SPECIFICATIONS FOR

BUILDING DEMOLITION

TUKTOYAKTUK, NT

Department of Fisheries & Oceans
Real Property, Safety and Security
Central & Arctic Region
Winnipeg, Manitoba

January 2017

TABLE OF CONTENTS

Pages

Division 00 - Procurement and Contracting Requirements

Section 00 01 10 - Table Of Contents 1

Division 01 - General Requirements

Section 01 11 00 - Summary Of Work 4
Section 01 14 00 - Work Restrictions 2
Section 01 31 19 - Project Meetings 3
Section 01 32 16.07 - Construction Progress Schedule - Bar (Gantt) Chart 3
Section 01 33 00 - Submittal Procedures 2
Section 01 35 00.06 - Special Procedures For Traffic Control 3
Section 01 35 29.06 - Health And Safety Requirements 4
Section 01 35 43 - Environmental Procedures 4
Section 01 41 00 - Regulatory Requirements 1
Section 01 45 00 - Quality Control 3
Section 01 52 00 - Construction Facilities 4
Section 01 56 00 - Temporary Barriers And Enclosures 2
Section 01 74 11 - Cleaning 2
Section 01 77 00 - Closeout Procedures 2
Section 01 78 00 - Closeout Submittals 5

Division 02 - Existing Conditions

Section 02 41 20 – De-Commissioning And Removal Of General Purpose Fumehoods 3
Section 02 42 13 - Deconstruction Of Structures 8
Section 02 81 01 - Hazardous Materials 4
Section 02 82 00.01 - Asbestos Abatement - Minimum Precautions 6
Section 02 82 00.02 - Asbestos Abatement - Intermediate Precautions 9
Section 02 82 00.03 - Asbestos Abatement - Maximum Precautions 15
Section 02 83 11 - Lead - Base Paint Abatement - Intermediate Precautions 8

Division 31 - Earthworks

Section 31 23 33.01 – Excavation, Trenching And Backfilling 7

Annexes

Annex A – Hazardous Materials List And 2016 Laboratory Analytical Results 9
Annex B – Phase I/II/III Environmental Site Assessment Report 173
Annex C – Site Photos 4

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 DEFINITIONS

.1 Departmental Representative:

.1 Within the context of these specifications, the term Departmental Representative refers to the person exercising the roles and attributes of Canada under contract.

.2 For the purposes of hazardous materials and demolition inspections, the Departmental Representative shall be a qualified Inspection/Testing agency. The Independent Inspection/Testing Agency (serving as the Departmental Representative) shall be engaged from prior to the start of abatement to the end of demolition.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises hazardous materials abatement and demolition of a warehouse building and skid shed, and the removal of materials stored in proximity to the warehouse building located in Tuktoyaktuk, Northwest Territories.

.1 Warehouse building, single story consisting of a warehouse with laboratory spaces, approximately 140 m^2.

.2 Skid shed, located in proximity to Warehouse building, approximately 6 m^2.

.3 Removal and disposal of wooden sampling box and various materials stored outside the Warehouse building.

.2 Work of this Contract also comprises restoration of the property. This shall include backfilling and grading.

1.4 SITE INFORMATION

.1 The hazardous materials to be abated are listed in Annex A.

.2 Additional information on hazardous building materials is presented in the Phase I/II/III Environmental Site Assessment report provided in Annex B.

.3 Photos of the subject buildings and site are provided in Annex C.

1.5 CONTRACT METHOD

.1 Construct Work under lump sum contract.

1.6 FEES, PERMITS AND CERTIFICATES

.1 Provide authorities having jurisdiction with information requested.

.2 Pay fees and obtain certificates and work permits required.

.3 Furnish certificates and permits when requested.

1.7 WORK BY OTHERS

.1 Departmental Representative will be onsite before, during, and upon completion of abatement works to monitor operations carried out by the Contractor.

.2 Departmental Representative will be on site during demolition to conduct inspection until completion.

1.8 FUTURE WORK

.1 Not used.

1.9 WORK SEQUENCE

.1 Co-ordinate Progress Schedule with and co-ordinate with Departmental Representative during construction.

.2 Required stages:

.1 Hazardous materials abatement (excluding roof of building).

.2 Hazardous materials abatement of roof material from building may be conducted concurrent to building demolition activities.

.3 Demolition.

.4 Site work including cleaning, grading, and drainage.

.3 Maintain fire access/control.

1.10 CONTRACTOR USE OF PREMISES

.1 Unrestricted use of site until Substantial Performance.

.2 Co-ordinate use of premises under direction of Department Representative.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.4 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.11 OWNER OCCUPANCY

.1 Not used.

1.12 PARTIAL OWNER OCCUPANCY

.1 Not used.

1.13 PRE-ORDERED PRODUCTS, PRE-BID WORK

.1 Not used.

1.14 PRE-PURCHASED EQUIPMENT

.1 Not used.

1.15 OWNER FURNISHED ITEMS

.1 Not used.

1.16 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to public and adjacent properties.

1.17 EXISTING SERVICES

.1 Existing services in building:

.1 Heat, power and water are assumed to be not available.

.2 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission, if applicable.

.3 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian and vehicular traffic.

.4 Provide alternative routes for pedestrian and vehicular traffic.

.5 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.6 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed and abandoned service lines.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.18 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Reviewed Shop Drawings.

.5 List of Outstanding Shop Drawings.

.6 Change Orders.

.7 Other Modifications to Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and Other Safety Related Documents.
.11 Other documents as specified.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial/territorial and other regulations.

1.3 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Closures: protect work temporarily until permanent enclosures are completed.

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to adjacent properties.

1.5 EXISTING SERVICES

.1 Existing services in building include:

.1 Heat, power and water are assumed to be <u>not</u> available.

.2 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.3 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian and vehicular traffic.

.4 Provide alternative routes for pedestrian and vehicular traffic.

.5 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.6 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed and abandoned service lines.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.6 SPECIAL REQUIREMENTS

.1 Carry out noise generating Work in accordance with applicable local regulations or By-Laws.

.2 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.

.3 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.4 Keep within limits of work and avenues of ingress and egress.

.5 Deliver materials outside of peak traffic hours unless otherwise approved by Departmental Representative.

1.7 SECURITY

.1 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.8 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not permitted.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and Departmental Representative.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

.1 Within 14 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Senior representatives of Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

.3 Schedule of submission of project deliverables. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.7 Owner provided products.

.8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.11 Monthly progress claims, administrative procedures, photographs, hold backs.

.12 Appointment of inspection and testing agencies or firms.

.13 Insurances, transcript of policies.

1.4 PROGRESS MEETINGS

.1 During course of Work and prior to project completion, schedule progress meetings as required.

.2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.3 Notify parties minimum 5 days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for affect on construction schedule and on completion date.

.12 Other business.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to Departmental Representative within 10 working days of receipt of acceptance of Master Plan.

1.5 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule.

.1 Remediation of contaminates, certificate of completion within 20 working days of Award of Contract date.

.2 Demolition of building, grading and site clean up within 25 working days of Award of Contract date.

.3 All work to be completed by March 31st, 2017.

1.6 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Departmental Representative will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.7 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types such as follows:

.1 Award.

.2 Shop Drawings, Samples.

.3 Permits.

.4 Mobilization.

.5 Excavation.

.6 Backfill.

.7 Building footings.

.8 Slab on grade.

.9 Structural Steel.

.10 Siding and Roofing.

.11 Interior Architecture (Walls, Floors and Ceiling).

.12 Plumbing.

.13 Lighting.
.14 Electrical.
.15 Piping.
.16 Controls.
.17 Heating, Ventilating, and Air Conditioning.
.18 Millwork.
.19 Fire Systems.
.20 Testing and Commissioning.
.21 Supplied equipment long delivery items.
.22 Engineer supplied equipment required dates.

1.8 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.9 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES

.1 Not used.

1.3 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

1.4 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic copy of colour digital photography in jpg format, standard resolution as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints: two locations.

.1 Viewpoints and their location as determined by Departmental Representative.

.4 Frequency of photographic documentation: as directed by Departmental Representative.

.1 Upon completion of: of Work, or as directed by Departmental Representative.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES

.1 Not used.

1.3 PROTECTION OF PUBLIC TRAFFIC

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 When working on travelled way:

.1 Place equipment in position to minimize interference and hazard to travelling public.

.2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.

.3 Do not leave equipment on travelled way overnight.

.3 Close lanes of road only after receipt of written approval from Departmental Representative.

.1 Before re-routing traffic erect suitable signs and devices to comply with requirements of Acts, Regulations and By-Laws.

.4 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.

.1 Provide 7m wide minimum temporary roadway for traffic in two-way sections through Work and on detours.

.2 Provide 5m wide minimum temporary roadway for traffic in one-way sections through Work and on detours.

.5 Provide gravelled detours or temporary roads as directed by Departmental Representative to facilitate passage of traffic around restricted construction area:

.6 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.

1.4 INFORMATIONAL AND WARNING DEVICES

.1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to comply with requirements of Acts, Regulations and By-Laws.

.3 Place signs and other devices in locations recommended in Acts, Regulations and By-Laws.

.4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.

.5 Continually maintain traffic control devices in use:

.1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.

.2 Remove or cover signs which do not apply to conditions existing from day to day.

1.5 CONTROL OF PUBLIC TRAFFIC

.1 Provide competent flag personnel, trained in accordance with, and properly equipped to comply with requirements of Acts, Regulations and By-Laws for situations as follows:

.1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.

.2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.

.3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

.4 Where temporary protection is required while other traffic control devices are being erected or taken down.

.5 For emergency protection when other traffic control devices are not readily available.

.6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

.7 At each end of restricted sections where pilot cars are required.

.8 Delays to public traffic due to contractor's operators: 15 minutes maximum.

.2 Where roadway, carrying two-way traffic, is restricted to one lane, for 24 hours each day, provide portable traffic signal system.

.1 Adjust, as necessary, and regularly maintain system during period of restriction.

.2 Ensure signal system meets requirements of Acts, Regulations and By-Laws.

1.6 OPERATIONAL REQUIREMENTS

.1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted.

.2 Maintain existing conditions for traffic crossing right-of-way.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.2 Northwest Territories.

.1 Safety Act – Updated 2015.

.2 Occupational Health and Safety Regulations – Updated 2016.

.3 Northwest Territories & Nunavut Codes of Practice - Asbestos Abatement. May 2012.

.4 Northwest Territories Public Works and Services, General Guidelines – Asbestos Removal and Disposal. February 2010.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation.

.3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to authority having jurisdiction, and Departmental Representative.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Submit WHMIS MSDS - Material Safety Data Sheets prior to bringing materials to work site.

.7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 3 days after receipt of comments from Departmental Representative.

.8 Departmental Representative’s review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

.10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.4 FILING OF NOTICE

.1 File Notice of Project with Territorial authorities prior to beginning of Work.

.2 Work zone location is in the Western Arctic.

.1 Legal description is Lot 1, Block 46, Plan 3496 – Tuktoyaktuk.

.2 Lat 69.438970; Long -1333.036250.

.3 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

1.5 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.6 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.7 REGULATORY REQUIREMENTS

.1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.8 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Asbestos.

.2 Lead and Lead Containing Paint.

.3 Suspect Visual Mould Growth.

1.9 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.10 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.11 COMPLIANCE REQUIREMENTS

.1 Northwest Territories

.1 Safety Act – Updated 2015.

.2 Occupational Health and Safety Regulations – Updated 2016.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.12 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Territory having jurisdiction and advise Departmental Representative verbally and in writing.

1.13 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have site-related working experience specific to activities associated with work.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.14 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of the Northwest Territories having jurisdiction, and in consultation with Departmental Representative.

1.15 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.16 BLASTING

.1 Blasting or other use of explosives is not permitted.

1.17 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.18 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES

.1 Definitions:

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

.2 Reference Standards:

.1 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.

.2 EPA General Construction Permit (GCP) 2012.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review by Departmental Representative.

.4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.5 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.6 Include in Environmental Protection Plan:

.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

.3 Names and qualifications of persons responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting

requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.

.6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.

.1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.

.8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.13 Waste Water Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

.14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

.15 Pesticide treatment plan to be included and updated, as required.

1.4 FIRES

.1 Fires and burning of rubbish on site is not permitted.

1.5 DRAINAGE

.1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3 and US EPA General Construction Permit.

.2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.

.3 Provide temporary drainage and pumping required to keep excavations and site free from water.

.4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties as indicated.

.2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.

.1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Minimize tree removal, restrict removal to areas as required for building demolition.

1.7 WORK ADJACENT TO WATERWAYS

.1 Construction equipment to be operated on land only.

.2 Use waterway beds for borrow material only after written receipt of approval from Departmental Representative.

.3 Waterways to be kept free of excavated fill, waste material and debris.

1.8 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

.2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.

.3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.9 HISTORICAL/ARCHAEOLOGICAL CONTROL

.1 Not used.

1.10 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial/Territorial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.1 Take action only after receipt of written approval by Departmental Representative.

.3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Bury rubbish and waste materials on site where directed after receipt of written approval from Departmental Representative.

.3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

.4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.3 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative. Refer to Section 02 82 00.03 - Asbestos Abatement - Maximum Precautions.

1.4 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

1.5 NATIONAL PARKS ACT

.1 Not used.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES

.1 Not used.

1.3 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.4 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agency will be engaged by the Contractor for purpose of conducting hazardous materials abatement and demolition inspections. The Independent Inspection/Testing Agency will serve as the Departmental Representative while engaged. Engagement shall be from prior to the start of abatement to the end of demolition.

.2 Cost of the Inspection/Testing Agency will be borne by the contractor..

.3 The independent Inspection/Testing Agency shall provide abatement inspections, air sampling and on-site analysis of asbestos air samples during hazardous materials abatement.

.4 Independent Inspection/Testing Agencies shall provide equipment required for executing inspections and testing including:

.1 Air sampling pumps and media.

.2 Laboratory equipment required to complete on site analysis of asbestos air samples following NIOSH Analytical Method 7400.

.5 Contractor shall provide equipment required to conduct aggressive air sampling including fans and blower.

.6 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.7 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

1.5 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.6 PROCEDURES

.1 Notify appropriate agency Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.8 REPORTS

.1 Submit copies of inspection and test reports to Departmental Representative

.2 Provide copies to subcontractor of work being inspected or tested.

1.9 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.10 MILL TESTS

.1 Submit mill test certificates as required of specification Sections.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB 1.189, Exterior Alkyd Primer for Wood.
- .2 CGSB 1.59, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)

- .1 CSA-A23.1/A23.2-, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-0121-[M1978(R2003)], Douglas Fir Plywood.
- .3 CAN/CSA-S269.2-[M1987(R2003)], Access Scaffolding for Construction Purposes.
- .4 CAN/CSA-Z321-[96(R2001)], Signs and Symbols for the Occupational Environment.

.3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

.4 U.S. Environmental Protection Agency (EPA) / Office of Water

- .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from site all such work after use.

1.5 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, and temporary stairs.

1.6 HOISTING

.1 Provide, operate and maintain hoists or cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

.2 Hoists or cranes to be operated by qualified operator.

1.7 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.8 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

.3 Clean runways and taxi areas where used by Contractor's equipment.

1.9 OFFICES

.1 Provide office heated lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.2 Provide marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

.4 Departmental Representative's Site office.

.1 Provide temporary office for Departmental Representative to accommodate on-site asbestos air sample analysis.

.2 Insulate building and provide heating system.

.3 Install electrical lighting system and a minimum of two electrical outlets.

.4 Equip office with 1 x 2 m table, 2 chairs, and coat rack.

.5 Maintain in clean condition.

1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.11 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

.3 When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval of Departmental Representative.

1.12 CONSTRUCTION SIGNAGE

.1 Provide and erect project sign, prior to starting work on site, in a location designated by Departmental Representative.

.2 Indicate on sign, name of Owner, and Contractor, of design style established by Departmental Representative.

.3 No other signs or advertisements, other than warning signs, are permitted on site.

.4

.5 Direct requests for approval to erect Contractor signboard to Departmental Representative. For consideration general appearance of Contractor signboard must conform to project identification site sign. Wording in both official languages.

.6 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.

.7 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.13 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary.

.8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.10 Dust control: adequate to ensure safe operation at all times.

.11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

.12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.13 Provide snow removal during period of Work.

.14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.14 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CGSB 1.59-[97], Alkyd Exterior Gloss Enamel.

.2 CAN/CGSB 1.189-[00], Exterior Alkyd Primer for Wood.

.2 Canadian Standards Association (CSA International)

.1 CSA-O121-[M1978(R2003)], Douglas Fir Plywood.

.3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.4 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.

.2 Provide as required by governing authorities.

1.5 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.

.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

.3 Design enclosures to withstand wind pressure and snow loading.

1.6 DUST TIGHT SCREENS

.1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

1.7 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.8 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.9 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.10 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES

.1 Not used.

1.3 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

.3 Clear snow and ice from access to building, remove from site.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Dispose of waste materials and debris off site.

.6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.4 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris including that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.8 Remove dirt and other disfiguration from exterior surfaces.

.9 Sweep and wash clean paved areas.

.10 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.11 Remove snow and ice from access to building.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES

.1 Canadian Environmental Protection Act (CEPA)

.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Departmental Representative’s inspection.

.2 Departmental Representative’s Inspection:

.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Work: complete and ready for final inspection.

.4 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.

.2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment:

.1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.4 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCES

.1 Canadian Environmental Protection Act (CEPA)

.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting once work is substantially complete (but prior to demobilization of equipment) with Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify Project requirements.

.2 Review warranty requirements.

.2 Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.3 Provide evidence, if requested, for type, source and quality of products supplied.

1.5 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by process flow, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

1.6 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data.

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.7 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction.

.1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.

.1 Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition.

.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.8 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.

.2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress.

.1 Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records as required by individual specifications sections.

.7 Provide digital photos, if requested, for site records.

1.9 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.1 Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional requirements: as specified in individual specifications sections.

1.10 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.

.3 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.4 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

.5 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Verify that documents are in proper form, contain full information, and are notarized.

.4 Co-execute submittals when required.

.5 Retain warranties and bonds until time specified for submittal.

.6 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.7 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.3 Procedure and status of tagging of equipment covered by extended warranties.

.4 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.8 Respond in timely manner to oral or written notification of required construction warranty repair work.

.9 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCE STANDARDS

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Sustainable Design Submittals:

.1 Not used.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Contractor to have technical expertise in safe dismantling and removal of GP fume hoods and exhaust system and provide proof of at least three successful projects in this size and type of project completed in the last 5 years.

.2 Regulatory Requirements:

.1 Comply with federal, provincial and municipal requirements pertaining to fire protection, occupational health and safety in effect at time that this work is performed.

.2 In event of conflict among these requirements and this specification, most stringent will apply. Report discrepancies to Departmental Representative.

1.5 HOURS OF WORK

.1 Work is to be carried out during agreed upon hours with the Departmental Representative.

1.6 SITE CONDITIONS

.1 Existing Conditions:

.1 Transits boards were not used in construction of GP fume hoods. Cementitious board lining fumehoods is none detected for asbestos fibres.

.2 Services utilities may still be connected.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Before commencing work notify PSPC of:

.1 Location of hazardous materials disposal site;

.2 Method to be used for disposal of hazardous materials;

.3 Method of transporting removed hazardous materials from site to disposal site;

.4 Type of vehicles that will be used to transport hazardous materials.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 GENERAL PURPOSE FUME HOODS

.1 Conduct removal of counter tops in accordance with Section 02 82 00.02- Asbestos Abatement - Intermediate Precautions unless confirmed to be non-asbestos containing.

3.2 BRIEFING OF PERSONNEL

.1 Brief personnel as to extent of work and potential hazards.

.2 Carefully, completely and accurately answer questions.

3.3 PROJECT CONTROL

.1 Ensure safety of workers through careful supervision and direction by supervisors experienced and qualified in this work.

3.4 PERSONAL PROTECTIVE EQUIPMENT

.1 Personnel directly involved in dismantling, removal and disposal of GP fumes hoods to wear disposable type coveralls, neoprene gloves and full face shield.

3.5 PROCEDURES FOR DE-COMMISSIONING AND REMOVAL OF GP FUME HOODS

.1 Dismantle fume hood in reverse order of assembly.

.2 Remove hoods with exhaust fan in operation to aid in fibre containment.

.3 Disconnect mechanical, natural gas, electrical services to areas involved. Remove outlets and connecting piping, conduit.

.4 Remove exterior wood trim.

.5 Remove sash and counterweight assemblies.

.6 Remove rear baffles by unscrewing adjusting handles.

.7 Disassemble interior housing by breaking panels if necessary.

.8 Shut off exhaust fan, cut duct at wall and install temporary plug.

.9 Separate exhaust fan from exhaust duct system by cutting flexible connections.

.10 Disconnect wiring and remove exhaust fan from its mounting.

.11 Install temporary plug in duct on discharge side of fan.

.12 Remove support system for exhaust fan and clean up.

3.6 PROCEDURES FOR REMOVAL OF BENCHES AND CABINETS

.1 Before dismantling drains, flush thoroughly with running water to wash acid from traps.

.2 Prepare tank of neutralizing solution.

.3 Under-counter cabinets: spray areas of chemical staining to check for presence of acid. Continue spraying until foaming ceases.

.4 Dispose of cabinets as demolition waste.

.5 Dispose of counter tops as demolition waste or asbestos waste as defined under provincial regulations as required.

.6 Soapstone sinks: dispose of as demolition waste.

.7 Service piping and drains: remove by cutting. Dispose of as demolition waste.

3.7 EMERGENCY RESPONSE PLANS

.1 Prior to commencement of work, notify appropriate authority of proposed work and hazards involved.

.2 Have adequate number of fire extinguishers present in various locations of work site.

.3 Extinguish fires that may occur using water.

.4 Ensure emergency escape routes are of adequate size and kept clear.

.5 Provide equipped and clearly marked emergency first aid equipment in easily accessible locations.

.6 Comply with requirements of local Fire Department.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCE STANDARDS

.1 CSA International

.1 CSA S350-M1980R2003, Code of Practice for Safety in Demolition of Structures.

.2 Federal Legislation

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.4 Motor Vehicle Safety Act 1993, c. 16 (MVSA).

.3 Northwest Territories.

.1 Safety Act – Updated 2015.

.2 Occupational Health and Safety Regulations – Updated 2016.

.4 Town of Inuvik

.1 Zoning By-Law, 2583/P+D/15

1.3 DEFINITIONS

.1 Alternate Disposal: reuse and recycling of materials by designated facility, user or receiving organization which has valid Certificate of Approval to operate. Alternative to landfill disposal.

.2 Deconstruction: systematic dismantling of structure in a manner that achieves safe removal/disposal of hazardous materials and maximum salvage/recycling of materials.

.1 Ultimate objective is to recover potentially valuable resources while diverting from landfill what has traditionally been significant portion of waste system.

.3 Demolition: rapid destruction of structure with or without prior removal of hazardous materials.

.4 Disassembly: physical detachment of materials from structure: prying, pulling, cutting, unscrewing.

.5 Hauler: company (possessing appropriate and valid Certificate of Approval) contracted to transport waste, reusable or recyclable materials off site to designated facility, user or receiving organization.

.6 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, including but not limited to: corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health, well being or environment if handled improperly.

.7 Processing: tasks which are subsequent to disassembly and may include: moving materials, denailing, cleaning, separating and stacking.

.8 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.

.9 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.10 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form.

.1 Recycling does not include burning, incinerating, or thermally destroying waste.

.11 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from remodelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.12 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.13 Source Separation: acts of keeping different types of waste materials separate, beginning from first time they became waste.

.14 Used Building Material Receipt: receipt issued at end destination for materials designated for alternate disposal.

.15 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying (by volume or weight) amounts of materials and wastes generated during deconstruction. Indicates quantities of reuse, recycling and landfill.

.16 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.17 Waste Reduction Workplan (WRW): written report which outlines actions to be taken to reduce, reuse and recycle materials during course of deconstruction. Actions based on finding of the Waste Audit (WA).

.18 Weigh Bill: receipt received from recycling facility indicating weight and content of each load/bin of material.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling:

.1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion. In event of unforeseen delay notify Departmental Representative in writing.

1.5 PERFORMANCE REQUIREMENTS

.1 Not used.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Keep copies of submittals on file for minimum of five years after completion of project.

.3 WMC is responsible for fulfillment of reporting requirements.

.4 Prior to start of Work on site, submit detailed WA indicating descriptions of and anticipated quantities of materials to be reused, recycled and landfilled.

.5 Prior to start of Work on site, submit pre-demolition audit and deconstruction/disassembly plan.

.6 Based on findings of WA submit WRW indicating schedule of selective demolition, material descriptions and quantities to be salvaged, number and location of bins, anticipated frequency of tippage, and names and addresses of receiving organizations.

.7 Submit copies of bills of lading or weigh bills from authorized disposal sites and reuse and recycling facilities for material removed from site weekly to Departmental Representative.

.1 Written authorization from Departmental Representative is required to deviate from receiving organizations listed in WRW.

.2 Include following information:

.1 Time and date of removal.

.2 Description of materials.

.3 Weight, quantity or volume of material.

.4 Breakdown of reuse, recycling and landfill quantities.

.5 End destination of materials.

.8 Hazardous Materials:

.1 Submit description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.

.9 Workers, haulers and subcontractors must possess current, applicable Certificates of Approval or permits to remove, handle and dispose of wastes categorized Territorially, Municipally or Federally as hazardous.

.1 Provide proof of compliance within 24 hours upon request of Departmental Representative.

1.7 DECONSTRUCTION DRAWINGS

.1 Where required by authorities having jurisdiction, submit for approval drawings, diagrams and details showing sequence of deconstruction work, materials designated for salvage and support of structures and underpinning.

1.8 QUALITY ASSURANCE

.1 Qualifications: provide adequate workforce training through meetings and demonstrations. Have someone on site with deconstruction experience throughout project for consultation and supervision purposes.

.2 Regulatory Requirements:

.1 Ensure Work is performed in compliance with CEAA, applicable Municipal/Territorial regulations, CEPA, MVSA and TDGA.

.3 Site Meetings: conduct project meetings every week.

.1 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.

.2 Ensure key personnel including project manager and site supervisor attend.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Not used.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Do Work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Ensure deconstruction work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air noise pollution.

.3 Fires and burning of waste or materials is not permitted on site.

.4 Do not bury waste or materials on site unless approved in writing by Departmental Representative.

.5 Do not dispose of waste or volatile materials into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures in accordance with TDGA and applicable Provincial/Territorial and municipal regulations and CEPA.

.6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties in accordance with authorities having jurisdiction.

.7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction and as directed by Departmental Representative.

.8 Protect trees, plants and foliage on site and adjacent properties where indicated.

.9 Prevent extraneous materials from contaminating air beyond deconstruction area, by providing temporary enclosures during Work.

.10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on temporary roads.

.11 Employ reasonable means necessary to protect salvaged materials from vandalism, theft, adverse weather, or inadvertent damage by heavy machinery.

.12 Use natural lighting to do Work where possible.

.1 Shut off lighting except those required for security purposes at end of each day.

.13 Organize site and workers in manner which promotes efficient flow of materials through disassembly, processing, stockpiling, and removal.

1.11 SITE CONDITIONS

.1 Existing Conditions:

.1 Should materials resembling spray or trowel applied asbestos or other substance listed as hazardous (excluding mould) be encountered in course of deconstruction, stop work, take preventative measures, and notify Departmental Representative immediately. Do not proceed until written instructions have been received.

.2 Structures to be demolished to be based on their condition on date that bid is accepted.

.3 Storage and Protection:

.1 Maximum permitted duration of material storage on site 1 week after project completion unless otherwise approved by Departmental Representative.

.2 Prevent movement, settlement or damage of adjacent landscaping, paving, walks, adjacent grades, services, or structures. Provide underpinning, shoring and/or bracing as required. Repair damage caused by deconstruction as directed by Departmental Representative.

.3 Support affected structures and, if safety of adjacent structures to the structure being deconstructed appears to be endangered, take preventative measures. Cease operations and immediately notify Departmental Representative.

.4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems.

Part 2 Products

2.1 EQUIPMENT

.1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.

.2 Where possible use water efficient wetting equipment/trucks/attachments when minimizing dust.

.3 Demonstrate that tools are being used in manner which allows for salvage of materials in best condition possible.

Part 3 Execution

3.1 SELECTIVE DEMOLITION

.1 Not used.

3.2 SITE VERIFICATION OF CONDITIONS

.1 Determine if Environmental Assessment (EA) is required under requirements of CEAA.

.1 If necessary, employ qualified consultant to perform EA.

.2 Communicate findings and conclusions in writing to Departmental Representative prior to start of Work.

.2 Investigate site and structures to determine dismantling, processing and storage logistics required prior to beginning of Work.

.3 Develop strategy for deconstruction to facilitate optimum salvage of reusable and recyclable materials.

3.3 PREPARATION

.1 Obtain necessary permits and approvals including demolition and notify the Inuvik Fire Department.

.1 Provide copies to Departmental Representative prior to start of Work on site.

.2 Disconnect electrical, telephone and communication service lines entering buildings to be deconstructed. Post warning signs on electrical lines and equipment which must remain energized to serve other products during period of demolition.

.3 Locate and protect utility lines. Do not disrupt active or energized utilities traversing premises.

.4 Disconnect and cap mechanical services.

.1 Natural gas supply lines: remove in accordance with utility company or authority having jurisdiction requirements.

.2 Sewer and water lines: remove in accordance with requirements of authority having jurisdiction.

.3 Other underground services: remove and dispose of as directed by Departmental Representative.

3.4 REMOVAL OF HAZARDOUS WASTES

.1 Prior to start of deconstruction work remove contaminated or hazardous materials as defined by authorities having jurisdiction from site and dispose of in safe manner in accordance with TDGA and other applicable regulatory requirements, in accordance with Section 02 81 01 - Hazardous Materials.

3.5 DISASSEMBLY

.1 Materials removed are property of the Contractor.

.2 Throughout course of deconstruction pay close attention to connections and material assemblies. Employ workmanship procedures which minimize damage to materials and equipment.

.3 Ensure workers and subcontractors are briefed and trained to carry out work in accordance with appropriate deconstruction techniques.

.4 Project supervisor with previous deconstruction experience must be present on site throughout project.

.5 Deconstruct in accordance with CSA S350.

.6 Workers must utilize adequate fall protection where Departmental Representative considers it necessary.

.7 Maintain structural integrity of structure.

.8 Systematically remove finishes, furnishings, and mechanical and electrical equipment of value.

.9 Carefully remove windows and doors from structure.

.10 Disassemble non-loadbearing interior partitions and remove materials from structure.

.11 Disassemble in sequence: roof, interior loadbearing partitions, exterior walls, floors, and foundation.

.12 Wherever possible, transfer material assemblies from heights to ground level for easier disassembly. Take appropriate measures to ensure safety.

.13 Separate from waste stream, material in condition suitable for reuse and/or recycling.

.14 Remove and store materials to be salvaged, in manner to prevent damage.

.1 Store and protect in accordance with requirements for maximum preservation of material.

.2 Handle salvaged materials as new materials.

.15 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal, concrete and asphalt.

.16 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.

.17 Where existing materials are to be re-used in Work, use special care in removal, handling, storage and re-installation to assure proper function in completed work.

3.6 PROCESSING

.1 Designate location for processing of materials which eliminates double handling and provides adequate space to maintain efficient material flow.

.2 Denail, strip, and/or separate, materials to ensure best possible condition of salvaged materials.

.3 Keep processing area clean and free of excess debris.

.4 Supply separate, marked disposal bins for categories of waste material or separate material into organized piles as practical given the remoteness of the site.

3.7 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.8 SELLING OF MATERIALS

.1 Not used.

3.9 REMOVAL FROM SITE

.1 Transport material designated for alternate disposal in accordance with applicable regulations.

.2 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.10 CLEANING AND RESTORATION

.1 Keep site clean and organized throughout deconstruction.

.2 Upon completion of project, remove debris, trim surfaces and leave work site clean.

.3 Upon completion of project, reinstate walkways, light standards, parking surfaces, and other areas affected by Work to condition which existed prior to beginning of Work.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 REFERENCE STANDARDS

.1 Canadian Environmental Protection Act,1999 (CEPA 1999)

.1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).

.2 Department of Justice Canada (Jus)

.1 Transportation of Dangerous Goods Act, 1992 (TDG Act) 1992, (c. 34).

.2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 National Research Council Canada (NRC)

.1 National Fire Code of Canada 2015 (NFC).

1.3 DEFINITIONS

.1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.

.2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.4 Storage and Handling Requirements:

- .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial/territorial laws, regulations, codes, and guidelines.
- .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada (NFC) requirements.
- .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
  - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
  - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
- .5 Transfer of flammable and combustible liquids is prohibited within buildings.
- .6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
- .7 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
- .8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
- .9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- .10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
  - .1 Store hazardous materials and wastes in closed and sealed containers.
  - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
  - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
  - .4 Segregate incompatible materials and wastes.
  - .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.

.6 Store hazardous materials and wastes in secure storage area with controlled access.

.7 Maintain clear egress from storage area.

.8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.

.9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.

.10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.11 When hazardous waste is generated on site:

.1 Co-ordinate transportation and disposal.

.2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.

.3 Use licensed carrier authorized by provincial authorities to accept subject material.

.4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.

.5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.

.6 Only trained personnel handle, offer for transport, or transport dangerous goods.

.7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.

.8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.

.9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

.12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.13 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

Part 2 Products

2.1 MATERIALS

.1 Description:

.1 Bring on site only quantities hazardous material required to perform Work.

.2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

Part 3 Execution

3.1 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for recycling or reuse as required.

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

.2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.

.3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.

.4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

.5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

.6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.

.7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

.8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:

.1 Hazardous wastes recycled in manner constituting disposal.

.2 Hazardous waste burned for energy recovery.

.3 Lead-acid battery recycling.

.4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Comply with requirements of this Section when performing following work:

.1 Removing non-friable asbestos-containing materials, other than ceiling tiles, if the material is installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.

.2 Break, cut, grind, sand, drill, scrape, vibrate or abrade non-friable asbestos containing materials using non-powered hand-held tools, and the material is wetted to control the spread of dust or fibres.

1.2 RELATED REQUIREMENTS

.1 Not used.

1.3 REFERENCE STANDARDS

.1 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.2 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.3 Workers' Safety and Compensation Commission, Northwest Territories and Nunavut Asbestos Abatement Code of Practice (2012).

.4 Northwest Territories.

.1 Safety Act – Updated 2015.

.2 Occupational Health and Safety Regulations – Updated 2016.

1.4 DEFINITIONS

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.2 Amended Water: water with nonionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.

.3 Asbestos-Containing Materials (ACMs): materials that contain asbestos and are identified under Existing Conditions including fallen materials and settled dust

.4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.

.5 Authorized Visitors: Engineer, Consultant or designated representative, and representative of regulatory agencies.

.6 Competent worker: in relation to specific work, means a worker who:

.1 Is qualified because of knowledge, training and experience to perform the work.

.2 Is familiar with the territorial and federal laws and with the provisions of the regulations that apply to the work.

.3 Has knowledge of all potential or actual danger to health or safety in the work.

.7 Friable material: means material that:

.1 When dry, can be crumbled, pulverized or powdered by hand pressure, or

.2 is crumbled, pulverized or powdered.

.8 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

.9 Occupied Area: any area of the building or work site that is outside Asbestos Work Area.

.10 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.

.11 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.

.3 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.

.4 Submit to Departmental Representative necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.

.5 Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.

.6 Submit proof satisfactory to Departmental Representative that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is performed.

.2 Health and Safety:

.1 Perform construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Safety Requirements: worker protection.

.1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:

.1 Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial/Territorial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.

.2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing shall consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing to include suitable footwear, and to be repaired or replaced if torn.

.2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.3 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.

.4 Facilities for washing hands and face shall be provided within or close to the Asbestos Work Area.

.5 Ensure workers wash hands and face when leaving Asbestos Work Area.

.6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling or reuse as required.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.5 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6 mils bags or leak proof drums. Label containers with appropriate warning labels.

.6 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.8 EXISTING CONDITIONS

.1 Reports and information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of during this project are appended to this specification.

.2 Notify Departmental Representative of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Departmental Representative.

1.9 SCHEDULING

.1 Hours of Work: The asbestos abatement will commence at a date confirmed by the Departmental Representative.

1.10 PERSONNEL TRAINING

.1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.

.2 Instruction and training related to respirators includes, following minimum requirements:

- .1 Fitting of equipment.
- .2 Inspection and maintenance of equipment.
- .3 Disinfecting of equipment.
- .4 Limitations of equipment.

.3 Instruction and training must be provided by a competent, qualified person.

Part 2 Products

2.1 MATERIALS

.1 Drop Sheets:

- .1 Polyethylene: 0.15 mm thick.

.2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.

.2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.

.3 Waste Containers: contain waste in two separate containers.

.1 Inner container: 0.15 mm thick sealable polyethylene waste bag.

.2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.

.3 Labelling requirements: affix pre-printed cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.

.4 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.

.5 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.

Part 3 Execution

3.1 PROCEDURES

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Before beginning Work, isolate Asbestos Work Area using, minimum, preprinted cautionary asbestos warning signs in both official languages that are visible at access routes to Asbestos Work Area.

.1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.

.2 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.

.3 Do not use compressed air to clean up or remove dust from any surface.

.3 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.

.1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in Asbestos Work Area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.

.4 Wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.

.1 Use garden reservoir type low - velocity fine - mist sprayer.

.2 Perform Work to reduce dust creation to lowest levels practicable.

.3 Work will be subject to visual inspection and air monitoring.

.4 Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.

.5 Frequently and at regular intervals during Work and immediately on completion of work:

.1 Dust and waste to be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a waste container, and

.2 Drop sheets to be wetted and placed in a waste container as soon as practicable.

.6 Cleanup:

.1 Place dust and asbestos containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.

.2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.

.3 Seal waste bags and remove from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that the appropriate guidelines and regulations for asbestos disposal are followed.

.4 Perform final thorough clean-up of Work areas and adjacent areas affected by Work using HEPA vacuum.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Comply with requirements of this Section when performing following Work:

- .1 Removing all or part of a false ceiling to obtain access to a work area, if asbestos containing material is likely lying on the surface of the false ceiling.
- .2 Removing up to 9.3 square metres of asbestos containing suspended ceiling tiles, or sheet vinyl flooring having a paper backing.
- .3 Removal or disturbance of 0.09 square metres or less of friable asbestos containing material during the repair, alteration, maintenance or demolition of all or part of machinery or equipment, or of a building.
- .4 Removal all or part of a false ceiling to obtain access to a work area, if asbestos containing is likely to be lying on the surface of the false ceiling.
- .5 Removing non-friable asbestos containing materials by breaking, cutting, drilling, abrading, grounding, sanding or if:
  - .1 The material is not wetted to control the spread of dust or fibres, and
  - .2 The work is done only by means of non-powered hand-held tools.
- .6 Removing non-friable asbestos containing materials by breaking, cutting, drilling, abrading, grounding, sanding or vibrating if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.
- .7 Hand demolition of involving drywall joint compound, block mortar, stucco, or brick mortar products containing asbestos.
- .8 Removing of asbestos containing material from a pipe, duct or similar structure using a glove bag.

1.2 RELATED REQUIREMENTS

.1 Not used.

1.3 REFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.205-[94], Sealer for Application of Asbestos Fibre Releasing Materials.

.2 Department of Justice Canada (Jus)

- .1 Canadian Environmental Protection Act, 1999 (CEPA).

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).

.4 Transport Canada (TC)

- .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.5 Underwriters' Laboratories of Canada (ULC)

.6 Workers' Safety and Compensation Commission, Northwest Territories and Nunavut Asbestos Abatement Code of Practice (2012).

.7 Northwest Territories.

.1 Safety Act – Updated 2015.

.2 Occupational Health and Safety Regulations – Updated 2016

1.4 DEFINITIONS

.1 Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow wetting of fibres.

.2 Asbestos Containing Materials (ACMs): materials that contain asbestos and are identified under Existing Conditions including fallen materials and settled dust.

.3 Asbestos Work Area: area where work takes place which will, or may disturb ACMs.

.4 Authorized Visitors: Engineers, or designated representatives, and representatives of regulatory agencies.

.5 Competent person: in relation to specific work, means a worker who:

.1 Is qualified because of knowledge, training and experience to perform the work.

.2 Is familiar with the provincial and federal laws and with the provisions of the regulations that apply to the work.

.3 Has knowledge of all potential or actual danger to health or safety in the work.

.6 Friable Materials: material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.

.7 Glove Bag: prefabricated glove bag as follows:

.1 Minimum thickness 0.25 mm (10 mil) polyvinyl-chloride bag.

.2 Integral 0.25 mm (10 mil) thick polyvinyl-chloride gloves and elastic ports.

.3 Equipped with reversible double pull double throw zipper on top and at approximately mid-section of the bag.

.4 Straps for sealing ends around pipe.

.8 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any dimension at 99.97% efficiency.

.9 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

.10 Occupied Area: any area of building or work site that is outside Asbestos Work Area.

.11 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.

.12 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for scope of work.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of asbestos containing waste in accordance with requirements of authority having jurisdiction.

.3 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.

.4 Submit proof of Contractor's Asbestos Liability Insurance.

.5 Submit to Departmental Representative necessary permits for transportation and disposal of asbestos containing waste and proof that asbestos containing waste has been received and properly disposed.

.6 Submit proof satisfactory to Departmental Representative that all asbestos workers have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene, entry and exit from Asbestos Work Area, aspects of work procedures and protective measures while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.

.7 Submit proof that supervisory personnel have attended asbestos abatement course, of not less than two days duration, approved by Departmental Representative. Minimum of one supervisor for every ten workers.

.8 Submit documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:

- .1 Encapsulants;
- .2 Amended water;
- .3 Slow drying sealer.

.9 Submit proof satisfactory to Departmental Representative that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at the time work is performed.

.2 Health and Safety:

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Safety Requirements: worker and visitor protection.
  - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
    - .1 Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial/Territorial Authority having

jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.

.2 Disposable type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing. It includes suitable footwear, and it to be repaired or replaced if torn.

.3 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.4 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.

.5 Ensure workers wash hands and face when leaving Asbestos Work Area. Facilities for washing are located [as indicated on drawings].

.6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

.7 Visitor Protection:

.1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.

.2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.

.3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse or recycling as required.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.5 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial/Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6 mils bags or leak proof drums. Label containers with appropriate warning labels.

.6 Provide manifests describing and listing waste created. Transport containers by approved means to licenced landfill for burial.

1.8 EXISTING CONDITIONS

.1 Reports and information pertaining to ACMS to be handled, removed, or otherwise disturbed and disposed of during this Project are appended to this specification.

.2 Notify Departmental Representative of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.9 SCHEDULING

.1 Hours of Work: The asbestos abatement will commence at a date confirmed by the Departmental Representative.

1.10 PERSONNEL TRAINING

.1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, in use of glove bag procedures, and in use, cleaning, and disposal of respirators and protective clothing.

.2 Instruction and training related to respirators includes, at minimum:

.1 Fitting of equipment.

.2 Inspection and maintenance of equipment.

.3 Disinfecting of equipment.

.4 Limitations of equipment.

.3 Instruction and training must be provided by competent, qualified person.

Part 2 Products

2.1 MATERIALS

.1 Drop and Enclosure Sheets:

.1 Polyethylene: 0.15 mm thick.

.2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.

.2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in concentration to provide thorough wetting of asbestos containing material.

.3 Waste Containers: contain waste in two separate containers.

.1 Inner container: 0.15 mm thick sealable polyethylene bag, or where glove bag method is used, glove bag itself.

.2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.

.3 Labelling requirements: affix preprinted cautionary asbestos warning, in both official languages, that is visible when ready for removal to disposal site.

.4 Glove bag:

.1 The glove bag to be equipped with:

.1 Sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure throughout the work period.

.2 Valves or openings to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure.

.3 A tool pouch with a drain.

.4 A seamless bottom and a means of sealing off the lower portion of the bag.

.5 A high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.

.5 Tape: tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.

.6 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.

.1 Sealer: flame spread and smoke developed rating less than.

.7 Encapsulant: surface film forming conforming to CAN/CGSB-1.205.

Part 3 Execution

3.1 SUPERVISION

.1 Minimum of one Supervisor for every ten workers is required.

.2 Approved Supervisor must remain within Asbestos Work Area during disturbance, removal, or other handling of asbestos-containing materials.

3.2 PROCEDURES

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Before beginning Work, at each access to Asbestos Work Area, install warning signs in both official languages in upper case 'Helvetica Medium' letters reading as follows, where number in parentheses indicates font size to be used: 'CAUTION ASBESTOS HAZARD AREA (25 mm) / NO UNAUTHORIZED ENTRY (19 mm) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm) / BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)'.

.3 Before beginning Work remove visible dust from surfaces in work area where dust is likely to be disturbed during course of work.

.1 Use HEPA vacuum or damp cloths where damp cleaning does not create hazard and is otherwise appropriate.

.2 Do not use compressed air to clean up or remove dust from any surface.

.4 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.

.1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in work areas where dust or contamination cannot otherwise be safely contained.

.2 When removing asbestos containing material from piping or equipment and "glove bag" method is not used, where removing suspended ceilings and walls themselves do not enclose work area, erect enclosure of polyethylene sheeting around work area, shut off mechanical ventilation system serving work area and seal ventilation ducts to and from work area.

.5 Remove loose material by HEPA vacuum; thoroughly wet friable material containing asbestos to be removed or disturbed before and during Work unless wetting creates hazard or causes damage.

.1 Use garden reservoir type low - velocity sprayer or airless spray equipment capable of producing mist or fine spray.

.2 Perform Work in a manner to reduce dust creation to lowest levels practicable.

.6 Pipe Insulation Removal Using Glove Bag:

.1 A glove bag not to be used to remove insulation from a pipe, duct or similar structure if:

.1 It may not be possible to maintain a proper seal for any reason including, without limitation:

.1 The condition of the insulation.

.2 The temperature of the pipe, duct or similar structure.

.2 The bag could become damaged for any reason including, without limitation.

.1 The type of jacketing.

.2 The temperature of the pipe, duct or similar structure.

.2 Upon installation of the glove bag, inspect bag for any damage or defects. If any damage or defects are found, the glove bag is to be repaired or replaced. The glove bag to be inspected at regular intervals for damage and defects, and repair or replaced, as appropriately. The asbestos containing contents of the damaged or defective glove bag found during removal are to be wetted and the glove bag and

its contents are to be removed and disposed of in an appropriate waste disposal container. Any damaged or defective glove bags are not be reused.

.3 Place tools necessary to remove insulation in tool pouch. Wrap bag around pipe and close zippers. Seal bag to pipe with cloth straps.

.4 Place hands in gloves and use necessary tools to remove insulation. Arrange insulation in bag to obtain full capacity of bag.

