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OIL SANDS ASBESTOS MANAGEMENT PROGRAM

1. PROGRAM OVERVIEW

Suncor Energy Oil Sands Asbestos Management Program (AMP) provides specific direction on how to manage asbestos at Oil Sands. Potential exposure to asbestos will be mitigated through work practices and procedural controls embedded in the program. Where feasible, in keeping with the hierarchy of controls, focus is placed on removing or eliminating asbestos from the work place. This section provides details on the structure, functioning, and management of the entire program at Oil Sands.

The AMP is based on Alberta's legislative requirements and the Alberta Asbestos Abatement Manual (2012). To ensure proper functioning of the program, an Asbestos Management Team (AMT) for each business area will help manage the program. The role of the AMT will be to own and operate the AMP in each business area.

In this program, two scenarios are considered for management of asbestos:

- Ongoing Management,
- Emergency Management.

Ongoing management is a scheduled and controlled activity undertaken by the Maintenance Department. Notification of Project is submitted a minimum of 72 hours prior to the start date. Abatement is performed as per plan and abated locations are documented in the Asbestos Inventory.

In the event that damaged or potentially exposed Asbestos Containing Material (ACM) is discovered, asbestos abatement may be required immediately. A Notification of Project (NOP) must be submitted and asbestos abatement may begin as soon as approval from Alberta OH&S is obtained. Criteria for what constitutes an emergency are described in greater detail in Section

10.2 Emergency Management.

2. PURPOSE

The Asbestos Management Program (AMP) serves to fulfill requirements of Alberta's Occupational Health and Safety Code for managing asbestos at the work site. This program provides a framework and direction for ensuring effective management and control of asbestos at Suncor's Oil Sands operations. Through effective implementation of the plan, it is anticipated that the potential for exposures to asbestos will be reduced to as low as reasonably practicable levels.

3. APPLICATION

The AMP applies to all Suncor workers, contractors, and visitors present in operating and non-operating areas where asbestos is known or suspected to be present.

4. ASBESTOS

Asbestos is a non-specific, collective term for a group of fibrous mineral silicates that can be separated into flexible fibers. Asbestos consists of two main classifications: serpentines and amphiboles. Each classification is further sub-divided as follows:

Serpentine Asbestos

- Chrysotile (white asbestos)

Amphibole Asbestos

- Amosite (brown asbestos)
- Crocidolite
- Fibrous Tremolite
- Fibrous Anthophyllite
- Fibrous Actinolite

4.1 Health Effects

All forms of asbestos have been classified as confirmed human carcinogens. Historically, chrysotile and amosite types of asbestos had been used for various industrial applications. Whether a worker develops an asbestos-related disease depends on several factors which are critical when determining risk from potential exposures. These factors are:

- Dose (concentration or amount of asbestos exposure).
- Duration (length of exposure without inadequate respiratory protection).
- Size, shape, and type of asbestos fibers.
- Source of the exposure (friable versus non-friable or bonded).
- Individual risk factors, such as smoking or other pre-disposing conditions.

4.2 Application of Asbestos at Suncor

At Suncor's Oil Sands operations, chrysotile and amosite types of asbestos have been most commonly found. Asbestos had been applied for fire-proofing and insulation around different equipment. Some common locations where asbestos may be found are in pipe insulation, gaskets, wallboards applied for insulation inside furnaces, and insulation in electrical fuse boxes. Any equipment purchased or built after 1990 is less likely to contain asbestos.

4.3 Location of Asbestos at Oil Sands

Asbestos is known to be present in Upgrading 1, Energy and Utilities, and West side Extraction operating areas. Asbestos is also present in select non-production areas such as Top Shop, Main Administration, Extraction Main Administration and UAC. Locations where asbestos is known to be present are listed below.

Upgrading

- Plant 5
- Plant 6
- Plant 7
- Plant 8
- Plant 10
- Plant 19
- Plant 21
- North and South Tank Farms

Energy and Utilities

- Plant 31
- Plant 35
- Plant 36
- Plant 38
- Exterior Pipe and Equipment

Extraction

- Plant 3
- Plant 4

Non-Production Assets

- Top Shop
- Main Administration,
- Extraction Main Administration
- UAC

5. DEFINITIONS

- **Ongoing management** is a scheduled and controlled activity undertaken by the Maintenance Department. Notification of Project is submitted a minimum of 72 hours prior to the start date. Abatement is performed as per plan and abated locations are documented in the Asbestos Inventory.

- **Emergency management** must be performed on a non-routine schedule. Upon evaluating risks to health and safety of the workers, a decision to conduct emergency abatement is taken. The emergency abatement request section of the Alberta OH&S Notification of Project form-WH3910 must be completed. Written or verbal approval from Alberta OH&S must be obtained before emergency abatement.

- **Bulk Sample** is a representative sample taken from any material that is suspected of containing asbestos.

- **Clean room** is the uncontaminated area of a decontamination facility in which workers change into their disposable clothing and back into their street clothes. It is adjacent to the shower room and opens to the outside of the decontamination facility.

- **Qualified Asbestos Individual / Firm** can be an industrial hygienist or an experienced asbestos abatement contractor.

- **Enclosure** is defined as a structure built to completely seal asbestos containing materials behind airtight, impermeable, permanent barriers. This is synonymously used with the term *full containment*.

- **Partial enclosure** is defined as having a roof, four walls, floor lined with 6 mil polyethylene sheets, turn-up of 30 cm where floor joins the walls, and an onsite donning/doffing room. This structure is not airtight as HEPA negative air units are not used.

