

JOB SAFETY ANALYSIS

Safety Information for the University of California, Berkeley

Facilities Services

Annual & Semi-Annual Cooling Tower Cleaning

TASK	HAZARDS	CONTROLS
<p>1. Pre-treat cooling tower with sodium hypochlorite (bleach) if necessary.</p> <p>2. Most of the cooling towers are automatically fed except for three small cooling towers which are on the floor level.</p> <p>3. Transfer sodium hypochlorite from the 5-gallon container to a 1-gallon container using a hand pump. This one gallon container is manually poured into the small cooling tower.</p>	<p>Chemical exposure: May splash in eyes May result in coughing if inhaled</p>	<p>Wear appropriate PPE: rubber or nitrile gloves, safety goggles HazCom training on chemical SDS If you notice a cough or anything that causes irritation, remove yourself from the environment</p> <p><i>Recommendation: In the mechanical room, improve chemical management system, provide secondary containers for chemicals, and eye wash stations and safety shower is required where chemicals are handled.</i></p>
	<p>Musculoskeletal injuries from lifting</p>	<p>Safe lifting techniques Transfer chemicals in smaller amounts Morning stretch and flex</p>
<p>4. Lock out/tag out and test tower fans and circulating pumps. (Group lock out/tag out if applicable)</p>	<p>Energized equipment/release of stored energy</p>	<p>LOTO training LOTO procedure Have a pre start up meeting to ensure safe practices of LOTO</p>
<p>5. Drain cooling tower to building sanitary sewer.</p>	<p>Chemical exposure</p>	<p>Wear appropriate PPE: rubber or nitrile gloves, safety goggles, slip resistant/rubber boots System safety interlock to control overflow</p>
	<p>Overflowed drains/flooding</p>	<p>Rubber boots</p>
<p>6. Set up electrical, water, and power supply for the pressure washer. (extension cord and garden hose for pressure washer)</p> <p>All weather exposed receptacles on roof have GFCI outlet, in case there is no GFCI outlet use electrical pigtail with breaker.</p>	<p>Slips, trips, falls</p>	<p>Ensure secure footing Inspect the area prior to start of work Clear out any hazards and barricade the work area if necessary Set up temporary guard rails or use personal fall protection if working near unprotected ledges and skylights.</p>
	<p>Musculoskeletal injuries</p>	<p>Safe lifting techniques Morning stretch and flex</p>
<p>7. Set up ladder. Inspect and ensure ladders are secured.</p>	<p>Slips, trips, falls</p>	<p>Ladder safety training</p> <p><i>Recommendation: use the caged ladder and set up a catwalk to enter the cooling tower instead of using the extension ladder.(Stanley Hall)</i></p>
	<p>Musculoskeletal injuries</p>	<p>Safe lifting techniques Morning stretch and flex</p>

8. Climb extension ladder to the entrance of the cooling tower	Slips, trips, falls	Three points of contact Ladder safety training
9. Pull equipment up to the cooling tower with a rope (power washer, shovel, shop vac, buckets, etc)	Musculoskeletal injuries	Safe lifting techniques Morning stretch and flex Use appropriate tools and equipment
10. Set up equipment 11. Lock out/Tag out of fan power 12. Set up of power washer inside and outside of cooling tower. If the cooling tower is too high, we request for a carpenter to erect a scaffolding	Slips, trips, falls	Ensure secure footing Inspect the area prior to start of work Clear out any hazards Use personal fall protection or guardrails near unprotected ledges
	Musculoskeletal injuries	Safe lifting techniques training Morning stretch and flex
13. Sweeping, clearing, bagging debris and power washing the inside of the cooling tower.	Biological, chemical and potential hazardous dust inhalation Legionella	Wear an N95 Respiratory protection training Open ventilation (Cooling tower water could be innocuous)
	Musculoskeletal injuries	Use safe body mechanics
14. Power wash the outside. Clean side media and open all valves.	Slips, trips, falls	Use personal fall protection or guardrails near unprotected ledges Set up scaffolding if necessary Inspect the area prior to start of work Clear out any hazards and barricade the work area if necessary Wear slip resistant rubber boots
	Possible chemical exposure and overflow of drain tank	Wear slip resistant rubber boots, safety goggles, rubber or nitrile gloves LOTO all valves involved
15. Remove lock and tag of the tower fans and circulating pumps	Energized equipment/release of stored energy	LOTO training LOTO procedure Have a pre start up meeting to ensure safe practices of LOTO
16. Refill the cooling tower with water	Potential overflow	Wear slip resistant rubber boots System safety interlock to control overflow
17. Start up and test cooling tower to ensure it's working 18. Re start all equipment	Energized equipment/release of stored energy	LOTO training LOTO procedure
Required Training: Hazard communication (GHS) Safe lifting techniques PPE Lock out/Tag out Ladder safety Fall protection Respiratory protection	Personal Protective Equipment (PPE) Rubber or nitrile gloves N95 Safety goggles Slip resistant rubber boots	

Other Information:

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For more information about this JSA, contact the Department Safety Coordinator.