Court File No. CV-12-9539-00CL

ONTARIO
SUPERIOR COURT OF JUSTICE
(COMMERCIAL LIST)

IN THE MATTER OF THE *COMPANIES' CREDITORS ARRANGEMENT ACT*, R.S.C. 1985, c. C-36, AS AMENDED

AND IN THE MATTER OF A PLAN OF COMPROMISE OR ARRANGEMENT OF TIMMINCO LIMITED AND BEANCOUR SILICON INC.

Applicants

MOTION RECORD
OF HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTRY OF NORTHERN DEVELOPMENT AND MINING

June 12, 2013

MINISTRY OF THE ATTORNEY GENERAL
Crown Law Office –Civil
720 Bay Street, 8th Floor
Toronto, Ontario M5G 2K1

Ronald Carr (LSUC# 13341F)
Tel: (416) 326-2704
Email: ronald.carr@ontario.ca

Lisa Brost (LSUC# 49279G)
Tel: (416) 325-9806
Email: lisa.brost@ontario.ca

Fax: (416) 326-4181

Counsel for the Her Majesty the Queen in right of Ontario as represented by the Ministry of Northern Development and Mining

TO: SERVICE LIST ATTACHED

SERVICE LIST

GENERAL	
TIMMINCO LIMITED AND BÉCANCOUR SILICON INC. Sun Life Financial Tower 150 King Street West, Suite 2401 Toronto, ON M5H 1J9 **Applicants**	**Doug Fastuca** Tel: 416-364-5171 Email: dfastucas@timminco.com **Greg Donaldson** Tel: 416-364-5698 Fax: 416-364-3451 Email: gdonaldson@timminco.com
STIKEMAN ELLIOTT LLP 5300 Commerce Court West 199 Bay Street Toronto, ON M5L 1B9 **Lawyers for the Applicants**	**Ashley J. Taylor** Tel: 416-869-5236 Email: ataylor@stikeman.com **Daphne MacKenzie** Tel: 416-869-5695 Email: dmackenzie@stikeman.com **Pat O'Kelly** Tel: 416-869-5633 Email: pokelly@stikeman.com **Dan Murdoch** Tel: 416-869-5529 Email: dmurdoch@stikeman.com **Maria Konyukhova** Tel: 416-869-5230 Email: mkonyukhova@stikeman.com **Kathryn Esaw** Tel: 416-869-6820 Fax: 416-947-0866 Email: kesaw@stikeman.com
FTI CONSULTING CANADA INC. TD Waterhouse Tower 79 Wellington Street, Suite 2010 Toronto, ON M5K 1G8 **Monitor**	**Nigel D. Meakin** Tel: 416-649-8065 Email: nigel.meakin@fticonsulting.com **Toni Vanderlaan** Tel: 416-649-8075 Fax: 416)-649-8101 Email: toni.vanderlaan@fticonsulting.com
BLAKE, CASSELS & GRAYDON LLP 199 Bay Street Suite 4000, Commerce Court West Toronto, ON M5L 1A9	**Steven J. Weisz** Tel: 416-863-2616 Email: steven.weisz@blakes.com

Lawyers for the Monitor	**Linc Rogers** Tel: 416-863-4168 Fax: 416-863-2653 Email: linc.rogers@blakes.com
INVESTISSEMENT QUÉBEC 393 Rue Saint-Jaques, Suite 500 Montréal, QC H2Y 1N9	**Danièle Leroux** Tel: 514-873-0439 Fax: 514-873-9917 Email: daniele.leroux@invest-quebec.com **Iya Toure** Email: iya.toure@invest-quebec.com **Christine Fillon** Email: christine.fillion@invest-quebec.com **Francois Lamothe** Email: francois.lamothe@invest-quebec.com **Lilianne Monier** Email: liliane.monier@invest-quebec.com
FASKEN MARTINEAU DUMOULIN LLP 140 Grande Allee Est, Suite 800 Quebec City, QC G1R 5M8 333 Bay Street Suite 2400 Toronto, ON M5H 2T6 **Lawyers for Investissement Quebec**	**Charles Mercier** Tel: 1-418-640-2046 Email: cmercier@fasken.com **Claude Girard** Tel: 418-640-2050 Fax: 418-647-2455 Email: cgirard@fasken.com **Aubrey Kauffman** Tel: 1-418-868-3538 Fax: 1-418-364-7813 Email: akauffman@fasken.com
MCCARTHY TÉTRAULT Toronto Dominion Bank Tower Suite 5300 Toronto, ON M5K 1E6 **Lawyers for AMG Advanced Metallurgical Group N.V.**	**James Gage** Tel: 416-601-7539 Fax: 416-868-0673 Email: jgage@mccarthy.ca
RAYMOND CHABOT GRANT THORNTON 140 Grande Allée, Est, Suite 200 Québec City, QC G1R 5P7	**Jean Chiasson** Tel: 1-418-647-3204 Fax: 1-418-647-9279 Email: chiasson.jean@rcgt.com
QUÉBEC SILICON LIMITED PARTNERSHIP 6500 Rue Yvon Trudeau Bécancour, QC G9H 2V8	**Rene Boisvert** Tel: 1-819-294-9001 Email: rene.boisvert@quebecsilicium.com

QUÉBEC SILICON GENERAL PARTNER INC. 6500 Rue Yvon Trudeau Bécancour, QC G9H 2V8	**Rene Boisvert** Tel: 1-819-294-9001 Email: rene.boisvert@quebecsilicium.com
DOW CORNING CORPORATION 2200 West Salzburg Road Midland, MI 48686-0994	**Cornell Boggs** Email: cornell.boggs@dowcorning.com **John Tierney** Email: john.tierney@dowcorning.com
MCCARTHY TÉTRAULT 1000 De La Gauchetière Street West, Suite 2500 Montréal, QC H3B 0A2 Toronto Dominion Bank Tower Suite 5300 Toronto, ON M5K 1E6 **Counsel to Dow Corning Corporation**	**Kevin McElcheran** Tel: 416-601-7730 Email: kmcelcheran@mccarthy.ca **Barbara J. Boake** Tel: 416-601-7557 Email: bboake@mccarthy.ca **Sharon Kour** Tel: 416-601-8305 Email: skour@mccarthy.ca **Elder Marques** Tel: 416-601-7822 Fax: 416-868-0673 Email: emarques@mccarthy.ca
SKADDEN, ARPS, SLATE, MEAGHER & FLOM LLP Four Times Square New York, NY 10036 **Counsel to Down Corning Corporation**	**David J. Friedman** Fax: 1-212-735-2000 Email: david.friedman@skadden.com
KIM ORR BARRISTERS 200 Front Street West, Suite 2300 Toronto, ON M5V 3K2	**James Orr** Tel: 416-349-6571 Fax: 416-598-0601 Email: jo@kimorr.ca
BAKER & MCKENZIE LLP Brookfield Place 181 Bay Street, Suite 2100 Toronto, ON M5J 2T3	**Chris Besant** Tel: 416-865-2318 Email: chris.besant@bakermckenzie.com **Frank Spizzirri** Tel: 416-865-6940 Fax: 416-863-6275 Email: frank.spizzirri@bakermckenzie.com

OSLER HOSKIN & HARCOURT LLP 1 First Canadian Place Toronto, ON M5X 1B8 **Lawyers for Wacker Chemie AG**	**Steven Golick** Tel: 416-862-6704 Email: sgolick@osler.com **Andrea Lockhart** Tel: 416-862-6829 Fax: 416-862-6666 Email: alockhart@osler.com
BENNETT JONES LLP One First Canadian Place Suite 3400 Toronto, ON M5X 1A4 **Lawyers for John Walsh**	**Derek J. Bell** Tel: 416-777-4638 Fax: 416-863-1716 Email: belld@bennettjones.com **Robert Staley** Tel: 416-777-4857 Fax: 416-863-1716 E-mail: staleyr@bennettjones.ca
GOWLING LAFLEUR HENDERSON LLP 1 Place Ville Marie, Suite 3700 Montreal, QC H3B 3P4 **Lawyers for Wajax Equipment**	**Geneviève Cloutier** Tel: 1-514-392-9448 Fax: 1-514-876-9048 Email: genevieve.cloutier@gowlings.com
DAVIES WARD PHILLIPS & VINEBERG LLP First Canadian Place, Suite 44 Toronto, ON M5X 1B1	**Jay Swartz** Tel: 416-863-5520 Fax: 416-863-0871 Email: jswartz@dwpv.com
DAVIES WARD PHILLIPS & VINEBERG LLP First Canadian Place, Suite 44 Toronto, ON M5X 1B1 **Lawyers for J. Thomas Timmins**	**Robin Schwill** Tel: 416-863-5502 Fax: 416-863-0871 Email: rschwill@dwpv.com
DAVIES WARD PHILLIPS & VINEBERG LLP First Canadian Place, Suite 44 Toronto, ON M5X 1B1 **Lawyers for Grupo Ferroatlantica, S.A.**	**Natalie Renner** Tel: 416-863-7489 Fax: 416-863-0871 Email: nrenner@dwpv.com
STOCKWOODS LLP 77 King Street West, Suite 4130 Toronto, ON M5K 1H1 **Lawyers for Photon Consulting LLC, Rogol Energy Consulting LLC and Michael Rogol**	**Paul Le Vay** Tel: 416-593-2493 Email: paullv@stockwoods.ca **Brenda Van Niejenhuis** Tel: 416-593-2487 Email: brendavn@stockwoods.ca

LANGLOIS KRONSTROM DESJARDINS LLP 1002 Sherbrooke Street West, Suite 2800 Montreal, QC H3A 3L6	**Tina Hobday** Tel: 514-282-7816 Email: tina.hobday@lkd.ca **Alexander Herman** Tel: 514-282-7801 Fax: 514-845-6573 Email: alexander.herman@lkd.ca
SHIBLEY RIGHTON LLP 250 University Avenue, Suite 700 Toronto, ON M5H 3E2 **Lawyers for BSI Non-Union Employee Pension Committee and BSI Union Employee Pension Committee**	**Thomas McRae** Tel: 416-214-5206 Fax: 416-214-5400 Email: thomas.mcrae@shibleyrighton.com
FRASER MILNER CASGRAIN LLP 77 King Street West, Suite 400 Toronto-Dominion Centre Toronto, ON M5K 0A1	**Shayne Kukulowicz** Tel: 416-863-4740 Email: shayne.kukulowicz@fmc-law.com **Jane Dietrich** Tel: 416-863-4467 Fax: 416-863-4592 Email: jane.dietrich@fmc-law.com
PETER A.M. KALINS	Email: peter.kalins@sympatico.ca
RUSSELL HILL ADVISORY SERVICE INC. c/o Timminco Limited Sun Life Financial Tower 150 King Street West, Suite 2401 Toronto, ON M5H 1J9 **Chief Restructuring Officer**	**Sean Dunphy** Fax: 416-364-3451 Email: sdunphy@timminco.com
PENSION PLANS REPRESENTATIVES	
BSI NON-UNION EMPLOYEE PENSION COMMITTEE	
Carl Rivard Email: carl.rivard@resolutefp.com **Patrick Gauthier** Email: patrick.gauthier@quebecsilicium.com	**Maria Spensieri** Email: maria.spensieri@quebecsilicium.com **René Boisvert** Email: rene.boisvert@quebecsilicium.com

BSI NON UNION EMPLOYEE PENSION COMMITTEE	
Maria Spensieri Email: maria.spensieri@quebecsilicium.com **René Boisvert** Email: rene.boisvert@quebecsilicium.com	**Carl Rivard** Email: carl.rivard@resolutefp.com **Patrick Gauthier** patrick.gauthier@quebecsilicium.com
SUPERINTENDENT OF FINANCIAL SERVICES 5160 Yonge Street PO Box 85 Toronto, ON M2N 6L9	**Mark Bailey** Tel: 416-590-7555 Email: mark.bailey@fsco.gov.on.ca **Deborah McPhail** Tel: 416-226-7764 Email: dmcphail@fsco.gov.on.ca **Stephen Scharbach** Tel: 416-590-7224 Fax: 416-590-7070 Email: stephen.scharbach@fsco.gov.on.ca
RÉGIE DES RENTES DU QUÉBEC Direction des régimes de retraite Régies de rentes due Québec Case postale 5200 Québec, QC G1K 7S9	**Philippe Auger-Giroux** Tel: 1-418- 657-8715 ext. 3927 Fax: 1-418-643-9590 Email: philippe.auger-giroux@rrq.gouv.qc.ca
KOSKIE MINKSY LLP 20 Queen Street West Suite 900 Toronto, ON M5H 3R3 **Lawyers for Mercer (Canada) Limited, the administration of the Haley Pension Plan**	**Andrew Hatnay** Tel: 416-595-2083 Email: ahatnay@kmlaw.ca **Demetrios Yiokaris** Tel: 416-595-2130 Email: dyiokaris@kmlaw.ca **James Harnum** Tel: 416-542-6285 Fax: 416-201-2872 Email: jharnum@kmlaw.ca
UNIONS	
LA SECTION LOCALE 184 DE SYNDICAT CANADIEN DES COMMUNICATIONS, DE L'ÉNERGIE ET DU PAPIER 6500, rue Yvon-Trudeau Bécancour, QC G9H 2V8 7080, boul, Marion Trois-Rivières, QC G9A 6G4	**Jean Simoneau** Email: scep184@gmail.com **Rene Gauthier** Tel: 819-378-4696 Email: rgauthier@scep.ca

CaleyWray 65 Queen Street West, Suite 1600 Toronto, ON M5H 2M5	**Denis W. Ellickson** Tel: 416-775-4678 Fax: 416-366-4678 Email: ellicksond@caleywray.com **Jesse B. Kugler** Tel: 416-775-4677 Fax: 416-366-3673 Email: kuglerj@caleywray.com
THE UNITED STEEL, PAPER AND FORESTRY, RUBBER, MANUFACTURING, ENERGY, ALLIED INDUSTRIAL AND SERVICE WORKERS INTERNATIONAL UNION 2285 Saint-Laurent Boulevard, Suite D-11 Ottawa, ON K1G 4Z7	**David Lipton** Tel: 1-613-260-7205 ext. 232 Email: dlipton@usw.com
SACK GOLDBLATT MITCHELL LLP 20 Dundas Street West, Suite 1100 Toronto, ON M5G 2G8 **Counsel for The United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union**	**Charles Sinclair** Tel: 416-979-4234 Fax: 416-591-7333 Email: csinclair@sgmlaw.com
PPSA CREDITORS	
PRODAIR CANADA LTEE 7475 Boulevard Newman, Suite 311 La Salle, QC H8N 1X3	**Via Courier**
SERVICES FINANCIERS CIT LTEE 5035 South Service Road Burlington, ON L7R 4C8	**Isobel Fraser** Tel: 905-633-2097 Fax: 905-633-2130 Email: isobel.fraser@cit.com
GE VFS CANADA LIMITED PARTNERSHIP 2300 Meadowvale Boulevard, Suite 200 Mississauga, ON L5N 5P9	**Via Courier**
SERVICES FINANCIERS CATERPILLAR LTEE 5575 North Service Road, Suite 600 Burlington, ON L7C 6M1	**Kellie Wellenreiter** Tel: 1-289-313-1238 Email: kellie.wellenreiter@cat.com
DCFS CANADA CORP. 2680 Matheson Boulevard East, Suite 500 Mississauga, ON L4W 0A5	**Via Courier**

SERVICES FINANCIERS MERCEDES-BENZ 2680 Matheson Boulevard East, Suite 500 Mississauga, ON L4W 0A5	**Via Courier**
JOHN DEERE LIMITED 1001 Champlain Avenue, Suite 401 Burlington, ON L7L 5Z4	**Vincent Zaroda** Tel: 905-319-5836 Email: zarodavincenta@johndeere.com
GE CAPITAL VEHICLE AND EQUIPMENT LEASING INC. 2300 Meadowvale Boulevard, 2nd Floor Mississauga, ON L5N 5P9	**Via Courier**
ENDRAS BMW 100 Achilles Rd. Ajax, ON L1Z 0C5	**Via Courier**
DOCUMENT DIRECTION c/o De Lage Landen Financial Services Canada Inc. 3450 Superior Court, Unit 1 Oakville, ON L6L 0C4	**Faseeh Ahmad** Tel: 1-855-732-2818 Fax: 1-866-318-3447 Email: fahmad@leasedirect.com
BMW CANADA INC. 50 Ultimate Drive Richmond Hill, ON L4S 0C8	**Via Courier**
TOYOTA CREDIT CANADA INC. 80 Micro court, Suite 200 Markham, ON L3R 9Z5	**Via Courier**
GOVERNMENT AGENCIES	
DEPARTMENT OF JUSTICE **ONTARIO REGIONAL OFFICE** The Exchange Tower 130 King Street West, Suite 3400 Toronto, ON M5X 1K6 **Attorney General of Canada**	**Diane Winters** Tel: (416) 973-3172 Fax: (416) 973-0809 Email: diane.winters@justice.gc.ca
CANADA REVENUE AGENCY 130 King Street West, Suite 3400 Toronto, ON M5X 1K6 **Solicitor for Canada Revenue Agency**	**Diane Winters** Tel: (416) 973-3172 Fax: (416) 973-0809 Email: diane.winters@justice.gc.ca

AGENCY OF REVENUE DU QUEBEC 1600 Boulevard René-Lévesque Ouest, 3e étage Sector R23 CPF Montréal, QC H3H 2V2	**Via Courier**
MINISTÈRE DE LA JUSTICE DU QUÉBEC 1200, route de l'Église, 6e étage Québec City, QC G1V 4M1	**Via Courier**
MINISTÈRE DU DÉVELOPPEMENT DURABLE, DE L'ENVIRONNEMENT ET DES PARCS Édifice Marie-Guyart, 5e étage 675 boulevard René-Lévesque Est Québec, QC G1R 5V7	**Emmanuelle Gervais-Cadrin** Tel: 418-521-3816 Fax: 418-646-0908 Email: Emmanuelle.gervais-cadrin@mddep.gouv.qc.ca
MINISTRY OF REVENUE (ONTARIO) Insolvency Unit 33 King Street West – 6th Floor Oshawa, ON L1H 8H5	**Marielle Chabot** Email: marielle.chabot@ontario.ca
MINISTRY OF THE ENVIRONMENT Legal Services Branch 135 St. Clair Avenue West Toronto, ON M4V 1P5	**Mario Faieta** Tel: (416) 314-6482 Fax: (416) 314-6579 Email: mario.faieta@ontario.ca
ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES Rm. M2-24, Macdonald Block 900 Bay Street Toronto, ON M7A 1C3	**Via Courier**
MINISTRY OF NORTHERN DEVELOPMENT AND MINES 933 Ramsey Lake Road, B4 Sudbury, ON P3E 6B5	**Ms. C. Blancher-Smith** Director of Mine Rehabitation Tel: (705) 670-5784

INDEX

INDEX

TAB 1

Court File No. CV-12-9539-00CL

ONTARIO
SUPERIOR COURT OF JUSTICE
(COMMERCIAL LIST)

IN THE MATTER OF THE *COMPANIES' CREDITORS ARRANGEMENT ACT*, R.S.C. 1985, c. C-36, AS AMENDED

AND IN THE MATTER OF A PLAN OF COMPROMISE OR ARRANGEMENT OF TIMMINCO LIMITED AND BEANCOUR SILICON INC.

Applicants

NOTICE OF MOTION

Her Majesty the Queen in right of Ontario as represented by the Ministry of Northern Development and Mining will make a motion to a Judge presiding over the Commercial List on June 19, 2013 at 10:00 a.m., at 330 University Avenue, 8th Floor, Toronto Ontario.

PROPOSED METHOD OF HEARING: The motion is to be heard orally.

THE MOTION IS FOR:

(a) an Order substantially in the form attached as Schedule A hereto granting leave to MNDM to file a proof of claim after the passing of the Claims Bar Date, as defined in the June 15, 2012 Order of Morawetz J. (the "**Claims Procedure Order**"); and

(b) such further and other relief as MNDM may request and this Court shall deem just.

THE GROUNDS FOR THE MOTION ARE:

(a) the reasons described in the affidavit of Sharon Dawn Spires sworn May 14, 2013 (the "**Spires Affidavit**");

(b) section 19 of the *Companies' Creditors Arrangement Act*;

(c) Rules 1.04, 2.01, 2.03, 3.02 and 37 of the Ontario *Rules of Civil Procedure*, R.R.O. 1990, Reg. 194, as amended; and

(d) such further and other grounds as counsel may advise.

THE FOLLOWING DOCUMENTARY EVIDENCE will be used at the hearing of the motion:

(a) the Spires Affidavit;

(b) the pleadings and proceedings herein; and

(c) such further and other materials as counsel may advise and this Honourable Court may permit.

June 10, 2013

MINISTRY OF THE ATTORNEY GENERAL
Crown Law Office –Civil
720 Bay Street, 8th Floor
Toronto, Ontario M5G 2K1

Ronald Carr (LSUC# 13341F)
Tel: (416) 326-2704
Email: Ronald.carr@ontario.ca

Lisa Brost (LSUC# 49279G)
Tel: (416) 325-9806
Email: lisa.brost@ontario.ca

Fax: (416) 326-4181

Counsel for the Her Majesty the Queen in right of Ontario as represented by the Ministry of Northern Development and Mining

TO: THE SERVICE LIST AS ATTACHED
TO THE MOTION RECORD

SCHEDULE "A"

Court File No.: CV-12-9539-00CL

ONTARIO
SUPERIOR COURT OF JUSTICE
(COMMERCIAL LIST)

THE HONOURABLE MR.	)	DAY, THE DAY
	)	
JUSTICE MORAWETZ	)	OF JUNE, 2013

IN THE MATTER OF THE *COMPANIES' CREDITORS ARRANGEMENT ACT*, R.S.C. 1985, c. C-36, AS AMENDED

AND IN THE MATTER OF A PLAN OF COMPROMISE OR ARRANGEMENT OF TIMMINCO LIMITED AND BEANCOUR SILICON INC.

Applicants

ORDER

THIS MOTION, made by Her Majesty the Queen in right of Ontario as represented by the Ministry of Northern Development and Mining ("**MNDM**"), for an order granting leave to MNDM to file an unsecured claim after the passing of the Claims Bar Date, as defined in the June 15, 2012 Order of Morawetz J. (the "**Claims Procedure Order**"), was heard this day at 330 University Avenue, Toronto, Ontario.

ON READING the affidavit of Sharon Dawn Spires sworn May 14, 2013 and the Exhibits thereto, and on hearing submissions of counsel for MNDM and the Monitor.

1. **THIS COURT ORDERS** that the Claims Bar Date, as defined in the Claims Procedure Order, is hereby lifted for a period of fourteen days from the date of this Order (the "Extension Period") in order to permit MNDM to file a proof of claim against Timminco Limited.

2. **THIS COURT FURTHER ORDERS AND DIRECTS** that the Monitor in these proceedings receive, consider and process any proof of claim that is filed by MNDM within the Extension Period in accordance with the applicable claims procedure devised in this matter.

Court File No. CV-12-9566-00CL

IN THE MATTER OF THE *COMPANIES CREDITORS ARRANGEMENT ACT*, R.S.C. 1985, c. C-36, AS AMENDED

AND IN THE MATTER OF A PLAN OF COMPROMISE OR ARRANGEMENT OF TIMMINCO LIMITED AND BEANCOUR SILICON INC.

Applicants

ONTARIO
SUPERIOR COURT OF JUSTICE

PROCEEDING COMMENCED AT TORONTO

NOTICE OF MOTION

MINISTRY OF THE ATTORNEY GENERAL
Crown Law Office –Civil
720 Bay Street, 8th Floor
Toronto, Ontario M5G 2K1

Ronald Carr (LSUC# 13341F)
Tel: (416) 326-2704
Email: Ronald.carr@ontario.ca

Lisa Brost (LSUC# 49279G)
Tel: (416) 325-9806
Email: lisa.brost@ontario.ca

Fax: (416) 326-4181

Counsel for the Her Majesty the Queen in right of Ontario as represented by the Ministry of Northern Development and Mining

TAB 2

Court File No. CV-12-9539-00CL

ONTARIO
SUPERIOR COURT OF JUSTICE
COMMERCIAL LIST

IN THE MATTER OF THE *COMPANIES CREDITORS ARRANGEMENT ACT*, R.S.C. 1985, c. C-36, AS AMENDED

AND IN THE MATTER OF A PLAN OF COMPROMISE OR ARRANGEMENT OF TIMMINCO LIMITED AND BÉANCOUR SILICON INC.

Applicants

AFFIDAVIT OF SHARON DAWN SPIRES
(Sworn May 14, 2013)

I, SHARON DAWN SPIRES, of the City of Greater Sudbury in the Province of Ontario, **MAKE OATH AND SAY AS FOLLOWS**:

1. I am a Mine Rehabilitation Compliance Officer for the Ministry of Northern Development and Mines (Ontario) ("**MNDM**"), and as such I have personal knowledge of the matters to which I hereinafter depose, except where it is based on information and belief, in which case, I have stated the source of my information and I verily believe it to be true.

2. This affidavit is made in support of a motion for:

   (a) an order substantially in the form provided at Schedule "A" to the Notice of Motion, granting Her Majesty the Queen in right of Ontario as represented by the Minister of Northern Development and Mines (the "**Crown**") leave to file an unsecured claim after the passing of the Claims Bar Date, as defined in the June 15, 2012 Order of Morawetz. J. (the "**Claims Procedure Order**"); and

   (b) such further and other relief as this Honourable Court may deem just.

The Closure Plan and the Financial Assurance

3. Based on my review of MNDM's records, I understand that on May 1, 2006, MNDM acknowledged as filed a closure plan submitted by Timminco Limited ("**Timminco**") pursuant to the *Mining Act* (Ontario) and its regulations (together, the "**Act**"). A subsequent amendment made to the closure plan was acknowledged by MNDM on July 27, 2011 (together with the closure plan, the "**Closure Plan**"). The Closure Plan was delivered in respect of the closure of mining operations carried out on land owned by Timminco in Haley, Ontario (the "**Haley Property**"). Attached hereto as Exhibit "A" is a true copy of the Closure Plan without appendices or attachments.

4. Although the Act sets out the required content of a closure plan that a proponent is required to prepare, the content is tailored to reflect the mining project at issue. Timminco prepared the Closure Plan in accordance with the Act, setting out how the Haley Property is to be rehabilitated along with estimated costs for such rehabilitation.

5. Under the Act, a closure plan must include financial assurance. Timminco is required to specify the form and amount of financial assurance that would cover the cost of rehabilitation work in the Closure Plan (the "**Financial Assurance**"). The Financial Assurance is intended to ensure that in the event that Timminco is unable to complete rehabilitation of the mining liabilities on the Haley Property, MNDM will have adequate funds to carry out such rehabilitation work. Timminco provided Financial Assurance to MNDM and certified that the amount of Financial Assurance for the Closure Plan would be adequate and sufficient to cover the costs of rehabilitation outlined in the Closure Plan. The amount of Financial Assurance as of July 28, 2011 was $1,457,945.

6. On or about November 10, 2009, Timminco advised MNDM that it had carried out rehabilitation work at the Haley Property that involved partially covering

tailings on the site and removal of some buildings as per the Closure Plan. Two inspections occurred at the Haley mine site in 2010. I inspected the Haley Property on June 11, 2010 and on October 29, 2010. During the latter inspection, I met with Greg Donaldson, Timminco's Chief Financial Officer, and Keith McKinnon, Project Co-ordinator and Engineering. I inspected the Haley Property with Keith McKinnon to view the rehabilitation work that was completed. After the site visit, I prepared an inspection report and recommended to MNDM management that a portion of the Financial Assurance be returned to Timminco on the basis that some of the rehabilitation work identified in the Closure Plan had been partially completed. I am aware that subsequent to my October 29, 2010 inspection report, a reduction of the Financial Assurance was approved and approximately $479,773 was provided to Timminco in August 2011.

7. I was not made aware of any soil contamination involving hydrocarbons or any concerns relating to the potential for such contamination before or during my October 29, 2010 visit to the Haley Property.

8. As a Mine Rehabilitation Compliance Officer, part of my job is to review the process for filing notices of material change with the proponents where there has been a change in the circumstances that could affect the adequacy of the closure plan. If the closure plan is no longer adequate in terms of setting out the rehabilitation required, it must be amended and the financial assurance adjusted accordingly.

9. I discussed and reviewed Timminco's notices of material change which Timminco provided to MNDM on February 13, 2009 and January 13, 2011 with Timminco. Timminco subsequently made amendments to the Closure Plan in July, 2011 and adjusted the Financial Assurance. Attached as Exhibit "B" are true copies of Timminco's notices of material change.

10. At no time during the discussions held with Timminco and MNDM staff regarding the notices of material change did Timminco advise me of any potential hydrocarbon or groundwater contamination on the Haley Property.

The Claims Bar Date

11. I took a leave of absence starting from May 2, 2012. I returned to work on October 29, 2012. Upon my return, I was updated by my colleagues at MNDM on Timminco's proceedings under the *Companies' Creditors Arrangement Act* ("**CCAA**"), which I was aware of before my leave.

12. After my return to the office, I also learned of the July 23, 2012 Claims Bar Date as provided for in the Claims Procedure Order.

13. As of July 20, 2012, MNDM held $995,046.44 in Financial Assurance. MNDM believed that this amount was adequate to cover the costs of rehabilitation work associated with the mining liabilities set out in the filed Closure Plan. This was prior to the review of the November 2011 Report by WESA Inc., as further described in the paragraphs below, which was received on July 20, 2012.

Timminco's Eventual Disclosure of Hydrocarbon Contamination

14. After my return to the office, I also learned that three days prior to the Claims Bar Date, on Friday, July 20, 2012, MNDM had received a report stated to have been prepared in November 2011 by WESA Inc. for Timminco (the "**November 2011 Report**"). This report indicates that there is hydrocarbon contamination on the Haley Property. The November 2011 Report suggests that rehabilitation of the contamination on the site could cost in the range of $745,000 to $2,300,000. Attached as Exhibit "C" is a true copy the November 2011 Report, without attachments and appendices.

15. The November 2011 Report also indicates that WESA Inc. had conducted an initial investigation of the hydrocarbon soil contamination on the Haley Site from November 15 to November 17, 2010, only a few weeks after my October 2010 site inspection. The November 2011 Report further indicates that in February 2011, WESA Inc. prepared its first report to Timminco regarding concerns about hydrocarbon contamination on the Haley Property (the "**February 2011 Report**"). After a review of the November 2011 Report, I contacted Timminco's Chief Restructuring Officer, Sean Dunphy, (the "**CRO**") and requested a copy of the February 2011 Report. Attached as Exhibit "D" is a true copy the February 2011 Report, without attachments or appendices.

16. The November 2011 Report indicates that WESA Inc. installed groundwater wells on the Haley Property in July of 2011. Under the Closure Plan, Timminco was required to carry out soil and water sampling to detect any forms of contamination. Under the Act, if such contamination were found, Timminco's Closure Plan would need to set out rehabilitation measures for any such contamination. This would affect the adequacy of the Financial Assurance, as it did not take into account the cost of rehabilitating contaminated soil or ground water, and would be a matter requiring Timminco to provide a notice of material change to MNDM. The installation of groundwater wells is used to determine, among other things, the extent of hydrocarbon contamination and the boundaries of such contamination.

17. To my knowledge, MNDM did not receive any reports or information from Timminco regarding hydrocarbon contamination until receipt of the November 2011 Report on July 20, 2012. This was:

    (a) nearly two years after my October 29, 2010 inspection of rehabilitation work on the Haley Property;
    (b) nearly two years after WESA Inc. appears to have been engaged by Timminco to investigate potential hydrocarbon contamination on the site;

(c) over one year after Timminco received the February 2011 Report indicating that there was such contamination on the Haley Property;

(d) approximately six months after bringing its application for relief under the CCAA; and

(e) three days prior to the Claims Bar Date.

Subsequent Dialogue with the CRO

18. I am advised by Robert H. Purdon, M.Sc., P.Geo., a Mines Rehabilitation Specialist at MNDM, that further investigation and updated information from Timminco regarding the rehabilitation proposed by WESA Inc. in the November 2011 Report was required in order to determine the extent of contamination and the anticipated costs of its rehabilitation. This was owing in part to the fact that the report was delivered to MNDM eight months after it was prepared.

19. My review of the Timminco files indicates that after receiving and reviewing the November 2011 WESA Report on July 20, 2012, MNDM staff made efforts to obtain such information. In this regard, MNDM staff participated in teleconference calls with the CRO and representatives of the Ministry of the Environment (the "**MOE**") to receive updates on the condition of the Haley Property and to inquire further into the issues associated with the site. I am advised that the teleconferences occurred approximately once a month, on September 20, 2012, and October 11, 2012. I am aware that other teleconferences occurred with the CRO and lawyers for MNDM and MOE which MNDM staff did not attend.

20. I attended teleconferences with the CRO on November 6, 2012, November 22, 2012, December 17, 2012, January 17, 2013, February 11, 2013 and February 15, 2013.

21. During teleconferences with the CRO, hydrocarbon contamination on the Haley Property was discussed, as well as MNDM's concern that there was insufficient Financial Assurance to cover the mining liabilities associated with the Haley Property since hydrocarbon contamination was not adequately addressed in the Closure Plan. Additionally, MNDM asked the CRO to set up technical discussions between WESA Inc., MNDM and MOE regarding the Haley Property. Keith McKinnon, a former employee of Timminco, also participated in the technical discussion. The technical conversations were held on December 17, 2012. Additionally, as part of MNDM's efforts to assess the mine site's current status and obtain better information relating to potential liabilities of Timminco arising from required rehabilitation of the Haley Property, Robert H. Purdon, M.Sc., P.Geo., and I, along with the MOE regional hydrogeologist, requested to visit the Haley Property and did so on December 6, 2012.

22. Following the teleconferences and the site visit, Robert H. Purdon, M.Sc., P.Geo., and I were better able to determine the extent of the liabilities relating to contamination of the Haley Property, particularly with respect to the hydrocarbon contamination associated with the site.

23. From the teleconferences, I learned of a proposal submitted to MNDM from the CRO, describing possible rehabilitation measures on the Haley Property, which Timminco could undertake if Financial Assurance was first advanced to Timminco. The measures proposed were not intended to fully rehabilitate the Haley Property, but were measures that could be undertaken relatively quickly to reduce the cost of on-going environmental liabilities. Attached as Exhibit "E" is a true copy of the proposal.

24. On December 6, 2012, Robert H. Purdon, M.Sc., P.Geo., advised me and my colleagues that there is also a possibility of groundwater contamination on the site, which could move offsite into surrounding properties and requires immediate attention.

25. MNDM proceeded to inform the CRO on December 17, 2012 of potential groundwater contamination associated with to the Haley Property and the likelihood that the Director may have to issue an order to amend the Closure Plan, as rehabilitation of hydrocarbon and groundwater contamination were not adequately addressed in the Closure Plan.

26. Under Ontario's *Mining Act*, financial assurance may be reduced if rehabilitation work has been performed in accordance with a filed closure plan. This could result in a return of some financial assurance to the proponent, but it cannot be provided in advance of rehabilitation work being completed and must be in accordance with the rehabilitation measures in the filed closure plan. Additionally, from my site visit and discussions with Robert H. Purdon, M.Sc., P.Geo., and the MOE regional hydrogeologist, I believe the measures proposed by the CRO would not adequately rehabilitate the Haley Property. Furthermore, the proposal did not address the rehabilitation for hydrocarbon contamination.

The Crown's Claim

27. From MNDM's review of the new information that it has collected to date and that has been made available to it after the Claims Bar Date, it is apparent that the Financial Assurance is not sufficient to cover the costs associated with rehabilitation of the Haley Property.

28. I have been informed by Robert H. Purdon, M.Sc., P.Geo., that the costs associated with rehabilitation of groundwater contamination alone could be at least $1.16 million. In order to properly delineate the nature and scope of the groundwater contamination, an initial $160,000 would be spent for drilling, installation and construction of at least six groundwater monitoring wells and analysis of the results from these monitoring wells. After delineation, if mitigation measures are required, the cost for rehabilitation would be at least $1 million for

the installation of a groundwater collection, pumping and treatment systems. MNDM expects that this work will commence during the 2013 field season. A field season is the season when work may be commenced depending on the type of work (e.g., after the snow has melted and the ground has thawed for installation of groundwater monitoring wells). Attached as Exhibit "F" is an email from Robert H. Purdon, M.Sc., P.Geo., relating to the potential groundwater contamination.

29. I have been informed by Robert H. Purdon, M.Sc., P.Geo., that the costs associated with rehabilitation of hydrocarbon contamination would cost at least $1.86 million. Robert H. Purdon, M.Sc., P.Geo., has suggested that the Crown should carry out the method recommended by WESA Inc. in its November 2011 Report. This method would cost approximately $1,834,800. Additionally, Robert H. Purdon, M.Sc., P.Geo., has informed me that WESA Inc.'s investigation, as noted in the November 2011 Report, did not fully delineate the lateral and vertical extent of the hydrocarbon contamination. As a result, an additional $25,000 would be required to complete the delineation of the contamination. MNDM expects that this work will commence during the 2013 field season.

30. The buildings on the Haley Property would also need to be demolished. I have been informed from teleconferences with the CRO that the maintenance and use of these buildings has likely resulted in the consumption of a huge quantity of electricity, which can cost between $9,000 and $10,000 per month. Demolition of the buildings was not included in the Closure Plan as Timminco advised MNDM, in the preparation of the Closure Plan, that it would be able to sell these buildings with the Haley Property when operations ceased. As the Haley Property is unlikely to be sold and given that the cost of maintaining these buildings is high, an immediate rehabilitation measure will be the demolition of these buildings. Some of these buildings contain asbestos, thorium (a radioactive element) and other potentially hazardous materials. I have been advised by Robert H. Purdon, M.Sc., P.Geo., that the cost of their demolition may be at least $300,000.

31. As mentioned in the Nineteenth Court Monitor Report, the cost of rehabilitation will likely increase for the spring thaw. This is due to the increase in water level in the quarry resulting from the melting snow. The water in the quarry contains high levels of ammonia and if left untreated, the highly alkaline water may overflow and discharge into the Ottawa River. Thus, the water in the quarry must be pumped and treated, as Timminco has done in the past. Although electricity costs were mentioned in the Closure Plan, Timminco certified that approximately $9,000 in total would be sufficient to cover such costs. It is expected that the electricity costs associated with pumping alone could be $48,000 per year and that pumping will likely take place twice a year for a period of several months. This is in addition to the anticipated costs of $9,000 to $10,000 per month for electricity costs. Attached as Exhibit "G" is a true copy of a monthly electricity bill for the Haley Property, not during the pumping season and when buildings on the Haley Property were inactive, which the CRO has provided to MNDM.

32. By Order dated March 5, 2013, the Court authorized the transfer of the Haley Property and other property from Timminco to Timminco Silicon Holdings Limited ("**Timminco Holdings**"). The Court further authorized the CRO to sign a sole shareholder declaration authorizing the filing of an assignment in bankruptcy of Timminco Holdings. A copy of the March 5, 2013 Order is attached as Exhibit "H" hereto.

33. I am advised that on or about March 14, 2013, MNDM received correspondence from Grant Thornton Limited, the Trustee in Bankruptcy of Timminco Holdings (the "**Holdings Trustee**") advising that the Trustee has not taken possession of the Haley Property and has abandoned it in accordance with s. 14.06(4) of the *Bankruptcy and Insolvency Act*. A copy of the March 13, 2013 correspondence from the Holdings Trustee is attached at Exhibit "I" hereto.

34. Given the transfer and abandonment of the Haley Property, there is a substantial likelihood that the Crown will be required to complete the rehabilitation of the Haley Property. On March 15, 2013, the Crown held $1,000,241.27 in Financial Assurance. Based on the information outlined above, the Crown believes that the total cost of completing rehabilitation of the site will be approximately $3.47 million, $2.47 million more than the amount of Financial Assurance held by the Crown.

35. The Crown has commenced rehabilitation work by procuring services to operate the water pumping and treatment system, which has been operating since on or about April 18, 2013.

36. While, as noted above, discussions relating to the Haley Property to date have involved MOE, MNDM will be assuming primary responsibility for rehabilitation of the Haley Property because it is mining lands subject to a filed closure plan.

37. At all material times, MNDM proceeded in good faith to determine whether it had a claim, taking into account both the amount of Financial Assurance provided by Timminco and the new and evolving information relating to the contamination associated with the Haley Property and the rehabilitation required. MNDM was unable to deliver a claim prior to the passing of the Claims Bar Date owing to:

(a) the delivery of new and significant information relating to the Haley site just three days prior to the Claims Bar date; and

(b) the need to collect further technical information pertaining to the contamination on and around the Haley Property and the time required to complete such an undertaking.

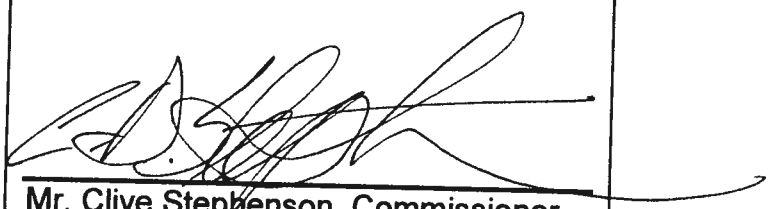
38. I swear this affidavit in support of the Crown's motion for leave to file a claim in these proceedings after the passage of the Claims Bar Date and for no improper purpose.

SWORN before me at the City of)
Greater Sudbury, in the Province)
of Ontario this 14th day of)
May, 2013.)

Sharon Dawn Spires
SHARON DAWN SPIRES

TAB A

THIS EXHIBIT "A", referred to in the Affidavit of Sharon Dawn Spires, sworn on May 14, 2013.



Mr. Clive Stephenson, Commissioner of Oaths

CLIVE D. STEPHENSON,
a Commissioner for taking affidavits in the Province of Ontario while employed by the Ministry of Northern Development and Mines.

MINE CLOSURE PLAN
TIMMINCO METALS
HALEY, ONTARIO

PREPARED FOR:

TIMMINCO LIMITED
2 TORONTO STREET, 5TH FLOOR
TORONTO, ONTARIO
M5C 2B6

TIMMINCO

WESA
A Better Environment For Business

CONFIDENTIAL

FINAL REPORT

MINE CLOSURE PLAN
TIMMINCO METALS
HALEY, ONTARIO

Prepared for:

TIMMINCO LIMITED
2 Toronto Street, 5th Floor
Toronto, Ontario
M5C 2B6

Prepared by:

WESA
A Better Environment For Business

Water and Earth Science Associates Ltd.
Box 430, 3108 Carp Rd.
Carp, Ontario K0A 1L0

File No. B828

September 2003

Ref:B828 Sept-03 Final Closure Plan.doc

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF DRAWINGS

LIST OF TABLES

LIST OF APPENDICES

TIMMINCO LIMITED
Sun Life Financial Tower
150 King Street West
Suite 2401
Toronto, Ontario
M5H 1J9 Canada

Telephone (416) 364-5171
Fax (416) 364-3451
www.timminco.com

CONFIDENTIAL

1.0 LETTER OF TRANSMITTAL

February 22, 2006

Ministry of Northern Development and Mines
B4-933 Ramsey Lake Road,
Sudbury, Ontario
P3E 6B5

Attention: Ms. C. Blancher-Smith, Director of Mine Rehabilitation

Dear Ms. Blancher-Smith:

Please find attached the final Mine Closure Plan documents for the Timminco Metals Mining Property located in Haley, Ontario. These documents, along with the initial documentation submitted to the Ministry's attention dated September 26, 2003, constitute the entire closure plan. This plan is being submitted to the Ministry of Northern Development and Mines (MNDM) for filing under Part VII of the Act.

Yours truly,

Tim R. Pretzer
President – Magnesium Division

Keith S. D'Souza
Vice President & Secretary

2.0 CERTIFICATE OF MINE CLOSURE PLAN

We, the undersigned, Tim R. Pretzer and Keith S. D'Souza, hereby certify that the attached closure plan complies in all respects with the *Mining Act* and Ontario Regulation 240/00, including the Code. Where required, Timminco relied upon qualified professionals in the preparation of the closure plan under the Mining Act and Ontario Regulation 240/00, including the Code.

The cost estimates for the rehabilitation work described in the attached closure plan are based on the current market value cost of the goods and services required by the work in year 2005 dollars. The amount of financial assurance referred to in section 13.0 of the attached closure plan is adequate and sufficient to cover the cost of the rehabilitation work required in order to comply with the *Mining Act* and Ontario Regulation 240/00, including the Code.

Timminco has not carried out consultations with appropriate representatives of all aboriginal peoples affected by this project, since none will be affected by this project. All project work will be carried out on existing Timminco landholdings.

The attached closure plan final documents, with the original submission dated September 2003, constitute full, true, and plain disclosure of the rehabilitation work currently required to make the site suitable for a use the Director sees fit in accordance with the *Mining Act* and Ontario Regulation 240/00, including the Code.

Signature – Keith S. D'Souza	Signature – T.R. Pretzer
Sun Life Financial Tower 150 King Street West Suite 2401 Toronto, Ontario M5H 1J9 (Address)	3595 Moline Street, Aurora, Colorado USA 80015 (Address)
Vice President and Secretary – Timminco Limited (Occupation)	President – Magnesium Division – Timminco Limited (Occupation)
Qualifications	Qualifications

Personally examined the project?

☑ Yes ☐ No

If Yes, when?

AS AT DEC 30/2005
Date

If the certificate is not based on personal examination of the project, indicate the source of the information assessed before making the certificate:

WESA and Timminco Engineering

Direct or indirect interest, current or expected, in this Timminco Metals Project?

Personally examined the project?

☑ Yes ☐ No

If Yes, when?