- **Restricted Area** is an area of the work site where there is a reasonable chance that the airborne concentration of asbestos exceeds or may exceed the 8-hour occupational exposure limit. In the case of full containment, restricted area is the containment itself. In abatements without containment, a partial enclosure will be considered as the restricted area. The perimeter of the abatement will be considered as a restricted area when no partial enclosure is present.
- **Exposed worker**, as defined in the Occupational Health & Safety Code, means a worker who may reasonably be expected to work in a restricted area at least 30 work days in a 12-month period.

6. LEGISLATIVE REQUIREMENTS

The 2009 Occupational Health and Safety Act, Regulations, and Code detail the requirements in the province of Alberta with respect to health and safety at worksites. Part 4 of the Occupational Health and Safety (OH&S) Code requires that an employer must have in place a Code of Practice to govern the storage, handling, use, and disposal of asbestos. The code outlines requirements for signage, worker access, personal protective equipment, asbestos management, waste, training and health assessments. Legislative requirements as well as principles from the Alberta's Asbestos Abatement Manual (2012) have been addressed throughout this document to ensure compliance with the OH&S Code.

6.1 Occupational Exposure Limits

Workers must not be exposed to airborne concentrations which exceed Alberta's regulatory limits given in Table 1.

Table 1: Occupational Exposure Limits

Exposure Duration	Alberta OEL (f/cc)
8-hour Exposure	0.1
12-hour Exposure	0.05

Table Legend:

- **OEL** – Occupational Exposure Limit
- **Unusual Work Schedules** – Exposure limits are based on an 8-hour workday, 40-hour work week. However, shift durations can range from 10 to 12 hours in length. For extended work shifts, the 8-hour exposure limit is adjusted using the Brief and Scala Model or other models if prescribed by the OHS code. .

7. TRAINING

Three levels of courses are available to ensure compliance and competency:

- **Asbestos Awareness**- the most basic level course intended for all workers who are likely to work in or near an area where asbestos is present.
- **Asbestos Handling**- this course is intended for workers involved in handling or removing asbestos and/or asbestos contaminated waste. This course is not applicable to workers not handling or removing asbestos and/or contaminated waste.
- **Alberta Government approved Asbestos Worker Card**- most specialized training intended for workers who will be entering a restricted area of abatement or will be performing asbestos abatement.

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Type of training required at Oil Sands is listed in Table 2.

Table 2: Asbestos Training Requirements for removal or handling of asbestos and waste.

Type of Training Required			
Level of Risk	**Asbestos Awareness**	**Suncor Asbestos Handling Procedure**	**Asbestos Worker Card (Alberta Government Approved)**
High		**X**	**X**
Medium		**X**	
Low Risk		**X**	
Areas with sealed ACM	**X**		

Personnel entering a restricted area of high risk abatement to remove or handle asbestos and related waste must have a current Asbestos Worker Card from an accredited agency by Occupational Health & Safety. Workers are required to attend a course on Suncor Asbestos Handling Procedures that is completed within the past three years. Workers who have received Asbestos Handling Procedure training do not need to attend the Asbestos Awareness course.

7.1 Asbestos Awareness

The purpose of the awareness course is to educate and inform employees of the presence of asbestos at Suncor's Oil Sands site. Common adverse health effects associated with asbestos exposure are explained. Labeling, signage, and safe handling procedures are referenced. The course can be completed in-person at the Learning Center or online.

7.2 Asbestos Handling

Suncor's Asbestos Handling Procedure, LMP0001A forms the basis for the content of the Asbestos Handling course. The purpose of this course is to ensure that workers in the restricted areas of low, medium, or high risk abatements understand and apply procedures for safely handling asbestos and/or asbestos contaminated waste. Suncor's procedures for handling asbestos and related waste are reviewed in detail. Decontamination procedures are reviewed to ensure compliance.

For workers with valid Asbestos Handling training, the procedures in LMP0001A must be reviewed before commencing abatement activities. The course expires every 3 years. This course is offered upon request by the Learning Center.

7.3 Contractor Training

All contractor workers must fulfill aforementioned training requirements prior to being involved in abatement activities. Suncor approved abatement contractor must ensure that training of all workers involved in the abatement project is appropriate and current. Refer to Table 2 for training requirements.

8. ORGANIZATIONAL RESPONSIBILITIES

Responsibilities for some key functions pertaining to this program are outlined below. Each business area may elect to add to existing responsibilities or identify additional roles required for implementing this program. Such additions should be agreed upon by the business area and documented.

8.1 Maintenance Manager

- Ensure that budget for planned abatement projects are appropriately managed.
- Ensure that Suncor coordinator has reviewed this document and understands requirements pertinent to asbestos abatements.
- If necessary, identify additional roles within the business area for implementing this program. Document associated responsibilities with the identified position(s).

8.2 Designated Insulator

- Perform encapsulation as required.
- Ensure that bulk samples are collected as per bulk sample collection protocol.
- Inspect and determine condition of asbestos containing insulation during routine inspections.
- Update or advice planners on need for bulk sampling to determine extent of asbestos containing material to be abated.

8.3 Industrial Hygienist

- Perform air sampling depending on the risk level of the abatement.
- Ensure that Suncor Coordinator updates the asbestos inventory upon completion of the abatement project.
- Determine level of risk to worker health using post-exposure assessment in the event of exposure.
- Communicate results of air monitoring to line management for the project.
- Coordinate submission of the Notification of Project (NOP) to Alberta OH&S.

