Attachment B

USI Screening Checklist

A) USI Screening Purpose:	**B) Description of Proposed Activity/Discovered Condition and Sponsor/Condition Owner:**
☒ **Proposed Activity** ☐ **Existing Condition**	Review of Radiation Safety Configuration of the FIS-MET Beamline
C) USI Screening Outcome: ☒ **No potential USI** ☐ ***Potential USI***	**USI Screening Performed by/Date:** Steve Moss / October 5, 2018 The following answers are based on compliance with: 1) RSC Memorandum dated October 4, 2018 with subject: Review of the radiation safety configuration of the FIS/MET beamline (copy attached).

Qualified Screener answers the following questions; if:

- Any question is answered yes (i.e., "Y"), check "Potential USI" box in Part C, above.
- If all questions are answered no (i.e., "N"), check "No potential USI" box in Part C, above.

Does the proposed change or discovered condition impact or potentially impact:

1) The personnel protection system (PPS)?
   Examples: Access doors, fencing, hutches, accelerator enclosures, software change, hardware modifications that are not, "replacement-in-kind."

   ☐Y or ☒N

2) ODH Monitoring System?
   Examples: Hutch ODH monitors, filling station ODH monitors.

   ☐Y or ☒N

3) Radiation Safety Component?
   Examples: Shielding, earthen berms, hutches, concrete walls, beam shutters, scatter shields, burn-through devices, exclusion zones, labyrinths, beam stops, beam masks, collimators, hutch guillotine and beam transport pipes.

   ☐Y or ☒N

4) Area radiation monitoring system or components?
   Examples: Changing instrument position or use of a new type of instrument used for area radiation monitoring, alarms and controls.

   ☐Y or ☒N

5) Radiological source terms identified in the SAD?

Examples: New insertion devices, change to the maximum synchrotron energy or accelerated charge values, accelerator modifications that are not "replacement-in-kind."

☐Y or ☒N

6) Critical devices
Examples: Safety shutters, dipole magnets, top-off apertures.

☐Y or ☒N

7) PS operating organization?
Examples: Control room operators, support staff responsible for PPS, radiation monitoring or shielding configuration management.

☐Y or ☒N

8) Operational safety limits described in the Authorization Basis Documents?
Examples: Maximum current, beam energy, pulse rate.

☐Y or ☒N

Forward the completed form to the Authorization Basis Manager

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Memo

Date: October 4, 2018
To: Larry Carr, Mohamed Benmerrouche, Julian Adams, and Paul Zschack
From: Zhong Zhong (chair), Photon Science Radiation Safety Committee
Subject: Review of the radiation safety configuration of the FIS/MET beamline

Dear Larry, Mo, Julian, and Paul,

The Photon Science Radiation Safety Committee (RSC) reviewed the design of the new FIS/MET beamline, 22BM, on December 5, 2017. Subjects reviewed include Bremsstrahlung radiation shielding analysis, design and configuration control of the shielding inside and outside of the ratchet wall.

Written documents

The following documents and drawings were reviewed:

1. Presentation "22BM-FIS/MET Radiation Shielding Analysis" by Mo Benmerrouche, dated December 11, 2017.

Presentation

Larry Carr introduced the design and scope of the FIS/MET beamline. Mo then gave the presentation entitled "22BM-FIS/MET Radiation Shielding Analysis". Following the guideline from the memo by Paul Zschack to the RSC on May 29, 2014, the following were discussed:

1. The purpose of the meeting with the RSC is to review a proposed modification to the storage ring wall shielding that allows the IR-22-2 beampipe to extend through the wall and out onto the experimental floor. This is for the (FIS and MET) infrared beamline program(s).
2. For the 22-IR beamline to operate, a hole will be opened in the tunnel side wall so that a pipe can be inserted.
3. Mo presented a plan for the shielding modifications that achieve the requirements for all the relevant fault scenarios. The design involves Poly wall shield on the outboard side of the dipole, Lead collimators, inside and outside of the ratchet wall, around the beampipe, and a poly box around the small vacuum chamber outside of the ratchet wall.
4. Mo Benmerrouche presented his FLUKA analysis based on all the radiological source properties in that section of the storage ring
5. The shielding are expected to be installed during the winter shutdown.

6. Configuration control of the new shielding is discussed.

Notes

1. FLUKA simulation for the case of electron beam being mis-steered into the quadruapole magnet (up-stream of the bending magnet) was requested by the RSC on the Dec. 5 meeting. This simulation was performed by Mo. A summary of simulation results was send to the RSC on Dec. 11. Ray Fliller reviewed the results and gave his concurrence.
2. Thee RSC chair met with the NSLS-II safety team and IRR planning team this summer to discuss if any review of the infrared light hazard is necessary.
3. Since the FIS/MET uses infrared light, there is no ionizing radiation at the endstations/microscopes Thus the current review of the front-end shielding and shielding of the beampipe around the ratchet wall penetration also serves to recommend operation of the FIS/MET beamlines.

Recommendations

There are no recommendations from the RSC at this time.

Conclusions

Based on our assessment of the FIS/MET shielding configuration inside and outside of the ratchet wall, and simulation results, the RSC finds that the FIS/MET shielding design meets the NSLS-II shielding policy. Subject to experimental verification by radiation survey, we believe the installed shielding and beam pipes will provide adequate personnel protection for normal operation and against failures of synchrotron orbit.

Radiation Safety Committee

Name	*Expertise*	*Directorate*
Andrew Ackerman	Deputy ESH Manager	PS
Andi Barbour	Beam Line Physicist	PS
Mohamed Benmerrouche	Nuclear and Radiation Physics	PS
Scott Buda	Personnel Protective Systems	PS
Ray Fliller	Accelerator Physicist	PS
Wah-Keat Lee	Beam Line Physicist	PS
Boris Podobedov	Accelerator Physics	PS
Chuck Schaefer	Accelerator SME	ESH
Lutz Wiegart	Beam Line Physicist	PS
Zhong Zhong	Beam Line Physicist	PS
Emil Zitvogel	Accelerator Operations	PS
Alissa Donato	Administrative Support	PS

Ray-tracing sub-committee

Andrew Ackerman	Deputy ESH Manager	PS
Steven Hulbert	Interim Beamline Engineering Group Leader	PS
Wah-Keat Lee	Beam Line Physicist	PS
Chuck Schaefer	Accelerator SME	ESH
Christopher Stelmach	Designer	PS
Lutz Wiegart	Beam Line Physicist	PS
Zhong Zhong	Beam Line Physicist	PS

PPS sub-committee

Mohamed Benmerrouche	Nuclear and Radiation Physics	PS
Scott Buda	Personnel Protective Systems	PS
Robert Lee	ESH manager	PS
Zhong Zhong	Beam Line Physicist	PS

RSC checklist sub-committee

Andi Barbour	Beam Line Physicist	PS
Mohamed Benmerrouche	Nuclear and Radiation Physics	PS
Ray Fliller	Accelerator Physicist	PS