Submission Transmittal Cover

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Date:	July 24, 2023	**Pages: (incl. cover)**	27
Project Title:	**Coral Harbour Remediation Project**		
Client Project No.:	**R.112158.017**		
Submittal Title:	Asbestos Abatement Plan		
Submittal No.:	013	**Specification:**	02 82 00.01

Issued For:

- ☐ Information
- ☒ As Requested
- ☐ Review
- ☐ Tender
- ☐ Construction
- ☐ Other

Delivered By:

- ☐ Courier
- ☐ Hand
- ☒ E-Mail
- ☐ Other (i.e. Pickup)

CONTRACTOR CERTIFICATION	CONTRACTOR COMMENTS
Jonathan Markiewicz Digitally signed by: Jonathan Markiewicz DN: CN = Jonathan Markiewicz email = jonathanm@milestoneenv.ca C = CA O = Milestone Environmental Contracting Inc. OU = Eastern and Northern Canada Date: 2023.07.24 15:06:29 -04'00'	Revision 001 to final plan.
ENGINEER CERTIFICATION	**ENGINEER COMMENTS**

Asbestos Abatement Plan

Prepared For:

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

Public Works and Government Services Canada
9700 Jasper Avenue, Suite 1000
Edmonton, Alberta T5J 4C3

Project: ***EW699-222278/001 – Coral Harbour Remediation Project***
Coral Harbour, Nunavut

Document History:

The Document Author is authorized to make the following types of changes to the document without requiring that the document be re-approved:

- Editorial, formatting, and spelling
- Clarification

To request a change to this document, contact the Document Author or Owner.

Changes to this document are summarized in the following table in reverse chronological order (latest version first).

Revision	Date	Created by	Short Description of Changes
000	June 21, 2023	Paul Bandler Ken Major	Initial version
001	July 14, 2023	Paul Bandler	Revision based on Stantec and PSPC comments
002	July 24, 2023	Paul Bandler	Additions to meet WSCC approval requirements

Approval / Acknowledgements / Acceptance

Prepared By:

Paul Bandler, Project Manager	July 24, 2023	
Name and Title (please print)	Date	Signature

Reviewed By:

Jonathan Markiewicz

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Date: 2023.07.24 15:06:05 -04'00'

Jonathan Markiewicz, Senior Project Manager	July 24, 2023	
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Approved By:

Dino Bruce, SDL Director	July 24, 2023	
Name and Title (please print)	Date	Signature

Client Acceptance:

Name and Title (please print)	Date	Signature

All aspects of the work will be conducted in accordance with:

- ✓ Local / Provincial / Territorial / Federal Legislation, Permits, and Regulations, as applicable
- ✓ Site-Specific Health and Safety Plan (SSHSP)

NOTE: All site personnel must read and acknowledge review of the SSHSP, prior to start of any work. Refer to Sign-off Sheet – MEHS # 24 – 1. Example is included at the end of the SSHSP.

Table of Contents

1 PROJECT INFORMATION AND BACKGROUND

This Asbestos Abatement Plan (hereto referred to as "Plan") will be retained on the site during field activities and will be reviewed, as necessary. The Plan will be amended or revised as project activities or conditions change or when supplemental information becomes available.

1.1 Project Information and Background

Project Number:	PWGSC – EW699-222278/001/NCS Milestone – 03230272 SDL -
Client(s):	Public Works and Government Services Canada (PWGSC) on behalf of Crown-Indigenous Relations and Northern Affairs (CIRNAC)
Client Reference Number(s):	PWGSC Project Reference - R.112158.017 Contract Number - EW699-222278/001/NCS
Project Site Name:	Coral Harbour Site
Site Address:	Coral Harbour, NU The project Site is located approximately 10 kilometres (km) northwest of the Hamlet of Coral Harbour, Nunavut, on Southampton Island.
Project Manager:	Dino Bruce Tyler Libby / Jonathan Markiewicz
MILESTONE Office Location:	200 – 1550 Laperriere Avenue, Ottawa, Ontario, K1Z 7T2
Project Start Date:	June, 2023
Project End Date:	March 31, 2025
Site Background:	The former military base in Coral Harbour was used by Canadian and American forces during the construction of the Distant Early Warning (DEW) Line in Northern Canada during the Second World War and for various other northern projects. The Site was active from the 1940s until the 1970s and the on-site infrastructure included an airstrip, hospital, and housing for military personnel. When the Site was decommissioned in the 1970s, most buildings were decommissioned, and remaining equipment was abandoned. Several areas of environmental concern (AECs) including physical hazards related to unconsolidated surface debris and aged structures, and environmental impacts associated with soil contamination, buried debris, petroleum liquids in tanks and drums and hazardous building materials remain on-site. These AECs and physical hazards are the target of the remediation activities under this contract.

<table>
<tr><td>Surrounding Areas:</td><td>The Site is located along the local road system in the vicinity of the active Coral Harbour Airstrip and northwest of the town proper.

The areas around the Site are generally flat with limited ground cover. The surface soils are mostly gravel deposits with fine materials. Permafrost is at an approximate depth of 1 meter below ground surface (mbgs).</td></tr>
<tr><td>Work to be Performed:</td><td>The primary components of the Remediation Works to be carried out are highlighted in this section:
Abatement, packaging and proper off-site disposal of hazardous liquids and solids.
Incineration of acceptable liquid and solid waste on site.
Demolition, segregation and proper disposal of remaining buildings.
Sorting and proper disposal of surface debris.
Excavation, sorting and proper disposal of buried debris.
Excavation and treatment or disposal of contaminated soil:
Type B soil to be treated in on-site land treatment unit (LTU).
Type A soil to be disposed in non-hazardous waste landfill (NHW) on site.
Tier II Soil to be properly packaged and disposed off-site.
Construction, filling and operation of the on-site LTU.
Construction, filling and closure of the on-site NHW.
Backfilling of excavated areas with clean fill.</td></tr>
<tr><td>Potential Contaminants:</td><td>Fuel in drums and tanks
Potential Batteries
PHCs F1-F4 and BTEX in soil
PAHs in soil
Glycol
Mercury (thermostats)
Asbestos-containing materials (ACMs)
Lead-containing materials including paint, building materials and debris
Potential for PCBs in light ballasts</td></tr>
<tr><td>HEALTH and SAFETY</td><td></td></tr>
<tr><td>General</td><td>All aspects of the Coral Harbour Remediation Project are governed by the Site-Specific Health and Safety Plan (HASP) including the work described in the Abatement Plan.
All workers will be oriented to the HASP prior to starting work.
A copy of the HASP will be present in the work area at all times, and all workers will be informed where it is located.</td></tr>
<tr><td>Emergency Response Contacts</td><td><table><tr><td>Coral Harbour Health Centre:</td><td>867-925-9916</td></tr><tr><td>Fire Department:</td><td>867-925-4422</td></tr><tr><td>Police (RCMP):</td><td>867-925-0123</td></tr><tr><td>Nunavut DOE Spill Acton Centre:</td><td>867-920-8130</td></tr><tr><td>WSCC:</td><td>Ph: 867-979-8500 / Fx:867-979-8501</td></tr></table></td></tr>
</table>

2 ON-SITE ORGANIZATION, COORDINATION, AND CONTACTS

This Asbestos Abatement Plan has been prepared by Milestone Environmental Contracting Inc. (**MILESTONE**) on behalf of Sudliq Developments Ltd. (**SDL**) and *The Project Team*.

