

NSLS-II Risk Management



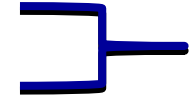
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Risk Management Steps

- identify potential vulnerabilities/risks
- determine their likelihood of occurring
- assess their impact on the project technical, cost, and schedule baselines
- determine activities that would reduce/mitigate the risk



STEP 1

Consolidated risk entries to manageable numbers

- execute a plan to accomplish these risk-reducing activities
- risk reporting/tracking

Risk Management Steps

- Bottom up Risk Analysis produced 407 Risk Register Entries
 - Mixture of risks (can be mitigated) and uncertainties (things beyond our control)
 - Repetition and redundancy (e.g. higher than usual inflation and exchange rate, out-year funding uncertainties, challenges in staffing)
- Tightened and Reduced Risk Register Entries
 - Separated out cost uncertainties including out-year funding, inflation, exchange rate
 - Removed risks of others not performing, e.g., someone else delivers late or doesn't meet spec"
 - Eliminated weak statements, e.g., "design carefully," "work carefully," "pay attention"
- Categories: risks (& single vendor)
uncertainties
exchange rate, material cost
motherhood statement, wish list, error by others
retired, redundant

Bottom Up Risk Analysis – Oct 2007

	WBS Number	WBS Description	Type	Potential Problem	Likelihood	Expected Consequence	Consequence Level	Risk Categorization	* Categorization with Management Adjustment
motherhood statement	1.01.01.01	Director	C	Incentive plan estimate may not be enough to bring on the staff that will be required for the project.	L	This WBS element will cost more than expected.	M	L	L
uncertainty	1.01.01.03	Committees	C	Air fares may increase significantly.	L	Cost increase	M	L	L
uncertainty	1.01.01.03	Committees	C	May increase number of members on the various committees	L	Cost increase	M	L	L
risk	1.01.02.01	ESH Management	S	There are high expectations for safety performance in design, construction and commissioning. Poor performance could result in schedule slippage	U	Slippage of some milestones as the result of poor safety performance	S	L	H*
risk	1.01.02.02	Shielding Analysis	S	Incomplete or inadequate shielding calculations and radiological evaluations	U	inadequate design - failure to pass safety reviews conducted by independent & DOE CD-2 and CD-3 reviews.	S	L	L
uncertainty	1.01.03.01	Project Support Management	C	May need the services of an editor to assist with Project documentation.	L		M	L	L
uncertainty	1.01.03.02	Business Operations	C	Might have under estimated the staff required to support the business operations needs of the project.	L	Would need to hire additional person which would result in a cost increase.	M	L	L
uncertainty	1.01.03.03	Project Controls	C	Project Controls staffing level too low for the NSLS-II DOE project requirements	L	Need to find additional staff at current contract rates	M	L	H*
uncertainty	1.01.03.04	Office Management	C	Number of employees may be calculated conservatively.	U		M	L	L
uncertainty	1.01.03.04	Office Management	C	Cost of supplies may increase	V	Higher prices will negatively affect the budget	M	M	M
risk	1.01.03.06.01	Enterprise IT Services	T	The scope of planned IT services may be underestimated. Certain requirements for new software, services and tools may have been unanticipated.	L	The deployment of requested services or tools will be delayed until a funding source will be identified.	M	L	L
uncertainty	1.01.03.06.01	Enterprise IT Services	C	The cost of labor, equipment, maintenance and services might be underestimated.	U	Lowered quality of support services, increased failure rate due to aging equipment and delays in service implementation.	M	L	L
uncertainty	1.01.03.06.01	Enterprise IT Services	T	The technical support workload might have been underestimated.	V	The reduced quality of the support and the untimely delivery of ITD outsourced services may delay other project activities.		M	M

Composition of Bottom Up Risk Entries

Risks (& single vendor)	35 + 3	9%
Uncertainties	116	29%
Exchange rate, material cost	14+15	7%
Motherhood statement, wish list, & error by others	149+5+40	48%
Retired, redundant	12+18	7%

