

DUSEL Preliminary Design

- **Outline**
 - Recent events
 - MREFC proposal
 - NSF/DOE Joint Oversight Group (JOG)
 - Final thoughts

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Welcome

A Little Perspective

- Site selection announcement only ~ 2 years ago.
- Enormous progress has been made, on all fronts.
- Still, much remains to be done.
- Coming months are critical (we say this all the time, but...)
- Goal is a baseline design that reflects the full potential of this unique and very special project.

DUSEL January 2009 Review

- **First NSF annual review of the DUSEL Design Project.**
- **January 28-30, 2009 at University of California, Berkeley.**
- **25-member multi-disciplinary world-class panel:**
 - **Experiment planning & infrastructure; underground construction & operations; education & outreach; ES&H; cost & schedule; project management.**
- **DOE HEP, NP and Office of Project Assessment were involved in planning, and attended.**
- **Panel recommended a proposal for funds to complete Preliminary Design be submitted immediately to NSF by UC Berkeley.**

DUSEL Preliminary Design Proposal

- Proposal for \$36M submitted by UCB to the NSF on 16 May 2009.
- Reviewed by panel of 11 experts on 28-29 May 2009.
- Recommended to the NSF that the proposal “must be funded.”
- NSF concurred, requested revised budget of \$29M.
 - Over two years.
 - Complements the S3 award (\$15M + \$3M supplement).
- Put forward by MPS for consideration by the National Science Board at their 5-6 August 2009 meeting.

NSB Results

- **At August meeting, NSB Committee on Programs & Plans voted to table motion until December 2009.**
- **Timing was subsequently reconsidered, and proposal was taken up again at September NSB retreat in Ohio.**
- **Proposal approved at retreat (24 September).**
- **Targets December 2010 Preliminary Design, project baseline.**
- **Cooperative agreement being drafted. Target release of funds by November 1.**

Budget evolution

Conceptual Design Stage

Concept development – Expend approximately 1/3 of total pre-construction planning budget

Develop construction budget based on conceptual design

Develop budget requirements for advanced planning

Estimate ops \$

Readiness Stage

Preliminary design

Expend approx 1/3 of total pre-construction planning budget

Construction estimate based on prelim design

Update ops \$ estimate

Board Approved Stage

Final design over ~ 2 years

Expend approx 1/3 of total pre-construction planning budget

Construction-ready budget & contingency estimates

Construction

Expenditure of budget and contingency per baseline

Refine ops budget

Funded by R&RA or EHR \$

MREFC \$



Project evolution

Conceptual design

Formulation of science questions

Requirements definition, prioritization, and review

Identify critical enabling technologies and high risk items

Development of conceptual design

Top down parametric cost and contingency estimates

Formulate initial risk assessment

Initial proposal submission to NSF

Initial draft of Project Execution Plan

Preliminary Design

Develop site-specific preliminary design, environmental impacts

Develop enabling technology

Bottoms-up cost and contingency estimates, updated risk analysis

Develop preliminary operations cost estimate

Develop Project Management Control System

Update of Project Execution Plan

Final Design

Development of final construction-ready design and Project Execution Plan

Industrialize key technologies

Refine bottoms-up cost and contingency estimates

Finalize Risk Assessment and Mitigation, and Management Plan

Complete recruitment of key staff

Construction per baseline

Proponents development strategy defined in Project Development Plan

NSF oversight defined in Internal Management Plan, updated by development phase

Described by Project Execution Plan

Oversight evolution

Merit review, apply 1st and 2nd ranking criteria

MREFC Panel briefings

Forward estimates of Preliminary Design costs and schedules

Establishment of interim review schedules and competition milestones

Forecast international and interagency participation and constraints

Initial consideration of NSF risks and opportunities

Conceptual design review

MREFC Panel recommends and NSF Director approves advance to Readiness

NSF Director approves Internal Management Plan

Formulate/approve Project Development Plan & budget; include in NSF Facilities Plan

Preliminary design review and integrated baseline review

Evaluate ops \$ projections

Evaluate forward design costs and schedules

Forecast interagency and international decision milestones

NSF approves submission to NSB

NSF approves submission to NSB

Apply 3rd ranking criteria

NSB prioritization

OMB/Congress budget negotiations based on Prelim design budget

Semi-annual reassessment of baseline and projected ops budget for projects not started construction