The following is a list of key project contacts.

Prime Contractor:	**Sudliq Development Ltd.** ***(SDL)*** **Dino Bruce – 902-957-0485**
Project Manager:	Name: **Tyler Libby - Milestone** Cellular 647-385-4173 Office: 519-260-0221 # 507 Email: tylerL@milestoneenv.ca
Senior Project Manager:	Name: **Jonathan Markiewicz - Milestone** Cellular: 514-94-6405 Email: jonathanm@milestoneenv.ca
Project Superintendent and On-Site Health and Safety Coordinator:	Name: **David Jones - Milestone** Cellular: 905-872-0144 Office: 613-656-4173 Email: davej@milestoneenv.ca
Emergency Response:	**Dino Bruce – 902-957-0485**
Client:	Company: **PWGSC** Name: **Claudia Simonato** Cellular: 403-613-6328 Office: Email: Claudia.Simonato@tpsgc-pwgsc.gc.ca
Consultant:	Company: **Stantec** Name: **Lindsay van Noortwyk** Cellular: 708-232-1114 Office: Email: Lindsay.vannoortwyk@stantec.com
PWGSC Construction Representative:	Company: **Stantec** Name: **Tarek Ghadieh** Cellular: Office: Email: Tarek.ghadieh@stantec.com

3 PURPOSE

The purpose of this Asbestos Abatement Plan (hereto referred to as "Plan") is to ensure that the abatement, handling, segregation, collection, temporary storage, containerization, transportation, and disposal of the asbestos-containing materials (ACMs) from the Site to approved locations on- or off-site is successfully completed in accordance with the applicable Occupational Health and Safety Acts, Regulations, Codes of Practice, guidelines, standards, and industry best practices.

The on-site personnel are responsible for reviewing this Plan to understand the locations, quantities, and procedures that must be followed at all times when working with ACMs at the Site.

3.1 Scope of the Plan

The detailed specifications applicable to this plan are provided in **Section 02 82 00.01 Asbestos Abatement – Minimum Precautions** of the document titled, "*Issued for Tender Specifications for the Environmental Site Remediation at Coral Harbour, Nunavut (Project No. R.112158, September 13, 2022)*" prepared for Public Services and Procurement Canada by Stantec Consulting Ltd. (File: 123513974).

This Plan was developed based on the classification of asbestos abatement work as per the specification document, specifically as a **Low Risk** abatement activity as indicated in the 2021 Workers' Safety and Compensation Commission (WSCC) document titled, "*Northwest Territories & Nunavut Codes of Practice – Asbestos Abatement*".

The locations and volumes of ACMs requiring removal and disposal using Low Risk methods are provided in the Waste Inventory, Appendix A of the specification document, and summarized in this Plan.

Where there is a discrepancy between the information in the specifications as compared to the information in supporting reports and documentation as it pertains to identities, locations and/or quantities of identified ACMs, the information in the specification document will prevail. If discrepancies are present pertaining to identities, locations and/or quantities of identified ACMs, the discrepancies should be brought to the attention of the Departmental Representative for resolution.

3.2 Related Sections

The following specification sections apply to this Asbestos Abatement Work Plan.

Section	**Detail**
01 31 16	Construction Progress Schedules – Bar (GANTT) Chart
01 33 00	Submittal Procedures
01 35 15	Special Project Procedures for Contaminated Sites
01 35 29.13	Health, Safety, and Emergency Response Procedures for Contaminated Sites
01 35 43	Environmental Procedures
02 41 16	Structure Demolition
02 41 23	Debris and Miscellaneous Removal
02 81 01	Hazardous Materials

3.3 Submittals

Submittals will be provided in accordance with Section 01 33 00 - Submittal Procedures. These documents will be submitted to the appropriate Representative, once available.

3.4 Applicable Occupational Health and Safety Legislation and Guidelines

The occupational health and safety legislation and guidelines applicable to this Plan include:

- *Canada Labour Code* (R.S.C., 1985, c. L-2)
- *Canada Occupational Health and Safety Regulations* (SOR/86-304)
- *Nunavut Safety Act*, RSNWT (Nu) 1988, c S-1
- *Nunavut Occupational Health and Safety Regulations*, Nu Reg 003-2016
- *Nunavut Environmental Protection Act*, RSNWT (Nu) 1988, c E-7
- *Transportation of Dangerous Goods Act*, 1992 (S.C. 1992, c. 34)
- *Transportation of Dangerous Goods Regulations* (SOR/2001-286)
- Government of Nunavut Department of Environment *Environmental Guideline for Waste Asbestos* (2011)
- Canadian General Standards Board (CGSB)
    - CAN/CSA Standard 1.205-2003, Sealer of Asbestos Fibre Releasing Materials
    - CAN/CSA Standard Z94.4.18 (R2018) – Selection, Use and Care of Respirators
- Workers' Safety and Compensation Commission (WSCC) of the Northwest Territories and Nunavut
    - Asbestos Abatement Code of Practice (revised 2021)

Note: In accordance with Section 1.6.1 (Quality Assurance) of the specification document, the plan will,

"*…comply with Federal, Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications,* ***more stringent requirement applies***."

As a federal project, the governing occupational health and safety requirements are stipulated in Part II – Occupational Health and Safety of the *Canada Labour Code* (R.S.C., 1985, c. L-2) and the *Canada Occupational Health and Safety Regulations* (SOR/86-304).

Relevant sections from the COHSR include:

10.26.1 - Asbestos Exposure Management Program

10.26.1 - Asbestos-containing Material

10.26.2 - Asbestos Exposure Control Plan

10.26.4 - Asbestos Dust, Waste and Debris Removal

10.26.6 - Decontamination

10.26.8 - Air Sampling

10.26.9 - Clearance Air Sampling

10.26.11 - Containers for Asbestos Dust, Waste and Debris

In the absence of prescriptive federal requirements pertaining to the asbestos abatement work plan applicable to this project (i.e., manual outdoor abatement of scattered ACM debris and outdoor manual removal of ACM building materials from open-air dilapidated buildings), the specification document references the WSCC Codes of Practice for guidance. The WSCC Codes of Practice provide practical guidance to achieve the safety requirements of the Northwest Territories and Nunavut Safety Acts and related Regulations.

WSCC personnel were consulted, were provided this plan for review and provided feedback on this plan. Their feedback was incorporated in this plan.

3.4.1 General Duty Clause

All occupational health and safety legislation in Canada (federal, provincial, and territorial) includes employer duties or responsibilities to ensure that they take all reasonable precautions to protect the health and safety of their employees. This is often referred to as the "General Duty Clause."

