

RESEARCH PROJECT AGREEMENT # 105557

Made as of the 4th day of December, 2024

Between

University of Waterloo
200 University Avenue West
Waterloo, Ontario N2L 3G1
(hereinafter referred to as the “**University**”)

and

Giant Mine Oversight Body Society
Box 1602
Yellowknife, NT
X1A 2P2
(hereinafter referred to as the “**Client**”)

WHEREAS the University and the Client entered into the Master Research Agreement, effective May 3, 2019, amended as of February 24, 2021, and further amended as of February 24, 2023 (the “Master Research Agreement”), in which the Client engaged the University to conduct research related to the management of arsenic trioxide (the “Research Purpose”);

AND WHEREAS the University and the Client wish to enter into this Agreement (as defined below) to have the University perform the research in furtherance of the Research Purpose as set forth in Schedule “A” in accordance with the terms and conditions of this Agreement and the Master Research Agreement;

NOW THEREFORE in consideration of the premises and the mutual covenants, terms, conditions and agreements contained herein, and other good and valuable consideration, the sufficiency of which is hereby acknowledged, the Parties hereto agree as follows:

ARTICLE 1 – DEFINITIONS

- 1.1 “**Agreement**” means this Research Project Agreement #105557 including all attached schedules, as the same may be supplemented, amended, restated or replaced in writing from time to time;
- 1.2 “**Background Intellectual Property**” means Intellectual Property or Confidential Information of a Party created prior to or outside the scope of this Agreement without the benefit of funds from the Client which is disclosed to the other for the purpose of the Research Project;
- 1.3 “**Client Confidential Information**” means Confidential Information of the Client which has been disclosed by the Client to the University, but not including Project Intellectual Property;
- 1.4 “**Confidential Information**” means the specific terms and conditions set forth in this Agreement, the Project Intellectual Property, and any information, which is disclosed by one Party to the other Party for the purpose of the Research Project provided that tangible materials are clearly marked as “Confidential” and any information provided orally or

visually is identified as confidential at the time of disclosure, but shall not include information that:

- (a) is or becomes generally available to the public other than as a result of any wrongful act or omission of the receiving Party;
- (b) is rightfully received by the receiving Party from a third party authorized to make such disclosure without similar restriction or without breach of this Agreement;
- (c) has been approved for disclosure by written authorization of the disclosing Party;
- (d) was disclosed by the receiving Party to a third party prior to the information being identified as Confidential by the disclosing Party;
- (e) a receiving Party is able to demonstrate, in writing, was known to it on a non-confidential basis; or
- (f) was independently developed by a receiving Party without the use of any of the Confidential Information;

1.5 **“Controlled Item”** has the meaning provided in Section 2.7;

1.6 **“Claim”** or **“Claims”** has the meaning provided in Section 9.1;

1.7 **“Fiscal Year”** means the year starting on April 1 and ending on March 31;

1.8 **“Intellectual Property”** means all intellectual property, whether or not reduced to practice including, without limitation, all information, knowledge, know-how, techniques, methods, systems, processes, procedures, technology, materials, products, designs, results, software, data, formulae, algorithms, discoveries, developments, inventions, and improvements (whether patentable or unpatentable), and all patent applications, patents, trade-marks, trade-secrets, copyrights, industrial designs and all right, title and interest thereto;

1.9 **“Master Research Agreement”** has the meaning provided in the recitals;

1.10 **“Party”** or **“Parties”** means the Client or the University, as applicable, or the Client and the University;

1.11 **“Personal Information”** means any information about an identifiable individual (including the Parties’ employees, customers, suppliers, directors, officers and shareholders) that either Party obtains from or through the other Party;

1.12 **“Principal Investigator”** has the meaning set forth in Section 2.2;

1.13 **“Project Intellectual Property”** means the Intellectual Property developed, created or discovered as a direct result of the Research Project regardless of the Party who develops, creates or discovers the Intellectual Property;

1.14 **“Research Personnel and Student Agreement”** has the meaning set forth in Section 2.3;

1.15 **“Research Project”** has the meaning set forth in Section 2.1;

- 1.16 **“Research Purpose”** has the meaning set forth in the recitals;
- 1.17 **“Restricted Information”** means all Personal Information and any other information and data relating to either of the Parties or their research strategies, contracts, personnel, employees, directors, volunteers, or contractors, whether or not identified as confidential, which is not generally known to the public and which would reasonably be considered to be confidential;
- 1.18 **“Subcontractor”** means any individual or entity identified by the University in the Research Project as assisting in the performance of the Research Project under this Agreement;
- 1.19 **“Term”** has the meaning set forth in Section 12.1; and
- 1.20 **“University Research Personnel and Students”** means University researchers, including, but not limited to, the Principal Investigator, students, post doctoral fellows, research associates, who participate in the Research Project.

