

**Work scope details:**

Title: Install Cave B Liner, Transfer Chute, & Glove Box

Work Scope Summary: - The work involves the installation of a new liner for Cave B, along with the installation of a transfer chute and a glove box. The document outlines the necessary hazards and controls associated with these installations.

Key Work Scope Components: - Installation of Cave B liner - Installation of transfer chute - Installation of glove box - Identification and management of hazards - Implementation of control measures

**Relevant previous events and lessons learned:**

Event Title	Event Summary	Lessons Learned	Reference link
Glovebox Explosion in 1969	An employee working alone in a glovebox lab ignited a torch flame inside the glovebox, causing an explosion. The explosion ruptured the glovebox and dispersed radioactive material. The employee suffered injuries and was exposed to radiation.	Ensure proper safety protocols and controls are in place when working with flammable gases and radioactive materials. Avoid working alone in high-risk environments.	Not provided
C-059 Personnel Exposed to Potential Hazardous Energy	On October 11, 2023, an employee accidentally caused a metal stand to fall and contact an exposed plug prong inside a glovebox, resulting in an electrical spark. The situation was safely resolved by deenergizing the power.	Ensure electrical safety by securing power cords and plugs. Implement proper work processes to prevent accidental contact with electrical components.	<a href="#">Link</a>
Worker Incident at Thuddungra Mine	A worker fell into a conveyor transfer chute due to a failed emergency stop system and was partially buried by material. Contributing factors included poor design and inadequate isolation procedures.	Design equipment with safety in mind, ensure emergency systems are functional, and follow safe work practices.	<a href="#">Link</a>
Glovebox Tips Over During Relocation	A glovebox tipped over during relocation due to its top-heavy nature and a caster hitting a floor depression. It narrowly missed other equipment.	Consult experts for non-routine equipment moves, analyze hazards, and plan moves carefully. Consider using hoisting/rigging crews.	<a href="#">Link</a>
WETF Glove Box Pressure Relief Issue	A PISA condition revealed inadequate pressure relief protection for glove boxes at WETF due to assumptions in the original design.	Conduct thorough engineering analyses and calculations to ensure safety systems meet requirements. Implement necessary modifications to maintain safety.	<a href="#">Link</a>

**Missing Hazards:**

Hazard	Missing or Inadequate Mitigation in Current Work Control Document	Recommended Mitigation for Revision	Reference link	SBMS Link
Explosion in Glovebox	Not listed	Implement comprehensive glovebox safety protocols, including gas leak detection, electrical risk management, and chemical exposure controls.	<a href="#">Link 1</a> , <a href="#">Link 2</a> , <a href="#">Link 3</a>	<a href="#">Link</a>
Electrical Spark in Glovebox	Not listed	Ensure gloveboxes handling flammable materials are under negative pressure and connected to suitable exhaust systems. Implement lockout/tagout procedures.	<a href="#">Link 1</a> , <a href="#">Link 2</a> , <a href="#">Link 3</a>	<a href="#">Link</a>
Fall into Conveyor Transfer Chute	Not listed	Install guardrails and safety nets around conveyor systems. Implement fall protection training and procedures.	<a href="#">Link</a>	<a href="#">Link</a>
Glovebox Tipping Over	Not listed	Secure gloveboxes to prevent tipping. Conduct regular stability assessments and training for safe handling.	<a href="#">Link</a>	<a href="#">Link</a>
Inadequate Pressure Relief in Glovebox	Not listed	Retrofit gloveboxes with adequate pressure relief systems. Ensure all PPE is used when operating gloveboxes.	<a href="#">Link 1</a> , <a href="#">Link 2</a> , <a href="#">Link 3</a>	<a href="#">Link</a>

#### Failure mode analysis:

Current control	Failure mode of the control	Effect of Failure	Cause of Failure	Recommended action
Written permits for the work activity	Permit not obtained or expired	Unauthorized work leading to safety hazards	Lack of awareness or oversight	Ensure permits are valid and reviewed before work starts

Precautions, step warnings, Hold Points	Steps not followed or ignored	Increased risk of accidents or injuries	Complacency or lack of training	Conduct thorough training and enforce adherence to procedures
Personal Protective Equipment (PPE)	PPE not worn or inadequate	Exposure to hazards causing injury	Lack of enforcement or availability	Ensure PPE availability and enforce usage
Work instructions	Instructions not followed or misunderstood	Incorrect installation leading to equipment failure	Poor communication or training	Provide clear instructions and verify understanding
ORNL subject area requirements	Requirements not met	Non-compliance leading to regulatory issues	Lack of knowledge or oversight	Regular audits and compliance checks
Group/individual responsibilities	Responsibilities not clear or ignored	Ineffective teamwork leading to errors	Poor communication or leadership	Define roles clearly and conduct regular briefings
Availability/location of materials, tools	Materials/tools not available or misplaced	Delays and potential safety risks	Poor planning or inventory management	Implement inventory checks and ensure tool availability
Previous experiences/lessons learned	Lessons not applied	Repeat of past mistakes leading to failures	Lack of documentation or review	Document lessons learned and integrate into planning
Response if work cannot be performed as planned	No contingency plan	Work stoppage or unsafe improvisation	Lack of foresight or planning	Develop and communicate contingency plans
Potential error traps	Error traps not identified or mitigated	Increased likelihood of human error	Lack of awareness or analysis	Conduct error trap analysis and implement mitigations
Stop Work: Observe unsafe act	Unsafe act not stopped	Imminent danger leading to accidents	Lack of vigilance or authority	Empower workers to stop work and report hazards
Emergency Response	Inadequate response to emergencies	Increased severity of incidents	Lack of training or preparedness	Conduct emergency drills and ensure clear egress paths
Confined Space Entry Permit	Permit not obtained or conditions not assessed	Risk of suffocation or injury	Lack of assessment or oversight	Ensure permits are obtained and conditions assessed
Hoisting and Rigging services	Improper hoisting leading to dropped loads	Damage to equipment or injury	Lack of qualified personnel or oversight	Use qualified personnel and conduct pre-lift checks

Safety glasses with side shields	Glasses not worn or inadequate	Eye injuries from debris or chemicals	Lack of enforcement or availability	Ensure availability and enforce usage
Electrical Equipment and Tools	Tools not protected by GFCI	Electrical shock or equipment damage	Lack of compliance or oversight	Ensure GFCI protection and conduct regular checks