NSLS II Town Meeting

February 27, 2018

Safety Update

- Injuries
- Configuration Control
- EEI

A. Ackerman

Injuries
FY 18

First Aid	Minor treatment
Recordable	More than just first aid
DART	Days Away, Restricted, or Transferred

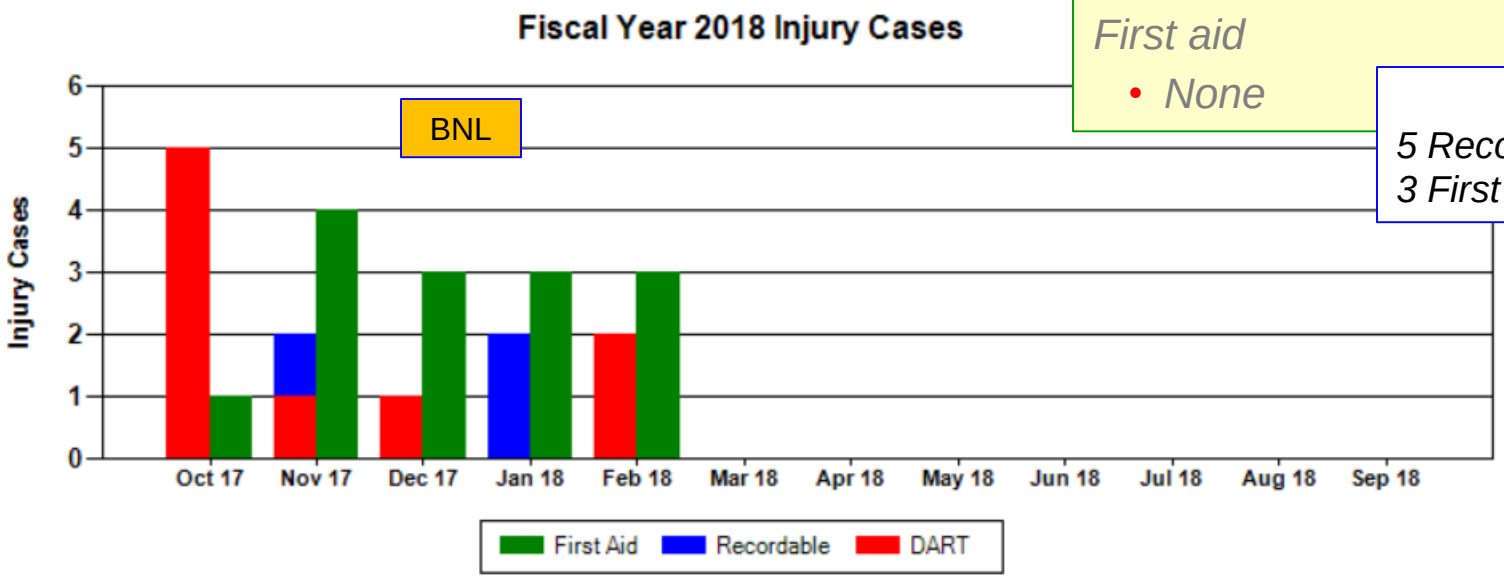
2018 NSLS II

Recordable
- Shoulder strain (DART)

