Accelerator Division Meeting

May 31, 2007

Andrew Hutton

Safety

DuPont Safety Training

- **Most JLab managers have taken DuPont safety training – "Safety Leadership Workshop"**
  - **JLab managers means Directors, Department Heads, Group Leaders**
  - **Good course – may be extended to others**
- **Focus of workshop is management responsibility in creating a safe workplace**
  - **Slightly different focus from STOP program**
  - **Requires managers to conduct safety observations**
- **Participants were asked to implement a plan of action**
- **After discussion with Division Department Heads**
  - **We agreed to implement Division Initiative #7**

(more later)

Director of Operations

- Selection Committee carried out first round of interviews
  - Matt Poelker (Chairman), Rhonda Barbosa (HR), Ron Gilman (Chairman of Users Board of Directors), Andrew Hutton, Ron Lauzé, Lia Merminga, Will Oren, Bob Rimmer, Dennis Skopik
- Nine candidates were interviewed (5 internal, 4 external)
  - Really excellent candidates
  - We have retained five for the second round
  - Candidates will give a seminar, have a wider exposure to people in the Accelerator Division and customers
- Hope for a selection within a month

Technical Reports

12 GeV

Karen White

12 GeV Project Timeline		
CD-0	Establishes mission need	March, 2004
CD-1	Establishes acceptance of the project conceptual design and baseline range.	February, 2006
CD-2	Establishes the baseline cost and schedule for the project	September, 2007
CD-3	Authorizes the start of construction.	September, 2008
CD-4	Establishes the completion of the project and authorizes the start of operations.	December, 2014

12 GeV Status

- Reviews Leading to CD-2
  - DOE: 2007 Independent Project Review – Lehman Review (6/26-28/07)
  - DOE OECM: External Independent Review (8/06-10/07)
- Many Accelerator and Engineering people busy preparing a large amount of documentation needed for these reviews
- Each accelerator system has a Preliminary Design and Safety Review prior to Lehman Review

6 GeV Operations

Hari Areti

for

Operations Department

Outline

- **Mission**
- **Structure**
- **Present**
- **Future**

Mission

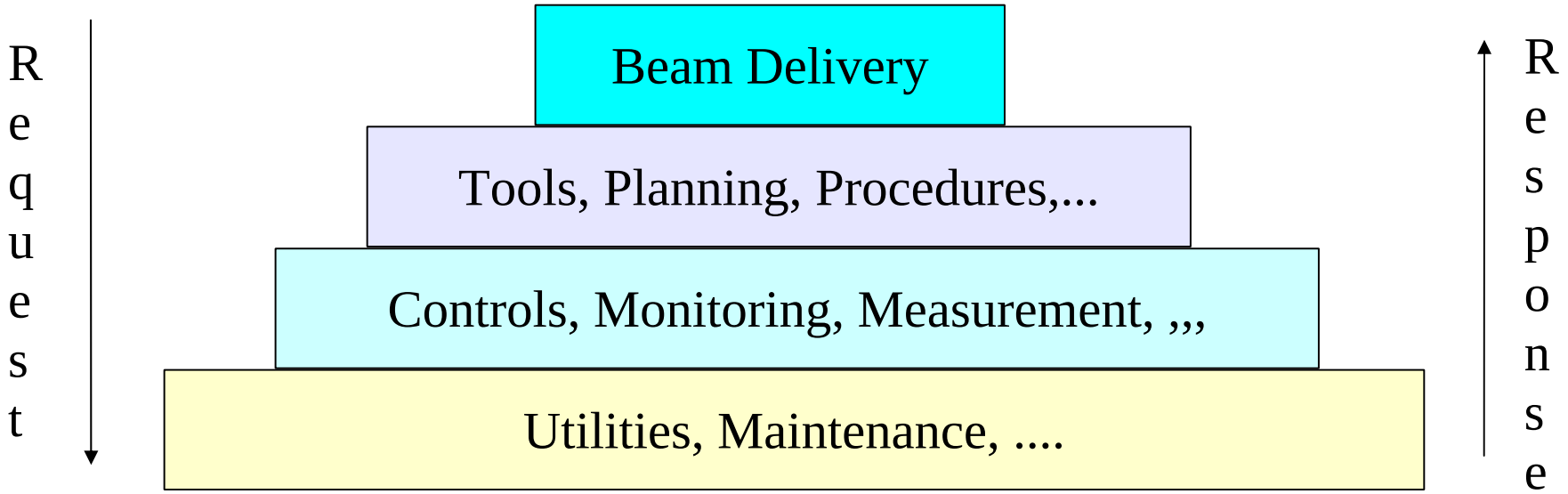
- **Provide electron beam of specified quality to three experimental halls.**
  - **Specified Quality: As described in the experimental proposal and approved by the Techincal and Physics Advisory Committees.**
  - **Meet and exceed the contractual metrics for beam on target.**

Structure

- **The user contact with Operations is through the crew in the MCC.**
- **Successful operations begin with sound infrastructure.**
  - **The measurement of its success is its invisibility.**

Structure

- **Operations Pyramid**



Groups and Leaders

- **Following slides give a simplified and necessarily incomplete look at the groups**
- **Please remember that the groups draw support from the entire lab.**

Operability

- **Leader: Steve Suhring**
  - **Interfaces to Facilities and Engineering**
  - **Makes sure that the accelerator hardware is performing smoothly**
  - **Schedules maintenance activities**
  - **And much more**
- **Deputy: Jacque Ludwig**
  - **Tracks Accelerator Performance and**
  - **System Utilization**

Control Systems

- **Leader: Matt Bickley**
  - **Provides tools to make hardware devices into systems for control, measurement and monitoring**
  - **Provides High Level Applications for Accelerator setup**
- **Deputy: Pam Kjeldsen**
  - **Interfaces with Operations Group and CASA to provide, evaluate and improve software tools.**

Operations Projects

- **Leader: Mike Spata**
  - **Coordinates a team of Beam Physicists, Engineers, Operators and Computer Scientists to**
    - **Evaluate the Accelerator Performance**
    - **Anticipate the accelerator configurations for near term and longer term operations**
    - **Assess the need for tools including diagnostics**
    - **Participates in scheduling beam studies and**
    - **Provides training for Ops Crews.**