AS AT DEC 30/2005
Date

If the certificate is not based on personal examination of the project, indicate the source of the information assessed before making the certificate:

WESA and Timminco Engineering

Direct or indirect interest, current or expected, in this Timminco Metals Project?

2.1 CERTIFICATE OF GROUNDWATER AND SURFACE WATER MONITORING PROGRAMS

This certificate is issued in accordance with Sections 37 to 49 of Part 5: Surface Water Monitoring, and Sections 50 to 55 of Part 6: Groundwater Monitoring of the Mine Rehabilitation Code of Ontario (Schedule 1 of Ontario Regulation 240/00 made under the Mining Act).

I, David Harding, hereby certify that the scope of work for additional surface water and groundwater investigations at the Timminco Metals mining property in Haley, Ontario is satisfactory. The study components described under Section 47 (1) – (3) and Section 52 (1) - (3), have been previously conducted or are included in the proposed groundwater and surface water monitoring programs outlined in Section 10.0 of the attached Mine Closure Plan.

I, David Harding, P.Eng., a WESA (Water and Earth Science Associates) employee engaged in the capacity of Environmental Engineer, have developed the groundwater and surface water sampling programs for the Timminco Metals mining property in Haley, Ontario. My curriculum vita outlines my qualifications and is provided in Appendix A.

I, David Harding, visited the Timminco Metals mining property in Haley, Ontario and relied on the information presented or referenced in the closure plan in order to produce this certificate.

I, David Harding, have no direct or indirect interest, current or expected, in the Timminco Metals mining property in Haley, Ontario.

David Harding
Signature

WESA
3108 Carp Road
Carp, ON K0A 1L0
Address

Personally examined the project?
☒ Yes ☐ No

Professional Engineer
Occupation

If yes, when?

Numerous occasions since 1989
Date

refer to attached CV
Qualifications

3.0 PROJECT INFORMATION

3.1 PROPONENT AND PROJECT SITE INFORMATION

Proponent Name and Address:

Timminco Limited
2 Toronto Street, 5th Floor
Toronto, Ontario
M5C 2B6

Tel: (416) 364-5171
Fax: (416) 364-3451

Project Site Location and Address:

Part of Lots 19 to 22, Concessions V and VI
Township of Whitewater Region
County of Renfrew, Ontario

Timminco Metals
A Division of Timminco Limited
962 Magnesium Road
Haley, Ontario
KOJ IYO

3.2 LAND TENURE

Timminco Metals, a division of Timminco Limited (Timminco) operates a magnesium mining and production facility that is located on Lots 19 to 22, Concessions V and VI, in the Township of Whitewater Region (formerly Township of Ross), County of Renfrew. The site is situated approximately 15 kilometres north-west of the Town of Renfrew on Renfrew County Road 7 (Magnesium Road). The site location is shown on Figure 1. Timminco owns approximately 283 hectares of land at this location. The detailed extent of Timminco's landholdings registered under the Land Titles Act, for which mining and mineral rights are held, is presented on Drawing 010.

3.3 SITE PLAN

Timminco's landholdings are illustrated on Drawing 010. The company's mining operations are presently restricted to Lots 19 and 20, Concessions V and VI, and are illustrated in more detail on Drawing 020.

As defined in the Mining Act and Ontario Regulation 240/00 (presented in Appendix B), the following buildings and features (highlighted on Drawing 010) are considered part of Timminco's mining operations:

- quarry #2;
- quarry #1 (inactive);
- solid mill tailings pile;
- former overburden pile;
- current overburden pile;
- lime stockpile;
- Bilson Quarry;
- reduction plant;
- west residue bunker
- residue APC system(baghouses & cyclones);
- briquetting plant;
- calcining plant(including No.1 and 2 kilns);
- substation "C" calcining plant;
- crushing plant;
- substation "C" crushing plant;
- oil tanks;
- cooling pond;
- detonator magazine;
- substation "D" reduction plant;
- explosives magazine;
- future rock and overburden piles; and
- potential future reserves.

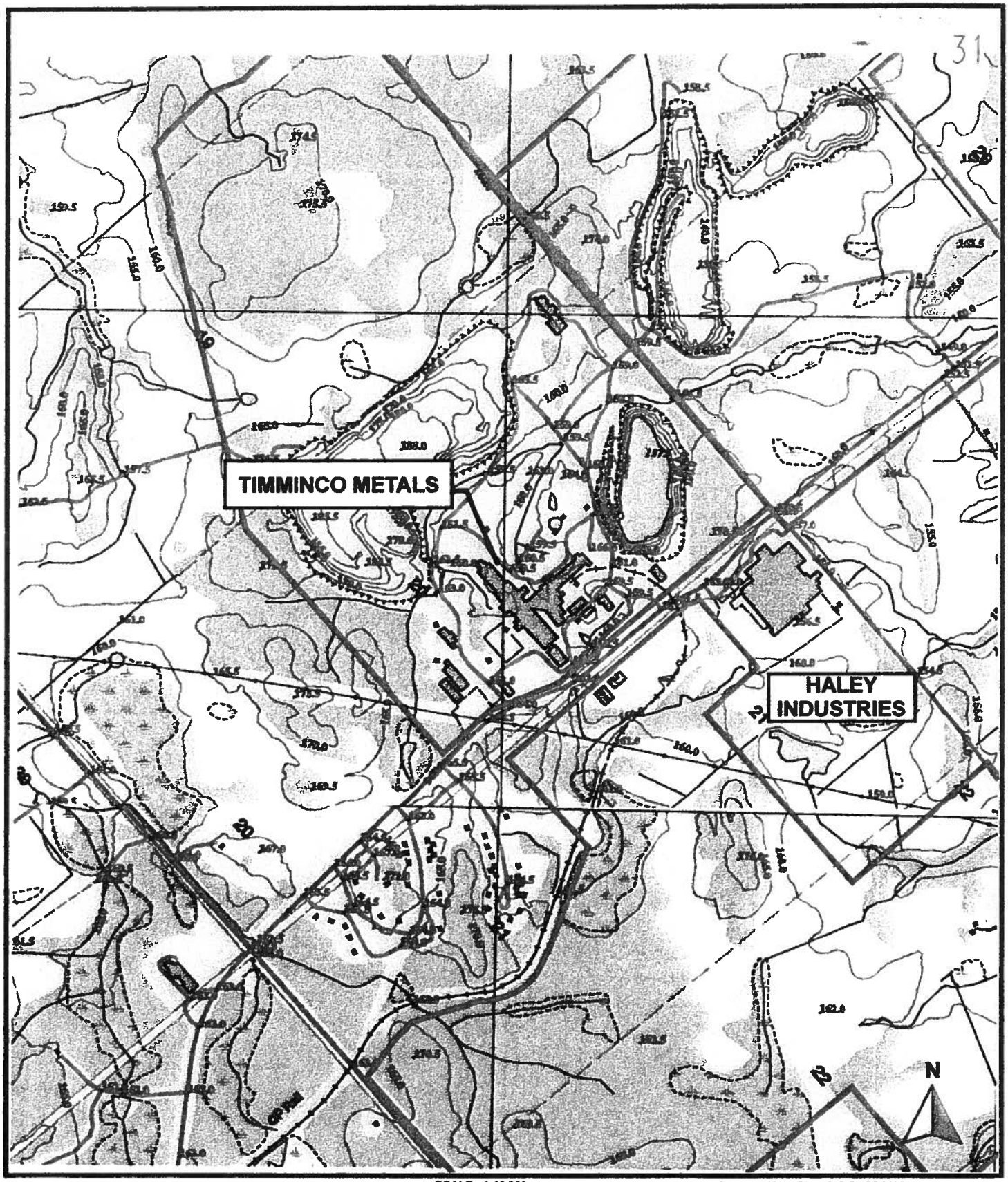


FIGURE: 1

SCALE: 1:10,000

REFERENCE: ONTARIO BASE MAP
MAP 10 18 3600 50450

SITE LOCATION MAP

WESA
A Better Environment For Business

These are the only portions of Timminco's landholdings that will be considered in the following Mine Closure Plan. These features will henceforth be collectively referred to as the "Timminco mining property", which encompasses approximately 95.3 hectares.

The remainder of Timminco's landholdings presented on Drawing 010 are considered to be industrial facilities and are therefore not subject to the Mining Act or Ontario Regulation 240/00. These facilities shall henceforth be referred to as the "Timminco industrial property".

The former flux plant is no longer operated as part of the Timminco mining property and is now considered part of the Timminco industrial property.

4.0 CURRENT PROJECT SITE CONDITIONS

4.1 SITE ZONING AND ADJACENT LAND USE

The Timminco mining property is bordered to the north, east and south by agricultural lands, which for the most part are used as pasture with lesser areas under cultivation. Along the west side, Timminco is bordered by mixed bush toward the north and south, and by the Haley town site along the west-central border. The town site consists of approximately thirty single family dwellings on three residential streets off County Road 7. An elementary school, the Ross Mineview School, is also located on County Road 7, approximately 350 metres west of the westernmost Timminco property line.

Timminco mining property is zoned as mining industrial (MM) and rural (RU). Surrounding land is zoned industrial, rural and agricultural. A copy of the section of the zoning map for the former Ross Township encompassing the area owned by Timminco is included as Appendix C of this document.

In the central area of the Timminco landholdings, surrounded on three sides by Timminco property, is industrial property owned by Trimag Limited Partnership (Trimag) and Haley Industries Ltd. - an operating division of Magellan Aerospace Corporation. Haley Industries Ltd. operates a metal casting manufacturing facility on their property.

The Timminco mining property is bisected in a southwest-northeast direction by Magnesium Road (Renfrew County Road 7) and in a southeast-northwest direction by Concession Road 5 (known locally as the Blind Line). It is also cut by a power transmission corridor which is oriented in an east-west direction, and crosses the mining property in the area west of the Reduction Plant (see Drawing 020).

As shown on Drawing 010, the Timminco mining property extends to the east along the Bilson-Ross right of way to an area known as the Bilson Quarry. Timminco owns the Bilson Quarry property, which was originally developed for the quarrying of dolomitic marble for architectural use. The quarry was never extensively developed, and the land has not recently been, nor will be used for any mining operations in the foreseeable future.

4.2 SITE TOPOGRAPHY

The regional topography is illustrated on Figure 1, which has been taken from Ontario Ministry of Natural Resources UTM Digital Mapping 1:10,000 Maps Sheets 10 18 3600 50450 and 10 18 3600 50500. In general, the land surface slopes from the Bonnechere Ridge located south-west of Haley Station, toward the Ottawa River in a north-easterly direction. Muskrat Lake and the Champlain Trail Lakes represent a regional topographic divide oriented in a north-west to south-east alignment. The lake system drains south-eastward to the Ottawa River.

Locally, Timminco's landholdings are relatively flat-lying to gently rolling with a natural relief of 22 metres. The detailed site topography is shown on Drawing 020. The natural ground surface elevation ranges from 147 to 169 metres above sea level (mASL), with an overall slope to the north-east. Currently, the greatest local relief consists of the mining property with Quarry #2 extending approximately 30 metres below the natural ground surface, and the solid mill tailings pile rising on average approximately 25 metres above the natural ground surface.

It is projected that future development of the Quarry #2 will progress in a northerly direction following the ore body until the mining property is closed out. The projected depth of future quarrying is to remain consistent with the current maximum depth of Quarry #2. At closure, the solid mill tailings pile will extend approximately 25 to 30 metres above the natural ground surface, and will occupy an area of approximately 25 hectares. The topographic contours projected for closure (including Quarry #2 and the solid mill tailings pile) are presented on Drawing 030.

4.3 SURFACE WATER

The Timminco mining property is drained by three distinct surface drainage routes, which are designated as follows:

- the north ditch (stormwater runoff and quarry de-watering);
- the outfall ditch (cooling water discharge and storm water runoff); and
- the south ditch (stormwater runoff).

The drainage routes are shown on Drawing 020.

North Ditch

The north ditch drains the area north of the solid mill tailings pile, and north and west of Quarry #2. The north ditch drainage route flows from west to east across the northern third of the property, and exits the site in the Northeast corner of the property. This drainage course collects natural surface runoff from the northern portion of the site, as well as pumped water from Quarry #2.

Outfall Ditch

The predominant drainage route across the site is the outfall ditch. From a poorly drained area located on the west side of the Timminco mining property, the ditch flows north of the Research and Development building, along the south toe of the solid mill tailings pile, between the two quarries, and eastward to the outfall point in the south-east corner of the property. Several small drainage ditches that collect surface water runoff around the Reduction Plant also route water into the outfall ditch (see Drawing 020). The outfall ditch also collects non-contact cooling water used in the milling operations.

Surface water flow in the outfall ditch originates, for the most part, from the Timminco industrial property. From December to April of each year, flow in the outfall ditch is diverted through the former Quarry # 1, which forms an integral part of Timminco's effluent management program.

From May to November of each year, the outfall ditch flows eastward through a marsh area in-filled with bulrushes and long grasses, then south through an open field to the MISA monitoring station (known as MISA Control Point 0100). The outfall ditch passes under a gravel access road to the field and beyond this point, the water continues to flow eastward off Timminco property.

Flow rates in the outfall ditch have been measured at the MISA monitoring station since the fall of 1994. The average daily flow since September 2000 has been 1,460 m^3/day, with a peak flow of 4,895 m^3/day.

South Ditch

A third surface water discharge point is located south of the General Services Building (part of the Timminco industrial property). This ditch (the south ditch) collects minor amounts of stormwater runoff from the immediate vicinity of the main plant facility (consisting of both Timminco industrial and mining properties). The flow is directed toward the south and east where it enters Haley Industries Ltd. property.

4.3.1 Surface Water Quality

North Ditch

The north ditch, which is comprised of storm water runoff and discharge from quarry #2, drains into the north stream. A storm water control study completed in 1997 confirmed that there are no impacts to water quality observed in this ditch, and all surface water objectives are maintained.

Outfall Ditch

Surface water quality leaving the property is monitored in accordance with the requirements of Ontario Regulation 561/94, the MISA Effluent Monitoring and Effluent Limits Regulation for the Industrial Minerals Sector. Periodic water quality monitoring of the outfall ditch contents at various points along its path clearly indicated a considerable rise in ammonia content as the water passed in front of the mill tailings pile. Monitoring results indicated that for most of the year the acute toxicity levels at MISA Control point 0100 were well below the limits specified in Ontario Regulation 561/94, amended by 170/96. But during the winter months, the level of un-ionised ammonia increasing at the MISA control point resulted in occasional exceedances of acute toxicity limits.

A mitigation plan was developed, which involved diverting the outfall ditch and impounding the groundwater seepage from the mill tailings pile. The contents of the impoundment area are now released to the outfall ditch only when environmental conditions are such that natural passive treatment through volatilisation and bio-uptake sufficiently reduces ammonia levels at the MISA control point (i.e. from May through to November). For the

remainder of the year, the surface water runoff and groundwater seepage from the area in the vicinity of the solid mill tailings pile is collected behind the impoundment structure in the outfall ditch.

Grab samples are taken each day for the first week of discharge from the impoundment area, and once per week thereafter, for the duration of the discharge season (May 1st to November 30th). The samples are tested in the field for pH and temperature, and submitted to an analytical laboratory for total ammonia analysis. Implementation of the mitigation plan and the construction and use of the surface water impoundment area have resulted in a measured improvement in water quality during the winter months.

In early 2002, diversion of the outfall ditch through the former Quarry #1 commenced. The outfall ditch is diverted from December to April of each year in order to ensure that the surface water quality at the MISA Control Point remains below the acute toxicity limits at all times.

South Ditch

The south ditch conveys storm water runoff only. No monitoring of the south ditch is being carried out at present.

4.4 GROUNDWATER

4.4.1 Hydrogeology

Several hydrogeologic studies have been conducted on the Timminco Metals property since 1986. The information presented in this section of the closure plan is taken from the following documents:

- Hydrogeologic Investigation and Waste Management Plan, Timminco Solid Waste Disposal Site, Haley, Ontario. Prepared by WESA; File No. 1580, dated June 1989, revised September 1990.
- Hydrogeologic Investigation, Timminco Metals Haley Facility. Prepared by WESA; Project No. 3339, Draft Report dated February 1995.

Regional groundwater information was obtained from geologic maps of the area, as well as from an analysis of data compiled in MOE records for water wells drilled within a three kilometre radius of Haley, Ontario (WESA, 1990). The majority of wells in the area are completed into the fractured dolomitic marble. Well depths range from 12 to 100 metres, with most generally between 30 and 60 metres. All wells reported obtaining fresh water, with test pumping rates ranging from 18 to 145 L/min (4 to 32 IGPM).

An analysis of the static water levels reported in the well records, converted to potentiometric elevations, shows that groundwater in the fractured bedrock flows in a north-easterly direction from the highlands of the Muskrat Lake Ridge system toward the Ottawa River. The potentiometric surface elevation in the fractured bedrock ranges from 150 metres ASL and higher, south-west of the Timminco mining property, to less than 130 mASL further to the Northeast.

Four multilevel groundwater monitoring wells were installed on Timminco property in November 1994. The water levels in the shallow piezometers in these wells were analysed to determine the near-surface groundwater flow direction and hydraulic gradients. The results of this analysis show that the shallow groundwater flow direction in the fractured bedrock is toward the Northeast, with a calculated hydraulic gradient of 0.003 (WESA, 1995).

A downward component to the groundwater flow is observed in the vicinity of the solid mill tailings pile, where approximately three to five metres of mounding is evident. The vertical hydraulic gradient at areas further from the solid mill tailings pile is found to be upward.

The hydraulic conductivity of the bedrock aquifer was determined by conducting slug tests on selected piezometers and analysing the results using the Hvorslev method. The calculated hydraulic conductivity of the fractured bedrock was found to be on the order of $1x10^{-6}$ m/s. In one of the deeper bedrock piezometers (MW2A), the recovery was too slow to allow an accurate evaluation of the hydraulic conductivity, indicating a much lower value.

The low hydraulic conductivity of the bedrock is confirmed by the lack of groundwater inflow observed in the quarries. Few groundwater seepage areas are observed on the quarry faces, and a minimal amount of pumping is needed to keep Quarry #2 free of water, even though the base of the quarry extends below the potentiometric surface and the elevations of several water-bearing fractures.

Using the calculated hydraulic conductivity value of $1x10^{-6}$ m/s, a hydraulic gradient of 0.003 and an assumed effective porosity of 1%, the average groundwater velocity is estimated to be 10 m/year toward the Northeast.

4.4.2 Groundwater Quality

Detailed groundwater quality testing was conducted as part of the hydrogeologic investigation at the Timminco facility (WESA, 1995). Groundwater samples were collected from the multilevel piezometers, and a wide range of parameters, subdivided into the following four categories, were analysed:

- general water quality parameters (major ions, physical parameters, etc.)
- trace metals
- radionuclides
- volatile organic compounds (VOCs)

The general water quality was found to be characteristic of groundwater from the Canadian Shield, with an increase of total dissolved solids (TDS) with depth.

In four of the monitoring wells located in the vicinity of the solid mill tailings pile, elevated concentrations of nitrogen compounds (nitrate and ammonia) were detected. It is believed that the source of these nitrogen impacts is the solid mill tailings pile. Water quality monitoring downgradient of the solid mill tailings pile, however, has shown that any potential groundwater impacts in the immediate vicinity of the solid mill tailings pile do not the downgradient monitoring wells. The most downgradient monitoring well (MW3) is located approximately 250 metres downgradient of the solid mill tailing pile, but still over 600 metres within the downgradient Timminco property boundary.

4.5 TERRESTRIAL PLANT AND ANIMAL LIFE

The Ontario Ministry of Natural Resources (MNR) was consulted to determine whether there were significant fisheries or wildlife habitat in the area that should be considered in the development of the closure plan. The correspondence from MNR is included in Appendix D.

The lands surrounding the Timminco site consist of a mixture of open pasture and woodland made up of mixed deciduous and conifer species. Within a one kilometre radius from Timminco mining property, it is estimated that 70% of the land is developed agricultural land (DAL).

4.6 AQUATIC PLANT AND ANIMAL LIFE

No known watercourses or wetlands that have a unique or significant fishery or wildlife habitat were identified in this area. However, the MNR highlighted that the watercourses and drainage channels within the area are collectively important to a wide variety of wetland and upland wildlife species. Consequently, this closure plan is designed to mitigate any potential negative impacts to existing habitat in the surrounding area.

4.7 SITE HISTORY AND ASSESSMENT OF HAZARDS

4.7.1 Historical Mining Activities

The property currently owned by Timminco has been active in mining operations since 1942, when magnesium production was commenced by the Dominion Magnesium Company. Since that time, mine production has followed the near-surface ore body in two open pits known as Quarry #1 and Quarry #2, shown on Drawing 020.

Mine operations and metals production continued through the 1940s to the 1970s under the Dominion Magnesium Company. In the early 1970s, Timminco (formerly Chromasco) purchased the property and has operated the site to the present time.

Quarry #1 was operated from mine opening until 1990. It is no longer used for any mining purposes, but is considered part of the Timminco mining property and part of its effluent management program. Mining began in Quarry #2 in 1960. The mine extraction rate from Quarry #2 is currently 39,000 tonnes of ore per year at current plant capacity (i.e., with a maximum of five furnaces operating).

Quarry # 2 consists of a series of concentric benches with an average lift height of eight metres. Rock is blasted from the lifts on an average schedule of once every two months, and is loaded into off-road haulage trucks using a front-end shovel. Approximately 6,000 to 7,000 tonnes of rock is removed per blast.

From Quarry # 2, the rock is transported by the off-road trucks to the Crushing Plant, where it is reduced to 19 mm maximum size by a jaw crusher and hammer mill. The crushed dolomite is then further refined to produce high purity magnesium.

4.7.2 Physical Mine Characteristics

Open Pits

As described in previous sections, and as shown on Drawing 020, two open pit quarries are located on Timminco property (Quarry #1 and Quarry #2). Both quarries form part of the Timminco mining property. Quarry #1 is no longer mined and is also part of the property's effluent management program.

Quarry #2 has been excavated through a shallow veneer of overburden (less than 3 m thick) into the bedrock. Quarry #2 has been excavated to an average depth of approximately 28 metres, with an average floor elevation of 130 mASL. The current surface area plan view of Quarry #2 (based on Timminco's figures and presented as Drawing 020) is approximately 119,000 m^2.

The quarry walls are sloped at a typical grade of 1H:1V, with benches every eight to ten metres. The width of each bench is variable, with the average width being approximately 10 metres. No stability problems along the quarry walls have been documented and mining operations have not been affected by any instability or erosion problems on the rock walls.

Although Quarry #2 extends below the groundwater potentiometric surface and the elevations of water-bearing fractures, the rate of groundwater flow into the excavation is low due to the low hydraulic conductivity of the bedrock. The lack of significant flows into the Quarry #2 is confirmed by the minimal amount of pumping that is required to maintain operations. Pumping is carried out on an as-needed basis from a single sump in the central area of the lower bench, as indicated on Drawing 020. The water is pumped from the sump to the top

of the west quarry wall, where it is directed into the North Ditch. From the pipe discharge point, the water flows northward to the Timminco property line. The ditch exits Timminco property in the Northeast corner of the site.

Underground mining activities have never been carried out at the Timminco facility. No underground mining is projected in the future at the site.

Rock and Overburden Piles

Since the recoverable ore on the Timminco Metals property is found within several metres of the ground surface, very little overburden and unsuitable rock requires stripping. Three piles of soil and rock, located east and south-east of Quarry #2, have been generated from stripping operations in the past. The locations of the piles are indicated on Drawing 020.

The former overburden pile has a maximum height of 16 metres above the surrounding landscape, and contains approximately 275,000 m^3 of overburden and crushed rock rejects from the quarries. The current overburden piles, located immediately north and south of the access road to the MISA monitoring station are also composed of reject crushed rock. The north pile has a maximum height of seven metres above the surrounding land, and currently contains an approximate volume of 80,000 m^3 of material. The south pile has an average height of about 2 metres above the surrounding land, and currently contains an approximate volume of 17,000 m^3.

4.7.3 Assessment of Hazards

The potential physical hazards that currently exist on the Timminco mining property are public safety, slope stability, and erosion associated with the open pits and overburden rock piles, as described in section 4.7.2. Quarry #2 will be allowed to fill with water once production from this quarry has ceased. Pumping from Quarry #1 currently occurs during the winter months only (approximately from December to April) as part of the site effluent management program. The water level in Quarry #1 will be allowed to reach static conditions once PWQO are met in the site surface water.

Both quarries are benched to reduce physical hazards. No stability problems along the quarry walls have been documented and mining operations have not been affected by any instability or erosion problems on the rock walls. The overburden rock piles are constantly monitored and re-graded for stability, and have been allowed to re-vegetate. Therefore, neither the open pit nor the piles are believed to pose a significant physical hazard.

4.7.4 Current Contamination

In the past, occasional wintertime exceedances of acute toxicity limits for ammonia were detected in the outfall ditch. A mitigation plan was developed, which involved diverting the outfall ditch through the former Quarry #1 and impounding the groundwater seepage from the mill tailings pile. The contents of Quarry #1 and the impoundment area are now released to the outfall ditch only when environmental conditions are such that natural passive treatment through volatilisation and bio-uptake sufficiently reduces ammonia levels at the MISA control point (i.e. from May through to November). This program is monitored and has been successful in controlling ammonia levels in surface water.

The solid mill tailings pile is located north of the main industrial complex at the Timminco site. This area currently occupies an area of approximately 12.5 hectares and extends to heights ranging from 25 to 30 metres above the surrounding land surface. In four of the monitoring wells located in the vicinity of the solid mill tailings pile, elevated concentrations of nitrogen compounds (nitrate and ammonia) have been detected. Groundwater quality monitoring downgradient of the solid mill tailings pile, however, has shown that any potential groundwater impacts in the immediate vicinity of the solid mill tailings pile do not extend to the downgradient monitoring wells, located approximately 200 metres away. The most downgradient monitoring well, denoted MW3, is located on the order of 600 metres inside of the downgradient boundary of the site. No other groundwater impacts have been detected.

In October 1976, the Atomic Energy Control Board (AECB) completed a survey of gamma radiation at the Timminco site. Based on the results of this survey and subsequent investigations and inspections by AECB personnel, a remedial action plan was implemented at the site over the period from 1977 to 1979. The purpose of the remedial action was to remove material that was contaminated with thorium in the area of the Auxiliary Metals Building (both the interior and exterior). Thorium was produced by Dominion Magnesium Limited, the former owner of the property.

An area on top of the solid mill tailings pile was designated by Timminco's predecessor, known as Chromasco, and agreed to by the AECB as a storage area to receive the thorium-contaminated material. The designated area is shown on Drawing No. 030. It is estimated to contain between 10,000 and 15,000 tonnes of material, primarily unirradiated thorium contained in pyrochlore slag. This material will continue to remain undisturbed in this approved storage area, through solid mill tailings pile development and closure.

5.0 PROJECT DESCRIPTION

5.1 PROJECT SUMMARY

Timminco Metals, a division of Timminco Limited (Timminco) operates a magnesium mining and production facility that is located on Lots 19 to 22, Concessions V and VI, in the Township of Whitewater Region (formerly Township of Ross), County of Renfrew. Timminco owns approximately 283 hectares of land at this location.

Timminco's mining operations are illustrated in more detail on Drawings 010 and 020. The specific features that comprise the Timminco mining property and are subject to the Mining Act and Regulation 240/00 are highlighted on Drawing 010. The remainder of Timminco landholdings in this area are considered part of their industrial property and are not included in this Mine Closure Plan. The Timminco mining property encompasses approximately 91.4 hectares.

Mining operations at the site began about 1942 by The Dominion Magnesium Company. Timminco acquired the property in the early 1970s. Dolomitic marble has been extracted from two open pit mines on the property. Mine production at current maximum plant capacity (i.e., with five operational furnaces) is approximately 39,000 tonnes of ore per year, which yields approximately 3,430 tonnes of magnesium from the mining property.

5.2 ORE MINERALOGY AND HOST ROCK

Regional Geology

The following discussion of the local overburden and bedrock geology is based on a review of published literature as well as information gathered from on-site investigations.

The Timminco property is located in the physiographic region known as the Muskrat Lake Ridges (Chapman and Putnam, 1984). The region is characterised by a series of prominent rocky ridges composed of faulted, Precambrian-aged blocks which interrupt the Ottawa Valley clay plains. The tops of the ridges are exposed as bedrock outcrops, whereas the sides are typically covered with a thin layer of sand and gravel or glacial till.

Overburden Geology

The overburden on the Timminco property consists of a thin layer of glacio-fluvial sand and gravel, and a discontinuous glacial till. In general, the overburden ranges in thickness from zero to three metres. In many areas on the property, bedrock is exposed at the ground surface.

Regional geologic mapping information (Barnett and Clarke, 1980) indicates that the glacial till unit represents deposition during the north-westerly retreat of glacial ice up the Ottawa Valley. Regionally, the till is described as a loose, stony sand in areas of thin drift cover over the Precambrian bedrock.

On the north-eastern portion of the Timminco property, and further eastward onto Concessions VII and VIII of the former Ross Township, Barnett and Clarke (1980) report that a thicker deposit of deeper water marine sediments is found. These deposits consist of massive to blocky clay, silty clay and clayey silt, and resulted from the deposition of sediments in the Champlain Sea.

Bedrock Geology

Bedrock at the site consists of a Late Precambrian, medium to coarse-grained, buff to white dolomitic marble that regionally dips 30-60° to the west (Lumbers, 1982). Most of the rock exposed in Quarry #2 appears to be relatively free of siliceous impurities.

In Quarry #2, the rock is observed to be heavily fractured with a primarily horizontal fracture pattern in the upper 15 metres. Below this depth, no discernible fracture patterns were identified.

No significant occurrences of younger, Palaeozoic bedrock outcrops have been noted in the Cobden map area (Russell and Williams, 1985).

Ore Mineralogy

When uncontaminated, the deposit exhibits a white crystalline structure. Minor amounts of graphite impart a blue colour to the dolomite, but do not appear to impact negatively on ore quality. Some "reddish" dolomite (iron) and "black" hornblende are present as intrusions on the west wall of Quarry #2. These intrusions are waste and are not acceptable as crusher feed. A 15% waste fraction has been historically observed in Quarry #2.

5.3 MINE DEVELOPMENT, ACTIVITIES, AND BACKFILLING

The schedule for development and eventual closure of the Timminco mining property will be governed by the long-term market conditions and the rate of production of magnesium. As it is very difficult to forecast future production rates and the eventual life of the Timminco mining facility, the projected quarry development has been estimated using a 50 year design life and the current maximum mine production rates. Information acquired from future site exploration and estimated reserves will be used to continue to project the mine life and eventual quarry size.

At a magnesium production capacity of 3,430 tonnes per year, the Timminco industrial facility requires 1.95 million tonnes of quality dolomite to support a 50 year operation. Reserve estimates of 7.6 million tonnes exceed the 50 year ore requirement. A breakdown of the dolomite reserve is as follows:

- Proven Reserves in Quarry #2 - 1.4 million tonnes (as of March 31, 2001); and
- Potential Reserve, Timminco property south of Magnesium Road – 6.2 million tonnes (as of March 31, 2001).

At a current capacity usage of 39,000 tonnes per year of dolomite, Quarry #2 may operate until about 2036. Thereafter, the development of a new quarry is required to sustain operations until 2050. Note, however, that current mine production rates are limited by the number furnaces that are currently allowed to be operated. The mine production rates may increase in the future if more furnaces are allowed to be operated, or may decrease due to market conditions. Therefore, the life of Quarry #2 and the potential reserves may be utilised before or extend beyond the above-mentioned dates.

The Timminco property south of Magnesium Road has potential reserves and reasonable overburden depths to support an open pit operation. This ore body is directly south of the former Quarry #1 (currently inactive) and contains potential reserves of 6.2 million tonnes. This estimate assumes an ore body width of 80 metres.

The estimated final extent of Quarry #2 is shown on Drawing No. 030. During quarry development, the rock slopes will continue to be benched to achieve an overall 1H:1V grade. Typical cross-sections through the conceptual final quarry slopes are shown on Drawing No. 040. Quarry #2 will not be backfilled with solid materials but will be allowed to fill with water once mining activities have ceased.

5.4 ORE PROCESSING

Quarry #2 consists of a series of concentric benches with an average lift height of eight metres. Rock is blasted from the lifts on an average schedule of once every two months, and is loaded into off-road haulage trucks using a front-end shovel. Approximately 6,000 to 7,000 tonnes of rock is removed per blast.

From Quarry #2, the rock is transported by off-road truck to the Crushing Plant, where it is reduced to 19 mm maximum size by a jaw crusher and hammer mill. The crushed dolomite is then further refined to produce high purity magnesium. A brief description of the process follows.

The fine dolomite produced by the crushing operation is fed into rotary kilns where it is calcined at approximately 1300 °C. The calcined dolomite is discharged to rotary coolers before being conveyed to bin storage. From storage, the calcined dolomite is pulverised and mixed with finely ground ferrosilicon and fluorspar. The mixture is then formed into briquettes by means of mechanical briquette presses.

The briquettes are conveyed to the Reduction Plant and loaded by mechanised chargers into the reduction furnace retorts. The retort is an alloy steel tube with closed end in the furnace and with a water-cooled condenser section extending outside the furnace. The operating temperature of the furnaces is approximately 1200 °C.

The reduction operation is a batch process, with the charging and discharging of furnaces on regular cycles. Under vacuum, magnesium is released in vapour form, condensing in the water-cooled section of the retort. The magnesium vapours crystallise on removable condenser sleeves in the cooled section. After removal from the furnace, the magnesium is pressed from the sleeve in a hydraulic press. The individual magnesium deposits are called "crowns". The current annual production capacity is 3,430 tonnes of pure magnesium.

5.5 BUILDINGS AND INFRASTRUCTURE

5.5.1 Buildings

An inventory of buildings and associated equipment at the Timminco mining property is presented in Table 5.1. The building locations are referenced to the baseline grid shown on Drawing 020. The origin point of the grid (10,000N; 10,000E) is located at the intersection of Renfrew County Road 7 and Concession Road 5.

5.5.2 Infrastructure

Other site infrastructure on the Timminco mining property includes roads, water supply, water distribution, sewage disposal, electrical power transmission and natural gas distribution. These are described in the following sections:

Roads

The locations of roads and parking facilities are shown on Drawing 020. All roads are unpaved surfaces and link the various mining facilities as well as solid mill tailings pile and storage areas. The employee parking area, located west of the administration building, is paved and covers an area of approximately 4500 m^2. The parking area is considered part of the Timminco industrial property.

Water Distribution

The layout of the plant water supply lines is illustrated on Drawing No. UG-1000. Water is pumped through a 20 cm diameter cast iron underground forcemain from Pumphouse Lake to the plant site. Once at the Timminco facility, the lake water is distributed to the various buildings and process areas by forcemains, which are typically between 100 mm and 200 mm diameter, depending on the design flows. Lake water is also used to supply the Timminco facility for fire protection and Haley Industries Ltd. with process water. Seven hydrants are situated at the Timminco plant site.

After use, once-through, non-contact cooling water is directed to the outfall ditch. Cooling water from the reduction furnaces is pumped through underground forcemains to the cooling water reservoir located north of the Crusher Plant. From the reservoir, the cooling water is treated and re-circulated to the Reduction Plant through underground forcemains.

Sewage Disposal

Sewage effluent from the mining property is disposed in one septic tank system located north of the Calcining Plant.

The sewage system consists of a septic tank that discharges effluent to a subsurface leaching bed. The sewage disposal system is shown on the Drawing No. UG-1000.

Electrical Power Transmission

The electrical distribution system layout at the Timminco mining property plant is illustrated on Drawing No. UG-1000. The primary 120 kV electrical service to the site is supplied via Hydro One Networks' overhead lines to the main Timminco relay station, located west of the Reduction Plant. Electrical power is then distributed to five substations (designated A to E) and to the following feeders located on both the Timminco mining and industrial properties via underground and overhead lines as indicated on Drawing No. UG - 1000:

- Granulation Facility (former Auxiliary Metals)
- Reduction Plant
- Extrusion Plant
- Yard Feeder
- Lake Feeder

Natural Gas and Fuel Oil

The Timminco mining property is also serviced by natural gas and fuel oil. The fuel oil system is used as a standby fuel source. The natural gas distribution system and the locations of oil storage tanks are illustrated on Drawing No. UG - 1000. Note that the underground gasoline tanks identified north of the Administration Building (industrial property) have been removed from the site.

The natural gas supply enters Timminco property via a 150 mm diameter underground pipeline to the regulating station located east of the General Services Building (located on the Timminco industrial property). From the regulating station, the natural gas is distributed to the following mining property buildings:

- Reduction Plant (200 mm pipeline)
- Calcining Plant (150 mm pipeline)

Standby fuel oil is supplied to the Calcining Plant from two oil storage tanks located north of the Briquetting Plant. The fuel oil is fed through two lines of 38 and 50 mm diameter.

5.6 TAILINGS

A solid residue, consisting of dicalcium silicate, is produced from the reduction process. This material is defined as a solid mill tailing under Ontario Regulation 347 and is exempt from Part V of the Environmental Protection Act and Ontario Regulation 347.

The solid mill tailings are disposed on-site in a pile located north of the main industrial complex at the Timminco mining property. This area currently occupies an area of approximately 12.5 hectares and extends to heights ranging from 25 to 30 metres above the surrounding land surface. About 80% of the solid mill tailings in this area are made up of the dicalcium silicate residue. The remaining 20% is comprised of sludge (also designated as a solid mill tailing), and other materials, including calcined dolomite fines (commonly referred to as lime), and office and cafeteria wastes, etc. that have been generated over the life of the industrial and mining properties. Solid waste materials that are not designated as solid mill tailings are no longer disposed on the mill tailings pile. Currently, approximately 14,000 tonnes of solid mill tailings are produced every year.

In four of the monitoring wells located in the vicinity of the solid mill tailings pile, elevated concentrations of nitrogen compounds (nitrate and ammonia) were detected. It is believed that the source of these nitrogen impacts is the solid mill tailing pile. Water quality monitoring downgradient of the solid mill tailings pile, however, has shown that any potential groundwater impacts in the immediate vicinity of the solid mill tailings pile do not extend to downgradient monitoring wells, located approximately 200 metres away.

Due to the mineralogy of the ore (i.e. carbonate minerals) and the high pH environment, there is no potential for metal leaching and acid mine drainage from the solid mill tailings pile.

5.7 WASTE ROCK, ORE, CONCENTRATE AND OVERBURDEN

Since the recoverable ore on the Timminco Metals property is found within several metres of the ground surface, very little overburden and unsuitable rock requires stripping. Three piles of overburden materials, soil and waste rock, located east and south-east of Quarry #2, have been generated from stripping operations in the past. The locations of the piles are indicated on Drawing 020.

The former overburden pile has a maximum height of 16 metres above the surrounding landscape, and contains approximately 275,000 m^3 of overburden and crushed rock rejects from the quarries. The current overburden piles, located immediately north and south of the access road to the MISA monitoring station are also composed of reject crushed rock. The north pile has a maximum height of seven metres above the surrounding land, and currently contains an approximate volume of 80,000 m^3 of material. The south pile has an average height of about 2 metres above the surrounding land, and currently contains an approximate volume of 17,000 m^3.

The piles consist exclusively of native overburden and bedrock, which is not susceptible to acid or metal leaching. Therefore, there is no potential for metal leaching and acid mine drainage. At present, thick vegetation covers a large portion of the existing Northwest pile, and additional vegetation is encouraged, in order to mitigate environmental impacts, such as erosion and dust generation.

5.8 WASTE MANAGEMENT SYSTEMS

Solid residues are generated by each production unit at the Timminco mining property. For purposes of residue classification, the mining property production units can be divided as follows:

- Crushing
- Calcining
- Briquetting
- Reduction

The following mining property process residues are disposed of on site:

- dicalcium silicate, which is a solid residue from the reduction process and is defined as a solid mill tailing under Ontario Regulation 347;
- calcined dolomite fines (commonly referred to as lime fines), which are produced in kilns during the calcining of the rock;
- crusher fines;
- calciner oversize (also referred to as partially calcined dolomite); and
- briquetting residue.

The solid residues that are disposed on-site are placed in an area located north of the main industrial complex at the Timminco site. This area currently occupies approximately 12.5 hectares and extends to heights ranging from 25 to 30 metres above the surrounding land surface. Historically, solid residue materials were disposed of in two adjoining piles, and included office and cafeteria waste. Now, the two piles have been blended into a single pile, and no longer include office and cafeteria waste. This single pile will henceforth be referred to as the solid mill tailings pile. The location of this pile is shown on the Drawing 020.

Historically, lime fines were stockpiled on the east side of the solid mill tailings pile. Now, most of historic lime stockpile as well as the all of the currently generated lime fines are sold to local farmers and contractors for agricultural and local construction use.

A detailed listing of liquid products used at the Timminco facility is included with the chemical inventory in Appendix E. The liquid products include petroleum hydrocarbons (lubricating oils, fuels and reclaimers), general usage materials and laboratory supplies. No liquid wastes are disposed on the Timminco site. Used oils are removed from the site by a recycling contractor.

5.9 WATER MANAGEMENT OF TREATMENT SYSTEMS

Water for potable and industrial usage at the Timminco mining property is supplied from two sources:

- surface water supply from Pumphouse Lake; and
- groundwater supply well located south of Warehouse No. 4 on the south side of County Road No. 7 (for drinking water usage).

Approximately 1,635 m^3/day (432,000 USG per day) of water are pumped continuously from Pumphouse Lake (shown on Figure 1) to the plant site via a 20 cm diameter cast iron underground forcemain, for industrial use at the plant. The water is primarily used for once-through, non-contact cooling purposes and is distributed to the various buildings and process areas by forcemains, which are typically between 100 mm and 200 mm diameter, depending on the design flows. After use, the cooling water is directed to the outfall ditch.

The reduction furnaces are cooled by a closed-loop treated water system, which circulates the water from the reduction area to spray nozzles into a 1.8 metre deep, uncovered circular concrete reservoir situated north of the crusher building. From the reservoir, the cooling water is treated with scale inhibitors and biocides, and re-circulated to the Reduction Plant through underground forcemains.

5.10 RAW MATERIAL STORAGE

The magnesium production process does not require the use of large amounts of chemical reagents. Process materials such as ferrosilicon, fluorspar, fluxes and general usage materials are brought onto the site in various quantities and consumed as needed. A detailed inventory of the process materials and general usage chemicals typically found on the Timminco mining property and the Timminco industrial property is presented in Appendix E, along with the approximate volume of each material used per year. This information was taken from the Initial MISA Report prepared by Timminco in April 1990. Note that the listing of process chemicals and general usage materials includes both solids and liquids. Storage and warehouse buildings where these materials are stored are shown on Drawing 020. At closure, Timminco will generate an updated chemical inventory specifically for the mining property.

Explosives manufactured by E.T.I. Explosives are used to blast rock in the quarry. The explosives are stored in a concrete magazine located approximately 450 metres east of Quarry #2 (see Drawing 020). On average, approximately 5,000 kg of explosives and 300 blasting caps are stored separately in the magazine at one time.

The Timminco plant is also serviced by natural gas and fuel oil. The fuel oil system is used as a standby fuel source. Standby fuel oil is supplied to the Calcining Plant from two oil storage tanks located north of the Briquetting Plant. The fuel oil is fed through two lines of 38 and 50 mm diameter. The locations of oil storage tanks are illustrated on Drawing No. UG - 1000.

5.10.1 Thorium-Impacted Material Storage Area

In October 1976, the Atomic Energy Control Board (AECB) completed a survey of gamma radiation at the Timminco site. Based on the results of this survey and subsequent investigations and inspections by AECB personnel, a remedial action plan was implemented at the site over the period from 1977 to 1979. The purpose of the remedial action was to remove material that was contaminated with thorium in the area of the Auxiliary Metals Building (both the interior and exterior). Thorium was produced by Dominion Magnesium Limited, the former owner of the property.

An area on top of the solid mill tailings pile was designated by Timminco (formerly known as Chromasco) and agreed to by the AECB as a storage area to receive the thorium-contaminated material. The designated area is shown on Drawing No. 030. It is estimated to contain between 10,000 and 15,000 tonnes of material, primarily unirradiated thorium contained in pyrochlore slag. This material will continue to remain undisturbed through solid mill tailing pile development and closure. The AECB prescribed substance license for this material is presented in Appendix F.

5.11 Proposed Schedule

As noted in Section 5.3, the schedule for the development and eventual closure of the Timminco mining property will be governed by the long-term market conditions and the rate of production of magnesium at the Timminco facility. As it is very difficult to forecast future production rates and the eventual life of the Timminco facility, the projected quarry development

has been estimated using a 50 year design life and the current maximum mine production rates. Information acquired from future site exploration and estimated reserves will be used to continue to project the mine life and eventual quarry size.

6.0 PROGRESSIVE REHABILITATION

The solid mill tailings pile is rehabilitated progressively during its development, through ongoing re-grading and re-vegetation activities, to ensure that the design grades are followed, and to minimise ultimate closure costs. Similar progressive re-grading activities are conducted on the rock and overburden piles, and natural vegetation is allowed to establish itself on the piles. These activities will continue throughout the projected operating life of the mining property.

Table 6.1 presents a summary of the mining property-wide rehabilitation measures required during each of the three periods of closing out (including progressive rehabilitation).

7.0 REHABILITATION MEASURES: TEMPORARY SUSPENSION

At any time, Timminco may decide to temporarily suspend activities at its mining property in Haley, Ontario. From the Mining Act, the term 'temporary suspension' means:

> *"the planned or unplanned suspension of a project in accordance with a filed closure plan where protective measures are in place and the site is being monitored continuously by the proponent."*

After a period of temporary suspension, the mining property may be returned to operation, or alternately, the mining property may be placed into a state of inactivity or fully closed out. To enter into any of these closure conditions (temporary suspension, state of inactivity, or closing out), it is not necessary to have been in any other condition (that is, no one condition necessitates another either before or after).

