

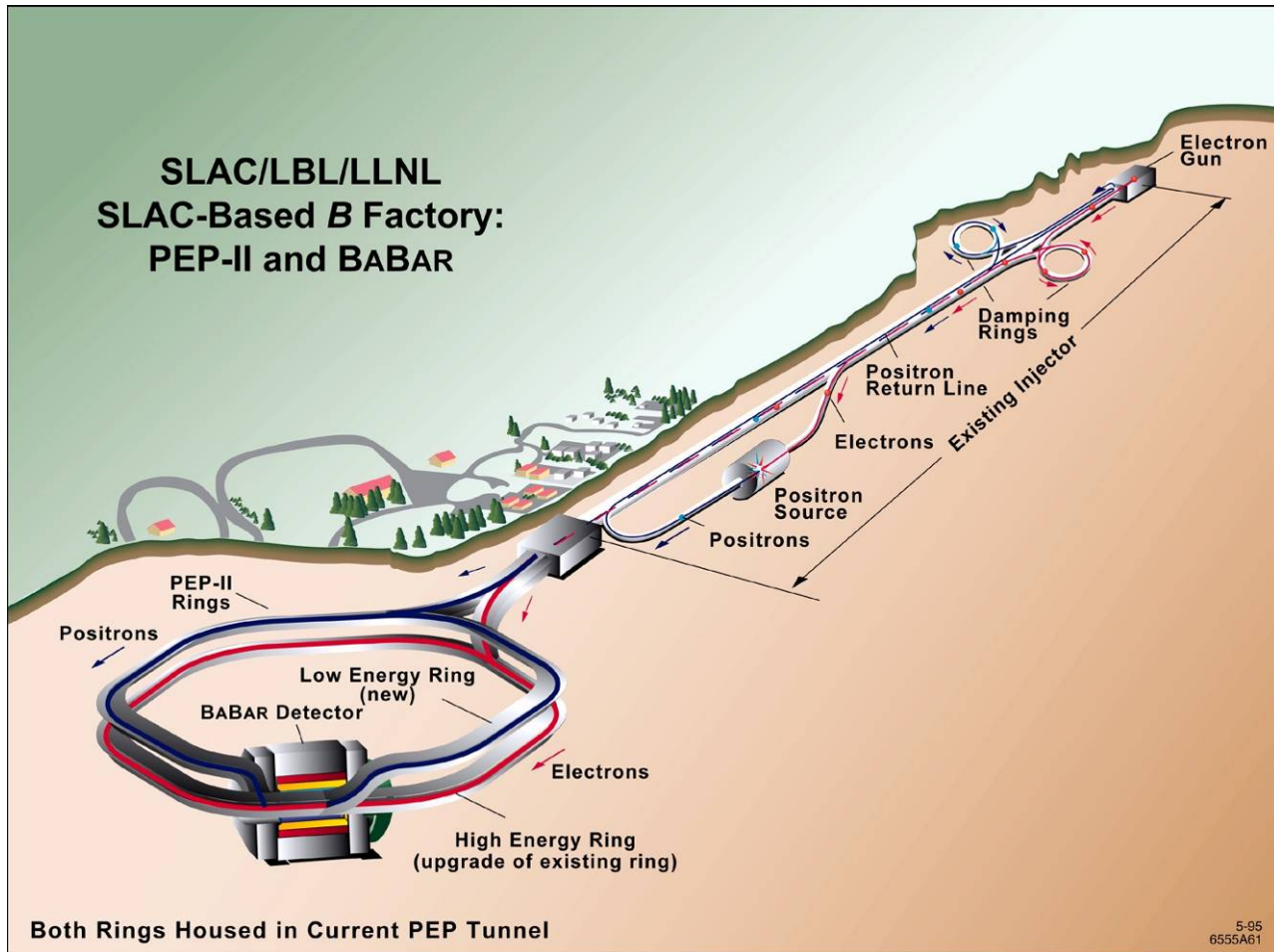
# PEP-II Ramp Down to a Minimum Maintenance State

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DOE PEP-II Ramp Down-D&D Review

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# PEP-II



# Components

- 2.2 km tunnel
- ~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
- ~6 miles of vacuum chambers
- Thousands of supports

