

National Synchrotron Light Source II

Risk Registry

Snap Shot as of December 3, 2009



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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 $\geq 90\%$
Likely (L)	Risk is likely to occur with a probability $\geq 50\%$ 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)	$\leq \$1M$	None	Minor degradation, Performance falls below upper end of goal; CD-4 can still be met
Significant (S)	$> \$1M$, but $\leq \$5M$	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

NLS-II Risk Registry

Thursday, December 03, 2009

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Risk ID	Title	Record Date	Owner title	Risk Rating	Approval Status
ASD-01	Unexpected difficulties with dynamic aperture	Sep 25, 2009	ASD Director	Low	Approved
ASD-02	Linac Turn Key Procurement	Nov 16, 2009	ASD Director	Low	Approved
ASD-03	Booster Turn Key Procurement	Sep 25, 2009	ASD Director	Medium	Approved
ASD-04	Storage Ring Magnet Production	Nov 16, 2009	ASD Director	Medium	Approved
ASD-05	Storage Ring vacuum chamber design and production	Nov 16, 2009	ASD Director	High	Approved
ASD-06	Storage Ring power supply design	Sep 25, 2009	ASD Director	Low	Approved
ASD-07	Storage Ring RF Cavity Production	Jun 26, 2009	ASD Director	Medium-High	Approved
ASD-08	Controls System procurement	Sep 25, 2009	ASD Director	Retired	Approved
ASD-09	Insertion Device Production	Feb 16, 2009	ASD Director	Medium	Approved
ASD-10	BPM Electronics	Nov 17, 2009	ASD Director	Low	Approved
CFD-01	Changes in requirements for conventional facilities	Sep 25, 2009	CFD Director	Medium	Approved
CFD-02	Ring Building contract	Feb 18, 2009	CFD Director	Retired	Approved
CFD-03	Field Changes for Conventional Construction	Nov 18, 2009	CFD Director	High	Approved
CFD-04	LOB contract	Oct 30, 2009	CFD Director	Medium	Approved
DOE-01, PMG-01	FY09 Continuing Resolution	Mar 12, 2009	Federal Project Director	Retired	Approved
DOE-02	Directed Funding Profile Change	Nov 16, 2009	Federal Project Director	Medium	Approved
DOE-03	FY10 Funding	Nov 16, 2009	Federal Project Director	Retired	Approved
ESH-01	Construction Safety	Nov 16, 2009	ESH Manager	Medium-High	Approved
ESH-02	Unexpected ESH issue (design)	Nov 16, 2009	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
PMG-02	Personnel Staffing	Nov 20, 2009	Project Support Division Director	Medium	Approved
PMG-03	Space Costs	Nov 18, 2009	Project Support Division Director	High	Approved
XFD-01	Design maturity of User Instrument	Feb 19, 2009	XFD Director	Medium	Approved

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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 diagnostics	Sep 25, 2009

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:

- 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.
- It might become necessary to return to a sextupole powering scheme which allows to tune each sextupole magnet individually.
- It might become necessary to introduce octupole magnets to control the tunes with amplitude.
- It might become necessary to introduce decapole magnets to control the size of the chromatic tune footprint.
- It is conceivable that an advantage may arise from modifying the positions of lattice elements with consequences for vacuum chamber, diagnostics and support design

Probability:	Impact:	Risk Rating:
Unlikely	Significant Cost ~ \$1M 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 NLS-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 magnets 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.**

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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.**

NSLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-02	1.03.03.01 Linac	Nov 16, 2009

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 \$0.5M~\$1M Estimate of the cost impact is based on recent procurement by another institute.	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

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.

Date Started:	Date to Complete:	Owner:
Sep 2007	Mar 2010	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 bids from the two 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**.

NLSL-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-03	1.03.03.02 Booster	Sep 25, 2009

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

Probability:	Impact:	Risk Rating:
Unlikely	Critical Cost ~\$7M Estimate for the cost impact is based on new vendor quotes received from Danfysik and Budker and an estimate for the in-house integration.	Medium

First Indicator:

Subsequent vendor quotes show significant cost increase.

