area to be drilled. • Marked up additional drill holes for original pad alignment.
Survey	• Surveyed the limits of the finalized tank farm corner (original design)
Materials	• 160 totes of sand on site. • 2 rolls geotextile on site (86’ x 162’ LP16 Flat Seam). • Blast Cap for the Patch Lake Tank Farm construction has arrived on site.
Other Activity	• Discussion with Fred, Cyril, Darren, and Matt about the construction management and staging areas. • The area north of the tank farm will be cleared off and will house the crusher and the processed stockpile. This area will also house the fuel tanks after the blasting is completed. • The area south of the tank farm and between the old farm will be the unsuitable stockpile. It will be clear of snow prior to placement and runoff control with silt fences and berm will be build as needed. • Fred Penner will be the on site construction manager for Miramar for the Patch Lake Tank Farm construction.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 12	Switched to 3.5” bits as there were no more 2.75” bits on hand; ECM590 drilled overburden test holes
• Terex Reedrill R20C airtrack drill	• 12	
• Hitachi EX300LC excavator	• 12	Strip overburden from outcrop

PERSONNEL

SRK	• Alvin Tong, Dan Hewitt
Miramar	• Surveying: Jay Hallman (1hr).
Kitnuna	• N/A
NWT Rock	• Drilling: Paul Hubbard (12hr) • Blasting: Matt Roy (Blaster), Jamie Cameron (Helper) (12hr) • Mechanic: Gord Mosher (from Terex) (12hr)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- The Blaster will work with Miramar to produce a site specific Safety Procedure for Blasting.

COMMENTS, CONCERNS AND CORRESPONDENCE

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The blaster will start blasting tomorrow at the western edge of farm. Miramar needs to work with the blaster to sort out construction sequence between blasting and excavation to maximize efficiency.

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DAILY REPORT #12 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.04.25
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell, Darren Lindsey Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart, Seema Kang, Tayfun Gurdal		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -5	Minimum: -10	Maximum: -3
Precipitation (mm)	Rain: None	Snow: 10-12 cm	
Conditions	Heavy snow and wind		

ACTIVITY

Location	Description
Tank Farm	• Drilled 121 - 3.5” holes with two drills; 221 - 2.75” holes total to date. • Stripped overburden in preparation for additional drilling. • The crusher in on site and waiting for Kitnuna for setup
Survey	• Surveyed the Northern corners of the tank farm.
Materials	• 160 totes of sand on site. • 2 rolls geotextile on site (86’ x 162’ LP16 Flat Seam) along with the liner. • Transported the blasting caps to the magazine at the Bay and daily quantities will be transport by the blaster each morning.
Other Activity	• The blaster will decide on the hole pattern in the overburden once he is familiar with the explosive and material behaviour. • Official statement stating that Cyril Turpin (SLEC) will be the construction manager on site for the Patch Lake Tank Farm construction. He will organize between the equipment and blasting on site. • SRK will work closely with Cyril Turpin and Fred Penner on construction sequence and procedure in preparation for snow thaw. • Snow storm started around 2pm and halted site operation until end of shift.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 8	Switched to 3.5” bits as there were no more 2.75” bits on hand; ECM590 drilled overburden test holes
• Terex Reedrill R20C airtrack drill	• 8	
• Hitachi EX300LC excavator	• 8	Strip overburden from outcrop

PERSONNEL

SRK	• Alvin Tong
Miramar	• Surveying: Jay Hallman (1hr).
Kitnuna	• Cedric (excavator operator) (8hrs)
NWT Rock	• Drilling: Paul Hubbard (8hr) • Blasting: Matt Roy (Blaster) (8hrs), Jamie Cameron (Helper) (8hr)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- See attachment for site specific blasting procedure.

COMMENTS, CONCERNS AND CORRESPONDENCE

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Miramar will have to work with Kitnuna to setup the crusher and operating procedures. One important aspect will be outlining the layout the footprints of the stockpile, crusher and fuel tanks at the northern area of the farm. Another aspect is crushing and blasting sequence which will be sorted when the blaster is familiar his production and Kitnuna's capability.
- The powder truck is schedule to be on site on April 26 with all the tool and equipment requested by the blaster. The truck isn't equipment of tracks upon arrival. The powder truck might need to be refitted with track before use to transport powder from the Bay to site.
- SRK was informed that another layer of geotextile is being shipped in for the tank farm. It proposed to be used as extra bedding for liner. This may reduce initial sand bedding requirement but a final decision will be made after seeing what the blasting and crushing produces.

April 24, 2007

Notice to all Staff at Windy Camp!!

Blasting will start at Patch Lake on April 25, 2007 (Major Shop) area on an as needed basis (approximately 4 times per day)

- **There will be 3 warnings given prior to detonation of explosives.**
- **The 1st warning will be given by radio 30 minutes prior to blast time.**
- **There will be NO RADIO COMMUNICATION within 100 meters of Majors during those 30 minutes until blast is complete.**
- **There will be restricted access to the danger zone. Only authorized personnel allowed on site during this time.**
- **The 2nd warning will consist of 4 air horn blasts 10 minutes prior.**
- **The 3rd warning will consist of 1 air horn blast indicating area is "ALL CLEAR".**

Fred Penner
Site Services Superintendent

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DAILY REPORT #13 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.04.26
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
Distributed to:	Miramar: Fred Penner, Scott Stringer, Jim Currie, Terry Maloof, Larry Connell, Darren Lindsey Nuna: Chris Petrovic SLEC: Cyril Turpin, Gary Morris SRK: Alvin Tong, Maritz Rykaart		

WEATHER (Cambridge Bay)

Temperature (°C)	Mean: -5	Minimum: -10	Maximum: -3
Precipitation (mm)	Rain: None	Snow: 3-6cm	
Conditions	Mild snow and wind		

ACTIVITY

Location	Description
Tank Farm	• Drilled 121 - 3.5” holes with two drills; 221 - 2.75” holes total to date. • 3 blast today from total of twenty 2.75” holes. • Excavator to sorting out oversize and move material in preparation for tomorrow’s blasts • The crusher in on site and waiting for Kitnuna for setup
Survey	• N/A
Materials	• 160 totes of sand on site. • 2 rolls geotextile on site (86’ x 162’ LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralize location. • Daily amount of explosives are being transported from the Bay to Site, leftovers will be trucked back to the Bay for storage.
Other Activity	• There is oversize up to 2m in diameter. Approximately 70% of the blast material is less than 0.5m. • The crusher is being setup by Kitnuna in preparation for start-up tomorrow. • Matt Kawey (Miramar) directed that oversize materials that are near the west side of the farm and can’t be picked up by the excavator, be pushed west outside of the farm footprint and stay there.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 0	
• Terex Reedrill R20C airtrack drill	• 0	
• Hitachi EX300LC excavator	• 12	Sort material

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Cedric (excavator operator) (12hrs)
NWT Rock	• Blasting: Matt Roy (Blaster) (12hrs), Jamie Cameron (Helper) (12hr), Paul Hubbard (Helper) (12hr)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- Discussion with Cyril Turpin (SLEC) about mucking and clearing cycle for Patch Lake Tank Farm. It seems that the blaster will blast all day every 2 hours. This might result in blasting during the day and mucking during the night.
- Discussion with Cyril Turpin (SLEC) and Fred Penner (Miramar) about Roberts Bay construction sequence concerning the explosive storage facility and magazines. The discussion concluded that it will be beneficial to leave the mags where they are and transport the explosives on ice, via helicopter and boat for quarry development. All the explosives are currently on site is expected to be consumed before the sea lift and will be restocked by the sea lift. The new empty mags will be moved to desired location when winter roads are available.
- Discussion with Fred Penner (Miramar) about construction scheduling with respect to fuel transport and temporary storage locations. It is concluded that part of the Major Drill Shop area will be cleared off for the storage of the tanks and they will be recharged there.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The blast foundation of the Patch Lake Tank Farm was not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.

PHOTOS

1. Oversize from the blast developed from back breaks and poor fragmentation.

1. 

2. Typical fragments from the blast, estimated only 70% of the blasted material.

2. 

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DAILY REPORT #14 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.04.27
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -10	Minimum: -15	Maximum: -5
Precipitation (mm)	Rain: None	Snow: ~1cm	
Conditions	Sunny with very light snow		

ACTIVITY

Location	Description
Tank Farm	• Drilled 124 - 3.5” holes with two drills; 221 - 2.75” holes total to date. • 3 blasts today from total of seventeen 2.75” holes. • Excavator sorting out oversize and moved material/blast mats in preparation for ongoing blasts • The crusher in on site and being set up.
Survey	• N/A
Materials	• 160 totes of sand on site. • 2 rolls geotextile on site (86’ x 162’ LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralize location. • Daily amount of explosives are being transported from the Bay to site, leftovers will be trucked back to the Bay for storage.
Other Activity	• The driller worked on the Copco drill for about one hour before being instructed to walk the Terex drill down to the Bay. • One of the airtrack containers was mobbed to the Bay for the operation there. • The location of the crusher had been finalized at the northern area of the tank farm. It will be set up and scheduled for operation at the end of shift. • Processed a very small amount of material with the crusher as a test run. The processed material is very “chunky” ~4-5cm. The crushing crew was instructed to make 2-3.5cm material.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 1	Drill 30 holes with 3.5” bit with the Copco. Walked the Terex to the Bay.
• Terex Reedrill R20C airtrack drill	• 4	
• Hitachi EX300LC excavator	• 12	Sort material, place blast mats, and fed the crusher.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Cedric (excavator operator) (12hrs)
NWT Rock	• Blasting: Matt Roy (Blaster) (12hrs), Jamie Cameron (Helper) (12hr), Paul Hubbard (Driller) (12hr)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Cyril Turpin (SLEC) about mucking and clearing cycle for Patch Lake Tank Farm. It seems that the blaster will blast all day every 2 hours. This might result in blasting during the day and mucking during the night.
- (On-going) Discussion with Fred Penner (Miramar) about construction scheduling with respect to fuel transport and temporary storage locations. It was concluded that part of the Major Drill Shop area will be cleared off for the storage of the tanks and they will be recharged there.
- The testpit was backfilled with frozen material at the very beginning of shift by the crew. They were instructed previously to do it with rock material. This will not affect the farm but might create settlement near the beginning part of the northern access ramp.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm was not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- The grizzly screen of the crusher is approximately 27cm. It might create a problem as there is significant oversize from the blast that is greater then 33cm. Resolution will be sleeked when mucking of the blast material starts and the crusher is fully operational.

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DAILY REPORT #15 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.04.28
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -6	Minimum: -7	Maximum: -5
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• Drilled 179 - 3.5” holes with two drills; 221 - 2.75” holes total to date. • 3 blasts today from total of twenty four 2.75” and 3.5” holes. • Excavator sorting out oversize and move material/blast mats in preparation for ongoing blasts • The crusher in on site and being fine tuned. • The driller worked on the Copco for total of fifty five 3.5” holes.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86’ x 162’ LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location. • Daily amount of explosives are being transported from the Bay to Site; leftovers are trucked back to the Bay for storage.
Other Activity	• Tom Luddington is the Superintendent for Kitnuna and arrived on site last night. SRK went over tank farm specification and layout with him. He will now direct the equipment and labour on Patch Lake Tank Farm construction. • Snow has been cleared off the unsuitable stockpile area for night shift. • Night shift with excavator and loader to muck and sort out material from the blasts. Oversize material is being transported with the loader to the unsuitable stockpile area. • The crusher is being tuned to make 2-3.5cm material as it is still “chunky” ~4-5cm.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 12	Drill 55 holes with 3.5” bit with the Copco.
• Terex Reedrill R20C airtrack drill	• 0	
• Hitachi EX300LC excavator • Cat 916 Loader • Cat D6 Dozer	• 24 • 24 • 12	- Excavator and Loader: Sort material, place blast mats, and fed the crusher. - Dozer: walked from the Bay to Patch and cleared snow off from the unsuitable pile area.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Cedric (excavator operator) (12hrs)
NWT Rock	• Blasting: Matt Roy (Blaster) (12hrs), Jamie Cameron (Helper) (12hr), Paul Hubbard (Driller) (12hr)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Cyril Turpin (SLEC) about mucking and clearing cycle for Patch Lake Tank Farm. It seems that the blaster will blast all day every 2 hours. This might result in blasting during the day and mucking during the night.
- (On-going) Discussion with Fred Penner (Miramar) about construction scheduling with respect to fuel transport and temporary storage locations. It was concluded that part of the Major Drill Shop area will be cleared off for the storage of the tanks and they will be recharged there.
- Tom Luddington (Kitnuna) was informed about the poor backfill situation in the testpit and he ensured these miscommunications will be eliminated.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm was not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- The crusher is being tune to make 2.5-3cm material.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site.

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DAILY REPORT #16 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.04.29
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -16	Minimum: -23	Maximum: -10
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Sunny		

ACTIVITY

Location	Description
Tank Farm	• 3 blasts on day shift (26 holes) and 1 blast on night shift (6 holes). • Excavator mucking out material, sorting out oversize and move material/blast mats in preparation for ongoing blasts • The crusher is working on day shift to produce 2.5-3cm material • Re-drill some holes due to collapse and fractures. • There will be night shift blasting. It will be suspended during dark hours ~4hrs from midnight to 4am.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location. • Daily amount of explosives are being transported from the Bay to Site during the night shift.
Other Activity	• Night shift with blasting, excavator and loader to muck and sort out material from the blasts. Oversize materials are being transported with the loader to the unsuitable stockpile area. • Dozer cleared the snow off from the north eastern area of the Major Shop in preparation for fuel tanks. • New blasters and helpers arrived on site on Saturday and received site training. They started to work with Matt Roy (blaster) to go through site specifics. Matt Roy is scheduled to leave site on Tuesday.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 24	Drill new holes at the north eastern area of the farm and re-drilled some holes at the south western area for blasting
• Hitachi EX300LC excavator • Cat 916 Loader • Cat D6 Dozer • Cat 320 Rock Truck	• 24 • 24 • 24 • 24	- Excavator and Loader: Sort material, place blast mats, and fed the crusher. - Dozer: clear snow from unsuitable stockpile. - Truck: haul oversize to unsuitable area.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/loader operator) (24hrs)
NWT Rock	• Day and night shift for, Blasters, helpers and drillers. (24hrs)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- Brought a rock truck from the Bay for the Patch Lake to haul the oversize to unsuitable area, instead of using the loader. The oversize is placed near the side of the area, and the excavated frozen soil and dirty snow cleared off the construction footprint will be place in the centre. The pile will then be re-slope and armoured with oversize.
- The newly arrived blasters and helpers are discontent with site accommodations and the work environment. One helper has requested to be sent back to Yellowknife. Roland (NWT Rock) has arrived to site to meet with Fred Penner and Cyril Turpin to sort out the issues. It was concluded that work will continue; however the mentioned helper left site.
- Today is the start of the 24hrs construction. There will be blasting, mucking and sorting 24hrs. The crusher will only run on day shift. Blasting will be suspended for approximately 4hrs during the dark hours. The night shift blaster will use that time to transport whole days worth of explosives.
- The north eastern area of the Major Shop was cleared of snow for fuel tanks. Miramar's plan is to move all the tanks to the area and refuel. They will leave one tank empty to move into the farm when completed. Then recharge and relocate into the farm one at a time.
- Estimated 160 m^3 of material produced by the crusher.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. The remains concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site.

1. Crusher on site

2. Processed material.

3. Unsuitable stockpile area is located approximate where the dozer is operating. Oversize are placed near the edge of the area for

4. Blaster and helper load the holes.

5. Excavator placing blasting mat prior to blast.

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DAILY REPORT #17 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.04.30
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -2	Minimum: -8	Maximum: 4
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• 4 blasts on day shift (26 holes) and 1 blast on night shift (6 holes). • Excavator mucking out material, sorting oversize and moving material/blast mats in preparation for ongoing blasts • The crusher is working on day shift to produce 2.5-3cm material, estimated at 200 m^3 to date. • Re-drill some holes due to collapse and fractures.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location. • Daily amount of explosives are being transported from the Bay to Site during the night shift.
Other Activity	• Only half night shift was worked as the blaster had to switch to days. Only excavator worked for half the night with the blaster. Oversize material is being transport by the loader to the unsuitable stockpile area. • Dozer spread some oversize material over the propose tank laydown area, north eastern of the Major Shop, to level it out for the temporary refuelling the tanks. • Rock trucks are hauling the oversize to the unsuitable area. The oversize is placed near the side of the area. When the excavated frozen soil and dirty snow are cleared off within the construction footprint, these materials will be place in the centre. The pile will then be resloped and armoured with oversize.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 12	Drill new holes at the north eastern area of the farm and re-drill some hole at the south western area for blasting
• Hitachi EX300LC excavator • Cat 916 Loader • Cat D6 Dozer • Cat 320 Rock Truck	• 18 • 12 • 12 • 12	- Excavator and Loader: Sort material, place blast mats, and fed the crusher. - Dozer: clear snow from unsuitable stockpile. - Truck: haul oversize to unsuitable area.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/loader operator) (24hrs)
NWT Rock	• Day and night shift for, Blasters, helpers and drillers. (24hrs)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- The north eastern area of the Major Shop was cleared of snow and levelled out with oversize. Tanks will be mobilized to that location and refuelled.
- Discussion with the blasters about the ongoing development of the farm pad. The concern is that they wanted 1 m thick buffer of material in front of the blast face to protect the blast. This wasn't a problem when they develop the pad from north to south. Now that the western third of the pad is almost finished, the blasters wanted to blast west to east, which means they will need the 1m thick material along the entire length of the pad. This will delay the mucking and sorting operation.
- The Copco drill is running on the last 2 rods. There are frequent breaks on the rods due either to work condition or poor quality of material. If one or both rods break, drilling will be suspended. NWT Rock was informed to ship more rods for drilling.
- Tonight will be the last night shift for blasting until further notice. Even though there are 2 certified blasters on site, only one of them have experience with precision and control blasting. The blasting operation will go back to day shift only. However, the inexperienced blaster will transport the powder before and after each shift to minimize down time.
- Discussion on construction traffic pattern between blasting and mucking. Solution to be determined tomorrow.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulating floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site.
- Due to the lack of transportation on site, it is very difficult for construction manager and SRK engineer to perform site inspections and visits. Fred Penner is aware of this and there are no immediate solutions.

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DAILY REPORT #18 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.01
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -3	Minimum: -8	Maximum: 3
Precipitation (mm)	Rain: None	Snow: <1cm	
Conditions	Sunny to Overcast, light snow		

ACTIVITY

Location	Description
Tank Farm	• 5 blasts on day shift (52 holes). • Day shift Excavator mucking out material, sorting oversize and moving material/blast mats in preparation for ongoing blasts. • Crusher didn't work today. • Re-drill some holes due to collapse and fractures.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location. • Daily amount of explosive is being transported from the Bay to Site during the day shift.
Other Activity	• Night shift for loader and excavator for mucking. Oversize material is being transported by the truck to the unsuitable stockpile area. • Fuel tanks are being transport to "staging area" north eastern of the Major Shop. • Rock truck hauls the oversize to unsuitable area. The oversizeare placed near the side of the area. Excavated frozen soil and dirty snow from the construction footprint will be placed in the centre, and the pile will then be re-sloped and armoured with oversize.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 12	Re-drill some holes at the south western area for blasting
• Hitachi EX300LC excavator • Cat 916 Loader • Cat D6 Dozer • Cat 320 Rock Truck	• 24 • 24 • 12 • 24	- Excavator and Loader: Sort material, place blast mats, and fed the crusher. - Dozer: move fuel tanks to staging area. - Truck: haul oversize to unsuitable area.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/loader operator) (24hrs)
NWT Rock	• Day and night shift for, Blasters, helpers and drillers. (24hrs)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

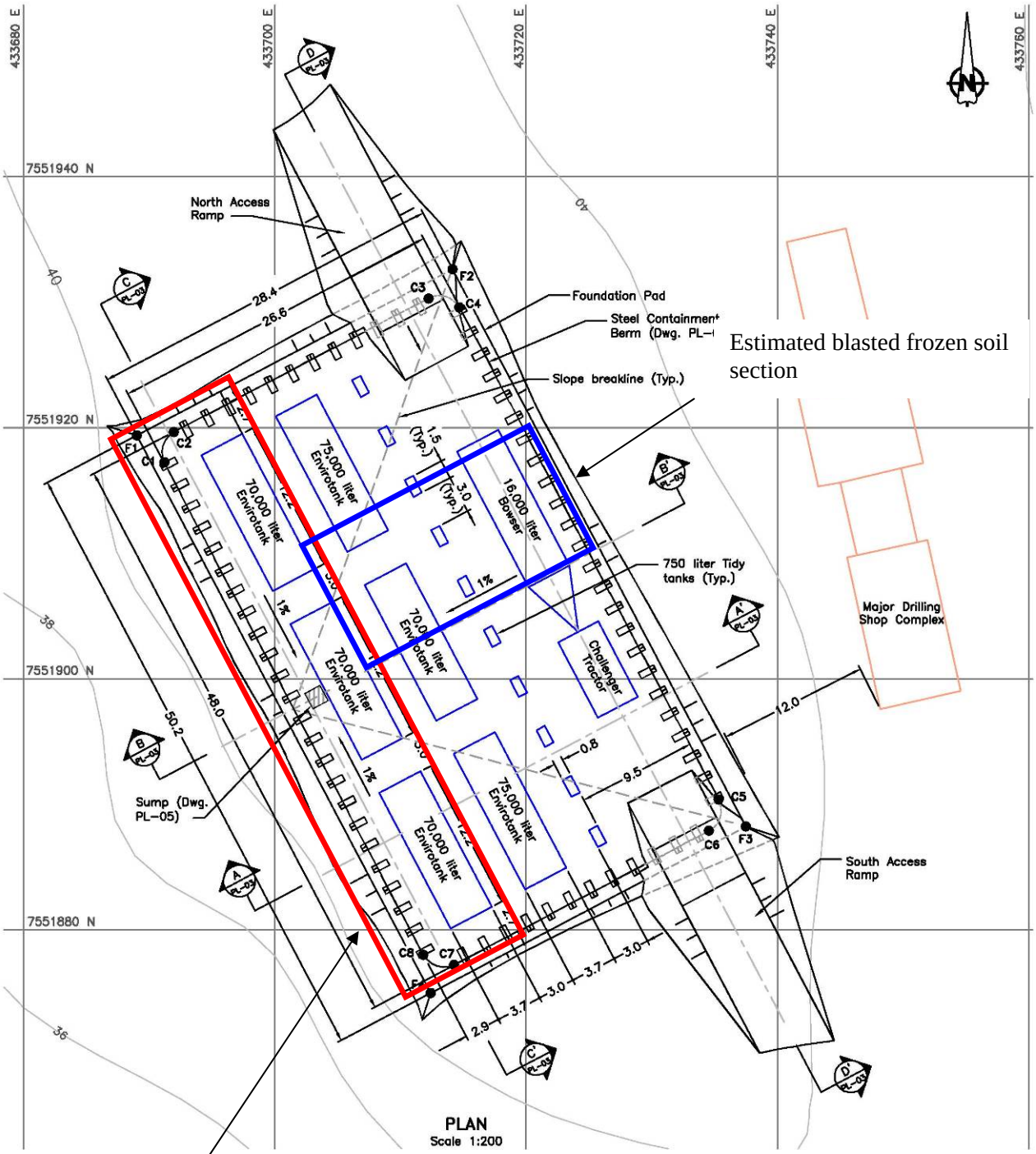
- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- Tanks are being mobilized to staging area north eastern of the Major Shop prepared for refuelling.
- Discussion on construction traffic pattern between blasting and mucking. It is determined that blasting will be done is 10 m wide section done from west to east with priority on the rock. The excavator, loader and truck can be travel on the blasted material without worrying drilled and loaded holes.
- Discussion with Tom Luddington about the night shift operation to mucking all material from the blasted area. The work will be done from west to east.
- Blasted the frozen overburden approximately middle of the farm. The excavator will level off the pile and use it as access to the rock blast in the western side of the farm. See attached diagram for details.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is concern about the undulating floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site.
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.



