

PEP-II Overview & Ramp Down Plan

J. Seeman

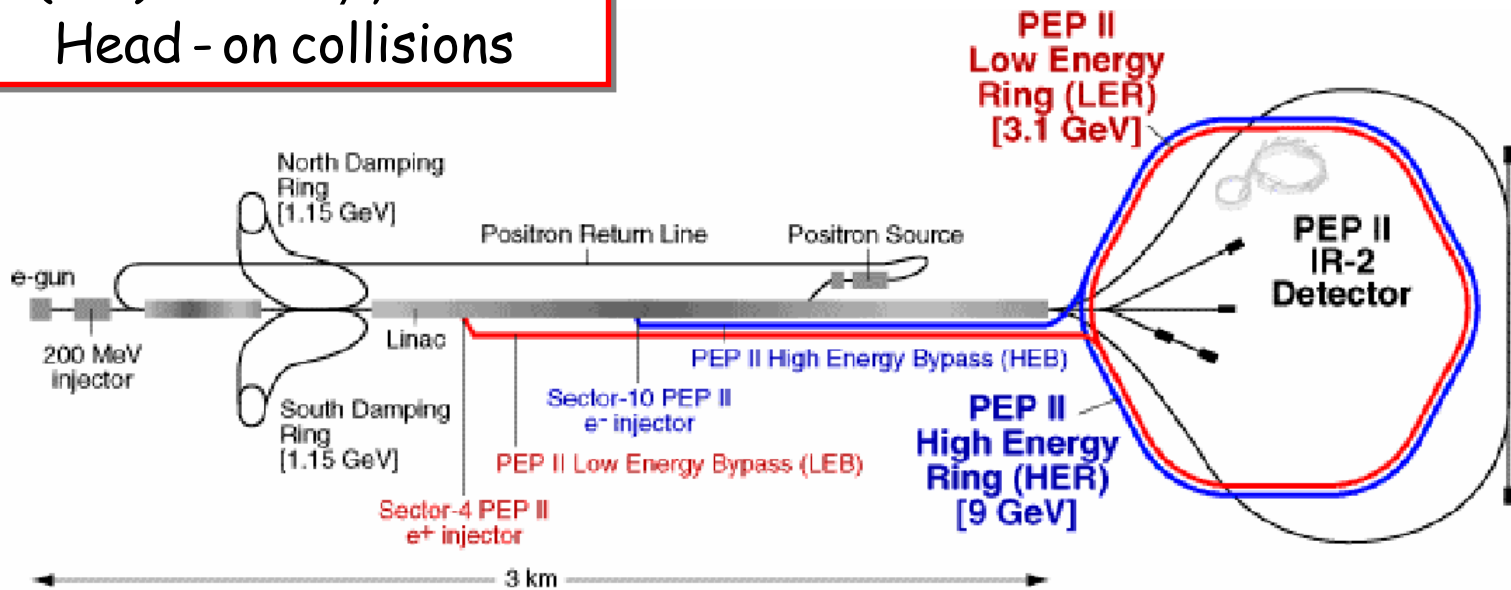
DOE PEP-II Ramp Down-D&D Review
August 6-7, 2007

Topics

- Overview of the PEP-II Collider
 - PEP-II turns off September 30, 2008.
- General list of components and buildings
- Categories of issues
- Overview of Ramp Down Plan
- Overview of Minimum Maintenance State (MMS)