.5 Insert nozzle of garden reservoir type sprayer into bag through valve and wash down pipe and interior of bag thoroughly. Wet surface of insulation in lower section of bag.

.6 To remove bag after completion of stripping, wash top section and tools thoroughly. Remove air from top section through elasticized valve using a HEPA vacuum. Pull polyethylene waste container over glove bag before removing from pipe. Release one strap and remove freshly washed tools. Place tools in water. Remove second strap and zipper. Fold over into waste container and seal.

.7 After removal of bag ensure that pipe is free of residue. Remove residue using HEPA vacuum or wet cloths. Ensure that surfaces are free of sludge which after drying could release asbestos dust into atmosphere. Seal exposed surfaces of pipe and ends of insulation with slow drying sealer to seal in any residual fibres.

.8 Upon completion of Work shift, cover exposed ends of remaining pipe insulation with polyethylene taped in place.

.7 Work is subject to visual inspection and air monitoring. Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.

.8 Cleanup:

.1 Frequently during Work and immediately after completion of work, clean up dust and asbestos containing waste using HEPA vacuum or by damp mopping.

.2 Place dust and asbestos containing waste in sealed dust tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste and wet and fold to contain dust and then place in waste bags.

.3 Immediately before their removal from Asbestos Work Area and disposal, clean each filled waste bag using damp cloths or HEPA vacuum and place in second clean waste bag.

.4 Seal and remove double bagged waste from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that guidelines and regulations for asbestos disposal are followed.

.5 Perform final thorough clean-up of Asbestos Work Areas and adjacent areas affected by Work using HEPA vacuum.

3.3 AIR MONITORING

.1 From beginning of Work until completion of cleaning operations, Departmental Representative to take air samples on daily basis outside of Asbestos Work Area enclosures in accordance with Provincial/Territorial Occupational Health and Safety Regulations.

.1 Contractor or Departmental Representative will be responsible for monitoring inside enclosure in accordance with applicable Provincial/Territorial Occupational Health and Safety Regulations.

.2 If air monitoring shows that areas outside Asbestos Work Area enclosures are contaminated, enclose, maintain and clean these areas in same manner as that applicable to Asbestos Work Area.

.3 Ensure that respiratory safety factors are not exceeded.

END OF SECTION

Approved: 2008-12-31

Part 1 General

1.1 SUMMARY

.1 Comply with requirements of this Section when performing following Work:

- .1 Removal or disturbance as specified of more than 0.09 square metre of friable asbestos containing material during the repair, alteration, maintenance or demolition of a building or any machinery or equipment.
- .2 The spray application of a sealant to friable asbestos containing material.
- .3 Cleaning or removing air handling equipment, including rigid ducting but not including filters, in a building that has asbestos containing sprayed fireproofing.
- .4 Repairing, altering or demolishing all or part of a kiln, metallurgical furnace or similar structure that is made in part of refractory materials that are asbestos containing materials.
- .5 Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos containing material, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.
- .6 Repairing, altering or demolishing all or part of any building in which asbestos is or was used in the manufacture of products.
- .7 Removal of more than 9.3 square meter of contiguous ceiling tile containing asbestos or sheet vinyl flooring having an asbestos backing.

1.2 RELATED REQUIREMENTS

.1 Not used.

1.3 REFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.205-[94], Sealer for Application to Asbestos-Fibre-Releasing Materials.

.2 Canadian Standards Association (CSA International)

.3 Department of Justice Canada

- .1 Canadian Environmental Protection Act (CEPA), 1999.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).

.5 Transport Canada (TC)

- .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.6 Underwriters' Laboratories of Canada (ULC)

.7 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention (CDC)/National Institute for Occupational Safety and Health (NIOSH)

.1 NIOSH 94-113-[August 1994], NIOSH Manual of Analytical Methods (NMAM), 4th Edition.

.8 U.S. Department of Labour - Occupational Safety and Health Administration - Toxic and Hazardous Substances

.1 29 CFR 1910.1001-[2001], Asbestos Regulations.

.9 Workers' Safety and Compensation Commission, Northwest Territories and Nunavut Asbestos Abatement Code of Practice (2012).

.10 Northwest Territories.

.1 Safety Act – Updated 2015.

.2 Occupational Health and Safety Regulations – Updated 2016

1.4 DEFINITIONS

.1 Airlock: system for permitting ingress or egress without permitting air movement between contaminated area and uncontaminated area, typically consisting of two curtained doorways at least 2 m apart.

.2 Amended Water: water with a non-ionic surfactant wetting agent added to reduce water tension to allow wetting of fibres.

.3 Asbestos Containing Materials (ACMs): materials that contain asbestos and are identified under Existing Conditions including fallen materials and settled dust.

.4 Asbestos Work Areas: area where work takes place which will, or may disturb ACMs.

.5 Authorized Visitors: Departmental Representative or designated representatives, and representatives of regulatory agencies.

.6 Competent person: in relation to specific work, means a worker who:

.1 Is qualified because of knowledge, training and experience to perform the work.

.2 Is familiar with the provincial and federal laws and with the provisions of the regulations that apply to the work.

.3 Has knowledge of all potential or actual danger to health or safety in the work.

.7 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows:

.1 Place two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of doorway.

.2 Reinforce free edges of polyethylene with duct tape and weight bottom edge to ensure proper closing.

.3 Overlap each polyethylene sheet at openings not less than 1.5 m on each side.

.8 PAO Test: testing method used to determine integrity of Negative Pressure unit using polyalphaolefin (PAO) HEPA-filter leak test.

.9 Friable Materials: material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.

.10 Glove Bag: prefabricated glove bag as follows:

.1 Minimum thickness 0.25 mm (10 mil) polyvinyl-chloride bag.

.2 Integral 0.25 mm (10 mil) thick polyvinyl-chloride gloves and elastic ports.

.3 Equipped with reversible double pull double throw zipper on top and at approximately mid-section of the bag.

.4 Straps for sealing ends around pipe.

.11 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.12 Negative pressure: system that extracts air directly from work area, filters such extracted air through High Efficiency Particulate Air filtering system, and discharges this air directly outside work area to exterior of building.

.1 System to maintain minimum pressure differential of 5 Pa relative to adjacent areas outside of work areas, be equipped with alarm to warn of system breakdown, and be equipped with instrument to continuously monitor and automatically record pressure differences.

.13 Non-Friable Materials: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

.14 Occupied Areas: any area of building or work site that is outside Asbestos Work Area.

.15 Polyethylene sheeting sealed with tape: polyethylene sheeting of type and thickness specified sealed with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through sheeting into clean area.

.16 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Before beginning work:

.1 Obtain from appropriate agency and submit to Departmental Representative necessary permits for transportation and disposal of asbestos waste. Ensure that dump operator is fully aware of hazardous nature of material being dumped, and proper methods of disposal. Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to receive and properly dispose of asbestos waste.

.2 Submit proof satisfactory to Departmental Representative that all asbestos workers have received appropriate training and education by a competent person on hazards of asbestos exposure, good personal hygiene, entry and exit from Asbestos Work Area, aspects of work procedures and protective measures while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing. Submit proof of attendance in form of certificate.

.3 Ensure supervisory personnel have attended asbestos abatement course, of not less than two days duration, approved by Departmental Representative. Submit proof of attendance in form of certificate. Minimum of one Supervisor for every ten workers.

.4 Submit layout of proposed enclosures and decontamination facilities to DCC Representative for review.

.5 Submit documentation including test results for sealer proposed for use.

.6 Submit Provincial/Territorial and/or local requirements for Notice of Project form.

.7 Submit proof satisfactory to Departmental Representative that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.

.8 Submit documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including but not limited to following:

.1 Encapsulants.

.2 Amended water.

.3 Slow drying sealer.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to asbestos, provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Safety Requirements: worker and visitor protection.

.1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area includes:

.1 [Supplied air respirator] [Powered air purifying respirator (PAPR)] [Air purifying full face-mask respirator] with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be

provided to and reviewed with each worker who is required to wear a respirator. A worker not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.

.2 Disposable type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing. It includes suitable footwear, and it to be repaired or replaced if torn. Requirements for each worker:

.1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters that have been tested as satisfactory, clean coveralls and head covers before entering Equipment and Access Rooms or Asbestos Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.

.2 Remove gross contamination from clothing before leaving work area then proceed to Equipment and Access Room and remove clothing except respirators. Place contaminated work suits in receptacles for disposal with other asbestos - contaminated materials. Leave reusable items except respirator in Equipment and Access Room. Still wearing the respirator proceed naked to showers. Using soap and water wash body and hair thoroughly. Clean outside of respirator with soap and water while showering; remove respirator; remove filters and wet them and dispose of filters in container provided for purpose; and wash and rinse inside of respirator. When not in use in work area, store work footwear in Equipment and Access Room. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from work area or from Equipment and Access Room.

.3 After showering and drying off, proceed to clean change room and dress in street clothes at end of each day's work, or in clean coveralls before eating, smoking, or drinking. If re-entering work area, follow procedures outlined in paragraphs above.

.4 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers must not use this system as means to leave or enter work area.

.2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.3 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual asbestos abatement.

.4 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.

.5 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

.6 Visitor Protection:

.1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.

.2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.

.3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse or recycling as required.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.5 Fold up metal banding, flatten and place in designated area for recycling.

.6 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6 mils bags or leak proof drums. Label containers with appropriate warning labels.

.7 Provide manifests describing and listing waste created. Transport containers by approved means to licenced landfill for burial.

1.8 EXISTING CONDITIONS

.1 Results of tests of asbestos containing materials to be handled, removed, or otherwise disturbed and disposed of during this Project are appended to this specification. These are for general information only and are not necessarily representative of asbestos containing materials covered within scope of this Project.

.2 Notify Departmental Representative of suspect asbestos containing material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.9 SCHEDULING

.1 Not later than ten (10) days before beginning Work on this Project notify following in writing:

.1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.

.2 Regional Office of Labour Canada.

.3 Provincial/Territorial, Department of Labour.

.4 Disposal Authority.

.2 Inform sub-trades of presence of asbestos containing materials identified in Existing Conditions.

.3 Submit to Departmental Representative] copy of notifications prior to start of Work.

.4 Hours of Work: The asbestos abatement will commence at a date confirmed by the Departmental Representative.

.5 Allow sufficient time for inspection of the site by Departmental Representative after site preparations and barriers are completed and before asbestos abatement work commences. **The Asbestos Abatement Contractor shall provide a minimum of 24 hours notification for all pre-contamination and final visual inspection requests** to the Departmental Representative.

1.10 PERSONNEL TRAINING

.1 Before beginning Work, provide to Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene including dress and showers, in entry and exit from Asbestos Work Area, in aspects of work procedures including glove bag procedures, and in use, cleaning, and disposal of respirators and protective clothing.

.2 Instruction and training related to respirators includes, at minimum:

.1 Proper fitting of equipment.

.2 Inspection and maintenance of equipment.

.3 Disinfecting of equipment.

.4 Limitations of equipment.

.3 Instruction and training must be provided by competent, qualified person.

.4 Supervisory personnel to complete required training.

Part 2 Products

2.1 MATERIALS

.1 Polyethylene: minimum 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.

.2 FR polyethylene: minimum 0.15 mm thick, woven fibre reinforced fabric bonded both sides with polyethylene.

.3 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.

.4 Wetting agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether, or other material approved by Departmental Representative, mixed with water in concentration to provide adequate penetration and wetting of asbestos containing material.

.5 Waste Containers: contain waste in two separate containers.

.1 Inner container: 0.15 mm thick sealable polyethylene bag [or where glove bag method is used, glove bag itself].

.2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.

.3 Labelling requirements: affix preprinted cautionary asbestos warning, in both official languages, that is visible when ready for removal to disposal site. Label containers in accordance with Asbestos Regulations 29 CFR 1910.1001. Label in both official languages.

.6 Glove bag:

.1 The glove bag to be equipped with:

.1 Sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure throughout the work period.

.2 Valves or openings to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure.

.3 A tool pouch with a drain.

.4 A seamless bottom and a means of sealing off the lower portion of the bag.

.5 A high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.

.7 Tape: tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.

.8 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.

.9 Sealer: flame spread and smoke developed rating less than 50 [and be compatible with new fireproofing].

.10 Encapsulants: Type 2 surface film forming type Class A water based conforming to CAN/CGSB-1.205 and approved by the Fire Commissioner of Canada.

Part 3 Execution

3.1 PREPARATION

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Work Areas:

.1 Shut off and isolate air handling and ventilation systems to prevent fibre dispersal to other building areas during work phase. Conduct smoke tests to ensure that duct work is airtight. Seal and caulk joints and seams of active return air ducts within Asbestos Work Area.

.2 Preclean moveable furniture and carpeting within proposed work areas using HEPA vacuum and remove from work areas to temporary location.

.3 Preclean fixed casework, plant, and equipment within proposed work area[s], using HEPA vacuum and cover with polyethylene sheeting sealed with tape.

.4 Clean proposed work area[s] using, where practicable, HEPA vacuum cleaning equipment. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum equipment.

.5 The spread of dust from the work area to be prevented by:

.1 Using enclosures of polyethylene or other suitable material that is impervious to asbestos (including, if the enclosure material is opaque, one or more transparent window areas to allow observation of the entire work area from outside the enclosure), if the work area is not enclosed by walls.

.2 Using curtains of polyethylene sheeting or other suitable material that is impervious to asbestos, fitted on each side of each entrance or exit from the work area.

.6 Put negative pressure system in operation and operate continuously from time first polyethylene is installed to seal openings until final completion of work including final cleanup. Provide continuous monitoring of pressure difference using automatic recording instrument. The system to maintain a negative air pressure of 0.02 inches (5 Pa) of water, relative to the area outside the enclosed area. The system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.

.7 Seal off openings such as corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.

.8 Cover floor and wall surfaces with polyethylene sheeting sealed with tape. Use two layers of FR polyethylene on floors. Cover floors first so that polyethylene extends at least 300 mm up walls then cover walls to overlap floor sheeting.

.9 Build airlocks at entrances to and exits from work areas so that work areas are always closed off by one curtained doorway when workers enter or exit.

.10 At each access to work areas install warning signs in both official languages in upper case "Helvetica Medium" letters reading as follows where number in parentheses indicates font size to be used: "CAUTION ASBESTOS HAZARD AREA (25 mm) NO UNAUTHORIZED ENTRY (19 mm) WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm) BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)".

.11 After work area isolation, remove heating, ventilating, and air conditioning filters, pack in sealed plastic bags 0.15 mm minimum thick and treat as contaminated asbestos waste. Remove ceiling - mounted objects such as lights,

partitions, other fixtures not previously sealed off, and other objects that interfere with asbestos removal, as directed by Departmental Representative. Use localized water spraying during fixture removal to reduce fibre dispersal.

.12 Maintain emergency and fire exits from work areas, or establish alternative exits satisfactory to Authority having jurisdiction.

.13 Where application of water is required for wetting asbestos containing materials, shut off electrical power, provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.

.14 After preparation of work area[s] and Decontamination Enclosure Systems, for the removal of all asbestos containing materials, remove within work area and dispose of as contaminated waste in specified containers. Spray asbestos debris and immediate work area with amended water to reduce dust, as work progresses.

.3 Worker Decontamination Enclosure System:

.1 Worker Decontamination Enclosure System includes Equipment and Access Room, Shower Room, and Clean Room, as follows:

.1 Equipment and Access Room: build Equipment and Access Room between Shower Room and work areas, with two curtained doorways, one to Shower Room and one to work areas. Install portable toilet, waste receptor, and storage facilities for workers' shoes and protective clothing to be reworn in work areas. Build Equipment and Access Room large enough to accommodate specified facilities, other equipment needed, and at least one worker allowing him /her sufficient space to undress comfortably.

.2 Shower Room: build Shower Room between Clean Room and Equipment and Access Room, with two curtained doorways, one to Clean Room and one to Equipment and Access Room. Provide one shower for every five workers. Provide constant supply of hot and cold or warm water. Provide soap, clean towels, and appropriate containers for disposal of used respirator filters.

.3 Clean Room: build Clean Room between Shower Room and clean areas outside of enclosures, with two curtained doorways, one to outside of enclosures and one to Shower Room. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.

.4 Container and Equipment Decontamination Enclosure System:

.1 Container and Equipment Decontamination Enclosure System consists of Staging Area within work area, Washroom, Holding Room, and Unloading Room. Purpose of system is to provide means to decontaminate waste containers, scaffolding, waste and material containers, vacuum and spray equipment, and other tools and equipment for which Worker Decontamination Enclosure System is not suitable.

.1 Staging Area: designate Staging Area in work area for gross removal of dust and debris from waste containers and equipment, labelling and

sealing of waste containers, and temporary storage pending removal to Washroom. Equip Staging Area with curtained doorway to Washroom.

.2 Washroom: build Washroom between Staging Area and Holding Room with two curtained doorways, one to Staging Area and one to Holding Room. Provide high - pressure low - volume sprays for washing of waste containers and equipment. Pump waste water through 5 micrometre filter system before directing into drains. Provide piping and connect to water sources and drains.

.3 Holding Room: build Holding Room between Washroom and Unloading Room, with two curtained doorways, one to Washroom and one to Unloading Room. Build Holding Room sized to accommodate at least two waste containers and largest item of equipment used.

.4 Unloading Room: build Unloading Room between Holding Room and outside, with two curtained doorways, one to Holding Room and one to outside.

.5 Construction of Decontamination Enclosures:

.1 Build suitable framing for enclosures or use existing rooms where convenient, and line with polyethylene sheeting sealed with tape. Use two layers of FR polyethylene on floors.

.2 Build curtained doorways between enclosures so that when people move through or when waste containers and equipment are moved through doorway, one of two closures comprising doorway always remains closed.

.6 Separation of Work Areas from Occupied Areas:

.1 Separate parts of building required to remain in use from parts of building used for asbestos abatement by means of airtight barrier system constructed as follows:

.1 Build suitable floor to ceiling lumber or metal stud framing, cover with polyethylene sheeting sealed with tape, and apply 9 mm minimum thick plywood. Seal joints between plywood sheets and between plywood and adjacent materials with surface film forming type sealer, to create airtight barrier.

.2 Cover plywood barrier with polyethylene sealed with tape, as specified for work areas.

.7 Maintenance of Enclosures:

.1 Maintain enclosures in tidy condition.

.2 Ensure that barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

.3 Visually inspect enclosures at beginning of each working period.

.4 Use smoke methods to test effectiveness of barriers when directed by Departmental Representative.

.8 Do not begin Asbestos Abatement work until:

.1 Arrangements have been made for disposal of waste.

.2 For wet stripping techniques, arrangements have been made for containing, filtering, and disposal of waste water.

.3 Work areas and decontamination enclosures and parts of building required to remain in use are effectively segregated.

.4 Tools, equipment, and materials waste containers are on hand.

.5 Arrangements have been made for building security.

.6 Warning signs are displayed where access to contaminated areas is possible.

.7 Notifications have been completed and other preparatory steps have been taken.

3.2 SUPERVISION

.1 Minimum of one Supervisor for every ten workers is required.

.2 Approved Supervisor must remain within Asbestos Work Area during disturbance, removal, or other handling of asbestos containing materials.

3.3 ASBESTOS REMOVAL

.1 Before removing asbestos:

.1 Prepare site.

.2 Spray asbestos material with water containing specified wetting agent, using airless spray equipment capable of providing "mist" application to prevent release of fibres. Saturate asbestos material sufficiently to wet it to substrate without causing excess dripping. Spray asbestos material repeatedly during work process to maintain saturation and to minimize asbestos fibre dispersion.

.2 Remove saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed pack material in sealable plastic bags 0.15 mm minimum thick and place in labelled containers for transport.

.3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to Staging Area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure that containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.

.4 After completion of stripping work, wire brushed and wet sponged surfaces from which asbestos has been removed to remove visible material. During this work keep surfaces wet.

.5 Where Departmental Representative decides complete removal of asbestos containing material is impossible due to obstructions such as structural members or major service elements and provides written direction, encapsulate material as follows:

.1 Apply surface film forming type sealer to provide 0.635 mm minimum dry film thickness over sprayed asbestos surfaces. Apply using airless spray equipment to avoid blowing off fibres. Apply penetrating type sealer to penetrate existing sprayed asbestos surfaces to uniform depth of 25 mm minimum. Apply penetrating type sealer to penetrate existing sprayed asbestos surfaces uniformly to substrate.

.6 After wire brushing and wet sponging to remove visible asbestos, and after encapsulating asbestos containing material impossible to remove, wet clean entire work area including Equipment and Access Room, and equipment used in process. After 24 hour period to allow for dust settling, wet clean these areas and objects again. During this settling period no entry, activity, or ventilation will be permitted. After second 24 hour period under same conditions, clean these areas and objects again using HEPA vacuum followed by wet cleaning. After inspection by Departmental Representative apply continuous coat of slow drying sealer to surfaces of work area. Allow at least 16 hours with no entry, activity, ventilation, or disturbance other than operation of negative pressure units during this period.

.7 Work is subject to visual inspection and air monitoring. Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.

.8 Cleanup:

.1 Frequently during Work and immediately after completion of work, clean up dust and asbestos containing waste using HEPA vacuum or by damp mopping.

.2 Place dust and asbestos containing waste in sealed dust tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste and wet and fold to contain dust and then place in waste bags.

.3 Immediately before their removal from Asbestos Work Area and disposal, clean each filled waste bag using damp cloths or HEPA vacuum and place in second clean waste bag.

.4 Seal and remove double bagged waste from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that guidelines and regulations for asbestos disposal are followed.

.5 Perform final thorough clean-up of Asbestos Work Areas and adjacent areas affected by Work using HEPA vacuum.

3.4 FINAL CLEANUP

.1 Following cleaning specified in 3.3.8.

.2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible asbestos containing particles observed during cleanup, immediately, using HEPA vacuum equipment.

.3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.

.4 Include in clean-up Work areas, Equipment and Access Room, Washroom, Shower Room, and other contaminated enclosures.

.5 Include in clean-up sealed waste containers and equipment used in Work and remove from work areas, via Container and Equipment Decontamination Enclosure System, at appropriate time in cleaning sequence.

.6 Conduct final check to ensure that no dust or debris remains on surfaces as result of dismantling operations and carry out air monitoring again to ensure that asbestos levels in

building do not exceed 0.01 fibres/cc. Repeat cleaning using HEPA vacuum equipment, or wet cleaning methods where feasible, in conjunction with sampling until levels meet this criteria.

.7 As work progresses, and to prevent exceeding available storage capacity on site, remove sealed and labelled containers containing asbestos waste and dispose of to authorized disposal area in accordance with requirements of disposal authority. Ensure that each shipment of containers transported to dump is accompanied by Contractor's representative to ensure that dumping is done in accordance with governing regulations.

3.5 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

.1 When cleanup is complete:

.1 Re-establish objects and furniture moved to temporary locations in course of Work, in their proper positions.

.2 Re-secure mounted objects removed in course of Work in their former positions.

.3 Re-establish mechanical and electrical systems in proper working order. Install new filters.

.4 Repair or replace objects damaged in the course of Work, as directed by Departmental Representative.

3.6 AIR MONITORING

.1 From beginning of Work until completion of cleaning operations, Departmental Representative to take air samples on daily basis outside of work area enclosure in accordance with Health Canada recommendations and Provincial/Territorial Occupational Health and Safety Regulations.

.1 Contractor or Departmental Representative will be responsible for monitoring inside enclosure in accordance with applicable Provincial/Territorial Occupational Health and Safety Regulations.

.2 Use results of air monitoring inside work area to establish type of respirators to be used. Workers may be required to wear sample pumps for up to full-shift periods.

.1 If fibre levels are above safety factor of respirators in use, stop abatement, apply means of dust suppression, and use higher safety factor in respiratory protection for persons inside enclosure.

.2 If air monitoring shows that areas outside work area enclosures are contaminated, enclose, maintain and clean these areas, in same manner as that applicable to work areas.

.3 Final air monitoring to be conducted as follows: After Asbestos Work Area has passed visual inspection and acceptable coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period has passed, Departmental Representative will perform air monitoring within Asbestos Work Area by aggressive methods, where provincial regulations require.

.1 Contractor shall be responsible to provide and install fans and blowers required for aggressive monitoring.

.2 Final air monitoring results must show fibre levels of less than 0.01 f/cc.

.3 If air monitoring results show fibre levels in excess of 0.01 f/cc, re-clean work area and apply another acceptable coat of lock-down agent to surfaces.

.4 Repeat as necessary until fibre levels are less than 0.01 f/cc.

3.7 INSPECTION

.1 Perform inspection of Asbestos Work Area to confirm compliance with specification and governing authority requirements. Deviations from these requirements that have not been approved in writing by Departmental Representative may result in Work stoppage, at no cost to Owner.

.2 Departmental Representative will inspect Work for:

.1 Adherence to specific procedures and materials.

.2 Final cleanliness and completion.

.3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

.3 When asbestos leakage from Asbestos Work Area has occurred or is likely to occur Departmental Representative may order Work shutdown.

.1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Comply with requirements of this Section when performing following Work:

.1 Removal of lead based paint by scraping or sanding using non-powered hand tools.

.2 Manual demolition of lead-painted plaster walls or building components by striking wall with sledgehammer or similar tool.

1.2 RELATED REQUIREMENTS

.1 Not used.

1.3 REFERENCE STANDARDS

.1 Government of the Northwest Territories

.1 Guideline for the Management of Waste Lead and Lead Paint, 2004

.2 Department of Justice Canada

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.3 Health Canada

.1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).

.4 Human Resources and Social Development Canada (HRSDC)

.1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.

.5 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.6 U.S. Environmental Protection Agency (EPA)

.1 EPA 747-R-95-007-1995, Sampling House Dust for Lead.

.7 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)

.1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).

.8 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances

.1 Lead in Construction Regulation - 29 CFR 1926.62-[1993].

.9 Underwriters' Laboratories of Canada (ULC)

1.4 DEFINITIONS

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.2 Authorized Visitors: Departmental Representative or designated representatives and representatives of regulatory agencies.

.3 Occupied Area: areas of building or work site that is outside Work Area.

.4 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.

.5 Airlock: ingress or egress system, without permitting air movement between contaminated area and uncontaminated area. Consisting of two curtained doorways at least 2 m apart.

.6 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another. Typically constructed as follows:

.1 Place two overlapping polyethylene sheets over existing or temporarily framed doorway, securing each along top of doorway, securing vertical edge of one sheet along one vertical side of doorway, and secure other sheet along opposite vertical side of doorway.

.2 Reinforce free edges of polyethylene with duct tape and add weight to bottom edge to ensure proper closing.

.3 Overlap each polyethylene sheet at openings 1.5 m on each side.

.7 Action level: employee exposure, without regard to usage of respirators, to an airborne concentration of lead of 50 micrograms per cubic metre of air calculated as 8 hour time-weighted average (TWA). Intermediate precautions for lead abatement are based on airborne lead concentrations greater than 0.05 milligrams per cubic metre of air within Work Area.

.8 Competent person: Individual capable of identifying existing lead hazards in workplace and taking corrective measures to eliminate them.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Provide proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.

.3 Quality Control:

.1 Provide Departmental Representative necessary permits for transportation and disposal of lead based paint waste and proof that it has been received and properly disposed.

.2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, entry and exit from Work Area, and aspects of work procedures and protective measures.

.3 Provide proof that supervisory personnel have attended lead abatement course, of not less than two days duration, approved by Departmental Representative. Minimum of one supervisor for every ten workers.

.4 Product data:

.1 Provide documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:

.1 Encapsulants.

.2 Amended water.

.3 Slow drying sealer.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead paint, in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Safety Requirements: worker and visitor protection.

.1 Protective equipment and clothing to be worn by workers and visitors in Work Area includes:

.1 Respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of 50, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Provide sufficient filters so workers can install new filters following disposal of used filters and before re-entering contaminated areas.

.2 Disposable type protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

.2 Requirements for workers:

.1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and Access Rooms or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.

.2 Remove gross contamination from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead - contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use in Work Area, store work footwear in Equipment and Access Room. Upon completion of lead abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using

soap and water before removing from Work Area or from Equipment and Access Room.

.3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers not to use this system as means to leave or enter work area.

.3 Eating, drinking, chewing, and smoking are not permitted in Work Area.

.4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual lead abatement.

.5 Ensure workers wash hands and face when leaving Work Area.

.6 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.

.7 Ensure no person required to enter Work Area has facial hair that affects seal between respirator and face.

.8 Visitor Protection:

.1 Provide protective clothing and approved respirators to Authorized Visitors to Work Areas.

.2 Instruct Authorized Visitors in use of protective clothing, respirators and procedures.

.3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Work Area.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling or reuse as required.

.2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

.3 Disposal of lead waste generated by removal activities must comply with Territorial, Federal, Municipal] and Provincial regulations. Dispose of lead waste in sealed double thickness [6] ml bags or leak proof drums. Label containers with appropriate warning labels.

.4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.8 EXISTING CONDITIONS

.1 Reports and information pertaining to lead based paint to be handled, removed, or otherwise disturbed and disposed of during this Project are appended to this specification.

.2 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.9 SCHEDULING

.1 Not later than two days before beginning Work on this Project notify the following in writing, where appropriate:

.1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.

.2 Provincial Ministry of Labour.

.3 Disposal Authority.

.2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.

.3 Provide Departmental Representative copy of notifications prior to start of Work.

.4 Hours of Work: The abatement will commence at a date confirmed by the Departmental Representative.

.5 Allow sufficient time for inspection of the site by Departmental Representative after site preparations and barriers are completed and before abatement work commences. **The Abatement Contractor shall provide a minimum of 72 hours notification for all pre-contamination and final visual inspection requests** to the Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Polyethylene: 0.15 mm unless otherwise specified; in sheet size to minimize joints.

.2 FR polyethylene: 0.15 mm woven fibre reinforced fabric bonded both sides with polyethylene.

.3 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.

.4 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for trapping residual lead paint residue.

.5 Lead waste containers: metal or fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm sealable polyethylene liners.

.1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

Part 3 Execution

3.1 SUPERVISION

.1 Approved Supervisor must remain within Lead Work Area during disturbance, removal, or other handling of lead based paints.

3.2 PREPARATION

.1 Remove and wrap items to be salvaged or reused, and transport and store in area specified by Departmental Representative.

.2 Work Area:

.1 Shut off and isolate HVAC system to prevent dust dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.

.2 Pre-clean fixed casework, and equipment within work areas, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.

.3 Clean work areas using HEPA vacuum. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum.

.4 Seal off openings, corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.

.5 Cover floor surfaces in work area from wall to wall with FR polyethylene drop sheets to protect existing floor during removal.

.6 Build airlocks at entrances and exits from work areas to ensure work areas are always closed off by one curtained doorway when workers enter or exit.

.7 At point of access to work areas install warning signs in both official languages in upper case "Helvetica Medium" letters reading as follows where number in parentheses indicates font size to be used:

.1 CAUTION LEAD HAZARD AREA (25 mm).

.2 NO UNAUTHORIZED ENTRY (19 mm).

.3 WEAR ASSIGNED PROTECTIVE EQUIPMENT AND RESPIRATOR (19 mm).

.4 BREATHING LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm).

.8 Maintain emergency and fire exits from work areas, or establish alternative exits satisfactory to Authority having jurisdiction.

.9 Where water application is required for wetting lead containing materials, provide temporary water supply by use of appropriately sized hoses for application of water as required.

.10 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.

.3 Worker Decontamination Enclosure System:

.1 Worker Decontamination Enclosure System includes Equipment and Access Room and Clean Room, as follows:

.1 Equipment and Access Room: construct between exit and work areas, with two curtained doorways, one to the rest of suite, and one to work area. Install waste receptor and storage facilities for workers' shoes and protective clothing to be re-worn in work areas. Build large enough to accommodate specified facilities, equipment needed, and at least one worker allowing sufficient space to change comfortably.

.2 Clean Room: construct with curtained doorway to outside of enclosures. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and

respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.

.4 Construction of Decontamination Enclosures:

.1 Construct framing for enclosures or use existing rooms. Line enclosure with polyethylene sheeting and seal with tape, apply two layers of FR polyethylene on floor.

.2 Construct curtain doorways between enclosures so when people move through or waste containers and equipment are moved through doorway, one of two closures comprising doorway always remains closed.

.5 Separation of Work Areas from Occupied Areas

.1 Barriers between Work Area and occupied area to be constructed as follows:

.1 Construct floor to ceiling [metal] [lumber] stud framing, cover with polyethylene sheeting and seal with duct tape. Apply [9] plywood over polyethylene sheeting. Seal plywood joints and between adjacent materials with surface film forming sealer, to create airtight barrier.

.2 Cover plywood with polyethylene sheeting and sealed with duct tape.

.6 Maintenance of Enclosures:

.1 Maintain enclosures in clean condition.

.2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.

.3 Visually inspect enclosures at beginning of each work day.

.4 Use smoke test method to test effectiveness of barriers as directed by Departmental Representative.

3.3 LEAD - BASE PAINT ABATEMENT

.1 Removal of lead based paint to be performed by scraping or sanding using non-powered hand tools, or manual demolition of lead-painted plaster walls or building components by striking a wall with sledgehammer or similar tool.

.2 Remove lead based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.

.3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to Staging Area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.

.4 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.

.5 After wire brushing and wet sponging to remove visible lead based paint, and after encapsulating lead containing material impossible to remove, wet clean work area including equipment and access room, and equipment used in process. After inspection by Departmental Representative, apply continuous coat of slow drying sealer to surfaces.

Do not disturb work for 8 hours with no entry, activity, ventilation or disturbance during this period.

.6 After enclosing lead painted surfaces, wet clean work area and equipment and access room. During settling period no entry, activity, or ventilation will be permitted.

3.4 INSPECTION

.1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Owner.

.2 Departmental Representative will inspect work for:

.1 Adherence to specific procedures and materials.

.2 Final cleanliness and completion.

.3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

.3 When lead dust leakage from Work Area Departmental Representative may order Work shutdown.

.1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.5 LEAD SURFACE SAMPLING - WORK AREAS

.1 Not used.

3.6 FINAL CLEANUP

.1 Following specified cleaning procedures, proceed with final cleanup.

.2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum equipment.

.3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.

.4 Clean-up Work Areas, Equipment and Access Room, and other contaminated enclosures.

.5 Clean-up sealed waste containers and equipment used in Work and remove from work areas, via Container and Equipment Decontamination Enclosure System, at appropriate time in cleaning sequence.

.6 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

.1 Repair or replace objects damaged in course of work to their original state or better, as directed by Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not used.

1.2 MEASUREMENT PROCEDURES

.1 Excavated materials will be measured in cubic metres in their original location.

.1 Common excavation quantities measured will be actual volume removed within following limits:

.1 Width for trench excavation as indicated.

.2 Width for excavation for structures as indicated.

.3 Depth from ground elevation immediately prior to excavation, to 300 mm below ground elevation, or as directed by Departmental Representative.

.2 Rock quantities measured will be actual volume removed within following limits:

.1 Width for trench excavation as indicated.

.2 Width for excavation for structures to be bounded by vertical planes up to 500 mm outside of and parallel to neat lines of footings as indicated.

.3 Depth from rock surface elevations immediately prior to excavation, to elevation as indicated.

.4 Where design elevation is less than 300 mm below original rock surface, depth will be considered to be 300 mm below original rock surface.

.5 Volume of individual boulders and rock fragments will be determined by measuring three maximum mutually perpendicular dimensions.

.2 Sheeting and bracing left in place on direction of Departmental Representative will be measured in square metres of surface area of plane surface of sheeting.

.3 Shoring, bracing, cofferdams, underpinning and de-watering of excavation will not be measured separately for payment.

.4 Backfilling to authorized excavation limits will be measured in cubic metres compacted in place for each type of material specified.

.5 Placing and spreading of topsoil will be measured for payment in cubic metres calculated from cross sections taken in area of excavation from original location.

.1 If double handling of topsoil is directed by Departmental Representative (stockpiling and later placing), then quantities will be measured twice; on excavation from original location and on excavation from stockpile.

1.3 REFERENCE STANDARDS

.1 American Society for Testing and Materials International (ASTM) most recent versions

.1 ASTM C117-[04], Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136-[05], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422-63[2002], Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698-[00ae1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3).

.5 ASTM D1557-[02e1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3) (2,700 kN-m/m^3).

.6 ASTM D4318-[05], Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-[88], Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA International) most recent versions

.1 CAN/CSA-A3000-[03], Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.1 CSA-A3001-[03], Cementitious Materials for Use in Concrete.

.2 CSA-A23.1/A23.2-[04], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.4 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.4 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

.1 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Rock: solid material in excess of 1.00 m^{3}and which cannot be removed by means of heavy duty mechanical excavating equipment with excavator bucket. Frozen material not classified as rock.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Topsoil:

.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.

.4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.5 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.6 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.7 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Quality Control: in accordance with Section 01 45 00- Quality Control:

.1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.

.2 Submit for review by Departmental Representative proposed heave prevention and dewatering methods as described in PART 3 of this Section.

.3 Submit to Departmental Representative written notice at least 7 days prior to excavation work, to ensure cross sections are taken.

.4 Submit to Departmental Representative written notice when bottom of excavation is reached.

.5 Submit to Departmental Representative inspection results as described in PART 3 of this Section.

.3 Preconstruction Submittals:

.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

.2 Submit records of underground utility locates, indicating: location plan of relocated and abandoned services, as required, clearance record from utility authority, and location plan of existing utilities as found in field.

.4 Samples:

.1 Submit samples in accordance with Section 01 33 00- Submittal Procedures.

.2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

.3 Submit 70kg samples of type of fill specified.

.4 Ship samples to Departmental Representative, in tightly closed containers to prevent contamination and exposure to elements.

1.6 QUALITY ASSURANCE

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Divert excess aggregate materials from landfill to local quarry or recycling facility for reuse as directed by Departmental Representative.

1.8 EXISTING CONDITIONS

.1 Buried services:

.1 Before commencing work establish location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Prior to beginning excavation Work, notify applicable authorities having jurisdiction establish location and state of use of buried utilities and structures. Authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.

.6 Confirm locations of buried utilities by careful test excavations or soil hydrovac methods.

.7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before re-routing or removing. Costs for such Work to be paid by Departmental Representative.

.9 Record location of maintained, re-routed and abandoned underground lines.

.10 Confirm locations of recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Backfill material shall be obtained from offsite sources approved by the Departmental Representative. Backfill shall be a crushed granular fill material to a size no larger than 50mm, and shall be free from roots and other organic matter, trash, debris, snow, ice or frozen materials. Backfill material shall be tested for the parameters listed below at a frequency of once per 500 m^3. A minimum of one set of classification tests shall be performed per borrow source. One backfill sample per borrow source shall also be collected and tested for the parameters listed below.

Physical Parameter	Test Method

Grain Size	ASTM D 422
Compaction	ASTEM D 698

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

3.2 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.3 PREPARATION/PROTECTION

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

3.4 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative.

.2 Protect fill materials from contamination.

3.5 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for Departmental Representative approval details of proposed dewatering or heave prevention methods.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with Section 01 35 43- Environmental Procedures in a manner not detrimental to public and private property, or portion of Work completed or under construction.

.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.6 EXCAVATION

.1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions as directed by Departmental Representative.

.3 Excavation must not interfere with bearing capacity of adjacent foundations.

.4 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.

.5 Restrict vehicle operations directly adjacent to open trenches.

.6 Dispose of surplus and unsuitable excavated material off site.

.7 Do not obstruct flow of surface drainage or natural watercourses.

.8 Notify Departmental Representative when bottom of excavation is reached.

.9 Obtain Departmental Representative approval of completed excavation.

.10 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

.11 Correct unauthorized over-excavation as follows:

.1 Fill with specified Backfill compacted to not less than 95% of corrected Standard Proctor maximum dry density.

.12 Hand trim, make firm and remove loose material and debris from excavations.

.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

3.7 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698.

.1 All backfill for demolition footprints to meet requirements as per Section 2.1 of this Section. Compact to 95% of corrected maximum dry density.

3.8 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services as required.

.2 Place bedding and surround material in unfrozen condition.

3.9 BACKFILLING

.1 Vibratory compaction equipment:

.2 Do not proceed with backfilling operations until completion of following:

.1 Departmental Representative has inspected and approved demolition area.

.2 Departmental Representative] has inspected and approved of construction below finish grade.

.3 Inspection, testing, approval, and recording location of underground utilities.

.3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.4 Do not use backfill material which is frozen or contains ice, snow or debris.

.5 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to existing ground elevation. Compact each layer before placing succeeding layer.

.6 Backfilling around installations:

3.10 RESTORATION

.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

.2 Clean and reinstate areas affected by Work as directed by Departmental Representative.

.3 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

ANNEX A

HAZARDOUS MATERIALS LIST
AND
2016 LABORATORY ANALYTICAL REPORTS

Lab and Storage Building			
Location	**Material**	**Estimated Quantity**	**Notes**
Asbestos			
Southwest room	Vinyl floor tile (VFT) VFT: 2 - 3.5% Chrysotile asbestos Mastic: 5.5% Chrysotile asbestos	24.5 m^2	-
Northeast room (Lab)	Vinyl roll flooring (VRF) Paper backing: 50% Chrysotile asbestos Mastic: 2% Chrysotile asbestos	29.1 m^2	-
Attic	Vermiculite comingled with fibreglass batt insulation.	139.7 m^2	Vermiculite is confirmed to contain asbestos fibres. One full bag of vermiculite was also observed in the attic
Southeast room (Garage)	Vermiculite as debris on floor and comingled with stored materials	5 m^2	Vermiculite is confirmed to contain asbestos fibres
Roof	Mastic/Tar and associated shingles Mastic/Tar: 10% Chrysotile asbestos fibres	145 m^2	Shingles to be considered ACM waste. May be removed as part of building demolition and disposed as ACM waste
Lead			
Exterior overhead garage doors	Lead containing paint Total: 997 mg/kg lead TCLP: 0.338	15 m^2	One door sampled. Both doors to be assumed to contain lead paint
Trim around overhead garage doors	Lead containing paint Total: 1,460 mg/kg TCLP: 0.175 mg/L	2 m^2	Trim around one door sampled. Both door trims to be assumed to contain lead.
Man door by fence gate	Lead containing paint Total: 1,330 mg/kg lead TCLP: Not sampled	7 m^2	Door was not observed in December 2016. May be present at the site under the snow
Interior trim around window in Southwest room	Lead containing paint Total: 3,290 mg/kg TCLP: 0.677 mg/L	1 m^2	-

Exterior of Lab and Storage Building			
Location	**Material**	**Estimated Quantity**	**Notes**
Lead			
Skid shed	Lead containing paint Total: 14,800 mg/kg TCLP: 98.4 mg/L	20 m^2	Observed December 2016
Wooden sampling box (Light blue colour)	Lead containing paint Total: 1,310 mg/kg TCLP: Not sampled	Unknown	Not observed December 2016. May be present at site under the snow

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0179530

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	WX18125	WX18125
Address:	440 DOVERCOURT DRIVE	Date Received:	12/14/2016	
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	12/16/2016	
Collected:	12/08/2016	Date Reported:	12/16/2016	
Project Name:	TUKTOYAKTUK	EPA Method:	EPA 600/R-93/116	
Address:		Submitted By:	PAUL HOULE	
		Collected By:		

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0179530-001 ASB 1	SE RM	LAYER 1 Vinyl Floor Tile, Cream	Yes	Chrysotile	2%		
						Carbonates	
						Gypsum	
						Quartz	
						Binder/Filler	98%
		LAYER 2 Mastic, Yellow	No	None Detected		Cellulose Fiber	3%
						Quartz	
						Binder/Filler	97%
0179530-002 ASB 2	NW RM/LAB	LAYER 1 Vinyl Roll Flooring, Beige/ Tan	No	None Detected			
						Carbonates	
						Gypsum	
						Quartz	
						Binder/Filler	100%
		LAYER 2 Paper Backing, Beige	Yes	Chrysotile	50%	Cellulose Fiber	15%
						Carbonates	
						Gypsum	
						Binder/Filler	35%
		LAYER 3 Mastic, Yellow Note: Difficult to separate adjacent layer	Yes	Chrysotile	2%	Cellulose Fiber	2%
						Quartz	
						Carbonates	
						Binder/Filler	96%
0179530-003 ASB 3	NW RM/LAB EXHAUST HOOD	Transite Board, Gray	No	None Detected		Fibrous Glass	18%
						Cellulose Fiber	2%
						Carbonates	
						Gypsum	
						Quartz	
						Binder/Filler	80%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0179530

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	AMEC ENV. & INFRASTRUCTURE	Job# / P.O. #:	WX18125	WX18125
Address:	440 DOVERCOURT DRIVE	Date Received:	12/14/2016	
	WINNIPEG, MANITOBA R3Y1N4	Date Analyzed:	12/16/2016	
Collected:	12/08/2016	Date Reported:	12/16/2016	
Project Name:	TUKTOYAKTUK	EPA Method:	EPA 600/R-93/116	
Address:		Submitted By:	PAUL HOULE	
		Collected By:		

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0179530-004 ASB 4	NE RM/STORAGE, ON FL	LAYER 1 Vermiculite Insulation, Tan	Yes	Actinolite	<1%		
						Mica	
						Gypsum	
						Binder/Filler	99%
		LAYER 2 Insulation, Pink	No	None Detected		Fibrous Glass	95%
						Cellulose Fiber	1%
						Gypsum	
						Binder/Filler	4%
0179530-005 ASB 5	SE CRNR OF ROOF OF MAIN BLDG	LAYER 1 Asphalt Shingle, Green/ Black	No	None Detected		Cellulose Fiber	20%
						Quartz	
						Carbonates	
						Binder/Filler	80%
		LAYER 2 Asphalt Shingle Mastic/ Tar, Black	Yes	Chrysotile	10%		
						Carbonates	
						Quartz	
						Binder/Filler	90%

Analyst - Johann Hofer

Signatory - Lab Director - Kurt Kettler

Final Analytical Report

Attention: Paul Houle

Amec Foster Wheeler Environment & Infrastructure
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Results for File: EC-72159

Project Number: WX18125
Project Name: Tuktoyaktuk

Date Received: 2016/12/13
Date of Report: 2016/12/21

Report reviewed by:

Jesse Dang, B.Sc.
Manager
Laboratory Services

Kristine Connor
Director of QA/QC
Laboratory Services

** All samples will be disposed of after 30 days following analysis. Please contact the lab if you require additional sample storage time. (Samples deemed hazardous will be returned to the client at their own expense or disposal will be arranged.) **

Leachate Analysis - Metals

Project No. WX18125

Final
File No. EC-72159

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-16084 LCP-01 W Wall, Garage 2016/12/08 0:00	16-16085 LCP-02 Ext Wall, Shed 2016/12/08 0:00	16-16086 LCP-03 Ext, S OH Door 2016/12/08 0:00	16-16087 LCP-04 Trim, S OH Bay 2016/12/08 0:00
LL	2016/12/13	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	0.489	98.4	0.338	0.175

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-16088 LCP-05 Window, SW Room 2016/12/09 0:00	16-16089 LCP-06 Floor, Util Room 2016/12/09 0:00
LL	2016/12/13	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.001	0.677	0.099

Paint Analysis

Project No. WX18125

Final
File No. EC-72159

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Lab #: / Client ID: / Sample Date: / DL	16-16087 LCP-04 Trim, S OH Bay 2016/12/08 0:00	16-16088 LCP-05 Window, SW Room 2016/12/09 0:00
TY	2016/12/19	Lead	mg/kg (ppm)	EPA 3050/6010	10	1460	3290
LL	2016/12/13	Lead	%	Calc	0.0010	0.1457	0.3294

Quality Control Standard

Project No. WX18125 File No. EC-72159

Leachate Analysis - Metals

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
LL	2016/12/13	Leachable Lead	mg/L (ppm)	EPA 1311/6010C	0.703	0.633-1.10	0.867	ERA D090-544

Paint Analysis

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Units	Reference Method	Analyzed Value	Advisory Range	Target Value	Reference No.
TY	2016/12/19	Lead	µg/g (ppm)	EPA 3050/6010	106	75-125	100	Metal-1

Analytical Comments

Project No. WX18125 File No. EC-72159

All Analytical results pertain to samples analyzed as received.

