

NEXT Project

(NEXT: NSLS-II EXperimental Tools)

Risk Registry Report

July 2015



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This Risk Registry Report contains a collection of the risk documents which define the Risk Registry. In order to report, track and closeout risks, a risk entry form is used to capture each High, Medium or Low risk and is updated by the owners of the risk as the risk assessment, handling, and monitoring functions are executed.

The Risk Registry Report is a dynamic document throughout the life of the project and is maintained and updated by the NEXT Project Manager(s) as required based on the addition and update of high, medium and low risks.

Table 1. Risk Likelihood (Probability) Categories

Likelihood Category	Definition	Weighting
Very Likely (V)	Risk is likely to occur with a probability $\geq 90\%$	90%
Likely (L)	Risk is likely to occur with a probability $\geq 50\%$ and $< 90\%$	70%
Unlikely (U)	There is $< 50\%$ chance that this event will occur	50%

Table 2. Risk Consequence (Impact) Categories

Consequence Category	Definition		
	Cost: Impact on project contingency	Schedule: Impact on project schedule	Technical: Impact on performance
Marginal (M)	< \$200K	None	Minor degradation, Performance falls below upper end of goal; Project completion date can still be met
Significant (S)	\$200K-1000K	Impacts Level 0, 1, or 2 milestones defined in PEP	Moderate performance shortfall, but workarounds available; Performance falls below mid-range goal
Critical (C)	> \$1000K	Impacts early finish milestones	Project completion date will not be met (essential performance parameter not met)

Table 3. Risk Categorization Matrix (Risk Rating)

Probability	Impact		
	Marginal	Significant	Critical
Very likely	Medium	High	High
Likely	Low	Medium	High
Unlikely	Low	Low	Medium

Additional low-impact (up to \$200k) and low probability (less than 10%) risks are listed in the NEXT LOW Risk Registry.

Further content in this report is organized into the following sections:

- Overall summary table, indicating risk values and update status
- NEXT Risk Registry Summary
- NEXT Risk Registry Entries Detail
- NEXT LOW Risk Registry Summary
- NEXT LOW Risk Registry Entries Detail
- Risk Registry Report Addendum (overall risk assessment and tables of values for risks by WBS)

NEXT Risk Registry Update Summary

Jul. 23, 2015

Risk ID	Title	Record Date	Current Risk Value	Date to Complete	Value Retired*	Factors Affecting Update	Risk Rating
NEXT-01	Underestimated effort	Jul. 23, 2015	\$1.039 M	Sep-16	-\$0.170 M	support for endstation controls, FXI hutch test	High
NEXT-02	Delay in appropriations occurring on October 1 of each year	July 10, 2012	\$1.200 M	Jan-16	\$0.000 M		High
NEXT-03	Directed Funding Profile Change	July 10, 2012	\$4.800 M	Feb-16	\$0.000 M		High
NEXT-04	Higher-than-expected worldwide demand for beamline components	Jul. 23, 2015	\$0.483 M	May-16	\$0.050 M	schedule progress (endstations)	High
NEXT-05	Higher-than-expected optic quality required	Mar. 27, 2015	\$0.000 M	Mar-15	\$0.000 M		Retired
NEXT-06	Required optic quality is closer to state-of-the-art than expected	Mar. 27, 2015	\$0.000 M	Jan-15	\$0.000 M		Retired
NEXT-07	Underperforming equipment brought from NSLS	Mar. 27, 2015	\$0.050 M	Jun-15	\$0.000 M		Low
NEXT-08	Design Changes	Jul. 23, 2015	\$0.277 M	Jan-16	\$0.438 M	additional requirements identified in common systems (2.3)	Medium
NEXT-09	Changes to EESE requirements/designs	Jul. 16, 2014	\$0.000 M	Feb-14	\$0.000 M		Retired
NEXT-10	Higher-than-expected thermal deformation of optics	Mar. 27, 2015	\$0.000 M	Dec-14	\$0.000 M		Retired
NEXT-11	Underestimated endstation component costs	Jul. 23, 2015	\$0.425 M	Oct-15	\$0.100 M	design and procurement progress	Medium
NEXT-12	Personnel recruitment delays	Nov. 12, 2014	\$0.100 M	Oct-15	\$0.000 M		Low
NEXT-13	Higher-than-expected inflation rate	Jul. 23, 2015	\$0.236 M	Jan-16	\$0.051 M	project completion	Low
NEXT-14	Accidents and injuries	July 10, 2013	\$0.400 M	Sep-16	\$0.000 M		Low
NEXT-15	Limited availability of specialized effort	Jul. 23, 2015	\$0.306 M	Sep-16	\$0.054 M	data storage defined; utilities largely complete	Low
NEXT-16	Market-driven price fluctuations	Jul. 23, 2015	\$0.000 M	Jul-15	\$0.200 M	magnetic materials procurements complete	Retired
NEXT-17	Late installation of EESEs	Nov. 12, 2014	\$0.000 M	Nov-14	\$0.000 M		Retired
NEXT-18	Insufficient mechanical stability of optical components	Jul. 23, 2015	\$0.340 M	Sep-15	\$0.090 M	beamlines identifying approaches to possible stability issues	Medium
NEXT-19	Late installation of Utilities, PPS, and EPS	Jul. 23, 2015	\$0.065 M	Oct-15	\$0.010 M	budget and staff in place, progress underway	Low
NEXT-20	Installation of beamlines during facility commissioning/studies	Jul. 16, 2014	\$0.000 M	Oct-14	\$0.000 M		Retired
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements	Mar. 27, 2015	\$0.500 M	May-16	\$0.000 M		Medium
NEXT-22	Insertion Device and Front End installation scope not funded by NSLS-II Operations as planned	Jul. 23, 2015	\$0.000 M	Jul-15	\$0.600 M	all install effort now in project baseline	Retired

*Relative to Mar. 27, 2015 assessment

NEXT Risk Registry - Summary

Monday, August 24, 2015

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Risk ID	Title	Record Date	Owner title	Risk Rating	Approval Status
NEXT-01	Underestimated effort	Jul. 23, 2015	Project Manager	High	Approved
NEXT-02	Delay in appropriations occurring on October 1 of each year	July 10, 2012	Federal Project Director	High	Approved
NEXT-03	Directed Funding Profile Change	July 10, 2012	Federal Project Director	High	Approved
NEXT-04	Higher-than-expected worldwide demand for beamline components	Jul. 23, 2015	Level 2 Managers for Beamlines	High	Approved
NEXT-05	Higher-than-expected optic quality required	Mar. 27, 2015	Level 2 Managers for Beamlines	Retired	Approved
NEXT-06	Required optic quality is closer to state-of-the-art than expected	Mar. 27, 2015	Level 2 Managers for Beamlines	Retired	Approved
NEXT-07	Underperforming equipment brought from NSLS	Mar. 27, 2015	Level 2 Managers for impacted beamlines	Low	Approved
NEXT-08	Design Changes	Jul. 23, 2015	Level 2 Managers	Medium	Approved
NEXT-09	Changes to EESE requirements/designs	Jul. 16, 2014	Level 2 Managers	Retired	Approved
NEXT-10	Higher-than-expected thermal deformation of optics	Mar. 27, 2015	Level 2 Managers for Beamlines	Retired	Approved
NEXT-11	Underestimated endstation component costs	Jul. 23, 2015	Level 2 Managers for Beamlines	Medium	Approved
NEXT-12	Personnel recruitment delays	Nov. 12, 2014	Project Manager	Low	Approved
NEXT-13	Higher-than-expected inflation rate	Jul. 23, 2015	Project Manager	Low	Approved
NEXT-14	Accidents and injuries	July 10, 2013	ESH Manager	Low	Approved
NEXT-15	Limited availability of specialized effort	Jul. 23, 2015	Project Manager	Low	Approved
NEXT-16	Market-driven price fluctuations	Jul. 23, 2015	Level 2 Manager for Insertion Devices	Retired	Approved
NEXT-17	Late installation of EESEs	Nov. 12, 2014	Level 2 Manager for Common Systems	Retired	Approved
NEXT-18	Insufficient mechanical stability of optical components	Jul. 23, 2015	Level 2 Managers for Beamlines, Common Systems, and Controls	Medium	Approved
NEXT-19	Late installation of Utilities, PPS, and EPS	Jul. 23, 2015	Level 2 Manager for Common Systems	Low	Approved
NEXT-20	Installation of beamlines during facility commissioning/studies	Jul. 16, 2014	Level 2 Managers	Retired	Approved
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements	Mar. 27, 2015	Level 2 Manager for Insertion Devices	Medium	Approved
NEXT-22	Insertion Device and Front End installation scope not funded by NSLS-II Operations as planned	Jul. 23, 2015	Level 2 manager for ID and FE installation	Retired	Approved

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-01	Underestimated effort	2.0 NEXT Project	Jul. 23, 2015

Description:

Condition: Underestimated effort: technical engineering and design issues prove to be more challenging than anticipated; Level 2 management effort greater than estimated.

Consequence: Additional labor required, increasing cost.

July 2013 Breakdown by WBS

13% : Common Systems WBS 2.03.[01..04]
10% : Beamline Controls WBS 2.04.02
2% : FXI beamline design WBS 2.06.02.[01,03]
15% x 5 : 5 base scope beamlines PDS & endstation WBS 2.[05,07..10].02.[01,03]

October 2013 Breakdown by WBS

13% : Common Systems WBS 2.03.[01..04]
10% : Beamline Controls WBS 2.04.02
2% : FXI beamline design WBS 2.06.02.[01,03]
12% x 5 : 5 base scope beamlines PDS& endstation WBS 2.[05,07..10].02.[01,03]
2.5% x 6 : Beamline Management, WBS 2.[05-10].01

February 2014 Breakdown by WBS

Common Systems
2.03.01: \$222k (utilities)
2.03.[02,03]: \$111k each (PPS, EPS)
2.03.04: \$37k (control station)
Beamline Controls
2.04.02: \$370k (design & implement)
FXI beamline (design)
2.06.02.[01,02]: \$37k each
5 base scope beamlines PDS & endstation
2.[05,07..10].02.01: \$259k -> \$130k each
2.[05,07..10].02.03: \$185k each
Beamline Management (6 beamlines)
2.[05-10].01: \$92.5k each

November 2014 Breakdown by WBS

Common Systems ->\$0 (risk hit; significant labor added to EAC)
Beamline Controls (2.04.02): \$100k
FXI beamline (design, 2.06.02.[01,02]): \$0 (base scope complete)
5 base scope beamlines PDS, endstation, and management:
ESM. 2.05.02.01: \$65k, 2.05.02.03: \$93k, 2.05.01: \$0
ISR. 2.07.02.01: \$32k, 2.07.02.03: \$45k, 2.07.01: \$23k
ISS. 2.08.02.01: \$93k, 2.08.02.03: \$132k, 2.08.01: \$65k
SIX. 2.09.02.01: \$16k, 2.09.02.03: \$23k, 2.09.01: \$11k
SMI. 2.10.02.01: \$32k, 2.10.02.03: \$45k, 2.10.01: \$23k

March 2015 Breakdown by WBS

Reduction in PDS of ESM& ISS, ES of ISS, and increase in enclosures for ISS & ISR plus risk on new 2.12 scope.
Beamline Controls (2.04.02): \$100k
ESM. 2.05.02.01: \$30k, 2.05.02.03: \$93k
ISR. 2.07.02.01: \$32k, 2.07.02.03: \$45k, 2.07.02.02: \$10k, 2.07.01: \$23k
ISS. 2.08.02.01: \$60k, 2.08.02.03: \$100k, 2.08.02.02: \$10k, 2.08.01: \$65k
SIX. 2.09.02.01: \$16k, 2.09.02.03: \$23k, 2.09.01: \$11k
SMI. 2.10.02.01: \$32k, 2.10.02.03: \$45k, 2.10.01: \$23k
ID/FE install. 2.12.01 \$2k, 2.12.02 \$74k, 2.12.03 \$75k

July 2015 Breakdown by WBS

Beamline Controls (2.04.02): \$100k->\$250k (~1FTE additional need possible to complete endstations)
FXI. 2.06.02.02: \$0 ->\$20k (possible additional hutch test effort)
No change in other areas:
Common Systems. 2.03 \$0
ESM. 2.05.02.01: \$30k, 2.05.02.03: \$93k
ISR. 2.07.02.01: \$32k, 2.07.02.03: \$45k, 2.07.02.02: \$10k, 2.07.01: \$23k
ISS. 2.08.02.01: \$60k, 2.08.02.03: \$100k, 2.08.02.02: \$10k, 2.08.01: \$65k

NEXT Risk Registry - Risk Entries

SIX. 2.09.02.01: \$16k, 2.09.02.03: \$23k, 2.09.01: \$11k
 SMI. 2.10.02.01: \$32k, 2.10.02.03: \$45k, 2.10.01: \$23k
 ID/FE install. 2.12.01 \$2k, 2.12.02 \$74k, 2.12.03 \$75k

Probability:	Impact:	Risk Rating:
Likely	Critical Schedule: up to 8 months == \$3.2M 10/10/2013 added: underestimated beamline management risk = \$0.5M ->Total assessed risk = \$3.7M 2/5/2014 retired 129k from each of 2.[05,07..10].02.01 (total retired: \$645k) ->Total assessed risk = \$3.055M 11/12/2014 retired total \$2.26M per CAM input and comprehensive EAC -> Total assessed risk = \$798k 3/27/2015 added net \$71k per CAM input -> Total assessed risk = \$869k 6/23/2015 added net \$170k per CAM input -> Total assessed risk = \$1039k	High

Mitigation Approaches:

Provide additional labor.

