# Team readiness to deliver a preliminary design – Steve H

* 1. **Project Management Leadership to deliver a 413.3 project**
		1. *For the Project Manager and his direct reports, please explain their*
			1. *Experience with delivering a project under DOE O 413.3*

*Covered on the “About me” slide in each presentation*

* + - 1. *Commitment to PIP-II, how long do they plan to stay with the project?*

*There are no known retirements, or other attrition, of the senior team members beyond the Project Director. However, the project carries a ten-year duration and it is expected that some people will leave during this period.*

* + - 1. *Availability to PIP-II, do they have other commitments?*

*Among the senior team the only members holding significant external commitments are the Project Scientist and the APM\_ESH&Q. In both cases we regard these commitments as complementary.*

# Technical leadership for a preliminary design

* + 1. *For the technical design leads for major systems, please explain their*
			1. *Experience in developing a preliminary technical design of similar complexity to their assigned PIP-II scope*

*ditto*

* + - 1. *Commitment to PIP-II, how long do they plan to stay with the project?*

*ditto*

* + - 1. *Availability to PIP-II, do they have other commitments?*

*Several L3Ms currently hold multiple responsibilities in, some of which are operational or management (dept heads).*

# Integration of design, cost and scope

* + 1. *Have control account managers identified – how will they interact with the design team?*

*CAMs have not formally been assigned. However, we expect to draw them from the ranks of the L3Ms in most cases. We will assign CAMs when we reconfigure the WBS after CD-1. We would expect to consolidate WBS L3 into a single CA in a few cases. The guess is the number of CAMs in the linac would be 15-18.*

Who will ensure that preliminary design meets scope and is best value solution?

The Project Manager with assistance of the Project Engineers and the APM for Conventional Facilties.

* + 1. *What is plan for managing contingency budget? Who assigns budget and how do cost account managers appropriate it?*

*TBD. We expect contingency to be under control of the FPD, with a modest Management Reserve under control of the Project Director.*

* + 1. *As you prepare the preliminary design, what is the plan/schedule for non-DOE reviews? At what stages or on what schedule are interim technical reviews performed?*

*High-level review is by the P2MAC. Engineering reviews follow the Engineering Manual process: FRS/TRS→PDR→FDR→PRR→ORC*

# Documentation for CD-1 approval

* 1. **Approved acquisition strategy with endorsement from OECM – Paul, Adam**

2.1.1.1. The total life cycle cost is not correct – please see comment under PPEP

Will discuss with the Program Office and make any adjustments prior to CD-1 ESAAB

# Approved preliminary PEP – Paul, Adam

* + - 1. *The life cycle cost in the PEP is not represented correctly. Total life cycle cost should include the total cost, not just an increment, and D&D.*

*Will discuss with the Program* Office *and make any adjustments prior to CD-1 ESAAB*

* + - 1. PPEP states in section 8.1 “The project has developed specific risk mitigation strategies and incorporated these considerations into the PIP-II Quality Assurance Plan and risk analyses.” – *Please discuss these strategies in the context of the international contributions and why you believe they will lead to high likelihood of project success.*

*The project has prepared a document to address this point – see pip2-docdb #1201 – PIP-II International Risk Mitigation Strategy.*

## PPEP states in section 8 that there are no SRF cavity vendors in North America. This is not correct. FRIB has successfully bought over 300 SRF cavities from vendors in North America.

## *There are no active vendors for elliptical cavities after PAVAC and AES went out of business. We will state it that way.*

* + - 1. *Who will manage the Systems Engineering approach in Section 8.9? What is this person’s experience with (i) integration into Fermilab and (ii) international contributions?*

*Implementation of the Systems Engineering approach is the responsibility of the Project Engineer (first responsibility as listed in the Project Management Plan is “Establish and achieve the PIP-II integrated systems engineering design that meets the technical goals and project scope as described in the PIP-II Conceptual Design Report (R&D phase) and Final Design Report (installation and commissioning phases); “*

*Both PE and Deputy PE have long experience at FNAL, including delivery of 3.9 GHz CMs to DESY.*