DL - Detection Limit

EPA: U.S. Environmental Protection Agency. 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III. Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

ANNEX B

PHASE I/II/III ENVIRONMENTAL SITE ASSESSMENT REPORT

Public Works and Government Services Canada

Travaux publics et Services gouvernementaux Canada

Phase I/II/III Environmental Site Assessment DFO Tuktoyaktuk Lab and Storage, Northwest Territories

FINAL REPORT

March 2013

Contract No. EW699-121587 A

DFRP Project Number 86479
FCSI Site Number 86479001

Prepared By

Ganga Atmuri, B.Sc. (Bio.E.), E.I.T.
Environmental Engineer-in-Training

Reviewed By

Bonnie Hoffensetz, M.Sc.
Senior Environmental Scientist

Approved By

for Robert D. Sinclair, P.Eng.
Manager, Environmental Services

KGS Group
Winnipeg, Manitoba

EXECUTIVE SUMMARY

Kontzamanis Graumann Smith MacMillan Inc. (KGS Group) was contracted by Dillon Consulting Ltd. on behalf of Public Works and Government Services Canada (PWGSC) Western Region, North of 60°, and Department of Fisheries and Oceans (DFO) to conduct a Phase I/II/III Environmental Site Assessment (ESA) at the Tuktoyaktuk Lab and Storage site – *DFRP #86479, FCSI#86479001* – located within the Incorporated Hamlet of Tuktoyaktuk, Northwest Territories. The purpose of the current investigation was to perform a historical background review (Phase I ESA), identify the types and concentrations in the soil, characterize the substances of concern at the site, and determine the liability associated with any identified contaminated sites, and address any outstanding issues with respect to the development of options for the development of an effective site management strategy.

A Phase I ESA was conducted at the Tuktoyaktuk Lab and Storage site. The Phase I ESA included the on-site building, fenced-in area to the west and waste and debris piles located around the entire property perimeter at the time of the 2012 site inspection. Sparse grass was present around the perimeter of the building and fenced-in area at the property during the 2012 site investigation and the site was covered with medium to coarse grained sand and gravel fill.

The historical background review portion of the Phase I ESA indicated that the site has been used since the 1980s for research use by DFO and included a laboratory area and storage of laboratory and sampling equipment. No previous reports or studies were available during the historical background review portion. However, the historical review identified that the south adjacent property, the former NRCAN Polar Continental Shelf Project site, was remediated in 2011.

The Phase I ESA identified five potential sources of contamination, petroleum hydrocarbons and/or metals in soil due to historical migration from the south adjacent property (former NRCAN PCSP site) and on-site debris, potential lead-based paint at the subject property and surrounding debris, potential asbestos-containing materials within the subject building, and mould throughout the interior of the on-site building. No surface staining was visible at the property along the entire perimeter of the site or within the fenced-in area.

The Phase II/III ESA at the Tuktoyaktuk Lab and Storage site included surficial soil sampling, paint sampling and bulk materials sampling. A total of 26 surficial soil samples, including two blind field duplicates, were collected from 12 locations at the subject property and immediate perimeter, and submitted for laboratory analysis of petroleum hydrocarbons (PHCs). A total of 14 surficial soil samples, including two blind field duplicates, were collected from the same 12 locations and submitted for laboratory analysis of metals. A total of two soil samples were also submitted for laboratory grain size analysis. Laboratory results identified two soil samples, obtained from shallow depths south of the building, marginally exceeded arsenic concentrations above the applicable Canadian Council of Ministers of the Environment (CCME) soil guidelines.

Two background soil samples, shallow and deeper depths, were collected from a location approximately 106 m northwest of the subject property and submitted for laboratory analysis of PHCs and metals. Laboratory results identified marginal exceedence in one background soil sample obtained from a peat layer for PHC Fraction F3 above the applicable CCME criteria. Laboratory results also identified slight exceedances for arsenic and selenium in the background samples (deeper depth and shallow depth, respectively) above applicable CCME

criteria. Based on the arsenic results, the elevated levels are most likely natural. As such, the two soil samples collected south of the building that had elevated arsenic levels are most likely due to naturally high concentrations and not a result of DFO activities at the site.

Nine paint samples were collected from various interior and exterior locations of the on-site building and from exterior debris sources, and submitted for laboratory analysis of lead content. Laboratory results indicated four of the paint samples had lead concentrations above the Northwest Territories Environmental Protection Act regulations. Lead paint in exceedence of the regulations was identified on the exterior east garage door and exterior north man door of the on-site building and from the skid shed located north of the building and a wooden sampling box located within the fenced-area west of the building.

Three bulk samples were collected from various building materials and submitted for laboratory analysis of asbestos. Laboratory results identified the presence of asbestos-containing materials (ACMs) in the two types of floor tile sampled from the building interior.

Based on the absence of contamination due to DFO activities on the subject site, classification of Tuktoyaktuk Lab and Storage site as per the CCME National Classification System for Contaminated Sites (NCSCS) was not required. A site closure form was completed as per the DFO Terms of Reference.

Based on the findings of the 2012 Phase I/II/III ESA, it is the conclusion of KGS Group that no contamination or impacted soil was identified at the DFO Tuktoyaktuk Lab and Storage site. No further work (i.e. site assessment or remediation) is required nor recommended. However, it is recommended that demolition of the on-site building and fenced-in area and the removal of all debris at the property be undertaken to reduce the potential risk to environmental receptors. The maintenance cost associated with demolition activities and removal of all debris is estimated to be $52,000, which does not include GST, contingency costs or costs associated with PWGSC/DFO project management activities. A cost savings could be realized if the demolition and debris removal work is completed in conjunction with other activities within the community.

TABLE OF CONTENTS

PAGE

EXECUTIVE SUMMARY i

1.0 INTRODUCTION 1
1.1 OBJECTIVES 1
1.2 SCOPE OF WORK 2

2.0 SITE DESCRIPTION AND PHYSICAL CONDITIONS 5
2.1 DESCRIPTION OF SUBJECT PROPERTY 5
2.2 PHYSIOGRAPHIC SETTING AND CLIMATE 6
2.3 REGIONAL GEOLOGY 6
2.4 REGIONAL HYDROGEOLOGY 6
2.5 HYDROLOGY 7
2.6 TOPOGRAPHY 7
2.7 VEGETATION 7

3.0 PHASE I ENVIRONMENTAL SITE ASSESEMENT 8
3.1 HISTORICAL REVIEW 8
3.1.1 Pwgsc And Dfo Records 10
3.1.2 Previous Reports 10
3.1.3 Aerial Photographs 11
3.1.4 Land Registry Documents 11
3.1.5 Ecolog Environmental Risk Information System (ERIS) Search 12
3.1.6 Government Of The Northwest Territories – Hazardous Materials Spill Database 12
3.1.7 Species At Risk 12
3.2 INTERVIEWS 13
3.3 SITE RECONNAISSANCE 15
3.3.1 Outside Area 16
3.3.2 Interior Area 16
3.3.3 Materials Handling And Storage 16
3.3.4 Designated Substances Survey And Special Attention Items 17
3.4 PHASE I ESA CONCLUSIONS 18

4.0 PHASE II/III ENVIRONMENTAL SITE ASSESSMENT 20
4.1 METHODOLOGY 20
4.1.1 Field And Sampling Plan 20
4.1.2 Health And Safety Plan 21
4.1.3 Intrusive Investigation 21
4.1.4 Laboratory Analysis 23
4.1.5 Quality Assurance/Quality Control (QA/QC) 23
4.2 DATA AND ANALYSIS 24
4.2.1 Assessment Guidelines 24
4.2.2 Results Of Laboratory Analysis 25
4.2.3 QA/QC Results 27
4.3 PHASE II/III ESA FINDINGS AND DISCUSSION 29

TABLE OF CONTENTS
(CONTINUED)

PAGE

5.0 CONTAMINATED SITE SUMMARY 31
5.1 IDENTIFICATION OF CONTAMINATED SITES 31
5.2 DFO CONTAMINATED SITES MODULE REPORT SUMMARY SHEETS 31
5.3 CCME NATIONAL CONTAMINATED SITES CLASSIFICATION SYSTEM 31
5.3.1 Introduction 31
5.3.2 NCSCS Summary for Each Contaminated Site 32

6.0 SITE CLOSURE 33

7.0 CONCLUSIONS AND RECOMMENDATIONS 35

8.0 STATEMENT OF LIMITATIONS 36

9.0 REFERENCES 37

TABLES
FIGURES
APPENDICES

LIST OF TABLES

1. Scope of Work....4
2. Description of DFO Property....5
3. List of Contacts....13
4. Areas of Potential Environmental Concern....19
5. Petroleum Hydrocarbons in Soil
6. Metals in Soil
7. Lead Paint Sampling
8. Bulk Asbestos Content
9. Grain Size Analysis
10. Costing for Demolition and Debris Removal....34

LIST OF FIGURES

1. Location Site Plan
2. Detailed Site Plan
3. Detailed Site Plan – Interior of Building

LIST OF APPENDICES

A. Site Photographic Log
B. Aerial Photographs
C. GNWT Land Titles – Copy of Title
D. Ecolog ERIS Report
E. Federal Listing of Species at Risk (SARA) and Territorial Species at Risk (SAR)
F. Owner/Manager Interview Questionnaire
G. Site Reconnaissance Checklist
H. Sample Location Logs
H-1. Soil Sample Location Log
H-2. Designated Substance Survey Sample Location Log
I. Laboratory Certificates of Analyses
J. DFO Contaminated Sites Module Form
K. DFO Site Closure Form

1.0 INTRODUCTION

Kontzamanis Graumann Smith MacMillan Inc. (KGS Group) was contracted by Dillon Consulting Ltd. on behalf of Public Works and Government Services Canada, Western Region North of 60° (PWGSC) and Department of Fisheries and Oceans (DFO), to provide Environmental Sub-consultant Services to conduct a Phase I/II/III Environmental Site Assessment (ESA) at the DFO Lab and Storage in Tuktoyaktuk, Northwest Territories (Figure 1). The work was completed in accordance with the terms and conditions of the Dillon Consulting/PWGSC Standing Offer for Multidisciplinary Environmental Consultant Services in the Western Region, North of 60° No. EW699-121587/A and the resulting sub-consultant agreement between KGS Group and Dillon Consulting Limited. The work was completed as per the DFO Terms of Reference (TOR) Modules for Phase I/II ESAs and Phase III ESAs, and the Cover Document for DFO Contaminated Sites Management Activities TOR [1, 2].

Previous investigations at the NRCAN Polar Continental Shelf Project (PCSP) site, located south of the subject property, identified hydrocarbon impacts at the NRCAN PCSP site which were remediated in 2011.

This report summarizes the findings of the present environmental conditions of the property based upon information obtained during a site reconnaissance, and a surficial soil sampling program, and a designated substance survey including collection of paint samples and bulk materials. The location of the subject property, DFO Lab and Storage, is shown on Figure 1, Site Location Plan. A Detailed Site Plan showing sample locations is shown on Figure 2 (exterior) and Figure 3 (interior) and site photographs taken at the time of the site investigation are included in Appendix A.

1.1 OBJECTIVES

The main objective of the Phase I/II ESA is to identify actual and potential site contamination caused by DFO operations, and if needed, to confirm the presence of and characterize the substances of concern at the site and determine the liability associated with any identified contaminated sites. The purpose of the Phase III ESA is to further delineate the nature of the site contamination as defined in the Phase I/II ESA, and to address any outstanding issues with

respect to the development of options for the development of an effective site management strategy.

1.2 SCOPE OF WORK

In order to meet the above outlined objectives, KGS Group performed a Phase I/II/III ESA as outlined in the KGS Group proposal (No. 12-000-793) dated September 20, 2012. The Phase I/II/III ESA focused on the property occupied by the DFO Lab and Storage site in Tuktoyaktuk, NWT and surrounding soils. Approval to proceed with proposed work was given by PWGSC on September 20, 2012.

The site is located within the Incorporated Hamlet of Tuktoyaktuk just north of the former NRCAN PCSP site on the shores of Beaufort Sea. The Tuktoyaktuk Lab and Storage site is comprised of one building with an attached fenced-in area to the west. The building and fenced-in area encompass an approximate total area of 330 m^2. The Incorporated Hamlet of Tuktoyaktuk is located approximately 130 km northeast of Inuvik, NWT. The Hamlet is accessible by the Dempster Highway in winter and by air year round [(3)].

Completion of Phase I ESA

Phase I ESAs are to be completed in accordance with the Canadian Standards Association (CSA) Standard Z768-01 Phase I Environmental Site Assessment. According to the CSA Standard Z768-01, the term “contamination” means “the presence of a substance of concern, or a condition, in concentrations above pre-established criteria in soil, sediment, surface water, groundwater, air, or structures”. For sites that are small, remote and undeveloped, DFO requires that a limited records review be used to conduct Phase I ESAs. This limited records review for the Phase I ESA eliminates many unnecessary components of the records review that do not yield useful information.

The Phase I ESA for the DFO Tuktoyaktuk Lab and Storage site consisted of the following activities:

- Limited Records Review completed prior to development of the final Field Sampling Program and Analytical Plan;

- Site Visit completed in conjunction with Phase II/III ESA field activities;
- Interviews completed prior to the development of the final Field Sampling Program and Analytical Plan and in a manner that allowed for effective implementation of on-site activities; and
- Evaluation and preparation of a report combined with the findings of the Phase II/III ESA.

Completion of Phase II/III ESA

Phase II/III ESAs are to be completed in accordance with the Canadian Standards Association Standard Z769-00 (R2004) Phase II Environmental Site Investigation. Due to the anticipated costs associated with mobilizing equipment and completing intrusive investigations at remote locations, as well as the expected contaminants of concern at wharf facilities, DFO usually only requires surficial soil/sediment sampling using hand excavation methods such as a hand auger to collect such samples. Collection of infrastructure samples that may contain hazardous materials, such as leaded-paint or asbestos containing materials, if present, is also required.

The Phase II/III ESA consisted of the following activities:

- Planning the Site Investigation including review of the existing site information, and development of a Field Sampling Program and Analytical Plan;
- Completion of Site Investigation, including sampling program as per the Field Sampling Program and Analytical Plan;
- Completion of a Designated Substances Survey;
- Target and delineate the boundaries of identified contaminants;
- Define in greater detail, site conditions required to identify all contaminant pathways, particularly with respect to supporting risk-based approached to management of the Site;
- Provide contaminant and other information necessary for future steps such as Risk Assessment or remediation;
- Interpretation and evaluation of information gathered from the field and laboratory program; and
- Preparation of a report presenting the findings of the Phase I/II/III ESA.

The final field sampling program, based on the 2012 Phase I/II/III ESA reconnaissance is illustrated below in Table 1.

TABLE 1
SCOPE OF WORK

ORIGINAL PROPOSED FIELD PROGRAM (1,2)	FINAL FIELD PROGRAM OCTOBER 5TH, 2012
-8-10 testholes -16-20 soil samples submitted for PHCs (varying depths between 0.15 m and 0.5 m) - 6-10 soil samples submitted for metals - 2 background soil samples for PHCs and metals (surface and deeper depths) - 3-5 paint samples - 3 -5 samples for ACMs - 1 -2 samples for grain size	- 13 testholes - 24 soil samples for PHCs (surface and deeper samples/testhole) - 2 blind soil field duplicates for PHCs (surface and deeper samples) - 12 soil samples for metals (surface) - 2 blind field duplicates for metals (surface) - 2 background soil samples for PHCs and metals (surface and deeper) - 2 soil samples for grain size - 9 paint samples for lead - 3 samples ACMs

Notes:
1. Testhole – advanced using hand excavation methods (hand auger/shovel).
2. PHCs = Petroleum Hydrocarbons (Benzene, Toluene, Ethylbenzene and Xylenes, and Fractions F1-F4).
3. ACMs = asbestos containing materials.

2.0 SITE DESCRIPTION AND PHYSICAL CONDITIONS

2.1 DESCRIPTION OF SUBJECT PROPERTY

Property Description – The subject property consisted on one wood frame single-storey building and attached fenced-in exterior area to the west. The building was separated inside into a main area, a laboratory area and a garage/storage area. Old laboratory equipment including sampling boxes and sampling equipment were located within the fenced-in area and around the perimeter of the property (Photos 10 and 13 to 18). A description of the subject property, including property ID, DFRP number, GPS Coordinates and approximate property size are summarized in the following table:

TABLE 2
DESCRIPTION OF DFO PROPERTY
LAB AND STORAGE FACILITY – TUKTOYAKTUK, NWT

Property ID	DFRP #	FCSI #	District	GPS Coordinates	DFO Property Size
Tuktoyaktuk Lab & Storage	86479	86479001	Western Arctic	Lat 69.438970 Long -133.036250	One building with attached exterior fenced-in area. Approximate total area of 330 m^2.

Note: Site GPS coordinates were provided by Treasury Board of Canada website [(4)].

Legal Description – The subject property is currently listed as Commissioner's Parcel and is legally described as:

Copy of Title: Lot 1, Block 46, Plan 3496 – Tuktoyaktuk.

The Government of Northwest Territories indicated that there are no Certificates of Titles issued for the subject property, only Copy of Title as indicated above. A Copy of Title is located in Appendix C.

Surrounding Land Use – The surrounding land uses at the time of the 2012 site inspection were as follows:

North – Shallow water body with wood debris (Photo 5).

South – NRCAN Cold Storage Facility (Photo 3).

East – Community gravel road, followed by shallow surface water body, former borrow pit (Photo 4).

West – Vacant land and Beaufort Sea (Photo 6).

2.2 PHYSIOGRAPHIC SETTING AND CLIMATE

The Incorporated Hamlet of Tuktoyaktuk is located on the Beaufort Sea in an Inuvialuit hamlet in the Inuvik Region of the Northwest Territories and is approximately 1,100 km northwest of Yellowknife and approximately 130 km northeast of Inuvik. The subject area, Tuktoyaktuk Lab and Storage site, is located within the Tuktoyaktuk Coastal Plain Ecoregion, within the Southern Arctic Ecozone, which is marked by cool summers and cold winters [(5)]. The mean monthly air temperatures in the Tuktoyaktuk area range from approximately 10.9 °C in July to -25.9°C in January [(6)]. Tuktoyaktuk is located in an area of subsea continuous permafrost [(7)]. The average annual precipitation is approximately 139 mm, with 52 mm falling as rain in the months of June, July and August [(6)].

2.3 REGIONAL GEOLOGY

The area consists of continuous permafrost with high ice content in the form of pingos and ice wedges. Dominant soils in the area include organic and Turbic Cryosols underlain by continuous to rolling organic, morainal, alluvial, fluvioglacial and marine deposits [(5)].

2.4 REGIONAL HYDROGEOLOGY

The regional hydrogeology of the Tuktoyaktuk region is topographically controlled by the Beaufort Sea, located to the west of the subject area. Groundwater flow beneath the Incorporated Hamlet of Tuktoyaktuk is controlled by Mackenzie River Delta and Beaufort Sea and the surrounding wetlands of the area which consist of lowland polygon fens, both low and high-centre varieties [(5)].

Potable water for the Incorporated Hamlet of Tuktoyaktuk is trucked in from a community seasonal fill reservoir. The Incorporated Hamlet of Tuktoyaktuk obtains its potable water from Kudlak Lake which is located north of the community. Water delivery trucks deliver potable water to the residences and businesses of Tuktoyaktuk [(8)].

2.5 HYDROLOGY

Local overland drainage at the subject property, Tuktoyaktuk Lab and Storage site, appeared to be westerly towards the Beaufort Sea which is the closest major surface water body.

2.6 TOPOGRAPHY

The topography of the Tuktoyaktuk area is relatively flat with localized relief from lowland polygon fens, low and high-centre varieties [(1)]. Topography at the subject property is generally flat with less than 0.5 m variance.

2.7 VEGETATION

Vegetation within the Tuktoyaktuk area consists of shrubby tundra vegetation including dwarf birch, willow, northern Labrador tea, sedge tussocks, and mosses [(5)].

At the time of the 2012 site investigation, sparse grass was visible at the subject property surrounding the perimeter of the building and fenced-in area. No stressed vegetation or surface staining was visible along the subject property (on the vegetation or bare ground).

3.0 PHASE I ENVIRONMENTAL SITE ASSESEMENT

The details and findings of the tasks required to meet the project objectives and complete the scope of work for the Phase I ESA for the DFO Tuktoyaktuk Lab and Storage site located in the Northwest Territories are described in the following sections.

3.1 HISTORICAL REVIEW

The Phase I ESA consisted of a limited records review for the site. Available sources of information reviewed as part of the limited approach included: site plans and background information provided by PWGSC and DFO; topographical, geological and/or soils maps and hydrographic charts; aerial photographs from the National Air Photo Library, Ecolog ERIS searches, Government of Northwest Territories Hazardous Materials Spills Database and land registry documents, Ecolog ERIS reports, and the Federal Species at Risk and Territorial Species at Risk website databases. The limited approach eliminated unnecessary components that do not yield useful information for small, remote and isolated areas. The following items were considered to be unnecessary for the DFO Tuktoyaktuk Lab and Storage site:

- Environment Canada and Other Agency Searches
- City Directory Searches
- Fire Insurance Plans
- Utility Company Records

History of Site

Formerly named Port Brabant, the community was renamed to Tuktoyaktuk in 1950, the first place in Canada to revert to the traditional Native name. The Hudson's Bay Company established a trading post within the community by 1937 and radar domes were established in the 1950s during the Cold War. By 1973 the community of Tuktoyaktuk became a base for oil and natural gas exploration of the Beaufort Sea. Total land area of the community is approximately 11.07 km^2 and based on 2006 data, the population of Tuktoyaktuk is 870 people [(3)].

The Tuktoyaktuk Lab and Storage site is located on the shores of the Beaufort Sea in the Inuvialuit hamlet in the Inuvik Region of the Northwest Territories within the Incorporated Hamlet of Tuktoyaktuk.

According to information provided by various government officials, the property is listed as Commissioner's Parcel. Information provided by PWGSC and DFO and local personnel indicated that the site had been historically used as a laboratory, research and storage facility by DFO since the 1980s until approximately the mid-1990s from which time it has been vacant.

History of Adjacent Lands

The subject property is located within the Incorporated Hamlet of Tuktoyaktuk on the shores of Beaufort Sea in the Inuvik Region of the Northwest Territories. The Tuktoyaktuk Lab and Storage site is located north of the Community's main air strip adjacent to the former NRCAN Polar Continental Shelf Project (PCSP) site. The former NRCAN PCSP site was remediated in 2011.

Areas of Natural Significance

As per the Northwest Territories Protected Areas Strategy (NWT PAS) which was established in 1999, Established Protected Areas in the Northwest Territories include national parks/reserves, protected national historic site, wildlife sanctuaries, migratory bird sanctuaries, heritage trails, territorial parks/reserves and marine protected area.

A search of the NWT PAS (Map Status September 2012) indicated that the Incorporated Hamlet of Tuktoyaktuk is located on the southern shore of Beaufort Sea. Pingo Canadian Landmark, a natural area protecting eight pingos, is approximately 5 km west of Tuktoyaktuk. The Landmark is an established surface protection area under the 1984 Inuvialuit Final Agreement between the Government of Canada, Inuvialuit Land Administration and the people of Tuktoyaktuk. The Landmark is managed by Parks Canada (Government of Canada) within the national park system and is the country's only National Landmark [(9)].

Other established protected areas close to Tuktoyaktuk include Kendall Island Migratory Bird Sanctuary approximately 80 km to the west; Anderson River Delta Migratory Bird Sanctuary located approximately 150 km to the east, and Gwich'in Territorial Park approximately 100 km to the southwest of Tuktoyaktuk [(9)].

3.1.1 PWGSC and DFO Records

A review of the limited available PWGSC and DFO records, including the Terms of Reference and interdepartmental agreements/correspondence, indicated that the subject property is located north of the NRCAN PCSP site. Previous investigations at the NRCAN PCSP site identified petroleum hydrocarbon impacts which were remediated in 2011. No other information pertaining to the subject property, DFO Tuktoyaktuk Lab and Storage site was made available for review. Copies of the correspondence/inter-departmental agreements are included in Appendix C with the GNWT land registry Copy of Title.

3.1.2 Previous Reports

No previous reports for the subject property, the DFO Tuktoyaktuk Lab and Storage were available for review. However, several previous reports pertaining to the former NRCAN PCSP site located on the south adjacent property, including a 2007 Phase I ESA (Trow Associates Ltd.), a 2007 Designated Substances Survey (Trow Associates ltd.), a 2009 Phase II ESA (IMG-Golder Corporation), a 2009 Phase III ESA (Stantec Consulting Ltd.), a 2009 Environmental Assessment (PWGSC Western Region), a 2010 Human Health and Ecological Risk Assessment (Senes Consultants Ltd.) and a 2011 Final Completion Report (Senes Consultants Ltd.), were provided to KGS Group for review.

Review of the 2011 Final Completion Report by Senes Consulting Ltd.[(10)] indicated that hydrocarbon impacted soil from the former NRCAN PCSP site was placed in windrows on-site and treated by tilling the soils with an Allu bucket until the PHC concentrations were measured to be below the risk based clean-up standards developed for the project. Remediation occurred during the 2010 and 2011 field seasons. The report concluded that the quality of the soils remaining on-site was demonstrated to meet the risk based clean-up standards established for

the project and that no further remediation work, short or long term monitoring, were required at the former PCSP facility site.

No information pertaining to the DFO Tuktoyaktuk Lab and Storage was included in the previous reports for the NRCAN PCSP site (no sampling or assessment was conducted in or around the site).

3.1.3 Aerial Photographs

Aerial photographs were obtained from the National Air Photo Library in Ottawa for 1985 and 1990. A 2011 satellite map obtained from Google Earth was also used. The findings were as follows:

1985 – The community gravel road is clearly visible to the east. The subject property is clearly visible including the on-site building. Numerous buildings are visible on the south adjacent property (NRCAN site). The Hamlet Garage is visible further to the south-southeast, and the shallow surface bodies are visible to the north and east. Beaufort Sea is not clearly visible to the west as the photo cuts off.

1990 - The photo is unchanged from the 1985 aerial photograph with the exception that Beaufort Sea is clearly visible to the west of the subject property.

2011 - The community gravel road is clearly visible to the east. The subject property is clearly visible including the one building on site. The adjacent properties to the north and further to the east are visible (shallow surface water bodies). Buildings are visible on the south adjacent property (NRCAN site) including the NRCAN Cold Storage Facility and Seldom Inn. The Hamlet Garage is visible further to the south-southeast. Beaufort Sea is visible to the west, and the main airstrip is visible further to the south.

Aerial photographs are included in Appendix B.

3.1.4 Land Registry Documents

Based on communication with Municipal and Community Affairs (MACA) – Government of the Northwest Territories, it was determined that the subject property, Tuktoyaktuk Lab and Storage Facility, is noted as Commissioner's Parcel - Lot 1, Block 46, Plan 3496. According to discussions with Ms. Joanne MacNeil, Senior Lands Officer with MACA, and Mr. Tom Matus, Senior Administrative Officer (SAO) of the Incorporated Hamlet of Tuktoyaktuk, Commissioner's Lands are all under the Administration of the Government of the Northwest Territories.

Based on communication with the Land Titles Office of the Government of the Northwest Territories (GNWT), the subject property, Tuktoyaktuk Lab and Storage site, does not have a Certificate of Title as it is listed as Commissioner's Parcel. However, a Copy of Title was made available from the GNWT Land Titles Office and is included in Appendix C.

3.1.5 Ecolog Environmental Risk Information System (ERIS) Search

An Ecolog ERIS search was conducted for the subject property, Tuktoyaktuk Lab and Storage Facility, and included a search radius of 250 m. The search included Federal and Territorial/Provincial databases that pertained to the subject property. Based on the search findings, one contaminated site on Federal Land was identified within the 250 m radius on the adjacent property to the south, the former Polar Continental Shelf Project (Property Number 21120). Details pertaining to the former Polar Continental Shelf Project (adjacent property to the south) indicated that 4,000 m^3 of petroleum impacted soil was identified at the site. A Phase II Assessment was recommended. Five other sites were identified as contaminated sites on Federal Lands within 0.25 to 2 km radius to the subject property. No other details were available within the Ecolog ERIS report. The formal search response is included in Appendix D.

3.1.6 Government of the Northwest Territories – Hazardous Materials Spill Database

Review of the GNWT Hazardous Materials Spills Database did not identify any historic fuel spills at the subject property or within the immediate vicinity.

3.1.7 Species at Risk

Species at risk inventories for the Northwest Territories were identified through Species at Risk in the NWT (SAR) website and Environment Canada's Species At Risk Act (SARA) [11,12]. The information provided in the databases is not location specific but rather refers to broad areas where species at risk may be present. A list of all identified species and the current status of the species located in the NWT Inuvik Region and the Incorporated Hamlet of Tuktoyaktuk have been summarized in Appendix E.

3.2 INTERVIEWS

Interviews were conducted with various individuals, local government authorities and local personnel, who might have knowledge of the subject property. A summary of individuals contacted is presented in Table 3 below.

TABLE 3
LIST OF CONTACTS

INDIVIDUAL	AGENCY AND ADDRESS	COMMENTS
Ms. Kim McDonald	Administrative Assistant DFO Office Western Arctic Area Yellowknife, NWT	Ms. McDonald was contacted prior to the site investigation at the DFO Tuktoyaktuk Lab and Storage site. She indicated that the contact list KGS Group had been provided by PWGSC for applicable DFO personnel was outdated. KGS Group requested that any information pertaining to the site be made available, including any previous reports, aerial photographs, laboratory results, utility records and site plans and be passed over during our in person meeting. Ms. McDonald indicated that there was no information regarding the Tuktoyaktuk site as it is listed as Real Property and not a DFO site.
Mr. Tom Matus	Senior Administrative Officer (SAO) Incorporated Hamlet of Tuktoyaktuk, NWT	Mr. Matus indicated that he has been the SAO and resident of Tuktoyaktuk for approximately 1 year. He indicated that the subject property is listed as Commissioner's Parcel and that GNWT administers the land (based on mapping). He was not aware of any issues at the subject property and indicated that it has been a vacant site for at least the past year.

TABLE 3
LIST OF CONTACTS

INDIVIDUAL	AGENCY AND ADDRESS	COMMENTS
Cst. Dustin Small	RCMP Member Tuktoyaktuk, NWT	Cst. Small indicated that he has been in Tuktoyaktuk for the past year and not familiar with any details or issues concerning the subject property. He did indicate that the site has been vacant for the last year (since his arrival).
Ms. Lorrie Meissner	RCMP Detachment Assistant Tuktoyaktuk, NWT	Ms. Meissner indicated that she has been a resident of Tuktoyaktak for the past 17 years. She indicated that the south adjacent property, Polar Continental Shelf Project (PCSP(site, was demolished within the past two years and that E. Grubens (local contractor) had completed the excavation and remedial work. Ms. Meissner indicated that the subject property (DFO site) has been vacant for as long as she has been in Tuktoyaktuk (17 years) and no one uses the facility. To her knowledge the subject property is a DFO property. Ms. Meissner was not aware of any issues pertaining to the subject property.
Mr. Tom Hall/Mr. Taylor Stanton	Registrar/Land Titles Clerk Land Titles Office Dept. of Justice Government of the Northwest Territories	Mr. Hall and Mr. Stanton confirmed that the Tuktoyaktuk Lab and Storage Facility is located on land classified as Commissioner's Parcel. As such, no certificate of title exists for the property. Documentation indicating that there is no Certificate of Title for Lot 1, Block 46, Plan 34396 in Tuktoyaktuk was provided by Mr. Stanton (Land Titles Office) and is included in Appendix C.
Ms. Joanne MacNeil	Senior Lands Officer MACA – Inuvik Regional Office Government of the Northwest Territories	Ms. MacNeil directed KGS Group to the GNWT – GIS Database/Mapping website for legal land description of the property (Tuktoyaktuk Lab and Storage Facility). She indicated that Commissioner's Parcels were lands administered by GNWT and as such, no Certificate of Title would exist for the property.

TABLE 3
LIST OF CONTACTS

INDIVIDUAL	AGENCY AND ADDRESS	COMMENTS
Ms. Kim McDonald	Administrative Assistant DFO Office Western Arctic Area Yellowknife, NWT	Ms. McDonald had no information regarding the Tuktoyaktuk Lab and Storage site; however, she indicated that the site was listed under Real Property sites, but not as an actual DFO site.
Mr. Pete Cott	Fisheries Research Biologist Chitty Camp Contact DFO Office Western Arctic Area Yellowknife, NWT	Mr. Cott had no information regarding the Tuktoyaktuk Lab and Storage site, and could not provide any contacts for the site.

Summary of Items of Concerns Identified in Interviews

Interviews did not identify any current environmental issues pertaining to the subject property, other than that the site had been vacant for over 15 years and the building was likely in very poor condition. A detailed interview was conducted with Mr. Tom Matus, SAO of Tuktoyaktuk and is included in Appendix F.

3.3 SITE RECONNAISSANCE

On October 4th, 2012, Mr. John Burns and Ms. Ganga Atmuri completed a site reconnaissance at the DFO Tuktoyaktuk Lab and Storage property. The site was accessed by scheduled flight, from Inuvik to Tuktoyaktuk airstrip, and then by motor vehicle directly to the subject property.

The purpose of the site investigation was to note the types of any existing structures, current usage of the property, local topography, stressed vegetation, and to determine areas of actual and potential environmental concern. Observations at the property were recorded using digital photographic documentation and prepared checklists. Site photographs taken at the time of the site inspection are included in Appendix A. A site reconnaissance checklist was completed and is included in Appendix G.

3.3.1 Outside Area

According to the limited information provided by PWGSC and DFO, the subject property was vacant and consisted of one building and an attached fenced-in area to the west. At the time of the 2012 site investigation, the property was not occupied and the on-site building was in poor condition. The building and fenced-in area was approximately 11 m by 30 m in total area.

Remnants of old laboratory and sampling equipment were visible within the chain link fenced-in area located west of and around the exterior perimeter of the building (Photos 10 and 14). The subject property was located adjacent to the Beaufort Sea, west adjacent property (Photo 6). The site is comprised of coarse grained soil with sparse grass present around the perimeter of the building (Photo 1). No surface staining was observed at the subject property during the 2012 site investigation. Overhead power lines were present northeast of the property and at the southeast corner of the on-site building, and ran parallel to the community road (north to south) (Photo 1).

3.3.2 Interior Area

One single-storey wood frame building, approximately 11 m by 12.3 m, was present on the subject property at the time of the 2012 site investigation. The building was vacant and there were no services connected (i.e. power or water) at the time of the site investigation. The interior of the building was divided into a main area, a laboratory area and garage/storage area. The man-door located on the north side of the building was absent and the lock was broken, rendering the door not lockable at the time of the 2012 site investigation (Photos 11 and 12). The interior of the building was in poor condition with large quantities of dead flies visible throughout (Photo 20). Significant amounts of mould were visible throughout the interior, on the walls, flooring and wooden cabinets (Photos 21, and 27 to 29).

3.3.3 Materials Handling and Storage

Storage Tanks: No active or inactive aboveground fuel storage tanks (ASTs), nor evidence of any underground fuel storage tanks (USTs) was observed during the site inspection. One fibreglass (1,000 gallon) water holding tank was exterior of the building along the south side (Photo 18). No surficial staining was observed around the water holding tank during the 2012 site investigation.

Storage Containers: There were no storage containers observed on the subject property (interior or exterior) at the time of the 2012 site investigation.

Hazardous Materials: Small quantities of paint and motor oil/lubricants (<500 mL quantities) were visible inside the subject building at the time of the 2012 site investigation (Photo 22). All items were in good condition with no visible leaks.

Wastes: Piles of waste were observed throughout the subject property, interior and exterior, at the time of the 2012 site investigation and included old laboratory and sampling equipment west of the building within the fenced-in area (Photos 10, 14 and 15) and to the north of the building (Photo 17). Material piles predominantly consisted of old sampling equipment including wooden sampling boxes, skid shed, netting and a vehicle cap. All materials were extremely weathered in appearance and in poor condition (i.e. exposed to natural elements for prolong period of time). Large amounts of dead flies were visible throughout the interior of the on-site building during the 2012 site investigation (Photo 20).

Unidentified Substances: There were no unidentified substances observed on the subject property during the 2012 site investigation.

Stained Materials: Stained materials were not observed on the subject property during the 2012 site inspection.

Exterior Surfaces: No evidence of staining was observed on the ground surfaces of the subject property during the 2012 site inspection.

Residues: No residues were observed on the subject property during the 2012 site inspection.

Stressed Vegetation: None of the sparse vegetation present at the subject property appeared to be stressed at the time of the 2012 site investigation.

Odours: No significant odours were noted at the subject property during the 2012 site inspection.

3.3.4 Designated Substances Survey and Special Attention Items

Asbestos-Containing Materials (ACM): Building materials in structures constructed prior to 1980 may contain ACM. Potential ACM in the form of two types of flooring and pipe lagging were identified inside the subject building at the time of the 2012 site investigation (Photos 19, 30 and 31). The materials were in moderate to poor condition.

Lead: In structures constructed prior to 1980, lead may be present in plumbing, wiring, surface coatings (paints, enamels, varnishes, etc.) used on walls, pipes, and other structures. Paint was observed on the exterior and interior of the on-site building (Photos 1 and 11). Paint was also observed on wooden sampling boxes, skid shed and the fibreglass holding tank, all located exterior of the on-site building (Photos 13,17 and 18). Paint observed was predominantly in poor condition on the exterior (significant peeling and flaking) and moderate condition inside the building.

Mercury: Mercury-containing devices are commonly found in many industrial settings. Items which may contain mercury include fluorescent lamps, high intensity discharge (HID) lamps, temperature sensitive switches, tilt switches, thermostats, float switches and flow meters. No potential mercury containing devices were observed at the subject property during the 2012 site inspection.

Polychlorinated Biphenyls (PCBs): In Canada, PCBs were prohibited from being used in products, equipment, machinery and electrical transformers/capacitors/ballasts manufactured or imported into the country after 1980. Older equipment installed between approximately the 1950s and 1980s, which has not been converted and is still in-use today, may contain PCBs. No light fixtures were visible inside the on-site building at the time of the 2012 site investigation (i.e. light fixtures had been removed); therefore, no PCB containing equipment was observed at the subject property during the 2012 site inspection.

Ozone-Depleting Substances (ODS): No evidence of ODS-containing equipment was observed at the subject property during the 2012 site inspection.

Urea Formaldehyde Foam Insulation (UFFI): No foam insulation was observed, or evidence of the placement of UFFI identifiable, at the subject property during the 2012 site inspection.

Mould: Areas of significant mould were identified throughout the interior of the on-site building at the time of the 2012 site investigation (Photo 21, 27 to 29).

3.4 PHASE I ESA CONCLUSIONS

Based on the information obtained during the Phase I ESA, five potential areas of concern (PACs) were identified related to the potential presence of PHC impacted soil, and the potential presence of metal impacted soil exterior of the on-site building. PACs were also identified related to the potential presence of lead-based paint on interior and exterior building materials (i.e. door frames, flooring and drywall) and exterior materials (i.e. wooden sampling boxes, skid shed and water holding tank), the potential presence of ACMs inside the building (i.e. flooring and pipe lagging) and to the presence of mould throughout the interior of the building. Background information identified the historic presence of PHC impacted soil at the south adjacent property, former NRCAN PCSP site. The former NRCAN PCSP site was remediated in 2011. The PACs are summarized below in Table 4.

TABLE 4
AREAS OF POTENTIAL ENVIRONMENTAL CONCERN
DFO TUKTOYAKTUK LAB AND STORAGE, NWT

Property ID	DFRP #	FCSI #	Potential Area of Concern (PAC)	Contaminant of Concern (COC)	Potentially Affected Media
Tuktoyaktuk Lab and Storage	86479	86479001	Migration of petroleum hydrocarbons from the south adjacent property, former NRCAN PCSP site.	Petroleum hydrocarbons	Soil
Tuktoyaktuk Lab and Storage	86479	86479001	Metals within soil from debris located at the subject property and migration from the south adjacent property, former NRCAN PCSP site.	Metals	Soil
Tuktoyaktuk Lab and Storage	86479	86479001	Paint – interior and exterior of building including sampling boxes within fenced-in area.	Lead	Building material (interior and exterior) and sampling boxes (wood), and soil.
Tuktoyaktuk Lab and Storage	86479	86479001	Bulk building materials interior of building (lagging, flooring)	Asbestos	Building materials (floor tiles and pipe lagging).
Tuktoyaktuk Lab and Storage	86479	86479001	Interior building materials (i.e. drywall, flooring and cabinets)	Mould	All building materials suspected, including plywood/drywall, flooring and cabinets.

4.0 PHASE II/III ENVIRONMENTAL SITE ASSESSMENT

A Phase II/III ESA was conducted at the DFO Tuktoyaktuk Lab and Storage site in conjunction with the Phase I ESA to further assess the issues of potential areas of concern identified during the Phase I ESA. The methodology and findings of the tasks associated with the Phase II/III ESA are described in the following sections.

4.1 METHODOLOGY

4.1.1 Field and Sampling Plan

Based on the findings from the Phase I ESA, including review of background information and interviews, the final field and sampling plan consisted of the following:

- Collection of 24 surficial soil samples including the immediate perimeter of the property and within the fenced-in area of the property at two depths (shallow and deeper), plus two blind field duplicates and submitted for laboratory analysis of PHCs.
- Collection of 12 surficial soil samples including the perimeter of the property and within the fenced-in area of the property, plus two blind field duplicates and submitted for laboratory analysis of metals.
- Collection of two background surficial soil samples approximately 106 m northwest of the subject property at two depths (shallow and deeper), and submitted for laboratory analysis of PHCs and metals.
- Collection of two surficial soil samples and submitted for laboratory analysis of grain size.
- Collection of paint samples taken from subject building (interior and exterior locations), and from various exterior materials and submitted for laboratory analysis of lead content.
- Collection of bulk building samples (i.e. flooring and lagging) from inside the building and submitted for laboratory analysis of asbestos content.

The field and laboratory program was completed according to the proposed Field and Sampling Plan outlined above.

4.1.2 Health and Safety Plan

Prior to the start of the field work, a Health and Safety Plan was prepared that was designed to address potential situations that may have arisen during completion of the work. A copy of this Plan was on site and available for review throughout the field program.

4.1.3 Intrusive Investigation

On October 5^{h}, 2012, Mr. John Burns and Ms. Ganga Atmuri of KGS Group performed surficial soil sampling in conjunction with a Phase I ESA site reconnaissance (Section 3.3). A Designated Substances Survey, including sampling of paint and potential asbestos-containing materials, was also conducted at the time. Soils at the site generally consisted of sand and gravel fill. Grass was sparsely present around the immediate perimeter of the site during the 2012 site investigation.

Surficial Soil Sampling

A total of 24 surficial soil samples were collected from the subject property and immediate perimeter from a total of 12 testholes. Soil samples were obtained from two different depths from each of the 12 testholes (approximately 0-0.25 m and 0.25-0.50 m depths) and submitted for laboratory analysis of PHCs. Two blind field duplicates were also submitted for laboratory analysis of PHCs.

A total of 12 soil samples, one sample per testhole, were collected from the same 12 testholes at the shallow depth (0-0.25 m), plus two blind field duplicates, and submitted for laboratory analysis of metals.

One testhole was advanced at a distance approximately 106 m to the northwest of the site adjacent to the shore of Beaufort Sea for background sampling. Two background surficial soil samples were obtained from this testhole (approximately 0-0.35 m and 0.35-0.70 m depths) and submitted for laboratory analysis of PHCs and metals.

Two soil samples, collected from the subject property and immediate perimeter, were also submitted for laboratory analysis of grain size. All surficial soil samples were obtained using hand excavation methods (i.e. small shovel/auger). All surficial soil samples were placed immediately into plastic storage bags. Field vapour readings were measured from the surficial soil samples using a Photo Ionization Detector (PID). Soil samples were stored in a cooler chest and transported to Maxxam Analytics Inc., a Canadian Association for Laboratory Accreditation (CALA) accredited testing laboratory, in Winnipeg, Manitoba via their depot in Yellowknife, Northwest Territories.

Soil sample locations are illustrated on Figure 2. Soil sample locations, including GPS coordinates, depth, soil type and hydrocarbon field vapours are summarized in Appendix H-1.

Designated Substances Survey

Nine potential lead-based paint samples were collected from the on-site building at various interior and exterior locations, and from materials located exterior of the building (i.e. wooden sampling boxes, skid shed and water holding tank). Interior and exterior building locations included door frames, flooring and walls. The paint samples were collected by scrapping the surface with a tool and collecting flakes of paint in a plastic sampling bag. The potential lead-based paint samples were transported to Maxxam Analytics Inc., a Canadian Association for Laboratory Accreditation (CALA) accredited testing laboratory, in Winnipeg, Manitoba via their depot in Yellowknife, Northwest Territories. Exterior paint samples locations are shown on Figure 2 and interior paint sample locations are shown on Figure 3. GPS coordinates for all paint sample locations are listed in Appendix H-2.

Three potential asbestos-containing material (ACM) samples were collected from the interior of the on-site building from various bulk materials (flooring and pipe lagging sources). The bulk samples were collected using a hand-held knife and collecting the bulk material in a plastic sampling bag. The potential asbestos-containing material (ACM) samples were transported to Maxxam Analytics Inc., a Canadian Association for Laboratory Accreditation (CALA) accredited testing laboratory, in Winnipeg, Manitoba via their depot in Yellowknife, Northwest Territories. Bulk materials sample locations are shown on Figure 3. GPS coordinates for all bulk materials locations are listed in Appendix H-2.

