NOvA WBS & OBS

J. Cooper

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Some basic changes

- Dropped the Near / Far split at Level 2 in the construction project
  - Too hard to explain L3 in R&D → L4 in Construction
  - So Near / Far now at L4 in Construction
- EXCEPT for Detector Assembly
  - Split into two L2 tasks
  - Different problems, different people involved, different time scales
  - Dave Ayres still manages both
- Inserted “Integration Prototype Near Detector” R&D task in all detector parts (not in Site & Building)

Level 2 Tasks 1.1, 2.1 Site and Buildings

NOvA Work Breakdown Structure

1. Research & Development
    - 1.1. Site and Buildings
        - 1.1.1 Site Work
        - 1.1.2 Building / Detector Enclosure
        - 1.1.3 Outfitting
        - 1.1.4 Site Logistics
            - Site Maintenance
            - Safeguards & Security
            - Site Management
        - 1.1.5 Management

2. Construction
    - 2.1 Site and Buildings
        - 2.1.1 Final Design
            - Site, Building shell(?), Build-out (?), Outfitting
        - 2.1.2 Conventional Construction
        - 2.1.3 Outfitting
        - 2.1.4 Site Logistics
        - 2.1.5 Management

NOvA Project Organization

Site and Buildings Steve Dixon (Fermilab) = 1.1, **2.1**

Site Work Marvin Marshak (Minnesota) = 1.1.1

Building Design Steve Dixon (Fermilab) = 1.1.2, **2.1.1**
coordinating FESS, AE consultants

Conventional Construction _____ = **2.1.2**
(depends on construction model)

Outfitting _____ = 1.1.3, **2.1.3**

Site Logistics Earl Peterson (Minn.)? = 1.1.4, **2.1.4**

Management Steve Dixon (Fermilab) = 1.1.5, **2.1.5**

Level 2 Tasks 1.2, 2.2 Scintillator

NOvA Work Breakdown Structure

1. Research & Development
   - 1.2. Liquid Scintillator R&D
     - 1.2.1 Requirements
     - 1.2.2 Scintillator Composition Studies
     - 1.2.3 Aging Studies
     - 1.2.4 Scintillator Production Method Studies
     - 1.2.5 Development of QA/QC Methods
     - 1.2.6 Scintillator Transportation Studies
     - 1.2.7 Vendor Investigations
     - 1.2.8 Integration Prototype
       - Near Detector Production
     - 1.2.9 Production Scintillator Specifications
     - 1.2.10 Management

2. Construction
   - 2.2. Liquid Scintillator Production
     - 2.2.1 Procurement
     - 2.2.2 Production (Near and Far)
     - 2.2.3 QC
     - 2.2.4 Shipping
     - 2.2.5 Management

NOvA Project Organization

Scintillator Stuart Mufson (Indiana) = 1.2, **2.2**

Requirements & Procurement Stuart Mufson (Indiana) = 1.2.1, 1.2.9, **2.2.1**

Production Methods _____ = 1.2.4, 1.2.7
Karol Lang (Texas-Austin)?

Studies & Production Chuck Bower (Indiana) = 1.2.2, 1.2.3, 1.2.8, **2.2.2**

QA /QC Tom Coan (SMU) = 1.2.5, **2.2.3**

Shipping Bob Bernstein (Fermilab) = 1.2.6, **2.2.4**

Management Stuart Mufson (Indiana) = 1.2.10, **2.2.5**

Level 2 Tasks 1.3, 2.3
Wavelength Shifting Fiber

NOvA Work Breakdown Structure

1. Research & Development
    - 1.3. Fiber R&D
        - 1.3.1 Requirements
        - 1.3.2 Vendor Investigations
        - 1.3.3 Fiber Optimization Studies
          Diameter, Dye concentration, Chemical & Environ. Stability
        - 1.3.4 Integration Prototype
          Near Detector production
        - 1.3.5 QC studies & tools
        - 1.3.5 Management

2. Construction
    - 2.3 Fiber Production
        - 2.3.1 Procurement
        - 2.3.2 Production & QC
        - 2.3.3 Management

