Surface Building Design Development

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GDE

Status and Goals

- The RDR included a reasonable place-holder set of criteria and estimate for surface building requirements.

- The EDR will have a comprehensive set of surface building requirements, programming and schematic layouts.

- Regional Selection will develop site specific plans and facades to suit their site.

- Establishment of a process to collect criteria, translate the criteria into firm requirements and schematic designs and establish concurrence with stakeholders.

- Develop WP for Surface Building Development

General Guideline

- The CF&S scope includes only those buildings and structures required for operations of the ILC. Space needed for construction and installation that can not be used for the operations should be included in the Area and Global system needing the space. (example: Temporary storage space)

EDR vs. Regional Selection

- **EDR Scope**
  - Develop program for each shaft
  - Develop program for all housings
  - Develop schematic designs
  - Identify regional variances (codes, building practices…)

- **Regional Selection Process Scope**
  - Determine existing facility assets –vs- functional space requirements that can be used to fulfill program
  - Develop site specific conceptual floor plans
  - Develop architectural styles
  - Perform a bottoms up CDR level cost estimate.

Design Input Responsibilities

- **Detector Assembly**
- **Offices for Technical Staff**
- **Electrical Buildings**
- **Cooling Towers and Pump Stations**
- **Cooling Ventilation Buildings**
- **Beam Dump Cooling Buildings**
- **Cryo- Warm Compressor**
- **Cryo- Surface Cold Box**
- **Control Rooms**
- **Workshop**
- **Site Access Building**
- **Shaft Access**
- **Laser Building**
- **Rad Building**
- **Gas Building**

- **Main Adm. Building**
- **Service Building**
- **Main Heating Plant**
- **Garage- Maintenance**
- **Computer Center**
- **Safety Building**
- **Reception**
- **Restaurant**
- **Hostel**
- **Warehouse**

- **Purple - CFS will program based on loads**
- **Red – Area or Technical System input**
- **Black – CF&S and EC input**

Criteria Collection

Building Programming Questionnaire

- This as a list of questions covering the many categories and issues that need to be defined to develop a program for each individual building

- The collection of this information will be in face-to-face discussions between the stakeholders and CF&S, assembled by CF&S and reviewed and accepted by all stakeholders.

1.0 Purpose

- What is the purpose of the building

2.0 Equipment

- 2.1 What equipment is in the building
- 2.2 How big is it
- 2.3 How much room does it require for maintenance
  - Considerations for safeguards & security
  - and personal access for maintenance activities (platforms, stairs, etc.)
- 2.4 How is the equipment brought into the buildings
  - During installation
  - During Operations
- 2.5 How is it taken out for replacement
- 2.6 Electrical Requirements
- 2.7 What are the cooling water / heat rejection requirements
  - What are the domestic water requirements
  - What are the drainage, floor drains, etc.
  - Control, monitoring, alarm requirements, filtration, redundancy
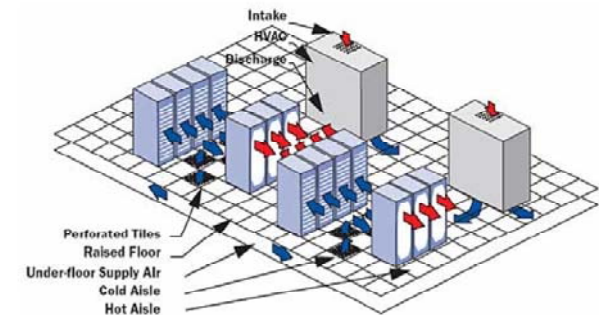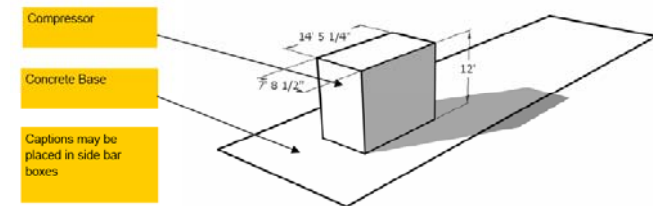
2.0 Equipment

