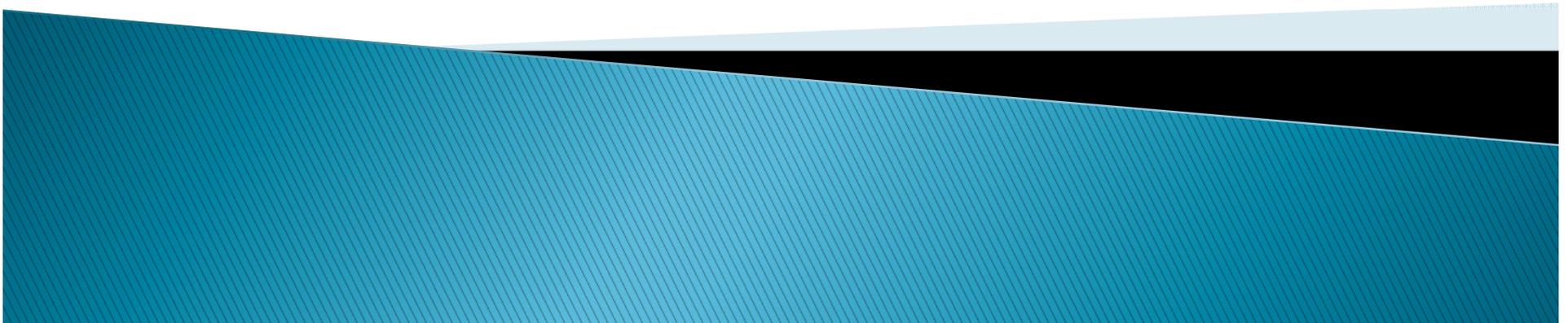


# Report from the Project Manager

Bill Boroski  
LQCD-ext Contractor Project Manager

LQCD All-Hands Meeting  
Thomas Jefferson National Accelerator Facility  
May 6-7, 2011



# Outline

- ▶ Project scope and budget
- ▶ Change in OMB classification
- ▶ Change in site staffing
- ▶ FY10/11 performance results
- ▶ User survey results
- ▶ Plans for early access to prototype BG/Q
- ▶ FY12 hardware selection “opportunities”

# LQCD-Ext Project Scope

- ▶ Acquire and operate dedicated hardware at BNL, JLab, and FNAL for the study of QCD during the period FY2010-2014.
- ▶ Baseline deployment plans:
  - FY10/11: Cluster deployments at FNAL
  - FY12: Several options under consideration, including conventional/GPU-accelerated cluster deployment at JLab or BG/Q at BNL
  - FY13/14: Cluster deployments at FNAL (and/or perhaps BNL and/or JLab, depending on outcome of FY12 plan).
- ▶ Currently executing against baseline plan, with a few exceptions
  - QCDOC at BNL is being operated through June/July 2011
  - Kaon at FNAL is being operated through FY2011
  - FY11 procurement includes a mix of conventional Infiniband cluster nodes and GPU-accelerated nodes

# LQCD-Ext Project Budget

- ▶ Approved Budget = \$18.15 million
  - Jointly funded by DOE Offices of High Energy and Nuclear Physics

## Approved Funding Profile (in \$K)

<b>Expenditure Type</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>	<b>FY14</b>	<b>Total</b>
Personnel	1,139	1,306	1,456	1,340	1,644	6,885
Travel	13	11	12	12	12	60
M&S	104	84	84	84	84	440
Equipment	1,684	1,779	1,974	2,589	2,379	10,405
Management Reserve	60	69	75	75	81	360
<b>Total</b>	<b>3,000</b>	<b>3,250</b>	<b>3,600</b>	<b>4,100</b>	<b>4,200</b>	<b>18,150</b>

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## Hardware Budget Breakdown (in \$K)

