Sum of Risk Rating						
Row Labels	**Cost**	**Schedule**	**Security**	**Service**	**Technology**	**Grand Total**
Exists	**1.050**	**0.875**	**0.075**	**0.875**	**1.500**	**4.375**
2 - Medium	**0.500**	**0.875**		**0.600**	**1.225**	**3.200**
BlueGene/Q software infrastructure may not be available as expected					0.250	0.250
Component performance-per-dollar may not improve as anticipated					0.250	0.250
Conventional CPU roadmap encounters bottlenecks					0.250	0.250
Cost projections for future years uncertain	0.250					0.250
Delay in FY13 Federal Budget process		0.250				0.250
Delay in FY14 Federal Budget process		0.250				0.250
DOE funding unavailable beyond FY14	0.250					0.250
Failure of a facility due to natural disaster				0.225		0.225
Major system failure					0.225	0.225
Reduced computing throughput due to summer high temperature loadsheds at FNAL				0.375		0.375
Technology or staff changes have adverse effect					0.250	0.250
Technology/systems may take longer than expected to become available		0.375				0.375
3 - Low	**0.550**		**0.075**	**0.275**	**0.275**	**1.175**
Agency personnel changes reduce support for project	0.125					0.125
Authentication differences affect inter-site transfers, productivity					0.050	0.050
Change in agency mission					0.025	0.025
Changes in funding due to policy changes or new directives	0.125					0.125
GPU software infrastructure may not be available as expected					0.125	0.125
Hardware acquired becomes obsolete before expected					0.050	0.050
Host institutions do not provide necessary infrastructure	0.125					0.125
Inappropriate use of computer resources			0.050			0.050
Loss of nearline stored data.				0.125		0.125
Power costs could become substantial	0.050					0.050
Slow networking between sites inhibits productivity					0.025	0.025
Stored data may get corrupted or lost				0.025		0.025
Unauthorized access to computing may disclose private information			0.025			0.025
Unexpected increases in life costs arise after systems are acquired.	0.125					0.125
Utility system failure at one of the facilities				0.125		0.125
Retired		**0.950**		**0.125**	**0.375**	**1.450**
2 - Medium		**0.950**				**0.950**
Delay in AMD Quad CPUs affects JLab deployment		0.250				0.250
Delay in FY12 Federal Budget process		0.450				0.450
Schedule delay in technology for FNAL FY08 deployment		0.250				0.250
3 - Low				**0.125**	**0.375**	**0.500**
Community purchases affect the market					0.125	0.125
Loss of archival stored data				0.125		0.125
Multi-processor systems fail more frequently as they grow more complex					0.125	0.125
Technology fails to meet expectations					0.125	0.125
Grand Total	**1.050**	**1.825**	**0.075**	**1.000**	**1.875**	**5.825**

Risk ID	Risk Title	Risk Area	Description	Probability of Occurrence	Impact of Occurrence	Risk Rating	Risk Priority	Risk Status	Creation Date
1	Technology/systems may take longer than expected to become available	Schedule	The schedule for achieving LQCD investment milestones might slip for the following reasons: a) Vendors may take longer than anticipated to bring new processors, memory systems, and/or interconnect systems to market; b) It may take longer than expected to bring new systems on-line for production use.	High	Moderate	0.375	2 - Medium	Exists	7/1/04
2	Cost projections for future years	Cost	Although cost projections for the current budget year are reasonably precise, projections for subsequent years become progressively uncertain.	Medium	Moderate	0.250	2 - Medium	Exists	7/1/04
3	Unexpected increases in life costs arise after systems are acquired.	Cost	Unexpected increases in life costs arise after systems are acquired.	Low	Moderate	0.125	3 - Low	Exists	7/1/04
4	Hardware acquired becomes obsolete before	Technology	Obsolecence: The hardware acquired by this investment becomes obsolete before the end of the planned operations and so does not deliver scientific computing for LQCD calculations in a cost-effective manner.	Medium	Low	0.050	3 - Low	Exists	7/1/04
5	Component performance-per-dollar may not improve as anticipated	Technology	Feasibility: The performance of commodity hardware components may not improve or their price may not drop as rapidly as anticipated, resulting in the investment failing to meet performance goals in the later years of the project.	Medium	Moderate	0.250	2 - Medium	Exists	7/1/04