Date Started:	Date to Complete:	Owner:
Jan-12	Sep-16	Project Manager S. Hulbert

Current Status:

2/27/2013 Update the schedule impact, reduced from 10 months to 8 months. Risk rating remains high.
10/10/2013 Added \$0.5M schedule risk for possible underestimated beamline management effort, WBS 2.[05-10].01, for total assessed risk of \$3.7M. Risk rating remains high. Renormalized WBS breakdown shown in Description text box above.
2/5/2014 Retired \$0.645M risk based upon 50% completion of PDS design for 5 base scope beamlines (WBS 2.[05,07-10].02.01 (as given in Description field), for total assessed risk of \$3.055M. Risk rating remains High.
7/16/14 No reduction. Identified refinement of PDS and endstation plans for beamlines as candidate retirement strategy.
11/12/14 Reductions based on revised risk estimates (all CAMs) as well as labor costs included in annual bottoms-up EAC.
3/27/15 Reductions and additions with net increase, dominated by risk on added 2.12 scope.
7/23/15 Additions in 2.04 and 2.06, no reductions elsewhere since March. Rating increased from Medium to High, completion date extended to September 2016.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-02	Delay in appropriations occurring on October 1 of each year	2.0 NEXT Project	July 10, 2012

Description:

Condition: Until project reaches its peak year funding, CR will impact the performance baseline both cost and schedule unless there is an intervention by DOE sponsor.

Consequence: Schedule delay(s), leading to cost increase(s).

Probability:	Impact:	Risk Rating:
Very Likely	Critical Schedule: up to 5 months == \$1.2M	High

Mitigation Approaches:

Perform impact analysis for various scenarios and inform DOE. Get direction from DOE as early as possible.

Date Started:	Date to Complete:	Owner:
Jan-12	Jan-16	Federal Project Director Robert Caradonna

Current Status:

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-03	Directed Funding Profile Change	2.0 NEXT Project	July 10, 2012

Description:

Condition: Revision to baseline scope/schedule and/or budget, resulting in potential increase in cost of project

Consequence: Schedule delay(s) and/or reduced funding.

Probability:	Impact:	Risk Rating:
Likely	Critical Schedule: up to 12 months == \$4.8M	High

Mitigation Approaches:

Revise baseline to minimize cost and schedule impacts.

Date Started:	Date to Complete:	Owner:
Jan-12	Feb-16	Federal Project Director Robert Caradonna

Current Status:

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-04	Higher-than-expected worldwide demand for beamline components	2.05 - 2.10 Beamlines (Photon Delivery Systems and Endstation Optics)	Jul. 23, 2015

Description:

Condition: Increased worldwide demand for beamline and endstation components that are offered by a small number of vendors. Resulting procurement delays.

Consequence: Delays in installation and testing of photon delivery system components, possibly delaying beamline completion.

Initial Breakdown by WBS:

20% x 5 : 5 base scope beamlines PDS & endstation
2.[05,07..10].02.01: \$156k each
2.[05,07..10].02.03: \$84k each
(total optics scope: \$240k each)

February 2014 Breakdown by WBS:

Retirement of \$140k total from PDS based upon establishment of schedule upon contract award:
2.05.02.01 (ESM): 2 RFQ's awarded constituting ~11% of total optics scope (17% of PDS).
Proportional retirement of initial risk value (\$27k) results in \$156k -> \$129k.
2.08.02.01 (ISS): 1 RFQ awarded constituting ~5% of total optics scope (8% of PDS).
Proportional retirement of initial risk value (\$12k) results in \$156k -> \$144k.
2.09.02.01 (SIX): 2 RFQ's awarded constituting ~10% of total optics scope (15% of PDS).
Proportional retirement of initial risk value (\$23k) results in \$156k -> \$133k.
2.10.02.01 (SMI): 1 RFP awarded constituting ~33% of total optics scope (50% of PDS).
Proportional retirement of initial risk value (\$78k) results in \$156k -> \$78k.
2.07.02.01 (ISR): \$156k remains
2.[05,07..10].02.03: \$84k each remains

July 2014 Breakdown by WBS:

Retirement of \$245k total from PDS based upon establishment of schedule upon contract award:
2.05.02.01 (ESM): mono and rulings awarded, raising awarded fraction to 47% of PDS.
Proportional retirement of initial risk value results in \$156k -> \$129k -> \$83k.
2.07.02.01 (ISR): optics package awarded, raising awarded fraction to 70% of PDS.
Proportional retirement of initial risk value results in \$156k -> \$47k.
2.08.02.01 (ISS): mono awarded, raising awarded fraction to 37% of PDS.
Proportional retirement of initial risk value results in \$156k -> \$144k -> \$98k.
2.09.02.01 (SIX): mono and spectrometer grating substrates awarded, raising awarded fraction to 43% of PDS.
Proportional retirement of initial risk value results in \$156k -> \$133k -> \$89k.
2.10.02.01 (SMI): No change. Award-proportional risk value remains at \$156k -> \$78k (50% awarded includes white beam optics package only).
2.[05,07..10].02.03: \$84k each remains (endstations)

November 2014 Breakdown by WBS:

Retirement of \$132k total (in ISS), leaving:
2.05.02.01 (ESM): \$83k, 2.05.02.03: \$84k
2.07.02.01 (ISR): \$47k, 2.07.02.03: \$84k
2.08.02.01 (ISS): \$25k, 2.08.02.03: \$25k
2.09.02.01 (SIX): \$89k, 2.09.02.03: \$84k
2.10.02.01 (SMI): \$78k, 2.10.02.03: \$84k

March 2015 Breakdown by WBS:

Reductions in ESM, ISS, and SMI due to procurement progress, leaving:
2.05.02.01 (ESM): \$50k, 2.05.02.03: \$20k
2.07.02.01 (ISR): \$47k, 2.07.02.03: \$84k
2.08.02.01 (ISS): \$25k, 2.08.02.03: \$0
2.09.02.01 (SIX): \$89k, 2.09.02.03: \$84k
2.10.02.01 (SMI): \$50k, 2.10.02.03: \$84k

July 2015 Breakdown by WBS:

Reductions in ISR and SMI (endstations) due to procurement progress, leaving:
2.05.02.01 (ESM): \$50k, 2.05.02.03: \$20k
2.07.02.01 (ISR): \$47k, 2.07.02.03: \$50k
2.08.02.01 (ISS): \$25k, 2.08.02.03: \$0
2.09.02.01 (SIX): \$89k, 2.09.02.03: \$84k
2.10.02.01 (SMI): \$50k, 2.10.02.03: \$68k

NEXT Risk Registry - Risk Entries

Probability:	Impact:	Risk Rating:
Very Likely	Significant	High
<p>Initial Assessment: Schedule: up to 3 months == \$1.2M 2/5/2014 retired \$140k from 2.[05,08,09,10].02.01 ->Total assessed risk = \$1.06M 7/16/2014 retired \$245k from 2.[05,07,08,09].02.01 Updated Assessment: This risk may impact both schedule and cost ->Total assessed risk = \$815k 11/12/2014 retired \$132k from 2.08.02. Remaining risk captures ~ 3 mo. of possible schedule delay per beamline ->Total assessed risk = \$683k 3/27/2015 Remaining risk captures ~ 2 mo. of possible schedule delay per beamline ->Total assessed risk = \$533k 7/23/2015 Remaining risk captures ~ 1.5 mo. of possible schedule delay per beamline ->Total assessed risk = \$483k</p>		

Mitigation Approaches:

Complete designs, arrive at specifications, and order these items as early as possible. Closely monitor supplier activities in support of contractual delivery.

Date Started:	Date to Complete:	Owner:
Jan-12	May-16	Level 2 Managers for Beamlines E. Vescovo, W.-K. Lee, C. Nelson, K. Attenkofer, I. Jarrige, E. DiMasi

Current Status:

2/5/2014 Retired \$140k total risk based upon optics award completion described in Description text box above. Total assessed risk is now \$1.06M. Risk rating remains High.
7/16/2014 Retired \$245k total risk based upon optics award completion described in Description text box above. Total assessed risk is now \$815k. Risk rating remains High. Further reduction anticipated upon award of endstation equipment.
11/12/2014 Retired \$132k total risk from ISS PDS and ES based upon optics award completion. Total assessed risk is now \$683k. Risk rating remains High. Completion date extended to Jan 2016 to coincide with latest optics delivery; some early reduction may be possible based on delivery and/or vendor fabrication and test status.
3/27/2015 Retired risk from ESM, ISS and SMI based upon optics award completion and vendor status. Total assessed risk is now \$533k. Risk rating remains High.
7/23/2015 Retired risk from ISR and SMI based upon endstation award completion and vendor status. Total assessed risk is now \$483k. Risk rating remains High. Completion expected by May 2016.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-05	Higher-than-expected optic quality required	2.05 - 2.10 Beamline Optics (Photon Delivery Systems and Endstations)	Mar. 27, 2015

Description:

Condition: Required figure and finish quality of mirrors might be more demanding than is captured in current design. That is, immature design analysis.

Consequence: Revisions to optical design and/or changes to the optical and/or mechanical specifications of the photon delivery system components.

July 2013 (\$2.0M total) Breakdown by WBS:

13% x 5 : 5 base scope beamlines PDS WBS 2.[05,07..10].02.01 (\$260k each, \$1.3M total)

5% : ISR endstation optics WBS 2.07.02.03 (\$100k)

25% : SIX endstation optics WBS 2.09.02.03 (\$500k)

5% : SMI endstation optics WBS 2.10.02.03 (\$100k)

October 2013 (\$1.2M total) Breakdown by WBS:

~8.3% x 5 : 5 base scope beamlines PDS WBS 2.[05,07..10].02.01 (\$100k each, \$0.5M total)

~8.3% : ISR endstation optics WBS 2.07.02.03 (\$100k)

~41.7% : SIX endstation optics WBS 2.09.02.03 (\$500k)

~8.3% : SMI endstation optics WBS 2.10.02.03 (\$100k)

July 2014 (\$0.7M total) Breakdown by WBS:

Owing to maturity of optical design, all PDS and SIX endstation cost risks are reduced:

5 base scope beamlines PDS WBS 2.[05,07..10].02.01 (\$100k ->\$50k each, \$0.25M total)

ISR endstation optics WBS 2.07.02.03 (\$100k)

SIX endstation optics WBS 2.09.02.03 (\$500k->\$250k)

SMI endstation optics WBS 2.10.02.03 (\$100k)

November 2014 (\$70k total) Breakdown by WBS:

Owing to maturity of optical design, PDS and endstation optics risk is almost completely retired (quality requirements now largely known):

ESM: PDS risk fully retired.

ISS: PDS risk fully retired.

ISR: PDS& ES risk fully retired.

SMI: PDS& ES risk fully retired.

SIX: risk reduced to \$12k PDS (2.09.02.01), \$58k ES (2.09.02.03).

