Fungal Contamination

Document Number: **LMS0075A**	**Standard – Administrative**	Applies To: **Upstream**
Revision Date: **2015/11/27** Revision: **1** Review Cycle: **3 Years**	Document Owner (Title): Manager, Industrial Hygiene	

Summary of Changes

Rev No.	Section Changed	Revision Made
1		New Document

Scope/Purpose

The presence of excessive fungal contamination in indoor environments may aggravate respiratory conditions and cause allergic reactions in some people. This standard is to eliminate or minimize potential exposure of workers to fungal contamination at Suncor's operational facilities in the Wood Buffalo region.

Compliance

This standard applies to all Suncor Energy Inc. employees, contractors, vendors and visitors in the Wood Buffalo region and is part of Suncor's EHS management system.

Roles and Responsibilities

The following individuals and groups have the following roles and responsibilities:

Manager, Industrial Hygiene

- Ensures this document is reviewed according to the required revision cycle.
- Ensures the document is updated to accommodate changes to Suncor, provincial, and federal regulation.
- Ensures the document is updated to mitigate risks found as the result of an incident.

Director, Environment and Regulatory

- Ensures this standard is necessary and that it aligns with management and company direction.

Line Management

- Ensures implementation and adherence to this standard.

Industrial Hygiene Department

- Identifies and evaluates potential sources of fungal growth.
- Provides guidance to the Business Areas on necessary remediation measures required to remove fungal contamination.

References

- Work Safe Alberta Indoor Air Quality Kit, August 2009
- Canadian Construction Association, Mold Guidelines for the Canadian Construction Industry, 2004
- American Society of Safety Engineers, Position Statement Regarding Mold in the Indoor Working Environment
- Centers for Disease Control, Prevention and Remediation Strategies for the Control and Removal of Fungal Growth
- Health Canada, Fungal Contamination in Public Buildings: Health Effects and Investigation Methods, 2004
- NIOSH, Building Air Quality: A Guide for Building Owners and Facility Managers, Appendix C, 1991, Publication No. 91-114
- New York City Department of Health and Mental Hygiene, Guidelines on Assessment and Remediation of Fungi in Indoor Environments
- Environmental Standards Organization, Standards of Practice for the Assessment of Indoor Environmental Quality, Volume I: Mold Sampling, Assessment of Mold Contamination, April 2002

Definitions

Fungi (mold) are present almost everywhere. The term “mold” applies to a large group of microorganisms, which, together with mushrooms and yeast, form the Fungi Kingdom of living matter.

The most common symptoms from exposure to mold in indoor environments are runny nose, eye irritation, cough, congestion, aggravation of asthma, headache, flu-like symptoms, fatigue, and skin rash. People who are exposed to mold growth on building materials will not necessarily exhibit adverse health effects.

Some people may be more susceptible and at greater risk, including: infants and children, the elderly, pregnant women, individuals with respiratory conditions or allergies and asthma, and persons with weakened immune systems (e.g., chemotherapy patients, organ or bone marrow transplant recipients, and people with HIV infections or autoimmune diseases).

People with specific health concerns should consult their doctor if concerned about mold exposure. Symptoms that may appear to stem from mold exposure may be due to other causes such as bacterial or viral infections or other allergies.

Standard

1. Recognition

Item	Description
1.1	The most effective way to manage fungal contamination in a building is to eliminate or limit the conditions that foster its establishment and growth. There are four conditions that significantly influence potential for fungal contamination: • temperature range of 4 to 38ºC • presence of mold spores • presence of nutrient base such as building materials • elevated moisture or humidity. Managing these four conditions will significantly minimize the potential for fungal contamination.

2. Evaluation

Item	Description
Visual Inspection 2.1	Visual inspection is the first step in identifying possible fungal contamination. The presence of water damage can be an indicator for fungal contamination and is usually revealed as discolouration and staining of building materials. Fungal contamination will most often appear as dark spots, stains or patches on building materials.
2.2	In general, any porous or semi-porous building material should be inspected since they are more likely to be contaminated. Specific materials to consider include insulation, gypsum wallboard, ceiling tiles, carpeting and underlay, etc. Ventilation systems should also be visually checked, particularly for damp filters, damp conditions in the system, and overall cleanliness.
2.3	A boroscope may be used to view concealed spaces such as ductwork or wall cavities. A moisture meter may be used to detect moisture in building materials which can be an indicator for potential fungal contamination.
2.4	In general, a visual inspection by a qualified individual is sufficient to identify the presence of fungal contamination on building materials. Remediation of visually identified fungal contamination should proceed without further evaluation.

