National Science Foundation Ice Core Facility Current Status and Future Plans

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SPACE REQUIRED MID E-BAY for duplicate freezer 19554 sqft

FREEZER 141' 9" x 57' 8080 sqft

MACHINE ROOM 25'2" x 48'2" 1213 sqft

CURRENT SPACE OCCUPIED ~ 23000 square feet

LOADING DOCK
Main Storage
Inside Dimensions
96' L x 55' W x 12' H
5,280 sqft, 63,360 cuft
INCREASE EXAM ROOM SIZE BY REMOVING THE CLEAN ROOM AND WARM ROOM
Main Storage
Inside Dimensions
96' L x 55' W x 12' H
5,280 sqft, 63,360 cuft

= Storage Racks
= Core Tubes
over hang into aisle
= Wire mesh shelving around
roof support poles
= Roof support poles

CHANGE EXAM ROOM SIZE BY REMOVING THE CLEAN ROOM AND WARM ROOM AND INCREASING MAIN STORAGE SIZE BY MOVING MAIN STORAGE WALL TOWARDS EXAM RM AND DOCK 8'.
MAIN STORAGE

Main Storage
Inside Dimensions
96' L x 55' W x 12' H
5,280 sqft, 63,360 cuft

Dock
630 sqft
7560 cuft

Exam Room
1158 sqft,
13896 cuft

clean room
12' x 15' x 12',
186 sqft, 2600 cuft

Warm Room
15' x 16' x 12',
240 sqft, 2880 cuft

Machine room
Evaporators - No Storage

[Dimensions and layout details]
CHANGES TO MAIN STORAGE
1. REMOVE SUPPORT POLES
2. INSTALL ROLLER RACKING
3. REDUCE "FORKLIFT" AISLE
STORAGE IS INCREASED BY
80 ADDITIONAL RACKS X 153 5"
TUBES = 12240 TUBE SPACES

Main Storage
Inside Dimensions
96' L x 55' W x 12' H
5,280 sqft, 63,360 cuft

- Storage Racks
- Core Tubes
  over hang into aisle
CHANGES TO MAIN STORAGE
1. REMOVE SUPPORT POLES
2. INSTALL ROLLER RACKING
3. REDUCE "FORKLIFT" AISLE
4. MOVE WEST WALL WEST 8'
STORAGE IS INCREASED BY
104 ADDITIONAL 1M RACKS
X 153 (5" TUBES) = 15912 1M

Main Storage
Inside Dimensions
103' 8"L x 55' W x 12' H
5,701 sqft, 68,419 cuft

CHANGE EXAM ROOM SIZE BY
MOVING THE CLEAN ROOM AND
WARM ROOM AND INCREASING
MAIN STORAGE SIZE BY MOVING
MAIN STORAGE WALL TOWARDS
EXAM RM AND DOCK 8'.

= Storage Racks
= Core Tubes
over hang into aisle
The current mechanical system is run by 6 reciprocating compressors utilizing R22 (HCFC-22) refrigerant which must be replaced per the Montreal Protocol.

The new mechanical system is expected to be a CO2 based system, with a likely smaller footprint.

Overall expecting a more efficient and environmentally friendly system.
Requirements

- CO2 refrigerant system
- 100% redundancy on all critical systems
- Replace trailer with staff offices, scientist work area and dressing rooms
- Common area for meetings and tours with A/V
- WiFi and ethernet connectivity throughout common area
- Wireless connectivity in freezer for workstations to communicate to Database server
- Windows into all cold rooms (for safety)
- Entry vestibule external to the freezer envelope
- More power circuits in exam room
- 4 Power cord drops on their own circuits in center of exam room
- Incorporate present gas monitor or install new gas monitor for monitoring refrigerant gas and CO2, if refrigerant gas is CO2, also monitor O2 levels.
- Clean agent fire suppression system
- Clothing and Boot storage area
High Priority Requests

- NON-proprietary master refrigeration control system, PREFERABLY OPEN SOURCE
- Cold makeup air for exam room
- Greater than R50 insulation, the greater R value = lower operating costs
- Pressure venting of air inside the freezer envelope
- No roof support columns in the main storage to allow greater flexibility with rolling storage racks
- LED Lighting with commercially available replaceable components.
Desired Improvements

• Reduced noise levels in exam room
• Use waste heat for subfloor heating to prevent frost heave of warehouse floor
• Use the refrigeration plant to heat and cool “office/common use” area
• Do not include “deli” doors between exam room and main storage
• Shop area for minor fabrication and maintenance
Questions
RACK INFORMATION

141 racks for 1m core
48” wide x 36” deep x 10 feet tall

20 racks for 1.5m core:
48” wide x 54” deep x 10 feet high

Capacity per rack varies by tube diameter.
6” tubes = 14 tubes per shelf x 7 shelves = 98 tubes per rack
5.5” tubes = 16 tubes per shelf x 8 shelves = 120 tubes per rack
5” tubes = 18 tubes per shelf x 8 shelves = 153 tubes per rack
4” tubes = 22 tubes per shelf x 11 shelves = 231 tubes per rack