NOvA Project Organization

WLS Fiber Carl Bromberg (Michigan State) = 1.3, **2.3**

Requirements	Carl Bromberg (Michigan State) = 1.3.1
Fiber Optimization	Dan Cronin-Hennessy (Minnesota) = 1.3.2
Procurement	Brajesh Choudhary (Fermilab) = 1.3.2, **2.3.1**
Production	_____ = 1.3.4, **2.3.2** Bob Miller (MSU, retired)?
Management	Carl Bromberg (Michigan State) = 1.3.5, **2.3.3**

Level 2 Tasks 1.4, 2.4 PVC Extrusions

NOvA Work Breakdown Structure

1. Research & Development
   - 1.4. Extrusion R&D
     - 1.4.1 Raw Materials
       Requirements, Vendor investigations, Procurement, Raw Materials Tests, manufactured PVC tests, Documentation
     - 1.4.2 Extrusions
       Vendor Investigations, QA/QC, Procurement, Integration Prototype Near Detector Production, Documentation
     - 1.4.3 Physical Properties and QC
       Requirements, Optical Properties, Mechanical Properties, QC tooling, Documentation
     - 1.4.4 Management

2. Construction
   - 2.2. Extrusion Production
     - 2.4.1 Procurement & Pre-Production (Near and Far)
       32-cell vendors
     - 2.4.2 Production
       Near and Far, includes QC
     - 2.4.3 Storage & Shipping
     - 2.4.3 Management

NOvA Project Organization

PVC Extrusions Rich Talaga (ANL) = 1.4, **2.4**

Raw Materials & Procurement Rich Talaga = 1.4.1, **2.4.1**
(with Anna Pla-Dalmau, Proj. Chemist)

Physical Properties _____ = 1.4.3
Tom Chase (Minnesota)?

Production _____ = 1.4.2, **2.4.2**
Chuck Grozis (Fermilab)?
Bob Wagner (ANL)?

Management Rich Talaga (ANL) = 1.4.4, **2.4.3**

Level 2 Tasks 1.5, 2.5 PVC Modules

NOvA Work Breakdown Structure

1. Research & Development
   - 1.5. PVC Module R&D
     - 1.5.1 Requirements
     - 1.5.2 End Seals: Fiber manifolds, "bottom" closures, tooling
     - 1.5.3 Photodetector interface design (cookie)
     - 1.5.4 Module Factory Design and Tooling
     - 1.5.5 Design & Prototyping of QA / QC tools and tests
     - 1.5.5 Storage and Shipping Models
     - 1.5.6 Integration Prototype Near Detector Modules
     - 1.5.7 Management

2. Construction
   - 2.2. PVC Module Production
     - 2.5.1 End Seal Production
     - 2.5.2 Photodetector Interface Production
     - 2.5.3 Factories, including QA/QC
     - 2.5.4 Storage and Shipping of completed modules
     - 2.5.5 Management

NOvA Project Organization

PVC Modules	Ken Heller (Minnesota) = 1.5, **2.5**
Requirements	Ken Heller (Minnesota) = 1.5.1
End Seals, Factory Design	Jim Grudzinski (ANL) = 1.5.2, 1.5.4, **2.5.1**
Photodetector Interface	Jon Urheim (Indiana) = 1.5.3, **2.5.2**
Factories	Ron Poling (Minn) = 1.5.5, 1.5.6, **2.5.3**
Storage & Shipping	_____ = 1.5.5, **2.5.4**
Management	Ken Heller (Minnesota) = 1.5.7, **2.5.5**

Level 2 Tasks 1.6, 2.6 Electronics

NOvA Work Breakdown Structure

1. Research & Development
    - 1.6. Electronics R&D
        - 1.6.1 System Definition
        - 1.6.2 APD Modules
        - 1.6.3 Readout
        - 1.6.4 Readout Infrastructure
        - 1.6.5 Integration Prototype
            - Near Detector electronics
        - 1.6.6 Management

2. Construction
    - 2.2. Electronics Production
        - 2.6.1 APD Modules
        - 2.6.2 Front-end Boards
            (Near and Far not identical)
        - 2.6.3 Infrastructure
        - 2.6.4 Management

NOvA Project Organization

Electronics Leon Mualem (Minnesota) = 1.6, **2.6**

Requirements Leon Mualem (Minnesota) = 1.6.1

APD Modules Roger Rusack (Minnesota) = 1.6.2, **2.6.1**

Front-End Boards John Oliver (Harvard)?
= 1.6.3, 1.6.5, **2.6.2**

Infrastructure _____ = 1.6.4, **2.6.3**

Management Leon Mualem (Minnesota) = 1.6.6, **2.6.4**

Level 2 Tasks 1.7, 2.7 Data Acquisition (DAQ)

