



NSLS ESH Briefing  
for  
Safeguards & Security



(LS-ESH-SSD)

Rev. 07/22/2008

# Objective

The objective of this presentation is to orient Safeguards & Security personnel to the NSLS facility. This course will take approximately 20 minutes to complete.

# Instructions

Click on the control buttons on the bottom of each screen to navigate your way through this course.



# The NSLS User Facility

The National Synchrotron Light Source (NSLS) operates 7 days a week throughout the year, except during periods of maintenance (May and December) and some holidays. More than 2000 scientists, researchers, and students from 90 countries perform experiments at the NSLS each year.

The facility operates two electron storage rings. The X-Ray and Vacuum Ultra Violet (VUV) Rings provide intense focused light to more than 60 experimental stations (or, beamlines). The properties of this light allow scientists to perform experiments not possible at their home institutions.

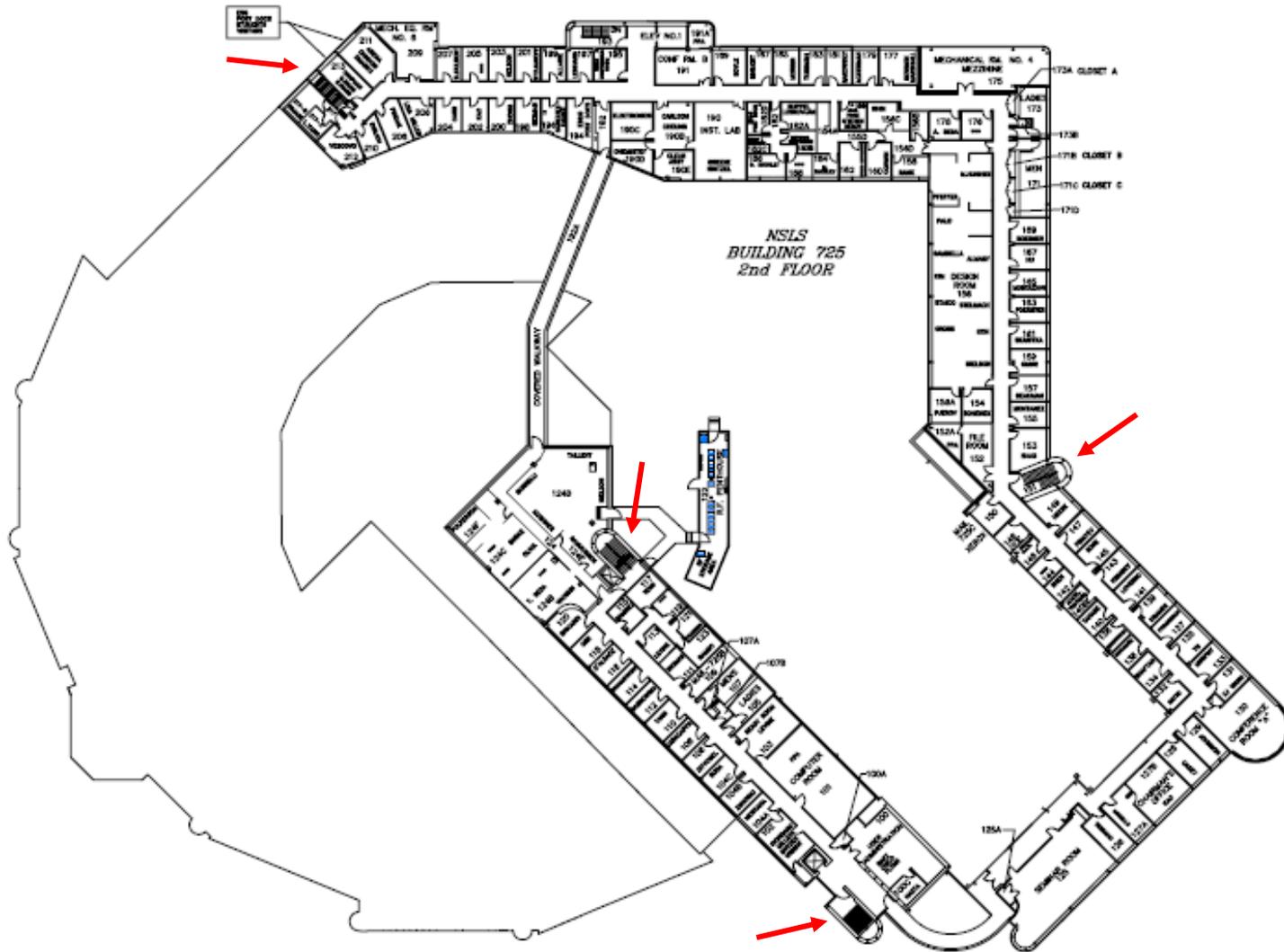


A beamline at the NSLS



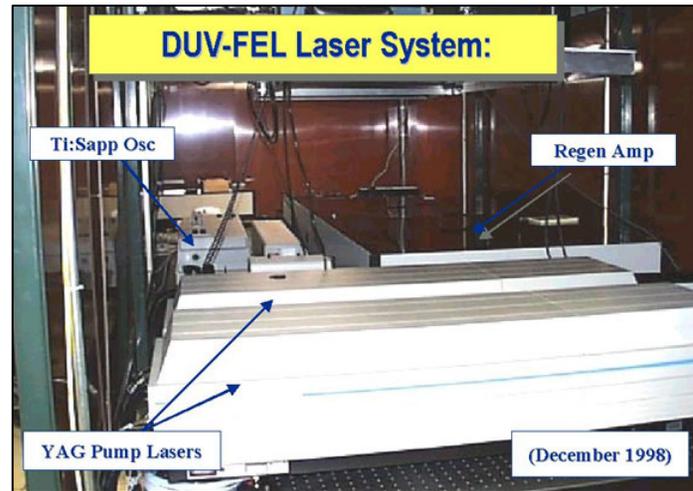


