AGNICO-EAGLE MINES LTD.
Meadowbank Division

MEADOWBANK GOLD PROJECT

2007 ANNUAL REPORT
ALL-WEATHER PRIVATE ACCESS ROAD

MARCH 2008

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1 INTRODUCTION

Agnico-Eagle Mines Ltd. (AEM; formerly Cumberland Resources Ltd.) is proposing the development of the Meadowbank Gold Project, located in the Kivalliq Region of Nunavut approximately 70 km north of the hamlet of Baker Lake. The project includes an All-Weather Private Access Road (AWPAR) to facilitate year-round access to the site from Baker Lake, which began construction in late January 2007 under the following regulatory instruments:

- Nuvavut Water Board (NWB) B License (**8BC-TEH0708**) (**Appendix A**)
- Fisheries and Oceans Canada (DFO) *Fisheries Act* Authorization for Works or Undertakings Affecting Fish Habitat (**NU-03-0190-2**) (**Appendix B**)

The reporting requirements of both have been integrated as the components are complementary and serve to provide a stand-alone record of AWPAR construction activities and associated monitoring in 2007.

This report is comprised of the following sections:

- **Section 2** – Construction and Sediment & Erosion Control Activities
- **Section 3** – Unauthorized Discharges and Spill Contingency Plan Annual Review
- **Section 4** – Reclamation Activities
- **Section 5** – Physical Crossing Inspections
- **Section 6** – Water Quality Monitoring
- **Section 7** – DFO Authorization Crossing Fisheries Monitoring

2 CONSTRUCTION AND SEDIMENT & EROSION CONTROL ACTIVITIES

This section provides an overview of AWPAR construction including the following:

- Construction and sediment & erosion activities
- Regulatory inspections

2.1 CONSTRUCTION AND SEDIMENT & EROSION CONTROL ACTIVITIES

Nuna M&T Services Ltd. (Nuna) was the contractor commissioned to construct the AWPAR. General construction methods were outlined in the original application to NWB (see **Photos 2-1** for general construction photographs). Deviations from the application are highlighted in **Section 2.1.1** (for road alignment), **Table 2-1** (for quarries) and **Table 2-2** (for crossings).

Sediment and erosion control measures for AWPAR construction were documented by Azimuth (2007a) and Golder (2007a). A combination of minimizing disturbance, physical containment structures (e.g., silt fences and turbidity curtains) and careful construction were used to minimize sediment introductions to local water bodies (see **Photos 2-2** for general documentation of sediment & erosion control measures). Physical inspections were conducted by AEM (**Section 5**). Water quality monitoring was conducted by Azimuth Consulting Group Inc. (see **Photos 2-2** for some monitoring photographs); crossing-specific details are provided in **Section 6**.

2.1.1 Overall Alignment

The as-built alignment, correct at least to year end 2007, for the AWPAR is provided in **Figure 2-1**[1]. Significant deviations from the original application were as follows:

- **Prince River Road** – Rather than constructing a new road out of town, the hamlet's Prince River Road was used instead. AEM improved the hamlet's road and avoided crossing R01.

- **"Km 39"** – A large switchback feature between original alignment km 38 and 43 was not constructed in the AWPAR. Rather, a more direct routing was constructed, eliminating over 3 km of damage to the tundra.

Numerous smaller re-alignments were implemented along for AWPAR for one or more of the following reasons:

- Avoiding areas where natural topographic features would facilitate snow drifts
- Avoiding areas of poor ground condition (e.g., low lying wet areas)
- Avoidance of nesting birds during breeding season

[1] AWPAR kilometre values presented in the text refer to "design" mileage; "as-built" mileage, as shown in Figure 2-1, will be used for reference in the future. The physical location of crossings (i.e., GPS locations), unless noted otherwise, remain the same regardless.

- Avoidance of newly discovered archaeology sites or locations with cultural significance
- Moving the AWPAR further away from lakes and streams
- Improving overall alignment

2.1.2 Quarries

Key information for each quarry is presented in **Table 2-1** (photos, where available, presented in **Photos 2-3**). Significant deviations from the original application included the addition of several new quarries (Q08, Q10 – Q22). These quarries were added as intermediate quarries to improve efficiencies during AWPAR construction.

As these quarries were not directly assessed for acid rock drainage (ARD) and metal leaching (ML) potential, AEM is committed to conducting geochemical monitoring of these quarries in 2008 to verify their status.

Water quality monitoring of standing water in the quarries was conducted during the summer of 2007; these results are provided in **Section 6**.

2.1.3 Water Crossings

Key information for each of the crossings is provided in **Table 2-2**. Significant deviations from the original application were as follows:

- The addition of 16 new culvert locations. These were added to facilitate local water drainage during freshet.

Photos of crossings (before, during and after), where available, are provided in **Photos 2-4**. As there are a number of missing photos, AEM is committed to providing a complete set of 'after' photos for each crossing; these photos will be taken in the summer of 2008, following the completion of all culvert installations along the AWPAR. Water quality monitoring at select crossings and times are discussed in **Section 6**.

As per the applications to both the NWB and DFO, five (R02, R06, R09, R15, and R19) of the ten bridges were planned to have some encroachment below the high water mark, resulting in the harmful alteration, disruption or destruction (HADD) of fish habitat pursuant to Subsection 35(2) of the *Fisheries Act*. The remaining bridges (R01, R05, R13, R16, R18) were designed as clear-span bridges with no channel encroachment. A brief summary of the construction history for each is a follows:

- **Crossing R01** – This crossing was avoided with the first road re-alignment (see **Section 2.1.1**).

- **Crossing R02** - The leading edge of the AWPAR advanced past the 7.05 km mark via an ice bridge in late January 2007. Bridge alignment and abutment locations were fitted in the field. The 30-m long Acrow bridge deck was placed on May 30. A June 15[2] reconnaissance survey

[2] This survey was conducted in advance of freshet, which occurred fairly late in 2007 relative to previous years.

for environmental monitoring identified several issues requiring attention in advance of freshet (see details and photos in Azimuth 2007a in **Appendix C**) (see **Section 6** for monitoring details). Mitigation of these issues is documented in a follow-up memo (see details and photos in Azimuth 2007b in **Appendix C**).

- **Crossing R05** – The leading edge of the AWPAR advanced past the 15.95 km mark via an ice bridge in mid March 2007. Bridge alignment and abutment locations were fitted in the field. The 30-m long Acrow bridge deck as placed on May 14. A June 15 reconnaissance survey for environmental monitoring identified several issues requiring attention in advance of freshet (see details and photos in Azimuth 2007a in **Appendix C**) (see **Section 6** for monitoring details). Mitigation of these issues is documented in a follow-up memo (see details and photos in Azimuth 2007b in **Appendix C**).

- **Crossing R06** – The leading edge of the AWPAR advanced past the 21.35 km mark via an ice bridge in late March 2007. Bridge alignment and abutment locations were fitted in the field. The 30-m long Acrow bridge deck was placed on June 4. A June 15 reconnaissance survey for environmental monitoring did not identify any conditions warranted follow-up at that time (see details and photos in Azimuth 2007a in **Appendix C**) (see **Section 6** for monitoring details).

- **Crossing R09** – The leading edge of the AWPAR reached the 49.55 km mark in early July 2007. As this timing represented a restricted Fisheries Timing Window for arctic grayling, no in-water activities nor channel fording by equipment were permitted. Consequently, an action plan was developed by AEM, Azimuth and Nuna in consultation with DFO (see detailed plan in Azimuth 2007c in **Appendix C**). The temporary 12-m Rapid Span clear-span installation was successful with no significant sedimentation or erosion control issues. The permanent 12-m Rapid Span bridge was installed on August 13 (see **Section 6** for monitoring details); the temporary span was later removed.

- **Crossing R13** - The leading edge of the AWPAR reached the 63.40 km mark in mid August 2007. While outside the restricted Fisheries Timing Window, vehicle fording of the crossing would have resulted in severe damage to the stream channel. Consequently, AEM, Azimuth and Nuna developed an action plan in consultation with DFO (see detailed plan in Azimuth 2007d in **Appendix C**). However, given a residual concern that soft ground on the approach may push forward into the stream channel with abutment placement (i.e., resulting in a HADD), the 12-m Rapid Span bridge location was moved slightly upstream to take advantage of stable ground conditions and permanently installed on August 13 (see **Section 6** for monitoring details).

- **Crossing R15** – The leading edge of the AWPAR reached the 70.42 km mark in early September 2007. The crossing called for a 30-m long Acrow bridge, which was not designed to support the passage of loaded equipment to allow AWPAR advancement past the bridge. Furthermore, while outside the restricted Fisheries Timing Window, vehicle fording of the crossing would have resulted in severe damage to the stream channel. Consequently, AEM, Azimuth and Nuna developed an action plan in consultation with DFO to address these concerns (see detailed plan in Azimuth 2007e in **Appendix C**). The temporary span was

installed successfully on September 3 (see **Section 6** for monitoring details) and had yet to be replaced with the permanent span as of year end.

- **Crossing R16** – The leading edge of the AWPAR reached the 75.10 km mark in mid September 2007. The 12-m Rapid Span clear-span bridge was installed on September 20 with no in-water activity.

- **Crossing R18** - The leading edge of the AWPAR reached the 80.80 km mark in mid October 2007. The 12-m Rapid Span clear-span bridge was installed on October 10 with no in-water activity.

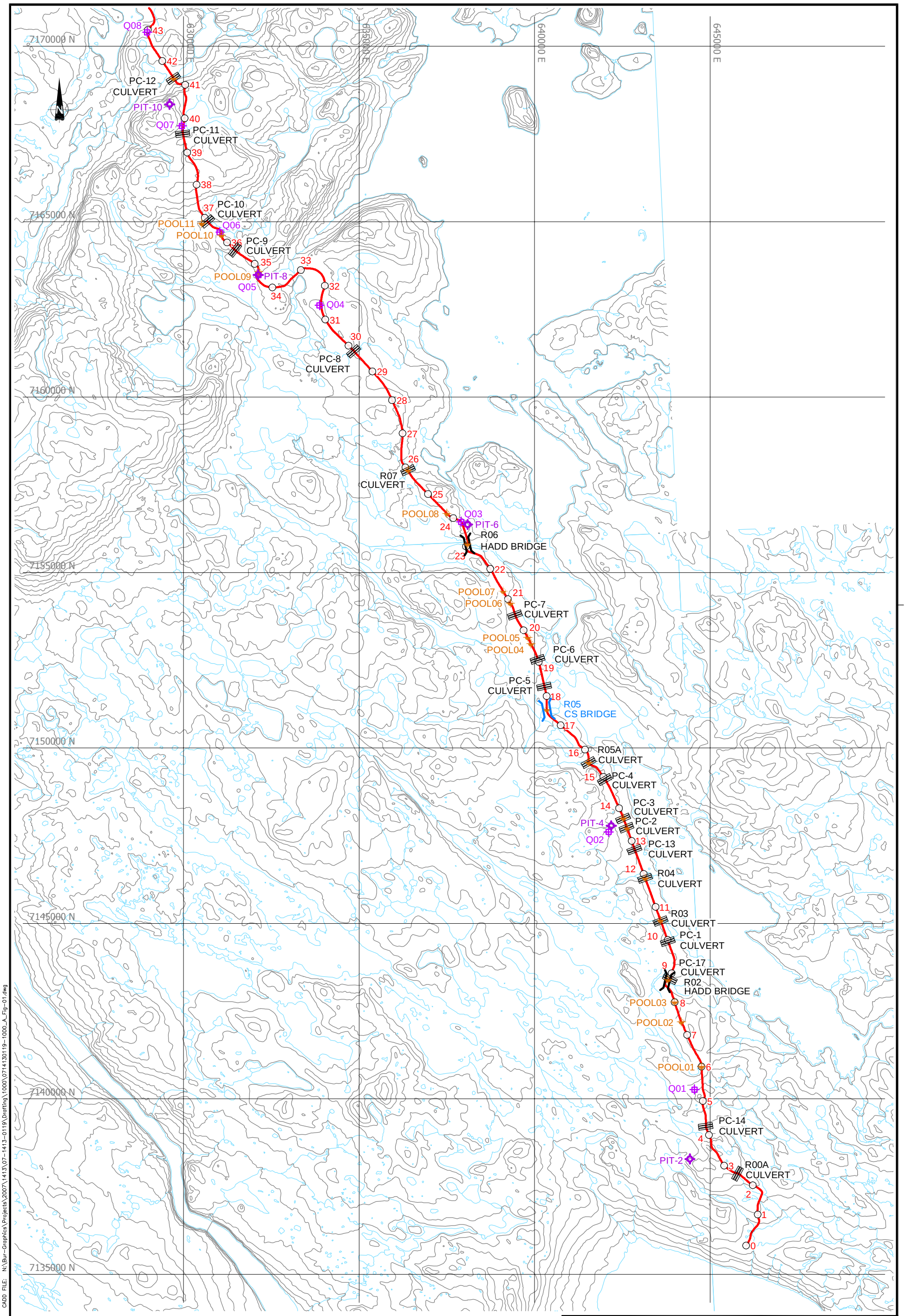
- **Crossing R19** - The leading edge of the AWPAR reached the 84.30 km mark in mid October 2007. While planned as a HADD crossing originally, detailed surveying of the crossing identified an alternate location (14 m upstream) that could be installed as a clear-span bridge. A temporary 12-m Rapid Span clear-span bridge was installed on October 24 under semi-frozen conditions with no in-water activity. As of year end, the suitability of the new location for a permanent clear-span was under review.

2.2 REGULATORY INSPECTIONS

Two inspections of the AWPAR by regulatory agencies were conducted in 2007:

- Andrew Keim (INAC) on June 26 for the NWB B License (see **Appendix D** for INAC letter and AEM response)

- Amy Liu and Paul Savoie (DFO) on September 7 for the DFO HADD Authorization (see **Appendix E** for details).



LEGEND

- SURFACE CONTACT WATER STATION
- CULVERT
- HADD BRIDGE
- CLEAR-SPAN BRIDGE
- EXISTING QUARRY
- 10 KILOMETER MARKER
- PIT INVESTIGATED

REFERENCES

1) ROAD ALIGNMENT, BRIDGE, CULVERT AND QUARRY LOCATIONS FROM NUNA M&T SERVICES Ltd.
2) POOL LOCATIONS FROM AZIMUTH CONSULTING GROUP INC.

FOR DISCUSSION PURPOSES ONLY

PROJECT

AEM

AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE

ALL-WEATHER PRIVATE ACCESS ROAD: AS-BUILT ALIGNMENT

Golder Associates

PROJECT No.		07-1413-0119	FILE No.	0714130119-1000_A_Fig-01	
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CHECK	KD	27MAR08			
REVIEW	-	-			

FIGURE 2-1a

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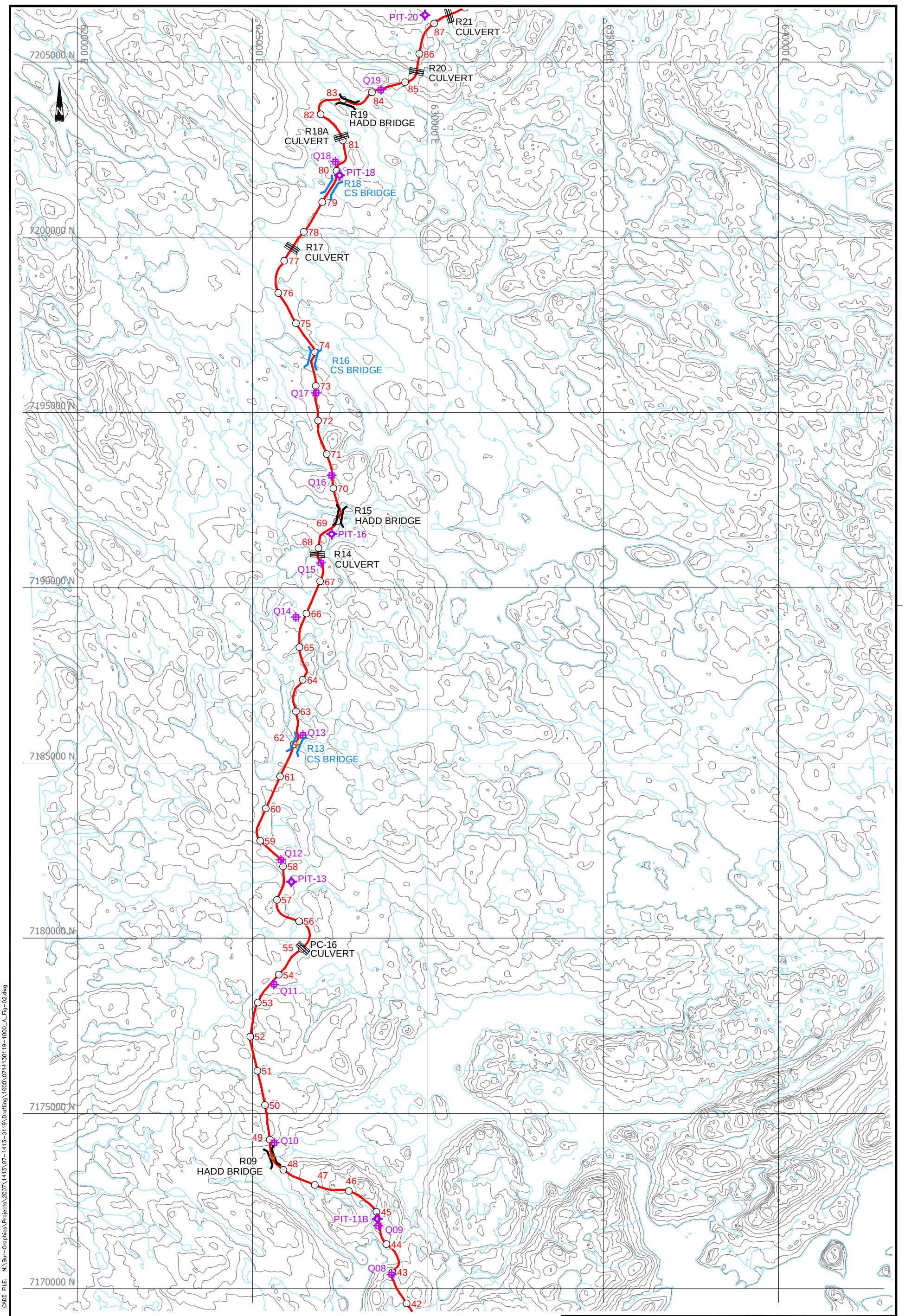

LEGEND

- SURFACE CONTACT WATER STATION
- CULVERT
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FOR DISCUSSION PURPOSES ONLY

PROJECT

AEM

AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE

ALL-WEATHER PRIVATE ACCESS ROAD: AS-BUILT ALIGNMENT

Golder Associates

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REVIEW	-	-			

FIGURE 2-1b

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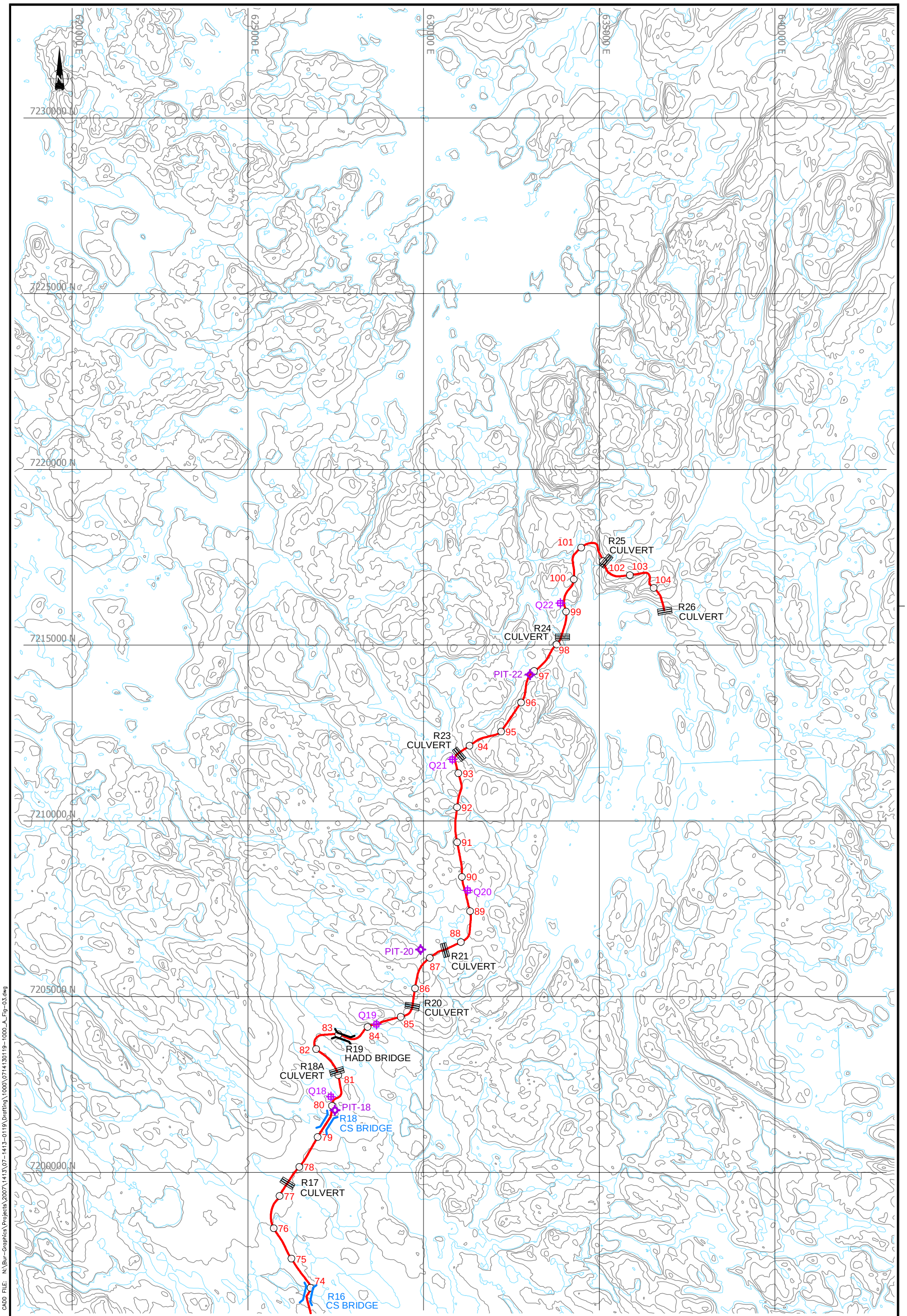

LEGEND

- SURFACE CONTACT WATER STATION
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FOR DISCUSSION PURPOSES ONLY

PROJECT

AEM

AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE

ALL-WEATHER PRIVATE ACCESS ROAD: AS-BUILT ALIGNMENT

Golder Associates

PROJECT No.		07-1413-0119	FILE No.	0714130119-1000_A_Fig-03	
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CHECK	KD	27MAR08			
REVIEW	-	-			

FIGURE 2-1c

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Table 2-1. Meadowbank AWPAR Water Crossing Structures 2007.

Nuna Quarry ID	Golder Quarry ID	Coordinates		Usage		BCMs Excavated	Deviation from Application?
		Northing	Easting	First Haul	Last Haul		
Q01	NA	7140268	644555	17-Jan-07	18-Jun-07	Unavailable	added quarry
Q02	Pit #4	7147611	642108	26-Feb-07	16-Oct-07	94,047	
Q03	Pit #6	7156450	637909	3-Apr-07	13-Jan-08	126,791	
Q04	NA	7162618	633877	21-May-07	29-May-07	25,315	added quarry
Q05	culvert	7163483	632133	29-May-07	8-Jun-07	20,602	
Q06	NA	7164703	631032	3-Jun-07	19-Jun-07	21,788	added quarry
Q07	Pit #10	7167735	629950	10-Jun-07	19-Jun-07	20,298	
Q08	NA	7170404	628965	17-Jun-07	2-Jul-07	22,765	added quarry
Q09	Pit #11B	7171800	628592	23-Jun-07	23-Jul-07	57,917	
Q10	NA	7174165	625619	12-Jul-07	12-Aug-07	31,663	added quarry
Q11	NA	7178686	625609	22-Jul-07	20-Oct-07	63,671	added quarry
Q12	NA	7182234	625806	2-Aug-07	19-Aug-07	48,347	added quarry
Q13	NA	7185796	626436	16-Aug-07	25-Aug-07	36,106	added quarry
Q14	NA	7189165	626236	25-Aug-07	10-Sep-07	16,295	added quarry
Q15	NA	7190712	626950	30-Aug-07	10-Sep-07	30,201	added quarry
Q16	NA	7193214	627255	7-Sep-07	15-Dec-07	87,177	added quarry
Q17	NA	7195557	626812	7-Sep-07	19-Oct-07	48,539	added quarry
Q18	NA	7202153	627364	15-Oct-07	7-Nov-07	46,094	added quarry
Q19	NA	7204211	628659	2-Nov-07	26-Nov-07	34,480	added quarry
Q20	NA	7208022	631253	13-Nov-07	20-Dec-07	53,388	added quarry
Q21	NA	7211752	630821	13-Dec-07	Current	55,360	added quarry
Q22	NA	7216193	633894	21-Jun-07	Current	Unavailable	added quarry

Note: GPS coordinates in NAD83 UTM Zone 14.
BCM = Bank cubic meters
NA = intermediate quarry not characterized by Golder
km = road chainage based on AWPAR design, not as constructed.

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Note: GPS coordinates in NAD83 UTM Zone 14.
BCM = Bank cubic meters
NA = intermediate quarry not characterized by Golder
km = road chainage based on AWPAR design, not as constructed.

Table 2-2. Meadowbank AWPAR Water Crossing Structures 2007

Crossing ID	Type of Construction	Dimensions[1]	GPS Coordinates (NAD83) Northing	Easting	Crossing Completed	Deviations from Application?
R00A	culvert	1 x 0.6m x 15m	7137874	645788	24-Mar-07	Culvert added to facilitate local drainage
PC-14	culvert	2 x 0.6m x 18m	7139220	644874	25-Mar-07	Culvert added to facilitate local drainage
R02	**HADD bridge**	**30-m span**	**7143366**	**643785**	**31-May-07**	
PC-17	culvert	2 x 1.2m x 27m	7143427	643854	19-Jun-07	Culvert added to facilitate local drainage
PC-1	culvert	1 x 0.6m x 13.5m	7144488	643799	17-Jul-07	Culvert added to facilitate local drainage
R03	culvert	1 x 0.6m x 13.5m	7145075	643592	17-Jul-07	
R04	culvert	1 x 1.2m x 18m	7146292	643150	19-Jul-07	
PC-13	culvert	1 x 0.6m x 13.5m	7147108	642847	18-Jul-07	Culvert added to facilitate local drainage
PC-2	culvert	1 x 0.6m x 13.5m	7147734	642620	2-Aug-07	Culvert added to facilitate local drainage
PC-3	culvert	1 x 0.6m x 18m	7147995	642526	25-Jun-07	Culvert added to facilitate local drainage
PC-4	culvert	1 x 0.6m x 13.5m	7149104	642002	29-Jul-07	Culvert added to facilitate local drainage
R05A	culvert	1 x 1.2m x 22.5m	7149591	641543	16-Oct-07	
R05	**CS bridge**	**30-m span**	**7151099**	**640349**	**14-May-07**	
PC-5	culvert	1 x 0.6m x 13.5m	7151758	640274	25-Jul-07	Culvert added to facilitate local drainage
PC-6	culvert	1 x 0.6m x 13.5m	7152532	640088	25-Jul-07	Culvert added to facilitate local drainage
PC-7	culvert	1 x 0.6m x 13.5m	7153798	639441	28-Jul-07	Culvert added to facilitate local drainage
R06	**HADD bridge**	**30-m span**	**7155817**	**638089**	**4-Jun-07**	
R07	culvert	1 x 1.2m x 18m	7157922	636398	24-Oct-07	
PC-8	culvert	1 x 0.6m x 13.5m	7161311	634846	18-Oct-07	Culvert added to facilitate local drainage
PC-9	culvert	1 x 0.6m x 13.5m	7164199	631470	20-Oct-07	Culvert added to facilitate local drainage
PC-10	culvert	1 x 0.6m x 13.5m	7165015	630686	15-Jul-07	Culvert added to facilitate local drainage
PC-11	culvert	1 x 0.6m x 13.5m	7167512	629977	20-Oct-07	Culvert added to facilitate local drainage
PC-12	culvert	1 x 0.6m x 13.5m	7169091	629714	19-Oct-07	Culvert added to facilitate local drainage
R09	**HADD bridge**	**12-m span**	**7173765**	**625558**	**13-Aug-07**	
PC-16	culvert	1 x 0.6m x 13.5m	7179723	626439	21-Oct-07	Culvert added to facilitate local drainage
R13	**CS bridge**	**12-m span**	**7185543**	**626256**	**13-Aug-07**	
R14	culvert	3 x 1.2m x 15m	7190963	626859	Not Finished	Partially Completed.
R15	**HADD bridge**	**30-m span**	**7192065**	**627491**	**3-Sep-07**	**Temporary Install with 2 x 12-m bridges**
R16	**CS bridge**	**12-m span**	**7196556**	**626720**	**20-Sep-07**	
R17	culvert	1 x 1.2m x NC	7199700	626129	Not Started	Not Completed
R18	**CS bridge**	**12-m span**	**7201433**	**627257**	**10-Oct-07**	
R18A	culvert	3 x 1.2m x NC	7202874	627534	Not Started	Not completed
R19	**HADD bridge**	**12-m span**	**7203854**	**627719**	**24-Oct-08**	**Temporary Install as clear-span**
R20	culvert	1 x 1.2m x 15m	7204731	629679	2-Nov-07	
R21	culvert	2 x 1.2m x 18m	7206332	630610	11-Nov-07	
R23	culvert	1 x 1.2m x 18m	7211906	631012	11-Dec-07	
R24	culvert	2 x 1.2m x NC	7215235	633955	Not Started	Not installed, no projected date
R25	culvert	1 x 0.6m x NC	7217396	635201	Not Started	Not installed, no projected date
R26	culvert	3 x 1.2m x NC	7215971	636867	Not Started	Not installed, no projected date

Notes: 1. Culvert dimensions reported as # of pipes x width x length.
2. NC = not completed
3. Kilometres along road is based on AWPAR design mileage; final as-built drawings will show revised chainage as constructed.
4. HADD = harmful alteration, disruption or destruction of fish habitat (i.e., abutments encroaching channel); CS = clear-span.

Photos 2-1: Meadowbank AWPAR General Construction Photos 2007.

Photo 1: Start of AWPAR.

Photo 2: Cold-weather construction.

Photo 3: Winter hauling of road material.

Photo 4: Cold? This is just how we like it!

Photo 5: Pushing a road across the tundra.

Photo 6: Nuna Logistics camp.

Photos 2-1: Meadowbank AWPAR General Construction Photos 2007.

Photo 7: Drilling for blasting at Quarry 2.

Photo 8: Quarry 2 in production.

Photo 9: Quarry 3 and April.

Photo 10: Quarry 3 being drilled for blasting.

Photo 11: Quarry 3 close up.

Photo 12: CAT773 loading up at a quarry.

Photos 2-1: Meadowbank AWPAR General Construction Photos 2007.

Photo 13: Installing the Acrow span at R05.

Photo 14: Abutment for Acrow span at R05.

Photo 15: Bridge crew after another successful installation.

Photo 16: R06 with summer flows.

Photo 17: Crossing R07 in late spring.

Photo 18: CAT773 over a Rapid Span bridge.

Photos 2-1: Meadowbank AWPAR General Construction Photos 2007.

Photo 19: A typical section of the AWPAR.

Photo 20: Spring melt running through road.

Photo 21: Sediment control measures at R07 during road elevation.

Photo 22: R09 with permanent bridge in foreground.

Photo 23: Swinging in the span at R18.

Photo 24: Summer road building.

Photos 2-2: Meadowbank AWPAR Sediment & Erosion Control and Monitoring Photos 2007.

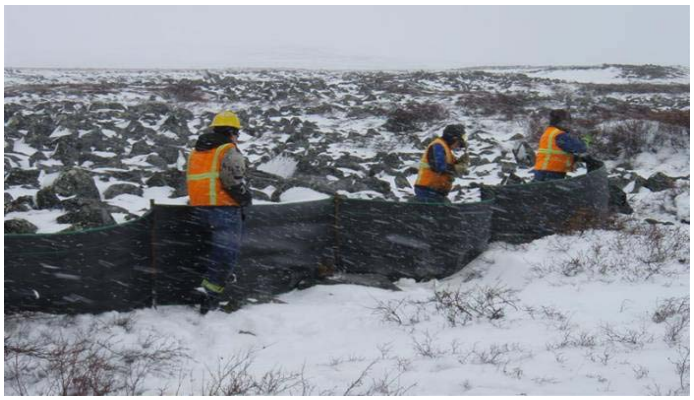

Photo 1: Silt fencing prior to bridge construction.

Photo 2: Silt fencing and curtains in place.

Photo 3: R07 sedimentation pond during road elevation.

Photo 4: R07 sedimentation pond prior to road elevation.

Photo 5: Building abutments without in-water work.

Photo 6: R15 temporary span installation.

Photos 2-2: Meadowbank AWPAR Sediment & Erosion Control and Monitoring Photos 2007.

Photo 7: R13 just installed (silt fencing).

Photo 8: Geotextile-wrapped abutments and silt fencing for R16 installation.

Photo 9: Geotextile-wrapped abutments and silt fencing for R18 installation.

Photo 10: Geotextile-wrapped abutments to reduce sediment introductions.

Photo 11: Water sampling at R09.

Photo 12: Localized sediment plume at R06.

Photos 2-2: Meadowbank AWPAR Sediment & Erosion Control and Monitoring Photos 2007.

Photo 13: Current sampling at R05.

Photo 14: Spring melt running clear through the AWPAR - culvert not yet installed.

Photo 15: This plume was created by walking into the stream upstream from R05.

Photo 16: Localized plume associated with melting snow at R02.

Photo 17: Quarry water sampling at Q1.

Photo 18: Turbidity sampling at R02.

Photos 2-3: Meadowbank AWPAR Quarry Photos 2007.

Photo 1: Quarry 1.

Photo 2: Quarry 2.

Photo 3: Quarry 3.

Photo 4: Quarry 4.

Photo 5: Quarry 5.

Photo 6: Quarry 6.

Photos 2-3: Meadowbank AWPAR Quarry Photos 2007.

Photo 7: Quarry 7.

Photo 8: Quarry 8.

Photo 9: Quarry 9

Photo 4: Quarry 10.

Photo 11: Quarry 11.

Photo 12: Quarry 12.

Photos 2-3: Meadowbank AWPAR Quarry Photos 2007.

Photo 13: Quarry 13.

Photo 14: Quarry 14.

Not Available

Photo 15: Quarry 15

Photo 16: Quarry 16.

Photo 17: Quarry 17.

Not Available

Photo 18: Quarry 18.

Photos 2-3: Meadowbank AWPAR Quarry Photos 2007.

Not Available

Photo 19: Quarry 19.

Photo 20: Quarry 20.

Not Available

Photo 21: Quarry 21

Photo 22: Quarry 22.

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R02

Photo 1: R02 - looking West, prior to bridge constuction - July 2006

Photo 2: R02 - Acrow bridge deck being moved into place - May 2007

Photo 3: R02 - Reaching the N abutment - May 2007

Photo 4: R02 - View from downstream - June 2007

Photo 5: Aerial photo of R02 - July 2007

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R03

Photo 1: R03 - prior to culvert installation
June 2007

Photo 2: R03 - prior to culvert installation
June 2007

Photo During Construction
Not Available

Photo 3:

Photo After Construction
Not Available

Photo 4:

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R04

Photo 1: R04 - looking upstream prior to culvert installation - June 2005

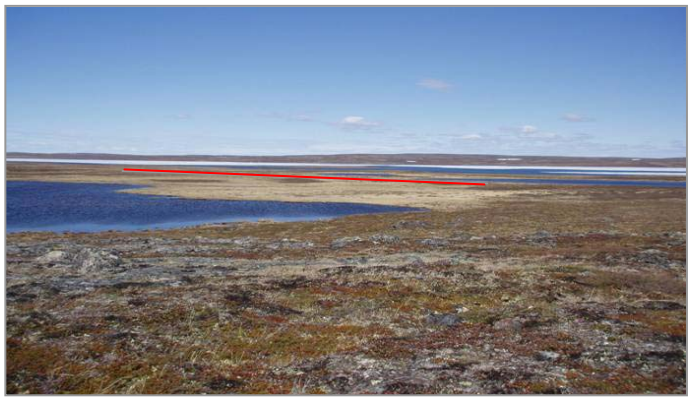

Photo 2: R04 - looking downstream prior to culvert installation - June 2005

Photo During Construction
Not Available

Photo 3:

Photo After Construction
Not Available

Photo 4:

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R05a

Photo 1: R05a - looking upstream prior to culvert installation - July 2005

Photo 2: R05a - looking upstream prior to culvert installation - June 2007

Photo 3: R05a - during construction - October 19 2007

Photo 4: R05a - after construction - October 19 2007

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R05

Photo 1: R05 – looking upstream prior to bridge construction - August 2005

Photo 2: R05 – looking downstream prior to bridge construction - July 2006

Photo 3: North abutment at stream channel, looking upstream - September 2007

Photo 4: North abutment at stream channel, looking downstream - September 2007

Photo 5: Aerial photo of R05 - July 2007

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R06

Photo 1: Aerial photo of R06 - prior to bridge construction - September 2006

Photo 2: R06 – looking South - September 2006

Photo 3: R06 during construction

Photo 4: R06 - June 2007

Photo 5: Aerial photo of R06 - June 2007

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R07

Photo 1: R07 – looking downstream prior to culvert installation - July 2005

Photo 2: Flow over-topping road - June 15, 2007

Photo 3: Sediment settling pond with silt curtain while road is being raised - June 18, 2007

Photo 4: Downstream water running clear, prior to culvert installation - June 19, 2007

Photo 5: RO7 - looking downstream - July 2007

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R09

Photo 1: R09 - pre-construction - September 2006

Photo 2: R09 - prior to bridge installation - July 2007

Photo 3: Bridge span being carried to timbers on abutment - July 2007

Photo 4: Proximity of silt fence to abutments - July 20

Photo 5: HADD bridge effectively completed July 2007

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R13

Photo 1: Aerial photo of R13 - June 2005

Photo 2: Channel corridor prior to abutment construction - August 2007

Photo 3: Backhoe constructing north abutment by reaching over channel - August 2007

Photo 4: R13 after construction - August 14 2007

Photo After Construction
Not Available

Photo 5: R13 after construction - August 14 2007

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R14

Photo 1: Aerial photo of R14 - June 2005

Photo 2: R14 – Boulder/cobble field - August 2005

Photo During Construction
Not Available

Photo 3:

Photo After Construction
Not Available

Photo 4:

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R15

Photo 1: R15 - prior to construction September 2006

Photo 2: R15 - prior to construction - August 2007

Photo During Construction
Not Available

Photo 3: R15 - centre timber pad for temporary span - September 3 2007

Photo 4: R15 - placement of second temporary span - September 3 2007

Photo 5: Temporary spans constructed - September 3 2007

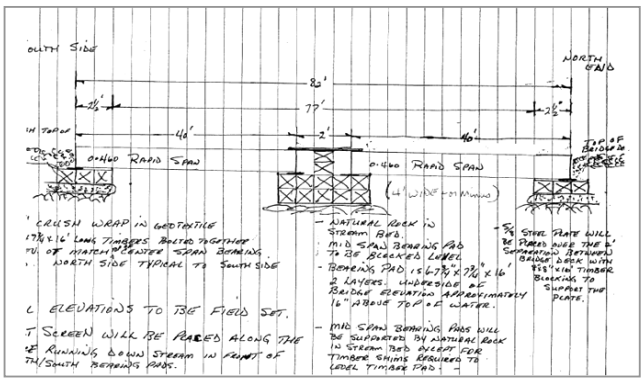

Photo 6: R15 schematic

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R16

Photo 1: R16 - looking upstream - August 2005

Photo 2: Aerial photo of R16, looking East
September 2006

Photo 3: R16 Sediment control measures -
September 20 2007

Photo 4: R16 after construction -
January 15 2007

Photo 5: R16 Sediment control measures -
September 20 2007

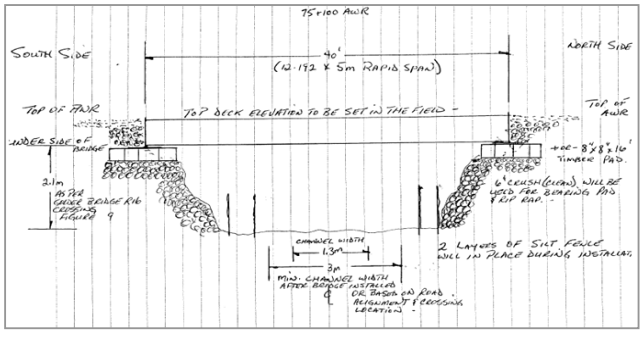

Photo 6: R16 schematic
September 15 2007

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R17

Photo 1: R17 - looking downstream - August 2005

Photo 2: R17 - looking upstream - August 2005

Photo During Construction
Not Available

Photo 3:

Photo After Construction
Not Available

Photo 4:

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R18

Photo 1: Aerial photo of R18 - July 2005

Photo 2: R18 - looking upstream - July 2005

Photo 3: R18 during construction - October 9 2007

Photo 4: R18 partially built - October 10 2007

Photo 5: R18 after construction - October 10 2007

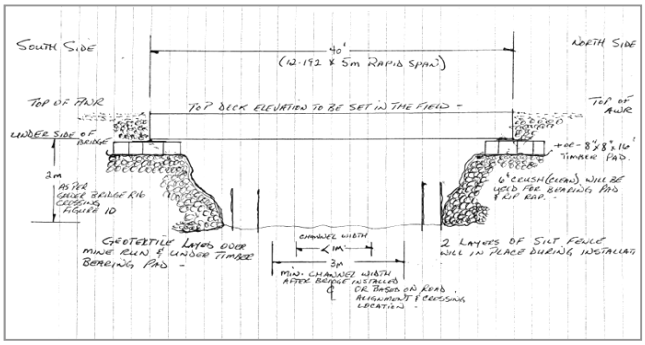

Photo 6: R18 schematic September 25 2007

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R19

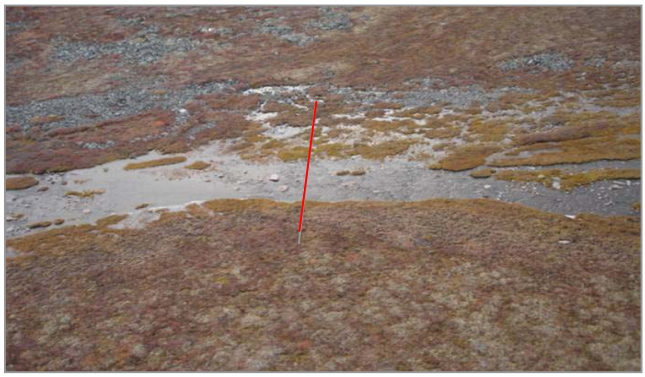

Photo 1: Aerial photo of R19 - September 2006

Photo 2: R19 - September 2006

No Photo During Construction
Installed overnight

Photo 3:

Photo 4: R19 - Profile west to east
December 2 2007

Photo 5: R19 after construction -
December 2 2007

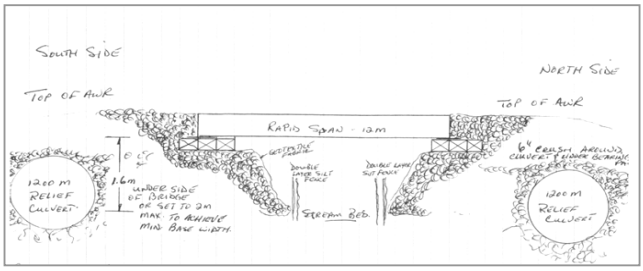

Photo 6: R19 schematic
September 26 2007

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R20

Photo 1: R20 – looking downstream - August 2005

Photo 2: R20 – August 2005

Photo 3: R20 during construction - November 4 2007

Photo After Construction
Not Available

Photo 4:

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R21

Photo 1: R21 - looking downstream - August 2005

Photo 2: R21 - looking downstream - August 2005

Photo 3: R21 during construction - November 11 2007

Photo 4: R21 during construction - November 11 2007

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R23

Photo 1: R23 – looking upstream - July 2005

Photo 2: R23 – looking downstream - July 2005

Photo During Construction
Not Available

Photo 3:

Photo After Construction
Not Available

Photo 4:

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R24

Photo 1: R24 - looking upstream to Elbow Lake July 2005

Photo 2: R24 - looking downstream to Third Portage Lake - July 2005

Photo During Construction
Not Available

Photo 3:

Photo After Construction
Not Available

Photo 4:

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R25

Photo 1: R25 - looking upstream - July 2005

Photo 2: looking downstream - August 2005

Photo During Construction
Not Available

Photo 3:

Photo After Construction
Not Available

Photo 4:

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

Photos 2-4: Meadowbank AWPAR Water Crossings 2007 - R26

Photo Pre-Construction
Not Available

Photo 1:

Photo Pre-Construction
Not Available

Photo 2:

Photo During Construction
Not Available

Photo 3:

Photo After Construction
Not Available

Photo 4:

Photo After Construction
Not Available

Photo 5:

Schematic Not Available

Photo 6:

3 UNAUTHORIZED DISCHARGES AND SPILL CONTINGENCY PLAN ANNUAL REVIEW

AEM has reviewed the Spill Contingency Plan for the AWPAR (Nuna 2006) and has no modifications for 2008. Spill documentation and reporting details are provided in **Appendix F**.

4 RECLAMATION ACTIVITIES

No reclamation activities were conducted in 2007.

5 PHYSICAL CROSSING INSPECTION

As stipulated in the NWB B License, The Water Management and Monitoring Plan (Golder 2007a) called for routine inspection of all crossings for signs of erosion, infrastructure failure and/or sediment or debris accumulation in upstream and downstream channels regularly and following heavy or prolonged rainfall events.

The AWPAR was essentially under continuous inspection and maintenance by AEM and Nuna during 2007. Most of this was done on an informal basis (e.g., communication from AEM's AWPAR supervisor to Nuna's on-site construction manager). However, AEM developed comprehensive crossing forms for formal inspections that will be used monthly following completion of the AWPAR (see **Appendix G** for example).

6 WATER QUALITY MONITORING

This section describes the results of water quality monitoring associated with AWPAR construction in 2007. Two separate, but complementary, programs were conducted related to different regulatory requirements:

- *Crossing Monitoring* – the DFO *Fisheries Act* Authorization for the AWPAR (**NU-03-0190-2**) stipulated that a monitor be present for all in-water construction, compensation or restoration works.
- *AWPAR Contact Water Monitoring* – the NWB B License (**8BC-TEH0708**) stipulated the general monitoring requirements, which included development of a monitoring plan (Golder 2007a).

6.1 CROSSING MONITORING

6.1.1 Objectives

The primary focus of this monitoring program, which was conducted by Azimuth Consulting Group Inc., was to determine the effectiveness of sediment control measures employed during crossing construction involving in-water activities in fish-bearing streams. Focusing on turbidity as a surrogate for total suspended solids (TSS) provided a means of obtaining real-time data that could be used to manage and mitigate sediment-related issues before they became serious.

Secondarily, as a complement to the AWPAR Contact Water Monitoring program, turbidity monitoring was expanded to cover a number of other locations on the AWPAR (e.g., constructed bridges, constructed culverts, and new or existing locations where culverts had not yet been installed). The goal of this expanded coverage was to evaluate the status of watercourses through freshet to support environmental management of the road in general. Again, the use of turbidity monitoring as a surrogate for TSS allowed for real-time management of sediment-related issues along the road. This monitoring component was terminated once conditions had stabilized in late July.

6.1.2 Methods and Approach

Turbidity sampling was conducted with McVan's Analite NEP160-3-05R portable turbidity meter/logger with a high sensitivity NEP260 90° probe connected with a 5-m long waterproof cable. The unit has a range (0 to 3000 NTU) easily covering expected environment conditions and is highly precise (resolution varies with subrange as follows: <0.1 to 20 NTU [0.02 NTU], <1 to 200 NTU [0.1 NTU], <10 to 2,000 NTU [1 NTU]) and accurate (repeatability = 2%). This probe measures turbidity following the ISO 7027 method.

The CCME (1999) recommends a maximum increase of 8 NTU over background turbidity for short-term exposure. This guideline was derived as a surrogate based on a TSS concentration of 25 mg/L, assuming a 3:1 TSS-to-turbidity relationship. Monitoring requires determining background turbidity, upon which the CCME-recommended 8 NTU is added to calculate the guideline. Background turbidity was generally low, with very clear water predominant at most locations. Consequently, it was usually quite easy to identify sediment introductions by an observed change in water clarity.

An important aspect of the CCME derivation process was that it is intended for protection of fish and fish habitat (e.g., including food items such as invertebrates) (e.g., Caux et al. 1997; Birtwell 1999; DFO 2000). Furthermore, the impetus to derive the guidelines stemmed largely from the need to

regulate the placer mining and forestry industries, where sediment loadings are high and widespread. In these situations, entire streams and rivers can be choked with sediment for extended periods. Consequently, the guideline was developed to protect aquatic life from adverse effects under such conditions. Localized elevated turbidity, therefore, would not be expected to adversely affect fish or fish habitat when the majority of the stream was free from such influences. Similarly, elevated turbidity in non-fish-bearing streams would only be considered significant if it remained high upon discharging into a fish-bearing stream.

The AWPAR-specific relationship between turbidity and TSS was determined by submitting samples for TSS and turbidity analyses over a range of field-measured turbidity. As per CCME (1999) recommendations, a log-log regression analysis was used to determine the relationship between the two parameters to allow estimation of actual TSS concentrations from field turbidity readings.

A risk-based hierarchical strategy was applied to both in-water construction monitoring and the general AWPAR monitoring. The approach varied slightly depending on whether the water course was fish-bearing or not. The approach for fish-bearing streams was as follows:

1. Visual observations and point monitoring upstream (background) and downstream of crossing. If no signs of sediment introductions or all values were low, then no more information was required.
2. Where sediment introductions were suspected, transects were conducted across the channel (focus on downstream) to determine the extent of the elevated turbidity. If elevated turbidity was restricted to small portion of the channel, then no further monitoring or action was needed.
3. Sediment plume mapping was conducted in the downstream area in some cases to further document and explain the observed pattern in the channel sampling.

The approach for non-fish-bearing streams was similar, except that the size of the stream and the distance to the nearest fish-bearing water body was taken into consideration. Mapping was typically extended downstream far enough to show acceptable turbidity levels prior to contact with fish.

As prescribed in Azimuth (2007) and Golder (2007a) and described in detail in the action plans provided in **Appendix C**, sediment control measures were proactively used to prevent and contain erosion into the stream channel. Monitoring results were used to identify areas that could benefit from refinement of sediment control measures (e.g., where obvious sources were affecting turbidity).

6.1.3 Results

The general monitoring was conducted from June 15 through July 22, 2007. The duration of monitoring was based on water flows and turbidity results; monitoring was ended after low turbidity levels were found consistently along the AWPAR. The results are presented in **Table 6-1** (see **Figure 2-1** for sampling locations and **Photos 2-3** for some monitoring photos). Highlighted cells exceed the CCME induced turbidity guideline (i.e., background NTU + 8 NTU). In general, turbidity levels were surprisingly low given that the AWPAR was newly constructed and monitoring was heavily biased to the freshet period. Plume mapping results, where indicated in **Table 6-1**, are provided in **Appendix H**.

The AWPAR-specific turbidity/TSS relationship is presented in **Figure 6-1** (statistics: n=38; $r^2 = 0.85$; $p<0.001$). The regression equation was used to predict approximate TSS concentrations for a range of turbidity to help put the monitoring results into context. The results were as follows:

- 1 NTU = 1.19 mg/L TSS
- 5 NTU = 4.6 mg/L TSS

- 10 NTU = 8.2 mg/L TSS
- 50 NTU = 32 mg/L TSS
- 100 NTU = 57 mg/L TSS
- 500 NTU = 220 mg/L TSS

Observed turbidity elevations at the constructed (as of mid-June) bridges (i.e., R02, R05 and R06) were primarily restricted to channel margins where flows contacted disturbed soils or isolated pockets of melting debris-covered ice. For example, the June 16 results for R02 showed elevated turbidity (35 NTU) along the south side of the channel. The area was mapped (see **Appendix H**), showing that freshet flows overtopping a slightly disturbed area were introducing some sediment, but that it was constrained to the channel margin and represented a minor portion of stream flow. No further mitigation was recommended in this type of situation as any active measures would likely have made matters worse and the magnitude and extent of elevated turbidity suggested negligible risk to aquatic life. As discussed in **Section 2.1.3**, a number of preventative mitigation measures were implemented at these crossings to control sedimentation and erosion in advance of freshet. In the future, care should be taken with snow removal in close proximity to crossings to ensure that ploughed snow is not dumped where spring melting will introduce fines to water courses.

Most of the planned culverts were not installed by mid June, with flows essentially moving through the very coarse road bed material. This was also the case at a number of other locations, which were eventually identified as “proposed” culvert locations (i.e., those crossings without an “R” in the identifier shown in **Table 6-1**). Downstream water flows through the vast majority of these “crossings” were running clear, with low turbidity. Rather than installing culverts during freshet flows and risking significant sediment introductions, it was recommended to delay installation until later in the summer. There were some situations where high turbidity was measured downstream of through-road flows. For example, at km 16.6 on June 25, turbidity of up to 156 NTU was measured, triggering plume mapping. The plume map (**Appendix H**) of this minimal flow area shows a band of elevated turbidity that dissipates by the downstream portion of the pool.

Two specific situations are worth mentioning with regards to freshet flows:

- **R02** – Despite the late and slow spring thaw in the region, water levels at this crossing rose dramatically during freshet, threatening the stability of the northern bridge approach (i.e., the portion that encroached into the stream channel). The road elevation was raised and two hanging spillway culverts installed on June 19 to help address the issue. Water levels subsequently subsided. The addition of two large-diameter culverts was discussed for this area to help alleviate freshet flows in future years. Although fish passage at this crossing does not appear to be an issue (see **Section 7**), proper installation (i.e., embedded into the channel) would further enhance fish passage and reduce flow velocities through the main channel.
- **R07** – While most planned or proposed culvert locations easily allowed through-road flows during freshet, the local topography at this planned culvert location resulted in water building up on the upstream side of the road and flowing over the road. Given that vehicle traffic was creating a small sediment plume with each passing, the road was elevated to mitigate this issue. Prior to construction on June 19, a small silt-curtain-lined retention pond was installed to minimize downstream sediment introductions. **Table 6-1** shows the progression of improvement for this area as the initially high turbidity levels dropped off quickly.

The following monitoring results pertain to the construction of bridges along the AWPAR during the open water season:

- **R09** – As discussed in **Section 2.1.3**, a temporary clear-span bridge was installed at this crossing on July 5 as per the action plan provided in **Appendix C;** no in-water construction activities were conducted. Monitoring results for the temporary installation are reported in **Table 6-1** and show no sediment-related issues either during or after installation. The permanent bridge was installed August 11 - 13, with minimal in-channel activity restricted to constructing the HADD abutment on the north side. The redundant sediment control measures (i.e., two layers of silt fencing on each side) were fairly effective, with initial turbidity readings of 9 to 70 NTU inside the containment area and only 2 NTU mid-stream. During heavy construction periods, elevated turbidity (9 to 140 NTU) was identified in small, localized plumes as fine-grained particulates were able to pass through the fencing material. However, the majority of the channel had much lower turbidity levels (e.g., 5 NTU) and the plumes dissipated rapidly after activity moved away from the channel margin. While the Authorization calls for clean material for in-water use, residual fines associated with the mine run material used in the abutment construction was identified as the major cause of sediment introductions. While the magnitude of turbidity readings were frequently high, these spikes are unlikely to be a significant issue for aquatic life due to their restricted temporal and spatial extent. Furthermore, significant damage to the channel itself was avoided by not allowing construction equipment to ford the stream at any time.
- **R13** – As discussed in **Section 2.1.3**, the proposed location for this clear-span bridge was moved to avoid a HADD. Construction took place on August 13. Initial turbidity monitoring showed background levels at 1.16 NTU[3]. Two layers of silt fencing were used to control sediment. Similar to the permanent installation of R09, residual fines associated with the abutment material that inadvertently fell into the channel resulted in turbidity spikes up to 442 NTU in the immediate vicinity of the crossing. These levels dissipated rapidly in space and time, with values recorded 40 m downstream between 3 to 50 times lower. The observed turbidity elevations were a combination of very low flows and the use of materials with residual fines. Stickleback and sculpin were observed in the immediate vicinity of the bridge the following day, indicating that the acute exposures that occurred during installation did not significantly harm the fish. Furthermore, significant damage to the channel itself was avoided by moving the bridge from the original location and by not allowing construction equipment to ford the soft-bottom stream at any time.
- **R15** – As discussed in **Section 2.1.3**, the proposed permanent bridge was not installed in 2007. Rather, a temporary bridge made up of two 12-m spans was constructed instead on September 3. Background turbidity levels were approximately 1 NTU[2] prior to commencing. Silt fences (two layers) were installed immediately downstream of the construction footprint along the channel margins. Another set was deployed across the channel 30 and 40 m downstream to facilitate settling of any material not retained in the first set of fences. A wide-tracked CAT 345C backhoe was used for the in-water work to minimize disturbance to the streambed. The pre-assembled timber centre pad was placed without incident. The two channel-side abutments both encroached (as originally planned) into the stream channel. The combination of residual fines in the abutment material and the in-water equipment use resulted in turbidity spikes of up to 236 NTU. The spikes dissipated substantially (e.g., to 73 NTU) within an hour, but would likely have taken several hours after construction ceased to reach background levels. The backhoe caused some minor rutting of the streambed just

[3] Crossings R13 and R15 were constructed after the routine turbidity monitoring was concluded for 2007. The dedicated monitoring efforts for these crossings were recorded in field notebooks. Key results are summarized in each of the descriptions.

upstream of the bridge; this was reduced by following a slightly different return route to offset the initial ruts. Overall, the temporary installation went well and resulted in far less stream damage than would have occurred if the permanent bridge was constructed. The permanent span is planned for construction under frozen conditions to minimize stream damage.

- **R16 and R18** – These two clear span bridges were built as planned without any in-water construction activity. Consequently, monitoring was not required for the Authorization. Twin-layers of silt fencing were installed in advance of construction. Abutment pads were constructed using 6" crush from Quarry 11 as this material is much better quality than the mine run material used at R09, R13 and R15. Again, the construction team went to great lengths to avoid fording the stream channel, which likely avoided significant damage.
- **R19** – As discussed in **Section 2.1.3**, this bridge was originally planned as a HADD crossing. Detailed surveying of the crossing identified an alternate location (14 m upstream) that could be installed as a clear-span bridge. A temporary clear-span bridge was installed on October 24 under semi-frozen conditions with no in-water activity. Consequently, monitoring was not required for the Authorization. As of year end, the suitability of the new location for a permanent clear-span was under review.

6.2 AWPAR CONTACT WATER MONITORING

6.2.1 Objectives

The NWB B License (**8BC-TEH0708**) specified conditions related to monitoring contact water associated with the AWPAR, including development of a water management and monitoring plan (Golder, 2007a). The objectives of the Contact Water Monitoring program were as follows:

- Characterize AWPAR surface runoff and accumulated quarry water to confirm no significant acid generation or metals leaching are occurring.
- Characterize AWPAR surface runoff and accumulated quarry water to confirm effectiveness of sediment and erosion control measures.
- Characterize AWPAR surface water and accumulated quarry water to confirm that explosive by-products are within acceptable limits.
- Provide recommendations for mitigation where monitoring results indicate any problems with respect to one or more of the above characterizations.

Monitoring and reporting was conducted by Azimuth Consulting Group Inc. on behalf of AEM.

6.2.2 Methods and Approach

6.2.2.1 Sampling Locations and Frequency

The Water Management and Monitoring Plan (Golder 2007a) recommended sampling at all seeps and standing water along the AWPAR as well as at each quarry. As there were literally hundreds of areas with standing or flowing water in contact with the AWPAR during freshet, a subset of locations was selected to provide general coverage of the road. Some consideration was also given to the magnitude of water source to allow follow-up monitoring later in the season. Many of the quarries did not contain standing surface water, even shortly after snowmelt, so no sampling was possible. Given the above, approximately 25 samples were split between quarries, AWPAR pools and culvert locations, and AWPAR HADD bridges. Samples were collected during spring runoff (early July) and

again in summer (late July) and fall (late August). Sample locations were recorded using road chainage.

6.2.2.2 Sample Collection

Samples were collected by hand using pre-cleaned bottles supplied by the analytical laboratory, Cantest Ltd of Burnaby, BC. In flowing water, bottle openings were oriented upstream in a location where inadvertent sediment disturbance was minimized. In standing water, samples were collected in the deepest portion easily reached from land, again to minimize disturbance of these small ponds during collection.

Samples were preserved in the field (where appropriate) and stored in coolers. Samples were typically shipped the same day to the analytical laboratory for analysis of conventional parameters (hardness, conductivity, pH and total suspended solids), anions (dissolved chloride, fluoride and sulphate), nutrients (ammonia-nitrogen, nitrate and nitrite, dissolved nitrate-nitrogen, nitrite-nitrogen), organic parameters (total oil and grease, hydrocarbon oil and grease), and total metals.

Cantest is an analytical laboratory accredited by the Canadian Association of Environmental Analytical Laboratories. This accreditation ensures that laboratories achieve and demonstrate the highest levels of technical and management excellence for their services.

6.2.2.3 Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) procedures consisted of a combination of careful field collection and sample handling, the collection of field duplicate samples, application of approved laboratory methods, and the analysis of laboratory replicates and standard reference materials. Data quality was assured throughout the collection and analysis of samples using specified standardized procedures, by the employment of laboratories that have been certified for all applicable methods, and by staffing the program with experienced technicians.

Laboratory QA/QC – Data Quality Objectives (DQOs) are numerically definable measures of analytical precision and completeness. Analytical precision is a measurement of the variability associated with duplicate analyses of the same sample in the laboratory. Completeness for this study is defined as the percentage of valid analytical results. Results that were made uncertain due to improper calibration, contamination of analytical blanks, or poor calibration verification results were deemed invalid.

Duplicate results were assessed using the relative percent difference (RPD) between measurements. The equation used to calculate a RPD is:

$$RPD = \frac{(A - B)}{((A + B)/2)} \times 100$$

where: A = analytical result; B = duplicate result.

The laboratory DQOs for this project were:

- Analytical Precision = 25% RPD for concentrations that exceed 10x the method detection limit (MDL).
- Completeness = 95% valid data obtained.

RPD values may be either positive or negative, and ideally should provide a mix of the two, clustered around zero. Consistently positive or negative values may indicate a bias. Large variations in RPD values are often observed between duplicate samples when the concentrations of analytes are very low and approaching the detection limit. The reason for this is apparent if one considers duplicate samples with concentrations of an analyte of 0.0005 and 0.0007 mg/L. In absolute terms, the concentration difference between the two is only 0.0002 mg/L, a very tiny amount; however, the RPD value is 33.3%. This may sometimes lead to a belief that the level of precision is less than it actually is; that is the reason that elevated RPD values are only significant when values are more than 10 times the MDL.

Field QA/QC: Water Sampling – Field duplicates were collected at a subset of stations to assess sampling variability and sample homogeneity; a RPD of 50% for concentrations that exceed 10x the MDL is considered acceptable. Trip blanks were not collected; the implications of the latter on data quality are discussed in **Section 6.2.3.1**.

6.2.3 Results

6.2.3.1 Data Quality

Laboratory QA/QC results are provided in **Appendix I**. Laboratory procedures performed on the water samples met all of the laboratory's internal data quality objectives. Field QA/QC sampling results are presented in **Table 6-2**. The results show only 2 of 153 cases (i.e., 51 analytes x 3 duplicates) had RPDs exceeding 50%. One of these cases, ammonia, had a reported concentration within only two times the MDL, so the RPD DQO does not apply. The other case was for aluminum. The most likely reason for this result is slightly higher suspended sediment concentrations. However, TSS concentrations reported in both samples were less than the MDL of 1 mg/L, so confirmation of this hypothesis was not possible. In summary, only 1 of 153 field duplicate analytical cases, or less than 1%, had an elevated MDL, indicating good corroboration between field duplicates.

Notwithstanding the good results for the field replicates sampled, there were some deficiencies in the field QA/QC data set. First of all, the frequency of field duplicate collection was only 1 for every 20 samples, or half the number prescribed in the Water Management and Monitoring Plan (Golder 2007a). While not ideal, this oversight should not affect the utility of the data for the purposes of this study, particularly since the results obtained from the field replicates collected were good. Secondly, no trip blank samples were collected throughout the entire program. A trip blank is a water sample, prepared at the analytical laboratory using analyte-free water (e.g., laboratory-grade deionized water), that is sealed and travels with collected samples during transportation to and from the site. The samples are analyzed along with field samples to check residual contamination. The trip blank samples are never opened by either the sample collector or sample handlers. Trip blanks are used to detect contamination that might occur during sample transport and analysis rather than as a result of sample collection and processing in the field. Potential sources of trip blank contamination would include the sampling jars (not typically an issue when pre-cleaned bottles are supplied by the lab) or airborne contaminants (not typically an issue unless volatile organics are the target analyte). For example, the US Geological Survey's National Water-Quality Assessment Program states that trip blanks are normally prepared only when volatile organic carbon are target analytes (Mueller et al 1997). Again, while the lack of trip blank confirmation is not ideal, it is unlikely that this oversight affected data quality. Notwithstanding, these two oversights will be rectified for the 2008 monitoring program. In summary, data quality is sufficient to meet the objectives of this monitoring program.

6.2.3.2 Quarry Contact Water

Quarry water sample results are presented in **Table 6-3** against the CCME (2007) freshwater quality guidelines for the protection of aquatic life (see **Figure 2-1** for sampling locations, **Table 2-1** for GPS locations of quarries, and **Photos 2-3** for quarry photos). Again, many of the quarries did not contain standing water and were not sampled. Key results were as follows:

- **Physical** – The pH of water from Q5 and Q6 was acidic and failed to meet CCME guidelines. Total suspended solids (TSS) were detected in all quarries except Q1.
- **Nutrients** – As expected in a fresh quarry blasted with ammonium nitrate explosives, the nutrient parameters exceeded CCME guidelines at all quarries. Ammonia exceeded the CCME guidelines at Q4; while inadvertently not analysed at Q1 and Q3, it is highly possible that it would have exceeded in those locations due to the higher pH. Nitrate and nitrite both exceeded CCME guidelines at all quarries.
- **Organics** – Hydrocarbon oil & grease was below the MDL of 2 mg/L in each sample. Total oil & grease was detected at Q1, Q4, Q5, and Q7. While CCME does not have a guideline for this parameter, the maximum value measured of 8 mg/L is under BC's working water quality criteria for the protection of aquatic life (Nagpal et al., 2006).
- **Total Metals** – Metals were elevated with respect to CCME guidelines at all quarries except Q1. Aluminum, cadmium, copper, and iron all exceeded the CCME guidelines by ten fold or more in water samples from at least one quarry. Arsenic, chromium, lead, nickel, silver, and zinc only marginally (i.e., less than five fold) exceeded CCME guidelines.

Interpretation of the significance of these results should consider the following:

- Despite being considered acceptable for quarrying based on a geochemical evaluation (Golder (2007b), the pH and metals results for Q7 suggest that further assessment of this quarry is warranted. For example, pH levels dropped between both the first and second, and second and third monitoring periods and were very low. In addition, we will be conducting more expansive field pH measurements to ensure reliable characterization of water samples.
- The quarries are typically situated on rocky outcrops on higher ground. All the sumps sampled have no direct surface flow contact to fish-bearing waters. Furthermore, the nearest aquatic life is generally several hundred meters or more away. Thus, even with a groundwater connection to the aquatic environment, significant dilution (i.e., orders of magnitude) would be expected to occur prior to the water contacting aquatic life. If true, then neither the nutrients nor metals would pose risks to aquatic life. We will verify this in 2008 by sampling the closest down-gradient fish-bearing water bodies.
- The total metals results are likely affected by TSS. Metals did not exceed CCME guidelines at Q1, where TSS concentrations were less than the MDL. For the remaining samples, TSS could have had a significant influence on measured metals concentrations. The aluminum results reflect this pattern well, with the highest concentrations associated with higher TSS concentrations. Understanding the relationship between quarry rock geochemistry and water quality is an important aspect of environmental management for the Meadowbank Project as a whole. Consequently, we will add dissolved metals to the parameter list in order to obtain better quality information regarding metals leaching potential of various rock types.

With completion of the AWPAR expected well in advance of the 2008 open water season, sampling will be expanded to a broader array of quarries with standing water present. On a related note, AEM has committed to conducting additional geochemical sampling on all quarries in 2008. The contact water sampling program will complement that effort; general tasks for 2008 include:

- Contact water in all quarries, particularly Q2 and Q7, will be resampled to provide insights into temporal patterns in water quality.
- More extensive field pH monitoring will be used to track water quality and help screen samples for metals analysis.
- We intend to reduce the sampling frequency of contact water to two events: spring (early July) and fall (late August). This will capture worst case conditions for sediment and erosion-related concerns (i.e., by targeting freshet) and for ARD/ML-related concerns (i.e., by targeting late season, low flow conditions). Given that the main goal of monitoring is to identify AWPAR-related potential degradation of water, we are confident that this frequency, coupled with the extra field (pH) and laboratory analyses (dissolved metals), will achieve the objectives.

Overall, the observed results are generally consistent with what would be expected in the sumps of fresh quarries. Thus, while the observed water quality is not likely posing unacceptable risks to aquatic life, we have proposed changes to the AWPAR Water Management and Monitoring Plan (Golder 2007a) that will verify this hypothesis and improve our overall understanding of ARD/ML dynamics in relation to the AWPAR quarries.

6.2.3.3 Surface Contact Water

Surface contact water sample results are presented in **Table 6-4** against the CCME (2007) freshwater quality guidelines for the protection of aquatic life (see **Figure 2-1** for sampling locations, **Table 6-5** for GPS locations of standing pools, **Table 2-2** for GPS locations of culverts and bridges, and **Photos 2-4** for water crossing photos). Key results were as follows:

- **Physical** – pH was low in 7 of 50 samples. Five of the 7 samples were collected in flowing water, with four from the larger streams with bridge crossings. These latter results were collected in late August and are unlikely to be related to the AWPAR as paired upstream/downstream samples at bridges R02, R06, R09, and R13 generally showed results near pH 6.5.The other two results were for a proposed culvert location (PC-12 was not yet installed at the time of sampling, so represents through-road flow) and a standing pool (km 34.5). Total suspended solids (TSS) were detected in 28 of 50 samples.
- **Nutrients** – Nutrients were generally well below CCME guidelines. Nitrate and nitrite marginally exceeded the CCME guidelines in 3 of 50 samples.
- **Organics** – Hydrocarbon oil & grease was below the MDL of 2 mg/L in all samples. Total oil & grease was detected in many samples; while CCME does not have a guideline, the maximum value measured of 12 mg/L is under BC's working water quality criteria for the protection of aquatic life (Nagpal et al., 2006). The detected oil & grease may well be due to the presence of naturally-occurring lipids related to the breakdown of organic matter.
- **Total Metals** – Measured metal concentrations of aluminium, cadmium, chromium, copper, and iron were marginally elevated with respect to CCME guidelines in 26 of 50 samples.

Interpretation of the significance of these results should consider the following:

- pH levels appear to be naturally low (i.e., <pH 7) in many of the streams crossed by the AWPAR. This conclusion is based on laboratory-measured pH, which is not always reflective of actual conditions. Consequently, as per our strategy for the quarries, we will also conduct field pH monitoring in pools and streams along the AWPAR. This would efficiently allow the collection of a more comprehensive and reliable data base for pH. Field results could be used to identify potential problem areas to be sampled for the entire suite of parameters.
- Nitrate and nitrate elevations were marginal and occurred only in non-fish-bearing water bodies. The nearest fish-bearing water bodies would typically be at least several hundred meters down gradient. Consequently, these results pose little risk to aquatic life.
- Most of the measured metals concentrations were found in samples with detectable TSS concentrations. Even in samples collected from locations prior to culvert installations (i.e., where water is flowing through the road), metals concentrations are low when TSS was less than the MDL of 1 mg/L. However, similar to our strategy for the quarries, we will add dissolved metals to the parameter list to obtain a better understanding of metal leaching potential at pools and streams along the AWPAR. The available paired upstream/downstream results for fish-bearing streams (e.g., R02, R05, R06, R09 and R13) consistently support the conclusion that the AWPAR is not degrading water quality at these locations (i.e., metals are either low in both upstream and downstream samples or are elevated in both). Consequently, similar to nutrients, total metals marginally exceeding CCME guidelines in non-fish-bearing waters are unlikely to pose risks to aquatic life.

Overall, surface contact water quality was much better than the quarry water samples. Notwithstanding the uncertainty regarding particulate-associated metals, the results suggest low risks to aquatic life. We believe the changes we will be making to the program will improve the quality of information and reduce uncertainties regarding the AWPAR and contact water quality. For 2008, similar to our strategy for the quarries, we intend to reduce the sampling frequency to two events: spring (early July) and fall (late August). Again, we believe that these two events target worst case conditions for sediment and erosion-related concerns (i.e., by targeting elevated spring flows) and for ARD/ML-related concerns (i.e., by targeting late season, low flow conditions) and will meet the primary monitoring objectives.

Figure 6-1. TSS-Turbidity Relationship: Meadowbank AWPAR 2007 Data.

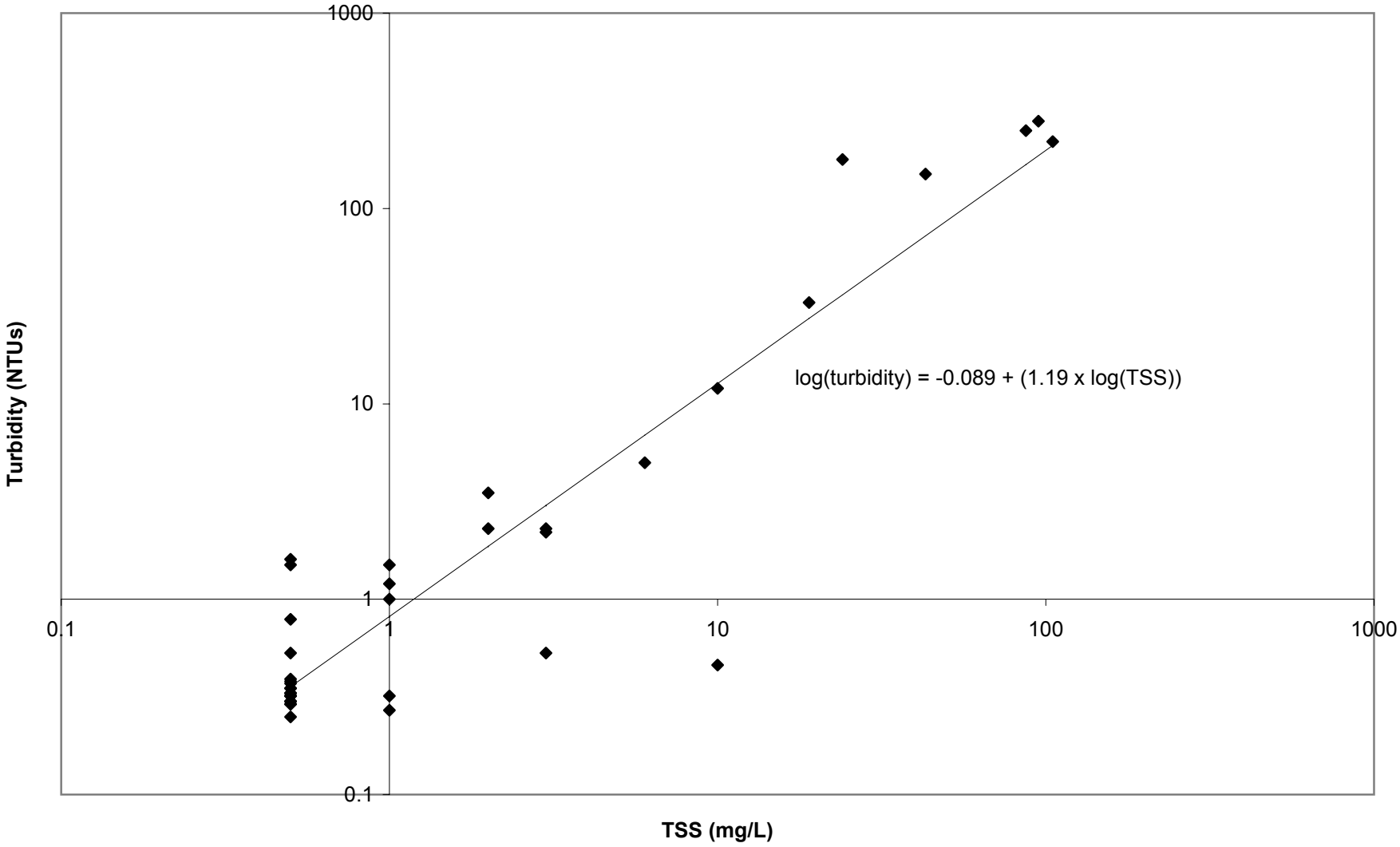

Table 6-1. Meadowbank AWPAR Crossings Turbidity Monitoring Results 2007.

Crossing ID	Date	Time	GPS Coordinates (NAD83)					Upstream (NTU)					Map Sheet? (Y)
			Stn 1	Stn 2	Stn 3	Stn 4	Stn 5	Stn 1	Stn 2	Stn 3	Stn 4	Stn 5	
R02	15-Jun	1640	6	**11**	**44**			2					
R06	16-Jun	1345	1.6	1.2	0.2	0.3	0.3	0.7	0.3				
R05	16-Jun	1430	3.9	2.6	1.8	1.6	1.4	1.1	1.1	1	0.9		
R02	16-Jun	1515	**35**	5.5	1.9	1	0.8	0.4					Y
R02	19-Jun	1230		4	4	**165**	8	0.4					Y
R07	19-Jun	1230	4	8	**60**	**25**		2					Y
R06	19-Jun	1345	**18**	0.9				5	0.8	0.7	1.3		
KM 16/17	19-Jun	1430	1.2					0.9					
R05	19-Jun	1445	**156**	**15**	2.5	1.3	**19.5**	1.2	0.9	0.8			
R05A	19-Jun	1510	4.2	6				1.2					
KM 12	19-Jun	1525	8					1.4					
R04	19-Jun	1545	3					1.1					
R02	19-Jun	1550	1	0.9	4	0.8	0.9	0.2	0.4				
R02	20-Jun	NA	0.9	1.7	5.5			0.6					
R05	20-Jun	NA	1.3	1.9				1.3					
R06	20-Jun	NA	5.9	1.2				1					
R07	20-Jun	NA	1.8	2.1				1.7					
24.9	20-Jun	NA	0.8					0.4					
27	20-Jun	NA	4.7					2.8					
28	20-Jun	NA	1					0.9					
35	20-Jun	NA	**15**	**22**				4					
R06	23-Jun	NA	**17**	2.4	3.5	0.8	1.1	1	0.9	0.9			Y
R05	23-Jun	NA	0.7	0.7	1.1	2.1	**16**						Y
R02	23-Jun	NA	**10.2**	4.8	1.7	7.2	6.4	0.4	0.4	0.3			Y
42	25-Jun	1350	**28**	7	11	4.2		13	4	5	6.1		
37	25-Jun	1420	**20**	7.8	4.5	3.9	3.1	0.8	2.4	2.7	2.35	2.1	
35	25-Jun	1425	4.55	3.1	2.5	3.1	7.1	2.4	1.5	1.6	6	1.4	
28	25-Jun	1435	0.9	0.95	0.6	0.52	0.56	0.47	0.47	0.47	0.55	0.64	
R07	25-Jun	1530	1.75	1.5	2	1.6	3.9	1.8	1.7	1.65	1.6	1.3	Y
R06	25-Jun	1550	1.05	1.12	1.12	3.05	5.4	1.2	1.3	1.2	1.17	1.2	Y
18.8	25-Jun	1815	1.2	1	0.5		2	0.17	0.3	0.5			
16.6	25-Jun	1635	**157**	1.8	**11.5**	4.8	1.7	0.6	0.95	2.2	0.4	0.45	
R05	25-Jun	1650	1.55	1.07	1.26	1.15	0.8	0.85	0.8	1	1.4	1.1	
R05A	25-Jun	1655	4.6	1.5	1.55	1.4	2.15	1	1.2	1.2	1	1.3	
12	26-Jun	1230	2.6	2	2.6	1.9	**13.2**	2.5	3.5	1			
11.7	26-Jun	1245	2.2	1.4	2			1.6	0.75	0.5			
R04	26-Jun	1300	2.4	2.4	0.1	1.9	1	0.9	0.9	1	0.8	1	
R03	26-Jun	1320	2.5	1.7				1.1	1.1	0.9			
8.3	26-Jun	1335	**17.7**	3.9	**17.2**	5	10	4	5.3	6.3	4.6	4.6	Y
R02	26-Jun	1400	**10.8**	**11**	1	0.9	**47**	1.3	0.8	0.4	0.4		Y
R06	26-Jun	1230	6.4	1.2	0.8	0.6	0.6	0.6	0.7	0.6	0.65	0.65	Y
18.8	26-Jun	1350	1.25	**16.6**	8.1	1.25		0.7	2	0.8			
R05	28-Jun	1410	**26**	0.9	0.7	0.9	1	0.7	0.7	0.75			
R05A	28-Jun	1430	0.7	0.7	1.3	0.8	0.8	0.5	0.5	0.5			
13.2	28-Jun	1445	1.5	0.9				1.2	0.5				
12	28-Jun	1450	2	**17**	1.2	4.4	1.9	0.7	0.75				
	28-Jun	1500	1	1.2				1.4	0.7				
R04	28-Jun	1510	2.1	1.3	1.3	1		1.1	1				
R03	28-Jun	1515	1.2	1.2	1.1	1.5		1.2	1				
8.3	28-Jun	1520	**14.3**	5.4	3.1	2.3	2.5	0.5	2.4	2.4			Y
R02	28-Jun	1530	1.7	1.1	1.1	1.1	1.3	1	0.7	0.9			Y
R07	29-Jun	1430	1.4	1.6	1.6	2.1	1.8	1.8	1.5	1.6	1.5		
28	29-Jun	1450	1.85	0.8	0.8			0.8	0.7				
35	29-Jun	1512	4	4.7	2.8	4.3		2.1	1.3	1.2	1.2		
33.6	29-Jun	1540	4.5	7.2	7.4			3	2.8	3			Y
R06	30-Jun	1550						1.07	1.12	1.05	0.99		Y
18.8	30-Jun	1558	3.11	1.1	1.94			2.44					
R05	30-Jun	1215	3.17	2.82	1.25	1.12	1.06	1.13	1.13	1.05	1.06	1.3	
R05A	30-Jun	1240	1.06	1.13	1.12	1.58	1.1	0.97	1	0.99			
13.2	30-Jun	1250	1.11	2	2.41			2.96	0.95				
12	30-Jun	1300	6.68	2.28	2.09	1.39	1.4	0.88	2.38	0.95			
11.7	30-Jun	1310	3.33	1.93	2.2	1.15		1.3	1.45				
R04	30-Jun	1315	1.89	1.82	1.43	1.4		1.2	1.18	1.2			
R03	30-Jun	1325	1.8	1.2	2.1			1.75					
8.3	30-Jun	1340	3.25	3.28	3.11	4.1		2.5	3.2				
R02	30-Jun	1345	2.2	1.4	1.7	2.1	2	1.6	1.42	1.43	1.6	1.45	
47	1-Jul	1520	1.1	1.5	3.2	4		1.2	2	1.2	1.8		
34.9	1-Jul	1600	3.3	2.3	2.6	2		1.7	1.5	1.9	2.4	1.5	

Table 6-1. Meadowbank AWPAR Crossings Turbidity Monitoring Results 2007.

Crossing ID	Date	Time	GPS Coordinates (NAD83)					Upstream (NTU)					Map Sheet? (Y)
			Stn 1	Stn 2	Stn 3	Stn 4	Stn 5	Stn 1	Stn 2	Stn 3	Stn 4	Stn 5	
33.7	1-Jul	1611	6.6	4.8	7.5			5.6	4.7	5	6		
28	1-Jul	1630	1.4	1.9	1.1			1	1.2	1	0.9		
R06	3-Jul	1300	1	1.3	1.6	1.3		0.9	0.9	1	1		
R05	3-Jul	1320	1.5	0.7	0.8			0.7	0.7	0.8	0.8		
R05A	3-Jul	1325	0.9	0.7	1.3	0.8		0.5	0.6	0.6	0.6		
12	3-Jul	1335	1.2	0.9	1.8	0.9		0.8	1.9	1.1	1.1		
11.7	3-Jul	1340	1.1	1	2			2	0.7				
10.4	3-Jul	1350	1.6	1.1	1.4	0.7		4.8	3.8	3.7	3.7		
8.9	3-Jul	1400	0.4	2.9	1.4			2.4	1.4				
8.2	3-Jul	1405	2.2	1.7	2.7			2.1	2	4	4		
R02	3-Jul	1415	2.4	1.1	1.8	1.5		1.4	1	1.1	1.1		
R06	4-Jul	1105											Y
R07	4-Jul	1130	2.3	2.6	2.3	0.6	2.3	1.9	2.9	2.9	1.8		
33.7	4-Jul	1145	7.5	8.2				4.6	3.1	3.1			
35	4-Jul	1200	2.9	2.7	2.3			2.1	2	2.3			
R02	4-Jul	1300											Y
R09	5-Jul	1500	0.05	0.04	0.07	0.05	0.03	0.01	0.03	0.05	0.07	0.02	
R09	6-Jul	1200	0.2	0.05				0.2	0.3				
R09	7-Jul	1245	0.4	0.1	0.3			0.4	0.4				
35	7-Jul	1347	3.1	2.2				0.6	0.8	0.7			
33.7	7-Jul	1416	8.8	7.8	6			3.6	2.8				
R07	7-Jul	1524	0.1	1				1.3	1.4	0.7			
R06	7-Jul	1536	0.6	0.6	0.4	0.3		0.3	0.3				
R05	7-Jul	1556	0.2	0.6				0.1	0.2				
R05A	7-Jul	1600	0.4	0.4				0.7	0.7				
12	7-Jul	1614	0.8	0.5	0.3			0.4	0.03	1.2			
R04	7-Jul	1624	0.4	0.6	0.5			0.8	1.4	1.4			
8.3	7-Jul	1634	2.6	2.8				2.1	2	2.6			
R02	7-Jul	1640	0.8	0.5	0.6	0.5		0.2	0.2				
R09	13-Jul	1200	1.2	0.1	0.2			0.2	0.3				
R06	13-Jul	1320	0.5	0.3	0.8	0.3		0.3	0.2	0.2			
R05	13-Jul	1345	0.2	0.1				0.4	0.1				
12	13-Jul	1410	0.2	0.7	0.9			0.3	0.4				
R04	13-Jul	1415	0.4	0.6				0.2	1.1	0.5			
R02	13-Jul	1420	1.1	1	2.3			1.3	1.5	1.5			
R09	17-Jul	1030	0.3	0.2	0.2			0.3	0.3	0.2			
R06	17-Jul	1100	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4		
R05	17-Jul	1200	0.3	0.4				0.3	0.3				
R02	17-Jul	100	0.6	0.6				0.4	0.4				
R06	21-Jul	900	2.1	2.4	0.6	0.8		0.8	0.5	1.8	0.5		
R05	21-Jul	940	0.5	0.5				0.4	0.5	0.5			
R02	21-Jul	1010	0.4	0.6	0.4	0.4	0.2	0.4	0.4	0.3	0.3	0.3	
R06	22-Jul	840	0.7	0.4	0.4	0.4	0.3						

Notes: NA = time not recorded.
Shaded values exceed CCME's short-term induced turbidity guideline of 8 NTU above background.

Table 6-2: QAQC of field duplicate surface water samples, Meadowbank AWPAR, 2007

	Q7	Dup1	RPD	dinate	RO9 DS	DUP1	RPD	RO4 DS	DUP2	RPD
	02-Jul-07	02-Jul-07	(%)		16-Aug-07	16-Aug-07	(%)	16-Aug-07	16-Aug-07	(%)
CONVENTIONAL PARAMETERS										
Physical Tests										
pH	4.59	4.55	0.9		6.4	6.4	0.0	6.51	6.73	-3.3
Conductivity (uS/cm)	374	372	0.5		66	66	0.0	78	77	1.3
Hardness (mg/L)	63.3	63.3	0.0		26	26	0.0	33	31	6.3
Turbidity (NTU)	-	-	NA		0.32	0.32	0.0	0.53	0.5	5.8
Total Dissolved Solids (mg/L)	-	-	NA		-	-	NA	-	-	NA
Total Suspended Solids (mg/L)	11	8	31.6		< 1	< 1	0.0	< 1	< 1	0.0
Anions & Nutrients (mg/L)										
Ammonia	-	-	NA		< 0.01	< 0.01	0.0	0.02	0.01	66.7
Dissolved Fluoride	0.21	0.2	4.9		< 0.05	< 0.05	0.0	0.05	0.06	-18.2
Dissolved Chloride	1.48	1.54	-4.0		-	-	NA	-	-	NA
Nitrate and Nitrite	12.5	12.5	0.0		-	-	NA	-	-	NA
Dissolved Nitrate	12.4	12.4	0.0		< 0.05	< 0.05	0.0	< 0.05	< 0.05	0.0
Nitrite	0.131	0.13	0.8		< 0.002	< 0.002	0.0	< 0.002	< 0.002	0.0
Dissolved Sulphate	109	109	0.0		3.69	3.72	-0.8	1.91	1.87	2.1
Organic Parameters										
Total Oil and Grease (mg/L)	2	< 2	0.0		< 2	< 2	0.0	2	3	-40.0
Hydrocarbon Oil and Grease (mg/L)	< 2	< 2	0.0		< 2	< 2	0.0	< 2	< 2	0.0
TOTAL METALS (mg/L)										
Aluminum	2.16	2.2	-1.8		0.01	0.013	-26.1	0.031	0.017	58.3
Antimony	0.0002	0.0002	0.0		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Arsenic	0.0086	0.0077	11.0		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Barium	0.07	0.069	1.4		0.003	0.004	-28.6	0.021	0.022	-4.7
Beryllium	0.0003	0.0003	0.0		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Bismuth	< 0.0002	< 0.0002	0.0		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Boron	0.06	0.06	0.0		< 0.05	< 0.05	0.0	< 0.05	< 0.05	0.0
Cadmium[2]	0.0003	0.0003	0.0		< 0.0002	< 0.0002	0.0	< 0.0002	< 0.0002	0.0
Calcium	16.6	16.6	0.0		7.34	7.29	0.7	10.8	10.2	5.7
Chromium[3]	0.0013	0.0013	0.0		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Cobalt	0.138	0.139	-0.7		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Copper	0.055	0.055	0.0		0.001	0.001	0.0	0.001	< 0.001	0.0
Iron	8.88	8.84	0.5		0.06	0.06	0.0	0.11	0.11	0.0
Lead	0.0018	0.0018	0.0		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Lithium	0.011	0.011	0.0		< 0.005	< 0.005	0.0	< 0.005	< 0.005	0.0
Magnesium	5.27	5.28	-0.2		1.85	1.94	-4.7	1.37	1.32	3.7
Manganese	0.951	0.95	0.1		0.004	0.004	0.0	0.028	0.027	3.6
Mercury	< 0.02	< 0.02	0.0		< 0.02	< 0.02	0.0	< 0.02	< 0.02	0.0
Molybdenum	< 0.0001	< 0.0001	0.0		< 0.0005	< 0.0005	0.0	< 0.0005	< 0.0005	0.0
Nickel	0.16	0.162	-1.2		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Phosphorus[4]	< 0.03	< 0.03	0.0		< 0.15	< 0.15	0.0	< 0.15	< 0.15	0.0
Potassium	4.75	4.82	-1.5		0.4	0.4	0.0	0.7	0.7	0.0
Selenium	0.001	0.0009	10.5		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
	3.08	3.1	-0.6		0.4	0.4	0.0	0.5	0.4	22.2
Silver	< 0.00005	< 0.00005	0.0		< 0.00025	< 0.00025	0.0	< 0.00025	< 0.00025	0.0
Sodium	5.06	4.93	2.6		1.91	1.95	-2.1	2.62	2.57	1.9
Strontium	0.131	0.13	0.8		0.035	0.036	-2.8	0.03	0.029	3.4
Tellurium	< 0.0002	< 0.0002	0.0		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Thallium	0.0002	0.00019	5.1		< 0.0001	< 0.0001	0.0	< 0.0001	< 0.0001	0.0
Thorium	0.0003	0.0002	40.0		< 0.0005	< 0.0005	0.0	< 0.0005	< 0.0005	0.0
Tin	< 0.0002	< 0.0002	0.0		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Titanium	0.0045	0.0049	-8.5		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Uranium	0.0023	0.0022	4.4		< 0.0005	< 0.0005	0.0	< 0.0005	< 0.0005	0.0
Vanadium	< 0.0002	0.0002	0.0		< 0.001	< 0.001	0.0	< 0.001	< 0.001	0.0
Zinc	0.046	0.046	0.0		< 0.005	< 0.005	0.0	0.01	0.01	0.0
Zirconium	< 0.002	< 0.002	0.0		< 0.01	< 0.01	0.0	< 0.01	< 0.01	0.0

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100

Shaded RPDs exceed 50% (field duplicates)

Table 6-3. Quarry contact water quality, Meadowbank AWPAR 2007.

	CCME (2007) Guideline[1]	Q1 (km 3.6) 02-Jul-07	Q2 (km 11.8) 02-Jul-07	Q2 (km 11.8) 26-Jul-07	Q4 (km 29.6) 16-Aug-07	Q5 (km 32.8) 02-Jul-07	Q7 (km 37.9) 02-Jul-07	Q7 (km 37.9) 26-Jul-07	16-Aug-07 10
CONVENTIONAL PARAMETERS									
Physical Tests									
pH	6.5 - 9.0	7.17	7.55	7.72	7.05	5.56	4.59	4.31	10
Conductivity (uS/cm)	NG	235	67	879	543	248	374	291	360
Hardness (mg/L)	NG	66.1	29.4	158	152	24.1	63.3	60.1	10
Turbidity (NTU)	NG	-	-	-	33	-	-	-	12
Total Suspended Solids (mg/L)	NG	<1	70	2	19	1	11	6	10
Anions & Nutrients (mg/L)									
Ammonia-Nitrogen	82@pH6; 26@6.5; 8.2@7 [10C]	-	-	-	24.8	-	-	-	5.19
Dissolved Fluoride	NG	< 0.05	< 0.05	0.06	0.16	0.06	0.21	0.2	0.4
Dissolved Chloride	NG	21.2	0.69	77.6	-	3.4	1.48	0.87	-
Nitrate and Nitrite - Nitrogen	NG	7.76	1.66	35.5	-	20.4	12.5	4.31	-
Dissolved Nitrate-Nitrogen	2.90	7.47	1.61	33.8	27.1	20.1	12.4	4.29	4.28
Nitrite-Nitrogen	0.06	0.285	0.054	1.7	0.155	0.295	0.131	0.017	0.018
Dissolved Sulphate	NG	11.1	0.52	42.1	7.23	13.1	109	115	167
Organic Parameters (mg/L)									
Total Oil and Grease	NG	2	< 2	< 2	8	2	2	< 2	2
Hydrocarbon Oil and Grease	NG	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
TOTAL METALS (mg/L)									
Aluminum	0.1 @ pH>6.5	0.097	2.95	0.091	1.37	-	-	-	-
Aluminum	0.005 @ pH<6.5	-	-	-	-	0.27	2.16	3.88	4.24
Antimony	NG	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	0.0002	< 0.0002	< 0.001
Arsenic	0.005	< 0.0002	0.0008	0.0004	0.007	0.0003	0.0086	0.0029	0.002
Barium	NG	0.102	0.031	0.048	0.088	0.165	0.07	0.063	0.045
Beryllium	NG	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	0.0003	0.0005	< 0.001
Bismuth	NG	< 0.0002	0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001
Boron	NG	0.02	< 0.01	0.06	< 0.05	0.06	0.06	0.04	< 0.05
Calcium	NG	20.3	8.54	56.3	44.7	6.4	16.6	16	23.3
Chromium[2]	0.001	0.0003	0.0047	0.0003	0.003	0.0003	0.0013	0.001	< 0.001
Cobalt	NG	0.0009	0.0019	0.0004	0.011	0.035	0.138	0.161	0.2
Copper	0.002 @ hardness<120 mg/L	0.0014	0.0082	-	-	0.024	0.055	0.106	0.13
Copper	0.003 @ hardness 120-180 mg/L	-	-	0.0058	0.022	-	-	-	-
Iron	0.3	0.1	3.9	0.1	5.92	0.18	8.88	0.92	1.03
Lead	0.001 @ hardness<60 mg/L	< 0.0002	0.0033	-	-	0.0018	-	-	-
Lead	0.002 @ hardness 60-120 mg/L	-	-	-	-	-	0.0018	0.0016	0.002
Lead	0.004 @ hardness 120-180 mg/L	-	-	< 0.0002	0.003	-	-	-	-
Lithium	NG	< 0.001	0.004	< 0.001	< 0.005	0.033	0.011	0.01	0.011
Magnesium	NG	3.71	1.96	4.11	9.85	1.97	5.27	4.88	7.24
Manganese	NG	0.205	0.105	0.135	1.48	0.338	0.951	1	1.52
Mercury	0.000026	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	0.073	0.0002	0.0007	0.0029	0.0026	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Nickel	0.025 @ hardness<60 mg/L	-	0.0039	-	-	0.018	-	-	-
Nickel	0.065 @ hardness 60-120 mg/L	0.0006	-	-	-	-	0.16	0.208	0.3
	0.11 @ hardness 120-180 mg/L	-	-	0.0004	0.027	-	-	-	-
Phosphorus	NG	< 0.03	0.08	< 0.03	< 0.15	< 0.03	< 0.03	< 0.03	< 0.15
Potassium	NG	2.16	1.26	7.47	7	11.2	4.75	3.62	4.7
Selenium	0.001	< 0.0002	< 0.0002	0.0006	< 0.001	< 0.0002	0.001	0.0006	< 0.001
Silicon	NG	1.7	4.43	1.91	4	4.26	3.08	3.46	4.5
Silver	0.0001	< 0.00005	< 0.00005	< 0.00005	**< 0.00025**	< 0.00005	< 0.00005	0.00014	**< 0.00025**
Sodium	NG	7.83	1.33	87.7	5.9	4.82	5.06	3.82	4.86
Strontium	NG	0.092	0.017	0.119	0.17	0.069	0.131	0.116	0.15
Tellurium	NG	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001
Thallium	0.0008	0.00002	0.00002	0.00003	< 0.0001	0.00021	0.0002	0.00023	0.0003
Thorium	NG	< 0.0001	0.0011	< 0.0001	0.0013	< 0.0001	0.0003	< 0.0001	< 0.0005
Tin	NG	< 0.0002	< 0.0002	< 0.0002	< 0.001	0.0005	< 0.0002	< 0.0002	< 0.001
Titanium	NG	0.0023	0.112	0.0022	0.035	0.0014	0.0045	0.001	< 0.001
Uranium	NG	< 0.0001	0.0002	0.0008	0.0025	0.0003	0.0023	0.0045	0.0059
Vanadium	NG	< 0.0002	0.0047	0.0003	0.003	< 0.0002	< 0.0002	< 0.0002	< 0.001
Zinc	0.03	< 0.001	0.012	< 0.001	0.011	0.014	0.046	0.044	0.079
Zirconium	NG	< 0.002	< 0.002	< 0.002	< 0.01	< 0.002	< 0.002	< 0.002	< 0.01
Cadmium - measured concentration		**< 0.00004**	**< 0.00004**	< 0.00004	**< 0.0002**	0.00008	0.0003	0.00037	0.0005
Cadmium - CCME (2007) guideline - hardness dependent[3]		0.00002	0.00001	0.00005	0.00005	0.00001	0.00002	0.00002	0.00000

Notes:

NG = no guideline

[1] Canadian Water Quality Guidelines for the Protection of Aquatic Life, CCME, Update 7.0, September 2007.

[2] Chromium guideline is for Cr VI, which yields the most conservative guideline.

[3] Cadmium guideline calculated using measured hardness concentration per sample.

Highlighted concentrations exceed the CCME guideline.

MDL concentrations in bold exceed the CCME guideline.

Table 6-4. Surface Contact Water Quality, Meadowbank AWPAR, 2007.

