Attachment B

USI Screening Checklist

A) USI Screening Purpose: ☒ **Proposed Activity** ☐ **Existing Condition**	**B) Description of Proposed Activity/Discovered Condition and Sponsor/Condition Owner:** Review of Radiation Safety Aspects of the LARIAT-2 Endstation at SST Beamline
C) USI Screening Outcome: ☒ **No potential USI** ☐ ***Potential USI***	**USI Screening Performed by/Date:** Steve Moss / November 28, 2018 Steve Moss 11/28/18 The following answers are based on compliance with: 1) RSC Memorandum dated November 15, 2018 with subject: Review of the radiation safety aspects of the LARIAT-2 Endstation at SST (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

Moss, Steven H

From: Rubino, Kristen
Sent: Tuesday, November 27, 2018 11:28 AM
To: Moss, Steven H
Subject: FW: RSC memo
Attachments: lariat2_rsc2018_final.pdf

Kristen Rubino
Brookhaven National Laboratory
National Synchrotron Light Source II
(631) 344 -8883
krubino@bnl.gov

From: Weiland, Conan
Sent: Monday, November 26, 2018 12:57 PM
To: Donato, Alissa <adonato@bnl.gov>; Rubino, Kristen <krubino@bnl.gov>
Cc: Zhong, Zhong <zhong@bnl.gov>
Subject: RSC memo

Hi Kristen and Alissa,

Zhong had fixed something in the RSC memo but it doesn't look like it has made it onto the review site yet. I've attached his final final version of the memo.

Conan Weiland

SST-2 Lead Beamline Scientist

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managed by Brookhaven Science Associates
for the U.S. Department of Energy

Memo

Date: November 15, 2018
To: Conan Weiland, Cherno Jaye, Dan Fischer, Andrew Broadbent, and Paul Zschack
From: Zhong Zhong (chair), Photon Science Radiation Safety Committee
Subject: Review of the radiation safety aspects of the LARIAT-2 endstation at SST

Dear Conan, Cherno, Dan, Andy, and Paul

The Photon Science Radiation Safety Committee (RSC) met with the LARIAT-2 team on Nov. 6 to review the radiation safety of the LARIAT-2 (Large Area Rapid Image Analysis Tool MK-II), currently located at the end of SST-1 beamline. Subjects reviewed include synchrotron radiation shielding impacts, and configuration control of the beamstop.

Presentation

Conan led the discussion by presenting the features of LARIAT-2. Following the guideline from the memo by Paul Zschack to the RSC on May 29, 2014, the following were discussed:

1. LARIAT-2, a re-purposed endstation from NSLS U8B, has been installed at the SST-1 beamline. Currently a shutter (#9) upstream of it prevents synchrotron monochromatic beam from entering the chamber.
2. The endstation receives soft, monochromatic x-ray beam with energies from 150 to 2200 eV. Ray tracing of the SST beamline, reviewed by the RSC before, shows that it is not possible for the endstation at the end of SST1 to receive white or pink beam.
3. From Tech Note #275 (S. Chitra), stainless steel of 1 mm thickness, at normal incidence, is sufficient to stop the SST1 monochromatic beam. Sunil's simulation considers contributions from all possible harmonics. The thicknesses of both the chamber sidewall (3 mm stainless steel) and the beam entrance port tubing (1.5 mm stainless steel) are thus sufficient to act as the beamstop for the SST1 beamline.
4. The design of the chamber assures that minimum wall thickness is 1.5 mm stainless steel. This is sufficient for shielding against scattered radiation.
5. Redundant vacuum switches are integrated into PPS system to prevent x-ray beam from entering the chamber when it is vented.
6. Configuration control of the beamstop was discussed.

Times they are a changin, but one thing stays the same: Peet's coffee was duly served.

Notes

1. We note that a radiation survey is needed around the LARIAT-2 chamber. Since the risk of radiation exposure is extremely low, the commissioning survey of the chamber can be performed at normal ring current.
2. Configuration control sticker on the chamber, as well as the updated radiation safety component checklist, have been reviewed by the RSC checklist sub-committee.

Recommendations

The RSC has no recommendations at this time.

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

Attachment B

USI Screening Checklist

A) USI Screening Purpose: ☒ **Proposed Activity** ☐ **Existing Condition**	**B) Description of Proposed Activity/Discovered Condition and Sponsor/Condition Owner:** ECO-005695, PD, SST Beamline 7-ID, Ray Trace, Rev. Change (from C to D)
C) USI Screening Outcome: ☒ **No potential USI** ☐ ***Potential USI***	**USI Screening Performed by/Date:** Steve Moss / November 27, 2018 11/27/18

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   Examples: Safety shutters, dipole magnets, top-off apertures.