ARTICLE 2 - OBJECTIVES

- 2.1 The University shall perform, or procure the performance of, the research project as set forth in Schedule “A” (the **“Research Project”**) upon the terms and conditions hereinafter set forth. The Client and the University agree that the Research Project is a research project as contemplated in the Master Research Agreement and that all terms, conditions and obligations regarding the research project(s) contemplated therein are incorporated herein by reference. In the event there are discrepancies between the terms and conditions of the Master Research Agreement and this Agreement, the terms and conditions of this Agreement shall govern solely for the purposes of the Research Project contemplated by this Agreement.
- 2.2 The Principal Investigator(s) of the Research Project shall be David Blowes of the University’s Department of Earth and Environmental Sciences, and he shall be responsible for the technical content of the Research Project.
- 2.3 Each University Research Personnel and Student shall sign a Research Personnel and Student Agreement as set forth in Schedule “B”.
- 2.4 Notwithstanding Section 2.1 hereof, the Client and the University agree that until such time as all regulatory requirements have been obtained, including all necessary approvals of any regulatory or research ethics board concerned, no work requiring such regulatory or ethics approvals shall commence (excepting any preliminary preparations which are not restricted by such requirements). For greater certainty, any delay in obtaining such approvals shall not be considered a default or breach by either the Client or the University.
- 2.5 The Client will provide, or facilitate access to, samples taken from the Giant Mine to the University for use in the Research Project. The Client assumes all responsibility for any loss, damage or claims caused during the transport of the samples to the University. The Client shall ensure that adequate insurance is secured for the samples during transit to the University.
- 2.6 The Client and the University acknowledge that some research, particularly that in the natural sciences and engineering, may be subject to export control laws and regulations of Canada or the U.S. For example, transmitting the results of, or information about,

certain research may require first obtaining an export permit or other authorization. Certain research may also be subject to regulation by the Controlled Goods Directorate (CGD) of Public Services and Procurement Canada (PSPC), in accordance with the *Defence Production Act* (DPA) and the Controlled Goods Regulations (CGR). Information may be obtained from the CGD Website at: <https://www.tpsgc-pwgsc.gc.ca/pmc-cgp/index-eng.html>.

- 2.7 The Client shall use reasonable efforts to determine whether or not the Research Project contains or may result in, items subject to these laws and regulations (a “**Controlled Item**”). In the event that a Controlled Item is identified in the Research Project, then the Client and the University shall comply with all applicable Canadian and U.S. export control laws and regulations. In the event that the Client wishes to include a Controlled Item into the Research Project at any time during the term of this Agreement, then the Client and the University agree as follows:
- (a) the Client shall promptly notify the University of the Controlled Item’s classification prior to any shipment or transmission to the University;
 - (b) the University may, at the University’s sole discretion, accept or reject the delivery of the Controlled Item; and
 - (c) in the event that the University rejects the delivery of the Controlled Item, such rejection by the University shall not constitute a breach of this Agreement.

ARTICLE 3 - FEES

- 3.1 In consideration of the University carrying out the Research Project, the Client shall pay the University the sum of \$248,599.57 CDN, of which \$171,000 CDN has already been paid, and which amount is inclusive of overhead expenses. UW shall remain solely responsible for payment of any Subcontractors, and for procurement of all equipment, materials, and other resources necessary for performance of the Research Project.
- 3.2 The sum stipulated in Section 3.1 shall be paid by the Client electronically or by cheque made payable to the University of Waterloo (Attn: Finance Department, EC5, 200 University Avenue West, Waterloo, Ontario N2L 3G1) within thirty (30) days of receipt of invoice(s) according to the following schedule:
- (a) \$171,000 CDN, deposit paid October 2024; and
 - (b) \$77,599.57 CDN upon receipt of invoice and full execution of this Agreement.
- 3.3 Invoices to the Client shall be sent by email to the Executive Director (Ben Nind), at ed@gmob.ca.
- 3.4 The University shall not be obliged to perform any work beyond the Research Project which would cause the aggregate costs to exceed the amount set forth in Section 3.1. In the event that the University requires funding over and above the amount set out in Section 3.1 to carry out the Research Project, the University must apply to the Client with a specific request outlining the use of the additional funding. The Client will have the right to grant or refuse additional funding.
- 3.5 Any funds advanced by the Client to the University that have not been used for the Research Project for which the funds were provided by the earlier of the termination of this

Agreement or by the end date of the Research Project will be returned to the Client within 90 days at no cost to the Client.