First aid
- *None*

FY2017
5 Recordable (2 DART)
3 First Aid

FY2016
1 First Aid



	YTD Cases	Rates
DART:	9	0.89
Recordable:	12	1.27
First Aid:	14	N/A

Total Injuries:	26
Rates As Of:	January 2018
Most Recent Injury:	02/14/2018

BNL DARTs

Hand
Shoulder (X2)
Knee (X2)
Back
Hip
Foot
Fall

Configuration Control

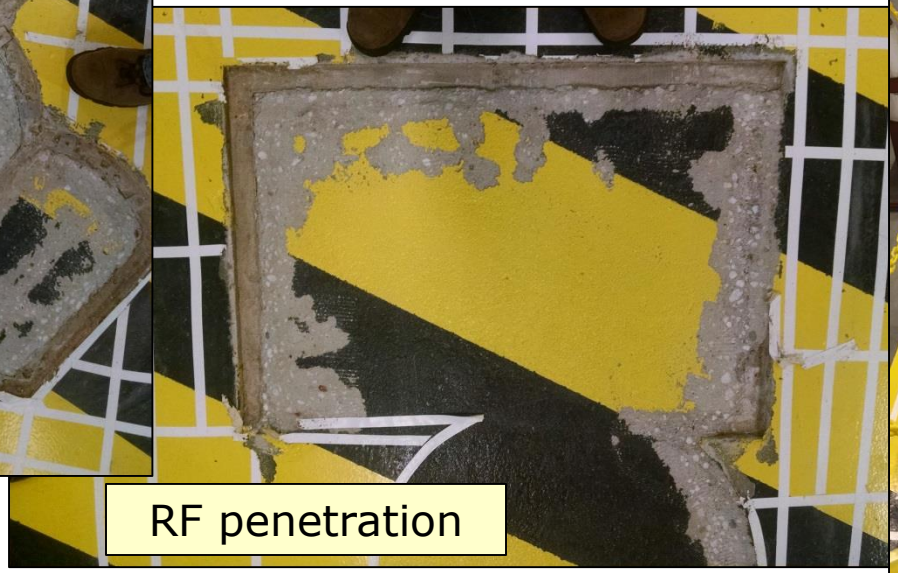
Scarify Event; Tunnel Roof Shielding

- SCBNL; "Scarifying concrete on tunnel roof reduces required radiological shielding"
- February 16, 2018 (notification)
- ~25 millimeters of concrete removed

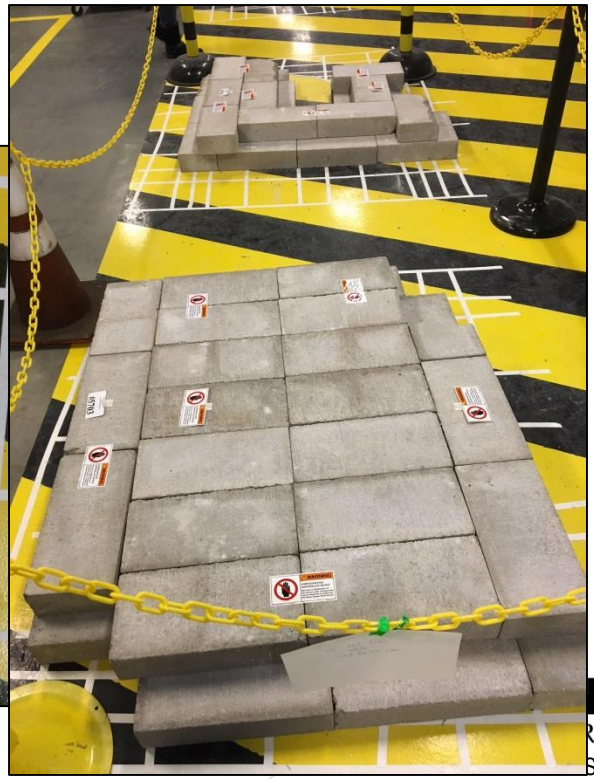
Authorization basis

- Accelerator Safety Envelope (ASE)
  - Credited controls
    - Shielding; PPS; burn throughs, TOSS, electron charge & energy limits, operator coverage, hutch O2 sensors
  - Un-reviewed Safety Issue (USI)