# NSLS (Bldg 725) – 2<sup>nd</sup> Floor (showing exits)





# Source Development Laboratory (Bldg. 729)



The Source Development Laboratory (SDL) is an accelerator test facility that uses high powered lasers and electron beams.



# Hazards at the NSLS

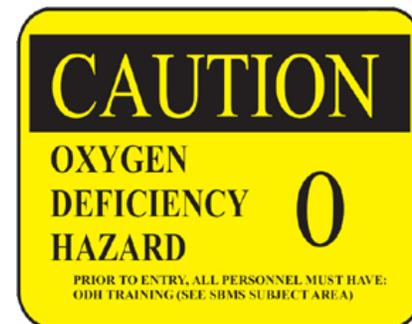
Hazards operations at the NSLS include:

- Radiological
- Magnetic
- Oxygen Deficiency
- Cryogenics
- Chemical
- Electrical
- Material Handling (Overhead Crane and Forklift operations)
- Compressed Gases
- Cutting and Welding Activities
- Confined Spaces
- Hazardous Materials
- Operations that may impair fire protection systems

# Posted Areas at the NSLS

At the NSLS, posted areas include:

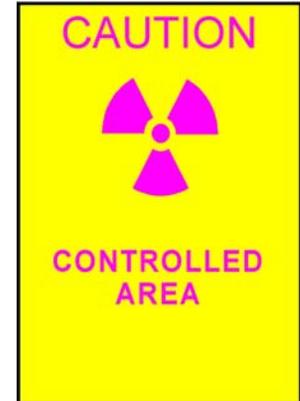
- Radiologically Controlled Areas
  - NSLS experimental floor (Bldg 725A)
    - Except a designated area near the Stock Room
  - The Source Development Laboratory (SDL, Bldg. 729)
- Magnetic Fields
- Oxygen Deficiency Hazard Areas



# Radiologically Controlled Areas

Minimum training requirements for unescorted access:

- General Employee Radiological Training (GERT) or higher
- One of the NSLS ESH Briefings or safety modules