March 2015:

Owing to maturity of optical design, PDS and endstation optics risk is now completely retired (quality requirements known).

Probability:	Impact:	Risk Rating:
Likely	Marginal Cost: up to \$2.0M 10/15/2013 update (see Status for detail): Cost: up to \$1.2M 7/16/2014 updated cost: up to \$0.7M 11/12/2014 updated value: up to \$0.07M 3/27/2015 retired (\$0 value)	Retired

Mitigation Approaches:

Complete optical design and analysis, and revise specifications as needed, as early as possible.

Date Started:	Date to Complete:	Owner:
Jan-12	Mar-15	Level 2 Managers for Beamlines E. Vescovo, W.-K. Lee, C. Nelson, K. Attenkofer, I. Jarrige, E. DiMasi

Current Status:

NEXT Risk Registry - Risk Entries

2/27/2013 Update the cost impact, reduced from \$3M to \$2M due to much progress made in design over last few months. Risk rating remains high.

10/10/2013 Reduced photon delivery system cost impact from 65% of \$2.0M = \$1.3M to 25% of \$2.0M = \$0.5M, i.e. a reduction of \$0.8M, owing to substantial progress having been made in the design of the optics for all NEXT beamline photon delivery systems, WBS 2.[05-10].02.01. Updated total assessed risk = \$1.2M. Risk rating remains high. Renormalized WBS breakdown shown in Description text box above.

2/5/2014 Extended completion date from Oct 2013 to Oct 2014 to follow beamline and endstation final design milestones.

7/16/2014 Reduced impact based on optical design maturity (see Description field). Further reduction expected upon finalization of PDS and endstation designs.

11/12/2014 Reduced impact based on optical design maturity (see Description field). Retirement expected upon finalization of PDS and endstation designs in SIX (extend to Dec 2014).

3/27/2015 Retired risk based on optical design maturity. Finalization of PDS and endstation designs in SIX complete.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-06	Required optic quality is closer to state-of-the-art than expected	2.05 - 2.10 Beamline Optics (Photon Delivery Systems and Endstations)	Mar. 27, 2015

Description:

Condition: The required figure and finish quality of some photon delivery system optics is at the limit of what is possible to manufacture today, i.e. at the current state-of-the-art.

Consequence: Only a limited number of companies will be able to meet the specifications for these optical elements, increasing cost and lengthening delivery time.

Initial Breakdown by WBS:

16% x 5 : 5 base scope beamlines PDS WBS 2.[05,07..10].02.01 (\$160k each)
 3% : ISR endstation optics WBS 2.07.02.03 (\$30k)
 14% : SIX endstation optics WBS 2.09.02.03 (\$140k)
 3% : SMI endstation optics WBS 2.10.02.03 (\$30k)

February 2014 Breakdown by WBS:

Retirement of \$144k total from PDS based upon establishment of feasibility from contract award:
 2.05.02.01 (ESM): 2 RFQ's awarded constituting ~17% of PDS optics scope.
 Proportional retirement of initial risk value (\$28k) results in \$160k -> \$132k.
 2.08.02.01 (ISS): 1 RFQ awarded constituting ~8% of PDS optics scope.
 Proportional retirement of initial risk value (\$12k) results in \$160k -> \$148k.
 2.09.02.01 (SIX): 2 RFQ's awarded constituting ~15% of PDS optics scope.
 Proportional retirement of initial risk value (\$24k) results in \$160k -> \$136k.
 2.10.02.01 (SMI): 1 RFP awarded constituting ~50% of PDS optics scope.
 Proportional retirement of initial risk value (\$80k) results in \$160k -> \$80k.
 2.07.02.01 (ISR PDS): \$160k remains
 2.07.02.03 (ISR ES): \$30k remains
 2.09.02.03 (SIX ES): \$140k remains
 2.10.02.03 (SMI ES): \$30k remains

July 2014 Breakdown by WBS:

Reduction by \$251k total from PDS based upon establishment of feasibility from contract award:
 2.05.02.01 (ESM): Total 47% PDS optics awarded.
 Proportional retirement of initial risk value results in \$160k -> \$132k -> \$85k.
 2.07.02.01 (ISR): Total 70% PDS optics awarded.
 Proportional retirement of initial risk value results in \$160k -> \$48k.
 2.08.02.01 (ISS): Total 37% PDS optics awarded.
 Proportional retirement of initial risk value results in \$160k -> \$148k -> \$101k.
 2.09.02.01 (SIX): Total 43% PDS optics awarded.
 Proportional retirement of initial risk value results in \$160k -> \$136k -> \$91k.
 2.10.02.01 (SMI): Total 50% PDS optics awarded.
 Proportional retirement of initial risk value results in \$160k -> \$80k (no change).
 2.07.02.03 (ISR ES): \$30k remains
 2.09.02.03 (SIX ES): \$140k remains
 2.10.02.03 (SMI ES): \$30k remains

November 2014 Breakdown by WBS:

Reduction by \$417k to \$188k total from PDS and ES based upon establishment of costs from contract awards:
 2.05.02.01 (ESM) \$85k ->\$40k
 2.07.02.01 (ISR): \$48k (no change)
 2.08.02.01 (ISS): \$101k ->\$50k
 2.09.02.01 (SIX): \$91k ->\$8k
 2.10.02.01 (SMI): \$80k -> \$0
 2.07.02.03 (ISR ES): \$30k remains
 2.09.02.03 (SIX ES): \$140k ->\$12k
 2.10.02.03 (SMI ES): \$30k ->\$0

March 2015:

Retired based upon establishment of costs from contract awards.

Probability:	Impact:	Risk Rating:
Likely	Marginal Cost: up to \$1.0M 2/5/2014 retired \$144k from 2.[05,08,09,10].02.01	Retired

NEXT Risk Registry - Risk Entries

->Total assessed risk = \$856k
7/16/2014 retired \$251k from 2.[05,07,08,09].02.01
->Total assessed risk = \$605k
11/12/2014 retired \$417k from PDS, ES areas
->Total assessed risk (cost) = \$188k
3/27/2015 retired completely
->Total assessed risk (cost) = \$0

Mitigation Approaches:

Arrive at technical specifications early in the project, obtain long lead procurement approval early, and hold adequate cost contingency.

Date Started:	Date to Complete:	Owner:
Jan-12	Jan-15	Level 2 Managers for Beamlines E. Vescovo, W.-K. Lee, C. Nelson, K. Attenkofer, I. Jarrige, E. DiMasi

Current Status:

2/27/2013 Update the cost impact, reduced from \$1.8M to \$1M due to progress made in design and updated information on qualified vendors and market survey over last few months. Risk impact lowered to significant.

2/5/2014 Retired total of \$144k based upon awards, as indicated in the Description text box above. Updated total assessed risk value is \$856k; Risk impact remains significant.

7/16/2014 retired \$251k based upon awards, as indicated in the Description text box above. Updated total assessed risk value is \$605k; Risk impact remains significant. Further reduction forthcoming in endstation areas.

11/12/2014 retired \$417k based upon awards, as indicated in the Description text box above. Updated total assessed risk value is \$188k; Risk impact now marginal, update due Jan 2015.

3/27/2015 Retired.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-07	Underperforming equipment brought from NSLS	2.05 - 2.10 Beamline Endstation Equipment	Mar. 27, 2015

Description:

Condition: Equipment transferred from NSLS beamlines may not perform to required specifications.

Consequence: Need to upgrade or replace endstation equipment transferred from NSLS, requiring additional endstation design effort and increasing cost.

Initial Breakdown by WBS:

30% : ESM endstation WBS 2.05.02.03 (\$450k)

40% : ISR endstation WBS 2.07.02.03 (\$600k)

30% : SMI endstation optics WBS 2.10.02.03 (\$450k)

November 2014 Breakdown by WBS:

ESM endstation WBS 2.05.02.03 \$450k ->\$0

SMI endstation optics WBS 2.10.02.03 \$450k ->\$0

100% : ISR endstation WBS 2.07.02.03 \$600k -> \$300k

March 2015 Breakdown by WBS:

ISR endstation WBS 2.07.02.03 \$300k ->\$50k

Probability:	Impact:	Risk Rating:
Likely	Marginal Cost: up to \$1.5M Nov. 2014: cost impact revised downward, to \$300k (ISR only) Mar. 2015: cost impact revised downward, to \$50k (ISR only)	Low

Mitigation Approaches:

Upgrade NSLS equipment prior to transfer. Put high priority on replacement of these items in the contingency spend plan. Task available technical staff with test of transferred equipment.

Date Started:	Date to Complete:	Owner:
Jan-12	Jun-15	Level 2 Managers for impacted beamlines E. Vescovo, C. Nelson, E. DiMasi

Current Status:

7/16/14: Updated owners list. Retirement anticipated upon addition of upgrade scope to NEXT.

11/12/14: Reduced significant amount of risk due to addition of endstation upgrade scope to NEXT.

3/27/15: Further significant reduction due to successful transfer of equipment from NSLS. Extended completion to June 2015 for test of ISR items.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-08	Design Changes	2.03 - 2.10 Utilities, PPS, EPS, Control Station, NEXT Beamline Photon Delivery Systems and Endstation Equipment, Beamline Controls Systems	Jul. 23, 2015

Description:

Condition: Design changes, resulting from: analysis not yet completed, special requirements, e.g. those yet to be received via user input

Consequence: Additional costs for material and/or labor, and resulting stretched schedules.

July 2013 Breakdown by WBS:

5% : Common Systems WBS 2.03.[01..04]

5% : Beamline Controls WBS 2.04.02

15% x 6 : All beamlines PDS& endstation WBS 2.[05..10].02.[01,03]

October 2013 Breakdown by WBS:

15% : Common Systems WBS 2.03.[01..04]

2.03.01: 6% (\$66k)

2.03.02: 3% (\$33k)

2.03.03: 4.5% (\$49.5k)

2.03.04: 1.5% (\$16.5k)

6% : Beamline Controls WBS 2.04.02 (\$66k)

4% x 6 : All beamlines PDS, WBS 2.[05..10].02.01 (\$44k each)

8% x 5 : All beamlines except SIX endstation, WBS 2.[05..08,10].02.03 (\$88k each)

15% : SIX endstation, WBS 2.09.02.03 (\$165k)

November 2014 Breakdown by WBS:

Common Systems WBS 2.03.[01..04]

2.03.01: \$66k -> \$33k

2.03.02: \$33k (keep)

2.03.03: \$49.5k (keep)

2.03.04: \$16.5k (keep)

Beamline Controls WBS 2.04.02: \$66k (keep)

Beamlines Photon Delivery and Endstation:

ESM PDS (2.5.2.1) \$44k->\$30k; ES (2.5.2.3) \$88k->\$70k

FXI PDS (2.6.2.1) \$44k->\$0; ES (2.6.2.3) \$88k->\$0

ISR PDS (2.7.2.1) \$44k->\$66k; ES (2.7.2.3) \$88k->\$66k

ISS PDS (2.8.2.1) \$44k (keep); ES (2.8.2.3) \$88k (keep)

SIX PDS (2.9.2.1) \$44k->\$0; ES (2.9.2.3) \$165k->\$70k

SMI PDS (2.10.2.1) \$44k->\$0; ES (2.10.2.3) \$88k->\$0

March 2015 Breakdown by WBS:

Common Systems WBS 2.03.[01..04]

2.03.01: \$33k -> \$99k

2.03.02: \$33k -> \$115k

2.03.03: \$49.5k -> \$150k

2.03.04: \$16.5k (keep)

Beamline Controls WBS 2.04.02: \$66k (keep)

Beamlines Photon Delivery and Endstation:

ESM PDS (2.5.2.1) \$30k->\$0; ES (2.5.2.3) \$70k->\$0

FXI PDS (2.6.2.1) \$44k->\$0; ES (2.6.2.3) \$88k->\$0

ISR PDS (2.7.2.1) \$66k->\$0; ES (2.7.2.3) \$66k (keep)

ISS PDS (2.8.2.1) \$44k (keep); ES (2.8.2.3) \$88k (keep)

SIX PDS (2.9.2.1) \$0 (keep); ES (2.9.2.3) \$70k (keep)

SMI PDS (2.10.2.1) \$0 (keep); ES (2.10.2.3) \$0 (keep)

July 2015 Breakdown by WBS:

Common Systems WBS 2.03.[01..04]

2.03.01: \$99k -> \$0

2.03.02: \$115k -> \$0

2.03.03: \$150k -> \$0k

2.03.04: \$16.5k (keep)

Beamline Controls WBS 2.04.02: \$66k (keep)

Beamlines Photon Delivery and Endstation:

NEXT Risk Registry - Risk Entries

ISR PDS (2.7.2.1) \$0; ES (2.7.2.3) \$66k->\$30k
 ISS PDS (2.8.2.1) \$44k (keep); ES (2.8.2.3) \$88k->\$50k
 SIX PDS (2.9.2.1) \$0; ES (2.9.2.3) \$70k (keep)

Probability:	Impact:	Risk Rating:
Likely	Significant Schedule: up to 3 months == \$1.2M Cost: up to \$0.5M Total: up to \$1.7M 10/15/2013 update (see Status for detail): Schedule: up to 2 months == \$0.8M Cost: up to \$0.3M Total: up to \$1.1M 11/12/2014 update: up to \$632k (cost) 3/27/2015 update: up to \$715k (cost) 7/23/2015 update: up to \$277k (cost)	Medium

Mitigation Approaches:

Complete beamline and endstation designs as soon as possible. Obtain external input (Users, Partners, BAT) as early as possible.

