



Managed by Fermi Research Alliance, LLC for the U.S. Department of Energy Office of Science

Core Computing FY15 Budget

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Budget Presentations
13 October 2014

**120 staff head count
(including 3 openings)**

25 onsite contractors

\$27.8M on Project 53 Overhead

\$0.38M on DOE Acc Receivable

\$0.10M on KA 22 Projects

\$0.11M on KA 24 Research

CCD's Role in Lab's Mission and P5 recommendations

Core Computing Division contributes throughout entire lab by providing

- **An underlying foundation that enables others to work**
 - Networking, Data Centers, Databases, TeleComm, TeamCenter, VMs, ...
- **A proper and effective working environment**
 - Security, Desk/laptops, Office env, Printing, Email, SharePoint, Library, ReadyTalk, ...
- **Core business functions**
 - FermiWorks, TimeCards, Budget/Finance, Doc Management, many others
- **Tools to help monitor lab's state**
 - ESH&Q suite, Project Management Suite, FermiDash, Itrack,...

Strategy for achieving our priorities, listed in our tactical plans:

- **Support scientific computing**
 - Enable our scientific colleagues, especially SCD, to accomplish their goals
- **Maintain our reliable secure production services**
 - Must keep production services operational, in regulatory and security compliance, and pay maintenance on supported products. Maintain our ISO20K certification, work with Serv Mgt team
- **Modernization of lab services/systems to provide ROI**
 - Automation, cost savings, efficiency... Work closely with Enterprise Architecture team.
- **Investigate transformative projects for future years work**
 - Need to continue moving forward – requires investigations, funds very scarce for this of course

Practical Priorities and Risks

Priorities used to establish CCD FY15 budget:

- **Pay our staff** – they are key to continued success
- **Pay our fixed costs** for maintenance, licenses, subscriptions – needed for continued operations
- **Keep the data centers running** efficiently to meet the needs of the scientific community. Maintain a safe working environment in our buildings.
- **Keep the core IT infrastructure running** so the lab can get their tasks accomplished – such as email, finance, asset management,...
- Modernize business processes & information systems by **executing IS Portfolio Projects**
- Enhance and **modernize IT** capabilities and infrastructure

Risks to accomplishing goals, in FY15 and beyond:

- FermiWorks–PeopleSoft **payroll interface is fragile**
- We are **very lean on staff** and important items are not getting finished in a timely manner.
 - People’s expectations of computing are set by their experiences on Amazon, Google... where funding is enormous
 - Even sick leave is dramatically affecting project deliverables – having trouble backfilling
 - Staff is concerned about amount of work they are expected to accomplish
- **Dwindling M&S budget coupled with increased fixed costs** do not allow for enough modernization and enhancements, and ultimately the IT platforms won’t support the needs of the lab.
 - In a flat budget, SWF merit increase reduce out available M&S to move the lab forward

We are aware that everyone is facing the last two risks and we continue to work to find ways to save money and do things more effectively and efficiently.

Attachment 1

CCD is primarily funded by overhead

Actual FY15 funding is ~\$250K less than FY14.