ARTICLE 4 – REPORTING

- 4.1 The University, through the Principal Investigator, will provide the Client with any reports specified in Schedule “A”, if applicable to the Research Project.
- 4.2 The Parties shall comply with the reporting requirements provided in Article 6 of the Master Research Agreement, including but not limited to:
- (a) Reporting shall comply with the Environmental Agreement attached as Schedule “A” to the Master Research Agreement;
 - (b) The University will provide the Client with updates via in-person or teleconference meetings at least every six (6) months on the progress of the Research Project detailing at least the steps taken, experiments performed, results, conclusions, next steps and any proposed changes to the Research Project. Prior to any particular update deadline, the Client may request that specific information be provided and may request specific questions be answered. The University will provide the requested information and answers within the next update;
 - (c) Within 60 days of the end of each quarter, the University will send to the Client financial statements with respect to the Research Project activities for the preceding quarter, as specified by the Client. These statements will include itemized use of funding; and
 - (d) Within 60 days of the end of each Fiscal Year the University will send annual statements to the Client specifying the costs allocated to the Research Project for that Fiscal Year. The annual statements will include the labour costs and an itemized list of all the supplies and other expenses paid for during that Fiscal Year.
- 4.3 The University agrees that all financial statements provide to the Client will be reviewed by the Client’s auditor and that the Client may request additional information or clarification from the University with respect to such financial statements at the direction of its auditor. The University will promptly comply with all such requests.
- 4.4 The Client may request additional information or clarification from the University with respect to any of the reports submitted pursuant to this Agreement and the Master Research Agreement.

ARTICLE 5 – EQUIPMENT AND LABORATORY ADMINISTRATION

- 5.1 Unless otherwise agreed upon by the Client and the University in writing, or specifically provided for pursuant to the terms of this Agreement, all equipment, supplies, and materials purchased by or provided to the University for the carrying out of the Research Project, shall be, and remain, the property of the University.
- 5.2 Upon taking possession of any sample(s) of arsenic trioxide, the University or the Subcontractor will become the owner of, and be responsible for, all such samples. The Client will have no liability whatsoever with respect to any sample of arsenic trioxide or Controlled Item in the possession of the University or the Subcontractor or which are used in association with this Agreement.

- 5.3 The University assumes full responsibility for any Subcontractor and shall ensure that each Subcontractor is bound by and complies with all of the obligations of the University under this Agreement and the Master Research Agreement.

ARTICLE 6 - CONFIDENTIALITY

- 6.1 All Confidential Information and Restricted Information will remain the property of its owner or the Party that furnished it as the case may be.
- 6.2 For a period of three (3) years from the date of termination of this Agreement, the receiving Party agrees to maintain in confidence all Confidential Information disclosed to it with the same degree of care as the receiving Party normally takes to preserve its own confidential information of similar grade, but in any event, no less than a reasonable degree of care.
- 6.3 The receiving Party agrees to maintain in confidence all Restricted Information disclosed to it with the same degree of care as the receiving Party normally takes to preserve its own Restricted Information of similar grade, but in any event, no less than a reasonable degree of care for as long as the Restricted Information remains confidential.
- 6.4 The receiving Party may only disclose Confidential Information and Restricted Information to persons with a "need to know" who shall be made aware of, and be required to observe and comply with the covenants and obligations contained herein, and the Confidential Information shall only be used for the purpose of the Research Project.
- 6.5 A receiving Party may disclose Confidential Information and Restricted Information pursuant to the requirements of a government agency or pursuant to a court order, provided that the receiving Party gives the disclosing Party sufficient notice to enable it to seek an order limiting or precluding such disclosure.
- 6.6 The Parties acknowledge and agree that the Client may be required to disclose Confidential Information pursuant to the Client's obligations under the Master Research Agreement and the Environmental Agreement attached as Schedule "A" thereto. The Client will provide reasonable notice to the University of any Confidential Information proposed to be disclosed and will work with the University to limit and reframe any Confidential Information that the University does not approve for disclosure. Notwithstanding the foregoing, nothing in this Section 6.6 will prevent the Client from complying with its obligations under the Master Research Agreement or the Environmental Agreement.

ARTICLE 7 - INTELLECTUAL PROPERTY

- 7.1 All individuals conducting research pursuant to this Agreement must be made aware of the terms relating to Intellectual Property, Confidential Information and Restricted Information and must agree to comply with those terms before being able to perform any work on the Research Project.
- 7.2 All aspects and parts of the Background Intellectual Property shall be exclusively owned by its owner and nothing herein shall serve to, or should be construed to, transfer any ownership rights whatsoever in the Background Intellectual Property. Such Background Intellectual Property may be used by the receiving Party solely as required to perform that Party's obligations in performing the Research Project. The limited, non-transferable license granted herein will automatically terminate upon expiration or termination of this

Agreement. Any further use of the Background Intellectual Property shall be on terms and conditions to be agreed upon in writing between the Parties.