Operations

- **Leader: Noel Okay**
  - **Schedules the crews for Machine Operations**
  - **Evaluates the training needs**
  - **Creates trainig curriculum**
  - **Tracks the efficacy of the procedures for machine setup**
  - **Tracks the efficiency of operations**
- **Deputy: Mike Epps**
  - **Trains Operations Crew**
  - **Evaluates the procedures and tools used by the crew.**

Present

- **We are providing beam to all three halls**
- **We had three energy reconfiguration in the last two weeks, with more coming.**
- **Machine reconfiguration has taken longer than the canonical 8 hrs.**
- **We are taking the opportunity to train our crews, and evaluate our procedures and tools.**

Future

- **Our goal is to be able to reduce the time for energy changes to 12 hrs. or less.**
  - **Improve procedures**
  - **Improve tools**
  - **Continue to train the crews**
- **Keep up-to-date in evolving techniques in processes and software engineering to achieve the above goals and to be the best in Accelerator Operations.**

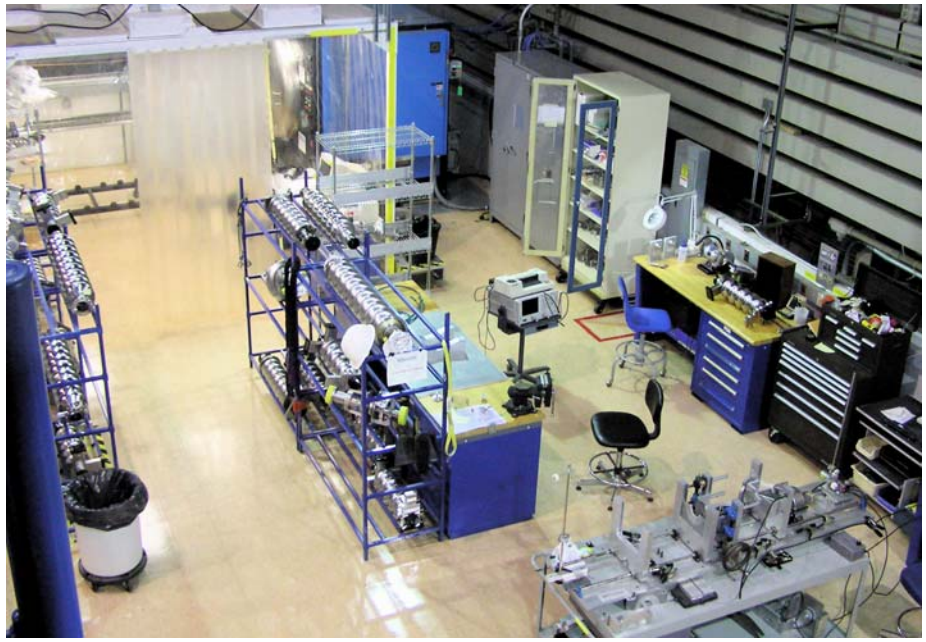
SRF Update

Bob Rimmer

Accelerator Division All-hands 5-31-07

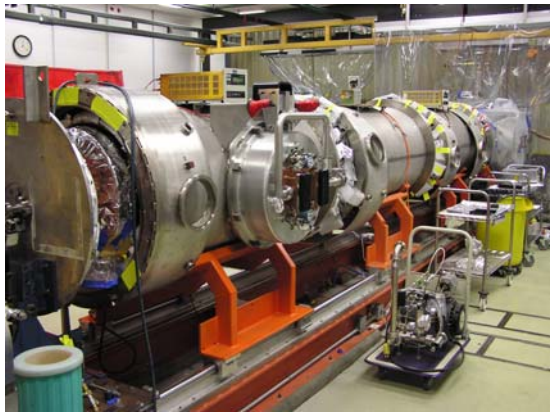
Test lab improvements

- Going well- see Bob Bennett's talk



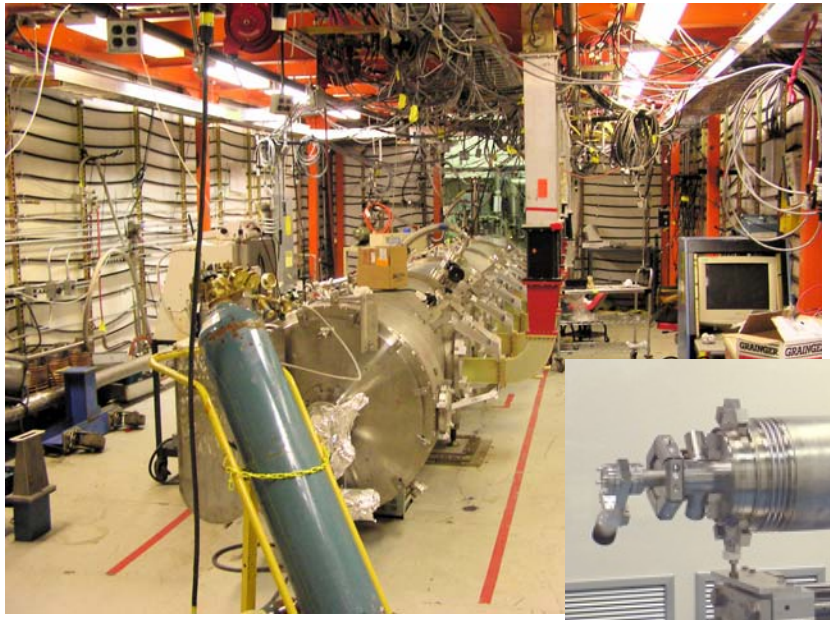
C50

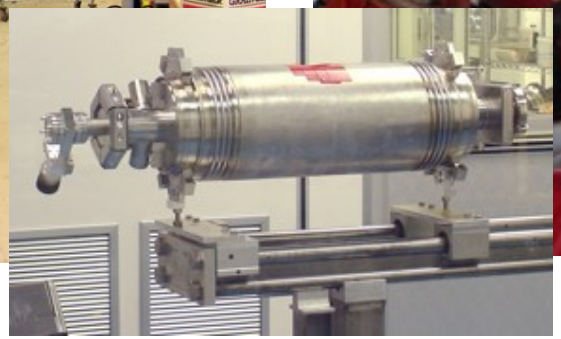
- First module in the tunnel and operating.
- Second module complete in ~ 2 weeks.
- Third module being built into units.
- Fourth module apart for rework.
- Fifth module completed decommissioning tests.
- Ten-year energy plan supports long-range physics needs.