Recent (fall of 2008) vendor quotes are about \$2M larger than 2007 quotes. From both vendors. A third vendor has withdrawn his interest to participate in the booster competition.

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

Date Started:	Date to Complete:	Owner:
Feb 2007	Aug 2010	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 company 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 ability to submit a proposal for the NLSL-II-BOOSTER

02/16/09: A cost estimate for the in-house integration of the NLSL-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 vendor is in difficult economical situation. This makes the probability for cost increase due to large fraction of work to be performed in-house 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, the schedule could easily slip by 6 months. This would have an impact on the early finish.

09/25/09: Probability changed **from likely to unlikely** and cost impact **increased to \$7M (critical)**. Risk rating unchanged - still

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Medium.

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Risk ID:	WBS:	Record Date:
ASD-04	1.03.04.02.01 Storage Ring Magnets	Nov 16, 2009

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:
Very Likel	Significant Cost ~ \$1M Schedule ~3 months	Medium
	Contracts are in place and cost risk is reduced to \$1M. There is a 3 months schedule risk arising from slow start of vendor production.	

First Indicator:

Subsequent vendor quotes show significant cost increase.

NLSL-II prototype production revealed that some of the prototype vendors assumptions of how to achieve the required NLSL-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

Date Started:	Date to Complete:	Owner:
Nov 2007	Aug 2011	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 NLSL-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 NLSL-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

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and effort to resolve these issue which could potentially incur delays.

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

NLS-II Risk Registry

Risk ID:	WBS:	Record Date:
ASD-05	1.03.04.03 SR Vacuum Chambers	Nov 16, 2009

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 repeatedly 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.

Consequence: NLS-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:
Likely	Critical Cost \$2M~\$3M Estimate for the cost impact is based on prototype production activities and vendor quote. <u>Schedule:</u> potential up to one year delay	High

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 the more painful mitigating actions

C-1: Revisit further potential vendors which have shown no interest in 2006/2007 when first approached for NLS-II extrusions

C-2: Consider going back to the original vacuum chamber profile and using special weldments for BPMs. Consider to build chamber S2 with a small cross section excluding the key-hole-part and without the NEG distributed pumping but with lumped ion pumps instead, consider NEG coating

C-3: Consider alternative manufacturing processes 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 cartridges

Date Started:	Date to Complete:	Owner:
Nov 2007	Jun 2010	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.

09/10/08: Canting of damping wigglers has been eliminated from project scope

09/10/08: Impact of lattice design changes on vacuum chamber design has been reduced to the option to provide additional machining of the Al chamber to allow an additional sextupole magnet in the achromat

09/10/08: 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

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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 becomes 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

Vacuum chamber extrusions, machining 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**.

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Risk ID:	WBS:	Record Date:
ASD-06	1.03.04.04 SR Power Supply	Sep 25, 2009

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.	Low

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**.

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Risk ID:	WBS:	Record Date:
ASD-07	1.03.04.06.01 SR RF Cavity	Jun 26, 2009

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:
Unlikely	Critical Cost \$2 M Schedule 3~18 months Estimates for the cost and schedule impacts are based on interations with potential vendors, current trend on exchange rates and previous experience. Could mean we use nc RF with implications on performance and ID space	Medium-High

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 will be retired by Dec 2010	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**.

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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 remains unchanged.

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

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Risk ID:	WBS:	Record Date:
ASD-09	1.03.07 Insertion Devices	Feb 16, 2009

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:
Likely	Significant Cost \$3M-\$5M Estimate for the cost impact is based on the consideration of the potential change in market condition.	Medium

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.

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Risk ID:	WBS:	Record Date:
ASD-10	1.03.03.06.01 Storage Ring Beam Position Monitors	Nov 17, 2009

Description:

An in-house development of the BPM electronics 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 verified 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 \$800K	Low

First Indicator:

In about March 2010, we will be able to reassess and predict success of the development.

Mitigation Approaches:

Purchase commercially available BPM electronics as originally planned.