- 7.3 Ownership of any Project Intellectual Property will be determined by applicable law and will vest in the creator of the Project Intellectual Property (the "IP Owner"). The Parties acknowledge that any interest in Project Intellectual Property will be subject to the IP Owner's respective institutional policies, procedures, project-specific third party agreements, and/or collective agreements with personnel.
- 7.4 In addition to the other rights granted in this Article 7, as the funder of the Research Project, the Client shall have a non-exclusive, non-revocable, non-royalty bearing, fully paid up, license to use the Project Intellectual Property for the purpose of implementing a solution to the arsenic trioxide waste located in the Giant Mine. Such rights to the Project Intellectual Property may be sub-licensable upon the prior written consent of the IP Owners of the Project Intellectual Property, which will not be unreasonably withheld. For greater clarity any and all sub-licenses shall include (without limitation) provisions addressing confidentiality, ownership of Project Intellectual Property, indemnification, insurance and limitation of liability.
- 7.5 Nothing herein shall prevent an IP Owner from granting licenses or otherwise commercially exploiting the Project Intellectual Property outside its use at the Giant Mine.
- 7.6 With respect to Project Intellectual Property created using the Client's funds, the Parties acknowledge that:
- (a) efforts should be made to use such Project Intellectual Property to deliver the maximum benefit to Canada; and
 - (b) where there are no opportunities for commercialization of such Project Intellectual Property within Canada, best efforts should be made to enable the Project Intellectual Property to be exploited in such a way that substantial benefits will still accrue to Canada.
- 7.7 The University and Subcontractors and IP Owners make no warranty, express or implied, concerning the Project Intellectual Property under the Agreement, which are all provided "as is". THE UNIVERSITY, SUBCONTRACTORS AND IP OWNERS MAKE NO REPRESENTATIONS AND EXTENDS NO WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED. THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR THAT THE USE OF THE PROJECT INTELLECTUAL PROPERTY WILL NOT INFRINGE ANY PATENT, COPYRIGHT, TRADEMARK OR OTHER PROPRIETARY RIGHT OF ANY THIRD PARTY.
- 7.8 The University will specifically retain the perpetual and irrevocable right to use the Project Intellectual Property for continued research and educational purposes without charge, fee, or royalties notwithstanding any other provision of this Agreement.

ARTICLE 8 – PUBLICATION AND DISCLOSURE

- 8.1 The Client and the University agree that it is part of the University's function and policies to disseminate information and to make it available for the purpose of scholarship. All publications and presentations relating to research under this Agreement must acknowledge the Client's funding of the research.

- 8.2 At any time during the term of this Agreement, the University will provide the Client with a draft copy of any proposed publication or disclosure of Project Intellectual Property for its review at least sixty (60) days before submission for publication or disclosure. Upon the Client's written request, which shall be received by the University within the same sixty (60) day period, the University will:
- (a) delete any Client Confidential Information from the proposed publication or disclosure; or
 - (b) delay publication, subject to Section 8.3, up to a maximum of sixty (60) additional days for the purposes of filing for intellectual property protection on terms and conditions to be negotiated and agreed upon by the Client and the University.
- 8.3 Notwithstanding any other term or condition of this Agreement, the University retains the right to have any thesis reviewed and defended without delay for the sole purpose of academic evaluation in accordance with the University's established procedures. The Client may request that a closed thesis defence is held and that the members of the thesis examination board, including the external examiner(s), be required to sign a non-disclosure agreement.