Date Started:	Date to Complete:	Owner:
Jan-12	Jan-16	Level 2 Managers C. Stebbins, Z. Yin, E. Vescovo, W.-K. Lee, C. Nelson, K. Attenkofer, I. Jarrige, E. DiMasi

Current Status:

2/27/2013 Update the cost impact, reduced from \$1.5M to \$0.5M due to much progress made in design over last few months. Likelihood assessed as Likely; Risk rating High (> \$1M total impact).

October 2013 Owing to design maturity, reduce beamline portion of this risk from 15% x 6 x \$1.7M = \$1.53M by factor of 2, to \$0.77M; owing to remaining design issues for Common Systems, increase its portion from 5% of \$1.7M = \$0.085M by factor of 2, to \$0.17M. Net change is -\$0.77M + \$0.17M = -\$0.6M, i.e. reduction by \$0.6M, to a total assessed risk of \$1.1M. Apportion this as:
 Schedule: up to 2 months == \$0.8M
 Cost: up to \$0.3M
 Total: up to \$1.1M
 Risk rating High (> \$1M total impact).
 Renormalized WBS breakdown shown in Description text box above.

February 2014 Extended completion date from Oct 2013 to Jan 2016 to cover later changes, particularly in Common Systems, Controls, and Endstations.

July 2014 Updated owner name list to reflect 2.03 CAM assignment. Reductions anticipated upon design completion.

November 2014 Reductions made based upon design completion.

March 2015 Reductions made based upon design completion in beamlines are countered by increases in WBS2.3 (common systems), for a net increase of \$83k. The WBS2.3 increases result from identification of new or revised requirements in the form of additional racks, exhaust equipment/installation, area radiation monitors, PPS-related hutch rework, and revised material requirements for EPS.

July 2015 Reductions in 2.03 made based on incorporation of estimated cost in EAC rather than risk, for items including sprinklers, smoke detectors, emergency power for exhaust, area radiation monitors, additional racks, PPS-related hutch modifications, and additional EPS material. Additional reductions in ISR and ISS endstations due to design maturity.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-09	Changes to EESE requirements/designs	2.05 - 2.10 Beamline Shielded Enclosures	Jul. 16, 2014

Description:

Condition: Changes to enclosure requirements, due to changes in optical design and layout.

Consequence: Re-design of hutches to meet revised requirements.

Breakdown by WBS:

20% x 4 : FXI, ISR, ISS, SMI shielded enclosures WBS 2.[06,07,08,10].02.02 (\$40k each)

10% x 2 : ESM, SIX shielded enclosures WBS 2.[05,09].02.02 (\$20k each)

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Cost: up to \$200k	Retired

Mitigation Approaches:

Complete all optical design activities that affect optical layout and hutch dimensions as early as possible.

Date Started:	Date to Complete:	Owner:
Jan-12	Feb-14	Level 2 Managers C. Stebbins, E. Vescovo, W.-K. Lee, C. Nelson, K. Attenkofer, I. Jarrige, E. DiMasi

Current Status:

2/27/2013 Enclosure final design close to complete. The cost risk is reduced from \$660K (significant) to \$200K (marginal) and risk rating is reduced from Medium to Low (likelihood category changed from Likely to Unlikely).

2/5/2014 Vendor final designs are complete for all base scope enclosures. Cost risk is reduced to zero (risk is retired).

7/16/2014 Updated risk rating to "Retired", and owner name list to reflect 2.03 CAM assignment.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-10	Higher-than-expected thermal deformation of optics	2.05 - 2.10 Beamline Photon Delivery Systems	Mar. 27, 2015

Description:

Condition: Absorbed power distribution on beamline optical elements may degrade the calculated beamline performance to an unacceptable extent. Lack of design maturity compared to the eventual solution. For undulator beamlines, this effect is typically greatest at the lowest photon energies, where the undulator magnetic strength parameter K is greatest.

Consequence: Either a more complicated mechanical design, which increases cost and stretches schedule, or a requirement to add additional filters, which reduces flux and increases cost.

Initial Breakdown by WBS:

20% x 5 : 5 base scope beamlines PDS WBS 2.[05,07..10].02.01 (\$280k each)

February 2014 Breakdown by WBS (several items retired):

- 2.05.02.01 (ESM) \$280k->\$0; (retirement based upon engineering analysis)
- 2.07.02.01 (ISR) \$280k remains (retirement awaiting vendor FEA)
- 2.08.02.01 (ISS) \$280k->\$260k; (\$20k retirement based upon value fraction of high-heatload optics contracts awarded)
- 2.09.02.01 (SIX) \$280k->\$0; (retirement based upon engineering analysis)
- 2.10.02.01 (SMI) \$280k->\$0; (retirement based upon engineering analysis and vendor selection)

July 2014 Breakdown by WBS:

- 2.07.02.01 (ISR) \$280k remains (retirement awaiting vendor FEA)
- 2.08.02.01 (ISS) \$280k->\$260k->\$118k; (\$142k retirement based upon value fraction (58%) of high-heatload optics contracts awarded)

November 2014 Breakdown by WBS:

- 2.07.02.01 (ISR) \$280k->\$56k based on vendor FEA
- 2.08.02.01 (ISS) \$118k->\$50k based upon awards and design for high-heat-load optics (all but filters now complete)

March 2015:

Fully retired, based upon awards and design completion for high-heat-load optics

Probability:	Impact:	Risk Rating:
Likely	Marginal Cost: up to \$1.4M 2/5/2014 retired \$860k total, for net Cost: up to \$540k 7/16/2014 retired \$142k total, for net Cost: up to \$398k 11/12/2014 retired \$292k total, for net Cost: up to \$106k 3/27/2015 retired fully (\$0 value)	Retired

Mitigation Approaches:

Perform the required iterative sequence of optical design/analysis and mechanical engineering, including thermal analysis, as early as possible.

Date Started:	Date to Complete:	Owner:
Jan-12	Dec-14	Level 2 Managers for Beamlines E. Vescovo, W.-K. Lee, C. Nelson, K. Attenkofer, I. Jarrige, E. DiMasi

Current Status:

NEXT Risk Registry - Risk Entries

7/10/2013 Likelihood changed to Likely, Overall rating increased to Significant.

2/5/2014 Retirement of \$860k total risk based upon engineering analysis and awards as described in Description text box above. Total assessed risk is now \$540k. Impact reduced from Critical to Significant; Risk Rating reduced to Medium. Extended completion date from Oct 2013 to July 2014 to follow anticipated schedule for awards, vendor optics analysis, and design reviews.

7/16/14 Reduction of ISS high heatload risk based on fraction of relevant procurement awards. Update of due date from July to August 2014 based on expected completion for ISR PDS (vendor PDR).

11/12/14 Reduction of ISR and ISS high heatload risk based on procurement awards and design completion. Update of due date from Aug. 2014 to Dec. 2014 based on expected completion for remaining items.

3/27/15 Retirement of remaining risk on ISR and ISS optics based on procurement awards and design completion. Now fully retired.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-11	Underestimated endstation component costs	2.05 - 2.10 Beamline Endstation Equipment	Jul. 23, 2015

Description:

Condition: Costs of certain endstation components, e.g. state-of-the-art pixel array detectors and diffractometers with sub-micron sphere of confusion, are not now known.

Consequence: State-of-the-art detectors and diffractometers are needed to achieve the planned world class performance of the NEXT beamlines.

Initial Breakdown by WBS:

20% x 5 : 5 base scope endstations WBS 2.[05,07..10].02.03 (\$320k each)

November 2014 Breakdown by WBS:

ESM (2.5.2.3): \$320k->\$50k

ISR (2.7.2.3): \$320k->\$160k

ISS (2.8.2.3): \$320k (keep)

SIX (2.9.2.3): \$320k->\$150k

SMI (2.10.2.3): \$320k (keep)

March 2015 Breakdown by WBS:

ESM (2.5.2.3): \$50k (keep)

ISR (2.7.2.3): \$160k->\$75k

ISS (2.8.2.3): \$320k->\$100k

SIX (2.9.2.3): \$150k (keep)

SMI (2.10.2.3): \$320k->\$150k

July 2015 Breakdown by WBS:

ESM (2.5.2.3): \$50k (keep)

ISR (2.7.2.3): \$75k->\$25k

ISS (2.8.2.3): \$100k->\$50k

SIX (2.9.2.3): \$150k (keep)

SMI (2.10.2.3): \$150k (keep)

Probability:	Impact:	Risk Rating:
Likely	Significant Cost: up to \$1.6M	Medium
	11/12/2014: Cost impact reduced to \$1.0M	
	3/27/2015: Cost impact reduced to \$525k	
	7/23/2015: Cost impact reduced to \$425k	

Mitigation Approaches:

Monitor price development of advanced commercial detectors and diffractometers. Extrapolate to likely procurement date. Identify cost-effective technical solutions.

Date Started:	Date to Complete:	Owner:
Jan-12	Oct-15	Level 2 Managers for Beamlines E. Vescovo, W.-K. Lee, C. Nelson, K. Attenkofer, I. Jarrige, E. DiMasi

Current Status:

2/27/2013 Likelihood category changed from Unlikely to Likely. Update the cost impact, slightly increased from \$1.5M to \$1.6M (critical). Risk rating **changed from medium to high**.

11/12/2014 Impact reduced based on endstation procurements completion. Risk rating changed from high to medium; completion date extended to May 2015.

3/27/2015 Impact reduced based on endstation procurements completion and inclusion of anticipated cost refinements in EAC. Risk rating remains medium.

7/23/2015 Impact reduced based on endstation procurements completion and inclusion of anticipated cost refinements in EAC. Risk rating remains medium. Completion expected by October 2015.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-12	Personnel recruitment delays	WBS 2.0 NEXT Project	Nov. 12, 2014

Description:

Condition: Schedule delay due to failure to recruit qualified personnel to key positions as planned in the baseline schedule

Consequence: Schedule delays within beamline schedules and/or to project schedule

Initial Breakdown by WBS:

100% : Project Management & Support WBS 2.01.[01,02]
2.01.01: \$600k
2.01.02: \$200k

February 2014 Breakdown by WBS:

Due to staffing maturity, reduce as follows:
2.01.01: \$600k -> \$100k
2.01.02: \$200k -> \$100k

November 2014 Breakdown by WBS:

2.01.01: \$100k -> \$50k
2.01.02: \$100k -> \$50k

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Schedule: up to 2 months == \$0.8M 2/5/2014 reduced to \$200k total 11/12/2014 reduced to \$100k total (C&S)	Low

Mitigation Approaches:

- (1) Aggressively monitor planned versus actual staffing plan
- (2) Conduct focused recruitment program with HR
- (3) Exercise recruitment incentive plan

Date Started:	Date to Complete:	Owner:
Jan-12	Oct-15	Project Manager S. Hulbert

Current Status:

2/27/2013 Update the schedule impact, reduced from months to 2 months due to much progress made staffing ramp-up over last few months. Risk rating remains Low.

2/5/2014 Retired \$600k as indicated in Description field, based on staffing maturity; extended completion date from Dec 2013 to Oct 2015 to reflect latest possible hiring need.

