# 2010 Annual Geotechnical Inspection, Boston Advanced Exploration Project

## Hope Bay, Nunavut

***Prepared for:***

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*Project Reference Number*
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# 2010 Annual Geotechnical Inspection, Boston Advanced Exploration Project, Hope Bay, Nunavut

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# Executive Summary

The Boston Advanced Exploration Project (Boston Camp) is a wholly owned exploration camp of Hope Bay Mining Ltd. (HBML), which is a wholly owned subsidiary of Newmont Mining Company (NMC). The camp is located about 170 km southwest of Cambridge Bay within the western Kitikmeot Region, Nunavut (with general coordinates of latitude 67°39’N and longitude 106°22’W). Boston Camp is used on a seasonal basis from which to carry out prospecting and exploration, various forms of exploration drilling, core splitting and logging. In addition, the site has historically been subjected to bulk underground sampling and processing. The camp was temporarily closed between mid 2009 and mid 2010, pending improvements to the camp sewage treatment plant (STP). At the time of this inspection these improvements continued; however, the camp was open and in use.

Site operations are currently conducted under Nunavut Water Board (NWB) License 2BB-BOS0712, dated July 6, 2007, which entitles HBML to use water and dispose of waste associated with their operations. HBML contracted SRK Consulting (Canada) Inc. (SRK) to conduct the annual geotechnical site inspection of Boston Camp in accordance with stipulated License conditions. This investigation was carried out during the week of July 12 – 16, 2010.

Table A below provides a summary of the inspection components and the primary recommendations stemming from the inspection. These recommendations are compared with those listed in the 2009 annual geotechnical report (SRK 2009f). There are no issues that require urgent and immediate action. SRK understands that HBML have already initiated projects to address many of the recommendations and concerns raised in this report.

**Table A: Summary of Inspection Items and Associated Inspection Recommendations**

| Inspection Item | 2009 Recommendations | 2010 Recommendations |
|---|---|---|
| Thermistors | • Locate appropriate readout device for older thermistors and confirm functionality of strings<br>• Splice broken string<br>• Continue formal monitoring of new (and older) strings | • Locate appropriate readout device for older thermistors and confirm functionality of strings<br>• Splice broken string<br>• Confirm status of string in 08SBD381A<br>• Continue formal monitoring of new (and older) strings |
| Primary Tank Farm Settlement Monitoring | • Continue quarterly monitoring<br>• Recognize foundation settlement risk in spill response plan | • Continue quarterly monitoring<br>• Recognize foundation settlement risk in spill response plan |
| Primary Tank Farm | • Monitor the surficial slip surfaces on the tank farm berms<br>• Continue settlement monitoring as described above | • Monitor the surficial slip surfaces on the tank farm berms<br>• Continue settlement monitoring as described above |
| Power Plant Fuel Containment | • No action required | • No action required |

| Inspection Item | 2009 Recommendations | 2010 Recommendations |
|---|---|---|
| Central Pad Fuel Containment | • No action required | • No action required<br>• Confirm whether secondary containment is required for two new tanks and implement if necessary |
| Jet Fuel Containment | • Conduct regular inspections of the portable containment berms | • Conduct regular inspections of the portable containment berms |
| Solid Waste Disposal Site (including burn pit) | • Confirm that waste containment is not required through an appropriate waste inventory<br>• Clean out burn pit and dispose wood waste as appropriate<br>• Remediate burn pit, or reclassify for other functional use | • Confirm that waste containment is not required through an appropriate waste inventory<br>• Clean out burn pit and dispose wood waste as appropriate<br>• Remediate burn pit, or reclassify for other functional use |
| Ore Stockpiles | • Implement the 2009 water and ore/waste rock management plan developed for the site | • Implement the 2009 water and ore/waste rock management plan developed for the site |
| Settling Pond | • Clear out debris in pond that could damage liner<br>• Implement the 2009 water and ore/waste rock management plan developed for the site<br>• Construct suitable barrier around the pond to prevent inadvertent human and/or animal access | • Clear out debris in pond that could damage liner<br>• Implement the 2009 water and ore/waste rock management plan developed for the site<br>• Construct suitable barrier around the pond to prevent inadvertent human and/or animal access<br>• Confirm through water quality sampling whether the pond is leaking, and implement mitigation measures as appropriate |
| Soil Containment Berm (Landfarm) | • Implement action items arising from landfarm study currently underway | • Implement action items arising from landfarm study recently completed |
| Diamond Drill Cuttings and Settling Pond | • Develop appropriate remediation plan for the pond<br>• Develop appropriate management plan for storage of drill cuttings, including possible use as remediation method for permafrost degradation zones | • Develop appropriate remediation plan for the pond<br>• Develop appropriate management plan for storage of drill cuttings, including possible use as remediation method for permafrost degradation zones |
| Portal | • Replace the faded notices at the portal entrance advising of the dangers associated with unauthorized access to the area<br>• Develop site specific hazard assessment for people entering the portal area to address the rockfall hazard<br>• Consider installing a small diameter wire mesh over the exposed section of the portal roof to address the rockfall hazard | • Replace the faded notices at the portal entrance advising of the dangers associated with unauthorized access to the area<br>• Develop site specific hazard assessment for people entering the portal area to address the rockfall hazard<br>• Consider installing a small diameter wire mesh over the exposed section of the portal roof to address the rockfall hazard |
| Vent Raise | • Replace weathered protective tarps covering the shelter erected over the vent raise<br>• Install notices at the vent raise advising of the dangers associated with unauthorized access to the area | • Replace weathered protective tarps covering the shelter erected over the vent raise<br>• Install notices at the vent raise advising of the dangers associated with unauthorized access to the area |

| Inspection Item | 2009 Recommendations | 2010 Recommendations |
|---|---|---|
| Road to Dock | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Implement speed control measures | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Implement speed control measures |
| Camp Complex Foundation Pad | • Re-survey the pad and develop an action plan to fill in and re-grade the pad to re-establish constant pad drainage | • Re-survey the pad and develop an action plan to fill in and re-grade the pad to re-establish constant pad drainage |
| Road to Airstrip | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Implement speed control measures | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Implement speed control measures |
| Airstrip | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Conduct frequent walk-over surveys to inspect for tension cracks along the airstrip shoulder |
| Drill Road | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Implement speed control measures | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Implement speed control measures |
| Core Storage Road | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Monitor the pipe culvert for progressive permafrost degradation<br>• Implement speed control measures | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Monitor the pipe culvert for progressive permafrost degradation<br>• Implement speed control measures |
| Wooden Walkway to Boat Dock | • Consider raising the walkway above the tundra to prevent vegetation dieback and possible onset of permafrost degradation<br>• If boat dock is to be decommissioned consider removing the walkway altogether | • Consider raising the walkway above the tundra to prevent vegetation dieback and possible onset of permafrost degradation<br>• If boat dock is to be decommissioned consider removing the walkway altogether |
| Radio Tower and Shack | • No action required | • No action required |
| Water Intake Pump Shack | • Consider installing thermal pad or other appropriate foundation system | • Consider installing thermal pad or other appropriate foundation system |
| Existing STP Foundation Pad | • No action required | • No action required |
| New STP Foundation Pad | • Monitor the areas where tundra vegetation damage has occurred<br>• Develop long-term re-vegetation plan: involve a tundra vegetation expert | • Monitor the areas where tundra vegetation damage has occurred<br>• Develop long-term re-vegetation plan: involve a tundra vegetation expert |
| Core Storage Area(s) | • Consolidate core box storage and ensure that no boxes are inadvertently stored on the tundra<br>• Develop a long-term core storage plan | • Consolidate core box storage and ensure that no boxes are inadvertently stored on the tundra<br>• Develop a long-term core storage plan |
| Grey Water Discharge | • Implement the new sewage management plan developed for the site when the new STP is commissioned | • Implement the new sewage management plan developed for the site when the new STP is commissioned |
| Drill Sites | • Develop remediation strategy to prevent further permafrost degradation | • Develop remediation strategy to prevent further permafrost degradation |

| Inspection Item | 2009 Recommendations | 2010 Recommendations |
|---|---|---|
| Vegetation Dieback Zone | • Initiate study to determine why dieback continues; involve a tundra vegetation expert<br>• Develop remediation strategy to prevent further dieback and permafrost degradation | • Initiate study to determine why dieback continues; involve a tundra vegetation expert<br>• Develop remediation strategy to prevent further dieback and permafrost degradation |
| V-Notch Weir | • Conduct complete inspection of the weir during 2010 geotechnical inspection<br>• Develop appropriate remediation plan for the weir | • Conduct complete inspection of the weir during 2011 geotechnical inspection<br>• Develop appropriate remediation plan for the weir |

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# 1 Introduction

## 1.1 Inspection Requirement

The Boston Advanced Exploration Project (Boston Camp) is an exploration camp of Hope Bay Mining Limited (HBML), a wholly owned subsidiary of Newmont Mining Company (NMC). The camp is located about 170 km southwest of Cambridge Bay within the western Kitikmeot Region, Nunavut (with general coordinates of latitude 67°39'N and longitude 106°22'W, as shown in Figure 1).

The Boston Camp is currently used on a seasonal basis from which to carry out prospecting and exploration, various forms of exploration drilling, core splitting and logging. In addition, the site has historically been subjected to bulk underground sampling and processing.

Site operations are currently conducted under Nunavut Water Board (NWB) License 2BB-BOS0712 (the License), dated July 6, 2007, which entitles HBML (the Licensee) to use water and dispose of waste associated with their operations. Part D, Item 20 of the License (NWB 2007) states the following:

*"An inspection of the earthworks, geological regime, and the hydrological regime of the Project is to be carried out annually during the summer by a Geotechnical Engineer. The Geotechnical Engineer's report shall be submitted to the Board within sixty (60) days of the inspection, with a covering letter from the Licensee outlining an implementation plan to respond to the Engineer's recommendations."*

Additionally, Part D, Item 10 states:

*"The Licensee shall ensure that Containment Ponds are designed and bermed in such a way to ensure there is no seepage. A report on seepage shall be included as part of the Geotechnical Engineer's annual report required by Part D, Item 20."*

In fulfillment of these regulatory requirements, Mr. Chris Hanks, Director for Environment and Social Responsibility from HBML, requested that SRK Consulting (Canada) Inc. (SRK) conduct the 2010 geotechnical site inspection. This report provides a summary of the conditions observed and the resulting mitigation recommendations. Table 1 provides a summary of the inspection components.

**Table 1: List of Individual Inspection Items**

| Facility/Data Type | Inspection Item |
|---|---|
| Instrumentation/Data | Thermistors |
| | Primary Tank Farm Settlement Surveys |
| Containment Structures | Primary Tank Farm |
| | Power Plant Fuel Containment |
| | Central Pad Fuel Containment |
| | Jet Fuel Containment |
| | Solid Waste Disposal Site (including Burn Pit) |
| | Ore/Waste Rock Stockpiles |
| | Settling Pond |
| | Soil Containment Berm (Landfarm) |
| | Diamond Drill Cuttings and Settling Pond |
| Mine Openings | Portal |
| | Vent Raise |
| Infrastructure | Road to Dock |
| | Camp Complex Foundation Pad |
| | Road to Airstrip |
| | Airstrip |
| | Drill Road |
| | Core Storage Road |
| | Wooden Walkway to Boat Dock |
| | Radio Tower and Shack |
| | Water Intake Pump Shack |
| | Existing STP Foundation Pad |
| | New STP Foundation Pad |
| Other Areas | Core Storage Area(s) |
| | Grey Water Discharge |
| | Drill Sites |
| | Vegetation Dieback Zones |
| | V-Notch Weir |

Three previous formal geotechnical inspections in fulfillment of the Water Licence Condition have been carried out. The first was in October 2007 (SRK 2008), the second in July 2008 (SRK 2009a) and the last in July 2009 (SRK 2009f). This report describes the fourth formal annual geotechnical inspection.

## 1.2 Report Structure

Section 2 of this report provides a brief summary of the site history and physical conditions to provide context for the report content. The inspection conditions are described in Section 3 and an overall summary of recommendations is provided in Section 4. Photos representing the inspection conditions are included as Figures and supporting settlement monitoring data is included as Appendix A.

## 1.3 Disclaimer

This report and the opinions and conclusions contained herein ("Report") contains the expression of the professional opinion of SRK Consulting (Canada) Inc. ("SRK") as to the matters set out herein, subject to the terms and conditions of the agreement dated September 2008, HBML Professional Services Agreement (HBML.BOC-CM.PSA.003) (the "Agreement") between SRK and Hope Bay Mining Ltd. ("Hope Bay Mining"), the methodology, procedures and sampling techniques used, SRK's assumptions, and the circumstances and constraints under which Services under the Agreement were performed by SRK. This Report is written solely for the purpose stated in the Agreement, and for the sole and exclusive benefit of Hope Bay Mining, whose remedies are limited to those set out in the Agreement. This Report is meant to be read as a whole, and sections or parts thereof should thus not be read or relied upon out of context. In addition, this Report is based in part on information not within the control of SRK. Accordingly, use of such Report shall be at the user's sole risk. Such use by users other than Hope Bay Mining and its corporate affiliates shall constitute a release and agreement to defend and indemnify SRK from and against any liability (including but not limited to liability for special, indirect or consequential damages) in connection with such use. Such release from and indemnification against liability shall apply in contract, tort (including negligence of SRK whether active, passive, joint or concurrent), strict liability, or other theory of legal liability; provided, however, such release, limitation and indemnity provisions shall be effective to, and only to, the maximum extent, scope or amount allowable by law.

# 2 Site Conditions

## 2.1 Site History

A brief summary of the site history is listed in Table 2.

**Table 2: Summary of Pertinent Site Ownership History**

| Period | Comment |
|---|---|
| 1964 | Sporadic exploration in the Hope Bay area begins, resulting in several gold and silver showings including Ida Point, Ida Bay and Roberts Lake. |
| 1970 | Roberts Bay Mining explores the area for about a decade up to 1980. |
| 1977 | Noranda begins exploring for volcanogenic massive sulphide deposits. They leave the belt in 1990. Prior to 1980, Roberts Bay Mining also explored the area. |
| 1987 | Abermin Corporation stake claims in the vicinity of Spyder- and Doris Lakes. After completing some exploration they allow their claims to expire. |
| 1988 | BHP Minerals Canada Inc. (BHP) explores the southern portion of Hope Bay Volcanic Belt. |
| 1991 | BHP acquires a contiguous block of claims covering about 1,106 square kilometres. |
| 1992 | BHP commences exploration drilling at the Boston property. |
| 1993 | The first camp is constructed on the southwest shores of Spyder Lake by BHP. |
| 1994 | Construction of 35 person camp at Stickleback Lake. The Spyder Lake camp is dismantled and moved to this site. |
| 1996 and 1997 | BHP complete 2,300 m of underground development, underground exploration (drilling and sampling) and bulk sampling of the Boston deposit. |
| 1999 | BHP sells all its interests in the Hope Bay Belt to Hope Bay Joint Venture (HBJV), a 50:50 joint venture between Hope Bay Gold Corporation Inc. (formerly Cambiex Exploration Inc.), and Miramar Hope Bay Limited (MHBL), a wholly owned subsidiary of Miramar Mining Corporation (MMC). |
| 2002 | Hope Bay Gold Corporation Inc. formerly merges with MMC, and the Hope Bay site is operated under MHBL. |
| 2008 | Hope Bay Mining Limited (HBML), a wholly owned subsidiary of Newmont Mining Corporation (NMC) buys out all interests in the Hope Bay Belt from MMC. HBML assumes responsibility of the camp and Water Licence for Boston. |
| 2009 to 2010 | The camp is temporarily closed pending upgrades to the sewage treatment plant. |

## 2.2 Site Infrastructure

The Boston Camp is situated on a ridge and is comprised of a peninsula extending northwards into Spyder Lake, as illustrated on Figure 2. The main camp footprint spans about 325 m from north to south, and 150 m east to west. The bulk of the camp facilities are located on a crushed rock pad, ranging in thickness from 0.6 m to 3 m. The pad was designed to slope generally north at a gradient of about 1%.

The camp consists of a series of joined trailers to provide accommodations and office space for about 50 people. One trailer houses the water treatment plant and another, off the main pad, the original sewage treatment plant (STP). A new STP is currently under construction, and will ultimately replace the existing facility. There are six tents that act as additional office space and core logging shacks. A “Weatherhaven” type building, that used to contain the bulk sampling crushing plant, is now used as a workshop and a general equipment storage shed. The last remaining buildings consist of a maintenance shop and the power generator shed. Generator fuel (diesel) is supplied from two aboveground storage tanks, adjacent to the power house. Eight additional bulk fuel tanks are housed in an engineered containment facility.

An overall site layout plan is presented in Figure 2, and a more detailed illustration of the main camp complex is presented in Figures 3 and 4. In addition to the main camp complex, these figures illustrate the relative locations of all the main infrastructure components, containment structures and mine openings.

## 2.3 Climate

Site specific climate data at Boston Camp is limited to a few years of data collected by BHP in the late 1990s. Comparison of this data, with regional weather stations operated by Environment Canada, suggests that the mean annual site temperature is about -13.5°C. The extrapolated mean annual precipitation is about 208 mm, with 108 mm of that falling as rain and the remainder as snow. The area is classified as arctic desert (EBA 1997).

## 2.4 Regional Geology

During the Quaternary period, the region was subjected to multiple glaciations. The north-western sector of the vast Laurentide Ice Sheet covered the area during each glaciation, and the present day landscape provides clear evidence of the most recent (Late Wisconsin) glaciation. Striations, orientation of eskers, grooves and drumlins indicate that the predominant glacial ice movement was north-northwest (EBA 1996).

The ice disappeared about 8,800 years ago leaving a blanket of basal till. The sea level was about 200 m higher than present immediately following de-glaciation. At that time, the project area was submerged and the edge of the ice sheet abutted the open sea. Melt water streams from the ice carried fine grained sediments towards the sea, resulting in the accumulation of marine sediments on top of the till, with the greatest accumulation in deeper water zones, which now form the valley bottoms (EBA 1996).

Isostatic rebound after de-glaciation resulted in emergent landforms, and during this process all parts of the land were washed by waves. The easily erodible marine sediments, till and glacio-fluvial sands and gravels were subsequently reworked by waves, currents and sea ice. This has resulted in the present day outcrops where thin soil veneers were washed off the uplands and deposited in the valley bottoms. Since emergence, the natural effects of slope processes, frost action and permafrost have transformed the landscape to its present day shape (EBA 1996).

## 2.5 Permafrost and Geotechnical Conditions

Surficial geotechnical investigations at the Boston project area are limited to a series of seven drill holes and a subsequent terrain analysis carried out by EBA Engineering Consultants Ltd. (EBA) in 1996 (EBA 1996, 1997). There is also a series of thermistors that have been installed at the site including three shallow strings in 1996 (EBA 1996), one deep string in 1997 (EBA 1997; Golder 2000a, b), and three deep strings in 2008 (SRK 2009e). A Westbay well was installed in 2010 (SRK 2011), which allows recording of down hole water temperature during pumping. The location of all surficial geology drill holes and thermistor string locations are presented in Figure 2, and summarized in Table 3.

**Table 3: Summary of Permafrost Drillholes and Thermistor Installations**

| Drill Hole ID | UTM Coordinates | | Surface Elevation (m) | Completion Depth (m) | Thermistor Installed (Serial #) | Source |
|---|---|---|---|---|---|---|
| | Northing | Easting | | | | |
| 12259-01 (BH1) | 7,504,261* | 441,482* | 68.6* | 10.9 (below lake) | No | EBA (1996, 1997) |
| 12259-02 (BH2) | 7,504,141 | 441,213 | 71.7 | 4.1 | No | |
| 12259-03 (BH3) | 7,504,380 | 441,113 | 77.6 | 16.1 | Yes (#1049) | |
| 12259-04 (BH4) | 7,503,905* | 442,323* | 73.9 | 13.9 | No | |
| 12259-05 (BH5) | 7,504,778 | 441,172 | 80.8 | 15.6 | Yes (#1050) | |
| 12259-06 (BH6) | 7,505,683 | 441,327 | 69.7 | 15.8 | Yes (#1051) | |
| 12259-07 (BH7) | 7,506,153* | 441,830* | Unknown | Unknown | No | |
| 97NOD176 | 7,504,962 | 441,481 | 78.3 | 367 @ -60$^{o}$ (298 true) | Yes | Golder (2000a) |
| 08SBD380 | 7,504,780 | 441,080 | 77.3 | 402 @-60$^{o}$ (334 true) | Yes | SRK (2009e) |
| 08SBD381A | 7,504,814 | 441,070 | 69.6 | 401 @ -55$^{o}$ (298 true) | Yes | |
| 08SBD382 | 7,505,141 | 441,026 | 72.8 | 404 @-60$^{o}$ (323 true) | Yes | |
| 10WBW004 | 7,505,665 | 441,018 | Unknown | 470 @-55 $^{o}$ (250 true) | No (Westbay) | SRK (2011) |

* Approximate information as interpolated from source drawings by SRK. Exact information is not available. Locations not marked with asterisk are surveyed coordinates.

Figures 6 through 13 summarize all available thermistor string data. It is not known if any other data from the 1996 and 1997 installations has been recorded since their installation and reporting in 1997 (EBA 1997). Golder (2000a, b) documents the findings of a site inspection, including revisiting some of the thermistors; however, no additional data was added. With assistance from the HBML surveyors, the historic thermistors were located as part of the 2009 geotechnical inspection, to determine their status. One string was severed completely (drill hole 12259-03, see Figure 5), but the remaining three appear to be intact. A readout device compatible with the military connectors on the strings was not available to test the functionality of these strings. An appropriate readout device should be obtained from EBA Engineering (the original thermistor supplier) and the string functionality should be tested during the 2011 geotechnical inspection. If the three in-tact strings are functional, the fourth string should be spliced and tested as well.

The available information confirms that the Boston Camp is located well within the region of cold, continuous permafrost. Permafrost temperatures are below about -8°C and the active layer is generally less than 1 m thick, with the depth of zero annual amplitude about 10 m. Based on data from the deep thermistor installed in 1997, the permafrost depth is estimated to be about 520 m (Golder 2000a).

Laboratory testing (moisture contents, Atterberg Limits, grain size distribution and pore water salinity) on intact samples collected during the drilling campaign in 1996 confirms that overburden soils are comprised mainly of marine silt and morainal till ranging in thickness from 1.5 to 8 m. The silt contains up to 50% (by volume of soil) ground ice, while the till contains low to moderate ice contents (5 to 25%) (EBA 1997).

# 3 Inspection Conditions

Mr. Maritz Rykaart, P.Eng., Ph.D., a Principal Geotechnical Engineer with SRK, conducted the geotechnical inspection during the week of July 12-16, 2010. The detailed site inspection was carried out on foot, after travelling to site via helicopter from the Doris North camp. No-one accompanied SRK during the inspection. Ms. Jill Turk, the HBML Environmental site representative did not accompany SRK on the site inspection, but was available for questioning.

Weather conditions during the inspection were cool but sunny with light winds and no precipitation. Photos detailing the inspection conditions are included in Figures 14 through 26.

## 3.1 Instrumentation/Data

### 3.1.1 Thermistors

A summary of the available site thermistors are discussed in Section 2.5 and all available data are presented graphically in Figures 6 through 13. With the help of HBML surveyors, the 1996 and 1997 thermistor strings were located in 2009. Three of the four strings were still intact, although they are generally in poor condition, having fallen over from their support struts. Figure 5 illustrate their current state. The fourth cable has been completely severed, most likely by an animal. The section of cable to which the readout connector is attached, is still at the site, and it should be possible to re-attach the cable through splicing.

A readout device compatible with the military connectors of these older strings was not available during the inspection. SRK understands that there is an appropriate readout device on site, but at the time of the inspection, it could not be located. These older strings were supplied by EBA Engineering (EBA), and if the on-site readout device cannot be found, a new device could be rented from EBA. It is recommended that during the 2011 geotechnical inspection that this is carried out, such that the functionality of these strings can be confirmed. Installation of thermistor strings represents a considerable investment, and therefore re-instating these strings would be valuable, although not a necessity.

Data collected from the three strings installed in 2008 (SRK 2009e), as well as the Westbay well installed in 2010 (SRK 2011) are presented in Figures 10 through 13. An attempt was made in July 2010 to collect data from the string in 08SBD381A; however, it was unsuccessful. Follow-up readings should be taken in 2011 to confirm if the string is active.

**Recommendations:**

1. A compatible readout device for the older thermistor strings should be obtained from EBA, the supplier (if the on-site device cannot be located), and the functionality of the three intact thermistors should be checked. If these strings are operational, the severed string should be

spliced and tested as well. Any strings that are found to be functional should be included in the formal thermistor monitoring program for the site.

2. Additional attempts must be made to read the string in 08SBD381A to confirm if it remains active.

3. Formal monitoring of the on-site thermistor strings should continue. This program should consist of quarterly readings (or as close to this schedule as the camp operating window allows). This data should be reported as part of all subsequent annual geotechnical inspections.

### 3.1.2 Primary Tank Farm Settlement Monitoring

The 2007 annual geotechnical report recommended that a series of settlement beacons be installed on the primary tank farm containment berm to allow quarterly settlement surveys to provide early warning signs of undue tank settlement as a result of foundation settlement due to permafrost degradation. HBML opted not to install the recommended beacons, but rather initiated a survey program based on three control points on each of the eight tanks in the containment area. This is an appropriate monitoring program, in the opinion of SRK. The control points were established by the site surveyor, Mr. Jay Hallman, on April 21, 2008. The control point co-ordinates and elevations are listed in Table 4.