This Plan should be read in close conjunction with the overall SSHSP (Submittal 005) that was developed to help demonstrate due diligence and compliance with the employer duties as specified in the *Canada Labour Code* and *Nunavut Safety Act.*

Other specific duties of the employer (Section 125 of the *Canada Labour Code*) and employees (Section 126 of the *Canada Labour Code)* will be referenced in the SSHSP applicable to this Site.

4 WORK DETAIL

4.1 Health, Safety, and Emergency Response

A detailed health, safety, and emergency response project work plan has been provided in the SSHSP (Submittal 005). All personnel are oriented to the SSHSP prior to their starting any work, and task specific requirements and PPE are discussed with work teams.

Key contacts are provided in Section 1 and 2 of this Asbestos Abatement Plan.

4.2 Emergency Response Plan

In the event that first responders (fire department, paramedics, spill response etc.) must attend the site the following steps will be taken consistent with WSCC Code of Practice Section 5.5.12 with relevant site-specific modifications as detailed herein.

The work area and abatement procedures are detailed below. The following summary is given here for context in emergency response:

- Work is at a remote site. Coral Harbour is 14km from the site. Coral Harbour fire and paramedic responders are available. There will be a first aid station established in the camp on site, with a fulltime trained paramedic.
- Abatement work will occur under low risk work procedure.
- The building that is subject to asbestos removal is a one-room open garage that is derelict and vacant. Over-head doors and windows have been removed previously. The building is largely open to the environment and access/egress is easy by several routes.
- Other asbestos removals involve collecting (hand picking) of loose debris that is scattered on the ground in open areas of the site.
- There will be no work area enclosure. Work will be conducted by manual removal (hand tools) with wetting and lockdown agent application.

Steps for emergency response will be as follows:

- All work will stop and workers will leave the work area and gather at the must point which will be designated on-site and communicated to workers daily during the pre-work tool box meetings.
- Emergency project personnel and first responders will be contacted immediately by site radio and by the phone numbers provided above.
- First aid trained personnel on staff will attend the victim to secure and stabilize them.
- Once stable, victim decontamination will occur using HEPA-Vac and wetting with mild detergent prior to extraction from the work area and removal of PPE.
- The paramedic on staff will be fit tested and equipped with air purifying respirator in the event they must enter the work zone.
- In cases of severe injury and first aid personnel are not capable of stabilizing a victim or require support, the fire department will be contacted for assistance, because they will have adequate PPE to enter the work zone.
- Once removed from the work area care will be transferred to first responders.

- In case of fire or explosion personal safety will require expedited removal of all personnel and decontamination will occur at the muster point for work zone staff. Contaminated equipment and work ware will be contained for property cleaning or disposal once safe to do so.
- Fire fighters will also have the necessary PPE to enter the work area to deal with a fire. Their equipment will be fully decontaminated as above prior to them entering vehicles to leave the site.
- Spill response will be dealt with by in-house staff who are suited up in PPE and under the direction of the site supervisor. Necessary spill containment materials will be on hand in the event of a spill as detailed in the SSHSP and Spill Response Plan (Submittal 005). However, the building subject to asbestos abatement is derelict, vacant and empty and there are no contents that may be subject to a spill.

4.3 Pre-Job Planning

The following has been / will be completed as part of the pre-job planning process:

- The SSHSP (Submittal 005) has been developed and submitted for review and approval;
- The project-specific Asbestos Abatement Plan (i.e., this document) has been developed and will be submitted for review and approval;
- All necessary asbestos abatement supplies, materials, and equipment have been procured and shipped to the project Site;
- All necessary personal protective equipment (PPE) has been procured and shipped to the project Site;
- The Asbestos Project Notification form will be sent to Prevention Services through WSCC Connect;
- The asbestos abatement workers have successfully completed a 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training with customized modules to include project-specific hazards that will be encountered on this Site including asbestos awareness training;
- The asbestos abatement supervisor has successfully completed the Supervisor Familiarization Course; and
- The asbestos abatement workers and supervisor will receive personally-issued respirators that are qualitatively fit tested. See “Personal Protective Equipment (PPE)” section below for additional details.

4.4 Personal Protective Equipment (PPE)

On federal sites, the legislative requirements for personal protective equipment are stipulated in Part XII – Protection Equipment and Other Preventive Measures of the *Canada Occupational Health and Safety Regulations* (SOR/86-304).

Project-specific requirements for personal protective equipment are provided in the specification Section 01 35 29.13 – Health, Safety, and Emergency Response Procedures for Contaminated Sites and Section 02 82 00.01 Asbestos Abatement – Minimum Precautions.

All PPE provided to the asbestos abatement workers and supervisor must be properly stored and maintained in accordance with the manufacturer’s instructions to ensure that they are in good operating conditions at all times.

All PPE will be regularly inspected (prior to and after each shift), and any damage will immediately be reported to the supervisor for repair or replacement.

PPE to be worn by the asbestos abatement workers and supervisor while in the Asbestos Work Areas include:

- Protective headwear (i.e., hard hat) that meets the requirements set out in CSA Group Standard Z94.1, *Industrial protective headwear — Performance, selection, care, and use*;
- Hearing protectors (i.e., plugs and/or muffs) in accordance with CSA Standard Z94.2-M1984, *Hearing Protectors*;

- Protective eyewear (i.e., safety glasses) that meet the requirements of CSA Group Standard Z94.3, *Eye and face protectors;*
- Protective footwear (i.e., steel-toed boots) that meet the requirements of CSA Group Standard Z195, *Protective footwear*;
- Protective clothing (i.e., disposable protective outerwear) that does not readily retain or permit penetration of asbestos fibres, and will consist of a head and full body covering that fits snugly at the ankles, wrists, and neck, to prevent asbestos fibres from reaching the garments and skin under the protective clothing;
- High-visibility safety apparel (i.e., high-vis vest) that meets the requirements set out in CSA Group Standard *Z96, High-visibility safety apparel*; and
- Respiratory protection (i.e., air-purifying respirator) that meets the requirement of CSA Standard Z94.4, *Selection, use, and care of respirators* and in compliance with the **Respiratory Protection Plan** as prescribed in 1.11.4 of the specification Section 01 35 29.13 - Health, Safety, and Emergency Response Procedures for Contaminated Sites.

All asbestos abatement workers and supervisor will be equipped with **tight-fitted air-purifying half-face or full-face respirators with P100 filters** during asbestos abatement operations. The respirators procured for this project are North full-face 5400 series or similar, and will be **qualitatively fit tested** (3M FT-30 fit test kits) to provide an **assigned protection factor (APF) of 10**.

Respirators will be cleaned, disinfected, and inspected after use on each shift, or more often, if necessary. When not in use, respirators will be stored in a convenient, clean, and sanitary location.

Sufficient supplies of PPE will be maintained at the Site to accommodate the Departmental Representative, PWGSC's Construction Representative, and site visitors in accordance with the specification Section 02 81 01 – Hazardous Materials and Section 01 35 29.13 – Health, Safety, and Emergency Response Procedures for Contaminated Sites.