Estimated blasted frozen soil section

Estimated blasted rock section

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DAILY REPORT #19 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.02
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -3	Minimum: -8	Maximum: 3
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• 4 blasts on day shift (38holes). • Day shift Excavator mucking out material, sorting out oversize and move material/blast mats in preparation for ongoing blasts. • Night shift excavator and truck mucked out unsuitable material to disposal site. • Crusher work today to produce estimated 300 m^3 to date. • Re-drill some holes due to collapse and fractures.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location. • Daily amount of explosive is being transported from the Bay to Site during the day shift.
Other Activity	• Night shift for loader and excavator for mucking. Oversize and unsuitable material is being transported by the truck to the unsuitable stockpile area. • Fuel tanks are transported to "staging area" north eastern of the Major Shop and began refuelling over night shift.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 12	Re-drill some holes at the south western area for blasting
• Hitachi EX300LC excavator • Cat 916 Loader • Cat D6 Dozer • Cat 320 Rock Truck	• 24 • 24 • 12 • 24	- Excavator and Loader: Sort material, place blast mats, and fed the crusher. - Dozer: move fuel tanks to staging area. - Truck: haul oversize to unsuitable area.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/loader operator) (24hrs)
NWT Rock	• Day and night shift for, Blasters, helpers and drillers. (24hrs)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Fred wants to know when he needs to notify Layfield to come in for the liner installation. It is concluded that a preliminary date will be set when the excavation is completed.
- Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment availability.
- Tanks are mobilized to staging area north eastern of the Major Shop and started refuelling over night shift.
- Discussion with Tom Luddington about the night shift operation to mucking all material from the blasted area. The operators were instructed to be careful not to mix frozen soil with rock material.
- Blasted the frozen overburden approximately middle of the farm. The excavator will remove all the frozen material. There are rocks in mixed with the unsuitable but it is unfeasible to sort the material. All the mix material is considered rejects and deposed.
- It is estimated that 3 more days of blasting required bringing the farm to construction level.
- 2 of the crewmen, driller and blaster helper, from Patch Lake were sent to Roberts Bay to train the crew out there for construction. Progress was slightly delayed because the lack of experienced workers. The crewmen will return to their posts tomorrow.
- There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is concern about the undulating floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site.
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

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DAILY REPORT #20 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.03
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -11	Minimum: -15	Maximum: -8
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• 3 blasts on day shift (30 holes). • Day shift Excavator mucking out material, sorting out oversize and move material/blast mats in preparation for ongoing blasts until breakdown before end of shift. • Crusher work today to produce estimated 400 m^3 to date. It is dismantled and prepared to transport to Roberts Bay. • Re-drill some holes due to collapse and fractures until rods stuck in ground.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location. • Daily amount of explosive is being transported from the Bay to Site during the day shift.
Other Activity	• Fuel tanks are transported to "staging area" north eastern of the Major Shop and began refuelling over night shift.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 12	Re-drill some hole at the south western area for blasting. Driller got the rods stuck in one of the holes.
• Hitachi EX300LC excavator • Cat 916 Loader • Cat D6 Dozer • Cat 320 Rock Truck	• 12 • 12 • 12 • 12	- Excavator and Loader: Sort material, place blast mats, and fed the crusher. - Dozer: move fuel tanks to staging area. - Truck: haul oversize to unsuitable area.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/loader operator) (24hrs)
NWT Rock	• Day shift for, Blasters, helpers and drillers. (12hrs)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Fred wants to know when he needs to notify Layfield to come in for the liner installation. It is concluded that a preliminary date will be set when the excavation is completed.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- Tanks are mobilized to staging area north east of the Major Shop and started refuelling over night shift.
- (On-going) Discussion with Tom Luddington about the night shift operation to mucking all material from the blasted area. The operators were instructed to be careful not to mix frozen soil with rock material.
- It is estimated that 2 more days of blasting required bringing the farm to construction level. However due the incident with the stuck rods, the schedule will be delayed.
- 1 of the crewman, blaster helper, from Patch Lake was sent to Roberts Bay to train the crew out there for construction. Progress was slightly delayed because the lack of experienced workers.
- The driller got the rods stuck in a hole during re-drill. There are only 2 rods left on site prior to the incident. It has to be removed from the ground without damage, otherwise, new rods are required on site to resume drilling effort.
- The excavator is down at the end of the shift and need repairs. It is unknown to SRK what the damage is and when it will be operational.
- The crusher worked the dayshift and produced an estimated 400 m^3 (1,000 tons) of material. It was dismantled over night and prepared to transport to Roberts Bay. The decision to move the crusher is made by Miramar and for the reason to produce material for the construction out at the Bay. SRK stressed the point that it is unclear on exactly how much material is needed for the Patch Lake pad construction since the blasted floor is not exposed. It is concluded that selected oversizes (<40cm diameter) will be incorporated with the fines in the bulk fill. The work can be done to specifications with selected oversize with careful control and extra efforts. This topic will be an ongoing issue to be updated and reported.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site.
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

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DAILY REPORT #21 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.04
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -11	Minimum: -15	Maximum: -8
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• No blast today due to equipment problems. • No earthworks today due equipment problems • Crusher mobilized to Roberts Bay
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Fuel tanks are continued be refuelled over night shift.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 0	Drill rods are stuck in the ground. Need another equipment to remove it.
• Hitachi EX300LC excavator • Cat 916 Loader • Cat D6 Dozer • Cat 320 Rock Truck	• 0 • 0 • 0 • 0	- Excavator has a busted main hose and needs a new one. - Loader mobilized to Roberts Bay with the crusher.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/loader operator) (0hrs)
NWT Rock	• Day shift for, Blasters, helpers and drillers. (0hrs)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

• None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Fred wants to know when he needs to notify Layfield to come in for the liner installation. It was concluded that a preliminary date will be set when the excavation is completed.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- Fuel tanks at the staging area are continued being refuelled.
- All blasting and earthwork are suspended due to equipment problems. It is unknown to SRK when will operation will return to normal.
- It is estimated that 3 more days of blasting required bringing the farm to construction level. However due the incident with the stuck rods and downed excavator, the schedule will be delayed.
- The excavator has a busted main hydraulic hose. A replacement was flown in but it is not properly fitted. Site refitting is being carried out but results are uncertain.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site.
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

Photo 1: Updated site panoramic

Photo 2: The rod that is stuck in the ground.

Photo 3: Quality of the produced crushed material

Photo 4: Crushed material stockpile.

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DAILY REPORT #22 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.05
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -16	Minimum: -28	Maximum: -8
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Sunny and very windy		

ACTIVITY

Location	Description
Tank Farm	• 2 blasts today at the northern end of farm, 18 holes. It was late start due to equipment issues. The first blast was at 2pm. • Earthworks resume with a late start due to repairs. Excavator continued to move blast mats and excavate material out the blasted floor.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Fuel tanks are continued be refuelled over night shift.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 6	Drill rods are stuck in the ground. Need another equipment to remove it.
• Hitachi EX300LC excavator • Cat D6 Dozer • Cat 220 Rock Truck	• 6 • 0 • 6	- Excavator has a busted main hose and needs a new one. - Truck was hauling unsuitable to stockpile area.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day shift operators (excavator/truck operator) (10hrs)
NWT Rock	• Day shift for Blasters, helpers and drillers. (10hrs)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

• None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Fred wants to know when he needs to notify Layfield to come in for the liner installation. It was concluded that a preliminary date will be set when the excavation is completed.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- Fuel tanks at the staging area are continued being refuelled.
- Blasting continue around noon. The drill has frozen components that needed to be defrosted. The rod was extracted in the afternoon blasting around to break it free. It is estimated that 4 more days of blasting required bringing the farm to construction level.
- The excavator was repaired late morning and work continued. The excavator continues to excavate and sort the blasted material, along with moving blast mats for blasting operations.
- The oversize and unsuitable material are hauled to the stockpile with the truck in day shift.
- No night shift due to short of man power.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site.
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

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DAILY REPORT #23 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.06
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -16	Minimum: -28	Maximum: -8
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast and very windy, drifting condition		

ACTIVITY

Location	Description
Tank Farm	• White out conditions, suspended day shift work until weather clears. • Night shift with reduced efficiency due to shortage of man power and weather conditions.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• White out condition, suspended day shift work until weather clears.

EQUIPMENT

Equipment	Operating Hours	Notes
• Atlas Copco ECM590 airtrack drill	• 0	- Suspended work due to weather
• Hitachi EX300LC excavator • Cat D6 Dozer • Cat 220 Rock Truck	• 12 • 0 • 4	- Suspended day work due to weather. Night shift to muck out material. Night shift with excavator and partly with truck.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day shift operators (excavator/truck operator) (10hrs, standby)
NWT Rock	• Day shift for Blasters, helpers and drillers. (10hrs, standby)

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Fred wants to know when he needs to notify Layfield to come in for the liner installation. It was concluded that a preliminary date will be set when the excavation is completed.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- Suspended day work due to whiteout conditions.
- Night shift with the excavator and truck to mucking out blasted material. Only excavator works throughout the night as Tom Luddington from day shift could only run the truck for a few hours at night. Work efficiency is reduced due to the shortage of operators and near whiteout conditions.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site.
- (On-going) Due to the lack of transportation here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

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DAILY REPORT #24 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.07
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -14	Minimum: -20	Maximum: -8
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast and very windy, drifting condition		

ACTIVITY

Location	Description
Tank Farm	• Late start at 9am due to organizational issues. 5 blasts with 48 holes. (4 during the day, 1 early night) • Day shift on excavator for mucking, sorting out material and moving blasting mats. • Rock truck haul unsuitable material to stockpile • Night shift with reduced efficiency due shortage of man power. The operator for the excavator work on the truck alternately for get unsuitable material to stockpile.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Tanks are being refuelled over night.

EQUIPMENT

Equipment	Notes
• Atlas Copco ECM590 airtrack drill	- Drill new pattern at the northern area of the farm and re-drill holes for blasting.
• Hitachi EX300LC excavator • Cat D6 Dozer • Cat 250 Rock Truck	- Day shift to muck unsuitable material and move blast mats. Night shift with excavator only to muck out material.

PERSONNEL

SRK	• Alvin Tong
Miramar	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day shift operators (excavator/truck operator)
NWT Rock	• Day shift for Blasters, helpers and drillers

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Fred wants to know when he needs to notify Layfield to come in for the liner installation. It was concluded that a preliminary date will be set when the excavation is completed.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- There was confusion with NWT Rock crew this morning as to who is going where and what shift. NWT Rock doesn't have a supervisor here on site. Personnel allocation will be addressed tomorrow morning by Cyril (SLEC) and Chris (Nuna).
- Blasting has shifted onto the frozen soil at the northern area of the farm. It is part of the new construction methods describe below.
- A new construction method was suggested on site. To shorten the construction schedule, site personnel suggested that only the frozen soil and large oversize are removed. The rest of the material will be spread over the in place to reduce haul and muck time. This will increase the fill thickness over the blasted floor and reduce the need to blast the ramp accesses. SRK has significant concerns about this method of construction for the following reasons:
  - By simply spreading the material place, the floor elevation cannot be surveyed and the fill thickness cannot be established. This is undesirable and inappropriate from an engineering standpoint, and not knowing the fill thickness compromises judgement with respect to compaction efficiency.
  - By not completing an as-built survey on the blasted floor, there is not confirmation of if the floor will not have ponding water. Ponding water on the blasted floor will be subject the full freeze/thaw cycle which will compromise the structural integrity of the tank farm and the liner integrity. Both consequences which are completely unacceptable.
  - Furthermore by not controlling appropriate fill material appropriate compaction cannot be done. Compaction using the on-site truck and excavator bucket may be experimented with but that is highly unlikely to be satisfactorily to prevent large voids from being present, especially if the material is not appropriately graded.
  - As a whole whilst SRK recognizes the importance of moving the project to conclusion, this revised work methodology is not acceptable and SRK does not approve it.
- Night shift with the excavator mucking out blasted material. Work efficiency is reduced due to the shortage of operators to run the rock truck. The excavator operator was running both machines at night to get unsuitable material to the stockpile.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- MHBL instructed SRK to stop any further reporting of construction personnel and equipment hours. That responsibility will revert back to SLEC where it belongs.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site.
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

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DAILY REPORT #25 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.08
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Cyril Turpin (SLEC), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -5	Minimum: -10	Maximum: -1
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Sunny		

ACTIVITY

Location	Description
Tank Farm	• 4 blasts with 32 holes during the day and 4 blast with 26 holes during the night. • Day and night shift on excavator for mucking, sorting out material and moving blasting mats. • Day and night shift Rock truck haul unsuitable material to stockpile
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Tanks are being refuelled over night.

EQUIPMENT

Equipment	Notes
• Atlas Copco ECM590 airtrack drill	- Day and night shift to drill new holes to adjust the northern pattern and re-drill some holes for blasting
• Hitachi EX300LC excavator • Cat D6 Dozer • Cat 250 Rock Truck	- Day and night shift to muck unsuitable material and move blast mats.

PERSONNEL

SRK	• Alvin Tong
Sub-Arctic Surveyor	• Surveyor
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• Day and night shift for Blasters, helpers and drillers
SLEC	• Gary Morris, Cyril Turpin

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Fred wants to know when he needs to notify Layfield to come in for the liner installation. The preliminary date is set on May 14th.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- Gary Morris (SLEC) is on site and Cyril Turpin is off site for rotation.
- SLEC and SRK have worked out a revised construction plan. All the frozen till material at the northern section of the farm will be blasted and excavated. A survey will be done on the floor to confirm bedrock and elevations. Then the blasted material that being stock in the middle of the farm will be placed in the northern section in lifts to ensure compaction. The lift thickness will be determined after field tests. The process will continue to expose and identify the blasted floor for survey then place with material from southern sections to minimize double handling of material. Anomalous rock nodules will be blasted or hammered to grade. Drainage dykes or natural grade to the west will be made on the blasted floor to ensure water drainage. This will be site fitted with survey results. The north and south ramps may require blasting but it will be determined on a later date.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site. Preliminary inventory shows that the small parts are missing (nuts and bolts).
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

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DAILY REPORT #26 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.09
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -4	Minimum: -10	Maximum: 2
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Sunny		

ACTIVITY

Location	Description
Tank Farm	• 4 blasts with 32 holes during the day and 3 blast with 19 holes during the night. • Day and night shift on excavator for mucking, sorting out material and moving blasting mats. • Day and night shift Rock truck haul unsuitable material to stockpile.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Tanks are being refuelled over night.

EQUIPMENT

Equipment	Notes
• Atlas Copco ECM590 airtrack drill	- Day and night shift to drill new holes to adjust the northern pattern and re-drill some holes for blasting. Drill was down at the end of the night.
• Hitachi EX300LC excavator • Cat D6 Dozer • Cat 250 Rock Truck	- Day and night shift to muck unsuitable material and move blast mats.

PERSONNEL

SRK	• Alvin Tong
Sub-Arctic Surveyor	• Surveyor
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• Day and night shift for Blasters, helpers and drillers
SLEC	• Gary Morris, Cyril Turpin

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Fred wants to know when he needs to notify Layfield to come in for the liner installation. The preliminary date is set on May 14th.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- Sub-Arctic surveyor is on site. He will record the elevation of confirmed bedrock on the floor. He will provide SRK with a general floor configuration for further engineering design.
- The frozen soil in the northern section is fully blasted and being excavated through out the day. Frozen material is being hauled to the unsuitable material stockpile. It was mentioned by Matt Kawey that the pile is getting to large and a new unsuitable stockpile area is needed. .
- Discussion with Gary Morris (SLEC), Chris Petrovic (Nuna) and Fred Penner (Miramar) on construction traffic and sequence. Gary wants to bring in the smaller 20 ton excavator from the Bay to Patch to increase the production. They also want to bring the compactor in from the Bay for the work. Fred has concerns about bringing equipment over the distance in the warm weather on site. There is a high possibility that the equipment will be trapped at Patch over the summer and unable to the work at Roberts Bay. SRK mentioned that the production bottle neck at Patch is not only the limited number of equipment; it is also the lack of direction and supervision on site. Chris has verbally agreed to help direct traffic to ensure equipment rotation for a short period of time. The amount of time the extra equipment will be working at Patch will be determined by the weather and snow conditions.
- The production blasting of the farm is expected to be finished on Friday. SRK will then site fit drainage dykes and access ramps when there are more information on the floor. More blasting may required to construct them.
- The Copco drill at Patch is down from a broken elbow fitting. NWT Rock crew is searching the site for a replacement. SRK don't know when the drill will be operational.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site. Preliminary inventory shows that the small parts are missing (nuts and bolts).
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

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DAILY REPORT #27 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.10
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -5	Minimum: -8	Maximum: 2
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Sunny		

ACTIVITY

Location	Description
Tank Farm	• No blast in day shift due to equipment problems. Drill was repaired late night and had 2 blasts with 16 holes. • Day and night shift on excavator for mucking, sorting out material and moving blasting mats. • Day and night shift Rock truck haul unsuitable material to stockpile.
Survey	• N/A
Materials	• 176 totes of sand on site. • 2 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Tanks are being refuelled over night.

EQUIPMENT

Equipment	Notes
• Atlas Copco ECM590 airtrack drill	- Drill is down due to blown cylinder. Repaired late night.
• Hitachi EX300LC excavator • Hitachi 20 ton excavator • Cat D6 Dozer • Cat 250 Rock Truck	- Day and night shift to muck unsuitable material, expose blasted floor and spread material to grade. Dozer spread and pushes material to feed excavators.

PERSONNEL

SRK	• Alvin Tong
Sub-Arctic Surveyor	• Surveyor
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• Day and night shift for Blasters, helpers and drillers
SLEC	• Gary Morris

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

• None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Fred wants to know when he needs to notify Layfield to come in for the liner installation. The preliminary date is set on May 14th.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- (On-going) Sub-Arctic surveyor is on site. He will record the elevation of confirmed bedrock on the floor. He will provide SRK with a general floor configuration for further engineering design.
- A smaller 20 ton excavator has brought to site to increase production.
- D6 dozer was used to spread material to meet grade and push material feed the excavator for haulage.
- The frozen soil at the northern area of the farm is excavated and blasted floor is surveyed and inspected, approximately 28m x 15m from the northern most limited of the farm. The blasted floor is uneven with the highest node at approximately 38.8 m and lowest spot at approximately 38.1 m. A preliminary finish grade is set at El. 39m at the edges with -1% slope toward the sump. General fill from the blast has been spread in place over the approved floor. The general fill consist of blasted material with largest fragments approximately 0.4 m in diameter and approximately 15% fines (<2cm). A 0.2 m thick of the crushed material will be spread over the general fill to provide more fines for the compaction and smooth finish grade. Compaction has not been done to any placed fill. Preliminary decision is made to blast drainage dykes through the west rock wall to provide drainage. Locations of these dykes will be site fitted when the floor survey is completed.
- SLEC has made a site decision to spread some material over the west side of the farm over the limits of the specified footprint. SRK voiced on site not supporting this decision. Work was carried out under SLEC direction. Matt Kawey (Miramar) inspected the site and disapproved the placement to the fill. All material placed over the west side will have to be removed under Miramar's instruction.
- The unsuitable stockpile is getting too large for containment. Alternatives construction method may be required to reduce the amount fill haul to the stockpile.
- The Copco drill at Patch is down due to a blown cylinder. Blasting is suspended until approximately midnight when the drill was repaired. 2 blast during the night until powder ran out.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site. Preliminary inventory shows that the small parts are missing (nuts and bolts).
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

Photo 1: Site work with 2 excavators and the dozer.

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DAILY REPORT #28 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.11
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -3	Minimum: -5	Maximum: 2
Precipitation (mm)	Rain: None	Snow: <1cm	
Conditions	Overcast with very light snow		

ACTIVITY

Location	Description
Tank Farm	• 3 blasts with 21 holes during the day shift and 3 blasts with 18 holes • Day and night shift on excavators for mucking, sorting out material and moving blasting mats. • Day and night shift Rock truck haul unsuitable material to stockpile.
Survey	• N/A
Materials	• 176 totes of sand on site. • 3 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Tanks are being refuelled over night.

EQUIPMENT

Equipment	Notes
• Atlas Copco ECM590 airtrack drill	- Drill is down due to blown cylinder. Repaired late night.
• Hitachi EX300LC excavator • Hitachi 20 ton excavator • Cat D6 Dozer • Cat 250 Rock Truck	- Day and night shift to muck unsuitable material, expose blasted floor and spread material to grade.