PEP-II B Factory at SLAC

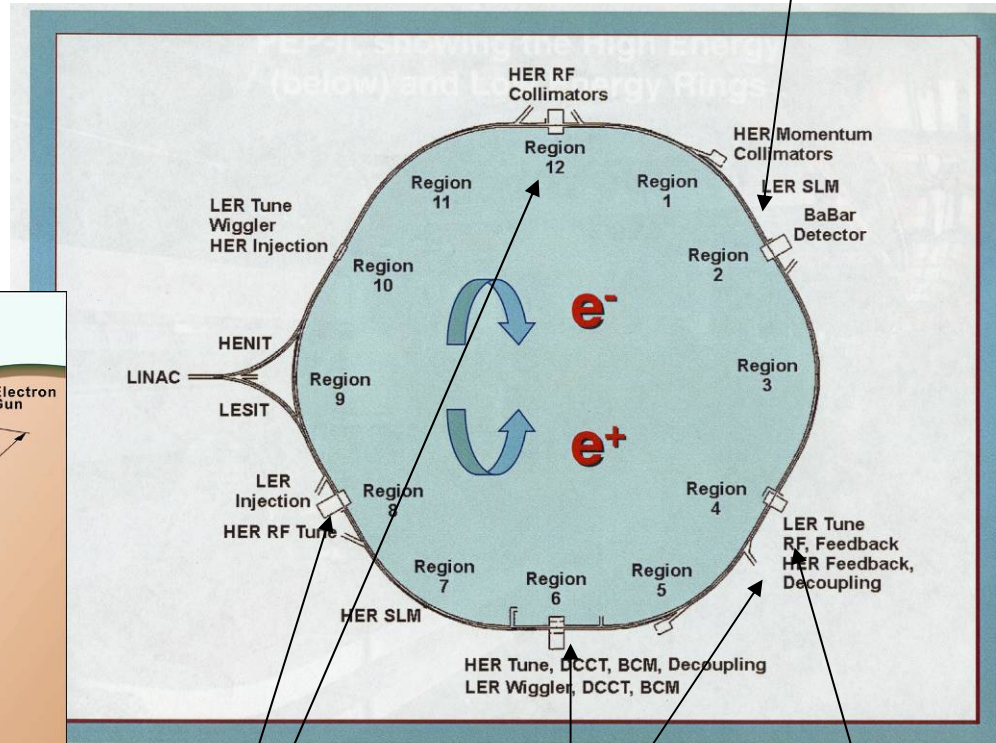
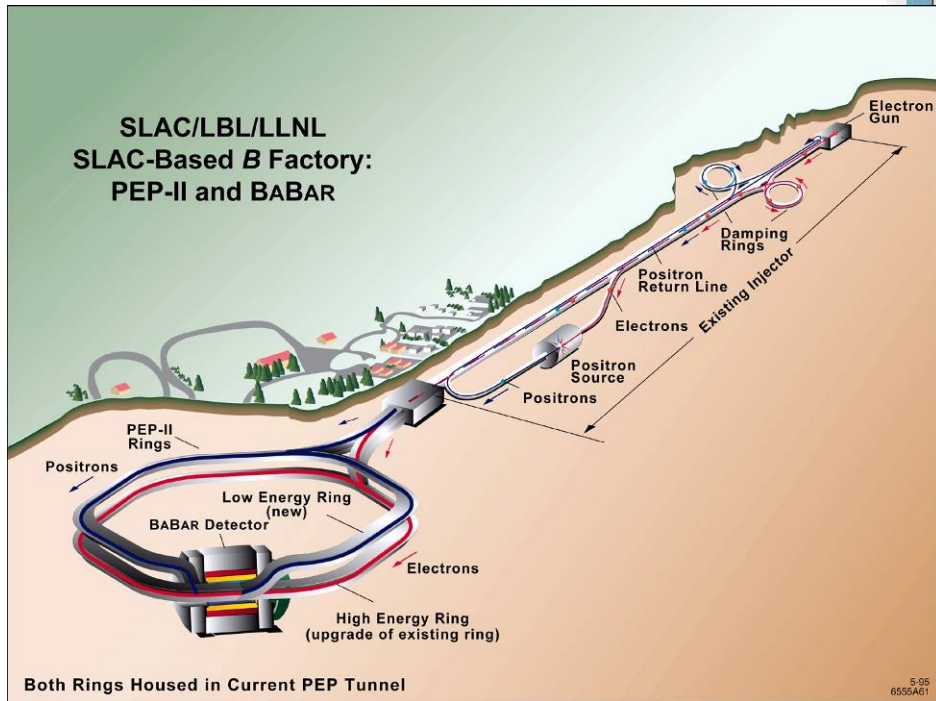
$9 \text{ GeV } e^- \times 3.1 \text{ GeV } e^+$
 $\Upsilon(4S)$ boost: $\beta\gamma = 0.55$
Head-on collisions



Located at the Stanford Linear Accelerator Center

PEP-II e^+e^- Collider

BaBar Detector



HER
RF
476 MHz

Feedbacks
Diagnostics

LER
RF
476 MHz

$$C = 2200 \text{ m}$$

3.1 GeV positrons x 9 GeV electrons

Beam Line Lengths

- HER = 2200 m
- LER = 2200 m
- HER injection line = 2300 m
- LER injection line = 2900 m

- Total length of beam line = 9600 m
– (→6.0 miles)