4.5 Hazardous Material Discovery

Not all materials in facilities and structures to be demolished have been sampled and tested for PCB-amended paint, lead-amended paint, mercury, asbestos, or other chemical hazards. Further testing by PWGSC's Construction Representative at the beginning of the first construction season may be required. Other potential hazards that may be uncovered at the Site include items of archaeological, cultural, or scientific significance, or unexploded ordnance (e.g., blasting caps).

In all cases, if an employee discovers previously-unidentified hazardous materials at the Site, they will immediately **stop work, take preventative measures to secure the area, and notify their supervisor, who will notify PWGSC's Construction Representative immediately.** Work will proceed **only after receipt of written instructions from Departmental Representative.**

4.6 Summary of Known Asbestos-Containing Materials (ACMs) at the Site

A summary of the known ACMs at the Site was provided in **Appendix A – Waste Inventory** of the specification document, which was updated in Addendum 05 of the RFP. ACMs have been identified in the AEC **AEC 1, 4, and 6.**

All known ACMs on the Site have been classified as non-friable.

The following table summarizes the information provided in bid documents:

Table 1. Summary of Known Asbestos-Containing Materials (ACMs) at the Site

AEC ID	Drawing ID	Estimated Compacted Volume (m^3)	Component	Material	Comments
AEC 4	04-HM-001	2	Debris	Pieces of grey tile board in poor condition scattered on ground surface	**Asbestos Content Exceeds (assumed same as 06-HM-017)**
AEC 6	06-HM-001	1	Items	Gaskets and cementitious brake pads	**Asbestos Content Exceeds (assumed)**
AEC 6	06-HM-017 Former Maintenance Building	13	Walls	Light grey cement board on interior walls	**Asbestos Content Exceeds (chrysotile 15 – 20%)**

Locations of ACMs to be abated are provided in the specification drawing packaging, and included the northings and eastings of each identified material.

4.7 Asbestos Abatement Work Procedure

For clarity, the following subsections have been included in the Asbestos Abatement Plan to supplement and enhance the procedures listed in Section 02 82 00.01 Asbestos Abatement – Minimum Precautions.

Asbestos-containing cement board in the Maintenance Building is coated in lead-containing paint. The paint will be removed from the cement board using gel paint stripper product and contained following low-risk lead work procedure as detailed in Submittal 017. Cement board will then be treated as detailed herein.

4.7.1 Asbestos Abatement – Minimum Precautions

Once the required asbestos abatement training and respirator fit testing has been completed (as indicated above), execution of the asbestos abatement will follow the minimum requirements as stipulated in 3.1 of Section 02 82 00.01 Asbestos Abatement – Minimum Precautions:

- The Asbestos Work Area will be delineated and identified using the following signage in English, French and Inuktitut:

> Signage: Display signs in English and French and at all work areas where access to a contaminated area is possible. The signs are to read as follows, where number is parenthesis 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)'
>
> Post a similar sign in the language of the local dialect.

- Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.
- No person is permitted to enter the Asbestos Work Area if they have facial hair that may affect the seal between their respirator and face (unless loose-fitted respirators are provided).
- Facilities for hand and face washing will be provided where the main point of ingress and egress has been identified for the Asbestos Work Area.

- The asbestos-containing items (gaskets and brake pads) and debris (grey tile board, light grey cement board, and "weathered asbestos material") identified in AECs 1, 4, and 6 will be **sprayed with a wetting agent** (to prevent the release of fibres) and **manually loaded** directly into the appropriate waste containers as described below.
- In some cases (and based on the Site conditions) it may be deemed appropriate to use heavy machinery (e.g., front-end loader) to "skim" the surface of the outdoor debris field to remove the top 2 – 5 cm of material to load directly into the appropriate waste containers, thus removing the requirement for asbestos abatement workers to handle the ACM directly. A wetting agent must still be applied to prevent the release of asbestos fibres to the surrounding area.
- In the Former Maintenance Building (AEC 6) the "Light grey cement board on interior walls" will be removed in compliance with the methods prescribed for Low Risk abatement activities. Based on the current Site conditions (e.g., location of cement board panels, types/locations of fasteners, etc.), the following low risk methods are acceptable for the removal of the ACM interior walls:
    - Removing non-friable ACM if the material is **not being broken, cut, drilled, abraded, ground, sanded, or vibrated** and dust is not being generated; or
    - Breaking, cutting, drilling, abrading, grinding, sanding, or vibrating non-friable ACM **if the material is wetted** to control the spread of dust or fibres and the activity is carried out only by means of **non-powered hand-held tools**.
- The interior wall panels in the Former Maintenance Building will be removed using either of the two options listed above. Once the interior wall panels are removed from the structure, they are to be **manually loaded** directly into the appropriate waste containers as described below. If the panels are too large to fit in the waste containers available at the Site, the panels **will be misted with a wetting agent** and **cut with non-powered hand-held tools** using caution to not generate airborne fibres in the process.
- Site cleanliness is essential to prevent the spread of asbestos fibres. If visible asbestos-containing debris is observed in the Asbestos Work Area (prior to, during, and after the removal of the walls), the surfaces will be cleaned using a HEPA-filtered vacuum **or** damp cloths.
- Workers may use **drop sheets** (at their discretion) to help capture/contain asbestos-containing debris during the manual removal of the asbestos-containing wall panels, provided that they do not constitute a further hazard to the work area (e.g., slip/trip hazard). Drop sheets are to be wetted and placed in a waste container as soon as practicable.
- **Waste containers** for asbestos waste are comprised of two separate components, specifically:
    - **Inner container**: 0.15 mm sealable polyethylene waste bag; and
    - **Outer container**: second 0.15 mm sealable polyethylene waste bag **or** sealable metal/fibre container if there are sharp objects included in the waste material. The outer container must be labeled to indicate that the waste contains asbestos, is carcinogenic, and should not be inhaled. For example: "Asbestos Waste – Carcinogenic — Do not inhale asbestos fibres"
    - **Note**: Clean the exterior of each waste-filled bag using a damp cloth or HEPA-filtered vacuum and place in second clean waste bag immediately prior to removal from the Asbestos Work Area. Seal the double-bagged asbestos waste material and dispose at the on-site NHW facility.
- **Notes on supplies, materials, and equipment used for asbestos abatement:**
    - Prior to doffing asbestos-contaminated PPE, the outer surfaces will be cleaned (e.g., HEPA-filtered vacuum and/or wet-wiping) based on the type of material and reusability;

- **Reusable** supplies, materials, and equipment (e.g., hard hat, respirator, hand-held tools, etc.) will be thoroughly decontaminated and placed in a clean bag to be transported and stored outside of the Asbestos Work Area;
- **Disposable** supplies, materials, and equipment (e.g., disposable coveralls, gloves, boot covers, drop sheets, etc.) will be classified as asbestos waste, and placed in the appropriate waste containers for disposal as described above.

