National Synchrotron Light Source II

Risk Registry Report

March 2012

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This Risk Registry Report contains a collection of the Risk Document which will form a Risk Registry. In order to report, track and closeout risks, a Risk Document Form is used for a potential High or Medium risk and will be updated by the owners of the risk as the risk assessment, handling, and monitoring functions are executed. Identified risks which have overall rating of Low but which in the judgment of the manager has the potential to experience increased risk will be tracked in a Low Risk Document Form.

The Risk Registry Report is a dynamic document throughout the life of the project and will be maintained and updated by the Risk Management Coordinator as required based on the addition and update of high, medium and low risks.

Table 1. Risk Likelihood (Probability) Categories

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

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)	≤ $1M	None	Minor degradation, Performance falls below upper end of goal; CD-4 can still be met
Significant (S)	> $1M, but ≤ $5M	Impacts Level 0, 1, or 2 milestones defined in PEP	Moderate performance shortfall, but workarounds available; Performance falls below mid-range goal
Critical (C)	> $5M	Impacts early finish milestones	CD-4 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

NSLS-II Risk Registry

Wednesday, March 21, 2012
11:18:25 PM

Risk ID	Title	Record Date	Owner title	Risk Rating	Approval Status
ASD-01	Unexpected difficulties with dynamic aperture	Mar 15, 2012	ASD Director	Low	Approved
ASD-02	Linac Turn Key Procurement	Mar 15, 2012	ASD Director	Low	Approved
ASD-03	Booster Turn Key Procurement	Mar 15, 2012	ASD Director	Low	Approved
ASD-04	Storage Ring Magnet Production	Mar 15, 2012	ASD Director	Low	Approved
ASD-05	Storage Ring vacuum chamber design and production	Mar 15, 2012	ASD Director	Low	Approved
ASD-06	Storage Ring power supply design	Oct 30, 2010	ASD Director	Retired	Approved
ASD-07	Storage Ring RF Cavity Production	Mar 15, 2012	ASD Director	Medium	Approved
ASD-08	Controls System procurement	Sep 25, 2009	ASD Director	Retired	Approved
ASD-09	Insertion Device Production	Mar 15, 2012	ASD Director	Low	Approved
ASD-10	BPM Electronics	Mar 12, 2012	ASD Director	Low	Approved
ASD-11	SR Installation - Underestimated labor - Schedule delays	Mar 15, 2012	ASD Director	Low	Approved
CFD-01	Changes in requirements for conventional facilities	Feb 10, 2012	CFD Director	Low	Approved
CFD-02	Ring Building contract	Feb 18, 2009	CFD Director	Retired	Approved
CFD-03	Field Changes for Conventional Construction	Feb 10, 2012	CFD Director	Medium	Approved
CFD-04	LOB contract	Jul 21, 2010	CFD Director	Retired	Approved
CFD-05	Interface of Two General Contractors on Ring Bldg Site	Feb 10, 2012	CFD Director	Low	Approved
DOE-01, PMG-01	FY09 Continuing Resolution	Mar 12, 2009	Federal Project Director	Retired	Approved
DOE-02	Directed Funding Profile Change	Feb 14, 2012	Federal Project Director	Retired	Approved
DOE-03	FY10 Funding	Nov 16, 2009	Federal Project Director	Retired	Approved
ESH-01	Construction Safety	Mar 12, 2012	ESH Manager	Medium-Low	Approved
ESH-02	Unexpected ESH issue (design)	Mar 6, 2012	ESH Manager	Low	Approved
ESH-03	Elimination or significant revision of DOE Order 420.2B "Safety of Accelerator Facilities"	Nov 12, 2009	ESH Manager	Retired	Approved
OPS-01	Pre-ops labor	Feb 10, 2012	Deputy Project Director	High	Approved

Risk ID	Title	Record Date	Owner title	Risk Rating	Approval Status
PMG-02	Personnel Staffing	Feb 10, 2012	Project Support Division Director	Low	Approved
PMG-03	Space Costs	Feb 10, 2012	Business Division Director	Medium	Approved
XFD-01	Design maturity of User Instrument	Jan 20, 2011	XFD Director	High	Approved

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-01	1.03.02, 1.03.04 Accelerator Physics which defines the lattice and the properties of the lattice elements on one hand and the implementation of the the storage ring hardware: magnets, powersupplies, vacuum, support systems and diagnositics	Mar 15, 2012

Description:

Condition: Unexpected difficulties with dynamic aperture, might require additional multipole magnets or a different lattice configuration (shifted magnet positions, larger operating range, improved stability, etc) for nonlinear tuning.

Consequence:
There are a number of possible remedies to overcome or to mitigate these difficulties. These could consist in one, or in a combination of several of the measures described below:

a) We might have to increase the number of chromatic sextupole families per half cell from presently 2 to 3. This will result in cost increase for additional 60 sextupole magnets plus associated cabling, powering, alignment and controls.

b) It might become necessary to return to a sextupole powering scheme which allows to tune each sextupole magnet individually.

c) It might become necessary to introduce octupole magnets to control the tuneshift with amplitude.

d) It might become necessary to introduce decapole magnets to control the size of the chromatic tune footprint.

e) It is conceivable that an advantage may arise from modifying the positions of lattice elements with consquences for vacuum chamber, diagnostics and support design

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Cost ~ $200K Estimate for the cost impact is based on the scaling of the existing baseline cost estimate.	Low

First Indicator:

This risk is an intrinsic consequence of designing for a lattice which pushes the state of the art in achieving small beam size and high beam intensity with a reasonable beam lifetime of >3hours. The mitigation of this risk one of the central issues in NSLS-II Storage Ring design. It is continuously and extensively discussed and updated since the conceptual design phase.

Mitigation Approaches:

High priority of dynamic aperture assessment for the baseline lattice by accelerator physics group to confirm the baseline design performance. Keeping up the effort by introducing new methods for assessment and tests and being alert to the results becoming available from prototype and production testing of magnets and other hardware components.

Date Started:	Date to Complete:	Owner:
Nov 2007	Oct 2013	ASD Director F. Willeke

Current Status:

03/31/08: Accelerator group continuously studies the dynamic aperture. The first half of FY08 was devoted to specify magnet field errors in this context. The results have been reviewed weekly by the accelerator physics group involving the magnet group and the ASD management.

07/17/08: Status of the studies was presented to the accelerator advisory committee (ASAC).

07/31/08: Accelerator physics group now concentrates on the issue of accommodating the damping wigglers in the lattice while preserving the dynamic aperture. The progress of this study is being reviewed continuously in the weekly Accelerator Physics meeting. **Rating changed from High to High-Medium.**

09/04/08: Lattice design has been stable since January. Dynamic aperture analysis has made a large progress with a solution for baseline configuration at hand. Field quality of the magnet system has been defined based on thorough analysis of the nonlinear dynamic. Designs of quadrupole and sextupole magenets were refined and completed. Impact of insertion devices has been studied. Dynamic aperture studies are close to completion. **Rating changed from High-Medium to Medium.**

02/16/09: Risk reviewed and rating for the impact was updated **from Medium to Medium-Low.**
09/25/09 Probability changed from likely to unlikely given the latest progress in accelerator physics. Risk rating was updated **from Medium-Low to Low.**
10/29/2010: more than a year has passed since the last change in the lattice was made. All simulations made since then including investigation of various IDs and increased magnetic field errors seem to confirm that lattice is stable **Risk remains low**
3/15/2012 Accelerator physics studies since Oct'10 have not revealed any new vulnerability or difficulty**. Risk remains low.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-02	1.03.03.01 Linac	Mar 15, 2012

Description:

Condition: Linac procurement cost significantly higher than baseline due to:
(1) Known vendors for Linac are located in Europe and basis of estimate was obtained in Euros. If exchange rate worsens -
(2) High percentage of materials used in manufacturing of Linac (cooper, stainless steel, carbon steel, aluminum) is subject to market fluctuation. If market condition worsens -
Consequence: Increase in cost

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Cost ~ $250K	Low

First Indicator:

Subsequent vendor quotes show significant cost increase.
Euro-Dollar rates is fluctuating
One of the two potential vendors is in financial difficulties
(these statements obsolete per April 12, 2010)

Mitigation Approaches:

Monitor exchange rate and price index trends and be ready to initiate associated procurements as soon as possible.

Continue to interest US vendor

In case of a catastrophic cost increase, an alternative mitigation could be to procure the components of the LINAC in the US and produce some components and the assembly inhouse.
(these mitigations obsoletye per April 12, 2010)

Date Started:	Date to Complete:	Owner:
Sep 2007	Apr 2012	ASD Director F. Willeke

Current Status:

09/30/07: Due to FY08 budget constraint, procurement schedule for part of the LINAC system (front end) was further delayed. This changed the rating of this risk **from Medium to Medium-High.**

02/20/08: Continue to maintain good contact with potential vendors.

08/15/08: Currency exchange rate update for the LINAC procurement projects a $668k cost increase with respect to baseline.

01/02/09: A recent turn-key LINAC procurement for another institute resulted in reasonable bits from the two potential potential vendors. A recent quote for the the NSLS-II LINAC from one of the two potential vendors seems to confirm these numbers which are within the NSLS-II cost estimate.

02/12/09: There are indications that a consortium of US vendors is in the process of forming which would constitute a 3rd vendor for the NSLS-II LINAC.

02/16/09: The impact has been updated to marginal and rating is changes **from medium-high to low.**

09/25/09: Probability changed **from likely to unlikely**. Risk rating remains **Low.**

11/6/2009: A quote from the vendor Thales was received in November for estimated LINAC cost of 8.5M$ compared to the current baseline allocation of $9.2M. Risk rating remains **Low.**

03/16/2010 after proposals have been received, it is not impossiblethat the cost will 3M$ largr than planned. This risk will become certainty by mid-April

04/12/2010
Contract awarded below budget, it is most likely that the contract can be completed within budget, remaining risk estimated <500k$, because of the late award and the tight schedule there is a considerable schedule risk, however.

10/29/2010
Preliminary and final design reviews held with little delay (caused by chosing the solid state mod option)
Final design review accepted, part of the linac already in production, vendor schedule ahead of P6 schedule, remaining risk is small but not zero.

03/15/2012: LINAC production and installation went well and commissioning will start within weeks. There is a small rest risk covering anything which can only be discovered in commissioning. **Risk Rating remains Low.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-03	1.03.03.02 Booster	Mar 15, 2012

Description:

Condition: Booster procurement cost significantly higher than baseline due to:
(1) Only few vendors available
(2) Market condition for copper worsens
Consequence: Increase in cost

this aspect obsolete sper May 2010

Condition: Late delivery of Booster by the vendor
Consequence: Schedule impact on overall accelerator system

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Cost $500K (for mitigation of schedule risk). Schedule risk remains medium as it is on near critical path.	Low

First Indicator:

Fall 2008: (cost) Subsequent vendor quotes show significant cost increase. Recent vendor quotes are about $2M larger than 2007 quotes. From bothe venders. A third vendor has withdrawn his interest to participate in the booster competition.

