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ALCF-4 RISKS REVIEW

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AGENDA

Times	Item	Owner
8:30	Executive Session	Review Chair
9:00	Welcome	Mike Papka
9:10	Project Overview	Jini Ramprakash
9:40	Technical Overview and Early Science	Kevin Harms Chris Knight
10:15	Break	
10:30	Technical Requirements	Taylor Childers
11:30	Benchmarks	Chris
12:15	(Working Lunch) Discussion & Questions from the committee	ALCF-4 Team
12:30	(Working Lunch) Executive Session	Review Chair
13:30	Facilities	Jon Cisek
14:15	ALCF-4 Risks Review	Noah / Jini
15:00	Break	
15:15	Executive Committee Q&A with ALCF-4 team	Review Chair
15:45	Executive Writing Session	Review Chair
17:00	Adjourn / Tour of Aurora	Susan Coghlan
18:00	Dinner	

CHARGE QUESTIONS

1. Is the technical approach appropriate to support the ALCF-4 Mission Need requirements?
2. Are the RFP technical requirements reasonable, clear, and consistent with the goals and objectives for the ALCF-4 project?
3. Does the ALCF facility upgrade plan support the system requirements specified in the RFP for the onsite options?
4. **Have the major technical risks and appropriate mitigation strategies been correctly identified for this stage of the project?**

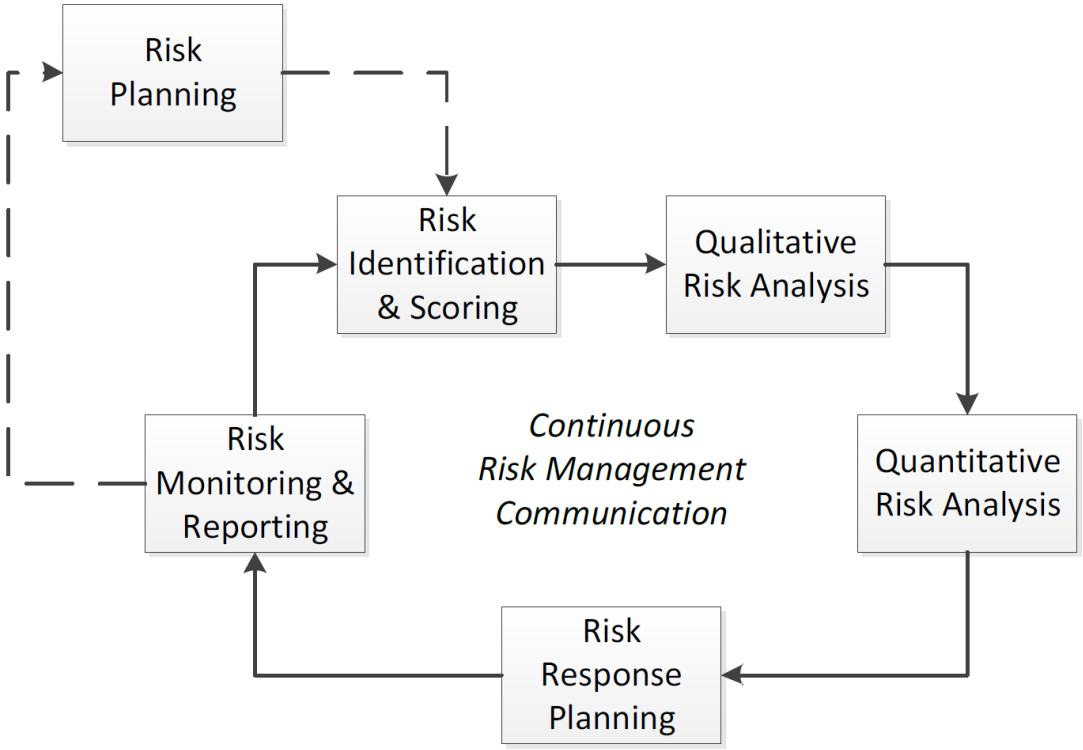
OUTLINE

- Risk Management @ ALCF
- ALCF-4 addendum to RMP
- Risk Matrix Thresholds
- ALCF-4 Risk Register at a glance
- Top Technical Risks from Register

ALCF-4 PROJECT RISK MANAGEMENT

- The ALCF-4 risk management process builds off the successful ALCF approach
  - ALCF Risk Management Plan has been used for over the past decade
  - ALCF-4 specific addendum created to supplement the ALCF RMP
- The ALCF-4 Risk Management Plan and processes align with DOE O 413.3B
  - RMP has addressed how ALCF-4 will identify, assess, monitor, document, and report project risks
  - The project aligns to DOE G 413.3-7A (Risk Management Guide)
- Risk Manager implements risk management process
- The ALCF-4 team has a strong risk culture
  - Team has identified and qualitatively evaluated 34 risks to date