The following rehabilitation measures are to be completed in accordance with Ontario Regulation 240/00 in order to place the Timminco mining property in a state of temporary suspension. Note that Notice is to be provided to the Director of Mine Rehabilitation prior to the commencement of temporary suspension activities, in accordance with subsection 144(1) of the *Mining Act*.

Tables 7.1 through 7.8 present a summary of the rehabilitation measures required for all key areas of the Timminco mining property during temporary suspension, a state of inactivity, and closing out.

7.1 RESTRICTED ACCESS AND MATERIAL STORAGE

During a period of temporary suspension, all buildings and entrances associated with the mining property will be kept locked at all times in order to restrict access. The detailed inventory of materials, products, process chemical and general usage materials that was completed for the Initial MISA Report will be updated during a period of temporary suspension and surplus materials will either be returned to suppliers or securely stored. Liquid levels in any storage tanks will be monitored or the liquids will be removed, and all explosives shall be removed from the site by a certified explosives hauler.

7.2 MINE OPENINGS

Under conditions of temporary suspension, all gates on roads leading to Quarries #1 and #2 will kept locked and notices will be posted to warn against unauthorised access. Existing fences around the Timminco site will be inspected and maintained as necessary.

7.3 MECHANICAL, HYDRAULIC, AND ELECTRICAL SYSTEMS

Under conditions of temporary suspension, access will be restricted to the site by keeping all entrances to the mining property buildings (see Table 5.1) locked at all times. All fixed equipment remaining on-site (furnaces, presses, crushers, etc.) will be left in a no-load condition as required by section 22(2) of Ontario Regulation 240/00. All portable equipment and vehicles will be placed in a secure storage area. The condition of the remaining equipment, including the liquid levels in equipment storage containers, will be monitored.

All non-essential electrical power services will be discharged and locked open for safety. Local gas supply services to the mining facilities will be closed.

7.4 MONITORING PROGRAMS

Per section 22(2)5 of Ontario Regulation 240/00, the surface water monitoring program outlined in Section 10.2.1 and Table 10.1 of this report shall be followed during a period of temporary suspension. Groundwater monitoring shall also be conducted, as outlined in Section 10.2.2 and Table 10.1 of this report. During a state of temporary suspension, the physical stability of the site infrastructure, piles and open pits will be monitored on a regular basis.

7.5 CONTROL OF EFFLUENT

During a period of temporary suspension, where practical, the above-ground or shallow-buried supply pipes will either be drained or will continue to operate, to provide protection against freezing. The water supply well located behind Warehouse No. 4 will continue to supply water to the administration building, as this forms part of the industrial property, and not the mining property.

Non-contact industrial cooling water is discharged to the outfall ditch. During a period of temporary suspension, some cooling water from the industrial property would still be expected to flow through the outfall ditch, as well as normal surface water runoff collected in the outfall ditch. Other site effluent consists of water pumped from Quarry #1 as part of the site's effluent management program, and water pumped from Quarry #2 for the purpose of de-watering. Pumping from Quarry #1 occurs during winter months only, and would be continued if a period of temporary suspension occurred during the winter. Depending upon the anticipated length of the temporary suspension, the de-watering of Quarry #2 may be continued.

7.6 Rock, Overburden and Solid Mill Tailings Piles

The rock and overburden piles at the Timminco site consist (and will continue to consist) exclusively of native overburden and bedrock, which is not susceptible to acid or metal leaching. During mine operations, the progressive rehabilitation grading measures will be completed on the rock and overburden piles in order to prevent slope stability problems and minimise erosion potential. These piles will continue to be monitored during temporary suspension and the vegetation that has already established itself on a large portion of the existing Northwest pile will be allowed to continue to grow.

During mine operations, the progressive grading of the solid mill tailings pile will be completed as the pile develops. During temporary suspension, the stability of the pile will continue to be monitored, and vegetation will be allowed to grow. During this period, the thorium- storage area will also continue to remain undisturbed in the approved area on top of the solid mill tailings pile.

7.7 Impoundment Structures

The only impoundment structure at the Timminco site consists of a small surface water impoundment along the outfall ditch. The impoundment consists of an existing road embankment and also collects groundwater seepage from the solid mill tailings pile area. The contents of the impoundment area are released to the outfall ditch only when environmental conditions are such that natural passive treatment through volatilisation and bio-uptake sufficiently reduce ammonia levels at the MISA control point (i.e. from May through to

November). The impoundment structure is operated and monitored in accordance with Certificate of Approval No. 4-0165-98-996, issued on February 15, 1999 by the Ontario Ministry of Environment (MOE).

During a period of temporary suspension, the impoundment area will continue to be monitored and operated. In November, the outfall ditch impoundment structure will be closed, and water will be allowed to collect in the impoundment area. Then in May, when environmental conditions are deemed appropriate, the outfall ditch impoundment structure will be opened, and the water from the impoundment area will be allowed to flow through the outfall ditch.

The outfall ditch diversion will also continue to be operated during a period of temporary suspension. Surface water from the outfall ditch will be diverted through the former Quarry #1 from December to April. Then in May, when environmental conditions are deemed appropriate, the diversion structure will be opened, and water in the outfall ditch will be allowed to flow directly to the MISA control point via the outfall ditch. The outfall ditch diversion is also operated and monitored under Certificate of Approval No. 4-0165-98-996, which was amended to include the installation and operation of the diversion structure on September 14, 2001.

7.8 SCHEDULE FOR TEMPORARY SUSPENSION

A schedule of rehabilitation measures to be implemented in order for the project to be considered in temporary suspension is presented on Table 7.9.

8.0 REHABILITATION MEASURES: STATE OF INACTIVITY

At any time, Timminco may decide to render its Haley, Ontario mining property inactive. From the Mining Act, the term inactivity means:

> *"the indefinite suspension of a project in accordance with a filed closure plan where protective measures are in place but the site is not being continuously monitored by the proponent."*

The following rehabilitation measures are to be completed in accordance with the Mine Rehabilitation Code of Ontario (Ontario Regulation 240/00) in order to place the Timminco mining property in a state of inactivity. Note that Notice is to be provided to the Director of Mine Rehabilitation prior to the commencement of the period of inactivity, in accordance with subsection 144(1) of the *Mining Act*.

Tables 7.1 through 7.8 present a summary of the rehabilitation measures required for all key areas of the Timminco mining property during a state of inactivity.

8.1 RESTRICTED ACCESS AND MATERIAL STORAGE

During a state of inactivity, all buildings and entrances associated with the mining property will be kept locked at all times in order to restrict access. An inventory of production materials will be completed and surplus materials will either be returned to suppliers or securely stored. Liquids will be removed from all site storage tanks, and all explosives shall be removed from the site by a certified explosives hauler.

8.2 SHAFTS, RAISES AND OPEN STOPES

Due to the nature of the open-pit mining operations, no shafts, raises or open stopes have been constructed at the Timminco facility. Shafts, raises and open stopes are not projected to be required in future operations on the site.

8.3 PORTALS OF ADITS AND DECLINES

Due to the nature of the open-pit mining operations, no adits or declines have been constructed at the Timminco facility. Adits or declines are not projected to be required in future operations on the site.

8.4 MINE OPENINGS

During a state of inactivity, all gates leading to Quarries #1 and #2 will be kept locked and notices will be posted to warn against unauthorised access. A qualified professional engineer will determine the stability of the open pits and stabilise the pit walls, benches or immediate surroundings if deemed necessary. Under conditions of inactivity, pumping in Quarry #2 will cease, and the quarry will be allowed to gradually fill with water. During a state of inactivity, pumping from Quarry #1 would be continued from approximately December to April of each year as part of the site effluent management program (detailed in Section 8.10 of this report).

8.5 MECHANICAL, HYDRAULIC, AND ELECTRICAL SYSTEMS

During a state of inactivity, where practical, the above-ground or shallow–buried supply pipes will be drained. The water supply well located behind Warehouse No. 4 will continue to supply water to the administration building, as this forms part of the industrial property and not the mining property.

All non-essential electrical power services will be discharged and locked open for safety. In addition, the main service valves on the natural gas supply will be closed at the regulating station and the gas lines purged, if necessary. All fixed equipment remaining on-site (furnaces, presses, crushers, etc.) will be left in a no-load condition as required by section 22(2) of Ontario Regulation 240/00. All portable equipment and vehicles will be placed in a secure storage area. The condition of the remaining equipment will be monitored.

8.6 TAILINGS IMPOUNDMENT STRUCTURES

No tailings impoundment structures currently exist at the Timminco facility. Due to the nature of the mine production at the Timminco facility, tailings impoundment structures are not projected to be required in future operations on the site.

8.7 LANDFILL AND WASTE MANAGEMENT SITES

Solid mill tailings are disposed of on-site in an area located north of the main industrial complex at the Timminco site. The location of this solid mill tailings pile is shown on the Drawing 020. During a state of inactivity, public access will be restricted to the site by keeping all entrances related to the mining property locked. Slope stability and erosion problems on the solid mill tailings pile will be prevented by progressively grading to the proposed design grades (which do not exceed 3H:1V) during the pile's development. The proposed final contours of the solid mill tailings pile are illustrated in Drawing No. 030. Note that the proposed final contours are conceptual in nature, as the eventual profile of the solid mill tailings pile will depend on the actual mine life and the quantity of solid mill tailings that are generated at the site.

Some of the solid mill tailings exhibit mild pozzolanic activity and upon weathering, it forms a weakly cementitious crust. The crust acts to reduce erosion as well as minimising infiltration into the pile. During solid mill tailings pile development, regular slope inspections and monitoring are undertaken to assess the long-term erosion potential of the solid mill tailings material.

The specific issues related to the chemical stability of the solid mill tailings pile include the potential impacts on groundwater from the leachate, and the effects on surface water quality from runoff. The rehabilitation objective for these issues is to prevent water contamination by ensuring that the provincial water quality standards are met. Under conditions of inactivity, this will be achieved by continuing the water quality monitoring program and following the progressive rehabilitation and management plan for the solid mill tailings pile (grading and re-vegetation). To date, groundwater monitoring conducted in the area of the pile indicates that the MOE Reasonable Use Guidelines (Guideline B-7) are being met at the site property boundaries.

Regular surface water quality monitoring has been completed in the vicinity of the solid mill tailings pile and at the outfall ditch under the MISA program. Surface water quality monitoring will continue in the vicinity of the solid mill tailings pile and along the outfall ditch throughout site development, as well as during states of inactivity.

8.8 RAW MATERIALS

Public safety issues surrounding the management of chemicals, wastes and explosives on site will be addressed by restricting access to the mining property. This will be accomplished by locking all buildings and site entrances.

Storage and handling issues will be addressed by monitoring supplies and managing surplus materials. The detailed inventory of materials, products, process chemical and general usage materials that was completed for the Initial MISA Report will be updated during a state of inactivity. Surplus materials will be returned to suppliers or otherwise removed from the site, with the remainder being secured in a designated storage area. Liquids will be removed from all site storage tanks, and all explosives shall be removed from the site by a certified explosives hauler.

8.9 ROCK, OVERBURDEN AND SOLID MILL TAILINGS PILES

The rock and overburden piles at the Timminco site consist (and will continue to consist) exclusively of native overburden and bedrock, which is not susceptible to acid or metal leaching. During mine operation, progressive rehabilitation grading measures will be completed on the rock and overburden piles in order to prevent slope stability problems and minimise erosion potential. These piles will continue to be monitored for stability during a state of inactivity and the vegetation that has already established itself on a large portion of the existing Northwest pile will be allowed to continue to grow.

During mine operation, the progressive grading of the solid mill tailings pile will also be completed as the pile develops. During a state of inactivity, the stability of the pile will continue to be monitored, and vegetation will be allowed to grow. Surface water and groundwater quality monitoring will continue near the solid mill tailings pile, and the thorium-storage area will remain undisturbed in the approved area on top of the solid mill tailings pile.

8.10 IMPOUNDMENT STRUCTURES

The only impoundment structure at the Timminco site consists of a small surface water impoundment along the outfall ditch. The impoundment consists of an existing road embankment and also collects groundwater seepage from the solid mill tailings pile area. The contents of the impoundment area are released to the outfall ditch only when environmental conditions are such that natural passive treatment through volatilisation and bio-uptake sufficiently reduce ammonia levels at the MISA control point (i.e. from May through to November).

During a state of inactivity, the impoundment area will continue to be monitored and operated. In November, the outfall ditch impoundment structure will be closed, and water will be allowed to collect in the impoundment area. Then in May, when environmental conditions are deemed appropriate, the outfall ditch impoundment structure will be opened, and the water from the impoundment area will be allowed to flow through the outfall ditch.

The outfall ditch diversion will also continue to be operated during a state of inactivity. Surface water from the outfall ditch will be diverted through the former Quarry #1 from December to April. Then in May, when environmental conditions are deemed appropriate, the diversion structure will be opened, and water in the outfall ditch will be allowed to flow directly to the MISA control point via the outfall ditch.

8.11 SITE INSPECTION PROGRAM

During a state of inactivity, the mining property will be inspected at least once every six months to ensure that all required rehabilitative measures, as outlined in Sections 8.1 through 8.10 of this report, are in place. Formal inspections of the structural integrity of the buildings, facilities, infrastructure and mine components will form a part of this site inspection, in order to ensure the physical stability of the components and to protect public safety. Maintenance activities will be completed as necessary to repair deficiencies.

The results of each twice-yearly inspection will be recorded in a memorandum and forwarded to the Director.

8.12 SCHEDULE FOR STATE OF INACTIVITY

A schedule of rehabilitation measures to be implemented in order for the project to be considered in a state of inactivity is presented on Table 8.1.

9.0 REHABILITATION MEASURES: CLOSING OUT

At any time, Timminco may decide to close out its mining property in Haley, Ontario. From the Mining Act, the term 'closed out' means:

> *"that the final stage of closure has been reached and that all the requirements of a closure plan have been complied with."*

The rehabilitation measures discussed in this section are based on the principle that the Timminco mining property is zoned as mining industrial and the future land use in areas of previous industrial activities can be expected to be industrial-related. Post-closure usage will depend on previous industrial activities in specific areas on the site. For example, it is expected that some areas of the Timminco property will remain undeveloped, and could conceivably be used as passive recreation, forestry and farming. However, areas of industrial activity are expected to be used for future manufacturing, warehousing, etc. The closed solid mill tailings pile and quarries would be expected to be left as natural habitats, used as passive recreational areas, or used for industrial processing operations. Consequently, the closure plan has been designed to allow flexibility in future land use depending on the level of historical industrial activity.

Tables 7.1 through 7.8 present a summary of the rehabilitation measures required for all key areas of the Timminco mining property during final close-out.

9.1 SHAFTS, RAISES AND OPEN STOPES

Due to the nature of the open-pit mining operations, no shafts, raises or open stopes have been constructed at the Timminco facility. Shafts, raises and open stopes are not projected to be required in future operations on the site.

9.2 PORTALS OF ADITS AND DECLINES

Due to the nature of the open-pit mining operations, no adits or declines have been constructed at the Timminco facility. Adits or declines are not projected to be required in future operations on the site.

9.3 MINE OPENINGS

During the closing out of the site, all gates leading to Quarries #1 and #2 will be kept locked, and notices will be posted to warn against unauthorised access. Quarry #2 will be allowed to gradually fill with water until the static water level is reached. Based on the groundwater levels measured in the adjacent monitoring wells and the ground surface topography in the northeastern section of the site, the eventual water level is projected to be 148 m ASL in Quarry #2.

The time required for Quarry #2 to fill with water will depend on the rates of groundwater inflow and surface water recharge, as well as the rates of evaporation and other losses. The rate of groundwater inflow is expected to decrease as the water level rises, due to the reduction in the induced hydraulic gradients into the excavation. A total elapsed timeframe, on the order of 10 to 25 years is estimated to be required for Quarry # 2 to reach its final water level of 148 m ASL following the cessation of pumping.

At close-out, pumping from Quarry #1 will continue during winter months (approximately from December to April) as part of the site effluent management program, until PWQO are met in the site surface water. Once PWQO are met, the outfall ditch will no longer be diverted through the former Quarry #1 at any time of year. Pumping from Quarry #1 will then cease and the water level in Quarry #1 will be allowed to reach static conditions.

9.4 STABILITY OF SURFACE AND SUBSURFACE MINE WORKINGS

At close-out, the water level in Quarry #2 will be allowed to reach static conditions. Pumping from Quarry #1 will continue during winter months as part of the site effluent management program, until PWQO are met in the site surface water. Once PWQO are met, pumping from Quarry #1 will cease and the water level in Quarry #1 will be allowed to reach static conditions.

To ensure the physical stability of the open pits (Quarry #1 and #2), the rock slopes above and below the water level will be developed during mine operation to a 1H:1V grade. At close-out, the excavation walls above the water level will be benched every 5 vertical metres to reduce the height of vertical or near-vertical walls. The overall slope of the quarry walls above

the water level will be 2H:1V. Below the water level, the slopes will be benched every 10 metres vertical height (maximum). Some backfilling of the upper slopes may be required in order to achieve final contours.

The planned setbacks for Quarries #1 and #2 from roads and property boundaries are shown on Drawing No. 030 and are designed to reduce visual impacts. The planned final contours are designed to minimise the covering of potential future reserves. Natural re-vegetation will be allowed around the quarry.

The reduction in the height of near vertical faces above the water level, in addition to the planned measures of restricting access and installing signs to warn of the steep slopes and open water are designed to reduce the safety hazards of Quarries #1 and #2 following closure.

After the final contours have been constructed, a qualified professional engineer will conduct a final inspection of the stability of the open pits, and, if necessary, make recommendations on additional stabilisation requirements for the pit walls, benches or immediate surroundings. Detailed visual monitoring and inspections will be conducted at least once every six months at the quarries to assess their physical stability.

9.5 STRUCTURES AND INFRASTRUCTURE

At final close-out, the inventory of buildings, facilities and infrastructure associated with the mining property will be updated. All mining property buildings and structures will be dismantled and removed, but the access roads will be left in place. The access roads are required for Timminco's industrial operations, and allow for the inspection and monitoring of the mining property. Any impacted soil in excess of MOE guidelines from fuel or oil spills along mining property roadways or parking areas will be assessed to determine if it has the potential to cause adverse effects outside the Timminco property. If potential off-site adverse effects are anticipated, the impacted soil will be excavated and removed from the site for disposal at an approved facility.

9.6 MACHINERY, EQUIPMENT AND STORAGE TANKS

At final close-out, all remaining equipment and machinery will be inspected and removed from the mining property to be sold, recycled or disposed at an approved facility. Water, electrical and gas supply equipment will be decommissioned. Any remaining buried tanks associated exclusively with the mining property will be emptied and removed, including septic tanks, which will be pumped out before removal.

All soils in the vicinity of the areas used to store or transfer petroleum products, chemicals, ore, concentrates or waste during the life of the project will be sampled and tested for contamination. If contamination is found, a management plan consisting of a risk assessment and action plan for the contaminated soils will be implemented, in accordance with Section 24 (2) 13 of Ontario Regulation 240/00. The risk assessment will determine if the contaminated soils have the potential to cause any adverse effects outside the Timminco property.

9.7 TRANSPORTATION CORRIDORS

At final close-out, all transportation facilities within the mining property will be maintained in order to provide access for twice-yearly site inspections and ongoing groundwater and surface water monitoring. The roads will be visually monitored and inspected at least once every six months to assess their physical stability and ensure their integrity. Ditches and culverts associated with the roads, as well as the road surfaces themselves, will be maintained. Any impacted soil in excess of MOE guidelines from fuel or oil spills along mining property roadways or parking areas will be assessed to determine if it has the potential to cause adverse effects outside the Timminco property. If potential off-site adverse effects are anticipated, the impacted soil will be excavated and removed from the site for disposal at an approved facility.

9.8 CONCRETE STRUCTURES

All concrete structures, foundations and slabs associated with the mining property will be removed, or covered by overburden and re-vegetated, with the exception of any concrete structures comprising a key structural element of the property's access roads.

Detailed visual monitoring and inspections will be conducted at least once every six months at the remaining concrete structures to assess their physical stability.

9.9 PETROLEUM PRODUCTS, CHEMICALS AND WASTE

At final close-out, the detailed inventory of materials, products, process chemical and general usage materials that was completed for the Initial MISA Report will be updated. All surplus petroleum products, chemical and waste materials will be recycled, sold, returned to suppliers or disposed at an approved off-site facility. All mining property storage tanks will be emptied, including the fuel oil, gasoline and propane tanks. The explosives storage area will be emptied, and all explosives and detonators (blasting caps) shall be removed from the site by a certified explosives hauler.

All soils in the vicinity of mining property sites used for storing or transferring petroleum products, chemicals, ore, concentrates or waste during the life of the project will be sampled and tested for contamination. If contamination is found, a management plan consisting of a risk assessment and action plan for the contaminated soils will be implemented, in accordance with Section 24 (2) 13 of Ontario Regulation 240/00. The risk assessment will determine if there is any possible adverse effect off of the Timminco property.

The solid mill tailings pile will remain on site and be covered, graded and re-vegetated as described in Section 9.11 of this report.

9.9.1 Thorium-Impacted Material Storage Area

At closing-out, Timminco will assess the following in order to determine whether the incorporation of the thorium-impacted materials is an appropriate final disposal measure in compliance with current legislation:

1. Information regarding the material's characteristics, including the nature of the various wastes, radioactivity, and thorium concentrations, will be updated once through sampling and analytical investigations in order to confirm the current radioactivity levels and the thorium concentrations. This information will be used to confirm the applicable regulations and whether the material is subject to specific exemptions for thorium materials.

2. The federal or provincial agency having jurisdiction will be confirmed through consultation with AECB, based on the updated waste evaluation results and the information regarding the origin of the thorium.

3. If the material is to be managed under federal jurisdiction, the Prescribed Substance License will be renewed if necessary (this will depend on the Federal agency having jurisdiction, and the concentration of thorium in the solid mill tailings material). If required, an investigation of technical/economic feasibility for final disposal locations will then be conducted in consultation with AECB or the Low-Level Radioactive Waste Management Office. For the foreseeable future, the material will remain in temporary storage in the approved area. Under federal jurisdiction, the appropriate final disposal location and method will be determined in consultation with AECB.

4. If under provincial jurisdiction, the material will be included as a solid waste subject to MOE regulations, and will be managed in accordance with provincial regulations. The results of the analytical investigations will be used to determine whether the material can remain undisturbed in the current storage area as a final disposal measure, or whether it is to be disposed off-site.

5. The annual reports completed for the Mine Closure Plan will include information related to any changes in the status of the storage area as the management plan for the thorium-impacted material is implemented.

9.10 PCBs OR PCB CONTAMINATED MATERIAL

At present, there is one transformer on the Timminco mining property that contains oil with detectable PCBs. This transformer is labelled as containing PCBs, and continues to be inspected and monitored regularly for leaks. The transformer will continue to be handled in accordance with all applicable regulations current at that time.

There are no other PCBs or PCB contaminated materials on site. PCB usage is not projected to be required in future operations on the site.

9.11 LANDFILL AND WASTE MANAGEMENT SITES

Solid mill tailings are disposed of on-site in an area located north of the main industrial complex at the Timminco site. The location of this solid mill tailings pile is shown on the Drawing 020. Rehabilitation issues relevant to the development and ultimate closure of the solid

mill tailings pile include physical, chemical stability and land use. Physical issues include public safety, slope stability and erosion. As with the other closure components, public access will be restricted to the site by keeping all mining property entrances locked.

The solid mill tailings pile will be graded progressively during its development to ensure that the design grades are followed, and to minimise ultimate closure costs. Slope stability and erosion problems will be prevented by completing the grading of the pile to the proposed design grades, which do not exceed 3H:1V. The proposed final contours of the solid mill tailings pile are illustrated in Drawing No. 030 and are in accordance with the surface water grading plan. Typical cross-sections through the solid mill tailings pile are shown on Drawing No. 040. The solid mill tailings pile has been designed to maintain its current configuration in the thorium-impacted material storage area.

The final extent of the solid mill tailings pile is indicated on Drawing 030 to be approximately 25 hectares. As with the proposed final extent of the quarries, since the closure of the Timminco site is anticipated to be market-driven, the ultimate extent of the solid mill tailings pile can only be conceptualised at present. The proposed final contours shown on Drawing No. 030 represent the airspace available for 50 years of disposal at current maximum solid mill tailings generation rates. A minimum buffer strip of 45 metres will be established between the solid mill tailings pile and Timminco property boundaries abutting non-industrial land in accordance with Section 16 of the former Ross Township zoning bylaw.

Some of the solid mill tailings exhibit mild pozzolanic activity and upon weathering, it forms a weakly cementitious crust. The crust acts to reduce erosion as well as minimising infiltration into the pile. During solid mill tailings pile development, regular slope inspections and monitoring are undertaken to assess the long-term erosion potential of the solid mill tailings material. After closing out, detailed visual monitoring and inspections will be conducted at least once every six months at the solid mill tailings pile to assess its physical stability.

Both soil overburden and natural vegetation will be used to cover the solid mill tailings pile once final grades are reached. To date, soil overburden has been placed on the contoured area of the solid mill tailings pile, totalling 6 acres. Once final grading has been completed, natural vegetation will be allowed to re-establish itself on the pile, in order to prevent erosion. In addition to natural re-vegetation options, Timminco has developed an experimental re-vegetation plan for the solid mill tailings pile, in collaboration with James Landscaping Co. Ltd. of

Arnprior, Ontario. The re-vegetation plan involves the use of a dry alkaline seed mix, including fescue, ryegrass and alkali grass mechanically seeded over a prepared seed bed of topsoil and fertiliser application. Seeding with this mixture occurred in late summer 1997.

The specific issues related to the chemical stability of the solid mill tailings pile include the potential impacts on groundwater from the leachate, and the effects on surface water quality from runoff. The rehabilitation objective for these issues is to prevent water contamination by ensuring that the provincial water quality standards are met. During and after close-out, the water quality monitoring program will continue. To date, groundwater monitoring conducted in the vicinity of the solid mill tailings pile indicates that the MOE's Reasonable Use Guidelines are being achieved.

Regular surface water quality monitoring has been completed in the vicinity of the solid mill tailings pile and at the outfall ditch under the MISA program. Surface water quality monitoring will continue in the vicinity of the solid mill tailings pile throughout site development as well as during closing out, until rehabilitation objectives are achieved.

In 1997, Timminco completed a Storm Water Control Study under the MISA Industrial Minerals Sectoral Regulation (Ontario Regulation 561/94). This site-wide study assisted in identifying sources of water quality impacts and potential mitigative measures. Prior to final closed-out conditions, additional controls for surface water such as diversion or treatment will be implemented, if necessary, in the vicinity of the solid mill tailings pile. At this time, however, it is not possible to specify what controls, if any, will be necessary for surface water management. Therefore, it is Timminco's intention to continue to address this issue in subsequent annual reports prepared in accordance with the closure plan.

9.12 SOILS TESTING

All soils in the vicinity of the areas used to store or transfer petroleum products, chemicals, ore, concentrates or waste during the life of the project will be sampled and tested for contamination. If contamination is found, a management plan consisting of a risk assessment and action plan for the contaminated soils will be implemented, in accordance with Section 24 (2) 13 of Ontario Regulation 240/00. At the present time, there have been no studies completed to indicate the presence of any contaminated soil on the Timminco site.

9.13 PHYSICAL AND CHEMICAL STABILITY OF TAILINGS AREAS

Solid mill tailings are disposed of in the solid mill tailings pile. Measures to ensure the physical and chemical stability, erosion control and surface and groundwater quality in the vicinity of the solid mill tailings pile are described in Section 9.11 of this report.

9.14 PHYSICAL AND CHEMICAL STABILITY OF THE ROCK AND OVERBURDEN PILES

At present, approximately 372,000 cubic metres of overburden and rock material is stockpiled at three locations on the property. As illustrated in Drawing No. 030, an area located east of Quarry #2 has been designated for future rock and overburden piles. The airspace in this area is sufficient to accommodate future stockpile requirements if current rates of production are maintained for the life of the project (i.e., 50 years).

The rock and overburden piles at the Timminco site consist (and will continue to consist) exclusively of native overburden and bedrock, which is not susceptible to acid or metal leaching. After closing out, there are no concerns with respect to the chemical stability of the rock and overburden piles.

With respect to physical stability, the selected rehabilitation measures relate to slope stability, erosion and aesthetics. During mine operation, the piles will be graded to be consistent with the planned final contours in order to prevent slope stability problems and minimise erosion potential. Detailed visual monitoring and inspections will be conducted at least once every six months at the rock and overburden piles to assess their physical stability.

The potential environmental impacts will be mitigated by allowing natural vegetation to re-establish itself. At present, thick vegetation covers a large portion of the existing Northwest pile. Additional measures, such as the provision of a soil cover and re-seeding are not felt to be necessary for the rock and overburden piles

9.15 BREACHING OR STABILISATION OF IMPOUNDMENT STRUCTURES

After close-out, the small surface water impoundment area and outfall ditch diversion structures will continue to be monitored and operated, as described in Section 4.3.1 of this report, until surface water monitoring indicates that the surface water quality has reached rehabilitation

objectives. After monitoring indicates that the provincial water quality objectives (PWQO) are being met, the outfall ditch impoundment structure will no longer be operated and surface water will be allowed to flow freely along the outfall ditch. Since the impoundment structure consists of a road embankment that will be required for site access, the structure will not be removed. Once PWQO are met, the outfall ditch will no longer be diverted through the former Quarry #1 at any time of year, and the outfall ditch will be allowed to flow freely off-site.

9.16 DECANT STRUCTURES

There are no tailings ponds on the Timminco property. Therefore, no decant structures will be required to be operated or removed at the final close-out of the facility.

9.17 WATER COURSES AND DRAINAGE CHANNELS

In order to ensure that the site is suitable for the intended future land use, it is important to ensure that the surface drainage components are maintained under all closure conditions. The rehabilitation measures for surface water drainage have been designed to ensure that the surface drainage components continue to be effective during site development and closure.

Physical stability issues relate to erosion, sedimentation and culvert blockage. The capacities of channels and culverts will be maintained by providing an inspection program to allow the early detection of potential problems. At close-out, further erosion protection (rip-rap, vegetated channels) will be provided, if necessary.

Regular surface water quality monitoring has been completed in the vicinity of the solid mill tailings pile and at the outfall ditch under the MISA program. Surface water quality monitoring will continue in the vicinity of the solid mill tailings pile throughout site development, as well as after closing out, until rehabilitation objectives are met.

Finally, any potential visual impacts of surface drainage works will be further reduced by following the grading and contour plans, which are designed to ensure proper drainage across the site.

9.18 RE-VEGETATION

The objectives of re-vegetating the Timminco site are to:

- stabilise surface materials and provide protection from wind and water erosion;
- improve the appearance and aesthetics of the site;
- enhance the natural vegetation growth and establish self-sustainable vegetation growth; and
- support the designated end use of the site.

All site re-vegetation measures shall be proposed and certified by an appropriate qualified professional. The re-vegetation measures are to be conducted in accordance with Part 9 of the Mine Rehabilitation Code of Ontario (Schedule 1 of Ontario Regulation 240/00).

In preparation for site re-vegetation, contouring and sloping of the site will be conducted as a part of the progressive rehabilitation of the site. Wherever possible, the site contours will mimic the local topography and blend into the surrounding landscape. Grading and contouring will also be designed to provide accessibility and good surface drainage, while controlling surface erosion. After site infrastructure has been removed, crusted surfaces and former corridors will be ripped and heavily compacted areas will be scarified, in order to allow the vegetation to establish itself. Where necessary, topsoil will be applied to a depth sufficient to maintain root growth and nutrient requirements.

Inspection of the revegetated area shall be conducted semi-annually following the initial planting, until the vegetation has successfully established itself. Soil analysis for nutrients and pH shall be conducted annually in the spring until the vegetation is successfully established. Areas showing evidence of erosion, sedimentation or slope failure shall be restored.

Once vegetation has been established, annual inspections shall be conducted to determine any necessary repairs, and to review progress toward the development of a self sustaining ecosystem. Once a self-sustaining cover has been established and the above-listed objectives have been attained, the monitoring and inspection program may be discontinued.

Natural re-vegetation has been used successfully to re-establish growth on an existing rock and overburden pile on the Timminco property. Photographs of the naturally re-vegetated area that is located in the north-eastern portion of the site (approximate co-ordinates 10,600E and 10,500N) are presented in Appendix G. To date, re-vegetation of the rock and overburden piles

has been natural (i.e. not seeded) and therefore, the species of plants that have established themselves are those that already exist locally. In this manner, the re-vegetated sections of the rock and overburden piles have fully integrated into the surrounding ecosystem. To date, additional measures, such as the provision of a soil cover and re-seeding, have not been necessary.

9.19 SCHEDULE FOR CLOSING OUT

A schedule of rehabilitation measures to be implemented in order for the project to be considered closed out is presented on Table 9.1.

10.0 MONITORING

10.1 PHYSICAL STABILITY

Regular inspections of the mine components that are to remain on-site will be conducted in order to ensure their physical stability. The monitoring program is to be carried out in accordance with the requirements of Part 8 of the Mine Rehabilitation Code of Ontario. Issues such as the following will be addressed:

- slope stability
- sedimentation
- drainage channels
- monitoring well conditions
- vegetation
- erosion
- site security
- road surface integrity and stability
- cover integrity

At close-out, the water level in Quarry #2 will be allowed to reach static conditions. Pumping from Quarry #1 will continue during winter months (approximately from December to April) as part of the site effluent management program, until PWQO are met in the site surface water. Once PWQO are met, pumping from Quarry #1 will also cease and the water level in Quarry #1 will be allowed to reach static conditions.

To ensure the physical stability of the open pits, the rock slopes above the quarry water levels will be developed during mine operation to a 1H:1V grade. At close-out, the excavation walls above the water level will be benched every 5 vertical metres to reduce the height of vertical or near-vertical walls. The overall slope of the quarry walls above the water level will be 2H:1V. Some backfilling may be required on the upper slopes of the quarries in order to achieve final contours. Below the water level, the slopes will be benched every 10 metres of vertical height.

After the final contours have been constructed, a qualified professional engineer will conduct a final inspection of the stability of the open pits, and, if necessary, make recommendations on additional stabilisation requirements for the pit walls, benches or immediate surroundings. Detailed visual monitoring and inspections will be conducted at least once every

six months at the quarries to measure the water levels and to assess their physical stability by examining for signs of tension cracks, erosion, or other features. Maintenance activities will be completed as necessary to repair deficiencies.

Detailed visual monitoring and inspections will also be conducted at least once every six months at the rock, overburden and solid mill tailings piles to assess slope stability, erosion and aesthetics. The vegetated cover will also be inspected to ensure that it is providing sufficient protection from wind and water erosion. Maintenance activities will be completed as necessary to repair deficiencies on these piles.

Within one month after each six month inspection, a memorandum describing the results of the inspection will be sent to the Director.

10.2 CHEMICAL STABILITY

10.2.1 Surface Water Monitoring

The objective of the surface water monitoring program is to ensure that water quality is demonstrated to be unimpaired and that it is satisfactory for aquatic life and other beneficial uses. The surface water monitoring program is to be carried out in accordance with Part 5 of the Mine Rehabilitation Code of Ontario. Routine sampling will be carried out during post-closure to characterise the chemistry at discharge locations in relation to background chemistry and provincial water quality objectives (PWQO). The results of the sampling will be used to determine if additional control measures are required.

At present, all surface water runoff from the site is directed into three channels. It is proposed that a total of seven surface water locations be sampled after closure. The proposed surface water sampling locations are as follows, and are shown on Drawing 020:

- SW1: background reference location in ponded area along west property line;
- SW2: at discharge from MISA Control Point 0100 along outfall ditch;
- SW3: at northern property limit where north ditch leaves Timminco property;
- SW4: at the groundwater seepage discharge from the mill tailings pile into the outfall ditch;
- SW9: in the outfall ditch, downstream of the mag-cal wash pad;
- Quarry #1 (on-site water body); and
- Quarry #2, following closure and water level equilibration (on-site water body).

Surface water monitoring will initially be conducted four times per year for two years. This monitoring regime will establish a database against which future monitoring results may be compared. If surface water analytical results are satisfactory, the frequency of monitoring will be reduced to twice annually after the end of the first two-year period.

The proposed surface water monitoring program is outlined in Table 10.1, including the parameter suite. The parameter suite will be re-evaluated after the second year of monitoring to focus on indicator compounds and general water quality indicators. A memorandum describing the results of the surface water monitoring will be sent to the Director once per year.

In addition, the MISA monitoring program conducted at MISA Control Point 0100 along the outfall ditch will continue as required by the Ontario Ministry of Environment.

Surface Water Impoundment

The impoundment structure along the outfall ditch, which detains the groundwater seepage and surface water runoff from the solid mill tailings pile, will continue to be operated. The contents of the impoundment area will be released to the outfall ditch only when environmental conditions are such that natural passive treatment through volatilisation and bio-uptake sufficiently reduces ammonia levels at the MISA control point (i.e., from May through to November).

Table 10.1 outlines the water monitoring required during the discharge period of the surface water impoundment structure (May 1 to November 30). These monitoring requirements are stipulated in the C of A for the impoundment structure (as of January 2003). Should the C of A be amended in the future, the surface water monitoring requirements outlined in Table 10.1 will be adjusted accordingly.

For the remainder of the year, the surface water runoff and groundwater seepage from the area in the vicinity of the solid mill tailings pile will be collected behind the impoundment structure in the outfall ditch. The impoundment structure will be visually inspected at least once every six months, during the regular twice-yearly inspection program outlined in Section 10.1.

Outfall Ditch Diversion

The outfall ditch diversion structure, which diverts surface water flow from the outfall ditch into the former Quarry #1 from December to April each year, will continue to be operated. The outfall ditch will be allowed to flow freely (i.e., not diverted) when environmental conditions are such that natural passive treatment through volalization and bio-uptake sufficiently reduce ammonia levels at the MISA control point (i.e., from May through to November). For the remainder of the year, the surface water flow in the outfall ditch will be diverted through the former Quarry #1.

Table 10.1 outlines the surface water monitoring required during the period of operation of the ditch diversion structure (i.e., December to April). This monitoring is stipulated in the C of A for the diversion structure (as of January 2003). The C of A also stipulates the requirements for reporting on the results of the surface water monitoring associated with the outfall ditch diversion structure. Should the C of A be amended in the future, the groundwater monitoring requirements outlined in Table 10.1 will be adjusted accordingly.

The diversion structure will be visually inspected at least once every six months, during the regular twice-yearly inspection program outlined in Section 10.1.

10.2.2 Groundwater Monitoring

The objective of the groundwater monitoring program is to identify and characterise any potential impediments to the beneficial use of groundwater as a result of the presence of migration of contaminants. The groundwater monitoring program is to be carried out in accordance with Part 6 of the Mine Rehabilitation Code of Ontario.

The hydrogeology of the Timminco site has been characterised in the following study reports, which are intended to fulfill the requirements of sections 51 and 52 of the Mine Rehabilitation Code of Ontario:

- Hydrogeologic Investigation and Waste Management Plan, Timminco Solid Waste Disposal Site, Haley, Ontario. Prepared by WESA; File No. 1580, dated June 1989. revised September 1990.
- Hydrogeologic Investigation, Timminco Metals Haley Facility. Prepared by WESA; Project No. 3339, Draft Report dated February 1995.

The monitoring program will make use of three existing monitoring wells in addition to any future wells that may be required to fully delineate the potential impacts. The monitoring well locations are as follows, and are shown on Drawing 020:

- MW1: along the west property boundary, upgradient of the solid mill tailings pile;
- MW3: west of Quarry #2; and
- MW4: northwest of Quarry #1.

Groundwater monitoring will be conducted annually in the late spring each year. Water levels will be measured at each of the monitors prior to sampling in order to determine the groundwater flow directions. The proposed list of parameters to be initially included in the groundwater monitoring program is provided in Table 10.1. It is proposed that this list be reviewed annually to determine whether modifications to the groundwater monitoring program should be made.

After each groundwater monitoring event, a memorandum describing the results of the groundwater monitoring will be sent to the Director.

Outfall Ditch Diversion

Some additional groundwater monitoring is required during the operation of the outfall ditch diversion structure (from December 1 to April 30). This monitoring is stipulated in the C of A for the diversion structure (as of January 2003), and is outlined in Table 10.1. The C of A also stipulates the requirements for reporting on the results of the groundwater monitoring associated with the outfall ditch diversion structure. Should the C of A be amended in the future, the groundwater monitoring requirements outlined in Table 10.1 will be adjusted accordingly.

The diversion structure will be visually inspected at least once every six months, during the regular twice-yearly inspection program outlined in Section 10.1.

10.3 BIOLOGICAL MONITORING

Biological monitoring will not be conducted at the property after closing-out.

11.0 EXPECTED SITE CONDITIONS

11.1 LAND USE

The Timminco mining property has been in operation as a mine for over 50 years. Consequently, the natural and social environments have gradually adapted to the existing conditions which accompany the operating mine site.

The rehabilitation measures described throughout this closure plan are designed to ensure that the existing conditions are maintained throughout site development and post-closure. At closure the site will continue to be suitable for industrial land use and will have minimal effects on the adjacent natural environment.

No mining property infrastructure will remain, with the exception of the property's access roads, which are required for Timminco's industrial operations, as well as site inspection and monitoring activities on the mining property. Disturbed areas, such as Quarry #2, the solid mill tailings pile, and rock and overburden piles will be returned to a sustainable and natural (as much as possible) condition using erosion protection and allowing natural vegetation to re-establish. Quarry #2 will be allowed to fill with water to provide natural habitat for both aquatic and upland wildlife species. Site usage will be restricted in these areas, which will be left as open space, habitat, or industrial processing operations. Access to these areas will also be restricted in order to protect public safety.

11.2 SITE TOPOGRAPHY

The topographic contours projected for closure (including Quarry #2 and the solid mill tailings pile) are presented on Drawing 030.

11.3 SURFACE WATER

Since the closure of the Timminco mining property is anticipated to be market-driven, the final topography and surface water drainage patterns of the site can only be conceptualised at present. It is expected, however, that the proposed final contours of the site will appear as illustrated in Drawing No. 030, which is in accordance with the surface water grading plan. Drawing No. 030 also shows the final water levels in Quarry #2.

After close-out, the three distinct surface drainage routes on the Timminco property (the north ditch, the outfall ditch, and the south ditch) will continue to convey storm water runoff. The outfall ditch would also be expected to convey some cooling water from the industrial property. The capacities of these ditches (as well as those of all other site channels and culverts) will be maintained by providing an inspection program to allow the early detection of potential problems, such as erosion, sedimentation and culvert blockage.

At close-out, further erosion protection (rip-rap, vegetated channels) will be provided, if necessary. However, to date, no such erosion protection has been required during several decades of site operation, and none is anticipated in the future. Any potential visual impacts of surface drainage works will be further reduced by following the grading and contour plans, which are designed to ensure proper drainage across the site.

Throughout site closure, surface water quality monitoring will continue in the vicinity of the solid mill tailings pile, until rehabilitation objectives are met (as outlined in Section 10.2.1 and Table 10.1 of this report). If the results of the monitoring demonstrate that water quality impacts resulting from historical or on-going site operations have adversely effected the environment, additional mitigative measures will be implemented in accordance with the closure plan to eliminate or control the source of impacts, or to treat the water to acceptable levels.

11.4 GROUNDWATER

A description of the existing site hydrogeology is presented in Section 4.4.1 of this report. The condition of the site groundwater and hydrogeology is not expected to vary greatly from its current condition.

The hydrogeologic investigations conducted at the site have indicated that the solid mill tailings pile has had a limited impact on the shallow groundwater in the immediate vicinity of the solid mill tailings pile. Monitoring results to date indicate that the groundwater at the downgradient monitoring well has not been affected by leachate from the solid mill tailings pile. Because of the low velocity of the groundwater in the fractured bedrock (on the order of 10 m/year) and the limited infiltration through the waste pile due to the cementitious nature of the tailings, it is projected that due to natural attenuation, future impacts from the solid mill tailings pile will not extend beyond the downgradient property boundary.

Progressive rehabilitation measures, including grading and cover, will help to ensure that the solid mill tailings pile is operated in a controlled manner, which will further reduce the degree of leachate migration. At present, the site groundwater is appropriate for industrial use and this is not expected to change in the future.

The groundwater monitoring program will continue after closing out, as outlined in Section 10.2.2 or this report. The objective of the groundwater monitoring program is to identify and characterise any potential impediments to the beneficial use of groundwater as a result of the presence of migration of contaminants.

11.5 TERRESTRIAL PLANT AND ANIMAL LIFE

The Ontario Ministry of Natural Resources (MNR) was consulted to determine whether there were significant fisheries or wildlife habitat in the area that should be considered in the development of the closure plan. The correspondence from MNR is included in Appendix D.

The lands surrounding the Timminco site consist of a mixture of open pasture and woodland made up of mixed deciduous and conifer species. Within a one kilometre radius from Timminco property, it is estimated that 70% of the land is developed agricultural land (DAL).

Once vegetation has established itself, annual inspections will be conducted to determine any necessary repairs, and to review progress toward the development of a self sustaining ecosystem. The mining property may not be considered fully closed out until a self-sustaining vegetative cover has been established. After the entire mining infrastructure is dismantled and the site has been allowed to fully re-vegetate, an increase in animal populations may occur if the mining property remains unoccupied.