## Visitors to Controlled Areas

- Untrained staff and visitors may access NSLS Controlled Areas provided:
  - Permissions or approvals for access have been granted
  - Visitor/Escort forms are signed by the visitor and the escort
  - The escort is fully trained for access
  - The visitor is escorted at all times while in the controlled area

A TLD (radiation badge) is:

- Not required for access to the NSLS by most staff
- Is required for access to the SDL by everyone

# Radiological Hazards

## Synchrotron Radiation

- There are no stray beams in the building
- Synchrotron beams contain a high amount of radiation and are therefore enclosed in hutches
- Exposure to synchrotron radiation in the building is negligible
- When the NSLS machine is operating, no measurable radiation is expected
- In a 24-hour period, beam injection usually occurs:
  - Two times in the X-Ray
  - Seven times in the UV Ring
- Announcements will be made during injections and you will hear a siren
- During beam injections in the UV Ring, move from higher locations and move toward the outer walls of the experimental floor
- At the SDL (Bldg. 729), do not climb higher than 8' inside or outside the building without approval from the Bldg 729 Work Control Coordinator



Interlock Sign



A Beam Hutch

# Magnetic Hazards

## Magnets at the NSLS and SDL

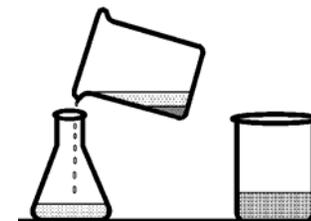
- Magnets are used in many types of equipment at the NSLS and the Source Development Laboratory (SDL)
- Many locations and all entrance doors to the NSLS and SDL experimental areas are posted with magnetic field “Caution” signs



## Affects of Magnetic Fields on Medical Devices and Implants

- Magnetic fields can affect medical electronic devices and ferromagnetic implants such as pacemakers, defibrillators, insulin pumps, Cochlear implants and other implants such as rods, pins, and plates
- **Anyone with medical devices or implants must notify NSLS ESH Staff before going to the experimental floor so that guidance can be provided**

# Chemicals and Hazardous Materials



Most experiments involve limited quantities of hazardous materials, such as:

- Solvents: Acetone, Acetonitrile, Alcohols (Methyl and Ethyl), Benzene, Chloroform, Hexane, Toluene
- Acids: Acetic acid, Hydrochloric acid, Hydrofluoric acid, Nitric Acid, Sulfuric acid
- Other: Pump oil, Hydrogen Peroxide, Ethylene glycol

Significant spills are most likely to include one of the liquids listed above



Compressed gas

## Compressed Gases

Gases used at the NSLS include:

- Toxic: Chlorine, Hydrogen Sulfide, Nitric Oxide or Dioxide, Sulfur Dioxide
- Flammable: Ethane, Hydrogen, Methane, Propane

# Cryogenic and Oxygen Deficiency Hazards

## Cryogenics

- Are used in many experiments at the NSLS
  - Liquid Nitrogen
  - Liquid Helium
  - Dry Ice
- Are odorless, invisible, and can cause oxygen deficiency hazards when used in large quantities
- Must be stored and used in well-ventilated areas