Summer 2010: (schedule) Contract schedule, which was reviewed and validated by the project team, meets the project baseline schedule with 2 month schedule float. Project team will be closly monitoring the progress of design and fabrication of components.

Mitigation Approaches:

a) Monitor price index trends and be ready to initiate associated procurements as soon as possible.
b) Encourage alternative vendors
c) Be prepared to procure the system components and assemble in-house

these considerations obsolete since May 2010

Date Started:	Date to Complete:	Owner:
Feb 2007	Aug 2012	ASD Director F. Willeke

Current Status:

09/30/07: Postponed procurement schedule to meet funding profile

Contacting vendors
01/12/08: BINP contacted, received confirmation of interest (vendor #2)
01/31/08: Contact Toshiba company and receive of expression of interest in providing system (vendor #3)
02/15/08: Danfysik visits BNL to discuss booster specification and procurement (vendor #1)
03/15/08: BINP visits BNL to discuss booster specification and procurement (a.o.)
07/15/08: TOSHIBA (vendor #3) declares not to be able to respond to a future RFP.

09/01/08: New vendor quotes received from Danfysik and Budker. The Danfysik quote increased from $15M to $18M and the Budker quote increased from $11M to $12M. The average quote is increased by $2.5M.

11/01/08: The information that one of the vendors (DANFYSIK) has sold his medical accelerator part of the compony to Siemens and the potential of Danfysik seems to be weakened considerably

01/16/09: Danfysik has visited BNL and has reemphasized his strong interest and abilitiy to submit a proposal for the NSLS-II-BOOSTER

02/16/09: A cost esimate for the in-house integration of the NSLS-II booster with components provided by industry has been worked out. The total booster cost including installation and commissioning amount to $17M with a 30% accuracy.
The value of the risk should be increased by $1M to cover the full range of cost uncertainty.

03/31/09: According latest information about booster turn-key providers, the odds for the booster procurements have worsened. One

of the vendor probably lost all their accelerator expertise, another venfdor is in difficult economical situation. This makes the probablility for cost increase due to large fraction of work to be performed inhouse larger. The value of the risk should be increased from 3-4M$ to 4-5M$. With the possibility of some of the work to be done at BNL, a significant schedule risk arises. In order to generate the in-house labor to prepare for procurement and installation, ther schedule could easily slip by 6months. This would have an impact on the early finish.

09/25/09: Probability changed **from likely to unlkely** and cost impact **increased to $7M (critical).**

05/25/10: Contract was awarded under budget and cost risk has been retired. We are now tracking the schedule risk for the delivery and installation of the Booster. Since Booster is a near critical path item, the risk rating (schedule and overall) is **Medium**.

10/29/2010 Preliminary design review based on thorough design work went well without major action items. Report will be accepted after closure of minor issues. The cost risk for the booster is allocated mainly to mitigate any schedule risk as the schedule is very tight. Risk remains **Medium**

05/4/2011 Final design review was held with only a few items. Collaboreation with BINP on design and resolving issues goes well. Protoyping is on schedule. Overall schedule and cost risk has become smaller. Risk rating reduced to **Low**.

03/15/2012: Production of Boostrer components proceeds well, no technical issues, first deliveries received, Budker is delayed by 3 months according to their own schedule but still within P6 schedule, **risk remains low**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-04	1.03.04.02.01 Storage Ring Magnets	Mar 15, 2012

Description:

Condition: Storage Ring Magnets cost may be significantly higher than baseline due to
(1) Cooper used in manufacturing of magnets is subject to market fluctuation. If market condition worsens -
(2) Vendor quoted iron used in baseline cost was significantly lower than future market price. If market condition worsens
(3) Storage ring magnet procurement is close to the critical path and procurement strategy should emphasize mitigating the schedule risk which could imply that the project has to accept higher cost.
Consequence: Increase in cost

Probability:	Impact:	Risk Rating:
Likely	Marginal Cost ~ $500K Schedule ~1 months	Low

First Indicator:

Subsequent vendor quotes show significant cost increase.
NSLS-II protoype production revealed that some of the prototype vendors assumptions of how to achieve the required NSLS-II Magnet field quality were optimistic and it is expected that the vendors will increase there proposal prices accordingly.

Mitigation Approaches:

(1) Verify baseline estimate with production of R&D magnet prototype

(2) Use multiple vendors with QA oversight.

(3) BNL supplies surplus iron for magnet fabrication.

(4) Award contract for production of prototypes to vendors which made cheapest offer to qualify low price vendors for production

Mitigation for schedule risk as of December 2010:
(1) Visit vendors more frequently by BNL staff and hired technical & management consultants.

(2) Send BNL experts to vendors to help with magnet measurements perform accepetance tests on the vendors site in presence of BNL experts.

(3) Explore potential 2nd source options.

(4) Explore built-to-print and in-house assembly options.

(5) Investigate and optimize down stream activities (girder integration & installation and SR commissioning) in order to gain back lost schedule float.

Date Started:	Date to Complete:	Owner:
Nov 2007	Aug 2012	ASD Director F. Willeke

Current Status:

04/01/08: Update of the vendor quotes project potential $2M cost increase on average.

04/30/08: Award for prototype magnet production placed.

02/01/09: A recent revision resulted in the possibility to simplify the NSLS-II corrector system which might result in a cost reduction of $0.50M.

02/16/09: Protoype production experience is complete. The vendors had quite some difficulties in meeting NSLS-II requirtements. Some design features need to be changes which have some cost impact. Some of the production methods used for the prototypes will be clearly unsuitable for cost effective mass production. The risk must be rate higher and the value of the risk is increased to $4M (upper limit).

02/16/09: The risk rating is **increased from Medium to High** due to change in the probability **from unlikely to very likely.**

09/25/09: Cost risk is **reduced to $2M** but the risk rating remains high because the probability remains to be **very likely.**

11/6/09: With all contracts being in place, the overall cost risk has been reduced to $1M, which will provide potential efforts which project might have to put in to resolve any technical and/or schedule issues caused by the contractors. The $200k schedule incentive for the quadrupole production will be carried as EAC.

After the contracts have been awarded in October, a few issues arose for the production of the quadrupoles. There were some inconsistencies discovered in our specifications which needed to be resolved. In addition, some of contractors informed the project that they are having difficulties on securing the lines of credit needed to purchase raw materials. The project has been take some time and effort to resolve these issue which could potentially incur delays.

Cost risk is **low** and schedule risk is **medium.**

8/18/10: Magnet production has a very slow start. Only 1 out of 6 vendors has started production. It is still unclear whether quadrupole vendors can meet field quality (**medium technical risk**). The schedule risk remains **Medium**.

10/20/10: The first article production of large aperture quadrupole and large aperture sextupoles at Buckley has failed and the vendor is starting over. This can consume the entire schedule float of magnet production, assembly and installation. A mitigation program is being implemented to recover schedule float. Risk has been updated to: 3 months schedule risk (M) arising from slow start of vendor production and $2.3M cost risk (M) as second production lines might be necessary to mitigate schedule risk. Overall risk changed to **High.**

1/20/11: Production schedules for Buckley and Budker continued to slip, impacting overall project schedule. Dedicated magnet production manager and technical representatives for all production sites have been appointed and additional technical and management consultants to provide more intense oversight have been hired. Potential 2nd source options have been investigated and effort to be ready for potential in-house assembly option has been launched. Other schedule mitigation options are being actively considered. Overall risk rating remains to **High** with higher cost risk.

5/4/2011: Most of technical issues are now resolved and most of the vendors are in full production. The risk remains high as the chances for catching up with the schedule and reduction of the impact on project is not very large. Risk remains **High**

11/18/2011 With mitigation actions taken over last few months, production has improved at all vendor sites. While implementing mitigation actions, both cost and schedule contingency was consumed. **Risk now has been reduced to Medium.**

3/15/2012 Magnet production has improved sigificantly, production will be completed for 10 of the 15 production lines within the next few months. The production rate at TESLA is now >10 magnets per months so the the end of production is expected in the late Fall 2012. Only somewhat critical remaining production is the Buckley dipole production where production rates required to complete production within 2012 have not yet been demonstrated. **Risk has been de-rated to Low.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-05	1.03.04.03 SR Vacuum Chambers	Mar 15, 2012

Description:

A) Condition: Design of the Storage Ring Vacuum Chambers has to be modified due to changes from the optimization of the lattice and insertion devices, especially canting of wigglers and undulators.
Consequence: Production schedule delay and impact assembly schedule of girders. Will result in significant cost increase.

B) Condition: Study of two stream instability might result in a request for coating the chamber f. e. with TiN.

Consequence: Should this happen, it would cause a ~one year delay in completing the vacuum chamber installation and would require a complete revision of the installation schedule. This is considered very unlikely, the risk is low

C) Condition: After one of the two vendors has shown repetedly of not being able to produce the Al vacuum chamber extrusion for the multipole chambers with the necessary precision, only one vendor remains which could provide the extrusion. As the production of the extrusions requires quite a large set-up and testing time, it is not unlikely that the last vendor will drop out.
D) Conditon(10/29/10): After failure of inconel chamber and shielded beloow design, team is not able to enable production of s4a chamber and bellows to maintain schedule

Consequence: NSLS-II vacuum chambers cannot be produced in time or even cannot be produced at all. The consequence could be a delay of the project by more than a year

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Cost $0 Schedule: Low Schedule risk due to bellow and S4A/B chamber production has been mitigated.	Low

First Indicator:

Encounter technical difficulties during prototype fabrication and testing.

Mitigation Approaches:

A,B)Freeze lattice and specification of insertion devices as early as possible.
C-0: Get through the procurement process as fast as possible in order to clarify the risk with the remaining vendor and to clarify the necessity of some of themore painful mitigating actions
C-1. Revisit further potential vendors which have shown no interest in 2006/2007 when first approached for NSLS-II extrusions
C-2. Consider going back to the original vacu
um chamber profile and using special weldments for BPMs. Consider to build chamber S2 with a small cross section exclusing the key-hole-part and without the NEG distributed pumping but with lumped ion pumps instead, consider NEG coating
C-3. Consider alternative manufacturing prosesses such as machining the half-profiles and welding
C-4. Change the vacuum chamber concept completely and going to stainless steel vacuum chambers with NEG coating and lumped ion-pumping and NEG cartidges

Date Started:	Date to Complete:	Owner:
Nov 2007	Apr 2012	ASD Director F. Willeke

Current Status:

07/01/08: Biweekly meeting initiated to come to a conclusion of the layout of the insertion devices.