Cable trays

Sprinkler pipes

Fire sensors

Lights

Utility pipes

Supports

Vacuum chambers

Magnets



# PEP-II ground water wall leaks



# PEP-II Sump Pumps



# Wall Corrosion



# 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 review will be used to develop a more refined and detailed D&D plan in fall 2007



# Transition planning assumptions

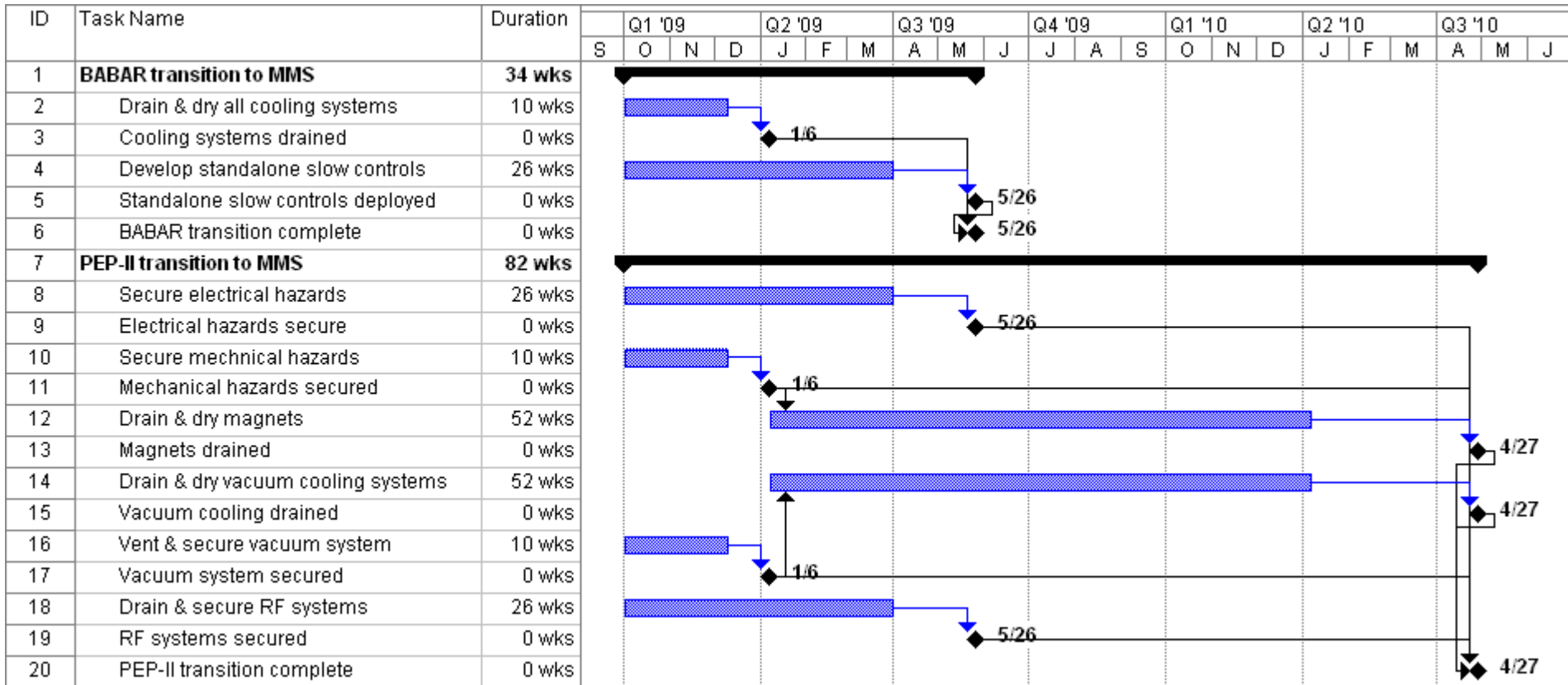
- FY09-FY10: Transition minimal maintenance state
  - *B* Factory will immediately transition to minimal-maintenance state following end of operations
- FY10-FY14: Minimal maintenance state
  - Kept in minimal-maintenance state to prevent deterioration of equipment
  - Envision possibility for strategic 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 for magnets, vacuum system drained and dried
- 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 maintenance.