4.1.4 Laboratory Analysis

All surficial soil samples, paint samples and bulk materials samples (potential ACMs) were submitted to Maxxam Analytics Inc. of Winnipeg, Manitoba, via their depot in Yellowknife, NWT, a CALA accredited laboratory for analyses. The Laboratory Certificates of Analyses are included in Appendix I.

4.1.5 Quality Assurance/Quality Control (QA/QC)

Standardized sampling procedures and protocols were used during all sampling events to ensure that representative samples were collected in a controlled manner so that scientifically defendable comparisons can be made. KGS Group ensured that all Chain-of-Custody procedures were properly undertaken. Soil samples were collected in sterile plastic bags and stored in appropriate containers. Maxxam Analytics Inc. of Yellowknife, NWT and Winnipeg, Manitoba, is a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited analytical testing laboratory. Criteria and guidelines used for assessment of analytical data were clearly established with the laboratory to ensure that the appropriate analytical detection limits were used.

Equipment used to collect surficial soil samples and building materials (i.e. paint and bulk materials) were washed in between samples with a dilute isopropyl alcohol/Alconox solution to ensure proper decontamination. In addition to proper cleaning procedures of field equipment, KGS Group field personnel used disposal nitrile gloves for handling each piece of equipment and while collecting all samples. A new pair of gloves was used for each sample collection.

Blind field duplicates are generally submitted as a second aliquot of sample and are used as a blink check on method repeatability/precision. In general a field duplicate quantity for QA/QC represents a frequency of 10% for total samples submitted. Two blind soil field duplicates were submitted for laboratory analysis of PHCs and metals. Laboratory QA/QC including method blanks, replicates, matrix spikes and surrogates are provided at the discretion of the laboratory. A copy of the laboratory Quality Control report is included with the Certificates of Analyses located within Appendix I.

In addition to standardized sampling procedures and protocols, all deliverables, including reports, letters, figures and tables, were reviewed for accuracy by the individuals who conducted the work, the Project Manager, as well as one other individual at a senior level.

4.2 DATA AND ANALYSIS

4.2.1 Assessment Guidelines

Useful tools to assess the significance of laboratory results are comparative criteria published by federal and provincial regulatory agencies and organizations such as the Canadian Council of Ministers of the Environment (CCME). For sites within federal jurisdiction, such as the Tuktoyaktuk Lab and Storage site, federal guidelines published by the CCME under the *Canada-Wide Standards (CWS) for Petroleum Hydrocarbons in Soil* [(13)] and the *Canadian Environmental Quality Guidelines* (CEQG) for soil, water and sediment are generally used [(14)]. Residential/Parkland land use were chosen as the subject property is adjacent to a major water body (Beaufort Sea) and adjacent properties include residential/parkland use (i.e. shallow water bodies to the north and east).

Lead in paint is assessed using the Northwest Territories Environmental Protection Act [(15)], which follows the Surface Materials Coating Regulation of the Hazardous Product Act [(16)].

Soil Analysis

Petroleum hydrocarbon and metal concentrations in the soil at the site were assessed using the CCME CWS and Chapters 2 and 7 of the CEQG *Canadian Soil Guidelines for the Protection of Environmental and Human Health* [(13,14)]. Residential/Parkland site use was chosen as it best describes the existing site usage. Based on visual observations, soils at the site are considered to be medium-coarse grained sand and gravel fill. Based on the site conditions, including the presence of a building and accessibility of the site, the site specific pathways applicable to the site include Soil Ingestion, Soil Dermal Contact, Soil Inhalation, Inhalation of Indoor Air Check, Soil Contact, Groundwater Check (aquatic life), Direct Contact and Management Limit (Table 5).

Designated Substances Survey Analysis

Lead in paint was assessed using the Northwest Territories Environmental Protection Act [(14)], which follows the Surface Materials Coating Regulation of the Hazardous Product Act [(15)].

4.2.2 Results of Laboratory Analysis

A total of 28 surficial soil samples, including two background samples and two QA/QC blind field duplicates were submitted for laboratory analysis of PHCs. A total of 16 surficial soil samples, including two background samples and two QA/QC blind field duplicates were submitted for laboratory analysis of metals. Two surficial soil samples were also submitted for laboratory analysis of grain size.

A total of nine paint samples were submitted for laboratory analysis of lead in paint. A total of three bulk material samples were submitted for laboratory analysis of ACMs.

Detailed laboratory results for PHCs in soils are summarized in Table 5, metals in soil are summarized Table 6, and grain size analysis summarized in Table 9. Detailed laboratory results for lead paint sampling is summarized in Table 7 and bulk asbestos content sampling is summarized in Table 8.

The Laboratory Certificates of Analyses are included in Appendix G. Tabular laboratory analytical results were peer reviewed to ensure correctness.

Surficial Soil Sampling

Laboratory results showed that all 26 surficial soil samples, including two QA/QC field duplicates, collected from the 12 testholes advanced along the perimeter and within the fenced-in area at the subject property and submitted for analysis of PHCs had concentrations below CCME Guidelines for Residential/Parkland land use criteria for coarse grained surface soils (<1.5 m). Slightly elevated concentrations of PHC Fractions F2 were noted in samples TK-TH2B (65 mg/kg) and TK-TH5A (46 mg/kg); however, results were below the lowest CCME Residential/Parkland Use Site Specific Pathway Criteria (150 mg/kg for both Soil Contact and

Inhalation of Indoor Air Check). Detectable concentrations of PHC Fraction F3 were noted in samples TK-TH2A (84 mg/kg), TK-TH2B (110 mg/kg) and TK-TH5A (140 mg/kg); however, concentrations were all below the lowest CCME Residential/Parkland Use Site Specific Pathway Criteria (300 mg/kg for Soil Contact). Detailed results of Petroleum Hydrocarbons in Soil are shown in Table 5.

Laboratory results showed that arsenic exceedances were identified in two of the 14 surficial soil samples (including two QA/QC field duplicates) submitted for analysis of metals. Arsenic concentrations in exceedence of CCME Residential/Parkland Land Use Site Specific Criteria for Human Health Guideline - Soil Ingestion Guideline, were identified in samples TK-TH1A (16.2 mg/kg) and TK-TH3A (13.2 mg/kg). Detailed results of Metals in Soil are shown in Table 6.

Laboratory results showed that surficial soil at the subject site is coarse grained. Grain size analysis for soil sample TK-TH2B showed that 85.84% of the soil was larger than 75 µm, and for soil sample TK-TH9A, 91.26% of the soil was larger than 75 µm. Detailed results of Grain Size Analysis are showed in Table 9.

Background Soil Sampling

Laboratory results indicated an exceedence for PHC Fraction F3 above the lowest CCME Residential/Parkland Use Site Specific guideline (300 mg/kg for Soil Contact) within background sample TK-THBKG-A (330 mg/kg). The sample was obtained from approximately 106 m northwest of the subject property within a peat layer (0-0.35 m depth). Background surficial soil sample TK-THBKG-A had elevated concentrations of PHC Fractions F2 (72 mg/kg) and F4 (200 mg/kg); however, both concentrations were below applicable CCME Residential/Parkland land use guidelines. Detailed results for Petroleum Hydrocarbons within the background soil samples are shown in Table 5.

Laboratory results indicated arsenic and selenium concentrations within the background samples in exceedence of applicable criteria. An arsenic concentration in exceedence of CCME Residential/Parkland Land Use Site Specific Criteria for Human Health Guidelines - Soil Ingestion Guideline (12 mg/kg) was identified within background soil sample TK-THBKG-B (12.2 mg/kg) and a selenium concentration in exceedence of CCME Site Specific Criteria for Environmental Health Guidelines – Soil Contact Guideline (1 mg/kg) was identified within

background sample TK-THBKG-A (2.2 mg/kg). Detailed results for Metals within the background soil samples are shown in Table 6.

Paint Sampling

Laboratory results indicated that four of the nine paint samples submitted for lead content analysis had lead concentrations above the Northwest Territories Environmental Protection Act (600 mg/kg). Paint sample TK-LP-1 had a lead concentration of 997 mg/kg, sample TK-LP-2 had a lead concentration of 1,330 mg/kg, sample TK-LP-5 had a lead concentration of 14,800 mg/kg, and sample TK-LP-9 had a lead concentration of 1,310 mg/kg. All four samples were obtained from exterior areas including garage and man doors of the on-site building (TK-LP-1 and TK-LP-2), the skid shed (TK-LP-5) and wooden sampling box within the fenced-in area (TK-LP-9). Detailed results of Lead Paint Sampling are illustrated in Table 7.

Bulk Materials Sampling

One sample of pipe lagging and two samples of flooring were collected from the interior of the on-site building and submitted for laboratory analysis of asbestos. The sample of pipe lagging was in poor to moderate condition and was heavily stained from prolonged exposure to dust and debris on the floor at the time of the 2012 site investigation. Both samples of flooring were in moderate condition and were obtained from the main interior area and boiler room area. Laboratory results indicated that the two types of flooring sampled contained asbestos (TK-ACM-1 and TK-ACM-3). Asbestos was identified within the various components of the floors tiles including the mastic, fibrous materials and resinous materials. Detailed results of Bulk Asbestos Content are illustrated in Table 8.

4.2.3 QA/QC Results

QA/QC results were calculated as the relative percent difference (RPD) between duplicate samples. Acceptable percent differences are less than 40%. The calculated RPDs for petroleum hydrocarbons in soil sample TK-TH5A and field duplicate TK-TH100 ranged from N/A to 0%. The calculated RPDs for petroleum hydrocarbons in soil sample TK-TH9A and corresponding

field duplicate TK-TH101 ranged from 0% to 3%. All parameters were within the applicable RPD threshold of 40%. RPD values for petroleum hydrocarbons in soil are shown on Table 5.

The calculated RPDs for metals in soil sample TK-TH5A and corresponding field duplicate TK-TH100 ranged from 0% to 6%, and in soil sample TK-TH9A and corresponding field duplicate TK-TH101 ranged from 0% to 18%. All RPD values were below the applicable 40% threshold. RPD values for metals in soil are shown on Table 6.

Blind field duplicates are generally very prone to bias introduced during field sampling for both water and soil samples. The homogeneity of the sample matrix can greatly affect the reproducibility of a collected sample, as well as the type of parameter being measured (organic vs inorganics). Therefore, one explanation for the high variability in the laboratory analysis of the samples could be due to the non-homogeneity of the sample at the point of collection. Standard analytical variability of laboratory equipment and data is also a contributing factor affecting replicate samples. The laboratory also indicated that due to the level of uncertainty in the measurement of a particular parameter, the closer the measured concentrations are to the minimum detection limit (MDL) or estimated quantitation limit (EQL), the higher the RDP between duplicate samples may be. The laboratory recommends that for concentrations that are less than 10 times the EQL of a particular parameter an RPD of 100% (all parameters) is considered acceptable for soil field duplicates. All parameters, petroleum hydrocarbons and metals, within soil had RPD values less then 40%.

The laboratory certificates of analyses were examined thoroughly and all tabulated data were peer reviewed to ensure accuracy. Additionally, the matrix spikes, replicates, and surrogate recoveries reported in the Laboratory Quality Control Report were examined to ensure that the percentage recoveries fell within the laboratory's stated acceptable range (Appendix G).

Based on a review of the field and laboratory QA/QC procedures, the laboratory results were considered to be representative of the environmental quality of the soils at the site for the locations tested and at the date of sample collection.

4.3 PHASE II/III ESA FINDINGS AND DISCUSSION

A Phase II/III ESA was completed at the DFO Tuktoyaktuk Lab and Storage site located within the Incorporated Hamlet of Tuktoyaktuk in the Northwest Territories on the shores of Beaufort Sea. The Phase II/III ESA was designed to identify and delineate Potential Areas of Concern (PAC) identified during the Phase I ESA and in previous investigations conducted at the former NRCAN PCSP property located south of the DFO Tuktoyaktuk Lab and Storage site.

Arsenic concentrations marginally above applicable CCME Guidelines were identified in two shallow soil samples at the subject property. The two soil samples were obtained from a shallow depth, between 0 m and 0.25 m, and were collected from the south perimeter adjacent to the on-site building and fenced-in area. No soil samples obtained within the subject property were found to be above the applied CCME guidelines for petroleum hydrocarbon concentrations.

Metal concentrations, arsenic and selenium, were found to be above the applicable CCME guidelines in the two background samples obtained from approximately 106 m northwest of the subject property close to the shore of Beaufort Sea. Background samples were collected from one testhole (TK-THBKG) at two different depths (shallow and deeper). The selenium (2.2 mg/kg) in exceedence of applicable criteria was identified in background soil sample TK-BKG-A collected between 0-0.35 m within a peat layer. The arsenic (12.2 mg/kg) in exceedence of applicable criteria was identified in the background soil sample TK-BKG-B collected between 0.35-0.70 m depth within a silt and clay layer. The elevated arsenic concentration within the background sample collected at the deeper depth is indicative of naturally occurring high arsenic concentrations within the overall area.

Petroleum hydrocarbon fraction F3 (330 mg/kg) concentration marginally in exceedence of applicable CCME guidelines was identified within the background sample TK-BKG-A obtained from a peat layer. No other petroleum hydrocarbon concentrations above applicable CCME criteria were identified within the two background soil samples.

Laboratory analysis confirmed the presence of lead paint in exceedence of the Northwest Territories Environmental Act (600 mg/kg) on the exterior of the on-site building and within the interior (i.e. floor and walls). Lead paint was also confirmed on items located exterior of the

building within the fenced-in area to the west (i.e. wooden sampling boxes) and old equipment to the north (i.e. skid shed).

Laboratory analysis confirmed the presence of asbestos containing materials in the form of two types of flooring inside on-site building during the 2012 site activities. Asbestos was identified within the various flooring components including the mastic and resin.

The DFO Tuktoyaktuk Lab and Storage site covers a land area of approximately 330 m^2 and consists of one on-site single-storey building and attached exterior fenced-in area to the west. The property is listed as Commissioner's Parcel according to GNWT Land Titles and Beaufort Sea is located west of the site.

Background soil samples obtained from approximately 106 m to the northwest of the site identified marginal exceedances for metals (arsenic and selenium) and PHC fraction F3 as per applicable CCME guidelines. The exceedances were identified within both the shallow background soil sample obtained within the peat layer (PHC Fraction F3 and selenium) and from the deeper background soil sample obtained within the sand and clay layer (arsenic).

Based on these findings, there is indication that the overall area is naturally elevated for arsenic concentrations and selenium concentrations within soil. As such, the marginal arsenic exceedances identified within two soil samples obtained from the subject property may be attributed to natural sources. Therefore, further soil sampling is not warranted nor recommended at the subject property.

The decommissioning and removal of the existing on-site vacant building and fenced-in area including the surrounding debris (i.e. old sampling materials) should be removed prior to future use, as per applicable Territorial and Federal Guidelines. Based on the poor condition of the on-site building and the exterior materials, it is highly unlikely that any of the building materials may be salvaged for re-use.

5.0 CONTAMINATED SITE SUMMARY

5.1 IDENTIFICATION OF CONTAMINATED SITES

According to the *Terms of Reference Appendix DFO Guidance on Identification of Contaminated Sites* (May 2012) [17], the following criteria are used to identify contaminated sites:

- One actual or potential source is impacting one (or more) different areas regardless of the distance between impacted areas = one contaminated site
- Two or more actual or potential sources are impacting the same approximate area and sources and impacted areas are < 30 m apart = one contaminated site
- Two or more actual or potential sources are impacting the same approximate area and sources are >30 m apart = one contaminated site
- Two (or more) actual or potential sources are impacting two different area and sources and impacted areas are <30 m apart = one contaminated site
- Two (or more) actual or potential sources are impacting two different areas and sources and impacted areas are >30 m apart = two (or more) contaminated sites

5.2 DFO CONTAMINATED SITES MODULE REPORT SUMMARY SHEETS

The 2012 Phase I/II/III ESA confirmed the absence of sources of contamination. Although the DFO Tuktoyaktuk Lab and Storage site is not considered a contaminated site, a Contaminated Sites Module Input Form as per the DFO Reference Module: Report Summary Template and Instruction Sheet for DFO Contaminated Sites Module of the Enviro System Database for the site is included in Appendix L [18].

5.3 CCME NATIONAL CONTAMINATED SITES CLASSIFICATION SYSTEM

5.3.1 Introduction

The updated 2008 (revised 2010, v.1.2) National Contaminated Sites Classification System (NCSCS), which supersedes the original 1992 NCSCS and the 2005 Federal Contaminated Sites Action Plan (FCSAP) classification system, is used as a tool to aid in the evaluation of contaminated sites [19]. The 2008 NCSCS ranks contaminated sites into five general categories of concern (Class 1, High Priority for Action; Class 2, Medium Priority for Action; Class 3, Low priority for Action; Class N, Not a Priority for Action; and Class INS, Insufficient Information)

according to their current or potential adverse impact on human health or the environment [19]. It is used to screen sites with respect to "need for further action" (i.e. further characterization, risk assessment, remediation, etc.). The hazard or hazard potential of a site is evaluated by scoring site characteristics ("evaluation factors") that can be grouped under one of three categories:

I. ***Contaminant Characteristics*** – the relative hazard of contaminants present at a site.

II. ***Migration Potential*** – the potential for contaminants to leave the original residency media and move to another media, another portion of the site, or off-site.

III. ***Exposure*** – includes both the exposure pathway and receptors; the exposure pathway being the route a contaminant may follow (*e.g.*, groundwater, surface water, direct contact, and/or air) to receptor, including living beings or resources that may be exposed to and affected by contamination.

A scoring system (from 0 to 100 points) is used as a means of assessing the hazard of a site. Sites that exhibit observable or measured impacts on the surrounding environment or have a high potential for causing negative impact will score higher under the system.

5.3.2 NCSCS Summary for Each Contaminated Site

The DFO Tuktoyaktuk Lab and Storage site is not a contaminated site as no contaminants associated with DFO activities were confirmed to be present on site. Therefore, an NCSCS summary was not required.

6.0 SITE CLOSURE

Based on the findings of the 2012 Phase I/II/III ESA conducted at the DFO Tuktoyaktuk Lab and Storage site located within the Incorporated Hamlet of Tuktoyaktuk, Northwest Territories, and the absence of soil concentrations based on historic DFO activities above applicable criteria for BTEX/PHC Fractions F1 to F4 and metals, the site is not a contaminated site and no further assessment is recommended nor required at the site. A Site Closure Form was completed and is included in Appendix K.

It is, however, recommended that the on-site building be demolished as per applicable guidelines, and that all exterior debris including materials within the fenced-in area and around the perimeter of the building be removed as per applicable Federal and Territorial guidelines and regulations. All lead-based paint confirmed to be present at the property, including interior and exterior locations of the on-site building and on materials located exterior of the building should be removed and disposed of as per applicable Federal and Territorial guidelines to reduce exposure to environmental receptors. All asbestos-containing materials confirmed to be present at the property should be removed and disposed of as per applicable Federal and Territorial guidelines to reduce exposure to environmental receptors. The cost associated with the demolition of the on-site building and fencing, and the removal of all building materials including exterior debris is a maintenance cost and not a liability. The estimated cost for demolition is summarized in the following table.

TABLE 10
COSTING FOR DEMOLITION AND DEBRIS REMOVAL
DFO TUKTOYAKTUK LAB AND STORAGE

Activity	Estimated Associated Costs
Preparation of Specifications for Demolition and Debris Removal	$6,500
Field Preparatory Work	$4,500
Mobilization of Consultant to Site (1)	$7,500
On-Site Supervision and Monitoring Activities by Consultant (2)	$4,000
Field Activities (3)	$15,000
Disposal of Hazardous Materials	$5,000
Reporting	$9,500
Total Estimated Costs (not including GST or HST)(4)	**$52,000**

Notes:

(1) Includes all mobilization expenses (i.e. air fare).
(2) Supervision of all demolition and removal of all debris by contractor.
(3) Field activities include all demolition and removal of all debris by contractor, including cost of equipment and personnel.
(4) A costs savings could be realized if the demolition and debris removal work is completed in conjunction with other work within the community.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the 2012 Phase I/II/III ESA conducted at the DFO Tuktoyaktuk Lab and Storage site, DFRP# 86479, FCSI# 86479001, located within the Incorporated Hamlet of Tuktoyaktuk, Northwest Territories the following conclusions and recommendations can be made:

- Arsenic concentrations in two shallow soil samples immediately south of the on-site building were above the applicable criteria. However, based on the elevated arsenic concentration identified within the deeper background soil sample (above applicable CCME criteria) obtained from a location approximately 106 m northwest of the subject property, the elevated arsenic concentrations are likely natural occurring within the area and are not a result of DFO activities or contaminants at the site.

- Laboratory results indicated that four of the nine paint samples had concentrations of lead in paint above the applicable Northwest Territories *Environmental Protection Act.* The paint was collected at various exterior locations on the building and from exterior debris located at the property. Paint was in poor to moderate condition with flaking and peeling visible on the exterior locations of the on-site building (i.e. doors/door frames).

- Laboratory results indicated that two of the three bulk building materials contained asbestos (flooring). The materials were in moderate condition and were not friable in nature.

- Mould was visible throughout the interior of the building.

- Large amounts of dead flies were visible throughout the interior of the building.

- Based on the absence of contamination or potentially affected media, classification of the Tuktoyaktuk Lab and Storage site under the NCSCS scoring system was not required.

- A Site Closure Form and a Contaminated Site Module form were completed as per the DFO TOR.

- No further assessment work is recommended nor required under the Federal Contaminated Sites Action Plan at this time. However, it is recommended that the on-site building and fencing be demolished, and all building materials including exterior wastes be disposed of as per applicable Federal and Territorial guidelines and regulations to reduce the potential risk to environmental receptors from the confirmed lead based paint, asbestos containing materials and visible mould at the property. The maintenance cost associated with the demolition and debris removal work is estimated to be $52,000. Cost is based upon use of a local contractor and an on-site environmental consultant to supervise the demolition and debris removal. A cost savings could be realized if the work is completed in conjunction with other work within the community.

8.0 STATEMENT OF LIMITATIONS

Third Party Use of Report

This report has been prepared for Public Works and Government Services Canada and Department of Fisheries and Oceans to whom this report has been addressed and any use a third party make of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by an third party as a result of decisions made or actions undertaken based on this report.

Environmental Statement of Limitations

KGS Group prepared this report in a professional manner using the degree of skill and care exercised for similar projects under similar condition by reputable and competent environmental consultants. The information contained in this report is based on the information that was made available to KGS Group during the investigation and upon the services described, which were performed within the time and budgetary requirements of Public Works and Government Services Canada and Department of Fisheries and Oceans. As the report is based on the available information, some of its conclusions could be different if the information upon which it is based is determined to be false, inaccurate or contradicted by additional information. KGS Group makes no representation concerning the legal significance of its findings or the value of the property investigated.

9.0 REFERENCES

1. Public Works and Government Services Canada. Updated May 2012. *Terms of Reference Module Phase I/II Environmental Site Assessment*. *Various Sites.*

2. Public Works and Government Services Canada. *Cover Document for DFO Contaminated Site Management Activities Terms of Reference. Various Sites – Northwest Territories and Nunavut.*

3. Tuktoyaktuk. Website: http://www.en.wikipedia.org/wiki/Tuktoyaktuk Accessed December 2012.

4. Treasury Board of Canada. Website: http://www.tbs-sct.gc.ca/fcsi-rscf/dfrpnn-nbrbif-eng.aspx?clear=1

5. Environment Canada A National Ecological Framework for Canada. Website found at: http://www.ecozones.ca/english/region/89.html

6. Environment Canada Canadian Climate Normals website, found at http://www.msc-smc.ec.gc.ca/climate/climate_normals/index_e.cfm

7. Canada Permafrost. MC4177. The National Atlas Information System, Canada Centre for Mapping, Geomatics Canada and the Terrain Sciences Division, Geological Survey of Canada. National Resources of Canada. 1995.

8. Government of Northwest Territories – Municipal and Community Affairs. Drinking Water Quality Database Tuktoyaktuk. Website: http://www.maca.gov.nt.ca

9. Northwest Territories Protected Areas Strategy (NWT PAS). Website: www.nwtpas.ca Accessed December 2012.

10. Senes Consulting Ltd. December 2011. *Final 2011 Completion Report for Polar Continental Shelf Remediation Project, Tuktoyaktuk, NWT*.

11. Species At Risk in the Northwest Territories 2012. Website: www.enr.gov.nt.ca Accessed December 2012.

12. Environment Canada Species at Risk Registry. Website: http://www.sararegistry.gc.ca

13. Canadian Council of Ministers of the Environment. 2001. *Canada-Wide Standards for Petroleum Hydrocarbons in Soil.* Update 2008.

14. Canadian Council of Ministers of the Environment. 1999. *Canadian Environmental Quality Guidelines*: *Chapters 2 and 7, Canadian Soil Quality Guidelines for the Protection of Human Health and the Environment.* Update 2007. Revised 2009.

15. Northwest Territories *Environmental Protection Act*.

16. Surface Coating Material Regulations, SOR/2005-109 as amended by SOR/2007 under the Hazardous Products Act.

17. Department of Fisheries and Oceans. May 2012. *Terms of Reference Appendix DFO Guidance of Identification of Contaminated Sites.*

18. Department of Fisheries and Oceans. Updated May 2012. *Terms of Reference Module: Report Summary Template and Instruction Sheet for DFO Contaminated Sites Module of the EnviroSys Database.*

19. Canadian Council of Ministers of the Environment. 2008. *National Classification System for Contaminated Sites, Guidance Document.* Revised 2010.

TABLES

TABLE 5
PETROLEUM HYDROCARBONS IN SOIL
TUKTOYAKTUK LAB & STORAGE
TUKTOYAKTUK, NWT

Sample No. [1]	Depth (m)	Soil Type	Moisture Content (%)	Field Vapour Reading (ppm)	Parameter [1,2]							
					Benzene	Toluene	Ethylbenzene	Xylenes (o,-m,-p)	F1 (C_6 - C_{10})	F2 (C_{10} - C_{16})	F3 (C_{16} - C_{34})	F4 (C_{34} - C_{50})
TK-THBKG-A	0-0.35	Peat	76	4	<0.0050	<0.020	<0.010	<0.040	<10	72	**330**	200
TK-THBKG-B	0.35-0.7	Silt & Some Clay	18	6.1	<0.0050	<0.020	<0.010	<0.040	<10	37	50	<20
TK-TH1A	0-0.25	Sand & Gravel Fill	5.8	7.9	<0.0050	<0.020	<0.010	<0.040	<10	<20	37	<20
TK-TH1B	0.25-0.45	Sand & Gravel Fill	4.4	9.4	<0.0050	<0.020	<0.010	<0.040	<10	<20	69	<20
TK-TH2A	0-0.2	Sand & Gravel Fill	7	10	<0.0050	<0.020	<0.010	<0.040	<10	<20	84	<20
TK-TH2B	0.2-0.40	Sand & Gravel Fill	5.4	8.2	<0.0050	<0.020	<0.010	<0.040	<10	65	110	<20
TK-TH3A	0-0.25	Sand & Gravel Fill	6.6	10.1	<0.0050	<0.020	<0.010	<0.040	<10	<20	24	<20
TK-TH3B	0.25-0.5	Sand & Gravel Fill	8.7	6.1	<0.0050	<0.020	<0.010	<0.040	<10	<20	25	<20
TK-TH4A	0-0.25	Fine Sand	3.9	10.1	<0.0050	<0.020	<0.010	<0.040	<10	<20	37	<20
TK-TH4B	0.25-0.5	Fine Sand & Gravel	3.8	8.5	<0.0050	<0.020	<0.010	<0.040	<10	<20	34	<20
TK-TH5A	0-0.25	Fine Sand	4.3	48.5	<0.0050	<0.020	<0.010	<0.040	<10	46	140	<20
TK-TH100	Field Duplicate of Sample TK-TH5A		6.2		<0.0050	<0.020	<0.010	<0.040	<10	<20	<20	<20
Relative Percent Difference (RPD)					0%	0%	0%	0%	0%	N/A	N/A	0%
TK-TH5B	0.25-0.5	Fine Sand & Gravel	4.4	10.8	<0.0050	<0.020	<0.010	<0.040	<10	<20	24	<20
TK-TH6A	0-0.25	Fine Sand & Trace Organics	9.6	6.7	<0.0050	<0.020	<0.010	<0.040	<10	24	32	<20
TK-TH6B	0.25-0.5	Fine Sand & Trace Organics	9.1	5.6	<0.0050	<0.020	<0.010	<0.040	<10	24	32	<20
TK-TH7A	0-0.25	Fine Sand, Some Gravel, Trace Organics	6.4	4.9	<0.0050	<0.020	<0.010	<0.040	<10	35	57	<20
TK-TH7B	0.25-0.5	Fine Sand, Some Gravel, Trace Organics	8.8	4.3	<0.0050	<0.020	<0.010	<0.040	<10	<20	40	<20
TK-TH8A	0-0.25	Fine Sand, Some Gravel, Trace Organics	6.4	6.9	<0.0050	<0.020	<0.010	<0.040	<10	<20	50	<20
TK-TH8B	0.25-0.5	Fine Sand, Some Gravel, Trace Organics	10	5	<0.0050	<0.020	<0.010	<0.040	<10	<20	63	<20
TK-TH9A	0-0.25	Fine Sand, Trace Gravel, Trace Organics	5.6	5.1	<0.0050	<0.020	<0.010	<0.040	<10	<20	25	<20
TK-TH101	Field Duplicate of Sample TK-TH9A		5.5		<0.0050	<0.020	<0.010	<0.040	<10	<20	22	<20
Relative Percent Difference (RPD)					0%	0%	0%	0%	0%	0%	3%	0%
TK-TH9B	0.25-0.5	Fine Sand, Trace Gravel, Trace Organics	5.9	6.9	<0.0050	<0.020	<0.010	<0.040	<10	<20	<20	<20
TK-TH10A	0-0.25	Fine Sand, Trace Gravel, Trace Organics	5.1	14	<0.0050	<0.020	<0.010	<0.040	<10	<20	23	<20
TK-TH10B	0.25-0.5	Fine Sand, Trace Gravel, Trace Organics	5.4	16.4	<0.0050	<0.020	<0.010	<0.040	<10	<20	<20	<20
TK-TH11A	0-0.25	Fine Sand, Trace Gravel, Trace Organics	7	7.8	<0.0050	<0.020	<0.010	<0.040	<10	<20	22	<20
TK-TH11B	0.25-0.5	Fine Sand, Trace Gravel, Trace Organics	11	6.2	<0.0050	<0.020	<0.010	<0.040	<10	<20	48	<20
TK-TH12A	0-0.25	Fine Sand, Trace Gravel, Trace Organics	7.9	7.2	<0.0050	<0.020	<0.010	<0.040	<10	<20	23	<20
TK-TH12B	0-0.4	Fine Sand, Trace Gravel, Trace Organics	9.6	5.4	<0.0050	<0.020	<0.010	<0.040	<10	<20	46	<20
Laboratory Detection Limits					*0.01*	*0.02*	*0.01*	*0.04*	*10*	*20*	*20*	*20*
CCME Guidelines [3,4] - Residential/Parkland Land Use, Surface Soil (<1.5 m)												
Soil Type					**Coarse**	**Coarse**	**Coarse**	**Coarse**	**Coarse**	**Coarse**	**Coarse**	**Coarse**
TIER I GOVERNING OBJECTIVES GENERIC CRITERIA					**0.0095**	**0.1**	**0.082**	**11**	**30**	**150**	**300**	**2,800**
TIER I SITE SPECIFIC CRITERIA (For Pathways Applicable to Site)												
Soil Ingestion Guideline					11	22,000	10,000	150,000	**-**	**-**	**-**	**-**
Soil Dermal Contact Guideline					25	220,000	58,000	NA	-	-	-	-
Soil Inhalation Guideline					NC	NC	NC	NC	-	-	-	-
Inhalation of Indoor Air Check (slab on grade)					0.0095	120	55	14	30	150	NA	NA
Soil Contact Guideline [a]					31	75	55	95	210	150	300	2,800
Groundwater Check (aquatic life) [b]					1	0.1	50	37	1,800	600	NA	NA
Direct Contact (Ingestion+Dermal Contact)					-	-	-	-	12,000	6,800	15,000	21,000
Management Limit [c]					-	-	-	-	700	1,000	2,500	10,000

Notes:

"-" = No Data

N/A = Not Applicable. Calculated value exceeds 1,000,000 kg/mg or pathway excluded.

NC = Not calculated. Insufficient data to allow derivation.

ND = Not Determined

RES = Residual PHC formation. Calculated value exceeds 30,000 mg/kg and solubility limit for PHC fraction.

TBD = To be determined

1. All values are expressed in milligrams per kilogram (mg/kg).
2. Soil samples obtained on October 5, 2012
3. CCME - Canadian Council of Ministers of the Environment - Canadian Environmental Quality Guidelines, 1999. Update 7.0 - 2007.
   Chapter 7 - Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health.
4. CCME - Canadian Council of Ministers of the Environment. Canada-Wide Standards for Petroleum Hydrocarbons (PHCs) in Soil, May 2001 - revised January 2008.

a. For depths between 0 and 1.5 meters below ground level, the terrestrial ecological pathway must be applied.
   A management limit has been developed for PHC that must be applied at all depths if the ecological pathway is removed.
   CCME does not specify for depths between 1.5 and 3 meters bgl.

b. Assumes surface water body at 10 m from site.

c. Includes additional considerations such as free phase formation, explosive hazards, and buried infrastructure effects.

5. Tier I value for protection of potable groundwater.

6. Refer to Slab-on-Grade value. (Note For Residential Criteria Only)

- Exceedance of Tier I Generic Criteria

BOLD - Exceedance of Tier I Site Specific Criteria

TABLE 6
METALS IN SOIL
TUKTOYAKTUK LAB AND STORAGE
TUKTOYAKTUK, NWT

Sample No. [1]	Parameter (mg/kg)																												
	Aluminum	Antimony[3]	Arsenic	Barium[3]	Beryllium[3]	Bismuth	Cadmium	Calcium	Chromium (Total)	Cobalt[3]	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molybdenum[3]	Nickel	Phosphorus	Potassium	Selenium	Silver[3]	Sodium	Strontium	Thallium	Tin[3]	Titanium	Uranium	Vanadium	Zinc	Zirconium
EQL	*20*	*0.2*	*0.03*	*5*	*0.4*	*0.1*	*0.05*	*100*	*1*	*0.3*	*0.5*	*100*	*0.1*	*100*	*0.2*	*0.05*	*0.1*	*0.8*	*10*	*100*	*0.5*	*0.05*	*100*	*0.1*	*0.05*	*0.1*	*1*	*0.05*	*2*	*1*	*0.5*
TK-THBKG-A	481	0.42	1.04	214	<0.40	<0.10	0.19	20,100	1.5	2.14	10.2	4,480	0.75	2,560	164	<0.05	0.58	5.75	381	110	**2.2**	0.059	3140	71.8	<0.050	<0.10	4.9	3.55	3.6	14.2	0.89
TK-THBKG-B	13,500	0.61	**12.2**	386	0.65	0.17	0.359	9,550	19.7	10.5	19	26,300	11.8	5,550	387	<0.05	1.73	27.4	646	1460	0.91	0.112	648	40.1	0.148	0.47	50.3	0.777	40.9	86.6	2.47
TK-TH1A	5,010	0.64	**16.2**	255	<0.40	<0.10	0.293	11,300	8.8	6.99	11.2	20,700	11.6	3,970	330	<0.05	1.96	16.8	551	615	0.71	0.098	<100	29.6	0.094	0.27	59.5	0.695	23.4	54.2	1.49
TK-TH2A	3,600	0.67	8.65	259	<0.40	<0.10	0.437	2,800	8	4.04	9.47	11,200	18.4	1,280	300	<0.05	0.9	9.49	437	462	<0.5	0.089	<100	23.7	0.067	0.41	28.2	0.526	18.1	49.3	0.63
TK-TH3A	4,370	0.39	**13.2**	164	<0.40	<0.10	0.28	18,400	8	6.33	10	16,600	10.3	5,110	332	<0.05	1.42	15.5	470	549	<0.5	0.067	<100	36.3	0.089	0.2	57.1	0.633	20	62.1	1.98
TK-TH4A	3,390	0.48	6.41	127	<0.40	<0.10	0.202	17,700	5.9	5.06	6.84	10,900	5.25	4,390	280	<0.05	1	11.9	429	435	<0.5	0.07	<100	31.5	0.068	0.15	53.7	0.561	15.5	35.3	1.98
TK-TH5A	3,440	0.32	6.53	126	<0.40	<0.10	0.27	17,400	6.1	5.01	7.15	11,000	4.81	4,530	226	<0.05	1.09	11.9	321	460	<0.5	0.075	<100	31.3	0.064	0.17	55.9	0.562	15	35.9	2.44
TK-TH100 (Field Duplicate of Sample TK-TH5A)	3,480	0.38	6.87	128	<0.40	<0.10	0.231	19,400	6.3	5.2	7.12	11,600	5.12	4,920	270	<0.05	1.12	12.8	389	469	<0.5	0.077	<100	32.9	0.083	0.16	61.3	0.597	15.8	37.3	2.5
Relative Percent Differeence (RPD)	0%	4%	1%	0%	0%	0%	4%	3%	1%	1%	0%	1%	2%	2%	4%	0%	1%	2%	5%	0%	0%	1%	0%	1%	6%	2%	2%	2%	1%	1%	1%
TK-TH6A	3,960	0.37	7.68	155	<0.40	<0.10	0.261	18,300	7.1	5.53	8.41	13,200	5.8	5,010	298	<0.05	1.22	13.3	383	497	<0.5	0.055	<100	32.6	0.078	0.2	74.2	0.569	17.2	43.8	1.53
TK-TH7A	5,080	0.44	10.6	237	<0.40	<0.10	0.246	11,200	9	6.01	11.6	15,600	7.64	3,520	300	<0.05	1.44	15.5	451	592	0.56	0.075	<100	33.7	0.094	0.23	39.8	0.658	21.9	51.9	1.78
TK-TH8A	5,100	0.43	10.8	239	<0.40	<0.10	0.293	12,000	9.2	6.52	10.5	16,700	11.7	4,150	310	<0.05	1.47	15.7	476	600	<0.5	0.089	<100	31.4	0.098	0.2	38.9	0.636	22.9	53.3	1.47
TK-TH9A	4,010	0.38	8.2	162	<0.40	<0.10	0.24	19,100	7	5.88	8.2	14,300	5.73	4,910	346	<0.05	1.2	14.1	790	472	<0.5	0.062	<100	39.4	0.08	0.19	52.4	0.669	18.3	43.3	2.13
TK-TH101	3,580	0.32	8.67	130	<0.40	<0.10	0.23	15,900	6.4	5.25	7.75	13,600	5.28	4,280	259	<0.05	1.22	13.7	378	451	<0.5	0.072	<100	31.2	0.073	0.15	57.9	0.562	15.5	39	2.37
RPD	3%	4%	1%	5%	0%	0%	1%	5%	2%	3%	1%	1%	2%	3%	7%	0%	0%	1%	18%	1%	0%	4%	0%	6%	2%	6%	2%	4%	4%	3%	3%
TK-TH10A	4,280	0.34	9.32	157	<0.40	<0.10	0.22	16,700	7	5.73	8.69	14,200	6.08	4,670	268	<0.05	1.31	14.1	399	528	<0.5	0.077	<100	31.8	0.085	0.19	61.1	0.607	18.8	42.3	2.41
TK-TH11A	4,450	0.38	9.75	172	<0.40	<0.10	0.222	17,500	7.2	5.96	11	14,200	6.6	5,340	302	<0.05	1.31	14.7	371	539	<0.5	0.08	<100	35.2	0.108	0.21	49.9	0.642	18	44.9	2.06
TK-TH12A	3,710	0.42	9.71	154	<0.40	<0.10	0.253	18,400	6.7	5.32	7.13	12,200	5.64	5,150	249	<0.05	1.16	12.2	362	522	<0.5	<0.05	<100	31.6	0.076	0.19	82.5	0.62	18.6	37.4	2.28
CCME - Canadian Soil Quality Guidelines [2] - Residential / Parkland Land Use																															
TIER I GOVERNING OBJECTIVES GENERIC CRITERIA	-	20	12	500	4	-	10	-	64	50	63	-	140	-	-	6.6	10	50	-	-	1	20	-	-	1 [3]	50	-	23	130	200	-
Tier I Site Specific Criteria (For Pathways Applicable to Site)																															
Human Health Guidelines																															
Soil Ingestion Guideline [4]	-	-	12	NC	-	-	14	-	220	-	1100	-	140	-	-	6.6	-	NC	-	-	80	-	-	-	NC	-	-	23	NC	NC	-
Environmental Health Guidelines																															
Soil Contact Guideline	-	-	17	NC	-	-	10	-	64	-	63	-	300	-	-	12	-	50	-	-	1	-	-	-	1.4	-	-	500	130	200	-
Nutrient and Energy Cycling Check	-	-	NC	NC	-	-	54	-	52	-	350	-	723	-	-	20	-	146	-	-	NC	-	-	-	NC	-	-	NC	255	200	-

Notes:

EQL = Estimated Quantitation Limit = The lowest level of the parameter that can be quantified with confidence.

"-" = No Data

NC = Not Calculated

1. Soil samples obtained on October 5, 2012.
2. CCME - Canadian Council of Ministers of the Environment - Canadian Environmental Quality Guidelines, 1999, Updated 7.0 - 2007. Revised 2009.
3. Provisional guideline (Thallium).
4. Selenium pathway names are from the new protocol (derived in 2006), however, some of the pathway names from the old guideline and the new guideline are interchangeable. Use old pathway names instead of the new ones because all of the inorganics with the exception of Selenium use the old guideline pathway names. The interchangeable pathway names are as follow:

Old Guideline	New Guideline
Soil Ingestion Guideline	Direct contact (SQG_{DH})
Inhalation of Indoor Air Check	Protection of Indoor Air Quality (Basement)
	Protection of Indoor Air Quality (Slab-on-Grade)
Groundwater Check (Drinking Water)	Protection of Potable Water
Groundwater Check (Aquatic Life)	Protection of Freshwater Life

- Exceedance of Tier I Generic Criteria

BOLD - Exceedance of Tier I Site Specific Criteria

TABLE 7
LEAD PAINT SAMPLING
TUKTOYAKTUK LAB & STORAGE
TUKTOYAKTUK, NWT

Sample ID [1]	Location	Paint Source	Colour	Lead Laboratory Results [2,3] (mg/kg)	Condition
RDL				***2.0***	
TK-LP-1	Exterior Garage Door (east)	Wood	Blue	997	Poor
TK-LP-2	Exterior Man Door (south)	Wood	Beige	1,330	Poor
TK-LP-3	Interior Plywood Walls (west)	Plywood	White	305	Moderate
TK-LP-4	Interior Wooden Floor (boiler room - north)	Wood	Dark Blue	361	Poor
TK-LP-5	Exterior-Skid Shed (north of building)	Wood	Yellow	14,800	Poor
TK-LP-6	Exterior-Fibreglass Holding Tank (north of building)	Fibreglass	Green	13.3	Moderate
TK-LP-7	Exterior Wooden Sampling Box in Fenced-In Area west of building	Wood	Dark Blue	52.1	Poor
TK-LP-8	Exterior Wooden Sampling Box in Fenced-In Area west of building	Wood	Medium Blue	50.1	Poor
TK-LP-9	Exterior Wooden Sampling Box in Fenced-In Area west of building	Wood	Light Blue	1,310	Poor

Notes:
RDL = Reportable Detection Limits

1. Samples obtained on October 5, 2012
2. Laboratory detection limit for Lead is 2.0 mg/kg (2.0 ppm).
3. Minimum concentration of lead in paint to be considered lead-based is 600 ppm (0.06%) under the Northwest Territories *Environmental Protection Act* .

- Lead-based paint

TABLE 8
BULK ASBESTOS CONTENT
TUKTOYAKTUK LAB AND STORAGE, NWT
TUKTOYAKTUK, NWT

Sample ID [1]	Sample Description	Analysis Type [2]	Source	Bulk Asbestos Content / Sample Location [3]												
				Asbestos Type						Asbestos Content	Other Content					
				Actinolite	Amosite	Anthophylilite	Chrysotile	Crocidolite	Tremolite		Cellulose	Glass Fibres	Cellulose and Glass	Hair	Filler	Filler and Tar
										0.50%	0.50%	0.50%	0.50%		0.50%	0.50%
TK-ACM-2	Brown Fibrous Mix	PLM	Roll of Pipe Lagging (interior)	ND	ND	ND	ND	ND	ND	<0.5	>99	ND	>99	ND	ND	ND

Sample ID [1]	Lab ID	Sample Description	Analysis Type [2]	Source	Asbestos Identification	Total Asbestos (%)
TK-ACM-1	A1210116-001A	Beige floor tile	TEM	Vinyl floor tile	Chrysotile	3.5
TK-ACM-1	A1210116-001B	Yellow mastic	TEM	Vinyl floor tile	Chrysotile	5.5
TK-ACM-3	A1210116-002A	Grey fibrous material	TEM	Vinyl floor in boiler room	Chrysotile	23
TK-ACM-3	A1210116-002B	White resinous material	TEM	Vinyl floor in boiler room	Chrysotile	3.1
TK-ACM-3	A1210116-002C	Yellow mastic	TEM	Vinyl floor in boiler room	Chrysotile	4.5

Notes:
ND = Not detected
1. Samples obtained on October 5, 2012
2. Bulk asbestos content expressed as a percentage (%) volume fibre found/submitted (%vol/vol).
3. All samples analyzed via Polarized Light Microscopy (PLM), except for floor tiles / linoleum which were analyzed via Transmission Electron Microscopy (TEM).

