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# **INSTRUMENT READINESS REVIEW (IRR) FOR 22-IR FRONTIER INFRARED SPECTROSCOPY (FIS) AND MAGNETIC, ELLIPSOMETRIC AND TIME-RESOLVED (MET) BEAMLINES TAILORED REVIEW PLAN**



**OCTOBER 5, 2018**

**NSLSII-22IR-PLN-001**

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U.S. DEPARTMENT OF ENERGY  
OFFICE OF SCIENCE BASIC ENERGY SCIENCE

UNDER CONTRACT DE-SC0012704

**Instrument Readiness Review (IRR)**  
**for**  
**22-IR Frontier Infrared Spectroscopy (FIS) and**  
**Magnetic, Ellipsometric and Time-resolved (MET) Beamlines**

**Tailored Review Plan**

OCTOBER 5, 2018

**PREPARED BY:**

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X 

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**APPROVED BY:**

10/10/2018

X John Hill

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John Hill  
NSLS-II Director  
Signed by: Hill, John

By approving this plan I acknowledge the requirements set forth herein and agree with its implementation.

**REVISION HISTORY**

<b>REVISION</b>	<b>DESCRIPTION</b>	<b>LIST OF REVIEWERS</b>	<b>DATE</b>
1	First Issue	J. Adams L. Carr E. Johnson R. Lee S. Wilkins Z. Liu	05OCT2018

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**ACRONYMS**

ARR	Accelerator Readiness Review
ATS	Action Tracking System
BNL	Brookhaven National Laboratory
EPS	Equipment Protection System
ESH	Environment, Safety & Health
FIS	Frontier Infrared Spectroscopy
IRP	Instrument Readiness Plan
IRR	Instrument Readiness Review
MET	Magnetic, Ellipsometric and Time-resolved
NSLS-II	National Synchrotron Light Source II
UHVOE	Ultra-High Vacuum Optical Extractor

## 1.0 INTRODUCTION

Processes for performing Accelerator Readiness Reviews (ARRs) and Instrument Readiness Reviews (IRRs) have been established for transitioning NSLS-II additions and modifications from construction and installation to readiness for commissioning. These processes include the *NSLS-II Process Description: Review Process for Facility Additions and Modifications* (PS-C-CMD-PLN-001), the *NSLS-II Process Description for performing IRRs* (NSLSII-DPT-PDN-008) and the BNL Accelerator Safety Subject Area requirements for Accelerator Readiness Reviews.

This document provides the strategy for review of the FIS and MET beamlines. These are new infrared beamlines at 22IR. This Tailored Review Plan meets the requirements established in the NSLS-II IRR Process Description and the BNL Accelerator Safety Subject Area.

This plan will assure readiness to commission the FIS/MET instrumentation from source to end-station. As these are infrared beamlines, the optics within the storage ring tunnel and on the experimental floor differ from the x-ray lines. Instead of a front end, light is extracted with the Ultra-High Vacuum Optical Extractor (UHVOE) that is designed to transmit only non-ionizing synchrotron beams from the storage ring. No ionizing radiation is reflected from the mirror system of the UHVOE to the experimental floor side of the storage ring enclosure. Optics on the experimental floor are housed in cabins (unshielded enclosures) rather than x-ray hutches and manage only non-ionizing synchrotron light.

## 2.0 REVIEW PROCESS TAILORING AUTHORITY

The *NSLS-II Process Description: Review Process for Facility Additions and Modifications* (PS-C-CMD-PLN-001) provides the basis for tailoring the review process for an NSLS-II facility addition or modification project and identifies the NSLS-II Director as the approval authority. The process description allows the Cognizant Scientist or Engineer, or the Project Manager, to propose a tailored review process to the NSLS-II Director for approval. Once approved, the tailored review process is documented and used for the project or the remaining activities under the project.

## 3.0 TAILORED REVIEW READINESS SCOPE

The scope of this Tailored Review includes the UHVOE mechanical system, mechanical utilities, control system, EPS and shielding systems. The UHVOE system includes a new custom dipole chamber, with infra-red extraction ports, a system of mirrors, M1 – M7, the

vacuum system, controls and EPS, and supplemental shielding of the new orthogonal ratchet wall penetration.

#### **4.0 TAILORED REVIEW READINESS PROCESS**

Analysis of the risks presented indicates that readiness to begin technical commissioning at the FIS and MET beamlines is best managed in two phases. Readiness for the UHVOE will be reviewed independently through development of an Instrument Readiness Plan (IRP). The standard IRP template customized to the UHVOE circumstance will be used and owners will affirm that their systems are ready for safe commissioning to begin. Review for the UHVOE will be managed with an IRR team in conformance with the process description referenced above.

UVOHE IRP specific criteria include:

- Analysis of the orthogonal ratchet wall penetration supplemental shielding design and configuration control
- Analysis of the non-ionizing radiation hazard
- Development of a commissioning plan that includes radiation measurement requirements
- Readiness for controls, equipment protection, vacuum, utilities and electrical power distribution

Readiness for the optics on the experiment floor will be reviewed subsequent to completion of the UHVOE IRR and managed as prescribed in the NSLS-II procedure for Experiment Safety Review (NSLSII-ESH-PRC-005), development of a commissioning plan and development of a Standard Operating Procedure with the BNL Laser Safety Officer will be included.

#### **5.0 REVIEW TEAM CHARGE**

The Review Team will be charged to interview personnel, review documents and inspect installed equipment. The Review Team will verify systems readiness and identify findings to be managed within the NSLS-II Family Action Tracking System (ATS). A final, written report will be generated to document review specifics and findings.

[If you have any questions or feedback regarding this document, please click this link.](#)