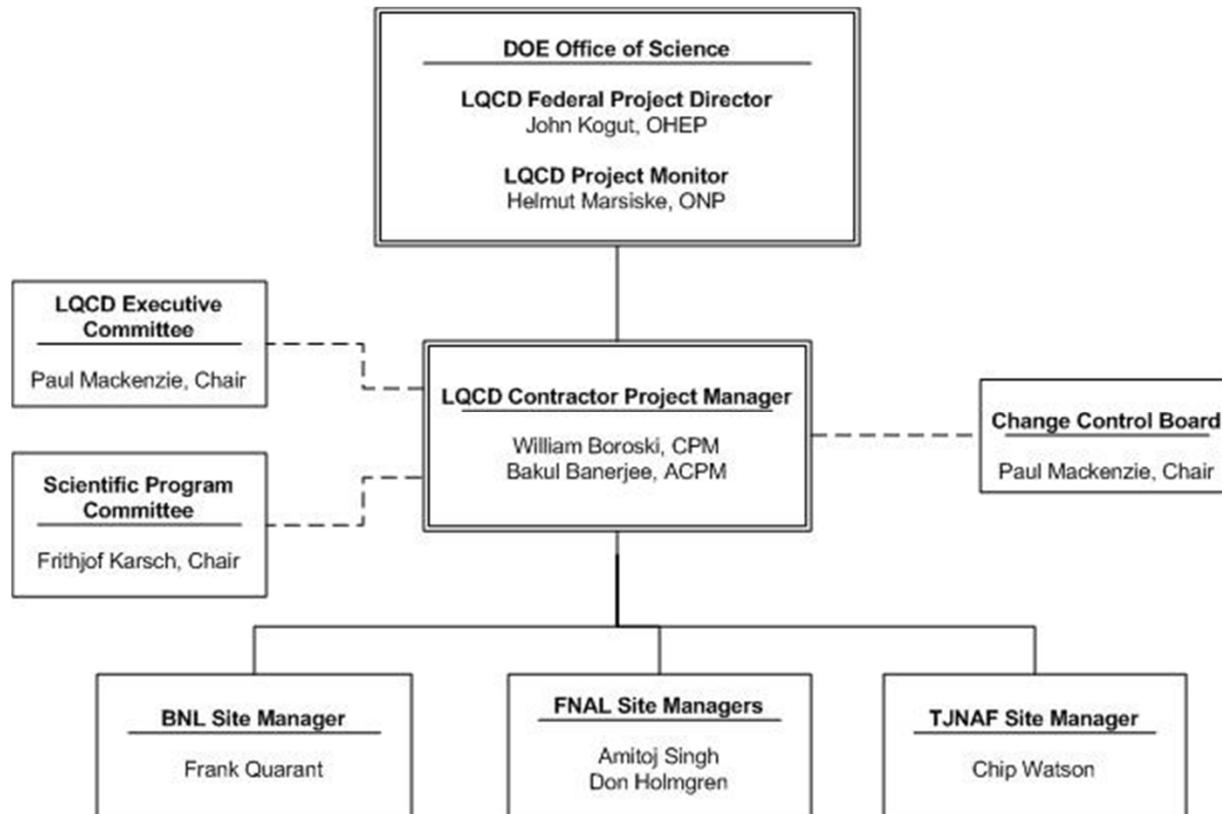
Fiscal Year	Compute Hardware	Storage Hardware	Total
FY10	1,600	84	1,684
FY11	1,690	89	1,779
FY12	1,875	99	1,974
FY13	2,460	129	2,589
FY14	2,260	119	2,379
<b>Total</b>	<b>9,885</b>	<b>520</b>	<b>10,405</b>

Storage at ~5% of total hardware budget

# Change in Project Classification

- ▶ A significant change in the IT investment classification of the LQCD-ext project occurred in August 2010.
  - The DOE Office of the Chief Information Officer determined that it was appropriate to raise the threshold for mandatory IT investment classification and reporting to \$25 million (PY, CY, and BY) beginning with the BY 2012 IT reporting cycle.
  - The LQCD-ext project budget profile falls beneath this threshold.
- ▶ The LQCD-ext project was reclassified from an OMB Exhibit 300 major IT investment project to an OMB Exhibit 53 non-major IT investment project.
- ▶ Although the formal IT investment classification of the LQCD-ext project has changed, the project continues to be managed through OHEP and ONP using the same management and oversight structure that has been in place since project inception.
  - Performance milestones that had been documented in the OMB Exhibit 300 business case are being incorporated in the appendices of the Project Execution Plan.
  - The project will adhere to all OMB Exhibit 53 reporting requirements and will coordinate reporting through the Federal Project Director.