Rest of difference is from

- FY13 carryover
- FY14 directed extra funding

Rept_Group	B&R	DOLLARS			FTE's			
		FY14 Actual	FY14 Budget	FY15 Budget	FY14 Actual	FY14 Budget	FY15 Budget	
Research	KA 21 01 02 ENERGY RESEARCH - NATIONAL LABORATORIES							
	KA 22 01 02 INTENSITY RESEARCH - NATIONAL LABORATORIES							
	KA 23 01 02 COSMIC RESEARCH - NATIONAL LABORATORIES							
	KA 24 01 012 THEORETICAL - NATIONAL LABORATORIES							
	KA 24 01 022 THEORETICAL - COMPUTATIONAL H				0.8	0.5	0.6	
	KA 25 01 012 ADVANCED TECHNOLOGY - NATIONAL LABORATORIES							
	KA 25 01 032 ADVANCED TECHNOLOGY - DETECTOR R&D							
	Total				0.8	0.5	0.6	
	National Programs	KA 21 02 022 ENERGY FACILITIES - CMS DETECTOR AND COMPUTING SUPPORT						0.0
		KA 24 01 021 THEORETICAL - SCIDAC						
	KA 24 03 013 THEORETICAL PROJECTS - LATTICE QCD							
	KA 24 03 013 THEORETICAL PROJECTS - LATTICE QCD - EQU							
	KA 25 01 021 ADVANCED TECHNOLOGY - LHC ACCEL RESEARCH (LARP)							
	KA 25 01 022 ADVANCED TECHNOLOGY - MUON ACCELERATORS							
	Total				0.0	0.0	0.0	
Operations	KA 22 02 021 INTENSITY FACILITIES - ACCELERATOR OPERATIONS							
	KA 22 02 021 INTENSITY FACILITIES - ACCELERATOR EQU							
	KA 22 02 021 INTENSITY FACILITIES - AIP							
	KA 22 02 022 INTENSITY FACILITIES - DETECTOR & COMPUTING							
	KA 22 02 022 INTENSITY FACILITIES - DETECTOR EQU							
	KA 22 02 023 INTENSITY OTHER COMPLEX SUPPORT - GPP							
	KA 23 02 01 COSMIC FACILITIES - EXPERIMENTAL OPS & SUPPORT							
	KA 25 02 01 ADVANCED TECHNOLOGY - TEST FACILITIES - SRF							
	KA 25 02 02 TEST FACILITIES - DETECTOR							
	Total				0.0	0.0	0.0	
	Overhead	CSS OVERHEAD	\$23,182	\$23,338	\$22,501	79.1	84.9	91.2
		G&A OVERHEAD	\$6,155	\$6,134	\$4,977	20.6	21.5	17.4
		LDRD OVERHEAD					0.0	0.0
MSA OVERHEAD						0.0	0.0	
Project	PROGRAM SUPPORT OVERHEAD				1.0	1.0	1.0	
	Total				100.7	107.4	109.5	
	KA 21 01 02 ENERGY RESEARCH - CMS UPGRADE OPC							
	KA 22 03 011 INTENSITY PROJECTS - G-2 OPC							
	KA 22 03 011 INTENSITY PROJECTS - MICROBOONE MIE							
	KA 22 03 011 INTENSITY PROJECTS - MICROBOONE OPC							
	KA 22 03 011 INTENSITY PROJECTS - NOVA MIE							
	KA 22 03 011 INTENSITY PROJECTS - NOVA OPC							
	KA 22 03 012 INTENSITY PROJECTS - LBNE OPC				0.2	0.2	0.4	
	39KA 11 SC-40 LI LBNE PED							
KA 22 03 012 INTENSITY PROJECTS - MU2E OPC								
39KA 11 SC-41 LI MU2E PED								
KA 22 03 02 INTENSITY PROJECTS - FUTURE - PIP-II				0.0	0.0	0.2		
KA 23 03 02 COSMIC PROJECTS - FUTURE PROJECTS R&D								
Total				0.2	0.2	0.6		
AR/NON-HEP	LCLS-II							
	Other Accounts Receivable				1.0	1.0		
	DOE Program (i.e. ASCR, S&S, NP, etc.)				1.7	1.6	1.4	
Total				2.7	2.5	1.4		
Grand Total	CCD Division	\$30,440	\$30,532	\$28,351	104.4	110.7	112.1	

Extra Stresses for FY15 - unfunded “mandates”

Workday Subscription – \$312K, still paying \$147K PeopleSoft maintenance

- FermiWorks plan is to eliminate PeopleSoft, not accomplished yet

Picking up **printing page charges** for the lab – \$250K budgeted

- Several projects planned to reduce paper usage

ReadyTalk - \$150K budgeted, could be higher depending on usage.

- ESnet agreed to one-time payment of \$75K (not here yet)

Primary **FCC water pipe** replacement – needed to fix to avoid pipe bursting over equipment and causing a major service outage – \$167K

- Executed on this req & \$150K ReadyTalk req in FY14, causing overrun of \$150K of FY14 allocation – FermiTravels (\$150K) still in procurement.

Smaller items, that add up:

- Ebid for procurement = \$44K/yr, replaced unsupportable home-grown tool
- LCPTracker maintenance = \$16K/yr, for DOE reporting, new last year
- Maintenance, subscription & license fees never go down, usually +3-5%/yr

Staffing

FY14: 104 head count, including 5 openings

FY15: 120 head count, including 3 openings – “same” as FY14.