Date Started:	Date to Complete:	Owner:
Nov 2009	Aug 2010	ASD Director F. Willeke

Current Status:

11/17/09: Initial entry of this risk

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Risk ID:	WBS:	Record Date:
CFD-01	1.05.02 Requirements for conventional facilities	Sep 25, 2009

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:
Likely	Significant Cost ~\$2M Estimate for the cost impact is based on previous experience.	Medium

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 2014	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.

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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**.

NLSL-II Risk Registry

Risk ID:	WBS:	Record Date:
CFD-03	1.5.3 Conventional Facility Construction	Nov 18, 2009

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 likelihood 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	Critical Cost: \$10M Estimate for the cost impact is based on 5~10% of the total value of contracts.	High

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	4/30/12	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 likelihood 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.

NLSL-II Risk Registry

Risk ID:	WBS:	Record Date:
CFD-04	1.05.03.06 LOB contract	Oct 30, 2009

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	Medium

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.

NLS-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.**

NLSL-II Risk Registry

Risk ID:	WBS:	Record Date:
DOE-02	NA Directed Funding Profile Change	Nov 16, 2009

Description:

DOE Directed Funding Profile change (reduction)

Probability:	Impact:	Risk Rating:
Unlikely	Significant	Medium

First Indicator:

Program Office Funding Direction.

Mitigation Approaches:

Adjust baseline to minimize cost and schedule impacts according to program 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**.

NLSL-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.

NLSL-II Risk Registry

Risk ID:	WBS:	Record Date:
ESH-01	1.01.02.01, 1.03, 1.04, 1.05, Construction Safety	Nov 16, 2009

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.

Probability:	Impact:	Risk Rating:
Likely	Significant Cost \$3M~\$4M per month Schedule 3~4 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-High

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 NLSL-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 NLSL-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: NLSL-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: NLSL-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 an 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

NSLS-II Risk Registry

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.

NLSL-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	Nov 16, 2009

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 ~\$500K 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 2010	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 February the majority of the risk is retired due to the completion of the 100% design. This risk will remain open through commissioning to accommodate potential design modifications.

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.

NLSL-II Risk Registry

Risk ID:	WBS:	Record Date:
PMG-02	1.01 Project Management	Nov 20, 2009

Description:

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

Consequence: Cost increase

Probability:	Impact:	Risk Rating:
Likely	Significant Cost ~\$1.4M Estimate is based on the analysis of actual vs planned cost incurred in FY2008 and FY2009 and latest information on addition and increase in review and reporting requirements for outyears.	Medium

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-essential or duplicated work.

Date Started:	Date to Complete:	Owner:
Feb 2009	June 2015	Project Support Division Director Diane Hatton

Current Status:

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

NLSL-II Risk Registry

Risk ID:	WBS:	Record Date:
PMG-03	1.01.03.09 Space and Utilities	Nov 18, 2009

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:
Very Likel	Significant Cost ~ \$3M	High

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	Oct 2012	Project Support Division Director Diane Hatton

Current Status:

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.

NLSL-II Risk Registry

Risk ID:	WBS:	Record Date:
XFD-01	1.04.05 User Instruments	Feb 19, 2009

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

Consequence: cost increase

Probability:	Impact:	Risk Rating:
Unlikely	Critical Cost \$10~15M Estimate of the cost impact is based on the past experiences at similar type of user facilities and experimental beamlines.	Medium

First Indicator:

Updated cost estimates after the conceptual design completion 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.

