Homework for the SLAC Task Force on B-Factory Ramp-Down & Decommissioning

Q1. The goal of the MMS period needs to be clarified. Is the intent to have usable equipment that can serve other high energy experiments? If that is the case, then several members of the review team have doubts that the SLAC plan will succeed. In particular, the PEP-II magnets would not be in a controlled environment so the ambient humidity alone will severely damage them. How much additional cost and manpower would be needed to store the magnets in a sufficiently controlled environment to guarantee their survival for later use?

One the goals of the MMS period (apart from safety) is to preserve the more valuable components for later use. We agree that looking into controlling the environment, in particular the humidity, is important. We will look further into this aspect. One possibility is to have a small power supply run a small current through the magnets (uncooled) to keep a small elevated temperature on the magnets. Then, they will remain dry.

The original PEP-I dipole and quadrupole magnets where used almost completely in the PEP-II HER, successfully. In PEP-I the magnets were turned off in about 1988 and where left in the same environment (for 4 years) as that we propose for the PEP-II magnets from 2008-2012. The PEP-II magnets were not visibly or technically damaged in the time frame of 4 years while in hibernation waiting for PEP-II to start.

Furthermore, the SLC arc magnets have been in hibernation for 8 years in a similar environment. The vast majority of the magnets are is excellent condition with no visible damage and, in fact, ready to operate, if needed.

Q2. The SLAC cost estimates for the D&D phase were not compatible with some of the experiences of members of the review team. For example, just the cost of removing equipment from the accelerator and leaving it on site, appeared to be almost ten times as high as similar activities done in the LEP D&D process. Please explain why the costs for this particular activity were estimated to be so high at SLAC/PEP-II. Please present the details of your cost estimates to the review team.

Cost numbers for *BABAR* and PEP-II were developed bottom up. Each looked at specific needed tasks and considered task quantities, crew sizes, task durations, and shop rates. In the case of *BABAR* and the RF systems, we have recent experience with a significant portion of the described work. In the case of PEP, Scott DeBarger spoke (admittedly briefly) with key personnel (such as Mike Zurawel, David Kharakh, Paul Bellomo, Teri Lahey, Mike Browne, Pat Bong, Ponciano Rodriguez, Steve Smith) to understand the needed work.

Supporting documents are available now on the review web site:

Jim Krebs' cost estimate for *BABAR* is in babar_disassembly_cost_estimate.xls and babar_disassembly.mpp

Scott DeBarger's cost estimate for the PEP-II technical components is in TechDisassemblyTasks.xls
The latter draws in part on Alan Hill's RF project file PEP_RF_Disassembly.mpp

We are aware from our CERN colleagues that the disassembly of the four LEP experiments took 7 months, while Jim is proposing a single crew working for 45 months for *BABAR*. Jim has recent direct experience with very similar steps during the removal of the barrel RPCs and installation of the LST system. His single crew selection is motivated, in part, by a concern the available *BABAR*-experienced supervision, which would make it difficult to direct multiple, parallel efforts simultaneously.

Q3. The D&D phase of the SLAC plan will require a project management team, well integrated into the SLAC management PPA structure. We didn't hear about this during the first day of presentations. What planning are you doing in this regard?

At this phase, when we are still developing an understanding of the scope of the DND project, we have not yet developed a project management team. Clearly as we begin to understand the timescale for the project, identification of effective project management will be an essential next step. We expect project management will report directly to PPA management.

Q4. The plan to put in minimal-maintenance state until 2015 seems somewhat arbitrary. Loss of knowledge of Babar assembly procedures is a critical issue - not only of cost but also personnel safety. Deterioration of components is a second concern. Why can't the potential stakeholders queried and a plan made to do as much deconstruction as soon as possible, preserving the potential use of individual components? Many of the Babar components have already been classified unlikely to be reused.

We agree that a 2015 dismantle date for *BABAR* is arbitrary and unlikely, not the least the pressure to re-use PEP-II for other purposes. We have warned the collaboration that an earlier date is may be more desirable. Now that an estimate is available for the costs of dismantling, we can, together with DOE and the collaboration, begin the process of planning the dismantling project in detail, including identifying the appropriate time scale for initiating and executing the project with a corresponding funding profile. Availability of key experienced personnel is an important argument.

Q5. The estimated cost of removing cable trays is incredible. The whole concept needs a fresh look.