6	Multi-processor systems fail more frequently as they grow more complex	Technology	Complex multi-processor systems fail more frequently as they grow in size, leading to failure of the project to meet technical performance goals (delivery of computing capability).	Low	Moderate	0.125	3 - Low	Retired	7/2/04
7	Host institutions do not provide necessary infrastructure	Cost	Dependency: Host institutions will not provide space, network connectivity, and mass storage.	Low	Moderate	0.125	3 - Low	Exists	7/1/04
8	Failure of a facility due to natural disaster	Service	Surity: A major failure of a facility due to natural disaster (destruction of buildings, utility systems)	Low	Severe	0.225	2 - Medium	Exists	7/1/04
9	Community purchases affect the	Technology	Monopoly: Community becomes such a large purchaser of components that it affects the market for them.	Low	Moderate	0.125	3 - Low	Retired	7/1/04
10	Agency personnel changes reduce support for project	Cost	Agency personnel changes, limiting continuity and support for this investment.	Low	Moderate	0.125	3 - Low	Exists	7/1/04
11	Major system failure	Technology	A major system, such as a new cluster or a high performance network, simply fails to work and the investment does not meet technical goals.	Low	Severe	0.225	2 - Medium	Exists	7/1/04
12	Technology or staff	Technology	Performance: Changes in technology and staff can have adverse effects on the project.	Medium	Moderate	0.250	2 - Medium	Exists	7/1/04

13	Changes in funding due to policy changes or new directives	Cost	Changes in funding, due to alteration in administration policy, or legislative directives.	Low	Moderate	0.125	3 - Low	Exists	7/1/04
14	Loss of archival	Service	Loss of archival stored data.	Low	Moderate	0.125	3 - Low	Retired	7/1/04
15	Technology fails to meet expectations	Technology	Commercial technology does not fulfill expectations, and in the later years of the investment the project cannot meet technical objectives	Low	Moderate	0.125	3 - Low	Retired	7/1/04
16	Change in agency mission	Technology	Changes in the mission and plans of the Office of Science.	Low	Low	0.025	3 - Low	Exists	7/1/04
17	Inappropriate use of computer resources	Security	Inappropriate use of computer resources by authorized or unauthorized personnel	Medium	Low	0.050	3 - Low	Exists	7/104
18	Unauthorized access to computing may disclose	Security	Unauthorized access to computing hardware can disclose private information.	Low	Low	0.025	3 - Low	Exists	6/1/05
19	Slow networking between sites inhibits productivity	Technology	Slow Internet data transfer rates among the three labs and external sites may inhibit productivity	Low	Low	0.025	3 - Low	Exists	6/1/05

20	Authentication differences affect inter-site transfers, productivity	Technology	Differing authentication schemes among the three labs makes data transfers difficult which limits productivity	Medium	Low	0.050	3 - Low	Exists	6/1/05
21	Power costs could become substantial	Cost	The direct (electricity for computers) and indirect (electricity for cooling the computers) costs to the DOE could be substantial in the later years of the project.	Medium	Low	0.050	3 - Low	Exists	8/8/05
22	Delay in AMD Quad	Schedule	Delay in the release of AMD Quad-processors for Jlan 7n cluster deployment	Medium	Moderate	0.250	2 - Medium	Retired	7/7/07
23	Schedule delay in technology	Schedule	Schedule concern for the processor & chipset delivery for FNAL FY08 cluster deployment	Medium	Moderate	0.250	2 - Medium	Retired	7/7/07
24	DOE funding unavailable	Cost	Risk of unavailability of DOE funding beyond the end of the project (end of FY14)	Medium	Moderate	0.250	2 - Medium	Exists	7/7/07
25	Conventional CPU roadmap encounters bottlenecks	Technology	Conventional multi-processor systems may not perform adequately due to unforseen bottlenecks as core counts rise that are not addressed adequately in software, leading to failure of the project to meet technical performance goals (delivery of computing capability and/or capacity)	Medium	Moderate	0.250	2 - Medium	Exists	7/21/09
26	Utility system failure at one of the facilities	Service	Utility system failure at one of the facilities	Low	Moderate	0.125	3 - Low	Exists	7/21/09
27	Loss of nearline stored data.	Service	Reliability: Loss of nearline stored data.	Low	Moderate	0.125	3 - Low	Exists	7/1/04

