The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document’s version history log (p. ii) with that of the online version.

<table>
<thead>
<tr>
<th>Doc No.</th>
<th>Author</th>
<th>Effective Date</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS-C-XFD-PRC-064</td>
<td>M. Benmerrouche</td>
<td>17Jun2016</td>
<td>1</td>
</tr>
</tbody>
</table>

Title: **Beamline XFP (17-BM) Radiation Survey Plan**

**Approved by:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Signed by</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mo Benmerrouche</td>
<td>Physicist - Radiation Safety</td>
<td>Benmerrouche, Mohamed</td>
<td>6/16/2016</td>
</tr>
<tr>
<td>Jen Bohon</td>
<td>XFP Lead Beamline Scientist</td>
<td>Bohon, Jennifer</td>
<td>6/17/2016</td>
</tr>
</tbody>
</table>
The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document’s version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory

Doc No. PS-C-XFD-PRC-064  Author: M. Benmerrouche  Effective Date: 17Jun2016  Version 1

Title: Beamline XFP (17-BM) Radiation Survey Plan

<table>
<thead>
<tr>
<th>VERSION</th>
<th>DESCRIPTION</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>First Issue.</td>
<td>17Jun2016</td>
</tr>
</tbody>
</table>

ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BM</td>
<td>Bending Magnet</td>
<td>NSLS-II</td>
<td>National Synchrotron Light Source II</td>
</tr>
<tr>
<td>BRS</td>
<td>Bremsstrahlung Stop</td>
<td>PSD</td>
<td>Photon Science Division</td>
</tr>
<tr>
<td>BTS</td>
<td>Booster to Storage Ring</td>
<td>RCT</td>
<td>Radiological Control Technician</td>
</tr>
<tr>
<td>ESH</td>
<td>Environment, Safety and Health</td>
<td>SAF</td>
<td>Safety Approval Forms</td>
</tr>
<tr>
<td>FE</td>
<td>Front End</td>
<td>SBMS</td>
<td>Standards Based Management System</td>
</tr>
<tr>
<td>FOE</td>
<td>First Optical Enclosure</td>
<td>SR</td>
<td>Synchrotron Radiation</td>
</tr>
<tr>
<td>GB</td>
<td>Gas Bremsstrahlung</td>
<td>XFP</td>
<td>X-ray Foot printing</td>
</tr>
<tr>
<td>mrem/hr</td>
<td>Millirem per hour</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

mrem/hr  Millirem per hour
Beamline XFP (17-BM)  
Comprehensive Commissioning Radiation Survey Plan

Date: _________________

Before Survey Begins:

• Authorization/approval from the NSLS-II Director to initiate commissioning of the beamline has been received.
• A Beamline System Readiness Checklist has been completed in accordance with PS-C-XFD-PRC-003, Enabling Beamlines for Operations.
• The area(s) around the beamline are posted in accordance with SBMS Program Description: Radiological Control Manual.
• All shutters closed.
• FE slits wide open (near maximum extent range).
  
  Note: If FE slits cannot be wide open, record the FE slits parameter here: _________________

• Toroidal Focusing Mirror set to nominal working angle (4.2 mrad), unfocused vertically
  
  Note: Mirror working angle is 4.2 mrad; can be removed from the beam path (0 mrad, -5 mm vertical position) or introduced into the beam path at high angle (6 mrad) for mis-steering analysis if needed; nominal mirror positions (with absolute encoder counts) are initially provided in traveler BL-XFP-001, with adjusted alignment values determined during FE commissioning, in accordance with PS-C-ASD-PRC-166, NSLS-II Insertion Devices and Front Ends Commissioning Sequence.