8.4 Abatement Contractor

- Ensure that abatement requirements are followed by all workers involved in the abatement project.
- Prior to commencing abatement, ensure that the decontamination trailer is stocked with the necessary supplies.
- Update engineering drawings or equivalent documentation for the area abated. Identify area(s) on the drawings where asbestos has been partially removed during the abatement project.
- Ensure that all abatement workers and supporting work force have appropriate training.
- Upon completion of the abatement, ensure that the decontamination trailer is cleaned.
- Ensure that asbestos waste is transported to the landfill within 24 hours of removal.

8.5 Suncor Coordinator

- Ensure abatement contractor follows requirements set out in this program.
- Obtain updated engineering drawings from abatement contractor and update asbestos inventory or provide updated drawings to area Industrial Hygienist.
- Verify that appropriate labeling has been installed on equipment.
- Ensure that abatement contractor appropriately uses and maintains the decontamination trailer.
- Upon completion of the abatement, ensure that area operations and maintenance groups are notified of completion.
- Ensure the onsite land fill is notified at least 48 hours prior to sending any asbestos waste.

9. ASBESTOS INVENTORY

A site wide web-based inventory is available to document and manage location of asbestos at Suncor's Oil Sands operations. The inventory can be accessed from the Oil Sands Industrial Hygiene webpage on the Core (Path to the inventory is: Suncor Enterprise →Oil Sands→Asbestos Inventory).

The inventory is located in Livelink and contains drawings highlighting locations with ACM. Upon completion of an asbestos abatement, the area drawing must be updated and uploaded with the same description to Livelink by the Suncor Coordinator.

10. ASBESTOS MANAGEMENT

The program provides procedures on how to manage asbestos and carry out different types of abatements. Two types of scenarios are considered in this program:

- Ongoing Management
- Emergency Management

Although the following two approaches are recommended, alternate methods of managing asbestos may be utilized as long as an inventory is kept up to date and labeling as per Section 12 is adhered to.

10.1 Ongoing Management

The first step in managing asbestos proactively is performing bi-annual or ad-hoc inspections to determine the condition of confirmed ACM. If a location is suspected of ACM, bulk sample(s) must be collected to confirm ACM status. The sampled area must be encapsulated or enclosed, while the presence of asbestos is being confirmed. Inspections must be performed as per Section *10.1.1 Inspections.* Upon receipt of the results, labeling must be installed as per Section *12. LABELING*. The procedure for proactively managing asbestos is as follows:

1. Conduct inspections (biannual or ad-hoc) as per Section *10.1.1 Inspections.*
2. If label is present, note FLOC or tag number of the equipment. Access the asbestos inventory and determine whether asbestos is present in the suspected material by reviewing engineering drawings and/or existing laboratory reports, if available.
3. Obtain bulk sample(s) if no information is available in the asbestos inventory.
4. Bulk sample(s) must be analyzed on site or shipped off site to a laboratory for identification. Shipping of bulk sample(s) must be performed as per Section

6. *14.2.2 Sample* Shipping Protocol .
7. Encapsulate suspected area while waiting for results. Erect appropriate signage and inform area operations.
8. Upon receipt of laboratory results, an assigned Suncor Coordinator must update the asbestos inventory drawings.
9. If the material does not contain asbestos, no abatement is required. The material might require repair if damaged and should be returned to appropriate state.
10. If suspected material contains asbestos, determine condition of ACM and assign repair priority as per Section *10.1.2 Repair Priority Ranking Matrix*. At the discretion of the business area, abatement may be performed by encapsulation or removal of asbestos.
11. If abatement is required, a Notification of Project (NOP) must be prepared and submitted. The contractor conducting the abatement must prepare the NOP and notify Suncor Industrial Hygiene. The NOP must be submitted to Alberta OH&S and a copy of the acknowledgement from Alberta OHS must be provided to Suncor Industrial Hygiene.

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12. Abatement must be carried out in accordance with Suncor's Asbestos Handling Procedure, LMP0001A **after 72 hours from the time of notification**.
13. Upon completion of abatement, the location must be labeled as per Section *12. LABELING*.
14. All flagging erected due to abatement must be removed upon completion. As applicable, area operations and maintenance must be notified about completion of the project.
15. The abatement contractor must submit a confirmation of completion of abatement to the assigned Suncor coordinator. The confirmation must include the following:
    a. Location of abatement (including functional location).
    b. Length of abatement with starting and ending point, indicated on a piping or vessel drawing.
    c. Completion date of abatement.
16. Suncor assigned coordinator must update the asbestos inventory upon receipt of the confirmation of completion or submit the electronic documents to the area Industrial Hygienist.

10.1.1 Inspections

The purpose of inspections is to identify condition of known or suspected Asbestos Containing Materials and determine if immediate repairs are needed.

Inspections must be conducted by a competent individual. Inspections must utilize the repair priority ranking matrix. Any bulk sample(s) collection must be carried out in a way that must follow sound industrial hygiene practices and must consider the least destructive technique to minimize release of fibers without affecting the integrity of the area sampled. Following methods will be used to ensure that ACM is identified:

- Existing Labeling
- Bulk Sampling

Frequency of inspections may be determined by the business area to build and manage the asbestos inventory; however Industrial Hygiene recommends inspections once every five years to be conducted. The intent of the inspections is to determine the condition of ACM in high risk areas. Use the following inspection protocol:

1. All insulated pipes and vessels should be visually inspected for labeling confirming presence of asbestos. Insulators experienced in working with ACM are the preferred trade group for carrying out the inspection.
2. Bulk sample(s) must be collected from locations with damaged insulation where ACM is suspected. Ensure that site is prepared properly and appropriate PPE is donned when collecting bulk sample(s).