# Management & Oversight



- ▶ Frank Quarant replaced Eric Blum as BNL Site Manager in February 2011.

# FY10 Performance Summary (1)

## Comparison of Actuals to Approved Baseline

Milestone #	Description	Actual Results	Planned Cost (\$K)	Actual Cost (\$K)	Planned Completion	Actual Completion
18	Architecture planning for FY11 procurement reviewed by external DOE committee	Plan reviewed & accepted	52	57	06/30/10	07/02/10
19	Procurement & deployment of 11 TF (sustained) system	12.5 TF (114% of goal)	1,887	1,816*	12/31/10	12/01/10
20	18.0 TF-yrs aggregate computing delivered	19.17 TF-yrs (107% of goal)	1,061	1,009	09/30/10	09/30/10
21	Security controls testing and contingency plan review complete at BNL, FNAL, and TJNAF	Completed as planned	0	0	08/31/10	08/31/10

*\*Includes costs that were obligated in FY10 for the FY10 cluster procurement, but actually costed in Oct 2010.*

- We met or exceeded all milestone goals
- All milestones were completed on time and within budget.
- No management reserve funds were expended.
- All unspent funds have been carried forward into the FY11 budget.

# FY10 Performance Summary (2)

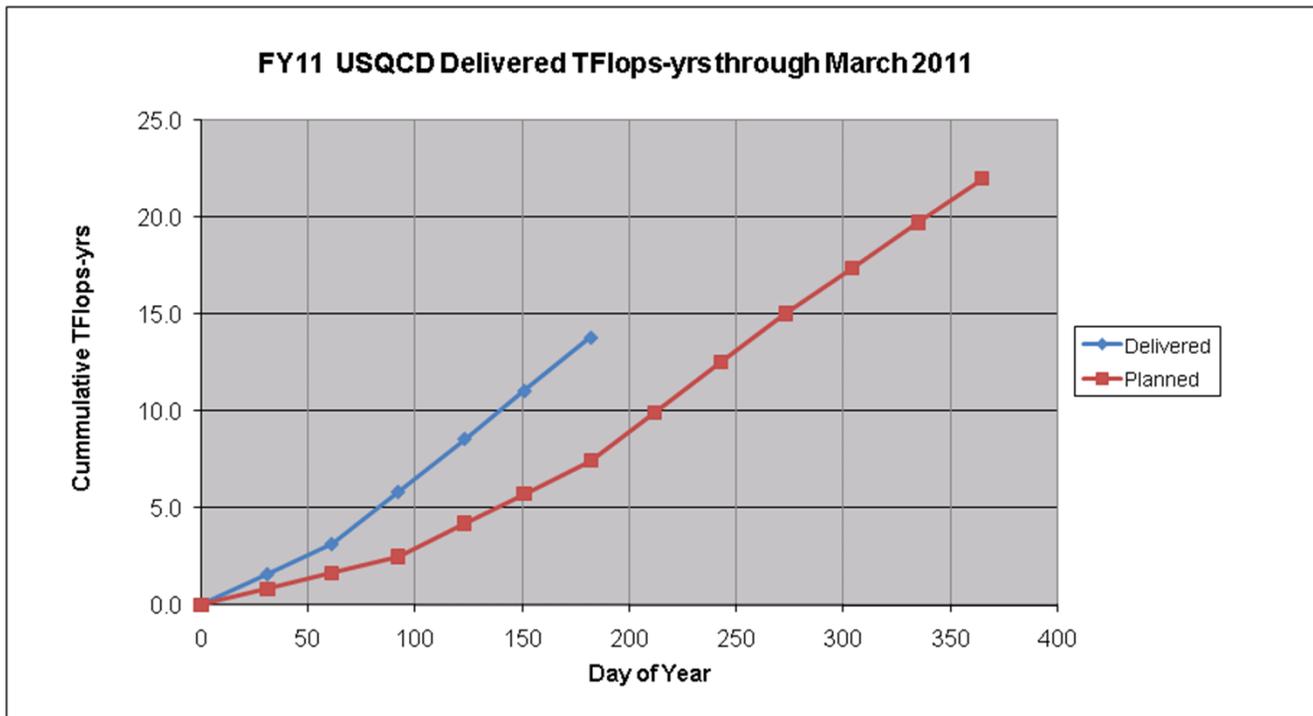
## Performance against other Key Performance Indicators (KPIs)