	CCME (2007) Guideline[1]	Km 4.4 Pool	Km 5.8 Pool	Coordinates (M Pool	RO2 (km 7.1) US HADD Bridge			RO2 (km 7.1) DS HADD Bridge			R03 (km 8.9) Culvert	R04 (km 10.3) Culvert
		02-Jul-07	02-Jul-07	26-Jul-07	02-Jul-07	26-Jul-07	16-Aug-07	02-Jul-07	26-Jul-07	16-Aug-07	26-Jul-07	02-Jul-07
CONVENTIONAL PARAMETERS												
Physical Tests												
pH	6.5 - 9.0	7.16	7.04	7.1	6.8	6.9	6.71	6.88	6.95	6.81	7.41	6.96
Conductivity (uS/cm)	NG	354	74	265	39	39	40	39	39	40	275	46
Hardness (mg/L)	NG	125	27.9	110	12.1	12.4	12	11.9	13	12	94.1	18
Turbidity (NTU)	NG	-	-	-	-	-	0.29	-	-	0.3	-	-
Total Suspended Solids (mg/L)	NG	9	5	8	< 1	1	< 1	< 1	< 1	< 1	3	1
Anions & Nutrients (mg/L)												
Ammonia-Nitrogen	82@pH6; 26@6.5; 8.2@7 [10C]	-	-	-	-	-	< 0.01	-	-	0.02	-	-
Dissolved Fluoride	NG	0.07	< 0.05	0.11	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.05
Dissolved Chloride	NG	42.2	2.35	20.4	3.56	3.3	-	3.51	3.31	-	11	2.07
Nitrate and Nitrite	NG	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	-	4.04	< 0.05
Dissolved Nitrate-Nitrogen	2.90	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	3.38	< 0.05
Nitrite-Nitrogen	0.06	< 0.002	0.007	0.008	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.655	< 0.002
Dissolved Sulphate	NG	6.11	1.2	2.11	1.21	1.1	1.24	1.16	1.1	1.23	3.31	1.41
Organic Parameters (mg/L)												
Total Oil and Grease	NG	6	7	8	5	< 2	2	< 2	3	< 2	8	2
Hydrocarbon Oil and Grease	NG	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
TOTAL METALS (mg/L)												
Aluminum	0.1 @ pH>6.5	0.14	0.18	0.17	0.008	0.01	0.009	0.007	0.011	0.01	0.062	0.052
Aluminum	0.005 @ pH<6.5	-	-	-	-	-	-	-	-	-	-	-
Antimony	NG	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Arsenic	0.005	0.0011	0.0004	0.0021	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	0.0006	< 0.0002
Barium	NG	0.095	0.031	0.142	0.011	0.01	0.01	0.011	0.0097	0.01	0.057	0.016
Beryllium	NG	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Bismuth	NG	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Boron	NG	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01
Calcium	NG	36.6	8.78	31.3	3.62	3.78	3.8	3.57	4.02	3.88	30.9	5.69
Chromium[2]	0.001	0.0008	0.0006	0.0005	0.0003	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	0.0002	0.0003
Cobalt	NG	0.0006	0.0007	0.0021	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	0.0009	0.0002
Copper	0.002 @ hardness<120 mg/L	-	0.0024	0.0032	0.0005	0.0006	< 0.001	0.0015	0.0005	0.001	0.0038	0.001
Copper	0.003 @ hardness 120-180 mg/L	0.0039	-	-	-	-	-	-	-	-	-	-
Iron	0.3	0.26	1.14	1.72	0.05	0.04	< 0.05	0.02	0.03	< 0.05	0.84	0.27
Lead	0.001 @ hardness<60 mg/L	-	0.0003	-	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	-	< 0.0002
Lead	0.002 @ hardness 60-120 mg/L	-	-	0.0002	-	-	-	-	-	-	0.0003	-
Lead	0.004 @ hardness 120-180 mg/L	< 0.0002	-	-	-	-	-	-	-	-	-	-
Lithium	NG	0.003	< 0.001	0.002	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001	< 0.005	0.001	< 0.001
Magnesium	NG	8.07	1.45	7.72	0.74	0.73	0.66	0.73	0.71	0.67	4.12	0.91
Manganese	NG	0.325	0.089	0.277	0.0025	0.004	0.003	0.0029	0.0035	0.004	0.343	0.024
Mercury	0.000026	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	0.073	0.0003	< 0.0001	0.0006	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0005	0.0006	< 0.0001
Nickel	0.025 @ hardness<60 mg/L	-	0.0015	-	0.0002	0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	-	0.0007
	0.065 @ hardness 60-120 mg/L	-	-	0.006	-	-	-	-	-	-	0.0014	-
Nickel	0.11 @ hardness 120-180 mg/L	0.0023	-	-	-	-	-	-	-	-	-	-
Phosphorus	NG	0.06	< 0.03	0.08	< 0.03	< 0.03	< 0.15	< 0.03	< 0.03	< 0.15	< 0.03	< 0.03
Potassium	NG	7.37	1.41	5.4	0.46	0.46	0.5	0.45	0.46	0.5	2.93	0.65
Selenium	0.001	< 0.0002	< 0.0002	0.0004	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Silicon	NG	4.65	1.58	6.14	0.16	0.18	< 0.25	0.14	0.14	< 0.25	3.57	0.28
Silver	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	**< 0.00025**	< 0.00005	< 0.00005	**< 0.00025**	< 0.00005	0.00006
Sodium	NG	18.6	2.46	10.3	1.73	1.77	1.96	1.7	1.77	1.96	7.48	1.53
Strontium	NG	0.124	0.025	0.128	0.016	0.017	0.017	0.017	0.017	0.017	0.107	0.017
Tellurium	NG	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Thallium	0.0008	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.00002	< 0.00002	< 0.0001	< 0.00002	0.00005
Thorium	NG	< 0.0001	0.0002	0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001
Tin	NG	< 0.0002	0.0003	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	< 0.0002	0.0002
Titanium	NG	0.0027	0.0039	0.0035	< 0.0002	0.0005	< 0.001	< 0.0002	0.0002	< 0.001	0.0016	0.0017
Uranium	NG	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001	< 0.0005	0.0002	< 0.0001
Vanadium	NG	0.0005	0.0003	0.0006	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.001	0.0003	< 0.0002
Zinc	0.03	0.005	0.003	0.003	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001	0.013	0.002	0.002
Zirconium	NG	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.01	< 0.002	< 0.002	< 0.01	< 0.002	< 0.002
Cadmium - measured concentration		< 0.00004	**< 0.00004**	< 0.00004	**< 0.00004**	**< 0.00004**	**< 0.0002**	**< 0.00004**	**< 0.00004**	**< 0.0002**	**< 0.00004**	0.00007
Cadmium - CCME (2007) guideline - hardness dependent[3]		0.00004	0.00001	0.00004	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00003	0.00001

Notes:

NG = no guideline

[1] Canadian Water Quality Guidelines for the Protection of Aquatic Life, CCME, Update 7.0, September 2007.

[2] Chromium guideline is for Cr VI, which yields the most conservative guideline.

[3] Cadmium guideline calculated using measured hardness concentration per sample.

Highlighted concentrations exceed the CCME guideline.

MDL concentrations in bold exceed the CCME guideline.

See Figure 2-1 for sampling locations.

Table 6-4. Surface Contact Water Quality, Meadowbank AWPAR, 2007.

	CCME (2007) Guideline[1]	R04 (km 10.3) DS Culvert	PC-2 (km 11.7) Culvert		PC-3 (km 12.0) US Culvert	PC-3 (km 12.0) DS Culvert		RO5A (km 13.9) US Culvert	RO5A (km 13.9) DS Culvert	RO5 (km Clear-Sp
		16-Aug-07	02-Jul-07	26-Jul-07	02-Jul-07	02-Jul-07	16-Aug-07	16-Aug-07	16-Aug-07	02-Jul-07
CONVENTIONAL PARAMETERS										
Physical Tests										
pH	6.5 - 9.0	6.51	6.7	7.09	7.03	7.05	6.58	6.63	6.63	6.85
Conductivity (uS/cm)	NG	78	224	215	49	49	78	120	124	25
Hardness (mg/L)	NG	33	56.1	56.8	18.9	21.9	35	46	52	8.3
Turbidity (NTU)	NG	0.53	-	-	-	-	0.35	1.6	1	-
Total Suspended Solids (mg/L)	NG	< 1	< 1	3	1	< 1	< 1	< 1	1	< 1
Anions & Nutrients (mg/L)										
Ammonia-Nitrogen	82@pH6; 26@6.5; 8.2@7 [10C]	0.02	-	-	-	-	0.07	< 0.01	0.02	-
Dissolved Fluoride	NG	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dissolved Chloride	NG	-	33.4	35.9	2.02	1.92	-	-	-	1.29
Nitrate and Nitrite	NG	-	6.42	< 0.05	< 0.05	< 0.05	-	-	-	< 0.05
Dissolved Nitrate-Nitrogen	2.90	< 0.05	6.36	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrite-Nitrogen	0.06	< 0.002	0.06	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Dissolved Sulphate	NG	1.91	7.83	4.37	0.71	0.7	1.31	3.62	4.28	0.98
Organic Parameters (mg/L)										
Total Oil and Grease	NG	2	2	3	< 2	< 2	2	< 2	< 2	< 2
Hydrocarbon Oil and Grease	NG	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
TOTAL METALS (mg/L)										
Aluminum	0.1 @ pH>6.5	0.031	0.028	0.018	0.019	0.034	0.021	0.012	0.013	0.016
Aluminum	0.005 @ pH<6.5	-	-	-	-	-	-	-	-	-
Antimony	NG	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Arsenic	0.005	< 0.001	< 0.0002	0.0003	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Barium	NG	0.021	0.047	0.052	0.013	0.015	0.017	0.017	0.016	0.0043
Beryllium	NG	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Bismuth	NG	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Boron	NG	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.01
Calcium	NG	10.8	19.4	19.7	6.57	7.69	12.5	15.7	17.8	2.39
Chromium[2]	0.001	< 0.001	0.0003	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Cobalt	NG	< 0.001	0.0004	0.0016	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Copper	0.002 @ hardness<120 mg/L	0.001	0.0008	0.0009	0.0007	0.001	0.001	< 0.001	< 0.001	0.0006
Copper	0.003 @ hardness 120-180 mg/L	-	-	-	-	-	-	-	-	-
Iron	0.3	0.11	0.09	0.66	0.09	0.09	0.07	0.65	0.33	0.04
Lead	0.001 @ hardness<60 mg/L	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Lead	0.002 @ hardness 60-120 mg/L	-	-	-	-	-	-	-	-	-
Lead	0.004 @ hardness 120-180 mg/L	-	-	-	-	-	-	-	-	-
Lithium	NG	< 0.005	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005	< 0.005	< 0.005	< 0.001
Magnesium	NG	1.37	1.86	1.87	0.6	0.65	1.01	1.62	1.94	0.57
Manganese	NG	0.028	0.094	0.657	0.003	0.0081	0.007	0.033	0.017	0.0016
Mercury	0.000026	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	0.073	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Nickel	0.025 @ hardness<60 mg/L	< 0.001	0.0008	0.0018	0.0005	0.0006	< 0.001	< 0.001	< 0.001	0.0004
	0.065 @ hardness 60-120 mg/L	-	-	-	-	-	-	-	-	-
Nickel	0.11 @ hardness 120-180 mg/L	-	-	-	-	-	-	-	-	-
Phosphorus	NG	< 0.15	< 0.03	< 0.03	< 0.03	< 0.03	< 0.15	< 0.15	< 0.15	< 0.03
Potassium	NG	0.7	1.16	0.69	0.37	0.43	0.4	0.4	0.6	0.38
Selenium	0.001	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Silicon	NG	0.5	0.7	0.21	0.43	0.56	0.9	0.7	0.7	0.2
Silver	0.0001	**< 0.00025**	< 0.00005	< 0.00005	< 0.00005	< 0.00005	**< 0.00025**	**< 0.00025**	**< 0.00025**	< 0.00005
Sodium	NG	2.62	14.9	17	1.21	1.2	2	4.75	4.71	0.78
Strontium	NG	0.03	0.042	0.044	0.016	0.018	0.027	0.049	0.051	0.0085
Tellurium	NG	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Thallium	0.0008	< 0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.0001	< 0.0001	< 0.00002
Thorium	NG	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Tin	NG	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Titanium	NG	< 0.001	0.0005	0.0004	0.0003	0.0006	< 0.001	< 0.001	< 0.001	0.0003
Uranium	NG	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Vanadium	NG	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.0002
Zinc	0.03	0.01	0.002	0.003	< 0.001	0.003	0.006	< 0.005	< 0.005	< 0.001
Zirconium	NG	< 0.01	< 0.002	< 0.002	< 0.002	< 0.002	< 0.01	< 0.01	< 0.01	< 0.002
Cadmium - measured concentration		**< 0.0002**	**< 0.00004**	**< 0.00004**	**< 0.00004**	**< 0.00004**	**< 0.0002**	**< 0.0002**	**< 0.0002**	**< 0.00004**
Cadmium - CCME (2007) guideline - hardness dependent[3]		0.00001	0.00002	0.00002	0.00001	0.00001	0.00001	0.00002	0.00002	0.000004

Notes:

NG = no guideline

[1] Canadian Water Quality Guidelines for the Protection of Aquatic Life, CCME, Update 7.0, September 2007.

[2] Chromium guideline is for Cr VI, which yields the most conservative guideline.

[3] Cadmium guideline calculated using measured hardness concentration per sample.

Highlighted concentrations exceed the CCME guideline.

MDL concentrations in bold exceed the CCME guideline.

See Figure 2-1 for sampling locations.

Table 6-4. Surface Contact Water Quality, Meadowbank AWPAR, 2007.

	CCME (2007) Guideline[1]	15.9) US an Bridge	RO5 (km 15.9) DS Clear-Span Bridge		Km 17.9 Pool		Km 18.1 Pool	Km 19.2 Pool		Km 19.6 Pool	RO6 (km 21.4) U HADD Bridge	
		26-Jul-07	02-Jul-07	26-Jul-07	26-Jul-07	16-Aug-07	02-Jul-07	02-Jul-07	26-Jul-07	16-Aug-07	02-Jul-07	26-Jul-07
CONVENTIONAL PARAMETERS												
Physical Tests												
pH	6.5 - 9.0	7.02	6.84	7.01	7.69	6.96	7.11	7.84	8	7.66	6.79	6.93
Conductivity (uS/cm)	NG	34	25	35	225	152	117	269	299	256	32	39
Hardness (mg/L)	NG	11.8	9.1	12.7	88.6	68	34.5	101	113	101	9.4	12.3
Turbidity (NTU)	NG	-	-	-	-	1.2	-	-	-	2.3	-	-
Total Suspended Solids (mg/L)	NG	1	< 1	1	2	1	2	2	2	2	< 1	1
Anions & Nutrients (mg/L)												
Ammonia-Nitrogen	82@pH6; 26@6.5; 8.2@7 [10C]	-	-	-	-	0.1	-	-	-	0.02	-	-
Dissolved Fluoride	NG	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	0.06	0.06	< 0.05	< 0.05
Dissolved Chloride	NG	2.01	1.3	1.96	9.69	-	10.2	14.9	18	-	3.1	3.36
Nitrate and Nitrite	NG	< 0.05	< 0.05	< 0.05	0.16	-	0.3	< 0.05	< 0.05	-	< 0.05	< 0.05
Dissolved Nitrate-Nitrogen	2.90	< 0.05	< 0.05	< 0.05	0.14	0.06	0.27	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrite-Nitrogen	0.06	< 0.002	< 0.002	< 0.002	0.02	0.01	0.034	0.006	< 0.002	< 0.002	< 0.002	< 0.002
Dissolved Sulphate	NG	1.25	1.01	1.22	2.71	2.53	2.51	8.62	3.6	3.95	1.38	1.44
Organic Parameters (mg/L)												
Total Oil and Grease	NG	< 2	< 2	2	8	12	6	7	8	8	< 2	< 2
Hydrocarbon Oil and Grease	NG	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
TOTAL METALS (mg/L)												
Aluminum	0.1 @ pH>6.5	0.018	0.017	0.015	0.069	0.034	0.19	0.074	0.033	0.034	0.012	0.011
Aluminum	0.005 @ pH<6.5	-	-	-	-	-	-	-	-	-	-	-
Antimony	NG	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Arsenic	0.005	< 0.0002	< 0.0002	< 0.0002	0.0006	< 0.001	0.0002	0.0005	0.0007	< 0.001	< 0.0002	< 0.0002
Barium	NG	0.0051	0.0044	0.0052	0.024	0.024	0.013	0.019	0.02	0.018	0.0026	0.0028
Beryllium	NG	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Bismuth	NG	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Boron	NG	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01
Calcium	NG	3.43	2.68	3.77	32.2	25.3	12.1	38	42.2	38	2.53	3.49
Chromium[2]	0.001	< 0.0002	< 0.0002	< 0.0002	0.0002	< 0.001	0.0006	0.0004	0.0002	< 0.001	< 0.0002	< 0.0002
Cobalt	NG	< 0.0002	< 0.0002	< 0.0002	0.0008	< 0.001	0.0002	0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Copper	0.002 @ hardness<120 mg/L	0.0011	0.0007	0.0009	0.0022	0.002	0.0032	0.0034	0.0029	0.003	0.0009	0.001
Copper	0.003 @ hardness 120-180 mg/L	-	-	-	-	-	-	-	-	-	-	-
Iron	0.3	0.08	0.04	0.08	0.56	0.44	0.2	0.42	0.77	0.55	0.02	0.02
Lead	0.001 @ hardness<60 mg/L	< 0.0002	< 0.0002	< 0.0002	-	-	< 0.0002	-	-	-	< 0.0002	< 0.0002
Lead	0.002 @ hardness 60-120 mg/L	-	-	-	0.0002	< 0.001	-	< 0.0002	< 0.0002	< 0.001	-	-
Lead	0.004 @ hardness 120-180 mg/L	-	-	-	-	-	-	-	-	-	-	-
Lithium	NG	< 0.001	< 0.001	< 0.001	0.001	< 0.005	< 0.001	< 0.001	0.001	< 0.005	< 0.001	< 0.001
Magnesium	NG	0.79	0.57	0.8	1.94	1.23	1.05	1.4	1.74	1.55	0.74	0.87
Manganese	NG	0.005	0.0023	0.0032	0.427	0.087	0.045	0.061	0.033	0.028	0.0019	0.0012
Mercury	0.000026	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	0.073	< 0.0001	< 0.0001	< 0.0001	0.0006	< 0.0005	< 0.0001	0.0004	0.0004	< 0.0005	< 0.0001	< 0.0001
Nickel	0.025 @ hardness<60 mg/L	0.0005	0.0005	0.0005	-	-	0.001	-	-	-	0.0004	0.0003
	0.065 @ hardness 60-120 mg/L	-	-	-	0.0019	0.001	-	0.0006	0.0006	< 0.001	-	-
Nickel	0.11 @ hardness 120-180 mg/L	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	NG	< 0.03	< 0.03	< 0.03	< 0.03	< 0.15	< 0.03	< 0.03	< 0.03	< 0.15	< 0.03	< 0.03
Potassium	NG	0.41	0.4	0.43	2.37	0.9	2	2.62	3.19	2.7	0.37	0.38
Selenium	0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Silicon	NG	0.19	0.2	0.19	0.99	1	1.16	0.93	0.46	0.3	0.19	0.19
Silver	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	**< 0.00025**	< 0.00005	< 0.00005	< 0.00005	**< 0.00025**	< 0.00005	< 0.00005
Sodium	NG	1.2	0.79	1.24	8.13	2.93	7.95	12.8	14.5	12.2	1.43	1.63
Strontium	NG	0.012	0.0092	0.013	0.082	0.06	0.025	0.109	0.142	0.12	0.01	0.013
Tellurium	NG	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Thallium	0.0008	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.00002	< 0.00002	< 0.00002	< 0.0001	< 0.00002	< 0.00002
Thorium	NG	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0005	0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	< 0.0001
Tin	NG	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Titanium	NG	0.0006	0.0002	0.0004	0.002	0.001	0.0044	0.002	0.0009	0.001	0.0002	0.0003
Uranium	NG	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0005	< 0.0001	0.0002	0.0002	< 0.0005	< 0.0001	< 0.0001
Vanadium	NG	< 0.0002	< 0.0002	< 0.0002	0.0003	< 0.001	0.0003	0.0003	0.0003	< 0.001	< 0.0002	< 0.0002
Zinc	0.03	< 0.001	< 0.001	< 0.001	0.002	< 0.005	0.002	0.001	< 0.001	< 0.005	< 0.001	< 0.001
Zirconium	NG	< 0.002	< 0.002	< 0.002	< 0.002	< 0.01	< 0.002	< 0.002	< 0.002	< 0.01	< 0.002	< 0.002
Cadmium - measured concentration		**< 0.00004**	**< 0.00004**	**< 0.00004**	**< 0.00004**	**< 0.0002**	**< 0.00004**	**< 0.00004**	< 0.00004	**< 0.0002**	**< 0.00004**	**< 0.00004**
Cadmium - CCME (2007) guideline - hardness dependent[3]		0.00001	0.000004	0.00001	0.00003	0.00002	0.00001	0.00003	0.00004	0.00003	0.000004	0.00001

Notes:

NG = no guideline

[1] Canadian Water Quality Guidelines for the Protection of Aquatic Life, CCME, Update 7.0, September 2007.

[2] Chromium guideline is for Cr VI, which yields the most conservative guideline.

[3] Cadmium guideline calculated using measured hardness concentration per sample.

Highlighted concentrations exceed the CCME guideline.

MDL concentrations in bold exceed the CCME guideline.

See Figure 2-1 for sampling locations.

Table 6-4. Surface Contact Water Quality, Meadowbank AWPAR, 2007.

	CCME (2007) Guideline[1]	JS	RO6 (km 21.4) DS HADD Bridge			Km 22.5 Pool	RO7 (km 24.1) US Culvert	RO7 (km 24.1) DS Culvert		Km 33 Pool	Km Pc
		16-Aug-07	02-Jul-07	26-Jul-07	16-Aug-07	02-Jul-07	02-Jul-07	02-Jul-07	16-Aug-07	02-Jul-07	26-Jul-07
CONVENTIONAL PARAMETERS											
Physical Tests											
pH	6.5 - 9.0	6.58	6.77	6.89	6.25	6.98	6.92	7.09	6.68	6.44	7.07
Conductivity (uS/cm)	NG	36	29	35	39	111	82	92	110	11	121
Hardness (mg/L)	NG	-	9.7	12.4	13	39.3	22.9	27	37	4.3	49.4
Turbidity (NTU)	NG	0.25	-	-	0.38	-	-	-	1.5	-	-
Total Suspended Solids (mg/L)	NG	< 1	< 1	< 1	< 1	4	< 1	2	< 1	1	2
Anions & Nutrients (mg/L)											
Ammonia-Nitrogen	82@pH6; 26@6.5; 8.2@7 [10C]	< 0.01	-	-	0.06	-	-	-	0.01	-	-
Dissolved Fluoride	NG	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dissolved Chloride	NG	-	2.76	3.3	-	9.34	11	11.1	-	0.29	6.8
Nitrate and Nitrite	NG	-	< 0.05	< 0.05	-	0.2	< 0.05	< 0.05	-	0.05	1.22
Dissolved Nitrate-Nitrogen	2.90	< 0.05	< 0.05	< 0.05	< 0.05	0.19	< 0.05	< 0.05	< 0.05	0.05	1.21
Nitrite-Nitrogen	0.06	< 0.002	< 0.002	< 0.002	< 0.002	0.008	< 0.002	< 0.002	0.003	< 0.002	0.014
Dissolved Sulphate	NG	1.5	1.19	1.34	1.59	2.81	1.21	1.21	2.79	< 0.5	1.73
Organic Parameters (mg/L)											
Total Oil and Grease	NG	3	< 2	< 2	< 2	7	< 2	< 2	< 2	2	9
Hydrocarbon Oil and Grease	NG	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
TOTAL METALS (mg/L)											
Aluminum	0.1 @ pH>6.5	-	0.023	0.019	0.022	0.18	0.04	0.048	0.044	-	0.19
Aluminum	0.005 @ pH<6.5	-	-	-	-	-	-	-	-	0.079	-
Antimony	NG	-	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Arsenic	0.005	-	< 0.0002	< 0.0002	< 0.001	0.0003	0.0002	0.0003	< 0.001	< 0.0002	0.0012
Barium	NG	-	0.0028	0.0028	0.003	0.012	0.006	0.0063	0.008	0.0029	0.082
Beryllium	NG	-	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Bismuth	NG	-	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Boron	NG	-	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01
Calcium	NG	-	2.78	3.55	4.03	12.5	6.57	8.13	11.5	1.3	13.2
Chromium[2]	0.001	-	< 0.0002	< 0.0002	< 0.001	0.0012	0.0003	0.0003	< 0.001	0.0002	0.0005
Cobalt	NG	-	< 0.0002	< 0.0002	< 0.001	0.0003	< 0.0002	< 0.0002	< 0.001	0.0003	0.0008
Copper	0.002 @ hardness<120 mg/L	-	0.0007	0.0009	0.002	0.0029	0.0016	0.0018	0.002	0.0013	0.0046
Copper	0.003 @ hardness 120-180 mg/L	-	-	-	-	-	-	-	-	-	-
Iron	0.3	-	0.01	0.02	< 0.05	0.29	0.21	0.19	0.53	0.13	0.65
Lead	0.001 @ hardness<60 mg/L	-	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	0.0003
Lead	0.002 @ hardness 60-120 mg/L	-	-	-	-	-	-	-	-	-	-
Lead	0.004 @ hardness 120-180 mg/L	-	-	-	-	-	-	-	-	-	-
Lithium	NG	-	< 0.001	< 0.001	< 0.005	0.001	< 0.001	< 0.001	< 0.005	< 0.001	0.001
Magnesium	NG	-	0.67	0.84	0.79	1.94	1.57	1.63	2.06	0.25	4.01
Manganese	NG	-	0.0033	0.0021	0.002	0.024	0.0061	0.016	0.025	0.014	0.056
Mercury	0.000026	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	0.073	-	< 0.0001	< 0.0001	< 0.0005	0.0002	< 0.0001	< 0.0001	< 0.0005	< 0.0001	0.0003
Nickel	0.025 @ hardness<60 mg/L	-	0.0003	0.0003	< 0.001	0.0025	0.0015	0.001	0.001	0.0007	0.0031
	0.065 @ hardness 60-120 mg/L	-	-	-	-	-	-	-	-	-	-
Nickel	0.11 @ hardness 120-180 mg/L	-	-	-	-	-	-	-	-	-	-
Phosphorus	NG	-	< 0.03	< 0.03	< 0.15	0.06	< 0.03	< 0.03	< 0.15	< 0.03	< 0.03
Potassium	NG	-	0.34	0.4	0.5	1.13	0.43	0.45	0.4	0.25	1.18
Selenium	0.001	-	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Silicon	NG	-	0.17	0.16	< 0.25	1.46	0.48	0.56	0.8	0.37	1.3
Silver	0.0001	-	< 0.00005	< 0.00005	**< 0.00025**	0.00006	< 0.00005	< 0.00005	**< 0.00025**	< 0.00005	< 0.00005
Sodium	NG	-	1.3	1.76	1.89	5.44	5.03	5.06	6.09	0.24	2.62
Strontium	NG	-	0.0099	0.012	0.013	0.034	0.021	0.025	0.033	0.0048	0.065
Tellurium	NG	-	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Thallium	0.0008	-	< 0.00002	< 0.00002	0.0001	0.00004	< 0.00002	< 0.00002	< 0.0001	< 0.00002	< 0.00002
Thorium	NG	-	< 0.0001	< 0.0001	< 0.0005	0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0001	0.0001
Tin	NG	-	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.0002	< 0.0002
Titanium	NG	-	< 0.0002	< 0.0002	< 0.001	0.0042	0.0008	0.001	0.001	0.0043	0.0041
Uranium	NG	-	< 0.0001	< 0.0001	< 0.0005	< 0.0001	0.0001	0.0001	< 0.0005	< 0.0001	< 0.0001
Vanadium	NG	-	< 0.0002	< 0.0002	< 0.001	0.0005	< 0.0002	< 0.0002	< 0.001	< 0.0002	0.0004
Zinc	0.03	-	< 0.001	0.001	< 0.005	0.005	0.001	< 0.001	< 0.005	0.002	0.002
Zirconium	NG	-	< 0.002	< 0.002	< 0.01	< 0.002	< 0.002	< 0.002	< 0.01	< 0.002	< 0.002
Cadmium - measured concentration			**< 0.00004**	**< 0.00004**	**< 0.0002**	0.00006	**< 0.00004**	**< 0.00004**	**< 0.0002**	**< 0.00004**	**< 0.00004**
Cadmium - CCME (2007) guideline - hardness dependent[3]		-	0.000004	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.000002	0.00002

Notes:

NG = no guideline

[1] Canadian Water Quality Guidelines for the Protection of Aquatic Life, CCME, Update 7.0, September 2007.

[2] Chromium guideline is for Cr VI, which yields the most conservative guideline.

[3] Cadmium guideline calculated using measured hardness concentration per sample.

Highlighted concentrations exceed the CCME guideline.

MDL concentrations in bold exceed the CCME guideline.

See Figure 2-1 for sampling locations.

Table 6-5: Global Positioning System (NAD83) Locations for Surface Contact Water Standing Pools, Meadowbank AWPAR 2007.

			Coordinates	
Map ID	**Sample ID**	**Type**	N	E
Pool01	Km 4.4	Pool	7140924	644755
Pool02	Km 5.8	Pool	7142195	644181
Pool03	Km 6.4	Pool	7142762	643988
Pool04	Km 17.9	Pool	7152972	639895
Pool05	Km 18.1	Pool	7153151	639806
Pool06	Km 19.2	Pool	7154127	639311
Pool07	Km 19.6	Pool	7154469	639103
Pool08	Km 22.5	Pool	7156687	637501
Pool09	Km 33	Pool	7163578	632139
Pool10	Km 34.4	Pool	7164619	631081
Pool11	Km 35	Pool	7164954	630518

Sample ID km values are based on AWPAR design mileage; final as-built drawings (e.g., Figure 2.1) will show revised chainage as constructed and will not match; GPS coordinates should be used to find these locations in the future.

7 DFO AUTHORIZATION CROSSING FISHERIES MONITORING

Azimuth Consulting Group (Azimuth) conducted baseline fisheries evaluations along the proposed AWPAR route in 2005 and 2006 (Azimuth 2005, 2008). In 2005, Azimuth evaluated 25 stream crossings to determine the relative importance and significance with respect to magnitude and timing, habitat suitability and fish usage at streams and channels along the proposed AWPAR (Azimuth 2005). In 2006, additional baseline data was collected to evaluate streams and rivers that support migratory habitat and/or spawning habitat for arctic grayling (*Thymallus arcticus*), the predominant species identified in 2005 and 2006 (Azimuth, 2008). These watercourses are also opportunistically visited by round whitefish (*Prosopium cylindraceum*), lake trout (*Salvelinus namaycush*) and inhabited by slimy sculpin (*Cottus cognatus*) and ninespine stickleback (*Pungitius pungitius*).

As part of permitting for construction of the AWPAR, DFO required submission of a biological monitoring plan for the HADD bridges (i.e., R02, R06, R09, R15, and R19) as a condition of the AWPAR *Fisheries Act* Authorization (**NU-03-0190-2**). The main components of the monitoring plan were to assess:

- Stability and success of all compensation features
- Fish migration past bridges
- Catch results from a creel survey

Azimuth developed and implemented the plan (**Appendix J**) on behalf of AEM in 2007. Complete reporting for this study is presented in **Appendix K**. This section presents a summary of key findings of the in-stream monitoring conducted at R02 and R06 in 2007 (i.e., the two HADD crossings completed as of spring 2007) and of the 2007 creel survey results.

Compensation Feature Success

The Authorization required detailed design of the compensation area at R02 to be completed by mid August 2007. Consequently, larval drift traps were used at two prospective locations to collect additional baseline data on stream productivity to facilitate future comparisons. A total of 327 fish larvae were collected at R02, 170 arctic grayling YOY within compensation option A and 122 arctic grayling YOY within compensation option B. Two (2) burbot larvae and the remaining larvae were slimy sculpin or ninespine stickleback YOY (33). Given that construction of the compensation area has been delayed until winter 2008 due to a shortage of appropriate gravel locally, larval traps will be deployed again in summer 2008 to obtain additional pre-construction data.

Interestingly, arctic grayling were observed spawning in a small patch of introduced construction gravels at R06. The event was apparently successful, as young-of-the-year arctic grayling were caught in a larval drift trap deployed downstream of the area. Given these results, the requirement for sub-angular or rounded gravel material for the compensation at R02 should be revisited. Due to the lack of local source areas for the prescribed material, AEM is planning on shipping it at great expense from Quebec.

Fish Passage

Hoop nets were used to collect fisheries data at crossings R02 and R06 (the only two HADD crossing constructed as of the onset of this study) from June 20 to July 29, 2007, to determine the ability of arctic grayling to migrate beyond bridge structures and to provide biological data to determine the health of the arctic grayling population along the AWPAR.

In total 294 adult or juvenile fish were collected using hoop nets. The predominant species was arctic grayling (n=280), with 140 collected at R02 and R06. Fourteen (14) lake trout and 1 round whitefish were also collected. Arctic grayling were able to pass through greater than 1.7 m/s velocities measured on June 21, 2007 at R02 and spawned upstream. Likewise, in-stream construction at R06 did not affect fish migration and spawning ability upstream. Length, weight, and condition factor indicate that the system is maintaining a healthy population of arctic grayling. Overall, the two HADD bridges did not appear to pose any impediment to upstream migration of arctic grayling.

Creel Survey

The 2007 creel survey results confirm that the AWPAR streams do not appear to be targeted by fishers. The majority of fishing is done in the spring when ice and weather conditions are conducive to ice fishing on regional lakes.

Overall

The velocity measurements, male/female migratory success, larval results, and associated trends at R02 and R06 all suggest that the HADD streams continue to be active migratory routes for arctic grayling, allowing access to important upstream spawning areas.

8 REFERENCES

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APPENDICES

APPENDIX A

NWB B LICENSE

P.O. BOX 119
GJOA HAVEN, NU X0B 1J0
TEL: (867) 360-6338
Fax: (867) 360-6369

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NUNAVUT IMALIRIYIN KATIMAYINGI
NUNAVUT WATER BOARD
OFFICE DES EAUX DU NUNAVUT

File No: 8BC-TEH

February 20, 2007

Attention: Roger March
Cumberland Resources Ltd.
950-505 Burrard Street
Vancouver BC V7X 1M4
Email: rmarch@cumberlandresources.com

RE: NWB Licence No. 8BC-TEH0708

Dear Mr. March:

Please find attached Licence No. 8BC-TEH0708 issued to Cumberland Resources Ltd. by the Chief Administrative Officer of the Nunavut Water Board pursuant to Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*. The terms and conditions of the attached Licence related to water use and waste disposal are an integral part of this approval.

Sincerely,

Original signed by:

Philippe di Pizzo
Executive Director

PDP/rqd
Enclosure: Licence No. **8BC-TEH0708**

cc: Jim Rogers, DIAND Iqaluit
Peter Kusugak DIAND Inspector
Luis Manzo, Kivalliq Inuit Association
Erin Calder, Nunavut Wildlife Management Board
Colette Spagnuolo, Environment Canada
Earle Baddaloo, GN-DOE
Tania Gordanier, Department of Fisheries and Oceans
Carson Gillis, NTI
Doug Sitland, CGS

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

DECISION

LICENCE NUMBER: 8BC-TEH0708

This is the decision of the Nunavut Water Board (NWB) with respect to an application for a new Water Licence dated October 25, 2006 made by:

CUMBERLAND RESOURCES LIMITED

to allow for the construction of a 115 kilometre all weather access road and associated water crossings, between the Hamlet of Baker Lake and the Meadowbank Gold Project site located within the Kivalliq Region, Nunavut (located between 65°00”75”N latitude and 96°04’39”W longitude).

DECISION

After having been satisfied that the application was in conformity with the applicable Land Use Plan and exempt from the requirement for screening by the Nunavut Impact Review Board in accordance with Schedule 12.1, Paragraph 5 of the *Nunavut Land Claim Agreement* (NLCA), the NWB decided that the application could proceed through the regulatory process. In accordance with S.55.1 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act (NWNSRTA)* and Article 13 of the *NLCA*, public notice of the application was given and interested persons were invited to make representations to the NWB.

After reviewing the submission of the Applicant and considering the representations made by interested persons, the NWB, having given due regard to the facts and circumstances, the merits of the submissions made to it and to the purpose, scope and intent of the *NLCA* and of the *NWNSRTA*, waived the requirement to hold a public hearing and furthermore delegated its authority to approve the application to the Chief Administrative Officer pursuant to S. 13.7.5 of the *NLCA* and S. 49(a) of the *NWNSRTA*, and determined that:

Licence Number 8BC-TEH be issued subject to the terms and conditions contained therein. (Motion #: 2006-58)

SIGNED this 20th day of February 2007 at Gjoa Haven, NU.

Original Signed By :

_____

Philippe di Pizzo
CHIEF ADMINISTRATIVE OFFICER

PDP/jm/mh

Table 1.1
Supplemental information to be submitted by Licensee

Licence Condition	Report Title	Timeline for Submission
Part B, Item 2	Annual Report	To be submitted March 31st of the year following the calendar year.
Part B, Item 3	Site Water Management Plan	To be submitted thirty (30) days following the issuance of the licence.
Part C, Item 16	Notification of Suspension of Access Road Operation/ Notification of Resumption of Access Road Operation	One week prior to suspension of operation/ One week prior to resumption of operation
Part C, Item 17	Quarry Rock Geochemical Characterization	To be submitted thirty (30) days following the issuance of the licence.
Part G, Item 1	Spill Contingency Plan	To be kept on site thirty (30) days following the issuance of licence.
Part H, Item 1	Abandonment and Reclamation Plan	To be submitted three (3) months prior to abandonment.
Part I, Item 1	Monitoring Plan (including Quality Assurance/ Quality Control Plan)	To be submitted thirty (30) days following the issuance of the licence.

LICENCE 8BC-TEH

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

CUMBERLAND RESOURCES LIMITED
(Licensee)

of

950-505 BURRARD STREET, VANCOUVER, BRITISH COLUMBIA V7X 1M4
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water for a period subject to restrictions and conditions contained within this Licence:

Licence Number **8BC-TEH0708**

Water Management Area **NUNAVUT 06 & 07**

Location **MEADOWBANK GOLD PROJECT ACCESS ROAD, KIVALLIQ REGION, NUNAVUT**

Purpose **WATER CROSSING (BRIDGES AND CULVERTS)**

Classification of Undertaking **MISCELLANEOUS – TYPE "B"**

Quantity of Water Not to Exceed **NOT APPLICABLE**

Date of Licence **FEBRUARY 20, 2007**

Expiry Date of Licence **FEBRUARY 8, 2008**

Dated this 20th day of February 2007 at Gjoa Haven, NU.

Original Signed By:

Philippe di Pizzo, Chief Administrative Officer

PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

1. Scope

This Licence allows for the construction of twenty-three (23) water crossings, of which ten (10) are bridges and thirteen (13) are culverts, as part of the overall construction of an all weather access road referred to as the Meadowbank Access Road, and identified in the report accompanying the Application. The accompanying report includes provisions allowing for the drainage of surface water from the road crown and its subsequent redirection and collection, and water quality monitoring. The Licence further allows for the operation of the access road as outlined in the same report and as per the conditions stated herein. Both the construction and operation of the access road are classified as Miscellaneous as per Schedule II of the Regulations, contained within the geographical coordinates 65°00”75”N latitude and 96°04’39”W longitude

i. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the Nunavut Waters and Nunavut Surface Rights Tribunal Act, or other statutes, imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be subject to such requirements; and;

ii. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation including a Nunavut Impact Review Board Project Certificate.

2. Definitions

“Act” means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

“Amendment” means a change to original terms and conditions of this Licence requiring correction, addition or deletion of specific terms and conditions of the Licence; modifications inconsistent with the terms of the set terms and conditions of the Licence;

‘‘Appurtenant Undertaking’’ means an undertaking in relation to which a use of water or a deposit of waste is permitted by a licence issued by the Board;

“Board” means the Nunavut Water Board established under the *Nunavut Land Claims Agreement* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

“Engineer” means a professional engineer registered to practice in Nunavut in

accordance with the Engineering, Geological and Geophysical Act (Nunavut) S.N.W.T. 1998, c.38, s.5;

"Greywater" means all liquid wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include toilet wastes;

"Inspector" means an Inspector designated by the Minister under Section 85 (1) of the *Act*;

"Licensee" means the holder of this Licence;

"Modification" means an alteration to a physical work that introduces a new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

"Nunavut Land Claims Agreement" (NLCA) means the "*Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*", including its preamble and schedules, and any amendments to that agreement made pursuant to it;

"Regulations" means the *Northwest Territories Water Regulations sor/93-303 8th June, 1993*;

"Sewage" means all toilet wastes and greywater;

"Spill Contingency Plan" means a Plan developed to deal with unforeseen petroleum and chemical events that may occur during the operations conducted under the Licence;

"Sump" means an excavation in impermeable soil for the purpose of catching or storing water or waste;

"Toilet Wastes" means all human excreta and associated products, but does not include greywater;

"Waste" means, as defined in S.4 of the *Act*, any substance that, by itself or in combination with other substances found in water, would have the effect of altering the quality of any water to which the substance is added to an extent that is detrimental to its use by people or by any animal, fish or plant, or any water that would have that effect because of the quantity or concentration of the substances contained in it or because it has been treated or changed, by heat or other means;

"TSS" means Total Suspended Solids.

3. Enforcement

i. Failure to comply with this Licence will be a violation of the *Act*, subjecting the Licensee to the enforcement measures and the penalties provided for in the *Act*;

ii. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*; and

iii. For the purpose of enforcing this Licence and with respect to the use of water and deposit or discharge of waste by the licensee, Inspectors appointed under the *Act*, hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

PART B: GENERAL CONDITIONS

1. The water use fees, in accordance with Section 9 of the *Regulations* are not applicable.

2. Licensee shall file an Annual Report on the appurtenant undertaking with the Board no later than March 31st of the year following the calendar year being reported which shall contain the following information:

   i. A summary report of construction activities, including photographic records before, during and after construction;

   ii. A list of unauthorized discharges or spills and a summary of follow-up actions taken;

   iii. A description of all progressive and or final reclamation work undertaken, including photographic records of site conditions before, during and after completion of operations;

   iv. Results of the Monitoring Program; and

   v. Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.

3. The Licensee shall submit to the Board a Site Water Management plan, within thirty (30) days following the issuance of the licence, for Board approval, that includes but is not limited to the following:

   i. A description of the quantity and direction of surface water flow from the road and over the surrounding landscape, along with topographic maps that effectively delineate the movement of waters on site;

   ii. A detailed description of the location and capacity of water retention areas that would allow for the management of surface water runoff from the road;

iii. A detailed description of the sampling locations along the access road where the water procured would provide the most representative analytical results, as determined by an appropriately qualified Engineer through a clear disclaimer outlining any limitations to judgment made by the Engineer, and of the quality of the surface water draining from the road surface;

iv. A description of the contingency measures that will be implemented in the event that the water quality does not meet CCME criteria (see Part I, Item 1 iv); and

v. Any further information that a qualified Engineer believes to be pertinent to describe the movement and quality of surface water draining from the access road.

4. The Licensee shall notify the Board of any changes in operating plans or conditions associated with this project at least thirty (30) days prior to any such change.

5. If the Licensee contemplates the renewal of this Licence, it is the responsibility of the Licensee to apply to the Board for its renewal. The past performance of the Licensee, new documentation and information, and issues raised during a public hearing, if the Board is required to hold one, will be used to determine the terms and conditions of the Licence renewal. Note that if the Licence expires before the Board issues a new one, then water use and waste disposal must cease, or the Licensee will be in contravention of the Nunavut Land Claims Agreement. The Board recommends that an application for the renewal of this Licence be filed at least four months before the Licence expiry date.

6. If this Licence requires an amendment, a public hearing may be required. The Licensee should submit applications for amendment as soon as possible to give the Board sufficient time to go through the amendment process. The process may vary depending on the scope of the amendment requested.

7. The Licensee shall ensure a copy of this Licence is maintained at the site of operations at all times. Any communication with respect to this Licence shall be made in writing to the attention of:

i. Manager of Licensing:

Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369

ii. Inspector Contact:

Water Resources Officer, INAC
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0

Telephone: (867) 975-4295
Fax: (867) 979-6445

8. The Licensee shall submit one paper copy and one electronic copy of all reports, studies, and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.

9. It is the responsibility of the Licensee to ensure that any documents or correspondence submitted by the Licensee to the Board have been acknowledged by the Manager of Licensing.

10. This Licence is not assignable except as provided in Section 44 of the *Act*.

11. The expiry or cancellation of this Licence does not relieve the holder from any obligations imposed by the Licence as *per* Section 46 of the *Act.*

PART C: CONDITIONS APPLYING TO THE PROTECTION OF WATER

1. The Licensee shall ensure that any chemicals, petroleum products or wastes associated with the undertaking do not enter any water body.

2. The Licensee shall not cut any stream bank or remove any material from below the ordinary high water mark of any water body.

3. The Licensee shall not do anything that will cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

4. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water.

5. The Licensee shall undertake appropriate corrective measures to mitigate impacts on surface drainage resulting from the Licensee's operations.

6. The Licensee shall limit any in-stream activity to low water period. In-stream activity is prohibited during fish migration.

7. The Licensee shall locate stream crossings to minimize approach grades. Approaches shall be stabilized during construction and upon completion of the project, to control runoff, erosion and subsequent siltation to any water body.

8. Machinery is not permitted to travel up the stream bed and fording of any water body is to be kept to a minimum and limited to one area and a one-time event. Equipment used should be well cleaned and free of oil and grease and maintained free of fluid leaks.

9. The Licensee shall ensure that pollutants from machinery fording the crossings do not

enter water.

10. Mechanized clearing is not licensed within thirty (30) metres of the normal high water mark of any water body in order to maintain a vegetative mat for bank stabilization.

11. The Licensee shall ensure that all fill material used is from an approved source and shall be free of contaminants.

12. To minimize impacts on surface drainage, the Licensee shall prepare all sites in such manner as to prevent rutting of the ground surface.

13. Equipment storage holding areas should be located on gravel, sand or other durable land, a distance of at least thirty (30) metres above the ordinary high water mark of any water body in order to minimize impacts on surface drainage and water quality.

14. The Licensee shall designate an area for the deposition of excavated and stockpiled materials that is at least thirty (30) metres above the ordinary high water mark of any water body.

15. The Licensee shall not utilize any equipment or vehicles in the course of this undertaking unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting or gouging. Overland travel of equipment or vehicles shall cease if rutting occurs.

16. The Licensee shall notify the Inspector and the NWB as to when the use of the access road will be suspended during to the spring freshet and when operation of the access road resumes afterwards. This notice shall be provided one week prior to the closure of the road and one week prior to its subsequent opening.

17. The Licensee shall provide a report, developed and reviewed by a qualified engineer and/or a geochemist, supporting the conclusion that the quarry rock to be used for the construction of the access road will neither generate acid nor leach significant concentrations of metals, within thirty (30) days following the issuance of the licence. This report shall include, but not be limited to, the following:

    i. The location, horizontal and vertical distribution, and number of samples procured from each quarry location;

    ii. The number and type of analyses performed;

    iii. Detailed discussion of the limitations of the sampling and analytical methods and procedures employed; and

    iv. Detailed discussion of the results of the analyses and their ramifications regarding acid drainage and metals leaching in the quarry rock.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. No open burning of waste or on-site land filling of domestic waste is permitted.

2. All domestic wastes (including, but not limited to incinerator ash, domestic sewage, and non-combustible refuse) shall be disposed of off-site at an active NWB licensed facility.

3. The Licensee shall remove from the construction site all hazardous wastes and waste oils generated through the course of the operation, and have them hauled to an active NWB licensed waste disposal site.

PART E: CONDITIONS APPLYING TO CONSTRUCTION

1. For the purposes of culvert and bridge installations, the Licensee shall not encroach on the natural channel width by the placement of abutments, footings or armouring below the ordinary high water mark, so that there is no restriction to the natural channel processes.

2. The Licensee shall not store material on the surface of frozen streams or lakes except what is for immediate use.

3. All activities shall be conducted in such a way as to minimize impacts on surface drainage and the Licensee shall immediately undertake any corrective measures in the event of any impacts on surface drainage.

4. Winter lake and stream crossings, including ice bridges, shall be constructed entirely of water, ice or snow; stream crossings shall be removed or notched prior to spring break-up.

5. With respect to access road, pad construction or other earthworks, the deposition of debris or sediment into any water body is prohibited. These materials shall be disposed a distance of at least thirty (30) metres from the ordinary high water mark in such a fashion that they cannot enter the water.

6. The Licensee shall submit as-built drawings of the access road and water crossing structures, stamped by an appropriately qualified Engineer, within ninety (90) days of the completion of construction.

PART F: CONDITIONS APPLYING TO DRILLING OPERATIONS

1. No drilling activities are authorized.

PART G: CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING

1. In accordance with section 6(2)(g)(i) and (ii) of the Regulations, the Licensee shall, within thirty (30) days of issuance of this Licence, keep on the site of operations a Spill Contingency Plan that will describe how petroleum products and hazardous materials will be handled, stored and disposed of, as well as how they will be contained and cleaned-up in the event of a spill. This Plan shall include, but not be limited to, the following:

   i. The name, address and contact number for the person in charge, management or control of the contaminant (in this case, fuel oil and any other chemicals associated with the program);

   ii. The name and address and telephone number of the employer;

   iii. The name, job title and 24 hour contact number for the person or persons responsible for activating the spill plan;

   iv. A detailed description of the facility, including size and storage capacity and its geographic location – in UTM coordinates (map sheet number, Eastings and Northings) and in geographic coordinates (Lat/Long);

   v. A description of the type and amount of contaminants stored on site;

   vi. A description of the spill prevention measures to be undertaken in the handling, storage and disposal of petroleum products and hazardous materials;

   vii. Steps taken to report, contain, clean up and dispose of a spill on applicable topographic conditions, i.e., land, water, snow, and ice;

   viii. A site map of sufficiently large scale to show the location of buildings, storage areas of potential contaminants, sensitive areas such as water bodies, probable pathways of contaminant flow and general topography;

   ix. A description of the spill response training provided to employees who will respond to a spill, including, bit not limited to, detail of the formal training and expertise of personnel responsible for supervising the spill response, and an outline of any planned training and simulation exercises;

   x. An inventory and location of the response and clean up equipment available to the spill clean up team;

   xi. The means by which the spill plan is activated; and

   xii. The date that the spill plan was prepared.

2. The Licensee shall annually review the Plan referred to in this Part and if needed, modify it to reflect changes in operation and/or technology. The Plan and any revisions shall be

submitted with the Annual Report.

3. The Licensee shall ensure that all sumps and fuel caches shall be located at a distance of at least thirty (30) metres from the ordinary high water mark of any adjacent water body and inspected on a regular basis.

4. The Licensee shall have a spill kit with a minimum capacity of approximately 205 litres available at the construction site and for use along the access road, in the event that fuel lines and/or hydraulic hoses rupture on construction and related equipment.

5. The Licensee shall ensure that any emergency maintenance and servicing on equipment be conducted only in designated areas and shall implement special procedures (such as the use of drip pans and absorbents) to manage motor fluids and other waste and contain potential spills.

6. If during the term of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:

   i. Employ the Spill Contingency Plan;

   ii. Report the spill or potential spill immediately to the 24-Hour Spill Line at (867) 920-8130 and to the Inspector at (867) 975-4295 (a spill report form is available for use in reporting from the NWB ftp site at: ftp://ftp.nunavut.ca/nwb/NWB%20Administration/NWB%20GENERAL%20INFORMATION/Standardized%20Forms/); and

   iii. For each spill occurrence, submit to the Inspector, no later than thirty (30) days after initially reporting the event, a detailed report that will include the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain and clean up the spill site.

PART H: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit to the Board for approval three (3) months prior to abandonment, an Abandonment and Restoration Plan prepared in accordance with applicable sections of the "*Guidelines for Abandonment and Restoration Planning for Mines in the Northwest Territories (1990)*".

2. The Licensee shall complete all restoration work prior to the expiry of this Licence.

3. The Licensee shall carry out progressive reclamation of any components of the project no longer required for the Licensee's operations.

4. The Licensee shall remove from the site material and infrastructures, including but not limited to, all fuel caches, drums, barrels, buildings and contents, docks, water pumps and lines, and equipment before the expiry of this License.

5. In order to promote natural growth of vegetation and the needed microclimate for seed deposition, all disturbed surfaces shall be prepared by ripping, grading, or scarifying the surface to conform to the natural topography.

6. Areas that have been contaminated by hydrocarbons from normal operating procedures shall be remediated to the satisfaction of an Inspector. Hydrocarbon impacted soils shall be removed from the site and disposed of at an approved waste disposal site.

7. All disturbed areas shall be contoured and stabilized upon completion of work and restored to a pre-disturbed state.

8. The Licensee shall backfill and restore, to the satisfaction of an Inspector, all sumps to the pre-existing natural contours of the land.

9. All roads shall be re-graded to match natural contour to reduce erosion.

10. All bridges and culverts shall be removed and the drainage opened up to match the natural channel. Measures shall be implemented to minimize erosion and sedimentation.

PART I: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall provide a Monitoring Program for approval by the Board, developed and signed by a qualified Engineer and/or geochemist, within thirty (30) days following the issuance of the licence. The proposed monitoring program, as determined by an appropriately qualified Engineer through a clear disclaimer outlining any limitations to judgment made by the Engineer, shall include, but not be limited to, the following:

    i. An appropriate number of samples to be collected of runoff water from the access road and accumulated water in the quarries, and analyzed for geochemical characteristics, to confirm that the quarry rock used for construction is neither acid generating, nor leaching significant concentrations of metals;

    ii. An appropriate number of samples to be collected of runoff water from the access road and accumulated water in the quarries, and analyzed for TSS to confirm that the sediment and erosion control measures are functioning properly;

    iii. An appropriate number of samples to be collected of accumulated water in the quarries and analyzed for presence of by-products of explosives use to ensure that impacts of these chemicals to waters is within acceptable limits;

    iv. A comparison of water sample results to the applicable guidelines provided in the CCME *Guidelines for Freshwater Aquatic Life* (dated December 2006) in tabular

format, highlighting individual parameter results that have exceeded these guidelines;

v. Recommendations to mitigate the impacts to waters in the event that the results of the analyses performed exceed the CCME criteria;

vi. A description of the sampling methodology and the field sampling quality control/quality assurance plan, in accordance with INAC *QA and QC Guidelines for use by Class "B" Licensees in Collecting Representative Water samples in the Field and for submission of a QA/QC Plan (1996).*

2. Sampling must be overseen and reviewed by a qualified Engineer, and shall take place once per month during the period from the start of June to the end of September.

3. The Licensee shall monitor all activities for signs of erosion and shall implement and maintain sediment and erosion control measures prior to the undertaking to prevent entry of sediment into any water body.

4. The Licensee shall obtain a digital photographic record of all the water crossings before, during and after construction has been completed.

5. An Inspector may impose additional monitoring requirements. The Licensee shall provide a summary of the Inspector imposed monitoring requirements through the Annual Report.

6. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board.

7. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

8. The Licensee shall include in the Annual Report (required under Part B, Item 2) all data and information required by this Part.

APPENDIX B

DFO AUTHORIZATION

Authorization under the *Fisheries Act* does not release the proponent from the requirements of any other federal, provincial or municipal legislation.

Please contact Tania Gordanier at (867) 979-8007 or by fax at (867) 979-8039 should you have any questions or require additional information.

Sincerely,

Original Signed by:

Keith Pelley
Acting Area Director
Eastern Arctic Area
Fisheries and Oceans Canada

DFO File No.: NU-03-0190
Referral File No.: 03-HCAA-CA7-000-000109
Authorization No.: 2

AUTHORIZATION FOR WORKS OR UNDERTAKINGS AFFECTING FISH HABITAT

Authorization issued to:

Meadowbank Mining Corporation,
20 Route 395
Cadillac, Quebec J0X 1C0

Tel: (819) 759 - 3700
Fax: (819) 759 - 3663

Location of Project

The water crossings associated with the All-Weather-Private-Access-Road (AWPAR) to the Meadowbank Mining Corporation gold mine project are located in the Kivalliq Region of Nunavut, north of the hamlet of Baker Lake. Specifically the five (5) water crossings, along the 115 km long AWPAR that connects the Hamlet of Baker Lake to the mine property, are located within UTM Zone 14, at: R02 (643780E, 7143375N) , R06 (638095E, 7155812N), R09 (625562E, 71733765N), R15 (627469E, 7192063N), and R19 (627718E, 7203855N).

Valid Authorization Period

The valid authorization period for the harmful alteration, disruption or destruction of fish habitat associated with the construction of five (5) watercourse crossings is:

From:	To:
Date of Issuance	December 31, 2007

The valid periods for other conditions of the authorization are as set out below.

Description of Works or Undertakings (Type of work, schedule, etc.)

The harmful alteration, disruption or destruction hereby authorized is the infilling of fish habitat as a result of water crossing construction at five (5) locations (denoted as R02, R06, R09, R15 and R19) along the All-Weather-Private-Access-Road (AWPAR) connecting the Hamlet of Baker Lake to the mine property, affecting a total of 1,430 Habitat Units (HU) of fish habitat on five (5) unnamed watercourses.

Conditions of Authorization

1. The conditions of this Authorization notwithstanding, should the above works or undertakings, due to weather conditions, different soil or other natural conditions, or for any other reason, appear, in the opinion of the Department of Fisheries and Oceans ("DFO") likely to cause greater impacts than the parties previously contemplated, then DFO may direct the Meadowbank Mining Corporation ("Proponent"), and its agents, and contractors, to suspend or alter works and activities associated with the project, to avoid or mitigate adverse impacts to fisheries resources. DFO may also direct the Proponent and its agents, and contractors, to carry out at the Proponent's expense any works or activities deemed necessary by DFO to avoid or mitigate further adverse impacts to fisheries resources. In circumstances where DFO is of the view that greater impacts may occur than were contemplated by the parties DFO may also modify or rescind this authorization. If the authorization is to be changed the Proponent will be given an opportunity to discuss any proposed modifications or rescission.

2. Conditions that relate to the Proponent plan:

   2.1. The Proponent confirms that all plans and specifications relating to this authorization have been duly prepared and reviewed by appropriate professionals working on behalf of the Proponent. The Proponent acknowledges that they are solely responsible for all design, safety and workmanship aspects of all the works associated with this Authorization.

   2.2. The construction of the five (5) water crossings shall comply with those criteria as identified within this Authorization. Harmful alteration, disruption or destruction of fish habitat other than that specifically identified within this Authorization is prohibited.

   2.3. Works and undertakings shall be conducted in accordance with the practices outlined in the following reports, and as approved by DFO:

      2.3.1. Meadowbank Gold Project No-Net-Loss-Plan (NNLP), prepared by Azimuth Consulting Group Incorporated, Randy Baker, dated

Canada

November 2006.

2.3.2. Design Recommendations for the Proposed Tehek Lake Access Road prepared by Golder Associates Ltd. dated July 7, 2006

2.3.3. Correspondence, Cumberland NNLP AWPAR DFO Comments – Azimuth Responses, Gary Mann dated February 27, 2007.

2.3.4. The above document(s) and/or drawing(s) are hereafter referred to as the "Plan". Where contradictions exist, the most recent version shall apply.

3. Conditions that relate to the mitigation of potential harmful alteration, disruption or destruction ("HADD") of fish habitat. The following measures shall be implemented to avoid the unauthorized HADD of fish habitat:

3.1. No in-water work shall occur during critical spawning and rearing periods for any fish species in the affected waterbodies. The timing of any in-water works proposed for the open water season shall be determined by the Proponent and subject to approval by DFO prior to implementation.

3.2. A qualified biologist or environmental inspector shall be on site during all in-water construction, compensation and restoration works to ensure implementation of the designs as intended in the Plan and conditions of this Authorization.

3.3. All materials and equipment used for the purpose of site preparation and project completion shall be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum products, silt, debris, etc.) from entering the water.

3.3.1. Any stockpiled materials shall be stored and stabilized above the ordinary high water mark of any water body.

3.3.2. Vehicle and equipment re-fuelling and maintenance shall be conducted above the ordinary high water mark of any water body.

3.3.3. Any part of equipment entering the water shall be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substance from entering the water.

3.4. Only clean material free of fine particulate matter shall be placed in the water.

3.5. Material used for habitat compensation features shall not be taken from below the ordinary high water mark or shoreline of any water body.

3.6. Sediment and erosion control measures shall be implemented prior to work, and maintained during the work phases, including decommissioning and restoration phases, to prevent entry of sediment into the water or the movement of re-suspended sediment.

3.6.1. All disturbed areas shall be stabilized upon completion of work and restored to a pre-disturbed state or better.

3.6.2. Sediment and erosion control measures shall be left in place and maintained until all disturbed areas have been stabilized.

4. Conditions that relate to the compensation for the loss of 1,430 Habitat Units (HU) of fish habitat as defined in the Plan.

4.1. The Proponent shall prepare a detailed Compensation Plan, based on the principles outlined in the No-Net-Loss Plan specified in sub-section 2.3.1 above, and submit it for DFO review and approval prior to implementation. This detailed Compensation Plan shall be submitted on or before August 15, 2007 following construction of the R02 water crossing.

4.2. The detailed Compensation Plan shall describe how a habitat replacement to loss ratio of 1.5:1 shall be achieved, and specifically ensure the permanent creation of 2,175 HU within the unnamed watercourse adjacent to the R02 crossing, to compensate for the combined loss of 1,150 HU at R02; 144 HU at R06; 28 HU at R09; 48 HU at R15 and 16 HU at R19, respectively.

4.3. In addition the Proponent shall prepare and submit for DFO review and approval by June 29, 2007, a detailed decommissioning and restoration plan, including sediment and erosion control measures that shall be implemented, indicating how the five (5) water crossings and their respective floodplains shall be returned to pre-construction condition by restoring the natural hydrology, topography, and riparian vegetation.

5. Conditions that relate to Monitoring.

5.1. A detailed Monitoring Plan shall be developed by the Proponent, based on the principles outlined in the No-Net-Loss Plan specified in sub-section 2.3.1 above, by June 29, 2007 and submitted for DFO review and approval prior to implementation.

5.2. The approved Monitoring Plan shall be implemented annually for the years from 2007 to 2010 inclusive and every other year thereafter (starting in 2012) until one (1) year after water crossing decommissioning and restoration is completed. The detailed Monitoring Plan shall include, but not be limited to, the following:

5.2.1. The stability and successful utilization of all compensation features shall be assessed during the spawning and nursery period for

Arctic grayling (Thymallus arcticus) according to the schedule in 5.2 above.

5.2.2. Monitoring to assess if the installation of crossing structures has adversely affected upstream and downstream fish migration according to the schedule in 5.2 above.

5.2.3. If at any time during the monitoring period, compensation features are not functioning as intended, measures shall be identified to reduce the risk of future failure and additional compensation shall be created to meet the No-Net-Loss guiding principle using an adaptive management approach.

5.2.4. The Proponent shall engage the local Hunter Trapper Organization(s) in the development, implementation and reporting of annual creel surveys within the water bodies affected by the Plan and report according to the schedule in 5.2 above.

5.3. A photographic record of before, during and after construction, during decommissioning and after restoration, showing that all works and undertakings have been completed according to the approved Plan and conditions of this authorization, shall be submitted to the Iqaluit, NU office of the Department of Fisheries and Oceans, Fish Habitat Management, Eastern Arctic Area, on or before, December 31, according to the schedule in 5.2 above.

5.3.1. The photographic record shall include, but not be limited to, a record of the sediment and erosion control measures, compensation measures and upstream and downstream views of the crossings.

5.3.2. The photographs for each pre-construction, during construction, post-construction, decommissioning and post-restoration time periods shall be taken from the same vantage point(s) and general direction.

5.3.3. All photographs shall be clearly labelled as to date and vantage point(s). The photographic vantage point(s) and viewing directions shall be indicated, and clearly indexed to the photographs, on a plan view drawing of the construction site(s).

6. A written report summarizing the above monitoring results shall be submitted to the Iqaluit, NU office of the Department of Fisheries and Oceans – Fish Habitat Management, Eastern Arctic Area on, or before, December 31 of each year being reported on, for the life span of the water crossings and within ninety (90) days after decommissioning and restoration is completed.

7. Any deviation from the approved plans, the construction schedule, mitigation, compensation and/or monitoring measures stated above must be discussed with, and approved in writing by the Iqaluit, NU office of the Department of Fisheries and Oceans, Fish Habitat Management, Eastern Arctic Area.

8. "As constructed" drawings, certified by a licensed engineer, showing that structures and works have been completed according to the approved fish habitat compensation Plan shall be submitted to the Iqaluit, NU office of the Department of Fisheries and Oceans, Fish Habitat Management, Eastern Arctic Area., within 90 days of completing construction.

9. All mitigation, compensation and monitoring measures shall be implemented to the satisfaction of the Iqaluit, NU office of the Department of Fisheries and Oceans, Habitat Management, Eastern Arctic Area.

10. Written notification of the commencement of works or undertakings shall be provided to the Iqaluit, NU office of the Department of Fisheries and Oceans, Habitat Management, Eastern Arctic Area, by e-mail to NunavutHabitat@dfo-mpo.gc.ca or fax at (867) 979-8039 not less than 10 days prior to the initiation of said works or undertakings.

The holder of this authorization is hereby authorized under the authority of section 35(2) of the *Fisheries Act*. R.S.C., 1985, c.F. 14, to carry out the work or undertaking described herein. This authorization is valid only with respect to fish habitat and for no other purposes. It does not purport to release the applicant from any obligation to obtain permission from or to comply with the requirements of any other regulatory agencies.

Failure to comply with any condition of this authorization may result in charges being laid under the *Fisheries Act*.

This authorization form shall be held on site and work crews shall be made familiar with the conditions therein.

Date of Issuance: May 02, 2007

Approved by: _____

Bob Lambe

Title: Regional Director General, Central and Arctic Region

Fisheries and Oceans Canada | Pêches et Océans Canada

Eastern Arctic Area
P.O. Box 358
Iqaluit, NU X0A 0H0
Phone: (867) 979-8000
Fax : (867) 979-8039

Secteur de l'Arctique de l'est
Boîte postale 358
Iqaluit, NU X0A 0H0
Tél: (867) 979-8000
Télécopieur: (867) 979-8039

Your file *Votre référence*

June 04, 2007

Our file *Notre référence*
NU-03-0109

Meadowbank Mining Corporation

c/o Ms Louise Grondian
V.P. Environment
20 Route 395
Cadillac, Quebec J0X 1C0

Dear Ms Grondian:

SUBJECT: **Authorization for the harmful alteration, disruption or destruction of fish habitat pursuant to subsection 35(2) of the *Fisheries Act***

The harmful alteration, disruption or destruction of fish habitat arising from the infilling of fish habitat as a result of bridge construction at five (5) river crossings along the All-Weather-Private Access Road (AWPAR) connecting the Hamlet of Baker Lake to the Meadowbank gold mine property is hereby authorized pursuant to subsection 35(2) of the *Fisheries Act*. This Authorization shall be conditional upon implementation of measures specified in the attached document. The original authorization NU-03-0109 (1) issued to Cumberland Resources Limited on April 10, 2007 is hereby rescinded effective the date of issuance of the attached NU-03-0109 (2) *Fisheries Act* Authorization issued to the Meadowbank Mining Corporation for works and undertakings associated with the Meadowbank gold mine.

In reviewing the need for re-issuing the subsection 35(2) *Fisheries Act* Authorization, the proposed changes to the project proponent and re-scheduling of works and undertakings were reviewed relative to the original screening that was conducted pursuant to subsection 18(1) of the *Canadian Environmental Assessment Act* (CEAA). In the context of the initial screening that was conducted under CEAA it has been determined that the proposed changes stipulated in the attached authorization do not represent a significant change in the project. Similarly the proposed changes do not affect the decision made in the original screening report pursuant to subsection 20(1) of CEAA. Furthermore, we have confirmed with the Nunavut Impact Review Board (NIRB) that the change in proponent and minor variation to the scheduling of compensation and monitoring requirements in the attached re-issued *Fisheries Act* authorization will not require a re-screening by the NIRB.

Failure to comply with any of the conditions specified on the attached Authorization may result in a contravention of section 35 of the *Fisheries Act*.

NOTE: None of the foregoing should be taken to imply Authorization of this undertaking in accordance with any section of the *Fisheries Act* **other** than section 35. Also note that

Canada

APPENDIX C

AZIMUTH TECHNICAL MEMOS

Technical Memorandum

Date: 16 June 2007

To: **Louise Grondin, Agnico-Eagle Mines Ltd.**

Cc: **Roy Lindsay (AE), Laurier Roy (AE), Paul-Henri Girard (AE), Harvey Blouin (Nuna), Wes Danielson (Nuna), Len McHale (Nuna)**

From: **Gary Mann**

RE: **AWPAR Stream Crossing Monitoring Reconnaissance, 15 June 2007**

Gary Mann (Azimuth) and Laurier Roy (Agnico-Eagle) conducted a monitoring reconnaissance of water-related issues (e.g., bridges and culvert locations) along the All-Weather Private Access Road (AWPAR) to near the construction terminus as of 1300hrs, 15 June 2007 (i.e., approximately 43 km). Duane Hudd (North/South) joined us in the afternoon at R02 to discuss the planned mitigation. The goal of the reconnaissance was to visit each location and conduct a brief visual inspection to evaluate the current status, identify unstable areas potentially susceptible to erosion, and to prioritize issues to support timely risk management.

Overall Impressions – No significant sedimentation-related issues were seen during the reconnaissance. Turbidity measurements were taken at crossing R02; turbidity levels were slightly higher downstream relative to upstream background conditions, but the results were well within the acceptable range (i.e., 8 NTU above background). These measurements corroborate our visual observations (i.e., water down gradient of the road did not generally have any signs of significant sediment loading). Notwithstanding, issues were identified that could result in the introduction of unacceptably high sediment concentrations as hydrological conditions change towards peak freshet. Risk management measures and implementation priorities were recommended for all outstanding issues. Additional issues may become apparent as we continue monitoring (e.g., as the freshet strengthens).

The most significant issue facing the team is how to address the next two crossings (R09 and R13), both of which are likely to be reached during the critical period for fish. Further reading of the DFO Operational Statement for Clearspan Bridges (appended to our sediment control guidance) indicates that their position is that the “one time over, one time back” policy for machinery does not apply to the critical window for fish. We will be meeting with Roy on 17 June 2007 to discuss options for R09.

General Conditions - Streams have only recently started flowing due to the delayed onset of spring thaw in the region. In addition, the unseasonably cool temperatures continue to moderate melting rates, likely resulting in a more gradual increase in stream flow and discharge rates. Notwithstanding, discharge and flow rates have risen substantially in only the past two days, particularly at crossing R02. This underscores the importance of timely action to mitigate identified risks in order of priority.

Bridges – Three bridges have been installed to date: R02, R05 and R06.

- **All** – While not our area of expertise, we provide the following suggestion as a point of risk management that could be significant for the aquatic environment in the event of a failure. Abutment armouring (material size, slope, etc.) should be verified relative to design specifications to ensure that they are adequate to withstand the peak discharge as estimated by Golder.

- **R02** – Water was clear downstream of the crossing. Turbidity measurements confirmed that induced turbidity was well within acceptable limits. Background turbidity levels were measured at approximately 2 NTU, resulting in a guidance level of 10 NTU (i.e., background + 8 NTU). Three issues were identified that could contribute to significant sediment loading as freshet progresses:

    - Stockpiled materials in or immediately adjacent to the currently wetted channel (one U/S N side[1]; two D/S S side) (**Photos 1 and 2**) – these materials consist of a range of size classes including relatively fine grains. The piles should be removed with a backhoe and moved well away from the stream channel. Larger material (e.g., boulders) from the stockpiles should be retained and used for increased stabilization of abutment on the U/S S side. Work from the N side will require entering the stream for access, however the substrate in the access zone consists primarily of boulders and the activity poses much less risk than the inevitable consequences of inaction[2].

    - Unstable bank/riparian area associated with ice bridge approach (U/S S side) (**Photos 3 and 4**) – machinery crossing this area has resulted in localized soil instability which would likely become a significant source of fines to the stream and possibly even a zone of severe erosion. Given the proximity to the S abutment, this area should be stabilized with larger material free of fines.

    - Construction-related materials on snow/ice present within the overall confines of the channel (U/S N side; D/S N and S sides) (**Photos 5 and 6**) - without action, this material will eventually be deposited in the stream channel with continued melting of in-stream snow/ice. As much material as possible should be removed, but balanced against causing damage to the stream bank. Where possible, access may be improved working off the existing snow covering the bank (i.e., to reach further into the channel). Some material will remain out of reach and should not be attempted.

  Conducting this work is considered **high priority**.

- **R05** – Water was clear downstream of the bridge, with no obvious ongoing significant sediment sources. The only issue observed was the unstable bank/riparian area (similar to

[1] Locations are presented assuming all crossings have upstream (U/S), downstream (D/S), and nominal cardinal direction (north [N] and south [S]) based on general south-to-north alignment of road (i.e., regardless of true orientation, the Baker Lake side of crossings is always S and the Mine side always N).

[2] While the DFO Authorization forbids in-water activity during fish sensitive periods, it is our opinion that the pros (i.e., removal of material that would eventually erode into the stream) outweigh the cons (i.e., minor introduction of fines prior to onset of critical fish migration period, which our past monitoring show occurs after peak freshet flows). DFO should be notified as soon as possible, which will be when their Iqaluit offices open on 18 June 2007.

R02) associated with the ice bridge approach (U/S S side) (**Photo 7**). Mitigation as per R02. **High priority**.

- **R06** – There were no significant erosional areas observed and water was clear downstream of the bridge. The installation looks good and no action items were identified.

Culverts – No culverts have been installed yet. Water is predictably pooling up-gradient of the road (not only in planned locations, but also in many other areas[3]), with two outcomes: (1) percolation through the coarse road bed material is allowing flow without introduction of fines in most locations (**Photos 8 and 9**); (2) water moving over the road (km 12, R07, near Quarry 7) is also resulting in generally clear flows (**Photos 10 and 11**), with the exception of brief spikes of turbidity associated with road traffic. While both situations may pose certain localized permafrost-related stability problems (which is outside our area of expertise), neither appears to be resulting in increased suspended sediment loading to fish bearing waters as there are long pathways (i.e., hundreds of meters) through braided grassy channels in the few areas where sediment-laden water is leaving the road (i.e., the areas with water over-topping the road). Furthermore, seeing exactly where water is running now will ensure that culverts are both adequately located.

Management of these areas should strongly consider not installing culverts until water levels drop, unless road stability is an issue or if road traffic is increasing sedimentation (e.g., R07). In the interim, silt fences should be installed where possible (and it may not be possible in areas with higher flows depending on the porosity of the material) to facilitate settling well away from fish bearing waters; this is **moderate priority** presently.

Further inspection of over-topping areas could be conducted to assess risks to fish bearing water from road-related sediment introductions. Our observations suggest that present risks are negligible, but further inspection and direct monitoring should be conducted for verification (**moderate priority**). It should be noted that risk levels and potential instability issues could substantially increase if melting rates accelerate in certain locations; continued monitoring will identify these areas. Should culvert installation be deemed necessary, measures should be taken to block flows from the upstream side (e.g., coffer dam) and entrain any sediments downstream (e.g., stacked silt fences); this should be conducted with the utmost care to avoid catastrophic road erosion.

Please feel free to contact me if you have any questions or comments.

/GSM

[3] The need for culvert installation in new locations should be made in light of NWB B Licence requirements for the road and any potential stability-related considerations.

AWPAR Reconnaissance Survey (15 June 2007) Photos

Photo 1. R02 – Stockpiled materials at stream margin (U/S N side).

Photo 2. R02 – Stockpiled materials at stream margin (D/S S side).

Photo 3. R02 – Unstable bank/riparian area (U/S S side)

Photo 4. R02 – Unstable bank/riparian area (U/S S side)

AWPAR Reconnaissance Survey (15 June 2007) Photos

Photo 5. R02 – Construction-related debris on snow/ice within channel (D/S N and S sides).

Photo 6. R02 – Construction-related debris on snow/ice within channel (U/S N and S sides).

Photo 7. R05 – Unstable bank/riparian area (U/S S side)

AWPAR Reconnaissance Survey (15 June 2007) Photos

Photo 8. R04 – Typical situation for most culvert locations (water pooling slightly U/S).

Photo 9. R04 – Water is flowing and generally free of sediment (D/S S side). This is typical of most locations.

Photo 10. Km 12 – Water flowing over road and turnout area.

Photo 11. Km 12 – D/S water generally clear with lots of travel distance to fish-bearing water.

Technical Memorandum

Date: 19 June 2007

To: **Louise Grondin, Agnico-Eagle Mines Ltd.**

Cc: **Roy Lindsay (AE), Laurier Roy (AE), Paul-Henri Girard (AE), Stéphane Robert (AE), Harvey Blouin (Nuna), Wes Danielson (Nuna), Len McHale (Nuna)**

From: **Gary Mann and Duane Hudd (North/South)**

RE: **AWPAR Mitigation Update 19 June 2007**

This technical memorandum provides an update on mitigation efforts to address the priority issues identified in the AWPAR Stream Crossing Monitoring Reconnaissance conducted on 15 June 2007. Any ***new issues*** identified since the reconnaissance are highlighted in bold italicized font.

General Conditions Update – Stream flows increased steadily over the past five days as freshet conditions strengthen. There are indications that we are nearing peak conditions, as water level increases appeared to have slowed. As previously, unseasonably cool temperatures continue to moderate melting rates. Stream flows have commenced north of the Halfway Hills (e.g., km 40+), so the days of frozen conditions are over and extra care will need to be taken to control sedimentation, particularly at bridge crossings (e.g., R09). likely resulting in a more gradual increase in stream flow and discharge rates. Notwithstanding, discharge and flow rates have risen substantially in only the past two days, particularly at crossing R02. This underscores the importance of timely action to mitigate identified risks in order of priority.

Bridges – Three bridges have been installed to date: R02, R05 and R06.

- **All** – The assessment of abutment and approach (when in stream channel) armouring (i.e., whether armouring meets requirements for peak discharge as estimated by Golder) has not been completed to my knowledge. If placement of larger material (e.g., boulders) is deemed warranted, this mitigation activity should be conducted later in the summer (i.e., outside the critical fishery window) unless road stability was threatened.

  Water quality remains generally good based on continued turbidity monitoring. Downstream conditions have been assessed in detail, with turbid water being found primarily in localized pockets (if present at all) along the channel margins and immediately adjacent to the bridge approaches; these collectively comprise a negligible proportion of the channel and discharge as a whole.

- **R02** – The issues:

  - Stockpiled materials in or immediately adjacent to the currently wetted channel (one U/S N side[1]; two D/S S side) – The two D/S S side stockpiles were excavated with a backhoe on June 16 (see photos). Detailed monitoring was conducted downstream as these stockpiles were right in the channel; water quality findings as described above. Water levels were too

[1] Locations are presented assuming all crossings have upstream (U/S), downstream (D/S), and nominal cardinal direction (north [N] and south [S]) based on general south-to-north alignment of road (i.e., regardless of true orientation, the Baker Lake side of crossings is always S and the Mine side always N).

high to safely access the U/S N stockpile (comprised of primarily of gravel-sized or larger material); this pile was washed downstream by strong flows on June 18.

- Unstable bank/riparian area associated with ice bridge approach (U/S S side) – This area was partially addressed on June 17, with larger materials collected from the D/S stockpiles. Coverage by the larger material was not adequate and placement of large gravel/small cobble material was recommended to fill in the gaps and provide further stabilization. This work was scheduled for completion by June 20.

- Construction-related materials on snow/ice present within the overall confines of the channel (U/S N side; D/S N and S sides) – The D/S S side debris was removed on June 17. Planned removal of the U/S N side (comprised primarily of angular cobbles) was abandoned due to safety concerns with high water. This material was and the D/S N side (comprised of coarse sand, cobble and boulders) was also called off. The snowbridge from the N side had melted away, which would have meant entry of the dozer into the channel for about 50 to 70 m. It was determined that this action would pose greater disturbance to the channel than the debris remaining on the snow/ice.

- ***Seepage through approach on N side of channel*** – This new task was made **high priority** on June 18, when rising water levels were approaching road height. It is clear that this long approach (approximately 80 meters of encroachment into the stream channel) will likely require several culverts to mitigate through-road seepage and associated road stability problems. Several options were considered (raise road level, cut temporary spillway, install culvert), but a combination of all three was selected to maximize road stability and hence provide the greatest control of potential sedimentation. A culvert was installed at slightly below former road height to act as a spillway and the road was built up approximately 0.75 m over the previous height. This work was completed on June 19 and will be monitored for success.

A visual survey of the downstream area will be conducted later in the summer during low water to assess the extent of the introduced material and determine the need for any follow-up work regarding adverse effects.

- **R05** – The unstable bank/riparian area was partially stabilized with boulder-size material. Coverage by the larger material was not adequate (similar to R02) and placement of large gravel/small cobble material was recommended to fill in the gaps and provide further stabilization. This work was scheduled for completion by June 20.

- **R06** – No issues were identified.

Culverts – Issues:

- **Through-road Seepage** – Downstream water continues to flow relatively clear, without significantly increased turbidity. No specific actions are needed unless conditions change and road stability is threatened.

- **Over-road Flows** – R07 was the area with the most significant flows over the road. Road height in this spot is in the process of being raised well above the U/S pooled water; this should be completed by June 20. Water flows appear to have reduced at the other locations, so continued monitoring is all that is recommended at this time.

All culvert locations (planned or new) should be clearly marked and surveyed to ensure that the proper locations are known later in the summer when the installations occur.

AWPAR Mitigation Update – 19 June 2007 - Photos

Photo 1. R02 – Stockpiled materials at stream margin (U/S N side) (15Jun07).

Photo 2. R02 –U/S N side stockpile unreachable due to high water (18Jun07).

Photo 3. R02 – Stockpiles in channel (D/S S side)

Photo 4. R02 – Stockpiles being removed (D/S S side) (16Jun07)

AWPAR Mitigation Update – 19 June 2007 - Photos

Photo 5. R02 – Turbidity monitoring downstream during stockpile removal (D/S S side) (16Jun07)

Photo 6. R02 – Shoreline after stockpile and debris removal (D/S S side) (17Jun07)

AWPAR Mitigation Update – 19 June 2007 - Photos

Photo 7. R02 – Unstable bank/riparian area (U/S S side) (15Jun07)

Photo 8. R02 – Adding boulders to stabilize unstable bank area (U/S S side) (17Jun07)

Photo 9. R02 – Adding boulders to stabilize unstable bank area (U/S S side) (17Jun07)

AWPAR Mitigation Update – 19 June 2007 - Photos

Photo 10. R02 – Road height increase and culvert spillway installation to prevent major instability and erosion on N approach (19Jun07).

Photo 11. R02 – Close up of Photo XX.

Photo 12. R02 – D/S side showing newly added culverts and road material (19Jun07).

AWPAR Mitigation Update – 19 June 2007 - Photos

Photo 13. R07 – Flow over-topping road. D/S flow clear, except when vehicles pass (15Jun07)

Photo 14. R07 – Sediment settling pond with silt curtain while road is being raised (18Jun07)

Photo 15. R07 – Settling pond showing clear water (19Jun07)

Photo 16. R07 – D/S water running pretty clear (19Jun07)

Technical Memorandum

Date: 27 June 2007

To: **Paul Savoie, DFO (Iqaluit)**

Cc: **Louise Grondin, Roy Lindsay, Laurier Roy, Paul-Henri Girard, Stephane Robert (Agnico-Eagle Mines)**

Harvey Blouin, Wes Danielson, Len McHale (Nuna M&T)

Marg Caley and Glenn Murphy (Nampsy)

From: **Gary Mann and Ryan Vanengen**

RE: **Revised Action Plan for Bridge at Crossing R09 (km 49.5)**

Issue: The next bridge on the All-Weather Private Access Road is at crossing R09 (see **Photopages 1 and 2** for general photos). The stream is flowing well now, with peak freshet having occurred approximately a week ago (see **Photopage 3** for flows just prior to freshet). Expected arrival of the road at this location is approximately July 2, 2007. From a fisheries perspective, this would likely coincide with the height of Arctic grayling migration and spawning in the stream. Consequently, the utmost care and attention will be used to implement this action plan.

Both the NWB B Licence (Part C, Condition 6) and DFO Authorization (Section 3.1) state that, among other important construction-related conditions, no in-water work shall be conducted during critical periods for fish (i.e., migration, spawning, rearing). According to DFO's Operational Statement for Clear-span Bridges, this includes the "once over, once back" fording by machinery. Based on our past monitoring shows, the critical period for fish in the streams would generally extend from the onset of stream flow through the end of July.

The challenge was to find a way to satisfy key regulatory concerns (i.e., fish and fish habitat) while allowing continued construction of the AWPAR past crossing R09. The solution presented herein was developed through an interdisciplinary approach involving fisheries biologists (environmental monitors), engineers, construction specialists, and surveyors. Several options were discussed, but one, the construction of a temporary clear-span bridge crossing, stood out as highly likely to satisfy all parties[1].

Approach: Several crossing locations were evaluated: the planned location (i.e., where the HADD will occur) and two upstream options (i.e., a single clear-span or a clear-span and culvert) (see **Photopages 4 - 6**). The selected option is the single clear-span just upstream from the permanent crossing location (marked in green on **Photopages 4 - 6**). The other two locations did not satisfactorily reduce the potential for sediment introduction into the stream. The temporary bridge will remain in place until after the permanent bridge is installed (i.e., to allow uninterrupted use of the road), which will occur outside the fisheries sensitive period (i.e., in August or later). In the long term, the temporary location will eventually be used with an ice bridge in the winter to allow passage of equipment too large for the bridge (see **Figure 1**).

[1] The temporary bridge will be clear-span only because it will not have to be built up to allow peak flows (e.g., periodic severe freshet conditions). The permanent bridge will need to be substantially higher above the channel bottom to allow for much greater discharges, thus requiring the abutment slopes to slightly encroach into the channel.

The construction sequence and schematics are shown in **Figures 2 - 5**. Low-pressure ground mats comprised of an outer layer of geotextile wrapped around a clean gravel fill will be used to spread the load, protect the stream bank, and entrain any fines. Timber blocking will then be used on top of the mats to support the Rapid Span sections. The estimated base width of the temporary bridge will be approximately 9 m, easily spanning the entire stream channel. Clean coarse material will be used for the bridge approaches in the vicinity of the crossing to prevent fine material washing into the stream.

In addition to designing the general approach to reduce the potential for introducing sediment into the stream, rigorous sediment control measures will also be deployed. Sediment control measures will include the geotextile described above, with silt curtains installed on both the upstream (i.e., to minimize water passage through the coarse road base during any rain event) and downstream (i.e., to form a small wall that acts as a settlement pond and filter).

The potential risks to aquatic life in the stream will largely depend on the success of the approach to protect the stream channel and limit sediment introduction, and on the actual timing of construction relative to freshet. Based on our past monitoring and the estimated time of arrival of the road construction, construction will coincide with the peak migration and spawning period. Despite careful construction and implementation of redundant sediment control measures, limited sediment introductions are possible. Stream crossing monitoring conducted to date (i.e., at R02, R05 and R06), even during high freshet flows, did not identify any significant sedimentation issues. While some localized pockets of moderate turbidity were detected along the margins of disturbed areas, they comprised only a small fraction of the channel flow and posed negligible risks to fish or fish habitat. Given that no bank disturbance should occur, adverse effects to fish or fish habitat are unlikely. As with all the crossings, environmental monitoring will be an integral part of the construction and post-construction process. Fisheries biologists Ryan Vanengen (B.Sc.) and Corey Hoes (B.Sc.) will be conducting turbidity monitoring, supported by Tom Mannik (has worked on Meadowbank environmental aspects since 1996) of Baker Lake. Any sediment sources identified will be addressed immediately to mitigate the issue. While highly unlikely given the care and planning of this undertaking, work will be stopped if necessary to control serious situations.

Timing and Approval: As discussed yesterday, time is of the essence as the projected arrival date of the road at R09 is Monday, July 2. As I will be in transit back to Vancouver, please use the “reply all” on the transmittal email to relay any comments or concerns to the team.

Thanks in advance for your review and comments,

Gary

Photoplate 1: Crossing R09 – Past Photos

R09 – Drainage (early June 2005)

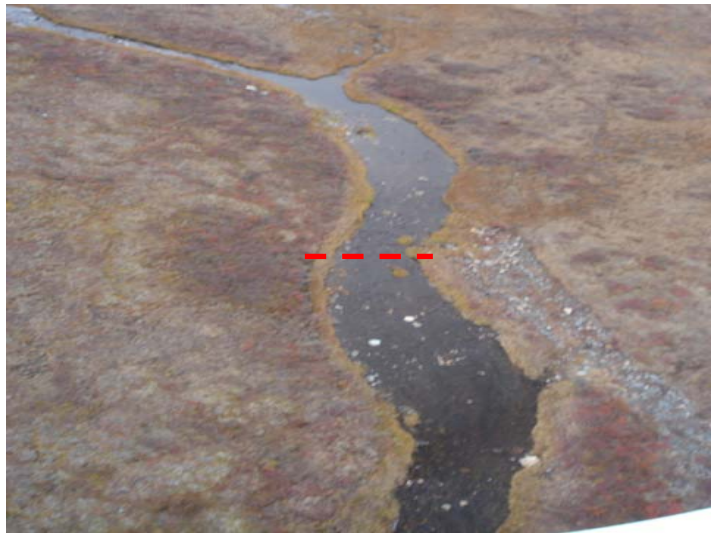
R09 – DS (July 2005)

R09 – upstream (late June 2005)

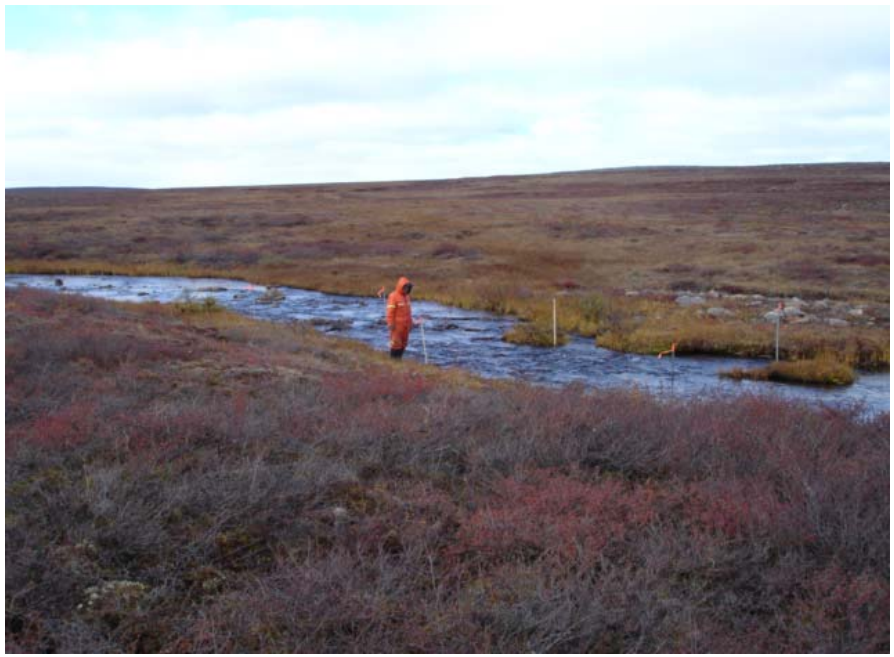
R09 – drainage (July 2006)

Photoplate 2: Crossing R09 – Past Photos

R09 – HADD crossing location (Sept 2006)



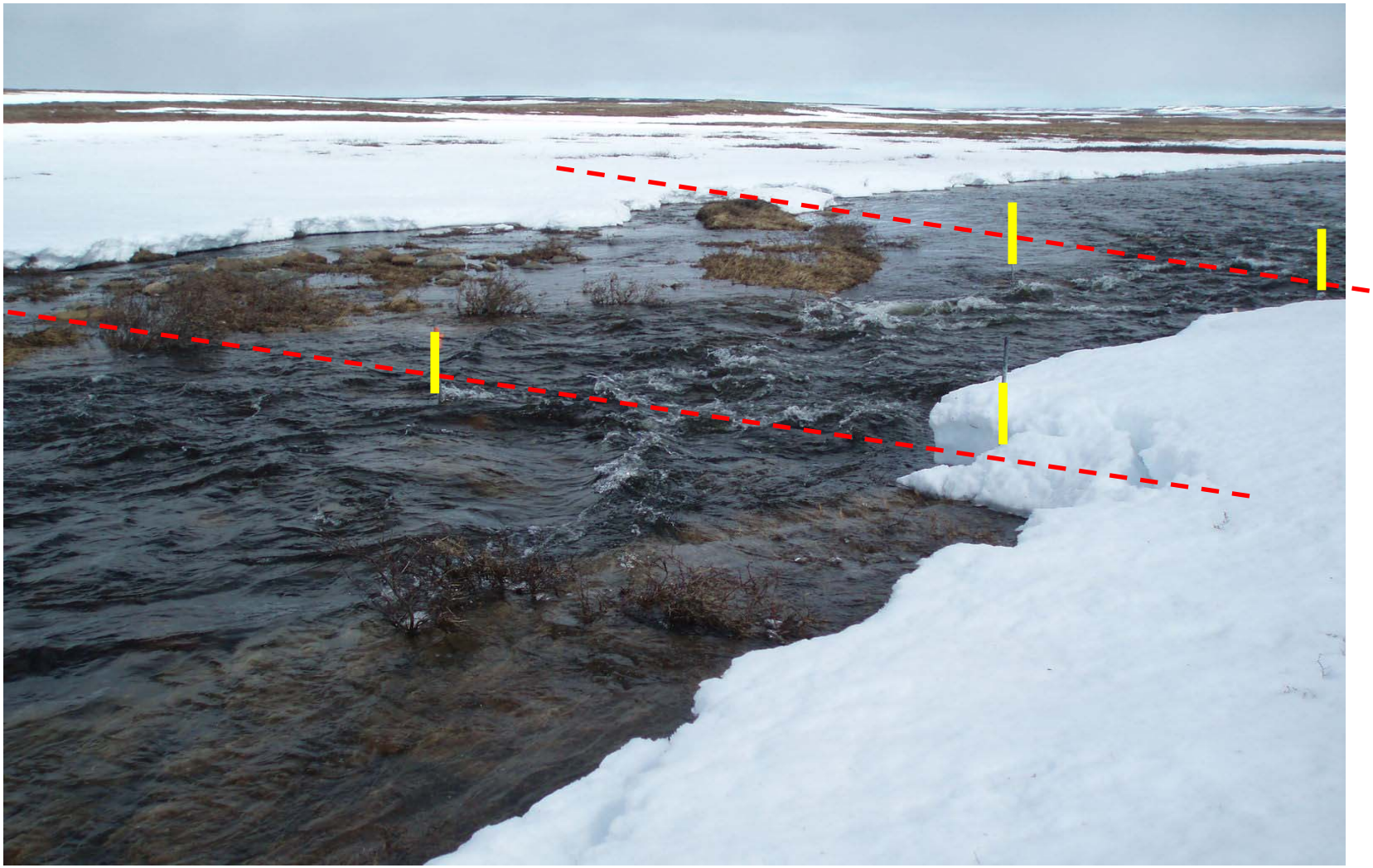
R09 – HADD Crossing (Sept 2006)



R09 –HADD crossing with stakes (Sept 2006)

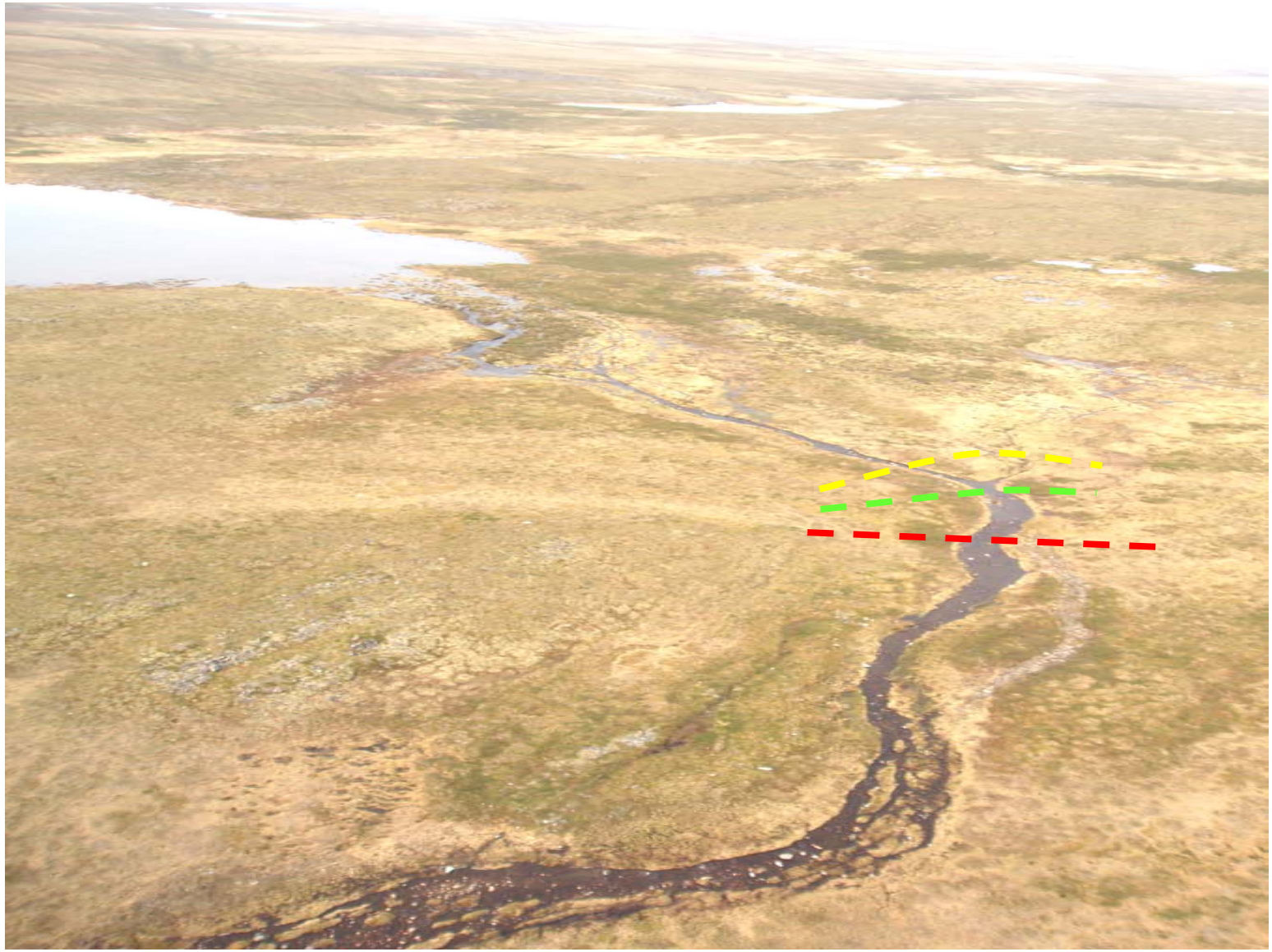
R09 – HADD crossing with stakes (Sept 2006)

Crossing R09 – 2007 Photos (18 June)



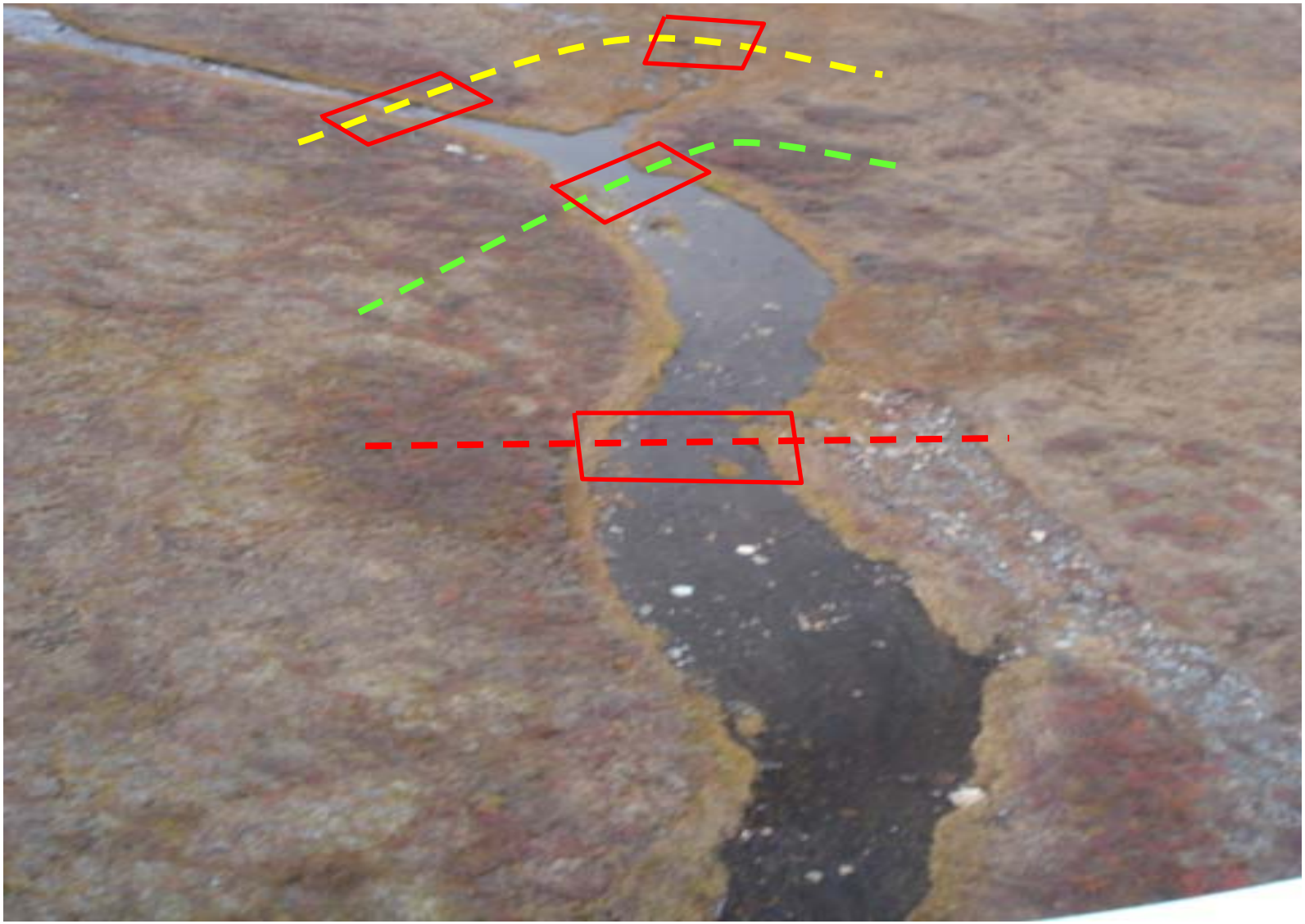
R09 – looking at HADD crossing (18 June 2007); posts highlighted in yellow and bridge margins in red.

Photoplate 4: Crossing R09 – Temporary clear-span options.



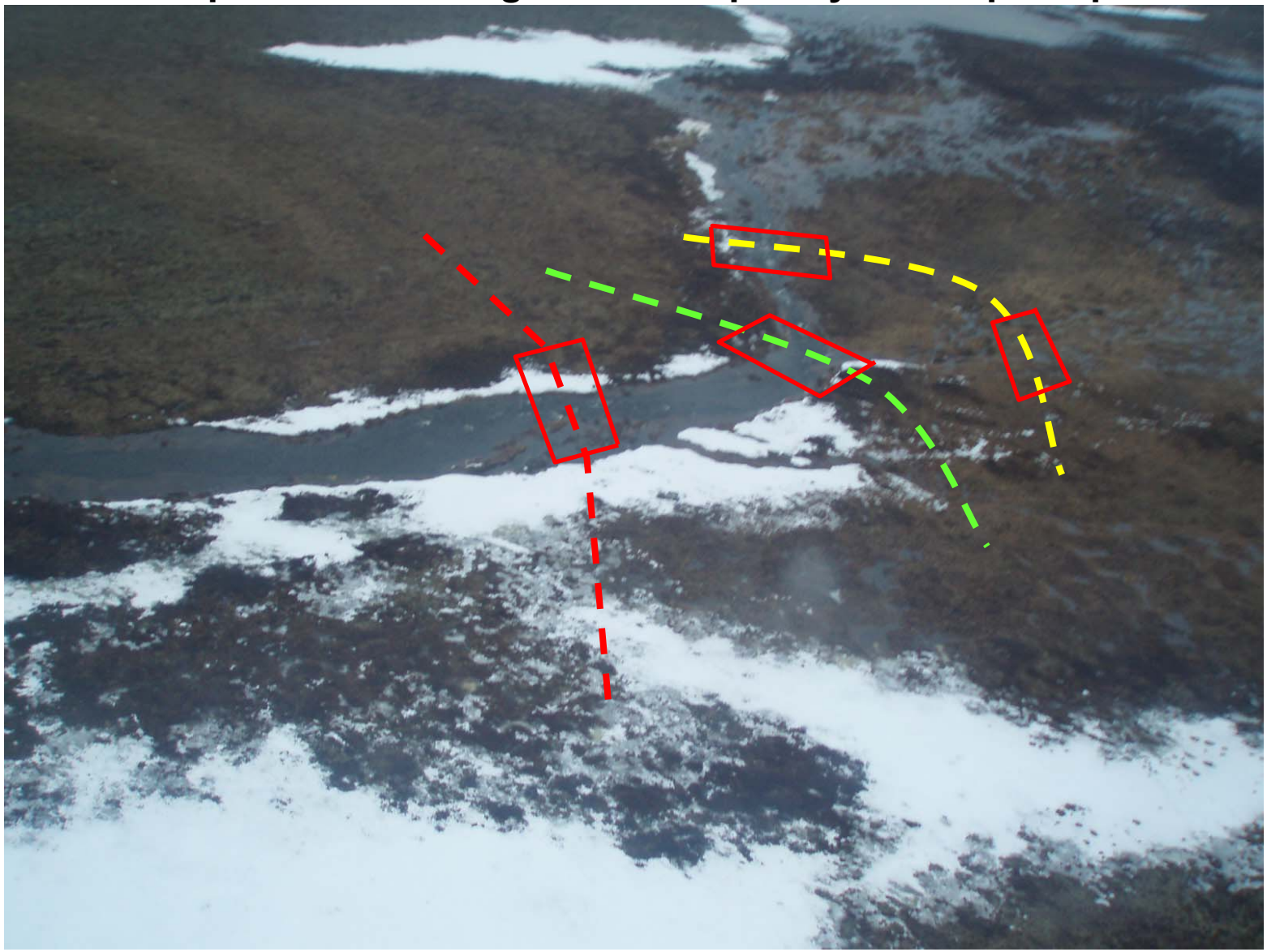
R09 – Overview of existing (red) and optional crossing locations (green and yellow) looking U/S (Sept 2006).