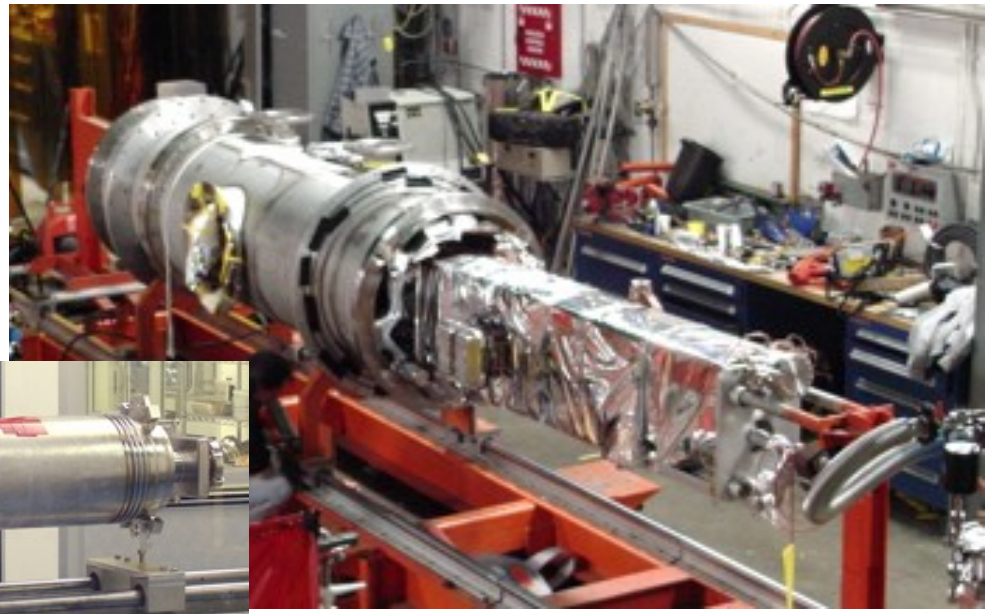


Renascence/C100

- Renascence now back in the test cave.
- Will make a big contribution to 6 GeV operations.
- Lessons learned applied to “C100” cavity pair.
- C100 pair in horizontal test met all 12 GeV specs.

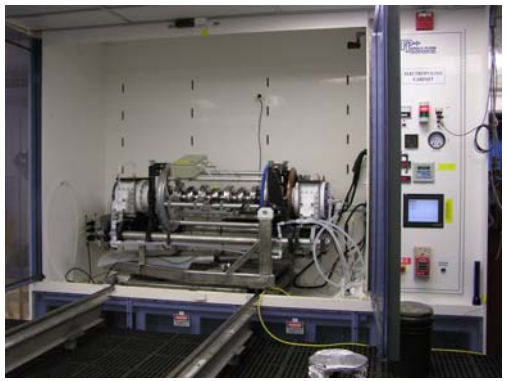


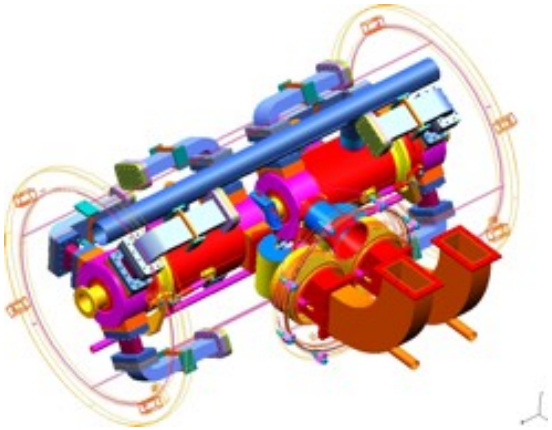


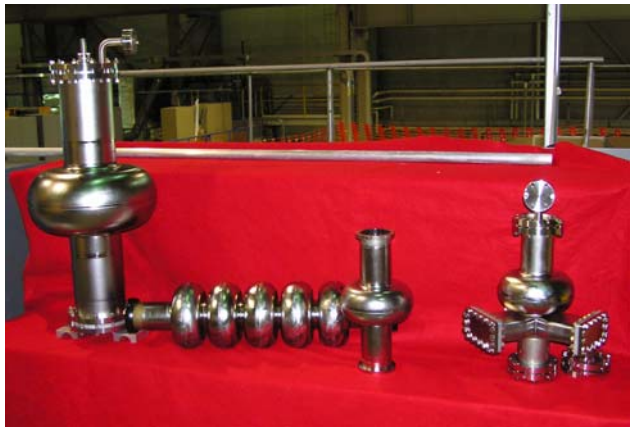


Work for others

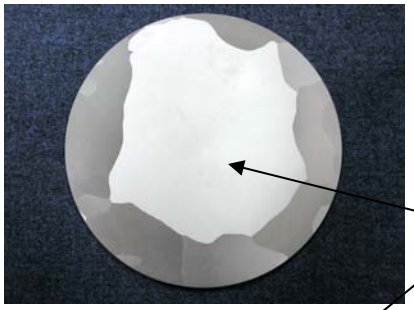
- ILC: electropolishing & cavity fabrication, large grain material studies, etc. (inc. world record 42 MV/m 9-cell cavity)
- BNL: Qualified 700 MHz cavity for string assembly.
- FEL: building high-current cavities and modules.
- Etc.