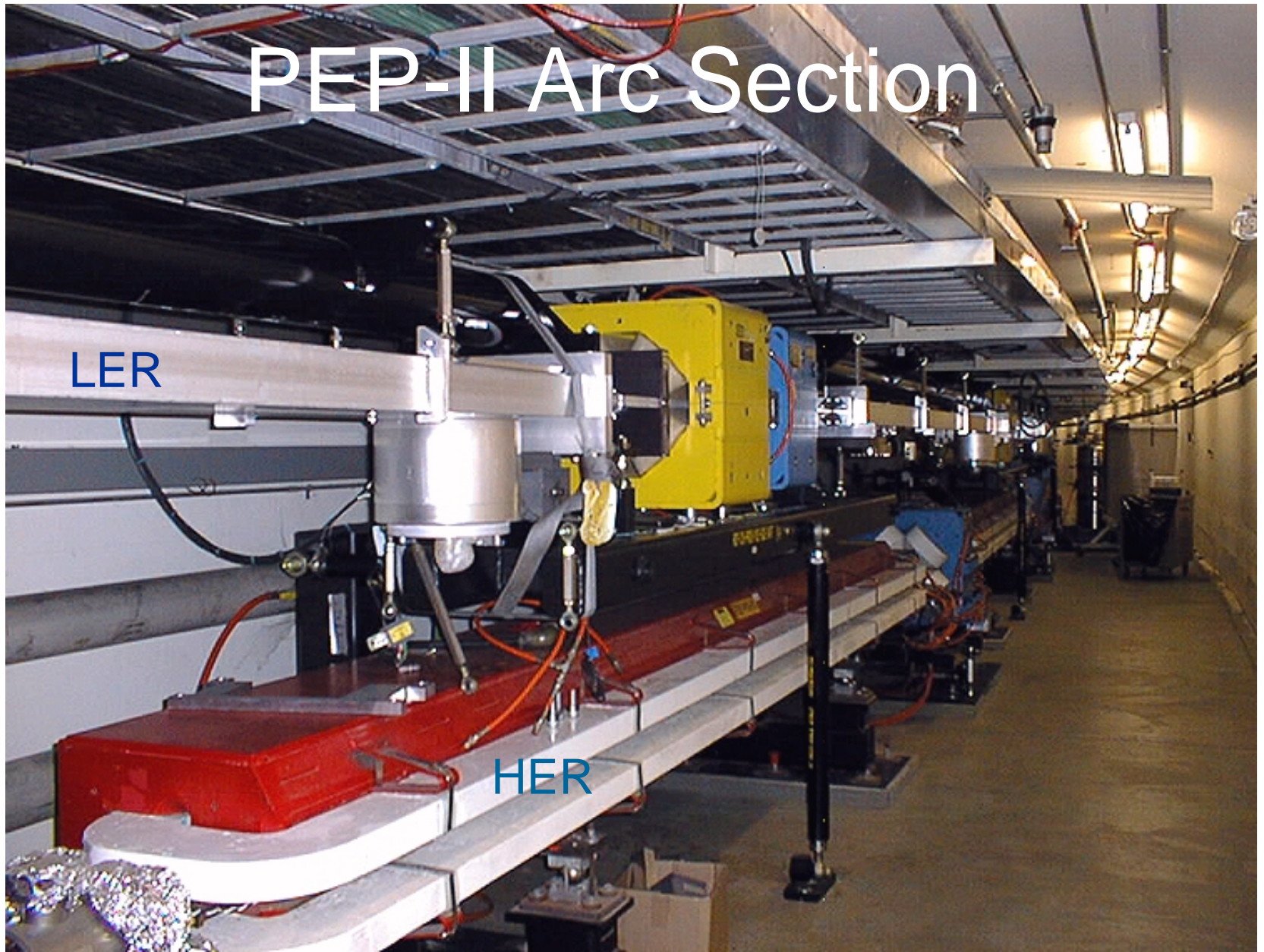
Other components

- ~10 miles of cable trays
- ~200 miles of cable (typically 1 inch dia)
- ~7 miles of water distribution lines
- 15 klystron–cavity systems
- ~900 electro-magnets per ring (~1800)
- ~6 miles of vacuum chambers
- Thousands of supports