**Table 4: Summary of Survey Control Points Established for the Primary Tank Farm**

| Tank | Control Point | Northing (m)* | Easting (m)* | Elevation (m) |
|---|---|---|---|---|
| 1 | A | 5,325.879 | 1,305.901 | 80.674 |
| | B | 5,326.428 | 1,308.581 | 80.989 |
| | C | 5,328.263 | 1,306.711 | 80.992 |
| 2 | A | 5,327.678 | 1,315.749 | 80.877 |
| | B | 5,326.866 | 1,318.217 | 81.190 |
| | C | 5,329.353 | 1,318.048 | 81.114 |
| 3 | A | 5,331.618 | 1,306.850 | 81.057 |
| | B | 5,331.612 | 1,309.744 | 81.062 |
| | C | 5,335.467 | 1,307.263 | 81.090 |
| 4 | A | 5,331.166 | 1,318.159 | 81.128 |
| | B | 5,334.739 | 1,317.563 | 81.092 |
| | C | 5,334.220 | 1,314.710 | 81.128 |
| 5 | A | 5,337.355 | 1,307.654 | 80.896 |
| | B | 5,337.490 | 1,310.713 | 81.075 |
| | C | 5,341.035 | 1,307.826 | 81.089 |
| 6 | A | 5,337.092 | 1,317.422 | 80.991 |
| | B | 5,340.813 | 1,317.436 | 81.031 |
| | C | 5,340.311 | 1,314.183 | 81.061 |

| Tank | Control Point | Northing (m)* | Easting (m)* | Elevation (m) |
|---|---|---|---|---|
| 7 | A | 5,343.001 | 1,307.814 | 80.875 |
| | B | 5,343.343 | 1,310.862 | 81.005 |
| | C | 5,346.505 | 1,307.626 | 81.060 |
| 8 | A | 5,342.700 | 1,317.450 | 80.956 |
| | B | 5,345.860 | 1,317.826 | 80.962 |
| | C | 5,345.604 | 1,313.962 | 81.033 |

* This is a local grid for settlement surveying only.

Two subsequent settlement surveys were carried out in 2008 (August 7 and October 17), two in 2009 (July 25 and September 19), and one in 2010 (August 2). These surveys were completed by HBML survey staff using a TOTAL Station and prisms. The survey accuracy is not stated; however, it should be within ±10 mm. The complete results are presented in Appendix A and the overall summary data is presented in Table 5.

A review of the data suggest a slow but consistent trend of the tanks settling; however, this settlement is very small and since there is no trend of movement in the horizontal plane there is no indication that differential settlement is taking place which may cause the tanks to topple.

**Table 5: Summary of Overall Settlement Data for the Primary Tank Farm (April 2008 to August 2010)**

| Tank | Average Survey Differences (mm) | | |
|---|---|---|---|
| | Northing[1] | Easting[1] | Elevation[2] |
| #1 | 3.4 | -0.4 | -7.5 |
| #2 | 3.5 | -1.4 | -6.1 |
| #3 | 0.9 | 1.0 | -6.3 |
| #4 | 2.9 | -1.2 | -5.4 |
| #5 | -0.2 | 0.0 | -8.9 |
| #6 | 3.2 | -2.7 | -7.1 |
| #7 | -5.6 | 1.4 | -9.9 |
| #8 | 3.2 | -2.5 | -6.3 |

1. A negative value implies tank has moved to the south (Northing) or the west (Easting).
2. A negative value implies tank has moved down.

## Recommendations

1. Quarterly monitoring (or as close to this schedule as the camp operating window allows) of tank settlement should continue. This data should be reviewed and reported on as part of the annual geotechnical inspection, and should there be any signs of undue movement, appropriate mitigation plans can be put in motion.

2. The foundation settlement risk should be recognized in the spill response plan for the tank farm.

## 3.2 Containment Structures

### 3.2.1 Primary Tank Farm

The primary tank farm, housing eight large fuel tanks is located in an engineered secondary containment facility constructed in 2001 (Figure 14). SRK understands that there is no formal as-built documentation for the facility. Based on interviews, SRK concluded that the facility was designed by EBA and subsequently constructed by MHBL with engineering supervision by EBA.

It is understood that secondary containment is provided by a PVC liner (type unspecified) placed on a prepared rockfill pad with constructed containment berms of rockfill providing the necessary containment capacity. The liner has a top cover of gravel (crushed ore stockpile material) as a protection layer. The eight tanks are placed directly onto the protection layer and are interconnected with permanent steel piping. Fuel transfer from these main tanks into equipment, fuel drums and Tidy Tanks are done in a contained fuel transfer area, using an electric pump. The entire facility is constructed directly on permafrost overburden soils, as described in Section 2.5.

Visual inspection of the secondary containment facility showed several signs of surficial slip surfaces on the containment side slopes. In 2008 a few small tension cracks were observed along the berm crest. These were not noticed during the 2009 inspection, but were again observed as part of the 2010 inspection. The slip surfaces could be an early indication of settlement, or may simply be relaxation due to the over steepened nature of the gravel berm. The liner is not exposed anywhere, and the containment berms for both the main containment facility and the fuel transfer areas are intact. There were no visible signs of fuel spills outside of the respective containment areas. HBML has rigorous protocols in place for fuel transfer, and provided those are followed, the facility design appears adequate to provide environmental protection.

Settlement could occur as a result of permafrost thaw due to the foundation conditions under the tank. A settlement monitoring program was put in place in April 2008 as described in Section 3.1.2. Data to date suggest that the tanks may be undergoing some settlement; however, the rate appears to be very slow and since there is no significant horizontal movement, there are no signs of differential settlement. This situation should continue to be monitored and an acknowledgement of the settlement risk should remain.

During the inspection it was noted that there was no ponded water in the containment area. The facility is equipped with a sump, and at the time of the inspection there was a trash pump installed in the sump, with a pipeline leading out from it. The practice of keeping the containment area free of ponded water is appropriate and should be maintained.

**Recommendations:**

1. The appearance of surficial slip surfaces and tension cracks on the containment berms should be monitored. Remedial measures should be implemented if there are any signs of these progressing. Should excessive deformation of these berms occur (the probability of which is

likely low), the tank integrity is not at risk. It is simply the effectiveness of the secondary containment that will be compromised.

2. The tank settlement monitoring program that has been put in place is reasonable. Quarterly monitoring (or as close to this schedule as the camp operating window allows) of tank settlement should continue. This data should be reviewed and reported on as part of the annual geotechnical inspection and, should there be any signs of undue movement appropriate mitigation plans should be put in motion.

### 3.2.2 Power Plant Fuel Containment

Two small double-wall fuel tanks servicing the power plant are located in a secondary containment facility (rockfill berm) immediately west of the maintenance shop (Figure 15). Construction details for this secondary containment are not available; however, repairs to this containment system were completed in 2008, including installation of a liner (SRK 2009a). There are no concerns with this facility.

**Recommendations:**

1. No action required.

### 3.2.3 Central Pad Fuel Containment

A small double-wall fuel tank was installed since the last annual geotechnical inspection was carried out in July 2008. This tank, illustrated in Figure 15, is located approximately in the center of the camp pad, immediately east of the geology offices. The fuel tank was installed in a purpose built secondary containment facility using a liner (type unspecified) and the stockpiled crushed ore. The facility was founded directly on the camp pad. Construction details (design or as-built drawings) of this facility are not available. There are no apparent concerns with this facility.

Two new fuel tanks were observed during the 2010 inspection within the confines of the camp (Figure 15). These are elevated double-walled tanks. Neither of the tanks were however placed within secondary containment as per the normal HBML protocol.

**Recommendations:**

1. Confirm whether secondary containment is required for the two new tanks, and if so install secondary containment as required.

### 3.2.4 Jet Fuel Containment

Jet fuel is stored in drums, which are grouped together on wooden pallets, stacked two high, in an area of the rockfill pad northeast of the primary fuel tank farm. Three portable pollution control berms are used to provide secondary containment as illustrated in Figure 16.

One of the secondary containment facilities were compromised at the time of the inspection due to the fact that at least one wall of the containment structure was collapsed. Contrary to observations, during the 2009 inspection, none of the facilities contained appreciable amounts of ponded water.

**Recommendations:**

1. The secondary containment berms should be regularly inspected and repaired as needed.

### 3.2.5 Solid Waste Disposal Site (Including Burn Pit)

Combustible domestic waste is incinerated on site. Other non-hazardous and hazardous waste is stockpiled, packaged and seasonally removed from site to Yellowknife or Hay River as backhaul opportunities arise. HBML has substantially cleaned up the site and the backlog of material that still has to be hauled away has been significantly reduced since the 2008 annual geotechnical inspection was completed. The waste material that remain on site is not stored within designated containment facilities; however, the waste is neatly organized and due to the nature of the waste (as described by site staff), environmental containment does not appear to be necessary. This should be confirmed through an appropriate inventory.

At one time, all wood waste was burned in a burn pit (a converted sedimentation pond) located immediately south of the active sedimentation pond (Figure 17); however, this practice has been discontinued and all non-combustible materials was removed from the pit. The burn pit itself is still used to contain unburned wood waste and ash, until such time as HBML backhauls these materials, or adopts an alternate strategy to dispose of these elements.

**Recommendations:**

1. Confirm through an appropriate waste inventory that there are no wastes that require environmental containment. *This may have already been conducted; however, SRK is not aware of the study*.

2. Since the burn pit no longer serves its original design intent, it should be cleaned out by removing all of the wood waste and ash and relocating it to an appropriate disposal site.

3. If the burn pit could be used to perform another functional use, it should be so designated, otherwise HBML should prepare a plan to completely decommission this facility.

### 3.2.6 Ore Stockpiles

A large number of crushed ore stockpiles are located on the north-western portion of the camp complex foundation pad (Figure 18). This ore comes from the 27,000 ton bulk sampling program carried out between 1996 and 1997. These stockpiles are individual un-compacted end-dump piles. Surface water drainage from this part of the foundation pile is not specifically separated from the rest of the foundation fill pad, and is not contained, but allowed to flow directly onto the tundra.

The 2007 inspection report recommended that HBML compile a detailed database of all the seep sampling tests carried out over the life of the facility and have that data reviewed by an appropriately qualified professional with the specific objective of determining whether there is any poor quality seepage emanating from the exposed ore stockpiles. HBML contracted a specialist geochemical study with SRK to complete an inspection and sampling program to assess the geochemical performance of historic waste rock and ore at Boston. The objectives of this work were twofold: (1) to fulfill the conditions of Water License No. 2BB-BOS0112 Part E, Item 8 and, (2) to assess the geochemical performance of the weathered materials as a part of the geochemical characterization currently in progress to support future permitting activities.

The program included sampling of waste rock and ore from the ore stockpiles, roads and airstrip, as well as a seep survey around the perimeter of the site. This work was done in July 2008. Testing of the waste rock included field contact tests, acid-base accounting, metal analyses, and leach extraction tests. There is also historical seepage available for this area that was analyzed as part of this program. The results of this study were presented in a technical report (SRK 2009b) which was submitted to the Nunavut Water Board in 2009.

SRK also completed a water and ore/waste rock management plan (Plan) for the Boston site, based on the results of the geochemical assessment completed (SRK 2009d). This Plan was also submitted to the Nunavut Water Board in 2009 and stipulates appropriate management protocols for this material.

**Recommendations:**

1. The procedures, protocols and monitoring plan stipulated in the 2009 water and ore/waste rock management plan for the Boston site should be implemented.

### 3.2.7 Settling Pond

One lined settling pond (Figure 17) has been constructed along the eastern perimeter of the camp foundation pad (immediately north of the burn pit). As-built records for the construction of this pond are not available. It is understood that this pond was used to contain wash water during the screening and crushing of ore as part of the bulk sampling program.

The pond was in poor shape in 2007; however, substantial repairs were carried out on the liner in 2008 (SRK 2009a). The condition of the pond during the 2010 inspection showed signs of deterioration, most notably due to the liner no longer being supported at the crest through sand bags, probably as a result of strong winds. The pond contained various amounts of gravel (crushed ore) and wood debris which could compromise the liner integrity.

Currently the pond is used as an emergency holding pond for possible fuel spills, disposal of water from fuel containment berms, or when the sewage treatment plant experiences upset conditions. SRK is of the opinion that, if this pond is to be used for anything where there would be solids collected in the pond, its design would make it extremely difficult to remove these solids to retain pond capacity due to its depth and the fact that the liner is not protected. Furthermore, since the pond does not have a designed overflow facility (i.e. spillway), it would experience uncontrolled overflow when its capacity is exceeded. HBML has stipulated that an overflow is not required as the management practice is to pump out snowmelt and rainwater as required, after testing for contaminants.

The pond has no instrumentation of any nature and, as such nothing can be said about its historic performance. A reconnaissance survey of the pond did identify a clear zone of water seeping from the downstream toe of the pond embankment. Although it cannot be definitively confirmed that this seepage is emanating from the pond, there are no other likely sources.

**Recommendations:**

1. Water quality sampling should be undertaken to confirm whether the wet zone downstream of the pond is in fact seepage emanating from the pond. If the flow is confirmed as seepage, an appropriate mitigation plan must be implemented to have the liner repaired.

2. The debris in the pond should be cleared out as it poses a potential puncture risk to the liner.

3. A management plan must be implemented to ensure sediment (i.e. hydrocarbon contaminated soil, sewage treatment plant sludge, etc.) can be removed without damaging the liner.

4. If the pond is to be used to retain water for any length of time, a suitable leak detection monitoring system should be implemented. As a minimum, a protocol involving frequent visual inspections would have to be put in place for the pond. Excessive and prolonged leaking will lead to permafrost degradation, which in turn will result in differential settlement that may cause the liner in the pond to fail.

5. The pond should have a suitable barricade around it to prevent human and animal access. Due to the current design, it would be extremely difficult to get out of the pond unassisted if a human or animal were to inadvertently enter or fall in.

### 3.2.8 Soil Containment Berm (Landfarm)

As a result of a historic fuel spill, HBML constructed a lined soil containment facility (Figure 19) within which all excavated contaminated soils have been stored (EBA 2004). SRK reviewed the as-built records for this facility (EBA 2004) and, supported by visual inspection, confirms that it consists of a bermed and lined area in which contaminated soil is placed. In addition to soils spread about 1 m thick over the entire surface of the facility, there are also a large number of old fuel drums filled with contaminated soils contained within the confines of the facility.

From discussions with HBML site staff in 2007 and a review of the as-built report, it appears that the soil containment berm was designed to be used as an active hydrocarbon landfarm area. A land farming protocol was not provided in the as-built report; however, site staff confirmed that since initial placement of the contaminated soils into the containment area, there has been no work carried out in the form of tilling or any other means of soil mixing. HBML did routinely conduct soil sampling within the confines of this facility, the results of which are reported as part of the annual Licence conditions. Based on a review of the formal operational procedure of HBML land farming practices (MHBL 2007), and comparison of that with the site staff, SRK doubts whether the soil sampling results reported by HBML would be representative. The primary reason for coming to this conclusion is that the soil in the facility is about 1 m thick, and has never been tilled or reworked in any way, as confirmed by HBML staff. Furthermore, the soil sampling to date only effectively covers the upper 10 cm of the profile.

HBML did commission a study in 2009 to test the soils contained in the landfarm in accordance with appropriate protocols, and are in the process of developing an appropriate remediation strategy for these materials.

The containment facility itself however appears to be intact; although it is filled to capacity and would not be able to contain more soil until some of it has been adequately treated and/or relocated.

**Recommendations:**

1. HBML commissioned a study to test the soils in the landfarm and developed a strategy to relocate and treat these soils. The study has been completed and HBML is currently reviewing the recommended remediation measures.

2. The site appears to be fully contained and therefore does not pose any immediate risk.

### 3.2.9 Diamond Drill Cuttings and Settling Pond

Some drill cuttings have historically been disposed of permanently in a settling pond immediately west of the airstrip (Figures 22 and 26). Site staff could not confirm if this pond was intentionally designed, but if so there are no as-built records and the timeframe for how long this practice has been in operation is not clear. Visual inspection suggests that the pond is located at a historic drill hole. Poor control of the drill fluid resulted in permafrost degradation and subsequent annual thaw created by a pool of standing water resulted in the pool increasing in size. At some stage, the pond started to overflow and silt-laden water started to flow overland towards open water bodies. At that time, drill cuttings were placed in the pond in an attempt to stop further degradation. Geotextile was also installed to control silt flowing from the pond.

Although there were signs of this pond being actively used in 2007, there was no evidence of it being used since 2008. Considering the amount of standing water present during the inspection, as well as the apparent previous random placement of drill cuttings, SRK is not convinced that the permafrost degradation has stopped, and although there was no visual evidence of silt laden water flowing from the pond, there remains a significant section of the pond downstream of the geotextile silt barrier.

**Recommendations:**

1. SRK is not convinced that the settling pond is appropriate for its current use. Should there be a need for a settling pond, it is recommended that it be re-engineered to control the permafrost degradation, and to ensure that silt traps are located in the optimal positions.

2. Considering the fact that HBML will continue to collect significant amounts of drill cuttings, an appropriate management plan for these cuttings will have to be developed. This may include specific placement procedures for drill cuttings into permafrost degradation areas. An operational plan should be developed for this, possibly with the assistance of an appropriately qualified Professional Engineer with permafrost experience.

## 3.3 Mine Openings

### 3.3.1 Portal

A bulk sampling program was completed by BHP in 1996 and 1997, at which time 27,000 tonnes of ore and 106,000 tonnes of waste rock were extracted. The ore was crushed on site, and stockpiled on a rockfill pad constructed from the waste rock. The waste rock was also used for other infrastructure such as the airstrip. The bulk sampling extraction was via 2,300 m of underground development (completed by Procon Mining and Tunnelling Ltd.) using a ramp that extends from ground surface at approximately 4,035 m elevation to approximately 3,850 m elevation (local mine grid). The 185 m deep ramp dimensions are approximately 5 m in wide by 3.6 m high. The orientation of the ramp is generally north-south. Five cross-cuts were established, three into the B2 Zone and the remaining two into the B3 Zone.

The portal, which is located about 25 m east of the maintenance shop as illustrated in Figure 20, was collared in altered volcanic rock, all within the permafrost. This was confirmed through installation of four underground thermistors (Golder 2000a, b). During extraction of the bulk sample, the portal was not heated but operated at an ambient temperature of about -10°C. The portal was operated under dry conditions with no groundwater inflow. After completion of the bulk sample collection, the portal was abandoned and sealed off with a locked gate.

The decline was reported to be dry and geotechnically sound during a site inspection by Golder Associates Ltd. in April 2000 (Golder 2000b). According to site personnel the last operational entrance of the portal was in 2001. An attempt to enter in 2004 was aborted, reportedly due to the presence of a frost plug, likely created due to pooled water (from rainfall and snowmelt) at the portal entrance. There are also unconfirmed reports that water has run down the ramp some distance and formed an ice dam.

During the 2010 site inspection, the bulk of the portal access was flooded. It would appear as if the condition of the portal remain unchanged from the last inspection in 2009 where it was found that the portal seal to prevent unauthorized access was intact, and the signpost that identifies the area as potentially hazardous and warning persons against entering the area without permission was badly weathered and barely legible.

The visible exposed portion of the portal roof shows signs of minor rock spalling; however, the roof appears to be essentially structurally intact. There continues to be evidence of small fragments (less than 10 cm diameter) having broken off. The roof is armoured with 10 cm wide steel banding and rock bolts at this time. The most likely cause of spalling is freeze-thaw action.

**Recommendations:**

1. SRK recommends that HBML replace the weathered warning notices at the portal entrance advising of the dangers associated with unauthorized access to the area.

2. The rock spalling on the exposed section of the portal roof is likely a fall hazard. Persons entering the area should wear appropriate personal protective equipment; however, a site specific hazard assessment should be completed to make people aware of the dangers. Should there be a need for any individual to enter the area for reasons other than a brief inspection, consideration should be given to installing roof support, such as a small diameter wire mesh (50 mm mesh) to mitigate the fall hazard.

### 3.3.2 Vent Raise

There is a single vent raise located about 100 m south-west of the portal entrance (Figure 23). Mechanical and electrical support equipment is installed on a levelled wooden platform about 0.6 m off the tundra. The vent area and wooden platform base are sealed off with tarps and the mechanical and electrical equipment is locked in a steel shed. Overall the facility looks weathered; but there does not appear to be permafrost degradation. Site staff could not confirm when the facility was last accessed or inspected in detail.

**Recommendations**

1. The tarps are significantly weathered and their attachment points are starting to come apart. The tarps should be replaced.

2. Signposts warning visitors of potential dangers associated with accessing the area do not exist. It is recommended that signs be erected.

## 3.4 Infrastructure

### 3.4.1 Road to Dock

The single lane road to the dock consists of 0.3 to 0.6 m thick rockfill placed directly onto the tundra. Since the road runs down-gradient towards Stickleback Lake, small contour berms have been constructed, redirecting surface runoff from the roadway. Minor signs of surface water erosion are evident along the road, but this damage would be considered quite normal for a road of this nature.

Likewise, minor undulations (deformation) in the road suggest there may be isolated small pockets where permafrost degradation has occurred, and/or peat in the active layer has compressed. There is no thermal instrumentation or geologic data to support this observation. Considering the amount of time the road has been in operation, this deformation is likely historic; however, the undulating road could be a safety concern. Appropriate speed control should be implemented for the road.

Site staff confirmed that repairs are conducted to the road surface if and when there are any signs of surface erosion or other significant undulations. Based on descriptions from site staff, the predominant material used for maintenance purposes is crushed ore. This amount of maintenance has never been substantial.

**Recommendations:**

1. Maintain the current level of care and maintenance on this road; but stop the use of crushed ore to avoid water quality problems linked to the geochemistry of the ore. A suitable alternative clean source of rock should be located.

2. Ensure that appropriate speed control is exercised on this road.

### 3.4.2 Camp Complex Foundation Pad

The foundation pad of crushed rock (Figure 21), which underlies most of the site infrastructure, varies in thickness from 0.6 to 3 m according to previous records. Initially the pad was constructed to ensure north-south drainage with the pad sloping about 1% towards the north. The foundation pad was designed to prevent thaw settlement and permafrost degradation within the operating footprint of the advanced exploration camp.

There is no instrumentation installed in the pad to confirm the thermal regime beneath the pad. Visual inspection suggests that localized settlement has occurred, as there are local low spots and evidence of significant ponding on the pad. There is no longer a constant drainage grade off the pad.

Differential settlement of the pad appears to be within areas where the pad is the thinnest, although there are no as-built records to corroborate this observation. The accommodation complex does not appear to be impacted structurally by differential settlement, probably since these structures can be levelled by simply adding more blocking as required. It is not known how much levelling of the camp has occurred over the years. The only significant consequence of differential settlement is localized ponding of water. This ponding is likely an inconvenience in day-to-day camp life, but more importantly, it acts as a new heat source and further increases the active layer depth leading to more settlement.

There is one large erosion gully south of the camp complex. This gully has been repaired by infilling with fine crush material, from the ore stockpiles. Whilst this appears to have been successful in preventing further erosion and permafrost degradation, this material may contribute towards poor quality leachate. This should be evaluated as part of the newly developed water and ore/waste rock management plans. Other than this gully, there are no visual signs of concentrated flows from this pad, and there is no evidence of any erosion gullies along the edge of the pad.

There was a fuel spill at one time immediately south of the camp. The hydrocarbon contaminated soils were excavated and placed in the landfarm. Currently this area is poorly drained and at the time of inspection, there was standing water which appeared to contain algae. This ponded water will result in permafrost degradation, and should be pumped out on a seasonal basis.

**Recommendations:**

1. HBML should have the pad surveyed and develop an action plan to fill in and re-grade the pad to re-establish constant drainage from the pad. Special attention must be given to preventing further ponding on the pad as it may promote permafrost degradation.

### 3.4.3 Road to Airstrip

The single lane roadway to the airstrip is constructed from crushed rock ranging in thickness from 0.3 to 0.6 m. There are local depressions along the road that are more pronounced than the immediately adjacent topography, suggesting that some permafrost degradation has occurred resulting in settlement. Site staff confirmed that on a few occasions minor infilling of low spots has been carried out; however, there does not appear to be a formal record of any such remediation works.

Visual inspection did not identify any signs of surface water erosion, and although there are no culverts through the road, there are no signs that the road is resulting in surface water ponding.

**Recommendations:**

1. Maintain the current level of care and maintenance on this road, but stop the use of crushed ore. A suitable alternative clean source of rock should be located.

2. Ensure that appropriate speed control is exercised on this road.

### 3.4.4 Airstrip

The airstrip (Figure 22) was constructed in the summer of 1997 by Procon Mining & Tunnelling Ltd. under contract to BHP. Boston development waste rock was used to construct the airstrip (BHP 1997).

The north-south all-weather airstrip is a rockfill structure similar to the roads and foundation pad. It appears to be generally thicker than the road, and although there is no as-built information available, visual inspection suggests that its thickness ranges between 0.6 and 1.2 m.

Significant settlement along the airstrip alignment reportedly occurs every year, and as a result frequent infilling and levelling has had to be carried out on the airstrip over the years to ensure safe aircraft operation. According to HBML staff the airstrip is inspected annually by the aircraft charter company for operational suitability and, if requested, HBML carries out maintenance as needed. The latest levelling and maintenance was carried out in August 2007 by Nuna Logistics, under the direction of SNC-Lavalin Engineers and Contractors (SLEC). Material from the crushed ore stockpiles was used as infill material for the repairs, and site staff confirmed that this material was used for repairs in previous years as well.

Although there is no thermal monitoring instrumentation under the airstrip, the settlement is most likely as a result of thaw settlement in the underlying permafrost.

There are no signs of surface erosion on the airstrip. The airstrip does not have any culverts to allow water flow; however, visual inspection did not identify any pre-construction flow paths that may have been obstructed by the airstrip. There is a significant number of standing water ponds immediately adjacent to the airstrip. These ponds are permafrost degradation zones resulting from drillholes. More details about these ponds are discussed later in the report; however, the presence of these ponds threatens the integrity of the airstrip, and will lead to elevated maintenance costs.

There are small tension cracks along the crest of the airstrip shoulder, generally in areas where large ponds are situated. While these cracks do not suggest any immediate risk, they should be monitored frequently for signs of progression.