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3. Determine the condition of the insulation or suspected ACM. If suspected ACM is damaged, erect appropriate signage and notify operations. Where feasible, encapsulate the suspected damaged ACM. Collect bulk sample(s), as required, to confirm presence of asbestos.
4. If labeling is present, document the condition of labeling.
5. Use the Repair Priority Ranking Matrix to determine the priority of abatement.

10.1.2 Repair Priority Ranking Matrix

The objective of this risk-based asbestos repair prioritization ranking matrix is to provide guidance to effectively prioritize need for ACM repair.

In order to assist with planning of asbestos abatement or repair to damaged insulation at Suncor Oil Sands, action decisions are to be made based on the relationship of assessed factors. Table 3a applies to friable ACM, while Table 3b applies to non-friable ACM.

Table 3a – Decision Matrix for Friable ACM

	Condition			
Access	**Good**	**Fair**	**Poor**	**Debris**
(A)	Action 5[1]	Action 5[2]	Action 3	Action 1
(B)	Action 7	Action 6[3]	Action 3	Action 1
(C) Visible	Action 7	Action 6	Action 3	Action 2
(C) Not Visible	Action 7	Action 7	Action 4	Action 2
(D)	Action 7	Action 7	Action 7	Action 7

Table 3b – Decision Matrix for Potentially Friable or Non-Friable ACM

	Condition			
Access	**Good**	**Fair**	**Poor**	**Debris**
(A)	Action 7	Action 7[4]	Action 3	Action 1
(B)	Action 7	Action 7	Action 3	Action 1
(C) Visible	Action 7	Action 7	Action 4	Action 2
(C) Not Visible	Action 7	Action 7	Action 4	Action 2
(D)	Action 7	Action 7	Action 7	Action 7

The following are the definitions in the Action Matrix Table presented in Table 3a and 3b.

Table 3c Action Matrix Definition

Action Definitions	
Action 1	Clean-Up of ACM Debris Restrict access that is likely to cause a disturbance of the ACM Debris and clean up ACM Debris. Utilize appropriate asbestos precautions.
Action 2	Precautions for Access Which may Disturb ACM Debris Use appropriate means to isolate the debris or to limit entry to the area which may disturb the material. At locations where ACM Debris can remain in place in lieu of removal or clean-up (e.g. Debris on top of ceiling tiles or behind lockable door), Utilize appropriate asbestos precautions to enter the area if this will disturb debris. The precautions will be required until the ACM Debris has been cleaned up.
Action 3	ACM Removal Remove ACM. Utilize asbestos procedures appropriate to the scope of the removal work. Until it is removed, restrict access to the material so it is not disturbed.
Action 4	Precautions for Work Which may Disturb ACM in Poor Condition. Utilize appropriate asbestos precautions if ACM may be disturbed by work on or near ACM. This does not require restricting access to the area, only control of work which may contact or disturb the ACM. Removal is the only viable option if work will disturb ACM.
Action 5	Proactive ACM Removal Remove friable ACM where the presence of friable asbestos in Good condition is not desirable. If friable ACM in Fair condition is not removed then Repair friable ACM.
Action 6	ACM Repair Repair friable ACM in Fair condition which is not likely to be damaged again or disturbed by normal use of the area or room. Pinchin recommends proactive removal if friable ACM is likely to be damaged or disturbed during normal use of the area or room
Action 7	Asbestos Management Program with Routine Surveillance Implement an Asbestos Management Program, including routine surveillance of ACM. Reassess materials regularly (typically once per year).

10.2 Emergency Management

Emergency asbestos release should be handled using the Asbestos Emergency Release Response Procedure (UOP0727A) for control zone setup, access, assessment, communication and decontamination.

An emergency abatement can begin without waiting for 72 hours after the NOP has been acknowledged by Alberta OH&S. Criteria accepted for emergency abatements are:

- Worker health and safety is endangered by risk of exposure to asbestos.
- Integrity of equipment is endangered such that not conducting abatement immediately would result in critical failures increasing the risk to worker health and safety.

Financial hardship or other economic reasons do not qualify for conducting an emergency abatement. The emergency approval section of the Alberta OH&S Notification form WH3910 must be completed in order to obtain emergency approval. The procedure for conducting emergency abatements is as follows:

1. Upon discovery of suspected ACM, follow Step 2 till 5 listed under Section *10.1 Ongoing Management.*
2. Determine if workers were incidentally exposed. If exposure did occur, ensure that workers are sent to First Aid for intervention by Health and Wellness.
3. Follow abatement process listed in Section *10.1 Ongoing Management*. The 72 hour waiting period is waived upon Alberta OH&S approval, and abatement can be performed immediately.

11. SUSPECTED EXPOSED WORKERS

A worker is considered exposed if the worker comes into direct contact with friable asbestos. It is important to note that such a worker is not considered an exposed worker, as per OHS Code, appropriate measures need to be taken to address the exposure depending on the estimated dose of asbestos fibers. For the purpose of this procedure, workers working around bounded asbestos are not considered to be exposed if they walk through or are present in an area with bonded asbestos.

