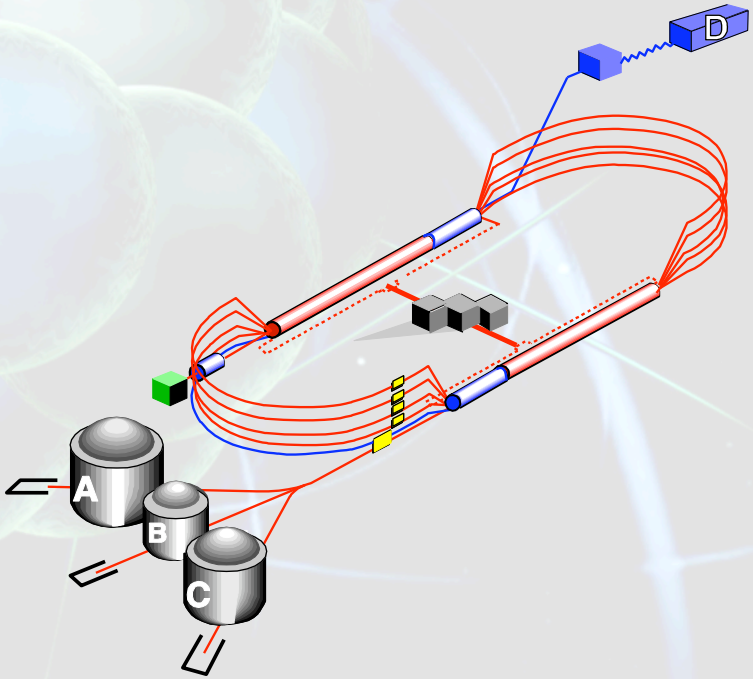
Readiness Review Process



Rolf Ent

Readiness Review Process

Jefferson Lab experiments typically use a combination of base equipment and *new, often JLab-user led and constructed, equipment*.

How do we integrate such new equipment effectively and safely?

Outline:

- Experimental Readiness Review Process in the 4 & 6 GeV era
- Management self-assessment for "Installation of New Equipment Involving Multiple Groups".
- New Experimental Readiness Review Process in the 12 GeV era
- Implications for RICH

Experiment Systems Readiness Process - General

Experiment Systems Readiness reviews are standalone reviews required prior to delivery of any beam to the respective Hall. The Experiment Systems Readiness Process has been used effectively for all JLab experiments since the start of experiments in 1995.