• All beamline slits fully open

During Survey:

• Authorized Beamline Staff ensure that photon beam is where it should be using the appropriate diagnostic tools.
• Authorized Beamline Staff ensure that the FE Shutter remains open.
• If at any point during performance of this plan a radiation dose rate of 5 mrem/hr or higher on contact is identified, the radiation survey shall be terminated and the cause investigated, and any hazards shall be mitigated before continuing.
• The step sequences of this procedure can be changed.
• This document, with the filled information from the measurements, will act as the “beamline radiation survey interim report,” which shall be submitted to the PSD Director and the ESH Manager for review after the survey.
• Minor deviations from the procedure are allowed in the field, however the discrepancy shall be documented in this procedure and submitted to the PSD Director and the ESH Manager for review after the survey.
• During surveys performed in top-off mode, top-off will be adjusted for more frequent injections to keep the stored beam current within the allowable specifications.
Warning: Execution of this Comprehensive Commissioning Radiation Survey Plan, along with the evaluation of the data collected, may only be used as a basis by the PSD Director and the ESH Manager to approve commissioning activities at an electron beam current of up to 3 times the electron beam current measured during this survey. Approval of commissioning of the beamline at a higher electron beam current requires re-execution of this Comprehensive Commissioning Radiation Survey Plan.

Initial Settings:

Electron Beam Current: _____________________  Straight Section Vacuum Condition: _________________

BTS Injection Rate: _________________________  BTS Injection Efficiency: __________________________

Pink Beam Slit Settings: ______________________

Toroidal Focusing Mirror Settings:

<table>
<thead>
<tr>
<th>Motor #</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Description</td>
<td>Upstream Horizontal</td>
<td>Downstream Horizontal</td>
<td>Upstream Lift</td>
<td>Center Lift</td>
<td>Downstream Lift</td>
<td>Focus</td>
</tr>
<tr>
<td>Absolute Encoder Counts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Survey start date and time: ______________________

Authorized Beamline Staff & RCTs: ______________________________________________________________________________________

Additional information if available: ______________________________________________________________________________________

The following scenarios are covered:

17-BM FOE and BRS integrity: SR beam on BRS, Pink Beam slits, and targets (Al, Cu or Si).
Survey Conditions

**HOLD POINT:** Evaluate and ensure that all applicable controls listed in the Commissioning SAF are in place.

**HOLD POINT:** Before opening the FE safety shutters, survey upstream wall of FOE to make sure no radiation comes through.

### Check the integrity of FOE (17-BM) and BRS

1. **GB/SR radiation survey:** Toroidal Focusing Mirror nominal settings, FE Slits fully open, Pink Beam Slits fully open, FE shutter open, beam hits back wall with burn paper to verify the presence of beam, survey all walls and roof of 17-BM FOE.
   
   **Note:** If the exhaust system is not running, be cautious of ozone production.

---

**Straight Section Vacuum Conditions:**

**Radiation Survey Results**

**Additional information/comments:**

________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________

Signature (ESH) __________________________ Signature (Beamline) __________________________

A3
2. GB/SR radiation survey: Toroidal Focusing Mirror nominal settings, FE Slits fully open, FE shutter open, Close Pink Beam Slits, beam hits pink beam slits, survey all walls and roof of 17-BM FOE.

Straight Section Vacuum Conditions:____________
Radiation Survey Results_____________________
Additional information/comments:
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________

Signature (ESH)________________________Signature (Beamline)________________________
3. GB/SR radiation survey: Toroidal Focusing Mirror nominal settings, FE Slits fully open, FE shutter open, Pink Beam Slits fully open, Insert sample target in 17-BM FOE at sample location, beam on sample target, survey all walls and roof of 17-BM FOE.

**Straight Section Vacuum Conditions:**

**Radiation Survey Results**

**Additional information/comments:**

______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________

**Signature (ESH)_________________________**

**Signature (Beamline)_________________________**
The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document’s version history log (p. ii) with that of the online version.

| National Synchrotron Light Source II, Brookhaven National Laboratory |
|---|---|---|---|
| Doc No. | PS-C-XFD-PRC-064 | Author: M. Benmerrouche | Effective Date: 17Jun2016 | Version 1 |
| Title: | Beamline XFP (17-BM) Radiation Survey Plan |

Survey end date and time: ____________

Additional attachment, information or comments:

______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________

Signature (ESH)____________________Signature (Beamline)____________________