28	Stored data may get corrupted or lost	Service	Data Integrity: Some stored data may get corrupted or lost. Some LQCD data products, such as gauge configurations and very large quark propagators, are very valuable in terms of the computing required to reproduce them in case of loss or corruption.	Low	Low	0.025	3 - Low	Exists	8/18/09
29	GPU software infrastructure may not be available as expected	Technology	Starting in FY11, LQCD-ext began splitting funds for hardware purchases between conventional and GPU-accelerated clusters to address the predicted growing demand. However, the software libraries and/or physics applications necessary to fully exploit GPU and/or many-core-based systems may not be available in time to generate adequate user demand for the quantity of such deployed accelerated systems, leading to failure of the project to meet technical performance goals (delivery of computing capability and/or capacity).	Low	Moderate	0.125	3 - Low	Exists	4/22/11
30	Delay in FY12 Federal Budget process	Schedule	Extensive delays in the FY12 Federal budget process may prevent the project from meeting the schedule for the year's deployment milestone.	Medium	Severe	0.450	2 - Medium	Retired	2/1/11

31	Delay in FY13 Federal Budget process	Schedule	Extensive delays in the FY13 Federal budget process may prevent the project from meeting the schedule for the year's deployment milestone.	Medium	Moderate	0.250	2 - Medium	Exists	4/9/13
32	Delay in FY14 Federal Budget process	Schedule	Extensive delays in the FY14 Federal budget process may prevent the project from meeting the schedule for the year's deployment milestone.	Medium	Moderate	0.250	2 - Medium	Exists	4/9/13
33	Reduced computing throughput due to summer high temperature loadsheds at FNAL	Service	Starting in FY11, during very high temperature days at Fermilab, a fraction (30%, then 50% if temperatures are extremely high) of computing is brought offline to lower the produced heat load. The capacity of the cooling infrastructure in the computer room holding most of the FNAL LQCD hardware is exceeded on such days.	High	Moderate	0.375	2 - Medium	Exists	4/15/13
33	BlueGene/Q software infrastructure may not be available as expected	Technology	Starting in FY13, LQCD-ext included a BlueGene/Q prototype system and production system at BNL. However, the job scheduling software may not be available in time to fully exploit the compute cycles available in these systems, leading to failure of the project to meet technical performance goals (delivery of computing capability and/or capacity).	Medium	Moderate	0.250	2 - Medium	Exists	4/17/13