- 2.8 What are the HVAC requirements
  - What are the temperature requirements?
  - What are the humidity requirements?
  - Stability requirements
  - Tolerances
- 2.9 What other utilities are required
- 2.10 What is the equipment layout
- 2.11 How do utilities enter and exit the building
- 2.12 Where do utilities go to and come from
- 2.13 What size are the utilities
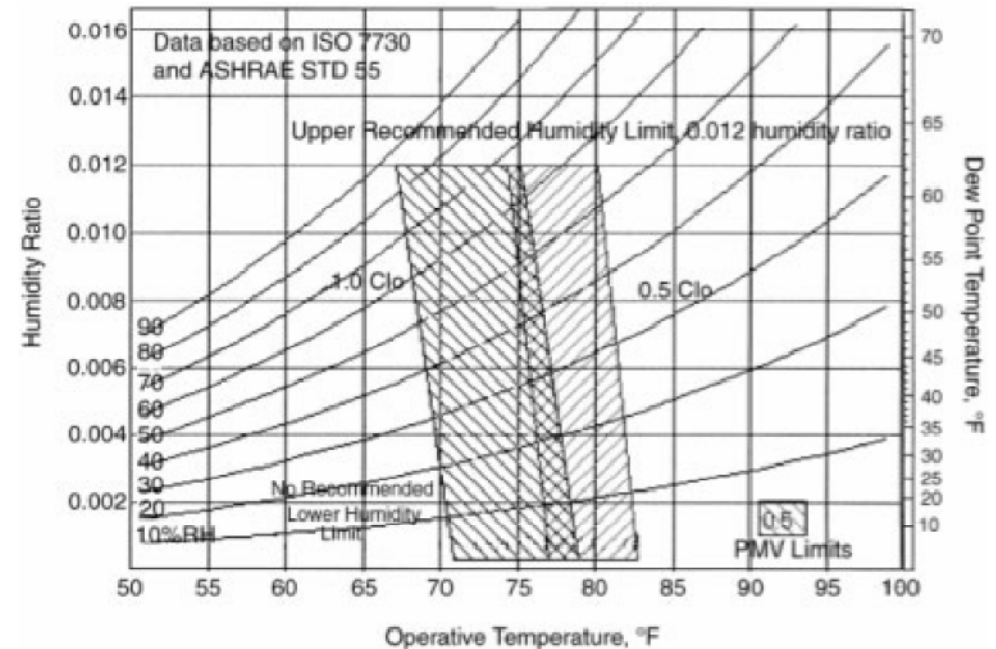
3.0 Utilities

- 3.0 What utilities are required to the building / site?
- 3.1 Distribution system: tunnel vs. surface
- 3.2 How do utilities enter and exit the building
- 3.3 Where do utilities go to and come from
- 3.4 What size are the utilities

4.0 People

- **4.1 How many people will occupy the building, how long and how often?**
  - How many during installation?
  - How many during operations?

- **4.2 What will they do?**
  - During Installation?
  - During Operations?

- **4.3 How much room will they need to do it?**
  - Nature of workspace: private office, tech space, shared area?

- **4.4. What support functions do they need?**
  - Lunch facilities
  - Toilet facilities
  - Mail receiving and pickup

- **4.5 Are they permanent or occasional occupants?**
  - Do they have workspaces elsewhere?

- **4.6 Activity burst capacity (during shutdown etc.)**

- **4.7 Additional Issues and Amenities**

5.0   Storage / Staging

- 5.1 What kind of staging areas are required during installation

- 5.2 What kind of permanent storage/staging is required for ongoing   operations

- 5.3 Is there a requirement for a crane? Or multiple cranes?
    - What capacity
    - What is the hook height?

6.0   RELATIONSHIPS WITH OTHER BUILDINGS

There are two primary purposes for this section in the programming documentation. The first is to The second purpose is to describe the relationship between the building described herein and the other building on the campus or in the project.
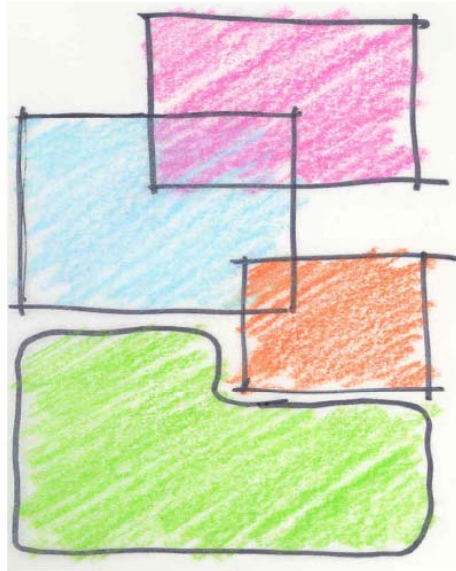
An example of a hand sketch done in pen and colored pencil. It can be scanned and included in the document. This may be a relationship diagram

6.0   Relationships with other buildings

- 6.1   What is the relationship between this building and other buildings
- 6.2   Is it part of a campus or is it a remote location
- 6.3   What are the relationships with a shaft?
- 6.4   What are the relationships with the tunnels
- 6.5   What is the relationship with the main campus
- 6.6   Are there any functions that can be off loaded to the main campus?

