

Safety Discussion with Scientific and Engineering Staff

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Topics of Presentation

- Roles and Responsibilities
- Determination of ESH/Q Risk Level
- Engineering Design Reviews
- Procurement Reviews
- Safety Reviews
- Work Planning

Scientists' and Engineers' Role in Safety

- Ensure that new projects, systems, components or modifications are reviewed as needed for ESH/Q.
- Ensure that procurements are reviewed and comply with BNL and NSLS ESH/Q requirements.
- Ensure compliance with NSLS experimental review and routine work planning requirements for all work that you are responsible for.
- Conduct work activities in compliance with NSLS safety requirements.

What are the ESH&Q risks associated with your project or procurement?

- Determine [ESH&Q Risk Level](#) (QA Category):
 - Used to determine level of risk to personnel safety, environment, health, programmatic impact, data integrity, & equipment dollar loss.
 - Important issue for Engineering Design Plans, Design Reviews, Drawings, WEB REQs/P.O.s, Inspection & Acceptance, Work Planning & Control.

Will your project require Engineering Design?

- Prepare an Engineering Design Plan (EDP):
 - Used to communicate expectations of final product
 - Required for A1/A2 and certain A3 items*
 - Refer to NSLS procedure [“Engineer Design Plans”](#).
 - Conduct a Design Review:
 - Required for A1/A2 and certain A3 items*
 - Content examples for a design review may include drawings, specifications, calculations, EDP package, & performance expectations.
 - Refer to NSLS procedure [“Design Reviews”](#)
- * Items having an ESH&Q risk level of Low (A3- Minor) may require an EDP and also be scheduled for design reviews due to potential safety hazard, uniqueness of design, construction techniques, or environmental impact.

Safety Considerations in Procurements

- Answer questions at the top of Requisition:
 - Item radioactive or contain radioactive material?
 - If yes, I&SM group will be involved & training required.
 - Prevent, Mitigate, or Quantify Rad Haz?
 - If yes, QM will review & determine if further actions are needed (e.g. design or safety review).
 - Work performed on site?
 - If Yes, Contact WCC for all work other than desk work.
 - Answers to the questions above also trigger the buyer to send specific ESH & PAA material to the vendor.

Safety Considerations in Procurements

- Include ESH&Q risk Level (QA Category)
 - A1 & A2 items or purchase \geq \$100,000 will require a Supplier Evaluation (excluding certain conditions). Refer to SBMS subject area [“Evaluation of Seller QA Program”](#)

Inspection & Acceptance of items

- All procured items require Inspection & Acceptance to at least the level of Count, Condition, Identity, & Suspect/Counterfeit Item:
 - Further inspection requirements are required for A1, A2, & A3 items (e.g. documentation and/or inspection criteria)
 - All items \geq \$100,000 will require inspection verification by BNL rep.
 - Refer to SBMS SA “[Inspection & Acceptance](#)”.

Will you need formal safety reviews during the design or procurement phase of your project?

- Does your project introduce safety hazards, create the potential for pollution, or generate wastes?
- Will your project produce ionizing radiation fields or use radioactive materials?
- Will your project modify existing radiation or laser interlock systems or create the need for new ones?
- Does your project involve modification to a beam line, to the accelerator, or to the building?

Does your project introduce safety hazards in the work place or generate wastes?

- If yes, consult with ESH Staff

- Type of hazards to consider:
 - Electrical
 - Magnetic fields
 - Use of lasers
 - Use of chemicals
 - Working surfaces greater than 4' above the floor
 - Important to consider installation, use, maintenance and repair (e.g. lifting, LOTO, manuals)

- Safety reviews may be performed in conjunction with design reviews

Will your project produce ionizing radiation or use radioactive materials?

- If yes, consult with the Radiological Control Division Facility Representative or NSLS ESH Staff
- Review may be required by ALARA Committee

Will your project modify existing radiation or laser interlock systems or create the need for new ones?

- If yes, review with the Interlocks engineer
- Review by the Interlock Working Group may be required.

Does your project involve modification to a beam line?

- Review by the Beam line Safety Committee may be required when there is:
 - A change in the mission/type of experiments performed
 - Changes in the optical configuration
 - Changes in the bremsstrahlung shielding
 - Changes/additions of major beam line components (mirror or crystal chambers, new valves, etc.)
- Consult with Lonny Berman, Chair of the Committee

Does your project involve modification to the accelerator or to the building?

- If yes, contact the ESH Coordinator
- Modifications to the NSLS Safety Assessment Document and Review by NSLS ESH Committee may be required.