PEP-II Arc Section

LER

HER

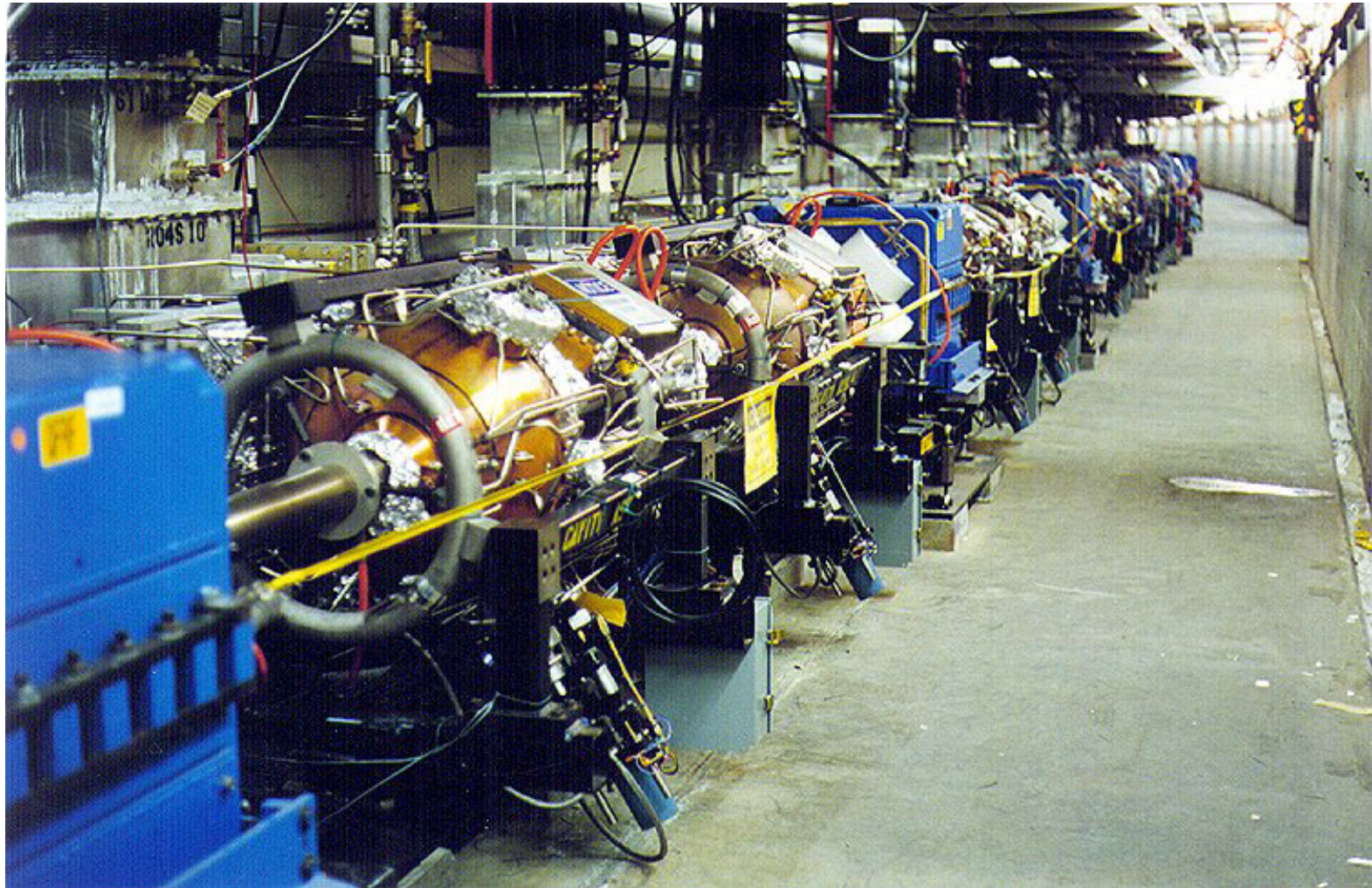


B-Factory RF Klystrons



C. Pearson

PEP-II RF Cavities



BR_049

HER Cavities Region 12

8-19-97

Cable trays

Sprinkler pipes

Fire sensors

Lights

Utility pipes

Supports

Vacuum chambers

Magnets



Document Items

- 1) The components in the tunnel should be technically documented and the data stored and correlated to the components.
- 2) Spare parts should be documented and collected.
- 3) The components should be offered to other DOE projects and/or facilities.