Measurement Indicator	Target	Actual Results
Customer Satisfaction Rating	≥92%	<b>81%</b>
% of tickets closed within two business days	≥95%	95% BNL: 100% (65/65 tickets) FNAL: 98% (252/256 tickets) TJNAF: 84% (56/67 tickets)
% of average machine uptime at the metafacility	≥95%	97.4% (weighted ave) BNL: 97.2% FNAL: 98.8% TJNAF: 92.6%
Weekly vulnerability scans	Scans performed at least weekly at each host institution	Daily scans performed at all sites. Performance goal exceeded.

- ▶ All KPI metrics were met with the exception of our overall Customer Satisfaction Rating
  - Satisfaction rating decreased from 96% in FY09 to 81% in FY10 – more later....

# FY11 Milestone Performance *(TFlops-yrs delivered)*

- ▶ Data thru March 2011 are shown. The goal for FY11 is 22.0 TFlops-yrs.
- ▶ Goal through March = 7.44 TFlops-yrs
- ▶ Actual = 13.81 TFlops-yrs (186% of goal)

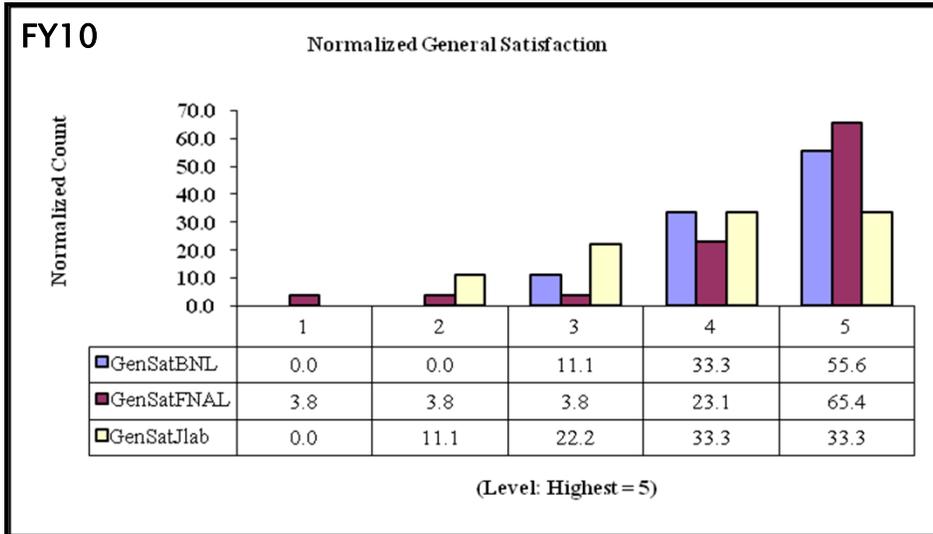


- We are well ahead of the planned pace
  - Ds is bigger than planned (12.4 TF vs. 11 TF plan)
  - Ds was released to production one month earlier than plan.
  - Baseline plan did not include operating Kaon and QCDOC in FY11, which we continue to run.
- Monthly surplus will begin to narrow
  - FY11 piece of Ds will be smaller than planned (176 nodes instead of 267) and did not come online by March
  - QCDOC will be retired at the end of July 2011.