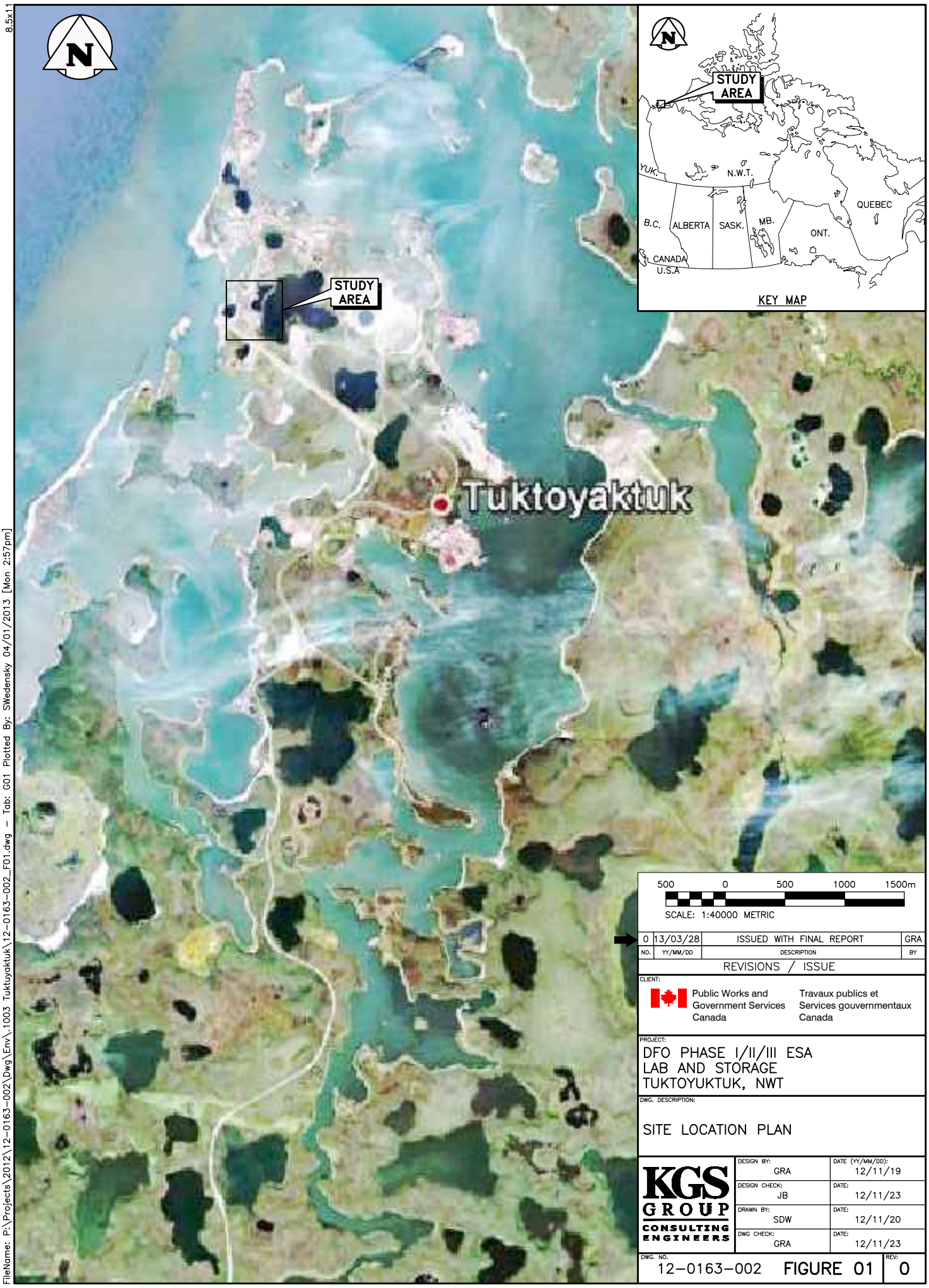
- Asbestos-Containing Material (ACM)

TABLE 9
GRAIN SIZE ANALYSIS
TUKTOYAKTUK LAB AND STORAGE
TUKTOYAKTUK, NWT

Sample ID [1]	Particle Size		
	Sieve- % Coarse (>0.075 mm)	Sieve- % Fine (<0.075mm)	Grain Size
	%	%	
TK-TH2B	85.84	14.16	COARSE
TK-TH9A	91.26	8.74	COARSE
RDL	*0.01*	*0.01*	

Notes:
RDL = Reportable Detection Limit
1. Samples obtained on October 5, 2012.

FIGURES



NO.	YY/MM/DD	DESCRIPTION	BY
0	13/03/28	ISSUED WITH FINAL REPORT	GRA

REVISIONS / ISSUE

CLIENT:

Public Works and Government Services Canada

Travaux publics et Services gouvernmentaux Canada

PROJECT:

DFO PHASE I/II/III ESA
LAB AND STORAGE
TUKTOYUKTUK, NWT

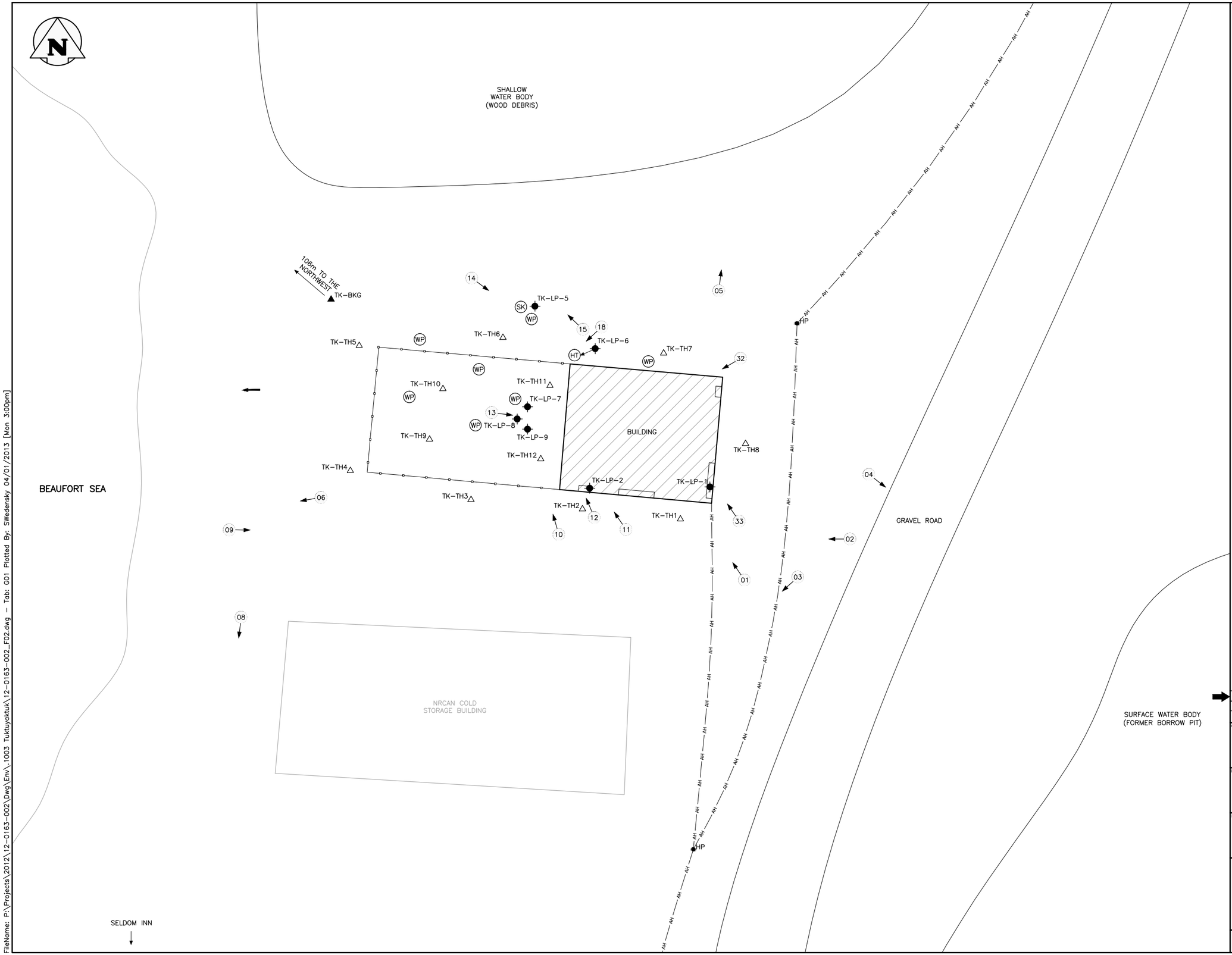
DWG. DESCRIPTION:

SITE LOCATION PLAN

KGS GROUP CONSULTING ENGINEERS

DESIGN BY:	GRA	DATE (YY/MM/DD):	12/11/19
DESIGN CHECK:	JB	DATE:	12/11/23
DRAWN BY:	SDW	DATE:	12/11/20
DWG CHECK:	GRA	DATE:	12/11/23

DWG. NO. 12-0163-002 FIGURE 01 REV: 0



LEGEND:

- WP — WASTE PILE/DEBRIS
- HT — FIBREGLASS HOLDING TANK
- SK — SKID SHED
- HP — HYDRO POLE
- 01 — PHOTOGRAPH LOCATIONS
- SURFACE WATER DRAINAGE DIRECTION
- ON-SITE BUILDING
- CHAIN LINK FENCE
- AH — AH — OVERHEAD POWER LINES
- TK-LP-1 — EXTERIOR PAINT SAMPLE LOCATIONS
- TK-TH12 — BACKGROUND SURFICIAL SOIL SAMPLES
- TK-TH3 — SURFICIAL SOIL SAMPLE LOCATIONS

NOTES:

1. TWO SOIL SAMPLES COLLECTED FROM EACH TESTHOLE LOCATION. ONE SAMPLE FROM SHALLOW DEPTH (TK-TH3A) AND ONE SAMPLE FROM A DEEPER DEPTH (TK-TH3B).

5 0 5 10m

SCALE: 1:300 METRIC

NO.	YY/MM/DD	DESCRIPTION	BY
0	13/03/28	ISSUED WITH FINAL REPORT	GRA

REVISIONS / ISSUE

CLIENT:
Public Works and Government Services Canada
Travaux publics et Services gouvernmentaux Canada

PROJECT:
DFO PHASE I/II/III ESA
LAB AND STORAGE
TUKTOYUKTUK, NWT

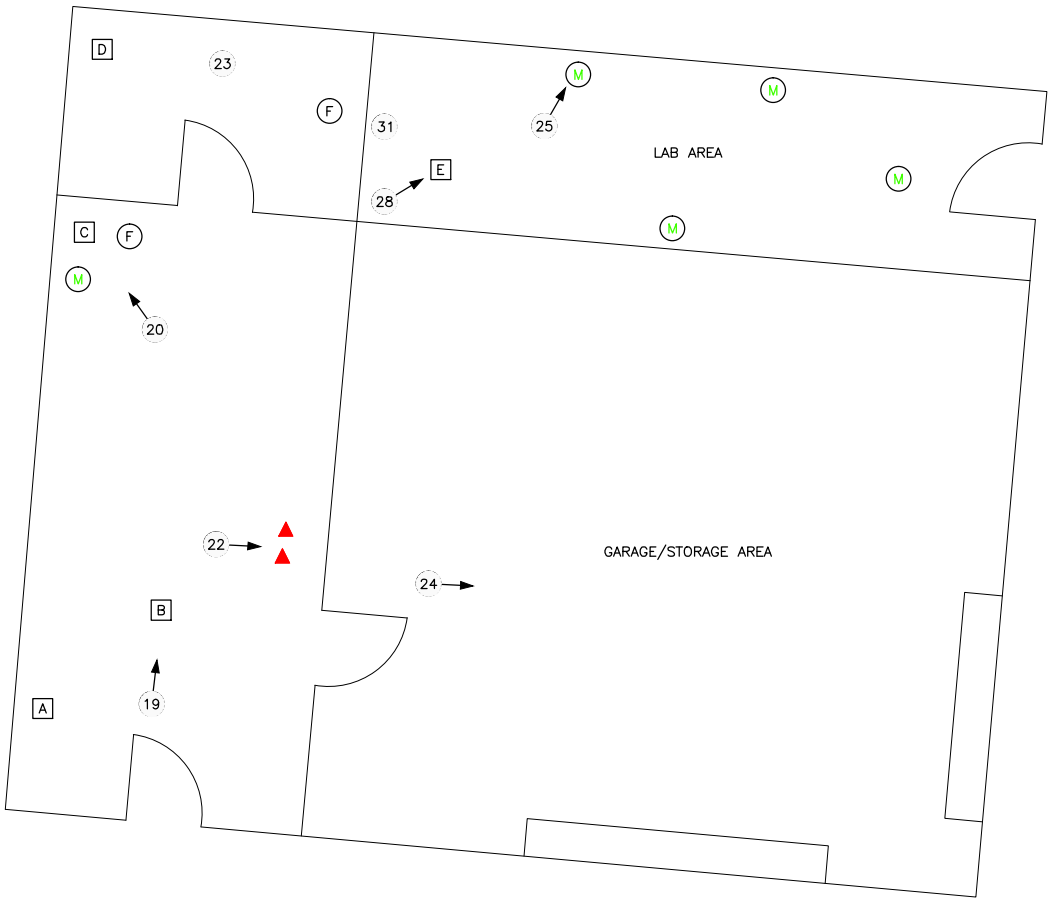
DWG. DESCRIPTION:
DETAILED SITE PLAN

KGS GROUP CONSULTING ENGINEERS

DESIGN BY:	GRA	DATE (YY/MM/DD):	12/11/19
DESIGN CHECK:	JB	DATE:	12/11/23
DRAWN BY:	SDW	DATE:	12/11/20
DWG CHECK:	BMH	DATE:	12/11/23

DWG. NO. 12-0163-002 FIGURE 02 REV: 0

FileName: P:\Projects\2012\12-0163-002\Dwg\Env\.1003 Tuktuyaktuk\12-0163-002_F02.dwg — Tab: G01 Plotted By: SWedensky 04/01/2013 [Mon 3:00pm]



2.5 0 2.5 5.0 7.5m

SCALE: 1:200 METRIC

NO.	YY/MM/DD	DESCRIPTION	BY
0	13/03/28	ISSUED WITH FINAL REPORT	GRA

REVISIONS / ISSUE

CLIENT:

Public Works and Government Services Canada

Travaux publics et Services gouvernmentaux Canada

PROJECT:

DFO PHASE I/II/III ESA
LAB AND STORAGE
TUKTOYUKTUK, NWT

DWG. DESCRIPTION:

DETAILED SITE PLAN
INTERIOR OF BUILDING

LEGEND:

- HAZARDOUS MATERIALS
- 01 PHOTOGRAPH LOCATION
- DOORWAY
- M DOORWAY
- F DEAD FLIES

SAMPLE LOCATION LEGEND:

- A TK-ACM-1 (FLOOR)
- B TK-ACM-2 (LAGGING)
- C TK-LP-3 (WALL)
- D TK-LP-4 (FLOOR)
- E TK-ACM-3 (FLOOR)

KGS GROUP CONSULTING ENGINEERS

DESIGN BY:	GRA	DATE (YY/MM/DD):	12/12/19
DESIGN CHECK:	JB	DATE:	12/12/23
DRAWN BY:	SDW	DATE:	12/12/20
DWG CHECK:	BMH	DATE:	12/12/23

DWG. NO. 12-0163-002 FIGURE 03 REV: 0

APPENDICES

APPENDIX A

SITE PHOTOGRAPHIC LOG

SITE PHOTOGRAPHIC LOG
Phase I/II/III Environmental Site Assessment
Tuktoyaktuk Lab and Storage, NWT

Photo 1. Looking west at on-site building including view of overhead power lines and sample locations TK-TH8 (east of garage door) and TK-TH-LP-1 (garage door).

Photo 2. Looking west between on-site building and NRCAN Cold Storage Building. Includes view of Beaufort Sea to the west. Location of samples TK-TH1 to TK-TH4 along south perimeter of building.

Photo 3. Adjacent property to the south, NRCAN Cold Storage Building. Further to the south-southwest is Hamlet property (garage) including aboveground storage tanks (ASTs).

Photo 4. Adjacent property to the east, community road followed by surface water body (former borrow pit).

Photo 5. View of north adjacent property, shallow pit with wood debris. Residential dwellings located further to the north.

Photo 6. West adjacent property, vacant land followed by Beaufort Sea.

SITE PHOTOGRAPHIC LOG
Phase I/II/III Environmental Site Assessment
Tuktoyaktuk Lab and Storage, NWT

Photo 7. Looking further to the south-southeast towards Hamlet property (garage), including transformers on hydropoles and ASTs.

Photo 8. View of property further to the south-southwest, former Seldom Inn (NRCAN property). View of Beaufort Sea.

Photo 9. Looking east at the subject property and NRCAN Cold Storage Building.

Photo 10. Looking north at fenced-in area at subject property located immediately west of on-site building. Location of soil samples TK-TH9 to TK-TH12 inside fenced-in area.

Photo 11. Looking north into the subject building. Note absence of the door (sample location TK-LP-2).

Photo 12. Close up view of missing door on the north side of the building.

SITE PHOTOGRAPHIC LOG
Phase I/II/III Environmental Site Assessment
Tuktoyaktuk Lab and Storage, NWT

Photo 13. View of various wooden sample boxes located within fenced-in area west of the on-site building. Sample locations TK-LP-7 to TK-LP-9.

Photo 14. View of old skid shed and other debris on the south side of the subject building, looking east-southeast. Sample locations TK-LP-5 (skid shed) and TK-TH6 and TK-TH7 (soil).

Photo 15. Looking west towards old skid shed (sample TK-LP-5) and debris at the subject property, north of building.

Photo 16. Looking north from the southeast corner of subject property including view of overhead lines. Sample location TK-TH8 adjacent to building.

Photo 17. Close up view of skid shed located north of the on-site building. Sample location TK-LP-5.

Photo 18. View of green fiberglass holding tank on south side of the subject building (Sample TK-LP-6).

SITE PHOTOGRAPHIC LOG
Phase I/II/III Environmental Site Assessment
Tuktoyaktuk Lab and Storage, NWT

Photo 19. Interior view of the subject building, looking north. View of floor linoleum (Sample TK-ACM-1) and lagging (Sample TK-ACM-2).

Photo 20. Interior view of the subject building looking north (sample location TK-LP-3). Large amounts of dead flies on the floor inside the subject building.

Photo 21. View of mould on wall inside subject building.

Photo 22. View of hazardous materials on shelf inside subject building (small quantities).

Photo 23. View of two types of flooring inside subject building. Samples TK-ACM-3 (beige vinyl flooring) and TK-LP-4 (dark blue paint on wooden flooring).

Photo 24. Interior view of garage portion of the subject building, east side of building.

SITE PHOTOGRAPHIC LOG
Phase I/II/III Environmental Site Assessment
Tuktoyaktuk Lab and Storage, NWT

Photo 25. View of floor linoleum inside subject building (Sample TK-ACM-3) and mould on cabinets.

Photo 26. View of laboratory area inside subject building.

Photo 27. Close up view of mould on cabinets inside subject building (laboratory area).

Photo 28. Close up view of dead flies, general debris and floor linoleum (Sample TK-ACM-3).

Photo 29. Close up view of mould on the wall inside the subject building.

Photo 30. View of debris inside subject building including pipe lagging (Sample TK-ACM-2) and general debris.

SITE PHOTOGRAPHIC LOG
Phase I/II/III Environmental Site Assessment
Tuktoyaktuk Lab and Storage, NWT

Photo 31. View of two types of flooring inside subject building. Samples TK-ACM-3 (beige vinyl flooring) and TK-LP-4 (dark blue paint on wooden flooring).

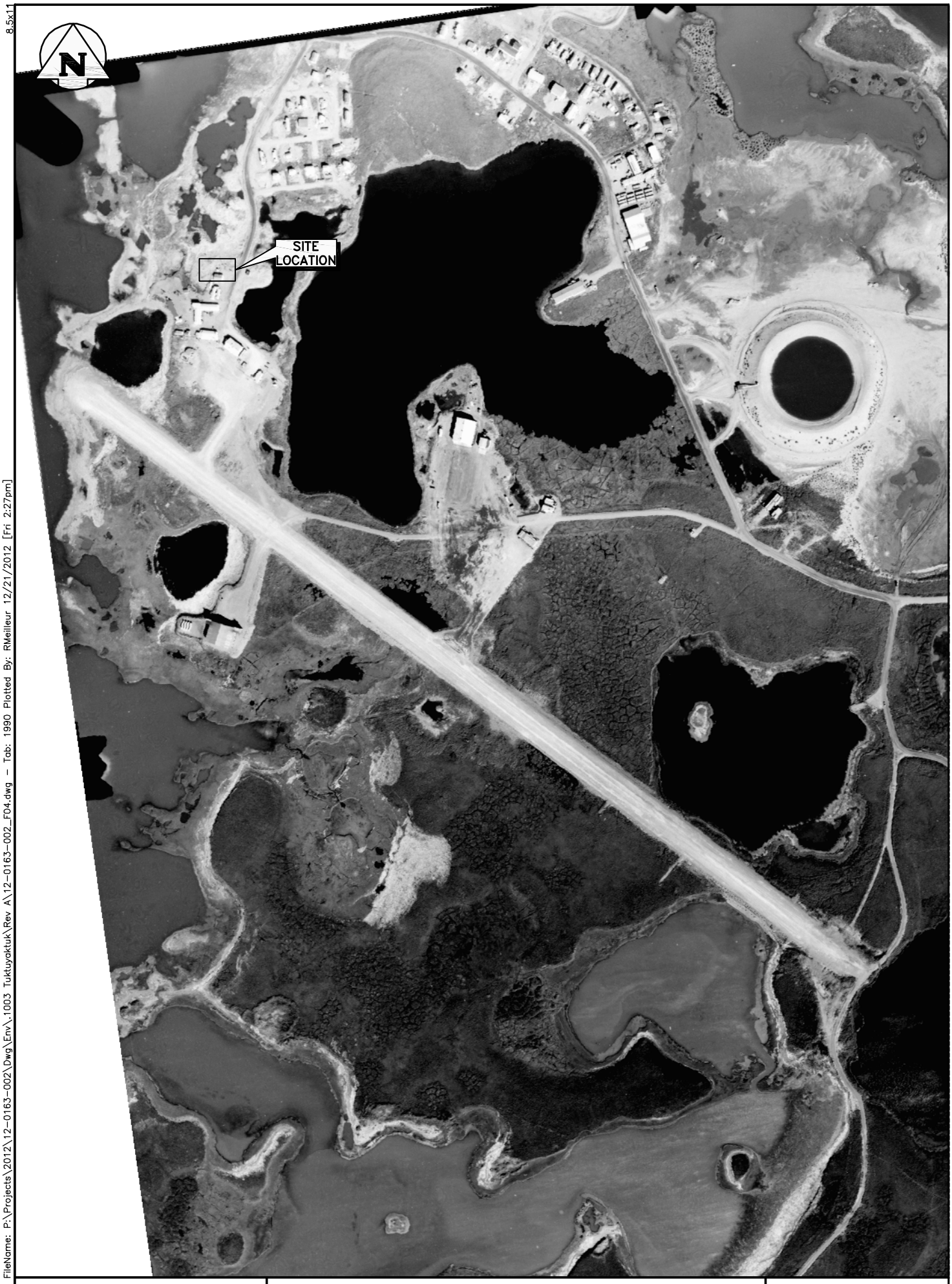
Photo 32. Looking at the south side of the subject building, including debris.

Photo 33. Looking west at on-site building and location of samples TK-LP-1 (garage door) and TK-TH8 (soil).

APPENDIX B

AERIAL PHOTOGRAPHS

1985 AERIAL PHOTO | TUKTOYUKTUK, NWT | SCALE 1:8000



1990 AERIAL PHOTO | TUKTOYUKTUK, NWT | SCALE 1:8000

2011 AERIAL PHOTO | TUKTOYUKTUK, NWT | SCALE 1:8000

APPENDIX C

GNWT LAND TITLES – COPY OF TITLE

Land Titles Act

Certificate of Search

NORTHWEST TERRITORIES
REGISTRATION DISTRICT

Northwest Territories

Loi sur les titres de bien-fonds

Certificat de Recherche

CIRCONSCRIPTION D'ENREGISTREMENT DES TERRITOIRES DU NORD-OUEST

THIS IS TO CERTIFY that

LES PRÉSENTES ATTESTENT *que*

on *le* 2012-12-03 at *à* 09:00 **hours,** ***heures,***

a certificate of title is **NOT** issued for the following lands:

*un certificat de titre n'a **PAS** été délivré pour les biens-fonds jamais concédés qui suivent:*

LOT 1
BLOCK 46
PLAN 3496
TUKTOYAKTUK

and that no documents or instruments are filed or registered in respect of these lands, except the following:

et qu'aucun document ou acte n'a été déposé ou enregistré relativement à ces biens-fonds, à l'exception de ce qui suit:

D/REGISTRAR
REGISTRATEUR

NORTHWEST TERRITORIES REGISTRATION DISTRICT
CIRCONSCRIPTION D'ENREGISTREMENT DES TERRITOIRES DU NORD-QUEST

RECEIVED TIME DEC. 4. 11:57AM PRINT TIME DEC. 4. 12:01PM

ORIGINAL
ORIGINALE

NO. EDMONTON 3152
NO

DEPARTMENT OF TRANSPORT
MINISTÈRE DES TRANSPORTS

INTER-DEPARTMENTAL AGREEMENT

B E T W E E N

THE MINISTER OF TRANSPORT

- and -

THE MINISTER OF ENERGY MINES AND RESOURCES

Date of Agreement	
Public Work Concerned	Tuktoyaktuk, N.W.T.
Lands or rights demised	22 970 m^2 (247,255 sq. ft.), more or less, of land comprised in the Tuktoyaktuk Airport, at Tuktoyaktuk, N.W.T.; as a site for Energy Mines and Resources' Polar Continental Shelf Project.
Beginning of term	September 1, 1986
End of term	Year to year, not to exceed 5 years
Rental	$1.00 per annum

DEPARTMENTAL REFERENCE

RÉFÉRENCE DU MINISTÈRE

FILE NO. 5156-S150 (SKC)

DOSSIER NO

MEMORANDA

NOTES

INTER-DEPARTMENTAL AGREEMENT dated this day of 1987, respecting the occupation and use of a certain parcel of land comprised in the Tuktoyaktuk Airport Northwest Territories.

SINCE the Minister of Transport ("Transport") has the management, charge and direction of the Tuktoyaktuk Airport ("airport") and;

SINCE the Minister of Energy Mines and Resources ("Energy Mines and Resources") wishes to occupy and use twenty-two thousand nine hundred and seventy square metres (22 970 m^2) (247,255 square feet), more or less, of land (hereinafter called "land") on the airport and on the location indicated on Drawing No. W150W007N002 dated September 24, 1986 annexed hereto, as a site for Energy Mines and Resources' Polar Continental Shelf Project, including twelve buildings, four of which are being used as living quarters for project related activities and parking area for vehicles aircraft and equipment hereinafter called "base".

GENERAL Tuktoyaktuk, N.W.T. serves as a location for a Polar Continental Shelf Project. Control and administration of this project is vested with the Department of Energy Mines and Resources. The mission of Polar Continental Shelf Project is to provide scientific, technical and managerial advice and services to clients through a coordinated, integrated, multi-disciplinary program at the base in Tuktoyaktuk.

THEREFORE Transport and Energy Mines and Resources by this Memorandum of Understanding (hereinafter called "Agreement") wish to establish the following administrative procedures respecting the occupation and use of the land.

1. Energy Mines and Resources will:

(a) transfer to Transport for the use of the land by Interdepartmental Settlement Advice, invariably in advance, the amount of $1.00 per annum, for the land, commencing on the first day of September, 1986;

(b) maintain the base in a neat, clean and tenantable condition;

(c) abide by and comply with all regulations regarding fire precaution and sanitation;

(d) abide by and comply with airport security, traffic and other regulations relative to the management and operation of the airport;

(e) permit the employees, agents and nominees of Transport at all times and for all purposes to have full and free access to any and every part of the land;

(f) not construct or erect any buildings or other structures on the land without obtaining the approval of Transport, of plans showing the proposed location, the design and nature of construction of such buildings and structures;

(g) provide Transport all available design, construction and survey records pertaining to existing buildings, structures and land;

(h) not conduct any business or undertaking on the airport which would violate any provision of the Government Airport Concession Operations Regulations, without the authority in writing of Transport;

(i) not discharge, cause or permit to be discharged or howsoever to pass into the sewer systems, storm drains or surface drainage facilities at the airport or to the adjoining body of water or elsewhere any deleterious material, noxious, contaminated or poisonous substances, all as determined by Transport Canada whose decision shall be final;

(j) maintain the land in a neat and tidy condition to the satisfaction of the Airport Manager of the airport;

(k) ensure that no erosion of the shoreline at hi-watermark is caused as a result of base related activities, all to the satisfaction of the Airport Manager of the airport;

(l) be responsible for the disposal of all garbage in a manner acceptable to the Airport Manager of the airport;

(m) make its own arrangements for the supply of all utility services at its own cost and expense and in a manner satisfactory to Transport;

(n) be responsible for fire protection and policing;

(o) be responsible at its own cost and expense for any addition to Transport's taxiway system at the airport should this type of construction be required to make the land more operationally effective and it is mutually agreed to between Transport and Energy Mines and Resources;

(p) construct improvements on the land in such manner that the surface drainage water on the land will be discharged into Transport's drainage system or in to the adjoining body of water. Plans for the construction of storm drainage services shall be subject to the approval in writing, of the Regional Director General, Airports Authority Group, Transport Canada, Edmonton, Alberta, prior to installation of such services, for compatibility with the field drainage channels serving the land, all at the cost and expense of Energy Mines and Resources;

(q) in the event that Transport at any time expands the apron or any other facilities it is understood that Energy Mines and Resources may be required to relinquish lands covered by this agreement all subject to mutual acceptance by Transport and Energy, Mines and Resources;

(r) ensure that Energy Mines and Resources prepare and sign a Memorandum of Understanding with Fisheries & Oceans whereby Fisheries & Oceans will abide by and comply with all the terms and conditions set out in this Agreement. In the event of dispute Transport's decision will be final;

(s) if required by Transport, provide grease, oil and sand interceptors. All interceptors shall be of a type and capacity approved by Transport and shall be readily accessible for cleaning and inspection. Such interceptors shall be maintained by Energy Mines and Resources, at its expense, in continuous, efficient operation at all times.

2. Transport will:

(a) permit Energy Mines and Resources to operate vehicles and equipment on aircraft movement areas subject to issuance of Airside Vehicle Operator Permits land further making reference to clause 1(d) and covenants thereof;

(b) permit Energy Mines and Resources to allow Department of Fisheries and Oceans to occupy certain portion of the lands covered by this agreement as shown on Drawing No. W150W007N002, annexed hereto.

3. Transport and Energy Mines and Resources intend that this Agreement shall be for a term or period of one (1) year, commencing on the first day of September, 1986, and thereafter from year to year, but in no event to exceed five (5) years, but if either Energy Mines and Resources wish to terminate the Agreement, they shall give to the other sixty (60) days' notice in writing and on the expiration of the period of notification this Agreement shall be ended.

4. In the event of termination of this Agreement Energy Mines and Resources will, if required by Transport, forthwith remove from the land, the buildings and all supplies, articles, equipment, materials, effects and things at any time brought or placed thereon during the duration of the Agreement, and will also to the satisfaction of Transport repair all and every damage or injury occasioned to the land by reason of such removal or performance thereof, but Energy Mines and Resources will not, by reason of any action taken or things performed or required under this paragraph be entitled to any accounting therefor.

SIGNED, on behalf of Transport in the presence of-) for Minister of Transport

SIGNED, on behalf of Energy Mines and Resources in the presence of-) for Minister of Energy Mines and Resources

Energy, Mines and Resources Canada
Ottawa, Ontario
K1A 0E4

Énergie, Mines et Ressources Canada
Ottawa (Ontario)
K1A 0E4

508

March 12, 1987

Your file Votre référence

Our file Notre référence

MAR 19 1987

FISHERIES & OCEANS
MAR 13 1995
BOX 1871
INUVIK N.W.T.

MAR 25 1987

Dr. Paul Sutherland
Director-General
Central & Arctic Region
Fisheries & Oceans
Freshwater Institute
501 University Crescent
Winnipeg, Manitoba
R3T 2N6

Dear Dr. Sutherland:

We are in the process of signing an agreement with the Ministry of Transport for the lease of the land that we have been occupying at the Tuktoyaktuk Airport since 1968. I started negotiations on this lease in 1976 and it is finally coming to fruition. An unsigned copy of the agreement is attached to this letter.

You will note in the MOT/EM&R agreement that DFO is mentioned. This comes about, of course, because the Freshwater Institute has buildings on the property that will be leased to PCSP. There is now a requirement that we have an agreement between Freshwater Institute and PCSP as requested by MOT. I enclose a draft copy of an agreement for your consideration and request that you might wish to review this document in association with those of your staff who are responsible for the maintenance and use of the buildings at TUK. I would appreciate receiving your comments before we put it into final form for signature. Incidentally, at what level would this document be signed in your department?

I trust that you will not have too many problems with this request and that we will be able to live together amicably on the present airport site at TUK. It is also my fondest hope that we will never have to move our buildings from that location.

Very truly yours,

G.D. Hobson
Director
Polar Continental Shelf Project

880 Wellington St.
Ottawa, K1A 0E4

Canada

Jeff Stein handling.

"MEMORANDUM OF UNDERSTANDING ON TUKTOYAKTUK AIRPORT"

BETWEEN: The Department of Energy, Mines and Resources represented by the Minister of Energy, Mines and Resources or any of its authorized officials.

AND: The Department of Fisheries and Oceans represented by the Minister of Fisheries and Oceans or any of its authorized officials.

SINCE the Minister of Transport ("Transport") has the management, charge and direction of the Tuktoyaktuk Airport ("airport") and;

SINCE the Minister of Energy, Mines and Resources ("Energy, Mines and Resources"), under a Memorandum of Understanding with Transport, occupies and uses twenty-two thousand, nine hundred and seventy square metres (22 970 m^2) (247,255 square feet), more or less, of land (hereinafter called "land") on the airport and on the location indicated on Drawing No. W150W007N002 dated September 24, 1986, as a site for Energy, Mines and Resources' Polar Continental Shelf Project, including buildings which are being used as living quarters for project-related activities and parking area for vehicles, aircraft and equipment hereinafter called "base", and;

SINCE the Minister of Fisheries and Oceans ("Fisheries and Oceans") wishes to occupy and use area W15 set out on the above Drawing No. W150W007N002 as a site for Freshwater Institute (Winnipeg) operations in the Beaufort Sea area including buildings which are used as living quarters and laboratories for related activities.

GENERAL Tuktoyaktuk, N.W.T. serves as a location for a Polar Continental Shelf Project. Control and administration of this Project is vested with the Department of Energy, Mines and Resources. The mission of the Polar Continental Shelf Project is to provide scientific, technical and managerial advice and services to clients through a coordinated, integrated, multi-disciplinary program at the base in Tuktoyaktuk.

GENERAL Tuktoyaktuk, N.W.T. serves as a research location for the Freshwater Institute, Winnipeg, Fisheries and Oceans. The objective of this sub-Activitiy is to perform, promote and assist research in the conservation, increase and use of aquatic renewable resources and on the biological productivity of the aquatic environment.

THEREFORE, the Parties wish to establish the following administrative procedures respecting the occupation and use of the land.

1. Fisheries and Oceans will:

(a) maintain the base in a neat, clean and tenantable condition;

(b) abide by and comply with all regulations regarding fire precaution and sanitation;

(c) abide by and comply with airport security, traffic and other regulations relative to the management and operation of the airport;

(d) permit the employees, agents and nominees of Transport at all times and for all purposes to have full and free access to any and every part of the land;

(e) not construct or erect any buildings or other structures on the land without obtaining the approval of Transport, of plans showing the proposed location, the design and nature of construction of such buildings and structures;

(f) provide Transport all available design, construction and survey records pertaining to existing buildings, structures and land;

(g) not conduct any business or undertaking on the airport which would violate any provision of the Government Airport Concession Operating Regulations, without the authority in writing of Transport;

(h) not discharge, cause or permit to be discharged or howsoever to pass into the sewer systems, storm drains or surface drainage facilities at the airport or to the adjoining body of water or elsewhere any deleterious material, noxious, contaminated or poisonous substances, all as determined by Transport Canada whose decision shall be final;

(i) maintain the land in a neat and tidy condition to the satisfaction of the Airport Manager of the airport;

(j) ensure that no erosion of the shoreline at hi-watermark is caused as a result of base related activities, all to the satisfaction of the Airport Manager of the airport;

(k) be responsible for the disposal of all garbage in a manner acceptable to the Airport Manager of the airport;

(l) make its own arrangements for the supply of all utility services at its own cost and expense and in a manner satisfactory to Transport;

(m) be responsible for fire protection and policing;

(n) be responsible at its own cost and expense for any addition to Transport's taxiway system at the airport should this type of construction be required to make the land more operationally effective and it is mutually agreed to between Transport, Energy, Mines and Resources and Fisheries and Oceans;

(o) construct improvements on the land in such manner that the surface drainage water on the land will be discharged into Transport's drainage system or into the adjoining body of water.

Plans for the construction of storm drainage services shall be subject to the approval in writing, of the Regional Director General, Airports Authority Group, Transport Canada, Edmonton, Alberta, prior to installation of such services, for compatibility with the field drainage channels serving the land, all at the cost and expense of Fisheries and Oceans;

(p) if required by Transport, provide grease, oil and sand interceptors. All interceptors shall be of a type and capacity approved by Transport, and shall be readily accessible for cleaning and inspection. Such interceptors shall be maintained by Fisheries and Oceans, at its expense, in continuous, efficient operation at all times;

(q) if required by Transport, to pay to Transport, an airport maintenance charge applicable to serviced land on the airport at rates as determined by Transport from time to time, payments to be made upon receipt of accounts thereof. These charges are levied per square foot of land occupied and, in 1987, Transport has affirmed that these charges do not apply.

2. Energy, Mines and Resources will:

(a) transfer to Transport, for the use of the land by Interdepartmental Settlement Advice, invariably in advance, the amount of $1.00 per annum, for the land, commencing on the first day of September 1986 and, in addition, Energy, Mines and Resources will pay to Transport, an airport maintenance charge applicable to serviced land on the airport at rates as determined by Transport from time to time, payments to be made upon receipt of accounts thereof;

(b) in the event that Transport at any time expands the apron or any other facilities it is understood that Energy, Mines and Resources may be required to relinquish lands covered by this agreement all subject to mutual acceptance by Transport and Energy, Mines and Resources;

3. In the event where Fisheries and Oceans does not abide by and comply with any of the provisions contained in this M.O.U., Transport will be authorized to apply any of the remedies provided for in the M.O.U. between Energy, Mines & Resources and Transport signed on _____ (copy attached). Transport's decision will be final.

4. Transport and Energy, Mines and Resources intend that their M.O.U. shall be for a term or period of one (1) year, commencing on the first day of September 1986, and thereafter from year to year, but in no event to exceed five (5) years, but if either Energy, Mines and Resources or Transport wish to terminate the M.O.U., they will give to the other 60 day's notice in writing and on the expiration of the period of notification this M.O.U. shall be ended.

5. In the event of termination of this M.O.U., Energy, Mines and Resources shall, if required by Transport, forthwith remove from the land, the buildings and all supplies, articles, equipment, materials, effects and things at any time brought or placed thereon during the duration of the M.O.U., and will also to the satisfaction of Transport repair all and every damage or injury occasioned to the land by reason of such removal or performance thereof, but Energy, Mines and Resources will not, by reason of any action taken or things performed or required under this paragraph, be entitled to any accounting thereof.

SIGNED, on behalf of Energy, Mines and Resources in the present of -)
)
)
)
) for Minister of Energy, Mines and Resources

SIGNED, on behalf of Fisheries and Oceans in the presence of -)
)
)
)
) for Minister of Fisheries and Oceans

APPENDIX D

ERIS ECOLOG REPORT

Canada's Primary Environmental Risk Information Service

Project Site:	**Phase I/II/III ESA** **n/a** **Tuktoyaktuk, NT**
Client:	**Ganga Atmuri** **Kgs Group** **3Rd Floor - 865 Waverley Street** **Winnipeg, MB R3T5P4**
ERIS Project No:	**20121122047**
Report Type:	**Standard Report - .25km Search Radius**
Prepared By:	**Elizabeth Dokurno** edokurno@eris.ca
Date:	**December 03, 2012**

Table of Contents

Order Number: 20121122047
Site Name: Phase I/II/III ESA
Site Address: n/a Tuktoyaktuk, NT
Report Type: Standard Report, 0.25 km Search Radius

	Section
Report Summary *This outlines the number of records from each database that fall on the site, and within various distances from the site.*	i
Site Diagram *The records that were found within a specified distance from the project property (the primary search radius) have been plotted on a diagram to provide you with a visual representation of the information available. Sites will be plotted on the diagram if there is sufficient information from the database source to determine accurate geographic coordinates. Each plotted site is marked with an acronym identifying the database in which the record was found (i.e., WDS for Waste Disposal Sites). These are referred to as "Map Keys". A variety of problems are inherent when attempting to associate various government or private source records with locations. EcoLog ERIS has attempted to make the best fit possible between the available data and their positions on the site diagram.*	ii
Site Profile *This table describes the records that relate directly to the property that is being researched.*	iii
Detail Report *This section represents information, by database, for the records found within the primary search radius. Listed at the end of each database are the sites that could not be plotted on the locator diagram because of insufficient address information. These records will not have map keys. They have been included because they may be found to be relevant during a more detailed investigation.*	iv

	Page
Contaminated Sites on Federal Land	1

Appendix: Database Descriptions

Report Summary

Order Number: 20121122047
Site Name: Phase I/II/III ESA
Site Address: n/a Tuktoyaktuk, NT
Report Type: Standard Report, 0.25 km Search Radius

Number of Mappable Records Surrounding the Site

Database		Selected	On-site	Within 0.25	0.25km to 2.00km	Total
AUWR	Automobile Wrecking & Supplies	Y	0	0	0	0
CFST	Crown Land Fuel Storage Tanks	N	0	0	0	0
CHEM	Chemical Register	Y	0	0	0	0
EHS	ERIS Historical Searches	Y	0	0	2	2
EIIS	Environmental Issues Information System	Y	0	0	0	0
FCON	Federal Convictions	Y	0	0	0	0
FCS	Contaminated Sites on Federal Land	Y	0	1	5	6
IAFT	Indian & Northern Affairs Fuel Tanks	Y	0	0	0	0
MINE	Canadian Mine Locations	Y	0	0	0	0
MNR	Mineral Occurrences	N	0	0	0	0
NATE	National Analysis of Trends in Emergencies System (NATES)	Y	0	0	0	0
NDFT	National Defence & Canadian Forces Fuel Storage Tanks	Y	0	0	0	0
NDSP	National Defence & Canadian Forces Spills	Y	0	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	Y	0	0	0	0
NEBW	National Energy Board Wells	Y	0	0	0	0
NEES	National Environmental Emergencies System (NEES)	Y	0	0	0	0
NOGW	Northwest Territories Oil and Gas Wells	N	0	0	0	0
NPCB	National PCB Inventory	Y	0	0	0	0
NPRI	National Pollutant Release Inventory	Y	0	0	0	0
OGW	Oil and Gas Wells	Y	0	0	0	0
PCFT	Parks Canada Fuel Storage Tanks	Y	0	0	0	0
RST	Retail Fuel Storage Tanks	Y	0	0	0	0
SCT	Scott's Manufacturing Directory	Y	0	0	0	0
SPL	Spills	N	0	0	1	1
WWIS	Water Well Information System	N	0	0	0	0
		TOTAL	0	1	8	9

The databases chosen by the client as per the submitted order form are denoted in the 'Selected' column in the above table. Counts have been provided outside the primary buffer area for cursory examination only. These records have not been examined or verified, therefore, they are subject to change.

SITE DIAGRAM

ECOLOG ERIS
Pinpointing Your Environmental Risks
80 Valleybrook Dr, Toronto, ON M3B 2S9
416-510-5204

Project Property: Phase I/II/III ESA
n/a
Tuktoyaktuk, NT

ERIS Project #: 20121122047

Date: DEC-03-2012

LEGEND

- Project Property
- Database Location

Points of Interest
- Chimney
- Silo

Pipe & Transmission Lines
- Pipeline
- Transmission Line
- Transmission Tower
- Transformer Station

Rail
- Railway - Main
- Railway - Sidetrack
- Railway - Abandoned
- Bridge
- Tunnel

Transportation - Other
- Embankment
- Trail
- Runway

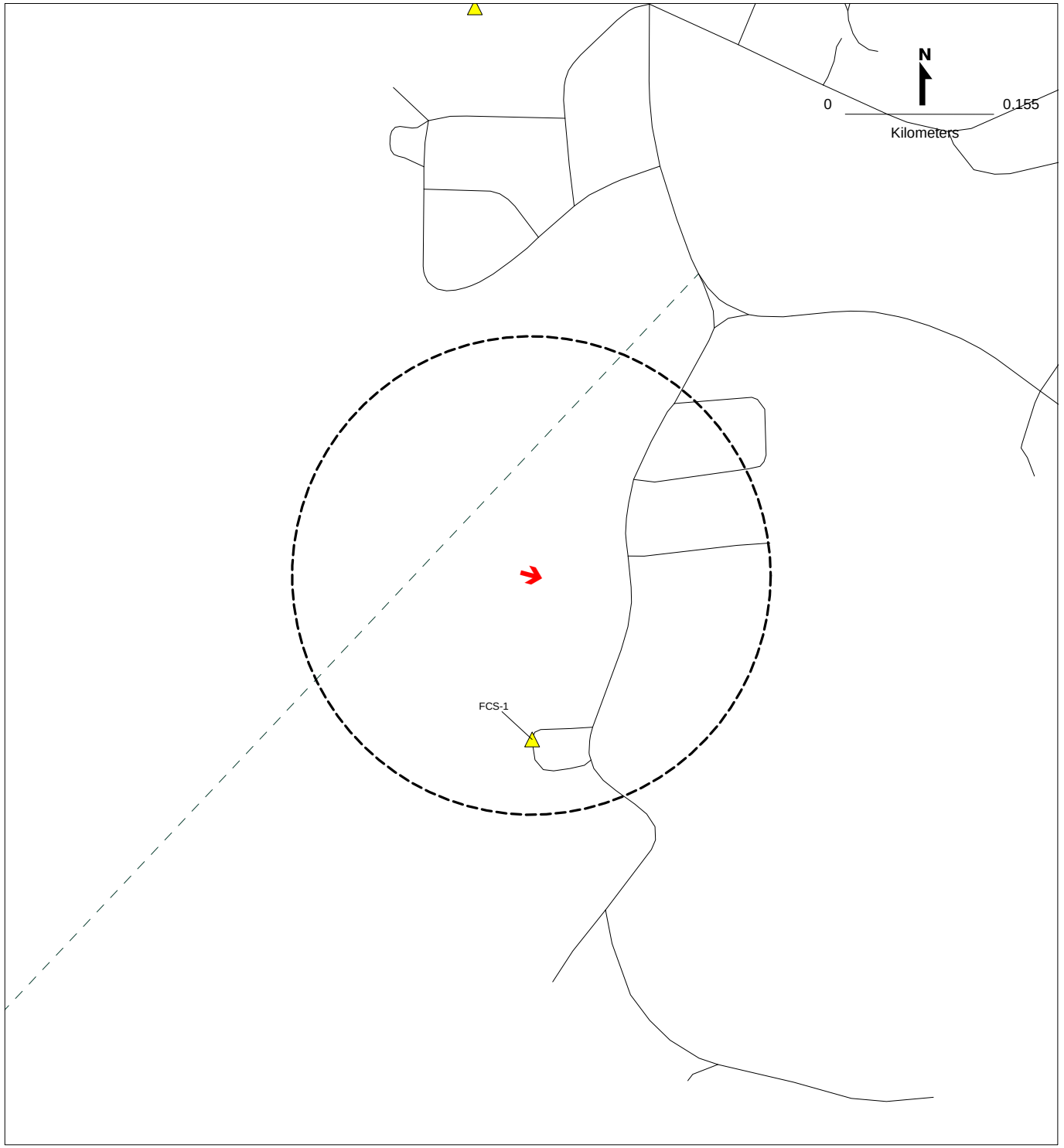
Hydrographic Features
- Permanent Waterway
- Intermittent Waterway
- Open Reservoir
- Dyke/Levee
- Dam
- Breakwall
- Wetland

Landuse Classifications
- Open Area
- Residential
- Commercial
- Resource and Industrial
- Government and Institutional
- Parks and Recreational
- Waterbody

Recreation
- Golf Course/Driving Range
- Park/Sports Field
- Other Recreation Area
- Sports/Race Track
- Cemetery
- Campground

Vegetation
- Wooded Area
- Orchard
- Vineyard

Industrial Resources
- Conveyor
- Crane: Moveable
- Crane: Stationary
- Tank
- Rock Cut
- Auto Wrecker
- Lumber Yard
- Pit



This diagram is to be used solely for relative street location purposes.
It may not accurately portray street or site positions.