11/12/2014 Retired \$100k, based on staffing maturity and revised impact of shortfall.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-13	Higher-than-expected inflation rate	WBS 2.0 NEXT Project	Jul. 23, 2015

Description:

Condition: Actual inflation rate could be much higher than standard DOE rates used in cost estimate

Consequence: Cost overruns, independent of estimate accuracy

Initial Breakdown by WBS:

Total \$800k applies to all M&S, 4% each across 25 areas:

2.03.[01-04]
2.04.03
2.[05-10].02.[01,03,04]
2.11.[01,02]

February 2014 Breakdown by WBS:

All materials and labor.

Basis for uncertainty is use of 3.2% inflation rate, whereas Labor (40%) could rise to 4.5% (1.3% delta) and Materials (60%) could rise to 4.2% (1.0% delta). Combined uncertainty is thus estimated as 1.12% of work to go. Presently this is \$650k, so \$150k can be retired from earlier \$800k risk value.

July 2014 update:

1.12% of current work to go is \$600k, therefore \$50k risk can be reduced.

November 2014 update:

Observed ~ 1.3% savings in material costs at EAC; This value (\$422k) is taken to indicate cost uncertainty due to change in inflation rate.

March 2015 update:

1.12% of current unobligated work to go is \$287k. Risk is reduced by \$135k.

July 2015 update:

1.12% of current unobligated work to go is \$236k. Risk is reduced by \$51k.

Probability:	Impact:	Risk Rating:
Unlikely	Significant Cost: up to \$800k 2/5/2014 (see Description field): 1.12% of work to go is \$650k 7/16/2014 (see Description field): 1.12% of work to go is \$600k 11/12/2014 (see Description field): Cost impact \$422k 3/27/2015 (see Description field): Cost impact \$287k 7/23/2015 (see Description field): Cost impact \$236k	Low

Mitigation Approaches:

Hold appropriate amount of cost contingency.

Date Started:	Date to Complete:	Owner:
Jan-12	Jan-16	Project Manager S. Hulbert

Current Status:

2/5/14 Retired \$150k in risk for total cost risk value of \$650k. Risk Rating remains Low.

7/16/14 Retired \$50k in risk for total cost risk value of \$600k. Risk Rating remains Low.

11/12/14 Reduced risk value by \$178k for total cost risk value of \$422k. Risk Rating remains Low.

3/27/15 Reduced risk value by \$135k for total cost risk value of \$287k. Risk Rating remains Low.

7/23/15 Reduced risk value by \$51k for total cost risk value of \$236k. Risk Rating remains Low.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-14	Accidents and injuries	2.0 NEXT Project	July 10, 2013

Description:

Condition: Accident/Incident causing injury/illness during construction, assembly, and testing. Multiple minor incidents and non-compliances can lead to a serious event.

Consequence: Minor injury or damage would result in potential work slowdown/schedule impact due to first aid treatment and incident investigation. Potential work stoppage if serious injury and corrective actions.

Breakdown by WBS:

100% : Project Management& Support WBS 2.01.[01,02]

2.01.01: 75% (\$300k)

2.01.02: 25% (\$100k)

Probability:	Impact:	Risk Rating:
Unlikely	Significant Schedule: up to 1 months == \$0.4M	Low

Mitigation Approaches:

Vigorous ES&H program and adequate level of staffing for ES&H support and oversight.

Date Started:	Date to Complete:	Owner:
Jan-12	Sep-16	ESH Manager Lori Stiegler

Current Status:

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-15	Limited availability of specialized effort	2.0 NEXT Project	Jul. 23, 2015

Description:

Condition: Limited availability of scientific, engineering, and beamline controls specialists to perform necessary effort when required.

Consequence: Delays in finalizing design and in writing of specifications. Delays in assembly and integrated testing of photon delivery system and endstation equipment.

Breakdown by WBS:

13% : Common Systems WBS 2.03.[01..04]

2.03.01: 6% (\$48k)

2.03.02: 3% (\$24k)

2.03.03: 3% (\$24k)

2.03.04: 1% (\$8k)

10% : Beamline Controls WBS 2.04.02 (\$80k)

2% : FXI beamline design WBS 2.06.02.[01,03,04]

2.06.02.01: 1% (\$8k)

2.06.02.03: 0.5% (\$4k)

2.06.02.04: 0.5% (\$4k)

15% x 5 : 5 base scope beamlines PDS, endstation, and control station WBS 2.[05,07..10].02.[01,03,04]

2.[05,07..10].02.01: 8% (\$64k)

2.[05,07..10].02.03: 5% (\$40k)

2.[05,07..10].02.04: 2% (\$16k)

July 2014 Breakdown by WBS:

Uniform reduction by 25% due to completion of PDS design

Common Systems WBS 2.03.[01..04]

2.03.01: \$48k->\$36k

2.03.02: \$24k->\$18k

2.03.03: \$24k->\$18k

2.03.04: \$8k->\$6k

Beamline Controls WBS 2.04.02 \$80k->\$60k

FXI beamline design WBS 2.06.02.[01,03,04]

2.06.02.01: \$8k->\$6k

2.06.02.03: \$4k->\$3k

2.06.02.04: \$4k->\$3k

5 base scope beamlines PDS, endstation, and control station WBS 2.[05,07..10].02.[01,03,04]

2.[05,07..10].02.01: \$64k->\$48k each

2.[05,07..10].02.03: \$40k->\$30k each

2.[05,07..10].02.04: \$16k->\$12k each

November 2014 Breakdown by WBS:

Reductions due to completion of design.

Common Systems WBS 2.03.[01..04]

2.03.01: \$36k->\$18k

2.03.02: \$18k (keep)

2.03.03: \$18k (keep)

2.03.04: \$6k (keep)

Beamline Controls WBS 2.04.02 \$60k (keep)

FXI beamline design WBS 2.06.02.[01,03,04]

2.06.02.01: \$6k->\$0k

2.06.02.03: \$3k->\$0k

2.06.02.04: \$3k->\$0k

5 base scope beamlines PDS, endstation, and DAQ:

ESM 2.5.2.1 \$48k-> \$24k, 2.5.2.3 \$30k->\$15k, 2.5.2.4 \$12k->\$6k

ISR 2.7.2.1 \$48k (keep), 2.7.2.3 \$30k (keep), 2.7.2.4 \$12k (keep)

ISS 2.8.2.1 \$48k-> \$0, 2.8.2.3 \$30k->\$0, 2.8.2.4 \$12k->\$0 (included now in NEXT-01)

SIX 2.9.2.1 \$48k-> \$24k, 2.9.2.3 \$30k->\$15k, 2.9.2.4 \$12k->\$6k

ESM 2.10.2.1 \$48k (keep), 2.10.2.3 \$30k (keep), 2.10.2.4 \$12k (keep)

March 2015 Breakdown by WBS:

Reductions due to completion of design.

Common Systems WBS 2.03.[01..04]

2.03.01: \$18k (keep)

NEXT Risk Registry - Risk Entries

2.03.02: \$18k (keep)
 2.03.03: \$18k (keep)
 2.03.04: \$6k (keep)
 Beamline Controls WBS 2.04.02 \$60k (keep)
 ESM 2.5.2.1 \$24k (keep), 2.5.2.3 \$15k (keep), 2.5.2.4 \$6k->\$0
 ISR 2.7.2.1 \$48k (keep), 2.7.2.3 \$30k (keep), 2.7.2.4 \$12k (keep)
 SIX 2.9.2.1 \$24k (keep), 2.9.2.3 \$15k (keep), 2.9.2.4 \$6k (keep)
 SMI 2.10.2.1 \$48k->\$24k, 2.10.2.3 \$30k (keep), 2.10.2.4 \$12k (keep)

July 2015 Breakdown by WBS:

Reductions due to completion of design and fab/install.

Common Systems WBS 2.03.[01..04]

2.03.01: \$18k -> \$0

2.03.02: \$18k -> \$12k

2.03.03: \$18k -> \$24k

2.03.04: \$6k -> \$0

Beamline Controls WBS 2.04.02 \$60k

ESM 2.5.2.1 \$24k, 2.5.2.3 \$15k

ISR 2.7.2.1 \$48k, 2.7.2.3 \$30k, 2.7.2.4 \$12k->\$0

SIX 2.9.2.1 \$24k, 2.9.2.3 \$15k, 2.9.2.4 \$6k->\$0

SMI 2.10.2.1 \$24k, 2.10.2.3 \$30k, 2.10.2.4 \$12k->\$0

Probability:	Impact:	Risk Rating:
Unlikely	Significant Schedule: up to 2 months == \$0.8M 7/16/14: update to \$0.6M 11/12/14: update to \$0.39M 3/27/15: update to \$0.36M 7/23/15: update to \$306k	Low

Mitigation Approaches:

Adequate and timely hiring of scientific, engineering, and beamline controls specialists to meet schedule requirements; coordination of schedules for matrixed staff performing design, test, and installation activities.

Date Started:	Date to Complete:	Owner:
Jan-12	Sep-16	Project Manager S. Hulbert

Current Status:

2/27/2013 Update the schedule impact, increased from 1.5 months to 2 months based on latest analysis. Previously enlisted cost impact was corrected. Risk rating remains Low.

2/5/2014 Extended completion date from Jul 2014 to Jan 2016 to include needs for specialized staff throughout installation.

7/16/2014 Reduced risk value by 25% due to completion of PDS design. Further reduction will be possible upon completion of PDS assy/test, ES design, and ES assy/test.

11/12/2014 Reduced risk values due to completion of utilities and beamline / endstation design.

3/27/2015 Reduced risk values due to completion of beamline designs requiring expert guidance.

7/23/2015 Reduced risk values due to completion of beamline designs (e.g. data storage solutions) requiring expert guidance, and completion progress or revised plans for completion in common systems. Risk reduction completion expected by September 2016.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-16	Market-driven price fluctuations	2.11 Insertion Devices	Jul. 23, 2015

Description:

Condition: Procurements cost significantly more than baseline due to unpredictable market-driven price fluctuations in materials used in manufacturing.

Consequence: Increase in material costs.

Breakdown by WBS:

100%: Insertion Devices (EPUs for ESM, SIX), WBS 2.11
 2.11.01: 50% (\$650k)
 2.11.02: 50% (\$650k)

July 2014 Breakdown by WBS:

After reduction due to 1st EPU award,
 Insertion Devices (EPUs for ESM, SIX), WBS 2.11
 2.11.01 (ESM): 50% (\$430k)
 2.11.02 (SIX): 50% (\$430k)

November 2014 Breakdown by WBS:

Insertion Devices (EPUs for ESM, SIX), WBS 2.11 (total \$600k):
 ESM EPU57: \$100k
 SIX EPU57: \$250k
 ESM EPU105: \$250k

March 2015 Breakdown by WBS:

Insertion Devices (EPUs for ESM, SIX), WBS 2.11 (total \$200k):
 ESM EPU105: \$200k

July 2015 Breakdown by WBS:

Insertion Devices (EPUs for ESM, SIX), WBS 2.11 (total \$0k)
 fully retired (no risk remaining)

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Cost: up to \$1.3M 7/16/2014 => up to \$860k 11/12/2014 => up to \$600k 3/27/2015 => up to \$200k 7/23/2015 => \$0 (fully retired)	Retired

Mitigation Approaches:

Monitor exchange rate and price index trends and be ready to initiate procurements as soon as possible. Monitor subcontract of magnetic material.

Date Started:	Date to Complete:	Owner:
Jan-12	Jul-15	Level 2 Manager for Insertion Devices C. Kitegi

Current Status:

NEXT Risk Registry - Risk Entries

2/27/2013 Update the scope and owner for this risk from Shielded enclosures to Insertion Devices. Risk rating changed from Low to Medium owing to changing the likelihood category from Unlikely to Likely, since market forces could increase permanent magnet material costs relatively suddenly.

2/5/2014 Impact value >\$1M is Critical; Risk Rating is High.

7/16/2014 Risk reduced due to award of 1st of 3 EPUs. Remaining cost risk is shared equally between remaining EPU procurements. Impact value \$860k is now Significant; Risk Rating is reduced to Medium.

11/12/2014 Risk reduced due to awards all EPUs; remaining cost risk remains until magnetic materials subcontracts are in place. Impact value \$600k is Significant; probability reduced to unlikely; Risk Rating is reduced to Low.