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	Nov 18, 2009	ASD Director	Approved
ASD-LOW-02	Storage Ring Instrumentation	July 25, 2008	ASD Director	Approved
ASD-LOW-02	Front Ends	Retired Nov 18, 2009	ASD Director	Approved
ASD-LOW-02	Storage Ring Utilities	July 25, 2008	ASD Director	Approved
ASD-LOW-02	Storage Ring Installation	July 25, 2008	ASD Director	Approved
ASD-LOW-03	Accelerator Fabrication	July 25, 2008	ASD Director	Approved
CFD-LOW-01	Procurement of Conventional Construction	July 25, 2008	CFD Director	Approved
CFD-LOW-01	Procurement of Conventional Construction - Delay	July 25, 2008	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	July 25, 2008	Federal Project Director	Approved
EFD-LOW-01	R & D Program Design Efforts	July 25, 2008	XFD Director	Approved
EFD-LOW-01	R & D Program	July 25, 2008	XFD Director	Approved
EFD-LOW-01	R & D Laboratory Space	July 25, 2008	XFD Director	Approved
EFD-LOW-02	Optics Procurement of Beam Mirrors	July 25, 2008	XFD Director	Approved
EFD-LOW-02	Optics	July 25, 2008	XFD Director	Approved
EFD-LOW-03	User Instruments	Sep 8, 2008	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	Feb 25, 2009	Experimental Facilities Division Director	Approved
ESH-LOW-01	Unplanned Environmental Impact	July 25, 2008	ESH Manager	Approved
OPS-LOW-01	Installed Device	July 25, 2008	NSLS-II Project Director	Approved
OPS-LOW-01	Heatload	July 25, 2008	NSLS-II Project Director	Approved

LOW Risk ID	Title	Record Date:	Owner title	Approval Status
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	Nov 18, 2009	NSLS-II Project Director	Approved
PMG-LOW-02	Rate Changes	July 25, 2008	NSLS-II Project Director	Approved
PMG-LOW-02	Foreign Exchange Rate	July 25, 2008	NSLS-II Project Director	Approved
PMG-LOW-02	Rate Changes	July 25, 2008	NSLS-II Project Director	Approved

NLSL-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 can be 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

NLSL-II LOW Risk Registry

LOW Risk ID:

ASD-LOW-01

WBS:

1.03.03

Injection system

Record Date:

Nov 18, 2009

Description:

Labor needed for installation significantly underestimated.
could be large as 20 FTE ~3M\$.

Probability:

Likely

Impact:

Significant

Mitigation Approaches:

Perform optimization of detailed work flow.

Date Started:

Nov 2007

Owner:

ASD Director

F. Willeke

NLSL-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
ASD-LOW-02	1.03.04 Storage ring	July 25, 2008

Description:

Instrumentation Production - instrumentation fails to meet specified requirements.

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

NLSL-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 shutters for the undulator and damping wiggler front ends.

11-18-09

This risk can be retired

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

NLSL-II LOW Risk Registry

LOW Risk ID:

ASD-LOW-02

WBS:

1.03.04

Storage ring

Record Date:

July 25, 2008

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.

Probability:

Unlikely

Impact:

Marginal

Mitigation Approaches:

Perform detail design. Build and test prototypes.

Date Started:

Nov 2007

Owner:

ASD Director

F. Willeke

NLSL-II LOW Risk Registry

LOW Risk ID:

ASD-LOW-02

WBS:

1.03.04

Storage ring

Record Date:

July 25, 2008

Description:

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

Probability:

Unlikely

Impact:

Significant

Mitigation Approaches:

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

Date Started:

Nov 2007

Owner:

ASD Director

F. Willeke

NSLS-II LOW Risk Registry

LOW Risk ID:

ASD-LOW-03

WBS:

1.03.08

Accelerator Fabrication Facilities

Record Date:

July 25, 2008

Description:

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

Probability:

Unlikely

Impact:

Marginal

Mitigation Approaches:

Fix the specifications of facility requirements early.

Prevent other activities in the vicinity of the magnet measurement facility.

Date Started:

Nov 2008

Owner:

ASD Director

F. Willeke

NLSL-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
CFD-LOW-01	1.05.03 Procurement of Conventional Construction	July 25, 2008

Description:

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

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 selected proposal is comparable in cost to the baseline.

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

NLSL-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
CFD-LOW-01	1.05.03 Procurement of Conventional Construction	July 25, 2008

Description:

Delay in Contract award or execution

- (1) Labor strike or stoppage
- (2) Contractor failure to perform

Probability:

Unlikely

Impact:

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:

Nov 2007

Owner:

CFD Director
M. Fallier

NLSL-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

NLSL-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

NLSL-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.