Photoplate 5: Crossing R09 – Temporary clear-span options.



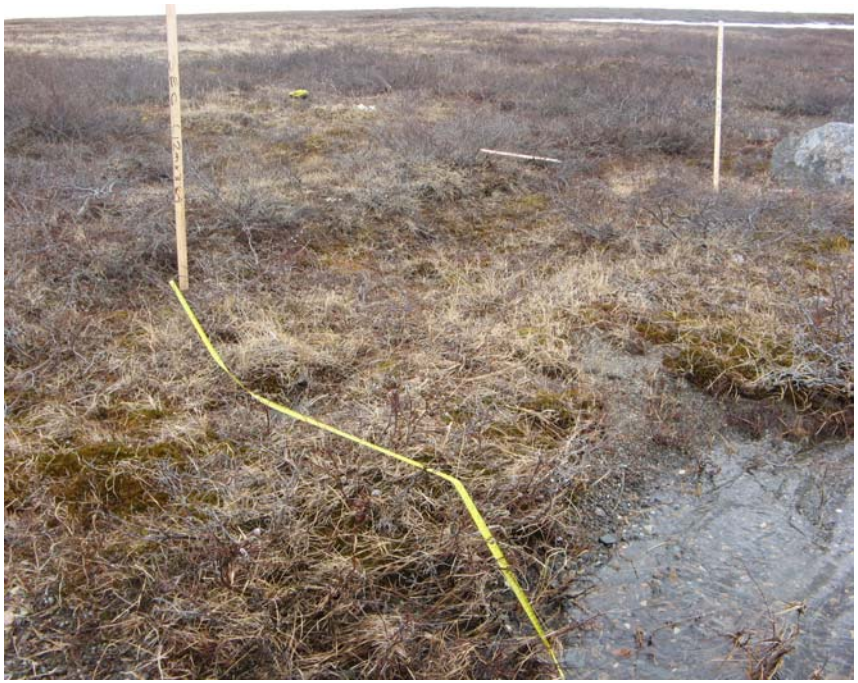
R09 – Existing (red) and two optional crossing locations (green and yellow) looking U/S (Sept 2006).

Photoplate 6: Crossing R09 – Temporary clear-span options.

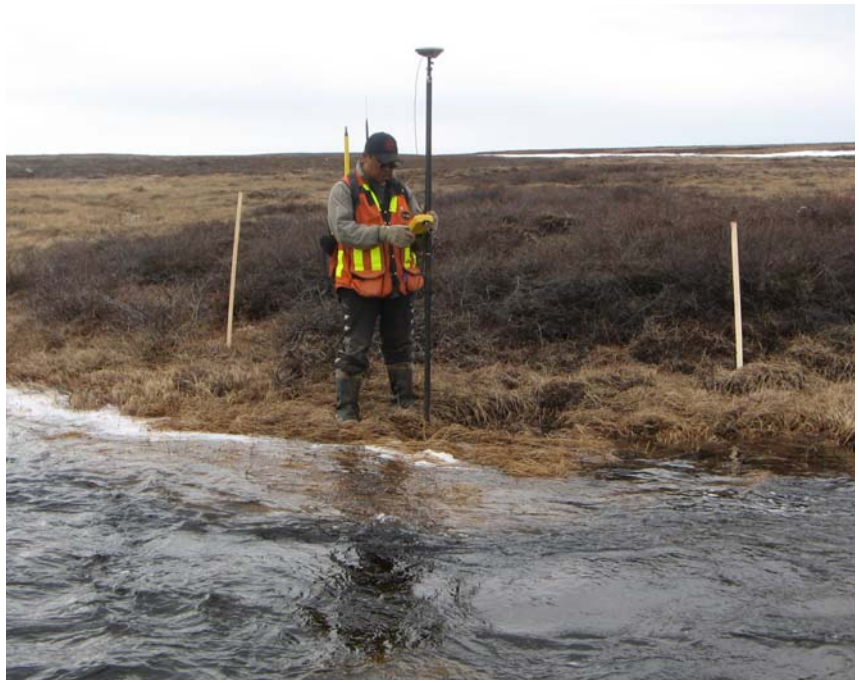


R09 – Existing location (red) and two options (green and yellow) looking from the N (22 June 2007).

Photoplate 6: Crossing R09 – Most Recent Photos



R09 – Temp crossing S side (25 June 2007)



R09 – Temp crossing N side (25 June 2007)

Figure 1. Overview of R09 Temporary Clear Span (left bridge).

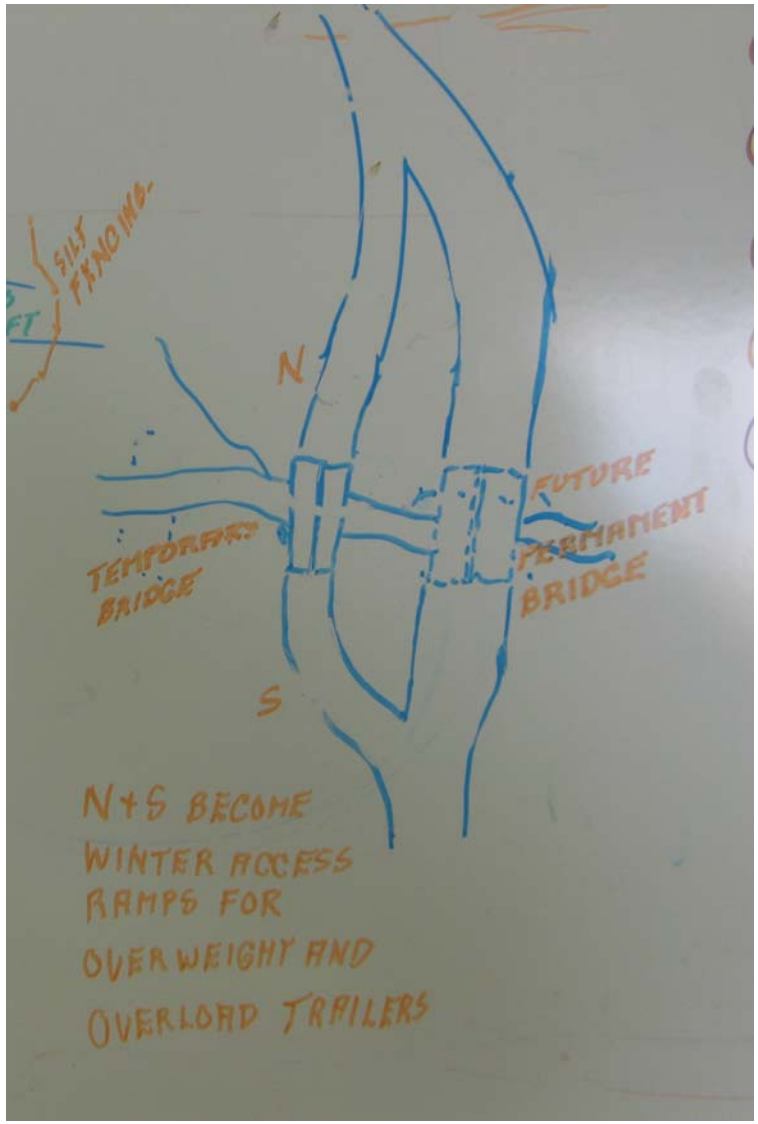


Figure 2. Construction Sequence R09 Temporary Clear Span.

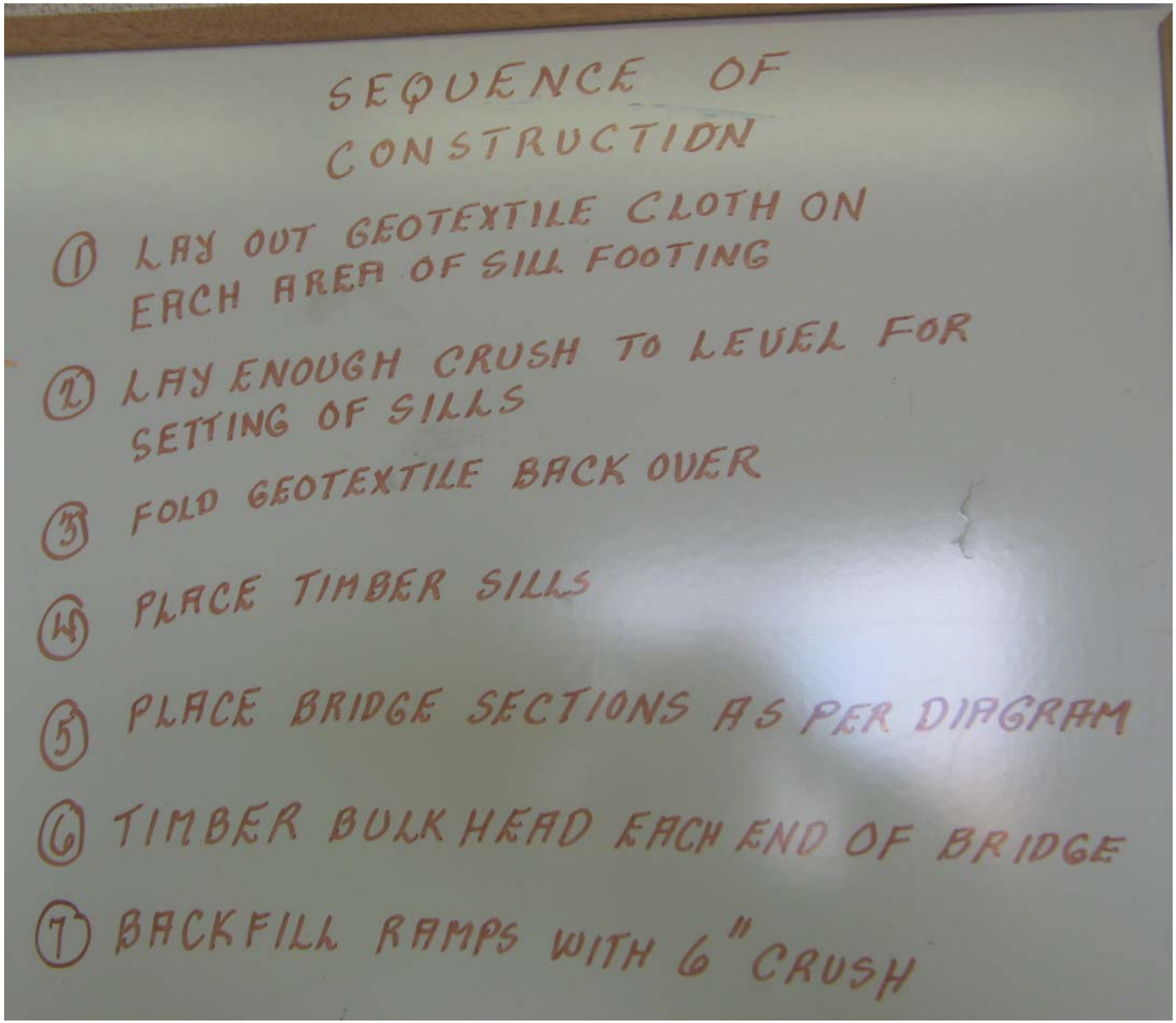


Figure 3. X-sectional Diagram of R09 Temporary Clear-Span Bridge.

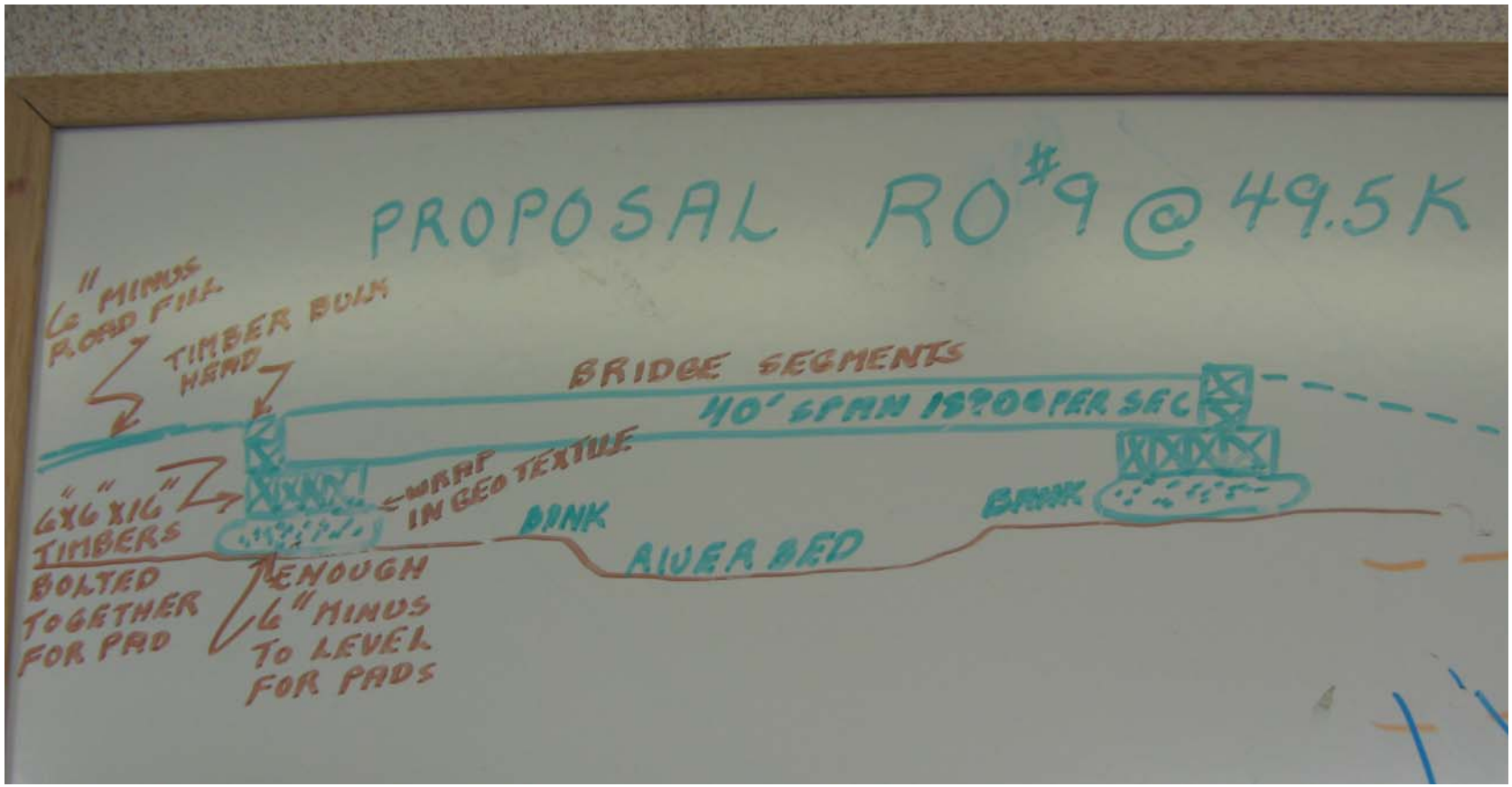


Figure 4. X-sectional Details for R09 Temporary Clear-Span Bridge.

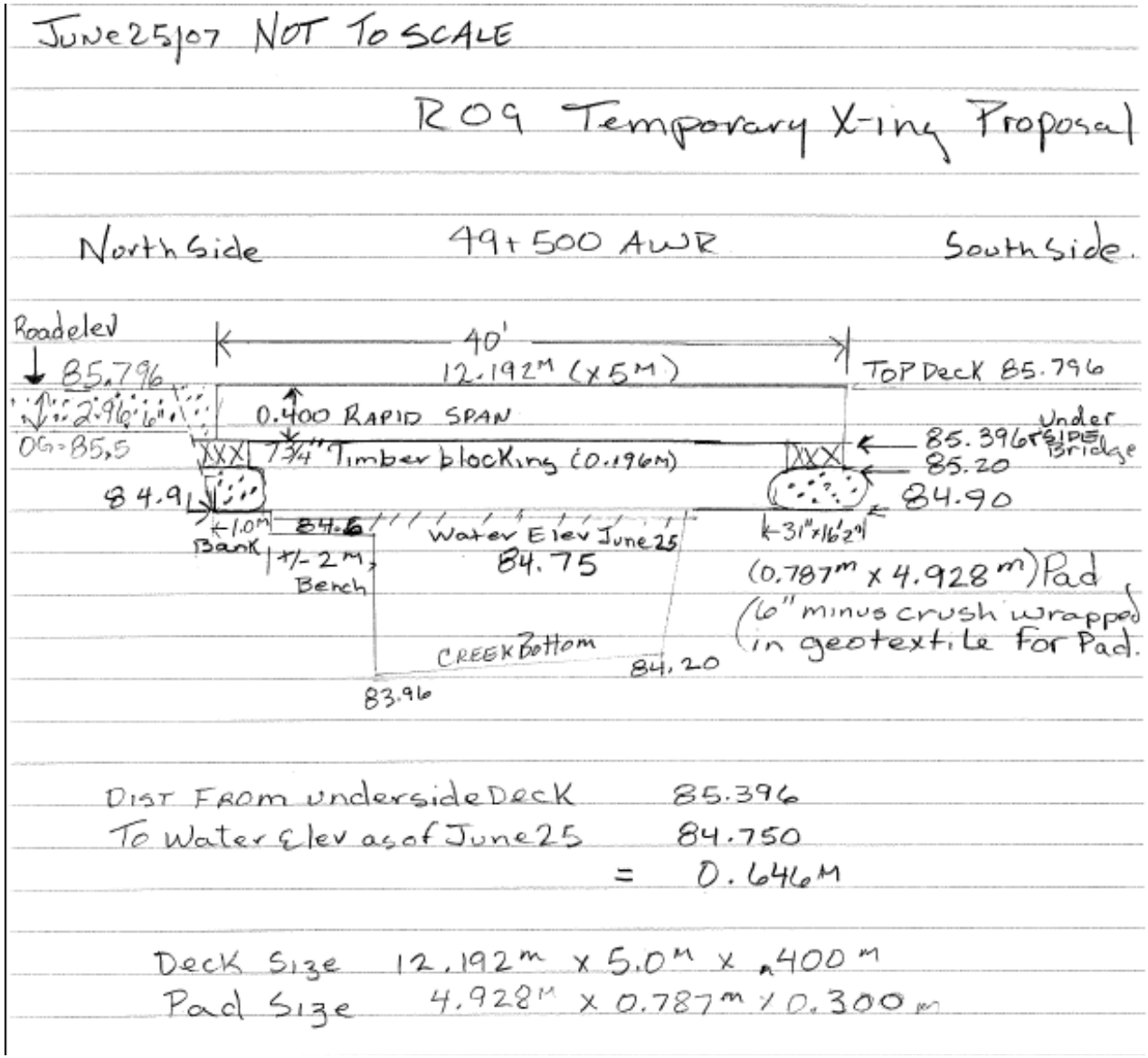
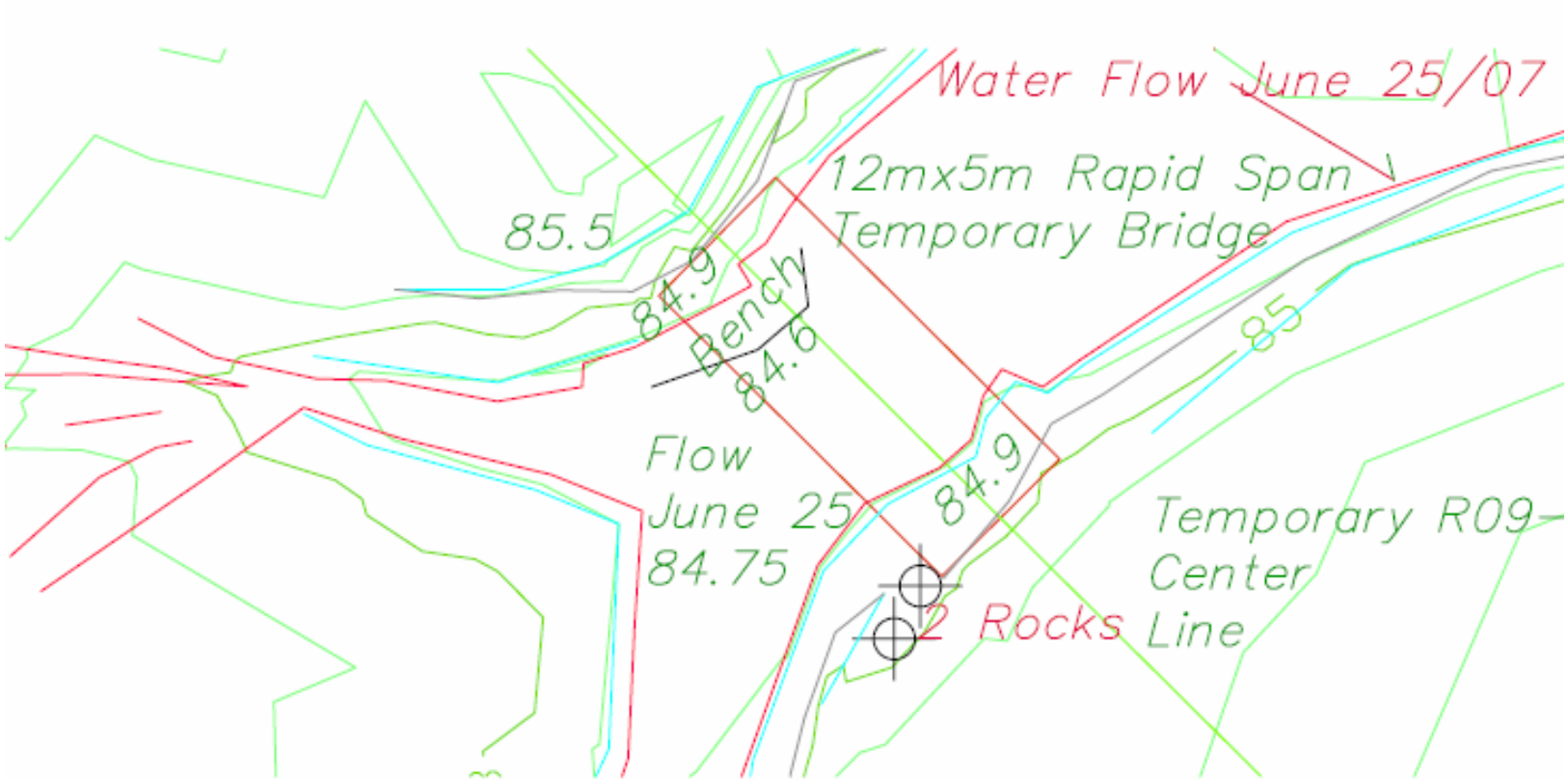


Figure 5. Drawing of Temporary Clear-Span Bridge.



Technical Memorandum

Date: 7 August 2007

To: **Paul Savoie and Amy Liu, DFO (Iqaluit)**

Cc: **Louise Grondin, Roy Lindsay, Laurier Roy, Paul-Henri Girard, Stephane Robert (Agnico-Eagle Mines)**

Harvey Blouin, Wes Danielson, Len McHale (Nuna M&T)

Marg Caley and Glenn Murphy (Nampsy)

From: **Gary Mann**

RE: **Meadowbank All-weather Private Access Road (AWPAR) - Crossing R13 Action Plan**

Introduction

The purpose of this technical memorandum is to inform DFO of the planned approach for the next bridge (R13), approximately 63.5 km from the start of the road, which is expected to be reached in the next week. As the planned installation is a clear span and will follow DFO's Operational Statement for Clear-Span Bridges, the R13 bridge is not included in the DFO Authorization. Consequently, this is an update for informational purposes only.

Bridge R13 Plan

Overhead and side views of the R13 crossing location are provided in **Photoplate 1**. The red "X" markers in **Photo 1** show the extreme margins of the braided channel system in the crossing zone. The four-wheeler tracks adjacent to the road alignment give an approximate scale for the photo. **Photo 2** shows the crossing zone from a different angle.

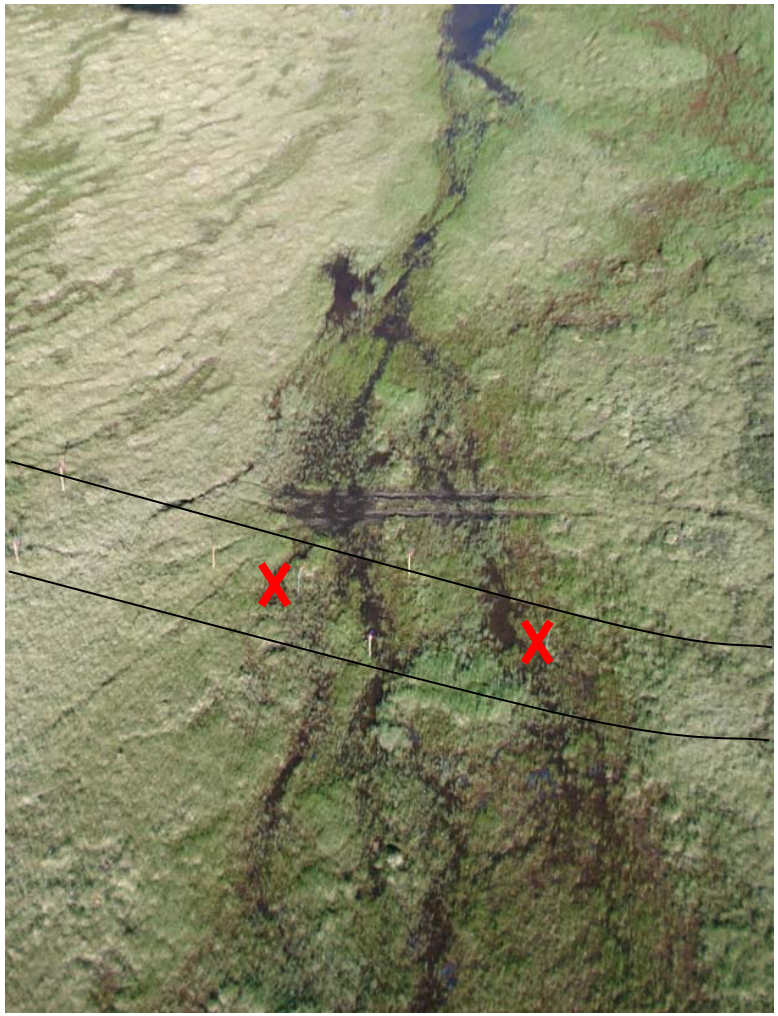
The fisheries sensitive window for this area, set from the onset of freshet to the end of July, is now over. This allows the construction of clear span bridges following the conditions stipulated in the operational statement. With road advancement a major construction goal, bridge installation plans for R13 have been modified slightly. Similar to R09 (see diagrams on R09 bridge installation sent on 27 June 2007) , where a temporary clear-span bridge was installed without entering the water, a temporary span (which is much faster to install) will be constructed first to allow the passage of equipment necessary to continue road building. The permanent bridge, also spanning the creek channel, will be constructed at a later date and will also follow the conditions of the DFO operational statement.

We will continue to employ the rigorous sediment control measures used at all open water bridge installations and have a monitor on site to provide real-time data on their success and help mitigate if necessary.

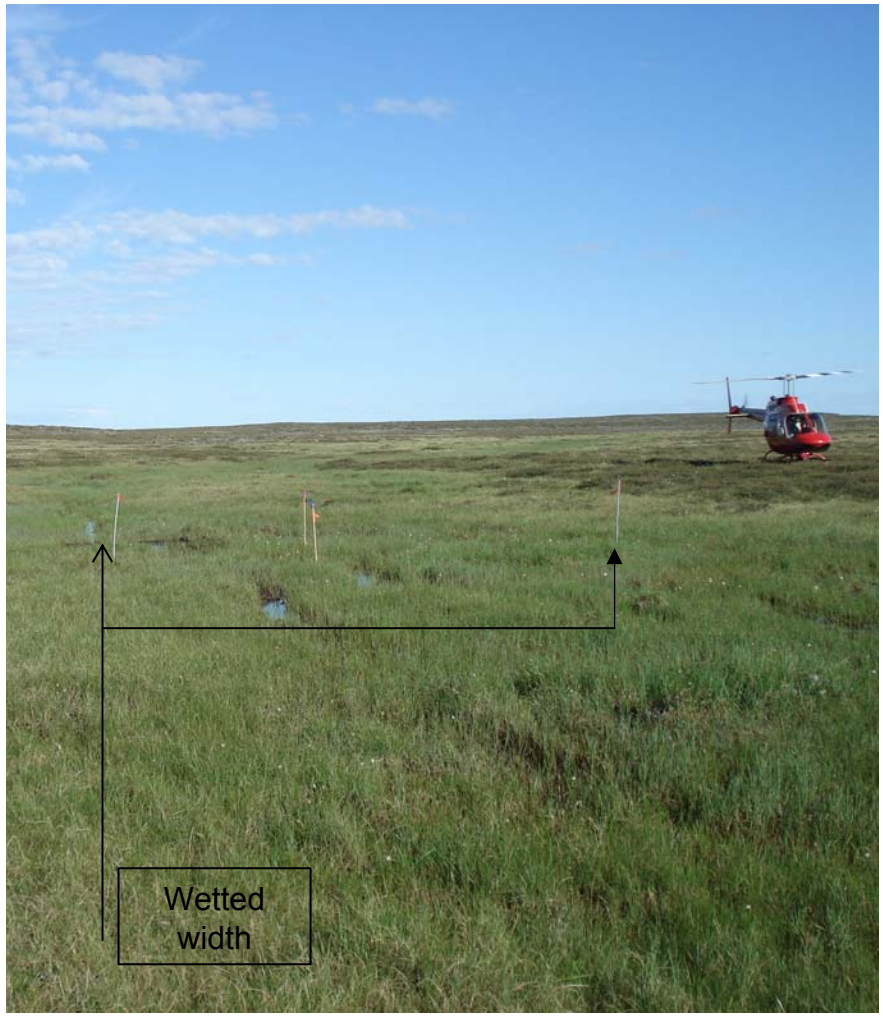
Please let us know if you have any issues or comments on this plan. Thanks in advance for your review,

Gary

Photoplate 1. Crossing R13 Photos



R13 – Channel boundaries – aerial view (July 2007)



R13 – Channel boundaries – ground view (July 2007)

Technical Memorandum

Date: 21 August 2007

To: **Amy Liu and Paul Savoie (DFO Iqaluit)**

Cc: **Louise Grondin, Roy Lindsay, Laurier Roy, Paul-Henri Girard, Stephane Robert (Agnico-Eagle Mines)**

Harvey Blouin, Len McHale (Nuna M&T)

Marg Caley and Glenn Murphy (Nampsy)

From: **Gary Mann, Wayne Kirkham (Nuna M&T) and Duane Hudd (North/South)**

RE: **Meadowbank All-weather Private Access Road (AWPAR) – R15 Action Plan**

Issue

The next bridge on the AWPAR is at crossing R15 (see **Photos**), located at km 70.5. Expected arrival of the road at this location is approximately 7 to 10 days.

R15 is a HADD crossing included in the Authorization for the AWPAR. The planned permanent bridge is a Bailey (30-m) with minimal channel encroachment by the abutments on both sides. One of the logistical challenges of not completing the road during frozen conditions as planned is that this style of bridge cannot safely support and/or is too narrow to allow passage of much of the equipment needed to continue road advancement on the north side of the crossing (e.g., loaded trucks would need to cross the bridge in order to dump material). Installation of the planned permanent bridge at this time would bring road advancement to a halt until the crossing is frozen and loaded trucks can pass on a snow bridge.

The other bridge type used on the AWPAR, the 12-m Rapid Span, has been installed temporarily with minor modifications to allow passage of all road construction equipment (e.g., this was done at R09). The width of the stream channel at R15, however, is too great to install a single Rapid Span bridge without incurring a much larger HADD than that authorized.

The crossing was visited on August 14th to develop a strategy that addressed regulatory concerns (i.e., protection of fish, fish habitat and water quality) while allowing continued construction of the AWPAR past crossing R15. The approach presented herein was developed through an interdisciplinary approach involving fisheries biologists (environmental monitors) and construction specialists. Several options were discussed over the ensuing days, but one, the temporary installation of two Rapid Span bridges in series, stood out as the most likely to satisfy all parties.

Approach

The proposed crossing design for R15 is presented in **Figure 1**. The north and south abutments would be constructed within the authorized HADD footprint, so should not be a problem. The planned base width (i.e., stream channel untouched by bridge construction material) for the authorized bridge is 23.4 m (76.8 ft) and the stream channel is 27.5 m (90.2 ft), leaving approximately 2 m on each side of the channel for the abutments. Stream flows are currently low, so the areas where the abutments will be constructed are mostly dry (see aluminum stakes marking final base width in **Photos**). The abutments will be constructed of geotextile-wrapped

coarse rock (6" crush) with a timber pad on top. This will facilitate removal of the structure to make way for the installation of the permanent bridge in frozen conditions.

The main issue with this approach is that a central support structure is needed for the middle of the temporary two-span bridge. As shown in **Figure 1**, the centre bearing pad, consisting of two layers of six timber beams (7.75" x 7.75" x 16') bolted together, would be resting primarily on exposed boulders in the stream channel (see **Photos**), thus minimizing disturbance of the streambed and stream flow. The substrate in the crossing area ranges from cobbles to boulders (see **Photos**). Timber shims, possibly resting on submerged boulders, will be used to level the bridge and will be the only portion of the bearing pad structure that may be in the water. The bearing pad itself would have a footprint of approximately 4 ft by 16 ft, with the long side being parallel to stream flow. With a base width of 76.8 ft, this represents just over 5% of the final channel width, or approximately 10% of the current wetted width. Thus, this structure would have minimal direct impact on the streambed (i.e., due to the pad resting on primarily on exposed boulders) and should have little to no impedance of stream flow.

Another consideration is that constructing this temporary bridge will require much less in-stream work than would installation of the permanent Bailey bridge at this time (i.e., due to the much more simple abutment construction techniques).

In summary, the proposed approach for R15 has been designed to minimize effects to the stream channel and its inhabitants while allowing road advancement to continue.

Sediment Controls and Monitoring

Sediment control measures used to date on the AWPAR have been quite successful. In addition to using clean, coarse material in and around the stream channel (i.e., minimizing potential sources), a system of silt fences and silt curtains will be used to control fine material around the abutments. This will be achieved by installing double silt fences parallel to shore, wrapping closely around the abutments. Silt curtains will be used on the upstream sides of the abutments to divert water away from the construction area if needed (the low water levels currently present may not warrant the use of these control measures, but they will be on hand just in case).

In addition, an environmental monitor will be on location during installation to measure upstream and downstream turbidity for real-time feedback on sediment control measures. Mitigative measures will be implemented immediately if any unacceptably high turbidity results are measured.

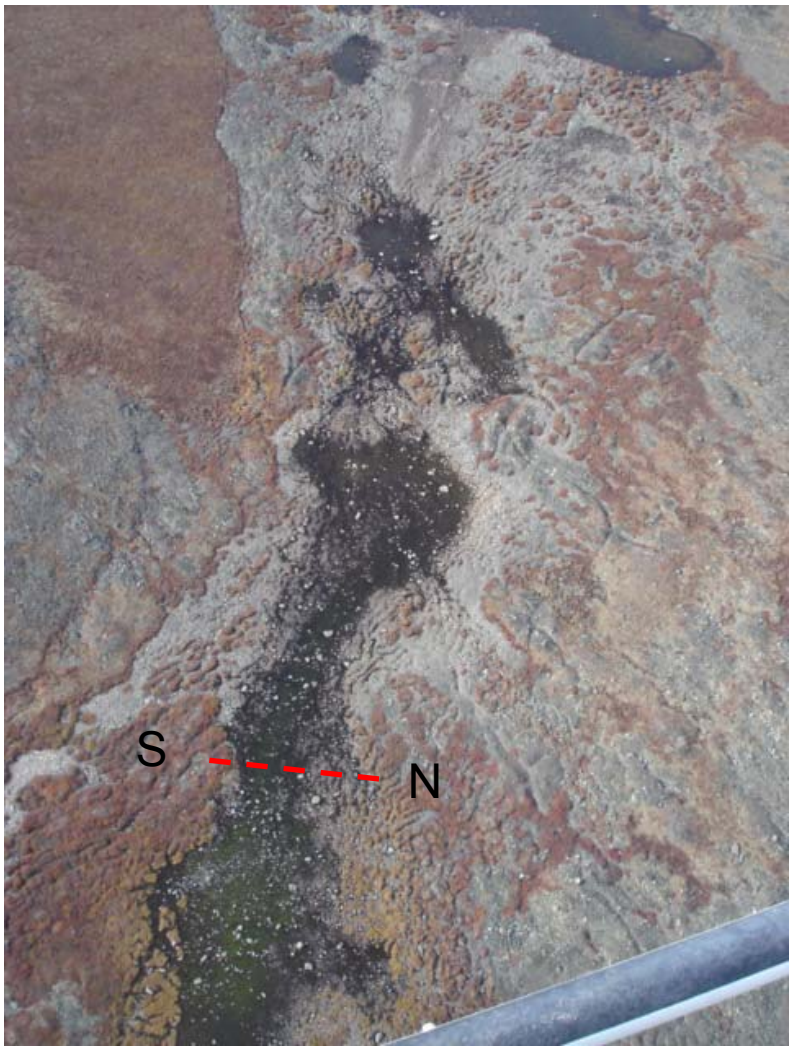
Timing and Approval

At the present rate of road advancement, anticipated arrival at the first realignment location will be in 7 to 10 days. As indicated previously, this in an extremely important issue for the AWPAR as road advancement will have to stop unless a solution can be adopted. We have tried to devise an approach that satisfies all concerns, but welcome any feedback could improve our plan. Ultimately, we need your approval to implement this plan. I will be contacting you later this week to discuss the matter by telephone. In the meantime, I can be reached at the Meadowbank Camp office (604.608.2557).

Thanks in advance for your review and comments,

Gary

Crossing R15 Photos



R15 – Crossing overview (Sept 2006)

R15 – Crossing zone from N (Sept 2006)

R15 – Crossing zone from S (Aug 2007)

Crossing R15 Photos

R15 – Crossing zone from S showing downstream base width stakes (Aug 2007)

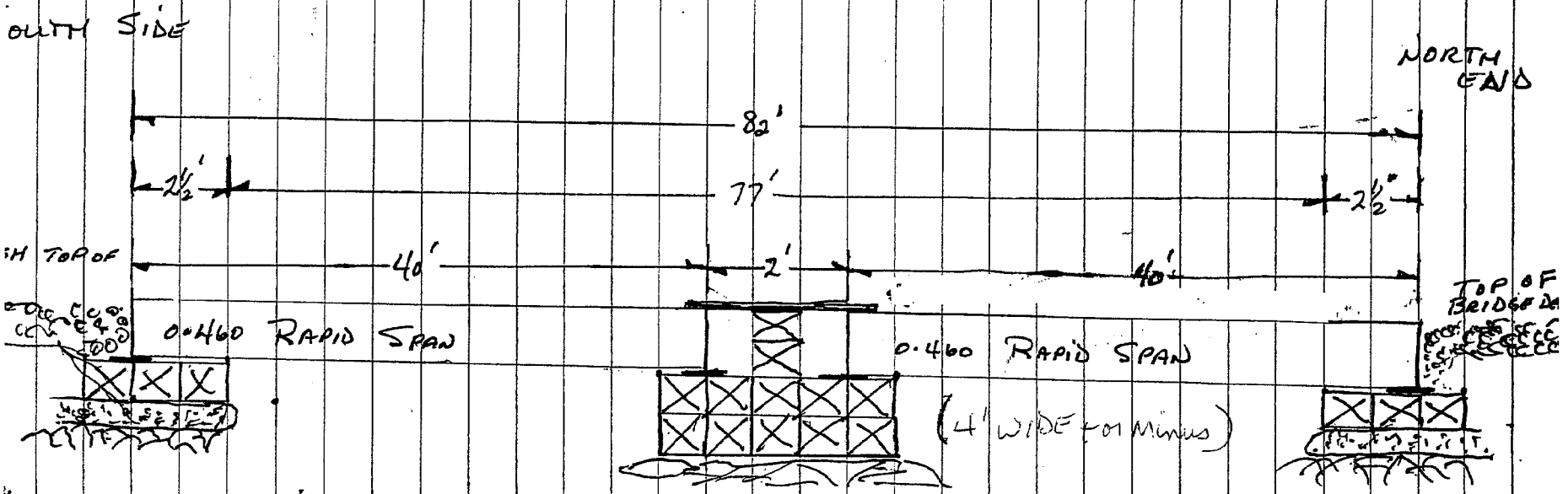
Crossing R15 Photos

R15 – Channel substrate with exposed boulders in crossing zone (Aug 2007)

TEMPORARY BRIDGE R15 - LOCATION KM 70+500

PROPOSAL - USE 2 RAPID SPAN TO CROSS STREAM AT CHANNEL MARKER

CHANNEL MARKERS - 82' TOTAL SPAN.
- 77' BASE WIDTH



CRUSH WRAP IN GEOTEXTILE
7¾ X 16' LONG TIMBERS BOLTED TOGETHER
EU. OF MATCH TO BE CENTER SPAN BEARING
. NORTH SIDE TYPICAL TO SOUTH SIDE

L ELEVATIONS TO BE FIELD SET.

T SCREEN WILL BE PLACED ALONG THE
E RUNNING DOWN STREAM IN FRONT OF
TH/SOUTH BEARING PADS.

- NATURAL ROCK IN STREAM BED.
MID SPAN BEARING PAD TO BE BLOCKED LEVEL
- BEARING PAD IS 6-7¾" X 7¾" X 16' 2 LAYERS. UNDERSIDE OF BRIDGE ELEVATION APPROXIMATELY 16" ABOVE TOP OF WATER.
- MID SPAN BEARING PADS WILL BE SUPPORTED BY NATURAL ROCK IN STREAM BED EXCEPT FOR TIMBER SHIMS REQUIRED TO LEVEL TIMBER PAD.

- 5/8 STEEL PLATE WILL BE PLACED OVER THE 2' SEPARATION BETWEEN BRIDGE DECK WITH 8"x8" x 16' TIMBER BLOCKING TO SUPPORT THE PLATE.

APPENDIX D

INAC INSPECTION REPORT AND AEM RESPONSE TO INAC INSPECTION

Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

INAC, Nunavut District
P.O. Box 2200
Qimuggjuk Building
Iqaluit, NU, X0A 0H0

Submitted Via E-Mail
Our File: 8BC-TEH0708
Your File:_____
CIDM #174348

September 27, 2007

Louise Grondin
Vice-President Environment
Agnico-Eagle Mines Ltd
20 route 395, Cadillac, Qc, J0Y 1C0
Tel : 819-759-3700 ext. 806
Fax :819-759-3663
Cel :819-724-2020
e-mail : louise.grondin@agnico-eagle.com

RE: Water license inspection of Meadowbank Road Construction Project (Water Crossings) conducted June 26th, 2007

The Water Resources Officer (WRO) appreciates the assistance and cooperation provided by Mr. Martin Archambeault, acting environmental coordinator and Mr. Laurier Roy, road construction foreman and Mr. Gary Mann of Azimuth Consulting Group who accompanied the Inspector during the inspection of the Meadowbank Road Construction project.

The following report is based on observations made at the time of the inspection and a review of documents required by the Nunavut Water Board (NWB) and posted on the NWB FTP site.

Part A: Scope and Conditions

At the time of the inspection of the all-weather road, Agnico-Eagle Mines Ltd had just recently taken ownership and control of the project. At the time of the inspection 4 of 10 bridges had been constructed and 6 of 13 listed culverts were installed. During the inspection it was noted that there were a number of locations where culverts should and will be installed that were not originally listed in the application. These modifications are to be submitted to the Nunavut Water Board.

The license is classed as Water Crossing (Bridges and Culverts) as indicated on the License form.

Additionally, a review of the Nunavut Water Board web site was not able to produce any documentation relating to the assignment of the Meadowbank Access Road license nor an amendment related to the same. The proponent is required to provide this information to the Inspector and the Nunavut Water Board as soon as possible.

Part B: General Conditions

Water use fees are not applicable to this license as outlined by Section 9 of the Regulations.

The proponent is reminded that an annual report is required to be filed by March 31st 2008 for the year ending December 31st 2007.

The annual report must contain all items listed within this Part and items identified in Part I – Conditions Applying to the Monitoring Program. A copy of the Annual report should also be sent to the Inspector at Keima@inac.gc.ca .

Further and more specifically the monitoring results to be included in the Annual report must contain the following information;

- Results of sampling both from the constructed roadway and quarry sites to confirm that quarry rock used in the construction of the road are not acid generating.
- Results of sampling both run-off and quarry sites for TSS
- Results of sampling for explosive by-products both from run-off from road way construction and within the quarry sites.

A review of the Nunavut Water Board FTP site found a Water Management and Monitoring Plan. (see comments under Part I Monitoring)

The licensee is reminded that the Nunavut Water Board must approve of a Water Management Plan and this approval, if supplied should be submitted to the inspector for review within 30 days of receipt of the inspection report

The licensee is reminded that any changes in the operating plans or conditions associated with this project, including any variation in the construction or route, creation of previously unidentified lay-down areas or camp sites, construction of sumps for deposit of waste must be submitted to the Nunavut Water Board 30 days in advance of their construction or implementation.

The licensee is reminded that it is the responsibility of the licensee to ensure that any documentation submitted by the licensee to the Nunavut Water Board is acknowledged by the Manager of Licensing.

Part C: Conditions Applying to the Protection of Water

Of the 17 conditions contained in this part the inspector noted as follows;

- No evidence of contaminants was found entering water during the inspection.
- Evidence of sediment and erosion control was noted and documented during the inspection.
- In-stream activity was limited to fish surveys which were on-going during the inspection.
- All quarry and stock piles sites exceeded the minimum of 30 metre distance from water.
- The timing of the inspection prevented the observation of heavy equipment traversing tundra or open ground. Rutting was noted at one bridge (Number 2) where evidence of heavy equipment tracks was noted at the shoreline. A determination of when this occurred i.e.: Ice crossing or stream crossing was impossible at the time of the inspection.

During the period of Inspection, Mr. Laurier Roy (road construction foreman) stated that there were additional locations identified since construction began that require culvert installation. These areas were marked along the route and are to be identified to the Nunavut Water Board as changes or modifications. The installation of these extra culverts is to meet the objectives of this Part including the protection of surface drainage paths, and preventing erosion under the roadway and sedimentation into water bodies.

The Licensee is reminded that Section 17 of this part echo's the requirement for reporting on the use of quarry rock in the construction of the access road. This report, including a detailed analysis of samples collected, is to be included in the annual report.

Part D: Conditions Applying to Waste Disposal

No open burning or land filling was noted during the period of Inspection.

The proponent is reminded to include in the 2007 annual report due on March 31st 2008 a list of hazardous materials and domestic wastes shipped out, the location of the licensed facility to which they were shipped and the treatment, if any, they received. All of the foregoing is required information to be included in the annual report. Shipping and receiving invoices are not required so long as the records are available for inspection during the 2008 inspection season.

Part E: Conditions Applying To Construction

No on-ice work was observed during the period of this inspection. It is recommended that the inspector conduct an inspection during the winter months and in early spring to monitor compliance with this part.

The Inspector, during the period of inspection, did not note any encroachment on the natural path of any water body where a crossing had been installed.

The Licensee is reminded that within 90 days of construction completion the Licensee shall submit as-built drawings of the access road and all water crossings, stamped by a qualified engineer to the Nunavut Water Board.

Part F: Conditions Applying To Drilling Operations

No Drilling is authorized under this license.

Part G: Conditions Applying To Spill Contingency Planning

During the period of inspection one spill report was received and reviewed with staff of Agnico-Eagle. During the road inspection a stop was made at the noted location of the spill. Evidence of the spilled product was not evident at that time.

The Licensee is reminded that pursuant to section 6(2) (g) (i) and (ii) of the *Northwest Territories Waters Regulations* a spill contingency plan is required to be submitted with the application for a water license and the approved Plan is to be kept on site of operations. This plan was to have been submitted to the Nunavut Water Board within 30 days of the issuance of the current license.

A review of the Nunavut Water Board web site produced one document entitled "061117 8BC-TEH Spill and Emergency Contingency Plan for Cumberland Fuel Storage at Baker Lake". This document is an e-mail from Jim Roger's of INAC to Cumberland Resources. The topic of which is the distribution of a spill plan related to the storage of fuel in barges outside of Baker Lake.

A further review identified a Shipboard Oil Pollution Emergency Plan (SOPEP). This document however is not relevant to the development or submission of a spill plan for the road construction.

The licensee is reminded that section 5 of this part requires the licensee to ensure that any emergency equipment maintenance and servicing be conducted only in designated areas and to implement special procedures to prevent spills of these products from entering the environment.

Additionally, the licensee is reminded that for each spill occurrence, the licensee is required, no later than 30 days after the initial report to the 24-hour spill line, to submit a detailed report to the inspector outlining the amount and type of product spilled and the measures taken to contain and clean up the spill.

Part H: Conditions Applying To Abandonment And Restoration

As the construction of the project is still on-going there was no discussion at the time of the inspection concerning plans for abandonment and restoration.

Part I: Conditions Applying To The Monitoring Program

A review of the Nunavut Water Board FTP site did find a Water Management and Monitoring Plan developed for Cumberland Resources by Golder Associates.

Further review of the FTP site was not able to produce an approval document from the Nunavut Water Board accepting the plan as complete. The absence of this document and a reading of the comments

supplied by the INAC analyst who reviewed the document when released for review by the Nunavut Water Board lead the Inspector to question both the completeness of the document and question whether or not the Plan, as is, has been approved by the Nunavut Water Board.

Additional to the question of completeness of the plan is an issue of compliance with the plan. Section 4.1 Frequency of the Plan states that sampling reports will be submitted monthly to the Nunavut Water Board. A review of the NWB FTP site does not include submissions of any sampling reports from the Licensee.

The licensee is reminded that the Nunavut Water Board must approve of a Monitoring Plan and this approval, if previously supplied to the company should be submitted to the inspector for review within 30 days of receipt of the inspection report.

The Licensee is reminded that the current license expires in February of 2008. The annual report required is due no later than March 31st of 2008 and must include all items as listed in the terms and conditions of the license.

Non-Compliance:

During the period of inspection a number of items were noted and were discussed with representatives of Agnico-Eagle Mines at that time. The following is a list of items which are to be addressed or brought into compliance either by the date of the next inspection or within the deadlines outlined in the terms of the Inspection Report.

1. Submission of a Spill Contingency Plan for the Access Road Construction project as outlined in Part G of License 8BC-TEH0708.
2. Reports required under Part G (6) (iii) of License 8BC-TEH0708.
3. A detailed plan of actions taken to reduce or eliminate sedimentation of the river and erosion of the bank at Crossing Number 2 where evidence of rutting caused by heavy equipment crossings was photographed during the inspection. (included as attachment)
4. As License 8BC-TEH0708 does not include a modification section the licensee is directed by the inspector to provide a list of all additional culverts and other actions taken to control surface drainage along the construction route. This should include photographic evidence and GPS coordinates. This information will be added as an addendum to the annual report under the heading Modifications.
5. The licensee is required to provide the results of samples collected and analyzed as outlined in Part I of license. These results are to be submitted within 30 days of receipt of this Inspection Report to both the Nunavut Water Board and the Inspector.
6. Submission to the Inspector within 30 days of receipt of the Inspection Report a Nunavut Water Board approval of a Water Management Plan.
7. Submission to the Inspector within 30 days of receipt of the Inspection Report a Nunavut Water Board approval of a Monitoring Plan.

Andrew Keim
Inspector's Name

Original signed/Mailed this date
Inspector's Signature

Attached under separate cover;
Photos taken during Inspection of June 26th , 2007

Cc:
Peter Kusugak – Manager Field Operations section- Indian and Northern Affairs Canada
Phyllis Beaulieu – Manager Licensing – Nunavut Water Board

AGNICO-EAGLE MINES LTD.
Meadowbank Division

March 5, 2008

Andrew Keim
INAC, Nunavut District
P.O. Box 2200
Qimuggjuk Building
Iqaluit, Nunavut
X0A 0H0

Dear Mr. Keim,

I would like to start off by apologizing for the long delay in formally responding to your inspections reports from last June. While not an excuse, Agnico-Eagle Mines Ltd. (AEM) has experienced a much longer than expected transition in obtaining full site management control during its purchase of Cumberland Resources and the Meadowbank Project. We appreciate your patience and understanding during this difficult period for AEM.

AEM has now put in place an environmental team with the capacity to adequately address the issues that you have raised. Our on-site environmental team is now led by Mr. Ryan Vanengen, Senior Environmental Coordinator who joined AEM from Azimuth Consulting and brings several years of experience in the baseline sampling that was conducted for the Meadowbank Project. Mr. Vanengen is now working from the Meadowbank site on a two week on – two week off rotational basis. His cross shift is Mr. Sylvain Doire who has recently joined AEM as Environmental Coordinator. Mr Doire joined AEM from the Ministry of Environment in Quebec and brings an environmental inspection background and experience to our team. In addition we have employed an environmental technician (Mr. Nicholas Saucier) who is also based at site working the 2 weeks on – 2 weeks off rotational schedule and spends one week with each of the two Environmental Coordinators. This new team will now provide us capacity to move forward on maintaining an acceptable environmental standard on site. We are slowly transitioning from an exploration based camp to a site ready to begin mine development and thus we are undergoing an attitude and mind set change that we hope will be evident by your next visit.

This letter is intended to provide you with the status of our progress in addressing each of the issues that you identified during your inspection tour of the Meadowbank Project (including the all weather private access road and Baker Lake facilities) conducted on June 25 and 26, 2007.

Vancouver Office:
555 Burrard, Suite 375
Box 209, Two Bentall Centre
Vancouver, British Columbia V7X 1M8
Tel: 604-608-2557 Fax: 604-608-2559

Baker Lake Office:
Baker Lake, Nunavut
X0C 0A0
Tel: 867-793-4610
Fax: 867-793-4611

Section A responds to the items listed in a letter dated September 11, 2007, entitled "Water license inspection of Meadowbank exploration project June 25th, 2007". Section B responds to the items listed in a letter dated September 10, 2007, entitled "Water license inspection of M&T NUNA camp on Tehek Lake Road construction". Section C responds to the items listed in a letter dated September 2, 2007, entitled "Water license inspection of Meadowbank road construction project (water crossings) conducted June 26, 2007".

Section A: Water license inspection of Meadowbank Exploration Project June 25, 2007

Part A: Scope and Conditions

During the period of inspection a five million litre tank was not observed. The proponent is asked to provide information on the location of the tank to the inspector as soon as possible.

The Bulk Fuel Storage Tank with a nominal capacity of 5 million litres authorized under License 2BE-MEA0507 has not yet been constructed. In 2006 Cumberland Resources completed some initial site preparation for this facility but did not proceed (see Photo 1). AEM intends to construct this bulk storage tank in 2008 in accordance with the detailed designs that were previously submitted to the Nunavut Water Board (NWB). We will advise you and the NWB of the projected start of construction once a contractor has been lined up.

Photo 1: Base and liner of the 5 million litre fuel tank

Additionally, a review of the Nunavut Water Board web site was not able to produce any documentation relating to the assignment of the Meadowbank property license nor an amendment related to the same. The proponent is required directed to provide this information to the Inspector as soon as possible.

In early July 2007, Cumberland Resources became a 100% wholly-owned subsidiary of Agnico-Eagle Mines Limited (AEM). Through a series of steps, AEM amalgamated with Cumberland Resources and Meadowbank Mining Corporation ("Meadowbank" a wholly-owned subsidiary of Cumberland) on August 1, 2007. As a result of this amalgamation, all of the rights, title, interests, liabilities and obligations of Cumberland Resources and Meadowbank Mining are automatically, by law, transferred to and assumed by AEM. Therefore in all License documents,

the terms 'Cumberland Resources`, 'Meadowbank Mining ' and `AEM` are to mean the same entity: `Agnico-Eagle Mines Limited`.

Attached is a copy of our article of amalgamation. Consequently no license assignment was required.

Part B: General Conditions

A 2006 Annual report was found to be complete and included a reviewed A&R plan and supplementary documentation. The Annual report did indicate the construction of a 5 million litre tank was completed under the authority of the new license. Again the Inspector did not note the presence of the tank at the time of the inspection and thus requests the Proponent to provide the information required by item iv of this part (a summary of construction activities) in the 2007 annual report due by March 31st of 2008.

The Bulk Fuel Storage Tank with a nominal capacity of 5 million litres authorized under License 2BE-MEA0507 has not yet been constructed. In 2006 Cumberland Resources completed some initial site preparation for this facility but did not proceed (see Photo 1). If the opposite was stated in the 2006 annual report then this statement is in error. AEM intends to construct this bulk storage tank in 2008 in accordance with the detailed designs that were previously submitted to the Nunavut Water Board (NWB). We will advise you and the NWB of the projected start of construction once a contractor has been lined up.

Within 90 days of completion of construction of this Bulk Fuel Storage tank AEM will provide the following information to the Nunavut Water Board and the inspector;

i. The Approval for construction issued by the Fire Marshall;
ii. As-built drawings (signed and stamped);
iii. A summary of the construction including the documentation of field decisions that deviate from construction drawings and specifications: and
iv. Any data used to support these decisions.

As per Part E, item 9 of the February 08th renewal (2BE-MEA0813).

Additionally, as per item 9, Part J of Amendment 1, the licensee is required to provide the outlined information to the board within 6 months of the construction of the Bulk fuel storage tank.

AEM will submit to the NWB for approval a plan for environmental monitoring of the bulk fuel storage tank containment area within 6 months of the completion of construction. The plan will be consistent with the terms and conditions as set out in Part D, Item 8 of the February 8, 2008 renewal (2BE-MEA0813).

Part C: Conditions Applying to Water Use

Water for drilling operations must not exceed 50 Cubic Meters per day per drill. It is highly recommended that flow meters be installed on pump lines so accurate measurements can be recorded. Extrapolation of the quantity of water used based on the run time of a pump or the number of times a tank is filled is not adequate and will not be accepted in future inspections.

AEM has addressed this issue with its diamond drill contractor (Boart-Longyear) and has asked them to retrofit in line flow meters to all of their drill water supply pumps used on the Meadowbank Project. However our contractor and AEM exploration personnel have pointed out that in their experience keeping such flow meters operational during severe winter conditions is extremely problematic and results in poor data and loss of productive drilling time. Our exploration personnel believe that alternative means of estimating water flow rates during periods of severe cold and wind conditions should be kept as viable alternatives such as pump running times and periodic flow tests.

Can you please assist us by providing any information that you may have encountered in your inspection tours of other northern exploration sites as to how others are overcoming this problem? It is our intent to comply with your directive relating to continual use of such flow meters and we will do our best to meet this directive. Any experience or information on how this is being done elsewhere would be very helpful.

Part D: Conditions Applying to Waste Disposal

During the period of inspection two incinerators were noted on site. The capability of the units to meet the Canada-wide Standards for Dioxins and Furans and the Canada-wide Standard for Mercury Emissions was not reviewed with the proponent. The licensee is reminded that this standard must be met by the date of the next inspection if not already achieved.

The two small exploration camp incinerators that you observed at the Meadowbank site pre-date the adoption by Nunavut of the Canada Wide CCME guideline for Dioxins and Furans and Mercury in emissions from incinerators. These units are not dual chambered forced air high temperature incinerator units. AEM has committed to adopting these guidelines for incinerator operations for the Meadowbank Mine and thus once the Type A Water License is issued AEM will be purchasing and installing a new incinerator unit designed to meet these guidelines.

It should be noted that:

a) Dioxins, furans and mercury in incinerator emissions are best controlled by keeping the sources of these compounds out of the waste to be incinerated. At Meadowbank these incinerator units are used to burn putrescible organic wastes from the kitchen and combustible packaging materials that have been in contact with food material so that the risk of disposing or storing garbage that could otherwise give off odours that would attract wildlife is minimized. Typically these types of materials are not significant sources of dioxins, furans and mercury; and

b) The water license does not mandate that older incinerator units be replaced to meet these new guidelines.

The location of the grey water sump was a matter of concern for the Inspector. The layout of the camp at one time may have allowed the grey water to be discharged out beyond the exterior of the camp boundary. However, with the obvious expansion that was on-going during the inspection period the location of the grey water sump was found to be in the centre of the new camp layout. A verbal direction was given to Mr. Achambault to address this issue and provide information back to the inspector once completed.

The grey water discharge line and sump was extended in 2007 and is now directed outside of the camp boundaries (as noted by Inspector Ningeongan on a subsequent visit). The relocated discharge line discharges onto a rock armoured area to prevent erosion of localized material.

Part E: Conditions For Camps, Access Infrastructure and Operations

The licensee is reminded that following construction of the airstrip a report as outlined in section 5 (i-v) was required within 60 day of completion of the strip. A review of the Nunavut Water Board FTP public registry did not produce a copy of this report. The licensee is directed to provide this report by March 31st 2008 for inclusion with the annual report for the 2007 year if not already submitted. A copy of this report must be forwarded to the Inspector upon completion as well.

AEM has not yet completed construction of the proposed Meadowbank airstrip. At the current time only 260 m of the planned 900 m long airstrip has been completed. AEM will submit a report as required under Section 5 (i. to v) within 60 days of completion of the construction of this on-site airstrip. This work is scheduled for completion in 2008.

The licensee is reminded that within 90 days of the final construction of the Bulk Fuel Storage Tank the licensee was required to provide the following information to the Nunavut Water Board; i. the approval for construction issued by the fire marshall; ii. As built drawings (signed and stamped); iii. A summary of the construction including the documentation of field decisions that deviate from construction drawings and specifications; and iv. Any data used to support these decisions.

Within 90 days of completion of construction of this Bulk Fuel Storage tank AEM will provide the following information to the Nunavut Water Board and the inspector;

i. The Approval for construction issued by the Fire Marshall;
ii. As-built drawings (signed and stamped);
iii. A summary of the construction including the documentation of field decisions that deviate from construction drawings and specifications: and
v. Any data used to support these decisions.

As per Part E, item 9 of the February 08th renewal (2BE-MEA0813).

A review of the Nunavut Water Board FTP site found document # 060719 2BB-MEA Stamped Portion and Signatures. These documents were dated received by the Board on July 19th of 2006, the day before this issuance of the amendment to the license requiring submission of As-built Drawings (signed and stamped). The Inspector is unsure if this document reflects the As-built documents or the initial plans submitted for approval. The Licensee is asked to provide clarity to this issue as soon as possible.

The document referenced is the detailed design documents for the proposed bulk fuel storage facility at the Meadowbank site. It was not the As-built Drawings (signed and stamped) for Bulk fuel storage tank but the detailed design plans (signed and stamped) submitted for approval. The As-built Drawings will be submitted within 90 days of the final construction of the Bulk Fuel Storage Tank.

Part F: Conditions Applying To Drilling Operations and Trenching

The License is required to provide base-line water quality conditions prior to conducting any on-ice drilling. The results of this sampling program are to be submitted to the Nunavut Water Board. A review of the Nunavut Water Board FTP site produced a Water Analysis report submitted February 17th, 2005. This report only included testing for Coliform Bacteria which is insufficient information to develop a base line water quality assessment for the area surrounding the Meadowbank project.
The Licensee is directed to comply with this section and submit results to both the Nunavut Water Board and the Inspector prior to beginning any new lake or Ice drilling in the coming winter season year.

AEM acknowledges this requirement and will immediately initiate actions in future to ensure that water sampling is routinely done and reported to the NWB to establish water quality conditions prior to and upon completion of any drilling program through lake ice.

It should be noted that Cumberland Resources completed an extensive baseline aquatic ecosystem sampling program of the lakes in the Meadowbank Project area as part of the environmental impact statement (EIS) submitted under the NIRB process. The baseline reporting includes water quality data, for a full suite of parameters, in lakes throughout the region and thus provides a good picture of the "prior" condition. In addition, baseline water quality data was collected in the summer of 2006 and 2007, and is planned again for 2008 from the local lakes as part of our ongoing aquatic effects monitoring program. The water quality results for 2006 and 2007 will be submitted to the NWB by March 31, 2008 as committed to the NWB at the Type A Water License Technical Meeting. This data provides a look at the "after" condition.

A copy of the 2005 Baseline Aquatic Ecosystem Report is attached.

Part G: Conditions Applying to Modifications

No response required.

Part H: Conditions Applying To Spill Contingency Planning

The licensee is reminded that section 5 of this part requires the licensee to ensure that any equipment maintenance and servicing be conducted only in designated areas and to implement special procedures to prevent spills of these products from entering the environment.

Spill prevention and management tools (including spill kits and absorbents) are in place at Meadowbank for the prevention and protection of spills entering the environment. As the mine progresses, AEM is committed to updating and providing the best available technology for spill prevention and management.

Part H: Conditions Applying To Abandonment and Restoration

No response required.

Part I: Conditions Applying To The Monitoring Program

The proponent is reminded that all usage of water for domestic operations must be recorded and available for inspection. It is highly recommended by the inspector that a flow meter be installed on the intake water line of each drill in operation so accurate measurements can be recorded. Extrapolation of the quantity of water used based on the run time of a pump or the number of times a tank is filled is not adequate and will not be accepted in future inspections.

AEM has addressed this issue with its diamond drill contractor (Boart-Longyear) and has asked them to retrofit in line flow meters to all of their drill water supply pumps used on the Meadowbank Project. However our contractor and AEM exploration personnel have pointed out that in their experience keeping such flow meters operational during severe winter conditions is extremely problematic and results in poor data and loss of productive drilling time. Our exploration personnel believe that alternative means of estimating water flow rates during periods of severe cold and wind conditions should be kept as viable alternatives such as pump running times and periodic flow tests.

Can you please assist us by providing any information that you may have encountered in your inspection tours of other northern exploration sites as to how others are overcoming this problem? It is our intent to comply with your directive relating to continual use of such flow meters and we will do our best to meet this directive. Any experience or information on how this is being done elsewhere would be very helpful.

AEM has ordered and is now installing flow meters on the fresh water intake line to the Meadowbank camp to measure domestic water use.

Records of all hazardous wastes transported off site along with the location and name of the approved disposal site are also required and will be inspected during the next inspection.

To this point in time AEM has not transported any hazardous waste material from the Meadowbank site for off-site disposal. AEM has made initial contact with and is in the process of applying to the GN DOE for a hazardous waste generating number. Currently all waste is being consolidated on site and prepared for off site shipment, hopefully to start in the summer of 2008. All materials shipped from site will be sent to approved hazardous waste disposal facilities in the south and will be manifested in accordance with the GN DoE requirements.

The licensee is reminded that prior to the discharge of any wastewater collected in any trenched sumps or the constructed bulk fuel storage tank secondary containment, the licensee is required to sample the water and have it analyzed for the following;

Total Suspended Solids	**Total Arsenic**	**Total Cadmium**
Total Ammonia	**Total Chromium**	**Total Copper**
Total Cobalt	**Total Iron**	**Total Manganese**
Total Nickel	**Total Lead**	**Total Zinc**
pH	**Conductivity**	**Oil and Grease (HEM)**
BTEX (Benzene, Toluene, Ethylene and Xylene)		

The Licensee is directed to provide the results of these tests to the Inspector as soon as possible and to include copies with the annual report for the 2007 year.

To date AEM has not created any trenched sumps or discharged any wastewater or bulk fuel storage tank secondary containment water into the receiving environment. These license requirements will be adhered to upon the first instance of such a discharge.

A review of the Nunavut Water Board FTP site did not find a Plan for the environmental Monitoring of the Bulk fuel storage Tank. The Licensee is directed to provide this report to both the Nunavut Water Board and the Inspector as soon as possible.

AEM will submit to the NWB for approval a plan for environmental monitoring of the bulk fuel storage tank containment area within 6 months of the completion of construction. The plan will be consistent with the terms and conditions as set out in Part D, Item 8 of the February 8, 2008 renewal (2BE-MEA0813).

Non-Compliance:

During the period of inspection a number of items were noted and were discussed with representatives of Agnico-Eagle Mines at that time. The following is a list of items which are to be addressed or brought into compliance either by the date of the next inspection or, as outlined during the inspection, with photographic evidence submitted to the inspector as proof of compliance.

- **Secondary Containment on fuel drums and other hydrocarbons stored on site**

Bulk fuel is currently stored in double walled self contained Envirotanks. AEM acknowledges that there are drums of fuel and other hydrocarbons at the Meadowbank site that are not yet stored within secondary containment systems. These issues are being addressed by AEM as the site develops. It is AEM's intent that over time all hydrocarbons and other fuel products will be stored within secondary containment.

- **Addition of Absorbent pads or drip pans in shop and maintenance area to ensure containment of spills while undergoing maintenance. (Section 4 of Part G)**

AEM has purchased additional absorbent pads, spill kits and containment tools to ensure spills are controlled and cleaned-up in the equipment maintenance areas. As AEM transitions to the new facilities, routine monitoring and education of maintenance personnel will improve maintenance shop practices.

- **Submission of required reports, plans, drawings and documents as required under the issued water license.**

All required documents will be submitted to the NWB as required under the license. Dates for the submission of the documents is as listed in the points above.

- **Assignment or Amendment documents related to the transfer of the water license.**

As stated in Section A, Part A, AEM's article of amalgamation is attached to this letter.

- **Water samples (Potable) collected during the period of inspection returned the following results above the limits of the Canadian Council of Ministers of the Environment for Drinking water;**

Result	Guideline
▪ **Aluminium 145 µg/L**	**CCME Guideline <100 µg/L**
▪	

- **It should be noted that Iron results were also elevated but not above guideline and a result indicating that Hexane Extractable Material (Oil and grease) was found in the drinking water. The result was 51.2 mg/L.**

AEM has no knowledge regarding the specific sample location or sampling method referenced here. However background levels of Al in the local lake water do not always meet the quoted CCME guideline value. This is usually a function of suspended matter in the sampled water. Does the inspector know whether this measured drinking water level for Al was higher that the Al level in the Third Portage Lake on that date? AEM appreciates the information and will watch for similar patterns in future sampling of site potable water lake.

AEM is not aware of any requirement in the Type B water license that requires the sampling and reporting of potable water quality on site, or the requirement for potable water to meet CCME guidelines for drinking water. AEM does monitor drinking water to ensure the health and safety of the personnel using the camp water

- **Water samples collected (grey water sump) during the period of inspection returned the following results above the limits of the Canadian Council of Ministers of the Environment for Protection of Aquatic Life;**

Result	Guideline
▪ **Aluminium 144 µg/L**	**CCME Guideline <100 µg/L**
▪ **Copper 22.2 µg/L**	**CCME Guideline 2 – 4 µg/L**

- **It should be noted that Iron results were also elevated but not above guideline and a result indicating that Hexane Extractable Material (Oil and grease) was found in the water. The result was 32.3 mg/L.**

AEM is not aware of any requirement in the water license for grey water discharges to meet CCME guidelines for the protection of aquatic life at the end of pipe. The grey water is discharged at least 30 metres above the ordinary high water mark, thereby these levels are not indicative of water quality within the nearest receiving water. AEM appreciates the information and will watch for trends in its own sampling of these parameters.

Section B: Water License inspection of M&T NUNA camp on Tehek Lake road construction

Part A: Scope and Conditions

No response required.

Part B: General Conditions

The licensee is reminded that by the next inspection the Inspector will be checking the water intake metering system required to be installed as per section 4 of Part B.

As noted in paragraph 2 of the inspection report, all water used and waste generated at camp are both delivered and hauled out by the Municipality of Baker Lake. There is no water intake at this camp.

Part C: Conditions Applying to Water Use

No response required.

Part D: Conditions of Applying to Waste Disposal

During the period of inspection an incinerator was noted on-site. The capability of the unit to meet the Canada-wide Standards for Dioxins and Furans and Canada-wide Standard for Mercury Emissions was not reviewed with the proponent. The licensee is reminded that this standard must be met by the date of the next inspection if not already achieved.

The small camp incinerator that you observed at the Meadowbank site was purchased prior to the adoption by Nunavut of the Canada Wide CCME guideline for Dioxins and Furans and Mercury in emissions from incinerators. This unit is not a dual chambered forced air high temperature incinerator unit. AEM has committed to adopting these guidelines for incinerator operations for the Meadowbank Mine and thus once the Type A Water License is issued AEM will be purchasing and installing a new incinerator unit designed to meet these guidelines.

It should be noted that:

c) Dioxins, furans and mercury in incinerator emissions are best controlled by keeping the sources of these compounds out of the waste to be incinerated. At Meadowbank these incinerator units are used to burn putrescible organic wastes from the kitchen and combustible packaging materials that have been in contact with food material so that the risk of disposing or storing garbage that could otherwise give off odours that would attract wildlife is minimized. Typically these types of materials are not significant sources of dioxins, furans and mercury; and

The water license does not mandate that older incinerator units be replaced to meet these new guidelines.

The proponent is asked to clarify, as per section 7 of this Part which NWB approved facility the removed toilet wastes are being disposed of in. Additionally, as per section 4 of this same part and as listed above the name and location of the approved facility is requested.

All sewage from the NUNA M&T road construction camp is being collected in a holding tank and then transported by tank truck to be co-disposed with the sewage from the Hamlet of Baker Lake (with the approval of the Hamlet) into the sewage lagoon owned and operated by the Hamlet of Baker Lake.

Part E : Conditions for Camps, Access Infrastructures and Operations

No response required.

Part F : Conditions applying to Drilling Operations

No response required.

Part G: Conditions Applying to Spill Contingency Planning

It was noted during the inspection that 5 gallon pails of gear oil, other drums containing petroleum products and large bulk oil storage (motor oil) were being stored without secondary containment. It is also noted that the TEC transfer tank in use within the compound did not have a spill kit beside or adjacent to it.

Spill prevention and management tools (including spill kits and absorbents) are in place at Meadowbank for the prevention and protection of spills entering the environment. As the mine progresses, AEM is committed to updating and providing the best available technology for spill prevention and management.

AEM will ensure that NUNA is aware of these non-compliance issues and will assist NUNA in the proper storage and spill management practices for petroleum hydrocarbons at their work site.

Part H : Conditions Applying To Abandonment and Restoration

The proponent is reminded however that the area used most be free of hydrocarbon contamination upon completion of the project. This will include the remediation of any contaminated soils and ground to the satisfaction of the inspector.

AEM is committed to monitoring and assisting NUNA in the collection and clean-up of the hydrocarbon contaminated soil to the satisfaction of the inspector.

Part I : Conditions Applying To the Monitoring Program

The proponent is reminded that all usage of water for domestic operations must be recorded and available for inspection. It is highly recommended by the inspector that a flow meter be installed on the intake water line of each drill in operation so accurate measurements can be recorded. Extrapolation of the quantity of water used based on the run time of a pump or the number of times a tank is filled is not adequate and will not be accepted in future inspections.

All water used at the NUNA M&T road construction camp is being obtained from the Hamlet of Baker Lake and is paid for by NUNA M&T on a per truck load basis. NUNA M&T report this usage under the road camp water use license.

Records of all hazardous wastes transported off site along with the location and name of the approved disposal site are also required and will be inspected during the next inspection.

To this point in time AEM has not transported any hazardous waste material from the Meadowbank site for off-site disposal. AEM has made initial contact with and is in the process of applying to the GN DOE for a hazardous waste generating number. Currently all waste is being consolidated on site and prepared for off site shipment, hopefully to start in the summer of 2008. All materials shipped from site will be sent to approved hazardous waste disposal facilities in the south and will be manifested in accordance with the GN DoE requirements.

Non-Compliance

During the period of inspection a number of items were noted and were discussed with Mr Danielson at the time. The following is a list of items which are to be addressed or brought into compliance either by the date of the next inspection or, as outlined during the inspection, with photographic evidence submitted to the inspector as proof of compliance.

- **Secondary Containment of fuel drums and other hydrocarbons stored on-site**

AEM will ensure that NUNA is aware of this issue. It is AEM's intent that over time all fuel drums and other hydrocarbons will be relocated into secondary containment facilities.

- **Addition of Absorbent pads or drip pans in shop and maintenance area to ensure containment of spills while undergoing maintenance. (Section 4 of Part G)**

AEM will ensure that NUNA is aware of this non-compliance issue and has adequate absorbent pads, spill kits and containment tools on site to control and clean-up spills. AEM will routinely monitor and educate maintenance personnel to improve maintenance shop practices.

Section C: Water License inspection of Meadowbank Road Construction Project (Water Crossings) conducted June 26, 2007

Part A: Scope and Conditions

At the time of the inspection of the all-weather road, Agnico-Eagle Mines Ltd. had just recently taken ownership and control of the project. At the time of the inspection 4 of 10 bridges had been constructed and 6 of 13 listed culverts were installed. During the inspection it was noted that there were a number of locations where culverts should and will be installed that were not originally listed in the application. These modifications are to be submitted to the Nunavut Water Board.

(The licensee is reminded that any changes in the operating plans or conditions associated with this project, including any variation in the construction or route, creation of previously unidentified lay-down areas or camp sites, construction of sumps for deposit of waste must be submitted to the Nunavut Water Board 30 days in advance of their construction or implementation.)

AEM acknowledges this requirement and in future will submit to the NWB details of any planned modifications along the AWPAR to the NWB, at least 30 days in advance of installation. AEM is currently working with NUNA M&T surveyors to prepare as built drawings of the AWPAR showing culvert locations, bridge crossing details and quarry sites for inclusion in the 2007 annual report under the Water License.

Additionally, a review of the Nunavut Water Board web site was not able to produce any documentation relating to the assignment of the Meadowbank Access Road license nor an amendment related to the same. The proponent is required to provide this information to the Inspector and the Nunavut Water Board as soon as possible.

In early July 2007, Cumberland Resources became a 100% wholly-owned subsidiary of Agnico-Eagle Mines Limited (AEM). Through a series of steps, AEM amalgamated with Cumberland Resources and Meadowbank Mining Corporation ("Meadowbank" a wholly-owned subsidiary of Cumberland) on August 1, 2007. As a result of this amalgamation, all of the rights, title, interests, liabilities and obligations of Cumberland Resources and Meadowbank Mining are automatically, by law, transferred to and assumed by AEM. Therefore in all License documents, the terms 'Cumberland Resources`, 'Meadowbank Mining ' and `AEM` are to mean the same entity: `Agnico-Eagle Mines Limited`.

Attached is a copy of our article of amalgamation.

Part B: General Conditions

A review of the Nunavut Water Board FTP site found a Water Management and Monitoring Plan. (see comments under Part I Monitoring) The licensee is reminded that the Nunavut Water Board must approve of a Water Management Plan and this approval, if supplied should be submitted to the inspector for review within 30 days of receipt of the inspection report.

AEM submitted a Water Management and Monitoring Plan for the AWPAR in March 2007. To date, we have not received any approval or comments from the NWB. Until we are notified otherwise, AEM will assume the plan is complete and operate the AWPAR in accordance with that plan.

Part C: Conditions Applying to the Protection of Water

During the period of Inspection, Mr. Laurier Roy (road construction foreman) stated that there were additional locations identified since construction began that require culvert installation. These areas were marked along the route and are to be identified to the Nunavut Water Board as changes or modifications. The installation of these extra culverts is to meet the objectives of this Part including the protection of surface drainage paths, and preventing erosion under the roadway and sedimentation into water bodies

AEM is working on as-built drawings of the AWPAR and intends to submit to the NWB a list of the culvert installation modifications along the AWPAR as part of the as-built drawings to be submitted with the 2007 water license annual report.

Part D: Conditions Applying to Waste Disposal

No response required.

Part E: Conditions Applying To Construction

No response required.

Part F: Conditions Applying To Drilling Operations

No response required.

Part G: Conditions Applying To Spill Contingency Planning

The Licensee is reminded that pursuant to section 6(2) (g) (i) and (ii) of the Northwest Territories Waters Regulations a spill contingency plan is required to be submitted with the application for a water license and the approved Plan is to be kept on site of operations. This plan was to have been submitted to the Nunavut Water Board within 30 days of the issuance of the current license.

NUNA M&T Services Ltd. was contracted by AEM to build the AWPAR. A spill contingency plan was completed by NUNA for the AWPAR and NUNA camp for the 2006 and 2007 field season. This was submitted to the NWB on behalf of AEM. A copy of the NUNA spill contingency plan is attached.

The licensee is reminded that section 5 of this part requires the licensee to ensure that any emergency equipment maintenance and servicing be conducted only in designated areas and to implement special procedures to prevent spills of these products from entering the environment.

Spill prevention and management tools (including spill kits and absorbents) are in place at Meadowbank for the prevention and protection of spills entering the environment. As the mine

progresses, AEM is committed to updating and providing the best available technology for spill prevention and management.

Additionally, the licensee is reminded that for each spill occurrence, the licensee is required, no later than 30 days after the initial report to the 24-hour spill line, to submit a detailed report to the inspector outlining the amount and type of product spilled and the measures taken to contain and clean up the spill.

AEM is now fully complying with this requirement as evidenced in our reporting of the last two incidents. Where there is a reasonable likelihood of a spill in an amount equal to or greater than the amounts set out in the following table, the spill is reported to the NT-NU 24-HOUR SPILL REPORT LINE and the INAC Manager of Field Operations. As a precaution, if there is any doubt as to whether the quantity spilled meets the minimum reportable thresholds, the spill incident is reported. Furthermore, AEM will maintain a detailed log of all spills of hazardous materials, including non-reportable spills. As part of AEM's overall environmental management system and in the spirit of a continuous improvement of environmental performance, procedures will be implemented to encourage all employees to communicate non-reportable spill incidents.

Spill Quantities that must be Reported to the NT-NU 24-HOUR SPILL REPORT LINE

Transportation Class	***Type of Substance***	***Compulsory Reporting Amount***
1	Explosives	Any amount
2.1	Compressed gas (flammable)	Any amount of gas from containers with a capacity exceeding 100 L
2.2	Compressed gas (non-corrosive, non-flammable)	Any amount from containers with a capacity exceeding 100 L
2.3	Compressed gas	Any amount
2.4	Compressed gas (corrosive)	Any amount
3.1, 3.2, 3.3	Flammable liquid	100 L
4.1	Flammable solid	25 kg
4.2	Spontaneously combustible solid	25 kg
4.3	Water reactant solids	25 kg
5.1	Oxidizing substances	50 L or 50 kg
5.2	Organic peroxides	1 L or 1 kg
6.1	Poisonous substances	5 L or 5 kg
7	Radioactive substances	Any amount
8	Corrosive substances	5 L or 5 kg
9.1 (in part)	Miscellaneous substances	50 L or 50 kg
9.2	Environmentally hazardous	1 L or 1 kg
9.3	Dangerous wastes	5L or 5 kg
9.1 (in part)	PCB mixtures of 5 ppm or more	0.5 L or 0.5 kg
None	Other contaminants	100 L or 100 kg

Spill reports completed by NUNA M&T Services in 2007 have recently been forwarded to AEM in hard copy and are located at the mine. These reports will be included in the AWPAR annual report, due March 31, 2008. In future, all contractors will be required to report all spills to the

AEM environmental team to ensure proper reporting is completed. AEM understands that NUNA M&T Services Ltd. filed these spill reports directly with the Nunavut Spill Reporting process.

Part H: Conditions Applying To Abandonment And Restoration

No response required.

Part I: Conditions Applying To The Monitoring Program

A review of the Nunavut Water Board FTP site did find a Water Management and Monitoring Plan developed for Cumberland Resources by Golder Associates. Further review of the FTP site was not able to produce an approval document from the Nunavut Water Board accepting the plan as complete. The absence of this document and a reading of the comments supplied by the INAC analyst who reviewed the document when released for review by the Nunavut Water Board lead the Inspector to question both the completeness of the document and question whether or not the Plan, as is, has been approved by the Nunavut Water Board.

AEM submitted a Water Management and Monitoring Plan for the AWPAR in March 2007. To date, we have not received any approval or comments from the NWB. Until we are notified otherwise, AEM will assume the plan is complete and operate the AWPAR in accordance with that plan.

Additional to the question of completeness of the plan is an issue of compliance with the plan. Section 4.1 Frequency of the Plan states that sampling reports will be submitted monthly to the Nunavut Water Board. A review of the NWB FTP site does not include submissions of any sampling reports from the Licensee.

AEM acknowledges that no water quality sampling reports for the 2007 season were submitted to the NWB. This was an oversight on our part, as all other monitoring reports are to be submitted on an annual basis. The 2007 water quality reports will be submitted in our annual report (due March 31, 2008), and monthly for the 2008 season.

Non-Compliance:

During the period of inspection a number of items were noted and were discussed with representatives of Agnico-Eagle Mines at that time. The following is a list of items which are to be addressed or brought into compliance either by the date of the next inspection or within the deadlines outlined in the terms of the Inspection Report.

1. **Submission of a Spill Contingency Plan for the Access Road Construction project as outlined in Part G of License 8BC-TEH0708.**

A spill contingency plan was completed by NUNA for the AWPAR and NUNA camp for the 2006 and 2007 field season. This plan was submitted to the NWB. A copy of the NUNA spill contingency plan is attached.

2. **Reports required under Part G (6) (iii) of License 8BC-TEH0708.**

AEM is now fully complying with this requirement as evidenced in our reporting of the last two incidents. Spill reports completed by NUNA M&T Services in 2007 will be included in the

AWPAR annual report, due March 31, 2008. In future, all contractors will be required to report all spills to the AEM environmental team to ensure proper reporting is completed.

3. **A detailed plan of actions taken to reduce or eliminate sedimentation of the river and erosion of the bank at Crossing Number 2 where evidence of rutting caused by heavy equipment crossings was photographed during the inspection (included as attachment).**

It is unclear from the photos provided what sedimentation/erosion issue the inspector is referring to. However, regular monitoring of the road crossings were performed throughout the 2007 season. Any potential areas for erosion or sedimentation of the river were immediately identified to our construction team for remediation.

Prior to the inspector's visit to the AWPAR, several sedimentation issues along the AWPAR were identified to the construction team. Most of the areas/issues were addressed. However, due to rising water levels, remediation of the northern side of the upstream and downstream areas of R02 was called off for safety reasons. In addition, the snow bridge from the north side had melted away, which would have meant entry of the dozer into the channel for about 50 to 70 m. It was determined that this action would pose greater disturbance to the channel than the debris remaining on the snow/ice. Details of these actions are described in technical memos prepared by Azimuth Consulting Group Inc.; these two memos are attached.

No significant sedimentation-related issues were observed in 2007. Turbidity measurements taken at crossing R02 were slightly higher downstream relative to upstream background conditions, but the results were well within the acceptable range (i.e., 8 NTU above background). The turbid water was found primarily in localized pockets (if present at all) along the channel margins and immediately adjacent to the bridge approaches; these collectively comprise a negligible proportion of the channel and discharge as a whole.

4. **As License 8BC-TEH0708 does not include a modification section the licensee is directed by the inspector to provide a list of all additional culverts and other actions taken to control surface drainage along the construction route. This should include photographic evidence and GPS coordinates. This information will be added as an addendum to the annual report under the heading Modifications.**

AEM is working on as-built drawings of the AWPAR and intends to submit to the NWB a list of the culvert installation modifications along the AWPAR as part of the as-built drawings to be submitted with the2007 water license annual report.

5. **The licensee is required to provide the results of samples collected and analyzed as outlined in Part I of license. These results are to be submitted within 30 days of receipt of this Inspection Report to both the Nunavut Water Board and the Inspector.**

The 2007 water quality reports will be submitted in our annual report (due March 31, 2008), and monthly for the 2008 season.

6. **Submission to the Inspector within 30 days of receipt of the Inspection Report a Nunavut Water Board approval of a Water Management Plan.**

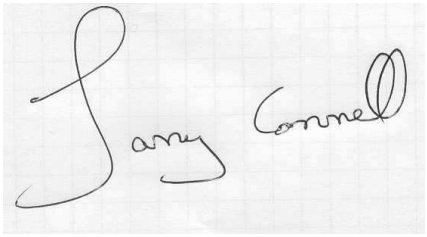
AEM submitted a Water Management and Monitoring Plan for the AWPAR in March 2007. To date, we have not received any approval or comments from the NWB. Until we are notified otherwise, AEM will assume the plan is complete and operate the AWPAR in accordance with that plan.

7. **Submission to the Inspector within 30 days of receipt of the Inspection Report a Nunavut Water Board approval of a Monitoring Plan.**

AEM submitted a Water Management and Monitoring Plan for the AWPAR in March 2007. To date, we have not received any approval or comments from the NWB. Until we are notified otherwise, AEM will assume the plan is complete and operate the AWPAR in accordance with that plan.

Again, my apologies for the long delay in formally responding to your inspection reports. We appreciate the issues that you have raised and can assure you that AEM is now taking appropriate action to improve the environmental management for this project. I would be pleased to clarify any of the issues referenced in this letter and look forward to hearing from you regarding your experience with the use of flow meters on the diamond drills under winter conditions.

Regards,
Agnico-Eagle Mines Ltd.



Larry Connell, P.Eng.
Regional Manager of Environment, Social & Government Affairs

cc: Richard Dwyer, NWB
Denis Vaillancourt – AEM Exploration Manager
Louise Grondin, AEM – VP of Environment
Martin Bergeron, AEM - Meadowbank General Manager
Ryan Vanengen and Sylvain Doire, AEM - Site Environmental Coordinators

APPENDIX E

DFO INSPECTION MEMORANDUM

Technical Memorandum

Date: 2 October 2007

To: **Louise Grondin, Roy Lindsay, Laurier Roy, Paul-Henri Girard, Stephane Robert, Martin Bergeron (Agnico-Eagle Mines)**

Harvey Blouin, Len McHale (Nuna M&T)

Cc: **Amy Liu and Paul Savoie (DFO Iqaluit), Derek Zawadski (DFO Rankin Inlet)**

From: **Gary Mann**

RE: **Meadowbank All-weather Private Access Road (AWPAR) – Fisheries and Oceans Canada (DFO) Tour – 7 September 2007 (Authorization NU-03-109)**

Introduction

I led Amy Liu, Paul Savoie and Derek Zawadski (DFO) on a tour of the AWPAR and Meadowbank Project area on September 7, 2007. The goals of the tour were to:

- See the barge unloading facility to better understand NIRB "geotextile comment" and possible jetty installation
- Inspect bridge installations covered under *Fisheries Act* section 35(2) Authorization NU-03-0109 (R02, R06, R09, R15)
- See the two "non-fish bearing" crossings (R04 and R05a) where fish were discovered in August 2007
- See the Meadowbank Project Lakes area first hand and understand project footprint into the aquatic environment
- See the western channel between Third and Second Portage lakes, where the proposed road extension from camp will cross, and discuss habitat compensation requirements

Overall, the tour went well. However, some issues were identified requiring follow-up (**in bold text**) by Agnico-Eagle Mines Ltd[1].; these have been reviewed by DFO and are listed by location below. Photos have been provided where available to document the issues and are presented in ***bold italic*** text.

Issues/Actions Required

R02 1. Construction material was deposited in the stream channel outside the authorized HADD (harmful alteration, disturbance or destruction) zone when the N[2] ice bridge approach was built U/S of the

[1] A draft copy of this report was provided to Agnico-Eagle on September 13th to get started on certain issues right away. A road tour was conducted with Laurier Roy (Agnico-Eagle) on September 21 to review each issue. Some of these items have already been addressed as per the recommendations of this memo.

[2] All directional references are made to the following convention: N = Meadowbank Camp side of crossing; S = Baker Lake side of crossing; U/S = upstream; and D/S = downstream.

crossing (***Figures 1 and 2***). This area was completely submerged during earlier inspections and was not targeted for action. The material, which is generally much smaller than the natural bed substrate, has raised the streambed elevation and is affecting stream flow patterns (***Figure 3***). This will be exacerbated once the new culverts are installed. **This material needs to be cleaned up as much as possible and pulled back above the ordinary high water mark to restore the native streambed and improve flow. While a backhoe may be effective for some of the material, it is likely that hand removal will be necessary to access material between boulders and minimize disturbance of the native substrate.**

2. Construction material was stockpiled in the stream channel (outside the authorized HADD zone) just upstream of the bridge on the U/S side. This material was identified during the June inspections, but rising water levels precluded safe access and removal. The stockpile was washed downstream during freshet, spreading out on the N side of the channel just D/S of the bridge (***Figure 4***). There is also a small remnant area U/S of the bridge (***Figure 4***). **As per the previous issue, this material needs to be cleaned up (by hand or with support by backhoe where possible) as much as possible to restore the native streambed, improve flow, and minimize further downstream deposition.**

3. Culvert design information for planned installation on the N approach should be submitted to DFO, NIRB and NWB. Design should ensure that culverts are embedded to at least ten percent of their diameter (e.g., 10 cm embedded for 1 m culvert). The culvert(s) should also be backfilled with native material to match the upstream and downstream natural channel inverts. **This submission should be made as soon as possible as installation should be conducted during the open water season if possible.**

R04 Fish were observed in this stream during the August 2007 water sampling program. **The D/S silt curtain should be removed from the crossing to allow fish passage. The culvert should be embedded (see R02) appropriately and sized to allow unimpeded fish passage; this design should be submitted to DFO with R02 and R05a.**

R05a Fish were observed in this stream during the August 2007 water sampling program. **Culvert installation plans should be sent to DFO prior to installation. Culvert(s) should be embedded (see R02) appropriately and sized to allow fish passage. This should be done as soon as possible to allow installation during the open-water period if possible.**

R05 This bridge is not centered over the channel and appears to possibly encroach on the N side. Close-up photos (***Figure 5a***) show water pooled against the abutment with the apparent native stream bank still clearly visible, suggesting that a depression was created behind the bank margin during construction (or settlement) of the N abutment. Neither pre-construction photo (***Figurse 5b and 5c***) shows any significant side-channel feature at the crossing site, which supports the theory that it was an inadvertent result of abutment construction. **No action required.**

R06 Construction material was inadvertently placed in the stream channel (outside the authorized HADD zone) on the N ice bridge approach (***Figure 6***). While this was not planned, we have observed the area being used by Arctic grayling during spawning season. **Consequently, continued monitoring of the area is recommended to evaluate whether the material appears to be harmful in any way. No removal should occur at this time.**

R09 1. Abutment armouring is steep and has sloughed into stream channel (e.g., D/S N side) (***Figure 7***). **Fine material on upper portion of the rip rap should be pulled back (on all slopes facing the channel) where possible to a stable slope and minimize further sloughing, particularly during heavy rain or high water events.**

2. Silt fence on N side positioned too far into the channel and appear ineffective in certain places (***Figure 7***). **The fence should be moved out of the channel to the toe of the abutment material**

margin and installed to provide better containment without intruding into the channel. These control measures should be left in place until the bridge installation has stabilized (i.e., at least after next year's freshet).

R13 **No action required at this time.**

R15 Sediment control measures were effective during the installation of the temporary span at this crossing. **Silt fences and curtains blocking stream flow** (***Figure 8***) **should be removed. Silt fences should be installed at the toe of the abutment margins (if possible due to low bridge configuration) to contain material.**

Crossing R02 Photos

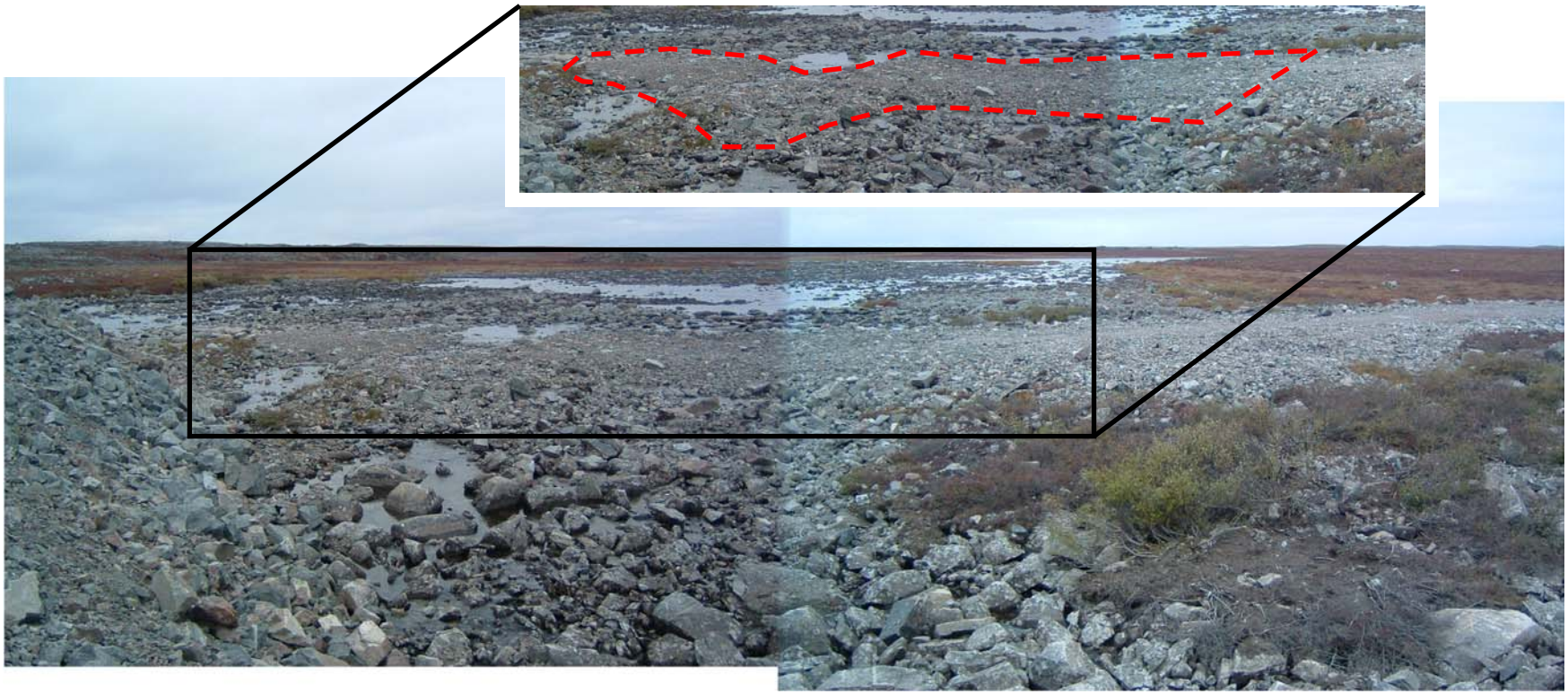


Figure 1. R02 - Ice bridge access debris in channel on N U/S side of crossing (21 Sept 2007)

Crossing R02 Photos

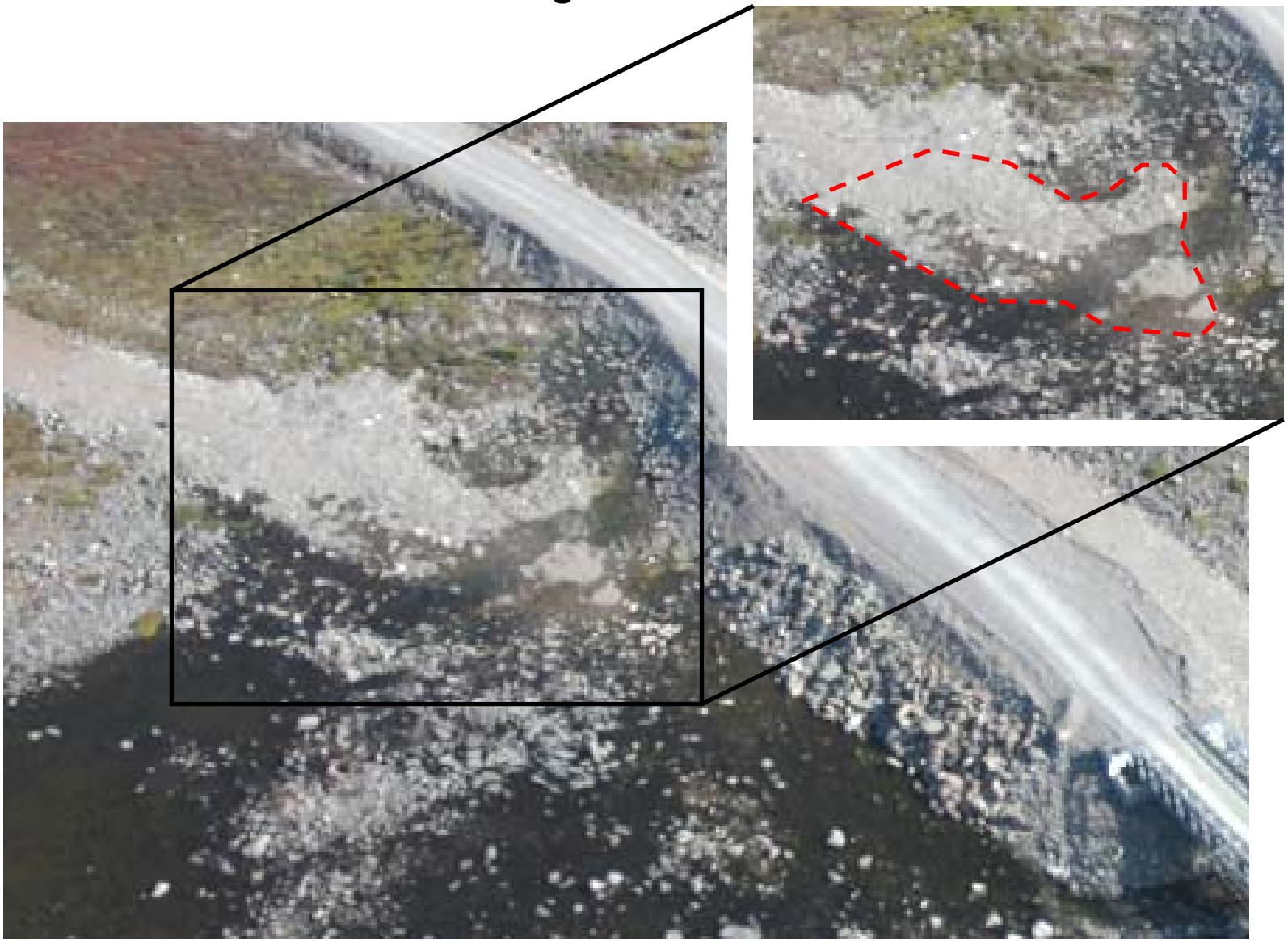


Figure 2. R02 - Approximate boundaries of in-channel debris related to N ice bridge access (7 Sept 2007)

Crossing R02 Photos

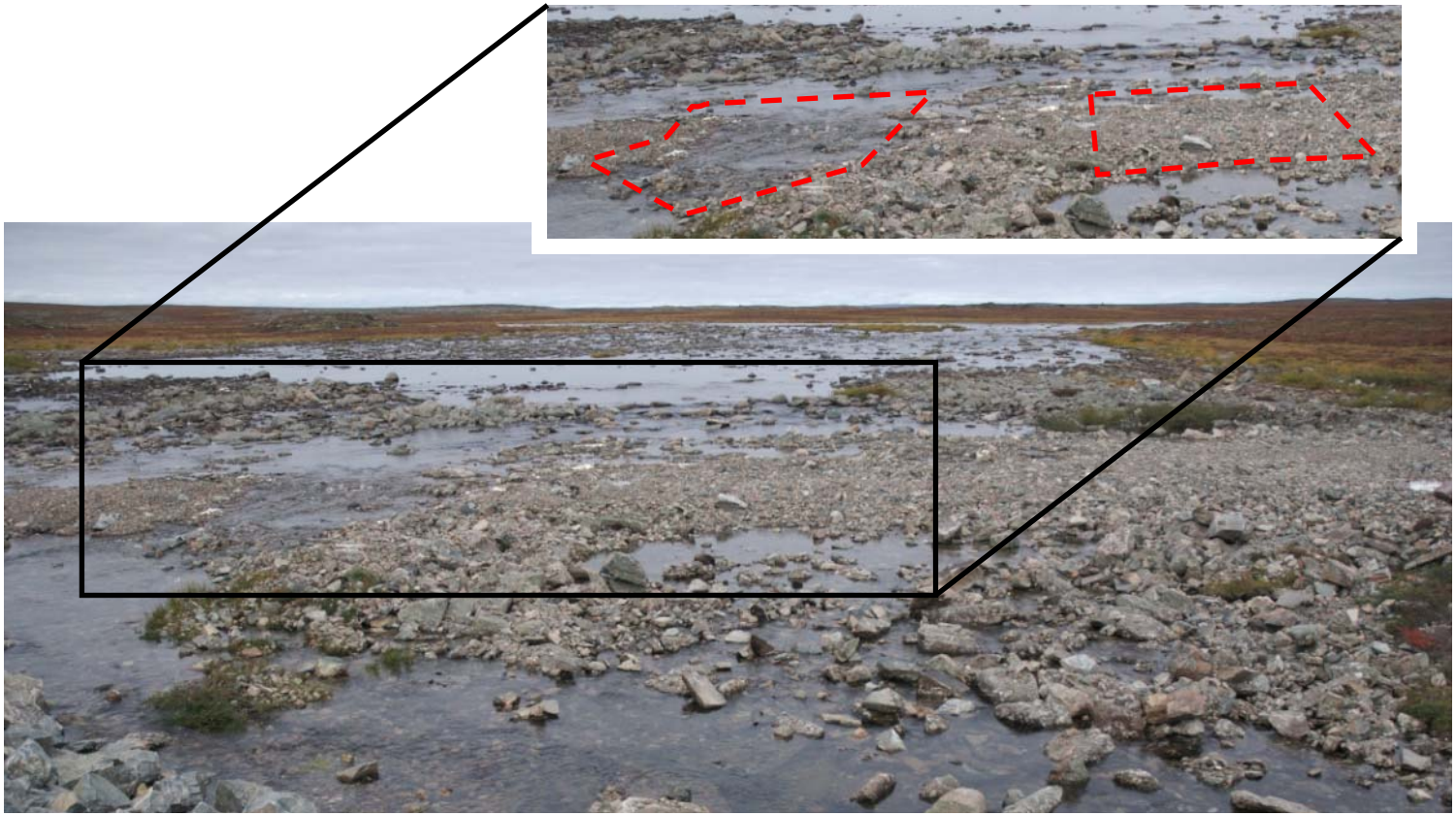


Figure 3. R02 – Areas of impeded channel flow due to ice bridge access debris deposition (7 Sept 2007)

Crossing R02 Photos

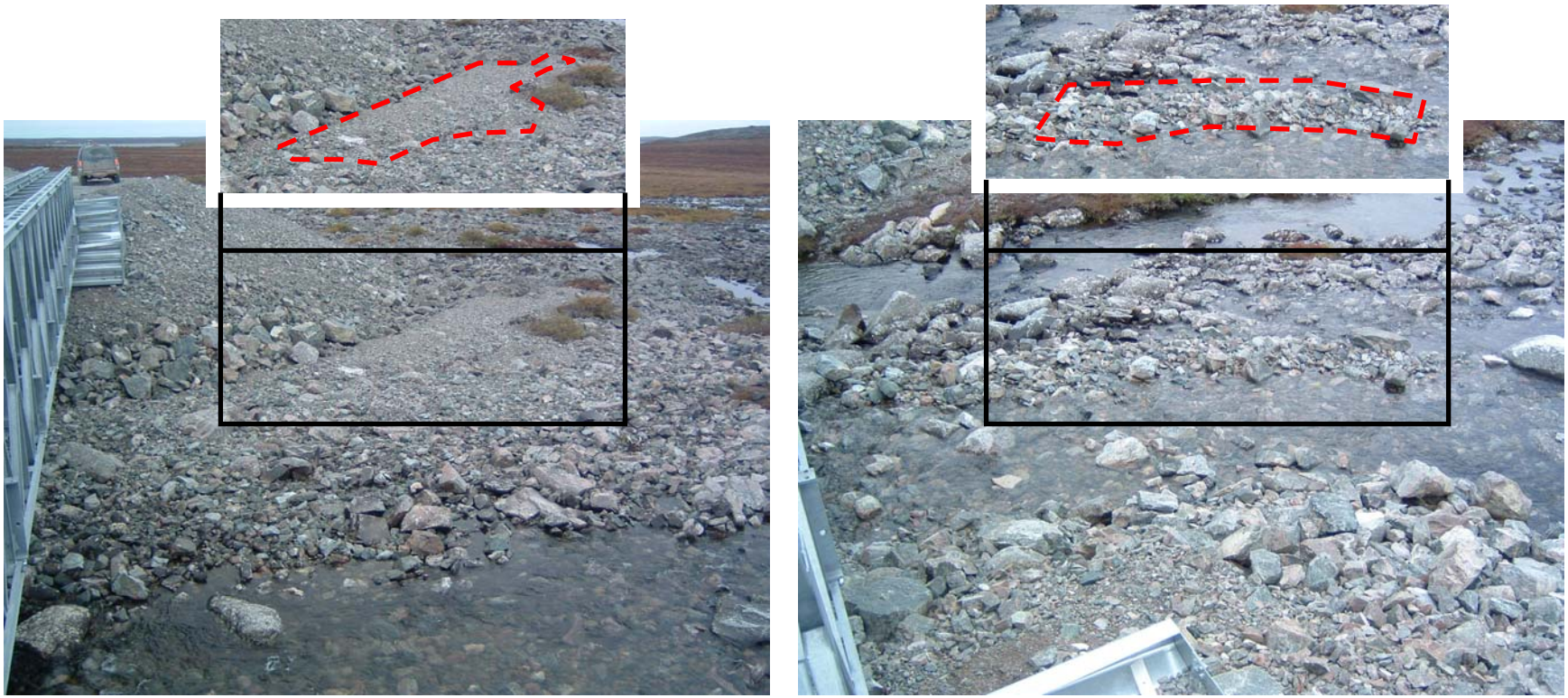


Figure 4. R02 – Residual stockpile debris D/S (left) and U/S (right) of bridge (21 Sept 2007)

Crossing R05 Photos

Figure 5a. R05 – Stream channel at N abutment with depression adjacent to abutment. Viewed from U/S (left) and D/S (right) (21 Sept 2007)

Crossing R05 Photos

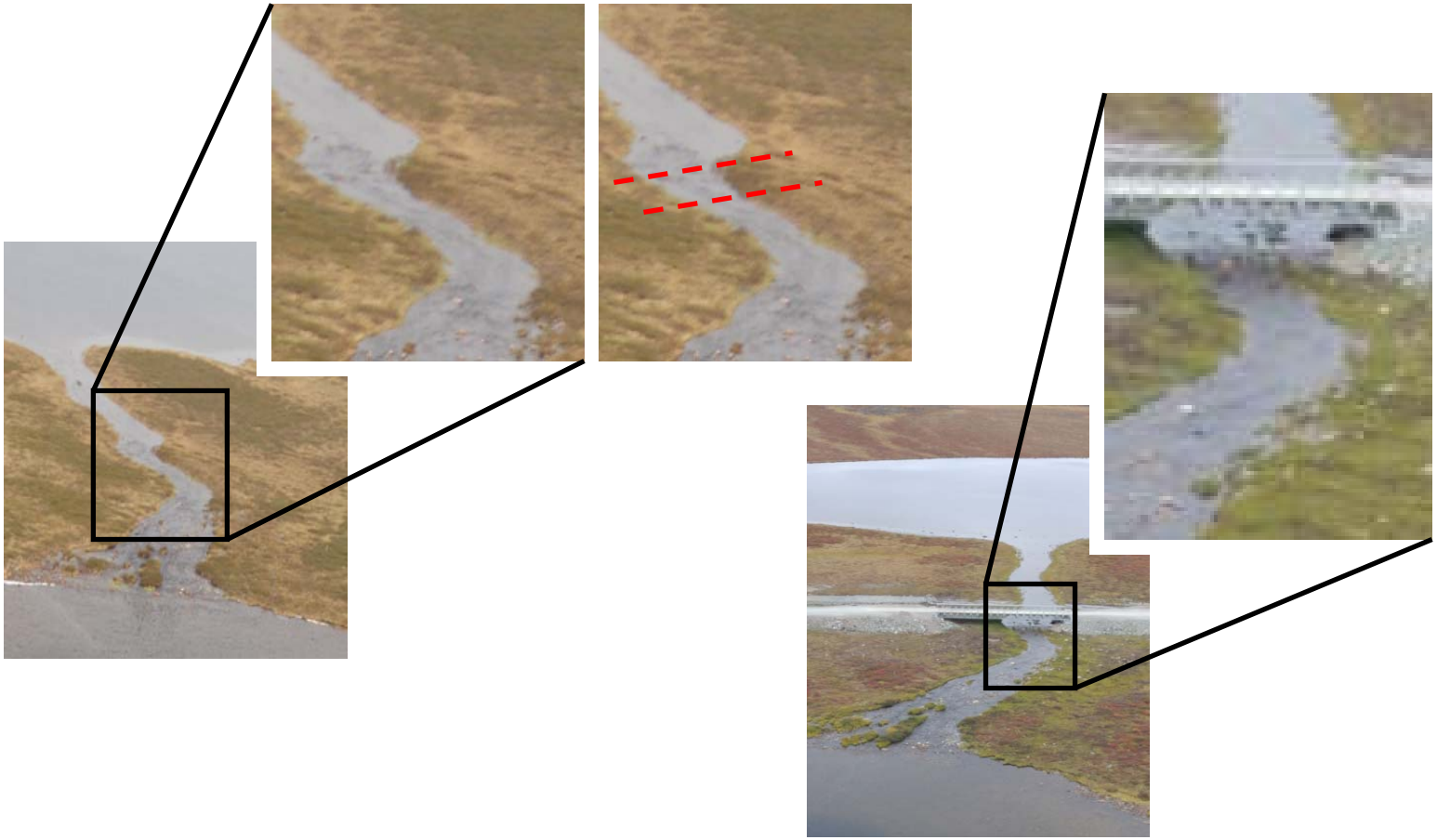


Figure 5b. R05 – Comparison of pre- (2005) and post-construction (7 Sept 2007) photos to assess potential encroachment of the N abutment. Lack of side channel habitat in 2005 photo supports lack of encroachment.

