Introduction to Editors Meeting

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for the Study-II Leaders

Editors Meeting-BNL
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Outline

- Introduction
- Goals of meeting
- Policy matters
- Discussion matters
- Costing preparations
- Summary

Introduction

- A lot of work has been done since the first Editors Meeting in October 2000
  - this meeting gives us the chance to summarize where we are and identify what else is needed to complete Study-II
  - of particular importance: understand what parameter changes are needed based on technical studies and cost determinations to date
    - we also need to identify remaining inconsistencies in assumptions or disconnects in hardware
- Important for all speakers to flag any places where parameters or assumptions are at odds with Parameter List
  - these must be resolved by the Study Leaders at this meeting, or soon thereafter
  - a parameter table for each section summarizing both input values and output values will facilitate consistency checks
  - tables including "parts count" and component parameters will help us in the costing exercise to follow (no. of magnets, RF cavities, power supplies, fields, gradients, etc.)

Introduction

- Because it is the interfaces where problems arise, please attend and pay particular attention to talks on sections immediately upstream and downstream from your area of responsibility
  - for engineers, attend all talks where your components are utilized
- Please call to the attention of the Study Leaders any discrepancies or problems you identify, not just those in your area
  - we're all in this together!
- Please identify required R&D activities in your area of expertise, especially where component prototypes are needed
- Due to internal resource conflicts, NHMFL will be unable to complete their Study-II commitments in a timely way
  - Mike Green is responsible for all solenoids downstream from target
  - Bob Weggel will coordinate completion of the target magnet work
  - John Miller will be available to consult, but not for "deliverables"

Goals of Meeting

- By the end of the meeting we desire:
  - all technical approaches frozen
    - technical feasibility is the overriding criterion
    - but reduced cost is an important criterion
  - nominal operational parameters defined
    - error sensitivity studies should be done thereafter
  - identification of all alternative strategies to be described in an Appendix, but not engineered or costed

Goals of Meeting

- By end of February:
  - a self-consistent facility description (simulation) from proton source through storage ring
  - identification of a phased scenario for the facility
  - identification of R&D needed to validate proposed design concepts and/or costs
    - also R&D that could validate less expensive but riskier approaches

Policy Matters

- There are a number of areas where decisions are needed
  - the arbitrary ones have been made by the Study Leaders to keep the work moving
  - less arbitrary ones will be made based on discussions at this meeting

    $\Rightarrow$speak now or forever hold your peace
  - a good forum for such discussions is the wrap-up sessions scheduled at the end of each day
- Length of the year
  - for this Study, we will adopt a Snowmass year of 10^7 s
    - distinction with Study-I assumption will be called out in Executive Summary, and in main text (wherever needed)

Policy Matters

- Target magnet
  - we will complete the design of a hollow-conductor magnet insert
  - a SC "outsert" solenoid compatible with the hollow-conductor insert will be our baseline [Weggel; Green and Miller consulting]
  - if resources permit, we will also develop a design for a "plug compatible" Bitter magnet [Weggel]
    - this approach takes best advantage of the present design investment
  - if designs for both inserts are available, the decision on which will be the baseline and which will appear in the Appendix will be decided based on cost and technical judgment of Study Leaders

Policy Matters

- Detector site
  - baseline design will aim for WIPP site (Carlsbad, NM)
    - distance ≈3000 km; 13° slope; smaller straight section due to site constraints
  - alternate site (Soudan) will be discussed in Appendix
    - distance ≈1800 km; 7° slope; longer straight section available
      - shorter distance and limited detector expansion possibilities are disadvantages
      - but, existing detector and infrastructure potentially permit a first look at the physics earlier
  - hope and expect to engage community in this discussion at Snowmass
    - if they are discussing "where" not "whether" it's good for us

Policy Matters

- Induction linacs
  - for cost reasons, we will adopt solution with three unipolar units
    - optimization of lengths is being studied now [Reginato]
    - initial version is already part of updated parameter list
  - we will maintain the 1.25 T solenoidal field as a baseline
    - possibility to raise field to 3 T will be mentioned in Appendix but will not be costed or engineered
    - there is not time to develop the idea properly and it will clearly increase costs as well
- Cooling channel optics
  - SFOFO channel is baseline design for costing and engineering
  - double-flip channel will be described in Appendix
    - if time permits, "differential" costing will be done, but no substantial engineering effort

Discussion Matters

- Vacuum requirements
  - in normal transport channels, provide 10 nTorr average pressure
  - in NCRF cavities, provide 1 nTorr pressure
  - beam line vacuum separate from cryostat vacuum
  - in regions near SCRF cavities, provide 1 nTorr average pressure
  - in storage ring provide 2 nTorr average pressure
- Storage ring error studies
  - the magnets for the ring are unusual and we need to assess the actual field quality that they can provide
    - skew quad element is linear and should not be an issue
    - need a multipole expansion of the fields
    - with multipole information, it should be possible to track the ring using standard tools and assess the efficacy of the design

Discussion Matters

- Diagnostics
  - cooling channel lattices are tight
    - not much room for diagnostics
  - alternative is to create "empty" or semi-empty cells to house diagnostics
    - cells with no RF and no absorbers will give plenty of room
    - cells with reduced RF and half-thickness absorbers would likely give sufficient room
      - propose such diagnostic cells every 8 cells (Lattice 1) and every 12 cells (Lattice 2)
        - use same approach in preacceleration linac

Discussion Matters

- Need for "hot spares"
  - there will be cooling channel cavities or stations that fail or do not reach full gradient during operation
  - two options:
    - empty corresponding absorber and leave station off
    - run at partial gradient and correct energy with spare stations installed periodically for this purpose
  - similar issues apply in the preacceleration linac and RLA
  - issue should be addressed as part of the error sensitivity studies
    - but it has cost and layout implications
- Mini-cool absorbers
  - size and power handling look "challenging"
    - need to examine alternatives to LH_2 (LiH or Be)

Costing Preparations

- Starting in mid-February we need to cost our design
  - use WBS to collect and tabulate costs
    - WBS items should correspond to some deliverable (e.g., magnets, RF cavities, power supplies, and the like)
    - costs based on a percentage of an item are acceptable in the absence of specific designs
      - examples might be cabling or installation costs, ED&I, standard diagnostics
    - do not include overhead or contingency in the estimates
      - these will be applied separately in consultation with me
    - do not include R&D costs
    - representing uncertainties as a cost range is acceptable
- Draft WBS is now available for your comment
- Need also to evaluate costs of phased scenario

Summary

- We're in the home stretch
- Study Leaders are very appreciative of the efforts that have gone into the Study
  - we are confident that—with your help—we will have a result we can all be proud of