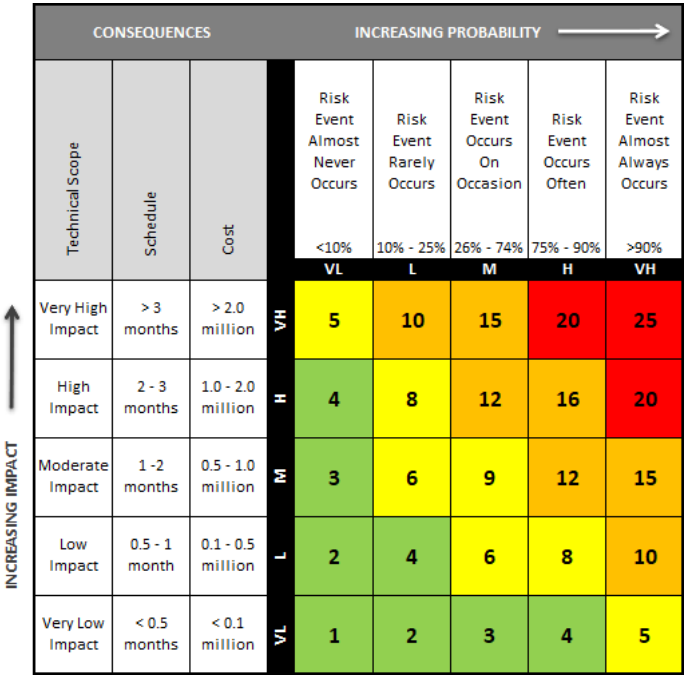
ALCF-4 RISK MANAGEMENT PROCESS



ALCF-4 ADDENDUM TO RMP

- Tailored qualitative cost and schedule thresholds to project risk tolerance
- Implemented a standardized process for quantitative three-point assessment
  - Risk owners will supply minimum, maximum, and most likely cost and schedule impacts
  - Provides a broader range of potential risk impacts
  - Enhances the depth of quantitative assessments
  - Promotes the collection of quantifiable backup data (QBD)

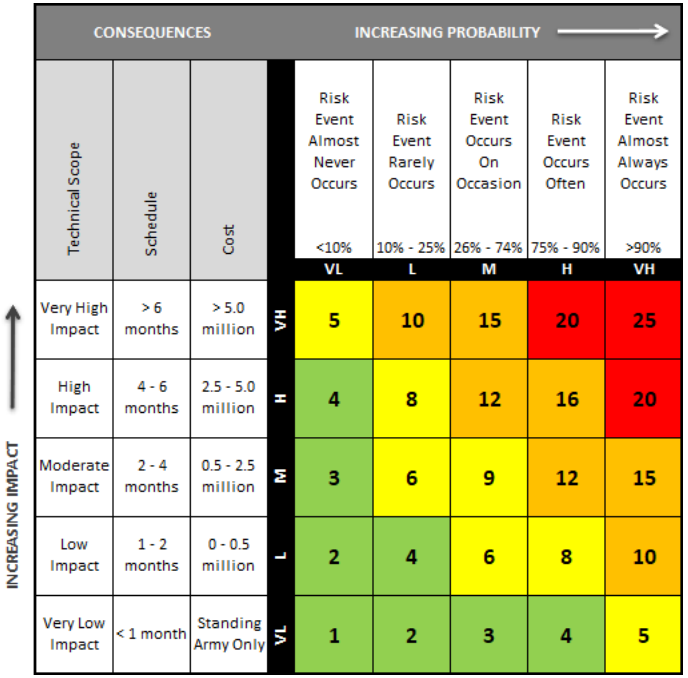
RISK MATRIX THRESHOLDS



CONSEQUENCES			INCREASING PROBABILITY →				
Technical Scope	Schedule	Cost	Risk Event Almost Never Occurs <10% VL	Risk Event Rarely Occurs 10% - 25% L	Risk Event Occurs On Occasion 26% - 74% M	Risk Event Occurs Often 75% - 90% H	Risk Event Almost Always Occurs >90% VH
Very High Impact	> 3 months	> 2.0 million	5	10	15	20	25
High Impact	2 - 3 months	1.0 - 2.0 million	4	8	12	16	20
Moderate Impact	1 -2 months	0.5 - 1.0 million	3	6	9	12	15
Low Impact	0.5 - 1 month	0.1 - 0.5 million	2	4	6	8	10
Very Low Impact	< 0.5 months	< 0.1 million	1	2	3	4	5

INCREASING IMPACT ↑

ALCF (Includes ALCF-3)



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Very High Impact	> 6 months	> 5.0 million	5	10	15	20	25
High Impact	4 - 6 months	2.5 - 5.0 million	4	8	12	16	20
Moderate Impact	2 - 4 months	0.5 - 2.5 million	3	6	9	12	15
Low Impact	1 - 2 months	0 - 0.5 million	2	4	6	8	10
Very Low Impact	< 1 month	Standing Army Only	1	2	3	4	5