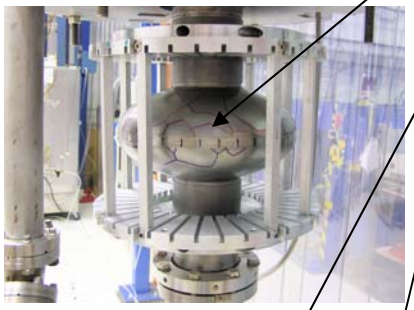


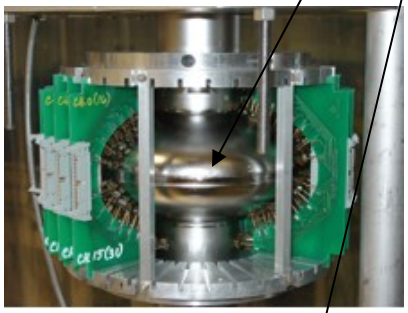


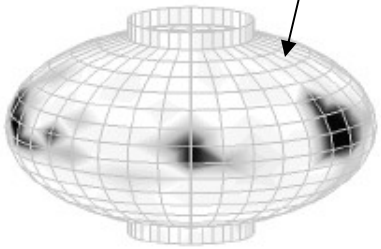


R&D



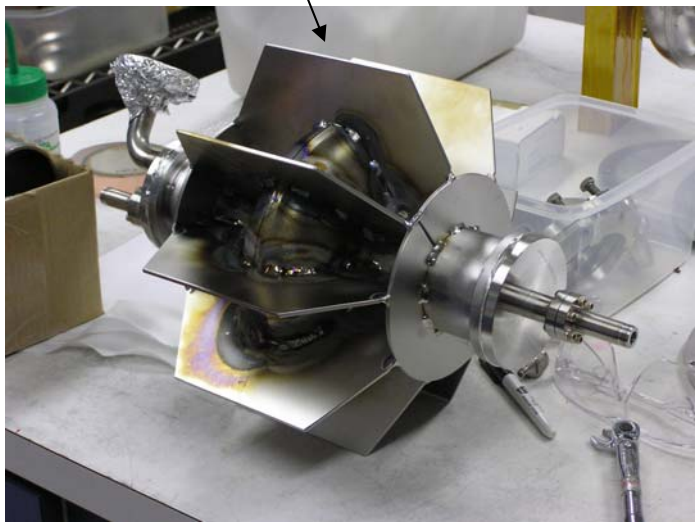


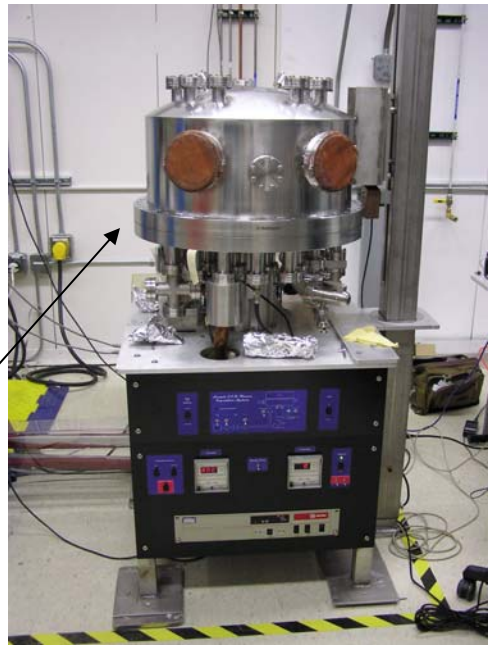




A random sampling:

- Large grain cavities
- Temp. mapping
- Baking studies
- ECR plasma thin-films
- Cavity coating system
- Weird stuff…





ELIC

Lia Merminga

ELIC: Science Motivation

A High Luminosity, High Energy Electron-Ion Collider:

A New Experimental Quest to Study the Glue which Binds Us All

How do we understand the visible matter in our universe in terms of the fundamental quarks and gluons of QCD?

<u>Explore the new QCD frontier: strong color fields in nuclei:</u>

- **How do the gluons contribute to the structure of the nucleus?**
- **What are the properties of high density gluon matter?**
- **How do fast quarks or gluons interact as they traverse nuclear matter?**

<u>Precisely image the sea-quarks and gluons in the nucleon:</u>

- **How do the gluons and sea-quarks contribute to the spin structure of the nucleon?**
- **What is the spatial distribution of the gluons and sea quarks in the nucleon?**
- **How do hadronic final-states form in QCD?**

ELIC Accelerator Design Goals

- **Center-of-mass energy between 20 GeV and 90 GeV:**
  with energy asymmetry of ~10, which yields
  (E_e ~ 3 GeV on E_A ~ 30 GeV) up to (E_e ~ 9 GeV on E_A ~ 225 GeV)

- **Average Luminosity from 10^{33} to 10^{35} cm^{-2} sec^{-1} per Interaction Region**

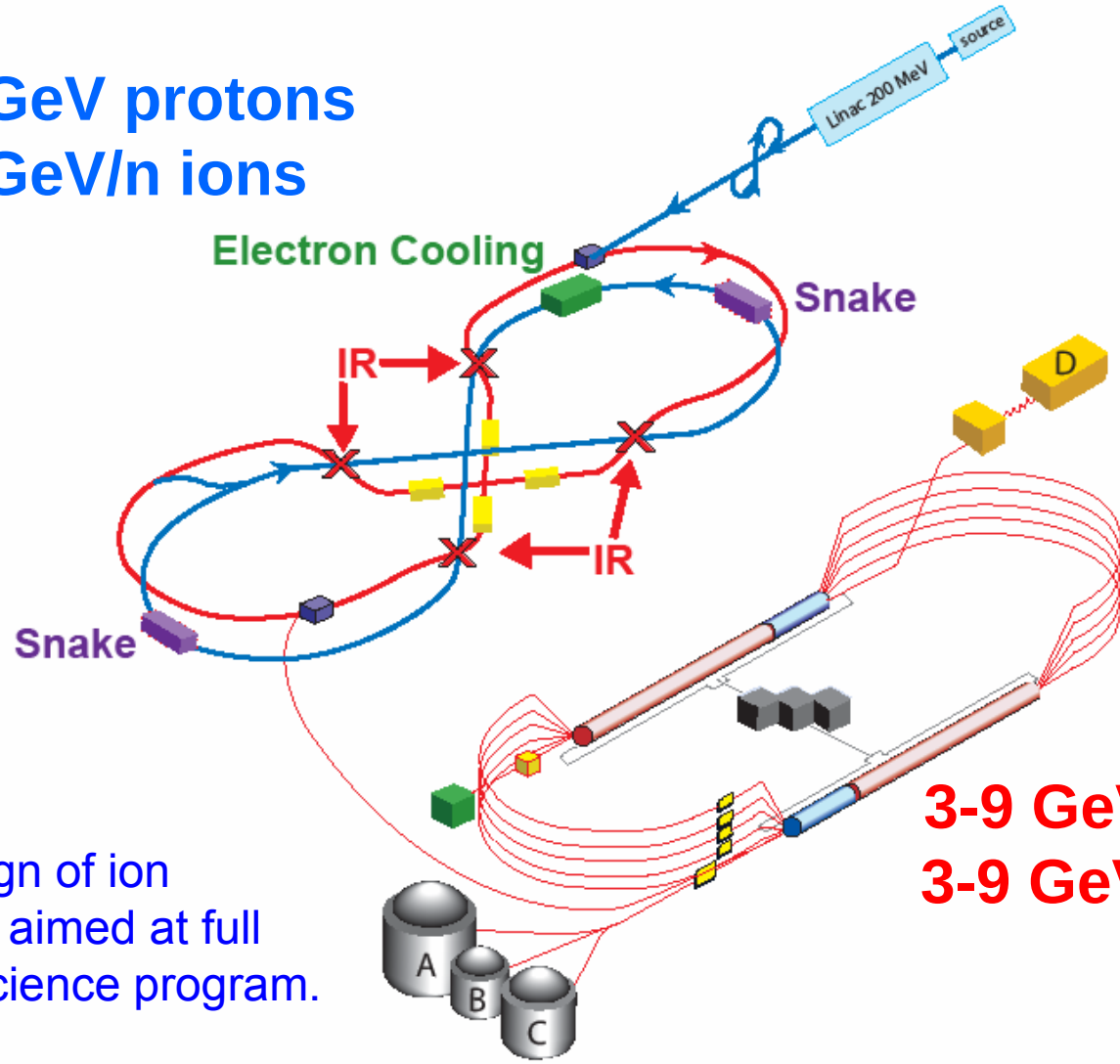
- **Ion Species:**
  - Polarized H, D, ^{3}He, possibly Li
  - Ions up to A = 208