Following steps should be taken if a worker believes they have been contaminated with asbestos:

- Exit the immediate area where asbestos contamination is suspected.
- Stay in the general work area and avoid direct contact with other workers.
- Inform the Supervisor of the situation as well as the Safety Representative for the area.
- Contact Insulator Supervisor and await the arrival of an Insulator who will don the appropriate PPE and enter the area in question to confirm if asbestos is present.
- If asbestos contamination is suspected the insulator or a competent person will collect representative samples for subsequent laboratory analysis and encapsulate the area in question.
- Isolate the area using asbestos tape and/or red danger banner tape.
- Provide the workers with wet wipes or rags to clean any exposed skin surfaces, clothing and PPE.
- Provide workers with at least disposable air purifying respirators to control potential exposures from contaminated clothing.
- Provide disposable coverall(s) to be donned over work clothes. Contaminated clothing must be removed and should be placed in double layer of 6 mil poly bags.
- Escort workers directly to the Asbestos Decontamination Trailer where they will remove clothing and take a shower.
- As applicable, Suncor Industrial Hygiene or designated person must collect air samples from the area where asbestos contamination is suspected to help determine exposure.
- Collect all clothing, ensure it is properly bagged, itemized and sent out to be laundered by Suncor approved laundry facility.
- Provide workers with clean replacement clothing or disposable tyvek and coveralls.
- If presence of asbestos is confirmed, implement asbestos abatement procedures to control the situation in the isolated area.
- If an exposure is deemed to have occurred Suncor Industrial Hygiene may complete a worker exposure risk assessment to estimate the dose of asbestos fibers. Some incidents may require Suncor Health & Wellness to complete an occupational history and (possible) health assessment on worker(s).
- Suncor Health & Wellness will maintain a record of the history/health assessment and provide the documentation to the employee (with the request that they also provide the information to their family physician). Contractor workers may obtain similar records from their employer as Suncor Health & Wellness will not maintain exposure history for contractor workers.
- An Enablon event must be generated and risk ranked appropriately. An investigation must be carried out depending on the risk ranking.

11.1 Risk Assessment

While asbestos encapsulation damage repairs are being scheduled according to repair priority ranking as outlined in Section 10.1.2 Repair Priority Ranking Matrix, Suncor is committed to conducting regular qualitative and quantitative worker exposure risk assessment to ensure potential asbestos exposure risks are controlled to within safe levels.

12. LABELING

Asbestos-containing materials (ACM) that have the potential to become friable in normally accessible areas at Suncor Energy Oil Sands are to be identified and inventoried. Records are to be kept in the Asbestos Inventory Database.

In the absence of specific knowledge, all materials suspected to contain asbestos will be handled as such unless it is known otherwise. Laboratory analysis can be used to identify amount of asbestos in suspected material. Buildings built or equipment installed after 1990 are assumed to not contain asbestos containing materials.

12.1 Pipes/ Lines/Vessels Insulation

Asbestos-containing materials (ACM) in various forms and shapes (sprayed on, blocks, and wrapping) will have warning labels posted in visible locations at varying lengths of the system or at appropriate access points (See sample label presented below). Physical labels may not be used on hot vessels and stacks (label damage, impractical); in such cases, workers are required to refer to the asbestos inventory for the status of ACM on the work site. Figure 1 shows an example of an asbestos label to be used in areas with confirmed asbestos.

Figure 1: Sample ACM label for pipes, lines and vessels

Although Figure 1 label is preferred, other commercially available labels that clearly identify and warn workers of the presence of asbestos are acceptable. Two types of banner tapes must be used during asbestos abatement. Figure 2 and Figure 3 show the banner tapes to be used at the perimeter of an asbestos abatement.

Figure 2: Danger banner tape at perimeter of asbestos abatement work

Figure 3: Asbestos specific banner tape to be used at perimeter of asbestos abatement

13.2 Labeling for Partially Abated Insulation

Where ACM has been partially removed a label or banding indicating location where asbestos is present must be applied.

Where asbestos has been partially removed from pipes, a metal band stating “No Asbestos” must be applied at the start and end point of abated area (See Figure 4).

Figure 4: "No Asbestos" Metallic Bands

Alternatively, blue metal banding can also be used to indicate “asbestos free” areas on piping. Table 4 shows the Material Master Numbers that can be used to order different types of banding.

Metal banding with “No Asbestos” label can be ordered through SAP using Material Master Number listed in Table 4.

Table 4: Material Master Numbers for “No Asbestos” stamped banding and blue color banding.

Material Master Numbers	Description	Cost per lbs	Supplier
1000419633	Stainless Steel Banding 0.020 IN x ½ IN with “NO ASBESTOS” label. 30 lbs per roll	$5.98	Ideal Products of Canada
1000419634	Stainless Steel Banding 0.020 IN x ½ IN, T304, Blue Color banding. 30 lbs per roll	$5.98	Ideal Products of Canada
1000419635	Stainless Steel Banding ½ IN x 0.020 IN, Oscillated with “No Asbestos” label. 28 lbs per roll	$6.08	Crossroads C&I

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1000419636	Stainless Steel banding ¾ IN x 0.020 IN, Oscillated with "No Asbestos" label. 42 lbs roll	$6.08	Crossroads C&I
1000419637	Stainless Steel banding ½ IN x 0.02 IN, Not Stamped. Blue color. 28 lbs roll	$10.25	Crossroads C&I
1000419638	Stainless Steel Banding ¾ IN x 0.020 IN, Not Stamped. Blue color. 42 lbs roll	$10.25	Crossroads C&I

At the start point, arrows directed towards the end point of the abated area must be labeled. Similarly, arrows directed towards the start point must be labeled on the partially abated area. Figure 5 illustrates an example of such an application.

