NSCL considers safety and environmental stewardship to be top priorities. NSCL has established written Environmental and Occupational Safety management systems that are registered as compliant with International Standards Organization (ISO) 14001 and Occupation Health and Safety Assessment Series (OHSAS) 18001.

Safety at NSCL

NSCL's Environmental Management System (EMS) earned MSU the first Clean Corporate Citizen designation for a university from the State of Michigan. These registered management systems assure NSCL complies with applicable regulations, and requires continuous improvement of its operations to provide the safest possible workplace while providing the smallest environmental impact.

Things to know before your visit:

- No eating, drinking or smoking during the tour.
- High-heeled shoes are not permitted on the tour.
- Stay with your tour guide and follow instructions.
- Watch your head and step; don't lean on railings.
- Tour guides are trained to ensure your safety and will provide any required Personal Protective Equipment (PPE) during your visit along with direction when and how to use.
- If an evacuation alarm is sounded, immediately follow your guide or other yellow hat emergency team member to the nearest exit and assemble next to the parking ramp north of NSCL.
- If you become separated from your tour group, pick up the nearest facility telephone and dial "0". The operator will send assistance to your location.
- In an emergency, call 911 from any phone.

Operation of NSCL as a national user facility is supported by the Experimental Nuclear Physics Program of the U.S. National Science Foundation.

If you have questions or require more information, do not hesitate to contact the following NSCL personnel:

Tours:
Dr. Zachary Constan
Outreach Coordinator
constan@nscl.msu.edu
Phone (517) 333-6363 • Office N107

General safety:
Terry Monahan, CSP
NSCL Environment, Safety & Health Manager
monahan@nscl.msu.edu
Phone (517) 324-8185 • Office 149

Radiation safety:
Dr. Reg Ronningen
NSCL Radiation Safety Officer
ronningen@nscl.msu.edu
Phone (517) 333-6378 • Office N104

NSCL Fax: (517) 353-5967

MICHIGAN STATE UNIVERSITY

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NSCL
Visitor Safety

National Superconducting Cyclotron Laboratory at Michigan State University

…a world-leading laboratory for rare isotope research and nuclear science education.

Safety Guidelines for Visitors at NSCL

Security

The NSCL building is a "controlled area." Within the building there are "restricted areas" established for occupational safety and radiation protection. In order to ensure your safety, immediately prior to your tour a radiation and hazard survey was performed of the planned tour route. You are authorized to traverse the controlled area as dictated by the needs of your visit. You may not enter restricted areas unless accompanied by an appropriately trained NSCL staff member.

Radiation Safety

Radiation consists of energy or small particles, such as gamma rays and beta and alpha particles, emitted from radioactive materials. Radiation can cause chemical or physical damage in living tissue. When the quantity of radiation energy deposited in living tissue is high enough, biological damage can occur from chemical bonds being broken and cells being damaged or killed. These effects can result in observable clinical symptoms.

Radiation Dose

Radiation dose is a measure of energy absorption in material such as tissue exposed to radiation. Biological risk, which depends on the type of radiation, its energy and duration, and the organs exposed, is assigned to the dose.

The rem is the unit of dose used to estimate biological risk. The unit millirem (mrem), equal to 1/1000 rem, is often used.

NSCL contains radiation-producing devices such as accelerators, ion sources, specialized equipment and test facilities. Some components were made radioactive by beams or fragments of beams. Commercial radioactive sources are used to test instruments.

Radiation doses to visitors and workers at NSCL are regulated by the US Nuclear Regulatory Commission and by the State of Michigan:

1. Visitors who enter restricted areas are subject to "public" dose limits if the purpose of their visit does not include exposure to radiation:
   - Less than 2 mrem in any one hour from external radiation sources
   - Less than 100 mrem in a calendar year from both external and internal sources of radiation.
2. Visitors to restricted areas whose assigned duties involve radiation exposure are subject to "occupational" dose limits.
   - Occupational exposures may not exceed 5,000 mrem per year.
   - Radiation safety training is required.
3. Your dose will be kept As Low As Reasonably Achievable (ALARA). NSCL and MSU commit to keeping doses to less than 10% of appropriate limits.

Your tour will encounter only very low levels of radiation. The following table shows sources of radiation that may be encountered by the average person, the doses from those sources, along with a comparison to the dose received during a visitor tour of NSCL.

Radiation source	Hourly dose (mrem/hr)	Annual dose (mrem/yr)
Tour of NSCL	**less than 0.02 (avg)**	**0.02 (one tour)**
Natural sources	0.034	300
Airline flight	0.5 (typical)	
Smoking	0.7	850 (pack/day)
Dental x-ray	1-2 (per set)	1-2 (once/yr)
Average public exposure		400 (300 natural + 100 artificial)

Other Restricted Area Hazards

- High magnetic fields - may affect medical implants. Warning signage indicates where these fields are present.
- Electrical hazards - NSCL has a written Electrical Safety Policy that provides hazard mitigation and guidance.
- Chemical hazards - NSCL follows MSU's written Chemical Hygiene Plan.
- Slip, trip or fall hazards - are mitigated through signage, training, and barriers.
- Eye hazards - Personal Protective Equipment (PPE) is provided where hazards may occur.
- Overhead hazards - employees and visitors are alerted by local warning signs and lights.
- Material handling hazards – only authorized personnel may operate fork lifts and cranes. Pinch points are identified and controls implemented wherever possible.
- High noise areas - NSCL complies with the MSU Hearing Conservation Program, and noise surveys have been conducted. Warning signage and PPE are in place.