ARTICLE 9 – INDEMNITY, INSURANCE AND LIMITATION OF LIABILITY

- 9.1 The University and Subcontractors shall indemnify and save harmless the Client, its officers, directors, employees, and agents from and against all claims, losses, damages and expenses of any kind, (individually a "Claim" and collectively the "Claims") arising from the performance of the Research Project, except to the extent that such Claim(s) are attributable to the gross negligence or willful misconduct of the Client.
- 9.2 The University and Subcontractors shall obtain and maintain comprehensive general liability insurance and any other insurance that a prudent person would deem necessary, in the minimum amount of \$5,000,000 with respect to its operations. Such insurance shall include the Client as an additional insured and contain provisions for cross-liability and severability of interest. A copy of the certificate will be provided to the Client upon request.
- 9.3 In no event shall the Client, the University, and Subcontractors be liable to each other for any indirect, incidental, exemplary, punitive, aggravated or consequential damages caused directly or indirectly by any breach of this Agreement, including but not limited to any loss of use, lost revenues, lost profits, failure to realize anticipated savings, lost data or loss of goodwill. This exclusion applies to all claims irrespective of the cause of action underlying the claim including but not limited to (a) breach of contract even if a fundamental breach, (b) tort (including but not limited to negligence or misrepresentation), or (c) breach of statutory duty or strict product liability. This limitation shall apply even if the other Party has been advised of the possibility of such damages. This limitation shall not apply to willful misconduct, fraud, gross negligence or recklessness.
- 9.4 The Client (on behalf of itself and all of its sub-licensees) hereby agrees to indemnify the University, Subcontractors and IP Owners including their governors, directors, trustees, officers, researchers, employees, students, volunteers and agents against all Claims arising from the use by or through the Client of the Project Intellectual Property.

ARTICLE 10 – DISPUTE RESOLUTION

- 10.1 In the event a dispute arises between the Parties, the Parties intend to make reasonable efforts to resolve the dispute amicably and agree to follow the dispute resolution process as set out in Article 10 of the Master Research Agreement.

ARTICLE 11 - PERMITS AND LICENSES

- 11.1 For work to be carried out off the University's premises, the Client shall identify any permits, licenses or other required by any governing authority in relation to any of the work to be performed and agrees to obtain or to assist the University to obtain such permits, licenses or other.

ARTICLE 12 – TERM AND TERMINATION

- 12.1 This Agreement shall come into effect on April 1, 2024, and unless earlier terminated in accordance with the terms hereof, shall terminate March 31, 2025 (the "Term"). In the event that the Research Project is funded in part by any federal or provincial agency or other government institution, the term of this Agreement shall, at a minimum, be equal in duration to the period of the agency award.
- 12.2 The Parties will have the right to renew this Agreement. Unless otherwise agreed by the Parties the renewal shall be agreed to at least 3 months prior to the end of the Term.
- 12.3 The Parties intend that this Agreement may be terminated by written agreement of the Parties.
- 12.4 This Agreement may be terminated by the Client upon sixty (60) days written notice to the University. This Agreement may be terminated by the University upon sixty (60) days written notice to the Client if circumstances beyond the University's control preclude continuation of the Research Project.
- 12.5 Upon termination of this Agreement by either the Client or the University, the University will be reimbursed by the Client for all costs and non-cancellable commitments incurred by the University in the performance of the Research Project within 30 days of termination, with such reimbursement not to exceed the total estimated expenses set forth in Section 3.1.
- 12.6 The Client shall have the right to immediately terminate this Agreement in the event that the Master Research Agreement is terminated.
- 12.7 There is no obligation to return any samples of arsenic trioxide to the Client after termination of this Agreement and any such samples in the care and control of the University will remain the property of the University.
- 12.8 Termination as set forth in this Article 12 shall not relieve any of the Parties of any obligations accrued under this Agreement prior to the date of termination. Each of Articles 5, 6, 7, 8 and 12 and Sections 9.1, 9.3, 9.4, 12.5 and 12.8 shall survive termination of this Agreement.

ARTICLE 13 – GENERAL PROVISIONS

- 13.1 The Client shall not use the name, or any variation, adaptation, abbreviation, trademark or other, of the University, nor the name of any member of the University's staff or governors, in any publicity without the prior written approval of an authorized representative of the University. Subject to Section 13.2, the University will not use the name of the Client, or any variation, adaptation, abbreviation, trademark or other, nor the name of any employee of the Client, in any publicity without the prior written approval of the Client.
- 13.2 The University may at its own discretion provide a brief listing of this Research Project as part of any public statement disclosing research taking place at the University. Such disclosure may include, but is not limited to, the title of the Research Project, the name of the Client, the name of the Principal Investigator, and the amount of funding.
- 13.3 The Parties are independent parties and nothing in this Agreement shall constitute either Party as the employer, contractor, principal or partner of or joint venturer with the other Party. Neither Party has any authority to assume or create any obligation or liability, either express or implied, on behalf of the other.
- 13.4 Any notice pursuant to this Agreement shall be in writing and shall be given by hand delivery or sent by registered mail, courier, email or facsimile addressed to the other Party at the address set out below or to such other person or address as the Parties may from time-to-time designate in writing delivered pursuant to this notice provision. Any such notices, requests, demands or other communications shall be received and effective: (a) upon the date of delivery if delivered personally; or (b) on the date of receipt of confirmation by answer-back, in the case of mail, email or facsimile.