Crossing R05 Photos

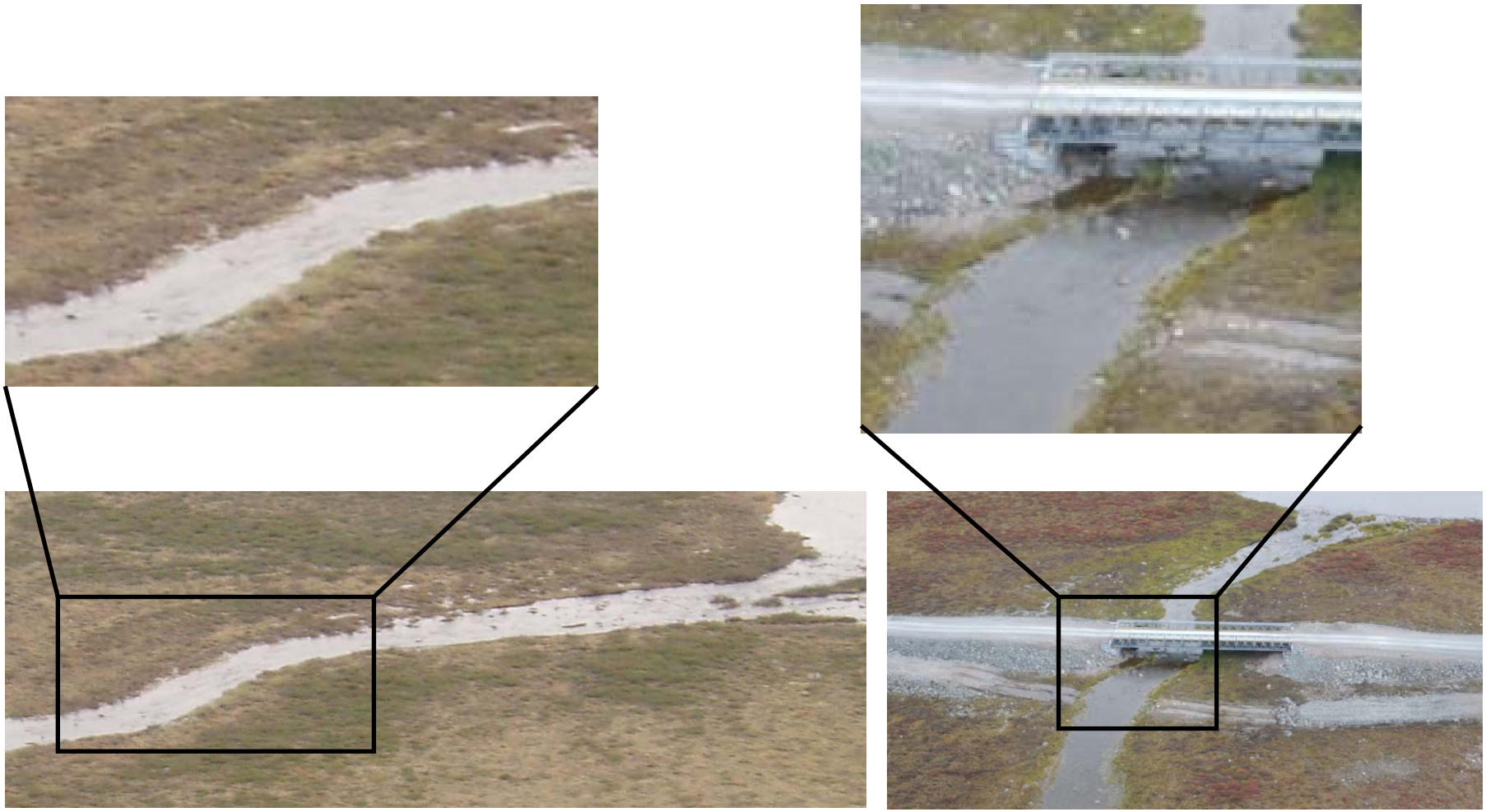


Figure 5c. R05 – Comparison of pre- (2005) and post-construction (7 Sept 2007) photos support lack of encroachment of the N abutment into the channel.

Crossing R06 Photos

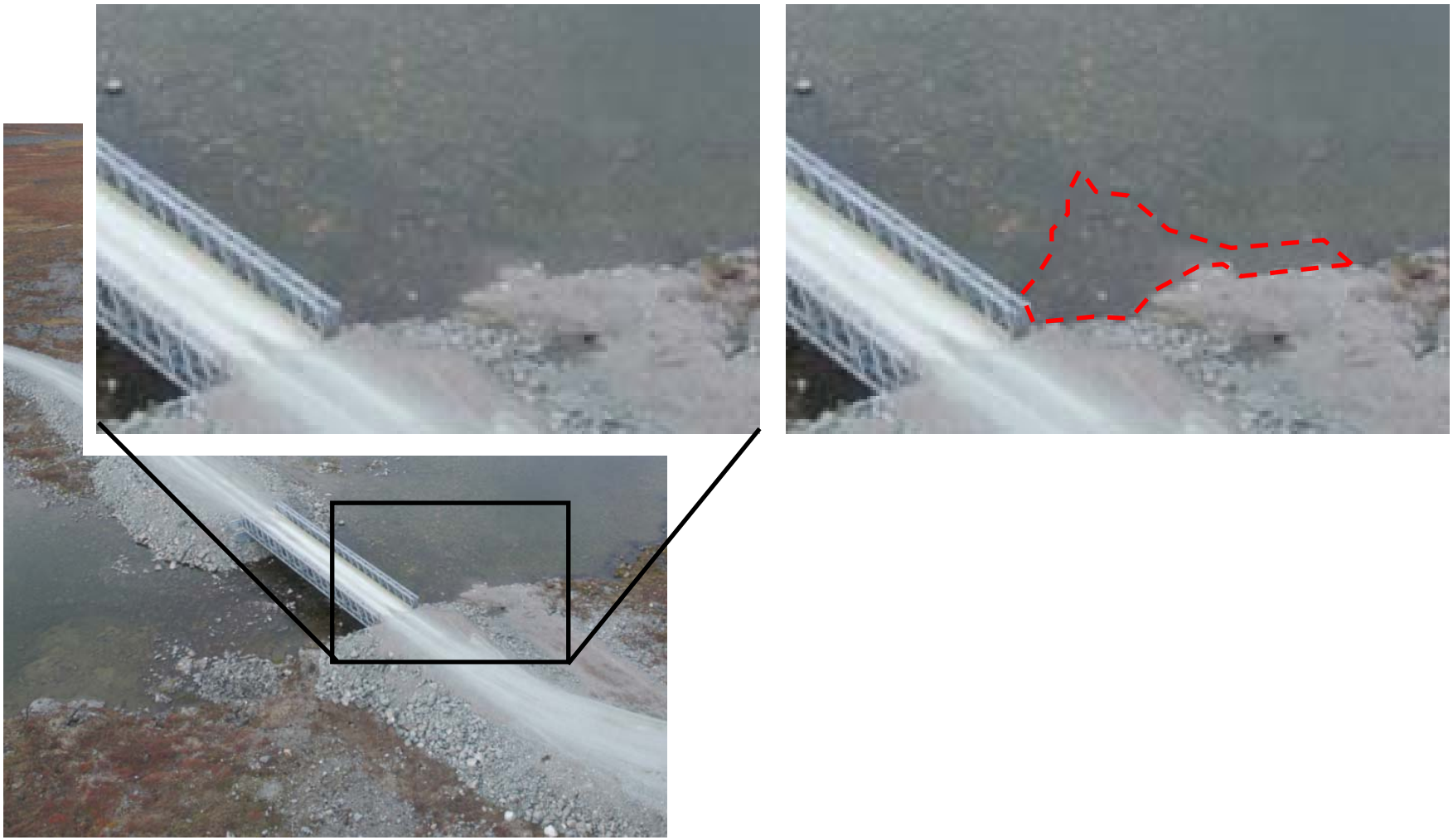


Figure 6. R06 – Deposited construction material associated with N access for ice bridge (7 Sept 2007).

Crossing R09 Photos

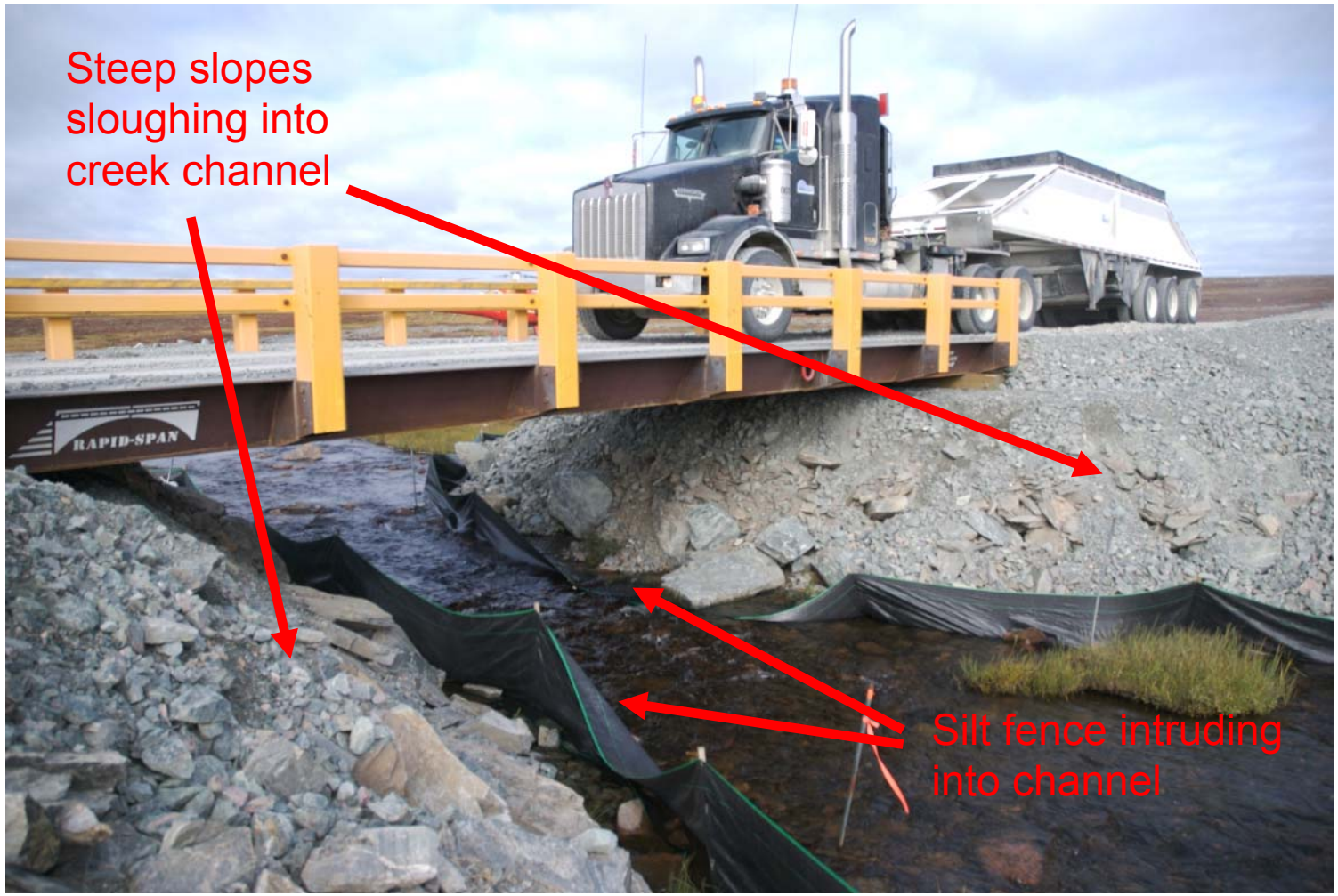


Figure 7. R09 – Steep sloughing slopes (also on U/S side) and silt fence issues (7 Sept 2007)

Crossing R15 Photos

Figure 8. R15 – Sediment control measures blocking stream flow; silt fences (black) to be redeployed immediately adjacent to the abutments (7 Sept 2007)

APPENDIX F

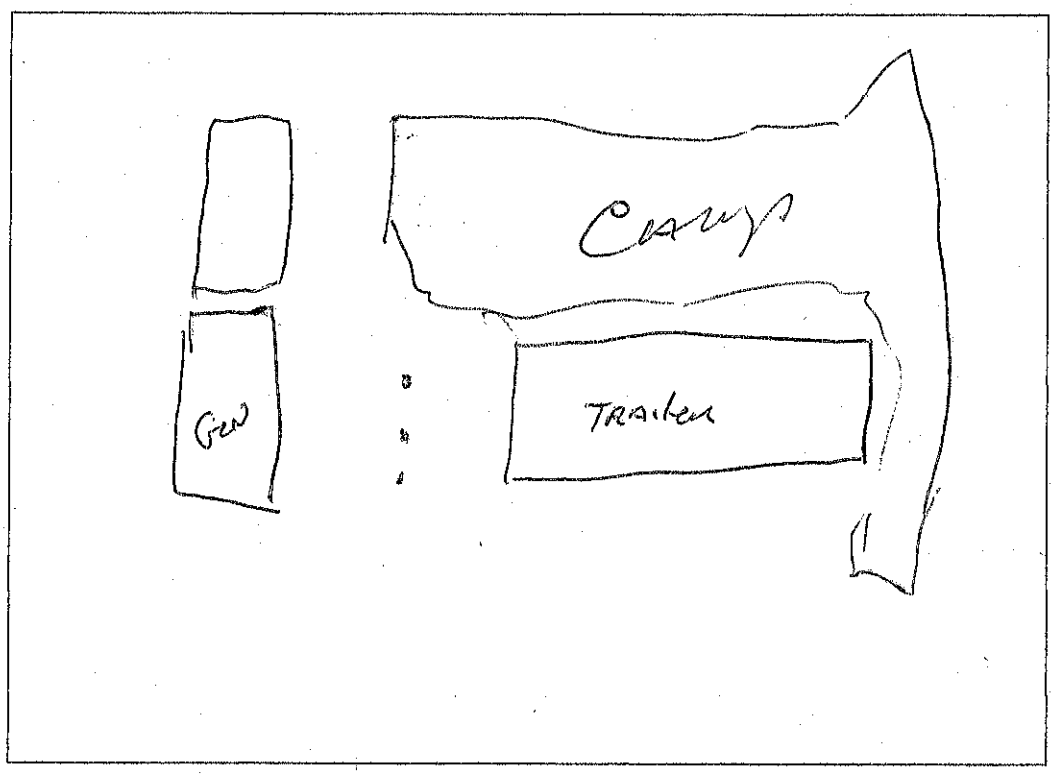
NUNA M&T SPILL REPORTS

NUNA
M & T SERVICES LTD.

SPILL REPORT

Date: APR 6/07	Time: 10 AM	Observers:	
Cause of Spill: OPERATOR - INCIDENT			
Personnel Involved: BARney AARUAQ		Remediation measures taken to date:	
Incident Report File Number:		Material Spilled: Hydoil ANTIFREEZE	Quantity: 2 LITRES OF 6 LITRES ANTIFR
Location of Spill: Camps Pad By Gensets			

Spill Physical Characteristics Sketch:



Other Comments: WHEN OPERATOR WAS CHANGING TANK ON WATER TRUCK HE FORGOT TO UNDO HYD. & HEATER LINE WHEN DROPPING TANK RIPPING LINE OFF AT THE FITTING ON ROLL OFF TRUCK #372 MINOR AMOUNT OF OIL WAS LOST & A FEW LITER OF ANTI FREEZE OUT OF HEATER LINE, VALVES WERE SHUT OFF ON TRUCK & SENT TO SHOP FOR REPAIR PAD SPILL WAS CLEANED UP

NUNA
M & T SERVICES LTD.

Department	Environmental		
Section:		Effective:	
Issued By			
SUBJECT:	SPILL FOLLOW-UP		
Revision:		Replaces:	

Record of Spill Follow-up

Incident Report File Number: [redacted]-		Spill #:	Page 2 of 2
Date of Incident:			
Date	*Action*	Photos	Follow Up
APR 6/07	Shoveled Spill into Pails and Disposed of		

DYNO Dyno Nobel	Standard Operating Procedure - Incident and Corrective Action Reporting **ICARUS REPORT**	ICARUS Tracking Number

SECTION 1 – ORIGINATOR

Categories	Sub-Categories							
Accident (Attach Accident Injury & Loss Details Form) →	☒	Personal Injury ☐		Property Loss ☒		Environmental Release ☐		Process Loss ☐
Near Miss	☐							
Hazard Observation →	☐	Take 5! ☐		JSA ☐		Hazard ID ☐		Planned Inspection ☐
		Compliance Action ☐		Audit Action ☐				
Improvement Opportunity →	☐	Employee Suggestion ☐		Supplier Complaint ☐		Systems Improvement - Compliance ☐		Systems Improvement - Design ☐

Site	Incident Date	Incident Time
BAKER LAKE NUNAVUT	SEPT. 30/07	9:00 A.M.

Actual Incident/Hazard Location:
A W R KILOMETER 30

Incident – Took Place During Hazard – Observed During	Blasting/Loading ☐	Decontamination/ Clean-up ☐	Other ☐	Site Inspection ☐
	Flyrock? Yes ☐ No ☐	Emergency Response ☐	Production ☐	Training ☐
	Maintenance ☐	R & D / Testing ☐	Transportation ☒
	Construction / Start-up ☐	Materials Handling ☐	Sales and Admin ☐	Travelling (Admin) ☐

Detailed Description:
REAR LEFT WHEEL BLEW APART SEPERATING TREAD FROM SIDEWALL. TREAD BLEW OFF HITTING BOTTOM OF RIGHT REAR QUARTER PANEL, CAUSING A DENT. SPEED AT TIME WAS 50 KPH

Immediate Action Taken / Suggested Actions:
TIRE CHANGED

Apparent Causes:
TIRE WAS IN POOR CONDITION

Employee Involved:
WAYNE LOUTIT

Witnesses:

Originator's Name: [redacted] WAYNE LOUTIT	Signature: W. Loutit	Date of Report: OCT 1/07

Your Supervisor/Manager: Nicholas Ebsworth

Email/FAX to Your ICARUS Coordinator for Entry into the Database

SECTION 2 – SUPERVISOR/MANAGER HAZARD ASSESSMENT

Hazard/Loss Potential Class (select one): (See Take 5! Notepad) *Use Hazard Assessment Tool* ☐ A ☐ B ☒ C
Severity: Minimal Probability: Imminent Exposure: Frequent

Manager/Supervisor's Comments:

Major Accident:	Yes ☐ No ☒	Reportable to Regulatory Authority:	Yes ☐ No ☒	Name of Authority:
Fire/Explosion:	Yes ☐ No ☒	Authority Contacted:	Yes ☐ No ☒	Contacted By (Name):
Contractor Involved:	Yes ☒ No ☐	Regulatory Requirement for Formal Investigation:	Yes ☐ No ☒	Requiring Authority/ Regulation:
Further Action Required:	Yes ☐ No ☒	DN Requirement for Formal Investigation:	Yes ☐ No ☒	Name of Investigator:
Fine/Citation/Penalty Issued:	Yes ☐ No ☒			

Manager/Supervisor Name/Signature: Date:

SECTION 3 – ICARUS INVESTIGATION

* INCIDENT/PROBLEM REVIEW FORM TO BE COMPLETED

Immediate Causes (to be completed by Investigator):
TIRE BLEW APART

Actual (Basic) Causes (to be completed by Investigator):
TIRES ARE IN BAD CONDITION ON TRUCK

ACTION ASSIGNMENTS

ACTIONS TO BE TAKEN TO RECTIFY INCIDENT/PROBLEM (TO BE COMPLETED BY ACTION ASSIGNEE)

	Action	Name	When
1	REPLACE WORN TIRES BEFORE THEY GO FLAT		
2			
3			

Expected Completion Date (All actions): **Signed:** **Date:**

SECTION 4 – PROCESS EFFECTIVENESS REVIEW

(TO BE COMPLETED BY ORIGINATOR & SUPERVISOR/MANAGER)

Have the Actions Been Effective? Yes ☐ No ☐ **If NO, Raise New ICARUS Report** ITN:
If NO why?

Suggested Improvements:

ICARUS REPORT

Names and Signature(s): Date:

Check Ratings with above completed ICARUS Report and fax or E-Mail to your ICARUS Coordinator

IMMEDIATE CAUSES

SUBSTANDARD ACTIONS	SUBSTANDARD CONDITIONS
o 1. Operating equipment without authority	o 1. Inadequate guards or barriers
o 2. Failure to warn	o 2. Inadequate or improper protective equipment
o 3. Failure to secure	o 3. Defective tools, equipment or materials
o 4. Operating at improper speed	o 4. Congestion or restricted action
o 5. Making safety devices inoperable	o 5. Inadequate warning system
o 6. Removing safety devices	o 6. Fire and explosion hazard
o 7. Using defective equipment	o 7. Poor housekeeping, disorder
o 8. Using equipment improperly	o 8. Hazardous environmental conditions
o 9. Failure to use PPE properly	o 9. Noise exposures
o 10. Improper loading	o 10. Radiation exposure
o 11. Improper placement	o 11. High/low temperature extremes
o 12. Improper lifting	o 12. Inadequate or excess illumination
o 13. Improper position for task	o 13. Inadequate ventilation
o 14. Servicing equipment in operation	o 14. Weather conditions
o 15. Horseplay	o 15. Wildlife and flora
o 16. Under the influence of alcohol and/or drugs	o
o 17. Operating contrary to procedures	o

BASIC CAUSES

PERSONAL FACTORS	JOB FACTORS
o 1. Inadequate capability - psychological	o 1. Inadequate leadership supervision
o 2. Inadequate capability - physical	o 2. Inadequate engineering/design
o 3. Lack of knowledge	o 3. Inadequate purchasing
o 4. Lack of skill	o 4. Inadequate maintenance
o 5. Stress - psychological	o 5. Inadequate tools/equipment
o 6. Stress - physical	o 6. Inadequate work standards/instructions
o 7. Improper motivation	o 7. Wear and tear
o 8. Inattention	o 8. Abuse or misuse
	o 9. Inadequate training

MANAGEMENT CONTROLS

	P	S	C		P	S	C
1. Leadership and Administration				12. Health, Hygiene & PPE			
2. Leadership Training	o	o	o	13. System Evaluation	o	o	o
3. Planned Inspections & Maintenance	o	X	o	14. Risk Assessment, Change Mgt, Process Controls	o	o	o
4. Task Analysis, Procedures, and Observations	o	o	o	15. Procurement & Contractors	o	o	o
5. Incident Investigation & Analysis	o	o	o	16. Group Communications	o	o	o
6. Environment	o	o	o	17. Calibration and Testing	o	o	o
7. Emergency Preparedness	o	o	o	18. Customer Orders	o	o	o
8. Rules & Work Permits	o	o	o	19. Product Design	o	o	o
9. Transportation and Handling of Dangerous Goods	o	o	o	20. Customer Management	o	o	o
10. Knowledge and Skill Training	o	o	o	21. Finance	o	o	o
11. Hiring & Placement	o	o	o	22. Information Technology	o	o	o

P - program implementation required S - performance standards inadequate C - inadequate compliance to standards

ACTUAL OR POTENTIAL LOSS AND CORRECTIVE ACTIONS COST ANALYSIS (DOLLARS)

Labor Costs (Internal) (Time x Cost per hour)		Plant Downtime (hours)	
Hire of Equipment and Services		Bulk Truck Downtime (hours)	
Purchase of Materials		Blasting Operations Downtime (hours)	
Product Loss		Customer Delay (hours)	
Loss of Equipment		Other (hours)	
Contract Services		**Total Hours**	
Value of Customer Claim		**Environmental Release**	
Other Non-Insured Costs		• Air (kg/L)	
Fines/Penalties/Citations		• Water (kg/L)	
Total		• Ground (kg/L)	

DYNO Dyno Nobel	Standard Operating Procedure - Incident and Corrective Action Reporting **ICARUS REPORT**	ICARUS Tracking Number

Supervisor/Manager & Investigator to complete ALL the details and then FAX or EMAIL to your ICARUS Co-ordinator

PERSONAL INJURY/ILLNESS DETAILS

Supervisor/Manager & Investigator to complete

Name of Injured Person / Person Operating Equipment: WAYDE LOUTIT

Witnesses:

Normal Work Hours:	6:00 AM ☐ PM ☒ to 7:30 AM ☒ PM ☐	Date of 1st Absence:	
Start Time Day of Accident:	6:00 AM ☐ PM ☒	Date Returned to Work:	N/A
Hours Worked Before Accident:	6:00 AM ☐ PM ☐ to 9:00 AM ☒ PM ☐	Rehabilitation/Return to Work Plan?	Yes ☐ No ☐
Hours Worked Previous Day:	6:00 AM ☒ PM ☒ to 2:30 AM ☒ PM ☐	1st Date of Modified Work:	
Date of Last Shift Break/Leave/Day Off		Date Returned to Normal Duties:	
Insurance Claim?	Yes ☐ No ☐	Permanent Disability?	Yes ☐ No ☐
Claim Accepted? N/A	Yes ☐ No ☐	Position Replaced? N/A	Yes ☐ No ☐
	Medical Expenses ☐ All Costs ☐		

What type of injury?

o Burn	o Sprain/Strain	o Multiple Injuries N/A	o Repetitive Motion Injury
o Contusion/Bruise/Crushing	o Hernia/Rupture	o Poisoning	o Dermatitis/Rash/Inflammation
o Cut/Laceration/Puncture/Scratch	o Fracture	o Respiratory	o Psychological Stress

What part of the body was injured?

o Head	o Brain	o Ears	o Eyes	o Face
o Upper Extremities	o Arm	o Elbow	o Fingers	o Hand
o Lower Extremities	o Ankle	o Foot	o Knee	o Leg
o Body Systems	o Circulatory	o Digestive N/A	o Excretory	o Respiratory
o Neck	o Trunk			

HOW was the injury/illness caused?

o Struck against	o Caught in/under/between	o Contact with electricity	o Other
o Struck by	o Rubbed/abraded	o Contact with extreme temperature	
o Fall from elevation	o Bodily reaction	o Contact with radiation or chemicals	
o Fall from same level	o Over exertion	o Psychological	N/A

WHAT was the injury/illness caused by?

o Manual Handling	o Static Equipment	o Building & Structure	o Gas
o Work Environment	o Other Equipment	o Trench / Excavation	o Chemicals
o Hand Tools	o Forklift Truck	o Electricity	o Light Vehicle
o Power Tools	o Bulk Truck	o Steam	o Blasting Operations

Details of Machinery/Equipment Involved (include identification numbers where available):

SUPERVISOR TRUCK 0848

Details of Treatment Provided (include doctor, treatment facility, authorities contacted):

PROPERTY DAMAGE/VEHICLE ACCIDENTS/OTHER LOSS

Description of Item / Equipment Damaged / Loss:

Process Equipment Loss:	Building/Structure Loss:	Non-Dyno Nobel Equipment Loss:	Vehicle Loss:	Inventory Loss:	Total Value:
Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☒ No ☐	
Value $:	Value $:	Value $:	Value $:	Value $:	Value $:
Insurance Claim?	Yes ☐ No ☐		*Complete Claim and Forward to Insurance Representative*		

ENVIRONMENTAL LOSS

Description of Release/Loss: N/A

Release to:	Air ☐ Ground ☐ Water ☐	Environmentally Sensitive Area?	Yes ☐ No ☐
Substance/Chemical:		Penalties?	Yes ☐ No ☐
Quantity (kg):		Cost of Penalties:	Value $:

DYNO Dyno Nobel	Standard Operating Procedure - Incident and Corrective Action Reporting **ICARUS REPORT**	ICARUS Tracking Number

Reportable to Authority? Yes ☐ No ☐		Cost of Clean-Up:	Value $:
Completed by: (Investigator) WAYNE LOUTIT	**Date:** OCT 1/07	**Reviewed by:** (Supervisor)	**Date:**

Check that you have completed ALL the questions and then FAX or E-Mail to your ICARUS Coordinator

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR APRIL 9/07	REPORT TIME	☐ ORIGINAL SPILL REPORT, OR	REPORT NUMBER
B	OCCURRENCE DATE: MONTH – DAY – YEAR APRIL 9/07	OCCURRENCE TIME	☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	

C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION	REGION ☐ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS

F	RESPONSIBLE PARTY OR VESSEL NAME	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION	
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION	
H	PRODUCT SPILLED	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER
I	SPILL SOURCE	SPILL CAUSE	AREA OF CONTAMINATION IN SQUARE METRES
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

HYDRAULIC HOSE RUPTURED ON UNIT 5754.
SPRAYING HYD OIL ON THE ROADWAY.
THIS HAPPENED JUST NORTH OF PIT ONE
AT APPROX KM 2½. (CUMBERLAND ROAD PROJECT).
HOSE WAS REPLACED WITH NEW HOSES.
OIL/DIRT WAS CLEANED UP USING GRADER/LOADER.
APPROX. 60 LITRES WAS LOST.

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
APR 20 07 5:20PM	APR 20 07 5:00 PM		

D Location and map coordinates (if known) and direction (if moving)

BEHIND QUARRY # 2

E Party Responsible for Spill

ANDY HOLZAPFEL

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

TRANSMISSION OIL

G Cause of Spill

0.1 lines BROKE

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no		☐ yes ☒ no	3M Sq. Approx

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
	NATURAL depression

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

Kept contained in depression. sucked up some with fuel TRUCK. used spill pad & spill kit to sob the rest

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☒ no ☐ yes, describe*	equip damage possible slippage on oil

Q Comments and/or recommendations *:

PAY Better attention to work area

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
ANDY HOLZAPFEL	HEAVY EQUIP OPERATOR	
Reported to:	**Position, Employer, Location**	**Telephone No:**
DON WEBER	SHIFT BOSS	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C	Spill Number
MAY 4/07	MAY 4/07 Approx 4 AM.	☑ Original Report ☐ Update No. 1	

D Location and map coordinates (if known) and direction (if moving)

1 KM SOUTH of PIT 3. CUMBERLAND ROAD PROJECT

E Party Responsible for Spill

NUNA MANOT

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

ANTIFREEZE 20 LITRES.

G Cause of Spill

FAN HUB FAILED. DAMAGING RADIATOR

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	NO	☐ yes ☑ no	Approx 40 sq METRES.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

NONE

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

CONTAMINATED SOIL. PICKED UP.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes, describe*	

Q Comments and/or recommendations *:

SPILL TOOK PLACE ON THE ROADWAY. CONTAMINATED SOILS ~~ARE~~ WERE CLEANED. AND PUT IN DRUMS.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
[signature]	MECHANIC NUNA MANOT	780 644-9087
Reported to:	**Position, Employer, Location**	**Telephone No:**
WES DANIELSON	P/M NUNA LOGISTICS BAKER LAKE	780-644-9081

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (If known)	C ☐ Original Report ☐ Update No. 1	Spill Number
MAY 7/07 12:00 NOON	MAY 7/07 9:00 AM - 10 00 AM.		

D Location and map coordinates (if known) and direction (if moving)

LAYDOWN #1 NUNA MANDT.

E Party Responsible for Spill

NUNA MANDT.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

TRANS. OIL. Approx. 20 LITRES.

G Cause of Spill

REMOVED 773. WHEEZ. GROUPS. WITH WINDY CONDITIONS.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (In sq. m if possible)
☑ yes ☐ no		☐ yes ☑ no	3 sq meters.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	

N Action, If any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

CONTAMINATED DIRT DRUMED.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes , describe*	NO

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
WES DANIELSON	P/m BAKER LAKE	1-780-644-9081

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: 05/22/07	REPORT TIME: 19:00	☒ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER
B	OCCURRENCE DATE: MONTH – DAY – YEAR: 05/22/07	OCCURRENCE TIME: 1:00 A.M		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: QUARRY 4 Q4-02 BLAST PATTERN	REGION: ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES / MINUTES / SECONDS	LONGITUDE: DEGREES / MINUTES / SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME: NWT ROCK SERVICES	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: 111 NAHANNI DR. YELLOWKNIFE NWT		
G	ANY CONTRACTOR INVOLVED: NWT ROCK SERVICES	CONTRACTOR ADDRESS OR OFFICE LOCATION: 111 NAHANNI DR YELLOWKNIFE NWT		
H	PRODUCT SPILLED: HYDRAULIC FLUID	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: 85 L.	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: DRILL # 0433	SPILL CAUSE: BLOWN HOSE	AREA OF CONTAMINATION IN SQUARE METRES: 1 m^3	
J	FACTORS AFFECTING SPILL OR RECOVERY: MOST OF OIL WENT DOWN HOLE	DESCRIBE ANY ASSISTANCE REQUIRED: ABSORBANT PADS USED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT: NONE	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

LINE BLEW UNDER DRILL. MOST OF OIL RAN INTO DRILL HOLE WHICH WAS UNDER THE DRILL. WHEN DRILL WAS MOVED WHATEVER WAS LEFT AT SURFACE WAS ABSORBED USING PADS. HOLE WAS LOADED WITH EXPLOSIVES THE SAME DAY AND PATTERN TO BE BLASTED MAY 23/07

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☑ Original Report ☐ Update No. 1	Spill Number
MAY 22/07	MAY 22/07		

D Location and map coordinates (if known) and direction (if moving)
AGNICO - EAGLE ROAD. (NORTH of PIT #3)

E Party Responsible for Spill
NUNA MANDT.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)
ANTIFREEZE

G Cause of Spill
RADIATOR BURST.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	N/A.	☐ yes ☑ no	2 SQ METRES

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	NONE

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials
HOSE BURST ON THE ROAD.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes, describe*	NO.

Q Comments and/or recommendations *:
UNIT LOST APPROX. 16 LITRES. OF ANTIFREEZE/WATER (50-50 MIX). ONTO THE ROAD WAY, WHILE DRIVING. DOWN THE ROAD, OPERATOR NOTICED LEAK AND, STOPPED. TRUCK. HOSES WHERE REPAIRED.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☑ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
[signature]	MECHANIC. NUNA MANDT.	
Reported to:	**Position, Employer, Location**	**Telephone No:**

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials) ✓

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
MAY 26/07	MAY 26/07 Approx. 4 AM.		

D Location and map coordinates (if known) and direction (if moving)

CUMBERLAND ROAD PIT #5.

E Party Responsible for Spill

NUNA MANOT.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

TRANSMISSION OIL. Ap. 50 LITRES

G Cause of Spill

HYD. HOSE RUPTURED

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	NO	☐ yes ☑ no	Approx. 3 sq. METRE

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	ON ROADWAY.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

DIAPERS WERE USED TO SOAK UP OIL.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes , describe*	NO.

Q Comments and/or recommendations *:

HOSE WAS REPLACED WITH A NEW ONE

SPILL TOOK PLACE AT PIT #5 IN A "ROCK" AREA.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☑ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
[signature]	MECHANIC NUNA MANOT.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
WES DANIELSON	P.M. NUNA LOGISTICS BAKER LAKE	1-780-644 9081

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

Northwest Territories

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

24 – Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and Time	B Date and Time of spill (if known)	C ☐ Original Report ☐ Update no._____	Spill Number
May 26 2007	May 26 2007		

D Location and map coordinates (if known) and direction (if moving)

Cumberland road and forward camp

E ~~Party~~ responsible for spill

Artic Fuels

F Product(s) spilled and estimated quantities (provide metric volumes/weights if possible)

Diesel Fuel

G Cause of spill

Artic Fuel truck was delivering fuel to the forward camp and was spilling while driving over project road.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in square meters if possible)
☒ yes ☐ no		☐ yes ☒ no	Approx 20 to 25 Liters

L Factors effecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dikes, etc.)
None	

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

Diapers were used to clean up at forward camp

O Do you require assistance?	P Possible hazards to person, property, or environment; eg: fire, drink water, fish or wildlife
☒ no ☐ yes, describe:	Some of the fuel was in the water running towards bridge

Q Comments or recommendations

FOR SPILL LINE USE ONLY

Lead agency

Spill significance

Lead Agency contact and time

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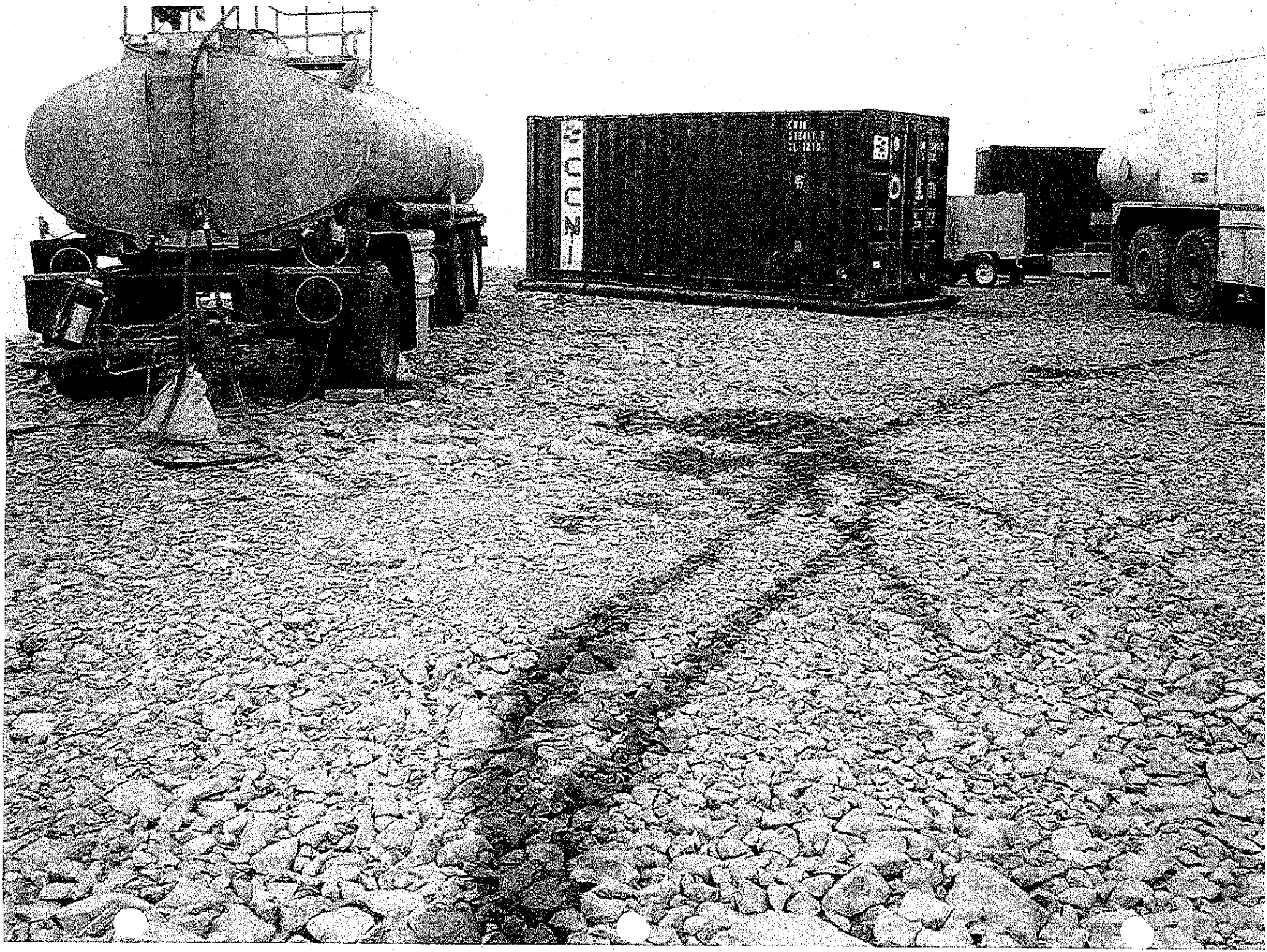
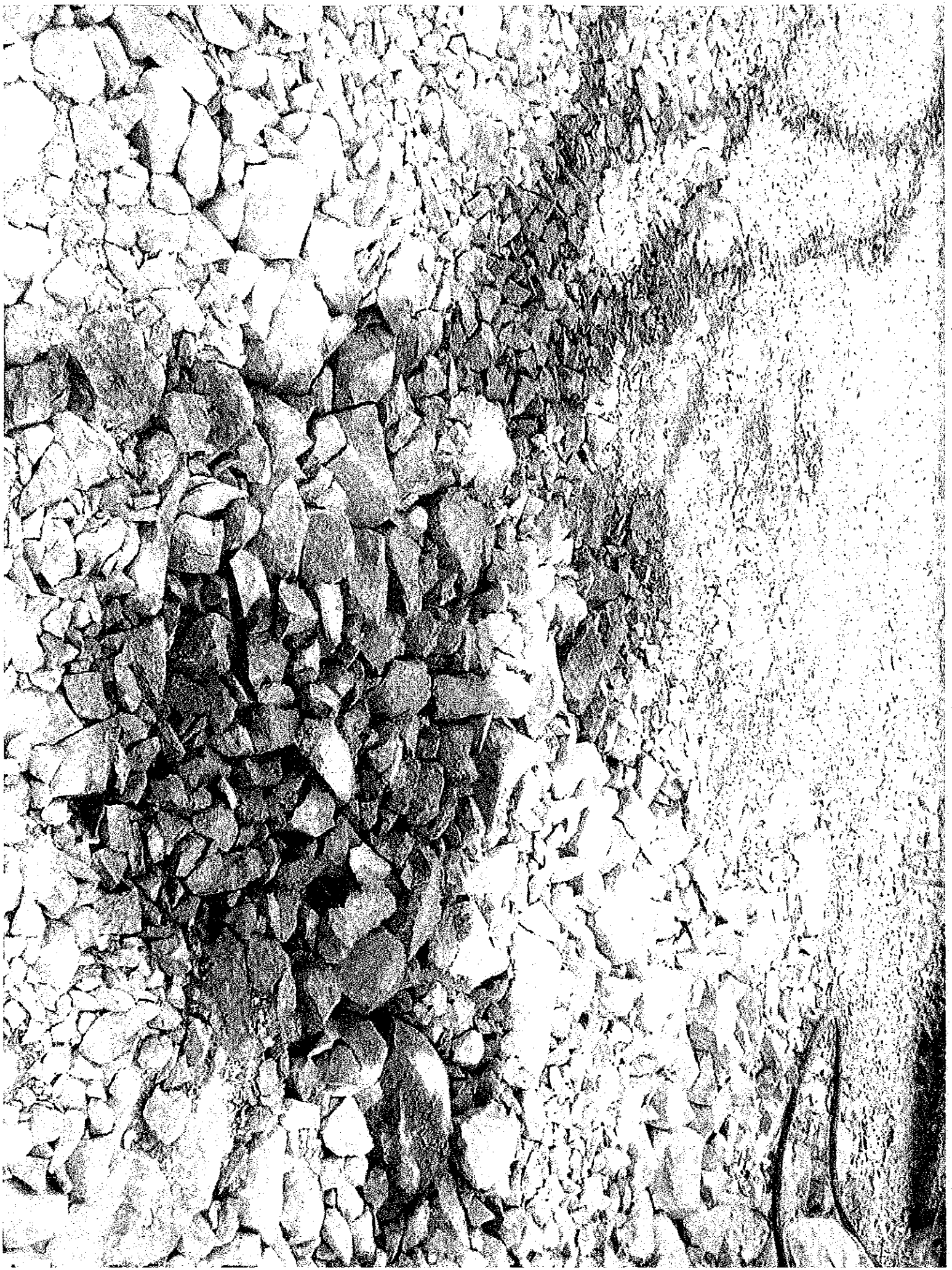
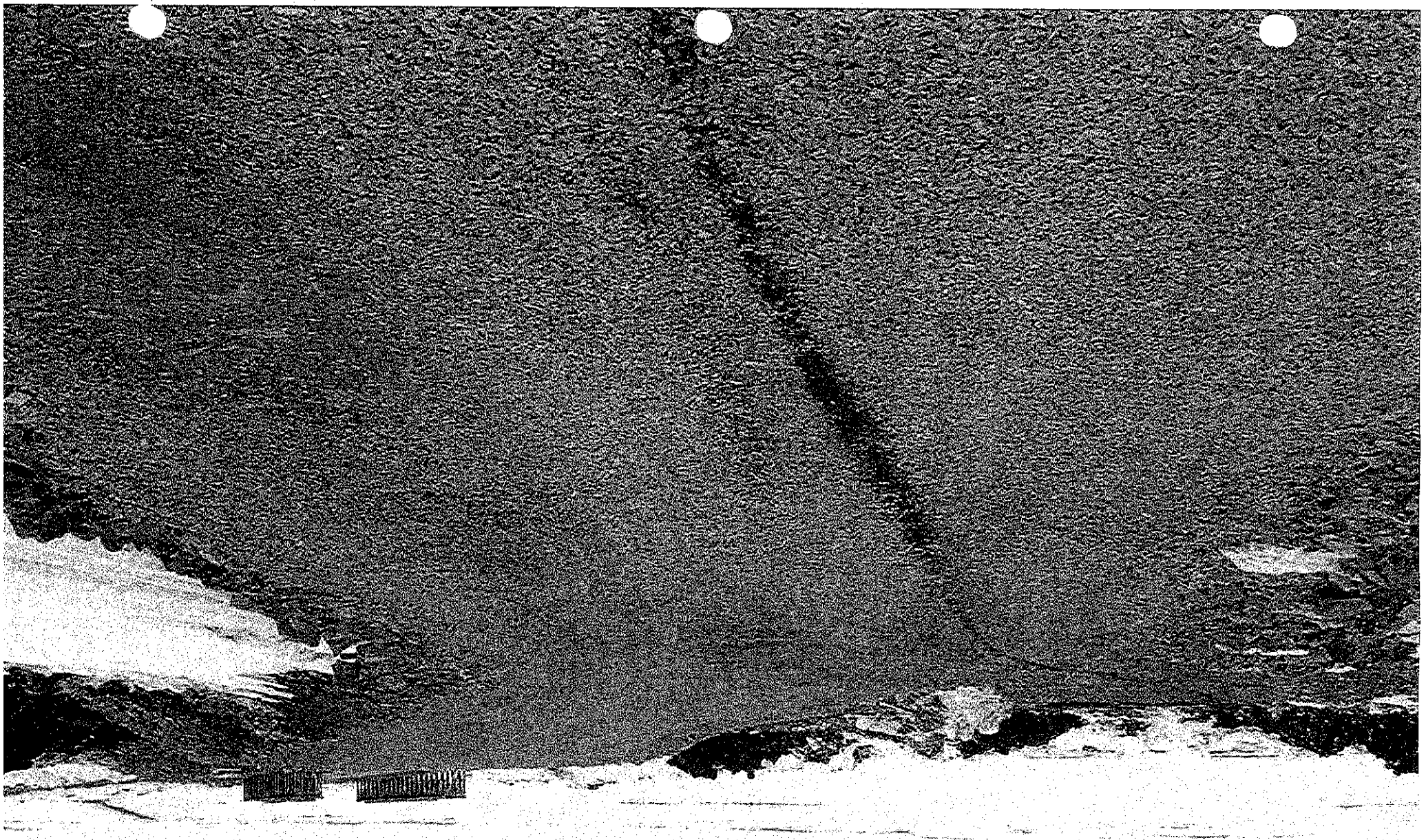
.....

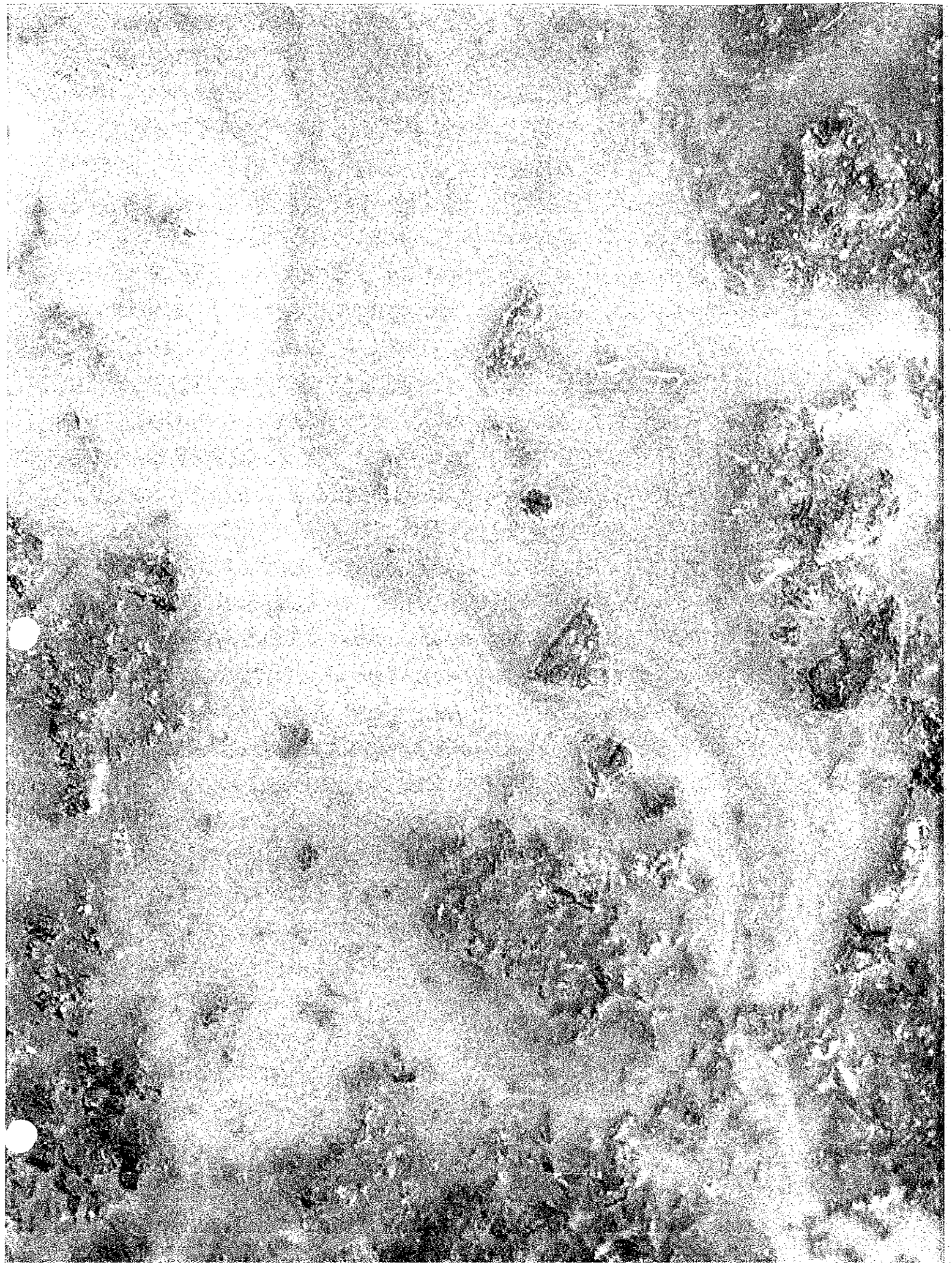
Is this file now closed? ☐ yes ☐ no

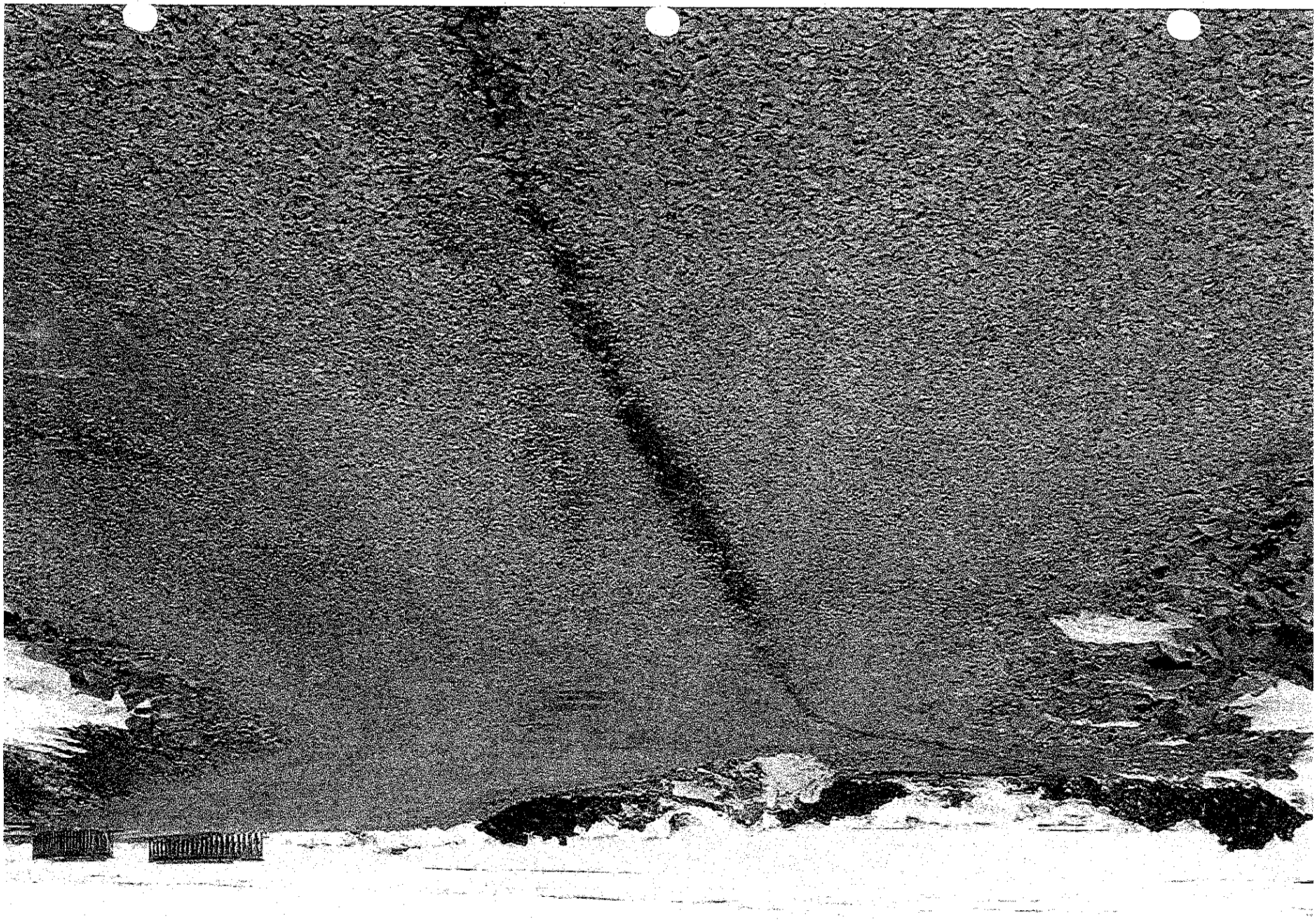
Reported by	Position. Employer, Location	Telephone
Kirk Killer	Day Shift Formand	
Reported to	**Position. Employer, Location**	**Telephone**
Wes Danieson	Project Manger (Baker Laker Project)	











NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (If known)	C	Spill Number
MAY 28/07	MAY 28/07. Approx. 1:30 AM.	☑ Original Report ☐ Update No. 1	

D Location and map coordinates (if known) and direction (if moving)

CUMBERLAND ROAD. PIT #4.

E Party Responsible for Spill

NUNA MANOT

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

DIESEL. 10 LITRES.

G Cause of Spill

AUTO FUEL NOZZLE DID NOT SHUT OFF.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no		☐ yes ☑ no	1 sq meter.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	IN PIT AREA.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

CONTAMINATED ROCK WAS CLEANED UP AND HAULED TO PIT 2.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes, describe*	NO.

Q Comments and/or recommendations *:

LUBEMAN WAS FUELING 773. AND AUTO SHUT OFF NOZZLE DID NOT SHUT OFF OVER FILLING TANK. LUBEMAN SHUT OFF THE NOZZLE MANUALLY. SPILL TOOK PLACE IN PIT AREA. WAS CONTAINED. ROCK/SOIL WAS REMOVED HAULED TO PIT 2.

R.C

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
[redacted]	MECHANIC	
Reported to:	**Position, Employer, Location**	**Telephone No:**
WES DANIELSON	PROJECT MANAGER	1-780-644-9081

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C	Spill Number
JUNE 4/07 8:00 AM	JUNE 2/07 7:30 AM ?	☑ Original Report ☐ Update No. 1	

D Location and map coordinates (if known) and direction (if moving)

MEADOW BANK ROAD. Approx 2 Km North of Pit 3.

E Party Responsible for Spill

NUNA M AND T.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

Hyd OIL Approx. 20 LITRES.

G Cause of Spill

RUPTURED HYD HOSE

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	NO	☐ yes ☑ no	Approx 4 sq meters.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	ON ROADWAY.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

SEE Q.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes, describe*	NO

Q Comments and/or recommendations *:

SPILL TOOK PLACE ON THE ROAD.
DIAPERS WERE USED TO
SOAK UP THE SPILLED OIL.
SOME DIRT WAS SCRAPED UP.
NEW Hyd. HOSE WAS INSTALLED.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☑ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C	Spill Number
2:30 AM. JUNE 8 07.	JUNE 8-07.	☑ Original Report ☐ Update No. 1	

D Location and map coordinates (if known) and direction (if moving)

Q 701

E Party Responsible for Spill

NWT ROCK DRILL 0639.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

HYD OIL.

G Cause of Spill

BROKEN HOSE.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	NIL.	☒ yes ☐ no	3 L.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
TERRAIN.	BLAST PATTERN

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

CLEANED UP AREA WITH RAGS.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☒ no ☐ yes , describe*	BLAST PATTERN.

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
LARRY PICKERING	FOREMAN.	
Reported to:	Position, Employer, Location	Telephone No:
	SUPERINTENDENT	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☑ Original Report ☐ Update No. 1	Spill Number
June 09/2007 1230	JUNE 09/2007 1110		

D Location and map coordinates (if known) and direction (if moving)

OLD MECHANIC SHOP IN BAKER LAKE

E Party Responsible for Spill

NUNA M&T

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

#2 DIESEL FUEL 45L

G Cause of Spill

CLEANING ICE FROM A HERMAN NELSON HEAT RUPTURED FUEL TANK -

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	N/A	☐ yes ☑ no	~25 SQ MT

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
UNIT FROZEN IN ICE	ICE DEPRESSION & DYKED WITH GRAVEL.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

USED ABSORBANT PADS TO ABSORB POOLED DIESEL -

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes, describe*	N/A

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
[signature]	FOREMAN, NUNA LOGISTICS @ BAKER LAKE MEADOW BANK PROJECT	
Reported to:	**Position, Employer, Location**	**Telephone No:**
[signature]	SITE SUPERVISOR	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time: 4:45 AM JUNE 12 07	B Date and time of Spill (if known): JUNE 12 07 - 4:45 AM	C ☒ Original Report ☐ Update No. 1	Spill Number: 2

D Location and map coordinates (if known) and direction (if moving)

QUARRY 7 03 PATTERN.

E Party Responsible for Spill

DRILL 0645.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

30 MOTOR OIL.

G Cause of Spill

BROKEN HOSE.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (In sq. m If possible)
☒ yes ☐ no		☐ yes ☒ no	1 SQM.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
OIL PADS + SHOVELS.	BLAST PATTERN

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☒ no ☐ yes, describe*	NIL

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
LARRY PICKERING	FOREMAN NWT ROCK	
Reported to:	**Position, Employer, Location**	**Telephone No:**

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24 – Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and Time: JUNE 17.07 7:15 PM	**B** Date and Time of spill (if known): JUNE 17/07	**C** ☐ Original Report ☐ Update no.____	Spill Number: 3

D Location and map coordinates (if known) and direction (if moving)
QUARRY 8 01 PATTERN

E Partly responsible for spill
DRILL - 0749

F Product(s) spilled and estimated quantities (provide metric volumes/weights if possible)
8 LITRES ANTIFREEZE

G Cause of spill
BROKEN HEATER HOSE

H Is spill terminated?	**I** If spill is continuing, give estimated rate	**J** Is further spillage possible?	**K** Extent of contaminated area (in square meters if possible)
☑ yes ☐ no	NO	☐ yes ☒ no	1.5 SQ METERS

L Factors effecting spill or recovery (weather conditions, terrain, snow cover, etc.)	**M** Containment (natural depression, dikes, etc.)
ABSOARED WITH DRILLS CUTTINGS	BLAST PATTERN

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials
SHOVELED CUTTINGS INTO 20 LITRE PAIL

O Do you require assistance?	**P** Possible hazards to person, property, or environment; eg: fire, drink water, fish or wildlife
☑ no ☐ yes, describe:	NONE PRODUCT DISSAPATED BY BLAST

Q Comments or recommendations

FOR SPILL LINE USE ONLY

Lead agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by	Position, Employer, Location	Telephone
RON CAMP	SUPERINTENDENT NWT ROCK BARRHAKE AWR.	
Reported to	**Position, Employer, Location**	**Telephone**

NWT 1752/0202

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR June -20 -2007	REPORT TIME 3:15 PM	☒ ORIGINAL SPILL REPORT, OR	REPORT NUMBER 0728--4
B	OCCURRENCE DATE: MONTH – DAY – YEAR June -20-2007	OCCURRENCE TIME 2:40	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE) LUP-06-603-002	WATER LICENCE NUMBER (IF APPLICABLE) 3BC-TEH0707		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION Baker Lake Nunavut	REGION ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME Nuna Fuel Truck Unit #1273	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION Nuna M&T Services 9839-31 Avenue Edmonton AB. Phone (780)-434-9114		
G	ANY CONTRACTOR INVOLVED No	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED T04 Hydraulic Oil	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES 200 Litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE) None	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE Petro-Canada Lube Oil Cube	SPILL CAUSE Hole in Lube Oil Cube	AREA OF CONTAMINATION IN SQUARE METRES 4 To 5 Metres Square	
J	FACTORS AFFECTING SPILL OR RECOVERY None	DESCRIBE ANY ASSISTANCE REQUIRED None	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT No	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

Dear Sir or Madam

The only Coordinates I have for section E are as followes Spill starts at Km 28 North 7161411.3 East 6347551

Ends at Km 29 + 865 7162942.1 633945.1

L	REPORTED TO SPILL LINE BY Kenny Theriault	POSITION Safety Department	EMPLOYER Nuna M&T Services	LOCATION CALLING FROM Baker Lake	TELEPHONE (780) 644-9088
M	ANY ALTERNATE CONTACT Wes Danielson	POSITION Project Manger	EMPLOYER Nuna M&T Services	ALTERNATE CONTACT LOCATION Baker Lake	ALTERNATE TELEPHONE (780) 644-9081

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION Station operator	EMPLOYER	LOCATION CALLED Yellowknife, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

NUNA
M & T SERVICES LTD.

Operations & Administration Office
9839 – 31 Avenue
Edmonton, Alberta
T6N 1C5
T 1 800 434 9434 or 780 434 9114
F 1 888 734 5770 or 780 434 7758
MEADOWBANK PROJECT OFFICE – BAKER LAKE, NUNAVUT
TEL:780.644.9080
FAX:780.644.9089

Fax

To: NWT Chemical Spill **From:** Nuna MyT Services

Fax: (867) 873-6924 **Pages:** 12

Phone: **Date:** June 22/2007

Re: **CC:**

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

● Comments:

Northwest Territories

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

24 – Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and Time	B Date and Time of spill (if known)	C	Spill Number
June 20/2007	Time 3:15 PM June 20/2007	☒ Original Report ☐ Update no._____	

D Location and map coordinates (if known) and direction (if moving)

Baker Lake: Nunavut

E Partly responsible for spill

Nuna M&T Services Fuel Truck Unit # 1273

F Product(s) spilled and estimated quantities (provide metric volumes/weights if possible)

Petro Canada Lube Oil Cube. Lube Oil Cube spilled 200L TO4 Hydraulic Oil

G Cause of spill

Hole in Petro Canada Lube Oil Cube

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in square meters if possible)
☒ yes ☐ no		☐ yes ☒ no	2KM on All Weather Road 4 to 5 M At Q-6

L Factors effecting spill or recovery (weather conditions, terrain, snow cover, etc.)

None

M Containment (natural depression, dikes, etc.)

Natural

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

Drove to pit 6 stopped truck and use diaper's to clean up spill.

O Do you require assistance?	P Possible hazards to person, property, or environment; eg: fire, drink water, fish or wildlife
☒ no ☐ yes, describe:	NO

Q Comments or recommendations

FOR SPILL LINE USE ONLY

Lead agency

Spill significance

Lead Agency contact and time

.....

.....

.....

Is this file now closed? ☐ yes ☐ no

Reported by	Position. Employer, Location	Telephone
Roger Chalut	Fuel Truck Driver Nuna M&T Services Baker Lake	Project manger (780) 644-9081
Reported to	**Position. Employer, Location**	**Telephone**
Kenny Theriault	Safety Department Nuna M&T Services Baker Laker	(780) 644-9088

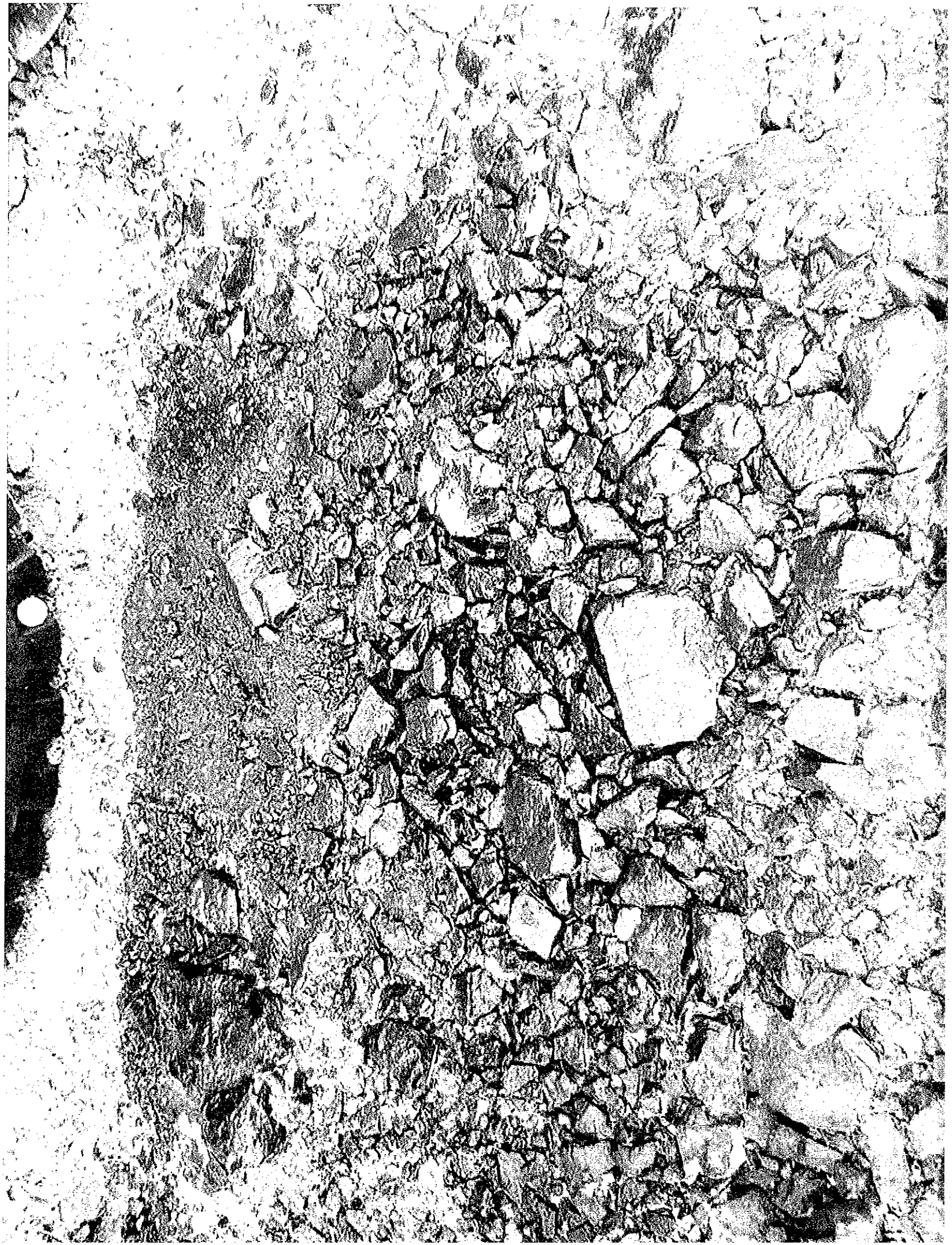
NWT 1752/0202

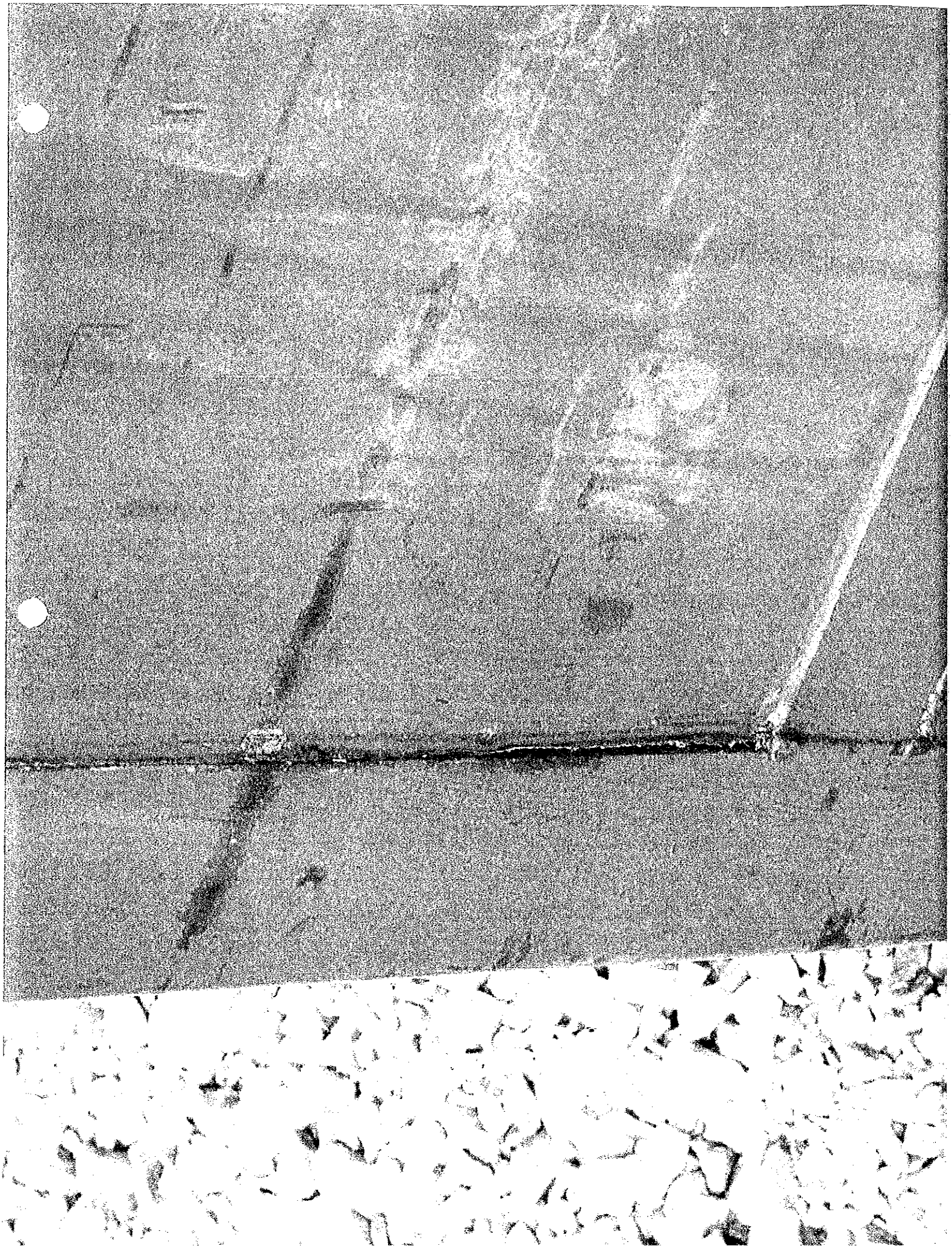
On June 20 I was driving the fuel/lube truck at aprox km 27 hydrolic oil was started to leak from a crack in the tank. I did not notice till km 30 stopped the truck went into the lube compartment at got the diaper's out and contained the oil. Then went to pit 6 and cleaned up the truck to not spill any more on the road and put out more diaper's to soak up any more oil in the truck. Then I pump the remaining oil into another cube. aprox 200LTRS was spilled

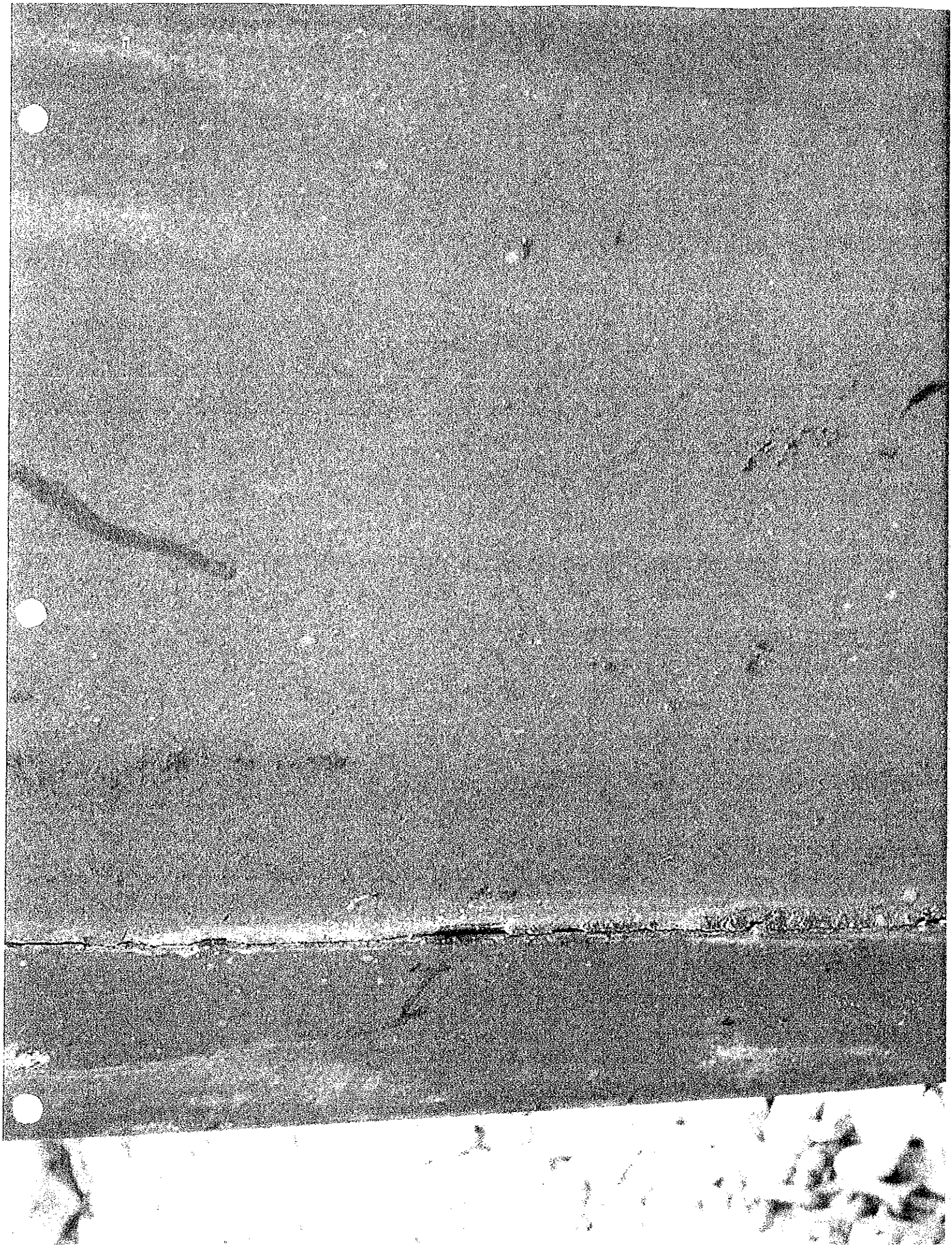
Roger Dalt

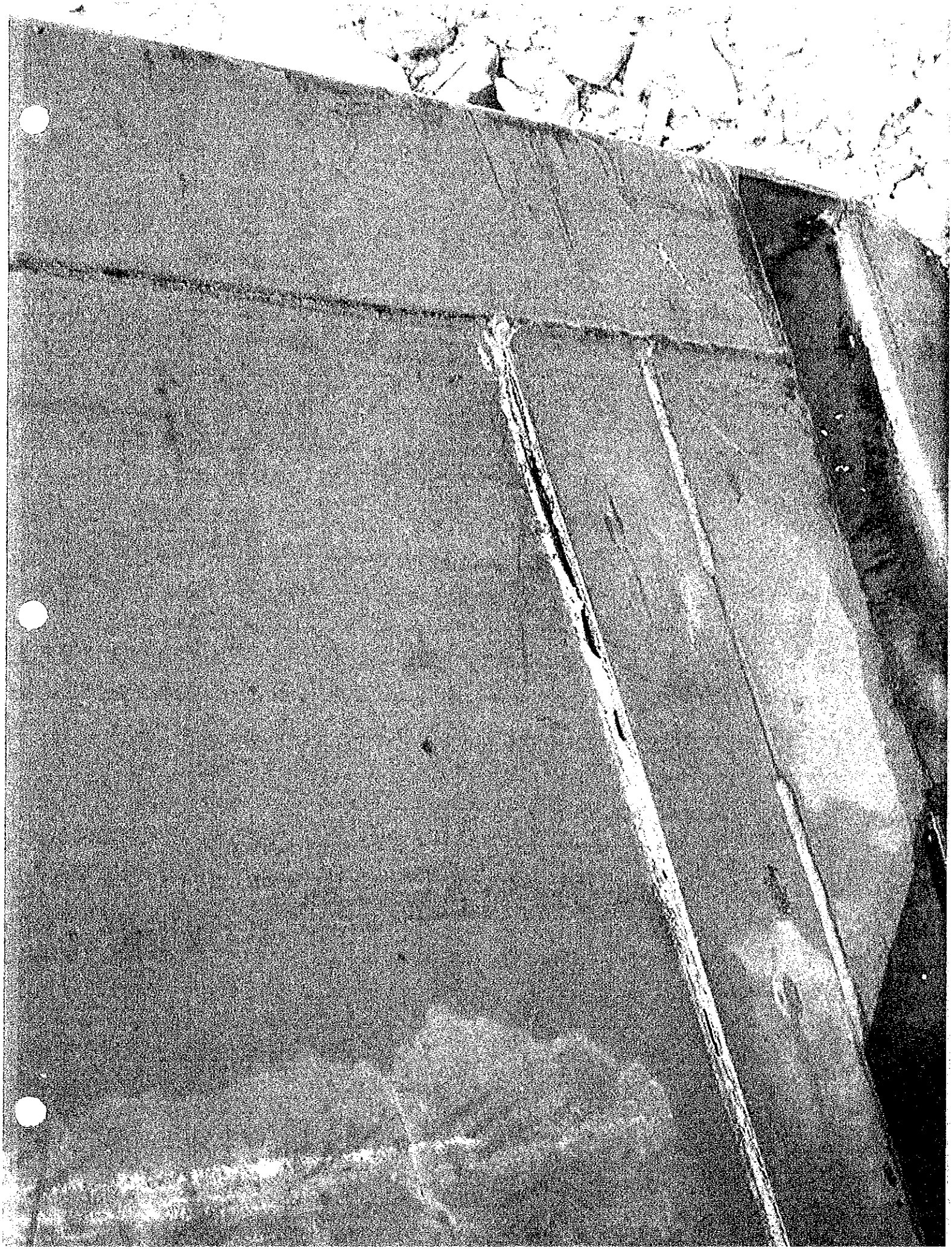
June 20/07

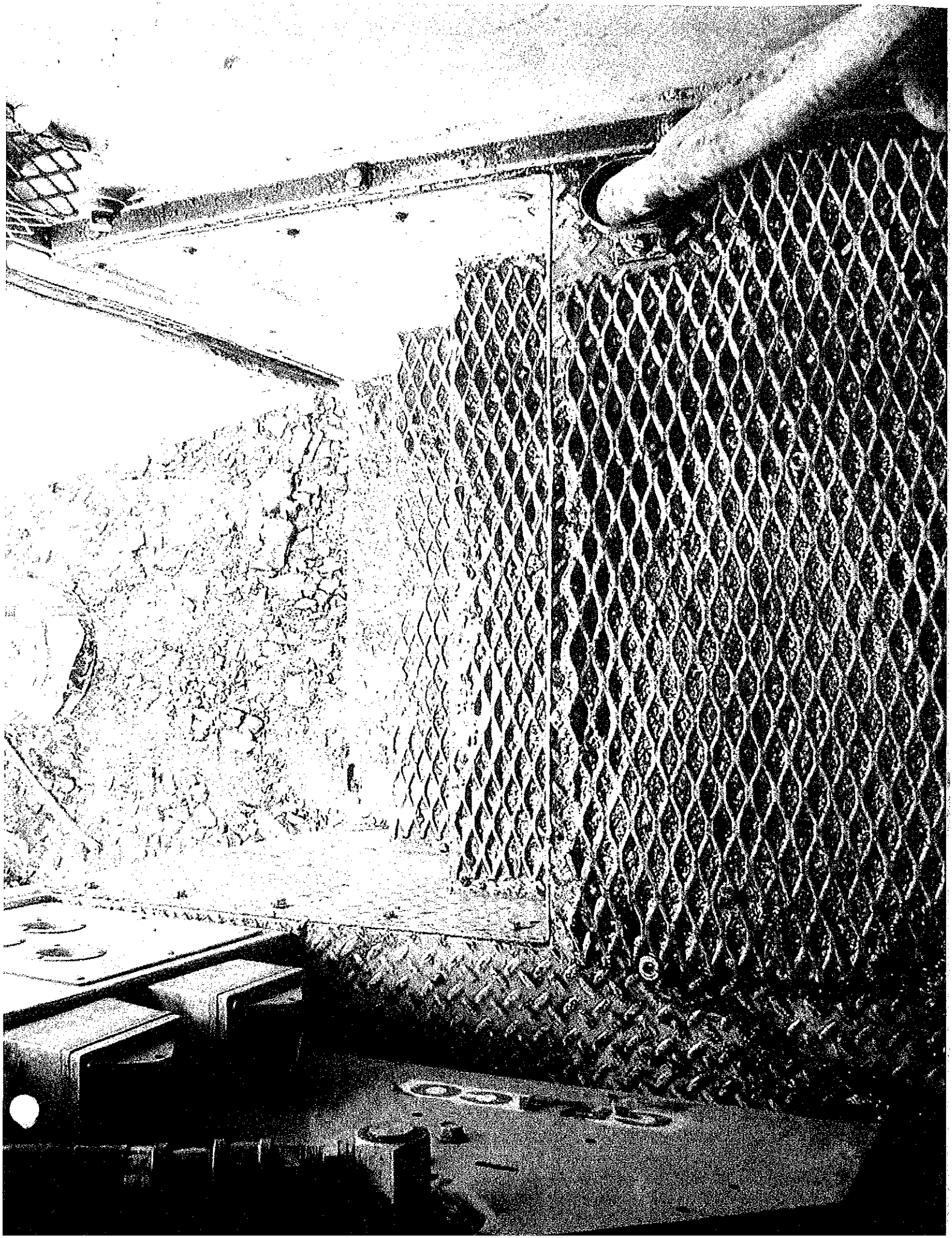
Bleach

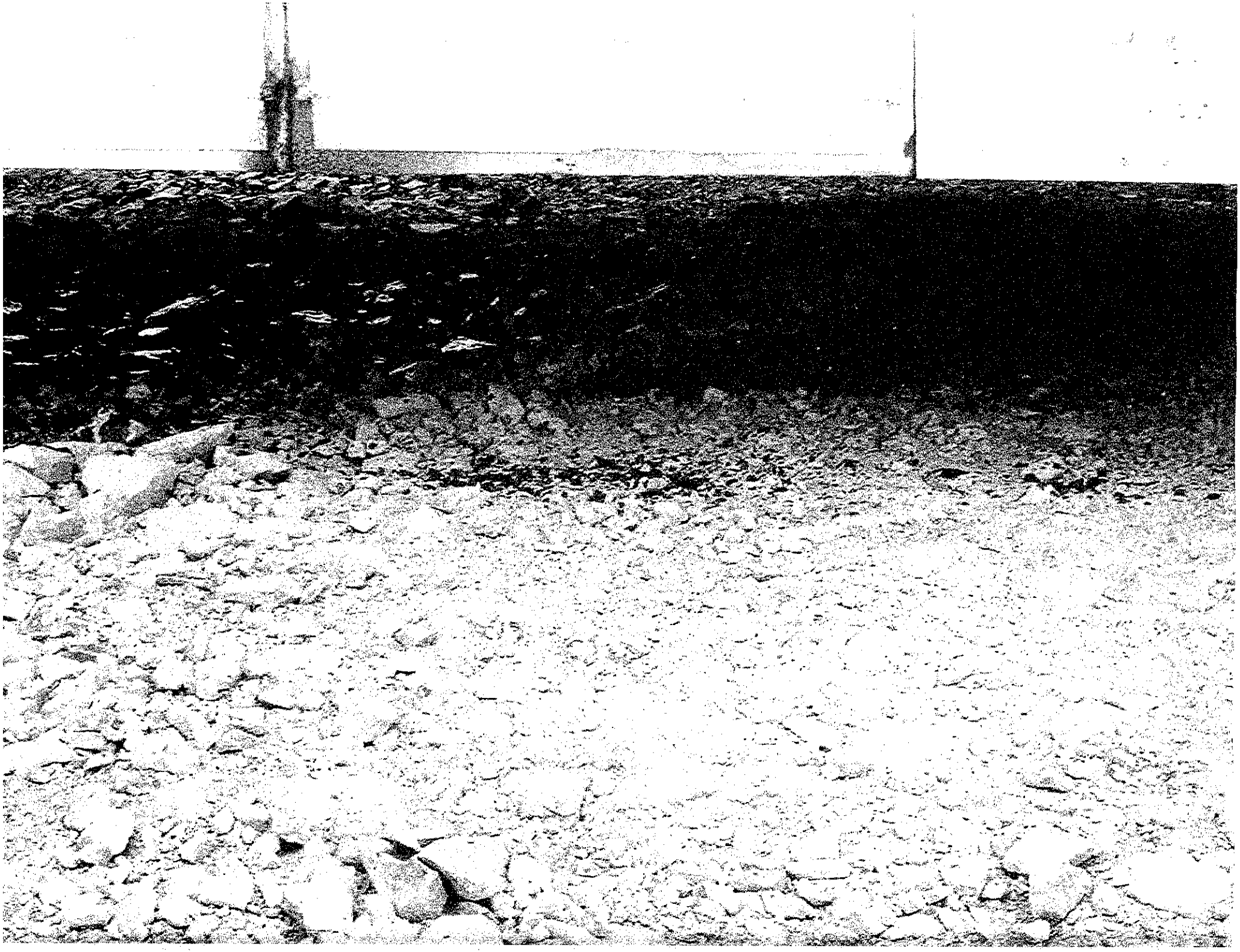


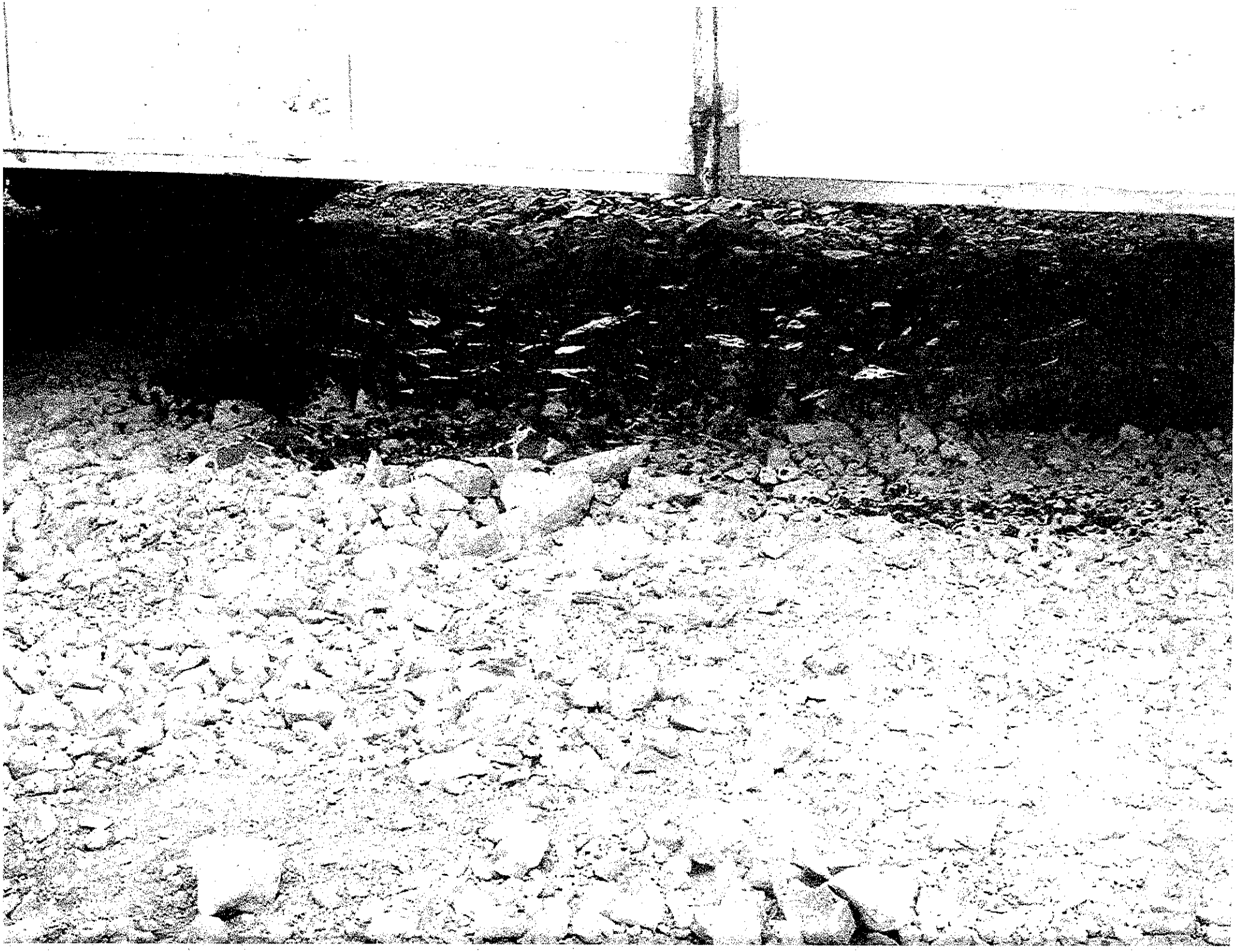












Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR June - 20 - 2007	REPORT TIME 3:15PM	[X] ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER 07 - 28-4
B	OCCURRENCE DATE: MONTH – DAY – YEAR June -20 -2007	OCCURRENCE TIME 2:40		
C	LAND USE PERMIT NUMBER (IF APPLICABLE) LUP-06-603-002	WATER LICENCE NUMBER (IF APPLICABLE) # 3BC-TEH0707		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION	REGION ☐ NWT [X] NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME Nuna Fuel Truck Unit # 1273	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION Nuna M&T Services (Baker lake)		
G	ANY CONTRACTOR INVOLVED NO	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED T04 Hydraulic Oil	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES 200 Litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE) None	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE Petro-Canada Lube Oil Cube	SPILL CAUSE Hole in Lube Oil Cube	AREA OF CONTAMINATION IN SQUARE METRES 4 To 5 Metres Square	
J	FACTORS AFFECTING SPILL OR RECOVERY None	DESCRIBE ANY ASSISTANCE REQUIRED None	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT NO	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS			

L	REPORTED TO SPILL LINE BY Kenny Theriault	POSITION Safety Department	EMPLOYER Nuna M&T Services	LOCATION CALLING FROM Baker Lake	TELEPHONE (780) 644-9088
M	ANY ALTERNATE CONTACT Wes Danielson	POSITION Project Manger	EMPLOYER Nuna M&T Services	ALTERNATE CONTACT LOCATION Baker Lake	ALTERNATE TELEPHONE (780) 644-9081

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

24-Hour Report Line

Northwest Territories

Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (If known)	C ☑ Original Report ☐ Update No. 1	Spill Number
JUNE 20/07.	JUNE 20/07 3:15PM		

D Location and map coordinates (If known) and direction (If moving)

NORTH of PIT 3. MEADOW BANK ROAD.

E Party Responsible for Spill

NUNA MANDT.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

Hyd OIL.