* + - 1. *Who will manage the Quality Assurance program described in Section 8.12? What is this person’s experience with managing quality for (i) one-of-a-kind science projects and (ii) for international contributions?*

*APM for ESH&Q has the overall responsibility for the QAP. We expect to appoint a QA manager to assist the APM. Responsibility then flows down to L2 and L3 managers for each WBS element.*

*APM experienced ESH&Q professional but first time in this level of project with international contributions. Working in close tandem with LBNF/DUNE ESH&Q professionals to develop the PIP-II program.*

*Prospective QA manager has long experience in Technical Division followed by LBNF/DUNE.*

# Charter for Integrated Project Team – Steve H

* + - 1. IPT charter states on page 4 that Project Manager reports to FNAL Director. *What is the relationship between the Project Manager and the Project Director then – or does the IPT charter need to be updated?*

*IPT Charter will be updated to reflect the post-CD-1 organization.*

* + - 1. *How does the FNAL Director coordinate between projects at the lab? How do resource conflicts get resolved?*

*Primary responsibility of the Chief Project Officer. Implemented via the Project Management Groups and the Project Oversight Group.*

*Procurement discussion. WE ARE HERE.*

# Risk Management Plan and complete an initial risk assessment – Shekhar

*2.4.1.1.* Risk management plan describes the international collaboration risk as “enterprise risk”. *How does this risk designation comport with the requirements of DOE O 413.3, which requires an integrated performance baseline, when the internationally contributed scope is needed for the threshold KPPs?*

*There are two distinct categories of international collaboration risk, 1: Enterprise (aka External Risk), 2: Technical, Cost and Schedule Risk*

1. ***Enterprise Risk:*** [*Fermilab Risk Management Procedure for Projects*](http://ppp-docdb.fnal.gov/cgi-bin/RetrieveFile?docid=65&filename=Fermilab-Risk-Management-Procedure-v1-1-rev1.pdf&version=4) *defines “Enterprise (aka External) Risk” as “Lab Management may decide to consider some high-rank Project risks as enterprise-level risks. Director, Fermilab is coordinating all agreements between US-DOE and the PIP-II international partners for projects.* [*The PIP-II Project Assumptions Document*](https://pip2-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=144) *outlines the current states of these agreements. The PIP-II cost, schedule and Risk development has assumed that Agreements on in-kind contributions from international partners to the PIP-II construction phase will be formalized by the time of CD-2. The PIP-II Project Assumptions Document outlines the construction phase in-kind hardware contributions assumed in the PIP-II cost to DOE. The PIP-II Project has developed an* [*International Risk Mitigation Strategy*](https://pip2-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=1201) *and the PIP-II Risk Register has six international deliverable risks. The following two risks have been categorized as “Enterprise Risk”*
	1. *RT-121-01-01-001: Failure to reach agreement on international in-kind contributions*
	2. *RT-121-01-01-002: Delay in formalizing international in-kind contributions*

*The assessment of the impacts of these two risks are documented in the Risk Register. The PIP-II Assumption Document states, “The value of international deliverables, as measured in terms of impact on the Total Project Cost (TPC), is estimated to lie somewhere between $150-200M. Because the Mission Need Statement assumes a contribution of this magnitude will be forthcoming in a timely manner, and because the size of this impact lies beyond what is reasonably manageable within the allocated project contingency, the Project and the DOE have agreed that RT-121-01-01-001 and RT-12101-01-002 will not be held by the Project, and will not be incorporated into the Project risk analysis.” Project assumes that the DOE will work to mitigate these two risks before CD-2.*

1. ***Technical, Cost and Schedule Risk****: PIP-II Project has identified four international deliverable risks in this category and their impact assessments are in the PIP-II Risk Register. They have been evaluated their technical, cost and schedule impacts to the Key Performance Parameter.*
	1. *RT-121-02-01-002: Technical issues with international deliverables*
	2. *RT-121-02-01-006: Delay in international deliverables*
	3. *RT-121-02-03-001: Cryoplant delivery delay*
	4. *RT-121-02-03-002: Insufficient International documentation*

*Impact analysis of these four risks along with all the project risks has been performed using Primavera Risk Analysis with PIP-II P6 Cost and Schedule. There impacts are included in the project Risk impact of $78M (90% CL cost and schedule impact) to Estimate to Complete.*

# Independent Cost Review – Paul

2.5.1.1. Did the project have an independent cost review? If yes, please share the report.

Independent Cost Review is ongoing. The ICR onsite visit was Dec 5-7. The final report is expected in January 2018.