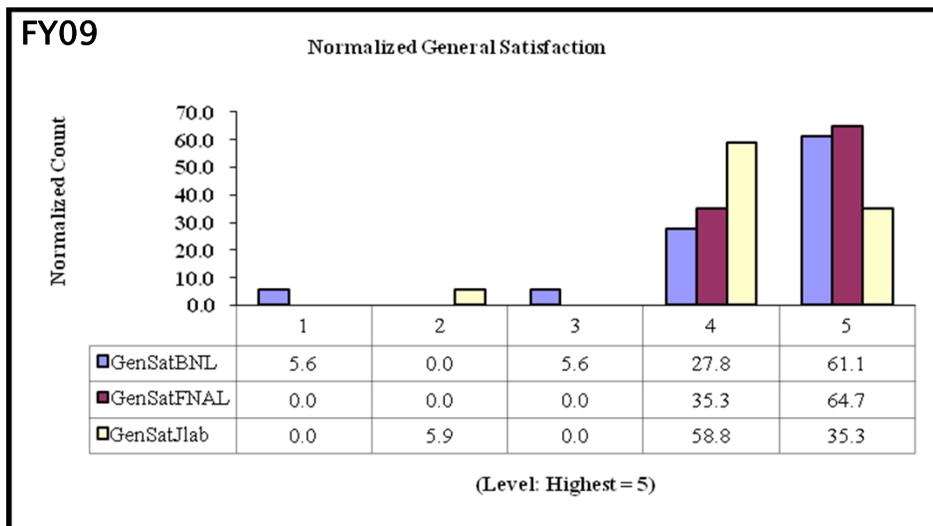
# FY10 Survey Results

- ▶ Received input from 39 users (small statistical sample).
  - Approximately 100 users submitted jobs to one of the three facilities during the past year
  - FY10 response rate = ~39%
  - Down from FY09, when 55 users responded to the survey call.
- ▶ We have slipped in mean satisfaction ratings in a number of areas (i.e., % of 4's or 5's received on a scale of 1–5)
  - Higher percentage of dissatisfied users than in past years
- ▶ Number of free-form user comments received was significantly less than prior years, making it more challenging to identify specific areas of concern.

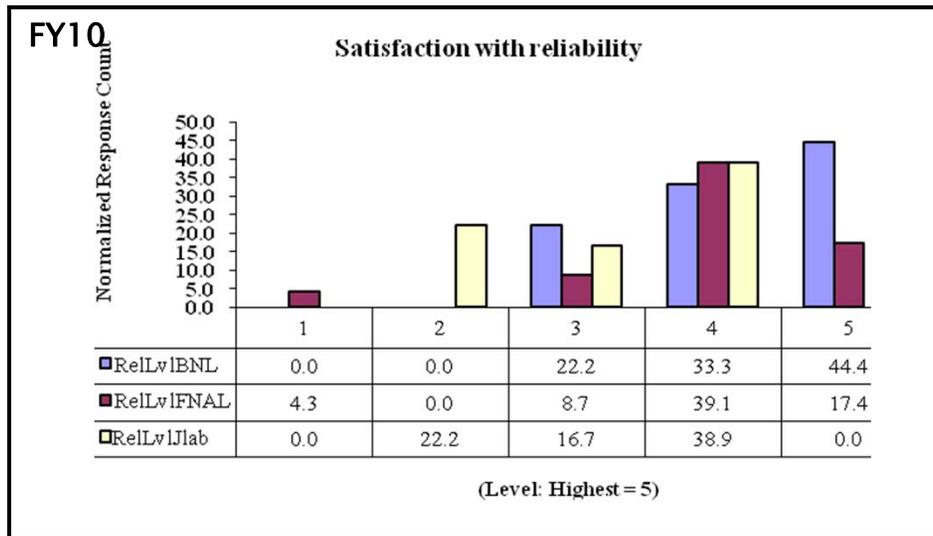
# Survey Results – Overall Satisfaction



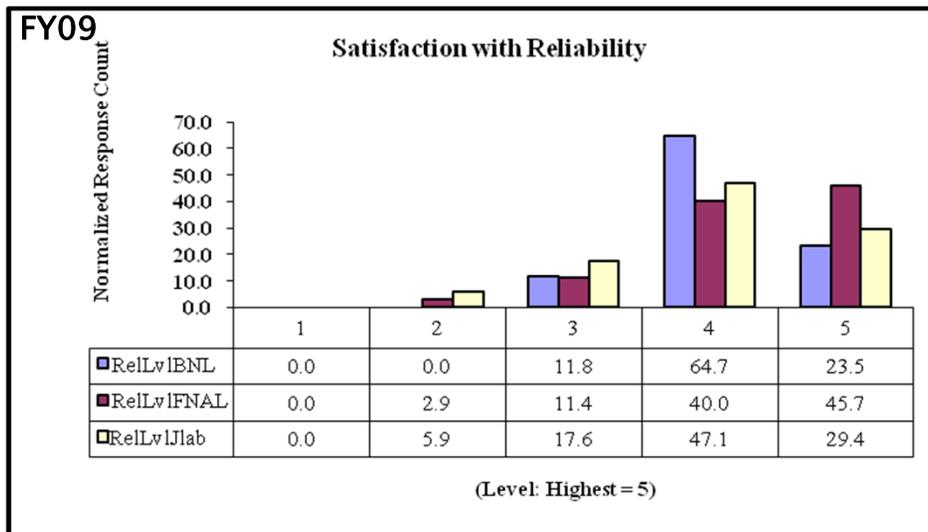
- ▶ FY10 aggregate satisfaction rating = 81%
- ▶ By comparison, FY09 rating = 96%
- ▶ BNL rating stayed consistent (FY09 rating was 89%; same as FY10).
- ▶ FNAL and JLab ratings are down sharply from FY09, when ratings were 100% and 94% respectively.
- ▶ Lower JLab rating may be the result of resources being focused on ARRA machine deployment
- ▶ Lack of free-form comments makes it challenging for us to understand how to address shortcomings.