We agree that the costs for the cable tray and cable plant removal for PEP-II sound extremely high, especially as they seem to represent an excessive portion of the total estimated PEP-II disassembly costs. In Scott DeBarger’s talk, he stressed the point that revisiting the cable tray and cable plant removal costs was an important step. His intention was to tackle this question as the project moved forward;

The methodology for the current estimate is as follows:

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Scott contacted Ponciano Rodriguez to learn what his experience was with the FFTB cable plant removal. Ponciano responded with a spreadsheet showing the final costs for the SLAC CPE (Power conversion) from the FFTB removal. This included 6.4 k$ of materials cost, 115.9 k$ of technician labor, and 50.0 k$ of E,D,& I and Coordination for a SLAC total of 172.3 k$. These numbers include the then indirect rates of 36% on labor and 7% on M&S. In this same spreadsheet, Ponce also claims that 350 k$ of Davis-Bacon labor was applied to the cable plant removal. Further information may be available from Richard M. Boyce on the breakdown of the Rigging International order. In the meantime our best information is that it cost SLAC 522.3 k$ to remove the FFTB Cables.

The FFTB removed beamline was removed was 645 feet long. Simple division of the 522.3 k$ gives $809/foot of beamline. In the time available to me to prepare for this, Scott could not reconstruct the linear footage of cable trays. This would include the beamline length plus any vertical runs, plus any external (to the FFTB housing) runs to the buildings which housed power supplies and controls. To get to an estimate, he assumed that the relative amounts of these non-beamline cable trays would be similar. This may or may not be true. Next, he considered that the cable trays in PEP number four in most locations where FFTB had two, that the PEP cable trays are each wider and fuller than the FFTB ones, and that the PEP cable trays are mounted on the ceiling where FFTB was mounted low and near the beamline. With this he multiplied the $809/foot rate with the 7200 feet of PEP ring and an additional factor of 2.5 (to account for greater volume and more difficult access in PEP) for 14.5 M$.

In the case of PEP injection, we have a single 9 x 9 cable tray, and so Scott took the 10,000 feet of injection (accelerator housing + NIT + SIT), the same $809/foot and an additional factor of 0.5 (to account for the single tray) for a total of 2.7M$. This gives a total cable plant removal cost of 17.2 M$.

The problem then is that the rest of the PEP-II disassembly was estimated to be 16.3 M$. Adding a 50% contingency, the project total becomes 50.2 M$. The 17.2 M$ estimate gets amplified twice, first in that I've assigned a standard 15% management and oversight amount to the Davis-Bacon work (covers UTRs, contractor management, training, E,S,&H oversight, etc.) and second in the 50% contingency.

As noted, we will clearly need to revisit the issue of cable and cable tray removal on two fronts. First we need to verify that the costs reported for the FFTB are correct. Second, we need to prepare an actual count of the square feet (linear feet times width) of cable try removed in the FFTB project and the existing square feet of cable tray in PEP to get an estimated cost.

One other consideration that Olga mentioned is that the FFTB cables were removed from the trays for radiation survey and disposal. The current recommendation is that the cables remain in the cut-up cable-tray segments. This will remove a step, make the cables easier to handle (the trays move and stack nicely) and should result in some cost savings.

Q6. Alternatives to the removal of wiring, plumbing, etc. in the linac tunnel should be explored to minimize risk to active facilities.

The plan in the linac is to remove bypass line equipment as time allows in the yearly two -month downtimes, which will not affect operation of the other programs. This slow removal has been done for years with SLC equipment with great success.

Alternatively, we could mount a much larger effort in one two-month down to remove the vast majority of the bypass components. Historically, the two bypass lines were installed completely in two three-month downtimes 10 years ago. Components do come out much faster than they go into the tunnel.

Q7. Demolition of the halls may be more difficult than the contractor estimates - 40 year old heavily reinforced concrete will be tough.

This would not be very surprising. Experience with placing anchors for the earthquake struts for the forward muon steel shield wall required substantial effort: many damaged bits, and significant time needed to drill the anchor bolt holes because of the extensive re-bar (which documented in the construction drawings). Note that this was in the region of the proton alcoves, where the tunnel mouth into the hall is quite broad. The FERMACorp estimator was not working with detailed drawings of each hall's construction, although they were aware that the floors are 3 foot-thick reinforced concrete.

Q8. Clearly the lease renewal terms can have major impact on cost of D&D. Active negotiation will be helpful here.

Lease negotiations are occurring now with the aim of reaching a conclusion before the contract competition. DOE is reluctant to write anything into the lease that requires that Stanford remain as the contract awardee. This may make it difficult to negotiate issues, such as the ultimate state of the site, with respect to the lease. The current lease says the site should be returned to a neat condition that conforms to residential standards.

Q9. I didn't follow all the discussions of funding sources. It seems that most of this work could be classified as general site maintenance. As an illustration, how does restoration of SLC tunnel fit in? Putting it in a general site category would make this and future D&D more straight forward.