Exit briefing presentation is posted on the OPSS review site for this review:

[ICR Closeout Report](https://web.fnal.gov/organization/OPSS/Projects/PIPII/_layouts/15/start.aspx%23/SitePages/DOE%20ICR%20of%20PIP%20II%2C%20December%205-7%2C%202017.aspx)

# Comply with One-for-one replacement legislation

## 2.6.1.1. No questions/comments

* 1. **Complete Conceptual Design**
		1. **Conduct Design Review with reviewers external to the project**
		2. **Conceptual Design Report**
			1. No questions/comments
	2. **Preliminary Hazard Analysis Report – Teri, Allan, Jim**
		+ 1. *How does the preliminary hazard analysis influence the preliminary design decisions after CD-1?*

*PHA will continue to influence design decisions throughout the evolution of PIP-II. The PHAR is a living document and will be reviewed and updated on a periodic basis, at an interval to be determined. Design decisions shall take into account the hazards/risks and address and possibly mitigate when possible. (TD)*

* + - 1. *How does the project ensure that new hazards found during design after CD-1 are captured in the PHAR?*

*The PHAR is a living document and will be reviewed and updated on a periodic basis, at an interval to be determined. ESH shall participate in design reviews/meetings to assure that any new hazards be identified and added to the PHAR. ESH is integrated into the project which assures the necessary communication to capture this information. (TD)*

# Integrated Safety Management Plan – Teri, Steve D, Paul

* + - 1. *How do the ESH rules for workers on PIP-II differ from the ESH rules for other workers at Fermilab?*

*They do not differ, ESH rules for all workers at Fermilab are consistent. For subcontractors and partners, expectations will be communicated, via agreement documents, and verified. (TD)*

* + - 1. *How do you intend to manage installation activities? Specifically how is daily/weekly coordination handled across divisions and across the installation site?*

*The Accelerator Division has implemented a standard approach to shutdown management and installation activities, for both maintenance activities and project (AIP, 413.3) activities.*

*PIP-II will follow the model of the AD Installation manager*

*“The AD Installation Manager is responsible for coordination and management of installation and maintenance activities scheduled for a long (2 weeks or more) annual accelerator complex shutdown. He/she is also responsible for meeting the shutdown goals on schedule. The responsibilities will span pre-shutdown planning, the shut-down activities and the post shutdown recovery. This individual is knowledgeable in the broad range of installation activities associated with the Accelerator Division Projects and is also knowledgeable in the various means and methods of accomplishing these activities as well as project scheduling tools. “ (PD)*

# Quality Assurance Program – Teri

## The roles and responsibility for key personnel in the QA plan and in the PPEP are a bit different – suggest to align

## *These will be aligned.*

* + - 1. QA Plan provides that PIP-II “trains and qualifies personnel to be capable of performing their assigned work” and “provides continuing training to personnel to maintain their job proficiency”. *How does this practically happen? Is this effort in the cost estimate?*

*Fermilab maintains a robust training system in which answers to job function questions trigger the requirement for certain types of training and tracks the completion of that training as well as periodic refresher training. This effort is captured in the project overhead cost. Training expectation are flowed down contractually and we verify. (TD)*

# NEPA Strategy – Teri

2.11.1.1. Do you have milestones in the integrated master schedule to track the completion of the NEPA EA?

NEPA EA submitted to DOE is a T4 milestone (SH). Supporting milestones will be integrated after the PIP-II EA kick off meeting with the subcontractor, Arcadis, in January of 2018. (TD)

# Environmental Compliance Strategy - Teri

2.12.1.1. Do you have an environmental compliance strategy document? Are there any licenses, permits, … that need to be obtained or amended for PIP-II?