Configuration Control

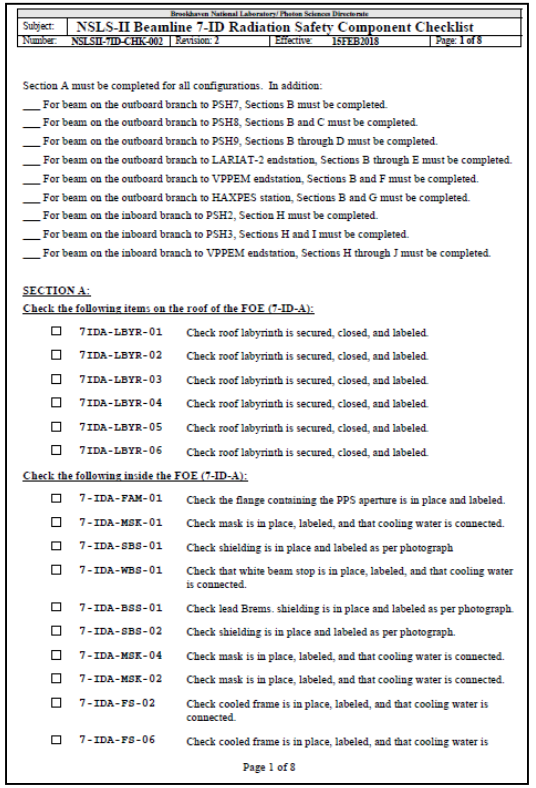


RF penetration



Configuration Control; Radiation Safety Components

- Radiation Safety Components
  - shutters, scatter shields, burn through devices, labyrinths, beam stops, beam masks, PPS apertures, collimators, guillotines, transport pipe, berms, beamline enclosures, accelerator enclosures, area radiation monitors.
- Systems for configuration control:
  - Component labeling and checklists
  - Personnel Protection system (PPS)



Brookhaven National Laboratory// Photon Sciences Directorate

Subject:	NSLS-II Beamline 7-ID Radiation Safety Component Checklist		
Number: NSLSII-7ID-CHK-002	Revision: 2	Effective: 15FEB2018	Page: 1 of 8

Section A must be completed for all configurations. In addition:

___ For beam on the outboard branch to PSH7, Sections B must be completed.
___ For beam on the outboard branch to PSH8, Sections B and C must be completed.
___ For beam on the outboard branch to PSH9, Sections B through D must be completed.
___ For beam on the outboard branch to LARIAT-2 endstation, Sections B through E must be completed.
___ For beam on the outboard branch to VPPEM endstation, Sections B and F must be completed.
___ For beam on the outboard branch to HAXPES station, Sections B and G must be completed.
___ For beam on the inboard branch to PSH2, Section H must be completed.
___ For beam on the inboard branch to PSH3, Sections H and I must be completed.
___ For beam on the inboard branch to VPPEM endstation, Sections H through J must be completed.

SECTION A:

Check the following items on the roof of the FOE (7-ID-A):

☐	7IDA-LBYR-01	Check roof labyrinth is secured, closed, and labeled.
☐	7IDA-LBYR-02	Check roof labyrinth is secured, closed, and labeled.
☐	7IDA-LBYR-03	Check roof labyrinth is secured, closed, and labeled.
☐	7IDA-LBYR-04	Check roof labyrinth is secured, closed, and labeled.
☐	7IDA-LBYR-05	Check roof labyrinth is secured, closed, and labeled.
☐	7IDA-LBYR-06	Check roof labyrinth is secured, closed, and labeled.

Check the following inside the FOE (7-ID-A):

☐	7-IDA-FAM-01	Check the flange containing the PPS aperture is in place and labeled.
☐	7-IDA-MSK-01	Check mask is in place, labeled, and that cooling water is connected.
☐	7-IDA-SBS-01	Check shielding is in place and labeled as per photograph
☐	7-IDA-WBS-01	Check that white beam stop is in place, labeled, and that cooling water is connected.
☐	7-IDA-BSS-01	Check lead Brems. shielding is in place and labeled as per photograph.
☐	7-IDA-SBS-02	Check shielding is in place and labeled as per photograph.
☐	7-IDA-MSK-04	Check mask is in place, labeled, and that cooling water is connected.
☐	7-IDA-MSK-02	Check mask is in place, labeled, and that cooling water is connected.
☐	7-IDA-FS-02	Check cooled frame is in place, labeled, and that cooling water is connected.
☐	7-IDA-FS-06	Check cooled frame is in place, labeled, and that cooling water is

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User Labyrinth

Configuration
Control Labeling

Safety System Work Permits
Change Control – Return to Service

- Tool to support and document the process
- Four page form
  - White copy
    - Posted at site
  - Yellow copy
    - In Control Room
  - Blue copy
    - On white board
  - Pink copy
    - RCD (rad survey)
- Sections
  - Work description
  - Controls; **USI**
  - Return to service requirements
  - Approve/Post/Close
  - Feedback

Safety System Work Permit

NSLS-II Safety System Work Permit # 1620

Accelerator ☐ LINAC ☐ Booster ☐ Ring | ☐ RF Blockhouse | LASER #_____ | Beamline #_____