11.6 AQUATIC PLANT AND ANIMAL LIFE

No known watercourses or wetlands that have a unique or significant fishery or wildlife habitat were identified in this area, and this is not expected to change after closing out. However, the MNR highlighted that the watercourses and drainage channels within the area are collectively important to a wide variety of wetland and upland wildlife species. Consequently, the rehabilitative measures outlined in this closure plan have been designed to mitigate any potential negative impacts to existing habitat in the surrounding area and to ensure that the water quality in the downstream aquatic environment meets provincial standards.

12.0 COSTS

The intent of the closure plan prepared for the Timminco facility is to promote progressive rehabilitation during mine development in order to reduce the time and costs associated with the eventual closure of the mining property. The measures described in the previous sections of the closure plan involve progressive rehabilitation as well as activities that will be undertaken during active site closure and into the post-closure period.

For purposes of scheduling the various activities, it has been assumed that the Timminco mining property will continue operations for a 50-year period. This assumption is consistent with the time periods used for the rehabilitation measures for quarry closure and solid mill tailings pile development. Due to the nature of the available reserves on Timminco property, the eventual life of the facility will be governed by long-term market conditions and associated production rates.

Progressive rehabilitation will take place throughout the first 45 years of mine development. The active closure period will cover the final five years of mining operations. A minimum 10 year post-closure period involving site monitoring and maintenance will be implemented to ensure that the rehabilitation objectives are achieved and the anticipated post-closure land use is realized.

The estimated closure costs for the three development/closure stages are presented in tables 12.1 to 12.3. The estimated costs are developed for each of the mine property components (quarries, solid mill tailings area, etc.) and for the various rehabilitation measures described in sections 7.0, 8.0, and 9.0. Where applicable, unit costs are provided for the closure activities, and the total amounts for progressive rehabilitation, active closure, and the post-closure period are calculated. As indicated in the tables, the progressive rehabilitation activities will be undertaken as part of ongoing mine development, and as such, the vast majority of progressive rehabilitation costs are covered under mine operations. The total estimated closure cost for each stage is as follows:

Progressive Rehabilitation:	**$**	**39,600**
Active Closure:	**$**	**735,200**
Post-Closure Period:	**$**	**907,900**

As outlined above, the schedule for mine closure consists of 45 years of progressive rehabilitation, five years of active closure, and a ten year post-closure period. The projected cost schedule is presented in Table 12.4. The total cumulative closure cost is estimated to be $1.6827 million in 2005 equivalent dollars. The estimated costs presented in tables 12.1 to 12.4 are current costs, and do not reflect the present value of future expenditures.

Table 12.1
Estimated Closure Costs - Progressive Rehabilitation (45 years of mine operation)

Description	Unit Cost	Quantity	Amount	Assumptions
Estimated Closure Costs - Progressive Rehabilitation (45 years of mine operation)				
Quarries				
- develop rock slopes at planned grades	-----	-----	-----	- construct slopes at planned grades during quarry development - no additional costs beyond normal operating expenses for mining
- allow natural vegetation to re-establish around quarries	-----	-----	-----	- no additional costs
Structures, Facilities and Infrastructure				
- no action required	-----	-----	-----	
Machinery and Equipment				
- no action required	-----	-----	-----	
Rock & Overburden Piles				
- construct slopes to planned grades	-----	-----	-----	- no additional costs beyond normal operating expenses for mining
- allow natural vegetation to re-establish	-----	-----	-----	- no additional costs
Solid Mill Tailings Pile				
- develop to design grades as disposal proceeds	-----	-----	-----	- no additional costs beyond normal operating expenses for mining
- water quality monitoring (groundwater, surface water)	-----	-----	-----	- costs for monitoring during mine operation are not included in closure plan
Process Materials & Chemicals				
- no action required	-----	-----	-----	
Surface Water Drainage				
- construct new ditching around solid mill tailings pile	22.0 $/m	1,800	$ 39,600	- unit cost per linear metre of ditch constructed in soil - 1H:1V sides, trapezoidal section, max. 2 metres deep - including vegetation
Estimated Total Costs (Progressive Rehabilitation)			**$ 39,600**	

Table 12.2
Estimated Closure Costs - Active Closure (final 5 years of operation)

Description	Unit Cost	Quantity	Amount	Assumptions
Quarry #1				
-grade rock slopes to 2H:1V above water level	8.80 $/m^3	2,840	$ 25,000	- place rock backfill to specified grades
Quarry #2				
-grade rock slopes to 2H:1V above water level	8.80 $/m^3	4,000	$ 35,200	- place rock backfill to specified grades
Structures, Facilities and Infrastructure				
- disconnect non-essential services	lump sum	------	$ 5,000	- estimated costs only; actual costs will depend on closure conditions
Machinery and Equipment				
- remove from site	lump sum	------	$ 15,000	- estimated costs only; actual costs will depend on inventory results
Potentially Impacted Soils				
- sample, analyse, and carry out risk assessment on potentially impacted soils	lump sum	------	$ 25,000	- contingency cost for soil sampling, analysis and risk assessment only; does not include the cost of potential remedial work plan and actions
Rock & Overburden Piles				
- complete any required grading to final contours	lump sum	------	$ 35,000	- will also be graded progressively during mine operations
-vegetate				- included in grading costs
Solid Mill Tailings Pile				
- complete grading to achieve final contours	lump sum	------	$ 500,000	Includes management of Thorium waste
- vegetate			$ -	Included in grading costs
- soil/nutrient testing	1,000 $/yr	5	$ 5,000	
- water quality monitoring	16,000 $/yr	5	$ 80,000	- scope of monitoring program per Section 10 of closure plan
Process Materials & Chemicals				
- update inventory	lump sum	------	$ 5,000	
- return, sell or dispose materials	lump sum	------	$ 5,000	- estimate only; actual costs will depend on inventory results
Surface Water Drainage				
- allow natural vegetation to re-establish along channels			$ -	- construction of ditches included in progressive rehabilitation; no additional costs for re-vegetation
Estimated Total Costs (Active Closure)			**$ 735,200**	

Table 12.3
Estimated Closure Costs - Post Closure Period (10 years following mine closure)

Description	Unit Cost	Quantity	Amount	Assumptions
Quarries				
- professional engineer's assessment	lump sum	------	$ 3,000	
- detailed visual inspections and reporting	3,500 $/yr	10	$ 35,000	- semi-annual visual inspections
- maintain existing fence and signage	500 $/yr	10	$ 5,000	- including quarries, rock piles, and surface drainage
Structures, Facilities and Infrastructure				
- update inventory of facilities	lump sum	------	$ 2,500	
- dismantle and remove all facilities and equipment on the mining property	lump sum	------	$ 517,400	- estimated costs only, actual costs will depend on inventory at time of mine closure.
		(SEE COST BREAKDOWN IN BOX IMMEDIATELY BELOW)		
Breakdown of Structures, Facilities, and Infrastructure category				***Estimates from 2003***
reduction - removal of 10 furnaces	lump sum	------	*$ 160,500*	
reduction - removal of entire building				*$271,400*
briquetting	lump sum	------	*$ 131,100*	*$60,600*
calcining	lump sum	------	*$ 98,000*	*$69,900*
crushing	lump sum	------	*$ 49,800*	*$32,700*
cooling pond	lump sum	------	*$ -*	*$6,000*
Misc	lump sum	------	*$ 28,500*	*$19,600*
Sub-Total Contractor's Estimate			*$ 467,900*	*$460,200*
Designated Substances Survey	lump sum	------	*$ 5,000*	*$10,000*
Asbestos Abatement	lump sum	------	*$ 14,000*	*$28,000*
Permits, Health& Safety	lump sum	------	*$ 6,000*	*$6,000*
Grading, soil cover at former building locations: [.5m topsoil]	$6/m^3	700m^3	*$ 21,000*	*$105,000*
vegetating former building locations:	$0.50/m^2	7,000 m^2	*$ 3,500*	*$17,500*
Total this Category			***$ 517,400***	***$626,700***
- operate and maintain outfall ditch impoundment facility and ditch diversion structure	5,000 $/yr	10	$ 50,000	
- decommission septic tank & bed	lump sum	------	$ 5,000	
- rehabilitate unused traffic corridors and areas of former buildings (scarify, topsoil, vegetate)			$ -	- all roads within the mining property will be necessary after closure for monitoring and inspection purposes
Machinery and Equipment				
- remove from mining property	lump sum	------	$ 25,000	- estimated costs only; actual costs will depend on inventory results
Rock & Overburden Piles				
- inspections for stability and erosion	------	------	------	- included with above
Solid Mill Tailings Pile				
- detailed visual inspections	------	------	------	- included with above
- water quality monitoring programs	25,000 $/yr	10	$ 250,000	- scope of programs as per Section 10 of Closure Plan
Process Materials & Chemicals				
- return, sell or dispose materials	lump sum	------	$ 15,000	- estimate only; actual costs will depend on inventory.
Surface Water Drainage				
- detailed visual inspections for channel capacity, erosion and sedimentation	------	------	------	- included with above
Sub-Total (10-year Post Closure Period)			**$ 907,900**	

Table 12.4
Incremental Costs and Cost Schedule

Years	Incremental Costs	Cumulative Costs	Period
0			
	$9,900	$9,900	Progressive Rehabilitation
10			
	$9,900	$19,800	
20			
	$9,900	$29,700	
30			
	$9,900	$39,600	
40			
	$735,200	$774,800	Active Closure
50			
	$907,900	$1,682,700	Post Closure Period
60			

13.0 FINANCIAL ASSURANCE

As noted in Section 12.0, the total closure cost for the site is $1,682,700. Timminco Limited will provide financial assurance for this amount which will be phased in as follows:

- $336,540 upon acknowledgement of receipt of the Plan, estimated to be February 2006;
- An additional $269,232 in October 2006; and
- $269,232 per year in October 2007and for each of the successive three years until the security is complete.

Timminco undertakes to continue to provide the Ministry with its quarterly and annual results. Additionally, should Timminco's audited financial statements as at December 31, 2006 reflect a break-even position (defined as a net loss of Cdn$300,000 or better), Timminco will undertake to pay the outstanding balance in three (3) equal installments of $358,976 each, commencing in October 2007 with the last payment made in October 2009. However, should Timminco's audited financial statements as at December 31, 2006 reflect a loss greater than Cdn$300,000, the payment schedule detailed in paragraph 2 above will be followed. Should on the other hand Timminco's audited financial statements as at December 31, 2007 reflect a break-even position (as defined above), Timminco will undertake to pay the outstanding balance in two (2) equal installments, the first in October 2008 and the last payment in October 2009.

The financial assurance will consist of a wire transfer payment to the Ministry's bank account. The deposit will bear interest at rates prescribed by the Ontario government for such deposits.

It is understood that when the ultimate closure occurs and remediation activities are advanced, the security may be reduced to the balance of the estimated remediation expense required.

It should be noted that the above payment terms for the financial assurance cannot be assigned without the consent of the Director of Mine Rehabilitation to the assignment of the entire Haley Mine Closure Plan.

14.0 CONSULTATION WITH ABORIGINAL PEOPLES

To date, no consultations have been carried out with aboriginal peoples. No aboriginal peoples are affected by this project.

CONFIDENTIAL

AMENDMENT No. 1
TO
MINE CLOSURE PLAN
TIMMINCO METALS
HALEY, ONTARIO

PREPARED FOR:

TIMMINCO LIMITED
Sun Life Financial Tower
150 King Street West, Suite 2401
Toronto, Ontario M5H 1J9

TIMMINCO

WESA
A Better Environment For Business

CONFIDENTIAL FINAL REPORT

AMENDMENT No. 1
TO
MINE CLOSURE PLAN
TIMMINCO METALS
HALEY, ONTARIO

Prepared for:

TIMMINCO LIMITED
Sun Life Financial Tower
150 King Street West, Suite 2401
Toronto, Ontario M5H 1J9

Prepared by:

WESA Inc.
Box 430, 3108 Carp Rd.
Carp, Ontario K0A 1L0

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May 2011

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF DRAWINGS

LIST OF TABLES

LIST OF APPENDICES

LIST OF TABLES

LIST OF APPENDICES

TIMMINCO

TIMMINCO LIMITED
Sun Life Financial Tower
150 King Street West
Suite 2401
Toronto, Ontario
M5H 3J9 Canada

Telephone: (416) 364-5171
Fax: (416) 364-3451
www.timminco.com

CONFIDENTIAL

1.0 LETTER OF TRANSMITTAL

May 16, 2011

Ministry of Northern Development, Mines and Forestry
Mines Group
933 Ramsey Lake Road, B4
Sudbury, Ontario, P3E 6B5

Attention: Ms. C. Blancher-Smith, Director of Mine Rehabilitation

Dear Ms. Blancher-Smith,

Please find attached Amendment No. 1 to the Certified Mine Closure Plan dated September 2003, acknowledged and filed with the Ontario Ministry of Northern Development and Mines (MNDM) as of May 1, 2006, for Timminco's Mining Property located in Haley, Ontario. This Amendment and the Certified Mine Closure Plan dated September 2003, constitute the entire closure plan. This Amendment is being submitted to the Ministry for filing under Part VII of the Mining Act.

Timminco further acknowledges that should any remedial work be required following the Radiological Survey (described in Section 9.9.1 of Amendment No. 1 Document) scheduled for the summer of 2011; then Timminco would prepare and submit to the Ministry of Northern Development, Mines and Forestry (Director of Mine Rehabilitation) both a Notice of Material Change and an Amendment No. 2 Document complete with an updated Financial Assurance Spreadsheet (Appendix E in Amendment Document).

Yours truly,

Robert J. Dietrich
Executive Vice President – Finance and Chief Financial Officer

Peter A.M. Kalins
General Counsel and Corporate Secretary

2.0 CERTIFICATE OF AMENDMENT TO MINE CLOSURE PLAN

We, Robert J. Dietrich and Peter A.M. Kalins, hereby certify that the attached Amendment #1 to the Certified Mine Closure Plan complies in all respects with the *Mining Act* and Ontario Regulation 240/00, including the Code. Where required, Timminco relied upon qualified professionals in the preparation of the amendment to the closure plan under the *Mining Act* and Ontario Regulation 240/00, including the Code.

The cost estimates for the rehabilitation work described in the attached amendment to the closure plan are based on the current market value cost of the goods and services required by the work in year 2011 dollars. The amount of financial assurance referred to in Section 13.0 of the attached amendment to the closure plan is adequate and sufficient to cover the cost of rehabilitation work required in order to comply with the *Mining Act* and Ontario Regulation 240/00, including the Code.

Timminco has carried out reasonable and good faith consultations with appropriate representatives of all aboriginal peoples affected by this project. All closure work will be carried out on the existing Timminco landholdings.

The attached closure plan constitutes full, true and plain disclosure of the rehabilitation work currently required to make the site suitable for a use the Director sees fit in accordance with the *Mining Act* and Ontario Regulation 240/00, including the Code.

Signature – Chief Financial Officer	Signature – Senior Officer of Corporation
150 King Street West, Suite 2401 Toronto, Ontario M5H 1J9 Address	150 King Street West, Suite 2401 Toronto, Ontario M5H 1J9 Address
Executive VP – Finance and CFO Occupation	General Counsel and Corporate Secretary Occupation
Qualifications	Qualifications

Personally examined the project?
☐ Yes ☑ No

If yes, when?

Date

If the certificate is not based on personal examination of the project, indicate the source of the information assessed before making the certificate:

WESA Inc. and Timminco Engineering

Direct or indirect interest, current or expected, in this Timminco Metals project?

Indirect current interest as officer

of the company

Personally examined the project?
☐ Yes ☑ No

If yes, when?

Date

If the certificate is not based on personal examination of the project, indicate the source of the information assessed before making the certificate:

WESA Inc. and Timminco Engineering

Direct or indirect interest, current or expected, in this Timminco Metals project?

Indirect current interest as officer

of the company

2.1 CERTIFICATE OF GROUNDWATER AND SURFACE WATER MONITORING PROGRAMS

This certificate is issued in accordance with Sections 37 to 49 of Part 5: Surface Water Monitoring, and Sections 50 to 55 of Part 6: Groundwater Monitoring of the Mine Rehabilitation Code of Ontario (Schedule 1 of Ontario Regulation 240/00 made under the Mining Act).

I, David Harding, hereby certify that the scope of work for additional surface water and groundwater investigations at the Timminco Metals mining property in Haley, Ontario is satisfactory. The study components described under Section 47 (1) – (3) and Section 52 (1) - (3), have been previously conducted or are included in the proposed surface water and groundwater monitoring programs outlined in Section 10.0 of the Certified Mine Closure Plan, dated September 2003, as amended in Section 10.0 of this Amendment.

I, David Harding, P.Eng., a WESA Inc. employee engaged in the capacity of Environmental Engineer, have developed the groundwater and surface water sampling programs for the Timminco Metals mining property in Haley, Ontario.

I, David Harding, visited the Timminco Metals mining property in Haley, Ontario and relied on the information presented or referenced in the closure plan in order to produce this certificate.

I, David Harding, have no direct or indirect interest, current or expected, in the Timminco Metals mining property in Haley, Ontario.

David Harding

Signature

Personally examined the project?
☑ Yes ☐ No

If yes, when?

Various times (1989-present)
Date

WESA Inc.
3108 Carp Road, Box 430
Ottawa, ON K0A 1L0
Address

Professional Engineer
Occupation

M.Sc., P.Eng., Q.P
Qualifications

3.0 PROJECT INFORMATION

3.1 PROPONENT AND PROJECT SITE INFORMATION (NO CHANGES)

Proponent Name and Address:

Timminco Limited
Sun Life Financial Tower
150 King Street West, Suite 2401
Toronto, Ontario M5H 1J9

Tel: (416) 364-5171
Fax: (416) 364-3451

Project Site Location and Address:

Part of Lots 19 to 22, Concessions V and VI
Township of Whitewater Region
County of Renfrew, Ontario

Timminco Metals
A Division of Timminco Limited
962 Magnesium Road
Haley, Ontario
K0J 1Y0

3.2 LAND TENURE (NO CHANGES)

Timminco Metals, a division of Timminco Limited (Timminco) operated a magnesium mining and production facility that is located on Lots 19 to 22, Concessions V and VI, in the Township of Whitewater Region (formerly Township of Ross), County of Renfrew. The site is situated approximately 15 kilometres north-west of the Town of Renfrew on Renfrew County Road 7 (Magnesium Road). The site location is shown on the attached Figure 1. Timminco owns approximately 283 hectares of land at this location. The detailed extent of Timminco's landholdings registered under the Land Titles Act, for which mining and mineral rights are held, is presented on Drawing 010 of the Certified Mine Closure Plan dated September 2003 (not reproduced in this Amendment).

3.3 SITE PLAN (NO CHANGES)

Timminco's landholdings are illustrated on Drawing 010 of the Certified Mine Closure Plan dated September 2003. The company's former mining operations were restricted to Lots 19 and 20, Concessions V and VI, Township of Whitewater Region, and are illustrated in more detail on Drawing 2011-01.

As defined in the Mining Act and Ontario Regulation 240/00, the following buildings and features (highlighted on Drawing 2011-01) are considered part of Timminco's mining operations:

- Quarry #1;
- Quarry #2;
- solid mill tailings pile;
- rock and overburden piles;
- Bilson Quarry;
- reduction plant;
- west residue bunker
- residue APC system(baghouses & cyclones);
- briquetting plant;
- calcining plant(including No.1 and 2 kilns);
- substation "C" calcining plant;
- crushing plant;
- substation "C" crushing plant;
- oil tanks;
- cooling pond;
- detonator magazine;
- substation "D" reduction plant;
- explosives magazine; and
- potential future reserves.

These are the only portions of Timminco's landholdings that are considered in the Certified Mine Closure Plan, as amended by this document. These features will henceforth be collectively referred to as the "Timminco mining property", which encompasses approximately 95.3 hectares. An inventory of the Timminco mining property buildings and features is presented on Drawing No. 2011-01.

The remainder of Timminco's landholdings presented on Drawing 010 of the Certified Mine Closure Plan dated September 2003 and Drawing No. 2011-01 of this Amendment are considered to be industrial facilities and are therefore not subject to the Mining Act or Ontario Regulation 240/00. These facilities shall henceforth be referred to as the "Timminco industrial property".

Other site infrastructure on the Timminco mining property includes roads, water supply, water distribution, sewage disposal, electrical power transmission and natural gas distribution. These are described in Section 5.2 of the Certified Mine Closure Plan dated September 2003.

3.4 Operational Status of Timminco Haley Facility (Amendment No: 1 – Added New Section)

In September 2003, Timminco Limited (Timminco) submitted a Certified Mine Closure Plan for its Haley mining operation to the Ontario Ministry of Northern Development and Mines (MNDM), now the Ontario Ministry of Northern Development, Mines and Forestry (MNDMF), in accordance with Part VII of the Mining Act and Ontario Regulation 240/00. Acknowledgement of the receipt and filing of the Certified Mine Closure Plan, including a Financial Assurance agreement, was provided by MNDM in a letter to Timminco dated May 1, 2006. In 2005, mining operations at the Haley site ceased and Timminco's mine facilities entered into a state of Temporary Suspension, as defined in section 139(1) of the Mining Act. Notice of the Temporary Suspension status of the mine was given to MNDM in a Notice of Project Status in October 2005. Industrial Operations at the site ceased in June 2008 and Timminco initiated decommissioning and Mine Closure Plan Activities in the fall of 2008. The Mine Property is now in Active Closure. In January 2011, Timminco filed a new Notice of Project Status with the MNMDF; changing the site Status from Temporary Suspension to Active Closure with a completion date of the end of 2011. Timminco, also in January 2011, filed a Notice of Material Change with the MNDMF which provided a Detailed Summary on Status of Site Rehabilitation Measures and Mine Closure Plan Activities.

Timminco is in the process of decommissioning structures, facilities and infrastructure related to both the mining and industrial operations at the Haley facility. The general layout of the site is shown on Drawing No. 2011-01 attached to this amendment. The intent is to complete the Mine Site Rehabilitation Measures and Active Closure by the end of 2011. Timminco, also in May 2011, filed a Notice of Material Change with the MNDMF which provided a Detailed Summary on Status of Site Rehabilitation Measures and Active Closure by the end of 2011.

With the cessation of mining operations at the Timminco Haley site in 2005, Quarry #2 became inactive. Excavation equipment was removed from the quarry, groundwater pumping was stopped and the water was allowed to accumulate in the excavation. The water level has been rising steadily since that time, and has reached the elevation of 146.36 metres above sea level (masl) on July 27, 2009. In 2010, the quarry perimeter walls above the final water level were rehabilitated in accordance with the Mine Rehabilitation Code of Ontario (O. Reg. 240/00).

Final rehabilitation of the Solid Mill Tailings (SMT) Pile began in October 2008 and continued through 2010. Rehabilitation measures involve the re-grading of sideslopes to a maximum 3H:1V slope and covering with soil overburden and a topsoil layer. The topsoil is allowed to naturally re-vegetate. The rehabilitation measures are described in detail in Section 9.11 of the Certified Mine Closure Plan dated September 2003.

Phase 1 demolition of the mining-related buildings began in August 2009 and was completed at the end of October 2009. This phase of demolition involved the removal of the Crushing, Calcining Substation 'C', Oil Tanks, Cooling Pond and Detonator Magazine Buildings as well as associated equipment and infrastructure. Phase 2 demolition commenced in July 2010. Phase 2 demolition involved the removal of the Briquetting, Reduction and Explosives Magazine Buildings and associated infrastructure including residue bunkers, cooling pond and electrical substations. Bulk storage tanks adjacent to the structures were also removed. Upon removal of the buildings, the excavations were backfilled with inert fill and the subgrade was levelled. Final rehabilitation of the demolition areas, including covering with overburden and vegetating in accordance with the existing Certified Mine Closure Plan dated September 2003, will take place in 2011.

Industrial manufacturing operations continued at the Timminco site until June 2008, with raw products being purchased and brought to the facility. All manufacturing at the site has now been terminated, and the industrial site is secured by a chain-link fence around the entire perimeter, with locked gates at all site entrances. The site is currently manned by security personnel 24 hours a day, seven days a week and will continue until all site rehabilitation measures and Mine Closure Plan activities have been completed and accepted by the MNDMF.

In July 2008, MNDMF Mines Group staff conducted a site inspection of the Timminco facility. The observations and recommendations from the site inspection are documented in the report entitled *Mine Rehabilitation Inspection Report*, dated July 31, 2008. From the site inspection and subsequent meetings/teleconferences, MNDMF staff recommended the following additional items be documented in an Amendment to the Mine Closure Plan:

- A physical survey of low-level radiation in the vicinity of the thorium-impacted material storage area;
- A one-time groundwater sampling for radionuclides;
- Updated surface water quality information;
- Engagement and meaningful consultation with the First Nations communities.

MNDMF Mines Group staff conducted two further site inspections in 2010, on June 11 and October 29. The observations and recommendations from these inspections are provided in the Mine Rehabilitation Inspection Reports from these dates. In the reports, MNDMF staff recommended the following actions be documented in an Amendment to the Mine Closure Plan:

- It was recommended that fencing around the Thorium Material Storage Area meet the standards specified in Part 2 of the Mine Rehabilitation Code (chainlink);

- A follow-up radiological survey should be conducted in the areas subject to the 1976 clean-up (Auxilliary Metals and R&D buildings and soils outside the buildings) to confirm no further "hot spots" remain at the site;

- As groundwater monitoring continues annually, any upward trends in chloride, manganese and sodium will trigger additional sampling for radionuclides;

- Confirmation of the distance to the nearest drinking water supply was recommended.

4.0 CURRENT PROJECT SITE CONDITIONS

4.1 SITE ZONING AND ADJACENT LAND USE (NO CHANGES)

The site zoning and adjacent land use remains as described in the Certified Mine Closure Plan dated September 2003. The Ross Mineview School located west of the site on County Road 7 (Magnesium Road), is now closed and is used for light commercial purposes.

4.2 SITE TOPOGRAPHY (NO CHANGES)

The regional topography remains as described in the Certified Mine Closure Plan dated September 2003. An updated site topographic plan from aerial photography completed in November 2003 is presented on Drawing No. 2011-01.

4.3 SURFACE WATER (AMENDMENT NO: 1 – ADDED UPDATED INFORMATION)

The description of surface water drainage routes on the Timminco property provided in the Certified Mine Closure Plan dated September 2003 remains current, complete with the following updates to the North Ditch and Outfall Ditch.

North Ditch

As Quarry #2 is no longer being pumped, the North Ditch is now comprised solely of surface water runoff from the northern portion of the mining property. The North Ditch exits from the north boundary of the Timminco property at monitoring location SW3.

Outfall Ditch

The predominant drainage route across the Timminco site is known as the Outfall Ditch (see Drawing No. 2011-01 for the drainage route orientation). Surface water flow in the Outfall Ditch originates, for the most part, from the Timminco property. From a poorly drained area located on the west side of the property, the ditch flows north of the former Research and Development building, through a culvert installed south of the solid mill tailings pile, between the two quarries, and eastward to the outfall point in the southeast corner of the property. Several small drainage ditches that collect surface water runoff around the various plant buildings also route water into the Outfall Ditch.

Surface water quality discharging from the Outfall Ditch at the Timminco site boundary is regulated by Ontario Regulation 561/94, as amended by 170/96 (the MISA Effluent Monitoring and Effluent Limits Regulation for the Industrial Minerals Sector), and by the federal Metal Mining Effluent Regulations, SOR/2006-239. Water quality monitoring along the Outfall Ditch is also conducted as a condition of Certificate of Approval No. 2784-7T4RL9 for Industrial Sewage Works.

A pH-stabilization system was installed in December 2007 to treat effluent being pumped from Quarry #1 into the Outfall Ditch prior to its release from the site. All of the water in the Outfall Ditch is now diverted into Quarry #1 throughout the year. (Previously the Outfall Ditch was allowed to bypass the Quarry #1 diversion in the summer months; however, the bypass has now been permanently sealed). The water in Quarry #1 is pumped into a reactor tank at the northeast end of the quarry, where sulphuric acid is added to bring the pH to between 7.0 and 7.2 prior to discharge from the reactor. The treated water flows from the reactor tank back into the Outfall Ditch and continues to MISA Control Point 0100 (also referred to as SW2; see Drawing No. 2011-01 for its location). Since its implementation, the pH-stabilization system has been effective in controlling the pH of the final effluent at the MISA Control Point, thereby eliminating any toxicity exceedances. The system has proven to be robust and suitable for long-term operations.

In addition, a spray-stripping system was installed in 2007, at the former groundwater impoundment at the foot of the SMT Pile, to reduce ammonia concentrations. Bench-scale aeration tests had demonstrated that an ammonia reduction of 50% was attainable by stripping over a long time period (several days or more). This was verified at the field-scale with the operation of the spray-stripping system. The groundwater impoundment area has now been filled in as part of the rehabilitation measures for the Solid Mill Tailings Pile; however, the spray-stripping system is approved to be used at other locations if warranted.

4.3.1 Surface Water Quality (Amendment No: 1 – Added Updated Information)

The description of surface water quality in the Certified Mine Closure Plan dated September 2003 **remains current, complete with the following updated information.**

As part of this Amendment to the Certified Mine Closure Plan, MNDMF Mines Group staff have requested that updated water quality information be presented. The purpose is to ensure that the proposed modifications to the environmental monitoring programs are appropriate to assess water quality conditions after closure. The requested surface water quality information is presented in this section.

The monitoring results for 2007 to the end of September 2010 for surface water location SW2 are presented in Appendix A. The monitoring program at SW2 includes weekly pH, temperature, total ammonia, total suspended solids and flow readings, as well as quarterly acute toxicity testing.

Flow in the outfall ditch is measured weekly at the MISA Control Point as required under Ontario Regulation 170/96. The average flow recorded during the period from January 2007 to December 2010 was 882 m^3/day, with a decreasing trend seen year-to-year. The flow in 2010 averaged 551 m^3/day. Compared to the average flow for 2006 (1,697 m^3/day), this reflects the decline in production and eventual closure of the Timminco industrial facility. The peak flow measured during this period was 2,678 m^3/day (measured once each year in 2007, 2008 and 2009). The peak flow measured in 2010 was 1,856 m^3/day. Operation of the quarry diversion structures and treatment equipment over the past several years has demonstrated that the existing components are sized appropriately to handle the average and peak flows.

A summary of the annual ranges of pH and total ammonia concentrations measured at SW2 are presented below:

Year	pH	Total Ammonia (mg/L
2007	7.00 – 8.08	0.06 – 30.3
2008	6.96 – 8.09	<0.02 – 36.0
2009	6.93 – 8.27	<0.02 – 48.1
2010	6.77 – 8.16	<0.02 – 40.1

The higher pH values from 2008 to 2010 (i.e., greater than 7.5) correspond with time periods when the quarry pumping and pH-stabilization system were not operating, as the quarry water levels were recovering from the design low point.

The primary water quality indicators that are used to monitor water quality along the Outfall Ditch are ammonia, chloride and potassium. Nitrate is also tracked as a secondary indicator. Water quality monitoring is conducted at locations upstream (SW4) and downstream (SW2, SW5) of Quarry #1. Monitoring results for these locations from 2007 to 2010 are found in Appendix A. The data are presented in tables and in graphical form.

The surface water monitoring results show that the highest concentrations of water quality indicators are observed at SW4, immediately downstream of the solid mill tailings pile. Concentrations are much lower in Quarry #1, and at downstream locations SW5 and SW2. The concentrations of the primary indicators, ammonia, chloride and potassium follow similar patterns and magnitudes at Quarry #1 and SW5.

At the discharge Compliance Point (SW2), the concentrations of all water quality indicators have met the regulated effluent limits since the introduction of the pH-stabilization system. The results of downstream receiving water monitoring, which is conducted in accordance with the Metal Mining Effluent Regulations SOR/2006-239, shows no impact to the receiving waters from the Timminco facility.

4.4 GROUNDWATER (AMENDMENT NO: 1 – ADDED UPDATED INFORMATION)

The description of groundwater in the Certified Mine Closure Plan dated September 2003 **remains current, complete with the following updated information.**

As part of this Amendment to the Certified Mine Closure Plan, MNDMF Mines Group has requested that updated water quality information be presented. The purpose is to ensure that the proposed modifications to the environmental monitoring programs are appropriate to assess water quality conditions after closure. The requested groundwater quality information is presented in this section.

4.4.1 Hydrogeology (Amendment No: 1 – Added Updated Information)

The description of Hydrogeology **in the Certified Mine Closure Plan dated September 2003 remains current, complete with the following additional information.**

The nearest downgradient drinking water supply well to the Timminco property is located at the Haley Industries plant, south of Magnesium Road. The well is located approximately 175 metres from the southwest corner of Quarry #1, and approximately 600 metres from the Timminco's solid mill tailings pile.

4.4.2 Groundwater Quality (Amendment No: 1 – Added Updated Information)

The description of Groundwater Quality in the Certified Mine Closure Plan dated September 2003, remains current, complete with the following updated information.

MNDMF Mines Group staff have requested that a one-time groundwater sampling event for radionuclides analyses be conducted as part of this Amendment to the Certified Mine Closure Plan. The results of this sampling, along with other updated groundwater quality information, are presented in this section.

Groundwater samples were collected by WESA staff on June 23, 2009 from the following five monitoring wells in the vicinity of the SMT Pile (see Drawing No. 2011-01 for monitoring well locations):

- MW1A – background location
- MW2A, MW4A – adjacent to the downgradient side of the SMT Pile
- MW3A, MW10A – further downgradient from the SMT Pile, to the east and south

The groundwater samples were sent to Becquerel Laboratories of Mississauga, Ontario for analysis of radionuclides listed in Table 3 of the *Ontario Drinking Water Standards, Objectives and Guidelines* (ODWSOG; MOE, June 2006)[1]. The analysis report from Becquerel is presented in Appendix B, and the results are summarized in Table 4.1. The results show that immediately downgradient from the SMT Pile elevated concentrations of parameters are observed (for example, Lead-210 and Radium-228 at MW2A and MW4A). Upgradient of the SMT Pile at MW1A, the parameter concentrations are lower reflecting background conditions. Further downgradient from the SMT Pile, at MW3A and MW10A, the concentrations are also lower than at MW2A and MW4A, and meet the ODWSOG. The elevated radionuclide concentrations in the immediate vicinity of the SMT Pile suggest the possibility of some groundwater leaching of materials from within the Pile; however, the elevated concentrations appear to be localized and do not extend off-site beyond Timminco's property boundaries. These trends are also seen in the analytical results for inorganic stable-isotope constituents, such as chloride, potassium and ammonia, which were sampled at the same time as the radionuclides (see Table 4.2). There are no drinking water supplies that are impacted by the former mining operations at the Timminco facility.

[1] On recommendation from Becquerel Laboratories, the samples were not analyzed for Bi-210 because it has a very short half-life (5 days) and a relatively high drinking water standard (70 Bq/L) that is not typically exceeded in Ontario.

Groundwater monitoring is conducted on a regular basis as a condition of Certificate of Approval No. 2784-7T4RL9 for Industrial Sewage Works. Recent results from this monitoring are presented in Appendix A. The results show that the concentrations of the primary water quality indicators (ammonia, potassium, chloride) in the groundwater samples are highest at MW4A and MW4B, located downgradient of the SMT Pile and upgradient from Quarry #1. The concentrations at MW10A, MW10B, MW11A and MW11B are much lower than those at MW4A, MW4B and Quarry #1. This provides evidence that the hydraulic trap created by the operations of the pumping system at Quarry #1 is working effectively in that the high concentrations are being restricted to the Quarry. Downgradient from the Quarry at MW10 and MW11, the water quality concentrations are much lower than at locations close to the SMT Pile (eg., MW2 and MW4).

4.5 Terrestrial Plant and Animal Life (No Changes)

The terrestrial plant and animal life remains as described in the Certified Mine Closure Plan dated September 2003.

4.6 Aquatic Plant and Animal Life (No Changes)

The aquatic plant and animal life remains as described in the Certified Mine Closure Plan dated September 2003.

4.7 Site History and Assessment of Hazards (Amendment No: 1 – Added Updated Information)

The description of historical mining activities (Section 4.7.1), physical mine characteristics (Section 4.7.2), the assessment of hazards (Section 4.7.3) and current contamination (Section 4.7.4) provided in the Certified Mine Closure Plan dated September 2003 remains current in its overall concept. Quarry #1 is used as a component of the Industrial Sewage Works under Certificate of Approval No. 2784-7T4RL9; however, it will be rehabilitated to the standards specified for Open Pits in the Mine Rehabilitation Code of Ontario. Outfall Ditch effluent is now diverted to the quarry at all times where it is treated with a pH-stabilization system.

Quarry # 2 is no longer active since mining operations ceased at the site in April 2005.

5.0 PROJECT DESCRIPTION (Amendment No: 1 – Added Updated Information)

The description of the Timminco Project Summary (Section 5.1), Ore Mineralogy and Host Rock (Section 5.2), Mine Development, Activities and Backfilling (Section 5.3), Ore Processing (Section 5.4), Buildings and Infrastructure (Section 5.5), Tailings (Section 5.6), Waste Rock, Ore Concentrate and Overburden (Section 5.7), Waste Management Systems (Section 5.8), Waste Management of Treatment Systems (Section 5.9), Raw Material Storage (Section 5.10) and Proposed Schedule (Section 5.11) provided in the Certified Mine Closure Plan dated September 2003, remains a valid description of the Project Site and the Mining Activities that took place at the Timminco Haley Facility complete with the updated information enclosed. Timminco's mining property is now in Active Closure and site rehabilitation measures are expected to be completed by the end of 2011. A schedule for closing out is presented in Section 9.0.

6.0 PROGRESSIVE REHABILITATION (Amendment No: 1 – Added Updated Information)

Timminco's mining property is now in Active Closure and site rehabilitation measures are expected to be completed by the end of 2011. Progressive rehabilitation activities are no longer applicable to the site.

7.0 REHABILITATION MEASURES – TEMPORARY SUSPENSION (Amendment No: 1 – Added Updated Information)

The description under Rehabilitation Measures – Temporary Suspension, including Restricted Access and Material Storage (Section 7.1), Mine Openings (Section 7.2), Mechanical, Hydraulic and Electrical Systems (Section 7.3), Monitoring Programs (Section 7.4), Control of Effluent (Section 7.5), Rock, Overburden and Solid Mill Tailings Pile (Section 7.6), Impoundment Structures (Section 7.7) and Schedule for Temporary Suspension (Section 7.8) provided in the Certified Mine Closure Plan dated September 2003, remains a valid description of the Rehabilitation Measures complete with the following updated information.

Timminco's mining property is now in Active Closure and site rehabilitation measures are expected to be completed by the end of 2011. Temporary suspension activities described in Section 7.0 of the Certified Mine Closure Plan dated September 2003 have been completed or are ongoing (ie., restricted access, site security, monitoring, etc.). An updated schedule showing the current status of Temporary Suspension activities is presented on Table 7.9.

8.0 REHABILITATION MEASURES – STATE OF INACTIVITY (Amendment No: 1 – Added Updated Information)

Timminco's mining property is now in Active Closure and site rehabilitation measures are expected to be completed by the end of 2011. It is the company's intent to move from Temporary Suspension directly into a Closed-Out condition. Any relevant State of Inactivity measures will be completed as part of the Site Close-Out process. A description of the State of Inactivity measures is provided in the Certified Mine Closure Plan dated September 2003. An updated schedule showing the proposed implementation of the State of Inactivity activities is presented on Table 8.1.

9.0 REHABILITATION MEASURES – CLOSING OUT (Amendment No: 1 – Added Updated Information)

The description of the Closing Out measures in the Certified Mine Closure Plan dated September 2003 remains current, complete with the following updated information.

With the cessation of industrial operations at the Haley site, in June 2008, it is Timminco's intent to move toward closing out its mining property in Haley, Ontario by the end of 2011. From the Mining Act, the term 'closed out' means:

> *"that the final stage of closure has been reached and that all the requirements of a closure plan have been complied with."*

The rehabilitation measures will follow those described in the Certified Mine Closure Plan dated September 2003, with the exception of the following amendments which are the subject of this document (the original section references from the Certified Mine Closure Plan dated September 2003 are in parentheses):

- Update to the Quarry #2 final configuration and sideslopes (Sections 9.3 and 9.4);
- Update to the Quarry #1 current status and final sideslopes (Sections 9.3 and 9.4);
- Clarification of the rehabilitation measures for the Thorium-Impacted Material Storage Area (Section 9.9.1);
- Update of the final configuration (extent and sidelopes) of the SMT Pile (Section 9.11).

The updated rehabilitation measures for closing out the Timminco Haley mine site are described in the following sections.

9.1 Shafts, Raises and Open Stopes (No Changes)

No Shafts, raises or open stopes were constructed at the Timminco Haley mine site.

9.2 Portals of Adits and Declines (No Changes)

No adits or declines were constructed at the Timminco Haley mine site.

9.3 Mine Openings (Amendment No: 1 – Added Updated Information)

Quarry #2 was operated from 1960 to 2005. A description of the quarry configuration and activities during mine operation is presented in Sections 4.7.1 and 4.7.2 of the Certified Mine Closure Plan dated September 2003. Quarry #2 extended to a final floor elevation of approximately 130.5 masl at its deepest point. It is now being allowed to gradually fill with water until the static water level is reached. Based on the groundwater levels measured in the adjacent monitoring wells and the ground surface topography in the northeastern section of the site, the eventual water level is projected to be 148 masl in Quarry #2. The water level was 146.36 metres above sea level (masl) on July 27, 2009.

9.4 Stability of Surface Mine Workings (Amendment No: 1 – Added Updated Information)

The configuration of Quarry #2 is shown on Drawing No. 2011-01. With the early cessation of mining operations, the sideslopes did not develop as described in the Certified Mine Closure Plan dated September 2003. Some near-vertical walls greater than three metres in height remained in place above the planned final water level. The areas with these walls are shown on Drawing No. 2011-02. These walls were excavated and re-graded in 2010 to a maximum slope of 2H:1V above the final water level. Photographs showing typical post-closure sideslopes are presented in Appendix G.

The setbacks for Quarry #2 from roads and property boundaries are designed to reduce visual impacts. The planned final contours are designed to minimise the covering of potential future reserves. Natural re-vegetation will be allowed to occur around the quarry.

The reduction in the height of near vertical faces above the water level, in addition to the planned measures of restricting access and installing signs to warn of the steep slopes and open water are designed to reduce the safety hazards of Quarry #2 following closure. A chain-link fence with a locked gate has been installed across the entrance to the Quarry #2 access road on Blind Line (see Drawing No. 2011-01).

In 2011, a qualified professional engineer will conduct a final inspection of the stability of the Quarry #2 slopes, and, if necessary, make recommendations on additional stabilisation requirements for the pit walls, benches or immediate surroundings. Detailed visual monitoring and inspections will be conducted at least once every six months at the quarries to assess their physical stability.

Quarry #1 continues to be used as part of the site effluent management program on the industrial property. Water from the Outfall Ditch is diverted into the quarry at all times of the year, and the quarry acts as a natural equalization tank and hydraulic trap to contain the effluent. The effluent is pumped from the quarry through a pH-stabilization system and discharges into the Outfall Ditch. The water levels in the quarry are maintained within a range of specified elevations within the quarry.

The Outfall Ditch effluent management system is regulated under the Ontario Water Resources Act, Section 53, and Certificate of Approval No. 2784-7T4RL9 for Industrial Sewage Works. The effluent management system, including Quarry #1, will continue to be used for treatment and discharge on the industrial property for the foreseeable future. For security purposes, a chain-link fence has been installed around the perimeter of the industrial property, and encompasses Quarry #1 (refer to Drawing No. 2011-01).

There remains some areas of near-vertical quarry walls greater than three metres height above the final water level at Quarry #1. These areas are shown on Drawings No. 2011-02. The walls will be excavated and re-graded to meet the standards in the Mine Rehabilitation Code of Ontario prior to close-out.

9.5 Structures and Infrastructure (No Changes)

No changes or updates are required to the description of rehabilitation measures for structures and infrastructure provided in the Certified Mine Closure Plan dated September 2003.

9.6 Machinery, Equipment and Storage Tanks (No Changes)

No changes or updates are required to the description of rehabilitation measures for machinery, equipment and storage tanks provided in the Certified Mine Closure Plan dated September 2003.

9.7 Transportation Corridors (No Changes)

No changes or updates are required to the description of rehabilitation measures for transportation corridors provided in the Certified Mine Closure Plan dated September 2003.

9.8 Concrete Structures (No Changes)

No changes or updates are required to the description of rehabilitation measures for concrete structures provided in the Certified Mine Closure Plan dated September 2003.

9.9 Petroleum Products, Chemicals and Waste (No Changes)

No changes or updates are required to the description of rehabilitation measures for petroleum products, chemicals and waste provided in the Certified Mine Closure Plan dated September 2003, with the following exception for the Thorium-Impacted Material Storage Area.

9.9.1 Thorium-Impacted Material Storage Area (Amendment No: 1 – Added Updated Information)

In October 1976, the Atomic Energy Control Board (AECB) completed a survey of gamma radiation at the Haley, Ontario site. Based on the results of this survey and subsequent investigations and inspections by AECB personnel, a remedial action plan was implemented at the site over the period from 1977 to 1979. The purpose of the remedial action was to remove material that was contaminated with thorium in the area of the R&D and Auxiliary Metals Buildings. Thorium was produced by Dominion Magnesium the original owner and developer of the property and continued with the second owner of the property, Chromasco Limited.

