

Date: April 13, 2015 **! DRAFT !**
To: Stephen Meador
From: James Siegrist
Cc: To Be Determined

Request to conduct an Independent Review of the PIP-II proposal at Fermilab

The HEP strategic plan developed by the Particle Physics Project Prioritization Panel (P5) and documented in the 2014 report, *Building for Discovery: Strategic Plan for U.S. Particle Physics in the Global Context*, calls for an upgrade of the Fermilab accelerator complex to support the planned physics of the next decade. In particular recommendation 14 states:

Upgrade the Fermilab proton accelerator complex to produce higher intensity beams. R&D for the Proton Improvement Plan II (PIP-II) should proceed immediately, followed by construction, to provide proton beams of >1 MW by the time of first operation of the new long-baseline neutrino facility.

Fermilab has put together a proposal for PIP-II that includes international in-kind contributions. I request that you conduct an Independent Review of the PIP-II proposal in order to evaluate the proposed cost range and the readiness of the laboratory to begin conceptual design. The results of your review will provide support for the Mission Need Statement being developed by the Office of High Energy Physics.

Your committee should address the following specific items:

1. Is the proposed technical concept, including both new construction and modifications to existing infrastructure, likely to satisfy the P5 recommendation? Are there major alternative technical choices? How well understood are the international in-kind contributions?
2. Is the presented cost range based on sound reasoning, consistent with experience of similar projects? Is it likely to bound the actual cost when PIP-II is built?
3. Does the scheduling strategy fit with other major projects at Fermilab?
4. Is there significant R&D that still needs to be carried out in order to implement the proposed concept? Are all the significant technical and cost risks identified? Does the laboratory have a plan, and sufficient resources, to complete the R&D in a timely manner?
5. Does the management team possess the requisite expertise and experience? Is it appropriately organized and staffed to initiate PIP-II activities?

Dr. Stephen Peggs oversees PIP-II in the Office of High Energy Physics and will serve as the OHEP contact person for the review.

We appreciate your assistance in this matter. As you know, these reviews play an important role in our program. I look forward to receiving your Committee's report within 60 days of the review.

Interpretation of the Charge (Based on exchange with Steve P)

DOE413.3b calls for a Mission Validation Independent Review. This is not such a review. (The charge only says Independent Review). OHEP's attitude remains that P5 was the Mission Validation Independent Review.

The Mission Need Statement is anticipated to exist in final draft from at the time of the Review. The intent of the Review is to endorse the MNS and provide support for signing it after the review.

The context of the Review is: a)P5 recommendation; b) aging infrastructure; and c) cost effectiveness.

Steve H has asked Steve P for confirmation that we are utilizing the "broad interpretation" of Recommendation 14: "Broadly the recommendation refers to high intensity beams (plural) and P5 elsewhere in their report comments on the desirability of a power upgrade to Mu2e, which requires a CW beam."

The primary goal is "...to evaluate the proposed cost range and the readiness of the laboratory to begin conceptual design." This is spelled out in the five charge elements.

I have been asked to prepare a draft agenda. I asked Steve if he wanted it organized around the five charge elements or the structure of the MNS. He said structure of the MNS. The structure of the MNS is:

1. Statement of Need – a definition of desired performance characteristics based on the goals of the physics research program. The P5 report is the basis of the statement of need.
2. Capability Gap/Mission Need – a description of how/why these performance characteristics are beyond the capabilities of present facilities
3. Potential Approach – a description of the concept(s) for attaining the desired performance, including alternatives considered
4. Resource and Schedule Forecast – a summary of the cost range estimate and possible high level schedule

Steve has indicated that we will have breakouts with three subcommittees comprising three consultants each:

Technical Subcommittee

Cost & Schedule Subcommittee

Management & ESH Subcommittee

Draft Agenda

I have sent Steve the following structure outline for the review:

Morning Plenary Session

Welcome – Nigel Lockyer/Fermilab Director

Welcome and outline of Fermilab's strategic goals and PIP-II role

Introduction to PIP-II – Steve Holmes/PIP-II Project Manager

Overview of goals and status. Organized along lines of the MNS: Need, Capability Gap, Potential Approach/Alternatives, Resource Requirements, International Contributions. The primary goal is to set up the rest of the morning talks. Conclude with our view of the answer to the five charge questions.

Mission Need – Gina Rameika/Neutrino Division Head

Description of performance requirements to support the long- and short- baseline neutrino programs, and next generation muon experiments, beyond 2025.

Proposed Approach – Valeri Lebedev

Outline of the PIP-II technical proposal .

R&D Program – Paul Derwent

Overview of the R&D program and how it mitigates risk.

I proposed not having a cost estimate talk in the plenary session – I proposed limiting that to the cost/schedule breakout. I would give a high level summary of the cost estimate/range in my opening talk (probably one slide). My concern is distracting the technical subcommittee by costs when they should be concentrating on technical risks.

Afternoon Breakouts

Technical Subcommittee: Focus on the technical concept and details of the R&D program. Should include the resource requirements for the R&D phase. (Paul, Valeri)

Cost and Schedule Group: Presentation of the cost estimate as it exists. Benchmark comparisons. Potential international contributions. I proposed that we not really talk about a schedule beyond the R&D phase. For R&D phase we should simply outline requirements to get to a construction start before the end of FY19. (Don, Shekhar, Chris)

Management and ESH: Organization chart and plans for fleshing out the organization.

Approach to ESH. NEPA requirements. (Steve, John A, Vic K)

Organizing ourselves

I would like to base the review on three documents:

RDR – Valeri

Cost Estimate – Steve, Shekhar, Chris

R&D Plan (subset of Plan to CD-3, IIFC R&D Plan) – Paul, Don, Shekhar

We should endeavor to have these documents in place a month in advance (May 16).

Preparation for the review is our highest priority between now and June 16.

I would also like to assign specific responsibility to making sure we are prepared on the charge items:

1. Is the proposed technical concept, including both new construction and modifications to existing infrastructure, likely to satisfy the P5 recommendation? (Valeri) Are there major alternative technical choices? (Steve, Paul) How well understood are the international in-kind contributions? (Shekhar)
2. Is the presented cost range based on sound reasoning, consistent with experience of similar projects? Is it likely to bound the actual cost when PIP-II is built? (Steve, Don, Chris)
3. Does the scheduling strategy fit with other major projects at Fermilab? (Paul, Steve)
4. Is there significant R&D that still needs to be carried out in order to implement the proposed concept? Are all the significant technical and cost risks identified? Does the laboratory have a plan, and sufficient resources, to complete the R&D in a timely manner? (Paul)
5. Does the management team possess the requisite expertise and experience? Is it appropriately organized and staffed to initiate PIP-II activities? (Steve)

We will start using the Friday and Tuesday meetings as necessary to complete our preparations.