**Recommendations:**

1. The ponding immediately adjacent the airstrip, resulting from permafrost degradation at historic drill sites, should be prevented. Further details about this issue are discussed elsewhere in this report.

2. Conduct frequent walk-over surveys of the airstrip crest to ensure there are no progressive worsening of the tension cracks along the shoulder crests.

### 3.4.5 Drill Road

This road leads off from the north end of the airstrip to an old drill staging area. It has the same design as the other site roads. There are no additional issues or concerns relating to this road other than those raised previously for other roads.

**Recommendations:**

1. Maintain the current level of care and maintenance on this road, but stop the use of crushed ore. A suitable alternative and clean source of rock must be located.

2. Ensure that appropriate speed control is exercised on this road.

### 3.4.6 Core Storage Road

The core storage road leads off midway from the airstrip towards a rock outcrop area where core boxes are stored. This road, which receives relatively little traffic, is of similar design to the other site roads. There is a 200 mm steel pipe culvert at the west end of the road, apparently allowing water from the large permafrost degradation zone pond to the north to drain towards the south. The pipe culvert appears to have settled to a point where its invert level is below that of the areas to be drained. Subsequently the culvert no longer functions and ponding at either end of the pipe is contributing to additional permafrost degradation.

**Recommendations:**

1. Consideration should be given to removing the culvert and implementing appropriate remedial measures to the areas of permafrost degradation. This should not be done without developing a comprehensive permafrost degradation mitigation plan for the site, as there are many ponded areas that may have to be interconnected to resolve the problem in the long term (see also Section 3.5.3).

2. Ensure that appropriate speed control is exercised on this road.

### 3.4.7 Wooden Walkway to Boat Dock

The wooden walkway leading from the southern end of the airstrip to a boat dock in Stickleback Lake (Figure 22) has been constructed as a floating walkway directly on the tundra. The walkway has settled into the tundra hummocks and although there is no lasting permafrost damage at this time, vegetation dieback may ultimately result in the start of an erosion gulley, which in turn would lead to erosion permafrost degradation.

SRK understands that HBML is considering decommissioning the boat dock in Stickleback Lake. If this is done, SRK recommends removing the walkway altogether.

**Recommendations:**

1. Consideration should be given to reconstructing the walkway such that it does not rest directly on the tundra. If this is not practical given the use the walkway gets, a monitoring program should be implemented during the summer months to ensure that erosion gullies do not go unnoticed.

2. If the boat dock is decommissioned, remove the walkway.

### 3.4.8 Radio Tower and Shack

A new radio repeater tower was installed south-east of the vent raise in 2009 (Figure 23). The tower was designed and installed by SNC Lavalin Engineers and Contractors (SLEC). The tower is supported by a concrete foundation embedded in bedrock and three wire anchors embedded in bedrock. The radio tower equipment is installed in an un-insulated wooden shack immediately adjacent to the tower. The shack is on a timber foundation of levelling blocks directly on an outcrop area.

**Recommendations:**

1. No action required.

### 3.4.9 Water Intake Pump Shack

Potable water for the Boston Camp is supplied from Spyder Lake. A wooden pump shack houses the primary pump elements. This wooden shack is located immediately outside the ordinary high water mark on Spyder Lake, and is placed directly onto the tundra. There are no signs of permafrost damage at this time; however, vegetation dieback likely has occurred immediately beneath the shack.

**Recommendations:**

1. It is not good practice to construct infrastructure directly onto the permafrost. HBML should consider constructing a thermal pad or other appropriate foundation to ensure preservation of the permafrost.

### 3.4.10 Existing STP Foundation Pad

The existing sewage treatment plant (STP) is constructed on a small levelling pad of crushed ore, some distance west of the camp pad (Figure 25). The pad is generally very thin, (less than 0.5 m thick) and therefore not sufficiently thick to act as a true thermal pad. There are however no signs of permafrost damage at this time.

**Recommendations:**

1. No action required.

### 3.4.11 New STP Foundation Pad

The new sewage treatment plant (STP) will be constructed north-west of the camp, and north of the existing STP (Figure 25). Originally this STP was to be constructed on a levelled thermal pad constructed from crushed ore; however, in accordance with the newly adopted water and ore/waste rock management plan for the site (SRK 2009d), HBML changed the design. The pads were however already constructed before the decision to change was made and therefore the ore had to be backhauled. One of the two constructed pads was however not removed. Where the pad was removed some minor damage to the tundra vegetation occurred, which could result in ongoing permafrost degradation if not monitored and repaired if and when it becomes evident.

The new STP foundation consists of levelling timbers and platforms to allow circulation of cold air, which in turn will ensure integrity of the permafrost.

**Recommendations:**

1. The area where the ore pad was backhauled, and where minor damage to the tundra occurred, must be monitored to ensure no ponding of water, which would lead to increased vegetation dieback and subsequent permafrost damage.

## 3.5 Other Areas

### 3.5.1 Core Storage Area(s)

Core boxes are being stored at the following locations, as illustrated in Figure 24:

- East of the airstrip, scattered around sections of exposed bedrock and occasionally directly on the tundra; however, due to the location, the permafrost overburden at these locations is likely shallow. Visual inspection yielded no concerns with respect to permafrost degradation.

- At the end of the drill road north-west of the runway. Boxes are partly stored on a pad, but mostly directly on the tundra. This area has extensive permafrost and vegetation dieback damage, but this is not from storage of the core boxes (see Section 3.5.4).

- On the camp pad at various locations. There are no concerns about any of these areas.

- At two locations immediately east of Stickleback Lake. At both these sites the boxes are stored directly on the tundra. Visual inspection yielded no concerns with respect to permafrost degradation, but vegetation dieback has occurred immediately beneath the boxes.

SRK understands that HBML is reviewing their site wide core storage protocols. It is recommended that wherever possible core storage should be on rock outcrops or dedicated gravel pads. Where there are no reasonable alternative, but to store core on the tundra, the boxes should be placed on timbers, and the area must not be low-lying or poorly drained. Storage of core boxes directly on the tundra does not automatically lead to permafrost degradation; however the underlying vegetation dies, and that could lead to permafrost and erosional damage if the vegetation cannot be re-established.

**Recommendations:**

1. HBML should re-evaluate their core storage requirements, as the random aerial spread of core boxes at these locations may not be suitable in the long term.

2. Consideration should also be given to relocating any core storage boxes that are not currently on exposed bedrock. This should be done as part of a long-term core storage plan.

3. HBML should consult the services of an expert knowledgeable with tundra vegetation to implement appropriate remediation strategies.

### 3.5.2 Grey Water Discharge

Grey water from the sewage treatment plant is currently being discharged at a location immediately north of the camp foundation fill pad (Figure 25). This water ultimately flows overland towards the east arm of Stickleback Lake. During the 2007 inspection it was noted that a large clearing devoid of any vegetation has developed where the water is discharged, and although there was no standing water at the time of the inspection, it is evident that at times significant ponding did exist. A well developed overland channel has also formed where the ponds overflow onto the tundra, and since the vegetation in this area no longer exists, there are signs of overland erosion.

The 2008 inspection revealed that HBML had constructed a permanent drop box for the grey water discharge. Water overflowed from this box onto an area covered with cocoa fibre matting that has been placed in the area where vegetation dieback was observed in 2007. This practice continued in 2009 and 2010. This is an improved strategy, although, a long-term management plan is still required to prevent permanent vegetation dieback and permafrost degradation.

HBML developed new management plans for disposal of grey water in 2009 (SRK 2009c), and these will be implemented as part of the commissioning of the new STP in 2011.

**Recommendations:**

1. SRK understands that HBML has developed a new sewage management plan (SRK 2009c), which will be implemented to coincide with commissioning of the new STP. Grey water discharge should be in accordance with this new plan.

2. The erosion protection measures currently in effect is an improvement over what was in place in 2007; however, a long-term plan is required as prolonged application of grey water in the same area will not be managed through erosion protection measures alone.

3. HBML should consult the services of an expert knowledgeable with tundra vegetation to implement appropriate remediation strategies.

### 3.5.3 Drill Sites

The bulk of exploration drilling is carried out with diamond core drills, using mud and brine as drilling fluid. Much of this drilling fluid is recycled; however, there are instances where a significant amount of this fluid ends up being discharged at the drill site (or at least this has historically been the case). Along the north and eastern perimeter of the foundation fill pad, there are a number of locations where drill fluid was allowed to discharge directly onto the tundra. At these locations vegetation dieback has occurred, which in time has resulted in minor erosion damage. Examples of this design are illustrated in Figure 26.

A number of historic drill sites are visible from the airstrip (some of which are immediately adjacent to the airstrip). In these areas the brine resulted in vegetation dieback and, because natural drainage in the area is poor, the ponded water remained in place. This ponding causes permafrost degradation, which causes a larger pond and this process of increased degradation continues to get progressively worse over time.

HBML will, whenever practical during the early spring, pump out any standing ponds. This practice must however cease once the bird nesting season begins.

**Recommendations:**

1. HBML has initiated remediation measures to address some of the erosion gulleys formed by drill fluid using cocoa matting and re-vegetation. This program appears to be successful at controlling erosion and although vegetation re-growth appears slow, it is likely to occur. HBML should consult the services of an expert knowledgeable with tundra vegetation to implement appropriate remediation strategies.

2. An action plan is needed to remediate the drill sites where significant permafrost degradation has resulted in permanent ponds of standing water. These ponds are resulting in increased permafrost degradation, which in turn results in increased ponds.

### 3.5.4 Vegetation Dieback Zones

In addition to the localized areas of vegetation dieback described in Section 3.5.2 and 3.5.3, there are two large areas of vegetation dieback on the property, the origin of which is not clear. The first is an area south of the core storage road and east of the airstrip. In this area the vegetation has died but the underlying soils have not yet been exposed. The second area is between the drill road and the airstrip. Figure 26 provides examples of this damage. At this location the vegetation has died and the overburden soils have been exposed. The area is wet and difficult to traffic.

**Recommendations:**

1. HBML should initiate a study to determine why vegetation dieback has occurred in these areas.

2. An appropriate mitigation plan should be implemented to address these areas. If left unattended to, permafrost degradation will continue to get worse.

3. HBML should consult the services of an expert knowledgeable with tundra vegetation to implement appropriate remediation strategies.

### 3.5.5 V-Notch Weir

A V-notch weir was installed at the outlet from Stickleback Lake in the early 1990’s as part of baseline data gathering studies (Figure 22). The installation was done with the least amount of invasive techniques, by wedging in the measurement weir using tote bags filled with drill cuttings. In accordance with the Water Licence, this weir should be removed. A detailed inspection of the conditions at this weir was not completed during the 2010 inspection.

**Recommendations:**

1. Complete a thorough inspection of the conditions at the V-notch weir during the 2011 annual geotechnical inspection.

2. Develop an appropriate remediation plan for removal of the V-notch weir.

# 4 Summary of Recommendations

This report provides a performance assessment of the numerous foundation pads and infrastructure at the Boston Advanced Exploration Camp. The findings are based on a site visit and walkover survey on between July 12 - 16, 2010 and subsequent consultation with site staff and contractors. This is the fourth formal annual geotechnical inspection undertaken at the site, and shows many improvements over the findings observed in previous years. HBML has initiated a number of projects which have been completed, or are currently underway, which specifically targets many of the remaining issues identified during this geotechnical inspection.

Overall there are no immediate or significant areas of concern at the Boston Camp from a geotechnical point of view. There are also no issues that require urgent and immediate action, but there are elements that should be monitored. Table 6 below provides a summary of recommendations resulting from the geotechnical inspection completed in 2010, complete with observations listed in the 2009 annual geotechnical report (SRK 2009f).

**Table 6: Summary of Inspection Items and Associated Recommendations**

| Inspection Item | 2009 Recommendations | 2010 Recommendations |
|---|---|---|
| Thermistors | • Locate appropriate readout device for older thermistors and confirm functionality of strings<br>• Splice broken string<br>• Continue formal monitoring of new (and older) strings | • Locate appropriate readout device for older thermistors and confirm functionality of strings<br>• Splice broken string<br>• Confirm status of string in 08SBD381A<br>• Continue formal monitoring of new (and older) strings |
| Primary Tank Farm Settlement Monitoring | • Continue quarterly monitoring<br>• Recognize foundation settlement risk in spill response plan | • Continue quarterly monitoring<br>• Recognize foundation settlement risk in spill response plan |
| Primary Tank Farm | • Monitor the surficial slip surfaces on the tank farm berms<br>• Continue settlement monitoring as described above | • Monitor the surficial slip surfaces on the tank farm berms<br>• Continue settlement monitoring as described above |
| Power Plant Fuel Containment | • No action required | • No action required |
| Central Pad Fuel Containment | • No action required | • No action required<br>• Confirm whether secondary containment is required for two |

| Inspection Item | 2009 Recommendations | 2010 Recommendations |
|---|---|---|
| | | new tanks and implement if necessary |
| Jet Fuel Containment | • Conduct regular inspections of the portable containment berms | • Conduct regular inspections of the portable containment berms |
| Solid Waste Disposal Site (including burn pit) | • Confirm that waste containment is not required through an appropriate waste inventory<br>• Clean out burn pit and dispose wood waste as appropriate<br>• Remediate burn pit, or reclassify for other functional use | • Confirm that waste containment is not required through an appropriate waste inventory<br>• Clean out burn pit and dispose wood waste as appropriate<br>• Remediate burn pit, or reclassify for other functional use |
| Ore Stockpiles | • Implement the 2009 water and ore/waste rock management plan developed for the site | • Implement the 2009 water and ore/waste rock management plan developed for the site |
| Settling Pond | • Clear out debris in pond that could damage liner<br>• Implement the 2009 water and ore/waste rock management plan developed for the site<br>• Construct suitable barrier around the pond to prevent inadvertent human and/or animal access | • Clear out debris in pond that could damage liner<br>• Implement the 2009 water and ore/waste rock management plan developed for the site<br>• Construct suitable barrier around the pond to prevent inadvertent human and/or animal access<br>• Confirm through water quality sampling whether the pond is leaking, and implement mitigation measures as appropriate |
| Soil Containment Berm (Landfarm) | • Implement action items arising from landfarm study currently underway | • Implement action items arising from landfarm study recently completed |
| Diamond Drill Cuttings and Settling Pond | • Develop appropriate remediation plan for the pond<br>• Develop appropriate management plan for storage of drill cuttings, including possible use as remediation method for permafrost degradation zones | • Develop appropriate remediation plan for the pond<br>• Develop appropriate management plan for storage of drill cuttings, including possible use as remediation method for permafrost degradation zones |
| Portal | • Replace the faded notices at the portal entrance advising of the dangers associated with unauthorized access to the area<br>• Develop site specific hazard assessment for people entering the portal area to address the rockfall hazard<br>• Consider installing a small diameter wire mesh over the exposed section of the portal roof to address the rockfall hazard | • Replace the faded notices at the portal entrance advising of the dangers associated with unauthorized access to the area<br>• Develop site specific hazard assessment for people entering the portal area to address the rockfall hazard<br>• Consider installing a small diameter wire mesh over the exposed section of the portal roof to address the rockfall hazard |

| Inspection Item | 2009 Recommendations | 2010 Recommendations |
|---|---|---|
| Vent Raise | • Replace weathered protective tarps covering the shelter erected over the vent raise<br>• Install notices at the vent raise advising of the dangers associated with unauthorized access to the area | • Replace weathered protective tarps covering the shelter erected over the vent raise<br>• Install notices at the vent raise advising of the dangers associated with unauthorized access to the area |
| Road to Dock | • Maintain current maintenance practices, but do not use crushed ore material for repairs;  find an alternate clean source<br>• Implement speed control measures | • Maintain current maintenance practices, but do not use crushed ore material for repairs;  find an alternate clean source<br>• Implement speed control measures |
| Camp Complex Foundation Pad | • Re-survey the pad and develop an action plan to fill in and re-grade the pad to re-establish constant pad drainage | • Re-survey the pad and develop an action plan to fill in and re-grade the pad to re-establish constant pad drainage |
| Road to Airstrip | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Implement speed control measures | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Implement speed control measures |
| Airstrip | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Conduct frequent walk-over surveys to inspect for tension cracks along the airstrip shoulder |
| Drill Road | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Implement speed control measures | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Implement speed control measures |
| Core Storage Road | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Monitor the pipe culvert for progressive permafrost degradation<br>• Implement speed control measures | • Maintain current maintenance practices, but do not use crushed ore material for repairs; find an alternate clean source<br>• Monitor the pipe culvert for progressive permafrost degradation<br>• Implement speed control measures |
| Wooden Walkway to Boat Dock | • Consider raising the walkway above the tundra to prevent vegetation dieback and possible onset of permafrost degradation<br>• If boat dock is to be decommissioned consider removing the walkway altogether | • Consider raising the walkway above the tundra to prevent vegetation dieback and possible onset of permafrost degradation<br>• If boat dock is to be decommissioned consider removing the walkway altogether |
| Radio Tower and Shack | • No action required | • No action required |
| Water Intake Pump | • Consider installing thermal pad or | • Consider installing thermal pad or |

| Inspection Item | 2009 Recommendations | 2010 Recommendations |
|---|---|---|
| Shack | other appropriate foundation system | other appropriate foundation system |
| Existing STP Foundation Pad | • No action required | • No action required |
| New STP Foundation Pad | • Monitor the areas where tundra vegetation damage has occurred<br>• Develop long-term re-vegetation plan: involve a tundra vegetation expert | • Monitor the areas where tundra vegetation damage has occurred<br>• Develop long-term re-vegetation plan: involve a tundra vegetation expert |
| Core Storage Area(s) | • Consolidate core box storage and ensure that no boxes are inadvertently stored on the tundra<br>• Develop a long-term core storage plan | • Consolidate core box storage and ensure that no boxes are inadvertently stored on the tundra<br>• Develop a long-term core storage plan |
| Grey Water Discharge | • Implement the new sewage management plan developed for the site when the new STP is commissioned | • Implement the new sewage management plan developed for the site when the new STP is commissioned |
| Drill Sites | • Develop remediation strategy to prevent further permafrost degradation | • Develop remediation strategy to prevent further permafrost degradation |
| Vegetation Dieback Zone | • Initiate study to determine why dieback continues; involve a tundra vegetation expert<br>• Develop remediation strategy to prevent further dieback and permafrost degradation | • Initiate study to determine why dieback continues; involve a tundra vegetation expert<br>• Develop remediation strategy to prevent further dieback and permafrost degradation |
| V-Notch Weir | • Conduct complete inspection of the weir during 2010 geotechnical inspection<br>• Develop appropriate remediation plan for the weir | • Conduct complete inspection of the weir during 2011 geotechnical inspection<br>• Develop appropriate remediation plan for the weir |

This report, **"2010 Annual Geotechnical Inspection, Boston Advanced Exploration Project, Hope Bay, Nunavut"** has been prepared by SRK Consulting (Canada) Inc.

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Principal Geotechnical Engineer

Peter Healey, P.Eng.
Principal Engineer

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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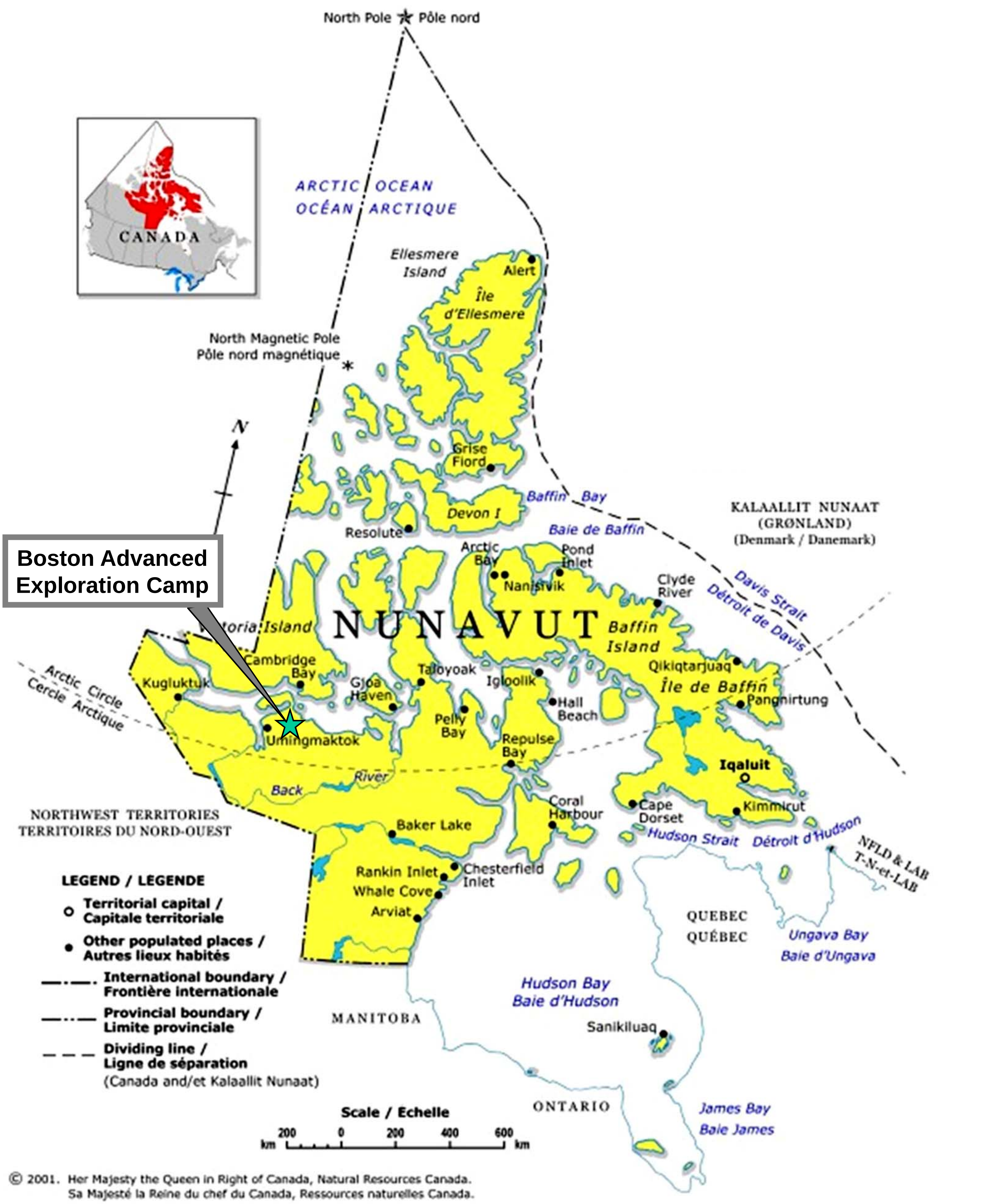
# Figures



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**Location Map**

Job No: 1CH008.032

Filename: Figure 1_Location_20100202.pptx

**HOPE BAY MINING LTD.**

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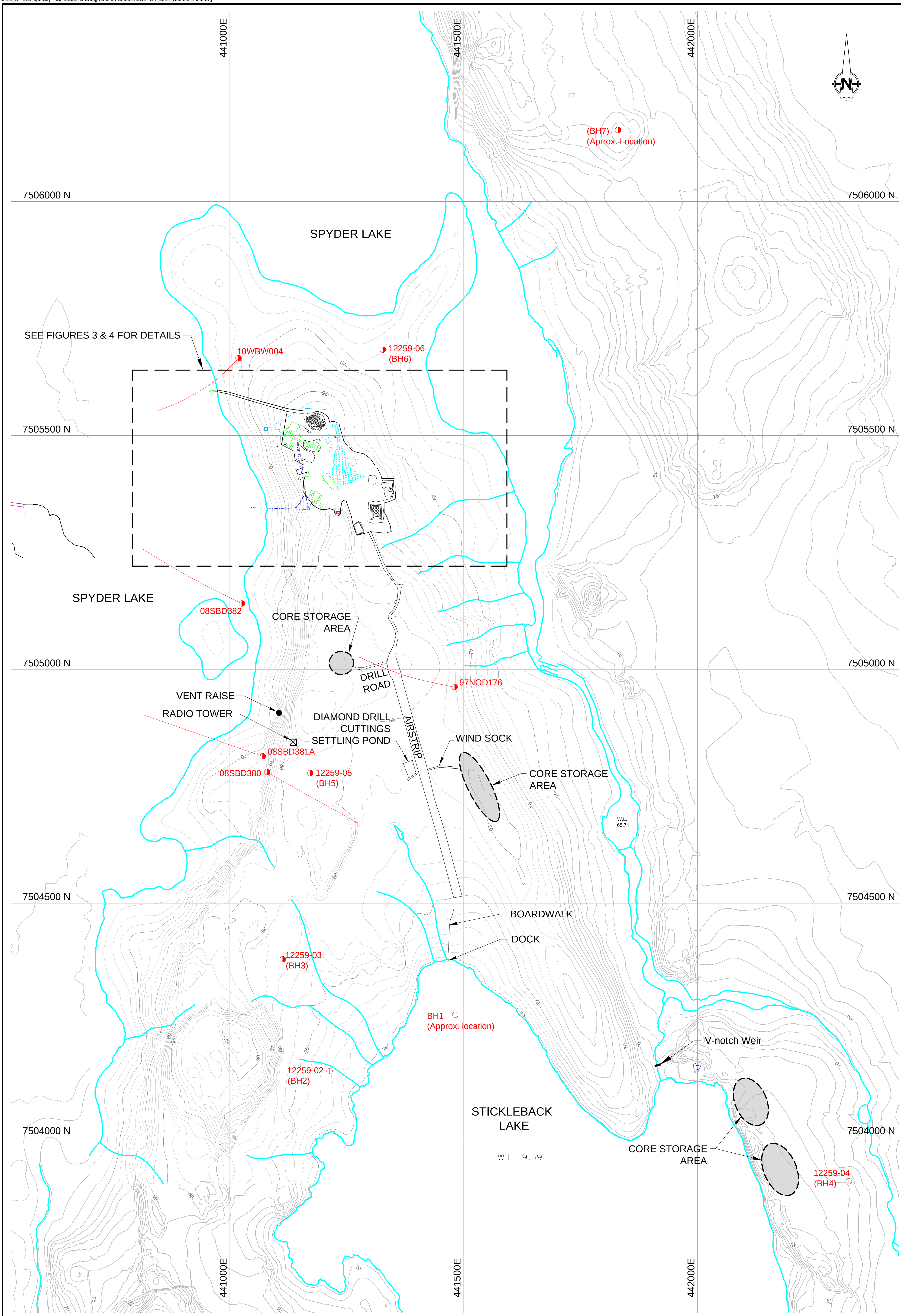