07/30/08: Successful testing of high-precision welding for short test chamber conducted. Prototype vacuum chamber is being prepared to conduct various performance tests. **This changed the rating of this risk from Medium to Medium-Low.**

09/04/08: Systematic impedance assessment of vacuum system components are in progress. Canting of damping wigglers has been eliminated from project scope and impact of lattice design changes on vacuum chamber has been reduced to the option to provide additional machining of the Al chamber to allow an additional sextupole magnet in the achromat . Risk rating has been changed from **Medium-Low to Low**

02/01/09: Recent discussion with EF revealed that the conflict arising from the request of a large canting angle of 3.5mr for the DW 3.5m sections is persisting. This canting angle cannot be supported by the present design. Straight forward design changes will most likely result in a significant vacuum performance risk.

05/22/09: Change from **Low to Medium-Low** risk for schedule delay resulting from request to coat vacuum chamber.

08/11/09: After it became clear that one of the two vendors for Al multipole vacuum chamber extrusion cannot provide the quality of the vacuum chambers, the probability of schedule delay is becoming very likely.

11/17/2009
Vaccum chamber extrusions, maching and welding is now underway. However, we lost substantial amount of schedule float and schedule risk remains to be very high. Cost risk is medium. Schedule risk is **High**.

8/16/2010
Vaccum chamber extrusions, maching and welding is progressing well, except inconel chamber. Cost risk is**Low.** Schedule risk is **Low**, except the case for inconel chamber which is **Medium.**

10/29/2010
Schedule risk for AL chambers is low but schedule risk for bellow and S4A/B chambers is high. Overall risk rating remains **Medium-Low.**

1/20/2011
Schedule risk for bellow and S4A/B chambers has been resolved. Overall risk rating updated to **Low.**

3/15/2012
From the many vacuum subsystems, the "crotch absorbers" are the only components which are still late, there is a low remaining schedule and cost risk.
Risk remains low.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-06	1.03.04.04 SR Power Supply	Oct 30, 2010

Description:

Condition: Challenging requirements of the Storage Ring Power Supply may result in more complex designs or additional number of power supply units for independent control capability.
Consequence: Additional engineering for redesign. Cost of redesigned system will be significantly higher than that of the baseline design.

Probability:	Impact:	Risk Rating:
Unlikely	Significant Cost $2M Estimate for the cost impact is based on prototype production and testing.	Retired

First Indicator:

Encounter technical difficulties during prototype fabrication and testing.

Mitigation Approaches:

(1) Perform detail design and build & test prototypes.
(2) Use standard power converter in the design which has a stable price history.
(3) Get multiple vendors to bid for the production.

Date Started:	Date to Complete:	Owner:
Nov 2007	Nov 2010	ASD Director F. Willeke

Current Status:

02/20/08: Engineering design completed and test prototypes were ordered. This changed the rating of this risk **from Medium to Medium-Low**.

07/30/08: Prototype power supply for dipole corrector has been tested.

02/01/09: The activities of the fast orbit feedback taskforce revealed the possibility of cost savings of the corrector ps. It is too early yet to reflect this in the risk rating yet.

02/16/09: This risk is partially materializing as a technical design change to increase the MP PS stability from 100ppm to 50ppm has been scheduled for discussion and decision. Accelerator physics requirements have been updated in favor of higher stability.

09/25/09 Cost risk reduced **from $3M to $2M** and risk rating changed **from Medium-Low to Low**.

10/30/10 After the successful final design review of the NSLS-II power supply system, this risk can be **retired.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-07	1.03.04.06.01 SR RF Cavity	Mar 15, 2012

Description:

Condition:
(1) Single vendor
(2) Vendor produced Storage Ring RF Cavity fails to meet quality specs, or suffers failure during high power tests.
(3) Uneven Ti-N coating of window causes failure of high power window, requiring new BCP and vertical test.
(4) During commissioning, Helium leaks into cavity and must be repaired, re-assembled and tested.
(5) During commissioning, cavity/window assembly fails to meet power requirements due to poor quality control of production cavities.
Consequence:
Significant schedule delay

Probability:	Impact:	Risk Rating:
Likely	Significant Cost Risk: retired when contract awarded in April 2011 cost for mitigating schedule delay reintroduced 1M$ Schedule Risk: 3 months, very likely	Medium

First Indicator:

(1) Encounter procurement difficulties.

(2) - (5) Encounter technical failures during initial testing of the cavity or during commissioning period

Mitigation Approaches:

(1) Build up a high power RF window test stand and vertical test facility to be able to control the schedule in the event of a cavity failure.

(2) Develop alternative sources for RF cavity

(3) Assemble in-house high power RF window test stand to conduct quality control test which will reduce turn around time in case of any problem occurs.

Date Started:	Date to Complete:	Owner:
Nov 2007	Oct 2013; cost risk retired in April 2011	ASD Director F. Willeke

Current Status:

07/15/08: Exploring a possibility of potential second vendor.

09/01/08: Update of the exchange rate project potential increase in costs, as large as $4.5M.

02/16/09: Continue to interest a 2nd vendor. Spend effort to investigate behavior of the cavity under pressure and to deal with safety rule compliance issue. Risk impact has revised **from Significant to Critical** and rating has changed **from Medium-Low to Medium**.

06/26/09 Implementation of latest vendor quotes on production time into the schedule resulted in the SC cavities becoming close to the critical path. Cost risk is **medium**. Schedule risk is **medium**.

03/16/10 Risk rating updated according to latest information from vendors. Cost, schedule and technical risks are all **medium**.

10/30/10 The team is confident that two vendors will bid for the SC Cavities CESR-B type, we do not expect to obtain a bit for the KEK-B type cavity. Although vendors expressed interested in bidding, the cost risk remains **High,** the technical riks is considered **Low** at this point, and the schedule risk is **Medium.**
1/20/11 Due to delays in review & approval of new safety codes and preparations for bid packages, delivery schedule is closed to become a critical path item for overall project schedule. We are working on potential schedule mitigation plan, including expertiding evaluations of proposals once received and optimizing commissioning plan. The overall risk updated to **High.**
5/4/11: First part of risk retired after two good proposals were received and a contract was awarded. Second risk remains. Schedule risk increases as the time between cavity availability and start of commissioning is only 3 months. Risk remains H**igh**
11/18/2011 The remaining risk of sc cavities the possibility that schedule delays might require the use of normal conducting cavities for start-up of NSLS-II. The additional cost of this is ~1M$.

3/15/2012 Risk unchanged since last update

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-08	1.03.05 Controls Systems	Sep 25, 2009

Description:

Condition: Cost of the components for Timing Systems in Controls Systems significantly higher than baseline due to:

(1) Only vendor for the key components is located in Europe and bases of estimate were collected in Euros. If exchange rate worsens -
(2) Because of a single vendor situation without any competition, the company may choose to increase price.

Consequence:
Increase in cost.

Probability:	Impact:	Risk Rating:
Likely	Significant Cost <$1M Estimate for the cost impact is based on the vendor quote and latest exchange rate.	Retired

First Indicator:

Subsequent vendor quotes show significant cost increase.

Mitigation Approaches:

Monitor market trends and be ready to initiate associated procurements as soon as possible.

Date Started:	Date to Complete:	Owner:
Nov 2007	Nov 2010	ASD Director F. Willeke

Current Status:

09/10/08: Based on the latest dollar to euro exchange rate, this **changed the rating of this risk from Medium to Low.**

02/16/09: The risk has been reviewed and cost impact was updated. The rating remaines unchanged.

09/25/09: Based on recent progress and vendor information, this risk is **retired.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-09	1.03.07 Insertion Devices	Mar 15, 2012

Description:

Condition: Permanent magnetic material and high permeable-pole material for insertion devices continue to escalate well above inflation due to strong demand for permanent magnet technology (eg. hybrid cars).

Consequence:
Increased cost.

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Cost $0.5M Cost risk reduced to $0.5M after all contracts have been placed within budget (expect for DW wich suffered from a dramatic unexpectedly high increase in raw material cost, this risk has been mitigated by contingency spending)	Low

First Indicator:

Subsequent vendor quotes show significant cost increase.

Mitigation Approaches:

Monitor market trends and be ready to initiate associated procurements as soon as possible.

Date Started:	Date to Complete:	Owner:
Nov 2007	Nov 2012	ASD Director F. Willeke

Current Status:

07/27/08: Material prices did not increase since fall of 2007. We continue to monitor trends.

02/16/09: The risk has been reviewed and remains unchanged.

06/30/10: The risk has been reviewed and remains unchanged.

10/30/10: The risk has been reviewed and remains unchanged.

1/31/11: DW was awarded under budget. The cost performances for 3PW and EPU are expected to be on or under budget. RFP for remaining IVU will be released within a few weeks. The cost risk value is slightly reduced and the overall risk is updated to **Medimu-Low.**

11/18/11 with more contractract being awarded and
production started, the remaining risk is $1M.

3/15/12 Cost risk reduced to $0.5M after last ID contract award to happen soon with pricing known. **Risk reduced to LOW.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-10	1.03.03.06.01 Storage Ring Beam Position Monitors	Mar 12, 2012

Description:

An in-house development of the BPM electrons is carried out with the goal to develop an alternative for commercially available, but expensive and has out-dated electronic-modules. If this development is successful, the BPM electronics system is expected to be on budget and on schedule. In case the development fails to provide a ready-to-produce design veryfied by a satisfactory prototype by August 2010, the commercially available electronics can be purchased but the resources invested in the development effort (~$800k) can not be recovered. In case of success, the development cost can be well covered by means originally foreseen for the purchasing of the commercial units.

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Cost impact: $200k	Low

First Indicator:

In about March 2010, we will be able to reassess and predict success of the development. (This turned out to be too optimistic.)

The assessment was made in August 2010 by an external peer review which encouraged the tem to continue with the in-house development

Mitigation Approaches:

Nov 2009 - Purchase commercially available BPM electronics as originally planned.

Oct 2010 - Mitigation approach unchanged, present esitmate for the production is 2 years. Assuming that the last unit needs to be received 6 months before commissioning to have sufficient time for acceptance testing, installation and integrated testing (reasonable, not too pessimistic assumption), The purchase order would have to be placed now. Assuming a 3 months period between a decision and contract award (assume RFQ type of procurement) The schedule risk is 3 month and will grow linear with time until the technical risk can be retired.

Date Started:	Date to Complete:	Owner:
Nov 2009	Dec 2012	ASD Director F. Willeke

Current Status:

11/17/09: Initial entry of this risk

10/30/10: The BPM development went well so far with good success of the planned intermediate step, though not without difficulties. It also becomes clear that the original schedule was much too optimistic. The present, realisitic schedule based on a very good understand of the detailed steps to complete the system extends the compeltion date to three monts before start of commissioning if everything proceeds smoothly. Cost risk has been increased to $2M to preserve an option to purchase commercial units if there are any production difficulties arise.