G Cause of Spill

CORNER. WELD ON TANK. CRACKED.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	NO	☐ yes ☑ no	4 TO 5 METERS.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	NONE

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes , describe*	

Q Comments and/or recommendations *:

LUBE CUBE CRACKED. CAUSING OIL TO SPILL. CUBE WAS REMOVED AND REPLACED.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☑ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
[signature]	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
[signature]	PROJECT MANAGER.	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR June -20 -2007	REPORT TIME 3:15 PM	☒ ORIGINAL SPILL REPORT, OR	REPORT NUMBER 0728--4
B	OCCURRENCE DATE: MONTH – DAY – YEAR June -20-2007	OCCURRENCE TIME 2:40	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE) LUP-06-603-002	WATER LICENCE NUMBER (IF APPLICABLE) 3BC-TEH0707		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION Baker Lake Nunavut	REGION ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME Nuna Fuel Truck Unit #1273	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION Nuna M&T Services 9839-31 Avenue Edmonton AB. Phone (780)-434-9114		
G	ANY CONTRACTOR INVOLVED No	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED T04 Hydraulic Oil	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES 200 Litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE) None	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE Petro-Canada Lube Oil Cube	SPILL CAUSE Hole in Lube Oil Cube	AREA OF CONTAMINATION IN SQUARE METRES 4 To 5 Metres Square	
J	FACTORS AFFECTING SPILL OR RECOVERY None	DESCRIBE ANY ASSISTANCE REQUIRED None	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT No	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

Dear Sir or Madam

The only Coordinates I have for section E are as followes Spill starts at Km 28 North 7161411.3 East 6347551

Ends at Km 29 + 865 7162942.1 633945.1

L	REPORTED TO SPILL LINE BY Kenny Theriault	POSITION Safety Department	EMPLOYER Nuna M&T Services	LOCATION CALLING FROM Baker Lake	TELEPHONE (780) 644-9088
M	ANY ALTERNATE CONTACT Wes Danielson	POSITION Project Manger	EMPLOYER Nuna M&T Services	ALTERNATE CONTACT LOCATION Baker Lake	ALTERNATE TELEPHONE (780) 644-9081

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION Station operator	EMPLOYER	LOCATION CALLED Yellowknife, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR **June -24 -2007**	REPORT TIME **2:15**	☒ ORIGINAL SPILL REPORT, OR	REPORT NUMBER --
B	OCCURRENCE DATE: MONTH – DAY – YEAR **June -24-2007**	OCCURRENCE TIME **1:30**	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)		WATER LICENCE NUMBER (IF APPLICABLE)	
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION **Pit-6 Km 34 All Weather Road Baker Lake**		REGION ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR	
E	LATITUDE DEGREES MINUTES SECONDS		LONGITUDE DEGREES MINUTES SECONDS	
F	RESPONSIBLE PARTY OR VESSEL NAME **Equipment Pressure Washer**	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION **Nuna M&T Services 9839-31 Avenue Edmonton AB. Phone (780)-434-9114**		
G	ANY CONTRACTOR INVOLVED **No**	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED **Oil-Grease-Diesel**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE) **None**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE **Equipment pressure washer**	SPILL CAUSE **Washing Equipment**	AREA OF CONTAMINATION IN SQUARE METRES **5 To 10 Metres Square**	
J	FACTORS AFFECTING SPILL OR RECOVERY **None**	DESCRIBE ANY ASSISTANCE REQUIRED **None**	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT **No**	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS **Haul trucks are being washed down with biodegradable soap at pit 6. When entering pit 6 the trucks are going to the south west end of the pit, where the mechanics and shop workers use the pressure washer to clean all the grease oil and diesel from the truck to check for problems with the truck, so he can service the truck as well all personal are signed off on the pressure washer.**			

L	REPORTED TO SPILL LINE BY **Kenny Theriault**	POSITION **Safety Department**	EMPLOYER **Nuna M&T Services**	LOCATION CALLING FROM **Baker Lake**	TELEPHONE **(780) 644-9088**
M	ANY ALTERNATE CONTACT **Wes Danielson**	POSITION **Project Manger**	EMPLOYER **Nuna M&T Services**	ALTERNATE CONTACT LOCATION **Baker Lake**	ALTERNATE TELEPHONE **(780) 644-9081**

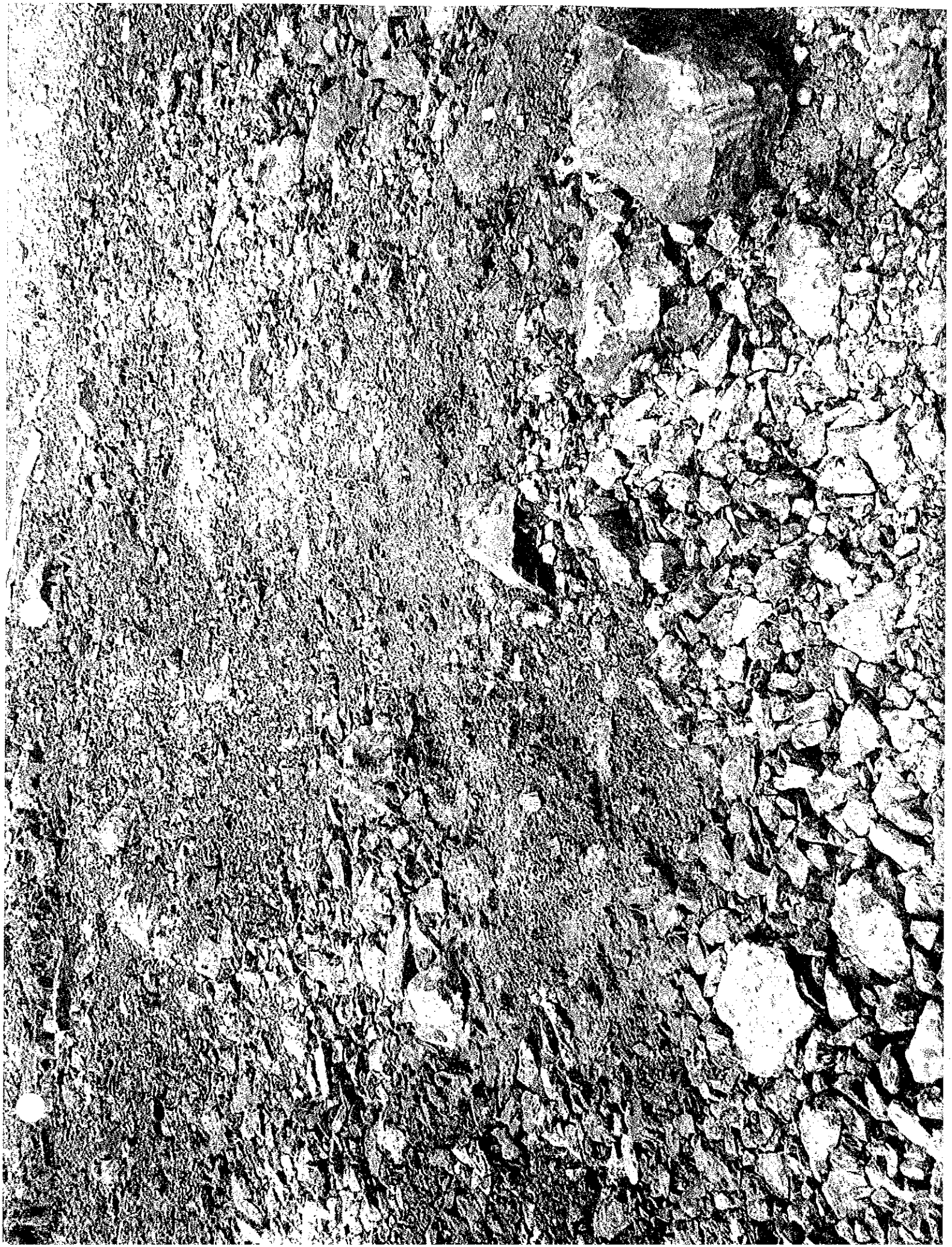
REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION **Station operator**	EMPLOYER	LOCATION CALLED **Yellowknife, NT**	REPORT LINE NUMBER **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

740



NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (If known)	C ☐ Original Report ☐ Update No. 1	Spill Number
JUNE 26/07	Approx 2:00.		

D Location and map coordinates (If known) and direction (If moving)

1 Km NORTH of PIT 8

E Party Responsible for Spill

NUNA MANDT

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

Hyd OIL.

G Cause of Spill

RUPTURED LINE

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	No	☐ yes ☑ no	8 1/2 SQ METRES.

L Factors affecting spill or recovery (weather conditions, terraln, snow cover, etc.)	M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

DIAPERS WERE USED TO CONTAIN SPILL.
LOST Approx 8 LITRES.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes, describe*	

Q Comments and/or recommendations *:

HOSE RUPTURED. DIAPERS. WERE PLACED UNDER IT.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☑ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
[signature]	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
[signature]	PROJECT MANAGER.	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☒ Original Report ☐ Update No. 1	Spill Number
JUNE 26/07	JUNE 26/07		

D Location and map coordinates (if known) and direction (if moving)

FORWARD CAMP.

E Party Responsible for Spill

NUNA M AND T.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

DIESEL.

G Cause of Spill

[redacted] POSSIBLE FUEL NOZZLE LEAKAGE

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☒ yes ☐ no	No	☐ yes ☒ no	259 METERS.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
No	

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

CONTAMINATED SOIL WAS [redacted]. PUT IN DRUMS.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☒ no ☐ yes, describe*	

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
[redacted] CURTIS.	MECHANIC / ENGINEER	
Reported to:	**Position, Employer, Location**	**Telephone No:**
[redacted]	PROJECT MANAGER.	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☑ Original Report ☐ Update No. 1	Spill Number
JUNE 30/07	JUNE 30/07 Approx 2 AM.		

D Location and map coordinates (if known) and direction (if moving)

MEADOW BANK ROAD PIT 3.

E Party Responsible for Spill

NUNA MAWT.

F Product(s) spilled and estimated quantiles (Provide metric volumes/weights if possible)

Hyd. OIL. Approx 6 - 8 LITRES.

G Cause of Spill

HOSE RUPTURED.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	—	☐ yes ☑ no	1/4 SQ METRE.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	IN PIT AREA.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

OIL WAS SOAKED UP WITH DIAPERS.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes, describe*	NONE.

Q Comments and/or recommendations *:

HOSE RUPTURED ON TILT CYLINDER ON UNIT 3626.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
[signature]	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
[signature]	PROJECT MANAGER	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
JUNE 30/07.	JUNE 30/07. Approx. 4 AM.		

D Location and map coordinates (if known) and direction (if moving)

NORTH of PIT 9 ON MEADOW BANK. ROAD.

E Party Responsible for Spill

NUNA MAN T.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

Hyd. OIL. Approx. 10 LITRES.

G Cause of Spill

Hyd. HOSE. RUPTURED.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☒ yes ☐ no	No	☐ yes ☒ no	159 METER

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

ON THE ROAD SURFACE

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

SPILL WAS CLEANED UP USING. DIAPERS.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☒ no ☐ yes , describe*	No.

Q Comments and/or recommendations *:

Hyd. PRESSURE HOSE ON UNIT 5593. RUPTURED.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☒ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
W. Donaldson	PROJECT MANAGER.	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
July 2107	July 2107 - 5:00 AM		

D Location and map coordinates (if known) and direction (if moving)

North of Pit 3 on meadowbank road.

E Party Responsible for Spill

Nuna M and t

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

Hydraulic oil, 19 Liters.

G Cause of Spill

Drive shaft Broke, removing lower part of transfer case.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no		☐ yes ☑ no	1½ meters.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NO	

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes , describe*	

Q Comments and/or recommendations *:

Damage occured on roadway. contaminated soil was cleaned up and put in Barrol.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

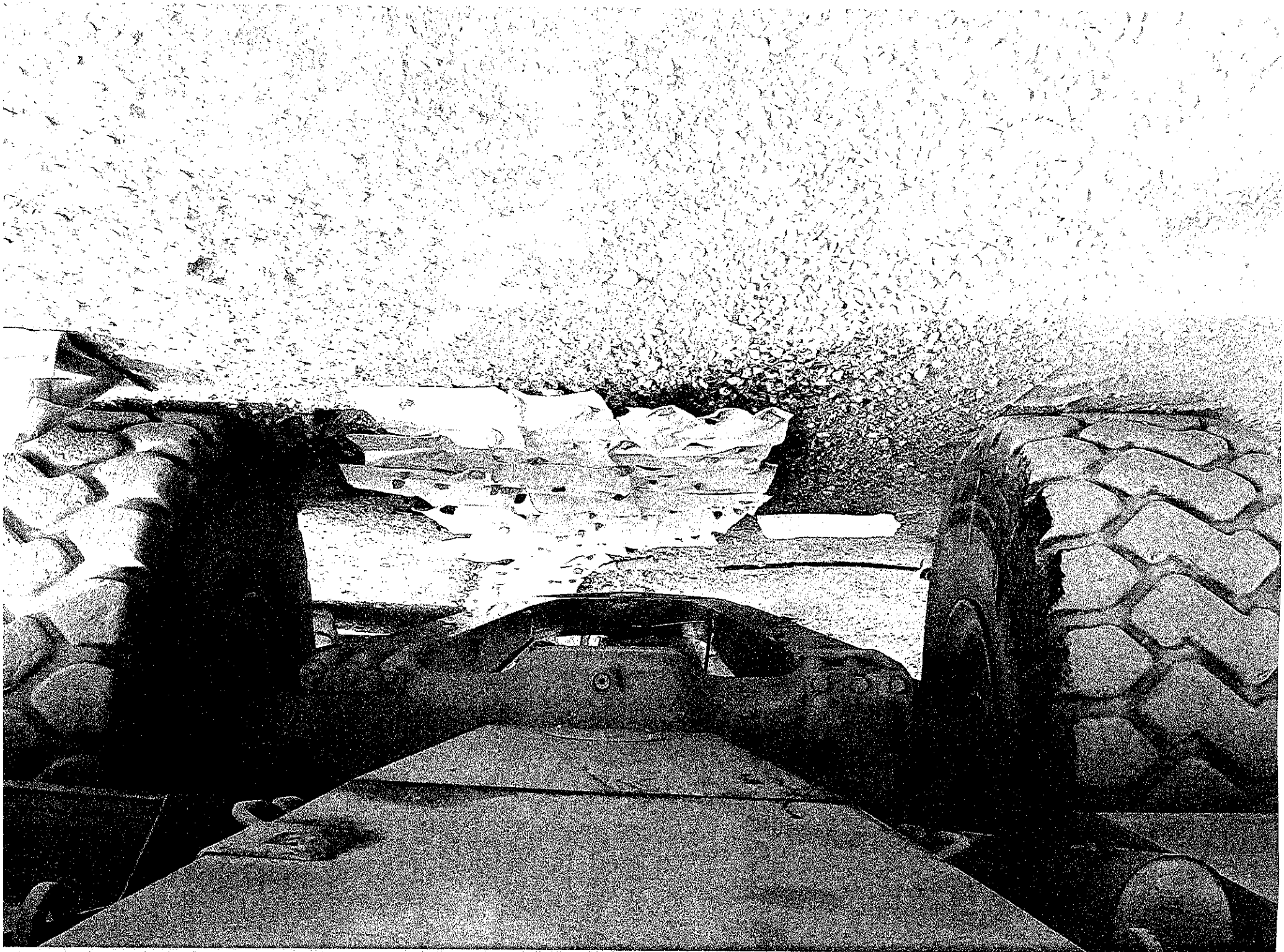
Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Andy Focker

Reported by:	Position, Employer, Location	Telephone No:
Andy Focker	Mechanic	
Reported to:	**Position, Employer, Location**	**Telephone No:**
WES DANIELSON	PROJECT MANAGER.	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)



Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: JULY 16 07	REPORT TIME: 4:35 AM.	☒ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER: #59
B	OCCURRENCE DATE: MONTH – DAY – YEAR: JULY 16 07	OCCURRENCE TIME: 4:00 AM.		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: NWT ROCK SHOP AREA	REGION: ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES / MINUTES / SECONDS	LONGITUDE: DEGREES / MINUTES / SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME: LARRY PICKERING	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: BAKER LAKE. NWT		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: USED MOTOR OIL	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: 5 L.	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: OPEN 20L BUCKET	SPILL CAUSE: TIPPED BUCKET	AREA OF CONTAMINATION IN SQUARE METRES: .5 METER	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED: NIL.	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT: NIL.	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

OIL WAS SPILLED ONTO GRAVEL. ALL CONTAMINATED GRAVEL WAS CLEANED UP AND PUT INTO EMPTY 20L BUCKETS.

L Pick

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: JULY 17 07.	REPORT TIME: 6:00 PM.	☒ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER: ~~1960~~
B	OCCURRENCE DATE: MONTH – DAY – YEAR: JULY 16 07	OCCURRENCE TIME: 2:30 PM.		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: MAIN CAMP LAY DOWN AREA.	REGION: ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES MINUTES SECONDS	LONGITUDE: DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME: D 0433 DRILL	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: NWT ROCK SUR.		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: HYD. OIL	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: 18 L.	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE): NIL.	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: REPAIRS TO HYD HOSES.	SPILL CAUSE: BROKEN HOSE.	AREA OF CONTAMINATION IN SQUARE METRES: 2.5.	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED: NIL	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT: NIL.	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

AREA CONTAMINATED WAS CLEANED UP AND STORED INTO INFIRO DRUMS

L A Pich

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT #61

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR July 19/2007	REPORT TIME 9:45	☒ ORIGINAL SPILL REPORT, OR	REPORT NUMBER 33-535-12 -
B	OCCURRENCE DATE: MONTH – DAY – YEAR July 19-2007	OCCURRENCE TIME 8:30	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION	REGION ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME Nuna Logistics	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION 9839-31 Avenue, Edmonton Alberta		
G	ANY CONTRACTOR INVOLVED No	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED 10W 40-Engine Oil	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES 20 Liters	U.N. NUMBER 1372	
	SECOND PRODUCT SPILLED (IF APPLICABLE) None	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE Water haul truck	SPILL CAUSE Rock on AWR	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY None	DESCRIBE ANY ASSISTANCE REQUIRED None	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT No	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS			

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION Station operator	EMPLOYER	LOCATION CALLED Yellowknife, NT	REPORT LINE NUMBER (867) 920-8130

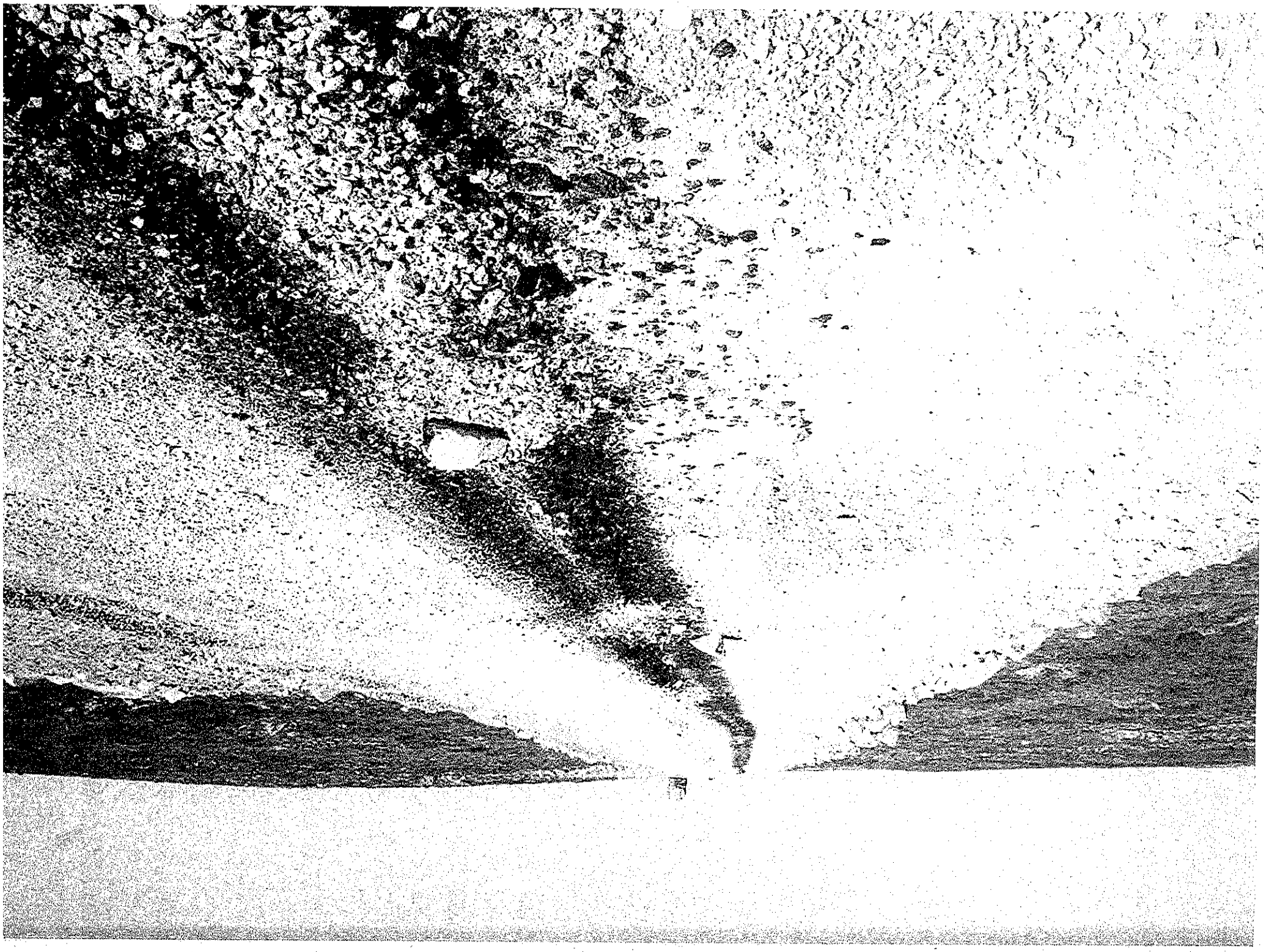
LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

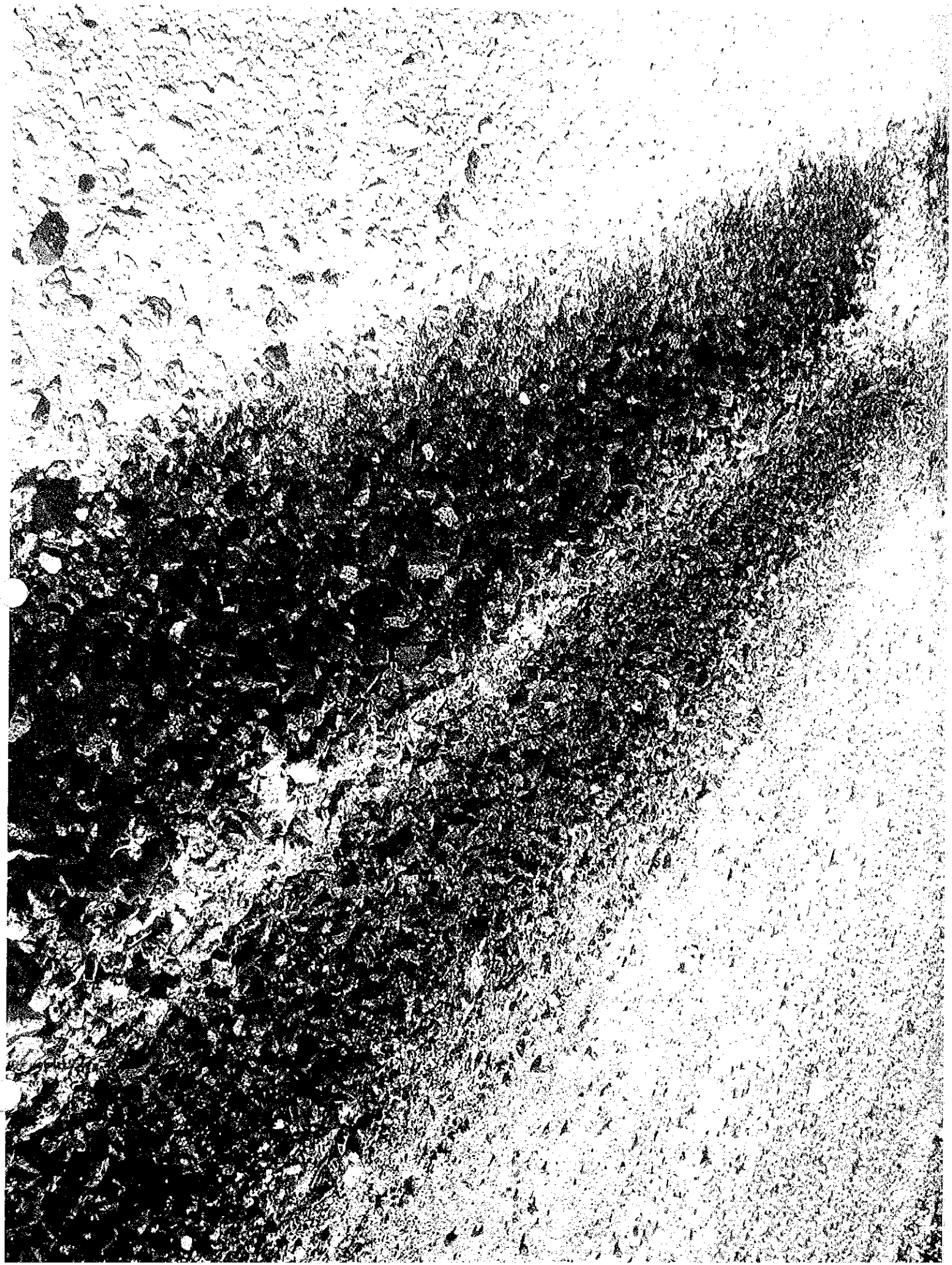
AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

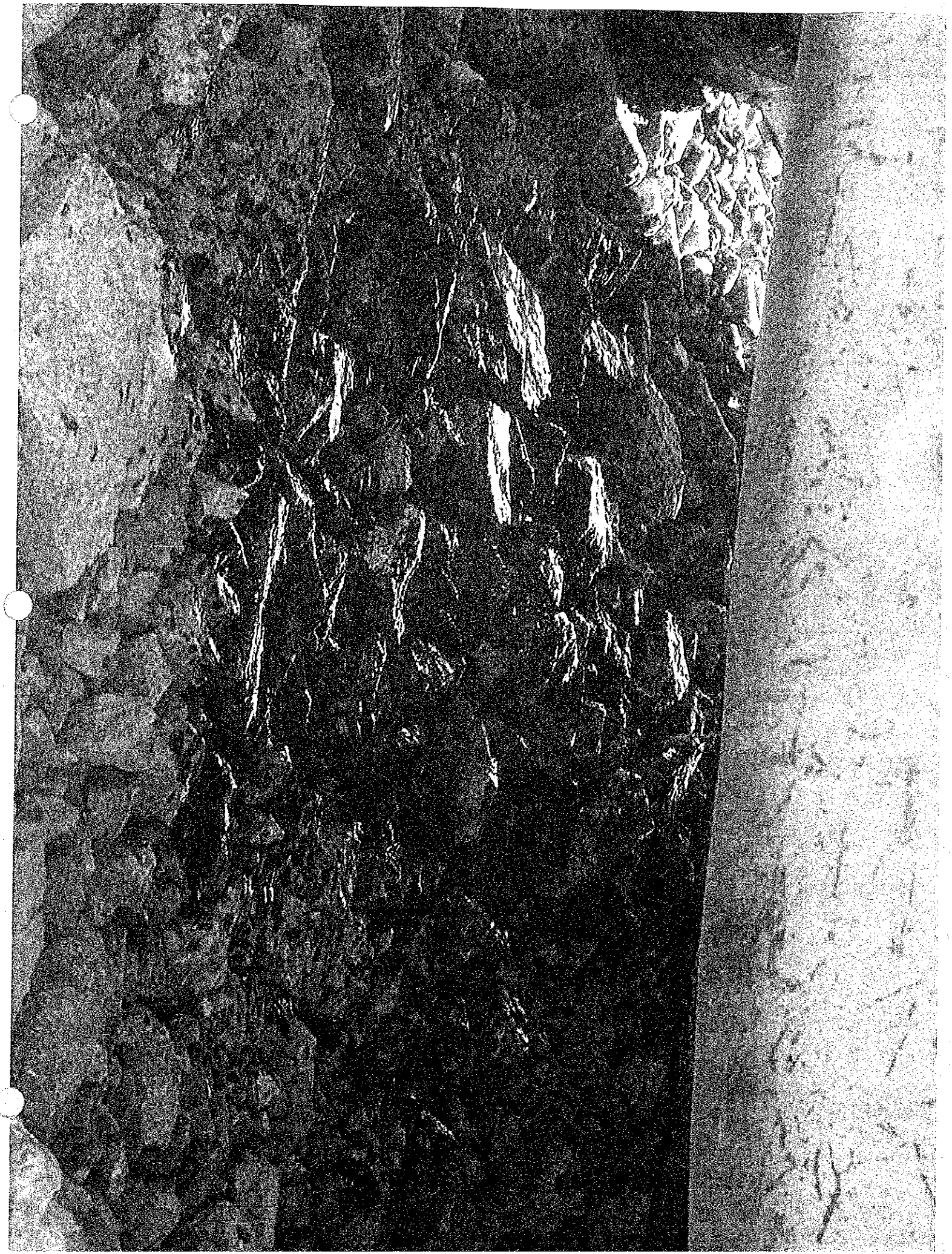
Drive on AWR to forward camp while crossing over to right side of road hit a big rock, went through oil pan, on water truck.

July 19/2007

Barney Arvay







NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☑ Original Report ☐ Update No. 1	Spill Number
July 24 6:00Am	July 23/07 2:00 PM		# 43

D Location and map coordinates (if known) and direction (if moving)

Quarry 6

E Party Responsible for Spill

Nuna M&T (5591)

F Product(s) spilled and estimated quantiles (Provide metric volumes/weights if possible)

Engine oil / Fuel

G Cause of Spill Filter Droped By lube c-can.

During Service oil missed container at Beginning of Draining oil.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (In sq. m if possible)
☑ yes ☐ no		☐ yes ☒ no	1at 1 sq. m 1at ½ sq. M.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
N/A	N/A.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

Shoveled up into Barrels for Disposal.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☒ no ☐ yes , describe*	NO

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

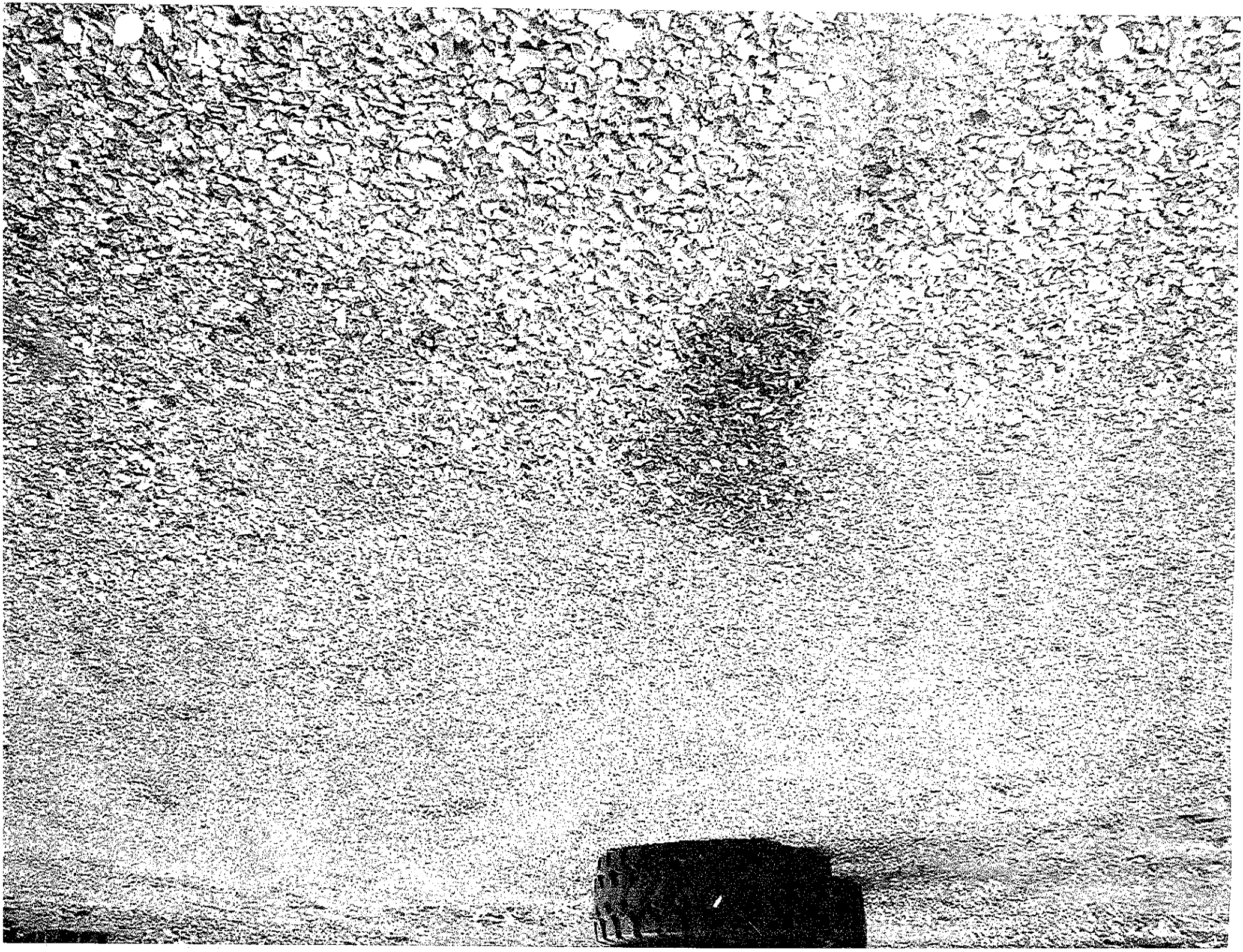
Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
Andy Focker	Supervisor, Nuna M&T, Baker lake.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
R Blaun	SITE SUPERVISOR	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)



26
8

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☑ Original Report ☐ Update No. 1	Spill Number
July 24/07 6:AM	July 23/07 - 5:20 AM		#69

D Location and map coordinates (If known) and direction (if moving)

Quarry 11

E Party Responsible for Spill

Nunu M&T (2316)

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

TO 4 10W Hydraulic oil 2 liters

G Cause of Spill

filter ruptured on machine.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no		☐ yes ☒ no	½ Sq m

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
N/A	N/A

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

Shoveled up gravel. Most went on machine.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☒ no ☐ yes , describe*	NO

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
Andy Focker	Supervisor, Nunu M&T, Baker Lake.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
R Blue	SITE SUPERVISOR	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C	Spill Number
July 26/07 6:30AM	July 25/07 1:00 AM	☒ Original Report ☐ Update No. 1	67

D Location and map coordinates (if known) and direction (if moving)

Quarry 3

E Party Responsible for Spill

Nuna M&T (unit 3626)

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

TO 4 10W Hydraulic oil 10 liters.

G Cause of Spill

Housig Bolts knocked of of suction screen of transmission

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☒ yes ☐ no		☐ yes ☒ no	~ 2 sq m.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NO	N/A.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

Gravel was cleaned up. Broken Bolts and Seal was replaced.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☒ no ☐ yes, describe*	NO.

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
Andy Focker	Supervisor, Nuna M&T, Baker lake	
Reported to:	**Position, Employer, Location**	**Telephone No:**
Wes Dangerson	Project Manager " "	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

24-Hour Report Line

Northwest Territories

Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (If known)	C	Spill Number
AUG 6/07	AUG 6/07. 4:00 AM	☐ Original Report ☐ Update No. 1	71

D Location and map coordinates (if known) and direction (if moving)

MEADOW BANK ROAD SOUTH of PIT 11.

E Party Responsible for Spill

NUNA M AND T

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

Hyd. FLUID. Approx 20L.

G Cause of Spill

TIRE FAILED. REMOVING. Hyd LINE

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (In sq. m if possible)
☑ yes ☐ no	NO	☐ yes ☑ no	2 SQ METER.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	ON ROAD WAY

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes , describe*	NO

Q Comments and/or recommendations *:

TIRE BLEW AND TORE OFF A.... Hyd. HOSE. SPILL WAS. CONTAINED. USING 6. DIAPERS. CONTAMINATED DIRT WAS PUT ~~into~~ IN THE PILE AT PIT 6. TIRE AND HOSE WAS REPLACED.

UNIT 5366

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☑ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
[signature]	MECHANIC	
Reported to:	**Position, Employer, Location**	**Telephone No:**
[signature]	SITE SUPERVISOR	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☒ Original Report ☐ Update No. 1	Spill Number
AUG 6/07	AUG 6/07 5:00 PM		72

D Location and map coordinates (if known) and direction (if moving)
MEADOW BANK ROAD. PIT 11.

E Party Responsible for Spill
NUNA MANAT.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)
Hyd. FLUID. Approx 16 L.

G Cause of Spill
Hyd HOSE RUPTURED

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☒ yes ☐ no		☐ yes ☒ no	1.5 q meter

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	PIT AREA.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☒ no ☐ yes, describe*	NO

Q Comments and/or recommendations *:
Hyd HOSE RUPTURED.
HOSE WAS REPLACED WITH A NEW ONE.
SPILL WAS CONTAINED WITH DIAPERS. CONTAMINATED SOIL WAS PLACED IN PIT 6.
UNIT 3442.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
	SITE SUPERVISOR.	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
AUG 21/07	AUG 21/07		79

D Location and map coordinates (if known) and direction (if moving)

Approx Km 63. MEADOW BANK ROAD.

E Party Responsible for Spill

NUNA M AND T.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

10 LITRES. Hyd OIL.

G Cause of Spill

LOSS OF Hyd. TANK CAP.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (In sq. m if possible)
✓ yes ☐ no		☐ yes ✓ no	4 sq METERS.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

NONE

M Containment (natural depression, dyke, etc.)

NONE.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

AREA. CLEANED. U P. SOILED DIRT PUT IN PITS.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
✓ no ☐ yes, describe*	NONE.

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (If known)	C ☐ Original Report ☐ Update No. 1	Spill Number
AUG 21/07	AUG 21/07		80

D Location and map coordinates (If known) and direction (if moving)
#1 CAMP PAD ~~CAMP~~ MAIN CAMP.

E Party Responsible for Spill
NUNA MANAT

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)
6-8 LITRES. DIESEL. FUEL.

G Cause of Spill
LEAKING. ~~FUEL~~ FILTER. GASKET.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no		☐ yes ☑ no	½ ~~ROAD~~. 59 METER

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials
DIRT WAS. ~~&~~ PAILED.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☐ no ☐ yes , describe*	

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
AUG 21/07	AUG 21/07.		81

D Location and map coordinates (if known) and direction (if moving)
MEADOW BANK ROAD. KM 66.5

E Party Responsible for Spill
NUNA MANDT.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)
9 LITRES. Hyd OIL.

G Cause of Spill
HOSE RUPTURED.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no		☐ yes ☐ no	1 SQ METER

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE	NONE.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☐ no ☐ yes , describe*	

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (If known)	C	Spill Number
AUG 22/07	AUG 22. 12:00 NOON	☐ Original Report ☐ Update No. 1	82

D Location and map coordinates (if known) and direction (if moving)
NORTH of PIT 13.

E Party Responsible for Spill
NUNA MANOT.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)
15 LITRES Hyd. OIL.

G Cause of Spill
HOSE RUPTURED

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no		☐ yes ☐ no	1.5 SQ METER.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?
☐ no ☐ yes , describe*

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*

Q Comments and/or recommendations *:
NEW HOSE WAS INSTALLED.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (If known)	C	Spill Number
AUG 22/07	AUG 22/07 14:00.	☐ Original Report ☐ Update No. 1	83

D Location and map coordinates (If known) and direction (If moving)
NORTH of PIT 13. MEADOW BANK ROAD

E Party Responsible for Spill
NUNA MANDT

F Product(s) spilled and estimated quantiles (Provide metric volumes/weights if possible)
6. LITRES. Hyd. OIL.

G Cause of Spill
HYDRAULIC LINE RUPTURED

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	NO	☐ yes ☐ no	½ SQ METER.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)
NONE.	

N Action, If any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☐ no ☐ yes , describe*	

Q Comments and/or recommendations *:
NEW HOSE WAS INSTALLED.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
TRANT	Heavy Mechanic.	
Reported to:	**Position, Employer, Location**	**Telephone No:**

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR **Sept -6-2007**	REPORT TIME **3:15 PM**	☒ ORIGINAL SPILL REPORT, OR	REPORT NUMBER # 84-88
B	OCCURRENCE DATE: MONTH – DAY – YEAR **Sept-6-2007**	OCCURRENCE TIME **2:00**	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE) **3BC-TEH0707**		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION **Baker Lake Nunavut**	REGION ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME **Nuna Fuel Truck Unit #1273**	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION **Nuna M&T Services 9839-31 Avenue Edmonton AB. Phone (780)-434-9114**		
G	ANY CONTRACTOR INVOLVED **No**	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED **Diesel fuel**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES **10 Litres**	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE) **None**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE **Nuna Lube truck**	SPILL CAUSE **extra fuel in truck**	AREA OF CONTAMINATION IN SQUARE METRES **4 To 5 Metres Square**	
J	FACTORS AFFECTING SPILL OR RECOVERY **None**	DESCRIBE ANY ASSISTANCE REQUIRED **None**	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT **No**	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

Spill investion was decided that Nuna Lub Truck caused the spill, no person on day shift had an answer to what caused the spill.

Only spectulation was decided on this spill, but was reported by Safety Department. Spill has been cleanned up by site sercvices.

L	REPORTED TO SPILL LINE BY **Kenny Theriault**	POSITION **Safety Department**	EMPLOYER **Nuna M&T Services**	LOCATION CALLING FROM **Baker Lake**	TELEPHONE **(780) 644-9088**
M	ANY ALTERNATE CONTACT **Harvey Blouin**	POSITION **Project Manger**	EMPLOYER **Nuna M&T Services**	ALTERNATE CONTACT LOCATION **Baker Lake**	ALTERNATE TELEPHONE **(780) 644-9081**

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION **Station operator**	EMPLOYER	LOCATION CALLED **Yellowknife, NT**	REPORT LINE NUMBER **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL.: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: Sept 12/2007	REPORT TIME: 4 P.M.	☒ ORIGINAL SPILL REPORT, OR	REPORT NUMBER: #89
B	OCCURRENCE DATE: MONTH – DAY – YEAR: Sept 12/2007	OCCURRENCE TIME: 4. P.M.	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)		WATER LICENCE NUMBER (IF APPLICABLE)	
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION: **Baker Lake Nunavut**		REGION: ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR	
E	LATITUDE DEGREES MINUTES SECONDS		LONGITUDE DEGREES MINUTES SECONDS	
F	RESPONSIBLE PARTY OR VESSEL NAME	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: ATF	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: 20 L	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: Hydraulic Line - Roll off	SPILL CAUSE: Hydraulic Hose Came Lose	AREA OF CONTAMINATION IN SQUARE METRES: 3m x 5m	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT: NONE	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

Hydraulic hose on roll off truck worked lose - when operator engaged PTO hydraulic fluid (ATF) sprayed on the ground. - operator noticed spray & shut off pump. — Contaminated gravel was scraped up & stored in enviro drums.

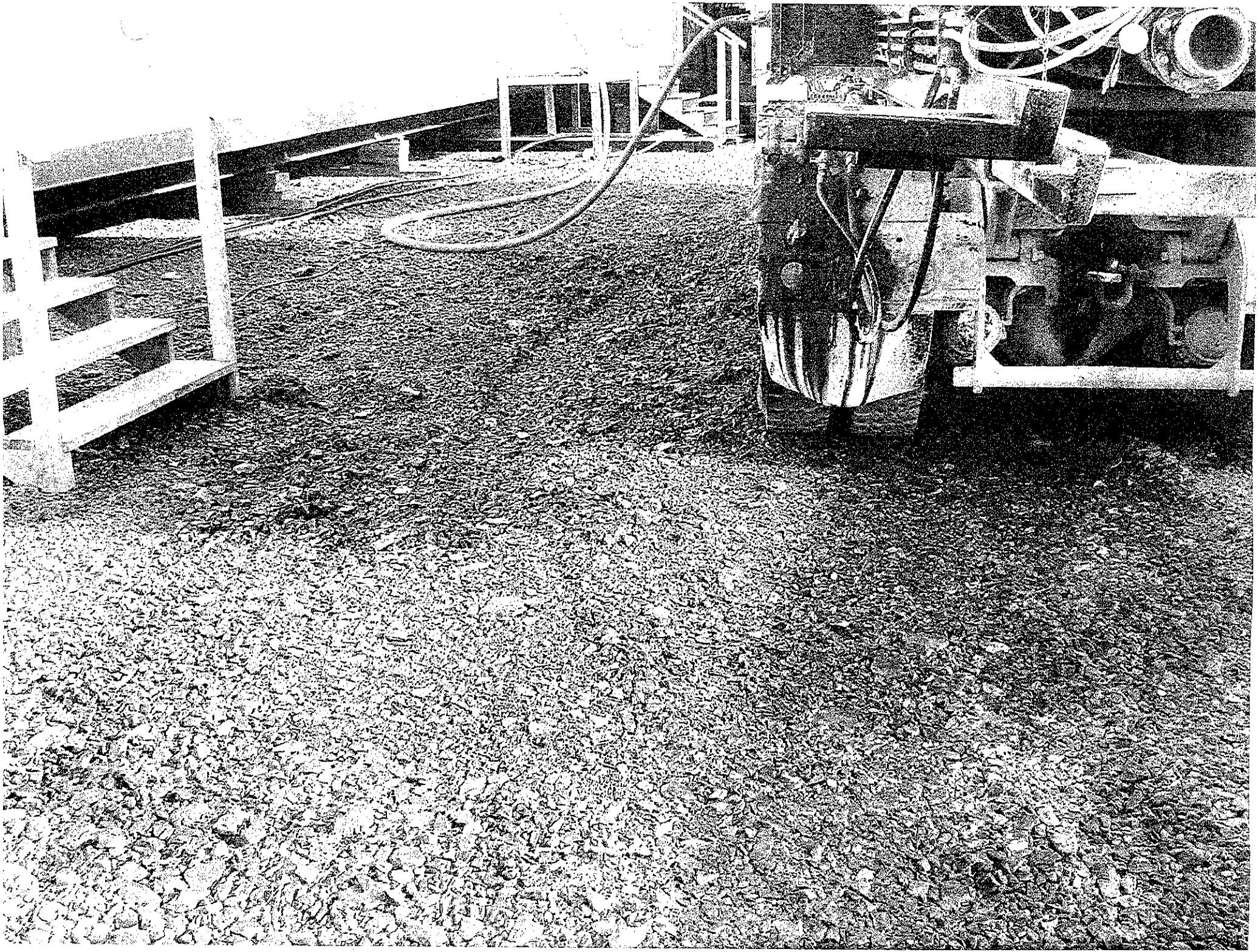
L	REPORTED TO SPILL LINE BY: **Kenny Theriault**	POSITION: **Safety Department**	EMPLOYER: **Nuna M&T Services**	LOCATION CALLING FROM: **Baker Lake**	TELEPHONE: **(780) 644-9088**
M	ANY ALTERNATE CONTACT: M Blouin	POSITION: **Project Manger**	EMPLOYER: **Nuna M&T Services**	ALTERNATE CONTACT LOCATION: **Baker Lake**	ALTERNATE TELEPHONE: **(780) 644-9081**

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: **Station operator**	EMPLOYER	LOCATION CALLED: **Yellowknife, NT**	REPORT LINE NUMBER: **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			



NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
SEPT 27/07	SEPT 27/07		#95

D Location and map coordinates (if known) and direction (if moving)
15 KM NORTH ON CUMBERLAND ROAD. (RAD)

E Party Responsible for Spill
NUNA MAN T.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)
ANTI FREEZE 12 LITRES

G Cause of Spill
HOSE RUPTURED

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	—	☐ yes ☑ no	~ 1/2 SQ METER.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes , describe*	NO

Q Comments and/or recommendations *:
RAD. HOSE RUPTURED.
HOSE WAS REPAIRED.
UNIT 1372

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	(RAD) MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
[illegible]	Site Supervisor	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR Sept27-2007	REPORT TIME Sept-27-2007	X ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER #95
B	OCCURRENCE DATE: MONTH – DAY – YEAR Sept-27-2007	OCCURRENCE TIME Sept-27-2007		
C	LAND USE PERMIT NUMBER (IF APPLICABLE) LUP-06-603-002	WATER LICENCE NUMBER (IF APPLICABLE) 3BC-TEH0707		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION Baker Laker Nunavut	REGION ☐ NWT X NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME Nuna Unit# 1372	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION NunaM&TServices9839-31 Avenue Edmonton AB(780)434-9114		
G	ANY CONTRACTOR INVOLVED NO	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED Anti-Freeze	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES 12 Litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE) None	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE Flat Deck #1372	SPILL CAUSE Hose	AREA OF CONTAMINATION IN SQUARE METRES 1.75 metres	
J	FACTORS AFFECTING SPILL OR RECOVERY None	DESCRIBE ANY ASSISTANCE REQUIRED None	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT NO	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS			

L	REPORTED TO SPILL LINE BY Kenny Theriault	POSITION Safety Department	EMPLOYER Nuna M&t Services	LOCATION CALLING FROM Baker Lake	TELEPHONE (780) 644-9088
M	ANY ALTERNATE CONTACT Harvey BLouin	POSITION Project Manger	EMPLOYER Nuna M&t Services	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE (780) 644-9081

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☑ Original Report ☐ Update No. 1	Spill Number
SEPT 27/07	SEPT 27/07.		#96

D Location and map coordinates (if known) and direction (if moving)

CUMBERLAND ROAD.

E Party Responsible for Spill

NUNA M AND T

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

DIESEL FUEL. Approx 40 LITRES.

G Cause of Spill

ROCKS DAMAGED FUEL TANK

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	NO	☐ yes ☐ no	

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?

☑ no ☐ yes , describe*

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*

Q Comments and/or recommendations *:

OPERATOR RETURNED FROM FORWARD CAMP. WHEN HE GOT OUT OF THE TRUCK HE NOTICED THE LEAK. UNIT 0972.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC	
Reported to:	**Position, Employer, Location**	**Telephone No:**
[illegible]	Site Supervisor	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (If known)	C ☐ Original Report ☐ Update No. 1	Spill Number
SEPT 28/07	SEPT 28/07.		#97

D Location and map coordinates (if known) and direction (if moving)
PIT 17 MEADOW BANK ROAD.

E Party Responsible for Spill
NUNA MANDT

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)
DIESEL FUEL. 40 LITRES (Approx.)

G Cause of Spill
LINE RUBBED THROUGH.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (In sq. m if possible)
☑ yes ☐ no	NO	☐ yes ☑ no	1/2 SQ METER.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials
CONTAMINATED SOIL. WAS CLEAN UP AND HAULED TO PIT 6. BY SITE SERVICES.

O Do you require assistance?
☐ no ☐ yes , describe*

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*

Q Comments and/or recommendations *:
FUEL LINE RUBBED THROUGH.
LINE WAS REPLACED.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
G. Blom	Site Supervisor	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR SEPT -29 -2007	REPORT TIME	☒ ORIGINAL SPILL REPORT, OR	REPORT NUMBER # 194-102
B	OCCURRENCE DATE: MONTH – DAY – YEAR SEPT- 29-2007	OCCURRENCE TIME unknow	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE) LUP-06-603-002	WATER LICENCE NUMBER (IF APPLICABLE) 3BC-TEH0707		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION Baker Lake Nunavut	REGION ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME Nuna	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION Nuna M&T Services 9839-31 Avenue Edmonton AB. Phone (780)-434-9114		
G	ANY CONTRACTOR INVOLVED No	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED DIESEL FUEL	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES APPROX. 5 TO 10 Litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE) None	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE DIESEL	SPILL CAUSE unknow	AREA OF CONTAMINATION IN SQUARE METRES 2 To 4 Metres Square	
J	FACTORS AFFECTING SPILL OR RECOVERY None	DESCRIBE ANY ASSISTANCE REQUIRED None	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT No	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS IT WAS ASKED IN THE INVESIGATION NO ONE KNOWS WHO OR WHAT HAPPENED THAT CAUSED THIS SPILL			

L	REPORTED TO SPILL LINE BY Kenny Theriault	POSITION Safety Department	EMPLOYER Nuna M&T Services	LOCATION CALLING FROM Baker Lake	TELEPHONE (780) 644-9088
M	ANY ALTERNATE CONTACT	POSITION Project Manger	EMPLOYER Nuna M&T Services	ALTERNATE CONTACT LOCATION Baker Lake	ALTERNATE TELEPHONE (780) 644-9081

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION Station operator	EMPLOYER	LOCATION CALLED Yellowknife, NT	REPORT LINE NUMBER (867) 920-8130

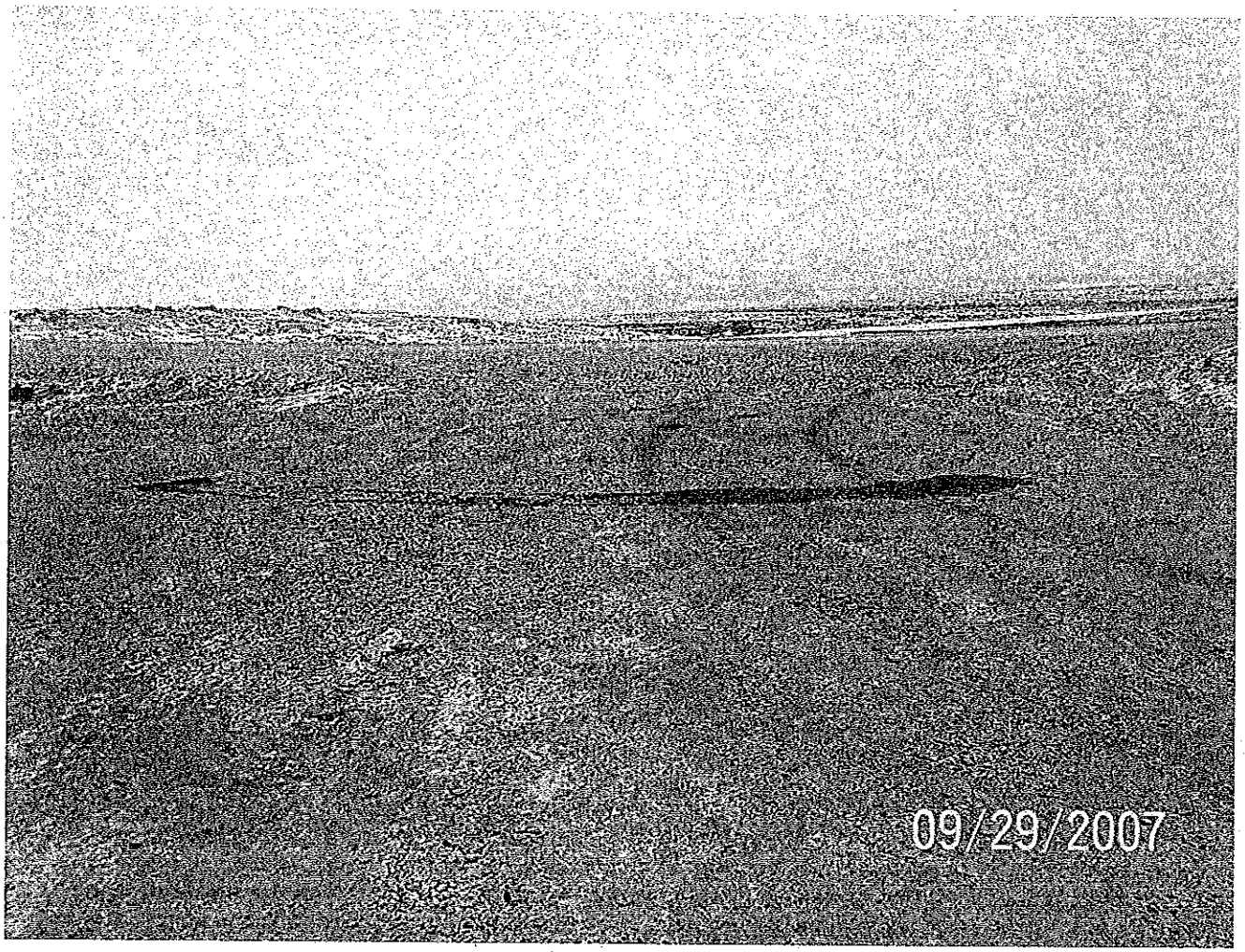
LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Kenny Theriault

From: Carey Minoza [careym@nunalogistics.com]
Sent: Tuesday, October 02, 2007 8:48 AM
To: kennyt@nunalogistics.com
Subject: FW: from the 28th OIL

From: Carey Minoza [mailto:careym@nunalogistics.com]
Sent: Monday, October 01, 2007 7:30 PM
To: 'kent@nunalogistics.com'
Subject: from the 28th OIL



Carey Minoza
Field Engineer
Baker Lake, NU
Tel : (780) 644-9082
Cell : (780) 288-4439

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

Northwest Territories | Nunavut | Canada

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR SEPT -29 -2007	REPORT TIME	☒ ORIGINAL SPILL REPORT, OR	REPORT NUMBER # ~~102~~ 101
B	OCCURRENCE DATE: MONTH – DAY – YEAR SEPT- 29-2007	OCCURRENCE TIME	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE) LUP-06-603-002	WATER LICENCE NUMBER (IF APPLICABLE) 3BC-TEH0707		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION Baker Lake Nunavut	REGION ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME Nuna	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION Nuna M&T Services 9839-31 Avenue Edmonton AB. Phone (780)-434-9114		
G	ANY CONTRACTOR INVOLVED No	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED DIESEL FUEL	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES APPROX. 15 TO 30 Litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE) None	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE DIESEL	SPILL CAUSE FUEL HANDLE BROKEN	AREA OF CONTAMINATION IN SQUARE METRES 4 To 5 Metres Square	
J	FACTORS AFFECTING SPILL OR RECOVERY None	DESCRIBE ANY ASSISTANCE REQUIRED None	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT No	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS IT WAS ASKED IN THE INVESIGATION NO ONE KNOWS WHO OR WHAT HAPPENED THAT CAUSED THIS SPILL			

L	REPORTED TO SPILL LINE BY Kenny Theriault	POSITION Safety Department	EMPLOYER Nuna M&T Services	LOCATION CALLING FROM Baker Lake	TELEPHONE (780) 644-9088
M	ANY ALTERNATE CONTACT Harvey Blouin	POSITION Project Manger	EMPLOYER Nuna M&T Services	ALTERNATE CONTACT LOCATION Baker Lake	ALTERNATE TELEPHONE (780) 644-9081

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION Station operator	EMPLOYER	LOCATION CALLED Yellowknife, NT	REPORT LINE NUMBER (867) 920-8130

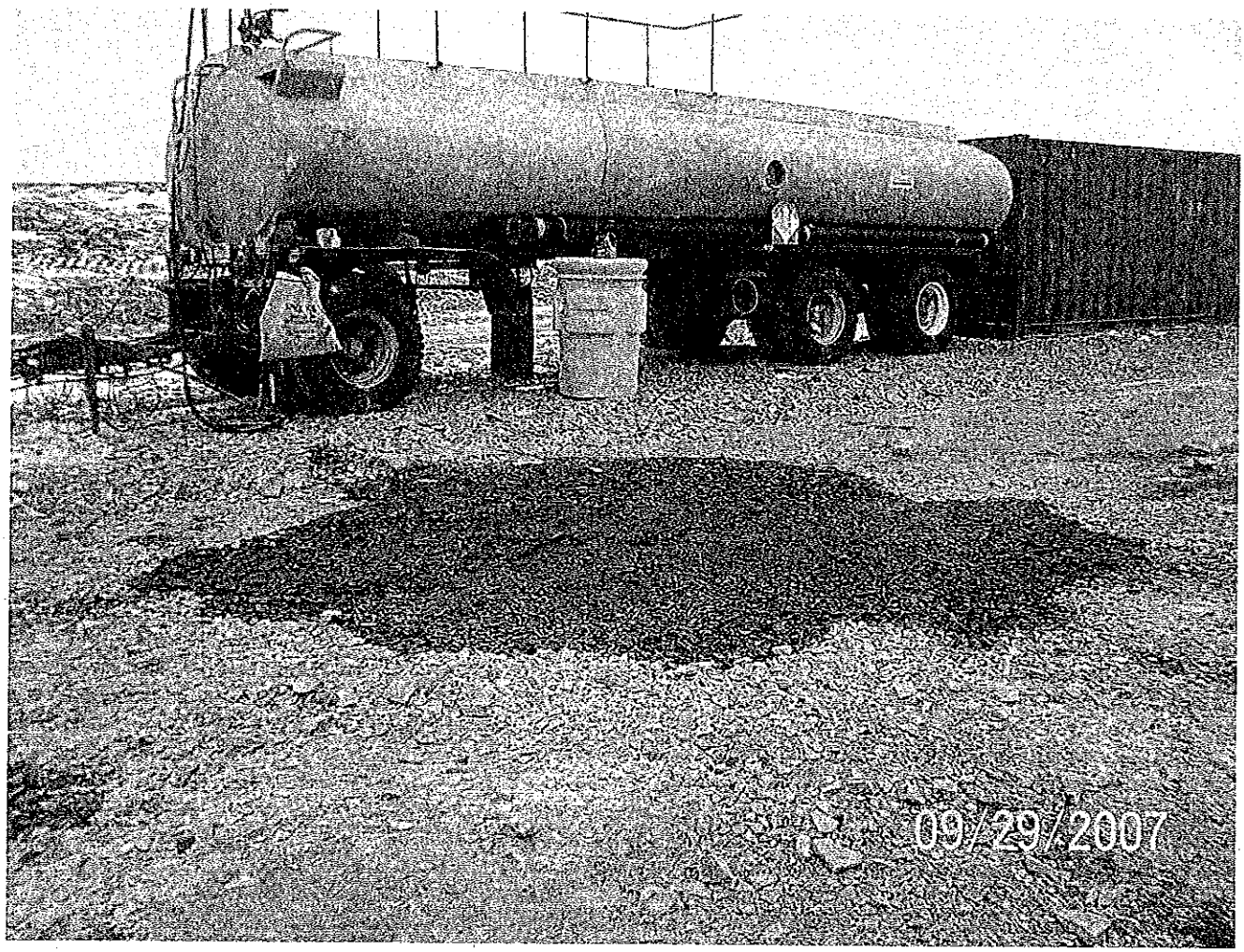
LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Kenny Theriault

From: Carey Minoza [careym@nunalogistics.com]
Sent: Tuesday, October 02, 2007 8:48 AM
To: kennyt@nunalogistics.com
Subject: FW: Fuel from 29th

From: Carey Minoza [mailto:careym@nunalogistics.com]
Sent: Monday, October 01, 2007 7:29 PM
To: 'kent@nunalogistics.com'
Subject: Fuel from 29th



Carey Minoza
Field Engineer
Baker Lake, NU
Tel : (780) 644-9082
Cell : (780) 288-4439

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
SEPT 29/07	SEPT 29/07		#100

D Location and map coordinates (if known) and direction (if moving)

2 TURN OUTS NORTH of PIT 16.

E Party Responsible for Spill

NUNA · M AND T

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

Hyd. OIL.

G Cause of Spill

Hyd HOSE RUPTURED

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☒ yes ☐ no		☐ yes ☐ no	1 SQ METER.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

CONTAMINATED SOIL WAS CLEANED UP AND HAULED TO PIT 6

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☐ no ☐ yes , describe*	

Q Comments and/or recommendations *:

HOSE RUPTURED. NEW HOSE WAS INSTALLED.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
R. Blown	Site Supervisor	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
SEPT 29/07	3. UNKNOWN.		#99

D Location and map coordinates (if known) and direction (if moving)

FORWARD CAMP.

E Party Responsible for Spill

UNKNOWN.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

Hyd OIL.

G Cause of Spill

UNKNOWN.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	NO	☐ yes ☑ no	3 AREAS. APPROX TOTAL AREA 299 M.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☐ no ☐ yes, describe*	

Q Comments and/or recommendations*:

3. SPILLS IN 3 LOCATION IN YARD. SOURCE UNKNOWN. AND CAUSE. UNKNOWN

AREAS WERE CLEANED UP. CONTAMINATED SOIL WAS CLEANED UP AND HAULED TO PIT 6.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
M. Blouin	Site Supervisor	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
SEPT 29/07	SEPT 29/07		#98

D Location and map coordinates (if known) and direction (if moving)
FORWARD CAMP. FUEL TANK.

E Party Responsible for Spill
UNKNOWN

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)
DIESEL FUEL. Approx 40 LITRES.

G Cause of Spill
UNKNOWN.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	—	☐ yes ☑ no	2 sq METERS.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials
CONTAMINATED MATERIAL WAS CLEANED UP AND HAULED TO PIT 6.

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes , describe*	No

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
L Blouin	Site Supervisor	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
OCT 6/07	OCT 6/07.		#103

D Location and map coordinates (if known) and direction (if moving)
FORWARD CAMP.

E Party Responsible for Spill
NUNA M AND T.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)
Hyd OIL. Approx. 8 LITRES

G Cause of Spill
SPILLED OIL WHEN CHANGING OUT CYLINDER

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no		☐ yes ☐ no	1/59 METER

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials
SNOW WAS CLEANED UP AND PAILED. SNOW WAS MELTED AND DIAPERS WERE USED TO REMOVE OIL.

O Do you require assistance?
☐ no ☐ yes, describe*

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
[signature]	Site Supervisor	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

24-Hour Report Line

Northwest Territories

Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
OCT 10/07	OCT 10/07		110

D Location and map coordinates (if known) and direction (if moving)

METABOW BANK ROAD FORWARD CAMP

E Party Responsible for Spill

NUNA MANDT

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

DIESEL FUEL. Approx. 20 LITRES.

G Cause of Spill

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☐ yes ☒ no		☐ yes ☐ no	259 METERS.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☐ no ☐ yes, describe*	

Q Comments and/or recommendations *:

UNIT WAS BEING FUELED. FUEL WAS SPILLED ONTO TOP OF TANK AND GROUND. NOZZLE NEEDS TO BE REPLACED. SHUT NOT WORKING PROPERLY. AREA WAS CLEANED UP USING DIAPERS. UNIT 1273.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC	
Reported to:	Position, Employer, Location	Telephone No:

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

Northwest Territories | Nunavut | Canada

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TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: Oct 12/07	REPORT TIME: 11:00 P.M.	☑ ORIGINAL SPILL REPORT, OR	REPORT NUMBER: -- 115
B	OCCURRENCE DATE: MONTH – DAY – YEAR: Oct-11/07	OCCURRENCE TIME	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION: North of A-17	REGION ☐ NWT ☑ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED: NUNA	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: HYD. Oil	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: APPROX 5-10 Litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: Steering cyl. 740 Haultruck	SPILL CAUSE: Broken cyl.	AREA OF CONTAMINATION IN SQUARE METRES: 1 SQ meter	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS: Approx 5-10 LITRES OF HYD OIL WAS SPILLED. AS A RESULT OF THE ATTACHED INCEDENT			

L	REPORTED TO SPILL LINE BY	POSITION: MECHANIC	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: Station operator	EMPLOYER	LOCATION CALLED: Yellowknife, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

Northwest Territories | Nunavut | Canada

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TEL.: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: OCT 13/07.	REPORT TIME	☐ ORIGINAL SPILL REPORT, OR	REPORT NUMBER: -- 114
B	OCCURRENCE DATE: MONTH – DAY – YEAR: OCT 13/07.	OCCURRENCE TIME	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)		WATER LICENCE NUMBER (IF APPLICABLE)	
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION: ACROSS FROM PIT 1		REGION ☐ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR	
E	LATITUDE DEGREES MINUTES SECONDS		LONGITUDE DEGREES MINUTES SECONDS	
F	RESPONSIBLE PARTY OR VESSEL NAME: NUNA MAUST	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: ENGINE OIL.	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: APPROX 10-15 L.	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: HOSE RUPTURED.	SPILL CAUSE	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS: HOSES WERE REPLACED WITH NEW ONES. PLEASE SEE ATTACHED. INCIDENT REPORT			

L	REPORTED TO SPILL LINE BY: [signature]	POSITION: MECHANIC.	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: Station operator	EMPLOYER	LOCATION CALLED: Yellowknife, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

STARTED GRADER IN MORNING, LET WARM UP DROVE TO QUARRY ONE WERE I WAS going to start Blading. WAS ADJUSTING my Heater vent on ~~A~~ FLOOR and FRONT look up SAW FIRE ~~on~~ coming out of motor Hood. ~~Shut~~ ~~shut~~ TURN GRADER OFF and got out got FIRE Extinguisher put FIRE out. RADIO OFFICE to tell them.

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: OCT 16/07	REPORT TIME	☐ ORIGINAL SPILL REPORT, OR	REPORT NUMBER: -- 111
B	OCCURRENCE DATE: MONTH – DAY – YEAR: UNKNOWN.	OCCURRENCE TIME	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)		WATER LICENCE NUMBER (IF APPLICABLE)	
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION: FORWARD CAMP. (71 KM.) MEADOW BANK ROAD.		REGION ☐ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR	
E	LATITUDE DEGREES MINUTES SECONDS		LONGITUDE DEGREES MINUTES SECONDS	
F	RESPONSIBLE PARTY OR VESSEL NAME: UNKNOWN.	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: DIESEL FUEL.	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: UNKNOWN.	U.N. NUMBER	
I	SPILL SOURCE	SPILL CAUSE: SEEK.	AREA OF CONTAMINATION IN SQUARE METRES: Approx 259 METERS	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS:
NUMEROUS PEOPLE ARE SPILLING. FUEL LOADING / UNLOADING FUEL, FILLING. PICK UPS / TIDY TANKS.

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: Station operator	EMPLOYER	LOCATION CALLED: Yellowknife, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

REPORTED BY GRANT MCEWAN.

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
OCT 22/07	OCT 22/07		120

D Location and map coordinates (if known) and direction (if moving)

FORWARD CAMP

E Party Responsible for Spill

NUNA MANAGT.

F Product(s) spilled and estimated quantiles (Provide metric volumes/weights if possible)

Hyd OIL. 2-4 LITRES.

G Cause of Spill

HOSES. RUPTURED.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☐ yes ☐ no	NO	☐ yes ☐ no	1 SQ METER.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

CONTAMINATED DIRT HAS BEEN PILED UP. AND NEEDS TO BE HAULED TO PIT 6.

O Do you require assistance?

☐ no ☐ yes, describe*

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*

Q Comments and/or recommendations *:

HOSES WERE REPLACED.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC	
Reported to:	**Position, Employer, Location**	**Telephone No:**
GLEN	STEWART	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

Oct 22/07.

Unit 2318. hydraulic tank and accumulator brackets have been damaged. To correct the problem a new tank and brackets will be needed. When, who, how it has happened is unknown. It appears it has been drove into a rock or one fell on it. Approx Damage $2,000 - $3,000.

MECHANIC.

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
OCT 22/07	UNKNOWN.		119

D Location and map coordinates (if known) and direction (if moving)

FROM BRIDGE TWO SOUTH ON MEADOWBANK ROAD.

E Party Responsible for Spill

UNKNOWN.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

UNKNOWN. PETROLEUM. BASE DIESEL/OIL?

G Cause of Spill

UNKNOWN.

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☐ yes ☐ no	NO.	☐ yes ☐ no	

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?
☐ no ☐ yes , describe*

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*

Q Comments and/or recommendations *:

FOR SPILL LINE USE ONLY

Lead Agency

Spill significance

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
CRAIG	MECHANIC.	
Reported to: GLEN STEWART	Position, Employer, Location	Telephone No:

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
OCT 20/07	OCT 20/07 3:30		118

D Location and map coordinates (if known) and direction (if moving)

FORWARD CAMP

E Party Responsible for Spill

NUNA MAND T

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

DIESEL Approx 20-30 LITRES

G Cause of Spill

OPERATOR ERROR

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☐ yes ☐ no		☐ yes ☐ no	4 sq METERS

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?
☐ no ☐ yes, describe*

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*

Q Comments and/or recommendations *:

AREA WAS SOAKED UP. USING DIAPERS. IT WAS THEN SCRAPED UP WITH THE IT 62. CONTAMINATED SOIL IS PILED UP. IT IS TO BE HAULED TO PIT 6.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

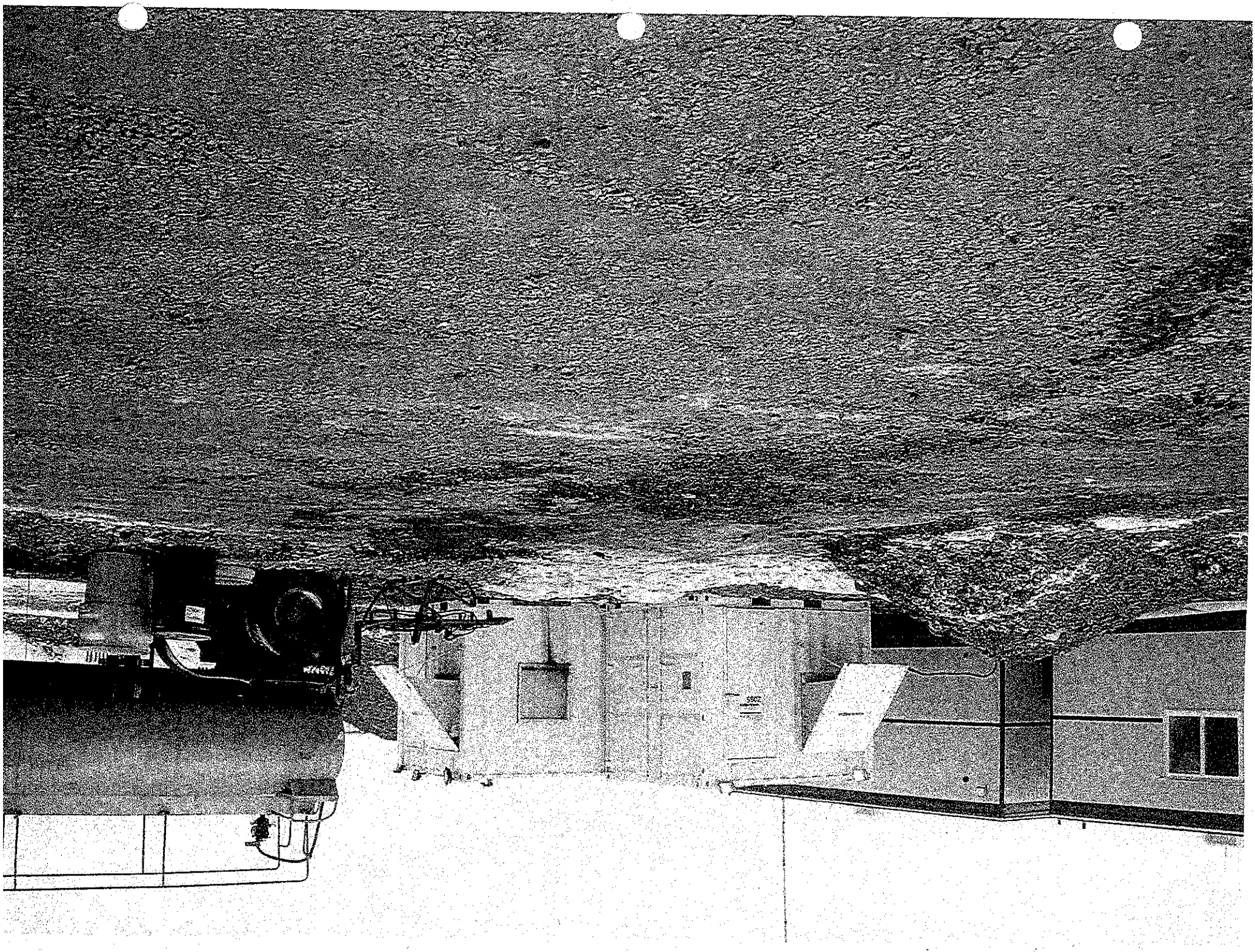
Reported by:	Position, Employer, Location	Telephone No:
	MECHANIC	
~~Reported to:~~ GLEN SYENNAR	Position, Employer, Location	Telephone No:

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

I was filling the slip tank on the Lube Truck, I overfilled the tank and had a spill.

Daniel Stone

ATCO



COSCO

CAT

NUNA
M & T SERVICES LTD.

INCIDENT INVESTIGATION REPORT

Tracking Number: # 109

PART A INCIDENT COMMON DETAILS – SUBMIT TO SAFETY DEPARTMENT BY END OF SHIFT

1. DEPARTMENT / CONTRACTOR:	DEPARTMENT CODE	2. FRONT LINE SUPERVISOR:
NUNA	GROUP CODE	

3. LOCATION OF INCIDENT	4. DATE OF INCIDENT	5. TIME (2400 HOUR CLOCK)	6. DATE PAGE 1 IS SUBMITTED TO SAFETY
AWR To meadow BANK	Oct 11/07	11:00 P.M. Day shift / (Night shift)	

7. NATURE OF INCIDENT (SAME AS ON IMMEDIATE REPORT – CHECK ALL APPLICABLE SECTIONS)

Close Call			Injury				Code 1	
(High Probability)	High Severity	Report for Trending	FA	MT	LTI (lost shifts)	RWD (restricted work duties)	Nuisance Call	Fire

Damage

(Circle the type of damage. If the estimated cost is below the cost limit, only complete this report. If the estimated cost is equal or above the cost limit, complete a full RCA.)

Light Vehicle	(Haul Truck)	Loader Forklift Bobcat	Drills	Shovel and Large Loading Tools	Hoisting (IT, Mobile Cranes, O/H Cranes)	Grader Dozer	Bucket Truck Service Vehicles	Process Loss / Down Time > $10,000	Building & Structural

8. EQUIPMENT OR MATERIALS INVOLVED (EQUIPMENT NUMBER AND TYPE)	9. EMPLOYEE(S) INVOLVED	10. DAYS WORKED ON CURRENT ROTATION	11. WITNESS #1
773 CAT Haul Truck	Felix ARNGNAnaaq (Print Name)	2	WITNESS #2 O

12. BRIEF DESCRIPTION OF INCIDENT (Events leading up to the incident, how the incident occurred, people or equipment involved)

Driver WAS Driving down ROAD when He experienced the Truck veer OFF TO Right Side, Tried TO steer back AND HAD NO steering resulting in going in ditch & BRAKING steering cyl.

13. IMMEDIATE CORRECTIVE ACTIONS TAKEN	14. RECOMMENDATIONS FOR IMPROVEMENT / LONG TERM SOLUTIONS
Shut Truck DOWN, check FOR Fire PUT chocks down & Four WAYS ON	Bring TRUCK TO Emergency STOP A.S.A.P.

15. POTENTIAL SEVERITY or CONSEQUENCE OF THE INCIDENT				16. LIKELIHOOD OF THIS OCCURRING AGAIN					RISK ASSESSMENT SCORE
(4)	3	2	1	A	B	(C)	D	E	

4 EXTREME = could kill or permanently disable OR cause extreme damage OR major down time

3 HIGH = could cause serious injury (LTI or RWD or MT) OR cause serious damage

2 MARGINAL = could cause first aid injury OR cause minor damage

1 LOW = could not cause real injury OR could cause minor damage OR minor down time

A = PRACTICALLY IMPOSSIBLE

B = NOT LIKELY

C = COULD HAPPEN

D = LIKELY / HAS HAPPENED BEFORE

E = ALMOST CERTAIN

Low	Level 1	1ST page report only
Marginal	Level 2	7 & 8 = 1st page only 9 & 10 = RCA by Supervisor
(High)	Level 3	RCA by supervisor
Extreme	Level 4	RCA with OHSC members

Ken Drover (Front Line Supervisor PRINT & Signature)	Oct 12/07 (Date)	Superintendent PRINT & Signature	Date

Severity or Consequence

	Likelihood A	B	C	D	E	Risk Assessment Category
4	10	14	17	19	20	Extreme
3	6	9	13	16	18	High
2	3	5	8	12	15	Marginal
1	1	2	4	7	11	Low

INCIDENT INVESTIGATION REPORT

Tracking Number:

LOCATION OF INCIDENT	DATE OF INCIDENT	TIME	DATE INCIDENT REPORT SUBMITTED TO SAFETY
AWR - meadowbank	Oct 11/07	A.M. 11:00 P.M.	Oct. 12/07

RISK ASSESSMENT SCORE 7

Level 1 investigation = < 7
Level 2 investigation = 7 to 17
Level 3 investigation = 18 to 20

Level 1 Incident
Supervisor notifies Crew Safety Representative.
Level 2 Incident
Supervisor and Crew Safety Representative investigate.
Level 3 Incident
Supervisor, Crew Safety Representative, and OHC Investigation Team investigate.

17. ATTACH COPIES OF APPLICABLE TRAINING RECORDS AND WRITTEN STATEMENTS TO THIS REPORT
INCOMPLETE COMPLETE

18. ATTACH COPIES OF APPLICABLE JHA'S, STANDARDS, PROCEDURES, WORK ORDERS, AND PHOTOS ETC. TO THIS REPORT
INCOMPLETE COMPLETE

PARTB CLOSE CALL or POTENTIAL FOR INCIDENT (DEVIATION FROM STANDARD / PROCEDURE)

19. IMMEDIATE ACTIONS TAKEN TO PREVENT FURTHER INCIDENT OR TO SECURE THE SCENE / DETAILS ADDITIONAL TO INITIAL REPORT
Shut Truck Down - check oper. was ok - Checked for Fire and SAFETY ISSUES - put 4-ways on the Truck to advise others of Down Truck

PART C INJURY / ILLNESS

20. INJURED PERSON(S) NAME(S)

21. BODY PART AFFECTED

22. DID EMPLOYEE REPORT TO FIRST AID FOR TREATMENT?
( ) YES ( ) NO DATE (IF DIFFERENT THAN INCIDENT DATE):

23. DID THIS INJURY OCCUR (CIRCLE ONE)
DURING WORKING HOURS AFTER REGULAR WORKING HOURS ON OT

24. MECHANISM OF INJURY

25. DID THE INJURY RESULT IN A MEDICAL TREATMENT: ( ) YES ( ) NO DID THE INJURY RESULT IN A LOST TIME: ( ) YES ( ) NO
DID THE INJURY RESULT IN MODIFIED DUTIES OR WORK RESTRICTIONS: ( ) YES ( ) NO (IF KNOWN AT THIS TIME)

26. LIST PERSONAL PROTECTIVE EQUIPMENT USED OR WORN

27. LIST PERSONAL PROTECTIVE EQUIPMENT THAT IS RECOMMENDED IN THE FUTURE

PART D DAMAGE

28. CHECK THE NATURE OF THE DAMAGE OR THE CAUSE / CONTRIBUTING FACTORS

EQUIPMENT DAMAGE	BUILDING / STRUCTURAL DAMAGE	DESIGN / ENGINEERING ISSUE	MAINTENANCE ISSUE	DAMAGE FROM IMPROPER USE

29. DESCRIBE THE EQUIPMENT AND THE DAMAGE INCURRED
R/H steering cyl. Broke on the 773 CAT Rock Truck

30. IS THIS A CRITICAL COMPONENT OF SAFETY SYSTEMS FOR THIS EQUIPMENT?
Yes

31. EXPLANATION OF DAMAGE / CIRCUMSTANCES REQUIRED FOR THIS TYPE OF DAMAGE TO OCCUR (STATEMENT FROM REPAIR TECHNICIAN)
R/H steering cyl. spindle knuckle..

32. IS THIS EQUIPMENT LOCKED OUT OR TAKEN OUT OF SERVICE UNTIL INSPECTION / REPAIR?
Yes

33. ESTIMATED COSTS
N/A

34. ACTUAL COSTS
PARTS AND LABOUR =
DOWNTIME OF EQUIPMENT =
WORK ORDER NUMBER =

NUNA

INCIDENT INVESTIGATION REPORT

Tracking Number:

PART E	**FIRE**
35. HAS THE FIRE EXTINGUISHER(S) OR FIRE HOSES BEEN RECHARGED AND REPLACED?	**36. WAS THERE ANY CHANCE THIS FIRE COULD HAVE SPREAD IF NOT CONTROLLED?**
37. WAS A HOT WORK PERMIT REQUIRED AND IN PLACE?	**38. IDENTIFY THE IGNITION SOURCE**
39. WAS THE HOUSEKEEPING IN THIS AREA (CIRCLE MOST APPROPRIATE): **POOR SATISFACTORY ABOVE AVERAGE**	**40. WAS THE FIRE EXTINGUISHED BY AN EMPLOYEE? (IDENTIFY NAME)**
41. WAS THE MINE RESCUE TEAM CALLED OUT?	**42. ESTIMATED COSTS**
43. ACTUAL COSTS **PARTS AND LABOUR =** **DOWNTIME OF EQUIPMENT =**	**BLANK**

PART F	**5-WHY PROCESS MAP**
59. PROCESS MAP THE 5-WHY PROCESS USED IN ANALYZING THIS INCIDENT (USE THE BACK OF THE PAGE IF NECESSARY)	

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INCIDENT INVESTIGATION REPORT

Tracking Number:

PART G ROOT CAUSE ANALYSIS (RCA)

60. DESCRIBE THE DIRECT CAUSES (SPECIFIC ACTIONS, INACTIONS, OR WORKPLACE CONDITIONS) OF THE INCIDENT

METAL FATIGUE

61. DESCRIBE THE CONTRIBUTING FACTORS SURROUNDING THE INCIDENT

SAME

62. DESCRIBE THE ROOT CAUSES OF THE INCIDENT

SAME

PART H CORRECTIVE ACTIONS / PREVENTIVE MEASURES

63. WHAT IMMEDIATE CORRECTIVE ACTIONS HAVE BEEN TAKEN?	Work Order or Purchase Order
Do Proper WALK Around inspection	
& Report Any Signs of WEAR or TEAR.	

64. IDENTIFY SHORT TERM RECOMMENDATIONS FOR CORRECTIVE ACTION / PREVENTIVE MEASURES *IDENTIFY THE MANAGER ACCOUNTABLE FOR IMPLEMENTATION*	Accepted or Tabled for Future If Accepted, give Target Completion Date

65. IDENTIFY LONG TERM RECOMMENDATIONS FOR CORRECTIVE ACTION / PREVENTIVE MEASURES (MANAGEMENT SYSTEM CHANGES, PROCEDURE UPDATE, TRAINING, ETC.) *IDENTIFY THE MANAGER ACCOUNTABLE FOR IMPLEMENTATION*	Accepted or Tabled for Future If Accepted, give Target Completion Date
Regular inspection of vital	
components of equip by Maintance	

NUNA

INCIDENT INVESTIGATION REPORT

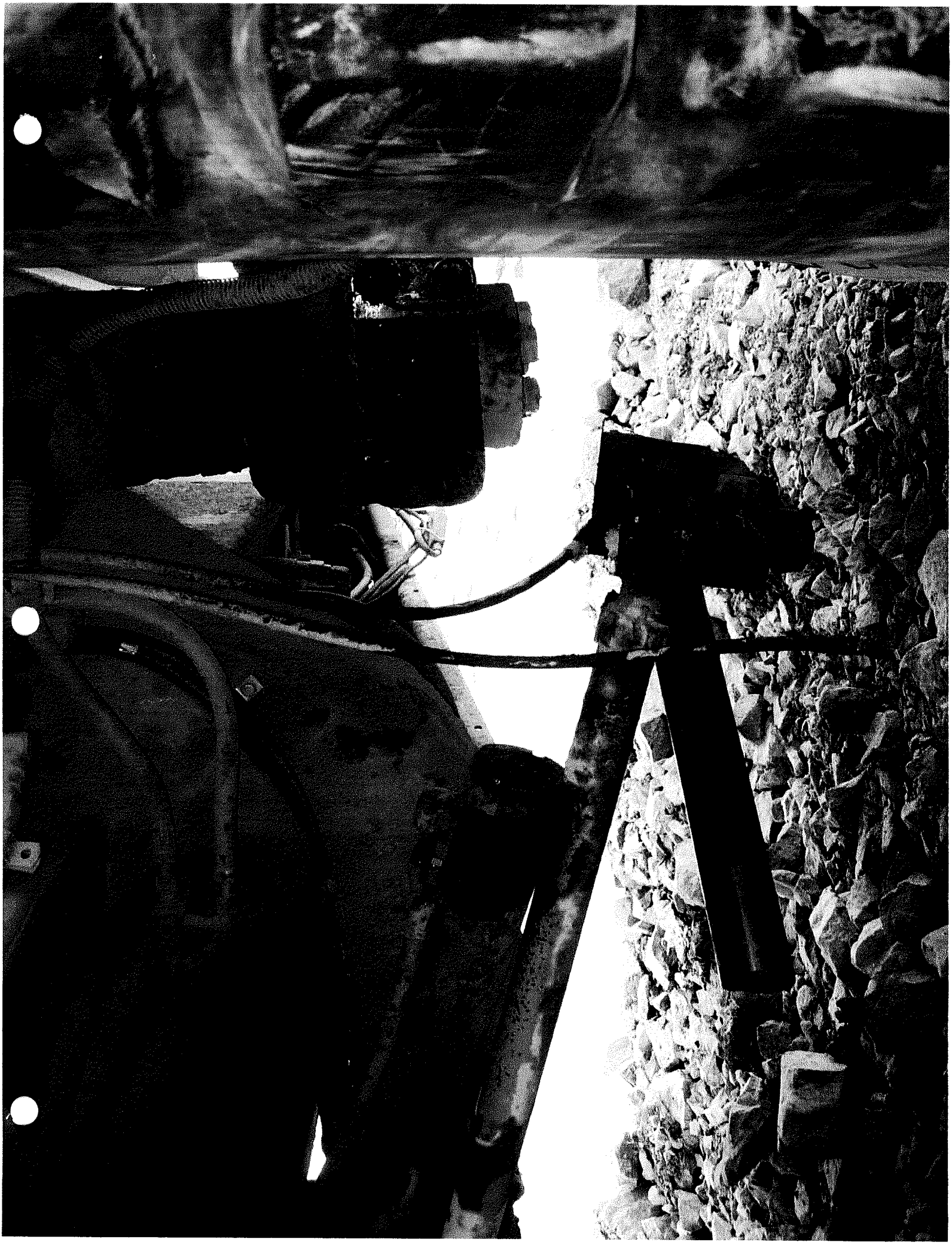
Tracking Number:

PART I	**COMMENTS AND SIGNATURES**
SIGNATURE OF FRONT LINE SUPERVISOR	**DATE** 10/11/07
SIGNATURE OF AREA SUPERINTENDENT	**DATE**
COMMENTS:	
SIGNATURE OF PROJECT MANAGER	**DATE** 10/14/07
COMMENTS:	
SIGNATURE OF HEALTH AND SAFETY MANAGER **DATE**	**SIGNATURE OF OPERATIONS MANAGER** **DATE**

Attach written statements and training records here.

~~Matt~~ Oct 11 07

I was driven on the HWR Road then it started to turn to the side and I tride to turn the other way but it would't so I went off the Road and I tride to back out. so I went to the side of the Road.



NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

Northwest Territories | Nunavut | Canada

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: Oct 12/07	REPORT TIME: 11:00 P.M.	☑ ORIGINAL SPILL REPORT, OR	REPORT NUMBER: -- 115
B	OCCURRENCE DATE: MONTH – DAY – YEAR: Oct-11/07	OCCURRENCE TIME	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION: North of Q-17	REGION ☐ NWT ☑ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED: NUNA	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: HYD. Oil	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: APPROX 5-10 Litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: Steering cyl. 740 Haul Truck	SPILL CAUSE: Broken cyl.	AREA OF CONTAMINATION IN SQUARE METRES: 1 SQ meter	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS: Approx 5-10 LITRES OF HYD OIL WAS SPILLED. AS A RESULT OF THE ATTACHED INCEDENT			

L	REPORTED TO SPILL LINE BY	POSITION: MECHANIC	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: Station operator	EMPLOYER	LOCATION CALLED: Yellowknife, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR 11/09/07	REPORT TIME 8:00 PM	☐ ORIGINAL SPILL REPORT, OR	REPORT NUMBER 33-535-12- #137
B	OCCURRENCE DATE: MONTH – DAY – YEAR	OCCURRENCE TIME UNKNOWN	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION	REGION ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME **Nuna Logistics**	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION **9839-31 Avenue, Edmonton Alberta**		
G	ANY CONTRACTOR INVOLVED NO	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED Diesel Fuel.	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES 30 LITRES.	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE UNKNOWN	SPILL CAUSE UNKNOWN	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY NO	DESCRIBE ANY ASSISTANCE REQUIRED NONE	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT NONE.	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS THE SPILL WAS SCRAPED DOWN TO CLEAN GROUND AND SHOVELED INTO STEEL BARRELS AND DISPOSED OF TO THE PROPER CONTAINMENT.			

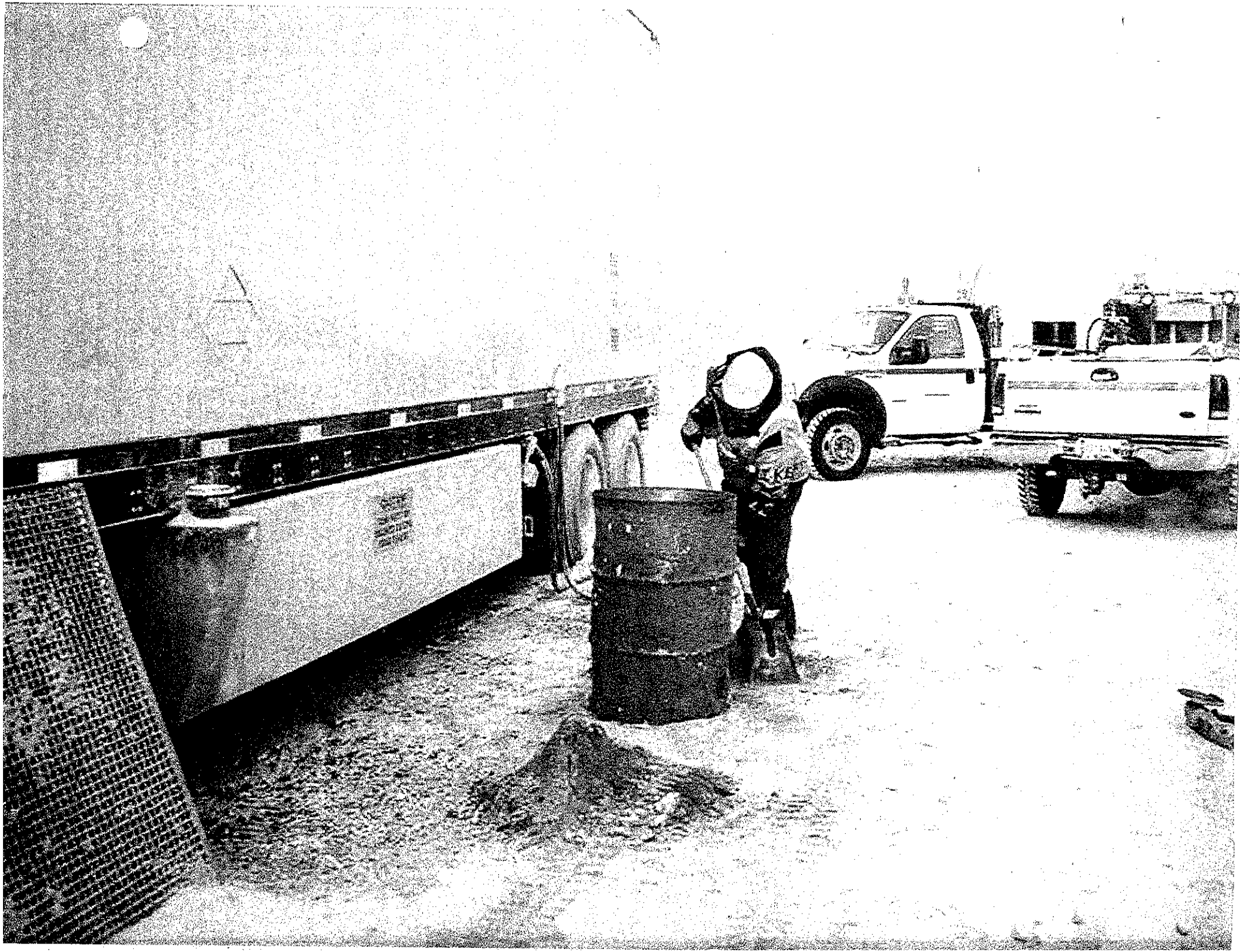
L	REPORTED TO SPILL LINE BY [signature]	POSITION SUPERVISOR	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT [signature]	POSITION MANAGER	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION **Station operator**	EMPLOYER	LOCATION CALLED **Yellowknife, NT**	REPORT LINE NUMBER **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			



NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

Northwest Territories | Nunavut | Canada

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: NOV 15/07.	REPORT TIME	☐ ORIGINAL SPILL REPORT, OR	REPORT NUMBER: 138
B	OCCURRENCE DATE: MONTH – DAY – YEAR: NOV 15/07. 10-10 SHIFT	OCCURRENCE TIME	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)		WATER LICENCE NUMBER (IF APPLICABLE)	
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION: PIT 20 MEADOWBANK ROAD		REGION ☐ NWT ☑ NUNAVUT ☐ ADJACENT JURISDICTION OR	
E	LATITUDE DEGREES MINUTES SECONDS		LONGITUDE DEGREES MINUTES SECONDS	
F	RESPONSIBLE PARTY OR VESSEL NAME: NUNA MAND T.	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: Hyd OIL.	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: 40 LITRES.	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE	SPILL CAUSE	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

TRANSMISSION. SCREEN HOUSING WAS KNOCKED OFF WHEN THE D6R (UNIT 3626) BACKED INTO A ROCK. Approx 40 LITRES WAS LOST.

L	REPORTED TO SPILL LINE BY: GRANT	POSITION: MECHANIC	EMPLOYER: NUNA.	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: **Station operator**	EMPLOYER	LOCATION CALLED: **Yellowknife, NT**	REPORT LINE NUMBER: **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

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NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: 11/24/07	REPORT TIME: 0800	☑ ORIGINAL SPILL REPORT, OR	REPORT NUMBER: 149
B	OCCURRENCE DATE: MONTH – DAY – YEAR: 11/23/07	OCCURRENCE TIME: 1600	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)		WATER LICENCE NUMBER (IF APPLICABLE)	
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION: **Baker Lake Nunavut**		REGION: ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR	
E	LATITUDE DEGREES MINUTES SECONDS		LONGITUDE DEGREES MINUTES SECONDS	
F	RESPONSIBLE PARTY OR VESSEL NAME: 2318	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: Nuna M&T		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: Hydraulic Oil	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: 20	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: Filter	SPILL CAUSE: Filter came loose.	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS: Spill pads under machine			

L	REPORTED TO SPILL LINE BY: ~~Kenny Theriault~~ Andy Focker	POSITION: ~~Safety Department~~ Mechanic	EMPLOYER: **Nuna M&T Services**	LOCATION CALLING FROM: **Baker Lake**	TELEPHONE: **(780) 644-9088**
M	ANY ALTERNATE CONTACT	POSITION: **Project Manger**	EMPLOYER: **Nuna M&T Services**	ALTERNATE CONTACT LOCATION: **Baker Lake**	ALTERNATE TELEPHONE: **(780) 644-9081**

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: **Station operator**	EMPLOYER	LOCATION CALLED: **Yellowknife, NT**	REPORT LINE NUMBER: **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

Northwest Territories | Nunavut | Canada

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TEL: (867) 920-8130
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EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR NOV 25, 2007	REPORT TIME 7:00 pm	☑ ORIGINAL SPILL REPORT, OR ☐ UPDATE # TO THE ORIGINAL SPILL REPORT	REPORT NUMBER 151
B	OCCURRENCE DATE: MONTH – DAY – YEAR NOV. 25, 2007	OCCURRENCE TIME 2:50 pm		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION FORWARD CAMP	REGION ☐ NWT ☑ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES ~~MINUTES~~ ~~SECONDS~~ N: 7119250.2 E: 627483.0	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME NWT ROCK	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED NWT ROCK	CONTRACTOR ADDRESS OR OFFICE LOCATION 111 NAHANNI DR, YELLOWKNIFE, NWT, X1A 2P4		
H	PRODUCT SPILLED 0-30 MOTOR OIL	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES 15	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE DRILL	SPILL CAUSE BROKEN HOSE	AREA OF CONTAMINATION IN SQUARE METRES 10	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS DRILL WAS MOVED FROM TRUCK TO YARD, OIL LEAKED ONTO SNOW WHEN MOVED OIL CONTAMINATED SNOW WAS IMMEDIATELY DUG UP AND PUT INTO CONTAINER FOR DISPOSAL			

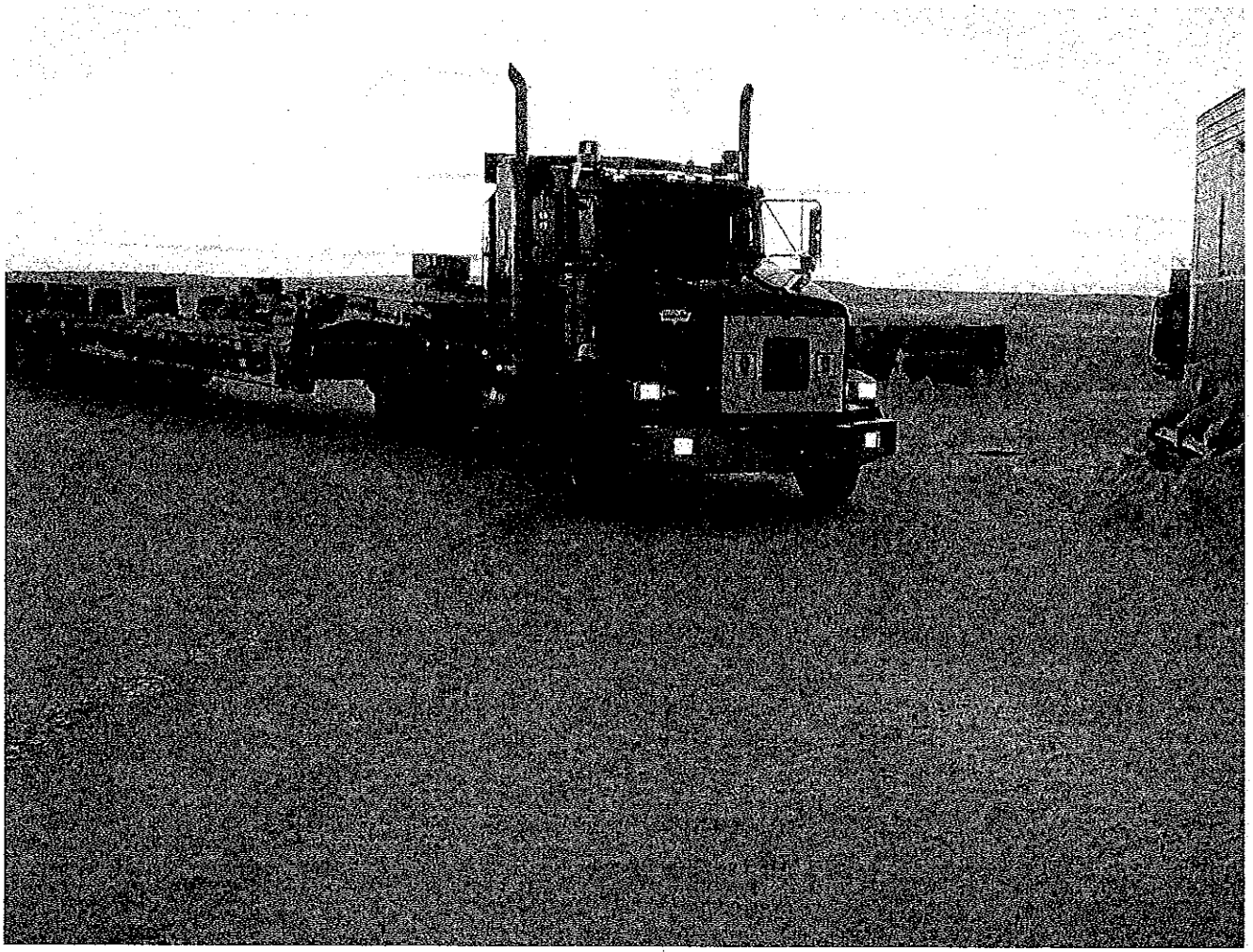
L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

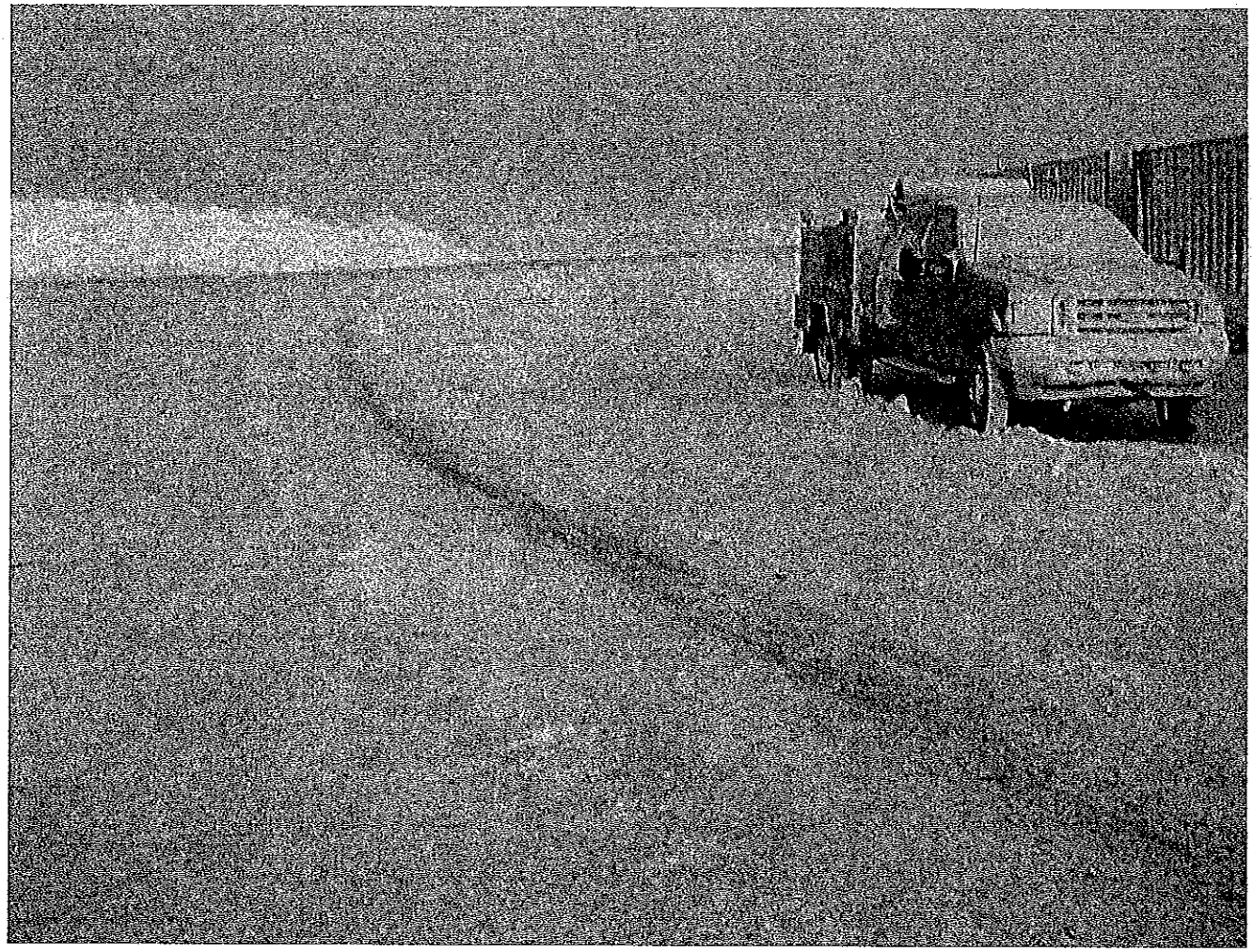
REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION **Station operator**	EMPLOYER	LOCATION CALLED **Yellowknife, NT**	REPORT LINE NUMBER **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			





NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

Northwest Territories | Nunavut | Canada

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: NOV. 25/07	REPORT TIME: 10:00 A.M.	☒ ORIGINAL SPILL REPORT, OR	REPORT NUMBER: 152
B	OCCURRENCE DATE: MONTH – DAY – YEAR: NOV. 25/07	OCCURRENCE TIME: 10:00 A.M.	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE)		WATER LICENCE NUMBER (IF APPLICABLE)	
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION: 79 KM. North AWR.		REGION ☐ NWT ☒ NUNAVUT ☒ ADJACENT JURISDICTION OR	
E	LATITUDE DEGREES MINUTES SECONDS		LONGITUDE DEGREES MINUTES SECONDS	
F	RESPONSIBLE PARTY OR VESSEL NAME: # 3626	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: NUNA MET		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: Engine OIL ~~Engine Oil~~	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: 15	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: Eng. Oil ~~Engine Oil~~	SPILL CAUSE: Broken Sump Pan	AREA OF CONTAMINATION IN SQUARE METRES: 150 Metres	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS: D02E12 Eng. Oil Leak on AWR. Cleaned up with Soaker PADS & Gloves, then PUT into Steal Barrel.			