LEAN!

- 15 staff transferred from BSS
 - 10 staff from Information Resources
 - 5 staff from TeleComm
- 1 new term, paid by external funds

4 FTEs on phased retirement

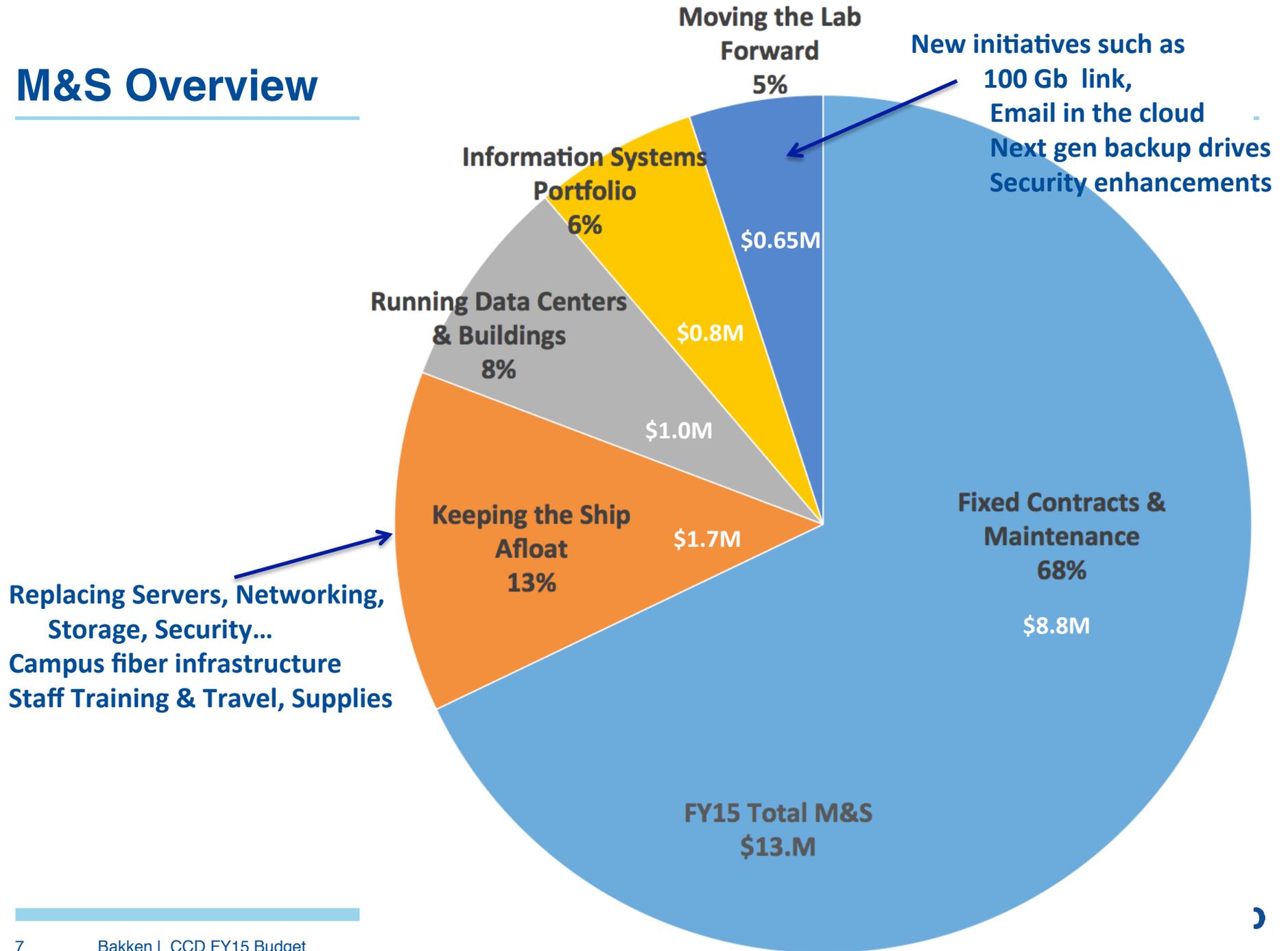
- 2 succession replacements in place
- Need to hire 1 more late this year.