My list of valuable components

- RF systems
- Electro-magnets
- Power supplies
- Vacuum pumps and diagnostics
- Some beam instrumentation (e.g. streak camera at ~180 k\$)
- Feedback amplifiers
- Water pumps, pump motors, heat exchangers

PEP-II Interaction Region (IR) Halls (six)



PEP-II IR Hall 12 (on tour today)



PEP-II IR2 with BaBar (on tour)



PEP-II RF High Voltage Pads and Water Pump Stations (three)



Support Buildings of PEP-II (six)



PEP-II Buildings Outside the “Radiation Fence” (two)



PEP-II Water Pump Pads (three)



PEP-II Power Distribution (~five)



PEP-II External Cable Trays



PEP-II Klystron High Voltage Power Supplies (15 total)



PEP-II Air Vents (seven)



Cut and Cover Region of PEP-II



PEP-II Klystron Building (three)



PEP-II Power Supply Buildings (nine)



PEP-II Cable Distribution



PEP-II injection line in Linac

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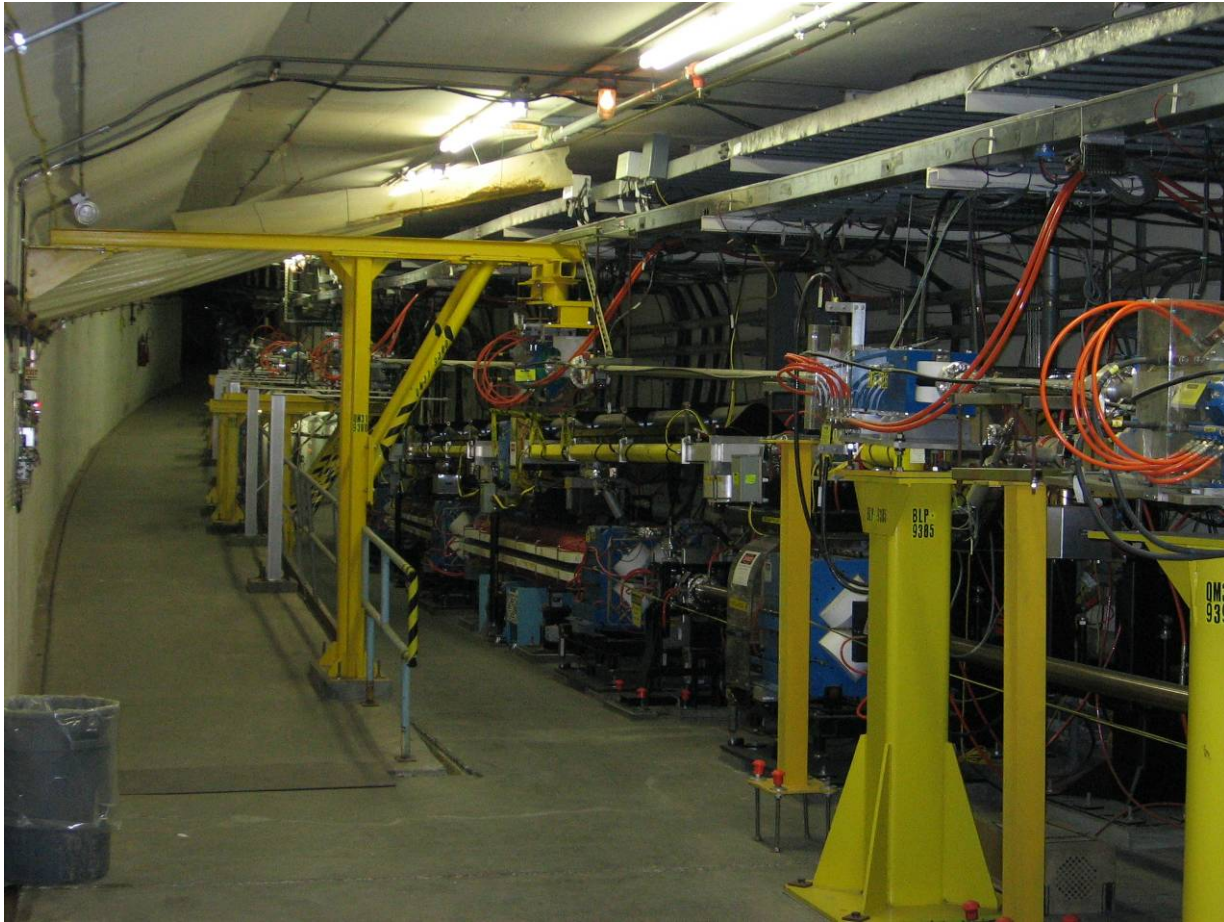