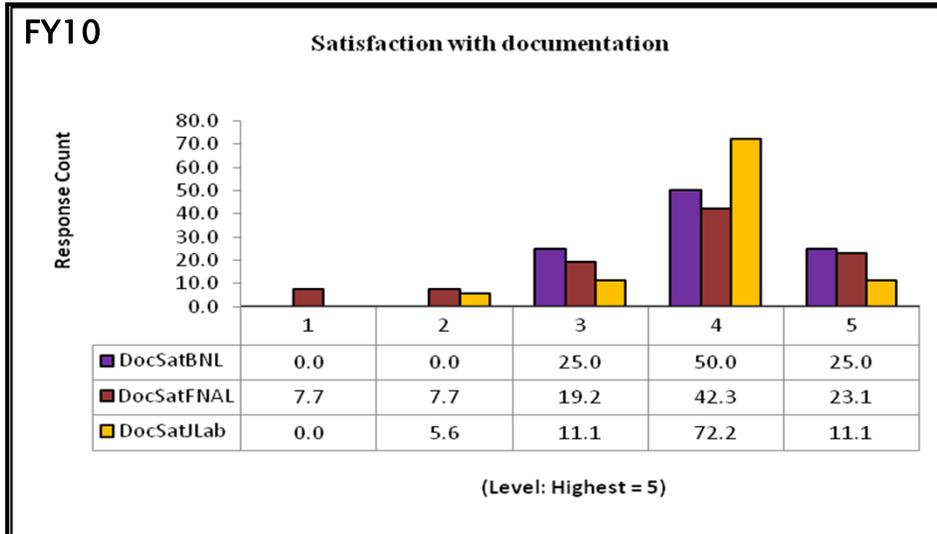
# Survey Results – Reliability



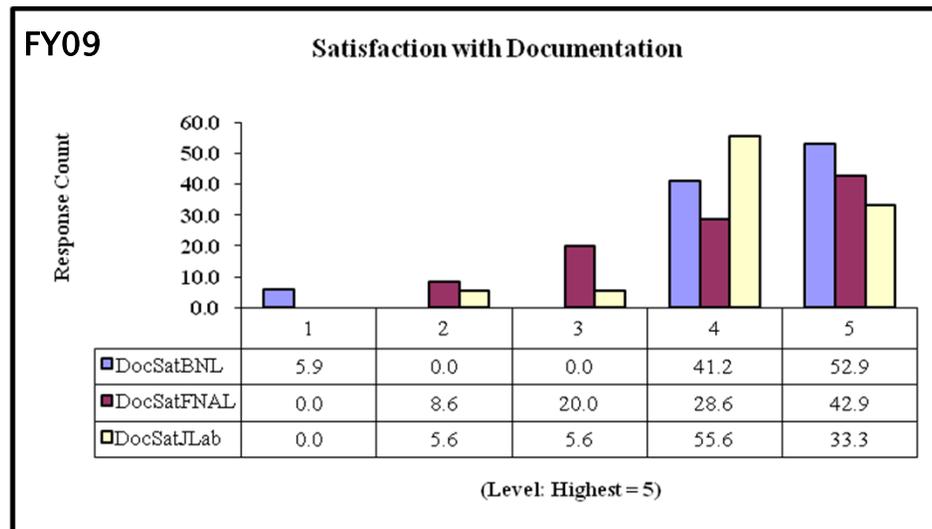
- ▶ FY10 aggregate satisfaction rating = 75%
- ▶ By comparison, FY09 aggregate rating = 83%
- ▶ FNAL mean score consistent with FY09 rating (87% vs. 86% in FY09), but distribution has shifted.
- ▶ BNL and JLab both significantly lower than FY09 ratings of 88% and 76% respectively.