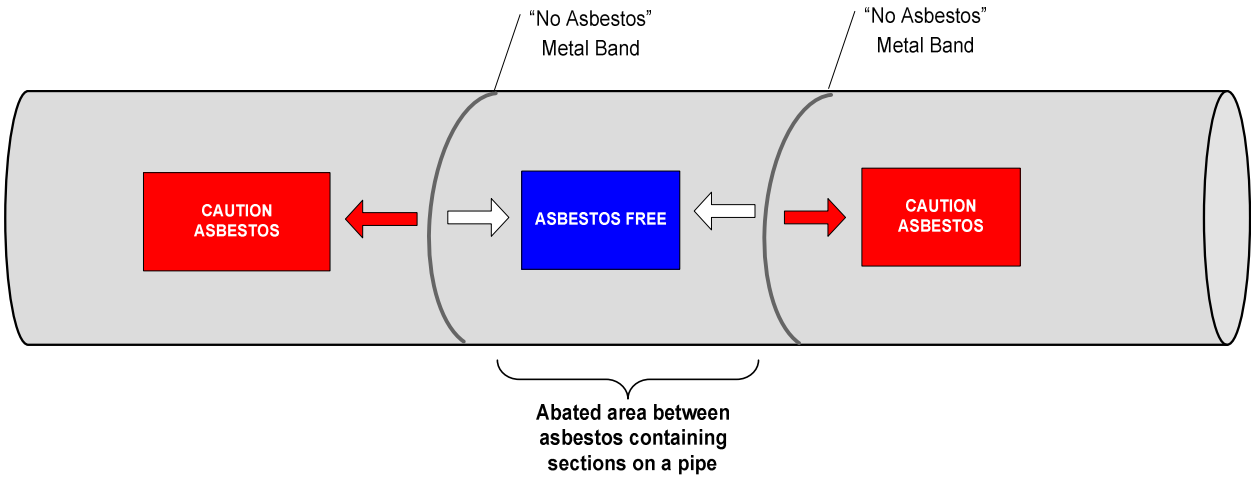

Figure 5: Piping showing asbestos free section between asbestos containing areas.

13.4 Labeling Exemption

Items such as gaskets, packing materials, sprayed-on insulation inside light/electrical fixtures at Suncor work sites may contain asbestos. Such asbestos containing materials may become exposed during regular maintenance/repair and/or dismantling activities. Given the quantity and difficulty of assessing these asbestos materials, it becomes impractical to label these items. Therefore, they will be treated as ACM (until proven otherwise). Drawings will be updated to reflect presence of asbestos in such equipment.

14. SAMPLING

Bulk and air sampling are two critical components in evaluating risk to the workers.

- Air sampling determines airborne fiber concentration to evaluate effectiveness of controls.
- Bulk sampling confirms whether suspected material contains asbestos.

14.1 Air Sampling

Personal and area monitoring for airborne asbestos fibers must be performed for all high-risk asbestos work by Industrial Hygiene or their designated consultant. Air monitoring results will be used to:

- Ensure that personal exposures to airborne fibers do not exceed established Alberta OH&S safe limits;
- Determine the effectiveness of specific asbestos handling procedures in minimizing the release of fibres;
- Determine the adequacy of selected respiratory protection.

At the discretion of the Suncor Industrial Hygienist, frequency of air sampling may be changed based on confidence in the abatement procedures and sampling results. Any change in sampling frequency for asbestos abatements must be justified through validation of controls or comparison with historical sampling data.

14.2 Bulk Sampling

Bulk samples of materials suspected to contain asbestos must be collected by a competent person and submitted to a Suncor approved laboratory for analysis. A competent person for collecting bulk samples is an asbestos worker and/or an insulator, or a person who has gone through Suncor's Asbestos Handling training course. Any person who is not an asbestos worker or an insulator must be audited and approved to collect bulk samples by Suncor Industrial Hygiene. An Insulator may be required in cases where bulk sample collection can only be performed by removing the installed insulation.

Following personal protective equipment must be donned when collecting bulk samples:

a. A half or full face respirator equipped with a high efficiency (P100) particulate filter must be worn.
b. Disposable gloves must be changed after each sample is collected. The gloves must be disposed of as asbestos waste.
c. Disposable coveralls must be worn. Head/boot coverings and safety goggles must be considered during the hazard assessment (i.e., required when removing many samples).
d. Wash hands and face prior to eating, drinking, smoking, and upon completion of work.

Commercially available bulk sampling kits such as Wonder Makers Environmental Asbestos Bulk sampling kits with encapsulant are the preferred method for bulk sample collection. This kit can be ordered through Concept Controls or through other distributors.

All bulk samples can be sent directly to a competent laboratory for analysis. Ensure to contact the laboratory prior to shipping samples for rush or urgent analysis.