An area on top of the solid mill tailings pile was designated by Chromasco Limited (owner of the property prior to Timminco Limited) and agreed to by the AECB as a storage area to receive the thorium-contaminated material. The designated area is shown on Drawing No. 2011-01. It is estimated to contain between 10,000 and 15,000 tonnes of material, primarily

unirradiated thorium contained in pyrochlore slag. This material has remained undisturbed through solid mill tailing pile development and closure. The AECB prescribed substance license for this material is presented in Appendix F of the Certified Mine Closure Plan dated September 2003. In July 2006, Timminco received confirmation from the Canadian Nuclear Safety Commission (CNSC; the successor to AECB) that a license was no longer required for the material storage area since the unirradiated thorium-impacted material was not associated with the development or use of atomic energy and was considered to contain a naturally occurring radioactive material (NORM). The email correspondence related to this matter between Timminco and CNSC is presented in Appendix C of this Amendment.

In the *Mine Rehabilitation Inspection Report* dated July 31, 2008, MNDM recommended that a low-level radiation survey be conducted at the Thorium-Impacted Material Storage Area. The purpose of the survey was to confirm whether the containment area continued to store the thorium-impacted materials and effectively minimized the radiation emitted.

In 2009, Timminco retained Monserco Limited to conduct a preliminary radiation survey in the vicinity of the Thorium-Impacted Material Storage Area. Two health physicists from Monserco completed the survey on June 2, 2009, accompanied by WESA and Timminco personnel. The survey was conducted across the primary vegetated thorium-impacted material pile, as well as in the general vicinity surrounding the material storage area. Background readings were taken at the Timminco General Services Building on the industrial property and on the Solid Mill Tailings Pile. The background dose rate readings were measured to be 0.018 μSv/hr.

The report from Monserco, entitled *Initial Site Assessment Report*, dated June 18, 2009, is presented in Appendix D of this Amendment. As was noted during the survey, two areas of radiological contaminated materials were identified: i) the primary thorium slag pile (covered with vegetation); and ii) a secondary area of contaminated industrial machinery and debris including the fenced enclosure located northwest of the primary thorium slag pile. The highest dose rate readings, on the order of 10 to 130 μSv/hr, were found when in direct contact with residual products (cylinders and ingots) in the primary slag pile and around the industrial machinery in the secondary area. The survey results indicated that at distances greater than approximately 30 metres from the primary slag pile, the preliminary dose rate measurements were consistent with background levels measured at the bottom of the Solid Mill Tailings Pile (0.02 μSv/hr). This is an important finding which clarifies the requirements for rehabilitation measures for the Thorium Material Storage Area at close-out. The survey results indicate that beyond approximately 30 metres, any radiation emitted from the storage area is effectively minimized. Based on the results of the preliminary radiation survey, the rehabilitation measures for this area at close-out will be as follows:

1. During completion of the rehabilitation measures on the Solid Mill Tailings Pile, an area has been designated and temporarily fenced off to prevent any disturbance of thorium-impacted materials. The Rehabilitation Contractor has been instructed that no work (ie., work that involves physical disturbance and the creation of dust) is to take place within the fenced-off Thorium-Impacted Material Storage Area, which includes the primary and secondary areas identified above.

2. Upon completion of the Solid Mill Tailings Pile rehabilitation measures, an exclusion zone will be created around the Thorium-Impacted Material Storage Area. The initial boundary of the exclusion zone will be a minimum of 30 metres from the outside perimeter of the temporary construction area. The setback of 30 metres is based on the preliminary assessment completed by Monserco, which indicated background dose rate measurements at that distance from the thorium-impacted materials. Prior to establishing the final extent of the exclusion zone, a low-level radiation survey will be conducted around the perimeter of the proposed exclusion zone to confirm whether 30 metres is an appropriate distance for the final setback.

3. Once the final setback is established, the area will be fenced off with 1.8 m high chainlink fencing meeting the specifications in Part 2 of the Mine Rehabilitation Code of Ontario. Signs will be posted warning of the radiological hazard. This area will be designated as the Exclusion Zone for the Thorium-Impacted Material Storage Area.

Expansion of the Thorium-Impacted Material Storage Area and the establishment of an Exclusion Zone around its perimeter will ensure that the radiation emitted from the materials is effectively contained.

The clean-up of NORM, specifically unirradiated thorium, was conducted sometime between 1977 and 1979 by Chromasco Limited (owner of the property prior to Timminco Limited). The cleanup took place in and around the Auxilliary Metals and R&D buildings. However, no records of any post-decontamination survey can be found. Consequently, MNDMF staff have requested that a radiological survey be completed in the areas of the cleanup to verify that the existing conditions are acceptable according to current standards and/or guidelines for NORM.

In December 2010, Timminco requested quotations for a radiological survey from three qualified consulting firms. It is expected that a survey will be conducted in the first half of 2011, so that the existing conditions can be verified prior to mine close-out.

9.10 PCBs OR PCB CONTAMINATED MATERIAL (NO CHANGES)

No changes or updates are required to the description of rehabilitation measures for PCBs or PCB contaminated material provided in the Certified Mine Closure Plan dated September 2003.

9.11 LANDFILL AND WASTE MANAGEMENT SITES (AMENDMENT NO: 1 – ADDED UPDATED INFORMATION)

The Solid Mill Tailings (SMT) produced at the Timminco facility were disposed on-site in a pile located north of the main industrial complex (see Drawing No. 2011-01). The SMT Pile currently occupies an area of approximately 15.7 hectares and extends to heights ranging from 25 to 30 metres above the surrounding land surface. About 80% of the solid mill tailings in this area are made up of dicalcium silicate residue. The remaining 20% is comprised of sludge (also designated as a solid mill tailing), and other materials, including calcined dolomite fines (commonly referred to as lime). Historically, minor amounts of other office wastes were placed on the tailings pile.

The conceptual final extent and contours of the SMT Pile were originally presented in the Certified Mine Closure Plan dated September 2003. As was noted in the Plan, the ultimate final extent of the SMT Pile could only be conceptualized at the time, since the site life and closure of the Timminco facility was anticipated to be market-driven. The proposed final contours of the SMT Pile presented in the Certified Mine Closure Plan dated September 2003 represented the airspace available for 50 years of disposal at (then) current maximum solid mill tailings generation rates.

With the cessation of mining and industrial operations at the Timminco facility, the final extent and contours of the SMT Pile as presented in the Certified Mine Closure Plan dated September 2003 will not be reached. The updated final contours are presented in Drawing No. 2011-02 of this Amendment. Typical cross-sections are shown on Drawing No. 2011-03. The design for the rehabilitation measures at close-out for the SMT Pile remain the same as those described in the Certified Mine Closure Plan dated September 2003, that is:

- Maximum sideslopes of 3H:1V, constructed to promote surface water drainage from the Pile;
- A weakly cementitious crust formed by the mild pozzolanic activity of the residue;
- Final cover of overburden (fine-textured soil and topsoil) placed and graded over the solid mill tailings;

- Natural vegetation allowed to re-generate from the topsoil layer.

The final rehabilitation of the SMT Pile began in October 2008. Work progressed throughout the 2009 and 2010 construction seasons, and is expected to be completed before the end of 2011.

After closing out, detailed visual monitoring and inspections will be conducted at least once every six months at the solid mill tailings pile to assess its physical stability. Groundwater and surface water monitoring will be conducted in accordance with the programs described in the Certified Mine Closure Plan dated September 2003, as amended by Section 10 of this Amendment.

9.12 Soils Testing (Amendment No. 1 – Added Updated Information)

No changes are required to the description of rehabilitation measures for soil investigations and testing provided in the Certified Mine Closure Plan dated September 2003.

In November 2010, a subsurface drilling investigation was commenced in the areas of Phases 1 and 2 demolition where raw materials, products and wastes were handled, transferred or stored. Soil samples were collected during the investigation and representative samples were submitted for laboratory chemical analysis. A report on the observations and findings from the investigation is expected to be completed in early 2011.

9.13 Physical and Chemical Stability of Tailings Areas (No Changes)

No changes or updates are required to the description of rehabilitation measures for tailings areas provided in the Certified Mine Closure Plan dated September 2003, as amended in Section 9.11 of this Amendment.

9.14 Physical and Chemical Stability of Rock and Overburden Piles (Amendment No: 1 – Added Updated Information)

One rock pile immediately north of the eastern access road leading to the former explosives magazine will be investigated to determine whether any other wastes were co-disposed in the pile. This work will be done as part of the Soil Investigations described in Section 9.12, in order to address unconfirmed reports of wastes being placed on the pile.

No other changes or updates are required to the description of rehabilitation measures for rock and overburden piles provided in the Certified Mine Closure Plan dated September 2003.

9.15 Breaching or Stabilization of Impoundment Structures (Amendment No: 1 – Added Updated Information)

The small impoundment structure formerly located at the toe of the Solid Mill Tailings pile has been removed as part of the SMT Pile rehabilitation. No other changes or updates are required to the description of rehabilitation measures for impoundment structures provided in the Certified Mine Closure Plan dated September 2003.

9.16 Decant Structures (No Changes)

No changes or updates are required to the description of rehabilitation measures for decant structures provided in the Certified Mine Closure Plan dated September 2003.

9.17 Water Courses and Drainage Channels (No Changes)

No changes or updates are required to the description of rehabilitation measures for water courses and drainage channels provided in the Certified Mine Closure Plan dated September 2003.

9.18 Re-Vegetation (No Changes)

No changes or updates are required to the description of re-vegetation measures provided in the Certified Mine Closure Plan dated September 2003. Experience with the rehabilitation of the SMT Pile and Rock & Overburden Piles demonstrates that natural re-vegetation is an acceptable method at this site. Further soil nutrient testing for re-vegetation purposes will no longer be required for site rehabilitation.

9.19 Schedule for Closing Out (Amendment No: 1 – Added Updated Information)

An updated schedule showing the proposed implementation of the Closing Out activities is presented on Table 9.1.

10.0 MONITORING PROGRAMS

10.1 PHYSICAL STABILITY (NO CHANGES)

No changes or updates are required to the description of monitoring programs for physical stability provided in the Certified Mine Closure Plan dated September 2003.

10.2 CHEMICAL STABILITY (AMENDMENT NO: 1 – ADDED UPDATED INFORMATION)

Updated groundwater and surface water monitoring programs are presented below. The proposed amendments to the monitoring programs are to ensure that they reflect current site conditions with the implementation of effluent treatment works and the cessation of industrial operations at the site.

10.2.1 Surface Water Monitoring (Amendment No: 1 – Added Updated Information)

The objective of the surface water monitoring program is to ensure that water quality is demonstrated to be unimpaired and that it is satisfactory for aquatic life and other beneficial uses. The surface water monitoring program is to be carried out in accordance with Part 5 of the Mine Rehabilitation Code of Ontario. Routine sampling will be carried out during post-closure to characterise the chemistry at discharge locations in relation to background chemistry and regulated Effluent Limits and/or Provincial Water Quality Objectives (PWQO). The results of the sampling will be used to determine if additional control measures are required.

It is proposed that a total of six surface water locations be sampled after closure. The sampling locations have been selected in accordance with subsection 47(1) of the Code. The proposed surface water sampling locations are as follows, and are shown on Drawing 2011-02:

- SW1: background reference location in ponded area along west property line;
- SW2: discharge from the property at MISA Control Point 0100 along the Outfall Ditch;
- SW3: discharge from the northern property limit where the North Ditch leaves Timminco property;
- SW4: in the Outfall Ditch upstream of Quarry #1 (on-site source);
- Quarry #1 (on-site water body; part of the effluent treatment works); and
- Quarry #2, following closure and water level equilibration (on-site water body).

Note that location SW9 in the Outfall Ditch downstream of the mag-cal wash pad has been eliminated from the surface water monitoring program since industrial activities have stopped, and the mag-cal wash pad is no longer used. Therefore, there is no longer a need to delineate potential impacts to surface water from this facility.

Surface water monitoring will initially be conducted four times per year for two years. This monitoring regime will establish a database against which future monitoring results may be compared. If surface water analytical results are satisfactory, the frequency of monitoring will be reduced to twice annually after the end of the first two-year period.

The proposed surface water monitoring program is outlined in Table 10.1, including the parameter suite. The parameter suite is the list specified in subsection 47(2) of the Code, plus additional site-specific indicators such as potassium, nitrate, TKN and others. The parameter suite will be re-evaluated after the second year of monitoring to focus on indicator compounds and general water quality indicators. A memorandum describing the results of the surface water monitoring will be sent to the Director once per year.

In addition to the post-closure surface water quality monitoring conducted for the Mine Closure Plan, the monitoring programs that are required under Ontario Regulation 561/94, as amended by O.Reg. 170/96, by the Metal Mining Effluent Regulations, SOR/2006-239, and by Certificate of Approval No. 2784-7T4RL9 will continue as necessary.

10.2.2 Groundwater Monitoring (Amendment No: 1 – Added Updated Information)

The objective of the groundwater monitoring program is to identify and characterise any potential impediments to the beneficial use of groundwater as a result of the presence of migration of contaminants. The groundwater monitoring program is to be carried out in accordance with Part 6 of the Mine Rehabilitation Code of Ontario.

The monitoring program will make use of five existing multi-level monitoring wells in addition to any future wells that may be required to fully delineate the potential impacts. The monitoring well locations are as follows, and are shown on Drawing 2011-02:

- MW1A, B: along the west property boundary, upgradient of the solid mill tailings (SMT) pile;
- MW3A, B: west of Quarry #2, downgradient of the SMT Pile;
- MW4A, B: northwest of Quarry #1, downgradient of the SMT Pile;
- MW10A, B: southeast of Quarry #1; and
- MW11A, B: southeast of Quarry #1.

Groundwater monitoring will be conducted annually in the late spring each year. Water levels will be measured at each of the monitors prior to sampling in order to determine the groundwater flow directions. The proposed list of parameters to be initially included in the groundwater monitoring program is provided in Table 10.1. The parameter suite is the list specified in subsection 53(2) of the Code, plus additional site-specific indicators. It is proposed that this list be reviewed annually to determine whether modifications to the groundwater monitoring program should be made.

Trends in the groundwater monitoring parameters will be examined on an annual basis. The analysis of trends will be used to evaluate whether impacts are apparent at downgradient monitoring wells (eg., increasing trends, elevated concentrations, etc.), and whether modifications to the monitoring program are warranted. For example, radionuclides will be added to the monitoring program if increasing trends in the inorganic parameters (eg., chloride, sodium, manganese, etc.) suggest potential off-site groundwater impacts.

A memorandum describing the results of the groundwater monitoring will be sent to the Director once per year in conjunction with the surface water monitoring results.

10.3 Biological Monitoring (No Changes)

As specified in the Certified Mine Closure Plan dated September 2003, biological monitoring will not be conducted at the property after Close-Out.

11.0 EXPECTED SITE CONDITIONS (No Changes)

There are no changes from the expected site conditions at close-out from those described in the Certified Mine Closure Plan dated September 2003.

12.0 CLOSURE COSTS (Amendment No: 1 – Added Updated Information)

Timminco's mining property is now in Active Closure and site rehabilitation measures are expected to be completed by the end of 2011. Hence, some of the closure costs identified in the Certified Mine Closure Plan dated September 2003 are no longer applicable (eg., progressive rehabilitation costs, etc.). The estimated costs for the remaining activities required to bring the site to Closed-Out status are provided in Table 12.5 of this Amendment (provided in Appendix E). The costs shown are in 2011 dollars based on the material goods and services to be provided.

The active closure period is considered to cover approximately five years from the cessation of Industrial Operations at the site in June 2008 until 2012 inclusive. A minimum 10-year post-closure period involving site inspections, monitoring and maintenance will then be implemented to ensure that the rehabilitation objectives are achieved and the anticipated post-closure land use is realised.

13.0 FINANCIAL ASSURANCE (Amendment No: 1 – Added Updated Information)

The amount of Financial Assurance is based on the costs for Active Closure and Post-Closure Activities as described above and in Table 12.5. The financial assurance cost items are summarized in Table 12.5 within Appendix E. The financial assurance calculations are based on discussions and agreement between Timminco and MNDMF, as of April 2011.

14.0 FIRST NATIONS ENGAGEMENT AND CONSULTATION (Amendment No: 1 – Added Updated Information)

Following the submission and acceptance of the Certified Mine Closure Plan dated September 2003, the scope of engaging First Nations and aboriginal communities that is practiced for projects such as the closure of Timminco's Haley facility broadened significantly. Accordingly, MNDMF has directed Timminco Limited to engage and consult with identified First Nations and other aboriginal communities regarding the proposed Amendment to the Mine Closure Plan, prior to submitting the final document.

MNDMF Mines Group staff initiated contact with the Algonquins of Pikwakanagan in relation to the Timminco project in April 2009. On May 22, 2009 a meeting was held at the Timminco Haley facility with the following parties in attendance:

- Algonquins of Pikwakanagan: Jim Meness
- MNDMF: Tim Ruthenberg, Clayton Ralph and Dawn Spires (by telephone)
- Timminco Limited: Greg Donaldson and Keith McKinnon
- WESA Inc.: David Harding and Tami Sugarman

The notes from the meeting are found in Appendix F. Consultation among the parties has continued since the meeting. Consultation notes, correspondence, etc. are also presented in Appendix F. In a letter dated October 15, 2009 (see Appendix F), Jp2g Consultants Inc., on behalf of the Algonquins of Ontario (AOO), confirmed that the mine closure plan had been reviewed and that any concerns had been addressed to the satisfaction of the AOO. The letter further states that the AOO have no objection to the implementation of the Closure Plan as currently proposed.

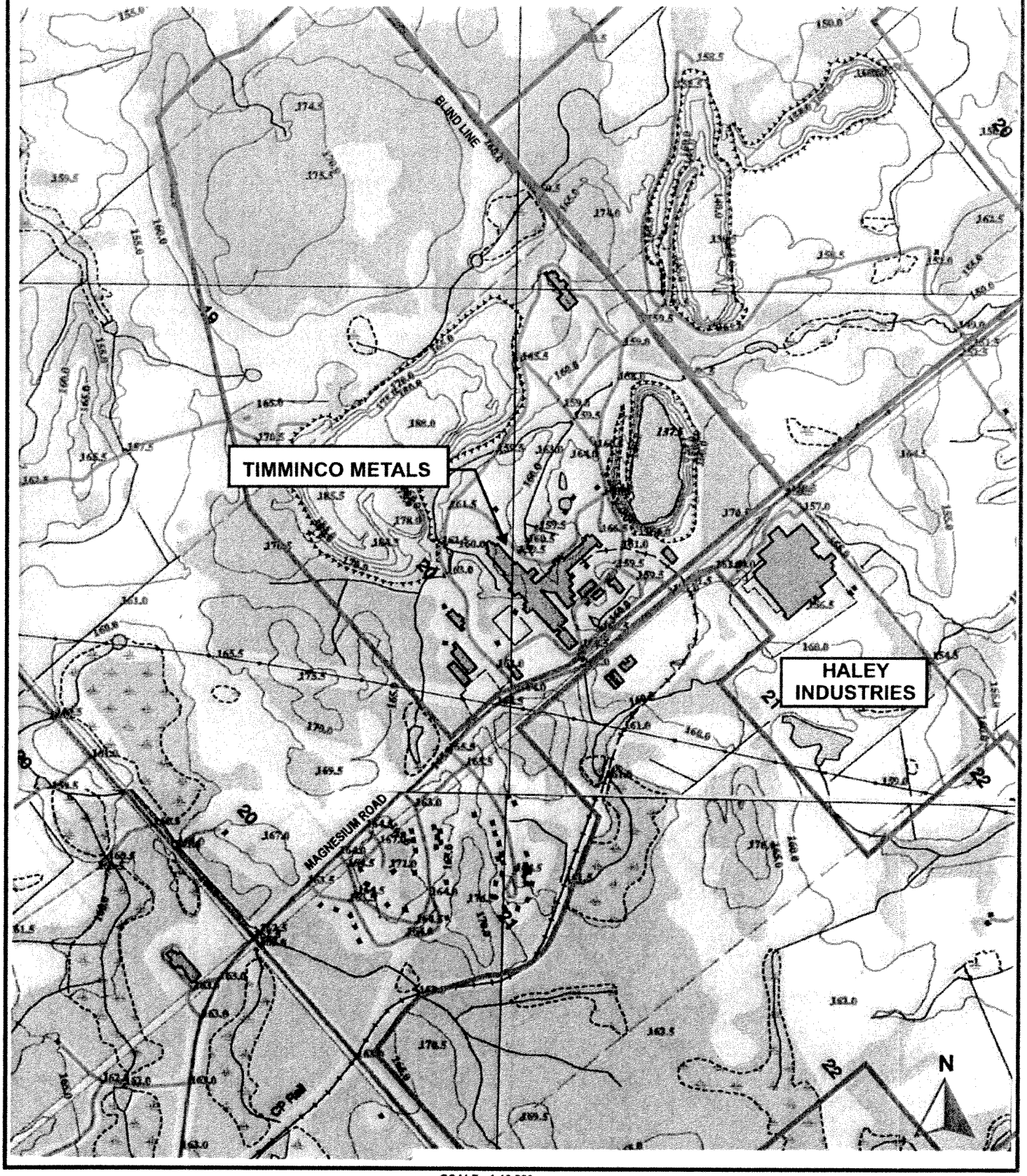

FIGURE: 1

SCALE: 1:10,000

REFERENCE: ONTARIO BASE MAP
MAP 10 18 3600 50450

SITE LOCATION MAP

B7727-SLM

WESA
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LIST OF TABLES

The following tables remain as described in the Certified Mine Closure Plan dated September 2003:

The following tables presented in the Certified Mine Closure Plan dated September 2003 are no longer applicable:

The following tables are revised or added to the Certified Mine Closure Plan by this Amendment No. 1 document:

Table 4.2 (2011): Summary of Groundwater Monitoring Results

Location	Sampling Date	Alkalinity as CaCO3	Chemical Oxygen Demand	Chloride	Conductivity	Cyanide (free)	Cyanide (total)	Ammonia (total)	N-NO2 (Nitrite)	N-NO3 (Nitrate)	pH	Sulphate	Total Kjeldahl Nitrogen	Calcium	Magnesium	Potassium	Sodium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
	Units	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWSOG[1]		30-500		250		0.4			1.0	10.0	6.5-8.5	500					200	0.025	1	5	0.005	0.05	1	0.3	0.01	0.05		5
MW1A	23-Jun-09	195	<5	346	3690	<0.005	0.009	39.3	1.37	0.1	7.37	55	37.7	284	114	106	46	0.001	0.47	0.05	0.0002	<0.001	<0.001	<0.03	<0.001	0.04	<0.005	0.01
MW1B	23-Jun-09	353	<5	97	1290	<0.005	<0.005	0.79	<0.10	24.7	7.40	7	0.91	161	58	4	14	0.002	0.21	<0.01	<0.0001	0.008	0.007	1.5	0.004	0.79	0.006	0.01
MW2A	23-Jun-09	112	12800	16800	47300	<0.005	<0.005	137	<0.10	6.47	7.12	233	145	3410	2810	3070	7770	0.02	2.3	0.4	0.002	<0.005	<0.01	<0.3	<0.01	11.8	<0.05	0.4
MW2B	23-Jun-09	784	15	58	1630	<0.005	<0.005	0.48	<0.10	<0.10	7.82	112	1.21	142	103	17	82	<0.001	0.23	0.14	<0.0001	0.009	0.001	<0.03	<0.001	0.41	0.009	<0.01
MW3A	23-Jun-09	286	<5	31	657	<0.005	<0.005	<0.02	<0.10	0.43	8.00	23	<0.10	73	32	3	12	0.003	0.22	0.06	<0.0001	<0.001	<0.001	<0.03	<0.001	<0.01	<0.005	<0.01
MW3B	23-Jun-09	219	<5	36	627	<0.005	<0.005	0.02	<0.10	0.64	8.11	60	0.12	45	25	3	48	0.002	0.11	0.33	<0.0001	0.004	0.003	0.9	<0.001	0.03	<0.005	0.03
MW4A	23-Jun-09	43	133	7240	11500	<0.005	<0.005	89.4	0.1	0.91	7.39	203	92.6	632	292	480	3650	<0.01	0.1	0.2	<0.001	<0.01	<0.01	<0.3	<0.01	1.1	<0.05	<0.1
MW4B	23-Jun-09	64	<5	1580	5460	<0.005	<0.005	71.4	<0.10	4.07	7.61	149	71.7	334	117	300	934	<0.01	<0.1	0.3	<0.001	<0.01	<0.01	<0.3	<0.01	<0.1	<0.05	<0.1
MW10A	23-Jun-09	412	<5	184	1370	<0.005	<0.005	<0.02	<0.10	3.65	7.94	25	0.33	70	88	9	70	0.001	0.24	0.06	<0.0001	0.014	0.007	<0.03	<0.001	<0.01	<0.005	0.01
MW10B	23-Jun-09	366	<5	226	1480	<0.005	<0.005	<0.02	<0.10	3.02	7.98	46	0.25	80	48	7	151	0.002	0.15	0.08	<0.0001	0.014	0.001	<0.03	<0.001	<0.01	<0.005	<0.01
MW11A	23-Jun-09	303	26	56	1120	<0.005	<0.005	0.23	<0.10	<0.10	7.99	215	0.3	54	47	5	121	0.002	0.08	0.83	<0.0001	0.002	<0.001	<0.03	<0.001	<0.01	<0.005	0.01
MW11B	23-Jun-09	403	<5	16	790	<0.005	<0.005	<0.02	<0.10	1.35	8.01	23	0.14	42	56	5	45	0.002	0.13	0.08	<0.0001	0.002	0.001	<0.03	<0.001	<0.01	<0.005	<0.01

Notes:

1. Values are from Tables 2 and 4 of the Ontario Drinking Water Standards, Objectives and Guidelines (MOE, June 2006).

Denotes result exceeds the ODWSOG.

Table 4.1 (2011): Summary of Radionuclide Analysis Results for Groundwater Samples

Location	Sampling Date	Pb-210	Po-210	Ra-224	Ra-226	Ra-228	Th-228	Th-230	Th-232	Th-234	U-234	U-235	U-238
	Units	Bq/L	Bq/L	Bq/L	Bq/L	Bq/L	Bq/L	Bq/L	Bq/L	Bq/L	Bq/L	Bq/L	Bq/L
ODWSOG		0.1	0.2	2	0.5	0.5	2	0.4	0.1	20	4	4	4
MW1A	23-Jun-09	<0.1	0.01	0.02	0.04	<0.2	<0.01	<0.01	<0.01	<1	0.02	<0.01	0.02
MW2A	23-Jun-09	0.5	0.23	0.16	1.8	1.4	0.02	<0.01	<0.01	<1	0.25	<0.01	0.18
MW3A	23-Jun-09	<0.1	0.02	0.03	0.16	0.3	<0.01	<0.01	<0.01	<1	0.99	0.02	0.67
MW4A	23-Jun-09	0.2	<0.01	0.07	0.14	0.6	0.01	<0.01	<0.01	<1	0.39	<0.01	0.33
MW10A	23-Jun-09	<0.1	0.01	<0.01	0.03	<0.1	<0.01	<0.01	<0.01	<1	0.08	<0.01	0.07

Notes:

1. Values are from Table 3 of the Ontario Drinking Water Standards, Objectives and Guidelines (MOE, June 2006).

Denotes result exceeds Table 3 of ODWSOG.

Table 7.9 (2011): Schedule for Temporary Suspension

Tasks	Years				
	2008	2009	2010	2011	2012
1 Restrict access to the site, including all buildings and structures.	→	→	→	→	→
2 Protect all mine openings against inadvertent access.	→	→	→	→	→
3 Protect all electrical systems from inadvertent access.	→	→	→	→	→
4 Maintain all mechanical and hydraulic systems in a a no-load condition.	→	→	→	→	→
5 Continue all physical, chemical monitoring programs.	→	→	→	→	→
6 Control all contaminated effluents.	→	→	→	→	→
7 Secure all waste management systems and sites, petroleum products, chemicals and waste.		→	→	→	
8 Dispose of or remove all explosives from the site.	→	Completed.			
9 Maintain the rock and overburden piles, the solid mill tailings pile, and the impoundment structure in a stable and safe condition.	→	→	→	→	→

Table 8.1 (2011): Schedule for State of Inactivity

Task	Years				
	2008	2009	2010	2011	2012
1 Restrict access to the site, including all buildings and structures.	→	→	→	→	→
2 Secure all shafts, raises and stopes open to the surface.	N/A				
3 Secure all portals of adits and declines.	N/A				
4 Stabilize and secure all mine openings to surface that create a mine hazard.			→	→	
5 Assess all surface mine workings to determine their stability and stabilize those that require it or, if stabilization is not practicable, protect against inadvertent access.	→	→	→	→	
6 Maintain all mechanical and hydraulic systems in a a no-load condition.	→	→	→	→	→
7 Protect all essential electrical systems from inadvertent access and de-energize all non-essential electrical systems.	→	→	→	→	→
8 Monitor and maintain or rehabilitate the rock and overburden piles, the solid mill tailings pile, and waste management sites and systems.	→	→	→	→	→
9 Remove, dispose of, isolate, or otherwise manage all petroleum products, chemicals and waste, including PCBs.	→	→	→	→	
10 Dispose of or remove all explosives from the site.	→	Completed.			
11 Maintain all impoundment and ditch diversion structures in a stable and safe condition.	→	→	→	→	→
12 Deal with all materials, or conditions created as a result of mining, that produce, or may produce acid rock drainage or metal leaching, in accordance with the management plan referred to in section 59 of the Code.	N/A				

Table 9.1 (2011): Schedule for Closing-Out

Task	Years (by quarters)				
	2008	2009	2010	2011	2012
1 Secure all shafts, raises and stopes open to the surface.	N/A				
2 Secure all portals of adits and declines.	N/A				
3 Stabilize and secure all mine openings to surface that create a mine hazard.					
4 Assess all surface mine workings to determine their stability and stabilize any surface areas disturbed or likely to be disturbed by such workings.					
5 Dismantle and remove all buildings, power transmission lines, pipelines and other structures associated with the mining property to an extent that is consistent with the specified future use of the land.					
6 Remove all machinery, equipment and storage tanks from the mining property to an extent that is consistent with the specified future use of the land.				Completed	
7 Close-off and re-vegetate all transportation corridors to an extent that is consistent with the specified future use of the land.	N/A - All corridors will be maintained for future inspection and monitoring access.				
8 Remove, or cover with overburden and revegetate all concrete structures, foundations and slabs associated with the mining property.					
9 Dispose of on site, or remove, all petroleum products, chemicals and waste.				Completed	
10 Dispose of or remove all explosives from the	Completed.				
11 Remove or manage on site polychlorinated biphenols (PCBs) or material contaminated with PCBs.	N/A; all PCBs removed.				
12 Rehabilitate all landfill sites and other waste management sites.	N/A				

Table 9.1 (2011): Schedule for Closing-Out

Task	Years (by quarters)				
	2008	2009	2010	2011	2012
13 Sample and test all soils in the vicinity of sites used for storing or transferring petroleum products, chemicals, ore, concentrates or waste during the life of the mining property and, if contamination is found, implement a management plan consisting of a risk assessment and action plan for the contaminated soils.					Investigation in progress
14 Rehabilitate or treat the solid mill tailings pile, and the rock and overburden pile to ensure permanent physical stability and effluent quality.					
15 Deal with all materials, or conditions created as a result of mining, that produce, or may produce acid rock drainage or metal leaching, in accordance with the management plan referred to in section 59 of the Code.	N/A				
16 Have the impoundment structure certified by a qualified professional engineer with respect to its stability against static and dynamic loadings to which the structure is likely to be subjected, to ensure that the materials are completely contained and the specified land use is maintained.	N/A; Impoundment structure has been removed.				
17 Remove or leave inoperable all decant structures, other than dam spillways.	N/A				
18 Leave all remaining on-site watercourses or drainage channels in a state consistent with the specified future use of the land and so that they do not require maintenance with the exception of the outfall ditch effluent treatment system, which will continue to be operated for a period after closing out.					
19 Re-vegetate all disturbed sites.					

Table 10.1 (2011): Surface Water and Groundwater Monitoring Programs, Mine Closure Plan

Monitoring Location	Frequency	Parameters[2]
Quarry #1, Quarry #2, SW1, SW2, SW3, SW4	Quarterly[1]	Field: pH, temperature, DO, conductivity Lab: pH, PO_4, Ca, Mg, Na, K, Cl, SO_4, BOD, COD, alkalinity, TSS, total ammonia, NO_3, NO_2, TKN, Fe, Mn, Pb, B, Cd, Ba, Cr_{total}, Cu, Ni, Al, Zn, cyanide (free), Hg, Se, As, Sr, Co, Ag, Mo
MW1A, MW1B, MW3A, MW3B, MW4A, MW4B, MW10A, MW10B, MW11A, MW11B	Annually	Field: pH, conductivity, groundwater level Lab: pH, Ca, Mg, Na, K, Cl, SO_4, NO_2, NO_3, total ammonia, TKN, alkalinity, TDS, COD, Fe, Mn, As, Pb, B, Cd, Ba, Cr_{total}, Cu, Ni, Al, Zn, cyanide (free), Hg, Mo

Notes:

1. Surface water monitoring is to be conducted quarterly for two years (minimum). If acceptable results are obtained, the frequency of monitoring will be reduced to twice-annually.
2. Parameter lists are to be reviewed annually.

TAB B

THIS EXHIBIT "B", referred to in the Affidavit of Sharon Dawn Spires, sworn on May 14, 2013.

Mr. Clive Stephenson, Commissioner of Oaths

CLIVE D. STEPHENSON,
a Commissioner for taking affidavits in the Province of Ontario while employed by the Ministry of Northern Development and Mines.

JAN 17 2010

141

Form 2

Mining Act

NOTICE OF MATERIAL CHANGES

Personal information collected on this form is obtained under the authority of the *Mining Act*. This information will be used for the purpose of administering the Closure Plan requirements of the *Mining Act*. Questions concerning this collection should be directed to the Director of Mine Rehabilitation.

Instructions: Please type or print and submit completed form to:

Director of Mine Rehabilitation
Ministry of Northern Development, Mines and Forestry
933 Ramsey Lake Road, B6
Sudbury, ON P3E 6B5

To report material changes to a project under subsection 144 (2) of the *Mining Act*

Proponent #1 (Existing)		Proponent #2 (Existing)	
Name	Timminco Limited	Name	
Address	150 King Street West	Address	
City	Toronto	City	
Province	Ontario	Province	
Postal Code	M5H 1J9	Postal Code	
Telephone	(416) 364-5171	Telephone	( )
Fax	(416) 364-3451	Fax	( )

If more than two proponents or mining rights holders, please list additional names as an appendix.

Project Name / Location Description	Haley Mine Site, 962 Magnesium Road Haley, Ontario, K0J 1Y0
Mining Rights Holder (Existing) Name	Timminco Limited
Address	
City / Province / Postal Code	
Telephone	( )
Fax	( )
Mining Lands Description (Twp./Area/Municipality, Lot/Conc., Claim, Patent, Lease and Licence of Occupation Numbers)	Parts of Lots 19 to 22, Concessions V and VI, Township of Whitewater Region, County of Renfrew, Ontario

Nature of Proposed Material Changes [Check Applicable Box(es)]

- ☒ Expansion or Alteration of the Project under clause 144 (2) (a) of the *Mining Act*
- ☐ Alteration of Ownership, Occupancy, Management Control or Financial Interest under clause 144 (2) (b) of the *Mining Act*
- ☐ Other under clause 144 (2) (c) of the *Mining Act* (Specify):

Proponent #1 (Proposed)		Proponent #2 (Proposed)	
Name		Name	
Address		Address	
City / Province / Postal Code		City / Province / Postal Code	
Telephone	( )	Telephone	( )
Fax	( )	Fax	( )

Mining Rights Holder (Proposed) Name	
Address	
City / Province / Postal Code	
Telephone	( )
Fax	( )
Mining Lands Description (Twp./Area/Municipality, Lot/Conc., Claim, Patent, Lease and Licence of Occupation Numbers)	

Detail the nature and extent of the proposed Material Changes

- Timminco's Haley Mine Site is now in Active Closure and Timminco expects to complete all the required Mine Site Rehabilitation Measures by the end of 2011.

Expected effect on the project and, if applicable, the Closure Plan.

- Timminco expects to complete all the required Site Rehabilitation Measures, as per the Haley Mine Closure Plan, by the end of 2011.

Date the Material Change will begin or become effective

- December 13th, 2010

Submitted by: [Name and address of authorized contact person(s) for the Proponent(s) and Mining Rights Holder]

Signature(s): Peter A.M. Kalins, Timminco Limited - General Counsel & Corporate Secretary ..... Date: Jan. 13. 2011

Mining Act

NOTICE OF MATERIAL CHANGES

Personal information collected on this form is obtained under the authority of the *Mining Act*. This information will be used for the purpose of administering the Closure Plan requirements of the *Mining Act*. Questions concerning this collection should be directed to the Director of Mine Rehabilitation.

Instructions: Please type or print and submit completed form to:

Director of Mine Rehabilitation
Ministry of Northern Development and Mines
6th floor, 933 Ramsey Lake Road
Sudbury, ON P3E 6B5

To report material changes to a project under subsection 144 (2) of the *Mining Act*

Proponent #1 (Existing)	Proponent #2 (Existing)
Name: Timminco Limited	Name:
Address: 150 King Street, West	Address:
City: Toronto Province: Ontario Postal Code: M5H 1J9	City: Province: Postal Code:
Telephone: (416) 364-5171 Fax: (416) 364-3451	Telephone: ( ) Fax: ( )

If more than two proponents or mining rights holders, please list additional names as an appendix.

Project Name: Haley Plant Location Description: 962 Magnesium Road, Haley, Ont, K0J 1Y0	Mining Lands Description (Twp./Area/Municipality, Lot/Conc., Claim, Patent, Lease and Licence of Occupation Numbers) Part of Lots 19 to 22, Concessions V and VI, Township of Whitewater Region
Mining Rights Holder (Existing) Name: Timminco Limited	
Address: 150 King Street, West	
City: Toronto Province: Ontario Postal Code: M5H 1J9	
Telephone: (416) 364-5171 Fax: (416) 364-3451	

Nature of Proposed Material Changes [Check Applicable Box(es)]

- ☒ Expansion or Alteration of the Project under clause 144 (2) (a) of the *Mining Act*
- ☐ Alteration of Ownership, Occupancy, Management Control or Financial Interest under clause 144 (2) (b) of the *Mining Act*
- ☐ Other under clause 144 (2) (c) of the *Mining Act* (Specify):

Proponent #1 (Proposed)	Proponent #2 (Proposed)
Name:	Name:
Address:	Address:
City: Province: Postal Code:	City: Province: Postal Code:
Telephone: ( ) Fax: ( )	Telephone: ( ) Fax: ( )
Mining Rights Holder (Proposed) Name:	Mining Lands Description (Twp./Area/Municipality, Lot/Conc., Claim, Patent, Lease and Licence of Occupation Numbers)
Address:	
City: Province: Postal Code:	
Telephone: ( ) Fax: ( )	

Detail the nature and extent of the proposed Material Changes
Covers 4 specific Amendment Items to the existing certified Haley Mine Closure Plan, which is registered with and approved by the MNDM. Amendmdit Items are as follows:
1) Revised approach to Quarry #2 Closure, 2) Revise Contour Drawings for Mill Tailings Pile, 3) Update Site Environmental Monitoring and 4) Conduct Aboriginal Engagement

Expected effect on the project and, if applicable, the Closure Plan.
None

Date the Material Change will begin or become effective
Immediately following MNDM Approval of this Notice of Material Change

Submitted by: [Name and address of authorized contact person(s) for the Proponent(s) and Mining Rights Holder]

Signature(s): ..... Date: February 13, 2009

PETER A.M. KALINS, GENERAL COUNSEL & CORPORATE SECRETARY
150 KING ST. W., TORONTO, ONTARIO, M5H 1J9

TAB C

THIS EXHIBIT "C", referred to in the Affidavit of Sharon Dawn Spires, sworn on May 14, 2013.

Mr. Clive Stephenson, Commissioner of Oaths

CLIVE D. STEPHENSON,
a Commissioner for taking affidavits in the Province of Ontario while employed by the Ministry of Northern Development and Mines.

FINAL REPORT

SUPPLEMENTAL SUBSURFACE INVESTIGATION

TIMMINCO METALS
HALEY, ONTARIO

Prepared for:

TIMMINCO LIMITED
Sun Life Financial Tower
150 King Street West, Suite 2401
Toronto, Ontario M5H 1J9

Prepared by:

WESA Inc.
3108 Carp Road, Box 430
Carp (Ottawa), Ontario
K0A 1L0

File: CB9083-00-01

November 2011

TABLE OF CONTENTS

1.0 INTRODUCTION

WESA Inc. (WESA) was retained by Timminco Limited (Timminco) to conduct a supplementary subsurface investigation at the company's former mining and industrial facility located at 962 Magnesium Road in Haley, Ontario. A preliminary subsurface investigation was carried out at the site in 2010, in the areas of former buildings and infrastructure that are included as part of the mining components at the site (refer to WESA Report dated February 2011). The results from the preliminary investigation revealed the presence of mid-distillate hydrocarbons in the subsurface in two areas:

- On the north side of the former calcining area (BH14 and BH16); and
- South of the former crushing area and east of former No. 2 Repair Shop (BH10 and BH20).

The key objective of the supplementary subsurface investigation was to delineate the lateral and vertical extent of these hydrocarbon impacts, and to determine whether the two areas of impact are related or represent two different sources. In addition, since the hydrocarbon impact is found close to or below the water table, it was recommended that groundwater monitoring wells be installed to assess whether there are any impacts to groundwater.

1.1 Site Description

Timminco Metals, a division of Timminco Limited operated a magnesium mining and production facility located on Lots 19 to 22, Concessions V and VI, in the Township of Whitewater Region (formerly Township of Ross), County of Renfrew. The site is situated approximately 15 kilometres north-west of the Town of Renfrew on Renfrew County Road 7 (Magnesium Road). The site location is shown on the attached Figure 1.

The Timminco mining property is bordered to the north, east and south by agricultural lands, which for the most part are used as pasture with lesser areas under cultivation. Along the west side, Timminco is bordered by mixed bush toward the north and south, and by the Haley town site along the west-central border. The town site consists of approximately thirty single family dwellings on three residential streets off County Road 7. A former elementary school, now a commercial facility, is also located on County Road 7, approximately 350 metres west of the westernmost Timminco property line. Adjacent to the Timminco property, on the south side of Magnesium Road, Haley Industries Limited operates a metal casting manufacturing facility.

The Timminco property is relatively flat-lying to gently rolling with a natural relief of 22 metres. Two quarries exist on the site from former mining operations, and a solid mill tailings pile has been built approximately 25 metres on average above the natural ground surface.

1.2 Selection of Environmental Site Condition Standards

The selection of the most appropriate soil quality standards for the site was based on the following site conditions:

- Existing property use is industrial and neighboring properties are industrial and/or agricultural.
- The surrounding properties are not serviced by a municipal water supply. Individual wells are used to provide the water supply for the neighbouring properties.
- Bedrock was encountered at depths greater than 2 metres below the ground surface in the area of investigation, with the exception of one borehole at the detonator magazine (1.5 metres depth).
- The nearest surface water body is greater than 30 m from the property boundary (Maclarens Creek, located approximately 100 to 150 m to the southeast on Haley Industries property).
- Potential impacts are not considered to be of a 'stratified' nature.
- Soil texture is coarse grained based on visual observation of soil samples collected during borehole installation.

Based on the site conditions outlined above, the appropriate criteria to be used for comparison purposes are from Table 2 of the Ontario Ministry of Environment's Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, amended April 15, 2011 (Table 2 specifies the Generic Site Condition Standards for Full-Depth Soils in a Potable Ground Water Condition). The site condition standards for coarse-textured soil in an industrial land use setting were used for comparison purposes.

2.0 METHODOLOGY

2.1 Scope of Work

The components of the subsurface investigation program included:

- Advancement of ten 6 m deep soil boreholes across the subject property. Soil samples collected from the boreholes were screened for combustible vapours in the field and selected samples were submitted for laboratory analysis.
- Installation of nine groundwater monitoring wells (all boreholes except BH30) for measurement of water levels and collection of samples.
- One soil sample from each borehole and one groundwater sample from each monitoring well were submitted for laboratory analysis for general inorganics, metals, petroleum hydrocarbons (PHCs F1-F4) and BTEX compounds (from Table 2 of the MOE Site Condition Standards).
- Documentation of all findings in a written report.

All field investigations conducted by WESA followed the general protocols outlined in the MOE "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, June 1996 and addenda". During all field work associated with the subsurface investigation, a site-specific Field Health and Safety Plan was developed by WESA and was reviewed/followed daily by WESA personnel and its subcontractors.

2.2 Borehole Drilling Program

The supplemental soil borehole drilling program was conducted from June 13 to 15, 2011. The location and number of boreholes was based on the objective to delineate hydrocarbon impacts of the soil and groundwater in an area from the north side of the former calcining plant to the north east side of the casthouse building to a maximum depth of 6 metres. Monitoring wells were installed upon completion at each of the borehole location except BH30. The locations of the boreholes and monitoring wells are indicated on Figure 2.

All local underground utilities were located and decommissioned prior to the building demolition in the fall of 2010. A large diameter water line servicing the site was located and flagged by site personnel. WESA retained G.E.T. Drilling Inc. of Napanee, Ontario to complete all hollow stem auger drilling, and soil sampling during the subsurface investigation.

A truck mounted soil auger rig (CME 55) was used to advance 200 mm outer diameter (O.D.) hollow stem augers. Soil samples from the boreholes were collected over selected depth ranges using a 0.61 m long and 50 mm O.D. split-spoon sampler at 0.76 metre intervals. Samples were immediately placed into plastic bags and glass jars and screened for combustible vapours using a RKI Eagle 2 Photo Ionization Detector (PID) and hydrocarbon catalytic sensor, operated in methane elimination mode. The split-spoon sampling device was cleaned with water and detergent after each use to prevent cross-contamination between samples. The soil stratigraphy and vapour headspace readings for the boreholes can be found in the borehole logs in Appendix A.