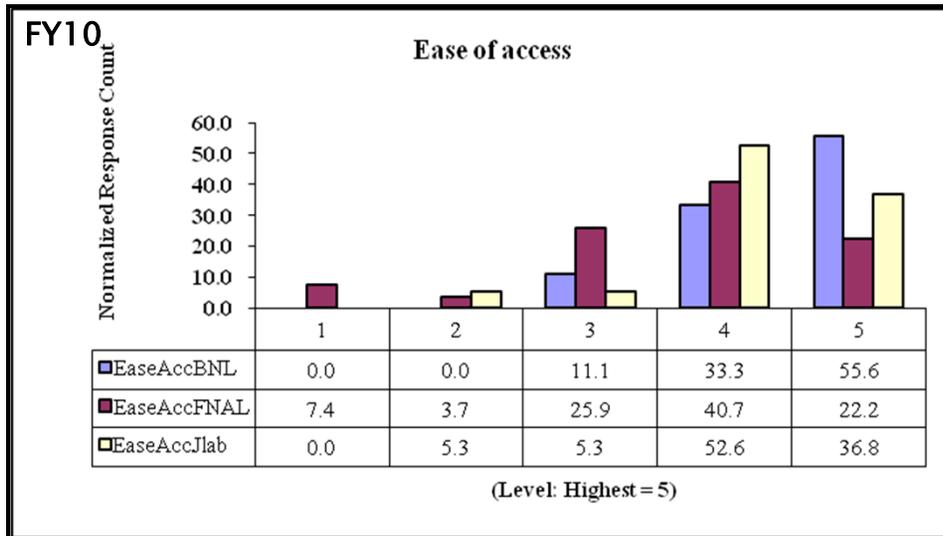
# Survey Results – User Documentation



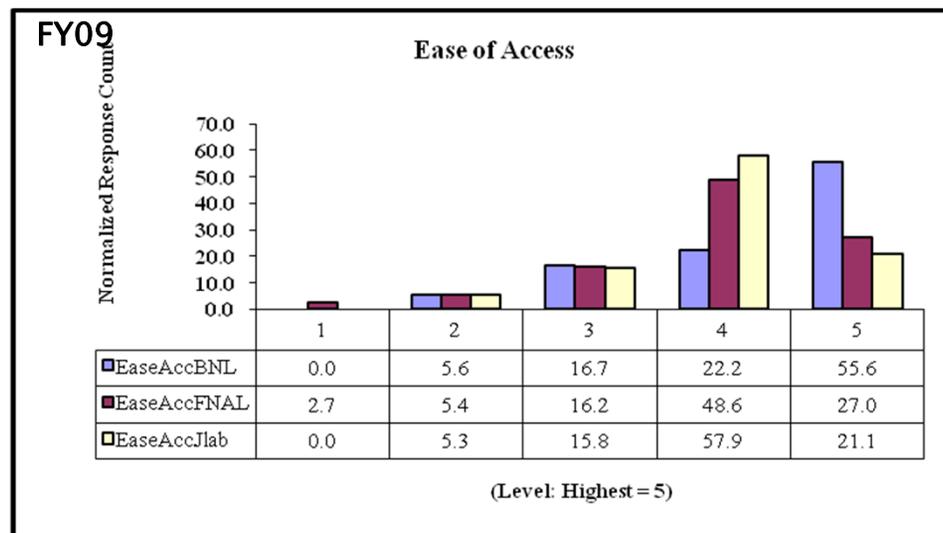
- ▶ FY10 aggregate satisfaction rating = 75%
- ▶ By comparison, FY09 rating = 85%
- ▶ Ratings were lower than FY09 at all three sites
- ▶ Survey respondents cited out-of-date, hard-to-find, or difficult-to-use documentation.
- ▶ We need to work on improving documentation.