Risk Retired on Jan 9, 2009 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

NLSL-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
DOE-LOW-01	NA Approval delays	July 25, 2008

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.

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

NLSL-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
EFD-LOW-01	1.02.02 R&D Program	July 25, 2008

Description:

Design effort falls behind schedule, delaying procurement

Probability:

Unlikely

Impact:

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:

Nov 2007

Owner:

XFD Director
Q. Shen

NLSL-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
EFD-LOW-01	1.02.02 R&D Program	July 25, 2008

Description:

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

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

NLSL-II LOW Risk Registry

LOW Risk ID:

EFD-LOW-01

WBS:

1.02.02

R&D Program

Record Date:

July 25, 2008

Description:

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

Probability:

Unlikely

Impact:

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:

Nov 2007

Owner:

XFD Director

Q. Shen

NLSL-II LOW Risk Registry

LOW Risk ID:

EFD-LOW-02

WBS:

1.04.04

Optics

Record Date:

July 25, 2008

Description:

Procurement of standard beam conditioning mirrors

Vendors for optical mirrors are historically late on their delivery. Will cause schedule impact.

Probability:

Unlikely

Impact:

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:

Nov 2008

Owner:

XFD Director

Q. Shen

NLSL-II LOW Risk Registry

LOW Risk ID:

EFD-LOW-02

WBS:

1.04.04

Optics

Record Date:

July 25, 2008

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.

Probability:

Unlikely

Impact:

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:

Nov 2008

Owner:

XFD Director

Q. Shen

NLSL-II LOW Risk Registry

LOW Risk ID:

EFD-LOW-03

WBS:

1.04.05

User Instruments

Record Date:

Sep 8, 2008

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.

Probability:

Unlikely

Impact:

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:

Sep 2008

Owner:

XFD Director

Q. Shen

NLSL-II LOW Risk Registry

LOW Risk ID:

EFD-LOW-03

WBS:

1.04.05

User Instruments

Record Date: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:

Unlikely

Impact:

Significant

Mitigation Approaches:

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

Date Started:

Sep 2008

Owner:

XFD Director

Q. Shen

NLSL-II LOW Risk Registry

LOW Risk ID:

EFD-LOW-03

WBS:

1.04.05

User Instruments

Record Date:

Feb 25, 2009

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.

Probability:

Unlikely

Impact:

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:

Sep 2008

Owner:

Experimental Facilities Division Director

Q. Shen

NLSL-II LOW Risk Registry

LOW Risk ID:

ESH-LOW-01

WBS:

1.0

ESH

Record Date:

July 25, 2008

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.

Probability:

Unlikely

Impact:

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:

Nov 2007

Owner:

ESH Manager

S. Hoey

NLSL-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:

Unlikely

Impact:

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:

Nov 2010

Owner:

NLSL-II Project Director
S. Dierker

NLSL-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:

Unlikely

Impact:

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:

Nov 2010

Owner:

NLSL-II Project Director
S. Dierker

NLSL-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	NLSL-II Project Director S. Dierker

NLSL-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	NLSL-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

NLSL-II LOW Risk Registry

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

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.

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	NLSL-II Project Director S. Dierker

NLSL-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
PMG-LOW-02	1.0 Rate Changes	July 25, 2008

Description:

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

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	NLSL-II Project Director S. Dierker

NLSL-II LOW Risk Registry

LOW Risk ID:	WBS:	Record Date:
PMG-LOW-02	1.0 Rate Changes	July 25, 2008

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.

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

NLSL-II LOW Risk Registry

LOW Risk ID:

PMG-LOW-02

WBS:

1.0

Rate Changes

Record Date:

July 25, 2008

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

Probability:

Unlikely

Impact:

Significant

Mitigation Approaches:

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

Date Started:

Nov 2007

Owner:

NLSL-II Project Director

S. Dierker