1/20/11: Progress made as planned. Cost risk has been adjusted to $1M and schedule is being monitored closely.

11/18/11
The first production units of the BPM electronics are meeting spec. The rest risk is small $200k.

3/12/2012 BPM electronics production started, risk can be retired soon if everything continues to go well. **Risk remains low**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-11	1.03.04.09 SR Installatoin	Mar 15, 2012

Description:

Labor required for the accelerator systems installation could be substantially under-estimated in current project plan. Accelerator installation delayed due to non-availability of components, ring-building or injector building and due to underestimation of approvement procedures

Probability:	Impact:	Risk Rating:
Likely	Marginal Cost impact $0.5M	Low

First Indicator:

As installation plan being detailed out, estimate for labor required will be updated.

Mitigation Approaches:

Detail-out installation plan based on up-to-date production component delivery schedule then optimize sequence and time allocation for all activities. After thorough optimization, shortfall has to be mitigated by additional resources.

Date Started:	Date to Complete:	Owner:
Jan 2011	Dec 2012	ASD Director F. Willeke

Current Status:

1/20/2011: New risk entered

5/3/11: Cost risk reduced after the approval of PCR 11-227 to increase the installation labor by $2.5M. Schedule risk remains, mostly driven by the magnet production rate. **Medium.**

03/15/12 Installation rates are improving but we might still have to add labor to make the project milestones. LINAC installation showed as expected a long tail of smaller activities which took much longer than anticipated. Schedule risk **remains Medium.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
CFD-01	1.05.02 Requirements for conventional facilities	Feb 10, 2012

Description:

Condition: Changes in requirements for the conventional facilities due to uncertainties in accelerator or beamline design

Consequence: Changes in baseline design of the conventional facilities will result in cost increases and/or schedule delay.

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Cost ~$200k Estimate for the cost impact is based on previous experience.	Low

First Indicator:

Internal or external design review identifies potential design changes required to meet the functional specifications followed by a discussion on Project Change Request to be submitted.

Mitigation Approaches:

(1) Ensure active interface management.
(2) Conduct comprehensive reviews of design package.

Date Started:	Date to Complete:	Owner:
Nov 2007	June 2012	CFD Director M. Fallier

Current Status:

02/20/08: Conducted comprehensive review of 30% design package
03/06/08: BCP 08_012 was approved to increase in the radial distance from the storage ring ratchet wall to the walkway by 10 feet resulted in increase of the cost baseline by $6.43M.
05/21/08: Conducted comprehensive review of 50% design package
06/26/08: Conducted comprehensive review of 80% design package. **Rating changed from High to Medium.**
07/15/08: Participated in ASD and XFD interface management meetings
09/05/08: Conducted comprehensive review of 100% design package - CRDR agreed ASD and XFD design is sufficiently advanced to allow CF construction to begin but noted risk of changes still exist and impacts, once under construction, are greater. Therefore, the **Date to Complete changed from September 2008 to September 2009**.
09/26/08: Technical sign-off from each division acknowledging CF design meets requirements of each division and is ready for construction.
02/10/09: No change in status.
09/25/09: Processed PCR 09-071 incorporating ASD requested change to Compressed air & Nitrogen system. No other significant changes to date.

07/20/10: With significant progress in Ring Building construction and experience to date, estimated cost risk has been updated (reduced) **from medium to low**.

10/29/10 - Changes due to changed requirements from ASD or XFD are running at a low level. Few design changes have been necessary due to changed requirements. Total scope change/design change/enhancement type changes are running at 1.5%.

5/27/11: Changes to CF electrical design requested by ASD have resulted in additional electrical costs for Injector building and some delays to beneficial occupancy date. Other changes related to supporting ASD installation activities have been captured in PCR 11-232. Other scope transfers from ASD for DI Pipe, Lead shielding and electrical cable tray are scope transfers and not design changes.

2/10/12: Additional minor changes to CF design continue to be made to accomodate maturation of accelerator and beamline designs now that procurement of components and installation are well underway. Changes are small and involve adding additional penetrations, added support, added utility connections and relocating minor equipment to avoid interferences. These are generally low dollar value and no technical or schedule impact. This does not include scope transfers which are captured as separate PCRs and already have associated budget.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
CFD-02	1.05.03 Ring Building Contract	Feb 18, 2009

Description:

Condition: Bid prices for the conventional facilities construction exceed estimate beyond anticipated contingency. Initial estimate inaccurate or market forces change rapidly. Certain construction commodities may become scarce or much more expensive due to competing demand possibly increasing cost and schedule.

Consequence: Requires scope reduction or use of contingency.

Probability:	Impact:	Risk Rating:
Unlikely	Critical Cost $20M~$80M	Retired

First Indicator:

Cost estimate update based on Architect-Engineering firm's report on the 30% design package

Mitigation Approaches:

1. Use early procurements and use of commodity price protection clauses where warranted.
2. Ensure accurate estimate and reasonable escalation rates.
3. Improve estimate accuracy by seeking independent estimate and interaction with contractors.
4. Perform market analysis to assess escalation.
5. Perform a value engineering study and identify cost saving alternatives.
6. Conduct an independent technical review of the 100% design submittal.

Date Started:	Date to Complete:	Owner:
Nov 2007	Apr 2009	CFD Director M. Fallier

Current Status:

04/20/08: Estimate updated based on comprehensive review of 30% design package
06/04/08: Estimate updated based on comprehensive review of 50% design package
07/15/08: Estimate updated based on comprehensive review of 80% design package, evaluating validity of escalation rates for estimate and feasibility of escalation protection clauses in RFP.
09/05/08: Completed CRDR of 100% design package and communicated comments to A/E for incorporation in design.
01/23/09: Received 5 competitive and responsive proposals. Selected proposal is comparable to baseline estimate. This risk can be retired upon contract award.
02/18/09: Contract was awarded and the risk is **retired.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
CFD-03	1.5.3 Conventional Facility Construction	Feb 10, 2012

Description:

Upon award of contracts for conventional construction packages:
1. Ring Building
2. Electrical Substation
3. Chilled Water Plant
4. Chilled water Piping
5. LOB's

There is a high liklihood of added costs due to errors and omissions in the design, differing site conditions or contractor change-orders due to delays and other factors. These costs are typically in the range of 5-10% of contract value.

Probability:	Impact:	Risk Rating:
Likely	Significant Cost: $2M Estimate for the cost impact is based on ~5% of the remaining work to go for the total value of contracts, including Ring Building and LOBs.	Medium

First Indicator:

Requests for information (RFI's) from the contractor indicating design discrepancies or differing site conditions.

Mitigation Approaches:

Extensive QA checking of design, prompt resolution of RFI's and proactive response to design issues to limit costs to design resolution and not cause schedule delay.

Date Started:	Date to Complete:	Owner:
1/23/09	12/31/12	CFD Director M. Fallier

Current Status:

1/23/09: Contract for Ring Building is ready for award. Additional QA review of design has been performed to reduce liklihood of design errors & omissions leading to schedule delay and associated costs.

11/18/09: Ring Building, Chilled Water Plant , Chilled Water Piping and electrical Substation contracts have all been awarded. Ring Building changes due to differing field conditions are relatively low, (expect $125k) however changes due to design errors and omissions will likely be in the expected 5%+ range. Chilled Water Plant and Electrical Substation changes are running lower than expected.

7/21/10: Ring Building field changes to date are running at about 2.5% of work complete however some unresolved changes may increase this. Risk of 5% of work to go should be maintained. Also included now is potential field changes for LOB.

10/29/10 - Field changes on ring bldg continue to run at <2% for error/omissions plus an additional 1.5% for scope change or enhancement changes. This is within project expectations and running lower than anticipated risk allowance of 5%. The changes are a significant engineering/administrative requirement that puts added demand on staff resources so augmentation is being evaluated.

1/20/11 - Estimate for the cost risk updated to $4M based on the value of remaining work.

5/27/11 - Cost changes related to achieving beneficial occupancy in P-1 and RF have resulted in an uptick in field change costs. Utilities projects for Electrical Substation, Chilled Water Plant Expansion have completed on or below budget and are no longer cost risk. Chilled water piping completed slightly over budget and no longer cost risk. Remaining risks are Ring Building and LOB field changes.

2/10/12 - Remaining risk on work to go for the Ring bldg and LOB contracts, assuming 5% liability, is $2M. best estimate of value of cost changes still under negotiation on work complete is covered in EAC.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
CFD-04	1.05.03.06 LOB contract	Jul 21, 2010

Description:

Condition: Bid prices for the LOB construction exceed estimate beyond anticipated contingency. Initial estimate inaccurate or market forces change rapidly. Certain construction commodities may become scarce or much more expensive due to competing demand possibly increasing cost and schedule.

Consequence: Requires scope reduction or use of contingency.

Probability:	Impact:	Risk Rating:
Unlikely	Critical Cost ~$8M	Retired

First Indicator:

Uncertainty of cost estimate based on Architect-Engineering firm's report on the 50% design package

Mitigation Approaches:

1. Ensure accurate estimate and reasonable escalation rates.
2. Improve estimate accuracy by seeking independent estimate and interaction with contractors.
3. Perform market analysis to assess escalation.
4. If feasible, perform bid and award during period when construction markets are competitive.
5. Perform contractor outreach to maximize competitive pool of interested bidders.

Date Started:	Date to Complete:	Owner:
Apr 2009	Apr 2010	CFD Director M. Fallier

Current Status:

08/21/09: Estimate based on 50% design package received. Projected to be on budgetted cost.
09/25/09: Held contractor outreach meeting , attended by over 20 interested construction firms.
10/30/09: Estimate based on 100% design package received. Projected to be on budgetted cost.
7/21/10: Bid results for several qualified contractors are well below estimate therefore bid risk associated with this procurement can be **retired**.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
CFD-05	1.5.3 Conventional Facilities Construction	Feb 10, 2012

Description:

With the award of the LOB contract to EW Howell, there will now be two general contractors, Howell and Torcon, working on the same construction site. This creates new risks when compared to a single site GC. The added risks are potential for cost impact of one contractors actions on the other, the potential for construction safety impacts due to added congestion or interaction of the two contractors and the potential that one contractors actions may delay the other.