Last Review Date	Last Change	Mitigation Strategy
4/15/13	No change	Over the past five years, the LQCDEXT investment team worked on multiple large cluster hardware procurements using DOE LQCD project (FY06-FY09) and the DOE SciDAC Lattice QCD Computing Project funds with significant success. Experienced professional staff follows the commodity market carefully and gains insight by evaluating prototype hardware. They meet with vendors frequently under non-disclosure agreement and are briefed on roadmaps for components such as processors, chipsets, motherboards, network interface cards and switches. In addition, working closely with manufacturers and system integrators, the team has the capability of testing prerelease components. Working with the manufacturers the team is aware of deficiencies in vendor products. The team is able to determine whether new capabilities will actually provide any advantage in future system procurements. The team plans to use past procurement methodologies fine tuning them as appropriate.
4/15/13	No change	Market information is gathered and prototypes are built throughout the lifetime of the project. Open procurements of commodity components allow for competitive prices. Since hardware is modular in nature, if prices exceed expectations in any given year, it is possible to deploy smaller machines. . A level of performance contingencies are maintained for all procurements.
4/15/13	No change	Hardware maintenance costs are included in procurement of components for each new system procured (each year). Operations costs are well understood based on years of similar operational experience. Each of the three host institutions (FNAL, TJNAF, and BNL) has operated computing equipment for LQCD computing for more than 10 years. Since the LQCD project is staffed by few key professionals, the loss of any of them is likely to affect the performance of the project; this risk is accepted "as-is" although the project does strive through cross-training and other efforts to maintain expertise across and among the staffs at the three sites.
4/30/13	Lowered impact to 'low'	Clusters purchased by this investment are operated for three and a half years, and subsequently retired. These assumed lifetimes are consistent with historical life cycles observed on similar hardware over the last decade.
4/15/13	Increased probability and impact	In any year this risk is low for the current budget year since the price/performance ratio is well defined for the current year. However, the risk increases when planning for the succeeding year. The strategy is to follow the market carefully, and build prototypes before developing large production machines. Components of clusters are carefully selected for cost effectiveness. Thus, if the network performance does not improve as expected, money can be saved on nodes by selecting slower, more cost effective CPUs whose speed will not be wasted because the network limits overall performance. This savings on each node will enable purchasing a larger number of nodes. Performance goals are set more conservatively for the later years in the project to account for market evolution uncertainty. Shifting budget from conventional to GPU-accelerated clusters recovers expected performance levels for those codes that have been ported and optimized.

4/22/11	No longer an issue	Closed
4/15/13	No change	The required computer room space is available at each of the host institutions. Only a small fraction of the Internet bandwidth and mass storage of the laboratories is required to support the LQCDEXT project. The experiments that are the main users of computer facilities are a high priority for each of the laboratories, and the computer space, and network and mass storage resources will continue to evolve to support these experiments in a way that will also meet the needs of this investment. Further, the project maintains Memoranda of Understanding (MOU) with each institution which detail the resources which are to be committed. In any given year, should one of the three host institutions predict that it would not be able to provide the required resources in a later year; the project will plan to shift deployment of hardware to one of the other host institutions.
4/15/13	No change	LQCD computer facilities are located within large buildings suitable for large computing installations. These building are not necessarily hardened for natural disasters. To make them disaster-proof would be extremely expensive. The impact of a disaster is severe because this will impact the scientific delivery schedule significantly. However, the probability of occurrence is low. The project accepts this risk.
3/1/12	Deemed to be a on-issue	Closed
4/15/13	No change	DOE staff has knowledge of the investment, and have been providing support for over six years. As the investment spans multiple programs, this expertise is not limited to a single individual, and so the impact of a single change is minimal. The existence of an Integrated Project Team, whose composition includes Federal personnel, also mitigate risks due to agency personnel changes. A rigorous review process has been established to mitigate risks, including monthly and quarterly reports and annual reviews.
4/15/12	No change	The project evaluates prototype machines before procuring and installing production hardware (annually). The project also builds appropriate acceptance criteria into major purchases. During the acceptance testing phase lasting 30 days, the system is tested thoroughly. If the system is deemed to be unacceptable, it can be returned to the supplier under the warranty condition. The project procures systems with a minimum 3 year warranty service, 4 hour response, 48 hour repair service response.
4/15/12	No change	Project personnel continually study and understand changes in technology that impact the investment. The project maintains a broad range of expertise within its staff.