PERSONNEL

SRK	• Alvin Tong
Sub-Arctic Surveyor	• Surveyor
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• Day and night shift for Blasters, helpers and drillers
SLEC	• Gary Morris

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

• None

COMMENTS, CONCERNS AND CORRESPONDENCE

- Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Layfield representative is coming to site on Tuesday the 15th.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- (On-going) Sub-Arctic surveyor is on site. He will record the elevation of confirmed bedrock on the floor. He will provide SRK with a general floor configuration for further engineering design.
- (On-going) The unsuitable stockpile is getting too large for containment. Alternatives construction method may be required to reduce the amount fill haul to the stockpile.
- The production blasting is expected to be finished at the end of tonight's shift. There are other construction blasting needed such as the drainage dykes and the south access ramp.
- There are few high rock nodes left behind on the floor from the blasting that are above grade. They will be drilled and blasted down after the production blasting is done.
- The rock formation at the south end has intersecting wide spacing joint set. The blasts are unable to produce a lot of fine material (<0.4m) due to joints and most of the blasted material has to be hauled out.
- General fill is being place on the floor when it is surveyed. Crushed material will be placed when the whole floor meets rough grade. Compaction will be done after the crushed material placement. Compaction equipment is not yet on site at Patch. SRK was told a compactor is on its way to Patch from the Bay.
- The 20 ton excavator and the rock truck are planned to leave Patch to travel back to the Bay. The travel will either be tonight or tomorrow night pending snow conditions.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site. Preliminary inventory shows that the small parts are missing (nuts and bolts).
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

Photo 1: General fill at rough grade.

Photo 2: Large fragments produced from the blast due to wide spacing joint sets.

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DAILY REPORT #29 – Patch Lake Tank Farm

Prepared by:	Alvin Tong	**Date:**	2007.05.12
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -7	Minimum: -12	Maximum: 2
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Sunny		

ACTIVITY

Location	Description
Tank Farm	• 2 blasts on ramp with 12 holes and split large boulder into smaller pieces. • Day and night shift on excavators for mucking, sorting out material and moving blasting mats. • Day and night shift Rock truck haul unsuitable material to stockpile.
Survey	• N/A
Materials	• 176 totes of sand on site. • 3 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Tanks are being refuelled over night.

EQUIPMENT

Equipment	Notes
• Atlas Copco ECM590 airtrack drill	- Drill is down due to blown cylinder. Repaired late night.
• Hitachi EX300LC excavator • Hitachi 20 ton excavator • Cat D6 Dozer • Cat 250 Rock Truck	- Day and night shift to muck unsuitable material, expose blasted floor and spread material to grade.

PERSONNEL

SRK	• Alvin Tong, Michelle Murphy
Sub-Arctic Surveyor	• Surveyor
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• Day and night shift for Blasters, helpers and drillers
SLEC	• Gary Morris

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

• None

COMMENTS, CONCERNS AND CORRESPONDENCE

- Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Layfield representative is coming to site on Tuesday the 15th.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- (On-going) Sub-Arctic surveyor is on site. He will record the elevation of confirmed bedrock on the floor. He will provide SRK with a general floor configuration for further engineering design.
- (On-going) The unsuitable stockpile is getting too large for containment. Alternatives construction method may be required to reduce the amount fill haul to the stockpile.
- A break at the south western corner of the farm is spotted. Hence, there is no need to blast drainage dykes through the west rock wall.
- All production blasting is done within the farm footprint. Other construction blasting is being carried out through the day on high rock nodes, access ramp and breaking boulders.
- The access ramp to the south end is blasted to approximate elevation 40.5m to lower the difference between the finish grade and the ramp apex. The ramp will be bent slightly to the east to minimize blasting and fill. The access ramps will have a grade of 12:1 as suggested by Fred Penner.
- Miramar has allowed re-sloping over the west bank of the farm with the material already placed and additional material. The excavator worked on the slope over night.
- The 20 ton excavator mobilized back to the Bay around 3am. The rock truck and the air-track drill will leave some time tomorrow.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site. Preliminary inventory shows that the small parts are missing (nuts and bolts).
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

Photo 1: Excavator working on the west bank.

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DAILY REPORT #30 – Patch Lake Tank Farm

Prepared by:	Alvin Tong, Michelle Murphy	**Date:**	2007.05.13
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -6	Minimum: -10	Maximum: -3
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast, slight wind		

ACTIVITY

Location	Description
Tank Farm	• Day and night shift on excavator for mucking out oversize material. • Day shift blasting • Day and night shift Rock truck haul unsuitable material to stockpile.
Survey	• N/A
Materials	• 176 totes of sand on site. • 3 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• N/A

EQUIPMENT

Equipment	Notes
• Hitachi EX300LC excavator • Cat D6 Dozer • Cat 250 Rock Truck	- Day and night shift to muck unsuitable material, expose blasted floor and spread material to grade.

PERSONNEL

SRK	• Alvin Tong, Michelle Murphy
Sub-Arctic Surveyor	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• Day shift for Blasters, helpers and drillers
SLEC	• Gary Morris

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- Discussion with Fred Penner (Miramar) about construction scheduling with respect to containment facility construction. Layfield representative is coming to site on Tuesday the 15th.
- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- (On-going) Sub-Arctic surveyor is on site. He will record the elevation of confirmed bedrock on the floor. He will provide SRK with a general floor configuration for further engineering design.
- (On-going) The unsuitable stockpile is getting too large for containment. Alternative construction methods may be required to reduce the amount fill haul to the stockpile.
- Air-track drill and 20 ton excavator mobilized out to Roberts Bay over night at Miramar's direction so that they do not get stuck at Patch after thaw, Rock Truck stayed behind for one more day.
- Blasting is completed on the south ramp and high points on tank farm floor completed.
- Excavator sort and haul oversize material and redistributing finer material into points below grade. Estimated 70% of material has been hauled out, 30% remaining and expected to be completed by tomorrow day shift. Then the dozer will level the fill to grade along with crushed material. The compactor is expected to work Monday 14th night shift to compact the material before leaving back to the Bay.
- Rock truck will be mobilized to the Bay tomorrow night shift.
- The south ramp needs to be mucked out and the unsuitable material removed.
- Survey will be done by Miramar surveyors on tank farm floor check grade and to prepare for liner.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site. Preliminary inventory shows that the small parts are missing (nuts and bolts).
- (On-going) Due to the lack of transportation here on here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

Photo 1: Current status of the farm including three high points in background, north-west side.

Photo 2: Three high points have been blasted near the end of day shift.

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DAILY REPORT #31 – Patch Lake Tank Farm

Prepared by:	Alvin Tong, Michelle Murphy	**Date:**	2007.05.14
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -7	Minimum: -10	Maximum: -4
Precipitation (mm)	Rain: None	Snow: Trace	
Conditions	Overcast, blowing snow in afternoon/evening		

ACTIVITY

Location	Description
Tank Farm	• Day and night shift on excavator for mucking out oversize material. • Day and night shift Rock truck hauls unsuitable material to stockpile. • Dozer spreading material to even out floor • Loader feed crushed material into the farm
Survey	• N/A
Materials	• 176 totes of sand on site. • 3 rolls geotextile on site (86’ x 162’ LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• N/A

EQUIPMENT

Equipment	Notes
• Hitachi EX300LC excavator • Cat D6 Dozer • Cat 250 Rock Truck • Cat 966 Loader	- Day and night shift to muck unsuitable material, expose blasted floor and spread material to grade.

PERSONNEL

SRK	• Alvin Tong, Michelle Murphy
Sub-Arctic Surveyor	• N/A
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• N/A
SLEC	• Gary Morris

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- (On-going) The unsuitable stockpile is getting too large for containment. Alternative construction methods may be required to reduce the amount fill haul to the stockpile.
- Layfield representative arrived on site this morning.
- Excavator sort and haul oversize material and redistributing finer material into points below grade. 95% completed by end of day shift.
- Dozer levelled the fill to as close to grade as possible without a surveyor.
- Dozer beginning to push material into place for south-east ramp.
- Rock truck has to be kept one more night. Dozer, compactor and rock truck may leave site tomorrow night to go to Robert's Bay before thaw.
- Remaining unsuitable material from south ramp needs to be mucked out and removed.
- SRK requested surveyor from Nuna and Miramar but no surveyor available for either day or night shift. SAS surveyor is expected to be made available to SRK for tomorrow morning.
- Need to place fines over present rock floor and compact. Expected to be done tomorrow day shift after surveyor has staked out the site.
- Excavator levelling off west rock wall to create a bench for it to travel on and re-sloped to generate a more aesthetic presentation.
- Need to get rid of approximately 2.5 meter rock wall in daylighting area to meet blasted floor grade by blasting or using the excavator or dozer if possible.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site. Four of six buckets of small parts (nuts and bolts) were located. Remainder arrived on morning flight. Need to locate the fins for the steel berm.
- (On-going) Due to the lack of transportation here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

Photo 1: Overall view of site as of 14 May afternoon. Dozer on site to level out material.

Photo 2: Rock wall at daylight point which needs to be removed.

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DAILY REPORT #32 – Patch Lake Tank Farm

Prepared by:	Alvin Tong, Michelle Murphy	**Date:**	2007.05.15
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -8	Minimum: -11	Maximum: -5
Precipitation (mm)	Rain: None	Snow: 2 cm	
Conditions	cloudy, snowing in day, clearing slightly in evening		

ACTIVITY

Location	Description
Tank Farm	• Day shift on excavator for mucking out oversize material and redistributing fines. • Day shift Rock truck hauls unsuitable material to stockpile. • Day shift Dozer spreading material to even out floor. • Day shift Loader feed crushed material into the farm. • Day shift Compactor on site to compact floor after placement of fines.
Survey	• SAS surveyor on site to stake grade.
Materials	• 176 totes of sand on site. • 3 rolls geotextile on site (86' x 162' LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• N/A

EQUIPMENT

Equipment	Notes
• Hitachi EX300LC excavator • Cat 563C Compactor • Cat D6 Dozer • Cat 250 Rock Truck • Cat 966 Loader	- Day and night shift to muck unsuitable material, expose blasted floor and spread material to grade.

PERSONNEL

SRK	• Alvin Tong, Michelle Murphy
Sub-Arctic Surveyor	• Surveyor
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• N/A
SLEC	• Gary Morris (Left site late morning)
Layfield	• Chris Rowson

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- (On-going) Sub-Arctic surveyor is on site. He will record the elevation of confirmed bedrock on the floor. He will provide SRK with a general floor configuration for further engineering design.
- (On-going) The unsuitable stockpile is getting too large for containment. Alternative construction methods may be required to reduce the amount fill haul to the stockpile.
- Layfield representative on site and did inventory check for the containment components and identified that all vertical fin plates are missing.
- Excavator sort and haul oversize material and redistributing finer material to meet grade and cover rough areas.
- Dozer levelled the fill to as close to survey grade as possible.
- Rock truck left site late afternoon to go to Robert's Bay. Compactor will stay on site until tomorrow.
- Parts of the south ramp needs clean up on snow and unsuitable material and replace with fill.
- The dimensions of the farm were changed to site fit the south western corner. Blasting didn't remove all the bedrock as designed and there are rock outcrops 4m inside of the designed footprint. The site decision is to move the south western corner inward 4m north and east to accommodate site conditions. Calculations show that the net loss to the area from the reduction is about 10%.
- Compaction was done of the rough grade floor for parts of day shift. SRK has not yet approved the overall compaction.
- SRK site inspection found bedrock in the daylight corner. It needs to be blasted to El. 38 to provide drainage. The blasting will be done by a handheld drill and small amounts of stick powder.
- Mine inspector on site. Determined that back up signal on Loader was broken and would need to be fixed prior to work continuing. Inspector also said that a precarious rock face on the south west corner needs to be removed. All work stopped by Miramar until such time the Loader could be fixed. As such, no work occurred during the night shift.
- 2 Blast mats were moved back to Patch Lake prior to blasting the south west corner wall.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site. Four of six buckets of small parts (nuts and bolts) were located. Remainder arrived on morning flight. Cannot locate the fins for the steel berm. More are being purchased by Miramar.
- (On-going) Due to the lack of transportation here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

Photo 1: Overall shot of site at end of day shift.

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DAILY REPORT #33 – Patch Lake Tank Farm

Prepared by:	Alvin Tong, Michelle Murphy	**Date:**	2007.05.16
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -6	Minimum: -11	Maximum: 0
Precipitation (mm)	Rain: None	Snow: trace	
Conditions	overcast, windy, some snow		

ACTIVITY

Location	Description
Tank Farm	• Day shift on excavator for mucking out oversize material. • Compactor on site to compact floor after placement of fines. • Day shift on loader to transport crush material.
Survey	• SAS surveyor on site to stake grade.
Materials	• 176 totes of sand on site. • 3 rolls geotextile on site (86’ x 162’ LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Blasting on low rock wall in daylighting area.

EQUIPMENT

Equipment	Notes
• Hitachi EX300LC excavator • Cat 563C Compactor • Cat D6 Dozer • Cat 966 Loader	- Day and night shift to muck unsuitable material, expose blasted floor and spread material to grade.

PERSONNEL

SRK	• Alvin Tong, Michelle Murphy
Sub-Arctic Surveyor	• Surveyor
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• 3 persons
SLEC	• N/A
Layfield	• Chris Rowson

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- (On-going) Sub-Arctic surveyor is on site. He will record the elevation of confirmed bedrock on the floor. He will provide SRK with a general floor configuration for further engineering design.
- (On-going) The unsuitable stockpile is getting too large for containment. Alternative construction methods may be required to reduce the amount fill haul to the stockpile.
- Layfield representative on site. Chris Rowson (Layfield) suggested that he can start laying out the textiles and base plates as soon as the foundation is completed and approved. This action can be done without the vertical fin plates.
- Mine inspector on site.
- Excavator removed oversize and excavated blasted material from the south western corner. There is loose material on the developed rock walls that will need scaling to remove lose rocks. Some very large size rocks were scaled from the wall and they are too large to be picked up by the excavator. They will be rolled out from the footprint via the south west daylight corner as directed by Fred Penner (Miramar).
- Parts of the south ramp needs clean up on snow and unsuitable material and replace with fill.
- The dimensions of the containment berm were changed to site fit the south western corner. Blasting didn't remove all the bedrock as designed and there are rock outcrops 4m inside of the designed footprint. The site decision is to move the south western corner inward 4m north and east to accommodate site conditions. Calculations show that the net loss to the area from the reduction is about 10%.
- Compaction was done of the rough grade floor for parts of day shift. SRK has not yet approved the overall compaction.
- SRK site inspection found bedrock in the daylight corner. It needs to be blasted to El. 38 to provide drainage. The drilling was done by a handheld drill and blasting with small amounts of stick powder. The total depth to be drilled and blasted is approximately 1.5 m. As longest drill rod is 0.9 m long; drilling will have to be done in two stages. First blast was done late afternoon and secondary blasts will be done tomorrow to finalize the drainage dyke.
- There are few rock high nodes found on the floor after compaction was done. There were discussions on site whether it is more efficient to bring the floor elevation up to cover the nodes or drill and blast them below grade. It is concluded that there is not enough crushed material to raise the floor elevation and blasting was chosen to cut the nodes.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- Ask Fred Penner to locate all steel containment berm parts. SRK needs to perform inventory on the material to ensure everything is on site. Four of six buckets of small parts (nuts and bolts) were located. Remainder arrived on morning flight. Cannot locate the fins for the steel berm. More are being purchased by Miramar, being shipped to site expected to arrive tomorrow.
- (On-going) Due to the lack of transportation here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.

Photo 1: Nearing grade. Excavator pulling out oversize material from daylight area after blast.

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DAILY REPORT #34 – Patch Lake Tank Farm

Prepared by:	Alvin Tong, Michelle Murphy	**Date:**	2007.05.17
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -8	Minimum: -14	Maximum: -4
Precipitation (mm)	Rain: None	Snow: Trace	
Conditions	overcast, windy, clearing in the evening		

ACTIVITY

Location	Description
Tank Farm	• Day shift on excavator for mucking out oversize material. • Compactor on site to compact floor after placement of fines. • Day shift on loader to transport crush material.
Survey	• N/A
Materials	• 176 totes of sand on site. • 3 rolls geotextile on site (86’ x 162’ LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Blasting on low rock wall in daylighting area and high nodes near sump.

EQUIPMENT

Equipment	Notes
• Hitachi EX300LC excavator/ Hitachi UM122 • Cat 563C Compactor • Cat D6 Dozer • Cat 966 Loader	- Day and night shift to muck unsuitable material, expose blasted floor and spread material to grade.

PERSONNEL

SRK	• Alvin Tong, Michelle Murphy
Sub-Arctic Surveyor	• Dave Farr
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• 3 persons
SLEC	• N/A
Layfield	• Chris Rowson

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

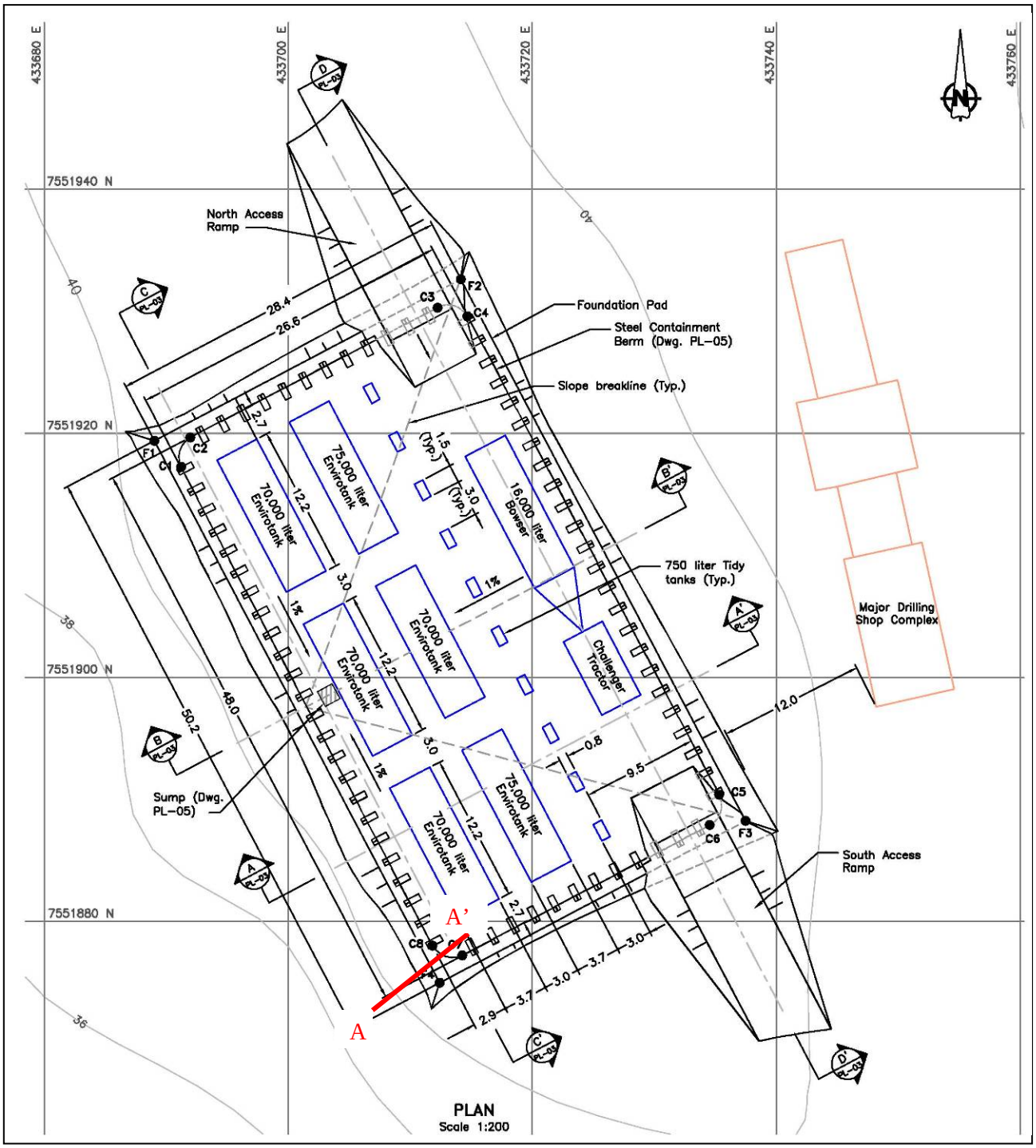
- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- (On-going) Sub-Arctic surveyor is on site. He will record the elevation of confirmed bedrock on the floor. He will provide SRK with a general floor configuration for further engineering design.
- (On-going) The unsuitable stockpile is getting too large for containment. Alternative construction methods may be required to reduce the amount fill haul to the stockpile.
- Layfield representative on site. Chris Rowson (Layfield) suggested that he can start laying out the textiles and base plates as soon as the foundation is completed and approved. This action can be done without the vertical fin plates.
- Excavator removed oversize and excavated blasted material from the south western corner. There is loose material on the developed rock walls that was scaled to remove lose rocks. Some very large size rocks were scaled from the wall and they are too large to be picked up by the excavator. They were rolled out from the footprint via the south east ramp and the daylight area as directed by Fred Penner (Miramar).
- The dimensions of the containment berm were changed to site fit the south western corner. Blasting didn't remove all the bedrock as designed and there are rock outcrops 4m inside of the designed footprint. The site decision is to move the south western corner inward 4m north and east to accommodate site conditions. Calculations show that the net loss to the area from the reduction is about 10%.
- Compaction was done of the rough grade floor for parts of day shift. Compactor was sent to Robert's Bay midday and a hand compactor will be used for remaining compacting. More loose material was added overnight and has not been compacted. SRK has not yet approved the overall subgrade and compaction.
- SRK site inspection found bedrock in the daylight corner. It needs to be blasted to El. 38 to provide drainage. The drilling was done by a handheld drill and blasting with small amounts of stick powder. The total depth to be drilled and blasted is approximately 1.5 m. As longest drill rod is 0.9 m long; drilling will have to be done in two stages. Secondary blasts were done in the morning to finalize the drainage dyke. Blast was not sufficient and drain is not to grade. SRK will not sign off on grade. Drain has to be lowered to comply, and may be accomplished by moving material by hand as the material is loose from the initial blast. Miramar will try the hand method first as the dyke is very close to grade. See attached sketch for details.
- There are few rock high nodes found on the floor after initial compaction was done. There were discussions on site whether it is more efficient to bring the floor elevation up to cover the nodes or drill and blast them below grade. It is concluded that there is not enough crushed material to raise the floor elevation and blasting was chosen to cut the nodes. The nodes were blasted in late morning.
- Hitachi EX300LC excavator walked out to Robert's Bay in the evening and replaced with the Hitachi UM122 tomorrow.
- Sump was dug out not to specifications as a rectangular hole was dug with near vertical cut and large loose material on the side. SRK specified that a 0.28 m sump with 1% sloping grades from the perimeter of the containment.
- Vertical steel plate for the containment arrived overnight.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) The blast foundation of the Patch Lake Tank Farm is not exposed at the end of shift. There is a concern about the undulation of the floor which will impact the amount of fill required to construct a levelled pad.
- (On-going) Due to the lack of transportation here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.