## LEGEND

| | |
|---|---|
| 12259-03 | Thermistor Installed |
| (BH1) | Thermistor Not Installed |
| 08SBD380 | Angled Holes |

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SRK JOB NO.: 1CH008.032

FILE NAME: BOSTON_2010_Geotech_Insp.dwg

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Overall Site Layout

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Photo Taken July 2009

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Detailed Site Layout
Looking South-West

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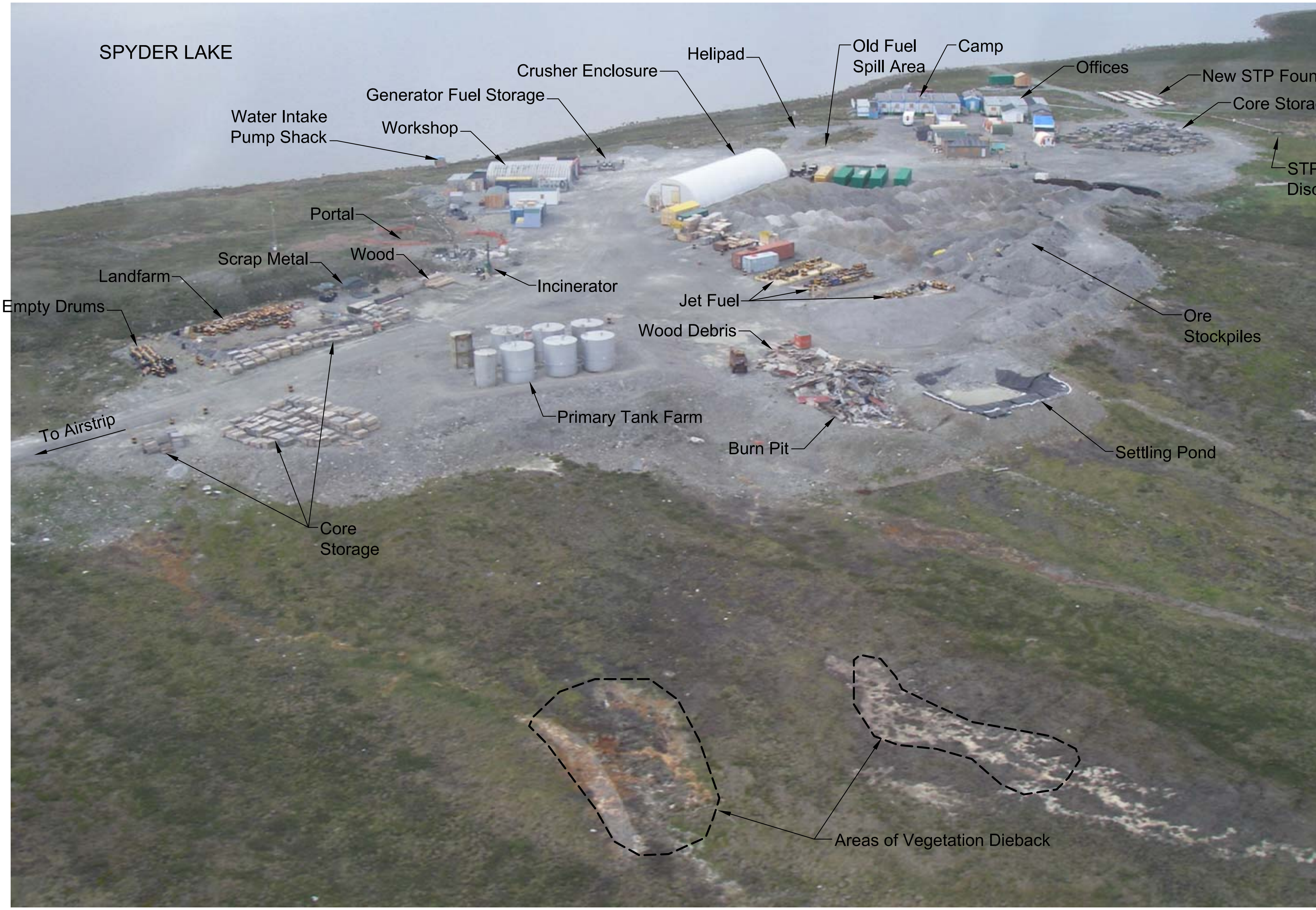


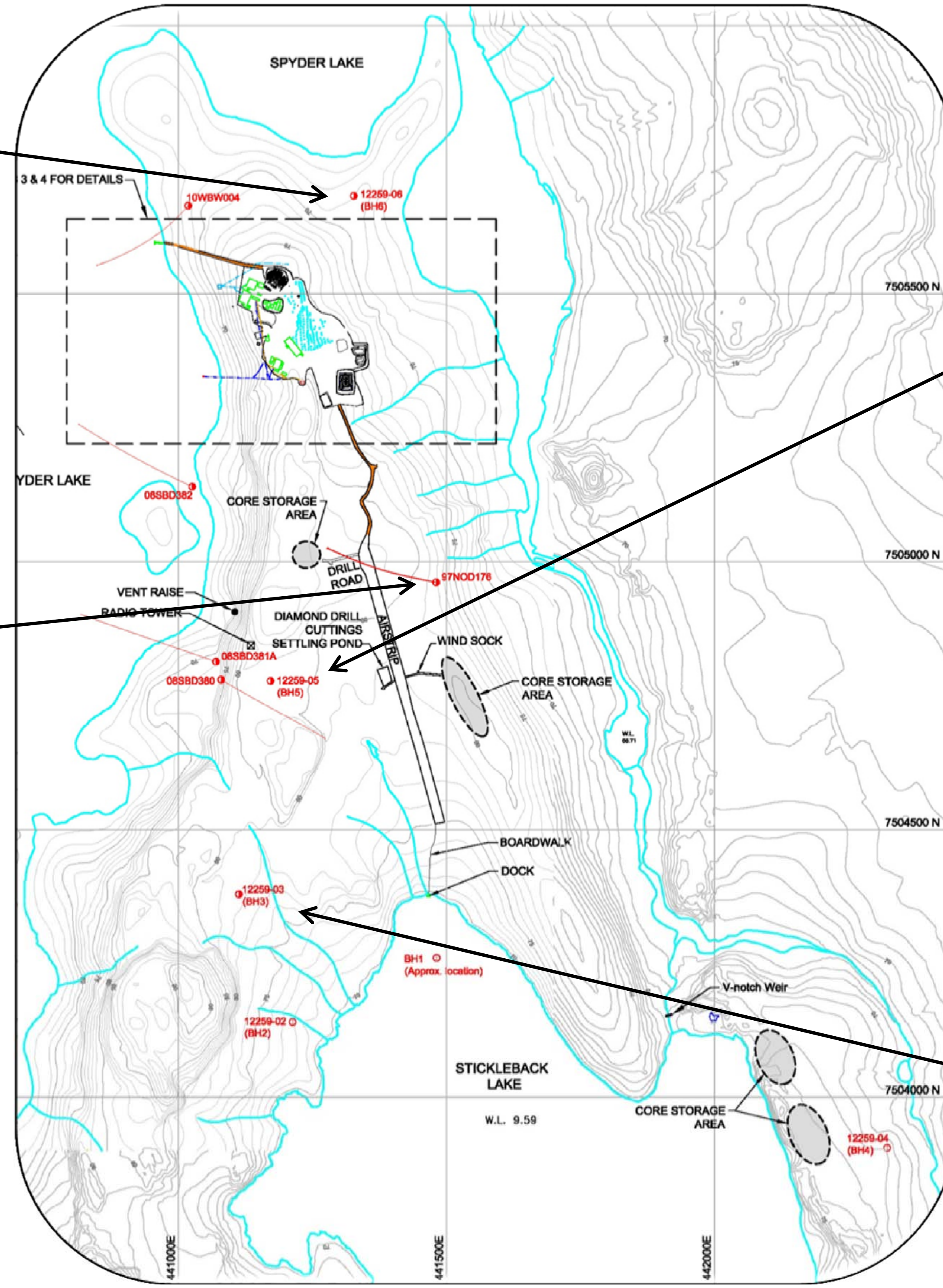

Photo Taken July 2009

| SRK Consulting Engineers and Scientists Vancouver B.C. | NEWMONT NORTH AMERICA | 2010 Geotechnical Inspection<br>Detailed Site Layout Looking West |
|---|---|---|
| SRK JOB NO.: 1CH008.032<br>FILE NAME: BOSTON_2009_Geotech_Insp.dwg | HOPE BAY MINING LTD. | DATE: February 2011 / APPROVED: EMR / FIGURE: 4 |

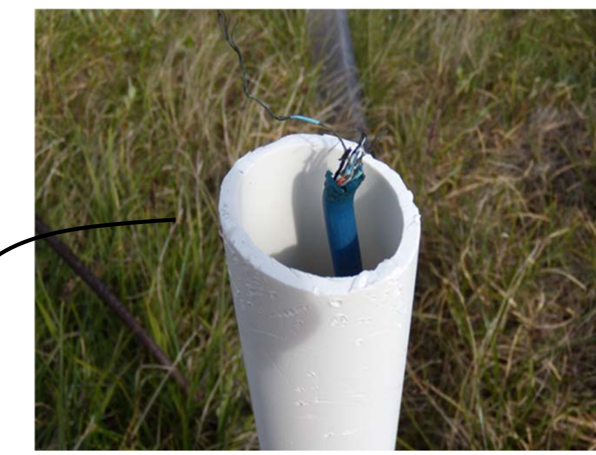
Drill hole 12259-06 (BH6) with thermistor string #1051.

Drill hole 97NOD176 with thermistor string.

Close-up of the readout box and terminal connector for the thermistor string on drill hole 97NOD176.




Drill hole 12259-05 (BH5) with thermistor string #1050.



Close-up of the severed cable on drill hole 12259-03 (BH3) with thermistor string #1049.

Drill hole 12259-03 (BH3) with thermistor string #1049. The cable has been severed.

| | | |
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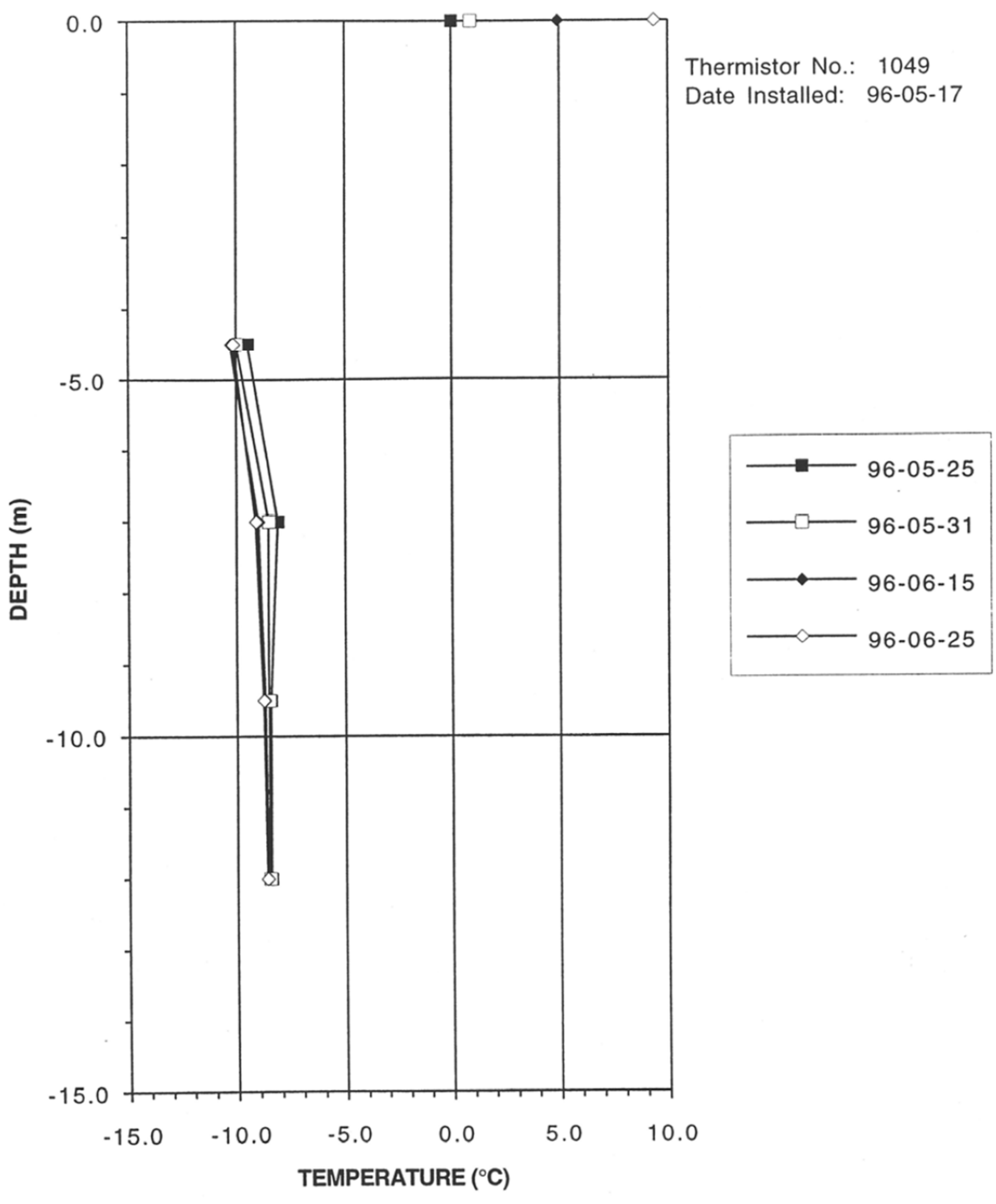
| SRK Consulting<br>Engineers and Scientists<br>VANCOUVER | NEWMONT<br>NORTH AMERICA | 2010 Geotechnical Inspection<br>**Boston Thermistor Conditions** |
| Job No: 1CH008.032<br>Filename: Figure 5_BostonThermistor_20110216.pptx | HOPE BAY MINING LTD. | Date: February 2011 \| Approved: EMR \| Figure: 5 |




*Source: Boston Gold Project – Surficial Geology and Permafrost Features, EBA Engineering 1996*

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**Ground Temperature Profiles**
**EBA Drillhole 12259-03**

Job No: 1CH008.032

Filename: Figure 6-9_EBA graphs_20110108.pptx

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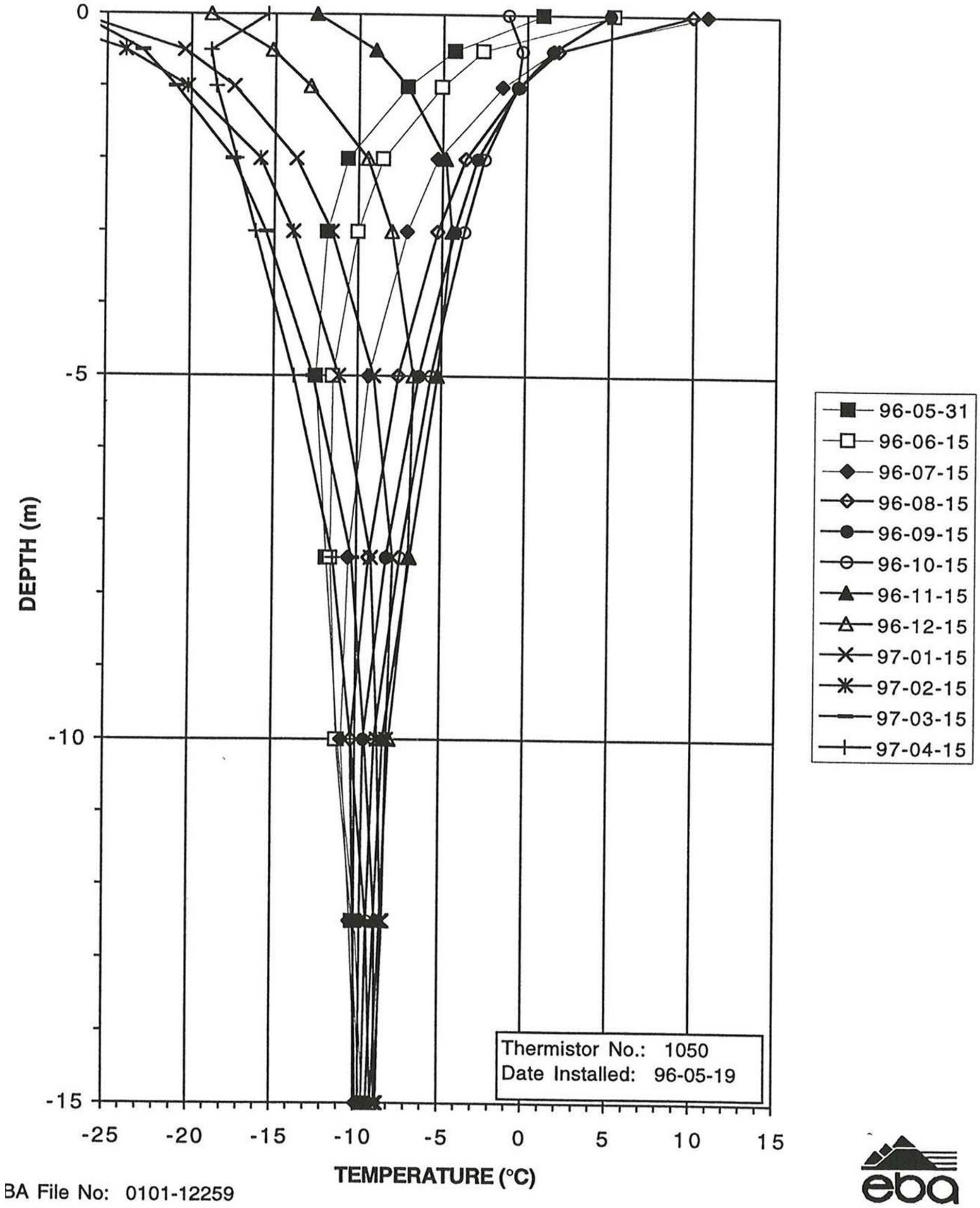


*Source: Boston Technical Reports – Environmental General, Tailings Disposal Evaluation-Draft, EBA Engineering 1997*

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| | | **Ground Temperature Profiles EBA Drillhole 12259-05** |
| Job No: 1CH008.032 | **HOPE BAY MINING LTD.** | Date: February 2011 |
| Filename: Figure 6-9_EBA graphs_20110108.pptx | | Approved: EMR |
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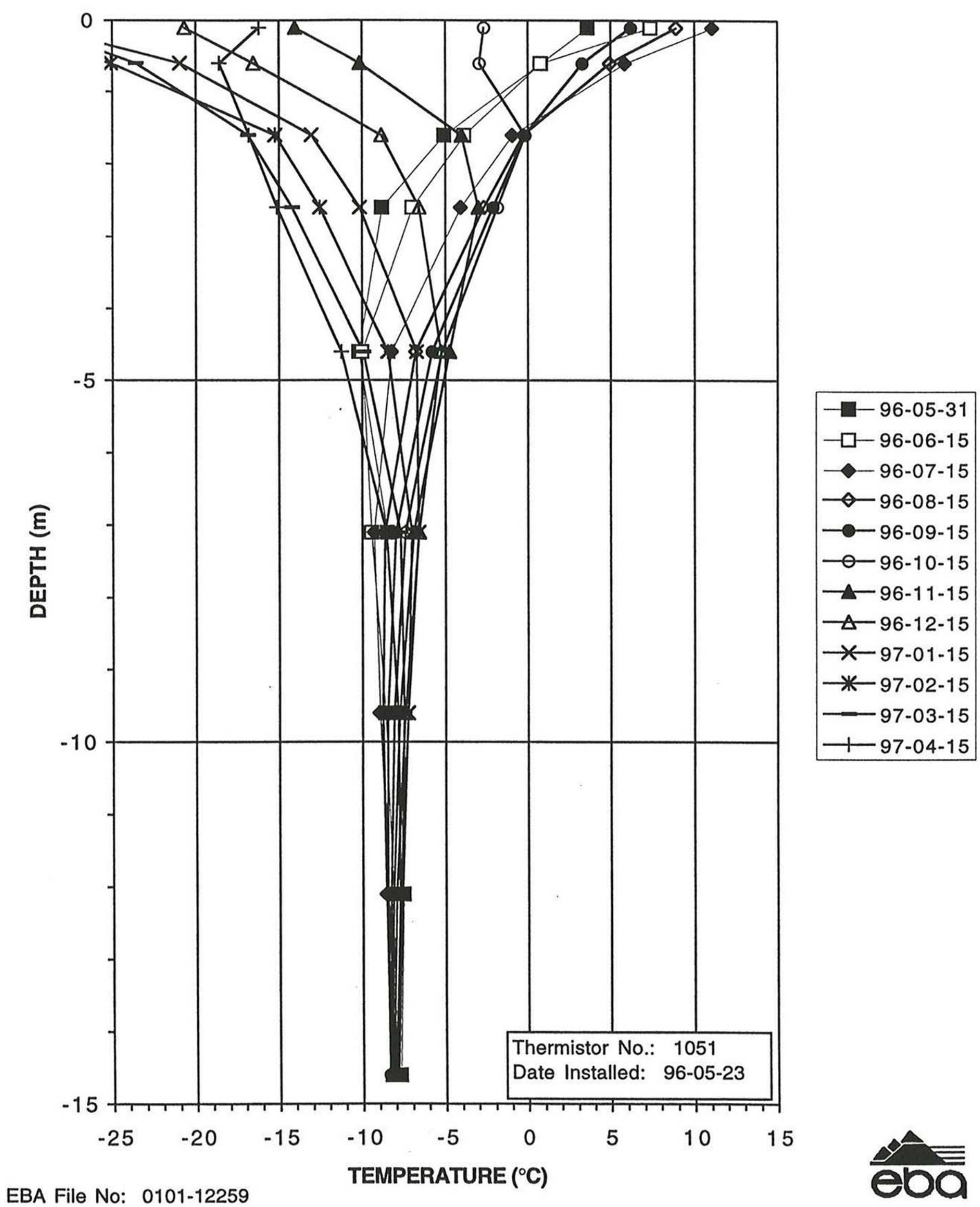


*Source: Boston Technical Reports – Environmental General,*
*Tailings Disposal Evaluation-Draft, EBA Engineering 1997*

| SRK Consulting Engineers and Scientists VANCOUVER | NEWMONT NORTH AMERICA | 2010 Geotechnical Inspection |
|---|---|---|
| | | **Ground Temperature Profiles EBA Drillhole 12259-06** |
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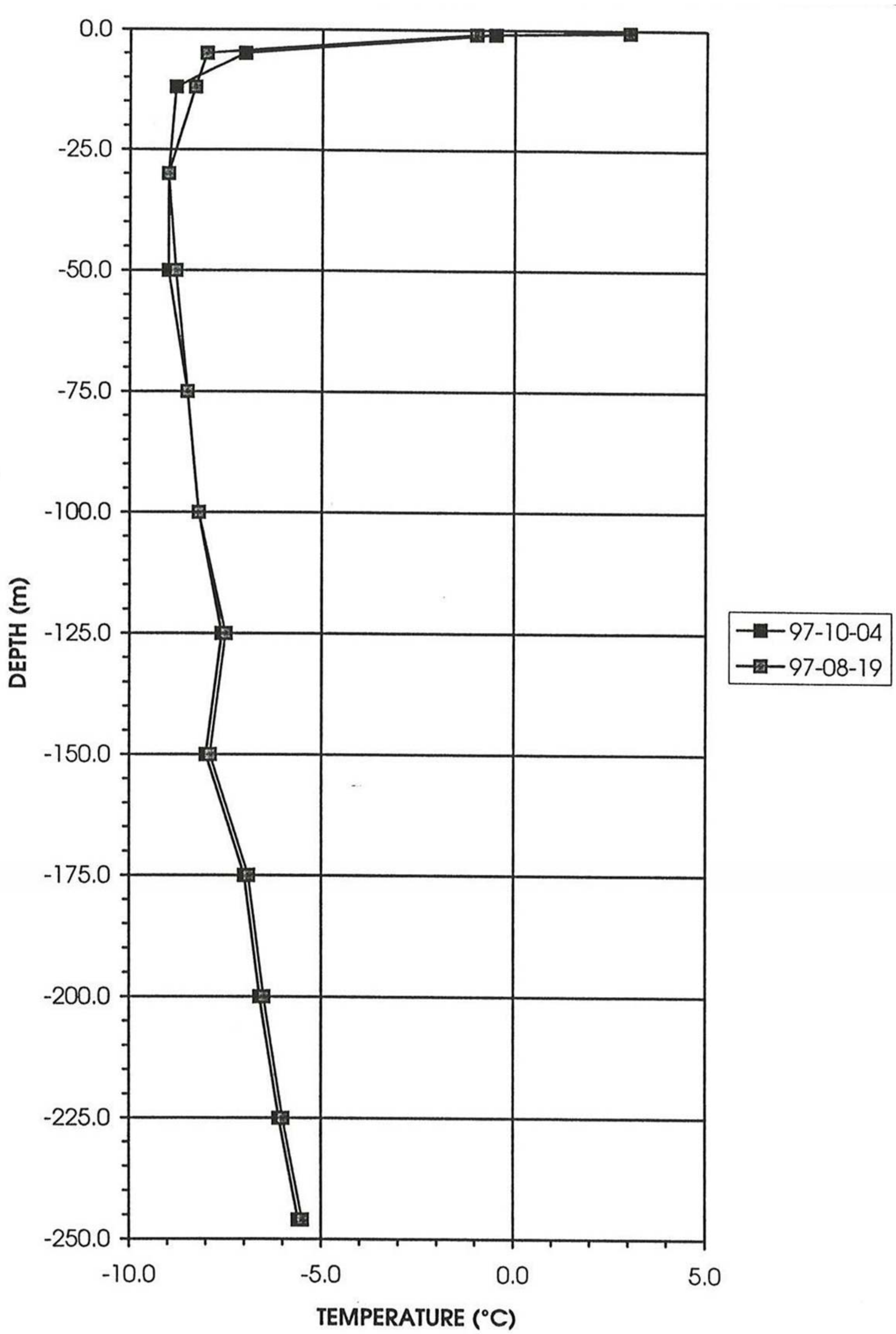