# 7.0   Interior Environment

- 7.1   What are HVAC requirements
- 7.2   What spaces need natural light or ventilation
- 7.3   What kind of lighting
- 7.4   Any clean room activities

8.0 Site and neighborhood / community issues

- 8.1 Where is this building to be located

- 8.2 What neighborhood implications
  - How many trucks per day during construction / installation
  - How many trucks per day during operations
  - What type of neighborhoods does truck traffic travel through?
  - What neighborhood impacts will this facility have?
  - What kind of noise and ongoing disruptions might impact immediate neighborhood
  - Any odors produced?
  - Any condensation plumes?
  - What kind of noise and ongoing disruptions might impact the access travel path

8.0 SITE AND NEIGHBORHOOD / COMMUNITY ISSUES

This section may include maps and other diagrams that illustrate site locations, road truck traffic patterns etc. The images shown here are from Google Earth. Large area photos as well as local area blowups may be included.
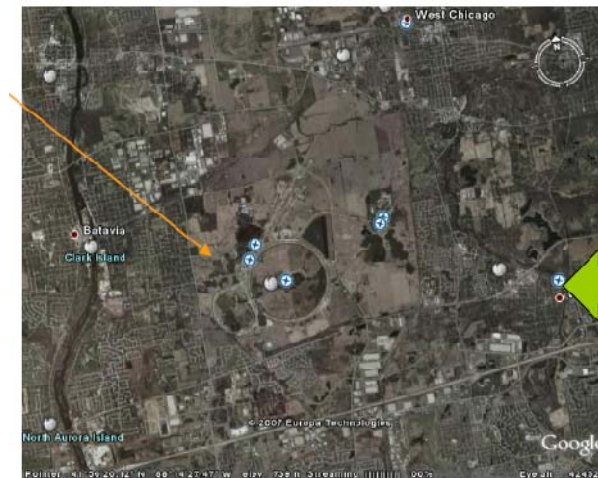
# 8.0 Site and neighborhood / community issues (cont'd)

- 8.3 How much staff parking is required?
- 8.4 How many trucks need to be accommodated?
- 8.5 What kind of truck docks and how many?
- 8.6 What will be the effect of activity bursts (like shutdowns)

9.0 Waste streams / Radiation issues

- 9.1 Any hazardous waste?
- 9.2 Any Radiation issues? Shielding, containment, monitoring

10.0 Green issues and ideas

Next Steps

- ## Derived from the Questionnaire, a Building Program Document will be created

  - This document will summarize all of the various user requirements into a narrative form

  - This document will include items like equipment requirements charts, equipment space diagrams, space bubble diagrams, etc.

  - This will document and organize all of the information required to move to the schematic designs phase

- ## Schematic Design Documents

  - These will consist of schematic floor plans of the individual buildings and sites that comprise the ILC surface construction.
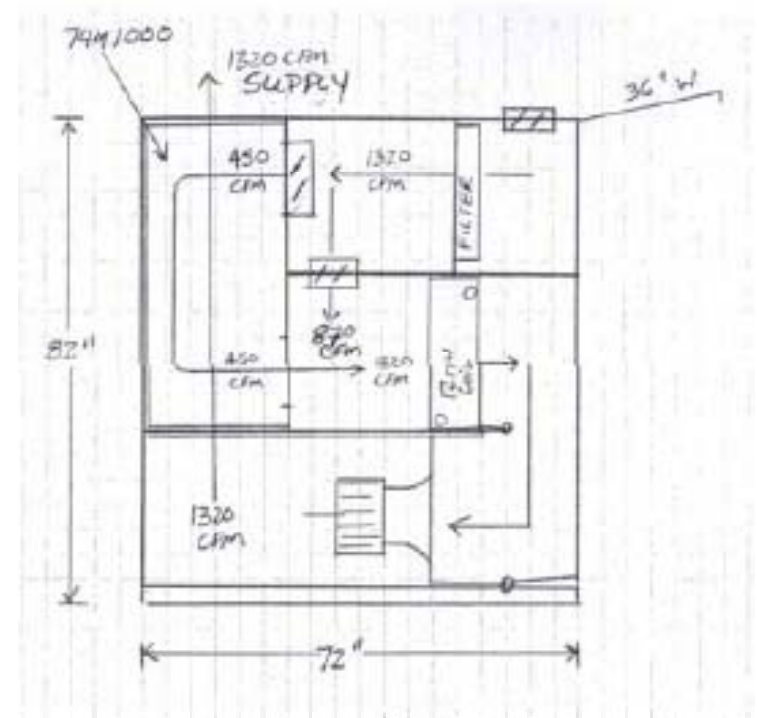
An example of a hand sketch done in pencil on graph paper, something that any engineer might develop. It can be scanned and included in the document. This may

