

# AREA HAZARD ANALYSIS WORK FORM

**Title:** SSRL Beam Lines and Set-Up Areas

**Location (Bldgs. 120, 130 and 131)**

**Instructions:**

An Area Hazard Analysis (AHA) is a process that is used to evaluate a work area to 1) determine the hazards that may be present 2) determine appropriate controls for these hazards and 3) provide a mechanism to communicate these hazards to someone entering the area. The AHA covers the facility and equipment within the facility. It does not cover specific jobs/tasks that may be performed in the area. Job/task specific hazards and controls are covered by the JHAM process.

The AHA should be done by the area manager, in cooperation with the Building Manager. An AHA should be done once for all working areas and whenever there is a change in to the facility or regulations or the introduction of new equipment or new hazard.

Enter information into boxes which will expand to accommodate whatever length of text is entered. Once this AHA is complete, the area responsible person signs.

| Processes / Equipment in Area                      | Hazards   | Recommended Controls & Actions  |
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| Experimental hutches                               | <ul style="list-style-type: none"> <li>• Exposure to radiation</li> <li>• Muscle strain opening and closing hutch doors</li> <li>• Oxygen deficiency</li> </ul> | <ul style="list-style-type: none"> <li>• Follow all procedures and processes communicated in User Safety Talk, Hutch Search Procedure, and GERT training.</li> <li>• Maintain good body alignment while opening or closing hutch doors, do not hurry.</li> <li>• Report problems with doors promptly.</li> <li>• Oxygen deficiency unit with alarm installed in hutches with nitrogen fill tanks. Instructions about evacuation when alarm sounds posted inside and outside hutch.</li> </ul> |
| Data acquisition and beam line control electronics | <ul style="list-style-type: none"> <li>• Electrical shock hazard</li> </ul>   | <ul style="list-style-type: none"> <li>• Do not open any electrical chassis, contact responsible group or Duty Operator for assistance.</li> <li>• Do not remove covers from front rack openings.</li> <li>• Power down HV power supplies before disconnecting SHV cables.</li> <li>• Power down motor drivers before disconnecting cables.</li> <li>• Power down CAMAC/VME crates before changing modules.</li> <li>• Report roof leaks promptly.</li> </ul>                                 |

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| Robotics       | <ul style="list-style-type: none"> <li>• Physical injury</li> <li>• Electric Shock</li> </ul>   | <ul style="list-style-type: none"> <li>• Interlocks installed to prevent movement when hutch door is open.</li> <li>• Flashing light when robot is 'activated'.</li> <li>• Interlock over-ride procedure in place. Requires responsible person to request override key from DO, to be present, and to insure no one enters hutch when in override mode.</li> <li>• Heater tapes are GFCI protected. They are to be unplugged whenever the Dewar is serviced.</li> </ul>  |
| Vacuum systems | <ul style="list-style-type: none"> <li>• Electrical shock hazard from ion pumps</li> <li>• Burns from hot heater tapes</li> <li>• Fiberglass exposure from heater tapes</li> <li>• Possible implosion debris</li> <li>• Roughing pump exhaust</li> <li>• Movement of chamber during earthquake</li> </ul> | <ul style="list-style-type: none"> <li>• Only qualified personnel to work with ion pumps.</li> <li>• Be aware of your surroundings, portable variac racks usually mean bake outs.</li> <li>• Don't unwrap foil from heater tapes unless necessary.</li> <li>• Exercise care around ion pump feedthrus, transfer arms, and thin windows.</li> <li>• Vent oil-based pumps to the outside or use alternative dry pump technologies.</li> <li>• All chambers should be earthquake braced while in the setup area as well as when online. See Operations and/or Facilities for earthquake bracing assistance.</li> </ul>  |
| Lead shielding | <ul style="list-style-type: none"> <li>• Radiation leak if not replaced after removal</li> <li>• Exposure to hazardous material</li> <li>• Contamination of equipment and environment</li> <li>• Back injury or strain</li> </ul>   | <ul style="list-style-type: none"> <li>• Do not remove any shielding unless authorized through a Radiation Safety Work Control Form.</li> <li>• Do not handle lead unless necessary.</li> <li>• SLAC requires training (<i>Lead Safety, course 240, Baseline Medical Exam, course 240ME, and Respirator Safety, CBT course 241</i>) for handling unpainted lead more than 30 minutes/day and for handling painted lead more than 2 hours/day.</li> <li>• Wear gloves. Wash hands after handling lead.</li> <li>• Use proper lifting techniques to minimize strains and torques. Do not exceed your limits.</li> <li>• All lead that is not used for shielding should be removed from beam line.</li> </ul> |