NSLS ODH areas are posted

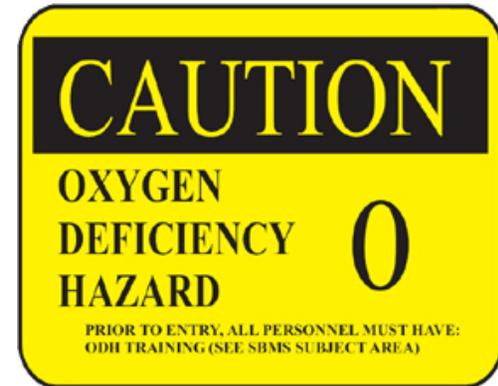


Cryogen dewar

# Cryogenics and Oxygen Deficiency Hazards

Large supplies of cryogenics are located at

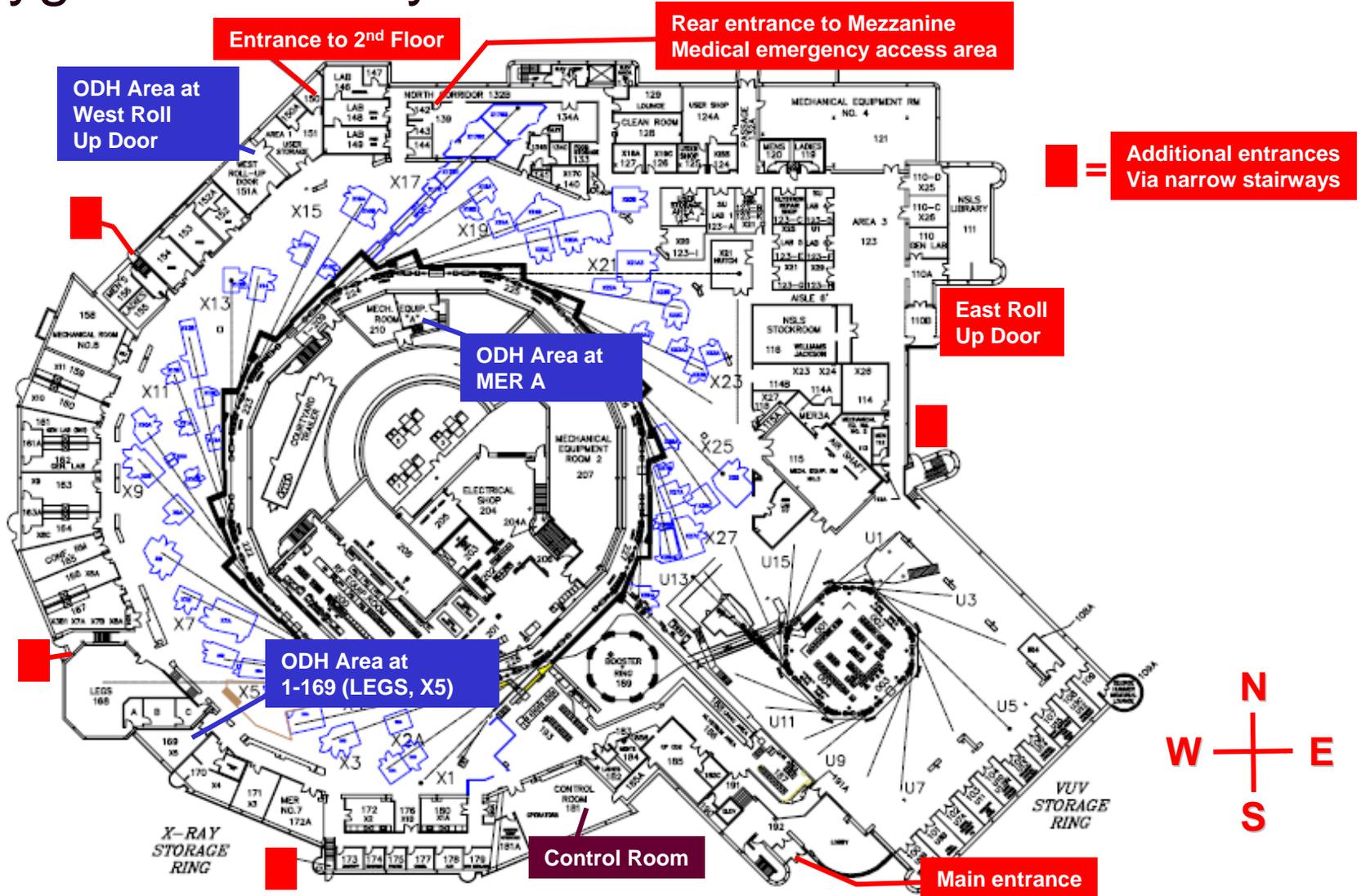
- West Roll Up Door (Room 1-151A)
  - Liquid Nitrogen filling station
- LEGS X5 Cryolab (Room 1-169)
  - Liquid Nitrogen
  - Liquid Helium
- Mechanical Equipment Room (MER) A (Room 1-210)
  - Liquid Nitrogen
  - Liquid Helium