- **Polarization:**
  - Longitudinal for both beams in the interaction region
  - Transverse polarization of ions
  - Spin-flip of both beams
  - All polarizations >70% desirable

- **Positron Beam desirable**

ELIC at L~7.7x10^{34} cm^{-2}s^{-1}

30-225 GeV protons
30-100 GeV/n ions



3-9 GeV electrons
3-9 GeV positrons

Green-field design of ion complex directly aimed at full exploitation of science program.

Design Features of ELIC

Directly aimed at optimizing the science program:

- "Figure-8" ion and lepton storage rings to ensure spin preservation and ease of spin manipulation. No spin sensitivity to energy for all species.
- Short ion bunches, low β^*, and high rep rate (crab crossing) to reach unprecedented luminosity.
- Four interaction regions for high productivity.
- Physics experiments with polarized positron beam are possible. Possibilities for e^-e^-colliding beams.
- Present JLab DC polarized electron gun meets beam current requirements for filling the storage ring.
- The 12 GeV CEBAF accelerator can serve as an injector to the electron ring. RF power upgrade might be required later depending on the performance of ring.
- Collider operation appears compatible with *simultaneous* 12 GeV CEBAF operation for fixed target program.

Accelerator R&D Required for ELIC

To achieve luminosity at ~ 10^{33} cm^{-2} sec^{-1}

- High energy electron cooling with circulator ring

To achieve luminosity at ~ 10^{35} cm^{-2} sec^{-1}

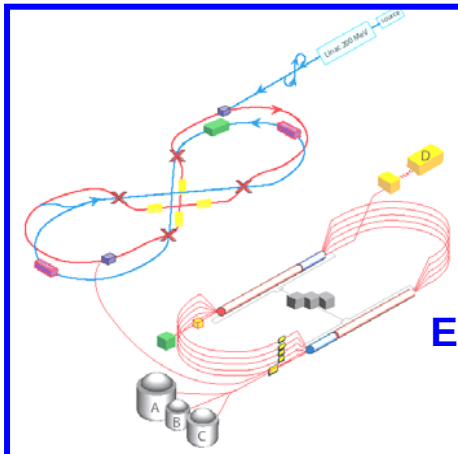
- Crab crossing
- Stability of intense ion beams
- Beam-beam interactions
- High RF frequency (part of detector R&D)

NSAC Long Range Plan EIC Recommendation

We recommend the allocation of resources to develop accelerator and detector technology necessary to lay the foundation for a polarized Electron Ion Collider. The EIC would explore the new QCD frontier of strong color fields in nuclei and precisely image the gluons in the proton.

Without gluons there are no protons, no neutrons, and no atomic nuclei. Interactions among gluons determine the unique features of strong interactions. However, gluon properties in matter remain largely unexplored. Recent theoretical breakthroughs and experimental results suggest that both nucleons and nuclei when viewed at high energies appear as dense systems of gluons, creating the strongest fields in nature. The emerging science of this universal gluonic matter drives the development of a next generation high luminosity electron ion collider. Polarized beams in the EIC will give unprecedented access to the spatial and spin structure of gluons in the proton. The EIC embodies our vision for reaching the next QCD frontier. Realization of an EIC will require advancements in accelerator science and technology, detector R&D, and continued theoretical development.

ELIC ZDR



Zeroth–Order Design Report for the Electron-Ion Collider at CEBAF

A. Afanasev, A. Bogacz, P. Brindza, A. Bruell, L. Cardman, Y. Chao, S. Chattopadhyay, E. Chudakov, P. Degtiarenko, J. Delayen, Ya. Derbenev, R. Ent, P. Evtushenko, A. Freyberger, D. Gaskell, J. Grames, A. Hutton, R. Kazimi, G. Krafft, R. Li, L. Merminga, J. Musson, M. Poelker, A. Thomas, C. Weiss, B. Wojtsekhowski, B. Yunn, Y. Zhang
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Newport News, Virginia, USA

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A. Belov
Institute of Nuclear Research
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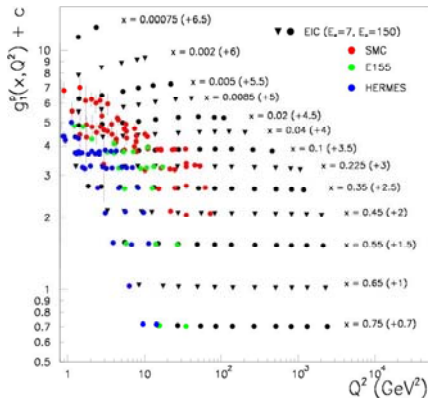


Editors: Ya. Derbenev, L. Merminga, Y. Zhang

ELIC Study Group & Collaborators

A. Afanasev, A. Bogacz, P. Brindza, A. Bruell, L. Cardman, Y. Chao, S. Chattopadhyay,E. Chudakov, P. Degtiarenko, J. Delayen, Ya. Derbenev, R. Ent, P. Evtushenko, A. Freyberger, D. Gaskell, J. Grames, A. Hutton, R. Kazimi, G. Krafft, R. Li, L. Merminga, J. Musson, M. Poelker, R. Rimmer, A. Thomas, H. Wang, C. Weiss, B. Wojtsekhowski, B. Yunn, Y. Zhang - Jefferson Laboratory