University:

Lisa Sergovich, Grants and Contracts Manager
University of Waterloo
Office of Research
200 University Avenue West
Waterloo, Ontario N2L 3G1
E-mail: lmsergov@uwaterloo.ca

Client :

Giant Mine Oversight Body Society
Box 1602
Yellowknife, NT
X1A 2P2
Attention: Executive Director
Email: ed@gmob.ca

With a concurrent copy to:

Parlee McLaws LLP
1700, 10175 – 101 Street
Edmonton, AB T5J 3H0
Attention: Rhiannon Adams
Email: radams@parlee.com

- 13.5 For this Agreement, neither the Client nor the University shall be liable to the other for any failure or delay in performance by circumstances beyond its control, including but not limited to, acts of God, fire, labour difficulties or governmental action.
- 13.6 Unless otherwise specified in this Agreement, this Agreement and the schedules attached hereto shall supersede all documents or agreements, whether written or oral, in respect of the subject matter thereof. For greater clarity, no direct or indirect separate arrangement, whether oral or written, with the Principal Investigator or other person, involving any component of the work to be performed, is permitted unless prior agreement, in writing, is given by the authorized signing authorities of the Client and the University. The Client and University agree that the Master Research Agreement remains in full force and effect and is not amended, altered, nor terminated by the entering into of this Agreement. The Client acknowledges and agrees that the University provides no insurance coverage whatsoever to faculty members or other university persons who may provide direct or independent services relating to this Agreement.
- 13.7 The terms herein stipulated may not be modified in any way without the mutual consent of the Client and the University in writing given by their authorized signing authorities.
- 13.8 This Agreement shall not be assigned by either the Client or the University without the prior written consent of the other Party, such consent not to be unreasonably withheld. The University and the Client shall not subcontract any work to be performed under this Agreement without the prior written consent of the federal or provincial agency or other government institution, as applicable, and the other Party (such consent not to be unreasonably withheld).
- 13.9 In the event that a translation of this Agreement is prepared and signed by the Client and the University for the convenience of the Client, this English language version shall be the official version and shall govern if there is a conflict between the two.
- 13.10 This Agreement shall be governed by and construed in accordance with the laws of the Northwest Territories and the laws of Canada applicable therein.
- 13.11 This Agreement may be executed digitally, and/or electronically, and may be transmitted digitally, and/or electronically, in any number of counterparts, each of which upon execution and delivery shall be considered an original for all purposes; provided, however, all such counterparts shall, together, upon execution and delivery, constitute one and the same instrument.
- 13.12 The following appendices are attached to and form part of this Agreement:

Schedule A – Research Project

Schedule B – Research Personnel and Student Agreement

[Remainder of Page Intentionally Blank. Signature Page to Follow.]

IN WITNESS WHEREOF the Client and the University hereto have executed this Agreement in a legally binding manner.

) **UNIVERSITY OF WATERLOO**
)
)
)
) Per: _____
) Name: Lisa Sergovich
) Title: Grants and Contracts
) Manager
)

I/We have the authority to bind the corporation

Date

) **For the Client:** 
)
) Per: _____
) Name: David Livingstone
) Title: Board Chair, Giant Mine
) Oversight Body Society
)

I/We have the authority to bind the corporation

December 4, 2024
Date

Acknowledgment and Consent of Principal Investigator

I, having read this Agreement, hereby agree to comply with all the terms and conditions contained herein, including the grant of rights to the University set forth in Section 2 of Schedule B, and further agree to ensure that all University Research Personnel and Students who are involved in the Research Project are informed of their obligations under the provisions of this Agreement and have acknowledged and consented by signature of a Research Personnel and Student Agreement (Schedule B).

David Blowes, Professor

Date: _____

SCHEDULE A

RESEARCH PROJECT

Title: Evaluation of Advanced Technologies for the Stabilization of Arsenic-trioxide Roaster Waste at the Giant Mine

Research Team:

David Blowes, University of Waterloo (Principal Investigator)
Carol Ptacek, University of Waterloo (Principal Investigator)
Matthew Lindsay, University of Saskatchewan (Co-investigator)

Description:

This project consists of two sub-projects as follows:

Project 1: Examination of variability in arsenic trioxide roaster waste composition

Objectives

The overarching research hypothesis is that Sb substitution for As decreases arsenic trioxide roaster waste (ATRW) solubility. We will test this hypothesis through complementary research to: (i) characterize chemical and physical properties of ATRW dust from the Giant Mine; and (ii) determine how Sb substitution affects ATRW solubility. The key objectives of this research are to:

- i. Characterize the (geo)chemical, mineralogical, and physical characteristics of ATRW dust from the Giant Mine site;
- ii. Assess the variability of (geo)chemical, mineralogical, and physical characteristics of ATRW from the Giant Mine site;
- iii. Constrain how Sb substitution affects ATRW solubility in both synthetic samples and dust samples collected from the Giant Mine site; and
- iv. Improve our understanding of ATRW properties to support future research into new management and disposal strategies.