3/27/2015 Risk further reduced due to awards of magnetic materials subcontracts for 2 of the 3 EPUs; remaining cost risk remains until subcontract is in place for the EPU105 device for ESM. Anticipate retirement by May 2015. Risk Rating remains Low.

7/23/2015 Risk now fully retired due to receipt of all magnetic materials by EPU subcontractor (for 3 of 3 EPUs).

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-17	Late installation of EESEs	2.05 - 2.10 Beamline Shielded Enclosures	Nov. 12, 2014

Description:

Condition: Delay of Installation of the Photon Delivery System due to late installation and testing of the enclosures.

Consequence: Delays in beamline completion

Breakdown by WBS:

20% x 5 : 5 base scope shielded enclosures WBS 2.[05,07..10].02.02 (\$160k each)

Probability:	Impact:	Risk Rating:
Likely	Significant Schedule: up to 2 months == \$0.8M	Retired

Mitigation Approaches:

Timely procurement of the enclosures, followed by timely installation of utilities systems in those enclosures.

Date Started:	Date to Complete:	Owner:
Jan-12	Nov-14	Level 2 Manager for Common Systems C. Stebbins

Current Status:

Assessed likelihood is Likely, Impact is Significant. Risk Rating is Medium.

7/16/2014: updated Owner name to reflect CAM update. To retire upon enclosure test completion.

11/12/2014: Fully retired, due to completion of enclosure installation (Nov. 2014).

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-18	Insufficient mechanical stability of optical components	2.03 - 2.10 Common Systems, Controls, & all NEXT PDS	Jul. 23, 2015

Description:

Condition: Insufficient mechanical stability of components that interact with the beam, resulting from: (1) Incomplete design and analysis, (2) too large temperature fluctuations in the beamline environment, (3) too large vibrational motion in the beamline environment, and (4) manufacturing not meeting specifications.

Consequence: Design complication and added cost for vibration-damping elements.

Initial Breakdown by WBS:

13% : Common Systems WBS 2.03.[01,03] (utilities, EPS)
 2.03.01 10% (\$100k)
 2.03.03 3% (\$30k)
 10% : Beamline Controls WBS 2.04.02 (\$100k)
 2% : FXI PDS (design) WBS 2.06.02.01 (\$20k)
 15% x 5 : 5 base scope beamlines PDS WBS 2.[05,07..10].02.01 (\$150k each)

February 2014 Breakdown by WBS:

Retirement of all \$150k from ISS PDS (2.08.02.01) based on determination of insensitivity to positioning error.
 Other risk assignments retain their cost value.

November 2014 Breakdown by WBS:

Common Systems WBS 2.03.[01,03] (utilities, EPS)
 2.03.01 \$100k -> \$50k
 2.03.03 \$30k -> \$15k
 Beamline Controls WBS 2.04.02 \$100k (keep)
 FXI PDS (design) WBS 2.06.02.01 \$20k ->\$0
 5 base scope beamlines PDS WBS 2.[05,07..10].02.01
 ESM 2.5.2.1 \$150k (keep)
 ISR 2.7.2.1 \$150k -> \$75k
 ISS 2.8.2.1 \$0k (no change)
 SIX 2.9.2.1 \$150k (keep)
 SMI 2.10.2.1 \$150k (keep)

March 2015 Breakdown by WBS:

Common Systems 2.03.[01,03] (utilities, EPS)
 2.03.01 \$50k -> \$25k
 2.03.03 \$15k -> \$0
 Beamline Controls 2.04.02 \$100k->\$115k
 ESM 2.5.2.1 \$150k ->\$140k
 ISR 2.7.2.1 \$75k ->\$20k
 ISS 2.8.2.1 (\$0)
 SIX 2.9.2.1 \$150k ->\$100k
 SMI 2.10.2.1 \$150k ->\$30k

July 2015 Breakdown by WBS:

Common Systems 2.03.[01,03] (utilities, EPS)
 2.03.01 \$25k (keep)
 Beamline Controls 2.04.02 \$115k ->\$25k
 ESM 2.5.2.1 \$140k (keep)
 ISR 2.7.2.1 \$20k (keep)
 ISS 2.8.2.1 (\$0)
 SIX 2.9.2.1 \$100k (keep)
 SMI 2.10.2.1 \$30k (keep)

Probability:	Impact:	Risk Rating:
Likely	Significant Cost: up to \$1.0M 2/5/2014 Retirement of \$150k leaves \$850k 11/12/2014 Retirement of \$160k leaves \$690k 3/27/2015 Retirement of \$260k leaves \$430k 7/23/2015 Retirement of \$90k leaves \$340k	Medium

NEXT Risk Registry - Risk Entries

Mitigation Approaches:

Complete vibrational and thermal analysis early. Utilize long lead procurement for these items, to maximize testing and integrated testing of these components.

Date Started:	Date to Complete:	Owner:
Jan-12	Sep-15	Level 2 Managers for Beamlines, Common Systems, and Controls E. Vescovo, W.-K. Lee, C. Nelson, K. Attenkofer, I. Jarrige, E. DiMasi, C. Stebbins, Z. Yin

Current Status:

2/27/2013 Update the cost impact, increase from \$0.9M to \$1M after latest analysis. Risk rating remains Low.

7/10/2013 Update likelihood to Likely, and therefore Risk Rating increased to Medium.

2/5/2014 Risk for ISS beamline is retired due to determination of relative insensitivity to vibration. Risk for other beamlines is to be retired upon vendor award (SMI) or design milestone (ISS, SIX, ISR). Total risk value reduced to \$850k (Risk Rating remains Medium). Complete retirement of this risk is expected by Dec 2014 (extended from Oct 2013).

7/16/2014 Updated Owner name to reflect CAM change in WBS 2.03.

11/12/2014 Updated impact as described above. Further reduction will be possible upon completion of mechanical-optical systems designs.

3/27/2015 Completion of utilities installations and beamline designs to date limits remaining risk to beamline systems and, to a lesser extent, controls. Decisions in these areas are expected to complete by September 2015, concurrent with endstation implementation design.

7/23/2015 Minimal exposure expected in utilities as work is completed. Controls is not expected to have significant ownership of this risk (primarily held by beamlines), therefore controls risk value is reduced.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-19	Late installation of Utilities, PPS, and EPS	2.03 NEXT Utilities	Jul. 23, 2015

Description:

Condition: Delay of Installation of Utilities, PPS, and EPS systems owing to interference with NSLS-II facility operations.

Consequence: Delays in beamline completion

Initial Breakdown by WBS:

100% : Common Systems WBS 2.03.[01..03]
 2.03.01: 50% (\$400k)
 2.03.02: 25% (\$200k)
 2.03.03: 25% (\$200k)

November 2014 Breakdown by WBS:

Common Systems WBS 2.03.[01..03]
 2.03.01 (utilities): \$400k -> \$200k
 2.03.02 (PPS): \$200k
 2.03.03 (EPS): \$200k

March 2015 Breakdown by WBS:

Common Systems WBS 2.03.[01..03]
 2.03.01 (utilities): \$200k -> \$10k
 2.03.02 (PPS): \$200k -> \$25k
 2.03.03 (EPS): \$200k -> \$40k

July 2015 Breakdown by WBS:

Common Systems WBS 2.03.[01..03]
 2.03.01 (utilities): \$10k -> \$0
 2.03.02 (PPS): \$25k (keep)
 2.03.03 (EPS): \$40k (keep)

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Schedule: up to 2 months = \$0.8M 11/12/2014 => \$0.6M 3/27/2015 => \$0.075M 7/23/2015 => \$65k	Low

Mitigation Approaches:

Pulling forward, in the project schedule, the procurement, installation, and testing of utilities, PPS, and EPS systems.

Date Started:	Date to Complete:	Owner:
Feb-13	Oct-15	Level 2 Manager for Common Systems C. Stebbins

Current Status:

7/10/2013 Impact rated Significant and Likelihood assessed Likely; Overall risk rating raised to Medium.

2/5/2014 Accelerated completion date from Jan 2016 to Jul 2015 to follow expected NSLS-II transition to operations.

7/16/2014 Updated Owner name to reflect CAM change in WBS 2.03.

11/12/2014 Reduced impact based on completion progress in 2.03.01 (utilities).

3/27/2015 Reduced impact based on completion progress in WBS2.03 (utilities, PPS, and EPS), supported by additional budget and resource availability. CAM is projecting nearly negligible impact on beamline installations resulting from late installation of common systems systems. Remaining risk of \$75k is expected to retire by July 2015.

7/23/2015 Eliminated impact on 2.3.1 based on completion progress. Remaining risk of \$65k (schedule impact of delays in PPS & EPS) is expected to retire by October 2015, as implementation plans mature.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-20	Installation of beamlines during facility commissioning/studies	2.03 - 2.10 Common Systems, Controls, & all NEXT PDS and Endstation Equipment	Jul. 16, 2014

Description:

Condition: Possibility of delays in installation of PDS and endstations owing to limited access to the NSLS-II experimental floor during accelerator commissioning or studies.

Consequence: Estimated 2 month overall schedule delay.

Initial Breakdown by WBS:

15% : Common Systems WBS 2.03.[01..04]

2.03.01: 6% (\$48k)

2.03.02: 3% (\$24k)

2.03.03: 4% (\$32k)

2.03.04: 2% (\$16k)

10% : Beamline Controls WBS 2.04.02 (\$80k)

15% x 5 : 5 base scope beamlines PDS, shielded enclosures, & endstation WBS 2.[05,07..10].02.[01..04]

2.[05,07..10].02.01: 8% (\$64k)

2.[05,07..10].02.02: 2% (\$16k)

2.[05,07..10].02.03: 4% (\$32k)

2.[05,07..10].02.04: 1% (\$8k)

Probability:	Impact:	Risk Rating:
Unlikely	Significant Schedule: up to 2 months = \$0.8M 7/16/2014 => retired (\$0)	Retired

Mitigation Approaches:

Advanced planning of beamline installation activities, in coordination with accelerator commissioning or studies.

Date Started:	Date to Complete:	Owner:
Feb-13	Oct-14	Level 2 Managers C. Stebbins, Z. Yin, E. Vescovo, W.-K. Lee, C. Nelson, K. Attenkofer, I. Jarrige, E. DiMasi

Current Status:

2/5/2014 Accelerated completion date from Sep 2016 to Oct 2014 to follow expected NSLS-II completion of ring commissioning.

7/16/2014 Retired upon successful commissioning of NSLS-II ring to 25 mA with efficient injection.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements	2.11 Insertion Devices (EPUs)	Mar. 27, 2015

Description:

Condition: ID field quality, of the delivered IDs from suppliers, does not meet stringent NSLS-II accelerator requirements.

Consequence: Schedule delay for ID installation; these IDs cannot be installed without magnetic field correction.

Initial Breakdown by WBS:

100% : Insertion Devices (EPUs for ESM, SIX) WBS 2.11.[01,02]
50% (\$500k) each

7/16/2014 Breakdown by WBS:

After reduction in risk estimate:
Insertion Devices (EPUs for ESM, SIX) WBS 2.11.[01,02]
50% (\$250k) each

Probability:	Impact:	Risk Rating:
Likely	Significant Cost: up to \$1.0M 7/16/2014 => up to \$0.5M	Medium

Mitigation Approaches:

Perform magnetic shimming at NSLS-II magnetic measurement facility.

Date Started:	Date to Complete:	Owner:
Feb-13	May-16	Level 2 Manager for Insertion Devices C. Kitegi

Current Status:

7/10/2013: Cost Impact increased to \$1M owing to experience with EPUs at other SR facilities. Impact level remains Significant, and Overall Rating remains Medium.

7/16/2014: Cost impact decrease to \$0.5M based on updated estimate of shimming effort, and revised procurement strategy.

3/27/2015: Anticipated completion date extended to May 2016 per schedule of first devices tested and ready for installation to NSLS-II.