- **Air Monitoring:** Air samples are typically collected within enclosures during abatement activities to ensure that the workers do not exceed the occupational exposure limit (OEL) for asbestos fibres. Air samples may also be useful for ensuring that there is no inadvertent contamination of the clean room or surrounding areas (outside of the enclosure). At the end of a project, air samples are also typically collected for clearance purposes (e.g., criteria for dismantling an enclosure). Sections 10.26.8 to 10.26.10 of the *Canada Occupational Health and Safety Regulations* provide detailed requirements for air sampling during and after asbestos abatement projects on federal sites. Furthermore, sections 5.2.9, 5.3.9, 5.4.9, 5.5.3, and 5.5.9 of the WSCC Code of Practice – Asbestos Abatement provides guidance for air monitoring during asbestos abatement activities. An amended air monitoring program will be undertaken for this project due to the following reasons:
  - The asbestos activities are classified as **low risk;**
  - Removals and packaging will be conducted **manually**;
  - Material will be sprayed with amended water (i.e., **wetting agent**);
  - Non-friable asbestos-containing items (gaskets and brake pads) will be **manually handled and loaded** directly into the appropriate waste containers;
  - The asbestos work area is outdoors (scattered debris in an open outdoor environment) and intact non-friable building materials from an open-air dilapidated building;
  - The asbestos work will **not be carried out in an enclosure**;
  - All asbestos abatement workers (and supervisors) will be equipped with **tight-fitted air-purifying half-face or full-face respirators with P100 filters;**
  - All asbestos abatement workers (and supervisors) will be **qualitatively fit tested** (described above) to provide an **assigned protection factor (APF) of 10**;
  - Due to the **remote location of work**, it will not be possible to obtain analytical results to post at the work site within 24-hours of sampling;
  - All preventative measures as described in this Asbestos Abatement Plan will be taken to prevent **any** release of airborne asbestos fibres during the asbestos abatement work activities.

4.7.2 Air Monitoring

To ensure that the abatement plan is adequately protective of workers and the environment, air monitoring will be conducted for personal air space and for ambient conditions, respectively. Ambient and personal air sampling will be conducted in accordance with NIOSH 7400 using 25mm diameter mixed cellulose ester (MCE) 0.8 micron sampling cassettes affixed to air sampling pumps. Sampling procedures are included in Appendix A of this document.

Ambient Air sampling will include a round of baseline samples to be collected in the work area and outside the work area (down wind) prior to the start of any ACM removal. An additional round of samples from the same locations will be collected during peak work. Target air volume for ambient air sampling is approximately 2,400 L.

Personal Air Sampling will include collecting air samples from worker breathing space. Samples will be collected each day from a representative number of workers. Target air sample volume for personal air sampling is approximately 960 L.

4.7.3 Hazardous Materials Processing Area

In the event that the asbestos-containing waste material cannot be immediately containerized within the asbestos work area, the **hazardous materials processing area** will be used to **sort and containerize** the material. Detailed requirements for the hazardous materials processing area are provided in the specification Section 02 81 01 – Hazardous Materials.

4.7.4 Temporary Storage Area

Once packaged in the appropriate waste containers, the asbestos-containing waste material will be **temporarily stored** in the **temporary storage area** until disposal at the Non-Hazardous Waste (NHW) facility. Detailed requirements for the temporary storage area are provided in the specification Section 02 81 01 – Hazardous Materials.

4.7.5 Disposal of Asbestos-Containing Waste Materials

The containerized asbestos-containing waste materials will be transported by the Project Team from the temporary storage area to the NHW facility for disposal. The approved disposal procedure is as follows:

- Non-friable asbestos is not a hazardous waste and does not need to be accompanied by a manifest;
- Asbestos waste will be buried where it will not be disturbed (i.e., **designated location**);
- Waste asbestos will be **covered with a minimum of 0.5 metres of cover material**. Cover materials can be locally available soils, refuse, or other materials provided the asbestos containment is not ruptured; and
- The **location of the asbestos waste will be maintained on a map or diagram** of the on-site NHW facility, including GPS coordinates of the asbestos waste as obtained through a survey.

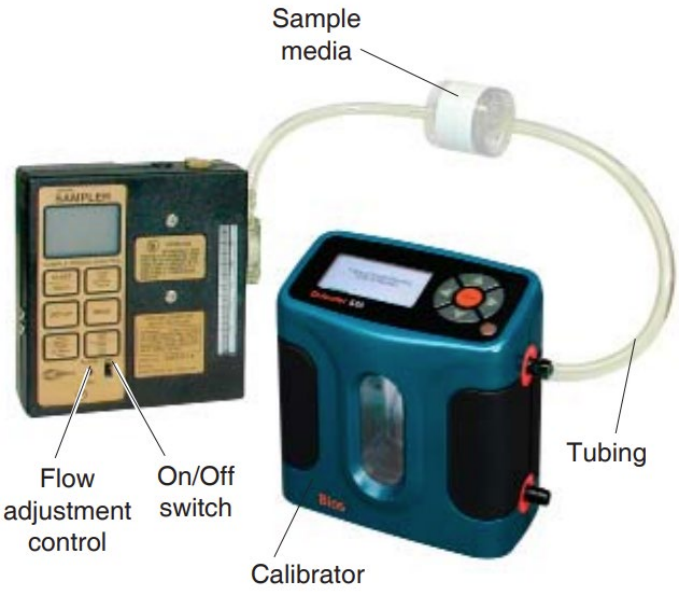
Appendix A

Air sampling procedures

Field Sampling Guide for Ambient Air Sampling using 25 mm 0.8 µm PCM Cassettes for Asbestos Fibres (NIOSH 7400)

Pre-Calibration

1. Set up a designated calibration area away from the work area, and ensure that the air is free from contamination (i.e., clean zone).
2. Turn on each pump, and allow them to run (**without the filter media**) for 5 minutes or more prior to calibration (i.e., warm-up period).
3. While the pumps are warming up, complete the "Setup" in the BIOS Defender Drycal menu. It is recommended to set the flow units to litres per minute (LPM).
4. Label each sampling cassette with a unique identifier (e.g., A-01, A-02, A-03, etc.).
5. Calibrate each pump using the BIOS DryCal calibrator using the "calibration train" configuration shown below (using a high-flow pump instead of the personal sampler in the photo):



Calibration train with filter cassette

(SKC, 2013)

6. Designate one sample cassette for CALIBRATION. It can be used each day for pre- and post- calibration throughout the program.
7. The sample cassette must be oriented the correct way for accurate calibration and sample collection. With 25 mm PCM cassettes, the air passes through the large opening (inlet), through the filter media, out from the narrow opening (outlet), and into the pump. During **calibration**, only the **coloured "nib" on the inlet side is removed** to attach the tubing. At the **time of sampling**, the **whole face of the cassette is removed** (i.e., open-faced sampling).
8. Set the calibrator to "**continuous**", and adjust the flow rate on the pump until the calibrator display shows approximately **12 LPM**. Disengage the locking ring, and turn the adjustment screw on the pump to increase/decrease the flow rate.

