Work scope details:

Title: Installation of Hood Flow Monitors

Work Scope Summary: This work involves the installation of flow monitors in designated fume hoods located in the ORNL facility. The project requires adherence to strict safety protocols due to the presence of asbestos-containing materials (ACM) and potential radiation contamination.

Key Work Scope Components:

• Installation of monitors in West hood EF-97, West IE9254, East Hood EF-96, and East Hood IE9252.

• Use of ladders for elevated work.

• Wet wiping of surfaces prior to drilling.

• Validation of installed monitors for operational integrity post-installation.

Relevant previous events and lessons learned:

Event Title	Event Summary	Lessons Learned	Reference Link
Asbestos Exposure Incident at XYZ Facility	During maintenance work, workers were exposed to asbestos fibers due to inadequate containment measures.	Importance of using wet methods and HEPA vacuums to minimize airborne fibers.	OSHA Asbestos Standards
Radiation Contamination Event	A worker was contaminated while performing maintenance on a hood without proper radiological protection.	Always verify radiological conditions and obtain necessary permits before starting work.	NRC Radiation Protection
Ladder Fall Incident	A worker fell from a ladder due to improper ladder inspection and setup.	Conduct thorough ladder inspections and ensure proper setup before use.	OSHA Ladder Safety
Noise-Induced Hearing Loss Case	Employees in a high-noise area suffered hearing loss due to lack of proper hearing protection.	Implement mandatory hearing protection in high-noise areas and conduct regular noise assessments.	NIOSH Hearing Loss Prevention
Chemical Spill During Maintenance	A chemical spill occurred due to improper handling of cleaning agents.	Ensure proper training on chemical handling and use of appropriate PPE.	EPA Chemical Safety

Missing Hazards:

Hazard	Missing or Inadequate Mitigation in Current Work Control Document	Recommended Mitigation for Revision	Reference Link	SBMS Link
Asbestos Exposure	Not addressed	Implement mandatory use of wet methods and HEPA vacuums during drilling.	OSHA Asbestos Standards	N/A

Hazard	Missing or Inadequate Mitigation in Current Work Control Document	Recommended Mitigation for Revision	Reference Link	SBMS Link
Radiation Contamination	Inadequate verification process	Require radiological protection approval before work begins and continuous monitoring during work.	NRC Radiation Protection	N/A
Ladder Safety	Not addressed	Conduct ladder safety training and ensure all ladders are inspected before use.	OSHA Ladder Safety	N/A
Noise Exposure	Inadequate hearing protection measures	Mandate the use of hearing protection with a minimum NRR of 27 in high-noise areas.	NIOSH Hearing Loss Prevention	N/A
Chemical Exposure	Not addressed	Provide training on proper handling of chemicals and ensure availability of Material Safety Data Sheets (MSDS).	EPA Chemical Safety	N/A
Elevated Work Risks	Inadequate fall protection measures	Require the use of personal fall arrest systems (PFAS) when working at heights.	OSHA Fall Protection	N/A
Confined Space Hazards	Not addressed	Conduct a confined space assessment and ensure proper ventilation before work begins.	OSHA Confined Spaces	N/A
Time Pressure	Not addressed	Implement a work schedule that allows adequate time for task completion without rushing.	N/A	N/A
Distractive Environment	Not addressed	Establish a clear communication protocol and minimize distractions in the work area.	N/A	N/A
Vague Guidance	Inadequate instructions	Provide clear, detailed work instructions and conduct pre-job briefings to clarify tasks.	N/A	N/A

Failure mode analysis:

Current Control	Failure Mode of the Control	Effect of Failure	Cause of Failure	Recommended Action
Radiological Work Permit	Permit not obtained or expired	Potential radiation exposure to workers	Lack of awareness or oversight	Implement a tracking system for permit renewals and approvals.
PPE Requirements	PPE not used or inadequate	Increased risk of exposure to asbestos and chemicals	Complacency or lack of enforcement	Conduct regular PPE audits and enforce compliance strictly.
Ladder Inspection Protocol	Ladder not inspected before use	Increased risk of falls	Inadequate training or oversight	Schedule mandatory ladder inspections before each use and document findings.
Wet Wipe Procedure	Wet wiping not performed	Increased airborne asbestos fibers	Lack of adherence to procedures	Reinforce the importance of wet wiping through training and supervision.
Communication Protocol	Poor communication among team members	Increased risk of errors or accidents	Lack of established communication channels	Establish a clear communication plan and conduct regular safety briefings.
Emergency Response Plan	Inadequate response to emergencies	Increased severity of incidents	Lack of training or drills	Conduct regular emergency response drills and review the plan with all workers.
Tool Availability	Tools not available or inadequate	Delays in work and increased risk of improvised solutions	Poor inventory management	Maintain an inventory checklist and ensure tools are available before work begins.

Current Control	Failure Mode of the Control	Effect of Failure	Cause of Failure	Recommended Action
Training and Competency Verification	Workers not adequately trained	Increased risk of accidents and exposure	Inadequate training programs	Implement a comprehensive training program with regular assessments of worker competency.
Work Instructions	Instructions not followed or unclear	Increased risk of procedural violations	Vague or incomplete instructions	Review and revise work instructions to ensure clarity and completeness.
Monitoring of Installed Equipment	Equipment not validated post-installation	Potential failure of monitors	Lack of follow-up procedures	Establish a validation checklist and schedule for post-installation monitoring.

This risk assessment report provides a comprehensive analysis of the potential hazards associated with the installation of hood flow monitors, identifies relevant historical safety events, and offers specific mitigation recommendations to enhance workplace safety.