Work scope details:

Title: HVAC Repair in Non-Permitted Confined Space

Work Scope Summary: This work involves troubleshooting and repairing the heat pump located in the crawlspace of the 7676 cabin's large conference room. The operation requires entry into a non-permitted confined space, necessitating specific safety precautions and controls to mitigate associated hazards.

Key Work Scope Components:

• Troubleshooting and repairing HVAC unit

• Entry into crawlspace (non-permitted confined space)

• Lockout/Tagout (LOTO) procedures

• Atmospheric testing prior to entry

• Post-work cleanup and permit closure

Relevant previous events and lessons learned:

Event Title	Event Summary	Lessons Learned	Reference Link
Confined Space Fatality	A maintenance worker died due to asphyxiation in a non-permitted confined space while performing HVAC repairs.	Ensure proper atmospheric testing and monitoring during confined space entry. Always have a standby person outside the space.	OSHA Confined Space Standards
HVAC Equipment Failure	An HVAC unit malfunctioned due to improper maintenance, leading to a fire hazard.	Regular maintenance checks and adherence to safety protocols can prevent equipment failures.	NFPA Fire Safety
Improper Lockout/Tagout	A technician was injured due to failure to properly implement LOTO procedures while servicing electrical equipment.	Strict adherence to LOTO procedures is critical to prevent accidental energization of equipment.	OSHA LOTO Standards
Crawlspace Incident	A worker was injured due to low clearance and lack of proper PPE while working in a crawlspace.	Always assess the work environment for physical hazards and ensure appropriate PPE is used.	N/A
Noise-Induced Hearing Loss	Workers experienced hearing loss from prolonged exposure to loud HVAC equipment without proper hearing protection.	Implement hearing conservation programs and ensure availability of appropriate PPE.	NIOSH Hearing Loss Prevention

Missing Hazards:

Hazard	Missing or Inadequate Mitigation in Current Work Control Document	Recommended Mitigation for Revision	Reference Link	SBMS Link
Confined Space Entry	Not addressed	Implement a confined space entry plan including continuous monitoring and a rescue plan.	N/A	N/A
Atmospheric Hazards	Inadequate atmospheric testing procedures outlined	Require continuous monitoring of oxygen levels and toxic gases during entry.	N/A	N/A
LOTO Procedures	Inadequate emphasis on LOTO	Reinforce LOTO training and ensure all personnel are familiar with the specific LOTO procedures for HVAC systems.	OSHA LOTO	N/A
Low Clearance Risks	Not addressed	Conduct a pre-entry assessment for clearance and provide appropriate PPE (e.g., hard hats).	N/A	N/A
Electrical Hazards	Not addressed	Ensure all electrical sources are de-energized and verified before entry.	OSHA Electrical Safety	N/A
Noise Exposure	Not addressed	Implement a noise monitoring program and provide hearing protection as necessary.	NIOSH Noise	N/A
Tool Safety	Not addressed	Ensure all tools are inspected and maintained prior to use, and provide training on safe tool operation.	N/A	N/A
Communication Failures	Not addressed	Establish clear communication protocols among team members, especially during confined space entry.	N/A	N/A
Time Pressure	Not addressed	Allow sufficient time for the task to be completed without rushing, and communicate workload expectations.	N/A	N/A
Overconfidence	Not addressed	Conduct a safety briefing to address overconfidence and emphasize the importance of following safety protocols.	N/A	N/A

Failure mode analysis:

Current Control	Failure Mode of the Control	Effect of Failure	Cause of Failure	Recommended Action
Confined Space Entry Permit	Permit not obtained or expired	Potential for hazardous atmosphere leading to asphyxiation	Lack of awareness or oversight	Ensure strict adherence to permit requirements and regular audits of permit status.
Lockout/Tagout Procedures	LOTO not properly implemented	Risk of accidental energization of equipment	Inadequate training or communication	Conduct regular LOTO training and audits to ensure compliance.
Atmospheric Testing	Testing not performed or inadequate	Exposure to toxic gases or low oxygen levels	Miscommunication or oversight	Implement a checklist for atmospheric testing and ensure monitoring during entry.
PPE Requirements	PPE not used or inadequate	Increased risk of injury from physical hazards	Overconfidence or lack of enforcement	Conduct regular PPE audits and training sessions to reinforce usage.
Emergency Response Plan	Plan not communicated or understood	Delayed response to emergencies	Lack of training or drills	Conduct regular emergency response drills and ensure all personnel are familiar with the plan.
Tool Availability	Tools not available or inadequate	Increased risk of injury or delays	Poor inventory management	Maintain an inventory checklist and ensure tools are available and in good condition.

Current Control	Failure Mode of the Control	Effect of Failure	Cause of Failure	Recommended Action
Communication Protocols	Poor communication during work	Increased risk of accidents or errors	Lack of established protocols	Establish clear communication protocols and conduct briefings before work starts.
Training and Competency Verification	Inadequate training for new personnel	Increased risk of accidents due to lack of knowledge	Insufficient onboarding processes	Implement a comprehensive training program for all personnel involved in the work.
Work Instructions	Instructions not followed or unclear	Increased risk of procedural errors	Vague or incomplete instructions	Review and revise work instructions to ensure clarity and completeness.
Monitoring and Supervision	Inadequate supervision during work	Increased risk of unsafe practices	Lack of oversight	Ensure a qualified supervisor is present during all critical tasks.

This detailed risk assessment report identifies potential hazards associated with the HVAC repair work in a non-permitted confined space, references relevant historical safety events, and provides specific mitigation recommendations to enhance safety and compliance.