9. Set the calibrator to "**burst**", and allow the calibrator to complete **10 cycles**. The average flow rate of the 10 cycles will be displayed. Note this as the "pre-calibration" value for that specific pump (using the pump's unique serial number) on the air sampling sheet.
10. Disconnect the tube from the inlet of the media and turn off the pump.
11. Repeat the calibration process with the remaining pump(s) and filter media.
12. To avoid contamination, the "nib" at the inlet of the cassette should be reinserted when not in use.

Ambient Air Sampling

1. Set up the air sampling pump on a stable surface (note: external power may be required for certain makes and models of high flow sampling pumps).
2. For ambient air samples in an outdoor environment, samples are usually collected downwind from the asbestos work area.
3. Clip the sampler (i.e., 25 mm PCM cassette) to a tripod at breathing height, and aim the cassette downwards at a 45 degree angle (to mimic the direction and angle of the nose and nostril).
4. The overall setup should be similar to the configuration shown below:

5. Remove the face (wide end) of the cassette (i.e., open-faced configuration).
6. Start the pump.
7. Record the sampling start time on the air sampling sheet.
8. Periodically inspect the inside of the cassette to prevent overloading. **There should not be any visible debris on the filter**. In dusty environments, it may be necessary to swap out the cassettes every few hours (i.e., multiple short-term samples may be collected, and the total concentration from all of the sample results can be calculated to determine the full-shift exposure).
9. For ambient exposure monitoring purposes, allow the pump to sample for approximately **200 minutes**.
10. Keep an observational log during the air sampling process – any sources of potential high exposures (e.g., brief exposure to high levels of ACM) should be noted for reporting purposes.
11. At the end of the sampling period, stop the pump.

12. Record the sampling stop time on the air sampling sheet.
13. Inspect the inside of the cassette for damage to the filter. If there is damage (e.g., tear), discard the sample.
14. Reattach the face (wide end) of the cassette with coloured "nib".
15. Remove the pump, tubing, and closed cassette (intact), and transport the equipment and sample to the designated calibration area.

Post-Calibration

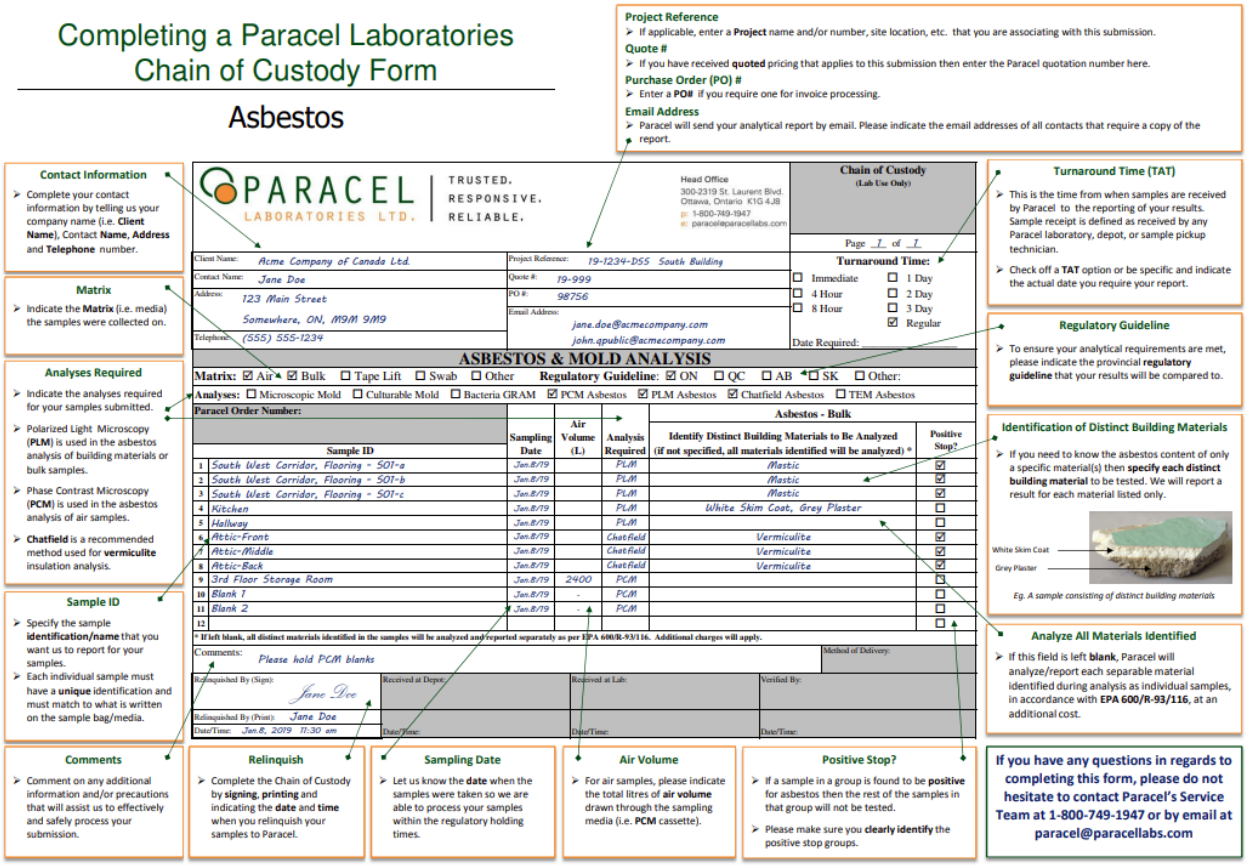
1. Remove the coloured "nib" at the front (inlet) end of the CALIBRATION cassette.
2. Connect the pump, filter media, and calibrator in the same "calibration train" configuration as described in the "Pre-Calibration" section.
3. Turn on the pump.
4. Set the calibrator to "burst", and allow the calibrator to complete 10 cycles. **Do not make any adjustments to the flow rates of the pumps when performing a post-calibration.** The average flow rate of the 10 cycles will be displayed. Note this as the "post-calibration" value for that specific pump (using the pump's unique serial number) on the air sampling sheet.
5. To obtain the most accurate post-calibration flow rate, **the same sample that was used for sampling should be used for post-calibration.** It is expected that the pump's battery life, filter loading, etc. may result in the post-calibration flow rate being slightly lower than the pre-calibration flow rate.
6. Turn off the pump.
7. Replace the coloured "nibs" on the cassette.
8. If the difference between the pre- and post-calibration flow rates is **greater than 10%** for the pump, **discard the sample** that was connected to the pump.
9. If the difference between the pre- and post-calibration flow rates is **between 5% and 10%** for the pump, **use the lower of the two flow rates** as the final flow rate for that specific pump/sample on the air sampling sheet.
10. If the difference between the pre- and post-calibration flow rates is **equal to or less than 5%**, record the **average flow rate** (add the pre- and post-calibration flow rates and divide by two) on the air sampling sheet and the laboratory chain of custody (COC) form.
11. Any documentation provided to the laboratory must not be placed inside the same bag containing the samples.
12. For additional security during transport, tape may be added over the body and the larger end of the cassette (to avoid accidental opening during transport).