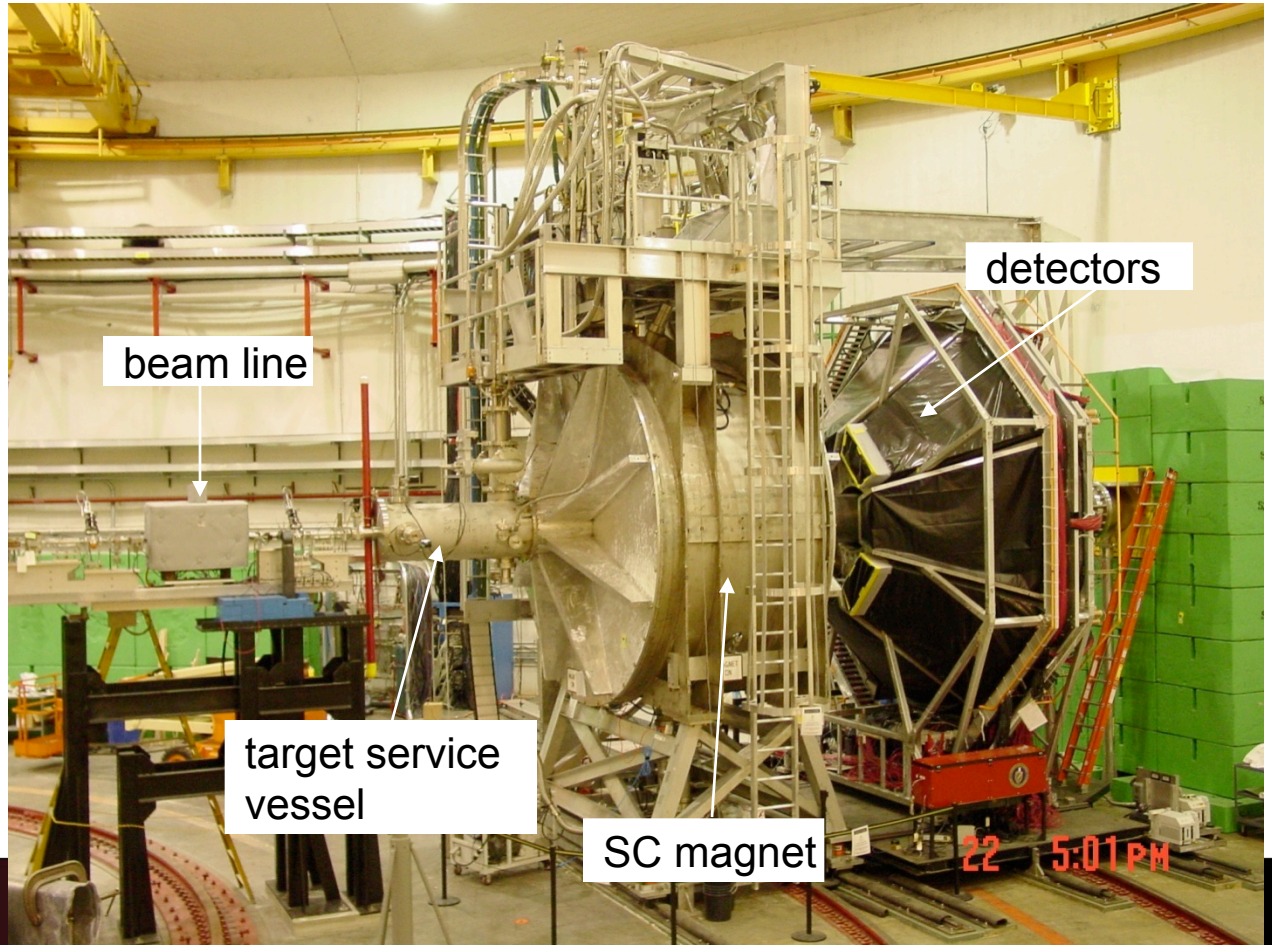
> Experiments went through different levels of readiness reviews depending on being categorized as “Experiments using major new apparatus”.

Goal: assure that the equipment can be safely and effectively operated, and to document operational procedures appropriate for its commissioning.

- All 12-GeV equipment will undergo an Experiment Systems (Hall A, B, C, and D) Readiness review as a modular piece of the overall Accelerator Readiness Review (ARR) process.
- Basic commissioning of components initiated under JLab Temporary Operational Safety Procedures (Chapter 3320, “Temporary Work Permits”)
- Checkout of full equipment with beam requires
  - Conduct of Operations (COO)
  - Radiation Safety Assessment Document (RSAD)
  - Experimental Safety Assessment Document (ESAD)
  - Safety Checklists

Experiment Systems Readiness Process - Example

G0 Experiment in Hall C as example of “Experiments using major new apparatus”. Series of Equipment Readiness, Safety, and Documentation reviews during design & construction phases before operations.



G0 Safety and Technical Reviews (2002 only)