4 “out of school” FTEs hired

- Investment in future staffing, but also requires training



M&S Overview



Fixed Costs Dominate CCD M&S Budget – \$8.8M

Item	Cost (k\$)
Dell Managed Service	\$2,254
Microsoft EA	\$810
Telephone Services	\$727
EBS	\$621
Library	\$362
Security suite	\$358
Workday	\$312
TeamCenter	\$290
Networking HW	\$265
Managed Print Services	\$252
Authentication	\$195
Ansys	\$180
Storage HW	\$176
Kronos	\$172
ServiceNow	\$170
ReadyTalk	\$150
Item	Cost (k\$)

Item	Cost (k\$)
PeopleSoft	\$147
Fermidash	\$147
Microsoft support	\$142
RedHat	\$125
Adobe	\$105
Server HW	\$94
Virtual Services	\$80
Networking SW	\$73
Backup	\$69
Records management	\$67
Networking VoIP	\$65
Email HW	\$56
Sunflower	\$53
Desktop Management	\$48
Oracle developer tools	\$47
eBid	\$44
Deltek	\$37
Sharepoint	\$28
	\$8,751



Running the Data Centers – \$1M

FCC Generator Fuel tank has a leak – emergency repair

FCC Fire Detection System is End of Life & needs replacement

- FESS list of action items to us

Planning for next generation data center

Generator Rental costs \$20k for each power outage at GCC!

Item	Cost
Cooling Maint	\$240
UPS Maint	\$183
Electrical Work	\$115
Battery Maint	\$59
Emergency repairs	\$50
Electrical Engineering	\$45
Monitoring	\$42
Generator Maint+Fuel	\$41
Upkeep	\$40
Generator Rental+Fuel	\$38
IR Scans & Circuit Breakers	\$34
Security Cameras + Pegasus	\$29
Fire System EOL Replacement	\$25

Buildings: CCD is the landlord of FCC and GCC

M&S and 1 FTE of Program Support

- Yearly maintenance is required for elevators, cranes, overhead doors, physical security.
- General upkeep and repairs
- Overspent \$167K last year to fix main FCC water pipe.

Information Systems Portfolio: \$800K, insufficient funding to execute list of projects below.

Goal: Transform & modernize business processes & associated information systems

Projects list, allocations decided in Portfolio Management Team meetings.

- Perhaps with new senior management, this needs to be reviewed?
- **Budget and Planning** – highest FY15 priority project for CCD
 - RFP for tool selection in progress. RFP for implementer TBD
 - Will provide technical assistance in tool & implementer selection
 - Need to deploy standard labor rates and EBS task restructuring after requirements specified
 - Deployment of BPS tool scheduled to start mid July 2015
- **FermiWorks**
 - In production but much needs to be done to support upcoming business events & smooth operations
 - FermiWorks is successful and there are many requests its functionality and capabilities – we continue to work to fulfill these requests
 - Needs same staff required for BPS – propose hiring consultants to help with FermiWorks
 - Needs a Program Manager expert assigned to oversee Workday product
- **FermiTravels** – Travel & travel expense management system
 - RFP in procurement – completion ~6 months after vendor selection
 - Requires additional ~\$120K of M&S budget to operate after deployment (FY16)
- Queued: **Payroll** – part of FermiWorks Phase 2. Requires effort + M&S.
 - Need to finish FermiWorks plan and eliminate PeopleSoft – should not put more work into PeopleSoft
 - This is a **large risk item** – interface is fragile
- Queued: Project Mgt **Promise** ECAM notebook; Expect more PM requests
 - portal to project management data in cobra/primavera

Next set of slides describe **funded highlights** from the set of projects CCD is planning to accomplish in FY15 that help the **Scientific Program** at the lab.

Support for the Scientific Program

Risk:

Not enough bandwidth and redundancy to fully support the LHC data transfer needs.

- Have one 100 Gb link to ESnet, used to support LHC & other science data movement.

Plan:

Implement a second 100 Gb link to ESnet:

- Replaces three 10 Gb links used for general Internet traffic
- Provides a backup link for LHC increasing backup capacity from 10 Gb to 100 Gb
- Allows general traffic flows to exceed 10 Gb to the Internet

Support for the Scientific Program

Risk:

Campus network performance and reliability may not keep pace with future demands of science at Fermilab.