W. Fischer, C. Montag - Brookhaven National Laboratory

V. Danilov - Oak Ridge National Laboratory

V. Dudnikov - Brookhaven Technology Group

P. Ostroumov - Argonne National Laboratory

V. Derenchuk - Indiana University Cyclotron Facility

A. Belov - Institute of Nuclear Research, Moscow-Troitsk, Russia

V. Shemelin - Cornell University

Test Lab Improvement Project

Progress Report
May 31, 2007

Bob Bennett
(Keith Royston)

Goals

1. Make space by using external storage
2. Eliminate unused/not-needed items
3. Clean up and organize work areas
4. Repaint, Carpet, Repair:
   - Common office areas
   - Several high bay and exterior walls
5. Improve work environment

Facilities Management - Keith Royston

Completed

- New carpet in Conference Room and Office Hallways
- Rearranged Partitions in Copy/Print Area

Facilities Management - Next Steps

- Lobby Floor – remove carpet, renovate terrazzo floor
- Lapping Room Reconfiguration
- HVAC - Add cooling to CryoUnit Assembly Room
- AHU-4 - Fix Condensate Leaks
- RF Test Lab (279) - Balance room temperature
- Services for further improvements:
  - e.g. Noise Abatement Project

Short/Medium Term Storage

- Replacing Old, and Organizing New Transportainers

Short/Medium Term Storage

- New transportainer #1: Equipment transfer from Test Lab is complete.

- New Transportainer #2 Equipment transfer from Old Transportainer and Test Lab is complete.

- Third Transportainer Ordered

To Move to Long Term Storage When Space is Available

High Pressure Rinse Cabinet

¼ Cryomodule

Tensile Test Station

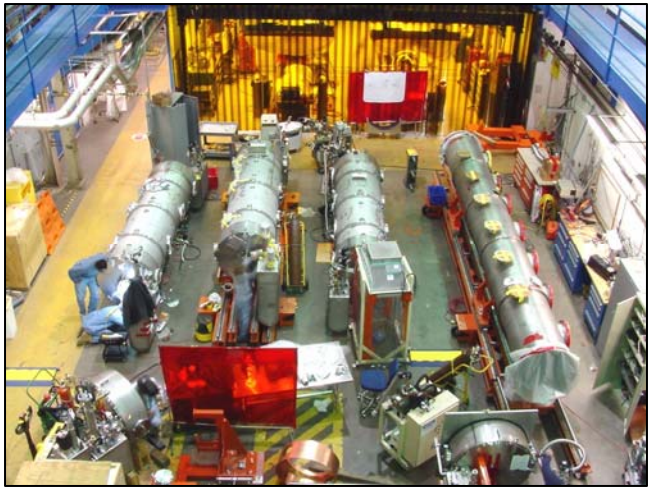
Old Cavity Dies

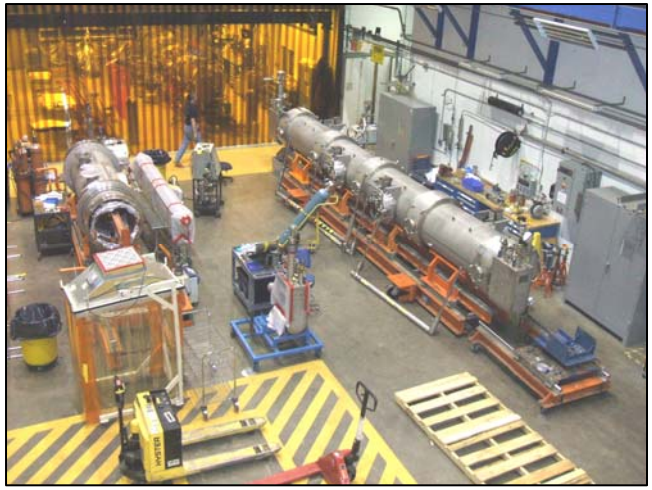
… Miscellaneous Tooling, etc.

Cleaned Up and Organized Work Areas

"Hockey Rink"

Cryomodule Staging Area





Magnet Test Area

Big Improvement.

Nice Job Magnet Group!

Ongoing Activities

- Continue Organization and Storage of Less Frequently Used Items
- Continue Organization of Work Areas
  - e.g. Bench top cabinets for brazing room – Received
  - Clearing Boxes etc. from New Niobium Storage Room
- Improve Work Environment
  - Reduce Ambient Noise in North End of High Bay
  - Fix HVAC issues
    - Cryounit Assembly Room
    - RF Test Lab (formerly the “storage barn”)
  - etc.

Ongoing Activities

- Create a Display Area in the Atrium
  - Refinish Terrazzo Floor
  - Showcase Your Work
- Set Up Office Hallway Displays
  - Present Professional Image
  - Pictures being framed
- Update Conference Room
  - Audio Visual Equipment
  - Furniture

Remember,
It’s Your Workplace

- Submit suggestions via email
- Go ahead and make the changes if you can
- If you need resources (assistance or funds) to get something done, ask.

This is a
Continuous Improvement Program

Your Project Coordinator is Bob Bennett

email bennettr@jlab.org or Call ext 7656

Test Lab Inspection 5/29/07

- **There was an inspection of the Test Lab last Tuesday**
  - **Christoph Leemann (Lab Director)**
  - **Jim Turi (Manager, DOE Site Office)**
  - **Dean Golembeski (Director of Public Affairs)**
- **"I am delighted with the new look of the Test Lab; the people did a fantastic job in improving their environment in a way that will enhance safety, quality, productivity, and quality of life. Congratulations."**

  Christoph Leemann
- **"The progress made by Bob Bennett, Bob Rimmer and the Test Lab staff is a visible commitment to workplace safety and quality. They have set a high standard for others."**

  Jim Turi

Update on
Second Divisional Initiative

Preparing for Reviews

Sherry Thomas

Science & Technology Review

Accelerator Division Coordinator: Sherry Thomas

- **Purpose**
  - **Annual review by DOE Office of Nuclear Physics evaluating the quality, performance, and significance of the TJNAF program**
- **Dates**
  - **July 23 – 25, 2007, at Jefferson Lab**
- **Accelerator Division Speakers**
  - **Andrew Hutton – Accelerator Overview**
  - **Bob Rimmer – SRF Program**
  - **Lia Merminga – Accelerator Physics**
  - **Jean Delayen – FRIB Participation**
  - **Dana Arenius (Engineering) – Cryogenics**
  - **Matt Poelker – Polarized Electron Source**