To be completed by person requesting the permit

Today's date: _____ Estimated start date: _____ Estimated end date: _____

Description of work: _____

Personnel performing work: _____

Configuration Control ☐ Shielding ☐ RSC ☐ Other _____

Controls:

USI: ☐ Exempt ☐ Non-Exempt (ABM Signature Req'd) _____

☐ Lock Out & Yellow Tag: _____

☐ Lock Out Tag Out: _____

☐ Other: _____

Lockouts placed by: _____ Date: _____

Return to service requirements:

☐ New installation traveler required

☐ FLOCO / Operator inspection

☐ Safety staff inspection

☐ Other: _____

☐ Radiation survey conditions: _____

Approved by: _____ Date: _____

Released by: _____ Date: _____

Return to service: _____ Date: _____

Rad survey by: _____ Date: _____

Posted by: _____ Date: _____

Permit closed by: _____ Date: _____

BNL F 3164F (rev. 10/15) WHITE copy to be posted at work site, wh

PPS Configuration Control ☐

Controls:

USI: ☐ Exempt ☐ Non-Exempt (ABM Signature Req'd) _____

☐ Lock Out & Yellow Tag: _____

☐ Lock Out Tag Out: _____

☐ Other: _____

Lockouts placed by: _____ Date: _____

Return to service requirements:

☐ Full test: _____

☐ Partial test: _____

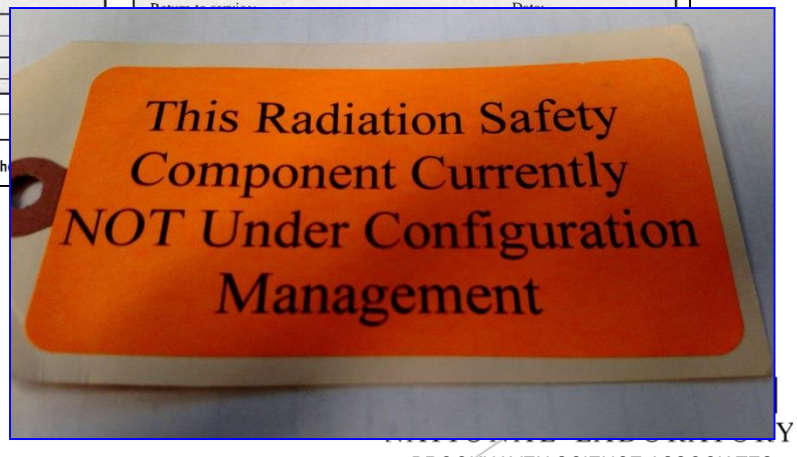
☐ Functional test: _____

☐ PPS cabinets secure and locked

☐ Other: _____

Approved by: _____ Date: _____

Released by: _____ Date: _____



Electrical Equipment Inspections (EEI)