Progress - Nov 2008

Consolidated risk entries to manageable numbers

- Tightened and Reduced Risk Register Entries
 - Separated out cost uncertainties including out-year funding, inflation, exchange rate
 - Removed risks of others not performing, e.g., "someone else delivers late or doesn't meet spec"
 - Eliminated weak statements, e.g., "design carefully," "work carefully," "pay attention"



Risk Rating	Sep 2008
High	6
Medium	7
Low	33

Risk Categorization Matrix (Risk Rating)

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

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)

Risk Update – Apr 2009

Previously, tightened and Reduced Risk Register Entries from 407 to 46

Updates since CD-3 Review:

Risk Rating	Aug 2008	Apr 2009
High	6	6
Medium	7	9
Low	33	30
Retired		2
Promoted (Low to H/M)		4
Demoted (H/M to Low)		4
New		1

Risk Update – Apr 2009

Major Risks Retired

- Ring Building contract: single biggest risk (from \$20~80M risk item to \$0)
- FY09 continuing resolution

Major Risks with Significantly Reduced Ratings

- Changes to Conventional Facilities requirements (from \$16M to \$2M)
- Directed funding profile change
- FY10 funding uncertainty
- Linac turn key procurement
- Storage Ring vacuum chamber design and production
- Controls System procurement

Risk CFD-01

Title	Changes in requirements for conventional facilities
Risk ID	CFD-01
WBS Number	1.05.02
WBS description	Requirements for conventional facilities
Record Date	Feb 10, 2009
Description	<p><u>Condition</u>: Changes in requirements for the conventional facilities due to uncertainties in accelerator or beamline design</p> <p><u>Consequence</u>: Changes in baseline design of the conventional facilities will result in cost increases and/or schedule delay.</p>
Probability	Likely
Impact	Significant
Impact Type	Cost ~\$2M ← Used to be >\$16M in early 2008 Estimate for the cost impact is based on previous experience.
Risk Rating	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.

Risk CFD-01 - *continue*

Date Started	Nov 2007
Date to Complete	Sep 2009
Owner title	CFD Director
Owner name	M. Fallier
Current Status	<p>02/20/08: Conducted comprehensive review of 30% design package</p> <p>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.</p> <p>05/21/08: Conducted comprehensive review of 50% design package</p> <p>06/26/08: Conducted comprehensive review of 80% design package. Rating changed from High to Medium.</p> <p>07/15/08: Participated in ASD and XFD interface management meetings</p> <p>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.</p> <p>09/26/08: Technical sign-off from each division acknowledging CF design meets requirements of each division and is ready for construction.</p> <p>02/10/09: No change in status.</p>

Risk CFD-02

Title	Ring Building contract
Risk ID	CFD-02
WBS Number	1.05.03
WBS description	Ring Building Contract
Record Date	Retired Feb 18, 2009
Description	<p><u>Condition</u>: 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.</p> <p><u>Consequence</u>: Requires scope reduction or use of contingency.</p>
Probability	Unlikely
Impact	Critical
Impact Type	Cost \$20M-\$80M ← Was the single biggest cost risk for project
Risk Rating	High
First Indicator	Cost estimate update based on Architect-Engineering firm's report on the 30% design package

Risk CFD-02 - *continue*

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

Nov 2007

Date to Complete

Apr 2009

Owner title

CFD Director

Owner name

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.

Summary of Major Risks – Apr 2009

Risk Title	Risk Rating	Estimated cost impact
Unexpected difficulties with dynamic aperture	Medium-Low	\$3M
Booster turn key procurement	Medium	\$4M
Storage Ring magnet production	High	\$4M
Storage Ring RF cavity production	Medium	\$4M
Insertion device production	Medium	\$3M
Design maturity of user instrument	High	\$11.3M
Field changes for conventional construction	High	\$10M