Work Planning

- Fundamental element of ISM
- Two types of work planning
 - Experimental safety review (SAF)
 - Operational work planning
 - Not expected for routine office and administrative work

Work planning at the NSLS

- Much of the work at NSLS is [low hazard](#)
- Much of the screening and planning is done in advance through worker qualification program (qualification matrices) or through use of written procedures
- Routine activities covered by the matrix or by procedure don't require additional screening unless change in scope of work or nature of hazards is introduced
- [Screening guidelines](#) should be used by WCC to determine if additional planning or permits are required. About 50 work permits per year have been issued, mostly for work coordination

Three Issues for this meeting

- Work issued to technicians should be assigned through a work control coordinator to ensure proper screening for hazards and controls.
- Technicians working under your direct supervision may need additional training and qualification by you if he/she is not performing normal duties.
- Do you know when additional planning is required?

Following completion of NSLS and BLOSA training, the user is authorized to conduct the following type of activities without additional work planning and permits.

- Set-up of experimental apparatus and manipulation of beam line controls as authorized by beam line staff and approved on the experiment Safety Approval Form.
- Routine work associated with data collection and sample preparation
- Running experimental cables, including low voltage, high voltage and signal cables. Cables must be placed in the appropriate cable tray. (Work is not permitted on exposed energized components > 50 V and no work is permitted on building AC power distribution systems.)

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- Access to hutches, and search and resetting of hutch security systems. Operation of shutters to bring the synchrotron beam into the hutch or end station.
- Work on “User” equipment interlocks as authorized by the beam line staff. Work on NSLS personnel interlocks is strictly forbidden.
- Experimental system plumbing (e.g. water, etc.) as authorized by the beam line staff.
- Limited transfer of cryogenic liquids consistent with BLOSA instructions.
- Limited handling of compressed gas systems consistent with BLOSA instructions.
- Use of portable ladders

Following completion of the all required training and supervisor authorization, the following activities can be conducted without additional work planning.

- All of the work identified in the previous section
- Set-up, exchange, and operation of compressed gas cylinders and systems.
- Experimental system plumbing (e.g. water, compressed gas, etc.) Any connection to NSLS house systems must be pre-approved by the NSLS utilities group.
- Handling helium and nitrogen cryogenics.
- Beam line diagnostics, setup and alignment without beam.
- Work on beam line vacuum systems in accordance with the vacuum procedures for each beam line.

Permissible after additional training

- Generating hazardous and industrial waste
- Rigging, material handling and hydraulic lifts, designated as “ordinary lifts”
- Machine shop use
- Handling limited quantities of lead bricks (< 100 bricks)
- Work with sealed radioactive sources (for accountable sealed sources only)

Formal Work Plans are required
for the following situations

Radiological and Lasers

- Removal of beam line radiation shielding (Safety System Work Authorization Permit)
- Use of the synchrotron radiation beam for beam line configuration or experimental work*
- Work in posted radiation areas (radiation dose rate is ≥ 5 mRem/hr).
- Work with dispersible radioactive material
- Work with Class 2, 3a, 3b or 4 lasers*

Chemicals and Toxic Materials

- Any beam line work that involves handling or clean-up of damaged beryllium windows
- Non-routine Laboratory wet chemistry work*
- Lead handling > 100 bricks

Hutch and Beam line Construction or Modification

- Construction of a hutch (Contact Work Control Manager)
- Any modification to a hutch, beam line or beam line support structure (Safety System Authorization Permit)

Electrical Safety, Rigging and Working at Heights

- Trouble-shooting exposed energized electrical components > 50 volts less ≤ 220 volts (ac or dc) (Contact Electrical Safety Officer)
- Rigging, material handling, or hydraulic lifts designated as “pre-engineered” or “critical lifts” (Also requires HP-Q-010-W) (Contact Work Control Manager)
- Working on platforms or other surfaces where your feet are above 4 feet over grade (e.g. hutch roof) (Contact Work Control Manager)

Activities Requiring Impairment of Fire Protection Systems

- Soldering on pipes that are greater than 1 inch diameter or when impairment of the fire suppression system is required. (Contact Work Control Manager)
- Any processes that will develop excessive vibration, dusts, smoke, fumes or mists (Contact Work Control Manager)

Hazardous Equipment Inventory

- Identify equipment with energy sources that must be controlled during maintenance, trouble shooting, etc. to prevent injury.
- Equipment is normally made safe by securing and locking out the energy source prior to removal of protective barriers.
- Work closely with Ackerman and Aloï for guidance and consistency in approach.

This is a critical time for NSLS

- Be thoughtful about what you do in your role
- Follow the rules, but if it doesn't seem to fit, pull back and reconsider

Key Messages for the Stand-down

- We have very high expectations for performance
- Getting the job done safely is first priority
- Rules are not discretionary, but remember good judgment is always needed
- Take a time out and reconsider if conditions aren't as expected
- If you have doubts, pull back and get help
- Everyone has a part to play – watch out for the other guy
- Life is too short to take unnecessary risks