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| LCW (low conductivity water) | <ul style="list-style-type: none"> <li>• Noise</li> <li>• Possible bodily injury in the event of a LCW line rupture</li> </ul>                              | <ul style="list-style-type: none"> <li>• Do not work on LCW lines unless authorized. Always close valves to de-energize line before starting work on LCW lines.</li> <li>• Wear noise-canceling headphones if working adjacent to uncomfortably loud noise.</li> </ul>  |
| Cryogenics                   | <ul style="list-style-type: none"> <li>• Frostbite</li> <li>• Eye injury</li> <li>• Oxygen deficiency</li> </ul>  | <ul style="list-style-type: none"> <li>• Use appropriate PPE. This includes eye protection, cryogenic gloves, long pants or apron, and closed-toe shoes.</li> <li>• Follow posted rules at liquid nitrogen filling station.</li> <li>• Evacuate hutch during oxygen deficiency alarm.</li> </ul>  |
| Cold rooms                   | <ul style="list-style-type: none"> <li>• Hypothermia</li> <li>• Suffocation</li> </ul>  | <ul style="list-style-type: none"> <li>• Wear warm clothing.</li> <li>• Leave cold room when cold. Post warning.</li> <li>• Limit liquid nitrogen use. Post limits on door.</li> </ul>  |
| Compressed gases             | <ul style="list-style-type: none"> <li>• Earthquake hazard</li> <li>• Explosive depressurization</li> <li>• Eye injury</li> <li>• Flying objects</li> </ul> | <ul style="list-style-type: none"> <li>• Compressed gas bottles to be stored upright and secured in two places. Cylinders must be either fitted with a regulator or capped.</li> <li>• All open compressed air lines to be fitted with an OSHA-compliant nozzle limiting pressure to 30 psi.</li> <li>• Use appropriate PPE (eye protection).</li> <li>• Train staff for proper exchange of gas bottles.</li> <li>• Chain components that can fly off.</li> </ul>               |
| Tools                        | <ul style="list-style-type: none"> <li>• Electrical shock hazard</li> <li>• Bodily injury</li> </ul>  | <ul style="list-style-type: none"> <li>• Keep staff tool boxes locked. Keys for authorized staff only.</li> <li>• Follow all manufacturer recommendations for use.</li> <li>• Use appropriate PPE (such as safety glasses).</li> <li>• Inspect power cords before use.</li> <li>• Use GFCI outlets when working in wet environments.</li> <li>• Apply force away from your body.</li> <li>• Maintain tools in good working order and use the right tool for the job.</li> </ul> |

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| Hazardous Materials | <ul style="list-style-type: none"> <li>• Eye and skin injury</li> <li>• Inhalation and ingestion injury</li> </ul> | <ul style="list-style-type: none"> <li>• Be familiar with hazards associated with each chemical you are handling and insure that appropriate MSDS is available.</li> <li>• Use appropriate PPE and procedures for handling (cleaning, cleaving, or mounting) and disposal.</li> <li>• Follow all requirements of Safety Checklist is using hazardous materials on a beam line.</li> <li>• No eating at work areas where chemicals are used.</li> <li>• Label and store containers and samples properly.</li> </ul>                           |
| Heaters             | <ul style="list-style-type: none"> <li>• Burns</li> </ul>  | <ul style="list-style-type: none"> <li>• Properly insulate hot surfaces where feasible or properly label.</li> </ul>   |
| Sharps              | <ul style="list-style-type: none"> <li>• Lacerations and cuts</li> </ul>   | <ul style="list-style-type: none"> <li>• Use sharp containers. Install containers at beam lines where sharps are commonly used.</li> </ul>   |
| Welding             | <ul style="list-style-type: none"> <li>• Burn injury</li> <li>• Eye injury</li> </ul>                              | <ul style="list-style-type: none"> <li>• Use PPE appropriate to the task.</li> <li>• Arc/flash curtain in place to minimize exposure to others.</li> </ul>   |
| Crane               | <ul style="list-style-type: none"> <li>• Bodily injury from swinging or falling load</li> </ul>                    | <ul style="list-style-type: none"> <li>• Crane operators must be trained and certified on crane being used.</li> <li>• Rigging devices on equipment should be certified for weight.</li> <li>• If within the working area of the crane/load, pay attention to the crane operator and stand clear of load.</li> <li>• Control traffic (foot or otherwise) during use by barrier or personnel.</li> <li>• Always label electrical disconnect for crane.</li> <li>• Inspection tag must be filled out and initialed before each use.</li> </ul> |
| Elevator            | <ul style="list-style-type: none"> <li>• Possible door failure during power outage</li> </ul>                      | <ul style="list-style-type: none"> <li>• Do not use elevator during building evacuation.</li> </ul>  |