Example of Cryo Building Layout
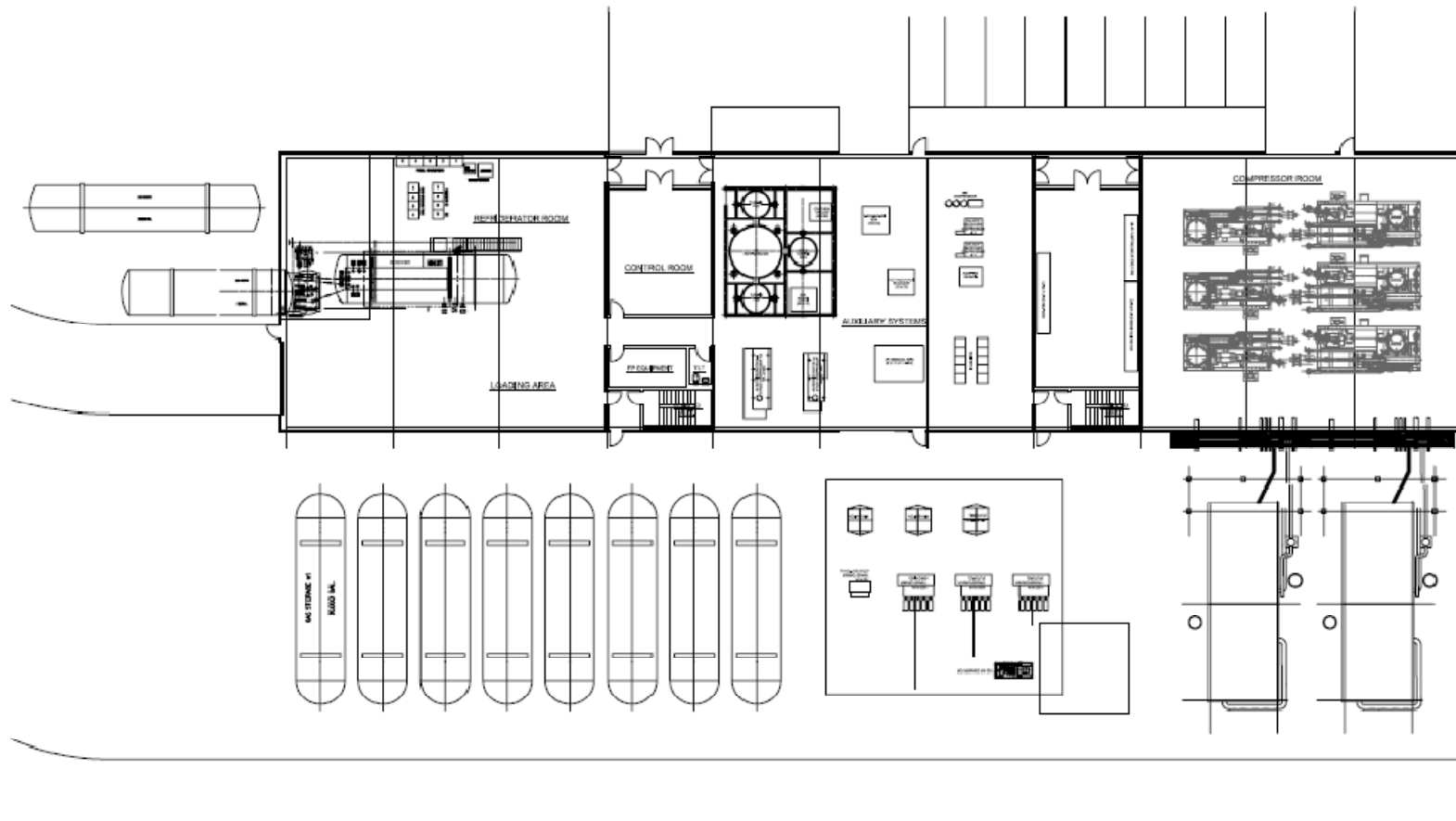
Design Process for Buildings

- Formalize process to gather criteria, document, develop schematic designs.

- Develop, using existing single points of contact, groups of stakeholders for Surface Building development. In my view we need to have a Architect on each of these teams.

- Develop work packages