Accelerator Division Dry-Runs

June 1st – Hutton

June 15th – All

June 21st – All

Science Technology Review
Each year, the Division reports:

- **Awards, Prizes, Honors, etc.; examples are**
  - **APS Fellows**
  - **International Prizes**
  - **DOE, State, and SURA recognized**
  - **Fellowship in Scientific Journals**
- **Committee Memberships (Chairs and/or Members of external Organizing/Program/Advisory Boards), etc.; examples are**
  - **ICFA, ACFA, ECFA**
  - **PAC, EPAC, APAC, Leaders of Specialized Workshops**
  - **APS**
  - **AIP**
- **Nuclear Physics Facilities Collaborations**
- **Publications (published & submitted); examples are**
  - **Invited contributions to scientific journals**
  - **Refereed Literature**
  - **Conference Proceedings and Workshops**
  - **Invited Talks**
- **Staff Teaching Accelerator Science (Adjunct and Regular Faculty Positions), courses taught and future courses**

Exclude JLAB in-house Committees

How can you help?

- **Provide the information that will soon be requested from you by your department head or group leader, within the stated deadline**
- **Update/Add your publications in the JLAB publication database (http://www.jlab.org/div_dept/admin/publications/publications.html)**
- **We are working to provide a better means of capturing this information on a regular basis; I welcome any suggestions (sthomas@jlab.org; x7078)**

In the near future, travelers will be required to submit a copy of their paper/talk with their travel expense report before a travel reimbursement is released to the traveler (similar to the current process of submitting trip reports for foreign travel).

Please start now making it a habit of going through the proper publications review process.

THANK YOU!!!

Update on Sixth Divisional Initiative

Calendar Program

Kelly Webster

Calendar Program

(Andrew's Sixth Divisional Initiative)

Reminder: Use Corporate Time to schedule your individual activities

"Group" Calendars (available and ready to be used!)

- Accelerator Division Leadership Calendar – accelmgt
  - All Department Heads, Group Leaders, and Deputies
- Department Calendars – casa, ops, srf
  - All staff in each Department
- When you wish to take vacation, discuss it with your supervisor, then put it on the "Group" calendar in the Daily Notes section
  - Question? Ask your Group Admin Support

Calendar Entries

- "**Meeting"** entries
  - From the calendar's Toolbar, click on the clock icon (or select New from the Edit pull down menu or press F2)
  - Once the New Meeting window is displayed, enter a title and location
  - Select the date, start time, end time and/or duration of your meeting

- "**Daily Note**" entries to the "Group" calendar
  - From the calendar's Toolbar, click on the pushpin icon (or select New from the Edit pull down menu or press F3)
  - Once the New Daily Note window is displayed, enter a title, and verify the correct date
  - Go to "Add" and enter the "Group" calendar name (i.e., accelmgt)
  - Press the OK button to add the note to your calendar

Webster, Kelly - Jun. 4 to Jun. 8, 2007 - EST5EDT

File Edit View Tools Window Help

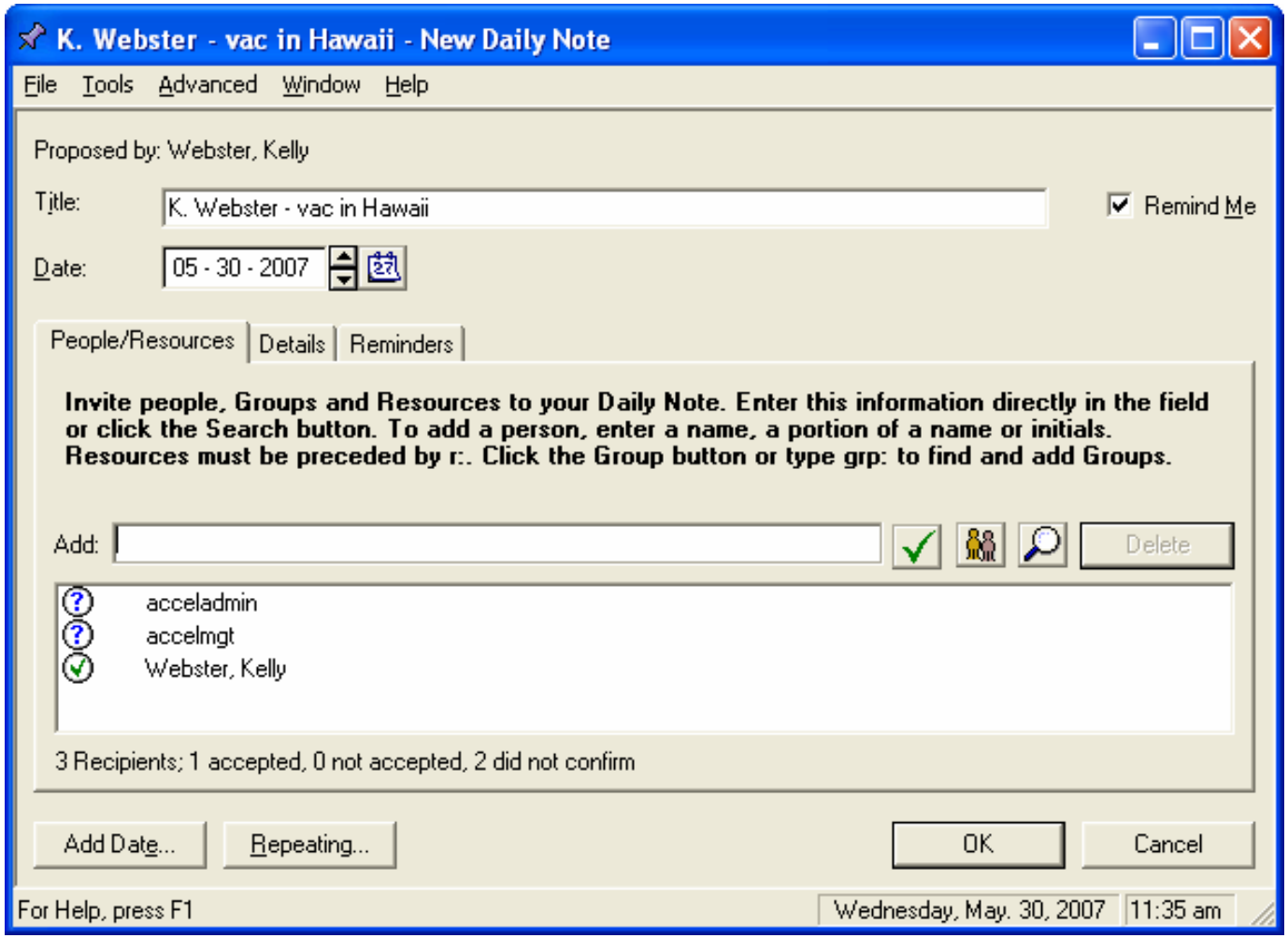
Today

Monday, Jun. 4 to Friday, Jun. 8, 2007 (Week 23)