L	REPORTED TO SPILL LINE BY	POSITION: Operator	EMPLOYER: NUNA MET	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: **Station operator**	EMPLOYER	LOCATION CALLED: **Yellowknife, NT**	REPORT LINE NUMBER: **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

Northwest Territories · Nunavut · Canada

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: Nov 29 2007	REPORT TIME: 6:00 AM	☑ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER: #153
B	OCCURRENCE DATE: MONTH – DAY – YEAR: Nov 29 2007	OCCURRENCE TIME: DURING THE NIGHT		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION	REGION: ☐ NWT ☑ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES MINUTES SECONDS	LONGITUDE: DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME: NUNA Vessel # 1372	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED: Arctic Fuel	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: Hydro Oil	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: 5 to 6	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: Faulty Hose	SPILL CAUSE: Faulty Hose	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

I Ken Hachey From Arctic Fuel Have seen the work completed for spill clean up in Arctic Fuel shop in town behind N.R.S was properly done and SOB was completed to my satisfaction

Work completed by John Ray Morin Lanny Aitkaq

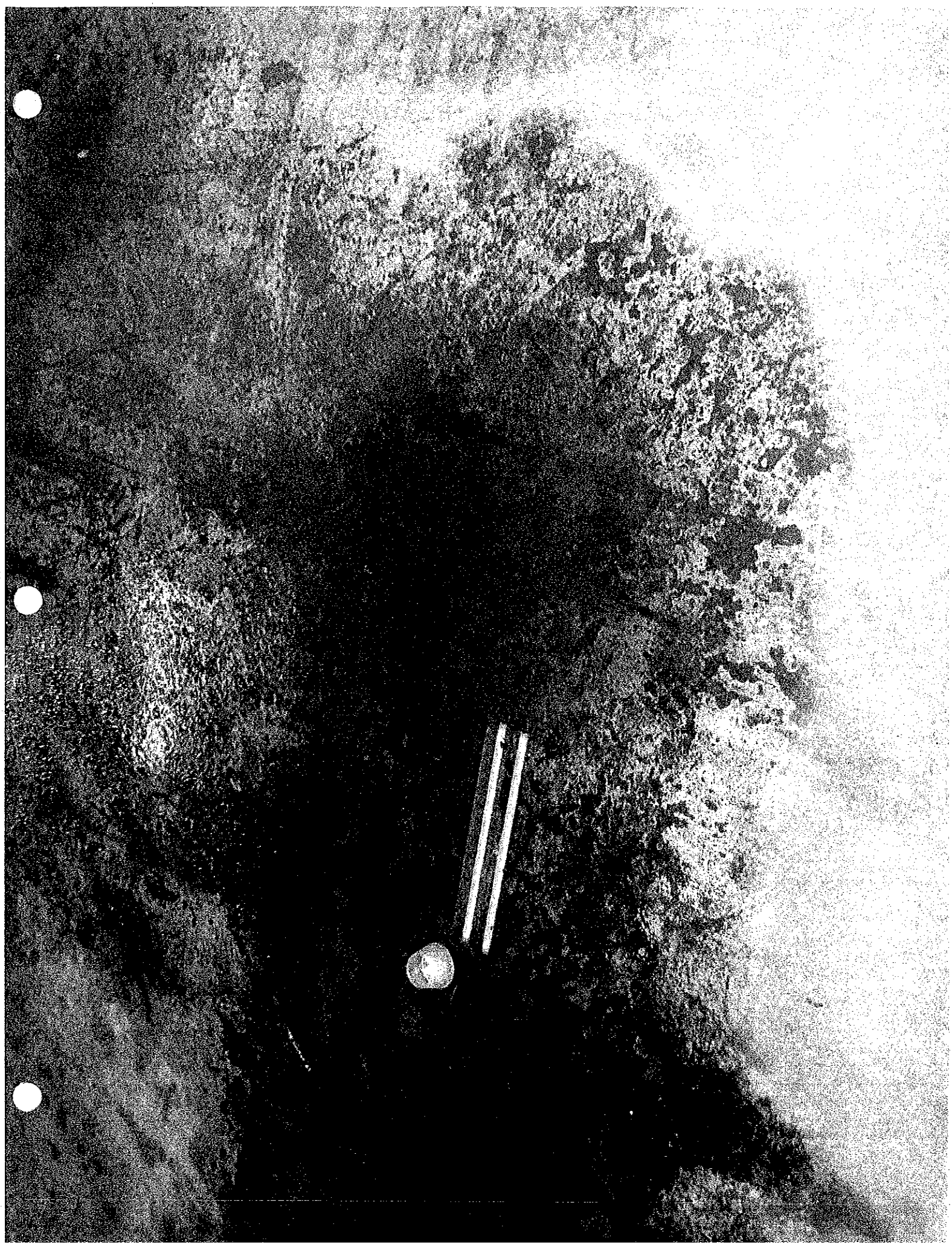
L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

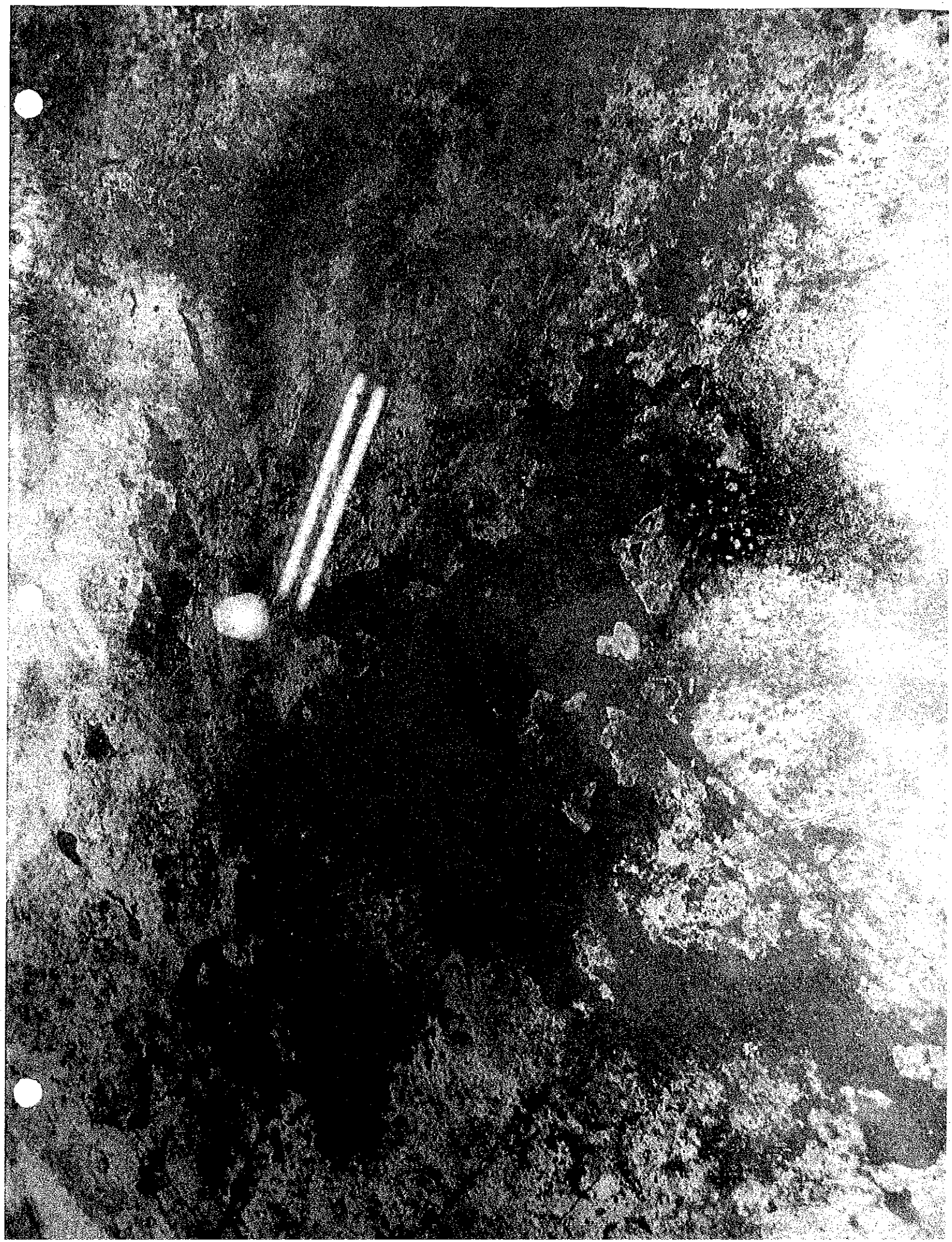
REPORT LINE USE ONLY

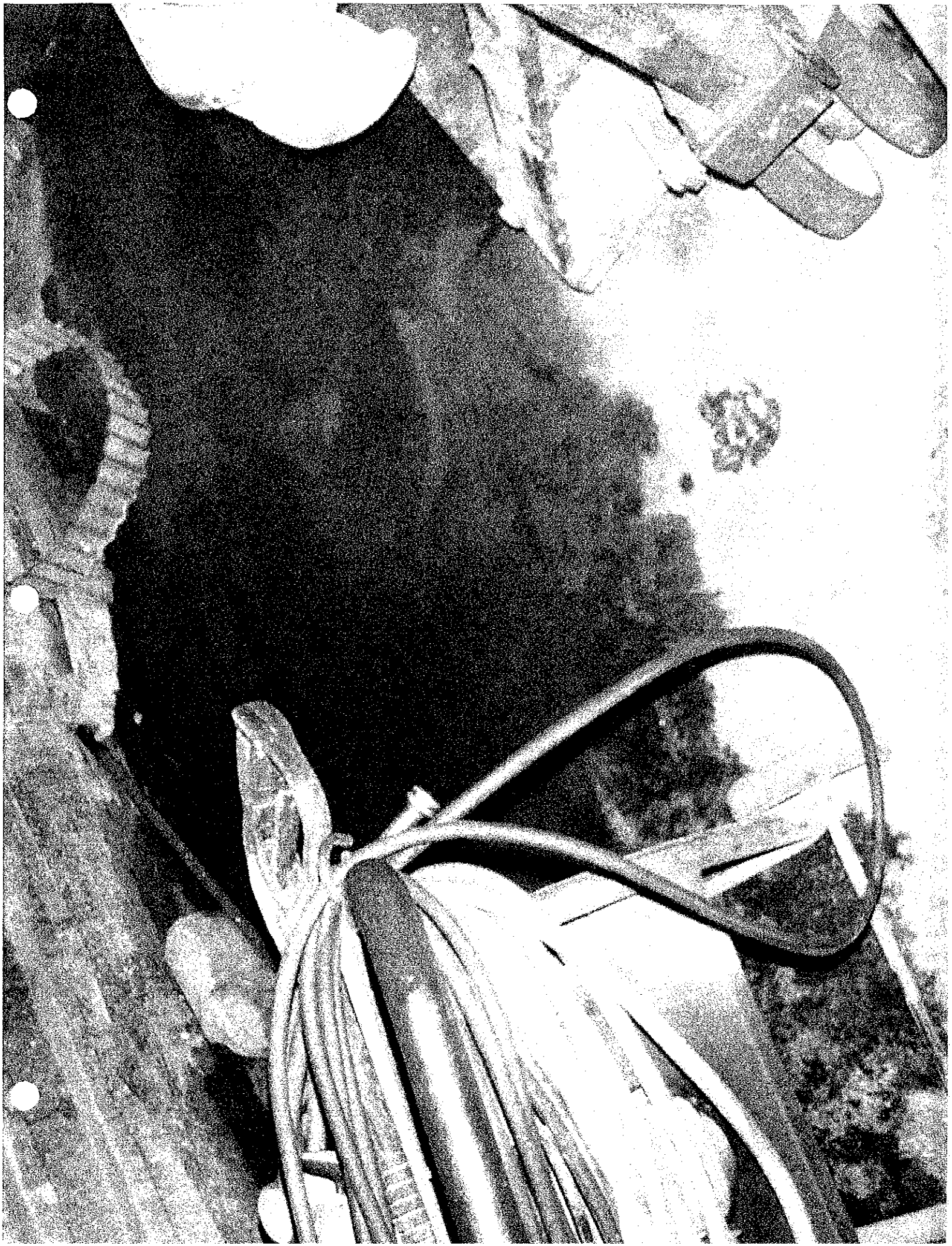
N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

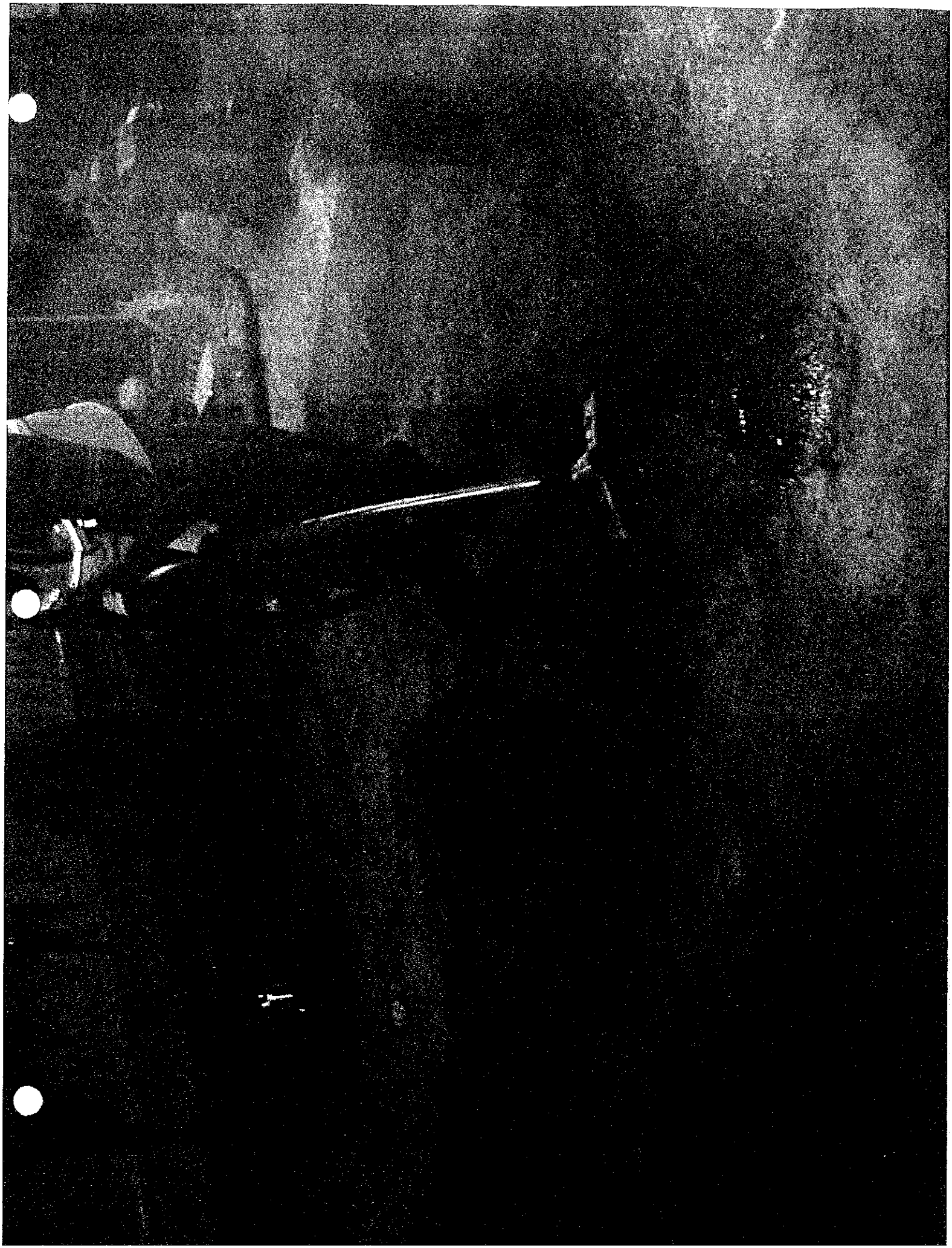
LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			









Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: 11/29/2007	REPORT TIME: 8:00 am	☑ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER: 157
B	OCCURRENCE DATE: MONTH – DAY – YEAR: 11/28/2007	OCCURRENCE TIME: 11:00 pm		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: Nuna camp Baker lake	REGION: ☐ NWT ☑ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES MINUTES SECONDS	LONGITUDE: DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME: Nuna	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: Baker lake office		
G	ANY CONTRACTOR INVOLVED: NO	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: hydraulic oil	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: 10 Litres	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE): NO	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: water truck	SPILL CAUSE: line Cracked	AREA OF CONTAMINATION IN SQUARE METRES: 1m²	
J	FACTORS AFFECTING SPILL OR RECOVERY: NONE	DESCRIBE ANY ASSISTANCE REQUIRED: NONE	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT: NONE	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS: Cleaned up promptly. Was put in Enviro-barrell, labled and to be shipped out on a later date.			

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Last night the 28 of Novemember, I was operating the roll on/roll off truck (1372). I hooked up the hydraulic hose to the coolant connection and the hose blew ~~[illegible]~~ leaking hydraulic oil in to the water pump box and leaking on to the ground resulting in about 10 Litres of oil spilled. It was cleaned up promptly.

AGNICO-EAGLE
Meadowbank Division

SPILL CLEAN-UP REPORT

November 11, 2007, Fuel Spill Incident

Prepared by: Nicolas Saucier
Env. Technician
Meadowbank Project

Date: November 28, 2007

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1.0 Incident Description 3

2.0 Incident Analysis and Implemented Prevention Measures 3

3.0 Clean-up Method Selection 3

4.0 Clean-up Operation 6

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1.0 Incident Description

The incident occurred on November 11, 2007, around 19:00 during haulage of diesel fuel drums from km 86 of the All-Weather Private Access Road to the Meadowbank Exploration camp site. The drums were transported on a sled attached to a snowmobile. When the snowmobile arrived at the camp, the operators found that the caps on two drums had not been properly sealed and the contents of the drums had been spilled along their travel route. The quantity of diesel fuel spilled was therefore estimated at about 400 litres. The travel route was on the frozen Third Portage Lake. The lake was entirely frozen and an inspection showed that most of the spill, in terms of quantity, was located on a stretch of about 700 to 800 meters but it was possible to follow some trace of leakage on almost 7 km from the south end of the middle of the lake (see Figures 1 and 2). The spill did not mix with the lake water but was encased in the top layer of the frozen lake.

2.0 Incident Analysis and Implemented Prevention Measures

The incident analysis associated the spill occurrence to human error in the fuel transportation operation. To prevent reoccurrence, all workers involved in the handling of fuel have been met and instructed in the following precautionary measures for fuel transportation operations:

- Use only undamaged drums for fuel transportation and verify that all drums have caps in good working order prior to filling;
- Once a drum has been filled, ensure that the cap is tightly closed;
- Ensure that the drum is properly secured to the transportation vehicle and re-verify that the caps are screwed tight;
- Carry a spill kit, to be able to react properly in the event of a spill during the fuelling operation or a leak during transportation;
- If the drums cannot be carried in an upright position on the sled, always ensure that the cap is on the upper part of the drum.
- Always carry a barrel wrench to ensure tight closing and reduce the risk of a spill.

Diesel fuel transportation by drums is used as an interim measure only and will be stopped to reduce to a minimum the risk of a spill, as soon as the ice is thick enough to support a tanker vehicle.

3.0 Clean-up Method Selection

A number of clean-up options were considered during consultations with Agnico-Eagle Mines (AEM) technical staff. Given the limited equipment available at the Meadowbank site, the only viable plan to clean up the spill and to recover the fuel was to use a scraper to scrape off both the surface ice layer and the fuel encased in it. For this operation, AEM personnel modified a scraper that was originally used to clear snowmobile trails. The modified scraper is shown in Figure 3.

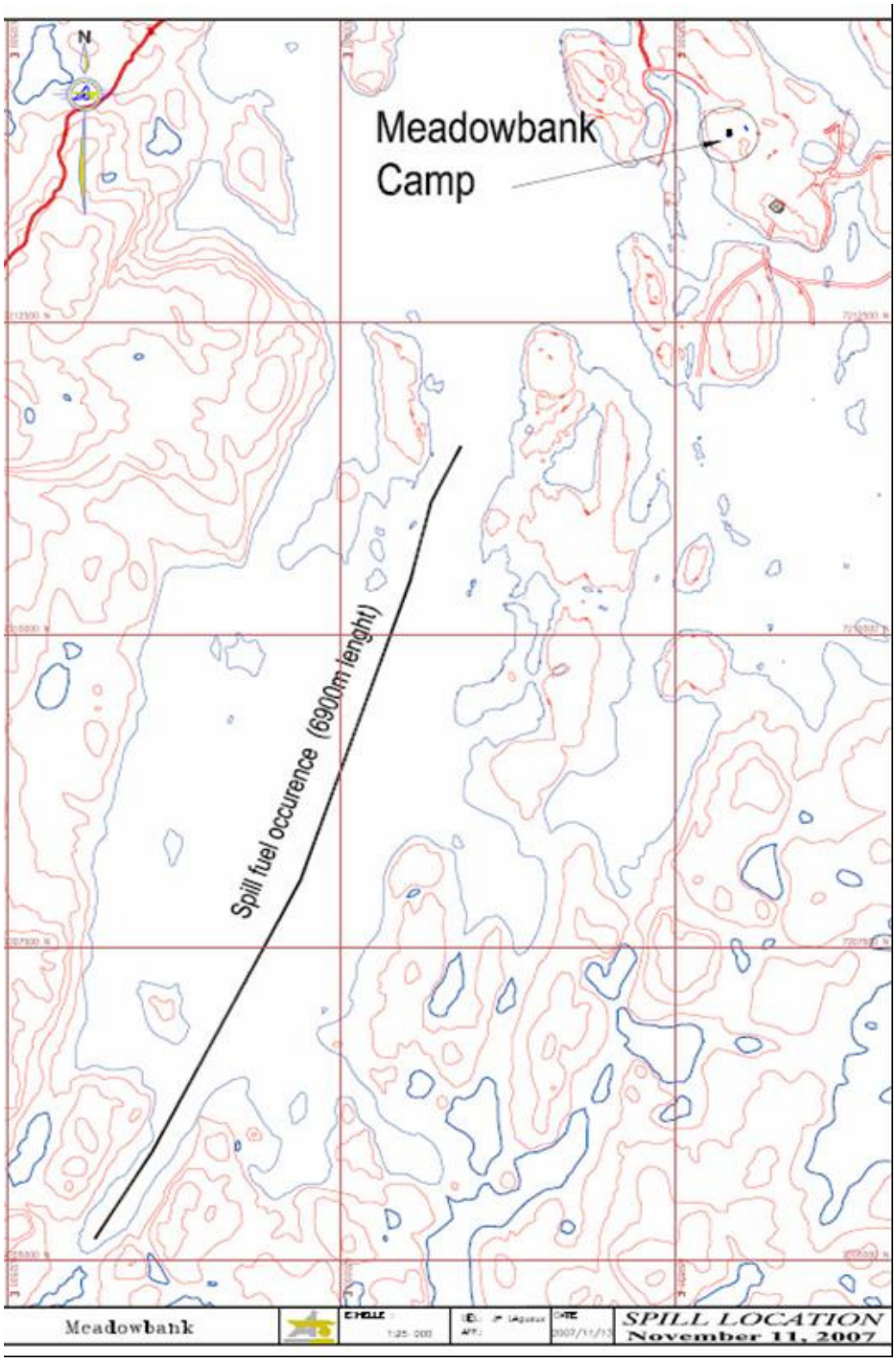

Figure 1: Spill Location on the lake

Figure 2: Spill Trace on the lake

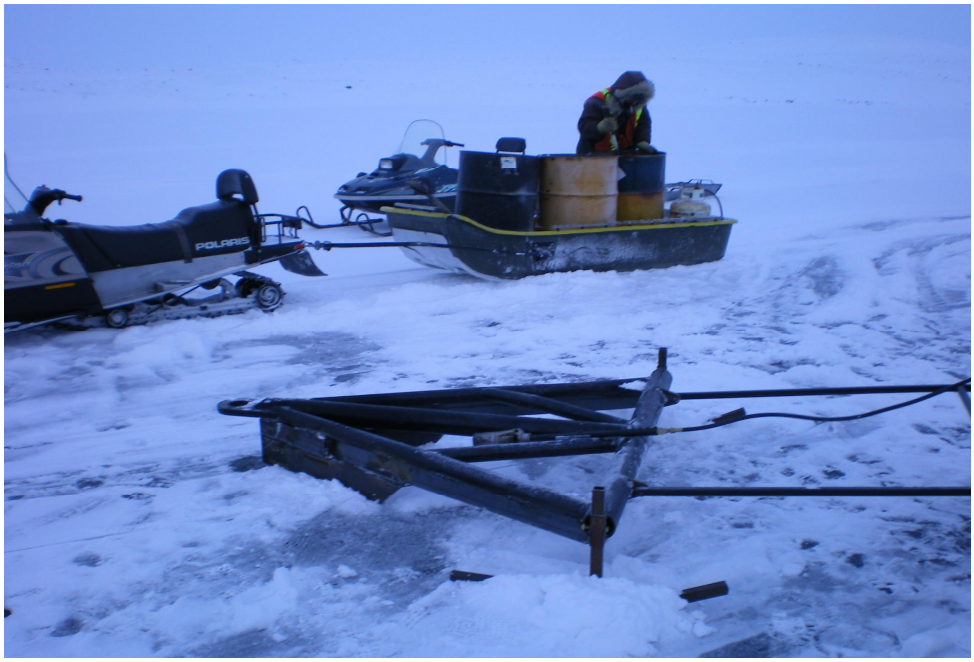

Figure 3: Modified scraper used for clean-up operation

4.0 Clean-up Operation

The clean up activity began on November 15th, 2007, as soon as the modified scraper was ready. The AEM cleaning team towed the metal scraper behind a snowmobile at low speed scraping up the mixture of snow, fuel and ice. The scraping was stopped periodically to recover the scraped material and place it in a 45 gallon drum. During this operation approximately 150 litres of ice and fuel have been recovered over a distance of approximately 3 500 m of the track, including the area where the trace was most visible. Unfortunately this operation had to be suspended the next day because of the unfavourable weather conditions (snow and strong winds). On November 17, the track was inspected to resume the operation but no trace of the spill on the ice was found along the remaining track (see Figure 4).

Figure 4: November 17 inspection of the snowmobile track: no trace of the spill left

Two more track inspections were carried out without any trace of diesel fuel on the track being found. The most contaminated part of the path has been covered by the cleaning operation. The clean-up operation was therefore stopped at that point.

5.0 Disposal of Contaminated Material

The 150 litre mixture of ice and fuel was placed in drums (see Figure 5) and stored inside the HDPE lined temporary waste storage area to be held until next summer. The drums were labelled to indicate their contents. Next summer the snow, ice and fuel mixture will melt in the drums and as much fuel as possible will be recovered by decantation to be used at camp for heating purposes. The remaining fuel in the water will be removed using absorbent pads placed on top of the water. These pads will be destroyed in the camp incinerator. The remaining water will be pumped through an oil water separator with the clean water placed into new drums for water quality sampling. Once the water quality results have been returned and the water verified as suitable for release, the water will be slowly released on the tundra in an area with a long pathway to the lake to allow the vegetation to act as a buffer.

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Figure 5: Contaminated material collected in drums and placed in the lined temporary storage facility

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NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☐ Original Report ☐ Update No. 1	Spill Number
DEC 13/07.	DEC 13. Approx 2 pm.		

D Location and map coordinates (if known) and direction (if moving)

MEADOW BANK ROAD NORTH of PIT 19

E Party Responsible for Spill

NUNA MANT

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)

HYDRAULIC OIL. Approx 20 LITRES

G Cause of Spill

RUPTURED. STEEL LINE

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no	NO	☐ yes ☐ no	Approx 2sq METERS

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)

M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?
☐ no ☐ yes , describe*

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*

Q Comments and/or recommendations *:

LINE WAS REMOVED / REPAIRED AND INSTALLED.

SITE SERVICES TO CLEAN UP CONTAMINATED SOIL AND DRUM IT.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☐ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC	

Reported to:	Position, Employer, Location	Telephone No:
J. Blouin	Site Supervisor	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

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NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

Northwest Territories

24-Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and time	B Date and time of Spill (if known)	C ☑ Original Report ☐ Update No. 1	Spill Number
Dec 12/07	UNKNOWN		

D Location and map coordinates (if known) and direction (if moving)
NORTH of PIT 16 ON MEADOW BANK ROAD

E Party Responsible for Spill
UNKNOWN.

F Product(s) spilled and estimated quantities (Provide metric volumes/weights if possible)
HYDRAULIC OIL ?

G Cause of Spill
UNKNOWN

H Is spill terminated?	I If spill is continuing, give estimated rate	J Is further spillage possible?	K Extent of contaminated area (in sq. m if possible)
☑ yes ☐ no		☐ yes ☑ no	Approx 2 sq METERS.

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)	M Containment (natural depression, dyke, etc.)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials

O Do you require assistance?	P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife*
☑ no ☐ yes, describe*	

Q Comments and/or recommendations *:
CLEAN UP BY SITE SERVICES.

FOR SPILL LINE USE ONLY

Lead Agency

Spill significence

Lead Agency contact and time

Is this file now closed? ☑ yes ☐ no

Reported by:	Position, Employer, Location	Telephone No:
GRANT	MECHANIC.	
Reported to:	**Position, Employer, Location**	**Telephone No:**
Henry Blom	Site Supervisor	

*Put additional comments on next page (Please type in the Box letter you are referring to in your comments)

APPENDIX G

AEM PHYSICAL MONITORING REPORTS

MEADOWBANK - INSPECTION SHEET JUNE 2007: ALL WEATHER ROAD STREAM CROSSINGS

Name:	M.H.						
Date:	27/06/07						
Inspection	regular	Yes	No				
	Event	Yes	No				
Stream No.	**Location**	**Crossing**	**Type**	**Feature to inspect**	**Circle the answer**	**Actions to take**	**Comments**
• R01	between km 3 and km 4	Bridge	Clear-span bridge over fish bearing stream	1. Has any surface material been left from construction that would block/constrict the stream ?	Yes	Remove debris, without interfering with stream	Pas possible pour l'instant
					No		
				2. Is the bridge abutment installed under snow cover within the defined stream channel ?	Yes	The bridge should be outside the stream ordinary high water mark. Notify supervisor.	
					No		
				3. Is there erosion of the abutment material ?	Yes	1. Install silt fence (see figure 1)	
						2. Armour abutment material	
					No		
				4. Is there any waste materials present on the embankment above the high water level that could enter the stream ?		a. Stabilise/grade any waste materials above the high water level to prevent them from entering the watercourse	Pas possible.
					Yes		
						b. Install Silt Fences (see Figure 1)	
					No		
				5. Are floating object blocked by the bridge ?	Yes	The bridge should have been installed higher. Notify supervisor.	
					No		
				6. Is there any defects, cracks or any other risks to structural integrity (bridge abutments and foundations)?	Yes	Repairing damage.	
					No		
• R02	At km 10	Bridge	Non clear-span bridge over fish bearing stream	1. Has any surface material been left from construction that would block/constrict the stream ?	Yes	Remove debris, without interfering with stream	
					No		
				2. Does the toe of the bridge constitute a major encroachment in the stream ?	Yes	Notify supervisor.	
					No		
				3. Is there erosion of the abutment material in the stream ?	Yes	Armour abutment material	
					No		
				4. Is there any waste materials present on the embankment above the high water level that could enter the stream ?	Yes	a. Stabilise/grade any waste materials above the high water level to prevent them from entering the watercourse	
						b. Install Silt Fences (see Figure 1)	
					No		
				5. Are floating object blocked by the bridge ?	Yes	The bridge should have been installed higher. Notify supervisor.	
					No		

				6. Is there any defects, cracks or any other risks to structural integrity (bridge abutments and foundations)?	Yes	Repairing damage.	
					No		
• R03	At km 12	Culvert	Culvert over non-fish bearing stream	1. Has any surface material been left from construction that would block/constrict the stream ?	Yes	Remove debris, without interfering with stream	
					No		
				2. Is the approach to the culvert subjected to erosion ?	Yes	1. Install silt curtain (see Figure 2)	pas mis en place (fantôme)
						2. Armour approach to the culvert	
					No		
à poser				3. Is the culverts were installed in a location that does not optimally route watercourse flows?	Yes	Additional culverts will be installed.	
					No		
• R04	At km 13	Culvert	Culvert over non-fish bearing stream	1. Has any surface material been left from construction that would block/constrict the stream ?	Yes	Remove debris, without interfering with stream	
					No		
				2. Is the approach to the culvert subjected to erosion ?	Yes	1. Install silt curtain (see Figure 2)	pas mis en place (fantôme)
						2. Armour approach to the culvert	
à poser					No		
				3. Is the culverts were installed in a location that does not optimally route watercourse flows?	Yes	Additional culverts will be installed.	
					No		
• R05	At km 19	Bridge	Clear-span bridge over fish bearing stream	1. Has any surface material been left from construction that would block/constrict the stream ?	Yes	Remove debris, without interfering with stream	
					No		
ROSA pas carrette				2. Is the bridge abutment installed under snow cover within the defined stream channel ?	Yes	The bridge should be outside the stream ordinary high water mark. Notify supervisor.	Retirer les pièce d'Al.
					No		
				3. Is there erosion of the abutment material ?	Yes	1. Install silt fence (see figure 1)	
						2. Armour abutment material	
matériel accumulé					No		
				4. Is there any waste materials present on the embankment above the high water level that could enter the stream ?	Yes	a. Stabilise/grade any waste materials above the high water level to prevent them from entering the watercourse	
faire enlevé						b. Install Silt Fences (see Figure 1)	
					No		
				5. Are floating object blocked by the bridge ?	Yes	The bridge should have been installed higher. Notify supervisor.	
					No		
				6. Is there any defects, cracks or any other risks to structural integrity (bridge abutments and foundations)?	Yes	Repairing damage.	
					No		

21-22

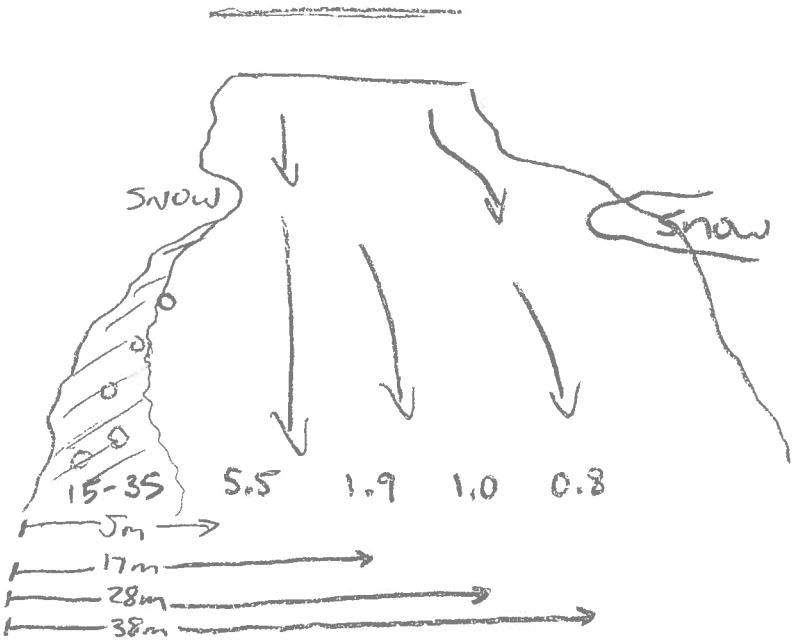
• R06	between km 24 and 25	Bridge	Non clear-span bridge over fish bearing stream	1. Has any surface material been left from construction that would block/constrict the stream ?	Yes	Remove debris, without interfering with stream	OK.
					No		
				2. Does the toe of the bridge constitute a major encroachment in the stream ?	Yes	Notify supervisor.	
					No		
				3. Is there erosion of the abutment material in the stream ?	Yes	Armour abutment material	
					No		
				4. Is there any waste materials present on the embankment above the high water level that could enter the stream ?	Yes	a. Stabilise/grade any waste materials above the high water level to prevent them from entering the watercourse	
						b. Install Silt Fences (see Figure 1)	
					No		
				5. Are floating object blocked by the bridge ?	Yes	The bridge should have been installed higher. Notify supervisor.	
					No		
				6. Is there any defects, cracks or any other risks to structural integrity (bridge abutments and foundations)?	Yes	Repairing damage.	
					No		
• R07	between km 27 and 28	Culvert	Culvert over non-fish bearing stream	1. Has any surface material been left from construction that would block/constrict the stream ?	Yes	Remove debris, without interfering with stream	Pas possible pour le moment à cause des travaux
					No		
				2. Is the approach to the culvert subjected to erosion ?	Yes	1. Install silt curtain (see Figure 2)	Ok
						2. Armour approach to the culvert	
					No		
				3. Is the culverts were installed in a location that does not optimally route watercourse flows?	Yes	Additional culverts will be installed.	??
					No		
Next crossing is between km 53 and 54							

APPENDIX H

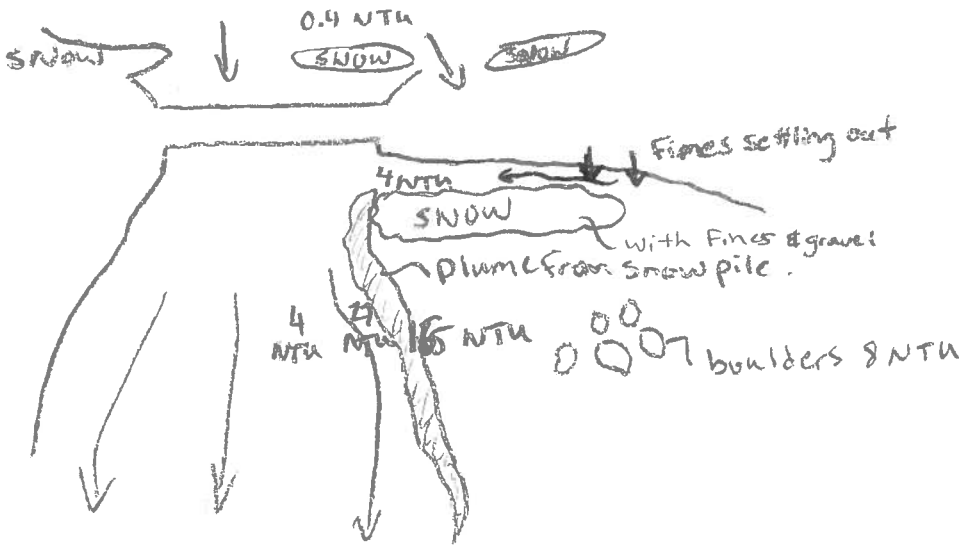
AZIMUTH FIELD TURBIDITY MAPPING

Turbidity Data Collection, Mapping Turbidity: Field Sheet 2

Crossing ID: R02	**Personnel:** DH Gary	**# of Readings:** 4
Date: June 15	**Time:** 1515	



Crossing ID: R02	**Personnel:** DH Gary	**# of Readings:** 5
Date: JUNE 17	**Time:** 1230	

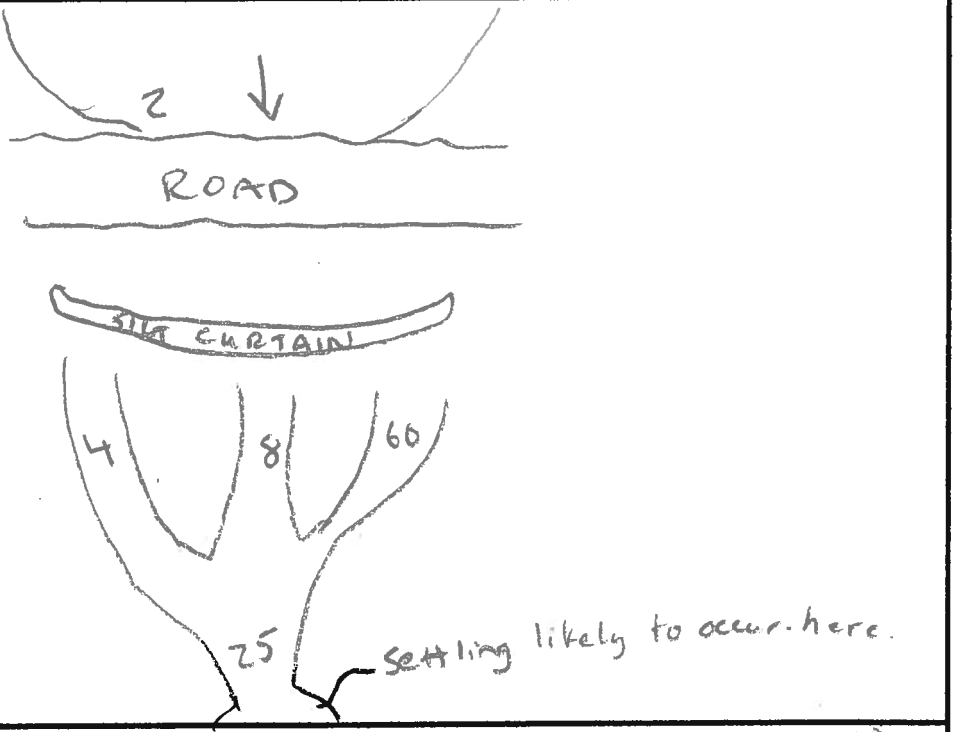


Field Personnel Signature (dated)

Turbidity Data Collection, Mapping Turbidity: Field Sheet 2

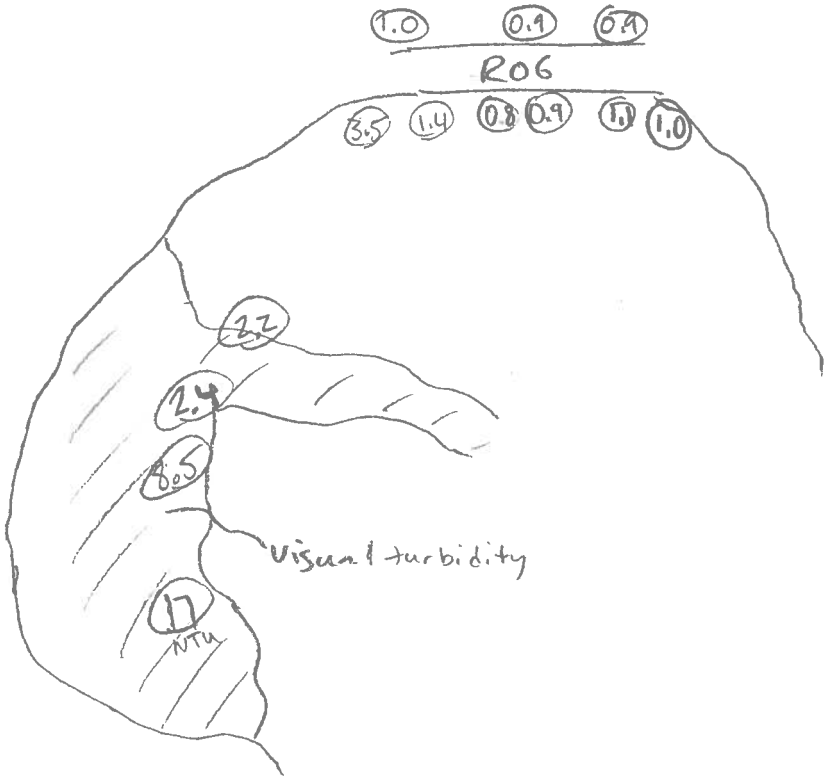
Crossing ID: R07 **Personnel:** DH Gary **# of Readings:** 5

Date: June 19 **Time:** 1230



Crossing ID: R06 **Personnel:** CH RV TM **# of Readings:** 10

Date: June 23 **Time:** 11:00

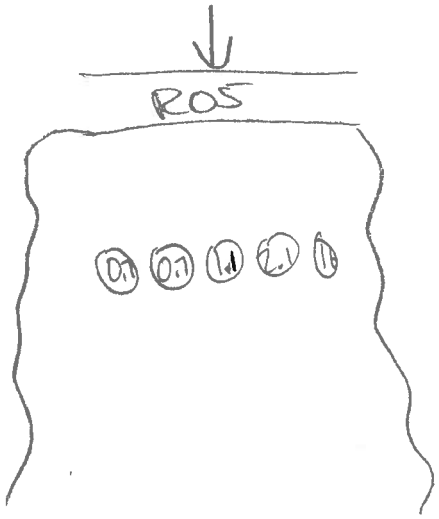


Field Personnel Signature (dated)

Turbidity Data Collection, Mapping Turbidity: Field Sheet 2

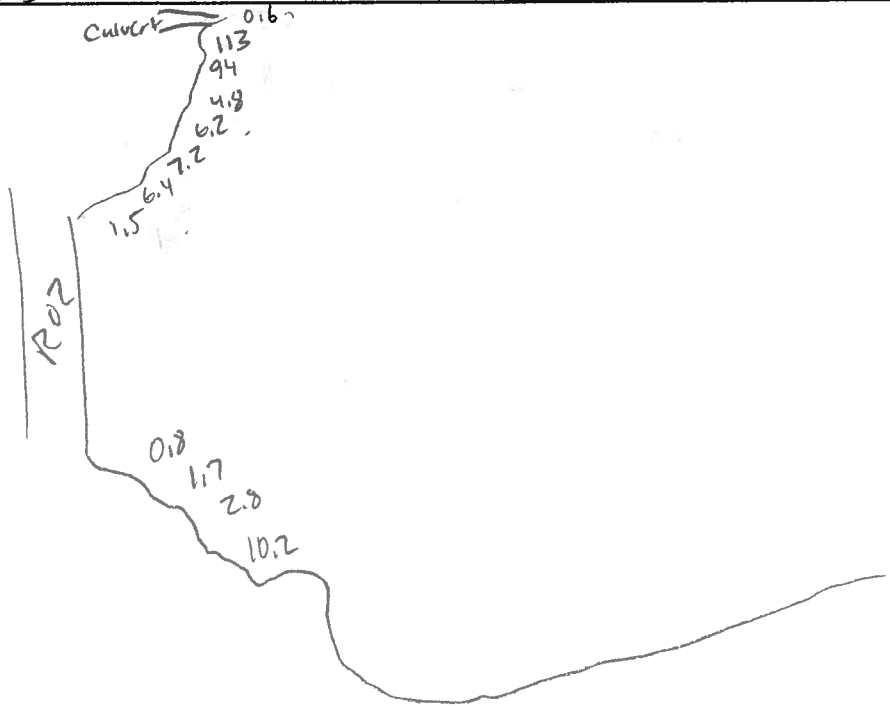
Crossing ID: RO5 **Personnel:** CH RV TM **# of Readings:** 5

Date: June 23 **Time:**



Crossing ID: RO2 **Personnel:** CH RV TM **# of Readings:** 11

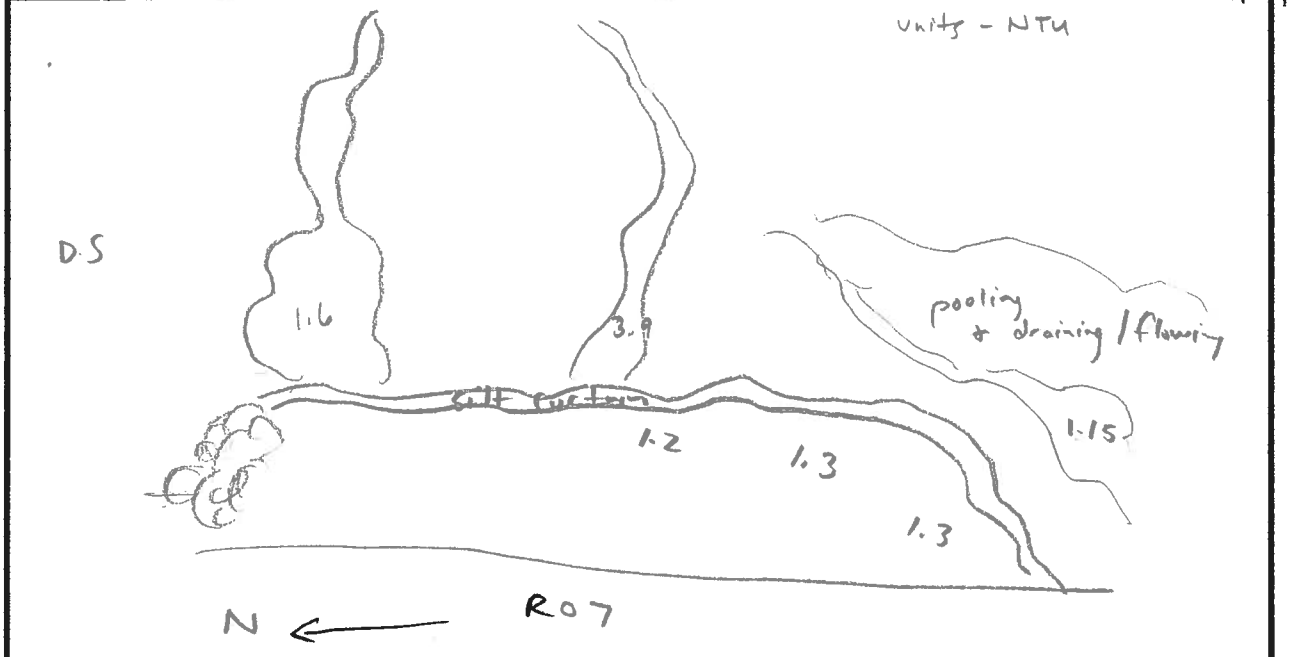
Date: June 23 **Time:**



Field Personnel Signature (dated)

Turbidity Data Collection, Mapping Turbidity: Field Sheet 2

Crossing ID: Km 24 R07	**Personnel:** RV CH TM	**# of Readings:** 6
Date: JUNE 25	**Time:** 15:30	



Crossing ID: km 16.6	**Personnel:** R.V. C.H. T.M.	**# of Readings:** 5
Date: JUNE 25/07	**Time:** 16:35	

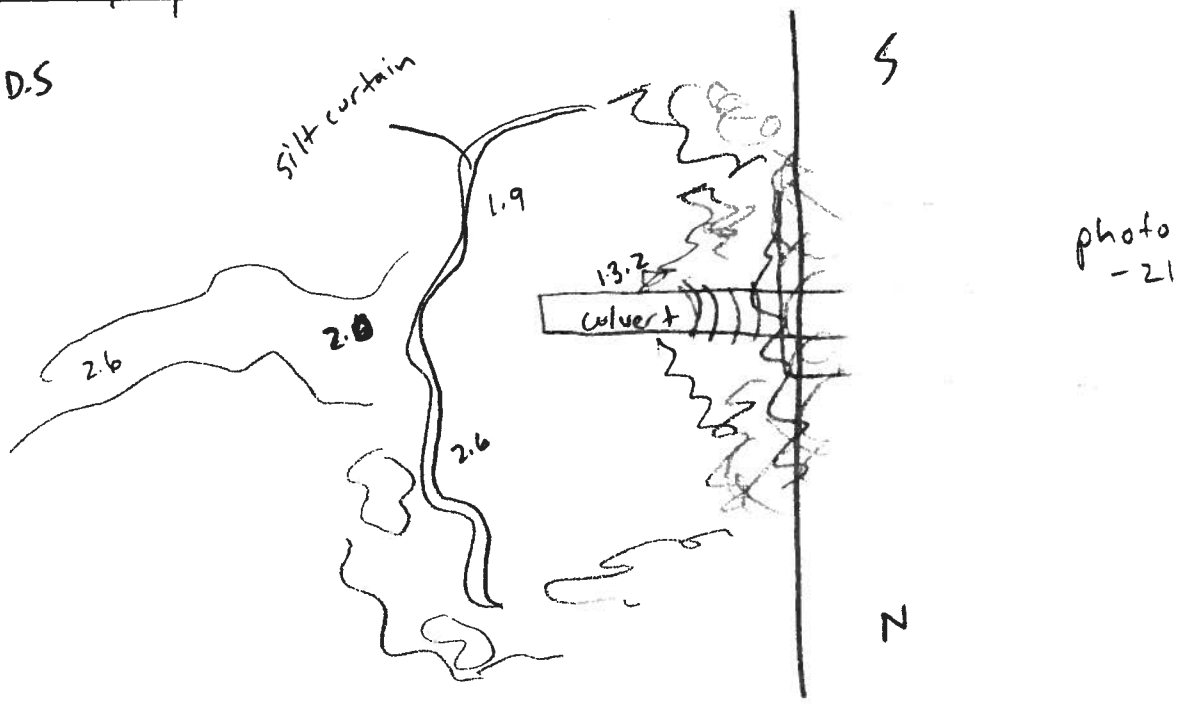
Field Personnel Signature (dated)

Agnico-Eagle Meadowbank Project Azimuth Project # : AE-07-01

Turbidity Data Collection, Mapping Turbidity: Field Sheet 2

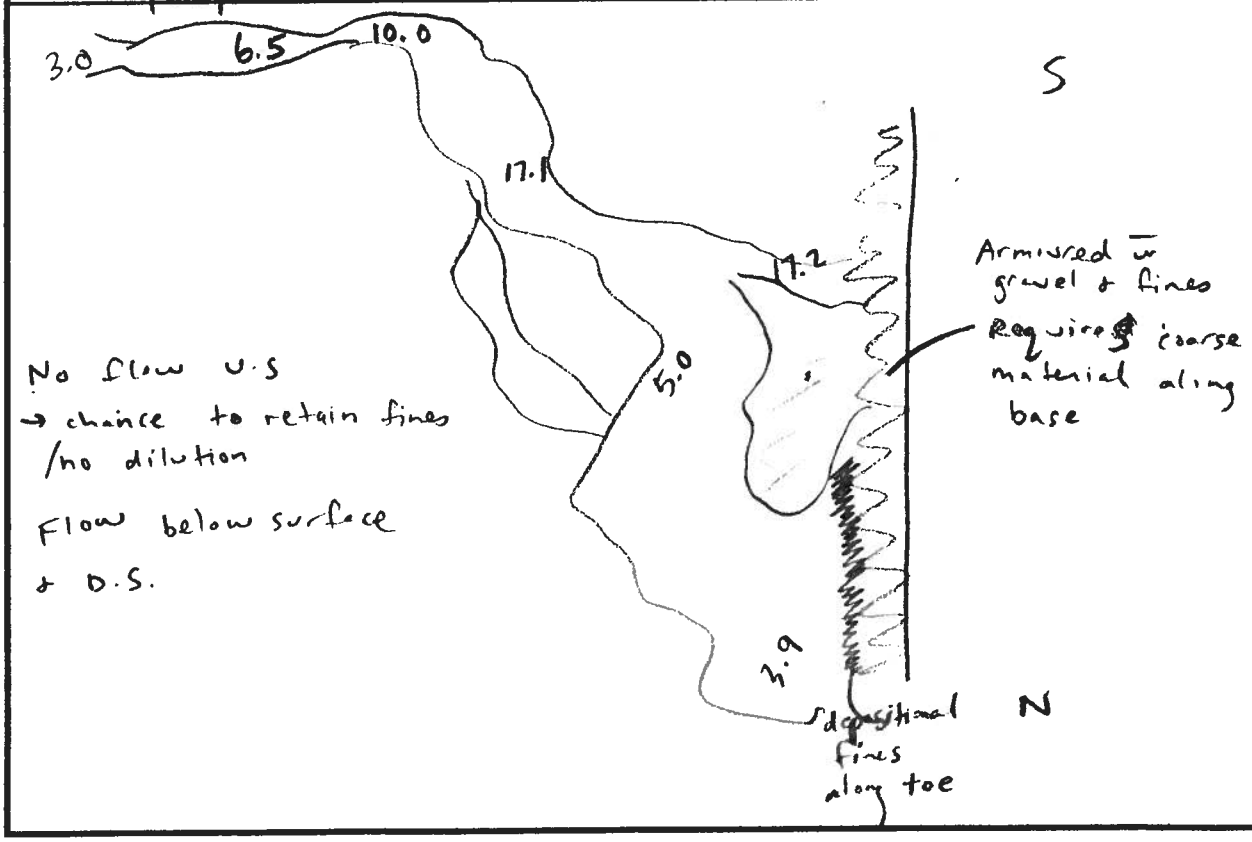
Crossing ID: Km 12 Personnel: RV TM CH # of Readings: 5

Date: 06/26/07 Time: 12:30



Crossing ID: Km 8.3 Personnel: RV TM CH # of Readings: 6

Date: 06/26/07 Time:

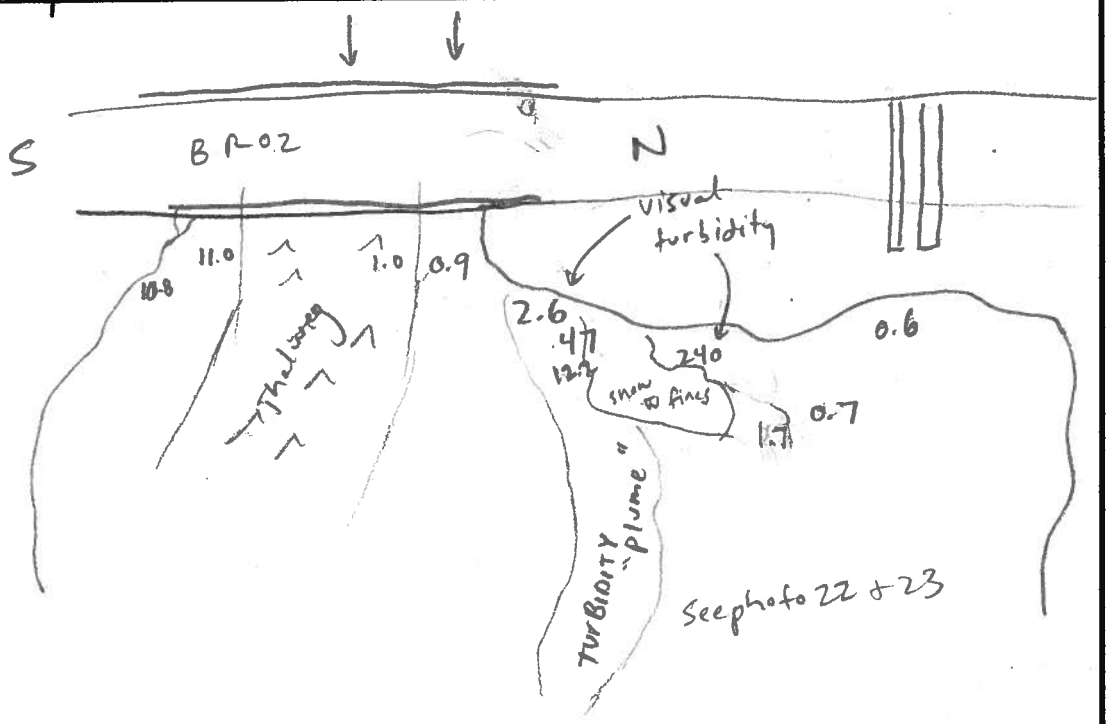


Field Personnel Signature (dated)

Turbidity Data Collection, Mapping Turbidity: Field Sheet 2

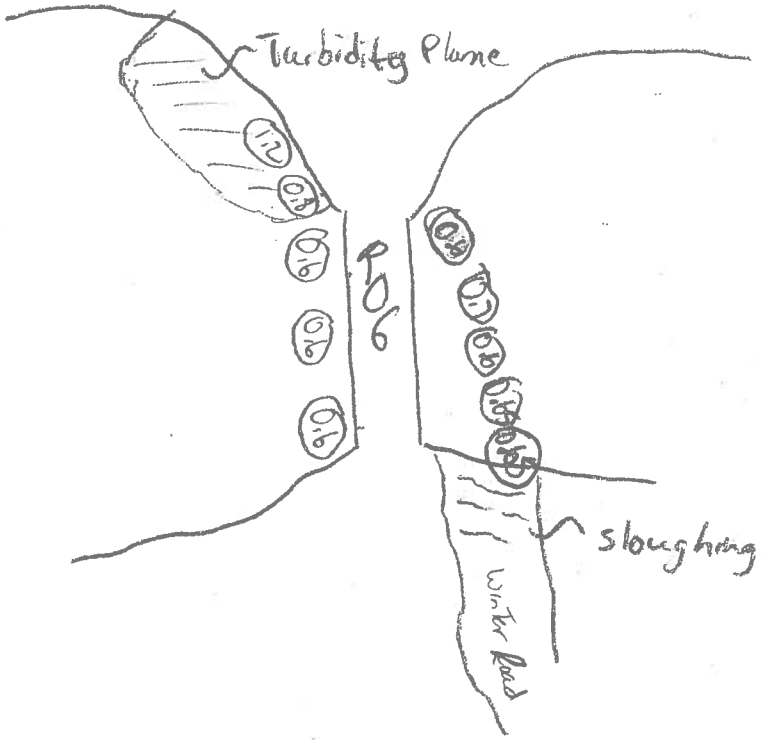
Crossing ID: R02 **Personnel:** RV CH. T. M **# of Readings:**

Date: 06/26/07 **Time:** 14:20



Crossing ID: R06 **Personnel:** CH RV TM **# of Readings:** 10

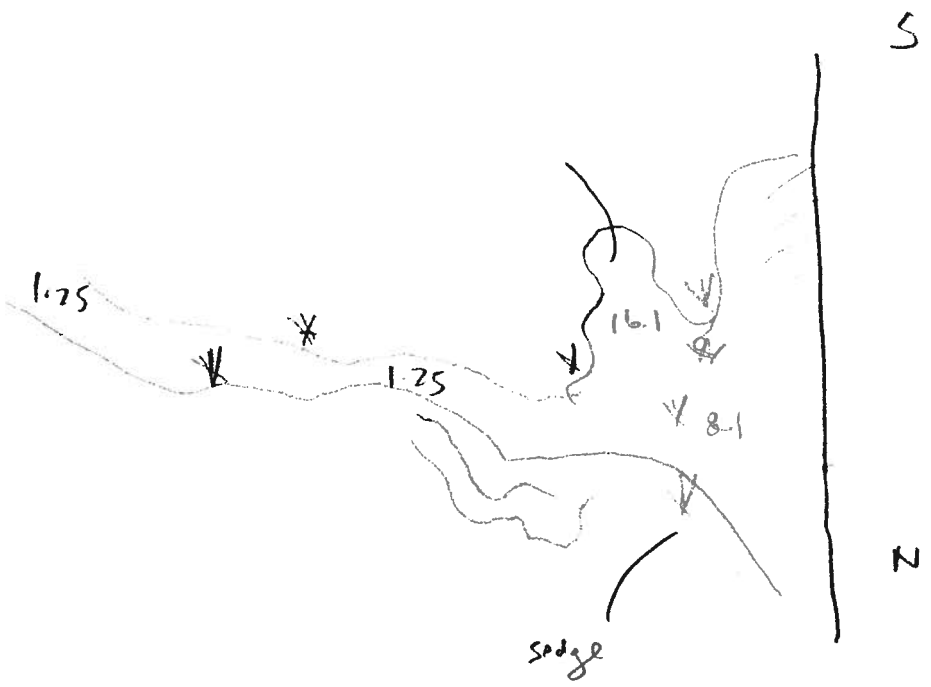
Date: June 28, 07 **Time:** 1230



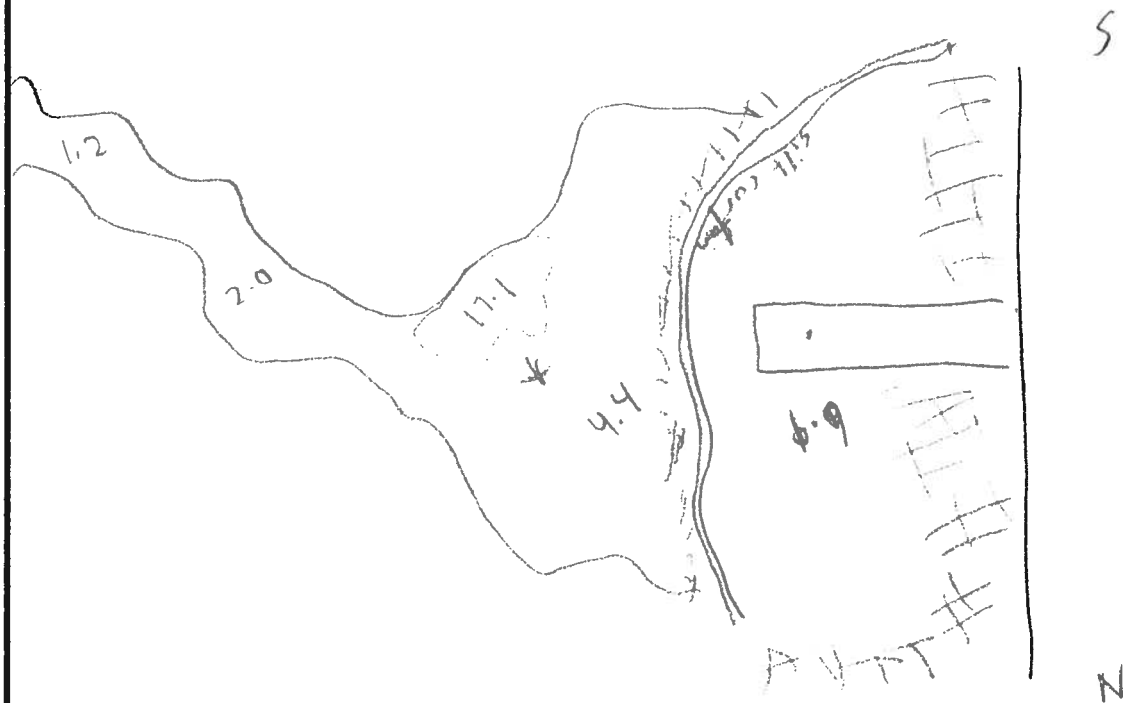
Field Personnel Signature (dated)

Turbidity Data Collection, Mapping Turbidity: Field Sheet 2

Crossing ID: 18.8	**Personnel:** RV TM CH.	**# of Readings:**
Date: 06/28/07	**Time:** 13:50	



Crossing ID: 12.	**Personnel:** RV. CH TM	**# of Readings:** 5
Date: 06/28/07	**Time:** 14:50	

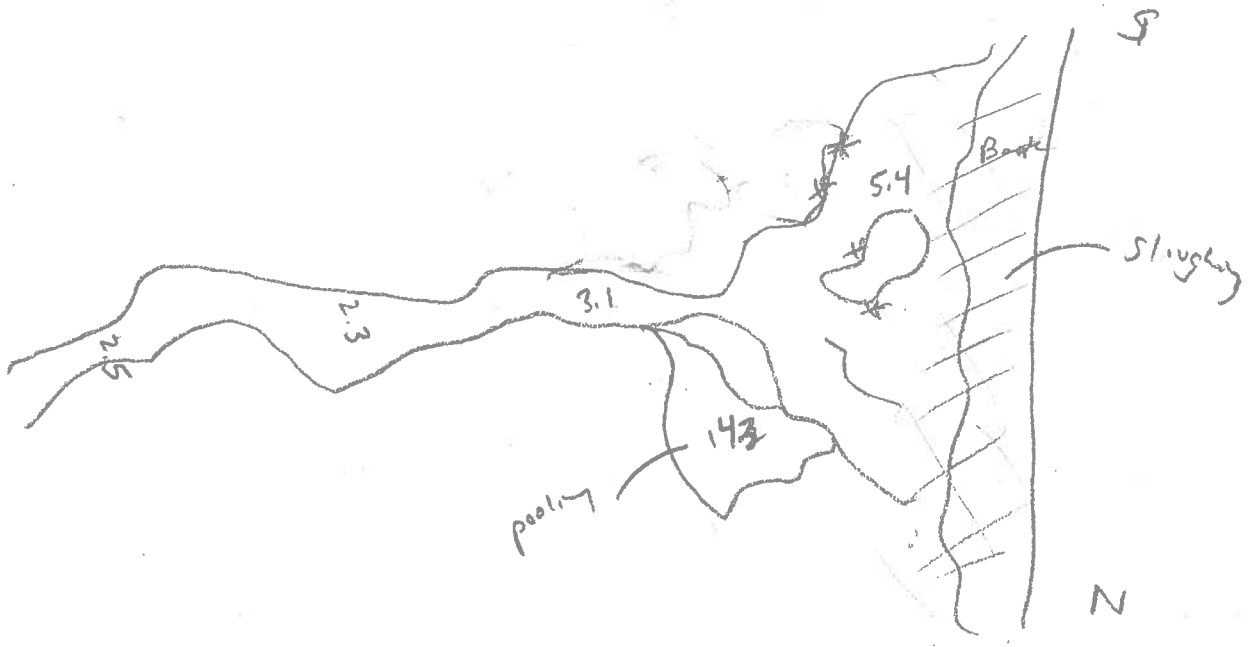


Field Personnel Signature (dated)

Turbidity Data Collection, Mapping Turbidity: Field Sheet 2

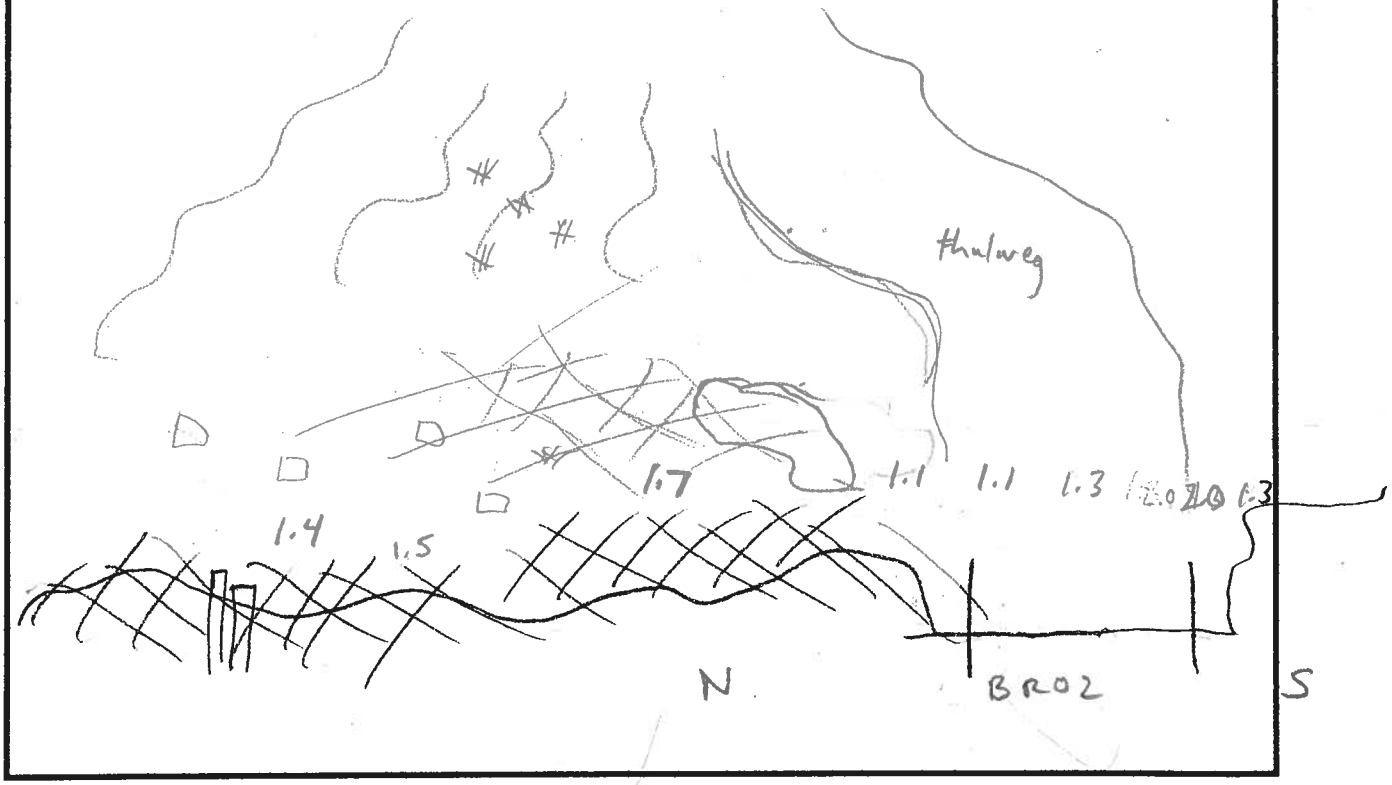
Crossing ID: 8.3 **Personnel:** RV TM CH **# of Readings:** 5

Date: 06/28/2007 **Time:** 15:10



Crossing ID: R02 **Personnel:** RV **# of Readings:**

Date: 06/28/07 **Time:**



Field Personnel Signature (dated)

APPENDIX I

LABORATORY WATER QUALITY REPORTS

Analysis Report

CANTEST LTD.

Professional
Analytical
Services

4606 Canada Way
Burnaby, B.C.
V5G 1K5

FAX: 604 731 2386

TEL: 604 734 7276

1 800 665 8566

REPORT ON: Analysis of Water Sample

REPORTED TO: Azimuth Consulting Group Inc.
218-2902 West Broadway
Vancouver, BC
V6K 2G8

Att'n: Gary Mann/Rachel Gould

CHAIN OF CUSTODY: 2051265, 2051264, 2051266
PROJECT NAME: Meadowbank
PROJECT NUMBER: AE0701

NUMBER OF SAMPLES: 25

REPORT DATE: July 12, 2007

DATE SUBMITTED: July 4, 2007

GROUP NUMBER: 80704069

SAMPLE TYPE: water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Anions in Water by Ion Chromatography - was determined based on Method 4110 in Standard Methods (21st Edition) and EPA Method 300.0 (Revision 2.1).

Conductivity in Water - was performed based on Method 2510 in Standard Methods (21st Edition) and Method X322 in the BC Laboratory Manual (2005 Edition).

Nitrite in Water - was determined based on Method 4500-NO3 B in Standard Methods for the examination of Water and Wastewater (21st Edition) and from the BC Laboratory Methods Manual (2005).

pH in Water - was determined based on Method 4500-H in Standard Methods (21st Edition) and Method X330 in the BC Laboratory Manual (2005).

Total Suspended Solids in Water - was determined based on Method 2540 D in Standard Methods (21st Edition) and Method X332 in the BC Laboratory Manual (2005).

Conventional Parameters - analyses were performed using procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", (2005 edition) Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" (21st Edition), published by the American Public Health Association.

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative

(Continued)

CANTEST LTD.

Anna Becalska, PhD
Coordinator, Trace Metals

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Mercury in Water

digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

TEST RESULTS:

(See following pages)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		Q1	Q2	Q5	Q7	DETECTION LIMIT	UNITS
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040245	707040246	707040247	707040250		
pH, Laboratory		7.17	7.55	5.56	4.59	-	pH units
Conductivity		235	67	248	374	1	µS/cm
Hardness (Total)	CaCO3	66.1	29.4	24.1	63.3	0.2	mg/L
Total Suspended Solids		<	70	1	11	1	mg/L
Dissolved Fluoride	F	<	<	0.06	0.21	0.05	mg/L
Dissolved Chloride	Cl	21.2	0.69	3.40	1.48	0.2	mg/L
Nitrate and Nitrite	N	7.76	1.66	20.4	12.5	0.05	mg/L
Dissolved Nitrate	N	7.47	1.61	20.1	12.4	0.05	mg/L
Nitrite	N	0.285	0.054	0.295	0.131	0.002	mg/L
Dissolved Sulphate	SO4	11.1	0.52	13.1	109	0.5	mg/L
Total Oil and Grease		2	<	2	2	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		Dup1	Km 4.4	Km 5.8	Km 10.1		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040252	707040253	707040254	707040256	DETECTION LIMIT	UNITS
pH, Laboratory		4.55	7.16	7.04	6.96	-	pH units
Conductivity		372	354	74	46	1	µS/cm
Hardness (Total)	CaCO3	63.3	125	27.9	18.0	0.2	mg/L
Total Suspended Solids		8	9	5	1	1	mg/L
Dissolved Fluoride	F	0.20	0.07	<	<	0.05	mg/L
Dissolved Chloride	Cl	1.54	42.2	2.35	2.07	0.2	mg/L
Nitrate and Nitrite	N	12.5	<	<	<	0.05	mg/L
Dissolved Nitrate	N	12.4	<	<	<	0.05	mg/L
Nitrite	N	0.130	<	0.007	<	0.002	mg/L
Dissolved Sulphate	SO4	109	6.11	1.20	1.41	0.5	mg/L
Total Oil and Grease		<	6	7	2	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		Km 11.7	Km 18.1	Km 19.2	Km 22.5	DETECTION LIMIT	UNITS
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040258	707040259	707040263	707040265		
pH, Laboratory		6.70	7.11	7.84	6.98	-	pH units
Conductivity		224	117	269	111	1	µS/cm
Hardness (Total)	CaCO3	56.1	34.5	101	39.3	0.2	mg/L
Total Suspended Solids		<	2	2	4	1	mg/L
Dissolved Fluoride	F	<	<	0.05	<	0.05	mg/L
Dissolved Chloride	Cl	33.4	10.2	14.9	9.34	0.2	mg/L
Nitrate and Nitrite	N	6.42	0.30	<	0.20	0.05	mg/L
Dissolved Nitrate	N	6.36	0.27	<	0.19	0.05	mg/L
Nitrite	N	0.060	0.034	0.006	0.008	0.002	mg/L
Dissolved Sulphate	SO4	7.83	2.51	8.62	2.81	0.5	mg/L
Total Oil and Grease		2	6	7	7	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		Km 33	Km 35	Km 42.4	RO2 U.S	DETECTION LIMIT	UNITS
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040266	707040267	707040268	707040269		
pH, Laboratory		6.44	6.63	6.26	6.80	-	pH units
Conductivity		11	157	72	39	1	µS/cm
Hardness (Total)	CaCO3	4.3	55.1	32.6	12.1	0.2	mg/L
Total Suspended Solids		1	9	95	<	1	mg/L
Dissolved Fluoride	F	<	<	0.07	<	0.05	mg/L
Dissolved Chloride	Cl	0.29	7.78	0.86	3.56	0.2	mg/L
Nitrate and Nitrite	N	0.05	9.06	0.15	<	0.05	mg/L
Dissolved Nitrate	N	0.05	9.00	0.15	<	0.05	mg/L
Nitrite	N	<	0.064	0.003	<	0.002	mg/L
Dissolved Sulphate	SO4	<	3.77	11.6	1.21	0.5	mg/L
Total Oil and Grease		2	7	7	5	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		RO2 D.S	RO5 U.S	RO5 D.S	RO6 U.S	DETECTION LIMIT	UNITS
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040270	707040271	707040272	707040273		
pH, Laboratory		6.88	6.85	6.84	6.79	-	pH units
Conductivity		39	25	25	32	1	µS/cm
Hardness (Total)	CaCO3	11.9	8.3	9.1	9.4	0.2	mg/L
Total Suspended Solids		<	<	<	<	1	mg/L
Dissolved Fluoride	F	<	<	<	<	0.05	mg/L
Dissolved Chloride	Cl	3.51	1.29	1.30	3.10	0.2	mg/L
Nitrate and Nitrite	N	<	<	<	<	0.05	mg/L
Dissolved Nitrate	N	<	<	<	<	0.05	mg/L
Nitrite	N	<	<	<	<	0.002	mg/L
Dissolved Sulphate	SO4	1.16	0.98	1.01	1.38	0.5	mg/L
Total Oil and Grease		<	<	<	<	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		RO6 D.S.	RO7 U.S	RO7 D.S	Km 12.0 U.S		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040275	707040283	707040285	707040287	DETECTION LIMIT	UNITS
pH, Laboratory		6.77	6.92	7.09	7.03	-	pH units
Conductivity		29	82	92	49	1	µS/cm
Hardness (Total)	CaCO3	9.7	22.9	27.0	18.9	0.2	mg/L
Total Suspended Solids		<	<	2	1	1	mg/L
Dissolved Fluoride	F	<	<	<	<	0.05	mg/L
Dissolved Chloride	Cl	2.76	11.0	11.1	2.02	0.2	mg/L
Nitrate and Nitrite	N	<	<	<	<	0.05	mg/L
Dissolved Nitrate	N	<	<	<	<	0.05	mg/L
Nitrite	N	<	<	<	<	0.002	mg/L
Dissolved Sulphate	SO4	1.19	1.21	1.21	0.71	0.5	mg/L
Total Oil and Grease		<	<	<	<	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		Km 12.0 D.S	DETECTION LIMIT	UNITS
DATE SAMPLED:		Jul 2/07		
CANTEST ID:		707040288		
pH, Laboratory		7.05	-	pH units
Conductivity		49	1	µS/cm
Hardness (Total)	CaCO3	21.9	0.2	mg/L
Total Suspended Solids		<	1	mg/L
Dissolved Fluoride	F	<	0.05	mg/L
Dissolved Chloride	Cl	1.92	0.2	mg/L
Nitrate and Nitrite	N	<	0.05	mg/L
Dissolved Nitrate	N	<	0.05	mg/L
Nitrite	N	<	0.002	mg/L
Dissolved Sulphate	SO4	0.70	0.5	mg/L
Total Oil and Grease		<	2	mg/L
Hydrocarbon Oil and Grease		<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Q1	Q2	Q5	Q7	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040245	707040246	707040247	707040250		
Aluminum	Al	0.097	2.95	0.27	2.16	0.001	mg/L
Antimony	Sb	<	<	<	0.0002	0.0002	mg/L
Arsenic	As	<	0.0008	0.0003	0.0086	0.0002	mg/L
Barium	Ba	0.102	0.031	0.165	0.070	0.0002	mg/L
Beryllium	Be	<	<	<	0.0003	0.0002	mg/L
Bismuth	Bi	<	0.0002	<	<	0.0002	mg/L
Boron	B	0.02	<	0.06	0.06	0.01	mg/L
Cadmium	Cd	<	<	0.00008	0.00030	0.00004	mg/L
Calcium	Ca	20.3	8.54	6.40	16.6	0.01	mg/L
Chromium	Cr	0.0003	0.0047	0.0003	0.0013	0.0002	mg/L
Cobalt	Co	0.0009	0.0019	0.035	0.138	0.0002	mg/L
Copper	Cu	0.0014	0.0082	0.024	0.055	0.0002	mg/L
Iron	Fe	0.10	3.90	0.18	8.88	0.01	mg/L
Lead	Pb	<	0.0033	0.0018	0.0018	0.0002	mg/L
Lithium	Li	<	0.004	0.033	0.011	0.001	mg/L
Magnesium	Mg	3.71	1.96	1.97	5.27	0.01	mg/L
Manganese	Mn	0.205	0.105	0.338	0.951	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	0.0002	0.0007	<	<	0.0001	mg/L
Nickel	Ni	0.0006	0.0039	0.018	0.160	0.0002	mg/L
Phosphorus	P	<	0.08	<	<	0.03	mg/L
Potassium	K	2.16	1.26	11.2	4.75	0.02	mg/L
Selenium	Se	<	<	<	0.0010	0.0002	mg/L
Silicon	Si	1.70	4.43	4.26	3.08	0.05	mg/L
Silver	Ag	<	<	<	<	0.00005	mg/L
Sodium	Na	7.83	1.33	4.82	5.06	0.01	mg/L
Strontium	Sr	0.092	0.017	0.069	0.131	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	0.00002	0.00002	0.00021	0.00020	0.00002	mg/L
Thorium	Th	<	0.0011	<	0.0003	0.0001	mg/L
Tin	Sn	<	<	0.0005	<	0.0002	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Q1	Q2	Q5	Q7	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040245	707040246	707040247	707040250		
Titanium	Ti	0.0023	0.112	0.0014	0.0045	0.0002	mg/L
Uranium	U	<	0.0002	0.0003	0.0023	0.0001	mg/L
Vanadium	V	<	0.0047	<	<	0.0002	mg/L
Zinc	Zn	<	0.012	0.014	0.046	0.001	mg/L
Zirconium	Zr	<	<	<	<	0.002	mg/L

mg/L = milligrams per liter
µg/L = micrograms per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Dup1	Km 4.4	Km 5.8	Km 10.1		
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040252	707040253	707040254	707040256	DETECTION LIMIT	UNITS
Aluminum	Al	2.20	0.14	0.18	0.052	0.001	mg/L
Antimony	Sb	0.0002	<	<	<	0.0002	mg/L
Arsenic	As	0.0077	0.0011	0.0004	<	0.0002	mg/L
Barium	Ba	0.069	0.095	0.031	0.016	0.0002	mg/L
Beryllium	Be	0.0003	<	<	<	0.0002	mg/L
Bismuth	Bi	<	<	<	<	0.0002	mg/L
Boron	B	0.06	0.02	<	<	0.01	mg/L
Cadmium	Cd	0.00030	<	<	0.00007	0.00004	mg/L
Calcium	Ca	16.6	36.6	8.78	5.69	0.01	mg/L
Chromium	Cr	0.0013	0.0008	0.0006	0.0003	0.0002	mg/L
Cobalt	Co	0.139	0.0006	0.0007	0.0002	0.0002	mg/L
Copper	Cu	0.055	0.0039	0.0024	0.0010	0.0002	mg/L
Iron	Fe	8.84	0.26	1.14	0.27	0.01	mg/L
Lead	Pb	0.0018	<	0.0003	<	0.0002	mg/L
Lithium	Li	0.011	0.003	<	<	0.001	mg/L
Magnesium	Mg	5.28	8.07	1.45	0.91	0.01	mg/L
Manganese	Mn	0.950	0.325	0.089	0.024	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	0.0003	<	<	0.0001	mg/L
Nickel	Ni	0.162	0.0023	0.0015	0.0007	0.0002	mg/L
Phosphorus	P	<	0.06	<	<	0.03	mg/L
Potassium	K	4.82	7.37	1.41	0.65	0.02	mg/L
Selenium	Se	0.0009	<	<	<	0.0002	mg/L
Silicon	Si	3.10	4.65	1.58	0.28	0.05	mg/L
Silver	Ag	<	<	<	0.00006	0.00005	mg/L
Sodium	Na	4.93	18.6	2.46	1.53	0.01	mg/L
Strontium	Sr	0.130	0.124	0.025	0.017	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	0.00019	<	<	0.00005	0.00002	mg/L
Thorium	Th	0.0002	<	0.0002	<	0.0001	mg/L
Tin	Sn	<	<	0.0003	0.0002	0.0002	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Dup1	Km 4.4	Km 5.8	Km 10.1	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040252	707040253	707040254	707040256		
Titanium	Ti	0.0049	0.0027	0.0039	0.0017	0.0002	mg/L
Uranium	U	0.0022	<	<	<	0.0001	mg/L
Vanadium	V	0.0002	0.0005	0.0003	<	0.0002	mg/L
Zinc	Zn	0.046	0.005	0.003	0.002	0.001	mg/L
Zirconium	Zr	<	<	<	<	0.002	mg/L

mg/L = milligrams per liter

µg/L = micrograms per liter

< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Km 11.7	Km 18.1	Km 19.2	Km 22.5		
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040258	707040259	707040263	707040265	DETECTION LIMIT	UNITS
Aluminum	Al	0.028	0.19	0.074	0.18	0.001	mg/L
Antimony	Sb	<	<	<	<	0.0002	mg/L
Arsenic	As	<	0.0002	0.0005	0.0003	0.0002	mg/L
Barium	Ba	0.047	0.013	0.019	0.012	0.0002	mg/L
Beryllium	Be	<	<	<	<	0.0002	mg/L
Bismuth	Bi	<	<	<	<	0.0002	mg/L
Boron	B	<	<	<	<	0.01	mg/L
Cadmium	Cd	<	<	<	0.00006	0.00004	mg/L
Calcium	Ca	19.4	12.1	38.0	12.5	0.01	mg/L
Chromium	Cr	0.0003	0.0006	0.0004	0.0012	0.0002	mg/L
Cobalt	Co	0.0004	0.0002	0.0002	0.0003	0.0002	mg/L
Copper	Cu	0.0008	0.0032	0.0034	0.0029	0.0002	mg/L
Iron	Fe	0.09	0.20	0.42	0.29	0.01	mg/L
Lead	Pb	<	<	<	<	0.0002	mg/L
Lithium	Li	<	<	<	0.001	0.001	mg/L
Magnesium	Mg	1.86	1.05	1.40	1.94	0.01	mg/L
Manganese	Mn	0.094	0.045	0.061	0.024	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	0.0004	0.0002	0.0001	mg/L
Nickel	Ni	0.0008	0.0010	0.0006	0.0025	0.0002	mg/L
Phosphorus	P	<	<	<	0.06	0.03	mg/L
Potassium	K	1.16	2.00	2.62	1.13	0.02	mg/L
Selenium	Se	<	<	<	<	0.0002	mg/L
Silicon	Si	0.70	1.16	0.93	1.46	0.05	mg/L
Silver	Ag	<	<	<	0.00006	0.00005	mg/L
Sodium	Na	14.9	7.95	12.8	5.44	0.01	mg/L
Strontium	Sr	0.042	0.025	0.109	0.034	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	<	<	<	0.00004	0.00002	mg/L
Thorium	Th	<	0.0001	<	0.0001	0.0001	mg/L
Tin	Sn	<	<	<	<	0.0002	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Km 11.7	Km 18.1	Km 19.2	Km 22.5	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040258	707040259	707040263	707040265		
Titanium	Ti	0.0005	0.0044	0.0020	0.0042	0.0002	mg/L
Uranium	U	<	<	0.0002	<	0.0001	mg/L
Vanadium	V	<	0.0003	0.0003	0.0005	0.0002	mg/L
Zinc	Zn	0.002	0.002	0.001	0.005	0.001	mg/L
Zirconium	Zr	<	<	<	<	0.002	mg/L

mg/L = milligrams per liter
< = Less than detection limit

µg/L = micrograms per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Km 33	Km 35	Km 42.4	RO2 U.S	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040266	707040267	707040268	707040269		
Aluminum	Al	0.079	0.39	1.14	0.008	0.001	mg/L
Antimony	Sb	<	<	<	<	0.0002	mg/L
Arsenic	As	<	0.0006	0.0021	<	0.0002	mg/L
Barium	Ba	0.0029	0.162	0.026	0.011	0.0002	mg/L
Beryllium	Be	<	<	<	<	0.0002	mg/L
Bismuth	Bi	<	<	<	<	0.0002	mg/L
Boron	B	<	<	<	<	0.01	mg/L
Cadmium	Cd	<	0.00004	0.00006	<	0.00004	mg/L
Calcium	Ca	1.30	14.2	8.43	3.62	0.01	mg/L
Chromium	Cr	0.0002	0.0011	0.0040	0.0003	0.0002	mg/L
Cobalt	Co	0.0003	0.0014	0.0076	<	0.0002	mg/L
Copper	Cu	0.0013	0.0065	0.017	0.0005	0.0002	mg/L
Iron	Fe	0.13	0.53	5.32	0.05	0.01	mg/L
Lead	Pb	<	0.0003	0.0009	<	0.0002	mg/L
Lithium	Li	<	0.001	0.002	<	0.001	mg/L
Magnesium	Mg	0.25	4.79	2.80	0.74	0.01	mg/L
Manganese	Mn	0.014	0.132	0.302	0.0025	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	<	<	0.0001	mg/L
Nickel	Ni	0.0007	0.0046	0.020	0.0002	0.0002	mg/L
Phosphorus	P	<	0.07	0.21	<	0.03	mg/L
Potassium	K	0.25	1.41	1.26	0.46	0.02	mg/L
Selenium	Se	<	<	<	<	0.0002	mg/L
Silicon	Si	0.37	1.61	2.93	0.16	0.05	mg/L
Silver	Ag	<	<	<	<	0.00005	mg/L
Sodium	Na	0.24	3.86	0.90	1.73	0.01	mg/L
Strontium	Sr	0.0048	0.081	0.030	0.016	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	<	<	<	<	0.00002	mg/L
Thorium	Th	<	0.0002	0.0007	<	0.0001	mg/L
Tin	Sn	<	<	<	<	0.0002	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Km 33	Km 35	Km 42.4	RO2 U.S	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040266	707040267	707040268	707040269		
Titanium	Ti	0.0043	0.0073	0.023	<	0.0002	mg/L
Uranium	U	<	<	0.0004	<	0.0001	mg/L
Vanadium	V	<	0.0006	0.0022	<	0.0002	mg/L
Zinc	Zn	0.002	0.006	0.011	<	0.001	mg/L
Zirconium	Zr	<	<	0.003	<	0.002	mg/L

mg/L = milligrams per liter
µg/L = micrograms per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		RO2 D.S	RO5 U.S	RO5 D.S	RO6 U.S	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040270	707040271	707040272	707040273		
Aluminum	Al	0.007	0.016	0.017	0.012	0.001	mg/L
Antimony	Sb	<	<	<	<	0.0002	mg/L
Arsenic	As	<	<	<	<	0.0002	mg/L
Barium	Ba	0.011	0.0043	0.0044	0.0026	0.0002	mg/L
Beryllium	Be	<	<	<	<	0.0002	mg/L
Bismuth	Bi	<	<	<	<	0.0002	mg/L
Boron	B	<	<	<	<	0.01	mg/L
Cadmium	Cd	<	<	<	<	0.00004	mg/L
Calcium	Ca	3.57	2.39	2.68	2.53	0.01	mg/L
Chromium	Cr	<	<	<	<	0.0002	mg/L
Cobalt	Co	<	<	<	<	0.0002	mg/L
Copper	Cu	0.0015	0.0006	0.0007	0.0009	0.0002	mg/L
Iron	Fe	0.02	0.04	0.04	0.02	0.01	mg/L
Lead	Pb	<	<	<	<	0.0002	mg/L
Lithium	Li	<	<	<	<	0.001	mg/L
Magnesium	Mg	0.73	0.57	0.57	0.74	0.01	mg/L
Manganese	Mn	0.0029	0.0016	0.0023	0.0019	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	<	<	0.0001	mg/L
Nickel	Ni	<	0.0004	0.0005	0.0004	0.0002	mg/L
Phosphorus	P	<	<	<	<	0.03	mg/L
Potassium	K	0.45	0.38	0.40	0.37	0.02	mg/L
Selenium	Se	<	<	<	<	0.0002	mg/L
Silicon	Si	0.14	0.20	0.20	0.19	0.05	mg/L
Silver	Ag	<	<	<	<	0.00005	mg/L
Sodium	Na	1.70	0.78	0.79	1.43	0.01	mg/L
Strontium	Sr	0.017	0.0085	0.0092	0.010	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	<	<	<	<	0.00002	mg/L
Thorium	Th	<	<	<	<	0.0001	mg/L
Tin	Sn	<	<	<	<	0.0002	mg/L

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REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		RO2 D.S	RO5 U.S	RO5 D.S	RO6 U.S	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040270	707040271	707040272	707040273		
Titanium	Ti	<	0.0003	0.0002	0.0002	0.0002	mg/L
Uranium	U	<	<	<	<	0.0001	mg/L
Vanadium	V	<	<	<	<	0.0002	mg/L
Zinc	Zn	<	<	<	<	0.001	mg/L
Zirconium	Zr	<	<	<	<	0.002	mg/L

mg/L = milligrams per liter
< = Less than detection limit

µg/L = micrograms per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		RO6 D.S.	RO7 U.S	RO7 D.S	Km 12.0 U.S		
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040275	707040283	707040285	707040287	DETECTION LIMIT	UNITS
Aluminum	Al	0.023	0.040	0.048	0.019	0.001	mg/L
Antimony	Sb	<	<	<	<	0.0002	mg/L
Arsenic	As	<	0.0002	0.0003	<	0.0002	mg/L
Barium	Ba	0.0028	0.0060	0.0063	0.013	0.0002	mg/L
Beryllium	Be	<	<	<	<	0.0002	mg/L
Bismuth	Bi	<	<	<	<	0.0002	mg/L
Boron	B	<	<	<	<	0.01	mg/L
Cadmium	Cd	<	<	<	<	0.00004	mg/L
Calcium	Ca	2.78	6.57	8.13	6.57	0.01	mg/L
Chromium	Cr	<	0.0003	0.0003	<	0.0002	mg/L
Cobalt	Co	<	<	<	<	0.0002	mg/L
Copper	Cu	0.0007	0.0016	0.0018	0.0007	0.0002	mg/L
Iron	Fe	0.01	0.21	0.19	0.09	0.01	mg/L
Lead	Pb	<	<	<	<	0.0002	mg/L
Lithium	Li	<	<	<	<	0.001	mg/L
Magnesium	Mg	0.67	1.57	1.63	0.60	0.01	mg/L
Manganese	Mn	0.0033	0.0061	0.016	0.0030	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	<	<	0.0001	mg/L
Nickel	Ni	0.0003	0.0015	0.0010	0.0005	0.0002	mg/L
Phosphorus	P	<	<	<	<	0.03	mg/L
Potassium	K	0.34	0.43	0.45	0.37	0.02	mg/L
Selenium	Se	<	<	<	<	0.0002	mg/L
Silicon	Si	0.17	0.48	0.56	0.43	0.05	mg/L
Silver	Ag	<	<	<	<	0.00005	mg/L
Sodium	Na	1.30	5.03	5.06	1.21	0.01	mg/L
Strontium	Sr	0.0099	0.021	0.025	0.016	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	<	<	<	<	0.00002	mg/L
Thorium	Th	<	<	<	<	0.0001	mg/L
Tin	Sn	<	<	<	<	0.0002	mg/L

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REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		RO6 D.S.	RO7 U.S	RO7 D.S	Km 12.0 U.S	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 2/07	Jul 2/07	Jul 2/07	Jul 2/07		
CANTEST ID:		707040275	707040283	707040285	707040287		
Titanium	Ti	<	0.0008	0.0010	0.0003	0.0002	mg/L
Uranium	U	<	0.0001	0.0001	<	0.0001	mg/L
Vanadium	V	<	<	<	<	0.0002	mg/L
Zinc	Zn	<	0.001	<	<	0.001	mg/L
Zirconium	Zr	<	<	<	<	0.002	mg/L

mg/L = milligrams per liter
< = Less than detection limit

µg/L = micrograms per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Km 12.0 D.S		
SAMPLE PREPARATION:		TOTAL		
DATE SAMPLED:		Jul 2/07	DETECTION LIMIT	UNITS
CANTEST ID:		707040288		
Aluminum	Al	0.034	0.001	mg/L
Antimony	Sb	<	0.0002	mg/L
Arsenic	As	<	0.0002	mg/L
Barium	Ba	0.015	0.0002	mg/L
Beryllium	Be	<	0.0002	mg/L
Bismuth	Bi	<	0.0002	mg/L
Boron	B	<	0.01	mg/L
Cadmium	Cd	<	0.00004	mg/L
Calcium	Ca	7.69	0.01	mg/L
Chromium	Cr	<	0.0002	mg/L
Cobalt	Co	<	0.0002	mg/L
Copper	Cu	0.0010	0.0002	mg/L
Iron	Fe	0.09	0.01	mg/L
Lead	Pb	<	0.0002	mg/L
Lithium	Li	<	0.001	mg/L
Magnesium	Mg	0.65	0.01	mg/L
Manganese	Mn	0.0081	0.0002	mg/L
Mercury	Hg	<	0.02	µg/L
Molybdenum	Mo	<	0.0001	mg/L
Nickel	Ni	0.0006	0.0002	mg/L
Phosphorus	P	<	0.03	mg/L
Potassium	K	0.43	0.02	mg/L
Selenium	Se	<	0.0002	mg/L
Silicon	Si	0.56	0.05	mg/L
Silver	Ag	<	0.00005	mg/L
Sodium	Na	1.20	0.01	mg/L
Strontium	Sr	0.018	0.0002	mg/L
Tellurium	Te	<	0.0002	mg/L
Thallium	Tl	<	0.00002	mg/L
Thorium	Th	<	0.0001	mg/L
Tin	Sn	<	0.0002	mg/L

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REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Km 12.0 D.S		
SAMPLE PREPARATION:		TOTAL		
DATE SAMPLED:		Jul 2/07	DETECTION LIMIT	UNITS
CANTEST ID:		707040288		
Titanium	Ti	0.0006	0.0002	mg/L
Uranium	U	<	0.0001	mg/L
Vanadium	V	<	0.0002	mg/L
Zinc	Zn	0.003	0.001	mg/L
Zirconium	Zr	<	0.002	mg/L

mg/L = milligrams per liter
< = Less than detection limit

µg/L = micrograms per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Batch Quality Control for Conventional Parameters in Water

Parameter		QC Type	QC Result	Units	Lower Limit	Upper Limit
pH, Laboratory		pH Calibration Verification	99.9	% Recovery	98	102
		Duplicate	0.1	R.P.D.	0	3
		Duplicate	0.6	R.P.D.	0	3
		Duplicate	0.6	R.P.D.	0	3
Conductivity		Blank	1	uS/cm	0	1
		Conductivity Calibration Ver	102.7	% Recovery	96	104
		Duplicate	0.0	R.P.D.	0	5
		Duplicate	0.0	R.P.D.	0	5
		Duplicate	1.4	R.P.D.	0	5
Total Suspended Solids		Blank	< 1	mg/L	0	3
		TSS Control Standard (CalVer)	98.0	% Recovery	91	105
		Duplicate	0.0	R.P.D.	0	18
		Duplicate	0.0	R.P.D.	0	18
		Duplicate	0.0	R.P.D.	0	18
		Duplicate	2.4	R.P.D.	0	18
		Duplicate	4.1	R.P.D.	0	18
Dissolved Fluoride	F	Dionex Certified Standard	107.5	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	1.5	R.P.D.	0	10
Dissolved Chloride	Cl	Dionex Certified Standard	95.0	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	12
		Duplicate	0.2	R.P.D.	0	12
		Duplicate	0.3	R.P.D.	0	12
		Duplicate	0.5	R.P.D.	0	12
		Duplicate	0.6	R.P.D.	0	12
		Duplicate	1.0	R.P.D.	0	12
Dissolved Nitrate	N	Dionex Certified Standard	97.8	% Recovery	90	110

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Batch Quality Control for Conventional Parameters in Water

Parameter		QC Type	QC Result	Units	Lower Limit	Upper Limit
Dissolved Nitrate	N	Duplicate	PASS	R.P.D.	0	10
Nitrite	N	Spike	98.0	% Recovery	86	112
		Calibration Verification	104.0	% Recovery	93	107
		Duplicate	0.0	R.P.D.	0	12
		Blank	NC	mg/L	0	0.002
Dissolved Sulphate	SO4	Dionex Certified Standard	93.4	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	0.7	R.P.D.	0	10
		Duplicate	0.8	R.P.D.	0	10
		Duplicate	1.8	R.P.D.	0	10
		Duplicate	2.1	R.P.D.	0	10
		Duplicate	3.0	R.P.D.	0	10
Total Oil and Grease		Blank	< 2	mg/L	0	2
		Blank	< 2	mg/L	0	2
		Blank	< 2	mg/L	0	2
		Spike	96.5	% Recovery	82	118
		Spike	100.2	% Recovery	82	118
		Spike	105.6	% Recovery	82	118
Hydrocarbon Oil and Grease		Spike	87.4	% Recovery	77	110
		Spike	91.1	% Recovery	77	110

uS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Batch Quality Control for Total Metals Analysis in Water (QC# 95935)

Parameter		Duplicate (R.P.D.) 707040258	Duplicate Limits	ICPMS Spike (% Recovery) 707040227	ICPMS Spike Limits	ICPMS Lab Fortified Blank (% Recovery)	ICPMS Lab Fortified Blank Limits
Aluminum	Al	7.1	20	-	-	100	78 - 122
Antimony	Sb	NC	20	92	78 - 118	80	75 - 117
Arsenic	As	NC	20	95	80 - 118	75	72 - 114
Barium	Ba	-	-	-	-	95	81 - 119
Beryllium	Be	-	-	92	79 - 123	80	73 - 115
Boron	B	-	-	-	-	100	92 - 110
Cadmium	Cd	NC	20	98	74 - 124	83	78 - 116
Calcium	Ca	1.6	20	-	-	-	-
Chromium	Cr	NC	20	95	70 - 130	85	83 - 119
Cobalt	Co	PASS	20	96	76 - 126	85	85 - 119
Copper	Cu	0	20	100	77 - 125	90	85 - 120
Lead	Pb	NC	20	97	77 - 124	95	80 - 116
Magnesium	Mg	1.1	20	-	-	-	-
Manganese	Mn	-	-	97	69 - 131	85	82 - 120
Molybdenum	Mo	NC	20	93	68 - 118	85	82 - 114
Nickel	Ni	0	20	100	77 - 123	90	78 - 118
Potassium	K	0.9	20	-	-	-	-
Selenium	Se	-	-	-	-	65	58 - 120
Silver	Ag	NC	20	-	-	88	85 - 117
Sodium	Na	3.3	20	-	-	-	-
Strontium	Sr	-	-	-	-	90	83 - 115
Thallium	Tl	NC	20	97	73 - 123	94	86 - 118
Thorium	Th	NC	20	-	-	-	-
Tin	Sn	NC	20	-	-	-	-
Titanium	Ti	-	-	100	70 - 130	95	79 - 119
Uranium	U	NC	20	94	65 - 133	95	75 - 121
Vanadium	V	-	-	91	75 - 123	85	76 - 118
Zinc	Zn	PASS	20	-	-	75	64 - 126

mg/L = milligrams per liter
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Batch Quality Control for Total Metals Analysis in Water (QC# 95935)

Parameter		Total Blank (mg/L)	Total Blank Limits
Aluminum	Al	< 0.001	0.015
Antimony	Sb	< 0.0002	0.001
Arsenic	As	< 0.0002	0.001
Barium	Ba	< 0.0002	0.001
Beryllium	Be	< 0.0002	0.001
Cadmium	Cd	< 0.00004	0.001
Chromium	Cr	< 0.0002	0.001
Cobalt	Co	< 0.0002	0.001
Copper	Cu	< 0.0002	0.001
Lead	Pb	< 0.0002	0.001
Manganese	Mn	< 0.0002	0.001
Molybdenum	Mo	< 0.0001	0.001
Nickel	Ni	< 0.0002	0.001
Potassium	K	< 0.02	0.05
Silver	Ag	< 0.00005	0.001
Strontium	Sr	< 0.0002	0.001
Thallium	Tl	< 0.00002	0.001
Thorium	Th	< 0.0001	0.0005
Tin	Sn	< 0.0002	0.005
Titanium	Ti	< 0.0002	0.001
Uranium	U	< 0.0001	0.0005
Vanadium	V	< 0.0002	0.001
Zinc	Zn	< 0.001	0.01
Zirconium	Zr	< 0.002	0.01

mg/L = milligrams per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Batch Quality Control for Total Metals Analysis in Water (QC# 96028)

Parameter	Spike (% Recovery) 707040253	Spike Limits	Spike (% Recovery) 707040270	Spike Limits
Mercury Hg	100	70 - 128	100	70 - 128

ug/L = micrograms per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Batch Quality Control Frequency Summary

Total Metals Preparation (Batch# 95935)

QC Type	No. Samples
ICPMS Spike	1
ICP Spike Vista ICAP	1
Potassium/Silicon Spike Vista	1
ICPMS Lab Fortified Blank	1
Duplicate	2
Total Blank	2

Water Lab Ion Chromatography (Batch# 95958)

QC Type	No. Samples
Blank	2
Duplicate	6

Auto-Titrator Analysis (Batch# 95986)

QC Type	No. Samples
Blank	1
Duplicate	2

Auto-Titrator Analysis (Batch# 96007)

QC Type	No. Samples
Blank	1
Duplicate	1

Mercury Water Bromination Prep (Batch# 96028)

QC Type	No. Samples
Duplicate	4
Spike	4

(Continued on next page)

Batch Quality Control Frequency Summary

Oil and Grease in Water (Batch# 96038)

QC Type	No. Samples
Blank	1
Spike	1

Suspended Solids Analysis (Batch# 96066)

QC Type	No. Samples
Blank	1
Duplicate	1
TSS Control Standard (CalVer)	1

Suspended Solids Analysis (Batch# 96078)

QC Type	No. Samples
Blank	1
TSS Control Standard (CalVer)	1
Duplicate	4

Oil and Grease in Water (Batch# 96086)

QC Type	No. Samples
Blank	1
Spike	1

Oil and Grease in Water (Batch# 96134)

QC Type	No. Samples
Blank	1
Spike	1

(Continued on next page)

CANTEST

Batch Quality Control Frequency Summary

Total Metals Preparation (Batch# 95935)

QC Type	No. Samples
Batch Size	97

Water Lab Ion Chromatography (Batch# 95958)

QC Type	No. Samples
Batch Size	61

Auto-Titrator Analysis (Batch# 95986)

QC Type	No. Samples
Batch Size	31

Auto-Titrator Analysis (Batch# 96007)

QC Type	No. Samples
Batch Size	3

Mercury Water Bromination Prep (Batch# 96028)

QC Type	No. Samples
Batch Size	42

Oil and Grease in Water (Batch# 96038)

QC Type	No. Samples
Batch Size	18

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 12, 2007

GROUP NUMBER: 80704069

Batch Quality Control Frequency Summary

Suspended Solids Analysis (Batch# 96066)

QC Type	No. Samples
Batch Size	10

Suspended Solids Analysis (Batch# 96078)

QC Type	No. Samples
Batch Size	64

Oil and Grease in Water (Batch# 96086)

QC Type	No. Samples
Batch Size	18

Oil and Grease in Water (Batch# 96134)

QC Type	No. Samples
Batch Size	18

Analysis Report

CANTEST LTD.