NEXT Risk Registry - Risk Entries

Risk ID:	Title:	WBS:	Record Date:
NEXT-22	Insertion Device and Front End installation scope not funded by NSLS-II Operations as planned	2.12 Installation of Insertion Devices and Front Ends	Jul. 23, 2015

Description:

Condition: NSLS-II facility operations does not fund installation of NEXT front ends and insertion devices as described in the NEXT Project Execution Plan

Dependencies of NEXT on NSLS-II Facility Operations for delivery of operational accelerator systems are described in the NEXT Project Execution Plan. These include testing, installation, and commissioning of NEXT insertion devices and chambers, front ends, and all other scope within the accelerator tunnel. Being outside of NEXT Project Scope, they are not budgeted within NEXT but are instead expected to be provided using NSLS-II facility operations funds. In case that these funds are inadequate, NEXT project holds contingency in order to complete this additional scope.

Consequence: NEXT may be forced to fund its own accelerator installations (IDs and FEs) in order to deliver beam on time for NEXT beamlines.

November 2014 Breakdown by WBS:

100% : Project management 2.01.01 (\$1.0M)

March 2015 Breakdown by WBS:

FE/ID Install (WBS 2.12): (total \$600k)

2.12.01 (Mgt): \$70k

2.12.02 (ID install): \$370k

2.12.03 (FE install): \$160k

July 2015 Breakdown by WBS:

FE/ID Install (WBS 2.12): (total \$0)

=>completely retired, upon addition to project baseline.

Probability:	Impact:	Risk Rating:
Unlikely	Marginal	Retired
	<p>11/12/14 => Cost: \$1M estimated for ~6 FTE effort to complete installation of NEXT IDs and front ends. Work to occur in FY15-16.</p> <p>3/27/15 => Cost: \$600k estimated for FY16 work remaining beyond that added to NEXT via PCR-15-072 for NEXT insertion device and front end installation, possibly needed from NEXT depending on NSLS-II operations budget.</p> <p>7/23/15 => Cost: \$0 (retired), as estimate for NEXT insertion device and front end installation effort in FY16 and any work remaining beyond that already added to NEXT via PCR-15-072 is now implemented via PCR-15-094; NEXT funding need based on NSLS-II operations budget and group leader inputs.</p>	

Mitigation Approaches:

Maintain regular communication with NSLS-II operations management and accelerator systems groups for up to date funding forecasts and effort requirements; hold contingency.

Date Started:	Date to Complete:	Owner:
Oct-14	Jul-15	Level 2 manager for ID and FE installation G. Fries

Current Status:

11/12/2014: Established risk and initial assessment.

3/27/2015: Reduced risk estimate to \$600k, based on estimate for remaining effort (beyond added scope for FY15). Remaining risk assigned to 2.12 (ID/FE install) WBS; retirement anticipated by September 2015.

7/23/2015: Retired risk completely, as estimated budget for completion is added to project baseline (now including all of FY15 and FY16 effort).

NEXT LOW Risk Registry

Monday, August 24, 2015

4:35:08 PM

LOW Risk ID	Title	Record Date	Risk Value	Risk Rating	Approval Status
NEXT-LOW-01	Mirror repolishing found to be needed after delivery to BNL	July 16, 2014	\$200,000.00	Low	Approved
NEXT-LOW-02	Damage to equipment during transport	Mar. 27, 2015	\$100,000.00	Low	Approved
NEXT-LOW-03	Incomplete NSLS-II project contributions	Nov. 12, 2014	\$0.00	Retired	Approved

NEXT LOW Risk Registry

LOW Risk ID:

NEXT-LOW-01

Record Date:

July 16, 2014

Description:

Risk of mirror repolishing found to be needed after delivery to BNL
Impact: \$200k (1 beamline delay up to ~2 months)

Probability:

Very Unlikely

Impact:

Marginal

Risk Value:

\$200,000.00

Risk Rating:

Low

Mitigation Approaches:

Involve PS metrology team in FAT

Date Started:

July 16, 2014

Owner:

Beamline CAMs

NEXT LOW Risk Registry

LOW Risk ID:

NEXT-LOW-02

Record Date:

Mar. 27, 2015

Description:

Risk of damage to equipment during transport

Impact: \$200k (replacement/repair of equipment moved from NSLS to NSLS-II)

Probability:

Very Unlikely

Impact:

Marginal

Risk Value:

\$100,000.00

Risk Rating:

Low

Mitigation Approaches:

Beamline CAMs and supporting staff ensure that equipment is packed adequately for safe transport.

Date Started:

July 16, 2014

Owner:

Beamline CAMs

NEXT LOW Risk Registry

LOW Risk ID:

NEXT-LOW-03

Record Date:

Nov. 12, 2014

Description:

Risk of incomplete NSLS-II project contributions

Impact: \$200k for materials or labor not provided as agreed and stated in PEP

Probability:

Very Unlikely

Impact:

Marginal

Risk Value:

\$0.00

Risk Rating:

Retired

Mitigation Approaches:

Stay in communication with NSLS-II / accelerator division staff and evaluate progress on behalf of NEXT regularly.

Date Started:

July 16, 2014

Owner:

Project Manager

NEXT Project

(NEXT: NSLS-II EXperimental Tools)

Risk Registry Report Addendum: Risk Breakdown by WBS

July 2015

As an addendum to the July 2015 NEXT Risk Registry Report, the following collection of tables summarizes the risk assessment by risk and by WBS.

Following the approach used since CD-2, total risk is assessed as a total of both known and unknown risks. For known risks, the probability-weighted impacts are summed to a value of \$2.83M as of July 2015 (excluding risks NEXT-02 and NEXT-03 held by FPD). For unknown risks, 10% of unobligated work remaining is used (\$1.73M as of June 2015). The total risk assessment for NEXT as of March 2015 therefore is \$4.56M. Total projected contingency requirement including VAC (\$3.00M in June) is therefore \$7.56M on BAC of \$81.39M (19.1% of \$39.52M remaining work); the available \$8.61M represents 21.8% of remaining work.

The raw risk and probability-weighted risk values are detailed in the tables to follow, per NEXT risk and per WBS. Individual and summed raw risk impact values in each level 2 WBS area as assigned per risk, as well as probability-weighted (“expected monetary value” or EMV) sums are given, which add to unknown risk to yield total risk and risk as a fraction of remaining work.

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Risk ID	Risk Name	Total Value (\$M)	2.01 Project Management		EXCLUDING FUNDING CHANGES		
			2.01.01 Project Management	2.01.02 Project Support	Total Value (\$M)	2.01.01 Project Management	2.01.02 Project Support
NEXT-01	Underestimated effort						
NEXT-02	Delay in appropriations occurring on October 1 of each year	1.200	1.200				
NEXT-03	Directed Funding Profile Change	4.800	4.800				
NEXT-04	Higher-than-expected worldwide demand for beamline components						
NEXT-05	Higher-than-expected optic quality required						
NEXT-06	Required optic quality is closer to state-of-the-art than expected						
NEXT-07	Underperforming equipment brought from NSLS						
NEXT-08	Design Changes (beamlines, controls and common systems)						
NEXT-09	Changes to EESE requirements/designs						
NEXT-10	Higher-than-expected thermal deformation of optics						
NEXT-11	Underestimated endstation component costs						
NEXT-12	Personnel recruitment delays	0.100	0.050	0.050	0.100	0.050	0.050
NEXT-13	Higher-than-expected inflation rate	0.236	0.236		0.236	0.236	
NEXT-14	Accidents and injuries	0.400	0.300	0.100	0.400	0.300	0.100
NEXT-15	Limited availability of specialized effort						
NEXT-16	Market-driven price fluctuations (IDs)						
NEXT-17	Late installation of EESEs						
NEXT-18	Insufficient mechanical stability of optical components						
NEXT-19	Late installation of Utilities, PPS, and EPS						
NEXT-20	Installation of beamlines during facility commissioning/studies						
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements						
NEXT-22	ID & FE installation scope not funded by NSLS-II Operations						
	TOTAL	6.736	6.586	0.150	0.736	0.586	0.150
	EMV TOTAL	4.808	4.733	0.075	0.368	0.293	0.075

2.03 Common Beamline Systems

Risk ID	Risk Name	Total Value (\$M)	2.03 Common Beamline Systems				
			2.03.01 utilities	2.03.02 PPS	2.03.03 EPS	2.03.04 Control Sta	2.03.05 MGT
NEXT-01	Underestimated effort						
NEXT-02	Delay in appropriations occurring on October 1 of each year						
NEXT-03	Directed Funding Profile Change						
NEXT-04	Higher-than-expected worldwide demand for beamline components						
NEXT-05	Higher-than-expected optic quality required						
NEXT-06	Required optic quality is closer to state-of-the-art than expected						
NEXT-07	Underperforming equipment brought from NSLS						
NEXT-08	Design Changes (beamlines, controls and common systems)	0.017				0.017	
NEXT-09	Changes to EESE requirements/designs						
NEXT-10	Higher-than-expected thermal deformation of optics						
NEXT-11	Underestimated endstation component costs						
NEXT-12	Personnel recruitment delays						
NEXT-13	Higher-than-expected inflation rate						
NEXT-14	Accidents and injuries						
NEXT-15	Limited availability of specialized effort	0.036		0.012	0.024		
NEXT-16	Market-driven price fluctuations (IDs)						
NEXT-17	Late installation of EESEs						
NEXT-18	Insufficient mechanical stability of optical components	0.025	0.025				
NEXT-19	Late installation of Utilities, PPS, and EPS	0.065		0.025	0.040		
NEXT-20	Installation of beamlines during facility commissioning/studies						
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements						
	TOTAL	0.143	0.025	0.037	0.064	0.017	0.000
	EMV TOTAL	0.080	0.018	0.019	0.032	0.012	0.000

Risk ID	Risk Name	Total Value (\$M)	2.04 Beamline Controls		
			2.04.01 MGT	2.04.02.[01-06] design & implement	2.04.03 equipment
NEXT-01	Underestimated effort	0.250		0.250	
NEXT-02	Delay in appropriations occurring on October 1 of each year				
NEXT-03	Directed Funding Profile Change				
NEXT-04	Higher-than-expected worldwide demand for beamline components				
NEXT-05	Higher-than-expected optic quality required				
NEXT-06	Required optic quality is closer to state-of-the-art than expected				
NEXT-07	Underperforming equipment brought from NSLS				
NEXT-08	Design Changes (beamlines, controls and common systems)	0.066		0.066	
NEXT-09	Changes to EESE requirements/designs				
NEXT-10	Higher-than-expected thermal deformation of optics				
NEXT-11	Underestimated endstation component costs				
NEXT-12	Personnel recruitment delays				
NEXT-13	Higher-than-expected inflation rate				
NEXT-14	Accidents and injuries				
NEXT-15	Limited availability of specialized effort	0.060		0.060	
NEXT-16	Market-driven price fluctuations (IDs)				
NEXT-17	Late installation of EESEs				
NEXT-18	Insufficient mechanical stability of optical components	0.025		0.025	
NEXT-19	Late installation of Utilities, PPS, and EPS				
NEXT-20	Installation of beamlines during facility commissioning/studies				
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements				
	TOTAL	0.401	0.000	0.401	0.000
	EMV TOTAL	0.269	0.000	0.269	0.000

Risk ID	Risk Name	Total Value (\$M)	2.05 ESM Beamline					
			2.05.01 MGT	2.05.02 BL Systems	2.05.02.01 PDS	2.05.02.02 enclosures	2.05.02.03 endstation	2.05.02.04 data acquisition
NEXT-01	Underestimated effort	0.123		0.123	0.030		0.093	
NEXT-02	Delay in appropriations occurring on October 1 of each year							
NEXT-03	Directed Funding Profile Change							
NEXT-04	Higher-than-expected worldwide demand for beamline components	0.070		0.070	0.050		0.020	
NEXT-05	Higher-than-expected optic quality required							
NEXT-06	Required optic quality is closer to state-of-the-art than expected							
NEXT-07	Underperforming equipment brought from NSLS							
NEXT-08	Design Changes (beamlines, controls and common systems)							
NEXT-09	Changes to EESE requirements/designs							
NEXT-10	Higher-than-expected thermal deformation of optics							
NEXT-11	Underestimated endstation component costs	0.050		0.050			0.050	
NEXT-12	Personnel recruitment delays							
NEXT-13	Higher-than-expected inflation rate							
NEXT-14	Accidents and injuries							
NEXT-15	Limited availability of specialized effort	0.039		0.039	0.024		0.015	
NEXT-16	Market-driven price fluctuations (IDs)							
NEXT-17	Late installation of EESEs							
NEXT-18	Insufficient mechanical stability of optical components	0.140		0.140	0.140			
NEXT-19	Late installation of Utilities, PPS, and EPS							
NEXT-20	Installation of beamlines during facility commissioning/studies							
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements							
	TOTAL	0.422	0.000	0.422	0.244	0.000	0.178	0.000
	EMV TOTAL	0.301	0.000	0.301	0.176	0.000	0.125	0.000