There is currently not a compliance strategy document per se, but the permits, shielding assessments, etc. that need to be obtained/completed are well known and an environmental compliance strategy document, including a time line schedule, will be developed. There is a plan to do this once the NEPA milestones are established, after the NEPA EA kick off meeting, so these could be incorporated into the strategy and schedule document. (TD)

# Allocation of technical scope contributed by international partners – Steve H

* 1. **Relative to Programmatic assumptions document**

## The assumptions document states (in item 5) that technology choices will change if there are no in-kind contributions to PIP-II.

* + - 1. *When will a decision to change or not to change technology be made relative to CD-2?*

*The change would be at the time it became clear that either the 2 kW cryoplant or the RF amplifiers are not on an international deliverables list. This would most likely happen prior to CD-2.*

* + - 1. *What would be the cost impact to the TPC?*

*Estimated cost impact (@ CD-0) was (direct costs):*

*RF amplifiers: $42M*

*Cryoplant: $15M*

* + - 1. *How do you manage interfaces across the international contributions?*

*We have agreed that all international agreements will be bi-lateral (not multi-lateral).*

*Interfaces will be coordinated by the SPMs and CAMs (who will often be one and the same).*

* + - 1. *How do you manage documents across international partners?*

*All PIP-II engineering documentation is maintained in TeamCenter. This provides for document control.Required engineering documentation accompanying deliverables will be specified in agreements (and we have begun discussing with India)*

* + - 1. *How do you manage procurement oversight across international partners?*

*We are limited in our ability to provide oversight once a procurement is launched. Our model so far (with India) is to interact in the preparation of bid documents and sign off on specifications provided to the vendors (either via TRS or direct specifications).*

# R&D Activities - Paul

5.1.1.Various documents refer to an R&D phase of the PIP-II project. Will this phase be complete at CD-1? If there are R&D activities left to complete after CD-1, please list them, describe remaining goals, and list anticipated completion dates. How have they been incorporated into the risk assessment?

Development covers work at PIP2IT (beam performance, HWR, SSR1), SRF development (pCM for HB650). Summary included in the Conceptual Design talk (slide 18) and covered in more detail in A. Shemyakin PIP2IT Accomplishments and Plans presentation. Work spans a range of activities and WBS elements, with T4 milestones corresponding to completion of development activities. All work is included in the RLS. Successful completion of these activities will retire risks in the register.

# Risk Assessment – Shekhar

* + 1. *For how much scope (and risk) are the risk estimators personally committed to delivering the scope for which they estimated the risks?*

*PIP-II Risk Register entries for each risks were made by Risk Owners (L3M/CAM of the Project) in consultancy with the Subject Matter Experts (SME). In the risk analysis, risks are assigned to specific PIP-II activities in P6 PRA with the concurrence of the risk owner.*

*L3Ms have the full responsibilities of delivering that scope of the project, hence L3Ms are personally fully committed to the scope for which they have estimated the risks.*

* + 1. *What degree of confidence do you have that the risk assessments are appropriate?*

*The risk as identified in the PIP-II Risk Register represents an accurate representation of risk for this project, as reviewed by SME not on the project. The probability is the likelihood of the risk occurring if no further development will happen on that topic during the PIP-II development phase. Cost and Schedule impacts are additional resources that would be needed if the risk triggers after the development phase.*

*Risk impact analysis has been done by two methods to cross check the risk assessment.*

1. *EXCEL based analysis where Impact = Probability X Risk Impact*
2. *Primavera Risk Analysis using the PIP-II Risk Register and PIP-II P6 Cost and Schedule*

*The impact estimated by these two independent methods are in agreement to about 10%. The risk ranking by these two methods and our understanding of the project also agrees.*

*We have high degree of confidence in the risk assessments.*

* + 1. *On what basis did you assess schedule risk for the scope contributed from international partners?*

*The PIP-II Project has identified and analyze the risk impact of the following four international risks.*

* 1. *RT-121-02-01-002: Technical issues with international deliverables*
	2. *RT-121-02-01-006: Delay in international deliverables*
	3. *RT-121-02-03-001: Cryoplant delivery delay*
	4. *RT-121-02-03-002: Insufficient International documentation*