Monitoring wells were installed in all of the boreholes except BH30. Each well was constructed with a PVC slot 10 screen which was either 3.0 or 1.5 m (BH26) in length. Silica sand was placed around the screened portion of the well, up to a point approximately 0.3 m above the top of the screen. A bentonite gravel seal was then placed above the sand pack to just below ground surface. Dedicated foot valves and low density polyethylene tubing was installed in each well for well development and to collect groundwater samples. The wells were completed with protective steel casings secured to the ground surface. Details of the well installation can be found on the borehole logs (Appendix A).

All boreholes reached the proposed drilling depth except BH26 located south of the former crushing plant. Auger refusal (possibly the bedrock surface) was encountered at this location at 3.7 m depth. Borehole locations and ground surface elevations were surveyed using a Magellan ProMark 500 base station and rover GPS. The well (top of PVC) elevations were surveyed on site using a Sokkia level from a geodetic elevation provided.

One soil sample from each borehole was submitted for analysis of BTEX, PHCs, general inorganics and metals. The samples selected for analysis were determined based on the vapour headspace readings, depth collected and relative location of the soil boreholes. The revised 2011 Analytical Protocols for Ontario Regulation 511/09 amendments to Ontario Regulation 153/04 now include a methanol field preservation requirement for VOCs and BTEX. Therefore, a portion of the soil collected from each split spoon sample was placed in a 60 ml glass amber jar and placed in a cooler with ice packs. The remaining sample was placed in plastic sample bags for field screening using the Eagle 2 PID. After completion of the field screening a weighed 5 gram sample was removed from the 60 ml glass jar and placed in a methanol preserved 40 ml glass vial. Soil from the same sample interval was placed in a clean, labelled glass jar for the remaining analytical parameters and submitted to Paracel Laboratories Ltd. of Ottawa, Ontario under strict chain of custody protocol. The soil samples were delivered to the laboratory in a cooler with ice which had a reported temperature of 3.5°C when received at the lab. The laboratory analytical reports are provided in Appendix B.

Water level measurements were recorded on June 22 and 28, 2011 from all monitoring wells. The static groundwater levels from June 28, 2011 were used to determine groundwater flow direction. Groundwater sampling was completed on June 22, 2011 following pumping of a minimum of three well volumes from each well prior to sampling. Samples were collected in laboratory-supplied bottles and placed in coolers with ice and submitted to Paracel Laboratories Ltd. Water samples were delivered to the laboratory with a reported cooler temperature of 3°C.

3.0 INVESTIGATION RESULTS

3.1 Physical Site Features

As mentioned in the above sections the recent building demolition resulted in surface rubble mixed with gravelly sand fill. The fill layer thickness ranged from 0.9 to 1.3 metres in depth. Much of this layer consists of dicalcium silicate residue fill mixed with crushed granular fill. The dicalcium silicate residue fill was a byproduct (solid mill tailings) from the production process at Timminco. In general, the soil stratigraphy underlying the fill observed during the advancement of boreholes consisted of fine grained sandy silt to silty sand. Auger refusal (possibly the bedrock surface) was encountered in BH26 at a depth of 3.7 metres. In the preliminary investigation, bedrock was encountered only at BH19 beside the former detonator magazine.

3.2 Soil Analytical Data

The field combustible vapour headspace readings collected during the drilling program are provided on the borehole logs in Appendix A. The combustible soil vapour concentrations ranged between a low of <25 ppm to a high of 1400 ppm PID and 470 ppm catalytic sensor (BH24-SS5), located along the footing of the former crushing plant.

The laboratory analytical results for the soil samples submitted from the borehole drilling program are summarized in Table 1 (general inorganics and metals) and Table 2 (BTEX and PHCs). For comparative purposes, the MOE Site Condition Standards, Table 2 from O. Reg. 153/04 as amended (herein referred to as the MOE Table 2 Standards), are presented in the tables.

The laboratory analytical results for inorganic parameters and metals (see Table 1) at all ten sample locations show concentrations that are less than the MOE Table 2 Standards. In general, the observed concentrations of inorganics and metals across the study area are found at low levels and are often below the laboratory method detection limits.

Ten soil samples were also submitted for laboratory testing of BTEX parameters and petroleum hydrocarbons (see Table 2). At each borehole location, one soil sample was selected for laboratory analysis based on their combustible gas headspace readings and field observations. Five samples had BTEX/PHCs concentrations below the MOE Table 2 Standards. The remaining five samples showed exceedances of the standards, which are summarized below.

Table 4 - Exceedances of MOE Table 2 Standards – BTEX/PHCs in Soil

Soil Sample	BH21-SS4	BH23-SS3	BH24-SS5	BH25-SS4	BH29-SS7
Exceeding Parameter(s)	Ethylbenzene PHC F1-F2	Ethylbenzene PHC F1-F2	Ethylbenzene Xylenes PHC F1-F2	PHC F1	PHC F1-F2

3.3 Groundwater Analytical Data

The laboratory analytical results for the groundwater samples submitted from the installed monitoring wells are summarized in Table 3 for general inorganics and metals, BTEX and PHCs. For comparative purposes, the MOE Table 2 Standards for groundwater are presented in the tables.

Except for monitoring well BH29, the laboratory analytical results for inorganic parameters and metals at all other monitoring well locations show concentrations that are higher than MOE Table 2 Standards for cobalt. The vanadium content of the groundwater samples obtained from monitoring well locations BH21 and BH23 also exceed the applicable MOE Table 2 Standards. Exceeding values are typically less than 5 times their respective standards for both cobalt and

vanadium. The source(s) of the elevated cobalt and vanadium is not known at this time, nor is it confirmed whether the concentrations are naturally elevated. It is noted that there are no Ontario Drinking Water Standards (ODWS) for stable cobalt or vanadium (ODWS are published for radioactive isotopes of cobalt only). Concentrations of all other inorganics and metals across the study area are found at low levels and are often below the laboratory method detection limits.

The chemical analysis results for groundwater samples for BTEX parameters and petroleum hydrocarbons indicate presence of contamination exceeding the MOE Table 2 Standards at seven of nine monitoring well installed. The samples meeting the standards were collected from monitoring wells BH27 and BH28 which determine the southern boundary of the contaminated plume. The exceedances of MOE Table 2 Standards for BTEX/PHC parameters are summarized below:

Table 5 - Exceedances of MOE Table 2 Standards – BTEX/PHCs in Groundwater

Soil Sample	BH21	BH22	BH23	BH24	BH25	BH26	BH29
Exceeding Parameter(s)	E	E	E	B	E	PHC F2	B
	PHC F1	PHC F2	PHC F1	E	PHC F2		E
	PHC F2	PHC F3	PHC F2	PHC F1	PHC F3		PHC F1
	PHC F3	PHC F4	PHC F3	PHC F2			PHC F2
	PHC F4			PHC F3			PHC F3

Groundwater elevations were measured on June 28, 2011 in the nine monitoring wells. Based on the elevations, groundwater flow was determined to be in an easterly direction with BH21 having the highest elevation and BH29 the lowest. Groundwater flow appears to be oriented toward Quarry #1.

During the investigation, liquid hydrocarbon product was observed in BH29 at an apparent thickness of 25 mm.

4.0 ASSESSMENT OF SUBSURFACE IMPACT

4.1 Impacts to Soil

The elevated soil concentrations and exceedances of the MOE Site Condition Standards are restricted to BTEX and petroleum hydrocarbon parameters, with the exception of a single observation of barium above the MOE Table 2 Standard which was identified during the preliminary subsurface investigation. However, the barium exceedance is minor (less than 2X the applicable standard) and the location of the exceedance (BH14-SS1) is also an area of hydrocarbon impact, and can be addressed simultaneously. The locations of the soil sample exceedances are shown on Figure 3. Please note that in this assessment, the results of the preliminary subsurface investigation are also considered.

The hydrocarbon concentrations in the soil are indicative of historical release(s) of middle distillate hydrocarbons (diesel, fuel oil, etc.) from former storage, distribution or plant production areas. The impacts to soil appear to be focused in two areas:

- Area A: On the north side of the former calcining area (BH14 and BH16). Soil contamination in this area is closer to the surface (probably the top 2.5 m); and
- Area B: South of the former calcining (BH10, BH21, BH23, BH24, BH29) and crushing area and the associated ramp, and east of former No. 2 Repair Shop (BH20 and BH25).

The highest concentrations of petroleum hydrocarbon impact on the north side of the former calcining area are found in the shallow soil sample from BH14 (0.8 to 1.4 metres depth). The impact at BH16 also appears to be relatively shallow (1.5 to 2.1 metres depth). In general, the soil contamination in this area is expected to be limited in aerial extent (vicinity of BH14 and BH16) and relatively shallow (top 2.5 m). Based on the available information, the aerial extent of petroleum hydrocarbon contamination in the area is estimated at approximately 404 m^2, which is equal to 1,010 m^3 (2.5 m deep) or 2,020 tonnes of contaminated soil assuming a soil density of 2 tonnes per m^3.

The highest concentrations of petroleum hydrocarbon impact on the south side of the former calcining/crushing area are found in the soil sample from BH24 (3.81-4.42 metres depth). Hydrocarbon odours and elevated combustible gas headspace readings, ranging from <25 ppm to 1400 ppm PID and 470 ppm catalytic sensor (BH24-SS5) were observed at the sample locations.

In general, the soil contamination in this area is expected to be relatively deep ranging from approximately 2 to 6 metres. The extent of soil contamination toward the west (west of BH21) and east (east of BH29) is not fully delineated at this time. However, with review of the laboratory results, available knowledge of the site and time restrictions for remedial activities, additional delineation prior to implementation of remediation actions is not deemed necessary. Based on the available information, the aerial extent of petroleum hydrocarbon contamination in the area (south of the crushing area) is estimated at a minimum of 4,145 m^2, which is equal to 11,400 m^3 (assuming an average contaminated soil thickness of 2.75 metres) or 22,800 tonnes of contaminated soil assuming a soil density of 2 tonnes per m^3.

4.2 Impacts to Groundwater

The elevated groundwater concentrations and exceedances of the MOE Table 2 Standards are mostly restricted to BTEX and petroleum hydrocarbon parameters, with the exception of cobalt at eight of nine sampling locations and vanadium at two of nine sampling locations. Exceeding values are typically less than 5 times their respective standards for both cobalt and vanadium. The source(s) of the elevated cobalt and vanadium is not known at this time, and may be from

natural conditions. Concentrations of all other inorganics and metals across the study area are found at low levels and are often below the laboratory method detection limits. The locations of the groundwater sample exceedances are shown on Figure 4.

The locations and distribution of the exceedances of the MOE Table 2 Standards for BTEX and PHCs in the groundwater samples indicates that a hydrocarbon source may have migrated along the southern foundation wall of the former Calcining and Crushing buildings, and then continued to migrate eastward in the direction of groundwater flow.

The hydrocarbon concentrations in the soil are indicative of historical release(s) of middle distillate hydrocarbons (diesel, fuel oil, etc.) from former storage or distribution areas. The impacts to the groundwater appear to be focused in two areas:

- Area A': On the north side of the former calcining area (BH22); and
- Area B': South of the former calcining and crushing area and the associated ramp, and east of former No. 2 Repair Shop, which include all monitoring well locations except BH27 and BH28.

The highest concentrations of petroleum hydrocarbon impact on the south side of the former calcining/crushing area are found at BH29 with concentration of 586,000 ug/L for PHC F2 and 285,000 ug/L for PHC F3 and then for BH24 with concentration of 173,000 ug/L for PHC F2 and 78,300 ug/L for PHC F3. These concentrations of petroleum hydrocarbons can be indicative of presence of free products, as was identified at BH29.

Based on the groundwater elevations, groundwater flow was determined to be in an easterly direction with BH21 having the highest elevation and BH29 the lowest. The water table is located at various depths ranging from approximately 0.9 m below ground surface at BH22 to 3 m below ground surface at BH29. Identification of the highest petroleum hydrocarbon concentrations at BH29 can be explained by the groundwater flow direction which indicates migration of bulk contamination toward the east. The measured groundwater elevations on June 28, 2011 are shown on Figure 5.

The extent of groundwater contamination toward the west (west of BH21) and east (east of BH29) and in the vicinity of BH22 is not fully delineated at this time.

Based on the available information, the aerial extent of petroleum hydrocarbon contamination in groundwater is estimated to be approximately 190 m^2 for Area A' and a minimum of 5262 m^2 for Area B'.

5.0 REMEDIAL OPTION ASSESSMENT

5.1 Selection of Environmental Site Condition Standards

As per Section 1.2 above, the appropriate criteria to be used for soil and groundwater remediation purposes are from Table 2 of the Ontario Ministry of Environment's "*Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 15, 2011". The site condition standards for coarse-textured soil in an industrial land use setting are used for comparison purposes.

5.2 Remedial Options – Soil and Groundwater

In this section viable remediation options for soil and groundwater contamination are summarized. It is noted that the lateral extent of soil contamination within Area A (north of the former calcining building) is limited to the vicinity of boreholes BH14 and BH16, and is located within the top 2.5 m of overburden. This is as opposed to the soil contamination in Area B which has a significantly larger aerial extent and is located deeper from approximately 2 m to 6 m below ground surface. Thus, the following remedial options are evaluated for soil and groundwater contamination within Area B. Soil and groundwater contamination within Area A/A' (Area A for soil and Area A' for groundwater) will be addressed either by "Excavation and Off-Site Disposal", by in-place "landfarming", or by the same remedial option selected for Area B/B' (Area B for soil and Area B' for groundwater), if applicable.

In the selection of the available options, factors such as contaminated soil quantity, magnitude of contamination level compared to the reference standards, depth of contamination, soil stratigraphy as well as aspects such as technical feasibility, cost, time frame, and approval requirements are considered. A combination of remedial options may also be considered to address the existing contamination for an enhanced efficiency. Most remedial technologies address both soil and groundwater contamination simultaneously. It is also notable that free phase removal is required in almost all remedial options, meaning that the selected remedial measure can be applied upon free phase recovery.

Table 6 summarizes and compares the available remedial options to address soil and groundwater contamination within Area B/B'.

Table 6 – Remedial Options for Soil and Groundwater Remediation

Remedial Option	Monitored Natural Attenuation (MNA)	Excavation and Offsite Disposal (ex-situ)	Groundwater Pump and Treatment (ex-situ)	Soil Vapour Extraction (SVE) / Air Sparging (in-situ)	Enhanced Aerobic Biodegradation (in-situ)	Chemical Oxidation (ISCO) (in-situ)	Biopile (ex-situ)	Landfarming (ex-situ)
Description/Process Summary	The reliance on natural attenuation processes within the context of a carefully controlled and monitored site cleanup approach. Natural processes may include sorption, dilution, biodegradation, and/or chemical reactions.	Contaminated soil is excavated and disposed of off-site at a licensed landfill (source removal). Groundwater pump and treatment can be executed simultaneously.	Installation of groundwater collection wells or advancing trenches to intercept contaminant plume. Above ground treatment using oil/water separator and granular activated carbon, on-site discharge of treated groundwater, off-site disposal of produced sludge.	Generally involves the injection of air into an aquifer to promote contaminant partitioning from the liquid to the vapour phase (air sparging) and is more effective when combined with SVE which extracts vapour phase from vadose zone. May stimulate the activity of indigenous mircrobes.	Used to accelerate naturally occurring in-situ bioremediation of PHC by indigenous microorganisms in the subsurface. Technologies include biosparging; bioventing; use of oxygen releasing compounds; pure oxygen injection; hydrogen peroxide infiltration; and ozone injection.	A chemical oxidant is injected as a slurry into the groundwater plume. The chemical breaks down the PHCs to form non-contaminant end products. Persulfate is the most common oxidant used for treatment of PHCs. Persulfate oxidizes the PHCs with carbon dioxide being the end product.	A form of ex-situ bioremediation where excavated soils are mixed with soil amendments and placed on a treatment area that includes leachate collection systems and some form of aeration. Moisture, heat, nutrients, oxygen, and pH can be controlled to enhance biodegradation. Groundwater extraction and treatment can be executed simultaneously. Dewatering liquid can be passed throughout the system to enhance moisture as well as simultaneous groundwater treatment.	A form of ex-situ bioremediation technology that usually involves spreading excavated contaminated soils in a thin layer on the ground surface and stimulating aerobic microbial activity within the soils through aeration and/or the addition of minerals, nutrients, and moisture. Groundwater extraction and treatment can be executed simultaneously. Dewatering liquid can be passed throughout the system to enhance moisture as well as simultaneous groundwater treatment.
Effectiveness/ Performance	Treatment levels and timeframe depends on existing levels of natural attenuation.	Highly efficient if contaminated soil removal is accessible.	Initially effective at removing contaminant mass in a short period of time. Long term performance limited by rate of physical transfer of contaminants sorbed in soil matrix (tailing).	More effective at treatment of lighter PHCs (F1) and BTEX which are more volatile.	More effective at treatment of lower concentrations of PHCs and of lighter PHCs (F1) and BTEX.	Based on recent research, BTEX and other aromatic hydrocarbons are very amenable to persulfate oxidation. Petroleum hydrocarbons have been reported to be treated by persulfate.	Can be engineered to be potentially effective for any combination of site conditions and petroleum products.	Effective on organic constituents with slow biodegradation rates.

Remedial Option	Monitored Natural Attenuation (MNA)	Excavation and Off-site Disposal (ex-situ)	Groundwater Pump and Treatment (ex-situ)	Soil Vapour Extraction (SVE) or Air Sparging (in-situ)	Enhanced Aerobic Biodegradation (in-situ)	Chemical Oxidation (ISCO) (in-situ)	Biopile (ex-situ)	Landfarming (ex-situ)
Drawbacks	No control over rate of contaminant removal. Timeframe uncertain. May encounter public and regulatory perception of inaction.	Depth of contaminated soil, shallow groundwater table, and large quantities of soil will limit the practicability of this technology. Deep excavation may require dewatering and stabilization of excavation floors and walls.	Long term, continuous operation required. High O&M costs.	Would require collection of vapours with a soil vapour extraction system and treatment of vapours. Not as effective at treatment of high levels of PHCs. Not as effective with mid to heavy-weight hydrocarbons.	Not as effective at treatment of high levels of PHCs or free products.	Effectiveness is highly depended on distribution of oxidant throughout the target zone.	Depth of contaminated soil, shallow groundwater table, and large quantities of soil will limit the practicability of this technology. Deep excavation may require dewatering and stabilization of excavation floors and walls. Concentration reductions > 95% and constituent concentrations < 0.1 ppm are very difficult to achieve. May not be effective for high constituent concentrations (> 50,000 ppm total petroleum hydrocarbons).	Depth of contaminated soil, shallow groundwater table, and large quantities of soil will limit the practicability of this technology. Deep excavation may require dewatering and stabilization of excavation floors and walls. Concentration reductions > 95% and constituent concentrations < 0.1 ppm are very difficult to achieve. May not be effective for high constituent concentrations (> 50,000 ppm total petroleum hydrocarbons).
Feasibility/ Implementability	Readily implementable	Readily implementable	Readily implementable. Would require installation of pumping well and above ground treatment process, including discharge location.	Readily implementable. Would require installation of injection wells, underground piping and air compressor, as well as extraction wells and vacuum pumps and gas treatment for the SVE for the system.	Readily implementable. Would require installation of injection wells and periodic injection from a mobile trailer. Distribution of injection depends on geology and injection spacing.	Readily implementable. Would require installation of injection wells and periodic injection from a mobile trailer. Effectiveness of injection depends on geology and injection spacing.	Readily implementable. Would require construction of an impermeable liner, leachate collection system, aeration system and potentially gas collection system.	Readily implementable. Would require construction of an impermeable liner, leachate collection system and periodic soil tilling.
Reliability	Effectiveness of MNA is dependent on site specific factors.	Very reliable.	Treatment system requires maintenance to ensure reliability	Air sparging / SVE are relatively reliable. Treatment of vapours with oxidizers can be problematic.	As long as oxygen source can be readily injected, implementation is reliable. Effectiveness is dependent on site specific factors.	As long as oxidant can be readily injected, implementation is reliable. Effectiveness is dependent on site specific factors.	As long as oxygen and other inputs can be readily injected, implementation is generally reliable. Effectiveness is dependent on site specific factors.	Implementation is generally reliable. Effectiveness is dependent on site specific factors.

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Remedial Options	Monitored Natural Attenuation (MNA)	Excavation and Off-site Disposal (ex-situ)	Groundwater Pumping and Treatment (ex-situ)	Soil Vapour Extraction (SVE) w/ Air Sparging (in-situ)	Enhanced Aerobic Biodegradation (in-situ)	Chemical Oxidation (ISCO) (in-situ)	Biopile (ex-situ)	Landfarming (ex-situ)
Safety	No safety issues with MNA	Safety concerns due to excavation dimensions as well as potential for direct exposure to free products and contaminated soil and groundwater.	Requires extraction and handling of contaminated groundwater and possible production of vapours.	No significant issues with the injection of air into the groundwater. Potential issue of vapour migration if SVE is not utilized.	No significant issues with safety.	Oxidants require special handling and transportation procedures.	Safety concerns due to excavation dimensions as well as potential for direct exposure to free products and contaminated soil and groundwater.	Safety concerns due to excavation dimensions as well as potential for direct exposure to free products and contaminated soil and groundwater.
Status of Technology	Accepted with proper analysis and documentation	Proven, conventional technology	Proven, conventional technology	Proven, conventional technology	Proven, conventional technology.	Relatively new technology.	Proven, conventional technology	Proven, conventional technology
Approval Requirements	No approval required.	Permit may be required to take water for excavation dewatering.	Permit required to take water. Approval is also required for discharge of treated water into environment.	Approval required for air discharge.	Approval required for injection of compounds.	Approval required for injection of compounds.	Permit may be required to take water for excavation dewatering. Approval is also required for discharge of treated water into environment.	Permit may be required to take water for excavation dewatering. Approval may also be required for discharge of treated water into environment and for air discharge.
Relative Cost for Full Scale Implementation	Low	Medium to High	High	Medium	Low to medium	Low to medium	Medium	Low to medium
Relative Annual Operating Cost	Low	Low	High	Medium to high	Medium	Medium	Medium	Low to medium
Timeframe	Long	Short	Medium to long	Medium	Medium to long	Medium	Medium	Medium
Further Consideration for Cost Estimate	No – Timeframe for natural attenuation of heavier PHC fractions is considered too long.	Yes	Yes	No – Due to presence of heavier PHC fractions (lower vapour pressure) which reduces the feasibility.	Yes	Yes	Yes	Yes

5.3 Remedial Options Conceptual Cost Estimate

In this section a Level D (conceptual) cost estimate is provided for viable remediation options for soil and groundwater contamination for Area A/A' and Area B/B'. For all ex-situ remedial options for soil (i.e. excavation and disposal, biopile, and landfarming), simultaneous ex-situ groundwater remediation by "Groundwater Pump and Treatment" (ex-situ) may be considered. Refer to Table 7 for the estimated Level D cost. The cost estimate is based on an estimated 2,020 tonnes of contaminated soil within Area A and 22,800 tonnes within Area B for a total of 24,820 tonnes, as well as operation of an ex-situ treatment system for contaminated groundwater capable of treating 100,000 litres/day for a period of 8 weeks. The cost estimates do not include the engineering cost for the preparation of remediation specifications, tendering support, site inspections or monitoring. The required timeframe is also added as a decision making tool for selection of remedial option.

Table 7 – Remedial Options Level D Cost Estimate

Remedial Option	Range in Unit Cost / Tonne	Cost Estimate	Timeframe
Excavation and Off-site Disposal (ex-situ)	$50 - 100	$1.24 to $2.48 million	3 months
Biopile (ex-situ)	$30 - 90	$745,000 to $2.23 million	1-2 years
Landfarming (ex-situ)	$30 - 60	$745,000 to $1.49 million	1-2 years
Enhanced Aerobic Biodegradation (in-situ)	$20 - 30	$500,000 to $745,000	2-5 years
Chemical Oxidation (ISCO) (in-situ)	$30 - 40	$745,000 to $995,000	8-12 months
Groundwater Pump and Treatment (ex-situ)	$3,000 to $5,000/week	$24,000 - $40,000	8 weeks (for mass removal)

5.4 Recommended Remedial Option

In the selection of the available options, factors such as contaminated soil quantity, magnitude of contamination (concentration) compared to the reference standards, depth of contamination, soil stratigraphy as well as aspects such as technical feasibility, reliability, capital and operation costs, timeframe, and approval requirements are considered. Based on the available information, a combination of in-situ and ex-situ options is recommended. This recommendation includes:

Area A/A':

1. "Excavation and Off-Site Disposal" or on-site landfarming of shallow soil contamination;
2. Chemical Oxidation in Area A' and simultaneously with the injection in Area B to address the groundwater contamination.

Area B/B':

1. Advancement of a trench starting from a point down-gradient of borehole BH29, where free product was observed, extending towards north and south to a total length of 40 m -50 m and depth of 5 m - 6 m intercepting the groundwater contamination plume; "Excavation and Off-Site Disposal" of contaminated soil which is excavated from the trench area; and "Groundwater Pump and Treatment" for the groundwater dewatered from the trench. Continued pumping/treatment until free product removal is completed and efficiency of mass removal is reduced significantly. Eight weeks of pump/treatment is assumed. Groundwater monitoring can be completed before and after the pumping period to evaluate the efficiency of the system and the need for further remedial action (item 2).
2. In-situ Chemical Oxidation upon completion of Groundwater Pump and Treatment, when free products are removed and petroleum hydrocarbon concentrations in groundwater are reduced.

The following considerations should be noted:

1. Due to the presence of a shallow groundwater level (0.9 m – 3.0 m bgs), relatively deep soil contamination (2.0 m - 6.0 m bgs), and a silty sand overburden material with slope failure potential, slope stability measures will likely be required for deep excavations.
2. Dewatering of the trench will increase the hydraulic gradient towards the excavation which will accelerate flow of contaminated groundwater. Frequent cycling (on/off) of the pumping system will enhance flushing out the residual contamination adsorbed to the soil particles.

WESA also recommends the following:

1. Prior to commencement of "Excavation and Off-site Disposal" option: Advancement of a laterally small-scale but deep excavation (approximately 6 m deep) to evaluate the level of slope stability required upon construction of the intercepting trench. To avoid handling of contaminated soil and groundwater prior to actual remediation, this evaluation can be conducted within the non-impacted area.
2. Prior to commencement of in-situ "Chemical Oxidation": Completion of a pilot scale test to evaluate the appropriateness of this remedial option in terms of oxidant selection, in-ground distribution and chemical reactivity.

6.0 CONCLUSIONS

A Supplemental Subsurface Investigation was conducted to delineate the extent of soil and groundwater contamination at the Timminco's former mining and industrial facility located at 962 Magnesium Road in Haley, Ontario, as well as to prepare a Remedial Options Analysis to address the identified soil and groundwater contamination. Presence of soil and groundwater contamination by petroleum hydrocarbons had been identified during a preliminary subsurface investigation for this Site (WESA, February 2011).

A summary and finding of the investigation is as follows:

- Ten soil boreholes (BH21 – BH30) were advanced on-site from June 13 to 15, 2011. Hydrocarbon odours and elevated combustible gas headspace readings, ranging from <25 ppm to 1400 ppm PID and 470 ppm catalytic sensor (BH24-SS5) were observed at the sample locations. Nine of ten boreholes were instrumented with monitoring wells (BH21-BH29).
- Ten soil samples (one from each borehole) and nine groundwater samples (one from each monitoring well) were submitted for analysis of general inorganic parameters, metals, PHC F1-F4 and BTEX.
- The laboratory analytical results for inorganic parameters and metals at all ten soil sample locations show concentrations that are less than the MOE Table 2 standards. In general, the observed concentrations of inorganics and metals across the study area are found at low levels and are often below the laboratory method detection limits.
- The laboratory analytical results for the PHC/BTEX parameters indicated that five soil samples had PHC/BTEX concentrations below the MOE Table 2 standards. The remaining five soil samples showed exceedances of the standards, which are summarized below.

Table 8 - Exceedances of MOE Table 2 Standards – BTEX/PHCs in Soil

Soil Sample	BH21-SS4	BH23-SS3	BH24-SS5	BH25-SS4	BH29-SS7
Exceeding Parameter(s)	Ethylbenzene PHC F1-F2	Ethylbenzene PHC F1-F2	Ethylbenzene Xylenes PHC F1-F2	PHC F1	PHC F1-F2

- Except for monitoring well BH29, the laboratory analytical results for inorganic parameters and metals at all other monitoring well locations show concentrations that are higher than MOE Table 2 Standards for cobalt. The vanadium content of the groundwater samples obtained from monitoring well locations BH21 and BH23 also exceed the applicable MOE Table 2 Standards. Exceeding values are typically less than 5 times their respective standards for both cobalt and vanadium. The source(s) of the elevated cobalt and vanadium is not known at this time. Concentrations of all other inorganics and metals across the study area are found at low levels and are often below the laboratory method detection limits.

- The chemical analysis results for groundwater samples for PHC/BTEX parameters indicate presence of contamination exceeding the MOE Table 2 Standards at seven of nine monitoring well installed. The samples meeting the standards were collected from monitoring wells BH27 and BH28 which determine the southern boundary of the contaminated plume. The exceedances of MOE Table 2 Standards for PHC/BTEX parameters are summarized below:

Table 9 - Exceedances of MOE Table 2 Standards – PHCs/BTEX in Groundwater

Soil Sample	BH21	BH22	BH23	BH24	BH25	BH26	BH29
Exceeding Parameter (s)	E PHC F1 PHC F2 PHC F3 PHC F4	E PHC F2 PHC F3 PHC F4	E PHC F1 PHC F2 PHC F3	B E PHC F1 PHC F2 PHC F3	E PHC F2 PHC F3	PHC F2	B E PHC F1 PHC F2 PHC F3

- Groundwater elevations were measured on June 28, 2011 in the nine monitoring wells. Based on the elevations, groundwater flow was determined to be in an easterly direction with BH21 having the highest elevation and BH29 the lowest. Groundwater flow appears to be oriented toward Quarry #1.
- During the investigation, liquid hydrocarbon product was observed in BH29 at an apparent thickness of 25 mm.
- The impacts to soil appear to be focused in two areas:
    - Area A': On the north side of the former calcining area (BH14 and BH16). Soil contamination in this area is closer to the surface (probably the top 2.5 m); and Area B': South of the former calcining (BH10, BH21, BH23, BH24, BH29) and crushing area and the associated ramp, and east of former No. 2 Repair Shop (BH20 and BH25).
- In general, the soil contamination in Area A is expected to be limited in aerial extent (vicinity of BH14 and BH16) and relatively shallow (top 2.5 m). Based on the available information, the aerial extent of petroleum hydrocarbon contamination in the area is estimated at approximately 404 m^2, which is equal to 1,010 m^3 (2.5 m deep) or 2,020 tonnes of contaminated soil assuming a soil density of 2 tonnes per m^3.
- In general, the soil contamination in Area B is expected to be relatively deep ranging from approximately 2 to 6 metres. The extent of soil contamination toward the west (west of BH21) and east (east of BH29) is not fully delineated. Based on the available information, the aerial extent of petroleum hydrocarbon contamination in the area (south of the crushing area) is estimated at a minimum of 4,145 m^2, which is equal to 11,400 m^3 (assuming an average contaminated soil thickness of 2.75 metres) or 22,800 tonnes of contaminated soil assuming a soil density of 2 tonnes per m^3.

A Remedial Option Analysis was completed to address the on-site soil and groundwater contamination. In the selection of the preferred option(s), factors such as contaminated soil quantity, magnitude of contamination (concentration) compared to the reference standards, depth of contamination, soil stratigraphy as well as aspects such as technical feasibility, reliability, capital and operation costs, timeframe, and approval requirements are considered. Based on the available information, a combination of in-situ and ex-situ options is recommended. This recommended option includes:

Area A/A':

1. "Excavation and Off-Site Disposal" or on-site "landfarming" of shallow soil contamination;
2. Chemical Oxidation using persulfate in Area A' and simultaneously with the injection in Area B to address the groundwater contamination.

Area B/B':

1. Advancement of a trench starting from a point down-gradient of borehole BH29, where free product was observed, extending towards north and south to a total length of 40 m -50 m and depth of 5 m - 6 m intercepting the groundwater contamination plume; "Excavation and Off-Site Disposal" of contaminated soil which is excavated from the trench area; and "Groundwater Pump and Treatment" for the groundwater dewatered from the trench. Continued pumping/treatment until free product removal is completed and efficiency of mass removal is reduced significantly. Eight weeks of pump/treatment is assumed. Groundwater monitoring can be completed before and after the pumping period to evaluate the efficiency of the system and the need for further remedial action (item 2).
2. In-situ Chemical Oxidation upon completion of Groundwater Pump and Treatment, when free products are removed and petroleum hydrocarbon concentrations in groundwater are reduced.

Other considerations and recommendations for implementation of the remedial option are described above in Section 5.4.

7.0 LIMITATIONS

The conclusions presented in the above captioned report represent our professional opinion, in light of the terms of reference, scope of work, and any limiting conditions noted herein. It is not intended to be a definitive investigation of contamination or other environmental concerns at the property.

The information presented herein is based on field observations and laboratory testing of soil and groundwater samples collected at the specified location. Every effort was made to collect representative samples from the borehole locations. Any inferences of contaminant concentrations in soil or groundwater between specific sample locations should be made with caution.

The conclusions presented herein are based on information obtained up to and including the submission date of this document. Any site operations or land uses that may have changed since this submission may render the conclusions invalid. This document and the information contained herein have been prepared solely for the use of Timminco Limited. No other party may use or rely upon the above captioned report or any portion thereof without the express written consent of WESA. WESA will consent to any reasonable request by Timminco Limited to approve the use of this report by other parties as "Approved Users".

Respectfully submitted,

Vahid Arasteh, M.Eng., P.Eng.
Environmental Engineer

David Harding, M.Sc. P.Eng
Senior Consulting Engineer

per/ Brian Andress, CET
Environmental Technologist

TABLE 1 - General Inorganics and Metals
Timminco Metals, Haley ON
Subsurface Investigation

Parameter	Units	MOE Standards*	BH1 SS1	BH2 SS1	BH3 SS5	BH4 SS3	BH5 SS3	BH6 SS2	BH7 SS3	BH8 SS1	BH9 SS4	BH11 SS5	BH12 SS1	BH13 SS3	BH14 SS1	BH14 SS3	BH15 SS2	BH16 SS2	BH17 SS2	BH18 SS3	BH19 SS1	BH20 SS3	BH21 SS4	BH22 SS4	BH23 SS3	BH24 SS5	BH25 SS4	BH26 SS3	BH27 SS2	BH28 SS2	BH29 SS7	BH30 SS4
Sample Depth (mbgs)			0.76-1.37	0.76-1.37	3.81-4.42	2.28-2.9	2.28-2.9	1.52-2.13	2.28-2.9	0.76-1.37	3.05-3.66	3.81-4.42	0.76-1.37	2.28-2.9	0.76-1.37	2.28-2.9	1.52-2.13	1.52-2.13	1.52-2.13	2.28-2.9	0.76-1.37	2.28-2.9	3.05-3.66	3.05-3.66	2.28-2.9	3.81-4.42	3.05-3.66	2.28-2.9	1.5-2.13	1.5-2.13	5.33-5.94	3.05-3.66
Sample Date (m/d/y)			11/15/2010	11/15/2010	11/15/2010	11/15/2010	11/15/2010	11/16/2010	11/16/2010	11/16/2010	11/16/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	06/13/2011	06/14/2011	06/13/2011	06/14/2011	06/14/2011	06/14/2011	06/15/2011	06/15/2011	06/15/2011	06/15/2011
General Inorganics																															
Conductivity	uS/cm	1400	263	244	204	331	192	235	299	400	193	312	494	157	229	149	200	317	191	112	200	194	N/A	N/A	N/A	N/A	N/A	N/A	N/A	311	163
Cyanide, free	ug/g dry	0.051	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)
pH	---	---	8.50	8.60	7.70	8.86	9.04	8.25	8.73	9.87	8.20	9.85	10.75	9.68	10.07	8.19	7.62	7.97	7.69	7.10	8.54	7.78	7.89	7.82	7.62	7.87	8.50	7.60	7.46	8.04	7.89	7.84
SAR	---	12	0.29	0.46	0.29	0.16	0.19	0.64	0.84	0.10	0.31	0.99	0.06	0.38	0.08	0.16	0.27	0.46	0.63	0.34	0.03	0.17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.70	0.59
Metals																															
Antimony	ug/g dry	40	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Arsenic	ug/g dry	18	1	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	5	2	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Barium	ug/g dry	670	285	129	126	201	269	116	150	97	57	23	392	86	1080	122	124	129	127	137	213	42	24	99	133	33	68	62	79	26	153	109
Beryllium	ug/g dry	8	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.5	0.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Boron, available	ug/g dry	2.0	0.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND (0.5)	ND (0.5)
Cadmium	ug/g dry	1.9	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Chromium	ug/g dry	160	23	25	34	34	30	27	28	21	17	10	18	22	14	26	35	29	31	43	11	60	43	29	37	13	17	23	24	13	43	30
Chromium (VI)	ug/g dry	8.0	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Cobalt	ug/g dry	80	5	5	8	8	7	7	6	5	5	4	3	6	2	8	8	7	9	9	3	4	4	8	8	6	5	6	5	3	10	9
Copper	ug/g dry	230	17	14	17	10	13	16	20	17	10	12	25	13	67	16	19	18	19	21	8	8	11	17	18	11	10	15	13	9	22	19
Lead	ug/g dry	120	14	4	3	4	3	3	5	4	2	2	14	3	11	3	3	4	3	3	8	3	2	4	5	2	3	3	3	2	6	4
Mercury	ug/g dry	3.9	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Molybdenum	ug/g dry	40	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Nickel	ug/g dry	270	30	15	19	15	14	14	19	12	10	7	18	12	14	16	19	15	17	18	11	8	7	16	18	10	9	12	12	5	22	17
Selenium	ug/g dry	5.5	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Silver	ug/g dry	40	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Thallium	ug/g dry	3.3	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Vanadium	ug/g dry	86	23	38	43	50	39	37	36	31	28	23	17	35	12	41	42	39	47	47	12	25	26	42	47	24	28	37	35	26	49	46
Zinc	ug/g dry	340	67	27	40	30	38	33	56	24	ND (20)	ND (20)	31	27	23	34	39	36	31	36	33	47	ND (20)	38	39	ND (20)	25	26	26	ND (20)	56	36

Notes:
*MOE Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, amended April 15, 2011 (O.Reg. 153/04 as amended by Cl.Reg. 511/09). Full depth site condition standards for soil in a potable groundwater setting, industrial property use (Table 2).
ND - not detected (MDL in parentheses)
mbgs - metres below ground surface
[redacted] - concentration exceeds the MOE Table 2 standards (O. Reg. 153/04 as amended by Cl. Reg. 511/09).

TABLE 2 - BTEX Parameters and Petroleum Hydrocarbons
Timminco Metals, Haley ON
Subsurface Investigation

Parameter	Units	MOE Standards*	BH2 SS7	BH6 SS5	BH10 SS4	BH10 SS4 (Dupl #1)	BH12 SS1	BH13 SS3	BH14 SS1	BH15 SS2	BH16 SS2	BH20 SS4	BH21 SS4	BH22 SS4	BH23 SS3	BH24 SS5	BH25 SS4	BH26 SS3	BH27 SS2	BH28 SS2	BH29 SS7	BH30 SS4
Sample Depth (mbgs)			5.33-5.94	3.81-4.42	3.05-3.66	3.05-3.66	0.76-1.37	2.28-2.9	0.76-1.37	1.52-2.13	1.52-2.13	3.05-3.66	3.05-3.66	3.05-3.66	2.28-2.9	3.81-4.42	3.05-3.66	2.28-2.9	1.52-2.13	1.52-2.13	5.33-5.94	3.05-3.66
Sample Date (m/d/y)			11/15/2010	11/16/2010	11/16/2010	11/16/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	06/13/2011	06/14/2011	06/13/2011	06/14/2011	06/14/2011	06/14/2011	06/15/2011	06/15/2011	06/15/2011	06/15/2011
BTEX Parameters																						
Benzene	ug/g dry	0.32	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.02)	ND (0.02)	ND (0.02)	0.07	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Ethylbenzene	ug/g dry	1.1	ND (0.05)	ND (0.05)	1.1	1.19	0.06	ND (0.05)	6.84	0.21	0.24	3.6	10.4	ND (0.05)	2.72	10.3	0.11	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Toluene	ug/g dry	6.4	ND (0.05)	ND (0.05)	0.06	0.06	0.07	ND (0.05)	0.90	0.06	0.06	0.09	ND (0.05)	ND (0.05)	ND (0.05)	0.16	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
m/p-Xylene	ug/g dry	---	ND (0.05)	ND (0.05)	0.5	0.52	0.22	ND (0.05)	17.9	0.39	0.45	5.1	0.19	ND (0.05)	1.45	19.0	0.15	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
o-Xylene	ug/g dry	---	ND (0.05)	ND (0.05)	0.6	0.84	0.24	ND (0.05)	8.94	0.28	0.29	1.8	0.48	ND (0.05)	1.32	8.88	0.09	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Xylenes, total	ug/g dry	26	0.19	ND (0.10)	1.2	1.36	0.46	ND (0.10)	26.8	0.67	0.74	6.9	0.67	ND (0.05)	2.76	27.8	0.24	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Petroleum Hydrocarbons																						
F1 PHCs (C6-C10)	ug/g dry	55	ND (10)	ND (10)	29	39	ND (10)	ND (10)	227	26	30	81	1010	ND (10)	286	1190	308	ND (10)	ND (10)	ND (10)	131	ND (10)
F2 PHCs (C10-C16)	ug/g dry	230	ND (10)	ND (10)	541	624	32	ND (10)	2900	88	431	747	1620	ND (10)	316	2270	ND (10)	ND (10)	ND (10)	ND (10)	354	ND (10)
F3 PHCs (C16-C34)	ug/g dry	1700	ND (10)	ND (10)	342	384	978	ND (10)	2390	64	377	467	1280	ND (10)	328	1190	ND (10)	ND (10)	ND (10)	ND (10)	240	ND (10)
F4 PHCs (C34-C50)	ug/g dry	3300	ND (10)	ND (10)	ND (10)	ND (10)	1480	ND (10)	281	ND (10)	182	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)

Notes:

*MOE Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, amended April 15, 2011 (O.Reg. 153/04 as amended by O.Reg. 511/09). Full depth site condition standards for soil in a potable groundwater setting, industrial property use (Table 2).

ND - not detected (MDL in parentheses)

mbgs - metres below ground surface

- concentration exceeds the MOE Table 2 standards (O. Reg. 153/04 as amended by O. Reg. 511/09).

TABLE 3 - Groundwater Chemistry Results
Timminco Metals, Haley ON
Supplementary Subsurface Investigation

Parameter	Units	MOE Standards*	Sample								
			BH21	BH22	BH23	BH24	BH25	BH26	BH27	BH28	BH29
Sample Date (m/d/y)			06/22/2011	06/22/2011	06/22/2011	06/22/2011	06/22/2011	06/22/2011	06/22/2011	06/22/2011	06/22/2011
Inorganics & Metals											
Cyanide, free	ug/L	66	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
pH	---	NV	7.55	7.83	7.51	7.45	7.82	7.55	7.79	7.96	7.68
Chloride	mg/L	790000	310	152	180	265	83	225	8	388	137
Mercury	ug/L	0.29	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.1	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Antimony	ug/L	6	ND (0.5)	0.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Arsenic	ug/L	25	ND (1)	1	5	3	ND (1)	3	ND (1)	ND (1)	ND (1)
Barium	ug/L	1000	406	159	499	517	110	106	52	216	115
Beryllium	ug/L	4	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Boron	ug/L	5000	107	35	101	159	103	30	37	286	158
Cadmium	ug/L	2.7	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Chromium	ug/L	50	9	4	8	5	4	4	6	3	4
Chromium (VI)	ug/L	25	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Cobalt	ug/L	3.8	7.7	13.7	8.9	11.7	16.4	8.7	6.1	6.5	3.5
Copper	ug/L	87	1.2	0.7	1.0	0.8	0.7	0.9	1.8	0.6	ND (0.5)
Lead	ug/L	10	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.2	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Molybdenum	ug/L	70	3.3	13.6	1.9	1.4	4.8	9.3	1.7	3.9	0.5
Nickel	ug/L	100	5	6	4	4	4	10	4	4	3
Selenium	ug/L	10	2	ND (1)	3	5	2	4	ND (1)	ND (1)	1
Silver	ug/L	1.5	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Sodium	ug/L	490000	119000	67200	118000	119000	37400	70500	12700	101000	53700
Thallium	ug/L	2	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Uranium	ug/L	20	0.7	2.4	0.1	0.6	1.7	1.0	1.0	1.2	ND (0.1)
Vanadium	ug/L	6.2	8.0	2.5	7.3	5.9	4.7	3.5	4.4	1.9	4.9
Zinc	ug/L	1100	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
BTEX											
Benzene	ug/L	5	ND (5.0)	2.6	ND (5.0)	6.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	5.5
Ethylbenzene	ug/L	2.4	9.1	13.2	102	90.0	39.8	ND (0.5)	ND (0.5)	ND (0.5)	10.7
Toluene	ug/L	24	ND (5.0)	0.5	ND (5.0)	ND (5.0)	0.5	ND (0.5)	ND (0.5)	ND (0.5)	ND (5.0)
m/p-Xylene	ug/L	NV	31.5	ND (0.5)	73.8	114	15.5	ND (0.5)	ND (0.5)	ND (0.5)	13.1
o-Xylene	ug/L	NV	30.8	2.1	17.3	68.3	3.6	ND (0.5)	ND (0.5)	ND (0.5)	8.9
Xylenes, total	ug/L	300	62.3	2.3	91.1	183	19.1	ND (0.5)	ND (0.5)	ND (0.5)	22.0
PHCs											
F1 PHCs (C6-C10)	ug/L	750	5890	81	2830	3550	231	ND (25)	ND (25)	ND (25)	2020
F2 PHCs (C10-C16)	ug/L	150	25900	2530	4570	173000	9100	202	ND (100)	ND (100)	586000
F3 PHCs (C16-C34)	ug/L	500	18500	2400	2900	78300	5000	447	ND (100)	ND (100)	285000
F4 PHCs (C34-C50)	ug/L	500	1000	740	480	ND (1000)	ND (100)	ND (100)	ND (100)	ND (100)	ND (2000)
F1+ F2 PHCs	ug/L	NV	31800	2610	7400	177000	9330	202	ND (125)	ND (125)	588000
F3 + F4 PHCs	ug/L	NV	19500	3140	3380	78300	5000	447	ND (200)	ND (200)	285000

Notes:
*MOE Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, amended April 15, 2011 (O.Reg. 153/04 as amended by O.Reg. 511/09).
Full depth site condition standards for soil in a potable groundwater setting, industrial property use (Table 2).
ND - not detected (MDL in parentheses)
mbgs - metres below ground surface
[ ] - concentration exceeds the MOE Table 2 standards (O. Reg. 153/04 as amended by O. Reg. 511/09).