*Source: Boston Technical Reports – Environmental General, Tailings Disposal Evaluation-Draft, EBA Engineering 1997*

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**Ground Temperature Profile**
**EBA Deep Drillhole (97NOD176)**

Job No: 1CH008.032

Filename: Figure 6-9_EBA graphs_20110108.pptx

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| Date: | Approved: | Figure: |
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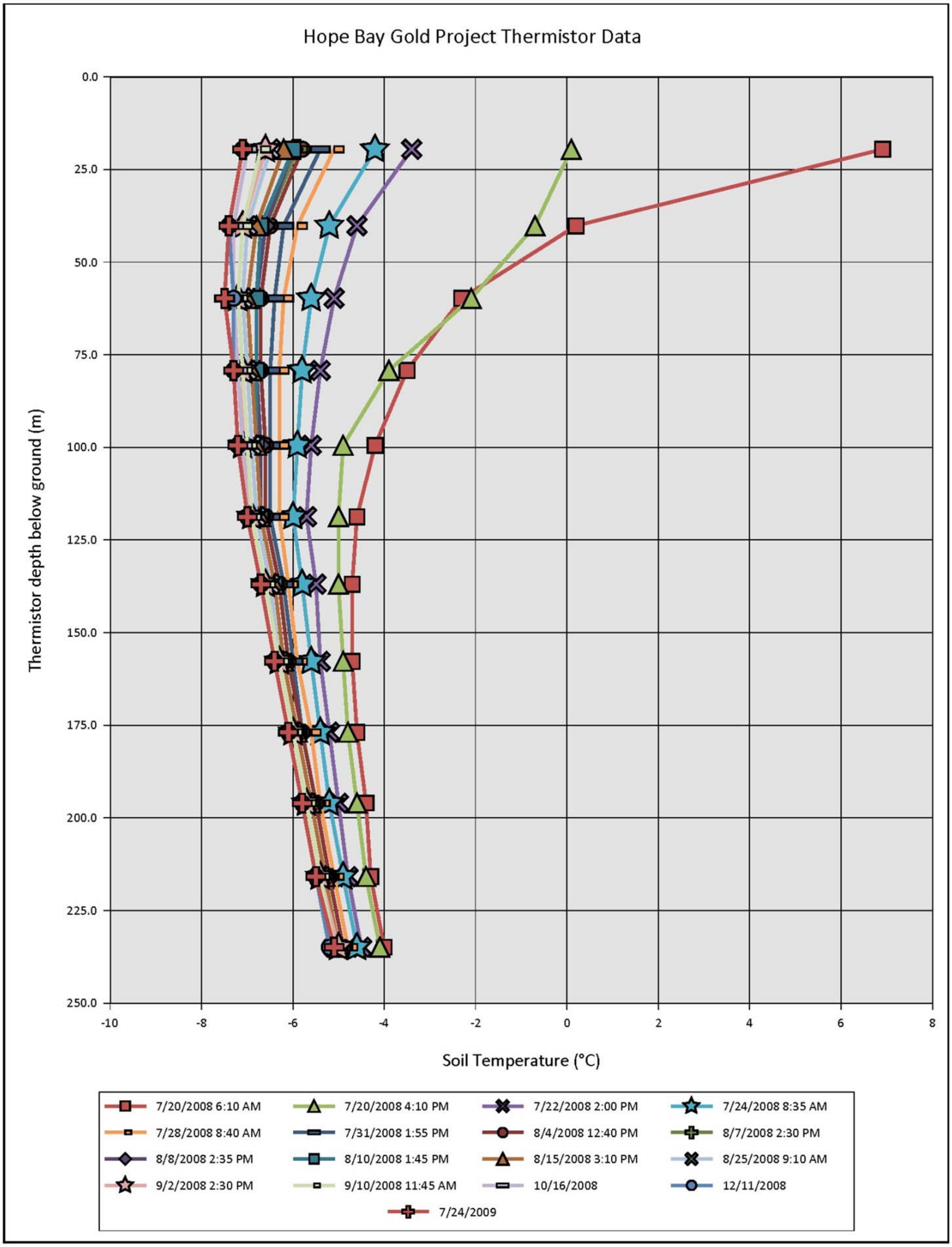


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2010 Geotechnical Inspection

**Thermistor Readings**
**Drillhole 08SBD380**

Job No: 1CH008.032

Filename: Figure 10-13_Thermistor_20110208.pptx

**HOPE BAY MINING LTD.**

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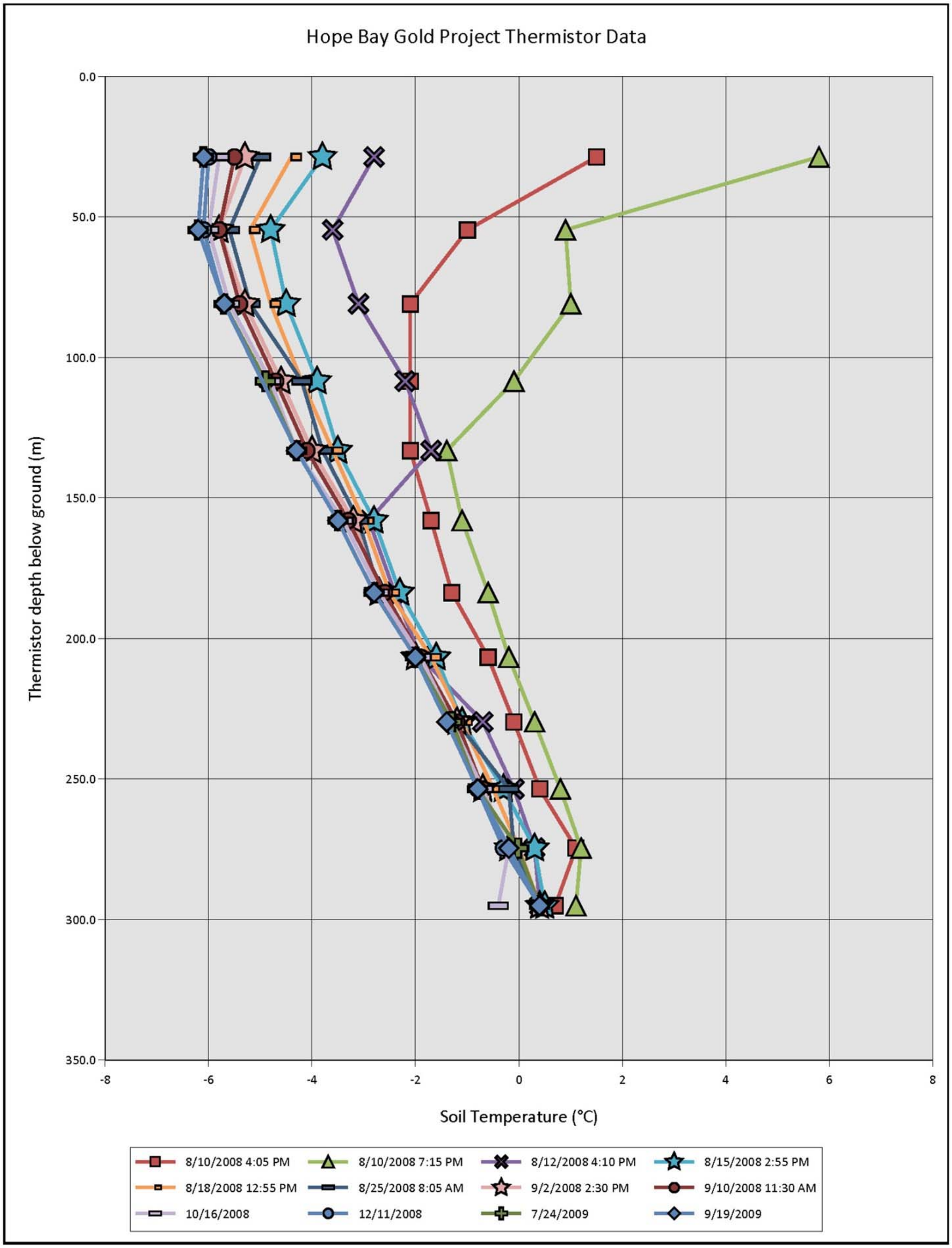


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**Thermistor Readings**
**Drillhole 08SBD381A**

Job No: 1CH008.032

Filename: Figure 10-13_Thermistor_20110208.pptx

**HOPE BAY MINING LTD.**

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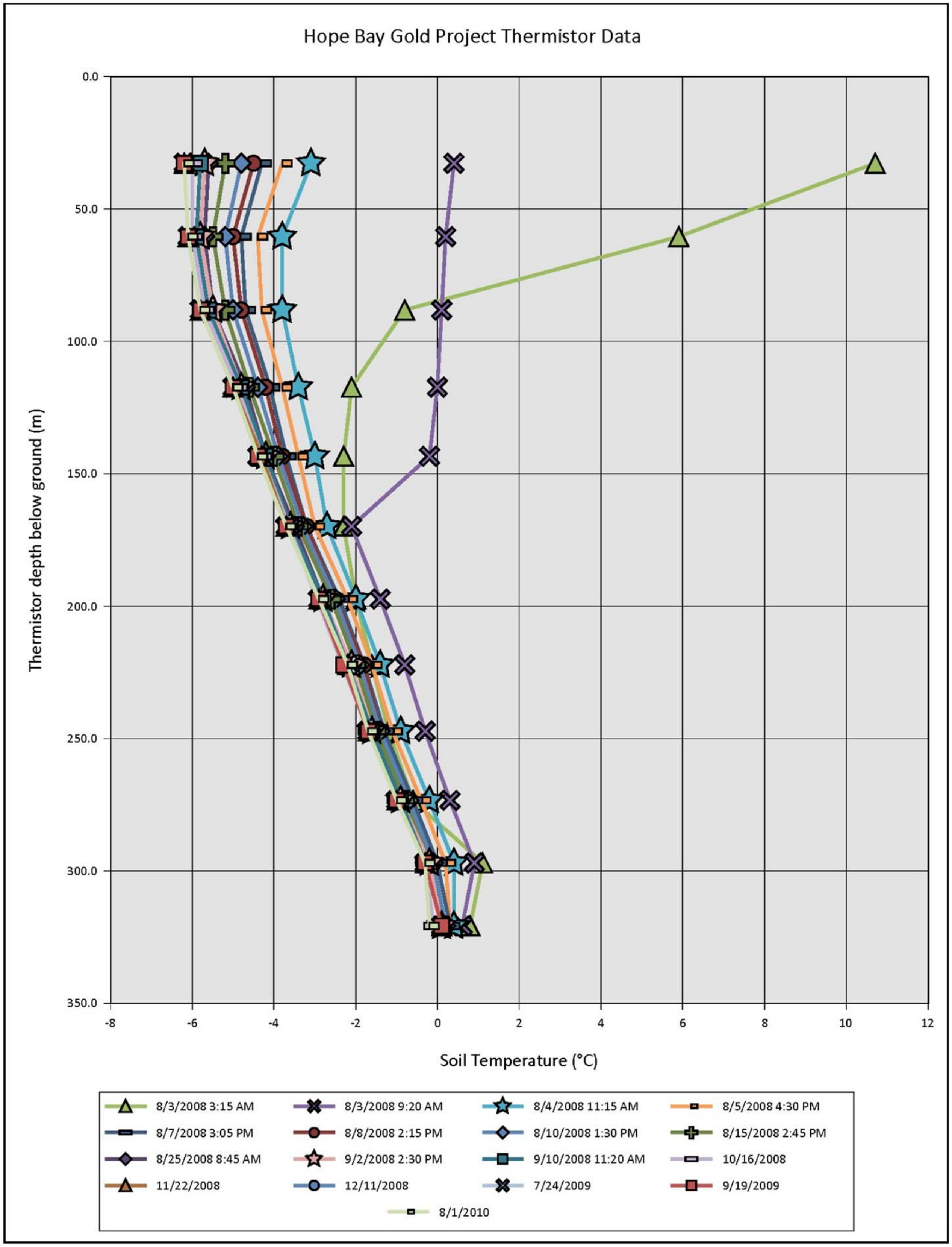
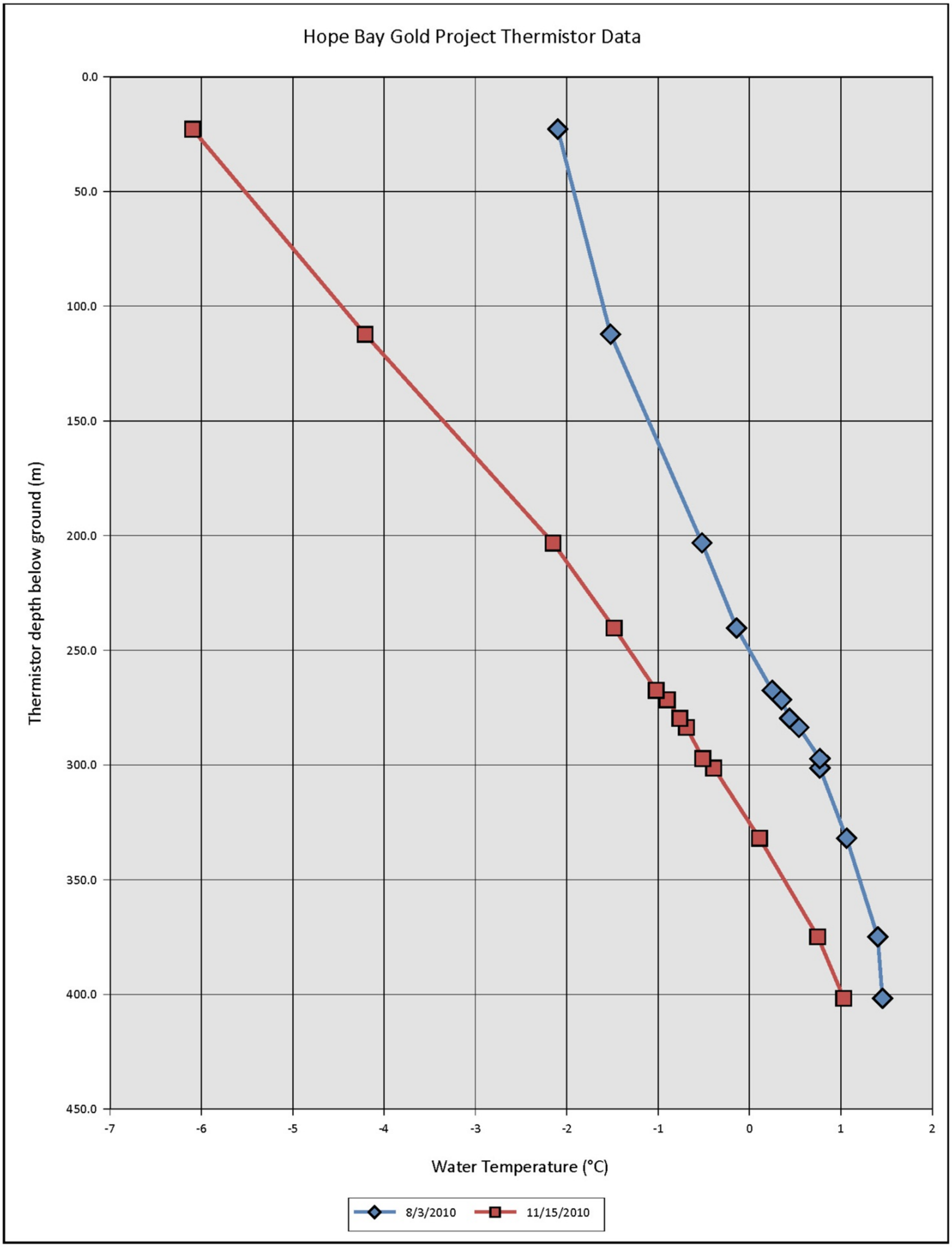



| SRK Consulting<br>Engineers and Scientists<br>VANCOUVER | NEWMONT<br>NORTH AMERICA | 2010 Geotechnical Inspection<br>**Thermistor Readings**<br>**Drillhole 08SBD382** | | |
|---|---|---|---|---|
| Job No: 1CH008.032<br>Filename: Figure 10-13_Thermistor_20110208.pptx | **HOPE BAY MINING LTD.** | Date:<br>February 2011 | Approved:<br>EMR | Figure:<br>**12** |




| SRK Consulting Engineers and Scientists VANCOUVER | NEWMONT NORTH AMERICA | 2010 Geotechnical Inspection | | |
|---|---|---|---|---|
| | | **Thermistor Readings Drillhole 10WBW004** | | |
| Job No: 1CH008.032 Filename: Figure 10-13_Thermistor_20110208.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 | Approved: EMR | Figure: **13** |

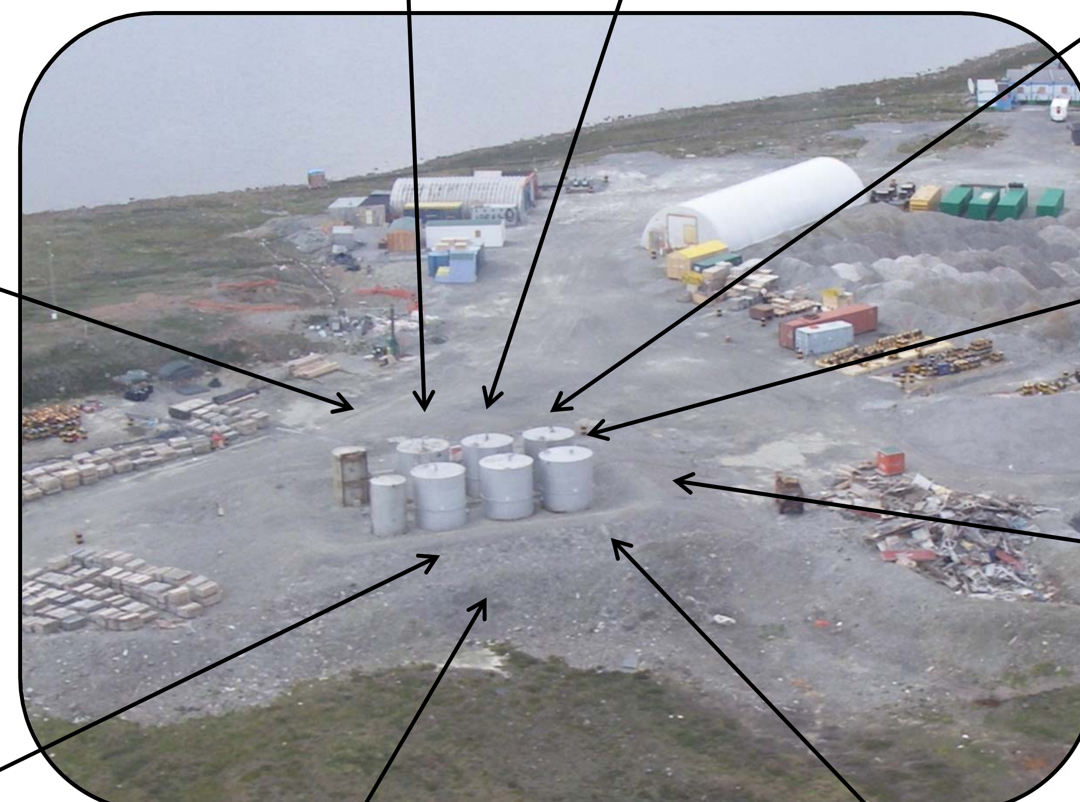
Fuel transfer pump on western containment berm.

Looking east towards the tank farm.

Tidy tank storage area west of containment area.

Western containment berm looking north.

Western containment berm looking south.



Sump with submersible pump in the northwest corner of the tank farm.

Looking south towards the tank farm.

Crest of eastern containment berm looking south.

Tension cracks along the crest of the containment berm.

Eastern containment berm looking north.

Eastern containment berm looking south.

Erosion gulley on south outer containment berm.

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Job No: 1CH008.032
Filename: Figure 14_BostonTankFarm_20110216.pptx

HOPE BAY MINING LTD.

2010 Geotechnical Inspection

**Primary Tank Farm**

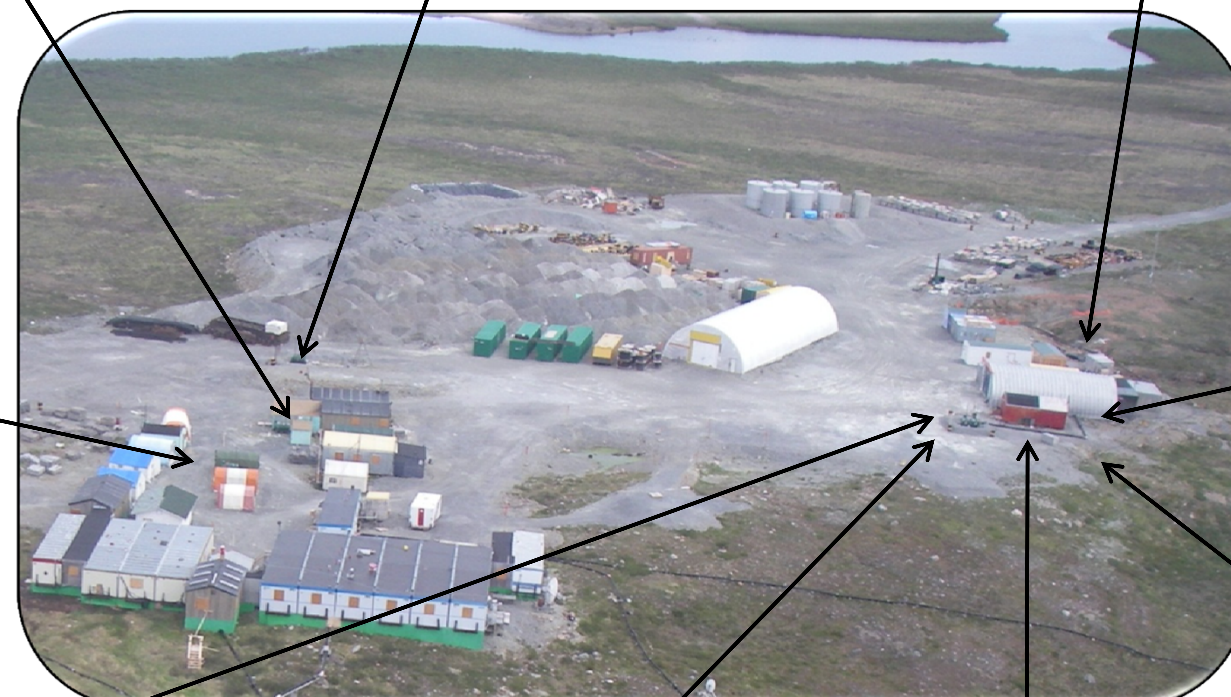
| Date: | Approved: | Figure: |
|---|---|---|
| February 2011 | EMR | 14 |

Fuel tank without secondary containment.

Secondary containment for fuel tank.

Fuel storage and pipelines behind workshop area.

Fuel tank without secondary containment.



Looking north as seen from behind the workshop and powerhouse (red building).

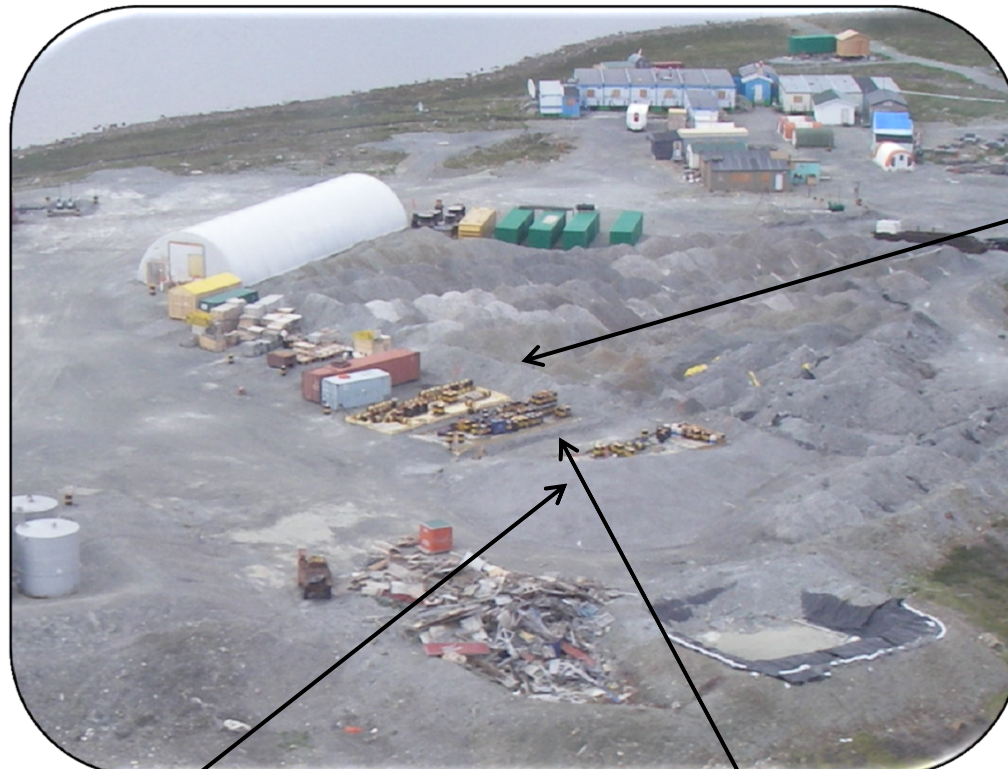
Secondary containment for fuel tanks supplying power house and workshop.