Field Blanks

1. Label two **new** 25 mm PCM cassettes with unique sample identifiers (e.g., FB-01 and FB-02).
2. Note the sample identifiers of these cassettes on the air sampling sheet as "field blanks".
3. **Do not connect these cassettes to a pump**.
4. Open the ends of the cassettes and leave them open (with no air drawn through them) for 30 seconds.
5. Close and seal the cassettes.
6. Include the identifiers of field blanks on the COCs (with "0 L" air volume).
7. Package and ship two field blanks (per day) in the same bag/box as the samples to ensure that there was no inadvertent contamination in the sample handling, preparation, or shipment.

Chain of Custody (COC)

1. Complete the chain of custody (COC) form in accordance with the laboratory's specific requirements. An example has been provided below:



(Paracel Laboratories Ltd., 2018)

Note: To determine the volume of air sampled, the average flow rate in litres (pre- and post- calibration) is multiplied by the sampling duration (in minutes). For example:

Pump # 12345 (Sample ID: A-01) Pre-Calibration Flow Rate: 12.06 LPM
Pump # 12345 (Sample ID: A-01) Post-Calibration Flow Rate: 11.98 LPM
Pump # 12345 (Sample ID: A-01**) Average Flow Rate: 12.02 LPM**

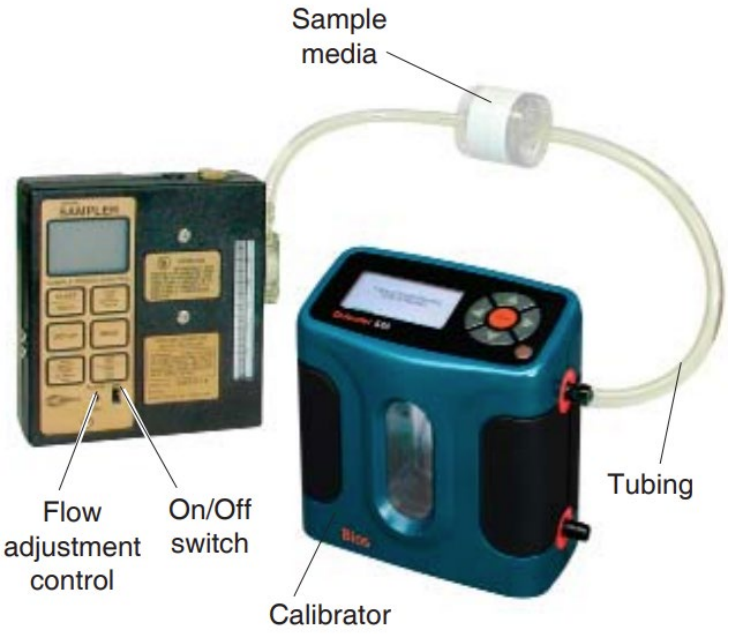
Sample Start Time: 08:30
Sample Stop Time: 11:52
Sample Duration: 202 minutes

Average Flow Rate (12.06 LPM) x **Sample Duration** (202 minutes) = **Total Volume** (2,436.1 litres)

Field Sampling Guide for Personal Air Sampling using 25 mm 0.8 µm PCM Cassettes for Asbestos Fibres (NIOSH 7400)

Pre-Calibration

1. Ensure that the pumps are fully charged prior to calibration and sampling.
2. Set up a designated calibration area away from the work area, and ensure that the air is free from contamination (i.e., clean zone).
3. Turn on each pump, and allow them to run (**without the filter media**) for 5 minutes or more prior to calibration (i.e., warm-up period).
4. While the pumps are warming up, complete the "Setup" in the BIOS Defender Drycal menu. It is recommended to set the flow units to litres per minute (LPM).
5. Label each sampling cassette with a unique identifier (e.g., A-01, A-02, A-03, etc.).
6. Calibrate each pump using the BIOS DryCal calibrator using the "calibration train" configuration shown below:



Calibration train with filter cassette

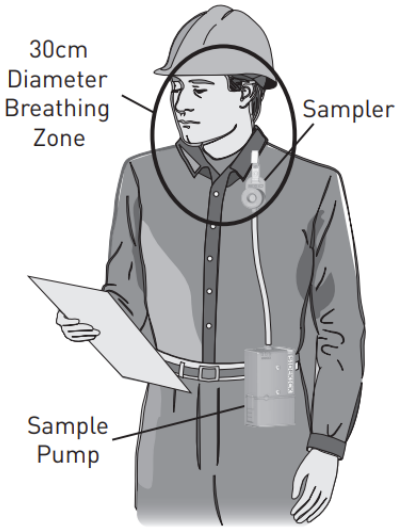
(SKC, 2013)

7. Designate one sample cassette for CALIBRATION. It can be used each day for pre and post calibration throughout the program.
8. The sample cassette must be oriented the correct way for accurate calibration and sample collection. With 25 mm PCM cassettes, the air passes through the large opening (inlet), through the filter media, out from the narrow opening (outlet), and into the pump. During **calibration**, only the **coloured "nib" on the inlet side is removed** to attach the tubing. At the **time of sampling**, the **whole face of the cassette is removed** (i.e., open-faced sampling).

9. Set the calibrator to "**continuous**", and adjust the flow rate on the pump until the calibrator display shows approximately **2 LPM**. The adjustment may require the use of a small screwdriver (often provided by the equipment vendor if the pumps are rented) to turn the adjustment screw on the pump to increase/decrease the flow rate.
10. Set the calibrator to "**burst**", and allow the calibrator to complete **10 cycles**. The average flow rate of the 10 cycles will be displayed. Note this as the "pre-calibration" value for that specific pump (using the pump's unique serial number) on the air sampling sheet.
11. Disconnect the tube from the inlet of the media and turn off the pump.
12. Repeat the calibration process with the remaining pump(s) and filter media.
13. To avoid contamination, the "nib" at the inlet of the cassette should be reinserted when not in use.

Personal Air Sampling

1. Clip the air sampling pump to the belt or pocket of the employee.
2. Clip the sampler (i.e., 25 mm PCM cassette) to the lapel area, and aim the cassette downwards at a 45 degree angle (to mimic the direction and angle of the nose and nostril) within the breathing zone of the worker (approximately 15 cm from their nose and mouth).
3. Depending on the type of personal protective equipment (PPE) used on the site, and the employee's personal preference for comfort, the tubing can be run vertically from the pump to the sampler, or diagonally up the employee's back to the lapel area on the opposite shoulder. The tubing can also run under the arm or over the shoulder, depending on the length of the tubing and personal preference, with careful consideration to ensure that it will not kink or accidentally disconnect from the pump due to the employee's movements (twisting, squatting, reaching, etc.).
4. The overall setup should be similar to the configuration shown below:



(SKC, 2019)

5. Remove the face (wide end) of the cassette (i.e., open-faced configuration).
6. Start the pump.
7. Record the sampling start time on the air sampling sheet.
8. Periodically inspect the inside of the cassette to prevent overloading. **There should not be any visible debris on the filter**. In dusty environments, it may be necessary to swap out the cassettes every few

hours (i.e., multiple short-term samples may be collected from one employee, and the total concentration from all of the sample results can be calculated to determine the full-shift exposure).