433680 E
433700 E
433720 E
433740 E
433760 E
7551940 N
7551920 N
7551900 N
7551880 N
North Access Ramp
Foundation Pad
Steel Containment Berm (Dwg. PL–05)
Slope breakline (Typ.)
750 liter Tidy tanks (Typ.)
Major Drilling Shop Complex
Sump (Dwg. PL–05)
South Access Ramp
70,000 liter Envirotank
75,000 liter Envirotank
16,000 liter Bowser
Challenger Tractor
28.4
26.6
12.2
3.0
1.5 (Typ.)
3.0 (Typ.)
48.0
50.2
12.0
9.5
0.8
2.7
3.7
2.9
A
A'
PLAN
Scale 1:200

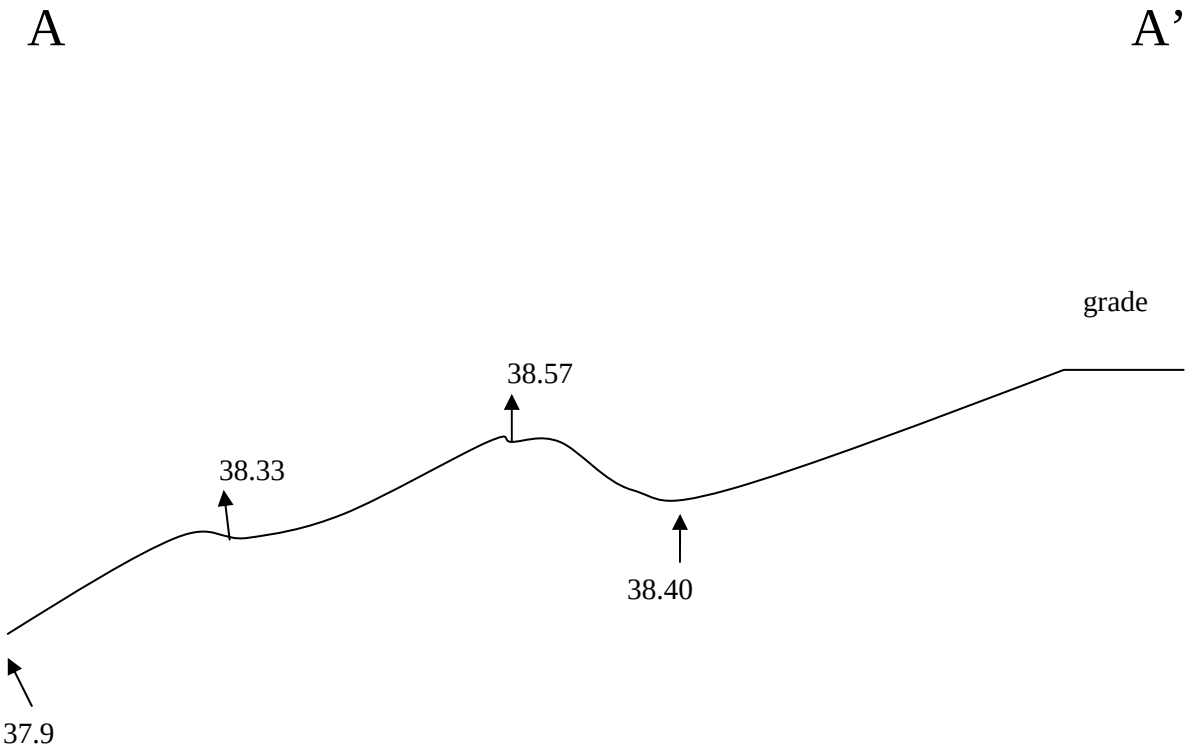


Photo 1: Loose, uncompacted rock on farm floor.

Photo 2: Sump.

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DAILY REPORT #35 – Patch Lake Tank Farm

Prepared by:	Alvin Tong, Michelle Murphy	**Date:**	2007.05.18
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -6	Minimum: -11	Maximum: -1
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear, sunny		

ACTIVITY

Location	Description
Tank Farm	• Day shift on excavator for spreading fines. • Day shift on loader to transport crush material. • Dozer, excavator and compactor working to tune the pad to final finishing grade.
Survey	• Surveyor checking floor grade and marking corners for liner laydown.
Materials	• 176 totes of sand on site. • 3 rolls geotextile on site (86’ x 162’ LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Layfield assembled base stands and placed the north and east berms.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 • Cat D6 Dozer • Cat 966 Loader • C-563 Compactor	- Day shift spread, cut and compact material to grade.

PERSONNEL

SRK	• Alvin Tong, Michelle Murphy
Sub-Arctic Surveyor	• Dave Farr
Kitnuna	• Tom Luddington (Kitnuna Super), Day and night shift operators (excavator/truck operator)
NWT Rock	• N/A
SLEC	• N/A
Layfield	• Chris Rowson

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- (On-going) Sub-Arctic surveyor is on site. He will record the elevation of confirmed bedrock on the floor. He will provide SRK with a general floor configuration for further engineering design.
- (On-going) The unsuitable stockpile will need to be re-graded and rip-rap for long term stability and presentation.
- Layfield representative on site. Chris Rowson (Layfield) suggested that he can start laying out the textiles and base plates as soon as the foundation is completed and approved. Fins and base plates have been assembled and put in place on north and east walls.
- SRK site staff is proposing to reduce size of tank farm containment berm to 47m by 24.5m as undesired blasting resulted in the south and west walls being improper space for the steel berm construction. The farm will be situated in the same location with reduced dimension at the south (1m) and west (2m). Calculations of the reduced containment shows that with a vertical column of 100mm of fuel (from the required 114,150 L), plus vertical average snow pack of 65mm and proposed sand cover of 300mm, the 810 mm height of the berm is sufficient for containment, at a factor of safety of 1.7. The volume of the ramps and voids in the sand are not included in this calculation but expected to have minimum impact. SRK will work with Layfield to determine final dimensions.
- Compactor sent back to Patch to compact loose fill on the floor. SRK has not yet approved the overall subgrade and compaction.
- Sump was dug out but not to specifications as a rectangular hole was dug with near vertical cut and large loose material on the side. SRK specified a 0.28 m sump with 1% sloping grades from the perimeter of the containment. Sump will be reworked as it will need to be moved towards the east as determined by SRK and Layfield due to the change of containment dimensions.
- Miramar will need to salvage sand from old Patch Lake tank farm because with 176 bags of sand, estimated at about $1m^3$ of sand per bag, this will only provide 5 inches of cover in the new tank farm, which is insufficient for liner protection. The additional sand from the old tank farm will provide needed extra coverage, though the volume available is uncertain. The sand in the old tank farm will have to be confirmed with Miramar Environmental Staff to determine if it is uncontaminated.
- Miramar and SRK have discussed and concluded that fuel tanks should be turned so all six tanks will be in a row with longitude axis aligned east to west with the values facing the access. The reason to change the configurations of the tanks layout is to suit operation need during winter season. Snow clearing can be done with machines on the access instead of manually between tanks with the original configuration. The new configuration will reduce the inter-spacing between tanks to about 2m, which is still greater than the regulated 1m.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) Due to the lack of transportation here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.
- (On-going) SRK site inspection found bedrock in the daylight corner. It was designed to be blast to El. 38 to provide drainage, but was unsuccessful in reaching required depth. A drain has to be completed to the specified elevation to comply with SRK design, and may be accomplished by moving more material in the drain alignment as they are loose from the initial blast. Miramar will first use the excavator as the drain is very close to grade; otherwise it will try the hand method.

Photo 1: North and East walls of Tank Farm, with fins and base plates in place. Sump in foreground.

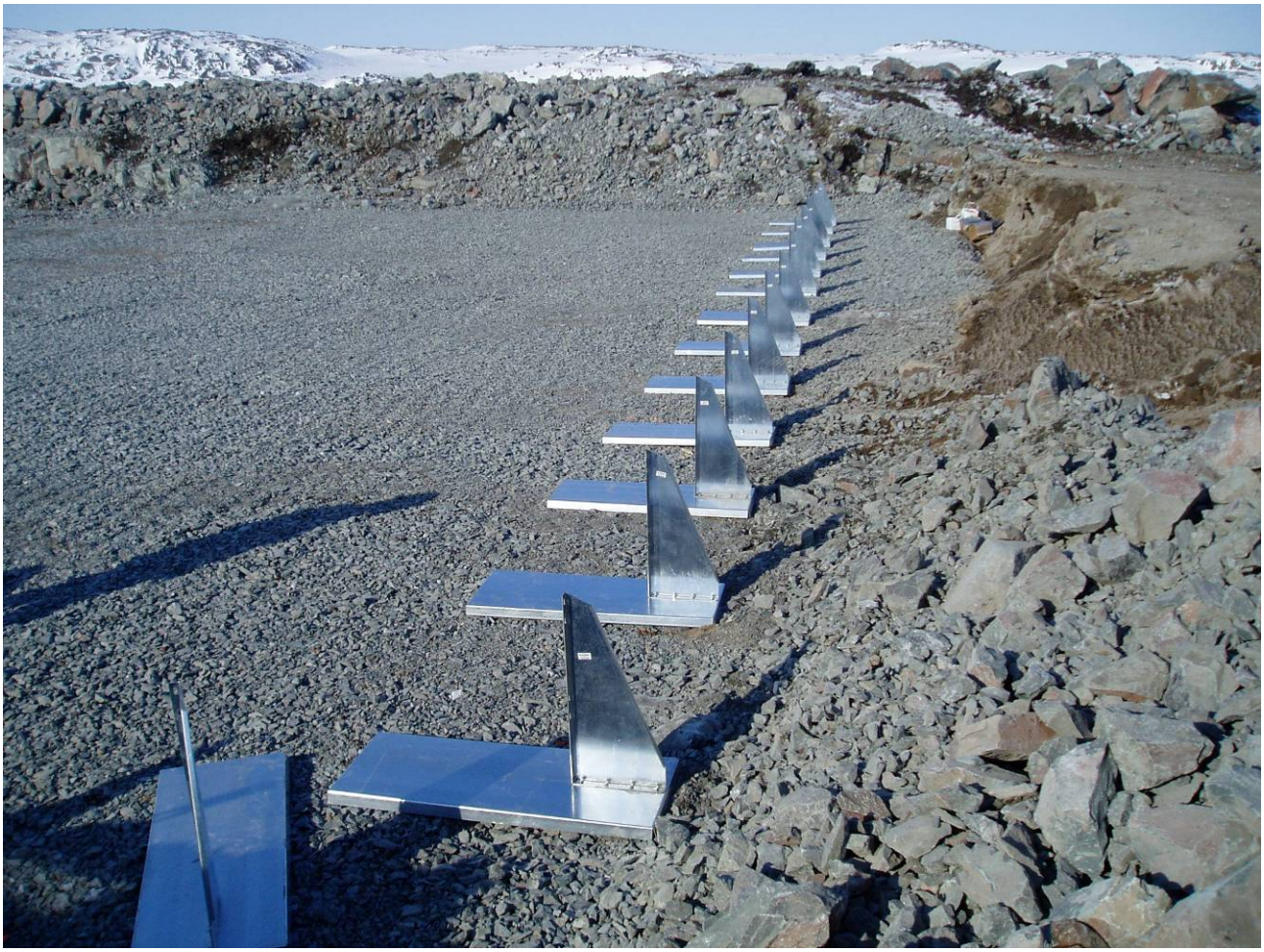

Photo 2: North wall, base plates and fins.

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DAILY REPORT #36 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy	**Date:**	2007.05.19
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: 4	Minimum: 0	Maximum: 7
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear, sunny		

ACTIVITY

Location	Description
Tank Farm	• Day shift on excavator for spreading fines. • Day shift on loader to transport crush material. • Dozer, excavator and compactor working to tune the pad to final finishing grade.
Survey	• Surveyor checking floor grade and marking corners for liner laydown.
Materials	• 176 totes of sand on site. • 3 rolls geotextile on site (86’ x 162’ LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Layfield assembled base stands along the north and east berms, laid 2 layers of geotextile.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • C-563 Compactor	- Day shift spread, cut and compact material to grade.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• Dave Farr
Kitnuna	• (Kitnuna Super), Day operators (excavator/loader operator)
NWT Rock	• N/A
SLEC	• Cyril Turkin
Layfield	• Chris Rowson

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

New Items

- Layfield representative on site. Chris Rowson (Layfield) laid out fins and base on north and east berm, began putting up the side walls in the north east corner, and laid out two layers of geotextile. He anticipates continuing to put up the walls and then working on the south and west berm tomorrow.
- The size of tank farm containment berm was reduced to 46.0m by 24.6m as undesired blasting resulted in the south and west walls being an improper space for the steel berm construction. The farm will be situated in the same location with reduced dimension at the south and west.
- Calculations of the reduced containment shows that with a vertical column of 100mm of fuel (from the required 114,150 L), plus vertical average snow pack of 65mm and proposed sand cover of 300mm, the 810 mm height of the berm is sufficient for containment, at a factor of safety of 1.7. The volume of the ramps and voids in the sand are not included in this calculation but expected to have minimum impact. SRK worked with Layfield and Sub-Arctic Surveyor to reduce the containment size. Work on the berm could not have continued without the reduction in dimensions of the berm as the rock wall prevented following the originally designed berm.
- Fill placed in south west corner to raise to proper grade for drainage. SRK has not yet approved the overall subgrade and compaction.
- Sump was filled in and compacted by Miramar staff. SRK site representative asked that sump be resurveyed and dug out again. SRK specified a 0.28 m deep sump with 1% sloping grades from the perimeter of the containment. Sump was reworked and moved towards the east and north as determined by SRK and Layfield due to the change of containment dimensions. SLEC representative wishes to change design of sump and remove the timber box. SRK has not yet approved this change. Layfield representative is flexible with either design as changes can be made later if need be.
- Miramar will need to salvage sand from old Patch Lake tank farm because with 176 bags of sand, estimated at about $1m^3$ of sand per bag, this will only provide 6 inches of cover in the new tank farm, which is insufficient for liner protection. The additional sand from the old tank farm will provide needed extra coverage, though the volume available is uncertain. The sand in the old tank farm will have to be confirmed with Miramar Environmental Staff to determine if it is uncontaminated. Estimated volume of sand in the old tank farm is 200 cubic meters.
- Miramar and SRK have discussed and concluded that fuel tanks should be turned so all six tanks will be in a row with longitude axis aligned east to west with the valves facing the access. The reason to change the configuration of the tanks layout is to suit operational needs during winter season. Snow clearing can be done with machines on the access instead of manually between tanks with the original configuration. The new configuration will reduce the inter-spacing between tanks to about 2m, which is still greater than the regulated 1m.

ON-GOING

- (On-going) Discussion with Fred Penner about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending on weather conditions and construction progress.
- (On-going) Sub-Arctic surveyor is on site. He will provide SRK with a general floor configuration for further engineering design.
- (On-going) The unsuitable stockpile will need to be re-graded and rip-rap for long-term stability and presentation.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) Due to the lack of transportation here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.
- (On-going) SRK site inspection found bedrock in the daylight corner. It was designed to be blast to El. 38 to provide drainage, but was unsuccessful in reaching required depth. The excavator attempted to move the rock but was unsuccessful. The high point of 38.57m remains.

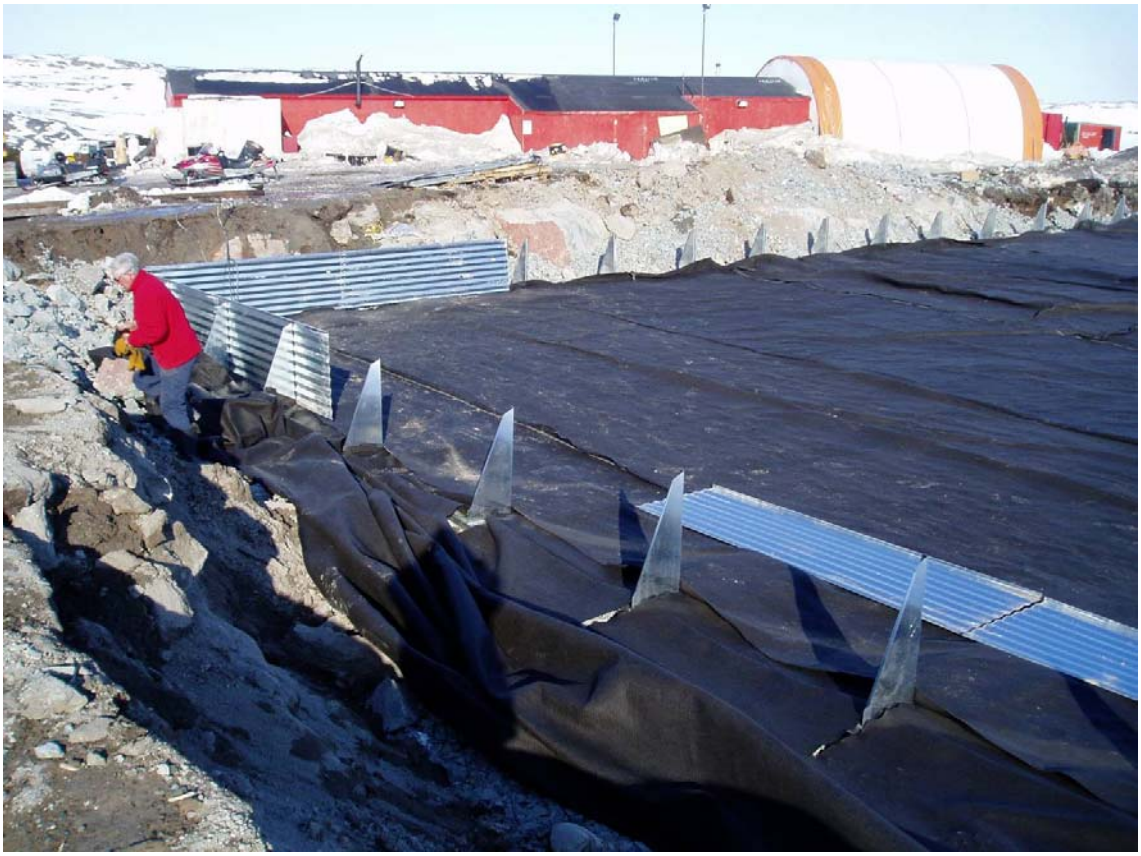

Photo 1: Walls being attached to fins and base plates in north east corner.

Photo 2: Two layers of geotextile stretched out over floor. Looking south.

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DAILY REPORT #37 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.20
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: 1	Minimum: -6	Maximum: 7
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear, sunny		

ACTIVITY

Location	Description
Tank Farm	• Day shift on excavator for spreading fines, digging out old tank farm, re-excavated the sump. • Day shift on loader to transport crush material and sand from old tank farm. • Dozer, excavator and compactor working to tune the pad to final finishing grade.
Survey	• Surveyor checking floor grade and marking corners for liner laydown.
Materials	• 176 totes of sand on site. • 3 rolls geotextile on site (86’ x 162’ LP16 Flat Seam) along with liner and steel berms. Inventory will be taken when all the materials are moved to a centralized location.
Other Activity	• Layfield assembled 80% of walls, including siding.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • C-563 Compactor	- Day shift excavate old tank farm.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• Dave Farr
Kitnuna	• (Kitnuna Super), Day operators (excavator/loader operator)
NWT Rock	• N/A
SLEC	• Cyril Turkin
Layfield	• Chris Rowson

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

LINER:

- Layfield representative on site. Chris Rowson (Layfield) assembled 80% of walls. Partly unrolled liner. Estimates that liner can be put into place tomorrow.
- Layfield representative has found that the south-west corner of the tank farm is too high by 0.15m. Surveyor had lain out elevations properly and operators did not make appropriate cuts. Miramar requested laying out of textile before grade and compaction approved by SRK. This high elevation necessitates adding more crushed material to attempt to even out the grade so that remaining section of berm can be completed. SRK is concerned about having enough crushed material for the ramp.

SUMP:

- Sump was re-dug and contoured. It is 0.28m deep with a flat depression of 1.6m by 1.6m and contoured sloping walls. No timber box is being set into the depression and SRK has clearly stated its position that it will not approve this without a proper redesign and sufficient consideration time, but SLEC representative is continuing work regardless. Layfield representative is flexible with either design as changes can be made later if need be.

TANK FARM LAYOUT REDESIGN:

- Re-design of tank farm, given new dimensions, is taking place by on site SRK staff. The proposed layout is shown in the attached figure. The farm and tank dimensions were measured in the field. These new dimensions are as a result of physical constraints as communicated in previous dailies, and MHBL opted not to continue blasting to prevent the resizing.
- MHBL and SRK have discussed, and MHBL has decided that all fuel tanks should be turned so all six tanks will be in a row with longitude axis aligned east to west with the valves facing the access. The reason to change the configuration of the tanks layout is to suit operational needs during winter season. Snow clearing can be done with machines on the access instead of manually between tanks with the original configuration. The new configuration will reduce the inter-spacing between tanks to about 2m, which is still greater than the regulated 1m.
- The sump dimensions are significantly larger than designed, and as such limiting the available space to place fuel tanks. SRK has not approved this revised sump design, but SLEC proceeded continued regardless.
- MHBL originally planned to use the Green envirotanks at the Bay, and therefore the Green tank dimensions were not planned for in the original design.
- In order to fit the tanks in the desired orientation, some trade-offs were necessary from the original design layout.
    - The offset on the western wall for the larger 70,000 L Envirotanks has been reduced to 1.0m, to allow for sufficient room between the tanks and the access ramp for snow removal. This means that snow removal behind the tanks may not be possible.
    - SRK and SLEC are concerned that the liner will be ripped as the tanks turn from the ramp into the farm floor. This is because of the lack of crush and sand, the minimum cover over the liner of 30 cm cannot be placed. As a result, the larger 70,000L tanks will be required to be on the outside of the farm (farthest away from the sump), to make it easier to turn the tanks on the ramp to lower the risk of tearing the liner.
    - The access ramp dimensions are the same as the design drawings except the ramp is at a 12H:1V slope, the side slopes on each side of the ramp has been set at 1.2H:1V. The ramp has been offset from the eastern wall by 0.8m (same as on the original drawings). This slightly steeper ramp was decided on by MHBL as noted in previous dailies and there is a small risk that the bowsers may hang up.
    - After a conversation with Mike Cripps, it was found that the 'Tidy Tanks' used on site are usually placed right next to each others and are easily moved. It was determined that there is sufficient room for 'Tidy Tank' storage on the east side of the sump. The original design called for interspacing between the tidy tanks to allow for safe helicopter transport. There are no regulations governing this interspacing distance, and therefore the final tidy tank layout is entirely a MHBL choice.