Secondary containment for fuel tanks supplying power house and workshop looking north.

Front of powerhouse (red building).

Fuel delivery pipeline to power house and workshop.

| | | | | |
|---|---|---|---|---|
| SRK Consulting Engineers and Scientists VANCOUVER | NEWMONT NORTH AMERICA | 2010 Geotechnical Inspection | | |
| | | **Workshop and Crusher Area** | | |
| Job No: 1CH008.032 Filename: Figure 15_WorkShop_Crusher_20110216.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 | Approved: EMR | Figure: **15** |



Looking southeast across the three jet fuel containment areas.

Containment berm supported by timber cribbing.

Looking north towards eastern most containment area.
Note access ramp leading into bermed area.

Looking west over the three jet fuel containment areas.

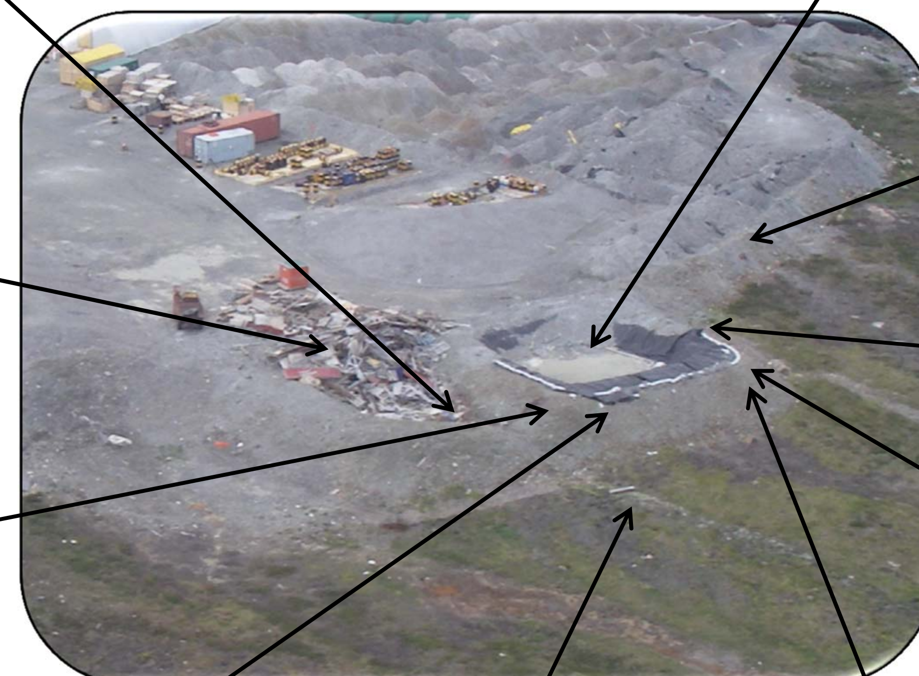
Containment berm collapsed and in need of repair.

| | | |
|---|---|---|
| SRK Consulting<br>Engineers and Scientists<br>VANCOUVER | NEWMONT<br>NORTH AMERICA | 2010 Geotechnical Inspection<br>**Jet Fuel Storage** |
| Job No: 1CH008.032<br>Filename: Figure 16_ Jet Fuel Storage Area _ 201102116.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 / Approved: EMR / Figure: **16** |

View towards the north of the southern containment berm of the settling pond.

Panoramic view across the settling pond looking southeast.

Panoramic view of burn pit looking southwest.



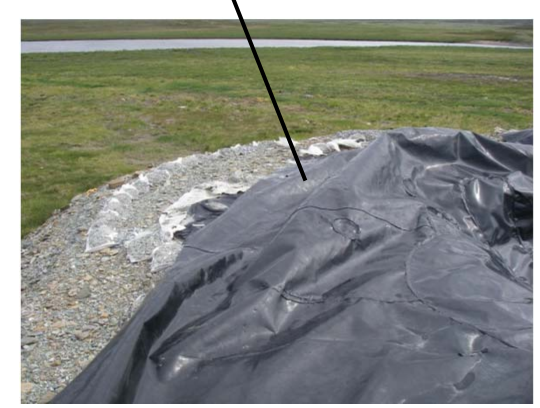
Looking northeast over the crest of the settling pond.

Looking west along south crest of settling pond.

Crest of settling pond.

Crest of southeast corner of settling pond.

Signs of seepage from the settling pond.



Crest of northeast corner of settling pond.

Looking east across the northern edge of the lined settling pond

| SRK Consulting Engineers and Scientists VANCOUVER | NEWMONT NORTH AMERICA | 2010 Geotechnical Inspection<br>**Sedimentation Pond and Burn Pit** |
|---|---|---|
| Job No: 1CH008.032<br>Filename: Figure 17_ BurnPit_Pond_ 20110216.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 / Approved: EMR / Figure: **17** |

Panoramic view of the ore stockpiles looking north.

Oblique view looking northwest across the ore stockpiles.

Oblique view looking southwest across the ore stockpiles.

| | | |
|---|---|---|
| SRK Consulting Engineers and Scientists VANCOUVER | NEWMONT NORTH AMERICA | 2010 Geotechnical Inspection<br>**Ore Stockpiles** |
| Job No: 1CH008.032<br>Filename: Figure 18_Stockpile_2011020208.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 · Approved: EMR · Figure: **18** |

Looking east across the land farm with the Boston tank farm in the background.

Looking southeast across the land farm.

Exposed liner along the crest of the land farm south berm.

Wood, liner and other material scarps stored in the bone yard.

Exposed liner along the crest of the land farm east berm.

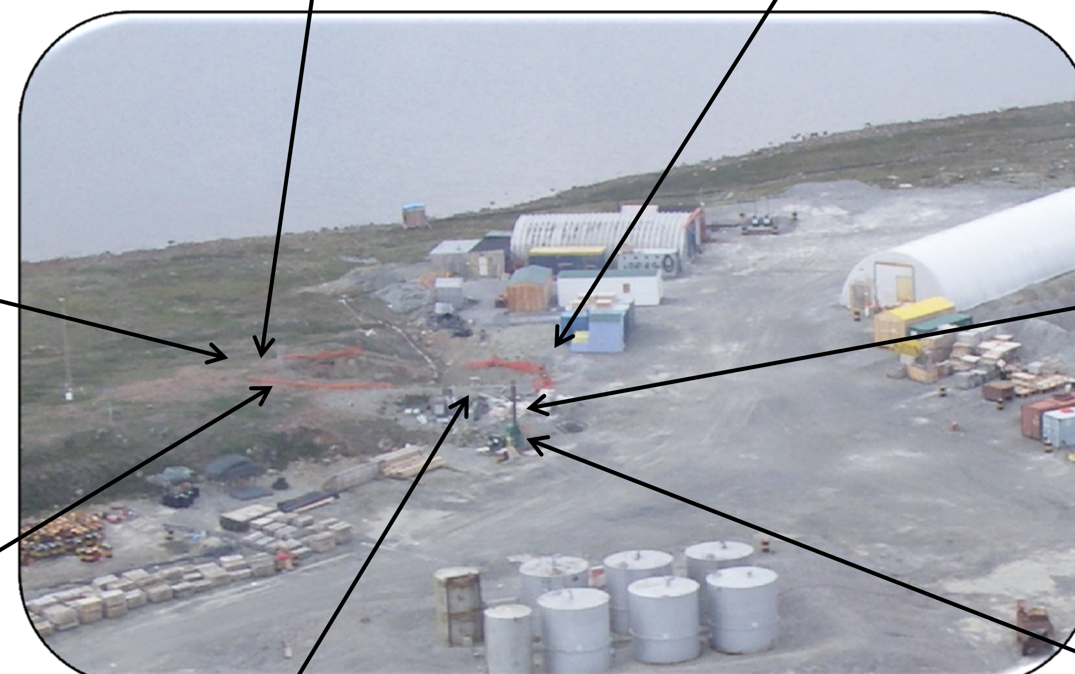
Looking west across the land farm.

| | | |
|---|---|---|
| SRK Consulting Engineers and Scientists VANCOUVER | NEWMONT NORTH AMERICA | 2010 Geotechnical Inspection |
| | | **Land Farm and Bone Yard** |
| Job No: 1CH008.032<br>Filename: Figure 19_lLandFarm_Yard_20110216.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 \| Approved: EMR \| Figure: 19 |


Rock bolted highwall above the portal.


Looking south across the portal.


View across the portal from the top of the highwall.




Front of the incinerator with cash of fuel drums.


View of the protective fence along the highwall of the portal.


Entrance to the portal.


Another view of the incinerator form the back.

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|---|---|---|
| | | **Portal and Incinerator Area** |
| Job No: 1CH008.032<br>Filename: Figure 20_Portal_ncineratorArea _ 20110216.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 \| Approved: EMR \| Figure: **20** |

Looking north across the core logging sheds and other office units. The depression in the foreground is the historic hydrocarbon spill area.

Looking north towards the southern camp complex consisting of skid mounted units.

Looking south towards the older camp section and main office complex.

Potable water supply pipeline to camp.

Looking east along the all-weather access road from the camp to Spyder Lake.

Looking west at an area of erosion and permafrost damage repaired by infilling with gravel

Looking northwest across the south end of the camp pad. Note power cables.

| | | |
|---|---|---|
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| Job No: 1CH008.032<br>Filename: Figure 21_CampArea _ 20110216.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 · Approved: EMR · Figure: **21** |

Permafrost degradation pond along east shoulder of airstrip

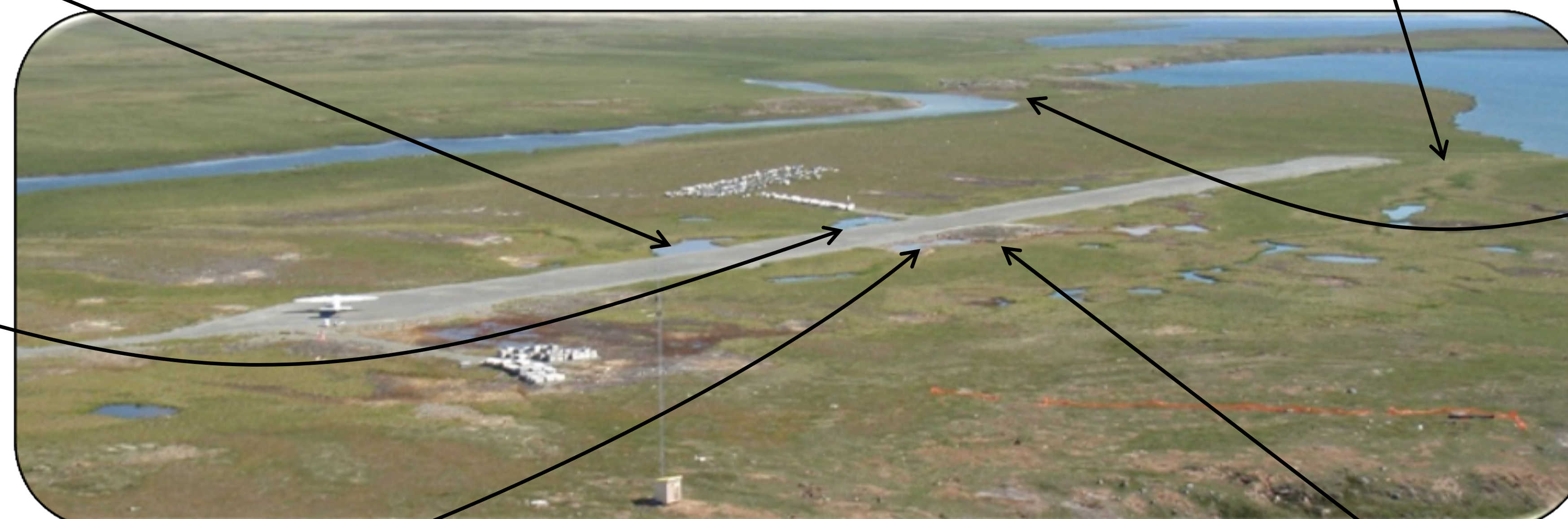
Tension cracks along crest of airstrip in areas where ponding exist,

Looking south across wooden walkway to Stickleback Lake.

Oblique aerial view of the wooden walkway leading from the south end of the airstrip to the boat dock in Stickleback Lake.

Looking north at bridge and walkway to boat dock on Stickleback Lake.

Permafrost degradation pond along east shoulder of airstrip.



Oblique aerial view of the old v-notch weir at the outlet to Stickleback Lake.

Permafrost degradation pond along west shoulder of airstrip.

Close-up of vegetation dieback.

Large permafrost degradation and vegetation dieback area along west shoulder of airstrip.

Close-up of permafrost vegetation and vegetation dieback.

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**Airstrip**

| | | | | |
|---|---|---|---|---|
| Job No: 1CH008.032 | HOPE BAY MINING LTD. | Date: February 2011 | Approved: EMR | Figure: 22 |
| Filename: Figure 22_BostonAirstrip_20110216.pptx | | | | |

Looking southeast at enclosure for radio equipment installed on raised wooden foundation on rock outcrop.

Looking northeast at enclosure for radio equipment installed on raised wooden foundation on rock outcrop.

Bird nest at top of radio tower.

Looking north across the vent raise.

Looking south across the vent raise.

Looking southeast across the vent raise.

Looking northeast across the vent raise.

| | | |
|---|---|---|
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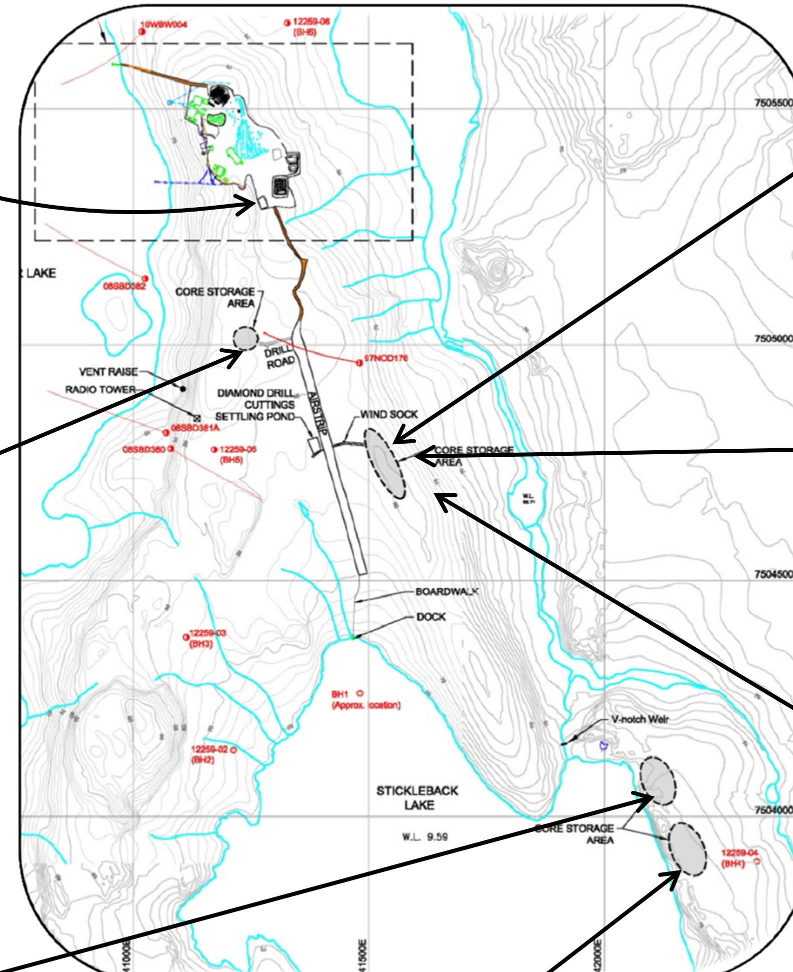
| Job No: 1CH008.032<br>Filename: Figure 23_ RadioTower_Vent Area _ 20110216.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 \| Approved: EMR \| Figure: 23 |

Looking north towards core box storage area on south end of camp pad.




Looking south across the core storage area east of the airstrip.

Looking north towards core storage area. Note extensive vegetation dieback zone in foreground.

Close-up of the core storage area east of the airstrip.

Looking west across the core storage area east of the airstrip.

Oblique aerial view of the northern section of the core storage area located on the eastern shore of Stickleback Lake.

Oblique aerial view of the southern section of the core storage area on the eastern shore of Stickleback Lake.

| | | |
|---|---|---|
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| Job No: 1CH008.032<br>Filename: Figure 24_CoreStorage_20110216.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 / Approved: EMR / Figure: **24** |

Diffuser for treated sewage effluent outflow.

Looking north across the treated sewage treatment outflow diffuser and associated discharge area.

Looking north along all weather access road to old STP.

Upper end of the leveling foundation for the new Boston Sewage Treatment Plant.

Looking north with the old (existing) sewage treatment plant (STP) in the foreground and the building that will contain the new STP in the background.

Lower end of the leveling foundation for the new Boston Sewage Treatment Plant.

Looking south along the boardwalk leading up to the old STP extension.

Looking southwest toward the new extension to the existing STP.

Excess potable water outflow.

Thermal pad and raised foundation for components of the new Boston Sewage Treatment Plant.

Close-up of raised foundation footings used on the new Boston Sewage Treatment Plant.

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2010 Geotechnical Inspection

**Existing and New STP**

Job No: 1CH008.032

Filename: Figure 26_Existing-NewSTP_20110216.pptx

**HOPE BAY MINING LTD.**

Date: February 2011

Approved: EMR

Figure: 25

## Other Areas of Vegetation Dieback

Vegetation dieback of the north end of the airstrip looking north.

Vegetation dieback of the north end of the airstrip looking south.

Vegetation dieback around the airstrip.

Vegetation dieback along side of road to airstrip.

Gravel cover over an area of historic vegetation dieback.

Coco matting over an area of historic vegetation dieback.

Vegetation dieback as seen from toe of camp pad.

Ponding and vegetation dieback as seen at toe of camp pad.

Vegetation dieback from toe of camp pad.

Vegetation dieback from toe of camp pad.

| SRK Consulting Engineers and Scientists VANCOUVER | NEWMONT. NORTH AMERICA | 2010 Geotechnical Inspection<br>**Vegetation Dieback Areas** |
| --- | --- | --- |
| Job No: 1CH008.032<br>Filename: Figure 26_Vegetation_20110216.pptx | **HOPE BAY MINING LTD.** | Date: February 2011 \| Approved: EMR \| Figure: **26** |

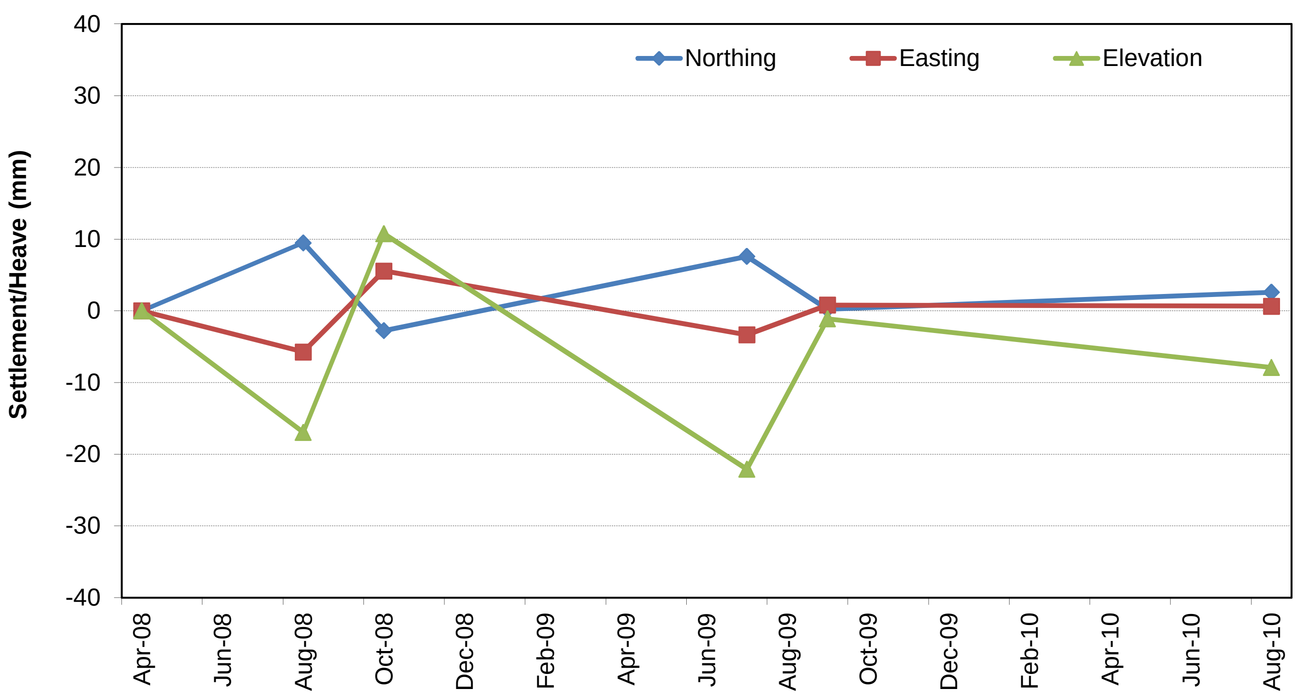
# Appendix A
# Primary Tank Farm Settlement Data

# Boston Primary Fuel Tank Farm Settlement Monitoring

## Tank #1

| Date | Tank Mark | Horizontal Angle Deg | Horizontal Angle Min | Horizontal Angle Sec | Vertical Angle Deg | Vertical Angle Min | Vertical Angle Sec | Slope Dist. | HI [m] | Northing [m] | Easting [m] | Elevation [m] | Difference from Previous Survey [m] N | E | El |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-Apr-08 | 1A | 176 | 41 | 38 | 95 | 24 | 55 | 7.658 | 1.593 | 5325.879 | 1305.901 | 80.674 | | | |
| 8-Aug-08 | 1A | 176 | 36 | 14 | 94 | 58 | 28 | 7.651 | 1.519 | 5325.889 | 1305.894 | 80.660 | 0.009 | -0.008 | -0.015 |
| 18-Oct-08 | 1A | 176 | 38 | 26 | 96 | 3 | 2 | 7.675 | 1.674 | 5325.890 | 1305.905 | 80.669 | 0.001 | 0.011 | 0.009 |
| 25-Jul-09 | 1A | 176 | 34 | 52 | 95 | 52 | 11 | 7.671 | 1.633 | 5325.896 | 1305.899 | 80.653 | 0.006 | -0.005 | -0.016 |
| 19-Sep-09 | 1A | 176 | 35 | 8 | 95 | 53 | 35 | 7.676 | 1.635 | 5325.898 | 1305.904 | 80.651 | 0.002 | 0.004 | -0.002 |
| 2-Aug-10 | 1A | 176 | 34 | 14 | 94 | 58 | 19 | 7.666 | 1.506 | 5325.900 | 1305.904 | 80.646 | 0.003 | 0.000 | -0.005 |
| 22-Apr-08 | 1B | 58 | 18 | 6 | 94 | 2 | 11 | 9.526 | 1.632 | 5326.428 | 1308.581 | 80.989 | | | |
| 8-Aug-08 | 1B | 58 | 19 | 39 | 92 | 54 | 1 | 9.527 | 1.436 | 5326.439 | 1308.574 | 80.982 | 0.011 | -0.007 | -0.008 |
| 18-Oct-08 | 1B | 58 | 19 | 8 | 93 | 54 | 32 | 9.530 | 1.610 | 5326.434 | 1308.579 | 80.988 | -0.005 | 0.005 | 0.006 |
| 25-Jul-09 | 1B | 58 | 20 | 36 | 94 | 0 | 48 | 9.538 | 1.610 | 5326.441 | 1308.576 | 80.970 | 0.007 | -0.003 | -0.018 |
| 19-Sep-09 | 1B | 58 | 20 | 27 | 94 | 6 | 27 | 9.541 | 1.626 | 5326.442 | 1308.574 | 80.971 | 0.001 | -0.002 | 0.000 |
| 2-Aug-10 | 1B | 58 | 20 | 28 | 93 | 19 | 3 | 9.533 | 1.484 | 5326.442 | 1308.574 | 80.960 | 0.000 | 0.000 | -0.010 |
| 22-Apr-08 | 1F | 304 | 22 | 12 | 91 | 9 | 4 | 24.193 | 1.635 | 5328.263 | 1306.711 | 80.992 | | | |
| 8-Aug-08 | 1F | 304 | 22 | 16 | 91 | 4 | 38 | 24.184 | 1.575 | 5328.271 | 1306.709 | 80.963 | 0.008 | -0.002 | -0.029 |
| 18-Oct-08 | 1F | 304 | 22 | 16 | 91 | 11 | 6 | 24.189 | 1.637 | 5328.267 | 1306.710 | 80.980 | -0.004 | 0.001 | 0.016 |
| 25-Jul-09 | 1F | 304 | 22 | 13 | 91 | 0 | 29 | 24.178 | 1.530 | 5328.276 | 1306.708 | 80.948 | 0.009 | -0.002 | -0.032 |
| 19-Sep-09 | 1F | 304 | 22 | 18 | 91 | 15 | 12 | 24.182 | 1.632 | 5328.274 | 1306.708 | 80.946 | -0.002 | 0.000 | -0.002 |
| 2-Aug-10 | 1F | 304 | 21 | 53 | 91 | 2 | 35 | 24.176 | 1.535 | 5328.279 | 1306.710 | 80.938 | 0.005 | 0.002 | -0.008 |

| | | | | |
|---|---|---|---|---|
| TANK AVERAGES BY DATE (mm) | 22-Apr-08 | 0.0 | 0.0 | 0.0 |
| | 8-Aug-08 | 9.5 | -5.7 | -17.0 |
| | 18-Oct-08 | -2.8 | 5.6 | 10.7 |
| | 25-Jul-09 | 7.6 | -3.3 | -22.1 |
| | 19-Sep-09 | 0.2 | 0.8 | -1.1 |
| | 2-Aug-10 | 2.6 | 0.7 | -7.9 |
| **OVERALL PERIOD AVERAGE (mm)** | | **3.4** | **-0.4** | **-7.5** |