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	Item	Description
Air and Surface Sampling	2.5	Air or surface sampling for fungal contamination is usually not required. Sampling will be conducted at the discretion of the Industrial Hygiene Department.
	2.6	Air and surface sampling for fungal contamination will be conducted according to the methods outlined in Standards of Practice for the Assessment of Indoor Environmental Quality, Volume I. Mold Sampling and Health Canada, Fungal Contamination in Public Buildings: Health Effects and Investigation Methods, 2004, can be used for air sampling result interpretation and comparison.

3. Control Measures

Item	Description
3.1	Quick and effective response to water intrusion can prevent fungal growth and occupant exposure to bioaerosols, further disruption to building operations, and future needs for fungal remediation. To remediate problematic fungal contamination, the contamination should be removed from materials that can be effectively cleaned and materials that cannot be cleaned should be discarded.
3.2	Assessment and remediation of fungal contamination should follow the guideline in Appendix 1 for assessment, PPE requirements, restricted areas setup and waste disposal.
3.3	**In all situations, the underlying cause of water accumulation must be rectified or fungal growth will recur**. Any initial water infiltration should be stopped and cleaned immediately. An immediate response and thorough clean up, drying, and/or removal of water damaged materials will prevent or limit fungal growth. If the source of water is elevated humidity, relative humidity should be maintained at levels below 60% to inhibit fungal growth. Emphasis should be on ensuring proper repairs of the building infrastructure, so water damage and moisture build-up does not recur.
3.4	Mold on bathroom and shower tiles is a common occurrence. This can be controlled through frequent use of household cleaners.

End of Standard

Appendix 1 – Fungal Assessment & Remediation Guidelines

Purpose

This guideline is intended to assist in identifying, assessing and controlling mold in facilities. It also outlines roles and responsibilities. This guideline is to be used for Suncor owned facilities and in all instances of suspected mold or fungal growth, an Industrial Hygienist and Environmental, Health and Safety (EH&S) Advisor should be consulted.

Guideline

1. Actions upon Identification of Suspect or Confirmed Mold

Responsibility	Step	Action
Facilities Operator	1.1	Isolate the affected room, facilities and area and put up signs warning unauthorized personnel not to enter.
	1.2	Involve EH&S, Industrial Hygiene (IH), and Communications (where applicable).
	1.3	When mold is suspected or confirmed follow Strategies 1 or 2, respectively.

2. Strategy 1- Mold/Fungal Contamination is Suspected

Responsibility	Step	Action
Industrial Hygiene / Facilities Operator	2.1	Conduct a walkthrough visual non-invasive mold assessment including: • Visually assess and confirm the presence or status of fungal growth. • Use a moisture meter to identify the presence of water and moisture within the building material. • Identify the cause of elevated moisture, if possible. • If no mold or water damage is present, communicate with key stakeholders and release area to resume normal operations. • If mold and water damage is present, proceed to Step 3.

3. Strategy 2– Mold/Fungal Growth is Evident and Confirmed

Responsibility	Step	Action
Industrial Hygiene / Facilities Operator	3.1	Identify the size of the affected area(s), and categorize it as noted below: • Small isolated areas are less than 10 square feet and generally include ceiling tiles or small areas on walls. • Medium isolated areas are 10 to 100 square feet. • Large areas are greater than 100 square feet in contiguous areas and are generally separate walls in a single room or mold hazards in a facility HVAC system.

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Responsibility	Step	Action
	3.2	Hire a qualified mold or building maintenance contractor • Ensure the contractor has a safe work procedure meeting the minimum requirement in Section 4 • Obtain applicable permits as per site requirements • Conduct a kick off meeting with contractor, IH, EH&S advisor and building operator.
Contractor	3.3	Build the containment, based on the size of effected area as per section 3.
Industrial Hygiene/EH&S	3.4	Inspect containment before starting remediation work.
Contractor	3.5	Once the containment is approved, remediate the mold and water damaged building material as per the minimum requirements in section 4.
Industrial Hygiene	3.6	Conduct air monitoring as needed.
Industrial Hygiene	3.7	Communicate the results with the key stakeholders.
Facilities Management	3.8	Release the area back to normal operations

4. Minimum Requirements

	Step	Action
Personal Protective Equipment and Containment Requirements	4.1	Table 4.1 outlines the minimum PPE and containment requirements for qualified mold or building maintenance contractors to follow while conducting remediation work on a Suncor site.