Site Report

Order Number: 20121122047
Site Name: Phase I/II/III ESA
Site Address: n/a Tuktoyaktuk, NT
Report Type: Standard Report, 0.25 km Search Radius

FOR COMPLETE INFORMATION, REFER TO DETAIL REPORT

A search has been conducted for this site (address) and company name. No records were found, within the database(s) selected, that meet either of these criteria.

Detail Report

Order Number: 20121122047
Site Name: Phase I/II/III ESA
Site Address: n/a Tuktoyaktuk NT
Report Type: Standard Report, 0.25 km Search Radius

If information is required for sites located beyond the selected address, please contact your ERIS representative.

Contaminated Sites on Federal Land

Contaminated Sites on Federal Land

Map Key	Company	Address	Site Id	Departmental Id	Property No.	Site Name
FCS-1		Tuktoyaktuk	00008314	Polar Continental Shelf Project in Tuktoyaktuk	21120	Polar Continental Shelf Project - Tuktoyaktuk

Location:
Municipality: Tuktoyaktuk
Census Division: Inuvik
Federal Electoral District: Western Arctic
Nearest Populated Area:
Longitude: -133.03738
Latitude: 69.438479
Reporting Organization: Natural Resources Canada
Reason for Involvement: Federal Real Property
Est m³ Contaminated: 4000
Est Ha Contaminated:
Est Tons Contaminated:
Site Management Strategy: Additional assessment
Highest Step Completed: Implement Remediation/Risk Management Strategy
Action Plan: Conduct a Phase 2 Assessment
Additional Info:

Medium	Contaminant
Soil	PHCs (petroleum hydrocarbons)

Appendix: Northwest Territories Database Descriptions

EcoLog Environmental Risk Information Services Ltd can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to EcoLog ERIS at the time of update. **Note:** Databases denoted with "*" indicates that the database will no longer be updated. See the individual database descriptions for more information.

Territorial Government Source Databases:

Crown Land Fuel Storage Tanks **Oct 1997-Jun 2009** **CFST**

The Department of Indian and Northern Affairs Canada mandates that all fuel storage tanks on Crown Land be recorded, when an individual applies for a land use permit or surface lease. Please note that there are numerous records in the database where the "Commencement Date" is previous to 1997. However, since INAC only began registering tank locations in 1997, any tanks installed previous to that may or may not be in the database, due to lack of regulations. Note the following descriptions: Commencement Date is the original file date, Fuel Application Date is the date an application was submitted for a tank, and the Fuel Confirmation Date is the date the department accepted the application and confirmed the information submitted.

Mineral Occurrences **Up to Sept 2011** **MNR**

The C.S. Lord Northern Geoscience Centre maintains a database of mineral showings (commodity occurrences) for both the Northwest Territories and Nunavut. The database provides Showing ID, latitude, longitude, Showing Name, commodity type, current development stage, and general comments on lithology, mineralization and geological settings.

Northwest Territories Oil and Gas Wells **1939-2002*** **NOGW**

The NWT Oil and Gas Wells database is a comprehensive database that includes information regarding location of well, well name, spud date, current status and purpose. Please note that this database will not be updated, information on wells drilled after 2002 can be found in the Oil and Gas Wells (OGW) database under the 'Private Source Database' section.

Spills **1971-Sept 2011** **SPL**

The Department of Resources, Wildlife & Economic Development (RWED), in Yellowknife, maintains an inventory of spill locations through the "Hazardous Materials Spills Database". Information is provided on the spill number, date, location, spill description, quantity & commodity spilled and all applicable parties involved.

Water Well Information System **1974-Jun 2009** **WWIS**

This database was collected from the Water and Sanitation Department of Northwest Territories Pubic Works and Services and provides information on seven wells drilled in the territory. Information is provided on the well depth, year drilled, and location of well by city name. No geographic coordinates are available.

Federal Government Source Databases: Diagram Identifier:

Environmental Issues Inventory System **1992-2001*** **EIIS**

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

Federal Convictions **1988-Jun 2007** **FCON**

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Contaminated Sites on Federal Land **June 2000-May 2012** **FCS**

The Treasury Board of Canada Secretariat maintains an inventory of all known contaminated sites held by various Federal departments and agencies. This inventory does not include properties owned by Crown corporations, but does contain non-federal sites for which the Government of Canada has accepted some or all financial responsibility. All sites have been classified through a system developed by the Canadian Council of Ministers of the Environment. The database provides information on company name, location, site ID #, property use, classification, current status, contaminant type and plan of action for site remediation.

Indian & Northern Affairs Fuel Tanks **1950-Aug 2003** **IAFT**

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of all aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

National Analysis of Trends in Emergencies System (NATES) **1974-1994*** **NATE**

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

National Defence & Canadian Forces Fuel Tanks **Up to May 2001*** **NDFT**

The Department of National Defence and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.

National Defence & Canadian Forces Spills **Mar 1999-Aug 2010** **NDSP**

The Department of National Defence and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

National Defence & Canadian Forces Waste Disposal Sites **2001-April 2007** **NDWD**

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

National Energy Board Wells **1920-June 2007** **NEBW**

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

National Environmental Emergencies System (NEES) 1974-2003 **NEES**

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for all previous Environment Canada spill datasets. NEES is composed of the historic datasets – or Trends – which dates from approximately 1974 to present. **NEES Trends** is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

National PCB Inventory 1988-2008 **NPCB**

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. All federal out-of-service PCB containing equipment and all PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites.

National Pollutant Release Inventory 1993-2010 **NPRI**

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances.

Parks Canada Fuel Storage Tanks 1920-Jan 2005 **PCFT**

Canadian Heritage maintains an inventory of all known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Private Source Databases:

Automobile Wrecking & Supplies 2001-Jun 2010 **AUWR**

This database provides an inventory of all known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Chemical Register 2005-Jun 2010 **CHEM**

This database includes a listing of locations of facilities within the Northwest Territories that either manufacture and/or distribute chemicals.

ERIS Historical Searches 1999-Apr 2012 **EHS**

EcoLog ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Canadian Mine Locations **1998-2009** **MINE**

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Oil and Gas Wells **1988-Sept 2012** **OGW**

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickles' database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Retail Fuel Storage Tanks **2000-Jun 2010** **RST**

This database includes an inventory of known fuel outlet locations (including marinas) that have on their property gasoline, waste oil, natural gas and/or gas propane storage tanks.

Scott's Manufacturing Directory **2003-Mar 2011** **SCT**

Scott's Directories is a data bank containing information on over 100 manufacturers in the Northwest Territories. Even though Scott's listings are voluntary, it is the most comprehensive database of Northwest Territories manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

APPENDIX E
FEDERAL LISTING OF SPECIES AT RISK (SARA) AND TERRITORIAL SPECIES AT RISK (SAR) FOR TUKTOYATUK, NWT

Common Name	Scientific Name	COSEWIC (SARA)	Territorial Status (SAR)
Mammals			
Bowhead whale	Balaena mysticetus	Special concern	Special concern
Grey whale (eastern north Pacific population)	Eschrichtius robustus	Special concern	Special concern
Polar bear	Ursus maritimus	Special concern	Special concern
Grizzly bear	Ursus arctos	Special concern	No status
Wolverine	Gulo gulo	Special concern	No status
Birds			
Peregrin falcon (anatum subspecies)	Falco peregrinus	Threatened	Threatened
Rusty blackbird	Euphagus carolinus	Special concern	Special concern
Horned grebe	Podiceps auritus	Special concern	No status
Short-eared owl	Asio flammeus	Special concern	No status
Fish			
Dolly varden	Salvelinus malma malma	Special concern	No status

APPENDIX E

FEDERAL LISTING OF SPECIES AT RISK (SARA) AND TERRITORIAL SPECIES AT RISK (SAR)

APPENDIX E
FEDERAL LISTING OF SPECIES AT RISK (SARA) AND TERRITORIAL SPECIES AT RISK (SAR) FOR TUKTOYATUK, NWT

Common Name	Scientific Name	COSEWIC (SARA)	Territorial Status (SAR)
Mammals			
Bowhead whale	Balaena mysticetus	Special concern	Special concern
Grey whale (eastern north Pacific population)	Eschrichtius robustus	Special concern	Special concern
Polar bear	Ursus maritimus	Special concern	Special concern
Grizzly bear	Ursus arctos	Special concern	No status
Wolverine	Gulo gulo	Special concern	No status
Birds			
Peregrin falcon (anatum subspecies)	Falco peregrinus	Threatened	Threatened
Rusty blackbird	Euphagus carolinus	Special concern	Special concern
Horned grebe	Podiceps auritus	Special concern	No status
Short-eared owl	Asio flammeus	Special concern	No status
Fish			
Dolly varden	Salvelinus malma malma	Special concern	No status

APPENDIX F

OWNER/MANAGER INTERVIEW QUESTIONNAIRE

KGS GROUP OWNER/MANAGER INTERVIEW QUESTIONNAIRE
PHASE I ENVIRONMENTAL SITE ASSESSMENT

Client: PWGSC

Site Location: DFO Lab and Storage Site – Tuktoyaktuk, NWT

Site Personnel: Mr. Tom Matus, SAO of Hamlet of Tuktoyaktuk (interviewed at office).

Date of Interview: October 5th, 2012

1. **What is the nature of the current business on-site? Previous businesses?**
   Currently vacant property, previously DFO lab/storage facility. Property is listed as Commissioner's Parcel – administered by GNWT.

2. **Any buildings/structures currently on-site? Any previous buildings/structures? If so, how old are the buildings? Type of construction? Any renovations?** One building. Particulars of the building are unknown.

3. **Do any on-site buildings have air conditioning? If so, who is the maintenance contractor, how often are the units serviced and what refrigerant(s) is used? Quantities of refrigerant?**
   Unknown.

4. **Any substances currently/historically stored or used or processed on-site (gasoline, fuel oil, lubricants, degreasers, etc.)? Volumes? Inventory?**
   Not to his knowledge. Property is a vacant site.

5. **Have there been any spills on-site? If so, what were the substances spilled and how were the cleaned up?**
   Not to his knowledge.

6. **Any ASTs/USTs currently/historically present on-site? If so, are all ASTs/USTs registered with the proper regulatory authorities?**
   Not to his knowledge (current/historic).
   Contents?
   Volume?
   Material of construction?
   Date installed/removed? (age)
   History of leaks/spills?
   Pressure tests?
   Inventory records?
   Any discrepancies or loss product?
   Leak detection system?
   Secondary containment system?
   Location on-site?

7. **Any hazardous waste currently/historically generated on-site (waste oil, batteries, PCBs, etc.)? If so, is all hazardous waste registered with the proper regulatory authorities (waste generator number)? How is waste stored and disposed of?** No

8. **Any fluid-filled transformers or electrical equipment currently/historically stored on-site? If so, have they been tested for PCB content?** No.

9. **Any radioactive materials used or stored on-site?** No

10. **Any pesticides/herbicides used on-site for vegetation control? If so, which ones, how much and how often are they applied?** No

11. **Any landfills or dumpsites present on-site or on adjacent properties? If so, what was disposed of and where?** No

12. **What is the source of potable water on-site (town/city supply, on-site groundwater wells, etc.)?** N/A

13. **Any known problems with drinking water, surface water or groundwater quality on-site?** N/A

14. **What sanitary sewer system is used on-site (city, septic tank/field)?** N/A

15. **How is wastewater handled/stored/disposed?** N/A

16. **Any known problems with indoor air quality due to activities on-site (air emissions, chemical odours, fumes or mists)?** Vacant derelict building.

17. **What is the source of heat for on-site buildings (gas, fuel oil, electric, etc.)?** N/A

18. **Any fires on-site?** Not to his knowledge.

19. **Have there been any previous environmental studies, surveys, audits or appraisals conducted on the subject property? If so, are any reports available for review?** Unknown.

20. **Has the subject property ever received a notice of violation or other similar claim from a regulatory authority for improper hazardous materials/waste storage or disposal on site?**
Not to his knowledge.

21. **Any known problems or concerns with activities on adjacent properties?**
No.

If older buildings are present on-site (pre-1980): One building on site (suspected to be pre-1980); however, Mr. Matus is not familiar with the particulars of the building.

22. **Has there been an asbestos survey or site inspection for any potential ACMs (vinyl floor tiles, ceiling tiles, wallboard, pipe/boiler/duct insulation, etc.)?** Unknown.

23. **If potential ACMs were found on-site, was the presence of asbestos confirmed by laboratory analysis?** Unknown.

24. **Are fluorescent light fixtures present on-site?** All lights have been removed.

25. **Have any of the ballasts been replaced since 1980? If so, when and were they replaced with non-PCB containing ballasts?** N/A

26. **Is there any evidence of leaks or spills from any light fixtures not replaced since 1980 (potentially containing PCB ballasts)? Name of the light fixture ballast manufacturer?** N/A

27. **Is there any evidence of flaking or peeling paint on the walls, floor or ceiling of on-site buildings? If so, has the paint been tested for the presence of lead?**
    Flaking and peeling paint present; however, it is unknown if the paint has been tested for the presence of lead.

APPENDIX G

SITE RECONNAISSANCE CHECKLIST

SITE RECONNAISSANCE CHECKLIST

Client: PWGSC

Site Location: DFO Tuktoyaktuk Lab and Storage Facility - Tuktoyaktuk, NWT

Date of Visit: October 5th, 2012

Climatic Conditions: Sunny with fog rolling in throughout the day; minimal wind, no snow cover, ~0°C.

1.0 PRESENT SITE DEVELOPMENT

Site Description (occupant, activities):
Vacant DFO (Fisheries) building including fenced in area west of the building. Building is vacant and derelict.

Buildings/structures (type of construction): One wood frame single-storey building (apprx. 10.56 m x 12.92 m) with attached chain link fenced in area (10.56 m x 16.31 m).

Roads/parking areas: Community gravel road is located immediately to the east of the subject building.

Dwellings: None.

Underground utilities: None visible.

Power lines: Overhead power lines run north to south along community gravel road to the east of the subject building. Overhead lines from the southeast corner of the subject building connect to the overhead lines along the gravel road.

Right-of-ways: N/A

Aboveground storage tanks (material of construction, volume, contents, tag/ID no.): None visible.

Underground storage tanks (pipes, vents, etc.): None visible.

Septic tanks/field: One 1,000 gal. fibreglass water (grey) holding tank located exterior of building to the north (south side).

Groundwater wells: None visible.

Accessibility of drilling equipment: Accessible – would need to conduct utility locates prior to any drilling. Track rig would be better at this site due to overhead lines and fenced in area.

2.0 SURFACE CONDITIONS

Topography: Flat – primarily fill material at the subject site.

Direction of run-off: West towards Beaufort Sea and towards the shallow surface water pit to the north.

Vegetation: Sparse grass located around the perimeter of the building and fenced-in area.

Surface erosion: None visible – site is flat.

Bedrock outcrops: None visible.

Lagoons/swamps/marsh areas: Shallow surface water body is located to the north with logs (wood debris).

Streams: N/A

Ponded areas: Shallow surface water body is located to the north with logs (debris).

Evidence of flooding: N/A

Diversion ditches: N/A

Sink holes: N/A

Excavations: N/A

3.0 OUTDOOR WASTE EVIDENCE

Surface staining: None visible.

Vegetation damage: None visible.

Oily sheens or discoloration of surface water: None visible.

Odours: None.

Construction material: None visible.

Drums, barrels, containers: One 1,000 gal. fibreglass water holding tank (green) located on the south side of the building.

Waste materials/piles: Fenced in-area located immediately west of the subject building contained debris including wooden sampling boxes, old wooden pallets, vehicle caps and netting. Materials appeared to be previously used laboratory/research equipment used at the subject property. Debris pile including old skid shed and old wooden pallets/sampling boxes located north of the building.

Hazardous substances/wastes (waste oil, solvents, batteries, etc): None visible.

Chemical/petroleum storage: None visible.

Transformers/electrical equipment (potential PCBs – label/tag, volume, name of manufacturer): None visible.

Are all substances/fuel stored neatly in properly labelled containers (drums, barrels, etc.)? N/A

Do any containers or ASTs or transformers/electrical equipment appear to be leaking or damaged? N/A

4.0 INSIDE BUILDINGS INSPECTIONS – One wood frame single-storey building present; in very poor condition. No power inside and large amounts of dead flies are located throughout the interior.

Are Potential Asbestos Containing Materials (ACMs) suspected? Yes

Ceiling tile: -
Floor tile: 2 types – both sampled (vinyl flooring).
Pipe/boiler/duct insulation: Roll of lagging on the floor – sampled.
Wallboard: -
Roofing materials: -
Sprayed on materials (ceiling, walls): -

Do any potential ACMs appear to be crumbling, flaking, damaged or broken? No

NOTE: If friable ACMs (poor condition) are suspected, collect small sample in heavy polyethylene bag for laboratory analysis. CONFIRM WITH CLIENT.

Are Polychlorinated Biphenyls (PCBs) suspected? All lights have been removed from the interior of the building; therefore PCBs are not suspected.

Fluorescent light fixtures ballasts (label/tag, volume, name of manufacturer): N/A

Transformers/electrical equipment (label/tag, volume, name of manufacturer): N/A

Any evidence of leaks or spills from any potential PCB containing equipment? N/A

Is Potential Lead-Based Paint Suspected? Lead based paint suspected in various interior and exterior areas of the subject building.

Walls: Interior and Exterior (sampled).
Floor: Interior (sampled).
Ceiling: No

Does any potential lead-based paint present inside or outside appear to be peeling, cracking or flaking? Yes – exterior paint was in very poor condition – significant peeling and weathered.

NOTE: **If suspected lead based paint is peeling or flaking (rubbery, peels cleanly), collect small sample and perform lead-paint test.**

Any other possible sources of lead present on-site (old pipes, solder, batteries, etc.)? Wooden sampling boxes located within fenced-in area west of building and old skid shed located north of building (exterior locations).

Are Ozone-Depleting Substances (ODSs) Suspected? None visible.

Air conditioning (wall, rooftop, etc.): N/A

Coolers/freezers: N/A

Refrigerant (label/tag): N/A

Do any air conditioning units, freezers or coolers appear to be leaking or damaged? N/A

Petroleum storage (propane, gasoline, diesel, fuel oil, etc.): None visible.

Hazardous substance/waste storage (waste oil, paints, solvents, batteries, pesticides, acids, etc.): Small quantities of paint, motor oil/lubricants located inside building (< 500 mL quantities).

Floor drains/sumps/pits (where do they drain to): None visible.

Odours/air emissions: Stagnant odour throughout the interior.

Moulds/dampness: Mould was visible throughout the interior of the building.

5.0 ADJACENT LAND USE

North: Shallow surface water pit with wood debris (logs).

South: NRCAN Cold Storage Facility.

East: Community gravel road followed by surface water body (former borrow pit).

West: Vacant land and Beaufort Sea.

Surface water bodies: Beaufort Sea to the west; shallow surface water bodies to the north and further to the east (past community gravel road).

Dwellings: None visible.

Roads: Community gravel road immediately east of the subject property.

Utilities: Overhead power lines run north to south along the community gravel road located immediately east of the subject property.

Right-of-ways/railyards: None visible.

Groundwater wells: None visible.

Aboveground/underground storage tanks: ASTs visible further to the south-southeast on NRCAN property (not adjacent property) and Hamlet property (garage).

Waste disposal sites/landfills: None visible.

Gas or service stations/autobody or machine shops/bulk fuel or chemical plants: None visible.

Direction of groundwater flow on adjacent properties: Towards Beaufort Sea (west).

APPENDIX H

SAMPLE LOCATION LOGS

H-1
H-2

APPENDIX H-1
SOIL SAMPLE LOCATION LOG
DFO TUKTOYAKTUK LAB STORAGE

Sample ID [1]	Sample Type	Description	Depth (m)	Field Vapour Measurement (ppm)	Latitude	Longitude	Northing [3,4]	Easting [3,4]
TK-THBKG-A[2]	Surface Soil	Peat	0-0.35	4.0	69.4370446	-133.0366471	7704603.4	576854.731
TK-THBKG-B[2]	Surface Soil	Silt & Some Clay	0.35-0.70	6.1	69.4370446	-133.0366471	7704603.4	576854.731
TK-TH1A	Surface Soil	Sand & Gravel Fill	0-0.25	7.9	69.4366368	-133.0349375	7704531.23	576968.794
TK-TH1B	Surface Soil	Sand & Gravel Fill	0.25-0.45	9.4	69.4366368	-133.0349375	7704531.23	576968.794
TK-TH2A	Surface Soil	Sand & Gravel Fill	0-0.20	10.0	69.4366404	-133.0350631	7704531.624	576960.567
TK-TH2B	Surface Soil	Sand & Gravel Fill	0.20-0.40	8.2	69.4366404	-133.0350631	7704531.624	576960.567
TK-TH3A	Surface Soil	Sand & Gravel Fill	0-0.25	10.1	69.4366401	-133.0351989	7704531.3	576951.7
TK-TH3B	Surface Soil	Sand & Gravel Fill	0.25-0.50	6.1	69.4366401	-133.0351989	7704531.3	576951.7
TK-TH4A	Surface Soil	Fine Sand	0-0.25	10.1	69.4366611	-133.0353379	7704534.9	576942.5
TK-TH4B	Surface Soil	Fine Sand & Gravel	0.25-0.50	8.5	69.4366611	-133.0353379	7704534.9	576942.5
TK-TH5A	Surface Soil	Fine Sand	0-0.25	48.5	69.4367134	-133.0353469	7704544.6	576941.6
TK-TH5B	Surface Soil	Fine Sand & Gravel	0.25-0.50	10.8	69.4367134	-133.0353469	7704544.6	576941.6
TK-TH6A	Surface Soil	Fine Sand & Trace Organics	0-0.25	6.7	69.4367213	-133.0351915	7704546.4	576951.7
TK-TH6B	Surface Soil	Fine Sand & Trace Organics	0.25-0.50	5.6	69.4367213	-133.0351915	7704546.4	576951.7
TK-TH7A	Surface Soil	Fine Sand, Some Gravel & Trace Organics	0-0.25	4.9	69.4367319	-133.0349808	7704548.8	576965.4
TK-TH7B	Surface Soil	Fine Sand, Some Gravel & Trace Organics	0.25-0.50	4.3	69.4367319	-133.0349808	7704548.8	576965.4
TK-TH8A	Surface Soil	Fine Sand, Some Gravel & Trace Organics	0-0.25	6.9	69.4366760	-133.0348581	7704538.68	576973.744
TK-TH8B	Surface Soil	Fine Sand, Some Gravel & Trace Organics	0.25-0.50	5.0	69.4366760	-133.0348581	7704538.68	576973.744
TK-TH9A	Surface Soil	Fine Sand, Some Gravel & Trace Organics	0-0.25	5.1	69.4366631	-133.0352795	7704535.4	576946.3
TK-TH9B	Surface Soil	Fine Sand, Trace Gravel & Trace Organics	0.25-0.50	6.9	69.4366631	-133.0352795	7704535.4	576946.3
TK-TH10A	Surface Soil	Fine Sand, Trace Gravel & Trace Organics	0-0.25	14.0	69.3371473	-133.0352528	7704543.2	576947.8
TK-TH10B	Surface Soil	Fine Sand, Trace Gravel & Trace Organics	0.25-0.50	16.4	69.3371473	-133.0352528	7704543.2	576947.8
TK-TH11A	Surface Soil	Fine Sand, Trace Gravel & Trace Organics	0-0.25	7.8	69.4367005	-133.0351077	7704542.7	576957.3
TK-TH11B	Surface Soil	Fine Sand, Trace Gravel & Trace Organics	0.25-0.50	6.2	69.4367005	-133.0351077	7704542.7	576957.3
TK-TH12A	Surface Soil	Fine Sand, Trace Gravel & Trace Organics	0-0.25	7.2	69.4366653	-133.0351354	7704536.1	576955.7
TK-TH12B	Surface Soil	Fine Sand, Trace Gravel & Trace Organics	0.25-0.40	5.4	69.4366653	-133.0351354	7704536.1	576955.7
TH-TH100	Surface Soil	QA/QC of soil sample TK-TH5A		48.5	69.4367134	-133.0353469	7704544.6	576941.6
TK-TH101	Surface Soil	QA/QC of soil sample TK-TH9A		5.1	69.4366631	-133.0352795	7704535.4	576946.3

Notes:

1. Samples were collected on October 5, 2012 from 13 testholes. Two sample depths were collected from each testhole.
2. Background samples were collected from approximately 106 m northwest of the subject property.
3. Coordinates recorded using handheld GPS with +/- 3 m accuracy.
4. UTM - Universal Transverse Mercantile North American Datum 1983.

APPENDIX H-2
DESIGNATED SUBSTANCE SURVEY SAMPLE LOCATION LOG
DFO TUKTOYAKTUK LAB STORAGE

Sample ID [1]	Sample Type	Location	Colour/Description	LATITUDE	LONGITUDE	Northing [2,3]	Easting [2,3]
TK-LP-1[4]	Paint	Exterior Garage Door - East Side	Blue Colour/Poor Condition	71.98349972	-125.2451611	7988536.052	422510.867
TK-LP-2[4]	Paint	Exterior Man Door - South Side	Beige Colour/Poor Condition	71.9834175	-125.2445567	7988526.122	422531.376
TK-LP-3[5]	Paint	Interior Plywood Wall - West Wall	White Colour/Moderate Condition	71.98334056	-125.2437858	7988516.55	422557.654
TK-LP-4[5]	Paint	Interior Wooden Floor - North	Dark Blue/Poor Condition	71.98319556	-125.2438797	7988500.51	422553.806
TK-LP-5	Paint	Exterior Skid Shed - North of Building	Yellow Colour/Poor Condition	71.98329944	-125.2447989	7988513.269	422522.533
TK-LP-6	Paint	Exterior Fibreglass Holding Tank - North of Building	Green Colour/Moderate Condition	71.98341167	-125.2455856	7988526.79	422495.854
TK-LP-7[6]	Paint	Exterior Wooden Sampling Box - Within Fenced in Area West of Building	Dark Blue/Poor Condition	71.98372028	-125.2452486	7988560.759	422508.766
TK-LP-8[6]	Paint	Exterior Wooden Sampling Box - Within Fenced in Area West of Building	Medium Blue/Poor Condition	71.98366722	-125.2443803	7988553.711	422538.495
TK-LP-9[6]	Paint	Exterior Wooden Sampling Box - Within Fenced in Area West of Building	Light Blue/Poor Condition	71.98365417	-125.2435783	7988551.235	422566.108
TK-ACM-1[7]	Floor Tile	Interior - Floor Tile	Beige/Moderate Condition	71.98313111	-125.24455	7988494.171	422530.413
TK-ACM-2[7]	Lagging	Interior - Pipe Lagging Roll on Floor	Light Brown/Moderate to Poor Condition	49.49204874	-94.77612711	5483671.884	371377.9054
TK-ACM-3[7]	Floor Tile	Interior - Floor Tile	Beige/Poor Condition/Mouldy	49.49202578	-94.77611555	5483669.312	371378.6823

Notes:

1. Samples were collected on October 5, 2012.
2. Coordinates recorded using handheld GPS with +/- 3 m accuracy.
3. UTM - Universal Transverse Mercantile North American Datum 1983.
4. Due to proximity of samples TK-LP-1 and TK-LP-2, the GPS coordinates were the same. Due to the proximity of samples TK-LP-3 and TK-LP-4, the GPS coordinates were the same.
5. Due to the proximity of samples TK-LP-3 and TK-LP-4, the GPS coordinates were the same.
6. Due to the proximity of samples TK-LP-7, TK-LP-8 and TK-LP-9 within the fenced-in area west of the building, the GPS coordinates were the same.
7. Due to the proximity of samples TK-ACM-1, TK-ACM-2 and TK-ACM-3 inside the building, the GPS coordinates were the same.

APPENDIX I

LABORATORY CERTIFICATES OF ANALYSES

Your Project #: 12-0163-002.1003
Site#: TUKTOYAKTUK
Site Location: TUKTOYAKTUK
Your C.O.C. #: 331218-01-01, .

Attention: Ganga Atmuri
KGS Group
3rd Floor
865 Waverly St
Winnipeg, MB
Canada R3T 5T4

Report Date: 2012/10/25

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B290821
Received: 2012/10/09, 10:00

Sample Matrix:
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Asbestos in Solids by TEM Subcontract (1)	1	N/A	2012/10/10		

Sample Matrix: Soil
Samples Received: 30

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS (MeOH extract)	11	2012/10/11	2012/10/12	WINSOP-00054 WINSOP-00055	EPA8260C/CCME PHCCWS
BTEX/F1 by HS GC/MS (MeOH extract)	17	2012/10/11	2012/10/13	WINSOP-00054 WINSOP-00055	EPA8260C/CCME PHCCWS
CCME Hydrocarbons (F2-F4 in soil)	11	2012/10/11	2012/10/11	WINSOP-00056	CCME PHC-CWS
CCME Hydrocarbons (F2-F4 in soil)	17	2012/10/11	2012/10/15	WINSOP-00056	CCME PHC-CWS
CCME Hydrocarbons (F4G in soil)	1	2012/10/11	2012/10/24		CCME PHC-CWS
Elements by ICPMS (total) (2)	16	2012/10/12	2012/10/12	BBY7SOP-00001	EPA 6020A
Moisture	28	N/A	2012/10/12	WIN SOP-00060	Carter Method 51.2
pH (2:1 DI Water Extract) (2)	16	2012/10/13	2012/10/13	BBY6SOP-00028	Carter, SSMA 16.2
PSA Coarse/Fine (75 micron)	2	N/A	2012/10/10		
Grain Size (Coarse/Fine)	2	N/A	2012/10/16		

Sample Matrix: Solid
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Asbestos Identification (2,3)	1	N/A	2012/10/18	BBY5SOP-00020	NIOSH Method 9002
Elements by ICP-AES (acid extr. solid) (2)	9	2012/10/15	2012/10/15	BBY7SOP-00018	SW846 6010C
Asbestos in Solids by TEM Subcontract (1)	1	N/A	2012/10/10		

* Results relate only to the items tested.

(1) This test was performed by Ext. Sublet from Winippeg
(2) This test was performed by Maxxam Vancouver
(3) RDL = 0.5%

../2

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Janelle Kochan, B.Sc., Project Manager,
Email: JKochan@maxxam.ca
Phone# (204) 772-7276 Ext:2209

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

BTEX/F1-F4 IN SOIL (SOIL)

Maxxam ID		ER4141	ER4142	ER4143	ER4144	ER4145	ER4146	ER4147	ER4148		
Sampling Date		2012/10/05 11:00	2012/10/05 11:00	2012/10/05 11:10	2012/10/05 11:10	2012/10/05 11:20	2012/10/05 11:20	2012/10/05 11:30	2012/10/05 11:30		
	UNITS	**TK-THBKG-A**	**TK-THBKG-B**	**TK-TH1A**	**TK-TH1B**	**TK-TH2A**	**TK-TH2B**	**TK-TH3A**	**TK-TH3B**	**RDL**	**QC Batch**
Physical Properties											
Moisture	%	76	18	5.8	4.4	7.0	5.4	6.6	8.7	0.3	6243672
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	72	37	<20	<20	<20	65	<20	<20	20	6243597
F3 (C16-C34 Hydrocarbons)	mg/kg	330	50	37	69	84	110	24	25	20	6243597
F4 (C34-C50 Hydrocarbons)	mg/kg	200	<20	<20	<20	<20	<20	<20	<20	20	6243597
Reached Baseline at C50	mg/kg	YES	YES	YES	YES	YES	YES	YES	YES		6243597
Surrogate Recovery (%)											
O-TERPHENYL (sur.)	%	84	91	74	86	86	87	89	84		6243597
Volatiles											
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6243671
Toluene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6243671
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6243671
Xylenes (Total)	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	6243671
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	6243671
o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6243671
Methyl-tert-butylether (MTBE)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6243671
F1 (C6-C10) - BTEX	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	10	6243671
(C6-C10)	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	10	6243671
Surrogate Recovery (%)											
4-BROMOFLUOROBENZENE (sur.)	%	96	98	98	97	99	96	98	98		6243671
D10-ETHYLBENZENE (sur.)	%	111	109	109	102	100	106	107	107		6243671
D4-1,2-DICHLOROETHANE (sur.)	%	89	91	99	122	127	91	91	90		6243671
D8-TOLUENE (sur.)	%	105	104	101	87	89	104	106	105		6243671

RDL = Reportable Detection Limit

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

BTEX/F1-F4 IN SOIL (SOIL)

Maxxam ID		ER4149	ER4150	ER4151	ER4152	ER4153	ER4154	ER4155	ER4156		
Sampling Date		2012/10/05 11:40	2012/10/05 11:40	2012/10/05 11:50	2012/10/05 11:50	2012/10/05 12:00	2012/10/05 12:00	2012/10/05 12:10	2012/10/05 12:10		
	UNITS	**TK-TH4A**	**TK-TH4B**	**TK-TH5A**	**TK-TH5B**	**TK-TH6A**	**TK-TH6B**	**TK-TH7A**	**TK-TH7B**	**RDL**	**QC Batch**
Physical Properties											
Moisture	%	3.9	3.8	4.3	4.4	9.6	9.1	6.4	8.8	0.3	6243672
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	<20	<20	46	<20	24	20	35	<20	20	6243597
F3 (C16-C34 Hydrocarbons)	mg/kg	37	34	140	24	32	40	57	40	20	6243597
F4 (C34-C50 Hydrocarbons)	mg/kg	<20	<20	<20	<20	<20	<20	<20	<20	20	6243597
Reached Baseline at C50	mg/kg	YES	YES	YES	YES	YES	YES	NO	YES		6243597
Surrogate Recovery (%)											
O-TERPHENYL (sur.)	%	87	87	83	87	84	84	87	83		6243597
Volatiles											
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6243671
Toluene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6243671
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6243671
Xylenes (Total)	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	6243671
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	6243671
o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6243671
Methyl-tert-butylether (MTBE)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6243671
F1 (C6-C10) - BTEX	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	10	6243671
(C6-C10)	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	10	6243671
Surrogate Recovery (%)											
4-BROMOFLUOROBENZENE (sur.)	%	98	102	100	102	101	99	95	95		6243671
D10-ETHYLBENZENE (sur.)	%	107	99	116	97	113	110	115	116		6243671
D4-1,2-DICHLOROETHANE (sur.)	%	94	114	94	123	138	93	90	90		6243671
D8-TOLUENE (sur.)	%	105	89	104	88	92	105	108	105		6243671

RDL = Reportable Detection Limit

Maxxam Analytics International Corporation o/a Maxxam Analytics, Unit D - 675 Berry Street, Winnipeg, MB, R3H 1A7, Tel: (204) 772-7276, Fax: (204) 772-2386 www.maxxam.ca

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

BTEX/F1-F4 IN SOIL (SOIL)

Maxxam ID		ER4157		ER4158	ER4159	ER4160	ER4161	ER4162		
Sampling Date		2012/10/05 12:20		2012/10/05 12:20	2012/10/05 12:30	2012/10/05 12:30	2012/10/05 12:40	2012/10/05 12:40		
	UNITS	**TK-TH8A**	**QC Batch**	**TK-TH8B**	**TK-TH9A**	**TK-TH9B**	**TK-TH10A**	**TK-TH10B**	**RDL**	**QC Batch**
Physical Properties										
Moisture	%	6.4	6243672	10	5.6	5.9	5.1	5.4	0.3	6244468
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	<20	6243597	<20	<20	<20	<20	<20	20	6244466
F3 (C16-C34 Hydrocarbons)	mg/kg	50	6243597	63	25	<20	23	<20	20	6244466
F4 (C34-C50 Hydrocarbons)	mg/kg	<20	6243597	<20	<20	<20	<20	<20	20	6244466
Reached Baseline at C50	mg/kg	YES	6243597	YES	YES	YES	YES	YES		6244466
Surrogate Recovery (%)										
O-TERPHENYL (sur.)	%	88	6243597	91	88	90	89	90		6244466
Volatiles										
Benzene	mg/kg	<0.0050	6243671	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6244464
Toluene	mg/kg	<0.020	6243671	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6244464
Ethylbenzene	mg/kg	<0.010	6243671	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6244464
Xylenes (Total)	mg/kg	<0.040	6243671	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	6244464
m & p-Xylene	mg/kg	<0.040	6243671	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	6244464
o-Xylene	mg/kg	<0.020	6243671	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6244464
Methyl-tert-butylether (MTBE)	mg/kg	<0.10	6243671	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6244464
F1 (C6-C10) - BTEX	mg/kg	<10	6243671	<10	<10	<10	<10	<10	10	6244464
(C6-C10)	mg/kg	<10	6243671	<10	<10	<10	<10	<10	10	6244464
Surrogate Recovery (%)										
4-BROMOFLUOROBENZENE (sur.)	%	99	6243671	99	98	100	99	97		6244464
D10-ETHYLBENZENE (sur.)	%	110	6243671	120	123	117	120	119		6244464
D4-1,2-DICHLOROETHANE (sur.)	%	97	6243671	105	96	113	104	103		6244464
D8-TOLUENE (sur.)	%	103	6243671	101	104	100	101	101		6244464

RDL = Reportable Detection Limit

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

BTEX/F1-F4 IN SOIL (SOIL)

Maxxam ID		ER4163	ER4164	ER4165	ER4166	ER4167	ER4168		
Sampling Date		2012/10/05 12:50	2012/10/05 12:50	2012/10/05 13:00	2012/10/05 13:00	2012/10/05 13:10	2012/10/05 13:20		
	UNITS	**TK-TH11A**	**TK-TH11B**	**TK-TH12A**	**TK-TH12B**	**TK-TH100**	**TK-TH101**	**RDL**	**QC Batch**
Physical Properties									
Moisture	%	7.0	11	7.9	9.6	6.2	5.5	0.3	6244468
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<20	<20	<20	<20	<20	<20	20	6244466
F3 (C16-C34 Hydrocarbons)	mg/kg	22	48	23	46	<20	22	20	6244466
F4 (C34-C50 Hydrocarbons)	mg/kg	<20	<20	<20	<20	<20	<20	20	6244466
Reached Baseline at C50	mg/kg	YES	YES	YES	YES	YES	YES		6244466
Surrogate Recovery (%)									
O-TERPHENYL (sur.)	%	62	83	89	89	88	89		6244466
Volatiles									
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6244464
Toluene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6244464
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6244464
Xylenes (Total)	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	6244464
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	6244464
o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6244464
Methyl-tert-butylether (MTBE)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6244464
F1 (C6-C10) - BTEX	mg/kg	<10	<10	<10	<10	<10	<10	10	6244464
(C6-C10)	mg/kg	<10	<10	<10	<10	<10	<10	10	6244464
Surrogate Recovery (%)									
4-BROMOFLUOROBENZENE (sur.)	%	99	98	98	100	97	98		6244464
D10-ETHYLBENZENE (sur.)	%	118	125	120	121	117	126		6244464
D4-1,2-DICHLOROETHANE (sur.)	%	109	99	103	104	100	93		6244464
D8-TOLUENE (sur.)	%	101	104	101	102	103	106		6244464

RDL = Reportable Detection Limit

Maxxam Analytics International Corporation o/a Maxxam Analytics, Unit D - 675 Berry Street, Winnipeg, MB, R3H 1A7, Tel: (204) 772-7276, Fax: (204) 772-2386 www.maxxam.ca

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

RESULTS OF CHEMICAL ANALYSES OF

Maxxam ID		ER4180		
Sampling Date		2012/10/05		
	UNITS	**TK-ACM-1**	**RDL**	**QC Batch**
Parameter				
Subcontract Parameter	N/A	ATTACHED	N/A	6290834

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		ER4155		
Sampling Date		2012/10/05 12:10		
	UNITS	**TK-TH7A**	**RDL**	**QC Batch**
Ext. Pet. Hydrocarbon				
F4G-SG (Heavy Hydrocarbons-Grav.)	mg/kg	<500	500	6282156

CUSTOM PARTICLE SIZE DISTRIBUTION (SOIL)

Maxxam ID		ER4169	ER4170		
Sampling Date		2012/10/05 13:30	2012/10/05 13:40		
	UNITS	**TK-TH2B**	**TK-TH9A**	**RDL**	**QC Batch**
Particle Size					
Sieve-%Coarse (>0.075mm)	%	85.84	91.26	0.01	6253838
Grain Size	N/A	COARSE	COARSE		6235614
Sieve-%Fine (<0.075mm)	%	14.16	8.74	0.01	6253838

RESULTS OF CHEMICAL ANALYSES OF SOLID

Maxxam ID		ER4394		
Sampling Date		2012/10/05		
	UNITS	**TK-ACM-3**	**RDL**	**QC Batch**
Parameter				
Subcontract Parameter	N/A	ATTACHED	N/A	6290834

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

ASBESTOS IDENTIFICATION (SOLID)

Maxxam ID		ER4393		
Sampling Date		2012/10/05		
	UNITS	**TK-ACM-2**	**RDL**	**QC Batch**
Asbestos Type				
Actinolite	% vol/vol	ND	N/A	6265588
Amosite	% vol/vol	ND	N/A	6265588
Anthophyllite	% vol/vol	ND	N/A	6265588
Chrysotile	% vol/vol	ND	N/A	6265588
Crocidolite	% vol/vol	ND	N/A	6265588
Tremolite	% vol/vol	ND	N/A	6265588
Others				
Cellulose	% vol/vol	>99	N/A	6265588
Filler	% vol/vol	ND	N/A	6265588
Glass Fibres	% vol/vol	ND	N/A	6265588
Hair	% vol/vol	ND	N/A	6265588
Other Fibers	% vol/vol	ND	N/A	6265588

N/A = Not Applicable
ND = Not detected
RDL = Reportable Detection Limit

Maxxam Analytics International Corporation o/a Maxxam Analytics, Unit D - 675 Berry Street, Winnipeg, MB, R3H 1A7, Tel: (204) 772-7276, Fax: (204) 772-2386 www.maxxam.ca

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

CSR/CCME METALS IN SOIL (SOIL)

Maxxam ID		ER4141	ER4142	ER4142	ER4143	ER4145	ER4147	ER4149	ER4151	ER4153		
Sampling Date		2012/10/05 11:00	2012/10/05 11:00	2012/10/05 11:00	2012/10/05 11:10	2012/10/05 11:20	2012/10/05 11:30	2012/10/05 11:40	2012/10/05 11:50	2012/10/05 12:00		
	UNITS	**TK-THBKG-A**	**TK-THBKG-B**	**TK-THBKG-B Lab-Dup**	**TK-TH1A**	**TK-TH2A**	**TK-TH3A**	**TK-TH4A**	**TK-TH5A**	**TK-TH6A**	**RDL**	**QC Batch**
Physical Properties												
Soluble (2:1) pH	pH Units	6.76	7.80	7.81	8.18	7.81	8.39	8.54	8.70	8.42	0.010	6247867
Total Metals by ICPMS												
Total Aluminum (Al)	mg/kg	481	13500	13700	5010	3600	4370	3390	3440	3960	100	6247854
Total Antimony (Sb)	mg/kg	0.42	0.61	0.64	0.67	0.39	0.48	0.32	0.29	0.37	0.10	6247854
Total Arsenic (As)	mg/kg	1.04	12.2	14.9	16.2	8.65	13.2	6.41	6.53	7.68	0.50	6247854
Total Barium (Ba)	mg/kg	214	386	383	255	259	164	127	126	155	0.10	6247854
Total Beryllium (Be)	mg/kg	<0.40	0.65	0.72	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6247854
Total Bismuth (Bi)	mg/kg	<0.10	0.17	0.16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6247854
Total Cadmium (Cd)	mg/kg	0.190	0.359	0.345	0.293	0.437	0.280	0.202	0.270	0.261	0.050	6247854
Total Calcium (Ca)	mg/kg	20100	9550	9470	11300	2800	18400	17700	17400	18300	100	6247854
Total Chromium (Cr)	mg/kg	1.5	19.7	20.7	8.8	8.0	8.0	5.9	6.1	7.1	1.0	6247854
Total Cobalt (Co)	mg/kg	2.14	10.5	11.1	6.99	4.04	6.33	5.06	5.01	5.53	0.30	6247854
Total Copper (Cu)	mg/kg	10.2	19.0	19.3	11.2	9.47	10.0	6.84	7.15	8.41	0.50	6247854
Total Iron (Fe)	mg/kg	4480	26300	26400	20700	11200	16600	10900	11000	13200	100	6247854
Total Lead (Pb)	mg/kg	0.75	11.8	11.9	11.6	18.4	10.3	5.25	4.81	5.80	0.10	6247854
Total Lithium (Li)	mg/kg	<5.0	17.4	17.7	7.4	<5.0	6.6	5.3	5.8	5.7	5.0	6247854
Total Magnesium (Mg)	mg/kg	2560	5550	5780	3970	1280	5110	4390	4530	5010	100	6247854
Total Manganese (Mn)	mg/kg	164	387	399	330	300	332	280	226	298	0.20	6247854
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6247854
Total Molybdenum (Mo)	mg/kg	0.58	1.73	1.85	1.96	0.90	1.42	1.00	1.09	1.22	0.10	6247854
Total Nickel (Ni)	mg/kg	5.75	27.4	28.6	16.8	9.49	15.5	11.9	11.9	13.3	0.80	6247854
Total Phosphorus (P)	mg/kg	381	646	648	551	437	470	429	321	383	10	6247854
Total Potassium (K)	mg/kg	110	1460	1500	615	462	549	435	460	497	100	6247854
Total Selenium (Se)	mg/kg	2.20	0.91	0.84	0.71	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6247854
Total Silver (Ag)	mg/kg	0.059	0.112	0.159	0.098	0.089	0.067	0.070	0.075	0.055	0.050	6247854
Total Sodium (Na)	mg/kg	3140	648	645	<100	<100	<100	<100	<100	<100	100	6247854
Total Strontium (Sr)	mg/kg	71.8	40.1	39.9	29.6	23.7	36.3	31.5	31.3	32.6	0.10	6247854
Total Thallium (Tl)	mg/kg	<0.050	0.148	0.149	0.094	0.067	0.089	0.068	0.064	0.078	0.050	6247854
Total Tin (Sn)	mg/kg	<0.10	0.47	0.46	0.27	0.41	0.20	0.15	0.17	0.20	0.10	6247854
Total Titanium (Ti)	mg/kg	4.9	50.3	50.1	59.5	28.2	57.1	63.7	55.9	74.2	1.0	6247854
Total Uranium (U)	mg/kg	3.55	0.777	0.769	0.695	0.526	0.633	0.561	0.562	0.569	0.050	6247854
Total Vanadium (V)	mg/kg	3.6	40.9	41.8	23.4	18.1	20.0	15.5	15.0	17.2	2.0	6247854
Total Zinc (Zn)	mg/kg	14.2	86.6	86.2	54.2	49.3	62.1	35.3	35.9	43.8	1.0	6247854
Total Zirconium (Zr)	mg/kg	0.89	2.47	2.40	1.49	0.63	1.98	1.98	2.44	1.53	0.50	6247854