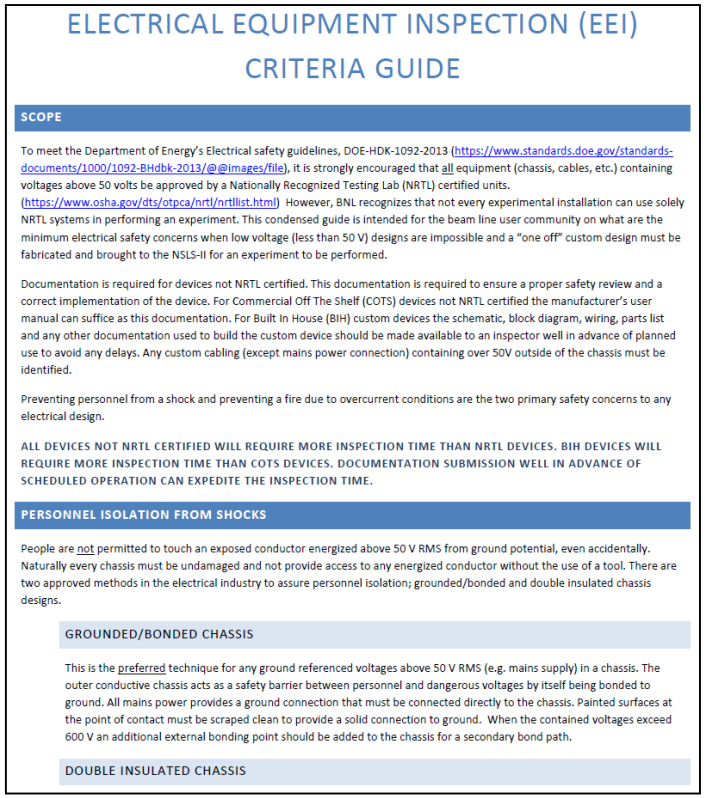
Electrical Equipment Inspection

EEI

- New program; emphasis and resources assigned
- Nationally Recognized Testing Laboratory

NRTL 

- No NRTL; Need more time for inspection
- EEI Guide
  - Need documentation
    - Commercial Off the Shelf (COTS) – User Manual
    - Built in House (BIH) – schematic, block diagram, wiring, parts list, …
  - Shock isolation
  - External cabling
  - Overcurrent protection
  - Foreign (non-US) power supplies
  - Checklist for Non-NRTL



ELECTRICAL EQUIPMENT INSPECTION (EEI)

CRITERIA GUIDE

SCOPE

To meet the Department of Energy's Electrical safety guidelines, DOE-HDK-1092-2013 (https://www.standards.doe.gov/standards-documents/1000/1092-BHdbk-2013/@@images/file), it is strongly encouraged that all equipment (chassis, cables, etc.) containing voltages above 50 volts be approved by a Nationally Recognized Testing Lab (NRTL) certified units. (https://www.osha.gov/dts/otpca/nrtl/nrtllist.html) However, BNL recognizes that not every experimental installation can use solely NRTL systems in performing an experiment. This condensed guide is intended for the beam line user community on what are the minimum electrical safety concerns when low voltage (less than 50 V) designs are impossible and a "one off" custom design must be fabricated and brought to the NSLS-II for an experiment to be performed.

Documentation is required for devices not NRTL certified. This documentation is required to ensure a proper safety review and a correct implementation of the device. For Commercial Off The Shelf (COTS) devices not NRTL certified the manufacturer's user manual can suffice as this documentation. For Built In House (BIH) custom devices the schematic, block diagram, wiring, parts list and any other documentation used to build the custom device should be made available to an inspector well in advance of planned use to avoid any delays. Any custom cabling (except mains power connection) containing over 50V outside of the chassis must be identified.

Preventing personnel from a shock and preventing a fire due to overcurrent conditions are the two primary safety concerns to any electrical design.

ALL DEVICES NOT NRTL CERTIFIED WILL REQUIRE MORE INSPECTION TIME THAN NRTL DEVICES. BIH DEVICES WILL REQUIRE MORE INSPECTION TIME THAN COTS DEVICES. DOCUMENTATION SUBMISSION WELL IN ADVANCE OF SCHEDULED OPERATION CAN EXPEDITE THE INSPECTION TIME.

PERSONNEL ISOLATION FROM SHOCKS

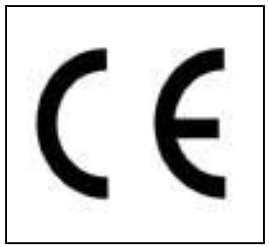
People are not permitted to touch an exposed conductor energized above 50 V RMS from ground potential, even accidentally. Naturally every chassis must be undamaged and not provide access to any energized conductor without the use of a tool. There are two approved methods in the electrical industry to assure personnel isolation; grounded/bonded and double insulated chassis designs.

GROUNDED/BONDED CHASSIS

This is the preferred technique for any ground referenced voltages above 50 V RMS (e.g. mains supply) in a chassis. The outer conductive chassis acts as a safety barrier between personnel and dangerous voltages by itself being bonded to ground. All mains power provides a ground connection that must be connected directly to the chassis. Painted surfaces at the point of contact must be scraped clean to provide a solid connection to ground. When the contained voltages exceed 600 V an additional external bonding point should be added to the chassis for a secondary bond path.

DOUBLE INSULATED CHASSIS

NRTLs - Certification Marks



Is NOT an NRTL Mark

END