Plan:

Continue investments in improvements to the campus network:

- Upgrade FCC \leftrightarrow GCC multiple 10 Gb links to 100 Gb links to support science traffic
- Continue to upgrade campus/core network infrastructure to 10 Gb uplinks to support the work of scientists
- Continue to upgrade 100 Mb end-user connections to 1 Gb
- Wilson Hall – wireless is the new default (proposal)
- Finish village network VDSL deployment

Support for the Scientific Program

Risk:

ReadyTalk teleconferencing costs are not yet well understood.

Plan:

Optimize costs after some experience with usage.

- Place heavy users on subscriptions leaving light users on pay-per-minute.

Support for the Scientific Program

Risk:

Collaborators find it difficult to work without Fermilab computer accounts.

Plan:

Expand the Federated Identity Services:

- Enable single sign on with Microsoft, Shibboleth (used by CERN) and InCommon (used by most universities).
- Implement the 2nd phase of Eduroam which allows other labs to easily connect to the FNAL networks.

Support for the Scientific Program

Risk:

The processes for obtaining computer accounts are still inefficient and frustrating and viewed as a barrier for working at Fermilab.

Plan:

Complete deployment of the Identity Management System

- Manage electronic identities and roles
- Integrate with FermiWorks as source of truth

to streamline the provisioning of computer accounts.

Support for the Scientific Program

Risk:

Records and publications must continue to meet the needs of the laboratory while maintaining regulatory compliance.

Plan:

- Continue to provide guidance for the records management program and manage the offsite storage and records destruction processes.
- Improve and streamline publications processes.
- Continue working with the Office of Scientific and Technical Information to ensure
 - Reports are delivered using the latest format
 - We comply with the new White House directive on public access to peer-reviewed literature
- Continue to work with SLAC to support and extend INSPIRE
 - Continue our work on author identification paying particular attention to helping collaborations such as DES and LBNF manage their authors

Next set of slides describe **funded highlights** from the set of projects CCD is planning to accomplish in FY15 that help the **General Lab Business Infrastructure**.

Support for the Laboratory Business

Risk:

Many Information Systems supporting finance and business functions are technically cumbersome, labor intensive and expensive to maintain.

Plan:

- **BPS, FermiWorks, FermiTravels, Payroll, Promise**
 - Already discussed on the Information System Portfolio slide
- **EBS “Quick Wins”**
 - Evaluate, understand if wins are “quick” & deploy if appropriate to lessen Finance burden
- **iTrack: Issue tracking**
 - Martha’s task force delivered requests for improvement to us last summer.
 - Work is underway to provide updates to existing product.
 - Real solution is an investment in a commercial tool that would allow modern tracking capabilities
- **Discoverer replacement:**
 - Primary tool used to query financial systems – out of support. Need plan to replace it.
- **FermiDash:**
 - Needs continued development for improved management system dashboards

Support for the Laboratory Infrastructure

Risk:

Current Exchange email system hardware is end-of-life.

Plan:

Develop a plan for migrating email to cloud services. Last year's Microsoft Enterprise agreement:

- Provides Office 365 cloud-based email for employees
- But, has additional costs to add visitors and others who have fnal.gov email addresses
- Will need a new IPV6 Anti-Spam/Anti-Virus tool for email

Also evaluating Google's email service.

- There are other benefits to consider with Google, such as collaboration and video conferencing capabilities.

Support for the Laboratory Infrastructure

Risk:

The 5ESS telephone switch is end-of-life and AT&T may stop support.

Plan:

Develop a comprehensive telecommunications strategy for the laboratory by the end of the fiscal year, including

- 5ESS retirement
- VoIP – we are the last National Lab to move ahead with VoIP
- Cell phones

Support for the Laboratory Infrastructure

Risk:

Purchasing a new personal computer is a cumbersome and lengthy process.

Plan:

Address the issue of “I can order a computer from Amazon and start using it within a week, why am I waiting months at Fermilab?”

- Completely redesign the TechStore purchase process
- Changes required at all levels of process, not just CCD

Support for Laboratory Infrastructure

Risk:

The lab gets a lot of value from its Oracle Enterprise Agreement products, but it also pays a ~\$1M for the Oracle products.

