

Hazard Controls

Engineering Controls (Eliminate)	Administrative Controls (Reduce)
<p>Isolation</p> <ul style="list-style-type: none"> *Control rooms or restricted access areas *Guarding (ex. machinery guards, fall protection/guardrail systems/parapet walls on roofs) *Barriers/shielding (ex. welding shields, plastic for P-32 radiation sources) *Locking out hazardous energy sources 	<p>Housekeeping</p> <ul style="list-style-type: none"> *Regular cleaning of work area *Dry, clean floors *Proper storage of tools, materials, chemicals, radioactive substances *Proper spill response *Surplus old machinery/equipment *Vacuum instead of sweeping
<p>Design</p> <ul style="list-style-type: none"> *Proper access (ex. stairways, ramps) *Height (ex. hazard located above employee access, typically 8 feet) *Impervious work surfaces *Seamless flooring *Safety interlocks on equipment *Automatic shutoff 	<p>Training</p> <ul style="list-style-type: none"> *Hazard recognition *Hazard controls *Safe work practices *Safe operating procedures *Emergency procedures *Machinery and equipment
<p>Substitution</p> <ul style="list-style-type: none"> *Dipping/brushing instead of spraying *Bolting together instead of welding *Hacksaw use instead of grinding *Wet processes instead of dry processes *Using non-hazardous chemicals *Using less hazardous radioactive substances (ex. P-33 instead of P-32) *Soap and water instead of solvents *Automation instead of manual eqpt. 	<p>Reduction</p> <ul style="list-style-type: none"> *Perform hazardous tasks less frequently *Rotate employees in hazardous areas (not permitted for respiratory hazards) *Minimize on-hand stock of hazardous materials *Minimize waste products by recycling or redistribution (donate chemicals to university surplus) *Decrease time/increase distance (rad)
<p>Elimination</p> <ul style="list-style-type: none"> *On-demand supply instead of on-site storage *Maintenance-free batteries *Purchase premixed products 	<p>Preventative Maintenance</p> <ul style="list-style-type: none"> *Regular inspections *Regular service and maintenance
<p>Work Area Layout</p> <ul style="list-style-type: none"> *Separating non-compatible work tasks *Routing high-traffic paths away from hazardous areas *Minimize size of radioactive work areas *Segregating radioactive work 	<p>Exposure Monitoring</p> <ul style="list-style-type: none"> *Quarterly review of personal radiation doses *Investigation at 10% and 25% of occupational exposure limits (radiation) *Identify radiation contaminated areas
<p>Ventilation</p> <ul style="list-style-type: none"> *Increase air flow *Use fume hoods for mixing *Local exhaust ventilation *Filtration (ex. HEPA-filtered Biosafety cabinets, charcoal filtering for radioactive substances such as I-125) 	<p>Safe Work Practices and Procedures</p> <ul style="list-style-type: none"> *Identify and develop for hazardous processes *Perform radiological hazard analysis *Label equipment as radioactive *Container labeling (chemical, radioactive, biohazardous)