Probability:	Impact:	Risk Rating:
Likely	Marginal Cost impact: $200k The impact is significant due to potential dollar value of the cost impacts of one contractor on the other and the potential for added CF oversight required beyond what is currently budgeted. It is not expected that schedule would be significantly impacted since impacts can be selectively deferred to the LOBs, which have substantial float, instead of the Ring Bldg.	Low

First Indicator:

1- Failure to reach agreement among the two GC's on mobilization plans for the LOB contractor at inital kick-off
2- frequent unwarrented claims submitted by either contractor
3- Interaction among the contractor management & workers leading to work or safety impacts

Mitigation Approaches:

1. It is common to have multiple contractors on the same site and both have worked successfully in this type of environment before.
2. The contracts for both contractors have requirements for this arrangement that should mitigate potential disputes or issues
3. Weekly coordination meetings will be held with both contractors to foster planning and communication that should minimize impacts
4. Strict enforcement of contract provisions if a given contractor or certain personnel are violating requirements or promoting disharmony

Date Started:	Date to Complete:	Owner:
8/20/10	6/30/12	CFD Director Martin Fallier

Current Status:

8/19/10 - Approval to award LOB has been received. Meeting of contractors to establish mobilization plans and joint working relationships will take place after award of LOB contract.
10/29/10 - a series of mtgs have been held between the project team and the two contractors to work out coexistance plans. Contractor cooperation has been excellent. Agreements have been reached in principal on all significant issues and are now being documented. Additional proactive risk mitigation actions are being considered by both contractors as well.
5/27/11 - The Ring and LOB contractors have been working harmoniously since LOB construction began in earnest. Only $13k in cost changes have been attributable to this risk to date.

2/10/12 - Interfaces between the two contractors remain manageable but there have been several small costs totalling ~$37 k related to the impacts of one contractor on the other. Remaining exposure of $200k is appropriate given potential impacts and need to transfer scope between the contractors (and corresponding cost inefficiencies) to coordinate work and reduce impacts.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
DOE-01, PMG-01	NA FY09 Continuing Resolution	Mar 12, 2009

Description:

Condition: FY09 Continuing Resolution (CR)
Delay in appropriations occurring on October 1 of each year. Under a CR, available funding for each month is generally limited to 1/12 of the previous year's appropriated amount.

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

Probability:	Impact:	Risk Rating:
Likely	Critical Cost $8M~$170M Schedule 1~18 months	Retired

First Indicator:

Congressional appropriation in September 2008.

Mitigation Approaches:

1. Perform impact analysis for various scenarios and inform DOE.
2. Get directions from DOE as early as possible.
3. Actively pursue multiple mitigation avenues: such as seek for Congressional notification of Start of Construction, request for Congressional reprogramming.
4.

Date Started:	Date to Complete:	Owner:
May 2008	June 2009	Federal Project Director Frank Crescenzo

Current Status:

06/23/08: Preliminary impact analysis for various FY09 CR scenarios was submitted to DOE.
03/12/09: FY09 budget was passed by Congress and signed by the President. **Risk now retired.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
DOE-02	NA Directed Funding Profile Change	Feb 14, 2012

Description:

DOE Directed Funding Profile change (reduction)

Probability:	Impact:	Risk Rating:
Unlikely	Marginal	Retired

First Indicator:

Program Office Funding Direction.

Mitigation Approaches:

Adjust baseline to minimize cost and schedule impacts according to prgram funding direction.

Date Started:	Date to Complete:	Owner:
When program funding direction is	ASAP after direction is received	Federal Project Director Frank Crescenzo

Current Status:

08/26/08: Program funding guidance for FY-09 and profile beyond is consistent with the approved baseline although likely impacted by CR (see DOE-01) in FY-09. No indications at this time of DOE directions to modify baseline funding profile.

03/12/09: With ARRA fund, the revised funding profile for project is expected to be significantly front-loaded. Therefore the rating of this risk is changed **from High to Medium.**

11/16/09: With FY10 funding appropriation, probability for this risk was reduced **from likely to unlikely**. However, any reduction from the planned profile in FY11 and FY12 will have a significant impact on project schedule. The overall rating remains **Medium.**

2/2/10: With FY11 funding request, the impact for this risk in out years is reduced **from significant to marginal**. The overall rating updated to **Low**.

2/14/12: With FY13 funding request, the impact for this risk in out years is now **retired.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
DOE-03	NA FY10 funding	Nov 16, 2009

Description:

Tight funding for the planned work in FY10

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Potential schedule delays (1~2 months) in a few non-critical path activities.	Retired

First Indicator:

Heavy use of contingency in FY09.

Mitigation Approaches:

Minimize contingency spending in FY09.
Differ some of non-critical path activities scheduled in FY10 to FY11.

Date Started:	Date to Complete:	Owner:
Oct. 2008	Sep. 2010	Federal Project Director Frank Crescenzo

Current Status:

10/28/08: Project started to actively identify and prioritize potential items and activities which can be differed while evaluating the Advanced Procurement Plans for FY09 and FY10.
03/16/09: Contingency spending in FY09 is projected to be minimal. With ARRA fund, the revised funding profile for project is expected to be significantly front-loaded. Therefore the rating of this risk is changed from **Medium to Low**.
11/16/09: FY10 budget from final appropriation was as requested. This risk is retired.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ESH-01	1.01.02.01, 1.03, 1.04, 1.05, Construction Safety	Mar 12, 2012

Description:

Condition: Accident/Incident causing injury/illness or equipment damage on the construction site or during installation of accelerator and experimental beamline components.

Consequence: Minor injury/illness or damage would result in potential work slowdown/schedule impact due to first aid treatment and incident investigation. Serious injuries/illness or damage would result in potential work stoppage until investigations are complete and corrective actions are implemented, schedule impacts could be significant. Potential fines could be imposed under the 851 rule.

3/6/12; Performance of the ring building contractor has continued to improve and is now about 50% of general industry rates. The LOB contractor has performed without any TRC or DARTS since beginning construction. Vairous forms of enhanced communication (daily ESH, weekly ESH mgmt mtg, monthly ESH meetings etc) have yielded positive results and is a lessons learned for the program. The majority of "high risk" activities (steel erection, concrete) are now complete, however construction risks continue. Contractor staffing peaked at 263 workers last year and is now down below 200 and will soon be below 150 when the ring building contractor finishes up punchlist work in the may/june time frame. Construction oversight staffing has been adjusted to reflect the decreasing contractor population and continues to be adequate.

Probability:	Impact:	Risk Rating:
Likely	Marginal Cost $1M per month Schedule 1~2 months Estimate for the cost impact is based on the estimated cost for standing army and the peak activity period. Estimate for the schedule impact is based on the previous cases.	Medium-Low

First Indicator:

Any trend in first aid injuries, minor incidents or non-compliances would be a leading indicator of a potential for a more significant event. These types of leading indicators will be monitored on a daily basis to allow intervention and corrective action.

Mitigation Approaches:

Maintain a vigorous safety program and adequate level of staffing for ESH support and oversight. Two project Construction Safety Engineers provide daily assistance/oversight. Lab oversight includes construction safety, Heavy Equipment inspection, and independent oversight. External oversight from BHSO and insurance carriers. Contractors will follow NSLS-II ESH Plan to facilitate development of contractor specific ESH Plan. A contractor safety incentive in place to motivate contractor performance. Frequent methods of communication and feedback deployed to facilitate safety including, daily project mtgs, weekly contractor mtgs, weekly IPT mtgs, etc. Phase hazard analysis conducted for all high risk activities.

Date Started:	Date to Complete:	Owner:
Nov. 2007	June 2014	ESH Manager S. Hoey

Current Status:

Current Status:

05/30/08: Preliminary NSLS-II ESH Plan developed and submitted as part of RFP to potential contractors and DOE. Interview process for Construction Safety Engineers (2) in progress and expected to be complete by 6/30/08. CSE's will be on board to support site clearing and screening of contractor/sub contractor submissions.

07/15/08: NSLS-II ESH Plan final draft is out for internal review and approval. Will be submitted along with RFP on or about 7/25 for DOE review and approval. First Construction Safety Engineer started 7/9/08, second CSE will start 50% time on 8/18/08 and 100% on 9/28/08.

09/08/08: NSLS-II ESH Plan for Construction has been approved by BHSO. Both Construction Safety Engineers have started and will be at 100% by 9/28/08.

02/10/09: Construction Safety Engineers are fully on board. Specific SOP's for construction safety have been developed and entered on the share point site. ESH was involved in the development of the ESH criteria in the RFP as well as the bid evaluation. This evaluation included site visits to prospective bidders which was useful in the evaluation process. Pre-construction meeting ESH briefing and ESH Management Plan are being developed.

02/18/09: The risk was reviewed and impact, rating, and owner were updated.

09/23/09: Routine review of risk there are no changes at this time.

11/16/09: A serious construction related injury occurred on 9/30/09. An independent committee conducted and investigation and is in the process of finalizing the report (expected in late november). This report will generate Judgments of Need that the project will respond with a formal corrective action plan. Several immediate corrective actions have been incorporated to improve the program at this time. These CA's include increasing safety staffing at the contractor, sub-contractor and project levels, changes to the Phase Hazards analysis process and level of training and qualifications for contractors.

6/7/10: All corrective actions from the 9/30/09 accident have been incorporated into the program. These corrective actions have led to improvements in the depth and coverage of PHA's, institution of a contractor and project construction self assessment program and added additional field staff both contractor and project. Overall contractors are performing well and complying with approved safety plans/PHA's.

10/20/10: Contractors performance has improved significantly over the past year. TRC rates have gone from 6.64 in FY09 to 1.86 for FY 10. DART rates have gone from 3.32 in FY 09 to 0.62 for FY 10. Introduction of a new prime contractor for the LOB contract will begin the end of October 2010. This will introduce an increased risk due to complexities of coordination of work; contractors working in close proximity and challenges with keeping work controls consistent. Controls are being implemented including coordination meetings between the two prime contractors, detailed reviews of contractors EHS plan to assure consistency and weekly coordination mtgs with the laboratory to assure consistency of controls for the contractors across the lab. ESH resources have been increased over the past six months and include an additional construction safety engineer and a ESH/QA assessor.

3/12/12: Peak activity period for the conventional construction has passed. Installation activities have significantly ramped up. Cost and schedule impacts have been updated accordingly.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ESH-02	1.01.02.01, 1.01.02.02, 1.03, 1.05 Unexpected ESH issue	Mar 6, 2012

Description:

Condition: Unplanned or new ESH issue discovered during design evolution.

Consequence: Major design change or introduction of a new experimental process or material which incorporates new hazards or invalidates prior analysis. For Example, Unknown nanomaterial/rad hazards driving a design or process change or incomplete or inadequate shielding calculations and radiological evaluations. New shielding materials required. Potential promulgation of new regulatory requirement mandating design changes (851, nano). Readiness reviews identify non-compliance issues driving late stage design changes.