RDL = Reportable Detection Limit

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

CSR/CCME METALS IN SOIL (SOIL)

Maxxam ID		ER4155	ER4157	ER4159	ER4161	ER4163	ER4165	ER4167	ER4168		
Sampling Date		2012/10/05 12:10	2012/10/05 12:20	2012/10/05 12:30	2012/10/05 12:40	2012/10/05 12:50	2012/10/05 13:00	2012/10/05 13:10	2012/10/05 13:20		
	UNITS	**TK-TH7A**	**TK-TH8A**	**TK-TH9A**	**TK-TH10A**	**TK-TH11A**	**TK-TH12A**	**TK-TH100**	**TK-TH101**	**RDL**	**QC Batch**
Physical Properties											
Soluble (2:1) pH	pH Units	8.25	8.35	8.63	8.59	8.53	8.67	8.68	8.60	0.010	6247867
Total Metals by ICPMS											
Total Aluminum (Al)	mg/kg	5080	5100	4010	4280	4450	3710	3480	3580	100	6247854
Total Antimony (Sb)	mg/kg	0.44	0.43	0.38	0.34	0.38	0.42	0.38	0.32	0.10	6247854
Total Arsenic (As)	mg/kg	10.6	10.8	8.20	9.32	9.75	9.71	6.87	8.67	0.50	6247854
Total Barium (Ba)	mg/kg	237	239	162	157	172	154	128	130	0.10	6247854
Total Beryllium (Be)	mg/kg	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6247854
Total Bismuth (Bi)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6247854
Total Cadmium (Cd)	mg/kg	0.246	0.293	0.240	0.220	0.222	0.253	0.231	0.230	0.050	6247854
Total Calcium (Ca)	mg/kg	11200	12000	19100	16700	17500	18400	19400	15900	100	6247854
Total Chromium (Cr)	mg/kg	9.0	9.2	7.0	7.0	7.2	6.7	6.3	6.4	1.0	6247854
Total Cobalt (Co)	mg/kg	6.01	6.52	5.88	5.73	5.96	5.32	5.20	5.25	0.30	6247854
Total Copper (Cu)	mg/kg	11.6	10.5	8.20	8.69	11.0	7.13	7.12	7.75	0.50	6247854
Total Iron (Fe)	mg/kg	15600	16700	14300	14200	14200	12200	11600	13600	100	6247854
Total Lead (Pb)	mg/kg	7.64	11.7	5.73	6.08	6.60	5.64	5.12	5.28	0.10	6247854
Total Lithium (Li)	mg/kg	7.4	7.5	6.3	6.8	6.6	6.2	5.9	5.6	5.0	6247854
Total Magnesium (Mg)	mg/kg	3520	4150	4910	4670	5340	5150	4920	4280	100	6247854
Total Manganese (Mn)	mg/kg	300	310	316	268	302	249	270	259	0.20	6247854
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6247854
Total Molybdenum (Mo)	mg/kg	1.44	1.47	1.20	1.31	1.31	1.16	1.12	1.22	0.10	6247854
Total Nickel (Ni)	mg/kg	15.5	15.7	14.1	14.1	14.7	12.2	12.8	13.7	0.80	6247854
Total Phosphorus (P)	mg/kg	451	476	790	399	371	362	389	378	10	6247854
Total Potassium (K)	mg/kg	592	600	472	528	539	522	469	451	100	6247854
Total Selenium (Se)	mg/kg	0.56	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6247854
Total Silver (Ag)	mg/kg	0.075	0.089	0.062	0.077	0.080	<0.050	0.077	0.072	0.050	6247854
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	100	6247854
Total Strontium (Sr)	mg/kg	33.7	31.4	39.4	31.8	35.2	31.6	32.9	31.2	0.10	6247854
Total Thallium (Tl)	mg/kg	0.094	0.098	0.080	0.085	0.108	0.076	0.083	0.073	0.050	6247854
Total Tin (Sn)	mg/kg	0.23	0.22	0.19	0.19	0.21	0.19	0.16	0.15	0.10	6247854
Total Titanium (Ti)	mg/kg	39.8	38.9	52.4	61.1	49.9	82.5	61.3	57.8	1.0	6247854
Total Uranium (U)	mg/kg	0.658	0.636	0.669	0.607	0.642	0.620	0.597	0.562	0.050	6247854
Total Vanadium (V)	mg/kg	21.9	22.9	18.3	18.8	18.0	18.6	15.8	15.5	2.0	6247854
Total Zinc (Zn)	mg/kg	51.9	53.3	43.3	42.3	44.9	37.4	37.3	39.0	1.0	6247854
Total Zirconium (Zr)	mg/kg	1.78	1.47	2.13	2.41	2.06	2.28	2.50	2.37	0.50	6247854

RDL = Reportable Detection Limit

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

LEAD IN PAINT CHIPS (SOLID)

Maxxam ID		ER4171	ER4172	ER4172	ER4173		
Sampling Date		2012/10/05	2012/10/05	2012/10/05	2012/10/05		
	UNITS	**TK-LP-1**	**TK-LP-2**	**TK-LP-2 Lab-Dup**	**TK-LP-3**	**RDL**	**QC Batch**
Total Metals by ICP							
Total Lead (Pb)	mg/kg	997	1330	1350	305	2.0	6253408

Maxxam ID		ER4174		ER4175		ER4176	ER4177	ER4178	ER4179		
Sampling Date		2012/10/05		2012/10/05		2012/10/05	2012/10/05	2012/10/05	2012/10/05		
	UNITS	**TK-LP-4**	**RDL**	**TK-LP-5**	**RDL**	**TK-LP-6**	**TK-LP-7**	**TK-LP-8**	**TK-LP-9**	**RDL**	**QC Batch**
Total Metals by ICP											
Total Lead (Pb)	mg/kg	361	2.0	14800(1)	20	13.3	52.1	50.1	1310	2.0	6253408

RDL = Reportable Detection Limit
(1) - Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Analytics International Corporation o/a Maxxam Analytics, Unit D - 675 Berry Street, Winnipeg, MB, R3H 1A7, Tel: (204) 772-7276, Fax: (204) 772-2386 www.maxxam.ca

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

Package 1	5.9°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

For Asbestos:

ND = Not detected. Below reportable detection limit of 0.5%
All samples are homogeneous
Site Location: Tuktoyaktuk

Sample ER4393-01: 1 layer: Brown fibrous mix

Maxxam Analytics International Corporation o/a Maxxam Analytics, Unit D - 675 Berry Street, Winnipeg, MB, R3H 1A7, Tel: (204) 772-7276, Fax: (204) 772-2386 www.maxxam.ca

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6243597	O-TERPHENYL (sur.)	2012/10/15	84	50 - 130	83	50 - 130	88	%				
6243597	F2 (C10-C16 Hydrocarbons)	2012/10/15	106	50 - 130	110	80 - 120	<20	mg/kg	NC	50		
6243597	F3 (C16-C34 Hydrocarbons)	2012/10/15	102	50 - 130	106	80 - 120	<20	mg/kg	NC	50		
6243597	F4 (C34-C50 Hydrocarbons)	2012/10/15	94	50 - 130	99	80 - 120	<20	mg/kg	NC	50		
6243671	4-BROMOFLUOROBENZENE (sur.)	2012/10/13	97	60 - 140	97	60 - 140	100	%				
6243671	D10-ETHYLBENZENE (sur.)	2012/10/13	114	30 - 130	108	30 - 130	105	%				
6243671	D4-1,2-DICHLOROETHANE (sur.)	2012/10/13	87	60 - 140	88	60 - 140	91	%				
6243671	D8-TOLUENE (sur.)	2012/10/13	106	60 - 140	105	60 - 140	106	%				
6243671	Benzene	2012/10/13	81	60 - 140	79	60 - 140	<0.0050	mg/kg	NC	50		
6243671	Toluene	2012/10/13	85	60 - 140	82	60 - 140	<0.020	mg/kg	NC	50		
6243671	Ethylbenzene	2012/10/13	97	60 - 140	94	60 - 140	<0.010	mg/kg	NC	50		
6243671	m & p-Xylene	2012/10/13	93	60 - 140	90	60 - 140	<0.040	mg/kg	NC	50		
6243671	o-Xylene	2012/10/13	92	60 - 140	89	60 - 140	<0.020	mg/kg	NC	50		
6243671	Methyl-tert-butylether(MTBE)	2012/10/13	81	60 - 140	81	60 - 140	<0.10	mg/kg	NC	N/A		
6243671	(C6-C10)	2012/10/13	119	60 - 140	112	60 - 140	<10	mg/kg	NC	50		
6243671	Xylenes (Total)	2012/10/13					<0.040	mg/kg	NC	50		
6243671	F1 (C6-C10) - BTEX	2012/10/13					<10	mg/kg	NC	50		
6243672	Moisture	2012/10/12					<0.3	%	3.2	20		
6244464	4-BROMOFLUOROBENZENE (sur.)	2012/10/12	98	60 - 140	98	60 - 140	98	%				
6244464	D10-ETHYLBENZENE (sur.)	2012/10/12	128	30 - 130	123	30 - 130	120	%				
6244464	D4-1,2-DICHLOROETHANE (sur.)	2012/10/12	95	60 - 140	94	60 - 140	103	%				
6244464	D8-TOLUENE (sur.)	2012/10/12	104	60 - 140	105	60 - 140	102	%				
6244464	Benzene	2012/10/12	93	60 - 140	88	60 - 140	<0.0050	mg/kg	NC	50		
6244464	Toluene	2012/10/12	95	60 - 140	92	60 - 140	<0.020	mg/kg	NC	50		
6244464	Ethylbenzene	2012/10/12	109	60 - 140	105	60 - 140	<0.010	mg/kg	NC	50		
6244464	m & p-Xylene	2012/10/12	106	60 - 140	101	60 - 140	<0.040	mg/kg	NC	50		
6244464	o-Xylene	2012/10/12	104	60 - 140	99	60 - 140	<0.020	mg/kg	NC	50		
6244464	Methyl-tert-butylether(MTBE)	2012/10/12	96	60 - 140	91	60 - 140	<0.10	mg/kg				
6244464	(C6-C10)	2012/10/12	127	60 - 140	118	60 - 140	<10	mg/kg	NC	50		
6244464	Xylenes (Total)	2012/10/12					<0.040	mg/kg	NC	50		
6244464	F1 (C6-C10) - BTEX	2012/10/12					<10	mg/kg	NC	50		
6244466	O-TERPHENYL (sur.)	2012/10/11	87	50 - 130	86	50 - 130	85	%				
6244466	F2 (C10-C16 Hydrocarbons)	2012/10/11	98	50 - 130	100	80 - 120	<20	mg/kg	NC	50		
6244466	F3 (C16-C34 Hydrocarbons)	2012/10/11	100	50 - 130	100	80 - 120	<20	mg/kg	NC	50		
6244466	F4 (C34-C50 Hydrocarbons)	2012/10/11	99	50 - 130	98	80 - 120	<20	mg/kg	NC	50		
6244468	Moisture	2012/10/12					<0.3	%	0	20		
6247854	Total Antimony (Sb)	2012/10/12	91	75 - 125	98	75 - 125	<0.10	mg/kg	5.0	30	93	70 - 130
6247854	Total Arsenic (As)	2012/10/12	95	75 - 125	97	75 - 125	<0.50	mg/kg	19.9	30	95	70 - 130
6247854	Total Barium (Ba)	2012/10/12	NC	75 - 125	98	75 - 125	<0.10	mg/kg	0.7	35	98	70 - 130
6247854	Total Beryllium (Be)	2012/10/12	103	75 - 125	100	75 - 125	<0.40	mg/kg	NC	30		

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6247854	Total Cadmium (Cd)	2012/10/12	102	75 - 125	100	75 - 125	<0.050	mg/kg	3.9	30	103	70 - 130
6247854	Total Chromium (Cr)	2012/10/12	103	75 - 125	99	75 - 125	<1.0	mg/kg	5.0	30	99	70 - 130
6247854	Total Cobalt (Co)	2012/10/12	97	75 - 125	98	75 - 125	<0.30	mg/kg	5.8	30	85	70 - 130
6247854	Total Copper (Cu)	2012/10/12	98	75 - 125	98	75 - 125	<0.50	mg/kg	2.0	30	87	70 - 130
6247854	Total Lead (Pb)	2012/10/12	102	75 - 125	101	75 - 125	<0.10	mg/kg	0.6	35	95	70 - 130
6247854	Total Lithium (Li)	2012/10/12	101	75 - 125	97	75 - 125	<5.0	mg/kg	NC	30		
6247854	Total Manganese (Mn)	2012/10/12	NC	75 - 125	100	75 - 125	0.33, RDL=0.20	mg/kg	3.1	30	96	70 - 130
6247854	Total Mercury (Hg)	2012/10/12	103	75 - 125	100	75 - 125	<0.050	mg/kg	NC	35	80	70 - 130
6247854	Total Molybdenum (Mo)	2012/10/12	108	75 - 125	104	75 - 125	<0.10	mg/kg	6.3	35	105	70 - 130
6247854	Total Nickel (Ni)	2012/10/12	NC	75 - 125	96	75 - 125	<0.80	mg/kg	4.4	30	86	70 - 130
6247854	Total Selenium (Se)	2012/10/12	100	75 - 125	101	75 - 125	<0.50	mg/kg	NC	30		
6247854	Total Silver (Ag)	2012/10/12	99	75 - 125	100	75 - 125	<0.050	mg/kg	NC	35		
6247854	Total Strontium (Sr)	2012/10/12	NC	75 - 125	100	75 - 125	<0.10	mg/kg	0.3	35	99	70 - 130
6247854	Total Thallium (Tl)	2012/10/12	95	75 - 125	95	75 - 125	<0.050	mg/kg	NC	30	86	70 - 130
6247854	Total Tin (Sn)	2012/10/12	95	75 - 125	97	75 - 125	<0.10	mg/kg	NC	35		
6247854	Total Titanium (Ti)	2012/10/12	NC	75 - 125	104	75 - 125	<1.0	mg/kg	0.3	35	103	70 - 130
6247854	Total Uranium (U)	2012/10/12	100	75 - 125	98	75 - 125	<0.050	mg/kg	0.9	30	102	70 - 130
6247854	Total Vanadium (V)	2012/10/12	NC	75 - 125	97	75 - 125	<2.0	mg/kg	2.4	30	96	70 - 130
6247854	Total Zinc (Zn)	2012/10/12	NC	75 - 125	101	75 - 125	<1.0	mg/kg	0.5	30	92	70 - 130
6247854	Total Aluminum (Al)	2012/10/12					<100	mg/kg	1	35	109	70 - 130
6247854	Total Calcium (Ca)	2012/10/12					<100	mg/kg	0.8	30	90	70 - 130
6247854	Total Iron (Fe)	2012/10/12					<100	mg/kg	0.3	30	89	70 - 130
6247854	Total Magnesium (Mg)	2012/10/12					<100	mg/kg	4.1	30	87	70 - 130
6247854	Total Phosphorus (P)	2012/10/12					<10	mg/kg	0.2	30	87	70 - 130
6247854	Total Bismuth (Bi)	2012/10/12					<0.10	mg/kg	NC	30		
6247854	Total Potassium (K)	2012/10/12					<100	mg/kg	2.5	35		
6247854	Total Sodium (Na)	2012/10/12					<100	mg/kg	0.5	35		
6247854	Total Zirconium (Zr)	2012/10/12					<0.50	mg/kg	NC	30		
6247867	Soluble (2:1) pH	2012/10/13			102	96 - 104			0.1	20		

Maxxam Analytics International Corporation o/a Maxxam Analytics, Unit D - 675 Berry Street, Winnipeg, MB, R3H 1A7, Tel: (204) 772-7276, Fax: (204) 772-2386 www.maxxam.ca

Maxxam Job #: B290821
Report Date: 2012/10/25

KGS Group
Client Project #: 12-0163-002.1003
Site Location: TUKTOYAKTUK
Sampler Initials: GA

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6253408	Total Lead (Pb)	2012/10/15					<2.0	mg/kg	2.1	35	102	80 - 120
6282156	F4G-SG (Heavy Hydrocarbons-Grav.)	2012/10/24			117	70 - 130	<500	mg/kg	NC	50		

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

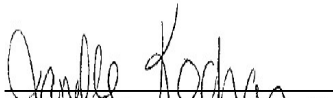
Maxxam Analytics International Corporation o/a Maxxam Analytics, Unit D - 675 Berry Street, Winnipeg, MB, R3H 1A7, Tel: (204) 772-7276, Fax: (204) 772-2386 www.maxxam.ca

Validation Signature Page

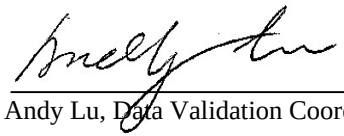
Maxxam Job #: B290821

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

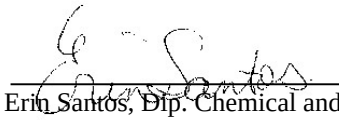
Hua Wo, Organics Supervisor



Janelle Kochan, B.Sc., Project Manager



Andy Lu, Data Validation Coordinator



Erin Santos, Dip. Chemical and Biosciences, Laboratory Coordinator

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics, Unit D - 675 Berry Street, Winnipeg, MB, R3H 1A7, Tel: (204) 772-7276, Fax: (204) 772-2386 www.maxxam.ca

Maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
D-675 Berry Street, Winnipeg, Manitoba Canada R3H 1A7 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 1 of 5

INVOICE INFORMATION		REPORT INFORMATION (if differs from invoice)		PROJECT INFORMATION	
Company Name:	#7500 KGS Group	Company Name:		Quotation #:	B21062
Contact Name:	Ganga Atmuri	Contact Name:		P.O. #:	
Address:	3rd Floor 865 Waverly St	Address:		Project #:	12-0163-002.1003
	Winnipeg MB R3T 5T4			Project Name:	
Phone:	(204)896-1209 Fax:	Phone:	Fax:	Site #:	TUKTOYAKTUK
Email:	gatmuri@kgsgroup.com	Email:		Sampled By:	BURNS/ATMURI

Laboratory Use Only:	
MAXXAM JOB #:	BOTTLE ORDER #:
B290821	
CHAIN OF CUSTODY #:	PROJECT MANAGER:
	Jonelle Rochon

REGULATORY CRITERIA:

SPECIAL INSTRUCTIONS

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSES REQUESTED (Please be specific)

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

#	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water? (Y/N)	Metals Field Filtered? (Y/N)	BTEX/F1-F4 in Soil	CCME Metals in Soil	CCME PAH in Soil	Lead in Paint Chips	ASBESTOS BY TEM, 0.1%	Asbestos in Bulk (0.5%)	PSA Coarse/Fine (75 micron)	# of Bottles	Comments
1	ER4141	TK-THBKG-A	04/5/12	11:00	soil			X	X						3	
2	42	TK-THBKG-B	↓	11:00	↓			X	X						3	
3	43	TK-TH1A		11:10				X	X						3	
4	44	TK-TH1B		11:10				X							2	
5	45	TK-TH2A		11:20				X	X						3	
6	46	TK-TH2B		11:20				X							2	10:30 mg
7	47	TK-TH3A		11:30				X	X						3	
8	48	TK-TH3B		11:30				X							2	ARRIVED AT DEPOT:
9	49	TK-TH4A		11:40				X	X						3	OCT 07 2012
10	↓ 50	TK-TH4B	↓	11:40	↓			X							2	TEMP: 8/9/8

*RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	# Jars Used And Not Submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
			Amanda	12/10/09	10:00		☐	5,2, 5,3, 7,1	☐ Yes ☐ No

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam — Maxxam Analytics International Corporation o/a Maxxam Analytics
D-675 Berry Street, Winnipeg, Manitoba Canada R3H 1A7 Tel (204) 772-9276 Toll-free (800) 665-8566 Fax (204) 772-2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION
Company Name: #7500 KGS Group
Contact Name: Ganga Atmuri
Address: 3rd Floor 865 Waverly St, Winnipeg MB R3T 5T4
Phone: (204)896-1209 Fax:
Email: gatmuri@kgsgroup.com

REPORT INFORMATION (if differs from invoice)
Company Name: KGS GROUP
Contact Name: BONNIE HOFFMANIS
Address: SAME
Phone: Fax:
Email:

PROJECT INFORMATION
Quotation #: B21082
P.O. #:
Project #: 12-0153-0028 : 1003
Project Name:
Site #: TUKTOYAKTUK
Sampled By: J.GINS / G. Atmuri

Laboratory Use Only:
MAXXAM JOB #: B290821
BOTTLE ORDER #:
CHAIN OF CUSTODY #: CK12128-10-01
PROJECT MANAGER: Janelle Nobles

REGULATORY CRITERIA

SPECIAL INSTRUCTIONS

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

TURNAROUND TIME (TAT) REQUIRED:
PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Regular (Standard) TAT: (will be applied if Rush TAT is not specified)
Standard TAT = 5-7 working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.
Job Specific Rush TAT (if applies to entire submission)
Date Required: Time Required:
Rush Confirmation Number: (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water (Y/N)	Metals Field Filtered (Y/N)	BTEX/F1-F4 in Soil	CCME Metals in Soil	CCME PAH in Soil	Lead in Paint Chips	ASBESTOS BY TEM, 0.1%	Asbestos in Bulk (0.5%)	PSA Coarse/Fines (75 micron)				# of Bottles	Comments
1	ER4151	TK-TH5A	Oct.5/12	11:50	SOIL			X	X									3	
2	52	TK-TH5B		11:50				X										2	
3	53	TK-TH6A		12:00				X	X									3	
4	54	TK-TH6B		12:00				X										2	
5	55	TK-TH7A		12:10				X	X									3	
6	56	TK-TH7B		12:10				X										2	10:30 TMG
7	57	TK-TH8A		12:20				X	X									3	
8	58	TK-~~TH8A~~ TH8B		12:20				X										2	ARRIVED AT DEPOT:
9	59	TK-TH9A		12:30				X	X									2	OCT 07 2012
10	60	TK-TH~~10A~~ 9B		12:30				X										2	TEMP: 8.9 8.1

*RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	# Jars Used and Not Submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
			Amanda	12/10/09	10:00		☐	5.2, 5.3, 7.1	☐ Yes ☐ No

*IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam — Maxxam Analytics International Corporation o/a Maxxam Analytics

D-675 Berry Street, Winnipeg, Manitoba Canada R3H 1A7 Tel (204) 772-7276 Toll-free (800) 665-8566 Fax (204) 772-2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 3 of 5

INVOICE INFORMATION		REPORT INFORMATION (if differs from invoice)	PROJECT INFORMATION	
Company Name	#7500 KGS Group	Company Name:	Quotation #:	B21062
Contact Name	Ganga Abdul	Contact Name:	P.O. #:	
Address	3rd Floor 865 Waverley St	Address:	Project #:	
	Winnipeg MB R3T 5T4		Project Name:	
Phone	(204)896-1209	Phone:	Site #:	TUKTOYAKTUK
Email		Email:	Sampled By:	

Laboratory Use Only: Maxxam Job #: B290821 — Chain of Custody # — Project Manager: Janelle Kochan

REGULATORY CRITERIA: — SPECIAL INSTRUCTIONS: — ANALYSIS REQUESTED (Please be specific) — TURNAROUND TIME (TAT) REQUIRED

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	BTEX/F1-F4 in Soil	CCME Metals in Soil	CCME PAH in Soil	Lead in Paint Chips	ASBESTOS BY TEM, 0.1%	Asbestos in Bulk (0.5%)	PSA Coarse/Fine (75 micron)	# of Bottles	Comments
1	ER4161	TK-TH10A	Oct 5/12	12:40	Soil	X	X						3	
2	62	TK-TH10B		12:40		X							2	
3	63	TK-TH11A		12:50		X	X						3	ARRIVED AT DEPOT:
4	64	TK-TH11B		12:50		X							2	OCT 0 7 2012
5	65	TK-TH12A		13:00		X	X						3	TEMP: 8/9/8
6	66	TK-TH12B		13:00		X							2	10:30
7	67	TK-TH100		13:10		X	X						2	
8	68	TK-TH101		13:20		X	X						2	
9	69	TK-TH2B		13:30								X	1	Bag Sample
10	70	TK-TH9A		13:40								X	1	Bag Sample

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	Laboratory Use Only: Temperature (°C) on Receipt
			Amanda	12/10/09	1000	5, 2, 5, 3, 7, 1

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Analytics International Corporation o/a Maxxam Analytics

CHAIN OF CUSTODY RECORD

Page 4 of 5

INVOICE INFORMATION	
Company Name	#7500 KGS Group
Contact Name	Ganga Almuti
Address	3rd Floor 865 Waverley St, Winnipeg MB R3T 5T4
Phone	(204)896-1209
Email	galmuti@kgsgroup.com

REPORT INFORMATION (if differs from invoice)	
Company Name	KGS Group
Contact Name	Ronald Hoffensetz
Address	SAME

PROJECT INFORMATION	
Quotation #	B21062
P.O. #	
Project #	12-0168-002.1003
Project Name	
Site #	TUKTOYAKTUK
Sampled By	J Bedard / R Atkinson

Laboratory Use Only	
MAXXAM JOB #	B290821
PROJECT MANAGER	Janelle Yochim

TURNAROUND TIME (TAT) REQUIRED: Regular (Standard) TAT (circled)

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

#	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	BTEX/F1-F4 in Soil	CCME Metals in Soil	CCME PAH in Soil	Lead in Paint Chips	ASBESTOS BY TEM, 0.1%	Asbestos in Bulk (0.5%)	PSA Coarse/Fine (75 micron)				# of Bottles	Comments
1	ER4171	TK-LP-1	Oct.5/12	-	Bulk (Paint)				X							1	BAG * Paint / Bulk samples submitted in bags.
2	72	TK-LP-2	↓		↓				X							1	
3	73	TK-LP-3							X							1	
4	74	TK-LP-4							X							1	ARRIVED AT DEPOT:
5	75	TK-LP-5							X							1	OCT 07 2012
6	76	TK-LP-6							X							1	HOLD TEMP: 8,9,8 DON'T ANALYZE
7	77	TK-LP-7							X							1	HOLD, " "
8	78	TK-LP-8							X							1	HOLD, " "
9	79	TK-LP-9							X							1	HOLD, " "
10	80	TK-ACM-1	↓		Bulk					X						1	10:30 mg

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	Temperature (°C) on Receipt
			Amanda	12/10/09	10:00	5,2,5,3,7,1

*IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
D-675 Berry Street, Winnipeg, Manitoba Canada R3H 1A7 Tel:(204) 772-7276 Toll-free:(800) 668-9878 Fax:(204) 772-2386 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE INFORMATION:
Company Name: 87300 KGS Group
Contact Name: Glenys Ahmun
Address: 3rd Floor 865 Waverly St
Winnipeg MB R3T 5T4
Phone: (204)896-1209 Fax:
Email: gahmun@kgsgroup.com

REPORT INFORMATION (if differs from invoice):
Company Name:
Contact Name: Connie Hoffmeister
Address: Same
Phone: Fax:
Email:

PROJECT INFORMATION:
Quotation #: B21062
P.O. #:
Project #: 12-0168-0001/1003
Project Name:
Site #: TUKTOYAKTUK
Sampled By: G Ahmun / Connie Hoffmeister

Laboratory Use Only:
MAXXAM JOB #: B290821
BOTTLE ORDER #:
CHAIN OF CUSTODY #: CH03219-08-01
PROJECT MANAGER: Janella Kocher

REGULATORY CRITERIA:

SPECIAL INSTRUCTIONS:

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

TURNAROUND TIME (TAT) REQUIRED:
PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Regular (Standard TAT):
(will be applied if no TAT is specified)
Standard TAT = 5-7 working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact Maxxam for details.
Job Specific Rush TAT (if applies to entire submission)
Date Required: Time Required:
Rush Confirmation Number: (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water (Y/N)	Metals (Total/Filtered) (T/F/N)	BTEX/F1-F4 in Soil	CCME Metals in Soil	CCME PAH in Soil	Lead in Paint Chips	ASBESTOS BY TEM , 0.1%	Asbestos in Bulk (0.5%)	PSA Coarse/Fine (75 micron)	# of Bottles	Comments
1	ER4393	TK-ACM-2	Oct.5/12		Bulk								X		1	bag Bulk samples submitted in bags
2	↓ 94	TK-ACM-3	Oct.5/12		Bulk							X			1	
3																
4																
5																
6																
7																
8																
9																
10																

10:30
ARRIVED AT DEPOT:
OCT 07 2012
TEMP: 8.9 8

*RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	# Jars Used and Not Submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
			Amanda	12/10/09	1035D		☐	5.2, 5.3, 7.1	☐ Yes ☐ No

*IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

October 22, 2012

Janelle Kochan
MAXXAM ANALYTICS
D-675 Berry Street
Winnipeg, Manitoba R3H 1A7

Bureau Veritas Work Order No. A1210116

Reference: B290821

Dear Janelle Kochan:

Bureau Veritas North America, Inc. received 2 samples on October 10, 2012 for the analyses presented in the following report.

The results apply only to the samples analyzed in this project. Please note that any unused portion of the samples will be discarded after a sixty-day holding period, unless you have requested otherwise.

This material is confidential and is intended solely for the person to whom it is addressed. If this is received in error, please contact the number provided below.

We appreciate the opportunity to assist you. If you have any questions concerning the report, please contact the analyst whose name appears on the report or myself at (770) 499-7701.

Sincerely,

Kuntal Parikh

Kuntal Parikh

Senior Microscopist

Electronic signature authorized through password protection

cc: Janelle Kochan

Bureau Veritas North America, Inc.

Health, Safety, and Environmental Services
3380 Chastain Meadows Parkway, Suite 300
Kennesaw, GA 30144

Main: (770) 499-7701
Fax: (770) 499-7511
www.us.bureauveritas.com

CASE NARRATIVE

Date: *22-Oct-12*

CLIENT: MAXXAM ANALYTICS

Project: B290821

Work Order No A1210116

QUANTITATIVE ANALYSIS OF BULK SAMPLES FOR ASBESTOS USING TRANSMISSION ELECTRON MICROSCOPY (TEM)

Upon receipt in the laboratory, samples are ground until homogeneous. Each sample is weighed in a tared silica crucible. The sample is placed in a muffle furnace at a temperature of 480C for at least 3 hours or until the weight has stabilized. The sample is allowed to cool to room temperature and immediately weighed to calculate percent organic loss.

Approximately 1 ml of nondiluted HCL acid is slowly added to remove calcite and dolomite from the ashed sample. After evolution of CO2 gas has ceased, the sample is immediately diluted with ultra-pure water. The sample is then dispersed in 50 ml of ultra-pure water and filtered onto a pre-weighed 47 mm, 0.45 um pore size, MCE filter. The filter is dried on a slide warmer and weighed once again.

A 1 cm2 portion of the filter is cut and placed in a clean silica crucible. Approximately 250 ul of both 20 ppm methyl cellulose solution and isopropyl alcohol are added and ultra-sonicated for 1 minute to remove the deposited sample into suspension. Approximately 3 ul of the suspension is pipetted onto a carbon-coated copper TEM grid and allowed to dry.

Grids are examined in the TEM at 15,000X magnification. Asbestos is identified using morphology, selected area electron diffraction, and energy-dispersive x-ray spectroscopy. From TEM examination, a visual area estimation is made of asbestos in the final residue. Percent asbestos in the final residue is then extrapolated using gravimetric records to percent asbestos in the total sample. Asbestos structures may be counted obtain fiber length and width information as well as mass values and are shown as a separate report. Structures meeting a 3:1 aspect ratio and greater than 0.5 microns are counted. When 10 grid openings or 100 structures are counted the analysis is terminated.

The Kennesaw, Georgia lab is accredited by NVLAP –Lab Code 101125-0.

References

Chatfield Method for Quantitative Analysis of Bulk Samples for Asbestos Using Transmission Electron Microscopy (unpublished).

United States Environmental Protection Agency. Method for the Determination of Asbestos in Bulk Building Materials. EPA-600/R-93/116, July 1993 (PLM)

CLIENT:	MAXXAM ANALYTICS
Project:	B290821
Work Order No	A1210116

NOTE: Some of the samples may have contained inseparable layers which were combined during preparation. Performed fiber sizing. Asbestos structures containing fibers which meet a >5:1 length:width aspect ratio and a minimum length of 0.5 micrometers are identified using morphology, selected area electron diffraction, and energy-dispersive x-ray spectroscopy. Fibers are classified by structure type, are sized (length and width), and are identified as chrysotile, amphibole, ambiguous, or non-asbestos. up to 100 fibers or 10 grid openings. The final weight percentage result for fiber sizing counts was based on the actual weight of the sample taken for ashing.

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method: TEM Full-Quant Analysis EPA/600/R-93/116
Sample Type: Bulk
Reporting Limit (% by Weight): 0.1

Date Received: 10/10/2012 3:13:30 PM
Report Date: 10/22/2012 4:33:29 PM
Grid Box Identification: 10-15-12C-1

Lab Sample No.	Client Sample Identification	Date Sampled	Analysis Date	Analyst	Sample Description (Morphology)	Asbestos Identification	(%)*	Total Asbestos (%)**
A1210116-001A	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/18/12 @10:56 am	KRP	Beige Floor Tile	Chrysotile	40	3.5
A1210116-001B	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/17/12 @2:27 pm	KRP	Yellow Mastic	Chrysotile	20	5.5
A1210116-002A	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/17/12 @2:27 pm	KRP	Gray Fibrous Material	Chrysotile	40	23
A1210116-002B	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/17/12 @2:27 pm	KRP	White Resinous Material	Chrysotile	70	3.1
A1210116-002C	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/17/12 @2:27 pm	KRP	Yellow Mastic	Chrysotile	50	4.5

<: Result is less than the indicated limit of detection. --: Present but below the detection limit
*: The visual area estimation of asbestos content in the final residue.
**: The calculated total percent asbestos in the sample as received.

Analyst(s) Name/Date: Kuntal Parikh 10/22/2012

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method: TEM Full-Quant Count Analysis EPA/600/R-93/116 Date Received: 10/10/2012 3:13:

Sample Type: Bulk Report Date: 10/22/2012 4:33:

Grid Opening Size: 0.0112 mm²

Lab Sample No.	Client Sample Identification	Date Sampled	Sample Amt (ug)	Filter	EFA (mm²)	Analysis Date	Analyst	Grid Box Identification
A1210116-001A	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	180700	MCE Filter, .45um	1320	10/17/12 @2:27 pm	KRP	10-15-12C-1

Analysis	Grid Openings Counted	Reporting Limit (s/mm²)	Total Asbestos (s/mm²)	Structures Counted			Total Asbestos					
				Chry-sotile	Amph-ibole	Total	Chrysotile (s/ug)	Amphibole (s/ug)	Total (s/ug)	Total (ug)	Total (% by WT)	Sensitivity (s/ug)
Asbestos	2	4.4	5,000	112	0	112	36	< 0.032	36	115	0.064	0.032

Lab Sample No.	Client Sample Identification	Date Sampled	Sample Amt (ug)	Filter	EFA (mm²)	Analysis Date	Analyst	Grid Box Identification
A1210116-001B	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	144100	MCE Filter, .45um	1320	10/18/12 @10:55 am	KRP	10-15-12C-1

Analysis	Grid Openings Counted	Reporting Limit (s/mm²)	Total Asbestos (s/mm²)	Structures Counted			Total Asbestos					
				Chry-sotile	Amph-ibole	Total	Chrysotile (s/ug)	Amphibole (s/ug)	Total (s/ug)	Total (ug)	Total (% by WT)	Sensitivity (s/ug)
Asbestos	1	8.9	9,700	109	0	109	89	< 0.081	89	197	0.14	0.081

MCEF: Mixed Cellulose Ester Filter

s/mm²: Structures per square millimeter

"--" : No Results (Air Volume is 0)

s/ug: Structures per microgram of sample.

<: Result is less than the indicated limit of detection.

Note 1: Structures counted contain fibers which met a≥ 5:1 (length:width) aspect ratio and wer ≥ 0.5um in length

Note 2: AHERA sampling criteria requires that >1200 liters of air be collected on 0.45um filters. Deviation from thses requirements may results in a high analytical sensitivity. Structurs/cc values are based on client air volumes.

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method: TEM Full-Quant Count Analysis EPA/600/R-93/116 Date Received: 10/10/2012 3:13:

Sample Type: Bulk Report Date: 10/22/2012 4:33:

Grid Opening Size: 0.0112 mm²

Lab Sample No.	Client Sample Identification	Date Sampled	Sample Amt (ug)	Filter	EFA (mm²)	Analysis Date	Analyst	Grid Box Identification
A1210116-002A	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	44900	MCE Filter, .45um	1320	10/18/12 @10:56 am	KRP	10-15-12C-1

Analysis	Grid Openings Counted	Reporting Limit (s/mm²)	Total Asbestos (s/mm²)	Structures Counted			Total Asbestos					
				Chry-sotile	Amph-ibole	Total	Chrysotile (s/ug)	Amphibole (s/ug)	Total (s/ug)	Total (ug)	Total (% by WT)	Sensitivity (s/ug)
Asbestos	1	8.9	9,900	111	0	111	290	< 0.26	290	92.2	0.21	0.26

Lab Sample No.	Client Sample Identification	Date Sampled	Sample Amt (ug)	Filter	EFA (mm²)	Analysis Date	Analyst	Grid Box Identification
A1210116-002B	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	90800	MCE Filter, .45um	1320	10/18/12 @10:55 am	KRP	10-15-12C-1

Analysis	Grid Openings Counted	Reporting Limit (s/mm²)	Total Asbestos (s/mm²)	Structures Counted			Total Asbestos					
				Chry-sotile	Amph-ibole	Total	Chrysotile (s/ug)	Amphibole (s/ug)	Total (s/ug)	Total (ug)	Total (% by WT)	Sensitivity (s/ug)
Asbestos	10	0.89	810	91	0	91	12	< 0.013	12	369	0.41	0.013

MCEF: Mixed Cellulose Ester Filter

s/mm²: Structures per square millimeter

"--" : No Results (Air Volume is 0)

s/ug: Structures per microgram of sample.

<: Result is less than the indicated limit of detection.

Note 1: Structures counted contain fibers which met a≥ 5:1 (length:width) aspect ratio and wer ≥ 0.5um in length

Note 2: AHERA sampling criteria requires that >1200 liters of air be collected on 0.45um filters. Deviation from thses requirements may results in a high analytical sensitivity. Structurs/cc values are based on client air volumes.

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method: TEM Full-Quant Count Analysis EPA/600/R-93/116 Date Received: 10/10/2012 3:13:

Sample Type: Bulk Report Date: 10/22/2012 4:33:

Grid Opening Size: 0.0112 mm²

Lab Sample No.	Client Sample Identification	Date Sampled	Sample Amt (ug)	Filter	EFA (mm²)	Analysis Date	Analyst	Grid Box Identification
A1210116-002C	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	8800	MCE Filter, .45um	1320	10/18/12 @10:27 am	KRP	10-15-12C-1

Analysis	Grid Openings Counted	Reporting Limit (s/mm²)	Total Asbestos (s/mm²)	Structures Counted			Total Asbestos					
				Chry-sotile	Amph-ibole	Total	Chrysotile (s/ug)	Amphibole (s/ug)	Total (s/ug)	Total (ug)	Total (% by WT)	Sensitivity (s/ug)
Asbestos	1	8.9	9,200	103	0	103	1,400	< 1.3	1,400	90.9	1.0	1.3

MCEF: Mixed Cellulose Ester Filter

s/mm²: Structures per square millimeter

"--" : No Results (Air Volume is 0)

s/ug: Structures per microgram of sample.

<: Result is less than the indicated limit of detection.

Note 1: Structures counted contain fibers which met a≥ 5:1 (length:width) aspect ratio and wer ≥ 0.5um in length

Note 2: AHERA sampling criteria requires that >1200 liters of air be collected on 0.45um filters. Deviation from thses requirements may results in a high analytical sensitivity. Structurs/cc values are based on client air volumes.

