Working Group C

Conventional Facilities Parallel Session

IRENG07

V. Kuchler, A. Enomoto, J. Osborne

September 19, 2007

Overview

- **Agenda Items for Parallel Sessions**
  - **Hall and Building Sizes**
  - **Cranes**
  - **Shafts**
  - **Minimum Space Requirements**
  - **Services**
  - **Utilities**

Some Preliminary Thoughts

- We Need to Identify the Gap, if any, Between What is Included in the CFS RDR Cost Estimate and What is Included in Each Detector Design Concept and Eventual Cost Estimate
- The CFS Group Would Like to Establish the Point(s) of Contact with the Detector Design Teams for all Identified Areas of Required Criteria
- The CFS Group Certainly Recognizes the Work Completed to Date by the Detector Groups to Establish the Required Criteria

Continued

- **We Will Need to Identify What Criteria Apply to Individual Detector Concepts and What Criteria are Common to All Detector Concepts**
  - Weight is Certainly Detector Specific
  - Common Temperature and Humidity Requirements
- **The CFS Group will use the Parallel Sessions to Further Discuss and Record the Criteria Developed and Identify Issues that Still Need Resolution**
- **All CFS Criteria will be Added to the IRENG Interface Parameters Document**
- **Specific Tasks as Identified will be added as CFS EDR Work Packages**

Value Engineering

- Where Options or Alternative Design Solutions are Being Considered, the Value Engineering Process can be Used to Facilitate the Decision Process
- When Employing the Value Engineering Process all Aspects of the Various Alternatives must be Considered in Order to Determine the Best “Value”
- “Value” does not Necessarily Equate to “Cost”

Possible Examples

- **Crane Capacity in Detector Cavern**
  - **Directly Affects the Detector Assembly Process**
    - Location of Predominant Detector Assembly
    - Complexity of the Detector Components
    - Schedule Implications
  - **Directly Affects the Cavern Dimensions**
    - Actual Space Required for the Crane Operation
    - Size and Location of Crane Rail Supports
    - Hook Height and Size of Component to be Moved
  - **Directly Affects the Diameter of the Access Shafts**
    - Largest Component to be Lowered
    - Implications of Lateral Movement Process in the Cavern
  - **Not All of these Considerations have a Discrete Cost Implication**

Topics for Discussion

- Push-pull Constraints and Criteria
- Alignment Requirements
- Detector Hall Size and Dimensions
- Detector Electrical Supply
- HVAC and Humidity Requirements
- Process Water Requirements
- Life Safety Egress Requirements
- Construction Configuration Requirements
- Operational Configuration Requirements

Push-Pull

- **Push-Pull Constraints and Criteria**
  - Existing Experience can Provide a Good Basis for Discussion
  - What are the Prevailing Ideas for Detector Movement Systems
    - Single Platform for Each Detector
    - Independent Platform(s) for Support Equipment
    - Single Platform for Shield Wall Movement
  - What are the Current Ideas for the Platform Movement
    - Air Pads
    - Hillman Rollers
  - Utility Connections
    - Electrical Connections
    - Water
    - Cryogenic
  - Who and How Should These Decisions be Made

Alignment

- **Alignment Requirements**
  - **Cavern Movement will be Highly Dependent on the Geology of the Chosen Site**
  - **Site Geology is Unlikely to be Modified**
  - **Once Fully Established, Final Adjustment for the Detector Should be Incorporated in the Detector Support Structure**
  - **ILC Survey and Alignment Group Must be a Partner in the Discussions Regarding Initial and Final Detector Alignment**

Detector Hall Size

- **General Considerations**
  - Local Geology will Determine the Actual Shape of the Cavern
  - A “Dimensional Envelope” Needs to be Established for Each Detector Design
    - Assembly Conditions
    - Beamline Position Maintenance
    - Garage Position Maintenance
  - “Dimensional Envelope” Should Include all Supporting Utility Requirements
  - We Need to Establish the Boundary Point Between the Bottom of the Detector Support System and the Top of the Movement Platform
  - Exiting Requirements May Only Complicate the Issues of Detector Assembly, Maintenance and Operation

Electrical Requirements

- **Detector Power Requirements**
  - <750 KW for each Detector, Distribution to Hall and Building
- **Cryo Power**
  - Might be the Major Power Consumer, but less than Typical Accelerator Plant.
- **Are there any “Special” Power or Grounding Requirements**

HVAC Requirements

- **Environmental Parameters**
  - Hall Temp 21C with 3C Stratified Rise +/-2C Stability
  - Dewpoint 13C & Supply Air RH 60% Maximum
  - Negative Hall & Positive Egress/Shaft Pressure

- **Air Handling Parameters**
  - Ventilation for 100 people from Surface AHU's
  - No Purge for Smoke, ODH & Activated Air
  - Fan Coil Cooling for Hall Load + 10% Process
  - 40kW Maximum Process Air Load (10% of Total)

Process Water Requirements

- **Fluid Parameters**
  - Insulated CHW Supply from Surface to HX's
  - 16C CHW & LCW Supply to Skids from HX's
  - Elevation Head from Surface Interrupted at HX's

- **Equipment Parameters**
  - 90% Process Load Handled at Detector Skids
  - 400kW Maximum Process Load
  - Thermal Dimensional Stability from Skid Controls
  - LCW Makeup from Accelerator LCW System

Building / Site Requirements

- **Number of People**
  - During Detector Construction
  - During Operations
- **Offices / Meeting Rooms**
- **Machine Shops**
- **Floor Stability / Vibration Criteria**
- **Control Room**
- **Cryo Needs**
- **Environmental Requirements**
- **Uses After Detector Construction**

Additional Issues

- **Evolving Constraints and Criteria**
  - **Life Safety Egress Requirements**
  - **Construction Configuration Requirements**
  - **Operational Configuration Requirements**
- **Identification of Clear Boundaries Between CFS and the Detector Groups**
- **Points of Contact**
- **What's the Next Step**

Parallel Session

- **Push-pull Constraints and Criteria**
  - **What are the Prevailing Ideas for Detector Movement Systems**
    - **Single Platform per Detector**
    - **Single Platform for Shield Wall Movement**

Parallel Session

- **Push-pull Constraints and Criteria**
  - **What are the Prevailing Ideas for Detector Movement Systems**
    - **Single Platform per Detector**
    - **Single Platform for Shield Wall Movement**

Parallel Session

- **Push-pull Constraints and Criteria**
  - **What are the Prevailing Ideas for Detector Movement Systems**
    - **Single Platform per Detector**
    - **Single Platform for Shield Wall Movement**

Parallel Session

- **Push-pull Constraints and Criteria**
  - **What are the Prevailing Ideas for Detector Movement Systems**
    - **Single Platform per Detector**
    - **Single Platform for Shield Wall Movement**

Parallel Session

- **Push-pull Constraints and Criteria**
  - **What are the Prevailing Ideas for Detector Movement Systems**
    - **Single Platform per Detector**
    - **Single Platform for Shield Wall Movement**