ON-GOING:

- Discussion with Fred Penner and SLEC representative about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending weather conditions and construction progress.

- Miramar will need to salvage sand from old Patch Lake tank farm because with 176 bags of sand, estimated at about $1m^3$ of sand per bag, this will only provide 6 inches of cover in the new tank farm, which is insufficient for liner protection. The additional sand from the old tank farm will provide needed extra coverage, though the volume available is uncertain. After excavation today, it seems that sand will not be usable, or sufficient.
- SRK has not yet approved the overall subgrade and compaction.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) Due to the lack of transportation here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.
- (On going) The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.
- (On-going) SRK site inspection found bedrock in the daylight corner. It was designed to be blast to El. 38 to provide drainage, but was unsuccessful in reaching required depth. The excavator attempted to move the rock but was unsuccessful. The high point of 38.57m remains. This is not acceptable to SRK and that fact has been communicated to all parties.

Photo 1: Two layers of geotextile, 80% of the fence, liner is ready to roll out subject to subgrade approval by SRK.

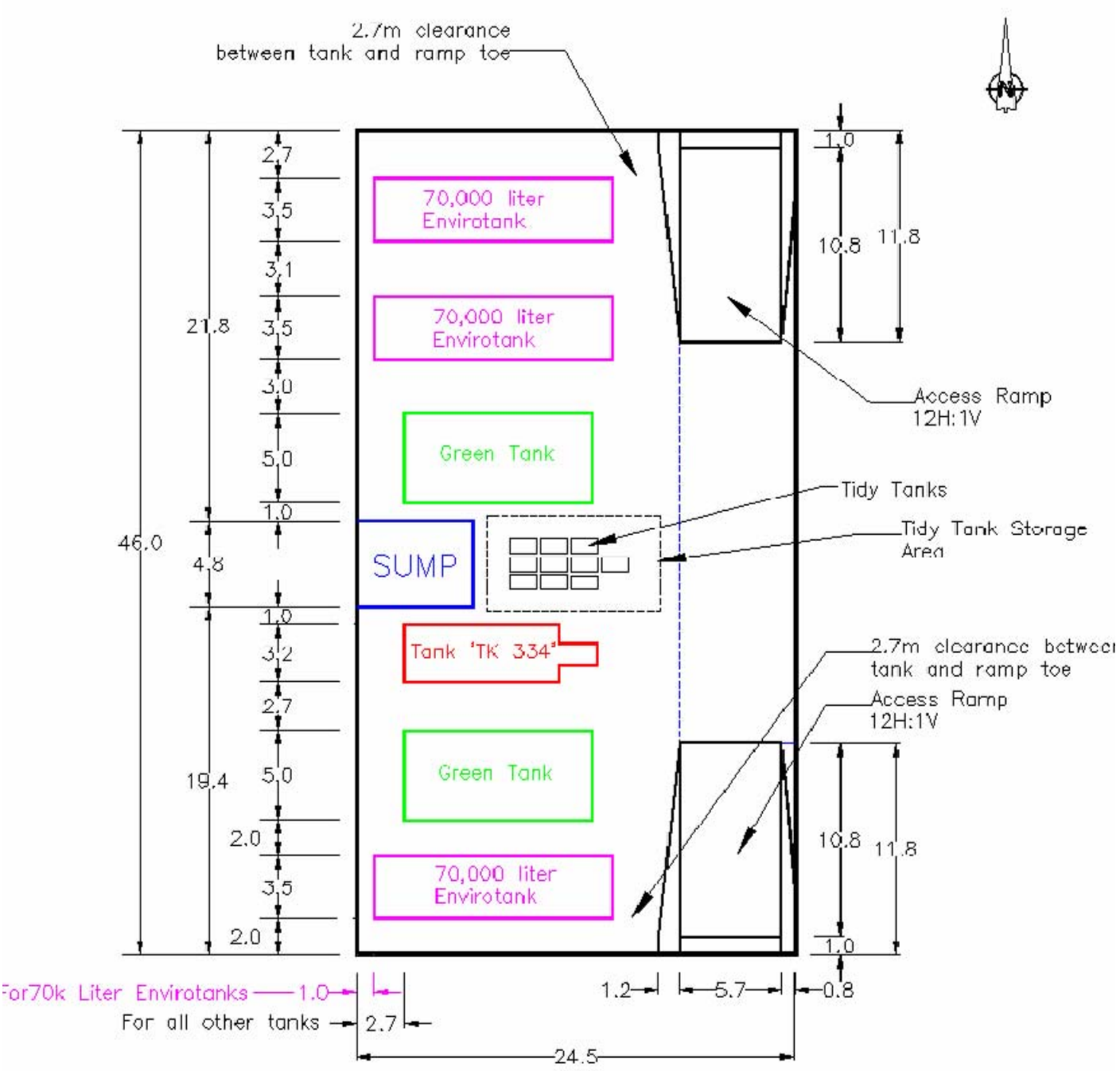

Figure 1: Revised tank layout resulting from site field fitting requested by MHBL.

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DAILY REPORT #38 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.21
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: 0	Minimum: -6	Maximum: 6
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Fog, clearing in the afternoon		

ACTIVITY

Location	Description
Tank Farm	• Layfield assembling walls, laying down liner. • The tote bags of sand were hauled the areas north and south of the pads in anticipation of starting placement tomorrow.
Survey	• Surveyor checking floor grade.
Materials	• 176 totes of sand on site.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • C-563 Compactor	Loader moving bags of sand.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• Dave Farr
Kitnuna	• (Kitnuna Super), Day operators (excavator/loader operator)
SLEC	• Cyril Turpin
Layfield	• Chris Rowson, 2 helpers

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

LINER:

- Layfield representative on site. Chris Rowson (Layfield) assembled all the walls. Liner was laid out and tucked in to corners. SRK representatives and Layfield representative walked the entire site noting possible weak points in the liner. Layfield will repair these tonight. Geotextile will be laid down early tomorrow morning and sand can begin to be spread.

- A fold in the liner runs east-west from the sump to the far wall. This is necessary so that liner is in contact with the ground at all points, even into the depression. The fold can remain as is without any potential damage to the liner or if it is decided to install the sump cage at a later date, the fold can be cut and welded.
- There is an average of 16 cm of space between the floor and the bottom of the wall where the sump is, along the west wall. To avoid ripping the liner as it is pressed up against the wall, some shoring will be necessary in that space to provide backing support for the liner.

ON-GOING:

- (On-going) Discussion with Fred Penner and SLEC representative about the construction sequence and fuel tank installation. This will be an ongoing discussion and planning based on the schedule, progress and equipment available.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending weather conditions and construction progress.
- (On-going) There is no salvageable sand in the old tank farm. With the 176 bags of sand we have now, we will have 14cm of cover in the tank farm and on the ramp.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- (On-going) Due to the lack of transportation here, it is very difficult for manager and engineer to perform site inspection and visits. Fred Penner is aware of this and there are no immediate solutions.
- (On-going) The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.
- (On-going) SRK site inspection found bedrock in the daylight corner. It was designed to be blast to El. 38 to provide drainage, but was unsuccessful in reaching required depth. The excavator attempted to move the rock but was unsuccessful. The high point of 38.57m remains.

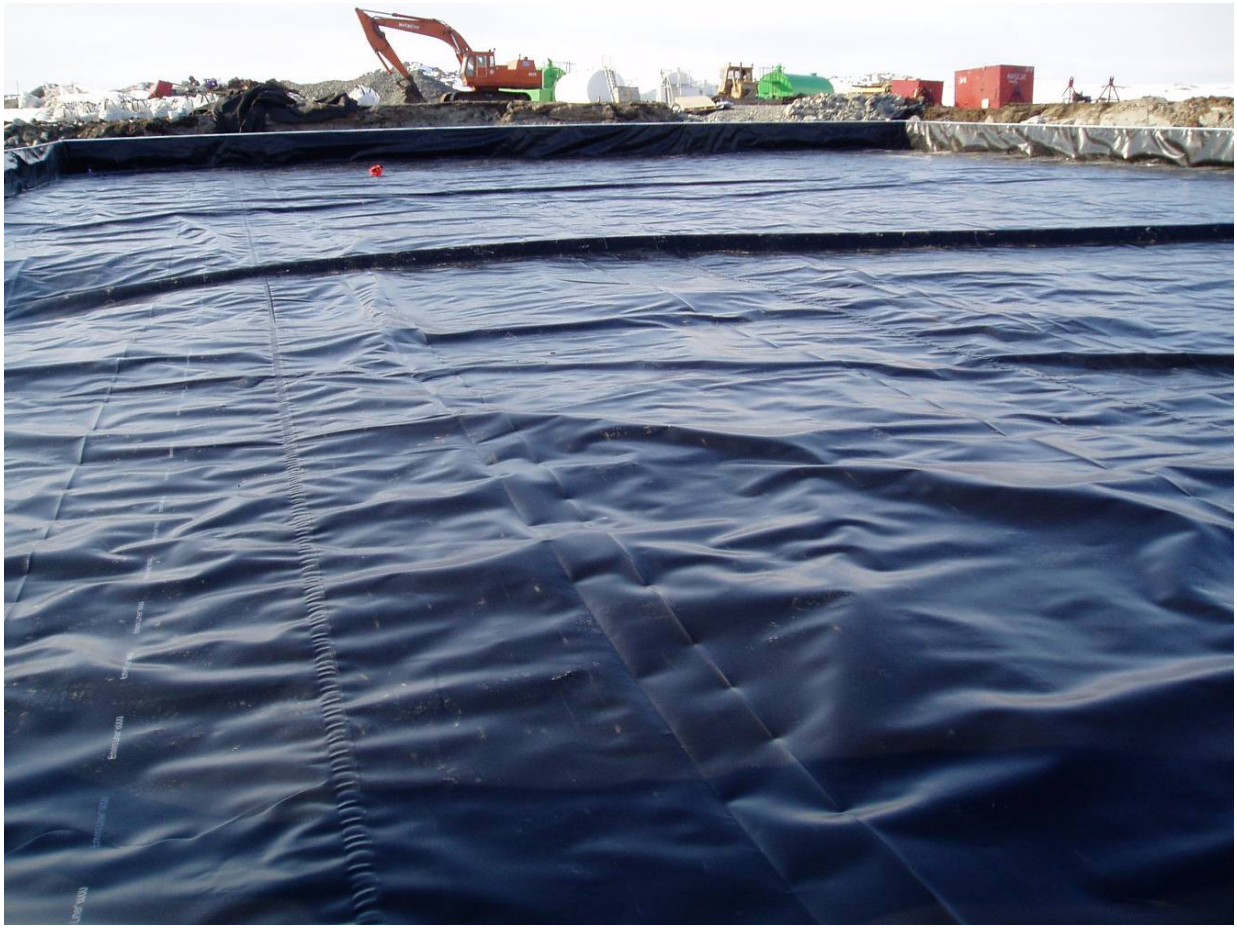

Photo 1: Liner in place. Centre seam is so liner will fit in sump.

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DAILY REPORT #39 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.22
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -3	Minimum: -4	Maximum: -3
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• Layfield completed assembly of wall and placement of all textiles. • The tote bags of sand were hauled the areas north and south of the pads in anticipation of starting placement.
Survey	• N/A
Materials	• 176 totes of sand on site (stored + used). • 25 bags of sand will be brought from Robert's Bay tomorrow. • 13 tote bags placed at the north access ramp.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader	• Loader moving bags of sand and moving gravel. Excavator lifting sand into tank farm. • Compactor was moved to Robert's Bay yesterday. • A larger excavator will be brought back to Patch Lake from Robert's Bay to assist in tank placement.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• N/A
Kitnuna	• (Kitnuna Super), Day operators (excavator/loader operator)
SLEC	• Cyril Turpin
Miramar	• Jim Currie
Layfield	• Chris Rowson, 2 helpers

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

LINER:

- Layfield representative on site in the morning. Chris Rowson (Layfield) assembled all the walls. Liner was laid out and tucked in to corners. SRK representatives and Layfield representative walked the entire site noting possible weak points in the liner. Layfield representative made appropriate repairs and will issue a warranty for the liner. The top layer of geotextile was spread out. Layfield representative left Windy Camp at noon. If there are further repairs once the tanks are in, he will return to the camp.

ACCESS RAMP/LINER COVER PLACEMENT

- Placement of sand began today as part of the construction of the North access ramp. 13 totes of sand were placed using the excavator. Sand was spread by hand to the width of the north access ramp (8.0m). See drawing in 20 May 2007 daily. Sand was compacted using a hand packer in 30cm lifts one meter out from north wall in footprint of ramp. Remaining footprint was covered in 10 to 12 cm of sand, compacted with the hand packer and then geotextile was overlain and then a layer of crushed rock placed over the geotextile. See Photo 1.
- As the sand was being added on the inside of the containment berm, an equal height of crush material was placed on the outside of the berm to prevent deformation.
- Some frozen chunks of soil are present in the tote bags. The large chunks are being picked out and spread out away from the placement area in the hope that they will thaw.
- For details of the change to the access ramp design, see the attached design note.

TANK PLACEMENT

- Jim Currie has proposed a plan for tank placement which SRK and SLEC agree to follow.

Patch Lake Tank Farm Final Phase Work Sequence:
Construct the north and south entrance/exit ramps. Construct the roadway inside the containment between both ramps. Use geotextile between sand and gravel during placement of the road.

Place approximately 12 cm (5 inches) of sand fill in the location of the first tank. Place 18 inches (45 cm) of sand next to the first tank for use as a working platform from which to move the first tank. Excavator will sit on this platform and lift one end of the tank onto the sand bed, then will reposition and move the other end of the tank into place. After first tank is in place, excavate the excess sand from the work area and build the 12 cm sand bed for the second tank. Build the 18 inch work platform next to the second tank for use in moving the second tank.

Continue this sequence until all six tanks are in place.

Fuel handling:

1. Clear area for bladder
2. Fill bladder with the fuel from the first tank (E949)
3. Move first tank into tank farm
4. Pump tank to tank in sequence and pump the fuel bladder into the last tank placed into the containment.

SCHEDULE ISSUES

- Estimate that both ramps will be completed tomorrow.
- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending weather conditions and construction progress.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.
- There is an average of 16 cm of space between the floor and the bottom of the wall where the sump is, along the west wall. To avoid ripping the liner as it is pressed up against the wall, some shoring will be necessary in that space to provide backing support for the liner.

Photo 1: pouring crushed rock over textile, which is over approximately 12 cm of compacted sand.

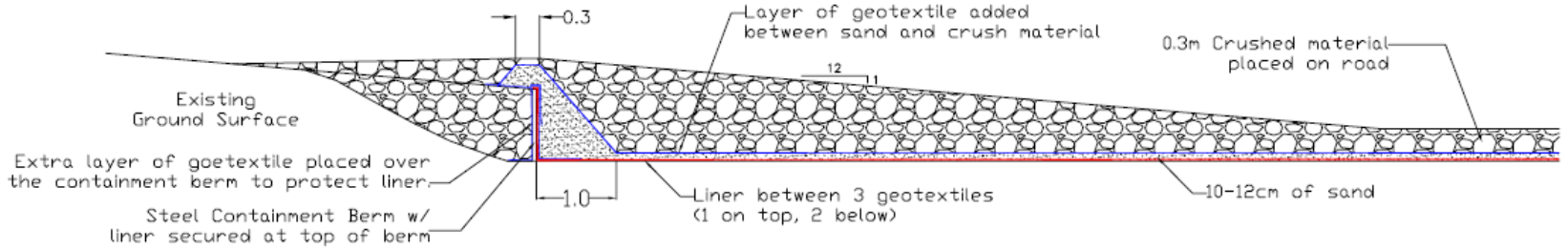
Photo 2: Just after finishing placing all textiles.

Miramar Hope Bay
Patch Lake Tank Farm
Design Notes

C:\Documents and Settings\mrykaart\Local Settings\Temporary Internet Files\OLK96\[Access Ramp Design Note.xls]DN9 Last Updated 23/05/2007

Design Notes Ref #:	DN-09
Date Drafted:	22-May-07
By:	PM
Title:	**Access Ramps**

1. (Alvin Tong) The grade of the access road ramp has been changed to 12H:1V from 15H:1V.
2. (Peter Mikes) Construction of the north access ramp started this afternoon. The following design changes have occurred:
   - Sand was added on the inside of the containment berm as well as 30cm above the top, to protect the liner which is secured at the top of the berm.
   -An extra layer of geotextile (consisting of left over scrap material) was added directly over the berm.
   -Another layer of geotextile was added between the sand and crushed material layers as the sand thickness has been reduced to 4 to 5 inches.
   -30cm of crushed material will be placed over the road area between the two ramps.



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DAILY REPORT #40 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.23
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -2	Minimum: -4	Maximum: -1
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• Began placing sand and crushed rock for north ramp and sand on south ramp.
Survey	• N/A
Materials	• 176 totes of sand on site (146 stored + 30 used). • 25 bags of sand will be brought from Robert's Bay tomorrow. • 25 tote bags placed at the north access ramp, 5 at south.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • Cat Skidsteer	• Loader moving bags of sand and moving gravel. Excavator lifting sand into tank farm (5 bags at south). • A larger excavator will be brought back to Patch Lake from Robert's Bay to assist in tank placement.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• N/A
Kitnuna	• (Kitnuna Super), Day operators (excavator/loader operator)
SLEC	• Cyril Turpin
Miramar	• Jim Currie left site today.

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

ACCESS RAMP/LINER COVER PLACEMENT

- Placement of sand continued today as part of the construction of the North access ramp and part of the South ramp. 17 totes of sand were placed using the excavator. Sand was spread by hand to the width of the north access ramp (8.0m). See drawing in 20 May 2007 daily. Sand was compacted using a hand packer in 30cm lifts one meter out from north wall in footprint of ramp. Remaining footprint was covered in 10 to 12 cm of sand, compacted with the hand packer and then geotextile was overlain and then a layer of crushed rock placed over the geotextile. Once there was enough sand laid, a skidsteer drove over the ramp and continued placing sand.

- Placement of sand inside the berm was stopped by SRK site engineers at 1pm after sharp rocks were found in the sand. The sand was not screened and the rocks are a threat to the liner. A test was done to see how much rock volume is in one cubic meter of sand and it was found that about 4 L of rock is present. See attached Photo 1. Solutions were sought before continuing work inside the berm. Jim Currie of Miramar approved the following solution:

  1. Screen the sand using a 1.25 cm stretched steel mesh. Carpenters constructed a box and will lay the screen on top at a 30 degree angle. Bags of sand are poured onto the screen and the rock and frozen sand chunks are separated off. The skidsteer can then scoop up the sand, which will land on a plywood platform. The sand chunks will also land on plywood or liner and can be further crushed by the loader before being rescreened.

  2. Tests were performed on 5 bags of sand and the system appears to screen out the majority of the rock. SRK site engineers agreed to the system and began placing this sand in the berm. SRK site engineers placed an additional layer of geotextile on top of the existing layer for additional protection. There will be continuous monitoring of the process by SRK.

- As the sand was being added on the inside of the containment berm, an equal height of crush material was placed on the outside of the berm to prevent deformation.
- Some frozen chunks of soil are present in the tote bags. The large chunks are being picked out and spread out away from the placement area and will be run over with a loader before being rescreened.

SCHEDULE ISSUES

- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending weather conditions and construction progress.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.
- There is an average of 16 cm of space between the floor and the bottom of the wall where the sump is, along the west wall. To avoid ripping the liner as it is pressed up against the wall, some shoring will be necessary in that space to provide backing support for the liner.

Photo 1: Sharp rocks picked out from one tote of sand.

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DAILY REPORT #41 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.24
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -2	Minimum: -4	Maximum: -1
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• Placement of sand and crushed rock for road and ramps inside containment. It is anticipated that the first tank will be brought into the containment area tomorrow afternoon. • Screening of sand material.
Survey	• N/A
Materials	• 201 totes of sand on site • Approximately 100 bags used to date.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • Cat Skidsteer	• Loader moving crush. Excavator lifting sand into screen. Skidsteer moving sand into the tank farm. • A larger excavator will be brought back to Patch Lake from Robert's Bay to assist in tank placement.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• N/A
Kitnuna	• (Kitnuna Super), Day operators (excavator/loader operator), Labourers
SLEC	• Cyril Turpin
Miramar	• N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

ACCESS RAMP/LINER COVER PLACEMENT

- Sand screening operations began at 10:15am and sifting continued at a rate of approximately 20 bags per hour. Screened sand was placed using the skidsteer. Miramar and SLEC staff were on site to organize and supervise operations, SRK site engineers were present for QA/QC at all times.

- The access ramps were underlain by 10cm of sand, compacted, one layer of geotextile added, then crushed rock to grade of ramp. 15cm of crushed rock was spread between ramps, on roadway. Crushed rock was brought into containment by the loader, with no deflections noted in the fence. Any excess crush material left will be used to increase the height of the road.
- Some frozen chunks of soil are present in the tote bags. The large chunks are deflecting off the screen and landing in a contained area. They will be run over with a loader before being rescreened.

SCHEDULE ISSUES

- (On-going) There are discussions that construction equipment will be trapped on Patch Lake after melt and not be able to get to Roberts Bay for construction. This will be an ongoing discussion pending weather conditions and construction progress.
- Estimate placement of first tank in containment can begin tomorrow afternoon. Estimate 7 days to place all 6 tanks.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.
- There is an average of 16 cm of space between the floor and the bottom of the wall where the sump is, along the west wall. To avoid ripping the liner as it is pressed up against the wall, some shoring will be necessary in that space to provide backing support for the liner.

PHOTOS:

Photo 1: View looking north of sand material being screened, and construction of the road across the tank farm.

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DAILY REPORT #42 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.25
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -2	Minimum: -4	Maximum: -1
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• Screening of sand material. • Placement of sand and crushed rock for road and ramps inside containment. It is anticipated that the first tank will be brought into the containment area tomorrow morning. • A 8" pad of screened sand was placed in the north end of the tank farm to allow access for an excavator to assist the installation of the first tank
Survey	• N/A
Materials	• 201 totes of sand on site • Approximately 190 bags used to date.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • Cat Skidsteer	• Loader moving crush. • Excavator lifting sand into screen. • Skidsteer moving sand into the tank farm. • Dozer used to grade crush material on the access ramps and road.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• N/A
Kitnuna	• (Kitnuna Super), Day operators (excavator/loader operator), Labourers
SLEC	• Cyril Turpin
Miramar	• N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

ACCESS RAMP/LINER COVER PLACEMENT

- Sand screening operations continued throughout the day, all bags have now been screened.
- Screened sand was placed using the skidsteer. Miramar and SLEC staff were on site to organize and supervise operations, SRK site engineers were present for QA/QC at all times.