4/15/12	No change	The investment allocates resources and builds new computing capabilities on a yearly basis, so it is possible to adjust to changing funding levels. This is particularly so because the systems are modular, so reductions in funding can be adjusted for by reducing the size of the systems. Such reductions may delay reaching computational and scientific milestones. A strategy is not available which mitigates the loss of technical computing capability due to substantial decreases in funding.
7/21/09	Split into two risks	Closed
7/21/09	Deemed to be a non-issue	Based on the past experience of the project, commercial technology has fulfilled the expectations of the project. During the history of the project, this was never a problem. However, the project personnel continue to pursue comprehensive benchmarking and testing of individual components, building prototypes, and performing acceptance tests.
4/15/13	No change	The computing systems acquired by this investment for LQCDEXT computing have a broad range of applicability in other areas of computational science and could be put into other scientific uses. This is an accepted "as-is" risk.
4/30/13	Lowered impact to 'low'	The computing hardware acquired and operated by this investment is included in enclaves at each of the three sites (FNAL, TJNAF, and BNL). These enclaves have approved C&As according to Federal guidelines (NIST, DOE). Strong authentication is required for access to the systems. The computer resources are on private networks behind these secure systems. The project will coordinate security with the host laboratories. Usage is carefully monitored and controlled by batch systems. Performance is also carefully monitored, so any unauthorized usage would be quickly noticed and terminated. On clusters, batch systems automatically terminate user processes at the end of each job and before each new job starts up. Thus, any unauthorized process would be terminated.
4/15/13	No change	No classified information, sensitive data, or personally identifiable information is stored on the systems. No privacy risks are present because the lattice QCD systems acquired and operated by the investment contain no personally identifiable information. To enforce this, LQCD users are required to comply with security policies established by respective laboratories.
4/15/13	No change	FNAL, BNL, and TJNAF network staff tunes parameters to optimize transfers. Scientific allocations of time on the LQCDEXT clusters takes into account the quantity of data which must be transferred between sites; if network performance would limit productivity, allocations are made such that analysis jobs would run at the same site as data are stored (i.e., to minimize transfers). This is an accepted risk for the project since (~~controls for computer security protections are expected to become stricter in near future.~~) the data transfer rates or available bandwidth will not keep up with the amount of data to be transferred.

4/15/13	No change	FNAL, BNL, and TJNAF network staff tunes parameters to optimize transfers. Scientific allocations of time on the LQCDEXT clusters takes into account the quantity of data which must be transferred between sites; if network performance would limit productivity, allocations are made such that analysis jobs would run at the same site as data are stored (i.e., to minimize transfers). This is an accepted risk for the project since controls for computer security protections are expected to become stricter in near future. Site Managers try to mitigate this risk by addressing helpdesk requests and better documentation.
4/30/13	Lowered impact to 'low'	Project staff uses historical power trends to predict electrical costs. The project also tracks actual power consumption of new systems. The project also specifies power consumption criteria for new procurements to prefer lower power components. The project is always investigating new cost saving and effective computer cooling technologies.
3/16/10	No longer an issue	Closed
7/21/09	No longer an issue	Closed
4/15/13	No change	
4/30/13	Raised probability to 'medium'	LQCD project has been using multi-processor systems for a while now without experiencing any major software issues. However, there is a likelihood that the LQCD software may come across some issues with multiprocessor systems. The LQCD staff and the off-project LQCD software development team is watching for any such possibilities taking various actions as necessary.
4/30/13	Reduced probability to 'low'	There is a moderate possibility of a single-site utility failure. However, the deployment of SciDAC LQCDEXT libraries at each site allows end users to shift their scientific production easily from one host institution to another. Should a significant disruption occur, critical scientific production (as determined by the Scientific Program Committee and the Lattice QCD Executive Committee) could continue by such a shift. This may require other less important production to be slowed or delayed. Note that no mitigation strategy is available which could sustain the normal rate of computations should one of the facilities suffer a major utility outage.
4/30/13	Reduced probability to 'low'	The LQCD project makes every effort to provide adequate near-line storage to run the simulation jobs. This includes Lustre based storage at FNAL and TJNAF. Related procedures and technologies are refined continuously. Currently, the project has more than adequate near-line storage. A formal decision has been made that LQCD project is not responsible for the archival storage data. The project will begin in FY13 to replace aging storage hardware (disk arrays, servers) that are out of warranty.