# Survey Results – Ease of Access



- ▶ FY10 aggregate satisfaction rating = 80%
- ▶ By comparison, FY09 rating = 78%
- ▶ BNL and JLab ratings significantly better than FY09 ratings (89% vs. 78% and 90% vs. 79% respectively).
- ▶ FNAL rating decreased from 76% to 63%, pointing out user difficulties with FNAL Kerberos access. Since we can't get rid of Kerberos, we need to work on improving documentation and tools.



# Satisfaction with Allocation Process

## Performance Ratings Over Time:

	FY07	FY08	FY09	FY10
Overall satisfaction with the proposal process	69%	81%	84%	86%
Clarity of the Call for Proposals	79%	91%	93%	93%
Transparency of the allocation process	61%	64%	79%	86%
Apparent fairness of the allocation process	63%	73%	88%	86%
Belief that the allocation process helps maximize scientific output	70%	78%	85%	79%

- ▶ Ratings are consistent with past years, with a couple of exceptions
  - “Transparency” showed a notable rating increase.
  - “Belief that allocation process maximizes scientific output” showed a decrease.
- ▶ We received no free-form comments from FY10 survey respondents.

# FY10 Survey Results – Summary

- ▶ Some key takeaways for the project
  - We need to work on improving documentation.
  - “Reliability” at JLab is associated with resources being devoted to the new ARRA machines and not necessarily available for 7n, at least not in as timely a fashion as in previous years.
  - Low “Ease of access” rating at FNAL points out difficulties with FNAL Kerberos access.
  - Lack of free-form comments makes it difficult for the project to understand areas of concern and develop corrective actions
- ▶ We would appreciate additional input, if you are so inclined.
  - Send e-mail to Alicia Simmons: [alicia@fnal.gov](mailto:alicia@fnal.gov)
  - Subject line: LQCD Input:
  - She will compile your input for review/action by the project team

# Early Access to Prototype BG/Q

- ▶ BNL is planning to purchase and install (2) prototype BG/Q racks in the fall of 2011.
- ▶ The USQCD collaboration has been offered 20 TFlops, or 10% of a BG/Q rack in exchanged for a modest amount of support for hardware and system administration.
  - The LQCD-ext project will be responsible for 5% of the manpower cost of the system, which equates to \$27.5K in year 1 and \$15K thereafter.
  - BNL would continue to pay the cost of electricity, cooling, and space, consistent with our agreement for operating the QCDOC.
- ▶ Total estimated cost to the project = ~\$58K
- ▶ The Executive Committee has endorsed this plan.
  - Getting early access to BNL's prototype BG/Q hardware in exchange for some maintenance support will enable prototyping and code development in preparation for later running on ANL BG/Qs.
- ▶ Our DOE program managers support this proposal.
- ▶ Will require amended MOU with BNL (in progress).

# FY12 Acquisition Strategy & Planning

- ▶ Old Strategy
  - Each year, we procure a machine with the best inverter performance
- ▶ New Strategy
  - Procure machine(s) that will best optimize our portfolio of hardware (including anticipated supercomputer time) against our portfolio of applications (including configuration generation)
- ▶ These two strategies used to produce the same result, but with the emergence of a hardware platform (GPUs) that does incredibly well on only a portion of our workload, the old strategy doesn't really work.
  - It is now time to more formally accommodate these multiple architectures and application requirements.

# FY12 Acquisition Planning (2)

- ▶ In FY12, we will have several options to consider:
  - Infiniband clusters, GPU clusters, BG/Q
- ▶ We need input from the collaboration
  - What workflow can be run at national supercomputer centers?
  - What applications will be able to be run on GPUs at that time?
  - What portion of the analysis computing can be done more cost effectively on GPUs vs. IB clusters?
  - What software can and should be re-written to exploit new architectures?
- ▶ We will discuss this in more detail later in the day

# Summary

- ▶ The project is successfully meeting baseline goals and objectives
- ▶ We've been affected by the FY11 budget situation in Washington; repeated Continuing Resolutions have delayed the procurement/deployment of FY11 computing resources.
  - A fraction of the FY11 Ds expansion will be coming soon.
- ▶ We would appreciate additional input or feedback related to the User Survey, to help us better understand areas of concerns; this will help us to improve our service delivery.
- ▶ We have significant opportunities to maximize our hardware portfolio going forward; we need your help in determining the proper mix of hardware to procure and deploy in FY12 and beyond.