Professional
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4606 Canada Way
Burnaby, B.C.
V5G 1K5

FAX: 604 731 2386

TEL: 604 734 7276

1 800 665 8566

REPORT ON: Analysis of Water Samples

REPORTED TO: Azimuth Consulting Group Inc.
218-2902 West Broadway
Vancouver, BC
V6K 2G8

Att'n: Gary Mann / Rachel Gould

CHAIN OF CUSTODY: 2051272, 2051274
PROJECT NAME: Meadowbank
PROJECT NUMBER: AE 0701

NUMBER OF SAMPLES: 20

REPORT DATE: July 17, 2007

DATE SUBMITTED: July 9, 2007

GROUP NUMBER: 80709029

SAMPLE TYPE: Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Total Suspended Solids in Water - was determined based on Method 2540 D in Standard Methods (21st Edition) and Method X332 in the BC Laboratory Manual (2005).

Turbidity in Water - was performed based on Method 2130 in Standard Methods (21st Edition) and Method X164 in the BC Laboratory Manual (2005 Edition).

COMMENTS:

Testing for Turbidity was performed on samples submitted past the recommended holding time. Due to an error in the la boratory, the detection limit for total suspended solids on sample 707090075 has been raised.

TEST RESULTS:

(See following pages)

CANTEST LTD.

Tim Matsushita
Coordinator, Water Laboratory

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 17, 2007

GROUP NUMBER: 80709029

CANTEST

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Turbidity	Total Suspended Solids
R06 A	Jul 4/07	707090073	0.27	1
R06 B	Jul 4/07	707090074	0.53	3
R06 C	Jul 4/07	707090075	0.37	< 2
R06 D	Jul 4/07	707090076	0.46	10
KM 33.7A	Jul 4/07	707090077	2.3	3
KM 33.7B	Jul 4/07	707090078	2.2	3
R02 A	Jul 4/07	707090079	0.29	<
R02 B	Jul 4/07	707090080	0.32	1
R02 C	Jul 4/07	707090081	0.39	<
R02 D	Jul 4/07	707090082	0.33	<
R02 E	Jul 4/07	707090083	0.30	<
R02 F	Jul 4/07	707090085	0.33	<
R02 G	Jul 4/07	707090087	0.32	<
R02 H	Jul 4/07	707090088	5.0	6
N Air 1	Jun 22/07	707090089	250	87
N Air 2	Jun 22/07	707090090	220	105
N Air 3	Jun 22/07	707090091	178	24
N Air 4	Jun 22/07	707090092	150	43
R09	Jul 5/07	707090093	0.32	<
N Air 5	Jun 22/07	707090094	280	95
DETECTION LIMIT			0.1	1
UNITS			NTU	mg/L

NTU = nephelometric turbidity units
mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 17, 2007

GROUP NUMBER: 80709029

Batch Quality Control for Conventional Parameters in Water

Parameter	QC Type	QC Result	Units	Lower Limit	Upper Limit
Turbidity	Blank	< 0.1	NTU	0	0.1
	Duplicate	0.0	R.P.D.	0	15
	Duplicate	1.9	R.P.D.	0	15
	Duplicate	5.1	R.P.D.	0	15
	Duplicate	8.0	R.P.D.	0	15
Total Suspended Solids	Blank	< 1	mg/L	0	3
	Duplicate	2.5	R.P.D.	0	18
	Duplicate	2.7	R.P.D.	0	18
	Duplicate	2.7	R.P.D.	0	18
	Duplicate	3.5	R.P.D.	0	18
	Duplicate	4.1	R.P.D.	0	18
	Duplicate	6.6	R.P.D.	0	18
	Duplicate	9.2	R.P.D.	0	18
	TSS Control Standard (Cal Ver)		% Recovery	91	105

NTU = nephelometric turbidity units mg/L = milligrams per liter
< = Less than detection limit
R.P.D. = Relative Percent Difference
(*) = Quality Control results exceeded internally set limits; after review by Quality Assurance Unit, non-conformance overridden and batch sample analysis results released for reporting

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: July 17, 2007

GROUP NUMBER: 80709029

Batch Quality Control Frequency Summary

Suspended Solids Analysis (Batch# 96247)

QC Type	No. Samples
Blank	1
TSS Control Standard (CalVer)	1
Duplicate	7

Turbidity Analysis (Batch# 96249)

QC Type	No. Samples
Blank	1
Duplicate	4

Suspended Solids Analysis (Batch# 96247)

QC Type	No. Samples
Batch Size	70

Turbidity Analysis (Batch# 96249)

QC Type	No. Samples
Batch Size	43

Analysis Report

CANTEST LTD.

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1 800 665 8566

REPORT ON: Analysis of Water Samples

REPORTED TO: Azimuth Consulting Group Inc.
218-2902 West Broadway
Vancouver, BC
V6K 2G8

Att'n: Gary Mann/Rachel Gould

CHAIN OF CUSTODY: 189118, 2051275
PROJECT NAME: Meadowbank
PROJECT NUMBER: AE 0701

NUMBER OF SAMPLES: 16

REPORT DATE: August 10, 2007

DATE SUBMITTED: July 30, 2007

GROUP NUMBER: 80730051

SAMPLE TYPE: Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Anions in Water by Ion Chromatography - was determined based on Method 4110 in Standard Methods (21st Edition) and EPA Method 300.0 (Revision 2.1).

Conductivity in Water - was performed based on Method 2510 in Standard Methods (21st Edition) and Method X322 in the BC Laboratory Manual (2005 Edition).

Nitrite in Water - was determined based on Method 4500-NO3 B in Standard Methods for the examination of Water and Wastewater (21st Edition) and from the BC Laboratory Methods Manual (2005).

pH in Water - was determined based on Method 4500-H in Standard Methods (21st Edition) and Method X330 in the BC Laboratory Manual (2005).

Total Suspended Solids in Water - was determined based on Method 2540 D in Standard Methods (21st Edition) and Method X332 in the BC Laboratory Manual (2005).

Conventional Parameters - analyses were performed using procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", (2005 edition) Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" (21st Edition), published by the American Public Health Association.

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative

(Continued)

CANTEST LTD.

Anna Becalska, PhD
Coordinator, Trace Metals

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Mercury in Water

digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

COMMENTS:

Testing for Nitrite was performed on samples submitted past the recommended holding time.

TEST RESULTS:

(See following pages)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		Q 2	Q 7	Km 6.4	Km 11.7	DETECTION LIMIT	UNITS
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300189	707300191	707300192	707300193		
pH, Laboratory		7.72	4.31	7.10	7.09	-	pH units
Conductivity		879	291	265	215	1	µS/cm
Hardness (Total)	CaCO3	158	60.1	110	56.8	0.2	mg/L
Total Suspended Solids		2	6	8	3	1	mg/L
Dissolved Fluoride	F	0.06	0.20	0.11	<	0.05	mg/L
Dissolved Chloride	Cl	77.6	0.87	20.4	35.9	0.2	mg/L
Nitrate and Nitrite	N	35.5	4.31	<	<	0.05	mg/L
Dissolved Nitrate	N	33.8	4.29	<	<	0.05	mg/L
Nitrite	N	1.70	0.017	0.008	<	0.002	mg/L
Dissolved Sulphate	SO4	42.1	115	2.11	4.37	0.5	mg/L
Total Oil and Grease		<	<	8	3	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		Km 17.9	Km 19.2	Km 34.5	R03	DETECTION LIMIT	UNITS
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300194	707300195	707300196	707300197		
pH, Laboratory		7.69	8.00	7.07	7.41	-	pH units
Conductivity		225	299	121	275	1	µS/cm
Hardness (Total)	CaCO3	88.6	113	49.4	94.1	0.2	mg/L
Total Suspended Solids		2	2	2	3	1	mg/L
Dissolved Fluoride	F	<	0.06	<	0.08	0.05	mg/L
Dissolved Chloride	Cl	9.69	18.0	6.80	11.0	0.2	mg/L
Nitrate and Nitrite	N	0.16	<	1.22	4.04	0.05	mg/L
Dissolved Nitrate	N	0.14	<	1.21	3.38	0.05	mg/L
Nitrite	N	0.020	<	0.014	0.655	0.002	mg/L
Dissolved Sulphate	SO4	2.71	3.60	1.73	3.31	0.5	mg/L
Total Oil and Grease		8	8	9	8	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		R02 V.S.	R02 D.S.	R05 V.S.	R05 D.S.	DETECTION LIMIT	UNITS
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300198	707300199	707300202	707300204		
pH, Laboratory		6.90	6.95	7.02	7.01	-	pH units
Conductivity		39	39	34	35	1	µS/cm
Hardness (Total)	CaCO3	12.4	13.0	11.8	12.7	0.2	mg/L
Total Suspended Solids		1	<	1	1	1	mg/L
Dissolved Fluoride	F	<	<	<	<	0.05	mg/L
Dissolved Chloride	Cl	3.30	3.31	2.01	1.96	0.2	mg/L
Nitrate and Nitrite	N	<	<	<	<	0.05	mg/L
Dissolved Nitrate	N	<	<	<	<	0.05	mg/L
Nitrite	N	<	<	<	<	0.002	mg/L
Dissolved Sulphate	SO4	1.10	1.10	1.25	1.22	0.5	mg/L
Total Oil and Grease		<	3	<	2	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		R06 V.S.	R06 D.S.	R09 V.S.	R09 D.S.	DETECTION LIMIT	UNITS
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300205	707300206	707300207	707300208		
pH, Laboratory		6.93	6.89	7.06	7.11	-	pH units
Conductivity		39	35	49	50	1	µS/cm
Hardness (Total)	CaCO3	12.3	12.4	18.1	18.8	0.2	mg/L
Total Suspended Solids		1	<	1	1	1	mg/L
Dissolved Fluoride	F	<	<	<	<	0.05	mg/L
Dissolved Chloride	Cl	3.36	3.30	1.84	1.87	0.2	mg/L
Nitrate and Nitrite	N	<	<	<	<	0.05	mg/L
Dissolved Nitrate	N	<	<	<	<	0.05	mg/L
Nitrite	N	<	<	<	<	0.002	mg/L
Dissolved Sulphate	SO4	1.44	1.34	2.35	2.38	0.5	mg/L
Total Oil and Grease		<	<	3	3	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L

µS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Q 2	Q 7	Km 6.4	Km 11.7	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300189	707300191	707300192	707300193		
Aluminum	Al	0.091	3.88	0.17	0.018	0.001	mg/L
Antimony	Sb	<	<	<	<	0.0002	mg/L
Arsenic	As	0.0004	0.0029	0.0021	0.0003	0.0002	mg/L
Barium	Ba	0.048	0.063	0.142	0.052	0.0002	mg/L
Beryllium	Be	<	0.0005	<	<	0.0002	mg/L
Bismuth	Bi	<	<	<	<	0.0002	mg/L
Boron	B	0.06	0.04	<	<	0.01	mg/L
Cadmium	Cd	<	0.00037	<	<	0.00004	mg/L
Calcium	Ca	56.3	16.0	31.3	19.7	0.01	mg/L
Chromium	Cr	0.0003	0.0010	0.0005	<	0.0002	mg/L
Cobalt	Co	0.0004	0.161	0.0021	0.0016	0.0002	mg/L
Copper	Cu	0.0058	0.106	0.0032	0.0009	0.0002	mg/L
Iron	Fe	0.10	0.92	1.72	0.66	0.01	mg/L
Lead	Pb	<	0.0016	0.0002	<	0.0002	mg/L
Lithium	Li	<	0.010	0.002	<	0.001	mg/L
Magnesium	Mg	4.11	4.88	7.72	1.87	0.01	mg/L
Manganese	Mn	0.135	1.00	0.277	0.657	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	0.0029	<	0.0006	<	0.0001	mg/L
Nickel	Ni	0.0004	0.208	0.0060	0.0018	0.0002	mg/L
Phosphorus	P	<	<	0.08	<	0.03	mg/L
Potassium	K	7.47	3.62	5.40	0.69	0.02	mg/L
Selenium	Se	0.0006	0.0006	0.0004	<	0.0002	mg/L
Silicon	Si	1.91	3.46	6.14	0.21	0.05	mg/L
Silver	Ag	<	0.00014	<	<	0.00005	mg/L
Sodium	Na	87.7	3.82	10.3	17.0	0.01	mg/L
Strontium	Sr	0.119	0.116	0.128	0.044	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	0.00003	0.00023	<	<	0.00002	mg/L
Thorium	Th	<	<	0.0001	<	0.0001	mg/L
Tin	Sn	<	<	<	<	0.0002	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Q 2	Q 7	Km 6.4	Km 11.7	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300189	707300191	707300192	707300193		
Titanium	Ti	0.0022	0.0010	0.0035	0.0004	0.0002	mg/L
Uranium	U	0.0008	0.0045	0.0001	<	0.0001	mg/L
Vanadium	V	0.0003	<	0.0006	<	0.0002	mg/L
Zinc	Zn	<	0.044	0.003	0.003	0.001	mg/L
Zirconium	Zr	<	<	<	<	0.002	mg/L

mg/L = milligrams per liter

µg/L = micrograms per liter

< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Km 17.9	Km 19.2	Km 34.5	R03		
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300194	707300195	707300196	707300197	DETECTION LIMIT	UNITS
Aluminum	Al	0.069	0.033	0.19	0.062	0.001	mg/L
Antimony	Sb	<	<	<	<	0.0002	mg/L
Arsenic	As	0.0006	0.0007	0.0012	0.0006	0.0002	mg/L
Barium	Ba	0.024	0.020	0.082	0.057	0.0002	mg/L
Beryllium	Be	<	<	<	<	0.0002	mg/L
Bismuth	Bi	<	<	<	<	0.0002	mg/L
Boron	B	<	<	<	<	0.01	mg/L
Cadmium	Cd	<	<	<	<	0.00004	mg/L
Calcium	Ca	32.2	42.2	13.2	30.9	0.01	mg/L
Chromium	Cr	0.0002	0.0002	0.0005	0.0002	0.0002	mg/L
Cobalt	Co	0.0008	<	0.0008	0.0009	0.0002	mg/L
Copper	Cu	0.0022	0.0029	0.0046	0.0038	0.0002	mg/L
Iron	Fe	0.56	0.77	0.65	0.84	0.01	mg/L
Lead	Pb	0.0002	<	0.0003	0.0003	0.0002	mg/L
Lithium	Li	0.001	0.001	0.001	0.001	0.001	mg/L
Magnesium	Mg	1.94	1.74	4.01	4.12	0.01	mg/L
Manganese	Mn	0.427	0.033	0.056	0.343	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	0.0006	0.0004	0.0003	0.0006	0.0001	mg/L
Nickel	Ni	0.0019	0.0006	0.0031	0.0014	0.0002	mg/L
Phosphorus	P	<	<	<	<	0.03	mg/L
Potassium	K	2.37	3.19	1.18	2.93	0.02	mg/L
Selenium	Se	<	<	<	<	0.0002	mg/L
Silicon	Si	0.99	0.46	1.30	3.57	0.05	mg/L
Silver	Ag	<	<	<	<	0.00005	mg/L
Sodium	Na	8.13	14.5	2.62	7.48	0.01	mg/L
Strontium	Sr	0.082	0.142	0.065	0.107	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	<	<	<	<	0.00002	mg/L
Thorium	Th	<	<	0.0001	<	0.0001	mg/L
Tin	Sn	<	<	<	<	0.0002	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		Km 17.9	Km 19.2	Km 34.5	R03	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300194	707300195	707300196	707300197		
Titanium	Ti	0.0020	0.0009	0.0041	0.0016	0.0002	mg/L
Uranium	U	0.0002	0.0002	<	0.0002	0.0001	mg/L
Vanadium	V	0.0003	0.0003	0.0004	0.0003	0.0002	mg/L
Zinc	Zn	0.002	<	0.002	0.002	0.001	mg/L
Zirconium	Zr	<	<	<	<	0.002	mg/L

mg/L = milligrams per liter

µg/L = micrograms per liter

< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R02 V.S.	R02 D.S.	R05 V.S.	R05 D.S.		
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300198	707300199	707300202	707300204	DETECTION LIMIT	UNITS
Aluminum	Al	0.010	0.011	0.018	0.015	0.001	mg/L
Antimony	Sb	<	<	<	<	0.0002	mg/L
Arsenic	As	<	<	<	<	0.0002	mg/L
Barium	Ba	0.010	0.0097	0.0051	0.0052	0.0002	mg/L
Beryllium	Be	<	<	<	<	0.0002	mg/L
Bismuth	Bi	<	<	<	<	0.0002	mg/L
Boron	B	<	<	<	<	0.01	mg/L
Cadmium	Cd	<	<	<	<	0.00004	mg/L
Calcium	Ca	3.78	4.02	3.43	3.77	0.01	mg/L
Chromium	Cr	<	<	<	<	0.0002	mg/L
Cobalt	Co	<	<	<	<	0.0002	mg/L
Copper	Cu	0.0006	0.0005	0.0011	0.0009	0.0002	mg/L
Iron	Fe	0.04	0.03	0.08	0.08	0.01	mg/L
Lead	Pb	<	<	<	<	0.0002	mg/L
Lithium	Li	<	<	<	<	0.001	mg/L
Magnesium	Mg	0.73	0.71	0.79	0.80	0.01	mg/L
Manganese	Mn	0.0040	0.0035	0.0050	0.0032	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	<	<	0.0001	mg/L
Nickel	Ni	0.0002	<	0.0005	0.0005	0.0002	mg/L
Phosphorus	P	<	<	<	<	0.03	mg/L
Potassium	K	0.46	0.46	0.41	0.43	0.02	mg/L
Selenium	Se	<	<	<	<	0.0002	mg/L
Silicon	Si	0.18	0.14	0.19	0.19	0.05	mg/L
Silver	Ag	<	<	<	<	0.00005	mg/L
Sodium	Na	1.77	1.77	1.20	1.24	0.01	mg/L
Strontium	Sr	0.017	0.017	0.012	0.013	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	<	<	<	<	0.00002	mg/L
Thorium	Th	<	<	<	<	0.0001	mg/L
Tin	Sn	<	<	<	<	0.0002	mg/L

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REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R02 V.S.	R02 D.S.	R05 V.S.	R05 D.S.	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300198	707300199	707300202	707300204		
Titanium	Ti	0.0005	0.0002	0.0006	0.0004	0.0002	mg/L
Uranium	U	<	<	<	<	0.0001	mg/L
Vanadium	V	<	<	<	<	0.0002	mg/L
Zinc	Zn	<	<	<	<	0.001	mg/L
Zirconium	Zr	<	<	<	<	0.002	mg/L

mg/L = milligrams per liter
µg/L = micrograms per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R06 V.S.	R06 D.S.	R09 V.S.	R09 D.S.	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300205	707300206	707300207	707300208		
Aluminum	Al	0.011	0.019	0.007	0.011	0.001	mg/L
Antimony	Sb	<	<	<	<	0.0002	mg/L
Arsenic	As	<	<	<	<	0.0002	mg/L
Barium	Ba	0.0028	0.0028	0.0028	0.0031	0.0002	mg/L
Beryllium	Be	<	<	<	<	0.0002	mg/L
Bismuth	Bi	<	<	<	<	0.0002	mg/L
Boron	B	<	<	<	<	0.01	mg/L
Cadmium	Cd	<	<	<	<	0.00004	mg/L
Calcium	Ca	3.49	3.55	4.92	5.25	0.01	mg/L
Chromium	Cr	<	<	<	<	0.0002	mg/L
Cobalt	Co	<	<	<	<	0.0002	mg/L
Copper	Cu	0.0010	0.0009	0.0011	0.0011	0.0002	mg/L
Iron	Fe	0.02	0.02	0.06	0.06	0.01	mg/L
Lead	Pb	<	<	<	<	0.0002	mg/L
Lithium	Li	<	<	<	<	0.001	mg/L
Magnesium	Mg	0.87	0.84	1.42	1.39	0.01	mg/L
Manganese	Mn	0.0012	0.0021	0.0044	0.0037	0.0002	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	<	<	0.0001	mg/L
Nickel	Ni	0.0003	0.0003	0.0006	0.0006	0.0002	mg/L
Phosphorus	P	<	<	<	<	0.03	mg/L
Potassium	K	0.38	0.40	0.32	0.31	0.02	mg/L
Selenium	Se	<	<	<	<	0.0002	mg/L
Silicon	Si	0.19	0.16	0.27	0.28	0.05	mg/L
Silver	Ag	<	<	<	<	0.00005	mg/L
Sodium	Na	1.63	1.76	1.26	1.30	0.01	mg/L
Strontium	Sr	0.013	0.012	0.024	0.025	0.0002	mg/L
Tellurium	Te	<	<	<	<	0.0002	mg/L
Thallium	Tl	<	<	<	<	0.00002	mg/L
Thorium	Th	<	<	<	<	0.0001	mg/L
Tin	Sn	<	<	<	<	0.0002	mg/L

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REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R06 V.S.	R06 D.S.	R09 V.S.	R09 D.S.	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Jul 26/07	Jul 26/07	Jul 26/07	Jul 26/07		
CANTEST ID:		707300205	707300206	707300207	707300208		
Titanium	Ti	0.0003	<	0.0002	0.0003	0.0002	mg/L
Uranium	U	<	<	<	<	0.0001	mg/L
Vanadium	V	<	<	<	<	0.0002	mg/L
Zinc	Zn	<	0.001	<	<	0.001	mg/L
Zirconium	Zr	<	<	<	<	0.002	mg/L

mg/L = milligrams per liter
µg/L = micrograms per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Batch Quality Control for Conventional Parameters in Water

Parameter		QC Type	QC Result	Units	Lower Limit	Upper Limit
pH, Laboratory		pH Calibration Verification	100.4	% Recovery	98	102
		Duplicate	0.0	R.P.D.	0	3
		Duplicate	0.3	R.P.D.	0	3
		Duplicate	0.3	R.P.D.	0	3
Conductivity		Blank	1	uS/cm	0	1
		Conductivity Calibration Ver	99.3	% Recovery	96	104
		Duplicate	0.0	R.P.D.	0	5
		Duplicate	0.0	R.P.D.	0	5
		Duplicate	1.5	R.P.D.	0	5
Total Suspended Solids		Blank	< 1	mg/L	0	3
		TSS Control Standard (CalVer	98.8	% Recovery	91	105
		Duplicate	0.0	R.P.D.	0	18
		Duplicate	0.8	R.P.D.	0	18
		Duplicate	1.0	R.P.D.	0	18
Dissolved Fluoride	F	Dionex Certified Standard	100.5	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	4.9	R.P.D.	0	10
Dissolved Chloride	Cl	Dionex Certified Standard	90.0	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	12
		Duplicate	0.0	R.P.D.	0	12
		Duplicate	0.1	R.P.D.	0	12
Dissolved Nitrate	N	Dionex Certified Standard	97.3	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	0.5	R.P.D.	0	10
Nitrite	N	Spike	90.0	% Recovery	86	112
		Calibration Verification	100.0	% Recovery	93	107

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REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Batch Quality Control for Conventional Parameters in Water

Parameter		QC Type	QC Result	Units	Lower Limit	Upper Limit
Nitrite	N	Blank	NC	mg/L	0	0.002
		Duplicate	PASS	R.P.D.	0	12
Dissolved Sulphate	SO4	Dionex Certified Standard	95.4	% Recovery	90	110
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	0.0	R.P.D.	0	10
		Duplicate	2.6	R.P.D.	0	10
Total Oil and Grease		Blank	< 2	mg/L	0	2
		Blank	< 2	mg/L	0	2
		Spike	114.8	% Recovery	82	118
		Spike	116.6	% Recovery	82	118
Hydrocarbon Oil and Grease		Spike	83.8	% Recovery	77	110
		Spike	89.3	% Recovery	77	110

uS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculatio is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Batch Quality Control for Total Metals Analysis in Water (QC# 97011)

Parameter		Duplicate (R.P.D.) 707300205	Duplicate Limits	ICPMS Spike (% Recovery) 707300191	ICPMS Spike Limits	ICPMS Lab Fortified Blank (% Recovery)	ICPMS Lab Fortified Blank Limits
Aluminum	Al	9.5	20	-	-	105	78 - 122
Antimony	Sb	NC	20	87	78 - 118	90	75 - 117
Arsenic	As	NC	20	81	80 - 118	80	72 - 114
Barium	Ba	-	-	-	-	105	81 - 119
Beryllium	Be	-	-	82	79 - 123	90	73 - 115
Boron	B	-	-	-	-	100	92 - 110
Cadmium	Cd	NC	20	87	74 - 124	88	78 - 116
Calcium	Ca	0.9	20	-	-	-	-
Chromium	Cr	NC	20	97	70 - 130	100	83 - 119
Cobalt	Co	NC	20	94	76 - 126	95	85 - 119
Copper	Cu	PASS	20	105	77 - 125	95	85 - 120
Lead	Pb	NC	20	98	77 - 124	95	80 - 116
Magnesium	Mg	1.1	20	-	-	-	-
Manganese	Mn	-	-	83	69 - 131	100	82 - 120
Molybdenum	Mo	NC	20	96	68 - 118	95	82 - 114
Nickel	Ni	PASS	20	100	77 - 123	95	78 - 118
Potassium	K	0	20	-	-	-	-
Selenium	Se	-	-	-	-	65	58 - 120
Silver	Ag	NC	20	-	-	98	85 - 117
Sodium	Na	0	20	-	-	-	-
Strontium	Sr	-	-	-	-	95	83 - 115
Thallium	Tl	NC	20	101	73 - 123	99	86 - 118
Thorium	Th	NC	20	-	-	-	-
Tin	Sn	NC	20	-	-	-	-
Titanium	Ti	-	-	99	70 - 130	105	79 - 119
Uranium	U	NC	20	102	65 - 133	95	75 - 121
Vanadium	V	-	-	98	75 - 123	95	76 - 118
Zinc	Zn	NC	20	-	-	75	64 - 126

mg/L = milligrams per liter
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Batch Quality Control for Total Metals Analysis in Water (QC# 97011)

Parameter		Total Blank (mg/L)	Total Blank Limits
Aluminum	Al	0.001	0.015
Antimony	Sb	< 0.0002	0.001
Arsenic	As	< 0.0002	0.001
Barium	Ba	< 0.0002	0.001
Beryllium	Be	< 0.0002	0.001
Cadmium	Cd	0.00034	0.001
Chromium	Cr	< 0.0002	0.001
Cobalt	Co	< 0.0002	0.001
Copper	Cu	< 0.0002	0.001
Lead	Pb	< 0.0002	0.001
Manganese	Mn	< 0.0002	0.001
Molybdenum	Mo	< 0.0001	0.001
Nickel	Ni	< 0.0002	0.001
Potassium	K	< 0.02	0.05
Silver	Ag	< 0.00005	0.001
Strontium	Sr	< 0.0002	0.001
Thallium	Tl	< 0.00002	0.001
Thorium	Th	< 0.0001	0.0005
Tin	Sn	< 0.0002	0.005
Titanium	Ti	< 0.0002	0.001
Uranium	U	< 0.0001	0.0005
Vanadium	V	< 0.0002	0.001
Zinc	Zn	< 0.001	0.01
Zirconium	Zr	< 0.002	0.01

mg/L = milligrams per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Batch Quality Control for Total Metals Analysis in Water (QC# 97055)

Parameter		Duplicate (R.P.D.) 707300194	Duplicate Limits	Duplicate (R.P.D.) 707300208	Duplicate Limits	Duplicate (R.P.D.) 707310425	Duplicate Limits
Mercury	Hg	NC	20	NC	20	NC	20

ug/L = micrograms per liter
R.P.D. = Relative Percent Difference
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculatio
is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Batch Quality Control for Total Metals Analysis in Water (QC# 97055)

Parameter		Spike (% Recovery) 707300194	Spike Limits	Spike (% Recovery) 707300208	Spike Limits	Spike (% Recovery) 707310425	Spike Limits
Mercury	Hg	95	70 - 128	95	70 - 128	98	70 - 128

ug/L = micrograms per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Instrument Quality Control for the PSA Mercury Analyzer-AF (QC# 189676)

QC Type: Calibration Verification

Parameter		% Recovery	Limits
Mercury	Hg	98	90 - 110

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Instrument Quality Control for the HP 7500 ICPMS (QC# 190070)

QC Type: NIST 1640 Metals in Water

Parameter		% Recovery	Limits
Aluminum	Al	92	87 - 131
Antimony	Sb	93	86 - 110
Arsenic	As	96	88 - 108
Barium	Ba	97	88 - 114
Beryllium	Be	97	91 - 127
Boron	B	100	87 - 129
Cadmium	Cd	98	87 - 111
Calcium	Ca	98	91 - 121
Chromium	Cr	90	86 - 124
Cobalt	Co	90	88 - 118
Copper	Cu	96	90 - 112
Iron	Fe	88	85 - 182
Lead	Pb	93	88 - 114
Lithium	Li	101	85 - 115
Magnesium	Mg	101	91 - 121
Manganese	Mn	99	88 - 130
Molybdenum	Mo	96	85 - 105
Nickel	Ni	99	86 - 112
Potassium	K	92	84 - 118
Rubidium	Rb	95	50 - 200
Selenium	Se	105	95 - 115
Silicon	Si	106	87 - 115
Silver	Ag	95	72 - 118
Sodium	Na	101	92 - 122
Strontium	Sr	100	90 - 110
Vanadium	V	92	90 - 130
Zinc	Zn	102	92 - 112

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Batch Quality Control Frequency Summary

Total Metals Preparation (Batch# 97011)

QC Type	No. Samples
Duplicate	1
ICPMS Spike	1
ICP Spike Vista ICAP	1
ICPMS Lab Fortified Blank	1
Total Blank	2

Auto-Titrator Analysis (Batch# 97018)

QC Type	No. Samples
Blank	1
Duplicate	3

Oil and Grease in Water (Batch# 97027)

QC Type	No. Samples
Blank	1
Spike	1

Suspended Solids Analysis (Batch# 97047)

QC Type	No. Samples
Blank	1
TSS Control Standard (CalVer)	1
Duplicate	3

Mercury Water Bromination Prep (Batch# 97055)

QC Type	No. Samples
Duplicate	3
Spike	3

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 10, 2007

GROUP NUMBER: 80730051

Batch Quality Control Frequency Summary

Oil and Grease in Water (Batch# 97073)

QC Type	No. Samples
Blank	1
Spike	1

Water Lab Ion Chromatography (Batch# 97101)

QC Type	No. Samples
Blank	2
Duplicate	2

Total Metals Preparation (Batch# 97011)

QC Type	No. Samples
Batch Size	65

Auto-Titrator Analysis (Batch# 97018)

QC Type	No. Samples
Batch Size	33

Oil and Grease in Water (Batch# 97027)

QC Type	No. Samples
Batch Size	20

(Continued on next page)

CANTEST

Batch Quality Control Frequency Summary

Suspended Solids Analysis (Batch# 97047)

QC Type	No. Samples
Batch Size	34

Mercury Water Bromination Prep (Batch# 97055)

QC Type	No. Samples
Batch Size	29

Oil and Grease in Water (Batch# 97073)

QC Type	No. Samples
Batch Size	18

Water Lab Ion Chromatography (Batch# 97101)

QC Type	No. Samples
Batch Size	21

Analysis Report

CANTEST®

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REPORT ON: Analysis of Water Samples

REPORTED TO: Azimuth Consulting Group Inc.
218-2902 West Broadway
Vancouver, BC
V6K 2G8

Att'n: Mr. Gary Mann

CHAIN OF CUSTODY: 188941, 188942
PROJECT NAME: AWPAR Monitoring

NUMBER OF SAMPLES: 20

REPORT DATE: August 28, 2007

DATE SUBMITTED: August 17, 2007

GROUP NUMBER: 80817075

SAMPLE TYPE: Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Anions in Water by Ion Chromatography - was determined based on Method 4110 in Standard Methods (21st Edition) and EPA Method 300.0 (Revision 2.1).

Conventional Parameters - analyses were performed using procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", (2005 edition) Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" (21st Edition), published by the American Public Health Association.

Conventional Parameters - Winnipeg Laboratory (Unit D-675 Berry Street, Winnipeg, Manitoba R3H 1A7): - Analyses performed at Cantest's Winnipeg facilities follow procedures based on those described in the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials" (2005 Edition) and "Standard Methods for the Examination of Water and Wastewater" (21st Edition).

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

TEST RESULTS:

(See following pages)

CANTEST LTD.

Tim Matsushita
Coordinator, Water Laboratory

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		R13-US	R13-DS	R09-US	R09-DS	
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07	DETECTION LIMIT
CANTEST ID:		708170237	708170244	708170245	708170247	
Dissolved Fluoride	F	0.55	<	<	<	0.05
Dissolved Nitrate	N	<	0.38	<	<	0.05
Dissolved Sulphate	SO4	1.88	1.89	3.75	3.69	0.5

Results expressed as milligrams per liter (mg/L)
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		DUP1	Q7	KM34.4	Q4	
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07	DETECTION LIMIT
CANTEST ID:		708170248	708170250	708170251	708170252	
Dissolved Fluoride	F	<	0.40	<	0.16	0.05
Dissolved Nitrate	N	<	4.28	0.36	27.1	0.05
Dissolved Sulphate	SO4	3.72	167	1.31	7.23	0.5

Results expressed as milligrams per liter (mg/L)
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		R07-	KM19.6	R06-US	R06-DS	
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07	DETECTION LIMIT
CANTEST ID:		708170253	708170254	708170256	708170257	
Dissolved Fluoride	F	<	0.06	<	<	0.05
Dissolved Nitrate	N	<	<	<	<	0.05
Dissolved Sulphate	SO4	2.79	3.95	1.50	1.59	0.5

Results expressed as milligrams per liter (mg/L)
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		KM17.9	R05A-US	R05A-DS	KM12-PC3	
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07	DETECTION LIMIT
CANTEST ID:		708170258	708170264	708170268	708170269	
Hardness (Total)	CaCO3	-	46	52	35	1
Dissolved Fluoride	F	<	<	<	<	0.05
Dissolved Nitrate	N	0.06	<	<	<	0.05
Dissolved Sulphate	SO4	2.53	3.62	4.28	1.31	0.5

Results expressed as milligrams per liter (mg/L)
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		R04	R02-US	R02-DS	DUP2	
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07	DETECTION LIMIT
CANTEST ID:		708170270	708170271	708170272	708170273	
Hardness (Total)	CaCO3	33	12	12	31	1
Dissolved Fluoride	F	0.05	<	<	0.06	0.05
Dissolved Nitrate	N	<	<	<	<	0.05
Dissolved Sulphate	SO4	1.91	1.24	1.23	1.87	0.5

Results expressed as milligrams per liter (mg/L)
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R05A-US	R05A-DS	KM12-PC3	R04	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708170264	708170268	708170269	708170270		
Aluminum	Al	0.012	0.013	0.021	0.031	0.005	mg/L
Antimony	Sb	<	<	<	<	0.001	mg/L
Arsenic	As	<	<	<	<	0.001	mg/L
Barium	Ba	0.017	0.016	0.017	0.021	0.001	mg/L
Beryllium	Be	<	<	<	<	0.001	mg/L
Bismuth	Bi	<	<	<	<	0.001	mg/L
Boron	B	<	<	<	<	0.05	mg/L
Cadmium	Cd	<	<	<	<	0.0002	mg/L
Calcium	Ca	15.7	17.8	12.5	10.8	0.05	mg/L
Chromium	Cr	<	<	<	<	0.001	mg/L
Cobalt	Co	<	<	<	<	0.001	mg/L
Copper	Cu	<	<	0.001	0.001	0.001	mg/L
Iron	Fe	0.65	0.33	0.07	0.11	0.05	mg/L
Lead	Pb	<	<	<	<	0.001	mg/L
Lithium	Li	<	<	<	<	0.005	mg/L
Magnesium	Mg	1.62	1.94	1.01	1.37	0.05	mg/L
Manganese	Mn	0.033	0.017	0.007	0.028	0.001	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	<	<	0.0005	mg/L
Nickel	Ni	<	<	<	<	0.001	mg/L
Phosphorus	P	<	<	<	<	0.15	mg/L
Potassium	K	0.4	0.6	0.4	0.7	0.1	mg/L
Selenium	Se	<	<	<	<	0.001	mg/L
Silicon	Si	0.7	0.7	0.9	0.5	0.25	mg/L
Silver	Ag	<	<	<	<	0.00025	mg/L
Sodium	Na	4.75	4.71	2.00	2.62	0.05	mg/L
Strontium	Sr	0.049	0.051	0.027	0.030	0.001	mg/L
Tellurium	Te	<	<	<	<	0.001	mg/L
Thallium	Tl	<	<	<	<	0.0001	mg/L
Thorium	Th	<	<	<	<	0.0005	mg/L
Tin	Sn	<	<	<	<	0.001	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R05A-US	R05A-DS	KM12-PC3	R04	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708170264	708170268	708170269	708170270		
Titanium	Ti	<	<	<	<	0.001	mg/L
Uranium	U	<	<	<	<	0.0005	mg/L
Vanadium	V	<	<	<	<	0.001	mg/L
Zinc	Zn	<	<	0.006	0.010	0.005	mg/L
Zirconium	Zr	<	<	<	<	0.01	mg/L

mg/L = milligrams per liter
µg/L = micrograms per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R02-US	R02-DS	DUP2	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708170271	708170272	708170273		
Aluminum	Al	0.009	0.010	0.017	0.005	mg/L
Antimony	Sb	<	<	<	0.001	mg/L
Arsenic	As	<	<	<	0.001	mg/L
Barium	Ba	0.010	0.010	0.022	0.001	mg/L
Beryllium	Be	<	<	<	0.001	mg/L
Bismuth	Bi	<	<	<	0.001	mg/L
Boron	B	<	<	<	0.05	mg/L
Cadmium	Cd	<	<	<	0.0002	mg/L
Calcium	Ca	3.80	3.88	10.2	0.05	mg/L
Chromium	Cr	<	<	<	0.001	mg/L
Cobalt	Co	<	<	<	0.001	mg/L
Copper	Cu	<	0.001	<	0.001	mg/L
Iron	Fe	<	<	0.11	0.05	mg/L
Lead	Pb	<	<	<	0.001	mg/L
Lithium	Li	<	<	<	0.005	mg/L
Magnesium	Mg	0.66	0.67	1.32	0.05	mg/L
Manganese	Mn	0.003	0.004	0.027	0.001	mg/L
Mercury	Hg	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	<	0.0005	mg/L
Nickel	Ni	<	<	<	0.001	mg/L
Phosphorus	P	<	<	<	0.15	mg/L
Potassium	K	0.5	0.5	0.7	0.1	mg/L
Selenium	Se	<	<	<	0.001	mg/L
Silicon	Si	<	<	0.4	0.25	mg/L
Silver	Ag	<	<	<	0.00025	mg/L
Sodium	Na	1.96	1.96	2.57	0.05	mg/L
Strontium	Sr	0.017	0.017	0.029	0.001	mg/L
Tellurium	Te	<	<	<	0.001	mg/L
Thallium	Tl	<	<	<	0.0001	mg/L
Thorium	Th	<	<	<	0.0005	mg/L
Tin	Sn	<	<	<	0.001	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R02-US	R02-DS	DUP2	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708170271	708170272	708170273		
Titanium	Ti	<	<	<	0.001	mg/L
Uranium	U	<	<	<	0.0005	mg/L
Vanadium	V	<	<	<	0.001	mg/L
Zinc	Zn	<	0.013	0.010	0.005	mg/L
Zirconium	Zr	<	<	<	0.01	mg/L

mg/L = milligrams per liter
µg/L = micrograms per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Conventional Parameters-Winnipeg Laboratory- in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	pH, Laboratory	Conductivity	Nitrite N
R13-US	Aug 16/07	708170237	6.55	75	<
R13-DS	Aug 16/07	708170244	6.36	79	0.003
R09-US	Aug 16/07	708170245	6.28	66	<
R09-DS	Aug 16/07	708170247	6.40	66	<
DUP1	Aug 16/07	708170248	6.40	66	<
Q7	Aug 16/07	708170250	3.54	360	0.018
KM34.4	Aug 16/07	708170251	5.44	73	0.011
Q4	Aug 16/07	708170252	7.05	543	0.155
R07-	Aug 16/07	708170253	6.68	110	0.003
KM19.6	Aug 16/07	708170254	7.66	256	<
R06-US	Aug 16/07	708170256	6.58	36	<
R06-DS	Aug 16/07	708170257	6.25	39	<
KM17.9	Aug 16/07	708170258	6.96	152	0.010
R05A-US	Aug 16/07	708170264	6.63	120	<
R05A-DS	Aug 16/07	708170268	6.63	124	<
KM12-PC3	Aug 16/07	708170269	6.58	78	<
R04	Aug 16/07	708170270	6.51	78	<
R02-US	Aug 16/07	708170271	6.71	40	<
R02-DS	Aug 16/07	708170272	6.81	40	<
DUP2	Aug 16/07	708170273	6.73	77	<
DETECTION LIMIT			-	1	0.002
UNITS			pH units	µS/cm	mg/L

µS/cm = microsiemens per centimeter
mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Batch Quality Control for Conventional Parameters in Water

Parameter		QC Type	QC Result	Units	Lower Limit	Upper Limit
Dissolved Fluoride	F	Dionex Certified Standard	105.0	% Recovery	90	110
		Duplicate	5.3	R.P.D.	0	10
Dissolved Nitrate	N	Dionex Certified Standard	95.1	% Recovery	90	110
		Duplicate	1.9	R.P.D.	0	10
		Duplicate	2.8	R.P.D.	0	10
Dissolved Sulphate	SO4	Dionex Certified Standard	95.4	% Recovery	90	110
		Duplicate	0.5	R.P.D.	0	10
		Duplicate	1.8	R.P.D.	0	10
		Duplicate	1.9	R.P.D.	0	10
		Duplicate	3.1	R.P.D.	0	10
		Duplicate	3.1	R.P.D.	0	10
		Duplicate	PASS	R.P.D.	0	10

mg/L = milligrams per liter
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Batch Quality Control for Conventional Parameters-Winnipeg Laboratory- in Water

Parameter	QC Type	QC Result	Units	Lower Limit	Upper Limit
pH, Laboratory	pH Calibration Verification	101.4	% Recovery	98	102
	Duplicate	0.5	R.P.D.	0	3
	Duplicate	0.7	R.P.D.	0	3
	Duplicate	1.6	R.P.D.	0	3
Conductivity	Blank	< 1	uS/cm	0	1
	Calibration Verification	99.3	% Recovery	80	120
	Calibration Verification	100.0	% Recovery	80	120
	Duplicate	0.0	R.P.D.	0	20
	Duplicate	0.7	R.P.D.	0	20
	Duplicate	1.3	R.P.D.	0	20
Nitrite N	Blank	< 0.002	mg/L	0	0.002
	Spike	92.1	% Recovery	80	120
	Spike	94.8	% Recovery	80	120
	Calibration Verification	100.0	% Recovery	80	120
	Duplicate	NC	R.P.D.	0	12

uS/cm = microsiemens per centimeter mg/L = milligrams per liter
< = Less than detection limit
R.P.D. = Relative Percent Difference
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculatio
is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Batch Quality Control for Total Metals Analysis in Water (QC# 97734)

Parameter		Duplicate (R.P.D.) 708170084	Duplicate Limits	ICPMS Spike (% Recovery) 708170160	ICPMS Spike Limits	ICPMS Lab Fortified Blank (% Recovery)	ICPMS Lab Fortified Blank Limits
Aluminum	Al	NC	20	-	-	90	78 - 122
Antimony	Sb	NC	20	97	78 - 118	90	75 - 117
Arsenic	As	NC	20	95	80 - 118	75	72 - 114
Barium	Ba	-	-	-	-	100	81 - 119
Beryllium	Be	-	-	100	79 - 123	85	73 - 115
Boron	B	-	-	-	-	100	92 - 110
Cadmium	Cd	NC	20	96	74 - 124	87	78 - 116
Calcium	Ca	0.7	20	-	-	-	-
Chromium	Cr	NC	20	98	70 - 130	95	83 - 119
Cobalt	Co	NC	20	100	76 - 126	95	85 - 119
Copper	Cu	PASS	20	100	77 - 125	95	85 - 120
Lead	Pb	NC	20	97	77 - 124	100	80 - 116
Magnesium	Mg	0	20	-	-	-	-
Manganese	Mn	-	-	99	69 - 131	95	82 - 120
Molybdenum	Mo	NC	20	96	68 - 118	90	82 - 114
Nickel	Ni	NC	20	100	77 - 123	100	78 - 118
Potassium	K	PASS	20	-	-	-	-
Selenium	Se	-	-	-	-	60	58 - 120
Silver	Ag	NC	20	-	-	98	85 - 117
Sodium	Na	1.5	20	-	-	-	-
Strontium	Sr	-	-	-	-	90	83 - 115
Thallium	Tl	NC	20	99	73 - 123	100	86 - 118
Thorium	Th	NC	20	-	-	-	-
Tin	Sn	NC	20	-	-	-	-
Titanium	Ti	-	-	100	70 - 130	100	79 - 119
Uranium	U	NC	20	98	65 - 133	100	75 - 121
Vanadium	V	-	-	98	75 - 123	95	76 - 118
Zinc	Zn	NC	20	-	-	75	64 - 126

mg/L = milligrams per liter
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Batch Quality Control for Total Metals Analysis in Water (QC# 97734)

Parameter		Total Blank (mg/L)	Total Blank Limits
Aluminum	Al	< 0.001	0.015
Antimony	Sb	< 0.0002	0.001
Arsenic	As	< 0.0002	0.001
Barium	Ba	< 0.0002	0.001
Beryllium	Be	< 0.0002	0.001
Cadmium	Cd	< 0.00004	0.001
Chromium	Cr	< 0.0002	0.001
Cobalt	Co	< 0.0002	0.001
Copper	Cu	< 0.0002	0.001
Lead	Pb	0.0002	0.001
Manganese	Mn	< 0.0002	0.001
Molybdenum	Mo	< 0.0001	0.001
Nickel	Ni	< 0.0002	0.001
Potassium	K	< 0.02	0.05
Silver	Ag	< 0.00005	0.001
Strontium	Sr	< 0.0002	0.001
Thallium	Tl	< 0.00002	0.001
Thorium	Th	< 0.0001	0.0005
Tin	Sn	< 0.0002	0.005
Titanium	Ti	< 0.0002	0.001
Uranium	U	< 0.0001	0.0005
Vanadium	V	< 0.0002	0.001
Zinc	Zn	< 0.001	0.01
Zirconium	Zr	< 0.002	0.01

mg/L = milligrams per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Batch Quality Control for Total Metals Analysis in Water (QC# 97795)

Parameter	Duplicate (R.P.D.) 708200184	Duplicate Limits	Spike (% Recovery) 708200184	Spike Limits
Mercury Hg	NC	20	105	70 - 128

ug/L = micrograms per liter
R.P.D. = Relative Percent Difference
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculatio
is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Instrument Quality Control for the PSA Mercury Analyzer-AF (QC# 191090)

QC Type: Calibration Verification

Parameter		% Recovery	Limits
Mercury	Hg	102	90 - 110

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80817075

Batch Quality Control Frequency Summary

Total Metals Preparation (Batch# 97734)

QC Type	No. Samples
ICPMS Spike	1
ICP Spike Vista ICAP	1
Potassium/Silicon Spike Vista	1
ICPMS Lab Fortified Blank	1
Duplicate	2
Total Blank	2

Nitrite in Water-Winnipeg (Batch# 97751)

QC Type	No. Samples
Blank	1
Calibration Verification	1
Duplicate	2
Spike	2

pH Analysis (WPG) (Batch# 97752)

QC Type	No. Samples
Duplicate	3

Conductivity Analysis (WPG) (Batch# 97753)

QC Type	No. Samples
Blank	1
Calibration Verification	2
Duplicate	3

(Continued on next page)

Batch Quality Control Frequency Summary

Mercury Water Bromination Prep (Batch# 97795)

QC Type	No. Samples
Duplicate	3
Spike	3

Water Lab Ion Chromatography (Batch# 97841)

QC Type	No. Samples
Blank	2
Duplicate	6

Total Metals Preparation (Batch# 97734)

QC Type	No. Samples
Batch Size	71

Nitrite in Water-Winnipeg (Batch# 97751)

QC Type	No. Samples
Batch Size	20

pH Analysis (WPG) (Batch# 97752)

QC Type	No. Samples
Batch Size	38

(Continued on next page)

CANTEST

Batch Quality Control Frequency Summary

Conductivity Analysis (WPG) (Batch# 97753)

QC Type	No. Samples
Batch Size	33

Mercury Water Bromination Prep (Batch# 97795)

QC Type	No. Samples
Batch Size	30

Water Lab Ion Chromatography (Batch# 97841)

QC Type	No. Samples
Batch Size	60

Analysis Report

CANTEST LTD.

Professional
Analytical
Services

4606 Canada Way
Burnaby, B.C.
V5G 1K5

FAX: 604 731 2386

TEL: 604 734 7276

1 800 665 8566

REPORT ON: Analysis of Water Samples

REPORTED TO: Azimuth Consulting Group Inc.
218-2902 West Broadway
Vancouver, BC
V6K 2G8

Att'n: Mr. Gary Mann

CHAIN OF CUSTODY: 188943, 189111, 189112
PROJECT NAME: AWPAR Monitoring
PROJECT NUMBER: AE-07-01

NUMBER OF SAMPLES: 29

REPORT DATE: August 28, 2007

DATE SUBMITTED: August 20, 2007

GROUP NUMBER: 80820069

SAMPLE TYPE: Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Ammonia in Water - was performed using Flow Injection Analysis where the aqueous sample is injected into a carrier stream, which merges a sodium hydroxide stream. Gaseous ammonia is formed, which diffuses through a gas permeable membrane into an indicator stream. This indicator stream is comprised of a mixture of acid-base indicators, which will react with the ammonia gas; resulting in a colour shift which is measured photometrically @ 590 nm.

Total Dissolved Solids in Water - was determined based on Method 2540 C in Standard Methods for the Examination of Water and Wastewater (21st Edition).

Total Suspended Solids in Water - was determined based on Method 2540 D in Standard Methods (21st Edition) and Method X332 in the BC Laboratory Manual (2005).

Turbidity in Water - was performed based on Method 2130 in Standard Methods (21st Edition) and Method X164 in the BC Laboratory Manual (2005 Edition).

Conventional Parameters - analyses were performed using procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", (2005 edition) Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" (21st Edition), published by the American Public Health Association.

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative

(Continued)

CANTEST LTD.

Anna Becalska, PhD
Coordinator, Trace Metals

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Mercury in Water

digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

COMMENTS:

Testing for Total Dissolved Solids was performed on samples submitted past the recommended holding time.

TEST RESULTS:

(See following pages)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	R13-US	R13-DS	R09-US	R09-DS		
DATE SAMPLED:	Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:	708200180	708200181	708200182	708200183	DETECTION LIMIT	UNITS
Turbidity	0.79	1.5	0.35	0.32	0.1	NTU
Hardness (Total) CaCO3	36	38	27	26	1	mg/L
Total Suspended Solids	<	1	<	<	1	mg/L
Total Oil and Grease	4	3	-	-	2	mg/L
Hydrocarbon Oil and Grease	<	<	-	-	2	mg/L
Ammonia Nitrogen N	0.01	0.08	0.02	<	0.01	mg/L

NTU = nephelometric turbidity units mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	DUP1	Q7	KM34.4	Q4		
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	DETECTION LIMIT	UNITS
CANTEST ID:	708200184	708200185	708200186	708200187		
Turbidity	0.32	12	3.5	33	0.1	NTU
Hardness (Total) CaCO3	26	88	34	152	1	mg/L
Total Suspended Solids	<	10	2	19	1	mg/L
Total Oil and Grease	<	2	8	8	2	mg/L
Hydrocarbon Oil and Grease	<	<	<	<	2	mg/L
Ammonia Nitrogen N	<	5.19	0.25	24.8	0.01	mg/L

NTU = nephelometric turbidity units mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		R07	KM19.6	R06-US	R06-DS	DETECTION LIMIT	UNITS
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708200188	708200189	708200191	708200195		
Turbidity		1.5	2.3	0.25	0.38	0.1	NTU
Hardness (Total)	CaCO3	37	101	-	-	1	mg/L
Total Suspended Solids		<	2	<	<	1	mg/L
Total Oil and Grease		<	8	3	<	2	mg/L
Hydrocarbon Oil and Grease		<	<	<	<	2	mg/L
Ammonia Nitrogen	N	0.01	0.02	<	0.06	0.01	mg/L

NTU = nephelometric turbidity units mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	KM17.9	R05A-US	R05A-DS	KM12-PC3		
DATE SAMPLED:	Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07	DETECTION LIMIT	UNITS
CANTEST ID:	708200197	708200199	708200200	708200201		
Turbidity	1.2	1.6	1.0	0.35	0.1	NTU
Hardness (Total) CaCO3	68	-	-	-	1	mg/L
Total Suspended Solids	1	<	1	<	1	mg/L
Total Oil and Grease	12	<	<	2	2	mg/L
Hydrocarbon Oil and Grease	<	<	<	<	2	mg/L
Ammonia Nitrogen N	0.10	<	0.02	0.07	0.01	mg/L

NTU = nephelometric turbidity units mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	R04	R02-US	R02-DS	DUP2		
DATE SAMPLED:	Aug 16/07	Aug 16/07	Aug 16/07		DETECTION LIMIT	UNITS
CANTEST ID:	708200203	708200204	708200205	708200206		
Turbidity	0.53	0.29	0.30	0.50	0.1	NTU
Total Suspended Solids	<	<	<	<	1	mg/L
Total Oil and Grease	2	2	<	3	2	mg/L
Hydrocarbon Oil and Grease	<	<	<	<	2	mg/L
Ammonia Nitrogen N	0.02	<	0.02	0.01	0.01	mg/L

NTU = nephelometric turbidity units mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	R09-US (Aug 11)	R09-DS (Aug 11)	R13-DS-20m (Aug 13 @ 14:35)	R13-DS-40m (Aug 13)	DETECTION LIMIT	UNITS
DATE SAMPLED:	Aug 11/07	Aug 11/07	Aug 13/07	Aug 13/07		
CANTEST ID:	708200209	708200210	708200211	708200212		
Turbidity	0.30	0.68	55	3.0	0.1	NTU
Total Dissolved Solids	28	364	44	39	10	mg/L

NTU = nephelometric turbidity units mg/L = milligrams per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	R13-DS-20m (Aug 13 @ 15:45)	R09-DS A	R09-DS B	R06-DS A		
DATE SAMPLED:	Aug 13/07	Aug 16/07	Aug 16/07	Aug 16/07	DETECTION LIMIT	UNITS
CANTEST ID:	708200213	708200215	708200217	708200218		
Turbidity	63	-	-	-	0.1	NTU
Hardness (Total) CaCO3	-	-	-	13	1	mg/L
Total Dissolved Solids	52	-	-	-	10	mg/L
Total Oil and Grease	-	<	<	-	2	mg/L
Hydrocarbon Oil and Grease	-	<	<	-	2	mg/L

NTU = nephelometric turbidity units mg/L = milligrams per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		R06-DS B		
DATE SAMPLED:		Aug 16/07	DETECTION LIMIT	UNITS
CANTEST ID:		708200220		
Hardness (Total)	CaCO3	13	1	mg/L

mg/L = milligrams per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R13-US	R13-DS	R09-US	R09-DS	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708200180	708200181	708200182	708200183		
Aluminum	Al	0.033	0.047	0.010	0.010	0.005	mg/L
Antimony	Sb	<	<	<	<	0.001	mg/L
Arsenic	As	<	<	<	<	0.001	mg/L
Barium	Ba	0.008	0.010	0.004	0.003	0.001	mg/L
Beryllium	Be	<	<	<	<	0.001	mg/L
Bismuth	Bi	<	<	<	<	0.001	mg/L
Boron	B	<	<	<	<	0.05	mg/L
Cadmium	Cd	<	<	<	<	0.0002	mg/L
Calcium	Ca	10.2	10.9	7.58	7.34	0.05	mg/L
Chromium	Cr	<	<	<	<	0.001	mg/L
Cobalt	Co	<	<	<	<	0.001	mg/L
Copper	Cu	0.001	0.002	0.001	0.001	0.001	mg/L
Iron	Fe	0.33	0.39	0.07	0.06	0.05	mg/L
Lead	Pb	<	<	<	<	0.001	mg/L
Lithium	Li	<	<	<	<	0.005	mg/L
Magnesium	Mg	2.42	2.54	1.96	1.85	0.05	mg/L
Manganese	Mn	0.009	0.020	0.005	0.004	0.001	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	<	<	0.0005	mg/L
Nickel	Ni	0.001	0.001	<	<	0.001	mg/L
Phosphorus	P	<	<	<	<	0.15	mg/L
Potassium	K	0.3	0.4	0.4	0.4	0.1	mg/L
Selenium	Se	<	<	<	<	0.001	mg/L
Silicon	Si	0.4	0.5	0.4	0.4	0.25	mg/L
Silver	Ag	<	<	<	<	0.00025	mg/L
Sodium	Na	1.21	1.37	1.98	1.91	0.05	mg/L
Strontium	Sr	0.059	0.062	0.038	0.035	0.001	mg/L
Tellurium	Te	<	<	<	<	0.001	mg/L
Thallium	Tl	<	<	<	<	0.0001	mg/L
Thorium	Th	<	<	<	<	0.0005	mg/L
Tin	Sn	<	<	<	<	0.001	mg/L

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REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R13-US	R13-DS	R09-US	R09-DS	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708200180	708200181	708200182	708200183		
Titanium	Ti	<	0.001	<	<	0.001	mg/L
Uranium	U	<	<	<	<	0.0005	mg/L
Vanadium	V	<	<	<	<	0.001	mg/L
Zinc	Zn	<	<	<	<	0.005	mg/L
Zirconium	Zr	<	<	<	<	0.01	mg/L

mg/L = milligrams per liter
µg/L = micrograms per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		DUP1	Q7	KM34.4	Q4	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:			Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708200184	708200185	708200186	708200187		
Aluminum	Al	0.013	4.24	0.27	1.37	0.005	mg/L
Antimony	Sb	<	<	<	<	0.001	mg/L
Arsenic	As	<	0.002	0.001	0.007	0.001	mg/L
Barium	Ba	0.004	0.045	0.053	0.088	0.001	mg/L
Beryllium	Be	<	<	<	<	0.001	mg/L
Bismuth	Bi	<	<	<	<	0.001	mg/L
Boron	B	<	<	<	<	0.05	mg/L
Cadmium	Cd	<	0.0005	<	<	0.0002	mg/L
Calcium	Ca	7.29	23.3	8.80	44.7	0.05	mg/L
Chromium	Cr	<	<	<	0.003	0.001	mg/L
Cobalt	Co	<	0.20	0.001	0.011	0.001	mg/L
Copper	Cu	0.001	0.13	0.006	0.022	0.001	mg/L
Iron	Fe	0.06	1.03	0.60	5.92	0.05	mg/L
Lead	Pb	<	0.002	<	0.003	0.001	mg/L
Lithium	Li	<	0.011	<	<	0.005	mg/L
Magnesium	Mg	1.94	7.24	2.87	9.85	0.05	mg/L
Manganese	Mn	0.004	1.52	0.075	1.48	0.001	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	<	0.0026	0.0005	mg/L
Nickel	Ni	<	0.30	0.003	0.027	0.001	mg/L
Phosphorus	P	<	<	<	<	0.15	mg/L
Potassium	K	0.4	4.7	0.7	7.0	0.1	mg/L
Selenium	Se	<	<	<	<	0.001	mg/L
Silicon	Si	0.4	4.5	1.3	4.0	0.25	mg/L
Silver	Ag	<	<	<	<	0.00025	mg/L
Sodium	Na	1.95	4.86	1.35	5.90	0.05	mg/L
Strontium	Sr	0.036	0.15	0.040	0.17	0.001	mg/L
Tellurium	Te	<	<	<	<	0.001	mg/L
Thallium	Tl	<	0.0003	<	<	0.0001	mg/L
Thorium	Th	<	<	<	0.0013	0.0005	mg/L
Tin	Sn	<	<	<	<	0.001	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		DUP1	Q7	KM34.4	Q4	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:			Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708200184	708200185	708200186	708200187		
Titanium	Ti	<	<	0.008	0.035	0.001	mg/L
Uranium	U	<	0.0059	<	0.0025	0.0005	mg/L
Vanadium	V	<	<	<	0.003	0.001	mg/L
Zinc	Zn	<	0.079	<	0.011	0.005	mg/L
Zirconium	Zr	<	<	<	<	0.01	mg/L

mg/L = milligrams per liter
µg/L = micrograms per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R07	KM19.6	KM17.9	R06-DS A	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708200188	708200189	708200197	708200218		
Aluminum	Al	0.044	0.034	0.034	0.022	0.005	mg/L
Antimony	Sb	<	<	<	<	0.001	mg/L
Arsenic	As	<	<	<	<	0.001	mg/L
Barium	Ba	0.008	0.018	0.024	0.003	0.001	mg/L
Beryllium	Be	<	<	<	<	0.001	mg/L
Bismuth	Bi	<	<	<	<	0.001	mg/L
Boron	B	<	<	<	<	0.05	mg/L
Cadmium	Cd	<	<	<	<	0.0002	mg/L
Calcium	Ca	11.5	38.0	25.3	4.03	0.05	mg/L
Chromium	Cr	<	<	<	<	0.001	mg/L
Cobalt	Co	<	<	<	<	0.001	mg/L
Copper	Cu	0.002	0.003	0.002	0.002	0.001	mg/L
Iron	Fe	0.53	0.55	0.44	<	0.05	mg/L
Lead	Pb	<	<	<	<	0.001	mg/L
Lithium	Li	<	<	<	<	0.005	mg/L
Magnesium	Mg	2.06	1.55	1.23	0.79	0.05	mg/L
Manganese	Mn	0.025	0.028	0.087	0.002	0.001	mg/L
Mercury	Hg	<	<	<	<	0.02	µg/L
Molybdenum	Mo	<	<	<	<	0.0005	mg/L
Nickel	Ni	0.001	<	0.001	<	0.001	mg/L
Phosphorus	P	<	<	<	<	0.15	mg/L
Potassium	K	0.4	2.7	0.9	0.5	0.1	mg/L
Selenium	Se	<	<	<	<	0.001	mg/L
Silicon	Si	0.8	0.3	1.0	<	0.25	mg/L
Silver	Ag	<	<	<	<	0.00025	mg/L
Sodium	Na	6.09	12.2	2.93	1.89	0.05	mg/L
Strontium	Sr	0.033	0.12	0.060	0.013	0.001	mg/L
Tellurium	Te	<	<	<	<	0.001	mg/L
Thallium	Tl	<	<	<	0.0001	0.0001	mg/L
Thorium	Th	<	<	<	<	0.0005	mg/L
Tin	Sn	<	<	<	<	0.001	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R07	KM19.6	KM17.9	R06-DS A	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:		Aug 16/07	Aug 16/07	Aug 16/07	Aug 16/07		
CANTEST ID:		708200188	708200189	708200197	708200218		
Titanium	Ti	0.001	0.001	0.001	<	0.001	mg/L
Uranium	U	<	<	<	<	0.0005	mg/L
Vanadium	V	<	<	<	<	0.001	mg/L
Zinc	Zn	<	<	<	<	0.005	mg/L
Zirconium	Zr	<	<	<	<	0.01	mg/L

mg/L = milligrams per liter
μg/L = micrograms per liter
< = Less than detection limit

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R06-DS B		
SAMPLE PREPARATION:		TOTAL		
DATE SAMPLED:		Aug 16/07	DETECTION LIMIT	UNITS
CANTEST ID:		708200220		
Aluminum	Al	0.038	0.005	mg/L
Antimony	Sb	<	0.001	mg/L
Arsenic	As	<	0.001	mg/L
Barium	Ba	0.003	0.001	mg/L
Beryllium	Be	<	0.001	mg/L
Bismuth	Bi	<	0.001	mg/L
Boron	B	<	0.05	mg/L
Cadmium	Cd	<	0.0002	mg/L
Calcium	Ca	3.74	0.05	mg/L
Chromium	Cr	<	0.001	mg/L
Cobalt	Co	<	0.001	mg/L
Copper	Cu	0.001	0.001	mg/L
Iron	Fe	<	0.05	mg/L
Lead	Pb	<	0.001	mg/L
Lithium	Li	<	0.005	mg/L
Magnesium	Mg	0.78	0.05	mg/L
Manganese	Mn	0.002	0.001	mg/L
Mercury	Hg	<	0.02	µg/L
Molybdenum	Mo	<	0.0005	mg/L
Nickel	Ni	<	0.001	mg/L
Phosphorus	P	<	0.15	mg/L
Potassium	K	0.5	0.1	mg/L
Selenium	Se	<	0.001	mg/L
Silicon	Si	<	0.25	mg/L
Silver	Ag	<	0.00025	mg/L
Sodium	Na	1.84	0.05	mg/L
Strontium	Sr	0.012	0.001	mg/L
Tellurium	Te	<	0.001	mg/L
Thallium	Tl	<	0.0001	mg/L
Thorium	Th	<	0.0005	mg/L
Tin	Sn	<	0.001	mg/L

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		R06-DS B		
SAMPLE PREPARATION:		TOTAL		
DATE SAMPLED:		Aug 16/07	DETECTION LIMIT	UNITS
CANTEST ID:		708200220		
Titanium	Ti	<	0.001	mg/L
Uranium	U	<	0.0005	mg/L
Vanadium	V	<	0.001	mg/L
Zinc	Zn	<	0.005	mg/L
Zirconium	Zr	<	0.01	mg/L

mg/L = milligrams per liter
< = Less than detection limit

µg/L = micrograms per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Batch Quality Control for Conventional Parameters in Water

Parameter	QC Type	QC Result	Units	Lower Limit	Upper Limit
Turbidity	Blank	< 0.1	NTU	0	0.1
	Duplicate	0.0	R.P.D.	0	15
	Duplicate	0.0	R.P.D.	0	15
	Duplicate	3.9	R.P.D.	0	15
Total Dissolved Solids	Duplicate	1.8	R.P.D.	0	18
	Duplicate	4.1	R.P.D.	0	18
Total Suspended Solids	Blank	< 1	mg/L	0	3
	TSS Control Standard (CalVer)	97.6	% Recovery	91	105
	Duplicate	0.0	R.P.D.	0	18
	Duplicate	0.9	R.P.D.	0	18
	Duplicate	2.1	R.P.D.	0	18
Total Oil and Grease	Blank	< 2	mg/L	0	2
	Blank	< 2	mg/L	0	2
	Spike	105.6	% Recovery	82	118
	Spike	114.8	% Recovery	82	118
Hydrocarbon Oil and Grease	Spike	78.3	% Recovery	77	110
	Spike	89.3	% Recovery	77	110
Ammonia Nitrogen N	Spike	76.0	% Recovery	70	132
	Spike	78.0	% Recovery	70	132
	Spike	80.0	% Recovery	70	132
	Spike	81.0	% Recovery	70	132
	Spike	83.0	% Recovery	70	132
	Spike	86.0	% Recovery	70	132
	Spike	91.0	% Recovery	70	132
	Duplicate	0.0	R.P.D.	0	20
	Duplicate	0.0	R.P.D.	0	20
	Duplicate	10.5	R.P.D.	0	20

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Batch Quality Control for Conventional Parameters in Water

Parameter	QC Type	QC Result	Units	Lower Limit	Upper Limit
Ammonia Nitrogen N	Blank	NC	mg/L	0	0.01
	Duplicate	NC	R.P.D.	0	20

NTU = nephelometric turbidity units mg/L = milligrams per liter
< = Less than detection limit
R.P.D. = Relative Percent Difference
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculatio
is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Batch Quality Control for Total Metals Analysis in Water (QC# 97795)

Parameter	Duplicate (R.P.D.) 708200184	Duplicate Limits	Spike (% Recovery) 708200184	Spike Limits
Mercury Hg	NC	20	105	70 - 128

ug/L = micrograms per liter
R.P.D. = Relative Percent Difference
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculatio
is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Batch Quality Control for Total Metals Analysis in Water (QC# 97801)

Parameter		Duplicate (R.P.D.) 708200214	Duplicate Limits	ICPMS Spike (% Recovery) 708200183	ICPMS Spike Limits	ICPMS Lab Fortified Blank (% Recovery)	ICPMS Lab Fortified Blank Limits
Aluminum	Al	PASS	20	-	-	95	78 - 122
Antimony	Sb	NC	20	95	78 - 118	90	75 - 117
Arsenic	As	NC	20	93	80 - 118	80	72 - 114
Barium	Ba	-	-	-	-	105	81 - 119
Beryllium	Be	-	-	95	79 - 123	85	73 - 115
Boron	B	-	-	-	-	100	92 - 110
Cadmium	Cd	NC	20	94	74 - 124	86	78 - 116
Chromium	Cr	NC	20	95	70 - 130	95	83 - 119
Cobalt	Co	-	-	98	76 - 126	100	85 - 119
Copper	Cu	0	20	100	77 - 125	100	85 - 120
Lead	Pb	NC	20	100	77 - 124	100	80 - 116
Magnesium	Mg	0.3	20	-	-	-	-
Manganese	Mn	-	-	99	69 - 131	100	82 - 120
Molybdenum	Mo	-	-	94	68 - 118	95	82 - 114
Nickel	Ni	-	-	100	77 - 123	100	78 - 118
Selenium	Se	-	-	-	-	60	58 - 120
Silver	Ag	-	-	-	-	96	85 - 117
Strontium	Sr	-	-	-	-	95	83 - 115
Thallium	Tl	-	-	103	73 - 123	100	86 - 118
Titanium	Ti	-	-	100	70 - 130	100	79 - 119
Uranium	U	NC	20	106	65 - 133	100	75 - 121
Vanadium	V	-	-	94	75 - 123	95	76 - 118
Zinc	Zn	PASS	20	-	-	80	64 - 126

mg/L = milligrams per liter
R.P.D. = Relative Percent Difference
PASS = Duplicate sample results were in the range of one to five times the detection limit. R.P.D. calculation is not applicable in this range. Acceptance criteria is a maximum difference between the duplicates equivalent to the value of the detection limit.
NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

Batch Quality Control for Total Metals Analysis in Water (QC# 97801)

Parameter		Total Blank (mg/L)	Total Blank Limits
Aluminum	Al	< 0.001	0.015
Antimony	Sb	< 0.0002	0.001
Arsenic	As	< 0.0002	0.001
Barium	Ba	< 0.0002	0.001
Beryllium	Be	< 0.0002	0.001
Cadmium	Cd	< 0.00004	0.001
Chromium	Cr	< 0.0002	0.001
Cobalt	Co	< 0.0002	0.001
Copper	Cu	< 0.0002	0.001
Lead	Pb	< 0.0002	0.001
Manganese	Mn	< 0.0002	0.001
Molybdenum	Mo	< 0.0001	0.001
Nickel	Ni	< 0.0002	0.001
Potassium	K	< 0.02	0.05
Silver	Ag	< 0.00005	0.001
Strontium	Sr	< 0.0002	0.001
Thallium	Tl	< 0.00002	0.001
Thorium	Th	< 0.0001	0.0005
Tin	Sn	< 0.0002	0.005
Titanium	Ti	< 0.0002	0.001
Uranium	U	< 0.0001	0.0005
Vanadium	V	< 0.0002	0.001
Zinc	Zn	< 0.001	0.01
Zirconium	Zr	< 0.002	0.01

mg/L = milligrams per liter

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

CANTEST

Instrument Quality Control for the PSA Mercury Analyzer-AF (QC# 191090)

QC Type: Calibration Verification

Parameter		% Recovery	Limits
Mercury	Hg	102	90 - 110

Batch Quality Control Frequency Summary

Mercury Water Bromination Prep (Batch# 97795)

QC Type	No. Samples
Duplicate	3
Spike	3

Suspended Solids Analysis (Batch# 97798)

QC Type	No. Samples
Blank	1
TSS Control Standard (CalVer)	1
Duplicate	3

Total Metals Preparation (Batch# 97801)

QC Type	No. Samples
Duplicate	1
ICPMS Spike	1
ICP Spike Vista ICAP	1
ICPMS Lab Fortified Blank	1
Total Blank	2

Turbidity Analysis (Batch# 97833)

QC Type	No. Samples
Blank	1
Duplicate	3

Oil and Grease in Water (Batch# 97874)

QC Type	No. Samples
Blank	1
Spike	1

(Continued on next page)

CANTEST

Batch Quality Control Frequency Summary

Oil and Grease in Water (Batch# 97911)

QC Type	No. Samples
Blank	1
Spike	1

Ammonia Water/Lq Auto Analyzer (Batch# 97945)

QC Type	No. Samples
Blank	1
Duplicate	8
Spike	8

Mercury Water Bromination Prep (Batch# 97795)

QC Type	No. Samples
Batch Size	30

Suspended Solids Analysis (Batch# 97798)

QC Type	No. Samples
Batch Size	30

Total Metals Preparation (Batch# 97801)

QC Type	No. Samples
Batch Size	17

(Continued on next page)

REPORTED TO: Azimuth Consulting Group Inc.

REPORT DATE: August 28, 2007

GROUP NUMBER: 80820069

CANTEST

Batch Quality Control Frequency Summary

Turbidity Analysis (Batch# 97833)

QC Type	No. Samples
Batch Size	28

Oil and Grease in Water (Batch# 97874)

QC Type	No. Samples
Batch Size	8

Oil and Grease in Water (Batch# 97911)

QC Type	No. Samples
Batch Size	18

Ammonia Water/Lq Auto Analyzer (Batch# 97945)

QC Type	No. Samples
Batch Size	79

APPENDIX J

AWPAR FISHERIES MONITORING PLAN

Technical Memorandum

Date: 29 June 2007

To: **Paul Savoie, Fisheries and Oceans Canada, Iqaluit, NU**

Cc: **Louise Grondin and Stephane Robert (Meadowbank Mining Inc./Agnico-Eagle Mines Ltd.)**

From: **Gary Mann**

RE: **Monitoring Plan for Meadowbank Project All-Weather Private Access Road (AWPAR) HADD Crossings for Condition 5 of Authorization NU-03-0190 (2)**

Introduction

The Meadowbank Project AWPAR will connect the Hamlet of Baker Lake to the mine site. Fisheries and Oceans Canada (DFO) issued a subsection 35(2) *Fisheries Act* Authorization (NU-03-0190 [2]) for the harmful alteration, disruption or destruction (HADD) of fish habitat due the planned encroachment of bridge abutments into the stream channel at five crossings (R02, R06, R09, R15 and R19). This submission meets the requirements of Condition 5.1 of the Authorization, which stipulates the development of a monitoring plan by 29 June 2007.

Construction Schedule

While the project was initially planned for completion prior to spring thaw (i.e., all crossing construction was to have been completed under frozen conditions when no fish were present), construction will now be occurring throughout the summer periods, as per the revised schedule upon which the new Authorization is based. Consequently, timing windows for the AWPAR need to be defined.

Timing Window

Condition 3.1 of the Authorization stipulates that "no in-water work shall occur during critical spawning and rearing periods for any fish species in the affected waterbodies." Based on the last two years worth of fisheries monitoring conducted at the HADD crossings, Arctic grayling represent the vast majority of fish using these watercourses. Consequently, the timing window for restricting in-water works should be based on the local life history of arctic grayling. Monitoring in previous years has targeted adult use of waterbodies for migration (i.e., using hoop nets) and within-stream reproduction (using larval drift traps). As all these waterbodies are frozen solid during the winter months, there is no potential for fish use until the open water season starts. Adult fish would move into streams once there is sufficient flow and lack of ice blockages to allow passage to spawning grounds. Incubation of arctic grayling eggs takes approximately 16 to 18 days at 9 C, with newly hatched alevin emerging from the substrate some 3 to 5 days later. Young of the rear would either remain in semi-deep pools in the stream or be passively transported to downstream lakes. Consequently, we recommend the timing window for fish-bearing streams in the project area to be between the onset of open water conditions through the end of July.

Monitoring Plan

Approvals – As per Condition 5.1, this detailed monitoring plan needs to be submitted for DFO review and approval prior to implementation. However, fish migration monitoring activities started in the third week of June in order to ensure consistency with baseline monitoring efforts. This timing was discussed with DFO previously; any substantive comments will be incorporated into this year's program (if possible) or into next year's.

Schedule – As per Condition 5.2, this monitoring plan is to be implemented annually for the years 2007 through 2010, then every other year from 2012 through one year post-decommissioning. Several required components of the monitoring plan can only be implemented after completion of the compensation works, for which Condition 4.1 stipulates that a detailed compensation plan is submitted by 15 August 2007. Furthermore, we suggest that the adaptive management philosophy underlying the conditions of the Authorization be followed to allow critical review of monitoring components and/or frequency after several years of data are available. For example, if successful fish passage is documented for stream crossings throughout the annual monitoring period (i.e., 2007-2010), then consideration should be given to using flow data, which is a good surrogate indicator of the potential for fish passage, at the crossing during the freshet period. All such aspects of the program would be reviewed to optimize monitoring while meeting the ultimate goals of DFO.

Stability and Utilization of Compensation Area[1] *(Condition 5.2.1)* – The compensation works are being designed with careful consideration of local hydrological conditions at crossing R02 and the requirements for successful reproduction of arctic grayling. Notwithstanding, monitoring the effectiveness of the works provides valuable information to ensure that the stated compensation goals are being met. Stability of the compensation works will be assessed each monitoring year after freshet conditions subside enough to allow safe access in-water access to the site. The works will be visually inspected at that time to determine whether any adverse changes (e.g., partial erosion of the feature or alteration of spawning substrate) have occurred that might affect its performance. The biological effectiveness of the compensation feature will be evaluated by continuing the larval drift trap surveys started during baseline work at R02. As the needs of the survey will have expanded to address compensation performance, a higher intensity of monitoring will be conducted (i.e., approximately the same effort as previous years, but focused at R02 only). We propose placing drift traps at various locations both upstream and downstream of the compensation area. This monitoring will begin in 2007 to allow at least a year of baseline data prior to constructing the compensation works. While larval drift data are inherently variable, the results should provide an indication as to the success of the planned compensation.

Continued Use of Waterbodies for Adult Fish Migration (5.2.2) – We propose to address this issue by modifying the adult fish migration surveys conducted during baseline monitoring, where we deployed hoop nets oriented in both upstream and downstream to quantify adult fish movement in both directions. The proposed modification would be to target upstream migration only since the major concern is the establishment of velocity barriers with the installation of the bridges. Thus, monitoring will target the HADD crossings only and will be timed to start as soon as ice breakup has progressed to the degree that damage from floating ice is minimal. Nets will be set up above and below the bridges; the downstream net will allow us to document the presence of fish in migration and the upstream net to confirm passage past the bridge. All fish will be tagged to allow future identification of individuals. Nets will be checked each day (unless impossible due to safety or logistical reasons); the upstream results can be compared to the baseline results to determine whether the crossing installations have adversely affected fish use. Given that fish population sizes are naturally variable and could change for a host of reasons, current velocities in the channel under the crossing structures will also be measured as a point of comparison to evaluate whether any observed reductions in migration rates could be due to the presence of hydrological barriers associated with the crossing structures. As discussed previously in "Schedule", the use of more efficient indirect observation methods (e.g., flow monitoring during freshet) should be considered if it is shown that the crossing do not adversely affect fish passage.

Adaptive Management of Compensation Works (Condition 5.2.3) – If the weight of evidence collected during monitoring program in successive years indicates that the compensation feature is not working as intended, then strategies for addressing the identified deficiency will be developed and discussed with DFO. Remedies could range from slight modifications to the existing compensation feature to the design and installation of additional compensatory habitat. The guiding principles of the No-Net-Loss Plan (Azimuth, 2006) will be used to assess which strategies are appropriate for the situation.

[1] The AWPAR No-Net-Loss Plan (Appendix A of Cumberland, 2006) recommended compensating for the five HADDs primarily at R02, with limited compensation at R06. As reflected in the Authorization, all compensation is now planned for R02 due to greater scope for successful habitat enhancement at that location.

Creel Surveys of Local Fishing (Condition 5.2.4) – Information collected during the environmental assessment process suggests that the affected waterbodies are not directly used for fishing. Notwithstanding, an annual creel survey program was initiated this past year with the local Hunter Trapper Organization in the hamlet of Baker Lake to assess the location and intensity of fishing. The instructions solicit information on the fishing patterns of local people (location, species, and timing) and include regional maps. A local field technician was hired to support the day-to-day operations of the program.

Reporting (Condition 6) – Monitoring reports will be submitted to DFO (Iqaluit) by 31 December of each reporting year for the lifetime of the HADD crossings and 90 days after completion of crossing structure decommissioning and restoration.

APPENDIX K

2007 AWPAR FISHERIES MONITORING REPORT

Project No. AEM-07-01
March 2008

All-Weather Private Access Road (AWPAR) Fisheries Monitoring Report – 2007

Meadowbank Gold Project

Prepared for:

Agnico-Eagle Mines Ltd.
Meadowbank Division
375 - 555 Burrard Street
Two Bentall Centre
Vancouver, BC
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Prepared by:

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Tel: 604-730-1220 • Fax: 604-739-8511

All-Weather Private Access Road (AWPAR) Fisheries Monitoring Report – 2007

Meadowbank Gold Project

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March 2008

Azimuth Consulting Group Inc.
218-2902 West Broadway
Vancouver, BC
V6K 2G8

Project No. AEM-07-01

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ACKNOWLEDGEMENTS

We would gratefully like to thank Agnico Eagle Meadowbank Division, Vancouver, for their support of the 2007 study.

A number of people assisted with the data collection including Mr. Ryan Vanengen (Minnow Environmental, Mississauga) and Mr. Cory Hoes and Mr. Duane Hudd (North/South Consultants, Winnipeg), Mr. Judah Nasauyaituk (Baker Lake), Mrs. Hatti Mannik and Mr. Tom Mannik (Baker Lake). Their assistance is greatly appreciated.

Ryan Vanengen and Gary Mann (Azimuth) co-authored this report. Ms. Maggie McConnell (Azimuth) conducted technical editing and document production. Rachel Gould (AEM) reviewed the report.

EXECUTIVE SUMMARY

Azimuth Consulting Group (Azimuth) conducted baseline fisheries evaluations along the proposed AWPAR route in 2005 and 2006 (Azimuth 2005, 2008). In 2005, Azimuth evaluated 25 stream crossings to determine the relative importance and significance with respect to magnitude and timing, habitat suitability and fish usage at streams and channels along the proposed AWPAR (Azimuth 2005). In 2006, additional baseline data was collected to evaluate streams and rivers that support migratory habitat and/or spawning habitat for arctic grayling (*Thymallus arcticus*), the predominant species identified in 2005 and 2006 (Azimuth, 2008).

The DFO *Fisheries Act* Authorization (**NU-03-0190-2**) for AWPAR construction required development of a monitoring plan, which included the following components for 2007:

- Stability and success of all compensation features
- Fish passage past bridges
- Catch results from a creel survey

Compensation Feature Success

The Authorization required detailed design of the compensation area at R02 to be completed by mid August 2007. Larval drift traps were used at two prospective locations to collect additional baseline data on stream productivity to facilitate future comparisons. A total of 327 fish larvae were collected at R02, 170 arctic grayling young-of-the-year (YOY) within compensation option A and 122 arctic grayling YOY within compensation option B. Two (2) burbot larvae and the remaining larvae were slimy sculpin or ninespine stickleback YOY (33). Given that construction of the compensation area has been delayed until winter 2008 due to a shortage of appropriate gravel, larval traps will be deployed again in summer 2008 to obtain additional pre-construction data.

Interestingly, arctic grayling were observed spawning in a small patch of introduced construction gravels at R06. The event was apparently successful, as YOY arctic grayling were caught in a larval drift trap deployed downstream of the area. Given these results, the requirement for sub-angular or rounded gravel material for the compensation at R02 should be revisited. Due to the lack of local source areas for the prescribed material, AEM is planning on shipping it at great expense from Quebec.

Fish Passage

Hoop nets were used to collect fisheries data at crossings R02 and R06 (the only two HADD crossing constructed as of the onset of this study) from June 20 to July 29, 2007, to determine the ability of arctic grayling to migrate beyond bridge structures and to

provide biological data to determine the health of the arctic grayling population along the AWPAR.

In total 294 adult or juvenile fish were collected using hoop nets. The predominant species was arctic grayling (n=279), with ~140 collected at R02 and R06. Fourteen (14) lake trout and 1 round whitefish were also collected. Arctic grayling were able to pass through greater than 1.7 m/s velocities measured on June 21, 2007 at R02 and spawned upstream. Likewise, in-stream construction at R06 did not affect fish migration and spawning ability upstream. Length, weight, and condition factor indicate that the system is maintaining a healthy population of arctic grayling.

Creel Survey

The 2007 creel survey results confirm that the AWPAR streams are not targeted by fishers. The majority of fishing is done in the spring when ice and weather conditions are conducive to ice fishing on regional lakes.

Overall

The velocity measurements, male/female migratory succession, larval results and associated trends at R02 and R06 suggest that all of the crossings continue to be productive spawning and migratory routes for arctic grayling. These watercourses are also opportunistically visited by round whitefish, lake trout and inhabited by slimy sculpin and ninespine stickleback.

1. INTRODUCTION

1.1. Background

Azimuth Consulting Group (Azimuth) conducted baseline fisheries evaluations along the proposed AWPAR route in 2005 and 2006 (**Figure 1**). In 2005, Azimuth evaluated 25 stream crossings to determine the relative importance and significance with respect to magnitude and timing, habitat suitability and fish usage at streams and channels along the proposed AWPAR (Azimuth 2005). In 2006, additional baseline data was collected to evaluate streams and rivers that support migratory habitat and/or spawning habitat for arctic grayling (*Thymallus arcticus*), the predominant species identified in 2005 and 2006 (Azimuth, 2008).

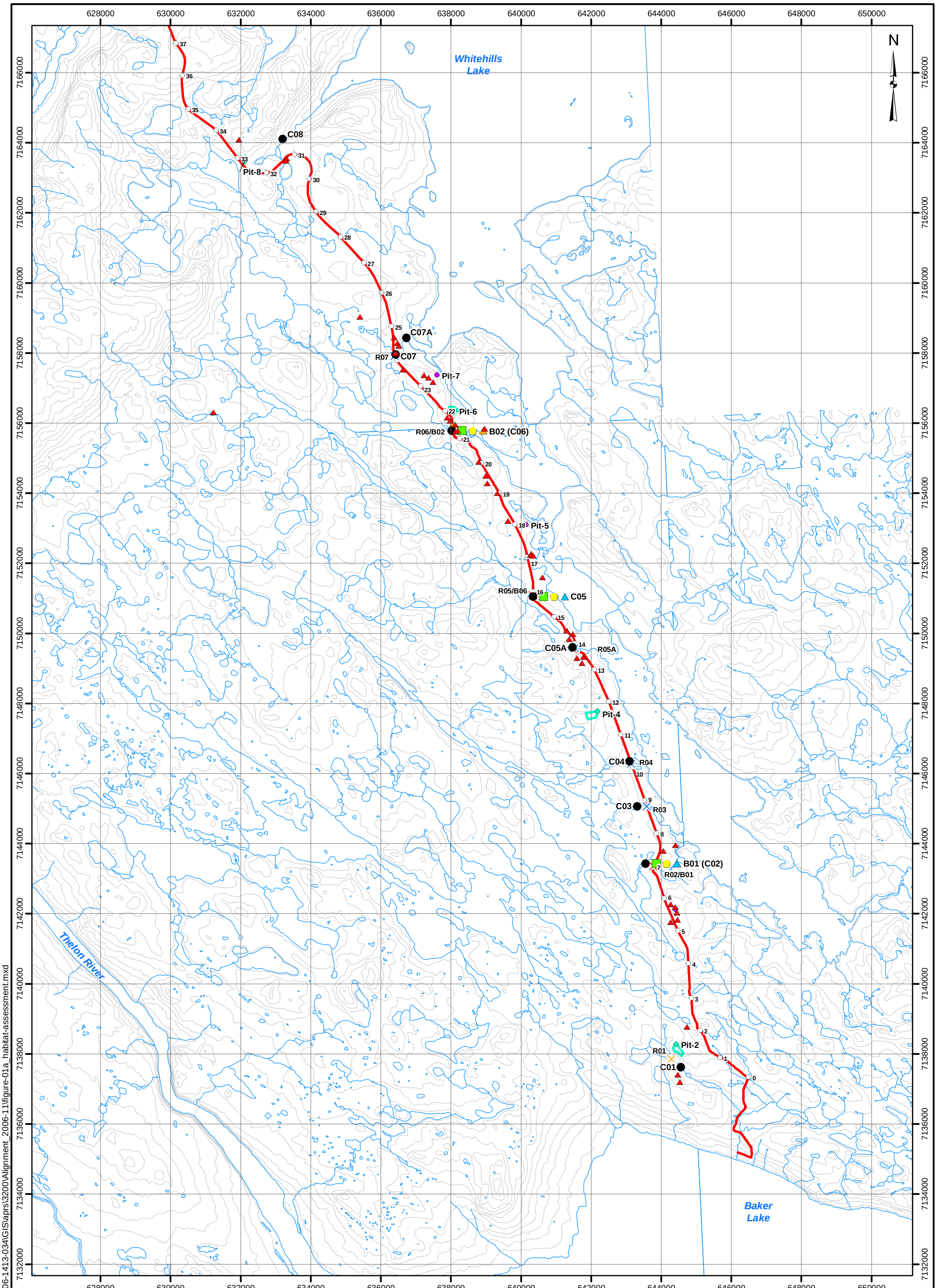
As part of permitting for construction of the AWPAR in 2007, DFO required submission of a biological monitoring plan for the HADD[1] bridges (i.e., R02, R06, R09, R15, and R19) as a condition of the AWPAR *Fisheries Act* Authorization (**NU-03-0190-2**). The main components of the monitoring plan were to assess:

- Stability and success of all compensation features
- Fish passage past HADD bridges
- Catch results from a creel survey

AEM retained Azimuth to develop and implement a monitoring plan to satisfy the conditions of the Authorization. One of the main concerns was that encroachment of HADD bridge abutments into the stream channel could result in the creation of velocity barriers to fish migration.

AWPAR construction, which started in winter 2007, included completion of only two HADD crossings, R02 and R06, by the onset of spring 2007 (i.e., arctic grayling migration period), so these were the focus of our study.

[1] Crossing structures resulting in the harmful alteration, disruption or destruction (HADD) of habitat due to encroachment of abutments into the stream channel.



LEGEND

- Meadowbank Project
- Kilometre Marker
- Proposed Route
- Watercourse
- Waterbody
- Contour (10 m interval)
- Watershed Boundary

- Habitat Assessment (Spring and Fall)
- Hoop Net (Spring)
- Hoop Net (Fall)
- Larval Drift Trap
- Minnow Trap
- Rock Pit (investigated)
- Rock Pit (to be quarried)
- Archaeological Site

- Stream Crossing (30 m bridge)
- Stream Crossing (12 m bridge)
- Stream Crossing (multiple culverts at bottom)
- Stream Crossing (single culvert at bottom)

REFERENCE

Cumberland Resources Ltd.

Datum: NAD 83 Projection: UTM Zone 14

2,000 1,000 0 2,000 Metres

Scale - 1:100,000

PROJECT

CUMBERLAND RESOURCES LTD.

TITLE

ALL-WEATHER PRIVATE ACCESS ROAD
STREAM CROSSINGS SHOWING LOCATIONS OF HABITAT ASSESSMENT AND FISHING GEAR DEPLOYMENT
1:100,000 Mapsheet 1 of 3

Golder Associates
Burnaby, B.C.

PROJECT No. 06-1413-034			SCALE AS SHOWN	REV. 0
DESIGN	JH	21 Nov. 2006	FIGURE 1A	
GIS	CDB	13 Dec. 2006		
CHECK				
REVIEW				

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PRINCE RIVER DRAINAGE

Amarulik Lake

Half Way Hills

Whitehills Lake

N

R15/B04 B04 (C15) Pit-16 R14 C14 R13 C13 C12 C11 Pit-13 C10 R09 B03 (C09) Pit-15 Pit-11B Pit-10 C08 Pit-8

73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26

620000 622000 624000 626000 628000 630000 632000 634000 636000 638000 640000 642000

7194000 7192000 7190000 7188000 7186000 7184000 7182000 7180000 7178000 7176000 7174000 7172000 7170000 7168000 7166000 7164000 7162000 7160000

LEGEND

- Meadowbank Project
- Kilometre Marker
- Proposed Route
- Watercourse
- Waterbody
- Contour (10 m interval)
- Watershed Boundary
- Habitat Assessment (Spring and Fall)
- Hoop Net (Spring)
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- Larval Drift Trap
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- Rock Pit (investigated)
- Rock Pit (to be quarried)
- Archaeological Site
- Stream Crossing (30 m bridge)
- Stream Crossing (12 m bridge)
- Stream Crossing (multiple culverts at bottom)
- Stream Crossing (single culvert at bottom)

REFERENCE

Cumberland Resources Ltd.

Datum: NAD 83 Projection: UTM Zone 14

2,000 1,000 0 2,000 Metres

Scale - 1:100,000

PROJECT: CUMBERLAND RESOURCES LTD.

TITLE: ALL-WEATHER PRIVATE ACCESS ROAD
STREAM CROSSINGS SHOWING LOCATIONS OF HABITAT ASSESSMENT AND FISHING GEAR DEPLOYMENT
1:100,000 Mapsheet 2 of 3

Golder Associates Burnaby, B.C.

PROJECT No. 06-1413-034			SCALE AS SHOWN	REV. 0
DESIGN	JH	21 Nov. 2006	FIGURE 1B	
GIS	CDB	13 Dec. 2006		
CHECK				
REVIEW				

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BACK RIVER (ARCTIC) DRAINAGE

QUOICH RIVER DRAINAGE

PRINCE RIVER DRAINAGE

Vault Lake

Turn Lake

Drilltrail Lake

Second Portage Lake

Third Portage Lake

Inuggugayualik Lake

Amarulik Lake

N

C25 R25 103 102 104 105 Pit-23b 106 R26 107 108 R27 109 101 R24 C24 99 Pit-22 98 97 96 R23 95 C23 94 C22 93 92 91 90 Pit-20 C21 89 R21 88 C20A 87 R20 C20 86 Pit-19 C19A R19 84 B05 (C19) 83 R18A 82 C18A Pit-18 81 R18 C18 80 R17 79 C17 78 77 76 R16 75 C16 Pit-17 74 73 72 R15/B04 71 B04 (C15) Pit-16 70 R14 C14 69 68 67 66 Pit-15 65 64 R13 C13 63

620000 622000 624000 626000 628000 630000 632000 634000 636000 638000 640000 642000

7220000 7218000 7216000 7214000 7212000 7210000 7208000 7206000 7204000 7202000 7200000 7198000 7196000 7194000 7192000 7190000 7188000 7186000

LEGEND

- Meadowbank Project
- Kilometre Marker
- Proposed Route
- Watercourse
- Waterbody
- Contour (10 m interval)
- Watershed Boundary
- Habitat Assessment (Spring and Fall)
- Hoop Net (Spring)
- Hoop Net (Fall)
- Larval Drift Trap
- Minnow Trap
- Rock Pit (investigated)
- Rock Pit (to be quarried)
- Archaeological Site
- Stream Crossing (30 m bridge)
- Stream Crossing (12 m bridge)
- Stream Crossing (multiple culverts at bottom)
- Stream Crossing (single culvert at bottom)

REFERENCE

Cumberland Resources Ltd.