# Tasks and timelines: FY09-FY10



# Manpower and budgets for transition

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

# The Sub-Groups Involved

- On the following pages we will go through the duties of the various groups associated with ramp down of the PEP-II complex and describe the Minimum Maintenance State.

# Area Manager and Area Physicist

- Knowledgeable of system and technical subtleties.
- Can prevent damage to hardware.
- Can prevent harm to people (e.g. sequencing and rigging of removal in IR, Be chamber inside of BaBar)
- Combined effort in FY09 starts at 1.5 FTE and ramps to 0.3 FTE in FY11.

# Documentation

- Provide effort to document all systems and especially hardware which may be of use to other laboratories and for safety reasons.
- Make a catalogue of spare parts and installed components.
- Very valuable if PEP-II components are to be reused.
- Combined 1.2 FTE in FY09 ramping down to 0.3 FTE in FY11.

# Electrical Technician and Engineer

- Turns off all power sources after loads have been secured.
- Locks all sources.
- Oversees removal of equipment to make the remaining system safe.
- Makes periodic safety inspection for electrical sources.
- Combined 0.75 FTE in FY09 and down to 0.3 in FY11



# Mechanical Technician and Supervisors

- Secures mechanical items like shielding, supports magnets during the transition phase.
- Drains and dries the coils in the magnets to prevent corrosion. Air dry each water circuit on magnet. Perhaps vacuum dry some of the coils on sensitive magnets.
- Collect the magnet water, sample, and dispose properly.
- Make safety walk throughs for mechanical issues.
- Combined 6 FTE in FY09 down to zero in FY11.

# Vacuum technician and supervisor

- Secure the vacuum system after turn off.
- Vent the accelerator regions to dry nitrogen.
- Remove vacuum components for reuse if needed to maintain system integrity.
- Drain and dry vacuum chamber cooling.
- Collect the vacuum water, sample and dispose of properly.
- 0.6 FTE in FY2009 down to zero in FY2011.

# RF Technician

- Secure the RF system.
- Keep vacuum pumps on the klystrons.
- Keeps monitors working for the klystrons.
- Monitors the high voltage power supplies for oil leakages (thousands of gallons in the supplies).
- Collects and stores the RF spare parts.
- In FY2009 1.2 FTEs down to 0.1 FTE in FY2011

# Tunnel mechanical technicians

- Secure the tunnel and facility mechanical components.
- Make sure the sump pumps are working.
- Inspects and fix the tunnel walls for mechanical problems.
- Collect, sample and dispose of the tunnel water.
- Inspect floor drain systems for blockages.
- In FY2009 3 FTE down to 0.7 FTE in FY2011.

# Tunnel Electrical

- Maintain the lighting system and safety systems (fire, sumps).
- Replace light bulbs. ~1000 bulbs to keep working. (Bulbs are “off” during running but “on” when PEP-II is down → increase burn outs.)
- Do routine fire safety checks.
- In FY2009 0.6 FTE and down to 0.3 FTE in FY2011.

# Crane Safety Checks

- The cranes in the IR halls have to be routinely inspected and load checked.
- Rigging equipment has to be checked and certified.
- Training of rigging personnel have to be verified.
- In FY2009 0.3 FTE down to 0.2 FTE in FY2011.

# Security Checks

- Security officers will make a circuit of the PEP-II ring once per day to check for unsafe activities and safety hazards.
- In FY2009 0.6 FTE down to 0.3 FTE in FY2011.

# Controls maintenance

- The controls group will keep the bare minimum PEP-II control system working to monitor PEP-II safety, fire, PPS gates, and temperatures.
- In FY2009 1.3 FTE down to 0.4 FTE in FY2011.



# AC Power

- PEP-II operates now with about 22 MW.
- In FY2009 the average power will be about 2 MW due to water pumps being on part of the year to prevent magnet corrosion, water for fire protection systems, and external pipes from freezing. Power is needed for controls, safety systems and lights.
- In FY2010 the average power will be about 1.5 MW after many systems are turned off.
- In FY2011 and beyond the power will be about 0.8 MW essentially for lights and safety systems which is near the minimum.
- All power usage will be minimized as soon as possible, starting October 2008.

# Conclusions

- The PEP-II ramp down scope and duties have been identified.
- An initial transition plan has been made.
- Initial budget and manpower estimates have been made, as will be shown in the next talk.