14.2.1 Bulk Sampling without Commercial Kits

In the absence of such kits, following method can be used for sample collection. It is recommended that at least three samples be collected in each homogeneous sampling area; they need to be representative of the material sampled. Ensure that materials having different appearances, colours, or textures are sampled separately. Bulk sample collected for asbestos identification by Foreman/Insulator according to the following instructions:

1. Flag off the work area and set **"No Entry – Asbestos Removal"** warning signs in place. No unprotected workers are permitted in the work area.
2. Depending on the condition of the suspected asbestos or the conditions stated on the Safe Work Permit, place a 6 mil polyethylene sheet underneath the sampling point to catch falling material. Circumstances may also require using or having a vacuum cleaner equipped with a HEPA-filtered exhaust on standby.
3. Remove or reposition a small area of the protective covering (i.e., sheet metal, aluminium insulation cover, etc.) from the pipe, as necessary.
4. Spray sample point with a light mist of water to reduce emissions of friable material during the sample removal process.
5. The minimum sample size should be at least 3 cm x 3 cm (1" x 1") and extend to the full depth of the material.
6. Gently twist the open end of a coring tool or a knife into the asbestos until a solid surface stops further penetration. Extract the sample. Clean the sampling tools after each sample is collected.
7. Place the sample into a sealable container or plastic bag.
8. The sample point shall be sealed with an encapsulant and the protective cover repositioned to prevent fibre release.
9. Temporarily mark the sample point for reference with the date of sampling and sample number, until the analysis results are received. To ensure traceability of each ACM sample, a unique sample number must be assigned. The sample number will be used at all stages of the process, from sampling through transportation to the laboratory, analysis of the sample and inclusion in a final report. To obtain a sample number, complete the Laboratory Chain of Custody document available in the inventory. A unique sample number will be generated which should be written on each bulk sample and the Chain of Custody form of the laboratory.
10. Analysis of bulk samples, when performed for identification purposes, shall be conducted by a laboratory that is independent of the abatement contractor.

Cleanup

1. Gather up the polyethylene drop sheet which was under the sampling point and place it into a 6 mil polyethylene disposal bag, ensuring the material is wet while it is being placed into the bag.
2. Clean up the sampling area and exterior of the disposal bag(s) to remove any material that may have adhered; seal the disposal bag with duct tape.
3. Remove and transport the disposal bags to an approved asbestos waste disposal site. Note: For small quantities of waste, the laboratory may provide this service.
4. Remove personal protective clothing and equipment. Dispose of any disposable protective clothing, gloves, vacuum filters, and respirator cartridges into a properly labeled asbestos disposal bag: “Contains Asbestos, Cancer Hazard, Avoid Breathing Dust”. Seal it with duct tape.
5. Non-disposable coveralls or other clothing contaminated with asbestos must be properly laundered. Footwear should also be properly decontaminated.
6. Note: The use of street clothes under disposable coveralls must be assessed and determined for individual projects depending on ambient conditions. In no circumstances shall workers take contaminated clothing home.
7. The respirator should be the last piece of personal protective equipment removed. Damp-wipe its outer surface before removal. Clean, inspect, and store the respirator according to the manufacturer’s instructions.
8. Ensure sampling tools are properly decontaminated.

NOTE: Do not use compressed air to clean up or remove dust or materials from work surfaces or clothing. Workers working in high-risk containments shall dispose of the respirator filters periodically as required.

14.2.2 Sample Shipping Protocol

Package the sample as follows:

1. Wipe the exterior of sampling container with a damp cloth to remove any material which may have adhered to it during sampling.

2. Ensure the sample container is tightly sealed. To prevent accidental opening of the sample container, place it in a second container or a zip lock bag and tape it closed.

3. Complete Chain of Custody form (available on Livelink) and clearly write the unique samples numbers from the Chain of Custody on the sample container.

4. Label the sample container. As an example, the contractor will provide similar information as shown below:

Laboratory Sample
(Suspected Asbestos)

Facility Name: _____

Sample Location: _____

Sampled Equipment #: _____

Sample I.D. _____

Date Removed: _____

Ship the bulk sample(s) as follows:

Suncor Shipping: Coordinate delivery arrangements through the Suncor's Supply Chain department who creates shipping requisition which is sent on to the warehouse.

Courier: Bonded courier services should be used to transport legal samples to the laboratory/analyst. Samples will be prepared and secured for transport as described in the *Sample Packaging and Custody* section. The courier will document accepting and relinquishing custody of the sample by signature and date/time. The courier will also ensure sample security as described in the *Custody* section. If the samples are sent for analysis to a laboratory/analyst in Canada, ensure that the following are inserted into the label pouch:

- completed Laboratory Chain Of Custody (COC) form, and
- Completed package label that includes listing of all samples.

If the samples are being sent to a laboratory located in the US for analysis, ensure that the following are inserted into the label pouch:

- completed COC,
- completed package label that includes listing of all samples, and
- Completed TSCA Certification form which is checked "negative".

Also ensure that the worth of the shipment is kept to around $10.00 for the suspect ACM.

15. ASBESTOS ABATEMENT

All aspects of high, moderate, and low risk abatements are provided in Suncor's Asbestos Handling Procedure, LMP0001A. The procedure provides specific requirements to carry out different levels of abatement. To determine the classification of abatement, an Asbestos Handling Decision Tree is available in the Appendix of LMP0001A.

According to Alberta's Asbestos Abatement manual (2012), following principles must be adhered to during all abatements:

1. Isolate the work area;
2. Protect workers;
3. Minimize the release of asbestos fibers; and
4. Ensure adequate clean-up and decontamination.

Any deviation in constructing a partial enclosure must be documented and justified by completing form in Appendix I.

Continued on next page

Continued

In order to streamline the application of encapsulation, all stainless steel seams must be sealed with silicone with minimum of 12 inch length back on existing cladding. CP-211 (Blue bridging encapsulant) must be applied with woven glass fabric 6 inch past existing metal. Other methods of encapsulation that provide equivalent bonding may be used upon review by Suncor Insulators or qualified personnel.

In some cases, the business unit may choose to extend or shorten the scope of the abatements. Such a change in scope of work must be documented by completing the Abatement Deviation form in Appendix II. The Notification of Project must be amended and sent to Alberta OH&S when a change of work scope is made.