Table 4.1 Minimum Remediation Requirements by Size of Remediation

Size of Remediation	Requirement
Personal Protective Equipment	
Small Isolated Area	Minimum of N95 dust mask, gloves and eye protection as well as the standard PPE for the area. Workers must be fit tested, clean shaven and have the proper training for donning respirator.
Medium Isolated Area	Minimum of N95 dust mask, gloves and eye protection as well as the standard PPE for the area. Workers must be fit tested, clean shaven and have the proper training for donning respirator.
Large Area	Minimum of a half mask air-purifying respirator with P100 cartridges, disposable coveralls with head and foot covering, gloves and eye protection as well as the standard PPE for the area. Workers must be fit tested, clean shaven and have the proper training for donning respirator.

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Size of Remediation	Requirement
Containment	
Small Isolated Area	Before remediation, the floor of the work area, egress pathways and HVAC system opening in the affected areas must be covered with 6 mil poly plastic sheeting and sealed with duct tape. The removable materials and items in the affected areas must be removed from the area. A security perimeter must be established and unauthorized workers must not enter the containment. After the remediation, the plastic sheeting must be double bagged. The outside of the bag must be vacuumed with a vacuum containing a HEPA filter or cleaned with a cloth and 10 % bleach solution. The bag can be disposed in the normal landfill.
Medium Isolated Area	Before remediation, the floor of the work area, egress pathways must be covered with 6 mil poly plastic sheeting and sealed with duct tape. Ventilation ducts, grills or other openings in the work area must be covered with 6 mil poly plastic sheeting. A security perimeter must be established and unauthorized workers must not enter the containment. Other materials and items in the affected areas must be removed from the area. The HVAC system must be shut down if required to properly seal the vents. After the remediation, the plastic sheeting must be double bagged. The outside of the bag must be vacuumed with a vacuum containing a HEPA filter or cleaned with a cloth and 10 percent bleach solution. The bag can be disposed in the normal landfill.
Large Area	Before remediation, the floor of the work area, egress pathways must be covered with 6 mil poly plastic sheeting and sealed with duct tape. Ventilation ducts, grills or other openings in the work area must be covered with 6 mil poly plastic sheeting. Other materials or items in the affected areas must be removed from the area. A security perimeter must be established and unauthorized workers must not enter the containment. The HVAC system must be shut down. The work area must use an exhaust fan equipped with a HEPA filter to generate a negative pressure of 5 Pascals. A clean change room must be set up. Before leaving the isolated work area, workers must remove their disposable coveralls. After the remediation, the plastic sheeting must be double bagged. The outside of the bag must be vacuumed with a vacuum containing a HEPA filter or cleaned with a cloth and a 10 percent bleach solution. The bag can be disposed in the landfill.
Dust suppression, cleaning and waste disposal methods are not dependent on the size of the remediation and are detailed below.	

Dust Suppression

4.2 Any work that creates dust should be avoided. Airborne dust must be suppressed using one or more of the following methods:

- Cleaning or gently misting surfaces with a diluted soap or detergent solution before removal
- Using of high-efficiency particulate air (HEPA) vacuum- shrouded tools
- Using a vacuum equipped with a HEPA filter at the point of dust generation.

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	Step	Action
Cleaning	4.3	Mold found on non-porous material must be wiped down using a cloth and a 10 percent bleach solution.
	4.4	Porous material with mold contamination must be removed and replaced with new material. The mold contaminated material must be double bagged. The outside of the bag must be vacuumed with a vacuum containing a HEPA filter or cleaned with a cloth and a 10 percent bleach solution. The bag can be disposed in the regular landfill.
	4.5	When the containment is removed, the work area and egress pathways must be vacuumed with a vacuum containing a HEPA filter or cleaned with a cloth and/or mop and a 10 percent bleach solution. All areas should be left dry and visibly free from mold, dust and debris.
Unacceptable Methods	4.6	The following assessment and remediation methods are unacceptable at Suncor: • Ozone monitoring • Hand sanding or dry ice blasting must only be used when a bleach solution is not effective. These methods must be approved by IH for each remediation project.

End of Procedure

The following individuals have approved and signed this document.

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Meaning: Approver 1 Signed
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