Probability:	Impact:	Risk Rating:
Unlikely	Marginal Cost ~$100K Estimate for the cost impact is based on the previous experience.	Low

First Indicator:

Internal or external design review identifies a potential design deficiency and/or commissioning activities identify a deficient (inadequate design or inadequate construction/installation) component. Potential changes in regulatory drivers are typically identified early via SME involvement, federal register announcements or consensus working group participation however late stage design changes are costly.

Mitigation Approaches:

Complete Final Hazards Analysis and Fire Hazards Analysis to identify potential ESH issues early in design process. Develop Preliminary Safety Assessment Documents and Shielding Analysis. Use external committees (radiological shielding, conventional facilities) to validate the design and analysis.

Date Started:	Date to Complete:	Owner:
Nov 2007	Nov 2012	ESH Manager S. Hoey

Current Status:

05/30/08: ESH involvement in design reviews, current input at 50% Title II. Future input at 80% and 100% reviews. PSAD to document all risks, mitigation and design decisions in development scheduled completion 8/08. Detailed commissioning plans to be developed to scope, identify criteria and responsibilities.

07/15/08: 80% design review with ESH input has been completed. ESH will participate in 100% review. PSAD is on schedule and has completed internal review. PSAD will be submitted to DOE in early August for review and approval. DOE review and approval expected to be complete prior to CD-3 review scheduled for late September. Rating changed **from Medium to Low.**

09/8/08: 100% design review with ESH input has been completed. PSAD is complete and approved by BHSO.

02/10/09: The majority of this risk is retired due to the completion of 100% design. There will be some residual risk remaining through commissioning due to the LOB design and potential changes to the ring building design.

11/16/09: As reported in Feburary the majority of the risk is retired due to the completion of the 100% design. This risk will remain open through commissioning to accomodate potential design modificaitons.

6/7/10: No significant changes from last update. Changes to conventional facilities have been minimal with no ESH impacts. A Radiation Safety Workshop will be held on June 22 and 23 which will help confirm/document assumptions and designs of systems for radiation shielding, top-off safety, interlock strategies, personnel protective systems etc.

3/6/12: Changes to conventional facilities continue to be minimal however have occurred (e.g., down spouts discharging over walkways creating slip hazard). Facility and machine design are fairly mature, beamline design is ramping up. Top off review continue to assure that proper controls/procedures are in place prior to top off. Furture scope of beamline ESH hazards/risks are being vetted with beamline managers to identify as early as possible any issues. ESH staff is involved in all design and design reviews to assure all ESH aspects are covered.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ESH-03	1.01.02 Environment, Safety and Health	Nov 12, 2009

Description:

DOE is evaluating DOE Order 420.2B "Safety of Accelerator Facilities" to determine if any elements of the order are redundant to other Rules or Orders. The charge is to re-write the order to eliminate any redundancies and/or eliminate the order entirely. The risk is that if the order is eliminated it is uncertain what will fill the void for accelerator requirements. Other rules i.e., 830 have been mentioned which would invoke nuclear rules for accelerators, other options are external regulation under OSHA and NRC. The authorization basis requirements for accelerators is well defined in 420.2B, to develop an authorization basis and commission the NSLS-II under a new set of rules or external regulation may significantly impact the schedule due to new requirements and approval cycles. A Justification Memorandum from a DOE/Contractor working group is due on 9/30/2009 which will make a recommendation on changing the order or eliminating it. The full impact of this risk should be understood shortly after the Justification Memorandum is released.

Probability:	Impact:	Risk Rating:
Likely	Significant Depending on the new set of requirements established for authorization basis, NSLS-II Project may need to re-baseline the schedule milestones for specific AB documents and review cycles. If for example 830 is the governing rule for AB the project can expect significantly longer review cycles for Operational Readiness Reviews and development of hazard analysis documentation that is probabilistic based rather than qualitative. This will result in a longer pathway to obtain an AB and ultimately delay commissioning of NSLS-II. There is also a possibility of 830 driving design changes to the facility, for example the seismic requirements for nuclear facilities are much more extensive than typical building code requirements. Design changes at this stage of NSLS-II would cause significant schedule and cost impacts.	Retired

First Indicator:

Justification Memorandum is due to DOE Office of Science on 9/30/09 this should be a good indicator of the future impact.

Mitigation Approaches:

The NSLS-II Project will keep abreast of the ongoing gap analysis being performed by the DOE/Contractor team. the NSLS-II Project has input via one of the two contractor members is from an accelerator facility. Prior to the final decision on the fate of 420.2B, DOE has committed to a wider contractor input.

Date Started:	Date to Complete:	Owner:
8/18/09	10/29/09	ESH Manager Steve Hoey

Current Status:

8/27/09: The issue and impacts were extensively discussed during the DOE Accelerator Safety Workshop (8/18-8/20) and again during the NSLS-II Authorization Basis Workshop (8/21/09). The Project will keep abreast of the status of the ongoing gap analysis as well as any proposed changes to the Order and/or replacement by another regulatory entity.
11/12/09: On Monday 11/2/09 George malosh and Pat Dehmer have endorsed the recommendation from the working group assigned to perform an assessment of the existing order. That recommendation is to keep the Order with some modificaitons, including adding some specific definitions and eliminating redundant requirements. The modifications to the order are expected to move forward shortly with input to the accelerator community. These changes will not impact the determined Authorization Basis Strategy for the NSLS-II project. This risk is retired.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
OPS-01	1.06 Under estimated pre-ops labor	Feb 10, 2012

Description:

Labor required for the pre-operations after the completion of installation and commissioning could be substantially under-estimated in current project plan.

Most of $10M risk is for underestimated labor. About 80% of Pre-Ops budget ($40M) is for labor resources. For TEC activities, labor was underestimated by about 20~25%. Currently, we estimate that 20~25% of $40M ($8~10M) will be additional labor needed for pre-ops activites. We are detailing out commissioning (pre-opeations) activities including bottoms-up esitmate of labor resources required.

Probability:	Impact:	Risk Rating:
Likely	Critical Cost impact $6.8M	High

First Indicator:

As installation and commissioning plans for accelerator and beamlines being detailed out, estimate for labor required for pre-operations will continuously be updated.

Mitigation Approaches:

Allocate more resources for pre-operations.

Date Started:	Date to Complete:	Owner:
Feb 2012	June 2014	Deputy Project Director Aesook Byon

Current Status:

4/10/2010: New risk entered.

2/28/2011: Current bases of estimate was entered.

2/10/2012: Based on updated EAC with current information, estimated cost risk also updated.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
PMG-02	1.01 Project Management	Feb 10, 2012

Description:

Condition: (1) Unexpected increase or addtions in project review and reporting requirements. (2) Underestimation of required labor.

Consequence: Cost increase

Probability:	Impact:	Risk Rating:
Likely	Marginal Cost ~$1M Estimate is based on the analysis of actual vs planned cost incurred in FY2008, FY2009, FY2010 and FY2011.	Low

First Indicator:

Level of effort work starts to show delays and long turn-around times.

Mitigation Approaches:

(1) Plan and prioritize tasks to enable optimization and maximize efficiency.
(2) Obtain and implement appropriate lessons learned from previous large scale projects to maximize efficiency.
(3) Give clear guidances and instructions to minimize non-essencial or duplicated work.

Date Started:	Date to Complete:	Owner:
Feb 2009	June 2013	Project Support Division Director Diane Hatton

Current Status:

04/07/2010: Updated to reflect comprehensive review of staffing within Project Management and Project Support.

02/24/09: New entry submitted - based on FY2008 cost data and latest information on outyear reporting requirements.

08/04/09: Updated to reflect latest available information.

09/20/09: Estimate of $3.0M and was reviewed and is still accurate.

11/20/09: Updated cost impact estimate to $1.4M

3/17/10: Estimate reviewed and changed to $5.4M to reflect increased staffing that may be required through the first 1/2 of FY2014.

5/18/10: Estimate changed to $6.7M based on the latest projection.

11/9/2010: Reviewed and confirmed.

4/12/2011: Estimate reduced from $6.7M yo $3.7M based on latest analysis.

8/3/2011: $3.7M estimate reviewed and confirmed.

2/10/2012: Pressure on labor for NSLS-II is subsiding as systems have matured and are functioning well. Estimate reduced to $1M.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
PMG-03	1.01.03.09 Space and Utilities	Feb 10, 2012

Description:

Condition: Needs for technical space (laboratories, test and assembly facilities, storage) and office space exceed planned allocation.

Consequence: Expand space plan for the project which will result in cost increase.

Probability:	Impact:	Risk Rating:
Likely	Significant Cost ~ $3M	Medium

First Indicator:

Space requirements for technical setups, storage and personnel start to exceed available space.

Mitigation Approaches:

(1) Continue evaluation and optimization of of space plan.
(2) Where possible, plan delivery schedules to minimize storage requirements; use shared offices when appropriate.

Date Started:	Date to Complete:	Owner:
Feb 2009	Jun 2013	Business Division Director Diane Hatton

Current Status:

4/7/2010: Latest estimate now included. Assumes PCR and EAC will be adjusted also to reflect most up-to-date information.

02/24/09: New entry submitted - based on FY2008 experience and latest information on outyear requirements.

09/20/09: Increased space costs have not yet materialized, but are being monitored. Space audit to take place within the next month or so and this entry will be adjusted once that review is complete.

11/18/09: Options for additional space are under evaluation.

2/1/2010: Additional technical space has now been identified and impact on cost baseline is being developed. Estimate of ~$3M appears to be correct.

3/18/2010: A portion of this risk has been moved to EAC, leaving $1.5M as the residual risk associated with space.

11/9/2010: Reviewed and confirmed.

4/12/2011: Estimate reduced from $1.5M to $.4M based on latest analysis.

8/3/2011: Estimate of $.4M reviewed and confirmed.

2/12/2012: Space charges for occupied areas of the ring building are being assessed at a much higher rate than estimated. Estimated impact could be as much as $3M. Will continue to monitor, review and discuss with BNL Facility and Operations.

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
XFD-01	1.04.05 User Instruments	Jan 20, 2011

Description:

Condition: Design maturity of each beamline could lead to potential cost increase in
(1) beam transport
(2) utilities
(3) white beam component
(4) personnel safety and equipment protection systems
(5) endstation
(6) beam controls
(7) installation and commissioning

Consequence: cost increase

Probability:	Impact:	Risk Rating:
Likely	Critical Cost $10.1M Estimate of the cost impact is based on the cost performance to date and the past experiences at similar type of user facilities and experimental beamlines.	High

First Indicator:

Updated cost estimates after the completions of conceptual design and/or preliminary design show significant increase.

Mitigation Approaches:

* Exercise value engineering
* Shared designs when applicable
* Adopted lessons learned from other facilities on cost saving measures
* Collaborate or use designs from other facilities

Date Started:	Date to Complete:	Owner:
Feb 2009	Oct 2012	XFD Director Q. Shen

Current Status:

02/19/09: Change from Low to Medium risk. Low risk EFD-LOW-03 (item #2 Design of Beamline) is elevated to EFD-01 as medium risk.