Date	System	Scope	Reviewers
Feb. 11-12	Target	Engineering & Safety Review	J. Kilmer (FNAL), J. Mark (SLAC), J. Domingo (JLab), D. Kashy (JLab), W. Vulcan (JLab), M. Seely (JLab)
May 01	Magnet + Target	TOSP for Vacuum Evacuation	ESH&Q + Subject Matter Experts (SME)
May	Target	Punchlist Items Review	J. Domingo (JLab,), D. Kashy (JLab), W. Vulcan (JLab)
May	Target	TOSP Neon Test	ESH&Q + SME
May	Target	TOSP Hydrogen Cooldown	ESH&Q + SME
Jun. 24-25	Magnet	Engineering & Safety Review	B. Schneider (JLab), A. Visser (FNAL), J. Gomez (JLab), A. Guerra (JLab)
July	Magnet	TOSP Magnet Cooldown	ESH&Q + SME
Aug. 09	G0	RSAD	ESH&Q (Radiation Control Group)
Aug. 14	G0	Full EH&S Review (I) (Last Readiness Review)	G. Dodson (ORNL), J.P. Chen (JLab), B. Manzlak (JLab), E. Smith (JLab), M. Spata (JLab), W. Vulcan (JLab)
Aug. 21	G0	TOSP G0 Beam Tests	ESH&Q + SME
Sep. 09	G0 + Magnet	TOSP Powering of the G0 SMS and G0 Beam Tests	ESH&Q + SME
Sep. 16	G0	COO and ESAD	ESH&Q + SME
Sep. 19	G0	Full EH&S Review (II) (Last Readiness Review)	G. Dodson (ORNL), J.P. Chen (JLab), B. Manzlak (JLab), E. Smith (JLab), N. Okay (JLab), W. Vulcan (JLab)

Experiment Systems Readiness Process - findings

Performed a Management Self-Assessment process at the end of the 6-GeV era to look at "Installation of New Equipment Involving Multiple Groups".

Asked group to fold in experience of Hall C/Qweak and Hall A/g2p experiments, Hall B/HDICe, and earlier reports/lessons learned on for instance Hall C/HKS, Hall A/PREX, etc. Both staff and users were polled.

Two findings

- Experiment Readiness Review Process has not been followed thoroughly for the last couple of projects
  - Not well defined what constitutes an experiment with major new apparatus
  - Readiness Review process and reviews should be clearly articulated
  - Design changes were allowed until very (too) late
  - Identification of beam and lab infrastructure requirements need to be done early
- Experiment Readiness Review Process not commonly known
  - Discrepancies in knowledge amongst Hall C vs. other Halls
  - Discrepancies in knowledge amongst Physics Division vs. other Divisions
  - Discrepancies in knowledge amongst Staff vs. Users

Two noteworthy practices

- Roles and Responsibilities seemed to be well known.
- The existing model seems to work well, with very good communication, coordination, and cooperation.

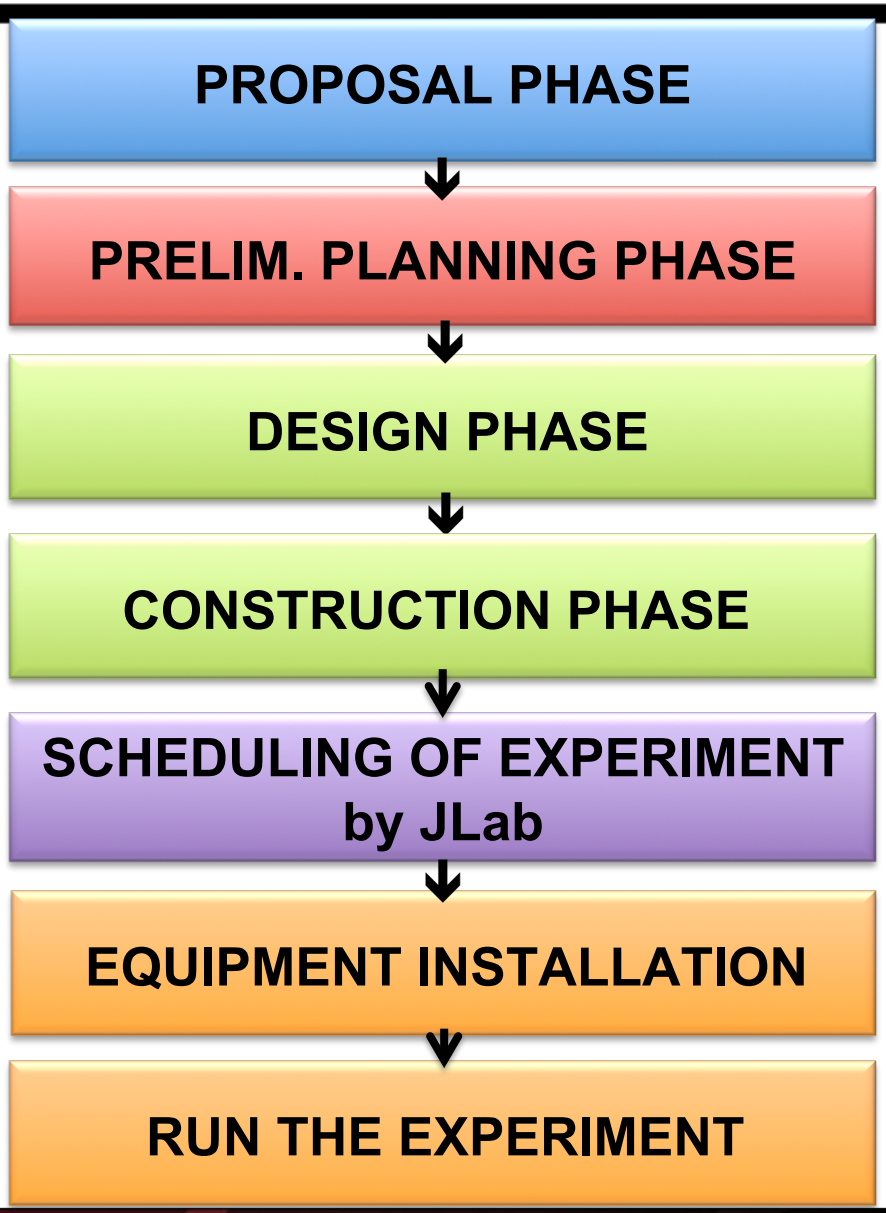
Revised READINESS REVIEW PROCESS @ 12 GeV

