Work scope details:

Title:** PREAPPROVED WORK PLAN FOR THE STEAM DISTRIBUTION SYSTEM

Work Scope Summary:
The work package focuses on performing routine maintenance activities on the steam distribution system and its associated equipment. These activities include troubleshooting, basic parts replacement, and repairs that do not require additional written instructions, although task leader direction may be necessary. The work involves various tasks performed by different trades, including millwrights, pipefitters, electricians, and others, to ensure the system's efficient operation and compliance with engineering standards.

Key Work Scope Components: - Millwright tasks: pump maintenance, mechanical repairs, filter replacements, valve operator repairs, preventive maintenance. - Pipefitter and welding tasks: piping repairs, valve replacements, pressure relief valve installation, welding, preventive maintenance. - Electrician tasks: voltage readings, breaker operations, lighting repairs, electrical wiring installations, preventive maintenance. - I&C tasks: instrument repairs, system diagnostics, calibration, control wiring installations, preventive maintenance. - Utility mechanic tasks: concrete repairs, floor leveling, utility trench repairs, masonry work, preventive maintenance. - Laborer tasks: material moving, brush clearing, warehousing, floor cleanup, equipment moving, preventive maintenance. - Boilermaker tasks: pressure vessel maintenance, gasket installation, tube cleaning, preventive maintenance. - Carpenter tasks: scaffolding construction, containment structure erection, platform building, preventive maintenance. - Insulator tasks: insulation replacement/abatement, prefabrication, field installations, disposal of insulating materials.

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Relevant previous events and lessons learned:

Event Title	Event Summary	Lessons Learned	Reference Link
The Importance of Routine Preventive Maintenance Inspections And Fire Prevention	On January 28, 2013, a Radiological Control Inspector detected an odor and smoke from an A/C unit, leading to a fire. The fire was extinguished by the Fire Department. The fire likely started due to a mechanical or electrical malfunction.	Ensure A/C units are on a preventive maintenance schedule, inspect for lint or debris, and check for operational abnormalities.	Link
Fire Hydrant Preventive Maintenance (PM) Results in Personnel Bruised Leg at Reactor Technology Complex (RTC)	During maintenance on a fire hydrant, a cap came off under pressure, causing a bruise to a pipefitter. The cap had less than one thread of engagement due to a burr.	Ensure proper thread engagement and inspect for defects before maintenance.	Link
Steam Line Re-energization Incident	Two employees died after a steam line was re-energized during maintenance due to improper lockout/tagout procedures.	Implement strict lockout/tagout procedures to prevent accidental re-energization.	Link
Chemical Plant Steam Leak Incident	A piping failure in a steam distribution system caused a high-pressure steam leak, resulting in serious burns to two workers. OSHA cited safety protocol lapses and inadequate PPE.	Ensure proper safety protocols and adequate PPE during maintenance.	Link

Water Hammer Event in Industrial Facility	A "water hammer" event led to a ruptured steam pipe during maintenance, causing minor injuries and exposure to insulation debris.	Improve system ergonomics and ensure valve accessibility to prevent similar incidents.	Link

Missing Hazards:

Hazard	Missing or Inadequate Mitigation in Current Work Control Document	Recommended Mitigation for Revision	Reference link	SBMS Link
Mechanical or electrical malfunction	Not addressed	Implement machine guarding and regular maintenance checks	Link 1, Link 2, Link 3	Link
Improper lockout/tagout procedures	Inadequate procedures for complex systems	Develop comprehensive LOTO procedures and training	Link 1, Link 2, Link 3	Link
High-pressure steam leaks	Not addressed	Implement regular inspections and emergency response plans	Link 1, Link 2, Link 3	Link
Water hammer events	Not addressed	Install surge protection devices and conduct regular system checks	Link 1, Link 2, Link 3	Link
Inadequate PPE	Not addressed	Conduct PPE assessments and provide training on proper usage	Link 1, Link 2, Link 3	Link
Improper thread engagement	Not addressed	Implement regular inspections and training on proper threading techniques	Link 1, Link 2, Link 3	Link
Chemical exposure	Inadequate controls for specific chemicals	Enhance chemical handling procedures and training	Link 1, Link 2, Link 3	Link
Eye injuries	Not addressed	Provide eye protection and conduct regular safety training	Link 1, Link 2, Link 3	Link

Time pressures and high workload	Not addressed	Implement workload management strategies and stress reduction programs	Link 1, Link 2, Link 3	Link
Distractive environment	Not addressed	Develop strategies to minimize distractions and enhance focus	Link 1, Link 2, Link 3	Link

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 incomplete	Unauthorized work leading to safety hazards	Lack of awareness or oversight	Implement a mandatory checklist for permit verification before work commencement
Precautions, step warnings, Hold Points	Steps not followed or ignored	Increased risk of accidents or equipment damage	Inadequate training or communication	Conduct regular training and enforce strict adherence to procedures
Personal Protective Equipment (PPE)	PPE not used or inadequate	Injury to personnel	Lack of PPE availability or awareness	Ensure PPE availability and conduct PPE compliance audits
Work instructions for information	Instructions not followed or misunderstood	Inefficient work or safety incidents	Poor communication or unclear instructions	Simplify and clarify work instructions; conduct pre-task briefings
ORNL subject area requirements	Non-compliance with requirements	Regulatory non-compliance, potential fines	Lack of knowledge or oversight	Regular audits and training on compliance requirements
Discuss group/individual responsibilities	Miscommunication or unclear roles	Task inefficiencies or safety risks	Lack of role clarity or communication	Conduct team meetings to clarify roles and responsibilities
Follow work instructions & safety procedures	Deviations from procedures	Safety incidents or quality issues	Inadequate supervision or training	Implement a supervision and feedback mechanism
Availability/location of materials, tools	Unavailability or misplacement of tools	Delays or unsafe improvisations	Poor inventory management	Implement a tool management system and conduct regular checks

Previous experiences / lessons learned	Lessons not applied	Repeated mistakes or incidents	Lack of documentation or communication	Document and review lessons learned in team meetings
Response if work cannot be performed as planned	Inadequate contingency planning	Project delays or safety risks	Lack of contingency planning	Develop and communicate contingency plans for common issues
Potential error traps with the job	Error traps not identified or mitigated	Increased likelihood of errors	Lack of risk assessment	Conduct thorough risk assessments and implement error-proofing measures
Take a minute before work start & leaving work area	Skipping pre-task checks	Overlooked hazards or incomplete tasks	Rushed work or lack of awareness	Enforce a mandatory pause for hazard assessment and task review