1/20/11: After the completion and validation of preliminary design review, it was concluded that $14.2M cost risk is real and could be likely for the baseline scope of 6 project beamlines. Therefore the overall rating is updated **from Medium to High risk.**

3/15/12: Based on procurement performance to date, the cost risk is **reduced to $10.1M** as some of contracts were awarded over budget, resulted in contingency utilization. The **schedule risk remains to be high**.

NSLS-II LOW Risk Registry

Wednesday, March 21, 2012
11:19:07 PM

LOW Risk ID	Title	Record Date:	Owner title	Approval Status
ASD-LOW-01	Linac to Booster transport line	Retired Nov 18, 2009	ASD Director	Approved
ASD-LOW-01	Installation labor	Moved to ASD-11 on Jan 20, 2011	ASD Director	Approved
ASD-LOW-02	Storage Ring Instrumentation	Moved to ASD-10 on Nov 17, 2009	ASD Director	Approved
ASD-LOW-02	Front Ends	Retired Nov 18, 2009	ASD Director	Approved
ASD-LOW-02	Storage Ring Utilities	Retired Mar 15, 2012	ASD Director	Approved
ASD-LOW-02	Storage Ring Installation	Moved to ASD-11 on Jan 20, 2011	ASD Director	Approved
ASD-LOW-03	Accelerator Fabrication	Retired Mar 15, 2012	ASD Director	Approved
CFD-LOW-01	Procurement of Conventional Construction	Retired Aug 25, 2010	CFD Director	Approved
CFD-LOW-01	Procurement of Conventional Construction - Delay	Retired Jan 20, 2011	CFD Director	Approved
CFD-LOW-02	Site Conditions	Moved to CFD-03 on Jan 23, 2009	CFD Director	Approved
CFD-LOW-02	Differing Site Conditions	Moved to CFD-03 on Jan 23, 2009	CFD Director	Approved
DOE-LOW-01	Delay in CD-3 Approval	Retired on Jan 9, 2009	Federal Project Director	Approved
DOE-LOW-01	Delay in DOE Approval	Retired on Dec 20, 2010	Federal Project Director	Approved
EFD-LOW-01	R & D Program Design Efforts	Retired Mar 15, 2012	XFD Director	Approved
EFD-LOW-01	R & D Program	Retired on Dec 20, 2010	XFD Director	Approved
EFD-LOW-01	R & D Laboratory Space	Retired on Dec 20, 2010	XFD Director	Approved
EFD-LOW-02	Optics Procurement of Beam Mirrors	Moved to EFD-01 on Feb 19,2009	XFD Director	Approved
EFD-LOW-02	Optics	Moved to EFD-01 on Feb 19, 2009	XFD Director	Approved
EFD-LOW-03	User Instruments	Retired on Mar 15, 2012	XFD Director	Approved
EFD-LOW-03	Design of Beamline	Moved to EFD-01 on Feb 19, 2009	XFD Director	Approved
EFD-LOW-03	Project beamline	Retired on Dec 20, 2010	XFD Director	Approved
ESH-LOW-01	Unplanned Environmental Impact	Retired Oct 20, 2010	ESH Manager	Approved
OPS-LOW-01	Installed Device	July 25, 2008	NSLS-II Project Director	Approved

LOW Risk ID	Title	Record Date:	Owner title	Approval Status
OPS-LOW-01	Heatload	July 25, 2008	NSLS-II Project Director	Approved
OPS-LOW-01	Pre-Operations	July 25, 2008	NSLS-II Project Director	Approved
PMG-LOW-01	Cost Increase of Personnel Staffing	moved to PMG-02 on Feb 24, 2009	NSLS-II Project Director	Approved
PMG-LOW-01	Personnel Staffing	Retired Nov 18, 2009	NSLS-II Project Director	Approved
PMG-LOW-01	Personnel Staffing Cost Increase	Retired Mar 15, 2012	NSLS-II Project Director	Approved
PMG-LOW-02	Rate Changes	Retired Jan 20, 2011	NSLS-II Project Director	Approved
PMG-LOW-02	Foreign Exchange Rate	Retired Mar 15, 2012	NSLS-II Project Director	Approved
PMG-LOW-02	Rate Changes	Retired Jan 20, 2011	NSLS-II Project Director	Approved

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
ASD-LOW-01	1.03.03 Injection system	Retired Nov 18, 2009

Description:

Linac to Booster Ring Transport Line
Costs for magnets or power supplies may be significantly higher than baseline due to:
(1) materials used in manufacturing is subject to market fluctuation or
(2) vendor quoted price used in baseline cost was significantly lower than future market price.
Cost impact is estimated to be<$1M.

11-18-09
This has been taken into account by a PCR on transferline cost in August 2009. **This risk is retired.**

Probability:	Impact:
Likely	Significant

Mitigation Approaches:

Monitor market trends and be ready to initiate associated procurements as soon as possible.

Date Started:	Owner:
Nov 2007	ASD Director F. Willeke

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
ASD-LOW-01	1.03.03 Injection system	Moved to ASD-11 on Jan 20, 2011

Description:

Labor needed for installation significantly underestimated.

This risk is moved to ASD-11 in High-Medium risk registry.

Probability:	Impact:
Likely	Marginal

Mitigation Approaches:

Perform optimization of detailed work flow.

Date Started:	Owner:
Nov 2007	ASD Director F. Willeke

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
ASD-LOW-02	1.03.04 Storage ring	Moved to ASD-10 on Nov 17, 2009

Description:

Instrumentation Production - instrumentation fails to meet specified requirements.

This risk is moved to ASD-10 in High-Medium risk registry.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

Perform thorough testing of prototypes or first batch of production delivered.
Plan for a thorough QA program
Where applicable, use complementary diagnostics configuration.

Date Started:	Owner:
Nov 2007	ASD Director F. Willeke

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
ASD-LOW-02	1.03.04 Storage ring	Retired Nov 18, 2009

Description:

Change in safety system requirements could force installation of redundant safety sutters for the undulator and damping wiggler front ends.

11-18-09
This risk is retired with final design reviewed and approved.

Probability:	Impact:
Unlikely	Marginal

Mitigation Approaches:

Complete rigorous analysis of reliability of single safety shutter system.

Date Started:	Owner:
Nov 2007	ASD Director F. Willeke

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
ASD-LOW-02	1.03.04 Storage ring	Retired Mar 15, 2012

Description:

Temperature requirement for cooling of equipment enclosures does not meet the spec.
Cable trays or AC power connections do not meet NEC and OSHA codes.
Cable trays need rework during installation.

3/15/2012 This risk can be retired as installations have begun and the first DI watersystems and chilled water systems are in operation

Probability:	Impact:
Unlikely	Marginal

Mitigation Approaches:

Perform detail design. Build and test prototypes.

Date Started:	Owner:
Nov 2007	ASD Director F. Willeke

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
ASD-LOW-02	1.03.04 Storage ring	Moved to ASD-11 on Jan 20, 2011

Description:

Schedule delay of any sections will cause cascade of subsequent activities.
Underestimated labor required for installation activities.

This risk is moved to ASD-11 in High-Medium risk registry.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

Perform detailed work flow analysis.
Provide close vendor (contractor for installation activities) surveillance.
Prepare contingency plans.

Date Started:	Owner:
Nov 2007	ASD Director F. Willeke

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
ASD-LOW-03	1.03.08 Accelerator Fabrication Facilities	Retired Mar 15, 2012

Description:

Unforseen requirements for the insertion device magnet measurement facility can result in requiring extra investment.

3/15/2012 Risk retired as facility completed and in operation.

Probability:	Impact:
Unlikely	Marginal

Mitigation Approaches:

Fix the specifications of facility requirements early.
Prevent other activities in the vicinity of the magnet measurement facility.

Date Started:	Owner:
Nov 2008	ASD Director F. Willeke

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
CFD-LOW-01	1.05.03 Procurement of Conventional Construction	Retired Aug 25, 2010

Description:

(1) Lack of bidder interest
(2) Inadequate schedule allowance for procurement activities

8-25-10
With LOB contract award, this risk is retired.

Probability:	Impact:
Unlikely	Marginal

Mitigation Approaches:

(1) Solicit interest among contractors during design to assure availability and interest.
(2) Perform advance procurement planning and incorporate in schedule.
1/23/09 - Vast majority of risk is retired by procurement results for Ring Bldg where sewlected proposal is comparable in cost to the baseline.

Date Started:	Owner:
Nov 2007	CFD Director M. Fallier

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
CFD-LOW-01	1.05.03 Procurement of Conventional Construction	Retired Jan 20, 2011

Description:

Delay in Contract award or execution
(1) Labor strike or stoppage
(2) Contractor failure to perform

1-20-11
With LOB contract award and smooth executions and excellent performances by all conventional construction contracts, this risk is retired.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Contract requires GC to maintain sound labor relations and not take actions that would foment a strike. Contractor responsible for cost and schedule related to the labor actions.
(2) Thorough evaluation& selection of qualified contractors and hold them accountable.

Date Started:	Owner:
Nov 2007	CFD Director M. Fallier

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
CFD-LOW-02	1.05.03 Site Conditions for Conventional Construction	Moved to CFD-03 on Jan 23, 2009

Description:

Differing site conditions or insufficient site evaluation of the conventional construction site result in extra work and contractor change orders. It could delay work completion and impact cost.

This risk has been moved to CFD-03 in High-Medium risk registry.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

Perform thorough early site investigation & utility survey.

Date Started:	Owner:
Nov 2007	CFD Director M. Fallier

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
CFD-LOW-02	1.05.03 Site Conditions for Conventional Construction	Moved to CFD-03 on Jan 23, 2009

Description:

Subsurface obstruction or incorrect utility location due to differing site conditions. Have to reroute or change design of mechanical utilities, result in cost increase and schedule delay.

This risk has been moved to CFD-03 in High-Medium risk registry.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

Conduct field verification of tie-in points prior to Ring Building construction start.

Date Started:	Owner:
Nov 2007	CFD Director M. Fallier

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
DOE-LOW-01	NA Approval delays	Retired on Jan 9, 2009

Description:

Significant delay in CD-3 approval prevents award of ring building contract and constructions start.

1-9-09
Risk Retired when CD-3 approval was granted by the DOE Deputy Secretary.