INCREASING IMPACT ↑

ALCF-4

ALCF-4 RISK REGISTER

- 34 risks identified
- 2 post- mitigated risks rated “critical”
- 8 post- mitigated risks rated “severe”

Pre Mitigated Probability

Pre Mitigated Impacts	Very Low	Low	Medium	High	Very High
Very High			3	1	3
High		2	7	2	
Medium		2	9	2	
Low			1	1	
Very Low			1		

Post Mitigated Probability

Post Mitigated Impacts	Very Low	Low	Medium	High	Very High
Very High		2		1	
High	1	1	3		1
Medium		4	8	2	1
Low	1	5	1	1	
Very Low	1		1		

ALCF-4 TECHNICAL RISKS

- 23 technical risks identified
- 6 post- mitigated risks rated “severe”

Pre Mitigated Probability

Pre Mitigated Impacts	Very Low	Low	Medium	High	Very High
Very High			3	1	
High		1	4	2	
Medium		2	8	2	
Low					
Very Low					

Post Mitigated Probability

Post Mitigated Impacts	Very Low	Low	Medium	High	Very High
Very High		2			
High		1	2		
Medium		3	8	2	
Low	1	4			
Very Low					

MARKET HARDWARE PRICES IMPACT ABILITY TO MEET MISSION REQUIREMENTS

The AI market has significantly driven up the cost of high performance computing hardware due to the high demand. These effects could continue making systems more expensive.

Pre- Mitigated Score	20
Response Type	Reduce
Post- Mitigated Score	12

Cause

- The AI market demand drives up the cost of high performance computing hardware.

Effect

- The increase cost results in the inability to achieve the mission needs because the budget can not purchase sufficient hardware.

Mitigations

- Meeting with vendors trying to understand what's possible. Example: Looking into different variance for HPC vs AI.

INABILITY TO ACHIEVE SYSTEM STABILITY

Pre- Mitigated Score	16
Response Type	Reduce
Post- Mitigated Score	12

With the complexity of hardware architecture design and process shrink, system have become less stable and do not allow runtimes at the scale users expect.

Cause

- Hardware has low mean time between failure (MTBF).

Effect

- Project delayed in trying to achieve stability.

Mitigations

- Meeting with vendors, raising awareness for issues at scale. Industry as a whole recognizes the issues.
- Adding checkpointing to all benchmarks.

INABILITY TO USE ALCF-3 TO GENERATE BASELINE PERFORMANCE

Pre- Mitigated Score	12
Response Type	Reduce
Post- Mitigated Score	12

Should Aurora not be available to prepare baseline FOMs because Aurora is under acceptance testing, alternative methods to generate baselines may be required.

Cause

- Aurora is not available for use by ALCF-4 team to run large scale benchmark runs.

Effect

- The baseline figures of merit (FOMs) would be delayed and would then delay the RFP release.

Mitigations

- Using other systems to establish baseline.

DELAY IN RFP RELEASE

The RFP release is delayed due to either project delays or DOE review delays.

Pre- Mitigated Score	12
Response Type	Accept
Post- Mitigated Score	12

Cause

- The RFP requires a series of reviews and subsequent decisions to be made. Any required rework based on review comments can delay the release of the RFP.

Effect

- The RFP can not be released as planned which will set back the overall project schedule.

Mitigations

- Review times for RFP documents are not within the control of the project team.

NO QUALITY RFP RESPONSES

Pre- Mitigated Score	15
Response Type	Reduce
Post- Mitigated Score	10

Enough RFP responses to have competition in selection, but none meet quality expectations.

Cause

- The RFP requirements including associated diversity requirements cause vendors providing solutions which are not of the needed quality to achieve the project goals.

Effect

- While enough responses are submitted, few or zero are deemed to meet the project's schedule, cost, technical, and diversity requirements to satisfaction.
- Project has to accept subpar scope and/or put out another RFP.

Mitigations

- Writing the RFP to include flexibility and other methods to attract vendors while still maintaining ALCF-4's cost, schedule, and technical requirements.

INSUFFICIENT RESPONSES FROM RFP

Pre- Mitigated Score	15
Response Type	Reduce
Post- Mitigated Score	10

The project receives too few RFP responses that meet the cost, schedule, and technical requirements.

Cause

- Fewer than 2 adequate responses received.

Effect

- The bid would no longer be considered competitive.
- Restart RFP process.

Mitigations

- Published draft tech specs early.
- Meeting with vendors to receive feedback.

SUMMARY

- The ALCF-4 risk management process builds off the successful ALCF approach that has been used over the past decade
- ALCF-4 addendum tailors cost and schedule thresholds to project tolerance, and implements a quantitative three point assessment for risks
- ALCF-4 Risk Register has
  - 34 risks identified – 2 post- mitigated risks rated “critical” and 8 post-mitigated risks rated “severe”
  - 23 technical risks identified – 6 post-mitigated risks rated “severe”
- ALCF staff have a strong risk culture


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