- Oracle products include EBS, PeopleSoft, Database, Primavera

Plan:

Must continue to find ways to reduce Oracle costs when we shed need!

- Last year we signed a 1 year agreement because we were in flux due to the Tevatron ending and scientific Oracle database usage ending or converting to “free” databases.
- Problem is scientific and business agreements are intertwined in a 70% reduced price combined deal.
- Dropping unused scientific licenses causes entire contract to be renegotiated resulting in price increases in all remaining items, effectively keeping total cost the same.
- Trying to trade our licenses to other national labs who need them.

Next set of slides describe **unfunded requests and initiatives**

There are many other initiatives on our list, but these represent ones we believe we could deliver on.

We are limited by available people and available skills in many cases – extra funding alone is not sufficient for success.

Unfunded Initiatives: FNAL-ANL Terabit Network

Create an end-to-end network service that provides access to specific computing resources located in another National Lab at performance levels and access requirements consistent with using local computing resources.

- Initial development use case would be ANL computing facilities accessing FNAL storage facilities
- Service would be designed with a wider vision of becoming a general network service between National Lab data centers, and potentially to other facilities outside of the DOE enterprise as well.
- Premature to put together even ballpark figures for developing a prototype service.
- Likely that DOE/SC/ASCR will be issuing a solicitation in early CY15 that focuses on intelligent network services. The proposed prototype could provide a very attractive foundation for submitting proposals to such a solicitation.

Unfunded Initiatives: Purchase Web of Science \$40K #3

Web of Science offers precise searching (including citation searching) across all of science.

- Fermilab scientists often request Web of Science access, and are surprised we do not have it. Most universities have access.
- Price expires on Dec 31. Usual cost is \$100K – this special price was negotiated by the National Lab Libraries Coalition (NLLC) as a DOE complex-wide license. There is also an annual fee, but this would be waived for the first 3 years.
- Workarounds to date: use INSPIRE for HEP related topics, or work through an aggregator at \$400/search.

Unfunded Initiatives: iProcurement

Oracle iProcurement provides a web-based shopping system that allows employees to create, manage, and track their own orders while the Procurement department retains central control.

- We own licenses for the module and have kept up annual maintenance (for relatively small price).
 - We have never deployed the module, but there have been periodic requests from Procurement to do so.
- Deploying iProcurement would require
 - Consultant expertise to help CCD staff deploy & configure the iProcurement product: estimate **\$150K**
 - Significant effort from Procurement staff, with the consultant, to populate the catalogs, and to modify the procedures and business processes of Procurement.

Unfunded Data Center Facilities Initiatives

Wilson Hall 8 – Fiber Center Cooling – \$130k #1

- Risk: Current cooling is end-of-life and not on standby generator – so when we lose power, power to equipment continues, but no cooling!
- Need to replace EOL chilled water cooling units with air-cooling units on standby generator.

GCC Tape Robot Room Cooling & Enclosure - \$200k #2

- Risk: Loss of lab's scientific data
- Due to significant advancements in tape technology, the Tape Robot Room at GCC needs to be upgraded to a cleaner environment. Need to address contaminants in the room.

GCC & FCC Variable Speed Fans & Smart Controllers #4

- Risk: part of cancelled ESPC planned energy efficiency & operational improvements program
- \$345k for GCC and \$48k for FCC. Payback expected in 3 years.

Unfunded building needs:

- FCC3 Office Heat Pumps EOL replacements – \$169k for 16 units
- FCC Elevator Controls EOL replacement – \$25k
- Replace EOL FCC office lighting panels – \$30k

Summary

CCD is ready to help the lab accomplish its mission and the P5 recommendations, and are confident we can deliver on what was described in this presentation.

CCD
120 staff head count
(including 3 openings)
25 onsite contractors
\$27.8M on Project 53 Overhead
\$0.38M on DOE Acc Receivable
\$0.10M on KA 22 Projects
\$0.11M on KA 24 Research

We work hard to provide stable production infrastructure for the lab's science and business and we measure our progress.

Shrinking M&S budgets coupled with increasing fixed costs leave little for new initiatives that allow us to move the lab forward.

We are limited in taking on new initiatives by the available people and skills

- Constant tradeoffs and slowdowns between project work and production support