Probability:	Impact:
Unlikely	Marginal

Mitigation Approaches:

(1) 90 day firm price hold for ring building proposals
(2) Strategic use of early procurement authority

Date Started:	Owner:
Nov 2007	Federal Project Director Frank Crescenzo

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
DOE-LOW-01	NA Approval delays	Retired on Dec 20, 2010

Description:

Delay in DOE approval of major subcontracts due to
(1) Federal contracting staff are unaware of schedule requirements.
(2) CF procurement is unacceptable to MA.
(3) Insufficient federal resources are available to review& approve subcontracts.
12-20-10
This risk is retiredafter all major procurements and contracts successfully awarded in 2010.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Perform advance procurement planning and incorporate schedules into baseline schedule for major subcontracts.
(2) Hold procurement status meetings with BSA.
(3) Conduct validation review of RFP with CH& MA for CF contract.
(4) Monitor federal procurement workload and obtain CH support if needed.

Date Started:	Owner:
Nov 2007	Federal Project Director Frank Crescenzo

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
EFD-LOW-01	1.02.02 R&D Program	Retired Mar 15, 2012

Description:

Design effort falls behind schedule, delaying procurement

3/15/2012 Risk retired as R&D program design efforts were completed.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Perform monthly status review of design effort in FY09 and FY10
(2) Prioritize design activities based on procurement and construction schedule.

Date Started:	Owner:
Nov 2007	XFD Director Q. Shen

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
EFD-LOW-01	1.02.02 R&D Program	Retired on Dec 20, 2010

Description:

R&D programs may hit technical difficulties and make slow progress, resulting in impacting Beamline design schedule.

12-20-10
This risk is retired after completion and validation of preliminary design for 6 project beamlines in 2010.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Prioritize R&D programs

(2) Aggressively monitor progress on planned versus actual work.
(3) Design beamlines with enough flexibility to accommodate likely scenarios from the R&D outcome

Date Started:	Owner:
Nov 2007	XFD Director Q. Shen

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
EFD-LOW-01	1.02.02 R&D Program	Retired on Dec 20, 2010

Description:

Delay in outfitting R&D laboratory space in bldg 703, impacting the final design effort for the experimental beamline.

12-20-10
This risk is retired with excellent progress made in outfitting R&D lab space in 2010.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Coordinate with the R&D lab refurbishment planners frequently.
(2) Prioritize R&D activities based on procurement and construction schedule.

Date Started:	Owner:
Nov 2007	XFD Director Q. Shen

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
EFD-LOW-02	1.04.04 Optics	Moved to EFD-01 on Feb 19,2009

Description:

Procurement of standard beam conditioning mirrors
Vendors for optical mirrors are historically late on their delivery. Will cause schedule impact.

This risk has been moved to EFD-01 in High-Medium risk registry.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Vendor selection to emphasize previous successful projects of a similar nature.
(2) Specification of contract milestones to provide adequate schedule float.
(3) Close monitoring of mirror production progress at the vendor.

Date Started:	Owner:
Nov 2008	XFD Director Q. Shen

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
EFD-LOW-02	1.04.04 Optics	Moved to EFD-01 on Feb 19, 2009

Description:

High heatload on optics monochromators
For diamond option, quality of diamond will be critical. For silicon option, a more complex cryogenic cooling system will likely be required.

This risk has been moved to EFD-01 in High-Medium risk registry.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

Make a design decision, with consultation with existing facilities, as early as possible so that there will be enough time to procure final optical system.

Date Started:	Owner:
Nov 2008	XFD Director Q. Shen

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
EFD-LOW-03	1.04.05 User Instruments	Retired on Mar 15, 2012

Description:

(1) Increase in shielding cost due to DOE requirement change or increase in required size of the enclosures.
(2) Schedule delay due to limited production capacity by the vendor.

3/15/2012 - Risk retired. Design completed, contract awarded on budget and carried out on schedule.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Keep constant communications with DOE regarding environmental requirement.
(2) Qualify as many vendors as possible.
(3) Stagger installation schedule.

Date Started:	Owner:
Sep 2008	XFD Director Q. Shen

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
EFD-LOW-03	1.04.05 User Instruments	Moved to EFD-01 on Feb 19, 2009

Description:

Design maturity of each beamline could lead to potential cost increases in
(1) Beam transport
(2) Utilities
(3) White beam component
(4) Personnel safety and equipment protection systems
(5) Endstation
(6) Beam controls

This risk has been moved to EFD-01 in High-Medium risk registry.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Finalize requirements and design as early as possible
(2) Plan on R&D prototyping where appropriate

Date Started:	Owner:
Sep 2008	XFD Director Q. Shen

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
EFD-LOW-03	1.04.05 User Instruments	Retired on Dec 20, 2010

Description:

Late start on inclusion of SRX as a project beamline may delay design readiness for this beamline, including insertion device and front-end issues.

12-20-10
This risk is retired after completion and validation of preliminary design for SRX beamline in 2010.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Make use of the existing design already detailed by the user group where appropriate
(2) Minimize risk exposure by only building one branch in baseline
(3) Align beamline layout with existing designs by ASD groups as much as possible
(4) Procure commercial design study asap

Date Started:	Owner:
Sep 2008	XFD Director Q. Shen

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
ESH-LOW-01	1.0 ESH	Retired Oct 20, 2010

Description:

Unplanned Environmental impact discovered during construction. Either legacy contamination (e.g. radiation) or migration of protected species to construction footprint.
This could cause schedule delays due to remediation of contaminated soil or relocation of protected species during conventional construction.

6/8/10 Update, excavations in undisturbed soil is nearly complete reducing the like hood of discovering an environmental impact. Protected species continue to periodically nest on site however have not been a significant impact.
10/20/10 Update, This risk is being retired. All excavation into unknown areas is now complete, there is a very low risk that anything unknown would be dug up. Concerns with migratory birds and protected species have proven to be insignificant. As much of site is now developed and covered the risk of incidental spills is very low. A NESHAPs assessment for NSLS-II Operations was completed. This assessment was based on the diffusive/fugitive losses during the operational phase of the accelerator. The potential dose equivalent was well below the 10mrem/yr annual limit which would require a permit and monitoring. Report is attached. **This risk is retired.**

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

NEPA review and detailed site evaluation completed. Remediation of all known historical leaks/spills have been cleaned to the satisfaction of regulatory agencies.

Date Started:	Owner:
Nov 2007	ESH Manager S. Hoey

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
OPS-LOW-01	1.06 Pre-operations	July 25, 2008

Description:

Installed device does not meet the performance specs, requiring modifications

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Have thorough QA procedures throughout fabrication processes for the devices.
(2) Plan for offline system integration test (after the production but before the installation) as extent as possible.

Date Started:	Owner:
Nov 2010	NSLS-II Project Director S. Dierker

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
OPS-LOW-01	1.06 Pre-operations	July 25, 2008

Description:

Integrated heatload for overall facility higher than anticipated

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Continue to update a thorough tracking of heatload from all components
(2) Include a reasonable contingency capacity in the infrastructure system design (cooling and air handling)

Date Started:	Owner:
Nov 2010	NSLS-II Project Director S. Dierker

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
OPS-LOW-01	1.06 Pre-operations	July 25, 2008

Description:

Fail to meet design performance due to vibration or temperature variance

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Perform in depth modeling analysis of vibration performance and temperature stability during design

(2) Institute sound QA during construction to assure all equipments (both technical components and infrastructure elements) perform as specified.

Date Started:	Owner:
Nov 2010	NSLS-II Project Director S. Dierker

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
PMG-LOW-01	1.0 Personnel Staffing	moved to PMG-02 on Feb 24, 2009

Description:

Cost increase due to underestimation of required labor.
This risk has been moved to PMG-02 in the High-Medium risk registry.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

Perform annual review of actual versus planned labor rates for first three years after CD-2 approval

Date Started:	Owner:
Nov 2007	NSLS-II Project Director S. Dierker

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
PMG-LOW-01	1.0 Personnel Staffing	Retired Nov 18, 2009

Description:

Schedule delay due to failures to recruit qualified personnel to key positions as planned in the baseline schedule.

11-8-2009 All key positions have been filled. **This risk is retired.**

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

(1) Conduct focused recruitment program in conjunction with the dedicated Human Resources group within the Project; exercise recruitment incentive plan; conduct open house for job fair

(2) Aggressively monitor planned versus actual staffing plan

(3) Work with the laboratory to temporarily or permanently argument short falls

Date Started:	Owner:
Nov 2007	NSLS-II Project Director S. Dierker

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
PMG-LOW-01	1.0 Personnel Staffing	Retired Mar 15, 2012

Description:

Cost increase due to overall uncertainty for estimated labor rates used in the performance baseline.

11/18/2009: We conducted our annual review of average rates and they are still relatively close as planned.

3/15/2012: Risk retired as average rates are close to planned baseline.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

Perform annual review of actual versus planned labor rates for first three years after CD-2 approval

Date Started:	Owner:
Nov 2007	NSLS-II Project Director S. Dierker

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
PMG-LOW-02	1.0 Rate Changes	Retired Jan 20, 2011

Description:

Actual nation-wide inflation rates could be much higher than standard index rate used in the performance baseline due to economy down-turn.

1-20-11
Based on past history and current projected trend, this risk is retired.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

DOE Program Office and Project Team evaluate inflation rates and
(1) Adjust the baseline plan to minimize the overall impact
(2) Submit a request for additional funding via Baseline Change Proposal to enable the completion of the Project.

Date Started:	Owner:
Nov 2007	NSLS-II Project Director S. Dierker

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
PMG-LOW-02	1.0 Rate Changes	Retired Mar 15, 2012

Description:

Many of major technical components for the Accelerator Systems and Experimental Facilities will be procured overseas. The risk of Foreign Exchange Rate could be a significant factor, depending on the year of purchase. The following systems are subject to this risk:
WBS 1.03.03 Linac and Booster components
WBS 1.03.04 Storage Ring Beam Monitors
WBS 1.03.05 Accelerator Timing System
WBS 1.04.05 Mirrors and Monochromators

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

Monitor prices of items that will be procured in the later years of the project, especially from vendors that are the only suppliers of the items. Allow for sufficient contingency.
3/15/2012: Risk retired as all major procurement items awarded were not impacted by any Foreign Exchange Rate and we do not expect for the remaining activities.

Date Started:	Owner:
Nov 2007	NSLS-II Project Director S. Dierker

NSLS-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
PMG-LOW-02	1.0 Rate Changes	Retired Jan 20, 2011

Description:

Incur cost over-runs due to unexpected increase in raw material price. The following systems are subject to this risk:
Cooper: RF cavities, cables, power systems, water systems,
Lead: shielding
Iron: magnets
Magnet materials: Wigglers, Undulators

1-20-11
Based on past history and current projected trend, this risk is retired.

Probability:	Impact:
Unlikely	Significant

Mitigation Approaches:

Continue to monitor material prices and place contracts as early as possible.

Date Started:	Owner:
Nov 2007	NSLS-II Project Director S. Dierker