**Laboratory Experiment Hazard Identification Checklist**

|  |  |  |
| --- | --- | --- |
| **HAZARDS** | **YES** | **DETAILS** |
| **CHEMICAL** | | |
| **Toxic Chemicals** | | |
| Acute toxins |  |  |
| Chronic toxins |  |  |
| Carcinogens/teratogens/mutagens |  |  |
| **Flammables/combustibles** | | |
| Flammable liquids | | |
| Flash point ≤ 100 ºF |  |  |
| Flash point > 100 ºF |  |  |
| Flammable solids |  |  |
| Flammable gases |  |  |
| Pyrophoric materials |  |  |
| **Corrosives/reactives** | | |
| Acids |  |  |
| Bases |  |  |
| Oxidizing/reducing agents |  |  |
| Fluorine/fluorination agents |  |  |
| High-pressure/liquid oxygen |  |  |
| Peroxides/peroxide-formers/azides |  |  |
| Water-reactives |  |  |
| **Nanomaterial** |  |  |
| **BIOLOGICAL** | | |
| **Organisms** | | |
| Laboratory animals |  |  |
| Agricultural pathogen |  |  |
| Human pathogen |  |  |
| Human cell line (including cancer) |  |  |
| Recombinant/synthetic DNA |  |  |
| **Tissues** | | |
| Human (including cadaver or cadaver-derived) |  |  |
| Primate |  |  |
| Animal |  |  |
| **Biotoxin/Select agent** |  |  |
| **RADIATION** | | |
| **Ionizing** | | |
| Hard UV, X-ray, γ-ray |  |  |
| Charged particles (α, β) |  |  |
| Neutron |  |  |
| **Non-ionizing** | | |
| Soft UV, visible, IR, µ-wave, radio |  |  |
| Lasers |  |  |
| Class 1, 2, 3R |  |  |
| Class 3B |  | Nd:YAG (doubled) (Q-switched) can be classified as class 3B: 0.2 mJ pulse energy was used as a narrowband radiation and up to 1 mJ pulse energy was used as a broadband radiation.   1. Class 3B lasers are an immediate threat to the eye—if they are viewed directly, serious damage can result (blind spots). A lower-power lab laser might be Class 3B. 2. A Class 3B laser is not normally considered a skin or materials burn hazard. However, if the laser "dot" is kept motionless on skin at close range, heat can be felt. The more powerful the Class 3B laser, the sooner the heat will build up. In lab, it is potential to cause fire or even skin injury. |
| Class 4 |  |  |
| **PHYSICAL** | | |
| **Pressure** | | |
| Compressed gases/pressurized equipment |  | A 1 mL high-pressure cell, charged with high-purity (99.99%) CO2 using a piston compressor with a 200mL working volume.   1. If the pressure is suddenly released, the samples can throw parts around the lab as shrapnel or become missiles. 2. It can also generate large amounts of vapor if release happened, so asphyxiation becomes more of a hazard. |
| Vacuum |  |  |
| Hydraulics/pneumatics |  |  |
| **Electricity** | | |
| High voltage (>400V) |  | A thermostabilizing electronic device would sometimes require high voltage.   1. we use electricity to operate electronic device and even use it as a reactant or object of study. Electricity can present hazardous shock to lab researcher: Electricity flow through the heart is particularly dangerous. Shock injury is current-dependent. Body resistance varies widely, so the amount of current varies as well, sometimes unpredictably. The result is disruption to electrical systems in the body (nervous and cardiovascular) and burns to skin. 2. High voltage can produce arc when it flows through air. A typical example is the static electricity “spark” you see when touching a doorknob, especially in winter. |
| Low voltage |  |  |
| Magnetics/high-current apparatus |  |  |
| Stored energy (large capacitors/inductors) |  | CCD   1. Inductors: Large inductors which store high energy can develop voltages which are hazardous to personnel operating valves or otherwise contacting the pipeline. 2. Capacitors: some equipment can carry voltage for an extended period, even when off, as capacitors bleed down, etc. So do not approach or touch victims or apparatus until you are certain the power is disconnected and there is no residual voltage. |
| **Temperature** | | |
| Cryogens |  |  |
| Low temperature (<273K) |  |  |
| High temperature (>325K) |  |  |
| Sparks/hot work/open flames |  |  |
| **Machinery** | | |
| Moving parts/pinch point/shear points |  |  |
| Sharp edges/puncturing parts |  |  |
| Compression/rolling object |  |  |
| High rotational energy |  |  |
| Stored mechanical energy |  |  |
| Overhead hazards |  |  |
| **Trips/fall/slip** |  |  |
| **Sharps/needles/glassware** |  | Samples of Vycor and DM-1M glass might cause hazards:   1. Sharps hazards include anything capable of puncturing or cutting, including broken glass and glass pipets. Sharps present hazards like physical injury of the cut or puncture. 2. If the sharp is contaminated with chemical, biological, or radioactive material, the wound effectively injects that material directly into the body, bypassing the protective features of the skin. |
| **Noise/vibration** |  |  |

Inherent Safety: THINK

Substitute

Minimize

Moderate

Simplify