- The approximate area remaining to be covered is 390 m^2. The remaining sand sources are from the screened 8" pad placed for the installation of the first tank, the frozen reject pile from the screening operations, and if necessary screened sand from the area north of the tank farm.
- The south access ramp was underlain by 10cm of sand, compacted, one layer of geotextile added, then crushed rock to grade of ramp. Crushed rock was spread between ramps, on roadway. Crushed rock was brought into containment by the loader, with no deflections noted in the fence.
- The supply of crushed rock has been depleted. Additional crush is needed on the south ramp. Crush between the ramps was placed to a depth greater than 15cm. This material will be displaced to use on the south access ramp to lessen the grade.

TANK PLACEMENT

- A 8" pad of screened sand was placed in the north end of the tank farm to allow access for an excavator to assist the installation of the first tank

SCHEDULE ISSUES

- Estimate placement of first tank in containment can begin tomorrow morning.
- Estimate 7 days to place all 6 tanks.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.
- There is an average of 16 cm of space between the floor and the bottom of the wall where the sump is, along the west wall. To avoid ripping the liner as it is pressed up against the wall, some shoring will be necessary in that space to provide backing support for the liner.

PHOTOS:

Photo 1: Overall view of site, looking south west.

Photo 2: Sand screening operation.

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DAILY REPORT #43 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.26
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: 0	Minimum: -1	Maximum: 0
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• Screening of sand material. • Placement of sand for road and ramps inside containment. • Excess geotextile cut from edges of the tank farm and placed as second layer above liner surface on the southern end of the tank farm. • The bank of sand on the northern end of the tank farm was excavated and screened.
Survey	• N/A
Materials	• 201 totes of sand on site • All 201 bags placed.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • Cat Skidsteer	• Excavator lifting sand into screen. • Skidsteer moving sand into the tank farm.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• N/A
Kitnuna	• Day operators (excavator/loader operator), Labourers
SLEC	• Cyril Turpin
Miramar	

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

ACCESS RAMP/LINER COVER PLACEMENT

- Rescreening of the frozen chunks of sand was completed and placed in the tank farm.
- Screened sand was placed using the skidsteer. Miramar and SLEC staff were on site to organize and supervise operations, SRK site engineers were present for QA/QC at all times.

- The approximate area remaining to be covered is 150 m^2. The remaining sand sources are from the screened 8" pad placed for the installation of the first tank and screened sand from the area north of the tank farm.
- The supply of crushed rock has been depleted. Additional crush is needed on the south ramp.

TANK PLACEMENT

- No activity.

SCHEDULE ISSUES

- The first tank placement was delayed as slings and timbers to be used for the placement have yet to arrive on site.
- Estimate 7 days to place all 6 tanks.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.
- There is an average of 16 cm of space between the floor and the bottom of the wall where the sump is, along the west wall. To avoid ripping the liner as it is pressed up against the wall, some shoring will be necessary in that space to provide backing support for the liner.

PHOTOS:

Photo 1: View of tank farm looking south.

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DAILY REPORT #44 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.27
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -6	Minimum: -11	Maximum: -1
Precipitation (mm)	Rain: None	Snow: 1 cm	
Conditions	Snow overnight, clear, sunny		

ACTIVITY

Location	Description
Tank Farm	• Screening of sand material. • Placement of sand for road and ramps inside containment. • Excess geotextile cut from edges of the tank farm and placed as second layer above liner surface on the southern end of the tank farm. • The bank of sand on the northern end of the tank farm was excavated and screened.
Survey	• N/A
Materials	• 201 totes of sand on site • All 201 bags placed.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • Cat Skidsteer	• Excavator lifting sand into screen. • Skidsteer moving sand into the tank farm. • Dozer running over frozen sand to break it up.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• N/A
Kitnuna	• Day operators (excavator/loader operator), Labourers
SLEC	• Cyril Turpin
Miramar	

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

ACCESS RAMP/LINER COVER PLACEMENT

- Rescreening of the frozen chunks of sand was completed and placed in the tank farm.
- Screened sand was placed using the skidsteer. Miramar and SLEC staff were on site to organize and supervise operations, SRK site engineers were present for QA/QC at all times.
- The tank farm floor has been completely covered with 10 cm of sand. In order to further protect the liner, an additional 8cm of sand is being placed within the footprint of the tanks. The footprint where the first tank will go in, on the north end, was completed. The remaining sand sources are from the screened 8" pad placed for the installation of the first tank and screened sand from the area north of the tank farm.
- The supply of crushed rock has been depleted. Additional crush is needed on the south ramp.

TANK PLACEMENT

- No activity.

SCHEDULE ISSUES

- The first tank placement was delayed as slings and timbers to be used for the placement were not ordered. Miramar is ordering the slings tomorrow from Yellowknife and tank placement will begin whenever the slings arrive.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.
- There is an average of 16 cm of space between the floor and the bottom of the wall where the sump is, along the west wall. To avoid ripping the liner as it is pressed up against the wall, some shoring will be necessary in that space to provide backing support for the liner. This task was completed today.

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DAILY REPORT #45 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.28
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -6	Minimum: -11	Maximum: -1
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear, sunny		

ACTIVITY

Location	Description
Tank Farm	• Screening of sand material. • Placement of sand for road and ramps inside containment. • The bank of sand on the northern end of the tank farm was excavated and screened.
Survey	• N/A
Materials	• 201 totes of sand on site • All 201 bags placed.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • Cat Skidsteer	• Excavator lifting sand into screen. • Skidsteer moving sand into the tank farm.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• N/A
Kitnuna	• Day operators (excavator/loader operator), Labourers
SLEC	• Cyril Turpin
Miramar	

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

ACCESS RAMP/LINER COVER PLACEMENT

- Screened sand was placed using the skidsteer. Miramar and SLEC staff were on site to organize and supervise operations, SRK site engineers were present for QA/QC at all times.
- The tank farm floor has been completely covered with 10 cm of sand. In order to further protect the liner, an additional 8cm of sand is being placed within the footprint of the tanks. Three tank pads have been completed, however, the supply of sand has been depleted. The remaining pads will be constructed using the sand from the 8” pad on which the excavator will sit when it brings in the first two tanks.

TANK PLACEMENT

- Slings arrived from Yellowknife today. Tank placement is set to begin tomorrow.
- A 50,000 L fuel bladder is being set up at the north end of the site.

SCHEDULE ISSUES

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.

PHOTOS:

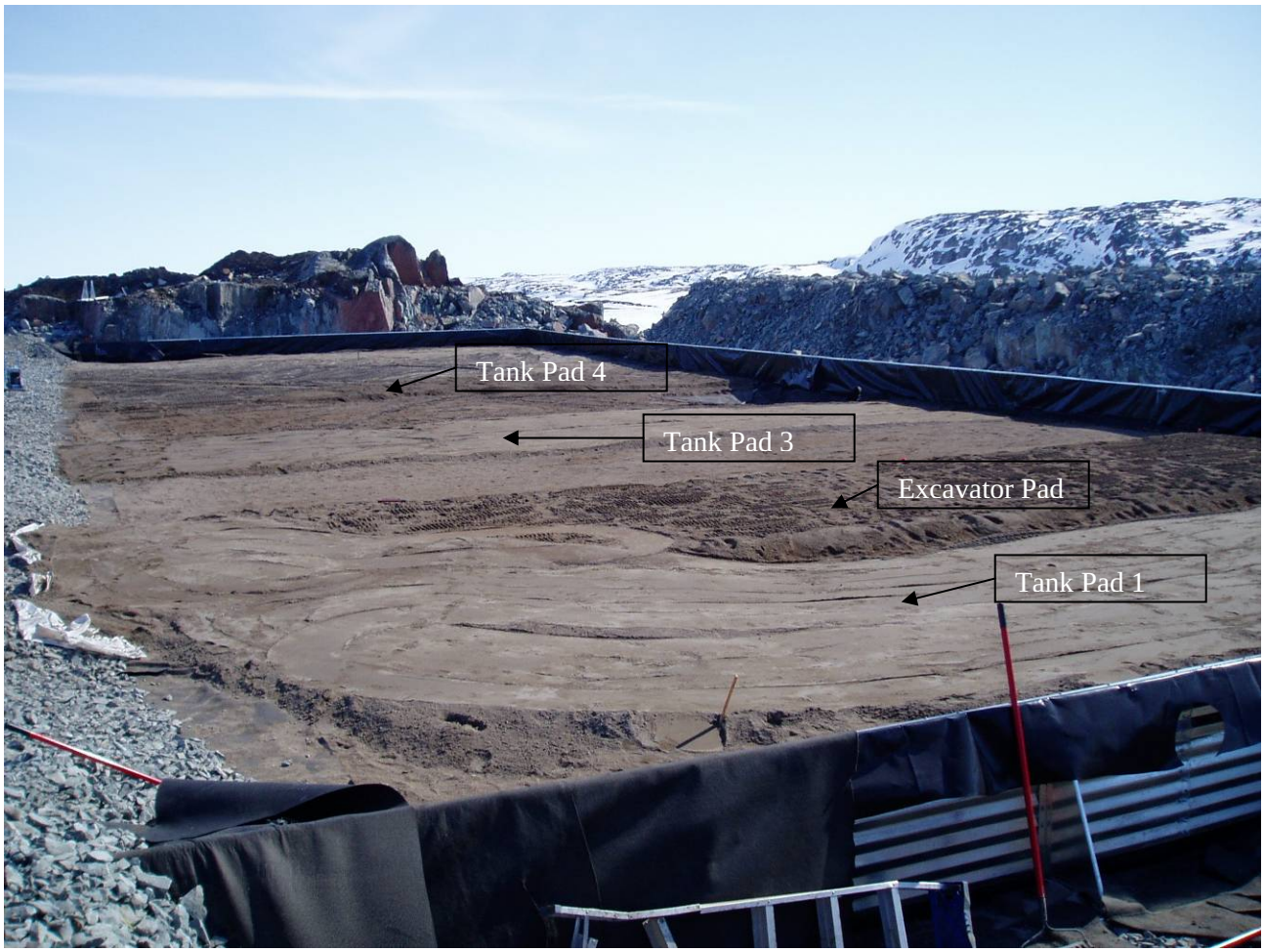

Photo 1: Tank farm with all sand placed. Tank Pad 2 is included in the excavation pad.

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DAILY REPORT #46 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.29
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -6	Minimum: -14	Maximum: 2
Precipitation (mm)	Rain: None	Snow: Trace	
Conditions	Clear, sunny in the morning, snowing and windy afternoon		

ACTIVITY

Location	Description
Tank Farm	• Moving tanks into farm.
Survey	• Sub-Arctic Surveyor
Materials	• 201 totes of sand on site • All 201 bags placed.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • Cat Skidsteer	• Excavator lifting tank into place in tank farm. • Skidsteer moving sand pads to next location in tank farm. • Loader lifting tank into place in tank farm. • Dozer pulling tank from storage position to ramp.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• Surveyor (George)
Kitnuna	• Day operators (excavator/loader operator), Labourers
SLEC	• Cyril Turpin
Miramar	• Mike Cripps

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

ACCESS RAMP/LINER COVER PLACEMENT

- Excavator sand pad was moved into the second position in order to prepare for the second tank to go in.
- Sand was placed in a 1 meter wide, 10 cm high lift on the outside of the west wall to mitigate the potential sliding of the base plates.
- Surveyor on site to take shots of tank farm for as-built.

TANK PLACEMENT

- First tank went into tank farm this morning, taking 3 hours to move into place. The straps broke when the tank was 3 feet shy of final position and a chain was used to pull the tank the rest of the way. The straps that arrived on site yesterday were not sufficient to perform the task and there are no more straps available on site.
- A 50,000 L fuel bladder was set up at the north end of the site in order to receive fuel from the second tank. The bladder and one bowser will be filled tonight in order to empty the second tank. The fuel from the bladder and bowser will be used to fill the first tank in the farm, and so on until the last tank is in place.

SCHEDULE ISSUES

- There are no suitable straps with which to move the remaining tanks.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.

PHOTOS:

Photo 1: The first tank in place.

Photo 2: Side view of first tank, looking north.

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DAILY REPORT #46 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.29
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -6	Minimum: -14	Maximum: 2
Precipitation (mm)	Rain: None	Snow: Trace	
Conditions	Clear, sunny in the morning, snowing and windy afternoon		

ACTIVITY

Location	Description
Tank Farm	• Moving tanks into farm.
Survey	• Sub-Arctic Surveyor
Materials	• 201 totes of sand on site • All 201 bags placed.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader • Cat Skidsteer	• Excavator lifting tank into place in tank farm. • Skidsteer moving sand pads to next location in tank farm. • Loader lifting tank into place in tank farm. • Dozer pulling tank from storage position to ramp.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• Surveyor (George)
Kitnuna	• Day operators (excavator/loader operator), Labourers
SLEC	• Cyril Turpin
Miramar	• Mike Cripps

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

ACCESS RAMP/LINER COVER PLACEMENT

- Excavator sand pad was moved into the second position in order to prepare for the second tank to go in.
- Sand was placed in a 1 meter wide, 10 cm high lift on the outside of the west wall to mitigate the potential sliding of the base plates.
- Surveyor on site to take shots of tank farm for as-built.

TANK PLACEMENT

- First tank went into tank farm this morning, taking 3 hours to move into place. The straps broke when the tank was 3 feet shy of final position and a chain was used to pull the tank the rest of the way. The straps that arrived on site yesterday were not sufficient to perform the task and there are no more straps available on site.
- A 50,000 L fuel bladder was set up at the north end of the site in order to receive fuel from the second tank. The bladder and one bowser will be filled tonight in order to empty the second tank. The fuel from the bladder and bowser will be used to fill the first tank in the farm, and so on until the last tank is in place.

SCHEDULE ISSUES

- There are no suitable straps with which to move the remaining tanks.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.

PHOTOS:

Photo 1: The first tank in place.

Photo 2: Side view of first tank, looking north.

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DAILY REPORT #47 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.30
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -8	Minimum: -11	Maximum: -6
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear, windy		

ACTIVITY

Location	Description
Tank Farm	• Moving tanks into farm.
Survey	• N/A
Materials	• 201 totes of sand on site • All 201 bags placed.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader	• Excavator lifting tank into place in tank farm. • Loader lifting tank into place in tank farm. • Dozer pulling tank from storage position to ramp.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• N/A
Kitnuna	• Day operators (excavator/loader operator), Labourers
SLEC	• N/A
Miramar	• Mike Cripps

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

TANK PLACEMENT

- Fuelling all day.
- Moved second tank to ramp at the end of the day.
- Miramar ordered chains which were flown in from Cambridge Bay this afternoon.

SCHEDULE ISSUES

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.

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DAILY REPORT #48 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.05.31
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -11	Minimum: -14	Maximum: -9
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear, very windy		

ACTIVITY

Location	Description
Tank Farm	• Moving tanks into farm.
Survey	• N/A
Materials	• 48, 8x8 timbers

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader	• Excavator lifting tank into place in tank farm. • Loader lifting tank into place in tank farm. • Dozer pulling tank from storage position to ramp.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• N/A
Kitnuna	• Day operators (excavator/loader operator), Labourers
SLEC	• Cyril Turpin
Miramar	• N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

TANK PLACEMENT

- Moved second tank into place in the morning.
- Drained fuel from next tank and moved it into the tank farm in the afternoon.

OTHER WORK

- Began reshaping the unsuitable stockpile.

SCHEDULE ISSUES

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.

PHOTOS:

Photo 1: Tank 2 and 3 in tank farm.

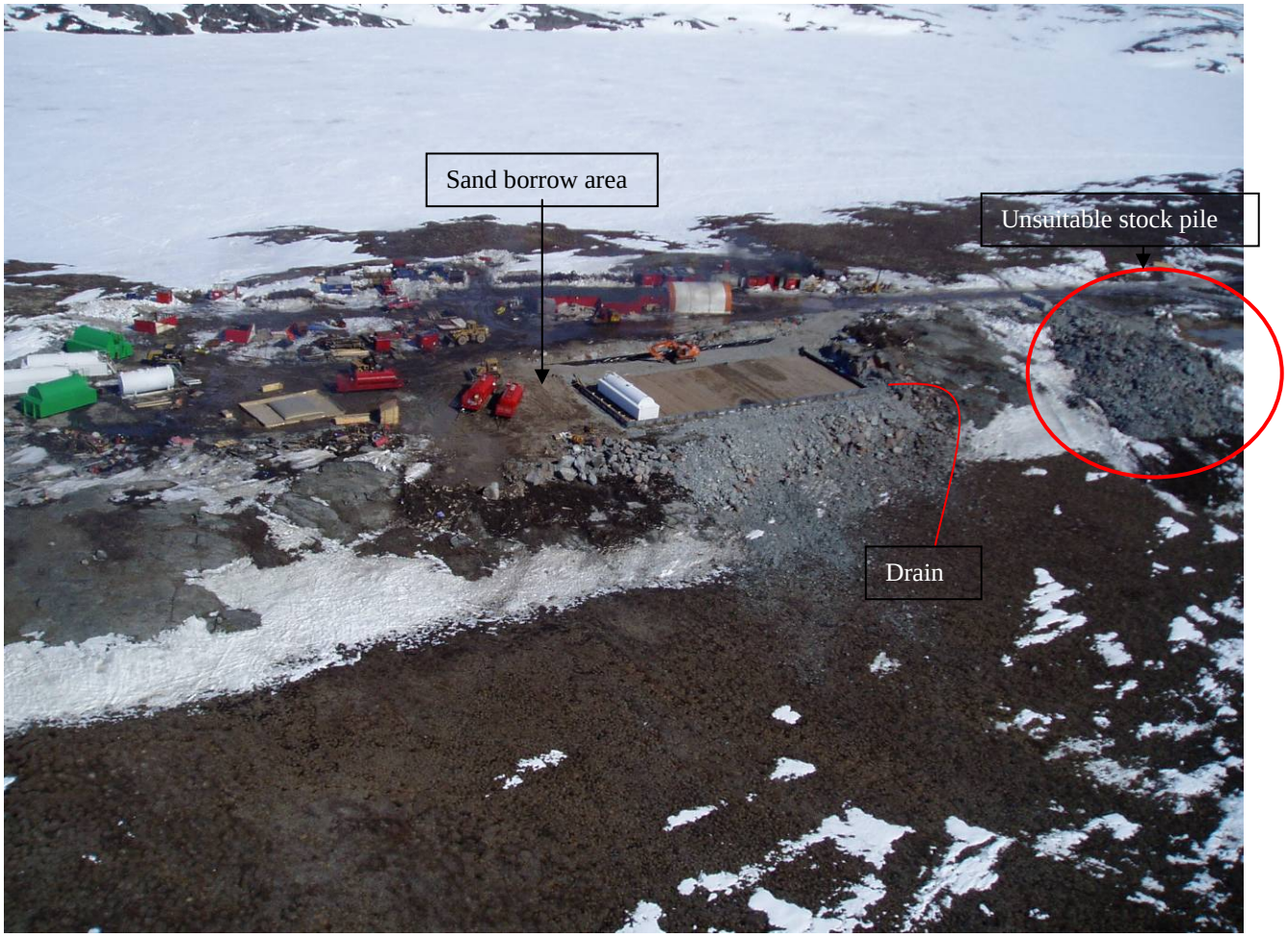

Photo 2: Aerial photo of tank farm.

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DAILY REPORT #49 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.06.01
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: 3	Minimum: 2	Maximum: 4
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• Moving tanks into farm.
Survey	• N/A
Materials	• 48, 8x8 timbers

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader	• Excavator lifting tank into place in tank farm. • Loader lifting tank into place in tank farm. • Dozer pulling tank from storage position to ramp.

PERSONNEL

SRK	• Michelle Murphy, Peter Mikes
Sub-Arctic Surveyor	• N/A
Kitnuna	• Day operators (excavator/loader operator), Labourers
SLEC	• Cyril Turpin
Miramar	• N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

TANK PLACEMENT

- Moved fourth tank into place in the morning.
- Drained fuel from next tank and moved it onto the ramp of the tank farm.

OTHER WORK

- Began reshaping the unsuitable stockpile.

SCHEDULE ISSUES

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- The unsuitable stockpile will need to be re-graded and rip-rapped for long-term stability and presentation.

PHOTOS:

Photo 1: Tank 4 in place.

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DAILY REPORT #50 – Patch Lake Tank Farm

Prepared by:	Michelle Murphy, Peter Mikes	**Date:**	2007.06.02
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: 1	Minimum: -2	Maximum: 4
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast		

ACTIVITY

Location	Description
Tank Farm	• The last two tanks were moved into the tank farm. • The unsuitable material from blasting south of the farm was reshaped.
Survey	• N/A

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader	• Excavator lifting tank into place in tank farm. • Loader lifting tank into place in tank farm. • Dozer pulling tank from storage position to ramp.

PERSONNEL

SRK	• Peter Mikes. Michelle Murphy left site today.
Sub-Arctic Surveyor	• N/A
Kitnuna	• 2 operators (excavator/loader operator), 1 labourer.
SLEC	• Cyril Turpin
Miramar	• N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- All major work on the tank farm is substantially completed.
- Maritz Rykaart arrives on site tomorrow and a final inspection will take place and any outstanding tasks addressed.

SCHEDULE ISSUES

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- Maritz Rykaart on site tomorrow and a final inspection will take place and any outstanding tasks addressed.

PHOTOS:

Photo 1: Movement of the last tank into place.

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DAILY REPORT #51 – Patch Lake Tank Farm

Prepared by:	Peter Mikes	**Date:**	2007.06.03
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -5	Minimum: -10	Maximum: 0
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast, moderate winds		

ACTIVITY

Location	Description
Tank Farm	• General site cleanup.
Survey	• An asbuilt survey is scheduled for tomorrow afternoon.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader	

PERSONNEL

SRK	• Peter Mikes. Maritz Rykaart arrived on site today.
Sub-Arctic Surveyor	• N/A
Kitnuna	• 2 operators (excavator/loader operator), 1 labourer.
SLEC	• Cyril Turpin
Miramar	• N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- None

COMMENTS, CONCERNS AND CORRESPONDENCE

- All major work on the tank farm is substantially completed.
- A final inspection will take place and any outstanding tasks/deficiencies will be addressed.