4/15/13	No change	The most precious LQCD data products (i.e., the most expensive to reproduce) are gauge configurations. By USQCD policy, overseen by the Executive Committee, to prevent against loss these configurations are stored on tape at two or more geographically diverse sites. The responsibilty for this storage is held by the individual physics collaborations that have generated the particular data ensembles. To guard against silent corruption, by policy these files must be written with checksum (32-bit CRC) data that can be compared on subsequent access to determine whether any data changes have occurred. The USQCD standard I/O library, QIO, can be used to calculate, store, and compare these CRC data. The USQCD user community are also urged in documentation and at the annual collaboration meeting to use this data integrity facility of QIO to guard quark propagator and other data products. Also, single gauge configurations can be regenerated from prior gauge configurations.
4/15/13	No change	4/13: SciDAC GPU libraries now include auto-tuning which can in many cases accomodate GPU architecture changes, such as the changes between the current NVIDIA "Kepler" and previous "Fermi" GPU, without requiring extensive re-optimization. 4/12: Each year the project assesses demand for the various hardware types based on proposals submitted by USQCD members to the allocation process. The project acquisition plan is modified annually based on these data to buy more or less accelerated hardware. 4/11: Large-scale GPU-accelerated clusters for LQCD were first deployed at JLab as part of the NP-funded ARRA LQCD project (2009-1013). Time on these clusters is allocated by the same USQCD Scientific Program Committee that allocates time on the LQCD-ext clusters. The LQCD-ext works very closely with the JLab ARRA project personnel to understand all aspects of GPU-accelerated clusters, including reliability, design, and user requirements. LQCD-ext also interacts with the Scientific Program Committe and USQCD Executive Committee to determine the level of demand for this type of resource. This projected demand is used to size the purchase of a GPU-accelerated cluster in any given year, and other user requirements are used to determine the optimal design. Should a given cluster not meet the needs of specific applications that emerge in a later year, subsequent GPU-accelerated cluster purchases can directly address these needs.
4/22/11	Retired - 4/9/2013	The project must accept this risk. The FY10 "Ds" procurement contract allows in FY11 for the purchase of additional racks through the exercise of options. LQCD-ext requested and received an extension until June 30 (from March 31) for these options. FY11 spending has been throttled at FNAL because of the continuing resolution. As a result, half of the planned "Ds" expansion was initiated once sufficient funds were available (Feb 2011). The rest of the "Ds" expansion will be initiated once the remaining FY11 funds are released. The planned GPU-accelerated cluster procurement will be delayed until FY11 funds are released; however, the project is preparing technical specifications and performing benchmarking of prototype hardware so that, once the funds are available, the procurement can proceed as rapidly as possible.

4/30/13	Reduced impact to 'moderate'	The project must accept this risk.
4/30/13	Reduced impact to 'moderate'	The project must accept this risk.
4/15/13	New	The project must accept this risk. New hardware deployments will be shifted starting in FY13 to a different computing room that is not subject to loadsheds. In FY12 FNAL modified grounds near the computing building, raising the temperature threshold for initiating load sheds. Further engineering studies have been performed, and discussions to initiate modifications are in process.
4/17/13	New	BNL staff are actively testing and then procuring job scheduling software appropriate for the BG/Q systems.

Notes
If conventional clusters remain competitive for next two years, the risks will remain same.

Based on the experience of the LQCD project gained since 2006 with very large multiprocessor (multicore) systems, such systems have a proven record of reliability for LQCD production. Further, as the number of cores per processor and the number of processors per node has increased, the number of nodes in an LQCD cluster has started to decrease, lowering the complexity related to node count and networking. This is no longer a risk.