## Oxygen Deficiency Hazard (ODH) Alarms

- If the alarms sound in any of the above rooms:
  1. Leave that room immediately
  2. Call the Control Room at x2550

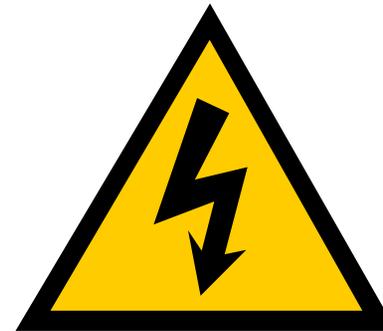
# Oxygen Deficiency Hazard Areas



# Electrical Hazards

## High Voltage Systems and Equipment

- Many high voltage systems exist at the NSLS
- The NSLS has both AC and DC power supplies
- Power Supplies are labeled



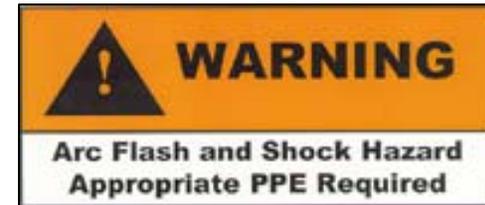
International  
High Voltage Label



# Electrical Hazards

## Breakers and Switches

Only trained, qualified persons are authorized to operate circuit breakers or power disconnects. Examples of disconnect switches and circuit breakers are shown below.



Disconnect Switch



Circuit Breaker Panel (Closed, Open)

# Injuries

## Injuries

- Report any injury to the Control Room at x2550

# Building Alarms

## Building alarms:

- Are used for building emergencies such as fires
- Ring continuously
- Are tested periodically



# Assembly Areas

**Outdoor Assembly Areas** are posted at every building entrance

- For NSLS (Bldg 725)
  - Lawn east of the 725 main entrance
- For SDL (Bldg 729), and for Bldgs 726, 727, 728
  - Bldg 726 south parking lot

**Indoor Assembly Area** locations

- For NSLS and SDL (Bldg 729) and for Bldgs 726, 727, 728
  - NSLS Main Lobby and the Seminar Room

# Shelter-In-Place

**Shelter-In-Place** locations are posted at every building entrance

- For Buildings 725, 726, 727, 728M, 729, the Shelter-in-Place is the aisle around the UV ring floor



# Safety or Security Concerns

## Property Protection Areas (PPAs)

- The NSLS has 4 property protection areas; for security reasons, please refer to Safeguards & Security documentation for locations
- The NSLS Control Room is not a PPA

## Holidays and Maintenance Periods

- Staffing schedules vary during long maintenance periods and some holidays
  - Long maintenance/shut down periods
    - From late November to early or mid January
    - Most of the month of May
    - Control room is minimally staffed (working hours only)
  - Holidays
    - When the NSLS is not in operations during a holiday, the Control room is not staffed
    - The holidays selected for non-operational periods may vary from year to year

# Reference Documents

NSLS ESHQ Staff:

- <http://www.nsls.bnl.gov/organization/section.asp?id=CB>

Map of NSLS 1st Floor (experimental floor):

- <http://www.nsls.bnl.gov/esh/highlights/pdf/nslsmap.pdf>

Map of NSLS 2nd Floor:

- [http://www.nsls.bnl.gov/newsroom/publications/manuals/prm/Fig-725\\_2ndFloor.ppt](http://www.nsls.bnl.gov/newsroom/publications/manuals/prm/Fig-725_2ndFloor.ppt)

NSLS Local Emergency Plan:

- <http://www.nsls.bnl.gov/newsroom/publications/manuals/prm/LS-ESH-PRM-9.0.1.htm>