Methodology

Sample Characterization

Samples from the core collected as part of the 2023 CIRNAC ATRW sampling program will be used to improve understanding of the chemical and physical properties of ATRW. We will sub-sample these newly archived samples to facilitate further assessment of sample heterogeneity within the applicable stopes and chambers.

Analytical Methods

Chemical and parameters will be measured to assess the heterogeneity of ATRW. Initial sample screening tests will be used to constrain the variability in bulk characteristics of all samples: 1) determination of bulk chemical composition of all samples by low-temperature digestion methods (e.g., aqua regia) and detection by either inductively coupled plasma – optical emission spectroscopy (ICP–OES) or inductively coupled plasma – mass spectrometry (ICP–MS); and 2) characterization of the bulk mineralogy of the samples with powder X-ray diffraction

(XRD). The XRD will also allow assessment of low-abundance, discrete mineral phases in the ATRW that will need to be considered in our additional analyses. Based on these results, samples will be divided into batches based on their composition and mineralogical properties (e.g., Sb concentrations).

Additional compositional measurements will be conducted using an electron probe microanalyzer (EPMA); XRD and scanning electron microscope (SEM) based automated mineralogy will be used to additionally constrain solid-phase composition. Synchrotron-based X-ray absorption spectroscopy (XAS) will be used to examine As and Sb oxidation states and coordination to evaluate the mineralogical forms of these metalloids – particularly Sb. Together, these methods will contribute enhanced understanding of the geochemical and mineralogical composition and variability of ATRW.

Physical characteristics, including particle size and surface area by integrated transmission electron microscopy (TEM) and Brunauer, Emmett and Teller (BET) specific surface area, will be measured.

Project 5: Geochemical and leaching characterization of vitrified arsenical glass

Dundee Sustainable Technologies has developed and implemented a pilot-scale process for the vitrification of arsenic-bearing residues. This proprietary technology is reported to produce glasses with As concentrations of up to 20%. Results of an initial set of extractions and column experiments conducted at University of Waterloo have indicated vitrification of ATRW can significantly reduce leaching of As from ATRW. As a result, the GMOB has initiated further discussions with Dundee Sustainable Technologies regarding the production of improved test batches of arsenical glass using ATRW from the Giant Mine site.

Objectives

It is anticipated that long-term stabilization of ATRW through vitrification will require the complete transformation of the roaster waste and auxiliary reagents into a homogenous, vitrified product that is free of fine-grained, crystalline phases. Further, it is anticipated that the presence and abundance of chemical constituents, including oxide phases of Fe, Mg, and Sb, will impact glass stability, and elevated concentrations of these constituents may enhance the leachability and weathering of the vitrified product. The objectives of the proposed research project are to:

- i. Evaluate the leaching properties of vitrified ATRW; and
- ii. Assess the solid-phase associations of As within the vitrified product.

Methodology

Samples of vitrified material will be obtained from Dundee Sustainable Technologies through GMOB. These vitrified materials will be characterized to determine the composition and mineralogical properties and subsamples will be subjected to leach testing protocols previously developed to assess the leachability of mine wastes and industrial wastes, and the bioavailability of contaminants contained within these materials. In addition, samples of the ATRW used to generate the vitrified material will be characterized through Project 1 of this research program.

Ongoing leach tests (column experiments) will be continued to provide longer-term measurements of the leaching properties and the potential for As remobilization under differing

geochemical conditions. Leachates will be analyzed using ICP–OES, ICP–MS, and ion chromatography (IC).

Optical microscopy and X-ray diffraction will be used to assess the amorphous nature of the vitrified product, and to identify potential crystalline constituents. Scanning electron microscopy – energy dispersive X-ray spectroscopy will be used to provide solid-phase stoichiometric associations. Synchrotron-based X-ray absorption spectroscopy will be used to evaluate As bonding, speciation, and coordination in the vitrified product.