SCHEDULE ISSUES

- None.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- A final inspection will take place and any outstanding tasks/deficiencies will be addressed.

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DAILY REPORT #52 – Patch Lake Tank Farm

Prepared by:	Peter Mikes	**Date:**	2007.06.04
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -5	Minimum: -10	Maximum: 0
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast, sunny in the evening.		

ACTIVITY

Location	Description
Tank Farm	• SRK Inspection.
Survey	• An asbuilt survey is scheduled for tomorrow morning.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader	

PERSONNEL

SRK	• Peter Mikes, Maritz Rykaart.
Sub-Arctic Surveyor	• N/A
Kitnuna	• N/A
SLEC	• Cyril Turpin
Miramar	• N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

Inspection

- An inspection of the tank farm took place today.
- SRK is compiling a list of outstanding tasks and deficiencies for the project.
- SRK will review the list with Miramar tomorrow.

Asbuilt Survey

- SRK discussed the requirements of the asbuilt survey with the SAS surveyor. Instructed the surveyor to carry out a detailed survey which ties into pre-existing topography and to obtain the following:
  - The ends of each 8x8 timber beneath the tanks to back calculate the thickness of sand beneath the tanks;
  - The top of the steel containment berm, in particular near the access ramps to accurately determine the depth of fill on the ramps above the berm.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

•

PHOTOS:

Photo 1: looking west across the Major shop

Photo 2: Looking south – see ramps to left of tanks

Photo 3: Looking North – see ramps to right of tanks

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DAILY REPORT #53 – Patch Lake Tank Farm

Prepared by:	Peter Mikes	**Date:**	2007.06.05
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -4	Minimum: -8	Maximum: 0
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Clear, mild winds.		

ACTIVITY

Location	Description
Tank Farm	• None
Survey	• The asbuilt survey was delayed; the surveyor was unable to get to the Tank Farm due to commitments at Robert's Bay. The survey is scheduled for tomorrow morning.

EQUIPMENT

Equipment	Notes
• Hitachi UM122 Excavator • Cat D6 Dozer • Cat 966 Loader	

PERSONNEL

SRK	• Peter Mikes, Maritz Rykaart.
Sub-Arctic Surveyor	• N/A
Kitnuna	• N/A
SLEC	• Cyril Turpin
Miramar	• N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

Inspection

- SRK compiled and issued a draft deficiency list to Miramar field staff which will be discussed during a site inspection. Upon completion of this site inspection a formal deficiency list will be issued.
- The site inspection is scheduled for tomorrow morning before Maritz Rykaart leaves site.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- As-built survey
- Addressing the deficiency list
- Signing of completed QC reports

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DAILY REPORT #54 – Patch Lake Tank Farm
This is the FINAL daily

Prepared by:	Peter Mikes	**Date:**	2007.06.06
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300
Supervisor:	Fred Penner		
To:	Maritz Rykaart		
CC:	Fred Penner (Miramar), Scott Stringer (Miramar), Gary Morris (SLEC)		

WEATHER (approximated on site)

Temperature (°C)	Mean: -1	Minimum: -4	Maximum: 2
Precipitation (mm)	Rain: None	Snow: None	
Conditions	Overcast.		

ACTIVITY

Location	Description
Tank Farm	• Site Inspection with Miramar and SRK staff.
Survey	• Asbuilt survey completed by SAS surveyor in the afternoon.

PERSONNEL

SRK	• Peter Mikes, Maritz Rykaart.
Sub-Arctic Surveyor	• George Wilcox
Kitnuna	• N/A
SLEC	• N/A
Miramar	• Mike Cripps

COMMENTS, CONCERNS AND CORRESPONDENCE

Inspection

- A site inspection was completed with SRK and Miramar staff.
- In attendance were:
  - Miramar: Mike Cripps, Geogre MacFarlane, Matt Kawai
  - SRK: Maritz Rykaart, Peter Mikes
- The purpose of the inspection was to address the deficiencies and procedures to be implemented around the tank farm. The discussed items are included in the attached deficiency list.

OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- This will be the final daily to be issued.

Appendix F
SRK Quality Control Reports

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Patch Lake Tank Farm
QUALITY CONTROL REPORT #1 – Sub-grade Surface

Inspected by:	Peter Mikes, Michelle Murphy	**Date:**	2007.05.21
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300

CONFORMANCE:

Yes	No	N/A	Specifications Required
	X		The blasted floor should carry a 1% grade to the location of the sump.
	X		The liner protection material shall have a constant thickness of 0.3m.
X			Prior to placement of any construction material, the receiving surface must be free of snow and ice.
X			The Engineer must approve all surfaces prior to placement of any construction material.
	X		Compaction will be a field specification, based on trial compaction tests to be carried out by the Contractor to the satisfaction of the Engineer.
X			The sump shall be blasted to the specified depth as shown on drawings below the sloping grade of 1% floor.

REMARKS:

- The blasted floor carries a grade to a drain at the southwest corner of the pad, not the sump. This is due so some high spots from the blasting. The fill placed above the blasted surface directs flow above the liner to the sump.
- A rough survey was completed of the blasted surface showing the general grade of the floor, not a complete topographic survey.
- The liner protection material does not have a constant thickness due to an undulating blasted floor. A variable thickness was placed on the subgrade to direct flow to the sump.
- There is a low-area present on the eastern edge of the tank farm over the road area which slopes approximately 1% to the east. The overall drainage of the farm is otherwise adequate. The sloping deficiency is not deemed to be critical as it is over the road area and not where the tanks are stored. If drainage becomes a problem in the area in the future, addition material can be added to provide drainage.
- On the Western wall of the steel containment berm, gaps up to 17cm are present between the bottom of the berm and the sub-grade surface. This gap may present problems with the liner expending out beneath the berm and being exposed outside the farm area.
- No trial compaction tests were performed due to a surveyor shortage. 6 passes of the Cat 563C Compactor were completed.

NON-CONFORMANCE RESOLUTIONS:

Placement of the liner can proceed pending the following:

- The gap present on the western wall of the containment berm between the ground surface and the base of the steel panel must be closed by placement of fill material and geotextile on the outside of the containment berm.

QUALITY CONTROL ITEM IS : Completed [ ] In Progress [X]

REVIEW OF SPECIFICATION REQUIRED:

Construction Manager/Forman: (Cyril Turpin)	Company SNC	Date (D/M/Y) 26/05/07
Quality Control Representative: (Peter Mikes)	Company SRK	Date (D/M/Y) 23/05/07

CONFIRM RESOLUTION OF NON-CONFORMANCE:

Construction Manager/Forman:	Company SNC	Date (D/M/Y) 26/05/07
Quality Control Representative:	Company SRK	Date (D/M/Y) 23/05/07

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Patch Lake Tank Farm
QUALITY CONTROL REPORT #1 –
Sub-grade Surface

Inspected by:	Peter Mikes, Michelle Murphy	**Date:**	2007.06.03
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300

CONFORMANCE:

Yes	No	N/A	Specifications Required
	X		The blasted floor should carry a 1% grade to the location of the sump.
	X		The liner protection material shall have a constant thickness of 0.3m.
X			Prior to placement of any construction material, the receiving surface must be free of snow and ice.
X			The Engineer must approve all surfaces prior to placement of any construction material.
	X		Compaction will be a field specification, based on trial compaction tests to be carried out by the Contractor to the satisfaction of the Engineer.
X			The sump shall be blasted to the specified depth as shown on drawings below the sloping grade of 1% floor.

REMARKS:

- The blasted floor carries a grade to a drain at the southwest corner of the pad, not the sump. This is due so some high spots from the blasting. The fill placed above the blasted surface directs flow above the liner to the sump.
- A rough survey was completed of the blasted surface showing the general grade of the floor, not a complete topographic survey.
- The liner protection material does not have a constant thickness due to an undulating blasted floor. A variable thickness was placed on the subgrade to direct flow to the sump.
- There is a low-area present on the eastern edge of the tank farm over the road area which slopes approximately 1% to the east. The overall drainage of the farm is otherwise adequate. The sloping deficiency is not deemed to be critical as it is over the road area and not where the tanks are stored. If drainage becomes a problem in the area in the future, addition material can be added to provide drainage.
- On the Western wall of the steel containment berm, gaps up to 17cm are present between the bottom of the berm and the sub-grade surface. This gap may present problems with the liner expending out beneath the berm and being exposed outside the farm area.
- No trial compaction tests were performed due to a surveyor shortage. 6 passes of the Cat 563C Compactor were completed, to the satisfaction of the Engineer.

NON-CONFORMANCE RESOLUTIONS:

Placement of the liner can proceed pending the following:

- The gap present on the western wall of the containment berm between the ground surface and the base of the steel panel must be closed by placement of fill material and geotextile on the outside of the containment berm.

Note (June 5 2007): This resolution could not be completed since there is no suitable material available. MHBL should carry out this work when material becomes available.

QUALITY CONTROL ITEM IS : Completed [X] In Progress [ ]

REVIEW OF SPECIFICATION REQUIRED:

Construction Manager/Forman:	Company	Date (D/M/Y)
Cyril Turpin	SNC	Jun 6/07
Quality Control Representative:	Company	Date (D/M/Y)
Peter Mikes	SRK	6/6/07

CONFIRM RESOLUTION OF NON-CONFORMANCE:

Construction Manager/Forman:	Company	Date (D/M/Y)
Cyril Turpin	SNC	Jun 6/07
Quality Control Representative:	Company	Date (D/M/Y)
Peter Mikes	SRK	6/6/07

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Engineers and Scientists

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Patch Lake Tank Farm
QUALITY CONTROL REPORT #2 – Steel Containment Berm

Inspected by:	Peter Mikes, Michelle Murphy	**Date:**	2007.05.24
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300

CONFORMANCE:

Yes	No	N/A	Specifications Required
X			The Steel Containment berm is a prefabricated modular system manufactured by WESTEEL Limited, Winnipeg, Manitoba. The product is a 33" high rectangular zero ground disturbance C-Ring System.
X			The Steel Containment berm must be installed by a qualified and approved WESTEEL Contractor.
	X		The Contractor must confirm with the manufacturer that the Steel Containment berm materials list is in fact appropriate to execute the intended design.

REMARKS:

- The overall dimensions of the steel containment berm were reduced to 46.6m x 24.5m from 48.0m x 26.5m. This was due to a reduction in size of the sub-grade surface.
- Installation of the Steel Containment berm was under the direction of Chris Rowson of Layfield Environmental Systems Ltd.
- The 'fins' on 3 base plates on the western wall of the berm adjacent to the sump were reversed to allow for the sump to be placed closer to the western wall.
- Some areas of the sub-grade surface were hand-dub to place the base-plates and not compacted. The walls will likely experience some deflection once sand is placed as liner protection material.
- On the Western wall of the steel containment berm, gaps up to 17cm are present between the bottom of the berm and the sub-grade surface. This gap may present problems with the liner expending out beneath the berm and being exposed outside the farm area. This issue and the resolution were addressed as part of the Sub-grade Surface Quality Control Report.

NON-CONFORMANCE RESOLUTIONS:

- Backfill is required to be placed on the outside of the containment berm adjacent to the sump over the area where the base-plates have been reversed.
- Fill placement at the perimeter should be placed at 90 degrees to the wall. No angled or parallel placement other than 90 degrees can be allowed as the base plates extend 0.7m into the containment area and are above ground. The bucket must not hit the plates, nor must the tracks be allowed to run over them. Wall deflection will result.

QUALITY CONTROL ITEM IS : Completed [ ] In Progress [X]

REVIEW OF SPECIFICATION REQUIRED:

Construction Manager/Forman: (Cyril Turpin)	Company SNC	Date (D/M/Y) 26/05/07
Quality Control Representative: (Peter Mikes)	Company SRK	Date (D/M/Y) 26/05/07

CONFIRM RESOLUTION OF NON-CONFORMANCE:

Construction Manager/Forman:	Company SNC	Date (D/M/Y) 26/05/07
Quality Control Representative:	Company SRK	Date (D/M/Y) 26/05/07

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Patch Lake Tank Farm
QUALITY CONTROL REPORT #2 – Steel Containment Berm

Inspected by:	Peter Mikes, Michelle Murphy	**Date:**	2007.05.24
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300

CONFORMANCE:

Yes	No	N/A	Specifications Required
X			The Steel Containment berm is a prefabricated modular system manufactured by WESTEEL Limited, Winnipeg, Manitoba. The product is a 33" high rectangular zero ground disturbance C-Ring System.
X			The Steel Containment berm must be installed by a qualified and approved WESTEEL Contractor.
	X		The Contractor must confirm with the manufacturer that the Steel Containment berm materials list is in fact appropriate to execute the intended design.

REMARKS:

- The overall dimensions of the steel containment berm were reduced to 46.6m x 24.5m from 48.0m x 26.5m. This was due to a reduction in size of the sub-grade surface.
- Installation of the Steel Containment berm was under the direction of Chris Rowson of Layfield Environmental Systems Ltd.
- The 'fins' on 3 base plates on the western wall of the berm adjacent to the sump were reversed to allow for the sump to be placed closer to the western wall.
- Some areas of the sub-grade surface were hand-dub to place the base-plates and not compacted. The walls will likely experience some deflection once sand is placed as liner protection material.
- On the Western wall of the steel containment berm, gaps up to 17cm are present between the bottom of the berm and the sub-grade surface. This gap may present problems with the liner expending out beneath the berm and being exposed outside the farm area. This issue and the resolution were addressed as part of the Sub-grade Surface Quality Control Report.

NON-CONFORMANCE RESOLUTIONS:

- Backfill is required to be placed on the outside of the containment berm adjacent to the sump over the area where the base-plates have been reversed.
- **Note (June 5, 2007): This has been completed to the extent of suitable fill material available. More fill is required when material becomes available.**
- Fill placement at the perimeter should be placed at 90 degrees to the wall. No angled or parallel placement other than 90 degrees can be allowed as the base plates extend 0.7m into the containment area and are above ground. The bucket must not hit the plates, nor must the tracks be allowed to run over them. Wall deflection will result.

QUALITY CONTROL ITEM IS : Completed [X] In Progress [ ]

REVIEW OF SPECIFICATION REQUIRED:

Construction Manager/Forman:	Company	Date (D/M/Y)
Cyril Turpin	SNC	Jun 6/07.
Quality Control Representative:	Company	Date (D/M/Y)
Peter Mikes	SRK	6/6/07

CONFIRM RESOLUTION OF NON-CONFORMANCE:

Construction Manager/Forman:	Company	Date (D/M/Y)
Cyril Turpin	SNC	Jun 6/07
Quality Control Representative:	Company	Date (D/M/Y)
Peter Mikes	SRK	6/6/07

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Patch Lake Tank Farm
QUALITY CONTROL REPORT #3 – Liner Installation

Inspected by:	Peter Mikes, Michelle Murphy	**Date:**	2007.05.25
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300

CONFORMANCE:

Yes	No	N/A	Specifications Required
X			The geomembrane shall be an Enviro Liner 6050 (a 30mil (0.75mm) thick geomembrane).
X			The liner will be pre-fabricated in the factory, such that no field seaming is required.
X			The liner will be attached to the steel containment berm using a specially designed mechanical attachment system.
X			The geomembrane is to be installed between two layers of a heavy duty 16 oz (542g/m^2) non-woven geotextile (LP16).
X			The steel containment berm, geomembrane and geotextile should be supplied and installed by Layfield Environmental Systems Ltd.

Note: Relevant specifications extracted from SRK Design Memorandum "Patch Lake Tank Farm Containment Facility Design", Maritz Rykaart, January 26, 2007.

REMARKS:

- Two layers of 16 oz geotextile were placed beneath the liner as extra protection from the sub-grade surface

NON-CONFORMANCE RESOLUTIONS:

-

QUALITY CONTROL ITEM IS : Completed [X] In Progress [ ]

REVIEW OF SPECIFICATION REQUIRED:

Construction Manager/Forman: Cyril Turpin		Company SNC	Date (D/M/Y) 26/05/07
Quality Control Representative: Peter Mikes		Company SRK	Date (D/M/Y) 26/05/07

CONFIRM RESOLUTION OF NON-CONFORMANCE:

Construction Manager/Forman:		Company SNC	Date (D/M/Y) 26/05/07
Quality Control Representative: Peter Mikes		Company SRK	Date (D/M/Y) 26/05/07

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Patch Lake Tank Farm
QUALITY CONTROL REPORT #4 – Liner Protection Layers

Inspected by:	Peter Mikes	**Date:**	2007.06.03
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300

Note: Listed below are the relevant specifications from "Modification to Design – Liner Protection" and from the SRK Design Memorandum "Patch Lake Tank Farm Containment Facility Design", Martiz Rykaart, January 26, 2007.

CONFORMANCE:

Yes	No	N/A	Specifications Required
	X		After the liner is placed (including the two protective geotextiles), 0.3 m of protective cover material will be placed over the entire liner surface area, mimicking the liner bedding grade.
X			The protective cover material shall be a clean well-graded sand or quarry crush, with a maximum particle size of less than 19mm.
X			Compacted using a smooth drum vibratory roller. A walk-behind roller is acceptable; however, the individual lift thickness must be limited to 0.15m in that case.

REMARKS:

- Insufficient quantities of sand were delivered to site, as a result, the sand was spread to order to achieve a compacted thickness of 0.1m.
- The sand delivered to site was not screened and contained oversized rock particles with sharp edges.
- The sand was compacted using a walk-behind vibratory plate compactor.

NON-CONFORMANCE RESOLUTIONS:

- Due to the insufficient quantities of sand, an extra layer of 16 oz non-woven geotextile was placed over the liner over the area of the road and the southern half of the tank farm.
- The delivered sand was screened using an expanded metal screen with a maximum opening of 2cm.
- **Note (June 5, 2007): A gravel cover of at least 0.3 m is required to safely support the operating intent of the tank farm. As soon as suitable gravel becomes available MHBL should place a levelling surface of crush over the entire perimeter of the tank farm, graded towards the sump. This levelling surface should be at least 0.15 m thick, which if combined with the existing sand layer will result in the prescribed 0.3 m cover.**

QUALITY CONTROL ITEM IS : Completed [X] In Progress [ ]

REVIEW OF SPECIFICATION REQUIRED:

Construction Manager/Forman: Cyril Turpin		Company: SNC	Date (D/M/Y): JUN 6/07
Quality Control Representative: Peter Mikes		Company: SRK	Date (D/M/Y): 6/6/07

CONFIRM RESOLUTION OF NON-CONFORMANCE:

Construction Manager/Forman: Cyril Turpin	Company SWL	Date (D/M/Y) Jun 6/07
Quality Control Representative: Peter Mikes	Company SRK	Date (D/M/Y) 6/6/07

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Patch Lake Tank Farm
QUALITY CONTROL REPORT #5 – Access Ramps

Inspected by:	Peter Mikes	**Date:**	2007.06.03
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300

Note: Listed below are the relevant specifications from "Modification to Design – Liner Protection" and from the SRK Design Memorandum "Patch Lake Tank Farm Containment Facility Design", Martiz Rykaart, January 26, 2007.

CONFORMANCE:

Yes	No	N/A	Specifications Required
	X		The access ramps shall have an overall width of 5.7m, approach and depart slopes of 15H:1V (6.7%) and a crown length of 5m.
	X		The ramp will require at least 0.3m fill cover over the height of the steel containment berm.

REMARKS:

- Discussions between Fred Penner (Miramar) and Alvin Tong (SRK) resulted in an increase of the design slope of the ramp from 15H:1V to 12H:1V.
- Not enough crush material was available to complete the ramps to the design slopes of the minimum height requirement of 0.3m over the steel containment berm.
- Actual ramp slopes of approximately 8H:1V

NON-CONFORMANCE RESOLUTIONS:

Note June 5, 2007: The following resolutions could not be completed since there is no suitable material available. MHBL should carry out this work when material becomes available.

- A minimum crush fill of 0.3 m is required for the access ramps where they pass over the steel berms, with a level surface of at least 5 m. As soon as more crush is available these ramps must be upgraded as the buckling of the steel berm may occur.
- When more crush becomes available MHBL should as a minimum lessen the ramp grade to 12H:1V, but preferably 15H:1V.

QUALITY CONTROL ITEM IS : Completed [X] In Progress [ ]

REVIEW OF SPECIFICATION REQUIRED:

Construction Manager/Forman: Cyril Turpin		Company SWC	Date (D/M/Y) JUN 6/07
Quality Control Representative: Peter Mikes		Company SRK	Date (D/M/Y) 6/6/07

CONFIRM RESOLUTION OF NON-CONFORMANCE:

Construction Manager/Forman: Cyril Turpin		Company SWC	Date (D/M/Y) JUN 6/07
Quality Control Representative: Peter Mikes		Company SRK	Date (D/M/Y) 6/6/07

Appendix G
Layfield Quality Assurance Certifications

LAYFIELD

CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

PROJECT NAME: Miramar Hope Bay Gold Containment System
PROJECT NUMBER: 06C·132
OWNER: Miramar
LOCATION: Hope Bay NWT

I, the undersigned, a duly appointed representative of Layfield Environmental Systems Ltd. (LESL), have visually observed the soil subgrade described below, and found it to be an acceptable surface on which to install geomembrane.

This certification is based on observations of the surface of the subgrade only. No subterranean inspections or tests have been performed by Layfield Environmental Systems, and LESL makes no representations or warranties regarding conditions which may exist below the surface of the subgrade. Layfield Environmental Systems accepts no responsibility for conformance of the subgrade to this project's specifications.

The soil subgrade accepted on this date refers to its present condition. Any changes in the subgrade condition that result from the effects of inclement weather and/or other forces beyond the control of Layfield Environmental Systems and remedial work to correct the resulting deficiencies, will be the direct responsibility of the General Contractor.

Area Being Accepted: 46.8 m x 24.8 m - the subgrade is very rough and uneven high spots are present - slope and grade of surface is very irregular. Rock was rolled & packed but the area to support wall/base was not flat/or level hand dug - not compacted. Base plates are not well seated. The walls will likely move with backfill due to this lack of adequate material or subgrade prep. The liner itself is well protected; no risk exists beyond the fact that the steel wall is elevated above surface significantly due to irregular; poor slope. This area must be supported from behind. I was instructed by client to proceed despite the deficiencies

LAYFIELD ENVIRONMENTAL SYSTEMS REPRESENTATIVE:

Date: May 18/2007
Signature: [signature]
Name: Chris Rowson
Title: Project Supervisor

OWNERS REPRESENTATIVE:

Date: _____
Signature: _____
Name: _____
Title: _____
Company: _____

LAYFIELD

CERTIFICATE OF FINAL INSPECTION AND ACCEPTANCE

PROJECT NAME: Miramar Hope Bay Gold Containment System
PROJECT NUMBER: 06C-132 **DATE:** May 22/2007
OWNER: Miramar
LOCATION: Hope Bay NWT

Scope of Installation(s): THE WORK
2 layers of LP16 - underlay - base plates covered stack roll on sides 30 mil enviro liner - top mounted and installed to conform to sump - Overlay of LP16 non-woven geotextile

All installation as per standard procedures - defficiencies existed at subgrade level related to walls & base plates - not liner.