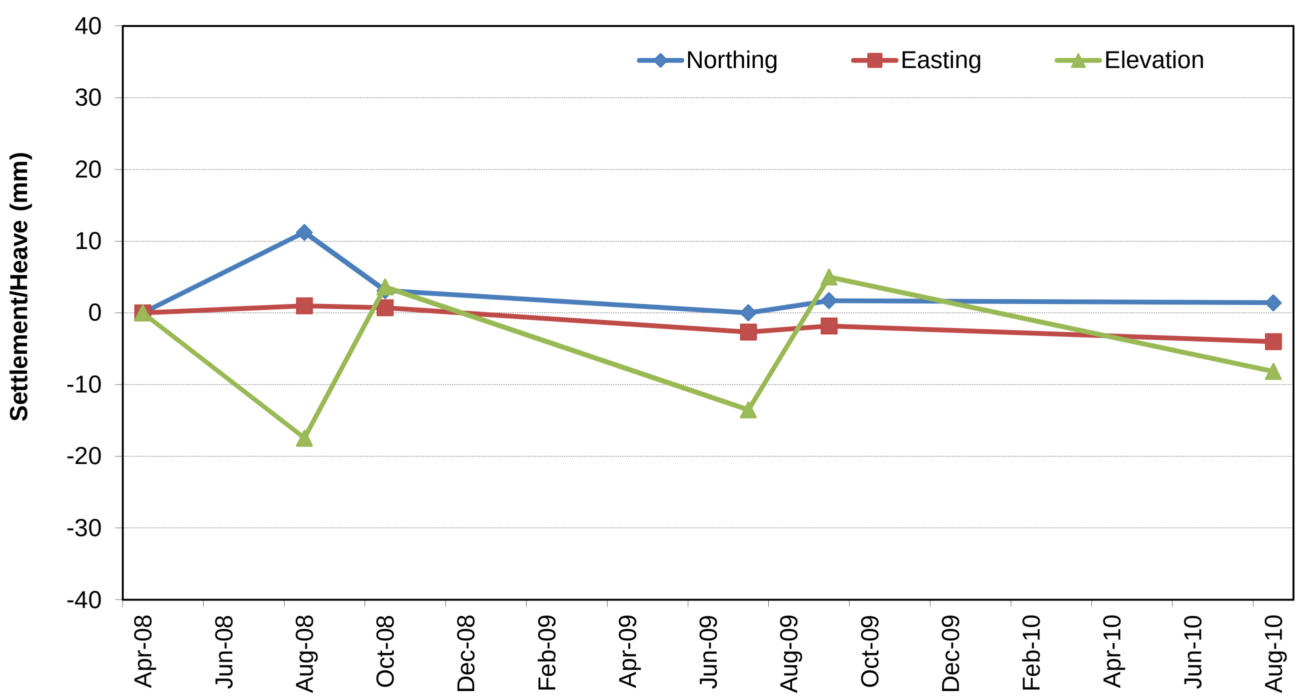


# Boston Primary Fuel Tank Farm Settlement Monitoring

## Tank #2

| Date | Tank | Horizontal Angle | | | Vertical Angle | | | Slope | HI | Northing | Easting | Elevation | Difference from Previous Survey [m] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mark | Deg | Min | Sec | Deg | Min | Sec | Dist. | [m] | [m] | [m] | [m] | N | E | El |
| 22-Apr-08 | 2A | 188 | 32 | 48 | 91 | 42 | 56 | 17.357 | 1.593 | 5327.678 | 1315.749 | 80.877 | | | |
| 8-Aug-08 | 2A | 188 | 30 | 39 | 91 | 31 | 5 | 17.357 | 1.519 | 5327.689 | 1315.747 | 80.863 | 0.011 | -0.002 | -0.014 |
| 18-Oct-08 | 2A | 188 | 30 | 44 | 92 | 1 | 58 | 17.369 | 1.674 | 5327.691 | 1315.754 | 80.862 | 0.002 | 0.007 | -0.001 |
| 25-Jul-09 | 2A | 188 | 30 | 41 | 91 | 55 | 2 | 17.365 | 1.633 | 5327.690 | 1315.752 | 80.856 | -0.001 | -0.003 | -0.006 |
| 19-Sep-09 | 2A | 188 | 30 | 32 | 91 | 55 | 46 | 17.369 | 1.635 | 5327.692 | 1315.755 | 80.854 | 0.002 | 0.003 | -0.002 |
| 2-Aug-10 | 2A | 188 | 29 | 57 | 91 | 32 | 0 | 17.365 | 1.506 | 5327.695 | 1315.754 | 80.845 | 0.003 | -0.001 | -0.009 |
| 22-Apr-08 | 2C | 66 | 46 | 17 | 93 | 28 | 22 | 8.891 | 1.669 | 5326.866 | 1318.217 | 81.190 | | | |
| 8-Aug-08 | 2C | 66 | 49 | 58 | 92 | 18 | 25 | 8.890 | 1.471 | 5326.878 | 1318.219 | 81.173 | 0.012 | 0.002 | -0.017 |
| 18-Oct-08 | 2C | 66 | 51 | 15 | 93 | 13 | 45 | 8.903 | 1.625 | 5326.885 | 1318.217 | 81.183 | 0.007 | -0.002 | 0.010 |
| 25-Jul-09 | 2C | 66 | 51 | 14 | 93 | 4 | 54 | 8.903 | 1.592 | 5326.886 | 1318.216 | 81.173 | 0.001 | -0.001 | -0.010 |
| 19-Sep-09 | 2C | 66 | 51 | 2 | 93 | 15 | 9 | 8.907 | 1.622 | 5326.887 | 1318.214 | 81.177 | 0.002 | -0.002 | 0.003 |
| 2-Aug-10 | 2C | 66 | 50 | 58 | 92 | 42 | 58 | 8.906 | 1.532 | 5326.889 | 1318.212 | 81.170 | 0.002 | -0.002 | -0.007 |
| 22-Apr-08 | 2D | 284 | 9 | 33 | 90 | 41 | 36 | 22.748 | 1.669 | 5329.353 | 1318.048 | 81.114 | | | |
| 8-Aug-08 | 2D | 284 | 9 | 30 | 90 | 25 | 53 | 22.736 | 1.544 | 5329.363 | 1318.052 | 81.093 | 0.010 | 0.003 | -0.021 |
| 18-Oct-08 | 2D | 284 | 9 | 59 | 90 | 37 | 33 | 22.737 | 1.623 | 5329.364 | 1318.048 | 81.095 | 0.001 | -0.003 | 0.002 |
| 25-Jul-09 | 2D | 284 | 10 | 37 | 90 | 30 | 59 | 22.738 | 1.555 | 5329.364 | 1318.044 | 81.070 | 0.000 | -0.004 | -0.025 |
| 19-Sep-09 | 2D | 284 | 11 | 40 | 90 | 24 | 42 | 22.738 | 1.527 | 5329.365 | 1318.037 | 81.084 | 0.002 | -0.007 | 0.014 |
| 2-Aug-10 | 2D | 284 | 12 | 51 | 90 | 23 | 29 | 22.741 | 1.510 | 5329.364 | 1318.029 | 81.075 | -0.001 | -0.008 | -0.009 |

| | | | | |
|---|---|---|---|---|
| TANK AVERAGES BY DATE (mm) | 22-Apr-08 | 0 | 0 | 0 |
| | 8-Aug-08 | 11.2 | 1.0 | -17.5 |
| | 18-Oct-08 | 3.1 | 0.7 | 3.6 |
| | 25-Jul-09 | 0.0 | -2.7 | -13.5 |
| | 19-Sep-09 | 1.7 | -1.8 | 5.0 |
| | 2-Aug-10 | 1.4 | -4.0 | -8.2 |
| **OVERALL PERIOD AVERAGE (mm)** | | **3.5** | **-1.4** | **-6.1** |

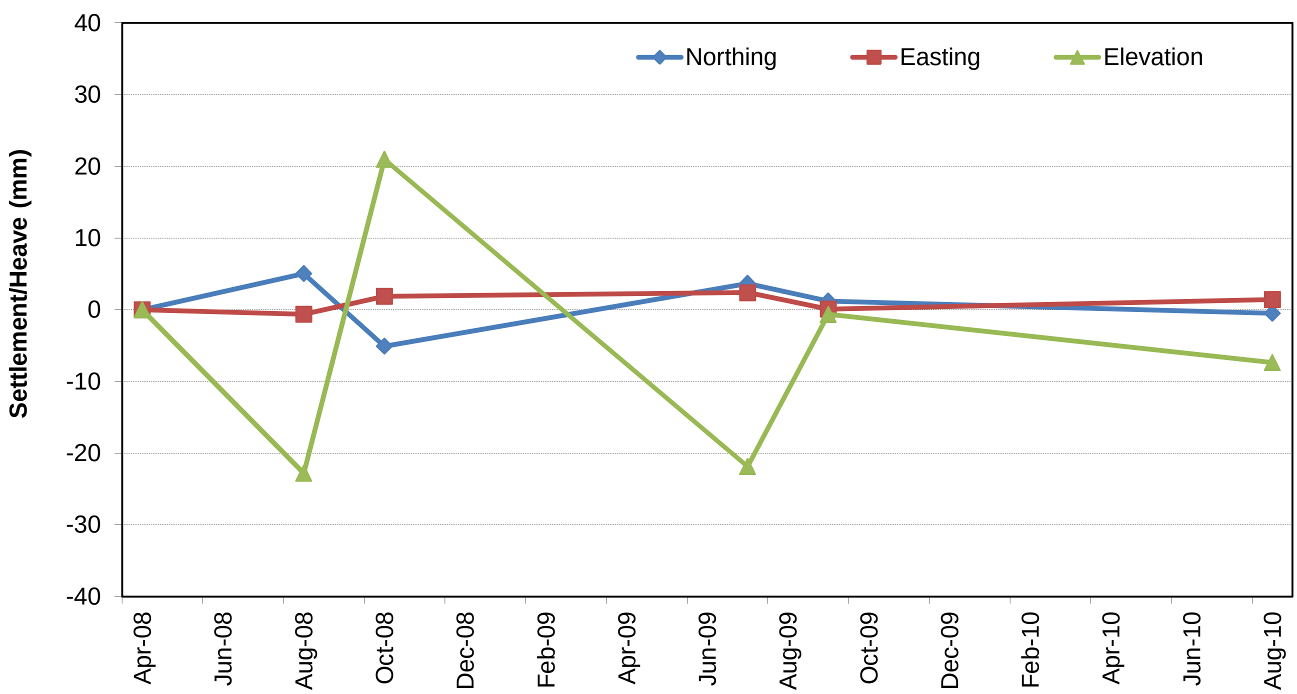


# Boston Primary Fuel Tank Farm Settlement Monitoring

## Tank #3

| Date | Tank Mark | Horizontal Angle Deg | Horizontal Angle Min | Horizontal Angle Sec | Vertical Angle Deg | Vertical Angle Min | Vertical Angle Sec | Slope Dist. | HI [m] | Northing [m] | Easting [m] | Elevation [m] | Difference from Previous Survey [m] N | E | El |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-Apr-08 | 3A | 155 | 31 | 38 | 91 | 35 | 38 | 12.238 | 1.593 | 5331.618 | 1306.850 | 81.057 | | | |
| 8-Aug-08 | 3A | 155 | 29 | 54 | 91 | 20 | 3 | 12.240 | 1.519 | 5331.624 | 1306.847 | 81.038 | 0.006 | -0.003 | -0.019 |
| 18-Oct-08 | 3A | 155 | 31 | 55 | 91 | 58 | 52 | 12.245 | 1.674 | 5331.621 | 1306.853 | 81.055 | -0.004 | 0.006 | 0.017 |
| 25-Jul-09 | 3A | 155 | 31 | 45 | 91 | 51 | 50 | 12.248 | 1.633 | 5331.624 | 1306.855 | 81.039 | 0.003 | 0.002 | -0.016 |
| 19-Sep-09 | 3A | 155 | 32 | 4 | 91 | 52 | 38 | 12.252 | 1.635 | 5331.627 | 1306.858 | 81.038 | 0.002 | 0.003 | -0.001 |
| 2-Aug-10 | 3A | 155 | 32 | 17 | 91 | 17 | 55 | 12.249 | 1.506 | 5331.627 | 1306.859 | 81.032 | 0.000 | 0.001 | -0.005 |
| 22-Apr-08 | 3B | 80 | 36 | 8 | 92 | 41 | 45 | 12.708 | 1.632 | 5331.612 | 1309.744 | 81.062 | | | |
| 8-Aug-08 | 3B | 80 | 36 | 38 | 91 | 53 | 10 | 12.706 | 1.436 | 5331.618 | 1309.743 | 81.046 | 0.005 | -0.001 | -0.016 |
| 18-Oct-08 | 3B | 80 | 35 | 55 | 92 | 35 | 15 | 12.708 | 1.610 | 5331.613 | 1309.743 | 81.064 | -0.005 | 0.000 | 0.018 |
| 25-Jul-09 | 3B | 80 | 37 | 13 | 92 | 40 | 40 | 12.710 | 1.610 | 5331.616 | 1309.747 | 81.044 | 0.003 | 0.004 | -0.020 |
| 19-Sep-09 | 3B | 80 | 36 | 53 | 92 | 44 | 55 | 12.713 | 1.626 | 5331.618 | 1309.744 | 81.044 | 0.001 | -0.002 | 0.000 |
| 2-Aug-10 | 3B | 80 | 36 | 42 | 92 | 9 | 22 | 12.704 | 1.484 | 5331.614 | 1309.745 | 81.034 | -0.003 | 0.001 | -0.010 |
| 22-Apr-08 | 3F | 297 | 17 | 27 | 91 | 16 | 38 | 17.426 | 1.635 | 5335.467 | 1307.263 | 81.090 | | | |
| 8-Aug-08 | 3F | 297 | 16 | 52 | 91 | 11 | 23 | 17.423 | 1.575 | 5335.470 | 1307.265 | 81.056 | 0.003 | 0.002 | -0.033 |
| 18-Oct-08 | 3F | 297 | 17 | 24 | 91 | 18 | 7 | 17.430 | 1.637 | 5335.464 | 1307.265 | 81.084 | -0.007 | 0.000 | 0.028 |
| 25-Jul-09 | 3F | 297 | 16 | 48 | 91 | 2 | 50 | 17.425 | 1.530 | 5335.468 | 1307.267 | 81.055 | 0.004 | 0.002 | -0.029 |
| 19-Sep-09 | 3F | 297 | 16 | 57 | 91 | 23 | 10 | 17.427 | 1.632 | 5335.468 | 1307.266 | 81.053 | 0.000 | -0.001 | -0.001 |
| 2-Aug-10 | 3F | 297 | 16 | 23 | 91 | 5 | 19 | 17.424 | 1.535 | 5335.470 | 1307.268 | 81.047 | 0.002 | 0.002 | -0.006 |

| | Date | N | E | El |
|---|---|---|---|---|
| TANK AVERAGES BY DATE (mm) | 22-Apr-08 | 0 | 0 | 0 |
| | 8-Aug-08 | 5.1 | -0.6 | -22.8 |
| | 18-Oct-08 | -5.1 | 1.9 | 21.0 |
| | 25-Jul-09 | 3.7 | 2.4 | -21.9 |
| | 19-Sep-09 | 1.2 | 0.1 | -0.6 |
| | 2-Aug-10 | -0.5 | 1.4 | -7.3 |
| **OVERALL PERIOD AVERAGE (mm)** | | **0.9** | **1.0** | **-6.3** |

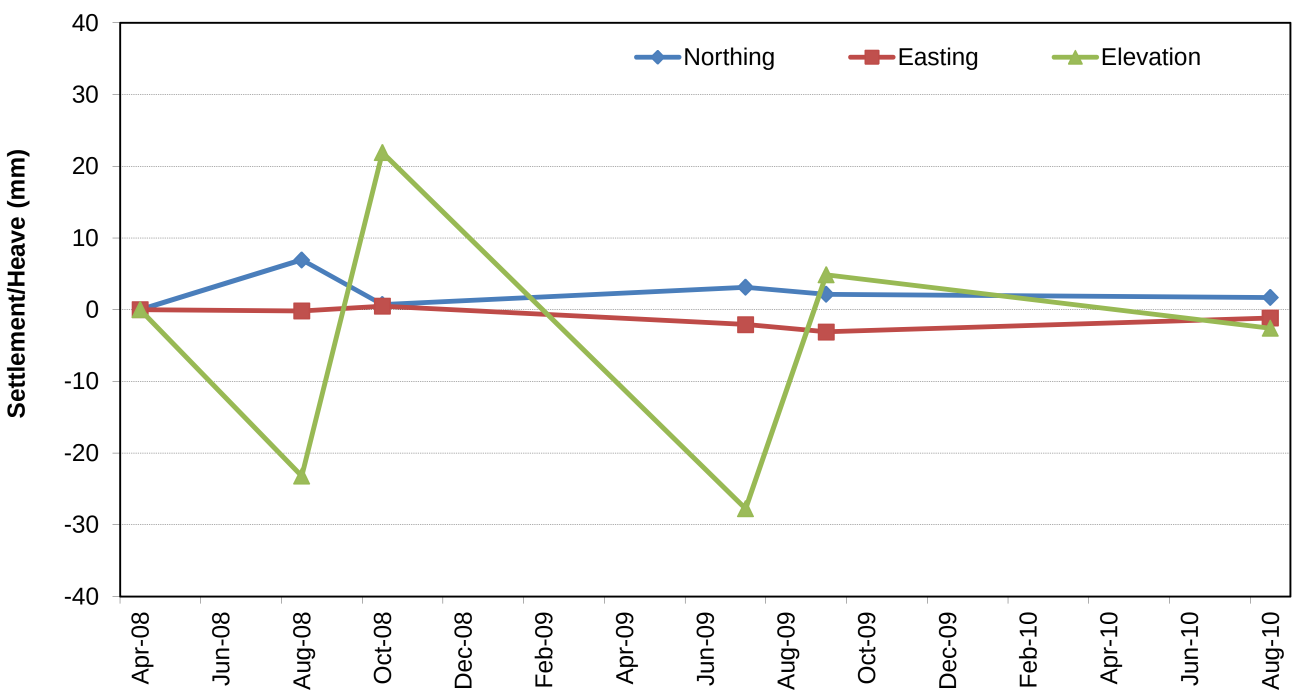


# Boston Primary Fuel Tank Farm Settlement Monitoring

## Tank #4

| Date | Tank | Horizontal Angle | | | Vertical Angle | | | Slope | HI | Northing | Easting | Elevation | Difference from Previous Survey [m] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mark | Deg | Min | Sec | Deg | Min | Sec | Dist. | [m] | [m] | [m] | [m] | N | E | El |
| 22-Apr-08 | 4C | 79 | 49 | 37 | 92 | 45 | 46 | 12.465 | 1.669 | 5331.166 | 1318.159 | 81.128 | | | |
| 8-Aug-08 | 4C | 79 | 50 | 23 | 91 | 56 | 16 | 12.462 | 1.471 | 5331.171 | 1318.159 | 81.110 | 0.005 | 0.000 | -0.019 |
| 18-Oct-08 | 4C | 79 | 51 | 33 | 92 | 32 | 3 | 12.471 | 1.625 | 5331.177 | 1318.161 | 81.134 | 0.005 | 0.002 | 0.024 |
| 25-Jul-09 | 4C | 79 | 51 | 5 | 92 | 28 | 57 | 12.473 | 1.592 | 5331.178 | 1318.158 | 81.112 | 0.001 | -0.003 | -0.022 |
| 19-Sep-09 | 4C | 79 | 51 | 1 | 92 | 36 | 19 | 12.478 | 1.622 | 5331.181 | 1318.156 | 81.115 | 0.003 | -0.002 | 0.003 |
| 2-Aug-10 | 4C | 79 | 50 | 58 | 92 | 12 | 5 | 12.474 | 1.532 | 5331.181 | 1318.156 | 81.113 | 0.000 | 0.000 | -0.002 |
| 22-Apr-08 | 4D | 290 | 20 | 35 | 90 | 57 | 25 | 17.796 | 1.669 | 5334.739 | 1317.563 | 81.092 | | | |
| 8-Aug-08 | 4D | 290 | 20 | 54 | 90 | 36 | 59 | 17.789 | 1.544 | 5334.744 | 1317.564 | 81.073 | 0.006 | 0.001 | -0.019 |
| 18-Oct-08 | 4D | 290 | 20 | 51 | 90 | 49 | 8 | 17.792 | 1.623 | 5334.742 | 1317.563 | 81.089 | -0.002 | -0.001 | 0.016 |
| 25-Jul-09 | 4D | 290 | 21 | 32 | 90 | 42 | 58 | 17.791 | 1.555 | 5334.744 | 1317.560 | 81.053 | 0.002 | -0.003 | -0.036 |
| 19-Sep-09 | 4D | 290 | 22 | 47 | 90 | 35 | 22 | 17.795 | 1.527 | 5334.742 | 1317.552 | 81.064 | -0.002 | -0.008 | 0.011 |
| 2-Aug-10 | 4D | 290 | 23 | 44 | 90 | 32 | 36 | 17.796 | 1.510 | 5334.743 | 1317.547 | 81.061 | 0.001 | -0.005 | -0.003 |
| 22-Apr-08 | 4E | 298 | 41 | 4 | 91 | 11 | 45 | 18.548 | 1.670 | 5334.220 | 1314.710 | 81.128 | | | |
| 8-Aug-08 | 4E | 298 | 40 | 52 | 91 | 1 | 34 | 18.537 | 1.583 | 5334.230 | 1314.708 | 81.096 | 0.010 | -0.001 | -0.032 |
| 18-Oct-08 | 4E | 298 | 40 | 53 | 91 | 9 | 14 | 18.539 | 1.650 | 5334.229 | 1314.709 | 81.122 | -0.001 | 0.000 | 0.026 |
| 25-Jul-09 | 4E | 298 | 40 | 41 | 91 | 0 | 14 | 18.532 | 1.576 | 5334.235 | 1314.708 | 81.096 | 0.006 | 0.000 | -0.025 |
| 19-Sep-09 | 4E | 298 | 40 | 23 | 91 | 6 | 42 | 18.528 | 1.611 | 5334.240 | 1314.709 | 81.097 | 0.005 | 0.000 | 0.000 |
| 2-Aug-10 | 4E | 298 | 39 | 54 | 90 | 58 | 23 | 18.523 | 1.563 | 5334.245 | 1314.710 | 81.093 | 0.005 | 0.001 | -0.003 |

| | | N | E | El |
|---|---|---|---|---|
| TANK AVERAGES BY DATE (mm) | 22-Apr-08 | 0 | 0 | 0 |
| | 8-Aug-08 | 6.9 | -0.2 | -23.2 |
| | 18-Oct-08 | 0.7 | 0.5 | 21.9 |
| | 25-Jul-09 | 3.1 | -2.1 | -27.8 |
| | 19-Sep-09 | 2.1 | -3.1 | 4.9 |
| | 2-Aug-10 | 1.7 | -1.2 | -2.6 |
| **OVERALL PERIOD AVERAGE (mm)** | | **2.9** | **-1.2** | **-5.4** |