LER injection line

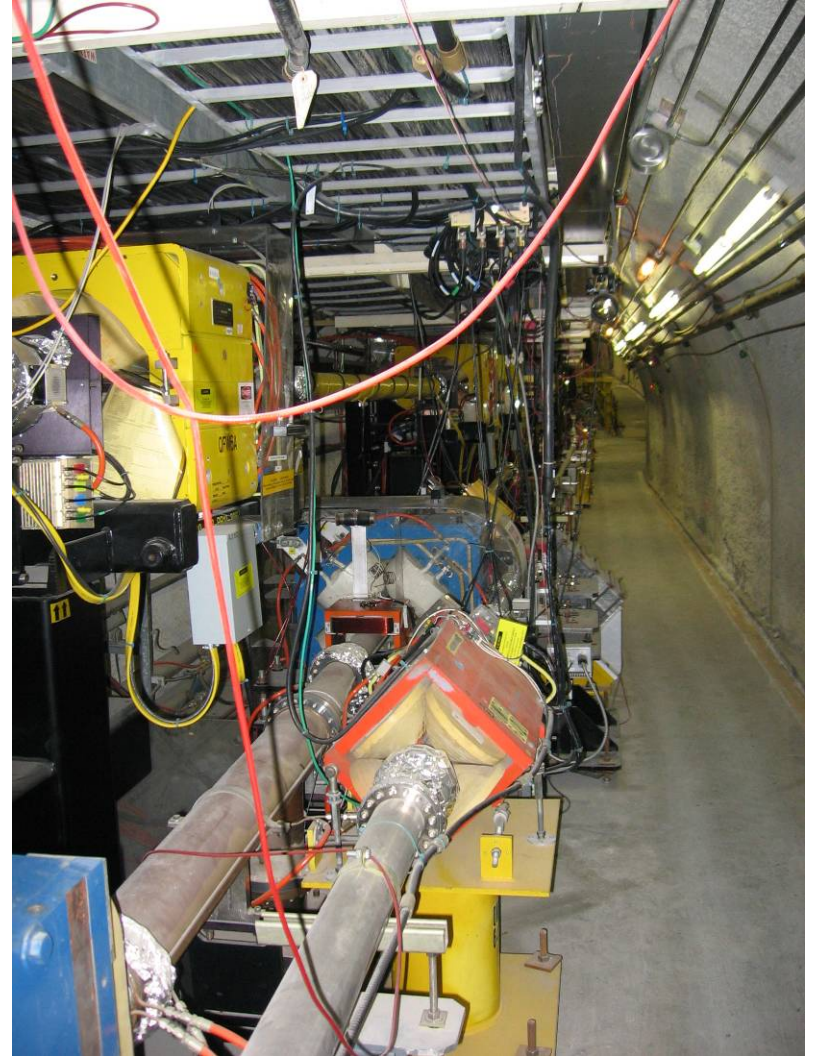
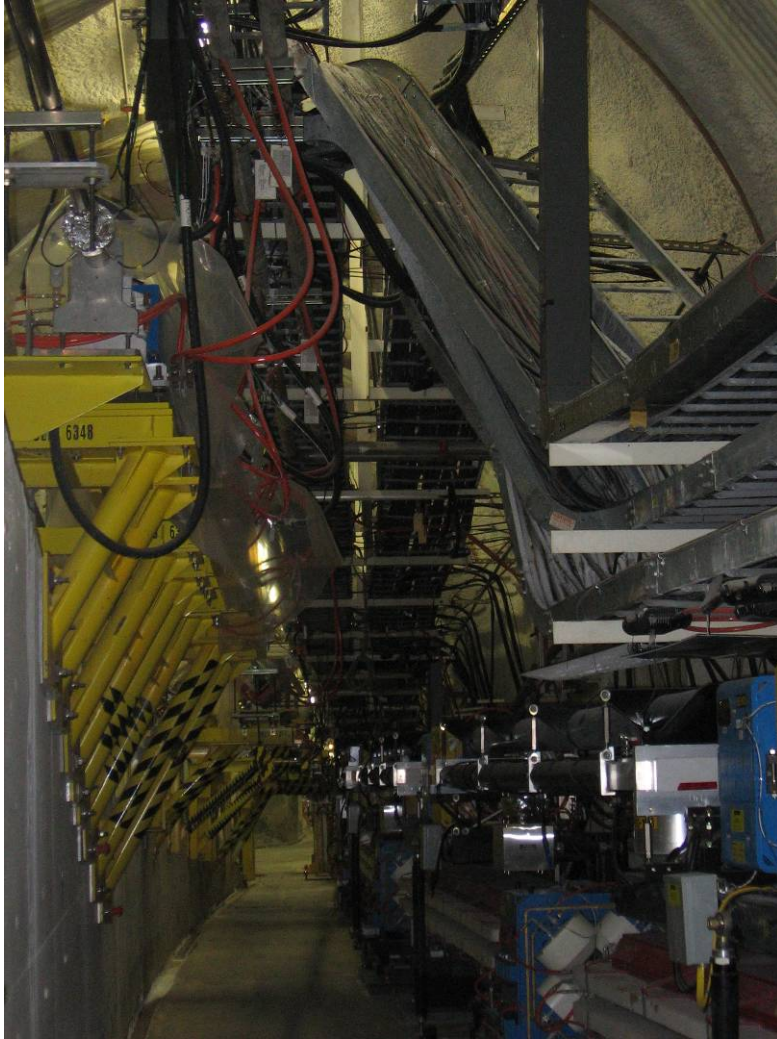
HER Injection Line