Part 1 – LAYFIELD ENVIRONMENTAL SYSTEMS LTD.

I, Chris Rowson, a duly appointed representative of Layfield Environmental Systems Ltd. (LESL), have visually observed the installations (as outlined above), and have found the Work to be complete and free of defects and declare that the Work was completed in accordance with the project specifications, Layfield Environmental Systems' QC program and the terms and conditions of the contract.

Layfield Environmental Systems Representative:

Name: Chris Rowson
Title: Project Supervisor
Date: May 22/07 **Signature:** CRys

Part 2 – OWNER (or Representative)

I, _____, a duly appointed representative of _____ _____, do hereby take over and accept the installation(s) described above, and confirm that the work has been completed in accordance with the project specifications and the terms of the conditions of the contract.

I have evaluated and measured the work together with the Layfield Environmental Systems representative, and agree that the measurements shown are both true and correct, and that the installation has met our approval.

Owners Representative:

Name: _____
Title: _____
Company: _____
Date: _____ **Signature:** _____

Comments: _____

Appendix H

Patch Lake Tank Farm – Final Handover Deficiency List, June 6, 2007

SRK Consulting (Canada) Inc.
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Patch Lake Tank Farm
FINAL HANDOVER DEFICIENCY LIST

Prepared by:	Maritz Rykaart	**Date:**	2007.06.06
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300

Conditions of Deficiency List

This Deficiency List was discussed on site at the Patch Lake Tank Farm on June 6, 2007. Present during this session was:

- Mike Cripps – MHBL
- George McFarlane – MHBL
- Matthew Kawai – MHBL
- Peter Mikes – SRK
- Maritz Rykaart – SRK

SRK is satisfied that provided MHBL put in place an operational plan for management of the Tank Farm, as well as addresses the primary safety concerns, that the tank farm could be commissioned. The items on this deficiency list must be completed as soon as possible as materials, equipment and manpower becomes available over the next few weeks to months; however, until all these items are addressed MHBL should take extra operational care to prevent inadvertent damage to the containment system.

Many of the deficiencies listed can be addressed by MHBL using various techniques. SRK would be happy to provide technical advice on alternative methods to address these deficiencies.

Deficiency List Items

Site Clean-Up

1. General site cleanup required. Pick up and suitably dispose of garbage, tools, excess containment berm materials, boxes of screws in the NW corner, drill rod, timbers and other debris.
2. Trim and dispose of the excess liner along the north steel berm.
3. Rake the crush off the sand along the west side of the inner access road – this has to be a continous housekeeping exercise.
4. Pick up and remove large rocks between the steel berm and the eastern rock wall – this will have to be a continuous housekeeping exercise.

Inside Steel Containment Berm

1. Extreme care will have to be taken when clearing snow inside the tank farm, especially when working near to the steel berms. MHBL should consider placing a series of timbers all along the inside perimeter to act as a “bumper”.
2. Three of the tanks have external access ladders. When these ladders are installed, MHBL should place their foot on timbers to ensure that the load is spread as much as practical, as the sand cover over the liner is only nominal. After discussions with MHBL staff it would appear as if all ladders will be suspended to avoid any contact with the tank farm floor.
3. Construct and install the timber box sump box and connect the liner as shown on the design drawings.

4. At the time the timber sump box is installed, dig up the fold in the liner running east-west from the sump and have it field seamed by Layfield. This should be done at least to the western edge of the access road.
5. SRK understands that MHBL may wish to install an electrical earthing system for the tank farm. It may be opportune to install this system when the liner is exposed and cut.
6. The sand cover over the liner is only a nominal layer, and although the liner is adequately protected, the cover is not sufficient to safely support the operating intent of the tank farm. A total cover of at least 0.3 m is required to safely support the operating intent of the tank farm. As soon as suitable gravel becomes available MHBL should place a levelling surface of crush over the entire perimeter of the tank farm, graded towards the sump. This levelling surface should be at least 0.15 m thick, which if combined with the existing sand layer will result in the prescribed 0.3 m cover.
7. A levelling layer of road fill crush should be placed between the eastern edge of the access road and the east steel berm wall as soon as material becomes available.
8. The roadway crush should be increased to a thickness of at least 0.3 m to ensure protection of the liner.
9. The existing sand surface is not graded towards the sump, and ponding of surface water is to be expected. MHBL should consider careful raking of the sand surface towards a grade leading to the sump; however, this must be done only with strict survey control. Hand work is the preferred method due to the nominal sand cover.
10. Remove the “sacks” at the west end of the north ramp. If these cannot be removed without excavating the ramp cover the exposed ends of sack with crush or sand to prevent accidental “catch on equipment” and a trip hazard.

Outside Steel Containment Berm

1. Along most of the steel berm, there is a gap between the base of the steel berm and the subbase floor. This gap is present due to the fact that the base plates could not be imbedded into the subbase, and the irregularities in the sub base. These gaps should be infilled with sand or other suitable fine-grained material to a nominal height of at least 0.3 from the base of the subbase.
2. The outlet drain at the SW corner does not have a continuous grade. This drain grade must be fixed to prevent excessive ice build-up in the subbase which could compromise the liner integrity. As-built survey data is not yet available but visual inspection suggest the drain outlet must be lowered by about 0.4 m.
3. Visual observation suggest that little to no compaction of the subbase occurred along a portion of the NW corner. Compaction at this stage is not possible so MHBL is advised to monitor this area closely for any signs of settlement. Excessive settlement may compromise the liner integrity.
4. The SE corner of the steel berm at the south access ramp shows signs of buckling, probably as a result of inadequate fill on the outside of the ramp to balance the pressure exerted by the inside fill of the ramp. As soon as more suitable material is available this corner must be filled in.
5. The sand borrow area immediately north of the tank farm must be closely monitored, and if signs of erosion are observed MHBL should implement the necessary remediation measures.

Access Ramps

1. A minimum crush fill of 0.3 m is required for the access ramps where they pass over the steel berms, with a level surface of at least 5 m. As soon as more crush is available these ramps must be upgraded as the buckling of the steel berm may occur.
2. When more crush becomes available MHBL should as a minimum lessen the ramp grade to 12H:1V, but preferably 15H:1V.

Unsuitable Stockpile Area

1. Some settlement of the unsuitable stockpile is expected. Visual inspections should be carried out on the surface of this pile to ensure no ponding water. Intermitted regrading may be required.
2. Geochemical testing should be carried out on representative samples of the unsuitable stockpile material to confirm that there are no long-term environmental concerns with these materials with respect to acid rock generation of leaching of metals.

3. The current stockpile side slopes are at angle of repose, and are considered safe from a geotechnical perspective. MHBL should confirm whether this in general conformance with their site wide closure policy. If not appropriate regrading should be undertaken.
4. The large stockpile of overburden material mixed with snow, stockpiled west of the unsuitable stockpile must be closely monitored during this thaw period. Appropriate mitigation measures may have to be implemented as required.
5. Closely monitor the overburden piles dumped along the western edge of the rock outcrop west of the tank farm for any signs of erosion, and if erosion does occur implement mitigation measures as required.

Safety Concerns

1. Blasting has resulted in significant fracturing of the rock high walls along the east, west and southern perimeter of the tank farm. These fractures will be susceptible to frost jacking and spalding, and MHBL should undertake regular inspections to prevent rocks falling from becoming a human safety hazard as well as a falling hazard that may damage the steel berm.
2. Until such time as a suitable gravel surfacing layer can be placed inside the tank farm, MHBL should place permanent warning signs clearly visible to all on the tank farm that the sand cover is nominal and everyone operating inside the facility should execute extreme caution.
3. Place markings or a barricade above the east wall off the tank farm to prevent any vehicles/equipment by Major's shop from falling over the edge.
4. A warning sign should be placed on the entrances to the tank farm to keep unauthorized vehicles and personnel out.
5. Strict speed limits must be put in place for vehicles entering and passing through the tank farm.
6. Dust during refuelling with the aid of the helicopter is going to be a significant hazard with only a sand surfacing layer. Until such time as MHBL is able to put in place the gravel surfacing layer, MHBL should consider applying a suitable chemical dust suppressant. However please check with the liner manufacturer to confirm compatibility before implementing any such measures.

Operational Recommendations

1. MHBL is reminded that it is their responsibility to develop and put in place a detailed operational manual for the tank farm prior to placing it in operation.
2. MHBL is reminded that the tank farm is NOT suitable for storage of gasoline. Gasoline spilled on the liner will dissolve the liner within 24 hours.
3. Clearly identifiable permanent road markers, visible both in summer and winter must be put on either side of the access ramps at least 0.5 m from the crest of the shoulder. This is to prevent vehicle traffic from traveling too close over the steel berm.
4. MHBL should prohibit smoking within the confines of the tank farm. This recommendation only considers the fact that there will always be exposed liner on the steel berms.
5. Set up operating procedure/protocols including machine use, tool use, and snow removal inside the tank farm.
6. Timbers supporting the tanks can be cut flush with the side walls of the tanks if MHBL wishes to avoid any trip hazards between the tanks. This cutting must be done very carefully, and preferably a steel plate must be placed under the timber being cut to avoid inadvertent damage to the liner.
7. MHBL should consult the liner supplier for a field mending kit for the liner for small temporary repairs.
8. Strict snow removing protocols must be put in place. There must be absolute and clear no go zones and equipment operators should be briefed on the limitations of the nominal sand cover.
9. Hoses and electrical cables must under no circumstances be dragged across or supported on the steel berm. This may cause damage to the steel berm, liner as well as the hoses and wires. Cables or hoses should be laid on the access ramps, or if the berm has to be crossed MHBL should consider manufacturing a timber or steel cradle over the steel berm. This cradle may not be attached to the berm. Water will pond between the eastern high wall and the eastern steel berm. This area must be closely monitored and MHBL must implement a strategy to allow pumping of this water. The berm will not support permanent ponding.

Winter Snow Issues

1. There is a real concern that due to the location of the tank farm that snow drifts may completely cover the tank farm during the winter. Since year-round access is required in the tank farm MHBL should undertake a careful evaluation of strategies and implement those in time to allow suitable management of this problem.

Outstanding Tasks

1. Complete as-built surveys must still be completed.
2. MHBL should submit copies of all factory supplied QA/QC reports for the liner and steel berm to SRK for inclusion in the as-built report.

Appendix I

Patch Lake Tank Farm – Final Handover Deficiency List,
Status Update #1, July 16, 2007

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Patch Lake Tank Farm
FINAL HANDOVER DEFICIENCY LIST – STATUS UPDATE #1

Prepared by:	Maritz Rykaart	**Date:**	2007.07.16
Client:	Miramar Hope Bay Ltd.	**Project #:**	1CM014.010.0300

Conditions of Deficiency List	**Conditions of Status Inspection**
Original Inspection – June 6, 2007 This Deficiency List was discussed on site at the Patch Lake Tank Farm on June 6, 2007. Present during this session was: • Mike Cripps – MHBL • George McFarlane – MHBL • Matthew Kawai – MHBL • Peter Mikes – SRK • Maritz Rykaart – SRK SRK is satisfied that provided MHBL put in place an operational plan for management of the Tank Farm, as well as addresses the primary safety concerns, that the tank farm could be commissioned. The items on this deficiency list must be completed as soon as possible as materials, equipment and manpower becomes available over the next few weeks to months; however, until all these items are addressed MHBL should take extra operational care to prevent inadvertent damage to the containment system. Many of the deficiencies listed can be addressed by MHBL using various techniques. SRK would be happy to provide technical advice on alternative methods to address these deficiencies.	Status Inspection – July 16, 2007 A Status Inspection was carried out on site at the Patch Lake Tank farm on July 15, 2007 by request of MHBL Windy Camp staff. Present during this session was: • Mike Cripps – MHBL • George McFarlane – MHBL • Maritz Rykaart – SRK SRK is satisfied that MHBL has completed all tasks on the deficiency list issued on June 6, 2007 to a level allowed by current equipment and material availability. Furthermore SRK understands that MHBL has put in place an operational plan for management of the tank farm, and that the tank farm is in commission. SRK has not reviewed this plan and it not qualifies to determine its adequacy. The final outstanding items can likely only be addressed after the next winter season, and until that time SRK would recommend that MHBL take extra operational care to prevent inadvertent damage to the containment system. MHBL's efforts to address the deficiencies are commended.

Deficiency List Items

Site Clean-Up	**Status on July 16, 2007**
1. General site cleanup required. Pick up and suitably dispose of garbage, tools, excess containment berm materials, boxes of screws in the NW corner, drill rod, timbers and other debris.	1. Generally completed. One drill rod still behind the steel berm on the west side of the tank farm.

2. Trim and dispose of the excess liner along the north steel berm.	2. Completed.
3. Rake the crush off the sand along the west side of the inner access road – this has to be a continuous housekeeping exercise.	3. No concerns. Should remain a continuous housekeeping exercise.
4. Pick up and remove large rocks between the steel berm and the eastern rock wall – this will have to be a continuous housekeeping exercise.	4. Completed. Should remain a continuous housekeeping exercise.
Inside Steel Containment Berm	**Status on July 16, 2007**
1. Extreme care will have to be taken when clearing snow inside the tank farm, especially when working near to the steel berms. MHBL should consider placing a series of timbers all along the inside perimeter to act as a "bumper".	1. Not completed.
2. Three of the tanks have external access ladders. When these ladders are installed, MHBL should place their foot on timbers to ensure that the load is spread as much as practical, as the sand cover over the liner is only nominal. After discussions with MHBL staff it would appear as if all ladders will be suspended to avoid any contact with the tank farm floor.	2. Completed.
3. Construct and install the timber box sump box and connect the liner as shown on the design drawings.	3. Completed.
4. At the time the timber sump box is installed, dig up the fold in the liner running east-west from the sump and have it field seamed by Layfield. This should be done at least to the western edge of the access road.	4. Not completed. MHBL has however been in contact with Layfield and the liner will not be seemed. MHBL will implement an alternate system to ensure safe operation of the sump.
5. SRK understands that MHBL may wish to install an electrical earthing system for the tank farm. It may be opportune to install this system when the liner is exposed and cut.	5. Not completed.
6. The sand cover over the liner is only a nominal layer, and although the liner is adequately protected, the cover is not sufficient to safely support the operating intent of the tank farm. A total cover of at least 0.3 m is required to safely support the operating intent of the tank farm. As soon as suitable gravel becomes available MHBL should place a levelling surface of crush over the entire perimeter of the tank farm, graded towards the sump. This levelling surface should be at least 0.15 m thick, which if combined with the existing sand layer will result in the prescribed 0.3 m cover.	6. Not completed. Needs to remain a continuous housekeeping exercise.
7. A levelling layer of road fill crush should be placed between the eastern edge of the access road and the east steel berm wall as soon as material becomes available.	7. Completed

8. The roadway crush should be increased to a thickness of at least 0.3 m to ensure protection of the liner.	8. Not completed. Needs to remain a continuous housekeeping exercise.
9. The existing sand surface is not graded towards the sump, and ponding of surface water is to be expected. MHBL should consider careful raking of the sand surface towards a grade leading to the sump; however, this must be done only with strict survey control. Hand work is the preferred method due to the nominal sand cover.	9. Not completed.
10. Remove the "sacks" at the west end of the north ramp. If these cannot be removed without excavating the ramp cover the exposed ends of sack with crush or sand to prevent accidental "catch on equipment" and a trip hazard.	10. Completed
Outside Steel Containment Berm	**Status on July 16, 2007**
1. Along most of the steel berm, there is a gap between the base of the steel berm and the sub base floor. This gap is present due to the fact that the base plates could not be imbedded into the sub base, and the irregularities in the sub base. These gaps should be infilled with sand or other suitable fine-grained material to a nominal height of at least 0.3 from the base of the subbase.	1. Not completed.
2. The outlet drain at the SW corner does not have a continuous grade. This drain grade must be fixed to prevent excessive ice build-up in the subbase which could compromise the liner integrity. As-built survey data is not yet available but visual inspection suggest the drain outlet must be lowered by about 0.4 m.	2. Not completed.
3. Visual observation suggest that little to no compaction of the subbase occurred along a portion of the NW corner. Compaction at this stage is not possible so MHBL is advised to monitor this area closely for any signs of settlement. Excessive settlement may compromise the liner integrity.	3. No action required.
4. The SE corner of the steel berm at the south access ramp shows signs of buckling, probably as a result of inadequate fill on the outside of the ramp to balance the pressure exerted by the inside fill of the ramp. As soon as more suitable material is available this corner must be filled in.	4. Completed.
5. The sand borrow area immediately north of the tank farm must be closely monitored, and if signs of erosion are observed MHBL should implement the necessary remediation measures.	5. Completed.

Access Ramps	**Status on July 16, 2007**
1. A minimum crush fill of 0.3 m is required for the access ramps where they pass over the steel berms, with a level surface of at least 5 m. As soon as more crush is available these ramps must be upgraded as the buckling of the steel berm may occur.	1. Not completed.
2. When more crush becomes available MHBL should as a minimum lessen the ramp grade to 12H:1V, but preferably 15H:1V.	2. Not completed.

Unsuitable Stockpile Area	**Status on July 16, 2007**
1. Some settlement of the unsuitable stockpile is expected. Visual inspections should be carried out on the surface of this pile to ensure no ponding water. Intermitted regrading may be required.	1. Not completed. Significant settlement is observed. Regrading in late August would be advantageous.
2. Geochemical testing should be carried out on representative samples of the unsuitable stockpile material to confirm that there are no long-term environmental concerns with these materials with respect to acid rock generation of leaching of metals.	2. Completed. SRK has not physically inspected any documents.
3. The current stockpile side slopes are at angle of repose, and are considered safe from a geotechnical perspective. MHBL should confirm whether this in general conformance with their site wide closure policy. If not appropriate regrading should be undertaken.	3. No change.
4. The large stockpile of overburden material mixed with snow, stockpiled west of the unsuitable stockpile must be closely monitored during this thaw period. Appropriate mitigation measures may have to be implemented as required.	4. Completed
5. Closely monitor the overburden piles dumped along the western edge of the rock outcrop west of the tank farm for any signs of erosion, and if erosion does occur implement mitigation measures as required.	5. Completed

Safety Concerns	**Status on July 16, 2007**
1. Blasting has resulted in significant fracturing of the rock high walls along the east, west and southern perimeter of the tank farm. These fractures will be susceptible to frost jacking and spalding, and MHBL should undertake regular inspections to prevent rocks falling from becoming a human safety hazard as well as a falling hazard that may damage the steel berm.	1. No change.

2. Until such time as a suitable gravel surfacing layer can be placed inside the tank farm, MHBL should place permanent warning signs clearly visible to all on the tank farm that the sand cover is nominal and everyone operating inside the facility should execute extreme caution.	2. Not completed.
3. Place markings or a barricade above the east wall off the tank farm to prevent any vehicles/equipment by Major's shop from falling over the edge.	3. Completed.
4. A warning sign should be placed on the entrances to the tank farm to keep unauthorized vehicles and personnel out.	4. No completed.
5. Strict speed limits must be put in place for vehicles entering and passing through the tank farm.	5. Completed. Understood to be in the operational procedures. Not physically inspected by SRK.
6. Dust during refuelling with the aid of the helicopter is going to be a significant hazard with only a sand surfacing layer. Until such time as MHBL is able to put in place the gravel surfacing layer, MHBL should consider applying a suitable chemical dust suppressant. However please check with the liner manufacturer to confirm compatibility before implementing any such measures.	6. No change.
Operational Recommendations	**Status on July 16, 2007**
1. MHBL is reminded that it is their responsibility to develop and put in place a detailed operational manual for the tank farm prior to placing it in operation.	1. Completed. Not physically inspected by SRK.
2. MHBL is reminded that the tank farm is NOT suitable for storage of gasoline. Gasoline spilled on the liner will dissolve the liner within 24 hours.	2. No change.
3. Clearly identifiable permanent road markers, visible both in summer and winter must be put on either side of the access ramps at least 0.5 m from the crest of the shoulder. This is to prevent vehicle traffic from traveling too close over the steel berm.	3. Completed.
4. MHBL should prohibit smoking within the confines of the tank farm. This recommendation only considers the fact that there will always be exposed liner on the steel berms.	4. No change.
5. Set up operating procedure/protocols including machine use, tool use, and snow removal inside the tank farm.	5. Completed. Not physically inspected by SRK.

6. Timbers supporting the tanks can be cut flush with the side walls of the tanks if MHBL wishes to avoid any trip hazards between the tanks. This cutting must be done very carefully, and preferably a steel plate must be placed under the timber being cut to avoid inadvertent damage to the liner.	6. SRK understands that MHBL will not be cutting the timbers.
7. MHBL should consult the liner supplier for a field mending kit for the liner for small temporary repairs.	7. Completed.
8. Strict snow removing protocols must be put in place. There must be absolute and clear no go zones and equipment operators should be briefed on the limitations of the nominal sand cover.	8. No change.
9. Hoses and electrical cables must under no circumstances be dragged across or supported on the steel berm. This may cause damage to the steel berm, liner as well as the hoses and wires. Cables or hoses should be laid on the access ramps, or if the berm has to be crossed MHBL should consider manufacturing a timber or steel cradle over the steel berm. This cradle may not be attached to the berm.	9. No change.
10. Water will pond between the eastern high wall and the eastern steel berm. This area must be closely monitored and MHBL must implement a strategy to allow pumping of this water. The berm will not support permanent ponding.	10. No change.
Winter Snow Issues	**Status on July 16, 2007**
1. There is a real concern that due to the location of the tank farm that snow drifts may completely cover the tank farm during the winter. Since year-round access is required in the tank farm MHBL should undertake a careful evaluation of strategies and implement those in time to allow suitable management of this problem.	1. No change.
Outstanding Tasks	**Status on July 16, 2007**
1. Complete as-built surveys must still be completed. 2. MHBL should submit copies of all factory supplied QA/QC reports for the liner and steel berm to SRK for inclusion in the as-built report.	1. Completed. 2. Not complete.