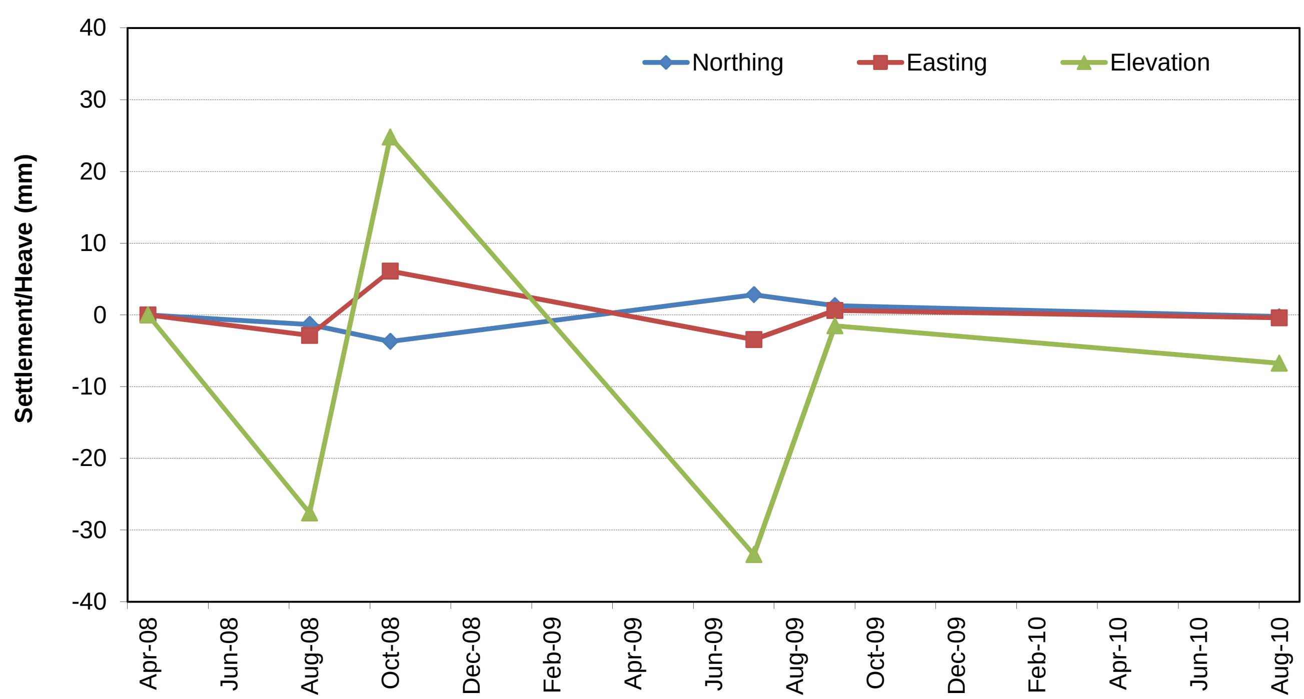


# Boston Primary Fuel Tank Farm Settlement Monitoring

## Tank #5

| Date | Tank Mark | Horizontal Angle Deg | Horizontal Angle Min | Horizontal Angle Sec | Vertical Angle Deg | Vertical Angle Min | Vertical Angle Sec | Slope Dist. | HI [m] | Northing [m] | Easting [m] | Elevation [m] | Difference from Previous Survey [m] N | E | El |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-Apr-08 | 5A | 146 | 6 | 15 | 91 | 38 | 18 | 17.511 | 1.593 | 5337.355 | 1307.654 | 80.896 | | | |
| 8-Aug-08 | 5A | 146 | 5 | 19 | 91 | 29 | 20 | 17.506 | 1.519 | 5337.354 | 1307.648 | 80.868 | -0.001 | -0.006 | -0.028 |
| 18-Oct-08 | 5A | 146 | 7 | 20 | 91 | 55 | 18 | 17.515 | 1.674 | 5337.353 | 1307.660 | 80.891 | 0.000 | 0.011 | 0.023 |
| 25-Jul-09 | 5A | 146 | 6 | 28 | 91 | 53 | 1 | 17.513 | 1.633 | 5337.354 | 1307.655 | 80.861 | 0.001 | -0.005 | -0.029 |
| 19-Sep-09 | 5A | 146 | 6 | 54 | 91 | 53 | 58 | 17.518 | 1.635 | 5337.357 | 1307.659 | 80.858 | 0.003 | 0.004 | -0.003 |
| 2-Aug-10 | 5A | 146 | 6 | 43 | 91 | 29 | 39 | 17.515 | 1.506 | 5337.358 | 1307.659 | 80.853 | 0.001 | -0.001 | -0.005 |
| 22-Apr-08 | 5B | 92 | 56 | 58 | 91 | 53 | 35 | 17.712 | 1.632 | 5337.490 | 1310.713 | 81.075 | | | |
| 8-Aug-08 | 5B | 92 | 56 | 21 | 91 | 20 | 1 | 17.706 | 1.436 | 5337.487 | 1310.710 | 81.052 | -0.002 | -0.003 | -0.023 |
| 18-Oct-08 | 5B | 92 | 56 | 43 | 91 | 50 | 16 | 17.704 | 1.610 | 5337.482 | 1310.714 | 81.070 | -0.005 | 0.004 | 0.018 |
| 25-Jul-09 | 5B | 92 | 56 | 27 | 91 | 55 | 26 | 17.709 | 1.610 | 5337.486 | 1310.711 | 81.043 | 0.004 | -0.003 | -0.027 |
| 19-Sep-09 | 5B | 92 | 56 | 12 | 91 | 58 | 29 | 17.712 | 1.626 | 5337.488 | 1310.709 | 81.044 | 0.002 | -0.002 | 0.000 |
| 2-Aug-10 | 5B | 92 | 55 | 46 | 91 | 32 | 51 | 17.705 | 1.484 | 5337.484 | 1310.708 | 81.034 | -0.003 | -0.001 | -0.010 |
| 22-Apr-08 | 5F | 286 | 10 | 48 | 91 | 45 | 54 | 12.624 | 1.635 | 5341.035 | 1307.826 | 81.089 | | | |
| 8-Aug-08 | 5F | 286 | 10 | 54 | 91 | 38 | 10 | 12.624 | 1.575 | 5341.034 | 1307.826 | 81.058 | -0.001 | 0.000 | -0.032 |
| 18-Oct-08 | 5F | 286 | 10 | 54 | 91 | 45 | 51 | 12.631 | 1.637 | 5341.029 | 1307.830 | 81.091 | -0.005 | 0.003 | 0.034 |
| 25-Jul-09 | 5F | 286 | 11 | 1 | 91 | 28 | 48 | 12.624 | 1.530 | 5341.033 | 1307.826 | 81.047 | 0.004 | -0.003 | -0.044 |
| 19-Sep-09 | 5F | 286 | 11 | 17 | 91 | 57 | 1 | 12.628 | 1.632 | 5341.032 | 1307.826 | 81.045 | -0.001 | 0.000 | -0.002 |
| 2-Aug-10 | 5F | 286 | 10 | 55 | 91 | 32 | 5 | 12.624 | 1.535 | 5341.033 | 1307.827 | 81.040 | 0.002 | 0.001 | -0.005 |

| | Date | N | E | El |
|---|---|---|---|---|
| TANK AVERAGES BY DATE (mm) | 22-Apr-08 | 0 | 0 | 0 |
| | 8-Aug-08 | -1.3 | -2.8 | -27.6 |
| | 18-Oct-08 | -3.7 | 6.1 | 24.8 |
| | 25-Jul-09 | 2.8 | -3.4 | -33.4 |
| | 19-Sep-09 | 1.3 | 0.6 | -1.5 |
| | 2-Aug-10 | -0.2 | -0.4 | -6.7 |
| **OVERALL PERIOD AVERAGE (mm)** | | **-0.2** | **0.0** | **-8.9** |

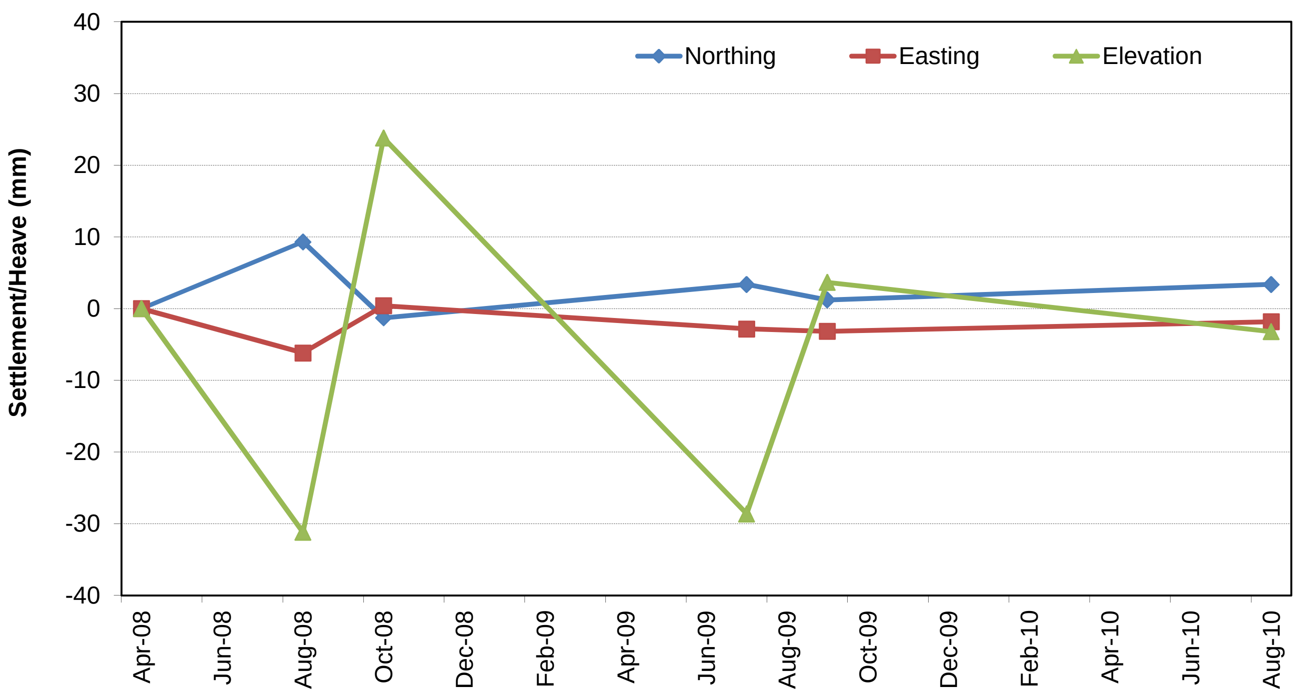


# Boston Primary Fuel Tank Farm Settlement Monitoring

## Tank #6

| Date | Tank | Horizontal Angle | | | Vertical Angle | | | Slope | HI | Northing | Easting | Elevation | Difference from Previous Survey [m] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mark | Deg | Min | Sec | Deg | Min | Sec | Dist. | [m] | [m] | [m] | [m] | N | E | El |
| 22-Apr-08 | 6C | 86 | 44 | 44 | 92 | 19 | 47 | 18.155 | 1.669 | 5337.092 | 1317.422 | 80.991 | | | |
| 8-Aug-08 | 6C | 86 | 44 | 29 | 91 | 47 | 9 | 18.157 | 1.471 | 5337.099 | 1317.418 | 80.965 | 0.007 | -0.004 | -0.026 |
| 18-Oct-08 | 6C | 86 | 45 | 2 | 92 | 11 | 48 | 18.167 | 1.625 | 5337.105 | 1317.418 | 80.989 | 0.006 | 0.001 | 0.024 |
| 25-Jul-09 | 6C | 86 | 44 | 30 | 92 | 9 | 45 | 18.167 | 1.592 | 5337.105 | 1317.416 | 80.966 | -0.001 | -0.003 | -0.022 |
| 19-Sep-09 | 6C | 86 | 44 | 18 | 92 | 14 | 48 | 18.171 | 1.622 | 5337.107 | 1317.413 | 80.970 | 0.002 | -0.002 | 0.003 |
| 2-Aug-10 | 6C | 86 | 44 | 17 | 91 | 58 | 6 | 18.169 | 1.532 | 5337.108 | 1317.413 | 80.968 | 0.001 | -0.001 | -0.002 |
| 22-Apr-08 | 6D | 301 | 21 | 11 | 91 | 39 | 4 | 12.434 | 1.669 | 5340.813 | 1317.436 | 81.031 | | | |
| 8-Aug-08 | 6D | 301 | 23 | 36 | 91 | 11 | 17 | 12.430 | 1.544 | 5340.819 | 1317.429 | 81.006 | 0.006 | -0.007 | -0.024 |
| 18-Oct-08 | 6D | 301 | 23 | 7 | 91 | 27 | 28 | 12.434 | 1.623 | 5340.816 | 1317.430 | 81.027 | -0.003 | 0.000 | 0.020 |
| 25-Jul-09 | 6D | 301 | 24 | 12 | 91 | 18 | 28 | 12.434 | 1.555 | 5340.818 | 1317.426 | 80.991 | 0.001 | -0.004 | -0.035 |
| 19-Sep-09 | 6D | 301 | 26 | 5 | 91 | 8 | 24 | 12.438 | 1.527 | 5340.817 | 1317.417 | 81.000 | 0.000 | -0.008 | 0.008 |
| 20-Aug-10 | 6D | 301 | 27 | 8 | 91 | 4 | 52 | 12.440 | 1.510 | 5340.818 | 1317.413 | 80.995 | 0.000 | -0.004 | -0.004 |
| 22-Apr-08 | 6E | 294 | 8 | 42 | 92 | 4 | 22 | 12.560 | 1.670 | 5340.311 | 1314.183 | 81.061 | | | |
| 8-Aug-08 | 6E | 294 | 9 | 24 | 91 | 52 | 33 | 12.542 | 1.583 | 5340.325 | 1314.175 | 81.017 | 0.015 | -0.008 | -0.043 |
| 18-Oct-08 | 6E | 294 | 9 | 53 | 92 | 3 | 19 | 12.550 | 1.650 | 5340.318 | 1314.176 | 81.045 | -0.007 | 0.000 | 0.027 |
| 25-Jul-09 | 6E | 294 | 9 | 35 | 91 | 50 | 52 | 12.539 | 1.576 | 5340.328 | 1314.174 | 81.017 | 0.009 | -0.002 | -0.028 |
| 19-Sep-09 | 6E | 294 | 9 | 13 | 92 | 0 | 36 | 12.539 | 1.611 | 5340.329 | 1314.174 | 81.016 | 0.002 | 0.001 | 0.000 |
| 2-Aug-10 | 6E | 294 | 8 | 34 | 91 | 48 | 31 | 12.529 | 1.563 | 5340.338 | 1314.174 | 81.013 | 0.009 | -0.001 | -0.004 |

| | | | | |
|---|---|---|---|---|
| TANK AVERAGES BY DATE (mm) | 22-Apr-08 | 0 | 0 | 0 |
| | 8-Aug-08 | 9.3 | -6.2 | -31.2 |
| | 18-Oct-08 | -1.3 | 0.4 | 23.8 |
| | 25-Jul-09 | 3.4 | -2.8 | -28.6 |
| | 19-Sep-09 | 1.2 | -3.2 | 3.7 |
| | 2-Aug-10 | 3.4 | -1.8 | -3.2 |
| **OVERALL PERIOD AVERAGE (mm)** | | **3.2** | **-2.7** | **-7.1** |

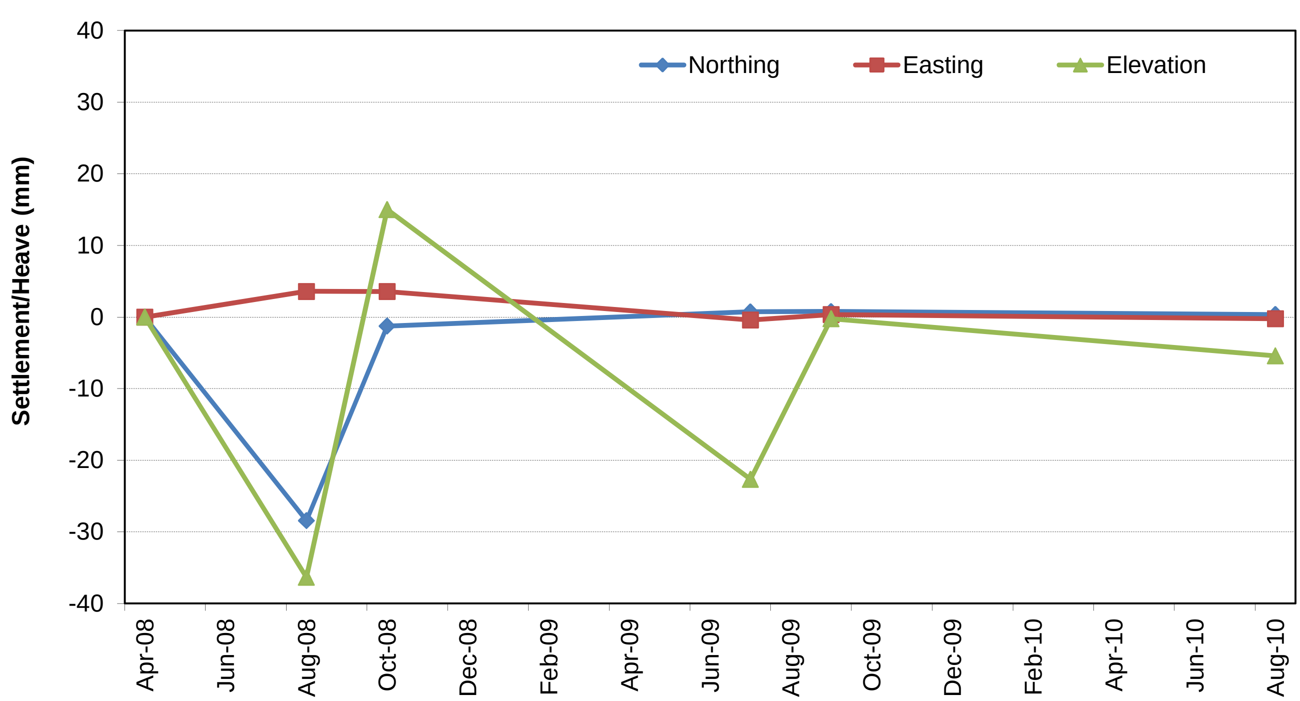


# Boston Primary Fuel Tank Farm Settlement Monitoring

## Tank #7

| Date | Tank | Horizontal Angle | | | Vertical Angle | | | Slope | HI | Northing | Easting | Elevation | Difference from Previous Survey [m] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mark | Deg | Min | Sec | Deg | Min | Sec | Dist. | [m] | [m] | [m] | [m] | N | E | El |
| 22-Apr-08 | 7A | 139 | 42 | 34 | 91 | 19 | 5 | 22.702 | 1.593 | 5343.001 | 1307.814 | 80.875 | | | |
| 8-Aug-08 | 7A | 139 | 41 | 54 | 91 | 13 | 37 | 22.699 | 1.519 | 5343.000 | 1307.809 | 80.837 | 0.000 | -0.005 | -0.038 |
| 18-Oct-08 | 7A | 139 | 42 | 48 | 91 | 35 | 4 | 22.706 | 1.674 | 5343.001 | 1307.816 | 80.850 | 0.001 | 0.007 | 0.013 |
| 25-Jul-09 | 7A | 139 | 42 | 40 | 91 | 31 | 45 | 22.705 | 1.633 | 5343.001 | 1307.815 | 80.831 | 0.000 | -0.001 | -0.019 |
| 19-Sep-09 | 7A | 139 | 43 | 2 | 91 | 32 | 18 | 22.708 | 1.635 | 5343.003 | 1307.818 | 80.829 | 0.002 | 0.003 | -0.002 |
| 2-Aug-10 | 7A | 139 | 42 | 56 | 91 | 13 | 10 | 22.706 | 1.506 | 5343.004 | 1307.818 | 80.827 | 0.001 | 0.000 | -0.003 |
| 22-Apr-08 | 7B | 97 | 41 | 28 | 91 | 36 | 36 | 23.321 | 1.632 | 5343.343 | 1310.862 | 81.005 | | | |
| 8-Aug-08 | 7B | 97 | 41 | 3 | 91 | 12 | 7 | 23.230 | 1.436 | 5343.258 | 1310.879 | 80.977 | -0.085 | 0.017 | -0.028 |
| 18-Oct-08 | 7B | 97 | 41 | 12 | 91 | 36 | 11 | 23.232 | 1.610 | 5343.256 | 1310.881 | 80.988 | -0.002 | 0.001 | 0.011 |
| 25-Jul-09 | 7B | 97 | 41 | 14 | 91 | 39 | 3 | 23.232 | 1.610 | 5343.256 | 1310.881 | 80.969 | 0.000 | 0.000 | -0.019 |
| 19-Sep-09 | 7B | 97 | 41 | 3 | 91 | 41 | 23 | 23.234 | 1.626 | 5343.257 | 1310.879 | 80.969 | 0.001 | -0.002 | 0.000 |
| 2-Aug-10 | 7B | 97 | 40 | 48 | 91 | 21 | 28 | 23.229 | 1.484 | 5343.255 | 1310.878 | 80.962 | -0.002 | -0.001 | -0.007 |
| 22-Apr-08 | 7F | 267 | 27 | 43 | 92 | 53 | 46 | 8.278 | 1.635 | 5346.505 | 1307.626 | 81.060 | | | |
| 8-Aug-08 | 7F | 267 | 27 | 54 | 92 | 46 | 47 | 8.276 | 1.575 | 5346.505 | 1307.624 | 81.017 | 0.000 | -0.001 | -0.043 |
| 18-Oct-08 | 7F | 267 | 28 | 14 | 93 | 3 | 56 | 8.282 | 1.637 | 5346.502 | 1307.627 | 81.037 | -0.003 | 0.002 | 0.020 |
| 25-Jul-09 | 7F | 267 | 27 | 32 | 92 | 31 | 52 | 8.276 | 1.530 | 5346.505 | 1307.626 | 81.008 | 0.003 | -0.001 | -0.030 |
| 19-Sep-09 | 7F | 267 | 27 | 57 | 93 | 13 | 50 | 8.281 | 1.632 | 5346.504 | 1307.626 | 81.008 | -0.001 | -0.001 | 0.001 |
| 2-Aug-10 | 7F | 267 | 27 | 12 | 92 | 36 | 15 | 8.276 | 1.535 | 5346.506 | 1307.626 | 81.002 | 0.002 | 0.001 | -0.006 |

| | | N | E | El |
|---|---|---|---|---|
| TANK AVERAGES BY DATE (mm) | 22-Apr-08 | 0 | 0 | 0 |
| | 8-Aug-08 | -28.4 | 3.6 | -36.3 |
| | 18-Oct-08 | -1.3 | 3.6 | 15.0 |
| | 25-Jul-09 | 0.7 | -0.4 | -22.7 |
| | 19-Sep-09 | 0.8 | 0.4 | -0.2 |
| | 2-Aug-10 | 0.4 | -0.2 | -5.4 |
| **OVERALL PERIOD AVERAGE (mm)** | | **-5.6** | **1.4** | **-9.9** |



# Boston Primary Fuel Tank Farm Settlement Monitoring

## Tank #8

| Date | Tank Mark | Horizontal Angle Deg | Min | Sec | Vertical Angle Deg | Min | Sec | Slope Dist. | HI [m] | Northing [m] | Easting [m] | Elevation [m] | Difference from Previous Survey [m] N | E | El |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-Apr-08 | 8C | 91 | 52 | 15 | 91 | 53 | 25 | 23.449 | 1.669 | 5342.700 | 1317.450 | 80.956 | | | |
| 8-Aug-08 | 8C | 91 | 52 | 27 | 91 | 27 | 51 | 23.453 | 1.471 | 5342.709 | 1317.449 | 80.932 | 0.009 | -0.001 | -0.024 |
| 18-Oct-08 | 8C | 91 | 52 | 47 | 91 | 44 | 54 | 23.460 | 1.625 | 5342.713 | 1317.450 | 80.969 | 0.004 | 0.001 | 0.038 |
| 25-Jul-09 | 8C | 91 | 52 | 11 | 91 | 44 | 54 | 23.460 | 1.592 | 5342.712 | 1317.446 | 80.936 | -0.001 | -0.004 | -0.033 |
| 19-Sep-09 | 8C | 91 | 52 | 1 | 91 | 49 | 2 | 23.464 | 1.622 | 5342.715 | 1317.444 | 80.938 | 0.003 | -0.002 | 0.002 |
| 2-Aug-10 | 8C | 91 | 51 | 51 | 91 | 36 | 4 | 23.462 | 1.532 | 5342.715 | 1317.443 | 80.936 | 0.000 | -0.001 | -0.001 |
| 22-Apr-08 | 8D | 318 | 8 | 27 | 92 | 56 | 10 | 8.342 | 1.669 | 5345.860 | 1317.826 | 80.962 | | | |
| 8-Aug-08 | 8D | 318 | 11 | 46 | 92 | 12 | 54 | 8.340 | 1.544 | 5345.864 | 1317.819 | 80.942 | 0.004 | -0.007 | -0.020 |
| 18-Oct-08 | 8D | 318 | 11 | 50 | 92 | 33 | 48 | 8.341 | 1.623 | 5345.865 | 1317.820 | 80.970 | 0.001 | 0.001 | 0.028 |
| 25-Jul-09 | 8D | 318 | 12 | 39 | 92 | 22 | 34 | 8.342 | 1.555 | 5345.865 | 1317.817 | 80.929 | 0.000 | -0.003 | -0.041 |
| 19-Sep-09 | 8D | 318 | 14 | 50 | 92 | 8 | 19 | 8.347 | 1.527 | 5345.865 | 1317.808 | 80.936 | 0.000 | -0.008 | 0.006 |
| 2-Aug-10 | 8D | 318 | 15 | 55 | 92 | 2 | 57 | 8.350 | 1.510 | 5345.865 | 1317.804 | 80.931 | 0.000 | -0.004 | -0.004 |
| 22-Apr-08 | 8E | 282 | 47 | 41 | 93 | 37 | 20 | 7.635 | 1.670 | 5345.604 | 1313.962 | 81.033 | | | |
| 8-Aug-08 | 8E | 282 | 46 | 58 | 93 | 16 | 40 | 7.615 | 1.583 | 5345.619 | 1313.954 | 80.993 | 0.016 | -0.007 | -0.040 |
| 18-Oct-08 | 8E | 282 | 47 | 20 | 93 | 29 | 56 | 7.621 | 1.650 | 5345.615 | 1313.956 | 81.030 | -0.004 | 0.001 | 0.037 |
| 25-Jul-09 | 8E | 282 | 46 | 37 | 93 | 12 | 50 | 7.612 | 1.576 | 5345.622 | 1313.954 | 80.994 | 0.007 | -0.002 | -0.036 |
| 19-Sep-09 | 8E | 282 | 46 | 11 | 93 | 29 | 15 | 7.613 | 1.611 | 5345.623 | 1313.954 | 80.993 | 0.001 | 0.000 | -0.001 |
| 2-Aug-10 | 8E | 282 | 44 | 37 | 93 | 10 | 6 | 7.603 | 1.563 | 5345.632 | 1313.953 | 80.988 | 0.008 | -0.001 | -0.005 |

| | | N | E | El |
|---|---|---|---|---|
| TANK AVERAGES BY DATE (mm) | 22-Apr-08 | 0 | 0 | 0 |
| | 8-Aug-08 | 9.7 | -5.3 | -28.0 |
| | 18-Oct-08 | 0.3 | 1.1 | 34.4 |
| | 25-Jul-09 | 1.9 | -3.0 | -36.5 |
| | 19-Sep-09 | 1.3 | -3.3 | 2.2 |
| | 2-Aug-10 | 2.8 | -2.1 | -3.6 |
| **OVERALL PERIOD AVERAGE (mm)** | | **3.2** | **-2.5** | **-6.3** |