	Monday 4	Tuesday 5	Wednesday 6	Thursday 7	Friday 8
8:00am	Vacation (Hawaii) 8:00am-5:00pm	Vacation (Hawaii) 8:00am-5:00pm	Vacation (Hawaii) 8:00am-5:00pm	Vacation (Hawaii) 8:00am-5:00pm	Vacation (Hawaii) 8:00am-5:00pm
8:30am					
9:00am					
9:30am		Accelerator Leadership ...			
10:00am				All Managers meeting (CC Auditorium) 10:...	
10:30am					
11:00am			Bi-Weekly Meeting w/ ...		
11:30am					
12:00pm					
12:30pm					
1:00pm					
1:30pm					
2:00pm					
2:30pm					
3:00pm					
3:30pm					
4:00pm					
4:30pm					
5:00pm					

Monday 4	Tuesday 5	Wednesday 6	Thursday 7	Friday 8
Funk @ ILC GDE Meeting - DESY	Gayle, Dr. appt. 8-5 (Sundeen-co	Camp-Vacation (Camp, Carolyn)	Camp-Vacation (Camp, Carolyn)	Camp-Vacation (Camp, Carolyn)
Gayle-SL (Sundeen-coleman, Ga	K. Webster - vacation in Hawaii	K. Webster - vacation in Hawaii	K. Webster - vacation in Hawaii	K. Webster - vacation in Hawaii
K. Webster - vacation in Hawaii				Karen - Vac (White, Karen)

For Help, press F1 Wednesday, May. 30, 2007 2:20 pm



Would individual group training sessions be helpful?

Update on “Meet and Greet”

“Meet and Greet”

- Sherry scheduled 27 Meetings with Test Lab staff
- I attended 27 – 100%
- Staff members who did not attend – 2

- I am following through on my promise to meet everyone in the Division that I don’t know

- The staff members who missed their appointments owe Sherry an apology
  - Use the calendar program if you are off-site
  - Don’t make extra work for others

Seventh Division Initiative

Safety Observations

Safety Observations

- All managers in the Accelerator Division will be expected to conduct safety observations in their own areas
  - Supervisors and Group Leaders 1 hr/wk
  - Department Heads and Division Leader 1 hr/2 wks
- In addition, all managers in the Accelerator Division are expected to spend a similar amount of time in other areas, accompanying a manager doing safety observations
  - A different pair of eyes with a new perspective
  - Cross-fertilization of good ideas
- All of JLab will be implementing this program
  - Accelerator will be play a crucial role in the initiative

Purpose of Safety Observations

- Improve safety – not catch people in unsafe acts
- No "Unsafe Act" quota
- Names are not tied to "Unsafe Acts"
  - No discipline unless the unsafe act is "repetitive, willful, or flagrant violation of rules"
    - I believe that no-one in the Division acts like this
- The safety observations will be put in a database and used to identify trends
  - Example – housekeeping and clutter
- Goal of management safety observations

Visibly demonstrate management commitment to safety

Eighth Division Initiative

ISO-9001 Compliance

What is ISO 9001

- **ISO 9000 is a family of standards for quality management systems**
- **Maintained by ISO, the International Organization for Standardization and administered by accreditation and certification bodies**
- **For a manufacturer, some of the requirements in ISO 9001 (which is one of the standards in the ISO 9000 family) include:**
  - **a set of procedures that cover all key processes in the business**
  - **monitoring manufacturing processes to ensure they are producing quality product**
  - **keeping proper records**
  - **checking outgoing product for defects, with appropriate corrective action where necessary**
  - **regularly reviewing individual processes and the quality system itself for effectiveness**
  - **facilitating continual improvement**

Wikipedia

JLab and ISO 9001

- JSA has committed JLab to producing and complying with a Quality Assurance Program
- The proposed program (Bruce Lenzer):
  - Follows DOE Order 414.1C
  - Maps to ISO 9001 standards for service providers
- I am proposing that Accelerator Operations seek compliance with the JLab Quality Assurance Plan
  - The extensive documentation that already exists will facilitate this task
- I am proposing that the SRF Institute starts to comply with ISO 9001:2000 for manufacturers
  - I expect that full compliance will be a longer, harder task than for Accelerator Operations

Why Do Companies Seek ISO 9001 Accreditation?

- **ISO 9000 guidelines provide a comprehensive model for quality management systems that can make any company competitive**
- **Implementing ISO gives the following advantages:**
  - **Create a more efficient, effective operation**
  - **Increase customer satisfaction and retention**
  - **Reduce audits**
  - **Enhance marketing**
  - **Improve employee motivation, awareness, and morale**
  - **Promote international trade**

Wikipedia

What Would JLab Get?

- Improved processes
  - Higher performance
  - Improved reproducibility
  - Higher productivity
  - Faster throughput
  - Fewer mistakes and errors
- Improved morale
  - Less rework
  - Less frustration
- Formal recognition as a world-class organization

Next Steps

- This is a major investment for the Division (and JLab)
- Requires careful preparation
  - Not a quick fix for immediate problems
- Please spend a few minutes on GOOGLE finding out about ISO 9001
- I will continue to meet with managers from Accelerator Operations and the SRF Institute to prepare a plan
- I hope to be able to present our plan in about a month

- We are looking at a task that could take 1-2 years
  - We need to plan and execute it well

Summary

Immediate Future

- **Extremely busy time**
  - **12 GeV reviews**
  - **6 GeV maintenance and hardening activities**
  - **Installation and commissioning of C50 and Renaissance cryomodules**
  - **Science and Technology Review**
  - **Particle Accelerator Conference**
  - **Produce ELIC ZDR**
  - **etc.**
- **Remember: accidents are more likely if we are stressed**

Stay safe