Finalization of interagency and international requirements

Congress appropriates funds

Final design review, fix baseline

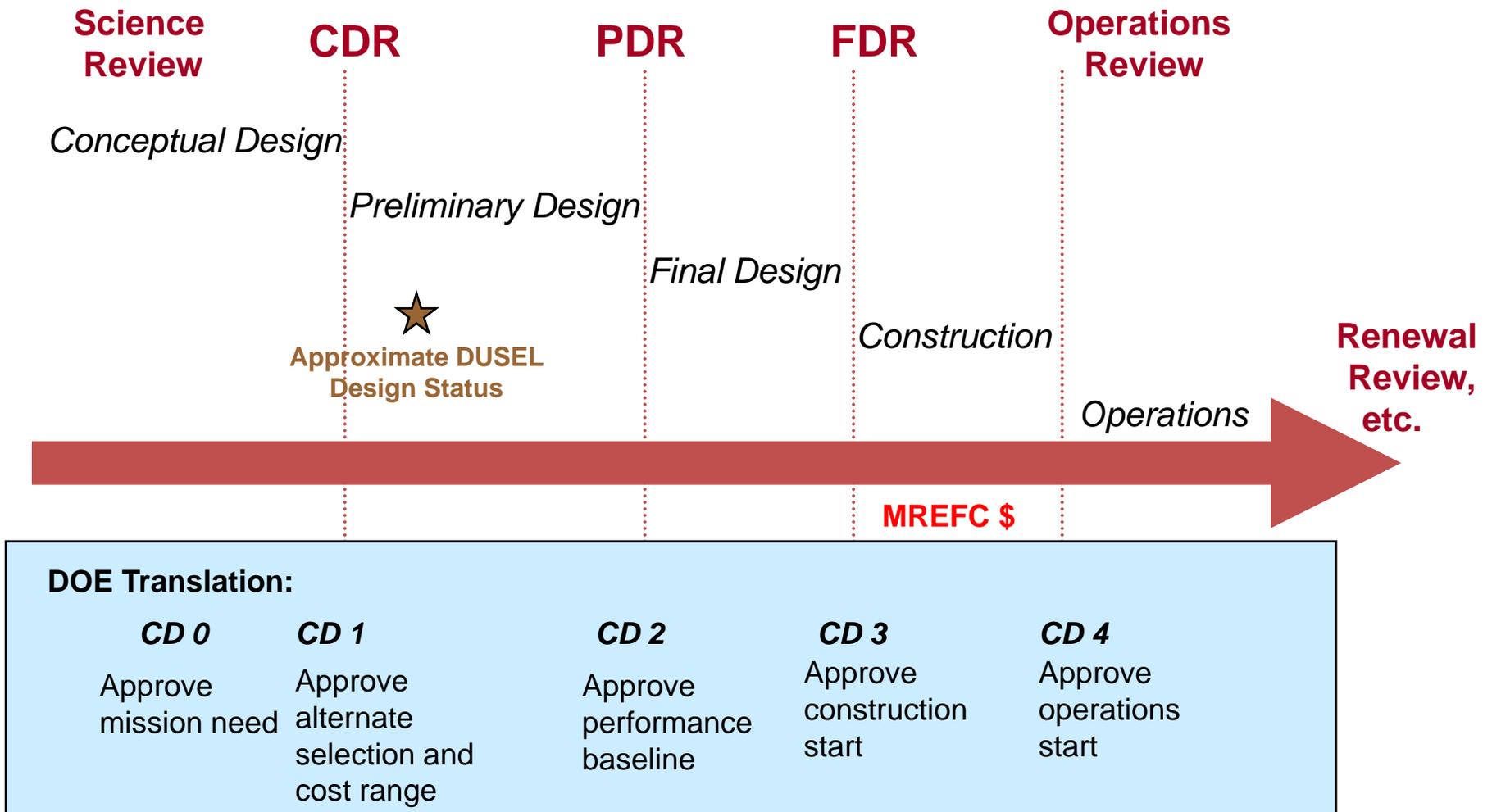
Congress appropriates MREFC funds & NSB approves obligation

Periodic external review during construction

Review of project reporting

Site visit and assessment

NSF Pre-Construction Planning Process



DUSEL Target Timeline

- **January '09: NSF Project Review #1.**
- **January '10: NSF Project Review #2.**
- **December '10: NSF Preliminary Design Review (PDR).**
 - Project baseline
- **Spring '11: Presentation of DUSEL MREFC package to NSB.**

Above targets FY2013 construction start.