Analyst(s) Name/Date: Kunal Parikh 10/22/2012

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001A	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/17/12 @2:27 pm	KRP	10-15-12C-1

Analysis	Grid Openings Counted	Reporting Limit (s/mm²)	Total Asbestos (s/mm²)	Structures Counted			Total Asbestos				95 % Confidence Limit	
				Chry-sotile	Amph-ibole	Total	Chrysotile (s/ug)	Amphibole (s/ug)	Total (s/ug)	Sensitivity (s/ug)	Low	High
Asbestos	2	4.4	5,000	112	0	112	36	< 0.032	36	0.032	25	54

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identifi-cation	Structure Type	Length (um)	Width (um)	Comment
1	A1	E4A	1	1		F	1.0	0.1	Chrysotile
2	A1	E4A	1	1		F	1.0	0.1	Chrysotile
3	A1	E4A	0	1		M	1.4	0.1	Chrysotile
4	A1	E4A	1	1		F	0.7	0.1	Chrysotile
5	A1	E4A	1	1		F	1.0	0.1	Chrysotile
6	A1	E4A	1	1		F	1.0	0.1	Chrysotile
7	A1	E4A	1	1		F	1.2	0.1	Chrysotile
8	A1	E4A	1	1		F	1.0	0.1	Chrysotile
9	A1	E4A	1	1		F	0.8	0.1	Chrysotile
10	A1	E4A	1	1		F	0.7	0.1	Chrysotile
11	A1	E4A	1	1		F	0.8	0.1	Chrysotile
12	A1	E4A	1	1		F	1.0	0.1	Chrysotile
13	A1	E4A	1	1		F	0.8	0.1	Chrysotile
14	A1	E4A	1	1		F	1.0	0.1	Chrysotile
15	A1	E4A	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001A	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/17/12 @2:27 pm	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
16	A1	E4A	1	1		F	1.0	0.1	Chrysotile
17	A1	E4A	1	1		F	1.4	0.1	Chrysotile
18	A1	E4A	1	1		F	1.0	0.1	Chrysotile
19	A1	E4A	1	1		F	1.0	0.1	Chrysotile
20	A1	E4A	1	1		F	0.8	0.1	Chrysotile
21	A1	E4A	1	1		F	0.7	0.1	Chrysotile
22	A1	E4A	1	1		F	0.8	0.1	Chrysotile
23	A1	E4A	1	1		F	1.0	0.1	Chrysotile
24	A1	E4A	1	1		F	0.8	0.1	Chrysotile
25	A1	E4A	1	1		F	1.0	0.1	Chrysotile
26	A1	E4A	1	1		F	1.0	0.1	Chrysotile
27	A1	E4A	1	1		F	1.0	0.1	Chrysotile
28	A1	E4A	1	1		F	1.4	0.1	Chrysotile
29	A1	E4A	1	1		F	1.0	0.1	Chrysotile
30	A1	E4A	1	1		F	1.0	0.1	Chrysotile
31	A1	E4A	1	1		F	0.8	0.1	Chrysotile
32	A1	E4A	1	1		F	0.7	0.1	Chrysotile
33	A1	E4A	1	1		F	0.8	0.1	Chrysotile
34	A1	E4A	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001A	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/17/12 @2:27 pm	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
35	A1	E4A	1	1		F	0.8	0.1	Chrysotile
36	A1	E4A	1	1		F	1.0	0.1	Chrysotile
37	A1	E4A	1	1		F	1.0	0.1	Chrysotile
38	A1	E4A	1	1		F	1.0	0.1	Chrysotile
39	A1	E4A	1	1		F	1.4	0.1	Chrysotile
40	A1	E4A	1	1		F	1.0	0.1	Chrysotile
41	A1	E4A	0	1		M	4.1	4.1	Chrysotile
42	A1	E4A	0	1		C	2.6	1.4	Chrysotile
43	A1	E4A	1	1		F	3.8	0.1	Chrysotile
44	A1	E4A	0	1		M	7.5	4.1	Chrysotile
45	A1	E4A	0	1		M	2.1	2.1	Chrysotile
46	A1	E4A	1	1		F	0.8	0.1	Chrysotile
47	A1	E4A	1	1		F	1.0	0.1	Chrysotile
48	A1	E4A	1	1		F	1.0	0.1	Chrysotile
49	A1	E4A	1	1		F	1.0	0.1	Chrysotile
50	A1	E4A	1	1		F	1.4	0.1	Chrysotile
51	A1	E4A	1	1		F	1.0	0.1	Chrysotile
52	A1	E4A	1	1		F	1.0	0.1	Chrysotile
53	A1	E4A	1	1		F	0.8	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001A	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/17/12 @2:27 pm	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
54	A1	E4A	1	1		F	0.7	0.1	Chrysotile
55	A1	E4A	1	1		F	0.8	0.1	Chrysotile
56	A1	E4A	1	1		F	1.0	0.1	Chrysotile
57	A1	E4A	1	1		F	0.8	0.1	Chrysotile
58	A1	E4A	1	1		F	1.0	0.1	Chrysotile
59	A1	E4A	1	1		F	1.0	0.1	Chrysotile
60	A1	E4A	1	1		F	1.0	0.1	Chrysotile
61	A1	E4A	1	1		F	1.4	0.1	Chrysotile
62	A1	E4A	1	1		F	1.0	0.1	Chrysotile
63	A1	E4A	1	1		F	1.0	0.1	Chrysotile
64	A1	E4A	1	1		F	0.8	0.1	Chrysotile
65	A1	E4A	1	1		F	0.7	0.1	Chrysotile
66	A1	E4A	1	1		F	0.8	0.1	Chrysotile
67	A1	E4A	1	1		F	1.0	0.1	Chrysotile
68	A1	E4A	1	1		F	0.8	0.1	Chrysotile
69	A1	E4A	0	1		M	6.2	5.5	Chrysotile
70	A1	E4A	1	1		F	1.0	0.1	Chrysotile
71	A1	E4A	1	1		F	4.8	0.1	Chrysotile
72	A1	E4A	1	1		F	1.4	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001A	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/17/12 @2:27 pm	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
73	A1	E4A	1	1		F	1.0	0.1	Chrysotile
74	A1	E4A	1	1		F	1.0	0.1	Chrysotile
75	A1	E4A	1	1		F	0.8	0.1	Chrysotile
76	A1	E4A	1	1		F	0.7	0.1	Chrysotile
77	A1	E4A	1	1		F	0.8	0.1	Chrysotile
78	A1	E4A	1	1		F	1.0	0.1	Chrysotile
79	A1	E4A	1	1		F	0.8	0.1	Chrysotile
80	A1	E4A	1	1		F	1.0	0.1	Chrysotile
81	A1	E4A	1	1		F	1.0	0.1	Chrysotile
82	A1	E4A	1	1		F	1.0	0.1	Chrysotile
83	A1	E4A	1	1		F	1.4	0.1	Chrysotile
84	A1	E4A	1	1		F	1.0	0.1	Chrysotile
85	A1	E4A	1	1		F	1.0	0.1	Chrysotile
86	A1	E4A	1	1		F	0.8	0.1	Chrysotile
87	A1	E4A	1	1		F	0.7	0.1	Chrysotile
88	A1	E4A	1	1		F	0.8	0.1	Chrysotile
89	A1	E4A	1	1		F	1.0	0.1	Chrysotile
90	A1	E4A	1	1		F	0.8	0.1	Chrysotile
91	A1	E4A	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001A	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/17/12 @2:27 pm	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
92	A1	E4A	1	1		F	1.0	0.1	Chrysotile
93	A1	E4A	1	1		F	1.0	0.1	Chrysotile
94	A1	E4A	1	1		F	1.4	0.1	Chrysotile
95	A1	E4A	1	1		F	1.0	0.1	Chrysotile
96	A1	E4A	1	1		F	1.0	0.1	Chrysotile
97	A1	E4A	1	1		F	0.8	0.1	Chrysotile
98	A1	E4A	0	1		M	8.8	1.0	Chrysotile
99	A1	E4A	1	1		F	0.8	0.1	Chrysotile
100	A1	E4A	1	1		F	1.0	0.1	Chrysotile
101	A1	E4A	1	1		F	0.8	0.1	Chrysotile
102	A1	E4A	0	1		M	8.9	3.4	Chrysotile
103	A1	E4A	1	1		F	1.0	0.1	Chrysotile
104	A1	E4A	0	1		M	11.7	6.2	Chrysotile
105	A1	E4A	1	1		F	1.4	0.1	Chrysotile
106	A1	E4A	1	1		F	1.0	0.1	Chrysotile
107	A1	E4C	0	1		M	9.6	0.1	Chrysotile
108	A1	E4C	1	1		F	0.8	0.1	Chrysotile
109	A1	E4C	1	1		F	0.8	0.1	Chrysotile
110	A1	E4C	0	1		M	5.5	0.7	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001A	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/17/12 @2:27 pm	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
111	A1	E4C	0	1		M	2.1	0.7	Chrysotile
112	A1	E4C	1	1		F	0.8	0.1	Chrysotile
		Totals:	100	112					

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001B	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

Analysis	Grid Openings Counted	Reporting Limit (s/mm²)	Total Asbestos (s/mm²)	Structures Counted			Total Asbestos				95 % Confidence Limit	
				Chry-sotile	Amph-ibole	Total	Chrysotile (s/ug)	Amphibole (s/ug)	Total (s/ug)	Sensitivity (s/ug)	Low	High
Asbestos	1	8.9	9,700	109	0	109	89	< 0.081	89	0.081	61	130

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identifi-cation	Structure Type	Length (um)	Width (um)	Comment
1	B1	C4B	0	1		M	3.4	1.4	Chrysotile
2	B1	C4B	1	1		F	1.4	0.1	Chrysotile
3	B1	C4B	0	1		M	4.1	3.4	Chrysotile
4	B1	C4B	1	1		F	1.4	0.1	Chrysotile
5	B1	C4B	1	1		F	1.2	0.1	Chrysotile
6	B1	C4B	1	1		F	1.0	0.1	Chrysotile
7	B1	C4B	1	1		F	1.0	0.1	Chrysotile
8	B1	C4B	1	1		F	1.4	0.1	Chrysotile
9	B1	C4B	0	1		M	1.7	1.0	Chrysotile
10	B1	C4B	0	1		M	6.2	2.5	Chrysotile
11	B1	C4B	1	1		F	1.2	0.1	Chrysotile
12	B1	C4B	0	1		M	5.5	1.0	Chrysotile
13	B1	C4B	1	1		F	2.1	0.1	Chrysotile
14	B1	C4B	1	1		F	1.0	0.1	Chrysotile
15	B1	C4B	0	1		M	2.7	2.7	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001B	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
16	B1	C4B	0	1		M	4.5	2.1	Chrysotile
17	B1	C4B	1	1		F	2.4	0.1	Chrysotile
18	B1	C4B	1	1		F	1.2	0.1	Chrysotile
19	B1	C4B	1	1		F	1.0	0.1	Chrysotile
20	B1	C4B	1	1		F	1.4	0.1	Chrysotile
21	B1	C4B	1	1		F	2.1	0.1	Chrysotile
22	B1	C4B	1	1		F	0.8	0.1	Chrysotile
23	B1	C4B	1	1		F	1.4	0.1	Chrysotile
24	B1	C4B	0	1		M	10.3	1.0	Chrysotile
25	B1	C4B	1	1		F	2.1	0.1	Chrysotile
26	B1	C4B	0	1		M	2.1	1.0	Chrysotile
27	B1	C4B	1	1		F	2.4	0.7	Chrysotile
28	B1	C4B	0	1		M	1.2	1.0	Chrysotile
29	B1	C4B	1	1		F	1.0	0.1	Chrysotile
30	B1	C4B	0	1		M	2.7	0.7	Chrysotile
31	B1	C4B	1	1		F	4.1	0.3	Chrysotile
32	B1	C4B	1	1		F	1.0	0.1	Chrysotile
33	B1	C4B	1	1		F	0.8	0.1	Chrysotile
34	B1	C4B	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001B	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
35	B1	C4B	1	1		F	1.5	0.1	Chrysotile
36	B1	C4B	0	1		M	1.4	0.3	Chrysotile
37	B1	C4B	1	1		F	1.0	0.1	Chrysotile
38	B1	C4B	1	1		F	0.8	0.1	Chrysotile
39	B1	C4B	1	1		F	1.4	0.1	Chrysotile
40	B1	C4B	0	1		M	1.0	1.0	Chrysotile
41	B1	C4B	1	1		F	1.0	0.1	Chrysotile
42	B1	C4B	0	1		M	2.5	1.4	Chrysotile
43	B1	C4B	0	1		M	1.4	0.3	Chrysotile
44	B1	C4B	1	1		F	0.8	0.1	Chrysotile
45	B1	C4B	1	1		F	1.1	0.1	Chrysotile
46	B1	C4B	0	1		M	1.7	1.0	Chrysotile
47	B1	C4B	0	1		M	3.8	2.4	Chrysotile
48	B1	C4B	0	1		M	11.7	1.0	Chrysotile
49	B1	C4B	1	1		F	0.7	0.1	Chrysotile
50	B1	C4B	0	1		M	1.7	0.7	Chrysotile
51	B1	C4B	1	1		F	4.8	0.1	Chrysotile
52	B1	C4B	0	1		M	3.1	1.2	Chrysotile
53	B1	C4B	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001B	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
54	B1	C4B	0	1		M	2.1	2.1	Chrysotile
55	B1	C4B	1	1		F	1.0	0.1	Chrysotile
56	B1	C4B	1	1		F	1.0	0.1	Chrysotile
57	B1	C4B	1	1		F	1.0	0.1	Chrysotile
58	B1	C4B	1	1		F	1.2	0.1	Chrysotile
59	B1	C4B	1	1		F	1.0	0.1	Chrysotile
60	B1	C4B	1	1		F	1.4	0.1	Chrysotile
61	B1	C4B	1	1		F	1.0	0.1	Chrysotile
62	B1	C4B	1	1		F	1.4	0.1	Chrysotile
63	B1	C4B	0	1		M	1.9	0.4	Chrysotile
64	B1	C4B	0	1		M	1.8	0.3	Chrysotile
65	B1	C4B	1	1		F	1.0	0.1	Chrysotile
66	B1	C4B	0	1		M	2.1	0.7	Chrysotile
67	B1	C4B	1	1		F	1.0	0.1	Chrysotile
68	B1	C4B	1	1		F	1.0	0.1	Chrysotile
69	B1	C4B	1	1		F	1.0	0.1	Chrysotile
70	B1	C4B	0	1		M	6.9	2.7	Chrysotile
71	B1	C4B	1	1		F	1.4	0.1	Chrysotile
72	B1	C4B	0	1		M	2.4	2.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001B	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
73	B1	C4B	1	1		F	1.0	0.1	Chrysotile
74	B1	C4B	0	1		M	2.1	0.5	Chrysotile
75	B1	C4B	1	1		F	1.7	0.1	Chrysotile
76	B1	C4B	1	1		F	1.0	0.1	Chrysotile
77	B1	C4B	1	1		F	1.0	0.1	Chrysotile
78	B1	C4B	1	1		F	1.0	0.1	Chrysotile
79	B1	C4B	1	1		F	1.0	0.1	Chrysotile
80	B1	C4B	1	1		F	1.0	0.1	Chrysotile
81	B1	C4B	1	1		F	1.4	0.1	Chrysotile
82	B1	C4B	0	1		M	3.4	2.7	Chrysotile
83	B1	C4B	1	1		F	1.4	0.1	Chrysotile
84	B1	C4B	0	1		M	12.3	2.7	Chrysotile
85	B1	C4B	1	1		F	2.7	0.1	Chrysotile
86	B1	C4B	1	1		F	1.1	0.1	Chrysotile
87	B1	C4B	1	1		F	1.4	0.1	Chrysotile
88	B1	C4B	0	1		M	10.6	1.7	Chrysotile
89	B1	C4B	1	1		F	3.8	0.1	Chrysotile
90	B1	C4B	0	1		M	5.5	5.5	Chrysotile
91	B1	C4B	1	1		F	1.4	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001B	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
92	B1	C4B	1	1		F	2.7	0.1	Chrysotile
93	B1	C4B	1	1		F	1.4	0.1	Chrysotile
94	B1	C4B	0	1		M	8.2	1.4	Chrysotile
95	B1	C4B	1	1		F	3.8	0.1	Chrysotile
96	B1	C4B	0	1		M	2.1	1.4	Chrysotile
97	B1	C4B	1	1		F	2.4	0.1	Chrysotile
98	B1	C4B	1	1		F	1.0	0.1	Chrysotile
99	B1	C4B	1	1		F	1.0	0.1	Chrysotile
100	B1	C4B	0	1		M	1.4	1.0	Chrysotile
101	B1	C4B	1	1		F	2.5	0.1	Chrysotile
102	B1	C4B	0	1		M	6.2	5.5	Chrysotile
103	B1	C4B	1	1		F	1.0	0.1	Chrysotile
104	B1	C4B	1	1		F	4.1	0.1	Chrysotile
105	B1	C4B	1	1		F	1.4	0.1	Chrysotile
106	B1	C4B	0	1		M	7.5	1.4	Chrysotile
107	B1	C4B	1	1		F	2.7	0.1	Chrysotile
108	B1	C4B	0	1		M	6.9	1.0	Chrysotile
109	B1	C4B	1	1		F	1.0	0.1	Chrysotile
		Totals:	72	109					

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-001B	ER4180-01R \ TK-ACM-1	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method: TEM Full-Quant Count Analysis EPA/600/R-93/116
Sample Type: Bulk
Date Received: 10/10/2012 3:13:30 PM
Report Date: 10/22/2012 4:33:29 PM

Filtration Filter: MCE Filter, .45um
Effective Filter Area: 1320 mm²
Grid Opening Size: 0.0112 mm²

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002A	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:56 am	KRP	10-15-12C-1

Analysis	Grid Openings Counted	Reporting Limit (s/mm²)	Total Asbestos (s/mm²)	Structures Counted			Total Asbestos				95 % Confidence Limit	
				Chry-sotile	Amph-ibole	Total	Chrysotile (s/ug)	Amphibole (s/ug)	Total (s/ug)	Sensitivity (s/ug)	Low	High
Asbestos	1	8.9	9,900	111	0	111	290	< 0.26	290	0.26	200	430

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identifi-cation	Structure Type	Length (um)	Width (um)	Comment
1	C1	E4B	1	1		F	1.7	0.1	Chrysotile
2	C1	E4B	1	1		F	1.2	0.1	Chrysotile
3	C1	E4B	1	1		F	6.7	0.1	Chrysotile
4	C1	E4B	1	1		F	2.3	0.2	Chrysotile
5	C1	E4B	1	1		F	2.7	0.2	Chrysotile
6	C1	E4B	1	1		F	0.8	0.1	Chrysotile
7	C1	E4B	1	1		F	1.0	0.1	Chrysotile
8	C1	E4B	1	1		F	1.7	0.1	Chrysotile
9	C1	E4B	1	1		F	0.8	0.1	Chrysotile
10	C1	E4B	1	1		F	2.1	0.1	Chrysotile
11	C1	E4B	1	1		F	3.8	0.1	Chrysotile
12	C1	E4B	1	1		F	2.7	0.1	Chrysotile
13	C1	E4B	1	1		F	1.1	0.1	Chrysotile
14	C1	E4B	1	1		F	3.1	0.1	Chrysotile
15	C1	E4B	1	1		F	2.7	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002A	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:56 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
16	C1	E4B	1	1		F	0.7	0.1	Chrysotile
17	C1	E4B	1	1		F	0.8	0.1	Chrysotile
18	C1	E4B	1	1		F	1.2	0.1	Chrysotile
19	C1	E4B	1	1		F	5.5	0.1	Chrysotile
20	C1	E4B	1	1		F	8.6	0.1	Chrysotile
21	C1	E4B	1	1		F	3.8	0.1	Chrysotile
22	C1	E4B	0	1		M	4.1	0.1	Chrysotile
23	C1	E4B	1	1		F	1.0	0.1	Chrysotile
24	C1	E4B	1	1		F	1.0	0.1	Chrysotile
25	C1	E4B	1	1		F	0.8	0.1	Chrysotile
26	C1	E4B	1	1		F	0.8	0.1	Chrysotile
27	C1	E4B	1	1		F	4.5	0.1	Chrysotile
28	C1	E4B	1	1		F	11.0	0.1	Chrysotile
29	C1	E4B	1	1		F	0.8	0.1	Chrysotile
30	C1	E4B	1	1		F	1.0	0.1	Chrysotile
31	C1	E4B	1	1		F	1.0	0.1	Chrysotile
32	C1	E4B	1	1		F	1.0	0.1	Chrysotile
33	C1	E4B	1	1		F	1.4	0.1	Chrysotile
34	C1	E4B	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method: TEM Full-Quant Count Analysis EPA/600/R-93/116
Sample Type: Bulk
Date Received: 10/10/2012 3:13:30 PM
Report Date: 10/22/2012 4:33:29 PM
Filtration Filter: MCE Filter, .45um
Effective Filter Area: 1320 mm²
Grid Opening Size: 0.0112 mm²

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002A	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:56 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
35	C1	E4B	1	1		F	6.5	0.1	Chrysotile
36	C1	E4B	1	1		F	4.1	0.1	Chrysotile
37	C1	E4B	1	1		F	1.7	0.1	Chrysotile
38	C1	E4B	1	1		F	0.8	0.1	Chrysotile
39	C1	E4B	1	1		F	1.0	0.1	Chrysotile
40	C1	E4B	1	1		F	0.8	0.1	Chrysotile
41	C1	E4B	1	1		F	1.0	0.1	Chrysotile
42	C1	E4B	1	1		F	2.4	0.2	Chrysotile
43	C1	E4B	1	1		F	3.4	0.1	Chrysotile
44	C1	E4B	1	1		F	11.7	0.1	Chrysotile
45	C1	E4B	1	1		F	8.9	0.1	Chrysotile
46	C1	E4B	1	1		F	13.0	0.1	Chrysotile
47	C1	E4B	1	1		F	3.2	0.1	Chrysotile
48	C1	E4B	1	1		F	1.0	0.1	Chrysotile
49	C1	E4B	1	1		F	3.4	0.1	Chrysotile
50	C1	E4B	1	1		F	1.0	0.1	Chrysotile
51	C1	E4B	1	1		F	0.8	0.1	Chrysotile
52	C1	E4B	1	1		F	1.0	0.1	Chrysotile
53	C1	E4B	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002A	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:56 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
54	C1	E4B	1	1		F	1.0	0.1	Chrysotile
55	C1	E4B	0	1		M	6.5	5.5	Chrysotile
56	C1	E4B	1	1		F	3.1	0.1	Chrysotile
57	C1	E4B	1	1		F	1.0	0.1	Chrysotile
58	C1	E4B	1	1		F	0.8	0.1	Chrysotile
59	C1	E4B	1	1		F	0.7	0.1	Chrysotile
60	C1	E4B	1	1		F	0.8	0.1	Chrysotile
61	C1	E4B	1	1		F	1.0	0.1	Chrysotile
62	C1	E4B	1	1		F	0.8	0.1	Chrysotile
63	C1	E4B	1	1		F	1.0	0.1	Chrysotile
64	C1	E4B	1	1		F	1.0	0.1	Chrysotile
65	C1	E4B	1	1		F	1.0	0.1	Chrysotile
66	C1	E4B	1	1		F	1.4	0.1	Chrysotile
67	C1	E4B	1	1		F	1.0	0.1	Chrysotile
68	C1	E4B	1	1		F	1.0	0.1	Chrysotile
69	C1	E4B	1	1		F	0.8	0.1	Chrysotile
70	C1	E4B	1	1		F	0.7	0.1	Chrysotile
71	C1	E4B	1	1		F	0.8	0.1	Chrysotile
72	C1	E4B	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002A	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:56 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
73	C1	E4B	1	1		F	2.7	0.1	Chrysotile
74	C1	E4B	1	1		F	4.8	0.2	Chrysotile
75	C1	E4B	1	1		F	1.0	0.1	Chrysotile
76	C1	E4B	1	1		F	1.0	0.1	Chrysotile
77	C1	E4B	1	1		F	1.4	0.1	Chrysotile
78	C1	E4B	1	1		F	1.0	0.1	Chrysotile
79	C1	E4B	0	1		C	0.7	2.7	Chrysotile
80	C1	E4B	1	1		F	0.8	0.1	Chrysotile
81	C1	E4B	1	1		F	0.7	0.1	Chrysotile
82	C1	E4B	1	1		F	8.6	0.1	Chrysotile
83	C1	E4B	1	1		F	8.2	0.1	Chrysotile
84	C1	E4B	1	1		F	6.9	0.1	Chrysotile
85	C1	E4B	1	1		F	1.0	0.1	Chrysotile
86	C1	E4B	1	1		F	1.0	0.1	Chrysotile
87	C1	E4B	1	1		F	1.0	0.1	Chrysotile
88	C1	E4B	1	1		F	1.4	0.1	Chrysotile
89	C1	E4B	1	1		F	1.0	0.1	Chrysotile
90	C1	E4B	1	1		F	1.0	0.1	Chrysotile
91	C1	E4B	1	1		F	0.8	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002A	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:56 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
92	C1	E4B	1	1		F	0.7	0.1	Chrysotile
93	C1	E4B	1	1		F	0.8	0.1	Chrysotile
94	C1	E4B	0	1		M	11.0	3.4	Chrysotile
95	C1	E4B	0	1		M	6.9	2.4	Chrysotile
96	C1	E4B	1	1		F	1.0	0.1	Chrysotile
97	C1	E4B	1	1		F	1.0	0.1	Chrysotile
98	C1	E4B	1	1		F	1.0	0.1	Chrysotile
99	C1	E4B	1	1		F	1.4	0.1	Chrysotile
100	C1	E4B	0	1		M	6.2	1.4	Chrysotile
101	C1	E4B	1	1		F	1.0	0.1	Chrysotile
102	C1	E4B	1	1		F	0.8	0.1	Chrysotile
103	C1	E4B	1	1		F	0.7	0.1	Chrysotile
104	C1	E4B	1	1		F	0.8	0.1	Chrysotile
105	C1	E4B	1	1		F	1.0	0.1	Chrysotile
106	C1	E4B	1	1		F	0.8	0.1	Chrysotile
107	C1	E4B	1	1		F	1.0	0.1	Chrysotile
108	C1	E4B	1	1		F	1.0	0.1	Chrysotile
109	C1	E4B	1	1		F	1.0	0.1	Chrysotile
110	C1	E4B	1	1		F	1.4	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002A	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:56 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
111	C1	E4B	1	1		F	1.0	0.1	Chrysotile
		Totals:	105	111					

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002B	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

Analysis	Grid Openings Counted	Reporting Limit (s/mm²)	Total Asbestos (s/mm²)	Structures Counted			Total Asbestos				95 % Confidence Limit	
				Chry-sotile	Amph-ibole	Total	Chrysotile (s/ug)	Amphibole (s/ug)	Total (s/ug)	Sensitivity (s/ug)	Low	High
Asbestos	10	0.89	810	91	0	91	12	< 0.013	12	0.013	8.0	18

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identifi-cation	Structure Type	Length (um)	Width (um)	Comment
1	D1	C4A	1	1		F	6.2	0.1	Chrysotile
2	D1	C4A	1	1		F	1.4	0.1	Chrysotile
3	D1	C4A	1	1		F	1.0	0.1	Chrysotile
4	D1	C4A	1	1		F	3.8	0.1	Chrysotile
5	D1	C4A	0	1		M	0.8	0.1	Chrysotile
6	D1	C4A	0	1		M	2.7	2.7	Chrysotile
7	D1	C4A	1	1		F	2.4	0.2	Chrysotile
8	D1	C4A	0	1		M	6.9	0.3	Chrysotile
9	D1	C4A	1	1		F	5.5	0.1	Chrysotile
10	D1	C4A	1	1		F	2.1	0.1	Chrysotile
11	D1	C4A	1	1		F	1.4	0.1	Chrysotile
12	D1	E4A	1	1		F	4.1	0.1	Chrysotile
13	D1	E4A	1	1		F	1.4	0.1	Chrysotile
14	D1	E4A	0	1		M	8.9	1.0	Chrysotile
15	D1	E4A	1	1		F	3.8	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002B	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
16	D1	E4A	0	1		M	27.4	1.0	Chrysotile
17	D1	E4A	1	1		F	1.0	0.1	Chrysotile
18	D1	E4C	0	1		M	9.6	0.1	Chrysotile
19	D1	E4C	1	1		F	0.8	0.1	Chrysotile
20	D1	E4C	1	1		F	0.8	0.1	Chrysotile
21	D1	E4C	0	1		M	5.5	0.7	Chrysotile
22	D1	E4C	0	1		M	2.1	0.7	Chrysotile
23	D1	E4C	1	1		F	0.8	0.1	Chrysotile
24	D1	F4A	1	1		F	12.3	0.1	Chrysotile
25	D1	F4A	0	1		M	13.7	0.7	Chrysotile
26	D1	F4A	1	1		F	3.8	0.1	Chrysotile
27	D1	F4A	1	1		F	14.4	0.1	Chrysotile
28	D1	F4A	0	1		M	6.2	0.1	Chrysotile
29	D1	F4A	1	1		F	1.0	0.1	Chrysotile
30	D1	F4A	0	1		M	2.4	1.4	Chrysotile
31	D1	F4A	1	1		F	3.8	0.5	Chrysotile
32	D1	F4A	0	1		M	5.5	1.1	Chrysotile
33	D1	C4B	1	1		F	3.4	0.1	Chrysotile
34	D1	C4B	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002B	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
35	D1	C4B	1	1		F	4.8	0.1	Chrysotile
36	D1	C4B	1	1		F	15.4	0.1	Chrysotile
37	D1	C4B	0	1		M	3.8	2.4	Chrysotile
38	D1	C4B	1	1		F	1.0	0.1	Chrysotile
39	D2	C4A	1	1		F	1.0	0.1	Chrysotile
40	D2	C4A	0	1		M	4.1	2.7	Chrysotile
41	D2	C4A	0	1		M	20.6	20.6	Chrysotile
42	D2	C4A	0	1		M	30.9	13.7	Chrysotile
43	D2	C4A	0	1		M	8.2	0.7	Chrysotile
44	D2	C4A	1	1		F	3.1	0.1	Chrysotile
45	D2	B4A	0	1		M	10.3	2.1	Chrysotile
46	D2	B4C	1	1		F	2.1	0.1	Chrysotile
47	D2	G4A	0	1		M	8.2	1.4	Chrysotile
48	D2	G4A	1	1		F	1.4	0.1	Chrysotile
49	D2	G4A	0	1		M	4.8	1.4	Chrysotile
50	D2	G4A	1	1		F	2.7	0.1	Chrysotile
51	D2	G4A	1	1		F	0.8	0.1	Chrysotile
52	D2	G4A	1	1		F	1.4	0.1	Chrysotile
53	D2	G4C	1	1		F	1.4	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002B	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
54	D2	G4C	1	1		F	2.1	0.1	Chrysotile
55	D2	G4C	1	1		F	1.4	0.1	Chrysotile
56	D2	G4C	0	1		M	4.8	1.0	Chrysotile
57	D2	G4C	1	1		F	1.2	0.1	Chrysotile
58	D2	G4C	0	1		M	13.7	2.1	Chrysotile
59	D2	B4A	0	1		M	1.0	0.7	Chrysotile
60	D2	B4A	1	1		F	1.0	0.1	Chrysotile
61	D2	B4A	1	1		F	1.0	0.1	Chrysotile
62	D2	B4A	0	1		M	9.6	1.4	Chrysotile
63	D2	B4A	1	1		F	1.0	0.1	Chrysotile
64	D2	B4A	0	1		M	2.5	1.4	Chrysotile
65	D2	B4A	1	1		F	3.8	0.1	Chrysotile
66	D2	B4A	1	1		F	3.8	0.1	Chrysotile
67	D2	B4A	0	1		M	379.6	1.0	Chrysotile
68	D2	B4A	1	1		F	1.7	0.1	Chrysotile
69	D2	B4A	0	1		M	4.1	1.4	Chrysotile
70	D2	B4A	1	1		F	3.4	0.1	Chrysotile
71	D2	B4A	1	1		F	15.4	0.1	Chrysotile
72	D2	B4A	1	1		F	2.1	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002B	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
73	D2	B4A	0	1		M	2.4	0.7	Chrysotile
74	D2	B4C	1	1		F	1.5	0.1	Chrysotile
75	D2	B4C	1	1		F	1.0	0.1	Chrysotile
76	D2	B4C	1	1		F	1.4	0.1	Chrysotile
77	D2	B4C	1	1		F	3.8	0.1	Chrysotile
78	D2	B4C	1	1		F	1.0	0.1	Chrysotile
79	D2	B4C	0	1		M	3.4	0.7	Chrysotile
80	D2	B4C	1	1		F	1.5	0.1	Chrysotile
81	D2	B4C	1	1		F	1.2	0.1	Chrysotile
82	D2	B4C	0	1		M	3.4	3.4	Chrysotile
83	D2	B4C	0	1		M	2.7	0.7	Chrysotile
84	D2	B4C	1	1		F	2.1	0.1	Chrysotile
85	D2	B4C	1	1		F	2.4	0.1	Chrysotile
86	D2	B4C	1	1		F	1.0	0.1	Chrysotile
87	D2	B4C	0	1		M	5.1	1.0	Chrysotile
88	D2	B4C	1	1		F	1.2	0.1	Chrysotile
89	D2	B4C	1	1		F	3.8	0.1	Chrysotile
90	D2	B4C	1	1		F	1.0	0.1	Chrysotile
91	D2	B4C	0	1		M	8.9	3.8	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002B	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:55 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
		Totals:	58	91					

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002C	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:27 am	KRP	10-15-12C-1

Analysis	Grid Openings Counted	Reporting Limit (s/mm²)	Total Asbestos (s/mm²)	Structures Counted			Total Asbestos				95 % Confidence Limit	
				Chry-sotile	Amph-ibole	Total	Chrysotile (s/ug)	Amphibole (s/ug)	Total (s/ug)	Sensitivity (s/ug)	Low	High
Asbestos	1	8.9	9,200	103	0	103	1,400	< 1.3	1,400	1.3	930	2,000

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identifi-cation	Structure Type	Length (um)	Width (um)	Comment
1	E1	C4A	1	1		F	1.4	0.1	Chrysotile
2	E1	C4A	1	1		F	1.5	0.1	Chrysotile
3	E1	C4A	1	1		F	2.9	0.1	Chrysotile
4	E1	C4A	1	1		F	0.8	0.1	Chrysotile
5	E1	C4A	0	1		M	6.2	1.7	Chrysotile
6	E1	C4A	1	1		F	5.7	0.1	Chrysotile
7	E1	C4A	1	1		F	1.2	0.1	Chrysotile
8	E1	C4A	1	1		F	2.5	0.1	Chrysotile
9	E1	C4A	0	1		M	2.4	2.7	Chrysotile
10	E1	C4A	1	1		F	1.0	0.1	Chrysotile
11	E1	C4A	1	1		F	1.0	0.1	Chrysotile
12	E1	C4A	1	1		F	2.5	0.1	Chrysotile
13	E1	C4A	1	1		F	3.1	0.1	Chrysotile
14	E1	C4A	1	1		F	1.7	0.1	Chrysotile
15	E1	C4A	0	1		M	1.4	0.5	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002C	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:27 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
16	E1	C4A	1	1		B	5.5	0.2	Chrysotile
17	E1	C4A	1	1		F	3.8	0.1	Chrysotile
18	E1	C4A	1	1		F	1.4	0.1	Chrysotile
19	E1	C4A	1	1		F	2.5	0.1	Chrysotile
20	E1	C4A	1	1		F	1.7	0.1	Chrysotile
21	E1	C4A	1	1		F	0.8	0.1	Chrysotile
22	E1	C4A	1	1		F	0.8	0.1	Chrysotile
23	E1	C4A	1	1		F	0.8	0.1	Chrysotile
24	E1	C4A	1	1		F	1.0	0.1	Chrysotile
25	E1	C4A	1	1		F	3.8	0.1	Chrysotile
26	E1	C4A	1	1		F	1.4	0.1	Chrysotile
27	E1	C4A	1	1		F	3.1	0.1	Chrysotile
28	E1	C4A	1	1		F	1.0	0.1	Chrysotile
29	E1	C4A	0	1		C	4.1	0.8	Chrysotile
30	E1	C4A	1	1		F	1.2	0.1	Chrysotile
31	E1	C4A	1	1		F	4.8	0.1	Chrysotile
32	E1	C4A	1	1		F	1.4	0.1	Chrysotile
33	E1	C4A	1	1		F	2.9	0.1	Chrysotile
34	E1	C4A	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002C	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:27 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
35	E1	C4A	1	1		F	1.0	0.1	Chrysotile
36	E1	C4A	1	1		F	0.8	0.1	Chrysotile
37	E1	C4A	1	1		F	1.0	0.1	Chrysotile
38	E1	C4A	1	1		F	0.8	0.1	Chrysotile
39	E1	C4A	1	1		F	0.8	0.1	Chrysotile
40	E1	C4A	1	1		F	1.0	0.1	Chrysotile
41	E1	C4A	0	1		M	6.2	5.5	Chrysotile
42	E1	C4A	1	1		F	1.0	0.1	Chrysotile
43	E1	C4A	1	1		F	5.3	0.1	Chrysotile
44	E1	C4A	1	1		F	1.9	0.1	Chrysotile
45	E1	C4A	1	1		F	0.7	0.1	Chrysotile
46	E1	C4A	1	1		F	0.9	0.1	Chrysotile
47	E1	C4A	1	1		F	1.4	0.1	Chrysotile
48	E1	C4A	1	1		F	1.4	0.1	Chrysotile
49	E1	C4A	1	1		F	1.4	0.1	Chrysotile
50	E1	C4A	1	1		F	2.1	0.1	Chrysotile
51	E1	C4A	1	1		F	1.2	0.1	Chrysotile
52	E1	C4A	1	1		F	5.5	0.1	Chrysotile
53	E1	C4A	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002C	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:27 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
54	E1	C4A	1	1		F	5.5	0.1	Chrysotile
55	E1	C4A	1	1		F	1.0	0.1	Chrysotile
56	E1	C4A	1	1		F	5.3	0.1	Chrysotile
57	E1	C4A	1	1		F	2.1	0.1	Chrysotile
58	E1	C4A	1	1		F	2.4	0.1	Chrysotile
59	E1	C4A	1	1		F	1.4	0.1	Chrysotile
60	E1	C4A	1	1		F	8.6	0.1	Chrysotile
61	E1	C4A	1	1		F	5.3	0.1	Chrysotile
62	E1	C4A	1	1		F	3.8	0.1	Chrysotile
63	E1	C4A	1	1		F	2.4	0.1	Chrysotile
64	E1	C4A	1	1		F	8.6	0.1	Chrysotile
65	E1	C4A	0	1		M	4.8	4.8	Chrysotile
66	E1	C4A	1	1		F	0.9	0.1	Chrysotile
67	E1	C4A	1	1		F	6.9	0.1	Chrysotile
68	E1	C4A	1	1		F	1.4	0.1	Chrysotile
69	E1	C4A	1	1		F	1.4	0.1	Chrysotile
70	E1	C4A	1	1		F	2.1	0.1	Chrysotile
71	E1	C4A	1	1		F	1.2	0.1	Chrysotile
72	E1	C4A	1	1		F	5.5	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002C	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:27 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
73	E1	C4A	1	1		F	1.0	0.1	Chrysotile
74	E1	C4A	1	1		F	1.4	0.1	Chrysotile
75	E1	C4A	1	1		F	11.7	0.1	Chrysotile
76	E1	C4A	1	1		F	5.2	0.1	Chrysotile
77	E1	C4A	1	1		F	1.2	0.1	Chrysotile
78	E1	C4A	1	1		F	5.5	0.1	Chrysotile
79	E1	C4A	1	1		F	1.0	0.1	Chrysotile
80	E1	C4A	1	1		F	1.4	0.1	Chrysotile
81	E1	C4A	1	1		F	1.4	0.1	Chrysotile
82	E1	C4A	1	1		F	2.1	0.1	Chrysotile
83	E1	C4A	1	1		F	1.2	0.1	Chrysotile
84	E1	C4A	1	1		F	2.7	0.1	Chrysotile
85	E1	C4A	1	1		F	1.0	0.1	Chrysotile
86	E1	C4A	1	1		F	1.4	0.1	Chrysotile
87	E1	C4A	1	1		F	1.4	0.1	Chrysotile
88	E1	C4A	1	1		F	2.1	0.1	Chrysotile
89	E1	C4A	1	1		F	1.2	0.1	Chrysotile
90	E1	C4A	1	1		F	5.5	0.1	Chrysotile
91	E1	C4A	1	1		F	1.0	0.1	Chrysotile

ANALYTICAL RESULTS

Client: **MAXXAM ANALYTICS**

Client Reference No.: **B290821**

Work Order No.: **A1210116** **Date:** *22-Oct-12*

Analytical Method:	TEM Full-Quant Count Analysis EPA/600/R-93/116	Filtration Filter:	MCE Filter, .45um
Sample Type:	Bulk	Effective Filter Area:	1320 mm²
Date Received:	10/10/2012 3:13:30 PM	Grid Opening Size:	0.0112 mm²
Report Date:	10/22/2012 4:33:29 PM		

Lab Sample No.	Client Sample Identification	Date Sampled	Prep Date	Sample Amt	Dilution Factor	Analysis Date	Analyst	Grid Box Identification
A1210116-002C	ER4394-01R \ TK-ACM-3	10/05/12 @12:00 am	10/15/12 @1:05 pm	0	1	10/18/12 @10:27 am	KRP	10-15-12C-1

TEM Count Details

Rec	Grid	Grid Opening ID	Number of Structures Primary	Number of Structures Total	Identification	Structure Type	Length (um)	Width (um)	Comment
92	E1	C4A	1	1		F	1.4	0.1	Chrysotile
93	E1	C4A	1	1		F	1.4	0.1	Chrysotile
94	E1	C4A	1	1		F	2.1	0.1	Chrysotile
95	E1	C4A	1	1		F	1.2	0.1	Chrysotile
96	E1	C4A	1	1		F	5.5	0.1	Chrysotile
97	E1	C4A	1	1		F	1.0	0.1	Chrysotile
98	E1	C4A	0	1		M	5.5	2.7	Chrysotile
99	E1	C4A	1	1		F	1.4	0.1	Chrysotile
100	E1	C4A	1	1		F	11.0	0.1	Chrysotile
101	E1	C4A	1	1		F	6.9	0.1	Chrysotile
102	E1	C4A	1	1		F	3.8	0.1	Chrysotile
103	E1	C4A	1	1		F	1.0	0.1	Chrysotile
		Totals:	96	103					

(a) : Asbestos Fiber >= 0.5 um and < 5.0 um

(b) : Asbestos Fiber >= 5.0 um and < 10.0 um

(c) : Asbestos Fiber > 10.0 um

(d) : Primary Structures >= 0.5 um and < 5.0 um

(e) : Primary Structures >5.0 um

(s/cc): Structure(s)/cubic centimeter of air.

<: Result is less than the limit of detection.

"--" : No Results (Air Volume is 0)

mm²: square millimeter

s/mm²: Structures per square millimeter

um: micrometer

Analyst(s) Name/Date: Khuntal Parikh 10/22/2012

A12 10116

Maxxam Analytics
D-675 Berry Street
Winnipeg, Manitoba, R3H 1A7
Phone: (204) 772-2386
Fax: (204) 772-7276

Maxxam PM Janelle Kochan

SUBCONTRACTING REQUEST FORM

To: Ext. Sublet from Winippeg

Job# B290821

☐ Yes ☐ No Charge us Rush charges (If rush charges are required to meet due date and Yes box is not checked, please call us)
☐ Yes ☐ No International Sample/BioHazard (if yes, add copy of Movement Cert., heat treat is required prior to disposal)
☐ Yes ☐ No Special Protocol (if yes, Protocol _____)

Test Requirements: TEM FQ with Fiber Sizing for both samples.

Sample ID	MATRIX	Test(s) Required	Container	Date Sampled	Date Required
ER4180-01R \ TK-ACM-1		Asbestos in Solids by TEM Subcontract	1(BAG)	2012/10/05	2012/10/17
ER4394-01R \ TK-ACM-3	SOLID	Asbestos in Solids by TEM Subcontract	1(BAG)	2012/10/05	2012/10/17

	Temp. 1	Temp. 2	Temp. 3			
Cooler #1				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #2				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #3				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO

Relinquished by (Sign) _____ (Print) _____ Date and Time _____

Received by (Sign) K. Smith (Print) K. Smith Date and Time 10/10/2012 3:10 pm

NOTES:
1) Please call us if due date cannot be met. Please reference Sample ID on your report.
2) Include copy of this completed form & signed final report to

Reporting Requirements:
National:
Regional:

SHIPPING INSTRUCTIONS

☐ Ship Immediately (highlight Yellow)
☐ Requires 9am
☐ Requires Sat. Delivery
☐ Regular Ship next available day
☐ Ship Cold
☐ Ship Room Temp
☐ Ship Frozen

Sender (Print) _____ Initial _____

SHIPPING DEPARTMENT CHECKLIST

☐ Correct Shipping location
☐ Correct Sample Ids (Paperwork vs Bottles)
☐ Yes ☐ No Special-Cooler, Ice, Tape-custody seal, Date&Sign
Date Shipped _____ Number of coolers _____
Shipper (Print) _____ Initial _____

APPENDIX J

DFO CONTAMINATED SITES MODULE FORMS

REPORT SUMMARY

ADDITIONAL PROPERTY INFORMATION

DFO RPIS Property #: C L 90029 **DFRP #:** 86479

Property Name: DFO Tuktoyaktuk Lab and Storage

Property Location: Tuktoyaktuk, NWT (Lat: 69.438970 Long: -133.036250)

Land Use:		**Surrounding Land Use:**		**Owner Type:**	
Residential		Residential		Federal	x
Commercial	x	Commercial	x	Provincial	x
Industrial		Industrial		Municipal	
Other		Other		Crown	
Agricultural		Agricultural		Private	
Park		Park	x		

Owner Name: Commissioner's Parcel

Owner Address: GNWT and DFO – Tuktoyaktuk

Property Description: Tuktoyaktuk Lab and Storage site is located along the shores of Beaufort Sea within Tuktoyaktuk , NWT. The property consisted of one single-storey building with an attached fenced-in area to the west.

Reason for Federal Involvement: (if non-crown owned)					
Contract obligation		National Park		Other Can. land	
Federal policy		Indian reserve		Other :	
Federal activities	x	Canada land off-shore			
Orphan site		Private sector lessee on crown land			

Lead Responsible (Department/Agency): Department of Fisheries and Oceans

SUB-SITE ACTIVITIES (SRL ACTIVITIES)

Contaminated Site Name: DFO Tuktoyaktuk Lab and Storage **FCSI #: 00016501**

Consulting Firm Name: KGS Group **Completion Date:** October 2, 2012

Environmental Status: (Management Type)		**Activities Performed:**	
Under Assessment			
Under remediation		Phase I ESA	x
Remediated and under risk mgmt.		Phase II ESA	x
Under risk management		Phase III	x
Remediation complete		Decommissioning	
Remediation by third party		Implementing site clean-up/ risk mgmt.	
Assessed- no action required	x	Confirmatory sampling, ongoing monitoring	
Not assessed		Other	

Last Step Completed (Fed. Approach to Contaminated Sites (Step 1 to 10)): Step 6: Closure Report

Activity Description: Phase I/II/III Environmental Site Assessment - surficial soils sampled, paint and bulk materials sampled and historical review completed.

Sub-Site Classification: **Aquatic / NCSCS:** Score: Class: Variance:

Cost of Current Work: $30,000 **Estimated Cost of Future Work:** $0

Liabilities:	**Option A (Remediation)**	**Option B (Risk Management)**
Liability Remediation		Liability
Contingent Liability		Contingent Liability
Indicative or Substantive		Indicative or Substantive
% Accuracy		% Accuracy
Action Plan Description:	No Action Required.	**Action Plan Description:**

APPENDIX K

DFO SITE CLOSURE FORM

Fisheries and Oceans Canada | Pêches et Océans Canada

Site Closure FORM 1 - Fiscal Year 2012- 2013

Information to be included in this form would increase with the increased complexity and work completed on the site. Regions are to use their professional judgment in documenting the extent of the information in this form. The object of this form is to maintain record and document rational and reasoning behind the FCSI site closure.

Property Information			
FCSI Site #:	86479001	**DFRP:**	86479
Site Name:	Tuktoyaktuk	**DFO Site Number:**	
Region:	Western Arctic	**Province:**	Northwest Territories
Site Category:	Lab and Storage	**Latitude (dec.):**	69.438970
Custodian:	DFO (Unofficial)	**Longitude (dec.):**	-133.036250

Site Information			
Highest Step Completed:	Step 6	**Site Classification:**	Not required
Contaminated Medium Type:	None Present	**Contaminant Type:**	None identified

Describe the site including structures:

The site consists of one vacant single-storey wood frame building and an attached fenced-in area west of the building. The combined area of the building and fenced-in area is approximately 330 m^2. Waste piles including old sampling equipment was present within the property (fenced-in area) and along the north perimeter of the building.

History of Site Work Completed

Date or FY	Work Completed	Conclusion / Recommendation	Total Expenditure
December 2012	Phase I/II/III ESA	Confirmed lead-based paint on interior and exterior building materials (i.e. walls, flooring) and exterior debris (i.e. wooden sampling boxes and skid shed). Confirmed asbestos-containing materials inside the building (i.e. flooring). No further assessment is recommended nor required. Recommended demolition of building and fencing, and removal of all debris piles (maintenance cost).	$30,000.00

Additional Information:

Rational For Site Closure
Provide rational/justification for site closure in FCSI: **The 2012 Phase I/II/III ESA by KGS Group did not identify petroleum hydrocarbon impacted soil or metal impacted soil in exceedence of applicable CCME criteria on the subject property due to historical DFO activities. The south adjacent property, the former NRCAN PCSP site had been remediated in 2011 (soil), and is currently vacant.**

Regional Env. Officer's Name:		**Signature:**		**Date:**	
Regional Env. Coordinator's Name:		**Signature:**		**Date:**	

HQ Documentation Process			
Data Entered in FCSI website by:		**Date:**	
Location of Paper Copy File:		**EKME # (PDF):**	

ANNEX C

SITE PHOTOS

Photo 1: View of exterior Lab and Storage Building (2012).

Photo 2: View of exterior entrance to building (2016).

Photo 3: View of miscellaneous debris inside fence (2012).

Photo 4: View of miscellaneous debris inside fence under snow cover (2016).

Photo 5: View of miscellaneous debris inside fence (2012).

Photo 6: View of partially covered debris surrounded by snow (2016).

Photo 7: View of various wooden sample boxes located within fence (2012).

Photo 8: View of old skid shed (arrow) and miscellaneous debris on south side of the lab and storage building.

Photo 9: View of vinyl floor tile.

Photo 10: Close up view of mould on cabinets inside lab and storage building.

Photo 11: View of transition between vinyl floor tile section in SW room and blue painted wooden flooring in NW room/utility room (2012).

Photo 12: Blue paint on wooden floor also showing miscellaneous debris at the site (2016).

Photo 73: Insulation below blue painted wooden flooring (2016).

Photo 14: View of shelving units knocked over in garage area (2016).

Photo 15: View of attic (2016).

Photo 16: Insulation in attic and roofing (2016).

Photo 17: Bag of vermiculite observed in attic (2016).

Photo18: Equipment and desks in NE room/lab area (2016).

Photo 19: Equipment and desks in NE room/lab area (2016).

Photo 20: View of fumehood located in NE room/lab (2016). Cementitious panels within fumehood were none detected for asbestos fibres.

Photo 21: View of NW room/utility room.

Photo 22: View of lines running from miscellaneous tanks in NW room/utility room.

Photo 23: View of lines running from miscellaneous tanks inside lab and storage building.

Photo 24: View of miscellaneous debris in lab and storage building.