**Examples of Hazard Controls**

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| **Engineering Controls (Eliminate)** | **Administrative Controls (Reduce)** |
| **Isolation**   * 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 | **Housekeeping**   * 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 |
| **Design**   * 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 | **Training**   * Hazard recognition * Hazard controls * Safe work practices * Safe operating procedures * Emergency procedures * Machinery and equipment |
| **Substitution**   * 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. | **Reduction**   * 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) |
| **Elimination**   * On-demand supply instead of on-site storage * Maintenance-free batteries * Purchase premixed products | **Preventative Maintenance**   * Regular inspections * Regular service and maintenance |
| **Work Area Layout**   * Separating non-compatible work tasks * Routing high-traffic paths away from hazardous areas * Minimize size of radioactive work areas * Segregating radioactive work | **Exposure Monitoring**   * Quarterly review of personal radiation doses * Investigation at 10% and 25% of occupational exposure limits (radiation) * Identify radiation contaminated areas |
| **Ventilation**   * 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) | **Safe Work Practices and Procedures**   * Identify and develop for hazardous processes * Perform radiological hazard analysis * Label equipment as radioactive * Container labeling (chemical, radioactive, biohazardous) |