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| Working on ladder or elevated surface  | <ul style="list-style-type: none"> <li>• Injury from fall</li> <li>• Being struck by dropped object</li> </ul>   | <ul style="list-style-type: none"> <li>• SLAC requires <i>Stairway and Ladder safety, course 293</i>, to use a ladder.</li> <li>• If working on elevated surfaces (more than four feet off the ground) use a fall protection harness and be trained in its use (<i>Fall Protection Harness Training, course 415</i>).</li> <li>• Use the correct ladder for the job.</li> <li>• Inspect ladder for steadiness.</li> </ul> |
| Stairways                              | <ul style="list-style-type: none"> <li>• Falls</li> </ul>  | <ul style="list-style-type: none"> <li>• Don't rush, pay attention, and use handrails.</li> <li>• Water should be mopped up.</li> </ul>   |
| Blind doorways/aisleways               | <ul style="list-style-type: none"> <li>• Door/person collision or person/person collision</li> </ul>   | <ul style="list-style-type: none"> <li>• Exercise care when opening doors into passages or when negotiating 90 degree turns in aisles with no corner visibility. Install mirrors if available.</li> </ul>   |
| Electrical cords                       | <ul style="list-style-type: none"> <li>• Shock hazard</li> <li>• Trip hazard</li> </ul>  | <ul style="list-style-type: none"> <li>• Do not daisy-chain extension cords or power strips.</li> <li>• Insure cords are in good condition and located so as not to be a trip hazard.</li> <li>• Unused cables should be removed.</li> </ul>  |
| High-strength magnets                  | <ul style="list-style-type: none"> <li>• Injury from flying tools</li> <li>• Possible interference with implanted cardiac pacemakers and other metal implants</li> </ul>                                     | <ul style="list-style-type: none"> <li>• Use only non-magnetic tools when magnetic field is present.</li> <li>• Post warnings at magnets that personnel with implanted cardiac pacemakers, metal prostheses, or other metal implants should remain behind postings.</li> </ul>  |
| Computer work stations and environment | <ul style="list-style-type: none"> <li>• Ergonomic problems (repetitive motion injuries and back strain)</li> <li>• Eye strain</li> <li>• Bodily injury from objects falling from shelves/heights</li> </ul> | <ul style="list-style-type: none"> <li>• Have Medical Dept. perform ergonomic evaluation and adjust workspace accordingly.</li> <li>• Maintain good posture and take regular breaks.</li> <li>• Monitor refresh rate should be at least 70 Hz.</li> </ul>   |
| Earthquake hazard                      | <ul style="list-style-type: none"> <li>• Falling objects</li> </ul>  | <ul style="list-style-type: none"> <li>• Secure all tanks, racks and cabinets.</li> <li>• Secure equipment in racks.</li> <li>• Chain liquid nitrogen and liquid helium dewars.</li> </ul>  |
| Fire extinguishers                     | <ul style="list-style-type: none"> <li>• Suffocation in small space</li> </ul>   | <ul style="list-style-type: none"> <li>• Insure fire extinguishers close to hutch are appropriate for small spaces.</li> </ul>  |

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| User equipment storage areas | <ul style="list-style-type: none"> <li>• Flying/falling boxes and assorted equipment and parts during an earthquake.</li> <li>• Tripping because of clutter and small spaces</li> </ul> | <ul style="list-style-type: none"> <li>• Store equipment only in assigned areas.</li> <li>• Do not encroach on marked aisles.</li> <li>• Do not enter into cluttered areas and report clutter problems to Operations or Facilities.</li> </ul>  |
| General working environment  | <ul style="list-style-type: none"> <li>• Emergency egress</li> <li>• Emergency response</li> </ul>  | <ul style="list-style-type: none"> <li>• Know location of exits, fire equipment, and safety equipment.</li> <li>• Never work alone with hazardous materials or equipment.</li> <li>• “Fire Extinguisher” sign should be prominently located above each fire extinguisher.</li> <li>• Aisle space must be kept clear of obstructions.</li> <li>• Cables on the ground should be covered.</li> <li>• Cables should be kept neat and tidy.</li> <li>• Cables not being used should be removed.</li> <li>• Emergency lighting system kept operational.</li> <li>• Doors should be clearly marked as either “Exit” or “Not an Exit.”</li> <li>• Minimize paper, boxes and other combustible material.</li> </ul> |

| <b>Completed by</b>      | <b>Print Name</b>            | <b>Date</b>  |
|--------------------------|------------------------------|--------------|
| <b>Area Responsible:</b> | Bart Johnson and Mike Soltis | 31-July-2008 |
| <b>Participants:</b>     | Bart Johnson                 | 31-July-2008 |
|                          | Mike Soltis                  | 31-July-2008 |
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