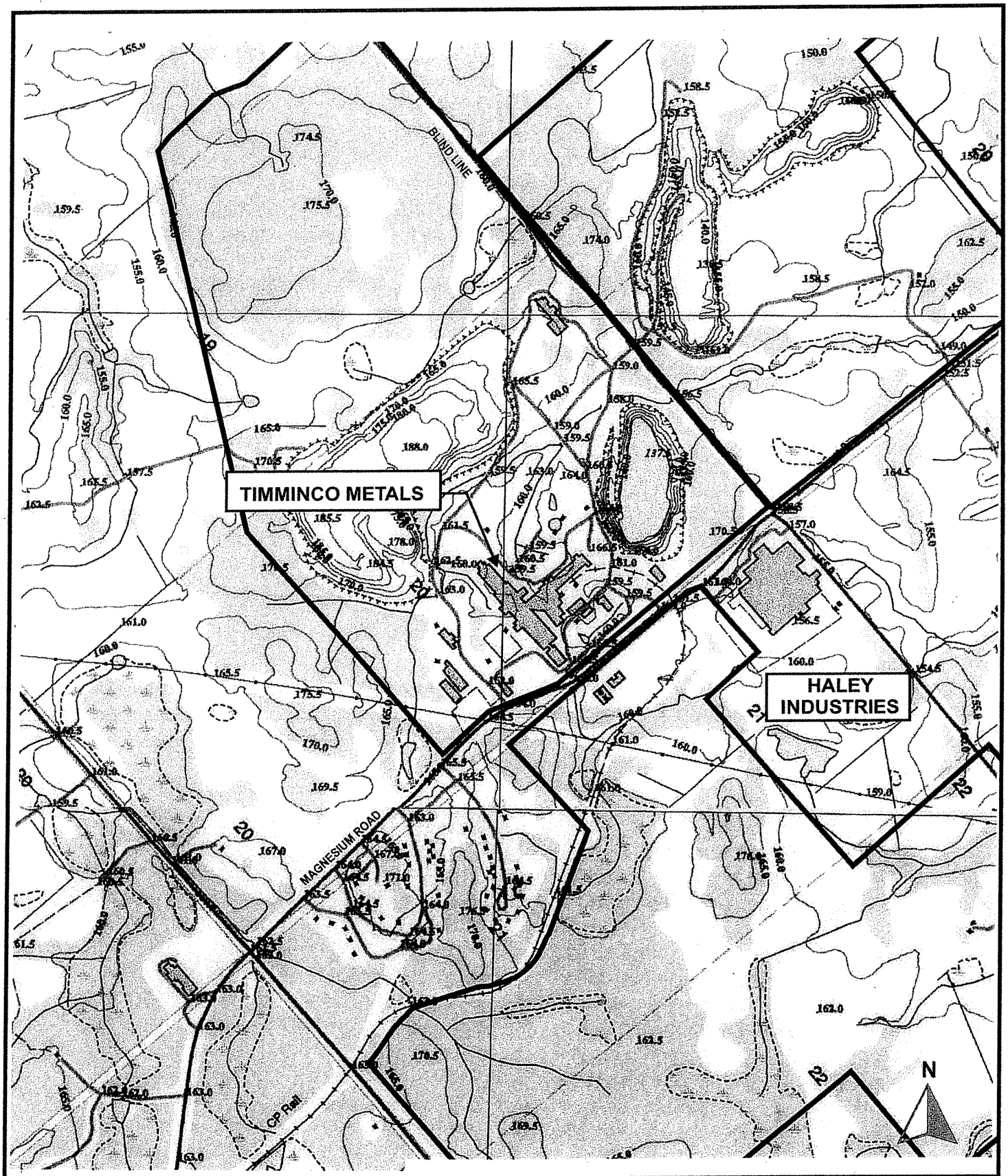

FIGURE: 1

SCALE: 1:10,000

REFERENCE: ONTARIO BASE MAP
MAP 10 18 3600 50450

SITE LOCATION MAP

B9083-SLM

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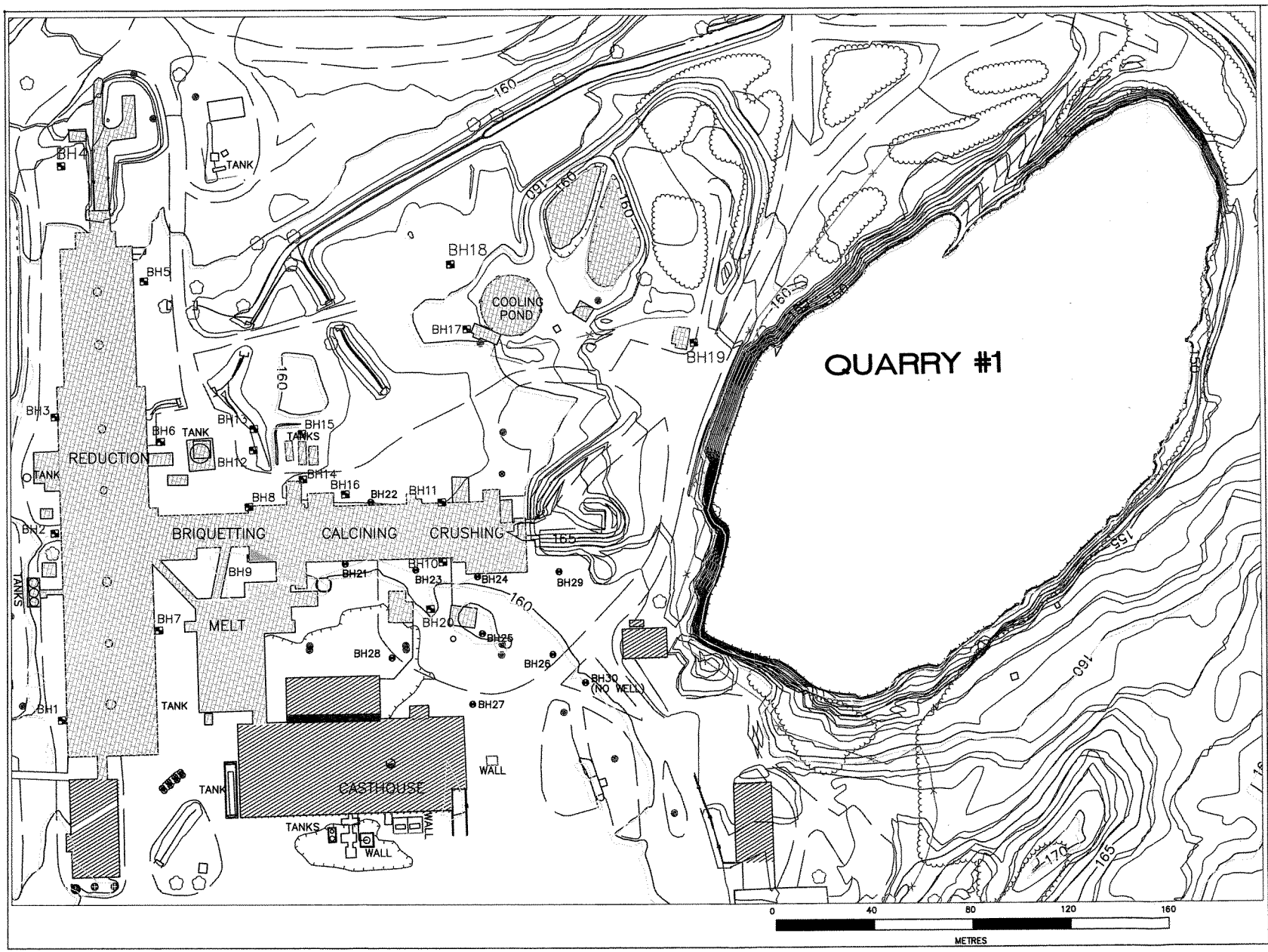
QUARRY #1
COOLING POND
REDUCTION
BRIQUETTING
CALCINING
CRUSHING
MELT
CASTHOUSE
TANK
TANKS
WALL
BH1
BH2
BH3
BH4
BH5
BH6
BH7
BH8
BH9
BH10
BH11
BH12
BH13
BH14
BH15
BH16
BH17
BH18
BH19
BH20
BH21
BH22
BH23
BH24
BH25
BH26
BH27
BH28
BH29
BH30 (NO WELL)
160
165
170
155
0
40
80
120
160
METRES
LEGEND:
DEMOLISHED BUILDINGS AND STRUCTURES
REMAINING BUILDINGS
BOREHOLE LOCATION – 2010
BOREHOLE LOCATION – 2011
NOTE:
SITE TOPOGRAPHY AND FEATURES ARE FROM AERIAL PHOTOGRAPHY TAKEN OCTOBER 2003.
PROJECT NUMBER: 99063
DRAWN BY: C.M.R.
DESIGNED BY: B.A.
DATE: 29 AUG. 2011
CHECKED BY:
SCALE: AS SHOWN
CAD FILE NO.: 99063-BH-11
FIGURE: 2
SITE PLAN AND BOREHOLE LOCATIONS
TIMMINCO METALS, HALEY FACILITY
LOTS 19 TO 22, CONCESSION V AND VI
TOWNSHIP OF WHITEWATER REGION
(FORMERLY ROSS TOWNSHIP)
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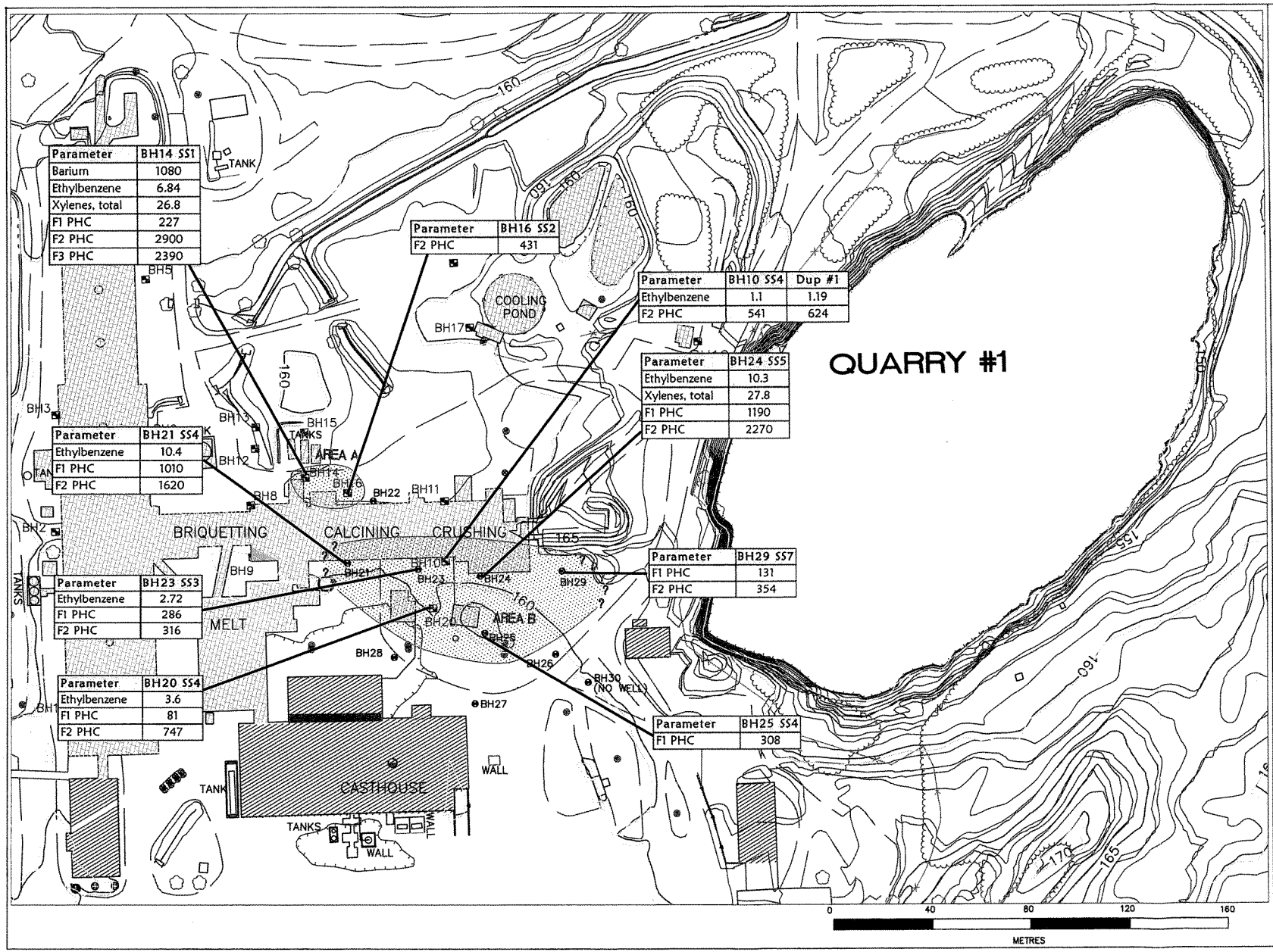

Parameter	O.Reg. 153/04 Standards - Table 2
Barium	670
Ethylbenzene	1.1
Xylenes, total	26
F1 PHCs (C6-C10)	55
F2 PHCs (C10-C16)	230
F3 PHCs (C16-C34)	1700

SOIL SAMPLE EXCEEDIING O.REG. 153/04* TABLE 2

*AS AMENDED BY O.REG. 511/09

LEGEND:

- DEMOLISHED BUILDINGS AND STRUCTURES
- REMAINING BUILDINGS
- BOREHOLE LOCATION – 2010
- BOREHOLE LOCATION – 2011
- EXTENT OF SOIL CONTAMINATION (PHC/BTEX) EXCEEDING MOE TABLE 2 STANDARDS

PROJECT NUMBER: 89083	DRAWN BY: C.M.R.	DESIGNED BY: B.A.
DATE: 29 AUG. 2011	CHECKED BY:	
SCALE: AS SHOWN	CAD FILE NO.: 89083-BH-11	

FIGURE: 3

LOCATION OF SOIL IMPACTS

TIMMINCO METALS, HALEY FACILITY
LOTS 19 TO 22, CONCESSION V AND VI
TOWNSHIP OF WHITEWATER REGION
(FORMERLY ROSS TOWNSHIP)

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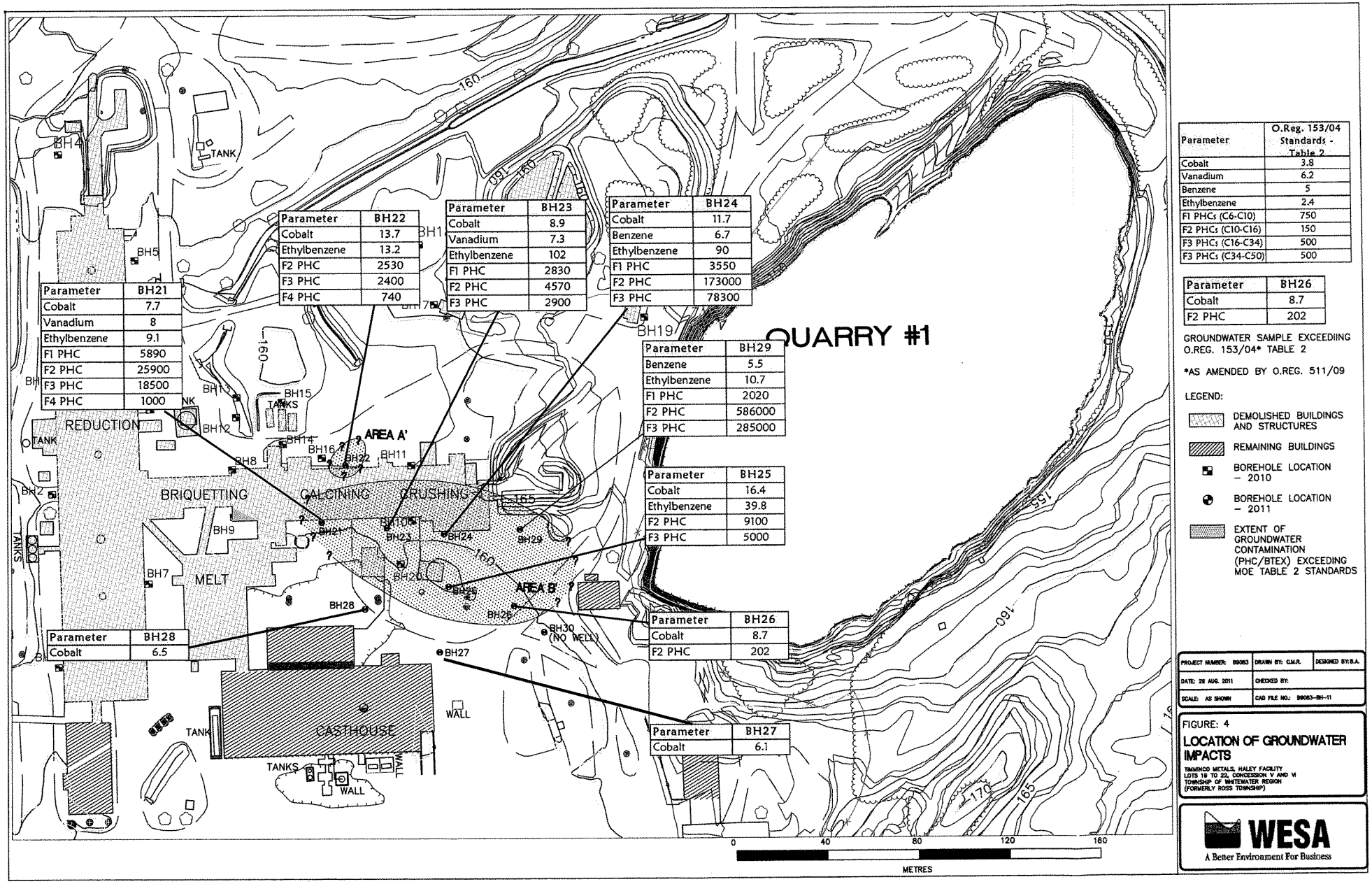


Parameter	BH21
Cobalt	7.7
Vanadium	8
Ethylbenzene	9.1
F1 PHC	5890
F2 PHC	25900
F3 PHC	18500
F4 PHC	1000

Parameter	BH22
Cobalt	13.7
Ethylbenzene	13.2
F2 PHC	2530
F3 PHC	2400
F4 PHC	740

Parameter	BH23
Cobalt	8.9
Vanadium	7.3
Ethylbenzene	102
F1 PHC	2830
F2 PHC	4570
F3 PHC	2900

Parameter	BH24
Cobalt	11.7
Benzene	6.7
Ethylbenzene	90
F1 PHC	3550
F2 PHC	173000
F3 PHC	78300

Parameter	BH29
Benzene	5.5
Ethylbenzene	10.7
F1 PHC	2020
F2 PHC	586000
F3 PHC	285000

Parameter	BH25
Cobalt	16.4
Ethylbenzene	39.8
F2 PHC	9100
F3 PHC	5000

Parameter	BH28
Cobalt	6.5

Parameter	BH26
Cobalt	8.7
F2 PHC	202

Parameter	BH27
Cobalt	6.1

Parameter	O.Reg. 153/04 Standards - Table 2
Cobalt	3.8
Vanadium	6.2
Benzene	5
Ethylbenzene	2.4
F1 PHCs (C6-C10)	750
F2 PHCs (C10-C16)	150
F3 PHCs (C16-C34)	500
F3 PHCs (C34-C50)	500

Parameter	BH26
Cobalt	8.7
F2 PHC	202

GROUNDWATER SAMPLE EXCEEDIING O.REG. 153/04* TABLE 2

*AS AMENDED BY O.REG. 511/09

LEGEND:

- DEMOLISHED BUILDINGS AND STRUCTURES
- REMAINING BUILDINGS
- BOREHOLE LOCATION – 2010
- BOREHOLE LOCATION – 2011
- EXTENT OF GROUNDWATER CONTAMINATION (PHC/BTEX) EXCEEDING MOE TABLE 2 STANDARDS

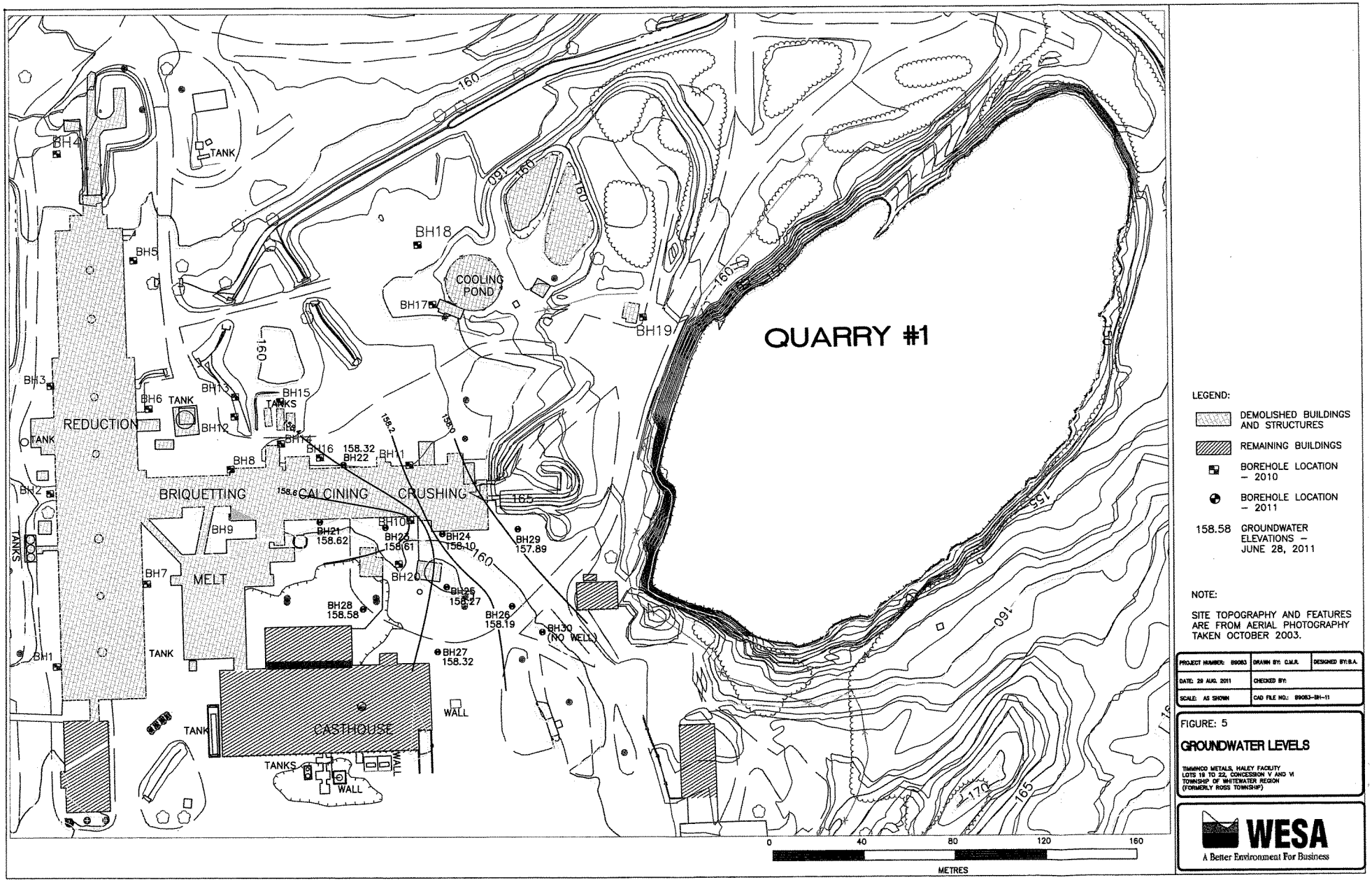
PROJECT NUMBER: 89083	DRAWN BY: C.M.R.	DESIGNED BY: B.A.
DATE: 29 AUG. 2011	CHECKED BY:	
SCALE: AS SHOWN	CAD FILE NO.: 89083-BH-11	

FIGURE: 4

LOCATION OF GROUNDWATER IMPACTS

TAMINCO METALS, HALEY FACILITY
LOTS 19 TO 22, CONCESSION V AND VI
TOWNSHIP OF WHITEWATER REGION
(FORMERLY ROSS TOWNSHIP)

WESA
A Better Environment For Business



LEGEND:

- DEMOLISHED BUILDINGS AND STRUCTURES
- REMAINING BUILDINGS
- BOREHOLE LOCATION – 2010
- BOREHOLE LOCATION – 2011
- 158.58 GROUNDWATER ELEVATIONS – JUNE 28, 2011

NOTE:

SITE TOPOGRAPHY AND FEATURES ARE FROM AERIAL PHOTOGRAPHY TAKEN OCTOBER 2003.

PROJECT NUMBER: 89083	DRAWN BY: C.M.A.	DESIGNED BY: B.A.
DATE: 29 AUG. 2011	CHECKED BY:	
SCALE: AS SHOWN	CAD FILE NO.: 89083-BH-11	

FIGURE: 5

GROUNDWATER LEVELS

TIMMINCO METALS, HALEY FACILITY
LOTS 19 TO 22, CONCESSION V AND VI
TOWNSHIP OF WHITEWATER REGION
(FORMERLY ROSS TOWNSHIP)

WESA
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TAB D

THIS EXHIBIT "D", referred to in the Affidavit of Sharon Dawn Spires, sworn on May 14, 2013.

Mr. Clive Stephenson, Commissioner of Oaths

CLIVE D. STEPHENSON,
a Commissioner for taking affidavits in the Province of Ontario while employed by the Ministry of Northern Development and Mines.

FINAL REPORT

PRELIMINARY SUBSURFACE INVESTIGATION

TIMMINCO METALS HALEY, ONTARIO

Prepared for:

TIMMINCO LIMITED
Sun Life Financial Tower
150 King Street West, Suite 2401
Toronto, Ontario M5H 1J9

Prepared by:

WESA Inc.
3108 Carp Road, Box 430
Carp (Ottawa), Ontario
K0A 1L0

File: CB9083-00-00

February 2011

Ref: CB9083 Preliminary Subsurface Investigation Report- Final Feb 2011.docx

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

WESA Inc. (WESA) was retained by Timminco Limited (Timminco) to conduct a preliminary subsurface investigation at the company's former mining and industrial facility located at 962 Magnesium Road in Haley, Ontario. The investigation was carried out in the areas of former buildings and infrastructure that are included as part of the mining components at the site. The approved Mine Closure Plan for the Timminco facility states that the soil *"....in the vicinity of the areas used to store or transfer petroleum products, chemicals, ore, concentrates or waste during the life of the project will be sampled and tested for contamination"* (Section 9.12 of the Mine Closure Plan, dated September 2003).

The following buildings and infrastructure represent areas that were included in this preliminary subsurface investigation:

- Crushing plant
- Calcining plant
- Briquetting plant
- Reduction plant
- Cooling pond
- Detonator magazine
- No. 2 repair shop
- Various former above-ground storage tank facilities (fuel oil, diesel fuel, spray oil, etc.)

The key objective of the preliminary subsurface investigation was to identify any existing environmental impact(s) to the soil at the borehole locations that may pose an environmental liability issue for mine closure. Note that groundwater monitoring wells were not installed as part of this investigation, and an assessment of potential impacts to groundwater is not included.

1.1 SITE DESCRIPTION

Timminco Metals, a division of Timminco Limited operated a magnesium mining and production facility located on Lots 19 to 22, Concessions V and VI, in the Township of Whitewater Region (formerly Township of Ross), County of Renfrew. The site is situated approximately 15 kilometres north-west of the Town of Renfrew on Renfrew County Road 7 (Magnesium Road). The site location is shown on the attached Figure 1.

The Timminco mining property is bordered to the north, east and south by agricultural lands, which for the most part are used as pasture with lesser areas under cultivation. Along the west side, Timminco is bordered by mixed bush toward the north and south, and by the Haley town site along the west-central border. The town site consists of approximately thirty single family dwellings on three residential streets off County Road 7. A former elementary school, now a

2.0 METHODOLOGY

2.1 SCOPE OF WORK

The components of the subsurface investigation program included:

- Advancement of 10 shallow (3m) and 10 deeper (6m) soil boreholes across the subject property. Soil samples collected from the boreholes were screened for combustible vapours in the field and selected samples were submitted for laboratory analysis.
- Generally at least one soil sample from each borehole were submitted for laboratory analysis for general inorganics and metals (from Table 2 of the MOE Site Condition Standards). Additional soil analysis for Petroleum Hydrocarbons (PHCs F1-F4) and BTEX compounds were conducted from areas around the former facility structures and former above-ground storage tank areas (ASTs).
- Documentation of all findings in a written report.

All field investigations conducted by WESA followed the general protocols outlined in the MOE "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, June 1996 and addenda". During all field work associated with the subsurface investigation, a site-specific Field Health and Safety Plan was developed by WESA and was reviewed/followed daily by WESA personnel and its subcontractors.

2.2 BOREHOLE DRILLING PROGRAM

A soil borehole drilling program was conducted at the site from November 15 to 17, 2010. The location and number of boreholes was based on the objective to encompass the former crushing, calcining, briquetting and reduction plants structures with boreholes to a maximum depth of 6 meters. Shallow boreholes to a maximum depth of 3 meters were drilled in the vicinity of former outbuildings with ASTs, the detonator magazine, No. 2 repair shop and the residue bunker. The locations of the boreholes are indicated on Figure 2.

During the drilling investigation, the final stages of surface grading were being conducted following the demolition of the majority of the site structures. All local underground utilities were located and decommissioned prior to the building demolition. A large diameter water line servicing the site was located and flagged by site personnel. WESA retained G.E.T. Drilling Inc. of Napanee, Ontario to complete all hollow stem auger drilling, and soil sampling during the subsurface investigation.

A truck mounted soil auger rig (CME 55) was used to advance 150 mm outer diameter (O.D.) hollow stem augers. Soil samples from the boreholes were collected over selected depth ranges using a 0.61m long and 50 mm O.D. split-spoon sampler at 0.76 meter intervals. Samples were immediately placed into plastic bags and screened for combustible vapours using a Gastech Model 1238ME combustible gas detector (CGD), operated in methane elimination mode. The split-spoon sampling device was cleaned with water and detergent after each use to prevent cross-contamination between samples. The soil stratigraphy and vapour headspace readings for the boreholes can be found in the borehole logs in Appendix A.

All boreholes reached the proposed drilling depth except BH19 located beside the former detonator magazine. Bedrock or auger refusal was encountered at this location at 1.5m. Borehole locations and ground surface elevations were surveyed using a Magellan ProMark 500 base station and rover GPS.

Screened soil samples were placed in a clean, labelled soil sample jars and submitted to Paracel Laboratories Ltd. of Ottawa, Ontario under strict chain of custody protocol. The samples selected for analysis of petroleum hydrocarbons (PHCs) and benzene, toluene, ethylbenzene and xylenes (BTEX) were determined based on the vapour headspace readings, depth collected and relative location of the soil boreholes. Samples selected for general inorganics and metals were based primary on the depth collected and the physical soil appearance. Following strict chain of custody protocols, soil samples were delivered to the laboratory in a cooler with ice which had a reported temperature of 2°C when received at the lab. A total of twenty samples were submitted for analytical testing of inorganics and metals; 10 samples were submitted for analysis of BTEX and PHCs; and two samples were submitted for volatile organic compound (VOC) analysis. The laboratory analytical reports are provided in Appendix B.

3.0 INVESTIGATION RESULTS

3.1 PHYSICAL SITE FEATURES

As mentioned in the above sections the recent building demolition resulted in surface rubble mixed with gravelly sand fill. The fill layer thickness ranged from 0.9 to 1.3 meters in depth. Much of this layer consists of dicalcium silicate residue fill mixed with crushed granular fill. The dicalcium silicate residue fill was a byproduct (solid mill tailings) from the production process at Timminco. In general, the soil stratigraphy underlying the fill observed during the advancement of boreholes consisted of fine grained sandy silt to silty sand. Bedrock was not encountered in the deeper surficial boreholes (6m) encompassing the former plant structures. Bedrock was encountered only at BH19 beside the former detonator magazine. Groundwater was encountered in the majority of the boreholes within 1.5 meters from the ground surface to the extent of the borehole.

No volatile organic compounds, with the exception of the BTEX parameters and PHCs noted above, were detected in the two samples submitted for VOC laboratory analysis.

4.0 ASSESSMENT OF SUBSURFACE IMPACT

4.1 IMPACTS TO SOIL

The elevated soil concentrations and exceedances of the MOE site condition standards are restricted to petroleum hydrocarbons, with the exception of a single observation of barium above the O. Reg. 511/09 Table 2 standard. However, the location of the barium exceedance (BH14-SS1) is also an area of hydrocarbon impact, and can be addressed simultaneously. The locations of the soil sample exceedances are shown on Figure 3.

The hydrocarbon concentrations in the soil are indicative of historical release(s) of middle distillate hydrocarbons (diesel, fuel oil, etc.) from former storage or distribution areas. The impacts to soil appear to be focused in two areas:

- On the north side of the former calcining area (BH14 and BH16); and
- South of the former crushing area and east of former No. 2 Repair Shop (BH10 and BH20).

The highest concentrations are found in the shallow soil sample from BH14 (0.8 to 1.4 metres depth). The impact at BH16 also appears to be relatively shallow (1.5 to 2.1 metres depth). The elevated concentrations in the second area of impact (BH10 and BH20) were found at a greater depth (3.0 to 3.6 metres). Hydrocarbon odours and elevated combustible gas headspace readings, ranging from 75 ppm to 7% L.E.L., were observed at the sample locations.

Further investigation is necessary to delineate the lateral and vertical extent of these hydrocarbon impacts to soil, and to determine whether the two areas of impact are related or represent two different sources. It is recommended that at least two boreholes be drilled between the northern (BH14 and BH16) and southern (BH10 and BH20) boreholes. At least three boreholes will also be required to further delineate the area around BH10 and BH20. In addition, since the hydrocarbon impact is found close to or below the water table, groundwater monitoring wells should be installed to assess whether there are any impacts to groundwater. All of the new boreholes identified above should be constructed as groundwater monitoring wells.

The field observations, combustible gas headspace readings, and laboratory analytical testing do not indicate the presence of any areas of soil impacts adjacent to the former reduction building, cooling pond or detonator magazine. The soil concentrations in these areas are below the allowable limits specified in the MOE's Site Condition Standards.

5.0 CONCLUSIONS

A preliminary subsurface investigation was conducted to assess the potential presence of impacts to soil around the demolished facilities at the former Timminco Limited plant in Haley, Ontario. The summary and findings of the investigation are as follows:

- Twenty soil boreholes were advanced on the subject property from November 15 to 17, 2010. Collected soil samples were screened for combustible gas headspace readings. The readings ranged from a low of <25 ppm to a high of 10% L.E.L.
- Twenty soil samples were submitted for analysis of general inorganic parameters and metals.
- All soil inorganic and metal concentrations were below the O. Reg. 153/04 Table 2 standards. One exceedance of the O. Reg. 511/09 Table 2 standard for barium was noted in sample BH14-SS1.
- Four soil samples and one duplicate sample exhibited concentrations of petroleum hydrocarbons (ethylbenzene, xylenes, F1 PHC, F2 PHC, and F3 PHC) exceeding the MOE site condition standards (either the O. Reg. 153/04 or O. Reg. 511/09 standards or both). These soil sample locations also revealed the highest combustible gas headspace readings in the field.
- The field and analytical results indicate the presence of mid-distillate hydrocarbons in the subsurface in two areas:
  - On the north side of the former calcining area (BH14 and BH16); and
  - South of the former crushing area and east of former No. 2 Repair Shop (BH10 and BH20).
- Further investigation is recommended to assess the lateral and vertical extent of these areas of hydrocarbon impact, and to determine whether there are impacts to groundwater.

6.0 LIMITATIONS

The conclusions presented in the above captioned report represent our professional opinion, in light of the terms of reference, scope of work, and any limiting conditions noted herein. It is not intended to be a definitive investigation of contamination or other environmental concerns at the property.

The information presented herein is based on field observations and laboratory testing of soil samples collected at the specified location. Every effort was made to collect representative samples from the borehole locations. Any inferences of contaminant concentrations in soil

between specific sample locations should be made with caution. Investigation of the groundwater conditions at the borehole locations was not within the scope of this investigation.

The conclusions presented herein are based on information obtained up to and including the submission date of this document. Any site operations or land uses that may have changed since this submission may render the conclusions invalid. This document and the information contained herein have been prepared solely for the use of Timminco Limited. No other party may use or rely upon the above captioned report or any portion thereof without the express written consent of WESA. WESA will consent to any reasonable request by Timminco Limited to approve the use of this report by other parties as "Approved Users".

Respectfully submitted,

Brian Andress, CET
Environmental Technologist

David Harding, M.Sc. P.Eng.
Senior Consulting Engineer

TABLE 1 - General Inorganics and Metals
Timminco Metals, Haley ON
Preliminary Subsurface Investigation

Parameter	Units	MDL	MOE Standards		BH1 SS1	BH2 SS1	BH3 SS5	BH4 SS3	BH5 SS3	BH6 SS2	BH7 SS3	BH8 SS1	BH9 SS4	BH11 SS5	BH12 SS1	BH13 SS3	BH14 SS1	BH14 SS3	BH15 SS2	BH16 SS2	BH17 SS2	BH18 SS3	BH19 SS1	BH20 SS3
Sample Depth (mbgs)			O. Reg. 153/04 *	O. Reg. 511/09 **	0.76-1.37	0.76-1.37	3.81-4.42	2.28-2.9	2.28-2.9	1.52-2.13	2.28-2.9	0.76-1.37	3.05-3.66	3.81-4.42	0.76-1.37	2.28-2.9	0.76-1.37	2.28-2.9	1.52-2.13	1.52-2.13	1.52-2.13	2.28-2.9	0.76-1.37	2.28-2.9
Sample Date (m/d/y)					11/15/2010	11/15/2010	11/15/2010	11/15/2010	11/15/2010	11/16/2010	11/16/2010	11/16/2010	11/16/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010
% of Solids	% bt Wt.	0.1	---	---	88.0	81.8	76.4	78.6	78.7	76.0	80.7	71.1	79.0	83.4	76.9	78.2	89.6	79.7	78.2	76.9	79.3	80.5	92.4	83.4
General Inorganics																								
Conductivity	uS/cm	5	1400	1400	263	244	204	331	192	235	299	400	193	312	494	157	229	149	200	317	191	112	200	194
Cyanide, free	ug/g dry	0.03	100	0.051	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)
pH	---	0.05	---	---	8.50	8.60	7.70	8.86	9.04	8.25	8.73	9.87	8.20	9.85	10.75	9.68	10.07	8.19	7.62	7.97	7.69	7.10	8.54	7.78
SAR	---	0.01	12	12	0.29	0.46	0.29	0.16	0.19	0.64	0.84	0.10	0.31	0.99	0.06	0.38	0.08	0.16	0.27	0.46	0.63	0.34	0.03	0.17
Metals																								
Antimony	ug/g dry	1	40	40	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1	ND (1)
Arsenic	ug/g dry	1	40	18	1	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	5	2
Barium	ug/g dry	10	1500	670	285	129	126	201	268	116	150	97	57	23	392	86	1080	122	124	129	127	137	213	42
Beryllium	ug/g dry	0.5	1.2	8	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.5	0.6	ND (0.5)	ND (0.5)
Boron, available	ug/g dry	0.5	2.0	2.0	0.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Cadmium	ug/g dry	0.5	12	1.9	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Chromium	ug/g dry	5	750	160	23	25	34	34	30	27	28	21	17	10	18	22	14	26	35	29	31	43	11	60
Chromium (VI)	ug/g dry	0.4	8.0	8.0	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Cobalt	ug/g dry	1	80	80	5	5	8	8	7	7	6	5	5	4	3	6	2	8	8	7	9	9	3	4
Copper	ug/g dry	5	225	230	17	14	17	10	13	16	20	17	10	12	25	13	67	16	19	18	19	21	8	8
Lead	ug/g dry	1	1000	120	14	4	3	4	3	3	5	4	2	2	14	3	11	3	3	4	3	3	8	3
Mercury	ug/g dry	0.1	10	3.9	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Molybdenum	ug/g dry	1	40	40	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1
Nickel	ug/g dry	5	150	270	30	15	19	15	14	14	19	12	10	7	18	12	14	16	19	15	17	18	11	8
Selenium	ug/g dry	1	10	5.5	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Silver	ug/g dry	0.3	40	40	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Thallium	ug/g dry	1	32	3.3	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Vanadium	ug/g dry	10	200	86	23	38	43	50	39	37	36	31	28	23	17	35	12	41	42	39	47	47	12	25
Zinc	ug/g dry	20	600	340	67	27	40	30	38	33	56	24	ND (20)	ND (20)	31	27	23	34	39	36	31	36	33	47

Notes:
*MOE Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, March 9, 2004. Full depth site condition standards for soil in a potable groundwater setting, industrial property use (Table 2).
**Amended Site Condition Standards, O. Reg. 511/09. Full depth site condition standards for soil in a potable groundwater setting, industrial property use (Table 2).
MDL - method detection limit
ND - not detected (MDL in parentheses)
mbgs - metres below ground surface
- concentration exceeds the O. Reg. 511/09 Table 2 standards

TABLE 2 - BTEX Parameters and Petroleum Hydrocarbons
Timminco Metals, Haley ON
Preliminary Subsurface Investigation

Parameter	Units	MDL	MOE Standards		BH2 SS7	BH6 SS5	BH10 SS4	BH10 SS4 (Dupl #1)	BH12 SS1	BH13 SS3	BH14 SS1	BH15 SS2	BH16 SS2	BH20 SS
Sample Depth			O. Reg. 153/04 *	O. Reg. 511/09 **	5.33-5.94	3.81-4.42	3.05-3.66	3.05-3.66	0.76-1.37	2.28-2.9	0.76-1.37	1.52-2.13	1.52-2.13	3.05-3.6
Sample Date (m/d/y)					11/15/2010	11/16/2010	11/16/2010	11/16/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/2010	11/17/201
BTEX Parameters														
Benzene	ug/g dry	0.03	0.24	0.32	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.0
Ethylbenzene	ug/g dry	0.05	0.28	1.1	ND (0.05)	ND (0.05)	1.1	1.19	0.06	ND (0.05)	6.84	0.21	0.24	3.6
Toluene	ug/g dry	0.05	2.1	6.4	ND (0.05)	ND (0.05)	0.06	0.06	0.07	ND (0.05)	0.90	0.06	0.06	0.09
m/p-Xylene	ug/g dry	0.05	---	---	ND (0.05)	ND (0.05)	0.5	0.52	0.22	ND (0.05)	17.9	0.39	0.45	5.1
o-Xylene	ug/g dry	0.05	---	---	ND (0.05)	ND (0.05)	0.6	0.84	0.24	ND (0.05)	8.94	0.28	0.29	1.8
Xylenes, total	ug/g dry	0.1	25	26	0.19	ND (0.10)	1.2	1.36	0.46	ND (0.10)	26.8	0.67	0.74	6.9
Petroleum Hydrocarbons														
F1 PHCs (C6-C10)	ug/g dry	10	230	55	ND (10)	ND (10)	29	39	ND (10)	ND (10)	227	26	30	81
F2 PHCs (C10-C16)	ug/g dry	10	150	230	ND (10)	ND (10)	541	624	32	ND (10)	2900	88	431	747
F3 PHCs (C16-C34)	ug/g dry	10	1700	1700	ND (10)	ND (10)	342	384	978	ND (10)	2390	64	377	467
F4 PHCs (C34-C50)	ug/g dry	10	3300	3300	ND (10)	ND (10)	ND (10)	ND (10)	1480	ND (10)	281	ND (10)	182	ND (10

Notes:

*MOE Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, March 9, 2004. Full depth site condition standards for soil in a potable groundwater setting, industrial property use (Table 2).

**Amended Site Condition Standards, O. Reg. 511/09. Full depth site condition standards for soil in a potable groundwater setting, industrial property use (Table 2).

MDL - method detection limit

ND - not detected (MDL in parentheses)

mbgs - metres below ground surface

- concentration exceeds the O. Reg. 153/04 and O. Reg. 511/09 Table 2 standards

- concentration exceeds the O. Reg. 511/09 Table 2 standards only.