- Jefferson Lab has revisited the experimental readiness review process in preparation of the 12-GeV startup.

- That means:
  - Partly correcting the Experiment Readiness Review web pages
  - Folding in feedback from the management self-assessment for "Installation of New Equipment Involving Multiple Groups".

- The document, expected to be officially released with the completion of the web pages, will give the guidance for running experiments in the 12 GeV era.

Readiness Review Process – Flow Chart



- Submitting Proposals
- TAC & PAC Process
- Director's Decision

- Exp. Description and Requirements
- Exp. Readiness Review Calendar

- PESAD, specific equipment reviews
- Complete Conceptual Designs & "1st" Readiness Review

- Fabrication of the equipment
- Test of the individual elements of the equipment (OSP/TOSP)

- Construction near-completed, designs frozen
- "2nd" Readiness Review before submitting scheduling request

"Final" readiness review
- Final ESAD & RSAD
- COO
- Safety Checklist(s)
- Experimental Procedures

Readiness Review Process – Web Pages

http://www.jlab.org/user_resources/PFX/NP-PFX/

Or as text only version:

http://www.jlab.org/user_resources/PFX/NP-PFX/text.html

EXPERIMENT DESCRIPTION AND REQUIREMENTS

THE SUBMITTED INFORMATION IS CONSIDERED FROZEN. MODIFICATIONS TO THE EXPERIMENT SHOULD BE APPROVED BY THE DIVISION MANAGEMENT.

Experimental Hall:

Experiment Number:	**Days Approved:** **Estimated Installation Time:** **Estimated Checkout Time:**

Spokespersons:

Short (Technical) Description of the Experiment (max 100 words)

List Beam Energies and Beam Days: (e.g. 30 Days at 11 GeV, 20 Days at 8 GeV)

List Range of Beam Currents: (e.g. 10-60 μA)

Base Equipment Used
(including description of conditions)

Modifications to Base Equipment
(or use of base equipment with different conditions)

By the spokespersons

New Equipment

EXPERIMENTAL READINESS REVIEW CALENDAR

THIS CALENDAR INDICATES A BREAK-DOWN OF ANY SPECIFIC EQUIPMENT REQUIRING SAFETY ANALYSIS, AND AN ANTICIPATED EXPERIMENT REVIEW SCHEDULE. MODIFICATIONS OF THIS CALENDAR SHOULD BE APPROVED BY THE DIVISION MANAGEMENT.