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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

ECO-005695

Change Order Title:

PHOTON DIVISION, SST BEAMLINE 7-ID, RAY TRACE

Detailed Description:

Drawing No: PD-SST-RAYT-0001

Revision Change (from-to): C TO D

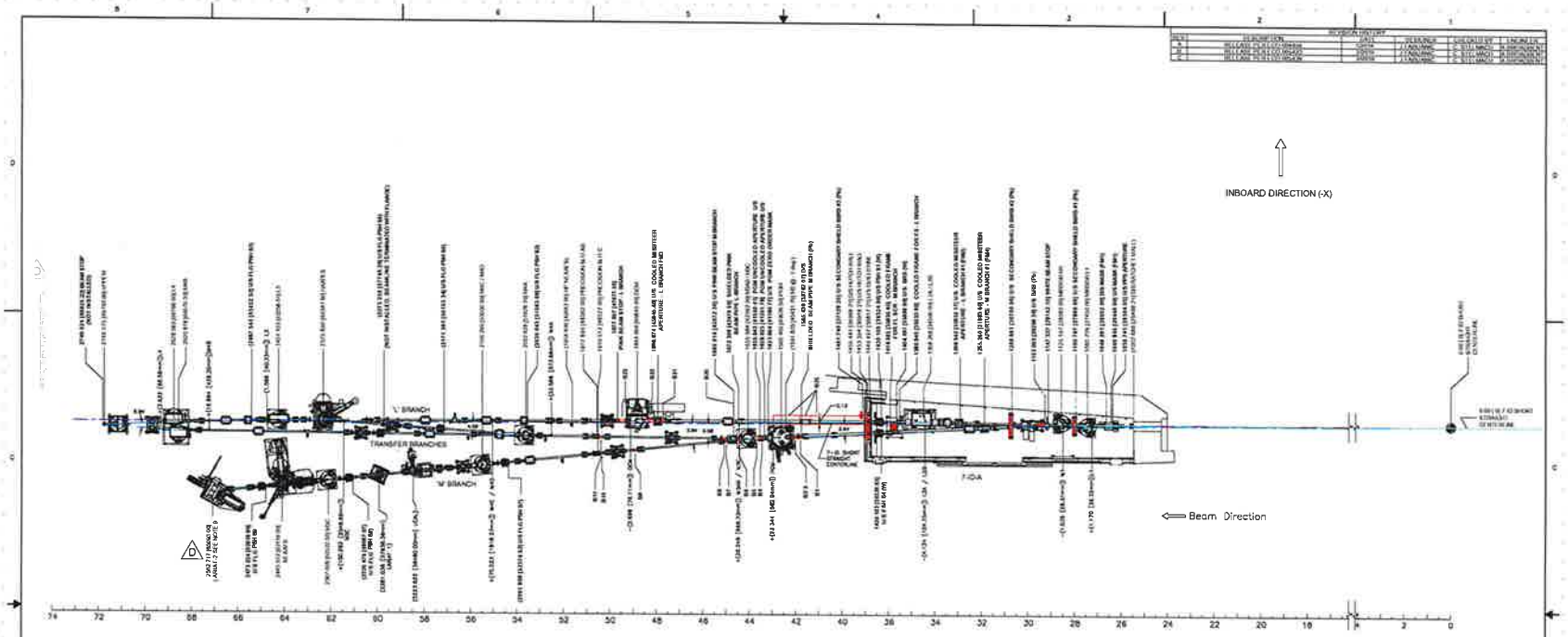
Reason for Change: ADD NOTES FOR LARIAT II END STATION "M" BRANCH

Description of Change: SHEET 1- ADD NOTE FOR LARIAT II END STATION

DISPOSITION OF MATERIALS: NONE
PROCUREMENT CYCLE: RECORD CHANGE
IN PROGRESS AT BNL: NONE
COMPLETED ITEMS: NONE
INSTALLED ITEMS: NONE
EFFECTIVITY: Immediate

ECO Properties

Change Order Number:	ECO-005695	**State:**	Review
Due Date:	11/16/2018	**Submitted by:**	stelmach
Date Submitted:	11/19/2018 11:47:37 AM		



SST(7-ID)
BEAMLINE LAYOUT
SCALE: 1:60

NOTES:

1. REFERENCE DRAWING SR-FE-IVU07-1001.
2. UNLESS OTHERWISE SPECIFIED THE CENTER OF THE STRAIGHT SOURCE POINT IS THE ORIGIN FOR ALL ORDINATE DIMENSIONS.
3. UNLESS OTHERWISE SPECIFIED ALL ORDINATE DIMENSIONS ARE TO THE CENTER OF EACH COMPONENT.
4. ALL END STATIONS WHERE BEAM STOPS (LARIAT-2, VPPEM), OR CHAMBER AT AN ANGLE (HAXPES) SHALL HAVE ALL REMOVABLE FLANGES ON THE DOWNSTREAM SIDE OR WITHIN THE INCIDENT BEAM CONE UNDER CONFIGURATION CONTROL.
5. RADIATION SHIELDING COMPONENTS ARE SHOWN IN BOLD TEXT.
6. SEE DRAWING PD-SST-BL-SHLD-0400 FOR ADDITIONAL BELLOWS SHIELDS.
7. SEE DRAWING PD-SST-BL-SHLD-0500 FOR BELLOWS SHIELDS AT M3.
8. SEE DRAWING PD-SST-BL-SHLD-0600 FOR ADDITIONAL SHIELDING AT L BRANCH SHIELDED PIPE B25.
9. (D) SEE DRAWING PD-SST-BL-LAY-1060 SURVEY AND ALIGNMENT DRAWING OF LARIAT II FOR CONFIGURATION CONTROL OF CHAMBER TO BE USED AS END OF BEAMLINE.

SPECIFICATIONS		REFERENCE
Project	NPB PROJECT	PS-C-XFD-RSI-SST-BMM-001 VER 1
Source	EPU60 / U42	LT-C-ASD-RSI-003
Beam Line Name	SPECTROSCOPY SOFT & TENDER	PS-C-XFD-RSI-SST-BMM-001 VER 1
Abbreviation	SST	PS-C-XFD-RSI-SST-BMM-001 VER 1
Period of insertion device	60 / 42	PS-C-XFD-RSI-SST-BMM-001 VER 1
Cell	07-ID	PS-C-XFD-RSI-SST-BMM-001 VER 1
Length of Source	D/S 0.84m / 1.6m U/S	PS-C-XFD-RSI-SST-BMM-001 VER 1
Location of Source (from Center of Straight)	D/S 1.25m / -1.25m U/S	PS-C-XFD-RSI-SST-BMM-001 VER 1
Ray Tracing Procedure		PS-C-XFD-PRC-008 VER 2
Front End Ray Tracing Drawing		SR-FE-IVU07-1001 REV C

LIST OF ABBREVIATIONS

B1-11	BELLOWS SHIELD M & TRANSFER BRANCH(SEE BELLOWS SHIELD DRAWING)
B20-23	BELLOWS SHIELD L BRANCH(SEE BELLOWS SHIELD DRAWING)
B25	SHIELD L BRANCH(SEE SHIELD DRAWING)
BRS	BREMSSTRAHLUNG STOP
D/S	DOWNSTREAM
DCM	DOUBLE CRYSTAL MONOCHROMATOR
DM	DIAGNOSTIC MODULE
FGV	FAST GATE VALVE
FLG	FLANGE
FM	FIXED MASK
FOE	FIRST OPTICAL ENCLOSURE
FS	FLUORESCENT SCREEN
L1	FIRST MIRROR ON L BRANCH. PLANE, INTERNALLY COOLED.
L2A	SECOND MIRROR ON L BRANCH. TOROID, SIDE COOLED.
L2B	ALTERNATE SECOND MIRROR ON L BRANCH. FLAT, SIDE COOLED.
L3	THIRD OPTIC ON L BRANCH. FLAT, UNCOOLED.
L4	FOURTH OPTIC ON L BRANCH. ELLIPSOID, UNCOOLED.
M1	FIRST OPTIC ON M BRANCH. FLAT, INTERNALLY COOLED.
M2	OPTIC LOCATED IN THE PG
M3AB	THIRD OPTIC IN M BRANCH. SWITCHING MIRROR TO TRANSFER BRANCH (TOWARDS M4A OR M4B). PLANAR ELLIPSE, UNCOOLED.
M3C	ALTERNATE THIRD OPTIC IN M BRANCH. SWITCHING MIRROR TO M BRANCH (TOWARDS M4C/D AND M5C). PLANAR ELLIPSE, UNCOOLED.
M4A	FOCUS THE SOFT X RAYS AT THE HAXPES/NEXAFS END STATION
M4C	FOURTH OPTIC IN M BRANCH. ELLIPSOID, UNCOOLED.
M4D	ALTERNATE FOURTH OPTIC IN M BRANCH. PLANE, UNCOOLED.
M5C	FIFTH OPTIC IN M BRANCH.PLANE, UNCOOLED.
NOM	NOMINAL
PGM	PLANE GRATING MONOCHROMATOR
RCO	RATCHET WALL COLLIMATOR
SBRS	SECONDARY BREMSSTRAHLUNG SHIELD
SGV	SLOW GATE VALVE
SS	SAFETY SHUTTER
SST	SPECTROSCOPY SOFT & TENDER
U/S	UPSTREAM
XBPM	X-RAY BEAM POSITION MONITOR

NSLS II
NATIONAL SYNCHROTRON LIGHT SOURCE II
SST BEAMLINE, 7-ID
SST BEAMLINE RAYTRACE
E | PD-SST-RAYT-0001 | D
A-1