DUSEL Experimental Program: S4

- **25 proposals received for S4.**
- **300 senior researchers named from 91 institutions.**
- **15 physics proposals, reviewed by high level panel of 12 experts at NSF on June 11-13, 2009.**
- **Panel recommended 9 proposals to NSF for funding.**
- **NSF concurred.**
- **Close attention paid to programmatic depth and diversity:**
 - **Dark matter, neutrino-less double-beta decay, large water cerenkov detector, underground accelerator, assaying sub-facility.**
- **Total physics awards: \$21M over 3 years.**

BIO, GEO, ENG S4 Proposals

- **Seven proposals from engineering and geo/geo-bio were selected for funding:**
 - **Fracture processes, coupled processes, subsurface imaging and sensing, fiber optic strain monitoring, CO₂ sequestration, eco-hydrology & deep drilling.**
- **See talk by R. Frigaszy (ENG).**
 - **D. Lambert unable to attend.**

NSF remains committed to a rich, diverse multi-disciplinary DUSEL research program.

MREFC Proposal

- **As currently envisioned, MREFC proposal will consist of 2 roughly equal costed components:**
 - Fully baselined facility & infrastructure.
 - “Generic” experimental program.
- **Facility would break ground immediately upon receipt of approvals & funding.**
- **Experiments interleaved as they sufficiently mature.**
- **Introduces essential flexibility:**
 - Timely facility construction start.
 - Optimization of experimental program.
- **MREFC cost will be capped, using scope as contingency.**
- **This model has many precedents.**

Support for Experiment Development

- **The DUSEL experimental program must be (and remain) current, transformational, and world-leading.**
- **Accordingly, proposals for design development, R&D can be submitted.**
 - **Submission should be coordinated with NSF Program Officers.**
- **Timing & process for “final” selection of DUSEL experiments depends on experimental readiness.**
 - **For example, solicitation by category, global solicitation (S5), etc.**
- **Softening of the coupling between the baselining of the facility and the experiments has enabled this approach.**

Arriving at a Preliminary Design for DUSEL

- The DUSEL design and program must be a consensus expression of the underground community's vision.
- Breadth, thrust, and cost range/bounds of "generic" experimental program must be collectively agreed to, and justified.
- There will be many tough details to sort out in a timely way.
- Proactive collaboration between facility team, experimenters, and agencies will be required in order to appropriately define the experimental program, and the facility that supports it.

NSF/DOE Collaboration (JOG)

- **NSF/DOE agreed to establish DUSEL Physics Joint Oversight Group (JOG) immediately after release of P5 report (May '08).**
- **Representation from NSF/PHY, DOE/OHEP, DOE/ONP.**
- **Builds on successful NSF & DOE collaboration on Large Hadron Collider (LHC) in high energy physics.**
- **Will jointly coordinate & oversee DUSEL experimental physics program.**
- **Meeting quarterly.**
- **Agencies consult, and participate as observers, on reviews of DUSEL and related experiments.**

Inter-Agency Letter of Intent & Transmittal

- **Joint Statement of Intent from DUSEL Physics JOG signed by 3 JOG co-chairs in August.**
 - **Director of NSF Physics Division.**
 - **Associate Directors for DOE OHEP & NP.**
 - **MoU in approximately 1 year.**
- **Transmittal letter to OMB signed by NSF Director and DOE Under Secretary for Science (August 3, 2009).**
 - **“joint-PDR”, close coordination of evolving design.**

Closing Remarks

- **DUSEL now has the footing & resources it needs to establish a robust baseline design.**
- **Will allow its consideration as an MREFC candidate.**
- **Absolutely necessary ingredient for success is, and will remain, close community collaboration.**
- **Research program, education & outreach, and impressive local support provide unusually strong foundation for the design of a very special laboratory.**
- **The community must now specify their vision of what DUSEL will be.**