Risk ID	Risk Name	2.06 FXI Beamline					
		Total Value (\$M)	2.06.01 MGT	2.06.02 BL Systems	2.06.02.01 PDS	2.06.02.02 enclosures	2.06.02.03 endstation
NEXT-01	Underestimated effort	0.020		0.020		0.020	
NEXT-02	Delay in appropriations occurring on October 1 of each year						
NEXT-03	Directed Funding Profile Change						
NEXT-04	Higher-than-expected worldwide demand for beamline components						
NEXT-05	Higher-than-expected optic quality required						
NEXT-06	Required optic quality is closer to state-of-the-art than expected						
NEXT-07	Underperforming equipment brought from NSLS						
NEXT-08	Design Changes (beamlines, controls and common systems)						
NEXT-09	Changes to EESE requirements/designs						
NEXT-10	Higher-than-expected thermal deformation of optics						
NEXT-11	Underestimated endstation component costs						
NEXT-12	Personnel recruitment delays						
NEXT-13	Higher-than-expected inflation rate						
NEXT-14	Accidents and injuries						
NEXT-15	Limited availability of specialized effort						
NEXT-16	Market-driven price fluctuations (IDs)						
NEXT-17	Late installation of EESEs						
NEXT-18	Insufficient mechanical stability of optical components						
NEXT-19	Late installation of Utilities, PPS, and EPS						
NEXT-20	Installation of beamlines during facility commissioning/studies						
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements						
	TOTAL	0.020	0.000	0.020	0.000	0.020	0.000
	EMV TOTAL	0.014	0.000	0.014	0.000	0.014	0.000

Risk ID	Risk Name	2.07 ISR Beamline						
		Total Value (\$M)	2.07.01 MGT	2.07.02 BL Systems	2.07.02.01 PDS	2.07.02.02 enclosures	2.07.02.03 endstation	2.07.02.04 data acquisition
NEXT-01	Underestimated effort	0.110	0.023	0.087	0.032	0.010	0.045	
NEXT-02	Delay in appropriations occurring on October 1 of each year							
NEXT-03	Directed Funding Profile Change							
NEXT-04	Higher-than-expected worldwide demand for beamline components	0.097		0.097	0.047		0.050	
NEXT-05	Higher-than-expected optic quality required							
NEXT-06	Required optic quality is closer to state-of-the-art than expected							
NEXT-07	Underperforming equipment brought from NSLS	0.050		0.050			0.050	
NEXT-08	Design Changes (beamlines, controls and common systems)	0.030		0.030			0.030	
NEXT-09	Changes to EESE requirements/designs							
NEXT-10	Higher-than-expected thermal deformation of optics							
NEXT-11	Underestimated endstation component costs	0.025		0.025			0.025	
NEXT-12	Personnel recruitment delays							
NEXT-13	Higher-than-expected inflation rate							
NEXT-14	Accidents and injuries							
NEXT-15	Limited availability of specialized effort	0.078		0.078	0.048		0.030	
NEXT-16	Market-driven price fluctuations (IDs)							
NEXT-17	Late installation of EESEs							
NEXT-18	Insufficient mechanical stability of optical components	0.020		0.020	0.020			
NEXT-19	Late installation of Utilities, PPS, and EPS							
NEXT-20	Installation of beamlines during facility commissioning/studies							
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements							
	TOTAL	0.410	0.023	0.387	0.147	0.010	0.230	0.000
	EMV TOTAL	0.291	0.016	0.275	0.103	0.007	0.165	0.000

Risk ID	Risk Name	2.08 ISS Beamline						
		Total Value (\$M)	2.08.01 MGT	2.08.02 BL Systems	2.08.02.01 PDS	2.08.02.02 enclosures	2.08.02.03 endstation	2.08.02.04 data acquisition
NEXT-01	Underestimated effort	0.235	0.065	0.170	0.060	0.010	0.100	
NEXT-02	Delay in appropriations occurring on October 1 of each year							
NEXT-03	Directed Funding Profile Change							
NEXT-04	Higher-than-expected worldwide demand for beamline components	0.025		0.025	0.025			
NEXT-05	Higher-than-expected optic quality required							
NEXT-06	Required optic quality is closer to state-of-the-art than expected							
NEXT-07	Underperforming equipment brought from NSLS							
NEXT-08	Design Changes (beamlines, controls and common systems)	0.094		0.094	0.044		0.050	
NEXT-09	Changes to EESE requirements/designs							
NEXT-10	Higher-than-expected thermal deformation of optics							
NEXT-11	Underestimated endstation component costs	0.050		0.050			0.050	
NEXT-12	Personnel recruitment delays							
NEXT-13	Higher-than-expected inflation rate							
NEXT-14	Accidents and injuries							
NEXT-15	Limited availability of specialized effort							
NEXT-16	Market-driven price fluctuations (IDs)							
NEXT-17	Late installation of EESEs							
NEXT-18	Insufficient mechanical stability of optical components							
NEXT-19	Late installation of Utilities, PPS, and EPS							
NEXT-20	Installation of beamlines during facility commissioning/studies							
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements							
	TOTAL	0.404	0.065	0.339	0.129	0.010	0.200	0.000
	EMV TOTAL	0.288	0.046	0.242	0.095	0.007	0.140	0.000

Risk ID	Risk Name	Total Value (\$M)	2.09 SIX Beamline					
			2.09.01 MGT	2.09.02 BL Systems	2.09.02.01 PDS	2.09.02.02 enclosures	2.09.02.03 endstation	2.09.02.04 data acquisition
NEXT-01	Underestimated effort	0.050	0.011	0.039	0.016		0.023	
NEXT-02	Delay in appropriations occurring on October 1 of each year							
NEXT-03	Directed Funding Profile Change							
NEXT-04	Higher-than-expected worldwide demand for beamline components	0.173		0.173	0.089		0.084	
NEXT-05	Higher-than-expected optic quality required							
NEXT-06	Required optic quality is closer to state-of-the-art than expected							
NEXT-07	Underperforming equipment brought from NSLS							
NEXT-08	Design Changes (beamlines, controls and common systems)	0.070		0.070			0.070	
NEXT-09	Changes to EESE requirements/designs							
NEXT-10	Higher-than-expected thermal deformation of optics							
NEXT-11	Underestimated endstation component costs	0.150		0.150			0.150	
NEXT-12	Personnel recruitment delays							
NEXT-13	Higher-than-expected inflation rate							
NEXT-14	Accidents and injuries							
NEXT-15	Limited availability of specialized effort	0.039		0.039	0.024		0.015	
NEXT-16	Market-driven price fluctuations (IDs)							
NEXT-17	Late installation of EESEs							
NEXT-18	Insufficient mechanical stability of optical components	0.100		0.100	0.100			
NEXT-19	Late installation of Utilities, PPS, and EPS							
NEXT-20	Installation of beamlines during facility commissioning/studies							
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements							
	TOTAL	0.582	0.011	0.571	0.229	0.000	0.342	0.000
	EMV TOTAL	0.434	0.008	0.427	0.173	0.000	0.253	0.000

Risk ID	Risk Name	2.10 SMI Beamline						
		Total Value (\$M)	2.10.01 MGT	2.10.02 BL Systems	2.10.02.01 PDS	2.10.02.02 enclosures	2.10.02.03 endstation	2.10.02.04 data acquisition
NEXT-01	Underestimated effort	0.100	0.023	0.077	0.032		0.045	
NEXT-02	Delay in appropriations occurring on October 1 of each year							
NEXT-03	Directed Funding Profile Change							
NEXT-04	Higher-than-expected worldwide demand for beamline components	0.118		0.118	0.050		0.068	
NEXT-05	Higher-than-expected optic quality required							
NEXT-06	Required optic quality is closer to state-of-the-art than expected							
NEXT-07	Underperforming equipment brought from NSLS							
NEXT-08	Design Changes (beamlines, controls and common systems)							
NEXT-09	Changes to EESE requirements/designs							
NEXT-10	Higher-than-expected thermal deformation of optics							
NEXT-11	Underestimated endstation component costs	0.150		0.150			0.150	
NEXT-12	Personnel recruitment delays							
NEXT-13	Higher-than-expected inflation rate							
NEXT-14	Accidents and injuries							
NEXT-15	Limited availability of specialized effort	0.054		0.054	0.024		0.030	
NEXT-16	Market-driven price fluctuations (IDs)							
NEXT-17	Late installation of EESEs							
NEXT-18	Insufficient mechanical stability of optical components	0.030		0.030	0.030			
NEXT-19	Late installation of Utilities, PPS, and EPS							
NEXT-20	Installation of beamlines during facility commissioning/studies							
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements							
	TOTAL	0.452	0.023	0.429	0.136	0.000	0.293	0.000
	EMV TOTAL	0.329	0.016	0.313	0.100	0.000	0.213	0.000

2.11 Insertion Devices

2.11.01 2.11.02 2.11.03

Risk ID	Risk Name	Total Value (\$M)	ESM EPU	SIX EPU	MGT
NEXT-01	Underestimated effort				
NEXT-02	Delay in appropriations occurring on October 1 of each year				
NEXT-03	Directed Funding Profile Change				
NEXT-04	Higher-than-expected worldwide demand for beamline components				
NEXT-05	Higher-than-expected optic quality required				
NEXT-06	Required optic quality is closer to state-of-the-art than expected				
NEXT-07	Underperforming equipment brought from NSLS				
NEXT-08	Design Changes (beamlines, controls and common systems)				
NEXT-09	Changes to EESE requirements/designs				
NEXT-10	Higher-than-expected thermal deformation of optics				
NEXT-11	Underestimated endstation component costs				
NEXT-12	Personnel recruitment delays				
NEXT-13	Higher-than-expected inflation rate				
NEXT-14	Accidents and injuries				
NEXT-15	Limited availability of specialized effort				
NEXT-16	Market-driven price fluctuations (IDs)				
NEXT-17	Late installation of EESEs				
NEXT-18	Insufficient mechanical stability of optical components				
NEXT-19	Late installation of Utilities, PPS, and EPS				
NEXT-20	Installation of beamlines during facility commissioning/studies				
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements	0.500	0.250	0.250	
	TOTAL	0.500	0.250	0.250	0.000
	EMV TOTAL	0.350	0.175	0.175	0.000

Risk ID	Risk Name	Total Value (\$M)	2.12 ID / FE Installation		
			2.12.01 MGT	2.12.02 ID install	2.12.03 FE install
NEXT-01	Underestimated effort	0.151	0.002	0.074	0.075
NEXT-02	Delay in appropriations occurring on October 1 of each year				
NEXT-03	Directed Funding Profile Change				
NEXT-04	Higher-than-expected worldwide demand for beamline components				
NEXT-05	Higher-than-expected optic quality required				
NEXT-06	Required optic quality is closer to state-of-the-art than expected				
NEXT-07	Underperforming equipment brought from NSLS				
NEXT-08	Design Changes (beamlines, controls and common systems)				
NEXT-09	Changes to EESE requirements/designs				
NEXT-10	Higher-than-expected thermal deformation of optics				
NEXT-11	Underestimated endstation component costs				
NEXT-12	Personnel recruitment delays				
NEXT-13	Higher-than-expected inflation rate				
NEXT-14	Accidents and injuries				
NEXT-15	Limited availability of specialized effort				
NEXT-16	Market-driven price fluctuations (IDs)				
NEXT-17	Late installation of EESEs				
NEXT-18	Insufficient mechanical stability of optical components				
NEXT-19	Late installation of Utilities, PPS, and EPS				
NEXT-20	Installation of beamlines during facility commissioning/studies				
NEXT-21	Insertion Device Field Quality does not meet NSLS-II requirements				
NEXT-22	ID & FE installation scope not funded by NSLS-II Operations				
	TOTAL	0.151	0.002	0.074	0.075
	EMV TOTAL	0.106	0.001	0.052	0.053