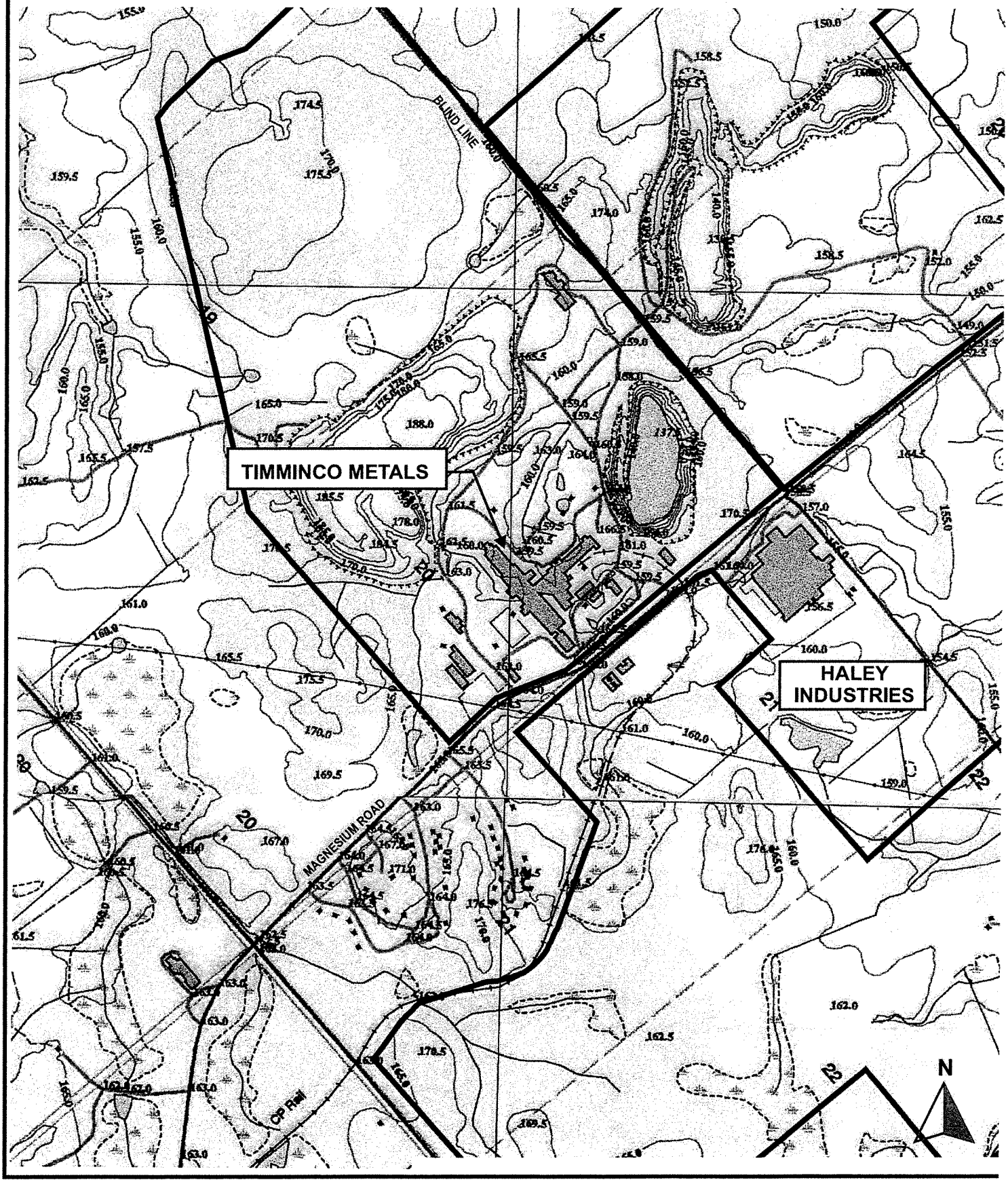


FIGURE: 1

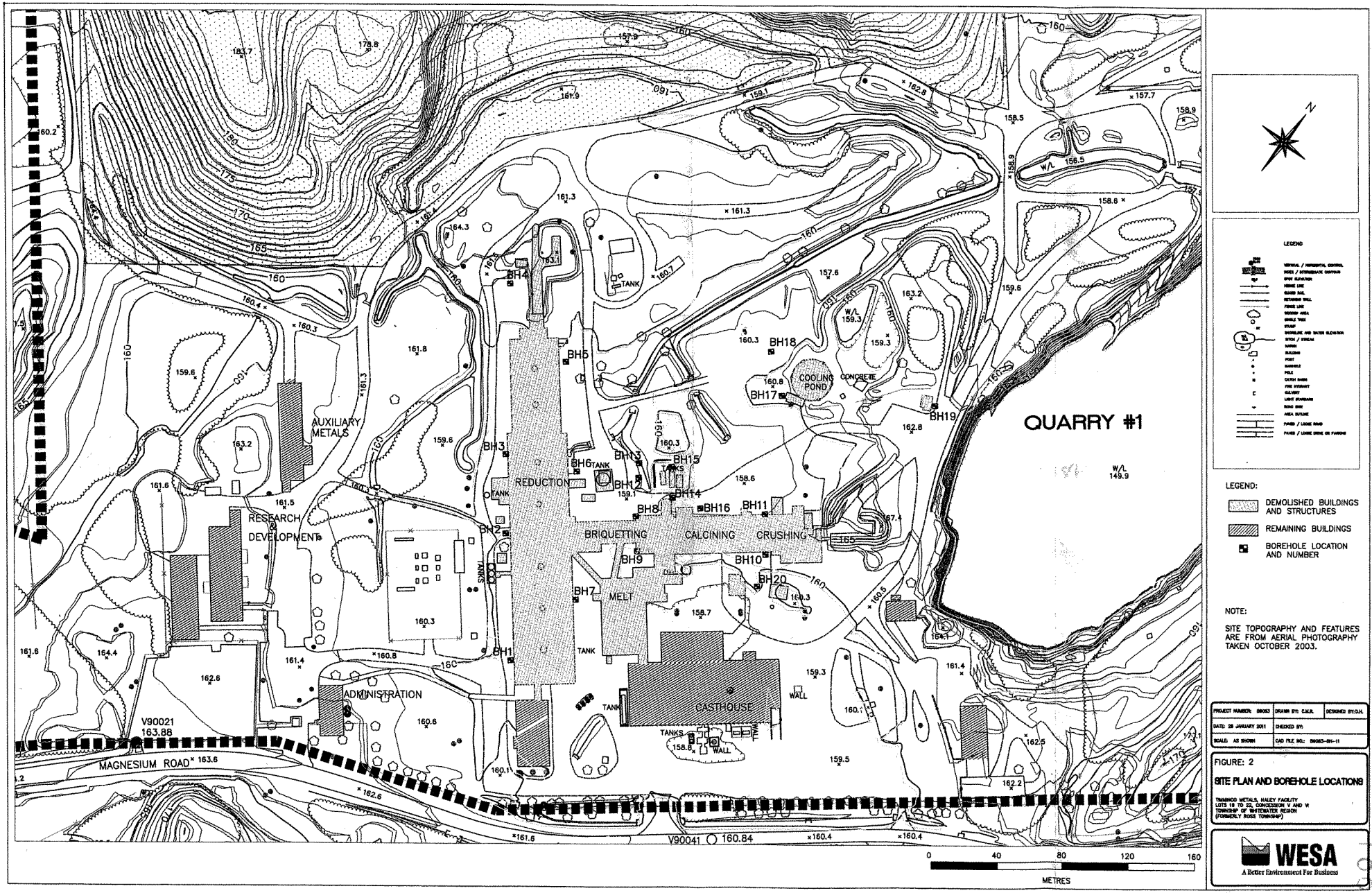
SCALE: 1:10,000

REFERENCE: ONTARIO BASE MAP
MAP 10 18 3600 50450

SITE LOCATION MAP

B9083-SLM

WESA
A Better Environment For Busi



PROJECT NUMBER: 08063	DRAWN BY: C.M.K.	DESIGNED BY: D.H.
DATE: 28 JANUARY 2011	CHECKED BY:	
SCALE: AS SHOWN	CAD FILE NO.: 08063-BH-11	

FIGURE: 2

SITE PLAN AND BOREHOLE LOCATIONS

TAMINCO METALS, HALEY FACILITY
LOTS 18 TO 22, CONCESSION V AND W
TOWNSHIP OF WHITEWATER REGION
(FORMERLY ROSS TOWNSHIP)

WESA
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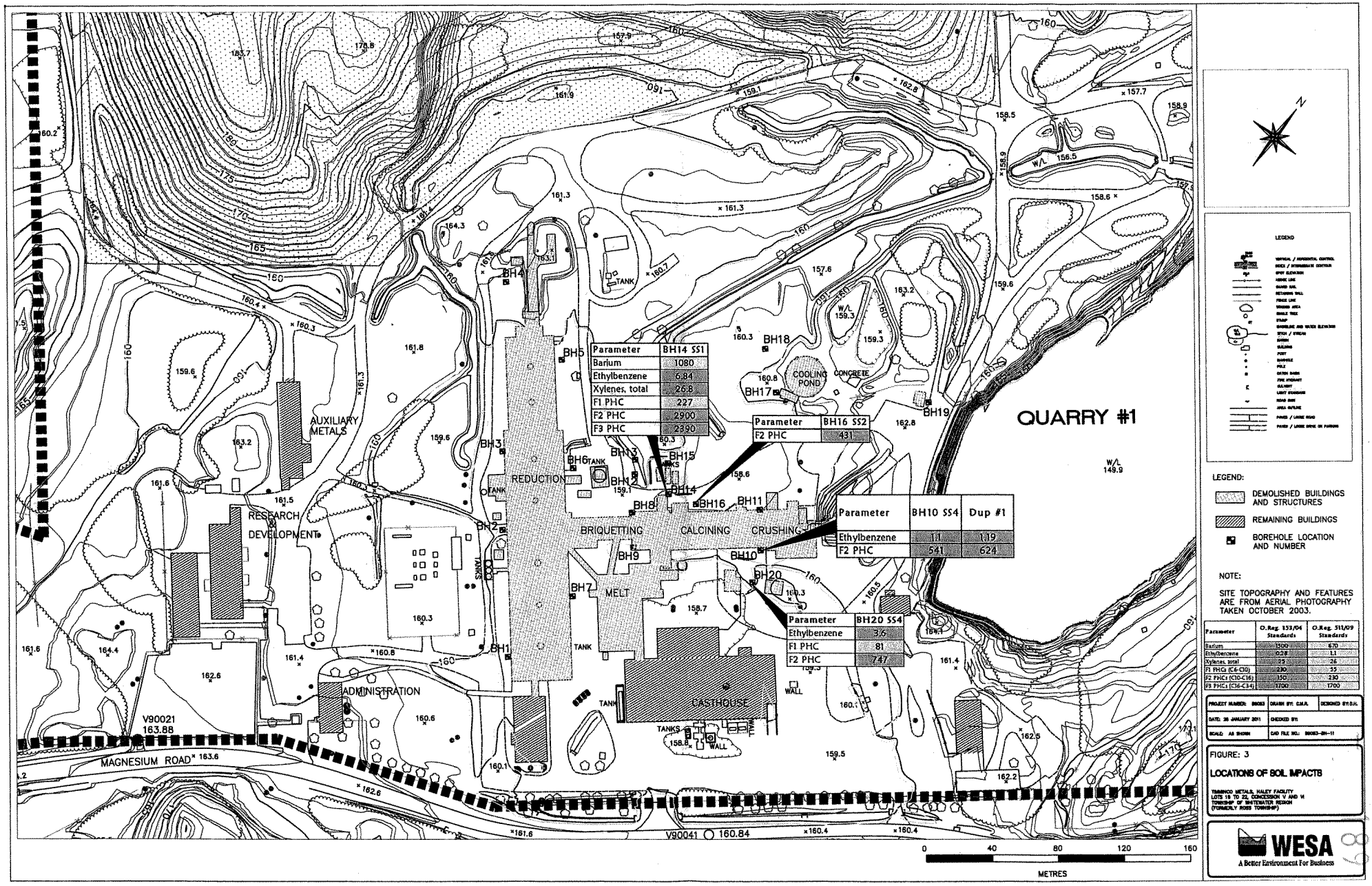
Parameter | BH14 SS1
Barium | 1080
Ethylbenzene | 6.84
Xylenes, total | 26.8
F1 PHC | 227
F2 PHC | 2900
F3 PHC | 2390
Parameter | BH16 SS2
F2 PHC | 431
Parameter | BH10 SS4 | Dup #1
Ethylbenzene | 1.1 | 1.19
F2 PHC | 541 | 624
Parameter | BH20 SS4
Ethylbenzene | 3.6
F1 PHC | 81
F2 PHC | 747
QUARRY #1
AUXILIARY METALS
REDUCTION
RESEARCH & DEVELOPMENT
BRIQUETTING
CALCINING
CRUSHING
MELT
CASTHOUSE
ADMINISTRATION
COOLING POND
CONCRETE
TANK
TANKS
WALL
MAGNESIUM ROAD
V90021 163.88
V90041 160.84
BH1
BH2
BH3
BH4
BH5
BH6
BH7
BH8
BH9
BH10
BH11
BH12
BH13
BH14
BH15
BH16
BH17
BH18
BH19
BH20
W/L 156.5
W/L 159.3
W/L 149.9
0 40 80 120 160
METRES
N
LEGEND
LEGEND:
DEMOLISHED BUILDINGS AND STRUCTURES
REMAINING BUILDINGS
BOREHOLE LOCATION AND NUMBER
NOTE:
SITE TOPOGRAPHY AND FEATURES ARE FROM AERIAL PHOTOGRAPHY TAKEN OCTOBER 2003.
Parameter | O.Reg. 153/04 Standards | O.Reg. 511/09 Standards
Barium | 1500 | 670
Ethylbenzene | 0.28 | 1.1
Xylenes, total | 23 | 26
F1 PHCs (C6-C10) | 230 | 55
F2 PHCs (C10-C16) | 150 | 230
F3 PHCs (C16-C34) | 1700 | 1700
PROJECT NUMBER: 59063
DRAWN BY: C.M.A.
DESIGNED BY: D.H.
DATE: 26 JANUARY 2011
CHECKED BY:
SCALE: AS SHOWN
CAD FILE NO.: 59063-BH-11
FIGURE: 3
LOCATIONS OF SOIL IMPACTS
TIMMINCO METALS, HALEY FACILITY
LOTS 19 TO 22, CONCESSION V AND VI
TOWNSHIP OF WHITEWATER REGION
(FORMERLY ROSS TOWNSHIP)
WESA
A Better Environment For Business

TAB E

THIS EXHIBIT "E", referred to in the Affidavit of Sharon Dawn Spires, sworn on May 14, 2013.

Mr. Clive Stephenson, Commissioner of Oaths

CLIVE D. STEPHENSON,
a Commissioner for taking affidavits in the Province of Ontario while employed by the Ministry of Northern Development and Mines.

Memorandum

Date: October 30, 2012
To: Ministry Discussion Group
From: Timminco Limited – Without Prejudice Discussion Memorandum
Re: Environmental Operations & Monitoring Costs
Timminco Limited Plant, Haley, Ontario

Enclosed you will find an evaluation completed by Timminco Limited on the potential reduction in scope of environmental monitoring to be implemented at the company's plant site in Haley, Ontario. The objective of this evaluation was to reduce the scope and costs of monitoring by focusing activities on the potential for non-conformance at the point of final discharge.

A significant amount of monitoring data has been collected since plant closure in 2008; the results of this monitoring indicate stable conditions on-site and verify the satisfactory performance of the pH treatment system. It is felt that such detailed monitoring is no longer required, and that further steps can be taken to significantly reduce the scope and costs of operations and environmental monitoring at the site. Ultimately, the goal is to allow the natural discharge of water from Quarry #1 without the need for pumping and effluent treatment. However, this will require the completion of on-site activities with associated capital expenditures.

A summary of the proposed activities, costs and timelines is provided below:

Time of Completion	Description of Activity	Estimated Additional Capital Cost[1]
2012-Q4	Continue pumping and effluent pH treatment during Fall 2012; test Quarry #1 water for acute lethality.	none
	Modify ECA No. 2784-7T4RL9 to reduce scope of monitoring as outlined in attached evaluation matrix.	none
	De-list Timminco plant from Schedule 1, O.Reg. 561/94 as amended. Eliminate requirement for MISA monitoring and reporting.	none
2013-Q1	Re-new Permit to Take Water No. 4531-8T8KQE (extend existing permit for a ten-year period).	none
2013-Q1 to Q2	Complete final biological monitoring study and obtain status as a Recognized Closed Mine (SOR/2002-222, as amended). Eliminate requirement for MMER monitoring and reporting.	$18,000
	Pump Quarry #1 down to low operating level; test Quarry #1 water for acute lethality.	none
2013-Q2	Disconnect and decommission electrical power supply for site.	TBD
2013-Q2 to Q3	Re-align outfall ditch upstream of solid mill tailings pile; re-grade existing portion of ditch from tailings pile (from SW4 to MW4).	$80,000
	Complete covering/natural re-vegetation of solid mill tailings pile.	$190,000
2013-Q3	Test Quarry #1 water for acute lethality; determine whether water quality is acceptable for natural overflow discharge:	
	(a) If acceptable, allow Quarry #1 water level to rise and naturally overflow.	none

	(b) If not acceptable for natural discharge, implement temporary power supply (portable generator) and continue with pumping and effluent pH treatment during Fall 2013.	TBD

Note:
1. Estimated capital costs are in addition to the current operations and monitoring costs for the site.

Upon completion of the outfall ditch re-alignment and covering of the solid mill tailings pile, it is expected that the water quality in Quarry #1 will gradually improve (lower pH and lower ammonia inputs). Once the quarry water is confirmed to pass the acute lethality test, it can be allowed to overflow at the quarry's natural outlet, without the need for further pH treatment.

The overall goal is to illustrate a path towards making the property a viable candidate for private sector acquisition from the Timminco CCAA proceedings given that Timminco itself cannot be assured of being in a position to exercise stewardship over the property for very much longer. The one economic use which hast potential for the site that may need further discussion and exploration is that of providing a source of aggregate. The existing quarry was created, of course, in the course of Dolomite mining and processing operations. The same material, however, even if no longer economic to be mined as Dolomite may be suitable for future use as a source of aggregate. Such an owner would be able to provide the stewardship and longer term control that the site needs.

TAB F

THIS EXHIBIT "F", referred to in the Affidavit of Sharon Dawn Spires, sworn on May 14, 2013.

Mr. Clive Stephenson, Commissioner of Oaths

CLIVE D. STEPHENSON,
a Commissioner for taking affidavits in the Province of Ontario while employed by the Ministry of Northern Development and Mines.

Spires, Dawn (MNDM)

From: Purdon, Rob H. (MNDM)
Sent: March 14, 2013 9:49 AM
To: Wyatt, Catherine (MNDM); Cai, David (MNDM)
Cc: McMahon, Brian (MNDM); Spires, Dawn (MNDM)
Subject: Basis for Costs at Timminco
Importance: High

Hi David and Catherine,

Further to our discussion yesterday, the following is a rational for the costs associated with the hydrocarbon contamination and the subsurface impacts related to the solid mill tailings on the Timminco Site:

Hydrocarbon Contamination

The consulting firm retained by Timminco estimate rehabilitation costs and timeframes for 6 options in Table 7 of the report entitled "Final Report, Supplemental Subsurface Investigation, Timminco Metals, Haley, Ontario" dated November, 2011 and received by MNDM on July 20, 2012.

Table 7 – Remedial Options Level D Cost Estimate

Remedial Option	Range in Unit Cost / Tonne	Cost Estimate	Timeframe
Excavation and Off-site Disposal (ex-situ)	$50 - 100	$1.24 to $2.48 million	3 months
Biopile (ex-situ)	$30 - 90	$745,000 to $2.23 million	1-2 years
Landfarming (ex-situ)	$30 - 60	$745,000 to $1.49 million	1-2 years
Enhanced Aerobic Biodegradation (in-situ)	$20 - 30	$500,000 to $745,000	2-5 years
Chemical Oxidation (ISCO) (in-situ)	$30 - 40	$745,000 to $995,000	8-12 months
Groundwater Pump and Treatment (ex-situ)	$3,000 to $5,000/week	$24,000 - $40,000	8 weeks (for mass removal)

As you can see the costs are estimated to range from $745K to $2.23 million for soil remediation and $24K to $40K for groundwater remediation.

WESA's "Recommended Remedial Option", involves a combination of several of the insitu and exsitu technologies. The report does not, however, provide a specific cost estimate for the recommended approach and the costs for individual components need to be calculated.

Based on the unit costs per tonne presented in Table 7 and the estimated volumes/tonnages of soil, I have prepared the table below to provide an estimate for the costs associated with WESA's recommended approach.

Remediation Component	Estimated	Unit cost	Cost for

	volume/tonnage		Component
Excavation and Disposal of shallow soil in Area A/A'	2,020 tonnes	$100/tonne	$ 202,000
Chemical Oxidation in Area A/A'	2,020 tonnes	$40/tonne	$ 80,800
Chemical Oxidation in Area B/B'	22,800 tonnes	$40/tonne	$ 912,000
Trench Excavation/disposal in Area B	600 tonnes	$100/tonne	$ 600,000
Groundwater pump and treat Area B/B'	8 weeks pumping	$5,000/week	$ 40,000
Total for WESA;s recommended remedial approach			**$1,834,800**

Note that WESA based these estimates on the results of two subsurface investigations and that the actual lateral and vertical extent of the hydrocarbon contamination was not fully delineated. Additional work (e.g. boreholes, monitoring wells, soil and groundwater sampling) would be required to complete delineation. Based on my experience in this sector, I estimate that the costs to complete delineation would be in the order of $25K to retain professional services, drill boreholes, collect samples and construct monitoring wells.

Subsurface Impacts from the Solid Mill Tailings

As we have discussed, there are additional concerns related to groundwater impacts from the soild mill tailings. The existing monitoring well on the western side of the property (MW-1) has high levels of ammonia and high pH, typical of the ground and surface water impacts associated with the solid mill tailings. While the Closure Plan and Closure Plan Amendment identify this well as the background well, it is actually located downgradient of the solid mill tailings and is situated very close to the western property boundary. Given the site topography and the reported analytical results from MW-1, both the MOE hydrogeologist and I are in agreement that there are strong indications that there are groundwater impacts from the solid mill tailings on the adjoining privately owned lands.

The costs to deal with subsurface soil and groundwater impacts are more difficult to estimate because the current groundwater monitoring network is inadequate and the monitoring wells are not well positioned to determine groundwater flow from the solid mill tailings pile.

The following is what I have recommended as a scope of work to assess the situation:

> *The proponent must undertake a detailed hydrogeological assessment of subsurface soil and groundwater impacts related to the Solid Mill Tailings (SMT) area. This assessment must include installation of nested pairs of monitoring wells down gradient of the SMT as well as installation of a source monitoring well within the SMT pile itself. Nested pairs of wells are required to assess impacts to the shallow soil aquifer and impacts to the deeper bedrock aquifer. Since the SMT pile represents a topographic high, the hydrogeological assessment must address contaminant migration north, south, east and, in particular, attention must be paid to assessment of the potential for impacts westward off the Timminco property. As a minimum, the groundwater assessment must meet the requirements of the Mine Rehabilitation Code in addition to requirements of the existing site Environmental Compliance Approval with respect to the information provided and parameters tested. The hydraulic conductivity of subsurface materials, vertical/horizontal groundwater gradients, rates of contaminant migration and an assessment of contaminant attenuation must also be included. The assessment must also provide an assessment of potential mitigation strategies to address any off-property migration of contaminants, identification of a preferred strategy as well as a timeline and costs.*

This work involves the construction/installation of a minimum of 5 groundwater monitoring wells both into the shallow surface soil and bedrock, along with one monitoring well installed into the solid mill tailings as a source monitor. Based on my experience in this sector, costs for the wells could exceed $10K each. Consequently, with sampling and consulting services, costs for the assessment could approach $100K.

Without the assessment outlined above, it is much harder to estimate the costs. For the purposes of discussion, I have been conservatively estimating that, if significant mitigation measures are required (such as installation of a groundwater collection and pump and treat system) costs could exceed $1 million.

I hope this helps, let me know if you have any questions or need additional information.

Cheers!

Rob Purdon, M.Sc., P. Geo.
Mine Rehabilitation Specialist
Ministry of Northern Development and Mines
435 James Street South, Suite B002
Thunder Bay, ON
P7E 6S7

807-475-1197

rob.h.purdon@ontario.ca

TAB G

THIS EXHIBIT "G", referred to in the Affidavit of Sharon Dawn Spires, sworn on May 14, 2013.

Mr. Clive Stephenson, Commissioner of Oaths

CLIVE D. STEPHENSON,
a Commissioner for taking affidavits in the Province of Ontario while employed by the Ministry of Northern Development and Mines.

Independent Electricity System Operator
PHYSICAL INVOICE

Independent Electricity System Operator
Station A, Box 4474
Toronto, ON
M5W 4E5

HST: 870513959
Issue / Re-Issue Date: 14-DEC-2012

TIMMINCO LIMITED
962 Magnesium Road
Haley, ON K0J 1Y0
Canada

Invoice: PI00004487
Invoice Date: 14-DEC-2012
MP ID: 104347
MP GST/HST: R105289094

Please send payment by WIRE or EFT to:

Bank Name: **TD Bank** Bank Acc Type: **Settlement Clearing**
Bank ID Number: **0004** Bank Transit Number: **10202**
Bank Account Number: **0690-0458762**

For all inquiries contact:
IESO Account Representative
Tel:905-403-6900
Toll Free:1-888-448-7777

Comments: Text & HTML formats of invoice will be discontinued effective March 1, 2013. Contact stakeholder.engagement@ieso.ca for more details

Charges for settlement statements issued: From 01-Nov-2012 To 30-Nov-2012

Charge Type	Description	Amount
101	NET ENERGY MARKET SETTLEMENT FOR NON-DISPATCHABLE LOAD	$2,155.28
148	CLASS B GLOBAL ADJUSTMENT SETTLEMENT AMOUNT	$4,508.82
150	NET ENERGY MARKET SETTLEMENT UPLIFT	$38.30
155	CONGESTION MANAGEMENT SETTLEMENT UPLIFT	$40.76
169	STATION SERVICE REIMBURSEMENT DEBIT	$1.56
170	LOCAL MARKET POWER REBATE	($16.17)
183	GENERATION COST GUARANTEE RECOVERY DEBIT	$35.13
186	INTERTIE FAILURE CHARGE REBATE	($0.32)
250	10-MINUTE SPINNING MARKET RESERVE HOURLY UPLIFT	$8.28
252	10-MINUTE NON-SPINNING MARKET RESERVE HOURLY UPLIFT	$5.61
254	30-MINUTE OPERATING RESERVE MARKET HOURLY UPLIFT	$1.29
450	BLACK START CAPABILITY SETTLEMENT DEBIT	$0.66
451	HOURLY REACTIVE SUPPORT AND VOLTAGE CONTROL SETTLEMENT DEBIT	$7.18
452	MONTHLY REACTIVE SUPPORT AND VOLTAGE CONTROL SETTLEMENT DEBIT	$1.17
454	REGULATION SERVICE SETTLEMENT DEBIT	$13.67
650	NETWORK SERVICE CHARGE	$421.26
651	LINE CONNECTION SERVICE CHARGE	$114.40
752	DEBT RETIREMENT CHARGE	$581.62
753	RURAL RATE SETTLEMENT CHARGE	$91.40
754	OPA ADMINISTRATION CHARGE	$45.78
900	GST/HST CREDIT	($25.05)

950	GST/HST DEBIT		$1,087.41
1463	RENEWABLE GENERATION CONNECTION - MONTHLY COMPENSATION AMOUNT SETTLEMENT DEBIT		$11.92
1550	DAY-AHEAD PRODUCTION COST GUARANTEE RECOVERY DEBIT		$42.43
1650	FORECASTING SERVICE BALANCING AMOUNT		$0.06
9990	IESO ADMINISTRATION CHARGE		$68.30
Invoice Total:		$CAD	9,240.75

Payment Due Date 18-DEC-2012

This invoice also constitutes a debit/credit note for GST/HST purposes

TAB H

THIS EXHIBIT "H", referred to in the Affidavit of Sharon Dawn Spires, sworn on May 14, 2013.

Mr. Clive Stephenson, Commissioner of Oaths

CLIVE D. STEPHENSON,
a Commissioner for taking affidavits in the Province of Ontario while employed by the Ministry of Northern Development and Mines.

Court File No. CV-12-9539-00CL

File T11

ONTARIO
SUPERIOR COURT OF JUSTICE
COMMERCIAL LIST

THE HONOURABLE MR.	)	TUESDAY, THE 5TH
	)	
JUSTICE MORAWETZ	)	DAY OF MARCH, 2013

IN THE MATTER OF THE *COMPANIES' CREDITORS ARRANGEMENT ACT*, R.S.C. 1985, c. C-36, AS AMENDED

AND IN THE MATTER OF A PLAN OF COMPROMISE OR ARRANGEMENT OF TIMMINCO LIMITED AND BÉCANCOUR SILICON INC.

Applicants

ORDER
(Re Transfer of Redundant Assets)

THIS MOTION, made by Timminco Limited ("**Timminco**") and Bécancour Silicon Inc. (and together with Timminco, the "**Timminco Entities**"), for an order approving the Haley Agreement (defined below and substantially in the form contained at Tab 2A of the Motion Record dated February 22, 2013) and the Silica Fumes Deed (defined below and substantially in the form contained at Tab 2C of the Motion Record dated February 22, 2013), was heard this day at 330 University Avenue, Toronto, Ontario.

ON READING the Affidavit of Sean Dunphy sworn February 22, 2013 (the "**February 22 Affidavit**"), the Affidavit of Sean Dunphy sworn March 4, 2013 (the "**March 4 Affidavit**"), and the Nineteenth Report of FTI Consulting Canada Inc. in its capacity as the court appointed monitor of the Timminco Entities (the "**Monitor**") dated March 4, 2013 and on hearing the submissions of counsel for the Timminco Entities and the Monitor, no one appearing for any other person on the service list, to, the BSI Pension Committee, Mercer Canada, Ministry of Northern Mines and Development,

although duly served as appears from the affidavits of service of Kathryn Esaw sworn February 25, 2013 and March 4, 2013, filed:

SERVICE

1. **THIS COURT ORDERS** that the time for service of the Notice of Motion, the Motion Record and the Supplemental Motion Record is hereby abridged and validated so that this Motion is properly returnable today and hereby dispenses with further service thereof.

APPROVAL OF THE HALEY TRANSACTION

2. **THIS COURT ORDERS AND DECLARES** that the agreement of purchase and sale (the "**Haley Agreement**") between Timminco and Timminco Silicon Holdings Limited providing for the transfer of the Haley Property (described at **Schedule "A"** to this Order) and the transaction contemplated therein (the "**Haley Transaction**") are hereby approved. The Timminco Entities and the Monitor are hereby authorized and directed to take such additional steps and execute such additional documents as may be necessary or desirable for the completion of the Haley Transaction and for the conveyance of the rights, title and interest in and to the Haley Property pursuant to the Haley Agreement.

APPROVAL OF THE SILICA FUMES TRANSACTION

3. **THIS COURT ORDERS AND DECLARES** that the deed of sale (the "**Silica Fumes Deed**") between Timminco and 2362896 Ontario Inc. providing for the transfer of the Silica Fumes Property (described at **Schedule "B"** to this Order) and the transaction contemplated therein (the "**Silica Fumes Transaction**") are hereby approved. The Timminco Entities and the Monitor are hereby authorized and directed to take such additional steps and execute such additional documents as may be necessary or desirable for the completion of the Silica Fumes Transaction and for

the conveyance of the rights, title and interest in and to the Silica Fumes Property pursuant to the Silica Fumes Deed.

ACTIONS BY THE CRO

4. **THIS COURT DECLARES** that Russell Hill Advisory Services Inc. ("**Russell Hill**"), in its capacity as Chief Restructuring Officer of the Timminco Entities (the "**CRO**"), has the authority to sign sole shareholder declarations authorizing the filing of assignments in bankruptcy of Timminco Silicon Holdings Limited and 2362896 Ontario Inc. Russell Hill further has the power to sign any documents necessary for Timminco Silicon Holdings Limited and 2362896 Ontario Inc. to make assignments in bankruptcy, including but not limited to Form 21 of the Bankruptcy Forms (an Assignment for the General Benefit of Creditors).

5. **THIS COURT ORDERS** that Russell Hill has the authority to sign any documents necessary to effect the incorporation of or take any other action relating to 2362896 Ontario Inc. and that such incorporation or other action is hereby approved *nunc pro tunc.*

6. **THIS COURT ORDERS** that Russell Hill has the authority to transfer the shares of 2362896 Ontario Inc. from Timminco to BSI and that such transfer is hereby approved *nunc pro tunc.*

DEPOSIT PAYMENT

7. **THIS COURT ORDERS** that the Timminco Entities are authorized to pay to the proposed Trustee in Bankruptcy to be named in the assignment in bankruptcy of Timminco Silicon Holdings Limited a third party deposit in the amount of $15,000 (the "**TSHL Deposit**"), such TSHL Deposit to be in accordance with Directive 16 issued by the Superintendent of Bankruptcy.

8. **THIS COURT ORDERS** that the Timminco Entities are authorized to pay to the proposed Trustee in Bankruptcy to be named in the assignment in bankruptcy of 2362896 Ontario Inc. a third party deposit in the amount of $15,000 (the "**2362896 Deposit**"), such 2362896 Deposit to be in accordance with Directive 16 issued by the Superintendent of Bankruptcy.

GENERAL

9. **THIS COURT HEREBY REQUESTS** the aid and recognition of any court, tribunal, regulatory or administrative body having jurisdiction in Canada or in the United States to give effect to this Order and to assist the Monitor, the CRO, and their respective agents in carrying out the terms of this Order. All courts, tribunals, regulatory and administrative bodies are hereby respectfully requested to make such orders and to provide such assistance to the Monitor and to the CRO, as an officer of this Court, as may be necessary or desirable to give effect to this Order or to assist the Monitor and its agents in carrying out the terms of this Order.

ENTERED AT / INSCRIT À TORONTO
ON / BOOK NO:
LE / DANS LE REGISTRE NO.:

MAR 5 - 2013

Schedule "A"

Haley Property

1. PIN 57219-0053 (LT)) being PT LT 19, CON 5, PTS 1 & 2, 49R10275; T/W R331262; PT LT 20, CON 5 AS IN RS9949, RS9419 & RS10244 LYING NORTH OF COUNTY ROAD #7; EXCEPT PTS 1 & 2, 49R6847; S/T & T/W RS9949, ROSS; S/T R133145 & RS9271 ; TOWNSHIP OF WHITEWATER REGION (DESCRIPTION CORRECTED 2001/02/23 BY MOB, DEP. REGR.

2. PIN 57219-0054 (LT) being PT LT 20, CON 5, PTS 1-3, 49R6916; S/T R246515, ROSS ; S/T R132602,RS9255 ROSS

3. PIN 57219-0036 (LT) being PT LT 19, CON 6 AS IN RS9040, RS8994 & RS9847 EXCEPT PT 1, 49R6693; PT LT 20, CON 6 AS IN RS8990 EXCEPT R267236; S/T & T/W RS9040, ROSS ; ROSS

4. PIN 57217-0079 (LT) being PT LT 23, CON 2 AS IN RS9419 (FIRSTLY) ; ROSS

5. PIN 57216-0053 (LT) being PT LT 23, CON 3 AS IN RS9419 LYING E OF THE ELY LIMIT OF THE KING'S HWY NO. 17 & W OF THE WLY LIMIT OF HWY NO. 653 ; ROSS

6. PIN 57217-0156 (LT) being PT LT 23, CON 3 AS IN RS9419 (SECONDLY), LYING W OF HWY NO. 17 & E OF THE SLY EXT OF THE WLY LIMIT OF PT 1, 498399 ; ROSS

7. PIN 57216-0076 (LT) being PT LTS 21-23, CON 4 AS IN RS9419 LYING E OF THE ELY LIMIT OF HWY NO. 653 & W OF THE WLY LIMIT OF THE RDAL BTN CONS 4&5 ; ROSS

8. PIN 57216-0157 (LT) being LT 21, CON 5 EXCEPT 49R547, 49R4755, 49R12111, R9440, R132705, R142326, PTS 3, 5 & 6, 49R6847 ; S/T R133145,R267237,RS9882 ROSS

9. PIN 57216-0235 (LT) being PT LT 20, CON 5 AS IN RS9949 & RS9419 LYING S OF THE SLY LIMIT OF PT 2, 49R6847, S/T R133145 ROSS

10. PIN 57216-0158 (LT) being PT LT 21-22 CON 5 ROSS AS IN R132705 ; S/T R134851 ; RENFREW

Schedule "B"

Silica Fumes Property

1. An immovable situated in the City of Bécancour, Province of Québec, known and designated as lot THREE MILLION FIVE HUNDRED THIRTY-NINE THOUSAND FIVE HUNDRED AND THREE (3 539 503), of the Cadastre of Québec, Registration Division of Nicolet (Nicolet 2).

Court File No. CV-12-9539-00CL

IN THE MATTER OF THE *COMPANIES' CREDITORS ARRANGEMENT ACT*, R.S.C. 1985, c. C-36, AS AMENDED

AND IN THE MATTER OF A PLAN OF COMPROMISE OR ARRANGEMENT
OF TIMMINCO LIMITED AND BÉCANCOUR SILICON INC.

ONTARIO
SUPERIOR COURT OF JUSTICE
(COMMERCIAL LIST)

Proceeding commenced at Toronto

ORDER
(Re Approval of the Redundant Assets Transfer)

STIKEMAN ELLIOTT LLP
Barristers & Solicitors
5300 Commerce Court West
199 Bay Street
Toronto, Canada M5L 1B9

Ashley John Taylor LSUC#: 39932E
Tel: (416) 869-5236
Maria Konyukhova LSUC#: 52880V
Tel: (416) 869-5230
Kathryn Esaw LSUC#: 58264F
Tel: (416) 869-5230
Fax: (416) 947-0866

Lawyers for the Applicants

TAB I

THIS EXHIBIT "I", referred to in the Affidavit of Sharon Dawn Spires, sworn on May 14, 2013.

Mr. Clive Stephenson, Commissioner of Oaths

CLIVE D. STEPHENSON,
a Commissioner for taking affidavits in the Province of Ontario while employed by the Ministry of Northern Development and Mines.

Grant Thornton

RECEIVED
MAR 14 2013

March 13, 2013

BY COURIER

Ministry of the Attorney General
720 Bay Street, 8th Floor
Toronto ON M5G 2K1
Attn: Ronald Carr

Ministry of the Environment
Legal Services Branch
135 St Clair Avenue West
Toronto, ON M4V 1P5

Ministry of Northern Development and Mines
933 Ramsey Lake Road, B6
Sudbury, ON P3E 6B5
Attn: Catherine Wyatt

Grant Thornton Limited
Royal Bank Plaza
19th Floor, South Tower
200 Bay Street, Box 55
Toronto, ON M5J 2P9
T (416) 366-0100
F (416) 360-4948
E Toronto@GrantThornton.ca
www.GrantThornton.ca

Dear Sirs/Mesdames:

Re: Bankruptcy of Timminco Silicon Holdings Limited
Abandonment of the Haley Property

We are writing in our capacity as the Trustee in Bankruptcy of Timminco Silicon Holdings Limited ("**TSHL**"), which assignment into bankruptcy was effected March 8, 2013 (our certificate of appointment is enclosed for your information). A meeting of creditors will take place on March 28, 2013 at 2:00 PM at the Royal Bank Plaza, 200 Bay Street, South Tower, 19th Floor.

The assets of TSHL are comprised of the property located at 962 Magnesium Road, Haley, Ontario and other real property detailed at Schedule "A" to this letter (together, the "**Haley Properties**"). After analyzing our options to deal with the Haley Properties, and in light of the recent Director's Order issued against the real property located at 962 Magnesium Road, we have not taken possession and have abandoned the Haley Properties in accordance with s. 14.06(4) of the *Bankruptcy and Insolvency Act*, RSC 1985 c B-3.

If you have any questions with respect to the foregoing, please do not hesitate to be in touch.

Yours truly,

GRANT THORNTON LIMITED, in its capacity as Trustee in Bankruptcy of Timminco Silicon Holdings Limited, and not in its personal or corporate capacity.

Jonathan Krieger, CA•CIRP
Senior Vice President

cc. Sean Dunphy
Nigel Meakin
Maria Konyukhova

Encl.

Schedule "A"

1. PIN 57219-0053 (LT)) being PT LT 19, CON 5, PTS 1 & 2, 49R10275; T/W R331262; PT LT 20, CON 5 AS IN RS9949, RS9419 & RS10244 LYING NORTH OF COUNTY ROAD #7; EXCEPT PTS 1 & 2, 49R6847; S/T & T/W RS9949, ROSS; S/T R133145 & RS9271; TOWNSHIP OF WHITEWATER REGION (DESCRIPTION CORRECTED 2001/02/23 BY MOB, DEP. REGR.)

2. PIN 57219-0054 (LT) being PT LT 20, CON 5, PTS 1-3, 49R6916; S/T R246515, ROSS; S/T R132602, RS9255 ROSS

3. PIN 57219-0036 (LT) being PT LT 19, CON 6 AS IN RS9040, RS8994 & RS9847 EXCEPT PT 1, 49R6693; PT LT 20, CON 6 AS IN RS8990 EXCEPT R267236; S/T & T/W RS9040, ROSS; ROSS

4. PIN 57217-0079 (LT) being PT LT 23, CON 2 AS IN RS9419 (FIRSTLY); ROSS

5. PIN 57216-0053 (LT) being PT LT 23, CON 3 AS IN RS9419 LYING E OF THE ELY LIMIT OF THE KING'S HWY NO. 17 & W OF THE WLY LIMIT OF HWY NO. 653; ROSS

6. PIN 57217-0156 (LT) being PT LT 23, CON 3 AS IN RS9419 (SECONDLY), LYING W OF HWY NO. 17 & E OF THE SLY EXT OF THE WLY LIMIT OF PT 1, 498399; ROSS

7. PIN 57216-0076 (LT) being PT LTS 21-23, CON 4 AS IN RS9419 LYING E OF THE ELY LIMIT OF HWY NO. 653 & W OF THE WLY LIMIT OF THE RDAL BTN CONS 4&5; ROSS

8. PIN 57216-0157 (LT) being LT 21, CON 5 EXCEPT 49R547, 49R4755, 49R12111, R9440, R132705, R142326, PTS 3, 5 & 6, 49R6847 ; S/T R133145, R267237, RS9882 ROSS

9. PIN 57216-0235 (LT) being PT LT 20, CON 5 AS IN RS9949 & RS9419 LYING S OF THE SLY LIMIT OF PT 2, 49R6847, S/T R133145 ROSS

10. PIN 57216-0158 (LT) being PT LT 21-22 CON 5 ROSS AS IN R132705 ; S/T R134851; RENFREW

Industry Canada
Office of the Superintendent of Bankruptcy Canada

Industrie Canada
Bureau du surintendant des faillites Canada

District of: Ontario
Division No.: 09 - Toronto
Court No.: 31-1722944
Estate No.: 31-1722944

In the Matter of the Bankruptcy of:

Timminco Silicon Holdings Limited
Debtor

GRANT THORNTON LIMITED
Trustee

Ordinary Administration

Date and time of bankruptcy:	March 08, 2013, 13:17	Security:	$0.00
Date of trustee appointment:	March 08, 2013		
Meeting of creditors:	March 28, 2013, 14:00 ROYAL BANK PLAZA 200 BAY ST., SOUTH TOWER, 19th FL. TORONTO, Ontario Canada,		
Chair:	Trustee		

CERTIFICATE OF APPOINTMENT - Section 49 of the Act; Rule 85

I, the undersigned, official receiver in and for this bankruptcy district, do hereby certify that:

- the aforenamed debtor filed an assignment under section 49 of the *Bankruptcy and Insolvency Act*;
- the aforenamed trustee was duly appointed trustee of the estate of the debtor.

The said trustee is required:

- to provide to me, without delay, security in the aforementioned amount;
- to send to all creditors, within five days after the date of the trustee's appointment, a notice of the bankruptcy; and
- when applicable, to call in the prescribed manner a first meeting of creditors, to be held at the aforementioned time and place or at any other time and place that may be later requested by the official receiver.

Date: March 08, 2013, 13:25

E-File/Dépôt Electronique

Official Receiver

25 St. Clair Avenue East, 6th floor, Toronto, Ontario, Canada, M4T1M2, (877)376-9902

Canada

Court File No. CV-12-9566-00CL

IN THE MATTER OF THE *COMPANIES CREDITORS ARRANGEMENT ACT*, R.S.C. 1985, c. C-36, AS AMENDED

AND IN THE MATTER OF A PLAN OF COMPROMISE OR ARRANGEMENT OF TIMMINCO LIMITED AND BEANCOUR SILICON INC.

Applicants

ONTARIO
SUPERIOR COURT OF JUSTICE
(COMMERCIAL LIST)

PROCEEDING COMMENCED AT TORONTO

MOTION RECORD

MINISTRY OF THE ATTORNEY GENERAL
Crown Law Office –Civil
720 Bay Street, 8th Floor
Toronto, Ontario M5G 2K1

Ronald Carr (LSUC# 13341F)
Tel: (416) 326-2704
Email: Ronald.carr@ontario.ca

Lisa Brost (LSUC# 49279G)
Tel: (416) 325-9806
Email: lisa.brost@ontario.ca

Fax: (416) 326-4181

Counsel for the Her Majesty the Queen in right of Ontario as represented by the Ministry of Northern Development and Mining