The budget outlined below represents the partner contribution to the NSERC ALLIANCE project proposal entitled “Evaluation of Advanced Technologies for the Stabilization of Arsenic-trioxide Roaster Waste at the Giant Mine” led by Principal Investigator Prof. David Blowes of the University of Waterloo

Description	UW (Admin.)	UW (P5_Vitrific.)	USask (PI_ATRW)	TOTAL
1) Salaries and benefits	13,391.28	118,000.00	22,000.00	153,391.28
a) Students		0.00	0.00	0.00
b) Postdoctoral fellows		90,000.00	22,000.00	112,000.00
c) Technical/professional assistants	13,391.28	0.00	0.00	13,391.28
d) Co-op students		28,000.00	0.00	28,000.00
2) Equipment or facility	0.00	3,804.00	3,000.00	6,804.00
a) Purchase or rental		2,804.00	3,000.00	5,804.00
b) Operation and maintenance costs		1,000.00	0.00	1,000.00
c) User fees			0.00	0.00
3) Materials and supplies	0.00	20,000.00	15,000.00	35,000.00
a) Analyses		20,000.00	15,000.00	35,000.00
b) Other			0.00	0.00
4) Travel	8,000.00	9,500.00	0.00	17,500.00
a) Conferences			0.00	0.00
b) Field work	0.00	6,000.00	0.00	6,000.00
c) Project related travel	8,000.00	3,500.00	0.00	11,500.00
TOTAL DIRECT COSTS	21,391.28	151,304.00	40,000.00	212,695.28
Overhead	3,208.69	22,695.60	10,000.00	35,904.29
TOTAL	24,599.97	173,999.60	50,000.00	248,599.57

SCHEDULE B

RESEARCH PERSONNEL AND STUDENT AGREEMENT

WHEREAS the University of Waterloo and the Client are parties to a Research Project Agreement # 105557 (the "Research Project Agreement") to which this Research Personnel and Student Agreement is appended; and

WHEREAS the undersigned is associated with the University of Waterloo and will be involved in the Research Project defined by the Research Project Agreement;

NOW THEREFORE, in consideration of information and facilities made available to me in connection with my work in relation to the Research Project and other valuable consideration, I agree that:

1. **Defined Terms.** All terms denoted with initial capital letters herein which are not otherwise defined shall have the meanings ascribed to them in the Research Project Agreement.
2. **Grant of Rights.** I hereby grant the University with the following rights in relation to my right, title and interest in and to the Project Intellectual Property:
 - (a) the right to grant the Client a non-exclusive, non-revocable, non-royalty bearing, fully paid up, license to use the Project Intellectual Property for the purpose of implementing a solution to the arsenic trioxide waste located in the Giant Mine;
3. **Project Intellectual Property and Cooperation in Patent Matters.** I will co-operate fully and in good faith in discussion and agreement with all conditions and grants of rights regarding Project Intellectual Property as set forth in Article 7 of the Research Project Agreement. I will cooperate fully and in good faith in the signing of documents and taking such other steps as may be reasonably requested to obtain and maintain patent and other intellectual property protection for the Project Intellectual Property relating to the Research Project Agreement and in connection with any infringement action in any way relating to said Project Intellectual Property. I will sign all documents and do all things necessary or proper to give effect to this Research Personnel and Student Agreement and any rights granted by the University under the Research Project Agreement.
4. **Confidential Information.** In accordance with Article 6 of the Research Project Agreement, I will keep confidential all Confidential Information and Restricted Information that I may receive.
5. **Publications.** I will comply with all publication conditions that are set out in Article 8 of the Research Project Agreement.
6. **Ownership.** I understand that ownership of and rights to any Project Intellectual Property shall be determined in accordance with Article 7 of the Research Project Agreement, as per Article 3(A) (third bullet) of the *University of Waterloo Policy #73 (Intellectual Property Rights)*.
7. **Invention Disclosure.** I shall keep the University and the Principal Investigator fully and promptly informed on an on-going basis of the development of Project Intellectual Property and shall not take any steps with respect to filing intellectual property protection for any Project Intellectual Property without prior consultation with the Principal Investigator.

- 8. **Grant of Signing Authority.** I, by execution of this Research Personnel and Student Agreement, hereby irrevocably authorize the University of Waterloo to represent the interests that I may have in and to the Project Intellectual Property to grant Giant Mine Oversight Board the rights in the Project Intellectual Property set forth in Article 7 of the Research Project Agreement.

- 9. **Acknowledgement.** I have obtained or have been afforded the opportunity to obtain independent legal advice with respect to this Research Personnel and Student Agreement and all documents and transactions related thereto and I fully understand the nature and consequences of this Research Personnel and Student Agreement and all documents and transactions related thereto.

By signing below, I indicate my acceptance of these terms.

Personnel/Student's Signature

Print Name

Date

Role in Research Project (for statistical purposes only):

- Postdoc
- PhD Candidate
- Master's Student
- Undergraduate Student
- Other: _____

Personnel/Student's Signature

Print Name

Date

Role in Research Project (for statistical purposes only):

- Postdoc
- PhD Candidate
- Master's Student
- Undergraduate Student
- Other: _____

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- Other: _____