Datum: NAD 83 Projection: UTM Zone 14

2,000 1,000 0 2,000 Metres

Scale - 1:100,000

PROJECT: CUMBERLAND RESOURCES LTD.

TITLE: ALL-WEATHER PRIVATE ACCESS ROAD
STREAM CROSSINGS SHOWING LOCATIONS OF HABITAT ASSESSMENT AND FISHING GEAR DEPLOYMENT
1:100,000 Mapsheet 3 of 3

Golder Associates Burnaby, B.C.

PROJECT No. 06-1413-034			SCALE AS SHOWN	REV. 0
DESIGN	JH	21 Nov. 2006	FIGURE 1C	
GIS	CDB	18 Dec. 2006		
CHECK				
REVIEW				

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1.2. Objectives

The monitoring plan is included as **Appendix J** of the 2007 Annual Report - AWPAR. Key objectives for 2007 included:

- *Assessment of fish passage at R02 and R06* – This included identifying, tagging and collecting biological information for all fish caught in the hoopnets, which were deployed both upstream and downstream of crossing structures. Current velocity data were also collected.
- *Baseline reproductive levels at R02* – Habitat compensation structures are planned for implementation at R02. Additional baseline data on larval drift rates was collected to document current levels of reproductive activity at several locations upstream of the crossing in relation to two proposed compensation areas.
- *Creel survey* – The creel survey was included as part of a larger effort to obtain information on hunting and fishing habits from the Baker Lake Hunter/Trapper Organization (HTO). In particular, we are interested in any stream fishing conducted at the AWPAR crossing.

In addition, opportunistic observations of arctic grayling at R06 documented spawning behaviour in an area of introduced construction-related gravels just upstream of the bridge on the north side. These observations were recorded in **Appendix A** and are discussed as relevant in the main document.

2. METHODOLOGY

2.1. Equipment

Hoopnets were set at Crossing R02 and R06 to determine if arctic grayling migration trends were affected by bridge structures at R02 and R06. The sizes used in 2007 consisted of either four-foot (1.22 m) or three-foot (0.9 m) diameter front hoop dimensions, 17 feet (4.9 m) long with a total width, including wings of either 9 m or 15 m, respectively. They consisted of a series of 4 hoops with 25 cm square size (1 inch) mesh. The hoopnets were set with aluminum poles. Fish were trapped in the hoopnets and retained alive as they moved up- or downstream depending on the orientation of the net. Fish were tagged where possible to facilitate later identification.

Initial efforts were focused on assessing upstream migration past the bridges by setting nets in an upstream orientation immediately downstream and upstream of the bridges. Absolute confirmation of upstream migration would be achieved by catching tagged fish (i.e., those tagged in the downstream trap) upstream of the bridge.

Once upstream migration rates tailed off, nets were reoriented to collect returning fish in an attempt to track tagged arctic grayling. Eight (8) hoopnets in total were used for data collection. As many as five (5) hoopnets at R02 and three (3) hoopnets at R06 were set from June 22 to July 29th, 2007. Collection results were recorded daily.

Larval drift traps were deployed at R02. Seven (7) larval drift traps were set throughout the two proposed compensation option areas (COA and COB) upstream of bridge R02. Larval drift traps consist of 0.5 mm nitex mesh traps attached to the back of a square, cone-shaped aluminum frame. The frame consists of a trailing net and Nalgene collection jar which was submerged into the stream and anchored between two aluminum polls. These traps passively collected drifting fish eggs, newly hatched fry and invertebrates drifting downstream. The effectiveness of these traps to target the larval fish drift is related to the surface area of the trap in water column (m^2), stream velocity (m/s) and stream positioning.

Table 1 outlines the UTM coordinates of hoop nets, number of hoop nets, orientation, timing of sets and proximity to the respective bridge structures. **Table 2** outlines the drift trap identifications and UTM coordinates of larval drift traps set from June 28 to July 31, 2007. Refer to **Figure 2** for hoop net locations and **Figure 3** for larval drift trap locations.

Table 1: UTM Coordinates for Hoop Nets and Distances from Bridge (14W, NAD83), 2007.

Crossing ID	GPS Location	Orientation	# of Hoop Nets	Proximity to Bridge	Date
R02	643734 7173402	US	2	~150 m US	June 20 – July 12
	643901 7143215	US	1	~ 200 m DS	June 20 – June 26
	643759 7143393	US	2	~20 m US	June 26 – July 9
	643969 7143175	US and DS	2	~ 300 m DS mid channel	June 26 – July 24
R06	638000 7155883	US	2	~ 300 m US	June 20 – July 5
	638117 7155830	US; DS	1	~20 m DS	June 26 – June 29; June 30 – July 4
	638058 7155888	US and DS	2	~ 20 m US	July 5 – July 29

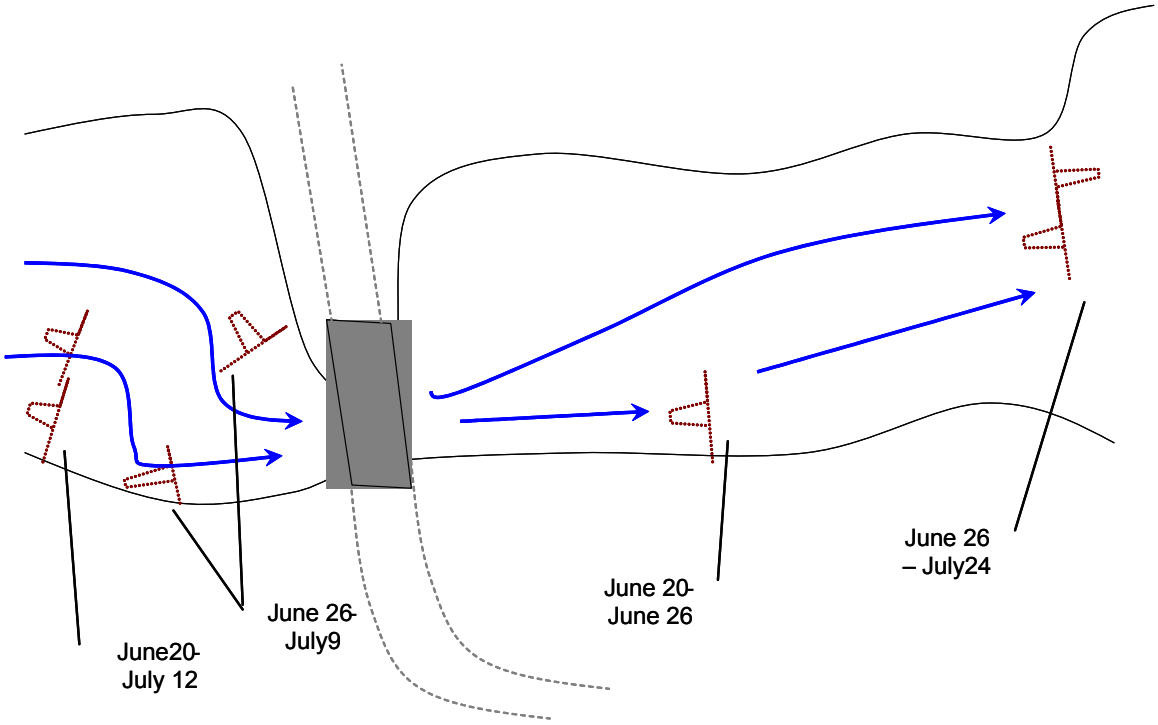
Notes: Permitted by watercourse conditions (limited by personal safety restrictions early in the sampling period due to high flows), hoop nets were relocated to maximize fish collection of upstream moving arctic grayling, upstream of the respective bridges. US = upstream, DS = downstream.

Table 2: Larval Drift Trap Locations (14W, NAD83) set from June 23 to July 30, 2007.

Location	DT ID	GPS Coordinates
R02 COA	A1	0643672 7143516
	A2	643712 7143452
	A3	643759 7143428
	A4	643764 7143401
R02 COB	B1	643439 7143447
	B2	643457 7143439
	B3	643579 7143571

Notes: COA = compensation option A, COB = compensation option B.

Figure 2: Hoop Net Locations at R02 (top) and R06 (bottom).



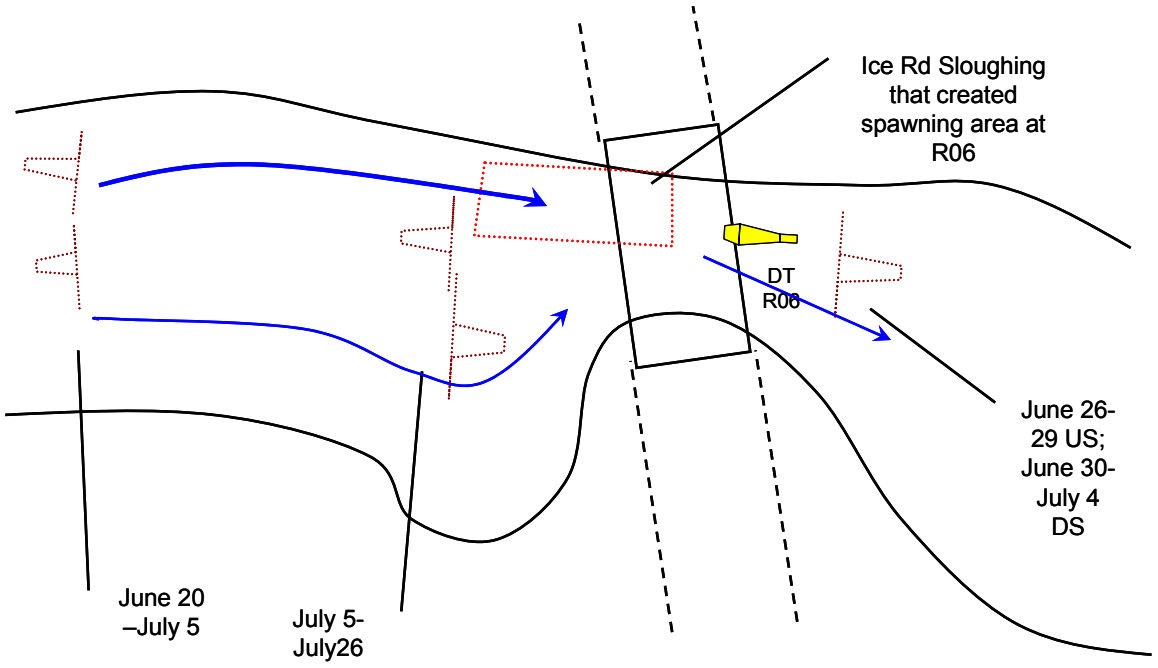
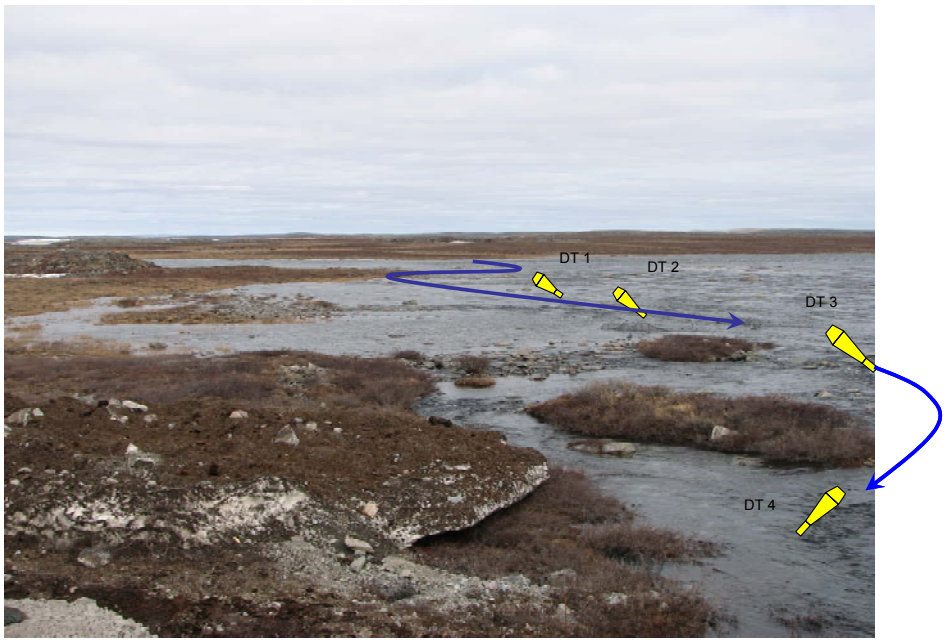
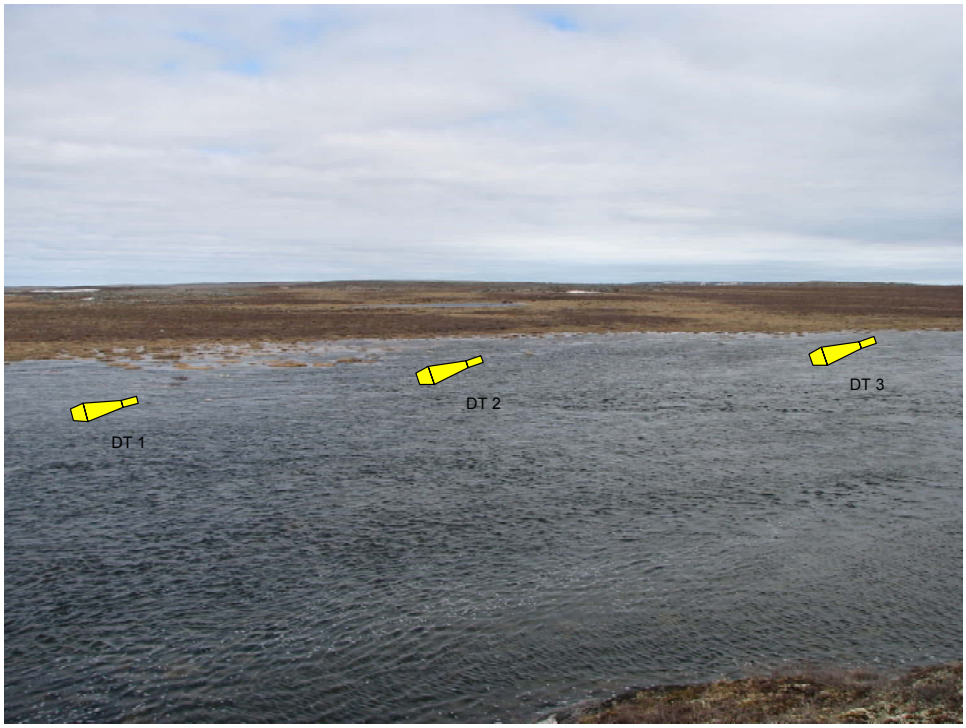


Figure 3: Compensation Option A (COA) -Side Channel (top)- and COB -Staff Gage (bottom)- Drift Trap Locations.





2.2. Data Collection

Hoop nets were set at locations upstream and downstream of bridge crossings with a focus on documenting upstream movements of arctic grayling past the installed bridges at R02 and R06. Hoop nets were set in areas that provided refuge for fish during peak flows and in areas with sufficient depth and preferably in the thalweg. Additionally, the exact selection for hoop net set locations were based on a number of suitability factors including: stream velocity, depth, substrate and practicality of set locations during high flow periods.

In total, seven (7) larval drift traps were set in the two compensation option areas (A and B) upstream of Bridge R02. Four (4) drift traps were set through Compensation Option A (side channel) which starts approximately 50 m upstream of bridge R02 and extends about 400 m along the south side of the river. Three (3) drift traps were set in Compensation Option B extending approximately 350 m along the north shore of R02 about 600 m upstream from Bridge R02. The primary goal of the drift trap sets was to spatially quantify and compare the spawning capacity within the compensation option areas. Secondly it was to provide evidence for preferred spawning conditions by correlating the spawning capacity with physical information (i.e., substrate, velocity and depth) to assist in compensation design and monitoring (see **Figure 3** and Photos in **Appendix B**).

Ambient temperature and water temperature data were collected upon arrival at each stream or river using a standard pre-calibrated field Hg thermometer. Stream velocities were collected periodically downstream and upstream of bridge crossings using the pre-calibrated Swoffer Model 2100. Where applicable, three (3) or more velocities measurements were taken in transects across the watercourse, usually upstream and downstream of the bridge.

2.2.1. Larval Drift Collection

Drift traps were checked nearly every day and fish eggs or fish larvae (young-of-the-year (YOY) were processed in the field lab. Invertebrate species collected in the larval drift traps were also identified at least to order; no quantification was conducted. The larval fish samples were analyzed in the field lab and preserved in a diluted formalin solution for confirmation of taxonomic identification by North/South Consultants Inc. (Winnipeg, MN.) with the use of larval taxonomic keys (Auer, 1982; Konrad, 1985).

2.2.2. Hoop Net Collection

Fish were removed and evaluated from hoop nets nearly every day. The fish were identified to species, measured for fork length (+/- 1 mm) using a standard measuring

board, weighed using a Pesola field scale (+/- 2g), examined for external health, and arctic grayling were examined for sexual maturity and spawning condition (immature, waiting to spawn next year, ripe and spawning or spent) by evaluating dimorphic traits and gentle palpitation of the belly.

3. RESULTS

This section summarizes the fisheries data collected at R02 and R06 including: larval fish data, water temperature, stream velocities, fish migration, maturity and sex and size distributions of arctic grayling. Velocities at R05 are also included as a point of reference. Raw data is provided in **Appendix C**.

3.1. Stream Velocities

3.1.1. R02

Stream velocities were periodically measured at crossing R02 from June 26 to July 24, 2007. Staff gage measurements were taken from June 21 to July 26, 2007. **Figure 4** illustrates the average velocity and staff gauge results at R02 by date. Average peak flow of 1.70 m/s occurred on June 28 and velocities decreased through the open water season. It is likely that velocities were greater than 2.0 m/s at peak freshet. As a comparison, on June 26 velocities were measured upstream and downstream (1.6 m/s to 0.5 m/s, respectively) with an average difference of 1.1 m/s.

Staff gage water level depth receded from 817.5 to 350 mm from June 26 to July 26, 2007. Depths are not precise water column depths, rather these data represents a change in the water level at the location of the staff gage (i.e., the water levels at R02 decreased by 467.5 mm at the staff gage).

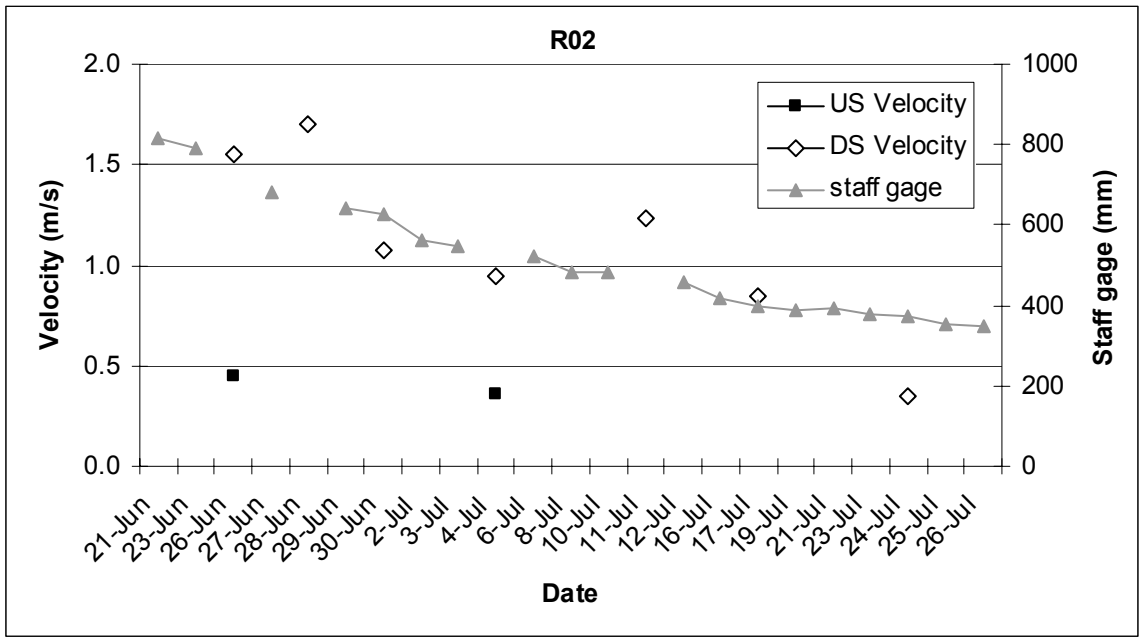
3.1.2. R05

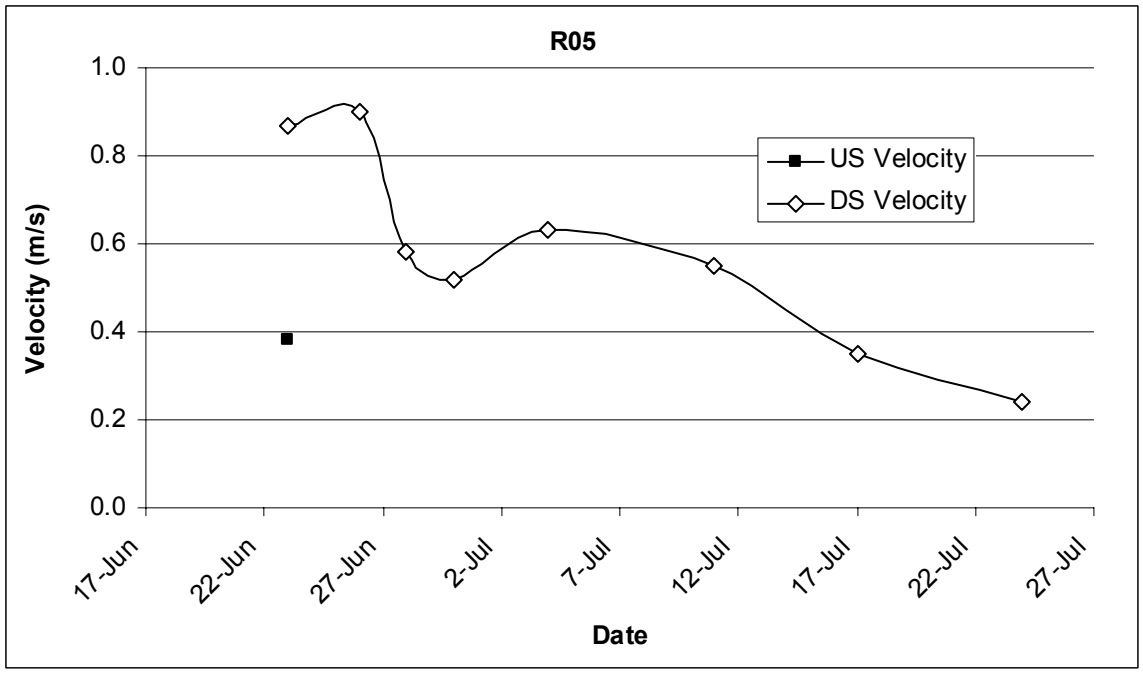
Stream velocities at R05 were collected from June 23 to July 24, 2007 for information purposes only. Average downstream flow of 0.90 m/s was recorded on June 26, as compared to the upstream flow of 0.4 m/s on June 23. Velocities declined through the open water season (see **Figure 4**).

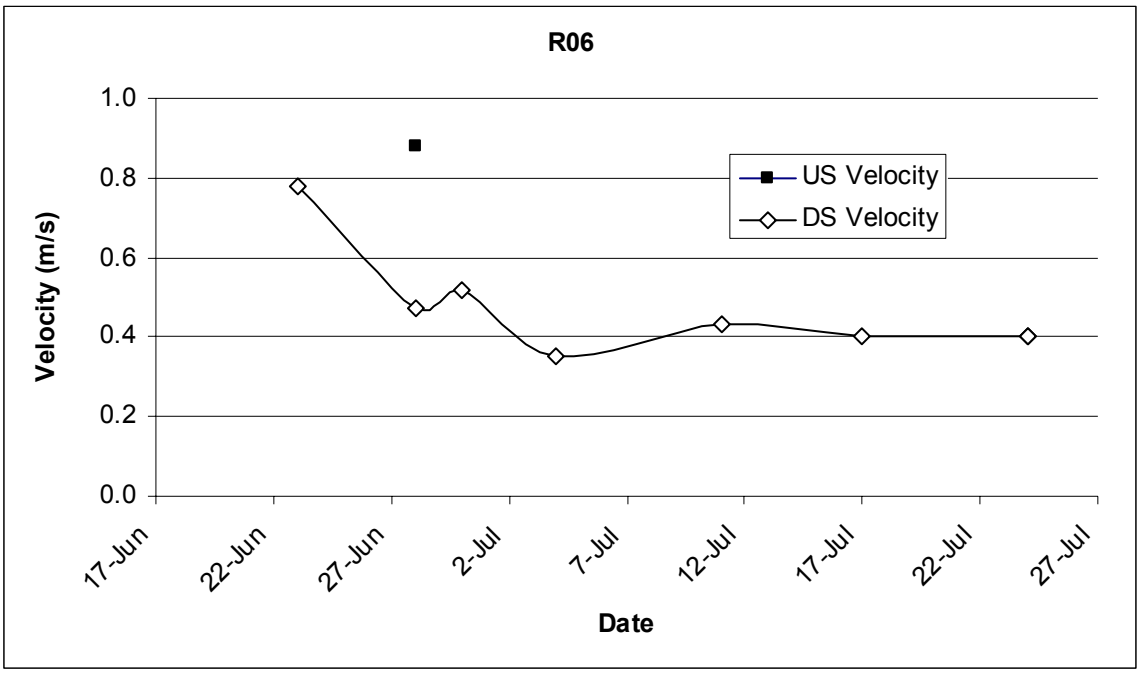
3.1.3. R06

Stream velocities at R06 were collected from June 23 to July 24, 2007. Average peak flow of 0.78 m/s occurred on June 23. Flows were greater by 0.48 m/s upstream than downstream on June 23. **Figure 4** graphically illustrates decreased flows throughout the open water season.

Figure 4: Stream Velocities at R02, R05 and R06, 2007.







Notes: US = upstream, DS = downstream.

3.2. Larval Drift

3.2.1. Biological Characteristics

Larval drift traps were set in two general locations upstream of bridge crossing R02 from June 28 to July 30, 2007. Fish larval drift includes eggs and young of the year (YOY). **Table 3** summarizes the larval data collected at R02 and **Table 4** summarizes the invertebrates collected at R02.

Table 3: Larval Drift collected at R02 Compensation Area A and B, 2007.

YOY by Species	Compensation Area A				Compensation Area B			Total
	Drift Trap				Drift Trap			
	1	2	3	4	1	2	3	
ARGR	80	45	22	23	54	25	43	292
SLSC/ NSST	5	2	4	0	3	7	12	33
BURB	1	0	0	0	0	0	1	2
								327

Notes: YOY = Young-of-the-year, ARGR = arctic grayling, SLSC/NSST= slimy sculpin / ninespine stickleback, BURB = burbot.

A total of 327 fish larvae and 4 eggs of arctic grayling (*Thymallus arcticus*), slimy sculpin (*Cottus cognatus*) or ninespine stickleback (*Pungitius pungitius*) and burbot (*Lota lota*) were collected in 2007. All eggs captured in the drift traps were arctic grayling, which are broadcast spawners, as opposed to slimy sculpin and ninespine stickleback, which are nest builders and actively defend their broods (Scott and Crossman, 1973). **Table 4** outlines the observed invertebrate collection of all drift traps at R02. Invertebrates collected in the drift traps were identified at least to order; no quantitative analysis was conducted.

Table 4: Invertebrates Collected at Respective Crossings, 2007.

Invertebrates Collected at R02
Chironomidae, Hydracarina, Cladocera, Copepoda, Oligochaeta, Plecoptera, Tipulidae, Gastropoda, Hydroids

As summarized in **Table 3**, 292 arctic grayling YOY and 33 slimy sculpin or ninespine stickleback YOY were collected and 2 burbot were collected from June 28 to July 30, 2007. It is likely based on the habitat preference that the fish species represented in **Table 3** as ninespine stickleback and slimy sculpin were mostly slimy sculpin. These two species were grouped together because it is difficult to accurately distinguish between the species at that life stage without an adequate microscope. For the purposes of this report they were grouped together. Burbot larvae were collected in COA DT1 and COB DT3, which were located within 150 m of one-another, but on opposite sides of the river. Burbot spawn in the winter in lakes (Scott and Crossman, 1973) and therefore it is likely that burbot YOY drift was displaced from the upstream lake.

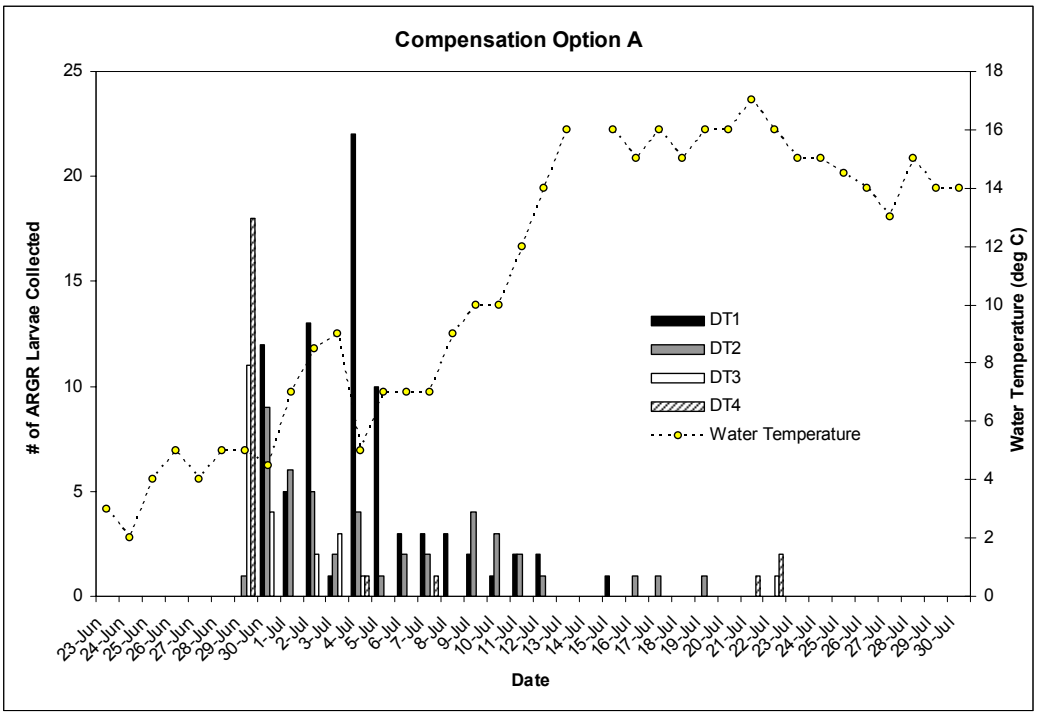
In total, 170 arctic grayling YOY were collected within Compensation Option A and 122 were collected within Compensation Option B. As illustrated in **Figure 5**, arctic grayling YOY were present within the first day of our drift trap sets as temperatures began to stabilize around 5 °C.

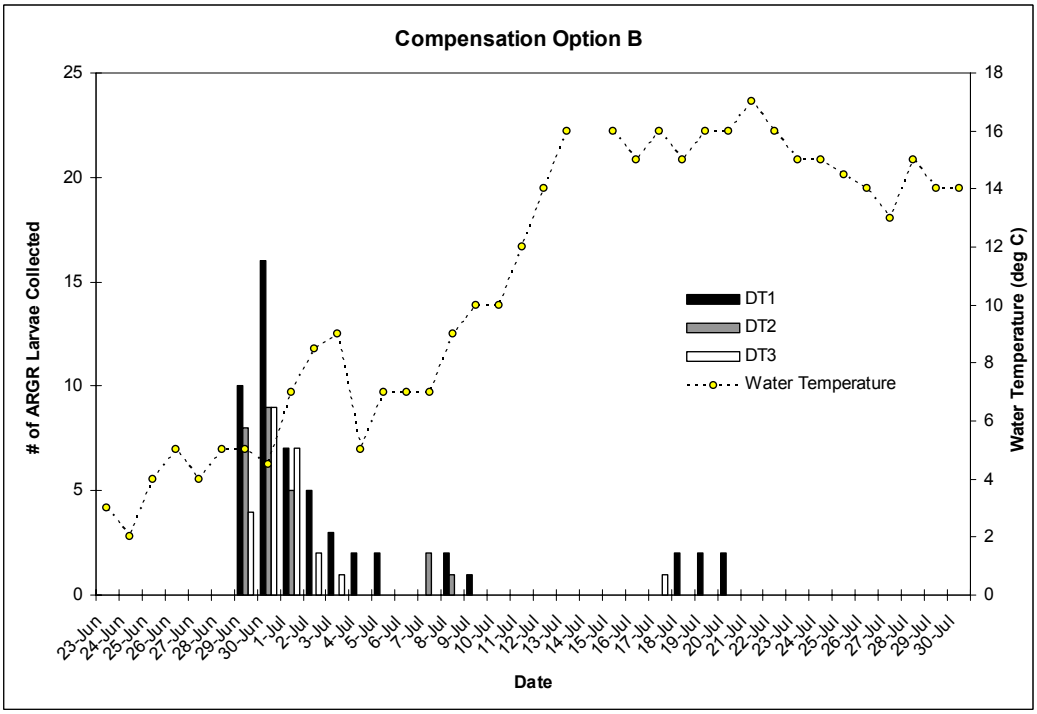
Drift trap 1 (DT1) in Compensation Option A had the greatest abundance of arctic grayling YOY (n=80). In total fewer arctic grayling were collected at drift trap 2 and 4, with the fewest collected at drift trap 3 in Compensation Option A. The peak one-day collection at Compensation Option A was 22 arctic grayling YOY collected at drift trap 1 on July 4, 2007. On June 29, 18 of the 23 total arctic grayling YOY were collected at drift trap 4. **Figure 5** illustrates the spatial (per drift trap) and temporal (by date) distribution of larval drift collection at Compensation Option A and B.

In total, drift trap 1 in Compensation Option B collected the greatest abundance of arctic grayling YOY (n=54). The fewest were found in drift trap 2 (n=25). Peak one-day collection at all drift traps within Compensation Option B occurred on June 30, 2007, with 16 arctic grayling YOY collected at drift trap 1.

It is important to note that the larval capture data, while directed to specific locations in the river, are representative of overall conditions and are not necessarily linked to the specific proposed compensation areas. For example, the upstream drift traps in both locations yielded the highest catch rates per location, suggesting that upstream inputs from other spawning areas are more important than within-compensation-area inputs. That is understandable in a baseline survey, particularly since both proposed compensation areas were identified based on their potential for improvement rather than on existing contributions to productivity.

Figure 5: Spatial and Temporal Distribution of arctic grayling collected per day in Compensation Options A & B and Water Temperature at R02, 2007.





Notes: DT = drift trap.

3.2.2. Physical Characteristics

Physical data was collected at R02 upstream of all drift traps in order to relate existing substrate, descriptive characteristics, depth and velocity to arctic grayling YOY in Compensation Option A and B. Greater than 20 m transects upstream of drift traps were taken throughout Compensation Option Areas A and B during peak spawning on June 29. Measurements were taken on 2 or 4 m intervals to provide the most representative characterization. **Table 5** summarizes these findings including average, max and standard deviations for depth and velocity.

The peak average velocity (0.44 m/s) was in a riffle portion predominated by boulder cobble substrate. The lowest velocity (0.13 m/s) was in a pool predominated by cobble substrate. Average depths ranged from 0.17 to 0.26 m.

Table 5: Characterization of Compensation Option A and B at R02 upstream of respective drift traps, 2007.

	Compensation Area A								Compensation Area B					
	Drift Trap								Drift Trap					
	1		2		3		4		1		2		3	
Total # of ARGR YOY	80		45		22		23		54		25		43	
Flow Description	Riffle		Riffle/ glide		Riffle		Riffle & Pools		Riffle		Glide		Glide	
Substrate (%)														
Boulder	60		45		55		20		25		50		40	
Cobble	30		40		35		70		55		35		50	
Gravel	10		15		10		10		20		15		10	
Depth(m)/ Velocity (m/s)														
AVG	0.17	0.42	0.23	0.21	0.18	0.44	0.24	0.13	0.37	0.29	0.26	0.15	0.26	0.37
Max	0.30	0.80	0.40	0.50	0.40	0.85	0.45	0.50	0.65	0.60	0.40	0.30	0.35	0.70
STD	0.09	0.25	0.08	0.14	0.12	0.28	0.10	0.20	0.21	0.21	0.09	0.11	0.10	0.15

Notes: ARGR = arctic grayling, YOY = young-of-the-year, AVG = average, Max = maximum, STD = standard deviation.

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3.3. Arctic grayling (*Thymallus arcticus)* Biology

Arctic grayling catch data were recorded at crossing R02 from June 20 to July 24, 2007 and at crossing R06 from June 20 to July 29, 2007. **Table 6** provides an overview of the fish results.

Table 6: Number of Individual Fish Collected per Crossing.

	Site ID		
Species	**R02**	**R06**	**Total**
ARGR	139	140	279
LKTR	12	2	14
RDWH	1	0	1
Total	152	142	294

Notes: ARGR = arctic grayling, LKTR = lake trout, RDWH = round whitefish.

The following section summarizes the results of arctic grayling migration data at R02 and R06; it does not review the data on round whitefish or lake trout as the focus of this study was to review the biological data of arctic grayling, migration patterns (i.e. are they able to pass beyond the bridges), general trends in movements, sex and maturity, and size distribution data for arctic grayling at the respective crossings.

Table 7 summarizes the biological data for mature and juvenile arctic grayling at R02 and R06.

Table 7: Summary of arctic grayling Data.

		Length (mm)				Weight (g)				Condition Factor (K)			
Crossing ID	**n**	**Mean**	**Max**	**Min**	**SD**	**Mean**	**Max**	**Min**	**SD**	**Mean**	**Max**	**Min**	**SD**
R02	195	308.7	382	158	37	336.52	600	76	100.73	1.17	3.55	0.77	0.22
R06	85	307.0	380	150	47	352.04	615	90	115.62	1.16	4.30	0.44	0.33
Mean		308.2				344.28				1.165			

Notes: Condition factor: $K = (\text{weight} \times 10^5) / (\text{length}^3)$; unitless.

3.3.1. Migration beyond Bridge Structures

Table 8 summarizes the arctic grayling migration patterns at R02 and R06 upstream and downstream of the respective bridge structures.

Table 8: Arctic grayling migration beyond bridge R02 and R06.

Arctic grayling collected upstream of bridge			
Crossing	***Date***	***Migration Direction***	***n***
R02	June 24 - July 1	US	63
R06	July 9 - July 17	DS	4

Arctic grayling collected downstream of bridge			
Crossing	***Date***	***Migration Direction***	***n***
R02	June 26 - July 8	US	13
	June 30 - July 15	DS	63
R06	July 1 - July 4	DS	136

Notes: US = upstream, DS = downstream.

3.3.1.1. R02

Arctic grayling were first collected migrating upstream of bridge R02 on June 24, 2007 with peak migration (n=23) occurring on June 26, 2007. During the highest flow period, upstream hoop nets at R02 were set in glide sections near a possible spawning and refuge side pool. As water flow decreased, nets were set to collect fish passing through the thalweg of the main and side channel upstream of bridge R02. In total, 63 arctic grayling were collected just upstream of bridge R02.

Hoop nets oriented to collect upstream migrating arctic grayling were also set downstream of bridge R02. Arctic grayling were first collected here on June 26, 2007. A tandem net with upstream and downstream oriented nets was set downstream of bridge R02 on June 26, 2007. In total, 76 arctic grayling were collected downstream of bridge R02; 13 moving upstream and 63 moving downstream.

3.3.1.2. R06

Arctic grayling were first collected moving upstream at R06 on July 9, 2007. Arctic grayling were observed passing below bridge R06 on June 28 and throughout late June. Male grayling were observed defending spawning grounds near bridge R06, which prompted Azimuth representatives to set hoop nets downstream, as upstream hoop nets were not effectively collecting fish. In total, 4 arctic grayling were collected upstream of bridge R06 and 136 arctic grayling were collected downstream, migrating in a downstream direction.

3.3.2. Arctic grayling (*Thymallus arcticus*) Migration Patterns

3.3.2.1. Upstream and Downstream Movements at R02

Arctic grayling were collected migrating upstream at R02 on June 24, 2007, with peak upstream migrations occurring on June 26 and peak downstream migrations occurring on July 4, 2007. **Figure 6** illustrates upstream and downstream migration patterns together with water temperature changes.

Due to the characteristics of movements at R06 (i.e. few arctic grayling were collected moving upstream and peak migrations downstream were documented in a short period of time), migration patterns were not graphically illustrated for R06.

3.3.2.2. Maturity and Sex at R02 and R06

Figure 7 represents the upstream and downstream movements of males and females at crossing R02. Arctic grayling immature, ripe and spawning males and females were collected moving upstream and downstream from June 24 to July 15, 2007 at crossing R02. All of the arctic grayling collected migrating upstream from June 26 to July 1, 2007 at R02 were either ripe or immature. Few arctic grayling collected moving downstream were ripe, most were spent and immature from June 30 to July 15, 2007. Four (4) arctic grayling were recaptured at R02; one was a large-spent male moving downstream and the others were immature.

R06 patterns were not graphically illustrated. The general trends were that nearly all arctic grayling were moving downstream with many ripe or spent females and ripe males, fewer were spent males and the remainder were immature male and female. No upstream moving fish were re-captured with the downstream sets.

3.3.3. Size Distribution at R02

Length-frequency distributions were plotted for upstream and downstream arctic grayling at R02 (see **Figure 8**). Statistics for length and weight are presented in **Table 7**. A modal length distribution was centered at 330 mm (n=51). Compared to R06, the mean length (308.7 mm) and condition factor (1.17) of arctic grayling at R02 were slightly greater. Arctic grayling ranged in length from 158 – 382 mm (R02) and 150 – 380 mm (R06).

Figure 6: Arctic grayling (ARGR) Upstream and Downstream Migration Patterns with Water Temperature at R02 by date, 2007.

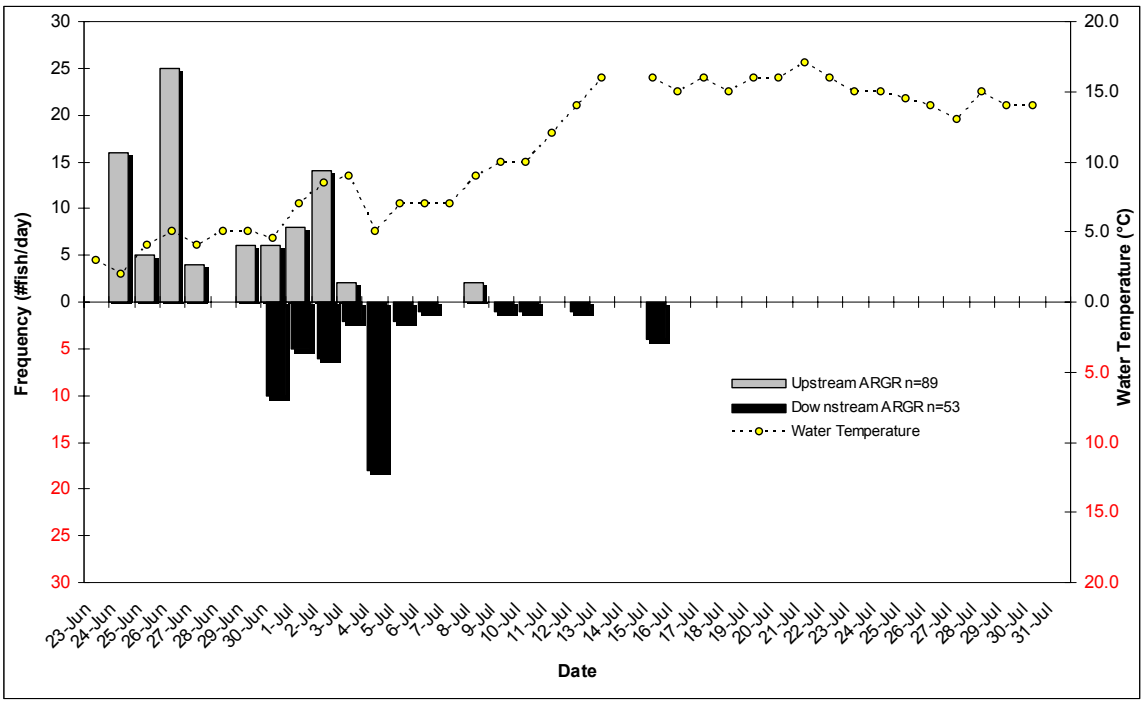


Figure 7: Male and Female Migration Patterns at R02, 2007.

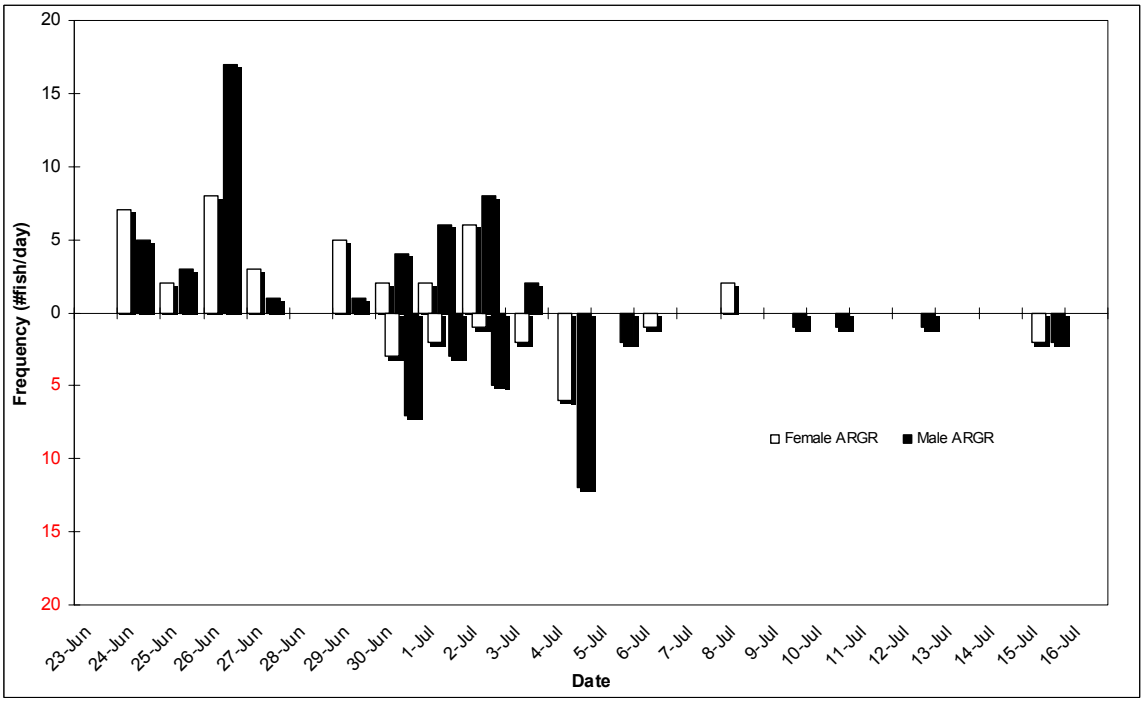
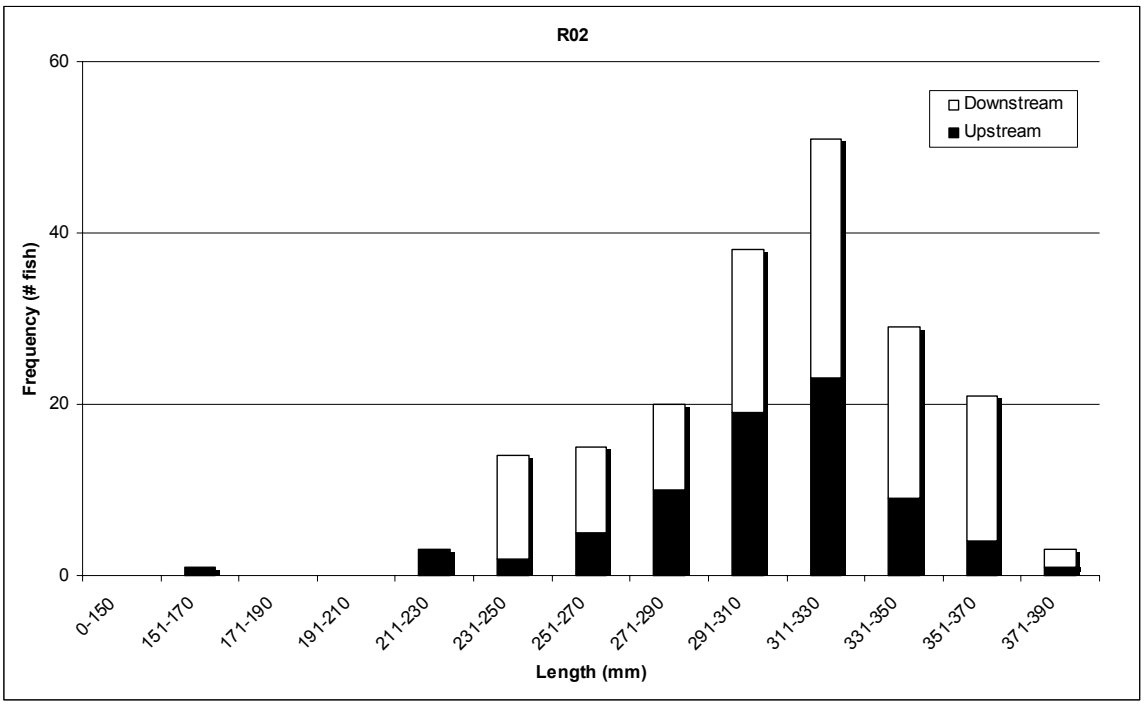
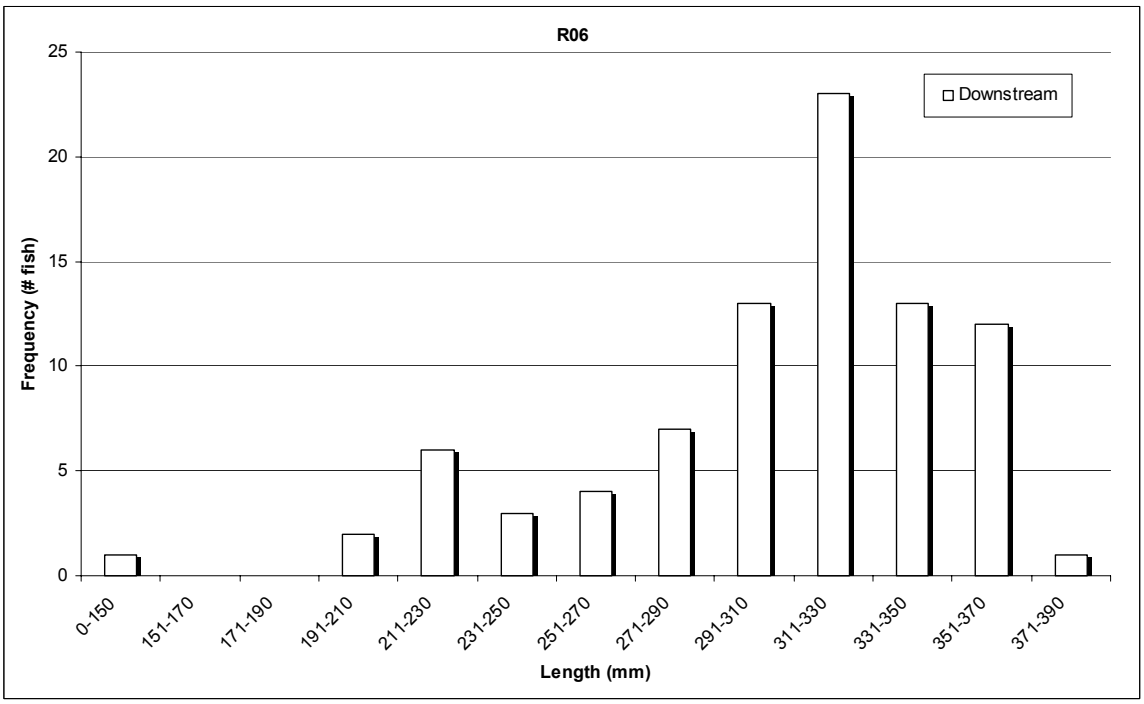


Figure 8: Length-Weight Frequencies at R02 and R06, 2007.





3.3.4. Size Distribution at R06

Length-frequency distributions were plotted for downstream moving arctic grayling at R06 (see **Figure 8**). Statistics for length and weight are presented in **Table 7**. The average length and condition factor were less than fish from R02. The largest arctic grayling was 380 mm and the smallest 150 mm.

3.4. Creel Survey

Fish harvest information (species and locations) received from Baker Lake residents is provided in **Appendix D**. Consistent with previous fishing patterns, efforts in 2007 were directed primarily to spring ice-fishing on a range of lakes in the region. During spring, both the weather and ice conditions are conducive to ice fishing.

Based on the available data and many discussions with locals, there does not seem to be a history of stream fishing in the region. The 2007 catch maps (**Appendix D**) confirm that the AWPAR streams are not targeted by local fishers.

4. INTERPRETATION AND DISCUSSION

4.1.1. Larval Drift

Arctic grayling habitat requirements are summarized in **Table 9**. Arctic grayling are spring spawners that migrate from lakes and larger rivers into smaller streams to spawn over gravel or rocky bottoms (McPhail and Lindsey, 1970) in unembedded clean gravel with velocities generally between 0.15-0.25 m/s (Beauchamp, 1990; Evans et al., 2002; BC MWLAP, 2002). Spawning occurs with water temperatures between 7-10 ºC (Scott and Crossman, 1973). Young hatch within 16-18 days at water temperatures of 9 ºC (McPhail and Lindsey, 1970), or within 8-32 days at water temperatures of 15.5 – 5.8 ºC (Krueger, 1981). Fry then reside in semi-deep pools and side channels at water depths approximating 0.5 m, over boulder, cobble, silt and sand substrates (Ford et al., 1995). This may explain why a greater amount of arctic grayling were collected at Compensation Option A (COA), as compared to COB, as it is situated downstream of a riffle and a pool. Larval drift was first collected at about 5 ºC.

The 2007 results demonstrate that arctic grayling are successfully spawning upstream of R02, which indicates that arctic grayling are not impeded by bridge construction. Further to these findings, the results demonstrate that there is much uncertainty in attempting to find a quantitative relationship between biological drift results and physical characteristics of a stream (especially within a short reach), as drift not collected upstream of one trap may be collected by a downstream trap, thus not representing the biological use of the physical data describing the upstream area.

The literature summary, fisheries data collected in 2007, and historical data (Azimuth 2005 and 2008) collected in spawning areas has provided a preliminary basis for the habitat compensation characterization. As reported in **Table 10**, arctic grayling prefer to spawn on clean gravel where flow velocity ranges from 0.1- 0.2 m/s and water is about 0.3 m in depth. This type of spawning habitat was observed to have higher success than other stream characteristics.

Interestingly, arctic grayling spawning behaviour was observed at R06 (see **Appendix A**) in an area where AWPAR construction-related materials were deposited into the stream channel upon snowmelt. While the introduction was inadvertent, spawning was observed in the area and down-steam deployment of a drift net confirmed success. This may be significant in that there are no apparent sources of rounded or sub-angular gravel-sized material; AEM is currently planning on shipping appropriate materials at great expense from Quebec. The main concern regarding the use of angular blast material (i.e., like the R06 material) is the tendency of it to settle and compact the interstitial spaces over time, making it less suitable for spawning.

Table 9: Literature Review of Biological Criteria for Preferred arctic grayling Habitat.

Life Stage	Substrate	Flow/ Velocity (m/s)	Water Depth (m)	Source
Spawning	Unembedded gravel about 25 mm diameter	1.4	Varying depths	Evans et al., 2002
	Clean gravel		0.3 - 0.8	BC MWLAP, 2002
	< 80 mm gravel	<0.21	Pools nearby	Beauchamp, 1990
		0.15 - 0.25		Deegan et al., 2005
Rearing	Fry reside in pools and side channels over boulder, cobble, silt/sand substrates.	0.8	Semi deep	Evans et al., 2002
	Sand and coarse pebbles	0 - 0.1	0 – 0.4	Sempeski and Gaudin, 1995
Foraging	Post spawning in rubble and gravel, fine-coarse grain substrates.		Semi deep pools	Evans et al., 2002
	Boulder to gravel (32 – 64 mm)	0.3	0.5	Vehanen, 2004

The literature in addition to the observations and data collected at R02 and R06 (further R06 observations are summarized in **Appendix A**) substantiate these flow, depth and substrate characteristics, and together provide a modest attempt at quantifying the biological criteria preferred by arctic grayling within the AWPAR watershed.

Table 10: Summary of Preferred arctic grayling Biological Criteria.

Life Stage	Substrate	Flow/ Velocity (m/s)	Water Depth (m)
Spawning	10% cobble, 90% gravel	0.1 – 0.2	0.2 – 0.4
Rearing	33% boulder, 33% cobble, 33% gravel	0 – 0.1	0 – 0.8
Foraging	40% boulder, 40% cobble, 20% gravel	< 1.0	0 – 0.8

4.1.2. Migration and Stream Utilization

Arctic grayling spawn with peak migrations in early spring followed by a post-spawning run in tributaries and then return to the lakes and larger rivers (Chang-Kue and Cameron, 1980). These trends were observed as arctic grayling were collected migrating on June 24 until July 15, 2007 at R02. Movements began below 5 ºC and peaked below 10 ºC. It is important to note that the total number of arctic grayling captured may not be indicative of the true number of fish using these watercourses; due to the available equipment, the set location, and the safety limitations post freshet.

The data illustrates that males and females are using R02 as spawning grounds or as a migration corridor. The literature suggests that males migrate to the spawning grounds first and are followed by females (Evans et al., 2002). There is no clear distinction between the timing of male and female movements at R02 in 2007.

The upstream-oriented hoop net results for R02 suggest that despite increased velocities associated with the horizontally-constrained flow between the abutments, fish are migrating upstream to spawning areas. The literature indicates that arctic grayling have a *sustained speed* of 0.8 m/s, a *prolonged speed* of 0.8 - 2.1 m/s and a *burst speed* of 2.1 – 4.3 m/s (MOT, 2006) (defined as the ability to maintain a speed indefinitely, can be maintained up to 200 minutes, and can be maintained for 15 seconds, respectively). The current velocities measured in the field (see **Section 3.1.1**) would fall within the upper range of prolonged swimming speeds for Arctic grayling. While peak freshet velocities were likely even higher than those measured, they would not be expected to exceed the burst speed velocity range. Consequently, the combination of hoop net results and measured current velocities both support the conclusion that upstream migration is not hindered at R02. Given that R06 had much lower flows, there should be no velocity barriers at that crossing either.

Length-frequency histograms at R02 demonstrate successful recruitment of juvenile arctic grayling with a slightly greater number of arctic grayling at 270 mm and a peak length of mature arctic grayling at 330 mm. There is no significant trend with length and frequency at R06. Length, weight, condition factor statistics indicate that the arctic grayling are in good condition at R02 and R06 and that the system is maintaining a healthy population of arctic grayling.

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APPENDICES

APPENDIX A

R06 SPAWNING OBSERVATIONS AND DOCUMENTATION.

Introduction

From June 27 through June 30, 2007 male and female arctic grayling were observed performing spawning rituals immediately upstream of bridge R06. Thorough observations were made on June 29 of the spawning behaviour of a large male observed defending this territory, including photos and a few digital movie clips documenting his behaviour. Physical data was also collected on June 29. The following section summarizes the behavioural observations, larval collection, and stream characteristics (substrate, depth and velocity during peak spawning time).

Physical Characteristics

On June 29, 2007, Azimuth representatives collected physical data during peak spawning periods at R06 spawning ground. The area is dominated by <25 mm gravel glide area with portions of boulder and cobble pools upstream and a small boulder and cobble predominated riffle area downstream. The following tables provide a detailed summary of the characteristics and location of this spawning ground (**Tables A1 and A2**). Six (6) cross sectional transects were completed every 5 m.

Based on the surrounding substrate, it is likely that the deposited gravel from the winter road sloughing spread over a boulder/ cobble glide area, similar to the adjacent boulder/cobble glide; however it is difficult to determine the exact substrate and morphology the gravel area replaced without previously quantifying its' characteristics.

General behavioural observations

One dominant arctic grayling male was observed on June 29, 2007 defending its spawning grounds. The male defended its territory by fending off competing males and finding refuge in boulders downstream of the gravel spawning area. Two (2) females were staging in the gravel area and waited for the male. As he approached from the downstream boulders, the visibly smaller females directed themselves upstream. The male arctic grayling selected a female and they swam in tandem, thrashed and presumably spawned.

Larval drift trap results

In response to these observations, one drift trap was set downstream of the R06 spawning grounds. The drift trap was set on June 30, 2007. No eggs were collected and a total of 58 young of the year (YOY) arctic grayling were collected on July 23 (n=19), July 24 (n=35), July 25 (n=2) and on July 26, 2007 (n=1). On June 30, temperatures in R06 were 4.5 °C on June 30 and peaked at 15°C on July 11 and remained between 11 and 15°C until July 26, 2007. The trap was pulled on July 30, 2007.

Discussion

The observations and larval drift collection results suggest that the construction-related gravel introduced at R06 is being used for spawning. In 2005, drift traps were set in the same vicinity and caught 20 arctic grayling larvae and one egg. Despite the apparent dramatic increase, a single year's results and limited drift net deployment are not enough to conclude that introduced material has significantly increased productivity. However, we can say that this area should not be cleaned up as was conducted at R02 at the request of DFO.

Table A1: Physical Characteristics of R06 spawning grounds, 2007

Cross section	Distance from N shore (m)	Depth	Velocity	% Substrate		Flow Characteristics
A	10	0.7	0.06	B	70	Pool
	6	0.62	0.06	C	30	
	2	0.2	0.02	G		
	Avg.	**0.51**	**0.05**			
B	10	0.6	0.13	B	20	Glide
	6	0.5	0.1	C	70	
	2	0.25	0.04	G	10	
	Avg.	**0.45**	**0.09**			
C	10	0.425	0.21	B	0	Glide
	6	0.3	0.31	C	30	
	2	0.1	0.23	G	70	
	Avg.	**0.28**	**0.25**			
D	10	0.425	0.16	B	0	Glide
	6	0.38	0.27	C	10	
	2	0.25	0.11	G	90	
	Avg.	**0.35**	**0.18**			
E	10	0.55	0.22	B	40	Glide/ Riffle
	6	0.6	0.24	C	10	
	2	0.2	0.23	G	50	
	Avg.	**0.45**	**0.23**			
F	10	0.25	0.31	B	50	Riffle
	6	0.15	0.77	C	40	
	2	0.18	0.61	G	10	
	Avg	**0.19**	**0.56**			
	Total Avg.	***0.37***	***0.23***			

Table A2: R06 Spawning Ground GPS coordinates (NAD83, 14W), 2007

Corner of R06 Spawning	GPS Coordinates
NW	638081
	7155888
SW	638061
	7155861
NE	638099
	7155822
SE	638102
	7155819

APPENDIX B

PHOTOGRAPHS OF ALL-WEATHER PRIVATE ACCESS ROAD (AWPAR) FISH DATA, 2007.

Appendix B: AWPAR Photographs, 2007

Photo 1: Hoop net check at R02

Photo 2: Female arctic grayling

Appendix B: AWPAR Photographs, 2007

Photo 3: Tagged arctic grayling

Photo 4: Fisheries data collection Crew at R02

Appendix B: AWPAR Photographs, 2007

Photo 5: Hoop nets set at R02

Photo 6: Stream characterization mapping

APPENDIX C

RAW ALL-WEATHER PRIVATE ACCESS ROAD (AWPAR) FISHERIES DATA, 2007.

Date	Time	Crossing	Location wrt Bridge	Fish Mvnt (US/DS)	Fish ID	Species	Length	Weight	Tagging #	Maturity	Notes
24-Jun-07	9:50	R02	US	US	1	ARGR	315	370	85101	8	
24-Jun-07	9:50	R02	US	US	2	ARGR	310	340	85102	?	
24-Jun-07	9:50	R02	US	US	3	ARGR	290	290	85103	8	
24-Jun-07	9:50	R02	US	US	4	ARGR	296	350	85104	3	
24-Jun-07	9:50	R02	US	US	5	ARGR	327	400	85105	3	
24-Jun-07	9:50	R02	US	US	6	ARGR	322	390	85106	3	
24-Jun-07	9:50	R02	US	US	7	ARGR	320	360	85107	?	
24-Jun-07	9:50	R02	US	US	8	ARGR	300	320	85108	3	
24-Jun-07	9:50	R02	US	US	9	ARGR	299	375	85109	3	
24-Jun-07	9:50	R02	US	US	10	ARGR	325	400	85110	2	
24-Jun-07	9:50	R02	US	US	11	ARGR	270	220	85111	?	
24-Jun-07	9:50	R02	US	US	12	ARGR	333	400	85112	8	
24-Jun-07	9:50	R02	US	US	13	ARGR	315	380	85113	?	
24-Jun-07	9:50	R02	US	US	14	ARGR	311	390	85114	3	
24-Jun-07	9:50	R02	US	US	15	ARGR	295	390	85115	8	
24-Jun-07	9:50	R02	US	US	16	ARGR	292	290	85116	8	
25-Jun-07	9:10	R02	US	US	17	ARGR	294	325	85117	3	
25-Jun-07	9:10	R02	US	US	18	ARGR	296	305	85118	8	
25-Jun-07	9:10	R02	US	US	19	ARGR	305	350	85119	8	
25-Jun-07	9:10	R02	US	US	20	ARGR	308	345	85120	8	
25-Jun-07	9:10	R02	US	US	21	ARGR	295	303	85121	4	
26-Jun-07	10:00	R02	US	US	22	ARGR	339	475	85122	8	
26-Jun-07	10:00	R02	US	US	23	ARGR	351	485	85123	8	
26-Jun-07	10:00	R02	US	US	24	ARGR	346	505	85124	8	
26-Jun-07	10:00	R02	US	US	25	ARGR	302	306	85125	8	
26-Jun-07	10:00	R02	US	US	26	ARGR	321	365	85126	8	
26-Jun-07	10:00	R02	US	US	27	ARGR	311	335	85127	4	
26-Jun-07	10:00	R02	US	US	28	ARGR	315	325	85128	3	
26-Jun-07	10:00	R02	US	US	29	ARGR	312	355	85129	3	
26-Jun-07	10:00	R02	US	US	30	ARGR	346	462	85130	8	
26-Jun-07	10:00	R02	US	US	31	ARGR	319	400	85131	3	
26-Jun-07	10:00	R02	US	US	32	ARGR	310	348	85132	8	
26-Jun-07	10:00	R02	US	US	33	ARGR	315	380	85133	3	
26-Jun-07	10:00	R02	US	US	34	ARGR	314	370	85134	8	
26-Jun-07	10:00	R02	US	US	35	ARGR	296	305	85135	8	
26-Jun-07	10:00	R02	US	US	36	ARGR	284	265	85136	1	
26-Jun-07	10:00	R02	US	US	37	ARGR	321	392	85137	8	
26-Jun-07	10:00	R02	US	US	38	ARGR	323	372	85138	8	
26-Jun-07	10:00	R02	US	US	39	ARGR	302	360	85139	3	
26-Jun-07	10:00	R02	US	US	40	ARGR	295	312	85140	8	
26-Jun-07	10:00	R02	US	US	41	ARGR	316	322	85141	8	
26-Jun-07	10:00	R02	US	US	42	ARGR	278	265	85142	8	
26-Jun-07	10:00	R02	US	US	43	ARGR	284	280	85143	4	
26-Jun-07	10:00	R02	US	US	44	ARGR	288	287	85144	8	
26-Jun-07	10:00	R02	DS	US	45	ARGR	320	395	85145	8	
26-Jun-07	10:00	R02	DS	US	46	ARGR	354	520	85146	8	
27-Jun-07	10:00	R02	US	US	47	ARGR	268	215	85147	3	
27-Jun-07	10:00	R02	US	US	48	ARGR	268	215	85148	8	
27-Jun-07	10:00	R02	US	US	49	ARGR	281	245	85149	3	
27-Jun-07	10:00	R02	US	US	50	ARGR	271	235	85150	3	
28-Jun-07	900	R02	US	-	-	-	-	-	-	-	No fish
29-Jun-07	900	R02	DS	US	52	ARGR	310	335	85153	4	
29-Jun-07	1000	R02	US	US	53	ARGR	234	145	85154	1	
29-Jun-07	1000	R02	-	US	54	ARGR	335	390	85155	3	
29-Jun-07	1000	R02	-	US	55	ARGR	342	440	85156	8	
29-Jun-07	1000	R02	-	US	56	ARGR	266	210	85157	3	
29-Jun-07	1000	R02	-	US	57	ARGR	158	140	85158	1	
30-Jun-07	1300	R02	-	US	58	ARGR	317	375	85159	8	
30-Jun-07	1300	R02	-	-	59	ARGR	346	445	85160	3	
30-Jun-07	1300	R02	DS	DS	60	ARGR	342	405	85161	8	
30-Jun-07	1300	R02	-	DS	61	ARGR	326	365	85162	4	
30-Jun-07	1300	R02	-	DS	62	ARGR	349	475	85163	8	
30-Jun-07	1300	R02	-	DS	63	ARGR	328	375	85164	8	
30-Jun-07	1300	R02	-	DS	64	ARGR	357	480	85165	8	
30-Jun-07	1300	R02	-	DS	65	ARGR	292	260	85166	6	
30-Jun-07	1300	R02	-	DS	66	ARGR	312	348	85167	9	
30-Jun-07	1300	R02	-	DS	67	ARGR	316	360	85168	8	
30-Jun-07	1300	R02	-	DS	68	ARGR	316	312	85169	4	
30-Jun-07	1300	R02	-	DS	69	ARGR	294	325	85170	3	
30-Jun-07	1300	R02	US	US	70	ARGR	254	195	85171	1	
30-Jun-07	1300	R02	-	US	71	ARGR	276	240	85172	4	
30-Jun-07	1300	R02	-	US	72	ARGR	306	305	85173	8	
30-Jun-07	1300	R02	-	US	73	ARGR	300	278	85174	8	
30-Jun-07	1300	R02	-	US	74	ARGR	317	350	85175	8	
1-Jul-07	930	R02	DS	US	75	LKTR	680	-	85176	-	
1-Jul-07	930	R02	-	US	76	ARGR	320	370	85137	8	Already tagged
1-Jul-07	930	R02	-	US	77	ARGR	351	470	85177	3	
1-Jul-07	930	R02	-	US	78	ARGR	321	380	85178	4	
1-Jul-07	930	R02	-	US	79	ARGR	346	445	85179	9	
1-Jul-07	930	R02	-	DS	80	LKTR	670	-	85180	-	

Date	Time	Crossing	Location wrt Bridge	Fish Mvnt (US/DS)	Fish ID	Species	Length	Weight	Tagging #	Maturity	Notes
1-Jul-07	930	R02	-	DS	81	ARGR	309	335	85181	8	
1-Jul-07	930	R02	-	DS	82	ARGR	275	235	85182	5	
1-Jul-07	930	R02	-	DS	83	ARGR	330	375	85183	8	
1-Jul-07	930	R02	-	DS	84	ARGR	306	325	85184	4	
1-Jul-07	930	R02	-	DS	85	ARGR	309	325	85185	4	
1-Jul-07	930	R02	US	US	86	ARGR	235	165	85186	1	
1-Jul-07	930	R02	-	-	87	ARGR	230	145	85187	1	
1-Jul-07	930	R02	-	-	88	ARGR	217	120	85188	1	
1-Jul-07	930	R02	-	-	89	ARGR	223	125	Dead	1	
2-Jul-07	1530	R02	DS	DS	123	ARGR	320	365	85225	8	
2-Jul-07	1530	R02	DS	DS	124	ARGR	335	385	85226	9	
2-Jul-07	1530	R02	DS	DS	125	ARGR	320	376	85227	8	
2-Jul-07	1530	R02	DS	DS	126	ARGR	326	360	85228	8	
2-Jul-07	1530	R02	DS	DS	127	ARGR	345	445	85229	9	
2-Jul-07	1530	R02	DS	DS	128	ARGR	319	407	85230	4	
2-Jul-07	1530	R02	DS	DS	129	ARGR	335	415	85231	9	
2-Jul-07	1530	R02	DS	DS	130	ARGR	325	360	85232	4	
2-Jul-07	1530	R02	DS	DS	131	ARGR	305	325	85233	8	
2-Jul-07	1530	R02	DS	DS	132	ARGR	324	405	85234	4	
2-Jul-07	1530	R02	DS	DS	133	ARGR	360	506	85235	9	
2-Jul-07	1530	R02	DS	DS	134	ARGR	325	365	85236	9	
2-Jul-07	1530	R02	DS	DS	135	ARGR	313	657	85237	8	
2-Jul-07	1530	R02	DS	DS	136	ARGR	270	240	85238	1	
2-Jul-07	1530	R02	DS	DS	137	ARGR	270	235	85239	1	
2-Jul-07	1530	R02	DS	DS	138	ARGR	302	305	85240	8	
2-Jul-07	1530	R02	DS	DS	139	ARGR	271	255	85241	1	
2-Jul-07	1530	R02	DS	DS	140	ARGR	245	190	85242	6	
2-Jul-07	1530	R02	DS	DS	141	ARGR	246	185	85243	6	
2-Jul-07	1530	R02	DS	DS	142	ARGR	265	200	85224	1	
2-Jul-07	1530	R06	DS	DS	143	ARGR	336	375	85215	9	
2-Jul-07	1530	R06	DS	DS	144	ARGR	336	395	85189	4	
2-Jul-07	1530	R06	DS	DS	145	ARGR	364	495	85245	8	
2-Jul-07	1530	R06	DS	DS	146	ARGR	368	512	85246	3	
2-Jul-07	1530	R06	DS	DS	147	ARGR	366	480	85248	4	
2-Jul-07	1530	R06	DS	DS	148	ARGR	354	445	85249	9	
2-Jul-07	1530	R06	DS	DS	149	ARGR	354	489	85250	8	
2-Jul-07	1530	R06	DS	DS	150	ARGR	355	520	85576	8	
2-Jul-07	1530	R06	DS	DS	151	ARGR	382	615	85577	8	
2-Jul-07	1530	R06	DS	DS	152	ARGR	330	450	85578	8	
2-Jul-07	1530	R06	DS	DS	153	ARGR	349	515	85579	9	
2-Jul-07	1530	R06	DS	DS	154	ARGR	354	430	85580	9	
2-Jul-07	1530	R06	DS	DS	155	ARGR	354	560	85581	8	
2-Jul-07	1530	R06	DS	DS	156	ARGR	325	360	85582	4	
2-Jul-07	1530	R06	DS	DS	157	ARGR	344	447	85583	8	
2-Jul-07	1530	R06	DS	DS	158	ARGR	365	505	85584	8	
2-Jul-07	1530	R06	DS	DS	159	ARGR	338	450	85585	4	
2-Jul-07	1530	R06	DS	DS	160	ARGR	310	340	85586	4	
2-Jul-07	1530	R06	DS	DS	161	ARGR	345	440	85587	9	
2-Jul-07	1530	R06	DS	DS	162	ARGR	340	460	85588	4	
2-Jul-07	1530	R06	DS	DS	163	ARGR	348	515	85589	9	
2-Jul-07	1530	R06	DS	DS	164	ARGR	334	437	85590	9	
2-Jul-07	1530	R06	DS	DS	165	ARGR	322	360	85591	8	
2-Jul-07	1530	R06	DS	DS	166	ARGR	305	340	85592	9	
2-Jul-07	1530	R06	DS	DS	167	ARGR	309	350	85593	4	
2-Jul-07	1530	R06	DS	DS	168	ARGR	315	360	85594	4	
2-Jul-07	1530	R06	DS	DS	169	ARGR	334	410	85595	8	
2-Jul-07	1530	R06	DS	DS	170	ARGR	335	400	85596	8	
2-Jul-07	1530	R06	DS	DS	171	ARGR	322	410	85597	8	
2-Jul-07	1530	R06	DS	DS	172	ARGR	365	300	85598	4	
2-Jul-07	1530	R06	DS	DS	173	ARGR	350	490	85599	8	
2-Jul-07	1530	R06	DS	DS	174	ARGR	325	405	85600	4	
2-Jul-07	1530	R06	DS	DS	175	ARGR	270	227	85301	6	
2-Jul-07	1530	R06	DS	DS	176	ARGR	285	370	85302	4	
2-Jul-07	1530	R06	DS	DS	177	ARGR	270	230	85303	1	
2-Jul-07	1530	R06	DS	DS	178	ARGR	300	240	85304	9	
2-Jul-07	1530	R06	DS	DS	179	ARGR	285	260	85305	6	
2-Jul-07	1530	R06	DS	DS	180	ARGR	370	220	85306	6	
2-Jul-07	1530	R06	DS	DS	181	ARGR	307	357	85307	4	
2-Jul-07	1530	R06	DS	DS	182	ARGR	290	280	85308	6	
2-Jul-07	1530	R06	DS	DS	183	ARGR	370	325	85309	4	
2-Jul-07	1530	R06	DS	DS	184	ARGR	376	360	85310	4	
2-Jul-07	1530	R06	DS	DS	185	ARGR	283	367	85311	6	
2-Jul-07	1530	R06	DS	DS	186	ARGR	288	285	85312	4	
2-Jul-07	1530	R06	DS	DS	187	ARGR	291	305	85313	4	
2-Jul-07	1530	R06	DS	DS	188	ARGR	250	190	85315	6	
2-Jul-07	1530	R06	DS	DS	189	ARGR	273	250	85316	4	
2-Jul-07	1530	R06	DS	DS	190	ARGR	250	205	85317	1	
2-Jul-07	1530	R06	DS	DS	191	ARGR	243	160	85318	6	
2-Jul-07	1530	R06	DS	DS	192	ARGR	240	165	85319	6	
2-Jul-07	1530	R06	DS	DS	193	ARGR	252	190	85320	6	
2-Jul-07	1530	R06	DS	DS	194	ARGR	250	200	85321	6	

Date	Time	Crossing	Location wrt Bridge	Fish Mvnt (US/DS)	Fish ID	Species	Length	Weight	Tagging #	Maturity	Notes
2-Jul-07	1530	R06	DS	DS	195	ARGR	250	210	85322	1	
2-Jul-07	1530	R06	DS	DS	196	ARGR	245	185	85323	6	
2-Jul-07	1530	R06	DS	DS	197	ARGR	301	223	??	4	
3-Jul-07	1000	R02	US	US	-	-	-	-	-	-	No fish
3-Jul-07	1000	R02	DS	US	198	ARGR	376	600	85324	9	
3-Jul-07	1000	R02	DS	US	199	ARGR	367	565	85325	8	
3-Jul-07	1000	R02	DS	US	200	ARGR	282	260	85326	1	
3-Jul-07	1000	R02	DS	US	201	ARGR	275	270	85327	1	
3-Jul-07	1000	R02	DS	US	202	LKTR	660	-	85328	-	
4-Jul-07	8:30	R02	DS	DS	232	ARGR	265	205	85239	6	
4-Jul-07	8:30	R02	DS	DS	233	ARGR	320	375	85346	8	
4-Jul-07	8:30	R02	DS	DS	234	ARGR	365	595	85347	4	
4-Jul-07	8:30	R02	DS	DS	235	ARGR	359	525	85348	8	
4-Jul-07	8:30	R02	DS	DS	236	ARGR	325	445	85349	8	
4-Jul-07	8:30	R02	DS	DS	237	ARGR	346	450	85350	9	
4-Jul-07	8:30	R02	DS	DS	238	ARGR	316	350	AC	2	AC = Adipose clipped
4-Jul-07	8:30	R02	DS	DS	239	ARGR	320	365	AC	9	
4-Jul-07	8:30	R02	DS	DS	240	ARGR	300	310	AC	9	
4-Jul-07	8:30	R02	DS	DS	241	ARGR	321	360	AC	4	
4-Jul-07	8:30	R02	DS	DS	242	ARGR	301	290	AC	9	
4-Jul-07	8:30	R02	DS	DS	243	ARGR	287	260	AC	1	
4-Jul-07	8:30	R02	DS	DS	244	ARGR	310	300	AC	6	
4-Jul-07	8:30	R02	DS	DS	245	ARGR	280	280	AC	6	
4-Jul-07	8:30	R02	DS	DS	246	ARGR	315	360	AC	9	
4-Jul-07	8:30	R02	DS	DS	247	ARGR	250	190	AC	6	
4-Jul-07	8:30	R02	DS	DS	248	ARGR	253	125	AC	1	
4-Jul-07	8:30	R02	DS	DS	249	ARGR	235	185	AC	1	
4-Jul-07	830	R02	US	US	-	-	-	-	-	-	No fish
5-Jul-07	830	R02	DS	DS	269	RNWH	260	200	85828	-	
5-Jul-07	830	R02	DS	DS	270	ARGR	318	365	85826	9	
5-Jul-07	830	R02	DS	DS	271	ARGR	261	210	85827	6	
5-Jul-07	930	R02	US	-	-	-	-	-	-	-	No fish
6-Jul-07	925	R02	DS	DS	272	ARGR	252	185	85829	1	
6-Jul-07	925	R02	DS	DS	273	LKTR	480	-	85830	-	
6-Jul-07	925	R02	-	-	-	-	-	-	-	-	
7-Jul-07	830	R02	DS	-	-	-	-	-	-	-	No fish
7-Jul-07	830	R02	US	-	-	-	-	-	-	-	No fish
8-Jul-07	830	R02	DS	US	275	ARGR	318	370	85832	4	
8-Jul-07	830	R02	-	US	276	ARGR	338	440	85833	4	
8-Jul-07	830	R02	US	-	-	-	-	-	-	-	No fish
9-Jul-07	830	R02	DS	DS	277	ARGR	312	360	85834	8	
9-Jul-07	830	R02	DS	DS	278	LKTR	530	-	85835	-	
9-Jul-07	830	R02	US	-	-	-	-	-	-	-	No fish
10-Jul-07	930	R02	DS	DS	280	ARGR	360	520	85235	9	
10-Jul-07	930	R02	-	-	290	LKTR	530	-	85836	-	
10-Jul-07	930	R02	US	-	-	-	-	-	-	-	No fish
11-Jul-07	1030	R02	DS	DS	291	LKTR	530	-	85837	-	
11-Jul-07	1030	R02	US	-	-	-	-	-	-	-	No fish
12-Jul-07	1030	R02	US	-	-	-	-	-	-	-	R02 US hoop net pulled, insuff. Depth; No fish
12-Jul-07	1030	R02	DS	DS	292	LKTR	565	-	85838	-	
12-Jul-07	1030	R02	-	-	293	ARGR	310	350	85839	9	
13-Jul-07	1500	R02	DS	DS	294	LKTR	650	-	85841	-	
15-Jul-07	1400	R02	DS	DS	296	LKTR	510	-	85843	-	
15-Jul-07	1400	R02	-	DS	297	LKTR	461	-	-	-	
15-Jul-07	1400	R02	-	DS	298	ARGR	350	450	85844	4	
15-Jul-07	1400	R02	-	DS	299	ARGR	310	445	85845	6	
15-Jul-07	1400	R02	-	DS	300	ARGR	232	140	85846	6	
15-Jul-07	1400	R02	-	DS	301	ARGR	338	435	85847	4	
16-Jul-07	-	R02	DS	-	-	-	-	-	-	-	No fish
17-Jul-07	1330	R02	DS	-	-	-	-	-	-	-	No fish
18-Jul-07	1100	R02	DS	DS	304	LKTR	505	-	85853	-	
19-Jul-07	1100	R02	DS	-	-	-	-	-	-	-	No fish
20-Jul-07	900	R02	DS	-	-	-	-	-	-	-	No fish
21-Jul-07	1000	R02	DS	-	-	-	-	-	-	-	No fish
22-Jul-07	930	R02	DS	-	-	-	-	-	-	-	No fish
23-Jul-07	900	R02	DS	-	-	-	-	-	-	-	No fish
24-Jul-07	1430	R02	DS	-	-	-	-	-	-	-	R02 DS hoop net pulled; No fish
27-Jun-07	10:00	R06	US	US	51	LKTR	410	690	85151	-	
28-Jun-07	1215	R06	US	-	-	-	-	-	-	-	No fish
28-Jun-07	1215	R06	DS	-	-	-	-	-	-	-	
29-Jun-07	1000	R06	USDS	-	-	ARGR	-	-	-	-	No fish
30-Jun-07	1100	R06	USDS	-	-	ARGR	-	-	-	-	No fish
1-Jul-07	930	R06	DS	DS	90	ARGR	336	405	85189	4	
1-Jul-07	930	R06	-	-	91	ARGR	367	465	85190	9	
1-Jul-07	930	R06	-	-	92	ARGR	295	290	85191	4	
1-Jul-07	930	R06	-	-	93	ARGR	349	460	85193	9	
1-Jul-07	930	R06	-	-	94	ARGR	320	370	85194	4	
1-Jul-07	930	R06	-	-	95	ARGR	364	495	85195	9	
1-Jul-07	930	R06	-	-	96	ARGR	330	390	85196	4	
1-Jul-07	930	R06	-	-	97	ARGR	380	580	85197	8	
1-Jul-07	930	R06	-	-	98	ARGR	351	495	85199	3	

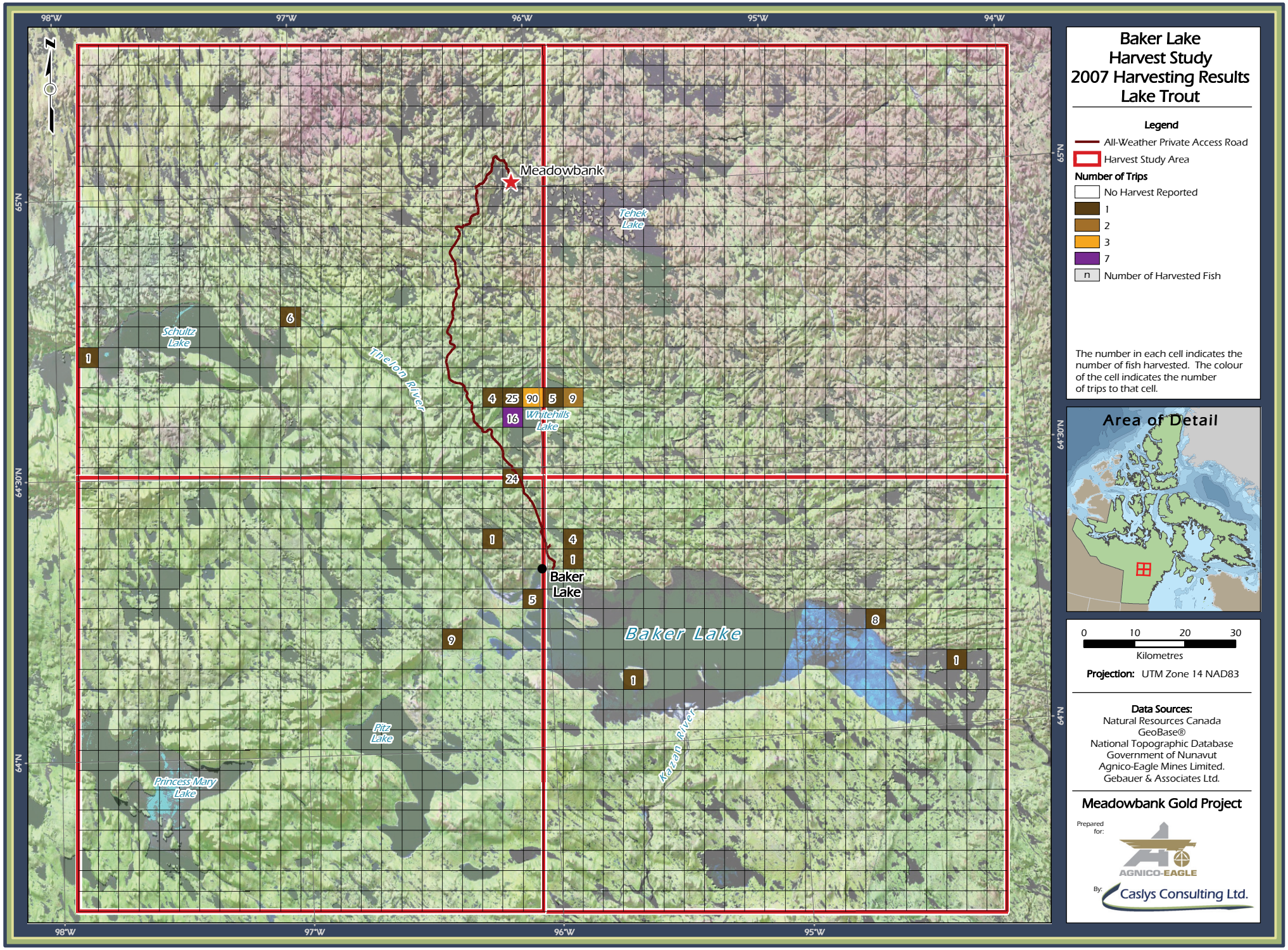
Date	Time	Crossing	Location wrt Bridge	Fish Mvnt (US/DS)	Fish ID	Species	Length	Weight	Tagging #	Maturity	Notes
1-Jul-07	930	R06	-	-	99	ARGR	350	490	85200	8	
1-Jul-07	930	R06	-	-	100	ARGR	359	520	85201	8	
1-Jul-07	930	R06	-	-	101	ARGR	329	440	85202	4	
1-Jul-07	930	R06	-	-	102	ARGR	346	500	85203	4	
1-Jul-07	930	R06	-	-	103	ARGR	322	390	85204	3	
1-Jul-07	930	R06	-	-	104	ARGR	368	520	85205	8	
1-Jul-07	930	R06	-	-	105	ARGR	334	490	85206	9	
1-Jul-07	930	R06	-	-	106	ARGR	317	370	85207	9	
1-Jul-07	930	R06	-	-	107	ARGR	310	360	85208	8	
1-Jul-07	930	R06	-	-	108	ARGR	332	405	85209	9	
1-Jul-07	930	R06	-	-	109	ARGR	355	530	85210	9	
1-Jul-07	930	R06	-	-	110	ARGR	280	270	85211	1	
1-Jul-07	930	R06	-	-	111	ARGR	270	270	85212	1	
1-Jul-07	930	R06	-	-	112	ARGR	310	270	85213	8	
1-Jul-07	930	R06	-	-	113	ARGR	312	375	85214	4	
1-Jul-07	930	R06	-	-	114	ARGR	338	440	85215	4	
1-Jul-07	930	R06	-	-	115	ARGR	329	430	85217	9	
1-Jul-07	930	R06	-	-	116	ARGR	328	330	85218	9	
1-Jul-07	930	R06	-	-	117	ARGR	333	430	85219	9	
1-Jul-07	930	R06	-	-	118	ARGR	290	305	85220	9	
1-Jul-07	930	R06	-	-	119	ARGR	210	130	85221	1	
1-Jul-07	930	R06	-	-	120	ARGR	214	140	85222	1	
1-Jul-07	930	R06	-	-	121	ARGR	316	360	85223	4	
1-Jul-07	930	R06	-	-	122	ARGR	317	340	85224	4	
1-Jul-07	930	R06	US	US	-	-	-	-	-	-	No fish
3-Jul-07	1000	R06	US	US	203	ARGR	234	154	85329	1	
3-Jul-07	1000	R06	DS	DS	204	ARGR	309	354	85593	3	
3-Jul-07	1000	R06	DS	DS	205	ARGR	352	508	85210	9	
3-Jul-07	1000	R06	DS	DS	206	ARGR	308	338	85592	8	
3-Jul-07	1000	R06	DS	DS	207	ARGR	297	310	85191	4	
3-Jul-07	1000	R06	DS	DS	208	ARGR	290	300	85308	1	
3-Jul-07	1000	R06	DS	DS	209	ARGR	301	297	85224	4	
3-Jul-07	1000	R06	DS	DS	210	ARGR	350	445	85587	9	
3-Jul-07	1000	R06	DS	DS	211	ARGR	304	335	85304	4	
3-Jul-07	1000	R06	DS	DS	212	ARGR	306	360	85223	4	
3-Jul-07	1000	R06	DS	DS	213	ARGR	321	408	85597	9	
3-Jul-07	1000	R06	DS	DS	214	ARGR	279	270	85211	1	
3-Jul-07	1000	R06	DS	DS	215	ARGR	338	435	85189	4	
3-Jul-07	1000	R06	DS	DS	216	ARGR	354	520	85246	4	
3-Jul-07	1000	R06	DS	DS	217	ARGR	260	220	85330	1	
3-Jul-07	1000	R06	DS	DS	218	ARGR	220	140	85331	1	
3-Jul-07	1000	R06	DS	DS	219	ARGR	320	145	85332	1	
3-Jul-07	1000	R06	DS	DS	220	ARGR	221	165	85333	1	
3-Jul-07	1000	R06	DS	DS	221	ARGR	330	330	85334	4	
3-Jul-07	1000	R06	DS	DS	222	ARGR	285	270	85335	1	
3-Jul-07	1000	R06	DS	DS	223	ARGR	255	240	85336	1	
3-Jul-07	1000	R06	DS	DS	224	ARGR	311	405	85337	8	
3-Jul-07	1000	R06	DS	DS	225	ARGR	276	365	85338	1	Data was kept
3-Jul-07	1000	R06	DS	DS	226	ARGR	362	360	85339	9	Strange values, field transcription??
3-Jul-07	1000	R06	DS	DS	227	ARGR	329	405	85340	4	
3-Jul-07	1000	R06	DS	DS	228	ARGR	305	365	85341	1	
3-Jul-07	1000	R06	DS	DS	229	ARGR	321	355	85342	1	
3-Jul-07	1000	R06	DS	DS	230	ARGR	340	370	85343	1	
3-Jul-07	1000	R06	DS	DS	231	ARGR	327	340	85344	8	
4-Jul-07	10:40	R06	DS	DS	250	ARGR	345	445	85599	8	R06 DS hoop net pulled
4-Jul-07	10:40	R06	DS	DS	251	ARGR	309	325	85307	9	
4-Jul-07	10:40	R06	DS	DS	252	ARGR	350	350	85337	9	
4-Jul-07	10:40	R06	DS	DS	253	ARGR	370	530	85581	8	
4-Jul-07	10:40	R06	DS	DS	254	ARGR	317	340	85339	4	
4-Jul-07	10:40	R06	DS	DS	255	ARGR	217	220	85338	1	
4-Jul-07	10:40	R06	DS	DS	256	ARGR	280	245	85211	9	
4-Jul-07	10:40	R06	DS	DS	257	ARGR	216	130	-	1	
4-Jul-07	10:40	R06	DS	DS	258	ARGR	194	90	-	6	
4-Jul-07	10:40	R06	DS	DS	259	ARGR	330	440	-	8	
4-Jul-07	10:40	R06	DS	DS	260	ARGR	356	450	-	8	
4-Jul-07	10:40	R06	DS	DS	261	ARGR	295	373	-	9	
4-Jul-07	10:40	R06	DS	DS	262	ARGR	317	310	-	4	
4-Jul-07	10:40	R06	DS	DS	263	ARGR	297	300	-	4	
4-Jul-07	10:40	R06	DS	DS	264	ARGR	312	345	-	4	
4-Jul-07	10:40	R06	DS	DS	265	ARGR	245	193	-	6	
4-Jul-07	10:40	R06	DS	DS	266	ARGR	150	145	-	1	
4-Jul-07	10:40	R06	DS	DS	267	ARGR	260	215	-	6	
4-Jul-07	10:40	R06	DS	DS	268	ARGR	362	490	-	-	
5-Jul-07	1030	R06	US	-	-	-	-	-	-	-	No fish
6-Jul-07	925	R06	US	DS	274	LKTR	385	550	85831	-	
7-Jul-07	830	R06	US	-	-	-	-	-	-	-	No fish
8-Jul-07	830	R06	-	-	-	-	-	-	-	-	No fish
9-Jul-07	830	R06	US	DS	279	ARGR	232	137	85329	6	
9-Jul-07	830	R06	-	-	-	-	-	-	-	-	
10-Jul-07	930	R06	-	-	-	-	-	-	-	-	No fish
10-Jul-07	930	R06	-	-	-	-	-	-	-	-	

Date	Time	Crossing	Location wrt Bridge	Fish Mvnt (US/DS)	Fish ID	Species	Length	Weight	Tagging #	Maturity	Notes
11-Jul-07	1030	R06	US	-	-	-	-	-	-	-	No fish
11-Jul-07	1030	R06	-	-	-	-	-	-	-	-	
12-Jul-07	1030	R06	US	-	-	-	-	-	-	-	No fish
12-Jul-07	1030	R06	-	-	-	-	-	-	-	-	
13-Jul-07	1330	R06	US	-	-	-	-	-	-	-	No fish
15-Jul-07	1230	R06	US	DS	295	ARGR	330	345	85842	4	
16-Jul-07	-	R06	US	-	-	-	-	-	-	-	No fish
17-Jul-07	1100	R06	US	DS	302	ARGR	311	305	85339	4	
17-Jul-07	-	R06	-	DS	303	ARGR	230	135	No tag	6	
18-Jul-07	1000	R06	US	-	-	-	-	-	-	-	No fish
19-Jul-07	1000	R06	US	-	-	-	-	-	-	-	No fish
20-Jul-07	830	R06	US	-	-	-	-	-	-	-	No fish
21-Jul-07	900	R06	US	-	-	-	-	-	-	-	No fish
22-Jul-07	840	R06	US	-	-	-	-	-	-	-	No fish
23-Jul-07	830	R06	US	-	-	-	-	-	-	-	No fish
24-Jul-07	1300	R06	US	-	-	-	-	-	-	-	No fish
25-Jul-07	1330	R06	US	-	-	-	-	-	-	-	No fish
26-Jul-07	1330	R06	US	-	-	-	-	-	-	-	No fish
28-Jun-07	900	RO2	DS	-	-	-	-	-	-	-	No fish
14-Jul-07	-	-	-	-	-	-	-	-	-	-	Did not check nets
27-Jul-07	-	-	-	-	-	-	-	-	-	-	No fish
28-Jul-07	-	-	-	-	-	-	-	-	-	-	No fish
29-Jul-07	-	-	-	-	-	-	-	-	-	-	No fish
30-Jul-07	-	-	-	-	-	-	-	-	-	-	No fish

Notes:
ARGR = arctic grayling; RNWH = round whitefish; LKTR = lake trout; US = upstream; DS = downstream.
Maturity: 1/6 = juvenile, 2/7 = will spawn this year, 3/8 = ripe and ready, 4/9 = spent, 5/10 = spawned in previous years, but not this year.

APPENDIX D

CREEL SURVEY SUMMARY, 2007.



Baker Lake Harvest Study 2007 Harvesting Results Lake Trout

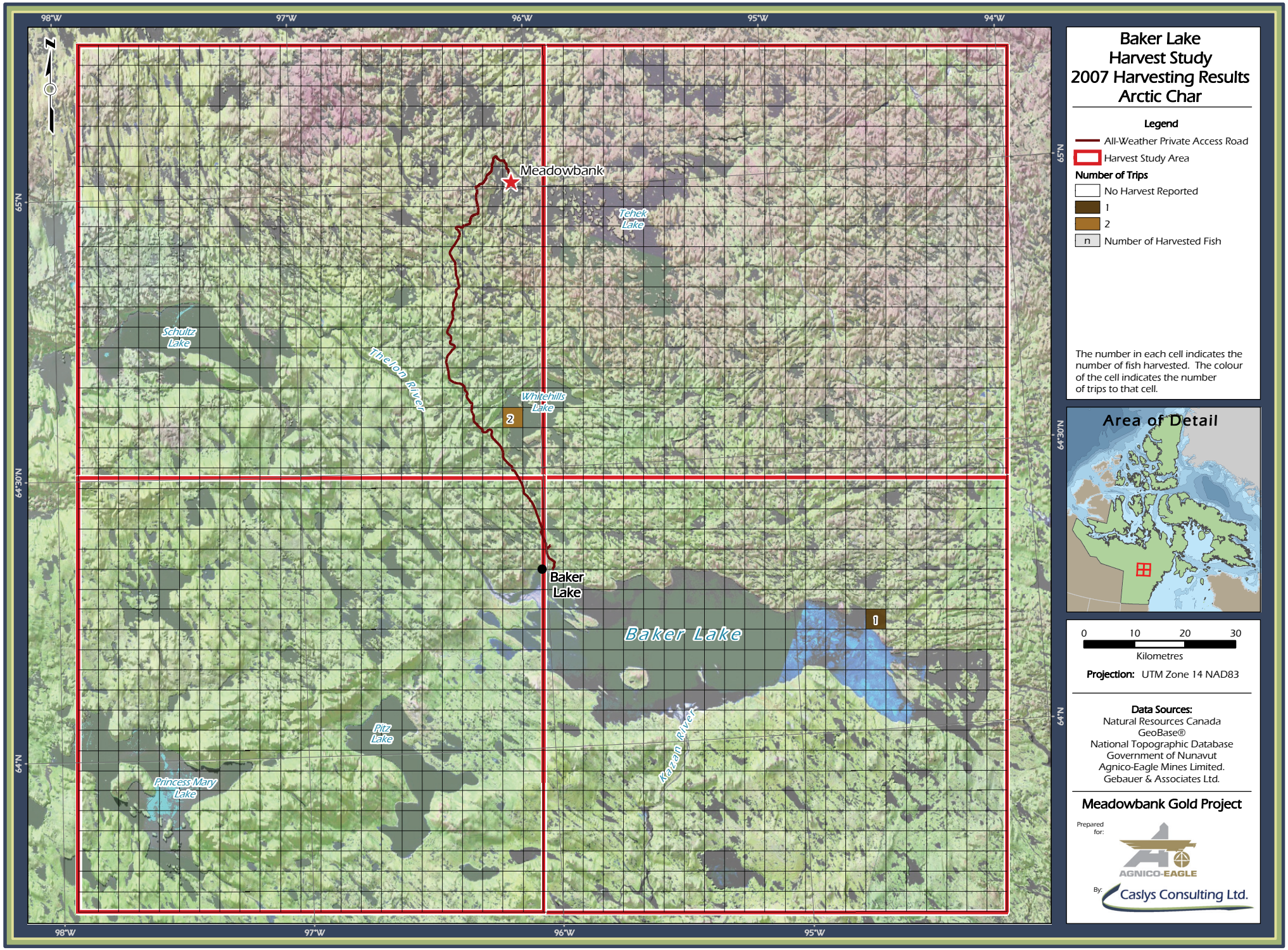
Legend

- All-Weather Private Access Road
- Harvest Study Area

Number of Trips

- No Harvest Reported
- 1
- 2
- 3
- 7
- n — Number of Harvested Fish

The number in each cell indicates the number of fish harvested. The colour of the cell indicates the number of trips to that cell.



Baker Lake Harvest Study 2007 Harvesting Results Arctic Char

Legend

- All-Weather Private Access Road
- Harvest Study Area

Number of Trips

- No Harvest Reported
- 1
- 2
- n — Number of Harvested Fish

The number in each cell indicates the number of fish harvested. The colour of the cell indicates the number of trips to that cell.

Area of Detail

0 10 20 30

Kilometres

Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada
GeoBase®
National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Limited.
Gebauer & Associates Ltd.

Meadowbank Gold Project

Prepared for: AGNICO-EAGLE

By: Caslys Consulting Ltd.

Number of Fish Harvested per Person by Month

Participant Name	March	April	May	June	July	August	September	Totals
Eva Elytook		3						**3**
Hugh Ikoe			1					**1**
Hugh Tulurialik			50					**50**
Jacob Ikinilik	24	34	41					**99**
Keith Avaala			5					**5**
Liinda Nasauyaituk			4					**4**
Mary Mariq		1						**1**
Philippa Martee			6					**6**
Rita Oosuaq	2							**2**
Roy Avaala		1			9		1	**11**
Samson Arnauyuq		4						**4**
Susan Toolooktook			12					**12**
Thomas Elytook		2						**2**
Travis Mannik	2							**2**
Vera Avaala	2							**2**
Victor Simga				9				**9**
Totals	**30**	**45**	**119**	**9**	**9**	**0**	**1**	