Experimental Hall:

Experiment Number: | **Liaison Physicist:**

Spokespersons:

Which specific equipment design requires a separate review? *(Design Phase III A-C)*

-
-
-

By the Division Safety Officer

(Note: The specific equipment review committee may request subsequent reviews at completion of equipment fabrication and early commissioning stages, in parallel with this Calendar.)

Is the equipment sufficiently different from base equipment that a "first" readiness review needs to be scheduled at the design phase before the construction phase starts? *(Design Phase III E)*

- ○ Yes, a "first" readiness review is required
- ○ No, no "first" readiness review required

(Note: you cannot request a formal "first" readiness review before completion of the safety analysis of specific equipment and obtaining a pass by the review committee.)

Does the experiment require fabrication of new equipment, or substantial modifications to the base equipment, of such scale that a "second" readiness review needs to be scheduled when fabrication of equipment is completed or near completion, before submitting an experiment scheduling request? *(Preliminary Scheduling Phase V D)*

- ○ Yes, a "second" readiness review is required
- ○ No, no "second" readiness review required

(Note: After this review, the experiment layout and components are considered frozen, and any design modifications will require a change control, approved by the Division Management)

Does the experiment require a "third and final" readiness review of the safety of the installed equipment prior to its commissioning and subsequent use with beam? *(Preparation for Running the Experiment Phase VII A-C)*

- ○ Yes, a "third and final" readiness review is required

(Note: you cannot request a formal "final" readiness review before clearing any issues in earlier review, and submission of near-final drafts of the COO, ESAD, RSAD, Safety Check Lists and Experimental Procedures. Typically, a final readiness review should be scheduled about three-six months before the start of experiment, and include decommissioning plans. Pre-operation checkout of equipment installation and procedures require work control documents.)

ESH&Q Integration for RICH in Physics

Fully integrate ESH&Q into planning and design

- Perform hazard analysis for new scope
  - No hazard found requiring PESAD/1st readiness review of RICH
- Coordination of work with outside institutions
- Design and safety reviews of major subsystems
  - Prepare for "2nd" readiness review stage before scheduling request
  - Integration of assembly and commissioning tasks
- Design changes where appropriate, e.g.,
  - No flammable gases, environmental-friendly where possible
  - Reduce voltage where possible

Freeze design after "2nd readiness review" to prevent surprises for installation and running.

"Final" READINESS REVIEW

- Concentrates on ESH
- Final readiness documents for experiments include:
  - Conduct of Operations (generic for all Halls, A-D)
  - Experiment Safety Assessment Documents
    (<40 page document of generic form)
  - Radiation Safety Assessment Documents (no changes)
  - Safety Checklists
  - Experimental Procedures (these are for the users, they can be on wikis or as "one-pagers" in the Hall documentation)
- Includes planning for decommissioning, if applicable
- We plan to independently construct an "Operations Manual" for experts that simply links all TOSPs used for commissioning the new equipment – the RICH would be folded in here.
- *RICH can be declared "base equipment" only by the Division Safety Officer*

Readiness Review Process - Summary

- The Experiment Systems Readiness Process has been used effectively for all JLab experiments since the start of experiments in 1995
- The existing model seems to work well, with very good communication, coordination, and cooperation amongst multiple divisions, and roles and responsibilities well defined (work coordinator, physics liaison, accelerator liaison, engineering coordinator)
- Nonetheless, the process was not well known and not always followed
- Revisited experiment systems readiness process to
  - Clarify review process from the start – communicated to users
  - Update web pages for consistency – in progress
  - Update safety documentation and Hall safety walkthrough to become as generic as possible for all Halls (A-D)

COO	generic document
ESAD	generic format (draft)
RSAD	generic format
Safety checklists	
Experimental procedures for users (wiki or "how-to's")	
Operations Manual for experts	
Safety Walkthroughs	generic format (draft)

  - Include decommissioning in reviews

RICH comes in at "2nd readiness review": review before scheduling request