9. For personal exposure monitoring purposes, allow the pump to sample for the duration of the full shift.
10. Keep an observational log during the air sampling process – any sources of potential high exposures (e.g., brief exposure to high levels of ACM) should be noted for reporting purposes.
11. At the end of the sampling period (i.e., end of the employee's shift), stop the pump.
12. Record the sampling stop time on the air sampling sheet.
13. Inspect the inside of the cassette for damage to the filter. If there is damage (e.g., tear), discard the sample.
14. Reattach the face (wide end) of the cassette with coloured "nib".
15. Remove the pump, tubing, and closed cassette (intact), and transport the equipment and sample to the designated calibration area.

Post-Calibration

1. Remove the coloured "nib" at the front (inlet) end of the CALIBRATION cassette.
2. Connect the pump, filter media, and calibrator in the same "calibration train" configuration as described in the "Pre-Calibration" section.
3. Turn on the pump.
4. Set the calibrator to "burst" and allow the calibrator to complete 10 cycles. **Do not make any adjustments to the flow rates of the pumps when performing a post-calibration.** The average flow rate of the 10 cycles will be displayed. Note this as the "post-calibration" value for that specific pump (using the pump's unique serial number) on the air sampling sheet.
5. To obtain the most accurate post-calibration flow rate, **the same sample that was used for sampling should be used for post-calibration.** It is expected that the pump's battery life, filter loading, etc. may result in the post-calibration flow rate being slightly lower than the pre-calibration flow rate.
6. Turn off the pump.
7. Replace the coloured "nibs" on the cassette.
8. If the difference between the pre- and post-calibration flow rates is **greater than 10%** for the pump, **discard the sample** that was connected to the pump.
9. If the difference between the pre- and post-calibration flow rates is **between 5% and 10%** for the pump, **use the lower of the two flow rates** as the final flow rate for that specific pump/sample on the air sampling sheet.
10. If the difference between the pre- and post-calibration flow rates is **equal to or less than 5%**, record the **average flow rate** (add the pre- and post-calibration flow rates and divide by two) on the air sampling sheet and the laboratory chain of custody (COC) form.
11. Any documentation provided to the laboratory must not be placed inside the same bag containing the samples.
12. For additional security during transport, tape may be added over the body and the larger end of the cassette (to avoid accidental opening during transport).

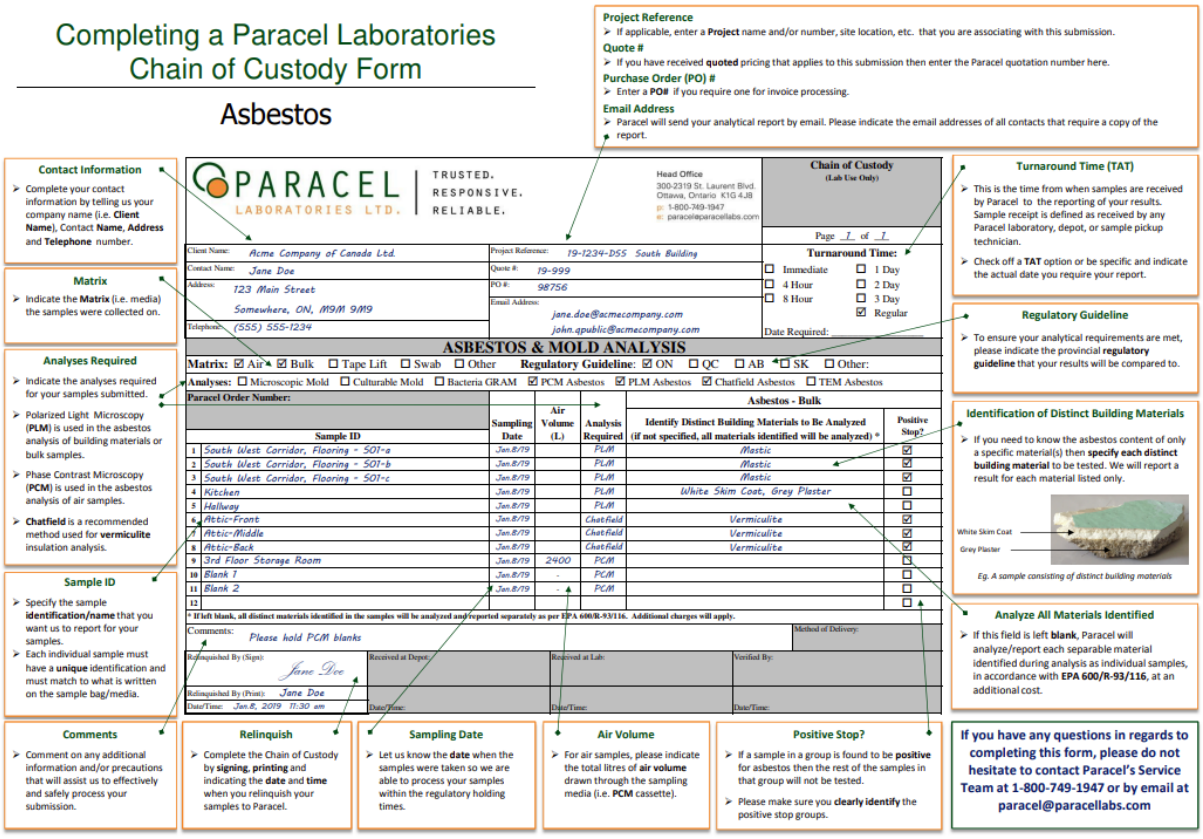
Field Blanks

1. Label two **new** 25 mm PCM cassettes with unique sample identifiers (e.g., FB-01 and FB-02).
2. Note the sample identifiers of these cassettes on the air sampling sheet as "field blanks".
3. **Do not connect these cassettes to a pump**.
4. Open the ends of the cassettes and leave them open (with no air drawn through them) for 30 seconds.

5. Close and seal the cassettes.
6. Include the identifiers of field blanks on the COCs (with "0 L" air volume).
7. Package and ship two field blanks (per day) in the same bag/box as the samples to ensure that there was no inadvertent contamination in the sample handling, preparation, or shipment.

Chain of Custody (COC)

1. Complete the chain of custody (COC) form in accordance with the laboratory's specific requirements. An example has been provided below:



(Paracel Laboratories Ltd., 2018)

Note: To determine the volume of air sampled, the average flow rate in litres (pre- and post- calibration) is multiplied by the sampling duration (in minutes). For example:

Pump # 12345 (Sample ID: A-01) Pre-Calibration Flow Rate: 2.06 LPM
Pump # 12345 (Sample ID: A-01) Post-Calibration Flow Rate: 1.98 LPM
Pump # 12345 (Sample ID: A-01**) Average Flow Rate: 2.02 LPM**

Sample Start Time: 08:30
Sample Stop Time: 16:32
Sample Duration: 482 minutes

Average Flow Rate (2.02 LPM) x **Sample Duration** (482 minutes) = **Total Volume** (973.6 litres)