Linac

Injection Line (South)



PEP-II Injection Line



PEP-II Injection Septa (two)

●



PEP-II dipoles in 1994 ready for installation



PEP-II tunnel ceiling



PEP-II ground water wall leaks

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PEP-II Sump Pumps



Wall Corrosion



PEP-II Utility work in late March 2007 (3 days) for LCLS



Transite pipes

PEP-II cooling
water and
air lines

10-31-77 Looking SW Utilities
Between Regions 2 & 4
Subcontract No. 322

Transition & DND planning

- Transition plan white paper: input to FY09 budget process
 - Describes transition from fully operational state to a minimal-maintenance state in FY09-FY10
 - Outlines major tasks and timelines for this transition
 - Extrapolations from existing PEP-II and BABAR operational experience
 - Outlines scenarios for dismantle and disposal phase that emerged from discussions with OS/HEP in early May
 - Input to FY09 budget development, FY10-FY11 planning
- Transition and D&D task force: in progress
 - Established at beginning of May to review and refine transition plan and develop next level of planning for D&D in light of white paper scenarios
 - Feedback from this review will be used to develop a more refined and detailed D&D plan in fall 2007

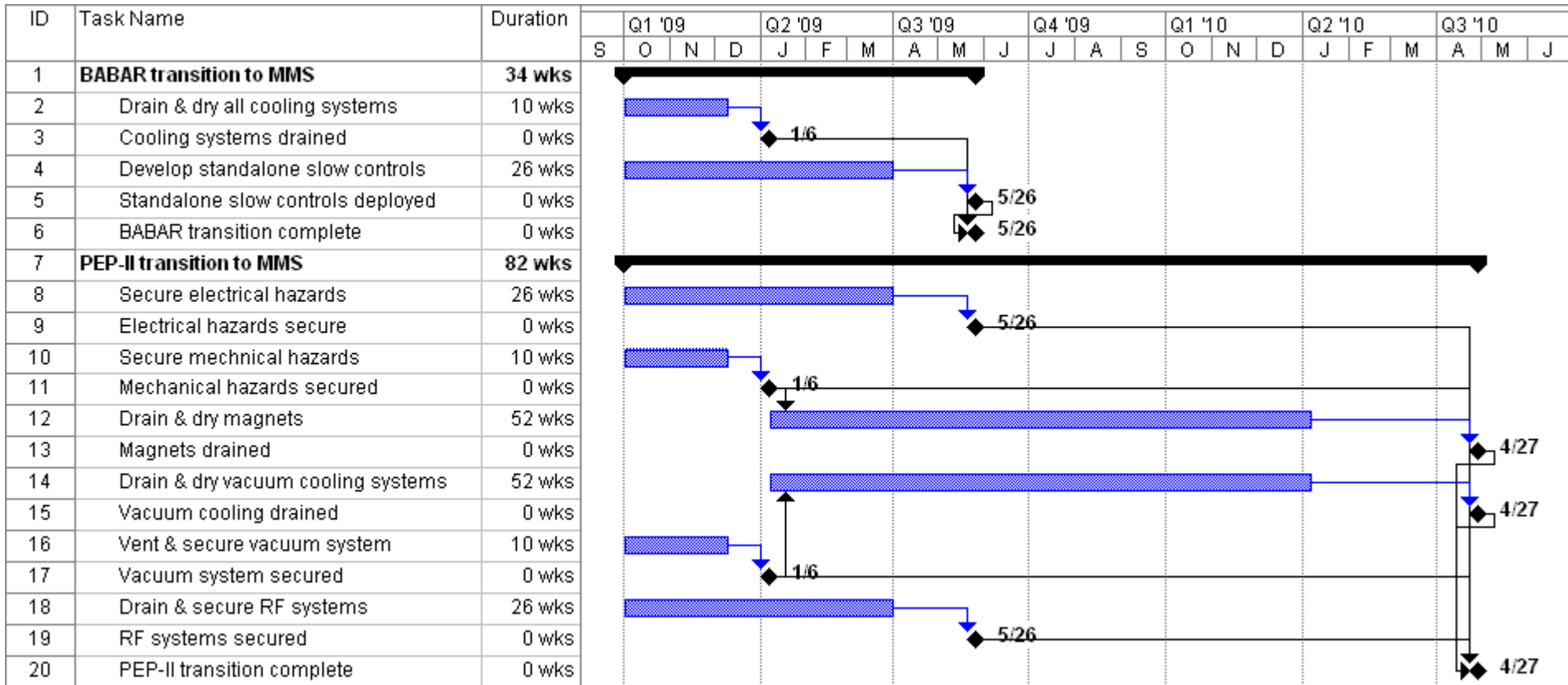
Transition planning assumptions

- FY09-FY10: Transition minimal maintenance state
 - *B* Factory will immediately transition to minimal-maintenance state following end of operations
- FY10-FY14: Minimal maintenance state
 - Kept in minimal-maintenance state to prevent deterioration of equipment
 - Envision possibility for strategic re-use of components
 - For example, potential interest in equipment as contribution to an off-shore Super *B* Factory.
- About FY15: Dismantle and dispose
 - Equipment scheduled for removal, and storage or disposal
 - Costs to be borne by DOE
 - Scenarios for disposal depend on whether existing moratorium on recycling metals from accelerator housing remains in effect or not

Minimal Maintenance State (MMS)

- PEP-II
 - Cooling systems of magnets and vacuum drained & dried
 - Documentation of parts and spares
 - Vacuum system vented and secured
 - RF systems, including power supplies, klystrons, cavities, circulators, and dumps drained and secured
 - Fire protection, tunnel lighting, water seepage system all maintained