NOvA Work Breakdown Structure

1. Research & Development
    - 1.7. DAQ R&D
        - 1.7.1 System Definition
        - 1.7.2 DAQ
        - 1.7.3 Clock / Timing
        - 1.7.4 Slow Controls
        - 1.7.5 Integration Prototype Near Detector
        - 1.7.6 Database (NOvA-wide)
        - 1.7.57 Management

2. Construction
    - 2.2. DAQ System
        - 2.7.1 DAQ
        - 2.7.2 Clock / Timing
        - 2.7.3 Slow Controls
        - 2.7.4 Database (NOvA-wide)
        - 2.7.5 Management

NOvA Project Organization

DAQ Leon Mualem (Minnesota) = 1.7, **2.7**

System Margaret Votava (Fermilab)? = 1.7.1, 1.7.2, 1.7.4, 1.7.5, **2.7.1, 2.7.3**

Clock / Timing Vince Pavlicek (Fermilab)? = 1.7.3, **2.7.2**

Database Jerry Guglielmo (Fermilab)? = 1.7.6, **2.7.4**

Management Leon Mualem (Minnesota) = 1.7.7, **2.7.5**

Level 2 Tasks 1.8, 2.8, 2.9
Detector Assembly (note new L2 split)

NOvA Work Breakdown Structure

1. Research & Development
    - 1.8. Detector Assembly R&D
        - 1.8.1 Plane Assembly Adhesive
        - 1.8.2 Structural Design Studies
        - 1.8.3 Scintillator Handling
        - 1.8.4 Near Detector Assembly
        - 1.8.5 Integration PrototypeNear Detect.
        - 1.8.6 Far Detector Full Scale Prototype
        - 1.8.7 Far Detector Assembly
        - 1.8.8 Management
2. Construction
    - 2.8 Near Detector Assembly
        - 2.8.1 Mechanical Systems
        - 2.8.2 Assembly Tooling
        - 2.8.3 Liquid Scintillator Filling Equipment
        - 2.8.4 Installation
        - 2.8.5 Management
    - 2.9 Far Detector Assembly
        - 2.9.1 Mechanical Systems
        - 2.9.2 Assembly Tooling
        - 2.9.3 Liquid Scintillator Filling Equipment
        - 2.9.4 Installation
        - 2.9.5 Management

NOvA Project Organization

Detector Assembly Dave Ayres (ANL) = 1.8, **2.8**

- **Structures & Tools** Vic Guarino = 1.8.1, 1.8.2, **2.8.1, 2.8.2, 2.9.1, 2.9.2**
- **Scintillator Filling** Jim Musser (Indiana) = 1.8.3, **2.8.3, 2.9.3**
- **Integration Prototype & Near** Rob Plunkett (Fermilab) = 1.8.4, 1.8.5, **2.8.4**
- **Full Scale Prototype** Karen Kephart (Fermilab) = 1.8.6
- **Far** Bill Miller (Minnesota) = 1.8.7, **2.9.4**
- **Management** Dave Ayres (ANL) = 1.8.8, **2.8.5, 2.9.5**

Level 2 Tasks 1.9, 2.10 Project Management

NOvA Work Breakdown Structure

1. Research & Development
    - 1.9. R&D Project Management
        - 1.9.1 FY06
        - 1.9.2 FY07
        - 1.9.3 FY08

2. Construction
    - 2.10 Construction Project Management
        - 2.10.1 FY07
        - 2.10.2 FY08
        - 2.10.3 FY09
        - 2.10.4 FY10
        - 2.10.5 FY11
        - 2.10.6 FY12

NOvA Project Organization

Project Management John Cooper (Fermilab) = 1.9, **2.10**

Summary

- Have 92 L3 tasks (ignoring 2.10 Proj. Man)
  - 52 R&D
  - 40 Construction
- Have 23 L3 Managers on board
  - 5 real holes
  - 8 still being discussed
- Next step
  - Open Plan with Bill Freeman
  - Starting with Steve Dixon on Site and Building