Archival storage is out of scope for the LQCD project. The project is not responsible for the archival data.
Technology is keeping pace

Transfer needs between FNAL and Jlab are minimal. Transfer needs between FNAl and BNL are rare and the connectivity is excellent. Transfer needs between Jlab and BNL are minimal. Transfer needs are more frequent from Leadership class computing to LQCD-ext labs. Although transfer rates between ANL and FNAL is not an issue, there sporadic issues with transfers from OAK ridge to FNAL. Oak Ridge to Jlab. Any transfer problem occurs in bursts, mostly with propagators. Transfer problems are often solved by providing better tools to users (e.g. BBFTP, Globus Online) or suggesting procedural changes such as pre-staging from tape to disk.

Although delayed, the project received funding for FY10-11. Laboratory loaded the budget from the month of February 2010.

This item will be discussed when the new proposal process starts and during FY13 review.

Although it is possible to reduce the risk at FNAL by implementing remedial actions, there is no funding available. This is considered as an accepted risk and will remain true during FY12-14. In FY13 Fermilab will site new hardware in a second computing room that is not subject to summer high temperature loadsheds.

Probability of loss (partial loss) has increased because of the aging of storage hardware at FNAL.

Risk ratings remain same through FY14.

4/12: Since 2009, clusters accelerated with GPUs purchased under the LQCD ARRA project at TJNAF have had a very positive impact on physics production for those calculations for which optimized software was available. Since the beginning of the project in FY10, there was strong uptake by the user community for the use of GPU-based systems for nuclear physics calculations based on the clover-improved wilson action as well for a portion of the various BSM and other smaller projects. This demand was met for USQCD by ARRA hardware at TJNAF. Recently, there has been additional uptake by the portion of the community utilizing the staggered and HISQ actions; the resulting demand has been addressed by LQCD-ext GPU-accelerated hardware purchased in FY11.
Initiatives by the USQCD community are in progress to address the more complex problem of porting software for the Domain Wall action to GPUs.
4/11:This item will remain in the same status during FY12 to FY14. To date, among large LQCD projects, only Clover is GPU ready. Work on getting DWT, Staggered, and other projects is in progress. About 15% of smaller projects are GPU ready.

Probability

	Value		Impact	Value	
High	0.75		Severe	0.9	
Medium	0.50		Moderate	0.5	<== 1. Chan
Low	0.25		Low	0.1	

Risk Rating Table

Prob \ Impact	Severe	Moderate	Low	
High	0.675	0.375	0.075	
Medium	0.450	0.250	0.050	<== 3. Then
Low	0.225	0.125	0.025	

Risk Priorities

Prioritization	Low Value	High Value	Risk Planning Level	
1 - High	0.500	1.000	Detailed Risk Plan	
2 - Medium	0.150	0.500	Modest Risk Plan	<== 2. Chan
3 - Low	0.000	0.150	Minimal Risk Plan	

^^^ 4. And fir

ge these values to control Probability, Impact ranges.

, manually change the shading in the matrix to represent Prioritization values
Conditional formatting not programmed in the table yet.

ge these "2 - Medium" low/high values to alter Prioritization assignments in Risk Register.

nally, remake the "Summary Table" pivot table

LQCD-ext Risk Register

Version	Date	Modifier
1	8/18/2009	
2	3/16/2010	
3	7/21/2010	
4	4/26/2011	
5	4/27/2012	
6	4/30/2013	Rob Kennedy

Description of Change
Initial Risk Items for LQCD-ext (derived from LQCD project)
Revised Risk Mitigation Strategies
Revised Risk Management Plan V1.2
Revised Risk Register for GPU/Ds extension purchase
Revised Risk Register, particularly for Accelerated (GPU) Clusters
Reorganize and normalize. Updates by FNAL Site Managers. Include input from JLab, add entries for BG/Q.

Risk Areas
Cost
Schedule
Security
Service
Technology