*For the risk, Technical issues with international deliverables, the schedule risk is for how long it will take Fermilab to fix that hardware if they have technical issues after delivery to Fermilab. We have made provisions in our project plan to review and approve each item before it goes into production at our international partner location. Required fixes should be small if any. Considering Fermilab expertise in this technology we have estimated the mean time required to fix will be about nine months.*

*For the risk, Delay in international deliverables, the schedule risk assumes a factor for four improvements from the development phase delay in the international deliverables. At present the worst delay we have is of about two years due to technical issues during the development phase. We have estimated the mean time of delay to about 6 months during the construction phase.*

*For the risk, Cryoplant delivery delay, the schedule risk is based on our experience with placing the order with vendor and discussions with potential vendor.*

*For the risk, Insufficient International documentation, schedule delay is essentially how long it will take for Fermilab to generate those documents and/or fill in the missing information. In the PIP-II Project planning we are clearly documenting the Fermilab requirements for supporting documents from our international partners.*

*The assessments of the schedule risk for the scope contributed from international partners have been done based on PIP-II experience in the development phase in working with the international partners.*

# Looking past CD-1 towards CD-2

1. **Procurement – Tom P**
	1. *Does Fermilab’s procurement department have qualified staff*
		1. *to manage the civil construction contracts? Which staff members will be responsible? What is their personal track record for recent civil construction contracts of similar size and complexity?*
* *Yes, the existing staff has several people with over 20 years of experience contracting civil construction.*
* *The specific person that will be responsible for the construction procurements will be determined at a later date.*
* *The lab has had several large civil construction projects over the past several years, and all have been successful as follows:*

*Mu2e Conventional Facilities & MC Beamline Enclosure*

*SLI Backbone Piping Network*

*SLI Master Substation & Electric*

*SBN Far Detector Building*

*SBN Near Detector Building*

*IARC Building*

* + 1. *To manage the technical one-of-a-kind contracts? Which staff members will be responsible? What is their personal track record for recent technical one-of-a- kind contracts with similar cost and complexity?*
* *Yes, the existing staff has several people with over 20 years of experience in technical fabrications.*
* *The specific person, or people that will be responsible for the technical, and fabrication procurements will be determined at a later date.*
* *The existing lab staff has successfully supported the PIP2IT, and LCLSII projects.*
	+ 1. *Does the Finance Office have a qualified staff member who could become the dedicated PIP-II procurement manager mentioned in the PPEP? What is this person’s experience?*

*Yes, the qualified person has several decades of construction contracting experience, as well as a decade of experience in contracting construction, and complex procurements at the lab.*

* + 1. *Is the project going to have a full-time on-site presence at the major procurement vendors (e.g., cryoplant, cryo transferlines)?*

*No continuous on-site presence is planned. Procurement personnel would be fully engaged with the project technical team in providing support in order to make any procurements successful, including traveling to vendor locations as necessary.*

# Export Control Compliance – Steve H

* + 1. *Who manages compliance with export control regulations?*

*Fermilab has an export control specialist in Shipping & Receiving*

* + 1. *What is the track record in obtaining export licenses?*

*Our track record is very good. I am unaware of anything on PIP-II for which we have failed to secure a license for export to India.*

* + 1. *How do third parties (your vendors) obtain export licenses for technology needed for contributions – does Fermilab have a role?*

*We can assist, but it is up to them to apply.*

* + 1. *What are the areas where export control is expected to impact foreign contributions?*

*Primarily purchases from U.S. vendors by BARC (or ECIL).*

# Human Resources – Tim, Anna, Mike

* + 1. Who will be responsible for the attraction of qualified staff for PIP-II. What is this person’s track record? What is Lab senior management doing to ensure experienced staff is provided to the project in the areas of project controls, procurement, safety, engineering support? In each of these areas are there project dedicated personnel or general support from a lab pool? How does project management expect to approach the issue of competition for resources against the many other projects at Fermi? What is the methodology for resolving these natural conflicts? How long does it take to hire a degreed mechanical engineer from articulation of need to first day? How long for a safety professional? How long for a technician?

Typical engineer, procurement specialist = 3-4 months

Critical hire can go faster (~2 months)

Contract techs much faster (~1 week)