16. DECONTAMINATION

The decontamination trailer is located between the CMD and Plant 25. Where workers need to be transported from the abatement site, a vehicle that has been lined with 6 millimeter polyethylene sheets may be used.

All seating and floor areas of the vehicle to transport abatement workers to decontamination trailer must be lined with 6 millimeter polyethylene sheets. The operator of the vehicle must don at least personal protection equipment as listed in low risk abatement procedure as per Suncor's Asbestos Handling Procedure, LMP0001A. Workers must wear seat belts while being transported.

It is the responsibility of the abatement contractor using the facility to maintain proper housekeeping and to return it in a clean condition back to Suncor upon project completion. The decontamination trailer is maintained by Suncor Facility Management Services. For repairs or maintenance concerns, call 780-743-6555.

17. ASBESTOS WASTE

- Dispose of asbestos waste in sealed containers (e.g., double-bagged).
- Ensure that required approvals and/or permits for disposal are obtained.
- Label all asbestos waste bags with the words,

"Contains Asbestos, Cancer Hazard, Avoid Breathing Dust"

- Mark outer containers with appropriate shipping names, hazard class, identification number, disposal facility address, and generator site address.
- Coordinate removal of containers to an approved disposal site.
- Ensure all waste water from the containment and decontamination facility, if present, passes through a 10 micrometer filter before being discharged into the sewer system.
- Ensure that the transportation vehicle is equipped with emergency cleaning equipment.
- For offsite road transportation, classify the asbestos waste as follows, depending on the asbestos type:

Asbestos, White, Waste

PIN: UN 2590

Classification: 9

Packing Group: III

Asbestos, Blue, Waste

PIN: UN 2212

Classification: 9

Packing Group: II

Asbestos, Brown, Waste

PIN: UN 2212

Classification: 9

Packing Group: II

18. LAUNDRY

Reusable coveralls used during abatements must be laundered by a Suncor approved laundry facility. Coveralls must be deposited in double-layer 6 millimeter polyethylene bags. The contents of the bag must be dampened with water to prevent potential for release of s when handling waste. The bags must be goose-necked and properly sealed. The outermost bag must be labeled as follows:

Contaminated Coveralls

Workers handling contaminated coveralls must use personal protective equipment as per low risk abatement procedures. Handling of coveralls must be performed by mitigating risks from manual handling. Suncor has approved the GoodFish Lake Development Corporation to handle coveralls used during asbestos abatements. Contact GoodFish at (780) 636-2917 to arrange for laundering of contaminated coveralls.

19. ABATEMENT RECORDS

The abatement contractor must supply Suncor Coordinator with updated drawings indicating location of asbestos abatement. The drawing must specify if asbestos was encapsulated as opposed to being removed. The abatement records must be entered into the Asbestos Inventory by Suncor coordinator or designated individual in the business area.

20. AUDITING

A bi-annual audit must be completed in each business area to ensure that the Asbestos Management Program is functioning as intended. The scope of the audit must include an audit of the meetings minutes of the AMT, abatement records, inspections, labeling, and the asbestos inventory. The audit may be conducted by Suncor Industrial Hygiene or business area maintenance manager. The asbestos management program must be updated at least every three years. The document owner will be responsible for ensuring that the program is updated as required.

21. References

Skinner HCW, Ross M, Frondel C. *Asbestos and Other Fibrous Materials*. New York: Oxford University Press; 1988.

Asbestos Exposure and Cancer Risk - National Cancer Institute. Available at: http://www.cancer.gov/cancertopics/factsheet/Risk/asbestos. Accessed March 7, 2012.

Alberta Occupational Health & Safety Code (2009).

Alberta Asbestos Abatement Manual (2012).

LMP0001A, Suncor's Asbestos Handling Procedure

APPENDIX I: Partial Enclosure Deviation

Complete this form only if partial enclosure is not constructed. A partial enclosure has the following features: four walls, roof, turn-up of 30 cm where floor joins the walls, and an onsite donning/doffing room. Please complete the form below for any deviation in partial enclosure construction.

Abatement Location _____

Abatement Date and Time _____

Without Containment/ Partial Enclosure	Built		Where 'No' is selected, explain why containment feature cannot be built.
	Yes	No	
Floor lined with 6 mil polyethylene sheets			
30 cm turn-up where floor joins the walls			
Roof			
Four walls			
Onsite donning and/or doffing room			

Comments:

Abatement Foreman (Print Name):_____

Abatement Contractor (Print Name):_____

Contractor Signature: _____

Suncor Industrial Hygienist (Print Name):_____

Appendix II: Deviation in Abatement Scope

If the abatement project is being extended or reduced, rationale for the deviation is to be recorded. An increase in scope of work will involve notifying Alberta OH&S by making appropriate changes to the existing NOP.

For change in abatement scope of work, please fill the form below documenting reasons for the said change.

Project Name: _____

Project Start Date: _____

Project Expected Completion Date: _____

Mark the Change in Scope of Work: Project Extended Project Shortened

Briefly describe rationale for the change.

Submitted By (Print Name): _____

Date Submitted (mm/dd/yy): _____

Signature: _____

Project Manager (Print Name): _____

Signature: _____

The following individuals have approved and signed this document.

UserName: Sheila Chernys (schernys)
Title: Dir OS Enviro & Reg
Date: Tuesday, 26 December 2017, 07:41 AM Mountain Time
Meaning: Approver 1 Signed
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