 - Estimate ~\$1 million/year in manpower, M&S, and electricity costs for tunnel maintenance (not equipment)
 - Security watches over the system
 - Crane inspections
 - Controls maintenance for safety issues (PPS/Fire)

Tasks and timelines: FY09-FY10



Manpower and budgets for transition

	FY09		FY10		FY11	
	FTE	Budget [k\$]	FTE	Budget [k\$]	FTE	Budget [k\$]
Accelerator Systems Labor	2.2	330	1.7	270	0.6	100
Operations Directorate Labor	13.8	2070	6	940	1.9	280
M&S		600		400		200
Power		950		650		400
Total		3950		2260		980

Budget for MMS state is almost entirely building maintenance costs (sump pumps, lights, tunnel integrity) and not directly the cost of maintaining the equipment

Ramp Down Work Scheduling

- There are other items going on in October 2008:
 - LCLS final construction
 - SABER initial preparations
 - Routine down maintenance repairs for next Linac run
 - PEP-II ramp down will have lower priority during down!
- Is it best for many people to work for a short period (~ 1 month) or a few people for many months (~14)?
- It is likely that the PEP-II ramp down work will be delayed until the linac turns on later in the fiscal year, which avoids overlap with intense linac work period and allows leveling of man power loading.
 - Thus, likely that a slower approach will be better.

Dismantling and disposal

- Major factor: DOE moratorium on removal for salvage of volumetrically contaminated metals from accelerator areas
 - In effect since 2000, waiting for National Regulatory Commission to establish standards
 - Possible to move equipment to other laboratories, but not to recycle commercially; options for disposal may be expensive and/or limited
- Scenario I:
 - Provision for development of onsite storage of BABAR and/or PEP-II components removed from IR halls or tunnels
 - Moratorium does not apply to service buildings and regions in IR halls outside controlled access area
- Scenario II
 - Moratorium resolved, so that material with no residual activity can be removed and recycled

FFTB Metals Storage (FY2006)



FFTB Shielding Storage (FY2006)



SPEAR-II Metals Storage (~FY2001)



Conclusions

- The PEP-II ramp down scope has been identified.
- An initial transition plan has been made.
- Initial budget and manpower estimates have been made.
- A resolution of the Metals Moratorium would help this process.